City of Woodinville

April 5, 2007

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Transportation Impacts of Wood Trails and Montevallo

- Historic and Future Traffic Counts
- Stopping Sight Distance *vs.* Entering Sight Distance
- Accident History and Rates in Project Area

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Traffic Counts

Collection of existing traffic patterns and characteristics in order to predict future traffic conditions

- **ADT Counts:** 3-day, 24-hr volumes, direction of travel, speeds
- **Turning Counts:** Movements at intersections during 2-hrs of AM and/or PM (Peak Hour)

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Location of ADT Counts

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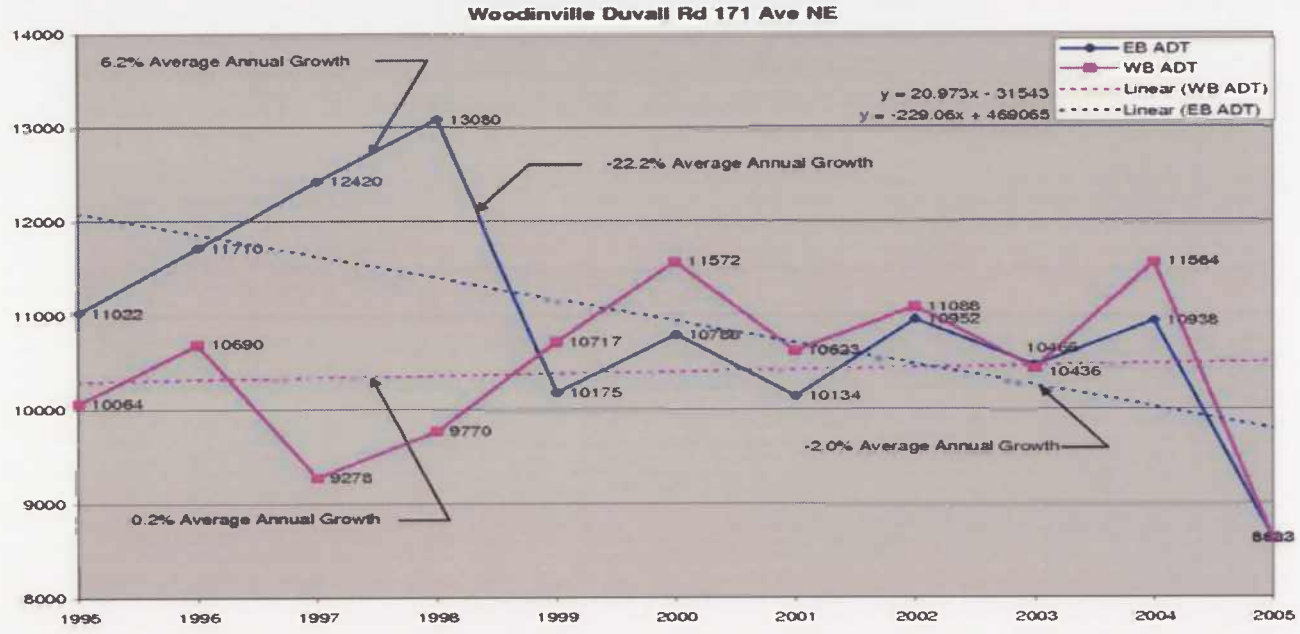
Historc ADT and Growth Rates on Woodinville – Duvall Road at 171st Ave. NE



