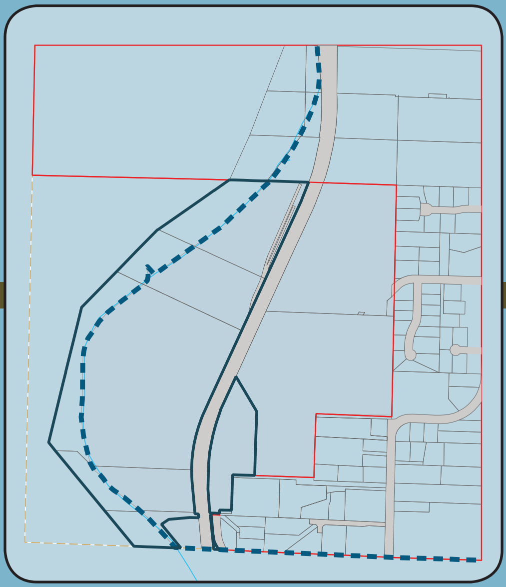

DRAFT

Supplemental Environmental Impact Statement

Final Docket XIII Comprehensive Plan Amendment - Paramount of Washington LLC ■ Snohomish County ■ February 2009

ICF Jones & Stokes
an ICF International Company

Draft Supplemental Environmental Impact Statement

Final Docket XIII Comprehensive Plan Amendment–Paramount of Washington LLC

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February 2009

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Acronyms

af	artificial fill
APE	Area of Potential Effects
BACT	Best Available Control Technology
bgs	below ground surface
BMPs	best management practices
BNSF	Burlington Northern Santa Fe
BP	before present
BTEX	benzene, toluene, ethyl-benzene, and xylenes
CAA	Clean Air Act
CAFE	Corporate Average Fuel Economy
CAPA	Critical Area Protection Area
CIPs	Capital Improvement Projects
CMZs	channel migration zones
CO	carbon monoxide
Corps	U.S. Army Corps of Engineers
County	Snohomish County
CPPs	Countywide Planning Policies
DAHP	Washington State Department of Archaeology and Historic Preservation
dB	decibels
dBA	A-weighted decibels
DNS	Determination of Nonsignificance
docket proposals	Snohomish County Final Docket XIII Comprehensive Plan Amendments
DPW	Department of Public Works
DS	Determination of Significance

DSL	digital subscriber line
E2AB/USN	estuarine intertidal aquatic bed/unconsolidated bottom
Ecology	Washington State Department of Ecology
EFH	essential fish habitat
EMTs	emergency medical technicians
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FLUM	Future Land Use Map
GHG	greenhouse gas
GMA	Growth Management Act
gpd	gallons per day
GPP	General Policy Plan
HI	Heavy Industrial
HPA	Hydraulic Project Approval
HSS	Highways of Statewide Significance
I-5	Interstate 5
IPCC	Intergovernmental Panel on Climate Change
ITE	Institute of Traffic Engineers
Leq	equivalent sound level
LOS	level of service
mgd	million gallons per day
MLLW	mean lower low water level
MR	Multiple Residential
MSA	Magnuson-Stevens Fisheries Conservation Act
MSV	maximum service volume

MTCA	Model Toxics Control Act
MUGA	Municipal Urban Growth Area
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFA	No Further Action
NGPA	Native Growth Protection Area
NMFS	National Marine Fisheries Service
NO2	nitrogen dioxide
NOC	Notice of Construction
NOx	nitrogen oxides
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
PAA	Potential Area of Annexation
Paramount	Paramount of Washington LLC
Pb	lead
PCB	Planned Community Business
PHS	Priority Habitats and Species
PM10	less than 10 micrometers in size
PM2.5	less than 2.5 micrometers in size
ppm	parts per million
ppt	parts per thousand
PSCAA	Puget Sound Clean Air Agency
PSE	Puget Sound Energy
PSRC	Puget Sound Regional Council

PUD	public utility district
Qpf	pre-Fraser deposits
Qva	advance outwash
Qvlc	by Lawton clay
Qvt	Vashon till
RCW	Revised Code of Washington
RWD	Ronald Wastewater District
SCC	Snohomish County Code
school district	Edmonds School District #15
Seattle	City of Seattle
SEIS	Supplemental Environmental Impact Statement
SEPA	State Environmental Policy Act
SHA	Site Hazard Assessment
Shoreline	City of Shoreline
SMAQMD	Sacramento Metropolitan Air Quality Management District
SMMP	Shoreline Management Master Program
SO2	sulfur dioxide
SPHs	floating separate-phase hydrocarbons
SR	State Route
SWFZ	South Whidbey Fault Zone
TMDL	Total Maximum Daily Load
TOD	Transit-Oriented Development
TPH-Gx	total petroleum hydrocarbons-gasoline
UC	Urban Center
UDC	Unified Development Code
UGA	Urban Growth Area

UI	Urban Industrial
uPa	micropascals
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
VCP	Voluntary Cleanup Program
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WISAARD	Washington Information System for Architectural and Archaeological Records Data
Woodway	Town of Woodway
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation
WUTC	Washington Utilities and Transportation Commission

Fact Sheet

Proposed Action:	Snohomish County Growth Management Act Comprehensive Plan Draft Supplemental Environmental Impact Statement for Docket XIII – Paramount of Washington LLC Proposal Annual amendments to the Snohomish County Growth Management Act (GMA) Comprehensive Plan are proposed in accordance with the provisions of the GMA and Snohomish County Code Title 30.74. This Draft Supplemental Environmental Impact Statement (SEIS) prepared for one of the Docket XIII amendments to the Snohomish County GMA Comprehensive Plan provides programmatic environmental review of one proposed site-specific nonproject amendment to the Future Land Use Map (FLUM) designation and associated rezone. In 2005, Snohomish County completed environmental review of the 10-year update to the Snohomish County GMA Comprehensive Plan. This document supplements the EIS prepared for the 10-Year update.
Action Sponsor:	Snohomish County
Lead Agency Responsible Official:	Craig R. Ladiser, Director Snohomish County Planning & Development Services M/S #604 3000 Rockefeller Avenue Everett, WA 98201-4201
Contact Person:	Steve Skorney, Project Manager Planning & Development Services Snohomish County E-Mail: steve.skorney@co.snohomish.wa.us Phone: 425-388-3311, Ext. 2207
Approvals Required:	Snohomish County Planning Commission – Recommendation Snohomish County Council -- Adoption
Date of Draft SEIS Issuance:	February 6, 2009
Date Draft SEIS Comments are Due:	March 23, 2009 Affected agencies, tribes, and members of the public are invited to comment on this Draft SEIS. Written comments must be postmarked or e-mailed by 5:00 p.m. March 23, 2009. Comments should be addressed to the Responsible Official at the Lead Agency address written above c/o Steve Skorney, project manager.
Public Hearing on Draft SEIS:	February 24, 2009
Projected Date of Issue of Final SEIS:	May 2009
Timing of Subsequent SEPA Review:	Project-level State Environmental Policy Act (SEPA) review will be conducted as appropriate project-level applications are submitted.
Location of Background and Supporting Documents:	Planning & Development Services Snohomish County 3000 Rockefeller Avenue Everett, WA 98201-4201

Document Availability:	This Draft SEIS for the Snohomish County GMA Comprehensive Plan is available online at: http://www1.co.snohomish.wa.us. In the search box type in the words "Docket XIII Paramount of Washington, LLC Draft SEIS." Hard copies or CDs of the Draft SEIS are available by contacting Planning & Development Services at 425-388-3670. A charge to cover costs of reproduction may be required.
Authors and Principal Contributors:	This Draft SEIS for the Snohomish County GMA Comprehensive Plan Docket XIII Amendment for the Paramount of Washington LLC site-specific request was prepared under the direction of the Snohomish County Planning and Development Services Department. Research, analysis and document preparation were performed by the following departments and firms: Snohomish County Planning and Development Services Snohomish County Public Works Department ICF Jones & Stokes 710 Second Avenue, Suite 550 Seattle, WA 98104 Golder Associates Inc. 18300 NE Union Hill Road, Suite 200 Redmond, WA 98052-3333 Fehr & Peers/Mirai 11410 NE 122nd Way, Suite 320 Kirkland, WA 98034-6927

Chapter 1. Summary

1.1. Proposal

Snohomish County (County) is proposing to adopt an amendment to its Growth Management Act (GMA) Comprehensive Plan (Snohomish County Final Docket XIII Comprehensive Plan Amendments) and an associated rezone that implements the amendment. This Draft Supplemental Environmental Impact Statement (SEIS) provides information, analysis, and mitigating measures relevant to one site-specific proposal, the Paramount of Washington, LLC (Paramount) site. Alternatives to the proposed amendment are also examined. The proposed amendment, if approved, would result in revisions to the associated GMA Comprehensive Plan Future Land Use Map (FLUM) and to the implementing zones.

Consistent with the requirements of the GMA, the County considers amendments to its GMA Comprehensive Plan on an annual basis through a process known as docketing. Through this process, the County accepts and evaluates applications from interested persons and agencies for amendments to the GMA Comprehensive Plan.

1.2. Environmental Review

The County completed an environmental review in 2005 with an Environmental Impact Statement (EIS) for the 10-Year Update of the GMA Comprehensive Plan. This Draft SEIS provides a qualitative analysis of the environmental impacts of the docket proposal.

The adoption of this docket proposal is classified under the State Environmental Policy Act (SEPA) as a non-project action. Consistent with SEPA, the County issued a Determination of Significance (DS), Adoption of Existing Environmental Documents, and Request for Comments on the Scope of the Draft SEIS for the proposed amendments on Docket XIII on November 14, 2007.

The analysis in this Draft SEIS is not intended to satisfy individual project action SEPA requirements such as the review required for future land use or building permit applications. Additional detailed environmental impact review of development proposals will occur as specific projects are proposed.

This Draft SEIS will be circulated for a 45-day public review period to invite written comments from the general public, tribes, permitting agencies, and agencies with jurisdiction over the areas where the Proposed Action has potential environmental impacts. A public hearing is planned for February 24, 2009, to receive verbal and written comments on the Proposed Action, No Action Alternative, and environmental review presented in this Draft SEIS.

A Final SEIS, which will provide responses to comments received during the Draft SEIS comment period, will be prepared following the close of the 45-day Draft SEIS comment period. Following completion of the Final SEIS, the Snohomish County Council will make its decision on Final Docket XIII. Snohomish County Council hearings will provide additional opportunities for public comment on Final Docket XIII.

1.3. Proposed Action, No Action Alternative, and Objectives

This Draft SEIS addresses one site-specific docket proposal to amend the GMA Comprehensive Plan FLUM. The objectives of the Proposed Action are listed below.

- Provide consistency with the GMA Comprehensive Plan elements, policies, and implementing regulations.
- Assure continued compliance with the GMA and Countywide Planning Policies (CPPs).
- Allow for a range of housing types affordable to different income levels.
- Provide for employment growth proportionate to population growth.

Table 1-1 summarizes the docket proposal and lists the elements of the environment that were addressed.

Table 1-1. Proposed Action and Scope of Environmental Review

Docket Proposal	Location	Proposed Action	Scope of Environmental Review in SEIS
Paramount of Washington LLC	Southwest border of Snohomish County abutting the Town of Woodway (Woodway) and City of Shoreline (Shoreline); at the northwest terminus of Richmond Beach Drive	Amend the GMA Comprehensive Plan FLUM from UI to UC and change the zoning from HI to PCB.	Earth; Surface Water; Wetlands; Fisheries; Wildlife and Vegetation; Air Quality; Noise; Cultural Resources; Aesthetics; Population, Employment, and Housing; Transportation; Public Services: Police and Fire Protection and Emergency Medical, Parks, Schools, Water Systems, Sanitary Sewer, Telecommunications, Solid Waste, Power and Natural Gas; Land and Shoreline Use; and Relationship to Plans and Policies

UI = Urban Industrial; UC = Urban Center; HI = Heavy Industrial; PCB = Planned Business Community

This Draft SEIS identifies and analyzes two alternatives: (1) Proposed Action, and (2) No Action Alternative. The No Action Alternative assumes that the individual docket proposal is not adopted and that the existing FLUM and zoning designation continue as under existing County plans and regulations.

1.4. Environmental Impacts and Proposed Mitigation Measures

1.4.1. Impact Analysis

Adoption of the docket proposal reviewed in this Draft SEIS would result in an amendment to the GMA Comprehensive Plan FLUM. This amendment and associated rezone would affect adopted plans and polices but, by themselves, would not have a direct impact on the environment. The amendment would have an indirect impact by changing the allowable uses and amount of potential development on the Paramount site. Future development allowed by this amendment could directly or indirectly affect surface water, wetlands, vegetation, groundwater, traffic, and utilities. Additional detailed environmental impact review of a site-specific development proposal would occur as specific projects are proposed (e.g., land use and building permit applications). A summary of impacts described in Chapter 3 for the docket proposal is included in Table 1-2, Summary of Impacts and Mitigation Measures.

1.4.2. Mitigation Measures

Development that may occur under the Proposed Action or under the No Action Alternative (which allows for some development potential under existing FLUM and zoning designations) may require mitigation to address specific environmental impacts. Specific impacts from future development would be assessed and the appropriate mitigation measures imposed through the County's SEPA authority or that of the local jurisdiction in the County to which a site may be annexed. Therefore, much of the discussion associated with mitigation is related to potential future development of the site as described in Chapter 3 and summarized below in the Summary of Impacts and Mitigation Measures (Table 1-2).

1.4.3. Significant Unavoidable Adverse Impacts

Conclusions as to whether there is a significant unavoidable adverse impact that cannot be mitigated are discussed in Chapter 3. Many of these conclusions contain assumptions about the ability to plan future development proposals in a way that would minimize impacts, or assumptions about how mitigation measures or existing regulations would be applied.

1.4.4. Summary of Impacts and Mitigation Measures

The full text of the Affected Environment, Impacts, and Mitigation Measures section of the Draft SEIS is presented in Chapter 3. Summary statements presented in Table 1-2 are considerably abbreviated from the full discussion in Chapter 3 and do not include explanations of terminology. Summary statements of the potential impacts also appear here in the absence of the context of existing environmental conditions (the Affected Environment discussion in Chapter 3). For those reasons, readers are encouraged to review the more comprehensive discussion of issues of interest in Chapter 3 to formulate the most accurate impression of impacts associated with the Proposed Action and No Action Alternative.

Table 1-2. Summary of Impacts and Mitigation Measures

	Proposed Action	No Action Alternative
Paramount of Washington LLC		
Future Land Use Map (FLUM) Designation	Urban Center (UC)	Urban Industrial (UI)
Earth		
Impacts	Earth and Critical Areas: No impacts are anticipated as a direct result of the Proposed Action. Soil and Groundwater Contamination: Shallow groundwater affected by volatile petroleum hydrocarbons presents the potential for contaminated soil vapors. Soil vapors with elevated levels of contamination could adversely affect the public by intruding into structures.	Earth and Critical Areas: If industrial activity includes the construction of additional structures, project-specific geotechnical and geologic analyses would be required to evaluate the impact of seismic, erosion, and settlement hazards. Soil and Groundwater Contamination: Under current U.S. Coast Guard Maritime Security (MARSEC) requirements, the site is secured, which prevents the public from exposure to on-site contamination. Under the No Action Alternative, Paramount would continue with the current remediation program being conducted under Ecology's Outfall 2 National Pollutant Discharge Elimination System (NPDES) permit. Should the Proposed Action be approved and development permitted, Paramount would cease the current petroleum operations. The site would be decommissioned and remediation activities would be accelerated (Huff per. comm. 2008).
Mitigation Measures	Soil and Groundwater Contamination ▪ Continue to implement the existing soil sampling program to identify and characterize the extent of soil contamination on the site. ▪ Develop a plan to remediate contamination identified by the soil sampling program. Depending on conditions encountered at the site, remediation methods such as excavation, segregation, and/or capping of affected soils may be necessary. ▪ Evaluate the potential for soil vapor intrusion associated with volatile contaminants such as benzene. ▪ Assess the need for an off-gassing or a subsurface vapor collection system. ▪ Continue operating the existing groundwater extraction and treatment system. Evaluate technologies to increase cleanup efficiencies.	
Unavoidable Adverse Impacts	Earth and Critical Areas: No impacts anticipated. Soil and Groundwater Contamination ▪ Significant potential for soil vapor emanating from subsurface contamination to concentrate over time thereby creating 'pockets' of trapped vapor contamination. ▪ Institutional Controls will likely be required to prevent future use of site groundwater for drinking water or irrigation purposes.	
Surface Water		
Impacts	▪ Future development could increase the amount of impervious surface on the site, increasing stormwater	The current petroleum-based operations would continue and could increase to the operation's capacity. The southern site

	Proposed Action	No Action Alternative
	runoff. ▪ Currently, more than half the site is impervious area. Required treatment standards that would be applied to future development are more efficient at pollutant removal than existing BMP's at the site. ▪ Future development in the portion of the site that is in a special flood hazard area would require flood-proofing of all new construction. ▪ It is likely that mitigation measures associated with development of the Proposed Action would lead to an overall improvement of surface water quality runoff from the site compared to existing conditions.	area could be developed with additional Urban Industrial uses. Only runoff from newly developed impervious surfaces would receive stormwater treatment.
Mitigation Measures	▪ Encourage the use of drainage systems that mimic natural drainage systems, such as vegetated swales, wet ponds, and created wetlands. ▪ Adopt more protective water quality standards, such as more protective requirements for water quality best management practices (BMPs). ▪ Reduce impervious surface area by adopting new development requirements that set maximum limits on the percentage of impervious area allowed and increase the infiltration of surface water (low impact development regulations). ▪ Implement stormwater quality monitoring to evaluate the effectiveness of stormwater practices and standards. ▪ Improvements to the constructed ditch along the north and eastern boundaries of the site to create a channel that mimics a natural creek. ▪ Removing the culvert that conveys the unnamed creek in the southern portion of the site, and restoring the natural channel through the site for that creek.	
Unavoidable Adverse Impacts	There would be no significant unavoidable adverse impacts on surface water related to the Proposed Action.	
Wetlands		
Impacts	Development within a wetland or buffer would result in the direct filling and subsequent loss of the resource. Development outside of wetlands and buffers could result in some indirect impacts on wetlands including sedimentation from stormwater runoff, increased nutrient loading from road and lawn runoff, changes in the amount or time water is in the wetland, and associated changes to wetland vegetation and habitat. Higher density development would also increase the probability of nonnative plant species invading wetland and buffer vegetation communities.	The effect of an increase in current operations on the site could result in an increase in impervious surfaces possibly leading to additional impact on the existing wetlands such as increased sedimentation from stormwater runoff, increased nutrient loading from road runoff, or changes in the amount or time water is in the wetland. Development in a wetland or buffer would result in the direct filling and subsequent loss of the resource. Under the No Action Alternative, the site may be used for petroleum product refining and distribution. In the past, refinery operation on the site has refined up to 5,000 barrels of petroleum per day. If this were to occur, it is likely that train traffic to the site would also increase.
Mitigation Measures	▪ Minimize impervious surface area. ▪ Schedule construction activities to occur during the dry season to reduce impacts on soils near wetlands and streams.	

	Proposed Action	No Action Alternative
	▪ Encourage increased infiltration of stormwater where technically feasible. ▪ Encourage buffer enhancement. ▪ Where protected stream and wetland buffers are in a degraded condition, encourage enhancement of the buffer through means such as establishment of native vegetation and control of nonnative invasive plant species.	
Unavoidable Adverse Impacts	If potential impacts on wetlands or buffers from future development of the site are avoided or mitigated, then no unavoidable adverse impacts are anticipated for this site. If wetland or buffer areas cannot be avoided or mitigated, then any future development would likely result in significant unavoidable adverse wetland impacts.	
Fisheries		
Impacts	The site is fully developed, and therefore currently has little or no functioning shoreline buffer along the majority of the shoreline. Maintaining the existing buffer in the current condition would not benefit the Puget Sound tidelands and marine habitat on and adjacent to the site.	Although state and federal regulations would continue to apply to industrial activities at the site, reducing the potential for spills, there would be a greater potential for fuel spills than under the Proposed Action.
Mitigation Measures	No mitigation measures for fisheries impacts would be required.	
Unavoidable Adverse Impacts	There are no significant unavoidable adverse impacts.	
Wildlife and Vegetation		
Impacts	Wildlife: If redevelopment to mixed use occurs, the increased level of human activity could reduce the potential for wildlife usage of the site, as wildlife may be disturbed by the human presence. Following redevelopment, noise levels on the site may be lower due to decreased industrial activity and train traffic to the site and increased vegetative cover that would provide some noise attenuation. Increased human activity along the shoreline may discourage use by bald eagles. If wetland buffers or shoreline setbacks are restored using native plant species, additional wildlife habitat would be created on site. Redevelopment could benefit critical habitat for southern resident killer whales by restoring a shoreline buffer, thereby incrementally improving water quality in the area. Vegetation: If the site were redeveloped for mixed use, it is expected that the tidal area would be accessible to more people and potentially impact marine vegetation.	Wildlife: The beach would remain restricted from public use and, therefore, human disturbance to wildlife would be less than what could occur under the Proposed Action. The site would continue to lack significant vegetation and so would lack habitat for most wildlife species. Vegetation: Beach access would remain restricted so the potential for impacts on marine vegetation would remain similar to current conditions.
Mitigation Measures	Wildlife: No mitigation measures for wildlife impacts would be required. Vegetation: No mitigation measures for vegetation impacts would be required.	
Unavoidable Adverse Impacts	Wildlife: There are no significant unavoidable adverse impacts. Vegetation: There are no significant unavoidable adverse impacts.	

	Proposed Action	No Action Alternative
Air Quality		
Impacts	Elimination of Current Industrial Emissions: Current industrial operations at the site would cease, therefore eliminating the considerable industrial emissions generated by those operations. Construction Emissions: Compliance with PSCAA regulations would prevent construction-related impacts on homes and businesses near the future construction sites. Local "Hot Spot" Air Quality Impacts from Increased Traffic at Local Intersections: It is unlikely that air quality impacts at local intersections would be significant. Emissions from Proposed New Commercial Operations: It is unlikely that new commercial operations would cause significant air quality issues, particularly when compared to the existing industrial operations they would replace. Emissions from Potential Sound Transit Commuter Rail Station: Implementation of current EPA emission control regulations for locomotives is expected to gradually reduce emission rates and ambient impacts. Greenhouse Gas Emissions: The Proposed Action could reduce regional greenhouse gas (GHG) emissions by roughly 8,883 metric tons CO2-equivalent per year compared to business as usual. The GHG emission reductions would beneficially contribute to the state's goal of reducing statewide GHG emissions to 50% below 1990 levels by 2050. The 8,883 metric tons per year reduction in the study area (compared to future business as usual) would be a relatively small fraction of the statewide reduction goal. Regardless, the reductions would incrementally assist in achieving the statewide goal.	Operations at the existing fuel terminal and asphalt plant at the site could be expected to expand. Air pollutant emissions would continue to be generated by the industrial operations. Emissions from the industrial operations sources would increase if current petroleum operations increase, or if rail traffic along the BNSF rail line increases. Train traffic on the BNSF rail line is forecast to increase its current volume of train crossings per day. The No Action Alternative would include restarting the petroleum refining operations at the 5,000 barrel per day capacity. This would generate additional marine terminal visits and haul truck traffic, with corresponding air emission increases.
Mitigation Measures	No mitigation measures for air quality impacts would be required. The County should require all construction contractors to implement air quality control plans for construction activities in the study area as part of plan features of the Proposed Alternative. Supplemental Construction Emission Reduction Measures include: ▪ Use water sprays or other non-toxic dust control methods on unpaved roadways. ▪ Minimize vehicle speed while traveling on unpaved surfaces. ▪ Prevent track-out of mud onto public streets. ▪ Cover soil piles when practical. ▪ Minimize work during periods of high winds when practical.	

	Proposed Action	No Action Alternative
	Measures to minimize air quality and odor issues caused by tailpipe emissions include: ▪ Locate stationary engines as far as practical from sensitive receptors. ▪ Maintain the engines of construction equipment according to manufacturers' specifications. ▪ Minimize idling of equipment while the equipment is not in use. Washington State Department of Ecology (Ecology) will likely implement GHG reduction requirements for new developments. Although the exact measures that will be required by Ecology cannot be forecast at this time, GHG emission reductions could be provided by using prudent building design and construction methods to use recycled construction materials, reduce space heating and electricity usage, and reduce water consumption and waste generation.	
Unavoidable Adverse Impacts	Neither the Proposed Action nor the No Action Alternative would cause significant air quality impacts.	
Noise		
Impacts	Construction Noise: Affected residences could include existing homes on the hillside overlooking the site, or future new dwellings on the site close to other Paramount buildings under construction. Daytime construction activity could cause annoyance and speech interference at outdoor locations adjacent to the construction sites, and could cause discernible noise for several blocks away from the site. Compliance with County nighttime noise ordinance limits would ensure nighttime construction activity would not cause significant impacts. Noise from Increased Traffic on Local Streets: All of the forecast traffic noise increases along each representative roadway segment are lower than Washington State Department of Transportation's (WSDOT's) "substantial increase" criterion of 10 A-weighted decibels (dBA). Therefore, this impact is not expected to be significant. Noise from New Commercial Operations in Redeveloped Paramount Parcel: Depending on the nature of the proposed development, the County may require the developer to conduct a noise impact study to forecast future noise levels, and to specify appropriate noise control measures. Compliance with the noise ordinance would ensure this potential impact would not be significant. Noise from Potential Sound Transit Commuter Rail Station: Future noise levels generated by low-speed operations at the commuter station would likely be lower than the current noise levels generated by high-speed commuter trains traveling past the site. Therefore, operation of a new commuter train station could	Under the No Action Alternative, noise emissions would increase if current petroleum operations increase, or if rail traffic along the BNSF rail line increases. Train traffic on the BNSF rail line is forecast to increase from its current volume of 40 train crossings per day up to 75 per day. Current industrial operations on site are equipped to refine up to 5,000 barrels per day of petroleum, although those refining operations are currently dormant. The No Action Alternative would include restarting the petroleum refining operations at the 5,000 barrel per day capacity. This would generate additional marine terminal visits and haul truck traffic, with corresponding noise emission increases.

	Proposed Action	No Action Alternative
	reduce overall train noise levels on the site compared to the No Action Alternative, so this impact would not be significant.	
Mitigation Measures	No mitigation measures for noise impacts would be required. County could require all future construction contractors within the proposed developments abide by supplemental construction noise reduction measures, including: ▪ Construction at night or on weekends could be prohibited, unless special dispensation was obtained from the County. ▪ Use of impact equipment should be discouraged before 8:00 a.m. and after 6:00 p.m. ▪ Loud, stationary equipment should be located as far as practical from noise-sensitive receivers. ▪ Idling trucks should be parked as far as practical from noise-sensitive receivers, and shut off when not active for long periods of time. ▪ Contractors should be discouraged from dropping pallets onto the ground, or from dragging steel items across pavement. ▪ Contractors should be required to give their employees “noise awareness training” to be aware of noise concerns at nearby homes and businesses.	
Unavoidable Adverse Impacts	Neither the Proposed Action nor the No Action Alternative would cause significant noise impacts.	
Cultural Resources		
Impacts	There are currently no cultural resources known to exist in or on the site, and therefore development activities under the Proposed Action would result in no impacts on cultural resources.	There are currently no cultural resources known to exist in or on the site, and therefore development activities under the No Action Alternative would result in no impacts on cultural resources.
Mitigation Measures	▪ An archaeological survey and testing is recommended for projects that involve significant excavation or changes vegetation and landforms. ▪ In the event that future development is proposed, it is recommended that an environmental review be conducted. If the project would disturb an archaeological resource, it is recommended that the County impose any and all measures to avoid or substantially lessen the impact. If avoidance of the archaeological resource is not possible, an appropriate research design must be developed and implemented with full data recovery of the archaeological resource prior to the development project.	
Unavoidable Adverse Impacts	No significant unavoidable adverse impacts are anticipated.	
Aesthetics		
Impacts	Visual Character: No significant adverse impacts are anticipated. Height and Bulk: Proposed Action has the potential to generate an increase in height and bulk over the No Action Alternative. Project-level review would be required to determine the exact height and bulk impacts. Light and Glare: The commercial component of the Proposed Action has the potential to significantly increase the amount of generated light and glare. Views: The exact extent of view impacts cannot be analyzed as no architectural	Visual Character: The development would already be allowed under the current land use designation and zoning regulations, yet it would represent an increase over existing conditions and has the potential to create impacts on visual character. Height and Bulk: No Action Alternative would entail an expansion of industrial uses to cover a greater portion of the site, thus increasing overall height and bulk. Light and Glare: The No Action Alternative has the potential to increase ambient light and glare in the vicinity. Views: Additional construction of industrial

	Proposed Action	No Action Alternative
	plans or design specifications have been submitted. Project-level design review by the County would be required to determine the exact view impacts.	facilities on the southern portion of the lowland area could potentially further disrupt views from the site. Off-site views of Puget Sound could potentially be affected. Expansion of development onto the currently open southern portion of the lowland area could potentially disrupt views from existing development located south of the Paramount site.
Mitigation Measures	▪ Regulations specify that exterior illumination and lighted signs shall be hooded and/or shielded to prevent glare. ▪ Signs in the Planned Community Business (PCB) zone shall not employ animations, sounds, rotation or illumination by any flashing type of light. ▪ Future development may require mitigation measures to address potential impacts on the built environment, particularly with regard to height, bulk, and views. Future impacts would be analyzed and applied under the County's SEPA review process at the time of application.	
Unavoidable Adverse Impacts	Potential exists for future development under the Proposed Action to result in adverse impacts. With the application of regulations, no significant unavoidable adverse impacts on aesthetics are anticipated, but project-level design review would be necessary to identify impacts and assign mitigation measures.	
Population/Employment/Housing		
Impacts	The added population in the Municipal Urban Growth Area (MUGA) under the Proposed Action would allow more than ample capacity to meet the MGUA population target. The added 800 jobs would exceed the MUGA job target. Shoreline appears to have excess job capacity for its King County employment targets, and if the site were part of Shoreline, the Proposed Action would increase the excess employment capacity.	The No Action Alternative is expected to increase employment. This would assist Woodway and the County in achieving the 620 job target and, similar to current circumstances, the excess employment capacity in the overall southwest Urban Growth Area (UGA) would help ameliorate the difference between job capacity and target. Shoreline has excess capacity to meet its employment target. If the Paramount site were part of Shoreline, the proposed No Action Alternative job capacity would increase the surplus capacity.
Mitigation Measures	Mitigation measures are not required in terms of population, employment, or housing impacts by themselves. Increases in population, employment, and housing do not conflict with growth targets. Development allowed under the Proposed Action or No Action Alternative may require mitigation to address potential impacts on the built and natural environments at both a non-project level as well as at the time a site-specific application is considered.	
Unavoidable Adverse Impacts	While employment will likely increase under the No Action Alternative, the increase would be much greater under the Proposed Action. The Proposed Action would also increase population and housing. Additional development and redevelopment of the Paramount site may result in secondary impacts on the natural and built environment and on the demand for public services.	
Transportation		
Impacts	Land Use and Trip Generation: Commercial development generally tends to result in higher trip generation than residential development, for the same geographical area.	Land Use and Trip Generation: Land use under the No Action Alternative is projected to continue as Heavy Industrial (HI), consistent with the County's current

	Proposed Action	No Action Alternative
	Modal Split Assumptions: It is expected that at full build-out, the site would have sufficient density to support transit routes to and from the site. **Intersection Operations:** The Proposed Action would increase traffic volumes by greater than 50% at six intersections. **Intersection LOS** analysis reports for 2025 Proposed Action conditions indicate that operations at the ten intersections projected to exceed LOS standards under the No Action Alternative are expected to degrade further under the Proposed Action. In addition, four intersections projected to meet standards under No Action, are expected to exceed standards under the Proposed Action. **Roadway Segment Operations:** The Proposed Action would increase traffic volumes on four roadway segments by greater than 50% as compared to the peak hour volumes under the No Action Alternative. **Site-generated PM peak** hour volumes are projected to exceed operational capacity on two roadway segments under Proposed Action conditions. In addition to the nine road segments identified under the No Action Alternative that include intersections projected to exceed standards, three segments include intersections that exceed standards under the Proposed Action. **Traffic Circulation:** ▪ As Richmond Beach Drive would provide the only access into and out of the site, all projected trips would travel on this roadway, so volumes are expected to increase substantially. ▪ The majority of traffic generated under the Proposed Action is expected to travel NW 196th Street/NW 195th Street/Richmond Beach Road/N 185th Street. ▪ A moderate amount of project-generated traffic is expected to travel on the primary north–south roads between Richmond Beach Road and SR 104. Increases are expected to occur along the 20th Avenue N/Timber Lane/Woodway Park Road corridor, but the total resulting volumes are not expected to be very high. Impacts are identified along this roadway because they exceed the adopted Woodway standard of LOS A. Moderate increases in traffic volumes are also expected along the 8th Avenue NW/100th Avenue W corridor. ▪ The projected increase in traffic under	FLUM. **Intersection Operations:** Ten of the 23 analysis intersections are expected to operate below applicable level of service (LOS) standards during one or both of the peak hours. The intersection located in Woodway is projected to operate at LOS B, which exceeds Woodway's adopted standard of LOS A, and thus is considered an impact. **Roadway Segment Operations:** Though no roadways are projected to carry volumes that exceed their estimated operational capacities, nine road segments include intersections projected to exceed applicable LOS standards, which, in turn would affect overall operations along the roadway.

	Proposed Action	No Action Alternative
	the Proposed Action would be expected to increase the potential for cut-through traffic on NW 190th Street, and thus is considered a potential impact. ▪ No other major paths are projected for traffic generated under the Proposed Action, although localized increases in traffic have been projected at other analysis locations.	
Mitigation Measures	Roadway Improvement Projects: Roadway improvement projects have been identified at any location at which a potential significant impact on roadway operations has been identified. Capacity mitigation projects include changes in traffic controls (such as upgrade from stop control to a traffic signal) or increases to the capacity of an intersection or roadway segment; and may involve multiple jurisdictions. See Table 3.11-16. Other Potential Mitigation Considered: ▪ A second access road between the proposal site and adjacent roadway system at NW 205th Street could possibly serve to remove some of the additional demand that is projected on the NW 196th Street/Richmond Beach Road corridor as a result of the Proposed Action. ▪ It is possible that future enhanced transit service between the site and other regional destinations could reduce some of the additional capacity needed as a result of additional development at the proposal site. Planning-Level Cost of Capacity Improvements: Under the GMA, local jurisdictions can require new development to pay the costs of improvements that are triggered by that development, as a condition of development approval. See Table 3.11-19 for planning-level cost estimates developed for the capacity mitigation projects.	
Unavoidable Adverse Impacts	Adoption of the proposed zoning would be expected to result in increased traffic in the vicinity of the proposal site. Although the effects of additional vehicles on traffic congestion can be mitigated to varying degrees through the recommended transportation improvements, the actual increase in traffic is considered a significant unavoidable adverse impact.	
Police and Fire Protection and Emergency Medical		
Impacts	Police: Introduction of a concentration of residential and employment uses in the vicinity of the Paramount site would result in an increase in demand for police protection. This increase would require additional patrols and more police officers than are currently assigned to the site. Fire: Currently, the Paramount site is not within the boundaries of any municipal or rural fire districts. Paramount contracts with the Shoreline Fire Department. Construction of the commercial and residential development would generate even greater demand for fire protection and emergency medical services than under the No Action Alternative.	Police: No population increase would occur, but employment on site could experience a slight increase over existing conditions. This additional demand is minimal; however, and no significant impacts on police protection services are anticipated. Fire: Because of the anticipated increase in fuel storage and distribution operations on site, the No Action Alternative is likely to generate an increased demand for fire protection services.
Mitigation Measures	Police: If the Proposed Action is implemented, the developer must coordinate with the Snohomish County Sheriff's Office to determine the necessity of additional officers and patrols. Fire: The County should assign the Paramount site to one of the rural fire districts to ensure the availability of adequate fire protection and emergency medical services, both	

	Proposed Action	No Action Alternative
	for residential emergencies and hazardous materials incidents. Alternatively, the current agreement with the Shoreline Fire Department could be extended.	
Unavoidable Adverse Impacts	Over time, population growth and development will continue to increase the need for police and fire and emergency medical services under either alternative.	
Parks		
Impacts	The increase in population would generate additional demand for parks and recreation facilities in the area. While this population increase is below the level of service threshold for requiring an additional community park, given the general lack of recreational opportunities in the immediate vicinity, it is likely that a perceived impact on parks and recreation facilities would occur.	No additional demand for parks and recreation facilities would be generated.
Mitigation Measures	▪ Development impact fees and related park dedication requirements proportionate to the size of the proposed development would be required. ▪ Future development should also include parks and/or open space dedication as integral parts of the urban center design, and the Snohomish County Parks Department should be consulted during the design process. Additional parks and open space dedications may be made in lieu of impact fees.	
Unavoidable Adverse Impacts	With mitigation, no significant unavoidable adverse impacts on parks are anticipated.	
Schools		
Impacts	The increased population of the school district would contribute to an overall increase in demand for education services, and would likely require use of portable structures.	No additional demand for school facilities would occur.
Mitigation Measures	The localized increase in demand for educational services could be partially alleviated through the use of portable structures, though this does not represent a permanent solution. The school district does not currently collect impact fees; however, the County should coordinate with the district to ensure that future development is included in capital facilities planning efforts and identify potential funding measures for necessary improvements, including collection of impacts fees.	
Unavoidable Adverse Impacts	With mitigation, no significant unavoidable adverse impacts on schools are anticipated.	
Water Systems		
Impacts	Development has the potential to generate significant impacts on water distribution through the introduction of a concentrated residential population and commercial area. Projections of future population and water demand assume approximately 77.3 gallons per capita per day (gpcd) of residential water consumption. Based on a potential population of 6,442, the Proposed Action could generate an additional demand for 0.50 million gallons per day (mgd). Potential commercial demand is difficult to determine with current	The No Action Alternative has the potential to result in a slight increase in water demand. Project-level review would be required to determine precise potable water and fire-flow requirements for any new development.

	Proposed Action	No Action Alternative
	information. The proposed high-density residential, commercial, and office uses would have significantly higher fire flow and storage requirements. Project-level review would be required to determine precise water demand and cost of infrastructure extension.	
Mitigation Measures	If the Proposed Action is implemented, the Olympic View Water and Sewer District (District) would be made aware of the change in land use designation so that it may plan accordingly. Residential development would require extension of services to the site, as well as possible system upgrades to meet fire flow and storage requirements. Future development would require coordination with the County and the District to determine project-level infrastructure needs and identify necessary upgrades and appropriate mitigation measures.	
Unavoidable Adverse Impacts	Implementation of the Proposed Action would result in an overall increase in water consumption and a greater need for water distribution infrastructure to serve the site.	
Sanitary Sewer Systems		
Impacts	The Proposed Action would result in significant impacts on wastewater service. The increased density could generate peak flows of up to 2.2 mgd. Commercial development (assuming 20 gpcd) could generate an additional 17,920 gpd. Demand for wastewater transmission and treatment would exceed the capacity of both existing infrastructure and currently planned capital improvements.	Pipeline improvements and lift station upgrades planned by Ronald Wastewater District (RWD) have been designed to accommodate residential densities and would be more than adequate to handle flows from the increased employment under the No Action Alternative. With implementation of these capital improvements, no significant impacts on wastewater service are anticipated.
Mitigation Measures	▪ Residential development would require the extension of sanitary sewer services and connection to existing infrastructure. ▪ Measures could include preparation of a pre-design study by the developer or a designated consultant, construction and dedication of the necessary infrastructure, or payment of impact fees to the RWD to defray the costs of construction. ▪ The project proponent indicated that future development will incorporate green technologies intended to reduce wastewater volumes and the amount of land required for wastewater treatment. Specific methods and technologies would be evaluated during project-level review.	
Unavoidable Adverse Impacts	With implementation of appropriate mitigation measures, no significant unavoidable adverse impacts on sanitary sewer are anticipated.	
Telecommunications		
Impacts	A new, concentrated residential population would generate additional demand for telecommunication services, particularly telephone and cable; additional demand for wireless communication in the area could be satisfied without construction of project-specific infrastructure. Development would require extension of additional telephone lines and television/data cables throughout the site.	No impacts on telecommunications are anticipated.
Mitigation Measures	Developers and property owners would be required to coordinate with service providers	

	Proposed Action	No Action Alternative
	to ensure that adequate services are available at the site.	
Unavoidable Adverse Impacts	With mitigation, no significant unavoidable adverse impacts on telecommunications are anticipated.	
Solid Waste		
Impacts	The residential component could generate over 4,500 tons of solid waste per year. The Roosevelt Regional Landfill has substantial unused storage capacity to meet this demand, and solid waste collection service would be contracted individually by each property owner/manager. No significant impacts on solid waste service are anticipated.	No significant impacts on solid waste collection and disposal are anticipated.
Mitigation Measures	None required.	
Unavoidable Adverse Impacts	While adequate capacity exists for disposal of solid waste generated at the Paramount site, the Proposed Action would still result in an overall increase in generation of solid waste in the County.	
Power and Natural Gas		
Impacts	Power: Conversion of the site for residential and commercial activity is unlikely to generate a significant increase in electrical demand when compared to regional capacity. Natural gas service is not considered necessary to support development; therefore, Puget Sound Energy would not be required to extend service into areas where it does not currently have infrastructure.	No significant power impacts are anticipated.
Mitigation Measures	Future development on the site would undergo project-level review to determine precise power and natural gas consumption and infrastructure requirements and any applicable impact fees.	
Unavoidable Adverse Impacts	While mitigation is anticipated to reduce impacts to less than significant levels, construction of the project would still result in an overall increase in demand for electric and natural gas infrastructure and, possibly, natural gas consumption.	
Land Use		
Impacts	Displacement: Land zoned and used for industrial purposes would be lost. Compatibility of Use: If the area were to be developed piecemeal, there would be potential incompatibilities between new residential development and existing industrial facilities. However, as it is the intent of the property owner to redevelop the site as a whole, no industrial uses would remain to conflict with the new mixed-use development. The uses proposed would be more compatible with surrounding development than the industrial uses currently on the site.	Displacement: No land uses would be introduced or displaced from the area, but the Paramount site could be expected to undergo additional industrial development to maximize the capacity of the facility. Compatibility of Use: Expanded industrial uses would remain incompatible with surrounding development, which is entirely residential in nature. Intensity and Activity Levels: The primary impact on surrounding development would be additional daily truck trips to and from the site. As such, the increase in activity levels would be felt

	Proposed Action	No Action Alternative
	Intensity and Activity Levels: The presence of high-density residential and commercial uses in close proximity could adversely affect low-density residential uses by creating increased noise, light and glare, and traffic congestion in the area. Indirect Impacts: The County, Woodway, and Shoreline may experience increases in requests for rezoning.	most acutely by residents in Shoreline. Indirect Impacts: None.
Mitigation Measures	▪ Implementation of traffic calming and noise abatement measures as a condition of development permit approval to reduce vehicular impacts on nearby residential development. ▪ Establishment of a medium-density transitional area surrounding the urban center to provide a buffer between high and low densities. ▪ Application of design standards or design review to minimize design incompatibilities with surrounding uses.	
Unavoidable Adverse Impacts	The Proposed Action represents a long-term change of land use for the site and a permanent loss of waterfront industrial property.	
Shoreline Use		
Impacts	Compatibility of Use: The mixed-use nature of the proposed development would be likely to result in use of the shoreline area for recreation or residential uses, as opposed to industrial use. Residential and recreational uses would be more compatible with the ecological restoration objectives of the adjacent Woodway Urban Conservancy designation. Intensity and Activity Levels: As shoreline access is a popular residential amenity, the increased population of the area has the potential to generate additional usage of the area by residents. Indirect Impacts: use of the property is anticipated to transition away from its current industrial function. Loss of this waterfront industrial property could potentially create additional demand for such facilities elsewhere, such as in the Urban shoreline zone of nearby Shoreline.	Compatibility of Use: Existing use is not compatible with Woodway's shoreline regulations, which prohibit industrial uses in nearby shoreline areas. Intensity and Activity Levels: The No Action Alternative is anticipated to increase both intensity and activity levels in the shoreline environment. Indirect Impacts: No indirect impacts on shoreline use patterns are anticipated.
Mitigation Measures	Locating higher-intensity shoreline uses away from the northern edge of the Paramount site, which borders Woodway's Urban Conservancy designation. Higher intensity uses should be located near the southern portion of the site, which borders Shoreline's Urban designation.	
Unavoidable Adverse Impacts	There are no significant unavoidable adverse impacts to shoreline use patterns.	
Relationship to Plans and Policies		
Impacts	Affected Plans and Policies Snohomish County Shoreline Management Master Program (SMMP): ▪ The Proposed Action is consistent with the SMMP.	Since there would be no change to the relationship to plans and policies, the No Action Alternative was not considered in this chapter.

	Proposed Action	No Action Alternative
	General Policy Plan: ▪ The Proposed Action would make the existing industrial site eligible for redevelopment and intensification as an urban center and is, therefore, consistent with LU Policy 2.B.1. ▪ The Proposed Action is consistent with LU Policy 2.B.2. The Proposed Action would allow the development of a new urban center which would accommodate new commercial development and is adjacent to a designated commuter rail corridor. Sound Transit, the regional transit agency, has previously listed the adjacent Richmond Beach community as a potential site for a Sounder commuter rail station. ▪ The Paramount site under the Proposed Action meets the locational criteria for the siting of an urban center. Because this is a non-project Draft SEIS and there is no site-specific proposal, it is not possible to evaluate all criteria at this time. The Proposed Action is generally consistent with LU Policy 3.A.2. ▪ The Paramount site is located adjacent to a regional high-capacity transit route, Sounder commuter rail. The Proposed Action is consistent with LU Policy 3.A.3. ▪ The Proposed Action includes densities greater than 12 dwelling units per acre and, therefore, is consistent with LU Policy 3.A.4. ▪ The Paramount site is not listed as one of the designated urban centers on the FLUM in LU Policy 3.A.5. However, the Proposed Action would result in an additional urban center location on the FLUM in the comprehensive plan; therefore, the Proposed Action is consistent with LU Policy 3.A.5. ▪ The Proposed Action will be implemented through the UCDP regulations in SCC Chapter 30.34A and therefore is consistent with LU Policy 3.A.6. ▪ The policy appears to require permit-level studies addressing all permitting considerations before considering redesignation of the Paramount site to UC. It is difficult at the programmatic/non-project level to determine “all permitting considerations” when an actual	

	Proposed Action	No Action Alternative
	proposal has not been submitted. As the policy is not clear and since the level of study regarding permitting considerations would not be required until the development proposal application, the Proposed Action may not be consistent with LU Policy 5.B.12. ▪ The Proposed Action would allow development of high density residential units, which would add to the range of housing types available in the urban area. It is consistent with Objective HO 1.B. ▪ The Proposed Action would rezone the site to Planned Community Business (PCB) which is the only implementing zoning designation for the UC land use designation. The PCB zoning designation allows for high-density residential and mixed use development in an existing urban growth area. The Proposed Action is consistent with Objective HO 1.D. ▪ The Proposed Action would allow redevelopment of an unincorporated "island" between Woodway and Shoreline. It is consistent with Policy HO 1.D.3. ▪ The redesignation from UI to UC allows for housing in a mixed-use development; therefore, the Proposed Action is consistent with Policy HO 1.D.4. Countywide Planning Policies (CPPs): ▪ Redesignation of this site would allow mixed use development and would provide additional capacity for population in the SW UGA. The Proposed Action would also increase employment on the site, adding to the current employment capacity. The residential densities and employment capacity projected in the Proposed Action description would support transit services; therefore the Proposed Action is consistent with Policy UG-8. ▪ The Proposed Action would use land efficiently in the SW UGA consistent with this policy. The time needed for the conversion of the subject properties from an industrial use to a mixed-use development will allow time for coordination of capital facilities and the extension of urban services to accommodate the projected population and employment capacity. Therefore, the Proposed Action is consistent with	

	Proposed Action	No Action Alternative
	Policy OD-1. ▪ This policy is about "encouraging policies" so is not directly related to the Proposed Action. However, if the Proposed Action were approved as outlined in the project description, it would provide jobs and housing on the site, therefore, providing consistency with Policy OD-8. Annexation Jurisdiction Both Woodway and Shoreline policies indicate the potential to annex the Point Wells site. To achieve consistency, the County, Woodway, and Shoreline should enter into conversation for the purpose of agreement and amendment of each jurisdiction's respective policies so that all reflect the same vision for jurisdictional boundaries. Woodway Shoreline Master Plan: ▪ Since the Proposed Action is a programmatic/non-project action, application of these policies is appropriate at the time of development review. Woodway Comprehensive 2004 Plan Update – Land Use Goals and Policies: ▪ Policies LUG-9 and LUG-10 call for coordination among jurisdictions to implement the land use plan and to prepare regulations to effectively implement development on the Point Wells site. The Proposed Action is being reviewed through the County's docket process which requires early and continuous public notice and participation including the involvement of property owners and other affected and interested individuals, tribes, cities, utility districts, businesses, and other organizations and government agencies. ▪ Adequate urban-level public facilities and services exist to support the Proposed Action; therefore it is consistent with LUP-1. ▪ The Proposed Action would allow higher density residential development than that found in surrounding residential uses and is supported by adequate levels of public facilities and services. Impacts on traffic and the natural environment are analyzed in this Draft SEIS; therefore the Proposed Action is consistent with LUP-4. ▪ Regarding LUP-18, at this time, policies in the Woodway Comprehensive Plan	

	Proposed Action	No Action Alternative
	relating to Point Wells have not been adopted by the County. ▪ Regarding LUP-19, at this time, an interlocal agreement with Woodway has not been adopted by the County. ▪ The Proposed Action relates to only the waterfront area and a portion of land situated east of and adjacent to the BNSF railroad tracks and existing overpass. As the Proposed Action is requesting a change from industrial, it would not be consistent with LUP-20. ▪ As the Proposed Action is requesting a change from industrial, it would not be consistent with LUP-21. ▪ There is not enough information available to determine if the Proposed Action would be consistent with LUP-27. Woodway Comprehensive 2004 Plan Update–Transportation Goals and Policies: ▪ Coordinated planning has not occurred yet, thus the Proposed Action is partially consistent with TP-3. Woodway Comprehensive 2004 Plan Update–Point Wells Land Use: ▪ Although there is some inconsistency within the Subarea Plan, it appears the Proposed Action would not be consistent with the Point Wells Subarea Plan. City of Shoreline Shoreline Management Master Program: ▪ There is not enough information at this point to determine if the Proposed Action would be entirely consistent with Shoreline's SMMP goals and policies. City of Shoreline Comprehensive Plan–Land Use Goals and Policies: ▪ Regarding LU-17, there is not enough information to determine if the development allowed under the Proposed Action would be consistent with all criteria of the Mixed Use designation. ▪ The Proposed Action is consistent, to date, with LU56. City of Shoreline Comprehensive Plan–Transportation Goals and Policies: ▪ Not enough information is available at this point to determine complete consistency.	

	Proposed Action	No Action Alternative
Mitigation Measures	For the Proposed Action to achieve consistency with the County's objectives and policies, the following policies could be amended and/or clarified: Policy LU 5.B.12. To clarify the policy, the following amended language could be considered (new language underlined): "Within the southwest UGA, parcels designated UI (on Point Wells) shall be considered for future redesignation from Urban Industrial to Urban Center designation upon issuance of a programmatic, nonproject environmental impact statement addressing environmental impacts, infrastructure, and the provision of urban services." For the Proposed Action to achieve consistency with Woodway's goals and policies, the following could occur: ▪ Coordination between the County and Woodway regarding planning and regulations and an interlocal agreement would need to occur to be consistent with LUG-10, LUP-18 and LUP-19. ▪ Urban-level services would need to be in place to be consistent with LUG-4 and LUP-1. ▪ Woodway could amend LUP-20 and LUP-21 to designate the Paramount site as mixed use. For the Proposed Action to achieve consistency with Shoreline's goals and policies, the following could occur: As the relevant transportation goals require coordination with Shoreline's neighboring jurisdictions to assess the impact of new development on the transportation system, including mitigation and funding, the affected jurisdictions could meet to determine transportation strategies.	
Unavoidable Adverse Impacts	No significant unavoidable adverse impacts are expected.	

1.5. Major Issues, Significant Areas of Controversy and Uncertainty, and Issues to be Resolved

The major issues to be resolved are 1) consistency between the Proposed Action and the existing County policies regarding criteria for an urban center designation and 2) mitigation of transportation impacts.

Chapter 2. Proposal Description

2.1. Overview

The Snohomish County Final Docket XIII Comprehensive Plan Amendments (docket proposals) include the Proposed Action. This chapter presents a description of the Proposed Action and the No Action Alternative that are the subject of this Draft Supplemental Environmental Impact Statement (SEIS).

The County adopted a 10-year update of its Growth Management Act (GMA) Comprehensive Plan in 2005. As part of that effort, the County issued a Draft EIS in May 2004 that analyzed three alternative land use scenarios. The County issued the Final EIS for the GMA Comprehensive Plan in 2005. In its draft and final forms, the EIS considered a range of alternative land use designations for the County's Future Land Use Map (FLUM) and policy amendments to elements of the GMA Comprehensive Plan, including the General Policy Plan. The 2005 Final EIS serves as the basis for subsequent environmental review of proposals to amend the GMA Comprehensive Plan, including both FLUM and text amendments.

Consistent with the requirements of the Washington GMA, the County considers amendments to its GMA Comprehensive Plan on an annual basis through the program known as the docket process. This Draft SEIS analyzes the docket proposal submitted by Paramount of Washington LLC (Paramount) and supplements the 2005 Comprehensive Plan EIS by providing additional information, analysis, and mitigation measures relevant to the Paramount proposal to amend the County's GMA Comprehensive Plan.

2.1.1. Planning Area

The County is located on Puget Sound, between Skagit County to the north and King County to the south. The County GMA Comprehensive Plan addresses all unincorporated areas of Snohomish County. Within the County, land is generally classified as urban, rural, or resource.

The Paramount site is designated Urban Industrial (UI) and lies in an unincorporated portion of the Southwest Urban Growth Area (UGA), near the Town of Woodway (Woodway) and the City of Shoreline (Shoreline) in King County to the south (Figure 2-1). This docket proposal would change the type of allowed urban land uses and could intensify activities on the site.

2.1.2. Final Docket XIII

The docket process for amending the GMA Comprehensive Plan is outlined in Chapter 30.74 of the Snohomish County Code (SCC). Through the docket process, the County accepts and evaluates applications for amendments on an annual basis. The County Council first evaluates each docket proposal and identifies which should be carried forward for additional review. County staff provides a more detailed review of the final set of docket proposals, including a State Environmental Policy Act (SEPA) analysis of environmental impacts. The environmental analysis and recommendations are then forwarded to the County Planning Commission for consideration. The County Planning Commission reviews the final docket proposals in a public hearing and makes recommendations to the County Council. The County Council then evaluates the Planning Commission's recommendations in a public hearing and takes final action.

On June 16, 2008, by Motion No. 08-238, the County Council included the Paramount proposal on Final Docket XIII. The Snohomish County Department of Planning and Development Services determined that the Paramount proposal should be analyzed in an SEIS, which will include this Draft SEIS and a Final SEIS. The County Council will review the impacts described in all environmental documents prepared for Docket XIII to ensure that cumulative impacts are considered.

2.1.3. Purpose

The SEIS will assist the public and agency decision makers considering future land uses and zoning that differ from present plans and regulations. This Draft SEIS and subsequent Final SEIS document will serve different purposes, as described below.

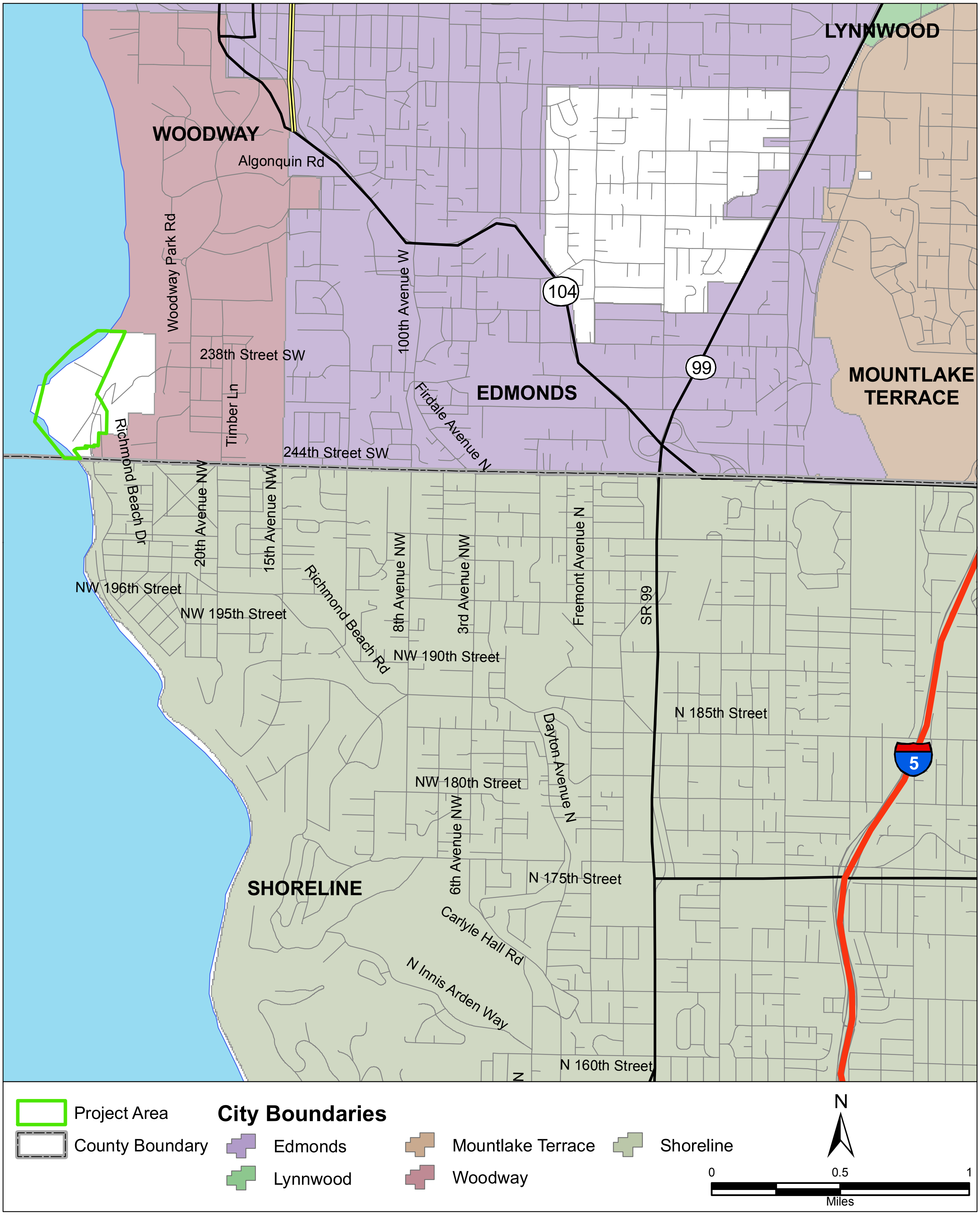

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Figure 2-1
Paramount Vicinity Map

Draft SEIS

The Draft SEIS addresses elements of the natural and built environment for the Paramount site. It compares the impacts of and the mitigation for the Proposed Action and No Action Alternative. With a required public comment period, the Draft SEIS also provides a vehicle for public input in decisions relative to planning and development in the County. Environmental review provided in the Draft SEIS may help County decision makers identify a preferred alternative and associated comprehensive plan/zoning amendments that would be analyzed in the Final SEIS.

Final SEIS

The role of the Final SEIS is to identify and analyze a preferred alternative, where appropriate, in the context of the Draft SEIS Proposed Action and No Action Alternative. Other key purposes include responding to public comments made on the Draft SEIS and correcting the Draft SEIS analysis, where appropriate. Prior to acting on the docket proposals, the Final SEIS will be considered by County decision makers for a minimum of seven days before taking final action.

2.1.4. Scope of Review

The 2005 GMA Comprehensive Plan EIS addressed the elements of the environment identified in Table 2-1.

Table 2-1. Environmental Elements Addressed in the 2005 GMA Comprehensive Plan Environmental Impact Statement

Natural Environment	Built Environment
Earth	Land and Shoreline Use
Air Quality	Relationship to Plans and Policies
Surface Water/Water Quality	Population/Employment/Housing
Groundwater	Aesthetics
Plants and Animals	Cultural Resources
	Transportation
	Noise
	Energy
	Public Services
	Telecommunications
	Solid Waste

A voluntary scoping notice was issued for the Final Docket XIII SEIS on November 14, 2007, and identified these same topics for review.

The scoping notice solicited public input on the scope of the Draft SEIS and the Paramount proposal. Comments addressed preferences on future urban land uses, ensuring public services are addressed; transportation; consistency with city/town plans; density; and other similar topics. Appendix A contains a scoping summary and how topics are addressed in this SEPA process.

2.1.5. Nonproject Environmental Analysis

This Draft SEIS provides a qualitative analysis of environmental impacts appropriate to the general nature of the Docket XIII request. The adoption of comprehensive plan amendments is classified under SEPA as a nonproject action, which is defined as an action that is programmatic in nature. Nonproject actions may include decisions on policies, plans, or programs. Environmental analysis for a nonproject proposal does not require the same level of site-specific analysis required for a permit application; instead, nonproject environmental analyses address impacts and alternatives appropriate to the scope and level of planning for the non-project proposal (WAC 197-11-442).

2.1.6. Phased Review

SEPA encourages a phased environmental review to focus on issues that are ready for decision-making and to exclude from consideration issues already decided or not yet ready for decision-making (WAC 197-11-060(5)). Phased review is appropriate when the sequence of a proposal moves from a programmatic document to other documents that are narrower in scope. For example, a phased review may be applied to a SEPA document, which is later followed by site-specific project-level review.

The County employs the phased review concept in its environmental review of growth management planning actions. This Draft SEIS will analyze the potential cumulative environmental impacts of the proposed amendment to the GMA Comprehensive Plan and zoning. Additional detailed environmental impact review of development proposals will occur as specific projects are proposed (e.g., land use and building permit applications). This additional incremental level of review occurs when subsequent implementation actions require a more detailed evaluation and as additional information becomes available. Future project-level environmental review of development applications that are not categorically exempt from SEPA could occur in the form of an SEIS, a SEPA Addendum, or a threshold Determination of Non-significance (DNS).

2.1.7. Docket XIII SEIS Review Process

Consistent with SEPA, the County issued a Determination of Significance (DS), Adoption of Existing Environmental Documents, and Request for Comments on the Scope of the SEIS for the proposed amendment on Docket XIII on November 14, 2007 (see Appendix A).

The Draft SEIS will be circulated for a 45-day public-review period to invite written comments from the general public, tribes, permitting agencies, and agencies with jurisdiction over the areas on which the Proposed Action has potential environmental impacts. A public hearing is planned during the comment period to receive verbal and written comments on the Proposed Action, No Action Alternative, and environmental review presented in the Draft SEIS.

A Final SEIS will be prepared following the close of the Draft SEIS comment period and will provide responses to comments received during the Draft SEIS comment period.

2.2. Proposed Action and No Action Alternative

2.2.1. Proposed Action

The Proposed Action would amend the GMA Comprehensive Plan FLUM (Figure 2-2) and zoning map to

- intensify the Southwest UGA/Woodway Municipal Urban Growth Area (MUGA) by designating Urban Center (UC) instead of Urban Industrial (UI) on an approximate 61-acre site along Puget Sound,
- provide consistency with the County's GMA Comprehensive Plan elements and policies,
- assure continued compliance with the GMA and Countywide Planning Policies (CPPs),
- allow for a range of housing types affordable to different income levels, and
- provide for employment growth proportionate to population growth.

2.2.2. No Action Alternative

The No Action Alternative is required by SEPA and would retain present comprehensive plan and zoning designations and present UGA boundaries. Where sites are developed at lesser intensities than adopted plans/zoning would allow, it is possible that further development or activities could occur between the present and the County's plan horizon year of 2025.

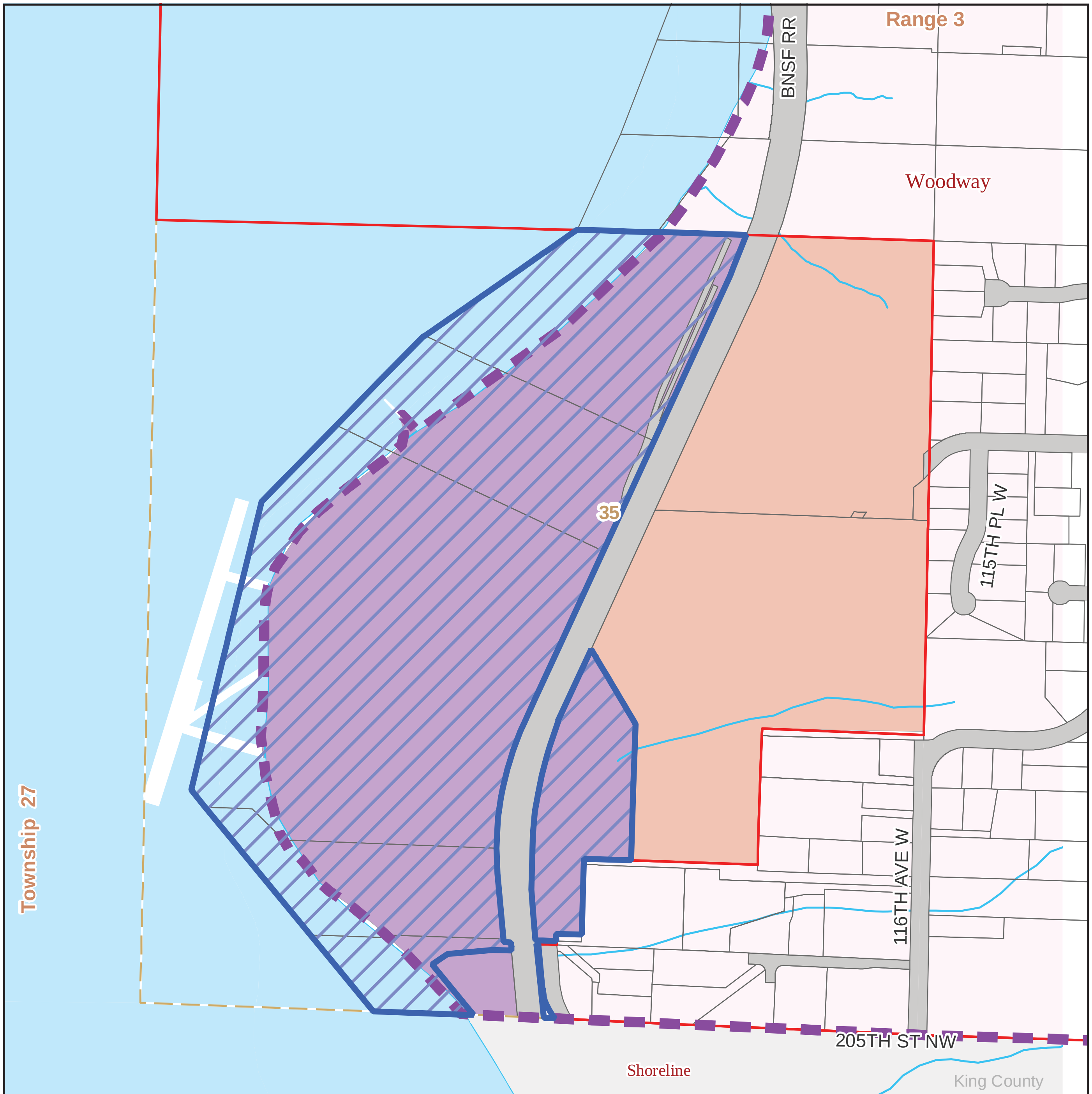
2.2.3. SEIS Docket Proposal

The request to amend the County's GMA Comprehensive Plan is summarized in Table 2-2.

The proposal request is described in terms of proponent, location, site characteristics, proposal objectives, requested actions, and alternatives.

Table 2-2. Paramount Comprehensive Plan Future Land Use Map Amendment Request

Project No./Proponent	General Location	Approx. Acres	Future Land Use Map (FLUM) Designation
Paramount of Washington LLC (SW 41)	Southwest border of the County abutting Woodway and Shoreline; at northwest terminus of Richmond Beach Drive	61 acres including tidelands	Current: UI Proposed: UC



Proposed Plan Amendment:

Paramount of Washington LLC (SW41)

Redesignate Urban Industrial to Urban Center.

Existing Plan Designations

Urban Low Density Residential

Urban Medium Density Residential

Urban Industrial

UGA Boundary

Cities

Assessor Parcels

Section Grid

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Map Document: (W:\plng\carto\docket\ Docket_XIII \Preliminary_Maps\Individual\Infill\SW_Infill\SW41_ ParamountofWashingtonLLC_FLU.mxd) 2/11/2008

N

Feet

0 250 500 750 1,000

Source: Snohomish County 2008

1068.07/SEIS (11/08)

ICF Jones & Stokes

an ICF International Company

Figure 2-2

Future Land Use Map—Paramount of Washington

Paramount of Washington, LLC

Proponent. Paramount of Washington, LLC.

Location. The site is located in the southwest corner of the Southwest UGA. It is adjacent to the northern boundary of King County and Shoreline and the southwestern edge of Woodway, at the northern terminus of Richmond Beach Drive.

Site size and characteristics. The approximate 61-acre site is currently used for petroleum product storage, processing, and distribution. The site is estimated to have 3,500 lineal feet of shoreline along Puget Sound. It is located in the Woodway MUGA. Approximately 45 acres are uplands and the remaining 16 acres are tidelands. Approximately 2 acres of the upland area has steep slopes or other physical limitations to development. One 5-acre parcel is located on the eastern side of the Burlington Northern Santa Fe (BNSF) Everett-to-Seattle main railroad line. The remaining 56 acres are located adjacent to Puget Sound on the western side of the railroad. Two private bridges connect the western parcels to the eastern parcel, although one is not currently used for vehicle or pedestrian traffic. A deepwater pier over 1,000 feet in length is located at the site. A smaller dock facility in poor condition is located on the site north of the main pier.

The outfall component of the new Brightwater regional wastewater treatment system is located on the property adjacent to the southeast corner of the site. King County owns approximately 1 acre of uplands and some adjoining tidelands at this location for construction of the outfall component and has temporary easement rights to several acres of the adjoining Paramount site during construction. In addition, King County will be granted a permanent maintenance access easement through the site to its outfall property.

The area to the south and southeast of the site is dominated by single-family residences on urban-sized lots, located in Woodway and Shoreline. An undeveloped steep bluff and top of a bluff bench area border the site on the east and northeast, with single-family residential development located beyond the bluff.

Objectives. Paramount of Washington LLC proposes a future UC development on the site that is as yet undefined in scale and scope but which, for the purposes of this analysis, is conceptualized to include 3,500 housing units (supporting 6,440 persons), 60,000 to 70,000 square feet of commercial space and 10,000 to 15,000 square feet of retail space (supporting 802 employees), a substantial public park or public access area, and a multi-modal transit center.

Requested actions. The requested action is to do the following:

- Amend the General Policy Plan FLUM designation on the property from the existing UI to UC.
- Rezone the site from its current designation of Heavy Industrial (HI) to Planned Community Business (PCB), which would allow for a mix, density, and design configuration of uses very similar to those currently permitted under the County’s Urban Centers Demonstration code

provision. The proponent requests participation in the Urban Centers Demonstration Program (UCDP), which requires that the site be zoned as PCB.

Alternatives. The alternative to the Proposed Action is the No Action Alternative, which would retain the existing FLUM designation of UI and the existing zoning of HI.

Assumptions. To assess the impacts of the docket request, the Proposed Action and No Action Alternative land use and zoning designations were translated into land use assumptions as shown in Tables 2-3 and 2-4. The Proposed Action would amend the FLUM for the project site from the existing UI to UC. It would also rezone the site from HI to PCB. Development assumptions are based on information supplied by the proponent and by County staff. Although the docket application included a generalized concept plan for a mixed use development, the proponent has emphasized that no specific project has as yet been designed. The purpose of this Draft SEIS is to review the impacts associated with a project of the type and scale that is generally contemplated by the comprehensive plan designation and zoning regulations rather than a specific developer-generated proposal. As part of a phased SEPA review, site-specific concept plans will be subject to SEPA review in the future at the time other permits are sought.

Table 2-3. Proposed Action Assumptions

	Statistics	Assumptions
Gross Acres	61	Area based on docket application.
Net Acres Industrial	0	Not considered part of a mixed-use development.
Net Acres Residential	33.0	Excludes tidelands (16 acres), shoreline buffer (125 feet) (10.04 acres), and 2 acres of steep slopes. Because of the highly developed nature of the site, did not apply further critical area reductions. Also, public purpose reductions are not applied as the site will likely provide private facilities.
Net Acres Commercial	30	Assumes 90% of developable land based on SCC 30.23.040(51). Maximum lot coverage for Urban Centers Demonstration Program.
Residential Dwellings	3,500	Assumes 106 dwelling units per developable acre, which would require a director decision under the County code for urban centers.
Population	6,440	2007 Buildable Lands Report assumption of 92% occupancy and 2.0 persons per household.
Employees	802	2007 Buildable Lands Report Estimate of Urban Center Employment Density equal to 27 employees per acre. This is a gross figure.

The No Action Alternative would retain the existing FLUM designation of UI and the existing zoning of HI. The current petroleum-based operations would continue and could increase to the operation's capacity. Further, the southern site area could intensify with additional UI uses. The comparison of current uses and projected uses under the No Action Alternative is shown in Table 2-4.

Table 2-4. No Action Alternative Assumptions

	Asphalt Operations		Fuels Storage and Distribution		Marine Fueling Operations	
	2007	Future	2007	Future	2007	Future
Average truck trips per day each way	7	14	0	125		
Maximum truck trips per day each way (Apr–Sept)	25	50	0			
Employees	12[a]	16	0	75–100		
Fuel transfers across dock per year			0	75	275	412

[a] Represents total 2007 employment on site. Some employees may be involved with other operations

Source: Paramount pers. comm.2008

2.3. Other Alternatives Previously Considered or Future Alternatives

The County GMA Comprehensive Plan EIS was completed in 2005 and represents analysis relevant to the No Action Alternative. This Draft SEIS focuses on a new option for mixed uses based on the docket request.

2.4. Benefits and Disadvantages of Delaying the Proposed Action

SEPA rules require that an EIS evaluate the benefits and disadvantages of delaying implementation of the Proposed Action to some future time, compared with approval at this time. Particular attention is given to the potential for foreclosing future options by implementing the Proposed Action.

Although the Paramount site has been used for industrial purposes since the early 1900s and could continue to be used in that manner, both Shoreline and Woodway considered a future development of the site with mixed residential and commercial uses, likely because of its desirable location on the shoreline of Puget Sound. The County, Shoreline, and Woodway all included in their comprehensive plans specific policies regarding the future redevelopment of the site, particularly to ensure that natural resource, shoreline, and traffic considerations were analyzed before any redevelopment took place on the site. See Chapter 3.11 for details on those policies.

A disadvantage to delaying the Proposed Action is that the proposed redevelopment of the site would likely accelerate the clean-up of soil contamination resulting from decades of petroleum processing and distribution on the site.

Benefits to delaying the Proposed Action include allowing additional time to complete detailed environmental studies and approval for appropriation of public funds to assist with a possible Sound Transit commuter station at the site. Furthermore, delaying the proposal would give the County additional time to find other land to designate as industrial if the need is there.

Chapter 3. Affected Environment, Significant Impacts, and Mitigation Measures

The potential environmental impacts of the Paramount of Washington LLC (Paramount) Proposed Action and resulting amendment to the Growth Management Act (GMA) Comprehensive Plan and Future Land Use Map (FLUM) are addressed in this Draft Supplemental Environmental Impact Statement (SEIS). This analysis uses new information to identify or address impacts not identified in the Environmental Impact Statement (EIS) prepared for Snohomish County's (County's) updated GMA Comprehensive Plan in 2005. Mitigation measures are recommended where appropriate and the potential for unavoidable significant adverse impacts is noted.

The County identified areas where the Paramount docket proposal would be evaluated in this Draft SEIS. Elements of the environment that are addressed include Earth, Surface Water, Wetlands, Fisheries, Wildlife and Vegetation, Air Quality, Noise, Cultural Resources, Aesthetics, Population/Employment/Housing, Transportation, Public Services (e.g., Sanitary Sewer, Domestic Water, Police, and Fire Protection, Schools, Parks), Land and Shoreline Use Patterns, and Relationship to Plans and Policies.

3.1. Earth and Soil and Groundwater Contamination

This section discusses the subsurface (earth) conditions and critical areas and existing soil and groundwater contamination of the Paramount of Washington, LLC (Paramount) site (including saltwater shorelines and tidelands). Paramount currently operates the Richmond Beach Asphalt Plant and Marine Fuels Terminal on the property. The property is designated Urban and lies within the Town of Woodway (Woodway) Municipal Urban Growth Area (MUGA).

3.1.1. Earth and Critical Areas

Affected Environment

The Paramount site is an approximate 61-acre property located on the eastern shore of Puget Sound. The site consists of a west, lower, semi-circular bench comprising about 56 acres that is located adjacent to Puget Sound and an east, upper, rectangular bench area comprising about 5 acres. The two areas are bisected by the north–south trending Burlington Northern Santa Fe (BNSF) Everett-to-Seattle railroad tracks.

The site formerly consisted of a saltwater marsh that was filled in the early 1900s to facilitate its current use as a petro-chemical storage facility (Pacific Environmental Group 1998). A series of steel sheet pile seawalls and rock bulkheads have been constructed along the shoreline of the lower bench adjacent to Puget Sound to retain the fill and protect the site from wave erosion.

The lower bench is located about 5 to 10 feet above the seawall and contains the existing asphalt plant and marine fuel terminal. The bench is nearly level, with less than 10 feet of elevation change across the length of the bench, and is separated from Puget Sound by a seawall. The upper bench is located about 50 feet above the lower bench and is accessed by a wooden trestle that extends over the railroad tracks.

To the east of the site across the railroad tracks is a steep ascending slope. The toe of the slope is situated about 100 feet east of the east border of the lower bench. The slope is approximately 150 to 200 feet high, densely vegetated, with an estimated slope gradient of 30% to 100%.

Geologic Setting

The Paramount site lies in the central portion of the Puget Sound Lowland, an elongated topographic and structural depression bordered by the Cascade Mountains to the east, the Olympic Mountains to the west and Mount Rainier to the southeast. The recent geologic history of the Puget Sound Lowland has been dominated by several glacial episodes. The most recent episode, the Vashon stade of the Fraser glaciation, is responsible for most of the present day surficial geologic and topographic conditions in the area of the site. The Puget lobe of the Cordilleran ice sheet deposited a heterogeneous assemblage of proglacial lacustrine deposits, advance outwash, till and recessional outwash. The terrain is dominated by a broad glacial drift plain that is subdivided by river troughs and valleys.

Review of the Composite Geologic Map of the Sno-King Area, Central Puget Lowland, Washington (Booth et al. 2004) indicates that the lower bench is underlain by artificial fill (Map Unit af) and the upper bench is underlain by pre-Fraser deposits (Qpf). Artificial fill consists of fills of various thickness and composition, resulting from land development. The pre-Fraser deposits consist of older glacial and nonglacial deposits.

The slope to the east of the upper bench is underlain in ascending order by Lawton clay (Qvlc), advance outwash (Qva) and Vashon till (Qvt). The Lawton clay unit typically consists of interbedded clayey silt, silty clay, and silt and fine sand mixtures. The advance outwash consists of glaciofluvial deposits of the Vashon stade, also called the Vashon advance outwash and known locally as the Esperance Sand. The advance outwash deposits are typically a homogeneous, clean, fine-to-medium sand, although some portions are composed of gravelly sand. The contact between the Lawton and advance outwash is transitional over several tens of feet, where layers of the glaciofluvial and glacialacustrine deposits interfinger; within this transition zone individual strata are laterally discontinuous. Groundwater becomes perched at the transition and where the units intersect a hillside, seepage can develop which is the source of many landslides in Seattle. Vashon till consists of a poorly to non-sorted, matrix-supported, structureless deposit (diamict) of widely varying grain sizes, ranging from clay to boulders.

Groundwater Conditions

Groundwater beneath the lower bench area is generally 1 to 8 feet below ground surface (bgs). Shallow groundwater flow is interpreted to be from east to west, toward Puget Sound. Across the property, the groundwater is influenced by precipitation. Tidal influences to groundwater levels have been minimized by the construction of sheet pile seawalls.

Geologic Hazards

Snohomish County Geologically Hazardous Areas regulations in Chapter 30.62B of the Snohomish County Code (SCC) require the identification and mapping of erosion, landslide, and seismic (liquefaction) hazards. Each of these geologic hazards is briefly described below.

Erosion Hazards. An erosion hazard is present where soils may experience severe to very severe erosion from construction activity. Depending on soil type, erosion may cause localized sloughing during wet weather. Removal of vegetation, modification of topography, and uncontrolled surface water runoff can accelerate erosion in erosion-prone soils.

SCC 30.62.015(9) identifies erosion hazards as areas meeting the following criteria:

- soils mapped by the United States Department of Agriculture Natural Resource Conservation Service (NRCS) as having a high erosion risk from water erosion;
- channel migration zones (CMZs), which comprise lands adjacent to current river channels that are at a high risk of becoming occupied by the channel within the next 100 years that are not landward of natural or manmade features which limit channel migration; and
- shorelines of water bodies subject to wind and wave erosion.

The NRCS maps the soils underlying the lower bench as urban land. These soils are identified by the NRCS as having a low erosion hazard. The shoreline of the Paramount site borders Puget Sound and is subjected to wave erosion; however, it is protected by bulkheads and sheet pile seawalls.

Landslide Hazards. Areas subject to landslides are determined by a combination of geologic, topographic, and hydrologic factors. Landslides can also be induced by seismic events.

SCC 30.62.015(16) defines landslide hazards as areas "potentially subject to mass earth movement based on a combination of geologic, topographic, and hydrologic factors, with a vertical height of 10 feet or more. These include the following:

- Areas of historic landslides as evidenced by landslide deposits, avalanche tracks, and areas susceptible to basal undercutting by streams, rivers or waves;
- Areas with slopes steeper than 33% which intersect geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock, and which contain springs or ground water seeps; and
- Areas located in a canyon or an active alluvial fan, susceptible to inundation by debris flows or catastrophic flooding.

Review of the Map Showing Recent and Historic Landslide Activity on Coastal Bluffs of Puget Sound Between Shilshole Bay and Everett, Washington (Baum 2000) indicates two landslides initiated in the upper portion of the steep slope located east of the Paramount site during the winters of 1995/1996 and 1996/1997. The slides consisted of shallow earth slides comprising 300 to 400 cubic yards of soil and debris that flowed downslope and were deposited near the railroad tracks east of the lower bench area. These historic landslides were attributed to record heavy precipitation events and did not affect the Paramount site.

In the winter of 1996/1997, the Woodway landslide also occurred about 1 mile north of the site. The Woodway landslide consisted of a combination of a deep-seated rotational failure and debris flow that extended through the advance outwash and Lawton clay units. The slide comprised about 150,000 cubic yards of soil that slumped and flowed across the railroad tracks and were deposited into Puget Sound.

The slope to the east of the site contains historic landslides and has slopes steeper than 33% that are underlain by permeable soils (advance outwash) overlying impermeable soils (Lawton clay). As such, the slope east of the Paramount site meets the criteria of a landslide hazard area.

The County allows for development activities in landslide hazard areas, provided the areas are protected through the use of "generally accepted proper engineering and construction practices" and appropriate setbacks based on the slope height.

Seismic Hazards. Seismic hazards are defined in SCC 30.62.015(23) as areas having a severe risk of the following:

- earthquake damage from liquefaction;
- seismically induced ground rupture;
- seismically induced landsliding; or
- areas of known or inferred faults.

The lower bench is underlain by fill overlying salt marsh deposits. Review of the Liquefaction Susceptibility Map of Snohomish County, Washington indicates the lower bench is mapped as having a high susceptibility to liquefaction.

Seismic hazards associated with slope instability typically correspond with steeply sloping areas that already meet the criteria of a landslide hazard area, as defined above. However, gently sloping areas that do not meet the definition of a landslide hazard area but are underlain by liquefiable soils may experience lateral spreading, which is a slope failure that develops on a gentle slope as a result of the loss of soil strength due to liquefaction.

There are no identified faults underlying the Paramount site. The closest known faults to the site are in the South Whidbey Fault Zone (SWFZ) which is located about four miles to the north of the site (Sherrod 2005).

Impact Analysis

Proposed Action

The Proposed Action would not include any imminent changes to the current land usage. Therefore, no impacts are anticipated as a direct result of the Proposed Action. However, the requested zoning change would allow for mixed use development consisting of housing, commercial space, retail businesses, public recreation areas, and a transit center.

Under these potential uses, there may be a potential for seismically induced liquefaction and an increased potential for erosion and landslide.

No Action Alternative

Under the No Action Alternative, the proposed zoning changes would not take place. The current land use designations prohibit residential or commercial structures; however, industrial activity at the site would likely increase even if the FLUM designation is not changed.

Mitigation Measures

Under the Proposed Action, any project-specific geotechnical and geologic analyses would need to be performed at the time of permit application to evaluate the impact of the previously discussed seismic, erosion, and landslide hazards. The proposed design would need to provide for setbacks from the landslide hazard areas in accordance with County requirements.

Potential for seismically induced liquefaction and lateral spread would need to be evaluated and may need to be mitigated through the use of appropriate foundations.

Modifications may also need to be made to the existing seawalls and rock buttresses to bring them to current code.

Under the No Action Alternative, if the industrial activity includes the construction of additional structures, project-specific geotechnical and geologic analyses would need to be performed to evaluate the impacts of the previously discussed seismic, erosion, and settlement hazards.

Significant Unavoidable Adverse Impacts

None anticipated.

3.1.2. Soil and Groundwater Contamination

Affected Environment

The western portion of the Paramount site is fenced on three sides and a staffed security gate prohibits unauthorized entry. A seawall protects the western perimeter from tidal flooding. Most of the property is between approximately 5 to 10 feet above sea level. There is approximately 50 feet of elevation change across the property, sloping upward from the west (Puget Sound) to the east.

Groundwater beneath the western area of the property is generally 1 to 8 feet below the ground surface (bgs), and shallow groundwater flows west toward Puget Sound. Across the property, the water table is significantly influenced by precipitation. Tidal influences to groundwater levels have been minimized by a seawall and sheet pile wall constructed along the western property perimeter.

Site History

According to documentation provided by Paramount, the petroleum distribution terminal and storage facility was originally constructed in 1912 (Paramount Petroleum Corporation 2007). A variety of petroleum products including crude oil, lubrication oils, aviation fuels, motor vehicle fuels, asphalt products, and marine fuels have been stored, refined, or transferred to or at the property.

In 1950, Chevron reportedly purchased the property and over the years developed an asphalt refinery and light product distribution center. The blending and storage of light petroleum products was terminated in 1994. The owner closed the distillation (refining) facility in June 2000, but continued to blend various asphalt products. Paramount acquired the property from Chevron in 2005 and continued to operate the asphalt plant and marine fuel storage facilities.

Known Contamination

Contamination is defined as the existence of one or more contaminant concentration(s) at or above cleanup levels established by the Washington State Model Toxics Control Act (MTCA). Ecology defines a contaminant as “any hazardous substance that does not occur naturally or occurs at greater than natural background levels.”

Historic Spills

Washington Administrative Code (WAC) 173-182 (new) requires certain oil handling facilities, such as Paramount Petroleum, to have a state-approved oil spill contingency plan that ensures the company’s ability to respond to major oil spills. Based on information provided on the Washington State Department of Ecology’s (Ecology’s) web site, Paramount Petroleum has an approved contingency plan that expires November 1, 2010.

Ecology's files document four significant spills associated with operations at the site. The first spill reportedly occurred in 1972, when gasoline spilled into Puget Sound from the Chevron Berth 2 (northwestern portion of property). Available documentation does not provide an estimated volume for this spill.

In 1985, jet fuel from a storage tank reportedly spilled on the property and flowed through the stormwater system into Puget Sound. A backhoe (owned by BNSF) broke a product line that crossed the railroad right-of-way. This caused a jet fuel spill of approximately 49,600 gallons, of which approximately 500 gallons discharged into Puget Sound.

The third major spill documented in Ecology files occurred on August 30, 1990. Approximately 176,400 gallons of North Slope oil spilled during the offloading of a tanker. The majority of the spilled product was contained within a dike surrounding the tanker; however, approximately 4,200 gallons flowed over the dike and affected the nearby shoreline (Snohomish Health District 1998).

A fourth historic spill occurred on December 30, 2003, at the Chevron/Texaco Terminal at Point Wells (Ecology 2003). Records show that approximately 4,700 gallons of heavy fuel oil were spilled. An employee from the Foss Maritime Company (Foss) apparently miscalculated the flow rate of oil into a barge during fuel transfer activities. This resulted in an overflow of fuel into Puget Sound. Cleanup crews responded to locations around the Puget Sound including, but not limited to, Indianola Marsh, Edmonds Wildlife Sanctuary, and Doe-kag-wats Lagoon. Foss was found to be at fault and was fined $577,000 by Ecology. Foss was also responsible for cleanup costs.

Initial Subsurface Investigations

In 1983, the previous property owner (Chevron Corporation) initiated a study to characterize subsurface petroleum contamination that was accumulating on the water table. Subsequent studies conducted in1985 and 1988 identified a floating free product plume on the water table (floating separate-phase hydrocarbons [SPHs]). Floating SPHs are light petroleum products such as gasoline that float on water. In contrast, motor oil is a heavy petroleum product that would generally sink rather than float.

A groundwater monitoring program was designed that included a series of SPH recovery wells. Original wells were installed in the late 1980s. Over the last 25 years, the number of groundwater wells used to recover SPH has increased. In addition, a groundwater pump and treatment system currently operates on the property.

Site Hazard Assessment (SHA)

Ecology files show that on March 1, 1988, the Paramount site was placed on the Confirmed and Suspected Contaminated Site List. The Snohomish Health District conducted a Site Hazard Assessment (SHA) in September 1997 to estimate the potential threat the site posed to human health and the environment, if not cleaned up. The estimate was based on the amount of contaminants, how toxic they are, and how easily they can come in contact with people and the environment. This assessment resulted in an SHA ranking of 3 on a scale of 1 to 5 (a ranking of 1 represents the highest level of concern relative to other sites, and a ranking of 5 the lowest). Hazard rankings help Ecology target where to spend cleanup funds. As of August 20, 2008, the property remains on the Confirmed and Suspected Contaminated Site List with an SHA of 3.

The SHA identifies two types of contamination present at the property: 1) EPA priority pollutants, metals and cyanide, and 2) petroleum products. Specifically, the petroleum products include total petroleum hydrocarbons–gasoline (TPH-Gx); benzene, toluene, ethyl-benzene, and xylenes (BTEX) compounds, TPH-Diesel, and TPH-Oil. The metals are lead. Analytical results have confirmed contamination to soil, groundwater, and surface water on the property.

Groundwater Contamination

Analytical results show that groundwater beneath the property has been affected by petroleum hydrocarbons ranging from light products such as gasoline to heavier products such as diesel or oil. In 2007, SPH was detected in 20 of the 142 groundwater wells. Measurable SPH ranged from 0.01 to 0.80 feet (0.12 to 9.6 inches).

Groundwater Remediation Systems

As documented in the 2007 Remediation System Operations Status and Groundwater Evaluation Quality Evaluation (Hart Crowser 2008), groundwater remediation at the property consists of recovery of floating SPH from selected groundwater wells and extraction and treatment of groundwater affected by dissolved phase petroleum hydrocarbons.

Extracted groundwater from three areas of the property—the south seawall area, the Tank 2 area, and the Asphalt Plant Area—is processed through an on-site treatment system. The groundwater flows through a series of bioreactors. Each bioreactor contains microorganisms that naturally break down the dissolved phase petroleum hydrocarbons. Nutrients and air are injected to enhance the growth and efficiency of these microorganisms. Processed groundwater is pumped through a carbon filter before discharging into Puget Sound. Under an existing National Pollution Discharge Elimination System (NPDES) permit (WA-003170-4), effluent quality is monitored on a monthly basis. The facility is currently in compliance with NPDES permit requirements.

In April 2008, Paramount initiated a 12-month pilot study in the Tank 2 area to evaluate using in-situ bioremediation to improve the overall treatment efficiency. The study is ongoing; however, to date, minor problems have been encountered and design modifications have been implemented.

SPH is recovered using either passive techniques (oil-absorbent socks) or an active belt-skimming unit. As the skimming belts pass through the SPH/water interface, a thin layer of SPH is collected on the belt. This SPH is skimmed off the belt by a series of blades and transferred to a holding tank. These skimming units can be moved between groundwater wells, as necessary. During 2007, approximately 155 gallons of SPH was recovered at the site.

In September 2008, pumping and skimming of SPH from groundwater beneath the asphalt plant began. As of the date of this review, these operations appear to be successful in removing SPH.

Soil Contamination

In 2007, Paramount began a program designed to further characterize soil contamination on the property. Borings were advanced at 50 locations across the property and soil samples collected. Approximately 10% of these borings were to a depth of 30 feet bgs. The majority of the borings were 12 to 15 feet bgs.

In 2008, Paramount advanced and sampled approximately 149 push probes and 26 wells. Soil contamination is generally limited to 5 to 8 feet bgs. As part of the Proposed Action, Paramount states that it plans to remediate contaminated soils by excavation and on-site or off-site treatment or disposal.

Paramount intends to apply to the Voluntary Cleanup Program (VCP) administered by Ecology. Using data obtained from site investigations and cleanup activities, the purpose of entering the VCP would be to obtain a determination of No Further Action (NFA). Paramount believes that these cleanup activities can be properly managed to prevent any increase in soil or groundwater contamination (Huff pers.comm.).

Impact Analysis

Proposed Action

Future site development activities, such as excavation and grading, would increase the potential for public exposure to known soil and groundwater contamination. Additionally, any affected soils encountered during construction would require an evaluation, characterization, and possible remediation. Remediation of these soils could include excavation and on-site treatment or off-site disposal.

Shallow groundwater affected by volatile petroleum hydrocarbons presents the potential for contaminated soil vapors. Soil vapors with elevated levels of contamination could adversely affect the public by intruding into structures. This potential source of contamination should be evaluated and findings used to design future development. However, in the absence of site-specific information about potential soil vapor contamination, it is difficult to conclusively identify adverse impacts.

No Action Alternative

The No Action Alternative would retain the existing FLUM designation of Urban Industrial (UI) and the existing zoning of Heavy Industrial (HI). Current land use designations prohibit residential and commercial building on the property. In the absence of residential or commercial buildings on the property, public exposure to contaminated soil, groundwater and potentially soil vapors is limited.

Because of the nature of operations at this site, it is subject to the U.S. Coast Guard Maritime Security (MARSEC) requirements. Under these requirements, the site is secured, which prevents the public from exposure to the on-site contamination. Under the No Action Alternative, Paramount would continue with the current remediation program being conducted under Ecology’s Outfall 2 NPDES permit. The pace of this remediation would be affected by the continued presence of the current operating facilities. Should the Proposed Action be approved and development permitted, Paramount would cease the current petroleum operations. The site would be decommissioned and remediation activities would be accelerated (Huff pers. comm.).

The No Action Alternative would likely result in continued petroleum-based operations and an increase to the operation's capacity. The site still contains all the necessary elements of an operational refinery. Historically, the up to 5,000 barrels of petroleum per day have been refined on site. Under existing zoning, Paramount has the option to restart refinery operations. Paramount would also consider restarting the asphalt plant (Huff pers. comm.).

Mitigation Measures

Soil and groundwater contaminants present at concentrations above the MTCA cleanup limits include total petroleum hydrocarbons (gasoline, diesel, and oil range), BTEX compounds, and lead. Soil and groundwater sampling and characterization activities are ongoing.

Recommended mitigation measures are as follows:

- Continue to implement the existing soil sampling program to identify and characterize the extent of soil contamination on the site.
- Develop a plan to remediate contamination identified by the soil sampling program. Depending on conditions encountered at the site, remediation methods such as excavation, segregation, and/or capping of affected soils may be necessary.
- Evaluate the potential for soil vapor intrusion associated with volatile contaminants such as benzene.
- Assess the need for an off-gassing or a subsurface vapor collection system.
- Continue operating the existing groundwater extraction and treatment system. Evaluate technologies to increase cleanup efficiencies.

Significant Unavoidable Adverse Impacts

Under both the Proposed Action and No Action Alternative, Ecology would require that the soil and groundwater remediation and characterization activities continue.

Under the Proposed Action, the following unavoidable adverse impacts could be expected:

- Significant potential for soil vapor would likely emanate from subsurface contamination to concentrate over time, thereby creating 'pockets' of trapped vapor contamination.
- Institutional controls would likely be required to prevent future use of site groundwater for drinking water or irrigation purposes.

3.2. Surface Water, Water Quality, and Drainage

This section contains information on surface waters, the water quality of surface waters, and drainages on and around the Paramount of Washington, LLC (Paramount) site. Potential drainage and water quality impacts associated with the docket proposal are described. This information was obtained from several sources including aerial photography and drainage basin mapping provided by Snohomish County (County), Flood Insurance Rate Maps developed by the Federal Emergency Management Agency (FEMA), scientific literature regarding stormwater runoff in the Puget Sound Basin, and a site inspection conducted in January 2008.

Degradation of water quality and increased flooding are common occurrences resulting from the development of drainage basins and are directly linked to the increase in impervious surface area that accompanies development. Increases in impervious surface coverage in a basin force streams to accommodate greater flow volumes and greater pollutant loadings conveyed from the developed lands. Regulations and best management practices (BMPs) have been implemented to reduce the flow rates and pollutants from the new impervious surfaces, and new development is required to follow these regulations. However, recent research has indicated that the impacts cannot be entirely mitigated with current regulations and BMPs (Booth et al. 2001; Booth 2000).

The effects of new development on water quality of surface waters also depend on the existing quality of the water body. Section 303(d) of the federal Clean Water Act requires Washington State to periodically prepare a list of surface waters in the state for which beneficial uses have been impaired by pollutants. The Washington State Department of Ecology (Ecology) is responsible for compiling this list for the state. The most recent completed list is for the year 2004; the 2008 list is in draft form and undergoing review by the U.S. Environmental Protection Agency. The list places each water body into one of five categories based on water quality in the water body. The categories are as follows:

Category 1: Meets tested standards. This category is for clean waters. Placement in this category does not necessarily mean that a water body is free of all pollutants. Most water quality monitoring is designed to detect a specific array of pollutants, so placement in this category means that the water body met standards for all the pollutants for which it was tested.

Category 2: Waters of concern. This category is for waters where there is some evidence of a water quality problem, but not enough to require production of a Total Maximum Daily Load (TMDL) calculation at the present time. TMDLs describe the type, amount, and sources of water pollution in a particular water body; analyze how much the pollution needs to be reduced or eliminated to meet water quality standards; and provide targets and strategies to control the pollution.

Category 3: No data. This category is for water bodies that have not been tested.

Category 4: Polluted waters that do not require a TMDL. This category is for waters that have pollution problems that are being solved in one of three ways, as follows:

Category 4a: This category is for water bodies that have an approved TMDL and are actively being implemented.

Category 4b: This category is for water bodies that have a pollution control plan that is expected to solve the pollution problems. While pollution control plans are not TMDLs, they must have many of the same features, and there must be some legal or financial guarantee that they will be implemented.

Category 4c: This category is for water bodies impaired by causes that cannot be addressed through a TMDL. These impairments include low water flow, stream channelization, and dams. These problems require complex solutions to help restore streams to more natural conditions.

Category 5: Polluted waters that require a TMDL. This category is for waters that have violated state water quality standards and that do not have a TMDL or pollution control plan in place. The 303(d) list is the traditional list of impaired water bodies. Placement in this category means that Ecology has data showing that the water quality standards have been violated for one or more pollutants, and there is no TMDL or pollution control plan. TMDLs are required for the water bodies in this category.

It is common for a single water body to be included in more than one category because of the types of pollutants tested and levels of pollutants found. For this document, water bodies in the Paramount site that were found to have pollutants to the extent that placed the water body in Category 2, Category 4, or Category 5 are listed, and the pollutant that caused the categorization is also listed. Water bodies in the study area listed as Category 1, or Category 3 are not specifically noted in this document.

3.2.1. Affected Environment

The 61-acre site is located in the Southwest County Urban Growth Area (UGA) and in the Town of Woodway (Woodway) Municipal Urban Growth Area (MUGA). It has a future land use map (FLUM) designation of Urban Industrial (UI). The site is adjacent to the northern boundary of King County and the southwestern boundary of Woodway. The western boundary of the site is Puget Sound with approximately 3,500 feet of shoreline included in the site.

The Paramount site is located in the Cedar/Sammamish Water Resource Inventory Area (WRIA) also referenced as WRIA 8. The site drains directly into Puget Sound. There is a small unnamed creek that enters the site near the southern end from the steep hillside to the east and then passes through the site in a culvert and discharges into Puget Sound. A constructed ditch along the northern boundary and the northern half of the eastern boundary of the site discharges to Puget Sound and appears mainly to convey runoff and groundwater seepage from the steep hillside to the east of the site. Figure 3.2-1 shows the topography of the Paramount site, the unnamed creek that enters the site near the southern end, and the constructed ditch along the northern and eastern boundaries.

Legend

Paramount of Washington, LLC

Topo (5' contours)

N

Feet

0 250 500 750 1,000

Produced by Snohomish County Department of Planning and Development Services, Cartography/GIS Team Snohomish County disclaims any warranty of merchantability or warranty of fitness of this map for any particular purpose, either expressed or implied. No representation or warranty made concerning the accuracy, currency, completeness or quality of data depicted on this map. Any user of this map assumes all responsibility for use thereof, and further agrees to hold Snohomish County harmless from and against any damage, loss, or liability arising from any use of this map.

Map Document: (W:\plng\carto\docket\ Docket_XIII \Preliminary_Maps\Individual\Infill\SW_Infill\SW41_ ParamountofWashingtonLLC_FLU.mxd) 2/11/2008

Source: Snohomish County Department of Planning and Development Services, Cartography/GIS Team 2008
Aerial photograph: 2007

1068.07/SEIS (11/08)

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Figure 3.2-1
Topography and Drainage—Paramount of Washington

Puget Sound, in the vicinity of the Paramount site, has been placed on Washington State's 2004 303(d) list of threatened and impaired water bodies due to fecal coliform (Category 5) (Washington State Department of Ecology 2004). This area of Puget Sound was also placed on the state's 2004 303(d) list due to low dissolved oxygen. However, there are subsequent findings by Ecology that indicate the low dissolved oxygen is due to natural conditions and this area is expected to be removed from the state's 2008 303(d) list (Washington State Department of Ecology 2008a) which is still in draft form at the time of writing this document.

The western edge of the Paramount site is tidelands and is located in a special flood hazard area. The tidelands in the site are mapped as Zone AE on the FEMA Flood Insurance Rate Map (Federal Emergency Management Agency 1999), which indicates that portion of the site is within a 100-year floodplain, and the base flood elevation has been determined from a detailed study. The area of the Paramount site in the special flood hazard area is all of the tidelands below an elevation of 10.0 feet (Figure 3-2.1 shows the 10 foot elevation contours).

Most of the Paramount site is already developed, serving as a petroleum products storage and transfer facility. Much of the site has impervious coverage. Stormwater runoff is routed through oil/water separators then through a Quadricell® Induced Air Flotation Unit prior to discharging into Puget Sound. A floculant is added to the stormwater runoff during treatment to promote removal of solids.

There are wetlands hydrologically connected to surface waters on the site, which are discussed in Section 3.3 of this document.

3.2.2. Impact Analysis

Proposed Action

The Proposed Action would amend the FLUM designation on the Paramount site from the existing UI to Urban Center (UC). The Proposed Action would also rezone the site from the current zone of Heavy Industrial (HI) to Planned Community Business (PCB). This change in zoning would allow for the potential future construction of 3,500 residential dwellings on 33 acres, and approximately 30 net acres of commercial development.

Currently more than half the site is impervious area. Future development of the Paramount site could increase the amount of impervious surface on the site, increasing stormwater runoff. All runoff from future development would require stormwater treatment per SCC 30.63A.210. Although the existing Paramount site complies with all applicable stormwater treatment standards that were in place at the time of development, future site development that includes stormwater treatment meeting current standards could improve the quality of the stormwater runoff compared to existing conditions. The treatment standards required by SCC 30.63A.210 that would be applied to future development are more efficient at pollutant removal than existing BMPs at the site. If the stormwater treatment BMPs for future development are correctly designed per County standards, there will be no degradation of water quality to the receiving water body resulting from the Proposed Action.

The site currently discharges directly into Puget Sound after water quality treatment and is likely to do so after future development. Because of this, increased flooding due to increased impervious surface associated with future development is not a concern per SCC 30.63A.210 (1) (b) (iii), which indicates that Puget Sound is a massive body of water such that runoff from development is allowed to discharge directly into it. This only applies to the *rate* of runoff discharged into Puget Sound; water quality treatment BMP's are still required to remove pollutants. If the stormwater treatment BMP's discharge directly into Puget Sound, there will be no increased flooding resulting from the Proposed Action.

Future development in the portion of the site that is in a special flood hazard area would require flood-proofing of all new construction per SCC 30.65.110 and would be limited to uses allowed by SCC 30.65.230.

No Action Alternative

The No Action Alternative would retain the existing FLUM designation of UI and the existing zoning of HI. The current petroleum-based operations would continue and could increase to the operation's capacity. The southern site area could be developed with additional UI uses. Only runoff from newly developed impervious surfaces would receive stormwater treatment per SCC 30.63A.210.

3.2.3. Mitigation Measures

Future development must be consistent with SCC 30.63A (Drainage Regulations). If future development occurs, the site-specific impacts would be assessed and appropriate mitigation measures would be imposed through the County's State Environmental Policy Act (SEPA) authority and other appropriate authorities.

Development under either the Proposed Action or No Action Alternative may require mitigation to address specific surface water impacts. The Final Environmental Impact Statement (EIS) for the Growth Management Act (GMA) Comprehensive Plan Update in 2005 (Snohomish County 2005a) listed general mitigation measures that would help offset the impacts of future land use changes on surface water features including:

- Encourage the use of drainage systems that mimic natural drainage systems, such as vegetated swales, wet ponds, and created wetlands.
- Adopt more protective water quality standards, such as more protective requirements for water quality BMPs.
- Reduce impervious surface area by adopting new development requirements that set maximum limits on the percentage of impervious area allowed and increase the infiltration of surface water (low impact development regulations).
- Implement stormwater quality monitoring to evaluate the effectiveness of stormwater practices and standards.

In addition, mitigation measures associated with future development under either the Proposed Action or No Action Alternative may include:

- improvements to the constructed ditch along the north and eastern boundaries of the site to create a channel that mimics a natural creek; and
- removing the culvert that conveys the unnamed creek in the southern portion of the site, and restoring the natural channel through the site for that creek.

Given the extensive development already on the site and associated existing adverse impacts to surface waters, it is likely that mitigation measures associated with development of the Proposed Action would lead to an overall improvement of surface water quality runoff from the site compared to existing conditions.

3.2.4. Significant Unavoidable Adverse Impacts

There would be no significant unavoidable adverse impacts on surface water related to the Proposed Action.

3.3. Wetlands

The Critical Areas Regulations (Snohomish County Code [SCC] 30.62A) regulate development of wetlands and their buffers to protect important elements of the natural environment and to safeguard public health, safety, and welfare. Wetlands and their corresponding buffers are regulated by Part 300 of SCC 30.62A and are designated as critical area protection areas. Snohomish County (County) designates critical areas by defining their characteristics and applies regulations to all development activity within those areas.

Four wetland categories are identified and described in SCC 30.62A.230. These categories are differentiated by criteria such as habitat value, the ability to affect water quality and quantity, and uniqueness. Requirements for wetland buffer widths vary from 25 feet to 300 feet, depending on the wetland category, adjacent land use intensity, and mitigation measures used.

In addition to compliance with Part 300 of SCC 30.62A, approvals from other regulating agencies may be required for future site developments. If wetland fill is proposed, a U.S. Army Corps of Engineers (Corps) permit (Section 404, Clean Water Act) may be required. This, or any federal funding or permit, would require compliance with the Endangered Species Act (ESA), which involves concurrence from the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) concerning listed species. The degree of wetland impacts may also determine whether compliance with Section 401 of the Clean Water Act is required. Section 401 of the Clean Water Act is administered by the Washington State Department of Ecology (Ecology).

The following information and analysis is based on a variety of sources, including National Wetlands Inventory (NWI) maps, previous ICF Jones & Stokes delineations, previous wetland reconnaissance reports provided by the County, and a reconnaissance level review of the site conducted by an ICF Jones & Stokes wetland biologist on January 31, 2008.

