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CHAPTER 1 : EXECUTIVE SUMMARY

OVERVIEW

This Silverton Transportation System Plan (TSP) identifies projects and programs needed to support the City's goals and policies and to serve planned growth through the TSP horizon year (2030). The TSP builds on the previous plan that was developed in 2000 for the City, and addresses changes in local and regional growth patterns and new transportation planning policies adopted by the state, among other issues. This document presents the recommended investments and priorities for the Pedestrian, Bicycle, Transit, and Motor Vehicle systems in the City of Silverton along with new transportation programs to correct existing deficiencies and enhance services. For each travel mode, a Master Plan project map and list are identified to support the City's transportation goals and policies. The most critical elements of these Master Plans are referred to as Action Plans. The final chapter identifies the estimated plan costs and makes recommendations about potential new funding sources to support the plan.

PLAN PROCESS AND COMMITTEES

The plan was developed in close coordination with Silverton City staff and a formal committee that included agency staff from Oregon Department of Transportation, Marion County, and Silverton as well as citizen representatives that included city council and planning commission members, local business owners, and other volunteers. Several of these members participated in reviewing the technical methods and findings of the study. They helped to consider consistency with the plans and past decisions in adjoining jurisdictions, and reach consensus on new recommendations. Additionally, a public open house was held, allowing citizens to comment on the plan, make suggestions and provide feedback.

The Silverton Transportation System Plan process included the following steps:

- Inventory/Data Collection for year 2006 baseline
- Update Goals and Policies
- Evaluate Existing Conditions and Future Travel Needs Through Forecasting
- Update Needs by Mode, Consider Alternatives and Prioritize Improvement Projects
- Refine Improvement Lists to Mitigate Deficiencies by Mode For 2030 Conditions
- Determine Planning and Cost Estimates of Improvements
- Identify Financing Sources
- Draft TSP

PLAN ORGANIZATION

This document is divided into ten chapters and a separate Technical Appendix. The title and focus of each chapter is summarized below:

- **Chapter 1: Summary:** This chapter provides a brief overview of the plan and presents the estimated funding needed to implement it.

- **Chapter 2: Transportation Policies:** This chapter presents the recommended goals and policies related to transportation.
- **Chapter 3: Existing Conditions:** This chapter examines the current transportation system in terms of the built facilities, how well they perform and comply with existing policies, and where outstanding deficiencies exist.
- **Chapter 4: Future Demands:** This chapter presents the details of how the City of Silverton is expected to grow under through 2030, and how travel demands on the city and regional facilities will change from general growth in the region.
- **Chapter 5: Pedestrian Plan:** This chapter presents strategies and plan recommendations to enhance pedestrian facilities and focus new improvements in areas with the highest concentration of activity.
- **Chapter 6: Bicycle Plan:** This chapter presents strategies and plan recommendations to enhance bicycle facilities and focus new improvements in areas with the highest concentration of activity.
- **Chapter 7: Transit:** This chapter makes recommendations to be considered by CARTS and the City of Silverton for their future enhancements to transit services.
- **Chapter 8: Motor Vehicles**
  This chapter presents strategies and plan recommendations to provide adequate mobility and access to the city, county and state facilities as travel demands grow to 2030 levels. This chapter also addresses street design standards, access spacing standards, functional class designations, and other programs to monitor and manage the street system.
- **Chapter 9: Other Modes:** This chapter discusses transportation issues related to rail, air, water, and pipeline transportation.
- **Chapter 10: Financing and Implementation:** This chapter presents the complete estimated revenues and costs for the transportation projects and programs developed in the plan. New funding alternatives are presented to bridge the gaps between the two. New funding programs and implementation measures will be required to put this updated transportation plan into action.
- **Technical Appendix:** The appendices contain detailed information regarding traffic volumes, street and intersection operational analysis, land use forecasts and other background materials.

GOALS AND POLICIES

The proposed goals and policies pertaining to Transportation are presented in Chapter 2. Goals are defined as brief guiding statements that describe a desired result. Policies associated with each of the individual goals describe the actions needed to move the community in the direction of completing each goal. These goals and policies were applied in the development of this Transportation System Plan to develop strategies and implement measures for each of the travel modes applied in the City of Silverton. The goals include:

- Develop a transportation system to enhance Silverton's livability through proper location and design of multi-modal transportation facilities, including streets, sidewalks, bicycle lanes, trails and transit.
- Create a balanced transportation system for all modes and reduce the number of trips by single occupant vehicles.
- Improve the safety of the transportation system.
- Develop an efficient transportation system that will handle future traffic growth.
- Provide a transportation system that is accessible to all members of the community.

- Develop a transportation system to provide for efficient freight movement.
- Develop a transportation system that is consistent with the adopted plans of state, local, and regional jurisdictions.
- Create a funding system to implement the recommended transportation system improvement projects.

TRANSPORTATION PLANS

The Silverton TSP update identifies projects and programs needed to support the City's goals and policies and to serve planned growth over the next 20 years. This document presents the recommended investments and priorities for the Pedestrian, Bicycle, Transit, and Motor Vehicle systems along with new transportation programs to enhance critical transportation services. For each travel mode, a Master Plan project map and list are identified to support the City's transportation goals and policies. The Master Plan represents a complete "wish" list of projects identified for the next 20 years; the Action Plan projects are a smaller subset of the Master Plan. The Action Plans for each travel mode only include projects that are expected to be reasonably funded within the time frame of the plan (generally the high priority projects). A table has been prepared for each travel mode that includes the Master Plan and Action Plan projects for implementation within the City of Silverton. The following sections summarize the plans for each mode.

Pedestrian

The existing pedestrian system in Silverton has significant needs. Sidewalks are provided downtown and in many newer residential neighborhoods, but have limited connections to other neighborhoods and other pedestrian generators such as schools, shopping and recreational facilities. Gaps within the sidewalk and trail system and facility barriers (e.g. railroad, Silver Creek) discourage pedestrian travel and put pedestrians at an increased safety risk by requiring them to share the roadway with vehicles in certain locations.

Based on these needs, a Pedestrian Master Plan (Figure 5-1) was developed and is outlined in Table 5-1. The Pedestrian Master Plan costs are estimated to be $9.6 million. The Pedestrian Master Plan will require incremental implementation. As development occurs, streets are rebuilt and other project funding opportunities (such as grant programs) arise, projects on the Master Plan should be integrated into project development. The pedestrian goals and input from the TAC were reviewed to create a Pedestrian Action Plan, which includes high priority projects that are reasonably expected to be funded by the year 2030. The Pedestrian Master Plan and Action Plan project list is shown in Table 1-1.

Table 1-1: Pedestrian Master Plan and Action Plan Projects

Priority	Project	Location/Side	From	To	Plan	Cost ($1,000)
Sidewalks on Existing Arterials and Collectors						
High	Oak Street	Both	Steelhammer Road	City limits	Action	$357
High	Pine Street (gap infill)	Both	Grant Street	City limits	Action	$164
High	South Water Street	Both	Smith Street	City limits	Action	$945
High	C Street	Both	McClaine Street	James Street	Action	$157
High	Steelhammer Road	Both	Oak Street	Evans Valley Road	Action	$388
High	C Street	South	Front Street	2nd Street	Action	$26

Priority	Project	Location/Side	From	To	Plan	Cost ($1,000)
High	James Street	East	C Street	North Water Street	Action	$53
High	James Street	West	C Street	Brooks Street	Action	$16
High	Westfield Street	Both	Main Street	Existing section	Action	$21
High	Main Street	Both	3rd Street	Steelhammer Road	Action	$567
Med	Oak Street	South	Mill Street	Steelhammer Road	Master	$283
Med	North Water Street	South	James Street	C Street	Master	$53
Med	North Water Street	East	C Street	A Street	Master	$41
Med	C Street	North	James Street	North Water Street	Master	$195
Med	James Street	Both	Florida Street	City Limits	Master	$164
Med	Westfield Street	East	Main Street	McClaine Street	Master	$252
Med	B Street	Both	1st Street	Mill Street	Master	$130
Med	1st Street	Both	Hobart Road	Existing section	Master	$483
Med	Jefferson Street	Both	2nd Street	James Street	Master	$210
Med	West Main Street	North	Westfield Street	City limits	Master	$95
Med	Keene Avenue	Both	Eureka Avenue	Coolidge Street	Master	$315
Med	Ike Mooney Road	Both	Existing section	City limits	Master	$172
Med	2nd Street	Both	Whittier Street	Hobart Road	Master	$483
Low	McClaine Street	North	Craig Street	Phelps Street	Master	$37
Low	Fiske Street	Both	Main Street	Charles Avenue	Master	$199
Low	2nd Street (gap infill)	East	Whittier Street	D Street	Master	$61
Low	Eureka Avenue	Both	Main Street	Bee Lane	Master	$525
Low	Monitor Road	West	Hobart Road	Oak Street	Master	$335
Low	Hobart Road	North	1st Street	Monitor Road	Master	$578
Low	Hobart Road	South	1st Street	Lanham Lane	Master	$389
Local Multi-Use Trail						
High	Off-street path #1		C Street	Hobart Road	Action	$338
High	Off-street path #2		Charles Avenue	Peach Street	Action	$262
Med	Off-street path #3 (Creek trail)		C Street	Silverton Library	Master	$150
Med	Pedestrian Stairway Connection		Coolidge Park	Anderson Drive	Master	$60
Med	Off-street path #4 (2nd Street)		Whittier Street	Oak Street	Master	$263
Med	Pedestrian Bridge		Cowing Street		Master	$80
Low	Off-street path #5		Existing rail line alignment	Church Street extension	Master	$188
Low	Pedestrian Bridge		Peach Street		Master	$80

Priority	Project	Location/Side	From	To	Plan	Cost ($1,000)
Low	Off-street path #6		Eska Way	Existing Church Street alignment	Master	$173
Low	Off-street path #7		Jefferson Street	Eska Way	Master	$48
Low	Off-street path #8		Lincoln Street	East side of Webb Lake	Master	$143
Sidewalks on New Arterials/Collectors						
Westside Connector #1		North/South	Silverton Road	Pine Street	Master	**
Eastside Connector #4		North/South	Oak Street (Hwy 213)	Pioneer Drive	Master	**
Northside Connector #5		East/West	James Street	2nd Street	Master	**
				Sidewalks on Existing Arterials and Collectors		$7,351
				Local Multi-Use Trail		$1,806
				*Pedestrian Crossing Improvements**		$142
				ADA Safety Audit and Annual Improvement Program		$330
				Total Pedestrian Action Plan Cost		**$3,679**
				Total Pedestrian Master Plan Cost		**$9,619**

Notes: *Pedestrian Crossing Improvement locations outlined in Pedestrian Plan (Chapter 5)
**Project costs are included in a Motor Vehicle Plan (Chapter 8)

Bicycle

The existing bike lane system on arterial and collector streets in Silverton does not provide adequate connections from neighborhoods to schools, parks, retail centers or downtown. Continuity and connectivity are key issues for bicyclists and the lack of facilities (or gaps) cause significant problems for bicyclists. Without connectivity of the bicycle system, this mode of travel is severely limited.

A Bicycle Master Plan (Figure 6-1) was developed based on these identified needs. The Bicycle Master Plan costs are estimated to be $6.9 million. The Bicycle Master Plan will require incremental implementation. As development occurs, streets are rebuilt and other project funding opportunities (such as grant programs) arise, projects on the Master Plan should be integrated into project development. The bicycle goals and input from the TAC were reviewed to create a Bicycle Action Plan, which includes high priority projects that are reasonably expected to be funded by the year 2030. The Bicycle Master Plan and Action Plan project list is shown in Table 1-2.

Table 1-2: Bicycle Master Plan and Action Plan Projects

Priority	Project	Location/Side	From	To	Plan	Cost ($1,000s)
Bike Lanes on Existing Arterials & Collectors						
High	1st Street	Both	Hobart Road	B Street	Action	$68
High	Oak Street	Both	Steelhammer Road	East City limits	Action	$255
High	North Water Street	Both	James Street	C Street	Action	$143
High	South Water Street	Both	Lane Street	Pioneer Drive	Action	$500

Priority	Project	Location/Side	From	To	Plan	Cost ($1,000s)
High	Pine Street	Both	West City limits	James Street	Action	$345
High	Silverton Road	Both	West City limits	Existing section	Action	$262
High	2nd Street	Both	Bow Tie Lane	Oak Street	Action	$5
Med	Oak Street	Both	Norway Street	Steelhammer Road	Master	$14
Med	Eureka Avenue	Both	Main Street	South City limits	Master	$645
Med	Main Street	Both	Westfield Street	Water Street	Master	$465
Med	Oak Street	Both	3rd Street	Church Street	Master	$192
Med	McClaine Street	Both	Existing section	Main Street	Master	$255
Med	Monitor Road	Both	Oak Street	Hobart Road	Master	$480
Med	Ike Mooney Road	Both	Pioneer Drive	East City limits	Master	$340
Med	Pioneer Drive	Both	South Water Street	Ike Mooney Road	Master	$36
Med	Evans Valley Road	Both	Steelhammer Road	East City limits	Master	$270
Med	Steelhammer Road	Both	Oak Street	Evans Valley Road	Master	$420
Low	2nd Street	Both	Hobart Road	Bow Tie Lane	Master	$287
Low	James Street	Both	Hobart Road	North Water Street	Master	$645
Low	Hobart Road	Both	James Street	Monitor Road	Master	$825
Bike Lanes on New Arterials & Collectors						
Westside Connector #1		North/South	Silverton Road	Pine Street	Master	*
Eastside Connector #4		North/South	Oak Street (Hwy 213)	Pioneer Drive	Master	*
Northside Connector #5		East/West	James Street	2nd Street	Master	*
Local Multi-Use Trail						
High	Off-street path #1		C Street	Hobart Road	Action	**
High	Off-street path #2		Charles Avenue	Peach Street	Action	**
Med	Off-street path #3 (Creek trail)		C Street	Silverton Library	Master	**
Med	Off-street path #4 (2nd Street)		Whittier Street	Oak Street	Master	**
Med	Pedestrian Bridge		Cowing Street	Hobart Road	Master	**
Low	Off-street path #5		Existing rail line alignment	Church Street extension	Master	**
Low	Pedestrian Bridge		Peach Street	Existing Church Street alignment	Master	**
Low	Off-street path #6		Eska Way	Existing Church Street alignment	Master	**
Low	Off-street path #7		Jefferson Street	Eska Way	Master	**
Low	Off-street path #8		Lincoln Street	East side of Webb Lake	Master	**
Regional Bikeway						
Regional bikeway connection			Silverton City Limits	Stayton	Master	-
Regional bikeway connection			Silverton City Limits	Salem	Master	-
Regional bikeway connection			Silverton City Limits	Mt. Angel	Master	-
Regional bikeway connection			Silverton City Limits	Wayside Park	Master	-
Regional bikeway connection			Silverton City Limits	Reservoir	Master	-
Other Bicycle Projects						
Bicycle Route Signage (shared bicycle facilities)				Throughout Silverton	Master	$25

Priority	Project	Location/Side	From	To	Plan	Cost ($1,000s)
Bicycle Parking				Downtown locations and key destinations	Master	$20
				Bike Lanes on Existing Arterials & Collectors		$6,452
				Other Bicycle Projects		$45
				Total Bicycle Action Plan Cost		**$1,578**
				Total Bicycle Master Plan Cost		**$6,497**

Notes: *Project costs are included in the Motor Vehicle Plan (Chapter 8)
**Project costs are included in the Pedestrian Plan (Table 5-1)

Transit

A number of strategies were identified for transit improvements in Silverton, including extended dial-a-ride services for the Silver Trolley, an express commuter connection to Salem, and transit amenities (e.g. park-and-ride lot). Coordination with local transit service providers will be required to implement these improvements. A need for improvements to the existing transit facilities was identified to support the future household and employment growth within the study area. Based on these needs, a Transit System Master Plan was created and is shown in Figure 7-1. A Transit Action Plan was developed to identify high priority projects that are reasonably expected to be funded by the year 2030. The Transit Master Plan and Action Plan project list is shown in Table 1-3.

Table 1-3: Transit Master Plan and Action Plan Projects

Priority	Project	Description	Plan	Cost ($1,000s)
High	Commuter Connection to Salem	Develop fixed route commuter connection to and from Salem. One new bus stop location will be added in downtown Silverton.	Action	$100/Year
High	Bus shelters	Install bus shelters at the two existing commuter connections at Roth's Grocery Store and the Silver Falls Library	Action	$20
High	Park-and-Ride Lot	Implement west-side park-and-ride lot to serve transit and carpool users. Specific location to be determined.	Action	$350
Medium	Bicycle Parking	Install secure bicycle parking at Park-and-Ride Lot	Master	$10
Medium	Dial-a-ride services	Enhance dial-a-ride services, including hours of operation and expanded service, and one additional vehicle.	Master	$52/Year
Low	Local Fixed Route Transit Feasibility Study	Future population growth will dictate when this project will occur (generally 25,000 people).	Master	$50
		Transit Action Plan Project Cost (for 23 years)		**$2,670**
		Transit Master Plan Project Cost (for 23 years)		**$3,926**

Motor Vehicle

A comprehensive evaluation of the 2030 motor vehicle needs for City streets and affected state highway facilities was performed to understand how well current plans will serve long-term growth within the City of Silverton. Several new projects were developed to maintain mobility standards or improve safety on city and state facilities. Without a significant investment in Transportation System Management (TSM), Travel Demand Management (TDM), and roadway improvements, several key facilities in the City would operate with congested conditions in the future.

The following sections summarize the recommended motor vehicle system plans that meet the demands of future growth and comply with local and regional planning requirements.

Transportation System Management (TSM)

Transportation System Management (TSM) focuses on low cost strategies to enhance operational performance of the transportation system by seeking solutions to immediate transportation problems, finding ways to better manage transportation, maximizing urban mobility, and treating all modes of travel as a coordinated system. TSM measures focus primarily on region wide improvements, however there are a number of TSM measures that are recommended for use in Silverton which include:

Neighborhood Traffic Management (NTM)

Silverton should consider traffic calming measures as appropriate and work with the community to find the traffic calming solution that best meets their needs and maintains roadway function. Table 8-1 lists common NTM applications and suggests which devices may be supported by the Silverton Fire Department. Any NTM project should include coordination with emergency agency staff to assure public safety.

Access Management

Access Management is a broad set of techniques that balance the need to provide efficient, safe and timely travel with the ability to allow access to individual properties. Proper implementation of access management techniques should guarantee reduced congestion, reduced accident rates, less need for roadway widening, conservation of energy, and reduced air pollution.

Access management is the control or limiting of vehicular access on arterial and collector facilities to maintain the capacity of the facilities and preserve their functional integrity. Access management strives to strike a balance between maintaining the integrity of the facility and providing access to adjacent parcels. Numerous driveways can erode the capacity of arterial and collector roadways. Preservation of capacity is particularly important on higher volume roadways for maintaining traffic flow and mobility. Whereas local and neighborhood streets function to provide access, collector and arterial streets serve greater traffic volume. Numerous driveways or street intersections increase the number of conflicts and potential for collisions and decrease mobility and traffic flow. Silverton, like every city, needs a balance of streets that provide access with streets that serve mobility.

Several access management strategies were identified to improve access and mobility in Silverton:

- Work with land use development applications to consolidate driveways, provide crossover easements, and take access from lower class roads where feasible. Existing, non-conforming accesses would only be subject to review and revision upon site improvement or a land use application.
- Establish City access spacing standards for new developments and construction, including the prohibition of new single family residential access on arterials and collectors

- Access to arterial roadways should only be permitted for public roads. However, parcels must not be landlocked by access spacing policies.
- Establish City access spacing standards to prohibit the construction of access points within the influence area of intersections. The influence area is that area where queues of traffic commonly form on the approach to an intersection (typically within 150 feet). In a case where a project has less than 150 feet of frontage, the site would need to explore potential shared access, or if that were not practical, place driveways as far from the intersection as the frontage would allow (permitting for 5 feet from the property line). However, full access may not be permitted in these conditions (e.g. restriction to right-in/right-out access)
- Implement City access spacing standards for new construction on County facilities within the urban growth boundary
- Meet ODOT access requirements on State facilities
- Establish maximum access spacing standards to promote connectivity.

New development and roadway projects located on City street facilities should meet the recommended access spacing standards summarized in Table 1-4.

Table 1-4: Recommended Access Spacing Standards for City Street Facilities

Street Facility	Maximum spacing* of roadways	Minimum spacing* of roadways	Minimum spacing** of roadway to driveway***	Minimum Spacing* driveway to driveway***
Arterial	1,000 feet	500 feet	250 feet	250 feet or combine
Collector:	500 feet	250 feet	150 feet	150 feet or combine
Neighborhood/Local	500 feet	250 feet	10 feet	10 feet

Notes: * Measured centerline to centerline
** Measured near street curb to near driveway edge
*** Private access to arterial roadways shall only be granted through a requested variance of access spacing policies (which shall include an access management plan evaluation)

Traffic Signal Spacing

Traffic signals that are spaced too closely on a corridor can result in poor operating conditions and safety issues due to the lack of adequate storage for vehicle queues. A minimum traffic signal spacing of 1,000-feet should be required for arterial and collector facilities outside of the Special Transportation Area (STA). Different signal spacing standards may be applied to lower classifications of roadways. ODOT identifies ½ mile as the desirable spacing of signalized intersections on regional and statewide highways but recognizes that shorter signal spacing may be appropriate due to a number of factors including existing road layout and land use patterns. Signal spacing below these standards should be studied in detail to consider traffic signal coordination and the impacts of vehicle flow and queuing within the area.

