

Small Area Transportation Study

35th Avenue SE

September 2016

Snohomish County Public Works Department



Snohomish County
Public Works

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SNOHOMISH COUNTY PUBLIC WORKS DEPARTMENT
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SMALL AREA TRANSPORTATION STUDY

LITTLE BEAR CREEK NEIGHBORHOOD

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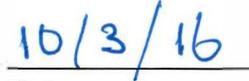
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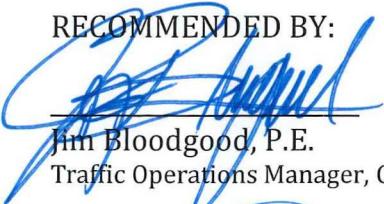


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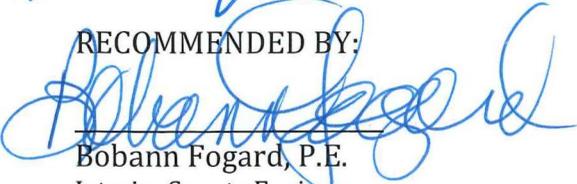


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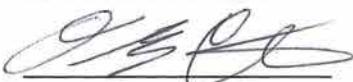


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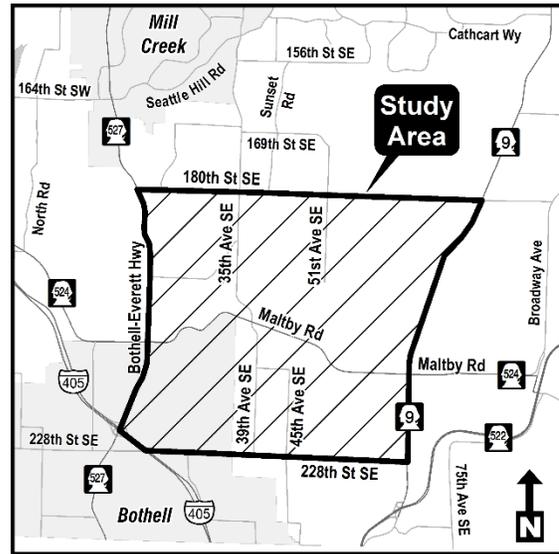
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Introduction

This Small Area Transportation Study (SATS) provides an analysis of an area of southwest Snohomish County served by three north/south corridors: 35th/39th Avenue SE, 43rd/45th Avenue SE, and 51st Avenue SE. The study area is defined by 180th Street SE to the north, 228th Street SE to the south, SR 527 to the west and SR 9 to the east. It includes both rural areas and some of the fastest growing urban areas in Snohomish County.

In 2015, the Snohomish County Council adopted an updated comprehensive plan that provided a 20-year forecast of population and employment for the year 2035. The plan also contained a Transportation Element (TE) that evaluated the ability of the county road system to accommodate the forecasted population growth. The One conclusion of the TE was that the arterial roadway segments in the study area would operate above their capacities with the high levels of growth. The 2035 forecast from the comprehensive plan update shows an expected 46 percent population increase in the influence area, 12 percent higher than the 34 percent population increase forecasted for Snohomish County as a whole.



State of Washington’s Growth Management Act requires that the county maintain a transportation system that is “concurrent” with the impacts from land development. Concurrency requires that where land development causes a deterioration of level of service (LOS) below an adopted standard it must be demonstrated that the county has a strategy in place to again meet the adopted LOS within six years or development impacting the deficient facilities may not be approved. This study uses a planning-level analysis that is not the same as a LOS analysis used for concurrency, but it can assist in identifying possible future issues and allow the county to adjust its strategy if necessary.

Projects Improving Connectivity

Snohomish County and its partner agencies have been actively working on transportation solutions to improve connectivity within and around the study area. These include improvements to state routes, bus lines, arterial roads, and trails used for non-motorized forms of transportation. Listed below are completed efforts and targeted projects.

- In 2012 Snohomish County and Community Transit (CT) began an innovative Transportation Demand Management (TDM) program to reduce automobile trips on SR 527.
- In 2013 WSDOT finished road widening and intersection improvements on portions of SR 9. WSDOT continues to improve SR 9 will additional widening projects that are still to be determined.
- In 2017 Snohomish County and WSDOT will be implementing an “adaptive” signal system on SR 527 that will improve traffic flow.
- Also in 2017 a widening project on Seattle Hill Road from 35th Avenue SE to SR 96 is scheduled for completion and will provide improved access to the study area.

- In 2019 CT will begin their second rapid transit bus line with the opening of the *Swift* “Green Line.”
- There are future plans for the completion of the North Creek Trail which will provide increased non-motorized transportation options; this project is to the west of SR 527 and just outside of the study area.

Other possible solutions for performance deficiencies and connectivity challenges are still in the planning stages. The TE plans for a number of transportation projects in the study area phased in seven-year increments. These projects are used as a starting place for this study. The TE projects serving the study area include:

- Widening 35th Avenue SE from SR 524 to Seattle Hill Road to three lanes
- Widening 39th Avenue SE from 228th Street SE to 207th Street SE to three lanes
- Completing the 43rd Avenue SE corridor from SR 524 to 180th Street SE by constructing two new two-lane sections; 200th Street SE to 196th Street SE and 184th Street SE to Sunset Road
- Widening 180th Street SE from SR 527 to 35th Avenue SE to five lanes
- Widening 180th Street SE from 35th Avenue SE to 51st Avenue SE to three lanes
- Widening 228th St SE from 35th Avenue SE to 39th Avenue SE to four/five lanes

In addition to the planned projects in the TE, two new arterial connections are considered that are on the county’s arterial circulation map. However, these projects are not in the TE and were not a part of the comprehensive plan’s 20-year travel demand forecast. These projects are:

- Completing the 43rd/45th Avenue SE corridor from 228th Street SE to SR 524 by constructing a new two-lane section of 43rd Avenue SE from 212th Street SE to SR 524
- Completing the 51st Avenue SE corridor from SR 524 to 180th St SE by constructing a new two-lane section from SR 524 to 196th Street SE

Some of the projects listed above are located in the rural area in which rural design standards and level of service standards would apply. In addition, the rural standards require roadway construction and operations that is suitable for the surrounding environment.

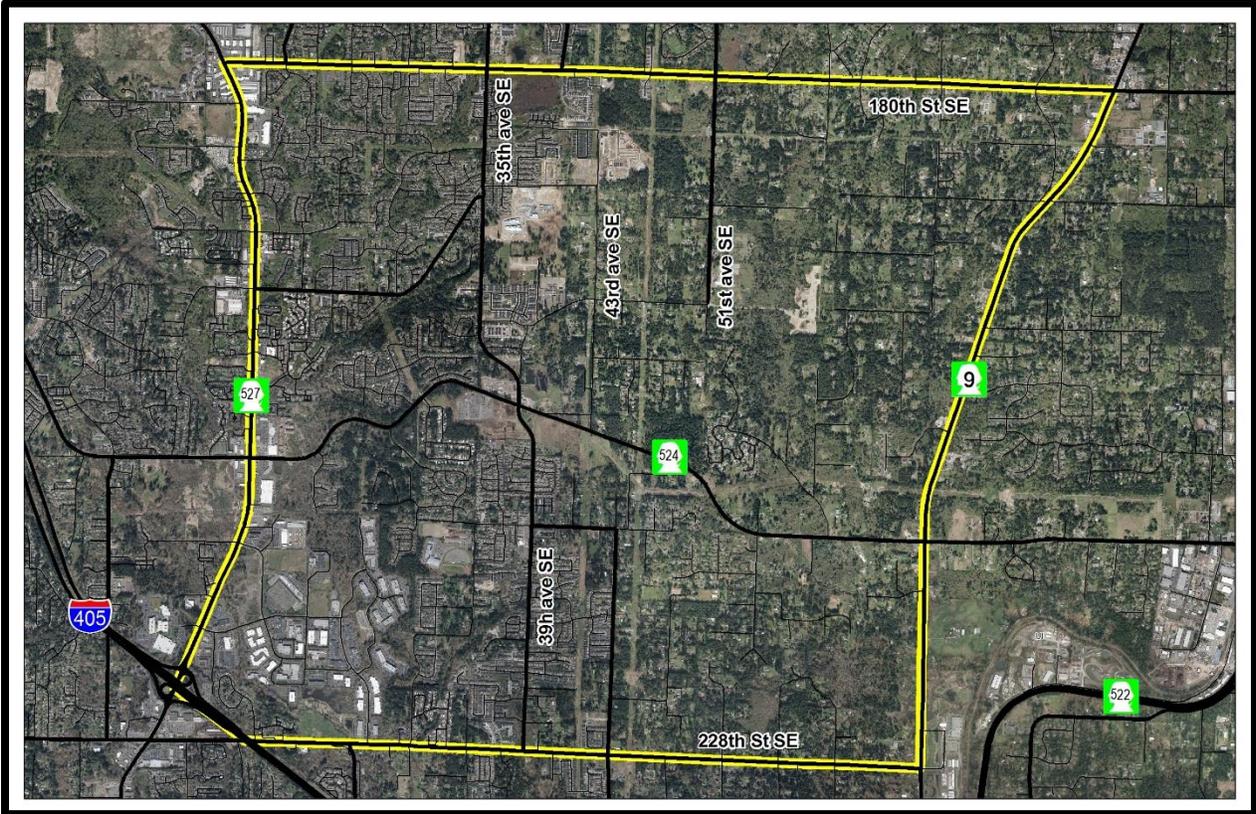
Methodology

This study employs a planning level analysis that uses the land-use forecast for 2035 from the comprehensive plan together with the county’s travel-demand model to identify possible performance deficiencies. This methodology compares the projected traffic volumes from the 2035 forecasts (v) to the theoretical capacity of the road (c) to create a volume to capacity ratio (v/c). The volume to capacity measurement is used to indicate the possibility of an LOS deficiency.

This planning-level volume to capacity analysis is not the same as a concurrency analysis. This analysis does not capture field measurable performance measures (speed, queuing and stops) as perceived by travelers. A concurrency analysis uses traffic volumes generated from currently permitted development rather than forecasted volumes to determine the operational impact of traffic on travel speed. It is the impact on the travel speed level of service (LOS), made through a concurrency analysis, that determines an LOS deficiency.

Framework of Study Results

The study identifies current performance deficiencies as well as possible deficiencies for the same seven year planning increments as used in the TE, 2021, 2028, and 2035. It also suggests possible solutions to address these deficiencies and recommends a phased timeline.



Aerial View of the Study Area

I. Background

Purpose of Study

The purpose of the 35th Avenue SE, 43rd Avenue SE, 51st Avenue SE Small Area Transportation Study is to assess alternative north/south routes to 35th Avenue SE by looking at the congested roadway network in the rapidly growing Little Bear Creek neighborhood and recommend steps to relieve the pressure on 35th Avenue SE via the parallel 43rd Avenue SE and 51st Avenue SE corridors.

The study approach utilizes a planning level analysis to:

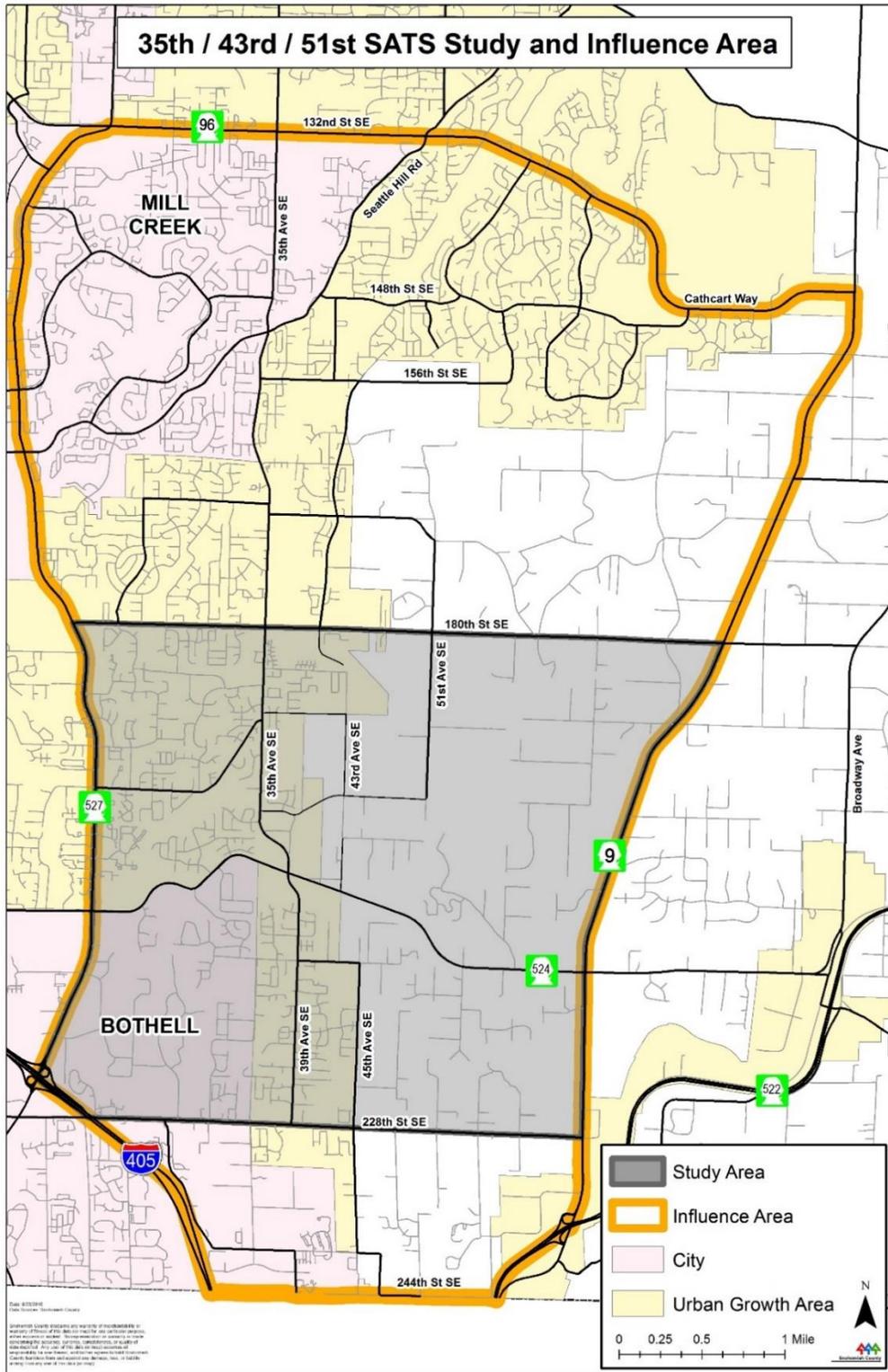
- Assess the adequacy of the existing transportation network
- Evaluate the projects necessary to support acceptable traffic circulation within the study area
- Determine performance measures for the proposed future road network (2035)
- Recommend implementation strategies for project phasing within the study area
- Assess the impact of connecting 43rd Avenue SE/45th Avenue SE and 51st Avenue SE corridors to ensure system connectivity

Snohomish County Public Works and Planning and Development Services staff will use the study to assist with decision making, guidance, and review of development improvements and necessary facilities. In addition State of Washington's Growth Management Act requires that the county has a strategy for maintaining an adopted LOS concurrent with the impacts from land development. This study will assist in identifying possible future issues and allow the county to adjust its strategy if necessary.