Source: King County

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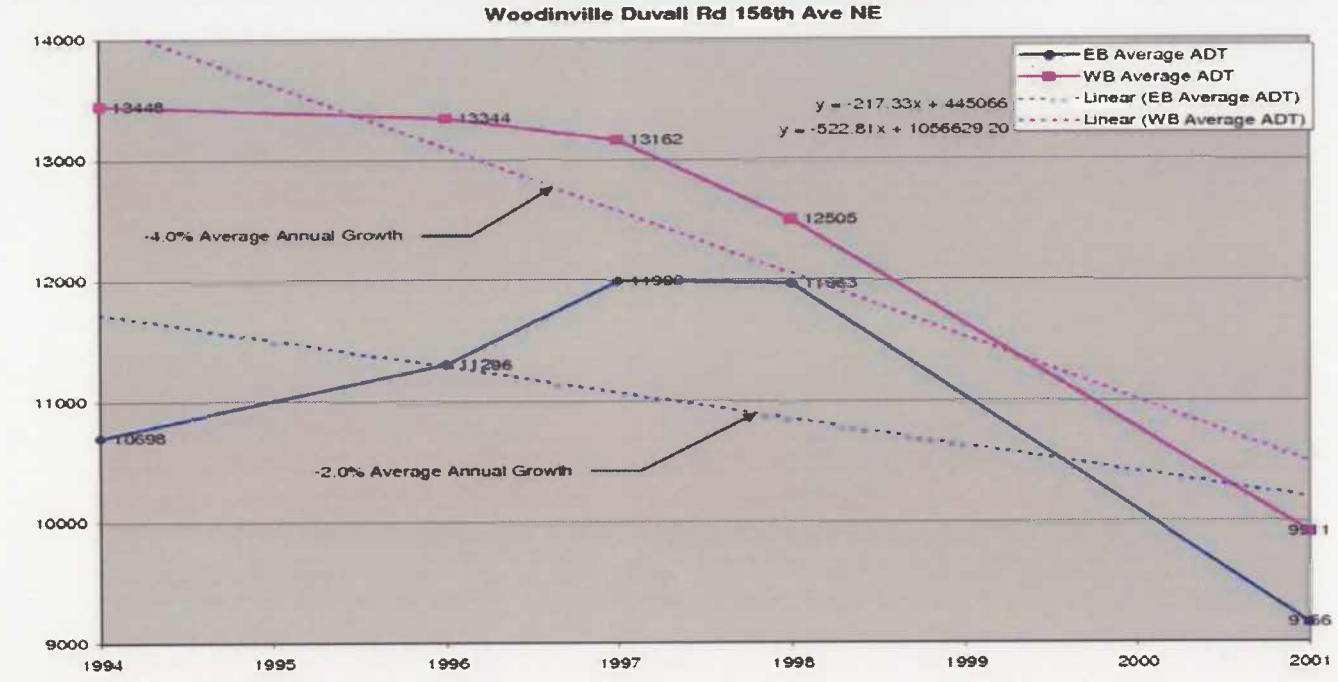
Historic ADT and Growth Rates on Woodinville – Duvall Road at 156th Ave. NE



