

*Southeast Transportation Study*  
Existing and 2030 Traffic Analysis



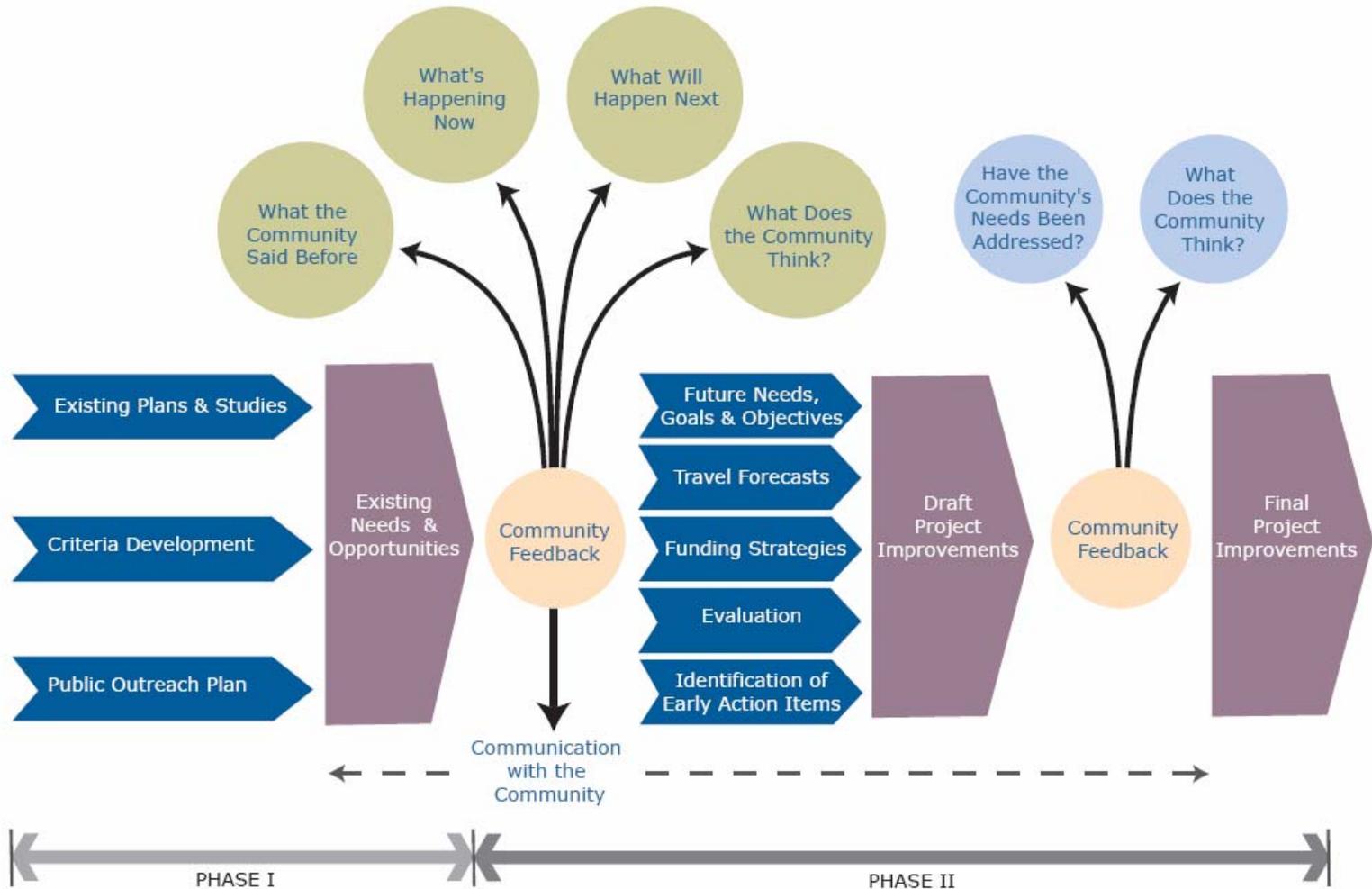
**Core Community Team Meeting**  
**November 8, 2006**

SDOT  
Underhill Company  
Mirai

# Main Topics

1. Background
  - Goals and Process
2. Existing Traffic Condition
3. Traffic Growth Projections
4. Levels of Service
5. Congested Arterial Intersections