Definition of Study Area

The study area is bound by SR 527 (Bothell Everett Highway) to the west, 180th Street SE to the north, SR 9 to the east, and 228th St SE to the south. The area is broadly referred to as the Little Bear Creek neighborhood. The study area was selected to border the highly congested segment of the 35th Avenue SE corridor and the functional significance of the network of roads cordoning the area. Figure 1 shows the general vicinity of the study area which is within the City of Bothell and the City of Mill Creek Municipal Urban Growth Areas (MUGAs) as well as rural unincorporated Snohomish County. This area includes the most congested sections of 35th Avenue SE as well as the fastest growing areas in that corridor. The study area also contains possible north/south corridors that may provide some congestion relief to 35th Avenue such as 43rd Avenue SE and 51st Avenue SE.

Figure 1 - Map of Study and Influence Area



Definition of Influence Area

The study also uses a larger “influence area” used for forecasting impacts on the study area. The influence area includes the area north and south of the study area. Its borders are SR 527 to the west, 132nd Street SW/SR 96 to the north, 244th Street SE to the south, and SR 9 to the east. This area has been experiencing a high rate of land-use development and growth, primarily within the western portion that is the Southwest Urban Growth Area (SWUGA). Parts of the influence area lie within the City of Mill Creek and City of Bothell MUGAs. Figure 1 shows the spatial relationship between the study area and the influence area.

Policies and Guidelines

The Snohomish County General Policy Plan (GPP) contains many policies that provide guidance for the development of the transportation system in Snohomish County. Among these policies are those that encourage the county to improve roadway connectivity and multimodal circulation (GPP-TR-1.B.5) and those that direct the county to avoid major new rural roads in rural areas (GPP-TR-1.B.7).

Some of the projects in this study are located in the rural area. The extensions of 43rd Avenue SE and 51st Avenue SE are classified as “minor collectors” in the comprehensive plan. Minor collectors have the purpose of providing local circulation and connectivity and as such should not be considered major new roads. Rural design standards and level of service standards would apply in these locations to provide for roadway construction and operation that fits into the context of the surrounding environment. Rural development regulations are in place to guard against urban development and maintain rural character.

The Snohomish County Engineering Design and Development Standards (EDDS) provides standards for roadway design. Generally, urban arterials, such as 35th Avenue SE are to include a curb, gutter, sidewalk, enclosed drainage, and bike lanes where appropriate. In comparison, rural arterials such as 51st Avenue SE and much of 43rd Avenue SE generally have walkways/shoulders and open drainage. EDDS Road Design Figures are in Appendix A for additional details.

II. Current Conditions

Current Land Use

The land use within the study area can be generally classified as both urban and rural. Figure 2 shows the defined urban and rural land use areas. The urban area, from SR 527 to the urban growth area boundary supports a mix of land uses consisting of single family homes, apartments, condos, townhomes, businesses, and public and institutional facilities. The area surrounding the 35th Avenue SE corridor is one of the faster growing residential areas of unincorporated Snohomish County at the time of this study. The area around SR 527 is made up of businesses, retail and dense housing. In the Southwest quadrant is the City of Bothell with the Canyon Park Business Park and Park & Ride.

The rural area, from urban growth area boundary to SR 9, is primarily rural residential homes with a Limited Area of More Intense Rural Development (LAMIRD), the Clearview Rural Commercial (CRC) designation at the junction of 180th Street SE and SR 9, and Rural Business at SR 524 and SR 9.

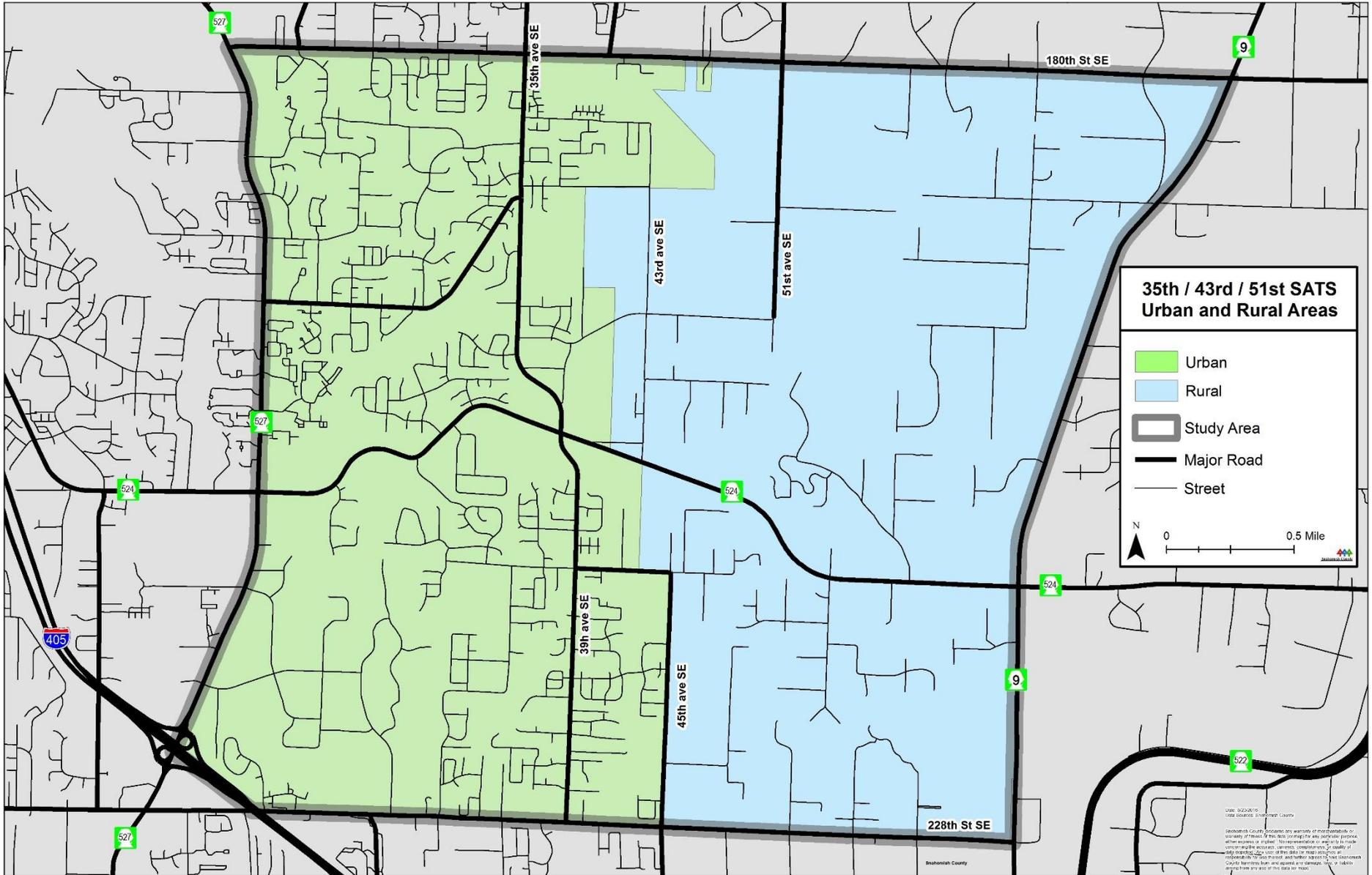
Current Zoning Pattern

The study area has a variety of zoning classifications. Residential and mixed-use zones range from Urban Center to Rural 5-Acre. There are also some areas zoned for commercial, neighborhood businesses and industrial uses. Map 1 in Appendix D shows the current zoning map for the study area.

Land Use and Development Activities

The influence area had a population of 19,654 and a total employment of 8,020 in 2010. The county issued building permits for more than 2,300 single family units, 250 multifamily units, and over 350,000 square feet of commercial, industrial, or public uses for construction in the unincorporated portion of the influence area between 2011 and 2016. The influence area also includes parts of the cities of Mill Creek and Bothell. According to the Snohomish County Tomorrow Growth Monitoring Report (2015), between 2011 and 2014, there were 520 residential units permitted within the City of Mill Creek, and 143 units in the Snohomish County portion of the City of Bothell.

Figure 2 - Urban and Rural Land Use Areas



Existing Road Network and Travel Patterns

The main north-south arterial roadway within the study area is 35th Avenue SE/39th Avenue SE. The travel patterns show that traffic is heavy in the north to south direction along 35th Avenue SE. The predominant traffic flow direction is southbound during the AM peak period from 6 a.m. to 9 a.m., and northbound in the PM peak period from 3 p.m. to 6 p.m. Traffic from 35th Avenue SE/39th Avenue SE feeds SR 527, I-405 and SR 9.

Other north/south roadways lie on the perimeters of the study area including SR 527 on the western boundary and SR 9 to the east. Meanwhile 43rd Avenue SE and 51st Avenue SE also run south/north within the study area, but these roadways do not currently provide direct continuous travel for through traffic between SR 524 and 180th Street SE.

The two main east/west corridors in the study area are SR 524 in the south and 180th Street SE to the north.

The posted speed limits along the arterial roadways range from 25 mph along 43rd Avenue SE and 35 mph on 35th Avenue SE and 51st Avenue SE.

Road Classification

The Snohomish County Arterial Circulation Map classifies the road system within the county. Within the study area, 35th Avenue SE/39th Avenue SE, 180th Street SE, SR 524 and 228th Street SE corridors are classified as minor arterial roadways intended to provide intra-community continuity and connectivity to the principal arterial system (SR 9 and SR 527). The 43rd Avenue SE and 51st Avenue SE corridors are classified as minor collector roadways intended to funnel traffic from local roads to the arterial network. All other roads within the focus area are designated as local roads. Figure 3 shows the Arterial Circulation Map for the study area.

Traffic Signals

Traffic signals are located at major cross streets in the study area. Some signals along 35th Avenue SE are in close proximity to each other. The phase for through movement at some of these signals are coordinated to facilitate traffic progression and improved operations. Signal locations are shown in Map 2 in Appendix D.

Accident Locations

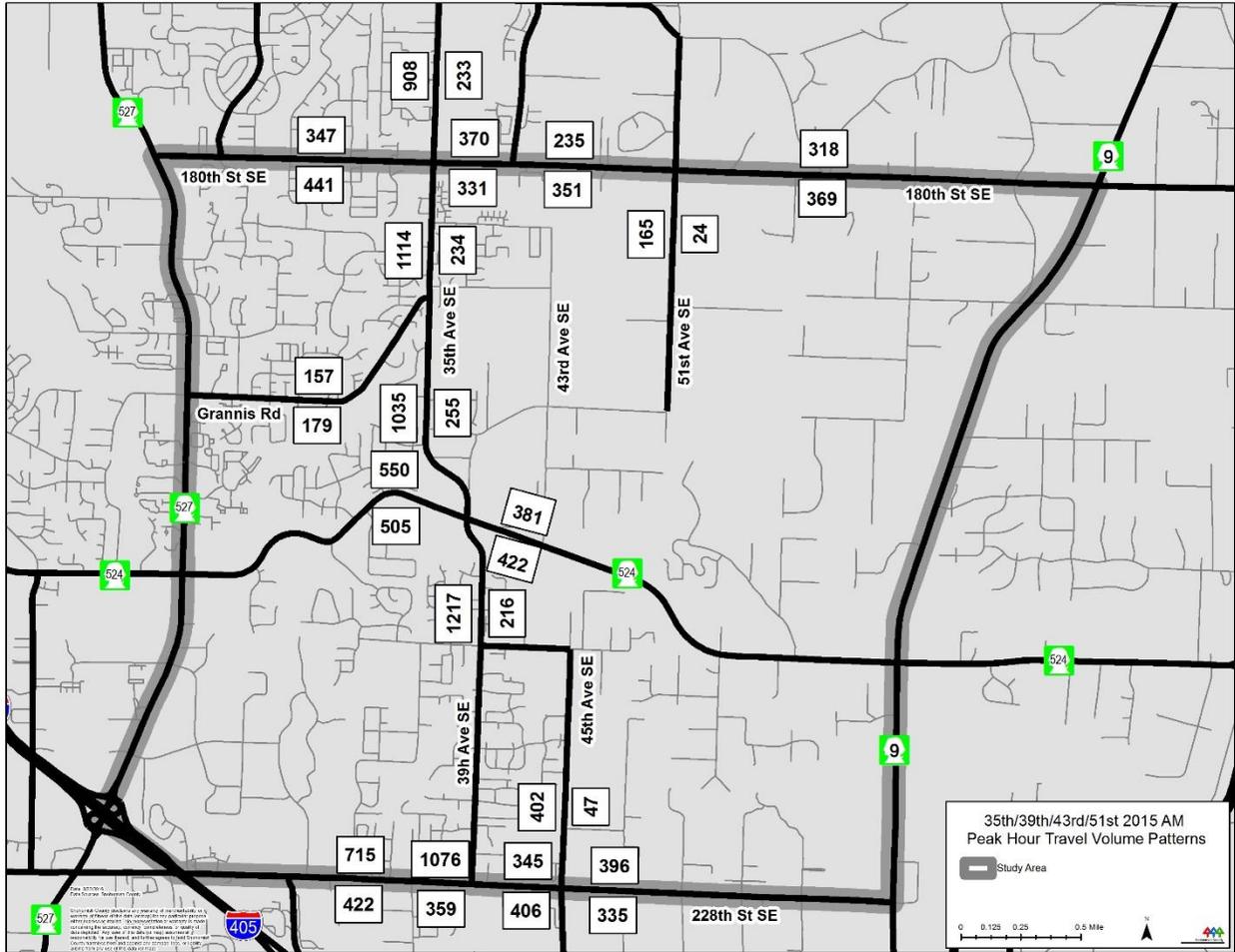
An inventory of accident types on arterials within the study vicinity is listed in Appendix C. Accidents are summarized for the three-year period between 2013 and 2015. Total accidents within the period is 246. About 65 percent of accidents involved property damage only and 32 percent involved injury. The one fatal accident recorded occurred on 51st Avenue SE between 196th Street SE and 169th Street SE. Most of the compiled accidents occurred along 180th Street SE between SR 527 and SR 9.