Source: City of Woodinville & King County

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Location of ADT Counts

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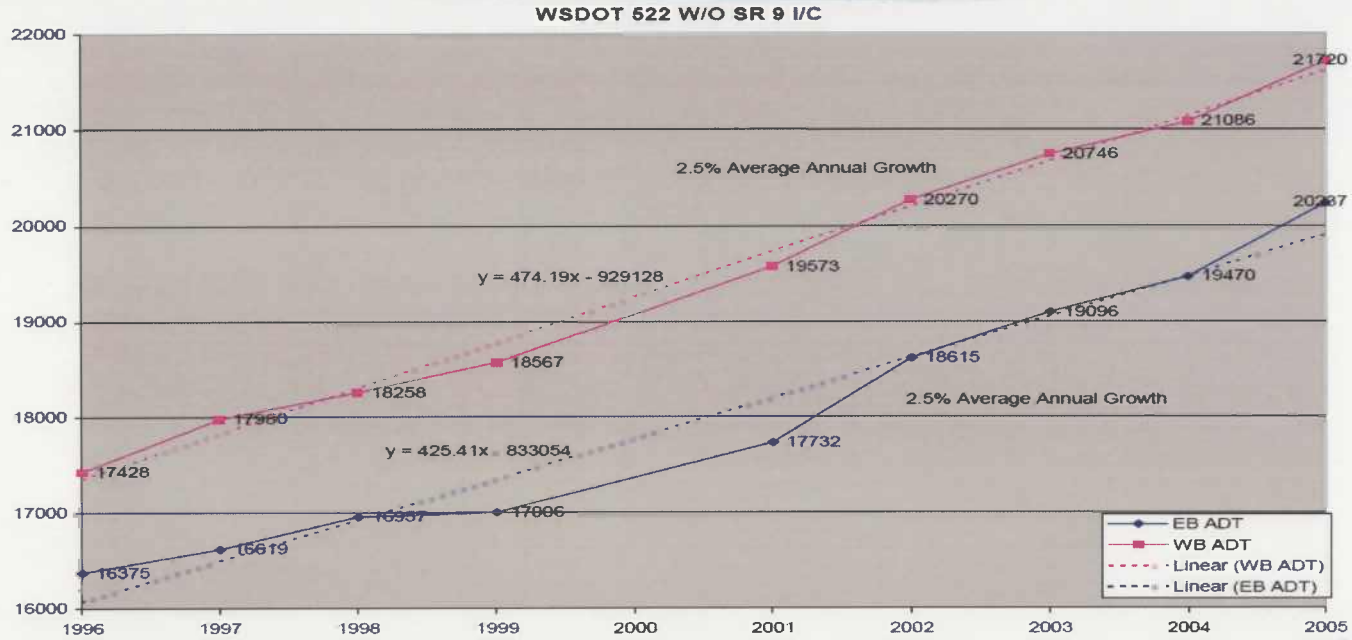
Historic ADT and Growth Rates on SR 522



Source: WSDOT

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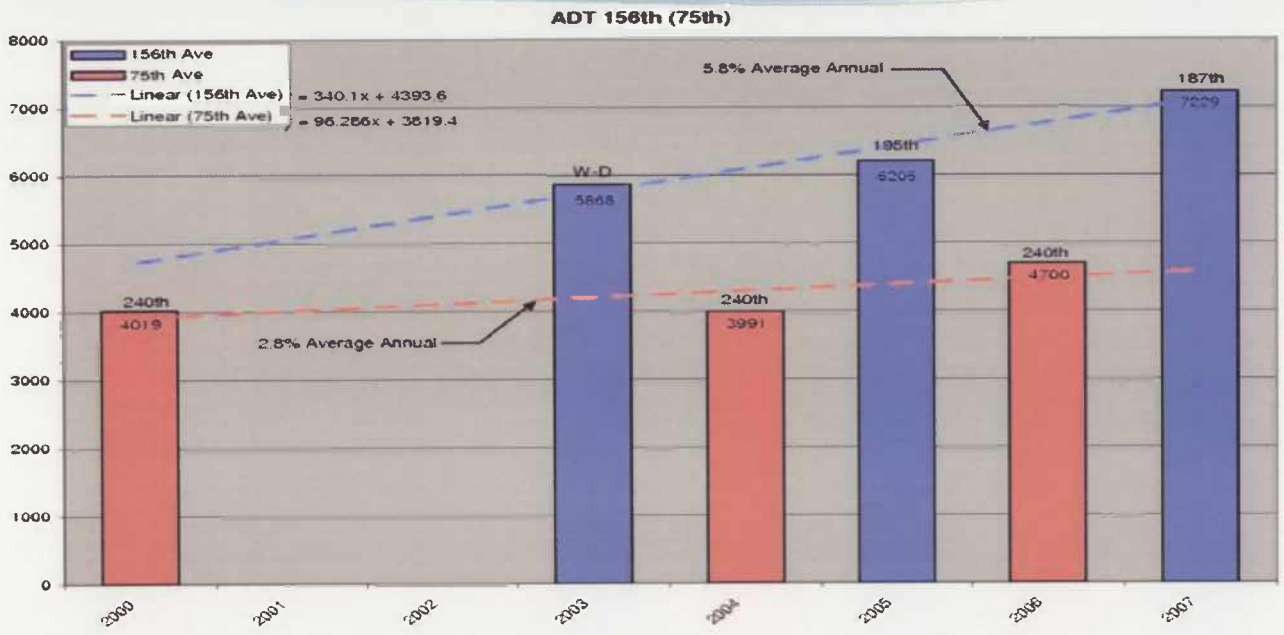
Historic ADT and Growth Rates on 156th Ave. NE