# SETS Process

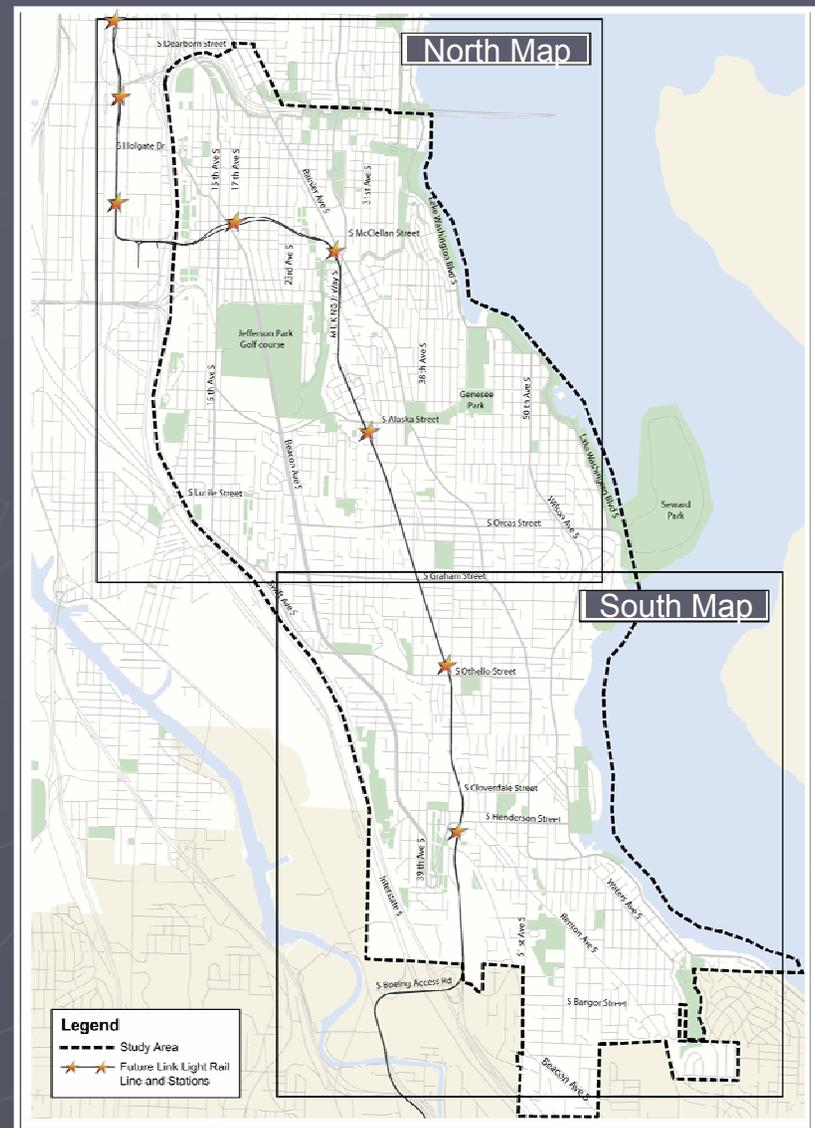


# Background

## ► Goals

- **Develop solutions** to improve transportation safety, mobility and accessibility
- **Capitalize on the Link investment**
- **Support the goals and objectives** of Southeast Seattle's Neighborhood Plans and Station Area Plans
- **Support cost-effective investments** to preserve and maintain transportation infrastructure

## SETS Area

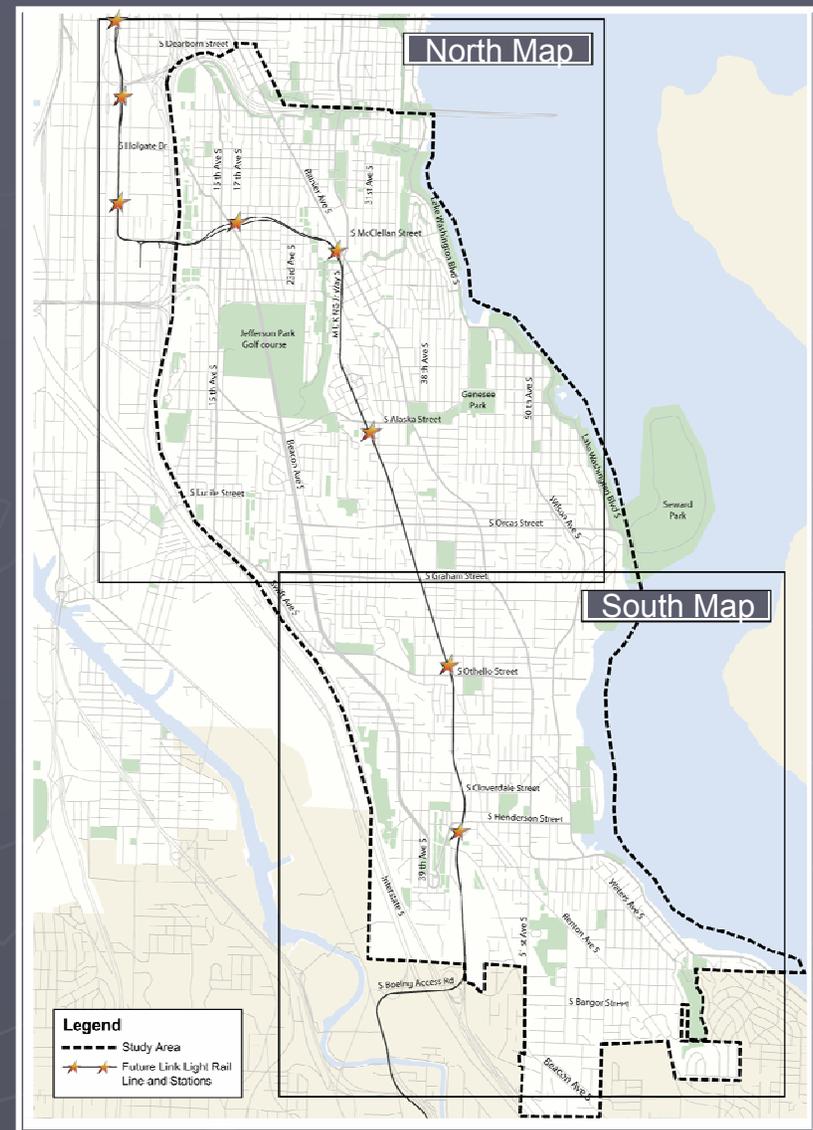


# Background

## ► Geographic Focus

- Areas within half mile of light rail stations
- Major east-west connectors
- Major commercial/residential hubs
- Major north-south roadways except MLK (which is already being improved as part of Link construction).

SETS Area









# Existing Traffic Congestion

- ▶ Measurement of Traffic Congestion
  - Level of Service



# What is Level of Service (LOS)?

## ▶ General Definition

- LOS is a quantitative measure to describe operational conditions of a transportation system – speed and travel time, traffic interruptions, and comfort and convenience

## ▶ Operation of intersections is critical in measuring the performance of the roadway network

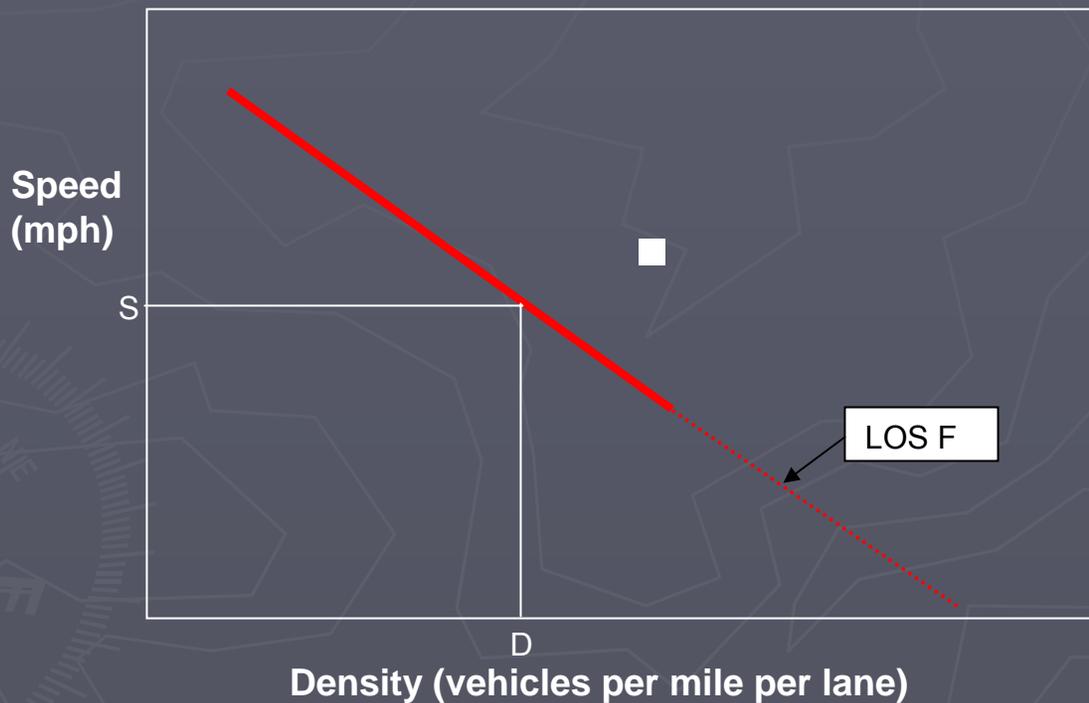
## ▶ Six LOS levels:

- LOS A - best condition
- LOS F – worst condition (unstable, high levels of delays, driver discomfort and frustration)

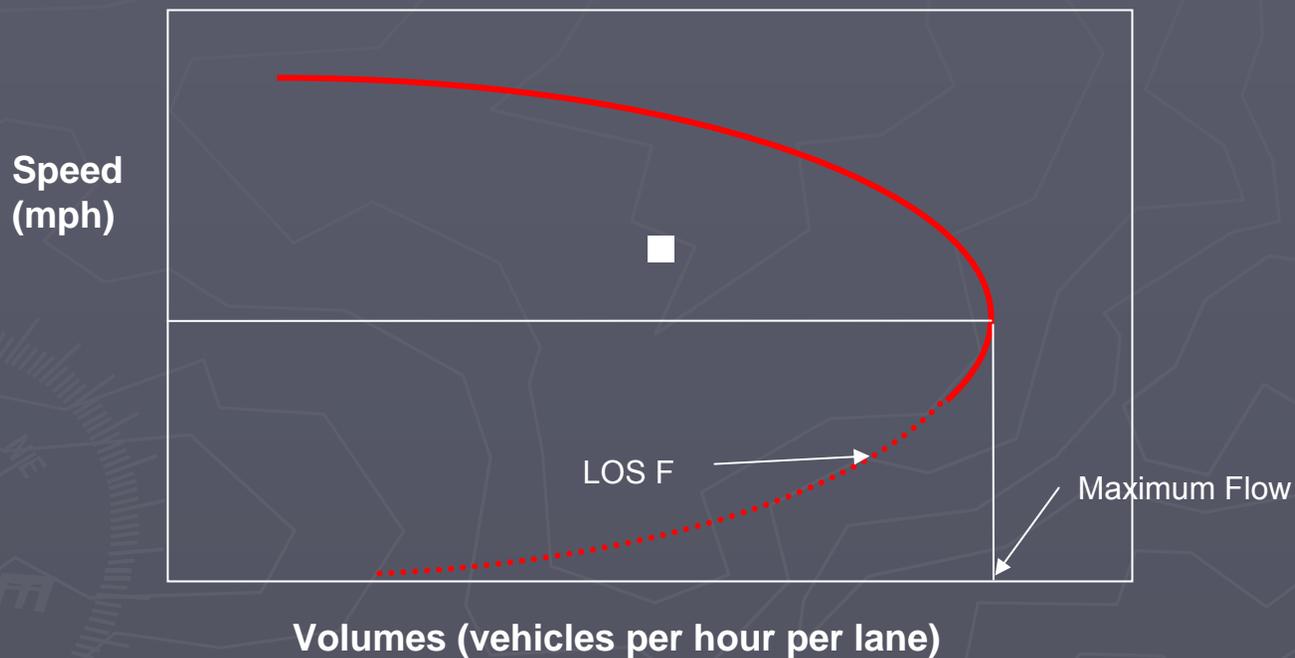
# Intersection Level of Service

- ▶ Definition based on delay per vehicle in second
  - Additional travel time in seconds experienced by a driver traveling through the intersection