Local Street Connectivity

Much of the local street network in Silverton is built but is not well connected. Multiple access opportunities for entering or exiting neighborhoods are limited. There are a number of locations where neighborhood traffic is funneled onto one single street. This type of street network results in out-of-direction travel for motorists and an imbalance of traffic volumes; both factors have impacts on residential frontage.

A Local Street Connectivity Plan is shown in Figure 8-1. In most cases, the connector alignments are not specific and are aimed at reducing potential neighborhood traffic impacts by better balancing traffic flows

on neighborhood routes. To protect existing neighborhoods from potential traffic impacts of extending stub end streets, connector roadways should incorporate neighborhood traffic management into their design and construction. All stub streets should have signs indicating the potential for future connectivity.

Additionally, new development that constructs new streets, or street extensions, should meet the following connectivity standards:

- Provide full street connections with spacing of no more than 500 feet between connections except where prevented by barriers.
- Provide bike and pedestrian access ways with spacing of no more than 300 feet except where prevented by barriers.
- Limit use of cul-de-sacs and other closed-end street systems to situations where barriers prevent full street connections
- Include no close-end street longer than 200 feet or having no more than 10 dwelling units.
- Include street cross-sections demonstrating dimensions of ROW improvements, with streets designed for posted or expected speed limits.

The arrows shown on Figure 8-1 indicate priority local and neighborhood connections only. Other stub end streets in the City's road network may become cul-de-sacs, extended cul-de-sacs or provide local connections. Pedestrian connections from the end of any stub end street that results in a cul-de-sac should be considered mandatory as future development occurs. The goal shall continue to be improved city connectivity for all modes of transportation.

Functional Classification

The proposed functional classification (shown in Figure 8-2) was developed following detailed review of the existing Silverton TSP and Marion County RTSP. The key changes include increasing the number of arterial roadways to create a connected network that serves regional trips at key gateways into the City, maintaining and updating the collector system to reflect changing land uses, and providing neighborhood routes that serve clear connections from neighborhoods and feed into the collector and arterial network.

Roadway Cross-Section Standards

The City of Silverton has current standards for street cross sections that apply citywide to residential, neighborhood, collector and minor arterial roadways. The TSP update includes several revisions and additions to the street cross-section standards. Arterial street cross sections have been designated for state highway segments both inside and outside of the Special Transportation Area (STA). Cross-sections were also added for a standard residential collector and alleyway. The local street cross-section was revised to include the option of either parking on both sides of the street with a 34-foot curb-to-curb width or parking on one side of the street with a 28-foot curb-to-curb width. The recommended roadway cross-sections are shown in Figures 8-3 through 8-5.

Transportation Demand Management (TDM)

Transportation Demand Management (TDM) is the general term used to describe any action that removes single occupant vehicle trips from the roadway network during peak travel demand periods. Generally, TDM focuses on reducing vehicle miles traveled and promoting alternative modes of travel for large employers of an area.

Many of the TDM strategies are tailored towards urban applications, where there are major employment generators and transit opportunities. TDM measures for more rural communities require special development, as compared to those that are implemented in urban areas. TDM measures in rural

environments should focus on increasing travel options and creating an environment that is supportive for walking and cycling. The most effective TDM measure for Silverton includes elements related to increased parking management (parking time limits and pricing) downtown, carpools, improved services for alternative modes of travel and employer incentives for the hospital schools and BrucePak. [1] The City of Silverton and Marion County shall coordinate to implement the pedestrian, bicycle, and transit system improvements, which offer alternative modes of travel.

Roadway Improvements

The extent and nature of the recommended street improvements for Silverton are significant. The forecasted 2030 land use indicates significant growth in both housing and employment within the TSP study area.

There are a number of locations in Silverton where, due to the lack of alternative routes, there is an imbalance of traffic volumes that load onto one street. A well connected transportation system limits out of direction travel for motorists, bicycles and pedestrians and reduces vehicle miles traveled within the study area. Roadway extension projects are needed to improve citywide connectivity for all modes of travel.

The 2030 analysis found that significant improvements would be required at the majority of the study intersections to accommodate the forecasted growth. These improvements include traffic signal control and the construction of additional turn lanes. Based on these needs, a Motor Vehicle Master Plan was created that is shown in Figure 8-10. The updated Motor Vehicle Master Plan costs are estimated to be $29.1 million. The Motor Vehicle Master Plan will require incremental implementation. As development occurs, streets are rebuilt and other project funding opportunities (such as grant programs) arise, projects on the Master Plan should be integrated into project development. In addition to the intersection improvements, three collector roadways were also identified as Master Plan projects that would enhance the circulation and connectivity throughout Silverton.

Westside North-South Connector #1: This potential roadway provides a connection from Pine Street to Silverton Road west of Grant Street. The roadway provides an important Westside connection and an additional bridge crossing west of downtown. Currently, the nearest bridge crossing is at James Street. The connection generally relieved trips on the C Street/James Street Corridor. The construction of a bridge crossing over Silver Creek adds significant cost to the project. This roadway connection was identified in the 2000 TSP.

Eastside North-South Connector #4: This potential roadway provides a parallel route that connects Silverton on the eastside of downtown. The alignment will tie into Monitor Road at Oak Street and connect to Pioneer Drive to the south. Generally, the east-side connector relieved trips through downtown that have origins/destinations on the east and south sides of Silverton. The proposed roadway is expected to carry approximately 1,900 vehicles in the future year (2030). This connection was also identified in the 2000 TSP. A key issue with this connection is the project limits outside of the adopted Urban Growth Boundary (UGB). This portion of the project would need to go through a Goal Exception analysis consistent with State of Oregon statutes in order to be designated in the TSP for funding or carried forward to project implementation.

[1] TriMet Employer Commute Options (employer survey information available online: http://www.trimet.org/employers/ecosrvy.htm

The proposed alignment of the connector crosses Evans Valley Road which is a likely location to break the construction of the connector into two phases: north of Evans Valley Road and south of Evans Valley Road. Phase 1 should be constructed first to connect the rapidly developing Pioneer neighborhood to Evans Valley Road, from there motor vehicle trips destined to Monitor Road or Highway 213 could be served by existing surface streets (until Phase 2, north of Evans Valley Road) is constructed.

Northside East-West Connector #5: This potential roadway connects James Street and 2nd Street south of Jefferson Street. The primary purpose of this roadway is to provide another connection north of C Street for trips destined on the east or west side of 1st Street (Hwy 214). The forecasted future daily volume on this roadway is approximately 900 vehicles. It does not have significant impacts on the adjacent intersections, although it does improve the connectivity and circulation north of downtown. A key issue with this roadway is the proposed railroad crossing. It is likely that ODOT Rail may not approve a new at-grade rail crossing within this City, and this connection would be required to be grade separated.

The motor vehicle goals and input from the TAC were reviewed to create a Motor Vehicle Action Plan, which are high priority projects that are reasonably expected to be funded by the year 2030. The collector roadways are not included in the Action Plan and are not expected to be funded over the next 20 years. The Motor Vehicle Master Plan and Action Plan projects are included in Table 1-5.

Table 1-5: Motor Vehicle Master Plan and Action Plan Projects

Location	Description	Plan	Cost ($1,000)
Intersection Improvements			
McClaine Street/Main Street	Install traffic signal and construct westbound right turn lane	Action	$600
1st Street (Hwy 214)/Hobart Road	Install traffic signal	Action	$250
Oak Street (Hwy 213)/2nd Street	Install traffic signal	Action	$250
Oak Street (Hwy 213)/Water Street	Install traffic signal	Action	$250
Oak Street(Hwy 213)/1st Street	Install traffic signal	Action	$250
1st Street (Hwy 214)/Lewis Street	Close the south leg of intersection	Action	$10
Main Street/1st Street	Install traffic signal	Action	$250
Main Street/1st Street	Construct an eastbound left turn lane	Action	$250
Main Street/Water Street	Install traffic signal	Action	$250
Main Street/Water Street	Construct a southbound right turn lane	Action	$250
Oak Street/2nd Street	Restrict eastbound and westbound left turns (signing)	Action	$5
C Street/McClaine Street	Construct southbound right turn lane	Action	$420
James Street/C Street**	Restrict northbound and southbound left turns	Action	-
Highway 213/Steelhammer Road	Construct left turn pocket with median treatment	Action	$250
Pioneer Drive/Evans Valley Road	Construct roundabout	Action	$750

Location	Description	Plan	Cost ($1,000)
Highway 213/Monitor Road	Construct roundabout	Action	$2,300
Roadway Connections[2]			
Westside North-South Connector #1	Construct north-south connector roadway from Pine Street to Silverton Road (includes construction of roundabout on Silverton Road)	Master	$7,800
Eastside North-South Connector #4 (Phase 1)	Construct north-south connector roadway from Pioneer Drive to Evans Valley Road	Action	$3,750
Eastside North-South Connector #4 (Phase 2)	Construct north-south connector roadway from Evans Valley Road to Highway 213	Master	$8,250
Northside East-West Connector #5	Construct east-west connector roadway from James Street to 2nd Street (south of Jefferson Street)	Master	$2,500
	Total Motor Vehicle Action Plan Project Cost		**$10,085**
	Total Motor Vehicle Master Plan Project Cost		**$28,635**

Note: *Project is located outside of current UGB. See footnote for related information.
**The turn restrictions at C Street/James Street should be implemented after the C Street/Water Street traffic signal has been constructed.

Other Modes

While auto, transit, bicycle and pedestrian transportation modes are the primary means of travel in Silverton, other modes of transportation must be considered and addressed. Future needs for rail, air and water infrastructure are identified and summarized below.

Rail

One rail line operates through the City of Silverton. The Willamette Valley Railroad currently provides branch rail line service for the shipment of commodities between Salem and Woodburn. The freight line operates two trains per day through the study area with speeds of 10 miles per hour or less. The following existing and forecasted needs have been identified within the City of Silverton:

Rail/Highway Grade Crossing Improvements

Three crossings have been identified for crossing improvements. The following crossings are currently controlled by stop signs and should be upgraded to crossing gates, flashers and pedestrian path features:

- 1st Street (Hwy 214)/Hobart Road
- 1st Street (Hwy 214)/Jefferson Street
- James Street/C Street

[2] This table identifies anticipated future roadway extensions outside of the UGB. These facilities are planned but will be authorized by subsequent land use decisions. These roadways are needed to support long term transportation needs and represent logical extensions and connections to meet future needs. These alignments are generalized recommendations for connectivity and will be refined when future land use decisions, such as UGB amendments, are considered. Designation of these projects as planned facilities or improvements will require an amendment to the Marion County TSP and/or a UGB amendment.

Rail Facility Upgrade

The existing rail facility is only used for freight rail service, in the future passenger rail (tourist-oriented) and/or commuter rail options may be introduced. The existing rail system will require facility improvements to accommodate these additional rail uses, as well as further coordination with the Oregon Department of Transportation.

Future Potential Rail Station

If commuter and/or passenger rail is introduced within the City of Silverton a centrally located rail station will be required. A potential, future station location has been identified on the northeast corner of C Street/Water Street. Future development in that area should not preclude this location as a potential station site.

Air

One private airfield facility is located northwest of Silverton. There are currently no existing or planned public airports within the Silverton TSP study area. Commercial passenger service in Silverton is provided at the McNary Field Airport, approximately 20 miles west of Silverton in Salem and at the Portland International Airport, approximately 60 miles north of Silverton. No major changes are expected to occur in the 24 year planning horizon. As such, no policies or recommendations in this area of transportation are provided for Silverton.

Water

No waterways are used for commercial transportation purposes within the Silverton TSP study area. Silver Creek and surrounding park areas and trails are used for recreation and Silver Creek was identified as a potential location for a recreational trail. No plans were identified for waterway infrastructure expansion. As such, no policies or recommendations in this area of transportation are provided for Silverton.

Pipeline

All existing pipelines within and passing through Silverton are outside of the maintenance responsibilities of the City. As such, no policies or recommendations in this area of transportation are provided for Silverton.

FUNDING

Transportation funding is commonly viewed as a user fee system where the users of the system pay for infrastructure through motor vehicle fees (such as gas tax and registration fees) or transit fares. However, a great share of motor vehicle user fees goes to road maintenance, operation and preservation of the system rather than construction of new system capacity. Much of what the public views as new construction is commonly funded (partially or fully) through property tax levies, traffic impact fees and fronting improvements to land development.

Assuming the renewable funding sources outlined in Chapter 10, the City of Silverton will collect approximately $461,100 for transportation operations and maintenance and $430,578 for capital improvements each year. This revenue will be generated from the state (fuel taxes and license fees), the Urban Renewal Fund, System Development Charges, and other revenue sources. Total revenues to be collected over 23 years between 2007 and 2030 would be $20.5 million with current funding sources and projected population and employment growth.

Table 1-6: Summary of Current Revenues for Transportation

Funding Category	Funding Allocation	Estimated Revenues Through 2030	Annual Amount
New Development (not SDC)	Operations and Maintenance	$143,000	$6,200
State Fuel Apportionment & Vehicle License Fee	Operations and Maintenance	$8,406,000	$365,500
ODOT Fund Exchange	Operations and Maintenance	$2,056,000	$89,400
Urban Renewal Fund	Capital Improvements	$2,300,000	$100,000
System Development Charge	Capital Improvements	$7,603,300	$330,578
	Total O&M Revenues	**$10,605,000**	**$461,100**
	Total Capital Revenues	**$9,903,300**	**$430,578**

Note: The annual amount indicates average annual totals over the last four years.

Source: City of Silverton, Adopted Budget, Fiscal Years 2003-2004 through 2006-2007

The costs outlined in the Transportation System Plan to implement the Action Plans for Streets, Transit, Bicycles, and Pedestrians total $24.2 million, and several other recommended transportation operations and maintenance programs would add $13.5 million for a total cost over 23 years of $37.6 million. This total exceeds the expected 23-year revenue estimate of $20.5 million (see Table 10-1) by approximately $17.1 million.

Table 1-7: Silverton Transportation Action Plans Costs over 23 years (2007 Dollars)

Transportation Element	Approximate Cost ($1,000)
System Improvement Projects (Action Plans projects to be funded by City)	
Motor Vehicle	$10,085
Roadway Reconstruction	$8,452
Bicycle	$1,578
Transit	$370
Pedestrian	$3,679
Total Capital Projects	**$24,164**
Operations and Maintenance Programs and Services	
Roadway Maintenance ($378,000 per year)	$8,693
Local Transit Operations ($150,000/yr)	$3,430
Gravel Street Paving ($58,000/yr)	$1,334
Total Operations and Maintenance Programs	**$13,457**
23 YEAR TOTAL in 2007 Dollars	**$37,621**

It is recommended that the City consider establishing a transportation utility fee as the backbone of its operations and maintenance funding approach. Street utility fees can provide a stable source of dedicated revenue useable for transportation system operations and maintenance and/or capital construction. Rate revenues can also secure revenue bond debt if used to finance capital improvements. Transportation utilities can be formed by Council action, and billed through the City utility billing system (e.g. water

bills).

The City should also review the Development Code to allow development exactions to fund TSP projects (Action Plan or Master Plan). An SDC update study is also recommended to re-calculate the growth share based on revised population estimates and generate additional revenue for capital improvement projects. In addition, the City should actively pursue grant and other special program funding in order to mitigate the costs to its citizens of transportation capital construction. The estimated 23 year total estimate of funds that could be generated from a transportation utility fee and the enforcement of development exactions are shown in Table 1-8. These additional funds would be expected to generate sufficient revenues to fully fund the Action Plan projects and maintenance programs.

Table 1-8: Recommended New Funding Sources for Transportation Programs

Transportation Funding Source	Estimated Revenue ($1,000)
Transportation Utility Fee*	$13,500
Development Exactions	$2,200
SDC Update-Revised Growth Share (35%)	$1,360
20 YEAR TOTAL in 2004 Dollars	**$17,100**

Notes: * Assumes utility fee corresponding to $54 per capita per year (a typical single family household may be charged approximately $7 per month).

CHAPTER 2 : TRANSPORTATION POLICIES

These goals and policies have been developed to guide the City's twenty-year vision of transportation system needs. There are eight transportation goals with related policies organized under each goal. The goals and policies are not prioritized.

The goals are brief guiding statements that describe a desired result. The policies describe the actions needed to move the community toward the goal. To implement these policies there can be numerous actions, programs, projects and/or regulations. Some of these are existing activities while additional actions may need to be considered in the future to meet identified needs. Below some of the policies, italic text provides details of potential implementing actions. Some typical implementing actions include transportation improvement projects, ordinance provisions, Development Code regulations, and Public Works design standards.

GOALS AND POLICIES

Goal #1: Develop a transportation system to enhance Silverton's livability through proper location and design of multi-modal transportation facilities, including streets, sidewalks, bicycle lanes, trails, and transit.

Policies:

a) Streets and highways shall be designed to respect the characteristics of the surrounding land uses, natural features, and other community amenities.

b) The City shall strive to identify and address deficiencies with the existing transportation facilities.

c) As appropriate, the City shall require design plans, transportation impact analyses studies and/or other information to ensure that transportation facilities do not negatively impact aesthetic, environmental, functionality, safety and/or other factors that effect livability.

d) Consider noise impacts in the design, redesign, and reconstruction of arterial streets immediately adjacent to residential neighborhoods.

e) The City shall protect neighborhoods from excessive through traffic and travel speeds while providing reasonable access to and from residential areas. Streets shall be designed to minimize speeding.

f) The City shall develop and maintain street design standards and neighborhood traffic management criteria. These regulations will be used in the design of new development and addressing neighborhood traffic concerns.

Action: Develop neighborhood impact thresholds and mitigation plan requirements that utilize traffic calming policies.

g) The City shall ensure that parking is effectively regulated through the development, adoption, and implementation of off-street parking requirements for all uses outside of the downtown area.

h) Within the downtown area, parking shall be evaluated periodically to ensure that parking needs are adequately met.

i) On-street downtown parking shall be managed to promote customer use and discourage employee parking.

j) New development shall be reviewed to ensure that the streets minimize cut-through traffic on residential streets.

Goal #2: Create a balanced transportation system for all modes and reduce the number of trips by single occupant vehicles.

Policies:

a) The City shall implement street design standards that recognize the multi-purpose nature of the street right-of-way for utility, pedestrian, bicycle, truck, transit, and vehicle traffic.

b) The City shall strive to provide or ensure connectivity to each area of Silverton for all modes of travel (pedestrian, bicycle, and vehicles) focusing on access to schools, parks, employment and recreational areas.

c) The City shall promote neighborhood and local connections for all modes of travel to provide adequate circulation to, through, and between neighborhoods.

d) The City shall strive for the development of a pedestrian system of sidewalks and pathways to provide safe, attractive, efficient, and accessible routes that allows pedestrians to travel from residential areas to schools, parks, commercial areas and major employment centers (with new construction or reconstruction projects).Facilities shall be designed to consider direct/shortest-path walking routes.

e) All new streets shall be constructed with sidewalks. Bicycle lanes shall be constructed on arterial and collector streets as noted within the Silverton Transportation Plan (with new construction or reconstruction projects).

f) The City shall promote a bikeway system of on-street bike lanes, shared roadways, and multi-use paths that allows bicyclists to travel from residential areas to schools, parks, commercial areas and major employment centers.

g) The City shall support efforts to implement regional off-street connections between Silverton, surrounding communities, and the greater area.

h) The City shall continue to support efforts to expand transit services within the City of Silverton and to maintain and expand regional transit services to surrounding communities.

i) As population growth warrants, undertake a transit feasibility study to consider fixed-route transit service. In the meantime adopt street design standards that maintain transit vehicle mobility on key potential transit routes.

j) Support demand management programs such as park-and-ride lots, van pools, and car pools to reduce single-occupancy auto trips.

k) Consider other actions to support multi-modal transportation.

Goal #3: Improve the safety of the transportation system.

Policies:

a) The City shall strive to improve traffic safety through a comprehensive program of engineering, education, and enforcement.

b) Where on-street pedestrian and bicycle facilities cannot reasonably be provided on highways and arterials, the City shall identify parallel routes that comply with state and city planning and design standards.

c) The City shall enhance safety by prioritizing and improving high accident locations within the City.

d) The City shall work with other agencies (e.g. ODOT, Marion County, etc) to review information and conditions in an effort to remedy safety issues.

e) The City shall work with area schools and the community to ensure that there are safe pedestrian, bicycle and bus routes to schools and work to communicate these routes to the community.