3.3.1. Affected Environment

The Paramount of Washington LLC (Paramount) site is developed and has been primarily used for petroleum products storage, processing, and distribution. A new portal and treated sewage outfall pipe is being constructed for King County's Brightwater Treatment Plant directly south of the Paramount site. A railroad runs north and south through the southern portion of the Paramount site and east of the northern portion of the site. It is estimated that there are currently 40 trains that use these tracks daily, which is expected to increase to 75 trains per day in approximately three years (Huff pers. comm.). A spur line to facilities on the existing site allows for delivery and pick up of materials.

According to the Soil Survey of Snohomish County Area, Washington (U.S. Department of Agriculture 1983), the soils series underlying the site include the following:

- Alderwood-Urban land complex, 8% to 15% slopes (map symbol 6);
- Alderwood-Everett gravelly sandy loams, 25% to 70% slopes (map symbol 4); and
- Urban Land (map symbol 78).

These soils are not listed as hydric on the national hydric soil list, but Alderwood-Urban and Alderwood-Everett are known to contain hydric inclusions (Natural Resources Conservation Service 2001). Hydric soils are those that contain water and are an indicator of a wetland.

The NWI maps one estuarine intertidal aquatic bed/unconsolidated bottom (E2AB/USN) regularly flooded wetland along the western edge of the site. This intertidal area was confirmed by a field reconnaissance. Estuarine systems encompass deep-water tidal habitats and adjacent tidal wetlands with variable salinity. The intertidal area is the area between extreme low water and extreme high water, including the associated splash zone. Estuarine wetlands are classified by the appearance of habitat features based on either the dominant vegetation or on the physiography and composition of the substrate. Aquatic beds include wetland and deep-water habitats dominated by plants that grow primarily on or below the water surface. They generally occur in water less than 6.5 feet (2 meters) deep and can occur under a variety of water regimes, including regularly flooded as is the case in the Paramount site. Unconsolidated shore includes wetlands that contain an unconsolidated substrate with less than 75% cover of stones, boulders, or bedrock; less than 30% cover of vegetation other than pioneering plants; and one of various water regimes, including regularly flooded. Regularly flooded estuarine wetlands are those where tidal water alternately floods and exposes land surface at least once daily (Cowardin et al. 1979).

Another NWI-mapped wetland, shown as a palustrine forested wetland that is temporarily flooded (PFOA) is indicated along the north portion of the site. This wetland is mapped as being outside of the site boundary; however, the actual wetland boundary has not been delineated. Depending on the location of the delineated boundary and the classification of the wetland, the wetland buffer may extend onto the Paramount site. Palustrine wetlands are non-tidal wetlands dominated by trees, shrubs, emergents, mosses, or lichens and have a salinity that is less than 0.5 parts per thousand (ppt). Forested wetlands are those containing woody vegetation that is greater than or equal to 19.66 feet (6 meters) in height. Temporarily flooded wetlands are those where surface water is present for brief periods of time during the growing season but the water table usually lies below the soil surface (Cowardin et al. 1979).

During the field reconnaissance, one additional potential wetland was observed on the northeast portion of the parcel along the railroad tracks. The potential wetland has not been delineated, but is linear and ditch-like and was found to have wetland vegetation and flowing water that discharged into Puget Sound (Figure 3.3-1). This drainage ditch conveys water from the hillside along the eastern side of the railroad tracks into Puget Sound and is routinely excavated to remove accumulated sediment and to prevent flooding of the railroad tracks. Neither the NWI wetlands nor the potential wetland identified during the field reconnaissance survey has much natural buffer due to the disturbed site conditions. Any future site-specific development proposal would require a wetland delineation and further environmental review to assess the extent of wetlands on the site, to classify wetlands, and to determine how the Critical Area Regulations would affect the Proposed Action. Prior to site-specific analysis, the wetlands/potential wetlands on the site cannot be classified.

The western boundary of the site is located along the shore of Puget Sound and Part 320 of SCC 30.62A indicates that a 150-foot buffer is required for marine shorelines. Because this shoreline has also been identified as a wetland (the estuarine wetland described above), the buffer required may be greater than the shoreline buffer, depending on the wetland category. Project level analysis would require wetland delineation and classification.

Buffer widths may be reduced by up to 15% without the requirement of a critical area study or mitigation plan if the buffer is placed in a separate tract or if a fence is constructed to discourage human use of the buffer. Fences must comply with the provisions of Part 320 of SCC 30.62A and allow wildlife passage.

Buffer averaging is allowed, meaning that buffer widths can be reduced in some areas and increased in others, with specific provisions as described in Part 320 of SCC 30.62A. Buffer averaging requires a critical area study.

3.3.2. Impact Analysis

Proposed Action

Changing the future land use map (FLUM) designation from Urban Industrial (UI) to Urban Center (UC) would facilitate higher density residential and commercial development. Impacts on wetlands or wetland buffers would require adherence to the County's Critical Area Regulations (SCC 30.62A).

The actual extent of on-site wetlands, as well as wetland functions and values, would be assessed at the time of a project-level environmental review. Wetlands and buffers within the site would limit development in those specific areas. Development within a wetland or buffer would result in the direct filling and subsequent loss of the resource. With development, pervious areas would probably be converted to a combination of impervious surfaces, lawn, and nonnative ornamental species.

Development outside of wetlands and buffers could result in some indirect impacts on wetlands including sedimentation from stormwater runoff, increased nutrient loading from road and lawn runoff, changes in the amount or time water is in the wetland, and associated changes to wetland vegetation and habitat. Higher density development would also increase the probability of nonnative plant species invading wetland and buffer vegetation communities.

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Figure 3.3-1
Wetlands - Paramount of Washington

No Action Alternative

Under the current zoning of Heavy Industrial (HI) and designation of UI, the site could be further developed with higher intensity land uses. Permitted uses under HI include antique shops, auto repair shops, churches, cold storage, department stores, drug stores, greenhouses, hardware stores, kennels, medical clinics, and park-and-ride lots. However, it is likely that any further intensity of use on the site would involve an increase in the present operation's capacity plus additional related industrial uses on the southern area of the site. The effect of an increase in current operations on the site could result in an increase in impervious surfaces possibly leading to additional impact on the existing wetlands such as increased sedimentation from stormwater runoff, increased nutrient loading from road runoff, or changes in the amount or time water is in the wetland. Development in a wetland or buffer would result in the direct filling and subsequent loss of the resource.

Under the No Action Alternative, the site may be used for petroleum product refining and distribution because the facility continues to contain all of the necessary components of an operational refinery and this use is permitted under the existing zoning. In the past, refinery operation on the site has refined up to 5,000 barrels of petroleum per day. If this were to occur, it is likely that train traffic to the site would also increase.

3.3.3. Mitigation Measures

Development under the Proposed Action or the No Action Alternative may require mitigation to address specific direct and indirect wetland impacts. If future development is proposed for the property, specific impacts from development would be assessed at that time, and appropriate mitigation measures would be imposed through the County's State Environmental Policy Act (SEPA) authority and other applicable regulations.

General mitigation measures, as identified in the Environmental Impact Statement (EIS) for the 2005 Growth Management Act (GMA) Comprehensive Plan Update, include the following:

- minimize impervious surface area;
- schedule construction activities to occur during the dry season to reduce impacts on soils near wetlands and streams;
- encourage increased infiltration of stormwater where technically feasible;
- encourage buffer enhancement; and
- where protected stream and wetland buffers are in a degraded condition, encourage enhancement of the buffer through means such as establishment of native vegetation and control of nonnative invasive plant species.

Part 310 of SCC 30.62A requires that development activities be designed and conducted to achieve no net loss of critical area functions and values. The project proponent must demonstrate that a reasonable effort has been made to avoid and minimize impacts, with avoidance taking precedence. If avoidance is not possible, impacts should be minimized to the extent possible and impacts to functions and values must be mitigated. Mitigation for impacts to functions and values of wetlands and wetland buffers should be in-kind and occur on site. Off-site mitigation may be approved if on-site mitigation cannot replace impacted functions and values. Off-site mitigation must occur in the same sub-drainage basin or, in the case of an estuarine wetland, the same drift-cell, which is a discrete area of sediment transport along the shoreline.

If it is determined that a proposed project would impact the functions or values of wetlands or wetland buffers, a mitigation plan must be developed, per Part 150 of SCC 30.62A. The mitigation plan must include:

- a description of existing functions and values—those that would be impacted, and functions and values anticipated with mitigation;
- a description of how lost functions and values would be replaced;
- a mitigation schedule;
- a long-term monitoring and maintenance plan;
- performance standards; and
- a form providing right-of-entry for the County to inspect the mitigation during the monitoring period.

Part 320 of SCC 30.62A describes wetland buffer widths. Standard buffer widths are identified for each wetland category; however, buffers can be larger in areas of high density land use and smaller than the standard in areas of low density land use. Two standard mitigation measures are identified in Part 340 of SCC 30.62A. For Category I and II wetlands in an area of high land use intensity and with a moderate or high level of habitat function, the required wetland buffer is greater than the standard if neither of these mitigation measures is implemented or if only one of the two is implemented. If both mitigation measures are implemented, the standard buffer width applies. Buffers for Category I and II wetlands with low habitat function values and Category III and IV wetlands in areas of high land use intensity are larger than the standard buffer if neither of the mitigation measures is implemented. Implementing either of the two mitigation measures, however, allows the standard buffer to be used. The two standard mitigation measures are:

- Mitigation Measure 1. Implementation of all applicable mitigation measures identified in Part 340 of SCC 30.62A, Table 5 (Table 3.3-1 below); and
- Mitigation Measure 2. Establishment of a habitat corridor.

Table 3.3-1. Mitigation Measures for High Intensity Land Uses (Part 340, SCC 30.62A, Table 5)

Examples of Disturbance[1]	Activities and Uses that Cause Disturbances	Examples of Measures to Minimize Impacts
Lights	▪ Parking lots ▪ Warehouses ▪ Manufacturing ▪ Residential	▪ Direct lights away from wetland
Noise	▪ Manufacturing ▪ Residential	▪ Locate activity that generates noise away from the wetland
Toxic runoff	▪ Parking lots ▪ Roads ▪ Manufacturing ▪ Residential areas ▪ Landscaping	▪ Route all new untreated runoff away from wetland while ensuring that wetland is not dewatered ▪ Establish covenants governing use of pesticides within 150 feet of wetland ▪ Apply integrated pest management
Stormwater runoff	▪ Parking lots ▪ Roads ▪ Manufacturing ▪ Residential areas ▪ Commercial ▪ Landscaping	▪ Retrofit stormwater detention and treatment for roads and existing adjacent development ▪ Prevent channelized flow
Change in water regime	▪ Impermeable surfaces ▪ Lawns ▪ Tilling	▪ Infiltrate or treat, detain, and disperse into buffer new runoff from impervious surface and new lawns
Pets and human disturbance	▪ Residential areas	▪ Use privacy fencing; plant dense vegetation to delineate buffer edge and to discourage disturbance using vegetation appropriate for the ecoregion; place wetland and its buffer in a separate tract

[1] These examples are not necessarily adequate for minimizing toxic runoff if threatened or endangered species are present at the site.

Habitat corridors should be designed in the following manner:

- connecting to a Category I or II wetland with a wetland, fish and wildlife habitat conservation area, or a buffer that is on the same property or in the same development, including all phases proposed;
- on adjacent properties and already protected as a Native Growth Protection Area (NGPA) or a Critical Area Protection Area (CAPA) or other permanently protected open space suitable for wildlife habitat use that either extends to the property boundary or is connected by easement; or
- on county, state, or federal land used for forestry, conservation, or passive recreation parks.

Habitat corridors may connect to a stormwater facility if the facility is designed to look like a natural pond or wetland. Habitat corridors must contain relatively undisturbed vegetation and maintain an average width as shown in Table 3.3-2.

Table 3.3-2. Average Width for Habitat Corridors

Wetland Category	Description	Standard Buffer Width (feet)	High Intensity Buffer Width (feet)	Average Habitat Corridor Width (feet)
Category I	Washington Natural Heritage Program/DNR high quality wetlands	190	250	60
	Bogs	190	250	60
	Estuarine (at least 1 acre) and Coastal Lagoons	150	200	50
	High Level Habitat Function (habitat function score is 29-36)	225	300	75
	Moderate Level Habitat Function (habitat function score is 20–28)	110	150	40
Category II	Estuarine (less than 1 acre)	110	150	40
	High Level Habitat Function (habitat function score is 29–36)	225	300	
	Moderate level Habitat Function (habitat function score is 20–28)	110	150	40

Source = Part 320 of SCC Chapter 30.62A.

If impacts to wetland functions and values are unavoidable, mitigation for these impacts is required. Table 3.3-3 shows the required mitigation ratios for wetlands.

Table 3.3-3. Mitigation Ratios for Wetlands (Part 340 SCC 30.62A)

Category/Type of Wetland	Creation	Enhancement[1]
All Category IV	1.5:1	3:1
All Category III	2:1	4:1
Category II Estuarine	Innovative development only	4:1
All other Category II	3:1	2:1
Category I (based on score for functions)	4:1	8:1
Category I Natural Heritage site	Innovative development only	Innovative development only
Category I Coastal Lagoon	Innovative development only	Innovative development only
Category I Bog	Not allowed	Innovative development only
Category I Estuarine	Innovative development only	Innovative development only

[1] Enhancement is allowed in lieu of creation for up to one acre of wetland fill.

Source = Part 320 of SCC Chapter 30.62A.

Innovative development design is described in Part 350 of SCC 30.62A and requires a critical area study that shows that the innovative design provides equivalent or better protection to critical area functions and values to that provided by standard prescriptive measures.

Impacts to buffer functions and values also require mitigation. Buffer mitigation ratios are shown in Table 3.3-4. These ratios may be reduced if innovative development is implemented and a critical area study shows that the innovative development design provides equivalent protection. Innovative development design may include measures prescribed in guidance documents such as watershed conservation plans or other similar conservation plans, low impact stormwater management strategies that address wetlands, fish and wildlife habitat conservation areas or buffer protection, and available information on low impact development.

Table 3.3-4. Mitigation Ratios for Buffers (Part 320 SCC 30.62A)

Existing Riparian Habitat Vegetation Type	Creation	Enhancement[1]
Mature forest	6:1	12:1
Non-mature forest	6:1	3:1
Shrub	2:1	4:1
Non-woody vegetation	1.5:1	3:1
No vegetated cover	1:1	2:1

[1] Enhancement of the existing buffer is allowed in lieu of creation for up to one acre of buffer loss.

Wetland and buffer enhancements include activities such as removal of nonnative vegetation and planting locally adapted, native plant species; providing snags and large woody debris, and revegetating cleared areas to provide a buffer. Specific methods used are dependent on the conditions of the site and the goals of the enhancement plan.

3.3.4. Significant Unavoidable Adverse Impacts

If potential impacts on wetlands or buffers from future development of the site are avoided or mitigated, then no unavoidable adverse impacts are anticipated for this site. If wetland or buffer areas cannot be avoided or mitigated, then any future development would likely result in significant unavoidable adverse wetland impacts.

3.4. Fisheries

The Critical Areas Regulations (Snohomish County Code [SCC] 30.62, and Fish and Wildlife Conservation Areas Regulations SCC 30.62A) regulate the development of streams, wetlands, marine habitat, and their buffers to protect important elements of the natural environment and to safeguard public health, safety, and welfare. Snohomish County (County) designates critical areas by defining their characteristics and applies regulations to all development activity in those areas, including permit applications. Approvals from other regulating agencies may also be required for future site developments. If wetland or stream fill is proposed, then a U.S. Army Corps of Engineers (Corps) permit (Section 404, Clean Water Act) may be required. This, or any federal funding or permit, would require compliance with the Endangered Species Act (ESA), which involves concurrence from the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) concerning listed species (i.e., Puget Sound chinook salmon, Puget Sound steelhead trout, and Puget Sound or coastal bull trout). Federal nexus (permits or funds) would also necessitate consultation with NMFS on potential effects of site development that could have adverse effects on essential fish habitat managed under the Magnuson–Stevens Fisheries Conservation Act (MSA).

Development that results in wetland impacts may also require compliance with Section 401 of the Clean Water Act, which is administered by the Washington State Department of Ecology (Ecology). A Hydraulic Project Approval (HPA) would be required from the Washington Department of Fish and Wildlife (WDFW) for any action that would alter the bed or banks of streams or marine waters, or if any impacts on wetlands are associated with those waters. Since this analysis does not include a specific development proposal, it is not known if any changes to the bed or banks of streams or the marine shoreline would occur.

A reconnaissance-level review of the habitat at the Paramount of Washington LLC (Paramount) site was conducted during a site visit in January 2008 by an ICF Jones & Stokes wetland ecologist and a fisheries biologist.

3.4.1. Affected Environment

The Paramount site is located on Point Wells on the eastern shore of the central basin of Puget Sound. One small stream crosses the site in a culvert (except for a small portion at the upstream/eastern edge of the site). The stream provides no fish habitat value due to the gradient of the site, the size of the stream, and the developed state of the property; therefore, the remainder of this section describes marine habitat and species.

Puget Sound tidelands along the western edge of the Paramount site provide habitat for a variety of marine species. The upper intertidal zone includes armored riprap banks along nearly the entire length, with the only exception along the very northern edge of the site. Below the armored bulkhead, there is a gravelly beach down to about the mean lower low water level (MLLW).

Subtidal habitat west of the Paramount site has sandy substrates and supports patchy eelgrass beds down to about the –15- to –20-foot MLLW elevation (Parametrix and King County 2003).

Existing fuel docks on the site provide deepwater ship access to the site and are currently used to transfer petroleum products from ship to shore. The pilings of the dock structures support a dock/piling community of marine invertebrates and fish that generally differ from the surrounding areas. The structure and cover of pile-supported docks shades the bottom and attracts rockfish and perch, as well as inhibits eelgrass and macroalgae growth on the bottom. In addition, mollusk and barnacle shell fragments often accumulate beneath pilings, influencing the benthic invertebrate community.

Armored riprap banks at the upper limit of the intertidal zone provide relatively little marine habitat value. Barnacles and clinging mollusks (snails, limpets, and chitons) attach to these rocks, and small crustaceans inhabit crevices between riprap boulders.

The pebbly beach in front of the armored banks supports some algae such as sea lettuce (*Ulva* species, primarily *Ulva lactuca*) and a variety of worms and clams; provides foraging areas for juvenile salmonids; and provides spawning habitat for two important forage fish species, sand lance and surf smelt (King County 2003; Washington Department of Fish and Wildlife 2008a). Most of the beach on the project site is mapped as potential forage fish spawning habitat, and a large portion is mapped as known spawning habitat (Washington Department of Fish and Wildlife 2008a).

Below the approximately 0.0 MLLW tidal elevation, the substrate is subjected to less wave action resulting in sandier sediment and a different benthic community. Eelgrass forms patchy beds that serve a number of valuable ecologic functions. Eelgrass blades typically support a growth of epiphytic algae and a number of clinging crustacean species (primarily copepods and isopods). Herring (*Clupea harengus*) and market squid (*Loligo opalescens*) often spawn in eelgrass, attaching their eggs to the eelgrass blades. Eelgrass and eelgrass-supported epiphytes are important primary producers and provide nutrients at the base of the Puget Sound food web.

Clams that inhabit the intertidal areas in the vicinity of Point Wells include heart cockles, gapers (horse clams), and geoducks (Golder and Parametrix 2002). Geoduck clam surveys were completed in the permitting/siting process for the Brightwater wastewater treatment plant outfall located immediately south of the Paramount site on Point Wells (Golder and Parametrix 2002). Geoduck clams were found at an average density of 0.08 per square foot (0.84 clam per square meter), and an average weight of 2.34 pounds (1.06 kilograms) per geoduck and 8,154 pounds per acre (8,920 kilograms per hectare) at elevations between –4 feet (1.2 meters) relative to MLLW and –70 feet (21.3 meters) MLLW (Golder and Parametrix 2002).

As part of the geoduck survey, other marine species were recorded and are listed in Table 3.4-1.

Table 3.4-1. Marine Animal Species Observed During Geoduck Surveys in the Vicinity of Point Wells

Group/Species Common Name1	Scientific Name	Group/Species Common Name1	Scientific Name
Algae		**Worms**	
Sea lettuce (green algae)	*Ulva sp.*	Tube worm	*Phyllochaetopterus prolifica*
Foliose red algae	*Rhodophyta*	Tube worm	*Spiochaetopterus costarum*
Filamentous red algae	*Rhodophyta*	**Echinoderms**	
Rockweed (brown algae)	*Fucus sp.*	Seastar	*Pycnopodia helianthoides*
Burrowing anemone	*Pachycerianthus fimbriatus*	Seastar	*Dermasterias imbricata*
Cnidarians		Seastar	*Mediaster aequalis*
Hydroids	*Cnidaria: Hydrozoa*	Seastar	*Crossaster papposus*
Sea anemone	*Metridium sp.*	Seastar	*Luidia foliata*
Sea anemone	*Urticina columbiana*	Seastar	*Solaster dawsoni*
Mollusks		Seastar	*Pisaster orchraceus*
Baetic dwarf olive snail	*Olivella baetica*	Seastar	*Pisaster brevispinus*
Diamond back tritonia	*Tritonia festiva*	Seastar	*Evasterias troschelli*
Rosy tritonia	*Tritonia diomedea*	Brittlestar	*Ophiura luetkini*
Gaper clams (formerly horse clam)	*Tresus sp.*	Sea cucumber	*Parastichopus californicus*
Geoduck clam	*Panopea abrupta*	**Fish**	
Rough mya clam	*Panomya sp.*	English sole	*Pleuronectes vetulus*
Truncate softshell clam	*Mya truncata*	C-O sole	*Pleuronichthys coenosus*
Nuttall cockle	*Clinocardium nuttallii*	Buffalo sculpin	*Enophyrs bison*
Northern horsemussel	*Modiolus modiolus*	Spotted ratfish	*Hydrologus colliei*
Bobtail Squid	*Rossia pacifica*		
Crustaceans			
Hermit crab	*Pagurus sp.*		
Red rock crab	*Cancer productus*		
Dungeness crab	*Cancer magister*		
Graceful rock crab	*Cancer gracilis*		
Northern kelp crab	*Pugettia producta*		

Source = Golder and Parametrix 2002.

[1] Common name of mollusks, crustaceans, and fish are standardized by the American Fisheries Society.

Eight salmonid fish species (chinook salmon, coho salmon, pink salmon, chum salmon, sockeye salmon, steelhead trout, cutthroat trout, and bull trout) all inhabit Puget Sound and may at times be present along the shoreline of the Paramount site. Of these species, three have been listed under the ESA. Salmonid species potentially present at the site and their ESA status are listed in Table 3.4-2. Juvenile salmonids likely forage along the shoreline of Point Wells, and adults may be found farther offshore.

Table 3.4-2. Salmonid Species Potentially Present at the Paramount Site and Associated Endangered Species Act Status

Species		Distribution	ESA Status
Common Name	Scientific Name		
Puget Sound chinook salmon	*Oncorhynchus tshawytscha*	Puget Sound	Threatened
Puget Sound coho salmon	*Oncorhynchus kisutch*	Puget Sound	None
Puget Sound chum salmon	*Oncorhynchusketa*	Puget Sound	None
Puget Sound coastal bull trout	*Salvelinus confluentus*	Puget Sound	Threatened
Puget Sound steelhead trout	*Oncorhynchus mykiss*	Puget Sound	Threatened
Sea-run cutthroat trout	*Oncorhynchus clarki*	Puget Sound	None

Source = Washington State Department of Fish and Wildlife (2008b).

Essential fish habitat (EFH) includes those waters and substrate necessary for fish of the species managed under the MSA to spawn, breed, feed, or grow to maturity. EFH waters include aquatic areas and their associated physical, chemical, and biological properties, substrate, and associated biological communities. At the Paramount site, this would include all marine waters below mean high tide elevation. Fish species with EFH in Puget Sound are listed in Table 3.4-3.

3.4.2. Impact Analysis

Proposed Action

Under the Proposed Action, the Paramount site would change from an industrial site to a high density, mixed-use area. This change would result in the removal of petroleum products and asphalt manufacturing and storage facilities from the site. Transfer of petroleum products would discontinue, and commercial space, residential dwellings, and associated development would eventually be built. Discontinuing ship traffic and the use and transfer of petroleum products associated with the existing site use would reduce the risk of oil spills which can have extensive detrimental effects on fish and aquatic habitat.

Table 3.4-3. Fish Species with Essential Fish Habitat in Puget Sound

Common Name	Scientific Name
Groundfish - Cartilaginous Fish Species	
Spiny dogfish	*Squalus acanthias*
Big skate	*Raja binoculata*
California skate	*Raja inornata*
Longnose skate	*Raja rhina*
Ratfish	*Hydrolagus colliei*
Groundfish - Cod	
Pacific cod	*Gadus macrocephalus*
Pacific whiting (hake)	*Merluccius productus*
Sablefish	*Anoplopoma fimbria*
Groundfish - Rockfish Species	
Black rockfish	*Sebastes melanops*
Bocaccio	*S. paucispinis*
Brown rockfish	*S. auriculatus*
Canary rockfish	*S. pinniger*
China rockfish	*S. nebulosus*
Copper rockfish	*S. caurinus*
Darkblotch rockfish	*S. crameri*
Greenstriped rockfish	*S. elongatus*
Pacific Ocean perch	*S. alutus*
Quillback rockfish	*S. maliger*
Redbanded rockfish	*S. babcocki*
Redstripe rockfish	*S. proriger*
Rosethorn rockfish	*S. helvomaculatus*
Rosy rockfish	*S. rosaceus*
Rougheye rockfish	*S. aleutianus*
Sharpchin rockfish	*S. zacentrus*
Splitnose rockfish	*S. diploproa*
Striptail rockfish	*S. saxicola*
Tiger rockfish	*S. nigrocinctus*
Vermilion rockfish	*S. miniatus*
Groundfish - Rockfish Species	
Yelloweye rockfish	*S. ruberrimus*
Yellowtail rockfish	*S. flavidus*
Shortspine thornyhead	*Sebastolobus alascanus*
Groundfish - Cabezon, Lings	
Cabezon	*Scorpaenichthys marmoratus*
Lingcod	*Ophiodon elongatus*
Kelp greenling	*Hexagrammos decagrammus*
Groundfish - Flatfish	
Pacific sanddab	*Citharichthys sordidus*
Butter sole	*Isopsetta isolepis*
Curlfin sole	*Pleuronichthys decurrens*
Rex sole	*Glyptocephalus zachirus*
Rock sole	*Lepidopsetta bilineata*
Sand sole	*Psettichthys melanostictus*
Starry flounder	*Platichthys stellatus*
Arrowtooth flounder	*Atheresthes stomias*
Dover sole	*Microstomus pacificus*
English sole	*Parophrys vetulus*
Flathead sole	*Hippoglossoides elassodon*
Petrale sole	*Eopsetta jordani*
Coastal Pelagic Species	
Anchovy	*Engraulis mordax*
Pacific sardine	*Sardinops sagax*
Pacific mackerel	*Scomber japonicus*
Market squid	*Loligo opalescens*
Pacific Salmon Species	
Chinook salmon	*Oncorhynchus tshawytscha*
Coho salmon	*O. kisutch*
Puget Sound pink salmon	*O. gorbuscha*

Because the site is fully developed, there is currently little or no functioning shoreline buffer along the majority of the shoreline. If the standard 150-foot shoreline buffer is conserved during site redevelopment, there would be no new impacts to fisheries. However, maintaining the existing buffer in the current condition would not benefit the Puget Sound tidelands and marine habitat on and adjacent to the Paramount site. As allowable under SCC 30.62.350, the shoreline buffer distance could be reduced to as little as 75 feet (half of the standard buffer width) during site redevelopment, if the buffer area is enhanced to provide an improvement in the ecological functions and values of the buffer area. Site amenities such as stormwater permeable pedestrian walkways, access to outdoor facilities, and stormwater detention/retention facilities could also be located in the buffer area. In addition, an “innovative development design” (SCC 30.62.370) could be used to improve shoreline, stream, or wetland buffer functions and values, with a reduced buffer distance. For the buffer to be reduced, the applicant would have to demonstrate that the development would result in a net improvement in buffer functions and values.

Any development proposal at this site that would reduce the shoreline buffer from the standard 150-foot width would have to be evaluated for its effects on buffer functions and values. Restoration opportunities that could be incorporated into buffer enhancement or an innovative development design to improve fisheries habitat conditions could include, but are not limited to:

- replacing impervious surfaces with pervious surface area;
- planting native vegetation that can shade the upper beach or contribute wood to the shoreline; shade of the upper beach could benefit forage fish egg incubation, since smelt and sand lance spawn in the substrate of the upper beach and their eggs would be less likely to become desiccated during low tide along shaded beach sections; and
- replacing a portion of the existing seawall with a more natural shoreline, which could conceivably include pocket beaches or removal of armoring along a more extensive stretch of shoreline; ideally this option would be combined with native plantings, particularly along the northern side of Point Wells, as this area would receive the most shade from trees planted in the buffer area.

No Action Alternative

Under the No Action Alternative, the Paramount site would continue to increase operations, fuel storage and distribution operations could be added, and marine fueling operations could increase. Although state and federal regulations would continue to apply to industrial activities at the site, reducing the potential for spills, there would be a greater potential for fuel spills than under the Proposed Action.

3.4.3. Mitigation Measures

No mitigation measures for fisheries impacts would be required.

3.4.4. Significant Unavoidable Adverse Impacts

There are no significant unavoidable adverse impacts.

3.5. Wildlife and Vegetation

3.5.1. Wildlife

This section focuses on critical wildlife species. Streams, lakes, marine waters, and critical fish species are discussed in Section 3.4, Fisheries.

The Critical Areas Regulations (Snohomish County Code [SCC] 30.62A) regulate wetlands and fish and wildlife habitat conservation areas to protect important elements of the natural environment and to safeguard public health, safety, and welfare. Snohomish County (County) designates critical areas by defining their characteristics and applies regulations to all development activity within those areas, including permit applications. These regulations implement the Growth Management Act (GMA), which promotes environmental protection, preservation, and good stewardship practices.

Wetlands that contain critical species listed as endangered or threatened by the state or federal governments are also protected pursuant to SCC 30.62A.400. Wetlands are discussed in Chapter 3.3 of this Draft Supplemental Environmental Impact Statement (SEIS).

Fish and wildlife conservation areas are defined in SCC 30.62A.010 as the following:

- streams,
- lakes,
- marine waters, and
- primary association areas for critical species.

Critical species are defined in SCC 30.62A.410 as the following:

- species listed as threatened or endangered under Revised Code of Washington (RCW) 77.12.020 and Title 16 United States Code (USC);
- species of local importance designated under SCC 30.62A.470; and
- the following Washington State-listed sensitive species:
  - Larch Mountain salamander,
  - common loon,
  - peregrine falcon,
  - Olympic mudminnow,
  - pygmy whitefish, and
  - gray whale.

Primary association areas are defined in SCC 30.91P.290 as “the area necessary for the viability and protection of any critical species, including habitat and surrounding areas needed for protection of the habitat.” This includes areas known to contain a critical species, or where the best available science indicates the habitat is used by a critical species. Uses include but are not limited to breeding, feeding, cover, and migration. The size of a primary association area is species and population dependent, and based on species’ habitat requirements.

Information contained in this analysis is based on a reconnaissance-level review of habitat at the Paramount of Washington LLC (Paramount) site conducted in January 2008 by an ICF Jones & Stokes wetland ecologist and a review of Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) data (WDFW 2008a).

Affected Environment

The approximate 61-acre Paramount site is located on the shore of Puget Sound and contains both highly developed upland area and tidelands. Tidelands make up the entire western boundary of the site. A railroad track runs along the eastern boundary of the portion of the site to the north of where the railroad crosses Point Wells Road (Figure 2-1), and a steep wooded bluff rises to the east of the track. South of where the railroad track crosses the road, a portion of the developed Paramount site is located east of the railroad track, with the steep wooded bluff continuing to the east of the site. There is very little vegetation in the upland portion of the site; therefore, habitat for wildlife is limited. Of the four habitat types defined as fish and wildlife conservation areas in SCC 30.62A.010, only marine waters occur on the site. The tidal area is also considered an estuarine wetland and there is one freshwater wetland on the site. Chapter 3.3 describes Wetlands in detail.

The Paramount site is developed and has been primarily used for petroleum products storage, processing, and distribution. Directly south of the Paramount site, a new portal and treated sewage outfall pipe is being constructed for King County’s new Brightwater wastewater treatment plant. A railroad runs north and south through the southern portion of the Paramount site and east of the northern portion of the site. It is estimated that there are currently 40 trains that use these tracks daily and this is expected to increase to 75 trains per day in approximately 3 years (Huff pers. comm.). A spur line to facilities in the existing site allows for delivery and pick up of materials on site.

A search of the WDFW PHS database found habitat for one critical species on the site. A bald eagle (*Haliaeetus leucocephalus*) nesting territory is located approximately 0.5 mile to the northeast of the site in Deer Park Reserve, a forested ravine associated with a stream draining to Puget Sound from the Town of Woodway (Woodway) and the bald eagle shoreline buffer associated with this nesting territory extends south and includes approximately the northern quarter of the site. Bald eagles from this nesting territory may perch in trees to the east of the site, forage in Puget Sound offshore of the site, and use undeveloped tidelands for consuming prey or resting. Bald eagles are not expected to regularly use the developed portion of the site due to a lack of suitable habitat features.

None of the Washington State-sensitive species identified in SCC 30.62A.410 are expected to be present on the site, although gray whales (*Estrichtius robustus*) may occasionally occur offshore of the site. Other marine mammals may also be found in the vicinity, including the southern resident killer whale (*Orcinus orca*), which is listed as endangered under the Endangered Species Act (70 FR 69903-69912).

A beach assessment study conducted on Point Wells beach, immediately south of the site, identified 31 species of invertebrates and several birds. Invertebrates observed included limpets, snails, chitons, bivalves, sea slugs, sea stars, barnacles, crabs, shrimp, hermit crabs, and anemones. The most abundant species found was butter clam (*Saxidomus gigantean*) and littleneck clam (*Protothaca staminea*). Birds reported were western gull (*Larus occidnetalis*), Bonaparte's gull (*L. philadelphia*), herring gull (*L. argentatus*), western grebe (*Aechmophorus occidentalis*), Arctic tern (*Sterna paradisaea*) and great blue heron (*Ardea herodias*) (King County 2008a). Given the proximity of the surveyed area to the site, it is likely that many of the same species also occur in the site.

Other species that may use the site include harbor seals (*Phoca vitulina*), which may forage near the shore or haul out on the beach; birds commonly associated with developed areas such as American crow (*Corvus brachyrhynchos*) and European starling (*Sturnus vulgaris*); and additional species of gulls and waterfowl.

Impact Analysis

Proposed Action

The Proposed Action would change the County’s Future Land Use Map (FLUM) designation of the site from Urban Industrial (UI) to Urban Center (UC). A UC designation would allow for redevelopment of the site as a mixed-use, planned community with regional retail, services, and high-density housing. Any redevelopment that occurred on the site would have to meet current code requirements for shoreline setbacks and wetland buffers.

Access to the Paramount site is currently restricted and although industrial activity occurs, the level of human activity in the tidal area is low. If redevelopment to mixed use were to occur, the level of human activity in the tidal area could be expected to increase. Point Wells beach to the south is heavily used by clam diggers and beachcombers (King County 2008a), and similar use could be expected as a result of allowing public access to the site’s beaches. This could reduce the potential for wildlife usage of the site, as wildlife may be disturbed by the presence of humans.

Wildlife currently using the site are expected to be acclimated to noise and activity associated with industrial use of the site, train traffic to and through the site, and ongoing construction of the Brightwater outfall to the south of the site. Some individuals may be disturbed by noise and activity associated with redevelopment, but others would likely not be disturbed because of acclimation. Following redevelopment, noise levels on the site may be lower because of decreased industrial activity and train traffic to the site and increased vegetative cover that would provide some noise attenuation.

Redevelopment of the site could benefit bald eagles by providing perch trees closer to the shoreline from which they could forage, particularly if native tree species such as Douglas-fir and western red cedar are planted in the shoreline buffer. It would, however, take several years for these trees to grow to a size suitable for bald eagle use. Increased human activity along the shoreline may discourage use by bald eagles, although individual eagles vary in their sensitivity to humans and eagles nesting in this relatively urban area may be acclimated to human activity.

Redevelopment for mixed use may benefit species that are commonly found in association with human development; however, it would likely include landscaping that could provide nesting or foraging habitat for these species. If wetland buffers or shoreline setbacks are restored using native plant species, additional wildlife habitat would be created on the site.

Under the Proposed Action, the dock on the site would no longer be used for transferring fuel for either fuel storage and distribution areas or for marine fueling operations, which would reduce the risk of water contamination from an oil or fuel spill that could impact marine mammals, birds, and invertebrates.

Lowering the risk of fuel spills into Puget Sound would benefit southern resident killer whales by reducing their risk of contamination. Puget Sound is included in the area designated as critical habitat for southern resident killer whales (71 FR 69054-69070). Redevelopment of the Paramount site could benefit critical habitat for the species by restoring a shoreline buffer, thereby incrementally improving water quality in the area.

No Action Alternative

Under the No Action Alternative, the Paramount site would continue to be managed as it currently is, with some redevelopment of industrial uses likely in areas currently not operating such as petroleum product refining and distribution (since the facility continues to contain all of the necessary components of an operational refinery and this use is permitted under the existing zoning). In the past, refinery operation on the site refined up to 5,000 barrels of petroleum per day. If this were to occur, it is likely that train traffic to the site would also increase, increasing the potential for noise to disturb wildlife using the site.

According to Paramount, there would be an estimated 75 fuel transfers across the existing dock on the property per year for fuel storage and distribution and 412 fuel transfers across the dock for marine fueling operations. This is an increase over the existing use as described in Chapter 2, and would increase the risk of a fuel spill that could impact the shoreline and the waters of Puget Sound, potentially impacting marine mammals, birds, and invertebrates. The National Marine Fisheries Service (NMFS) lists oil or other contaminant spills as a risk factor for the southern resident killer whale; although, it is thought to be a relatively low risk because of the standards and safeguards already in place (National Marine Fisheries Service 2008).

The beach would remain restricted from public use; therefore, human disturbance to wildlife would be less than what could occur under the Proposed Action. The site would continue to lack significant vegetation and so would lack habitat for most wildlife species.

Mitigation Measures

No mitigation measures for wildlife impacts would be required.

Significant Unavoidable Adverse Impacts

There are no significant unavoidable adverse impacts.

3.5.2. Vegetation

Affected Environment

The Paramount site is heavily developed and contains little natural vegetation. Tidal areas likely contain marine vegetation. A beach assessment conducted at Point Wells beach, to the immediate south of the site, recorded the presence of large algae in the genera *Desmerestia*, *Costaria*, and *Sargassum* in areas containing cobbles and boulders, and sea lettuce (*Ulva lactuca*) was observed attached to several rocks (King County 2008a). Given the proximity of Point Wells beach to the site, it is likely that many of the same genera/species also occur in the site.

Impact Analysis

Proposed Action

As with wildlife, it is likely that redevelopment of the Paramount site would increase the amount of vegetation on the site, due to landscaping and potential restoration of wetland buffer and shoreline set back areas. Landscaping is likely to largely consist of nonnative ornamental plants, some of which may be invasive. The presence of disturbed soils on the site could allow establishment of nonnative invasive plant species which could affect areas of existing native wetland and marine vegetation.

If the site were redeveloped for mixed use, it is expected that public beach access would be emphasized, making the tidal area accessible to people for the purposes of beachcombing and clam digging, which could potentially impact marine vegetation.

No Action Alternative

Under the No Action Alternative, the Paramount site would continue to support industrial uses and would continue to contain little vegetation. Beach access would remain restricted so the potential for impacts to marine vegetation would remain similar to current conditions.

Mitigation Measures

No mitigation measures for vegetation impacts would be required.

Significant Unavoidable Adverse Impacts

There are no significant unavoidable adverse impacts.

3.6. Air Quality

This section describes emission sources and sensitive receptor locations near the Paramount of Washington LLC (Paramount) site. It describes how future changes in land use in the development could potentially increase, or in some cases decrease, air pollutant emissions.

3.6.1. Affected Environment

Air Pollution Regulations

Regulatory Overview

The Clean Air Act (CAA), as amended in 1990, is the federal law that governs air quality in the United States. Its counterpart in Washington State is the Washington Clean Air Act of 1991. These laws set standards for the concentration of pollutants that can be found in the air. At the federal level, the Environmental Protection Agency (EPA) administers the CAA. The Washington Clean Air Act is administered by the Washington State Department of Ecology (Ecology) at the state level and by local clean air agencies at the regional levels. Snohomish County (County) is in the Puget Sound region, where the Puget Sound Clean Air Agency (PSCAA) has local jurisdiction.

Ambient Air Quality Standards

EPA, PSCAA, and Ecology established regulations designed to limit emissions from air pollution sources and to minimize concentrations of pollutants in the outdoor ambient air. Although their regulations are similar in stringency, each agency has established its own standards. Unless the state or local jurisdiction has adopted more stringent standards, EPA standards apply.

Table 3.6-1 lists both the national and Washington State ambient air quality standards for six criteria pollutants: carbon monoxide (CO), ozone, particulate matter less than 10 micrometers in size (PM10), particulate matter less than 2.5 micrometers in size (PM2.5), lead (Pb), sulfur dioxide (SO2), and nitrogen dioxide (NO2). The National Ambient Air Quality Standards (NAAQS) consist of primary standards designed to protect public health and secondary standards designed to protect public welfare (e.g., preventing air pollution damage to vegetation). Ecology has established additional ambient standards for total suspended particulates and SO2, which are more stringent than the federal requirements.

Table 3.6-1. National and Washington State Ambient Air Quality Standards

Pollutant	Federal Primary	Federal Secondary	State
Carbon Monoxide			
8-hour average[1]	9 ppm	No standard	9 ppm
1-hour average[1]	35 ppm	No standard	35 ppm
Ozone[2]			
8-hour average[2,3]	0.075 ppm	0.075 ppm	0.075 ppm
Total Suspended Particles			
Annual average	No standard	No standard	60 µg/m
24-hour average[1]	No standard	No standard	150 µg/m
Particulate Matter - PM10			
24-hour average[1]	150 µg/m[1]	150 µg/m[1]	150 µg/m[1]
Particulate Matter - PM2.5			
Annual average	15 µg/m	15 µg/m	15 µg/m
24-hour average[1]	35 µg/m[1]	35 µg/m[1]	35 µg/m[1]
Lead			
Quarterly average	1.5 µg/m[1]	1.5 µg/m[1]	1.5 µg/m[1]
Sulfur Dioxide			
Annual average	0.03 ppm	No standard	0.02 ppm
24-hour average[1]	0.14 ppm	No standard	0.10 ppm
3-hour average[1]	No standard	0.50 ppm	No standard
1-hour average[3]	No standard	No standard	0.40 ppm
Nitrogen Dioxide			
Annual average	0.05 ppm	0.05 ppm	0.05 ppm

Notes:

Annual standards are never to be exceeded. Short-term standards are not to be exceeded more than once per year, unless noted.

ppm = parts per million; PM10 = particles 10 microns or less in size; PM2.5 = particles 2.5 microns or less in size; µg/m3 = micrograms per cubic meter

[1] Not to be exceeded on more than 1 day per calendar year as determined under the conditions indicated in Chapter 173 475 WAC.

[2] In March 2008, EPA lowered the federal standard for 8-hour ozone from 0.08 parts per million (ppm) to 0.075 ppm to better protect public health.

[3] To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm.

[4] 0.25 ppm not to be exceeded more than two times in 7 consecutive days.

Source: Chapter 173, Sections 470 to 475 Washington Administrative Code (WAC).

Attainment Status Designation

Ecology maintains a network of air quality monitoring stations throughout the state. These stations are placed in areas where there may be air quality problems, usually in or near urban areas or close to large air pollution sources. A limited number of additional stations are located in remote areas to provide an indication of regional background air pollution levels.

Based on monitoring information collected over a period of years, EPA and Ecology designate regions as being “attainment” or “nonattainment” areas for regulated air pollutants. Attainment status indicates that air quality in an area meets the federal, health-based ambient air quality standards; nonattainment status indicates that air quality in an area does not meet those standards. If the measured concentrations in a nonattainment area improve so they are consistently below the federal standards, Ecology and EPA can reclassify the nonattainment area to a “maintenance area”. In this case, Ecology and PSCAA are required to implement maintenance plans to ensure ongoing emission reductions and continuous compliance with the federal standards.

The Puget Sound region (including western Snohomish County) is currently designated as a maintenance area for CO and an attainment area for all other air pollutants. However, in March 2008, the EPA lowered its eight-hour ozone standard from 0.08 parts per million (ppm) to 0.075 ppm to better protect public health. Under the new standard, the three-year average (2006–2008) concentration measured at the Enumclaw station in King County exceeded the eight-hour ozone standard. The PSCAA will work with Ecology to make recommendations to EPA about ozone designations; therefore, the region will be designated as a nonattainment area for ozone starting in 2010. The PSCAA will work with Ecology to make recommendations to EPA about ozone designations. Until then, the region is still designated an attainment area for ozone.

Puget Sound Clean Air Agency Air Pollutant Regulations

All construction sites in the Puget Sound region are required to implement rigorous emission controls to minimize fugitive dust and odors during construction, as required by PSCAA Regulation 1, Section 9.15, Fugitive Dust Control Measures. All industrial and commercial air pollutant sources in the Puget Sound region are required to register with PSCAA. Facilities with substantial emissions are required to obtain a Notice of Construction (NOC) air quality permit before construction is allowed to begin.

The NOC permit requires the applicant to demonstrate the following:

- Demonstrate that Best Available Control Technology (BACT) emission controls will be installed to minimize air pollutant emissions.
- Use a computer dispersion model to demonstrate that, after installation of BACT emission controls, the ground-level pollutant concentrations will not approach the allowable air quality limits.

Transportation Conformity Regulations

Regionally significant transportation projects (regardless of the source of funding) proposed for construction in nonattainment or maintenance areas are subject to the transportation conformity regulations specified under federal regulations (EPA 40 CFR Parts 51 and 93) and state regulations (Chapter 173-420 of WAC). Regionally significant projects include the construction or widening of new roadways and the widening of signalized intersections. The intent of these regulations is to ensure that transportation projects, plans, and programs affecting regional and local air quality will conform to existing plans and timetables for attaining and maintaining federal health-based air quality standards. The government agency proposing the roadway improvements must demonstrate transportation conformity by performing the following steps:

- Conduct a regional air quality analysis by confirming with the regional transportation planning agency (such as Puget Sound Regional Council [PSRC] in this case) to include the proposing agency's long-range transportation plan in PSRC's regional air quality modeling for their required periodic air quality conformity analysis; and confirm that the regional emissions (including the proposed roadway project) are within the allowable emission budget specified by Ecology.
- Conduct a project-level CO hot spot analysis to model the worst-case concentrations at the most heavily congested intersections; and confirm that the modeled CO concentrations are below the NAAQS.

The preceding air quality demonstrations must be included in National Environmental Policy Act (NEPA) documentation for any proposed future roadway improvement projects subject to NEPA review.

Existing Emission Sources

Air pollutant emissions are currently generated by the following activity at the existing industrial operations:

- current construction activity associated with the Brightwater wastewater treatment plant,
- tugboats and barges serving the marine terminal,
- volatilization (evaporation) losses from fuel loading and fuel storage tanks,
- boilers and heaters,
- asphalt loading equipment,
- heavy-duty diesel haul trucks shipping fuel and asphalt, traveling along public streets in the Town of Woodway (Woodway) and the City of Shoreline (Shoreline), and
- freight and commuter rail traffic at an average of 40 trains per day traveling along the perimeter of the Paramount site on the Burlington Northern Santa Fe (BNSF) rail line, and the limited number of freight trains that enter the site to serve existing industrial customers.

3.6.2. Impact Assessment

Proposed Action

The Proposed Action would likely result in increased employment and residential growth on the Paramount site, thus increasing air pollutant emissions. The specific air quality impacts are described below.

Elimination of Current Industrial Emissions

Under the Proposed Action, the current industrial operations at the site would cease, which would eliminate the industrial emissions generated by those operations.

Construction Emissions

There is currently construction underway for the Brightwater outfall south of the Paramount site. Redevelopment of the site would require demolition and construction activity, which would temporarily increase construction-related emissions. Affected residences could include existing homes on the hillside overlooking the site or future new businesses and dwellings on the site close to other Paramount buildings under construction. The hillside homes are at least 0.5 mile from the site and sit at the top of an approximately 250-foot-tall slope, so it is unlikely those homes would be affected by construction operations in the development.

All construction contractors would be required to comply with PSCAA regulations on construction emissions and minimize their fugitive dust and odor emissions. Compliance with these regulations would prevent construction-related impacts on homes and businesses near any future construction sites.

Local “Hot Spot” Air Quality Impacts from Increased Traffic at Local Intersections

Redevelopment of the Paramount site would increase vehicle travel on existing public roads in Woodway and Shoreline. However, it is unlikely that the increased traffic and congestion would cause localized air pollutant concentrations at local intersection to form a “hot spot” (i.e., a localized area where air pollutant concentrations exceed the NAAQS limits). PSCAA operates ambient air pollution monitors at some of the most heavily congested intersections in the Puget Sound region, and none of those monitors have indicated exceedances over the past several years. EPA’s ongoing motor vehicle regulations have also provided steady decreases in tailpipe emissions from individual vehicles, and it is possible that those continuing decreases from individual vehicles could more than offset the increase in vehicle traffic. For these reasons, it is unlikely that air quality impacts at local intersections would be significant.

Emissions from Potential New Commercial Operations

Land use in the redeveloped Paramount site would consist of a mix of multifamily residential housing and retail, office, and commercial buildings. It is likely that new commercial development would occur near either current or future residential housing. Unless properly controlled, mechanical equipment (such as commercial boilers and heating units) and trucks at loading docks at office and retail buildings could cause air pollution issues at adjacent residential property. However, such issues are unlikely to occur because PSCAA regulations require all future emission-generating equipment to be equipped with BACT controls to minimize emissions. For that reason, it is unlikely that new commercial operations would cause significant air quality issues, particularly when compared to the existing industrial operations they would replace.

Emissions from Potential Sound Transit Commuter Rail Station

The redevelopment of the Paramount site could include a new Sound Transit commuter rail station; however, it is unlikely that the redevelopment would warrant adding new trains to Sound Transit's service. Trains serving the new commuter station would enter at a low speed, idle for a brief period during passenger loading, and then depart at a low speed. Future exhaust emissions generated by locomotives idling at the station and accelerating away from the station would likely be greater than emissions from current and future locomotives traveling at cruising speed past the development without a train station. However, in either case, it is unlikely that locomotive emissions would cause localized air pollutant concentrations to approach the NAAQS air quality limits. Current EPA emission control regulations for locomotives mandate future emission reductions for new or reconstructed engines; therefore, implementation of those regulations is expected to gradually reduce emission rates and ambient impacts (U.S. Environmental Protection Agency 2008)

Greenhouse Gas Emissions

Current Greenhouse Gas Regulations

The issue of how emissions from human activities may affect the global climate has been the subject of extensive international research during the past several decades. There is now a broad consensus among atmospheric scientists that emissions caused by humans have already caused measurable increases in global temperature and are expected to result in significantly greater increases in temperature in the future. However, there is still considerable uncertainty about the exact magnitude of future global impacts and the best approach to mitigate the impacts.

The United Nations' Intergovernmental Panel on Climate Change (IPCC) published its most recent sets of 5-year progress reports summarizing worldwide research on global climate change in 2001 and 2007 (Intergovernmental Panel on Climate Change 2007). These reports indicated that some level of global climate change is likely to occur and that there is a significant possibility of adverse environmental effects. Several alternative mitigation measures were evaluated by the worldwide scientific community to reduce global emissions, including the first round of worldwide reductions in greenhouse gases (GHGs), as prescribed by the Kyoto Protocol.

Global climate change is a cumulative issue related to worldwide GHG emissions rather than emissions from any individual facility. No single project emits enough GHGs to influence global climate change by itself. GHGs emitted anywhere on the planet remains active for roughly 100 years and eventually disperses throughout the world. Therefore, future climate change in Washington State would be influenced as much by, for example, new industrial activity in China as it would be by the future development of the Paramount site.

In response to growing worldwide concerns, Washington State Governor Christine Gregoire issued Executive Order 07-02, committing the state to reducing its GHG emissions under a staged schedule: 1) reduce emissions to 1990 levels by 2020; and 2) reduce emissions to 50% below 1990 levels by 2050 (Washington State Department of Ecology 2008b). In addition, the County has developed its Executive Order 07-48 which was enacted in July 2007, mandating significant reductions in countywide GHG emissions. While neither the state nor county GHG goals have promulgated any current GHG restrictions that would apply to future developers at the Paramount site, these goals illustrate the importance of local action to reduce GHG emissions.

Greenhouse Gas Emission Estimate

The GHG emission spreadsheet developed by King County was used to estimate life-cycle emissions (King County Department of Development and Environmental Services 2009) and was used to estimate future full-buildout emissions associated with the Proposed Action. The King County spreadsheet estimates GHG emissions to construct the building and estimates life-cycle emissions generated by the building occupants over the presumed life of the building. It uses statewide estimates for vehicle travel, building occupancy, and space heating, so the spreadsheet is a relevant tool to provide an approximate estimate of GHG emissions anywhere in Washington State. The spreadsheet assumes the office and commercial buildings in Washington State will be occupied for between 58 to 62 years and estimates life-cycle emissions within that time period. The following types of life-cycle emissions and emission reduction efficiencies are estimated:

Embodied emissions. These are the emissions generated by the construction of the building, including extraction, production, and eventual disposal of the building materials used to construct the structure. These emissions do not include embodied emissions during the operating life of the facility.

Energy. These are emissions generated by space heating and electrical supply to the building during its 58- to 62-year lifespan. The spreadsheet incorporates energy intensity factors specific to Washington State.

Transportation. These include tailpipe emissions generated by on-road vehicles used by building occupants and employees after the building is constructed. The transportation emissions do not account for vehicles passing through the Paramount site unless they are directly associated with the buildings being evaluated. These emissions account for "upstream" emissions during extraction and refining of the fossil fuel used over the lifespan of the building. The transportation emissions do not account for vehicle travel by delivery trucks carrying goods to or from buildings, nor do they account for vehicle travel by customers at retail or commercial buildings. The spreadsheet was modified to assume a fleet-wide fuel economy of 35 miles per gallon for future vehicle travel, consistent with EPA's newly proposed Corporate Average Fuel Economy (CAFE) vehicle mileage standard.

Transit-Oriented Development. Transit-Oriented Development (TOD) is expected to reduce GHG emissions compared to traditional development by reducing vehicle trips and fuel usage. For this assessment the percent reductions in vehicle usage and the corresponding emission GHG reductions were derived based on the Sacramento Metropolitan Air Quality Management District (SMAQMD) document, Recommended Guidance for Land Use Emission Reductions (Sacramento Metropolitan Air Quality Management District 2007). The SMAQMD methodology uses a scoring system to estimate GHG emission reduction for a new development based on the TOD mixed-use density, housing density, and proximity to existing and future bus/rail transit.

The SMAQMD methodology estimates GHG reductions only as a result of reduced vehicle trip generation, but it does not attempt to estimate GHG reductions provided by other mitigation measures such as use of recycled building materials, improved thermal insulation, reduced electricity consumption, or reduced waste generation. Based on the SMAQMD approach, average GHG emissions for the proposed transit-oriented development at the Paramount site would be 18% lower than "business as usual."

Table 3.6-2 presents the calculated annual emissions generated by potential full-buildout development in the Paramount site. The table shows uncontrolled "business as usual" emissions (without accounting for the Proposed Action's TOD reduction measures) and the controlled emissions (accounting for the TOD reduction measures). The results are presented as metric tons per year of "equivalent carbon dioxide (CO2) emission," based on an assumed 60-year life span for the buildings in the development. Most of the emissions would consist of CO2, but the emissions would also contain small amounts of other GHGs such as methane (CH4) and nitrous oxide (N2O). The King County spreadsheet normalizes the aggregate emissions to CO2-equivalent to account for the various global warming potential values for each constituent. As listed in Table 3.6-2, the estimated controlled GHG emissions for the full-buildout condition are 40,450 metric tons CO2-equivalent per year. That estimate is 8,883 metric tons per year less than "business as usual."

It is also important to consider that the potential redevelopment of the Paramount site would displace the current industrial operations at the site. However, it is uncertain whether those displaced industrial facilities would resume operations at a new regional location, or whether their market share (and emissions) would be taken over by competing firms. Regardless, for this analysis it is not possible to determine if those displaced emissions would be eliminated, or if the industrial operations would resume at some other location.

Table 3.6-2. Future Full-Buildout Greenhouse Gas Emissions

	Annual GHG Emissions (metric tons/year of CO2-quivalent)		
Land Use Category	Uncontrolled Business as Usual	With Proposed TOD Trip Reduction Measures	Net Reduction Compared to Business As Usual
Multifamily housing	47,983	393,350	N/A
Retail development	157	129	N/A
Commercial development	1,190	972	N/A
Site paving	3	3	N/A
Total	49,333	40,450	8,883

TOD = Transit-Oriented Development

Comparison to Washington State GHG Reduction Goals

The Proposed Action would reduce regional GHG emissions by roughly 8,883 metric tons CO2-equivalent per year compared to business as usual. The GHG emissions reductions would beneficially contribute to the Washington State's goal of reducing statewide GHG emissions to

50% below 1990 levels by 2050 (Washington State Department of Ecology 2008b). Current Washington State emissions are 93 million metric tons CO2-equivalent per year, so the state's goal is equivalent to an emissions reduction of 47 million metric tons/year. The 8,883 metric tons per year reduction in the Paramount site (compared to future business as usual) would be a relatively small fraction of the statewide reduction goal. Regardless, the reductions would incrementally assist in achieving the statewide goal.

No Action Alternative

Under the No Action Alternative, operations at the existing fuel terminal and asphalt plant at the Paramount site could be expected to expand. Air pollutant emissions would continue to be generated by the following industrial operations:

- tugboats operating at the existing industrial marine terminal;
- volatilization from fuel storage and fuel loading operations;
- heaters, fans, and loading equipment at the existing asphalt plant;
- industrial haul trucks carrying fuel and asphalt along public roads through Woodway and Shoreline; and
- freight trains and commuter trains traveling on the existing rail line.

Under the No Action alternative, emissions from these sources would increase if current petroleum operations increase, or if rail traffic along the BNSF rail line increases. Train traffic on the BNSF rail line is forecasted to increase from its current volume of 40 train crossings per day up to 75 per day (Huff pers. comm.). The current industrial operations at the Paramount site are equipped to refine up to 5,000 barrels per day of petroleum, although those refining operations are currently dormant. The No Action Alternative would include restarting the petroleum refining operations at the 5,000-barrel-pe -day capacity (Huff pers. comm.). This would generate additional marine terminal visits and haul-truck traffic, with corresponding air emission increases.

3.6.3. Mitigation Measures

Construction Emission Reduction Measures

The County should require all construction contractors to implement air quality control plans for construction activities in the Paramount site as part of any potential project action. The air quality control plans should include best management practices (BMPs) to control fugitive dust and odors emitted by diesel construction equipment.

During construction, dust from excavation and grading could cause temporary, localized increases in the ambient concentrations of fugitive dust and suspended particulate matter. The following BMPs could be used to control fugitive dust:

- Use water sprays or other non-toxic dust control methods on unpaved roadways.
- Minimize vehicle speed while traveling on unpaved surfaces.

- Prevent track-out of mud onto public streets.
- Cover soil piles when practical.
- Minimize work during periods of high winds when practical.

Mobile construction equipment and portable stationary engines would emit air pollutants including nitrogen oxides (NOx), CO, and diesel particulate matter. These emissions would be temporary and localized. It is highly unlikely that the temporary emissions would cause ambient concentrations at adjoining parcels to approach the federal limits. Typical mitigation measures to minimize air quality and odor issues caused by tailpipe emissions include the following:

- Locate stationary engines as far from sensitive receptors as is practical.
- Maintain the engines of construction equipment according to manufacturers' specifications.
- Minimize idling of equipment while the equipment is not in use.

Greenhouse Gas Reduction Measures

Ecology will likely implement GHG emissions reduction requirements for new developments. Although the exact measures that will be required by Ecology cannot be forecasted at this time, GHG emissions reductions could be provided by using prudent building design and construction methods to use recycled construction materials, reduce space heating and electricity usage, and reduce water consumption and waste generation. Table 3.6-3 lists a variety of additional mitigation measures that could further reduce GHG emissions caused by building construction, space heating, and electricity usage (Washington State Department of Ecology 2008c). The table lists potential GHG reduction measures and indicates where the emission reductions might occur. The County could require development permit applicants to identify the reduction measures included in its projects and to explain why other measures are not included or are not applicable.

Table 3.6-3. Potential Greenhouse Gas Reduction Measures

		Emissions Category		
	Comments	Direct[1]	Indirect[2]	Transportation[3]
Site Design				
Plant trees and vegetation near structures to shade buildings.	Reduces on-site fuel combustion emissions and purchased electricity plus enhances carbon sinks.	■	■	
Minimize building footprint.	Reduces on-site fuel combustion emissions and purchased electricity consumption, materials used, maintenance, land disturbance, and direct construction emissions.	■	■	
Design water-efficient landscaping.	Minimizes water consumption, purchased energy, and upstream emissions from water management.		■	

	Comments	Emissions Category		
		Direct[1]	Indirect[2]	Transportation[3]
Minimize energy use through building orientation.	Reduces on-site fuel combustion emissions and purchased electricity consumption	■	■	
Building Design and Operations				
Apply LEED standards (or equivalent) for design and operations	Reduces on-site fuel combustion emissions and off-site/indirect purchased electricity, water use, waste disposal	■	■	
Purchase Energy Star equipment and appliances for public agency use.	Reduces on-site fuel combustion emissions and purchased electricity consumption	■	■	
Incorporate on-site renewable energy production, including installation of photovoltaic cells or other solar options.	Reduces on-site fuel combustion emissions and purchased electricity consumption.	■	■	
Design streetlights to use energy-efficient bulbs and fixtures.	Reduces purchased electricity.		■	
Construct "green roofs" and use high-albedo roofing materials.	Reduces on-site fuel combustion emissions and purchased electricity consumption	■	■	
Install high-efficiency HVAC systems.	Minimizes fuel combustion and purchased electricity consumption.	■	■	
Eliminate or reduce use of refrigerants in HVAC systems.	Reduces fugitive emissions. Compares refrigerant usage before/after to determine GHG reduction.	■		
Maximize interior day lighting through floor plates, increased building perimeter and use of skylights, celestories, and light wells.	Increases natural/day lighting initiatives and reduces purchased electrical energy consumption.		■	
Incorporate energy efficiency technology such as the following: ▪ super insulation, ▪ motion sensors for lighting and climate control, and ▪ efficient, directed exterior lighting.	Reduces fuel combustion and purchased electricity consumption.	■	■	
Use water-conserving fixtures that surpass building code requirements.	Reduces water consumption.		■	
Reuse gray water and/or collect and reuse rainwater.	Reduces water consumption with its indirect upstream electricity requirements.		■	
Use recycled building materials and products.	Reduces extraction of purchased materials, possibly reduces transportation of materials, encourages recycling and reduction of solid waste disposal.		■	■

	Comments	Emissions Category		
		Direct[1]	Indirect[2]	Transportation[3]
Use building materials that are extracted and/or manufactured in the region.	Reduces transportation of purchased materials.			■
Use rapidly renewable building materials.	Reduces emissions from extraction of purchased materials.		■	
Conduct third-party building commissioning to ensure energy performance.	Reduces fuel combustion and purchased electricity consumption.	■	■	
Track energy performance of building and develop a strategy to maintain efficiency.	Reduces fuel combustion and purchased electricity consumption.	■	■	
Transportation				
Size parking capacity not to exceed local parking requirements and, where possible, seek reductions in the parking supply through special permits or waivers.	Reduced parking discourages auto dependent travel, encouraging alternative modes such as transit, walking, biking etc. Reduces direct and indirect VMT.			■
Develop and implement a marketing/information program that includes posting and distribution of ridesharing/transit information.	Reduces direct and indirect VMT.			■
Subsidize transit passes. Reduce employee trips during peak periods through alternative work schedules, telecommuting, and/or flex-time. Provide a guaranteed ride home program.	Reduces employee VMT.			■
Provide bicycle storage and showers/changing rooms.	Reduces employee VMT.			■
Use traffic signalization and coordination to improve traffic flow and support pedestrian and bicycle safety.	Reduces transportation emissions and VMT.	■		■
Apply advanced technology systems and management strategies to improve operational efficiency of local streets.	Reduces emissions from transportation by minimizing idling and maximizing transportation routes/systems for fuel efficiency.			■
Develop shuttle systems around business district parking garages to reduce congestion and create shorter commutes.	Reduces idling fuel emissions and direct and indirect VMT.			■

LEED = Leadership in Energy and Environmental Design; GHG = greenhouse gas; VMT = vehicle miles traveled.

1 Direct emissions include emissions generated on site that the proponent of the action has direct control over.

2 Indirect emissions include those generated off site and for which the proponent does not have direct control over. Examples include emissions associated with purchased or acquired electricity.

3 Transportation emissions can be either direct (i.e., within the control of the proponent) or indirect (i.e., outside of the proponent's direct control).

Source = Washington State Department of Ecology 2008c.

3.6.4. Significant Unavoidable Adverse Impacts

Neither the Proposed Action nor the No Action Alternative would cause significant air quality impacts.

3.7. Noise

This section describes noise-sensitive receiver locations near the Paramount of Washington, LLC (Paramount) site and describes how future changes in land use could potentially increase (or in some cases decrease) noise emissions and noise levels at the sensitive receiver locations.

3.7.1. Affected Environment

Noise Terminology

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micropascals (uPa). One uPa is approximately one hundred billionths (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to over 100 million uPa. Because of this huge range of values, sound is rarely expressed in terms of uPa. Instead, a logarithmic scale is used to describe sound pressure level in terms of decibels (dB). For example, the threshold of hearing for young adults is about 20 uPa, which corresponds to 0 dB.

Community noise levels often vary considerably during any given hour. The equivalent sound level (Leq) is usually used to quantify the "average" noise level during any given period. The Leq during a given time-varying sound profile is the steady noise level that has the same sound energy level as the time-varying profile.

Because decibels are logarithmic units, sound pressure level cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase; when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces a sound pressure level of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB, but 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dB louder than one source.

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity of the sound is a purely physical quantity, the perceived loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies and in the way it perceives the sound pressure level in that range. In general, people are most sensitive to the frequency range of 1,000 to8,000 Hertz; we perceive sounds within that range better than sounds of the same amplitude at higher or lower frequencies. To approximate the response of the human ear, the sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies. An "A-weighted" sound level (expressed in units of A-weighted decibels [dBA]) can then be computed based on this information. The A-weighting system approximates the frequency response of the average young ear when listening to most ordinary sounds. Table 3.7-1 describes typical A-weighted noise levels for various noise sources typically encountered.

Table 3.7-1. Common Noise Levels

Sound Source	Decibels (dBA)	Typical Response
Carrier deck jet operation	140	Painfully loud
Limit of amplified speech	130	Painfully loud
Jet takeoff (200 feet) Auto horn (3 feet)	120	Threshold of feeling and pain
Riveting machine Jet takeoff (2,000 feet)	110	Threshold of feeling and pain
Shout (0.5 foot) New York subway station	100	Very annoying
Heavy truck (50 feet) Pneumatic drill (50 feet)	90	Hearing damage (8-hour exposure)
Passenger train (100 feet) Helicopter (in flight, 500 feet) Freight train (50 feet)	80	Annoying
Freeway traffic (50 feet)	70	Intrusive
Air conditioning unit (20 feet) Light auto traffic (50 feet)	60	Intrusive
Normal speech (15 feet)	50	Quiet
Living room, bedroom, library	40	Quiet
Soft whisper (15 feet)	30	Very quiet
Broadcasting studio	20	Very quiet
	10	Just audible
	0	Threshold of hearing

Source: Federal Transit Administration 2006.

Noise Regulations

County Noise Ordinance for Stationary Commercial/Industrial Sources

The Snohomish County Code (SCC) Chapter 10.01, Noise Control, applies to industrial and commercial noise sources, as well as "nuisance noise" originating from residential areas. The noise ordinance exempts motor vehicle noise on public roads from SCC 10.01 requirements, provided individual vehicle noise levels meet other Snohomish County (County) regulations. Permissible sound levels at a receiving land use depend on the district zoning. Permissible noise limits are shown in Table 3.7-2.

Table 3.7-2. Permissible Community Noise Limits

Noise Control District: Sound Source	Permissible Noise Level in dBA Noise Control District of Receiving Source: Residential		Commercial	Industrial
	Daytime	Nighttime	All hours	All hours
Residential	55	45	57	60
Commercial	57	47	60	65
Industrial	60	50	65	70

Source: SCC Title 10 Chapter 10.01.

For noise levels that exceed the above levels for durations of less than 1 hour, maximum permissible sound levels are adjusted as shown in Table 3.7-3:

Table 3.7-3. Adjustment to Maximum Permissible Noise Levels for Noises of Short Duration

Duration of Sound Level within a 1-hour Interval	Add Amount to Maximum Permissible Sound Level
15 minutes	+ 5 dB
5 minutes	+ 10 dB
1.5 minutes	+ 15 dB

Source: SCC Title 10 Chapter 10.01.

The following sounds are exempt, at all times, from the SCC maximum permissible sound levels, including but not limited to:

- traffic noise from vehicles traveling on public streets,
- warning devices or alarms, and
- sounds created by construction equipment, including special construction vehicles, at temporary construction sites, provided the receiving property is located in a commercial or industrial district.

Traffic Noise Impact Criteria

SCC 10.01defines traffic noise impacts resulting from roadway improvement projects using County funds rather than state or federal funds. The code defines a traffic noise impact caused by vehicles along a County-funded roadway improvement project as 67 dBA (peak-hour Leq) and lists criteria used to determine whether County funds can be used to abate identified traffic noise impacts.

Existing Noise Sources and Noise-Sensitive Receivers

The Paramount site is currently used for heavy industrial operations including a marine terminal, industrial fuel storage, and asphalt storage and distribution. Current noise sources include the following:

- current, temporary construction for the Brightwater Treatment Plant outfall project,
- tugs and barges serving the marine terminal,
- boilers and heaters,
- asphalt loading equipment,
- heavy-duty diesel haul trucks shipping fuel and asphalt, traveling along public streets in the Town of Woodway (Woodway) and the City of Shoreline (Shoreline), and
- freight and commuter rail traffic on the Burlington Northern Santa Fe (BNSF) main rail line along the east side of the Paramount site, along with a limited number of low-speed trains on the rail spur serving the industrial operations in the site.

Noise-sensitive receivers that could be affected include the following:

- existing low-density housing on the hillside east of the existing facility, with line-of-sight exposure to noise sources in the properties, homes, and businesses along the public streets serving the facility, and
- future homes and businesses in the proposed development, adjacent to future construction sites.

3.7.2. Impact Assessment

Proposed Action

The Proposed Action would likely result in increased employment and residential growth in the Paramount site, thus possibly increasing noise levels. The specific noise impacts are described as follows.

Construction Noise

Redevelopment of the Paramount site would require demolition and construction activity close to existing homes, which would temporarily increase noise levels. Affected residences could include existing homes on the hillside overlooking the site, or future new dwellings on the site close to other Paramount buildings under construction. Temporary daytime construction activity is exempted from the County noise ordinance limits; however, daytime construction activity could cause annoyance and speech interference at outdoor locations adjacent to the construction sites and could cause discernible noise for several blocks away from the site. Nighttime construction activity, if any, is not exempted from the County’s noise ordinance, and would be required to comply with the nighttime limits specified by the County noise ordinance. Compliance with County nighttime noise ordinance limits would ensure nighttime construction activity would not cause significant impacts.

Noise from Increased Traffic on Local Streets

The Proposed Action would likely result in increased employment and residential growth in the Paramount site. As described in Section 3.11, Transportation, future traffic volumes would increase on local streets serving the subject property. These traffic increases would result in higher ambient noise levels at residential dwelling units constructed adjacent to the streets. Traffic noise would be caused by moving traffic, vehicles idling at intersections, and by transit vehicles at new bus stops.

The loudest vehicles would be transit buses serving the new developments in the site and traveling on public streets through Woodway and Shoreline. Future noise caused by the new bus trips would be partially offset by displacement of the existing and future industrial haul truck trips that would occur under the No Action Alternative to support operation of the fuel terminal and asphalt plant at the site. Estimates of daily and peak-hour bus traffic were not developed for this Supplemental Environmental Impact Statement (SEIS).

The increases in traffic volume are not expected to be high enough to cause a significant increase in traffic noise along the major arterials serving the site. Traffic noise increases along representative roadway segments were estimated by comparing peak-hour traffic volumes under current conditions with forecasted future full-buildout peak-hour traffic volumes. A substantial noise increase (indicating a significant noise impact) is defined as a 10 dBA peak-hour increase (future with-project noise level minus existing level). Table 3.7-4 lists the forecasted traffic noise increases along representative roadway segments.

Table 3.7-4. Forecasted Increases in Peak-Hour Traffic Noise

	Peak-Hour Traffic Volume (vehicles per hour)		
Roadway Segment	Existing Condition	Future Full-Buildout Condition	Traffic Noise Increase (1-Hr dBA); Future Full Buildout Minus Existing
NW 186th Street, West of 20th Ave NW	180	1,590	9 dBA
NW 185th Street, West of SR-99	1,230	2,100	2 dBA
8th Avenue NW, North of Richmond Beach Road	1,120	1,415	1 dBA

As indicated in Table 3.7-4, the forecasted traffic noise increases range from 1 dBA to 9 dBA. All of the forecasted traffic noise increases along each representative roadway segment are lower than Washington State Department of Transportation’s (WSDOT’s) “substantial increase” criterion of 10 dBA; therefore, this impact is not expected to be significant.

Noise from New Potential Commercial Operations

Land use in the redeveloped Paramount site would consist of a mix of multifamily residential housing and retail, office, and commercial buildings. It is likely that new commercial development would occur near either current or future residential housing. Unless properly controlled, mechanical equipment (such as rooftop air conditioning units) and trucks at loading docks at office and retail buildings could cause ambient noise levels at nearby residential housing units that exceed the County noise ordinance limits. However, the County would require all prospective future developers to use low-noise mechanical equipment adequate to ensure compliance with the County’s current daytime and nighttime noise ordinance limits. Depending on the nature of the proposed development, the County may require the developer to conduct a noise impact study to forecast future noise levels, and to specify appropriate noise control measures. Compliance with the noise ordinance would ensure this potential impact would not be significant.

Noise from Potential Sound Transit Commuter Rail Station

Although redevelopment of the site could include a new Sound Transit commuter rail station, it is unlikely that the new development would warrant adding new trains to Sound Transit's service. Trains serving the potential new commuter station would enter at a low speed, idle for a brief period during passenger loading, and then depart at a low speed. Future noise levels generated by low-speed operations at the commuter station would likely be lower than the current noise levels generated by high-speed commuter trains traveling past the site. Therefore, operation of a new commuter train station could reduce overall train noise levels on the site compared to the No Action Alternative, so this impact would not be significant.

No Action Alternative

Under the No Action Alternative, operations at the existing fuel terminal and asphalt plant at the Paramount site could be expected to expand. Noise would be emitted by the following industrial operations:

- tugboats operating at the existing industrial marine terminal;
- heaters, fans, and loading equipment at the existing asphalt plant;
- industrial haul trucks carrying fuel and asphalt along public roads through Woodway and Shoreline; and
- freight trains and commuter trains traveling on the existing BNSF main rail line at the east edge of the site, and trains on the rail spur serving the industrial operations in the site.

Under the No Action Alternative, noise emissions from these sources would increase if current petroleum operations increase, or if rail traffic along the BNSF rail line increases. Train traffic on the BNSF rail line is forecasted to increase from its current volume of 40 train crossings per day to 75 per day (Huff pers. comm.). The current industrial operations at the Paramount site are equipped to refine up to 5,000 barrels per day of petroleum, although those refining operations are currently dormant. The No Action Alternative would include restarting the petroleum refining operations at the 5,000 barrel per day capacity (Huff pers. comm.), which would generate additional marine terminal visits and haul truck traffic with corresponding noise emission increases.

3.7.3. Mitigation Measures

Temporary construction noise generated by potential future construction activity (adjacent to homes and businesses that would already have been built under the Proposed Action) could be bothersome. Temporary daytime construction noise is exempt from the County noise ordinance, but construction activity could still be annoying to nearby residents if conducted in the morning or in the evening. To reduce the potential for these issues, the County could require all future construction contractors in the proposed developments to abide by supplemental construction noise reduction measures. These measures could include the following:

- Construction at night or on weekends could be prohibited, unless special dispensation was obtained from the County.
- Use of impact equipment could be discouraged before 8:00 a.m. and after 6:00 p.m.
- Loud, stationary equipment could be located as far away as practical from noise-sensitive receivers.
- Idling trucks could be parked as far away as practical from noise-sensitive receivers and shut off when not active for long periods of time.
- Contractors could be discouraged from dropping pallets onto the ground or from dragging steel items across pavement.
- Contractors could be required to give their employees “noise awareness training” to be aware of noise concerns at nearby homes and businesses.

3.7.4. Significant Unavoidable Adverse Impacts

Neither the Proposed Action nor the No Action Alternative would cause significant noise impacts.

3.8. Cultural Resources

This section assesses the potential effects of the Proposed Action and No Action Alternative on cultural resources. The cultural resources considered at the Paramount of Washington LLC (Paramount) site may include archaeological, historic, or ethnographic resources.

3.8.1. Affected Environment

The cultural resources analysis area or Area of Potential Effects (APE) is defined as the geographic area or areas in which an undertaking may directly or indirectly cause change of character or use of archaeological and/or historic resources. The definition of the APE is influenced by the scale and nature of an undertaking. For the Paramount docket proposal, the APE is equivalent to the Paramount site, which consists of approximately 61 acres located in the southwest corner of the unincorporated portion of the Southwest Snohomish County Urban Growth Area (UGA). It is adjacent to the northern boundary of King County and the City of Shoreline (Shoreline) and the southwestern edge of the Town of Woodway (Woodway), at the northern terminus of Richmond Beach Drive.

Cultural Setting

Prehistoric Setting

Ames and Maschner (1999) created a general cultural sequence for the Pacific Northwest, noting a shift from small groups of generalized hunter-fisher-gatherers to large, complex social groups with reliance on aquatic resources (Table 3.8-1). Evidence of human occupation in the Puget Sound area can be found to coincide with the stabilization of sea levels, approximately 5,000 years ago; however, prior evidence may lie buried beneath the waters. Excavations at the West Point site in the Magnolia District of Seattle, for example, have produced inundated remains dating from around 4,200 to 700 years before present (BP) (Larson and Lewarch 1995). The West Point site was discovered during construction of the King County Waste Treatment Facility. As evidenced by findings at this site, continuous occupation from the stabilization of the sea levels to the Protohistoric and Historic periods is common for many sites in the Puget Sound region (Nelson 1990).

A review of the Paramount site's glacial history and vegetation, drainage, and climatic changes over time allows inferences to be made about when and how hunter-fisher-gatherers may have first inhabited and used resources in the area. As the climate stabilized and forests developed at the end of the last ice age approximately 6,000 years ago, animal species such as deer and elk emerged and became established. Salmon and other fish species used the lakes and streams in the vicinity of the site at approximately the same time. Hunter-fisher-gatherers most likely hunted deer, elk, bear, and beaver, among others, in the forests, prairies, and riparian areas around the site for the last 6,000 years. Salmon, trout, and other fish species would have been accessible in the waters of Lake Washington, the Sammamish River and its tributaries, and the many small streams and lakes in the area. Plant resources such as camas, wapato, berries, and roots would also have been available at different times of the year.

Table 3.8-1. Pacific Northwest General Cultural Sequence

Dates	Period	Settlement	Subsistence	Technology
~11,000 BP	Paleo–Indian	Highly mobile, small groups	Generalized marine, shoreline and terrestrial resources	Stone, bone, antler, perishable materials Clovis points
10,500–4,400 BC	Archaic	Highly mobile, small groups	Generalized marine, shoreline and terrestrial resources	Stone, bone, antler, perishable materials Olcott points
4,400–1,800 BC	Early Pacific	Increased sedentism in seasonal villages	Increased use of shoreline resources, expanded use of marine resources Camas and shellfish first used	Increase in ground stone, bone, antler, perishable materials Cascade points
1,800 BC–AD 220/500	Middle Pacific	Winter villages of plank houses and seasonal camps	Increased focus on marine and riverine resources. Food storage technologies developed	Decrease in stone tools, diversification of tools of bone, antler, perishable materials, canoes
AD 200/500–AD 1775	Late Pacific	Large permanent villages and special use camps	Specialized marine, riverine, and terrestrial resources. Extensive food storage	Very little stone

BP = Before present

Ethnographic Setting

The Paramount site is in the traditional territory of the Sammamish people, a Duwamish subgroup that occupied the area around the Sammamish River from Puget Sound to the eastern shore of Lake Washington (Curtis 1907: 174; Ruby and Brown 1992; Swanton 1968). The language is considered to be a Southern Lushootseed dialect from the Coast Salish stock (Suttles and Lane 1990). The Sammamish people were hunter-fisher-gatherers who relied on the diverse aquatic, floral and faunal resources available to them in the many lakes, streams, and prairies around Puget Sound, Lake Washington, and the Sammamish River valley. Seasonally-available resources were gathered and processed at temporary encampments accessed from a permanent village primarily occupied during the winter months.

No historically-known village has been identified near the Paramount site, thus archaeological remains on the site may likely be associated with ephemeral or temporary habitation or food procurement along the shores of Puget Sound. Temporary habitation areas were used annually and the heavy accumulation of debris over a large area or time span often resulted in a large midden. However, the coastal location of these middens would contribute to their destruction through erosion (Wessen 1985). The coastal location of the site with its access to abundant marine resources would have been attractive to hunter-fisher-gatherers in the area that may have intensely used the area for thousands of years.

Historic Setting

In 1792, George Vancouver and his crew were the first Europeans to explore the Puget Sound area. He was followed in 1841 by Lieutenant Charles Wilkes and the lieutenant's United States Exploring Expedition, who undertook the first Euro-American maritime survey of the Puget Sound area since Vancouver's initial venture. Along with overland explorations in the region, Wilkes organized his men into separate parties to survey the sound, assigning Lieutenant Commander C. Ringgold the portion encompassing the Paramount site. The Wilkes expedition charted waters and land portions and bestowed names on many recognizable locations, including Point Edmund and Point Wells, which is the geographic location of the Paramount site.

Continued direct and indirect contact with local Native American populations by these expeditions and later European emigration led to an increase in epidemics and regional instability, resulting in a population decline (Boyd 1999; Suttles and Lane 1990). Increased interest in Euro-American settlement of the area came with the Donation Land Claim Act in 1850. Washington Territory Governor Isaac A. Stevens and tribal representatives from area tribes including Duwamish, Suquamish, Snoqualmie, Snohomish, Lummi, Skagit, and Swinomish signed the Point Elliott Treaty in 1855. Negotiations for the Point Elliot Treaty, along with other Washington Territory treaties enacted by Stevens were conducted in Chinook jargon, which led to misunderstandings and miscommunications among all parties. The Point Elliott Treaty provided the Tulalip Reservation for the Snohomish, Snoqualmie, Stillaguamish, and Skykomish. Groups without reservation rights, including the Duwamish, remained living in or near their traditional territories in the Puget Sound area.

Euro-American settlement along the eastern shore of Puget Sound in the vicinity of the Paramount site began during the second half of the nineteenth century. During this time, communities such as Edmonds, Richmond Beach, and Shoreline were established, as the population of nearby Seattle increased and as residents and adventurous entrepreneurs sought opportunities beyond the confines of the urban center.

The communities of Richmond Beach and Shoreline were established with close ties to Seattle. Seattle's population increased dramatically in the early twentieth century, from approximately 45,000 to over 310,000 by 1910, and then to 380,000 by the late 1920s. Capitalizing on this growth, real estate speculators in King County planned towns and communities around anticipated transportation corridors. In the 1880s, this included the arrival of the first transcontinental railroads to the Pacific Northwest. Later it included the establishment of interurban railway lines and state transportation routes, such as the Seattle–Everett Interurban railway in 1906 and the North Trunk Road (which became Pacific Highway/U.S. 99 through Shoreline and Edmonds) in 1914.

The Great Northern Railroad established a flag stop in the community of Richmond Beach in 1891. A central location on the railroad line between Edmonds and Seattle, this event spurred residential growth in the area and increased the pace of development in the wooded uplands of what is now Shoreline. Housing developments spread from downtown Seattle outward along this and other transportation corridors, as people wanted more affordable tracts of land or a more rural lifestyle farther outside the city.

Shoreline was one such community that developed as a distant suburb of Seattle. Suburban development began after the construction of the Interurban Railway and expanded after the opening of the North Trunk Road, both of which ran through the Shoreline community. The Interurban Railway and North Trunk Road provided easy access to Seattle's urban center for both residents and local farmers.

By making it easier for people and goods to move between Shoreline, Seattle, and Everett, the Interurban Railway supported the development of many farms and small suburban subdivisions. One such subdivision, located west of Shoreline, was a planned developed called Woodway Park.

Beginning in 1912, a developer by the name of David Whitcomb, Sr. purchased approximately 400 acres of land between Richmond Beach and Edmonds for a new planned community. Over a period of a few years, Mr. Whitcomb subdivided the acreage to provide home sites for friends or other select residents desiring to live in the country. Called Woodway Park, the community was equipped with its own water system and its character was protected by deed restrictions that specified required lot sizes (2 acres or more), setbacks, and street design.

In 1958, the residents of Woodway Park and several adjacent neighborhood subdivisions formed a town of 660 acres with a population of approximately 400.

The Point Wells area, now the Paramount site, has been used for industrial purposes since the early 1900s. The site was first used as a petroleum storage facility, or tank farm, in 1912. The Standard Oil Company of California—now Chevron—built a regional distribution terminal at Point Wells to meet the growing demand for gasoline and other petroleum products. Tanker ships brought the oil products from California refineries, where they were transferred to storage tanks, and railroad tank cars and trucks carried the products to local distributors. Chevron opened an asphalt refinery on the property in 1950.

Regulatory Context

Washington State Environmental Policy Act (SEPA) regulations require that significant properties, specifically those listed in or eligible for the National Register of Historic Places (NRHP) and the Washington Heritage Register, be given consideration when state undertakings may affect historic and cultural values.

Under SEPA, the Washington State Department of Archaeology and Historic Preservation (DAHP) is the specified agency that considers the effects of a Proposed Action on cultural resources and provides formal recommendations to local governments and other state agencies for appropriate treatments or actions. DAHP does not regulate the treatment of properties that are found to be significant; a local governing authority may choose to uphold DAHP's recommendations and may require mitigation of adverse effects on significant properties.

For the purposes of this section, the degree to which the Proposed Action may adversely affect districts, sites, buildings, structures, and objects listed in or eligible for listing in the NRHP, is the primary criterion for determining significant impacts under SEPA. Secondary criteria are whether the Proposed Action has the potential to affect districts, sites, buildings, structures, and objects listed in or eligible for listing in the Washington Heritage Register or the Snohomish County Register of Historic Places. Further detail on county, state and federal regulations and requirements can be found in Appendix B.

County of Snohomish—Certified Local Government

On December 9, 2002, the Snohomish County Council passed Amended Ordinance # 02-064 adopting a new Snohomish County Code (SCC) Chapter 30.32D relating to Historic and Archaeological Resources. The purpose of the chapter is to identify, evaluate, and protect archaeological and historic resources in the County and to preserve and rehabilitate eligible historic properties for future generations. This action further signifies the County's stewardship of significant cultural resources in the region.

Methodology

Efforts to identify cultural resources at the Paramount site consisted of conducting a review of DAHP records to identify properties previously listed in, or determined eligible for listing in the NRHP, the Washington Heritage Register, or the Snohomish County Register of Historic Places. The cultural resources considered in the site may be categorized into three major types:

Archaeological Resources. Resources that represent important evidence of past human behavior, including portable artifacts such as arrowheads or tin cans; non-portable features such as cooking hearths, foundations, and privies; or residues such as food remains and charcoal. Archaeological remains can be virtually any age, from yesterday's trash to prehistoric deposits thousands of years old.

Ethnographic Resources. Sites, areas, and materials important to Native Americans for religious, spiritual, or traditional uses. These resources can encompass the sacred character of physical locations (mountain peaks, springs, and burial sites) or particular native plants, animals, or minerals that are gathered for use in traditional ritual activities. Also included are villages, burials, rock art, rock features, and traditional hunting, gathering, and fishing sites. In some cases, ethnographic resources may overlap prehistoric or historic archaeological resources or they may be embedded within each other.

Historic Resources. Resources of the historic built environment that can include houses, barns, stores, post offices, bridges, and community structures that are more than 50 years old.

Record Search and Literature Review

A record search was undertaken at DAHP in Olympia to identify previously documented archaeological, ethnographic, and historic resources within 1 mile of the Paramount site and to help establish a context for resource significance. The following inventories and sources were consulted:

- DAHP Electronic Database;
- Snohomish County Heritage 2000 Inventory;
- National Register of Historic Places; and
- Washington Information System for Architectural and Archaeological Records Data (WISAARD).

Previously Recorded Sites

There are no previously recorded archaeological sites in or on the Paramount site. There are no previously recorded archaeological sites within a 1 mile radius of the Paramount site.

Previously Conducted Surveys

No cultural resource studies have been conducted in or on the Paramount site. Two cultural resource surveys were previously conducted within a 1 mile radius of the site (Juell 2006; Gilles et al. 2006). No archaeological or historic resources were identified.

3.8.2. Impact Analysis

Typical project impacts that may disrupt or adversely impact cultural resources may include:

- demolition, removal, or substantial alteration without consideration of historic and archaeological sites and/or features;
- incompatible massing, size, scale, or architectural style of new development on adjacent properties;
- obstruction or extensive shading of significant views to and from a resource by new development;
- incompatible use of an existing building or structure;
- disruption of integrity of setting; and
- long-term loss of access to the property.

The level of significance for an impact is dependent on the existing integrity and nature of contributing elements to a property’s historic or cultural significance and the sensitivity of the current or historic use of the resource.

Proposed Action

The Proposed Action would amend the Future Land Use Map (FLUM) designation on the Paramount site from the existing Urban Industrial (UI) to Urban Center (UC), and rezone the site from its current designation of Heavy Industrial (HI) to Planned Community Business (PCB). The Proposed Action changes the type and density of the development allowed on the site. The likelihood that any new development under the Proposed Action would affect cultural resources depends on the proximity of the proposed development to any cultural resources identified at the time of development. If any cultural resources were identified during future development, those findings would create a significant impact on those resources. However, because there are currently no cultural resources known to exist in or on the site, development activities under the Proposed Action alternative would result in having no impacts on cultural resources.

No Action Alternative

The No Action Alternative would retain the current comprehensive plan designation and zoning. However, it is possible that further development or activities could occur on the site between the present and the County's plan horizon year of 2025 at lesser intensities and within the limitations of the existing plan and zoning designations. Thus, the No Action Alternative has the same potential to affect cultural resources as the Proposed Action.

Because there are currently no cultural resources known to exist in or on the site, development activities under the No Action Alternative would result in no impacts on cultural resources.

3.8.3. Mitigation Measures

Applicable Regulations and Commitments

There are currently no cultural resources known to exist on the site. If, however, previously unknown cultural resources were identified during the planning or construction of future development projects, then it is possible that proposed development projects on the site may be governed by applicable federal, state, and local laws, which would require further review on an individual basis.

Federal Laws

The Archaeological Resource Protection Act of 1979 protects archaeological resources and sites that are on public and tribal lands and assists in sharing information among entities seeking to preserve these resources.

The National Historic Preservation Act of 1966, as amended, establishes national standards for designating historic and culturally significant properties and establishes the authority of the State Historic Preservation Officer. Section 106 USC 470(a)(d) of this law establishes a program that requires federal agencies to consider effects to historic properties caused by federally sponsored undertakings.

The Archaeological and Historic Preservation Act of 1974 governs archaeological and other historic and cultural resources found in federal construction activities, including the construction of dams.

The Native American Graves and Repatriation Act governs the protection, preservation, and repatriation of Native American remains and cultural artifacts found in Native American burial sites.

State Laws

The Governor's Executive Order 05-05 requires state agencies with Capital Improvement Projects (CIPs) to integrate the DAHP, the Governor's Office of Indian Affairs, and concerned tribes into their CIP planning process. This executive order affects any capital construction projects and any land acquisitions for the purposes of capital construction.

Revised Code of Washington (RCW) 27.44 Indian Graves and Records provides protection for Native American graves and burial grounds, encourages voluntary reporting of said sites when they are discovered, and mandates a penalty for disturbance or desecration of such sites.

RCW 27.53 Archaeological Sites and Resources governs the protection and preservation of archaeological sites and resources and establishes the Department of Archaeology and Historic Preservation as the administering agency for these regulations.

RCW 68.60 Abandoned and Historic Cemeteries and Historic Graves provides for the protection and preservation of abandoned and historic cemeteries and historic graves.

Other Potential Mitigation Measures

Because of its coastal location, it is possible that intact buried archaeological resources remain in as yet untested sections of the Paramount site. Established precedent for this possibility exists in the circumstances surrounding the discovery of the West Point site in Seattle's Discovery Park and the Tse-whit-sen village site in Port Angeles. Both sites were assumed to lie on culturally sterile soil prior to development, yet later were found to contain significant cultural resources. The century-long use of the Paramount site for industrial purposes may have destroyed any vestiges of cultural resources, or it may have protected them. The following mitigation measures are recommended for all future development projects on the site to avoid impacts on previously unidentified cultural resources:

1. An archaeological survey and testing is recommended for projects that involve significant excavation and any changes made to the vegetation and landforms.
2. In the event that a future development project is proposed on the Paramount site or immediately surrounding a previously unidentified site containing an archaeological resource, it is recommended that an environmental review of the development project be conducted that considers the impacts on the archaeological resource and, if needed, includes a study conducted by a qualified archaeologist to determine whether the proposed development project would materially impact the archaeological resource. If the project would disturb an archaeological resource, it is recommended that the Snohomish County (County) impose any and all measures to avoid or substantially lessen the impact. If avoidance of the archaeological resource is not possible, an appropriate research design must be developed and implemented with full data recovery of the archaeological resource prior to the development project.

3.8.4. Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to cultural resources are anticipated.

3.9. Aesthetics

The purpose of the Aesthetics section is to address the overall visual character of the Paramount of Washington LLC (Paramount) site, including height and bulk of existing and proposed development, the visual effects of light and glare, and the presence of any important views.

3.9.1. Affected Environment

The physical setting of the Paramount site is a relatively flat area of shoreline adjacent to Puget Sound on the west with a steep grade change to the east. A single upland parcel (approximately 5 acres) is located on the hill to the east and is hereafter referred to as the “upland area.” The remainder of the Paramount site, which lies at approximately sea level, is denoted as the “lowland area.” The Burlington Northern Santa Fe (BNSF) railroad runs along the eastern edge of the lowland area and separates the two areas.

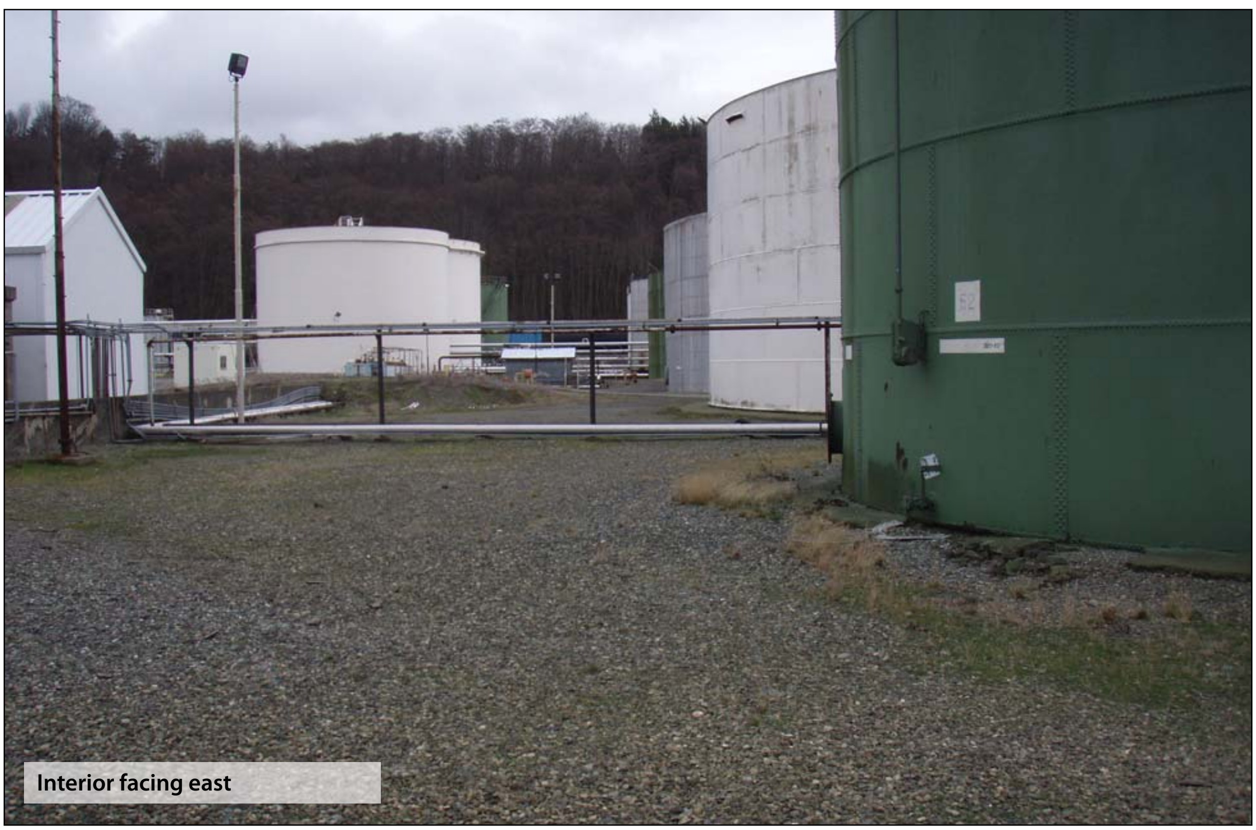
Visual Character

The Paramount site is currently the location of an asphalt plant and petroleum storage facility, located along the shoreline of Puget Sound. The dominant visual feature of the site is the collection of petroleum storage tanks that covers the northern and central portions of the lowland area. These tanks display great variety in age, physical condition, and size. In addition to the petroleum tanks, the northern and central portions of the lowland area contain a large number of prefabricated metal industrial buildings and equipment storage yards. Typical of industrial areas, very little vegetation is present on the lowland portion of the Paramount site, and groundcover consists primarily of gravel and pavement. The southern third of the lowland area is also disturbed industrial land, but is comparatively free of large structures. Figure 3.9-1 illustrates the typical visual character of the lowland area.

The small upland portion of the Paramount site is much less intensely developed, containing office buildings and parking areas. The upland area of the site is separate from the lowland area by a steep change of grade and by a railroad right-of-way, which presents a strong physical and visual barrier.

Height and Bulk

Most of the buildings on the lowland area are no more than one to two stories in height. While the petroleum storage tanks vary in size, and some exceed 30 feet in height, maximum allowed height on the site is 65 feet. Typical of industrial settings, individual structures exhibit similar appearance, and when viewed as a whole, the densely developed complex appears monolithic and visually massive, with little sense of variety or differentiation between one industrial building and the next. Existing development in the lowland area is shown in Figure 3.9-2. The upland area exhibits considerably less visual bulk than the lowland area. Consisting primarily of office buildings, building heights are lower than in the lowland area.



1068.07/SEIS (11/08)

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Figure 3.9-1
Industrial Visual Character of Paramount Lowland Area


View from dock facing northeast


View from dock facing east

1068.07/SEIS (12/08)

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Figure 3.9-2
Height and Massing of Existing Structures

Light and Glare

The lowland area currently uses extensive exterior illumination to provide lighting of the property for operational purposes. The on-site railroad siding, in particular, contains a large number of high-intensity lights for worker safety during loading and unloading procedures. Because of the presence of a thickly wooded grade change immediately east of the Paramount site, development in that area is currently shielded from the ambient light produced on the site. However, the slope becomes less extreme and less heavily forested near the southern end of the site, and development to the southeast has a direct line of sight to a portion of the existing industrial facility, as shown in Figure 3.9-3.

Views

Because of its waterfront location, views from the Paramount site are primarily directed toward Puget Sound. Views from the interior of the site are currently obstructed by the density of industrial development, but unobstructed views are available from the northern and southern ends of the site and from the upland area to the east. Because of its higher elevation, views from this location are not obstructed by current development.

Views of Puget Sound are a valuable amenity also to properties surrounding the Paramount site. A number of homes have been constructed at the top of the steep slope immediately to the north and east of the site to take advantage of these views.

Regulatory Context

Snohomish County Comprehensive Plan

The Land Use Element of the Snohomish County Comprehensive Plan contains goals and policies relating to urban design for enhancing the character and quality of development in urban growth areas. Pertinent goals and policies are excerpted below.

Goal LU 4. In cooperation with the cities and towns, create urban developments which provide a safe and desirable environment for residents, shoppers, and workers.

Objective LU 4.A		**Develop and implement comprehensive design guidelines and a design review process that improves the quality of residential, commercial, and industrial development.**
LU Policies	4.A.1	[Snohomish] County [County] shall work with architects, builders, and others to establish a design review process, innovative and flexible design guidelines and development regulations for site planning and the design of buildings, consistent with the urban design policies of the GPPs and utilizing reports such as the reports referenced in the introduction to Goal LU 4.
	4.A.2	The County shall explore and consider design guidelines for residential, commercial, and industrial development that meet the following criteria:

Existing floodlights at rail siding

Sight line to nearby residential development. (View from dock facing southeast)

1068.07/SEIS (12/08)

ICF Jones & Stokes
an ICF International Company

Figure 3.9-3
Light and Glare Conditions

a) Residential developers should support family households and children by providing adequate and accessible open space and recreation, and encouraging opportunities for day care, preschool, and after-school care services within close proximity.

b) Where increased density housing is proposed, the height, scale, design, and architectural character should be compatible with the character of buildings in the surrounding area.

c) New buildings oriented onto the street, maintain or create streetscape and pedestrian qualities and reduce the visual impact of parking lots, garages and storage areas.

d) Where high rise buildings are developed, street level uses are limited to commercial activities, entertainment services, public services, and other related public-generating activities.

e) The appearance of existing areas should be improved by:

1. encouraging well maintained landscaping on streets and in parking areas;
2. reducing the visual clutter of utility poles, overhead power lines, and suspended traffic signals;
3. encouraging improvements to entrances, façades, and lighting; and
4. grouping together signs and ensuring they are scaled and designed in a manner appropriate to the street frontage.

f) Developments should provide adequate setbacks, buffers, and visual screens to make them compatible with abutting residential and other land uses.

g) Urban design is sensitive to the preservation of existing cultural resources.

h) Consideration of design guidelines should include consideration of costs and impacts on affordable housing.

Objective LU 4.B **Establish and implement specific design guidelines for mixed use areas–urban centers and urban villages.**

LU Policies 4.B.1 The County shall work with architects, builders, and others to establish a design review process, innovative and flexible design guidelines, development regulations, and incentives for the development of urban centers and Urban Villages, consistent with the urban design policies of the GPP and utilizing reports referenced in the introduction to Goal LU 4.

4.B.2 The County shall explore and consider design guidelines for urban centers and villages that achieve the following objectives:

a) Centers that are visible and accessible to pedestrians from the streets and clearly defined through lighting, landscaping, street furniture, landmarks, changes in land use, and/or open space.

b) The design of new buildings that result in the creation of quality pedestrian spaces and that are compatible with planning architectural scale, massing, building orientation, height, articulation, and materials.

c) Open spaces that are incorporated into the design of centers and situated in a manner that complements other land uses.

d) Where increased density housing is proposed, the height, scale, design, and architectural character of the proposed units is compatible with the character of buildings in the surrounding area and may require taller buildings to be located in the core of the Village or Center, or at an edge adjacent to nonresidential uses, with heights stepping down towards existing lower density housing.

e) High quality developments and a mix of housing and commercial uses that allows for the use of creative and innovative design and fosters joint development strategies.

f) Building setbacks that create public spaces with visual interest.

g) Off-street parking that is within structures or underground, where feasible. Where underground parking or structures are not feasible, off-street surface parking within a center should be located at the sides or the rear of buildings and well landscaped to reduce the visual impact of large parking areas. Surface parking in front of a building (between the building and the street) should be avoided, whenever possible.

h) Shared parking among various land uses and provision of bicycle parking.

i) Centers that are connected with nearby residential, parks, schools, and employment areas by well-landscaped and barrier-free pedestrian, bicycle, and transit linkages (see also transportation element).

j) Well-designed urban centers and urban villages that are sensitive to natural and cultural resources so as to preserve them.

k) Emphasis shall be placed on the public realm, which may include parks, plazas, play area and trails, such that they create a sense of place within centers.

l) Consideration of design guidelines should include consideration of costs and impacts on affordable housing.

Snohomish County Unified Development Code

Title 30 of the Snohomish County Code (SCC) constitutes the Unified Development Code (UDC) and contains standards and procedures regulating development in the unincorporated portions of the County. The UDC implements the goals and policies of the comprehensive plan through the establishment of zoning districts and their associated development regulations.

The UDC contains bulk regulations for the various zoning districts including maximum building height, maximum lot coverage, and required setbacks from adjacent uses. Landscaping requirements are also included, as are parking requirements and signage regulations. The existing UDC was established in 2002 and is currently being reviewed and updated by Snohomish County.

Urban Centers Demonstration Program (UCDP)

Urban centers are compact areas of well-designed development that serve to bring a variety of different land uses to a single location. Urban centers are designed to be pedestrian oriented, allowing residents to live, work, and shop in their neighborhood, as well as have good access to transit services. The County began the Urban Centers Demonstration Program (UCDP) in 2002 to showcase this style of development and to monitor the effectiveness of the concept.

The County designates centers in areas that can support significant growth in population and employment and increased usage of transit. Centers fall into one of four categories (Snohomish County 2008a):

Urban Center. A mixed-use area that includes high-density residential, office, and retail, and public and community facilities. Pedestrian connections are provided along high-capacity routes or transit corridors.

Urban Village. A mixed-use district that hosts small-scale commercial and office uses. Public buildings and high-density residential development are also allowed, as well as public open space. Pedestrian orientation focuses on pedestrian circulation, pedestrian scale in design, and convenient pedestrian access and connectivity between neighborhoods. Urban villages often include several neighborhoods or communities located in close proximity to each other.

Transit Pedestrian Village. A core area within an urban center designed specifically for transit. These areas include mixed-use buildings that combine housing and office uses with neighborhood-scale retail. Multifamily housing is provided at high densities in order to support high-capacity transit service. The public realm is of great importance in these areas, including parks, plazas, transit centers, and other public facilities.

Manufacturing/Industrial Centers. Major existing regional employment centers, characterized by high-intensity manufacturing or industrial uses. These areas often cannot be easily mixed with other land uses at high densities, but are located with good access to the regional transportation network.

Regulations governing the UCDP are contained in SCC 30.34A.

3.9.2. Impact Analysis

As a non-project action, the proposed amendment to the County's Comprehensive Plan Future Land Use Map (FLUM) would not directly impact aesthetics. If adopted, this amendment would change the allowed uses and potential future development on the site. Project-level review would be required for future development proposals.

For the purposes of this analysis, an aesthetic impact occurs if the Proposed Action would result in:

- an increase in building heights or visual bulk significant enough to create obvious conflicts of scale between new and existing nearby development;
- the alteration or obstruction of recognized views; or
- an increase in light and glare that affects views or interferes with public safety.

Proposed Action

Visual Character

As described in Chapter 2, development of the Paramount site under the Proposed Action would seek admission to the County's UCDP, which specifies criteria for participation in SCC 30.34A.020. Requirements for participation in the program include:

- inclusion of a compatible mix of high-density residential development with public, commercial, and/or office use;
- residential development with a net density of 12 to 24 units per acre, or more;
- frontage on or access to a major transit corridor or location within 0.25 mile of a park-and-ride facility; and
- inclusion of public areas and transit- and pedestrian-oriented development, even if transit service is not currently available.

While a project design has not been formulated for the Paramount site, redevelopment of the site in accordance with the requirements of the UCDP would replace the current industrial facilities with a pedestrian-oriented, mixed-use neighborhood focused on transit service. While project-level design review would be required prior to construction, the development allowed under the proposed land use and zoning regulations would provide greater pedestrian access to the site, and the proposed mixed-use district would be more aesthetically compatible with the residential nature of surrounding development than is the current facility.