Traffic Volumes

The existing traffic volumes on the major roadways within the study vicinity are shown in Figure 4 for the AM peak hour and in Figure 5 for the PM peak hour. There is a distinctive high peaking direction in travel pattern along 35th Avenue SE. During the AM peak hour, the southbound direction experiences the highest traffic volume. During the PM peak hour, the reverse occurs - the northbound direction experiences the highest traffic volume. These high volumes result in performance deficiencies and high delays at intersections during the peak periods.

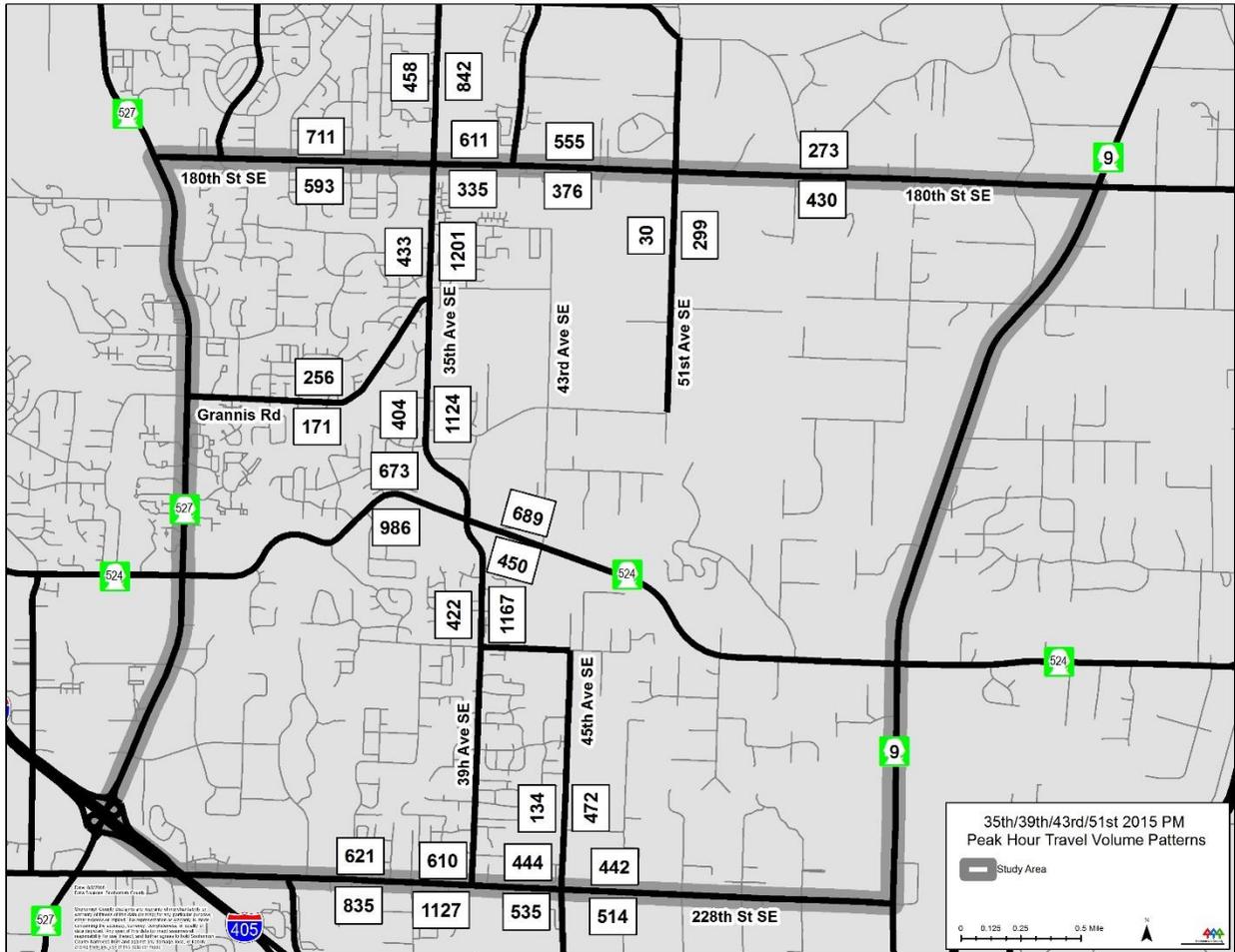
The two-directional volumes for the PM peak hour are consistently higher than that of the AM peak hour. As a result, the PM peak volumes are used for the planning-level roadway performance determinations. Traffic turn volumes for existing key intersections are summarized in Appendix B.

**Figure 4 - Existing (2015)
AM Peak Hour Volumes (vehicles per hour)**



- ¹ Directional peak volumes. Highest one hour within the AM peak period of 6 a.m. to 9 a.m.
- ² Volume data are compiled from existing tube counts and intersection turn counts
- ³ Volume data measured in vehicles/hour

**Figure 5 - Existing (2015)
PM Peak Hour Volumes (vehicles per hour)**



¹ Directional peak volumes. Highest one hour within the PM peak period of 3 p.m. to 6 p.m.

² Volume data are compiled from existing tube counts and intersection turn counts

³ Volume data measured in vehicles/hour

Current Traffic Network Performance

The TE details the operational performance of all arterial units within the county. The table below summarizes the arterial units within the study area and the corresponding planning level volume-to-capacity (v/c) ratio in 2015. A v/c ratio exceeding 1.0 indicates potential problems in performance. At this level, motorists consider travel unacceptable due to low travel speeds, long queues and delays at intersections and excessive number of stops. A v/c ratio below 1.0 indicates satisfactory traffic operations. This level generally occurs with favorable progression and lower congestion.

For this study, the planning level analysis was extended by using existing 2015 and 2016 traffic counts to compute the v/c ratios for the roadway segments. Table 1 summarizes the segment level performance measures (v/c) for the AM and PM peak hours.

During the AM peak hour, vehicles travelling along 35th Avenue SE and 39th Avenue SE operate at a performance level between 0.90 and 1.0. These levels signify that these roadway segments are nearing their operational capacity.

During the PM peak hour, vehicles travelling along 35th Avenue SE and 39th Avenue SE operate at a performance level exceeding 1.0 v/c. These levels signify that the roadway segments operate above their capacity during the PM peak hour.

The planning level approach used in this study does not capture the field measurable performance measures (speed, queuing and stops) as perceived by travelers. Specifically, this planning level analysis does not capture vehicular travel speeds and the number of stops along the corridor.

Table 1: Current Traffic Network Performance

2015 AM and PM Peak Hour Bi-Directional v/c Ratios				
Street	Start	End	AM v/c	PM v/c
35 th Ave SE	180 th St SE	168 th St SE	0.77	0.88
35 th Ave SE	Grannis Rd	180 th St SE	0.91	1.11
35 th Ave SE	SR 524	Grannis Rd	0.87	1.03
39 th Ave SE	228 th St SE	SR 524	0.98	1.08
180 th St SE	SR 527	35 th Ave SE	0.47	0.78
180 th St SE	35 th Ave SE	Sunset Rd	0.50	0.68
180 th St SE	Sunset Rd	51 st Ave SE	0.40	0.63
180 th St SE	51 st Ave SE	SR 9	0.52	0.53
228 th St SE	35 th Ave SE	39 th Ave SE	0.88	1.06
228 th St SE	39 th Ave SE	45 th Ave SE	0.44	0.58
228 th St SE	45 th Ave SE	SR 9	0.43	0.57
Grannis Rd	SR 527	35 th Ave SE	0.24	0.30
51 st Ave SE	196 th St SE	180 th St SE	0.13	0.23
45 th Ave SE	228 th St SE	212 th St SE	0.32	0.43

Transit Service

Transit service is limited to the City of Bothell and the far western edge of the study area. This is the portion of the study area that is in Community Transit's public transportation benefit area (PTBA). See Map 3, Study Area Transit Map in Appendix D. The PTBA does not include 35th Avenue SE, 43rd Avenue SE, or 51st Avenue SE.

The Community Transit local bus service in the study area includes:

- Three routes on SR 527 (105, 106, and 435)
- Two routes on the most western portion of 228th Street SE (106 and 120)
- One route on the most western portion of 180th Street SE (106)

A park and ride and freeway transit center is located at Canyon Park in the most southwest corner of the study area at the SR 527 interchange with I-405. The park and ride has approximately 300 parking spaces with a 100 percent utilization rate.

Non-Motorized Facilities

All existing sidewalks and bicycle lanes in the study area were inventoried for the purpose of the TE. The new developments have sidewalks and bike lanes while the older areas have no or minimal non-motorized facilities. New pedestrian and bicycle facilities are being built as new development occurs and some will be built by Snohomish County.

Sidewalk completion is based on frontage development, and roadway improvements. The following lists areas where sidewalks exist along these four key roadways within the study area.

- The majority of 39th Avenue SE between 228th Avenue SE and SR 524 has sidewalks on both sides.
- Much of 35th Avenue SE between SR 524 and 180th Street SE has sidewalks, however, gaps still remain.
- Along 43rd Avenue SE between 188th Street SE and 180th Street SE there are some sidewalks
- On 43rd Avenue SE between 194th Street SE and 188th St SE sidewalks are only on the east side.
- There are sidewalks on both sides of 228th Street SE between 39th Avenue SE and SR 9.

There are currently 50 miles of sidewalks in the unincorporated Snohomish County portion of the study area. A little more than seven miles of these sidewalks are along the key roadways of 35th Avenue SE, 39th Avenue SE, 43rd Avenue SE, and 228th Street SE. The sidewalk and pedestrian network can be seen on Map 4, Non-Motorized Facilities, in Appendix D.

The Countywide Bicycle Facilities map in the TE identifies about 17 miles of planned bicycle facilities within the urban portion of the study area on 35th Avenue SE, 39th Avenue SE, 180th Street SE, 194th Street SE, 228th Street SE, and Grannis Road. This network is currently about 25 percent built out. Bicycle lanes exist on 35th/39th Avenue SE starting 207th Place SE to just north of SR 524. They also exist on both sides of 228th Street SE from 39th Avenue SE to SR 9. The bicycle network can be seen on Map 5, Bicycle Facilities, in Appendix D.

Streams and Wetlands

The Streams, Wetlands & Watershed Map (Map 6 in Appendix D) shows the streams, wetlands, and watershed within the study area. There are 11 key creeks and additional unnamed streams that feed into the bigger Little Bear Creek (LBC) and North Creek. With the LBC watershed directly east of the UGA, this will put limitations on enhancing and developing the road network east of 35th Avenue SE. Other roadways such as 35th Avenue SE and 39th Avenue SE are outside of the LBC watershed, 43rd Avenue SE and 45th Avenue SE are on the edge of the LBC watershed, and 51st Avenue SE is centrally located in the LBC watershed. Currently Snohomish County's Surface Water Management Division is performing a water quality study on the LBC Basin for the Department of Ecology that may result in new regulations for development practices in the area. There are numerous wetlands located along the creeks and streams. See Map 6, Streams, Wetlands & Watershed in Appendix D.



Stream in the Little Bear Creek Watershed

III. Future Conditions

Comprehensive Plan Designations

The future land use within the study area can be generally classified as urban and rural. The designation does not differ significantly from the existing land use. Map 7, Future Land Use in Appendix D shows the defined urban and rural land uses. The 2015 Comprehensive Plan designates the future land use as follows:

- The urban area is designated as mostly Urban Low Density Residential or is within the City of Bothell, which consists of mostly residential and some commercial and industrial uses along SR 527.
- There are also medium sized pockets of urban, medium-density residential and urban center and small areas designated with general commercial, urban commercial, urban industrial, urban village, urban high-density residential, and public/institutional.
- The rural area is almost entirely designated as Rural Residential (1DU/5 Acres Basic) with a LAMIRD, the Clearview Rural Commercial (CRC) designation at the junction of 180th St SE and SR 9, Rural Business at SR 524 and SR 9 and other non-conforming uses.

Household and Employment Forecasts

Between 2010 and 2035, it is forecasted that the households within the influence area will grow by 44 percent, employment will increase by 31 percent, and population will rise by 46 percent. As a reference, the population of Snohomish County as a whole is expected to grow by 34 percent over that same period.

Table 2: Socio-Economic Forecasts in the Influence Area

Year	2010	2035	Percent Change
Population	19,654	28,616	46%
Household	7,170	10,355	44%
Employment	8,020	10,521	31%

*Snohomish County MAZs (25341, 25342, 25350, 25361, 25362, 25371, 25372, 25381-84, 25391, 25392, 25401-04, 25571-73, 25600, 25620, 25630, 25641, and 25642)

Planned Project Improvements

Transportation Element's Projects

Roadway Improvement Projects are listed in the Snohomish County 2015 TE and are recommended to be built over the next 20 years to meet the county's transportation needs to accommodate planned growth.

Table 3 through 5 list the projects which have been programmed to be completed by 2021, 2028 and 2035 respectively.

Table 3: Projects Programmed in TE by 2021

Street	Start	End	Project	Current Status
180 th St SE	SR 527	Brook Blvd	Widen to 5 lanes	Design
Seattle Hill Rd	35 th Ave SE	132 nd St SE	Widen to 3 lanes	Construct Spring 2017
35 th Ave SE (Phase 1)	180 th St SE	Seattle Hill Rd	Widen to 3 lanes	Design / ROW
35 th Ave SE/39 th Ave SE/York Rd (Phase 2)	SR 524	180 th St SE	Widen to 3 lanes	Design

Table 4: Projects Programmed in TE by 2028

Street	Start	End	Project	Current Status
180 th St SE	Brook Blvd	35 th Ave SE	Widen to 5 lanes	Planning
43 rd Ave SE	200 th St SE	196 th St SE	New Road – Rural 2 lanes	Design
Sunset Rd/43 rd Ave SE	43 rd Ave SE at 184 th St SE	End of Sunset Rd (Rd#21755)	New Road – Urban 2 lanes	Design
39 th Ave SE	228 th St SE	207 th St SE	Widen to 3 lanes	Partially Completed
228 th St SE	35 th Ave SE	39 th Ave SE	Widen to 4/5 lanes	Not started yet

Table 5: Projects Programmed in TE by 2035

Street	Start	End	Project	Current Status
180 th St SE	35 th Ave SE	51 st Ave SE	Widen to 3 lanes	Not started yet

Non-Motorized (Pedestrian/Sidewalk)

The TE does not include specific standalone sidewalk projects. The EDDS requires all arterials to have sidewalks in urban areas and walkways/shoulders in rural areas upon roadway widening projects or adjacent parcel development. With the future completion of TE projects, the frontage along the roadway will include sidewalks and walkways as part of the projects. This will provide residents in unincorporated Snohomish County within the study area a network of continuous pedestrian paths, better connectivity within their neighborhood and more transportation options to reach their destinations.

As development builds, non-motorized facilities will be provided. The sidewalks on the key unincorporated study area roadways (35th, 39th, 43rd, and 228th) are expected to double between 2015 and 2035 due to the construction of the roadway projects outlined in the TE. For a map of pedestrian and sidewalk facilities see Map, 4 Non-Motorized Facilities in Appendix D.