# Basic Relationships between Speed and Vehicle Density



# Basic Relationships between Speed and Vehicle Volume



# Intersection Level of Service

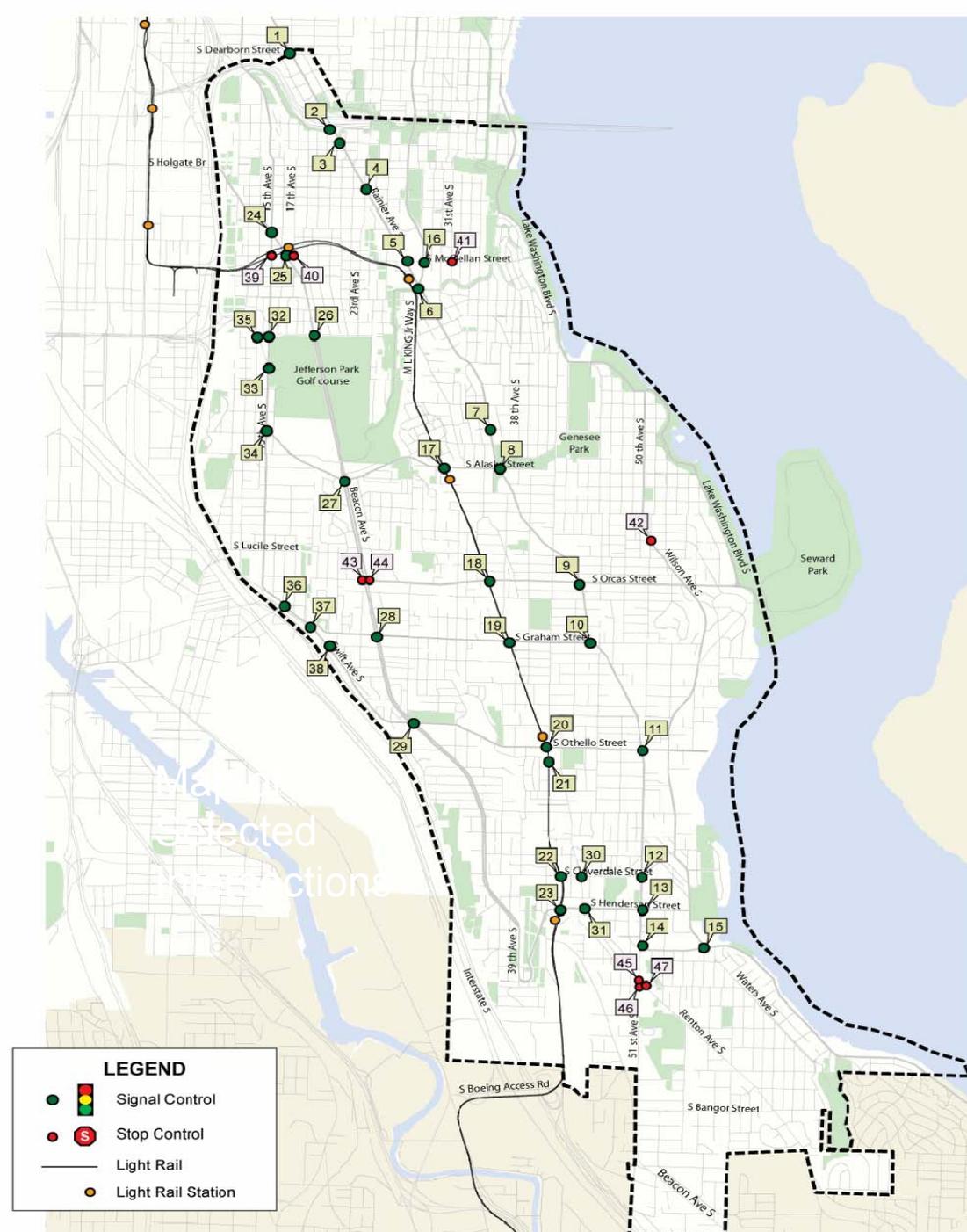
Level of Service	Signalized Intersection: Delay per Vehicle (seconds)	Unsignalized Intersection: Delay per Vehicle (seconds)	Description
A	$\leq 10$	$\leq 10$	Little or no delay
B	$> 10$ and $\leq 20$	$\leq 10$ and $\leq 15$	Short delays
C	$> 20$ and $\leq 35$	$> 15$ and $\leq 25$	Average delays
D	$> 35$ and $\leq 55$	$> 25$ and $\leq 35$	Long delays
E	$> 55$ and $\leq 80$	$> 35$ and $\leq 50$	Very long delays
F	$> 80$	$> 50$	Failure - extreme congestion

Source: Highway Capacity Manual 2000

# Intersections Analyzed

## Selected:

- 37 signalized intersections
- 9 unsignalized intersections
- 1 intersection (MLK & Renton) that is unsignalized now but will be signalized as part of light rail construction





# Forecast Methodology

## ▶ Land Use Growth Projections

2000 housing	28,410 units
<u>2030 housing forecast</u>	<u>39,410 units</u>
Housing growth	11,000 units (38.7 %)



2000 employment	25,160 workers
<u>2030 employment forecast</u>	<u>29,410 workers</u>
Employment growth	4,250 workers (16.9 %)

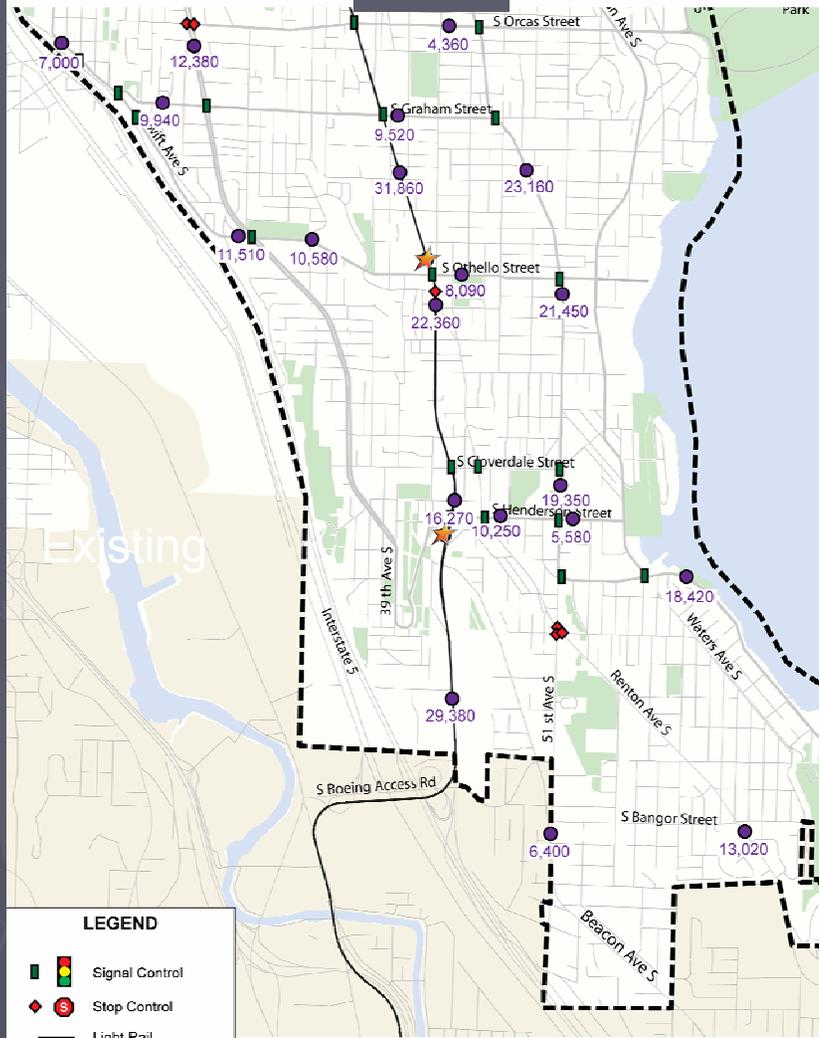
## ▶ 2030 Forecasts are for “baseline conditions”

- Assumed no major improvements in study area except for Sound Transit light rail.