No significant adverse impacts on visual character are anticipated under the Proposed Action.

Height and Bulk

Under the Proposed Action, zoning in the Paramount site would be amended to Planned Community Business (PCB). Height and bulk regulations for the PCB zone are contained in SCC 30.23.030, which sets the maximum height at 40 feet, a decrease from the 65-foot limit currently in place under the existing Heavy Industrial (HI) zone. Additionally, all residential development in the PCB zone is required to adhere to the height and bulk regulations of the Multiple Residential (MR) zone. The MR zone limits residential development to a height of 35 feet and 40% maximum lot coverage. Minimum building separations are required at 15 feet, and each additional floor above the second story requires a 5-foot increase in building separation and a 3-foot increase in setbacks.

Under the Proposed Action, future development could apply for inclusion in the UCDP, which allows a maximum height of 45 feet for structures using surface parking and a maximum height of 90 feet if providing structured parking (SCC 30.23.040). Based on these standards, the Proposed Action has the potential to generate an increase in height and bulk over the No Action Alternative.

Project-level review would be required to determine the exact height and bulk impacts associated with future proposed development and if a waiver of any development standards by the Planning and Development Services Director is appropriate.

Light and Glare

Under the Proposed Action, the intensity of development of the Paramount site is projected to increase. Residential and commercial development often results in increases to exterior illumination, including street lights and illuminated signage and headlights from increased automobile traffic. The Proposed Action would allow up to 3,500 dwelling units and approximately 30 acres of mixed-use space on the site, the commercial component of which has the potential to significantly increase the amount of generated light and glare.

Views

While no project design has been completed, it is likely that development under the Proposed Action would be configured in a manner that takes advantage of the Puget Sound views available from the site. Views are valuable amenities for residents, and it is anticipated that much of the shoreline area would be reserved for residential development. The UCDP allows buildings using structured parking to increase their maximum height to 90 feet. This provision increases the likelihood that future development on the site may interfere with views from residences at the top of the bluff in Woodway. However, the exact extent of view impacts from a specific project under the Proposed Action cannot be analyzed as no architectural plans or design specifications have been submitted. The purpose of this non-project Supplemental Environmental Impact Statement (SEIS) is to identify potential impacts stemming from the change in land use designation.

Project-level design review by the County would be required to determine the exact impacts on views associated with future development under the Proposed Action and to identify appropriate mitigation measures, if any are required.

No Action Alternative

Under the No Action Alternative, no change of FLUM designation or zoning would occur, and industrial uses in the Paramount site would be allowed to continue. It is assumed that development on the site would eventually expand to the capacity allowed by current land use and zoning regulations.

Visual Character

Future development or redevelopment of the Paramount site would entail the construction of structures similar to what is currently on the site, including fuel storage tanks and asphalt production facilities. Under the No Action Alternative, it is assumed that petroleum processing and distribution activities would increase to match the plant's capacity; therefore, additional facilities may be constructed, further intensifying the industrial nature of the site. In addition, expanded industrial capacity could lead to an increase in truck trips to and from the site and increased use of the dock for marine fueling operations. While this development would already be allowed under the current land use designation and zoning regulations, it would represent an increase over existing conditions and has the potential to create impacts on visual character.

Height and Bulk

The No Action Alternative would preserve the Paramount site's existing HI zoning designation. According to SCC 30.23.030, the HI zone allows a maximum height of 65 feet, with no maximum on lot coverage. The current average height of structures in the Paramount site is less than 65 feet. Based on these standards, the No Action Alternative has the potential to increase the height and bulk of development on the site over existing conditions. While such development is already permitted by current zoning and land use designations, the No Action Alternative would entail an expansion of industrial uses to cover a greater portion of the site, thus increasing overall height and bulk.

Light and Glare

Under the No Action Alternative, petroleum storage and distribution operations in the Paramount site may increase in the future. As detailed in Table 2-4, it is assumed that increased operations would entail a doubling of average daily truck trips to and from the site and a 50% increase in annual marine fuel transfers. These increased operations may require the construction of additional facilities, and marine fueling operations could potentially occur at night. Additional exterior illumination may be required to ensure worker safety and site security. Therefore, the No Action Alternative has the potential to increase ambient light and glare in the vicinity.

Views

Views from the Paramount site are currently obstructed by existing development, and this is unlikely to change under the No Action Alternative. Additional construction of industrial facilities on the southern portion of the lowland area, which is currently undeveloped, could potentially further disrupt views from the site.

Off-site views of Puget Sound could also potentially be affected by the No Action Alternative. Current zoning allows building heights up to 65 feet, which is higher than the average existing structures. Increased heights on the Paramount site could potentially obstruct views from the hilltop homes located to the northeast of the site. Likewise, the expansion of development onto the currently open southern portion of the lowland area could potentially disrupt views from existing development located south of the Paramount site.

3.9.3. Mitigation Measures

Applicable Regulations and Commitments

Light and Glare

Chapters SCC 30.23 and 30.27 specify that exterior illumination and lighted signs shall be hooded and/or shielded to prevent glare when viewed from surrounding properties and rights-of-way. SCC 30.27.045 additionally specifies that signs in the PCB zone shall not employ animations, sounds, rotation or illumination by any flashing type of light.

Other Potential Mitigation Measures

Future development under the Proposed Action or No Action Alternative may require project-specific mitigation measures to address potential impacts on the built environment, particularly regarding height, bulk, and views. Future impacts would be analyzed and appropriate mitigation measures applied under the County’s State Environmental Policy Act (SEPA) review process at the time of application.

3.9.4. Significant Unavoidable Adverse Impacts

Given that analysis of aesthetic impacts rests heavily on the details of project-level design, the potential exists for future development under the Proposed Action to result in adverse impacts. With the application of existing regulations, no significant unavoidable adverse impacts on aesthetics are anticipated, but project-level design review would be necessary to identify any specific impacts and assign appropriate mitigation measures.

3.10. Population, Employment, and Housing

This section analyzes the potential change in population, employment, and housing capacity impacts that would result from the Proposed Action compared with the No Action Alternative. The change in population, employment, and housing capacity is based on the existing and proposed Snohomish County (County) Comprehensive Plan Future Land Use Map (FLUM) and zoning designations described in Chapter 2 and selected population, housing, and employment assumptions in the 2007 Buildable Lands Report for Snohomish County (Snohomish County Tomorrow 2007).

3.10.1. Affected Environment

Population

Town of Woodway and City of Shoreline Population

As of April 1, 2008, the County's population was 696,600, according to the State of Washington Office of Financial Management. The County's population in 2006 was 671,800, the County's Buildable Lands Report baseline, and 628,000 in 2002, the County's Comprehensive Plan baseline. Between 2002 and 2008, the population grew by 68,600 persons or at greater than a 10% increase. Unincorporated Snohomish County attracted 35% of the population increase and the cities combined attracted 65% of the population increase (State of Washington Office of Financial Management 2008).

The current and projected population of the Town of Woodway (Woodway), which is adjacent to the Paramount site, is shown in Table 3.10-1.

Table 3.10–1. Current and Projected Woodway Population

Population 2002	Population 2006[1]	Population Target 2025	Population Capacity 2006–2025	Unincorp-orated UGA Population 2002	Unincorp-orated UGA Population 2006	Unincorp-orated UGA Population Target 2025	Unincorp-orated UGA Population Capacity 2006–2025
990	1,165[2]	1,170	138	0	0	170	119

[1] All estimates are based on 2002 Woodway boundaries.

[2] As of 2008, Woodway achieved a population of 1,180, exceeding its target.
UGA = Urban Growth Area

The 2007 Buildable Lands Report indicates that the Woodway Municipal Urban Growth Area (MUGA) has less capacity than the target, though excess capacity in the town limits would allow for the total town/MUGA target to be met. As part of the Southwest Urban Growth Area (UGA), the total population target could be met as whole.

The City of Shoreline (Shoreline) lies adjacent to the Woodway MUGA in King County and considered the Paramount property in its comprehensive plan. Shoreline's 2008 population was estimated at 53,440 by the State of Washington Office of Financial Management (OFM). Cities in King County are not assigned a population growth target, but rather a household growth target, which is described later in this section.

Paramount of Washington LLC

The Paramount of Washington LLC (Paramount) site contains an industrial operation and there are no existing residents.

Employment

County and Area-wide Employment

According to the Washington State Employment Security Department estimates of covered employment, there were 247,670 jobs in the County as of 2007. This is an increase of 33,795 jobs or 7% over 213,875 in 2002. Table 3.10-2 identifies employment for Woodway.

Table 3.10-2. Current and Projected Woodway Employment

Employment 2002	Employment 2006[1]	Employment Target 2025	Employment Capacity 2006–2025	Unincorp-orated UGA Employment 2002	Unincorp-orated UGA Employment 2006	Unincorp-orated UGA Employment Target 2025	Unincorp-orated UGA Employment Capacity 2006–2025
53	64	90	0	13	12	620	0

[1] All estimates are based on 2002 Woodway boundaries.
UGA = Urban Growth Area

The 2007 Buildable Lands Report indicates that Woodway and its MUGA have less capacity than the target, though the Southwest UGA as a whole has excess capacity.

Shoreline currently contains 16,187 jobs according to the State of Washington Employment Security Department, as reported in the 2008 King County Annual Growth Report. Shoreline's 2001–2022 employment target is 2,618. Given job growth between 2001 and 2007, the balance of the target for 2008–2022 equals over 1,100 jobs. Recent land capacity studies indicate that Shoreline has capacity for 3,492 jobs (King County 2007).

Paramount of Washington LLC

The Paramount site contains an industrial operation and there are no existing residents. Paramount estimated 12 current employees associated with asphalt operations.

Housing

Unincorporated Snohomish County attracted 35% of the population increase and all the cities combined attracted 65% of the population increase (State of Washington Office of Financial Management 2008).

The County's housing units equaled 246,798 (113,103 unincorporated) in 2002, the County's Comprehensive Plan baseline. There were 267,707 housing units in 2006, the Buildable Lands Report baseline, and nearly half were located in unincorporated areas at 122,087. In 2008, housing units increased to 277,704, with 125,242 units in the unincorporated areas. Between 2002 and 2008, housing units grew by 30,892 units, greater than a 12% increase and slightly greater than the population increase.

UGA housing statistics for Woodway are presented in Table 3.10-3.

Table 3.10-3. Woodway Urban Growth Area Housing Statistics

Current Housing		Additional Housing Capacity		Fair Share Housing for Low/Mod-Income Households	
2006 Dwellings: Town Limits[1]	2006 Dwellings: UGA[2]	2025 Town Limits[3]	2025 UGA[3]	2025 Town Limits[4]	2025 Housing Planning Area Combined[5]
437	0	50	43	130	20,789

[1] Housing Unit Inventory by County, State of Washington Office of Financial Management. Data is stated for April 1, 2005.

[2] The 2007 Buildable Lands Report for Snohomish County, Snohomish County Tomorrow, identifies the residentially designated land in the MUGA as vacant.

[3] 2007 Buildable Lands Report for Snohomish County, Snohomish County Tomorrow.

[4] Snohomish County Tomorrow, 2025 Fair Share Housing Allocation.

[5] Housing Planning Areas are typically larger than city limits and UGA and may include multiple cities e.g., Southwest UGA and environs (Snohomish County 2005b).

Shoreline's household target between 2001 and 2022 equals 2,651. Due to growth between 2001 and 2007, the remaining growth target between 2008 and 2022 equals 1,490. Shoreline has capacity for 6,583 households, more than necessary to attain the remaining target between 2008 and 2022 (King County 2007).

Paramount of Washington LLC

The Paramount site contains no housing units.

3.10.2. Impact Analysis

Proposed Action

The Proposed Action is projected to add 6,440 persons and 3,500 dwelling units in the Woodway MUGA. The Proposed Action is also estimated to provide approximately 802 gross jobs or 790 net jobs, which would be commercial and retail in nature rather than industrial.

The added population in the MUGA under the Proposed Action would allow more than ample capacity to meet the MUGA population target. The added 800 jobs would exceed the MUGA job target.

Shoreline appears to have excess job capacity for its King County employment targets, and if the site were part of Shoreline, the Proposed Action would increase the excess employment capacity.

No Action Alternative

The No Action Alternative would not provide for additional population or housing units in the Woodway MUGA. Thus, there would be no change in capacity for either population or housing, and no change in terms of the ability of Woodway or Shoreline to meet growth targets.

The combined town/MUGA population target can be met by the No Action Alternative when considering the areas combined, but not if considering the MUGA alone.

The No Action Alternative is expected to increase employment to 91 to 116 gross jobs. This is 79 to 104 jobs above the 12 existing jobs. These jobs would support increased asphalt operations and a fuel storage and distribution operation (see Chapter 2). This would assist Woodway and the County in achieving the 620 job target and, similar to current circumstances, the excess employment capacity in the overall southwest UGA would help ameliorate the difference between job capacity and target.

Shoreline has excess capacity to meet its employment target. If the Paramount site were part of Shoreline, the proposed No Action Alternative job capacity would increase the surplus capacity.

3.10.3. Mitigation Measures

Mitigation measures are not required in terms of population, employment, or housing impacts by themselves. The increases in population, employment, and housing do not conflict with growth targets. Development allowed under the Proposed Action or under the No Action Alternative may require mitigation to address potential impacts on the built and natural environments at both a non-project level (see remaining Draft SEIS sections) as well as at the time a site-specific application is considered.

3.10.4. Significant Unavoidable Adverse Impacts

While employment will likely increase under the No Action Alternative, the increase would be much greater under the Proposed Action by about 711 jobs above the No Action Alternative. The Proposed Action would also increase population and housing by 6,440 persons and 3,500 dwellings, respectively, over current conditions. Additional development and redevelopment of the Paramount site may result in secondary impacts on the natural and built environment and on the demand for public services. See remaining Draft SEIS sections regarding the potential for impacts and the ability to mitigate associated environmental and service impacts where identified.

3.11. Transportation

3.11.1. Affected Environment

The affected environment consists of the current transportation facilities that serve the study area, and the existing operating conditions of those facilities. The regional transportation system includes state highways, city and county roadways, interchanges and bridges, bikeways and trails, public transportation facilities and services, railroads, marine ports, ferries, and airports. Local jurisdictions maintain an inventory of transportation facilities and services to meet the requirements of the Growth Management Act (GMA) and provide a sound basis for effective planning.

Transportation facilities and services present in the study area for the docket proposal include city roadways, state highways, public transportation services, and bicycle and pedestrian facilities.

Study Area

The Paramount of Washington LLC (Paramount) site is located at Point Wells at the southwest corner of Snohomish County (County). It is bordered by Puget Sound to the west, the Town of Woodway (Woodway) to the north and east, and the City of Shoreline (Shoreline) to the south (Figure 3.11-1). The Burlington Northern Santa Fe (BNSF) Railroad runs north–south through the site.

Topography of the site generally slopes upward from sea level moving east from Puget Sound. It is bordered on the south and southeast by single-family residential located in Woodway and Shoreline. An undeveloped steep bluff and bluff bench area border the site on the east and northeast, with single family residences located beyond the bluff.

Currently, the only access to the site is provided by Richmond Beach Drive, which connects to the southeast corner of the site via an overpass across the railroad. The presence of the bluff adjacent to the east and northeast side of the site substantially limits the potential for additional access roads between the site and the surrounding roadway network.

Regional access to the study area is provided via State Route (SR) 99, which runs generally north–south throughout the Puget Sound region is located approximately 2.5 miles to the east of the site; and SR 104 which runs generally northwest-southeast between Interstate 5 (I-5) and the Edmonds Ferry Terminal, includes the Edmonds–Kingston ferry route, and is located to the north of the site. I-5 runs generally north-south, and is located 1 to 2 miles to the east of SR 99. Local street access in the study area is proved by city streets in Shoreline, Edmonds, and Woodway.

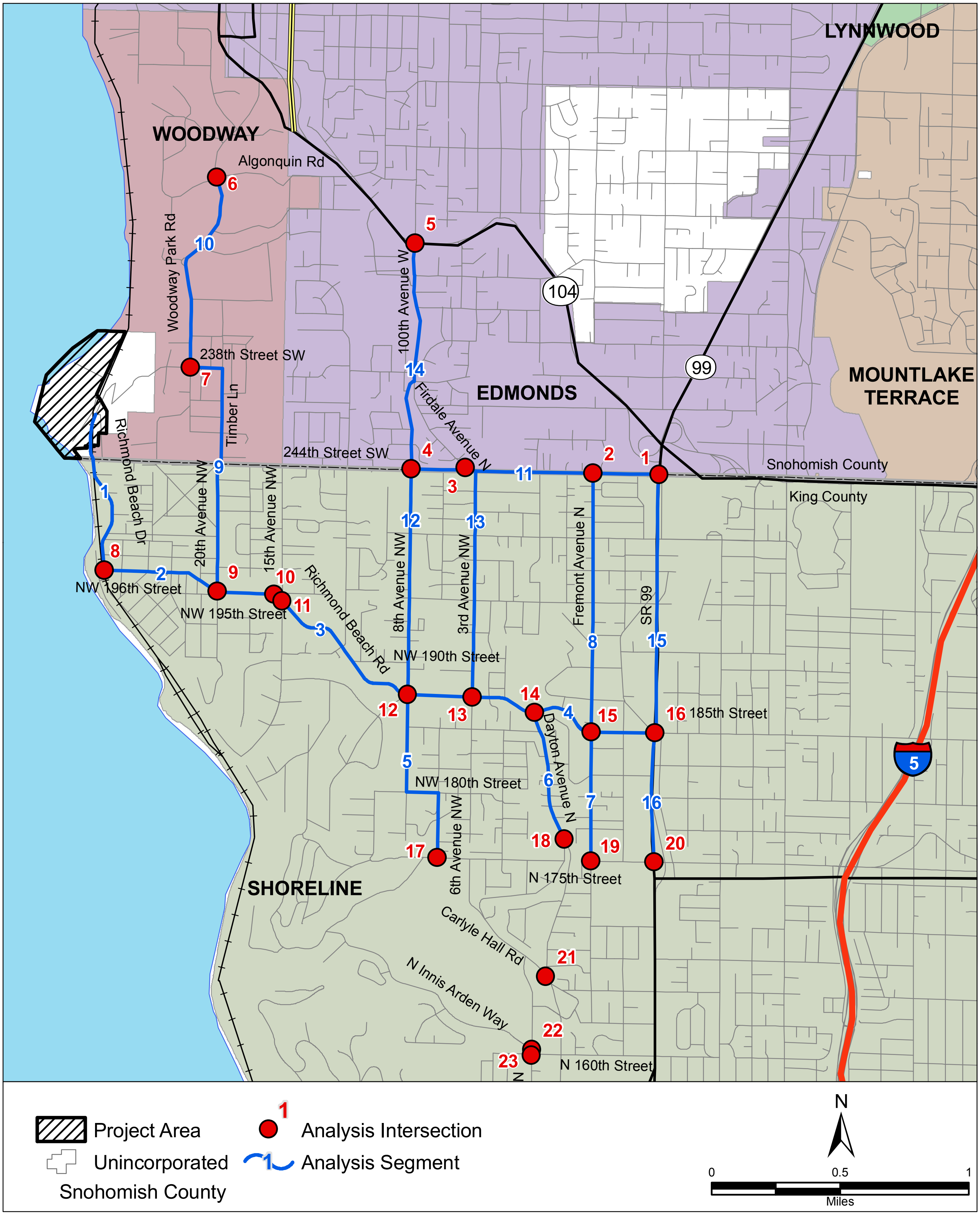

Figure 3.11-1
Transportation Study Area

Transportation analysis provided in this Draft Supplemental Environmental Impact Statement (SEIS) evaluates operations on key roadway segments and intersections that could potentially be affected by traffic generated by buildout of the proposed land use. The transportation study area is bounded by SR 104 to the north, SR 99 to the east, and N 160th Street to the south. Existing characteristics and operating conditions of transportation facilities within the study area are described in the following sections.

Roadways

The roadway segments that provide major access to the Paramount site were identified in the vicinity of the site and included in analysis for this proposal. A roadway's characteristics include its Functional Classification, which reflects the relative access and mobility functions it serves. The functional classification of a roadway is defined by the jurisdiction in which it is located. The major classifications are described as follows.

- Freeway. A freeway is a multilane, high-speed, high-capacity roadway intended exclusively for motorized traffic. All access is controlled by interchanges and road crossings are grade-separated. The freeways that run through the County are all under the jurisdiction of the Washington State Department of Transportation (WSDOT).
- Principal Arterial. A principal arterial is an intercommunity roadway that connects major community centers and facilities and is often constructed with limited direct access to abutting land uses. The primary function of principal arterials is to provide a high degree of vehicular mobility; however, they may play a minor role in providing land access. Principal arterials serve high-volume corridors, carrying the greatest portion of through or long distance traffic within a community.
- Minor Arterial. A minor arterial is an intra-community roadway bounded by the principal arterial system, which connects centers and facilities within the community and serves some through traffic, while providing a greater level of access to abutting properties. Minor arterials connect with other arterial and collector roads extending into the urban area.
- Collector. A collector is a roadway designed to fulfill both functions of mobility and access to adjacent development. Collectors typically serve intra-community trips connecting residential neighborhoods with each other or activity centers, while also providing a high degree of property access within a localized area. These roadways "collect" vehicular trips from local access streets and distribute them to higher classification streets.
- Local Access Street. A local access street is a roadway designed with a primary function of providing access to residences. Typically, they are only a few blocks long and are relatively narrow. All roadways that have not been designated as an arterial or a collector roadway are considered to be local access streets.

In 1998, the Washington State Legislature passed Highways of Statewide Significance (HSS) legislation, codified as RCW 47.06.140. HSS facilities provide and support transportation functions that promote and maintain significant statewide travel and economic linkages. The legislation emphasizes that these significant facilities be planned from a statewide perspective, so standards of HSS facilities are set at the state level. In the transportation study area, both SR 104 and SR 99 (portion to the south of SR 99) are designated HSS facilities.

For roadways under the County's jurisdiction, operating quality is measured according to arterial units. The County defines arterial units such that the physical and operational characteristics of the roadway elements within each unit are similar. An arterial unit can be a road, segment of road, or system of roads. Planning-level analysis of arterial units is based upon maximum service volume (MSV). MSV is the estimated vehicle capacity of the arterial unit, and is calculated based on procedures described in the Department of Public Works (DPW) Rule 4224 (adopted pursuant to the delegation of authority in SCC 30.66B.080; updated in 2006). MSV represents the highest traffic volume that a roadway can carry, while still maintaining its adopted operational standard.

For this Draft SEIS, all analysis roadway segments are located within Edmonds, Woodway, and Shoreline, with none under county jurisdiction. In urban areas such as these, operations of roadway segments are typically controlled by the operations of intersections located along them. The cities' respective policies reflect this, and all have set their roadway operating standards according to the operations of their intersections (described in the following section). Therefore, operations of the analysis roadways were evaluated primarily according to operations of key intersections located along them. However, in order to assess the overall carrying capacity of analysis roadway under future conditions, MSV estimate procedures were used to estimate planning-level operating capacities of city roadways, which are summarized in Table 3.11-1.

Table 3.11-1. Estimated Capacity of Analysis Roadway Segments

Jurisdiction / Functional Classification	Planning-Level Operating Capacity (vehicles per hour per lane)
Woodway / Collector	650
Shoreline / Collector	750
Shoreline / Minor Arterial	850
Edmonds / Minor Arterial	850
Shoreline / Principal Arterial	1,050

Table 3.11-2 presents the road segments within the study area identified for analysis, with their existing characteristics and peak-hour traffic volumes. Each analysis road segment is under the jurisdiction of the city in which it is located. The table shows that existing average volumes along the analysis roadways are well below their estimated operating capacities. The analysis roadway segments are also shown in Figure 3.11-1.

Table 3.11-2. Analysis Roadway Segment Characteristics and Existing Volumes

	Roadway Segment	Width	Jurisdiction	Functional Classification	Estimated Operating Capacity (veh/hour)[1]	Existing Traffic Volume (veh/hour)[2]	
						AM Peak Hour	PM Peak Hour
1	Richmond Beach Drive: Woodway City Limits to NW 196th Street	2 lanes	Shoreline/ Woodway	Collector	1,300	60	70
2	NW 196th Street: Richmond Beach Drive to NW 20th Avenue	2 to 4 lanes	Shoreline	Collector	1,500	130	180
3	NW 195th Street/Richmond Beach Road: 20th Avenues NW to 8th Avenue NW	4 lanes	Shoreline	Minor Arterial	3,400	710	790
4	Richmond Beach Road: 8th Avenue NW to SR 99	4 lanes	Shoreline	Minor Arterial	3,400	1,160	1,230
5	8th Avenue NW/NW 180th Street/6th Avenue NW: Richmond Beach Road to N 175th Avenue	2 lanes	Shoreline	Collector	1,500	490	440
6	Dayton Avenue N: Richmond Beach Road to N 175th Street/Saint Luke Place	2 lanes	Shoreline	Minor Arterial	1,700	690	620
7	Fremont Avenue N: N 175th Street to N 185th Street	2 lanes	Shoreline	Collector	1,500	760	750
8	Fremont Avenue N: N 185th Street to 244th Street SW	2 lanes	Shoreline	Collector	1,500	580	680
9	20th Street NW/Timber Lane/238th Street SW: NW 196th Street to Woodway Park Drive	2 lanes	Shoreline/ Woodway	Collector	1,300	200	230
10	Woodway Park Road: 238th Street SW to Algonquin Road	2 lanes	Woodway	Collector	1,300	110	180
11	244th Street SW: 100th Avenue W to SR 99	2 to 3 lanes	Shoreline/ Edmonds	Collector/ Minor Arterial	1,700	710	690
12	8th Avenue NW: Richmond Beach Road to 244th Street SW	2 lanes	Shoreline	Minor Arterial	1,700	540	550
13	3rd Avenue NW : Richmond Beach Road to 244th Street SW	2 lanes	Shoreline	Collector	1,500	610	430
14	100th Avenue W: 244th Street SW to SR 104	2 to 4 lanes	Edmonds	Minor Arterial	1,700	860	970
15	SR 99: 224th Street SW to N 185th Street (HSS)	5 lanes	Shoreline/ WSDOT	Principal Arterial	4,200	2,230	2,520
16	SR 99: N 175th Street to N 185th Street (HSS)	5 lanes	Shoreline/ WSDOT	Principal Arterial	4,200	2,090	2,670

[1] Operating capacity is a planning-level estimate, based upon the roadway functional classification and width. The two-directional capacity was estimated by applying the per lane planning-level capacities presented in Table 3.11-1.

[2] Two-directional traffic volumes, based upon traffic counts taken in November 2007 and March 2008.

Intersections

Table 3.11-3 presents the intersections that were identified for the Draft SEIS analysis, along with their existing traffic control and the jurisdiction in which they are located. Operating conditions of these intersections generally control the operations of the roadway segments presented in the previous section. The analysis roadway segments are also shown in Figure 3.11-1.

Table 3.11-3. Analysis Intersections

	Intersection	Existing Traffic Control	Jurisdiction
1	244th Street SW and SR 99	Signal	Shoreline/Edmonds/WSDOT
2	244th Street SW and Fremont Avenue N	Northbound Stop-Control	Shoreline
3	Firdale Avenue N and 244th Street SW	Northbound Stop-Control	Edmonds
4	244th Street SW and 100th Avenue W	Eastbound/Westbound Stop-Control	Edmonds
5	SR 104 and 100th Avenue W	Signal	Edmonds/WSDOT
6	Algonquin Road and Woodway Park Road	Eastbound/ Westbound Stop-Control	Woodway
7	238th Street SW and Woodway Park Road	All-way Stop-Control	Woodway
8	NW 196th Street and Richmond Beach Drive	Westbound Stop-Control	Shoreline
9	NW 196th Street and 20th Avenue NW	All-way Stop-Control	Shoreline
10	NW 195th Street and 15th Avenue NW	Northbound/Southbound Stop-Control	Shoreline
11	Richmond Beach Road and 15th Avenue NW	All-way Stop-Control	Shoreline
12	Richmond Beach Road and 8th Avenue NW	Signal	Shoreline
13	Richmond Beach Road and 3rd Avenue NW	Signal	Shoreline
14	Richmond Beach Road and Dayton Avenue N	Signal	Shoreline
15	N 185th Street and Fremont Avenue N	Signal	Shoreline
16	N 185th Street and SR 99	Signal	Shoreline/WSDOT
17	N 175th Street and 6th Avenue NW	Southbound Stop-Control	Shoreline
18	St Luke Place N and Dayton Avenue N	Eastbound Stop-Control	Shoreline
19	N 175th Street and Fremont Avenue N	Signal	Shoreline
20	N 175th Street and SR 99	Signal	Shoreline/WSDOT
21	Carlyle Hall Road and Dayton Avenue N	All-way Stop-Control	Shoreline
22	N Innis Arden Way and Greenwood Avenue N	Eastbound Stop-Control	Shoreline
23	N 160th Street and Greenwood Avenue N	All-way Stop-Control	Shoreline

Intersection analysis was completed for the weekday AM and PM peak hours. This represents the hour of the day during which the highest traffic volumes most typically occur, and is consistent with the analysis completed for the current adopted Transportation Element in the County's GMA Comprehensive Plan (Snohomish County 2008b). It is also consistent with the analysis periods reflected in the transportation elements of the cities' comprehensive plans. Both Shoreline and Edmonds analyze the PM peak hour, and Woodway analyzes the AM and PM peak hours. AM and PM peak hour intersection traffic counts were collected at all of the analysis intersections in November 2007 and March 2008. Existing intersection characteristics, AM peak hour traffic volumes, and PM peak hour traffic volumes and are provided in Appendix C of this Draft SEIS (Tables B-1, B-2, and B-3, respectively). Operating conditions of the analysis intersections, based upon these volumes, are discussed in the following section.

Level of Service (LOS)

Level of Service (LOS) is a qualitative measure of congestion that describes the quality of traffic conditions and takes into consideration factors such as volume, speed, travel time, and delay of vehicles traveling on a roadway. All jurisdictions within the study area define roadway LOS according to methodologies presented in the Highway Capacity Manual (Transportation Research Board 2000). LOS is represented by letter grades, A through F. LOS A and B reflect traffic flows with minimal delay; LOS C and D reflect moderate and stable traffic conditions; LOS E reflects conditions that approach capacity; and LOS F reflects congested conditions with potential for substantial delays.

LOS for signalized intersections is determined by the average amount of delay experienced by vehicles at the intersection. Table 3.11-4 summarizes the LOS criteria for signalized intersections.

Table 3.11-4. Level of Service Criteria for Signalized Intersections

Level of Service	Average Delay per Vehicle (seconds/vehicle)
A	= 10
B	> 10–20
C	> 20–35
D	> 35–55
E	> 55–80
F	> 80

Source: Transportation Research Board 2000.

For two-way stop-controlled intersections (or one-way stop-controlled T-intersections), LOS is based on the amount of delay experienced by drivers on the minor (stop-controlled) approaches. All-way stop-controlled intersections require drivers on all approaches to stop before proceeding into the intersection, so LOS is determined by the average computed or measured delay for all movements.

The LOS criteria for stop-controlled intersections have different threshold values than those for signalized intersections, primarily because drivers expect different levels of performance from distinct types of transportation facilities. In general, stop-controlled intersections are expected to carry lower volumes of traffic than signalized intersections. Thus for the same LOS, a lower level of delay is acceptable at stop-controlled intersections than it is for signalized intersections. Table 3.11-5 summarizes the LOS thresholds for stop-controlled intersections.

Table 3.11-5. Level of Service Criteria for Stop-Controlled Intersections

Level of Service	Average Delay per Vehicle (seconds/vehicle)
A	= 10
B	> 10–15
C	> 15–25
D	> 25–35
E	> 35–50
F	> 50

Source: Transportation Research Board 2000.

Level of Service Standards

LOS standards are used to evaluate the transportation impacts of long-term growth and concurrency. Jurisdictions adopt standards by which the minimum acceptable roadway operating conditions are determined. Deficiencies are identified if operations fall below these standards.

The analysis roadways analyzed in this Draft SEIS are located within Shoreline, Edmonds, Woodway. Thus, to analyze this docket proposal, projected conditions in the area were held to the applicable city LOS standards, defined as follows.

City of Shoreline

Shoreline's adopted LOS standard is specified in the Transportation Element of the City's Comprehensive Plan (City of Shoreline 2005a).

- Transportation Policy T13. Adopt LOS E at the signalized intersections on the arterials within the city as the LOS standards for evaluating planning level concurrency and reviewing traffic impacts of developments, excluding the Highways of Statewide Significance (Aurora Avenue N and Ballinger Way NE). LOS shall be calculated with the delay method described in the Transportation Research Board's Highway Capacity Manual 2000 or its updated versions.

Other Shoreline policies potentially relevant to this Draft SEIS analysis are listed below.

- Transportation Policy T45. Work with neighborhood residents to reduce speeds and cut-through traffic on non-arterial streets with education, enforcement, traffic calming, signing, or other techniques. Design new residential streets to discourage cut-through traffic while maintaining the connectivity of the transportation system.
- Transportation Policy T47. Monitor traffic growth on collector arterials and neighborhood collectors and take measures to keep volumes within reasonable limits.
- Transportation Policy T69. Pursue methods of reducing the impact on Richmond Beach Drive at the King/Snohomish County line (e.g., closing) if the Point Wells property is not annexed by the Shoreline. Consider the extension of 205th only as potential mitigation for future development of Point Wells.

City of Edmonds

Edmonds' adopted LOS standard is specified in the Transportation Element of the city's comprehensive plan (City of Edmonds 2002). The LOS standard for each functional classified roadway within Edmonds is listed below.

- Arterials (LOS D or better, (except SRs),
- Collectors (LOS C or better), and
- Local Street (LOS B or better).

Other Edmonds policies potentially relevant to this Draft SEIS analysis are listed below.

- Local residential streets should be designed to prevent or discourage their use as shortcuts for through traffic. Local traffic control measures should be coordinated with the affected neighborhood.
- Traffic circulation in the downtown area should flow in and around commercial blocks to promote customer convenience and reduce congestion. Through traffic should be segregated from local traffic circulation to encourage and support customer access.

Town of Woodway

Woodway's comprehensive plan sets an LOS standard of LOS A for major intersections within the town, which include the following three intersections (Town of Woodway 2004):

- Timber Lane and SW 238th Street,
- Woodway Park Road and SW 238th Street, and
- Woodway Park Road and Algonquin Road.

Other Woodway policies potentially relevant to this Draft SEIS analysis are listed below.

- Transportation Policy TP-3. To coordinate the planning of regional transportation facilities with surrounding jurisdictions. Further, the town shall review development projects in surrounding jurisdictions and strive to mitigate impacts from such projects on Woodway's transportation network.
- Transportation Policy TP-4. To minimize cut-through traffic on residential streets.
- Transportation Policy TP-5. To employ traffic calming measures that will enhance the quality of life and transportation safety for residents.

Existing Level of Service

Table 3.11-6 presents the results of LOS analysis for the 23 analysis intersections under existing conditions (see also Figure 3.11-2). The table shows that all analysis intersections are currently operating within applicable LOS standards during both the AM and PM hours. The intersection LOS analysis reports for existing conditions are provided in Appendix D of this Draft SEIS.

Table 3.11-6. Existing Peak Hour Intersection Level of Service

			AM Peak		PM Peak			
	Intersection	Existing Traffic Control	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS	LOS Standard	Juris-diction
1	244th Street SW and SR 99	Signal	44	D	48	D	E/D (SR 99 HSS)	Shoreline/ Edmonds/ WSDOT
2	244th Street SW and Fremont Avenue N	Northbound Stop-Control	21	C	30	D	E	Shoreline
3	Firdale Avenue N and 244th Street SW	Northbound Stop-Control	14	B	12	B	D	Edmonds
4	244th Street SW and 100th Avenue W	Eastbound/ Westbound Stop-Control	12/13	B/B	11/14	B/B	D	Edmonds
5	SR 104 and 100th Avenue W	Signal	24	C	34	C	D (SR 104 HSS)	Edmonds/ WSDOT
6	Algonquin Road and Woodway Park Road	Eastbound/ Westbound Stop-Control	10/9	A/A	0/9	A/A	A	Woodway
7	238th Street SW and Woodway Park Road	All-way Stop-Control	7	A	7	A	A	Woodway
8	NW 196th Street and Richmond Beach Drive	Westbound Stop-Control	7	A	9	A	E	Shoreline
9	NW 196th Street and 20th Avenue NW	All-way Stop-Control	9	A	9	A	E	Shoreline
10	NW 195th Street and 15th Avenue NW	Northbound/ Southbound	12/15	B/B	12/18	B/C	E	Shoreline

	Intersection	Existing Traffic Control	AM Peak Average Delay (sec/veh)	AM Peak LOS	PM Peak Average Delay (sec/veh)	PM Peak LOS	LOS Standard	Juris-diction
		Stop-Control						
11	Richmond Beach Road and 15th Avenue NW	All-way Stop-Control	10	A	11	B	E	Shoreline
12	Richmond Beach Road and 8th Avenue NW	Signal	29	C	26	C	E	Shoreline
13	Richmond Beach Road and 3rd Avenue NW	Signal	8	A	7	A	E	Shoreline
14	Richmond Beach Road and Dayton Avenue N	Signal	11	B	9	A	E	Shoreline
15	N 185th Street and Fremont Avenue N	Signal	24	C	27	C	E	Shoreline
16	N 185th Street and SR 99	Signal	49	D	43	D	E (SR 99 HSS)	Shoreline/ WSDOT
17	N 175th Street and 6th Avenue NW	Southbound Stop-Control	15	C	11	B	E	Shoreline
18	St Luke Place N and Dayton Avenue N	Eastbound Stop-Control	15	B	13	B	E	Shoreline
19	N 175th Street and Fremont Avenue N	Signal	9	A	8	A	E	Shoreline
20	N 175th Street and SR 99	Signal	45	D	36	D	E (SR 99 HSS)	Shoreline/ WSDOT
21	Carlyle Hall Road and Dayton Avenue N	All-way Stop-Control	22	C	17	C	E	Shoreline
22	N Innis Arden Way and Greenwood Avenue N	Eastbound Stop-Control	13	B	11	B	E	Shoreline
23	N 160th Street and Greenwood Avenue N	All-way Stop-Control	18	C	14	B	E	Shoreline

HSS = Highway Statewide of Significance

The existing roadway segment conditions are also illustrated in Figure 3.11-2. Analysis presented in the previous section (see Table 3.11-2) indicates that existing traffic volumes on the roadway segments are below the roadways' operating capacities. Because urban roadway operations are generally controlled by intersection operations, and all analysis intersections currently operate within the cities' adopted LOS standards, this indicates that the analysis roadway segments are currently operating at acceptable levels.

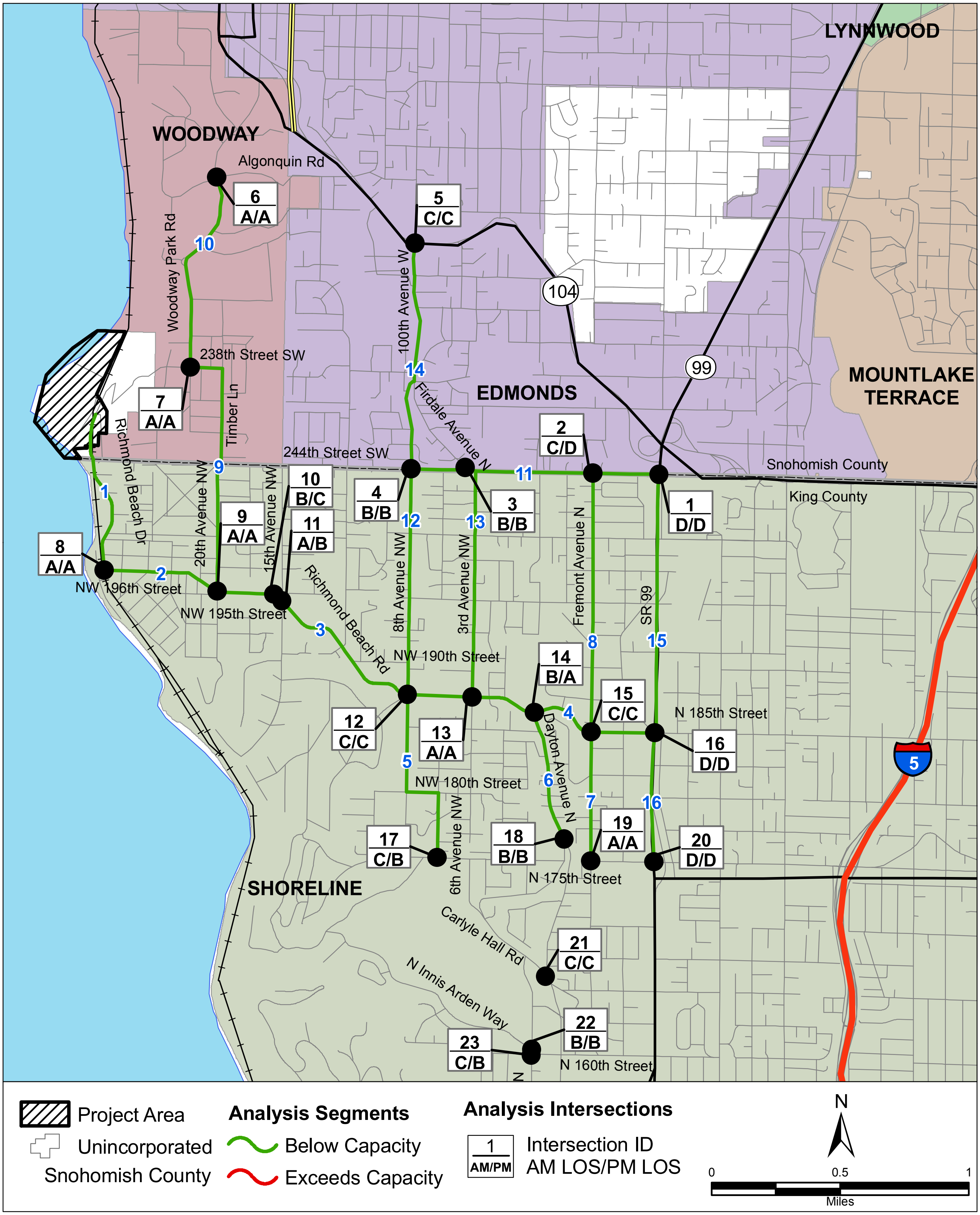

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Figure 3.11-2
Existing Roadway Level of Service

Existing Traffic Safety

Existing safety conditions and collision rates for roadways within the study area were assessed by reviewing the Transportation Elements of Shoreline and Edmonds' comprehensive plans (City of Shoreline 2005a; City of Edmonds 2002). Based on the cities' analyses, the following intersections were identified to have the highest collision rates among the analysis intersections:

- 244th Street SW and SR 99: 1.2 accidents per million entering vehicles,
- SR 104 and 100th Avenue W: 1.0 accident per million entering vehicles, and
- Richmond Beach Road and 3rd Avenue NW: 1.06 accidents per million entering vehicles.

The following two segments on Richmond Beach Road were identified to have the highest collision rates among the analysis segments:

- Richmond Beach Road between 15th Avenue NW and 12th Avenue NW: 0.83 accidents per million vehicle miles, and
- Richmond Beach Road between 8th Avenue NW and 3rd Avenue NW: 1.17 accidents per million vehicle miles.

Transit Service

Transit service is provided primarily by Community Transit in the County and by Metro Transit in King County. Sound Transit also provides regional intercity transit service throughout the Puget Sound region. Transit service consists of local routes, which provide all-day service (often including weekends) and commuter routes, which provide service during peak travel periods on weekdays. Information on transit routes and bus stops in the study areas was obtained from Community Transit (Community Transit 2008), Metro Transit (King County 2008c), and Sound Transit (Sound Transit 2008).

Figure 3.11-3 presents the existing transit service within the study area. Transit routes are described in the section following the figure. The figure shows that most arterials in the study area are served by at least one transit route. The Paramount site, however, is not currently directly served by any bus routes, as the current heavy industrial use of the property does not generate the level of travel demand that would be needed to support transit. The closest bus route is located approximately 0.5 mile south of the southern edge of the site.

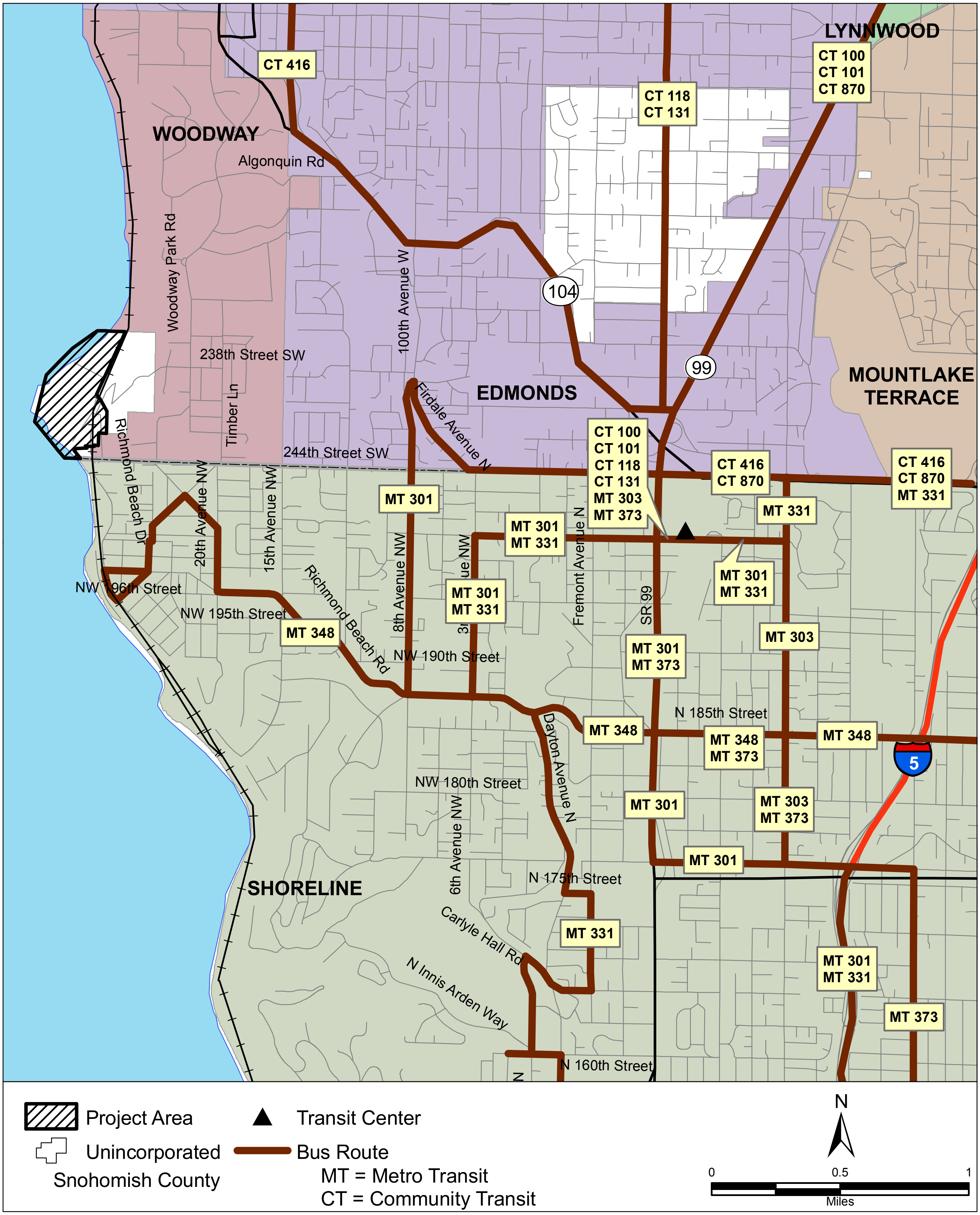

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Figure 3.11-3
Transit Service

Community Transit

Several Community Transit routes operate in the study area:

- Route 100**.** This route provides commuter service on weekdays between Aurora Village Transit Center in Shoreline and Everett Station through Edmonds and Lynnwood, primarily via N 200th Street and SR 99 in the study area. During the AM peak travel period, the route operates northbound, with return trips provided in the PM peak travel period.
- Route 101**.** This route provides service on weekdays and weekends between Aurora Village Transit Center in Shoreline and Mariner Park and Ride in Everett through Edmonds and Lynnwood, primarily via N 200th Street and SR 99 in the study area.
- Route 118**.** This route provides service on weekdays and weekends between Aurora Village Transit Center in Shoreline and Ash Way Park and Ride in Lynnwood via Edmonds. It primarily operates on N 200th Street, SR 99, and 84th Avenue W in the study area.
- Route 131**.** This route provides service on weekdays and weekends from Aurora Village Transit Center in Shoreline to Edmonds. In Shoreline, the route operates along N 200th Street and SR 99. In Edmonds, the route operates on 244th Street SW, Firdale Avenue, 100th Avenue W, and Edmonds Way.
- Route 416**.** This route provides commuter service on weekdays between Edmonds and downtown Seattle. Southbound trips are in the AM peak travel period with return trips in the PM peak hour. Major roads traversed by this route in the study area include 244th Street SW, SR 99 and Edmonds Way.
- Route 870**.** This route provides commuter service on weekdays between Edmonds and the University District in Seattle via 244th Street SW and SR 99 in the study area. Southbound trips are offered until mid-morning with return trips throughout the afternoon.

King County Metro Transit

The following King County Metro Transit bus routes serve the study area:

- Route 301**.** This commuter route operates between downtown Seattle and Richmond Beach in Shoreline in both directions during AM and PM peak hours. Major roads in the study area traversed by this route include N. 175th Street, SR 99, 244th Street SW, Firdale Avenue, 8th Avenue NW, Richmond Beach Road, 3rd Avenue NW, and N. 200th Street.
- Route 303**.** This commuter route operates from Shoreline Park and Ride to First Hill in Seattle in the AM peak hours with return trips in the PM peak hours. The route travels along N 175th Street, Meridian Avenue N, N 200th Street, and SR 99 in the study area.
- Route 331**.** This route operates between the University of Washington in Bothell and Community College in Shoreline throughout the day on weekdays and weekends via

Kenmore and Lake Forest Park. Major roads in the study area traversed by this route include N 200th Street, 3rd Avenue NW, Richmond Beach Road, Dayton Avenue N, Fremont Avenue North, Carlyle Hill Road, and Greenwood Avenue N.

- Route 348**.** This route operates between Northgate Transit Center in Seattle and Richmond Beach in Shoreline on weekdays and weekends, primarily via N 185th Street, Richmond Beach Road, and NW 195th Street in the study area. It does not circulate through the Aurora Village Transit Center. This route provides the service closest to the site, running approximately 0.5 mile to the south.
- Route 373**.** This commuter route provides service from the Aurora Village Transit Center in Shoreline to the University District in Seattle via N 185th Street, SR 99, and N 200th Street in the study area during the AM peak travel period with return trips in the PM peak travel period.

Sound Transit/Amtrak

The Sounder commuter rail line operates along the existing rail between Seattle and Everett, with stops in Edmonds and Mukilteo. Through a partnership with Amtrak, Amtrak trains are also available for commuters along this route. The trains run through the Paramount site on the BNSF tracks, but the closest station is located in Edmonds. Sounder operates four southbound trains during the morning commute period and four northbound trains during the evening commute period. Amtrak operates one southbound and one northbound run each in the morning and evening.

Pedestrian Facilities

Pedestrian facilities in the study area include sidewalks, roadway shoulders, and the shared use of low traffic streets. In the study area, the following analysis roadway segments have sidewalks on one or both sides of the street (City of Edmonds 2002; City of Shoreline 2005b; Town of Woodway 2004):

- NW 196th Street/ Richmond Beach Road between 24th Avenue NW and SR 99: both sides of street,
- Fremont Avenue N between N 170th Street and N 175th Street: east side of street,
- 244th Street SW/Firdale Avenue between 100th Avenue W and SR 99: both sides of street,
- 100th Avenue W between 244th Street and Firdale Avenue: west side of street,
- 100th Avenue W between Firdale Avenue and SR 104: both sides of street, and
- SR 99 between N 175th Street and N 185th Street: both sides of street.

Shoulders are provided on most analysis roadway segments that do not have sidewalks.

Bicycle Facilities

Bicycle facilities may include dedicated paths, bikeways, or marked routes on the streets. In the study area, the following analysis roadway segments are designated as bike routes are listed below (City of Edmonds 2002; City of Shoreline 2005b, Town of Woodway 2004):

- Timber Lane/238th Street SW between 20th Street NW and Woodway Park Drive,
- Woodway Park Drive between 238th Street SW and 3rd Avenue S,
- 244th Street SW/Firdale Avenue between 100th Avenue W and SR 99, and
- 100th Avenue W between Firdale Avenue and 9th Avenue S.

In addition, the Interurban Trail runs in a dedicated right of way between Seattle and the County. In the study area it is roughly parallel to SR 99. It connects to area businesses as well as to transit hubs.

3.11.2. Impact Analysis

Transportation impact analysis was completed for the future planning year of 2025. This analysis year was selected to be consistent with the analysis completed for the current adopted County Transportation Element (Snohomish County 2008b). It is also consistent with the long-range planning year in the Woodway's comprehensive plan (Town of Woodway 2004). The Shoreline and Edmonds plans evaluate 2022 as their long-range planning year (City of Shoreline 2005a; City of Edmonds 2002). The 2025 planning year evaluated in this Draft SEIS is more conservative than 2022, because it takes into account three additional years of projected regional traffic growth.

The County's Transportation Element also evaluates a shorter term future planning year of 2015. However, if the docket request were approved, it is unlikely that the site would be developed and would generate project-related traffic prior to 2015. Therefore, no supplemental analysis of 2015 conditions has been performed. The following sections present the impact analysis and results for the Proposed Action and No Action Alternative.

No Action Alternative

Future traffic volumes at analysis intersections and on analysis roadway segments under the No Action Alternative were forecasted using the County's travel demand model, and reflect conditions expected to result under the adopted Future Land Use Map (FLUM). The No Action Alternative is described in detail in Chapter 2 of this Draft SEIS.

Traffic Forecasts

A travel demand forecasting model was developed to project future year traffic volumes within the study area. The technical report that documents the model development is provided in Appendix E of this Draft SEIS. The Snohomish County Department of Public Works provided the base year model platform for this study. The model is based on an EMME platform and consists of four-step process similar to the Puget Sound Regional Council (PSRC) model. Land use in Snohomish County was based on the adopted County FLUM. For areas outside of the County, PSRC future land use projections were used. The model was validated based on the traffic counts that were collected in the study area. The existing year network was enhanced in the Points Well and surrounding areas by adding many local streets that otherwise are not included in the County or PSRC models. The transportation analysis zone system was modified in the study area to better capture the traffic on the minor arterial and collector roadways. County staff provided the base year land use for the new split zones. The existing year trip table was created based on this finer zone system. The validation focused on I-5, SR-99 and major arterials in the surrounding areas, and included minor arterials and collectors in the study area.

Once the model was validated for both AM and PM conditions, it was used as the basis to develop the future year models. The network was built on the existing year validated network based on planned projects through 2025. County staff provided future year base trip tables that were assigned to create future year base roadway volumes.

Within the Paramount site, the No Action Alternative land use reflected development expected under build-out of the current County FLUM. Land use outside the Paramount site was based upon regional population and employment forecasts.

Land Use and Trip Generation

Land use under the No Action Alternative is projected to continue as Heavy Industrial (HI), consistent with the current County FLUM. Table 3.11-7 summarizes the land use assumption and trip generation projections for the Paramount site under the No Action Alternative conditions. The table shows a projection of 71 trips during the AM peak hour, and 75 trips during the PM peak hour.

Table 3.11-7. Trip Generation Projections–No Action Alternative

	AM Peak Hour Trips			PM Peak Hour Trips		
Land Use	Inbound	Outbound	Total	Inbound	Outbound	Total
HI (116 employees)	55	16	71	22	53	75

Hi = Heavy Industrial

Intersection Operations

The No Action Alternative model output volumes were post-processed to project AM peak hour and PM peak hour traffic volumes at intersections. The projected AM peak hour and PM peak hour intersection traffic volumes are provided Tables B-4 and B-5, respectively, in Appendix C of this Draft SEIS.

Table 3.11-8 summarizes projected 2025 LOS under the No Action Alternative (see also Figure 3.11-4). The intersection LOS analysis reports for 2025 No Action Alternative conditions are provided in Appendix D of this Draft SEIS. The table shows that the following 10 of the 23 analysis intersections are expected to operate below applicable LOS standards during one or both of the peak hours:

- (1) 244th Street SW and SR 99 (AM and PM peak hours),
- (2) 244th Street SW and Fremont Avenue N (PM peak hour),
- (4) 244th Street SW and 100th Avenue W (PM peak hour),
- (5) SR 104 and 100th Avenue W (AM and PM peak hours),
- (6) Algonquin Road and Woodway Park Road (AM and PM peak hours),
- (16) N 185th Street and SR 99 (AM and PM peak hours)
- (17) N 175th Street and 6th Avenue NW (AM peak hour),
- (20) N 175th Street and SR 99 (PM peak hour),
- (21) Carlyle Hall Road and Dayton Avenue N (AM peak hour), and
- (23) N 160th Street and Greenwood Avenue N (AM peak hour).

Of these 10 intersections, six are located in Shoreline, two are located in Edmonds, one is located on the Shoreline/Edmonds city boundary, and one is located in Woodway. It should be noted that the intersection located in Woodway is projected to operate at LOS B, which reflects a relatively low level of delay; however, it exceeds Woodway's adopted standard of LOS A, and thus is considered an impact.

Table 3.11-8. Intersection Level of Service–No Action Alternative

	Intersection	Existing Traffic Control	AM Peak		PM Peak		LOS Standard	Juris-diction
			Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS		
1	244th Street SW and SR 99	Signal	F	173	F	115	E/D (SR 99 HSS)	Shoreline/ Edmonds/ WSDOT

	Intersection	Existing Traffic Control	AM Peak Average Delay (sec/veh)	AM Peak LOS	PM Peak Average Delay (sec/veh)	PM Peak LOS	LOS Standard	Juris-diction
2	244th Street SW and Fremont Avenue N	Northbound Stop-Control	E	46	F	71	E	Shoreline
3	Firdale Avenue N and 244th Street SW	Northbound Stop-Control	C	18	B	14	D	Edmonds
4	244th Street SW and 100th Avenue W	Eastbound/ Westbound Stop-Control	C/C	18/24	A/F	9/53	D	Edmonds
5	SR 104 and 100th Avenue W	Signal	E	68	F	133	D (SR 104 HSS)	Edmonds/ WSDOT
6	Algonquin Road and Woodway Park Road	Eastbound/ Westbound Stop-Control	B/B	12/11	A/B	0/15	A	Woodway
7	238th Street SW and Woodway Park Road	All-way Stop-Control	A	8	A	9	A	Woodway
8	NW 196th Street and Richmond Beach Drive	Westbound Stop-Control	A	9	A	9	E	Shoreline
9	NW 196th Street and 20th Avenue NW	All-way Stop-Control	B	10	B	11	E	Shoreline
10	NW 195th Street and 15th Avenue NW	Northbound/ Southbound Stop-Control	B/C	14/19	A/D	10/26	E	Shoreline
11	Richmond Beach Road and 15th Avenue NW	All-way Stop-Control	B	10	B	12	E	Shoreline
12	Richmond Beach Road and 8th Avenue NW	Signal	E	65	E	62	E	Shoreline
13	Richmond Beach Road and 3rd Avenue NW	Signal	C	27	A	10	E	Shoreline
14	Richmond Beach Road and Dayton Avenue N	Signal	B	15	B	12	E	Shoreline
15	N 185th Street and Fremont Avenue N	Signal	C	33	D	36	E	Shoreline
16	N 185th Street and SR 99	Signal	F	192	F	192	E (SR 99 HSS)	Shoreline/ WSDOT
17	N 175th Street and 6th Avenue NW	Southbound Stop-Control	F	57	C	17	E	Shoreline
18	St Luke Place N and Dayton Avenue N	Eastbound Stop-Control	C	24	B	14	E	Shoreline
19	N 175th Street and Fremont Avenue N	Signal	B	12	A	8	E	Shoreline
20	N 175th Street and SR 99	Signal	E	79	F	91	E (SR 99 HSS)	Shoreline/ WSDOT

	Intersection	Existing Traffic Control	AM Peak		PM Peak		LOS Standard	Juris-diction
			Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS		
21	Carlyle Hall Road and Dayton Avenue N	All-way Stop-Control	F	104	E	46	E	Shoreline
22	N Innis Arden Way and Greenwood Avenue N	Eastbound Stop-Control	C	20	B	13	E	Shoreline
23	N 160th Street and Greenwood Avenue N	All-way Stop-Control	F	58	D	26	E	Shoreline

Note: HSS = Highway Statewide of Significance

Roadway Segment Operations

Table 3.11-9**Error! Bookmark not defined.** summarizes projected operating conditions of the analysis roadway segments under the No Action Alternative (see also Figure 3.11-4). The table shows that traffic volumes on some roadways are projected to increase substantially under the No Action Alternative. In particular, roadways in the northeast section of Shoreline (including and northeast of 8th Avenue NW and Richmond Beach Road/N 185th Street) are expected to experience substantial increases in traffic; though they are still projected to be below their estimated operating capacities.

Even though no roadways are projected to carry volumes that exceed their estimated operational capacities, the following nine road segments include intersections projected to exceed applicable LOS standards, which, in turn would affect overall operations along the roadway:

- (4) Richmond Beach Road: 8th Avenue NW to SR 99,
- (5) 8th Avenue NW/NW 180th Street/6th Avenue NW: Richmond Beach Road to N 175th Avenue,
- (8) Fremont Avenue N: N 185th Street to 244th Street SW,
- (10) Woodway Park Road: 238th Street SW to Algonquin Road,
- (11) 244th Street SW: 100th Avenue W to SR 99,
- (12) 8th Avenue NW: Richmond Beach Road to 244th Street SW,
- (14) 100th Avenue W: 244th Street SW to SR 104,
- (15) SR 99: 224th Street SW to N 185th Street, and
- (16) SR 99: N 175th Street to N 185th Street.

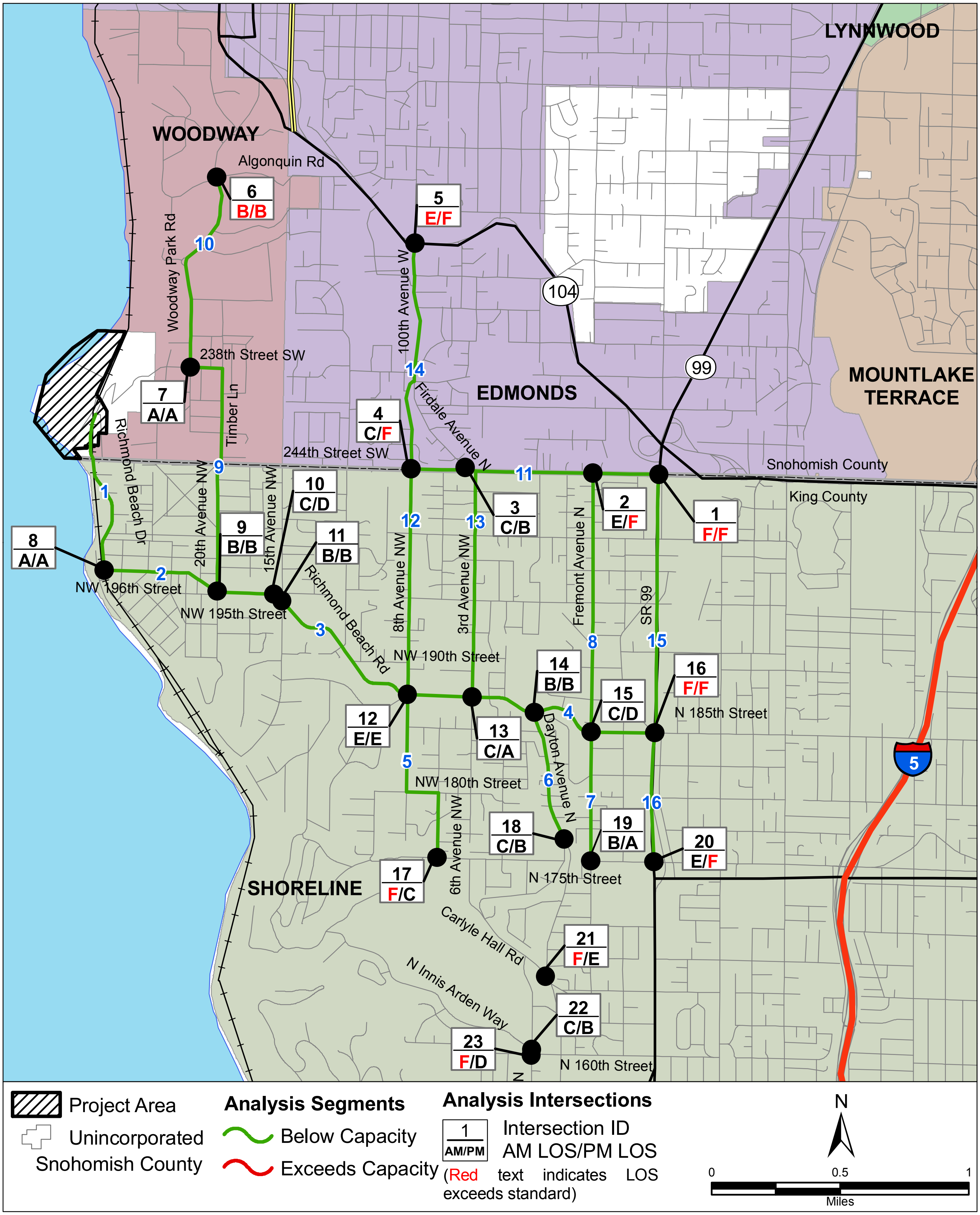

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Figure 3.11-4
2025 No Action Roadway Level of Service

Table 3.11-9. Roadway Segment Operations–No Action Alternative

	Roadway Segment	Estimated Operating Capacity (veh/hour)[1]	Existing Traffic Volumes (veh/hour)		2025 No Action Volumes (veh/hour)		Includes Intersection(s) that Exceed LOS Standard	Jurisdiction
			AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour		
1	Richmond Beach Drive: Woodway City Limits to NW 196th Street	1,300	60	70	110	115	No	Shoreline/ Woodway
2	NW 196th Street: Richmond Beach Drive to NW 20th Avenue	1,500	130	180	295	400	No	Shoreline
3	NW 195th Street/Richmond Beach Road: 20th Avenues NW to 8th Avenue NW	3,400	710	790	785	1,060	No	Shoreline
4	Richmond Beach Road: 8th Avenue NW to SR 99	3,400	1,160	1,230	1,360	1,980	Yes	Shoreline
5	8th Avenue NW/NW 180th Street/6th Avenue NW: Richmond Beach Road to N 175th Avenue	1,500	490	440	820	940	Yes	Shoreline
6	Dayton Avenue N: Richmond Beach Road to N 175th Street/Saint Luke Place	1,700	690	620	855	730	No	Shoreline
7	Fremont Avenue N: N 175th Street to N 185th Street	1,500	760	750	880	885	No	Shoreline
8	Fremont Avenue N: N 185th Street to 244th Street SW	1,500	580	680	830	1,075	Yes	Shoreline
9	20th Street NW/Timber Lane/238th Street SW: NW 196th Street to Woodway Park Road	1,300	200	230	370	460	No	Shoreline/ Woodway
10	Woodway Park Road: 238th Street SW to Algonquin Road	1,300	110	180	330	400	Yes	Woodway

	Roadway Segment	Estimated Operating Capacity (veh/hour)[1]	Existing Traffic Volumes (veh/hour)		2025 No Action Volumes (veh/hour)		Includes Intersection(s) that Exceed LOS Standard	Jurisdiction
			AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour		
11	244th Street SW: 100th Avenue W to SR 99	1,700	710	690	1,415	1,335	Yes	Shoreline/ Edmonds
12	8th Avenue NW: Richmond Beach Road to 244th Street SW	1,700	540	550	1,025	1,120	Yes	Shoreline
13	3rd Avenue NW : Richmond Beach Road to 244th Street SW	1,500	610	430	1,040	695	No	Shoreline
14	100th Avenue W: 244th Street SW to SR 104	1,700	860	970	820	960	Yes	Edmonds
15	SR 99: 224th Street SW to N 185th Street	4,200	2,230	2,520	4,175	3,730	Yes	Shoreline/ WSDOT
16	SR 99: N 175th Street to N 185th Street	4,200	2,090	2,670	3,285	3,720	Yes	Shoreline/ WSDOT

[1] Operating capacity is a planning-level estimate, based upon the roadway functional classification and width. The two-directional capacity was estimated by applying the per-lane planning-level capacities presented in Table 3.11-1.

Proposed Action

Future traffic volumes at analysis intersections and on analysis roadway segments under the Proposed Action were forecasted using the County's travel demand model, and reflect conditions expected to result under maximum allowable build-out under the proposed zoning. The Proposed Action is described in detail in Chapter 2 of this Draft SEIS.

It is important to note that the Proposed Action analyzed in this document is the proposed change in zoning; it is not the actual development that would be built on the site if the zoning change were approved. If the Proposed Action (proposed zoning change) were to be approved, project-level environmental analysis will still be required for whatever actual development is proposed at the site. Because this is a programmatic analysis that evaluates impacts that could potentially occur as a result of the proposed zoning change, transportation analysis conservatively focuses on the highest level of development, and thus the highest level of impact, that could reasonably be expected to occur under that proposed zoning. Thus, it is possible that future development under the Proposed Action could be less intense than what is evaluated in this Draft SEIS.

Traffic Forecasts

The travel demand forecasting model (described under the No Action Alternative) was also developed to project future year traffic volumes within the study area under the Proposed Action. The technical report that documents the model development is provided in Appendix E of this Draft SEIS. Outside the Paramount site, all land use under the Proposed Action is the same that the land use identified under the No Action Alternative. Inside the Paramount site, land use and resulting trip generation projections reflect build-out of development that would be allowed under the proposed zoning change.

Land Use and Trip Generation

Traffic volumes for potential development under the proposed zoning were estimated using standard average trip generation rates from the Trip Generation Manual (Institute of Transportation Engineers 2003). Table 3.11-10 summarizes the trip generation rates that were used to analyze land use types that would be expected under the proposed zoning.

Table 3.11-11 summarizes the mix of land use that was assumed under build-out under the proposed zoning, and the projection of trips generated by those land uses. Trips were projected by applying the rates summarized in Table 3.11-10 to the land uses summarized in Table 3.11-11. Commercial development generally tends to result in higher trip generation than residential development, for the same geographical area. The proposed mixed use zoning in the docket proposal could reflect varying proportions of commercial to residential development. For this Draft SEIS analysis, a proportion of commercial development at the higher end of the potential range was conservatively assumed.

Table 3.11-10. Institute of Traffic Engineers Trip Generation Rates–Peak Hour of Adjacent Street

			AM Peak			PM Peak			
ITE Land Use Category	ITE Code	Unit	ITE Average Rate	% In	% Out	ITE Average Rate	% In	% Out	Zoning Use
Residential Condominium/Townhouse	230	Dwelling Units	0.19[a]	16%	84%	0.24[b]	67%	33%	Multiple Residential
General Office Building	710	Employees	0.48[c]	88%	12%	0.46[d]	17%	83%	Service
Specialty Retail Center	814	1,000 Square Feet	-	-	-	2.71[e]	44%	56%	Retail
Shopping Center	820	1,000 Square Feet	1.03	61%	39%	-	-	-	Retail

[a] Projected trips are calculated based on the equation, Ln(T) = 0.80Ln(X) + 0.26, T = trips and X = land use.
[b] Projected trips are calculated based on the equation,- Ln(T) = 0.82Ln(X) + 0.32, T = trips and X = land use.
[c] Projected trips are calculated based on the equation,- Ln(T) = 0.86Ln(X) + 0.24, T = trips and X = land use.
[d] Projected trips are calculated based on the equation,- T = 0.37(X) +60.08, T = trips and X = land use.
[e] Projected trips are calculated based on the equation,- T = 2.40(X) + 21.48, T = trips and X = land use.
ITE = Institute of Traffic Engineers
Source: Institute of Transportation Engineers 2003.

Table 3.11-11. Trip Generation Projections–Proposed Action

				AM Trips[2]		PM Trips[3]	
ITE Land Use Category	ITE Code	Unit[1]	Unit Type	Inbound	Outbound	Inbound	Outbound
Residential Condominium/Townhouse	230	3,220	Dwelling Units	121	613	602	295
General Office Building	710	528	Employees	220	28	32	176
Specialty Retail Center/ Shopping Center	814/ 820	136	1000 Square feet	49	23	75	104
Total Trips				390	664	709	575

1. Retail employees converted at 500 gross square feet per employee.

2. AM reductions from total trips for internal trips (2.9%), walk/bike (10%), and pass-by (34% of retail).

3. PM reductions for internal trips (5.9%), walk/bike (10%), and pass-by (34% of retail).

Trip Distribution

The distribution of site-generate trips is projected as part of the travel demand modeling process. Figures 3.11-5 and 3.11-6 show the general directional distribution of trips under the Proposed Action during AM and PM peak hours, respectively.

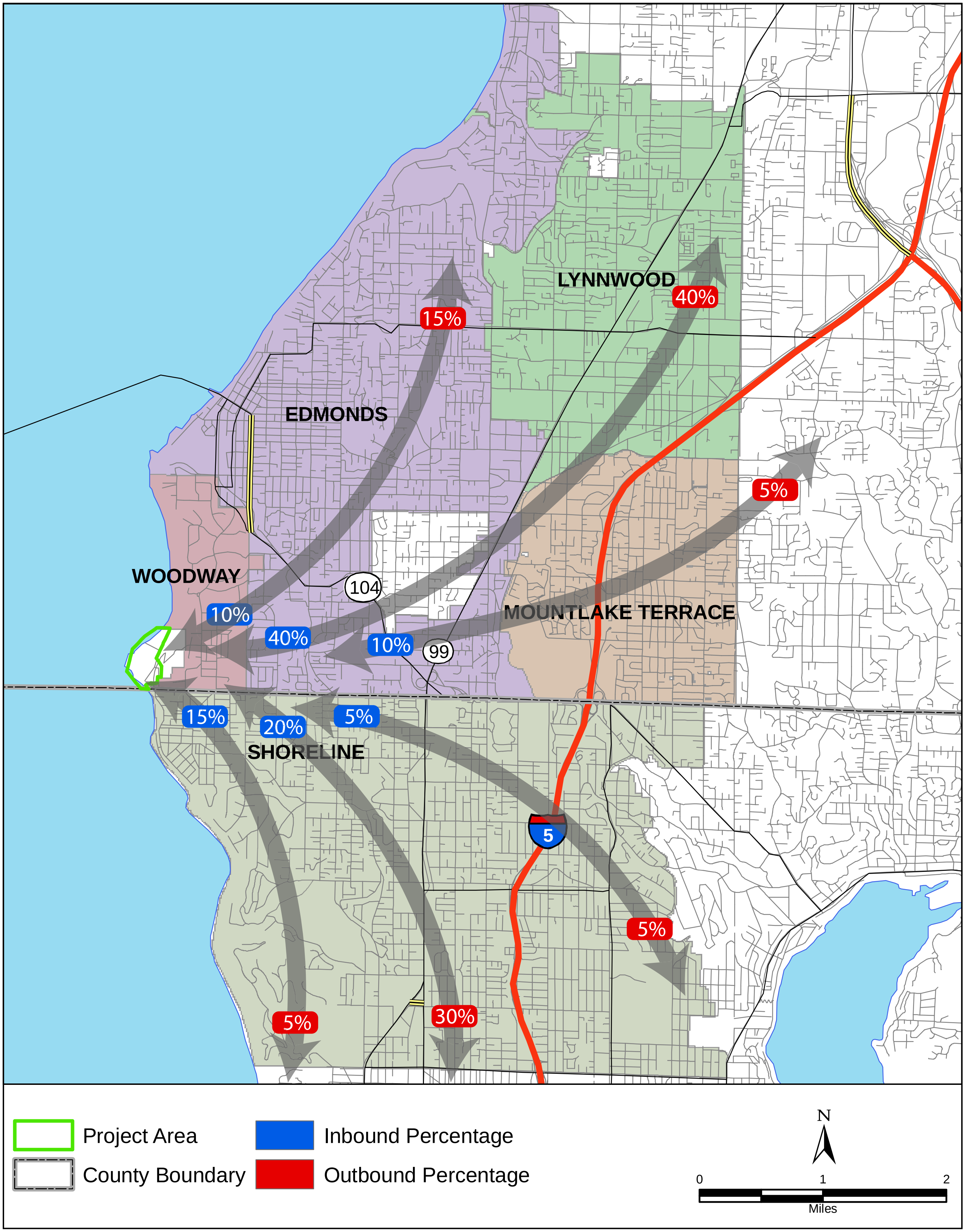

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Figure 3.11-5
AM Peak- Hour Trip Distribution (Proposed)

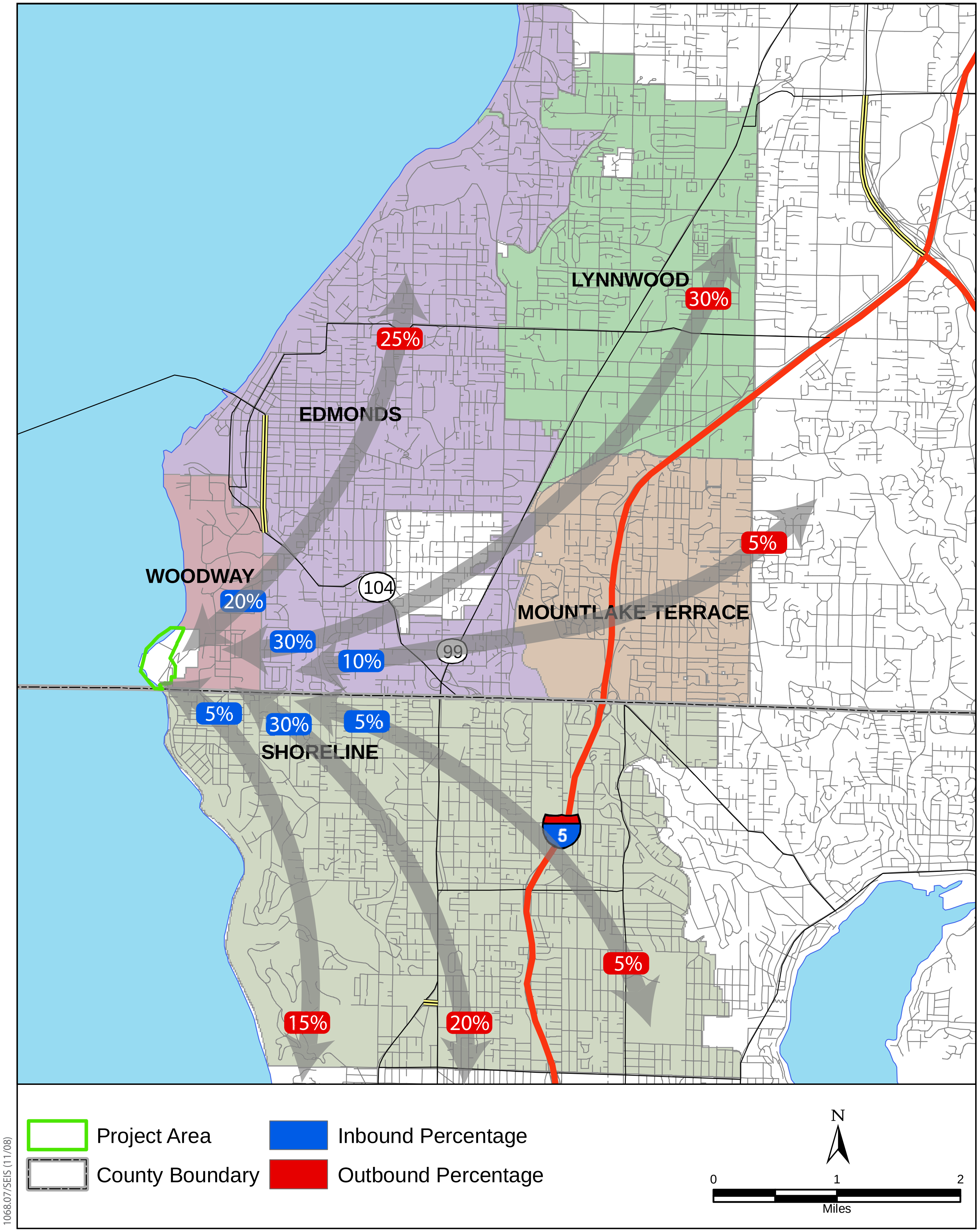

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Figure 3.11-6
PM Peak- Hour Trip Distribution (Proposed)

Mode Split Assumptions

Traffic generated by development at the Paramount site could potentially travel via automobile, transit, or non-motorized modes. As described previously, trips generated by land use under the Proposed Action were projected according to standard methods and rates presented in the Trip Generation Manual (Institute of Transportation Engineers 2003). The Institute of Traffic Engineers (ITE) presents rates for vehicle trips, based upon driveway counts of representative sites for different land uses. At the ITE-observed sites, a typical level of transit and non-motorized travel would be present that is in addition to the vehicle estimates. However, for development that departs from typical observed sites, ITE provides guidelines for making adjustments to these assumptions.

Typical ITE sites do not reflect mixed use development. Since development under the Proposed Action zoning would be mixed use, adjustments were made in the total trips generated by the site to reflect a higher level of trips that would occur between different uses within the site. Since multi-family and commercial development would be located within proximity to each other, a greater number of non-motorized trips would be expected to occur between them. The ITE Trip Generation Handbook (Institute of Transportation Engineers 2001) provides guidelines for these adjustments, based on the mix of land use. Using these guidelines, a 10% reduction was applied to the total trip estimate. These reduced trips are assumed to travel within the site, and thus were not assigned to the surrounding street network.

It is expected that at full build-out, the site would have sufficient density to support transit routes to and from the site. However, because the site is geographically isolated, analysis assumed that transit use would reflect typical levels that are already implicit in the ITE trip generation rates, so no additional reductions were made regarding regional transit access to and from the site.

Intersection Operations

The Proposed Action model output volumes were post-processed to project AM peak hour and PM peak hour traffic volumes at intersections. The projected AM peak hour and PM peak hour intersection traffic volumes are provided Tables B-6 and B-7, respectively, in Appendix C of this Draft SEIS.

Table 3.11-12 summarizes the percentage of volume increase over the No Action Alternative projected to result from the Proposed Action. Projections indicate that the proposal would increase traffic volumes by greater than 50% at the following intersections:

- (6) Algonquin Road and Woodway Park Road,
- (7) 238th Street SW and Woodway Park Road,
- (8) NW 196th Street and Richmond Beach Drive,
- (9) NW 196th Street and 20th Avenue NW,

- (10) NW 195th Street and 15th Avenue NW, and
- (11) Richmond Beach Road and 15th Avenue NW.

The first two intersections listed above are located in Woodway. Their relative increases are higher in part because of their proximity to the site, but also because the No Action Alternative volumes are relatively low. The other four intersections are those closest to the site, so it would be expected that the relative increases in volumes would be higher at these locations. Site generated traffic is expected to disperse, and result in smaller increases over the No Action Alternative, as it gets farther from the site.

Table 3.11-12. Intersection Volume Increase by the Proposed Action

		2025 AM Peak			2025 PM Peak		
	Intersection	No Action (veh/hr)	Proposed Action (veh/hr)	Increase (%)	No Action (veh/hr)	Proposed Action (veh/hr)	Increase (%)
1	244th Street SW and SR 99	5,700	5,860	3	5,560	5,620	1
2	244th Street SW and Fremont Avenue N	1,585	1,740	10	1,510	1,610	7
3	Firdale Avenue N and 244th Street SW	1,125	1,310	16	1,100	1,195	9
4	244th Street SW and 100th Avenue W	985	1,265	28	1,150	1,675	46
5	SR 104 and 100th Avenue W	3,755	4,030	7	4,865	5,205	7
6	Algonquin Road and Woodway Park Road	405	625	54	570	720	26
7	238th Street SW and Woodway Park Road	350	575	64	415	565	36
8	NW 196th Street and Richmond Beach Drive	120	1,095	813	130	1,325	919
9	NW 196th Street and 20th Avenue NW	755	1,720	128	945	2,090	121
10	NW 195th Street and 15th Avenue NW	950	1,680	77	1,115	2,015	81
11	Richmond Beach Road and 15th Avenue NW	990	1,775	79	1,165	2,145	84
12	Richmond Beach Road and 8th Avenue NW	2,260	2,845	26	2,640	3,135	19
13	Richmond Beach Road and 3rd Avenue NW	2,260	2,350	4	2,305	2,435	6
14	Richmond Beach Road and Dayton Avenue N	2,205	2,310	5	2,180	2,300	6
15	N 185th Street and Fremont	2,470	2,525	2	2,500	2,705	8

	Intersection	2025 AM Peak			2025 PM Peak		
		No Action (veh/hr)	Proposed Action (veh/hr)	Increase (%)	No Action (veh/hr)	Proposed Action (veh/hr)	Increase (%)
	Avenue N						
16	N 185th Street and SR 99	5,285	5,350	1	5,320	5,400	2
17	N 175th Street and 6th Avenue NW	930	965	4	985	1,045	6
18	St Luke Place N and Dayton Avenue N	1,255	1,280	2	1,050	1,135	8
19	N 175th Street and Fremont Avenue N	1,425	1,440	1	1,395	1,425	2
20	N 175th Street and SR 99	4,460	4,515	1	4,805	4,860	1
21	Carlyle Hall Road and Dayton Avenue N	1,480	1,505	2	1,230	1,265	3
22	N Innis Arden Way and Greenwood Avenue N	1,355	1,390	3	1,075	1,095	2
23	N 160th Street and Greenwood Avenue N	1,450	1,475	2	1,185	1,220	3

veh/hr = intersection entering vehicles per hour

Table 3.11-13 summarizes projected 2025 intersection LOS under the Proposed Action (see also Figure 3.11-7). The intersection LOS analysis reports for 2025 Proposed Action conditions are provided in Appendix D of this Draft SEIS. The table shows that operations at the ten intersections projected to exceed LOS standards under the No Action Alternative are expected to degrade further under the Proposed Action.

The following four intersections projected to meet standards under the No Action Alternative are expected to exceed standards under the Proposed Action:

- (9) NW 196th Street and 20th Avenue NW,
- (10) NW 195th Street and 15th Avenue NW,
- (11) Richmond Beach Road and 15th Avenue NW, and
- (12) Richmond Beach Road and 8th Avenue NW.

All four intersections are located along NW 196th Street/NW 195th Street/Richmond Beach Road in Shoreline, which is the primary route between the Paramount site and SR 99.

Table 3.11-13. Proposed Action Peak Hour Intersection Level of Service

	Intersection	Existing Traffic Control	AM Peak		PM Peak		LOS Standard	Juris-diction
			Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS		
1	244th Street SW and SR 99	Signal	F	195	F	121	E/D (SR 99 HSS)	Shoreline/ Edmonds/ WSDOT
2	244th Street SW and Fremont Avenue N	Northbound Stop-Control	F	90	F	107	E	Shoreline
3	Firdale Avenue N and 244th Street SW	Northbound Stop-Control	D	28	C	15	D	Edmonds
4	244th Street SW and 100th Avenue W	Eastbound/ Westbound Stop-Control	C/E	22/43	A/F	11/ECL	D	Edmonds
5	SR 104 and 100th Avenue W	Signal	F	95	F	166	D (SR 104 HSS)	Edmonds/ WSDOT
6	Algonquin Road and Woodway Park Road	Eastbound/ Westbound Stop-Control	B/B	14/13	A/C	0/18	A	Woodway
7	238th Street SW and Woodway Park Road	All-way Stop-Control	A	10	A	10	A	Woodway
8	NW 196th Street and Richmond Beach Drive	Westbound Stop-Control	B	15	C	23	E	Shoreline
9	NW 196th Street and 20th Avenue NW	All-way Stop-Control	E	44	F	68	E	Shoreline
10	NW 195th Street and 15th Avenue NW	Northbound/ Southbound Stop-Control	E/F	29/105	B/F	11/278	E	Shoreline
11	Richmond Beach Road and 15th Avenue NW	All-way Stop-Control	D	33	F	83	E	Shoreline
12	Richmond Beach Road and 8th Avenue NW	Signal	F	111	F	167	E	Shoreline
13	Richmond Beach Road and 3rd Avenue NW	Signal	C	26	B	10	E	Shoreline
14	Richmond Beach Road and Dayton Avenue N	Signal	B	16	B	12	E	Shoreline
15	N 185th Street and Fremont Avenue N	Signal	D	36	D	36	E	Shoreline
16	N 185th Street and SR 99	Signal	F	199	F	204	E (SR 99 HSS)	Shoreline/ WSDOT
17	N 175th Street and 6th Avenue NW	Southbound Stop-Control	F	70	C	18	E	Shoreline
18	St Luke Place N and Dayton Avenue N	Eastbound Stop-Control	D	27	C	15	E	Shoreline

	Intersection	Existing Traffic Control	AM Peak		PM Peak		LOS Standard	Juris-diction
			Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS		
19	N 175th Street and Fremont Avenue N	Signal	B	11	A	8	E	Shoreline
20	N 175th Street and SR 99	Signal	F	83	F	97	E (SR 99 HSS)	Shoreline/ WSDOT
21	Carlyle Hall Road and Dayton Avenue N	All-way Stop-Control	F	113	F	55	E	Shoreline
22	N Innis Arden Way and Greenwood Avenue N	Eastbound Stop-Control	C	21	B	13	E	Shoreline
23	N 160th Street and Greenwood Avenue N	All-way Stop-Control	F	65	D	29	E	Shoreline

HSS = Highway Statewide of Significance

Roadway Segment Operations

Table 3.11-14 summarizes projected operating conditions of the analysis roadway segments under the No Action Alternative (see also Figure 3.11-7). The table summarizes the projected percentage of volume difference under the Proposed Action, compared to the No Action Alternative. In most cases, the Proposed Action is expected to result in increases in traffic; but in some cases, minor decreases are projected. This is because the model analyzes network-wide affects of traffic patterns; and in some cases, the overall affect of the new site-generated traffic could be a shift in the paths taken by other traffic unrelated to the site.

Projections indicate that the Proposed Action would increase traffic volumes on the following roadway segments by greater than 50 percent as compared to the peak hour volumes under the No Action Alternative:

- (1) Richmond Beach Drive: Woodway City Limits to NW 196th Street (AM and PM peak hours)
- (2) NW 196th Street: Richmond Beach Drive to NW 20th Avenue (AM and PM peak hours)
- (3) NW 195th Street/Richmond Beach Road: 20th Avenue NW to 8th Avenue NW (AM and PM peak hours)
- (10) Woodway Park Road: 238th Street SW to Algonquin Road (AM peak hour)

Woodway Park Road (segment 10) is located in Woodway. The higher relative increase on this segment is due in part to its proximity to the site, but also because the No Action Alternative volumes on this roadway segment are relatively low. The other analysis segments are those closest to the site, so it would be expected that the relative increases in volumes would be higher at these locations. Site-generated traffic is expected to disperse, and result in smaller increases over the No Action Alternative, as it gets farther from the site.

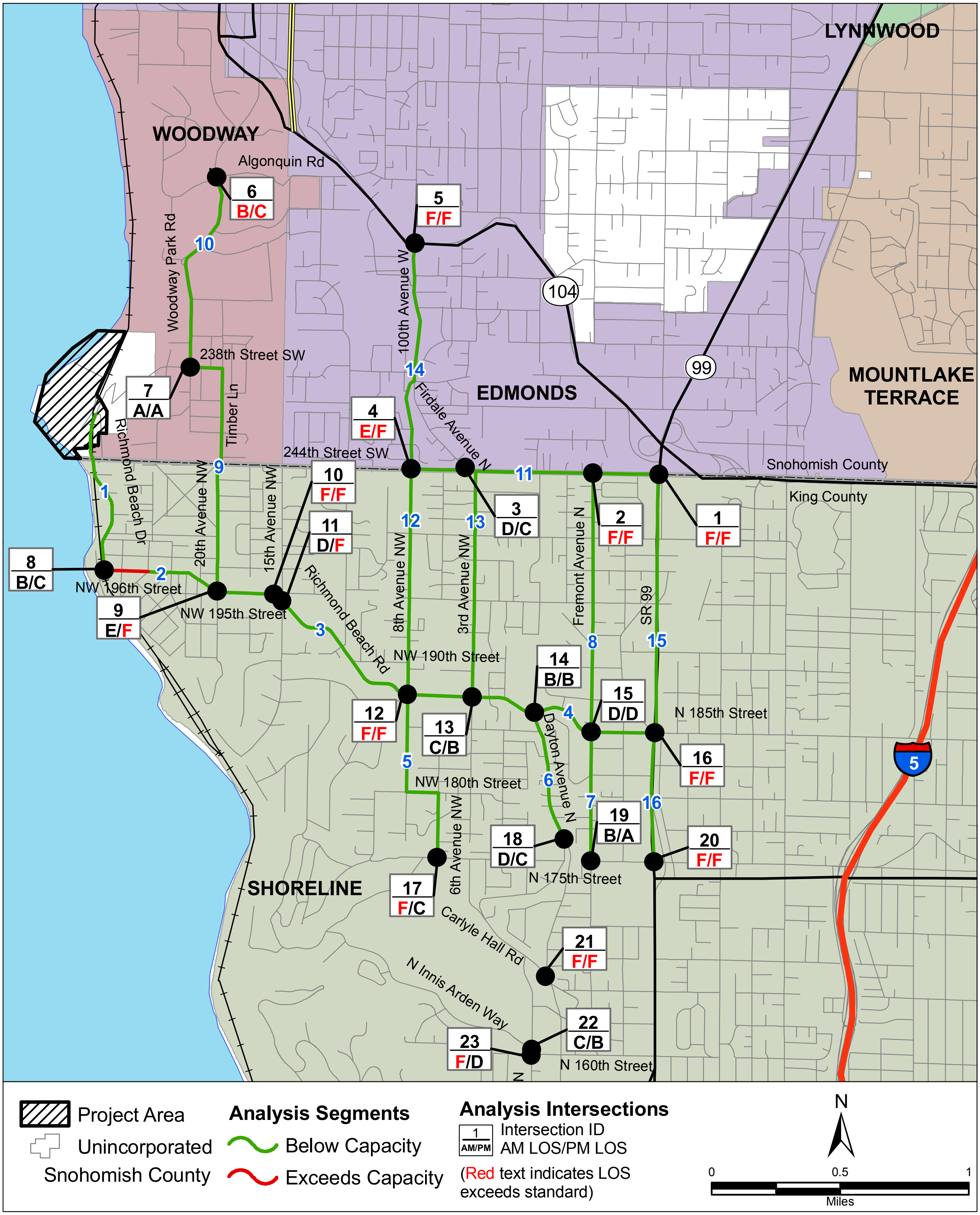

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Figure 3.11-7
2025 Proposed Action Roadway Level of Service

Table 3.11-14 shows that site-generated PM peak hour volumes are projected to exceed operational capacity on segment (1) Richmond Beach Road, and segment (2) the two-lane portion of NW 196th Street (west of NW 24th Avenue) under Proposed Action conditions.

Table 3.11-14. Segment Volume Increase by the Proposed Action

			AM Peak Hour			PM Peak Hour		
	Roadway Segment	Estimated Operating Capacity[1]	No Action (veh/hr)	Proposed Action (veh/hr)	% Increase	No Action (veh/hr)	Proposed Action (veh/hr)	% Increase
1	Richmond Beach Drive: Woodway City Limits to NW 196th Street	1,300	110	1,085	886%	115	1,310	1039%
2	NW 196th Street: Richmond Beach Drive to NW 20th Avenue	1,500	295	1,270	331%	400	1,590	298%
3	NW 195th Street/Richmond Beach Road: 20th Avenues NW to 8th Avenue NW	3,400	785	1,640	109%	1,060	1,960	85%
4	Richmond Beach Road: 8th Avenue NW to SR 99	3,400	1,360	1,975	45%	1,980	2,150	9%
5	8th Avenue NW/NW 180th Street/6th Avenue NW: Richmond Beach Road to N 175th Avenue	1,500	820	855	4%	940	935	-1%
6	Dayton Avenue N: Richmond Beach Road to N 175th Street/Saint Luke Place	1,700	855	865	1%	730	800	10%
7	Fremont Avenue N: N 175th Street to N 185th Street	1,500	880	895	2%	885	955	8%
8	Fremont Avenue N: N 185th Street to 244th Street SW	1,500	830	795	-4%	1,075	1,085	1%
9	20th Street NW/Timber Lane/238th Street SW: NW 196th Street to Woodway Park Road	1,300	370	550	49%	460	590	28%
10	Woodway Park Road: 238th Street SW to Algonquin Road	1,300	330	555	68%	400	550	38%
11	244th Street SW: 100th Avenue W to SR 99	1,700	1,415	1,550	10%	1,335	1,425	7%
12	8th Avenue NW: Richmond Beach Road to 244th Street SW	1,700	1,025	1,235	20%	1,120	1,645	47%

	Roadway Segment	Estimated Operating Capacity[1]	AM Peak Hour			PM Peak Hour		
			No Action (veh/hr)	Proposed Action (veh/hr)	% Increase	No Action (veh/hr)	Proposed Action (veh/hr)	% Increase
13	3rd Avenue NW : Richmond Beach Road to 244th Street SW	1,500	1,040	1,060	2%	695	705	1%
14	100th Avenue W: 244th Street SW to SR 104	1,700	820	920	12%	960	1,400	46%
15	SR 99: 224th Street SW to N 185th Street	4,200	4,175	4,200	1%	3,730	3,700	-1%
16	SR 99: N 175th Street to N 185th Street	4,200	3,285	3,285	0%	3,720	3,700	-1%

[1] Operating capacity is a planning level estimate, based upon the roadway functional classification and width. This value was estimated by applying the per lane planning-level capacities presented in Table 3.11-1.

Table 3.11-15 identifies which of the analysis road segments include one or more intersections that are projected to exceed adopted LOS standards under the Proposed Action. In addition to the nine road segments identified under the No Action Alternative include intersections projected to exceed standards, the following three segments include intersections that exceed standards under the Proposed Action:

- NW 196th Street: Richmond Beach Drive to NW 20th Avenue,
- NW 195th Street/Richmond Beach Road: 20th Avenues NW to 8th Avenue NW, and
- 20th Street NW/Timber Lane/238th Street SW: NW 196th Street to Woodway Park Road.

Table 3.11-15. Proposed Action Roadway Segment Operations

	Roadway Segment	Includes Intersection(s) that Exceed LOS Standard	Jurisdiction
1	Richmond Beach Drive: Woodway City Limits to NW 196th Street	No	Shoreline/ Woodway
2	NW 196th Street: Richmond Beach Drive to NW 20th Avenue	Yes	Shoreline
3	NW 195th Street/Richmond Beach Road: 20th Avenues NW to 8th Avenue NW	Yes	Shoreline
4	Richmond Beach Road: 8th Avenue NW to SR 99	Yes	Shoreline
5	8th Avenue NW/NW 180th Street/6th Avenue NW: Richmond Beach Road to N 175th Avenue	Yes	Shoreline
6	Dayton Avenue N: Richmond Beach Road to N 175th Street/Saint Luke Place	No	Shoreline
7	Fremont Avenue N: N 175th Street to N 185th Street	No	Shoreline
8	Fremont Avenue N: N 185th Street to 244th Street SW	Yes	Shoreline

	Roadway Segment	Includes Intersection(s) that Exceed LOS Standard	Jurisdiction
9	20th Street NW/Timber Lane/238th Street SW: NW 196th Street to Woodway Park Road	Yes	Shoreline/ Woodway
10	Woodway Park Road: 238th Street SW to Algonquin Road	Yes	Woodway
11	244th Street SW: 100th Avenue W to SR 99	Yes	Shoreline/ Edmonds
12	8th Avenue NW: Richmond Beach Road to 244th Street SW	Yes	Shoreline
13	3rd Avenue NW : Richmond Beach Road to 244th Street SW	No	Shoreline
14	100th Avenue W: 244th Street SW to SR 104	Yes	Edmonds
15	SR 99: 224th Street SW to N 185th Street	Yes	Shoreline/ WSDOT
16	SR 99: N 175th Street to N 185th Street	Yes	Shoreline/ WSDOT

The overall projected effect of the Proposed Action on traffic circulation is summarized as follows:

- As Richmond Beach Drive would provide the only access into and out of the site, all projected trips would travel on this roadway, so volumes are expected to increase substantially. Projections indicate that 2025 PM peak-hour volumes would slightly exceed the operational capacity of the roadway. The northern portion of the Richmond Beach Drive segment is not currently built to collector standards. It has narrow lanes and intermittent shoulders of varying width. This is sufficient for its current use, which is to carry the low number of vehicles generated by the existing industrial use of the site. The southern portion of the segment is wider, but is also built to rural standards with shoulders instead of sidewalks. Under the proposed land use, this roadway would carry a much higher traffic volume, and would also serve as the route for pedestrian and bicycle traffic in and out the site. In order to safely accommodate the expected mix of vehicular and non-motorized traffic under the Proposed Action, Richmond Beach Drive should be improved to urban collector standards with minimum 11-foot travel lanes and a separate pedestrian path.
- The travel model indicates that the majority of traffic generated under the Proposed Action is expected to travel NW 196th Street/NW 195th Street/Richmond Beach Road/N 185th Street. This is the most direct path between the site and SR 99, which provides the most direct access to the regional roadway system.
- A moderate amount of project-generated traffic is also expected to travel on the primary north-south roads between Richmond Beach Road and SR 104. Increases are expected to occur along the 20th Avenue N/Timber Lane/Woodway Park Road corridor, but the total resulting volumes are not expected to be very high. Impacts are identified along this roadway

because they exceed the adopted Woodway standard of LOS A. However, the worst LOS projected to result under 2025 Proposed Action is LOS B. Moderate increases in traffic volumes are also expected along the 8th Avenue NW/100th Avenue W corridor.

- Model projections indicate that increased congestion at the intersection of Richmond Beach Road and 8th Avenue NW expected under the Proposed Action would cause travelers to attempt to bypass that intersection by cutting through NW 190th Street, which connects the two roadways on block north of their intersection. NW 190th Street is a local access street that is not intended to carry through-traffic. It is possible that this could also occur to a lesser degree under the No Action Alternative. However, the Proposed Action is projected to add 500 to 600 additional vehicles to this intersection during each of the peak hours. The projected increase in traffic under the Proposed Action would be expected to increase the potential for cut-through traffic on NW 190th Street, and thus is considered a potential impact.
- No other major paths are projected for traffic generated under the Proposed Action, although localized increases in traffic have been projected at other analysis locations.

3.11.3. Mitigation Measures

Roadway Improvement Projects

Roadway improvement projects have been identified at any location at which a potential significant impact on roadway operations has been identified. If improvement projects recommended under the No Action Alternative were not found to be sufficient to accommodate projected future demand identified under Proposed Action, additional mitigation measures have been identified as needed. Capacity mitigation projects include changes in traffic controls (such as upgrade from stop control to a traffic signal) or increases to the capacity of an intersection or roadway segment; and may involve multiple jurisdictions.

Table 3.11-16 summarizes the improvements that have been identified to mitigate impacts under the Proposed Action and No Action Alternative (see also Figure 3.11-8). Note, as this is a programmatic assessment, these measures are intended to provide a conservative order-of-magnitude estimate of the level of mitigation that would be needed under full build-out of development that would be allowed under the Proposed Action and No Action Alternative. It is expected that if the proposed zoning were approved, subsequent project-level environmental analysis would include detailed analysis to identify recommended improvements needed to support the actual development proposal, and could include demand-oriented measures as well as capacity improvements.

Table 3.11-16. Recommended Mitigation for the Proposed Action and No Action Alternative

	Location	Jurisdiction	Proposed Action	No Action Alternative
	Intersections			
1	244th Street SW and SR 99	Shoreline/ Edmonds/ WSDOT	No Action Alternative improvement would also address Proposed Action impacts.	Restripe northbound right-turn lane to through-right lane. Add a southbound through lane, a southbound right-turn lane, a 2nd eastbound left-turn lane, and a westbound right-turn lane.
2	244th Street SW and Fremont Avenue N	Shoreline	No Action Alternative improvement would also address Proposed Action impacts.	Install a signal.
4	244th Street SW and 100th Avenue W	Edmonds	No Action Alternative improvement plus Install a signal.	Install all-way stop-control. Add northbound and southbound through lanes.
5	SR 104 and 100th Avenue W	Edmonds/ WSDOT	No Action Alternative improvement plus add a westbound right-turn lane.	Add a northbound through lane, an eastbound right-turn lane, and a 2nd westbound left-turn lane.
6	Algonquin Road and Woodway Park Road	Woodway	No Action Alternative improvement plus add a northbound through lane.	Install all-way stop control.
9	NW 196th Street and 20th Avenue NW	Shoreline	Install a signal and add eastbound and westbound left-turn lanes.	---
10	NW 195th Street and 15th Avenue NW	Shoreline	Install a signal and coordinate with intersection below.	---
11	Richmond Beach Road and 15th Avenue NW	Shoreline	Install a signal and coordinate with intersection above.	---
12	Richmond Beach Road and 8th Avenue NW	Shoreline	Add a southbound right-turn lane, a 2nd eastbound left-turn lane, and northbound right-turn lane.	---
16	N 185th Street and SR 99	Shoreline/ WSDOT	No Action Alternative improvement plus add a westbound right-turn lane.	Add eastbound and westbound left-turn lanes, an eastbound right-turn lane, and a 2nd southbound left-turn lane. Change signal phasing to provide protected left-turn phases for eastbound and westbound approaches.
17	N 175th Street and 6th Avenue NW	Shoreline	No Action Alternative improvement would also address Proposed Action impacts.	Install a signal.
20	N 175th Street and SR 99	Shoreline/ WSDOT	No Action Alternative improvement would also address Proposed Action impacts.	Add a 2nd westbound left-turn lane. Change signal phasing to provide protected left-turn phases for eastbound and westbound approaches.

	Location	Jurisdiction	Proposed Action	No Action Alternative
21	Carlyle Hall Road and Dayton Avenue N	Shoreline	No Action Alternative improvement would also address Proposed Action impacts.	Install a signal.
23	N 160th Street and Greenwood Avenue N	Shoreline	No Action Alternative improvement would also address Proposed Action impacts.	Install a signal.
	Roadway Segments			
1	Richmond Beach Drive, between the site and the Woodway/Shoreline city limits (~2,600 feet)	Shoreline/ Woodway	Widen to urban collector standards with 11-foot lanes and separate pedestrian pathway.	---
2	NW 196th Street, between Richmond Beach Drive and 24th Avenue NW (~900 feet)	Shoreline	Widen from two lanes to four lanes	---
	NW 190th Street, between NW Richmond Beach Road and 8th Avenue NW (~1,100 feet)	Shoreline	Install traffic calming devices	---

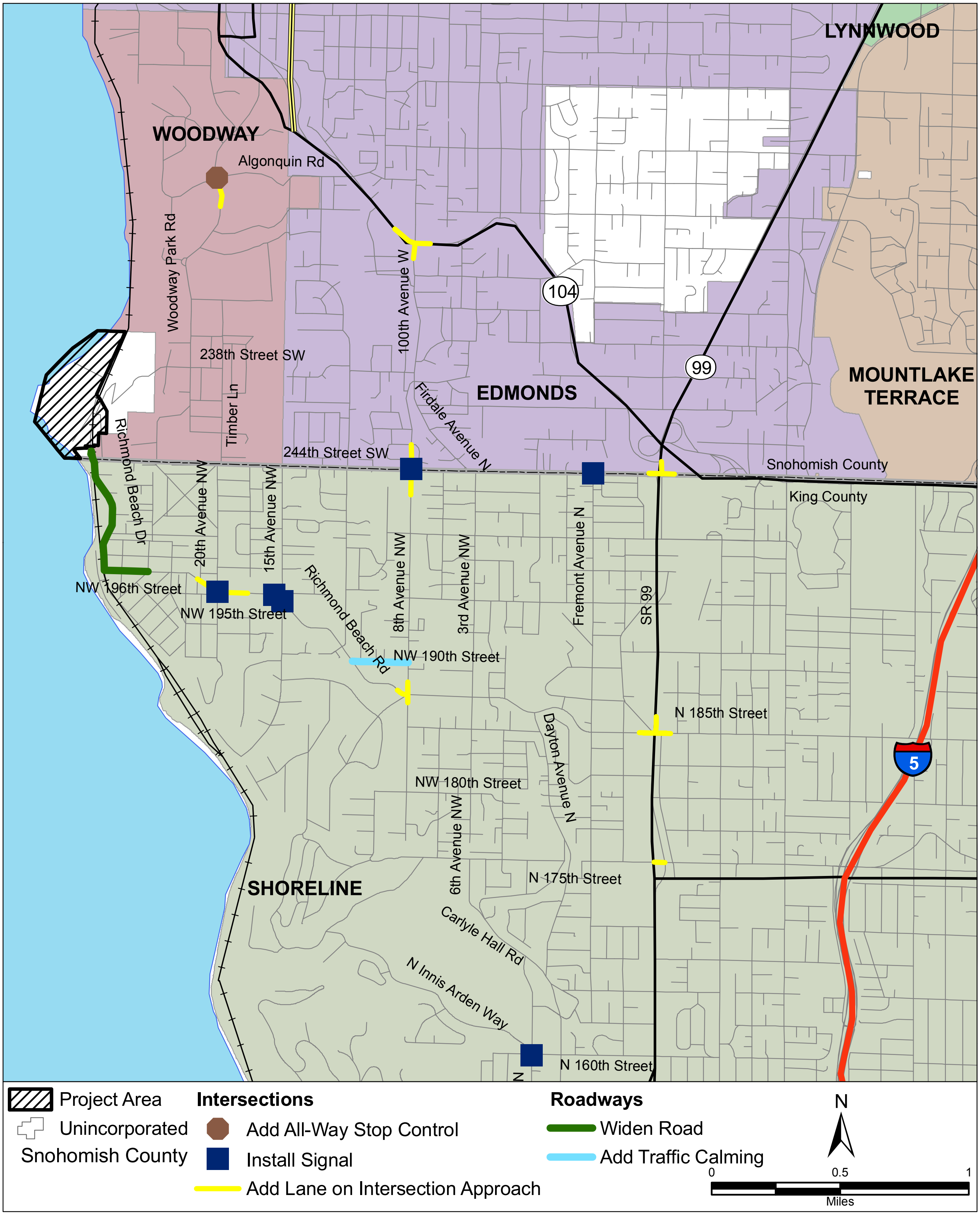

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Figure 3.11-8
Roadway Mitigation Projects

Tables 3.11-17 and 3.11-18 summarize the intersection LOS projected with the identified capacity improvement projects in place, for the Proposed Action and the No Action Alternative, respectively. The tables show that the recommended measures are expected to fully mitigate identified impacts so that all analysis intersections would potentially operate within the adopted standards of the local jurisdictions. Figure 3.11-8 shows 2025 peak hour LOS for analysis intersections with mitigation in place under the Proposed Action.