Bicycle Improvements

Bicycle improvements are required on arterials based on the 2015 Countywide Bicycle Facility System Map (Map 5 in Appendix D). By 2035, after the planned TE projects are built, the bicycle lane network

within the unincorporated study area will be over 85 percent complete. This more than triple the amount of the current bicycle lane miles. The expanded bicycle network will provide residents in the study area with a more continuous bicycle lane network, more transportation travel options and connectivity within the neighborhood.

The key arterials within the study area that have planned bicycle improvements are as follows:

- 35th Avenue SE/39th Avenue SE (228th Street SE to 180th Street SE)
- 196th Street SE/Grannis Road (SR 527 to 35th Avenue SE)
- 180th Street SE (SR 527 to SR 9)
- 51st Avenue SE (SR 524 to 180th St SE)
- 228th Street SE (SR 527 to SR 9) partially in City of Bothell
- 220th Street SE/26th Avenue SE/29th Drive SE (SR 527 to 228th Street SE) in City of Bothell
- SR 524 (SR 527 to Bothell City Limits) in City of Bothell

West of the study area, Snohomish County's North Creek Trail will run parallel to SR 527 filling a missing gap in the trail and connecting SR 524 with 183rd Avenue SE. This non-motorized project is fully designed and construction ready.

See the study area portion of the 2015 Countywide Bicycle Facility System Map in Map 5, Bicycle Facilities in Appendix D.

Other Jurisdiction Projects

The following are project improvements planned by other jurisdictions. These projects will have direct traffic circulation impacts on the study area.

- City of Bothell: Widen to three southbound lanes on SR 527 between I-405 and SR 524
- City of Bothell: Widen to three northbound lanes on SR 527 between 211th St SE to north of SR 524.
- City of Bothell: Widen to five lanes on 228th Street between 19th Avenue SE and 39th Avenue SE
- City of Bothell: Widen 35th Avenue SE to three lanes between 240th Street SE and 228th Street SE and make an intersection improvement at 35th Avenue SE and 240th Street SE
- WSDOT: Widen SR 9 to four/five lanes between 176th Street SE and SR 96

The City of Bothell also has proposed future sidewalks and trail improvements.

Transit Improvement

The Community Transit *2016-2021 Transit Development Plan* indicated their plan to open the second bus rapid transit line, now known as the *Swift Green Line*, 2019. It will provide faster and more frequent transit service between the Canyon Park P&R and Paine Field/Boeing in Everett via SR 527 on the west edge of the study area.

The Community Transit *Long-Range Transit Plan* includes higher levels of transit service in the future on four corridors within the study area: 35th Avenue SE, SR 9, SR 524th Street SE and 228th SE. The plan includes possible future *Swift* Bus Rapid Transit service on SR 524. Substantial portions of these corridors

are not currently in Community Transit's service area. Future expansions of transit service would be dependent on their annexation into Community Transit's service area.

The Snohomish County Comprehensive Plan has designated SR 527, SR 524, 35/39th corridor, and 228th Street SE as Transit Emphasis Corridors to serve as a framework for transit and land use coordination. See Map 3, Study Area Transit in Appendix D.

Travel Demand Forecasts

The traffic forecasts for future years in this planning-level study uses the land use assumptions from the 2015 Snohomish County comprehensive plan update. In addition to the proposed projects identified in the TE, the following new roadways were assumed for modeling travel demand in year 2035:

- 43rd Avenue SE/45th Avenue SE: new road from 212th Street SE to SR 524
- 51st Avenue SE: new road from SR 524 to 196th Street SE

These roadways were recommended as minor collectors shown on the 2015 comprehensive plan arterial circulation map as seen earlier in Figure 3 on page 15.

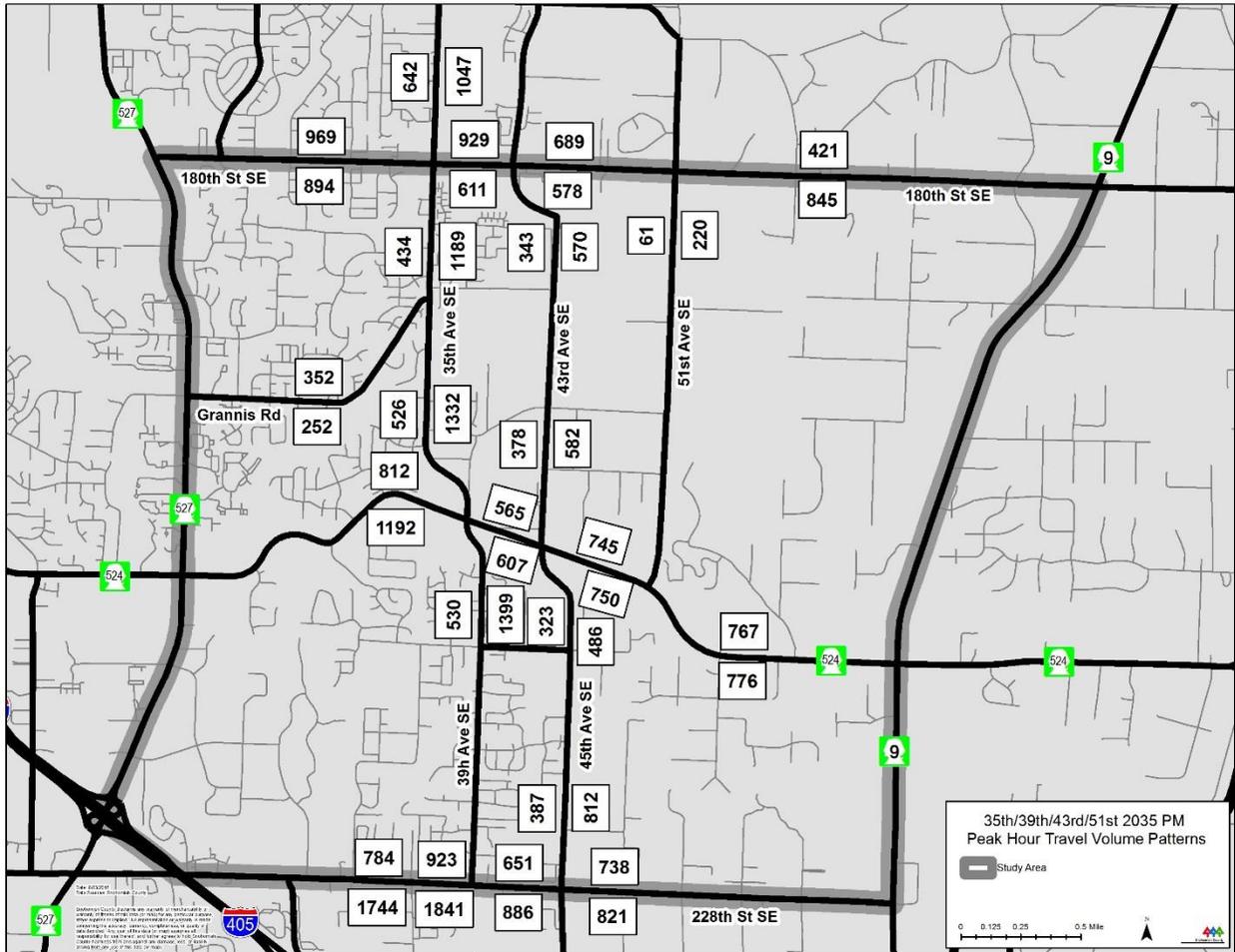
Snohomish County's travel-demand model was used to estimate traffic forecasts for the roadways and intersections for 2021, 2028 and 2035. Alternate traffic volumes were derived to assess the performance of several phasing improvements within the north-south corridors in the study area.

The demand forecasts indicate that traffic along the 35th Avenue SE corridor will grow by approximately 1.52 percent annually from current 2015 traffic levels through 2035. This will total a 30.4 percent increase in traffic on this corridor over the 20-year period.

The 2035 PM peak hour traffic demand for the roadway segments are shown in Figure 6.

Intersection turn volumes at key crossroads were also extracted from the travel demand model and is summarized in Appendix B.

**Figure 6 - Future Year (2035)
PM Peak Hour Demand Volumes**



¹ Directional peak volumes. Highest one hour as modeled within the PM peak period of 3 p.m. to 6 p.m.

² Volume data are post-processed from the Snohomish County Travel Demand Model

³ Volume data is measured in vehicles/hour

Project Phasing Analysis in the Small Area Transportation Study

A planning level criteria, using roadway segment volume-to-capacity (v/c) ratio analysis was used to evaluate the performance of roadway phasing options in the study area for 2021, 2028 and 2035. The county's traffic demand model was used to derive forecast volumes (V) for each of the phasing options considered. The Maximum Service Volume (MSV) for each roadway segment was estimated using lookup tables prepared by the county as a surrogate to roadway capacity. The MSV values are based on the number of lanes and intersection signal spacing along a corridor.

The planning level approach used in this study does not capture the real influence of intersection delays to vehicles. The analysis does not capture field measurable performance measures (speed, queuing and stops) as perceived by travelers. Specifically, this planning level analysis does not capture vehicular travel speeds and the number of stops along the corridor.

Under the planning level v/c measure employed in this analysis, when the demand volume (V) for a road exceeds its MSV or Capacity (C), that is, if v/c is greater than 1.0, then there is potential for unstable traffic operation and adverse roadway performance.

A volume-to-capacity ratio (v/c) less than 1.0 indicates stable traffic operations and describes reasonably unimpeded traffic operation.

The traffic analysis show that the two-way PM peak hour volumes are higher than the two-way AM peak hour volumes. Consequently, the PM volumes were used for estimating segment level v/c ratios. The existing (2015) PM peak hour v/c ratio for the 35th Ave SE corridor is estimated at 1.03. This indicates a less stable condition in which small increases in traffic flow may cause substantial increases in delay and decreases in travel speed along the corridor.

To determine the projects which will create the most beneficial impacts within the study area, the following phasing scenarios were considered and analyzed in 2021, 2028 and 2035.

The phasing analysis evaluate the volume-to-capacity (v/c) ratio on 35th Avenue SE north of SR 524 during the PM peak hour. This segment represents the worst operating roadway section in terms of PM peak hour traffic volumes and road segment delays in the study area.

Year 2021 Phasing Summary

The phasing options analyzed in 2021 are shown in Table 6.

Table 6: 2021 Project Phasing Options Analysis

2015 Base		2021 Phasing					
Existing PM Peak		2021 TE		2021 TE - 35 th Phase 2 + Sunset/43 rd		2021 TE + Sunset/43 rd	
Volume	v/c	Volume	v/c	Volume	v/c	Volume	v/c
1528	1.03	1801	1.02	1510	1.03	1667	0.95

Note: The TE projects planned to be completed by 2021 are identified in Table 3 on page 23.

2021 TE – Assumes that all TE projects planned to be completed by 2021 have been constructed.

2021 TE - 35th Phase 2 + Sunset/43rd – Assumes that all TE projects planned to be completed by 2021 have been constructed with the exception of the 35th Ave SE widening project between SR 524 and 180th St SE (Phase 2). This scenario also assumes that two 43rd Avenue projects that were planned in the TE to be completed by 2028 be accelerated to be completed by 2021. Those projects are 43rd Avenue SE between 200th Street SE and 196th Street SE, and 43rd Avenue SE between 184th Street SE and the end of Sunset Rd.

2021 TE + Sunset/43rd – Assumes that all TE projects planned to be completed by 2021 have been constructed including the 35th Ave SE widening project between SR 524 and 180th St SE (Phase 2). This scenario also assumes that the two 43rd Avenue projects included in the scenario above have been completed by 2021.

Analysis: The analysis indicates that projects that have been assumed in the TE for 2021 will provide a marginal improvement for 35th Avenue SE over current conditions but will likely not be adequate to maintain the performance of the roadway. Constructing the two 43rd projects in place of the 35th Avenue SE phase 2 widening will also not provide the desired performance. The analysis indicates that the desired performance on 35th Avenue SE can be achieved for 2021 if the two projects on 43rd Avenue corridor between 200th St and Sunset Rd are completed in addition to all of the projects assumed in the TE.

[Year 2028 Phasing Summary](#)

The phasing options analyzed in 2028 are shown in Table 7.

Table 7: 2028 Project Phasing Options Analysis

2015 Base		2028 Phasing					
Existing PM Peak		2028 TE		2028 TE + 43 rd /45 th		2028 TE + 51 st	
Volume	v/c	Volume	v/c	Volume	v/c	Volume	v/c
1528	1.03	1933	1.10	1750	0.99	1927	1.09

Note: The TE projects planned to be completed by 2028 are identified in Table 3 and Table 4 on page 23.

2028 TE – Assumes that all TE projects planned to be completed by 2028 have been constructed.

2028 TE + 43rd/45th – Assumes that all TE projects planned to be completed by 2028 have been constructed with the addition of a new arterial segment on the 43rd/45th Avenue SE corridor that connects 212th Street SE and SR 524. This 43rd/45th project is currently shown as a new road on the TE Arterial Circulation Map, but is not currently planned to be completed before the 2035.

2028 TE + 51st – Assumes that all TE projects planned to be completed by 2028 have been constructed with the addition of a new arterial segment on 51st Avenue SE between SR 524 and 196th Street SE. This 51st Avenue project is currently shown as a new road on the TE Arterial Circulation Map, but is not currently planned to be completed before the 2035.

Analysis: As can be seen in Table 7, the analysis indicates that the TE projects assumed to be completed by 2028 will not likely be adequate to maintain the performance of the 35th Avenue SE in 2028. The analysis indicates that completing a the new 43rd/45th connection south of SR 524 in addition to the 2028 TE projects will likely achieve the desired 2028 performance. The analysis indicates that that completing a new arterial segment of 51st Avenue south of SR 524 in addition to the 2028 TE project list will not likely provide the desired performance.

[Year 2035 Phasing Summary](#)

Three phasing options were analyzed in 2035 and are summarized in Table 8.

Table 8: 2035 Project Phasing Options Analysis

2015 Base		2035 Phasing							
Existing PM Peak		2035 TE		2035 TE with 43 rd /45 th added		2035 TE with 51 st added		2035 TE with both 43 rd /45 th and 51 st added	
Volume	v/c	Volume	v/c	Volume	v/c	Volume	v/c	Volume	v/c
1528	1.03	1990	1.13	1831	1.04	1927	1.09	1813	1.03

Note: The TE projects planned to be completed by 2035 are identified in identified in Table 3, Table 4, and Table 5 on page 23.

2035 TE – Assumes that all projects in the TE planned to be completed by 2035 have been constructed.

2035 TE with 43rd/45th – Assumes that all TE projects have been built by 2035 with the addition of a new 43rd Avenue SE/45th Avenue SE arterial segment between 212th Street SE and SR 524.

2035 TE with 51st added – Assumes that all projects in the TE are built by 2035 with the addition of a new 51st Avenue SE arterial segment between SR 524 and 196th Street SE.