Action: The City shall work with area schools and the community in developing safe pedestrian, bicycle and bus routes to schools. Communicate selected safe school route program to community. Improvement projects near schools shall consider school access and safety during project development.

f) Enhance pedestrian safety by filling network gaps to provide continuous pedestrian facilities.

g) The City shall develop and maintain access management standards for streets, consistent with the City, County, and State standards, to reduce conflicts between vehicles and trucks, and between vehicles and bicycles and pedestrians.

h) The City shall ensure that adequate primary and secondary access for emergency services vehicles is provided throughout the City.

Action: Develop traffic calming standards based on functional classification to preserve response routes.

i) The City shall meet federal and state safety standards for rail crossings.

j) The City shall comply with safe routing of hazardous materials consistent with federal guidelines.

Action: Work with federal agencies, the Public Utility Commission, the Oregon Department of Environmental Quality, public safety providers, and ODOT to assure consistent routes, laws, and regulations for the transport of hazardous materials.

Goal #4: Develop an efficient transportation system that will handle future traffic growth.

Policies:

a) The City shall designate roadway functional classifications that reflect the desired function and characteristics of different roadways, including access management policies.

Action: Maintain a functional classification system that meets the City's needs and respects the needs of other agencies including, but not limited to, Marion County and ODOT.

b) Land use development standards shall consider impacts on transportation facilities, reduce travel demand, and encourage all modes of transportation.

c) Capital improvement projects shall be designed to serve travel demands consistent with the forecast year of the current Transportation System Plan or a 20-year horizon, whichever is greater.

d) The City shall encourage development that effectively mixes land uses to reduce reliance on vehicles.

e) The City shall assist in maintaining acceptable levels of service on state roads consistent with the Oregon Transportation Plan. Where appropriate, the City shall support reducing traffic congestion and enhancing traffic flow through such measures as intersection improvements, intelligent transportation systems, signal synchronization, and other similar measures.

f) The City shall implement performance standards for use in evaluating new development proposals.

Action: City performance standards shall be used to evaluate developments impacting City or County facilities. The level of service standard shall be LOS D based on the Highway Capacity Manual methodology and a v/c ratio of 0.85 for signalized and all-way stop controlled intersections. For unsignalized intersection, the level of service standard shall be LOS D based on the Highway Capacity Manual and a v/c ratio of 0.90. ODOT v/c ratio standards shall apply to ODOT facilities.

Within the downtown core area, including:

- *Main Street/Oak Street*
- *Water Street/Oak Street*
- *1st Street/Oak Street*
- *Water Street/Main Street*
- *1st Street/Main Street*
- *Main Street/McClaine Street*
- *2nd Street/Oak Street*
- *Lewis Street/1st Street*
- *Lewis Street/Water Street*

- *Main Street/2nd Street*

Intersections must be analyzed using microsimulation software (e.g. Synchro/SimTraffic) as a system. The simulated intersection delay must not exceed 55 seconds at any of the aforementioned intersections

g) The City shall review comprehensive plan amendments and zone changes for their impacts on transportation facilities. Proposals that are determined to have an impact shall be required to demonstrate that the proposed changes will not significantly affect the transportation system and are consistent with the identified function, capacity, and performance standards of the transportation facility.

Goal #5: Provide a transportation system that is accessible to all members of the community.

Policies:

a) The City shall require all new transportation facilities be constructed to meet the requirements of the Americans with Disabilities Act (ADA).

b) Existing transportation facilities that do not meet the ADA standards shall be retrofitted when improvements are being made to that facility or through City transportation improvement projects.

c) The City shall support services to respond to the needs of all groups of transportation system users, including disadvantaged[3] individuals.

d) The City shall develop a plan to upgrade existing public facilities that are non-compliant with accessibility standards.

Goal #6: Develop a transportation system to provide for efficient freight movement.

Policies:

a) The City shall recognize designated truck routes and the need for highway access as essential for efficient movement of goods and these facilities and adjacent land uses shall be designed to reflect the needs of freight movement.

b) The City shall consider the impact of railroad facilities on land use decisions.

c) The City shall consider utilization of appropriate controls for all railroad crossings.

d) As part of future roadway improvements, the City shall consider impacts to pipeline facilities.

Goal #7: Create a funding system to implement the recommended transportation system improvement projects.

Policies:

a) The City shall coordinate with ODOT and other jurisdictions to develop a long-range financial strategy to make needed improvements to the transportation system and support operational and maintenance requirements.

Action: The financial strategy should consider the appropriate elements. View the process of improving the transportation system as that of a partnership between the public (through fees and taxes) and private sectors (through exactions and conditions of development approval), each of which has appropriate roles in the financing of these improvements to meet present and projected needs.

b) The City shall seek adequate funding for maintenance of transportation facilities, including consideration of alternate funding opportunities.

Action: Develop a long-term financing program that provides a stable source of funds to ensure cost-effective maintenance of transportation facilities and efficient effective use of public funds.

c) The City shall maintain a funding program that requires development to pay for its fair share of transportation improvements as well as mitigate for impacts to the transportation system so that there are no reductions in the level of service, functionality or carrying capacity.

d) The City shall establish rights-of-way at the time of site development and to officially secure them by dedication of property.

e) The City shall monitor and update the Transportation System Plan so that issues and opportunities are addressed in a timely manner.

f) The City shall prepare and maintain a current capital improvement program that establishes the City's construction and improvement priorities, and allocate the appropriate level of funding.

Goal #8: Develop a transportation system that is consistent with the adopted plans of the state, local, and regional jurisdictions.

Policies:

a) The City shall coordinate with the Oregon Department of Transportation (ODOT) and other governmental agencies to improve and maintain Highway 213 and Highway 214 consistent with the *Oregon Highway Plan* (OHP); including participation on ODOT project development teams for improvements that affect the City.

b) The City shall cooperate with surrounding counties (Marion County, Linn County, etc.) to maintain and improve county roads consistent with each County's Transportation System Plan.

c) The City shall notify ODOT, DLCD, Marion County, and other governmental agencies that rely on the transportation system when changes are proposed to the Silverton Transportation System Plan.

d) The City shall participate with the Mid-Willamette Valley Area Commission on Transportation (MWACT) and identify opportunities for enhanced coordination and assistance with City projects.

e) The City shall identify an elected official to join and participate in the Mid-Willamette Valley Area Commission on Transportation (MWACT).

CHAPTER 3 : EXISTING CONDITIONS

This chapter presents the existing condition of the transportation network in the Silverton transportation system plan (TSP) study area. The purpose of this chapter is to document existing transportation facilities in the study area. The findings will provide the basis for determining the existing transportation needs and developing future transportation projects within the study area.

OVERVIEW

Existing transportation conditions were evaluated as part of the City of Silverton TSP Update. An analysis of current conditions provides an understanding of facility development, service and performance. This chapter summarizes existing transportation operation in the City for all travel modes including pedestrians, bicycles, transit, motor vehicles, freight, water and air, as applicable. To understand existing travel patterns and conditions, multiple aspects of the City's transportation system were considered. An inventory was conducted in the fall of 2006 to establish base year conditions for the TSP. Much of this data provides a basis of comparison for future assessment of transportation performance in Silverton relative to desired policies.

The study area includes the City of Silverton and the surrounding transportation system network. The study area for this TSP update is shown in Figure 3-1.

Twenty-one intersections within the study area were selected for focused operational analysis. Data was gathered at these locations to evaluate traffic conditions including vehicle delays and levels of service. The following sections review the existing transportation systems including pedestrian, bicycle, transit, motor vehicle and other modes (such as heavy vehicle, rail, water, etc.) and their performance within the City.

City of Silverton
Transportation System Plan

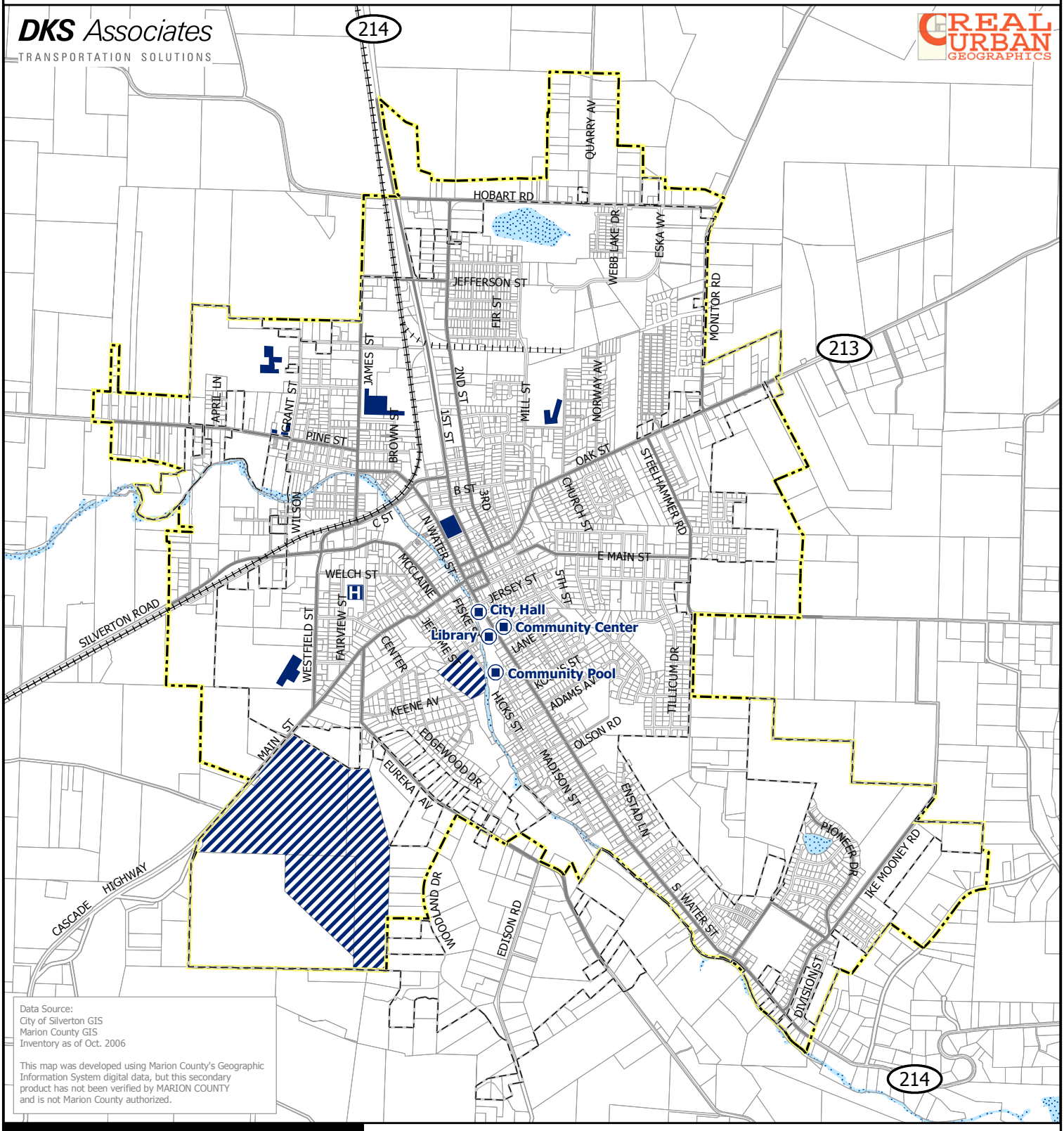


FIGURE 3-1

Study Area

0 0.25 0.5 Miles

not to scale

Legend

- Urban Growth Boundary
- City Limit
- Hospital
- Civic/Government
- School
- Water
- Park
- Major Street
- Local Street
- County Roads
- Railroad
- Abandoned

PEDESTRIANS

Facilities

Creating a safe, convenient pedestrian system includes a variety of different components. Generally, interconnected sidewalk facilities on both sides of the street on all arterials and collectors is desirable, as well as safe convenient on or off street connections to all major pedestrian generators, such as schools, parks, and retail centers. Street lighting and pedestrian crossing facilities also make up the pedestrian environment.

The existing sidewalk inventory was obtained from existing data compiled by the City of Silverton combined with a limited field inventory. Sidewalks are generally present on both sides of the street in the central downtown area, but further from the city center the arterial and collector streets only have intermittent sidewalks. In many cases, sidewalks are provided on one side of the street only, preventing continuity and a convenient safe path to the pedestrian generators within the City. The railroad and Silver Creek also present barriers to pedestrian connectivity from the areas north and west of downtown. Figure 3-2 shows the existing sidewalk inventory within the City of Silverton.

Activity Levels

Pedestrian counts were conducted during the PM peak hour at the study intersections. These counts represent a sample of the existing pedestrian activity based on one evening peak period. Pedestrian activity is influenced by factors such as time of year and weather conditions; variations would be expected with data collection over time based on these factors. Generally, the proximity to adjacent land uses (i.e. schools, parks, commercial developments) are the most significant predictors of pedestrians and thus represent key areas for sidewalk placement and connectivity.

Pedestrian crossing volumes at the study intersections were counted during the weekday vehicular PM peak hours and have been provided in Table 3-1. This table represents volumes collected during a peak period (4:00-6:00 p.m.) that cross all four (or three as applicable) legs of the intersection. Although, the vehicular peak period occurs from 4 to 5 PM, some areas, especially those near schools, see higher pedestrian volumes earlier in the day. Pedestrian crossing volumes are shown in Table 3-1.

Table 3-1: Pedestrian Crossing Volumes (PM Peak Period 4:00-6:00)

Intersection	Pedestrian Crossing Volume
Oak Street (Hwy 213)/Steelhammer Road	0
Oak Street (Hwy 213)/Monitor Road	0
Oak Street (Hwy 213)/1st St (Hwy 214)	77
Oak Street (Hwy 213)/2nd Street	47
Oak Street(Hwy 213)/Water Street	267
1st Street (Hwy 214)/C Street	25
1st Street (Hwy 214)/Hobart Street	2
1st Street (Hwy 214)/Main Street	114
1st Street/Lewis Street	46
Water Street/Lewis Street	67
Water Street (Hwy 214)/Main Street	94
Water Street (Hwy 214)/Pioneer Drive	1
Water Street (Hwy 214)/Park Street	4
Water Street/C Street	37
Front Street/C Street	42
McClaine Street/Main Street	16
Westfield Street/Main Street	0
C Street/McClaine Street	23
C Street/James Street	74
James Street/Pine Street	44
James Street/Water Street	50

The highest pedestrian volumes were observed at Oak Street (Hwy 213) and Water Street, with 267 PM peak period crossings. Typically, most significant pedestrian movements occur near retail, recreational, and educational facilities. This trend is present in Silverton, as the table shows significant pedestrian volumes near the downtown core and near the schools along James Street, Water Street, and Church Street.

Existing Issues

- *Lack of connectivity of sidewalk network to retail centers/schools/downtown-specifically residential developments to the east and west of downtown*
- *Lack of pedestrian crossing enhancements at uncontrolled or high volume locations*
- *Significant barriers to pedestrian connectivity (e.g. railroad and Silver Creek)*

City of Silverton
Transportation System Plan

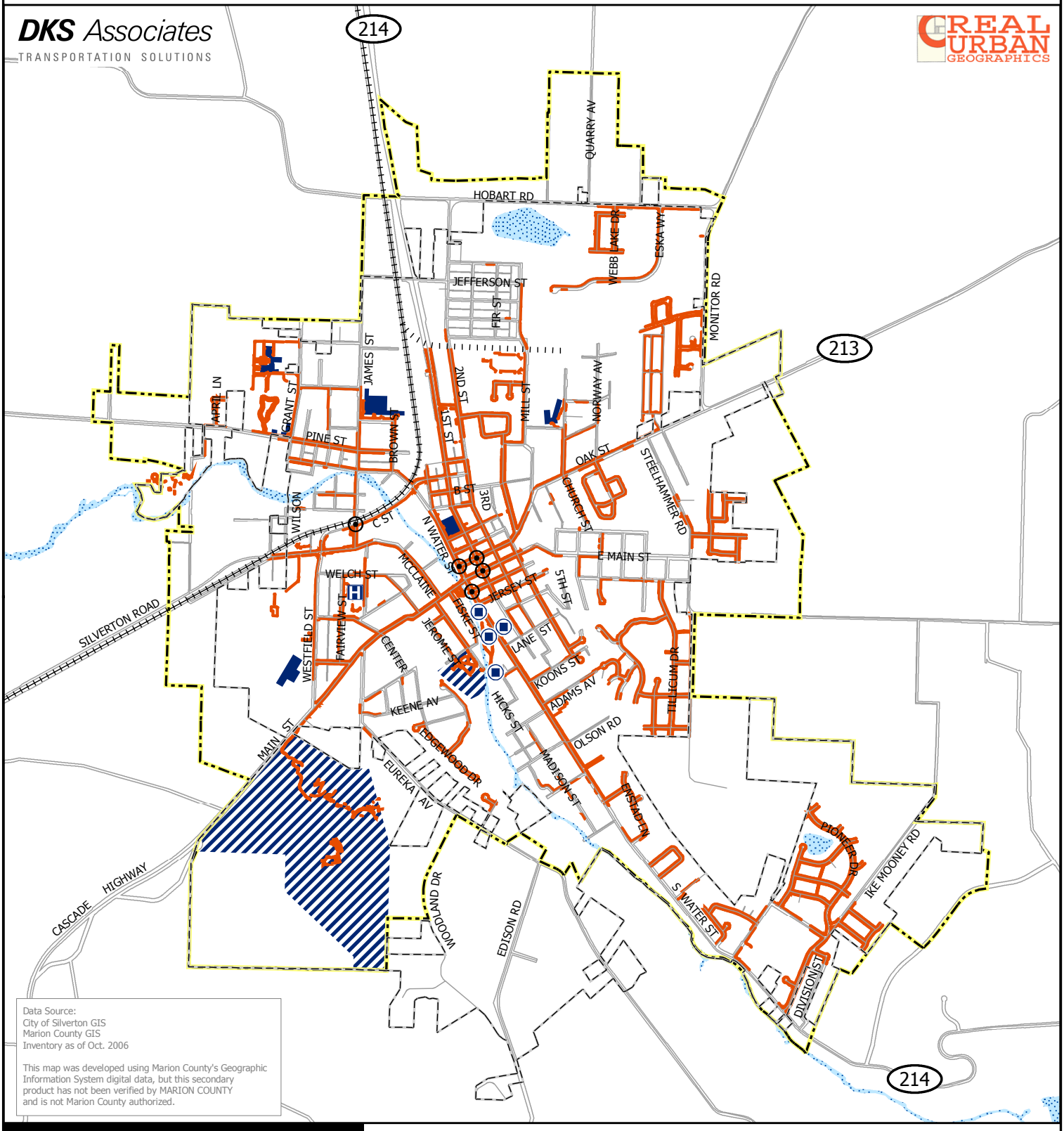


FIGURE 3-2

Existing Pedestrian Facilities

0 0.25 0.5 Miles

not to scale

Legend

- Existing Sidewalk
- Urban Growth Boundary
- City Limit
- Water
- High Pedestrian Crossing Locations (>75 in P.M. peak hour)
- Hospital
- Civic/Government
- School
- Road
- Railroad
- Abandoned

BICYCLES

Facilities

The arterial and collector roadway system within the study area has intermittent bicycle facilities. Striped bike lanes are present along C Street, Westfield Avenue and sections of Main Street. This interconnected series of bike lanes provides an adequate connection from north of downtown to the west portion of Silverton. Additional striped bicycle lanes are present on Oak Street (Hwy 213) east of Steelhammer Road on one side of the street as well as portions of South Water Street (Hwy 214) near Pioneer Drive where the bike lanes were added with new development. Many arterial and collector streets do not have striped bike lanes but have wide shoulders that facilitate bicycles sharing the road with motor vehicles. The existing bike routes were built according to the bicycle system plan in the Silverton TSP. Figure 3-3 illustrates the existing bicycle facilities within the City of Silverton.

Activity Levels

Bicycle counts were conducted during the weekday evening peak period (4:00 to 6:00 PM) at the study intersections in Silverton and are shown in Table 3-2. Volumes were highest along C Street, downtown and near the schools on James Street, Water Street, and Church Street.