Table 3.11-17. Proposed Action Peak Hour Intersection Level of Service–Mitigated

			AM Peak		PM Peak			
	Intersection	Mitigated Traffic Control	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS	LOS Standard	Juris-diction
1	244th Street SW and SR 99	Signal	E	73	D	50	E/D (SR 99 HSS)	Shoreline/ Edmonds/ WSDOT
2	244th Street SW and Fremont Avenue N	Signal	B	16	B	10	E	Shoreline
3	Firdale Avenue N and 244th Street SW	Northbound Stop-Control	D	28	C	15	D	Edmonds
4	244th Street SW and 100th Avenue W	Signal	A	5	A	8	D	Edmonds
5	SR 104 and 100th Avenue W	Signal	D	47	D	53	D (SR 104 HSS)	Edmonds/ WSDOT
6	Algonquin Road and Woodway Park Road	All-Way Stop-Control	A	9	A	10	A	Woodway
7	238th Street SW and Woodway Park Road	All-way Stop-Control	A	10	A	A	A	Woodway
8	NW 196th Street and Richmond Beach Drive	Westbound Stop-Control	B	15	C	23	E	Shoreline
9	NW 196th Street and 20th Avenue NW	Signal	A	10	C	20	E	Shoreline
10	NW 195th Street and 15th Avenue NW	Signal	A	10	B	11	E	Shoreline
11	Richmond Beach Road and 15th Avenue NW	Signal	A	7	A	9	E	Shoreline
12	Richmond Beach Road and 8th Avenue NW	Signal	D	51	D	53	E	Shoreline
13	Richmond Beach Road and 3rd Avenue NW	Signal	C	26	B	10	E	Shoreline
14	Richmond Beach Road and Dayton Avenue N	Signal	B	16	B	12	E	Shoreline
15	N 185th Street and Fremont Avenue N	Signal	D	36	D	36	E	Shoreline

	Intersection	Mitigated Traffic Control	AM Peak Average Delay (sec/veh)	AM Peak LOS	PM Peak Average Delay (sec/veh)	PM Peak LOS	LOS Standard	Juris-diction
16	N 185th Street and SR 99	Signal	E	69	E	74	E (SR 99 HSS)	Shoreline/ WSDOT
17	N 175th Street and 6th Avenue NW	Signal	A	8	A	8	E	Shoreline
18	St Luke Place N and Dayton Avenue N	Eastbound Stop-Control	D	27	C	15	E	Shoreline
19	N 175th Street and Fremont Avenue N	Signal	B	11	A	8	E	Shoreline
20	N 175th Street and SR 99	Signal	D	53	E	78	E (SR 99 HSS)	Shoreline/ WSDOT
21	Carlyle Hall Road and Dayton Avenue N	Signal	B	11	A	8	E	Shoreline
22	N Innis Arden Way and Greenwood Avenue N	Eastbound Stop-Control	D	32	C	16	E	Shoreline
23	N 160th Street and Greenwood Avenue N	Signal	C	25	C	24	E	Shoreline

Note: HSS = Highway Statewide of Significance

Table 3.11-18. No Action Alternative Peak Hour Intersection Level of Service–Mitigated

	Intersection	Mitigated Traffic Control	AM Peak Average Delay (sec/veh)	AM Peak LOS	PM Peak Average Delay (sec/veh)	PM Peak LOS	LOS Standard	Juris-diction
1	244th Street SW and SR 99	Signal	D	54	D	50	E/D (SR 99 HSS)	Shoreline/ Edmonds/ WSDOT
2	244th Street SW and Fremont Avenue N	Signal	A	10	A	9	E	Shoreline
3	Firdale Avenue N and 244th Street SW	Northbound Stop-Control	C	18	B	14	D	Edmonds
4	244th Street SW and 100th Avenue W	All-Way Stop-Control	B	11	C	15	D	Edmonds
5	SR 104 and 100th Avenue W	Signal	D	40	D	53	D (SR 104 HSS)	Edmonds/ WSDOT
6	Algonquin Road and Woodway Park Road	All-Way Stop-Control	A	8	A	10	A	Woodway
7	238th Street SW and Woodway Park Road	All-way Stop-Control	A	8	A	9	A	Woodway

	Intersection	Mitigated Traffic Control	AM Peak		PM Peak		LOS Standard	Juris-diction
			Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS		
8	NW 196th Street and Richmond Beach Drive	Westbound Stop-Control	A	9	A	9	E	Shoreline
9	NW 196th Street and 20th Avenue NW	All-way Stop-Control	B	10	B	11	E	Shoreline
10	NW 195th Street and 15th Avenue NW	Northbound/ Southbound Stop-Control	B/C	14/19	A/D	10/26	E	Shoreline
11	Richmond Beach Road and 15th Avenue NW	All-way Stop-Control	B	10	B	12	E	Shoreline
12	Richmond Beach Road and 8th Avenue NW	Signal	E	65	E	62	E	Shoreline
13	Richmond Beach Road and 3rd Avenue NW	Signal	C	27	A	10	E	Shoreline
14	Richmond Beach Road and Dayton Avenue N	Signal	B	15	B	12	E	Shoreline
15	N 185th Street and Fremont Avenue N	Signal	C	33	D	36	E	Shoreline
16	N 185th Street and SR 99	Signal	E	59	E	80	E (SR 99 HSS)	Shoreline/ WSDOT
17	N 175th Street and 6th Avenue NW	Signal	A	8	A	8	E	Shoreline
18	St Luke Place N and Dayton Avenue N	Eastbound Stop-Control	C	24	B	14	E	Shoreline
19	N 175th Street and Fremont Avenue N	Signal	B	12	A	8	E	Shoreline
20	N 175th Street and SR 99	Signal	D	50	E	75	E (SR 99 HSS)	Shoreline/ WSDOT
21	Carlyle Hall Road and Dayton Avenue N	Signal	B	11	A	8	E	Shoreline
22	N Innis Arden Way and Greenwood Avenue N	Eastbound Stop-Control	D	28	B	15	E	Shoreline
23	N 160th Street and Greenwood Avenue N	Signal	C	25	C	23	E	Shoreline

HSS = Highway Statewide of Significance

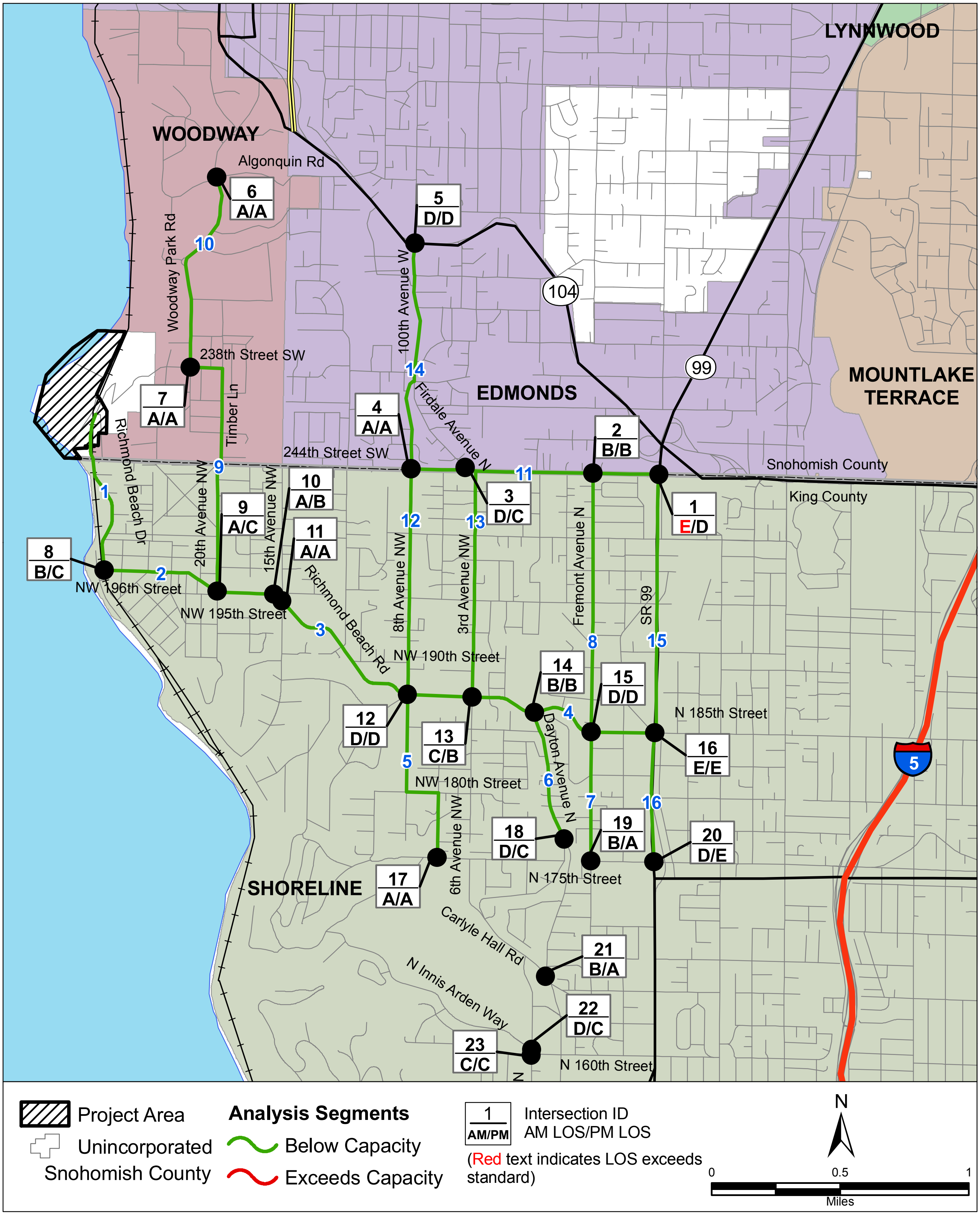

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Figure 3.11-9
2025 Proposed Action Roadway Level of Service - Mitigated

Other Potential Mitigation Considered

Additional Access Road at Site

A second access road between the Paramount site and adjacent roadway system at NW 205th Street could possibly serve to remove some of the additional demand that is projected on the NW 196th Street/Richmond Beach Road corridor as a result of the Proposed Action. However, the presence of steep bluffs between the site and NW 205th Street to the east would substantially constrain such a roadway. The County performed a slope analysis of the area that would serve an extension of NW 205th Street and concluded that slopes would exceed all county standards for maximum grade for arterials and local roads; and would unlikely achieve an effective alternative route for automobiles and transit due to extreme road grades. It was also concluded that construction of such a roadway would be physically difficult and at a very high cost that would likely exceed the total cost of transportation improvement measures identified in this document. In addition, since operational deficiencies have also been identified along NW 205th Street, diversion of additional traffic to this corridor could further exacerbate those problems, thus requiring additional mitigation along that roadway. Since reasonable capacity improvement measures could be identified along the NW 196th Street/Richmond Beach Road corridor, it was determined that these recommendations would be the most cost effective way to address identified operational impacts at the programmatic level reflected in this document.

Additional Transit at Site

It is possible that future enhanced transit service between the site and other regional destinations could reduce some of the additional capacity needed as a result of additional development at the Paramount site. As discussed earlier in this section, build-out of mixed use development under the proposed zoning would be expected to provide adequate density to support transit service at the site. Reduction in regional trips as a result of mixed use on the site was included in the analysis assumptions under the Proposed Action. However, the location and characteristics of the site do not provide any basis for assuming that the share of transit demand to regional destinations would be any greater than is typical. Any commitment to enhanced demand-oriented measures is not appropriate at a programmatic level of analysis, because there is no mechanism by which to tie such commitments to approval of the Proposed Action, which is simply the zoning change (and not the actual development, which would be covered by subsequent project-level analysis). Thus, assumption of transit share greater than what is already implicit in the ITE trip generation assumptions was not considered to be reasonable at this programmatic level.

Also, while commuter rail runs directly through the site, construction of a train station to allow direct rail service at the site was not considered reasonable in the foreseeable future. Sound Transit has not indicated any plan to build a station at this location; and if a station were to be considered, a detailed feasibility study would need to be implemented that would assess not only if the site had adequate demand to justify rail, but also study the implications of additional demand to the area that would be expected to result. For these reasons, train service at the Paramount site was not considered to be feasible mitigation at the programmatic level.

Planning-Level Cost of Capacity Improvements

Under the GMA, local jurisdictions can require the new development to pay the costs of improvements that are triggered by that development, as a condition of development approval. Table 3.11-19 presents planning-level cost estimates that were developed for the capacity mitigation projects. The assumptions and calculations for these cost estimates are provided in Appendix F of this Draft SEIS. It should be noted that these estimates are very broad, and are intended to provide a conservative order-of-magnitude estimate of the cost of potential improvements. It is expected that if the proposed zoning were approved, subsequent project-level environmental analysis would include more detailed cost estimates of recommended improvements. As part of project-level assessment, new development may be required to contribute to the cost of improvements in proportion to its contribution of vehicle trips to the deficiencies being mitigated. In addition, at the project level, if additional demand-oriented measures were developed as an alternative to some of the capacity improvement, construction of infrastructure and/or provision of services needed to implement them could be identified as a condition of development approval.

Table 3.11-19. Cost Estimates for Recommended Mitigation Projects

Location/Jurisdiction	Proposed Action Alternative Project Costs[1,2]	No Action Alternative Project Costs[1]
Shoreline		
244th Street SW and Fremont Avenue N	---	$580,000
NW 196th Street and 20th Avenue NW	$2,030,000	---
NW 195th Street and 15th Avenue NW	$580,000	---
Richmond Beach Road and 15th Avenue NW	$580,000	---
Richmond Beach Road and 8th Avenue NW	$2,087,500	---
N 175th Street and 6th Avenue NW	---	$580,000
Carlyle Hall Road and Dayton Avenue N	---	$580,000
N 160th Street and Greenwood Avenue N	---	$580,000
NW 196th Street, between Richmond Beach Drive and 24th Avenue NW	$2,035,000	---
NW 190th Street, between NW Richmond Beach Road and 8th Avenue NW	$100,000	---
Edmonds		
244th Street SW and 100th Avenue W	$580,000	$3,605,000
Woodway		

Location/Jurisdiction	Proposed Action Alternative Project Costs[1,2]	No Action Alternative Project Costs[1]
Algonquin Road and Woodway Park Road	$1,800,000	$5,000
Shoreline and WSDOT		
N 185th Street and SR 99	$500,000	$2,912,500
N 175th Street and SR 99	---	$1,087,500
Shoreline and Woodway		
Richmond Beach Drive, between the site and NW 196th Street	1,655,000	---
Edmonds and WSDOT		
SR 104 and 100th Avenue W	$500,000	$1,587,500
Shoreline, Edmonds, and WSDOT		
244th Street SW and SR 99	---	$3,447,500
Total Costs	$12,447,500	$14,965,000

1 All costs are presented in 2008 dollars.
2 Costs listed under Proposed Action are in addition to those listed under the No Action Alternative.

3.11.4. Significant Unavoidable Adverse Impacts

Adoption of the proposed zoning would be expected to result in increased traffic in the vicinity of the Paramount site. Although the effects of additional vehicles on traffic congestion can be mitigated to varying degrees through the recommended transportation improvements, the actual increase in traffic is considered a significant unavoidable adverse impact.

3.12. Public Services

The purpose of this section is to review the current state of public services in and around the Paramount of Washington LLC (Paramount) site and to assess potential impacts on these services under the two development alternatives: the Proposed Action and the No Action Alternative. Public services in this section include police, fire and emergency medical services, parks, schools, water systems, sanitary sewer systems, telecommunications, solid waste, and power and natural gas.

3.12.1. Police and Fire and Emergency Medical Services

Affected Environment

Police

Law enforcement in unincorporated Snohomish County (County) is provided by the Snohomish County Sheriff's Office. The Sheriff's Office is divided into precincts serving the northern and southern areas of the County. The North Precinct operates the East Station, which responds to calls in the remote eastern reaches of the County. The Sheriff's Office also provides law enforcement services on a contract basis to several municipalities, including Stanwood, Gold Bar, and Darrington.

The Paramount site is serviced by the County Sheriff's Office, South Precinct, with headquarters in Mill Creek, approximately 10 miles northeast of the site. The precinct maintains a car (Car #B4) that provides service to the southwestern portion of the County. The average response time by the Sheriff's Office to this area is 5 to 10 minutes (Ter-Veen pers. comm.).

Fire Protection and Emergency Medical Services

Fire protection and emergency medical services in the County are provided through a combination of rural fire districts and municipal fire departments. In addition, Boeing, the Everett Naval Base, Paine Field, and the U.S. Forest Service provide their own on-site fire protection services. Water supply infrastructure maps in the County Capital Facilities Plan indicate very little water system infrastructure in the immediate vicinity of the Paramount site.

According to the Snohomish County Fire Marshall, the Paramount site is not currently within the boundaries of any of the municipal fire departments or rural fire districts of the County (Snohomish County Fire Marshal pers. comm.). Paramount currently contracts with the City of Shoreline (Shoreline) Fire Department (King County Fire District #4) to provide fire suppression and emergency medical service to the site. The nearest Shoreline Fire Department response facility is Fire Station 64, located approximately 2.25 miles southeast of the Paramount site. Station 64 is staffed by one lieutenant, four firefighters/emergency medical technicians (EMTs), and two firefighter/paramedics. The station is equipped with one pumper engine, one basic life support vehicle, and one advanced life support vehicle. The Shoreline Fire Department responded to a total of 9,420 calls in 2006. Approximately 80% of these calls were for emergency medical service (Shoreline Fire Department 2007).

Impact Analysis

Proposed Action

Under the Proposed Action, the Paramount site would undergo a change of Future Land Use Map (FLUM) designation and zoning, which would allow redevelopment of the site as a mixed use center, incorporating residential and retail development. Based on the assumptions set forth in Table 2-4, the Paramount site could support up to 3,500 new dwelling units with an estimated population of 6,442.

Police

The County does not currently specify a level of service standard for police service, but the introduction of a concentration of residential and employment uses in the vicinity of the Paramount site would result in an increase in demand for police protection. According to the Washington State Office of Financial Management (Office of Financial Management 2007), an estimated total of 27,203 crimes were reported in the County in 2007, which equates to approximately 39.6 reported crimes per thousand residents per year. Based on these rates, redevelopment of the Paramount site could generate up to approximately 255 reported crimes annually. This increase under the Proposed Action would require additional patrols and more police officers than are currently assigned to the site.

Fire and Emergency Medical Services

Redevelopment under the Proposed Action has a high potential to create significant impacts on fire protection and emergency medical services. Currently, the Paramount site is not within the boundaries of any municipal fire department or rural fire district, though Paramount currently contracts with the Shoreline Fire Department to provide these emergency services. The construction of the commercial and residential development anticipated under the Proposed Action would generate even greater demand for fire protection and emergency medical services than under the No Action Alternative.

No Action Alternative

Under the No Action Alternative, no change in the County Comprehensive Plan FLUM designation or zoning would occur at the Paramount site and current uses would continue. As the site is not currently developed to the fullest extent allowed by existing regulations, the No Action Alternative could add truck trips to and from the asphalt facility and increased fuel storage capacity. Under this alternative, employment at the site is expected to increase by approximately 79 to 104 employees, and the number of marine fuel transfers could nearly double over existing conditions.

Police

The County Capital Facilities Plan does not establish a level of service standard for law enforcement services, but the need for additional facilities and officers is generally tied to increases in population and employment. Under the No Action Alternative, no population increase would occur, but employment on the site could experience a slight increase over existing conditions. This additional demand is minimal; however, and no significant impacts on police protection services are anticipated.

Fire and Emergency Medical Services

The County Capital Facilities Plan does not directly address fire and emergency medical services, as these services are provided by fire districts or municipalities. Identifying a level of service standard for fire protection is difficult as available services vary based on the resources of the responsible agency. One consistent standard of fire protection is water system fire flow. County building and fire codes mandate fire flow requirements for urban levels of development.

Because of the anticipated increase in fuel storage and distribution operations on the site, the No Action Alternative is likely to generate an increased demand for fire protection services. Additional discussion of water infrastructure in the vicinity can be found in Section 3.12.4, Water Systems.

Mitigation Measures

Police

If the Proposed Action is implemented, the developer must coordinate with the County Sheriff’s Office to determine the necessity of additional officers and patrols for the area.

Fire and Emergency Medical Services

The County should assign the Paramount site to one of the rural fire districts to ensure the availability of adequate fire protection and emergency medical services, both for residential emergencies and hazardous materials incidents. Alternatively, the current agreement with the Shoreline Fire Department could be extended to cover future development in the area.

Significant Unavoidable Adverse Impacts

Over time, population growth and development will continue to increase the need for police and fire and emergency medical services under either alternative.

3.12.2. Parks

Affected Environment

The County Parks Department manages approximately 9,800 acres of parkland, including trails, fresh water and saltwater beaches, river estuaries, forests, and lakes. The County classifies parks according to a combination of size, service area, and uses available. These categories include:

Regional Parks. These are parks with unique amenities that attract users from a wide area. They typically serve multiple jurisdictions and may incorporate both active and passive recreation opportunities. Many regional parks are established for the purpose of large-scale preservation of natural areas.

Community Parks. Community Parks are designed to serve the population within a 5-mile radius and often host large community events such as skateboarding or team sports. The average size of the County's community parks is 28 acres. Community parks may also include natural areas, such as shoreline access or preserved open space, as well as traditional park amenities, such as picnicking areas and playgrounds.

Neighborhood Parks. Neighborhood parks are typically small and intended to serve the immediately surrounding area. They can include passive uses, such as picnicking areas and hiking trails, as well as active uses, such as sports fields. These parks may also feature natural resources that have been designated for protection from development, such as wetlands or forests.

Trails. This classification includes local and regional trails that provide connections between and access to other parks and natural areas, as well as linear parks. Facilities in this group typically provide rest/picnic areas, trailheads, and interpretive stations.

Open Space/Preserve. These parks are intended to preserve wilderness areas, unique open space, or wildlife habitat. Recreation facilities at these parks are generally limited to passive uses, such as picnic areas, trails, or boardwalks, and public access may be restricted in areas containing especially sensitive or unique natural features.

Special Use. Special use parks include those facilities that feature a specialized use, such as golf courses, fairgrounds, shooting ranges, or off-leash dog parks. These parks typically offer only one type of activity and may generate revenue.

The adopted level of service standard for parks in the County is one additional community park per 21,000 additional residents (Snohomish County 2006). According to the 2007 Snohomish County Parks Comprehensive Plan, no County-owned parks are located in the immediate vicinity of the Paramount site. The nearest County park is Esperance Park, a community park of 6.2 acres, located 2.75 miles northeast of the site. The park features two soccer fields, two volleyball courts, a little league baseball diamond, and a playground. The northwest corner of the park contains a forested area equipped with nature trails, and open space is available for picnicking activities. In addition to County parks, several King County and municipal facilities are located in the area. Point Edwards Park is located approximately one mile north of the site in the Town of Woodway (Woodway), Richmond Beach Center Park and Richmond Beach Park are located 0.5 mile southeast and 0.9 mile south–southeast, respectively, in Shoreline.

Impact Analysis

Proposed Action

Under the Proposed Action, the Paramount site would undergo a change of FLUM designation and zoning, which would allow redevelopment of the site as an urban center, incorporating residential and retail development. Based on the assumptions set forth in Table 2-4, the Paramount site could support up to 3,500 new dwelling units with an estimated population of 6,442. This increase in population would generate additional demand for parks and recreation facilities in the area. While this population increase is below the level of service threshold for requiring an additional community park (6,442 residents = 0.31 park), given the general lack of recreational opportunities in the immediate vicinity, it is likely that a perceived impact on parks and recreation facilities would occur under the Proposed Action.

No Action Alternative

Under the No Action Alternative, the Paramount site would continue in its current industrial uses and no residential development would occur. As such, no additional demand for parks and recreation facilities would be generated.

Mitigation Measures

Future development on the Paramount site would be required to comply with Chapter 30.66A of the Snohomish County Code (SCC), which sets forth development impact fees and related park dedication requirements proportionate to the size of the proposed development. Future development on the site should also include parks and/or open space dedication as integral parts of the urban center design, and the County Parks Department should be consulted during the design process. Additional parks and open space dedications may be made in lieu of impact fees.

Significant Unavoidable Adverse Impacts

With mitigation, no significant unavoidable adverse impacts on parks are anticipated.

3.12.3. Schools

Affected Environment

The Paramount site is located within the boundaries of Edmonds School District #15 (school district). Students in the area attend the schools listed in Table 3.12-1.

The school district passed a capital levy in 2004 and a construction bond in 2006 to fund capital improvements at its facilities over the next several years. Sherwood Elementary, constructed in 1967, recently received earthquake safety upgrades, various classroom technology updates, and an emergency storage structure. College Place Middle School has received similar treatment, with the addition of irrigation and drainage improvements to the athletic fields planned for 2009. Edmonds-Woodway High School also received earthquake safety and technology upgrades, and drainage work on athletic fields is scheduled for completion in 2008 (Edmonds School District 2008b).

Table 3.12-1. Schools Serving the Paramount Site

School Name	Grades Served	Address	Approx. Enrollment	Square Footage per Student	Distance from Site
Sherwood Elementary	K–6	22901 106th Avenue West Edmonds, WA 98020	414	104.6	1.1 miles NE
College Place Middle School	7–8	7501 208th Street SW Lynnwood, WA 98036	585	148.8	3.4 miles NE
Edmonds-Woodway High	9–12	7600 212th Street SW Edmonds, WA 98026	1,838	113.7	3.3 miles NE

Source: Edmonds School District 2008a.

For the 2006–2007 school year, Edmonds-Woodway High School and Sherwood Elementary were listed by the school district as being at or above capacity and therefore closed to intra-district transfer enrollment. As of the 2008–2009 school year, Edmonds-Woodway High School remains closed to transfer enrollment (Edmonds School District 2008c).

Design capacities and standards of service are contained in the school district's 2008–2013 Capital Facilities Plan (Edmonds School District 2008d). Table 3.12-2 shows the current status of the school district's enrollment, based on 2007–2008 school year.

Table 3.12-2. Edmonds School District 2007–2008 Enrollment StatusError! Bookmark not defined.

School Type	2007–2008 Enrollment	Design Capacity	Current Utilization	Surplus/Deficit
Elementary	10,346	12,813	85%	2,467
Middle School	3,074	3,453	90%	379
High School	7,044	8,365	82%	1,321

Source: Edmonds School District (2008d)

The school district's Capital Facilities Plan indicates that some transfer of capacity between schools is possible because of the use of portable structures.

Impact Analysis

Proposed Action

Redevelopment of the Paramount site under the Proposed Action could support up to 3,500 new dwelling units with an estimated population of 6,442. The school district last updated its student generation rates in 2006. The 2006-2011 Capital Facilities Plan indicates an estimated single family student generation rate of 0.483 students per unit and a multifamily (two bedrooms or more) student generation rate of 0.157 students per unit. All residential development under the Proposed Action would be multifamily, thus creating the potential to generate an additional 549 students that would be served by the schools listed in Table 3.12-1. Though the school district currently has sufficient capacity overall to accommodate these additional students, transfer of capacity through the use of portable structures is likely to be necessary, especially given that Edmonds-Woodway High is currently operating at or above capacity. The increased population of the school district under the Proposed Action would contribute to an overall increase in demand for education services.

Those counties planning under the Growth Management Act (GMA) are authorized to collect impact fees from developers to offset the costs incurred by providing public facilities to serve the new development. The County currently authorizes school districts serving the county to collect impact fees to help fund the necessary construction of new school facilities to serve new development (SCC 30.66C), contingent on the development of a Capital Facilities Plan. The school district's 2008 Capital Facilities Plan indicates that the school district does not currently collect impact fees from developers.

No Action Alternative

Under the No Action Alternative, the Paramount site would continue in its current industrial use, and no residential development would occur. Therefore, no additional demand for school facilities would occur under the No Action Alternative.

Mitigation Measures

The school district monitors upcoming development within its jurisdiction and regularly updates its Capital Facilities Plan to adequately reflect anticipated growth. The localized increase in demand for educational services resulting from the Proposed Action could be partially alleviated through the use of portable structures to transfer excess capacity from other schools to those directly serving the Paramount site, though this does not represent a permanent solution. While the school district does not currently collect impact fees, the County should coordinate with the district to ensure that future development under the Proposed Action is included in capital facilities planning efforts and identify potential funding measures for necessary improvements, including collection of impacts fees.

Significant Unavoidable Adverse Impacts

Over time, demand for school services and facilities is anticipated to increase as growth occurs. With mitigation, no significant unavoidable adverse impacts on schools are anticipated.

3.12.4. Water Systems

Affected Environment

The Paramount site is served by the Olympic View Water and Sewer District (District), which provides water to Woodway and the adjacent unincorporated portion of the County. According to

Woodway's 2004 Comprehensive Plan, the District obtains its water from the City of Seattle (Seattle), but maintains interties to the City of Edmonds to draw on the Everett regional system in case of emergencies (Town of Woodway 2004).

In 1984, the District acquired an independent water source facility at Deer Creek in Woodway, which includes a spring-fed source for supplementing Seattle's supply. The District also maintains four storage facilities with a combined nominal capacity of 4.4 million gallons of water (Snohomish County 2006). A water treatment plant was constructed at the Deer Creek facility in 1998 with a 1 million gallon-per-day capacity; however, Seattle remains the District's primary source of potable water (Municipal Research and Services Center 2008). According to the District, its most recent contract with Seattle provides for adequate supply to meet any additional demand generated within the district (Eberhart pers. comm.)

A portion of the upland section of the Paramount site (east of the Burlington Northern Santa Fe [BNSF] Railroad) is currently served by 8-inch, 10-inch, and 4-inch ductile iron water lines, but the industrial lowland area west of the railroad is not currently served by existing infrastructure (Olympic View Water and Sewer District 2003).The district has identified two capital improvements necessary to adequately serve development on the Paramount site under the current planning scenario. These projects are listed in the District's 2003 Comprehensive Water System Plan:

- Capital Facilities Project 11(South Boundary Main): Installation of 1,900 linear feet of 8-inch ductile iron pipe along the southern border of the district from 112th to 116th Avenue W. This project would be located in Woodway.
- Capital Facilities Project 12 (Point Wells Main): Installation of a 2,200-foot loop of 8-inch ductile iron pipe, currently planned to extend service to the Paramount site in anticipation of a change in land use. The District indicated that completion of this project will be the responsibility of the developer at the time the site is redeveloped (Eberhart pers. comm.).

Impact Analysis

Proposed Action

Development anticipated under the Proposed Action has the potential to generate significant impacts on water distribution through the introduction of a concentrated residential population and commercial area. District projections of future population and water demand assume approximately 77.3 gallons per capita per day of residential water consumption. Based on a potential population of 6,442, the Proposed Action could generate an additional demand for 0.50 million gallons per day (mgd). The District does not currently maintain a standard for estimating demand per commercial employee, so potential commercial demand under the Proposed Action is difficult to determine with current information. However, the District's supply contract with Seattle allows the District to draw as much water as is required to satisfy demand.

While adequate supply exists to support future growth, distribution infrastructure is not currently adequate to meet the needs of development under the Proposed Action. The capital facilities projects described under Affected Environment were designed as part of the District's 2003 plan under the assumption that future development on the Paramount site would be low-density residential in nature. The high-density residential, commercial, and office uses included in the Proposed Action would have significantly higher fire flow and storage requirements, and project-level review would be required to determine precise water demand and cost of infrastructure extension.

No Action Alternative

Because of the anticipated additional employment at the Paramount site, the No Action Alternative has the potential to result in a slight increase in water demand over existing conditions. Project-level review would be required to determine precise potable water and fire-flow requirements for any new development.

Mitigation Measures

The District is currently updating its capital facilities plan for release in 2009. If the Proposed Action is implemented, the District would be made aware of the change in land use designation so that it may plan accordingly.

Residential development of the Paramount site would require extension of services to the site, as well as possible system upgrades to meet fire flow and storage requirements. Future development would require coordination with the County and the District to determine project-level infrastructure needs and identify necessary upgrades and appropriate mitigation measures.

Significant Unavoidable Adverse Impacts

Implementation of the Proposed Action would result in an overall increase in water consumption and a greater need for water distribution infrastructure to serve the site.

3.12.5. Sanitary Sewer Systems

Affected Environment

The Paramount site is located in Sewer Basin 24 of the Ronald Wastewater District (RWD). RWD serves Shoreline in King County and the immediate vicinity of the Paramount site in unincorporated Snohomish County. RWD serves approximately 55,524 residents with over 16,000 sewer connections and maintains approximately 190 miles of pipeline and 16 pump stations (Ronald Wastewater District 2008). RWD's Lift Station 13 is located at 20454 Richmond Beach Drive NW, approximately 0.2 mile south–southwest of the site, and currently handles flows from four upland residential parcels in addition to the Paramount facility. The lift station was last upgraded in 1996.

Aside from the lift station, very little sanitary sewer infrastructure exists in the vicinity of the Paramount site. An 8-inch gravity sewer serves four residential parcels southeast of the lift station, but RWD does not maintain any other infrastructure in Sewer Basin 24.

The 2007 amendment to RWD's comprehensive sewer plan indicates that improvements to sewer infrastructure in Basin 24 are planned to support future residential and commercial development in the area. These projects include an upgrade to Lift Station 13 and the installation of an 8-to-12-inch sewer main along the BNSF right-of-way. The plan indicates that the precise locations of these projects are subject to the level of development experienced in the area, and alternative pipeline alignments and lift station locations may be evaluated as development proceeds (Ronald Wastewater District 2001, amended 2007).

Impact Analysis

Proposed Action

Under the Proposed Action, the Paramount site could accommodate up to 3,500 new multifamily dwelling units with a population of up to 6,442. The planned sewer pipeline and lift station improvements described under Affected Environment were sized to accommodate flows from low-density residential development, specifically R-9,600 zoning (approximately 4.5 units per acre). Assuming 2.4 persons per household, a flow rate of 85 gallons per capita per day, and a peaking factor of 4.0, the improvements were designed for total expected flows of 780,480 gallons per day (gpd).

The Proposed Action assumes much higher residential densities (95 units per developable acre) and the inclusion of 896 employees. Using the same residential flow rates as in the previous paragraph, the increased density of the Proposed Action could generate peak flows of up to 2.2 mgd. Commercial development (assuming 20 gallons per capita per day) could generate an additional 17,920 gpd. Demand for wastewater transmission and treatment under this scenario would exceed the capacity of both existing infrastructure and currently planned capital improvements. As such, the Proposed Action would result in significant impacts on wastewater service.

No Action Alternative

The anticipated increase in employment at the Paramount site under the No Action Alternative has the potential to increase demand on sanitary sewer facilities in the vicinity by generating slightly higher daytime flows. The pipeline improvements and lift station upgrades planned by RWD have been designed to accommodate residential densities and would be more than adequate to handle flows from the increased employment under the No Action Alternative. With implementation of these capital improvements, the No Action Alternative is not anticipated to result in significant impacts on wastewater service.

Mitigation Measures

Residential development of the Paramount site would require the extension of sanitary sewer services and connection to existing infrastructure. Coordination with RWD will be necessary to amend RWD's capital facilities plan to reflect higher levels of growth and ensure that future facilities have adequate capacity for the proposed demand. The RWD Comprehensive Sewer Plan indicates that a pre-design study shall be conducted to determine if Lift Station 13 will require additional capacity for future development or if another lift station should be constructed. Potential mitigation could include the preparation of this study by the developer or a designated consultant, construction and dedication of the necessary infrastructure, or payment of impact fees to the RWD to defray the costs of construction.

The project proponent indicated that future development will incorporate green technologies intended to reduce wastewater volumes and the amount of land required for wastewater treatment. Specific methods and technologies would be evaluated during project-level review.

Significant Unavoidable Adverse Impacts

Exact demand for wastewater services would be evaluated under project-level review, and adequate mitigation applied from the measures described above, at the discretion of the County and RWD. With implementation of appropriate mitigation measures, no significant unavoidable adverse impacts on sanitary sewer are anticipated.

3.12.6. Telecommunications

Affected Environment

Telephone

Telephone services at the Paramount site are provided by Verizon under a franchise from the Washington Utilities and Transportation Commission (WUTC). Verizon provides telephone service to all communities in the County, using a combination of copper and fiber-optic lines. Verizon also offers digital subscriber line (DSL) data service.

In addition to Verizon’s traditional telephone service, Comcast Cable and Qwest Communications also offer digital telephone service in conjunction with their digital data and television service. Availability of digital telephone service varies by location and provider.

Cable

Comcast provides cable television and digital cable data services throughout most of the County. While availability of service is extensive in the urban areas of the County including unincorporated areas, Comcast does not offer cable services in some of the more remote areas of the County and considers requests for extension of service based on technical difficulty and economic feasibility.

Wireless Communication

Wireless telephone communication is widely available in the County and all major U.S. carriers offer service in the area including AT&T, Verizon Wireless, T-Mobile, and Sprint.

Impact Analysis

Proposed Action

The Proposed Action would introduce a concentrated residential population to the Paramount site, including up to 3,500 dwelling units and up to 30 acres of commercial development. These land uses would generate additional demand for telecommunication services, particularly telephone and cable; additional demand for wireless communication in the area could be satisfied without the construction of project-specific infrastructure. Construction of new residential structures and commercial buildings would require the extension of additional telephone lines and television/data cables throughout the site. Project-level review and coordination with service providers would be necessary to ensure that demand is met.

No Action Alternative

Under the No Action Alternative, no land use changes are proposed and no additional telecommunications infrastructure would be required. No impacts on telecommunications are anticipated under this alternative.

Mitigation Measures

Communication service providers monitor development trends in their service areas and provide service extensions in response to demand. Developers and property owners would be required to coordinate with service providers to ensure that adequate services are available at the site.

Significant Unavoidable Adverse Impacts

With mitigation, no significant unavoidable adverse impacts on telecommunications are anticipated.

3.12.7. Solid Waste

Affected Environment

Solid waste collection in the vicinity of the Paramount site is handled by Allied Waste of Lynnwood, which provides garbage, recycling, and yard waste collection services for the communities of Lynnwood, Edmonds, and Woodway. Allied Waste operates a recycling center south of Seattle that sorts and ships over 1.5 million pounds of material every day (Allied Waste 2008).

For materials not able to be recycled, Allied Waste operates the Roosevelt Regional Landfill in Klickitat County. Covering 2,545 acres, the landfill has a total capacity of 120 million tons, has an expected receiving life of 40 years, and receives waste from western Washington, California, and Alaska (Center for Land Use Interpretation 2008). According to County Department of Public Works and as of October 2005, the landfill had an unused capacity of approximately 92 million tons (Snohomish County 2008).

Impact Analysis

Proposed Action

Development under the Proposed Action has the potential to increase the level of solid waste generation through the introduction of up to 6,442 residential customers and 802 employees. Based on past solid waste collection statistics, the residential component of the Proposed Action could generate over 4,500 tons of solid waste per year (Snohomish County 2004). The Roosevelt Regional Landfill has substantial unused storage capacity to meet this demand, and solid waste collection service would be contracted individually by each property owner/manager. No significant impacts on solid waste service are anticipated under the Proposed Action.

No Action Alternative

While the increased employment allowed under the No Action Alternative would generate slightly more solid waste than under existing conditions, the increase would be minimal. No significant impacts on solid waste collection and disposal are anticipated under the No Action Alternative.

Mitigation Measures

No mitigation measures are required.

Significant Unavoidable Adverse Impacts

While adequate capacity exists for disposal of solid waste generated at the Paramount site, the Proposed Action would still result in an overall increase in generation of solid waste in the County.

3.12.8. Power and Natural Gas

Affected Environment

Power

Electrical power in the County is provided by the Snohomish County Public Utility District (PUD)**Error! Bookmark not defined.** #1. The PUD serves approximately 316,000 residential and business customers throughout the County and obtains its current power supply primarily from the Bonneville Power Authority. The PUD, however, owns two generation facilities, including the Jackson Hydroelectric Project, and obtains a small portion of its energy from third-party purchases. The Snohomish County PUD Integrated Resource Plan illustrates the PUD's intent to cultivate additional sources of energy to keep pace with anticipated increases in electricity consumption, including the introduction of renewable energy sources, wind power, biomass, and geothermal energy. The PUD also plans to incorporate increasing levels of conservation measures to reduce overall loads.

Between now and 2012, the PUD anticipates a 13% increase in electric demand, not accounting for conservation measures. The bulk of this increase is associated with residential and commercial growth; industrial demand is anticipated to remain relatively stable (Snohomish County PUD 2008).

The PUD maintains over 5,000 miles of transmission lines to serve customers, as well as 78 substations, 5 operation centers, and 6 local offices (Snohomish County 2006a).

Natural Gas

Natural gas service in the southwest portion of the County is provided by Puget Sound Energy (PSE). PSE serves approximately 735,000 natural gas customers across its 11-county service area. PSE owns and maintains more than 21,000 miles of gas mains and service lines and purchases its natural gas from fields in Alberta and British Columbia, Canada, as well as the Rocky Mountain states (Puget Sound Energy 2008). Natural gas consumption for residences in the County has been trending upward in recent years. The PUD has monitored a sharp reduction in the number of all-electric homes and expects this trend to continue (Snohomish County PUD 2008).

Impact Analysis

Proposed Action

Power

While construction of residential and commercial projects on the site would require the installation of additional infrastructure (transmission lines, transformers, etc.) to serve development, the current operation uses large amounts of electrical power. Taken alone, conversion of the site for residential and commercial activity is unlikely to generate a significant increase in electrical demand when compared to regional capacity.

No Action Alternative

Under the No Action Alternative, current industrial land uses would continue. While additional energy consumption associated with the increase in employment at the Paramount site is anticipated, this increase would not likely require the construction of additional infrastructure. No significant power impacts are anticipated.

Natural Gas

Exact levels of natural gas demand under the Proposed Action are difficult to determine since multifamily housing often uses less natural gas than single-family housing, and rental units are often less likely to be offered with natural gas than owned units. The current petroleum operation also consumes substantial amounts of natural gas, and project-level review and coordination with PSE would be required to determine if future development would result in an increase in consumption of natural gas and/or increased need for distribution infrastructure. Natural gas service is not considered necessary to support development; therefore, PSE would not be required to extend service into areas where it does not currently have infrastructure.

Mitigation Measures

Future development on the site would undergo project-level review to determine precise power and natural gas consumption and infrastructure requirements and any applicable impact fees.

Significant Unavoidable Adverse Impacts

While mitigation is anticipated to reduce impacts to less than significant levels, construction of the project would still result in an overall increase in demand for electric and natural gas infrastructure and, possibly, natural gas consumption.

3.13. Land and Shoreline Use Patterns

As a non-project action, the proposed amendment to the Comprehensive Plan Future Land Use Map (FLUM) would not directly affect land use. If adopted, this amendment would change the allowed uses and potential future development on the site. Project-level review would be required for future development proposals.

Future development allowed under this amendment to the FLUM could directly or indirectly affect adjacent land uses. This section describes existing land uses on the site and in the vicinity, as well as FLUM, zoning, and shoreline classifications, and analyzes potential impacts from the Proposed Action and the No Action Alternative. Impacts discussed include displacement, use compatibility, development intensity, activity levels and patterns, and indirect land use impacts. The relationship of the Proposed Action and the No Action Alternative to relevant plans and policies is discussed in Chapter 3.14, Relationship to Plans and Polices.

3.13.1. Land Use Patterns

The Proposed Action requests a change of FLUM designation from Urban Industrial (UI) to Urban Center (UC) and a change of zoning from Heavy Industrial (HI) to Planned Community Business (PCB). Table 3.13-1 compares the uses that would be permitted outright under both the existing and proposed zoning. Uses on this list may be subject to additional constraints under Snohomish County Code (SCC) 30.22.130 and additional uses may be allowed as conditional uses, subject to County review and approval. As the Proposed Action requested inclusion in the Urban Centers Demonstration Program (UCDP), the uses prohibited by that program as shown in SCC 30.34A.100 that would otherwise be permitted in the PCB zone are so indicated.

Table 3.13-1. Comparison of Permitted Uses: Heavy Industrial and Planned Community Business Zoning Districts

Heavy Industrial (Existing)	Planned Community Business (Proposed)
Adult entertainment business/use	Amusement facility
Agriculture	Art gallery
Airport, stage 1 utility	Auto repair, minor (UCDP prohibited)
Airport, all others	Bakery
Amusement facility	Church
Antique shop	Cleaning establishment
Art gallery	Community facilities for juveniles (up to 24 residents)
Asphalt batch plant and continuous mix asphalt plant	Day care center
Auto repair, major	Department store
Auto repair, minor	Drug store
Auto towing	Dwelling, multifamily
Auto wrecking yard	Dwelling, single family (UCDP prohibited)
Bakery	Dwelling, townhouse

Heavy Industrial (Existing)	Planned Community Business (Proposed)
Billboards	Fallout shelter (individual or joint)
Boat sales	Financial institutions
Caretaker's quarters	Fix-it shop
Cemetery, columbarium, crematorium, mausoleum	Garage, detached private accessory (up to 4,000 square feet on more than 3 acres)
Church	Garage, detached private non-accessory (up to 2,400 square feet)
Cleaning establishment	Government structures and facilities
Clubhouse	Greenhouse, lath house, and nurseries (retail and wholesale) (UCDP prohibited)
Cold storage	Grocery store (smaller than 60,000 square feet)
Commercial vehicle storage facility	Grooming parlor
Community club	Guesthouse
Community facilities for juveniles (up to 24 residents)	Gymnasium
Construction contracting	Hardware store
Country club	Hazardous waste storage & treatment facilities, onsite (UCDP prohibited)
Craft shop	Health and social service facility (levels I-III)
Day care center	Home improvement center
Department store	Hotel/motel
Distillation of alcohol	Library
Distillation of wood, coal, bones or manufacturing of their byproducts	Licensed practitioner
Dock & boathouse, private non-commercial	Locksmith
Drug store	Medical clinic
Explosives, manufacturing	Mini self-storage (UCDP prohibited)
Explosives, storage	Model house and sales office
Extraction of animal or fish fat or oil	Museum
Fabrication shop	Office, general
Fairgrounds	Park, public
Fallout shelter (individual or joint)	Park-and-ride and park-and-pool lots
Farm product processing	Personal services shop
Farm stand (up to 5,000 square feet)	Pet shop
Farmer's market	Printing plant
Financial institutions	Railroad right-of-way
Fish farm	Recreational facility
Fix-it shop	Restaurant
Forestry	Retail store
Forge, foundry, blast furnace for melting of ore	Retirement apartments
Fuel & coal yard	Retirement housing
Garage, detached private accessory (up to 4,000 square feet on more than 3 acres)	Service station (UCDP prohibited)
Garage, detached private non-accessory (up to 2,400 square feet)	Specialty store
Golf course and driving range	Stables
Government structures and facilities	Storage structure, accessory (up to 4,000 square feet on more than 3 acres)
Greenhouse, lath house, and nurseries (retail and wholesale)	Storage structure, non-accessory (up to 2,400 square feet)
Grocery store	

Heavy Industrial (Existing)	Planned Community Business (Proposed)
Grooming parlor	Studio
Hardware store	Swimming or wading pool
Hazardous waste storage & treatment facilities, onsite	Tavern
Health and social service facility, level III	Tire store (UCDP prohibited)
Home improvement center	Transit center
Junkyard	Utility facilities (UCDP prohibited)
Kennel (commercial, private breeding)	Veterinary clinic
Laboratory	Wholesale establishment (UCDP prohibited)
Library	
Licensed practitioner	
Livestock auction facility	
Locksmith	
Lumberyard	
Manufacturing	
Massage parlor	
Medical clinic	
Mini self-storage	
Mobile home and travel trailer sales	
Mortuary	
Motor vehicle and equipment sales	
Museum	
Office, general	
Park, public	
Park-and-ride and park-and-pool lots	
Personal services shop	
Personal wireless communications facilities	
Pet shop	
Petroleum products and gas storage – bulk	
Print shop	
Printing plant	
Race track	
Railroad right-of-way	
Recreational facilities	
Rendering of fat, tallow, or lard	
Restaurant	
Retail store	
Rolling or blooming mills	
Sawmill	
Schools	
Second hand store	
Service station	
Shake and shingle mill	
Shooting range	

Heavy Industrial (Existing)	Planned Community Business (Proposed)
Small animal husbandry	
Specialty store	
Stables	
Stockyard or slaughterhouse	
Storage, retail sales livestock feed	
Storage structure, accessory (up to 4,000 square feet on more than 3 acres)	
Storage structure, non-accessory (up to 2,400 square feet)	
Studio	
Swimming or wading pool	
Tannery	
Tar distillation or manufacturing	
Tavern	
Television or radio station	
Tire store	
Tool sales and rental	
Transit center	
Utility facilities	
Veterinary clinic	
Warehousing	
Wholesale establishment	
Yacht/boat club	

Source: Snohomish County Code 30.22.130

Affected Environment

Site Use and History

The 61-acre Paramount of Washington LLC (Paramount) site is currently used for petroleum products storage, processing, and distribution. The site has been in use as a fuel storage depot since 1912, and Chevron established the first asphalt plant at the site in 1950.

Vicinity Characteristics

The site is located in the southwest corner of the Southwest County Urban Growth Area (UGA), adjacent to the northern limits of the City of Shoreline (Shoreline) in King County and to the west of the Town of Woodway (Woodway). The land immediately east of the site in Woodway consists primarily of vacant or undeveloped land and single-family residential development (generally 0.25-acre lots or larger). Land to the southeast of the site, in Shoreline, also consists of primarily single-family residential development.

Existing Land Use and Zoning Designations for the Site

The current FLUM designation is Urban Industrial, with implementing zoning of HI. As shown in Table 3.13-1, residences are not allowed uses in the HI zone.

Surrounding Area Land Use Designations and Zoning

As shown in Figure 2-1, the Paramount site is located in a small pocket of unincorporated land bordered on the south by Shoreline in King County and by Woodway to the east and north. Two large undeveloped parcels across the Burlington Northern Santa Fe (BNSF) railroad from the lowland portion of the site are designated Urban Low Density Residential, with an implementing zone of R-9,600.

Woodway

Woodway places a high priority on fostering single-family residential development and keeping density low to preserve a more rural lifestyle, as outlined in the town's Land Use Goals and Policies (Town of Woodway 2000):

LUG-1: To preserve the Town of Woodway's natural and scenic character, park-like atmosphere and the privacy of individual residences.

LUG-2: To preserve and protect the Town of Woodway's historical development patterns and future neighborhoods through strict enforcement of the Town's land use regulations.

Land in Woodway adjacent to the Paramount site is designated as Forested Residential Park, Suburban Residential, and Conservation on the town's Future Land Use and Zoning map.

Shoreline

Nearby development in Shoreline is designated as Low Density Residential under the city's Comprehensive Plan, with an implementing zone of R-6 (6 units per acre).

Impact Analysis

Proposed Action

Displacement

Approval of the change in FLUM designation on the Paramount site and the associated change of zoning would result in the conversion of the site from an industrial facility to a mixed-use, residential, commercial, and office center. This conversion would allow the development of up to 3,500 residential units with an estimated population of 6,440 as well as the construction of up to 30 acres of commercial development. Land zoned and used for industrial purposes would be lost.

Compatibility of Use

The permitted uses in the proposed and existing zones are compared in Table 3.13-1. While the PCB and HI zones share many commercial and office uses, the HI zone does not allow the development of residences. If the area were to be developed piecemeal, there would be potential incompatibilities between new residential development and existing industrial facilities. However, as it is the intent of the property owner to redevelop the Paramount site as a whole, no industrial uses would remain to conflict with the new mixed-use development.

While the addition of urban-level, high-density residential development and commercial and office uses at this location would create a higher density than currently exists in the surrounding areas, the uses proposed would be more compatible with surrounding development than the industrial uses currently on the site.

Intensity and Activity Levels

The introduction of an urban center at this location has the potential to increase activity levels in the area, especially vehicular traffic, which could create impacts on the low-density residential development to the east and south. The presence of high-density residential and commercial uses in close proximity could adversely affect low-density residential uses by creating increased noise, light and glare, and traffic congestion in the area.

Indirect Impacts

If the proposed urban center is established, the concentration of commercial, office, and residential uses could attract additional development to nearby areas. This development could result in increased residential density in surrounding neighborhoods, which are currently low-density in character. While current zoning prevents the extensive development of commercial uses in these surrounding areas, the County, Woodway, and Shoreline may experience increases in requests for rezoning.

No Action Alternative

Displacement

Under the No Action Alternative, no land uses would be introduced or displaced from the area, but the Paramount site could be expected to undergo additional industrial development to maximize the capacity of the facility.

Compatibility of Use

While the No Action Alternative is compatible with the existing FLUM designation and zoning for the site, expanded industrial uses would remain incompatible with surrounding development, which is entirely residential in nature.

Intensity and Activity Levels

Expanded industrial development on the site would be similar in size and intensity to the existing facilities. Activity levels in the area could increase slightly as petroleum operations at the site expand. The primary impact on surrounding development would be additional daily truck trips to and from the site. As such, the increase in activity levels would be felt most acutely by residents in Shoreline.

Indirect Impacts

The No Action Alternative is not expected to result in any changes to local land use patterns.

Mitigation Measures

Future development under the Proposed Action or No Action Alternatives may require project-specific mitigation measures to address potential impacts on the built or natural environments. Future impacts would be analyzed and appropriate mitigation measures applied under the County's State Environmental Policy Act (SEPA) review process at the time of application.

Potential mitigation measures to reduce impacts on land use patterns could include:

- Implementation of traffic calming and noise abatement measures as a condition of development permit approval to reduce vehicular impacts on nearby residential development.
- Establishment of a medium-density transitional area surrounding the urban center to provide a buffer between high and low densities.
- Application of design standards or design review to minimize design incompatibilities with surrounding uses.

Significant Unavoidable Adverse Impacts

The Proposed Action represents a long-term change of land use for the Paramount site and a permanent loss of waterfront industrial property.

3.13.2. Shoreline Use Patterns

Under the Shoreline Management Act, local jurisdictions are required to adopt a Shoreline Management Master Program (SMMP) for shorelines of the state. Snohomish County first adopted its SMMP in 1974, and the most recent update occurred in 2006. Because of its location on Puget Sound, portions of the Paramount site lie in the jurisdiction of the County SMMP.

For a detailed discussion of shoreline policies and shoreline designation criteria, see Chapter 3.14, Relationship to Plans and Polices.

Affected Environment

Site Use and History

As discussed in section 3.13.1, the site has been in use as a petroleum storage and processing facility since approximately 1912. A dock is located in the nearshore environment to facilitate marine fueling operations.

Vicinity Characteristics

The shoreline area to the north of the Paramount site is mostly undeveloped. The primary feature is the BNSF railroad, which runs between the shore and the base of the bluff to the east. Land uses at the top of the bluff, as discussed in the previous section, are primarily large-lot, single-family residential developments.

The BNSF railroad right-of-way is also the dominant feature of the shoreline to the south of the site. The majority of the shoreline in this area is under the direct ownership of BNSF railroad.

Existing Shoreline Designation for the Site

According to the County SMMP, the shoreline designation for the site is Urban, which is intended to absorb higher-density development while protecting and restoring ecological functions, and to provide appropriate public access to and recreational use of the shoreline environment. The urban designation is the most permissive shoreline environment designation specified in the County SMMP, allowing many uses that the other designations do not. The following is a list of generalized categories of uses allowed in the urban designation:

- Agriculture
- Aquaculture (facilities, harvest, and processing)
- Boating facilities
- Commercial
- Forestry
- Institutional uses
- Ports and industry
- Recreation
- Residential
- Utilities facilities (except dams or power plants)

The above uses function as an overlay of existing zoning; for one of these uses to be allowed, it must also be permitted in the underlying zoning district before being considered for the shoreline jurisdiction.

Surrounding Area Shoreline Designations

Woodway

Shorelines in Woodway are designated as Shoreline Residential, Natural, Shoreline Conservancy, or Aquatic (Town of Woodway 2001). Adjacent to the site, Woodway designated the BNSF railroad right-of-way and land waterward as Urban Conservancy. This designation is intended to protect and restore ecological functions in urban and developed settings. Few uses are permitted outright (water-dependent recreation, hazardous waste cleanup) and commercial and industrial activities are prohibited. Single-family residential uses are a conditional use, but multifamily residential development is prohibited.

Shoreline

When Shoreline incorporated in 1995, it adopted King County's existing 1978 Shoreline Master Program as its local SMMP. Shoreline developed a series of shoreline environment designations during the development of its 1998 comprehensive plan, but these have not been approved by the

Washington Department of Ecology. Therefore, Shoreline currently applies the King County Shoreline Master Program for shoreline environments in its jurisdiction.

According to the existing King County Shoreline Master Program, the area immediately south of the King County–Snohomish County line is designated Urban, which is intended for high intensity development, including a variety of residential, commercial, recreational, and industrial uses.

Impact Analysis

Proposed Action

Compatibility of Use

No change of shoreline designation is requested under the Proposed Action. The proposed land uses are permitted under the current Urban designation, and would be more compatible with the ecological restoration objectives of the County SMMP than the current industrial complex. While the Proposed Action would represent greater density than seen in surrounding shoreline environments, the mixed-use nature of the proposed development would be likely to result in use of the shoreline area for recreation or residential uses, as opposed to industrial use. Residential and recreational uses would be more compatible with the ecological restoration objectives of the adjacent Woodway Urban Conservancy designation.

Intensity and Activity Levels

The introduction of an urban center at this location has the potential to increase activity levels in the shoreline environment. The proposed change of FLUM designation and zoning would change use of the shoreline area from industrial to primarily recreational or residential. As shoreline access is a popular residential amenity, the increased population of the area has the potential to generate additional usage of the area by residents.

Indirect Impacts

While the Proposed Action does not entail a change of shoreline environment designation, use of the property is anticipated to transition away from its current industrial function. Loss of this waterfront industrial property could potentially create additional demand for such facilities elsewhere, such as in the Urban shoreline zone of nearby Shoreline.

No Action Alternative

Compatibility of Use

All current industrial uses are permitted under the existing Urban shoreline designation. While the existing use would be permitted under the King County shoreline designation to the south, it is not compatible with Woodway's shoreline regulations, which prohibit industrial uses in nearby shoreline areas.

Intensity and Activity Levels

The No Action Alternative assumes that additional industrial development would occur on the site to increase operation capacity. This expansion could entail increased use of the existing dock for marine fueling operations and the potential construction of addition industrial facilities in the shoreline environment. The No Action Alternative is anticipated to increase both intensity and activity levels in the shoreline environment.

Indirect Impacts

As the No Action Alternative does not entail a change of shoreline environment designation, no indirect impacts on shoreline use patterns are anticipated.

Mitigation Measures

Future development under the Proposed Action or No Action Alternative may require project-specific mitigation measures to address potential impacts on the built or natural environments. Future impacts would be analyzed and appropriate mitigation measures applied under the County’s Shoreline Management review process at the time of application.

Potential mitigation measures to reduce incompatibilities with surrounding shoreline designations could include:

- Locating higher-intensity shoreline uses away from the northern edge of the Paramount site, which borders Woodway’s Urban Conservancy designation. Higher intensity uses should be located near the southern portion of the site, which borders Shoreline’s Urban designation.

Significant Unavoidable Adverse Impacts

There are no significant unavoidable adverse impacts to shoreline use patterns.

3.14. Relationship to Plans and Policies

Federal, state, and county regulations, plans, and policies guide development in Snohomish County (County). These include the federal Endangered Species Act (ESA), State of Washington Growth Management Act (GMA), State Shoreline Management Act (SMA), Countywide Planning Policies (CPPs), Snohomish County GMA Comprehensive Plan and General Policy Plan (GPP) Snohomish County Code (SCC) Title 18 Zoning, and Snohomish County Shoreline Management Master Program (SMMP). ESA provisions as they relate to fisheries are discussed in Section 3.4, Fisheries.

The policies and plans analysis below focuses on consistency of the Proposed Action with the Comprehensive Plan and related City of Shoreline (Shoreline) functional plans and policies, GMA goals, the CPPs and the GPP. The relevant portions of these documents are summarized below followed by a brief discussion of the proposal's consistency with them.

3.14.1. Reviewed Plans and Policies

Growth Management Act

The GMA is based on several planning goals, which must be considered when developing CPPs, comprehensive plans, and development regulations. Goals address urban growth, sprawl reduction, efficient multimodal transportation systems, housing availability and affordability, economic development, property rights, timely and fair permit processes, natural resource industries, open space and recreation, environmental protection, citizen participation, public facilities and services, and historic preservation (Revised Code of Washington (RCW).

Jurisdictions subject to planning under the GMA are required to prepare and adopt CPPs. The County adopted its CPPs in 1993. Comprehensive plans for each jurisdiction in a county must be consistent with the CPPs. The Snohomish County Plans and Regulations section below describes the County's comprehensive plan and CPPs.

The comprehensive plan serves as the guide for local government staff and elected officials in making decisions regarding ordinances, regulations, and public facility investments to ensure that the overall goals and policies are furthered by those decisions. To implement a comprehensive plan, development regulations and capital facility plans need to be prepared. The GMA specifically requires critical area and natural resource ordinances protecting environmental, agricultural, forestry, and mineral resources.

Shoreline Management Act

A local SMMP is required by the SMA (RCW 90.58) for "Shorelines of the State" (Shorelines of the State are defined in RCW 90.58.030). An SMMP must include goals and policies related to shoreline uses, conservation, economic development, public access, recreation, circulation, and housing. Development regulations for specific shoreline uses must be included as well.

The SMA addresses priorities for shoreline uses. An SMMP must give preference to uses, in the following order of preference:

1. Recognize and protect the statewide interest over local interest.
2. Preserve the natural character of the shoreline.
3. Result in long-term over short-term benefit.
4. Protect the resources and ecology of the shoreline.
5. Increase public access to publicly owned areas of the shorelines.
6. Increase recreational opportunities for the public on the shoreline.
7. Provide for any other element as defined in RCW 90.58.100 deemed appropriate or necessary.

Snohomish County Plans and Regulations

Countywide Planning Policies (CPPs). CPPs were adopted by the County in 1993 and have been periodically amended. These policies are important because they establish Urban Growth Areas (UGAs) and employment growth targets for each jurisdiction within the UGAs.

Comprehensive Plan. The County adopted its first GMA Comprehensive Plan in June 1995 and has periodically amended it, including the required 10-year update, which was adopted in December 2005. The GMA Comprehensive Plan includes required and optional elements as follows: Land Use (addressing Urban, Rural, and Resource Lands), Population and Employment, Housing, Transportation, Capital Facilities, Utilities, Economic Development, Natural Environment, Interjurisdictional Coordination, and Siting of Essential Public Facilities.

Shoreline Management Master Program (SMMP). The Snohomish County SMMP became effective in 1974 and is amended periodically. It applies to regulated water bodies and shorelands within 200 feet of the ordinary high water mark (OHWM) of regulated water bodies, called "shorelines of the state." Shoreline environments are mapped and designated as Urban, Suburban, Rural, Conservancy, or Natural. Use regulations vary by the shoreline environment that applies to the shorelands.

Development Regulations. To implement its GMA Comprehensive Plan, the County adopted development regulations including zoning and a critical areas ordinance, which was updated and adopted in 2007. Critical area regulations are addressed in SCC Chapter 30.62. The Urban Centers Demonstration Program (UCDP) (SCC 30.34A) implements policies related to urban centers. This program encourages "innovative, well-designed, well-sited, mixed-use, higher-density development to be located within or next to designated urban centers."

3.14.2. Discussion of Relationship to Plans and Policies

Since the County's plans, policies and regulations implement state GMA and SMA laws and the GMA Comprehensive Plan and GPP policies flow from the CPPs, the primary focus of this section is to address consistency of the docket proposal with applicable GMA Comprehensive Plan and GPP policies. If relevant, GMA and SMA goals and requirements or the County's SMMP policies are also cited.

An analysis of consistency with plans and policies from the adjacent Town of Woodway (Woodway), which is in the County, is also included because the Point Wells area (Paramount site) is part of Woodway's Municipal Urban Growth Area (MUGA). An analysis of consistency with plans and policies from the adjacent city (Shoreline), which is in King County, is included because Shoreline includes the Point Wells area in its Potential Area of Annexation (PAA) and because the vehicle access to the Paramount site goes through Shoreline.

No analysis is included for the No Action Alternative since the No Action Alternative would retain existing GMA Comprehensive Plan Future Land Use Map (FLUM) and zoning designations, and since the current designations were applied on the basis of policies in the adopted GMA Comprehensive Plan and GPP.

3.14.3. Affected Plans and Policies and Consistency Analysis

Affected Plans and Policies–Snohomish County

Snohomish County Shoreline Management Master Program (SMMP)–Urban Environment Designation Criteria

The site of the Proposed Action is designated as an Urban Environment in the SMMP, a designation that includes areas of high-intensity land use. This environment is particularly suitable for those areas presently subjected to extremely intensive use pressure and to areas planned to accommodate urban expansion. Shoreline areas to be designated as an Urban Environment should possess one or more of the following criteria:

- areas of high-intensity land use including recreation, residential, public facility, commercial, industrial development and intensive port activities;
- areas designated in the adopted plans of public agencies for expansion of urban uses;

- areas possessing few biophysical limitations for urban development; and
- areas that can provide the necessary infrastructure of public services and utilities and access to accommodate urban development.

  Consistency: *The Paramount site is designated as an urban shoreline environment in the SMMP. It is now, and has been for many decades, used for industrial purposes as a petroleum products storage facility, processing and distribution operation. The Proposed Action would redevelop the site for an urban center comprising a mix of high density residential and commercial uses with significant required public circulation, facilities, and open space.*

  The proposed Urban Center (UC) comprehensive plan designation is consistent with one or more of the urban shoreline environment criteria. The proposed designation would allow for a continuation of intensified use of the site. However, this mixed-use designation would provide the opportunity for public physical access to the adjacent shoreline that was previously not available. Necessary public services, utilities, and access would be available to accommodate the proposed development of urban centers. Since the site is fully developed, the Proposed Action is consistent with the urban shoreline environment as there are few biophysical limitations for future urban development. However, redevelopment of the site under the UC designation could result in potential restoration in the shoreline setback area.

General Policy Plan, Countywide Planning Policies, and GMA Comprehensive Plan

The following GPP policies, CPPs, and GMA Comprehensive Plan policies are the most relevant to the Proposed Action to redesignate the Paramount site from a FLUM designation of Urban Industrial (UI) to UC:

General Policy Plan (GPP)

Objective LU 2.B. Encourage intensification and revitalization of existing and planned commercial and industrial areas.

> **LU Policy 2.B.1.** The County shall encourage expansion, revitalization, redevelopment, and intensification of existing areas before new sites are designated and zoned.
>
> ***Consistency:*** *The Proposed Action would make the existing industrial site eligible for redevelopment and intensification as an urban center and is, therefore, consistent with LU Policy 2.B.1.*
>
> **LU Policy 2.B.2.** The majority of new commercial development shall be accommodated as mixed use in urban centers, and/or urban village or adjacent to transit stations or designated transit corridors.

Consistency: *The Proposed Action is consistent with LU Policy 2.B.2. The Proposed Action would allow the development of a new urban center which would accommodate new commercial development and is adjacent to a designated commuter rail corridor. Sound Transit, the regional transit agency, has previously listed the adjacent Richmond Beach community as a potential site for a Sounder commuter rail station.*

Objective LU 3.A. Plan for urban centers within unincorporated UGAs consistent with Vision 2020 and the CPPs.

LU Policy 3.A.1. FLUM and UGA land use plans shall include designations and implementation measures for urban centers, based on the characteristics and criteria below.

LU Policy 3.A.2. Urban centers shall be compact (generally not more than 1.5 square miles) pedestrian-oriented areas within designated UGAs with good access to higher frequency transit and urban services. Pedestrian orientation includes pedestrian circulation, pedestrian-scaled facilities and pedestrian convenience. These locations are intended to develop and redevelop with a mix of residential, commercial, office, and public uses at higher densities, oriented to transit and designed for pedestrian circulation. Urban centers should also include urban services and reflect high quality urban design. Urban centers shall emphasize the public realm (open spaces, parks, and plazas) and create a sense of place (identity). Urban centers will develop/redevelop over time and may develop in phases.

Consistency: *The Paramount site under the Proposed Action meets the locational criteria for the siting of an urban center. The Paramount site is compact and less than one-tenth of a square mile in size. The site is located along the Sounder commuter rail corridor and urban services are available. Because this is a non-project Draft SEIS and there is no site-specific proposal, it is not possible to evaluate the other criteria at this time. The Proposed Action is consistent with LU Policy 3.A.2.*

LU Policy 3.A.3. Urban centers shall be located adjacent to a freeway/highway and a principal arterial road, and within one-fourth of a mile walking distance from a transit center or park-and-ride lot or be located on a regional high capacity transit route or a major bus route.

Consistency: *The Paramount site is located adjacent to a regional high-capacity transit route, Sounder commuter rail. The Proposed Action is consistent with LU Policy 3.A.3.*

LU Policy 3.A.4. Residential net densities shall not be less than 12 dwelling units per acre; maximum densities may be established as part of more detailed planning. Population and employment size will be consistent with criteria in the CPPs and General Policy Plan.

Consistency: *The Proposed Action includes densities greater than 12 dwelling units per acre and, therefore, is consistent with LU Policy 3.A.4.*

LU Policy 3.A.5. The following urban centers are designated on the FLUM: 164th Street and Interstate 5 (I-5); 128th Street and I-5; Highway 99 and 152nd St SW; Highway 99 and SR 525; 196th Street and SR 527; and 44th Avenue West and I-5. Additional urban centers may be designated in future amendments to the GMA Comprehensive Plan.

Consistency: *The Paramount site is not listed as one of the designated urban centers on the FLUM in LU Policy 3.A.5. However, the Proposed Action would result in an additional urban center location on the FLUM in the comprehensive plan; therefore, the Proposed Action is consistent with Policy 3.A.5.*

LU Policy 3.A.6. Desired growth within urban centers shall be accomplished through the development of concept or master plans, application of appropriate zoning classifications, provision of necessary services and public facilities, including transit, sewer, water, stormwater, roads and pedestrian improvements, parks, trails and open space, and protection of critical areas. The County will identify and apply methods to facilitate development within designated urban centers, including supportive transit, parks, road, and non-motorized improvements.

Consistency: *The Proposed Action will be implemented through the UCDP regulations in SCC Chapter 30.34A. The proposed development of the Paramount site as an urban center will require compliance with all applicable UCDP procedures and standards including the provision of necessary services and public facilities. The Proposed Action is consistent with Policy 3.A.6.*

Objective LU 5.B. Recognize unique land use issues within specific UGAs as identified in previously adopted subarea plans and/or studies.

LU Policy 5.B.12. Within the Southwest UGA, parcels designated UI (on Point Wells) shall be considered for future redesignation from UI to Mixed Use/UC designation upon receipt of necessary studies addressing all permitting considerations such as site development and environmental impacts and issues.

Consistency: *The policy appears to require permit-level studies addressing all permitting considerations before considering redesignation of the Paramount site to UC. Comprehensive plan land use designations are generally analyzed at the programmatic/non-project level which does not include all "permitting considerations." It is difficult at the programmatic/non-project level to determine "all permitting considerations" when an actual proposal has not been submitted. Generally permitting considerations would include building bulk, setbacks, critical areas, shorelines, landscaping, infrastructure improvements, transportation, and mitigation, all of which are determined by codified development regulations. As the policy is not clear and since* *the level of study regarding permitting considerations would not be required until the development proposal application, the Proposed Action may not be consistent with Policy 5.B.12.*

Objective HO 1.B. Ensure that a broad range of housing types is available in urban and rural areas.

Consistency: *The Proposed Action would allow the development of high density residential units, which would add to the range of housing types available in the urban area. The Proposed Action is consistent with Objective HO 1.B.*

Objective HO 1.D. Maintain an adequate supply of appropriately zoned developable land.

Consistency: *The Proposed Action would rezone the site to Planned Community Business (PCB) which is the only implementing zoning designation for the UC land use designation. The PCB zoning designation allows for high-density residential and mixed use development in an existing urban growth area. The Proposed Action is consistent with Objective HO 1.D.*

HO Policy 1.D.3. The County shall encourage expeditious and efficient infill development in UGAs.

Consistency: *The Proposed Action would allow redevelopment of an unincorporated "island" between Woodway and Shoreline. The Proposed Action is consistent with Policy 1.D.3.*

HO Policy 1.D.4. The County shall encourage housing in mixed-use developments in designated urban centers in unincorporated Snohomish County.

Consistency: *The redesignation from UI to UC allows for housing in a mixed-use development; therefore, the Proposed Action is consistent with Policy 1.D.4.*

Countywide Planning Policies (CPPs)

Policy UG-8. Ensure UGAs provide sufficient density, developable land, and public services to accommodate most of the projected population and employment growth. In addition, the density should be adequate, according to recent studies, to support transit services and efficient utilization of infrastructure.

Consistency: *Redesignation of this site would allow mixed use development and would provide additional capacity for population in the SW UGA. The Proposed Action would also increase employment on the site, adding to the current employment capacity. The residential densities and employment capacity projected in the Proposed Action description would support transit services; therefore the Proposed Action is consistent with Policy UG-8.*

Policy OD-1. Promote development within UGAs in order to use land efficiently, add certainty to capital facility planning, and timely and coordinated extension of urban services and utilities for new development.

Consistency: *The Proposed Action would use land efficiently in the SW UGA consistent with this policy. The time needed for the conversion of the subject properties from an industrial use to a mixed-use development will allow time for coordination of capital facilities and the extension of urban services to accommodate the projected population and employment capacity. Therefore, the Proposed Action is consistent with Policy OD-1*

Policy OD-8. Encourage land use, economic, and housing policies that colocate jobs and housing to optimize use of existing and planned transportation systems and capital facilities.

Consistency: *This policy is about "encouraging policies" so is not directly related to the Proposed Action. However, if the Proposed Action were approved as outlined in the project description, it would provide jobs and housing on the site, therefore, providing consistency with Policy OD-8.*

Annexation Jurisdiction

At this time, annexation of the Point Wells site to an incorporated city is not part of the Proposed Action. However, since provision of services and facilities may be facilitated through eventual annexation to either Woodway or Shoreline, the relevant policies on annexation of the site are discussed below.

Both Woodway and Shoreline policies indicate the potential to annex the Point Wells site. The site is part of Woodway's MUGA, indicating that annexation to Woodway may be appropriate at some point in the future. That assumption is reflected in Woodway's policies, which are outlined below.

Shoreline has several adopted policies establishing a framework should annexation of the Point Wells site become an eventuality for the city. The site appears on Shoreline's Comprehensive Plan Land Use Map with the designation Potential Annexation Area. GPP Policy IC 1.B.4 states that the County will not support annexation of unincorporated Snohomish County by a jurisdiction situated predominately outside the County unless there is an interlocal agreement established with Shoreline and the County. Shoreline does not have an annexation-related interlocal agreement with the county. Eventual annexation to one jurisdiction would result in inconsistency with the policies of the other.

Affected Plans and Policies–Woodway

Shoreline Management Master Plan (SMMP)

While the Point Wells site is outside of Woodway's boundaries and not subject to the town's SMMP, some policies address potential development of the site and related issues. The relevant policies are discussed below.

Public Access

Policy 1. Public access should be considered in the review of all private and public developments (including land division) with the exception of the following:

a. single-family dwelling development; and subdivisions containing less than five lots, or
b. where deemed inappropriate due to health, safety and environmental concerns.

Policy 2. Development, uses, and activities on or near the shoreline should not impair or detract from the public's access to the water.

Policy 9. Public views from the shoreline upland areas should be enhanced and preserved. Enhancement of views should not be construed to mean excessive removal of vegetation that partially impairs views.

Consistency*: Since the Proposed Action is a programmatic/non-project action, application of these policies is appropriate at the time of development review.*

Comprehensive Plan–2004 Update

Land Use Goals and Policies

While the Point Wells site is outside of Woodway's boundaries and not subject to the town's land use goals and policies, some policies address the site directly, as follows:

LUG-9. To continue to work with landowners, neighborhoods, and appropriate jurisdictions to collectively implement the land use plan for Point Wells as designated in the Woodway and County comprehensive plans.

LUG-10. To prepare development regulations that will effectively implement the land use plan and policies for the Point Wells subarea.

Consistency: *Policies LUG-9 and LUG-10 call for coordination among jurisdictions to implement the land use plan and to prepare regulations to effectively implement development on the Point Wells site. The Proposed Action is being reviewed through the County's docket process which requires early and continuous public notice and participation including the involvement of* *property owners and other affected and interested individuals, tribes, cities, utility districts, businesses, and other organizations and government agencies.*

LUG-4. To discourage development in areas where there are not adequate public facilities and services unless the public facilities and services can be provided in an efficient and environmentally responsible manner.

LUP-1. Development shall be limited to areas with adequate levels of service.

Consistency: *Adequate urban-level public facilities and services exist to support the Proposed Action.*

LUP-4. Redevelopment to higher densities shall be limited by such factors as surrounding residential uses, adequacy of public facilities and services, traffic patterns, town character, and the project's cumulative impacts on the surrounding natural areas including the urban forests, bluff, tidelands and stream corridors, and the protection of and minimizing impacts on environmentally sensitive areas.

Consistency: *The Proposed Action would allow higher density residential development than that found in surrounding residential uses and is supported by adequate levels of public facilities and services. Impacts on traffic and the natural environment are analyzed in this Draft SEIS.*

LUP-18. To recommend to the County the adoption of policies relating to Point Wells as contained in the Woodway Comprehensive Plan to serve as a guide in administering land use decisions related to the unincorporated portion of Point Wells.

Consistency: *At this time, policies in the Woodway Comprehensive Plan relating to Point Wells have not been adopted by the County.*

LUP-19. To establish and apply land use controls, development plan review procedures and impact mitigation measures for Point Wells through an interlocal agreement with Snohomish County. Such agreement is necessary to reflect the contiguous location of Point Wells to the town limits and its designation as a MUGA of Woodway.

Consistency: *At this time, an interlocal agreement with Woodway has not been adopted by the County.*

LUP-20. To separate Point Wells into three land use planning areas: the upper bluff area, the mid-bluff area, and the waterfront area. The upper bluff area currently serves as a buffer between existing Woodway residences and industrial uses located on the waterfront. If future development is proposed for the upper bluff, it shall be implemented with the urban residential land use designation with a corresponding maximum density of four units per acre. In addition, an open space area planned for public passive uses shall be located north of the extension at 238th Street. The mid-bluff area is encumbered by environmentally sensitive areas dominated by steep slopes and shall be designated as an environmentally critical area. The waterfront area and a portion of land situated east of and adjacent to the Burlington Northern Santa Fe (BNSF) railroad tracts (sic) and existing overpass shall be designated as industrial.

Consistency: *The Proposed Action relates to only the waterfront area and a portion of land situated east of and adjacent to the BNSF railroad tracks and existing overpass. As the Proposed Action is requesting a change from industrial, it would not be consistent with LUP-20.*

LUP-21. The industrial designation for the waterfront area is projected to be the most appropriate land use for the near term and within the 20-year planning period. The town may consider amending the industrial designation at such time that environmental, capital facilities, and geo-political conditions warrant a more intensive use of the waterfront area which may include a potential marina.

Consistency: *As the Proposed Action is requesting a change from industrial, it would not be consistent with LUP-21.*

LUP-27. To confirm that surface transportation access shall continue to be provided to the waterfront area through the existing transportation network.

Consistency: *There is not enough information available to determine if the Proposed Action would be consistent with LUP-27.*

Transportation Goals and Policies

TP-3. To coordinate the planning of regional transportation facilities with surrounding jurisdictions. Further, the town shall review development projects in surrounding jurisdictions and strive to mitigate impacts from such projects on Woodway's transportation network.

Consistency: *Although this Draft SEIS provides a coordinated review of transportation impacts at a programmatic level, coordinated planning has not yet occurred. The Proposed Action is partially consistent with TP-3.*

Point Wells Land Use Objective and Guiding Principles

Woodway's 1994 planning process included work on a Point Wells Subarea Plan. The report gives an overview of the community values and sets forth Land Use Objectives and Guiding Principles and Land Use Alternatives. The report is adopted in the Appendices of the 2004 Comprehensive Plan (Town of Woodway 2004).

Consistency: *Although the Land Use Objectives and Guiding Principles contain language indicating that the waterfront area (most of the Paramount site) could be redeveloped into an economically viable, pedestrian-oriented, land use mix, with pedestrian access to the shore, the Community Values section indicates a preference for a restored natural area with water-dependent uses rather than a highly urban development. However, the preferred* *alternative for the waterfront area "reflects the property owner's desire to maintain the existing industrial use as the planned future use."*

Although there is some inconsistency within the Point Wells Subarea Plan, it appears the Proposed Action would not be consistent with the plan.

Affected Plans and Policies–Shoreline

1998 Shoreline Management Master Program (SMMP)

The 1998 shoreline goals and policies (Appendix 2 of the City of Shoreline Comprehensive Plan) have not yet been reviewed by the Washington State Department of Ecology (Ecology) and as such, do not yet qualify as part of Shoreline's recognized SMMP. However, the goals and policies relevant to the Proposed Action are included below as a guide to development of the updated SMMP (expected in 2009) as well as an indication of Shoreline's desires for development of the Point Wells site.

Goal SM I. To allow for a diversity of uses within the shoreline area consistent with the different character of various shorelines within the city, and to preserve and enhance the natural and aesthetic quality of important shoreline areas.

Policy SM 4. Encourage multiple uses in Urban-High Intensity environments, which enhance the public's use and enjoyment of the shoreline.

Goal SM II. To encourage a variety of uses which provide amenities to the community, economic development, and public access to the shoreline in Urban-High Intensity designated areas.

SM12. Use the following criteria if Point Wells is annexed and proposed for redevelopment:

- Consider a mix of commercial, residential, recreational and industrial water oriented uses.
- Ensure public access and amenities.
- Ensure adequate infrastructure.
- Protect views of the shoreline from nearby upland uses.
- Ensure clean-up of any hazardous materials.
- Minimize impacts on adjacent shoreline and neighborhood uses.
- Allow flexible site design to meet these criteria and to minimize development impacts.

Consistency: *Although the policies of Shoreline's SMMP would apply only if the Paramount site were annexed to Shoreline, they are included here to demonstrate that Shoreline would expect the Paramount site to be redeveloped as a mixed use. However, there is not enough information* *at this point to determine if the Proposed Action would be entirely consistent with Shoreline's SMMP goals and policies.*

Comprehensive Plan

Land Use Goals and Policies

Goal LU II. Annex unincorporated areas of the County that are within Shoreline's PAA.

LU17. The Mixed Use designation applies to a number of stable or developing areas and to the PAA at Point Wells. This designation is intended to encourage the development of pedestrian-oriented places, with architectural interest, that integrate a wide variety of retail, office, and service uses with residential uses. Appropriate zoning designations for the area include, Neighborhood Business, Community Business, Office, Regional Business, Industrial, R-8, R-12, R-18, R-24 and/or R-48.

Consistency: *The Proposed Action would allow the development of a mixed use area. The County implementing a PCB zone allows similar uses as the suggested Shoreline zones, with the exception of Industrial, which is not an allowed use in PCB. There is not enough information to determine if the development allowed under the Proposed Action would be consistent with the other criteria of the Mixed Use designation.*

LU53. Consider the Point Wells area as a logical PAA due to its public road access through the Richmond Beach neighborhood, its contiguous boundary, its use of Shoreline-based public services, and potential development impacts on Shoreline.

Consistency*: The Proposed Action does not consider annexation; however, this Draft SEIS analyzes traffic impacts on Shoreline, recognizing the relationship between the Paramount site access and the roads in Shoreline.*

LU56. Ensure that property owners in the PAAs are invited to participate in discussing proposed land use, shoreline management, and zoning changes for the annexation areas.

Consistency: *Residents of the Shoreline area were invited to a scoping meeting to discuss the topics analyzed in the SEIS and will have further opportunities to comment on the SEIS and on future development applications. The Proposed Action is consistent, to date, with LU56.*

Transportation Goals and Policies

Goal T X. Coordinate the implementation and development of Shoreline's transportation system with our neighbors and regional partners.

T25. Work with Sound Transit to study the development of a low impact commuter rail stop in the Richmond Beach/Point Wells area. The Richmond Beach residents shall be involved in the decision-making process as far as location, design, and access to the service.

T67. Develop interlocal agreements with neighboring jurisdictions for development impact mitigation, coordination of joint projects, and management of passthrough traffic. Consider annexing the sections of NE 145th and NE 205th Streets that are adjacent to the city. Work with adjacent jurisdictions and stakeholders to jointly study the 145th, 205th and Bothell Way NE corridors to develop level of service standards as part of a plan and funding strategy for future improvements.

T69. Pursue methods of reducing the impact on Richmond Beach Drive at the King/Snohomish County line (e.g., closing) if the Point Wells property is not annexed by Shoreline. Consider the extension of 205th only as potential mitigation for future development of Point Wells.

Consistency: *This Draft SEIS analyzes potential impacts on Shoreline roads and traffic that could result from the Proposed Action. Future development on the site would be required to provide detailed traffic studies to determine effects on roads and air quality as well as to coordinate with surrounding jurisdictions, including Sound Transit. Although the Proposed Action may be consistent with the policies from a programmatic standpoint, not enough information is available at this point to determine complete consistency.*

3.14.4. Mitigation Measures

For the Proposed Action to achieve consistency with the County's objectives and policies, the County could amend and/or clarify the following policy:

- Policy 5.B.12. To clarify the policy, the following amended language could be considered (new language underlined): "Within the Southwest UGA, parcels designated UI (on Point Wells) shall be considered for future redesignation from Urban Industrial to <u>Urban Center</u> designation upon <u>issuance of a programmatic, nonproject environmental impact statement addressing environmental impacts, infrastructure, and the provision of urban services.</u>"

For the Proposed Action to achieve consistency with Woodway's goals and policies, the following could occur:

- Coordinate between the County and Woodway regarding planning and regulations and an interlocal agreement would need to occur to be consistent with LUG-10, LUP-18 and LUP-19.
- Establish urban-level services to be consistent with LUG-4 and LUP-1.
- Woodway could amend LUP-20 and LUP-21 to designate the Paramount site as mixed use.

For the Proposed Action to achieve consistency with Shoreline's goals and policies, the following could occur:

- As the relevant transportation goals require coordination with Shoreline's neighboring jurisdictions to assess the impact of new development on the transportation system, including mitigation and funding, the affected jurisdictions could meet to determine transportation strategies.

3.14.5. Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts are expected.

Chapter 4. Distribution List

4.1. Federal Agencies

Federal Emergency Management Agency

National Marine Fisheries Service

U.S. Army Corps of Engineers

U.S. Department of Agriculture, Forest Service

U.S. Department of Housing and Urban Development

U.S. Environmental Protection Agency

U.S. Fish and Wildlife Service, Region 1

U.S. Natural Resources Conservation Service

4.2. State and Regional Agencies

Community Transit

County Road Administration Board

Department of Agriculture

Department of Community, Trade and Economic Development

Department of Corrections

Department of Ecology

Department of Fish and Wildlife

Office of Archaeology and Historical Preservation

Office of Community Development, Growth Management Program

Office of the Governor

Parks and Recreation Commission

Puget Sound Action Team

Puget Sound Air Pollution Control Agency

Puget Sound Regional Council

Department of General Administration

Department of Health

Department of Natural Resources

Department of Social and Health Services, Land and Building Division

Department of Transportation

Department of Transportation, Northwest Region

Everett Transit

King County Metro Transit

Puget Sound Water Quality Authority

Recreation and Conservation Office

Snohomish/King Environmental Alliance

Snohomish County Health District

Sound Transit

Utilities and Transportation Commission

State Energy Office

4.3. Cities

City of Arlington

City of Bothell

City of Brier

City of Edmonds

City of Everett

City of Gold Bar

City of Granite Falls

City of Lake Stevens

City of Lynnwood

City of Marysville

City of Mill Creek

City of Mukilteo

City of Mountlake Terrace

City of Monroe

City of Shoreline

City of Snohomish

City of Stanwood

City of Sultan

City of Woodinville

Town of Woodway

Town of Darrington

Town of Index

4.4. School Districts

Arlington School District

Darrington School District

Marysville School District

Monroe School District

Edmonds School District #15

Everett School District

Granite Falls School District

Index School District

Lake Stevens School District

Lakewood School District

Mukilteo School District

Northshore School District

Snohomish School District

Stanwood School District

Sultan School District

4.5. Diking Districts

Diking District 1

Diking District 2

Diking District 3

Diking District 4

Diking Improvement District #5

Stillaguamish Flood Control District

Drainage Improvement District #7

Lake Stevens Drainage Improvement District #8

Diking District #12

Drainage Improvement District #13

French Slough Flood Control District

Marshland Flood Control District

Biringer Dike

4.6. Fire Districts and Ports

Arlington Fire Department

Bothell Fire Department

Darrington Ambulance

Edmonds Fire Department

Everett Fire Department

Fire District 1 South County

Fire District 10 Bothell

Fire District 11 Silver Lakes

Fire District 12 Marysville

Fire District 26 Gold Bar

Fire District 27 Gedney/Hat Island

Fire District 28 Index

Fire District 3 Monroe

Fire District 4 Snohomish

Fire District 5 Sultan Fire

Fire District 7 Clearview

Fire District 8 Lake Stevens

Granite Falls Fire Department

Fire District 15 Tulalip

Fire District 16 Lake Roesigner

Fire District 17 Granite Falls

Fire District 19 Silvana

Fire District 21 Arlington Heights

Fire District 22 Getchell

Fire District 23 Robe Valley

Fire District 24 Darrington

Fire District 25 Oso

No. County Regional Fire Authority

Island County Fire District 1

Lynnwood Fire Department

Marysville Fire Department

Monroe Fire Department

Mountlake Terrace Fire Department

Mukilteo Fire Department

Paine Field Fire District

Port of Edmonds

Port of Everett

Snohomish Fire Department

Stanwood Fire Department

4.7. Neighboring Planning Departments

Chelan County Planning Department

Island County Planning Department

King County Department of Development and Environmental Services

Pierce County Planning and Land Services

Skagit County Planning Department

Thurston County Development Services

Whatcom County Planning and Development Services

4.8. Tribes

Muckleshoot Tribes

Sauk/Suiattle Tribe

Stillaguamish Tribe

Tulalip Tribes

4.9. Utilities

Alderwood Water and Wastewater District

Arlington Public Works

Cascade Natural Gas

Ronald Wastewater District

Puget Sound Energy

Roosevelt Water Association

Comcast Cablevision

Cross Valley Water District

Darrington Public Works

Everett Public Works

Granite Falls Public Works

Highland Water District.

King County Brightwater Project

Lake Stevens Sewer District

Marysville Public Works

METRO/Transit

Monroe Public Works

Mukilteo Water District

Olympic View Water and Sewer District

Olympus Terrace Sewer District

Schulter Water Association

Seven Lakes Water Association

Silver Lake Water District

Sky Meadow Water Assn., Inc.

Snohomish County PUD

Snohomish Public Works

Stanwood Public Works

Startup Water District

Sultan Public Works

Three Lakes Water Association

Tulalip Utilities Authority, Districts 1 and 2

Wilderness Ridge Community Club Water Supply

Wilkshire Lane Water District

4.10. News Media

Arlington Times

Bothell-Kenmore Reporter

Enterprise Newspaper

KRKO

KSER FM

Lake Stevens Journal

Marysville Globe

Mill Creek Enterprise

Monroe Monitor/Valley Times

Mukilteo Beacon

Seattle Post-Intelligencer

Seattle Times-North Bureau

Snohomish County Tribune

The Edmonds Paper

The Herald

Woodinville Weekly

KCPQ TV

KING TV

KIRO TV

KOMO TV

4.11. Libraries

Arlington Library

Bothell Library

Brier Public Library

Clinton Library

Coupeville Library

Darrington Library

Edmonds Public Library

Everett Public Library

Evergreen Branch, Snohomish County Prosecuting Attorney Everett Library System

Freeland Library

Granite Falls Library

Lake Stevens Library

King County Library System

Langley Library

Lynnwood Public Library

Marysville Public Library

Mill Creek Library

Monroe Library

Mountlake Terrace Library

Mukilteo Public Library

Oak Harbor Library

Shoreline Library

Snohomish Public Library

Sno-Isle Regional Library

Stanwood Library

Sultan Library

Woodinville Public Library

4.12. Snohomish County Departments

Paine Field Airport

Snohomish County Assessor

Snohomish County Auditor’s Office

Snohomish County Department of Emergency Management

Snohomish County Executive

Snohomish County Facilities Management

Snohomish County Finance Department

Snohomish County Fire Marshall

Snohomish County Medical Examiner

Snohomish County Parks and Recreation Department

Snohomish County Planning & Development Services

Snohomish County Prosecuting Attorney

Snohomish County Public Works

Snohomish County Sheriff

Snohomish County Treasurer’s Office

Snohomish Health District

Snohomish County Hearing Examiner

4.13. Snohomish County Community Groups

Action Council for Esperance

Agriculture for Tomorrow

Alderwood Community Council

Arlington Heights Comm

Canyon Firs Homeowners Assn

Community Transit

Crestline Estates Action

DARAC

Econ Dev Council of Snohomish Co

Edmonds Chamber of Commerce

Everett Area Chamber of Commerce

Everett Transit

Friends of Florence Acres

Futurewise

Housing Auth of Sno Co

Jordan Rd Citizens Group

Kayak Pt Citizens Group

Kennard Corner Homeowners

League of Women Voters

Little Bear Creek Protective Assn

Martha Lake Community Club

Martha Lake Homeowners

Master Builders of King &Sno Co

McKees Evergreen Beach

N. Creek Rural/1000 Friends of Sc

Newberg Organization

North Marysville Citizens

Pilchuck Audubon Society

Possession Bay Association

Professional Consultants Sno Co

Silver Lake Action Committee

Sno Co Camano Board of Realtors

Sno/Arl Trail Coalition

Snohomish Conservation District

So Co Preservation Assn

So County Chamber Of Commerce

Stillaguamish Citizens Alliance

Tulalip Natural Resources

Wandering Creek Homes

Other notification will be provided in accordance with Snohomish County Code (SCC) Chapter 23.28, Environmental Policy, Public Notice, and Commenting Procedures.

Chapter 5. References

5.1. Printed References

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Appendix A

Draft Docket XIII Scoping Summary

Scoping Summary and Comments

2008 Final Docket XIII ■ Snohomish County ■ January 2008

Scoping Summary and Comments

Prepared for:

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January 2008

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Appendix

Chapter 1. Introduction

State law requires that each county and city planning under the Growth Management Act has a procedure for interested persons to suggest amendments to its comprehensive plan or development regulations. Snohomish County created a process to accept and evaluate proposed amendments. This process has been codified in Title 32.74, Snohomish County Code, and is known as the "Docketing" process. Through the Docketing Process, the county accepts and evaluates applications for amendments once a year. The annual deadline for application submittal and the review process is October 31.

Potential Comprehensive Plan Future Land Use Map (FLUM) amendments relating to four area-specific Future Land Use Map amendment requests will be addressed in a Supplemental Environmental Impact Statement (SEIS). The Supplemental EIS will address potential impacts of the proposed policies and site-specific requests at a non-project, programmatic level of analysis.

On November 14, 2007, Snohomish County invited agencies, affected tribes, and members of the public to comment on the scope of the SEIS, including alternatives, mitigation measures, probable significant adverse impacts, and licenses or other approvals that may be required. In addition to providing written comments, agencies, tribes and members of the public were invited to attend three scoping meetings. By the scoping deadline of December 5, 2007, written comments were received from 34 agencies, citizen groups, or individuals.

The State Environmental Policy Act (SEPA) does not require responses to scoping comments; however, the comments should be considered during the preparation of the Supplemental EIS. The purpose of this document is to summarize the comments received during the scoping period and to identify how the comments can be addressed in the Supplemental EIS.

Chapter 2. Comment Summary

This section provides a table that briefly describes the comments from all of the scoping meetings and other correspondence. Full copies of the comments regarding the Paramount of Washington LLC proposal are provided in Appendix C.

The comments related to the original four proposed docket sites and potential policy issues such as land use densities, transportation, public services, and possible annexation by local cities.

The discussion section notes how the comments can be addressed in the EIS as appropriate.

Table 2-1. Comment Summary

City of Lake Stevens (LS-1), SR9/US2 LLC (SNO-1)

Name/Agency	Comment Summary	Discussion
	Agency & Interest Group Written Comments	
City of Snohomish	**SNO-1** ▪ Need to evaluate impact on City of Snohomish's public services, facilities, and utilities that would result from not expanding the City's UGA to secure an adequate supply of commercial lands. Clear need for expansion of the UGA to allow the City to prepare for future needs. ▪ Urban development within the City's expanded UGA will require adoption of a long-range plan for the area and annexation of the area to the City. **LS-1** ▪ The City of Lake Stevens' proposed amendment application is substantively different than the proposal which was placed on the final docket and made available for public hearings. County staff has agreed to accept more new information from the City up to 16 days after the close of the SEIS scoping period. ▪ This different application precludes meaningful public participation as required by GMA. ▪ SEIS should only evaluate information submitted to the County prior to the docket public hearings. ▪ LS-1 does not identify whether the proposed land use action would be implemented by the County or only after annexation into the City of Lake Stevens. The EIS must include detailed financial impact analysis of LS-1 upon the County until annexation is completed. ▪ The City of Lake Stevens' proposal represents an unnecessary and unjustified expansion of the County's UGA. The County should only evaluate the application materials originally submitted by the City or move LS-1 to the Docket XIV schedule to allow proper evaluation of the new information.	The purpose of the SEIS is as an informational document about potential environmental impacts. SEPA does not require an economic or fiscal analysis or a cost benefit analysis in an EIS (WAC 197-11-448 and 450). The Docket XIII SEIS will focus on environmental impacts consistent with the purpose of SEPA.Through the planning process, the County may consider whether economic/fiscal information would be useful, and the appropriate timing of such an analysis.The County may choose to conduct an economic or fiscal analysis apart from the SEIS if the County finds it would be useful information in its decision-making process in addition to the environmental information. The City of Lake Stevens docket application, as with all docket applications under study, requires that assumptions be made regarding the likely land use pattern if included in the Urban Growth Boundary. A common methodology of considering a reasonable worst case approach to the SEIS analysis allows for an "apples to apples" comparison. The County has allowed docket applicants to clarify their applications or provide additional information. In addition to the clarifications of the Lake Stevens proposal, the SR 9 US 2 LLC proposal was amended to add the City of Snohomish as a co-applicant. All applicants were allowed to provide additional environmental information after the docket deadline and this information will be peer reviewed and included in the SEIS where appropriate by the County and its SEPA consultants. The SEPA process and the County's docket process include comment periods and hearings as appropriate to ensure that public input is considered.
SR9/US2 LLC	**SNO-1** ▪ No changes to the proposal have been submitted that substantively alter the proposed land uses. The proposal requires – as a voluntary condition – the annexation into the City of Snohomish prior to development of the requested urban plan designation.	The voluntary condition can be noted in the SEIS land use section as a phasing mechanism.
Futurewise	**Growth Management** ▪ The County's 2007 Buildable Lands Report shows that there is no justification for expansion of either the Lake Stevens or Snohomish UGA to meet the adopted population targets through 2025.	The SEIS will address growth targets in plans and policies and population/employment/housing sections.

City of Lake Stevens (LS-1), SR9/US2 LLC (SNO-1)

Name/Agency	Comment Summary	Discussion
	▪ The EIS should document the impacts of any proposed land use and zoning changes on water quality/quantity, critical areas, transportation, wildlife, noise, police and fire services, schools, parks, stormwater runoff, utilities, and annexation timelines. **Public Involvement** ▪ The City has done a poor job of public notification and involvement. Residents of the proposed UGA areas have not been adequately heard by the cities.	Environmental topics listed are part of the SEIS scope. Annexation timelines would be addressed in terms of growth phasing. The SEPA process and the County's docket process include comment periods and hearings as appropriate to ensure that public input is considered.
Citizen Correspondence		
Multiple Citizens: Ted & Joy Beckmeyer Patricia A. Bongard Len & Susan Bone Coby Dilling George Ensz Edna and RW Hannaford Gina Hanzsek Herb & Lilly Ann Haugo Anthony A. & Terry Jongejan Margaret & David Shaeffer J.G. Simicich James R. & Ethelind L. Stevens	**Potential Annexation** ▪ Several letters voiced opposition to being annexed by either the City of Snohomish or the City of Lake Stevens. Several letters stated a preference for being associated with the City of Snohomish, rather than the City of Lake Stevens. Reasons include schools, shopping, community character, etc.	The SEIS will address natural and built environment impacts including activity patterns. The governance issue will be addressed through docket hearings and the legislative process.

Paramount of Washington, LLC (SW-41)

Name/Agency	Comment Summary	Discussion
Agency & Interest Group Written Comments		
City of Shoreline	**SEIS Scope** ▪ Scope topics address key issues **Public Services** ▪ How will public services be provided to the geographically isolated site?	The SEIS will address a range of public services including the cities' adopted levels of service and potential service demands.

City of Lake Stevens (LS-1), SR9/US2 LLC (SNO-1)

Name/Agency	Comment Summary	Discussion
	▪ What types of interlocal agreements will be needed? ▪ What state and local standards must be met to issue the future building permits? ▪ How will the County's building permit standards be coordinated with standards of other local public services (e.g. local fire department)?	
Richmond Beach Community Association	**Public Involvement** ▪ Learned of public meetings after the meetings. Would like to be informed of the process and any future public involvement opportunities. **Transportation** ▪ Richmond Beach Drive NW is the only road to the property. Adding residential uses to the area would significantly increase traffic. A transportation plan is needed to accommodate the additional traffic. ▪ Vehicle access should be provided through Snohomish County. **Emergency Services** ▪ All emergency services should be provided by Snohomish County.	SEPA does not require scoping for a *supplemental* EIS. As a courtesy and to further the public input process the County published a scoping notice advertising a written comment period and three optional public open houses.The notice was published in local newspapers and on the County's web page. It was also sent to agencies and lists of interested parties compiled from 2007 docket threshold hearings. Citizens commenting through the scoping process have been added to the County's list of interested parties. All comments received including those of the Association have been considered. Current and future transportation and emergency services will be addressed in the SEIS.
Port of Edmonds	**Potential Marina** ▪ Point Wells property is located within the Edmonds Port District. The Port of Edmonds Master Plan includes the concept of a marina as one potential use at the Point Wells location. ▪ Marinas are not listed as a permitted use in the Snohomish County Code, but are not necessarily prohibited. ▪ It is important that the County recognize the economic, recreational, and environmental benefits of development and operation of marinas.	The allowable uses under present and future land use designations and zoning will be addressed in the SEIS. However, particular uses would require site specific SEPA review at a future date, such as a marina.
Town of Woodway	**Woodway Comprehensive Plan** ▪ Point Wells is located within the Woodway Municipal Urban Growth Area. The Town's comprehensive plan includes policies directly related to the planning and development of future land uses at Point Wells. The Town Council requests that the Paramount proposal be evaluated for consistency with these policies.	Compatibility with plans and policies will be addressed in the SEIS, including Woodway policies.

City of Lake Stevens (LS-1), SR9/US2 LLC (SNO-1)

<table>
<tr><th>Name/Agency</th><th>Comment Summary</th><th>Discussion</th></tr>
<tr><td colspan="3">Citizen Correspondence</td></tr>
<tr><td>Michael Jackson</td><td>Transportation
▪ The project will significantly increase traffic on 185th, and the intersections of Aurora Ave., 185th St. and 175th St. will become inadequate. All the existing traffic feeding into the area will be impacted. Increased traffic will result in drivers using residential streets, affecting the quality of life in nearby neighborhoods.
Schools
▪ If significant access is not provided to the north, will additional school capacity in Shoreline be necessary to accommodate the increased population?
Public Services
▪ If significant access is not provided to the north, how will the Snohomish Fire and Police Departments respond to emergencies?
▪ If a marina is added, which public safety department will be responsible for responding to emergencies?
▪ Who will provide the infrastructure for utilities? Will water and sewer lines be routed through King or Snohomish County? Who will pay to maintain this infrastructure?
Environmental Cleanup
▪ Who will be responsible if the initial soil cleanup at Point Wells is not adequate?</td><td>Transportation, schools, public safety, water, sewer, earth, and groundwater including contamination are part of the SEIS scope.</td></tr>
<tr><td>Beth O'Neill</td><td>Transportation/Access
▪ Access routes to and from the Point Wells site are problematic. If no other routes are provided, the residents of Richmond Beach would experience dramatically increased traffic and population. If an access route were built through Woodway, the residents of that town would experience similar impacts.</td><td>Transportation including access considerations is part of the SEIS scope.</td></tr>
<tr><td>Sandra Greene</td><td>Miscellaneous Scope Elements
▪ Will the proposal be on the ballot for a vote?
▪ Who is paying for the environmental analysis?
▪ Who will provide infrastructure, and who will pay for it?
▪ New bridge over train tracks should consider safety issues.
▪ Local traffic has increased. How will new roads be funded?
▪ How would emergency providers access the area in a timely fashion?
▪ Will new schools and/or busing be required?
▪ New residences, people, cars, and noise would create significant impacts on quality of life.</td><td>The docket items are legislative and are to be considered by the Snohomish County Council.
The Snohomish County Department of Planning and Development Services is managing the preparation of the SEIS. Consistent with SEPA and County code, the County is allowed to require payment by docket applicants for the SEIS.
Transportation, noise, schools, and public safety are SEIS topics.</td></tr>
</table>

City of Lake Stevens (LS-1), SR9/US2 LLC (SNO-1)

Name/Agency	Comment Summary	Discussion
Carla Nichols	**Public Involvement** ▪ Please provide notification of all public meetings and opportunities for public input.	Citizens commenting through the scoping process have been added to the County's list of interested parties.
Corbitt Loch	**Land Use Density** ▪ Urban Center is the most intensive land use designation in the Snohomish County Comprehensive Plan. The SEIS should evaluate other, less-intensive land use designations. ▪ There is a wide range of ways that the property could be developed under the Urban Center designation. The project may not be able to be evaluated at the non-project level. **Transportation** ▪ There are no existing roads or streets capable of accommodating the volume of traffic that would be generated by development as an Urban Center. ▪ Be creative with transportation options such as a sky tram or a tunnel under Woodway to Edmonds. **Potential Annexation** ▪ SEIS should evaluate the impacts associated with development as part of the Town of Woodway compared to the impacts resulting from development after annexation to Shoreline.	The Draft SEIS will address the No Action and Proposed Action alternatives in the SEIS and would bookend a range of possible activities. As a result of the SEIS analysis, mitigation measures, and citizen input, the Final SEIS may address other alternatives. All docket applications under study require that assumptions be made regarding the likely land use pattern based on the proposed land use designation/zoning. A common methodology of considering a reasonable worst case approach to the SEIS analysis allows for an "apples to apples" comparison. Transportation is a SEIS topic. The SEIS will address a range of public services including the cities' adopted levels of service and potential service demands.
Lisa Sezate	**Public Involvement** ▪ Please provide notification of all public meetings and opportunities for public input. **Transportation** ▪ Transportation concerns are of great import to us. Please consider less intensive development.	Citizens commenting through the scoping process have been added to the County's list of interested parties.