2035 TE with both 43rd/45th and 51st added – Assumes that all projects in the TE are built by 2035 with the addition to the 43rd Avenue SE/45th Avenue SE and 51st Avenue SE projects.

Analysis: The analysis indicates that none of the four scenarios analyzed will likely achieve the desired performance for 2035.



Northbound Traffic on 35th Avenue SE and 164th Street SE during the PM Peak Period

Future Traffic Network Performance

The TE details the operation performance of all arterial units within the county. The table below summarizes the arterial units within the study area and the corresponding two-way volume-to-capacity (v/c) ratio in 2035. A v/c ratio exceeding 1.0 indicates potential problems in traffic operations. A v/c ratio below 1.0 indicates satisfactory traffic operations.

In addition to the assumptions used for the 2035 TE analysis, this study assumes the following arterial roadway extensions for 2035.

- 43rd Avenue SE/45th Avenue SE new road from between 212th Street SE and SR 524
- 51st Avenue SE new road from SR 524 and 196th Street SE

Table 9 – Future Traffic Network Performance

2035 PM Peak Hour Bi-Directional v/c Ratios			
Street	Beginning	End	v/c
35 th Ave SE	180 th St SE	168 th St SE	0.96
35 th Ave SE	Grannis Rd	180 th St SE	0.92
35 th Ave SE	SR 524	Grannis Rd	1.03
39 th Ave SE	228 th St SE	SR 524	1.10
180 th St SE	SR 527	35 th Ave SE	0.54
180 th St SE	35 th Ave SE	Sunset Rd	0.88
180 th St SE	Sunset Rd	51 st Ave SE	0.72
180 th St SE	51 st Ave SE	SR 9	0.95
228 th St SE	35 th Ave SE	39 th Ave SE	0.83
228 th St SE	39 th Ave SE	45 th Ave SE	0.91
228 th St SE	45 th Ave SE	SR 9	0.93
Grannis Rd	SR 527	35 th Ave SE	0.43
51 st Ave SE	SR 524	180 th St SE	0.20
45 th Ave SE	228 th St SE	212 th St SE	0.85
45 th Ave SE	212 th St SE	SR 524	0.55
43 rd Ave SE	SR 524	196 th St SE	0.84
43 rd Ave SE	188 th St SE	180 th St SE	0.59

A traffic performance comparison between the study area traffic networks under current conditions (Table 1 on page 19) and under 2035 conditions (Table 9 above) indicates that the traffic performance will remain relatively stable. The analysis indicates that the increased traffic demand generated by 46% population increase will be offset by the completion of the TE project list (Tables 3,4, and 5 on page 23), and the two additional projects discussed above.

IV. Conclusions

Based on the project phasing analysis for 35th Avenue SE, Snohomish County Public Works makes the following conclusions:

- To maintain acceptable traffic conditions on 35th Avenue SE in 2021, this analysis indicates that all TE projects planned to be completed by 2021 are necessary. These projects are listed in Table 3 on page 23. In addition this study finds that two projects that had been planned in the TE for 2028 completion should be accelerated. These projects are 43rd Avenue SE from 200th Street SE to 196th Street SE and Sunset Road/43rd Avenue SE from 43rd Avenue SE at 184th Street SE to the end of Sunset Road.
- To maintain acceptable traffic conditions on 35th Avenue SE in 2028, this analysis indicates that all TE projects planned to be completed by 2028 are necessary. These projects are listed in Tables 3 and 4 on page 23 of this report. In addition the analysis indicates that a roadway segment connecting 43rd Avenue SE/45th Avenue SE between 212th Street SE and SR 524 should be completed by 2028. This project is not currently on the TE project list, but is included on the TE arterial circulation map.
- This analysis indicates that the projects in the TE scheduled for completion by 2035, listed in tables 3, 4, and 5 on page 23, will not be sufficient to maintain acceptable traffic conditions in the study area in 2035. The 2035 analysis also tested two additional projects not currently on the adopted TE project list, 43rd Avenue SE from 212th Street SE to SR 524 and a new 51st Avenue SE segment from SR 524 to 196th Street SE. The analysis indicates that the addition of these two projects to the 2035 TE project list will not provide the capacity necessary to achieve v/c levels below 1.0 on 35th Avenue SE.

It is important to emphasize that the planning-level volume to capacity approach used in this study only indicates the possibility of a level of service deficiency. This planning-level analysis does not capture field measurable performance measures such as speed, queuing and stops that are necessary factors for an actual level of service deficiency determination necessary for concurrency purposes. A more detailed operational analysis would be necessary to make this determination.

Appendices

- A. Snohomish County Engineering and Design and Development Standards (EDDS) – Roadway design standards
- B. Forecast intersection turn volumes
- C. Accident Data Summary
- D. Maps

Appendix A: EDDS - Roadway Design Standards

ROAD STANDARDS – ARTERIALS

RURAL AREA STANDARDS ARE TO BE USED IN DESIGNING ROADS UTILIZING SHOULDERS AND OPEN DRAINAGE. THESE STANDARDS WILL GENERALLY BE REQUIRED IN RURAL AREAS AS DESIGNATED IN SNOHOMISH COUNTY'S COMPREHENSIVE PLANS. HOWEVER, THESE STANDARDS MAY ALSO BE ALLOWED FOR THOSE ROADS LYING INSIDE THE URBAN AREA BOUNDARY WHERE ZONING REQUIRES RESIDENTIAL LOT SIZES OF APPROXIMATELY ONE-HALF ACRE OR MORE AND CHARACTERIZED BY LARGE AREAS OF FARMLAND OR NATURAL AND UNDEVELOPED LANDS.

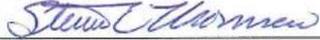
URBAN AREA STANDARDS ARE TO BE USED IN DESIGNING STREETS UTILIZING CURB AND GUTTER SECTIONS, SIDEWALKS AND ENCLOSED DRAINAGE. THESE STANDARDS WILL GENERALLY BE REQUIRED IN AREAS OF SUBURBAN OR HIGHER DENSITIES AS DESIGNATED IN SNOHOMISH COUNTY'S COMPREHENSIVE PLANS. HOWEVER, THESE STANDARDS MAY ALSO BE REQUIRED FOR THOSE ROADS IN RURAL AREAS WHERE ZONING PERMITS RESIDENTIAL LOT SIZES OF APPROXIMATELY ONE-THIRD ACRE OR LESS, COMMERCIAL OR INDUSTRIAL DEVELOPMENT, OR OTHER INTENSIVE LAND USES.

NOTES:

1. PAVEMENT WIDTH FOR RURAL ARTERIALS IS MEASURED FROM OUTSIDE EDGE OF SHOULDER TO OUTSIDE EDGE OF SHOULDER. URBAN ARTERIALS ARE MEASURED FROM FACE OF CURB TO FACE OF CURB. WIDTH VARIES DEPENDING ON WHETHER BICYCLE LANES OR WIDENED EXTERIOR LANES ARE CONSTRUCTED. SEE TEXT SECTION 4-08.
2. SHOULDER WIDTHS VARY. SEE TEXT SECTION 4-06.
3. DESIGNATED WALKWAYS SHALL BE DELINEATED IN ACCORDANCE WITH STANDARD DRAWING 4-160.
4. ALL PAVED SHOULDERS AND NON-SEPARATED WALKWAYS SHALL BE CONSTRUCTED TO THE SAME PAVEMENT SECTION AS REQUIRED FOR TRAVEL LANES.
5. BOULEVARDS (I.E., STREETS WITH MEDIANS) SHALL BE CONSTRUCTED WITH A MINIMUM OF 20 FEET OF CLEAR PAVEMENT ON EACH SIDE OF THE MEDIAN. IF PARKING IS ALLOWED, A MINIMUM OF 28 FEET SHALL BE CONSTRUCTED ON EACH SIDE OF THE MEDIAN TO ALLOW FOR 20 FEET OF CLEAR PAVEMENT PLUS 8 FEET OF PARKING.
6. ROADS IN COMMERCIAL/INDUSTRIAL AREAS SERVING SIGNIFICANT VOLUMES OF TRUCK TRAFFIC MAY REQUIRE ADDITIONAL WIDTH AND PAVEMENT DEPTH AS DETERMINED BY THE ENGINEER BASED ON SUPPORTING DATA SUBMITTED BY THE DEVELOPER.
7. NUMBER OF LANES TO BE DETERMINED FROM THE TRANSPORTATION ELEMENT OF THE COMPREHENSIVE PLAN AND THE TRANSPORTATION NEEDS REPORT.
8. ADDITIONAL R/W WIDTH MAY BE REQUIRED TO ACCOMMODATE 7-FOOT SIDEWALKS IN COMMERCIAL/INDUSTRIAL OR MULTI-FAMILY RESIDENTIAL ZONED AREAS.
9. IF BICYCLE LANES ARE REQUIRED. SEE TEXT SECTION 4-08. MINIMUM WIDTH SHALL BE 5 FT IN A CURB ROAD SECTION AND 4 FT IN A NON-CURB ROAD SECTION.
10. IF BICYCLE LANES ARE NOT REQUIRED, THE EXTERIOR LANE WIDTH ON URBAN ROADS SHALL BE 14 FT TO PROVIDE A SHARED TRAVEL LANE.

SEE TEXT CHAPTER 3

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	SNOHOMISH COUNTY PUBLIC WORKS		APPROVED BY:	
	3-030A	ROAD STANDARDS – ARTERIALS	 5-29-03 COUNTY ROAD ENGINEER DATE	

Appendix A (continued): EDDS - Roadway Design Standards

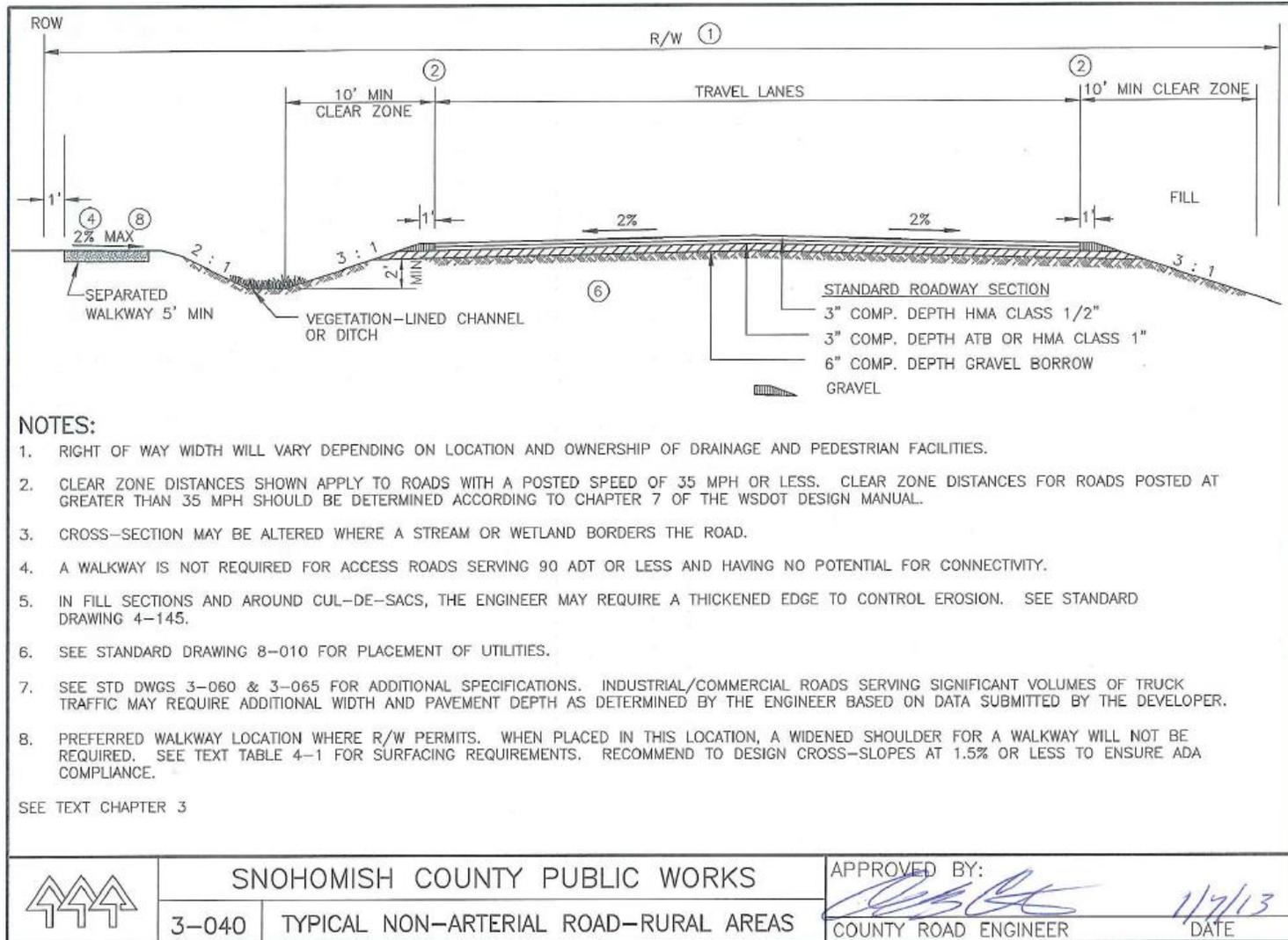
RURAL ARTERIALS						
MINIMUM WIDTH IN FEET						
RURAL AREAS	R/W	PAVEMENT WIDTH ①	EXTERIOR LANE ⑩	INTERIOR LANE	SHOULDER SIDE/SIDE ②③④	
MINOR COLLECTOR						
ADT < 400	70	36	11	---	7/7	
ADT 400 to 2000	70	38	11	---	8/8	
ADT > 2000	70	40	12	---	8/8	
MAJOR COLLECTOR						
ADT < 2000	80	38	11	---	8/8	
ADT > 2000 (2 Lane)	80	40	12	---	8/8	
ADT > 2000 (4 Lane)	100	62	11	12	8/8	

URBAN ARTERIALS						
MINIMUM WIDTH IN FEET						
URBAN AREAS ⑤⑥⑦	R/W ⑧	PAVEMENT WIDTH ①	BICYCLE LANE ⑨	EXTERIOR LANE ⑩	INTERIOR LANE	LEFT TURN LANE
COLLECTOR ARTERIAL						
(2 Lanes)	70	28-34	5	12-14	--	--
(3 Lanes)	70	40-46	5	12-14	--	12
(4 Lanes)	80	50-56	5	12-14	11	--
(5 Lanes)	92	62-68	5	12-14	11	12
MINOR ARTERIAL						
(2 Lanes)	80	28-34	5	12-14	---	---
(3 Lanes)	80	40-46	5	12-14	--	12
(4 Lanes)	80	50-56	5	12-14	11	---
(5 Lanes)	92	62-68	5	12-14	11	12
PRINCIPAL ARTERIAL						
(4 Lanes)	100	52-58	5	12-14	12	---
(5 Lanes)	100	64-70	5	12-14	12	12
(6 Lanes)	106	76-82	5	12-14	12	---
(7 Lanes)	118	88-94	5	12-14	12	12