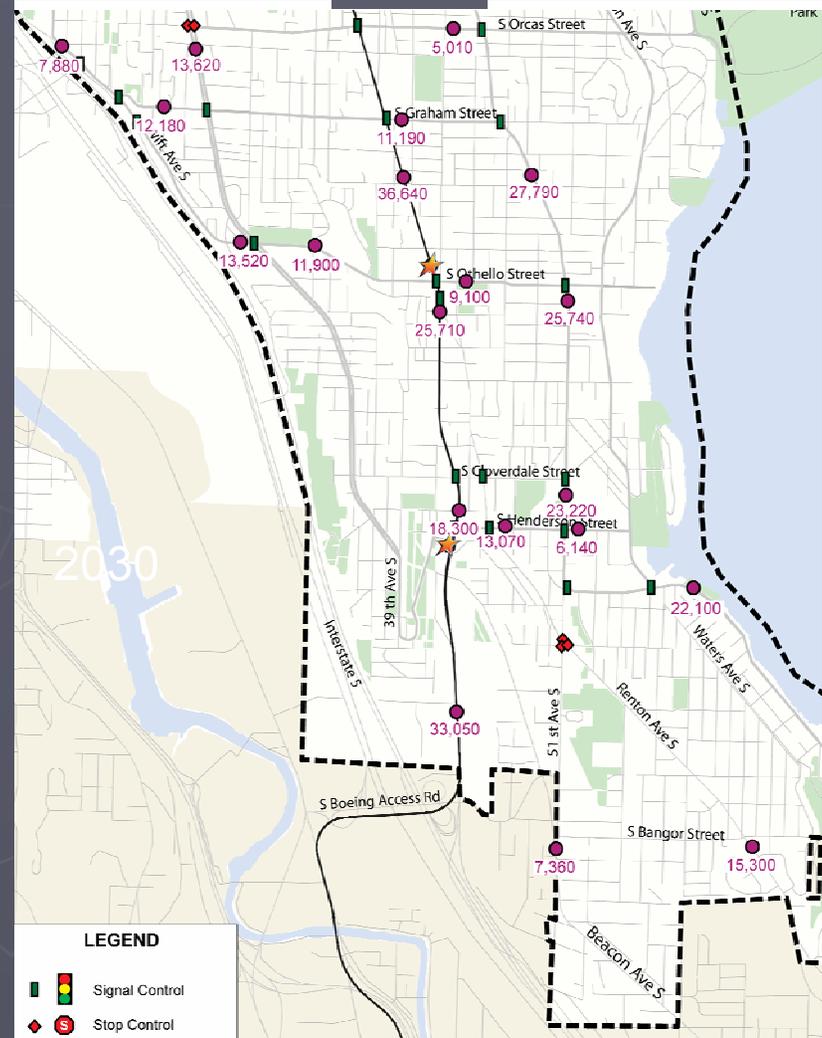


# Average Weekday Daily Traffic Volumes (2004 and 2030)

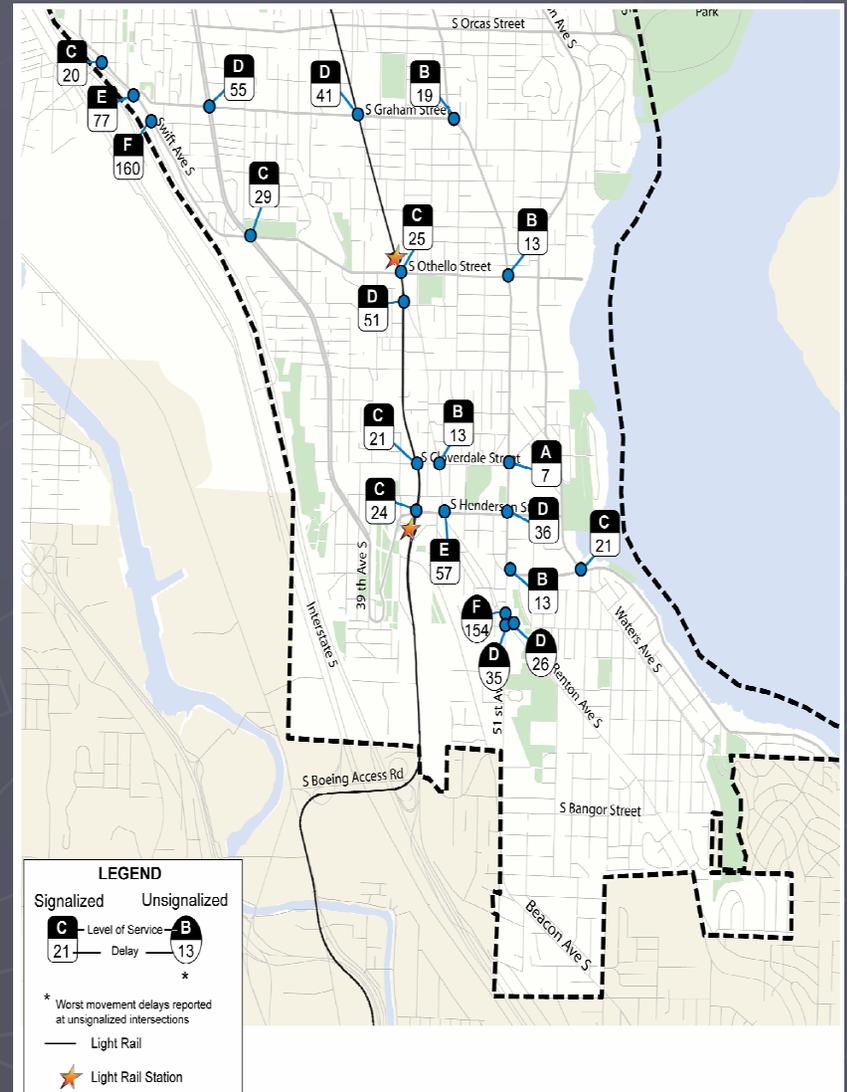
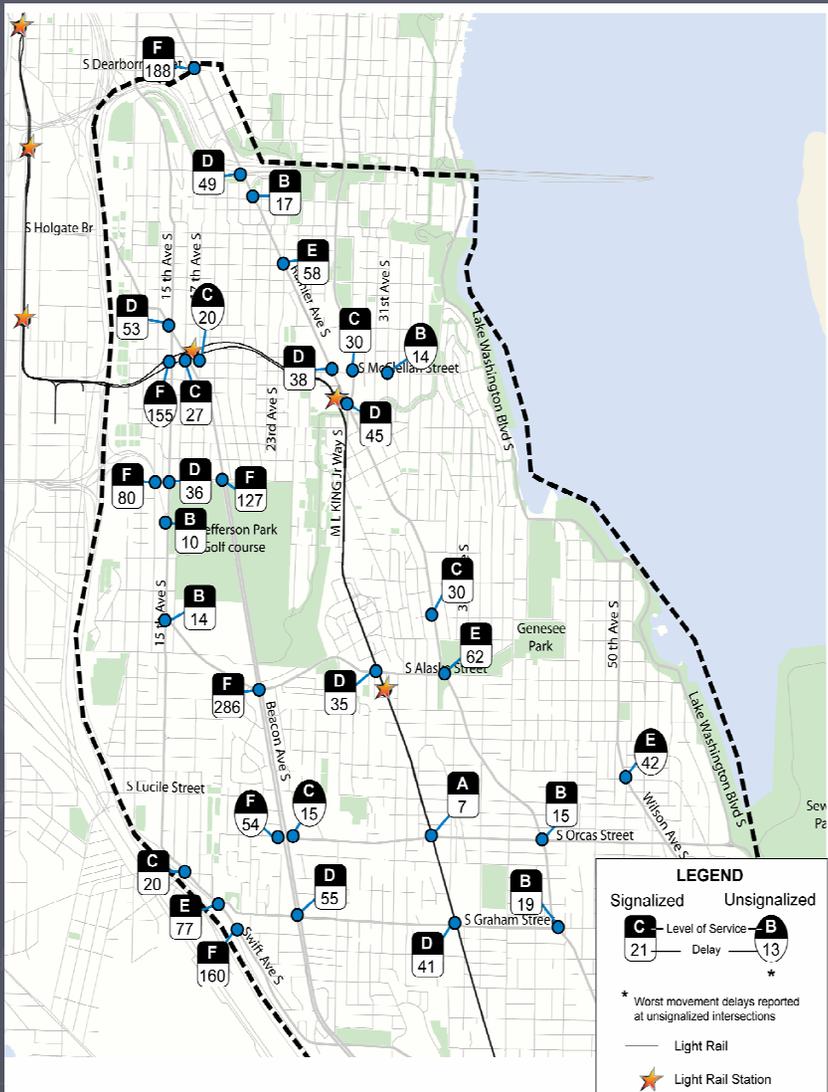
2004