Table 3-2: Bicycle Crossing Volume (Weekday PM Peak Period 4:00-6:00)

Intersection	East/West Bike Volume	North/South Bike Volume
Oak Street (Hwy 213)/Steelhammer Road	0	0
Oak Street (Hwy 213)/Monitor Road	0	0
Oak Street (Hwy 213)/1st St (Hwy 214)	4	2
Oak Street (Hwy 213)/2nd Street	2	2
Oak Street(Hwy 213)/Water Street	10	2
1st Street (Hwy 214)/C Street	8	4
1st Street (Hwy 214)/Hobart Street	1	2
1st Street (Hwy 214)/Main Street	0	5
1st Street(Hwy 214)/Lewis Street	4	1
Water Street(Hwy 214)/Lewis Street	2	1
Water Street (Hwy 214)/Main Street	0	0
Water Street (Hwy 214)/Pioneer Drive	0	0
Water Street (Hwy 214)/Park Street	0	0
Water Street/C Street	9	5
Front Street/C Street	0	0
McClaine Street/Main Street	1	0
Westfield Street/Main Street	0	0
C Street/McClaine Street	2	0
C Street/James Street	0	3
James Street/Pine Street	6	5
James Street/Water Street	5	4

Existing Issues

- *Lack of bicycle parking*
- *Lack of off-street bike path*
- *No signed/marked bikeways or bicycle routes*
- *Lack of a complete, connected bicycle feeder system into downtown*

City of Silverton
Transportation System Plan

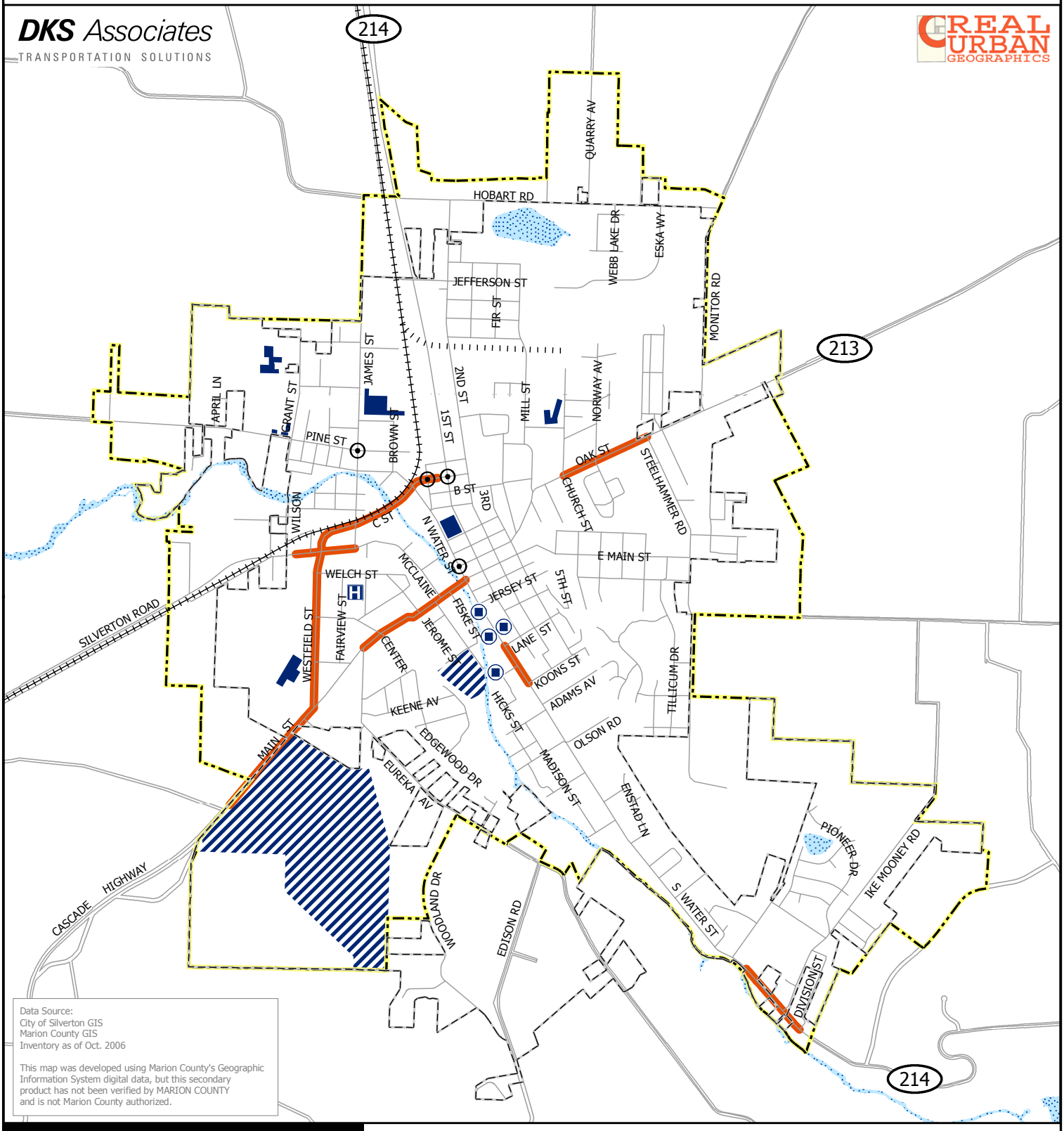


FIGURE 3-3

Existing Bicycle Facilities

0 0.25 0.5 Miles

not to scale

Legend

- Existing Bicycle Lanes
- High Bicycle Activity Locations (>10 in P.M. peak hour)
- Hospital
- Civic/Government
- School
- Urban Growth Boundary
- City Limit
- Water
- Roads
- Railroad
- Abandoned

TRANSIT

Facilities

The existing transit service within the City of Silverton is limited to one regional service provider and four demand-responsive dial-a-ride services.

Chemeketa Area Regional Transportation System (CARTS) provides a weekday fixed-route public transit service to Gates, Gervais, Aumsville, Silverton, Woodburn, Mt. Angel, Hubbard and Salem. CARTS operates North County routes that provide a total of 6 stops per day in Silverton at Roth's Family Market, Riteaid/Safeway and Downtown. The hours of operation are 6:00 AM to 5:00 PM. This route connects to Cherriots, the primary public transportation service in Salem. In addition to the fixed-route service, CARTS provides Dial-a-Ride service throughout the rural areas of Marion County. Clients may call one day or two weeks ahead and schedule curb-to-curb transportation service.

The City of Silverton owns and operates the Silver Trolley, which provides limited general public transportation services. The trolley operates as a dial-a-ride service on weekdays between 8:30 AM and 3:30 PM. The recommended donation is $1.00 per ride; however no one is turned away for lack of payment.

Wheels Community Transportation provides service for elderly citizens in need of transportation for medical appointments, employment, education purposes and nutritional shopping. Non-emergency medical transportation to Portland and other nearby communities is provided on a space available basis. Reservations for the dial-a-ride service must be made in advance; service is provided on weekdays from 7:00 AM to 5:30 PM.

The Silverton Hospital also provides medical transportation transit services for seniors over the age of 55 and disabled citizens. Seniors Plus is a service that provides medical transportation to Silverton Hospital and Silverton Hospital medical staff offices between the hours of 8:30 AM and 4:30 PM.

Existing Issues

- *Lack of regional connections to major employment areas (e.g. Salem)*
- *Lack of local service for citizens within the community that do not have automobile access, including senior citizens, disabled and youth*
- *Limited connections to other provider's services*

MOTOR VEHICLES

The motor vehicle system within the City of Silverton includes city streets, county roadways, and state highways. The following section describes the current system and how it functions.

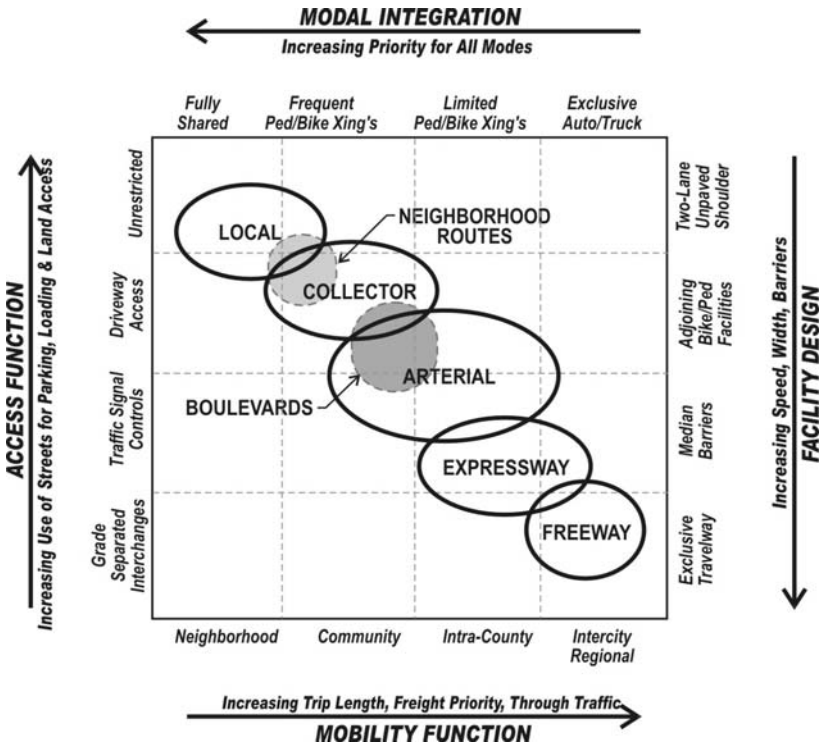
Functional Classification

Functional classification is the grouping of roadways by the character of service they provide. The functional classification system is designed to serve transportation needs within the community. The schematic diagram below shows the competing functional nature of roadway facilities as it relates to access, mobility, multi-modal transport, and facility design. The diagram is useful to understand how worthwhile objectives can have opposing effects. For example, as mobility is increased (bottom axis), the provision for non-motor vehicle modes (top axis) is decreased accordingly. Similarly, as access increases (left axis); the facility design (right axis) dictates slower speeds, narrower roadways, and non-exclusive facilities. The goal of selecting functional classes for particular roadways is to provide a suitable balance of these four competing objectives.

The diagram shows that as street classes progress from local to freeway the following occurs:

Mobility Increases – Longer trips between destinations, greater proportion of freight traffic movement, and a higher proportion of through traffic.

Integration of Pedestrian and Bicycle Decreases – Provisions for sidewalks and bike facilities are required up through the arterial class, however, the frequency of intersection or mid-block crossings for non-motorized vehicles steadily decreases with higher functional classes. The expressway and freeway facilities typically do not allow pedestrian and bike facilities adjacent to the roadway and crossings are grade-separated to enhance mobility and safety.



Access Decreases – The shared uses for parking, loading, and direct land access is reduced. This occurs through parking regulation, access control and spacing standards (see opposite axis).

Facility Design Standards Increase – Roadway design standards require increasingly wider, faster facilities leading to exclusive travel ways for autos and trucks only. The opposite end of the scale is the most basic two-lane roadway with unpaved shoulders.

Two additional areas are noted on the diagram for **Neighborhood Routes** and **Boulevards** that span two conventional street classes.

The existing functional classifications from the 1999 Silverton Transportation System Plan are shown in Figure 3-4. Four categories were identified including: arterial roadways, collector streets, neighborhood collector streets, and local streets.

The *Oregon Highway Plan* identifies Highway 213 and Highway 214 as District Highways. District highways often function as county and city arterials or collectors and provide connections between small urbanized areas, rural centers and urban hubs, while also serving local access and traffic. The management objective for District highways is to provide for safe and efficient, moderate to high-speed continuous-flow operation in rural areas and moderate to low-speed operation for traffic flow and pedestrian/bicycle movements in urban areas.

This TSP update should address the limitations of the existing functional class and establish a system that meets City needs and addresses regional issues. A functional class system based primarily on connectivity would allow the design flexibility to handle each of the issues identified above.

Roadway Jurisdiction

Roadway ownership and maintenance responsibilities of the various roads in the TSP study area are identified in Figure 3-5. Generally, arterial and collector roadways on the outskirts of the Silverton city limits are under the jurisdiction of Marion County. The City is responsible for the remainder of the roads within the city limits with the exception of Highway 213 and Highway 214 which fall under the jurisdiction of the Oregon Department of Transportation (ODOT). Within the City there are also designated private roadways; on these roadways it is the owner's responsibility for roadway maintenance and improvement.

Access Management Standards

The ODOT access management standards, as defined in OAR 734-051, call for minimum distances between access points on the same side of District Highways. Access management benefits typically include improved traffic flow, fewer vehicle conflicts, and reduced collisions. The standards vary depending on posted speed on the roadway, as shown in Table 3-3.

Table 3-3: ODOT Access Management Standards

	Posted Speed (MPH)				
Facility	**55 or greater**	**50**	**40,45**	**30,35**	**20 or less**
District Highway (feet)	700	550	500	350	350

Source: Oregon Highway Plan 1999

Marion County also identified access management standards in the Marion County Transportation System Plan. The standards are outlined in Table 3-4.

Table 3-4: Marion County Access Management Standards

Functional Class	Access Spacing Requirements
Arterial	500' from any intersection with a state highway, arterial or major collector
	400' from any other intersection (including private access)
Major Collector	400' from any intersection with an arterial or state highway
	300' from any other intersection (including a private access)
Minor Collector	300' from any intersection with an arterial or state highway
	150' from any other intersection (including a private access)
Local Street	200' from any intersection with an arterial or state highway
	100' from any intersection with a major collector, minor collector, or local road
	50' from any intersection with a private access

Source: Marion County RTSP, 2005

Special access management strategies for Silverton Road and north Highway 214 are recommended in the existing Silverton TSP that are consistent with Marion County and ODOT access spacing standards. The TSP recommends that ODOT access spacing standards be reviewed on a case by case basis for the south section of Highway 214 (South Water Street), and the east section of Highway 213 (Oak Street) for new development or redevelopment. On local City streets and on County roadways within the City, access spacing standards are recommended and shown in Table 3-5.

Table 3-5: City of Silverton Access Management Standards

	Minimum Access Spacing between Streets or Driveways (centerline to centerline)	Signal Spacing
Arterial	400 feet +/- 20% (existing developed areas)	½ mile
Collector	150 feet +/- 20 % (existing developed areas)	¼ mile

Source: City of Silverton TSP, 1999

City of Silverton
Transportation System Plan

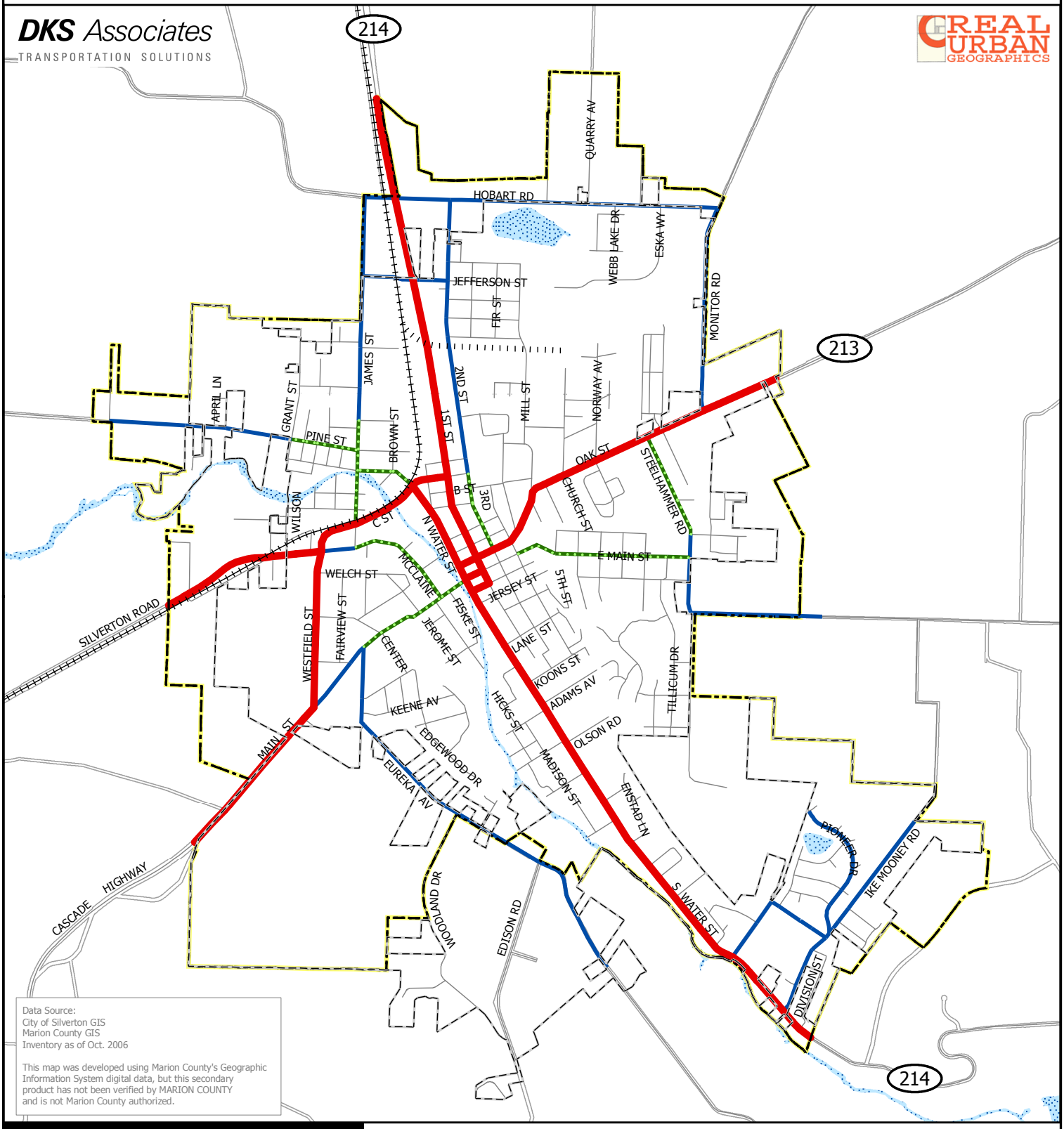


FIGURE 3-4

Existing Functional Classification

0 0.25 0.5 Miles

not to scale

Legend

- Arterial Street
- Collector Street
- Neighborhood Collector
- Local Street
- County Roads
- Urban Growth Boundary
- City Limit
- Water
- Railroad
- Abandoned

City of Silverton
Transportation System Plan

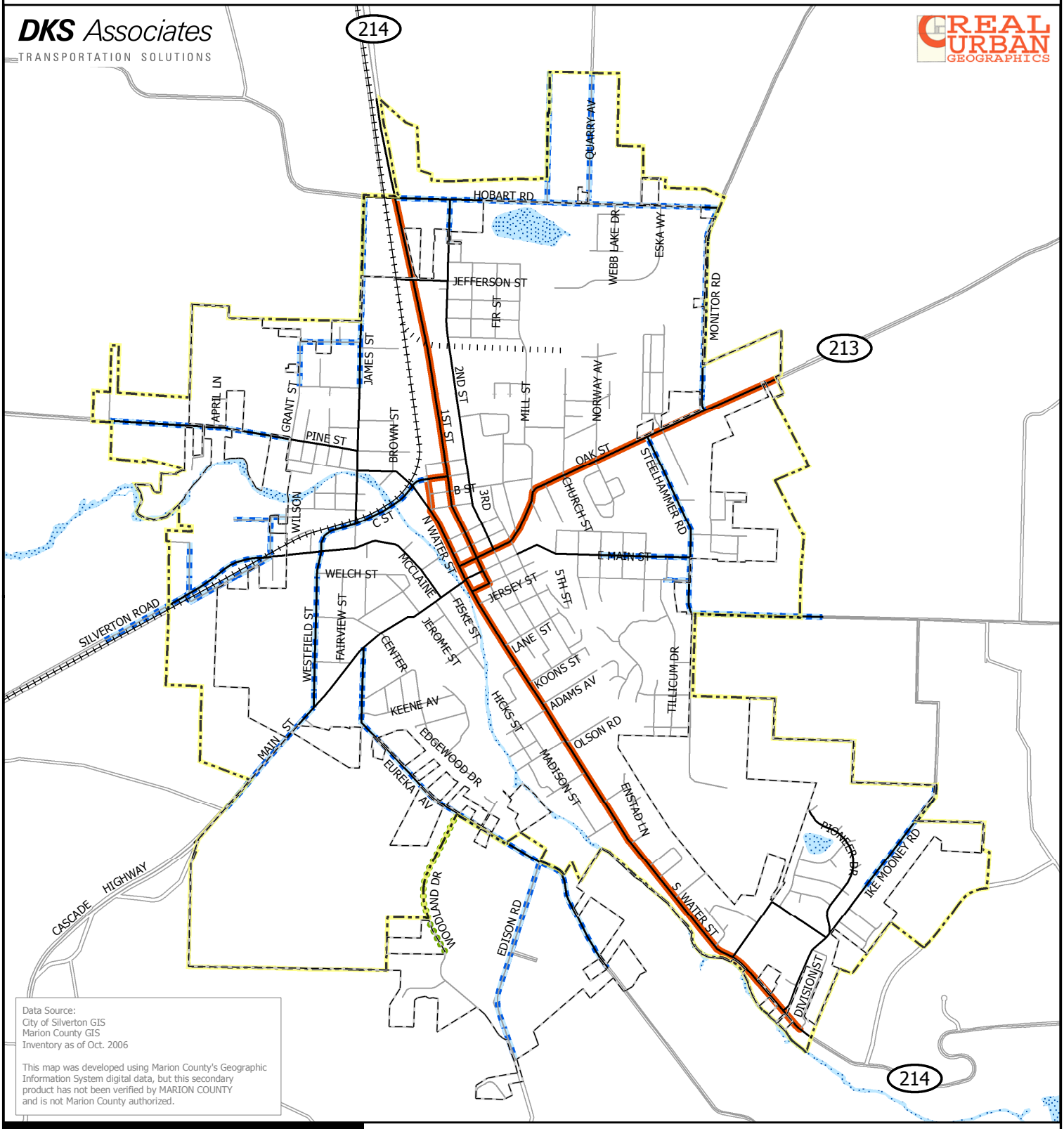


FIGURE 3-5

Existing Roadway Jurisdiction

0 0.25 0.5 Miles
not to scale

Legend

Jurisdiction
- State of Oregon
- Marion County
- Local Street

- Urban Growth Boundary
- City Limit
- Water
- Railroad
- Abandoned

ROADWAY CHARACTERISTICS

A field inventory was conducted to determine existing characteristics of collectors and arterials within the TSP study area. Data collected included posted speed limits, roadway lanes and intersection controls. These characteristics define roadway capacity and operating speeds through the street system, which affects travel path choices for drivers in Silverton.