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Source: City of Woodinville, Costco Study, & Snohomish Co.

Historic Growth as Shown by ADT *vs.* PSRC

- Historic ADT ***Long-Term Rates*** of +5.8 to -4.0 % per year
- PSRC 2.5% per year is based on population and employment growth
- Due to variability of ADT growth rates, historically the use of PSRC rate has proven to be the most reliable

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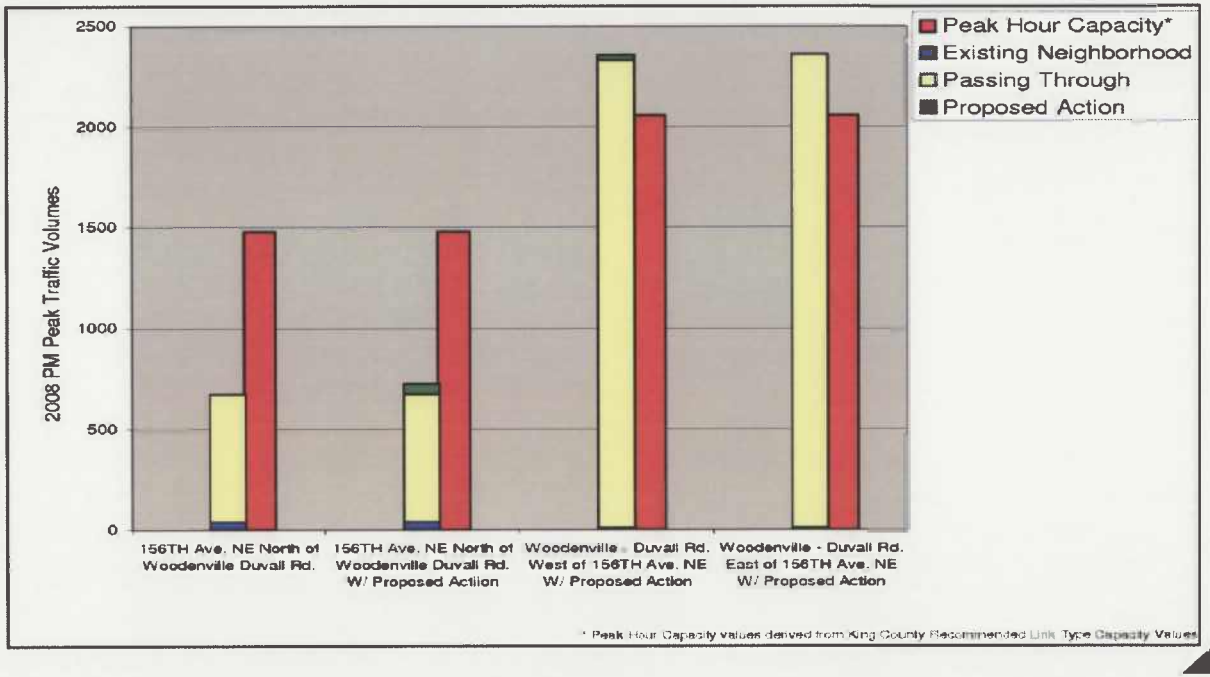
Project Trips Compared to Existing Neighborhood and Background Traffic, and Roadway Capacity



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Stopping Sight Distance (Safety) vs. Entering Sight Distance (Operational)