City of Lake Stevens (LS-1), SR9/US2 LLC (SNO-1)

Name/Agency	Comment Summary	Discussion
Robert E. Schillberg	**SEIS Scope** ▪ The broader and more comprehensive SEPA study now will be helpful in reviewing future development. **Aesthetics** ▪ A big issue is the light and glare created by the development. **Transportation** ▪ Check previous SEPA studies regarding a possible Sounder station on the property.	The impact on aesthetics will be analyzed in the SEIS. Previous relevant studies will be reviewed.

Cathcart (GPP-2)

Name/Agency	Comment Summary	Discussion
	Citizen Correspondence	
Multiple Citizens: Neil & Madonna Horn David L. Kersten Stanley T. & Jeanine McGuire Anne Bueler Wilson Don & Judi Wilson	**Land Use** ▪ Several citizens commented on the desire to re-zone their properties in the vicinity of the county site (presently zoned as R-5).	The SEIS addresses the docket items approved for study by the Snohomish County Council in 2007. Citizens may request a docket item in the future.
Norma Scott	**Stormwater Runoff** ▪ Need to address stormwater runoff from the Cathcart landfill on downhill properties and provide vegetative buffers between development and neighboring properties.	Surface water is a topic for the SEIS.

Appendix

Scoping Comments

Skorney, Steve

From: Greene, Sandra [sgreene@Dendreon.com]
Sent: Wednesday, December 05, 2007 4:30 PM
To: Skorney, Steve
Subject: FW: Scanned from E-600 12/05/2007 16:20

DOC120507.pdf
(42 KB)

Dear Mr. Skorney:

Please incorporate my comments on the attached letter for the Scope of SEIS for Docket XIII - SW 41 Paramount NW LLC.

Thank you.

Yours sincerely, Sandra Greene

Work Phone Number: 206-829-1532

-----Original Message-----
From: Dendreon 1st Floor Scanner [mailto:tromine@dendreon.com]
Sent: Wednesday, December 05, 2007 4:20 PM
To: Greene, Sandra
Subject: Scanned from E-600 12/05/2007 16:20

Scanned from E-600.
Date: 12/05/2007 16:20
Pages:1
Resolution:200x200 DPI

Sandra Greene
19501 26th Avenue NW
Shoreline, WA 98177
(206) 546-7792

December 5, 2007

Snohomish County Planning & Development Services
Steve Skorney, Senior Planner
3000 Rockefeller Ave. M/S 604
Everett, WA 98201-4046

RE: SCOPE OF SEIS FOR DOCKET XIII – SW 41 Paramount NW LLC

Dear Mr. Skorney:

Please incorporate my comments as part of the scope of environmental analysis for SW 41.

- When will this be put on the ballot for a vote? If not – why not?
- What consideration has been given to the cost to the taxpayer of the proposed project?
- Will the initial analysis be financed by King County, Snohomish County, or the developer?
- Who will provide the infrastructure for roads, water and sewers and how will this be financed?
- Who will maintain and pay for the infrastructure?
- This project will require a bridge over the train track – how will safety on the tracks be managed with such a large influx of families?
- Road access is not in existence and how will this be funded? The local traffic at the present time has become very heavy, without additional residences in the area.
- How could Medical and Fire emergencies make timely responses?
- This project is not only a matter of dollars and cents but will become an impact on our way of life.
- Will a new school(s) be required or major bussing for the children in such a project?
- This is not just about providing a new tax basis for the area but a major change from the impact of so many new residences, people, cars and noise.
- It appears to me that the over-riding factor of this project is (once more) how government can, and big time land owners, line their own pockets at the expense of the local residents.

Thank you in advance for taking the time to review all aspects of the impact of this project. I look forward to receiving updates on the review.

Yours sincerely, Sandra Greene

Sandra R. Greene

RICHMOND BEACH
COMMUNITY ASSOCIATION

P.O. Box 60186 – Richmond Beach, WA 98160-0186

December 5, 2007

Mr. Steve Skorney, Senior Planner
Snohomish County PDS
3000 Rockefeller Ave., M/S 604
Everett, WA 98201-4046

Re: Potential Rezone of Pt. Wells property

Dear Mr. Skorney:

The Richmond Beach Community Association has recently learned of the application made by Paramount of Washington, LLC to rezone 65 acres on the waterfront of the Pt. Wells property and re-designate it as *Urban Center*. We appreciate the opportunity to comment, however, we are disappointed that we did not receive any public notice of these events and therefore only learned of the public meetings on this proposal after the fact. In the future, we would like to attend public meetings on this issue.

We are requesting to be informed of the process and additional meetings and opportunities to study the EIS and comment on the findings.

As you know, there is only one road that provides access to the former Chevron property. That road is Richmond Beach Drive NW, which runs through the neighborhood of Richmond Beach in the city of Shoreline (King County). We believe it would be premature to allow a rezone of the property without first having a transportation plan that would accommodate the additional traffic. Richmond Beach Drive is a two-lane road, whose lanes are as narrow as 10' in many spots. In addition, many property owners were allowed to build up to the street on both sides of Richmond Beach Drive and therefore, widening the road would significantly impact many residents.

The RBCA Board has heard from several residents who are concerned by Paramount's mixed use proposal. Residents are most disconcerted by the fact that adding residential use to the Pt. Wells area would significantly increase traffic and further overburden this community and these under-sized roads. Traffic would be especially problematic if there is no Snohomish County access.

The Richmond Beach community feels that any potential projects that are necessitating this rezone need to guarantee that all vehicle access would be through Snohomish County and that all emergency services would be provided by Snohomish County. We ask that a project built in Snohomish County not be a burden to its Richmond Beach neighbors to the south.

Please consider our comments while studying the requested zoning changes. We look forward to receiving more information about this process. Thank you for your assistance in this regard.

Sincerely,

Sean Quigley,
President

c: Bob Olander, City Manager, Shoreline
Shoreline City Council

Skorney, Steve

From: Steve Cohn [scohn@ci.shoreline.wa.us]
Sent: Wednesday, December 05, 2007 11:51 AM
To: Skorney, Steve
Subject: City of Shoreline SEIS comment letter

<<SEIS Point Wells Comment Letter.pdf>> <<PointWells.pdf>>

Steve,

Attached are the City's comment letter (dated Dec. 4) on the SEIS scope for the Paramount/Point Wells CPA and attachment to the letter, dated May 7.

We are sending this my US mail as well.

Thanks for the opportunity to comment. We look forward to working with you on this project.

Steve Cohn

Senior Planner

206-546-1418

CITY OF SHORELINE

RECEIVED
DEC 06 2007
PLANNING & DEVELOPMENT SERVICES

City of Shoreline
17544 Midvale Avenue North
Shoreline, WA 98133-4921
(206) 546-1700 ♦ Fax (206) 546-2200

December 4, 2007

Snohomish County Planning and Development Services
Steve Skorney, Senior Planner
3000Rockefeller Ave. M/S 604
Everett, WA 98201-4046

Dear Mr. Skorney,

The City of Shoreline appreciates the opportunity to comment on the scope of the Supplemental Environmental Impact Statement (SEIS) for Snohomish County's GMA Comprehensive Plan Amendments: Docket XIII.

Our comments are directed towards the EIS scope for the Paramount (Point Wells) Amendment.

We believe that your preliminary scoping has identified the major issues to be analyzed in the SEIS:

- Surface Water/Water Quality
- Groundwater
- Plants and Animals: Fisheries
- Plants and Animals: Vegetation, Wetlands, and Wildlife
- Land Use
- Population, Employment, Housing
- Aesthetics
- Cultural Resources
- Transportation
- Noise
- Public Services

Shoreline's letter to the Snohomish County Council dated May 7, 2007 (attached) identified most of the concerns noted above. Since you have already identified them as items to be covered in the SEIS, we will not reiterate them.

In addition to the items mentioned in our letter, we want to especially emphasize the need to discuss the provision of Public Services to the site. Specifically, it will be helpful for the decision makers to understand the complicated structure of service provision to a redeveloped area that is geographically isolated from much of Snohomish County. This section would address questions such as:

- What agencies will be responsible for providing the services needed for an urban center?
- What types of interlocal agreements will be needed? What process will be engaged to identify and secure the necessary agreements?
- What state and local government development and building standards must be met in determining whether or not to issue the permit (e.g., if Snohomish County is responsible for issuing the building permit and the Shoreline Fire Department is responsible for serving the area, how will the Shoreline Fire Department's standards, criteria and procedures be involved in the site and building permit review process)?

We look forward to working with you and your consultant on the SEIS. If you have questions, please contact Steven Cohn, Senior Planner, 206-546-1418

Sincerely,

Joseph W. Tovar, FAICP
Director, Planning and Development Services

<u>Attachment</u>

City of Shoreline letter of May 7, 2007

CITY OF
SHORELINE

Planning and Development Services
17544 Midvale Avenue North
Shoreline, WA 98133-4921
(206) 546-1811 ♦ Fax (206) 546-8761

May 7, 2007

Snohomish County Council
M/S #609
3000 Rockefeller Ave.
Everett WA 98201-4046

Re : Docket XII, SW 41, Paramount of Washington

Dear Councilmembers,

The City of Shoreline appreciates the opportunity to comment on the docketing proposal from Paramount of Washington's comprehensive plan amendment.

County staff's initial review of the docketing proposal acknowledged that neither the Draft Environmental Impact Statement (DEIS) nor the Final EIS for the Ten Year Update to the GMA Comprehensive Plan analyzed this site as a potential urban center. We believe that a number of significant issues will need to be addressed in the environmental document as well as in the County's staff report addressing the initial rezone review criteria. We strongly disagree with the County staff's assessment that the only likely impact would be "possible soil contamination." Among the other likely impacts will be significant transportation impacts as well as the demand for police, fire, emergency medical, water, sewer, recreation and other urban level municipal service not readily available by or through Woodway or Snohomish County.

Due to the unique topography and resulting access constraints at Point Wells, the City of Shoreline will be directly affected by the impacts of the development of an urban center on this site, perhaps even more so than Woodway or any other part of Snohomish County. Shoreline currently provides the only vehicular access to Point Wells, and so far as we are aware, the only route for utility services as well. As a result, Point Wells is within the Potential Annexation Area for Shoreline. Additionally, we are concerned about the compatibility, or lack thereof, between the Shoreline Comprehensive Plan, zoning, development regulations, and shoreline master program designations and what is proposed by Snohomish County. We foresee that these issues will need to be addressed in either an EIS or a Supplemental EIS. Among the issues to be addressed are:

- Additional traffic analysis is likely. The trip generation estimate by the traffic consultants is probably low, given that this development is at a "dead-end street". The estimates to the inbound traffic for the condominiums seem to be particularly low (an estimate of 440 inbound PM peak trips generated by inhabitants of 2,030 units);
- Appropriate transportation mitigations and their funding will need to be identified;
- Amount of and impacts of construction traffic and mitigations need to be identified;
- Sewer and water infrastructure needs to be identified as well as questions of using the public right of way;
- Impacts on the school district should be quantified;
- Demands for emergency response, including both police and fire, and
- Since the Point Wells area was not designated as a potential urban center, it is probable that coordination will have to occur with the service providers to ensure that service can be provided by the time that the development comes on line.

Given the complexity of these questions, the potential magnitude of the impacts, and the number of jurisdictions needed to address them, we believe that an EIS or SEIS will be necessary. It is not clear to us that the County staff will have enough time to analyze the probable adverse impacts within the timeframe for the annual docketing process, particularly in view of the magnitude of the number of other docketing requests. Similar questions arise for Rezone Criteria 2: whether the public facilities are available or in the comprehensive plans of the applicable service providers.

We appreciate the efforts of County staff to keep us informed about the potential for a Comprehensive Plan change of this magnitude. Our staff will be available to discuss these issues in further detail if the proposed amendment is added to this year's docket.

Sincerely,

Joseph W. Tovar, FAICP
Director, City of Shoreline Planning and Development Services

cc Robert L. Ransom, Mayor of Shoreline
Shoreline Councilmembers
Robert Olander, Shoreline City Manager
Craig Ladiser, Director, Snohomish County Planning and Development Services

Skorney, Steve

From: Michael Jackson [michael.jackson@nmwco.com]
Sent: Wednesday, December 05, 2007 11:13 AM
To: Skorney, Steve
Cc: dorismccon@comcast.net; Beth O'Neill; Therese Byrne
Subject: RE: Snohomish County PDS Determination of Significance andScopingNotice - Docket XIII SEIS

Mr. Skorney,

I writing in regard to the Determination of Significance and Scope of the proposed Point Wells development. Being a resident of Richmond Beach, Shoreline and King County, I foresee an impact effecting me, and other residents of these communities.

Of course traffic is always pointed out, but I also see other issues that don't seem to be getting the appropriate attention.

1) If access is provided south via Richmond Beach Rd/185th St, then this will become the natural route for those headed to Seattle, Bellevue and all population centers to the south. Predominately headed to I-5 via 175th St.

a) This will significantly increase traffic on 185th St to Meridian, the cross traffic from 185th St to 175th St.. on Meridian, Freemont and Aurora and the 175th St traffic from Freemont Ave. to I-5.

b) The intersections of Aurora Ave. and both 185th St and 175th St will become inadequate. This will result in longer delays for the Aurora traffic, which is a significant north-south corridor for the greater North Seattle area. Edmonds has already addressed this issue by making Edmonds Way an underpass at Aurora.

c) Not only will this direct route's traffic be increased, but all the existing traffic feeding into this route will be impacted. For example traffic from East of I-5, headed for the Interstate will then find longer merge lines at the entrance ramps.

d) These increased bottle necks will result in drivers using neighbor residential streets as through streets. The increased speeding and noise will change the quite, peaceful nature desired by citizens in their neighborhoods.

2) If significant access is not provided north, where will the children is this development obtain their schooling? Is Shoreline, in King County, to provide the additional buildings, teachers, supplies, bussing for these citizens of Snohomish county?

3) If significant access is not provided north, how will the Snohomish Fire and Police Departments respond to emergencies in a timely manner? Will life and death situations be delayed as vehicles negotiate the narrow, winding routes from Snohomish County to Richmond Beach Road?

4) With the addition of a marina, which public safety department will have the burden for the increased needs, boats, divers, etc.?

5) Will King County have to provide the infrastructure for utilities? Will water and sewer lines be routed through Snohomish or King Counties? Who will pay to maintain this infrastructure?

6) Who will bear the burden when the initial soil cleanup at Point Wells ends up not being adequate? Using the repeated cleanups at Seattle's Gas Works Park as an example, I for one have very little confidence that anyone knows how to really clean it up; much less do it correctly the first time. How large of a bond will the developers have to put up to insure future needs in this area and how long will they have to be maintained? This alone, should scare King County and Shoreline from ever wanting to annex Point Wells.

Please include these issues with the others that you already have while addressing the scope and significance. Thank you for listening.

Michael S. Jackson
2211 NW 199th St.
Shoreline, WA 98177
michael.jackson@nmwco.com
(206) 691-5610

PORT OF EDMONDS

336 Admiral Way · Edmonds, WA 98020-7214 · (425) 774-0549 · (425) 774-7837 FAX

November 28, 2007

Craig Ladiser, Director
Planning and Development Services
Snohomish County
3000 Rockefeller Avenue – Mailstop 604
Everett, WA 98201-4046

RE: Request for Comments on Scope of SEIS
GMA Comprehensive Plan Amendments: Docket XIII

Dear Mr. Ladiser:

The Port of Edmonds recently became aware that Snohomish County is proposing amendments to its adopted Comprehensive Plan. We are specifically interested in the Paramount of Washington, LLC Proposal to rezone 65.9 acres, including tidelands, from the current zoning of Urban Industrial to the Urban Center designation. The subject property is located within the Edmonds Port District and in the Town of Woodway's Urban Growth Area.

Washington State Law established port districts for the purpose of economic development. Marinas are significant aesthetic and recreational amenities and are also important economic development drivers. Both the Port of Edmonds Master Plan and the Woodway Comprehensive Plan include language that addresses the concept of a marina as one of the potential uses at the Point Wells location. This critical waterfront site must be developed with great care and sensitivity. To do anything less is to squander a precious resource.

The Port of Edmonds Master Plan, adopted on June 27, 2005, states that, *"the Master Plan vision, when fully implemented, will realize the following: The Port's in-water marina is currently filled to capacity. There could be opportunities for marina expansion in concert with the Edmonds Crossing Project or through partnerships with the Town of Woodway and the owner of the Point Wells property."*

The Town of Woodway's Comprehensive Plan includes the concept of a marina in at least two sections of the document. In the Point Wells Subarea Plan policies, LUP-21 states that, *"The industrial designation for the waterfront area is projected to be the most appropriate land use for the near-term..."* It goes on to say that, *"The Town may consider amending the industrial designation at such time that environmental, capital* *facilities and geo-political conditions warrant a more intensive use of the waterfront area which may include a potential marina."* Appendices to Woodway's plan include *Future elements of Point Wells that should contribute to a "sense of place". These elements were developed through a community survey.* Among the elements is an "*Appropriately scaled marina with sailboats and power boats."*

It has come to our attention that marinas are not listed as a permitted use in the Snohomish County Code. However, we are also aware that just because a use is not specifically listed, it is not necessarily prohibited. In the case of a marina, we understand that it may be considered under the category of "recreational uses not otherwise noted."

If the Port of Edmonds can be assured that this category of use would be permitted within an Urban Center and that the County is not taking any action that would preclude the inclusion of a marina at this site, our concerns would be diminished. It is important that the County recognize the economic, recreational and even environmental benefits that come from the development and ongoing operation of marinas.

Thank you for the opportunity to express our concerns. As you know, land use regulations that are adopted for future development have a profound and lasting impact on what actual development is undertaken. We believe that the waterfront portion of the property which is the subject of the Paramount of Washington evaluation is a unique resource that merits very careful review. We appreciate your attention to this issue as you proceed with review and revisions to the Snohomish County Comprehensive Plan. Please feel free to contact me or Chris Keuss if you have any questions.

Sincerely,

Marianne Burkhart

Marianne Burkhart, President
Edmonds Port Commission

cc: Steve Skorney, Senior Planner, Snohomish County PDS
Carla Nichols, Mayor, Town of Woodway
Steven Farkas, VP and General Counsel, Paramount Petroleum
Steven Ohlenkamp
Brad Cattle, Port Attorney
Chris Keuss, Executive Director, Port of Edmonds

Town of Woodway

Mr. Craig Ladiser, Director
Snohomish County Planning and Development Services
3000 Rockefeller Ave. M/S 604
Everett, Washington 98201-4046

RE: Supplemental Environmental Impact Statement related to the GMA Comprehensive Plan Amendments: Docket 13 – Paramount Proposal

Dr Mr. Ladiser,

The Woodway Town Council has reviewed the Scoping Notice for the GMA Comprehensive Plan Amendments for Docket 13 and submits the following comments related to the Paramount proposal for your consideration. The comments listed below are preliminary in nature and may be supplemented with additional comments prior to the close of the comment period on December 5, 2007.

Background
The Town Council adopted the Woodway Comprehensive Plan in April 2005. As you are aware, Point Wells is located within the Woodway Municipal Urban Growth Boundary (MUGA) and as such, the Town's comprehensive plan includes policies directly related to the planning and development of future land uses at Point Wells, including the waterfront area. As your consulting team embarks on the SEIS for the Paramount proposal, we respectfully request that the Woodway Comprehensive Plan be carefully reviewed and addressed for consistency with the proposal.

Our comprehensive plan divides the Point Wells sub area into three geographic areas for planning purposes: the upper bluff, the mid bluff and the waterfront area. The plan includes a set of Land Use Objectives and Guiding Principles intended to be used when considering future land use designations at Point Wells. The objectives and guiding principles applicable to the waterfront and mid-bluff areas are included below since the Paramount proposal specifically affects only these two geographic areas Point Wells.

Waterfront Area – West of contour 60' and BNSF Railroad Tracks to water

1. *Appropriately scaled marine dependant or related uses of the waterfront are desirable as long as environmental impacts to the shoreline bluff areas and surrounding properties are minimized and mitigated.*
2. *An appropriate range of urban services should be provided to an economically viable land use mix.*
3. *Future uses should be economically viable over the long term development of the subarea.*
4. *Public and private waterfront uses and facilities should be pedestrian oriented and provide connections to adjacent appropriate uses.*
5. *Development shall only occur following all necessary site clean-up consistent with the Dept. of Ecology standards.*

6. *Natural vegetative enhancement of the shoreline with public beach access is appropriate.*

7. *Natural vegetation indigenous to the upper bluff and shoreline should be enhanced with the development of new land use proposals.*

8. *Vehicular and pedestrian access should be provided in a safe, efficient and aesthetically pleasing manner to the subarea.*

Mid Bluff Area – East of contour 60' and BNSF Railroad Tracks to approximate contour 140'

9. *Bluff Area vegetation should be maintained and enhanced to provide slope stability and protect wildlife habitats while providing selected view corridors for upland areas.*

10. *Future uses should be limited to open space and protection of designated environmentally sensitive areas.*

The Town Council requests that the Paramount proposal for future residential, village center and open space uses be evaluated for consistency with the above objectives and principles.

Point Wells Policies

In addition to the objectives and guiding principles, the Point Wells plan also includes a set of development policies.

One significant policy is LUP-21. This policy acknowledges that the current Industrial Land Use designation on the waterfront portion of Point Wells is adequate for the near-term, however a more intensive land use designation may be appropriate for the long term. Toward this end, the Woodway Plan considered several alternative mixed-use plans for the waterfront area. Future land use mix could include high density residential, a retail/office commercial component, public open space and a potential marina. These alternatives are listed in the appendices and the Paramount proposal will need to be evaluated for consistency with these generalized alternative land use scenarios.

Other policies address the potential of development of future land uses in unincorporated Snohomish County and how the Town's land use plan for Point Wells should be implemented. In the event of unincorporated development at Point Wells, the policies provide for an interlocal agreement among the affected parties to address various development issues and impacts. Of particular importance is the preparation of effective implementation tools to appropriately implement the future land use plan.

Additional policies address the provision of safe and efficient vehicular and pedestrian access to Point Wells and the need to ensure that baseline studies be prepared to address site sensitivities. Baseline studies should include at a minimum, geo-technical surveys, low impact site development techniques, view preservation and design guidelines. These studies are appropriate whether development is proposed in Woodway through annexation or in unincorporated Snohomish County.

The SEIS should carefully examine the consistency of the County's Urban Center designation policies with Woodway's comprehensive plan policies for Point Wells. The evaluation is important to ensure comprehensive plan consistency as is set forth in the Washington State Growth Management Act.

Thank you for the opportunity to submit these preliminary comments and we trust that the SEIS will effectively address the above comments together with the probable impacts and attendant mitigation measures for the environmental measures listed in the scoping notice.

Respectfully submitted,

Carla Nichols, Mayor
Town of Woodway

CC:
Steven D. Farkas, VP, Paramount 14700 Downey Ave, Paramount, CA 98073
Steve Ohlenkamp
Chris Kuess, Port of Edmonds
Steve Skorney, Senior Planner
Woodway Town Council
Woodway Planning Commission

Skorney, Steve

From: Beth O'Neill [raggdyantq@comcast.net]

Sent: Wednesday, December 05, 2007 4:58 PM

To: Skorney, Steve

Subject: Snohomish County PDS Determination of Significance andScopingNotice - Docket XIII SEIS

Dear Mr. Skorney,

I am writing with regards to the above-referenced matter. In making your determination about whether or not to rezone the Point Wells property, the greater good must be taken into account. Simply because a developer desires to do something - in this case being granted a rezone to Urban Center status - does not mean that a city or county agency is required to grant that request.

Point Wells is situated in such a way that egress routes are problematic. If the rezone were to be granted and no other egress routes were provided other than what currently exists through Richmond Beach, the neighbors of that community would suffer greatly from dramatically increased traffic and population. If egress routes were also built though Woodway, that quiet community would likewise suffer from the increased density.

The spillover from this greatly increased population would then tax egress routes clear up to Highway 99 and the Freeway, routes that are already feeling the burden of increased development on a far more limited scale than what is being proposed for Point Wells.

It often seem all too easy for city and county agencies to acquiesce to the requests of developers. Please consider alternative approaches to using this property. Simply because a developer *can* build something, does not necessarily mean that it is the *right* thing to do.

Thank you for your consideration of this matter.
Sincerely,
Beth O'Neill

Name Carla Nichols
Address 22440 Dogwood Ln
City, State, Zip Woodway 98020
Phone 425 670 237[illegible]
Email redwoodway@att.net

COMMENT SHEET
Please print legibly

Please share your comments about the Snohomish County Docket XIII Scoping Notice for the Draft Supplemental EIS. We thank you for your time and participation.

Check Sound Transit's FEIS to determine what the impact would be for the installation of a mass transit station in the Richmond Beach / Pt. Wells area. This was addressed in an earlier Sound Transit EIS.

Thank you

Please mail to:
Steve Skorney, Senior Planner, Snohomish County PDS
3000 Rockefeller Ave., M/S 604
Everett, WA 98201-4046
For questions or comments, contact steve.skorney@co.snohomish.wa.us

Name Lisa Sezate
Address 2437 NW 196th St.
City, State, Zip Shoreline, WA 98177
Phone 206.533.0595
Email lisa.sezate@shorelineschools.org

COMMENT SHEET
Please print legibly

Please share your comments about the Snohomish County Docket XIII Scoping Notice for the Draft Supplemental EIS. We thank you for your time and participation.

Please be sure you notify me of all meetings and opportunities for public input. Also, please, please analyse every possible aspect of this change. The transportation concerns are of great ~~concern~~ import to us. Please consider less intensive development.

Thank you!

Please mail to:
Steve Skorney, Senior Planner, Snohomish County PDS
3000 Rockefeller Ave., M/S 604
Everett, WA 98201-4046
For questions or comments, contact steve.skorney@co.snohomish.wa.us

Name Robert E. Schillberg
Address ~~23823~~ 23823-113th Pl W
City, State, Zip Woodway WA 98020
Phone
Email - Also can be reached at at Woodway City Hall

COMMENT SHEET

Please print legibly

Please share your comments about the Snohomish County Docket XIII Scoping Notice for the Draft Supplemental EIS. We thank you for your time and participation.

As I am on the town council.

I have read and agree with Mayor Nicholas Kelley about this determination.

The broader & more comprehensive the SEPA - study is now, will be helpful for all parties interested in the development of the ~~properties~~ Paramount property.

Robert E Schillberg
Woodway City Council member.

Also a big ~~issue~~ issue is the light & glare created by the development.

Also check the SEPA studies for a ~~study~~ study of a launder station on the property. It is included in a early SEPA study by ~~to~~ launder to Everett

Please mail to:

Steve Skorney, Senior Planner, Snohomish County PDS

3000 Rockefeller Ave., M/S 604

Everett, WA 98201-4046

For questions or comments, contact steve.skorney@co.snohomish.wa.us

Corbitt Loch
2437 NW 196th Street
Shoreline, WA 98177
(206) 617-0041

December 4, 2007

Snohomish County Planning & Development Services
Steve Skorney, Senior Planner
3000 Rockefeller Ave. M/S 604
Everett, WA 98201-4046

RE: SCOPE OF SEIS FOR DOCKET XIII – SW 41 Paramount NW LLC

Dear Mr. Skorney:

Please incorporate my comments as part of the scope of environmental analysis for SW 41.

- As required by ch. 197-11 WAC, the SEIS for SW 41 must carefully examine "worst case" conditions associated with a proposal lacking sufficient information for analysis. Urban Center is the most-intensive land use designation offered by the Snohomish County Comprehensive Plan (Plan). Urban Center development regulations even allow the Director to approve residential density above and beyond normal maximum residential densities.
- The SEIS must include the study of alternative actions which generate less environmental impact than the proposal. It is prudent that the SEIS evaluate other, less-intensive land use designations.
- Presently, there are no roads or streets in existence capable of accommodating the volume of traffic that would be generated by development as an Urban Center. A representative of Jones and Stokes stated during the November 28, 2007 scoping meeting that the SEIS would evaluate new road corridors through Woodway. Please ensure that this analysis is thorough.
- Is there any uncertainty whether Woodway or Shoreline will ultimately annex Point Wells? If so, this SEIS should evaluate the impacts associated with development as part of the Town of Woodway, compared to the impacts resulting from development after annexation to Shoreline.
- I encourage you to be creative in addressing potential traffic impacts. I have suggested the possibility of a sky tram like the new tram at the Oregon Health and Science University in Portland. The tram could carry passengers and goods to and from the Edmonds transit station, where connections can be made to Sound Transit, Metro Transit, Washington State Ferries, park and ride lots, and even FlexCar. See http://www.portlandtram.org. Or, what about a tunnel under Woodway to Edmonds?
- Please remain open to the idea that this proposal cannot be evaluated at the non-project level. There is virtually an unlimited number of ways the property could develop under Urban Center. Sometimes, the details are critical to understanding the impacts of future development, and whether comprehensive plan land use designations should be changed.

Thank you in advance for conducting thorough and objective analysis of SW-41. Please notify me of all future announcements relating to SW-41. I look forward to learning more about your assumptions, methodologies, findings, mitigation measures, and conclusions.

Very truly yours,

Corbitt Loch

Corbitt Loch

Appendix B

Certified Local Government

Appendix B. Snohomish County–Certified Local Government

As a Certified Local Government1 (CLG), historic preservation is an important part of Snohomish County's (County's) land use planning policy. The County's CLG status was granted by the National Park Service in 2003. In accordance with CLG requirements, the County conducted a survey to identify potentially eligible historic resources and established a Historic Preservation Ordinance. The historic resources survey, known as the Snohomish County Heritage 2000 Initiative, issued its final report in January 2001. It involved the partnership of the County and the League of Snohomish County Heritage Organizations, representing 32 museums and heritage organizations throughout the County. The initiative, which began in 1995, identified more than 600 recorded historic properties, including archaeological and historic resources, sites, and districts.

Through the Snohomish County Historic Preservation Commission (Historic Preservation Commission), the County maintains a program to identify, preserve, and protect significant historic and archaeological resources that represent the County's rich culture and history. The Historic Preservation Commission achieves these goals by offering a number of services to support preservation efforts countywide, which include the administration of a three-tiered local register of historic places, the implementation of Special Valuation Tax Incentives for historic building rehabilitation, and other education resources and contacts.

Properties on and eligible for placement on the Snohomish County Register of Historic Places are subject to the provisions of SCC 30.32D.060, Alteration or Demolition of Property on County Register. An owner of property listed on the local register who proposes any physical alteration or rehabilitation of the exterior of the property—or of interior features that are listed as contributing to the significance of the property excluding ordinary repair, maintenance, and emergency repairs—must request and receive a Certificate of Appropriateness from the Historic Preservation Commission for the proposed work. If a building permit is required for the work, issuance of a Certificate of Appropriateness is a precondition to the issuance of a building permit. Furthermore, an owner who proposes to partially or completely demolish a registered property must request and receive from the Historic Preservation Commission a waiver of a Certificate of Appropriateness as a precondition to issuance of a permit for demolition.

National Register of Historic Places

First authorized by the Historic Sites Act of 1935, the National Register of Historic Places (NRHP) was established by the National Historic Preservation Act of 1966 as "an authoritative

[1] The Certified Local Government Program is a preservation partnership between local, state and national governments focused on promoting historic preservation at the grass roots level. The program is jointly administered by the National Park Service (NPS) and the State Historic Preservation Offices (SHPOs) in each state, with each local community working through a certification process to become recognized as a Certified Local Government (CLG).

guide to be used by Federal, state and local governments, private groups and citizens to identify the Nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment." NRHP recognizes properties that are significant at the national, state, and local levels.

According to NRHP guidelines, the quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that

- possess integrity of location, design, setting, materials, workmanship, feeling, and association; and:
- are associated with events that have made a significant contribution to the broad patterns of our history; or
- are associated with the lives of persons significant in our past; or
- embody the distinctive characteristics of a type, period, or method of construction; or that represent the work of a master, possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; or
- have yielded, or may be likely to yield, information important in prehistory or history.

Ordinarily birthplaces, cemeteries, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years are not considered eligible for the NRHP, unless they satisfy certain conditions.

The evaluation of integrity, according to the NRHP, is grounded in an understanding of a property's physical features and how these features relate to the property's historic significance. It is through the retention of original character-defining features that the significance of a resource is conveyed. The NRHP recognizes seven aspects or qualities that, in various combinations, define the integrity of a property. These qualities include the following:

Location. The place where the historic property was constructed or the place where the historic event occurred.

Design. The combination of elements that create the form, plan, space, structure, and style of a property.

Setting. The physical environment of a historic property.

Materials. The physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.

Workmanship. The physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.

Feeling. A property's expression of the aesthetic or historic sense of a particular period of time.

Association. The direct link between an important historic event or person and a historic property.

Washington Heritage Register

The Washington Heritage Register is an official listing of historically significant sites and properties found throughout the State of Washington. The list is maintained by the Washington Department of Archaeological and Historical Preservation (DAHP) and includes districts, sites, buildings, structures, and objects that have been identified and documented as being significant in local or state history, architecture, archaeology, engineering or culture. Sites and properties must meet the following requirements to qualify for the Washington Heritage Register.

- A building, site, structure, or object must be at least 50 years old. If newer, the resource should have documented exceptional significance.
- The resource should have a high-to-medium level of integrity, i.e., it should retain important character-defining features from its historic period of construction.
- The resource should have documented historical significance at the local, state, or federal level.

Sites that are listed in the NRHP are automatically added to the Washington Heritage Register; therefore, a separate nomination form does not need to be completed.

Appendix C

Intersection Characteristics and Traffic Volumes

Table B-1. Existing Characteristics of Analysis Intersections

		Geometry of Intersection Approach					
	Intersection	Northbound	Southeast-bound	Southbound	Eastbound	Northeast-bound	Westbound
1	244th Street SW and SR 99	1 left, 2 through, 1 right		1 left, 1 through, 1 through-right	1 left, 1 through, 1 through-right		1 left, 1 through, 1 through-right
2	244th Street SW and Fremont Avenue N	1 left-right			1 through-right		1 left, 1 through
3	Firdale Avenue N and 244th Street SW	1 left-right			1 through-right		1 left, 1 through
4	244th Street SW and 100th Avenue W	1 left-through-right		1 left-through-right	1 left-through-right		1 left-through-right
5	SR 104 and 100th Avenue W	1 left, 1 through, 1 through-right		1 left, 1 through, 1 through-right	1 left, 1 through, 1 through-right		1 left, 1 through, 1 through-right
6	Algonquin Road and Woodway Park Road	1 left-through-right		1 left-through-right	1 left-through-right		1 left-through-right
7	238th Street SW and Woodway Park Road	1 left-through-right		1 left-through-right	1 left-through-right		1 left-through-right
8	NW 196th Street and Richmond Beach Drive	1 through-right		1 left-through			1 left-right
9	NW 196th Street and 20th Avenue NW	1 left-through-right		1 left-through-right	1 left-through, 1 through-right		1 left-through, 1 through-right
10	NW 195th Street and 15th Avenue NW (w)	1 left-through-right		1 left-through-right	1 left-through, 1 through-right		1 left-through, 1 through-right
11	Richmond Beach Road and 15th Avenue NW (e)	1 left-through-right		1 left-through-right	1 left-through, 1 through-right		1 left-through, 1 through-right
12	Richmond Beach Road and 8th Avenue NW	1 left, 1 through-right		1 left, 1 through-right	1 left, 1 through, 1 through-right	1 left--right	1 left, 1 through, 1 through-right

		Geometry of Intersection Approach					
	Intersection	Northbound	Southeast-bound	Southbound	Eastbound	Northeast-bound	Westbound
13	Richmond Beach Road and 3rd Avenue NW	1 left, 1 through-right		1 left, 1 through-right	1 left-through, 1 through-right		1 left-through, 1 through-right
14	Richmond Beach Road and Dayton Avenue N	1 left, 1 left-right			1 through, 1 through-right		1 left, 2 through
15	N 185th Street and Fremont Avenue N	1 left, 1 through-right		1 left, 1 through-right	1 left, 1 through, 1 through-right		1 left, 1 through, 1 through-right
16	N 185th Street and SR 99	2 left, 1 through, 1 through-right	1 right	1 left, 1 through, 1 through-right	1 left-through, 1 through-right		1 left-through, 1 through-right
17	N 175th Street and 6th Avenue NW			1 left-right	1 left-through		1 through-right
18	St Luke Place N and Dayton Avenue N	1 left-through		1 through-right	1 left, 1 right		
19	N 175th Street and Fremont Avenue N	1 left-through, 1 right		1 left-through-right	1 left-through-right		1 left-through, 1 right
20	N 175th Street and SR 99	1 left, 1 through, 1 through-right		2 left, 1 through, 1 through-right	1 left, 1 through, 1 through-right		1 left, 1 through, 1 through-right
21	Carlyle Hall Road and Dayton Avenue N	1 left-through-right		1 left-through-right	1 left-through-right		1 left-through-right
22	N Innis Arden Way and Greenwood Avenue N	1 left-through		1 through-right	1 left, 1 right		
23	N 160th Street and Greenwood Avenue N	1 left-through-right		1 left-through-right	1 left-through-right		1 left-through, 1 right

Table B-2. Existing AM Peak Hour Intersection Traffic Volumes

		Northbound				Southeast-bound	Southbound				Eastbound				Northeast-bound				Westbound				
	Intersection	LT2	LT	TH	RT	RT	LT	TH	RT	RT2	LT	TH	RT	RT2	LT2	LT	RT	RT2	LT2	LT	TH	RT	RT2
1	244th Street SW and SR 99		18	441	104		133	1483	225		169	336	93							227	261	63	
2	244th Street SW and Fremont Avenue N		40		126							501	107							227	246		
3	Firdale Avenue N and 244th Street SW		5		82							546	7							52	228		
4	244th Street SW and 100th Avenue W		2	93	67		10	292			2	5	3							44	3	7	
5	SR 104 and 100th Avenue W		162	231	86		170	467	30		24	342	143							123	471	88	
6	Algonquin Road and Woodway Park Road		1	63	3		19	46	4		5	4	1							10	5	18	
7	238th Street SW and Woodway Park Road			16	2		24	18	3		5	6	1							2	4	38	
8	NW 196th Street and Richmond Beach Drive			5	1		25	6												10		23	
9	NW 196th Street and 20th Avenue NW		2	5	73		242	4	4		2	141								22	58	68	
10	NW 195th Street and 15th Avenue NW (w)		3		4		97	6	17		10	451									162	34	
11	Richmond Beach Road and 15th Avenue NW (e)		11		47						2	533	17							30	185		
12	Richmond Beach Road and 8th Avenue NW	1	17	62	25		166	216	12	15	18	446	95	19	21	36	12	23	20	31	243	62	
13	Richmond Beach Road		13	51	31		237	69	74		43	624	17							14	334	134	

	Intersection	Northbound				Southeast -bound	Southbound				Eastbound				Northeast-bound				Westbound				
		LT2	LT	TH	RT	RT	LT	TH	RT	RT2	LT	TH	RT	RT2	LT2	LT	RT	RT2	LT2	LT	TH	RT	RT2
	and 3rd Avenue NW																						
14	Richmond Beach Road and Dayton Avenue N		104		114							628	349							123	349		
15	N 185th Street and Fremont Avenue N		97	120	30		101	262	58		93	464	206							38	310	17	
16	N 185th Street/Firlands Way and SR 99	65	30	420	37	6	168	1351	111	17	197	281	93							108	181	42	30
17	N 175th Street and 6th Avenue NW						451		8		10	63									23	44	
18	St Luke Place N and Dayton Avenue N		76	118				424	180		31		63										
19	N 175th Street and Fremont Avenue N			163	223		212	323			4	6								191		63	
20	N 175th Street and SR 99		23	497	20		110	1333	28		41	341	100							372	187	73	
21	Carlyle Hall Road and Dayton Avenue N		20	148	51		7	382	89		24	49	180							78	75	7	
22	N Innis Arden Way and Greenwood Avenue N		471	139				227	55		8		145										
23	N 160th Street and Greenwood Avenue N		16	269	14		86	257	27		14	29	14							16	34	334	

LT = Left turn movement; TH = Through movement; RT = Right turn movement

Table B-3. Existing PM Peak Hour Intersection Traffic Volumes

		Northbound				Southeast-bound	Southbound				Eastbound				Northeast-bound				Westbound				
	Intersection	LT2	LT	TH	RT	RT	LT	TH	RT	RT2	LT	TH	RT	RT2	LT2	LT	RT	RT2	LT2	LT	TH	RT	RT2
1	244th Street SW and SR 99		63	1161	146		192	857	150		238	253	59							211	299	352	
2	244th Street SW and Fremont Avenue N		116		251							314	41							101	402		
3	Firdale Avenue N and 244th Street SW		9		54							275	7							70	458		
4	244th Street SW and 100th Avenue W		2	320	63		9	122	1		1	2	3							59	3	13	
5	SR 104 and 100th Avenue W		190	586	117		180	327	37		46	709	149							103	737	219	
6	Algonquin Road and Woodway Park Road			92	6		30	84	1											9		34	
7	238th Street SW and Woodway Park Road			27	1		47	37	8		2	5								1	4	52	
8	NW 196th Street and Richmond Beach Drive			3	4		34	7												9		22	
9	NW 196th Street and 20th Avenue NW		3	18	41		132	11	6		4	155	3							74	127	168	
10	NW 195th Street and 15th Avenue NW (w)		2		4		55		33		9	303	3							69	402	103	
11	Richmond Beach Road and 15th Avenue NW (e)		31		48				1		2	337	23							51	542	1	
12	Richmond Beach Road and 8th Avenue NW		8	109	200		88	61	20	32	24	341	30	12	11	17	43	12	46	41	489	179	
13	Richmond Beach Road		22	38	28		83	35	49		41	460	28							37	692	185	

	Intersection	Northbound				Southeast-bound	Southbound				Eastbound				Northeast-bound				Westbound				
		LT2	LT	TH	RT	RT	LT	TH	RT	RT2	LT	TH	RT	RT2	LT2	LT	RT	RT2	LT2	LT	TH	RT	RT2
	and 3rd Avenue NW																						
14	Richmond Beach Road and Dayton Avenue N		291		80							403	168							78	554		
15	N 185th Street and Fremont Avenue N		215	280	53		102	177	120		77	384	15							15	303	95	
16	N 185th Street/Firlands Way and SR 99	114	40	1264	39	14	77	909	64	7	166	287	83							149	242	47	59
17	N 175th Street and 6th Avenue NW						82		12		7	27									54	283	
18	St Luke Place N and Dayton Avenue N		67	378				170	39		34		44										
19	N 175th Street and Fremont Avenue N		1	389	244		59	132	3		2		2							171	3	167	
20	N 175th Street and SR 99		37	1306	30		212	947	33		85	207	34							256	313	154	
21	Carlyle Hall Road and Dayton Avenue N		39	455	9		11	252	14		58	29	27							18	23	8	
22	N Innis Arden Way and Greenwood Avenue N		203	291				130	14		22		181										
23	N 160th Street and Greenwood Avenue N		13	357	26		143	158	6		11	37	9							14	29	130	

LT = Left turn movement; TH = Through movement; RT = Right turn movement

Table B-4. 2025 No Action AM Peak Hour Intersection Traffic Volumes

		Northbound				Southeast -bound	Southbound				Eastbound				Northeast-bound				Westbound				
	Intersection	LT2	LT	TH	RT	RT	LT	TH	RT	RT2	LT	TH	RT	RT2	LT2	LT	RT	RT2	LT2	LT	TH	RT	RT2
1	244th Street SW and SR 99		20	1035	140		160	2615	250		355	430	95							270	265	65	
2	244th Street SW and Fremont Avenue N		45		145							705	125							275	290		
3	Firdale Avenue N and 244th Street SW		5		85							695	10							60	270		
4	244th Street SW and 100th Avenue W		5	100	95		10	700				5	5							50	5	10	
5	SR 104 and 100th Avenue W		180	235	140		205	1090	50		30	440	285							370	580	150	
6	Algonquin Road and Woodway Park Road			80	80		30	150	5		5	10								15	10	20	
7	238th Street SW and Woodway Park Road			50	5		80	55	5		5	5								5	5	135	
8	NW 196th Street and Richmond Beach Drive			5			35	5												10		65	
9	NW 196th Street and 20th Avenue NW			5	75		270	5	5		5	165								25	120	80	
10	NW 195th Street and 15th Avenue NW (w)		5		5		115	5	20		10	500									250	40	
11	Richmond Beach Road and 15th Avenue NW (e)		10		50							600	20							30	280		
12	Richmond Beach Road and 8th Avenue NW		20	75	30		195	545	50	50	25	530	170	25	25	55	15	25	25	35	295	70	
13	Richmond Beach Road		15	60	35		545	80	80		110	740	20							15	395	165	

	Intersection	Northbound				Southeast -bound	Southbound				Eastbound				Northeast-bound				Westbound				
		LT2	LT	TH	RT	RT	LT	TH	RT	RT2	LT	TH	RT	RT2	LT2	LT	RT	RT2	LT2	LT	TH	RT	RT2
	and 3rd Avenue NW																						
14	Richmond Beach Road and Dayton Avenue N		160		135							935	415							145	415		
15	N 185th Street and Fremont Avenue N		105	160	30		175	295	70		110	850	245							45	365	20	
16	N 185th Street/Firlands Way and SR 99	75	30	930	45	5	735	1910	130	20	235	515	230							130	215	50	35
17	N 175th Street and 6th Avenue NW						750		10		10	75									35	50	
18	St Luke Place N and Dayton Avenue N		90	180				500	180		35		270										
19	N 175th Street and Fremont Avenue N			195	265		230	385			5	5								225		115	
20	N 175th Street and SR 99		60	975	25		435	1660	35		95	370	155							375	190	85	
21	Carlyle Hall Road and Dayton Avenue N		25	210	65		10	505	120		35	65	235							100	100	10	
22	N Innis Arden Way and Greenwood Avenue N		610	180				295	70		10		190										
23	N 160th Street and Greenwood Avenue N		20	350	20		110	335	35		20	40	20							20	45	435	

LT = Left turn movement; TH = Through movement; RT = Right turn movement

Table B-5. 2025 No Action PM Peak Hour Intersection Traffic Volumes

		Northbound				Southeast-bound	Southbound				Eastbound				Northeast-bound				Westbound				
	Intersection	LT2	LT	TH	RT	RT	LT	TH	RT	RT2	LT	TH	RT	RT2	LT2	LT	RT	RT2	LT2	LT	TH	RT	RT2
1	244th Street SW and SR 99		75	1720	175		225	1440	185		280	300	70							250	425	415	
2	244th Street SW and Fremont Avenue N		120		295							370	50							130	545		
3	Firdale Avenue N and 244th Street SW		10		65							325	10							150	540		
4	244th Street SW and 100th Avenue W			785	75		10	150					5							105	5	15	
5	SR 104 and 100th Avenue W		225	1220	315		215	370	40		70	720	350							275	795	270	
6	Algonquin Road and Woodway Park Road			290	15		30	100												70	25	40	
7	238th Street SW and Woodway Park Road			70	5		125	75	10			5									5	120	
8	NW 196th Street and Richmond Beach Drive			5	5		70	10												10		30	
9	NW 196th Street and 20th Avenue NW		5	55	50		145	15	10		45	185	5							90	150	190	
10	NW 195th Street and 15th Avenue NW (w)				5		65		40		10	360	5							80	430	120	
11	Richmond Beach Road and 15th Avenue NW (e)		35		50							405	25							55	595		
12	Richmond Beach Road and 8th Avenue NW		55	345	200		105	135	25	40	30	405	80	15	20	20	50	15	55	90	615	340	
13	Richmond Beach Road		25	45	35		200	50	50		60	545	45							45	915	290	

	Intersection	Northbound				Southeast-bound	Southbound				Eastbound				Northeast-bound				Westbound				
		LT2	LT	TH	RT	RT	LT	TH	RT	RT2	LT	TH	RT	RT2	LT2	LT	RT	RT2	LT2	LT	TH	RT	RT2
	and 3rd Avenue NW																						
14	Richmond Beach Road and Dayton Avenue N		395		95							520	200							90	880		
15	N 185th Street and Fremont Avenue N		260	295	65		200	230	120		90	525	15							20	565	115	
16	N 185th Street/Firlands Way and SR 99	135	100	1705	45	15	345	1285	75	10	195	325	275							175	400	180	70
17	N 175th Street and 6th Avenue NW						190		15		10	30									65	675	
18	St Luke Place N and Dayton Avenue N		165	500				170	45		40		130										
19	N 175th Street and Fremont Avenue N			460	290		70	155	5											205	5	205	
20	N 175th Street and SR 99		45	1720	50		380	1185	45		100	225	40							305	420	290	
21	Carlyle Hall Road and Dayton Avenue N		50	580	10		15	345	20		75	35	35							25	30	10	
22	N Innis Arden Way and Greenwood Avenue N		255	365				170	20		30		235										
23	N 160th Street and Greenwood Avenue N		15	445	35		185	205	10		15	45	10							20	35	165	

LT = Left turn movement; TH = Through movement; RT = Right turn movement

Table B-6. 2025 Proposed Action AM Peak Hour Intersection Traffic Volumes

		Northbound				Southeast-bound	Southbound				Eastbound				Northeast-bound				Westbound				
	Intersection	LT2	LT	TH	RT	RT	LT	TH	RT	RT2	LT	TH	RT	RT2	LT2	LT	RT	RT2	LT2	LT	TH	RT	RT2
1	244th Street SW and SR 99		20	1035	135		160	2640	240		320	605	95							275	270	65	
2	244th Street SW and Fremont Avenue N		60		135							855	125							255	310		
3	Firdale Avenue N and 244th Street SW		5		205							725	10							80	285		
4	244th Street SW and 100th Avenue W		5	100	255		10	800				5	5							70	5	10	
5	SR 104 and 100th Avenue W		180	235	160		240	1085	50		35	625	250							435	585	150	
6	Algonquin Road and Woodway Park Road			115	240		30	170	5		5	5								25	10	20	
7	238th Street SW and Woodway Park Road			50	5		110	55	5		5	5								5	5	330	
8	NW 196th Street and Richmond Beach Drive			5			680	5												10		395	
9	NW 196th Street and 20th Avenue NW			5	75		270	5	30		170	645								25	425	70	
10	NW 195th Street and 15th Avenue NW (w)		5		5		115	5	20		10	940									545	35	
11	Richmond Beach Road and 15th Avenue NW (e)		10		105							1040	20							30	570		
12	Richmond Beach Road and 8th Avenue NW		20	75	30		195	480	50	240	190	670	250	25	30	50	15	25	25	35	370	70	
13	Richmond Beach Road		15	60	35		475	80	75		125	810	20							15	395	245	

	Intersection	Northbound				Southeast -bound	Southbound				Eastbound				Northeast-bound				Westbound				
		LT2	LT	TH	RT	RT	LT	TH	RT	RT2	LT	TH	RT	RT2	LT2	LT	RT	RT2	LT2	LT	TH	RT	RT2
	and 3rd Avenue NW																						
14	Richmond Beach Road and Dayton Avenue N		165		135							955	420							145	490		
15	N 185th Street and Fremont Avenue N		150	140	30		175	280	70		110	860	250							45	395	20	
16	N 185th Street/Firlands Way and SR 99	75	35	920	45	5	815	1865	130	20	235	460	295							130	240	50	35
17	N 175th Street and 6th Avenue NW						785		10		10	75									35	50	
18	St Luke Place N and Dayton Avenue N		90	185				485	180		35		305										
19	N 175th Street and Fremont Avenue N			195	265		220	385			5	5								225		140	
20	N 175th Street and SR 99		80	965	25		470	1635	35		95	370	175							385	195	85	
21	Carlyle Hall Road and Dayton Avenue N		25	210	65		10	520	120		35	65	240							105	100	10	
22	N Innis Arden Way and Greenwood Avenue N		620	185				305	75		10		195										
23	N 160th Street and Greenwood Avenue N		20	355	20		115	345	35		20	40	20							20	45	440	

LT = Left turn movement; TH = Through movement; RT = Right turn movement

Table B-7. 2025 Proposed Action PM Peak Hour Intersection Traffic Volumes

	Intersection	Northbound				Southeast-bound	Southbound				Eastbound				Northeast-bound				Westbound				
		LT2	LT	TH	RT	RT	LT	TH	RT	RT2	LT	TH	RT	RT2	LT2	LT	RT	RT2	LT2	LT	TH	RT	RT2
1	244th Street SW and SR 99		75	1700	175		225	1430	185		285	320	70							250	490	415	
2	244th Street SW and Fremont Avenue N		135		305							385	50							120	615		
3	Firdale Avenue N and 244th Street SW		10		85							335	10							215	540		
4	244th Street SW and 100th Avenue W			995	95		10	380					5							170	5	15	
5	SR 104 and 100th Avenue W		330	1130	315		220	360	40		65	800	335							470	850	290	
6	Algonquin Road and Woodway Park Road			285	80		30	175												80	30	40	
7	238th Street SW and Woodway Park Road			70	5		210	80	10			5									5	180	
8	NW 196th Street and Richmond Beach Drive			5	5		585	10												10		710	
9	NW 196th Street and 20th Avenue NW		10	50	50		145	15	100		130	610	10							90	730	150	
10	NW 195th Street and 15th Avenue NW (w)				5		65		40		10	785	5							70	885	150	
11	Richmond Beach Road and 15th Avenue NW (e)		35		50							830	25							135	1070		
12	Richmond Beach Road and 8th Avenue NW		65	355	200		100	135	20	125	260	515	115	15	15	30	55	15	55	80	670	310	
13	Richmond Beach Road		25	45	35		200	50	55		65	650	45							45	930	290	

	Intersection	Northbound				Southeast-bound	Southbound				Eastbound				Northeast-bound				Westbound				
		LT2	LT	TH	RT	RT	LT	TH	RT	RT2	LT	TH	RT	RT2	LT2	LT	RT	RT2	LT2	LT	TH	RT	RT2
	and 3rd Avenue NW																						
14	Richmond Beach Road and Dayton Avenue N		395		95							615	210							100	885		
15	N 185th Street and Fremont Avenue N		255	330	85		185	235	120		100	600	30							20	630	115	
16	N 185th Street/Firlands Way and SR 99	135	175	1635	40	15	335	1275	75	10	215	380	285							170	355	230	70
17	N 175th Street and 6th Avenue NW						215		15		10	30									80	695	
18	St Luke Place N and Dayton Avenue N		190	500				200	50		40		155										
19	N 175th Street and Fremont Avenue N			460	290		95	155	5											205	5	210	
20	N 175th Street and SR 99		40	1720	55		400	1155	45		100	245	85							305	430	280	
21	Carlyle Hall Road and Dayton Avenue N		50	605	10		15	350	20		75	40	35							25	30	10	
22	N Innis Arden Way and Greenwood Avenue N		265	375				170	20		30		235										
23	N 160th Street and Greenwood Avenue N		15	460	35		190	205	10		15	50	10							20	40	170	

LT = Left turn movement; TH = Through movement; RT = Right turn movement

Appendix D

Level of Service Reports

Existing AM Peak Hour
Synchro LOS Report

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.97		1.00	0.97		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3424		1770	3437		1770	3539	1583	1770	3469	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3424		1770	3437		1770	3539	1583	1770	3469	
Volume (vph)	169	336	93	227	261	63	18	441	104	133	1483	225
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	184	365	101	247	284	68	20	479	113	145	1612	245
RTOR Reduction (vph)	0	23	0	0	19	0	0	0	63	0	11	0
Lane Group Flow (vph)	184	443	0	247	333	0	20	479	50	145	1846	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	13.9	15.8		15.0	16.9		1.5	47.6	47.6	13.0	59.1	
Effective Green, g (s)	13.9	15.8		15.0	16.9		1.5	47.6	47.6	13.0	59.1	
Actuated g/C Ratio	0.13	0.15		0.14	0.16		0.01	0.44	0.44	0.12	0.55	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	229	504		247	541		25	1568	702	214	1909	
v/s Ratio Prot	0.10	c0.13		c0.14	0.10		0.01	0.14		c0.08	c0.53	
v/s Ratio Perm									0.03			
v/c Ratio	0.80	0.88		1.00	0.62		0.80	0.31	0.07	0.68	0.97	
Uniform Delay, d1	45.4	44.9		46.2	42.2		52.8	19.3	17.2	45.2	23.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	18.1	15.9		57.3	2.1		95.2	0.1	0.0	8.2	13.5	
Delay (s)	63.6	60.8		103.5	44.3		148.0	19.4	17.2	53.4	36.8	
Level of Service	E	E		F	D		F	B	B	D	D	
Approach Delay (s)		61.6			68.7			23.2			38.0	
Approach LOS		E			E			C			D	

Intersection Summary			
HCM Average Control Delay	44.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	107.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	501	107	227	246	40	126
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	545	116	247	267	43	137
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			661		1364	603
vC1, stage 1 conf vol					603	
vC2, stage 2 conf vol					761	
vCu, unblocked vol			661		1364	603
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			73		82	73
cM capacity (veh/h)			927		241	499

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	661	247	267	180
Volume Left	0	247	0	43
Volume Right	116	0	0	137
cSH	1700	927	1700	397
Volume to Capacity	0.39	0.27	0.16	0.45
Queue Length 95th (ft)	0	27	0	58
Control Delay (s)	0.0	10.3	0.0	21.4
Lane LOS		B		C
Approach Delay (s)	0.0	4.9		21.4
Approach LOS				C

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	546	7	52	228	5	82
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	593	8	57	248	5	89
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			601		958	597
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			601		958	597
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		98	82
cM capacity (veh/h)			976		269	503

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	601	57	248	95
Volume Left	0	57	0	5
Volume Right	8	0	0	89
cSH	1700	976	1700	479
Volume to Capacity	0.35	0.06	0.15	0.20
Queue Length 95th (ft)	0	5	0	18
Control Delay (s)	0.0	8.9	0.0	14.4
Lane LOS		A		B
Approach Delay (s)	0.0	1.7		14.4
Approach LOS				B

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	2	5	3	44	3	7	2	93	67	10	292	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	5	3	48	3	8	2	101	73	11	317	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	490	517	317	487	481	138	317			174		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	490	517	317	487	481	138	317			174		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	100	90	99	99	100			99		
cM capacity (veh/h)	478	458	723	481	480	911	1243			1403		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	11	59	176	328
Volume Left	2	48	2	11
Volume Right	3	8	73	0
cSH	519	512	1243	1403
Volume to Capacity	0.02	0.11	0.00	0.01
Queue Length 95th (ft)	2	10	0	1
Control Delay (s)	12.1	12.9	0.1	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	12.1	12.9	0.1	0.3
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	37.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.98		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3383		1770	3455		1770	3396		1770	3507	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3383		1770	3455		1770	3396		1770	3507	
Volume (vph)	24	342	143	123	471	88	162	231	86	170	467	30
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	372	155	134	512	96	176	251	93	185	508	33
RTOR Reduction (vph)	0	77	0	0	24	0	0	66	0	0	8	0
Lane Group Flow (vph)	26	450	0	134	584	0	176	278	0	185	533	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	1.4	14.6		5.1	18.3		7.1	12.8		7.1	12.8	
Effective Green, g (s)	1.4	14.6		5.1	18.3		7.1	12.8		7.1	12.8	
Actuated g/C Ratio	0.03	0.26		0.09	0.33		0.13	0.23		0.13	0.23	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	45	888		162	1137		226	782		226	807	
v/s Ratio Prot	0.01	0.13		c0.08	c0.17		0.10	0.08		c0.10	c0.15	
v/s Ratio Perm												
v/c Ratio	0.58	0.51		0.83	0.51		0.78	0.36		0.82	0.66	
Uniform Delay, d1	26.8	17.4		24.8	15.1		23.5	17.9		23.6	19.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	16.7	0.5		27.9	0.4		15.5	0.3		20.1	2.0	
Delay (s)	43.5	17.9		52.7	15.4		39.0	18.2		43.7	21.4	
Level of Service	D	B		D	B		D	B		D	C	
Approach Delay (s)		19.1			22.2			25.2			27.1	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	23.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	55.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	4	1	10	5	18	1	63	3	19	46	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	4	1	11	5	20	1	68	3	21	50	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	188	167	52	169	168	70	54			72		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	188	167	52	169	168	70	54			72		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	100	99	99	98	100			99		
cM capacity (veh/h)	745	715	1015	782	715	993	1551			1528		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	11	36	73	75
Volume Left	5	11	1	21
Volume Right	1	20	3	4
cSH	752	870	1551	1528
Volume to Capacity	0.01	0.04	0.00	0.01
Queue Length 95th (ft)	1	3	0	1
Control Delay (s)	9.9	9.3	0.1	2.1
Lane LOS	A	A	A	A
Approach Delay (s)	9.9	9.3	0.1	2.1
Approach LOS	A	A		

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	6	1	2	4	38	0	16	2	24	18	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	7	1	2	4	41	0	17	2	26	20	3

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	13	48	20	49
Volume Left (vph)	5	2	0	26
Volume Right (vph)	1	41	2	3
Hadj (s)	0.07	-0.48	-0.03	0.10
Departure Headway (s)	4.2	3.6	4.0	4.1
Degree Utilization, x	0.02	0.05	0.02	0.06
Capacity (veh/h)	844	980	865	852
Control Delay (s)	7.2	6.8	7.1	7.4
Approach Delay (s)	7.2	6.8	7.1	7.4
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.1		
HCM Level of Service	A		
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	10	23	5	1	25	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	25	5	1	27	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	67	6			7	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	67	6			7	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	98			98	
cM capacity (veh/h)	923	1077			1614	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	36	7	34
Volume Left	11	0	27
Volume Right	25	1	0
cSH	1025	1700	1614
Volume to Capacity	0.03	0.00	0.02
Queue Length 95th (ft)	3	0	1
Control Delay (s)	8.6	0.0	5.9
Lane LOS	A		A
Approach Delay (s)	8.6	0.0	5.9
Approach LOS	A		

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	18.4%	ICU Level of Service	A
Analysis Period (min)	15		

9: NW 196th St NW & 20TH Ave NW
HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	2	141	0	22	58	68	2	5	73	242	4	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	153	0	24	63	74	2	5	79	263	4	4

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	79	77	55	105	87	272
Volume Left (vph)	2	0	24	0	2	263
Volume Right (vph)	0	0	0	74	79	4
Hadj (s)	0.05	0.03	0.25	-0.46	-0.51	0.22
Departure Headway (s)	5.7	5.7	5.9	5.2	4.6	5.0
Degree Utilization, x	0.12	0.12	0.09	0.15	0.11	0.38
Capacity (veh/h)	589	593	569	645	718	679
Control Delay (s)	8.3	8.2	8.3	7.9	8.2	11.1
Approach Delay (s)	8.3		8.0		8.2	11.1
Approach LOS	A		A		A	B

Intersection Summary			
Delay	9.3		
HCM Level of Service	A		
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	451	0	0	162	34	3	0	4	97	6	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	490	0	0	176	37	3	0	4	105	7	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	176			490			622	688	245	466	707	107
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	176			490			622	688	245	466	707	107
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	100	99	78	98	98
cM capacity (veh/h)	1398			1069			357	365	755	474	356	927

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	256	245	88	125	8	130
Volume Left	11	0	0	0	3	105
Volume Right	0	0	0	37	4	18
cSH	1398	1700	1069	1700	511	501
Volume to Capacity	0.01	0.14	0.00	0.07	0.01	0.26
Queue Length 95th (ft)	1	0	0	0	1	26
Control Delay (s)	0.4	0.0	0.0	0.0	12.2	14.7
Lane LOS	A				B	B
Approach Delay (s)	0.2		0.0		12.2	14.7
Approach LOS					B	B

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	2	533	17	30	185	0	11	0	47	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	579	18	33	201	0	12	0	51	0	0	0

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	292	308	133	101	63	0
Volume Left (vph)	2	0	33	0	12	0
Volume Right (vph)	0	18	0	0	51	0
Hadj (s)	0.04	-0.01	0.16	0.03	-0.41	0.00
Departure Headway (s)	4.9	4.9	5.4	5.3	5.1	5.7
Degree Utilization, x	0.40	0.42	0.20	0.15	0.09	0.00
Capacity (veh/h)	721	725	645	660	639	583
Control Delay (s)	10.0	10.1	8.5	8.0	8.6	8.7
Approach Delay (s)	10.1		8.3		8.6	0.0
Approach LOS	B		A		A	A

Intersection Summary			
Delay	9.5		
HCM Level of Service	A		
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0				4.0	4.0			4.0	4.0	
Lane Util. Factor	1.00	0.95				1.00	0.95			1.00	1.00	
Frt	1.00	0.97				1.00	0.97			1.00	0.96	
Flt Protected	0.95	1.00				0.95	1.00			0.95	1.00	
Satd. Flow (prot)	1770	3431				1770	3432			1770	1782	
Flt Permitted	0.55	1.00				0.95	1.00			0.95	1.00	
Satd. Flow (perm)	1028	3431				1770	3432			1770	1782	
Volume (vph)	18	446	95	19	20	31	243	62	1	17	62	25
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	485	103	21	22	34	264	67	1	18	67	27
RTOR Reduction (vph)	0	0	0	0	0	0	30	0	0	0	22	0
Lane Group Flow (vph)	20	609	0	0	0	56	301	0	0	19	72	0
Turn Type	Perm				Prot	Prot			Split	Split		
Protected Phases		4			3	3	8		1	1	1	
Permitted Phases	4											
Actuated Green, G (s)	14.4	14.4				2.2	20.6			8.0	8.0	
Effective Green, g (s)	14.4	14.4				2.2	20.6			8.0	8.0	
Actuated g/C Ratio	0.23	0.23				0.03	0.33			0.13	0.13	
Clearance Time (s)	4.0	4.0				4.0	4.0			4.0	4.0	
Vehicle Extension (s)	3.0	3.0				3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	235	783				62	1120			224	226	
v/s Ratio Prot		c0.18				c0.03	0.09			0.01	c0.04	
v/s Ratio Perm	0.02											
v/c Ratio	0.09	0.78				0.90	0.27			0.08	0.32	
Uniform Delay, d1	19.2	22.8				30.3	15.7			24.3	25.1	
Progression Factor	1.00	1.00				1.00	1.00			1.00	1.00	
Incremental Delay, d2	0.2	4.9				80.1	0.1			0.2	0.8	
Delay (s)	19.3	27.7				110.5	15.8			24.5	25.9	
Level of Service	B	C				F	B			C	C	
Approach Delay (s)		27.5					29.5				25.7	
Approach LOS		C					C				C	

Intersection Summary			
HCM Average Control Delay	28.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	63.1	Sum of lost time (s)	20.0
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0				4.0		
Lane Util. Factor	1.00	1.00				1.00		
Frt	1.00	0.98				0.95		
Flt Protected	0.95	1.00				0.97		
Satd. Flow (prot)	1770	1832				1714		
Flt Permitted	0.95	1.00				0.97		
Satd. Flow (perm)	1770	1832				1714		
Volume (vph)	166	216	12	15	21	36	12	23
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	180	235	13	16	23	39	13	25
RTOR Reduction (vph)	0	3	0	0	0	0	0	0
Lane Group Flow (vph)	180	261	0	0	0	100	0	0
Turn Type	Split				Split			
Protected Phases	6	6			2	2		
Permitted Phases								
Actuated Green, G (s)	11.6	11.6				6.9		
Effective Green, g (s)	11.6	11.6				6.9		
Actuated g/C Ratio	0.18	0.18				0.11		
Clearance Time (s)	4.0	4.0				4.0		
Vehicle Extension (s)	3.0	3.0				3.0		
Lane Grp Cap (vph)	325	337				187		
v/s Ratio Prot	0.10	c0.14				c0.06		
v/s Ratio Perm								
v/c Ratio	0.55	0.77				0.53		
Uniform Delay, d1	23.4	24.5				26.6		
Progression Factor	1.00	1.00				1.00		
Incremental Delay, d2	2.0	10.6				2.9		
Delay (s)	25.4	35.1				29.5		
Level of Service	C	D				C		
Approach Delay (s)		31.2				29.5		
Approach LOS		C				C		

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frt		1.00			0.96		1.00	0.94		1.00	0.92	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3515			3386		1770	1756		1770	1719	
Flt Permitted		0.90			0.93		0.66	1.00		0.70	1.00	
Satd. Flow (perm)		3176			3149		1227	1756		1303	1719	
Volume (vph)	43	624	17	14	334	134	13	51	31	237	69	74
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	47	678	18	15	363	146	14	55	34	258	75	80
RTOR Reduction (vph)	0	4	0	0	88	0	0	22	0	0	0	0
Lane Group Flow (vph)	0	739	0	0	436	0	14	67	0	258	155	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		12.5			12.5		11.2	11.2		11.2	11.2	
Effective Green, g (s)		12.5			12.5		11.2	11.2		11.2	11.2	
Actuated g/C Ratio		0.39			0.39		0.35	0.35		0.35	0.35	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1252			1242		434	620		460	607	
v/s Ratio Prot								0.04			0.09	
v/s Ratio Perm		c0.23			0.14		0.01			c0.20		
v/c Ratio		0.59			0.35		0.03	0.11		0.56	0.26	
Uniform Delay, d1		7.6			6.7		6.7	6.9		8.3	7.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.8			0.2		0.0	0.1		1.6	0.2	
Delay (s)		8.3			6.9		6.7	7.0		9.8	7.5	
Level of Service		A			A		A	A		A	A	
Approach Delay (s)		8.3			6.9			6.9			9.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	31.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	0.97	
Frt	0.95		1.00	1.00	0.92	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	3350		1770	3539	3253	
Flt Permitted	1.00		0.95	1.00	0.98	
Satd. Flow (perm)	3350		1770	3539	3253	
Volume (vph)	628	349	123	349	104	114
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	683	379	134	379	113	124
RTOR Reduction (vph)	120	0	0	0	102	0
Lane Group Flow (vph)	942	0	134	379	135	0
Turn Type			Prot			
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	17.8		5.6	27.4	7.6	
Effective Green, g (s)	17.8		5.6	27.4	7.6	
Actuated g/C Ratio	0.41		0.13	0.64	0.18	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1387		231	2255	575	
v/s Ratio Prot	c0.28		c0.08	0.11	c0.04	
v/s Ratio Perm						
v/c Ratio	0.68		0.58	0.17	0.23	
Uniform Delay, d1	10.3		17.6	3.2	15.2	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.3		3.7	0.0	0.2	
Delay (s)	11.6		21.3	3.2	15.4	
Level of Service	B		C	A	B	
Approach Delay (s)	11.6			7.9	15.4	
Approach LOS	B			A	B	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	43.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3376		1770	3512		1770	1806		1770	1812	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3376		1770	3512		1770	1806		1770	1812	
Volume (vph)	93	464	206	38	310	17	97	120	30	101	262	58
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	504	224	41	337	18	105	130	33	110	285	63
RTOR Reduction (vph)	0	82	0	0	7	0	0	15	0	0	0	0
Lane Group Flow (vph)	101	646	0	41	348	0	105	148	0	110	348	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.2	16.5		1.3	13.6		4.2	13.8		4.2	13.8	
Effective Green, g (s)	4.2	16.5		1.3	13.6		4.2	13.8		4.2	13.8	
Actuated g/C Ratio	0.08	0.32		0.03	0.26		0.08	0.27		0.08	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	144	1075		44	922		144	481		144	483	
v/s Ratio Prot	c0.06	c0.19		0.02	0.10		0.06	0.08		c0.06	c0.19	
v/s Ratio Perm												
v/c Ratio	0.70	0.60		0.93	0.38		0.73	0.31		0.76	0.72	
Uniform Delay, d1	23.2	14.9		25.2	15.6		23.2	15.2		23.3	17.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.3	1.0		109.0	0.3		16.8	0.4		21.1	5.2	
Delay (s)	37.5	15.8		134.2	15.9		40.0	15.5		44.4	22.5	
Level of Service	D	B		F	B		D	B		D	C	
Approach Delay (s)		18.5			28.1			25.1			27.7	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	23.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	51.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0	4.0	4.0		4.0
Lane Util. Factor		0.95			0.95			0.91	0.95	0.95		1.00
Frt		0.98			0.97			1.00	1.00	0.99		1.00
Flt Protected		0.98			0.99			0.95	0.95	1.00		0.95
Satd. Flow (prot)		3394			3382			1610	1681	3496		1770
Flt Permitted		0.98			0.99			0.95	0.95	1.00		0.95
Satd. Flow (perm)		3394			3382			1610	1681	3496		1770
Volume (vph)	197	281	93	108	181	42	30	65	30	420	37	168
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	214	305	101	117	197	46	33	71	33	457	40	183
RTOR Reduction (vph)	0	16	0	0	7	0	0	0	0	6	0	0
Lane Group Flow (vph)	0	604	0	0	386	0	0	51	53	491	0	183
Turn Type	Split			Split				Prot	Prot			Prot
Protected Phases	4	4		8	8			5	5	2		1
Permitted Phases												
Actuated Green, G (s)		17.0			14.8			4.0	4.0	36.3		14.7
Effective Green, g (s)		17.0			14.8			4.0	4.0	36.3		14.7
Actuated g/C Ratio		0.17			0.15			0.04	0.04	0.37		0.15
Clearance Time (s)		4.0			4.0			4.0	4.0	4.0		4.0
Vehicle Extension (s)		3.0			3.0			3.0	3.0	3.0		3.0
Lane Grp Cap (vph)		584			507			65	68	1284		263
v/s Ratio Prot		c0.18			c0.11			0.03	0.03	0.14		c0.10
v/s Ratio Perm												
v/c Ratio		1.03			0.76			0.78	0.78	0.38		0.70
Uniform Delay, d1		40.9			40.3			47.0	47.0	23.0		39.9
Progression Factor		1.00			1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2		46.5			6.7			44.9	41.9	0.2		7.8
Delay (s)		87.4			47.0			91.9	88.9	23.2		47.7
Level of Service		F			D			F	F	C		D
Approach Delay (s)		87.4			47.0					34.8		
Approach LOS		F			D					C		

Intersection Summary			
HCM Average Control Delay	48.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	98.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	SER2
Lane Configurations				
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0
Lane Util. Factor	0.95			1.00
Frt	0.99			0.86
Flt Protected	1.00			1.00
Satd. Flow (prot)	3493			1611
Flt Permitted	1.00			1.00
Satd. Flow (perm)	3493			1611
Volume (vph)	1351	111	17	6
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1468	121	18	7
RTOR Reduction (vph)	1	0	0	5
Lane Group Flow (vph)	1606	0	0	2
Turn Type				custom
Protected Phases	6			
Permitted Phases				1 4
Actuated Green, G (s)	47.0			31.7
Effective Green, g (s)	47.0			31.7
Actuated g/C Ratio	0.48			0.32
Clearance Time (s)	4.0			
Vehicle Extension (s)	3.0			
Lane Grp Cap (vph)	1662			517
v/s Ratio Prot	c0.46			
v/s Ratio Perm				0.00
v/c Ratio	0.97			0.00
Uniform Delay, d1	25.1			22.8
Progression Factor	1.00			1.00
Incremental Delay, d2	14.8			0.0
Delay (s)	39.9			22.8
Level of Service	D			C
Approach Delay (s)	40.7			
Approach LOS	D			

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	63	23	44	451	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	68	25	48	490	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	73				139	49
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	73				139	49
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				42	99
cM capacity (veh/h)	1527				848	1020

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	79	73	499
Volume Left	11	0	490
Volume Right	0	48	9
cSH	1527	1700	850
Volume to Capacity	0.01	0.04	0.59
Queue Length 95th (ft)	1	0	98
Control Delay (s)	1.1	0.0	15.1
Lane LOS	A		C
Approach Delay (s)	1.1	0.0	15.1
Approach LOS			C

Intersection Summary			
Average Delay	11.7		
Intersection Capacity Utilization	42.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	31	63	76	118	424	180
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	68	83	128	461	196
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	852	559	461			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	852	559	461			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	87	92			
cM capacity (veh/h)	305	529	1100			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	34	68	211	657
Volume Left	34	0	83	0
Volume Right	0	68	0	196
cSH	305	529	1100	1700
Volume to Capacity	0.11	0.13	0.08	0.39
Queue Length 95th (ft)	9	11	6	0
Control Delay (s)	18.3	12.8	3.8	0.0
Lane LOS	C	B	A	
Approach Delay (s)	14.6		3.8	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		

19: N 175th St & Fremont Ave N
HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frt		1.00			1.00	0.85		1.00	0.85		1.00	
Flt Protected		0.98			0.95	1.00		1.00	1.00		0.98	
Satd. Flow (prot)		1829			1770	1583		1863	1583		1827	
Flt Permitted		0.89			0.75	1.00		1.00	1.00		0.80	
Satd. Flow (perm)		1667			1398	1583		1863	1583		1493	
Volume (vph)	4	6	0	191	0	63	0	163	223	212	323	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	7	0	208	0	68	0	177	242	230	351	0
RTOR Reduction (vph)	0	0	0	0	0	53	0	0	93	0	0	0
Lane Group Flow (vph)	0	11	0	0	208	15	0	177	149	0	581	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		10.4			10.4	10.4		29.3	29.3		29.3	
Effective Green, g (s)		10.4			10.4	10.4		29.3	29.3		29.3	
Actuated g/C Ratio		0.22			0.22	0.22		0.61	0.61		0.61	
Clearance Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		363			305	345		1144	972		917	
v/s Ratio Prot								0.10				
v/s Ratio Perm		0.01			c0.15	0.01			0.09		c0.39	
v/c Ratio		0.03			0.68	0.04		0.15	0.15		0.63	
Uniform Delay, d1		14.7			17.1	14.7		3.9	3.9		5.8	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		0.0			6.2	0.1		0.1	0.1		1.4	
Delay (s)		14.7			23.3	14.8		4.0	4.0		7.3	
Level of Service		B			C	B		A	A		A	
Approach Delay (s)		14.7			21.2			4.0			7.3	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	47.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		0.97	0.95	
Frt	1.00	0.97		1.00	0.96		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3419		1770	3390		1770	3518		3433	3528	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3419		1770	3390		1770	3518		3433	3528	
Volume (vph)	41	341	100	372	187	73	23	497	20	110	1333	28
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	371	109	404	203	79	25	540	22	120	1449	30
RTOR Reduction (vph)	0	27	0	0	41	0	0	3	0	0	1	0
Lane Group Flow (vph)	45	453	0	404	241	0	25	559	0	120	1478	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	15.4	15.4		22.1	22.1		1.5	36.8		6.8	42.1	
Effective Green, g (s)	15.4	15.4		22.1	22.1		1.5	36.8		6.8	42.1	
Actuated g/C Ratio	0.16	0.16		0.23	0.23		0.02	0.38		0.07	0.43	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	281	542		403	772		27	1333		240	1530	
v/s Ratio Prot	0.03	c0.13		c0.23	0.07		0.01	c0.16		0.03	c0.42	
v/s Ratio Perm												
v/c Ratio	0.16	0.84		1.00	0.31		0.93	0.42		0.50	0.97	
Uniform Delay, d1	35.3	39.6		37.5	31.2		47.7	22.3		43.5	26.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	10.8		45.4	0.2		139.9	0.2		1.6	15.5	
Delay (s)	35.5	50.4		82.9	31.4		187.6	22.5		45.1	42.3	
Level of Service	D	D		F	C		F	C		D	D	
Approach Delay (s)		49.1			61.8			29.5			42.5	
Approach LOS		D			E			C			D	

Intersection Summary			
HCM Average Control Delay	45.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	97.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	24	49	180	78	75	7	20	148	51	7	382	89
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	53	196	85	82	8	22	161	55	8	415	97

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	275	174	238	520
Volume Left (vph)	26	85	22	8
Volume Right (vph)	196	8	55	97
Hadj (s)	-0.37	0.11	-0.09	-0.07
Departure Headway (s)	6.3	7.0	6.4	5.9
Degree Utilization, x	0.48	0.34	0.42	0.85
Capacity (veh/h)	524	460	508	520
Control Delay (s)	15.0	13.6	14.0	32.8
Approach Delay (s)	15.0	13.6	14.0	32.8
Approach LOS	C	B	B	D

Intersection Summary			
Delay	22.3		
HCM Level of Service	C		
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	8	145	471	139	227	55
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	158	512	151	247	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1452	277	307			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1452	277	307			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	79	59			
cM capacity (veh/h)	85	762	1254			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	9	158	663	307
Volume Left	9	0	512	0
Volume Right	0	158	0	60
cSH	85	762	1254	1700
Volume to Capacity	0.10	0.21	0.41	0.18
Queue Length 95th (ft)	8	19	51	0
Control Delay (s)	52.0	11.0	8.6	0.0
Lane LOS	F	B	A	
Approach Delay (s)	13.1		8.6	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	14	29	14	16	34	334	16	269	14	86	257	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	32	15	17	37	363	17	292	15	93	279	29

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	62	54	363	325	402
Volume Left (vph)	15	17	0	17	93
Volume Right (vph)	15	0	363	15	29
Hadj (s)	-0.06	0.19	-0.67	0.02	0.04
Departure Headway (s)	7.2	7.0	6.2	6.2	6.1
Degree Utilization, x	0.12	0.11	0.62	0.56	0.68
Capacity (veh/h)	392	480	549	545	561
Control Delay (s)	11.3	9.7	17.5	16.7	20.8
Approach Delay (s)	11.3	16.5		16.7	20.8
Approach LOS	B	C		C	C

Intersection Summary			
Delay	17.7		
HCM Level of Service	C		
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		

Existing PM Peak Hour
Synchro LOS Report

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.97		1.00	0.92		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3439		1770	3252		1770	3539	1583	1770	3460	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3439		1770	3252		1770	3539	1583	1770	3460	
Volume (vph)	238	253	59	211	299	352	63	1161	146	192	857	150
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	259	275	64	229	325	383	68	1262	159	209	932	163
RTOR Reduction (vph)	0	22	0	0	149	0	0	0	100	0	15	0
Lane Group Flow (vph)	259	317	0	229	559	0	68	1262	59	209	1080	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	14.0	18.0		12.0	16.0		4.8	33.8	33.8	11.0	40.0	
Effective Green, g (s)	14.0	18.0		12.0	16.0		4.8	33.8	33.8	11.0	40.0	
Actuated g/C Ratio	0.15	0.20		0.13	0.18		0.05	0.37	0.37	0.12	0.44	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	273	682		234	573		94	1317	589	214	1524	
v/s Ratio Prot	c0.15	0.09		0.13	c0.17		0.04	c0.36		c0.12	0.31	
v/s Ratio Perm									0.04			
v/c Ratio	0.95	0.46		0.98	0.98		0.72	0.96	0.10	0.98	0.71	
Uniform Delay, d1	38.0	32.1		39.3	37.2		42.3	27.8	18.6	39.8	20.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	40.2	0.5		52.2	31.1		23.9	15.7	0.1	54.3	1.5	
Delay (s)	78.3	32.6		91.5	68.3		66.2	43.5	18.7	94.1	22.2	
Level of Service	E	C		F	E		E	D	B	F	C	
Approach Delay (s)		52.4			74.0			41.9			33.7	
Approach LOS		D			E			D			C	

Intersection Summary			
HCM Average Control Delay	47.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	90.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	314	41	101	402	116	251
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	341	45	110	437	126	273
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			386		1020	364
vC1, stage 1 conf vol					364	
vC2, stage 2 conf vol					657	
vCu, unblocked vol			386		1020	364
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			91		65	60
cM capacity (veh/h)			1173		357	681

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	386	110	437	399
Volume Left	0	110	0	126
Volume Right	45	0	0	273
cSH	1700	1173	1700	530
Volume to Capacity	0.23	0.09	0.26	0.75
Queue Length 95th (ft)	0	8	0	163
Control Delay (s)	0.0	8.4	0.0	29.7
Lane LOS		A		D
Approach Delay (s)	0.0	1.7		29.7
Approach LOS				D

Intersection Summary			
Average Delay	9.6		
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	275	7	70	458	9	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	299	8	76	498	10	59
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			307		953	303
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			307		953	303
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		96	92
cM capacity (veh/h)			1254		270	737

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	307	76	498	68
Volume Left	0	76	0	10
Volume Right	8	0	0	59
cSH	1700	1254	1700	591
Volume to Capacity	0.18	0.06	0.29	0.12
Queue Length 95th (ft)	0	5	0	10
Control Delay (s)	0.0	8.1	0.0	11.9
Lane LOS		A		B
Approach Delay (s)	0.0	1.1		11.9
Approach LOS				B

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	34.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	2	3	59	3	13	2	320	63	9	122	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	2	3	64	3	14	2	348	68	10	133	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	555	573	133	543	540	382	134			416		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	555	573	133	543	540	382	134			416		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	100	86	99	98	100			99		
cM capacity (veh/h)	427	425	916	443	444	665	1451			1143		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	7	82	418	143
Volume Left	1	64	2	10
Volume Right	3	14	68	1
cSH	581	471	1451	1143
Volume to Capacity	0.01	0.17	0.00	0.01
Queue Length 95th (ft)	1	16	0	1
Control Delay (s)	11.3	14.2	0.1	0.6
Lane LOS	B	B	A	A
Approach Delay (s)	11.3	14.2	0.1	0.6
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	38.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.97		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3447		1770	3418		1770	3451		1770	3485	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3447		1770	3418		1770	3451		1770	3485	
Volume (vph)	46	709	149	103	737	219	190	586	117	180	327	37
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	771	162	112	801	238	207	637	127	196	355	40
RTOR Reduction (vph)	0	23	0	0	36	0	0	23	0	0	11	0
Lane Group Flow (vph)	50	910	0	112	1003	0	207	741	0	196	384	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	2.2	21.8		4.5	24.1		11.0	18.6		9.7	17.3	
Effective Green, g (s)	2.2	21.8		4.5	24.1		11.0	18.6		9.7	17.3	
Actuated g/C Ratio	0.03	0.31		0.06	0.34		0.16	0.26		0.14	0.25	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	55	1064		113	1167		276	909		243	854	
v/s Ratio Prot	0.03	0.26		c0.06	c0.29		c0.12	c0.21		0.11	0.11	
v/s Ratio Perm												
v/c Ratio	0.91	0.86		0.99	0.86		0.75	0.82		0.81	0.45	
Uniform Delay, d1	34.1	22.9		33.0	21.7		28.5	24.4		29.5	22.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	87.5	6.9		81.6	6.5		10.9	5.7		17.5	0.4	
Delay (s)	121.6	29.8		114.7	28.2		39.4	30.1		47.0	23.0	
Level of Service	F	C		F	C		D	C		D	C	
Approach Delay (s)		34.5			36.6			32.1			31.0	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	33.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	70.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	9	0	34	0	92	6	30	84	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	10	0	37	0	100	7	33	91	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	297	264	92	260	261	103	92			107		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	297	264	92	260	261	103	92			107		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	99	100	96	100			98		
cM capacity (veh/h)	619	628	966	681	630	952	1502			1484		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	47	107	125
Volume Left	0	10	0	33
Volume Right	0	37	7	1
cSH	1700	879	1502	1484
Volume to Capacity	0.00	0.05	0.00	0.02
Queue Length 95th (ft)	0	4	0	2
Control Delay (s)	0.0	9.3	0.0	2.1
Lane LOS	A	A		A
Approach Delay (s)	0.0	9.3	0.0	2.1
Approach LOS	A	A		

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	22.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	2	5	0	1	4	52	0	27	1	47	37	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	5	0	1	4	57	0	29	1	51	40	9

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	8	62	30	100
Volume Left (vph)	2	1	0	51
Volume Right (vph)	0	57	1	9
Hadj (s)	0.09	-0.51	0.01	0.08
Departure Headway (s)	4.3	3.7	4.1	4.2
Degree Utilization, x	0.01	0.06	0.04	0.12
Capacity (veh/h)	798	941	839	849
Control Delay (s)	7.4	6.9	7.3	7.7
Approach Delay (s)	7.4	6.9	7.3	7.7
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.4		
HCM Level of Service	A		
Intersection Capacity Utilization	21.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	9	22	3	4	34	7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	24	3	4	37	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	87	5			8	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	87	5			8	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	98			98	
cM capacity (veh/h)	893	1078			1613	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	34	8	45
Volume Left	10	0	37
Volume Right	24	4	0
cSH	1017	1700	1613
Volume to Capacity	0.03	0.00	0.02
Queue Length 95th (ft)	3	0	2
Control Delay (s)	8.7	0.0	6.1
Lane LOS	A		A
Approach Delay (s)	8.7	0.0	6.1
Approach LOS	A		

Intersection Summary			
Average Delay	6.5		
Intersection Capacity Utilization	18.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	4	155	3	74	127	168	3	18	41	132	11	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	168	3	80	138	183	3	20	45	143	12	7

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	89	88	149	252	67	162
Volume Left (vph)	4	0	80	0	3	143
Volume Right (vph)	0	3	0	183	45	7
Hadj (s)	0.06	0.01	0.30	-0.47	-0.35	0.19
Departure Headway (s)	5.7	5.6	5.7	4.9	5.1	5.5
Degree Utilization, x	0.14	0.14	0.24	0.34	0.10	0.25
Capacity (veh/h)	597	606	609	708	629	605
Control Delay (s)	8.4	8.3	9.2	9.2	8.7	10.3
Approach Delay (s)	8.3		9.2		8.7	10.3
Approach LOS	A		A		A	B

Intersection Summary			
Delay	9.2		
HCM Level of Service	A		
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	9	303	3	69	402	103	2	0	4	55	0	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	329	3	75	437	112	2	0	4	60	0	36
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	437			333			755	938	166	832	995	274
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	437			333			755	938	166	832	995	274
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			94			99	100	99	76	100	95
cM capacity (veh/h)	1119			1224			268	245	849	247	226	723

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	174	168	293	330	7	96
Volume Left	10	0	75	0	2	60
Volume Right	0	3	0	112	4	36
cSH	1119	1700	1224	1700	493	328
Volume to Capacity	0.01	0.10	0.06	0.19	0.01	0.29
Queue Length 95th (ft)	1	0	5	0	1	30
Control Delay (s)	0.5	0.0	2.5	0.0	12.4	20.5
Lane LOS	A		A		B	C
Approach Delay (s)	0.3		1.2		12.4	20.5
Approach LOS					B	C

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	2	337	23	51	542	1	31	0	48	0	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	366	25	55	589	1	34	0	52	0	0	1

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	185	208	350	296	86	1
Volume Left (vph)	2	0	55	0	34	0
Volume Right (vph)	0	25	0	1	52	1
Hadj (s)	0.04	-0.05	0.11	0.03	-0.25	-0.57
Departure Headway (s)	5.5	5.4	5.3	5.2	5.7	5.6
Degree Utilization, x	0.28	0.31	0.51	0.43	0.14	0.00
Capacity (veh/h)	640	649	668	679	583	566
Control Delay (s)	9.4	9.6	12.5	10.8	9.6	8.6
Approach Delay (s)	9.5		11.7		9.6	8.6
Approach LOS	A		B		A	A

Intersection Summary			
Delay	10.8		
HCM Level of Service	B		
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0				4.0	4.0		4.0	4.0		4.0
Lane Util. Factor	1.00	0.95				1.00	0.95		1.00	1.00		1.00
Frt	1.00	0.98				1.00	0.96		1.00	0.90		1.00
Flt Protected	0.95	1.00				0.95	1.00		0.95	1.00		0.95
Satd. Flow (prot)	1770	3481				1770	3397		1770	1682		1770
Flt Permitted	0.38	1.00				0.95	1.00		0.95	1.00		0.95
Satd. Flow (perm)	699	3481				1770	3397		1770	1682		1770
Volume (vph)	24	341	30	12	46	41	489	179	8	109	200	88
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	371	33	13	50	45	532	195	9	118	217	96
RTOR Reduction (vph)	0	0	0	0	0	0	55	0	0	99	0	0
Lane Group Flow (vph)	26	417	0	0	0	95	672	0	9	236	0	96
Turn Type	Perm				Prot	Prot			Split			Split
Protected Phases		4			3	3	8		1	1		6
Permitted Phases	4											
Actuated Green, G (s)	12.8	12.8				3.7	20.5		12.2	12.2		6.2
Effective Green, g (s)	12.8	12.8				3.7	20.5		12.2	12.2		6.2
Actuated g/C Ratio	0.21	0.21				0.06	0.33		0.20	0.20		0.10
Clearance Time (s)	4.0	4.0				4.0	4.0		4.0	4.0		4.0
Vehicle Extension (s)	3.0	3.0				3.0	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)	145	722				106	1129		350	333		178
v/s Ratio Prot		0.12				c0.05	c0.20		0.01	c0.14		0.05
v/s Ratio Perm	0.04											
v/c Ratio	0.18	0.58				0.90	0.59		0.03	0.71		0.54
Uniform Delay, d1	20.1	22.0				28.8	17.1		20.0	23.1		26.4
Progression Factor	1.00	1.00				1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.6	1.1				55.3	0.8		0.0	6.8		3.1
Delay (s)	20.7	23.1				84.1	18.0		20.0	29.9		29.5
Level of Service	C	C				F	B		B	C		C
Approach Delay (s)		23.0					25.6			29.6		
Approach LOS		C					C			C		

Intersection Summary			
HCM Average Control Delay	26.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	61.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0				4.0		
Lane Util. Factor	1.00				1.00		
Frt	0.93				0.91		
Flt Protected	1.00				0.98		
Satd. Flow (prot)	1733				1667		
Flt Permitted	1.00				0.98		
Satd. Flow (perm)	1733				1667		
Volume (vph)	61	20	32	11	17	43	12
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	66	22	35	12	18	47	13
RTOR Reduction (vph)	20	0	0	0	0	0	0
Lane Group Flow (vph)	103	0	0	0	90	0	0
Turn Type				Split			
Protected Phases	6			2	2		
Permitted Phases							
Actuated Green, G (s)	6.2				6.8		
Effective Green, g (s)	6.2				6.8		
Actuated g/C Ratio	0.10				0.11		
Clearance Time (s)	4.0				4.0		
Vehicle Extension (s)	3.0				3.0		
Lane Grp Cap (vph)	174				184		
v/s Ratio Prot	c0.06				c0.05		
v/s Ratio Perm							
v/c Ratio	0.59				0.49		
Uniform Delay, d1	26.5				25.8		
Progression Factor	1.00				1.00		
Incremental Delay, d2	5.3				2.0		
Delay (s)	31.9				27.9		
Level of Service	C				C		
Approach Delay (s)	30.8				27.9		
Approach LOS	C				C		

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frt		0.99			0.97		1.00	0.94		1.00	0.91	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3498			3425		1770	1745		1770	1700	
Flt Permitted		0.85			0.92		0.70	1.00		0.71	1.00	
Satd. Flow (perm)		2978			3156		1300	1745		1324	1700	
Volume (vph)	41	460	28	37	692	185	22	38	28	83	35	49
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	500	30	40	752	201	24	41	30	90	38	53
RTOR Reduction (vph)	0	9	0	0	50	0	0	22	0	0	0	0
Lane Group Flow (vph)	0	566	0	0	943	0	24	49	0	90	91	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		13.5			13.5		7.5	7.5		7.5	7.5	
Effective Green, g (s)		13.5			13.5		7.5	7.5		7.5	7.5	
Actuated g/C Ratio		0.47			0.47		0.26	0.26		0.26	0.26	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1386			1469		336	451		342	440	
v/s Ratio Prot								0.03			0.05	
v/s Ratio Perm		0.19			c0.30		0.02			c0.07		
v/c Ratio		0.41			0.64		0.07	0.11		0.26	0.21	
Uniform Delay, d1		5.1			5.9		8.1	8.2		8.6	8.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			1.0		0.1	0.1		0.4	0.2	
Delay (s)		5.3			6.9		8.2	8.3		9.0	8.7	
Level of Service		A			A		A	A		A	A	
Approach Delay (s)		5.3			6.9			8.3			8.8	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	29.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	0.97	
Frt	0.96		1.00	1.00	0.97	
Flt Protected	1.00		0.95	1.00	0.96	
Satd. Flow (prot)	3383		1770	3539	3365	
Flt Permitted	1.00		0.95	1.00	0.96	
Satd. Flow (perm)	3383		1770	3539	3365	
Volume (vph)	403	168	78	554	291	80
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	438	183	85	602	316	87
RTOR Reduction (vph)	92	0	0	0	56	0
Lane Group Flow (vph)	529	0	85	602	347	0
Turn Type			Prot			
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	11.4		2.9	18.3	9.3	
Effective Green, g (s)	11.4		2.9	18.3	9.3	
Actuated g/C Ratio	0.32		0.08	0.51	0.26	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1083		144	1819	879	
v/s Ratio Prot	c0.16		c0.05	0.17	c0.10	
v/s Ratio Perm						
v/c Ratio	0.49		0.59	0.33	0.39	
Uniform Delay, d1	9.8		15.8	5.1	10.8	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.3		6.3	0.1	0.3	
Delay (s)	10.1		22.1	5.2	11.1	
Level of Service	B		C	A	B	
Approach Delay (s)	10.1			7.3	11.1	
Approach LOS	B			A	B	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	35.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	41.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.98		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3520		1770	3413		1770	1818		1770	1750	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3520		1770	3413		1770	1818		1770	1750	
Volume (vph)	77	384	15	15	303	95	215	280	53	102	177	120
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	84	417	16	16	329	103	234	304	58	111	192	130
RTOR Reduction (vph)	0	4	0	0	52	0	0	11	0	0	0	0
Lane Group Flow (vph)	84	429	0	16	380	0	234	351	0	111	322	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	3.0	15.6		0.7	13.3		8.3	18.2		4.5	14.4	
Effective Green, g (s)	3.0	15.6		0.7	13.3		8.3	18.2		4.5	14.4	
Actuated g/C Ratio	0.05	0.28		0.01	0.24		0.15	0.33		0.08	0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	97	998		23	825		267	602		145	458	
v/s Ratio Prot	c0.05	c0.12		0.01	0.11		c0.13	c0.19		0.06	c0.18	
v/s Ratio Perm												
v/c Ratio	0.87	0.43		0.70	0.46		0.88	0.58		0.77	0.70	
Uniform Delay, d1	25.8	16.1		27.0	17.8		22.8	15.3		24.7	18.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	50.6	0.3		63.9	0.4		25.8	1.4		21.1	4.8	
Delay (s)	76.4	16.4		91.0	18.2		48.7	16.7		45.8	23.2	
Level of Service	E	B		F	B		D	B		D	C	
Approach Delay (s)		26.1			20.8			29.3			29.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0	4.0	4.0		4.0
Lane Util. Factor		0.95			0.95			0.91	0.95	0.95		1.00
Frt		0.98			0.97			1.00	1.00	1.00		1.00
Flt Protected		0.98			0.99			0.95	0.95	1.00		0.95
Satd. Flow (prot)		3404			3376			1610	1681	3523		1770
Flt Permitted		0.98			0.99			0.95	0.95	1.00		0.95
Satd. Flow (perm)		3404			3376			1610	1681	3523		1770
Volume (vph)	166	287	83	149	242	47	59	114	40	1264	39	77
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	180	312	90	162	263	51	64	124	43	1374	42	84
RTOR Reduction (vph)	0	15	0	0	11	0	0	0	0	2	0	0
Lane Group Flow (vph)	0	567	0	0	529	0	0	82	85	1414	0	84
Turn Type	Split			Split				Prot	Prot			Prot
Protected Phases	4	4		8	8			5	5	2		1
Permitted Phases												
Actuated Green, G (s)		17.8			16.8			7.7	7.7	42.4		5.0
Effective Green, g (s)		17.8			16.8			7.7	7.7	42.4		5.0
Actuated g/C Ratio		0.18			0.17			0.08	0.08	0.43		0.05
Clearance Time (s)		4.0			4.0			4.0	4.0	4.0		4.0
Vehicle Extension (s)		3.0			3.0			3.0	3.0	3.0		3.0
Lane Grp Cap (vph)		618			579			127	132	1524		90
v/s Ratio Prot		c0.17			c0.16			0.05	0.05	c0.40		c0.05
v/s Ratio Perm												
v/c Ratio		0.92			0.91			0.65	0.64	0.93		0.93
Uniform Delay, d1		39.4			39.9			43.8	43.8	26.3		46.3
Progression Factor		1.00			1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2		18.6			19.0			10.7	10.3	10.1		72.7
Delay (s)		57.9			58.9			54.6	54.1	36.4		119.0
Level of Service		E			E			D	D	D		F
Approach Delay (s)		57.9			58.9					38.3		
Approach LOS		E			E					D		

Intersection Summary			
HCM Average Control Delay	42.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	98.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	SER2
Lane Configurations				
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0
Lane Util. Factor	0.95			1.00
Frt	0.99			0.86
Flt Protected	1.00			1.00
Satd. Flow (prot)	3500			1611
Flt Permitted	1.00			1.00
Satd. Flow (perm)	3500			1611
Volume (vph)	909	64	7	14
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	988	70	8	15
RTOR Reduction (vph)	1	0	0	12
Lane Group Flow (vph)	1065	0	0	3
Turn Type				custom
Protected Phases	6			
Permitted Phases				1 4
Actuated Green, G (s)	39.7			22.8
Effective Green, g (s)	39.7			22.8
Actuated g/C Ratio	0.41			0.23
Clearance Time (s)	4.0			
Vehicle Extension (s)	3.0			
Lane Grp Cap (vph)	1418			375
v/s Ratio Prot	0.30			
v/s Ratio Perm				0.00
v/c Ratio	0.75			0.01
Uniform Delay, d1	24.9			28.9
Progression Factor	1.00			1.00
Incremental Delay, d2	2.3			0.0
Delay (s)	27.2			28.9
Level of Service	C			C
Approach Delay (s)	33.9			
Approach LOS	C			

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	7	27	54	283	82	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	29	59	308	89	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	366				257	212
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	366				257	212
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				88	98
cM capacity (veh/h)	1192				727	828

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	37	366	102
Volume Left	8	0	89
Volume Right	0	308	13
cSH	1192	1700	738
Volume to Capacity	0.01	0.22	0.14
Queue Length 95th (ft)	0	0	12
Control Delay (s)	1.7	0.0	10.7
Lane LOS	A		B
Approach Delay (s)	1.7	0.0	10.7
Approach LOS			B

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	32.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	34	44	67	378	170	39
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	37	48	73	411	185	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	762	206	185			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	762	206	185			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	94	95			
cM capacity (veh/h)	353	835	1390			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	37	48	484	227
Volume Left	37	0	73	0
Volume Right	0	48	0	42
cSH	353	835	1390	1700
Volume to Capacity	0.10	0.06	0.05	0.13
Queue Length 95th (ft)	9	5	4	0
Control Delay (s)	16.4	9.6	1.6	0.0
Lane LOS	C	A	A	
Approach Delay (s)	12.5		1.6	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frt		0.93			1.00	0.85		1.00	0.85		1.00	
Flt Protected		0.98			0.95	1.00		1.00	1.00		0.98	
Satd. Flow (prot)		1695			1775	1583		1863	1583		1831	
Flt Permitted		0.89			0.73	1.00		1.00	1.00		0.82	
Satd. Flow (perm)		1538			1355	1583		1862	1583		1531	
Volume (vph)	2	0	2	171	3	167	1	389	244	59	132	3
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	2	186	3	182	1	423	265	64	143	3
RTOR Reduction (vph)	0	1	0	0	0	133	0	0	124	0	1	0
Lane Group Flow (vph)	0	3	0	0	189	49	0	424	141	0	209	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		10.6			10.6	10.6		21.0	21.0		21.0	
Effective Green, g (s)		10.6			10.6	10.6		21.0	21.0		21.0	
Actuated g/C Ratio		0.27			0.27	0.27		0.53	0.53		0.53	
Clearance Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		412			363	424		987	839		812	
v/s Ratio Prot												
v/s Ratio Perm		0.00			c0.14	0.03		c0.23	0.09		0.14	
v/c Ratio		0.01			0.52	0.11		0.43	0.17		0.26	
Uniform Delay, d1		10.6			12.3	11.0		5.7	4.8		5.1	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		0.0			1.3	0.1		0.3	0.1		0.2	
Delay (s)		10.6			13.7	11.1		6.0	4.9		5.2	
Level of Service		B			B	B		A	A		A	
Approach Delay (s)		10.6			12.4			5.5			5.2	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	39.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		0.97	0.95	
Frt	1.00	0.98		1.00	0.95		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3464		1770	3364		1770	3527		3433	3521	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3464		1770	3364		1770	3527		3433	3521	
Volume (vph)	85	207	34	256	313	154	37	1306	30	212	947	33
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	225	37	278	340	167	40	1420	33	230	1029	36
RTOR Reduction (vph)	0	16	0	0	67	0	0	2	0	0	3	0
Lane Group Flow (vph)	92	246	0	278	440	0	40	1451	0	230	1062	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	11.2	11.2		15.4	15.4		4.6	37.8		6.0	39.2	
Effective Green, g (s)	11.2	11.2		15.4	15.4		4.6	37.8		6.0	39.2	
Actuated g/C Ratio	0.13	0.13		0.18	0.18		0.05	0.44		0.07	0.45	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	229	449		315	600		94	1543		238	1597	
v/s Ratio Prot	0.05	c0.07		c0.16	0.13		0.02	c0.41		c0.07	0.30	
v/s Ratio Perm												
v/c Ratio	0.40	0.55		0.88	0.73		0.43	0.94		0.97	0.67	
Uniform Delay, d1	34.5	35.2		34.6	33.6		39.6	23.2		40.1	18.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	1.4		23.9	4.6		3.1	11.6		48.4	1.1	
Delay (s)	35.7	36.6		58.5	38.2		42.7	34.9		88.5	19.5	
Level of Service	D	D		E	D		D	C		F	B	
Approach Delay (s)		36.4			45.4			35.1			31.8	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	36.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	86.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	58	29	27	18	23	8	39	455	9	11	252	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	63	32	29	20	25	9	42	495	10	12	274	15

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	124	53	547	301
Volume Left (vph)	63	20	42	12
Volume Right (vph)	29	9	10	15
Hadj (s)	-0.01	0.01	0.04	0.01
Departure Headway (s)	6.1	6.3	4.9	5.2
Degree Utilization, x	0.21	0.09	0.75	0.44
Capacity (veh/h)	526	494	712	657
Control Delay (s)	10.7	10.0	21.2	12.2
Approach Delay (s)	10.7	10.0	21.2	12.2
Approach LOS	B	A	C	B

Intersection Summary			
Delay	16.7		
HCM Level of Service	C		
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	22	181	203	291	130	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	197	221	316	141	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	907	149	157			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	907	149	157			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	78	84			
cM capacity (veh/h)	259	898	1423			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	24	197	537	157
Volume Left	24	0	221	0
Volume Right	0	197	0	15
cSH	259	898	1423	1700
Volume to Capacity	0.09	0.22	0.16	0.09
Queue Length 95th (ft)	8	21	14	0
Control Delay (s)	20.3	10.1	4.2	0.0
Lane LOS	C	B	A	
Approach Delay (s)	11.2		4.2	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	11	37	9	14	29	130	13	357	26	143	158	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	40	10	15	32	141	14	388	28	155	172	7

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	62	47	141	430	334
Volume Left (vph)	12	15	0	14	155
Volume Right (vph)	10	0	141	28	7
Hadj (s)	-0.02	0.20	-0.67	0.00	0.12
Departure Headway (s)	6.4	6.8	5.9	5.2	5.4
Degree Utilization, x	0.11	0.09	0.23	0.62	0.50
Capacity (veh/h)	464	474	541	667	635
Control Delay (s)	10.2	9.3	9.5	16.2	13.7
Approach Delay (s)	10.2	9.5		16.2	13.7
Approach LOS	B	A		C	B

Intersection Summary			
Delay	13.8		
HCM Level of Service	B		
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.97		1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3443		1770	3434		1770	3539	1583	1770	3493	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3443		1770	3434		1770	3539	1583	1770	3493	
Volume (vph)	355	430	95	270	265	65	20	1035	140	160	2615	250
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	386	467	103	293	288	71	22	1125	152	174	2842	272
RTOR Reduction (vph)	0	13	0	0	14	0	0	0	75	0	5	0
Lane Group Flow (vph)	386	557	0	293	345	0	22	1125	77	174	3109	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	22.0	21.0		17.0	16.0		2.3	75.5	75.5	18.9	92.1	
Effective Green, g (s)	22.0	21.0		17.0	16.0		2.3	75.5	75.5	18.9	92.1	
Actuated g/C Ratio	0.15	0.14		0.11	0.11		0.02	0.51	0.51	0.13	0.62	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	262	487		203	370		27	1801	805	225	2168	
v/s Ratio Prot	c0.22	c0.16		0.17	0.10		0.01	0.32		c0.10	c0.89	
v/s Ratio Perm									0.05			
v/c Ratio	1.47	1.14		1.44	0.93		0.81	0.62	0.10	0.77	1.43	
Uniform Delay, d1	63.2	63.7		65.7	65.7		72.8	26.2	18.8	62.7	28.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	232.6	86.7		225.1	29.9		95.3	0.7	0.1	15.2	198.1	
Delay (s)	295.8	150.4		290.8	95.5		168.1	26.9	18.9	77.8	226.3	
Level of Service	F	F		F	F		F	C	B	E	F	
Approach Delay (s)		209.1			183.3			28.4			218.4	
Approach LOS		F			F			C			F	