Pavement Conditions

Figure 3-6 depicts the general pavement conditions of the roadways within the City of Silverton and an existing inventory of gravel streets. Pavement conditions were classified into the following three categories, including: good-fair, fair-poor, very poor. Generally most street segments were good-fair or fair-poor with the exception of the following five street segments that were identified as very poor and in need of improvement including:

- Adams Street (Water Street to the end of the road)
- Welch Street (Westfield Street to Main Street)
- Hazel Street (Keene Avenue to Ross Avenue)
- Chester Street (2nd Street to Mill Street)
- North Second Street (Whittier Street to Lincoln Street)

Several gravel street segments have been identified by the City as priority streets; these streets have through traffic, are mostly developed and are longer than two lots. This type of use makes them more of a priority for City participation in their improvement. The priority gravel streets include:

- Brooks Street
- Hill Street
- Lane Street
- Park Street
- Rock Street
- Short Street
- North 3rd Street
- Wall Street
- Wilson Street
- Olson Road
- Elm Street
- Meade Street
- Ord Street
- Sherman Street
- Willow Street

Vehicle Speeds

Figure 3-7 shows an inventory of the posted speeds in Silverton. The majority of streets within the City have posted speed limits of 25 miles per hour (mph) or are not posted and assumed to be 25 mph. Arterial roadways outside of the central grid have higher speeds, ranging from 35 mph to 45 mph. The highest posted speed limit within the study area is on Highway 214 near Hobart Road. The speed limit decreases towards the City to 25 mph at C Street.

Roadway Cross-section

The number of travel lanes on key roadways in Silverton is shown in Figure 3-7. The majority of the roadways in Silverton are two-lane facilities. The exceptions are Highway 214 north of the downtown, which has a center turn-lane for an extended section, McClaine Street between C Street and Fossholm Road, and Westfield Street from McClaine Street to West Center Street. The remaining roads in Silverton are two-lane roadways.

Additionally, there is a couplet downtown between C Street and Lewis Street. Water Street (southbound) and First Street (northbound) are one-way facilities.

City of Silverton
Transportation System Plan

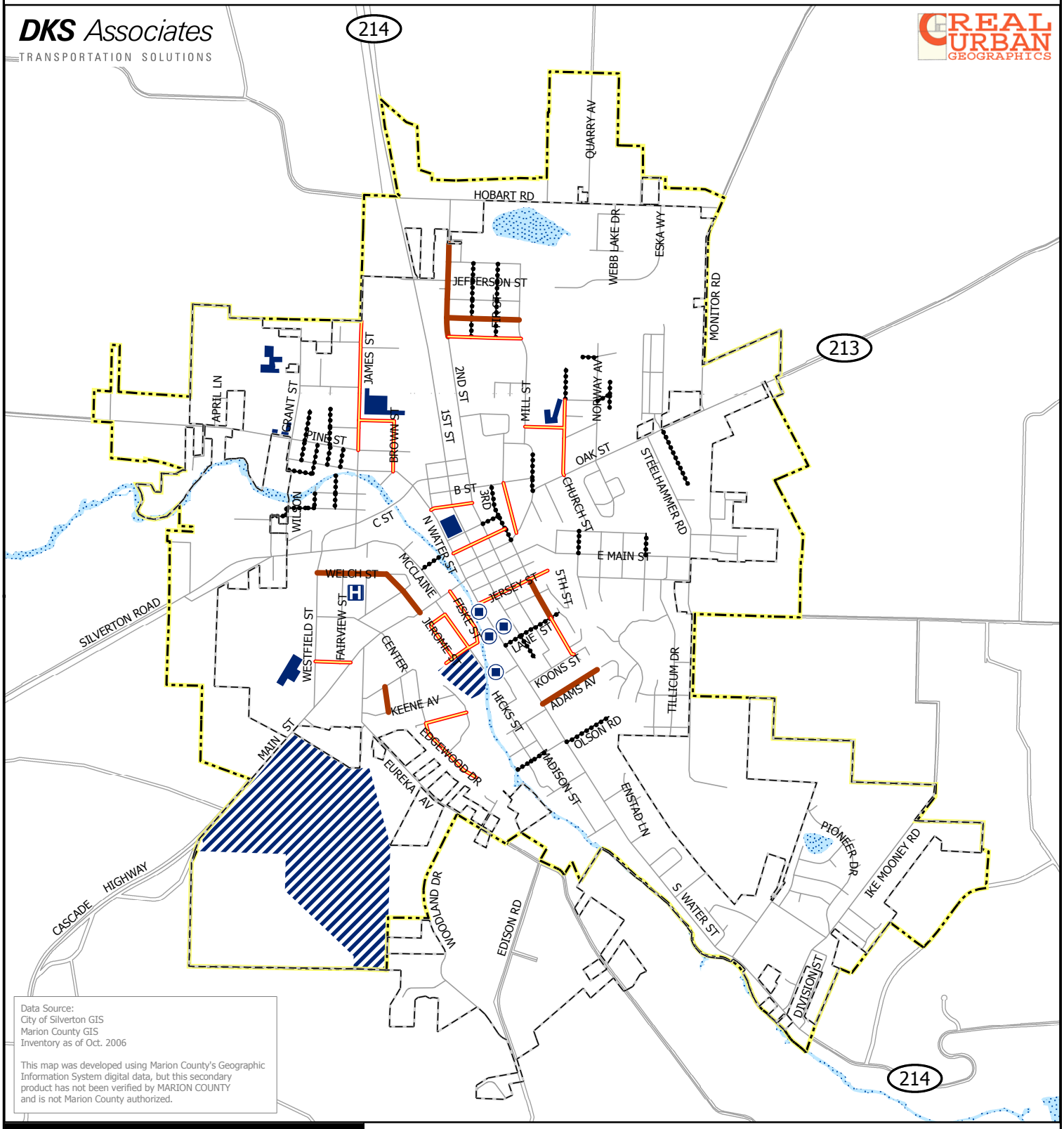


FIGURE 3-6

Existing Pavement Conditions

0 0.25 0.5 Miles

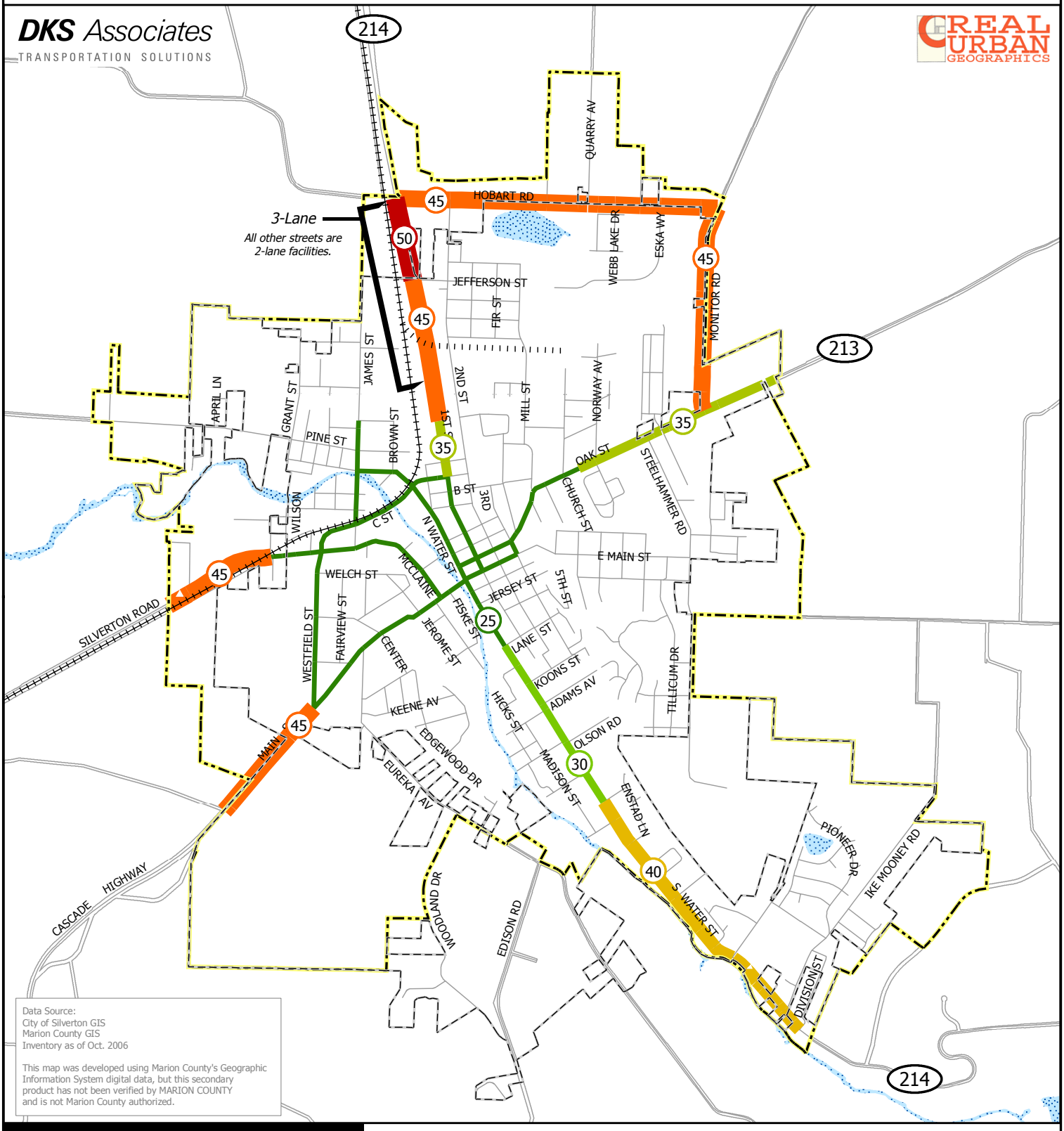
not to scale

Legend

Pavement Condition
- Fair - Poor
- Very Poor

- Hospital
- Civic/Government
- School
- Water
- Park
- Gravel Streets
- Roads
- Urban Growth Boundary
- City Limit

City of Silverton
Transportation System Plan



Data Source:
City of Silverton GIS
Marion County GIS
Inventory as of Oct. 2006

This map was developed using Marion County's Geographic Information System digital data, but this secondary product has not been verified by MARION COUNTY and is not Marion County authorized.

FIGURE 3-7

Vehicle Speed Limits

0 0.25 0.5 Miles

not to scale

Legend

Posted Speed Limit

- 25 mph
- 30 mph
- 35 mph
- 40 mph
- 45 mph
- 50 mph

Urban Growth Boundary

City Limit

Roads

Railroad

Abandoned

Water

Intersection Control

The only traffic signal located within the urban growth boundary is at the intersection of C Street and McClaine Street. Other intersection controls (stop signs or flashing lights) are depicted at all of the study area intersection in Figure 3-8.

On-Street Parking

On-street parking is concentrated in downtown Silverton. Most of the streets in the downtown network have parking on both sides of the street. Parking meters are located along segments of High Street, Oak Street, Main Street, Water Street, First Street and Lewis Street in the downtown core area. Outside of downtown, there is limited on-street parking along arterials and collectors, generally on one side of the street. The existing on-street parking inventory is shown in Figure 3-9.

Emergency Response Routes

The primary emergency response routes include the major arterial street system exiting each quadrant. These arterial routes include South Water Street to the south, Cascade Highway to the east, Highway 214 to the north, and Silverton Road and West Main Street to the west. There are three critical creek crossings at Main Street, C Street, and James Street.

City of Silverton
Transportation System Plan

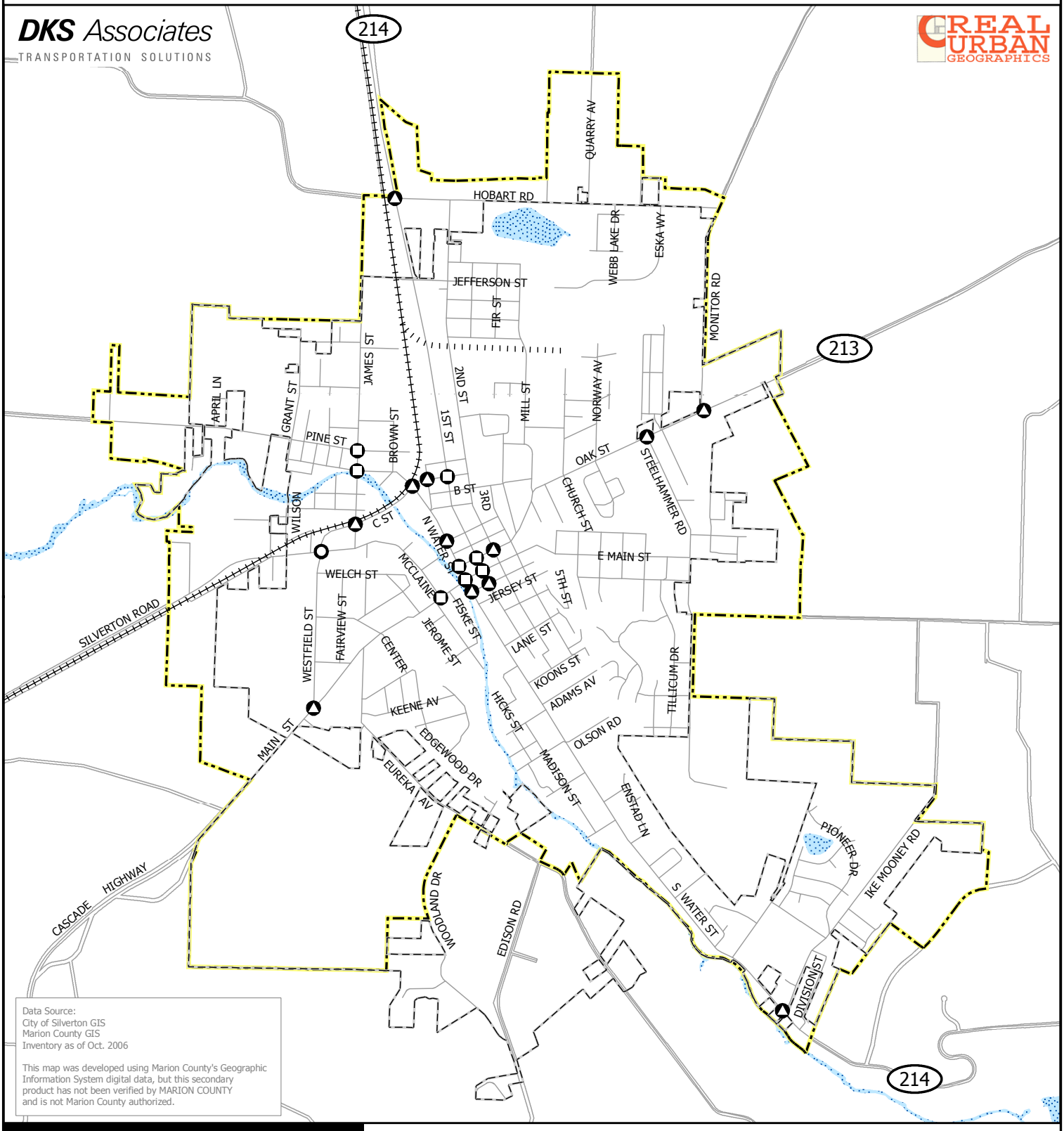


FIGURE 3-8

Intersection Control

0 0.25 0.5 Miles

not to scale

Legend

Study Intersections and Controls

- All-Way Stop
- Signal
- Unsignalized
- Roads
- Urban Growth Boundary
- City Limit
- Water
- Railroad
- Abandoned

City of Silverton
Transportation System Plan

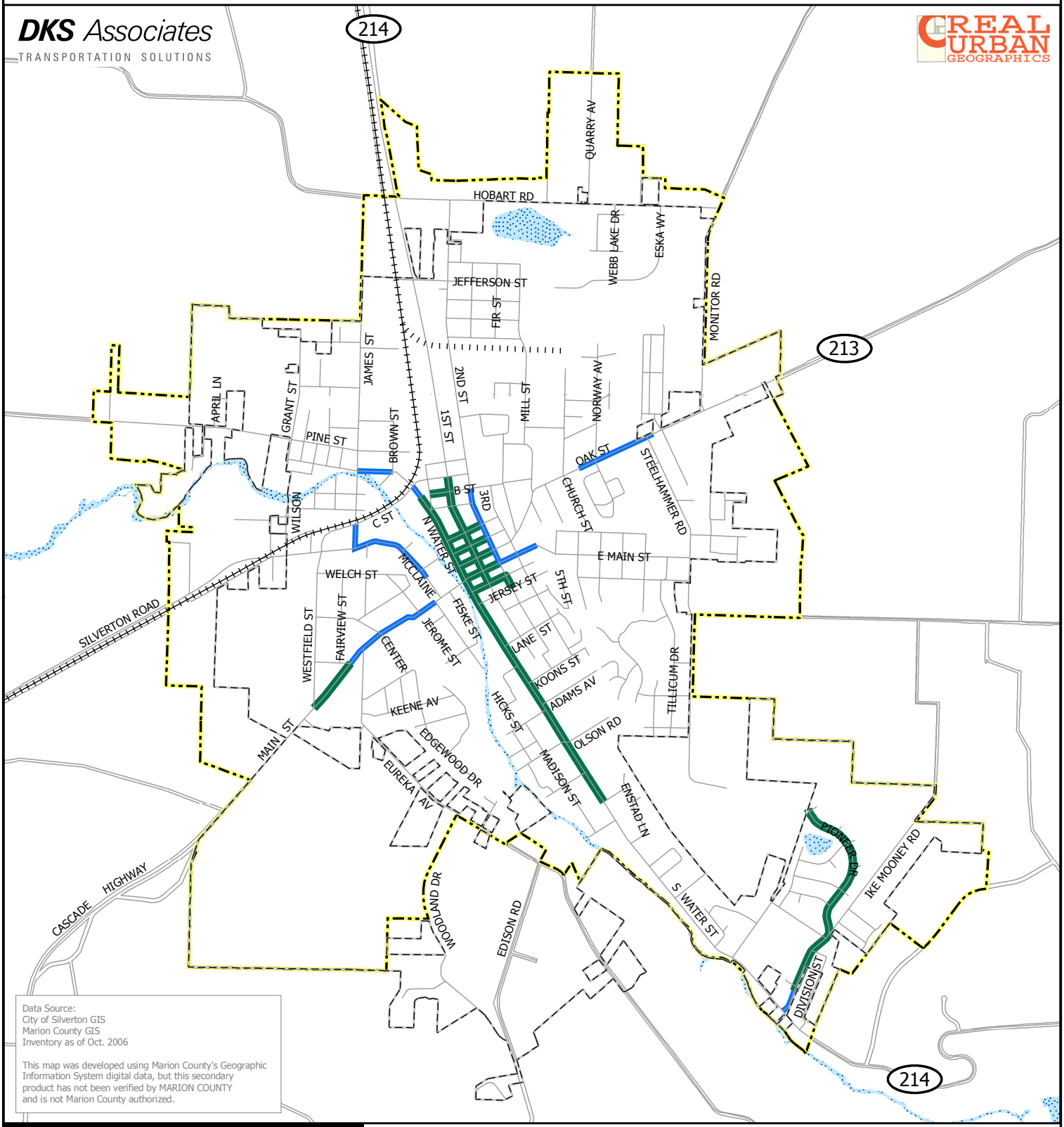


FIGURE 3-9

Existing Parking Inventory

0 0.25 0.5 Miles

not to scale

Legend

On-Street Parking (arterials and collectors)

- Parking Both Sides
- Parking One Side
- Roads
- Urban Growth Boundary
- City Limit
- Water
- Railroad
- Abandoned

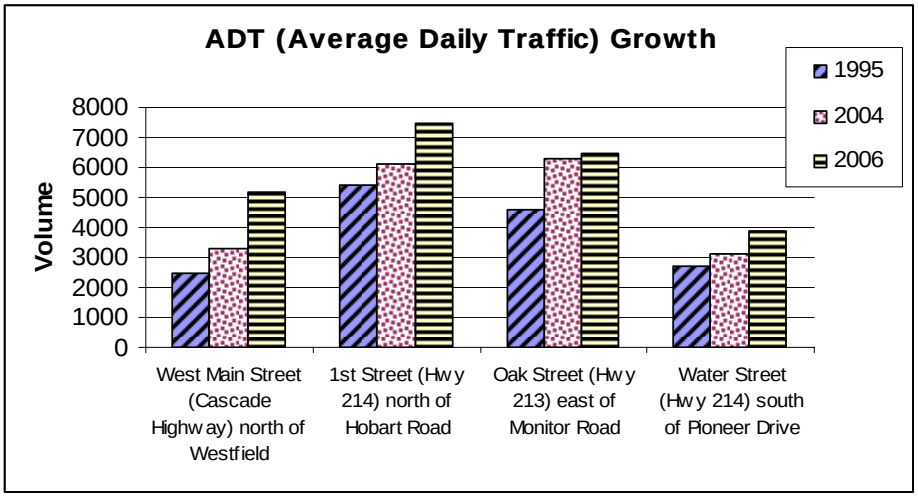
MOTOR VEHICLE VOLUMES

The average daily traffic (ADT) volumes were surveyed in the fall of 2006 at eight different locations in the City of Silverton over a 24-hour period to determine existing daily traffic volumes by direction. The count locations included:

- Highway 213 west of C Street
- Highway 213 east of Monitor Road
- Highway 214 north of Pioneer Drive
- Highway 214 north of Hobart Road
- Cascade Highway south of Westfield Street
- Pine Street west of Grant Street
- Eureka Avenue west of Woodland Drive
- Steelhammer Road south of Reserve Street

Other ADT volumes were estimated based on PM peak hour counts and the assumption that the PM peak hour is approximately 11% of the daily traffic volumes[4]. Typically, PM peak hour traffic is between 8 and 12 percent of daily traffic. The average daily traffic volumes are shown in Figure 3-10.