City uses AASHTO Standards as required by RCW 35.78.030

US Customary

Design speed (mph)	Brake reaction distance (ft)	Braking distance on level (ft)	Stopping sight distance Calculated (ft)	Stopping sight distance Design (ft)
15	55.1	21.6	76.7	80
20	73.5	38.4	111.9	115
25	91.9	60.0	151.9	155
30	110.3	86.4	196.7	200
35	128.6	117.6	246.2	250
40	147.0	153.6	300.6	305
45	165.4	194.4	359.8	360
50	183.8	240.0	423.8	425
55	202.1	290.3	492.4	495
60	220.5	345.5	566.0	570
65	238.9	405.5	644.4	645
70	257.3	470.3	727.6	730
75	275.6	539.9	815.5	820
80	294.0	614.3	908.3	910

Exhibit 3-1. Stopping Sight Distance

US Customary

Design speed (mph)	Stopping sight distance (ft)	Intersection sight distance for passenger cars Calculated (ft)	Intersection sight distance for passenger cars Design (ft)
15	80	165.4	170
20	115	220.5	225
25	155	275.6	280
30	200	330.8	335
35	250	385.9	390
40	305	441.0	445
45	360	496.1	500
50	425	551.3	555
55	495	606.4	610
60	570	661.5	665
65	645	716.6	720
70	730	771.8	775
75	820	826.9	830
80	910	882.0	885

Exhibit 9.55 Design Intersection Site Distance – Case B1 – Left Turn from Stop

Note: Intersection sight distance shown is for a stopped passenger car to turn left onto a two-lane highway with no median and grades 3 percent or less. For other conditions, the time gap must be adjusted and required sight distance recalculated.

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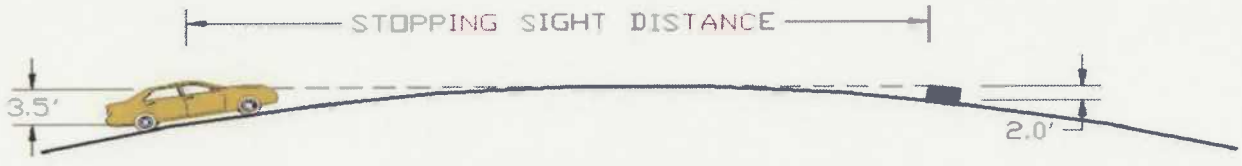
Stopping Sight Distance



AASHTO 45 MPH DESIGN SPEED
SSD = 360 FT LEVEL GRADE

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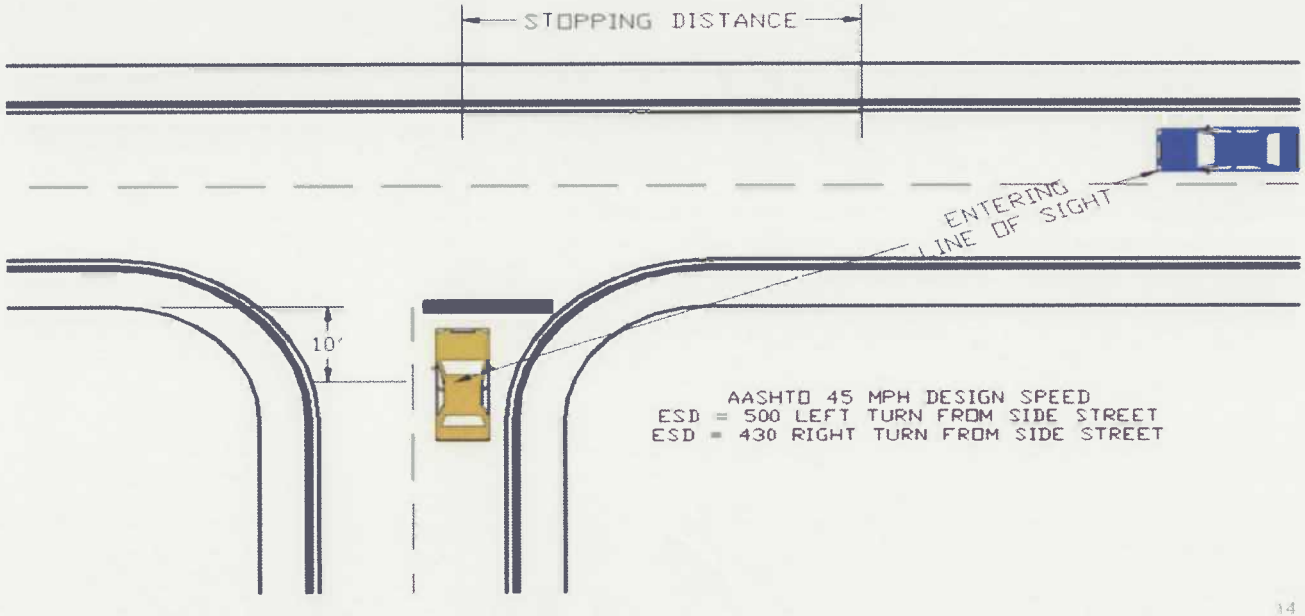
Entering Sight Distance