2030



# 2030 Intersection LOS



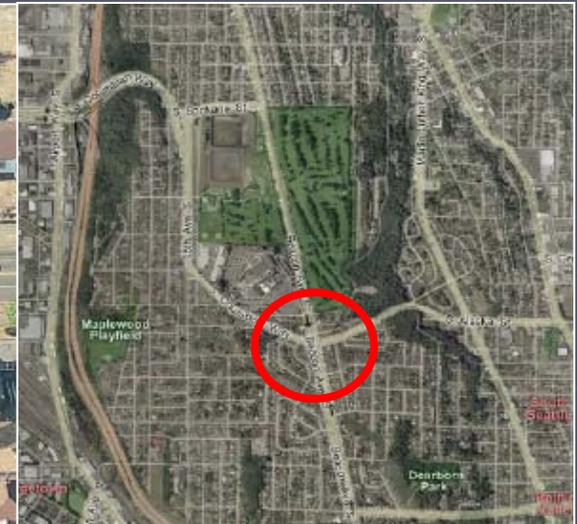
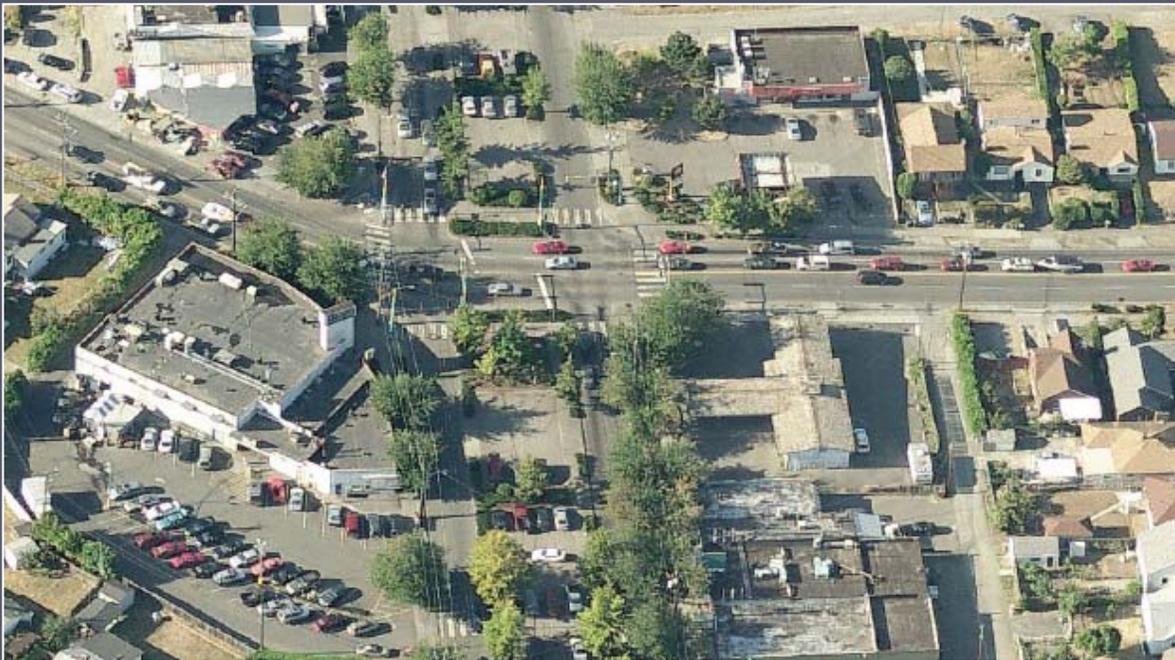
# Intersections Analyzed with Excessive Delay