Historic average daily traffic (ADT) counts were also obtained from a database maintained by Marion County to compare general daily volume growth within the City of Silverton. The historical ADT counts were analyzed from 1994-2002 at several locations, primarily on the outer edges of the City. The percentage of growth over the eight year time period ranged from 7% to 26%, with each entrance/exit to Silverton experiencing an average growth of about 14%. The highest percentage of growth was on Main Street, southwest of the downtown grid with 24% growth and further south along Cascade Highway (an extension of West Main Street) with a growth of 26% over the specified time frame. The lowest percentage of growth was found north of Silverton on Hobart Road, east and west of Highway 214. The growth trends are shown at select locations within the City of Silverton in the figure below.



[4] Five different locations with current ADT counts and turn movement counts were evaluated and averaged to determine the 11% value including: C Street/McClaine Street, Monitor Road/Oak Street (Hwy 213), Pioneer Street/Water Street (Hwy 214), Hobart Road/1st Street (Hwy 214), and Westfield Street/Cascade Hwy

PM peak hour traffic turn movement counts were collected for all of the study area intersections. New counts were conducted at several intersections in September 2006 during the PM peak hour (4:00 – 6:00 PM). The count locations included:

- C Street/McClaine Street
- Highway 213/Steelhammer Road
- Highway 213/Monitor Road
- Highway 214/Pioneer Drive
- James Street/Water Street
- James Street/Pine Street
- Westfield Street/Main Street
- C Street/James Street

The remaining study area intersection turn movement counts were provided by the Oregon Department of Transportation (ODOT) over the same PM time period. These counts were used to provide a basis for analyzing existing problem areas as well as establishing a base condition for future comparisons. Generally, the PM peak occurred between 4:45 and 5:45 PM, with some intersections exhibiting variations.

City of Silverton
Transportation System Plan

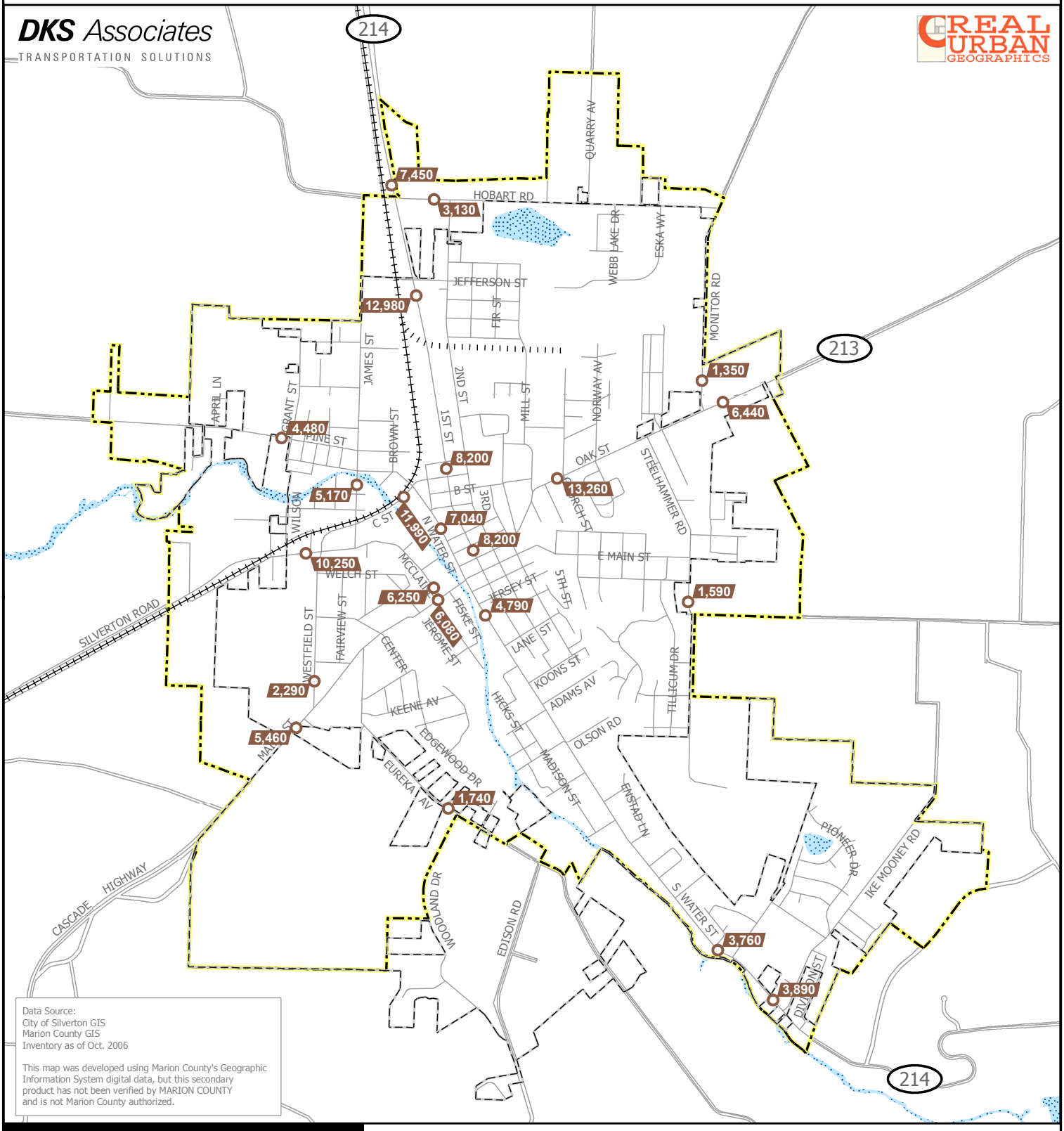


FIGURE 3-10

Existing Average Daily Traffic (ADT) Volume

0 0.25 0.5 Miles

not to scale

Legend

- 1,000 Average Daily Traffic Volume
- Roads
- Urban Growth Boundary
- City Limit
- Water
- Railroad
- Abandoned

TRAFFIC OPERATIONS

Definition of Traffic Levels of Service

Level of Service (LOS) is used as a measure of effectiveness for intersection operation. It is similar to a "report card" rating based upon average vehicle delay. Level of Service A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. Level of Service D and E are progressively worse peak hour operating conditions. Level of Service F represents conditions where demand has exceeded capacity. This condition is typically evident in long queues and delays.

The unsignalized intersection level of service calculation evaluates each movement separately to identify problems (typically left turns from side streets). The calculation is based on the average total delay per vehicle for stop-controlled movements (typically on the minor side street or left turn movements). Level of service (LOS) F indicates that there are insufficient gaps of suitable size to allow minor street traffic to safely enter or cross the major street. This is generally evident by long delays and queuing on the minor street. Level of service F may also result in more aggressive driving, with side street vehicles accepting shorter gaps. It should be noted that the major street traffic moves without delay and the LOS F is for side-street or left turns, which may be only a small percentage of the total intersection volume. It is for these reasons that level of service results must be interpreted differently for signalized and unsignalized locations. A summary of the descriptions for level of service will be provided in the TSP technical appendix.

The volume to capacity ratio (v/c) is used as a measure of effectiveness for signalized and unsignalized intersection operation. The v/c calculated by dividing the volume entering the intersection by the total capacity (maximum volume the intersection could serve). The v/c describes the amount of intersection capacity that is utilized by the volume. A v/c of 1.0 suggests there is no available capacity at that intersection and not one more vehicle could be accommodated.

> **ODOT Standard** — ODOT operating standards[5] for District Highways inside a UGB call for the maximum volume to capacity ratio for peak hour operating conditions to vary depending on speed, as shown in Table 3-6.
>
> **Marion County Standard**— Marion County operating standards for unsignalized intersections is level of service E. For signalized intersections, the standard is level of service D with v/c ratio 0.85.

Table 3-6: ODOT Operating Standards

Posted Speed (MPH)	>=45	40	<=35	STA
Volume to Capacity Ratio (v/c)	0.80	0.85	0.90	0.95

No standards for traffic operations are included in the City of Silverton TSP or Comprehensive Plan, although generally level of service D or better is used for both signalized and unsignalized intersections.

[5] *1999 Oregon Highway Plan - Amendment*, Oregon Department of Transportation, July 2005.

Existing Operating Conditions

The PM peak hour intersection counts were used to determine the existing level of service based on the *2000 Highway Capacity Manual* methodology. Traffic counts and level of service calculation sheets are provided in the TSP appendix. Table 3-7 summarizes the existing weekday PM peak hour study intersection operation conditions.

Table 3-7: Existing Weekday Intersection Level of Service (PM Peak Hour)

Intersection	LOS	Delay (sec)	V/C	Jurisdiction	Standard Met
Signalized Intersection					
C Street/McClaine Street	B	21.0	0.75	Marion County	Yes
All-Way Stop Intersection					
James Street/Pine Street	B	11.0	0.48	Silverton	Yes
James Street/Water Street	B	10.3	0.46	Silverton	Yes
Oak St(Hwy 213)/1st Street (Hwy 214)	B	11.3	0.42	ODOT	Yes
1st Street(Hwy214)/Main Street	B	12.0	0.52	ODOT	Yes
Water Street/Main Street	C	18.1	0.68	ODOT	Yes
Oak Street(Hwy 213)/Water Street	B	11.7	0.45	ODOT	Yes
McClaine Street/Main Street	C	17.9	0.77	Silverton	Yes
1st Street(Hwy214)/C Street	D[6]	26.0	0.86	ODOT	No
Unsignalized Intersection					
Westfield Street/Main Street	A/A	9.6	0.12	Marion County	Yes
Oak St(Hwy 213)/Steelhammer Road	A/B	13.3	0.10	ODOT	Yes
Oak St(Hwy 213)/Monitor Road	A/C	16.2	0.10	ODOT	Yes
1st Street(Hwy214)/Pioneer Drive	A/A	9.2	0.05	ODOT	Yes
1st Street(Hwy214)/Hobart Street	A/C	16.4	0.23	ODOT	Yes
Oak St(Hwy 213)/2nd Street	A/E	37.0	0.29	ODOT	Yes
1st Street(Hwy 214)/Lewis Street	A/C	24.5	0.27	ODOT	Yes
Water Street/Lewis Street	A/A	9.2	0.06	ODOT	Yes
Front Street/C Street	A/D	34.1	0.10	Marion County	Yes
Water Street/Park Street	A/B	10.6	0.04	ODOT	Yes
Water Street/C Street	A/F	>80	0.78	Marion County	No
James Street/C Street	A/C	24.4	0.21	Marion County	Yes

Notes: A/A=major street LOS/minor street LOS
Signalized and all-way stop delay = average vehicle delay in seconds for entire intersection
Unsignalized delay = highest minor street approach delay

The intersections at 1st Street (Hwy 214)/C Street and Water Street /C Street do not meet the jurisdictional operation standards under existing conditions. Traffic signals for these two intersections are being designed.

[6] Due to queuing impacts from 1st Street/Water Street this unsignalized intersections fails to meet operational standards, though the HCM analysis methodology indicates LOS D for the minor street movement.

TRAFFIC SAFETY

Collision data was also obtained from the Oregon Department of Transportation for the period from 2003 through 2006 for each of the study area intersections. Table 3-10 includes collision data for each of the study intersections that had incidents, classified by fatal, non-fatal, and property damage only incidents. The accident rate was also calculated to standardize the existing data. The equivalent accident rates per million entering vehicles (MEV) are shown in Table 3-8. A collision rate greater than 1.0 generally indicates a safety-related problem that should be evaluated further.

Table 3-8: Intersection Collision Classification

Intersection	Fatal	Non-Fatal	Property Damage Only	Total	Accident Rate*
James Street/Pine Street	0	2	0	2	0.25
Westfield Street/Main Street	0	0	1	1	0.19
C Street/McClaine Street	0	3	4	7	0.38
Highway 213/Steelhammer Road	0	0	1	1	0.13
Oak Street(Hwy213)/1st Street(Hwy 214)	0	2	3	5	0.53
Water Street/Main Street	0	2	2	4	0.27
Oak Street(Hwy 213)/2nd Street	0	1	2	3	0.30
Front Street/C Street	0	0	1	1	0.08
Water Street/C Street	0	3	2	5	0.35

Note: *Accidents per million entering vehicles
Source: Oregon Department of Transportation (data from 2003-2006)

Overall, the collision rates at the study area intersections were relatively low. The highest collision rate occurred at Oak Street (Hwy 213) and 1st Street (Hwy 214) located in the downtown core. The intersection is an all-way stop.

Additionally, the intersection of Water Street/Main Street had two collisions involving bicycles/pedestrians that resulted in non-fatal injuries. One of these bicycle/pedestrian collisions occurred under dark conditions.

TRUCKS

Efficient truck movement plays a vital role in the economical movement of raw materials and finished products. The designation of through truck routes provides for this efficient movement while at the same time maintaining neighborhood livability, public safety, and minimizing maintenance costs of the roadway system. Marion County identifies a truck route on the north side of Silverton within the urban growth boundary and includes Hobart Road, Monitor Road and Mt. Angel Highway. Additionally, the City of Silverton has designated freight routes along First Street, Silverton Road, Westfield Street and Cascade Highway. These routes are shown in Figure 3-11, along with corresponding freight activity. ODOT[7] does not identify any freight routes within the City of Silverton. Trucks are prohibited on West Main Street, east of Westfield Street.

Heavy vehicle volumes and percentages were collected at study intersections as part of the turn movement counts and were included in the level of service calculations. Table 3-9 lists the approximate percentage of trucks traveling along key corridors (arterials and major collectors) in Silverton during the PM peak hour.

Table 3-9: Heavy Vehicle Activity on Key Corridors

Location	PM Peak Hour Truck Percentage	# of Trucks
Westfield Street/ Main Street	7%	34
C Street/McClaine Street	4%	66
Oak Street (Hwy 213)/Steelhammer Road	4%	27
1st Street (Hwy 214)/Pioneer Drive	4%	14
1st Street (Hwy 214)/Hobart Drive	3%	28
James Street/C Street	5%	57
Oak Street (Hwy 213)/Monitor Road	5%	34

[7] *1999 Oregon Highway Plan*, Oregon Department of Transportation. May 1999.

City of Silverton
Transportation System Plan

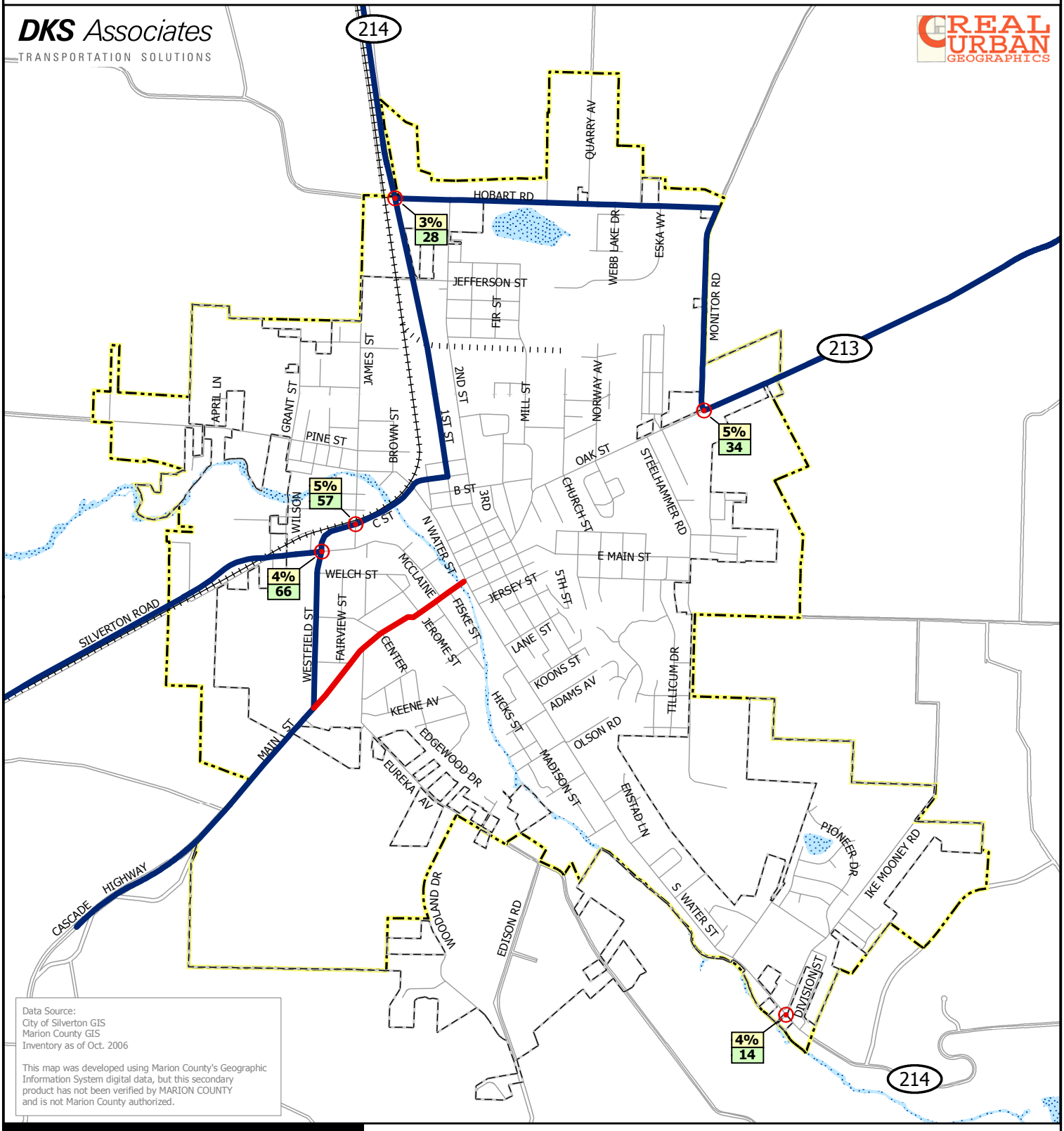


FIGURE 3-11

Existing Truck Routes

0 0.25 0.5 Miles

not to scale

Legend

- 5% / 57 — Heavy Vehicle Volume (P.M. peak)
- Truck Route
- Trucks Prohibited
- Roads
- Urban Growth Boundary
- City Limit
- Water
- Railroad
- Abandoned

RAIL

One rail line operates through the City of Silverton. The Willamette Valley Railroad currently provides branch line rail service for the shipment of commodities between Salem and Woodburn. The freight line operates two trains per day through the study area with speeds of 10 miles per hour or less. This line connects to the rail line in Woodburn to the north and terminates in Stayton to the south.

There are six existing railroad/highway grade crossing within the City of Silverton:

- Fossholm Road, north of Silverton Road
- Hobart Road, west of Highway 214
- James Street, north of C Street
- Jefferson Street, west of Highway 214
- Silverton Road, west of C Street, and
- Water Street, north of C Street

Gates and flashers are provided at the rail crossings on Water Street and Silverton Road, while the other four crossings Fossholm Road, Hobart Road, James Street and Jefferson Street are only controlled by stop signs. The existing railroad and crossings are shown in Figure 3-12.