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Existing Sight Distance Problem Areas

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Area History of Accidents

Study Intersections	Reported Accidents (2001-2003)[1]	Reported Accidents (2004-2005)[1]	Average Accidents / Year	Accidents per Million Entering Vehicles[2]
156th Avenue NE/NE 203rd Place	0	0	0.00	0.0
156th Avenue NE/NE 202nd Street	0	0	0.00	0.0
156th Avenue NE/NE 201st Street	0	0	0.00	0.0
156th Avenue NE/NE 198th Street	0	0	0.00	0.0
156th Avenue NE/NE 195th Street	0	1	0.20	0.08
156th Ave NE/NE Woodinville-Duvall Rd	10	5	3.00	0.31
NE Woodinville-Duvall Rd/NE Woodinville Way	10	3	2.60	0.25
NE Woodinville-Snohomish Rd/NE 195th St	37	9	9.20	0.76
Key Roadways	**Reported Accidents (2001-2003)**	**Reported Accidents (2004-2005)[1]**	**Average Accidents / Year**	**Accident Types**
156th Avenue NE: NE 195th Street to NE 203rd Place	2	0	0.40	Vehicle in ditch Vehicle struck pole
NE 202nd Street: 156th Avenue NE to Western Terminus	1	0	0.20	Vehicle struck pole
NE 201st Street: 156th Avenue NE to Western Terminus	1	0	0.20	Collision at private driveway
NE 198th Street: 156th Avenue NE to Western Terminus	0	0	0	None
NE 195th Street: 156th Avenue NE to Western Terminus	0	0	0	None

1. Data provided by City of Woodinville Staff
2. Accidents per million entering vehicles at the intersection (MEV); ADT estimated as being ten times PM peak TEV.
3. Intersections occurring either mid-block along these roadways, or at non-study intersections.

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2001 to 2005 Accident History

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Transportation Engineering Conclusions

- Minor traffic impacts due to Proposed Action none of which exceed the City's adopted LOS of "E"
- There are several Stopping Sight Distance problem locations that can be mitigated with improvements

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Recommended Condition of Approval Addressing Sight Distance Problems

"Any potential increase in risk to safety attributed to the Proposed Action's increase in traffic is to be offset by a proportional increase in safety provided by the construction of roadway and / or pedestrian safety improvements. Potential improvements may include lane delineations, lane widening and / or turn lane(s) at defined locations, pedestrian improvements at defined locations, raised curbing, and additional signage.

"The appropriateness of any proposed roadway and / or pedestrian safety improvement must be determined solely by the City Engineer and shall be determined in light of access locations, and vertical and horizontal roadway geometrics."

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Time for Questions

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