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	SNOHOMISH COUNTY PUBLIC WORKS		APPROVED BY:
	3-030B	ROAD STANDARDS - ARTERIALS	 COUNTY ROAD ENGINEER DATE

Appendix A (continued): EDDS - Roadway Design Standards



Appendix B: Turn Volumes

35th / 43rd Avenue SE existing and forecasted PM peak intersection turning movement volumes

Existing (2015) Turning Movements

2021 Assuming TE Projects are built

2021 TE-35th Phase 2+Sunset+43rd

2021 TE + Sunset + 43rd

35th Ave SE & SR 96					
		98	356	460	
		↙	↓	↘	
157	↗		4428		287
1315	→				789
246	↘				135
		↙	↑	↘	
		198	301	87	

35th Ave SE & SR 96					
		98	419	551	
		↙	↓	↘	
160	↗		5147		366
1557	→				897
290	↘				141
		↙	↑	↘	
		235	356	78	

35th Ave SE & SR 96					
		97	422	548	
		↙	↓	↘	
155	↗		5151		363
1556	→				900
288	↘				141
		↙	↑	↘	
		239	364	79	

35th Ave SE & SR 96					
		98	419	547	
		↙	↓	↘	
154	↗		5159		358
1558	→				904
292	↘				141
		↙	↑	↘	
		242	372	75	

35 Ave SE at SEATTLE HILL RD					
		66	508	289	
		↙	↓	↘	
98	↗		3436		161
618	→				305
88	↘				134
		↙	↑	↘	
		83	823	263	

35 Ave SE at SEATTLE HILL RD					
		75	631	311	
		↙	↓	↘	
114	↗		3962		178
684	→				454
102	↘				106
		↙	↑	↘	
		91	936	280	

35 Ave SE at SEATTLE HILL RD					
		75	633	311	
		↙	↓	↘	
112	↗		3962		178
684	→				450
101	↘				111
		↙	↑	↘	
		90	948	269	

35 Ave SE at SEATTLE HILL RD					
		75	634	310	
		↙	↓	↘	
112	↗		3980		178
684	→				448
101	↘				118
		↙	↑	↘	
		90	954	276	

35 Ave SE at 156th St SE					
		N/A	566	125	
		↙	↓	↘	
N/A	↗		1706		109
N/A	→				N/A
N/A	↘				41
		↙	↑	↘	
		N/A	768	97	

35 Ave SE at 156th St SE					
		N/A	657	144	
		↙	↓	↘	
N/A	↗		1966		125
N/A	→				N/A
N/A	↘				47
		↙	↑	↘	
		N/A	889	104	

35 Ave SE at 156th St SE					
		N/A	662	144	
		↙	↓	↘	
N/A	↗		1967		125
N/A	→				N/A
N/A	↘				43
		↙	↑	↘	
		N/A	890	103	

35 Ave SE at 156th St SE					
		N/A	670	143	
		↙	↓	↘	
N/A	↗		1988		125
N/A	→				N/A
N/A	↘				43
		↙	↑	↘	
		N/A	904	103	

Appendix B (continued): Turn Volumes

Existing (2015) Turning Movements

2021 Assuming TE Projects are built

2021 TE-35th Phase 2+Sunset+43rd

2021 TE + Sunset + 43rd

Sunset Rd at 156th St SE						
		11	13	5		
		↓	↓	↓		
19	↘		643		↙	6
81	→				←	91
71	↙				↘	37
		↙	↑	↘		
		170	47	92		

Sunset Rd at 156th St SE						
		17	18	5		
		↓	↓	↓		
31	↘		903		↙	6
85	→				←	94
172	↙				↘	40
		↙	↑	↘		
		286	53	96		

Sunset Rd at 156th St SE						
		17	18	5		
		↓	↓	↓		
35	↘		937		↙	6
85	→				←	94
176	↙				↘	40
		↙	↑	↘		
		312	53	96		

Sunset Rd at 156th St SE						
		16	18	5		
		↓	↓	↓		
37	↘		943		↙	6
85	→				←	94
173	↙				↘	40
		↙	↑	↘		
		320	53	96		

35 Ave SE at 168th St SE						
		123	450	N/A		
		↓	↓	↓		
92	↘		1763		↙	N/A
N/A	→				←	N/A
29	↙				↘	N/A
		↙	↑	↘		
		72	997	N/A		

35 Ave SE at 168th St SE						
		132	546	N/A		
		↓	↓	↓		
101	↘		2019		↙	N/A
N/A	→				←	N/A
30	↙				↘	N/A
		↙	↑	↘		
		72	1138	N/A		

35 Ave SE at 168th St SE						
		132	547	N/A		
		↓	↓	↓		
102	↘		2021		↙	N/A
N/A	→				←	N/A
30	↙				↘	N/A
		↙	↑	↘		
		72	1138	N/A		

35 Ave SE at 168th St SE						
		132	555	N/A		
		↓	↓	↓		
101	↘		2042		↙	N/A
N/A	→				←	N/A
30	↙				↘	N/A
		↙	↑	↘		
		72	1152	N/A		

35 Ave SE at 169th St SE						
		N/A	443	65		
		↓	↓	↓		
N/A	↘		1452		↙	87
N/A	→				←	N/A
N/A	↙				↘	15
		↙	↑	↘		
		N/A	813	29		

35 Ave SE at 169th St SE						
		N/A	521	84		
		↓	↓	↓		
N/A	↘		1698		↙	109
N/A	→				←	N/A
N/A	↙				↘	19
		↙	↑	↘		
		N/A	931	34		

35 Ave SE at 169th St SE						
		N/A	524	82		
		↓	↓	↓		
N/A	↘		1697		↙	101
N/A	→				←	N/A
N/A	↙				↘	18
		↙	↑	↘		
		N/A	940	32		

35 Ave SE at 169th St SE						
		N/A	533	82		
		↓	↓	↓		
N/A	↘		1720		↙	100
N/A	→				←	N/A
N/A	↙				↘	18
		↙	↑	↘		
		N/A	955	32		

Appendix B (continued): Turn Volumes

Existing (2015) Turning Movements

2021 Assuming TE Projects are built

2021 TE-35th Phase 2+Sunset+43rd

2021 TE + Sunset + 43rd

Sunset Rd at 169th St SE					
		4	39	22	
		↙	↓	↘	
5	↗		380		↖ 95
45	→				← 62
6	↘				↙ 6
		↙	↑	↘	
		12	73	8	

Sunset Rd at 169th St SE					
		4	130	33	
		↙	↓	↘	
7	↗		651		↖ 106
60	→				← 79
11	↘				↙ 6
		↙	↑	↘	
		19	185	8	

Sunset Rd at 169th St SE					
		4	142	21	
		↙	↓	↘	
6	↗		674		↖ 79
55	→				← 66
15	↘				↙ 6
		↙	↑	↘	
		26	243	8	

Sunset Rd at 169th St SE					
		4	143	21	
		↙	↓	↘	
6	↗		679		↖ 79
55	→				← 65
15	↘				↙ 6
		↙	↑	↘	
		26	248	8	

35 Ave SE at 180th St SE					
		118	216	54	
		↙	↓	↘	
153	↗		2483		↖ 103
312	→				← 312
128	↘				↙ 68
		↙	↑	↘	
		281	652	86	

35 Ave SE at 180th St SE					
		120	285	54	
		↙	↓	↘	
176	↗		2988		↖ 105
383	→				← 361
128	↘				↙ 159
		↙	↑	↘	
		300	754	163	

35 Ave SE at 180th St SE					
		124	243	95	
		↙	↓	↘	
157	↗		2850		↖ 184
423	→				← 448
78	↘				↙ 108
		↙	↑	↘	
		236	700	54	

35 Ave SE at 180th St SE					
		123	258	89	
		↙	↓	↘	
156	↗		2978		↖ 176
408	→				← 461
101	↘				↙ 128
		↙	↑	↘	
		249	725	104	

Sunset Rd at 180th St SE					
		84	1	70	
		↙	↓	↘	
29	↗		1047		↖ 27
306	→				← 526
1	↘				↙ 1
		↙	↑	↘	
		1	1	1	

Sunset Rd at 180th St SE					
		172	1	82	
		↙	↓	↘	
160	↗		1357		↖ 36
323	→				← 579
1	↘				↙ 1
		↙	↑	↘	
		1	1	1	

Sunset Rd at 180th St SE					
		136	63	75	
		↙	↓	↘	
19	↗		1809		↖ 13
319	→				← 537
115	↘				↙ 49
		↙	↑	↘	
		201	235	48	

Sunset Rd at 180th St SE					
		149	50	75	
		↙	↓	↘	
67	↗		1751		↖ 12
328	→				← 539
88	↘				↙ 11
		↙	↑	↘	
		202	193	38	

Appendix B (continued): Turn Volumes

Existing (2015) Turning Movements

2021 Assuming TE Projects are built

2021 TE-35th Phase 2+Sunset+43rd

2021 TE + Sunset + 43rd

180th St at 51st Ave SE					
		10	7	8	
		↓	↓	↓	
7	↔		867		17
257	↔				239
5	↔				17
		↖	↖	↖	
		↑	↑	↑	
		21	113	165	

180th St at 51st Ave SE					
		12	7	8	
		↓	↓	↓	
7	↔		990		17
293	↔				302
5	↔				17
		↖	↖	↖	
		↑	↑	↑	
		17	126	178	

180th St at 51st Ave SE					
		11	4	8	
		↓	↓	↓	
14	↔		910		17
300	↔				247
5	↔				15
		↖	↖	↖	
		↑	↑	↑	
		14	110	164	

180th St at 51st Ave SE					
		12	4	8	
		↓	↓	↓	
14	↔		910		17
299	↔				247
5	↔				15
		↖	↖	↖	
		↑	↑	↑	
		14	110	164	

35 Ave SE at 188th St SE					
		N/A	425	27	
		↓	↓	↓	
N/A	↔		1831		22
N/A	↔				N/A
N/A	↔				31
		↖	↖	↖	
		↑	↑	↑	
		N/A	1282	44	

35 Ave SE at 188th St SE					
		N/A	578	27	
		↓	↓	↓	
N/A	↔		2243		23
N/A	↔				N/A
N/A	↔				74
		↖	↖	↖	
		↑	↑	↑	
		N/A	1473	68	

35 Ave SE at 188th St SE					
		N/A	435	27	
		↓	↓	↓	
N/A	↔		1874		23
N/A	↔				N/A
N/A	↔				74
		↖	↖	↖	
		↑	↑	↑	
		N/A	1246	69	

35 Ave SE at 188th St SE					
		N/A	489	27	
		↓	↓	↓	
N/A	↔		2009		23
N/A	↔				N/A
N/A	↔				74
		↖	↖	↖	
		↑	↑	↑	
		N/A	1333	63	

35 Ave SE at Grannis Rd.					
		122	311	N/A	
		↓	↓	↓	
116	↔		1823		N/A
N/A	↔				N/A
55	↔				N/A
		↖	↖	↖	
		↑	↑	↑	
		134	1085	N/A	

35 Ave SE at Grannis Rd.					
		176	431	N/A	
		↓	↓	↓	
199	↔		2303		N/A
N/A	↔				N/A
89	↔				N/A
		↖	↖	↖	
		↑	↑	↑	
		152	1256	N/A	

35 Ave SE at Grannis Rd.					
		139	277	N/A	
		↓	↓	↓	
213	↔		1887		N/A
N/A	↔				N/A
89	↔				N/A
		↖	↖	↖	
		↑	↑	↑	
		153	1016	N/A	

35 Ave SE at Grannis Rd.					
		147	323	N/A	
		↓	↓	↓	
198	↔		1982		N/A
N/A	↔				N/A
86	↔				N/A
		↖	↖	↖	
		↑	↑	↑	
		165	1063	N/A	

Appendix B (continued): Turn Volumes

Existing (2015) Turning Movements

2021 Assuming TE Projects are built

2021 TE-35th Phase 2+Sunset+43rd

2021 TE + Sunset + 43rd

35 Ave SE at 197th PI SE					
		N/A	380	24	
		↙	↓	↘	
N/A	↗		1609		18
N/A	→				N/A
N/A	↘				78
		↙	↑	↘	
		N/A	1106	3	

35 Ave SE at 197th PI SE					
		N/A	514	24	
		↙	↓	↘	
N/A	↗		1923		18
N/A	→				N/A
N/A	↘				80
		↙	↑	↘	
		N/A	1284	3	

35 Ave SE at 197th PI SE					
		N/A	380	26	
		↙	↓	↘	
N/A	↗		1614		20
N/A	→				N/A
N/A	↘				71
		↙	↑	↘	
		N/A	1110	7	

35 Ave SE at 197th PI SE					
		N/A	423	26	
		↙	↓	↘	
N/A	↗		1676		20
N/A	→				N/A
N/A	↘				71
		↙	↑	↘	
		N/A	1129	7	

197th PI SE at Jewell Rd					
		N/A	N/A	N/A	
		↙	↓	↘	
N/A	↗		528		N/A
31	→				109
3	↘				1
		↙	↑	↘	
		21	N/A	363	

197th PI at Jewell Rd					
		N/A	N/A	N/A	
		↙	↓	↘	
N/A	↗		582		N/A
32	→				110
3	↘				1
		↙	↑	↘	
		22	N/A	414	

197th PI at Jewell Rd					
		N/A	N/A	N/A	
		↙	↓	↘	
N/A	↗		643		N/A
33	→				103
3	↘				2
		↙	↑	↘	
		21	N/A	482	

197th PI at Jewell Rd					
		N/A	N/A	N/A	
		↙	↓	↘	
N/A	↗		626		N/A
33	→				103
3	↘				2
		↙	↑	↘	
		21	N/A	465	

35 Ave SE at 198th PI SE					
		16	438	N/A	
		↙	↓	↘	
6	↗		1576		N/A
N/A	→				N/A
11	↘				N/A
		↙	↑	↘	
		15	1090	N/A	

35 Ave SE at 198th PI SE					
		24	572	N/A	
		↙	↓	↘	
13	↗		1908		N/A
N/A	→				N/A
16	↘				N/A
		↙	↑	↘	
		15	1268	N/A	

35 Ave SE at 198th PI SE					
		25	584	N/A	
		↙	↓	↘	
9	↗		1702		N/A
N/A	→				N/A
16	↘				N/A
		↙	↑	↘	
		15	1053	N/A	

35 Ave SE at 198th PI SE					
		25	481	N/A	
		↙	↓	↘	
14	↗		1663		N/A
N/A	→				N/A
15	↘				N/A
		↙	↑	↘	
		15	1113	N/A	

Appendix B (continued): Turn Volumes

Existing (2015) Turning Movements

2021 Assuming TE Projects are built

2021 TE-35th Phase 2+Sunset+43rd

2021 TE + Sunset + 43rd

York Rd at Jewell Rd					
		4	469	N/A	
		↙	↓	↘	
0	↗				↖
N/A	→		2036		←
2	↘				↗
		↙	↑	↘	
		0	1128	433	