No Passenger rail transportation service directly serves the City of Silverton. AMTRAK service is available in Salem and Portland, Oregon.

Existing Issues

The primary issue with rail service in the City of Silverton is related to the adequacy of rail crossings. Three of the rail crossings currently have crossing amenities including gates and flashing lights; enhancements for the remaining crossings should be explored.

AIR

Silverton does not currently have a publicly-owned or operated airport. The Salem Airport-McNary Field is the closest public general aviation facility. It is classified as a Category 2 airport in the Oregon Aviation Plan and serves corporate aviation activity, general aviation and commercial passenger service. Other passenger and freight air transportation is available in Portland at the Portland International Airport (PDX), located approximately 60 miles to the northwest.

PIPELINE

The existing pipeline facilities in Silverton include transmission lines and pipelines. Transmission lines carry electricity, cable television and telephone service. Pipelines transport water, sanitary, storm sewer and natural gas throughout the City.

WATER

There are no commercial waterways within the City of Silverton's Urban Growth Boundary. The Silverton Reservoir (located outside of the City limits) and the Pettit Reservoir are owned by the City and serves as recreation waterways. Silver Creek runs from the south to northwest through the City of Silverton, providing recreational and aesthetic opportunities.

City of Silverton
Transportation System Plan

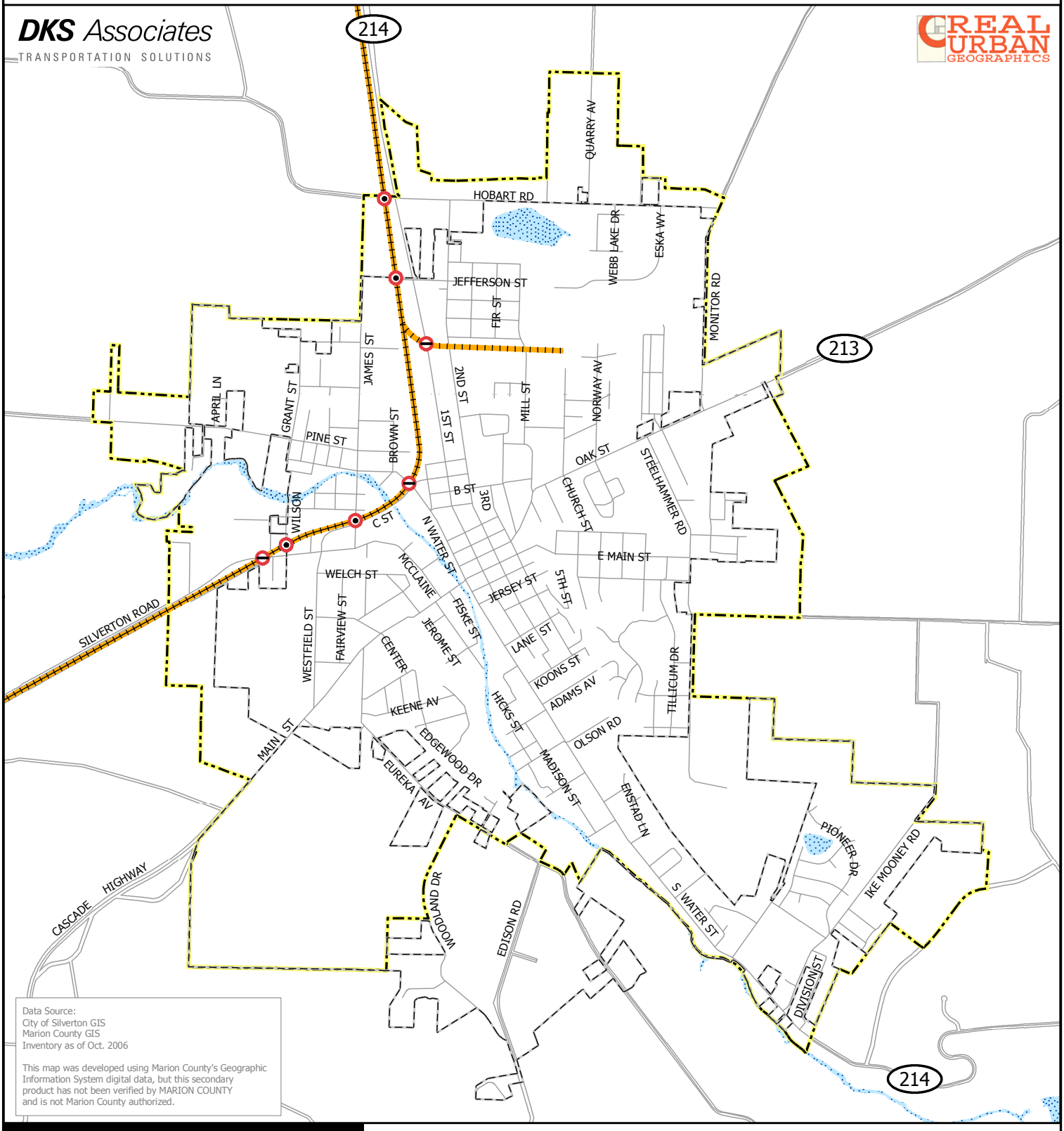


FIGURE 3-12

Rail Lines and Rail Crossing Locations

0 0.25 0.5 Miles
not to scale

Legend

Railroad Crossing
- Stop Controlled
- Gate Controlled

Roads

Urban Growth Boundary
City Limit
Water
Railroad
Abandoned

CHAPTER 4 : FUTURE NEEDS

The purpose of this chapter is to summarize the land use and travel demand component of the future conditions analysis and introduce the projected motor vehicle needs and deficiencies. The following sections describe the forecasting process including key assumptions, forecasted land use growth and model application for the City of Silverton.

TRAVEL DEMAND AND LAND USE

The Silverton Transportation System Plan (TSP) update addresses existing system needs and additional facilities that are required to serve future growth beyond the 2015 forecast year of the existing TSP. A travel demand model was developed and used to determine future traffic volumes in Silverton for the forecast year 2030. This model translates projected land use growth into motor vehicle trips and assigns them to the roadway network. The resulting traffic volume projects form the basis for identifying potential roadway deficiencies and for evaluating alternative circulation improvements. This section describes the forecasting process, including key land use inputs.

Projected Land Use Growth

Land use is a key factor in developing a functional transportation system. The amount of land that is planned to be developed, the type of land uses and how the land uses are mixed together have a direct relationship to the expected demands on the transportation system. Understanding the amount and type of land use is critical to taking actions to maintain or enhance the operation of the transportation system. Projected land uses were developed within the City's Urban Growth Boundary for the future year (2030). The following sections summarize the forecasted growth that will influence travel within Silverton. A detailed description of the land use forecasting is included in the technical appendix

For transportation forecasting, the land use data is stratified into geographical areas called transportation analysis zones (TAZs), which represent the sources of vehicle trip generation. There are 34 TAZs within the Silverton TSP Update study area that represent land use and access to the transportation system in Silverton. The TAZs are shown in Figure 4-1. Table 4-1 summarizes the growth in the three key land use types (households, retail employees and other employees) for the TAZs included in the Silverton TSP update study area. This growth in land use corresponds to a year 2030 population projection of approximately 14,000 residents.

City of Silverton
Transportation System Plan

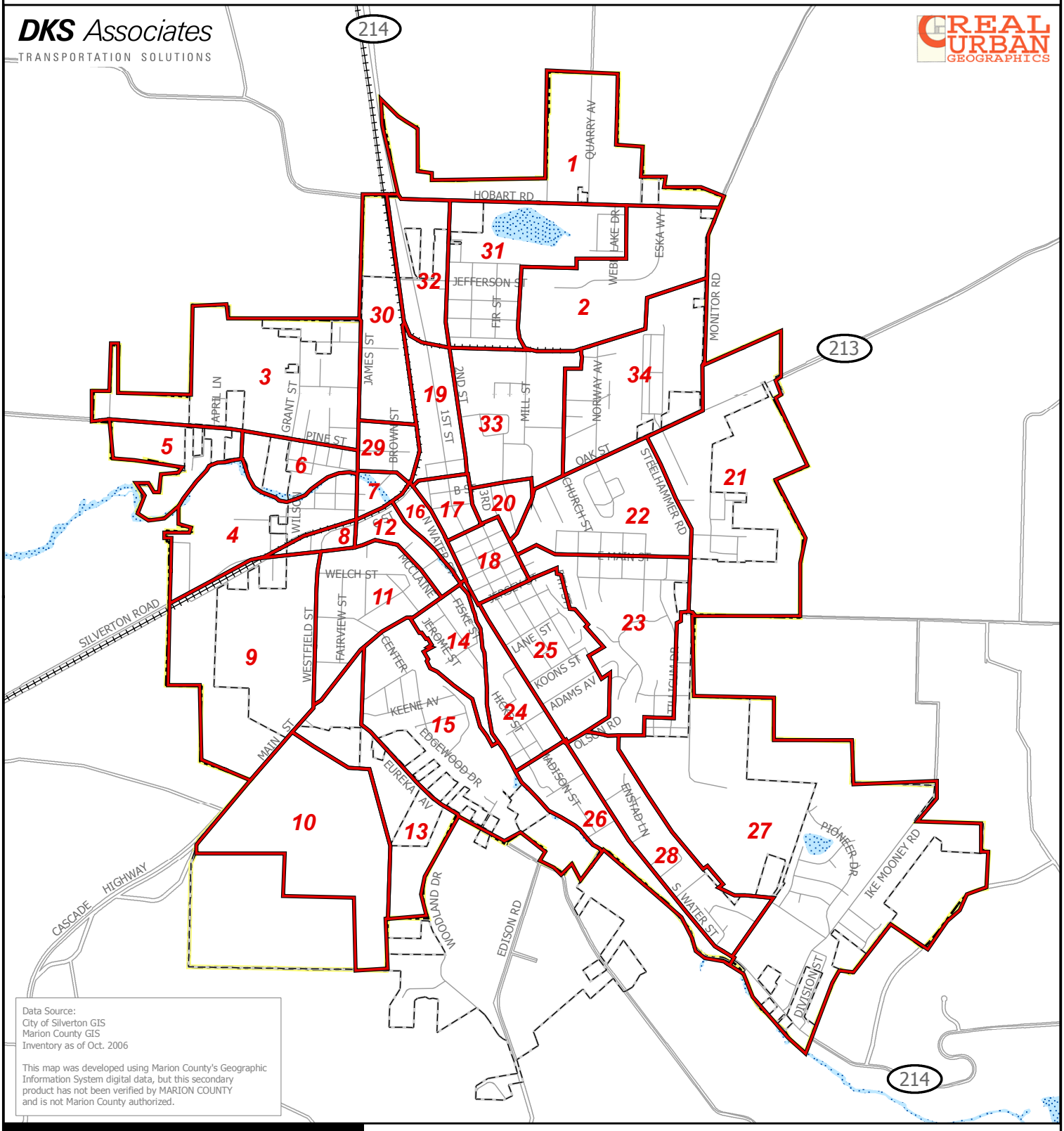


FIGURE 4-1

Transportation Analysis Zone (TAZ) Map

0 0.25 0.5 Miles

not to scale

Legend

- Transportation Analysis Zones (TAZ)
- Roads
- Urban Growth Boundary
- City Limit
- Water
- Railroad
- Abandoned

Table 4-1: Silverton TSP Study Area Land Use Summary

Land Use	2006-2030 Growth
Households	1,854
Retail Employees	296
Non-Retail Employees	1,287

As shown in Table 4-1, the future 2030 land use indicates significant growth in both housing and employment within the TSP study area. The most significant employment growth is located north and east of downtown. The most significant growth areas in housing are located to the east and to the south of downtown. The transportation system should be monitored to make sure that land uses in the plan are balanced with transportation system capacity. This TSP balances needs with the forecasted land uses that will occur through 2030.

Travel Demand Forecast

A determination of future traffic system needs in Silverton requires the ability to accurately forecast travel demand resulting from estimates of future population and employment for the City. The objective of the transportation planning process is to provide the information necessary for making decisions on when and where improvements should be made to the transportation system to meet future travel demand.

For the Silverton TSP Update, a model was developed following ODOT Procedures Manual Methodology[8] to determine forecasts for the future year (2030). In order to accurately forecast 2030 traffic volumes, future travel demand projections were based on adding three distinct segments of demand growth to the existing traffic volumes:

- *Internal-Internal* trips: Trips traveling within Silverton exclusively;
- *Internal-External and External-Internal* trips: Trips with either an origin or destination in Silverton with the opposite trip end in a location outside the Silverton TSP update study area; and
- *External-External* trips: Trips that do not have an origin or destination in Silverton (through traffic that does not stop in Silverton).

Internal trips are based on local trip generation which are trips resulting from the expected growth in employment and households in Silverton based on land use forecasts. External trips are based on forecasted growth at gateways to the City (Highway 214, Highway 213, and Silverton Road) External-external and internal-internal trips are calculated by distributing growth at gateways to the City (that is not a through trip) to origins or destinations within the City. By using this method, double counting of trips was avoided.

The combined local land use generated trips and external trip growth was then added to the existing 2006 Design Hour Volumes (DHV) to yield a future volume forecast. This future year 2030 volume forecast was analyzed to determine areas of performance deficiencies in the roadway network. The

[8] *Analysis Procedures Manual*, Oregon Dept. of Transportation: Transportation Development Division, April 2006, p. 4-21

methodology for determining forecasted 2030 traffic volumes in Silverton is described in further detail in the following sections.

Local Trip Generation

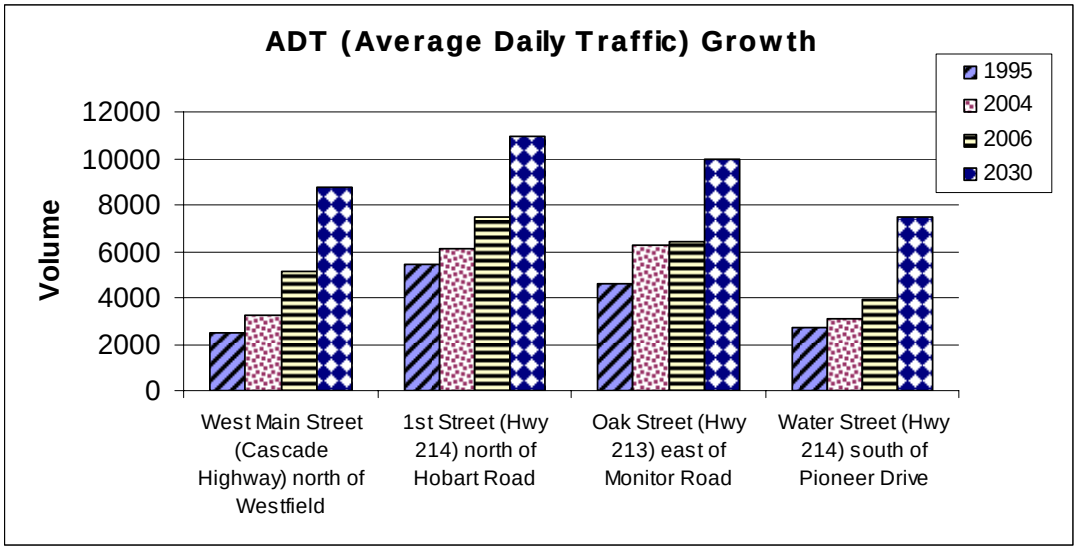
The trip generation process translates land use quantities (number of dwelling units, retail, and other employment) into vehicle trip ends (number of vehicles entering or leaving a TAZ) using trip generation rates established during the model verification process. The trip generation rates used for housing, retail employment and non-retail employment uses are based average trip rates for similar land use types in the Institute of Transportation Engineers (ITE) Trip Generation Manual[9]. Table 4-2 provides a listing of the weekday PM peak hour trip rates used in this analysis.

Table 4-2: Model Average Trip Rates

Land Use	In	Out	Total
Households	0.63	0.37	1.0
Retail Employees	3.0	3.0	6.0
Non-Retail Employees	0.15	0.35	0.5

External Trip Growth

In addition to growth resulting from forecasted land use changes within the City, growth of external traffic must also be accounted for. Six significant gateways to the community were identified as locations where the external growth was most likely to occur, including: Silverton Road, Highway 214, Highway 213, Pine Street and West Main Street (Cascade Highway). External growth along these six primary roadways was estimated based on historical growth data from Marion County, the inputs to the Salem-Keizer Area Transportation Study (SKATS) travel demand model, ODOT's future growth tables, and projected population within the City. The projected future year (2030) traffic volumes at four of the six external gateways are shown in the figure below.



[9] *Trip Generation Manual*, 7th Edition, Institute of Transportation Engineers, 2003.

To separate external-external traffic growth from traffic using external gateways with either a trip origin or destination in Silverton (internal-external and external-internal trips, respectively) the existing travel pattern probability of being an external-external trip was applied. Using this methodology, the external-external trip probability was estimated for travel to and from each end of the external gateways and applied to the forecasted trip growth at each location to yield the expected 2030 external-external trip growth. The remainder of growth at each gateway (total growth minus through trip growth) is the resulting forecast for external-internal and internal-external trips. The growth forecasted for external gateways was separated by type in Table 4-3.

Table 4-3: External Growth Forecast by Trip Type

					Growth Distribution	
Location	**Existing 2-Way Volume**	**2006 External-External Trips**	**2006 External-Internal / Internal-External Trips**	**2006-2030 Projected Growth**	**2030 External-External Trip Growth**	**2030 External-Internal / Internal-External Trip Growth**
Highway 214 (North of Hobart Rd)	694	299	395	422	181	241
Highway 213	589	227	131	358	138	220
South Water Street	311	238	73	189	145	44
West Main Street	461	217	244	477	225	252
Silverton Road	1047	436	611	637	265	372
Pine Street-Hazelgreen Street	415	186	229	253	113	140

Internal Trip Growth

In addition to external growth, internal growth is applied throughout the study area to determine the estimated future trips. The trip generation for each TAZ was estimated, as described previously. The Silverton study area generated a total of 4292 internal PM peak hour trips. The internal trip growth is determined by subtracting the internal-external trips and external-internal trips (as shown in Table 4-3) from the total internal trip generation.

Trip Distribution

Trip distribution estimates how many trips travel from one zone in the model to any other zone. Distribution was based on weighting the attractiveness of each zone by the number of trip ends generated. The relative attractiveness is applied to new trips in the study area while existing trips are assumed to maintain their current travel patterns.

Traffic Assignment

In this process, trips from one zone to another are assigned to specific travel routes in the network, and resulting trip volumes are accumulated on links of the network until all trips are assigned. The Traffix software package was used to model the transportation network and to assign the additional growth volume to the existing roadway and intersection volumes. In this assignment process, manual adjustments to trip patterns can be made if new roadways are anticipated to divert trips or if short-cut routes are expected to become more attractive as major roadways become congested.

MOTOR VEHICLE OPERATIONS

No-Build (2030) Scenario

The analysis for the forecasted 2030 growth was a No-Build scenario, including only transportation system improvements in Silverton that are already programmed and expected to be constructed with the current funding levels. These projects include the construction of traffic signals at C Street/1st Street (Hwy 214) and C Street/Water Street (Hwy 212). Assuming these improvements were in place, the forecasted 2030 design hour traffic volumes were applied to study area intersections and reanalyzed, using the same methodology outlined in the existing conditions chapter to assess future operations. Table 4-4 shows the results of this analysis.

Table 4-4: 2030 Intersection Operations (PM Peak Hour)

Intersection		2006 Existing		2030 No-Build	
	Jurisdiction	LOS	V/C	LOS	V/C
Signalized Intersection					
C Street/McClaine Street	Marion County	B	0.75	**F**	**>1.0**
1st Street(Hwy214)/C Street	ODOT	**D**	**0.86**	**D**	**0.91**
Water Street/C Street	Marion County	**A/F**	**0.78**	C	0.68
All-way Stop Controlled Intersections					
Oak Street(Hwy 213)/Water Street	ODOT	B	0.45	D	0.85
McClaine Street/Main Street	Silverton	C	0.77	**F**	**>1.0**
James Street/Pine Street	Silverton	B	0.48	D	0.95
James Street/Water Street	Silverton	A	0.46	C	0.72
Unsignalized Intersections					
1st Street (Hwy 214)/Oak Street (Hwy 213)	ODOT	B	0.42	**E**	**> 1.0**
1st Street(Hwy214)/Main Street	ODOT	B	0.52	**F**	**> 1.0**
Water Street/Main Street	ODOT	C	0.68	F	> 1.0
Water Street/Lewis Street	ODOT	A/A	0.06	A	0.05
1st Street(Hwy 214)/Lewis Street	ODOT	A/C	0.27	**A/F**	**0.42**
Westfield Street/Main Street	Marion County	A/A	0.12	A/B	0.30
Oak St(Hwy 213)/Steelhammer Road	ODOT	A/B	0.10	**A/F**	**0.68**
Oak St(Hwy 213)/Monitor Road	ODOT	A/C	0.10	**A/E**	**0.37**
1st Street(Hwy214)/Pioneer Drive	ODOT	A/A	0.05	A/B	0.17
1st Street(Hwy214)/Hobart Street	ODOT	A/C	0.23	**A/F**	**0.91**
Oak St(Hwy 213)/2nd Street	ODOT	A/E	0.29	**A/F**	**>1.0**
Front Street/C Street	ODOT	A/D	0.10	A/D	0.90
Water Street/Park Street	ODOT	A/B	0.04	A/B	0.04
James Street/C Street	Marion County	A/C	0.21	**B/F**	**>1.0**

Note: Bold type indicates failure to meet adopted mobility standard.