No	Intersection	2004/2006		2030	
		LOS	Delay in seconds	LOS	Delay in seconds
27	Beacon Avenue S/ S Columbia Way*	F	184	F	286
1	Rainier Avenue S/ Dearborn Street*	F	109	F	188
38	Swift Avenue S/ I-5 Northbound Off-Ramp*	F	90	F	160
39	15th Avenue S and S McClellan Street**	F	56	F	155
45	51st Avenue S/ Renton Avenue S**	F	96	F	154
26	Beacon Avenue S/ S Spokane Street*	F	83	F	127
35	S Columbia Way/ S Spokane Street*	C	34	F	80
37	Swift Avenue S/ S Graham Street*	D	43	E	77
8	Rainier Avenue S/ S Alaska Street*	D	42	E	62
4	Rainier Avenue S/ 23rd Avenue S*	D	35	E	58
31	Renton Avenue S/ S Henderson Street*	D	40	E	57
43	Beacon Avenue S (west)/ S Orcas Street**	D	34	F	54
42	Wilson Avenue S and S Dawson Street**	D	25	E	42

\* indicates a signalized intersection

\*\* indicates an unsignalized intersection

Congested Intersection	2004/2006 LOS	Delay in seconds	2030 LOS	Delay in seconds
Beacon Avenue S/ S Columbia Way (signalized)	F	184	F	286



### Characteristics

- On Beacon, the VA Hospital is just north of this intersection.
- S Columbian Way is major route between I-5, Beacon, MLK and (via Alaska) Rainier Avenue, and connects to the West Seattle Bridge.
- Split phasing and high traffic volumes in all directions are major sources of delay.

# # 1

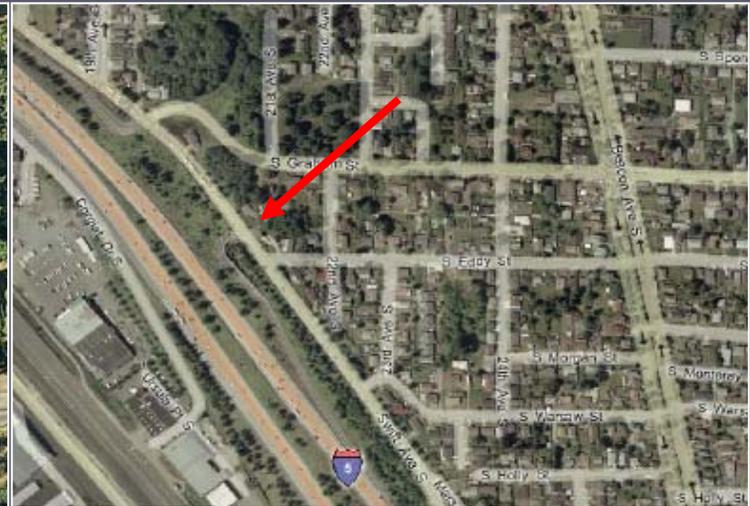
Congested Intersection	2004/2006 LOS	Delay in seconds	2030 LOS	Delay in seconds
Rainier Avenue S/ Dearborn Street (signalized)	F	109	F	188



### Characteristics

- North edge of study area
- Goodwill development likely to worsen further (not assumed in 2030 Baseline)
- Heavy northbound left turns
- Heavy eastbound left turns
- High pedestrian crossings
- **High Accident Location**

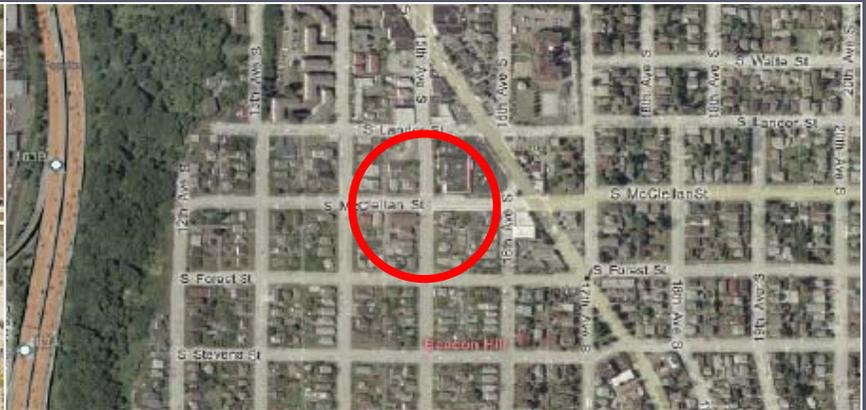
Congested Intersection	2004/2006 LOS	Delay in seconds	2030 LOS	Delay in seconds
Swift Avenue S/ I-5 Northbound Off-Ramp (signalized)	F	90	F	160



### Characteristics

- Northbound off-ramp from I-5 connects in a T-intersection to Swift.
- Heavy volumes on Swift will conflict with heavy volumes from the ramp.

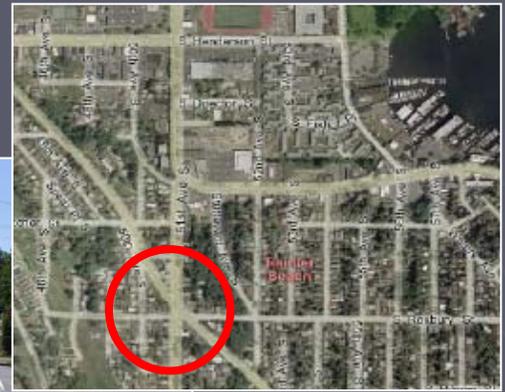
Congested Intersection	2004/2006 LOS	Delay in seconds	2030 LOS	Delay in seconds
15th Avenue S / S McClellan Street (unsignalized)	F	56	F	155



### Characteristics

- 15<sup>th</sup> is a “back road” route from the Swift /I-5 off ramp to the VA Hospital, to Capitol Hill, First Hill and the International District (via 12<sup>th</sup> Avenue). In Southeast Seattle it runs primarily through residential development.
- McClellan connects to Rainier, 23<sup>rd</sup> and west to Mt. Baker Blvd.
- Unsignalized intersection with stop signs for east-west traffic only.
- Southeast corner has been widened for right turn.
- Westbound movement is hindered by north-south traffic which does not stop.
- **High Accident Location**

Congested Intersection	2004/2006 LOS	Delay in seconds	2030 LOS	Delay in seconds
51 <sup>st</sup> Avenue S/ Renton Avenue S (unsignalized)	F	96	F	154