Intersection Summary			
HCM Average Control Delay	173.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.38		
Actuated Cycle Length (s)	148.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	126.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	705	125	275	290	45	145
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	766	136	299	315	49	158
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			902		1747	834
vC1, stage 1 conf vol					834	
vC2, stage 2 conf vol					913	
vCu, unblocked vol			902		1747	834
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			60		70	57
cM capacity (veh/h)			753		162	368

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	902	299	315	207
Volume Left	0	299	0	49
Volume Right	136	0	0	158
cSH	1700	753	1700	283
Volume to Capacity	0.53	0.40	0.19	0.73
Queue Length 95th (ft)	0	48	0	131
Control Delay (s)	0.0	12.9	0.0	45.7
Lane LOS		B		E
Approach Delay (s)	0.0	6.3		45.7
Approach LOS				E

Intersection Summary			
Average Delay	7.7		
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	695	10	60	270	5	85
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	755	11	65	293	5	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			766		1185	761
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			766		1185	761
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			92		97	77
cM capacity (veh/h)			847		193	405

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	766	65	293	98
Volume Left	0	65	0	5
Volume Right	11	0	0	92
cSH	1700	847	1700	382
Volume to Capacity	0.45	0.08	0.17	0.26
Queue Length 95th (ft)	0	6	0	25
Control Delay (s)	0.0	9.6	0.0	17.6
Lane LOS		A		C
Approach Delay (s)	0.0	1.7		17.6
Approach LOS				C

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	5	5	50	5	10	5	100	95	10	700	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	5	54	5	11	5	109	103	11	761	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	967	1005	761	962	954	160	761			212		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	967	1005	761	962	954	160	761			212		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	99	76	98	99	99			99		
cM capacity (veh/h)	224	238	405	226	255	885	851			1358		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	11	71	217	772
Volume Left	0	54	5	11
Volume Right	5	11	103	0
cSH	300	258	851	1358
Volume to Capacity	0.04	0.27	0.01	0.01
Queue Length 95th (ft)	3	27	0	1
Control Delay (s)	17.5	24.2	0.3	0.2
Lane LOS	C	C	A	A
Approach Delay (s)	17.5	24.2	0.3	0.2
Approach LOS	C	C		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	0.97		1.00	0.94		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3330		1770	3430		1770	3341		1770	3516	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3330		1770	3430		1770	3341		1770	3516	
Volume (vph)	30	440	285	370	580	150	180	235	140	205	1090	50
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	478	310	402	630	163	196	255	152	223	1185	54
RTOR Reduction (vph)	0	116	0	0	24	0	0	92	0	0	4	0
Lane Group Flow (vph)	33	672	0	402	769	0	196	315	0	223	1235	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	3.0	17.6		18.0	32.6		9.0	24.4		15.6	31.0	
Effective Green, g (s)	3.0	17.6		18.0	32.6		9.0	24.4		15.6	31.0	
Actuated g/C Ratio	0.03	0.19		0.20	0.36		0.10	0.27		0.17	0.34	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	58	640		348	1221		174	890		301	1190	
v/s Ratio Prot	0.02	c0.20		c0.23	0.22		c0.11	0.09		0.13	c0.35	
v/s Ratio Perm												
v/c Ratio	0.57	1.05		1.16	0.63		1.13	0.35		0.74	1.04	
Uniform Delay, d1	43.7	37.0		36.8	24.5		41.3	27.2		36.1	30.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.2	49.2		97.4	1.0		106.2	0.2		9.4	36.4	
Delay (s)	55.8	86.2		134.2	25.5		147.5	27.5		45.5	66.7	
Level of Service	E	F		F	C		F	C		D	E	
Approach Delay (s)		85.0			62.1			66.5			63.5	
Approach LOS		F			E			E			E	

Intersection Summary			
HCM Average Control Delay	67.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	91.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	96.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	10	0	15	10	20	0	80	80	30	150	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	11	0	16	11	22	0	87	87	33	163	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	389	405	166	367	364	130	168			174		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	389	405	166	367	364	130	168			174		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	98	100	97	98	98	100			98		
cM capacity (veh/h)	539	522	879	570	551	919	1409			1403		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	16	49	174	201
Volume Left	5	16	0	33
Volume Right	0	22	87	5
cSH	528	679	1409	1403
Volume to Capacity	0.03	0.07	0.00	0.02
Queue Length 95th (ft)	2	6	0	2
Control Delay (s)	12.0	10.7	0.0	1.4
Lane LOS	B	B		A
Approach Delay (s)	12.0	10.7	0.0	1.4
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	32.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	5	0	5	5	135	0	50	5	80	55	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	0	5	5	147	0	54	5	87	60	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	11	158	60	152
Volume Left (vph)	5	5	0	87
Volume Right (vph)	0	147	5	5
Hadj (s)	0.13	-0.52	-0.02	0.13
Departure Headway (s)	4.7	3.9	4.4	4.4
Degree Utilization, x	0.01	0.17	0.07	0.19
Capacity (veh/h)	722	881	774	770
Control Delay (s)	7.8	7.7	7.8	8.5
Approach Delay (s)	7.8	7.7	7.8	8.5
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.0		
HCM Level of Service	A		
Intersection Capacity Utilization	29.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	10	65	5	0	35	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	71	5	0	38	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	87	5			5	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	87	5			5	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	93			98	
cM capacity (veh/h)	893	1078			1616	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	82	5	43
Volume Left	11	0	38
Volume Right	71	0	0
cSH	1049	1700	1616
Volume to Capacity	0.08	0.00	0.02
Queue Length 95th (ft)	6	0	2
Control Delay (s)	8.7	0.0	6.4
Lane LOS	A		A
Approach Delay (s)	8.7	0.0	6.4
Approach LOS	A		

Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	20.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	165	0	25	120	80	0	5	75	270	5	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	179	0	27	130	87	0	5	82	293	5	5

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	95	90	92	152	87	304
Volume Left (vph)	5	0	27	0	0	293
Volume Right (vph)	0	0	0	87	82	5
Hadj (s)	0.06	0.03	0.18	-0.37	-0.53	0.22
Departure Headway (s)	6.0	6.0	6.1	5.5	5.0	5.4
Degree Utilization, x	0.16	0.15	0.16	0.23	0.12	0.45
Capacity (veh/h)	556	560	556	612	648	639
Control Delay (s)	8.9	8.8	9.0	9.0	8.7	12.7
Approach Delay (s)	8.9		9.0		8.7	12.7
Approach LOS	A		A		A	B

Intersection Summary			
Delay	10.3		
HCM Level of Service	B		
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	500	0	0	250	40	5	0	5	115	5	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	543	0	0	272	43	5	0	5	125	5	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	272			543			726	837	272	592	859	158
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	272			543			726	837	272	592	859	158
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			98	100	99	67	98	97
cM capacity (veh/h)	1289			1022			298	299	726	384	290	860

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	283	272	136	179	11	152
Volume Left	11	0	0	0	5	125
Volume Right	0	0	0	43	5	22
cSH	1289	1700	1022	1700	423	412
Volume to Capacity	0.01	0.16	0.00	0.11	0.03	0.37
Queue Length 95th (ft)	1	0	0	0	2	42
Control Delay (s)	0.4	0.0	0.0	0.0	13.7	18.8
Lane LOS	A				B	C
Approach Delay (s)	0.2		0.0		13.7	18.8
Approach LOS					B	C

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	600	20	30	280	0	10	0	50	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	652	22	33	304	0	11	0	54	0	0	0

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	326	348	185	152	65	0
Volume Left (vph)	0	0	33	0	11	0
Volume Right (vph)	0	22	0	0	54	0
Hadj (s)	0.03	-0.01	0.12	0.03	-0.43	0.00
Departure Headway (s)	5.0	5.0	5.5	5.4	5.4	6.0
Degree Utilization, x	0.46	0.48	0.28	0.23	0.10	0.00
Capacity (veh/h)	702	707	637	647	606	550
Control Delay (s)	11.0	11.4	9.4	8.7	9.0	9.0
Approach Delay (s)	11.2		9.1		9.0	0.0
Approach LOS	B		A		A	A

Intersection Summary			
Delay	10.4		
HCM Level of Service	B		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0				4.0	4.0		4.0	4.0		4.0
Lane Util. Factor	1.00	0.95				1.00	0.95		1.00	1.00		1.00
Frt	1.00	0.96				1.00	0.97		1.00	0.96		1.00
Flt Protected	0.95	1.00				0.95	1.00		0.95	1.00		0.95
Satd. Flow (prot)	1770	3396				1770	3438		1770	1783		1770
Flt Permitted	0.52	1.00				0.95	1.00		0.95	1.00		0.95
Satd. Flow (perm)	965	3396				1770	3438		1770	1783		1770
Volume (vph)	25	530	170	25	25	35	295	70	20	75	30	195
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	576	185	27	27	38	321	76	22	82	33	212
RTOR Reduction (vph)	0	0	0	0	0	0	16	0	0	12	0	0
Lane Group Flow (vph)	27	788	0	0	0	65	381	0	22	103	0	212
Turn Type	Perm				Prot	Prot			Split			Split
Protected Phases		4			3	3	8		1	1		6
Permitted Phases	4											
Actuated Green, G (s)	30.0	30.0				5.0	39.0		12.1	12.1		49.0
Effective Green, g (s)	30.0	30.0				5.0	39.0		12.1	12.1		49.0
Actuated g/C Ratio	0.24	0.24				0.04	0.31		0.10	0.10		0.39
Clearance Time (s)	4.0	4.0				4.0	4.0		4.0	4.0		4.0
Vehicle Extension (s)	3.0	3.0				3.0	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)	230	808				70	1063		170	171		688
v/s Ratio Prot		c0.23				c0.04	0.11		0.01	c0.06		0.12
v/s Ratio Perm	0.03											
v/c Ratio	0.12	0.98				0.93	0.36		0.13	0.60		0.31
Uniform Delay, d1	37.7	47.7				60.4	33.8		52.2	54.7		26.8
Progression Factor	1.00	1.00				1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.2	25.4				82.1	0.2		0.3	5.9		0.3
Delay (s)	37.9	73.1				142.4	34.0		52.5	60.6		27.0
Level of Service	D	E				F	C		D	E		C
Approach Delay (s)		72.0					49.3			59.3		
Approach LOS		E					D			E		

Intersection Summary			
HCM Average Control Delay	64.6	HCM Level of Service	E
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	126.1	Sum of lost time (s)	20.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0				4.0		
Lane Util. Factor	1.00				1.00		
Frt	0.98				0.96		
Flt Protected	1.00				0.97		
Satd. Flow (prot)	1820				1722		
Flt Permitted	1.00				0.97		
Satd. Flow (perm)	1820				1722		
Volume (vph)	545	50	50	25	55	15	25
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	592	54	54	27	60	16	27
RTOR Reduction (vph)	2	0	0	0	0	0	0
Lane Group Flow (vph)	698	0	0	0	130	0	0
Turn Type				Split			
Protected Phases	6			2	2		
Permitted Phases							
Actuated Green, G (s)	49.0				10.0		
Effective Green, g (s)	49.0				10.0		
Actuated g/C Ratio	0.39				0.08		
Clearance Time (s)	4.0				4.0		
Vehicle Extension (s)	3.0				3.0		
Lane Grp Cap (vph)	707				137		
v/s Ratio Prot	c0.38				c0.08		
v/s Ratio Perm							
v/c Ratio	0.99				0.95		
Uniform Delay, d1	38.2				57.8		
Progression Factor	1.00				1.00		
Incremental Delay, d2	30.2				60.6		
Delay (s)	68.4				118.4		
Level of Service	E				F		
Approach Delay (s)	58.8				118.4		
Approach LOS	E				F		

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frt		1.00			0.96		1.00	0.94		1.00	0.93	
Flt Protected		0.99			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3505			3383		1770	1760		1770	1723	
Flt Permitted		0.74			0.92		0.65	1.00		0.69	1.00	
Satd. Flow (perm)		2601			3131		1206	1760		1286	1723	
Volume (vph)	110	740	20	15	395	165	15	60	35	545	80	80
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	804	22	16	429	179	16	65	38	592	87	87
RTOR Reduction (vph)	0	2	0	0	66	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	944	0	0	558	0	16	83	0	592	174	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		24.5			24.5		30.4	30.4		30.4	30.4	
Effective Green, g (s)		24.5			24.5		30.4	30.4		30.4	30.4	
Actuated g/C Ratio		0.39			0.39		0.48	0.48		0.48	0.48	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1013			1220		583	851		622	833	
v/s Ratio Prot								0.05			0.10	
v/s Ratio Perm		c0.36			0.18		0.01			c0.46		
v/c Ratio		0.93			0.46		0.03	0.10		0.95	0.21	
Uniform Delay, d1		18.4			14.3		8.5	8.8		15.5	9.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		14.6			0.3		0.0	0.1		24.6	0.1	
Delay (s)		33.0			14.5		8.5	8.9		40.2	9.5	
Level of Service		C			B		A	A		D	A	
Approach Delay (s)		33.0			14.5			8.8			33.2	
Approach LOS		C			B			A			C	

Intersection Summary			
HCM Average Control Delay	27.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	62.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	0.97	
Frt	0.95		1.00	1.00	0.93	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3376		1770	3539	3277	
Flt Permitted	1.00		0.95	1.00	0.97	
Satd. Flow (perm)	3376		1770	3539	3277	
Volume (vph)	935	415	145	415	160	135
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1016	451	158	451	174	147
RTOR Reduction (vph)	71	0	0	0	124	0
Lane Group Flow (vph)	1396	0	158	451	197	0
Turn Type			Prot			
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	27.1		7.1	38.2	8.4	
Effective Green, g (s)	27.1		7.1	38.2	8.4	
Actuated g/C Ratio	0.50		0.13	0.70	0.15	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1676		230	2476	504	
v/s Ratio Prot	c0.41		c0.09	0.13	c0.06	
v/s Ratio Perm						
v/c Ratio	0.83		0.69	0.18	0.39	
Uniform Delay, d1	11.8		22.7	2.8	20.8	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	3.7		8.2	0.0	0.5	
Delay (s)	15.5		30.9	2.9	21.3	
Level of Service	B		C	A	C	
Approach Delay (s)	15.5			10.1	21.3	
Approach LOS	B			B	C	

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	54.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3421		1770	3511		1770	1818		1770	1809	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3421		1770	3511		1770	1818		1770	1809	
Volume (vph)	110	850	245	45	365	20	105	160	30	175	295	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	924	266	49	397	22	114	174	33	190	321	76
RTOR Reduction (vph)	0	32	0	0	5	0	0	9	0	0	0	0
Lane Group Flow (vph)	120	1158	0	49	414	0	114	198	0	190	397	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	7.1	26.5		2.0	21.4		5.0	15.4		8.2	18.6	
Effective Green, g (s)	7.1	26.5		2.0	21.4		5.0	15.4		8.2	18.6	
Actuated g/C Ratio	0.10	0.39		0.03	0.31		0.07	0.23		0.12	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	185	1331		52	1103		130	411		213	494	
v/s Ratio Prot	c0.07	c0.34		0.03	0.12		0.06	0.11		c0.11	c0.22	
v/s Ratio Perm												
v/c Ratio	0.65	0.87		0.94	0.38		0.88	0.48		0.89	0.80	
Uniform Delay, d1	29.3	19.2		33.0	18.2		31.2	22.9		29.5	23.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.6	6.3		102.9	0.2		43.7	0.9		33.9	9.2	
Delay (s)	36.9	25.5		135.9	18.4		74.9	23.8		63.4	32.2	
Level of Service	D	C		F	B		E	C		E	C	
Approach Delay (s)		26.6			30.7			41.9			42.3	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	32.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	68.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0	4.0	4.0		4.0
Lane Util. Factor		0.95			0.95			0.91	0.95	0.95		1.00
Frt		0.96			0.97			1.00	1.00	0.99		1.00
Flt Protected		0.99			0.99			0.95	0.95	1.00		0.95
Satd. Flow (prot)		3374			3384			1610	1681	3515		1770
Flt Permitted		0.99			0.99			0.95	0.95	1.00		0.95
Satd. Flow (perm)		3374			3384			1610	1681	3515		1770
Volume (vph)	235	515	230	130	215	50	35	75	30	930	45	735
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	255	560	250	141	234	54	38	82	33	1011	49	799
RTOR Reduction (vph)	0	19	0	0	4	0	0	0	0	2	0	0
Lane Group Flow (vph)	0	1046	0	0	463	0	0	56	59	1058	0	799
Turn Type	Split			Split				Prot	Prot			Prot
Protected Phases	4	4		8	8			5	5	2		1
Permitted Phases												
Actuated Green, G (s)		35.0			18.0			4.0	4.0	35.0		46.0
Effective Green, g (s)		35.0			18.0			4.0	4.0	35.0		46.0
Actuated g/C Ratio		0.23			0.12			0.03	0.03	0.23		0.31
Clearance Time (s)		4.0			4.0			4.0	4.0	4.0		4.0
Vehicle Extension (s)		3.0			3.0			3.0	3.0	3.0		3.0
Lane Grp Cap (vph)		787			406			43	45	820		543
v/s Ratio Prot		c0.31			c0.14			0.03	0.04	0.30		c0.45
v/s Ratio Perm												
v/c Ratio		1.33			1.14			1.30	1.31	1.29		1.47
Uniform Delay, d1		57.5			66.0			73.0	73.0	57.5		52.0
Progression Factor		1.00			1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2		156.7			88.4			238.8	238.8	139.6		222.0
Delay (s)		214.2			154.4			311.8	311.8	197.1		274.0
Level of Service		F			F			F	F	F		F
Approach Delay (s)		214.2			154.4					208.3		
Approach LOS		F			F					F		

Intersection Summary			
HCM Average Control Delay	192.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	122.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	SER2
Lane Configurations				
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0
Lane Util. Factor	0.95			1.00
Frt	0.99			0.86
Flt Protected	1.00			1.00
Satd. Flow (prot)	3501			1611
Flt Permitted	1.00			1.00
Satd. Flow (perm)	3501			1611
Volume (vph)	1910	130	20	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2076	141	22	5
RTOR Reduction (vph)	0	0	0	2
Lane Group Flow (vph)	2239	0	0	3
Turn Type				custom
Protected Phases	6			
Permitted Phases				1 4
Actuated Green, G (s)	77.0			81.0
Effective Green, g (s)	77.0			81.0
Actuated g/C Ratio	0.51			0.54
Clearance Time (s)	4.0			
Vehicle Extension (s)	3.0			
Lane Grp Cap (vph)	1797			870
v/s Ratio Prot	c0.64			
v/s Ratio Perm				0.00
v/c Ratio	1.25			0.00
Uniform Delay, d1	36.5			15.9
Progression Factor	1.00			1.00
Incremental Delay, d2	115.4			0.0
Delay (s)	151.9			15.9
Level of Service	F			B
Approach Delay (s)	184.0			
Approach LOS	F			

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	75	35	50	750	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	82	38	54	815	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	92				168	65
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	92				168	65
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				0	99
cM capacity (veh/h)	1502				816	999

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	92	92	826
Volume Left	11	0	815
Volume Right	0	54	11
cSH	1502	1700	818
Volume to Capacity	0.01	0.05	1.01
Queue Length 95th (ft)	1	0	453
Control Delay (s)	0.9	0.0	56.5
Lane LOS	A		F
Approach Delay (s)	0.9	0.0	56.5
Approach LOS			F

Intersection Summary			
Average Delay	46.2		
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	35	270	90	180	500	180
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	293	98	196	543	196
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1033	641	543			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1033	641	543			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	84	38	90			
cM capacity (veh/h)	233	475	1025			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	38	293	293	739
Volume Left	38	0	98	0
Volume Right	0	293	0	196
cSH	233	475	1025	1700
Volume to Capacity	0.16	0.62	0.10	0.43
Queue Length 95th (ft)	14	103	8	0
Control Delay (s)	23.4	24.1	3.6	0.0
Lane LOS	C	C	A	
Approach Delay (s)	24.0		3.6	0.0
Approach LOS	C			

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frt		1.00			1.00	0.85		1.00	0.85		1.00	
Flt Protected		0.98			0.95	1.00		1.00	1.00		0.98	
Satd. Flow (prot)		1817			1770	1583		1863	1583		1829	
Flt Permitted		0.87			0.75	1.00		1.00	1.00		0.79	
Satd. Flow (perm)		1620			1399	1583		1863	1583		1474	
Volume (vph)	5	5	0	225	0	115	0	195	265	230	385	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	5	0	245	0	125	0	212	288	250	418	0
RTOR Reduction (vph)	0	0	0	0	0	94	0	0	115	0	0	0
Lane Group Flow (vph)	0	10	0	0	245	31	0	212	173	0	668	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		12.8			12.8	12.8		31.2	31.2		31.2	
Effective Green, g (s)		12.8			12.8	12.8		31.2	31.2		31.2	
Actuated g/C Ratio		0.25			0.25	0.25		0.60	0.60		0.60	
Clearance Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		399			344	390		1118	950		884	
v/s Ratio Prot								0.11				
v/s Ratio Perm		0.01			c0.18	0.02			0.11		c0.45	
v/c Ratio		0.03			0.71	0.08		0.19	0.18		0.76	
Uniform Delay, d1		14.9			17.9	15.1		4.7	4.7		7.6	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		0.0			6.8	0.1		0.1	0.1		3.7	
Delay (s)		14.9			24.7	15.2		4.8	4.8		11.3	
Level of Service		B			C	B		A	A		B	
Approach Delay (s)		14.9			21.5			4.8			11.3	
Approach LOS		B			C			A			B	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	52.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		0.97	0.95	
Frt	1.00	0.96		1.00	0.95		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3383		1770	3376		1770	3526		3433	3528	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3383		1770	3376		1770	3526		3433	3528	
Volume (vph)	95	370	155	375	190	85	60	975	25	435	1660	35
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	402	168	408	207	92	65	1060	27	473	1804	38
RTOR Reduction (vph)	0	33	0	0	36	0	0	1	0	0	1	0
Lane Group Flow (vph)	103	537	0	408	263	0	65	1086	0	473	1841	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	20.0	20.0		30.0	30.0		5.0	52.5		21.5	69.0	
Effective Green, g (s)	20.0	20.0		30.0	30.0		5.0	52.5		21.5	69.0	
Actuated g/C Ratio	0.14	0.14		0.21	0.21		0.04	0.38		0.15	0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	253	483		379	723		63	1322		527	1739	
v/s Ratio Prot	0.06	c0.16		c0.23	0.08		0.04	c0.31		0.14	c0.52	
v/s Ratio Perm												
v/c Ratio	0.41	1.11		1.08	0.36		1.03	0.82		0.90	1.06	
Uniform Delay, d1	54.6	60.0		55.0	46.9		67.5	39.5		58.2	35.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	75.4		68.2	0.3		122.5	4.2		17.8	39.0	
Delay (s)	55.7	135.4		123.2	47.2		190.0	43.7		76.0	74.5	
Level of Service	E	F		F	D		F	D		E	E	
Approach Delay (s)		123.2			91.0			52.0			74.8	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM Average Control Delay	78.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	35	65	235	100	100	10	25	210	65	10	505	120
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	71	255	109	109	11	27	228	71	11	549	130

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	364	228	326	690
Volume Left (vph)	38	109	27	11
Volume Right (vph)	255	11	71	130
Hadj (s)	-0.37	0.10	-0.08	-0.08
Departure Headway (s)	7.4	8.3	7.6	7.2
Degree Utilization, x	0.75	0.53	0.69	1.39
Capacity (veh/h)	470	397	449	506
Control Delay (s)	28.9	20.2	26.1	207.1
Approach Delay (s)	28.9	20.2	26.1	207.1
Approach LOS	D	C	D	F

Intersection Summary			
Delay	103.6		
HCM Level of Service	F		
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	10	190	610	180	295	70
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	207	663	196	321	76
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1880	359	397			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1880	359	397			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	68	70	43			
cM capacity (veh/h)	34	686	1162			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	11	207	859	397
Volume Left	11	0	663	0
Volume Right	0	207	0	76
cSH	34	686	1162	1700
Volume to Capacity	0.32	0.30	0.57	0.23
Queue Length 95th (ft)	26	32	94	0
Control Delay (s)	157.0	12.5	11.2	0.0
Lane LOS	F	B	B	
Approach Delay (s)	19.7		11.2	0.0
Approach LOS	C			

Intersection Summary			
Average Delay	9.4		
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	40	20	20	45	435	20	350	20	110	335	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	43	22	22	49	473	22	380	22	120	364	38

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	87	71	473	424	522
Volume Left (vph)	22	22	0	22	120
Volume Right (vph)	22	0	473	22	38
Hadj (s)	-0.07	0.19	-0.67	0.01	0.04
Departure Headway (s)	9.1	8.0	7.2	7.4	7.4
Degree Utilization, x	0.22	0.16	0.94	0.87	1.07
Capacity (veh/h)	373	436	492	470	486
Control Delay (s)	14.6	11.3	53.1	43.1	87.3
Approach Delay (s)	14.6	47.7		43.1	87.3
Approach LOS	B	E		E	F

Intersection Summary			
Delay	57.7		
HCM Level of Service	F		
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.97		1.00	0.93		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3439		1770	3277		1770	3539	1583	1770	3479	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3439		1770	3277		1770	3539	1583	1770	3479	
Volume (vph)	280	300	70	250	425	415	75	1720	175	225	1440	185
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	304	326	76	272	462	451	82	1870	190	245	1565	201
RTOR Reduction (vph)	0	13	0	0	118	0	0	0	60	0	6	0
Lane Group Flow (vph)	304	389	0	272	795	0	82	1870	130	245	1760	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	21.0	25.2		25.8	30.0		7.0	66.0	66.0	17.0	76.0	
Effective Green, g (s)	21.0	25.2		25.8	30.0		7.0	66.0	66.0	17.0	76.0	
Actuated g/C Ratio	0.14	0.17		0.17	0.20		0.05	0.44	0.44	0.11	0.51	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	248	578		304	655		83	1557	697	201	1763	
v/s Ratio Prot	c0.17	0.11		c0.15	c0.24		0.05	c0.53		c0.14	0.51	
v/s Ratio Perm									0.08			
v/c Ratio	1.23	0.67		0.89	1.21		0.99	1.20	0.19	1.22	1.00	
Uniform Delay, d1	64.5	58.5		60.8	60.0		71.5	42.0	25.6	66.5	36.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	132.0	3.1		26.6	110.1		93.9	96.9	0.1	134.9	20.8	
Delay (s)	196.5	61.6		87.3	170.1		165.4	138.9	25.7	201.4	57.7	
Level of Service	F	E		F	F		F	F	C	F	E	
Approach Delay (s)		119.7			151.1			129.9			75.2	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM Average Control Delay	114.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	113.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	370	50	130	545	120	295
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	402	54	141	592	130	321
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			457		1304	429
vC1, stage 1 conf vol					429	
vC2, stage 2 conf vol					875	
vCu, unblocked vol			457		1304	429
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			87		52	49
cM capacity (veh/h)			1104		272	626

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	457	141	592	451
Volume Left	0	141	0	130
Volume Right	54	0	0	321
cSH	1700	1104	1700	455
Volume to Capacity	0.27	0.13	0.35	0.99
Queue Length 95th (ft)	0	11	0	320
Control Delay (s)	0.0	8.7	0.0	70.6
Lane LOS		A		F
Approach Delay (s)	0.0	1.7		70.6
Approach LOS				F

Intersection Summary			
Average Delay	20.2		
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	325	10	150	540	10	65
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	353	11	163	587	11	71
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			364		1272	359
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			364		1272	359
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			86		93	90
cM capacity (veh/h)			1194		160	686

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	364	163	587	82
Volume Left	0	163	0	11
Volume Right	11	0	0	71
cSH	1700	1194	1700	477
Volume to Capacity	0.21	0.14	0.35	0.17
Queue Length 95th (ft)	0	12	0	15
Control Delay (s)	0.0	8.5	0.0	14.1
Lane LOS		A		B
Approach Delay (s)	0.0	1.8		14.1
Approach LOS				B

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	40.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	5	105	5	15	0	785	75	10	150	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	114	5	16	0	853	82	11	163	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1098	1120	163	1084	1079	894	163			935		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1098	1120	163	1084	1079	894	163			935		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	40	97	95	100			99		
cM capacity (veh/h)	176	204	882	191	215	340	1416			732		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	5	136	935	174
Volume Left	0	114	0	11
Volume Right	5	16	82	0
cSH	882	203	1416	732
Volume to Capacity	0.01	0.67	0.00	0.01
Queue Length 95th (ft)	0	102	0	1
Control Delay (s)	9.1	52.9	0.0	0.8
Lane LOS	A	F		A
Approach Delay (s)	9.1	52.9	0.0	0.8
Approach LOS	A	F		

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.96		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3366		1770	3405		1770	3430		1770	3488	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3366		1770	3405		1770	3430		1770	3488	
Volume (vph)	70	720	350	275	795	270	225	1220	315	215	370	40
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	76	783	380	299	864	293	245	1326	342	234	402	43
RTOR Reduction (vph)	0	40	0	0	22	0	0	15	0	0	5	0
Lane Group Flow (vph)	76	1123	0	299	1135	0	245	1653	0	234	440	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	7.0	40.0		20.0	53.0		24.6	59.0		15.0	49.4	
Effective Green, g (s)	7.0	40.0		20.0	53.0		24.6	59.0		15.0	49.4	
Actuated g/C Ratio	0.05	0.27		0.13	0.35		0.16	0.39		0.10	0.33	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	83	898		236	1203		290	1349		177	1149	
v/s Ratio Prot	0.04	c0.33		c0.17	0.33		0.14	c0.48		c0.13	0.13	
v/s Ratio Perm												
v/c Ratio	0.92	1.25		1.27	0.94		0.84	1.23		1.32	0.38	
Uniform Delay, d1	71.2	55.0		65.0	47.0		60.8	45.5		67.5	38.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	70.5	122.2		149.3	14.4		19.6	108.2		178.8	0.2	
Delay (s)	141.7	177.2		214.3	61.5		80.5	153.7		246.3	38.8	
Level of Service	F	F		F	E		F	F		F	D	
Approach Delay (s)		175.0			92.8			144.3			110.3	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	133.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	115.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	70	25	40	0	290	15	30	100	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	76	27	43	0	315	16	33	109	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	554	505	109	497	497	323	109			332		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	554	505	109	497	497	323	109			332		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	84	94	94	100			97		
cM capacity (veh/h)	389	457	945	473	462	718	1482			1228		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	147	332	141
Volume Left	0	76	0	33
Volume Right	0	43	16	0
cSH	1700	524	1482	1228
Volume to Capacity	0.00	0.28	0.00	0.03
Queue Length 95th (ft)	0	28	0	2
Control Delay (s)	0.0	14.5	0.0	2.0
Lane LOS	A	B		A
Approach Delay (s)	0.0	14.5	0.0	2.0
Approach LOS	A	B		

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	5	0	0	5	120	0	70	5	125	75	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	0	0	5	130	0	76	5	136	82	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	5	136	82	228
Volume Left (vph)	0	0	0	136
Volume Right (vph)	0	130	5	11
Hadj (s)	0.03	-0.54	-0.01	0.12
Departure Headway (s)	4.8	4.1	4.5	4.4
Degree Utilization, x	0.01	0.15	0.10	0.28
Capacity (veh/h)	683	816	768	780
Control Delay (s)	7.8	7.8	8.0	9.1
Approach Delay (s)	7.8	7.8	8.0	9.1
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.5		
HCM Level of Service	A		
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	10	30	5	5	70	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	33	5	5	76	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	171	8			11	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	171	8			11	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	97			95	
cM capacity (veh/h)	780	1074			1608	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	43	11	87
Volume Left	11	0	76
Volume Right	33	5	0
cSH	981	1700	1608
Volume to Capacity	0.04	0.01	0.05
Queue Length 95th (ft)	3	0	4
Control Delay (s)	8.8	0.0	6.5
Lane LOS	A		A
Approach Delay (s)	8.8	0.0	6.5
Approach LOS	A		

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	21.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	45	185	5	90	150	190	5	55	50	145	15	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	49	201	5	98	163	207	5	60	54	158	16	11

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	149	106	179	288	120	185
Volume Left (vph)	49	0	98	0	5	158
Volume Right (vph)	0	5	0	207	54	11
Hadj (s)	0.20	0.00	0.31	-0.47	-0.23	0.17
Departure Headway (s)	6.3	6.1	6.1	5.3	5.8	6.0
Degree Utilization, x	0.26	0.18	0.31	0.43	0.19	0.31
Capacity (veh/h)	538	557	563	648	551	550
Control Delay (s)	10.3	9.2	10.6	11.1	10.2	11.7
Approach Delay (s)	9.8		10.9		10.2	11.7
Approach LOS	A		B		B	B

Intersection Summary			
Delay	10.7		
HCM Level of Service	B		
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	360	5	80	430	120	0	0	5	65	0	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	391	5	87	467	130	0	0	5	71	0	43
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	467			397			867	1057	198	929	1125	299
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	467			397			867	1057	198	929	1125	299
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			92			100	100	99	66	100	94
cM capacity (veh/h)	1090			1158			217	205	809	207	187	697

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	207	201	321	364	5	114
Volume Left	11	0	87	0	0	71
Volume Right	0	5	0	130	5	43
cSH	1090	1700	1158	1700	809	282
Volume to Capacity	0.01	0.12	0.08	0.21	0.01	0.40
Queue Length 95th (ft)	1	0	6	0	1	47
Control Delay (s)	0.5	0.0	2.8	0.0	9.5	26.2
Lane LOS	A		A		A	D
Approach Delay (s)	0.3		1.3		9.5	26.2
Approach LOS					A	D

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	405	25	55	595	0	35	0	50	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	440	27	60	647	0	38	0	54	0	0	0

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	293	174	383	323	92	0
Volume Left (vph)	0	0	60	0	38	0
Volume Right (vph)	0	27	0	0	54	0
Hadj (s)	0.03	-0.08	0.11	0.03	-0.24	0.00
Departure Headway (s)	5.6	5.5	5.4	5.3	5.9	6.4
Degree Utilization, x	0.46	0.27	0.58	0.48	0.15	0.00
Capacity (veh/h)	619	633	652	662	559	510
Control Delay (s)	12.0	9.3	14.3	11.9	10.0	9.4
Approach Delay (s)	11.0		13.2		10.0	0.0
Approach LOS	B		B		A	A

Intersection Summary			
Delay	12.2		
HCM Level of Service	B		
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0				4.0	4.0		4.0	4.0		4.0
Lane Util. Factor	1.00	0.95				1.00	0.95		1.00	1.00		1.00
Frt	1.00	0.97				1.00	0.95		1.00	0.95		1.00
Flt Protected	0.95	1.00				0.95	1.00		0.95	1.00		0.95
Satd. Flow (prot)	1770	3439				1770	3350		1770	1760		1770
Flt Permitted	0.25	1.00				0.95	1.00		0.95	1.00		0.95
Satd. Flow (perm)	469	3439				1770	3350		1770	1760		1770
Volume (vph)	30	405	80	15	55	90	615	340	55	345	200	105
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	440	87	16	60	98	668	370	60	375	217	114
RTOR Reduction (vph)	0	0	0	0	0	0	84	0	0	23	0	0
Lane Group Flow (vph)	33	543	0	0	0	158	954	0	60	569	0	114
Turn Type	Perm				Prot	Prot			Split			Split
Protected Phases		4			3	3	8		1	1		6
Permitted Phases	4											
Actuated Green, G (s)	15.9	15.9				8.0	27.9		28.0	28.0		10.0
Effective Green, g (s)	15.9	15.9				8.0	27.9		28.0	28.0		10.0
Actuated g/C Ratio	0.18	0.18				0.09	0.31		0.31	0.31		0.11
Clearance Time (s)	4.0	4.0				4.0	4.0		4.0	4.0		4.0
Vehicle Extension (s)	3.0	3.0				3.0	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)	83	608				158	1040		551	548		197
v/s Ratio Prot		0.16				0.09	c0.28		0.03	c0.32		0.06
v/s Ratio Perm	0.07											
v/c Ratio	0.40	0.89				1.00	0.92		0.11	1.04		0.58
Uniform Delay, d1	32.8	36.2				41.0	29.9		22.1	31.0		37.9
Progression Factor	1.00	1.00				1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2	3.1	15.4				71.6	12.3		0.1	48.5		4.1
Delay (s)	35.9	51.6				112.6	42.2		22.1	79.5		42.0
Level of Service	D	D				F	D		C	E		D
Approach Delay (s)		50.7					51.5			74.2		
Approach LOS		D					D			E		

Intersection Summary			
HCM Average Control Delay	61.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	89.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0				4.0		
Lane Util. Factor	1.00				1.00		
Frt	0.95				0.92		
Flt Protected	1.00				0.98		
Satd. Flow (prot)	1773				1676		
Flt Permitted	1.00				0.98		
Satd. Flow (perm)	1773				1676		
Volume (vph)	135	25	40	20	20	50	15
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	147	27	43	22	22	54	16
RTOR Reduction (vph)	10	0	0	0	0	0	0
Lane Group Flow (vph)	207	0	0	0	114	0	0
Turn Type				Split			
Protected Phases	6			2	2		
Permitted Phases							
Actuated Green, G (s)	10.0				8.0		
Effective Green, g (s)	10.0				8.0		
Actuated g/C Ratio	0.11				0.09		
Clearance Time (s)	4.0				4.0		
Vehicle Extension (s)	3.0				3.0		
Lane Grp Cap (vph)	197				149		
v/s Ratio Prot	c0.12				c0.07		
v/s Ratio Perm							
v/c Ratio	1.05				0.77		
Uniform Delay, d1	40.0				40.0		
Progression Factor	1.00				1.00		
Incremental Delay, d2	78.5				20.6		
Delay (s)	118.4				60.6		
Level of Service	F				E		
Approach Delay (s)	92.1				60.6		
Approach LOS	F				E		

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frt		0.99			0.97		1.00	0.93		1.00	0.93	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3486			3410		1770	1741		1770	1723	
Flt Permitted		0.75			0.91		0.69	1.00		0.70	1.00	
Satd. Flow (perm)		2634			3116		1280	1741		1305	1723	
Volume (vph)	60	545	45	45	915	290	25	45	35	200	50	50
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	592	49	49	995	315	27	49	38	217	54	54
RTOR Reduction (vph)	0	10	0	0	51	0	0	28	0	0	0	0
Lane Group Flow (vph)	0	696	0	0	1308	0	27	59	0	217	108	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		23.9			23.9		12.0	12.0		12.0	12.0	
Effective Green, g (s)		23.9			23.9		12.0	12.0		12.0	12.0	
Actuated g/C Ratio		0.54			0.54		0.27	0.27		0.27	0.27	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1434			1696		350	476		357	471	
v/s Ratio Prot								0.03			0.06	
v/s Ratio Perm		0.26			c0.42		0.02			c0.17		
v/c Ratio		0.49			0.77		0.08	0.12		0.61	0.23	
Uniform Delay, d1		6.2			7.9		11.8	12.0		13.9	12.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			2.2		0.1	0.1		2.9	0.2	
Delay (s)		6.5			10.1		11.9	12.1		16.8	12.6	
Level of Service		A			B		B	B		B	B	
Approach Delay (s)		6.5			10.1			12.1			15.4	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	43.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	0.97	
Frt	0.96		1.00	1.00	0.97	
Flt Protected	1.00		0.95	1.00	0.96	
Satd. Flow (prot)	3392		1770	3539	3373	
Flt Permitted	1.00		0.95	1.00	0.96	
Satd. Flow (perm)	3392		1770	3539	3373	
Volume (vph)	520	200	90	880	395	95
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	565	217	98	957	429	103
RTOR Reduction (vph)	77	0	0	0	47	0
Lane Group Flow (vph)	705	0	98	957	485	0
Turn Type			Prot			
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	13.7		2.5	20.2	11.1	
Effective Green, g (s)	13.7		2.5	20.2	11.1	
Actuated g/C Ratio	0.35		0.06	0.51	0.28	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1182		113	1819	953	
v/s Ratio Prot	0.21		c0.06	c0.27	c0.14	
v/s Ratio Perm						
v/c Ratio	0.60		0.87	0.53	0.51	
Uniform Delay, d1	10.5		18.2	6.4	11.8	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.8		45.7	0.3	0.4	
Delay (s)	11.3		64.0	6.6	12.2	
Level of Service	B		E	A	B	
Approach Delay (s)	11.3			12.0	12.2	
Approach LOS	B			B	B	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	39.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.97		1.00	0.97		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3525		1770	3449		1770	1812		1770	1767	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3525		1770	3449		1770	1812		1770	1767	
Volume (vph)	90	525	15	20	565	115	260	295	65	200	230	120
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	571	16	22	614	125	283	321	71	217	250	130
RTOR Reduction (vph)	0	3	0	0	24	0	0	11	0	0	0	0
Lane Group Flow (vph)	98	584	0	22	715	0	283	381	0	217	380	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	3.7	18.9		1.5	16.7		12.9	22.0		8.8	17.9	
Effective Green, g (s)	3.7	18.9		1.5	16.7		12.9	22.0		8.8	17.9	
Actuated g/C Ratio	0.06	0.28		0.02	0.25		0.19	0.33		0.13	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	97	991		40	857		340	593		232	471	
v/s Ratio Prot	c0.06	0.17		0.01	c0.21		c0.16	0.21		0.12	c0.22	
v/s Ratio Perm												
v/c Ratio	1.01	0.59		0.55	0.83		0.83	0.64		0.94	0.81	
Uniform Delay, d1	31.8	20.8		32.5	23.9		26.1	19.3		28.9	23.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	94.2	0.9		15.3	7.0		15.8	2.4		41.2	9.8	
Delay (s)	125.9	21.7		47.9	31.0		41.9	21.6		70.2	32.8	
Level of Service	F	C		D	C		D	C		E	C	
Approach Delay (s)		36.6			31.5			30.1			46.4	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM Average Control Delay	35.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0	4.0	4.0		4.0
Lane Util. Factor		0.95			0.95			0.91	0.95	0.95		1.00
Frt		0.95			0.95			1.00	1.00	1.00		1.00
Flt Protected		0.99			0.99			0.95	0.95	1.00		0.95
Satd. Flow (prot)		3315			3343			1610	1681	3526		1770
Flt Permitted		0.99			0.99			0.95	0.95	1.00		0.95
Satd. Flow (perm)		3315			3343			1610	1681	3526		1770
Volume (vph)	195	325	275	175	400	180	70	135	100	1705	45	345
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	212	353	299	190	435	196	76	147	109	1853	49	375
RTOR Reduction (vph)	0	46	0	0	5	0	0	0	0	1	0	0
Lane Group Flow (vph)	0	818	0	0	892	0	0	126	130	1901	0	375
Turn Type	Split			Split				Prot	Prot			Prot
Protected Phases	4	4		8	8			5	5	2		1
Permitted Phases												
Actuated Green, G (s)		27.0			29.0			12.0	12.0	57.0		21.0
Effective Green, g (s)		27.0			29.0			12.0	12.0	57.0		21.0
Actuated g/C Ratio		0.18			0.19			0.08	0.08	0.38		0.14
Clearance Time (s)		4.0			4.0			4.0	4.0	4.0		4.0
Vehicle Extension (s)		3.0			3.0			3.0	3.0	3.0		3.0
Lane Grp Cap (vph)		597			646			129	134	1340		248
v/s Ratio Prot		c0.25			c0.27			0.08	0.08	c0.54		c0.21
v/s Ratio Perm												
v/c Ratio		1.37			1.38			0.98	0.97	1.42		1.51
Uniform Delay, d1		61.5			60.5			68.9	68.8	46.5		64.5
Progression Factor		1.00			1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2		177.1			181.0			71.4	68.3	192.8		250.2
Delay (s)		238.6			241.5			140.2	137.1	239.3		314.7
Level of Service		F			F			F	F	F		F
Approach Delay (s)		238.6			241.5					227.3		
Approach LOS		F			F					F		

Intersection Summary			
HCM Average Control Delay	192.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.42		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	128.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	SER2
Lane Configurations				
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0
Lane Util. Factor	0.95			1.00
Frt	0.99			0.86
Flt Protected	1.00			1.00
Satd. Flow (prot)	3506			1611
Flt Permitted	1.00			1.00
Satd. Flow (perm)	3506			1611
Volume (vph)	1285	75	10	15
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1397	82	11	16
RTOR Reduction (vph)	1	0	0	11
Lane Group Flow (vph)	1489	0	0	5
Turn Type				custom
Protected Phases	6			
Permitted Phases				1 4
Actuated Green, G (s)	66.0			48.0
Effective Green, g (s)	66.0			48.0
Actuated g/C Ratio	0.44			0.32
Clearance Time (s)	4.0			
Vehicle Extension (s)	3.0			
Lane Grp Cap (vph)	1543			516
v/s Ratio Prot	0.42			
v/s Ratio Perm				0.00
v/c Ratio	0.97			0.01
Uniform Delay, d1	40.9			34.8
Progression Factor	1.00			1.00
Incremental Delay, d2	15.3			0.0
Delay (s)	56.2			34.8
Level of Service	E			C
Approach Delay (s)	108.2			
Approach LOS	F			

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	30	65	675	190	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	33	71	734	207	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	804				492	438
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	804				492	438
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				61	97
cM capacity (veh/h)	820				529	619

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	43	804	223
Volume Left	11	0	207
Volume Right	0	734	16
cSH	820	1700	535
Volume to Capacity	0.01	0.47	0.42
Queue Length 95th (ft)	1	0	51
Control Delay (s)	2.5	0.0	16.5
Lane LOS	A		C
Approach Delay (s)	2.5	0.0	16.5
Approach LOS			C

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	40	130	165	500	170	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	141	179	543	185	49
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1111	209	185			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1111	209	185			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	78	83	87			
cM capacity (veh/h)	201	831	1390			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	43	141	723	234
Volume Left	43	0	179	0
Volume Right	0	141	0	49
cSH	201	831	1390	1700
Volume to Capacity	0.22	0.17	0.13	0.14
Queue Length 95th (ft)	20	15	11	0
Control Delay (s)	27.7	10.2	3.1	0.0
Lane LOS	D	B	A	
Approach Delay (s)	14.3		3.1	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor					1.00	1.00		1.00	1.00		1.00	
Frt					1.00	0.85		1.00	0.85		1.00	
Flt Protected					0.95	1.00		1.00	1.00		0.98	
Satd. Flow (prot)					1776	1583		1863	1583		1830	
Flt Permitted					0.73	1.00		1.00	1.00		0.79	
Satd. Flow (perm)					1361	1583		1863	1583		1461	
Volume (vph)	0	0	0	205	5	205	0	460	290	70	155	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	223	5	223	0	500	315	76	168	5
RTOR Reduction (vph)	0	0	0	0	0	148	0	0	167	0	2	0
Lane Group Flow (vph)	0	0	0	0	228	75	0	500	148	0	247	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)					11.0	11.0		16.8	16.8		16.8	
Effective Green, g (s)					11.0	11.0		16.8	16.8		16.8	
Actuated g/C Ratio					0.31	0.31		0.47	0.47		0.47	
Clearance Time (s)					4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)					3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)					418	486		874	743		686	
v/s Ratio Prot								c0.27				
v/s Ratio Perm					c0.17	0.05			0.09		0.17	
v/c Ratio					0.55	0.16		0.57	0.20		0.36	
Uniform Delay, d1					10.3	9.0		6.9	5.6		6.1	
Progression Factor					1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2					1.5	0.1		0.9	0.1		0.3	
Delay (s)					11.8	9.2		7.8	5.7		6.4	
Level of Service					B	A		A	A		A	
Approach Delay (s)		0.0			10.5			7.0			6.4	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	35.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		0.97	0.95	
Frt	1.00	0.98		1.00	0.94		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3460		1770	3323		1770	3524		3433	3520	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3460		1770	3323		1770	3524		3433	3520	
Volume (vph)	100	225	40	305	420	290	45	1720	50	380	1185	45
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	245	43	332	457	315	49	1870	54	413	1288	49
RTOR Reduction (vph)	0	10	0	0	83	0	0	1	0	0	2	0
Lane Group Flow (vph)	109	278	0	332	689	0	49	1923	0	413	1335	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	15.2	15.2		27.0	27.0		27.5	75.8		16.0	64.3	
Effective Green, g (s)	15.2	15.2		27.0	27.0		27.5	75.8		16.0	64.3	
Actuated g/C Ratio	0.10	0.10		0.18	0.18		0.18	0.51		0.11	0.43	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	179	351		319	598		325	1781		366	1509	
v/s Ratio Prot	0.06	c0.08		0.19	c0.21		0.03	c0.55		c0.12	0.38	
v/s Ratio Perm												
v/c Ratio	0.61	0.79		1.04	1.15		0.15	1.08		1.13	0.88	
Uniform Delay, d1	64.6	65.9		61.5	61.5		51.4	37.1		67.0	39.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.8	11.6		61.4	86.6		0.2	46.3		86.6	6.6	
Delay (s)	70.3	77.5		122.9	148.1		51.7	83.4		153.6	46.0	
Level of Service	E	E		F	F		D	F		F	D	
Approach Delay (s)		75.5			140.5			82.7			71.4	
Approach LOS		E			F			F			E	

Intersection Summary			
HCM Average Control Delay	90.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	99.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	75	35	35	25	30	10	50	580	10	15	345	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	38	38	27	33	11	54	630	11	16	375	22

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	158	71	696	413
Volume Left (vph)	82	27	54	16
Volume Right (vph)	38	11	11	22
Hadj (s)	-0.01	0.02	0.04	0.01
Departure Headway (s)	6.9	7.2	5.5	5.7
Degree Utilization, x	0.30	0.14	1.05	0.66
Capacity (veh/h)	495	451	669	610
Control Delay (s)	12.8	11.4	73.2	19.0
Approach Delay (s)	12.8	11.4	73.2	19.0
Approach LOS	B	B	F	C

Intersection Summary			
Delay	46.1		
HCM Level of Service	E		
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

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HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	30	235	255	365	170	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	255	277	397	185	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1147	196	207			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1147	196	207			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	81	70	80			
cM capacity (veh/h)	175	846	1365			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	33	255	674	207
Volume Left	33	0	277	0
Volume Right	0	255	0	22
cSH	175	846	1365	1700
Volume to Capacity	0.19	0.30	0.20	0.12
Queue Length 95th (ft)	17	32	19	0
Control Delay (s)	30.1	11.1	4.7	0.0
Lane LOS	D	B	A	
Approach Delay (s)	13.2		4.7	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	15	45	10	20	35	165	15	445	35	185	205	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	49	11	22	38	179	16	484	38	201	223	11

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	76	60	179	538	435
Volume Left (vph)	16	22	0	16	201
Volume Right (vph)	11	0	179	38	11
Hadj (s)	-0.01	0.22	-0.67	0.00	0.11
Departure Headway (s)	7.6	7.7	6.8	5.8	6.1
Degree Utilization, x	0.16	0.13	0.34	0.87	0.73
Capacity (veh/h)	424	437	496	612	572
Control Delay (s)	12.0	10.6	12.0	34.8	23.8
Approach Delay (s)	12.0	11.7		34.8	23.8
Approach LOS	B	B		D	C

Intersection Summary			
Delay	25.5		
HCM Level of Service	D		
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	0.91		1.00	0.91	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3443		1770	3539	1583	1770	4994		1770	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3443		1770	3539	1583	1770	4994		1770	5085	1583
Volume (vph)	355	430	95	270	265	65	20	1035	140	160	2615	250
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	386	467	103	293	288	71	22	1125	152	174	2842	272
RTOR Reduction (vph)	0	14	0	0	0	63	0	13	0	0	0	78
Lane Group Flow (vph)	386	556	0	293	288	8	22	1264	0	174	2842	194
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	24.0	19.1		20.0	15.1	15.1	2.3	56.5		16.9	71.1	71.1
Effective Green, g (s)	24.0	19.1		20.0	15.1	15.1	2.3	56.5		16.9	71.1	71.1
Actuated g/C Ratio	0.19	0.15		0.16	0.12	0.12	0.02	0.44		0.13	0.55	0.55
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	641	512		275	416	186	32	2196		233	2814	876
v/s Ratio Prot	0.11	c0.16		c0.17	0.08		0.01	0.25		c0.10	c0.56	
v/s Ratio Perm						0.01						0.12
v/c Ratio	0.60	1.09		1.07	0.69	0.04	0.69	0.58		0.75	1.01	0.22
Uniform Delay, d1	47.9	54.7		54.2	54.5	50.3	62.7	27.0		53.7	28.7	14.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.6	64.8		72.7	4.9	0.1	47.1	0.4		12.3	19.4	0.1
Delay (s)	49.5	119.5		126.9	59.4	50.4	109.8	27.4		66.0	48.1	14.7
Level of Service	D	F		F	E	D	F	C		E	D	B
Approach Delay (s)		91.2			88.8			28.8			46.3	
Approach LOS		F			F			C			D	

Intersection Summary			
HCM Average Control Delay	54.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	128.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	1.00	1.00	
Frt	0.98		1.00	1.00	0.90	
Flt Protected	1.00		0.95	1.00	0.99	
Satd. Flow (prot)	1825		1770	1863	1651	
Flt Permitted	1.00		0.26	1.00	0.99	
Satd. Flow (perm)	1825		478	1863	1651	
Volume (vph)	705	125	275	290	45	145
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	766	136	299	315	49	158
RTOR Reduction (vph)	6	0	0	0	138	0
Lane Group Flow (vph)	896	0	299	315	69	0
Turn Type			Perm			
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	58.0		58.0	58.0	8.9	
Effective Green, g (s)	58.0		58.0	58.0	8.9	
Actuated g/C Ratio	0.77		0.77	0.77	0.12	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1413		370	1443	196	
v/s Ratio Prot	0.49			0.17	c0.04	
v/s Ratio Perm			c0.63			
v/c Ratio	0.63		0.81	0.22	0.35	
Uniform Delay, d1	3.7		5.1	2.3	30.3	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.9		12.2	0.1	1.1	
Delay (s)	4.7		17.3	2.4	31.4	
Level of Service	A		B	A	C	
Approach Delay (s)	4.7			9.6	31.4	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	74.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	695	10	60	270	5	85
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	755	11	65	293	5	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			766		1185	761
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			766		1185	761
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			92		97	77
cM capacity (veh/h)			847		193	405

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	766	65	293	98
Volume Left	0	65	0	5
Volume Right	11	0	0	92
cSH	1700	847	1700	382
Volume to Capacity	0.45	0.08	0.17	0.26
Queue Length 95th (ft)	0	6	0	25
Control Delay (s)	0.0	9.6	0.0	17.6
Lane LOS		A		C
Approach Delay (s)	0.0	1.7		17.6
Approach LOS				C

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	5	5	50	5	10	5	100	95	10	700	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	5	54	5	11	5	109	103	11	761	0

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	11	71	60	158	391	380
Volume Left (vph)	0	54	5	0	11	0
Volume Right (vph)	5	11	0	103	0	0
Hadj (s)	-0.27	0.10	0.08	-0.42	0.05	0.03
Departure Headway (s)	5.6	5.8	5.6	5.1	5.0	5.0
Degree Utilization, x	0.02	0.11	0.09	0.22	0.54	0.53
Capacity (veh/h)	577	565	616	678	708	712
Control Delay (s)	8.7	9.6	8.0	8.4	12.6	12.2
Approach Delay (s)	8.7	9.6	8.2		12.4	
Approach LOS	A	A	A		B	

Intersection Summary			
Delay	11.3		
HCM Level of Service	B		
Intersection Capacity Utilization	43.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	0.91		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.94		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	3433	3430		1770	4800		1770	3516	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	3433	3430		1770	4800		1770	3516	
Volume (vph)	30	440	285	370	580	150	180	235	140	205	1090	50
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	478	310	402	630	163	196	255	152	223	1185	54
RTOR Reduction (vph)	0	0	222	0	25	0	0	102	0	0	4	0
Lane Group Flow (vph)	33	478	88	402	768	0	196	305	0	223	1235	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	2.3	16.8	16.8	11.9	26.4		11.6	29.2		15.4	33.0	
Effective Green, g (s)	2.3	16.8	16.8	11.9	26.4		11.6	29.2		15.4	33.0	
Actuated g/C Ratio	0.03	0.19	0.19	0.13	0.30		0.13	0.33		0.17	0.37	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	46	666	298	457	1014		230	1570		305	1299	
v/s Ratio Prot	0.02	0.14		c0.12	c0.22		c0.11	0.06		0.13	c0.35	
v/s Ratio Perm			0.06									
v/c Ratio	0.72	0.72	0.29	0.88	0.76		0.85	0.19		0.73	0.95	
Uniform Delay, d1	43.2	34.0	31.2	38.0	28.5		38.0	21.6		35.0	27.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	41.5	3.7	0.6	17.3	3.3		24.9	0.1		8.7	14.8	
Delay (s)	84.7	37.7	31.7	55.3	31.8		62.9	21.7		43.7	42.2	
Level of Service	F	D	C	E	C		E	C		D	D	
Approach Delay (s)		37.3			39.7			35.1			42.4	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	39.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	89.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	10	0	15	10	20	0	80	80	30	150	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	11	0	16	11	22	0	87	87	33	163	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	16	49	174	201
Volume Left (vph)	5	16	0	33
Volume Right (vph)	0	22	87	5
Hadj (s)	0.10	-0.17	-0.27	0.05
Departure Headway (s)	4.9	4.6	4.0	4.3
Degree Utilization, x	0.02	0.06	0.19	0.24
Capacity (veh/h)	673	720	872	814
Control Delay (s)	8.0	7.9	8.0	8.6
Approach Delay (s)	8.0	7.9	8.0	8.6
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.2		
HCM Level of Service	A		
Intersection Capacity Utilization	32.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	5	0	5	5	135	0	50	5	80	55	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	0	5	5	147	0	54	5	87	60	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	11	158	60	152
Volume Left (vph)	5	5	0	87
Volume Right (vph)	0	147	5	5
Hadj (s)	0.13	-0.52	-0.02	0.13
Departure Headway (s)	4.7	3.9	4.4	4.4
Degree Utilization, x	0.01	0.17	0.07	0.19
Capacity (veh/h)	722	881	774	770
Control Delay (s)	7.8	7.7	7.8	8.5
Approach Delay (s)	7.8	7.7	7.8	8.5
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.0		
HCM Level of Service	A		
Intersection Capacity Utilization	29.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	10	65	5	0	35	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	71	5	0	38	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	87	5			5	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	87	5			5	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	93			98	
cM capacity (veh/h)	893	1078			1616	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	82	5	43
Volume Left	11	0	38
Volume Right	71	0	0
cSH	1049	1700	1616
Volume to Capacity	0.08	0.00	0.02
Queue Length 95th (ft)	6	0	2
Control Delay (s)	8.7	0.0	6.4
Lane LOS	A		A
Approach Delay (s)	8.7	0.0	6.4
Approach LOS	A		

Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	20.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	165	0	25	120	80	0	5	75	270	5	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	179	0	27	130	87	0	5	82	293	5	5

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	95	90	92	152	87	304
Volume Left (vph)	5	0	27	0	0	293
Volume Right (vph)	0	0	0	87	82	5
Hadj (s)	0.06	0.03	0.18	-0.37	-0.53	0.22
Departure Headway (s)	6.0	6.0	6.1	5.5	5.0	5.4
Degree Utilization, x	0.16	0.15	0.16	0.23	0.12	0.45
Capacity (veh/h)	556	560	556	612	648	639
Control Delay (s)	8.9	8.8	9.0	9.0	8.7	12.7
Approach Delay (s)	8.9		9.0		8.7	12.7
Approach LOS	A		A		A	B

Intersection Summary			
Delay	10.3		
HCM Level of Service	B		
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	500	0	0	250	40	5	0	5	115	5	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	543	0	0	272	43	5	0	5	125	5	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	272			543			726	837	272	592	859	158
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	272			543			726	837	272	592	859	158
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			98	100	99	67	98	97
cM capacity (veh/h)	1289			1022			298	299	726	384	290	860

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	283	272	136	179	11	152
Volume Left	11	0	0	0	5	125
Volume Right	0	0	0	43	5	22
cSH	1289	1700	1022	1700	423	412
Volume to Capacity	0.01	0.16	0.00	0.11	0.03	0.37
Queue Length 95th (ft)	1	0	0	0	2	42
Control Delay (s)	0.4	0.0	0.0	0.0	13.7	18.8
Lane LOS	A				B	C
Approach Delay (s)	0.2		0.0		13.7	18.8
Approach LOS					B	C

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	600	20	30	280	0	10	0	50	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	652	22	33	304	0	11	0	54	0	0	0

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	326	348	185	152	65	0
Volume Left (vph)	0	0	33	0	11	0
Volume Right (vph)	0	22	0	0	54	0
Hadj (s)	0.03	-0.01	0.12	0.03	-0.43	0.00
Departure Headway (s)	5.0	5.0	5.5	5.4	5.4	6.0
Degree Utilization, x	0.46	0.48	0.28	0.23	0.10	0.00
Capacity (veh/h)	702	707	637	647	606	550
Control Delay (s)	11.0	11.4	9.4	8.7	9.0	9.0
Approach Delay (s)	11.2		9.1		9.0	0.0
Approach LOS	B		A		A	A

Intersection Summary			
Delay	10.4		
HCM Level of Service	B		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0				4.0	4.0		4.0	4.0		4.0
Lane Util. Factor	1.00	0.95				1.00	0.95		1.00	1.00		1.00
Frt	1.00	0.96				1.00	0.97		1.00	0.96		1.00
Flt Protected	0.95	1.00				0.95	1.00		0.95	1.00		0.95
Satd. Flow (prot)	1770	3396				1770	3438		1770	1783		1770
Flt Permitted	0.52	1.00				0.95	1.00		0.95	1.00		0.95
Satd. Flow (perm)	965	3396				1770	3438		1770	1783		1770
Volume (vph)	25	530	170	25	25	35	295	70	20	75	30	195
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	576	185	27	27	38	321	76	22	82	33	212
RTOR Reduction (vph)	0	0	0	0	0	0	16	0	0	12	0	0
Lane Group Flow (vph)	27	788	0	0	0	65	381	0	22	103	0	212
Turn Type	Perm				Prot	Prot			Split			Split
Protected Phases		4			3	3	8		1	1		6
Permitted Phases	4											
Actuated Green, G (s)	30.0	30.0				5.0	39.0		12.1	12.1		49.0
Effective Green, g (s)	30.0	30.0				5.0	39.0		12.1	12.1		49.0
Actuated g/C Ratio	0.24	0.24				0.04	0.31		0.10	0.10		0.39
Clearance Time (s)	4.0	4.0				4.0	4.0		4.0	4.0		4.0
Vehicle Extension (s)	3.0	3.0				3.0	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)	230	808				70	1063		170	171		688
v/s Ratio Prot		c0.23				c0.04	0.11		0.01	c0.06		0.12
v/s Ratio Perm	0.03											
v/c Ratio	0.12	0.98				0.93	0.36		0.13	0.60		0.31
Uniform Delay, d1	37.7	47.7				60.4	33.8		52.2	54.7		26.8
Progression Factor	1.00	1.00				1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.2	25.4				82.1	0.2		0.3	5.9		0.3
Delay (s)	37.9	73.1				142.4	34.0		52.5	60.6		27.0
Level of Service	D	E				F	C		D	E		C
Approach Delay (s)		72.0					49.3			59.3		
Approach LOS		E					D			E		

Intersection Summary			
HCM Average Control Delay	64.6	HCM Level of Service	E
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	126.1	Sum of lost time (s)	20.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0				4.0		
Lane Util. Factor	1.00				1.00		
Frt	0.98				0.96		
Flt Protected	1.00				0.97		
Satd. Flow (prot)	1820				1722		
Flt Permitted	1.00				0.97		
Satd. Flow (perm)	1820				1722		
Volume (vph)	545	50	50	25	55	15	25
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	592	54	54	27	60	16	27
RTOR Reduction (vph)	2	0	0	0	0	0	0
Lane Group Flow (vph)	698	0	0	0	130	0	0
Turn Type				Split			
Protected Phases	6			2	2		
Permitted Phases							
Actuated Green, G (s)	49.0				10.0		
Effective Green, g (s)	49.0				10.0		
Actuated g/C Ratio	0.39				0.08		
Clearance Time (s)	4.0				4.0		
Vehicle Extension (s)	3.0				3.0		
Lane Grp Cap (vph)	707				137		
v/s Ratio Prot	c0.38				c0.08		
v/s Ratio Perm							
v/c Ratio	0.99				0.95		
Uniform Delay, d1	38.2				57.8		
Progression Factor	1.00				1.00		
Incremental Delay, d2	30.2				60.6		
Delay (s)	68.4				118.4		
Level of Service	E				F		
Approach Delay (s)	58.8				118.4		
Approach LOS	E				F		

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frt		1.00			0.96		1.00	0.94		1.00	0.93	
Flt Protected		0.99			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3505			3383		1770	1760		1770	1723	
Flt Permitted		0.74			0.92		0.65	1.00		0.69	1.00	
Satd. Flow (perm)		2601			3131		1206	1760		1286	1723	
Volume (vph)	110	740	20	15	395	165	15	60	35	545	80	80
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	804	22	16	429	179	16	65	38	592	87	87
RTOR Reduction (vph)	0	2	0	0	66	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	944	0	0	558	0	16	83	0	592	174	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		24.5			24.5		30.4	30.4		30.4	30.4	
Effective Green, g (s)		24.5			24.5		30.4	30.4		30.4	30.4	
Actuated g/C Ratio		0.39			0.39		0.48	0.48		0.48	0.48	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1013			1220		583	851		622	833	
v/s Ratio Prot								0.05			0.10	
v/s Ratio Perm		c0.36			0.18		0.01			c0.46		
v/c Ratio		0.93			0.46		0.03	0.10		0.95	0.21	
Uniform Delay, d1		18.4			14.3		8.5	8.8		15.5	9.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		14.6			0.3		0.0	0.1		24.6	0.1	
Delay (s)		33.0			14.5		8.5	8.9		40.2	9.5	
Level of Service		C			B		A	A		D	A	
Approach Delay (s)		33.0			14.5			8.8			33.2	
Approach LOS		C			B			A			C	

Intersection Summary			
HCM Average Control Delay	27.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	62.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	0.97	
Frt	0.95		1.00	1.00	0.93	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3376		1770	3539	3277	
Flt Permitted	1.00		0.95	1.00	0.97	
Satd. Flow (perm)	3376		1770	3539	3277	
Volume (vph)	935	415	145	415	160	135
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1016	451	158	451	174	147
RTOR Reduction (vph)	71	0	0	0	124	0
Lane Group Flow (vph)	1396	0	158	451	197	0
Turn Type			Prot			
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	27.1		7.1	38.2	8.4	
Effective Green, g (s)	27.1		7.1	38.2	8.4	
Actuated g/C Ratio	0.50		0.13	0.70	0.15	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1676		230	2476	504	
v/s Ratio Prot	c0.41		c0.09	0.13	c0.06	
v/s Ratio Perm						
v/c Ratio	0.83		0.69	0.18	0.39	
Uniform Delay, d1	11.8		22.7	2.8	20.8	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	3.7		8.2	0.0	0.5	
Delay (s)	15.5		30.9	2.9	21.3	
Level of Service	B		C	A	C	
Approach Delay (s)	15.5			10.1	21.3	
Approach LOS	B			B	C	

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	54.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3421		1770	3511		1770	1818		1770	1809	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3421		1770	3511		1770	1818		1770	1809	
Volume (vph)	110	850	245	45	365	20	105	160	30	175	295	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	924	266	49	397	22	114	174	33	190	321	76
RTOR Reduction (vph)	0	32	0	0	5	0	0	9	0	0	0	0
Lane Group Flow (vph)	120	1158	0	49	414	0	114	198	0	190	397	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	7.1	26.5		2.0	21.4		5.0	15.4		8.2	18.6	
Effective Green, g (s)	7.1	26.5		2.0	21.4		5.0	15.4		8.2	18.6	
Actuated g/C Ratio	0.10	0.39		0.03	0.31		0.07	0.23		0.12	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	185	1331		52	1103		130	411		213	494	
v/s Ratio Prot	c0.07	c0.34		0.03	0.12		0.06	0.11		c0.11	c0.22	
v/s Ratio Perm												
v/c Ratio	0.65	0.87		0.94	0.38		0.88	0.48		0.89	0.80	
Uniform Delay, d1	29.3	19.2		33.0	18.2		31.2	22.9		29.5	23.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.6	6.3		102.9	0.2		43.7	0.9		33.9	9.2	
Delay (s)	36.9	25.5		135.9	18.4		74.9	23.8		63.4	32.2	
Level of Service	D	C		F	B		E	C		E	C	
Approach Delay (s)		26.6			30.7			41.9			42.3	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	32.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	68.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			0.91	0.95	0.95		0.97
Frt	1.00	1.00	0.85	1.00	0.96			1.00	1.00	0.99		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	0.95	1.00		0.95
Satd. Flow (prot)	1770	3539	1583	1770	3389			1610	1681	3515		3433
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	0.95	1.00		0.95
Satd. Flow (perm)	1770	3539	1583	1770	3389			1610	1681	3515		3433
Volume (vph)	235	515	230	130	215	50	35	75	30	930	45	735
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	255	560	250	141	234	54	38	82	33	1011	49	799
RTOR Reduction (vph)	0	0	69	0	8	0	0	0	0	3	0	0
Lane Group Flow (vph)	255	560	181	141	318	0	0	56	59	1057	0	799
Turn Type	Prot		Perm	Prot				Prot	Prot			Prot
Protected Phases	7	4		3	8			5	5	2		1
Permitted Phases			4									
Actuated Green, G (s)	18.0	22.5	22.5	11.0	15.5			5.0	5.0	47.1		32.9
Effective Green, g (s)	18.0	22.5	22.5	11.0	15.5			5.0	5.0	47.1		32.9
Actuated g/C Ratio	0.14	0.17	0.17	0.08	0.12			0.04	0.04	0.36		0.25
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0		4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	246	615	275	150	406			62	65	1278		872
v/s Ratio Prot	c0.14	c0.16		0.08	0.09			0.03	0.04	0.30		c0.23
v/s Ratio Perm			0.11									
v/c Ratio	1.04	0.91	0.66	0.94	0.78			0.90	0.91	0.83		0.92
Uniform Delay, d1	55.8	52.5	49.9	58.9	55.4			62.0	62.0	37.5		47.0
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2	67.2	17.7	5.6	55.0	9.5			80.1	78.9	4.5		14.1
Delay (s)	123.0	70.2	55.5	113.9	64.9			142.1	140.9	42.0		61.0
Level of Service	F	E	E	F	E			F	F	D		E
Approach Delay (s)		79.4			79.7					51.8		
Approach LOS		E			E					D		

Intersection Summary			
HCM Average Control Delay	58.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	129.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	SER2
Lane Configurations				
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0
Lane Util. Factor	0.95	1.00		1.00
Frt	1.00	0.85		0.86
Flt Protected	1.00	1.00		1.00
Satd. Flow (prot)	3539	1583		1611
Flt Permitted	1.00	1.00		1.00
Satd. Flow (perm)	3539	1583		1611
Volume (vph)	1910	130	20	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2076	141	22	5
RTOR Reduction (vph)	0	4	0	3
Lane Group Flow (vph)	2076	159	0	2
Turn Type		Perm		custom
Protected Phases	6			
Permitted Phases		6		1 4
Actuated Green, G (s)	75.0	75.0		59.4
Effective Green, g (s)	75.0	75.0		59.4
Actuated g/C Ratio	0.58	0.58		0.46
Clearance Time (s)	4.0	4.0		
Vehicle Extension (s)	3.0	3.0		
Lane Grp Cap (vph)	2050	917		739
v/s Ratio Prot	c0.59			
v/s Ratio Perm		0.10		0.00
v/c Ratio	1.01	0.17		0.00
Uniform Delay, d1	27.2	12.7		19.0
Progression Factor	1.00	1.00		1.00
Incremental Delay, d2	23.1	0.1		0.0
Delay (s)	50.3	12.8		19.0
Level of Service	D	B		B
Approach Delay (s)	51.1			
Approach LOS	D			

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		1.00	1.00		1.00	
Frt		1.00	0.92		1.00	
Flt Protected		0.99	1.00		0.95	
Satd. Flow (prot)		1852	1715		1772	
Flt Permitted		0.95	1.00		0.95	
Satd. Flow (perm)		1772	1715		1772	
Volume (vph)	10	75	35	50	750	10
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	82	38	54	815	11
RTOR Reduction (vph)	0	0	48	0	0	0
Lane Group Flow (vph)	0	93	44	0	826	0
Turn Type	Perm					
Protected Phases		4	8		6	
Permitted Phases	4					
Actuated Green, G (s)		6.8	6.8		46.8	
Effective Green, g (s)		6.8	6.8		46.8	
Actuated g/C Ratio		0.11	0.11		0.76	
Clearance Time (s)		4.0	4.0		4.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		196	189		1346	
v/s Ratio Prot			0.03		c0.47	
v/s Ratio Perm		c0.05				
v/c Ratio		0.47	0.23		0.61	
Uniform Delay, d1		25.7	25.0		3.3	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		1.8	0.6		0.8	
Delay (s)		27.5	25.7		4.2	
Level of Service		C	C		A	
Approach Delay (s)		27.5	25.7		4.2	
Approach LOS		C	C		A	

Intersection Summary			
HCM Average Control Delay	8.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	61.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	35	270	90	180	500	180
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	293	98	196	543	196
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1033	641	543			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1033	641	543			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	84	38	90			
cM capacity (veh/h)	233	475	1025			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	38	293	293	739
Volume Left	38	0	98	0
Volume Right	0	293	0	196
cSH	233	475	1025	1700
Volume to Capacity	0.16	0.62	0.10	0.43
Queue Length 95th (ft)	14	103	8	0
Control Delay (s)	23.4	24.1	3.6	0.0
Lane LOS	C	C	A	
Approach Delay (s)	24.0		3.6	0.0
Approach LOS	C			

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frt		1.00			1.00	0.85		1.00	0.85		1.00	
Flt Protected		0.98			0.95	1.00		1.00	1.00		0.98	
Satd. Flow (prot)		1817			1770	1583		1863	1583		1829	
Flt Permitted		0.87			0.75	1.00		1.00	1.00		0.79	
Satd. Flow (perm)		1620			1399	1583		1863	1583		1474	
Volume (vph)	5	5	0	225	0	115	0	195	265	230	385	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	5	0	245	0	125	0	212	288	250	418	0
RTOR Reduction (vph)	0	0	0	0	0	94	0	0	115	0	0	0
Lane Group Flow (vph)	0	10	0	0	245	31	0	212	173	0	668	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		12.8			12.8	12.8		31.2	31.2		31.2	
Effective Green, g (s)		12.8			12.8	12.8		31.2	31.2		31.2	
Actuated g/C Ratio		0.25			0.25	0.25		0.60	0.60		0.60	
Clearance Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		399			344	390		1118	950		884	
v/s Ratio Prot								0.11				
v/s Ratio Perm		0.01			c0.18	0.02			0.11		c0.45	
v/c Ratio		0.03			0.71	0.08		0.19	0.18		0.76	
Uniform Delay, d1		14.9			17.9	15.1		4.7	4.7		7.6	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		0.0			6.8	0.1		0.1	0.1		3.7	
Delay (s)		14.9			24.7	15.2		4.8	4.8		11.3	
Level of Service		B			C	B		A	A		B	
Approach Delay (s)		14.9			21.5			4.8			11.3	
Approach LOS		B			C			A			B	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	52.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95		1.00	0.95		0.97	0.95	
Frt	1.00	0.96		1.00	0.95		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3383		3433	3376		1770	3526		3433	3528	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3383		3433	3376		1770	3526		3433	3528	
Volume (vph)	95	370	155	375	190	85	60	975	25	435	1660	35
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	402	168	408	207	92	65	1060	27	473	1804	38
RTOR Reduction (vph)	0	41	0	0	45	0	0	2	0	0	1	0
Lane Group Flow (vph)	103	529	0	408	254	0	65	1085	0	473	1841	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	10.5	17.0		13.0	19.5		4.0	45.8		17.5	59.3	
Effective Green, g (s)	10.5	17.0		13.0	19.5		4.0	45.8		17.5	59.3	
Actuated g/C Ratio	0.10	0.16		0.12	0.18		0.04	0.42		0.16	0.54	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	170	526		408	602		65	1478		550	1914	
v/s Ratio Prot	0.06	c0.16		c0.12	0.08		0.04	c0.31		0.14	c0.52	
v/s Ratio Perm												
v/c Ratio	0.61	1.00		1.00	0.42		1.00	0.73		0.86	0.96	
Uniform Delay, d1	47.4	46.1		48.1	39.9		52.6	26.6		44.7	23.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.0	40.5		44.6	0.5		111.6	1.9		12.7	12.7	
Delay (s)	53.4	86.6		92.7	40.4		164.3	28.6		57.4	36.6	
Level of Service	D	F		F	D		F	C		E	D	
Approach Delay (s)		81.5			70.6			36.2			40.9	
Approach LOS		F			E			D			D	

Intersection Summary			
HCM Average Control Delay	49.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	109.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.91			0.99			0.97			0.97	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1678			1808			1801			1814	
Flt Permitted		0.95			0.65			0.93			0.99	
Satd. Flow (perm)		1599			1208			1686			1805	
Volume (vph)	35	65	235	100	100	10	25	210	65	10	505	120
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	71	255	109	109	11	27	228	71	11	549	130
RTOR Reduction (vph)	0	147	0	0	3	0	0	18	0	0	15	0
Lane Group Flow (vph)	0	217	0	0	226	0	0	308	0	0	675	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		12.8			12.8			21.5			21.5	
Effective Green, g (s)		12.8			12.8			21.5			21.5	
Actuated g/C Ratio		0.30			0.30			0.51			0.51	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		484			366			857			917	
v/s Ratio Prot												
v/s Ratio Perm		0.14			c0.19			0.18			c0.37	
v/c Ratio		0.45			0.62			0.36			0.74	
Uniform Delay, d1		11.9			12.6			6.3			8.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.7			3.1			0.3			3.1	
Delay (s)		12.6			15.7			6.5			11.3	
Level of Service		B			B			A			B	
Approach Delay (s)		12.6			15.7			6.5			11.3	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	42.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	10	190	610	180	295	70
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	207	663	196	321	76
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1880	359	397			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1880	359	397			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	68	70	43			
cM capacity (veh/h)	34	686	1162			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	11	207	859	397
Volume Left	11	0	663	0
Volume Right	0	207	0	76
cSH	34	686	1162	1700
Volume to Capacity	0.32	0.30	0.57	0.23
Queue Length 95th (ft)	26	32	94	0
Control Delay (s)	157.0	12.5	11.2	0.0
Lane LOS	F	B	B	
Approach Delay (s)	19.7		11.2	0.0
Approach LOS	C			

Intersection Summary			
Average Delay	9.4		
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	40	20	20	45	435	20	350	20	110	335	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	43	22	22	49	473	22	380	22	120	364	38

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total (vph)	87	71	473	424	120	402
Volume Left (vph)	22	22	0	22	120	0
Volume Right (vph)	22	0	473	22	0	38
Hadj (s)	-0.07	0.19	-0.67	0.01	0.53	-0.03
Departure Headway (s)	9.8	8.3	7.4	8.1	8.6	8.0
Degree Utilization, x	0.24	0.16	0.97	0.95	0.29	0.90
Capacity (veh/h)	356	424	473	440	414	432
Control Delay (s)	15.9	11.6	59.2	60.0	13.9	48.6
Approach Delay (s)	15.9	53.0		60.0	40.6	
Approach LOS	C	F		F	E	

Intersection Summary			
Delay	48.8		
HCM Level of Service	E		
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	0.91		1.00	0.91	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3439		1770	3539	1583	1770	5015		1770	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3439		1770	3539	1583	1770	5015		1770	5085	1583
Volume (vph)	280	300	70	250	425	415	75	1720	175	225	1440	185
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	304	326	76	272	462	451	82	1870	190	245	1565	201
RTOR Reduction (vph)	0	20	0	0	0	151	0	12	0	0	0	108
Lane Group Flow (vph)	304	382	0	272	462	300	82	2048	0	245	1565	93
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	9.0	15.1		15.0	21.1	21.1	7.6	39.9		14.0	46.3	46.3
Effective Green, g (s)	9.0	15.1		15.0	21.1	21.1	7.6	39.9		14.0	46.3	46.3
Actuated g/C Ratio	0.09	0.15		0.15	0.21	0.21	0.08	0.40		0.14	0.46	0.46
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	309	519		266	747	334	135	2001		248	2354	733
v/s Ratio Prot	0.09	0.11		c0.15	0.13		0.05	c0.41		c0.14	0.31	
v/s Ratio Perm						c0.19						0.06
v/c Ratio	0.98	0.74		1.02	0.62	0.90	0.61	1.02		0.99	0.66	0.13
Uniform Delay, d1	45.4	40.5		42.5	35.8	38.4	44.8	30.1		42.9	20.8	15.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	46.5	5.4		61.1	1.5	25.4	7.5	26.3		53.2	0.7	0.1
Delay (s)	91.9	45.9		103.6	37.3	63.8	52.3	56.4		96.1	21.5	15.4
Level of Service	F	D		F	D	E	D	E		F	C	B
Approach Delay (s)		65.7			62.6			56.2			30.0	
Approach LOS		E			E			E			C	

Intersection Summary			
HCM Average Control Delay	49.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	1.00	1.00	
Frt	0.98		1.00	1.00	0.90	
Flt Protected	1.00		0.95	1.00	0.99	
Satd. Flow (prot)	1833		1770	1863	1660	
Flt Permitted	1.00		0.42	1.00	0.99	
Satd. Flow (perm)	1833		791	1863	1660	
Volume (vph)	370	50	130	545	120	295
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	402	54	141	592	130	321
RTOR Reduction (vph)	8	0	0	0	161	0
Lane Group Flow (vph)	448	0	141	592	290	0
Turn Type			Perm			
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	17.4		17.4	17.4	11.5	
Effective Green, g (s)	17.4		17.4	17.4	11.5	
Actuated g/C Ratio	0.47		0.47	0.47	0.31	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	864		373	878	517	
v/s Ratio Prot	0.24			c0.32	c0.17	
v/s Ratio Perm			0.18			
v/c Ratio	0.52		0.38	0.67	0.56	
Uniform Delay, d1	6.8		6.3	7.6	10.6	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.5		0.6	2.1	1.4	
Delay (s)	7.3		6.9	9.6	12.0	
Level of Service	A		A	A	B	
Approach Delay (s)	7.3			9.1	12.0	
Approach LOS	A			A	B	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	36.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	325	10	150	540	10	65
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	353	11	163	587	11	71
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			364		1272	359
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			364		1272	359
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			86		93	90
cM capacity (veh/h)			1194		160	686

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	364	163	587	82
Volume Left	0	163	0	11
Volume Right	11	0	0	71
cSH	1700	1194	1700	477
Volume to Capacity	0.21	0.14	0.35	0.17
Queue Length 95th (ft)	0	12	0	15
Control Delay (s)	0.0	8.5	0.0	14.1
Lane LOS		A		B
Approach Delay (s)	0.0	1.8		14.1
Approach LOS				B

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	40.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	5	105	5	15	0	785	75	10	150	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	114	5	16	0	853	82	11	163	0

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	5	136	427	508	92	82
Volume Left (vph)	0	114	0	0	11	0
Volume Right (vph)	5	16	0	82	0	0
Hadj (s)	-0.57	0.13	0.03	-0.08	0.09	0.03
Departure Headway (s)	5.7	6.0	5.2	5.1	6.1	6.0
Degree Utilization, x	0.01	0.23	0.62	0.72	0.16	0.14
Capacity (veh/h)	580	563	685	692	564	569
Control Delay (s)	8.7	10.8	15.0	18.7	9.0	8.8
Approach Delay (s)	8.7	10.8	17.0		8.9	
Approach LOS	A	B	C		A	

Intersection Summary			
Delay	15.2		
HCM Level of Service	C		
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	0.91		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	3433	3405		1770	4929		1770	3488	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	3433	3405		1770	4929		1770	3488	
Volume (vph)	70	720	350	275	795	270	225	1220	315	215	370	40
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	76	783	380	299	864	293	245	1326	342	234	402	43
RTOR Reduction (vph)	0	0	277	0	34	0	0	46	0	0	8	0
Lane Group Flow (vph)	76	783	103	299	1124	0	245	1622	0	234	437	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	5.0	27.1	27.1	10.9	33.0		17.9	33.0		13.0	28.1	
Effective Green, g (s)	5.0	27.1	27.1	10.9	33.0		17.9	33.0		13.0	28.1	
Actuated g/C Ratio	0.05	0.27	0.27	0.11	0.33		0.18	0.33		0.13	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	89	959	429	374	1124		317	1627		230	980	
v/s Ratio Prot	0.04	0.22		c0.09	c0.33		c0.14	c0.33		c0.13	0.13	
v/s Ratio Perm			0.07									
v/c Ratio	0.85	0.82	0.24	0.80	1.00		0.77	1.00		1.02	0.45	
Uniform Delay, d1	47.1	34.1	28.4	43.5	33.5		39.1	33.5		43.5	29.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	50.7	5.5	0.3	11.4	26.5		11.1	21.5		63.9	0.3	
Delay (s)	97.9	39.6	28.7	54.8	60.0		50.2	54.9		107.4	29.9	
Level of Service	F	D	C	D	E		D	D		F	C	
Approach Delay (s)		39.8			59.0			54.3			56.6	
Approach LOS		D			E			D			E	

Intersection Summary			
HCM Average Control Delay	52.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	70	25	40	0	290	15	30	100	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	76	27	43	0	315	16	33	109	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	0	147	332	141
Volume Left (vph)	0	76	0	33
Volume Right (vph)	0	43	16	0
Hadj (s)	0.00	-0.04	0.00	0.08
Departure Headway (s)	5.2	5.0	4.5	4.7
Degree Utilization, x	0.00	0.20	0.41	0.19
Capacity (veh/h)	617	665	781	719
Control Delay (s)	8.2	9.2	10.6	8.8
Approach Delay (s)	0.0	9.2	10.6	8.8
Approach LOS	A	A	B	A

Intersection Summary			
Delay	9.8		
HCM Level of Service	A		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	5	0	0	5	120	0	70	5	125	75	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	0	0	5	130	0	76	5	136	82	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	5	136	82	228
Volume Left (vph)	0	0	0	136
Volume Right (vph)	0	130	5	11
Hadj (s)	0.03	-0.54	-0.01	0.12
Departure Headway (s)	4.8	4.1	4.5	4.4
Degree Utilization, x	0.01	0.15	0.10	0.28
Capacity (veh/h)	683	816	768	780
Control Delay (s)	7.8	7.8	8.0	9.1
Approach Delay (s)	7.8	7.8	8.0	9.1
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.5		
HCM Level of Service	A		
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	10	30	5	5	70	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	33	5	5	76	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	171	8			11	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	171	8			11	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	97			95	
cM capacity (veh/h)	780	1074			1608	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	43	11	87
Volume Left	11	0	76
Volume Right	33	5	0
cSH	981	1700	1608
Volume to Capacity	0.04	0.01	0.05
Queue Length 95th (ft)	3	0	4
Control Delay (s)	8.8	0.0	6.5
Lane LOS	A		A
Approach Delay (s)	8.8	0.0	6.5
Approach LOS	A		

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	21.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	45	185	5	90	150	190	5	55	50	145	15	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	49	201	5	98	163	207	5	60	54	158	16	11

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	149	106	179	288	120	185
Volume Left (vph)	49	0	98	0	5	158
Volume Right (vph)	0	5	0	207	54	11
Hadj (s)	0.20	0.00	0.31	-0.47	-0.23	0.17
Departure Headway (s)	6.3	6.1	6.1	5.3	5.8	6.0
Degree Utilization, x	0.26	0.18	0.31	0.43	0.19	0.31
Capacity (veh/h)	538	557	563	648	551	550
Control Delay (s)	10.3	9.2	10.6	11.1	10.2	11.7
Approach Delay (s)	9.8		10.9		10.2	11.7
Approach LOS	A		B		B	B

Intersection Summary			
Delay	10.7		
HCM Level of Service	B		
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	360	5	80	430	120	0	0	5	65	0	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	391	5	87	467	130	0	0	5	71	0	43
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	467			397			867	1057	198	929	1125	299
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	467			397			867	1057	198	929	1125	299
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			92			100	100	99	66	100	94
cM capacity (veh/h)	1090			1158			217	205	809	207	187	697

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	207	201	321	364	5	114
Volume Left	11	0	87	0	0	71
Volume Right	0	5	0	130	5	43
cSH	1090	1700	1158	1700	809	282
Volume to Capacity	0.01	0.12	0.08	0.21	0.01	0.40
Queue Length 95th (ft)	1	0	6	0	1	47
Control Delay (s)	0.5	0.0	2.8	0.0	9.5	26.2
Lane LOS	A		A		A	D
Approach Delay (s)	0.3		1.3		9.5	26.2
Approach LOS					A	D

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	405	25	55	595	0	35	0	50	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	440	27	60	647	0	38	0	54	0	0	0

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	293	174	383	323	92	0
Volume Left (vph)	0	0	60	0	38	0
Volume Right (vph)	0	27	0	0	54	0
Hadj (s)	0.03	-0.08	0.11	0.03	-0.24	0.00
Departure Headway (s)	5.6	5.5	5.4	5.3	5.9	6.4
Degree Utilization, x	0.46	0.27	0.58	0.48	0.15	0.00
Capacity (veh/h)	619	633	652	662	559	510
Control Delay (s)	12.0	9.3	14.3	11.9	10.0	9.4
Approach Delay (s)	11.0		13.2		10.0	0.0
Approach LOS	B		B		A	A

Intersection Summary			
Delay	12.2		
HCM Level of Service	B		
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0				4.0	4.0		4.0	4.0		4.0
Lane Util. Factor	1.00	0.95				1.00	0.95		1.00	1.00		1.00
Frt	1.00	0.97				1.00	0.95		1.00	0.95		1.00
Flt Protected	0.95	1.00				0.95	1.00		0.95	1.00		0.95
Satd. Flow (prot)	1770	3439				1770	3350		1770	1760		1770
Flt Permitted	0.25	1.00				0.95	1.00		0.95	1.00		0.95
Satd. Flow (perm)	469	3439				1770	3350		1770	1760		1770
Volume (vph)	30	405	80	15	55	90	615	340	55	345	200	105
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	440	87	16	60	98	668	370	60	375	217	114
RTOR Reduction (vph)	0	0	0	0	0	0	84	0	0	23	0	0
Lane Group Flow (vph)	33	543	0	0	0	158	954	0	60	569	0	114
Turn Type	Perm				Prot	Prot			Split			Split
Protected Phases		4			3	3	8		1	1		6
Permitted Phases	4											
Actuated Green, G (s)	15.9	15.9				8.0	27.9		28.0	28.0		10.0
Effective Green, g (s)	15.9	15.9				8.0	27.9		28.0	28.0		10.0
Actuated g/C Ratio	0.18	0.18				0.09	0.31		0.31	0.31		0.11
Clearance Time (s)	4.0	4.0				4.0	4.0		4.0	4.0		4.0
Vehicle Extension (s)	3.0	3.0				3.0	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)	83	608				158	1040		551	548		197
v/s Ratio Prot		0.16				0.09	c0.28		0.03	c0.32		0.06
v/s Ratio Perm	0.07											
v/c Ratio	0.40	0.89				1.00	0.92		0.11	1.04		0.58
Uniform Delay, d1	32.8	36.2				41.0	29.9		22.1	31.0		37.9
Progression Factor	1.00	1.00				1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2	3.1	15.4				71.6	12.3		0.1	48.5		4.1
Delay (s)	35.9	51.6				112.6	42.2		22.1	79.5		42.0
Level of Service	D	D				F	D		C	E		D
Approach Delay (s)		50.7					51.5			74.2		
Approach LOS		D					D			E		

Intersection Summary			
HCM Average Control Delay	61.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	89.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0				4.0		
Lane Util. Factor	1.00				1.00		
Frt	0.95				0.92		
Flt Protected	1.00				0.98		
Satd. Flow (prot)	1773				1676		
Flt Permitted	1.00				0.98		
Satd. Flow (perm)	1773				1676		
Volume (vph)	135	25	40	20	20	50	15
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	147	27	43	22	22	54	16
RTOR Reduction (vph)	10	0	0	0	0	0	0
Lane Group Flow (vph)	207	0	0	0	114	0	0
Turn Type				Split			
Protected Phases	6			2	2		
Permitted Phases							
Actuated Green, G (s)	10.0				8.0		
Effective Green, g (s)	10.0				8.0		
Actuated g/C Ratio	0.11				0.09		
Clearance Time (s)	4.0				4.0		
Vehicle Extension (s)	3.0				3.0		
Lane Grp Cap (vph)	197				149		
v/s Ratio Prot	c0.12				c0.07		
v/s Ratio Perm							
v/c Ratio	1.05				0.77		
Uniform Delay, d1	40.0				40.0		
Progression Factor	1.00				1.00		
Incremental Delay, d2	78.5				20.6		
Delay (s)	118.4				60.6		
Level of Service	F				E		
Approach Delay (s)	92.1				60.6		
Approach LOS	F				E		

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frt		0.99			0.97		1.00	0.93		1.00	0.93	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3486			3410		1770	1741		1770	1723	
Flt Permitted		0.75			0.91		0.69	1.00		0.70	1.00	
Satd. Flow (perm)		2634			3116		1280	1741		1305	1723	
Volume (vph)	60	545	45	45	915	290	25	45	35	200	50	50
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	592	49	49	995	315	27	49	38	217	54	54
RTOR Reduction (vph)	0	10	0	0	51	0	0	28	0	0	0	0
Lane Group Flow (vph)	0	696	0	0	1308	0	27	59	0	217	108	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		23.9			23.9		12.0	12.0		12.0	12.0	
Effective Green, g (s)		23.9			23.9		12.0	12.0		12.0	12.0	
Actuated g/C Ratio		0.54			0.54		0.27	0.27		0.27	0.27	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1434			1696		350	476		357	471	
v/s Ratio Prot								0.03			0.06	
v/s Ratio Perm		0.26			c0.42		0.02			c0.17		
v/c Ratio		0.49			0.77		0.08	0.12		0.61	0.23	
Uniform Delay, d1		6.2			7.9		11.8	12.0		13.9	12.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			2.2		0.1	0.1		2.9	0.2	
Delay (s)		6.5			10.1		11.9	12.1		16.8	12.6	
Level of Service		A			B		B	B		B	B	
Approach Delay (s)		6.5			10.1			12.1			15.4	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	43.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	0.97	
Frt	0.96		1.00	1.00	0.97	
Flt Protected	1.00		0.95	1.00	0.96	
Satd. Flow (prot)	3392		1770	3539	3373	
Flt Permitted	1.00		0.95	1.00	0.96	
Satd. Flow (perm)	3392		1770	3539	3373	
Volume (vph)	520	200	90	880	395	95
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	565	217	98	957	429	103
RTOR Reduction (vph)	77	0	0	0	47	0
Lane Group Flow (vph)	705	0	98	957	485	0
Turn Type			Prot			
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	13.7		2.5	20.2	11.1	
Effective Green, g (s)	13.7		2.5	20.2	11.1	
Actuated g/C Ratio	0.35		0.06	0.51	0.28	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1182		113	1819	953	
v/s Ratio Prot	0.21		c0.06	c0.27	c0.14	
v/s Ratio Perm						
v/c Ratio	0.60		0.87	0.53	0.51	
Uniform Delay, d1	10.5		18.2	6.4	11.8	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.8		45.7	0.3	0.4	
Delay (s)	11.3		64.0	6.6	12.2	
Level of Service	B		E	A	B	
Approach Delay (s)	11.3			12.0	12.2	
Approach LOS	B			B	B	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	39.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.97		1.00	0.97		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3525		1770	3449		1770	1812		1770	1767	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3525		1770	3449		1770	1812		1770	1767	
Volume (vph)	90	525	15	20	565	115	260	295	65	200	230	120
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	571	16	22	614	125	283	321	71	217	250	130
RTOR Reduction (vph)	0	3	0	0	24	0	0	11	0	0	0	0
Lane Group Flow (vph)	98	584	0	22	715	0	283	381	0	217	380	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	3.7	18.9		1.5	16.7		12.9	22.0		8.8	17.9	
Effective Green, g (s)	3.7	18.9		1.5	16.7		12.9	22.0		8.8	17.9	
Actuated g/C Ratio	0.06	0.28		0.02	0.25		0.19	0.33		0.13	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	97	991		40	857		340	593		232	471	
v/s Ratio Prot	c0.06	0.17		0.01	c0.21		c0.16	0.21		0.12	c0.22	
v/s Ratio Perm												
v/c Ratio	1.01	0.59		0.55	0.83		0.83	0.64		0.94	0.81	
Uniform Delay, d1	31.8	20.8		32.5	23.9		26.1	19.3		28.9	23.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	94.2	0.9		15.3	7.0		15.8	2.4		41.2	9.8	
Delay (s)	125.9	21.7		47.9	31.0		41.9	21.6		70.2	32.8	
Level of Service	F	C		D	C		D	C		E	C	
Approach Delay (s)		36.6			31.5			30.1			46.4	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM Average Control Delay	35.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			0.91	0.95	0.95		0.97
Frt	1.00	1.00	0.85	1.00	0.94			1.00	1.00	1.00		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	0.95	1.00		0.95
Satd. Flow (prot)	1770	3539	1583	1770	3335			1610	1681	3526		3433
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	0.95	1.00		0.95
Satd. Flow (perm)	1770	3539	1583	1770	3335			1610	1681	3526		3433
Volume (vph)	195	325	275	175	400	180	70	135	100	1705	45	345
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	212	353	299	190	435	196	76	147	109	1853	49	375
RTOR Reduction (vph)	0	0	160	0	7	0	0	0	0	2	0	0
Lane Group Flow (vph)	212	353	139	190	700	0	0	125	131	1900	0	375
Turn Type	Prot		Perm	Prot				Prot	Prot			Prot
Protected Phases	7	4		3	8			5	5	2		1
Permitted Phases			4									
Actuated Green, G (s)	12.0	18.7	18.7	15.3	22.0			12.3	12.3	59.0		11.0
Effective Green, g (s)	12.0	18.7	18.7	15.3	22.0			12.3	12.3	59.0		11.0
Actuated g/C Ratio	0.10	0.16	0.16	0.13	0.18			0.10	0.10	0.49		0.09
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0		4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	177	551	247	226	611			165	172	1734		315
v/s Ratio Prot	c0.12	0.10		0.11	c0.21			0.08	0.08	c0.54		c0.11
v/s Ratio Perm			0.09									
v/c Ratio	1.20	0.64	0.56	0.84	1.15			0.76	0.76	1.10		1.19
Uniform Delay, d1	54.0	47.5	46.9	51.2	49.0			52.4	52.4	30.5		54.5
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2	130.9	2.5	2.9	23.5	83.5			17.9	17.9	52.9		112.8
Delay (s)	184.9	50.0	49.8	74.7	132.5			70.3	70.3	83.4		167.3
Level of Service	F	D	D	E	F			E	E	F		F
Approach Delay (s)		83.0			120.2					81.8		
Approach LOS		F			F					F		

Intersection Summary			
HCM Average Control Delay	79.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	SER2
Lane Configurations				
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0
Lane Util. Factor	0.95	1.00		1.00
Frt	1.00	0.85		0.86
Flt Protected	1.00	1.00		1.00
Satd. Flow (prot)	3539	1583		1611
Flt Permitted	1.00	1.00		1.00
Satd. Flow (perm)	3539	1583		1611
Volume (vph)	1285	75	10	15
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1397	82	11	16
RTOR Reduction (vph)	0	4	0	12
Lane Group Flow (vph)	1397	89	0	4
Turn Type		Perm		custom
Protected Phases	6			
Permitted Phases		6		1 4
Actuated Green, G (s)	57.7	57.7		33.7
Effective Green, g (s)	57.7	57.7		33.7
Actuated g/C Ratio	0.48	0.48		0.28
Clearance Time (s)	4.0	4.0		
Vehicle Extension (s)	3.0	3.0		
Lane Grp Cap (vph)	1702	761		452
v/s Ratio Prot	0.39			
v/s Ratio Perm		0.06		0.00
v/c Ratio	0.82	0.12		0.01
Uniform Delay, d1	26.7	17.1		31.1
Progression Factor	1.00	1.00		1.00
Incremental Delay, d2	3.3	0.1		0.0
Delay (s)	30.0	17.2		31.1
Level of Service	C	B		C
Approach Delay (s)	57.0			
Approach LOS	E			

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		1.00	1.00		1.00	
Frt		1.00	0.88		0.99	
Flt Protected		0.99	1.00		0.96	
Satd. Flow (prot)		1840	1633		1763	
Flt Permitted		0.59	1.00		0.96	
Satd. Flow (perm)		1095	1633		1763	
Volume (vph)	10	30	65	675	190	15
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	33	71	734	207	16
RTOR Reduction (vph)	0	0	437	0	4	0
Lane Group Flow (vph)	0	44	368	0	219	0
Turn Type	Perm					
Protected Phases		4	8		6	
Permitted Phases	4					
Actuated Green, G (s)		11.9	11.9		9.5	
Effective Green, g (s)		11.9	11.9		9.5	
Actuated g/C Ratio		0.40	0.40		0.32	
Clearance Time (s)		4.0	4.0		4.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		443	661		570	
v/s Ratio Prot			c0.23		c0.12	
v/s Ratio Perm		0.04				
v/c Ratio		0.10	0.56		0.38	
Uniform Delay, d1		5.4	6.7		7.7	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		0.1	1.0		0.4	
Delay (s)		5.5	7.7		8.1	
Level of Service		A	A		A	
Approach Delay (s)		5.5	7.7		8.1	
Approach LOS		A	A		A	

Intersection Summary			
HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	29.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	40	130	165	500	170	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	141	179	543	185	49
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1111	209	185			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1111	209	185			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	78	83	87			
cM capacity (veh/h)	201	831	1390			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	43	141	723	234
Volume Left	43	0	179	0
Volume Right	0	141	0	49
cSH	201	831	1390	1700
Volume to Capacity	0.22	0.17	0.13	0.14
Queue Length 95th (ft)	20	15	11	0
Control Delay (s)	27.7	10.2	3.1	0.0
Lane LOS	D	B	A	
Approach Delay (s)	14.3		3.1	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor					1.00	1.00		1.00	1.00		1.00	
Frt					1.00	0.85		1.00	0.85		1.00	
Flt Protected					0.95	1.00		1.00	1.00		0.98	
Satd. Flow (prot)					1776	1583		1863	1583		1830	
Flt Permitted					0.73	1.00		1.00	1.00		0.79	
Satd. Flow (perm)					1361	1583		1863	1583		1461	
Volume (vph)	0	0	0	205	5	205	0	460	290	70	155	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	223	5	223	0	500	315	76	168	5
RTOR Reduction (vph)	0	0	0	0	0	148	0	0	167	0	2	0
Lane Group Flow (vph)	0	0	0	0	228	75	0	500	148	0	247	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)					11.0	11.0		16.8	16.8		16.8	
Effective Green, g (s)					11.0	11.0		16.8	16.8		16.8	
Actuated g/C Ratio					0.31	0.31		0.47	0.47		0.47	
Clearance Time (s)					4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)					3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)					418	486		874	743		686	
v/s Ratio Prot								c0.27				
v/s Ratio Perm					c0.17	0.05			0.09		0.17	
v/c Ratio					0.55	0.16		0.57	0.20		0.36	
Uniform Delay, d1					10.3	9.0		6.9	5.6		6.1	
Progression Factor					1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2					1.5	0.1		0.9	0.1		0.3	
Delay (s)					11.8	9.2		7.8	5.7		6.4	
Level of Service					B	A		A	A		A	
Approach Delay (s)		0.0			10.5			7.0			6.4	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	35.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95		1.00	0.95		0.97	0.95	
Frt	1.00	0.98		1.00	0.94		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3460		3433	3323		1770	3524		3433	3520	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3460		3433	3323		1770	3524		3433	3520	
Volume (vph)	100	225	40	305	420	290	45	1720	50	380	1185	45
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	245	43	332	457	315	49	1870	54	413	1288	49
RTOR Reduction (vph)	0	10	0	0	89	0	0	1	0	0	2	0
Lane Group Flow (vph)	109	278	0	332	683	0	49	1923	0	413	1335	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	8.0	19.3		15.7	27.0		30.2	73.8		16.0	59.6	
Effective Green, g (s)	8.0	19.3		15.7	27.0		30.2	73.8		16.0	59.6	
Actuated g/C Ratio	0.06	0.14		0.11	0.19		0.21	0.52		0.11	0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	101	474		383	637		380	1847		390	1490	
v/s Ratio Prot	c0.06	0.08		0.10	c0.21		0.03	c0.55		c0.12	0.38	
v/s Ratio Perm												
v/c Ratio	1.08	0.59		0.87	1.07		0.13	1.04		1.06	0.90	
Uniform Delay, d1	66.4	57.0		61.5	56.9		44.7	33.5		62.4	37.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	112.5	1.9		18.2	56.6		0.2	32.5		62.0	7.4	
Delay (s)	178.9	58.8		79.7	113.5		44.8	66.0		124.4	45.1	
Level of Service	F	E		E	F		D	E		F	D	
Approach Delay (s)		91.8			103.4			65.4			63.8	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM Average Control Delay	74.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	140.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	99.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			0.98			1.00			0.99	
Flt Protected		0.97			0.98			1.00			1.00	
Satd. Flow (prot)		1757			1790			1852			1846	
Flt Permitted		0.82			0.89			0.95			0.97	
Satd. Flow (perm)		1471			1622			1764			1801	
Volume (vph)	75	35	35	25	30	10	50	580	10	15	345	20
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	38	38	27	33	11	54	630	11	16	375	22
RTOR Reduction (vph)	0	21	0	0	9	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	137	0	0	62	0	0	694	0	0	410	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.9			9.9			35.7			35.7	
Effective Green, g (s)		9.9			9.9			35.7			35.7	
Actuated g/C Ratio		0.18			0.18			0.67			0.67	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		272			300			1175			1200	
v/s Ratio Prot												
v/s Ratio Perm		c0.09			0.04			c0.39			0.23	
v/c Ratio		0.50			0.21			0.59			0.34	
Uniform Delay, d1		19.6			18.5			4.9			3.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.5			0.3			0.8			0.2	
Delay (s)		21.1			18.9			5.7			4.0	
Level of Service		C			B			A			A	
Approach Delay (s)		21.1			18.9			5.7			4.0	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	53.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	30	235	255	365	170	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	255	277	397	185	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1147	196	207			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1147	196	207			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	81	70	80			
cM capacity (veh/h)	175	846	1365			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	33	255	674	207
Volume Left	33	0	277	0
Volume Right	0	255	0	22
cSH	175	846	1365	1700
Volume to Capacity	0.19	0.30	0.20	0.12
Queue Length 95th (ft)	17	32	19	0
Control Delay (s)	30.1	11.1	4.7	0.0
Lane LOS	D	B	A	
Approach Delay (s)	13.2		4.7	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	15	45	10	20	35	165	15	445	35	185	205	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	49	11	22	38	179	16	484	38	201	223	11

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total (vph)	76	60	179	538	201	234
Volume Left (vph)	16	22	0	16	201	0
Volume Right (vph)	11	0	179	38	0	11
Hadj (s)	-0.01	0.22	-0.67	0.00	0.53	0.00
Departure Headway (s)	8.0	7.7	6.8	6.3	7.1	6.5
Degree Utilization, x	0.17	0.13	0.34	0.94	0.39	0.42
Capacity (veh/h)	428	450	511	563	500	540
Control Delay (s)	12.6	10.6	12.0	49.5	13.4	13.0
Approach Delay (s)	12.6	11.7		49.5	13.2	
Approach LOS	B	B		E	B	

Intersection Summary			
Delay	28.0		
HCM Level of Service	D		
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