York Rd at Jewell Rd					
		0	609	N/A	
		↙	↓	↘	
0	↗				↖
N/A	→		2396		←
0	↘				↗
		↙	↑	↘	
		0	1303	484	

York Rd at Jewell Rd					
		0	465	N/A	
		↙	↓	↘	
0	↗				↖
N/A	→		2106		←
0	↘				↗
		↙	↑	↘	
		0	1088	553	

York Rd at Jewell Rd					
		0	508	N/A	
		↙	↓	↘	
0	↗				↖
N/A	→		2191		←
0	↘				↗
		↙	↑	↘	
		0	1148	535	

43rd Ave SE & Jewell Rd					
		18	1	4	
		↙	↓	↘	
79	↗				↖
336	→		473		←
0	↘				↗
		↙	↑	↘	
		0	0	2	

43rd Ave SE & Jewell Rd					
		21	1	5	
		↙	↓	↘	
93	↗				↖
397	→		559		←
0	↘				↗
		↙	↑	↘	
		0	0	2	

43rd Ave SE & Jewell Rd					
		19	190	5	
		↙	↓	↘	
225	↗				↖
356	→		1178		←
2	↘				↗
		↙	↑	↘	
		2	322	13	

43rd Ave SE & Jewell Rd					
		19	141	5	
		↙	↓	↘	
200	↗				↖
359	→		1083		←
2	↘				↗
		↙	↑	↘	
		2	303	10	

35/39th Ave SE at SR 524					
		135	186	99	
		↙	↓	↘	
542	↗				↖
321	→		3273		←
123	↘				↗
		↙	↑	↘	
		195	953	30	

35/39th Ave SE at SR 524					
		145	294	121	
		↙	↓	↘	
561	↗				↖
420	→		3821		←
121	↘				↗
		↙	↑	↘	
		209	1100	36	

35/39th Ave SE at SR 524					
		140	271	5	
		↙	↓	↘	
587	↗				↖
414	→		3543		←
119	↘				↗
		↙	↑	↘	
		207	1104	57	

35/39th Ave SE at SR 524					
		140	292	27	
		↙	↓	↘	
564	↗				↖
415	→		3569		←
121	↘				↗
		↙	↑	↘	
		200	1154	37	

Appendix B (continued): Turn Volumes

Existing (2015) Turning Movements

2021 Assuming TE Projects are built

2021 TE-35th Phase 2+Sunset+43rd

2021 TE + Sunset + 43rd

Not Existing

43rd Ave SE & SR 524

		0	0	0		
		↓	↓	↓		
0	↶				↷	0
0	→		0		←	0
0	↷				↶	0
		↶	↑	↷		
		0	0	0		

Not Existing

43rd Ave SE & SR 524

		0	0	0		
		↓	↓	↓		
0	↶				↷	0
0	→		0		←	0
0	↷				↶	0
		↶	↑	↷		
		0	0	0		

43rd Ave SE & SR 524

		48	0	159		
		↓	↓	↓		
71	↶				↷	298
520	→		1528		←	432
0	↷				↶	0
		↶	↑	↷		
		0	0	0		

43rd Ave SE & SR 524

		26	0	134		
		↓	↓	↓		
39	↶				↷	308
555	→		1495		←	433
0	↷				↶	0
		↶	↑	↷		
		0	0	0		

39th Ave SE at 212th St SE

		19	319	84		
		↓	↓	↓		
57	↶				↷	444
20	→		1705		←	19
25	↷				↶	7
		↶	↑	↷		
		29	667	15		

39th Ave SE at 212th St SE

		19	373	128		
		↓	↓	↓		
57	↶				↷	547
20	→		1974		←	19
25	↷				↶	9
		↶	↑	↷		
		29	731	17		

39th Ave SE at 212th St SE

		27	372	121		
		↓	↓	↓		
69	↶				↷	552
24	→		2034		←	23
30	↷				↶	9
		↶	↑	↷		
		41	748	17		

39th Ave SE at 212th St SE

		27	372	125		
		↓	↓	↓		
69	↶				↷	563
24	→		2060		←	23
30	↷				↶	9
		↶	↑	↷		
		41	759	17		

Not Existing

45th Ave SE & 212th St SE

		0	0	0		
		↓	↓	↓		
0	↶				↷	0
0	→		0		←	0
0	↷				↶	0
		↶	↑	↷		
		0	0	0		

Not Existing

45th Ave SE & 212th St SE

		0	0	0		
		↓	↓	↓		
0	↶				↷	0
0	→		0		←	0
0	↷				↶	0
		↶	↑	↷		
		0	0	0		

Not Existing

45th Ave SE & 212th St SE

		0	0	0		
		↓	↓	↓		
0	↶				↷	0
0	→		0		←	0
0	↷				↶	0
		↶	↑	↷		
		0	0	0		

Not Existing

45th Ave SE & 212th St SE

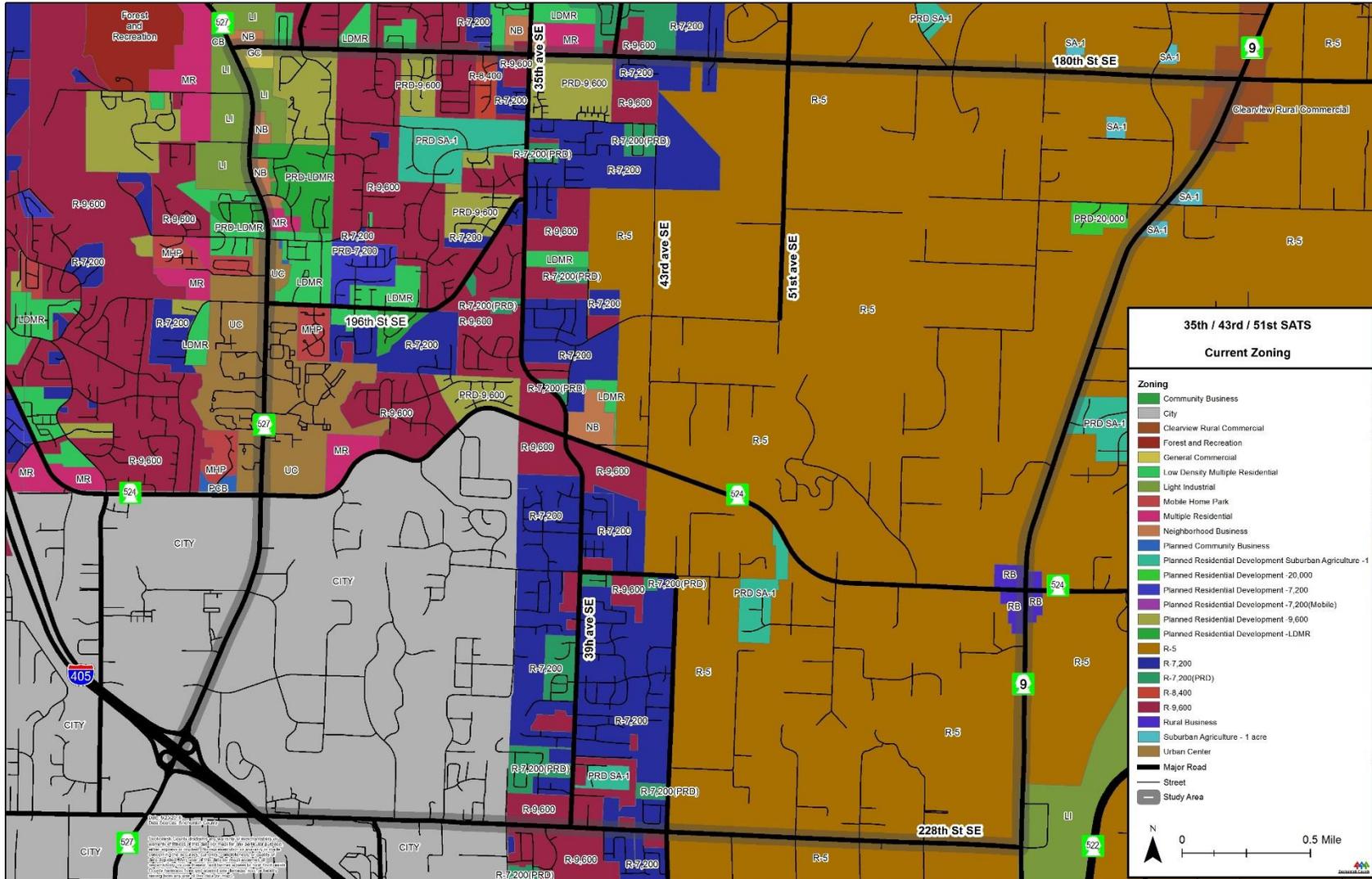
		0	0	0		
		↓	↓	↓		
0	↶				↷	0
0	→		0		←	0
0	↷				↶	0
		↶	↑	↷		
		0	0	0		

Appendix C: Accident Locations

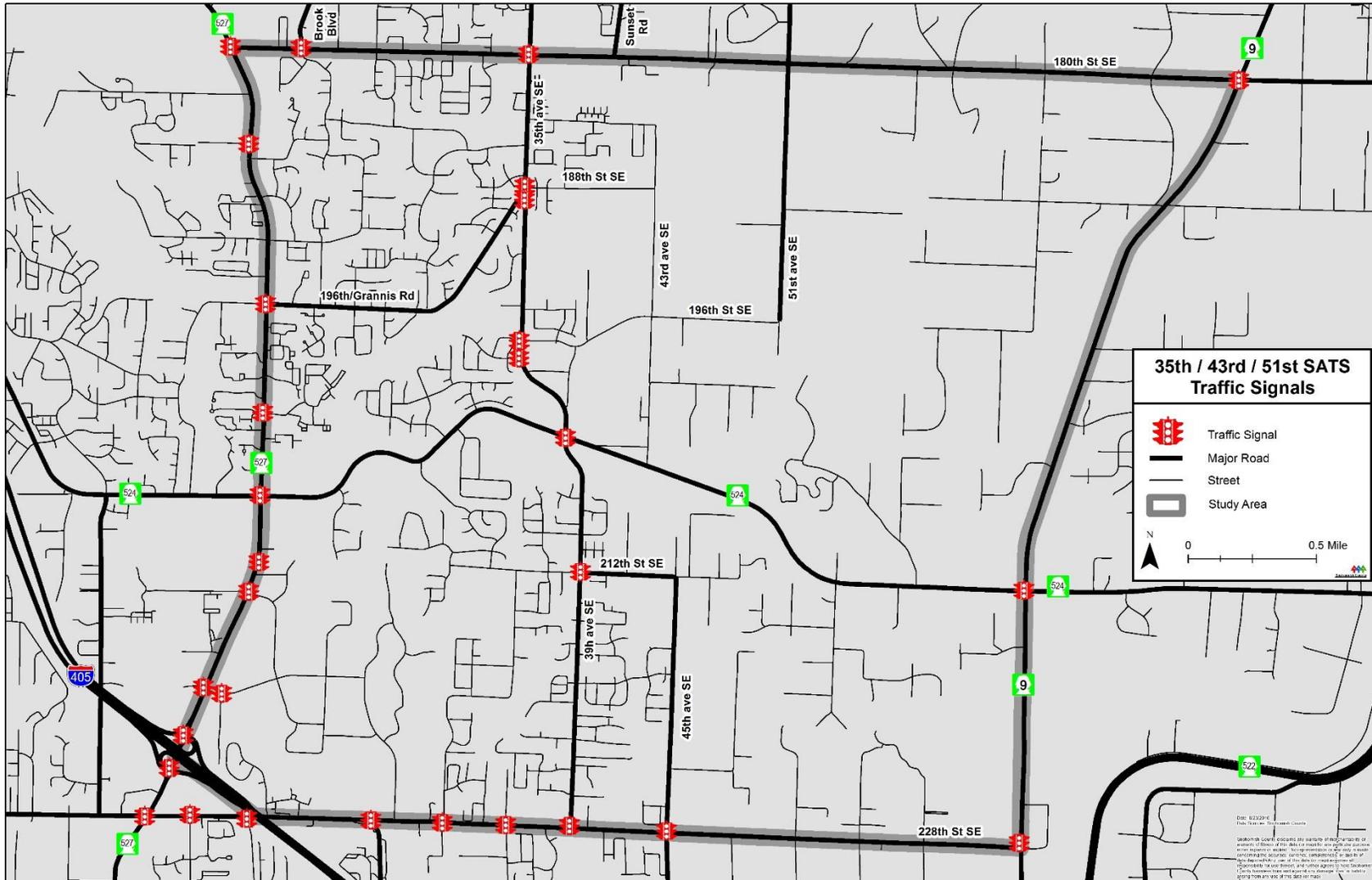
Table 1 - Accident Location History (2013-2015)						
Street	Start – End	2013-2015 Total Accidents	Property Damage Only	Fatal	Injury	Unknown
51st Ave SE	Just south of 196th St SE to the north terminus of 51st Ave SE (north of 169th St SE)	3	1	1	1	0
Sunset Ave	Road terminus north of 184th St SE to North of 156th St SE	9	8	0	1	0
43rd Ave SE	196th St SE to 184th St SE	0	0	0	0	0
35th Ave SE	SR 524 to 180th St SE	57	39	0	18	0
39th Ave SE	228th St SE to SR 524	32	19	0	13	0
45th Ave SE	240th St SE to 212th St SE	15	9	0	5	1
228th St SE	Bothell City Limits to SR 9	23	13	0	9	1
Grannis Road	SR 527 to 35th Ave SE	17	13	0	4	0
180th St SE	SR 527 to SR 9	90	59	0	31	0
TOTAL ACCIDENTS		246	161	1	82	2