**Characteristics:**

- Stop-sign controlled intersection, with traffic island for Roxbury crossing.
- Renton Avenue is a major north-south non-freeway route between Renton and Seattle; to the north it ends at MLK and to the south it ends at Renton Airport.
- 51<sup>st</sup> Street is a southern extension of Rainier Avenue serving Skyway and connecting to Beacon Avenue South. Roxbury is a residential street that runs about ten blocks to the east and four to the west.
- Development at the intersection is primarily residential with neighborhood business.
- Volumes from all approaches are heavy, overwhelming the intersection.
- **High Accident Location**

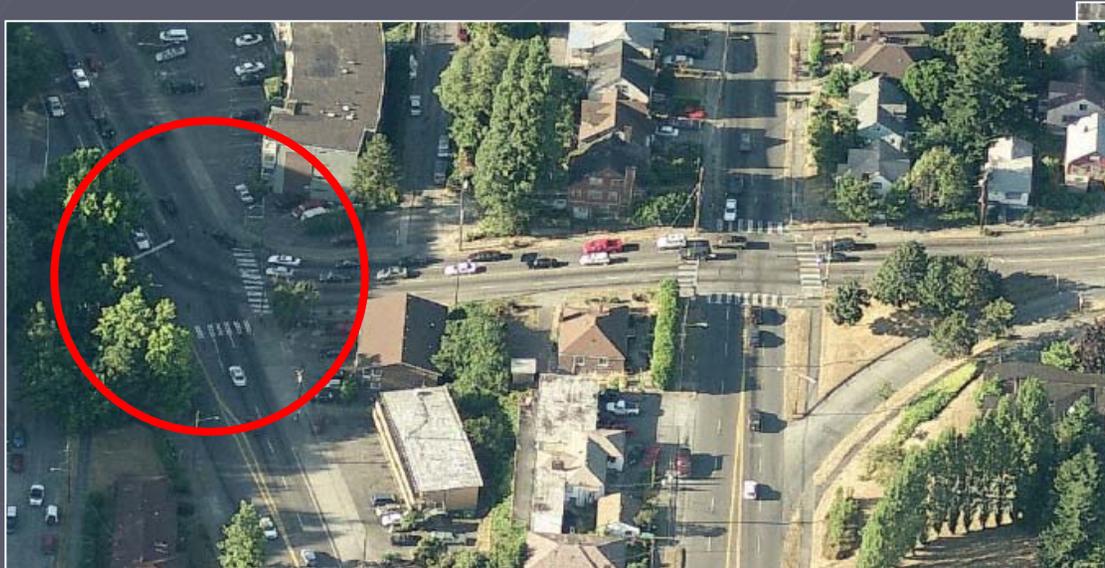
Congested Intersection	2004/2006 LOS	Delay in seconds	2030 LOS	Delay in seconds
Beacon Avenue S/ S Spokane Street (signalized)	F	83	F	127



### Characteristics

- To the south, Beacon serves the VA Hospital; to the north, the Beacon Hill business district and Amazon.
- Spokane connects east-west from 23<sup>rd</sup> to the freeway.
- Split phasing and heavy east-west movement contribute to delays.

Congested Intersection	2004/2006 LOS	Delay in seconds	2030 LOS	Delay in seconds
S Columbian Way / S Spokane Street (signalized)	C	34	F	80



## Characteristics

- This intersection is just before/after the Columbian Way/I-5/West Seattle Bridge interchange.
- On Columbian Way, the intersection is a short block from 15<sup>th</sup> Ave S intersection.
- Heavy westbound right-turn traffic will conflict with north-south traffic on Columbian Way.





Congested Intersection	2004/2006 LOS	Delay in seconds	2030 LOS	Delay in seconds
Rainier Avenue S / 23 Avenue S (signalized)	D	35	E	58



### Characteristics

- Split signal timing and heavy movement on Rainier result in high congestion.
- No crosswalk for peds on west side of 23<sup>rd</sup> crossing Rainier
- **High Accident Location**
- **Nearby HALs: 23<sup>rd</sup> & Walker, and 23<sup>rd</sup> & College**

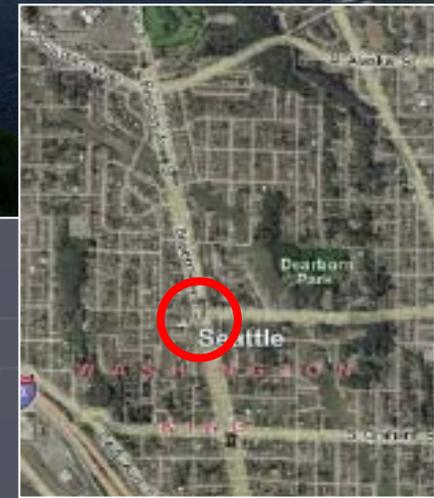
Congested Intersection	2004/2006 LOS	Delay in seconds	2030 LOS	Delay in seconds
Renton Avenue S / S Henderson Street (signalized)	D	40	E	57



### Characteristics

- Renton provides an alternative to Rainier or MLK for north-south travel.
- There is commercial development at the intersection, but Renton is primarily residential.
- Henderson is a short east-west arterial between MLK and Lake Washington.
- Heavy southbound traffic will conflict with northbound left turn.
- **High Accident Location**

Congested Intersection	2004/2006 LOS	Delay in seconds	2030 LOS	Delay in seconds
Beacon Avenue S (west) / S Orcas Street (unsignalized)	D	34	F	54



### Characteristics

- Beacon Avenue anchors to the north include VA Hospital, Beacon Hill business district and Link station, and Amazon.
- Beacon median is landscaped with walking path.
- Orcas connects to the Lake to the east but only continues a few more blocks to the west where it ends at a steep slope.
- Development is single family with a church on one corner.
- The dominant flow on Beacon overwhelms the intersection.
- **High Accident Location**

Congested Intersection	2004/2006 LOS	Delay in seconds	2030 LOS	Delay in seconds
Wilson Avenue S and S Dawson Street (unsignalized)	D	25	E	42



### Characteristics

- 4-legged, stop sign controlled intersection where angled arterial passes through neighborhood business district in otherwise primarily single family neighborhood.
- East-west pedestrian crossings are particularly wide.
- Parking lots abut corners, adding vehicle movements over sidewalks.
- PCC is planning to expand at its current site.
- Southbound approach on Wilson will overwhelm the intersection.

# Next Steps

- ▶ Develop comprehensive SETS action list for all modes
- ▶ Evaluate intersection/roadway improvements comprehensively as part of an overall action plan
- ▶ Finalize intersection/roadway recommendations for inclusion in the overall SETS action list