2025 Proposed Action AM Peak Hour
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3467		1770	3436		1770	3539	1583	1770	3495	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3467		1770	3436		1770	3539	1583	1770	3495	
Volume (vph)	320	605	95	275	270	65	20	1035	135	160	2640	240
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	348	658	103	299	293	71	22	1125	147	174	2870	261
RTOR Reduction (vph)	0	8	0	0	14	0	0	0	73	0	4	0
Lane Group Flow (vph)	348	753	0	299	350	0	22	1125	74	174	3127	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	19.0	25.0		16.0	22.0		2.3	72.5	72.5	18.9	89.1	
Effective Green, g (s)	19.0	25.0		16.0	22.0		2.3	72.5	72.5	18.9	89.1	
Actuated g/C Ratio	0.13	0.17		0.11	0.15		0.02	0.49	0.49	0.13	0.60	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	227	584		191	509		27	1729	773	225	2098	
v/s Ratio Prot	c0.20	c0.22		0.17	0.10		0.01	0.32		c0.10	c0.89	
v/s Ratio Perm									0.05			
v/c Ratio	1.53	1.29		1.57	0.69		0.81	0.65	0.10	0.77	1.49	
Uniform Delay, d1	64.7	61.7		66.2	59.9		72.8	28.5	20.4	62.7	29.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	260.8	142.5		278.3	3.8		95.3	0.9	0.1	15.2	223.2	
Delay (s)	325.5	204.2		344.5	63.8		168.1	29.3	20.4	77.8	252.9	
Level of Service	F	F		F	E		F	C	C	E	F	
Approach Delay (s)		242.3			190.4			30.7			243.6	
Approach LOS		F			F			C			F	

Intersection Summary			
HCM Average Control Delay	194.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.47		
Actuated Cycle Length (s)	148.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	132.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	855	125	255	310	60	135
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	929	136	277	337	65	147
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL		
Median storage veh)				1		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1065		1889	997
vC1, stage 1 conf vol					997	
vC2, stage 2 conf vol					891	
vCu, unblocked vol			1065		1889	997
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			58		56	50
cM capacity (veh/h)			654		147	296

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	1065	277	337	212
Volume Left	0	277	0	65
Volume Right	136	0	0	147
cSH	1700	654	1700	226
Volume to Capacity	0.63	0.42	0.20	0.94
Queue Length 95th (ft)	0	53	0	202
Control Delay (s)	0.0	14.5	0.0	90.3
Lane LOS		B		F
Approach Delay (s)	0.0	6.5		90.3
Approach LOS				F

Intersection Summary			
Average Delay	12.2		
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	725	10	80	285	5	205
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	788	11	87	310	5	223
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			799		1277	793
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			799		1277	793
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			89		97	43
cM capacity (veh/h)			824		164	388

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	799	87	310	228
Volume Left	0	87	0	5
Volume Right	11	0	0	223
cSH	1700	824	1700	376
Volume to Capacity	0.47	0.11	0.18	0.61
Queue Length 95th (ft)	0	9	0	96
Control Delay (s)	0.0	9.9	0.0	28.3
Lane LOS		A		D
Approach Delay (s)	0.0	2.2		28.3
Approach LOS				D

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	5	5	70	5	10	5	100	255	10	800	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	5	76	5	11	5	109	277	11	870	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1163	1288	870	1158	1149	247	870			386		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1163	1288	870	1158	1149	247	870			386		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	97	98	54	97	99	99			99		
cM capacity (veh/h)	164	161	351	164	195	791	775			1173		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	11	92	391	880
Volume Left	0	76	5	11
Volume Right	5	11	277	0
cSH	221	183	775	1173
Volume to Capacity	0.05	0.51	0.01	0.01
Queue Length 95th (ft)	4	63	1	1
Control Delay (s)	22.1	43.3	0.2	0.3
Lane LOS	C	E	A	A
Approach Delay (s)	22.1	43.3	0.2	0.3
Approach LOS	C	E		

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.97		1.00	0.94		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3387		1770	3431		1770	3324		1770	3516	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3387		1770	3431		1770	3324		1770	3516	
Volume (vph)	35	625	250	435	585	150	180	235	160	240	1085	50
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	679	272	473	636	163	196	255	174	261	1179	54
RTOR Reduction (vph)	0	35	0	0	18	0	0	94	0	0	3	0
Lane Group Flow (vph)	38	916	0	473	781	0	196	335	0	261	1230	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	3.6	29.6		26.0	52.0		12.0	28.5		21.5	38.0	
Effective Green, g (s)	3.6	29.6		26.0	52.0		12.0	28.5		21.5	38.0	
Actuated g/C Ratio	0.03	0.24		0.21	0.43		0.10	0.23		0.18	0.31	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	52	824		378	1467		175	779		313	1099	
v/s Ratio Prot	0.02	c0.27		c0.27	0.23		c0.11	0.10		0.15	c0.35	
v/s Ratio Perm												
v/c Ratio	0.73	1.11		1.25	0.53		1.12	0.43		0.83	1.12	
Uniform Delay, d1	58.5	46.0		47.8	25.8		54.8	39.6		48.3	41.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	40.9	66.7		133.2	0.4		103.9	0.4		17.1	66.2	
Delay (s)	99.4	112.7		181.0	26.2		158.7	40.0		65.4	108.0	
Level of Service	F	F		F	C		F	D		E	F	
Approach Delay (s)		112.2			83.7			77.2			100.6	
Approach LOS		F			F			E			F	

Intersection Summary			
HCM Average Control Delay	95.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	121.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	104.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	5	0	25	10	20	0	115	240	30	170	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	0	27	11	22	0	125	261	33	185	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	535	639	188	511	511	255	190			386		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	535	639	188	511	511	255	190			386		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	100	94	98	97	100			97		
cM capacity (veh/h)	426	383	855	458	453	783	1384			1173		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	11	60	386	223
Volume Left	5	27	0	33
Volume Right	0	22	261	5
cSH	403	538	1384	1173
Volume to Capacity	0.03	0.11	0.00	0.03
Queue Length 95th (ft)	2	9	0	2
Control Delay (s)	14.2	12.5	0.0	1.4
Lane LOS	B	B		A
Approach Delay (s)	14.2	12.5	0.0	1.4
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	5	0	5	5	330	0	50	5	110	55	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	0	5	5	359	0	54	5	120	60	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	11	370	60	185
Volume Left (vph)	5	5	0	120
Volume Right (vph)	0	359	5	5
Hadj (s)	0.13	-0.55	-0.02	0.15
Departure Headway (s)	5.1	4.0	5.0	4.9
Degree Utilization, x	0.02	0.41	0.08	0.25
Capacity (veh/h)	645	856	662	677
Control Delay (s)	8.2	9.8	8.4	9.6
Approach Delay (s)	8.2	9.8	8.4	9.6
Approach LOS	A	A	A	A

Intersection Summary			
Delay	9.6		
HCM Level of Service	A		
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	10	395	5	0	680	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	429	5	0	739	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1489	5			5	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1489	5			5	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	85	60			54	
cM capacity (veh/h)	74	1078			1616	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	440	5	745
Volume Left	11	0	739
Volume Right	429	0	0
cSH	807	1700	1616
Volume to Capacity	0.55	0.00	0.46
Queue Length 95th (ft)	84	0	62
Control Delay (s)	14.7	0.0	9.1
Lane LOS	B		A
Approach Delay (s)	14.7	0.0	9.1
Approach LOS	B		

Intersection Summary			
Average Delay	11.1		
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		

9: NW 196th St NW & 20TH Ave NW

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	170	645	0	25	425	70	0	5	75	270	5	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	185	701	0	27	462	76	0	5	82	293	5	33

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	535	351	258	307	87	332
Volume Left (vph)	185	0	27	0	0	293
Volume Right (vph)	0	0	0	76	82	33
Hadj (s)	0.21	0.03	0.09	-0.14	-0.53	0.15
Departure Headway (s)	7.4	7.3	7.6	7.3	7.7	7.3
Degree Utilization, x	1.11	0.71	0.54	0.63	0.19	0.67
Capacity (veh/h)	477	487	458	475	418	482
Control Delay (s)	98.6	24.7	18.0	20.6	12.5	23.8
Approach Delay (s)	69.4		19.4		12.5	23.8
Approach LOS	F		C		B	C

Intersection Summary			
Delay	43.5		
HCM Level of Service	E		
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	940	0	0	545	35	5	0	5	115	5	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	1022	0	0	592	38	5	0	5	125	5	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	592			1022			1364	1636	511	1149	1655	315
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	592			1022			1364	1636	511	1149	1655	315
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			94	100	99	17	94	97
cM capacity (veh/h)	979			675			98	99	508	150	96	681

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	522	511	296	334	11	152
Volume Left	11	0	0	0	5	125
Volume Right	0	0	0	38	5	22
cSH	979	1700	675	1700	164	165
Volume to Capacity	0.01	0.30	0.00	0.20	0.07	0.92
Queue Length 95th (ft)	1	0	0	0	5	169
Control Delay (s)	0.3	0.0	0.0	0.0	28.5	105.2
Lane LOS	A				D	F
Approach Delay (s)	0.2		0.0		28.5	105.2
Approach LOS					D	F

Intersection Summary			
Average Delay	9.0		
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	1040	20	30	570	0	10	0	105	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1130	22	33	620	0	11	0	114	0	0	0

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	565	587	342	310	125	0
Volume Left (vph)	0	0	33	0	11	0
Volume Right (vph)	0	22	0	0	114	0
Hadj (s)	0.03	0.01	0.08	0.03	-0.50	0.00
Departure Headway (s)	5.9	5.8	6.5	6.5	6.3	7.3
Degree Utilization, x	0.92	0.95	0.62	0.56	0.22	0.00
Capacity (veh/h)	606	609	532	546	559	477
Control Delay (s)	42.0	47.7	18.4	16.1	11.0	10.3
Approach Delay (s)	44.9		17.3		11.0	0.0
Approach LOS	E		C		B	A

Intersection Summary			
Delay	33.4		
HCM Level of Service	D		
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0				4.0	4.0		4.0	4.0		4.0
Lane Util. Factor	1.00	0.95				1.00	0.95		1.00	1.00		1.00
Frt	1.00	0.96				1.00	0.98		1.00	0.96		1.00
Flt Protected	0.95	1.00				0.95	1.00		0.95	1.00		0.95
Satd. Flow (prot)	1770	3385				1770	3455		1770	1783		1770
Flt Permitted	0.44	1.00				0.95	1.00		0.95	1.00		0.95
Satd. Flow (perm)	821	3385				1770	3455		1770	1783		1770
Volume (vph)	190	670	250	25	25	35	370	70	20	75	30	195
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	207	728	272	27	27	38	402	76	22	82	33	212
RTOR Reduction (vph)	0	0	0	0	0	0	10	0	0	10	0	0
Lane Group Flow (vph)	207	1027	0	0	0	65	468	0	22	105	0	212
Turn Type	Perm				Prot	Prot			Split			Split
Protected Phases		4			3	3	8		1	1		6
Permitted Phases	4											
Actuated Green, G (s)	39.0	39.0				5.0	48.0		13.1	13.1		58.0
Effective Green, g (s)	39.0	39.0				5.0	48.0		13.1	13.1		58.0
Actuated g/C Ratio	0.27	0.27				0.03	0.33		0.09	0.09		0.39
Clearance Time (s)	4.0	4.0				4.0	4.0		4.0	4.0		4.0
Vehicle Extension (s)	3.0	3.0				3.0	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)	218	897				60	1127		158	159		698
v/s Ratio Prot		c0.30				c0.04	0.14		0.01	c0.06		0.12
v/s Ratio Perm	0.25											
v/c Ratio	0.95	1.14				1.08	0.42		0.14	0.66		0.30
Uniform Delay, d1	53.1	54.0				71.0	38.6		61.8	64.8		30.7
Progression Factor	1.00	1.00				1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2	46.3	78.4				141.1	0.2		0.4	9.8		0.2
Delay (s)	99.3	132.5				212.2	38.9		62.2	74.7		30.9
Level of Service	F	F				F	D		E	E		C
Approach Delay (s)		126.9					59.6			72.7		
Approach LOS		F					E			E		

Intersection Summary			
HCM Average Control Delay	110.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	147.1	Sum of lost time (s)	20.0
Intersection Capacity Utilization	93.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0				4.0		
Lane Util. Factor	1.00				1.00		
Frt	0.94				0.96		
Flt Protected	1.00				0.97		
Satd. Flow (prot)	1758				1722		
Flt Permitted	1.00				0.97		
Satd. Flow (perm)	1758				1722		
Volume (vph)	480	50	240	30	50	15	25
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	522	54	261	33	54	16	27
RTOR Reduction (vph)	11	0	0	0	0	0	0
Lane Group Flow (vph)	826	0	0	0	130	0	0
Turn Type				Split			
Protected Phases	6			2	2		
Permitted Phases							
Actuated Green, G (s)	58.0				12.0		
Effective Green, g (s)	58.0				12.0		
Actuated g/C Ratio	0.39				0.08		
Clearance Time (s)	4.0				4.0		
Vehicle Extension (s)	3.0				3.0		
Lane Grp Cap (vph)	693				140		
v/s Ratio Prot	c0.47				c0.08		
v/s Ratio Perm							
v/c Ratio	1.19				0.93		
Uniform Delay, d1	44.5				67.1		
Progression Factor	1.00				1.00		
Incremental Delay, d2	100.3				54.2		
Delay (s)	144.9				121.4		
Level of Service	F				F		
Approach Delay (s)	121.8				121.4		
Approach LOS	F				F		

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frt		1.00			0.94		1.00	0.94		1.00	0.93	
Flt Protected		0.99			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3505			3337		1770	1760		1770	1727	
Flt Permitted		0.72			0.93		0.65	1.00		0.69	1.00	
Satd. Flow (perm)		2557			3093		1211	1760		1286	1727	
Volume (vph)	125	810	20	15	395	245	15	60	35	475	80	75
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	136	880	22	16	429	266	16	65	38	516	87	82
RTOR Reduction (vph)	0	3	0	0	154	0	0	22	0	0	0	0
Lane Group Flow (vph)	0	1035	0	0	557	0	16	81	0	516	169	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		21.0			21.0		21.0	21.0		21.0	21.0	
Effective Green, g (s)		21.0			21.0		21.0	21.0		21.0	21.0	
Actuated g/C Ratio		0.42			0.42		0.42	0.42		0.42	0.42	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1074			1299		509	739		540	725	
v/s Ratio Prot								0.05			0.10	
v/s Ratio Perm		c0.40			0.18		0.01			c0.40		
v/c Ratio		0.96			0.43		0.03	0.11		0.96	0.23	
Uniform Delay, d1		14.1			10.3		8.5	8.8		14.0	9.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		19.2			0.2		0.0	0.1		27.7	0.2	
Delay (s)		33.3			10.5		8.5	8.9		41.7	9.5	
Level of Service		C			B		A	A		D	A	
Approach Delay (s)		33.3			10.5			8.8			33.8	
Approach LOS		C			B			A			C	

Intersection Summary			
HCM Average Control Delay	25.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	0.97	
Frt	0.95		1.00	1.00	0.93	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3377		1770	3539	3279	
Flt Permitted	1.00		0.95	1.00	0.97	
Satd. Flow (perm)	3377		1770	3539	3279	
Volume (vph)	955	420	145	490	165	135
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1038	457	158	533	179	147
RTOR Reduction (vph)	65	0	0	0	123	0
Lane Group Flow (vph)	1430	0	158	533	203	0
Turn Type			Prot			
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	28.7		5.7	38.4	9.0	
Effective Green, g (s)	28.7		5.7	38.4	9.0	
Actuated g/C Ratio	0.52		0.10	0.69	0.16	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1749		182	2453	533	
v/s Ratio Prot	c0.42		c0.09	0.15	c0.06	
v/s Ratio Perm						
v/c Ratio	0.82		0.87	0.22	0.38	
Uniform Delay, d1	11.2		24.5	3.1	20.7	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	3.1		32.6	0.0	0.5	
Delay (s)	14.3		57.1	3.1	21.2	
Level of Service	B		E	A	C	
Approach Delay (s)	14.3			15.5	21.2	
Approach LOS	B			B	C	

Intersection Summary			
HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	55.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3420		1770	3513		1770	1813		1770	1807	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3420		1770	3513		1770	1813		1770	1807	
Volume (vph)	110	860	250	45	395	20	150	140	30	175	280	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	935	272	49	429	22	163	152	33	190	304	76
RTOR Reduction (vph)	0	34	0	0	4	0	0	10	0	0	0	0
Lane Group Flow (vph)	120	1173	0	49	447	0	163	175	0	190	380	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	7.6	27.4		2.1	21.9		8.9	19.2		8.7	19.0	
Effective Green, g (s)	7.6	27.4		2.1	21.9		8.9	19.2		8.7	19.0	
Actuated g/C Ratio	0.10	0.37		0.03	0.30		0.12	0.26		0.12	0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	183	1277		51	1048		215	474		210	468	
v/s Ratio Prot	c0.07	c0.34		0.03	0.13		0.09	0.10		c0.11	c0.21	
v/s Ratio Perm												
v/c Ratio	0.66	0.92		0.96	0.43		0.76	0.37		0.90	0.81	
Uniform Delay, d1	31.6	21.9		35.6	20.7		31.2	22.2		31.9	25.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.2	10.6		111.0	0.3		14.2	0.5		36.8	10.3	
Delay (s)	39.8	32.5		146.6	21.0		45.4	22.6		68.7	35.8	
Level of Service	D	C		F	C		D	C		E	D	
Approach Delay (s)		33.2			33.3			33.3			46.8	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	36.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	73.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0	4.0	4.0		4.0
Lane Util. Factor		0.95			0.95			0.91	0.95	0.95		1.00
Frt		0.96			0.97			1.00	1.00	0.99		1.00
Flt Protected		0.99			0.99			0.95	0.95	1.00		0.95
Satd. Flow (prot)		3341			3392			1610	1681	3514		1770
Flt Permitted		0.99			0.99			0.95	0.95	1.00		0.95
Satd. Flow (perm)		3341			3392			1610	1681	3514		1770
Volume (vph)	235	460	295	130	240	50	35	75	35	920	45	815
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	255	500	321	141	261	54	38	82	38	1000	49	886
RTOR Reduction (vph)	0	31	0	0	4	0	0	0	0	2	0	0
Lane Group Flow (vph)	0	1045	0	0	490	0	0	59	61	1047	0	886
Turn Type	Split			Split				Prot	Prot			Prot
Protected Phases	4	4		8	8			5	5	2		1
Permitted Phases												
Actuated Green, G (s)		33.0			18.0			4.0	4.0	35.0		48.0
Effective Green, g (s)		33.0			18.0			4.0	4.0	35.0		48.0
Actuated g/C Ratio		0.22			0.12			0.03	0.03	0.23		0.32
Clearance Time (s)		4.0			4.0			4.0	4.0	4.0		4.0
Vehicle Extension (s)		3.0			3.0			3.0	3.0	3.0		3.0
Lane Grp Cap (vph)		735			407			43	45	820		566
v/s Ratio Prot		c0.31			c0.14			0.04	0.04	c0.30		c0.50
v/s Ratio Perm												
v/c Ratio		1.42			1.20			1.37	1.36	1.28		1.57
Uniform Delay, d1		58.5			66.0			73.0	73.0	57.5		51.0
Progression Factor		1.00			1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2		197.6			112.6			265.0	255.5	133.8		262.9
Delay (s)		256.1			178.6			338.0	328.5	191.3		313.9
Level of Service		F			F			F	F	F		F
Approach Delay (s)		256.1			178.6					205.9		
Approach LOS		F			F					F		

Intersection Summary			
HCM Average Control Delay	199.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.41		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	127.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	SER2
Lane Configurations				
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0
Lane Util. Factor	0.95			1.00
Frt	0.99			0.86
Flt Protected	1.00			1.00
Satd. Flow (prot)	3500			1611
Flt Permitted	1.00			1.00
Satd. Flow (perm)	3500			1611
Volume (vph)	1865	130	20	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2027	141	22	5
RTOR Reduction (vph)	0	0	0	2
Lane Group Flow (vph)	2190	0	0	3
Turn Type				custom
Protected Phases	6			
Permitted Phases				1 4
Actuated Green, G (s)	79.0			81.0
Effective Green, g (s)	79.0			81.0
Actuated g/C Ratio	0.53			0.54
Clearance Time (s)	4.0			
Vehicle Extension (s)	3.0			
Lane Grp Cap (vph)	1843			870
v/s Ratio Prot	0.63			
v/s Ratio Perm				0.00
v/c Ratio	1.19			0.00
Uniform Delay, d1	35.5			15.9
Progression Factor	1.00			1.00
Incremental Delay, d2	90.4			0.0
Delay (s)	125.9			15.9
Level of Service	F			B
Approach Delay (s)	180.1			
Approach LOS	F			

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	75	35	50	785	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	82	38	54	853	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	92				168	65
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	92				168	65
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				0	99
cM capacity (veh/h)	1502				816	999

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	92	92	864
Volume Left	11	0	853
Volume Right	0	54	11
cSH	1502	1700	818
Volume to Capacity	0.01	0.05	1.06
Queue Length 95th (ft)	1	0	528
Control Delay (s)	0.9	0.0	69.7
Lane LOS	A		F
Approach Delay (s)	0.9	0.0	69.7
Approach LOS			F

Intersection Summary			
Average Delay	57.5		
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	35	305	90	185	485	180
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	332	98	201	527	196
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1022	625	527			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1022	625	527			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	84	32	91			
cM capacity (veh/h)	237	485	1040			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	38	332	299	723
Volume Left	38	0	98	0
Volume Right	0	332	0	196
cSH	237	485	1040	1700
Volume to Capacity	0.16	0.68	0.09	0.43
Queue Length 95th (ft)	14	128	8	0
Control Delay (s)	23.1	27.0	3.5	0.0
Lane LOS	C	D	A	
Approach Delay (s)	26.6		3.5	0.0
Approach LOS	D			

Intersection Summary			
Average Delay	7.8		
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frt		1.00			1.00	0.85		1.00	0.85		1.00	
Flt Protected		0.98			0.95	1.00		1.00	1.00		0.98	
Satd. Flow (prot)		1817			1770	1583		1863	1583		1829	
Flt Permitted		0.87			0.75	1.00		1.00	1.00		0.80	
Satd. Flow (perm)		1621			1399	1583		1863	1583		1486	
Volume (vph)	5	5	0	225	0	140	0	195	265	220	385	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	5	0	245	0	152	0	212	288	239	418	0
RTOR Reduction (vph)	0	0	0	0	0	114	0	0	118	0	0	0
Lane Group Flow (vph)	0	10	0	0	245	38	0	212	170	0	657	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		12.8			12.8	12.8		29.9	29.9		29.9	
Effective Green, g (s)		12.8			12.8	12.8		29.9	29.9		29.9	
Actuated g/C Ratio		0.25			0.25	0.25		0.59	0.59		0.59	
Clearance Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		409			353	400		1099	934		876	
v/s Ratio Prot								0.11				
v/s Ratio Perm		0.01			c0.18	0.02			0.11		c0.44	
v/c Ratio		0.02			0.69	0.10		0.19	0.18		0.75	
Uniform Delay, d1		14.3			17.2	14.5		4.8	4.8		7.7	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		0.0			5.8	0.1		0.1	0.1		3.6	
Delay (s)		14.3			23.0	14.6		4.9	4.9		11.3	
Level of Service		B			C	B		A	A		B	
Approach Delay (s)		14.3			19.8			4.9			11.3	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	50.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		0.97	0.95	
Frt	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3369		1770	3379		1770	3526		3433	3528	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3369		1770	3379		1770	3526		3433	3528	
Volume (vph)	95	370	175	385	195	85	80	965	25	470	1635	35
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	402	190	418	212	92	87	1049	27	511	1777	38
RTOR Reduction (vph)	0	46	0	0	40	0	0	1	0	0	1	0
Lane Group Flow (vph)	103	546	0	418	264	0	87	1075	0	511	1814	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	17.0	17.0		25.0	25.0		5.0	44.0		18.0	57.0	
Effective Green, g (s)	17.0	17.0		25.0	25.0		5.0	44.0		18.0	57.0	
Actuated g/C Ratio	0.14	0.14		0.21	0.21		0.04	0.37		0.15	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	251	477		369	704		74	1293		515	1676	
v/s Ratio Prot	0.06	c0.16		c0.24	0.08		0.05	c0.30		0.15	c0.51	
v/s Ratio Perm												
v/c Ratio	0.41	1.14		1.13	0.37		1.18	0.83		0.99	1.08	
Uniform Delay, d1	46.9	51.5		47.5	40.8		57.5	34.6		50.9	31.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	87.1		88.0	0.3		159.7	4.7		37.5	47.9	
Delay (s)	48.0	138.6		135.5	41.1		217.2	39.3		88.4	79.4	
Level of Service	D	F		F	D		F	D		F	E	
Approach Delay (s)		125.2			95.8			52.6			81.4	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM Average Control Delay	82.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	35	65	240	105	100	10	25	210	65	10	520	120
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	71	261	114	109	11	27	228	71	11	565	130

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	370	234	326	707
Volume Left (vph)	38	114	27	11
Volume Right (vph)	261	11	71	130
Hadj (s)	-0.37	0.10	-0.08	-0.07
Departure Headway (s)	7.4	8.4	7.7	7.3
Degree Utilization, x	0.76	0.54	0.70	1.43
Capacity (veh/h)	468	395	445	492
Control Delay (s)	30.3	20.8	26.7	227.5
Approach Delay (s)	30.3	20.8	26.7	227.5
Approach LOS	D	C	D	F

Intersection Summary			
Delay	113.4		
HCM Level of Service	F		
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	10	195	620	185	305	75
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	212	674	201	332	82
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1921	372	413			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1921	372	413			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	64	69	41			
cM capacity (veh/h)	30	674	1146			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	11	212	875	413
Volume Left	11	0	674	0
Volume Right	0	212	0	82
cSH	30	674	1146	1700
Volume to Capacity	0.36	0.31	0.59	0.24
Queue Length 95th (ft)	28	34	100	0
Control Delay (s)	178.9	12.8	11.6	0.0
Lane LOS	F	B	B	
Approach Delay (s)	20.9		11.6	0.0
Approach LOS	C			

Intersection Summary			
Average Delay	9.8		
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	40	20	20	45	440	20	355	20	115	345	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	43	22	22	49	478	22	386	22	125	375	38

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	87	71	478	429	538
Volume Left (vph)	22	22	0	22	125
Volume Right (vph)	22	0	478	22	38
Hadj (s)	-0.07	0.19	-0.67	0.01	0.04
Departure Headway (s)	9.2	8.1	7.2	7.5	7.4
Degree Utilization, x	0.22	0.16	0.96	0.89	1.11
Capacity (veh/h)	373	435	492	469	488
Control Delay (s)	14.8	11.4	56.3	45.7	101.7
Approach Delay (s)	14.8	50.6		45.7	101.7
Approach LOS	B	F		E	F

Intersection Summary			
Delay	64.5		
HCM Level of Service	F		
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

2025 Proposed Action PM Peak Hour
Synchro LOS Report

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.97		1.00	0.93		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3444		1770	3296		1770	3539	1583	1770	3478	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3444		1770	3296		1770	3539	1583	1770	3478	
Volume (vph)	285	320	70	250	490	415	75	1700	175	225	1430	185
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	310	348	76	272	533	451	82	1848	190	245	1554	201
RTOR Reduction (vph)	0	13	0	0	109	0	0	0	65	0	7	0
Lane Group Flow (vph)	310	411	0	272	875	0	82	1848	125	245	1748	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	19.0	24.9		24.1	30.0		6.0	60.0	60.0	15.0	69.0	
Effective Green, g (s)	19.0	24.9		24.1	30.0		6.0	60.0	60.0	15.0	69.0	
Actuated g/C Ratio	0.14	0.18		0.17	0.21		0.04	0.43	0.43	0.11	0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	240	613		305	706		76	1517	678	190	1714	
v/s Ratio Prot	c0.18	0.12		0.15	c0.27		0.05	c0.52		c0.14	0.50	
v/s Ratio Perm									0.08			
v/c Ratio	1.29	0.67		0.89	1.24		1.08	1.22	0.18	1.29	1.02	
Uniform Delay, d1	60.5	53.7		56.7	55.0		67.0	40.0	24.8	62.5	35.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	158.7	2.9		26.1	119.5		126.5	104.4	0.1	163.8	26.8	
Delay (s)	219.2	56.6		82.8	174.5		193.5	144.4	24.9	226.3	62.3	
Level of Service	F	E		F	F		F	F	C	F	E	
Approach Delay (s)		125.3			154.6			135.6			82.4	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	120.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	115.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	385	50	120	615	135	305
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	418	54	130	668	147	332
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			473		1375	446
vC1, stage 1 conf vol					446	
vC2, stage 2 conf vol					929	
vCu, unblocked vol			473		1375	446
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			88		43	46
cM capacity (veh/h)			1089		258	613

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	473	130	668	478
Volume Left	0	130	0	147
Volume Right	54	0	0	332
cSH	1700	1089	1700	431
Volume to Capacity	0.28	0.12	0.39	1.11
Queue Length 95th (ft)	0	10	0	417
Control Delay (s)	0.0	8.8	0.0	107.1
Lane LOS		A		F
Approach Delay (s)	0.0	1.4		107.1
Approach LOS				F

Intersection Summary			
Average Delay	29.9		
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	335	10	215	540	10	85
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	364	11	234	587	11	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			375		1424	370
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			375		1424	370
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			80		91	86
cM capacity (veh/h)			1183		120	676

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	375	234	587	103
Volume Left	0	234	0	11
Volume Right	11	0	0	92
cSH	1700	1183	1700	454
Volume to Capacity	0.22	0.20	0.35	0.23
Queue Length 95th (ft)	0	18	0	22
Control Delay (s)	0.0	8.8	0.0	15.2
Lane LOS		A		C
Approach Delay (s)	0.0	2.5		15.2
Approach LOS				C

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	5	170	5	15	0	995	95	10	380	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	185	5	16	0	1082	103	11	413	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1587	1620	413	1573	1568	1133	413			1185		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1587	1620	413	1573	1568	1133	413			1185		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	0	95	93	100			98		
cM capacity (veh/h)	77	101	639	87	109	247	1146			589		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	5	207	1185	424
Volume Left	0	185	0	11
Volume Right	5	16	103	0
cSH	639	92	1146	589
Volume to Capacity	0.01	2.23	0.00	0.02
Queue Length 95th (ft)	1	461	0	1
Control Delay (s)	10.7	662.8	0.0	0.6
Lane LOS	B	F		A
Approach Delay (s)	10.7	662.8	0.0	0.6
Approach LOS	B	F		

Intersection Summary			
Average Delay	75.3		
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.96		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3383		1770	3404		1770	3424		1770	3487	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3383		1770	3404		1770	3424		1770	3487	
Volume (vph)	65	800	335	470	850	290	330	1130	315	220	360	40
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	870	364	511	924	315	359	1228	342	239	391	43
RTOR Reduction (vph)	0	30	0	0	22	0	0	17	0	0	6	0
Lane Group Flow (vph)	71	1204	0	511	1217	0	359	1553	0	239	428	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	8.7	39.0		30.0	60.3		32.9	51.0		14.0	32.1	
Effective Green, g (s)	8.7	39.0		30.0	60.3		32.9	51.0		14.0	32.1	
Actuated g/C Ratio	0.06	0.26		0.20	0.40		0.22	0.34		0.09	0.21	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	103	880		354	1368		388	1164		165	746	
v/s Ratio Prot	0.04	c0.36		c0.29	0.36		0.20	c0.45		c0.14	0.12	
v/s Ratio Perm												
v/c Ratio	0.69	1.37		1.44	0.89		0.93	1.33		1.45	0.57	
Uniform Delay, d1	69.3	55.5		60.0	41.7		57.3	49.5		68.0	52.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.5	172.8		214.9	7.4		27.5	156.3		232.4	1.1	
Delay (s)	86.8	228.3		274.9	49.2		84.9	205.8		300.4	53.9	
Level of Service	F	F		F	D		F	F		F	D	
Approach Delay (s)		220.6			115.1			183.3			141.4	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	165.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.38		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	125.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	80	30	40	0	285	80	30	175	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	87	33	43	0	310	87	33	190	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	668	652	190	609	609	353	190			397		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	668	652	190	609	609	353	190			397		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	78	92	94	100			97		
cM capacity (veh/h)	319	376	852	399	398	690	1384			1162		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	163	397	223
Volume Left	0	87	0	33
Volume Right	0	43	87	0
cSH	1700	449	1384	1162
Volume to Capacity	0.00	0.36	0.00	0.03
Queue Length 95th (ft)	0	41	0	2
Control Delay (s)	0.0	17.5	0.0	1.4
Lane LOS	A	C		A
Approach Delay (s)	0.0	17.5	0.0	1.4
Approach LOS	A	C		

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	5	0	0	5	180	0	70	5	210	80	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	0	0	5	196	0	76	5	228	87	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	5	201	82	326
Volume Left (vph)	0	0	0	228
Volume Right (vph)	0	196	5	11
Hadj (s)	0.03	-0.55	-0.01	0.15
Departure Headway (s)	5.2	4.3	4.8	4.6
Degree Utilization, x	0.01	0.24	0.11	0.42
Capacity (veh/h)	618	764	708	745
Control Delay (s)	8.2	8.7	8.3	10.9
Approach Delay (s)	8.2	8.7	8.3	10.9
Approach LOS	A	A	A	B

Intersection Summary			
Delay	9.8		
HCM Level of Service	A		
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	10	710	5	5	585	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	772	5	5	636	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1291	8			11	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1291	8			11	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	28			60	
cM capacity (veh/h)	109	1074			1608	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	783	11	647
Volume Left	11	0	636
Volume Right	772	5	0
cSH	956	1700	1608
Volume to Capacity	0.82	0.01	0.40
Queue Length 95th (ft)	236	0	48
Control Delay (s)	23.2	0.0	8.6
Lane LOS	C		A
Approach Delay (s)	23.2	0.0	8.6
Approach LOS	C		

Intersection Summary			
Average Delay	16.5		
Intersection Capacity Utilization	90.8%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	130	610	10	90	730	150	10	50	50	145	15	100
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	141	663	11	98	793	163	11	54	54	158	16	109

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	473	342	495	560	120	283
Volume Left (vph)	141	0	98	0	11	158
Volume Right (vph)	0	11	0	163	54	109
Hadj (s)	0.18	0.01	0.13	-0.17	-0.22	-0.09
Departure Headway (s)	7.8	7.7	7.6	7.3	8.3	7.6
Degree Utilization, x	1.03	0.73	1.05	1.14	0.27	0.60
Capacity (veh/h)	454	463	472	495	404	463
Control Delay (s)	76.4	27.3	82.0	110.3	14.4	21.1
Approach Delay (s)	55.8		97.0		14.4	21.1
Approach LOS	F		F		B	C

Intersection Summary			
Delay	68.4		
HCM Level of Service	F		
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	785	5	70	885	150	0	0	5	65	0	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	853	5	76	962	163	0	0	5	71	0	43
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	962			859			1554	1992	429	1649	2076	562
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	962			859			1554	1992	429	1649	2076	562
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			90			100	100	99	0	100	91
cM capacity (veh/h)	711			778			64	53	574	59	47	470

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	438	432	557	644	5	114
Volume Left	11	0	76	0	0	71
Volume Right	0	5	0	163	5	43
cSH	711	1700	778	1700	574	88
Volume to Capacity	0.02	0.25	0.10	0.38	0.01	1.29
Queue Length 95th (ft)	1	0	8	0	1	209
Control Delay (s)	0.5	0.0	2.6	0.0	11.3	278.2
Lane LOS	A		A		B	F
Approach Delay (s)	0.2		1.2		11.3	278.2
Approach LOS					B	F

Intersection Summary			
Average Delay	15.3		
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	830	25	135	1070	0	35	0	50	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	902	27	147	1163	0	38	0	54	0	0	0

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	601	328	728	582	92	0
Volume Left (vph)	0	0	147	0	38	0
Volume Right (vph)	0	27	0	0	54	0
Hadj (s)	0.03	-0.02	0.13	0.03	-0.24	0.00
Departure Headway (s)	6.5	6.4	6.2	6.1	6.7	7.4
Degree Utilization, x	1.08	0.58	1.25	0.98	0.17	0.00
Capacity (veh/h)	553	556	592	582	528	482
Control Delay (s)	84.9	16.8	143.7	54.8	11.1	10.4
Approach Delay (s)	60.8		104.2		11.1	0.0
Approach LOS	F		F		B	A

Intersection Summary			
Delay	83.2		
HCM Level of Service	F		
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0				4.0	4.0		4.0	4.0		4.0
Lane Util. Factor	1.00	0.95				1.00	0.95		1.00	1.00		1.00
Frt	1.00	0.97				1.00	0.95		1.00	0.95		1.00
Flt Protected	0.95	1.00				0.95	1.00		0.95	1.00		0.95
Satd. Flow (prot)	1770	3432				1770	3371		1770	1762		1770
Flt Permitted	0.20	1.00				0.95	1.00		0.95	1.00		0.95
Satd. Flow (perm)	374	3432				1770	3371		1770	1762		1770
Volume (vph)	260	515	115	15	55	80	670	310	65	355	200	100
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	283	560	125	16	60	87	728	337	71	386	217	109
RTOR Reduction (vph)	0	0	0	0	0	0	42	0	0	16	0	0
Lane Group Flow (vph)	283	701	0	0	0	147	1023	0	71	587	0	109
Turn Type	Perm				Prot	Prot			Split			Split
Protected Phases		4			3	3	8		1	1		6
Permitted Phases	4											
Actuated Green, G (s)	55.0	55.0				7.0	66.0		28.0	28.0		12.0
Effective Green, g (s)	55.0	55.0				7.0	66.0		28.0	28.0		12.0
Actuated g/C Ratio	0.42	0.42				0.05	0.51		0.22	0.22		0.09
Clearance Time (s)	4.0	4.0				4.0	4.0		4.0	4.0		4.0
Vehicle Extension (s)	3.0	3.0				3.0	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)	158	1452				95	1711		381	380		163
v/s Ratio Prot		0.20				c0.08	0.30		0.04	c0.33		0.06
v/s Ratio Perm	c0.76											
v/c Ratio	1.79	0.48				1.55	0.60		0.19	1.55		0.67
Uniform Delay, d1	37.5	27.2				61.5	22.6		41.7	51.0		57.1
Progression Factor	1.00	1.00				1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2	380.2	0.3				291.6	0.6		0.2	258.3		9.9
Delay (s)	417.7	27.4				353.1	23.2		41.9	309.3		67.0
Level of Service	F	C				F	C		D	F		E
Approach Delay (s)		139.7					63.2			281.1		
Approach LOS		F					E			F		

Intersection Summary			
HCM Average Control Delay	167.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.67		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	102.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0				4.0		
Lane Util. Factor	1.00				1.00		
Frt	0.92				0.92		
Flt Protected	1.00				0.98		
Satd. Flow (prot)	1718				1677		
Flt Permitted	1.00				0.98		
Satd. Flow (perm)	1718				1677		
Volume (vph)	135	20	125	15	30	55	15
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	147	22	136	16	33	60	16
RTOR Reduction (vph)	23	0	0	0	0	0	0
Lane Group Flow (vph)	282	0	0	0	125	0	0
Turn Type				Split			
Protected Phases	6			2	2		
Permitted Phases							
Actuated Green, G (s)	12.0				8.0		
Effective Green, g (s)	12.0				8.0		
Actuated g/C Ratio	0.09				0.06		
Clearance Time (s)	4.0				4.0		
Vehicle Extension (s)	3.0				3.0		
Lane Grp Cap (vph)	159				103		
v/s Ratio Prot	c0.16				c0.07		
v/s Ratio Perm							
v/c Ratio	1.78				1.21		
Uniform Delay, d1	59.0				61.0		
Progression Factor	1.00				1.00		
Incremental Delay, d2	373.2				156.9		
Delay (s)	432.2				217.9		
Level of Service	F				F		
Approach Delay (s)	336.1				217.9		
Approach LOS	F				F		

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frt		0.99			0.97		1.00	0.93		1.00	0.92	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3493			3412		1770	1741		1770	1716	
Flt Permitted		0.74			0.90		0.68	1.00		0.70	1.00	
Satd. Flow (perm)		2598			3092		1273	1741		1305	1716	
Volume (vph)	65	650	45	45	930	290	25	45	35	200	50	55
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	707	49	49	1011	315	27	49	38	217	54	60
RTOR Reduction (vph)	0	8	0	0	50	0	0	28	0	0	0	0
Lane Group Flow (vph)	0	819	0	0	1325	0	27	59	0	217	114	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		24.3			24.3		12.1	12.1		12.1	12.1	
Effective Green, g (s)		24.3			24.3		12.1	12.1		12.1	12.1	
Actuated g/C Ratio		0.55			0.55		0.27	0.27		0.27	0.27	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1422			1692		347	474		356	468	
v/s Ratio Prot								0.03			0.07	
v/s Ratio Perm		0.32			c0.43		0.02			c0.17		
v/c Ratio		0.58			0.78		0.08	0.13		0.61	0.24	
Uniform Delay, d1		6.6			8.0		12.0	12.2		14.1	12.6	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.6			2.4		0.1	0.1		2.9	0.3	
Delay (s)		7.2			10.4		12.1	12.3		17.0	12.9	
Level of Service		A			B		B	B		B	B	
Approach Delay (s)		7.2			10.4			12.2			15.6	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	44.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	0.97	
Frt	0.96		1.00	1.00	0.97	
Flt Protected	1.00		0.95	1.00	0.96	
Satd. Flow (prot)	3404		1770	3539	3373	
Flt Permitted	1.00		0.95	1.00	0.96	
Satd. Flow (perm)	3404		1770	3539	3373	
Volume (vph)	615	210	100	885	395	95
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	668	228	109	962	429	103
RTOR Reduction (vph)	59	0	0	0	41	0
Lane Group Flow (vph)	837	0	109	962	491	0
Turn Type			Prot			
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	15.8		3.8	23.6	11.8	
Effective Green, g (s)	15.8		3.8	23.6	11.8	
Actuated g/C Ratio	0.36		0.09	0.54	0.27	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1239		155	1924	917	
v/s Ratio Prot	c0.25		c0.06	0.27	c0.15	
v/s Ratio Perm						
v/c Ratio	0.68		0.70	0.50	0.54	
Uniform Delay, d1	11.6		19.3	6.2	13.5	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.5		13.5	0.2	0.6	
Delay (s)	13.1		32.7	6.4	14.1	
Level of Service	B		C	A	B	
Approach Delay (s)	13.1			9.1	14.1	
Approach LOS	B			A	B	

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	43.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.97		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3514		1770	3457		1770	1806		1770	1768	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3514		1770	3457		1770	1806		1770	1768	
Volume (vph)	100	600	30	20	630	115	255	330	85	185	235	120
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	652	33	22	685	125	277	359	92	201	255	130
RTOR Reduction (vph)	0	5	0	0	20	0	0	13	0	0	0	0
Lane Group Flow (vph)	109	680	0	22	790	0	277	438	0	201	385	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.4	22.2		1.5	19.3		13.0	20.4		10.3	17.7	
Effective Green, g (s)	4.4	22.2		1.5	19.3		13.0	20.4		10.3	17.7	
Actuated g/C Ratio	0.06	0.32		0.02	0.27		0.18	0.29		0.15	0.25	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	111	1108		38	948		327	523		259	445	
v/s Ratio Prot	c0.06	c0.19		0.01	c0.23		c0.16	c0.24		0.11	0.22	
v/s Ratio Perm												
v/c Ratio	0.98	0.61		0.58	0.83		0.85	0.84		0.78	0.87	
Uniform Delay, d1	33.0	20.5		34.1	24.0		27.7	23.4		28.9	25.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	79.3	1.0		19.6	6.4		18.0	11.2		13.5	15.9	
Delay (s)	112.3	21.5		53.7	30.4		45.7	34.7		42.5	41.2	
Level of Service	F	C		D	C		D	C		D	D	
Approach Delay (s)		33.9			31.0			38.9			41.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	35.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	70.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0	4.0	4.0		4.0
Lane Util. Factor		0.95			0.95			0.91	0.95	0.95		1.00
Frt		0.95			0.95			1.00	1.00	1.00		1.00
Flt Protected		0.99			0.99			0.95	0.95	1.00		0.95
Satd. Flow (prot)		3327			3312			1610	1681	3527		1770
Flt Permitted		0.99			0.99			0.95	0.95	1.00		0.95
Satd. Flow (perm)		3327			3312			1610	1681	3527		1770
Volume (vph)	215	380	285	170	355	230	70	135	175	1635	40	335
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	234	413	310	185	386	250	76	147	190	1777	43	364
RTOR Reduction (vph)	0	38	0	0	5	0	0	0	0	1	0	0
Lane Group Flow (vph)	0	919	0	0	892	0	0	147	190	1819	0	364
Turn Type	Split			Split				Prot	Prot			Prot
Protected Phases	4	4		8	8			5	5	2		1
Permitted Phases												
Actuated Green, G (s)		30.0			30.0			12.0	12.0	54.0		20.0
Effective Green, g (s)		30.0			30.0			12.0	12.0	54.0		20.0
Actuated g/C Ratio		0.20			0.20			0.08	0.08	0.36		0.13
Clearance Time (s)		4.0			4.0			4.0	4.0	4.0		4.0
Vehicle Extension (s)		3.0			3.0			3.0	3.0	3.0		3.0
Lane Grp Cap (vph)		665			662			129	134	1270		236
v/s Ratio Prot		c0.28			c0.27			0.09	0.11	c0.52		c0.21
v/s Ratio Perm												
v/c Ratio		1.38			1.35			1.14	1.42	1.43		1.54
Uniform Delay, d1		60.0			60.0			69.0	69.0	48.0		65.0
Progression Factor		1.00			1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2		180.9			166.4			121.6	226.0	199.0		264.1
Delay (s)		240.9			226.4			190.6	295.0	247.0		329.1
Level of Service		F			F			F	F	F		F
Approach Delay (s)		240.9			226.4					247.4		
Approach LOS		F			F					F		

Intersection Summary			
HCM Average Control Delay	203.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.42		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	128.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	SER2
Lane Configurations				
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0
Lane Util. Factor	0.95			1.00
Frt	0.99			0.86
Flt Protected	1.00			1.00
Satd. Flow (prot)	3506			1611
Flt Permitted	1.00			1.00
Satd. Flow (perm)	3506			1611
Volume (vph)	1275	75	10	15
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1386	82	11	16
RTOR Reduction (vph)	1	0	0	11
Lane Group Flow (vph)	1478	0	0	5
Turn Type				custom
Protected Phases	6			
Permitted Phases				1 4
Actuated Green, G (s)	62.0			50.0
Effective Green, g (s)	62.0			50.0
Actuated g/C Ratio	0.41			0.33
Clearance Time (s)	4.0			
Vehicle Extension (s)	3.0			
Lane Grp Cap (vph)	1449			537
v/s Ratio Prot	0.42			
v/s Ratio Perm				0.00
v/c Ratio	1.02			0.01
Uniform Delay, d1	44.0			33.4
Progression Factor	1.00			1.00
Incremental Delay, d2	28.9			0.0
Delay (s)	72.9			33.5
Level of Service	E			C
Approach Delay (s)	123.5			
Approach LOS	F			

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	30	80	695	215	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	33	87	755	234	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	842				519	465
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	842				519	465
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				54	97
cM capacity (veh/h)	793				510	598

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	43	842	250
Volume Left	11	0	234
Volume Right	0	755	16
cSH	793	1700	515
Volume to Capacity	0.01	0.50	0.49
Queue Length 95th (ft)	1	0	66
Control Delay (s)	2.5	0.0	18.4
Lane LOS	A		C
Approach Delay (s)	2.5	0.0	18.4
Approach LOS			C

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	40	155	190	500	200	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	168	207	543	217	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1201	245	217			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1201	245	217			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	75	79	85			
cM capacity (veh/h)	173	794	1352			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	43	168	750	272
Volume Left	43	0	207	0
Volume Right	0	168	0	54
cSH	173	794	1352	1700
Volume to Capacity	0.25	0.21	0.15	0.16
Queue Length 95th (ft)	24	20	13	0
Control Delay (s)	32.7	10.7	3.6	0.0
Lane LOS	D	B	A	
Approach Delay (s)	15.2		3.6	0.0
Approach LOS	C			

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor					1.00	1.00		1.00	1.00		1.00	
Frt					1.00	0.85		1.00	0.85		1.00	
Flt Protected					0.95	1.00		1.00	1.00		0.98	
Satd. Flow (prot)					1776	1583		1863	1583		1824	
Flt Permitted					0.73	1.00		1.00	1.00		0.72	
Satd. Flow (perm)					1361	1583		1863	1583		1337	
Volume (vph)	0	0	0	205	5	210	0	460	290	95	155	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	223	5	228	0	500	315	103	168	5
RTOR Reduction (vph)	0	0	0	0	0	148	0	0	168	0	2	0
Lane Group Flow (vph)	0	0	0	0	228	80	0	500	147	0	274	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)					10.9	10.9		16.6	16.6		16.6	
Effective Green, g (s)					10.9	10.9		16.6	16.6		16.6	
Actuated g/C Ratio					0.31	0.31		0.47	0.47		0.47	
Clearance Time (s)					4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)					3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)					418	486		871	740		625	
v/s Ratio Prot								c0.27				
v/s Ratio Perm					c0.17	0.05			0.09		0.21	
v/c Ratio					0.55	0.17		0.57	0.20		0.44	
Uniform Delay, d1					10.2	9.0		6.9	5.5		6.3	
Progression Factor					1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2					1.5	0.2		0.9	0.1		0.5	
Delay (s)					11.7	9.1		7.8	5.7		6.8	
Level of Service					B	A		A	A		A	
Approach Delay (s)		0.0			10.4			7.0			6.8	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	35.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		0.97	0.95	
Frt	1.00	0.96		1.00	0.94		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3403		1770	3330		1770	3523		3433	3519	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3403		1770	3330		1770	3523		3433	3519	
Volume (vph)	100	245	85	305	430	280	40	1720	55	400	1155	45
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	266	92	332	467	304	43	1870	60	435	1255	49
RTOR Reduction (vph)	0	23	0	0	72	0	0	2	0	0	2	0
Lane Group Flow (vph)	109	335	0	332	699	0	43	1928	0	435	1302	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	16.0	16.0		28.0	28.0		27.8	73.8		17.0	63.0	
Effective Green, g (s)	16.0	16.0		28.0	28.0		27.8	73.8		17.0	63.0	
Actuated g/C Ratio	0.11	0.11		0.19	0.19		0.18	0.49		0.11	0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	188	361		329	618		326	1724		387	1470	
v/s Ratio Prot	0.06	c0.10		0.19	c0.21		0.02	c0.55		c0.13	0.37	
v/s Ratio Perm												
v/c Ratio	0.58	0.93		1.01	1.13		0.13	1.12		1.12	0.89	
Uniform Delay, d1	64.2	66.8		61.4	61.4		51.4	38.5		66.9	40.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.3	29.3		51.9	78.2		0.2	61.9		83.9	6.8	
Delay (s)	68.5	96.1		113.3	139.6		51.6	100.4		150.8	47.3	
Level of Service	E	F		F	F		D	F		F	D	
Approach Delay (s)		89.7			131.7			99.3			73.2	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM Average Control Delay	96.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	150.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	100.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	75	40	35	25	30	10	50	605	10	15	350	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	43	38	27	33	11	54	658	11	16	380	22

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	163	71	723	418
Volume Left (vph)	82	27	54	16
Volume Right (vph)	38	11	11	22
Hadj (s)	-0.01	0.02	0.04	0.01
Departure Headway (s)	6.9	7.3	5.5	5.8
Degree Utilization, x	0.31	0.14	1.10	0.67
Capacity (veh/h)	494	447	658	607
Control Delay (s)	12.9	11.5	89.4	19.6
Approach Delay (s)	12.9	11.5	89.4	19.6
Approach LOS	B	B	F	C

Intersection Summary			
Delay	55.1		
HCM Level of Service	F		
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	30	235	265	375	170	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	255	288	408	185	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1179	196	207			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1179	196	207			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	80	70	79			
cM capacity (veh/h)	166	846	1365			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	33	255	696	207
Volume Left	33	0	288	0
Volume Right	0	255	0	22
cSH	166	846	1365	1700
Volume to Capacity	0.20	0.30	0.21	0.12
Queue Length 95th (ft)	18	32	20	0
Control Delay (s)	31.9	11.1	4.8	0.0
Lane LOS	D	B	A	
Approach Delay (s)	13.4		4.8	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	6.1		
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	15	50	10	20	40	170	15	460	35	190	205	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	54	11	22	43	185	16	500	38	207	223	11

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	82	65	185	554	440
Volume Left (vph)	16	22	0	16	207
Volume Right (vph)	11	0	185	38	11
Hadj (s)	-0.01	0.20	-0.67	0.00	0.11
Departure Headway (s)	7.8	7.8	6.9	5.9	6.2
Degree Utilization, x	0.18	0.14	0.36	0.91	0.76
Capacity (veh/h)	421	436	493	596	559
Control Delay (s)	12.4	10.9	12.5	41.8	26.1
Approach Delay (s)	12.4	12.1		41.8	26.1
Approach LOS	B	B		E	D

Intersection Summary			
Delay	29.2		
HCM Level of Service	D		
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		

2025 Proposed Action AM Peak Hour with Mitigations
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	0.91		1.00	0.91	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3467		1770	3539	1583	1770	4997		1770	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3467		1770	3539	1583	1770	4997		1770	5085	1583
Volume (vph)	320	605	95	275	270	65	20	1035	135	160	2640	240
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	348	658	103	299	293	71	22	1125	147	174	2870	261
RTOR Reduction (vph)	0	9	0	0	0	56	0	11	0	0	0	70
Lane Group Flow (vph)	348	752	0	299	293	15	22	1261	0	174	2870	191
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	18.3	27.1		21.0	29.8	29.8	2.3	56.5		17.9	72.1	72.1
Effective Green, g (s)	18.3	27.1		21.0	29.8	29.8	2.3	56.5		17.9	72.1	72.1
Actuated g/C Ratio	0.13	0.20		0.15	0.22	0.22	0.02	0.41		0.13	0.52	0.52
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	454	678		268	761	341	29	2038		229	2647	824
v/s Ratio Prot	0.10	c0.22		c0.17	c0.08		0.01	0.25		c0.10	c0.56	
v/s Ratio Perm						0.01						0.12
v/c Ratio	0.77	1.11		1.12	0.39	0.04	0.76	0.62		0.76	1.08	0.23
Uniform Delay, d1	58.0	55.7		58.8	46.5	43.1	67.8	32.5		58.2	33.2	18.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	7.6	68.6		89.7	0.3	0.1	71.7	0.6		13.5	45.2	0.1
Delay (s)	65.6	124.3		148.4	46.8	43.1	139.5	33.0		71.7	78.4	18.3
Level of Service	E	F		F	D	D	F	C		E	E	B
Approach Delay (s)		105.9			92.2			34.8			73.3	
Approach LOS		F			F			C			E	

Intersection Summary			
HCM Average Control Delay	73.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	138.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	102.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	1.00	1.00	
Frt	0.98		1.00	1.00	0.91	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	1831		1770	1863	1663	
Flt Permitted	1.00		0.20	1.00	0.98	
Satd. Flow (perm)	1831		371	1863	1663	
Volume (vph)	855	125	255	310	60	135
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	929	136	277	337	65	147
RTOR Reduction (vph)	4	0	0	0	77	0
Lane Group Flow (vph)	1061	0	277	337	135	0
Turn Type			Perm			
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	86.1		86.1	86.1	12.4	
Effective Green, g (s)	86.1		86.1	86.1	12.4	
Actuated g/C Ratio	0.81		0.81	0.81	0.12	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1480		300	1506	194	
v/s Ratio Prot	0.58			0.18	c0.08	
v/s Ratio Perm			c0.75			
v/c Ratio	0.72		0.92	0.22	0.70	
Uniform Delay, d1	4.6		7.7	2.4	45.2	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.7		32.5	0.1	10.4	
Delay (s)	6.3		40.2	2.5	55.6	
Level of Service	A		D	A	E	
Approach Delay (s)	6.3			19.5	55.6	
Approach LOS	A			B	E	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	106.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	725	10	80	285	5	205
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	788	11	87	310	5	223
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			799		1277	793
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			799		1277	793
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			89		97	43
cM capacity (veh/h)			824		164	388

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	799	87	310	228
Volume Left	0	87	0	5
Volume Right	11	0	0	223
cSH	1700	824	1700	376
Volume to Capacity	0.47	0.11	0.18	0.61
Queue Length 95th (ft)	0	9	0	96
Control Delay (s)	0.0	9.9	0.0	28.3
Lane LOS		A		D
Approach Delay (s)	0.0	2.2		28.3
Approach LOS				D

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.93			0.98			0.89			1.00	
Flt Protected		1.00			0.96			1.00			1.00	
Satd. Flow (prot)		1737			1760			3161			3537	
Flt Permitted		1.00			0.76			0.95			0.95	
Satd. Flow (perm)		1737			1386			2998			3364	
Volume (vph)	0	5	5	70	5	10	5	100	255	10	800	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	5	5	76	5	11	5	109	277	11	870	0
RTOR Reduction (vph)	0	4	0	0	10	0	0	72	0	0	0	0
Lane Group Flow (vph)	0	6	0	0	82	0	0	319	0	0	881	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.9			7.9			45.3			45.3	
Effective Green, g (s)		7.9			7.9			45.3			45.3	
Actuated g/C Ratio		0.13			0.13			0.74			0.74	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		224			179			2219			2490	
v/s Ratio Prot		0.00										
v/s Ratio Perm					c0.06			0.11			c0.26	
v/c Ratio		0.03			0.46			0.14			0.35	
Uniform Delay, d1		23.3			24.7			2.3			2.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.0			1.9			0.0			0.1	
Delay (s)		23.3			26.6			2.3			2.9	
Level of Service		C			C			A			A	
Approach Delay (s)		23.3			26.6			2.3			2.9	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	4.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	61.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.91		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	4776		1770	3516	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	4776		1770	3516	
Volume (vph)	35	625	250	435	585	150	180	235	160	240	1085	50
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	679	272	473	636	163	196	255	174	261	1179	54
RTOR Reduction (vph)	0	0	204	0	0	111	0	125	0	0	4	0
Lane Group Flow (vph)	38	679	68	473	636	52	196	304	0	261	1229	0
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	3.6	19.6	19.6	13.0	29.0	29.0	11.0	25.8		17.2	32.0	
Effective Green, g (s)	3.6	19.6	19.6	13.0	29.0	29.0	11.0	25.8		17.2	32.0	
Actuated g/C Ratio	0.04	0.21	0.21	0.14	0.32	0.32	0.12	0.28		0.19	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	70	757	339	487	1120	501	213	1345		332	1228	
v/s Ratio Prot	0.02	c0.19		c0.14	0.18		c0.11	0.06		0.15	c0.35	
v/s Ratio Perm			0.04			0.03						
v/c Ratio	0.54	0.90	0.20	0.97	0.57	0.10	0.92	0.23		0.79	1.00	
Uniform Delay, d1	43.2	35.0	29.6	39.1	26.1	22.1	39.9	25.2		35.4	29.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.3	13.3	0.3	33.3	0.7	0.1	40.1	0.1		11.6	25.9	
Delay (s)	51.5	48.3	29.9	72.4	26.7	22.2	80.0	25.3		47.0	55.7	
Level of Service	D	D	C	E	C	C	E	C		D	E	
Approach Delay (s)		43.3			43.1			42.5			54.2	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	46.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	91.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	5	0	25	10	20	0	115	240	30	170	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	0	27	11	22	0	125	261	33	185	5

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	11	60	63	323	223
Volume Left (vph)	5	27	0	0	33
Volume Right (vph)	0	22	0	261	5
Hadj (s)	0.13	-0.09	0.03	-0.53	0.05
Departure Headway (s)	5.4	5.1	4.9	4.3	4.6
Degree Utilization, x	0.02	0.08	0.09	0.39	0.29
Capacity (veh/h)	587	629	716	813	755
Control Delay (s)	8.5	8.6	7.2	8.9	9.5
Approach Delay (s)	8.5	8.6	8.6		9.5
Approach LOS	A	A	A		A

Intersection Summary			
Delay	8.9		
HCM Level of Service	A		
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	5	0	5	5	330	0	50	5	110	55	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	0	5	5	359	0	54	5	120	60	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	11	370	60	185
Volume Left (vph)	5	5	0	120
Volume Right (vph)	0	359	5	5
Hadj (s)	0.13	-0.55	-0.02	0.15
Departure Headway (s)	5.1	4.0	5.0	4.9
Degree Utilization, x	0.02	0.41	0.08	0.25
Capacity (veh/h)	645	856	662	677
Control Delay (s)	8.2	9.8	8.4	9.6
Approach Delay (s)	8.2	9.8	8.4	9.6
Approach LOS	A	A	A	A

Intersection Summary			
Delay	9.6		
HCM Level of Service	A		
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	10	395	5	0	680	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	429	5	0	739	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1489	5			5	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1489	5			5	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	85	60			54	
cM capacity (veh/h)	74	1078			1616	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	440	5	745
Volume Left	11	0	739
Volume Right	429	0	0
cSH	807	1700	1616
Volume to Capacity	0.55	0.00	0.46
Queue Length 95th (ft)	84	0	62
Control Delay (s)	14.7	0.0	9.1
Lane LOS	B		A
Approach Delay (s)	14.7	0.0	9.1
Approach LOS	B		

Intersection Summary			
Average Delay	11.1		
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.98			0.87			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.96	
Satd. Flow (prot)	1770	3539		1770	3464			1626			1760	
Flt Permitted	0.44	1.00		0.34	1.00			1.00			0.69	
Satd. Flow (perm)	824	3539		629	3464			1626			1267	
Volume (vph)	170	645	0	25	425	70	0	5	75	270	5	30
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	701	0	27	462	76	0	5	82	293	5	33
RTOR Reduction (vph)	0	0	0	0	23	0	0	50	0	0	7	0
Lane Group Flow (vph)	185	701	0	27	515	0	0	37	0	0	324	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.1	16.1		16.1	16.1			15.2			15.2	
Effective Green, g (s)	16.1	16.1		16.1	16.1			15.2			15.2	
Actuated g/C Ratio	0.41	0.41		0.41	0.41			0.39			0.39	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	338	1450		258	1419			629			490	
v/s Ratio Prot		0.20			0.15			0.02				
v/s Ratio Perm	c0.22			0.04							c0.26	
v/c Ratio	0.55	0.48		0.10	0.36			0.06			0.66	
Uniform Delay, d1	8.8	8.5		7.2	8.0			7.6			9.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.8	0.3		0.2	0.2			0.0			3.3	
Delay (s)	10.6	8.8		7.3	8.2			7.6			13.3	
Level of Service	B	A		A	A			A			B	
Approach Delay (s)		9.2			8.2			7.6			13.3	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	39.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frt		1.00			0.99			0.93			0.98	
Flt Protected		1.00			1.00			0.98			0.96	
Satd. Flow (prot)		3537			3507			1695			1754	
Flt Permitted		0.95			1.00			0.87			0.76	
Satd. Flow (perm)		3356			3507			1518			1383	
Volume (vph)	10	940	0	0	545	35	5	0	5	115	5	20
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	1022	0	0	592	38	5	0	5	125	5	22
RTOR Reduction (vph)	0	0	0	0	7	0	0	4	0	0	11	0
Lane Group Flow (vph)	0	1033	0	0	623	0	0	6	0	0	141	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		23.5			33.6			10.4			10.4	
Effective Green, g (s)		23.5			33.6			10.4			10.4	
Actuated g/C Ratio		0.45			0.65			0.20			0.20	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1517			2266			304			277	
v/s Ratio Prot					c0.18							
v/s Ratio Perm		c0.31						0.00			c0.10	
v/c Ratio		0.68			0.28			0.02			0.51	
Uniform Delay, d1		11.3			4.0			16.7			18.5	
Progression Factor		1.00			0.50			1.00			1.00	
Incremental Delay, d2		1.3			0.1			0.0			1.5	
Delay (s)		12.6			2.1			16.7			20.0	
Level of Service		B			A			B			B	
Approach Delay (s)		12.6			2.1			16.7			20.0	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	52.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			0.95			1.00				
Frt		1.00			1.00			0.88				
Flt Protected		1.00			1.00			1.00				
Satd. Flow (prot)		3529			3530			1626				
Flt Permitted		1.00			0.90			0.98				
Satd. Flow (perm)		3529			3169			1601				
Volume (vph)	0	1040	20	30	570	0	10	0	105	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1130	22	33	620	0	11	0	114	0	0	0
RTOR Reduction (vph)	0	2	0	0	0	0	0	91	0	0	0	0
Lane Group Flow (vph)	0	1150	0	0	653	0	0	34	0	0	0	0
Turn Type	Perm			Prot			Perm			Perm		
Protected Phases		4		3	3 8			2			6	
Permitted Phases	4						2			6		
Actuated Green, G (s)		23.5			33.6			10.4				
Effective Green, g (s)		23.5			33.6			10.4				
Actuated g/C Ratio		0.45			0.65			0.20				
Clearance Time (s)		4.0						4.0				
Vehicle Extension (s)		3.0						3.0				
Lane Grp Cap (vph)		1595			2090			320				
v/s Ratio Prot		c0.33			c0.04							
v/s Ratio Perm					0.17			c0.02				
v/c Ratio		0.72			0.31			0.11				
Uniform Delay, d1		11.6			4.1			17.0				
Progression Factor		0.52			1.00			1.00				
Incremental Delay, d2		1.2			0.1			0.1				
Delay (s)		7.2			4.2			17.1				
Level of Service		A			A			B				
Approach Delay (s)		7.2			4.2			17.1			0.0	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	52.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0				4.0	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95				1.00	0.95		1.00	1.00	1.00	1.00
Frt	1.00	0.96				1.00	0.98		1.00	1.00	0.85	1.00
Flt Protected	0.95	1.00				0.95	1.00		0.95	1.00	1.00	0.95
Satd. Flow (prot)	3433	3385				1770	3455		1770	1863	1583	1770
Flt Permitted	0.48	1.00				0.95	1.00		0.95	1.00	1.00	0.95
Satd. Flow (perm)	1730	3385				1770	3455		1770	1863	1583	1770
Volume (vph)	190	670	250	25	25	35	370	70	20	75	30	195
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	207	728	272	27	27	38	402	76	22	82	33	212
RTOR Reduction (vph)	0	0	0	0	0	0	13	0	0	0	30	0
Lane Group Flow (vph)	207	1027	0	0	0	65	465	0	22	82	3	212
Turn Type	Perm				Prot	Prot			Split		Perm	Split
Protected Phases		4			3	3	8		1	1		6
Permitted Phases	4										1	
Actuated Green, G (s)	36.0	36.0				5.0	45.0		10.3	10.3	10.3	33.0
Effective Green, g (s)	36.0	36.0				5.0	45.0		10.3	10.3	10.3	33.0
Actuated g/C Ratio	0.31	0.31				0.04	0.39		0.09	0.09	0.09	0.29
Clearance Time (s)	4.0	4.0				4.0	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0				3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	545	1066				77	1360		160	168	143	511
v/s Ratio Prot		c0.30				c0.04	0.13		0.01	c0.04		0.12
v/s Ratio Perm	0.12										0.00	
v/c Ratio	0.38	0.96				0.84	0.34		0.14	0.49	0.02	0.41
Uniform Delay, d1	30.5	38.5				54.3	24.3		47.9	49.5	47.4	32.8
Progression Factor	1.00	1.00				1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	19.2				53.5	0.2		0.4	2.2	0.1	0.5
Delay (s)	30.9	57.7				107.7	24.4		48.3	51.7	47.5	33.4
Level of Service	C	E				F	C		D	D	D	C
Approach Delay (s)		53.2					34.4			50.1		
Approach LOS		D					C			D		

Intersection Summary			
HCM Average Control Delay	50.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	114.3	Sum of lost time (s)	20.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		
Lane Util. Factor	1.00	1.00			1.00		
Frt	1.00	0.85			0.96		
Flt Protected	1.00	1.00			0.97		
Satd. Flow (prot)	1863	1583			1722		
Flt Permitted	1.00	1.00			0.97		
Satd. Flow (perm)	1863	1583			1722		
Volume (vph)	480	50	240	30	50	15	25
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	522	54	261	33	54	16	27
RTOR Reduction (vph)	0	142	0	0	0	0	0
Lane Group Flow (vph)	522	173	0	0	130	0	0
Turn Type		Perm		Split			
Protected Phases	6			2	2		
Permitted Phases		6					
Actuated Green, G (s)	33.0	33.0			10.0		
Effective Green, g (s)	33.0	33.0			10.0		
Actuated g/C Ratio	0.29	0.29			0.09		
Clearance Time (s)	4.0	4.0			4.0		
Vehicle Extension (s)	3.0	3.0			3.0		
Lane Grp Cap (vph)	538	457			151		
v/s Ratio Prot	c0.28				c0.08		
v/s Ratio Perm		0.11					
v/c Ratio	0.97	0.38			0.86		
Uniform Delay, d1	40.2	32.5			51.5		
Progression Factor	1.00	1.00			1.00		
Incremental Delay, d2	31.2	0.5			36.3		
Delay (s)	71.4	33.0			87.7		
Level of Service	E	C			F		
Approach Delay (s)	52.2				87.7		
Approach LOS	D				F		

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frt		1.00			0.94		1.00	0.94		1.00	0.93	
Flt Protected		0.99			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3505			3337		1770	1760		1770	1727	
Flt Permitted		0.72			0.93		0.65	1.00		0.69	1.00	
Satd. Flow (perm)		2557			3093		1211	1760		1286	1727	
Volume (vph)	125	810	20	15	395	245	15	60	35	475	80	75
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	136	880	22	16	429	266	16	65	38	516	87	82
RTOR Reduction (vph)	0	3	0	0	154	0	0	22	0	0	0	0
Lane Group Flow (vph)	0	1035	0	0	557	0	16	81	0	516	169	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		21.0			21.0		21.0	21.0		21.0	21.0	
Effective Green, g (s)		21.0			21.0		21.0	21.0		21.0	21.0	
Actuated g/C Ratio		0.42			0.42		0.42	0.42		0.42	0.42	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1074			1299		509	739		540	725	
v/s Ratio Prot								0.05			0.10	
v/s Ratio Perm		c0.40			0.18		0.01			c0.40		
v/c Ratio		0.96			0.43		0.03	0.11		0.96	0.23	
Uniform Delay, d1		14.1			10.3		8.5	8.8		14.0	9.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		19.2			0.2		0.0	0.1		27.7	0.2	
Delay (s)		33.3			10.5		8.5	8.9		41.7	9.5	
Level of Service		C			B		A	A		D	A	
Approach Delay (s)		33.3			10.5			8.8			33.8	
Approach LOS		C			B			A			C	

Intersection Summary			
HCM Average Control Delay	25.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	0.97	
Frt	0.95		1.00	1.00	0.93	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3377		1770	3539	3279	
Flt Permitted	1.00		0.95	1.00	0.97	
Satd. Flow (perm)	3377		1770	3539	3279	
Volume (vph)	955	420	145	490	165	135
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1038	457	158	533	179	147
RTOR Reduction (vph)	65	0	0	0	123	0
Lane Group Flow (vph)	1430	0	158	533	203	0
Turn Type			Prot			
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	28.7		5.7	38.4	9.0	
Effective Green, g (s)	28.7		5.7	38.4	9.0	
Actuated g/C Ratio	0.52		0.10	0.69	0.16	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1749		182	2453	533	
v/s Ratio Prot	c0.42		c0.09	0.15	c0.06	
v/s Ratio Perm						
v/c Ratio	0.82		0.87	0.22	0.38	
Uniform Delay, d1	11.2		24.5	3.1	20.7	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	3.1		32.6	0.0	0.5	
Delay (s)	14.3		57.1	3.1	21.2	
Level of Service	B		E	A	C	
Approach Delay (s)	14.3			15.5	21.2	
Approach LOS	B			B	C	

Intersection Summary			
HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	55.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3420		1770	3513		1770	1813		1770	1807	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3420		1770	3513		1770	1813		1770	1807	
Volume (vph)	110	860	250	45	395	20	150	140	30	175	280	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	935	272	49	429	22	163	152	33	190	304	76
RTOR Reduction (vph)	0	34	0	0	4	0	0	10	0	0	0	0
Lane Group Flow (vph)	120	1173	0	49	447	0	163	175	0	190	380	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	7.6	27.4		2.1	21.9		8.9	19.2		8.7	19.0	
Effective Green, g (s)	7.6	27.4		2.1	21.9		8.9	19.2		8.7	19.0	
Actuated g/C Ratio	0.10	0.37		0.03	0.30		0.12	0.26		0.12	0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	183	1277		51	1048		215	474		210	468	
v/s Ratio Prot	c0.07	c0.34		0.03	0.13		0.09	0.10		c0.11	c0.21	
v/s Ratio Perm												
v/c Ratio	0.66	0.92		0.96	0.43		0.76	0.37		0.90	0.81	
Uniform Delay, d1	31.6	21.9		35.6	20.7		31.2	22.2		31.9	25.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.2	10.6		111.0	0.3		14.2	0.5		36.8	10.3	
Delay (s)	39.8	32.5		146.6	21.0		45.4	22.6		68.7	35.8	
Level of Service	D	C		F	C		D	C		E	D	
Approach Delay (s)		33.2			33.3			33.3			46.8	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	36.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	73.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.91	0.95	0.95		0.97
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.99		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	0.95	1.00		0.95
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1610	1681	3514		3433
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.95	0.95	1.00		0.95
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583		1610	1681	3514		3433
Volume (vph)	235	460	295	130	240	50	35	75	35	920	45	815
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	255	500	321	141	261	54	38	82	38	1000	49	886
RTOR Reduction (vph)	0	0	70	0	0	17	0	0	0	3	0	0
Lane Group Flow (vph)	255	500	251	141	261	75	0	59	61	1046	0	886
Turn Type	Prot		Perm	Prot		Perm		Prot	Prot			Prot
Protected Phases	7	4		3	8			5	5	2		1
Permitted Phases			4			8						
Actuated Green, G (s)	21.0	24.7	24.7	12.0	15.7	15.7		6.0	6.0	55.5		41.5
Effective Green, g (s)	21.0	24.7	24.7	12.0	15.7	15.7		6.0	6.0	55.5		41.5
Actuated g/C Ratio	0.14	0.16	0.16	0.08	0.10	0.10		0.04	0.04	0.37		0.28
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	248	584	261	142	371	166		65	67	1303		952
v/s Ratio Prot	c0.14	0.14		0.08	0.07			0.04	0.04	0.30		c0.26
v/s Ratio Perm			c0.16			0.05						
v/c Ratio	1.03	0.86	0.96	0.99	0.70	0.45		0.91	0.91	0.80		0.93
Uniform Delay, d1	64.3	60.8	62.0	68.8	64.8	63.0		71.6	71.6	42.2		52.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00
Incremental Delay, d2	64.6	11.8	44.8	73.1	6.0	2.0		78.9	79.0	3.7		15.2
Delay (s)	129.0	72.6	106.8	141.9	70.7	64.9		150.5	150.6	45.9		67.9
Level of Service	F	E	F	F	E	E		F	F	D		E
Approach Delay (s)		96.2			89.9					56.6		
Approach LOS		F			F					E		

Intersection Summary			
HCM Average Control Delay	68.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	149.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	SER2
Lane Configurations				
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0
Lane Util. Factor	0.95			1.00
Frt	0.99			0.86
Flt Protected	1.00			1.00
Satd. Flow (prot)	3500			1611
Flt Permitted	1.00			1.00
Satd. Flow (perm)	3500			1611
Volume (vph)	1865	130	20	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2027	141	22	5
RTOR Reduction (vph)	0	0	0	4
Lane Group Flow (vph)	2190	0	0	1
Turn Type				custom
Protected Phases	6			
Permitted Phases				4
Actuated Green, G (s)	91.0			24.7
Effective Green, g (s)	91.0			24.7
Actuated g/C Ratio	0.61			0.16
Clearance Time (s)	4.0			4.0
Vehicle Extension (s)	3.0			3.0
Lane Grp Cap (vph)	2128			266
v/s Ratio Prot	c0.63			
v/s Ratio Perm				0.00
v/c Ratio	1.03			0.00
Uniform Delay, d1	29.3			52.2
Progression Factor	1.00			1.00
Incremental Delay, d2	27.3			0.0
Delay (s)	56.7			52.2
Level of Service	E			D
Approach Delay (s)	59.9			
Approach LOS	E			

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		1.00	1.00		1.00	
Frt		1.00	0.92		1.00	
Flt Protected		0.99	1.00		0.95	
Satd. Flow (prot)		1852	1715		1772	
Flt Permitted		0.95	1.00		0.95	
Satd. Flow (perm)		1771	1715		1772	
Volume (vph)	10	75	35	50	785	10
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	82	38	54	853	11
RTOR Reduction (vph)	0	0	48	0	0	0
Lane Group Flow (vph)	0	93	44	0	864	0
Turn Type	Perm					
Protected Phases		4	8		6	
Permitted Phases	4					
Actuated Green, G (s)		6.8	6.8		48.2	
Effective Green, g (s)		6.8	6.8		48.2	
Actuated g/C Ratio		0.11	0.11		0.77	
Clearance Time (s)		4.0	4.0		4.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		191	185		1356	
v/s Ratio Prot			0.03		c0.49	
v/s Ratio Perm		c0.05				
v/c Ratio		0.49	0.24		0.64	
Uniform Delay, d1		26.5	25.7		3.4	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		2.0	0.7		1.0	
Delay (s)		28.4	26.4		4.4	
Level of Service		C	C		A	
Approach Delay (s)		28.4	26.4		4.4	
Approach LOS		C	C		A	

Intersection Summary			
HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	63.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	35	305	90	185	485	180
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	332	98	201	527	196
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1022	625	527			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1022	625	527			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	84	32	91			
cM capacity (veh/h)	237	485	1040			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	38	332	299	723
Volume Left	38	0	98	0
Volume Right	0	332	0	196
cSH	237	485	1040	1700
Volume to Capacity	0.16	0.68	0.09	0.43
Queue Length 95th (ft)	14	128	8	0
Control Delay (s)	23.1	27.0	3.5	0.0
Lane LOS	C	D	A	
Approach Delay (s)	26.6		3.5	0.0
Approach LOS	D			

Intersection Summary			
Average Delay	7.8		
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frt		1.00			1.00	0.85		1.00	0.85		1.00	
Flt Protected		0.98			0.95	1.00		1.00	1.00		0.98	
Satd. Flow (prot)		1817			1770	1583		1863	1583		1829	
Flt Permitted		0.87			0.75	1.00		1.00	1.00		0.80	
Satd. Flow (perm)		1621			1399	1583		1863	1583		1486	
Volume (vph)	5	5	0	225	0	140	0	195	265	220	385	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	5	0	245	0	152	0	212	288	239	418	0
RTOR Reduction (vph)	0	0	0	0	0	114	0	0	118	0	0	0
Lane Group Flow (vph)	0	10	0	0	245	38	0	212	170	0	657	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		12.8			12.8	12.8		29.9	29.9		29.9	
Effective Green, g (s)		12.8			12.8	12.8		29.9	29.9		29.9	
Actuated g/C Ratio		0.25			0.25	0.25		0.59	0.59		0.59	
Clearance Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		409			353	400		1099	934		876	
v/s Ratio Prot								0.11				
v/s Ratio Perm		0.01			c0.18	0.02			0.11		c0.44	
v/c Ratio		0.02			0.69	0.10		0.19	0.18		0.75	
Uniform Delay, d1		14.3			17.2	14.5		4.8	4.8		7.7	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		0.0			5.8	0.1		0.1	0.1		3.6	
Delay (s)		14.3			23.0	14.6		4.9	4.9		11.3	
Level of Service		B			C	B		A	A		B	
Approach Delay (s)		14.3			19.8			4.9			11.3	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	50.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95		1.00	0.95		0.97	0.95	
Frt	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3369		3433	3379		1770	3526		3433	3528	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3369		3433	3379		1770	3526		3433	3528	
Volume (vph)	95	370	175	385	195	85	80	965	25	470	1635	35
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	402	190	418	212	92	87	1049	27	511	1777	38
RTOR Reduction (vph)	0	56	0	0	46	0	0	2	0	0	1	0
Lane Group Flow (vph)	103	536	0	418	258	0	87	1074	0	511	1814	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	8.8	16.8		12.0	20.0		5.0	38.6		17.4	51.0	
Effective Green, g (s)	8.8	16.8		12.0	20.0		5.0	38.6		17.4	51.0	
Actuated g/C Ratio	0.09	0.17		0.12	0.20		0.05	0.38		0.17	0.51	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	155	562		409	670		88	1350		593	1785	
v/s Ratio Prot	0.06	c0.16		c0.12	c0.08		0.05	c0.30		0.15	c0.51	
v/s Ratio Perm												
v/c Ratio	0.66	0.95		1.02	0.38		0.99	0.80		0.86	1.02	
Uniform Delay, d1	44.6	41.6		44.4	35.1		47.9	27.6		40.5	24.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.3	26.7		50.2	0.4		91.3	3.3		12.3	25.4	
Delay (s)	54.8	68.3		94.6	35.4		139.2	30.9		52.8	50.3	
Level of Service	D	E		F	D		F	C		D	D	
Approach Delay (s)		66.3			69.7			39.0			50.8	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM Average Control Delay	53.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	100.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.90			0.99			0.97			0.98	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1677			1807			1801			1815	
Flt Permitted		0.95			0.63			0.93			0.99	
Satd. Flow (perm)		1597			1172			1683			1806	
Volume (vph)	35	65	240	105	100	10	25	210	65	10	520	120
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	71	261	114	109	11	27	228	71	11	565	130
RTOR Reduction (vph)	0	178	0	0	4	0	0	21	0	0	17	0
Lane Group Flow (vph)	0	192	0	0	230	0	0	305	0	0	689	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		12.1			12.1			20.4			20.4	
Effective Green, g (s)		12.1			12.1			20.4			20.4	
Actuated g/C Ratio		0.30			0.30			0.50			0.50	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		477			350			848			910	
v/s Ratio Prot												
v/s Ratio Perm		0.12			c0.20			0.18			c0.38	
v/c Ratio		0.40			0.66			0.36			0.76	
Uniform Delay, d1		11.3			12.4			6.1			8.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.6			4.4			0.3			3.6	
Delay (s)		11.9			16.8			6.4			11.7	
Level of Service		B			B			A			B	
Approach Delay (s)		11.9			16.8			6.4			11.7	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	40.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	1813	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1583	1770	1863	1813	
Volume (vph)	10	195	620	185	305	75
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	212	674	201	332	82
RTOR Reduction (vph)	0	184	0	0	9	0
Lane Group Flow (vph)	11	28	674	201	405	0
Turn Type		Perm	Split			
Protected Phases	4		5	5	6	
Permitted Phases		4				
Actuated Green, G (s)	9.7	9.7	32.7	32.7	20.3	
Effective Green, g (s)	9.7	9.7	32.7	32.7	20.3	
Actuated g/C Ratio	0.13	0.13	0.44	0.44	0.27	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	230	206	775	816	493	
v/s Ratio Prot	0.01		c0.38	0.11	c0.22	
v/s Ratio Perm		c0.02				
v/c Ratio	0.05	0.13	0.87	0.25	0.82	
Uniform Delay, d1	28.5	28.8	19.1	13.2	25.5	
Progression Factor	1.00	1.00	0.65	0.59	1.00	
Incremental Delay, d2	0.1	0.3	7.9	0.1	10.5	
Delay (s)	28.5	29.1	20.4	7.9	36.0	
Level of Service	C	C	C	A	D	
Approach Delay (s)	29.0			17.5	36.0	
Approach LOS	C			B	D	

Intersection Summary			
HCM Average Control Delay	24.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	74.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Frt		0.97			1.00	0.85		0.99		1.00	0.99	
Flt Protected		0.99			0.98	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		1777			1834	1583		1845		1770	1837	
Flt Permitted		0.91			0.92	1.00		1.00		0.95	1.00	
Satd. Flow (perm)		1638			1712	1583		1845		1770	1837	
Volume (vph)	20	40	20	20	45	440	20	355	20	115	345	35
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	43	22	22	49	478	22	386	22	125	375	38
RTOR Reduction (vph)	0	14	0	0	0	416	0	2	0	0	4	0
Lane Group Flow (vph)	0	73	0	0	71	62	0	428	0	125	409	0
Turn Type	Perm			Perm		Perm	Split			Split		
Protected Phases		4			8		5	5		6	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		9.7			9.7	9.7		32.7		20.3	20.3	
Effective Green, g (s)		9.7			9.7	9.7		32.7		20.3	20.3	
Actuated g/C Ratio		0.13			0.13	0.13		0.44		0.27	0.27	
Clearance Time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)		213			222	206		808		481	499	
v/s Ratio Prot								c0.23		0.07	c0.22	
v/s Ratio Perm		c0.04			0.04	0.04						
v/c Ratio		0.34			0.32	0.30		0.53		0.26	0.82	
Uniform Delay, d1		29.6			29.5	29.4		15.4		21.3	25.5	
Progression Factor		1.00			1.00	1.00		1.00		0.68	0.60	
Incremental Delay, d2		1.0			0.8	0.8		0.6		0.2	7.1	
Delay (s)		30.6			30.3	30.3		16.0		14.6	22.3	
Level of Service		C			C	C		B		B	C	
Approach Delay (s)		30.6			30.3			16.0			20.5	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	23.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	74.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

2025 Proposed Action PM Peak Hour with Mitigations
Synchro LOS Report

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3444		1770	3539	1583	1770	5014		1770	4998	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3444		1770	3539	1583	1770	5014		1770	4998	
Volume (vph)	285	320	70	250	490	415	75	1700	175	225	1430	185
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	310	348	76	272	533	451	82	1848	190	245	1554	201
RTOR Reduction (vph)	0	19	0	0	0	150	0	12	0	0	16	0
Lane Group Flow (vph)	310	405	0	272	533	301	82	2026	0	245	1739	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	10.0	15.4		15.0	20.4	20.4	7.6	39.8		14.0	46.2	
Effective Green, g (s)	10.0	15.4		15.0	20.4	20.4	7.6	39.8		14.0	46.2	
Actuated g/C Ratio	0.10	0.15		0.15	0.20	0.20	0.08	0.40		0.14	0.46	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	343	529		265	721	322	134	1992		247	2304	
v/s Ratio Prot	0.09	0.12		c0.15	0.15		0.05	c0.40		c0.14	0.35	
v/s Ratio Perm						c0.19						
v/c Ratio	0.90	0.77		1.03	0.74	0.94	0.61	1.02		0.99	0.75	
Uniform Delay, d1	44.6	40.7		42.6	37.4	39.3	44.9	30.2		43.0	22.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	25.9	6.6		62.3	4.0	33.5	8.0	24.5		54.8	1.4	
Delay (s)	70.5	47.2		104.9	41.4	72.7	52.9	54.7		97.8	23.8	
Level of Service	E	D		F	D	E	D	D		F	C	
Approach Delay (s)		57.1			66.4			54.7			32.8	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM Average Control Delay	50.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	100.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	1.00	1.00	
Frt	0.98		1.00	1.00	0.91	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	1834		1770	1863	1663	
Flt Permitted	1.00		0.41	1.00	0.98	
Satd. Flow (perm)	1834		773	1863	1663	
Volume (vph)	385	50	120	615	135	305
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	418	54	130	668	147	332
RTOR Reduction (vph)	9	0	0	0	177	0
Lane Group Flow (vph)	463	0	130	668	302	0
Turn Type			Perm			
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	17.9		17.9	17.9	11.2	
Effective Green, g (s)	17.9		17.9	17.9	11.2	
Actuated g/C Ratio	0.48		0.48	0.48	0.30	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	885		373	899	502	
v/s Ratio Prot	0.25			c0.36	c0.18	
v/s Ratio Perm			0.17			
v/c Ratio	0.52		0.35	0.74	0.60	
Uniform Delay, d1	6.6		6.0	7.7	11.0	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.6		0.6	3.4	2.0	
Delay (s)	7.2		6.5	11.1	13.1	
Level of Service	A		A	B	B	
Approach Delay (s)	7.2			10.4	13.1	
Approach LOS	A			B	B	

Intersection Summary			
HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	37.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	335	10	215	540	10	85
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	364	11	234	587	11	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			375		1424	370
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			375		1424	370
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			80		91	86
cM capacity (veh/h)			1183		120	676

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	375	234	587	103
Volume Left	0	234	0	11
Volume Right	11	0	0	92
cSH	1700	1183	1700	454
Volume to Capacity	0.22	0.20	0.35	0.23
Queue Length 95th (ft)	0	18	0	22
Control Delay (s)	0.0	8.8	0.0	15.2
Lane LOS		A		C
Approach Delay (s)	0.0	2.5		15.2
Approach LOS				C

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.86			0.99			0.99			1.00	
Flt Protected		1.00			0.96			1.00			1.00	
Satd. Flow (prot)		1611			1764			3493			3535	
Flt Permitted		1.00			0.74			1.00			0.93	
Satd. Flow (perm)		1611			1372			3493			3277	
Volume (vph)	0	0	5	170	5	15	0	995	95	10	380	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	5	185	5	16	0	1082	103	11	413	0
RTOR Reduction (vph)	0	4	0	0	6	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	1	0	0	200	0	0	1175	0	0	424	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		12.3			12.3			29.2			29.2	
Effective Green, g (s)		12.3			12.3			29.2			29.2	
Actuated g/C Ratio		0.25			0.25			0.59			0.59	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		400			341			2061			1933	
v/s Ratio Prot		0.00						c0.34				
v/s Ratio Perm					c0.15						0.13	
v/c Ratio		0.00			0.59			0.57			0.22	
Uniform Delay, d1		14.0			16.4			6.3			4.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.0			2.6			0.4			0.1	
Delay (s)		14.0			18.9			6.6			4.8	
Level of Service		B			B			A			A	
Approach Delay (s)		14.0			18.9			6.6			4.8	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.91		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	4919		1770	3487	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	4919		1770	3487	
Volume (vph)	65	800	335	470	850	290	330	1130	315	220	360	40
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	870	364	511	924	315	359	1228	342	239	391	43
RTOR Reduction (vph)	0	0	274	0	0	206	0	51	0	0	8	0
Lane Group Flow (vph)	71	870	90	511	924	109	359	1519	0	239	426	0
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	4.8	24.8	24.8	15.0	35.0	35.0	22.9	32.0		13.0	22.1	
Effective Green, g (s)	4.8	24.8	24.8	15.0	35.0	35.0	22.9	32.0		13.0	22.1	
Actuated g/C Ratio	0.05	0.25	0.25	0.15	0.35	0.35	0.23	0.32		0.13	0.22	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	84	871	389	511	1229	550	402	1562		228	765	
v/s Ratio Prot	0.04	c0.25		c0.15	0.26		c0.20	c0.31		c0.14	0.12	
v/s Ratio Perm			0.06			0.07						
v/c Ratio	0.85	1.00	0.23	1.00	0.75	0.20	0.89	0.97		1.05	0.56	
Uniform Delay, d1	47.6	38.0	30.4	42.9	29.1	23.1	37.8	34.0		43.9	35.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	50.5	30.0	0.3	39.8	2.6	0.2	21.3	16.6		72.8	0.9	
Delay (s)	98.1	68.0	30.7	82.7	31.7	23.2	59.1	50.6		116.7	35.9	
Level of Service	F	E	C	F	C	C	E	D		F	D	
Approach Delay (s)		59.2			45.1			52.2			64.6	
Approach LOS		E			D			D			E	

Intersection Summary			
HCM Average Control Delay	53.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	100.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	80	30	40	0	285	80	30	175	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	87	33	43	0	310	87	33	190	0

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	0	163	155	242	223
Volume Left (vph)	0	87	0	0	33
Volume Right (vph)	0	43	0	87	0
Hadj (s)	0.00	-0.02	0.03	-0.22	0.06
Departure Headway (s)	5.6	5.3	5.2	5.0	5.0
Degree Utilization, x	0.00	0.24	0.22	0.33	0.31
Capacity (veh/h)	573	627	668	702	693
Control Delay (s)	8.6	9.9	8.5	9.2	10.2
Approach Delay (s)	0.0	9.9	8.9		10.2
Approach LOS	A	A	A		B

Intersection Summary			
Delay	9.5		
HCM Level of Service	A		
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	5	0	0	5	180	0	70	5	210	80	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	0	0	5	196	0	76	5	228	87	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	5	201	82	326
Volume Left (vph)	0	0	0	228
Volume Right (vph)	0	196	5	11
Hadj (s)	0.03	-0.55	-0.01	0.15
Departure Headway (s)	5.2	4.3	4.8	4.6
Degree Utilization, x	0.01	0.24	0.11	0.42
Capacity (veh/h)	618	764	708	745
Control Delay (s)	8.2	8.7	8.3	10.9
Approach Delay (s)	8.2	8.7	8.3	10.9
Approach LOS	A	A	A	B

Intersection Summary			
Delay	9.8		
HCM Level of Service	A		
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	10	710	5	5	585	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	772	5	5	636	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1291	8			11	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1291	8			11	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	28			60	
cM capacity (veh/h)	109	1074			1608	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	783	11	647
Volume Left	11	0	636
Volume Right	772	5	0
cSH	956	1700	1608
Volume to Capacity	0.82	0.01	0.40
Queue Length 95th (ft)	236	0	48
Control Delay (s)	23.2	0.0	8.6
Lane LOS	C		A
Approach Delay (s)	23.2	0.0	8.6
Approach LOS	C		

Intersection Summary			
Average Delay	16.5		
Intersection Capacity Utilization	90.8%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.97			0.94			0.95	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.97	
Satd. Flow (prot)	1770	3531		1770	3449			1741			1718	
Flt Permitted	0.18	1.00		0.32	1.00			0.97			0.78	
Satd. Flow (perm)	330	3531		591	3449			1698			1371	
Volume (vph)	130	610	10	90	730	150	10	50	50	145	15	100
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	663	11	98	793	163	11	54	54	158	16	109
RTOR Reduction (vph)	0	2	0	0	38	0	0	29	0	0	30	0
Lane Group Flow (vph)	141	672	0	98	918	0	0	90	0	0	253	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.2	24.2		24.2	24.2			27.8			27.8	
Effective Green, g (s)	24.2	24.2		24.2	24.2			27.8			27.8	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.46			0.46	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	133	1424		238	1391			787			635	
v/s Ratio Prot		0.19			0.27							
v/s Ratio Perm	c0.43			0.17				0.05			c0.18	
v/c Ratio	1.06	0.47		0.41	0.66			0.11			0.40	
Uniform Delay, d1	17.9	13.2		12.8	14.6			9.1			10.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	95.0	0.2		1.2	1.1			0.3			1.9	
Delay (s)	112.9	13.4		14.0	15.7			9.4			12.5	
Level of Service	F	B		B	B			A			B	
Approach Delay (s)		30.6			15.5			9.4			12.5	
Approach LOS		C			B			A			B	

Intersection Summary			
HCM Average Control Delay	20.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frt		1.00			0.98			0.86			0.95	
Flt Protected		1.00			1.00			1.00			0.97	
Satd. Flow (prot)		3534			3456			1611			1715	
Flt Permitted		0.93			0.85			1.00			0.81	
Satd. Flow (perm)		3305			2962			1611			1428	
Volume (vph)	10	785	5	70	885	150	0	0	5	65	0	40
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	853	5	76	962	163	0	0	5	71	0	43
RTOR Reduction (vph)	0	1	0	0	16	0	0	4	0	0	36	0
Lane Group Flow (vph)	0	868	0	0	1185	0	0	1	0	0	78	0
Turn Type	Perm			Prot			Perm			Perm		
Protected Phases		4		3	3 8			2			6	
Permitted Phases	4						2			6		
Actuated Green, G (s)		17.1			35.1			8.1			8.1	
Effective Green, g (s)		17.1			35.1			8.1			8.1	
Actuated g/C Ratio		0.33			0.69			0.16			0.16	
Clearance Time (s)		4.0						4.0			4.0	
Vehicle Extension (s)		3.0						3.0			3.0	
Lane Grp Cap (vph)		1104			2166			255			226	
v/s Ratio Prot					c0.15			0.00				
v/s Ratio Perm		c0.26			0.23						c0.05	
v/c Ratio		0.79			0.55			0.00			0.34	
Uniform Delay, d1		15.4			4.1			18.1			19.2	
Progression Factor		1.00			1.07			1.00			1.00	
Incremental Delay, d2		3.8			0.2			0.0			0.9	
Delay (s)		19.2			4.5			18.2			20.1	
Level of Service		B			A			B			C	
Approach Delay (s)		19.2			4.5			18.2			20.1	
Approach LOS		B			A			B			C	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	51.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			0.95			1.00				
Frt		1.00			1.00			0.92				
Flt Protected		1.00			0.99			0.98				
Satd. Flow (prot)		3524			3519			1680				
Flt Permitted		1.00			0.65			0.87				
Satd. Flow (perm)		3524			2303			1499				
Volume (vph)	0	830	25	135	1070	0	35	0	50	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	902	27	147	1163	0	38	0	54	0	0	0
RTOR Reduction (vph)	0	3	0	0	0	0	0	45	0	0	0	0
Lane Group Flow (vph)	0	926	0	0	1310	0	0	47	0	0	0	0
Turn Type	Perm			Prot			Perm			Perm		
Protected Phases		4		3	3 8			2			6	
Permitted Phases	4						2			6		
Actuated Green, G (s)		17.1			35.1			8.1				
Effective Green, g (s)		17.1			35.1			8.1				
Actuated g/C Ratio		0.33			0.69			0.16				
Clearance Time (s)		4.0						4.0				
Vehicle Extension (s)		3.0						3.0				
Lane Grp Cap (vph)		1177			1911			237				
v/s Ratio Prot		c0.26			c0.19							
v/s Ratio Perm					0.28			c0.03				
v/c Ratio		0.79			0.69			0.20				
Uniform Delay, d1		15.4			4.8			18.7				
Progression Factor		0.73			1.00			1.00				
Incremental Delay, d2		2.3			1.0			0.4				
Delay (s)		13.5			5.8			19.1				
Level of Service		B			A			B				
Approach Delay (s)		13.5			5.8			19.1			0.0	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	51.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0				4.0	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95				1.00	0.95		1.00	1.00	1.00	1.00
Frt	1.00	0.97				1.00	0.95		1.00	1.00	0.85	1.00
Flt Protected	0.95	1.00				0.95	1.00		0.95	1.00	1.00	0.95
Satd. Flow (prot)	3433	3432				1770	3371		1770	1863	1583	1770
Flt Permitted	0.21	1.00				0.95	1.00		0.95	1.00	1.00	0.95
Satd. Flow (perm)	759	3432				1770	3371		1770	1863	1583	1770
Volume (vph)	260	515	115	15	55	80	670	310	65	355	200	100
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	283	560	125	16	60	87	728	337	71	386	217	109
RTOR Reduction (vph)	0	0	0	0	0	0	49	0	0	0	174	0
Lane Group Flow (vph)	283	701	0	0	0	147	1016	0	71	386	43	109
Turn Type	Perm				Prot	Prot			Split		Perm	Split
Protected Phases		4			3	3	8		1	1		6
Permitted Phases	4										1	
Actuated Green, G (s)	40.0	40.0				9.0	53.0		22.0	22.0	22.0	9.0
Effective Green, g (s)	40.0	40.0				9.0	53.0		22.0	22.0	22.0	9.0
Actuated g/C Ratio	0.36	0.36				0.08	0.48		0.20	0.20	0.20	0.08
Clearance Time (s)	4.0	4.0				4.0	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0				3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	276	1249				145	1626		354	373	317	145
v/s Ratio Prot		0.20				c0.08	0.30		0.04	c0.21		0.06
v/s Ratio Perm	c0.37										0.03	
v/c Ratio	1.03	0.56				1.01	0.62		0.20	1.03	0.14	0.75
Uniform Delay, d1	35.0	27.9				50.5	21.1		36.6	44.0	36.1	49.4
Progression Factor	1.00	1.00				1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	60.9	0.6				78.4	0.8		0.3	55.9	0.2	19.5
Delay (s)	95.8	28.5				128.9	21.8		36.9	99.8	36.3	68.9
Level of Service	F	C				F	C		D	F	D	E
Approach Delay (s)		47.9					34.8			72.8		
Approach LOS		D					C			E		

Intersection Summary			
HCM Average Control Delay	52.7	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	109.9	Sum of lost time (s)	20.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		
Lane Util. Factor	1.00	1.00			1.00		
Frt	1.00	0.85			0.92		
Flt Protected	1.00	1.00			0.98		
Satd. Flow (prot)	1863	1583			1677		
Flt Permitted	1.00	1.00			0.98		
Satd. Flow (perm)	1863	1583			1677		
Volume (vph)	135	20	125	15	30	55	15
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	147	22	136	16	33	60	16
RTOR Reduction (vph)	0	125	0	0	0	0	0
Lane Group Flow (vph)	147	33	0	0	125	0	0
Turn Type		Perm		Split			
Protected Phases	6			2	2		
Permitted Phases		6					
Actuated Green, G (s)	9.0	9.0			9.9		
Effective Green, g (s)	9.0	9.0			9.9		
Actuated g/C Ratio	0.08	0.08			0.09		
Clearance Time (s)	4.0	4.0			4.0		
Vehicle Extension (s)	3.0	3.0			3.0		
Lane Grp Cap (vph)	153	130			151		
v/s Ratio Prot	c0.08				c0.07		
v/s Ratio Perm		0.02					
v/c Ratio	0.96	0.25			0.83		
Uniform Delay, d1	50.3	47.3			49.2		
Progression Factor	1.00	1.00			1.00		
Incremental Delay, d2	60.7	1.0			29.5		
Delay (s)	111.0	48.3			78.7		
Level of Service	F	D			E		
Approach Delay (s)	76.0				78.7		
Approach LOS	E				E		

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frt		0.99			0.97		1.00	0.93		1.00	0.92	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3493			3412		1770	1741		1770	1716	
Flt Permitted		0.74			0.90		0.68	1.00		0.70	1.00	
Satd. Flow (perm)		2598			3092		1273	1741		1305	1716	
Volume (vph)	65	650	45	45	930	290	25	45	35	200	50	55
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	707	49	49	1011	315	27	49	38	217	54	60
RTOR Reduction (vph)	0	8	0	0	50	0	0	28	0	0	0	0
Lane Group Flow (vph)	0	819	0	0	1325	0	27	59	0	217	114	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		24.3			24.3		12.1	12.1		12.1	12.1	
Effective Green, g (s)		24.3			24.3		12.1	12.1		12.1	12.1	
Actuated g/C Ratio		0.55			0.55		0.27	0.27		0.27	0.27	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1422			1692		347	474		356	468	
v/s Ratio Prot								0.03			0.07	
v/s Ratio Perm		0.32			c0.43		0.02			c0.17		
v/c Ratio		0.58			0.78		0.08	0.13		0.61	0.24	
Uniform Delay, d1		6.6			8.0		12.0	12.2		14.1	12.6	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.6			2.4		0.1	0.1		2.9	0.3	
Delay (s)		7.2			10.4		12.1	12.3		17.0	12.9	
Level of Service		A			B		B	B		B	B	
Approach Delay (s)		7.2			10.4			12.2			15.6	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	44.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	0.97	
Frt	0.96		1.00	1.00	0.97	
Flt Protected	1.00		0.95	1.00	0.96	
Satd. Flow (prot)	3404		1770	3539	3373	
Flt Permitted	1.00		0.95	1.00	0.96	
Satd. Flow (perm)	3404		1770	3539	3373	
Volume (vph)	615	210	100	885	395	95
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	668	228	109	962	429	103
RTOR Reduction (vph)	59	0	0	0	41	0
Lane Group Flow (vph)	837	0	109	962	491	0
Turn Type			Prot			
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	15.8		3.8	23.6	11.8	
Effective Green, g (s)	15.8		3.8	23.6	11.8	
Actuated g/C Ratio	0.36		0.09	0.54	0.27	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1239		155	1924	917	
v/s Ratio Prot	c0.25		c0.06	0.27	c0.15	
v/s Ratio Perm						
v/c Ratio	0.68		0.70	0.50	0.54	
Uniform Delay, d1	11.6		19.3	6.2	13.5	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.5		13.5	0.2	0.6	
Delay (s)	13.1		32.7	6.4	14.1	
Level of Service	B		C	A	B	
Approach Delay (s)	13.1			9.1	14.1	
Approach LOS	B			A	B	

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	43.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.97		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3514		1770	3457		1770	1806		1770	1768	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3514		1770	3457		1770	1806		1770	1768	
Volume (vph)	100	600	30	20	630	115	255	330	85	185	235	120
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	652	33	22	685	125	277	359	92	201	255	130
RTOR Reduction (vph)	0	5	0	0	20	0	0	13	0	0	0	0
Lane Group Flow (vph)	109	680	0	22	790	0	277	438	0	201	385	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.4	22.2		1.5	19.3		13.0	20.4		10.3	17.7	
Effective Green, g (s)	4.4	22.2		1.5	19.3		13.0	20.4		10.3	17.7	
Actuated g/C Ratio	0.06	0.32		0.02	0.27		0.18	0.29		0.15	0.25	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	111	1108		38	948		327	523		259	445	
v/s Ratio Prot	c0.06	c0.19		0.01	c0.23		c0.16	c0.24		0.11	0.22	
v/s Ratio Perm												
v/c Ratio	0.98	0.61		0.58	0.83		0.85	0.84		0.78	0.87	
Uniform Delay, d1	33.0	20.5		34.1	24.0		27.7	23.4		28.9	25.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	79.3	1.0		19.6	6.4		18.0	11.2		13.5	15.9	
Delay (s)	112.3	21.5		53.7	30.4		45.7	34.7		42.5	41.2	
Level of Service	F	C		D	C		D	C		D	D	
Approach Delay (s)		33.9			31.0			38.9			41.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	35.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	70.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.91	0.95	0.95		0.97
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	1.00		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	0.95	1.00		0.95
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1610	1681	3527		3433
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.95	0.95	1.00		0.95
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583		1610	1681	3527		3433
Volume (vph)	215	380	285	170	355	230	70	135	175	1635	40	335
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	234	413	310	185	386	250	76	147	190	1777	43	364
RTOR Reduction (vph)	0	0	161	0	0	9	0	0	0	2	0	0
Lane Group Flow (vph)	234	413	149	185	386	317	0	147	190	1818	0	364
Turn Type	Prot		Perm	Prot		Perm		Prot	Prot			Prot
Protected Phases	7	4		3	8			5	5	2		1
Permitted Phases			4			8						
Actuated Green, G (s)	14.0	19.8	19.8	15.2	21.0	21.0		14.0	14.0	58.0		11.0
Effective Green, g (s)	14.0	19.8	19.8	15.2	21.0	21.0		14.0	14.0	58.0		11.0
Actuated g/C Ratio	0.12	0.17	0.17	0.13	0.18	0.18		0.12	0.12	0.48		0.09
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	207	584	261	224	619	277		188	196	1705		315
v/s Ratio Prot	c0.13	0.12		0.10	0.11			0.09	0.11	c0.52		c0.11
v/s Ratio Perm			0.09			c0.20						
v/c Ratio	1.13	0.71	0.57	0.83	0.62	1.14		0.78	0.97	1.07		1.16
Uniform Delay, d1	53.0	47.4	46.2	51.1	45.8	49.5		51.5	52.8	31.0		54.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00
Incremental Delay, d2	102.0	3.9	3.0	21.3	2.0	98.7		18.8	54.7	42.0		99.8
Delay (s)	155.0	51.3	49.2	72.4	47.8	148.2		70.3	107.5	73.0		154.3
Level of Service	F	D	D	E	D	F		E	F	E		F
Approach Delay (s)		76.0			89.4					75.9		
Approach LOS		E			F					E		

Intersection Summary			
HCM Average Control Delay	73.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	SER2
Lane Configurations				
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0
Lane Util. Factor	0.95			1.00
Frt	0.99			0.86
Flt Protected	1.00			1.00
Satd. Flow (prot)	3506			1611
Flt Permitted	1.00			1.00
Satd. Flow (perm)	3506			1611
Volume (vph)	1275	75	10	15
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1386	82	11	16
RTOR Reduction (vph)	1	0	0	14
Lane Group Flow (vph)	1478	0	0	2
Turn Type				Over
Protected Phases	6			7
Permitted Phases				
Actuated Green, G (s)	55.0			14.0
Effective Green, g (s)	55.0			14.0
Actuated g/C Ratio	0.46			0.12
Clearance Time (s)	4.0			4.0
Vehicle Extension (s)	3.0			3.0
Lane Grp Cap (vph)	1607			188
v/s Ratio Prot	0.42			0.00
v/s Ratio Perm				
v/c Ratio	0.92			0.01
Uniform Delay, d1	30.4			46.9
Progression Factor	1.00			1.00
Incremental Delay, d2	9.0			0.0
Delay (s)	39.4			46.9
Level of Service	D			D
Approach Delay (s)	62.1			
Approach LOS	E			

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		1.00	1.00		1.00	
Frt		1.00	0.88		0.99	
Flt Protected		0.99	1.00		0.96	
Satd. Flow (prot)		1840	1637		1764	
Flt Permitted		0.49	1.00		0.96	
Satd. Flow (perm)		916	1637		1764	
Volume (vph)	10	30	80	695	215	15
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	33	87	755	234	16
RTOR Reduction (vph)	0	0	455	0	5	0
Lane Group Flow (vph)	0	44	387	0	245	0
Turn Type	Perm					
Protected Phases		4	8		6	
Permitted Phases	4					
Actuated Green, G (s)		11.8	11.8		9.9	
Effective Green, g (s)		11.8	11.8		9.9	
Actuated g/C Ratio		0.40	0.40		0.33	
Clearance Time (s)		4.0	4.0		4.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		364	650		588	
v/s Ratio Prot			c0.24		c0.14	
v/s Ratio Perm		0.05				
v/c Ratio		0.12	0.60		0.42	
Uniform Delay, d1		5.7	7.1		7.7	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		0.1	1.5		0.5	
Delay (s)		5.8	8.5		8.1	
Level of Service		A	A		A	
Approach Delay (s)		5.8	8.5		8.1	
Approach LOS		A	A		A	

Intersection Summary			
HCM Average Control Delay	8.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	29.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	40	155	190	500	200	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	168	207	543	217	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1201	245	217			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1201	245	217			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	75	79	85			
cM capacity (veh/h)	173	794	1352			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	43	168	750	272
Volume Left	43	0	207	0
Volume Right	0	168	0	54
cSH	173	794	1352	1700
Volume to Capacity	0.25	0.21	0.15	0.16
Queue Length 95th (ft)	24	20	13	0
Control Delay (s)	32.7	10.7	3.6	0.0
Lane LOS	D	B	A	
Approach Delay (s)	15.2		3.6	0.0
Approach LOS	C			

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor					1.00	1.00		1.00	1.00		1.00	
Frt					1.00	0.85		1.00	0.85		1.00	
Flt Protected					0.95	1.00		1.00	1.00		0.98	
Satd. Flow (prot)					1776	1583		1863	1583		1824	
Flt Permitted					0.73	1.00		1.00	1.00		0.72	
Satd. Flow (perm)					1361	1583		1863	1583		1337	
Volume (vph)	0	0	0	205	5	210	0	460	290	95	155	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	223	5	228	0	500	315	103	168	5
RTOR Reduction (vph)	0	0	0	0	0	148	0	0	168	0	2	0
Lane Group Flow (vph)	0	0	0	0	228	80	0	500	147	0	274	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)					10.9	10.9		16.6	16.6		16.6	
Effective Green, g (s)					10.9	10.9		16.6	16.6		16.6	
Actuated g/C Ratio					0.31	0.31		0.47	0.47		0.47	
Clearance Time (s)					4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)					3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)					418	486		871	740		625	
v/s Ratio Prot								c0.27				
v/s Ratio Perm					c0.17	0.05			0.09		0.21	
v/c Ratio					0.55	0.17		0.57	0.20		0.44	
Uniform Delay, d1					10.2	9.0		6.9	5.5		6.3	
Progression Factor					1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2					1.5	0.2		0.9	0.1		0.5	
Delay (s)					11.7	9.1		7.8	5.7		6.8	
Level of Service					B	A		A	A		A	
Approach Delay (s)		0.0			10.4			7.0			6.8	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	35.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95		1.00	0.95		0.97	0.95	
Frt	1.00	0.96		1.00	0.94		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3403		3433	3330		1770	3523		3433	3519	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3403		3433	3330		1770	3523		3433	3519	
Volume (vph)	100	245	85	305	430	280	40	1720	55	400	1155	45
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	266	92	332	467	304	43	1870	60	435	1255	49
RTOR Reduction (vph)	0	27	0	0	82	0	0	2	0	0	3	0
Lane Group Flow (vph)	109	331	0	332	689	0	43	1928	0	435	1301	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	8.0	17.3		14.7	24.0		27.8	67.8		15.0	55.0	
Effective Green, g (s)	8.0	17.3		14.7	24.0		27.8	67.8		15.0	55.0	
Actuated g/C Ratio	0.06	0.13		0.11	0.18		0.21	0.52		0.11	0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	108	450		386	611		376	1826		394	1480	
v/s Ratio Prot	0.06	0.10		c0.10	c0.21		0.02	c0.55		c0.13	0.37	
v/s Ratio Perm												
v/c Ratio	1.01	0.74		0.86	1.13		0.11	1.06		1.10	0.88	
Uniform Delay, d1	61.4	54.6		57.0	53.4		41.6	31.5		57.9	34.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	89.1	6.2		17.4	76.6		0.1	37.6		76.5	6.3	
Delay (s)	150.5	60.7		74.5	130.0		41.7	69.1		134.4	41.1	
Level of Service	F	E		E	F		D	E		F	D	
Approach Delay (s)		81.7			113.3			68.5			64.5	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM Average Control Delay	77.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	130.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	100.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			0.98			1.00			0.99	
Flt Protected		0.98			0.98			1.00			1.00	
Satd. Flow (prot)		1760			1790			1852			1846	
Flt Permitted		0.82			0.89			0.95			0.97	
Satd. Flow (perm)		1477			1618			1767			1800	
Volume (vph)	75	40	35	25	30	10	50	605	10	15	350	20
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	43	38	27	33	11	54	658	11	16	380	22
RTOR Reduction (vph)	0	20	0	0	9	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	143	0	0	62	0	0	722	0	0	415	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.8			9.8			35.4			35.4	
Effective Green, g (s)		9.8			9.8			35.4			35.4	
Actuated g/C Ratio		0.18			0.18			0.67			0.67	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		272			298			1176			1198	
v/s Ratio Prot												
v/s Ratio Perm		c0.10			0.04			c0.41			0.23	
v/c Ratio		0.52			0.21			0.61			0.35	
Uniform Delay, d1		19.6			18.4			5.0			3.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.8			0.3			1.0			0.2	
Delay (s)		21.4			18.8			6.0			4.0	
Level of Service		C			B			A			A	
Approach Delay (s)		21.4			18.8			6.0			4.0	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	53.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	1836	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1583	1770	1863	1836	
Volume (vph)	30	235	265	375	170	20
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	255	288	408	185	22
RTOR Reduction (vph)	0	223	0	0	7	0
Lane Group Flow (vph)	33	32	288	408	200	0
Turn Type		Perm	Split			
Protected Phases	4		5	5	6	
Permitted Phases		4				
Actuated Green, G (s)	6.3	6.3	19.7	19.7	11.6	
Effective Green, g (s)	6.3	6.3	19.7	19.7	11.6	
Actuated g/C Ratio	0.13	0.13	0.40	0.40	0.23	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	225	201	703	740	429	
v/s Ratio Prot	0.02		0.16	c0.22	c0.11	
v/s Ratio Perm		c0.02				
v/c Ratio	0.15	0.16	0.41	0.55	0.47	
Uniform Delay, d1	19.3	19.3	10.8	11.5	16.3	
Progression Factor	1.00	1.00	0.55	0.53	1.00	
Incremental Delay, d2	0.3	0.4	0.3	0.7	0.8	
Delay (s)	19.6	19.7	6.2	6.8	17.1	
Level of Service	B	B	A	A	B	
Approach Delay (s)	19.7			6.6	17.1	
Approach LOS	B			A	B	

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	49.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Frt		0.98			1.00	0.85		0.99		1.00	0.99	
Flt Protected		0.99			0.98	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		1811			1832	1583		1843		1770	1850	
Flt Permitted		0.92			0.90	1.00		1.00		0.95	1.00	
Satd. Flow (perm)		1685			1667	1583		1843		1770	1850	
Volume (vph)	15	50	10	20	40	170	15	460	35	190	205	10
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	54	11	22	43	185	16	500	38	207	223	11
RTOR Reduction (vph)	0	10	0	0	0	162	0	4	0	0	3	0
Lane Group Flow (vph)	0	71	0	0	65	23	0	550	0	207	231	0
Turn Type	Perm			Perm		Perm	Split			Split		
Protected Phases		4			8		5	5		6	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		6.3			6.3	6.3		19.7		11.6	11.6	
Effective Green, g (s)		6.3			6.3	6.3		19.7		11.6	11.6	
Actuated g/C Ratio		0.13			0.13	0.13		0.40		0.23	0.23	
Clearance Time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)		214			212	201		732		414	433	
v/s Ratio Prot								c0.30		0.12	c0.12	
v/s Ratio Perm		c0.04			0.04	0.01						
v/c Ratio		0.33			0.31	0.12		0.75		0.50	0.53	
Uniform Delay, d1		19.7			19.7	19.2		12.8		16.5	16.6	
Progression Factor		1.00			1.00	1.00		1.00		0.74	0.74	
Incremental Delay, d2		0.9			0.8	0.3		4.4		0.8	1.1	
Delay (s)		20.7			20.5	19.4		17.2		13.1	13.3	
Level of Service		C			C	B		B		B	B	
Approach Delay (s)		20.7			19.7			17.2			13.2	
Approach LOS		C			B			B			B	

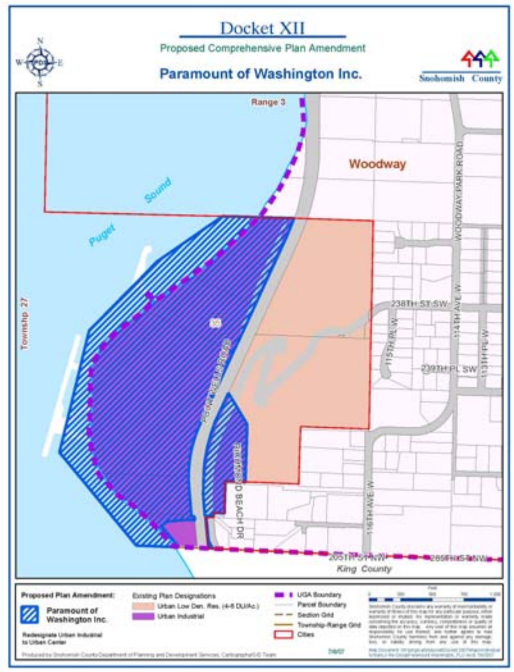
Intersection Summary			
HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	49.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Appendix E

Travel Demand Forecasting Report

Snohomish County Docket XIII

Point Wells Area



December 2008

Prepared for:

Snohomish County

ICF Jones & Stokes

Prepared by:

Fehr & Peers / Mirai

Snohomish County Docket XIII

Point Wells Area

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THE INTRODUCTION

Forecasting future travel demand is a key component in any transportation planning project. It provides the foundation for the transportation needs analyses, the comprehensive plan, EIS studies and large site development studies. Models are helpful to determine the quantitative relationship between land development and the need for future roadway network improvements. Understanding the future nature of traffic volumes and travel patterns in the study area makes it possible to recommend an appropriate set of transportation facility improvements for the area.