Appendix D: Maps

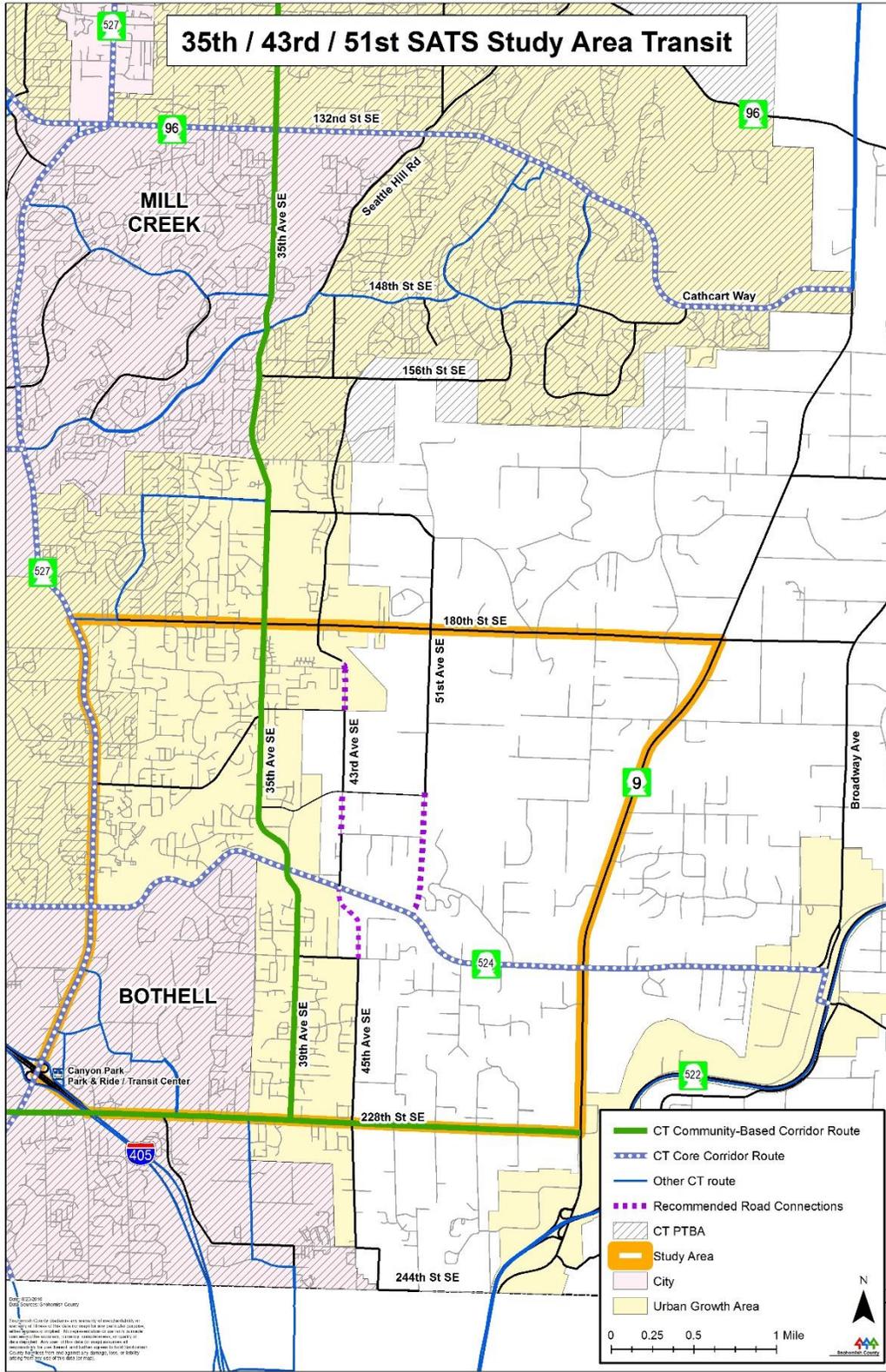
Map 1 – Current Zoning Map



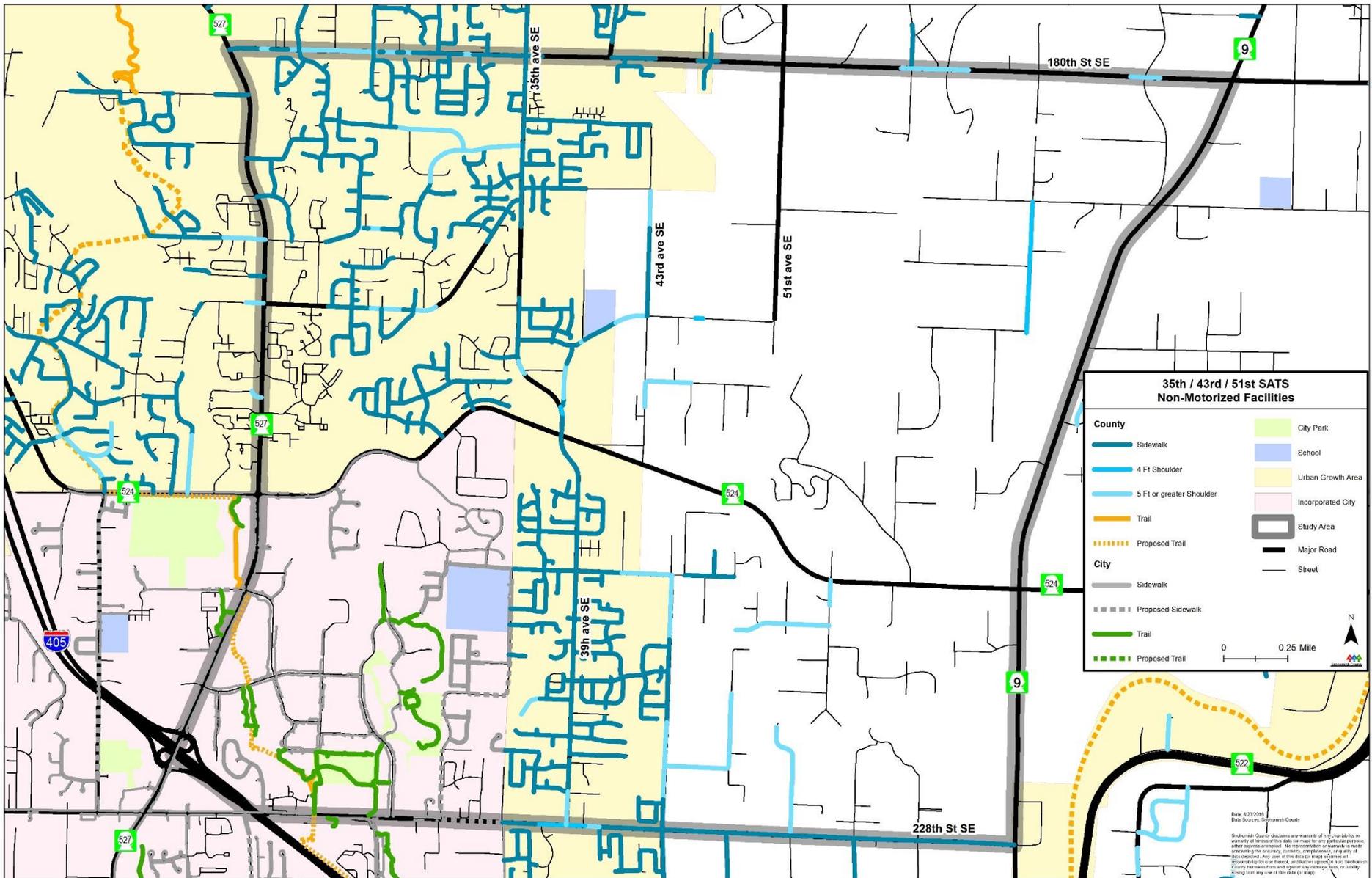
Map 2 - Traffic Signals Map



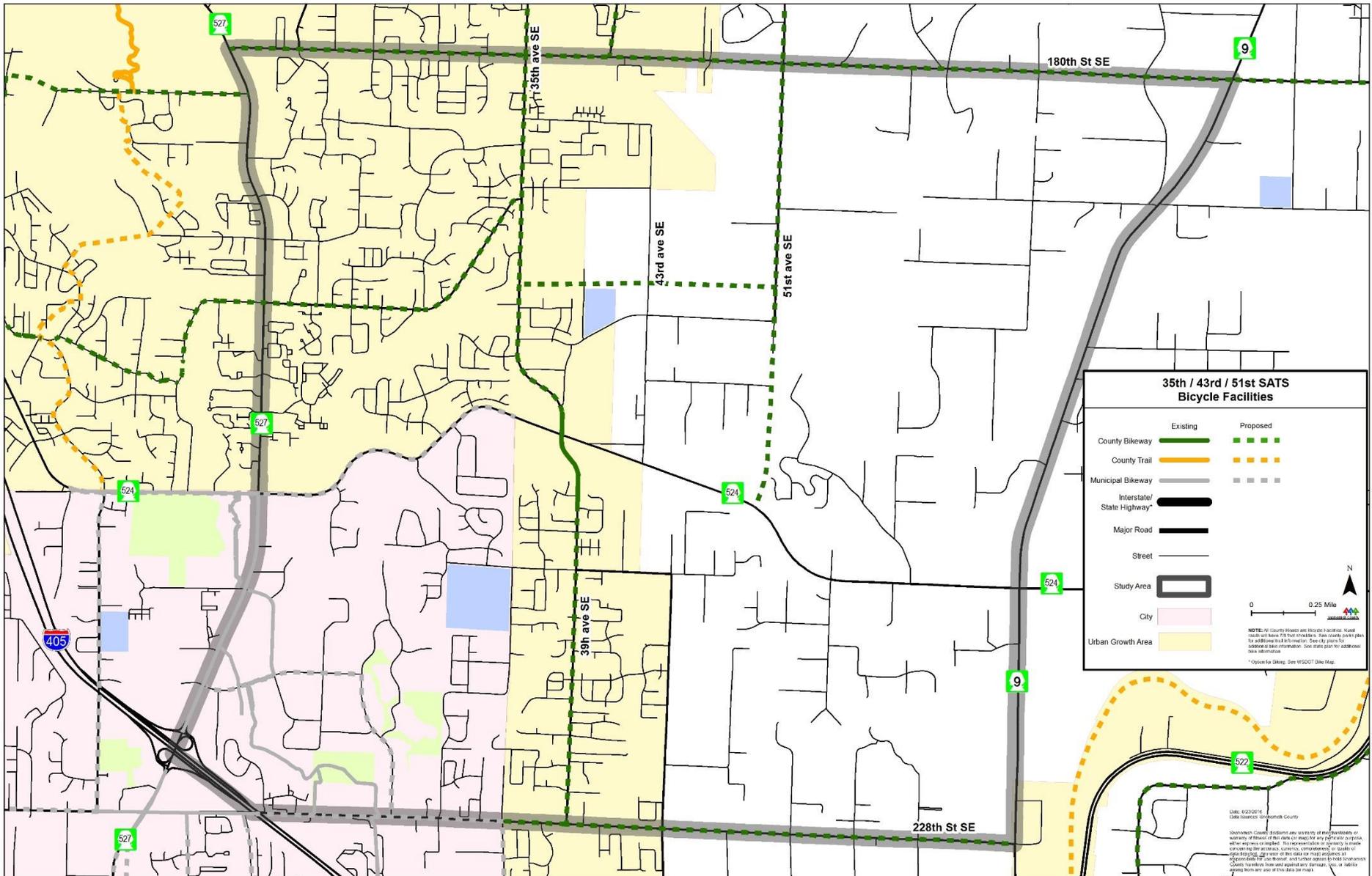
Map 3 – Study Area Transit Map



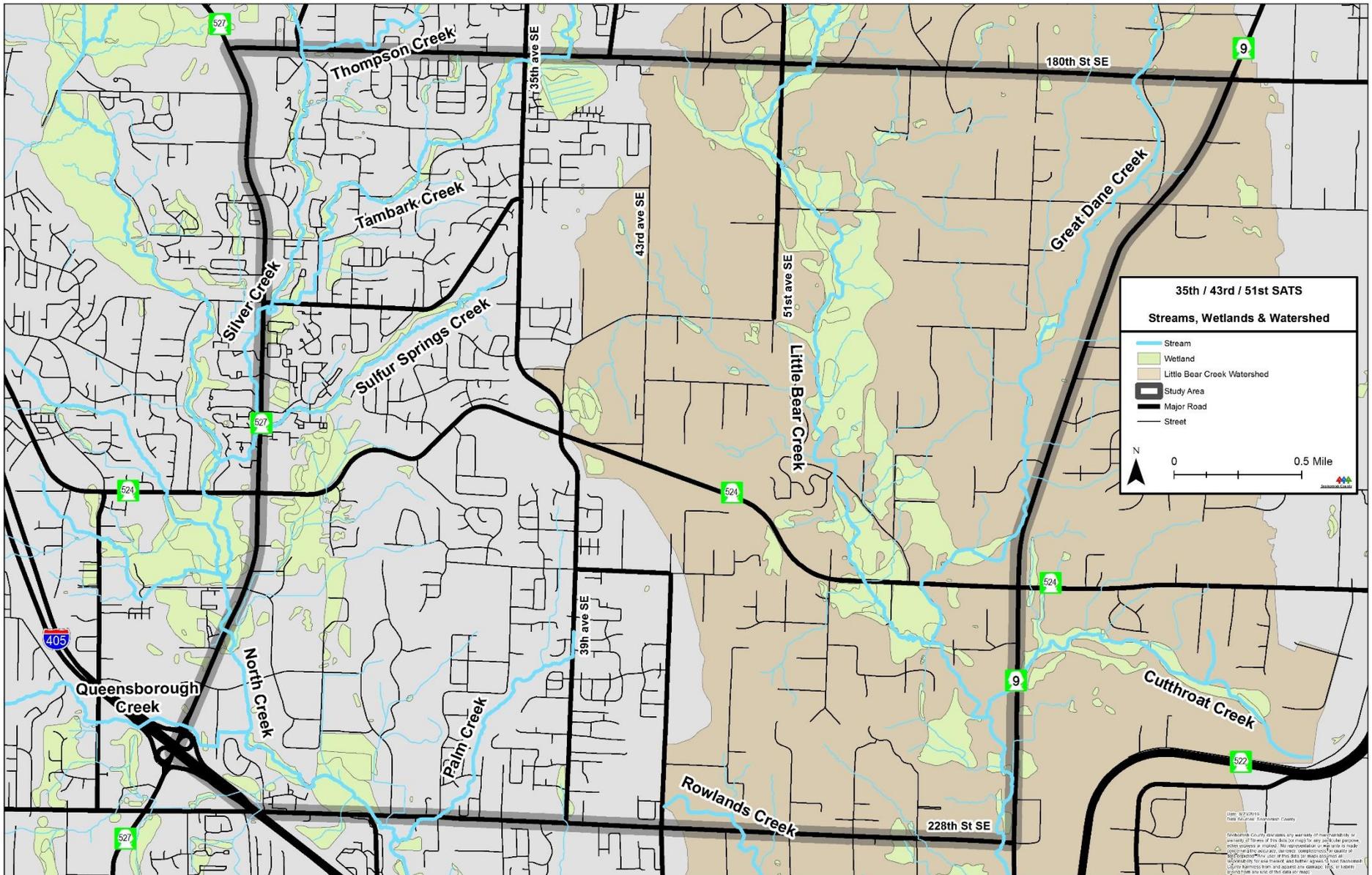
Map 4 – Non-Motorized Facilities Map



Map 5 – Bicycle Facilities Map



Map 6 – Streams Wetlands & Watershed Map



Map 7 – Future Land Use Map