The focus of this documentation is to provide information about the travel forecasts for the Point Wells area study. The study used Snohomish County's travel demand model for development of the travel forecasts. The Snohomish County model assumptions and procedures are included in this documentation. The documentation provides information for all users, not only the technical experts who run the models, but also the planners who use information from the model.

SNOHOMISH COUNTY MODEL

The Snohomish County model is set up in a manner consistent with the Puget Sound Regional Council's (PSRC) model. The PSRC's model covers the four county region – Snohomish, King, Kitsap and Pierce counties. The PSRC derives their employment forecast information from the State level forecast. The PSRC allocates this information to smaller TAZ (traffic analysis zone) levels. Snohomish County develops its own household and employment information for their MAZs (Micro Analysis Zones) consisting of 800 zones within the County. For the areas outside the County, the model uses PSRC data. The Snohomish County model uses PSRC trip generation model, trip distribution model and mode choice model. The resulting vehicle trip tables were converted to Snohomish MAZ and used in the traffic assignment on the highway network for the AM and PM peak hours. The flow chart in **Figure 1** shows the relationship between the PSRC model and the Snohomish County model.

Land Use

The land use assumed in the Snohomish County model is shown in **Table 1** at the County level for the year 2005, 2015 and 2025. The land use types assigned for the MAZs include: housing units (HH) and employment for the following sectors: Retail (RETAIL), Finance, Insurance, Real Estate and Services (FIRES), Manufacturing (MANU), Wholesale, Trade, Communication and Utilities (WTCU), Government (GOV) Employment and Education (EDUC) Employment.

Figure 1. Snohomish County Modeling Procedure

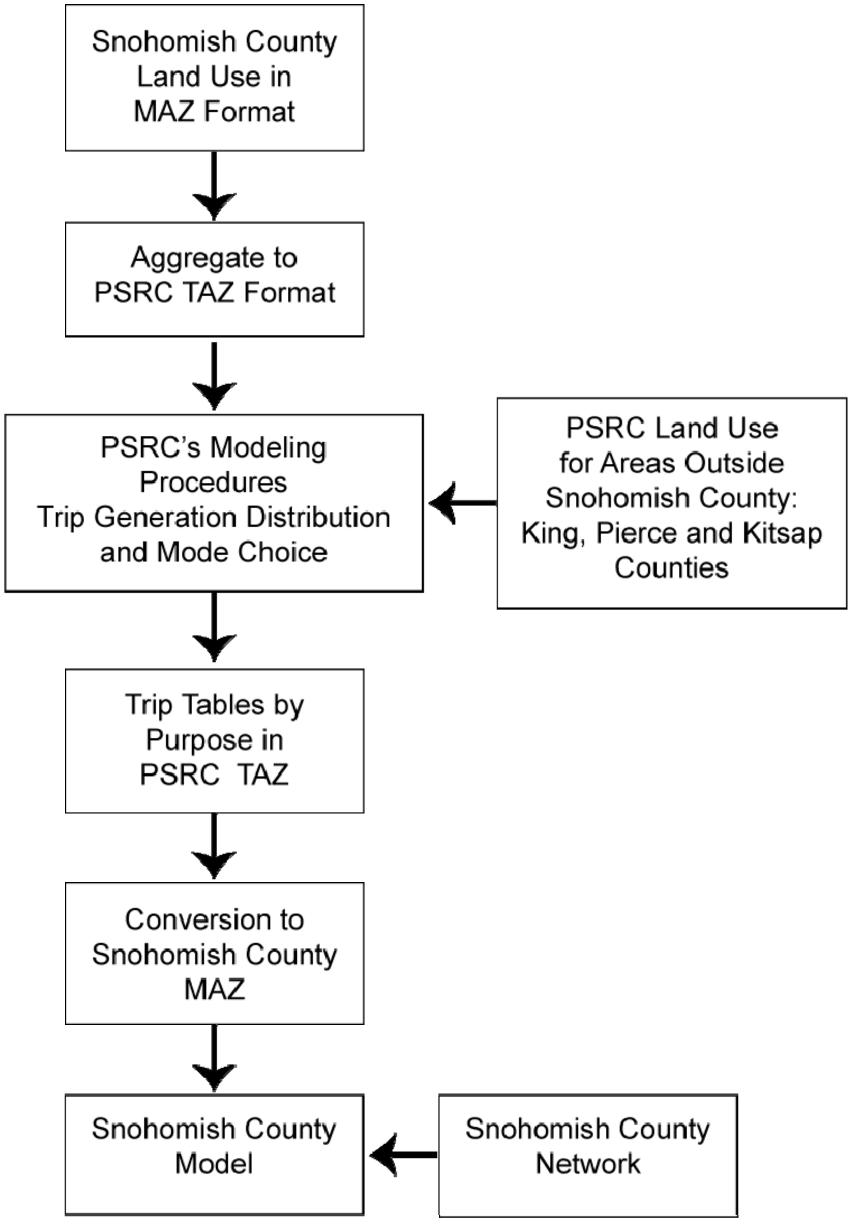

Table 1. Snohomish County Household and Employment

	HH	RETAIL	FIRE	MANU	WTCU	GOV	EDUC	EDUC OTHER

2005	245209	50953	72577	48165	17968	25126	12335	4630
2015	305156	64124	96040	58356	24235	30267	16205	5473
2025	355779	76767	124908	65487	32012	35253	18555	6291

Year 2005 Model for Point Wells Area Study

The Snohomish County base year 2005 model was modified to incorporate a detailed zone system and road network in the Point Wells study area. To capture the effect of land use changes on the transportation network, the MAZs near the Point Wells area were split into smaller zones. A total of 21 new zones were added in and around the study area, increasing the model to a total of 821 zones. **Figure 2** displays a map showing the boundaries of the old MAZ and the Shoreline TAZs and the new split zones in the Point Wells study area. The County provided the land use for the split zones for year 2005, 2015 and 2025. **Table 2** presents the zone system for the updated Snohomish County model. **Figure 3** shows the procedures used to update the 2005 model. It also shows how the 2015 and 2025 No Action models were created.

Figure 2. Point Wells Study Zone System

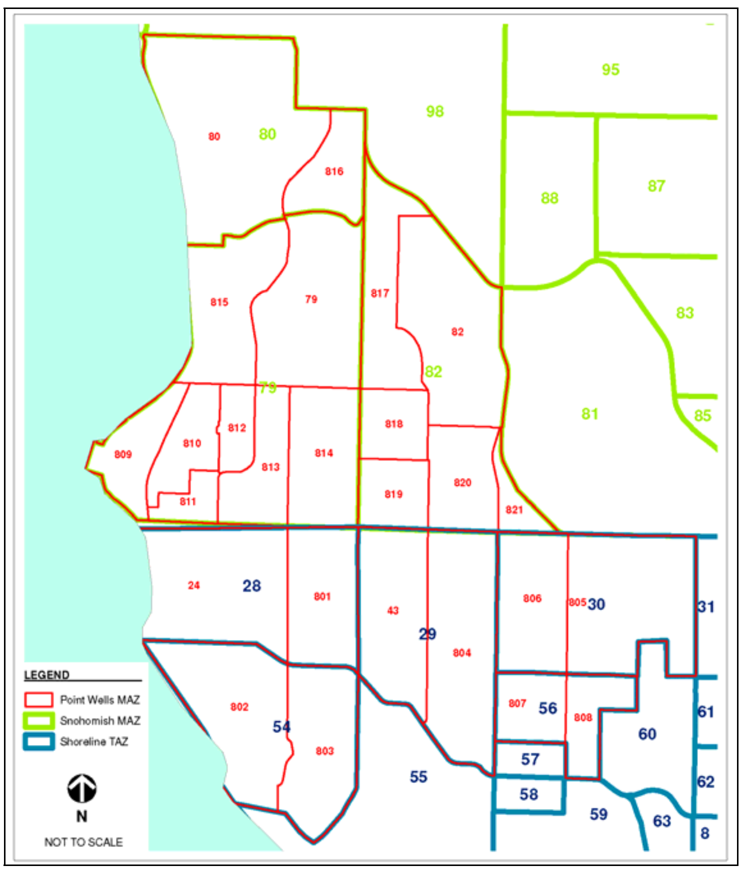

Figure 3. Modeling Procedure used in Point Wells Study to Create 2005, 2015 and 2025 Models

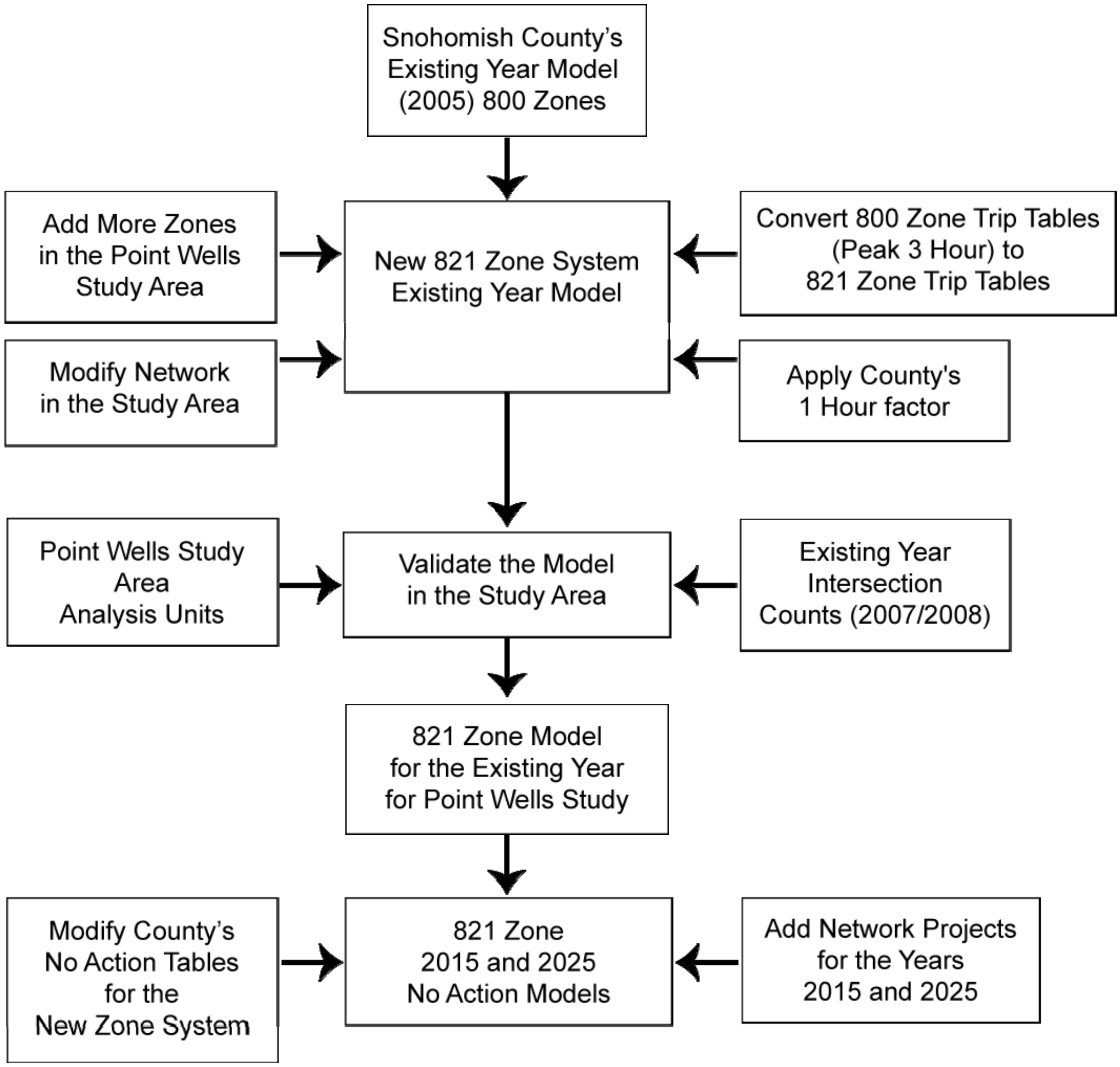

Table 2. Summary of Snohomish County's Microanalysis Zones

MAZ	County
MAZs within other Counties	
1 - 2	Pierce County

3 - 74	King County
75 - 78	Kitsap County
MAZs within Snohomish County	
79 – 716, 718 – 730, 732 – 740, 742 – 796, 801 - 821	Snohomish County
717, 731 and 741	External Stations combined with MAZs
797 - 800	Freestanding external stations
PSRC TAZ-related External Stations	
940,942 – 944 and 956	Pierce County
939, 941 and 945	King County
954 – 955	Kitsap County
946 - 953	Snohomish County

The land used in the Point Wells study area is shown in **Table 3.** The original SMAZ 79 (Snohomish County Micro Analysis Zones) contains the Point Wells parcel. This SMAZ is split into nine smaller zones as shown in **Table 4**. The new SMAZ and the land use in the study area were compared to the PSRC land use for the years 2005, 2015 and 2025. This table shows the equivalency between the PSRC TAZ, the old, and the new Snohomish SMAZ for the study area. The study area arterial network was refined by adding more streets to capture the impact on the minor arterials and collectors.

Table 3. Snohomish County Land Use and PSRC's Land Use Comparison

SMAZ	05HH	05EMP	15HH	15EMP	25HH	25EMP
Snohomish County Land Use						
79	294	66	404	100	407	199
80	108	31	112	32	122	32
82	767	370	826	345.5	848	346
81	1807	595	1925	634	2196	726
Snohomish Total	**2976**	**1062**	**3267**	**1111**	**3573**	**1303**
SMAZ	05HH	05EMP	15HH	15EMP	25HH	25EMP
Comparison to PSRC's Land Use						
PSRC TAZ 579	326	56	339	60	372	68
SNOH CO MAZs 79&80	402	97	516	132	529	231
PSRC TAZ 580	2599	950	2751	979	3044	1072

SNOH CO MAZs 81&82	2574	965	2751	979	3044	1072
PSRC 579&580	2925	1006	3090	1039	3416	1140
SNOH 79-82	2976	1062	3267	1111	3573	1303

Trip Table Creation

The model includes trip tables that reflect the zone and land use changes. Snohomish County provided the base 2005, 2015 and 2025 trip tables. Originally it was planned to take the new 821 zone system land use and feed into PSRC model's four step process, create trip tables by purpose, and convert them to Snohomish County MAZ system. After discussions with the County's Senior modeler, the trip tables were split to the new zone system for the base year to obtain the same results. Both processes required equivalency files to match Snohomish's new MAZ system to the PSRC TAZ system. They equivalency is required to convert the land use and trip tables. Table 4 shows the TAZ equivalency factors between the TAZ and MAZ. It also shows the relationship between new MAZ and the old MAZ for the zonal production and attraction. These production and attraction factors are important to create 821 zone trip tables from 800 zone trip tables. For the years 2005, 2015 No Action and 2025 No Action trip tables were created using these factors. After creating 821 zone system daily trip tables, the daily tables were factored to create AM and PM peak 1-hour trip tables using the factors shown in **Table 5**. These peak factors were provided by Snohomish County.

Table 4. TAZ/MAZ Equivalency Factors

PSRC TAZ	Snohomish Co. MAZ	Snohomish new SMAZ		PSRC TAZ to SMAZ Factors			Old SMAZ to New SMAZ Factors	
				20005	2005		20005	2005
				Prod	Attr		Prod	Attr
219	24	24		0.319	0.110		0.319	0.110
		801		0.294	0.257		0.294	0.257
		802		0.124	0.253		0.124	0.253
		803		0.263	0.380		0.263	0.380
220	43	43		0.037	0.135		0.037	0.135
		43		0.168	0.676		0.168	0.676
		43		0.158	0.080		0.158	0.080
		804		0.152	0.034		0.152	0.034

		805		0.223	0.028		0.223	0.028
		806		0.131	0.028		0.131	0.028
		807		0.044	0.009		0.044	0.009
		808		0.086	0.009		0.086	0.009
579	79	79		0.094	0.052		0.129	0.076
		809		0.000	0.309		0.000	0.455
		810		0.000	0.000		0.000	0.000
		811		0.040	0.000		0.054	0.000
		812		0.050	0.072		0.068	0.106
		813		0.134	0.237		0.184	0.348
		814		0.357	0.010		0.490	0.015
		815		0.055	0.000		0.075	0.000
	80	80		0.216	0.299		0.798	0.935
		816		0.055	0.021		0.202	0.065

TAZ/MAZ Equivalency Factors (Continued)

PSRC TAZ	Snohomish Co. MAZ	Snohomish SMAZ final		PSRC to SMAZ Factors			MAZ to SMAZ Factors	
				20005	2005		20005	2005
				Prod	Attr		Prod	Attr
580	81	81		0.695	0.626		1.000	1.000
	82	82		0.092	0.278		0.302	0.743
		817		0.058	0.027		0.189	0.073
		818		0.029	0.010		0.095	0.027
		819		0.047	0.000		0.154	0.000
		820		0.059	0.014		0.194	0.038
		821		0.020	0.044		0.066	0.119

Table 5. Peak Hour / Directional Factors

Purpose	AM		PM	
	P-A	A-P	P-A	A-P
HBW	0.1361	0.0292	0.0085	0.0836
HBO	0.0246	0.0134	0.0332	0.0488
NHB	0.0210	0.0140	0.0455	0.0455
THRU	0.1260	-	0.1009	-

Validation

Validation is a process that evaluates how the existing year model volumes on the highways and arterials compare to the actual counts. The validation was completed at two levels – first, to the countywide screenlines used by the County and a second, more rigorous one at the study area level. The validation involved modifying some of the loading points to reflect the field conditions, modifying the speeds or capacity to be uniform on the corridor and checking the length of the links to make sure it reflects reality in the study are. **Table 6** provides information about the total screenlines at the County level and **Table 7** presents the validation results for the study area.

FEHR & PEERS
Mirai

Table 6. Countywide Travel Model Validation

Peak Hour	Daily Count Estimate	Peak Hour %	Peak Hour Count NB/EB	Peak Hour Count SB/WB	Both Dir Peak Hour Count	Peak Hour Model NB/EB	Peak Hour Model SB/WB	% Difference (Model to Count) NB/EB	% Difference (Model to Count) SB/WB
AM	5,225,198	6.3%	131,364	195,445	326,809	132,085	208,250	0.5%	6.6%
PM	5,192,451	7.8%	227,219	179,591	406,810	241,304	177,155	6.2%	-1.4%

Table 7. Snohomish County Docket XIII Paramount Subarea Travel Model Validation (AM and PM Peak Hours)

Arterial	AM								
	Existing			Model			% Difference Model to Counts		
	EB/NB	WB/SB	Both Dir	EB/NB	WB/SB	Both Dir	EB/NB	WB/SB	Both Dir
Arterial Total	3289	4414	7703	2888	5029	7917	-12%	14%	3%
SR 99: 224th Street SW to N 185th Street	647	1647	2294	660	1448	2108	2%	-12%	-8%
SR 99: N 175th Street to N 185th Street	552	1558	2110	750	1538	2288	36%	-1%	8%
I-5 North of NE 185th St	5410	7590	13000	5020	8066	13086	-7%	6%	1%
I-5 North of 236th St SW	5490	7100	12590	5935	7234	13169	8%	2%	1%
Arterial	PM								
	Existing			Model			Ratio		
	EB/NB	WB/SB	Both Dir	EB/NB	WB/SB	Both Dir	EB/NB	WB/SB	Both Dir
Arterials - Total	4496	3492	7988	5460	4093	9553	21%	17%	20%
SR 99: 224th Street SW to N 185th Street	1498	1057	2555	1625	977	2602	8%	-8%	2%
SR 99: N 175th Street to N 185th Street	1457	1155	2612	1460	1139	2599	0%	-1%	0%
I-5 North of NE 185th St	8220	6290	14510	8947	6709	15656	9%	7%	8%
I-5 North of 236th St SW	6995	6671	13666	7870	6676	14546	13%	0%	6%

2015 and 2025 No Action Model

For this study, 821 zone models for the 2015 and 2025 No Action models were created based on the validated 2005 model. The 2015 No Action network was created by adding the improvement projects planned for County, the cities in the County and State highway system to be completed by 2015. Using this as a base, the 2025 No Action network was created by adding the projects to be built between 2015 and 2025. **Appendices A, B and C** lists the improvement projects of the cities, the County and the State. The 2015 and 2025 trip tables for Home based Work, Home based Other and Non-Home based purposes were created by splitting the 800 zone tables using EMME software and ensembles procedure.

2025 Action Model

To create the 2025 Action model with the planned Point Wells development, the 2025 No Action model was used as the base. **Figure 4** shows the procedures used for the 2025 Action model. The trip tables for AM and PM peak hour were created to reflect the planned land use for the Point Wells area. **Table 8** shows the Paramount mixed-use land use and the developed trip estimate for AM, PM and Daily. These are based on the ITE method and detailed calculations of trip generation are shown in **Appendix D.**

Figure 4. 2025 Action Modeling Procedure for Point Wells Study Area

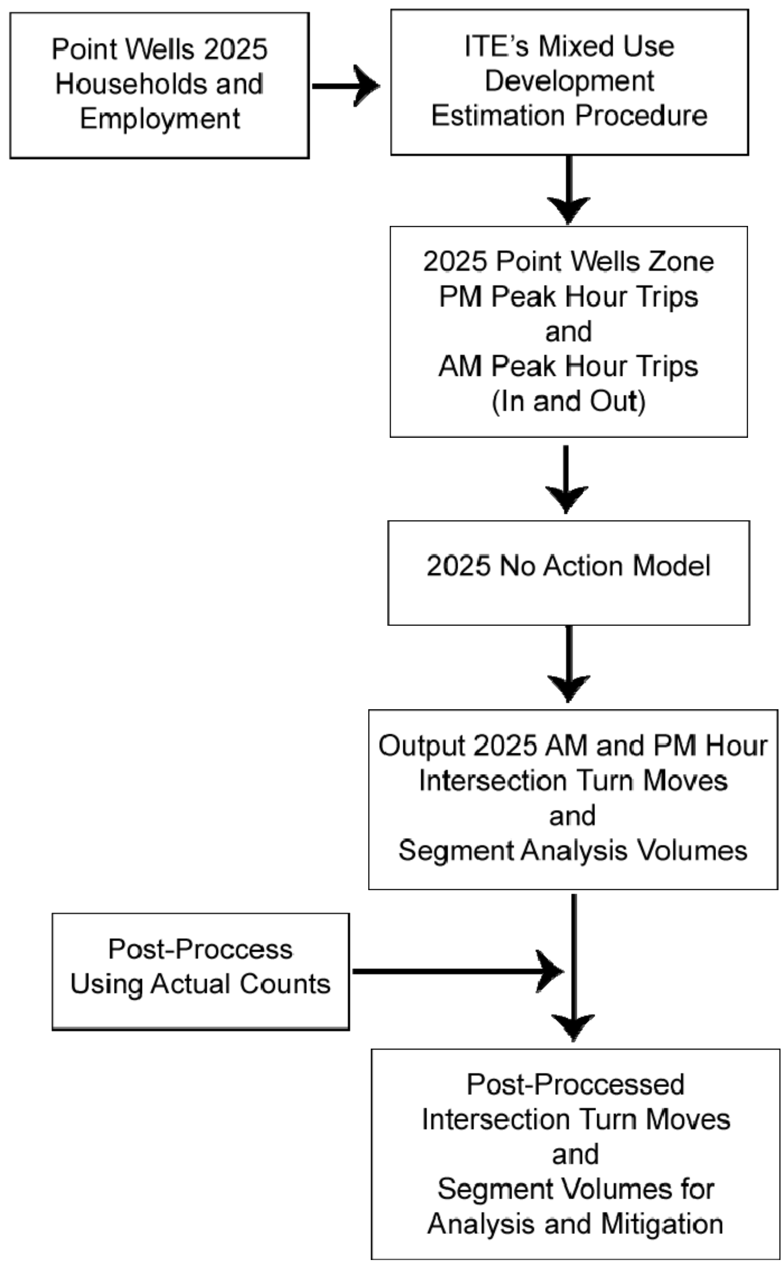

Table 8. Paramount Mixed-Use Development Estimate AM Peak Hour, PM Peak Hour and Daily*

			New AM Peak Hour Trips		New PM Peak Hour Trips		New Daily Trips
Residential	Units		Entering	Exiting	Entering	Exiting	
Residential Condominium/Townhouse	3220	Dwelling Units	121	613	602	295	8801
Total Residential and Senior Housing Trips	3220	Dwelling Units	121	613	602	295	8801
			New AM Peak Hour Trips		New PM Peak Hour Trips		New Daily Trips
Office			Entering	Exiting	Entering	Exiting	
General Office Building	528	employees	220	28	32	176	1216
Total Office Trips	528	employees	220	28	32	176	1216
			New AM Peak Hour Trips		New PM Peak Hour Trips		New Daily Trips
Commercial			Entering	Exiting	Entering	Exiting	
Specialty Retail Center [1]	136	1000 gsf	49	23	75	104	2596
Total Commercial Trips	136	1000 gsf	49	23	75	104	2596
			New AM Peak Hour Trips		New PM Peak Hour Trips		Daily Trips
Total Development			Entering	Exiting	Entering	Exiting	
Total Combined Trips			390	664	709	575	12613

* Paramount Mixed Use Development Estimate AM Peak Hour, PM Peak Hour and Daily (Continued)

Adjustments [2]			
	INTERNAL	PED/BIKE	PASS-BY
AM Reduction	2.9%	10.0%	34.0%
PM Reduction	5.9%	10.0%	34.0%

[1] Commercial = 1 emp /500 gsf. For AM Peak Hour, Shopping Center (820) was used for trip generation.
[2] Assumed reductions per ITE Trip Generation Handbook (March 2001). Internal trips based on the level of interaction between land uses.Pass-by trips only apply to commercial uses. Pedestrian/Bike reduction typical for mixed-use residential development.

Source: Institute of Transportation Engineers, Trip Generation (7th Edition)
Institute of Transportation Engineers, Trip Generation Handbook

Post-Processing

The following section presents the methodology used to develop the Year 2015 and 2025 AM and PM peak hour demand traffic forecasts for the project study area. Post-processing is a process that increases the accuracy of the forecast numbers based on the actual counts and model forecast numbers. The Snohomish County travel demand model was used to predict changes in travel patterns for the Years 2015 and 2025 Baseline and 2025 Action for AM and PM peak hours.

Methodology

Post processing takes the existing turning movement data or segment volume, and using available data from a travel demand model, develops future year demand volumes. The following steps were used to create the post-processed turn moves and segment volumes in the study area

- **Step 1** - The Snohomish County travel demand model was used to create the raw turn volumes and segment volumes for AM and PM peak hours for forecast scenarios.
- **Step 2** – Following the recommended procedures outlined in the National Cooperative Highway Research Program (NCHRP) Report 255, year 2015 demand volumes were developed. The NCHRP 255 procedure is outlined below.
    - Calculate the percent difference between the existing count and the existing travel demand model volume.
    - If the ratio is **less than 50%**, use the ratio method:
        - $V_{ri} = F_i * (B_{ci} / B_{ai})$

          V_{ri} = ratio adjusted future year volume for turning movement i;

          F_i = future year forecasted volumes for turning movement i;

          B_{ci} = base year traffic count for turning movement i; and

          B_{ai} = base year assigned volume for turning movement i.
    - If the ratio is **greater than 150%**, use the difference method:
        - $V_{di} = F_i + (B_{ci} - B_{ai})$

          V_{di} = difference adjusted future year volume for turning movement i;
    - If the ratio is **between 50% and 150%**, use the blended method (i.e. the average of the ratio and difference methods):
        - $V_{bi} = (V_{ri} + V_{di}) / 2$

          V_{bi} = blended adjusted future year volume for turning movement i;
- **Step 3** – Adjust volumes, where appropriate (i.e., a new leg at an intersection results in an unrealistic volume difference between intersection), based on adjacent intersections and engineering judgment.

Tables 9 and 10 show the analyzed arterials and intersections, respectively.

Table 9. Analyzed Arterials

No.	Arterial
1	Richmond Beach Drive: County Line to NW 196th Street
2	NW 196th Street: Richmond Beach Drive to NW 20th Avenue
3	NW 195th Street/Richmond Beach Road: 8th to 20th Avenues NW
4	Richmond Beach Road: 8th Avenue NW to SR-99
5	8th Avenue NW/NW 185th Street/6th Avenue NW: Richmond Beach Road to N 175th Ave
6	Dayton Avenue N: Richmond Beach Road to N 175th Street/Saint Luke Place
7	Fremont Avenue N: N 175th to N 185th Street
8	NW 20th Street/Timber Road/238th Street SW: NW 196th Street to Woodway Park Drive
9	Woodway Park Road: 238th Street SW to Algonquin Road
10	244th Street SW: 100th Avenue W to SR-99
11	8th Avenue NW: Richmond Beach Road to 244th Street SW
12	3rd Avenue NW : Richmond Beach Road to 244th Street SW
13	Fremont Avenue N: N 185th Street to 244th Street SW
14	100th Avenue W: 244th Street SW to SR-104
15	SR 99: 224th Street SW to N 185th Street
16	SR 99: N 175th Street to N 185th Street

Table 10. Analyzed Intersections

No.	Intersection	East-West	North-South
1	244th Street SW and SR 99	244th Street SW	SR 99
2	244th Street SW and Fremont Avenue N	244th Street SW	Fremont Avenue N
3	Firdale Avenue N and 244th Street SW	Firdale Avenue N	244th Street SW
4	244th Street SW and 100th Avenue W	244th Street SW	100th Avenue W
5	SR 104 and 100th Avenue W	SR 104	100th Avenue W
6	Algonquin Road and Woodway Park Road	Algonquin Road	Woodway Park Road
7	238th Street SW and Woodway Park Road	238th Street SW	Woodway Park Road
8	NW 196th Street and Richmond Beach Drive	NW 196th Street	Richmond Beach Drive
9	NW 196th Street and 20th Avenue NW	NW 196th Street	20th Avenue NW
10	NW 195th Street and 15th Avenue NW (w)	NW 195th Street	15th Avenue NW
11	Richmond Beach Rd and 15th Ave NW (e)	Richmond Beach Rd	15th Avenue NW
12	Richmond Beach Road and 8th Avenue NW	Richmond Beach Rd	8th Avenue NW
13	Richmond Beach Road and 3rd Avenue NW	Richmond Beach Rd	3rd Avenue NW
14	Richmond Beach Road and Dayton Ave N	Richmond Beach Rd	Dayton Avenue N
15	N 185th Street and Fremont Avenue N	N 185th Street	Fremont Avenue N
16	N 185th Street and SR 99	N 185th Street	SR 99
17	N 175th Street and 6th Avenue NW	N 175th Street	6th Avenue NW
18	St Luke Place N and Dayton Avenue N	St Luke Place N	Dayton Avenue N
19	N 175th Street and Fremont Avenue N	N 175th Street	Fremont Avenue N
20	N 175th Street and SR 99	N 175th Street	SR 99
21	Carlyle Hall Road and Dayton Avenue N	Carlyle Hall Road	Dayton Avenue N
22	N Innis Arden Way and Greenwood Ave N	N Innis Arden Way	Greenwood Avenue N
23	N 160th Street and Greenwood Avenue N	N 160th Street	Greenwood Avenue N

APPENDICES – IMPROVEMENT PROJECT LIST

Appendix A. 2015 and 2025 City Arterial Improvement Projects

Project Number	TSA	Jurisdiction	Name	Limits	FC	Miles	Improvements	Staging
AR-3	A	Arlington	188th Street NE	47th Avenue NE to Smokey Point Boulevard	CL	0.90	Urban 5-lane Standard	2015
AR-4	A	Arlington	47th Avenue NE	188th Street NE to Cemetery Road	CL	0.70	Urban 3-lane Standard	2015
AR-5	A	Arlington	Cemetery Road Extension	47th Avenue NE to 67th Avenue NE	CL	1.22	Urban 5-lane Standard	2015
AR-6	A	Arlington	211th Place NE	SR 530 to 67th Avenue NE	CL	0.39	Urban 3-lane Standard	2015
AR-7	A	Arlington	Olympic Avenue NE Extension	Division Street to Maple Street	MA	0.25	Urban 3-lane Standard	2015
BO-3	F	Bothell	228th Street SE	I-405 (19th Ave SE) to 35th Ave SE	MA	0.96	Urban 5-Lane Standards	2015
BO-4	F	Bothell	Fitzgerald Road	228th Street SE to 240th St SE	CL	0.85	Urban 3-Lane Standards	2015
ED-1	F	Edmonds	220th Street SW	9th Ave S to 84th Ave W	CL	0.97	Urban 3-Lane Standards	2015
ED-2	F	Edmonds	238th Street SW	84th Avenue W to SR 104	MA	0.27	Urban 3-Lane Standards	2015
ED-3	F	Edmonds	84th Avenue W	212th Street SW to 238th Street SW	CL	1.63	Urban 3-Lane Standards	2015
EV-10	D	Everett	100th Street SW	Evergreen Way to 23rd Ave W	CL	1.07	Widen to 3 lane	2015
EV-11	D	Everett	East Everett Ave Extension	E Grand Ave to Railway Ave	CL	0.20	Construct BNSF Overcrossing	2015
EV-3	D	Everett	112th Street SE	3rd Ave SE to SR 527 (19th Ave SE)	MA	1.00	Widen to 5 lane	2015
EV-5	D	Everett	116th Street SE	SR 527 to Everett C/L	CL	0.29	Widen to 3 lane	2015
EV-6	D	Everett	East Marine View Drive	I-5 to N Broadway/SR 529	PA	1.50	Widen to 3/4 lanes	2015

Project Number	TSA	Jurisdiction	Name	Limits	FC	Miles	Improvements	Staging

Project Number	TSA	Jurisdiction	Name	Limits	FC	Miles	Improvements	Staging
EV-7	D	Everett	41st Street SE Overcrossing	I-5 I/C to landfill site	MA	0.30	Extend 41st St SE to riverfront/industrial properties including bridge over RR lines.	2015
EV-9	D	Everett	South Broadway	41st Street SE to SR 526	PA	3.03	Widen to 4/5 lanes	2015
LS-1	B	Lake Stevens	20th Street NE	116th Avenue NE to West C/L	MA	0.35	Urban 2-lane Standard	2015
LS-10	B	Lake Stevens	Grade Road	20th Street NE to 22nd Street NE	MA	0.06	Urban 2-lane Standard	2015
LS-2	B	Lake Stevens	20th Street NE	Hartford Drive to 116th Avenue NE	CL	0.50	Urban 2-lane Standard	2015
LS-3	B	Lake Stevens	20th Street NE	Main Street to East C/L	MA	0.62	Urban 2-lane Standard	2015
LS-4	B	Lake Stevens	North Lakeshore Dr.	West C/L to Main Street	CL	1.01	Urban 2-lane Standard	2015
LS-5	B	Lake Stevens	Hartford Drive	Grade Road to Old Hartford Road	CL	0.61	Urban 2-lane Standard	2015
LS-6	B	Lake Stevens	East Lakeshore Dr.	Main Street to 12th Street NE	CL	0.32	Urban 2-lane Standard	2015
LS-7	B	Lake Stevens	East Lakeshore Dr.	12th Street NE to South C/L	CL	0.69	Urban 2-lane Standard	2015
LS-8	B	Lake Stevens	16th Street NE	Main Street to East C/L	CL	0.66	Urban 2-lane Standard	2015
LS-9	B	Lake Stevens	Grade Road	22nd Street NE to North C/L	MA	1.21	Urban 2-lane Standard	2015
LY-1	F	Lynnwood	44th Avenue West	194th Street SW to I-5	PA	0.61	Widen to 7 Lanes	2015
LY-2	F	Lynnwood	200th Street SW	48th Avenue W to SR 99	MA	0.95	Widen to 5 Lanes	2015
LY-3	F	WSDOT/ Lynnwood	SR 524/196th Street SW	48th Avenue W to 37th Avenue W	PA	0.69	Widen to 7 Lanes	2015
LY-4	F	Lynnwood	179th Street SW/Maple Road	36th Avenue W to Alderwood Mall Parkway	CL	0.42	New 2-Lane Extension	2015
LY-5	F	Lynnwood	36th Avenue W	179th Street SW to 164th Street SW	MA	0.97	Widen to 4/5 Lanes	2015
MA-1	A	Marysville	State Avenue	136th Street NE to 152nd Street NE	MA	1.09	Urban 5-lane Standards	2015
Project Number	TSA	Jurisdiction	Name	Limits	FC	Miles	Improvements	Staging
MA-11	A	Marysville	116th Street NE	I-5 to State Avenue	MA	0.43	Urban 5-lane Standards	2015

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MA-12	A	Marysville	88th Street NE	State Avenue to 44th Drive NE	MA	0.19	Urban 3-lane Standards	2015
MA-13	A	Marysville	88th Street NE	61st Drive NE to 67th Avenue NE	MA	0.35	Urban 3-lane Standards	2015
MA-14	A	Marysville	88th Street NE Extension	67th Ave NE to 84th Street NE	MA	1.46	Urban 3-lane Standards	2015
MA-15	A	Marysville	84th Street NE	83rd Avenue NE to SR 9	MA	0.26	Urban 3-lane Standards	2015
MA-2	A	Marysville	State Avenue	116th St. NE to 136th StNE	MA	1.34	Urban 5-lane Standards	2015
MA-3	A	Marysville	State Avenue	100th St NE to 116th StNE	MA	1.04	Urban 5-lane Standards	2015
MA-4	A	Marysville	SR 528	47th AveNE to 67th AveNE	PA	1.27	Re-stripe to 2 EB & 2 WB lanes. Remove parking on N side.	2015
MA-6	A	Marysville	51st Avenue NE	Grove Street to 84th Street NE	CL	0.73	Urban 3-lane Standards	2015
MA-7	A	Marysville	Sunnyside Boulevard	47th Avenue NE to Marysville C/L	MA	2.03	Urban 3-lane Standards	2015
MA-9	A	Marysville	67th Avenue NE	44th Street NE to Grove Street	MA	1.98	Urban 3-lane Standards	2015
MC-2	D	Mill Creek	Dumas Road	SR 96 to SR 527	CL	0.53	Widen to 3 Lanes	2015
MO-1	C	Monroe	Woods Creek Rd	US 2 to Monroe C/L	MA	1.01	Urban 3-Lane Standards	2015
MO-2	C	Monroe	Chain Lake Rd	US 2 to UGA Boundary	CL	1.58	Urban 2/3-Lane Standards	2015
MO-3	C	Monroe	164th Street SE/162nd Street SE/W Main Street	161st Ave SE to SR 203	MA	2.15	Urban 2/3-Lane Standards	2015
MU-1	D	Mukilteo	Harbour Pt. Blvd S/121st Street SW Extension	Harbour Point Boulevard S to 121st Street SW	CL	0.50	Realign 121st St SW/Harbour Pt. Blvd S to intersect with new alignment east of SR 525	2015

Project Number	TSA	Jurisdiction	Name	Limits	FC	Miles	Improvements	Staging
MU-2	D	Mukilteo	Harbour Point Blvd	SR-525 to 47th Place W	CL	0.18	Urban 5-Lane Standards	2015
MU-3	D	Mukilteo	Harbour Pt. Blvd/Harbour Point Blvd S	47th Place W to Harbour Reach Drive	CL	2.37	Urban 3-Lane Standards	2015
MU-4	D	Mukilteo	Harbour Point Blvd S	Harbour Reach Drive to SR 525	CL	0.47	Urban 5-Lane Standards	2015
MU-5	D	Mukilteo	Russell Rd/Cyrus Way/Evergreen Dr	SR 525/Russell Road to SR 525/Evergreen Drive	CL	1.00	Widen to 3 Lanes	2015
MU-6	D	Mukilteo	Chennault Beach Rd	SR 525 to 47th Avenue W	CL	0.30	Widen to 3 Lanes	2015
MU-7	D	Mukilteo	Harbour Reach Dr Extension	Harbour Point Boulevard S to Beverly Park Road	CL	1.00	New alignment connecting Beverly Park Rd & Harbour Pt. Blvd. S from Harbour Reach Dr to 132nd St SW	2015
MU-8	D	Mukilteo	Picnic Pt. Connection	Harbour Point Boulevard S to Picnic Point Road	CL	0.80	New alignment connecting Harbour Pt Blvd S & Picnic Pt Rd	2015
SN-2	C	Snohomish	Avenue D	SR 9 to 7th Street SE	PA	0.89	Urban 3-Lane Standards	2015
SN-3	C	Snohomish	2nd Street SE	Avenue D to Snohomish C/L	PA	0.70	Urban 3-Lane Standards	2015
SU-2	C	Sultan	Rice Road	US 2	PA	0.00	Traffic signal & channelization at US 2/Rice Rd I/S	2015
SU-3	C	Sultan	5th Street SE	US 2	PA	0.00	Traffic signal & channelization at US 2/5th St I/S	2015
TU-1	A	Tulalip	116th Street NE	I-5 to 27th Avenue NE	MA	0.47	Urban 5-lane Standard	2015
BO-1	F	Bothell	240th Street SE	Fitzgerald Road to 39th Avenue SE	CL	0.50	Urban 3-Lane Standards	2025
BO-2	F	Bothell	228th Street SE	8th Avenue W (Bothell C/L) to 9th Avenue SE	MA	1.06	Urban 5-Lane Standards	2025

Project Number	TSA	Jurisdiction	Name	Limits	FC	Miles	Improvements	Staging
EV-1	D	Everett	100th Street SE	7th Avenue SE to I-5 undercrossing	CL	0.51	Widen to 3 lanes & connect to 100th St SE undercrossing of I-5	2025
EV-12	D	Everett	Hardeson Rd/5th Ave W	Casino Road to Merrill Creek Parkway	MA/CL	1.70	Widen to 5 lanes	2025
EV-13	D	Everett	41st Street SE	I-5 to Rucker Avenue	PA	0.58	Widen to 7 lanes	2025
EV-2	D	WSDOT/Everett	SR 99 (Evergreen Way)	112th Street SW to Airport Road	PA	0.55	Widen to 7 lane w/ HOV emphasis	2025
EV-4	D	WSDOT/Everett	100th Street SE/SE Everett Mall Way @ I-5	19th Avenue SE to Everett Mall	MA	0.15	Build crossing under I-5 at 100th St SE between 19th Ave SE & Everett Mall, w/ HOV only access to I-5 NB & HOV only access from I-5 SB. Build on-ramp to SB I-5 from SE Everett Mall Way.	2025
EV-8	D	Everett	Riverfront Parkway	41st Street SE Overcrossing to Lowell-Snohomish River Road	MA	1.10	New connector between 41st St SE Over-crossing & Lowell-Snohomish River Rd.	2025
LY-6	F	Lynnwood	36th Avenue W	179th Street SW to Alderwood Mall Way	MA	1.14	Widen to 4/5 Lanes	2025
MC-1	D	Mill Creek	Town Center Blvd. (New)	Dumas Road to Mill Creek Boulevard	MA	1.49	Urban 2-lane Standard	2025
SN-1	C	Snohomish	Bickford Avenue	SR 9 to Snohomish C/L	MA	1.30	Urban 3-Lane Standards	2025

Appendix B. 2015 and 2025 County Arterial Improvement Projects

TSA	TE Project Number	Name	Limits	FC	Miles	Improvements	Timing
CRITICAL ARTERIAL SYSTEM IMPROVEMENTS (CASI)							
A	AO/C-3	51st Avenue NE	108th Street NE to 136th Street NE	CL	1.81	Urban 3-Lane Standards	2015
B	AO/C-10	20th Street SE	99th Avenue SE to S. Lake Stevens Road	MA	0.33	Urban 5-Lane Standards	2015
B	AO/C-9	20th Street SE	91st Avenue SE to 99th Avenue SE	MA	0.48	Urban 5-Lane Standards	2015
B	AO/C-8	20th Street SE	Cavalero Road to 91st Avenue SE	MA	0.97	Urban 4-Lane Standards w/ turn pockets	2015
C	AO-15	Airport Way	SR 9 to 99th Avenue SE	MA	0.53	Rural/Urban 2-Lane Standards	2015
C	AC-8	Airport Way	99th Avenue SE to Bridge #1	MA	0.58	Urban 3-Lane Standards	2015
D	AC-10	112th Street SW/ Beverly Park Road Corridor	SR 525 to Airport Road	MA	1.36	Urban 5-Lane Standards	2015
D	AC-9	Beverly Park Road	Airport Road to 112th Street SW	MA	0.16	Urban 5-Lane Standards	2015
D	AO/C-16	180th Street SE	SR 527 to Brook Boulevard	MA	0.27	Urban 5-Lane Standards	2015
D	AC-25	35th Avenue SE	Seattle Hill Road to 162nd Street SE	MA	0.69	Urban 3-Lane Standards	2015
D	NR-8	Puget Park Drive Extension	67th Avenue SE to Cathcart Way	CL	0.58	Urban 2-Lane Standards	2015
E	AC-38	Snohomish-Woodinville Road	SR 522 to King County Line	MA	0.56	Urban 3-Lane Standards	2015
A	AO-3	88th Street NE	Marysville C/L (44th Drive NE) to Marysville C/L (61st Drive NE)	MA	1.11	Urban 3-Lane Standards	2025
A	AO/C-1	140th Street NE / Stimson Road	23rd Avenue NE to 34th Avenue NE	MaC	0.85	Rural 4-Lane Standards	2025
A	AO/C-4	51st Avenue NE	88th Street NE to 108th Street NE	CL	1.19	Urban 3-Lane Standards	2025
A	NR-2	51st Avenue NE	84th Street NE to 88th Street NE	CL	0.25	Urban 3-Lane Standards w/ NB Auxiliary lane	2025
A	JP-2	51st Avenue NE	136th Street NE to 152nd Street NE	CL	1.06	Urban 3-Lane Standards	2025
A	JP-4	100th Street NE	Shoultes Road to 51st Avenue NE	CL	0.44	Urban 3-Lane Standards	2025

TSA	TE Project Number	Name	Limits	FC	Miles	Improvements	Timing
A	JP-1	51st Avenue NE	152nd Street NE to SR 531	CL	1.27	Urban 3-Lane Standards	2025
B	NR-4	Granite Falls Alternate Route	Mountain Loop Highway to SR 92	PA	2.10	Rural 2-Lane Standards in Urban Area	2025
D	AC-23	Seattle Hill Road	35th Avenue SE to 132 Street SE (SR 96)	MA	1.60	Urban 3-Lane Standards	2025
D	AC-17	36th / 35th Avenue West	164th Street SW to 156th Street SW	CL	0.52	Urban 3-Lane Standards	2025
D	AC-20	North Road	176th Place SW to 164th Street SW	CL	0.80	Urban 3-Lane Standards	2025
D	NR-6	148th Street SW	Jefferson Way to Meadow Road	CL	0.89	Urban 3-Lane Standards	2025
D	AO/C-12	Ash Way	Gibson Road to 164th Street SW	CL	2.38	Urban 3-Lane Standards	2025
D	AO/C-14	148th Street SW	35th Avenue W to Jefferson Way	CL	0.86	Urban 3-Lane Standards	2025
D/E	AC-27	35th Avenue SE	180 Street SE to 188 Street SE	MA	0.52	Urban 3-Lane Standards	2025
D/E	AC-26	35th Avenue SE	162nd Street SE to 180th Street SE	MA	1.13	Urban 3-Lane Standards	2025
D/F	AC-21	North Road	SR 524 to 176th Place SW	CL	0.98	Urban 3-Lane Standards	2025
E	AS-39a	169th Street SE	35th Avenue SE to Sunset Road SE	CL	0.41	Urban 2-Lane Standards	2025
E/F	AC-30	35th Avenue SE	188th Street SE to 198th Place SE	MA	0.66	Urban 3-Lane Standards	2025
E/F	AC-32	39th Avenue SE	228th Street SE to 207th Street SE	MA	1.30	Urban 3-Lane Standards	2025
E/F	AC-31	39th Avenue SE (York Road)	204th Street SE (SR 524) to 198th Place SE	MA	0.38	Urban 3-Lane Standards	2025
E/F	JP-7	39th Avenue SE	240th Street SE to 228th Street SE	MA	0.75	Urban 3-Lane Standards	2025
F	AO-33	Locust Way/Lockwood Road/Carter Road	King County Line to 240th Street SW	MA	0.85	Urban 2-Lane Standards. Realign I/S of Locust Way & Lockwood Road	2025
F	AO-32	14th Avenue W./Carter Road	220th Street SW to 240th Street SW	MA	1.30	Urban 2-Lane Standards	2025
F	NR-14	14th Avenue W Extension	Locust Way to 220th Street SW	MA	0.51	Urban 2-Lane Standards	2025
F	AC-39	Poplar Way	Lynnwood C/L to Larch Way	CL	0.72	Urban 3-Lane Standards	2025

TSA	TE Project Number	Name	Limits	FC	Miles	Improvements	Timing
F	AO-31	Locust Way	Larch Way to 14th Avenue W Extension	MA	0.30	Urban 2-Lane Standards	2025
ARTERIAL LEVEL OF SERVICE IMPROVEMENTS (ALOSI)							
A	AO/C-2	34th Avenue NE	116th Street NE to 136th Street NE	MiC	1.31	Rural 4-Lane Standards w/ realignment of I-5/116th Street NE I/C	2015
A	AC-3	67th Avenue NE	Marysville C/L to 108th Street NE	MA	1.12	Urban 3-Lane Standards	2015
B	AO/C-7	20th Street SE	US 2 to Cavalero Road	MA	0.27	Urban 4-Lane Standards w/ operations improvements	2015
B	AO/C-5	Lundeen Parkway	SR 9 to 99th Avenue NE	MA	0.61	Urban 4-Lane Standards	2015
B	AC-6	South Lake Stevens Road	20th Street SE to S. Davies Road	CL	0.34	Urban 3-Lane Standards	2015
C	AO-14	Marsh Road	Lowell-Larimer Road to SR 9	MiC	2.00	Rural 2-Lane Standards	2015
D	AC-29	180th Street SE	25th Avenue SE to 35th Avenue SE	MA	0.61	Urban 5-Lane Standards	2015
D	AC-28	180th Street SE	Brook Boulevard to 25th Avenue SE	MA	0.29	Urban 5-Lane Standards	2015
D	AC-19	28th Avenue W.	164th Street SW to SR 525 Off-Ramp	MA	0.56	Urban 5-Lane Standards	2015
D	AC-11	4th Avenue W.	112th Street SW to Everett C/L	MA	0.47	Urban 5-Lane Standards	2015
E	AC-34	180th Street SE	51st Avenue SE to Snohomish Avenue	MaC	1.43	Rural 3-Lane Standards	2015
E	AC-36	228th Street SE	39th to 45th Avenue SE	MA	0.38	Urban 4-Lane Standards	2015
E	AC-37	228th Street SE	45th Avenue SE to SR 9	MaC	1.40	Rural 3/5-Lane Standards	2015
A	AC-2	100th Street NE	51st Avenue NE to 67th Avenue NE	CL	1.03	Urban 3-Lane Standards	2025
A	AS-11	67th Avenue NE	108th Street NE to 152nd Street NE	MaC	2.88	Rural 2-Lane Standards	2025
A	AS-13	83rd Avenue NE	Soper Hill Road to SR 528	CL	2.22	Urban 2-Lane Standards	2025
A	AS-15	Marine Drive NW	64th Street NW to 83rd Place NW	MaC	2.08	Rural 2-Lane Standards	2025
A	AS-16	Marine Drive NW	7th Drive NW to 64th Street NW	MaC	1.48	Rural 2-Lane Standards	2025

TSA	TE Project Number	Name	Limits	FC	Miles	Improvements	Timing
A	AC-1	Shoultes Road/100th Street NE	State Avenue to 108 Street NE	CL	0.66	Urban 3-Lane Standards	2025
A	AO-1	Smokey Point Boulevard	UGA Boundary to SR 530	MaC	1.04	Rural 2-Lane Standards w/ intersection treatments	2025
B	AS-17	20th Street NE (Lakeview Drive)	Lundeen Parkway to Lake Stevens C/L	MA	0.48	Urban 2-Lane Standards	2025
B	AO-11	South Lake Stevens Road	S Davies Road to E. Lake Stevens Road	CL	0.73	Urban 2-Lane Standards	2025
B	AC-5	Vernon Road	Davies Road to SR 9	CL	0.15	Urban 3-Lane Standards	2025
C	AS-31	Broadway Avenue	164th Street SE to SR 9	MiC	2.31	Rural 2-Lane Standards	2025
C	AO-16	Springhetti Road	Broadway Avenue to Airport Way	MiC	1.97	Rural 2-Lane Standards	2025
D	AC-22	116th Street SE	Everett C/L to 35th Avenue SE	CL	0.60	Urban 3-Lane Standards	2025
D	AO/C-15	148th Street SE	Seattle Hill Rd to Power Line Easement	MA	0.42	Urban 3-Lane Standards	2025
D	AC-16	36th / 35th Avenue W.	156th Street SW to 148th Street SW	CL	0.47	Urban 3-Lane Standards	2025
D	AC-15	52nd Avenue W.	Lynnwood C/L to Beverly Park Road	MA	1.24	Urban 3-Lane Standards	2025
D	AO/C-13	Ash Way	164th Street SW to Maple Road	CL	1.15	Urban 3-Lane Standards	2025
D	AC-14	Beverly Park Road	52nd Avenue W. to Picnic Point Road/ Shelby Road	MA	0.49	Urban 3-Lane Standards	2025
D	AC-12	E. Gibson Road	Ash Way to Airport Road/128th Street SW	CL	0.17	Urban 3-Lane Standards	2025
D	AC-13	Gibson Road	SR 99 to Ash Way	CL	0.59	Urban 3-Lane Standards	2025
D	AS-33	Manor Way	Jefferson Way to 148th Street SW	CL	0.77	Urban 2-Lane Standards w/ intersection treatments	2025
D	AO-18	Manor Way	SR 99 to Jefferson Way	CL	0.57	Urban 2-Lane Standards w/ intersection treatments	2025
D	AO-22	Meridian Avenue S/130th Street SE/3rd Avenue SE	Meadow Place SW to SR 96 (128th Street SE)	CL	0.56	Urban 2-Lane Standards w/ intersection improvements	2025

TSA	TE Project Number	Name	Limits	FC	Miles	Improvements	Timing
D/F	AS-34	178th Street SW/Maple Road	Larch Way to Ash Way	CL	1.20	Urban 2-Lane Standards	2025
E	AC-33	180th Street SE	35th Avenue SE to 51st Avenue SE	MA	1.02	Urban 3-Lane Standards	2025
E	AS-40	180th Street SE	83rd Avenue SE to Broadway Avenue	MaC	0.56	Rural 2-Lane Standards	2025
E	AO/C-17	180th Street SE	Snohomish Avenue to 83rd Avenue SE	MaC	0.58	Urban 5-Lane Standards w/ Signal	2025
E	AO-25	Bostian Road/224th Street SE/75th Avenue SE	Paradise Lake Road to King County Line	CL/MiC	2.63	Urban/Rural 2-Lane Standards	2025
E	AC-35	Paradise Lake Road	SR 522 to UGA Boundary	CL	0.35	Urban 3-Lane Standards	2025
F	AO-27	Damson Road/N. Damson Road	SR 524 to Logan Road	CL	1.12	Urban 2-Lane Standards	2025
F	AO-28	Larch Way	212th Street SW to Cypress Way	MA	1.27	Urban 2-Lane Standards	2025
F	AO-29	Larch Way	Cypress Way to Locust Way	MA	0.26	Urban 2-Lane Standards	2025
F	AO-30	Logan Road	Locust Way to Damson Road	CL	0.56	Urban 2-Lane Standards	2025

Appendix C. 2015 and 2025 State Highway Improvement Projects

Project Number	Name	Limits	Miles	Improvements	Staging
WS-IC-1	Interstate 5 @ SR 531	@ Interchange	0.00	Widen Overpass to 5/6 lanes	2015
WS-2	SR 9	Scholman Road to 256th Street NE	1.98	Widen to provide 12-foot lanes and 4-foot shoulders. Realign 2 existing curves.	2015
WS-14	Interstate 5	Marine View Dr to SR 526	5.51	Construct HOV lanes from SR 526 to Marine View Dr. & auxiliary lanes between 41st St & US 2. Move Broadway off-ramp to right side.	2015
WS-IC-3	Interstate 5 @ 41st Street SE	@ Interchange	0.00	Interchange Reconstruction including widening I-5 overpass to 5 lanes	2015
WS-IC-7	SR 525 @ 164th Street SW undercrossing	@ Interchange	0.00	HOV direct access ramp at 164th St. SW	2015
WS-19	SR 527	132nd Street SE to 112th Street SE	1.47	Widen to 5 Lanes	2015
WS-22	SR 522	Paradise Lake Road to Snohomish River	3.90	Widen to 4-lane divided highway, w/ 2 interchanges. Provide third WB auxiliary lane on uphill grades.	2015
WS-IC-5	Interstate 5 @ State Route 525	@ Interchange	0.00	Construct missing ramp connection from SB I-5 to WB SR 525	2015
WS-23	SR 104	Ferry Terminal to Pine Street I/S	0.63	Align SR 104 to proposed ferry terminal location.	2015
JP-8b	SR 524	9th Avenue SE to SR 527	0.60	Urban 5-Lane Standards	2015
WS-24	SR 99	244th Street SW to SR 104 I/C	0.17	Widen SR 99 bridge over SR 104 to 7 Lanes.	2015
WS-26	SR 527	228th Street SE to 240th Street SE	0.72	Widen remaining portion to 5-Lanes	2015
WS-6	SR 9	Intersections from SR 92 to SR 530	0.0	Improve three intersections at SR 528, 84th Street NE and SR 531 to eliminate choke points. Additional turn lanes and channelization will be added at each intersection.	2015
WS-4	SR 531	43rd Avenue NE to 67th Avenue NE	1.47	Widen to 5 lanes	2025
WS-8	Interstate 5	Marine View Drive to SR 528	4.77	Add HOV Lanes	2025
WS-12	SR 522	Snohomish River to US 2	4.18	Widen to 4 lane divided highway. New bridge over Snohomish River.	2025

Project Number	Name	Limits	Miles	Improvements	Staging
WS-IC-2	Interstate 5 @ US 2	@ Interchange	0.00	Interchange Improvement including Everett Arterial Access Improvements. Part of WS-11 above.	2025
WS-18	SR 96	I-5 to Seattle Hill Road	3.28	Transit Enhancements.	2025
WS-21	SR 9	SR 522 to 176th Street SE	4.03	Widen to 5 lanes with access management provisions that include: limiting signal spacing to 1 mile or greater, no new signalized intersections, raised median treatments and limitations on driveway and private road access .	2025
WS-IC-6	Interstate 5 @ State Route 524	@ Interchange	1.38	Interchange improvement. Construct NB & SB collector/distributor lanes along I-5.	2025
JP-8a	SR-524	24th Avenue W to 9th Avenue SE	2.93	Urban 5-Lane Standards	2025
WS-10	SR 204	US 2 to SR 9	2.35	WB peak period HOV lane	2025
WS-9	SR 9	176th Street SE to SR 92	13.46	Widen to 4/5 lanes with access control as needed. Intersection improvements at 132nd St SE, Marsh Rd, US 2, 20th St SE, SR 204, Lundeen Park Way, SR 96, & SR 92. Use other access management provisions that include: limiting signal spacing to 1 mile or gre	2025
WS-IC-4	Interstate 5 @ 128th Street SW	@ Interchange	0.00	WB SR 96 to SB I-5 fly-over ramp & NB I-5 to WB 128th St fly-over ramp	2025
WS-17	SR 99	148th Street SW to Airport Road (Everett C/L)	2.06	Widen to 6/7 lanes for HOV. Access management. Signal coordination	2025
WS-7	SR 529	Interstate 5 to 1st Street NW (Marysville)	0.70	Widen to 4 with HOV lanes, including 4-lane bridge over Ebey Slough	2025
WS-5	SR 531	67th Avenue NE to SR 9	1.29	Widen to 5 lanes	2025
WS-1	SR 532	Island County Line to Interstate 5	7.18	Improve & consolidate access points, improve channelization at various intersections, new signals & signal timing, bridge retrofit, & expansion of I-5 park & ride lot	2025

Project Number	Name	Limits	Miles	Improvements	Staging
WS-3	US 2	City of Sultan (WCL) to City of Sultan (ECL)	3.02	Widen to 5 lanes through Sultan city limits. Replace bridges over Sultan River and Sultan Mill pond.	2025
WS-13	US 2	City of Gold Bar (WCL) to City of Gold Bar (ECL)	2.88	Capacity and operations improvements.	2025
WS-11	US 2	I-5 to SR 204	2.71	Widen to 3 lanes in eastbound direction. Modify I/C at I-5/US 2 & US 2/SR 204	2025 EB Only

Appendix D. Trip Generation

AM Peak Hour

Land Use A: Residential	ITE Code	Unit Type	Units	Average Rate	R^2	Fitted Curve Eq.	Total Trips	Entering	Exiting	Trips Entering	Trips Exiting
Residential Condominium/Townhouse	230	dwelling units	3220	0.44	0.76	Ln(T) = 0.80Ln(X) + 0.26	830	17%	83%	141	689
Total			3220				830			141	689

Land Use B: Office	ITE Code	Unit Type	Units	Average Rate	R^2	Fitted Curve Eq.	Total Trips	Entering	Exiting	Trips Entering	Trips Exiting
General Office Building	710	employees	528	0.48	0.88	Ln(T) = 0.86Ln(X) + 0.24	279	88%	12%	246	33
Total			528				279			246	33

Land Use C: Commercial	ITE Code	Unit Type	Units	Average Rate	R^2	Fitted Curve Eq.	Total Trips	Entering	Exiting	Trips Entering	Trips Exiting
Specialty Retail Center	815	1000 sq. ft.	136	1.03	0.52	Ln(T) = 0.60Ln(X) + 2.29	140	61%	39%	85	55
Total			136				140			85	55

If r2 >= 0.75 use fitted curve equation.
If fitted curve beta value is above 10, then use average rate below intersection point between avg rate and equation.

Source: Institute of Transportation Engineers, *Trip Generation* (7th Edition)

FEHR & PEERS
Mirai

Analyst: Fehr & Peers / Mirai

Date: 12/1/2008

Multi-Use Development Trip Generation and Internal Capture Summary

Development: Point Wells

Time Period: AM Peak Hour

[redacted]

[redacted]	Land Use A: Residential		
	Total	Internal	External
[redacted]	141	7	134
[redacted]	689	8	681
Total	830	14	816
%	100%	2%	98%

[redacted]

Demand 0% 0

2% 3 Demand

Demand 42% 289

31% 44 Demand

Balanced 0

1 Balanced

Balanced 8

6 Balanced

Demand 0% 0

2% 1 Demand

Demand 9% 8

11% 6 Demand

Land Use B: Office			
	Total	Internal	External
Enter	246	2	244
Exit	33	2	31
Total	279	4	0
%	100%	2%	0%

Demand 31% 76

Balanced 2

Demand 3% 2

23% 8 Demand

2 Balanced

2% 2 Demand

Land Use C: Commercial			
	Total	Internal	External
Enter	85	9	76
Exit	55	8	47
Total	140	17	123
%	100%	12%	88%

Internal Trips			
	enter	exit	total
Land Use A: Residential	7	8	14
Land Use B: Office	2	2	4
Land Use C: Commercial	9	8	17
TOTAL	18	18	36
Internal Capture			2.9%

Source: Institute of Transportation Engineers, *Trip Generation Handbook*

AM Peak Hour

Land Use A: Residential and Senior Housing	Starting Entering Trips	Starting Exiting Trips	External Entering Trips	External Exiting Trips	Ped/bike Red	Adjusted Entering Trips	Adjusted Exiting Trips	Pass-by Rate	Passby Trips	Final Trips Entering	Final Trips Exiting	Percent reduction
Residential Condominium/Townhouse	141	689	134	681	10%	121	613	0%	0	121	613	
Total	141	689	134 OK	681 OK		121	613			121	613	12%

Land Use B: Office	Starting Entering Trips	Starting Exiting Trips	External Entering Trips	External Exiting Trips	Ped/bike Red	Adjusted Entering Trips	Adjusted Exiting Trips	Pass-by Rate	Passby Trips	Final Trips Entering	Final Trips Exiting	
General Office Building	246	33	244	31	10%	220	28	0%	0	220	28	
Total	246	33	244 OK	31 OK		220	28			220	28	11%

Land Use C: Commercial	Starting Entering Trips	Starting Exiting Trips	External Entering Trips	External Exiting Trips	Ped/bike Red	Adjusted Entering Trips	Adjusted Exiting Trips	Pass-by Rate	Passby Trips	Final Trips Entering	Final Trips Exiting	
Specialty Retail Center	85	55	76	47	10%	68	42	34%	37	49	23	
Total	85	55	76 OK	47 OK		68	42			49	23	21%
	472	777	454	759		409	683			390	664	

10% Ped/Bike reflects assumed non-motorized trips.

Source: Institute of Transportation Engineers, *Trip Generation Handbook*

FEHR & PEERS
Mirai

PM Peak Hour

Land Use A: Residential	ITE Code	Unit Type	Units	Average Rate	R^2	Fitted Curve Eq.	Total Trips	Entering	Exiting	Trips Entering	Trips Exiting
Residential Condominium/Townhouse	230	dwelling units	3220	0.52	0.80	Ln(T) = 0.82Ln(X) + 0.32	1036	67%	33%	694	342
Total			3220				1036			694	342

Land Use B: Office	ITE Code	Unit Type	Units	Average Rate	R^2	Fitted Curve Eq.	Total Trips	Entering	Exiting	Trips Entering	Trips Exiting
General Office Building	710	employees	528	0.46	0.84	T = 0.37(X) +60.08	243	17%	83%	41	202
Total			528				243			41	202

Land Use C: Commercial	ITE Code	Unit Type	Units	Average Rate	R^2	Fitted Curve Eq.	Total Trips	Entering	Exiting	Trips Entering	Trips Exiting
Specialty Retail Center	814	1000 sq. ft.	136	2.71	0.98	T = 2.40(X) + 21.48	348	44%	56%	153	195
Total			136				348			153	195

If fitted curve beta value is above 10, then use average rate below intersection point between avg rate and equation.

Source: Institute of Transportation Engineers, *Trip Generation* (7th Edition)

Analyst: Fehr & Peers / Mirai

Date: 12/1/2008

Multi-Use Development Trip Generation and Internal Capture Summary

Development: Point Wells

Time Period: PM Peak Hour

[redacted]

[redacted]		
[redacted]	[redacted]	External
[redacted]	[redacted]	669
[redacted]	[redacted]	328
[redacted]	[redacted]	997
[redacted]	[redacted]	96%

Demand 0% 0

[redacted] Demand

Balanced [redacted]

Demand 0% 0

4 Balanced

2% 4 Demand

Demand 42% 144

Balanced 14

Demand 9% 14

31% 215 Demand

21 Balanced

11% 21 Demand

Land Use B: Office			
	Total	Internal	External
Enter	41	6	35
Exit	202	7	195
Total	243	13	0
%	100%	5%	0%

Demand 31% 13 — Balanced 6 — Demand 3% 6

23% 46 Demand — 3 Balanced — 2% 3 Demand

Land Use C: Commercial			
	Total	Internal	External
Enter	153	17	136
Exit	195	27	168
Total	348	44	304
%	100%	13%	87%

Internal Trips	enter	exit	total
Land Use A: Residential	25	14	39
Land Use B: Office	6	7	13
Land Use C: Commercial	17	27	44
TOTAL	48	48	96
Internal Capture			5.9%

Source: Institute of Transportation Engineers, *Trip Generation Handbook*

PM Peak Hour

Land Use A: Residential and Senior Housing	Starting Entering Trips	Starting Exiting Trips	External Entering Trips	External Exiting Trips	Ped/bike Red	Adjusted Entering Trips	Adjusted Exiting Trips	Pass-by Rate	Passby Trips	Final Trips Entering	Final Trips Exiting	Percent reduction
Residential Condominium/Townhouse	694	342	669	328	10%	602	295	0%	0	602	295	
Total	694	342	669 OK	328 OK		602	295			602	295	13%

Land Use B: Office	Starting Entering Trips	Starting Exiting Trips	External Entering Trips	External Exiting Trips	Ped/bike Red	Adjusted Entering Trips	Adjusted Exiting Trips	Pass-by Rate	Passby Trips	Final Trips Entering	Final Trips Exiting	
General Office Building	41	202	35	195	10%	32	176	0%	0	32	176	
Total	41	202	35 OK	195 OK		32	176			32	176	14%

Land Use C: Commercial	Starting Entering Trips	Starting Exiting Trips	External Entering Trips	External Exiting Trips	Ped/bike Red	Adjusted Entering Trips	Adjusted Exiting Trips	Pass-by Rate	Passby Trips	Final Trips Entering	Final Trips Exiting	
Specialty Retail Center	153	195	136	168	10%	122	151	34%	93	75	104	
Total	153	195	136 OK	168 OK		122	151			75	104	22%
	888	739	840	691		756	622			709	575	

10% Ped/Bike reflects assumed non-motorized trips.

Source: Institute of Transportation Engineers, *Trip Generation Handbook*

Daily Trips

Land Use A: Residential and Senior Housing	ITE Code	Unit Type	Units	Average Rate	R^2	Fitted Curve Eq.	Total Trips	Entering	Exiting	Trips Entering	Trips Exiting
Residential Condominium/Townhouse	230	dwelling units	3220	5.86	0.83	Ln(T) = 0.85Ln(X) + 2.55	12278	50%	50%	6139	6139
Total			3220				12278			6139	6139

Land Use B: Office	ITE Code	Unit Type	Units	Average Rate	R^2	Fitted Curve Eq.	Total Trips	Entering	Exiting	Trips Entering	Trips Exiting
General Office Building	710	employees	528	3.32	0.88	Ln(T) = 0.84Ln(X) + 2.23	1801	50%	50%	901	900
Total			528				1801			901	900

Land Use C: Commercial	ITE Code	Unit Type	Units	Average Rate	R^2	Fitted Curve Eq.	Total Trips	Entering	Exiting	Trips Entering	Trips Exiting
Specialty Retail Center	814	1000 sq. ft.	136	44.32	0.69	T = 42.78(X) + 37.66	6028	50%	50%	3014	3014
Total			136				6028			3014	3014

If r2 >= 0.75 use fitted curve equation.
If fitted curve beta value is above 10, then use average rate below intersection point between avg rate and equation.

Daily

Land Use A: Resdiential	Trip Gen Trips	External Trips	Winslow Ped/bike Red	Adj Trips	Pass-by Rate	Adj Trips	Entering	Exiting	Trips Entering	Trips Exiting
Residential Condominium/Townhouse	12278	11735	25%	8801	0%	8801	50%	50%	4401	4401
Total	12278	11735		8801		8801			4401	4401
		OK								

Land Use B: Office	Trip Gen Trips	External Trips	Winslow Ped/bike Red	Adj Trips	Pass-by Rate		Entering	Exiting	Trips Entering	Trips Exiting
Single Family Detached Housing	1801	1621	25%	1216	0%	1216	50%	50%	608	608
Total	1801	1621		1216		1216			608	608
		0								

Land Use C: Commercial	Total Trips	External Trips	Winslow Ped/bike Red	Adj Trips	Pass-by Rate	Adj Trips	Entering	Exiting	Trips Entering	Trips Exiting
Specialty Retail Center	6028	5244	25%	3933	34%	2596	50%	50%	1298	1298
Total	6028	5244		3933		2596			1298	1298
		OK								
	20107	18600		13950		12613			6307	6307

10% Ped/Bike reflects assumed non-motorized trips.

Appendix F

Transportation Cost Estimates

Snohomish County Docket XIII
Paramount Subarea 17-Nov-08
Project Cost Estimates

No.	Intersection	No Action Improvement	Action Improvement	No Action Costs	Action Costs
1	244th Street SW and SR 99	Restripe northbound right-turn lane to through-right lane. Add a southbound through lane, a southbound right-turn lane, a 2nd eastbound left-turn lane, and a westbound right-turn lane.		$3,447,500	
2	244th Street SW and Fremont Avenue N	Install a signal.		$580,000	
3	Firdale Avenue N and 244th Street SW				
4	244th Street SW and 100th Avenue W	Install all-way stop-control. Add northbound and southbound through lanes.	No Action improvement and Install a signal.	$3,605,000	$580,000
5	SR 104 and 100th Avenue W	Add a northbound through lane, an eastbound right-turn lane, and a 2nd westbound left-turn lane.	No Action improvement and add a westbound right-turn lane.	$1,587,500	$500,000
6	Algonquin Road and Woodway Park Road	Install all-way stop-control.	No Action improvement and add a northbound through lane.	$5,000	$1,800,000
7	238th Street SW and Woodway Park Road				
8	NW 196th Street and Richmond Beach Drive				
9	NW 196th Street and 20th Avenue NW		Install a signal and add eastbound and westbound left-turn lanes.		$2,030,000
10	NW 195th Street and 15th Avenue NW (w)		Install a signal and coordinate with intersection below.		$580,000
11	Richmond Beach Road and 15th Avenue NW (e)		Install a signal and coordinate with intersection above.		$580,000
12	Richmond Beach Road and 8th Avenue NW		Add a southbound right-turn lane, a 2nd eastbound left-turn lane, and northbound right-turn lane.		$2,087,500
13	Richmond Beach Road and 3rd Avenue NW				
14	Richmond Beach Road and Dayton Avenue N				
15	N 185th Street and Fremont Avenue N				
16	N 185th Street and SR 99	Add eastbound and westbound left-turn lanes, an eastbound right-turn lane, and a 2nd southbound left-turn lane. Change signal phasing to provide protected left-turn phases for eastbound and westbound approaches.	No Action improvement and add a westbound right-turn lane.	$2,912,500	$500,000
17	N 175th Street and 6th Avenue NW	Install a signal.		$580,000	
18	St Luke Place N and Dayton Avenue N				
19	N 175th Street and Fremont Avenue N				
20	N 175th Street and SR 99	Add a 2nd westbound left-turn lane. Change signal phasing to provide protected left-turn phases for eastbound and westbound approaches.		$1,087,500	
21	Carlyle Hall Road and Dayton Avenue N	Install a signal.		$580,000	
22	N Innis Arden Way and Greenwood Avenue N		Install a signal and add northbound left-turn lane. Coordinate with intersection below.		$1,667,500
23	N 160th Street and Greenwood Avenue N	Add a southbound left-turn lane.	No Action improvement and Install a signal. Coordinate with intersection above.	$725,000	$580,000
	Richmond Beach Road, between Richmond Beach Drive and 24th Avenue NW		Widen from two lanes to four lanes		$2,050,000
	NW 190th Street, between NW Richmond Beach Road and 8th Avenue NW		Install traffic calming devices		$200,000
			Total Costs	**$15,110,000**	**$13,155,000**

Snohomish County Docket
Paramount
Project Cost Estimate

Name: Signal   ID Number:
From: To:
Project Description:
Assume a standard signal installation. Assume curb and gutters are in place and some sidewalk work will be required.

Description	Quantity	Unit	Unit Cost	Adj. Factor	Total
Mobilization	1	LS	8%	1	$ 20,928
Traffic Control	1	LS	7%	1	$ 18,312
Miscellaneous	1	LS	5%	1	$ 13,080
Erosion Control	1	LS	0.5%	1	$ 1,308
Trimming and Cleanup	1	LS	0.5%	1	$ 1,308
Construction Surveying	1	LS	1%	1	$ 2,616
Clearing & Grubbing	1	LF	$ 10	1	$ 10
Pavement Removal	200	SY	$ 10	1	$ 2,000
Excavation	0	CY	$ 25	1	$ -
Embankment	0	CY	$ 5	1	$ -
Borrow	0	TN	$ 25	1	$ -
Storm Drainage - New		LF	$ 60	1	$ -
Storm Drainage - Modify	200	LF	$ 40	1	$ 8,000
Storm Drainage - Flow Control	0	SY	$ 12	1	$ -
Storm Drainage - Water Quality	0	SY	$ 8	1	$ -
Crushed Surfacing Base Course	0	TN	$ 25	1	$ -
Hot Mix Asphalt, Cl. 1/2" PG 64-22	0	TN	$ 75	1	$ -
Traffic Signal	1	EA	$ 250,000	1	$ 250,000
Illumination (250' Spacing)		EA	$ 10,000	1	$ -
Decorative Illumination (150' Spacing)	0	EA	$ 15,000	1	$ -
Rock Wall	0	SF	$ 20	1	$ -
Modular Block Wall w/ Geogrid	0	SF	$ 45	1	$ -
Soldier Pile Wall w/ Timber Lagging	0	SF	$ 80	1	$ -
Curb and Gutter		LF	$ 22	1	$ -
Sidewalk		SY	$ 40	1	$ -
Signing and Striping	200	LF	$ 8	1	$ 1,600
Planting	0	SF	$ 8	1	$ -
Irrigation	0	SF	$ 3	1	$ -
Guardrail		LF	$ 40	1	$ -
Fence		LF	$ 35	1	$ -
Handrail		LF	$ 80	1	$ -
Special Features					
Utility Undergrounding		LF	$ 150	1	$ -
Bridge		SF	$ 180	1	$ -
Mitigation		LS	$ 5,000	1	$ -
					$ 261,600
SUBTOTAL					$ 319,162
Multi-Year Escalation - Construction		YR	5%		$ -
Sales Tax	0	LS	8.9%		$ -
Design Contingency			15%		$ 47,874
Construction Contingency			25%		$ 79,791
SUBTOTAL - Construction Costs					*$ 446,827*
Right-of-Way - Acquisition Cost		EA	$ 5,000	1	$ -
Right-of-Way - Land Value		SF	$ 5	1	$ -
Multi-Year Escalation - Land Value	0	YR	12%		$ -
SUBTOTAL - Right of Way Costs					*$* -
Impact Fees	0	LS	$ -		$ -
Permitting		LS	15%		$ -
Engineering Design			15%		$ 67,024
Engineering Construction			10%		$ 44,683
General Administration (City)			5%		$ 22,341
TOTAL PROJECT COST					***$ 580,875***

Snohomish County Docket
Paramount
Project Cost Estimate

Name: Left Turn Pocket with Right of Way ID Number:
From: To:

Project Description:
Construct a 12 foot wide left turn pocket for 200 feet with 180 feet of taper leadning into the pocket. Assumeright of way acquisition will be required. Assumes existing condition inlcudes curb, gutter and sidewalk. Assume at least two signal poles will need to be revised.

Description	Quantity	Unit	Unit Cost	Adj. Factor	Total
Mobilization	1	LS	8%	1	$ 19,341
Traffic Control	1	LS	7%	1	$ 16,923
Miscellaneous	1	LS	5%	1	$ 12,088
Erosion Control	1	LS	0.5%	1	$ 1,209
Trimming and Cleanup	1	LS	0.5%	1	$ 1,209
Construction Surveying	1	LS	1%	1	$ 2,418
Clearing & Grubbing	1	LF	$ 10	1	$ 10
Pavement Removal	400	SY	$ 10	1	$ 4,000
Excavation	0	CY	$ 25	1	$ -
Embankment	0	CY	$ 5	1	$ -
Borrow	0	TN	$ 25	1	$ -
Storm Drainage - New		LF	$ 60	1	$ -
Storm Drainage - Modify	200	LF	$ 40	1	$ 8,000
Storm Drainage - Flow Control	390	SY	$ 12	1	$ 4,680
Storm Drainage - Water Quality	390	SY	$ 8	1	$ 3,120
Crushed Surfacing Base Course	300	TN	$ 25	1	$ 7,500
Hot Mix Asphalt, Cl. 1/2" PG 64-22	300	TN	$ 75	1	$ 22,500
Traffic Signal	0.5	EA	$ 250,000	1	$ 125,000
Illumination (250' Spacing)	2	EA	$ 10,000	1	$ 20,000
Decorative Illumination (150' Spacing)	0	EA	$ 15,000	1	$ -
Rock Wall	0	SF	$ 20	1	$ -
Modular Block Wall w/ Geogrid	0	SF	$ 45	1	$ -
Soldier Pile Wall w/ Timber Lagging	0	SF	$ 80	1	$ -
Curb and Gutter	760	LF	$ 22	1	$ 16,720
Sidewalk	680	SY	$ 40	1	$ 27,200
Signing and Striping	380	LF	$ 8	1	$ 3,040
Planting	0	SF	$ 8	1	$ -
Irrigation	0	SF	$ 3	1	$ -
Guardrail		LF	$ 40	1	$ -
Fence		LF	$ 35	1	$ -
Handrail		LF	$ 80	1	$ -
Special Features					
Utility Undergrounding		LF	$ 150	1	$ -
Bridge		SF	$ 180	1	$ -
Mitigation		LS	$ 5,000	1	$ -
					$ 241,760
SUBTOTAL					$ 294,957
Multi-Year Escalation - Construction		YR	5%		$ -
Sales Tax	0	LS	8.9%		$ -
Design Contingency			15%		$ 44,244
Construction Contingency			25%		$ 73,739
SUBTOTAL - Construction Costs					*$ 412,940*
Right-of-Way - Acquisition Cost	8	EA	$ 5,000	1	$ 40,000
Right-of-Way - Land Value	3480	SF	$ 25	1	$ 87,000
Multi-Year Escalation - Land Value	0	YR	12%		$ -
SUBTOTAL - Right of Way Costs					*$ 127,000*
Impact Fees	0	LS	$ -		$ -
Permitting	1	LS	15%		$ 61,941
Engineering Design			15%		$ 61,941
Engineering Construction			10%		$ 41,294
General Administration (City)			5%		$ 20,647
TOTAL PROJECT COST					***$ 725,763***

Snohomish County Docket
Paramount
Project Cost Estimate

Name: Left Turn Pocket No Right of Way ID Number:
From: To:

Project Description:
Construct a 12 foot wide left turn pocket for 200 feet with 180 feet of taper leadning into the pocket. Assume no right of way is required. Assumes existing condition inlcudes curb, gutter and sidewalk. Assume at least two signal poles will need to be revised.

Description	Quantity	Unit		Unit Cost	Adj. Factor		Total
Mobilization	1	LS		8%	1	$	19,341
Traffic Control	1	LS		7%	1	$	16,923
Miscellaneous	1	LS		5%	1	$	12,088
Erosion Control	1	LS		0.5%	1	$	1,209
Trimming and Cleanup	1	LS		0.5%	1	$	1,209
Construction Surveying	1	LS		1%	1	$	2,418
Clearing & Grubbing	1	LF	$	10	1	$	10
Pavement Removal	400	SY	$	10	1	$	4,000
Excavation	0	CY	$	25	1	$	-
Embankment	0	CY	$	5	1	$	-
Borrow	0	TN	$	25	1	$	-
Storm Drainage - New		LF	$	60	1	$	-
Storm Drainage - Modify	200	LF	$	40	1	$	8,000
Storm Drainage - Flow Control	390	SY	$	12	1	$	4,680
Storm Drainage - Water Quality	390	SY	$	8	1	$	3,120
Crushed Surfacing Base Course	300	TN	$	25	1	$	7,500
Hot Mix Asphalt, Cl. 1/2" PG 64-22	300	TN	$	75	1	$	22,500
Traffic Signal	0.5	EA	$	250,000	1	$	125,000
Illumination (250' Spacing)	2	EA	$	10,000	1	$	20,000
Decorative Illumination (150' Spacing)	0	EA	$	15,000	1	$	-
Rock Wall	0	SF	$	20	1	$	-
Modular Block Wall w/ Geogrid	0	SF	$	45	1	$	-
Soldier Pile Wall w/ Timber Lagging	0	SF	$	80	1	$	-
Curb and Gutter	760	LF	$	22	1	$	16,720
Sidewalk	680	SY	$	40	1	$	27,200
Signing and Striping	380	LF	$	8	1	$	3,040
Planting	0	SF	$	8	1	$	-
Irrigation	0	SF	$	3	1	$	-
Guardrail		LF	$	40	1	$	-
Fence		LF	$	35	1	$	-
Handrail		LF	$	80	1	$	-
Special Features							
Utility Undergrounding		LF	$	150	1	$	-
Bridge		SF	$	180	1	$	-
Mitigation		LS	$	5,000	1	$	-
						$	241,760
SUBTOTAL						$	294,957
Multi-Year Escalation - Construction		YR		5%		$	-
Sales Tax	0	LS		8.9%		$	-
Design Contingency				15%		$	44,244
Construction Contingency				25%		$	73,739
SUBTOTAL - Construction Costs						*$*	*412,940*
Right-of-Way - Acquisition Cost	0	EA	$	5,000	1	$	-
Right-of-Way - Land Value	0	SF	$	25	1	$	-
Multi-Year Escalation - Land Value	0	YR		12%		$	-
SUBTOTAL - Right of Way Costs						*$*	-
Impact Fees	0	LS	$	-		$	-
Permitting	1	LS		15%		$	61,941
Engineering Design				15%		$	61,941
Engineering Construction				10%		$	41,294
General Administration (City)				5%		$	20,647
TOTAL PROJECT COST						***$***	***598,763***

Snohomish County Docket Paramount
Project Cost Estimate

Name: Through Lane With Right of Way   ID Number:
From: To:
Project Description:
Countruct thrugh lane beginning 500 feet prior to the intersection and extending 800 feet beyond the intersection. Assume that right of way will need to be acquired and that widening will be for a 12 foot wide lane. Assume at least two signal poles will need to be relocated.

Description	Quantity	Unit	Unit Cost	Adj. Factor	Total
Mobilization	1	LS	8%	1	$ 44,058
Traffic Control	1	LS	7%	1	$ 38,550
Miscellaneous	1	LS	5%	1	$ 27,536
Erosion Control	1	LS	0.5%	1	$ 2,754
Trimming and Cleanup	1	LS	0.5%	1	$ 2,754
Construction Surveying	1	LS	1%	1	$ 5,507
Clearing & Grubbing	1	LF	$ 10	1	$ 10
Pavement Removal	1800	SY	$ 10	1	$ 18,000
Excavation	1200	CY	$ 25	1	$ 30,000
Embankment	0	CY	$ 5	1	$ -
Borrow	0	TN	$ 25	1	$ -
Storm Drainage - New		LF	$ 60	1	$ -
Storm Drainage - Modify	200	LF	$ 40	1	$ 8,000
Storm Drainage - Flow Control	0	SY	$ 12	1	$ -
Storm Drainage - Water Quality	1740	SY	$ 8	1	$ 13,920
Crushed Surfacing Base Course	1300	TN	$ 25	1	$ 32,500
Hot Mix Asphalt, Cl. 1/2" PG 64-22	1400	TN	$ 75	1	$ 105,000
Traffic Signal	0.5	EA	$ 250,000	1	$ 125,000
Illumination (250' Spacing)	9	EA	$ 10,000	1	$ 90,000
Decorative Illumination (150' Spacing)	0	EA	$ 15,000	1	$ -
Rock Wall	0	SF	$ 20	1	$ -
Modular Block Wall w/ Geogrid	0	SF	$ 45	1	$ -
Soldier Pile Wall w/ Timber Lagging	0	SF	$ 80	1	$ -
Curb and Gutter	1300	LF	$ 22	1	$ 28,600
Sidewalk	1160	SY	$ 40	1	$ 46,400
Signing and Striping	1300	LF	$ 8	1	$ 10,400
Planting	3900	SF	$ 8	1	$ 31,200
Irrigation	3900	SF	$ 3	1	$ 11,700
Guardrail		LF	$ 40	1	$ -
Fence		LF	$ 35	1	$ -
Handrail		LF	$ 80	1	$ -
Special Features					
Utility Undergrounding		LF	$ 150	1	$ -
Bridge		SF	$ 180	1	$ -
Mitigation		LS	$ 5,000	1	$ -
					$ 550,720
SUBTOTAL					$ 671,888
Multi-Year Escalation - Construction		YR	5%		$ -
Sales Tax	0	LS	8.9%		$ -
Design Contingency			15%		$ 100,783
Construction Contingency			25%		$ 167,972
SUBTOTAL - Construction Costs					*$ 940,644*
Right-of-Way - Acquisition Cost	10	EA	$ 5,000	1	$ 50,000
Right-of-Way - Land Value	15600	SF	$ 25	1	$ 390,000
Multi-Year Escalation - Land Value	0	YR	12%		$ -
SUBTOTAL - Right of Way Costs					*$ 440,000*
Impact Fees	0	LS	$ -		$ -
Permitting	1	LS	15%		$ 141,097
Engineering Design			15%		$ 141,097
Engineering Construction			10%		$ 94,064
General Administration (City)			5%		$ 47,032
TOTAL PROJECT COST					***$ 1,803,933***

Snohomish County Docket
Paramount
Project Cost Estimate

Name: Through Lane No Right of Way   ID Number:
From: To:
Project Description:
Countruct thrugh lane beginning 500 feet prior to the intersection and extending 800 feet beyond the intersection. Assume no right of way will be required and that widening will be for a 12 foot wide lane. Assume at least two signal poles will need to be relocated.

Description	Quantity	Unit	Unit Cost	Adj. Factor	Total
Mobilization	1	LS	8%	1	$ 44,058
Traffic Control	1	LS	7%	1	$ 38,550
Miscellaneous	1	LS	5%	1	$ 27,536
Erosion Control	1	LS	0.5%	1	$ 2,754
Trimming and Cleanup	1	LS	0.5%	1	$ 2,754
Construction Surveying	1	LS	1%	1	$ 5,507
Clearing & Grubbing	1	LF	$ 10	1	$ 10
Pavement Removal	1800	SY	$ 10	1	$ 18,000
Excavation	1200	CY	$ 25	1	$ 30,000
Embankment	0	CY	$ 5	1	$ -
Borrow	0	TN	$ 25	1	$ -
Storm Drainage - New		LF	$ 60	1	$ -
Storm Drainage - Modify	200	LF	$ 40	1	$ 8,000
Storm Drainage - Flow Control	0	SY	$ 12	1	$ -
Storm Drainage - Water Quality	1740	SY	$ 8	1	$ 13,920
Crushed Surfacing Base Course	1300	TN	$ 25	1	$ 32,500
Hot Mix Asphalt, Cl. 1/2" PG 64-22	1400	TN	$ 75	1	$ 105,000
Traffic Signal	0.5	EA	$ 250,000	1	$ 125,000
Illumination (250' Spacing)	9	EA	$ 10,000	1	$ 90,000
Decorative Illumination (150' Spacing)	0	EA	$ 15,000	1	$ -
Rock Wall	0	SF	$ 20	1	$ -
Modular Block Wall w/ Geogrid	0	SF	$ 45	1	$ -
Soldier Pile Wall w/ Timber Lagging	0	SF	$ 80	1	$ -
Curb and Gutter	1300	LF	$ 22	1	$ 28,600
Sidewalk	1160	SY	$ 40	1	$ 46,400
Signing and Striping	1300	LF	$ 8	1	$ 10,400
Planting	3900	SF	$ 8	1	$ 31,200
Irrigation	3900	SF	$ 3	1	$ 11,700
Guardrail		LF	$ 40	1	$ -
Fence		LF	$ 35	1	$ -
Handrail		LF	$ 80	1	$ -
Special Features					
Utility Undergrounding		LF	$ 150	1	$ -
Bridge		SF	$ 180	1	$ -
Mitigation		LS	$ 5,000	1	$ -
					$ 550,720
SUBTOTAL					$ 671,888
Multi-Year Escalation - Construction		YR	5%		$ -
Sales Tax	0	LS	8.9%		$ -
Design Contingency			15%		$ 100,783
Construction Contingency			25%		$ 167,972
SUBTOTAL - Construction Costs					*$ 940,644*
Right-of-Way - Acquisition Cost	0	EA	$ 5,000	1	$ -
Right-of-Way - Land Value	0	SF	$ 25	1	$ -
Multi-Year Escalation - Land Value	0	YR	12%		$ -
SUBTOTAL - Right of Way Costs					*$ -*
Impact Fees	0	LS	$ -		$ -
Permitting	1	LS	15%		$ 141,097
Engineering Design			15%		$ 141,097
Engineering Construction			10%		$ 94,064
General Administration (City)			5%		$ 47,032
TOTAL PROJECT COST					***$ 1,363,933***

Snohomish County Docket
Paramount
Project Cost Estimate

Name: Right Turn Pocket with Right of Way ID Number:

From: To:

Project Description:

Assumes a 200 foot right turn pocket with 90 feet of taper into the pocket. Assumes right of way will be required and one signal pole will need to be relocated.

Description	Quantity	Unit	Unit Cost	Adj. Factor	Total
Mobilization	1	LS	8%	1	$ 12,827
Traffic Control	1	LS	7%	1	$ 11,224
Miscellaneous	1	LS	5%	1	$ 8,017
Erosion Control	1	LS	0.5%	1	$ 802
Trimming and Cleanup	1	LS	0.5%	1	$ 802
Construction Surveying	1	LS	1%	1	$ 1,603
Clearing & Grubbing	1	LF	$ 10	1	$ 10
Pavement Removal	400	SY	$ 10	1	$ 4,000
Excavation	0	CY	$ 25	1	$ -
Embankment	0	CY	$ 5	1	$ -
Borrow	0	TN	$ 25	1	$ -
Storm Drainage - New		LF	$ 60	1	$ -
Storm Drainage - Modify	200	LF	$ 40	1	$ 8,000
Storm Drainage - Flow Control	320	SY	$ 12	1	$ 3,840
Storm Drainage - Water Quality	320	SY	$ 8	1	$ 2,560
Crushed Surfacing Base Course	300	TN	$ 25	1	$ 7,500
Hot Mix Asphalt, Cl. 1/2" PG 64-22	300	TN	$ 75	1	$ 22,500
Traffic Signal	0.25	EA	$ 250,000	1	$ 62,500
Illumination (250' Spacing)	2	EA	$ 10,000	1	$ 20,000
Decorative Illumination (150' Spacing)	0	EA	$ 15,000	1	$ -
Rock Wall	0	SF	$ 20	1	$ -
Modular Block Wall w/ Geogrid	0	SF	$ 45	1	$ -
Soldier Pile Wall w/ Timber Lagging	0	SF	$ 80	1	$ -
Curb and Gutter	760	LF	$ 22	1	$ 16,720
Sidewalk	260	SY	$ 40	1	$ 10,400
Signing and Striping	290	LF	$ 8	1	$ 2,320
Planting	0	SF	$ 8	1	$ -
Irrigation	0	SF	$ 3	1	$ -
Guardrail		LF	$ 40	1	$ -
Fence		LF	$ 35	1	$ -
Handrail		LF	$ 80	1	$ -
Special Features					
Utility Undergrounding		LF	$ 150	1	$ -
Bridge		SF	$ 180	1	$ -
Mitigation		LS	$ 5,000	1	$ -
					$ 160,340
SUBTOTAL					$ 195,625
Multi-Year Escalation - Construction		YR	5%		$ -
Sales Tax	0	LS	8.9%		$ -
Design Contingency			15%		$ 29,344
Construction Contingency			25%		$ 48,906
SUBTOTAL - Construction Costs					*$ 273,875*
Right-of-Way - Acquisition Cost	4	EA	$ 5,000	1	$ 20,000
Right-of-Way - Land Value	3480	SF	$ 25	1	$ 87,000
Multi-Year Escalation - Land Value	0	YR	12%		$ -
SUBTOTAL - Right of Way Costs					*$ 107,000*
Impact Fees	0	LS	$ -		$ -
Permitting	1	LS	15%		$ 41,081
Engineering Design			15%		$ 41,081
Engineering Construction			10%		$ 27,387
General Administration (City)			5%		$ 13,694
TOTAL PROJECT COST					***$ 504,118***

Snohomish County Docket Paramount
Project Cost Estimate

Name: NW 196th Street Wideing with Right of Way ID Number:
From: Richmond Beach Drive To: NW 24th Avenue
Project Description:
Widen NW 196th Street from 2 lanes to 4 lanes between Richmond Beach Drive and NW 24th Avenue for 900 feet. Assume that right of way will need to be acquired and that widening will be for a 12 foot wide lane. Assume at least two signal poles will need to be relocated.

Description	Quantity	Unit	Unit Cost	Adj. Factor	Total
Mobilization	1	LS	8%	1	$ 52,128
Traffic Control	1	LS	7%	1	$ 45,612
Miscellaneous	1	LS	5%	1	$ 32,580
Erosion Control	1	LS	0.5%	1	$ 3,258
Trimming and Cleanup	1	LS	0.5%	1	$ 3,258
Construction Surveying	1	LS	1%	1	$ 6,516
Clearing & Grubbing	1	LF	$ 10	1	$ 10
Pavement Removal	2400	SY	$ 10	1	$ 24,000
Excavation	1600	CY	$ 25	1	$ 40,000
Embankment	0	CY	$ 5	1	$ -
Borrow	0	TN	$ 25	1	$ -
Storm Drainage - New		LF	$ 60	1	$ -
Storm Drainage - Modify	200	LF	$ 40	1	$ 8,000
Storm Drainage - Flow Control	0	SY	$ 12	1	$ -
Storm Drainage - Water Quality	2400	SY	$ 8	1	$ 19,200
Crushed Surfacing Base Course	1800	TN	$ 25	1	$ 45,000
Hot Mix Asphalt, Cl. 1/2" PG 64-22	1900	TN	$ 75	1	$ 142,500
Traffic Signal	0.5	EA	$ 250,000	1	$ 125,000
Illumination (250' Spacing)	9	EA	$ 10,000	1	$ 90,000
Decorative Illumination (150' Spacing)	0	EA	$ 15,000	1	$ -
Rock Wall	0	SF	$ 20	1	$ -
Modular Block Wall w/ Geogrid	0	SF	$ 45	1	$ -
Soldier Pile Wall w/ Timber Lagging	0	SF	$ 80	1	$ -
Curb and Gutter	1300	LF	$ 22	1	$ 28,600
Sidewalk	1600	SY	$ 40	1	$ 64,000
Signing and Striping	1300	LF	$ 8	1	$ 10,400
Planting	5400	SF	$ 8	1	$ 43,200
Irrigation	3900	SF	$ 3	1	$ 11,700
Guardrail		LF	$ 40	1	$ -
Fence		LF	$ 35	1	$ -
Handrail		LF	$ 80	1	$ -
Special Features					
Utility Undergrounding		LF	$ 150	1	$ -
Bridge		SF	$ 180	1	$ -
Mitigation		LS	$ 5,000	1	$ -
					$ 651,600
SUBTOTAL					$ 794,962
Multi-Year Escalation - Construction		YR	5%		$ -
Sales Tax	0	LS	8.9%		$ -
Design Contingency			15%		$ 119,244
Construction Contingency			25%		$ 198,741
SUBTOTAL - Construction Costs					*$ 1,112,947*
Right-of-Way - Acquisition Cost	10	EA	$ 5,000	1	$ 50,000
Right-of-Way - Land Value	15600	SF	$ 25	1	$ 390,000
Multi-Year Escalation - Land Value	0	YR	12%		$ -
SUBTOTAL - Right of Way Costs					*$ 440,000*
Impact Fees	0	LS	$ -		$ -
Permitting	1	LS	15%		$ 166,942
Engineering Design			15%		$ 166,942
Engineering Construction			10%		$ 111,295
General Administration (City)			5%		$ 55,647
TOTAL PROJECT COST					***$ 2,053,773***