The performance standards used to evaluate the existing conditions were also applied to the future No-Build scenario. As shown in Table 4-4, several of the study area intersections fall below the operational standards for the future year (2030). These intersections are located on the major roadways through the City that experience the most significant growth in traffic. While several intersections appear to need capacity enhancements, there are no major roadways that appear to need widening for additional through lanes in 2030. However, additional road extensions or capacity enhancements to minor roads that could divert traffic may be an alternative to constructing significant intersection improvements.

No-Build (2030) Financially Constrained Scenario

In addition to the No-Build scenario, another future year scenario was analyzed. The No-Build financially constrained scenario included planned transportation improvements from Silverton's current Capital Improvement Plan that would improve connectivity or add system capacity. Only projects that were assumed to be funded and constructed by the forecast year of 2030 were included in the analysis model. Key improvements affecting future traffic assignment and operations include:

Intersection Improvements

- Main Street and Water Street (add traffic signal)
- Main Street and First Street (add traffic signal)
- Oak Street (Highway 213) and First Street (add traffic signal)
- C Street and Front Street (restricted to right in/out movements based on the latest design for C Street/Water Street and C Street/1st Street improvements)

New Roadways

- East Side Collector (Monitor Road extension to South Water Street)
- West Side Collector and Bridge (Pine Street to Silverton Road)

The new roadways were taken into account when assigning future trips in the transportation model. Generally, the west-side collector relieved trips on the C Street/James Street corridor and the east-side collector relieved trips through downtown that have origins/destinations on the east and south sides of the City. The resulting estimated link volumes are shown on Figure 4-2 for the two new roadways along with key corridors throughout the City.

Assuming these improvements were in place, the forecasted 2030 design hour traffic volumes were applied to study area intersections and reanalyzed, using the same methodology outlined in the existing conditions chapter to assess future operations. Table 4-5 displays the results of this analysis.

Table 4-5: 2030 Intersection Operations (PM Peak Hour)

Intersection		2030 No-Build		2030 No-Build Financially Constrained	
	Jurisdiction	LOS	V/C	LOS	V/C
Signalized Intersections					
C Street/McClaine Street	Marion County	**F**	**>1.0**	**F**	**>1.0**
1st Street(Hwy214)/C Street	ODOT	**D**	**0.91**	**D**	**0.91**

Intersection		2030 No-Build		2030 No-Build Financially Constrained	
	Jurisdiction	LOS	V/C	LOS	V/C
Water Street/C Street	Marion County	C	0.73	C	0.73
All-way Stop Controlled Intersections					
Oak Street(Hwy 213)/Water Street	ODOT	D	0.85	B	0.67
McClaine Street/Main Street	Silverton	**F**	**>1.0**	**F**	**>1.0**
James Street/Pine Street	Silverton	D	0.95	C	0.82
James Street/Water Street	Silverton	C	0.72	B	0.65
Unsignalized Intersections					
1st Street (Hwy 214)/Oak St (Hwy 213)	ODOT	**E**	**> 1.0**	B	0.70
1st Street(Hwy214)/Main Street	ODOT	**F**	**> 1.0**	**F**	**> 1.0**
Water Street/Main Street	ODOT	F	> 1.0	B	0.78
Water Street/Lewis Street	ODOT	A	0.05	A	0.07
1st Street(Hwy 214)/Lewis Street	ODOT	**A/F**	**0.42**	**A/E**	**0.38**
Westfield Street/Main Street	Marion County	A/B	0.30	A/B	0.16
Oak St(Hwy 213)/Steelhammer Road	ODOT	**A/F**	**0.68**	**A/F**	**>1.0**
Oak St(Hwy 213)/Monitor Road	ODOT	**A/E**	**0.37**	**A/F**	**0.49**
1st Street(Hwy214)/Pioneer Drive	ODOT	A/B	0.17	A/C	0.30
1st Street(Hwy214)/Hobart Street	ODOT	**A/F**	**0.91**	**A/F**	**0.89**
Oak St(Hwy 213)/2nd Street	ODOT	**A/F**	**>1.0**	**A/F**	**>1.0**
Front Street/C Street	ODOT	A/D	0.90	A/D	0.20
Water Street/Park Street	ODOT	A/B	0.04	A/B	0.04
James Street/C Street	Marion County	**B/F**	**>1.0**	**B/F**	**>1.0**

Note: Bold type indicates failure to meet adopted mobility standard.

Micro-simulation Analysis

In addition to the Highway Capacity Manual (HCM) based analysis that analyzes intersections in an isolated sense, a micro-simulation model was also utilized for the downtown core to evaluate the downtown grid as a network of roadways that interact with each other. SimTraffic was used to model the signal system network that was assumed as part of the planned improvements for the future year 2030. The simulation illustrates queuing effects and delay through the intersection. Table 4-6 compares the average delay at each of the signalized intersections for the two types of analysis.

Table 4-6: 2030 Average Intersection Delay Comparison (PM Peak Hour)

Intersection	HCM Delay / LOS	SimTraffic Delay / LOS
Oak Street(Hwy 213)/Water Street	16 seconds / B	826 seconds / F
1st Street (Hwy 214)/Oak St (Hwy 213)	15 seconds / B	20 seconds / C
1st Street(Hwy214)/Main Street	87 seconds / F	31 seconds / C
Water Street/Main Street	18 seconds / B	104 seconds / F

As illustrated in the Table 4-6, the Sim Traffic delay is significantly higher than what was calculated using the HCM methodology at Oak Street/Water Street and Main Street/Water Street. This trend generally indicates that the signals are operating worse than the level of service indicates due to queuing impacts, which is expected in a downtown environment with short block lengths. Intersections where simulated delays exceed 100 seconds are locations where drivers would have to wait through multiple traffic signal cycle phases before passing through the intersections, due to queues blocking traffic entering the intersection. Additional modifications (e.g. signal timing adjustments or the construction of turn lanes) to the signal system network will be required to mitigate the intersections that remain below the performance standards for operations. These modifications may include adjustments to signal timings or the construction of additional turn lanes.

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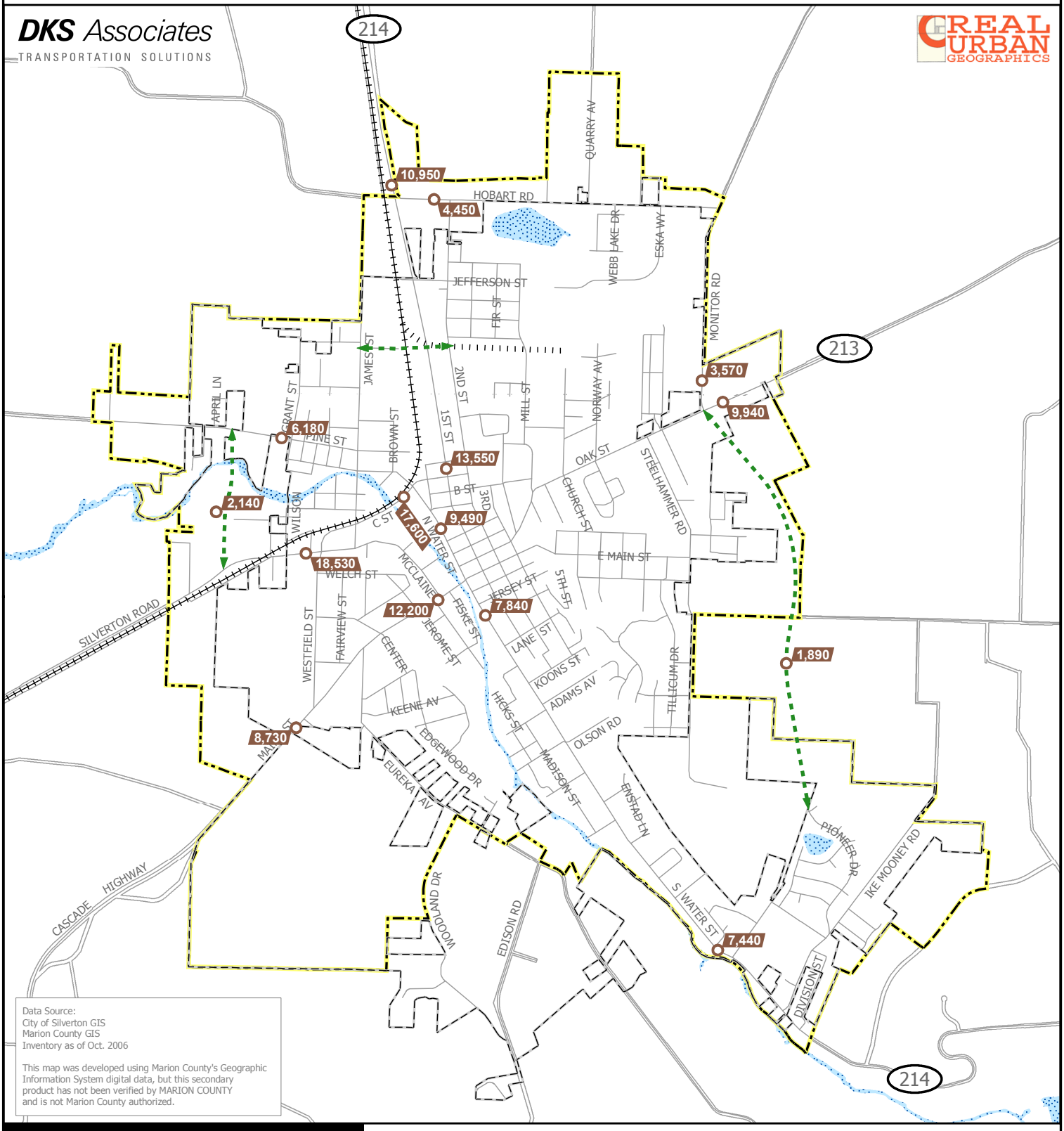


FIGURE 4-2

Future (2030) Projected ADT Volumes

0 0.25 0.5 Miles

not to scale

Legend

- 1,000 Projected Average Daily Traffic Volume
- Future Collector
- Roads
- Urban Growth Boundary
- City Limit
- Water
- Railroad
- Abandoned

CHAPTER 5 : PEDESTRIAN

This chapter summarizes existing and future pedestrian needs in the City of Silverton, and outlines strategies and an Action Plan to effectively mitigate deficiencies. The criteria used in evaluating pedestrian needs and the strategies for addressing these needs were identified through work with the City's Technical Advisory Committee (TAC).

FACILITIES

Sidewalks shall be built to the City's current design standards and in compliance with the Americans with Disabilities Act (at least four feet of unobstructed sidewalk).[10] Wider sidewalks may be constructed in commercial districts or on arterial streets. On facilities under State jurisdiction (including 1st Street (Hwy 214) and Oak Street (Hwy 213)), the minimum sidewalk width allowed must be at least as wide as ODOT's design standards require. Additional pedestrian facilities may include accessways, pedestrian districts and pedestrian plazas.

> ***Accessway*** – A walkway that provides pedestrian and/or bicycle passage either between streets or from a street to a building or other destinations such as a school, park or transit stop.
>
> ***Pedestrian District*** – A plan designation or zoning classification that establishes a safe and convenient pedestrian environment in an area planned for a mix of uses likely to support a relatively high level of pedestrian activity.
>
> ***Pedestrian Plaza*** – A small, semi-enclosed area usually adjoining a sidewalk or a transit stop which provides a place for pedestrians to sit, stand or rest.

Sidewalks should be sized to meet the specific needs of the adjacent land uses. Guidance to assess capacity needs for pedestrians can be found in the *Highway Capacity Manual*.[11] Typically, the base sidewalk sizing for local streets should be six feet (clear of obstruction). The critical element is the effective width of the walkway. Because of street utilities and amenities (i.e. benches), a six-foot walkway can be reduced to three feet of effective walking area. This is the greatest capacity constraint to pedestrian flow.

As functional classification of roadways change, so should the design of the pedestrian facilities. Collectors should to consider minimum sidewalks widths of 5 to 8 feet and arterials should have sidewalk widths of 5 to 10 feet. Wider sidewalks may be necessary depending upon urban design needs and pedestrian flows (e.g. adjacent to storefront retail).

STRATEGIES

The existing conditions and future needs analysis identified pedestrian system issues within Silverton that include an incomplete arterial/collector sidewalk system, significant barriers to pedestrian

[10] *Americans with Disabilities Act*, Uniform Building Code.
[11] *Highway Capacity Manual*, Transportation Research Board, 2000; Chapter 18.

network (e.g. railroad and creek) and the need for enhanced crossing locations in downtown Silverton. These needs correspond with those identified previously in the 2000 TSP.

Several strategies were developed to address pedestrian system needs and to guide project prioritization. This prioritization process helps to focus community investment on those projects that are most effective at meeting critical needs, while deferring other projects of lesser value. The improvement strategies were ranked by the Technical Advisory Committee (TAC) for use in this TSP[12].

The strategies for pedestrian facilities (listed in order of importance) are:

- Connect key pedestrian corridors to schools, parks, and activity centers
- Construct sidewalks to complete the pedestrian system (focus first on arterial and collector roadways)
- Fill in gaps in the network where some sidewalks exist to provide continuity
- Construct arterial crossing enhancements
- Improve/construct curb ramps for ADA
- Reconstruct all sidewalks to City of Silverton standards (width, safety, attractiveness, ADA compliance)
- Provide pedestrian corridors that connect neighborhoods
- Improve pedestrian corridors that connect to potential transit locations

NEEDS

To meet transportation performance standards and serve future growth, the future transportation system needs multi-modal improvements to manage the forecasted travel demand throughout Silverton. Pedestrian travel in and around the study area needs to provide a safe, efficient and interconnected system that can afford users the ability to consider walking as a viable mode of travel for trips that are one mile in length or less. The following needs have been identified for pedestrian access and circulation within the City of Silverton:

Gaps in the Pedestrian Network

Arterial and collector streets in Silverton provide a limited sidewalk inventory (see Figure 3-2). Sidewalks are provided in the downtown grid and many newer residential neighborhoods, but there are limited connections and only intermittent sidewalks connecting into downtown. Additionally, the pedestrian system also has significant barriers (e.g. creek and railroad) that contribute to poor pedestrian connectivity throughout the City.

An important existing pedestrian need in Silverton is providing sidewalks on all arterial and collector roadways and providing a connection from residential areas to schools, parks and shopping centers. This includes the need for safe, well lighted arterial, collector, and local streets with suitable pedestrian amenities and crossing facilities to reduce barriers to pedestrian travel. Pedestrian facility needs in Silverton must consider the three most prevalent trip types:

- Residential based trips – home to school, home to home, home to retail, home to park, home to transit, home to entertainment
- Service based trips – multi-stop retail trips, work to restaurant, work to services, work/shop to transit
- Recreational based trips – home to park, exercise trips, casual walking trips

[12] Technical Advisory Committee Meeting, March 3, 2007.

Residential trips need a set of interconnected sidewalks radiating out from homes to destinations within one-half to one mile. Beyond these distances, walking trips of this type become substantially less common (over 20 minutes). Service based trips require direct, conflict-free connectivity between uses (for example, downtown with its main street that connects multiple destinations). Service based trips need a clear definition of connectivity. This requires mixed use developments to locate front doors which relate directly to the public right-of-way and provide walking links between uses within one-half mile. Recreational walking trips have different needs. Off-street trails, well landscaped sidewalks and relationships to unique environment (creeks, trees, and farmland) are important.

The most common need is to provide a safe and interconnected system that affords the opportunity to consider the walking mode of travel, especially for trips less than one mile in length

Development of Multi-use Trails

Multi-use trails can supplement the existing sidewalk system and provide connections where the existing pedestrian or bicycle system is deficient. Multi-use trails are typically off-street and are wider than a typical sidewalk to facilitate shared use with bicyclists. The abandoned rail lines in Silverton provide a good opportunity for available right-of-way to develop a several multi-use trails that will create a connected multi-use trail system throughout Silverton. Additionally, creek side trails adjacent to Silver Creek have been identified that provide connections to Coolidge McClaine Park, the Silverton Library and other recreational destinations.

Pedestrian Crossing Enhancements

Under future year conditions, many of the downtown intersections will remain unsignalized. Motor-vehicle volume and lane configurations at unsignalized intersections were examined and compared to the criteria[13] for considering marked crosswalks and other pedestrian enhancements. Generally, facilities with daily traffic volumes between 12,000 and 15,000 vehicles were used as the threshold for determining where enhanced crossings should be considered at uncontrolled intersections. Other considerations for pedestrian crossing enhancement locations and prioritization included: crossings identified in the City's Downtown Development Plan[14], existing pedestrian crossing volumes, and proximity to school facilities.

Other pedestrian enhancements include the construction of curb extensions to improve the safety at intersections by reducing the crossing distance. Curb extensions are also implemented to enhance the urban design and aesthetic value throughout downtown areas. Potential pedestrian enhancement locations include all unsignalized crossings of Water Street and 1st Street between Oak Street and C Street, Lewis Street/1st Street, Lewis Street/Water Street and C Street between 1st Street and McClaine Street. Crossing safety enhancements that should be considered at these locations include the following measures to help define the crossing area and improve driver yielding behavior:

- Delineation of the crossing area- this could be accomplished with improved visibility striping, pavement texturing, or brick inlay
- Curb extensions
- Pedestrian crossing signing at mid-block crossing locations
- Pedestrian level lighting at crossing location

The unsignalized intersections on Lewis Street present potential safety issues that are attributed to

[13] *Manual of Uniform Traffic Control Devices Handbook*, Institute of Transportation Engineers, 2001; Chapter 13, Table 13-2.
[14] Silverton Downtown Development Plan, July 2007.

the uncontrolled turning movements. As planned development continues and pedestrian volumes increase, pedestrian signals may be required to provide safe crossing opportunities at these two intersections. In the interim at Lewis Street/1st Street, the west leg pedestrian crossing may be closed. Currently, the volume is minimal on this intersection leg. A solution at Lewis Street/Water Street includes the construction of an island median to provide a safe refuge and reduce the pedestrian crossing distance on the east leg of the intersection (Refer to Silverton's Downtown Development Plan for specific project details)

Although sidewalks are generally well-connected downtown, pedestrian crossings at uncontrolled or high volume intersections pose additional safety issues to system users. Gaps, outside the downtown area, in the sidewalk and trail network discourage pedestrians and put them at an increased safety risk by requiring them to share the roadway with vehicles in certain locations.

PEDESTRIAN MASTER PLAN AND ACTION PLAN

To meet transportation performance standards and serve future growth, the future transportation system needs multi-modal improvements to manage the forecasted travel demand. The extent of the recommended multi-modal improvements for Silverton is significant. Future growth can be accommodated with significant investment in transportation improvements.

A list of potential pedestrian projects to meet the identified needs and achieve the City's goals and policies was developed into a Pedestrian Master Plan. The Pedestrian Master Plan identifies improvements to provide a connected pedestrian network within the City of Silverton, focusing on arterial and collector roadways and providing connections to high pedestrian activity areas. In addition, local streets should provide sidewalks where possible, and the City of Silverton Development Code regulations should require new developments to provide pedestrian infrastructure as part of the development costs. All new roadways constructed in the City shall include sidewalks. The Pedestrian Master Plan projects are shown in Figure 5-1 and summarized in Table 5-1.

Each pedestrian project was ranked based on how well it met the improvement strategies that were identified. A high, medium, and low designation was given to each project to indicate a general priority that the projects should be implemented. These priorities were used to create a Pedestrian Action Plan. The Action Plan consists of projects which are selected from the Master Plan to be funded and constructed over the next 20 years. The selection process helps to focus community investment on those projects that are most effective at meeting critical needs, while deferring other projects of lesser values. As development occurs, streets are rebuilt and other opportunities (such as grant programs) arise, projects on the Master Plan should also be pursued. A Pedestrian Action Plan project list was created to identify high priority pedestrian projects that are reasonably expected to be funded by the year 2030, which meets the requirements of the updated Transportation Planning Rule[15]. Table 5-1 shows the full Master Plan and Action Plan identified in the TSP update analysis. The Pedestrian Action Plan is shown in Figure 5-2.

The planning level cost estimates provided in Table 5-1 are based on general unit costs for transportation improvements, but do not reflect the unique project elements that can significantly add to project costs. Each of these project costs will need further refinement to detail right-of-way requirements and costs associated with other special design details as projects are pursued.

[15] *OAR Chapter 660*, Department of Land Conservation and Development, Division 012, Transportation Planning, adopted on March 15, 2005, effective April 2005.

City of Silverton
Transportation System Plan

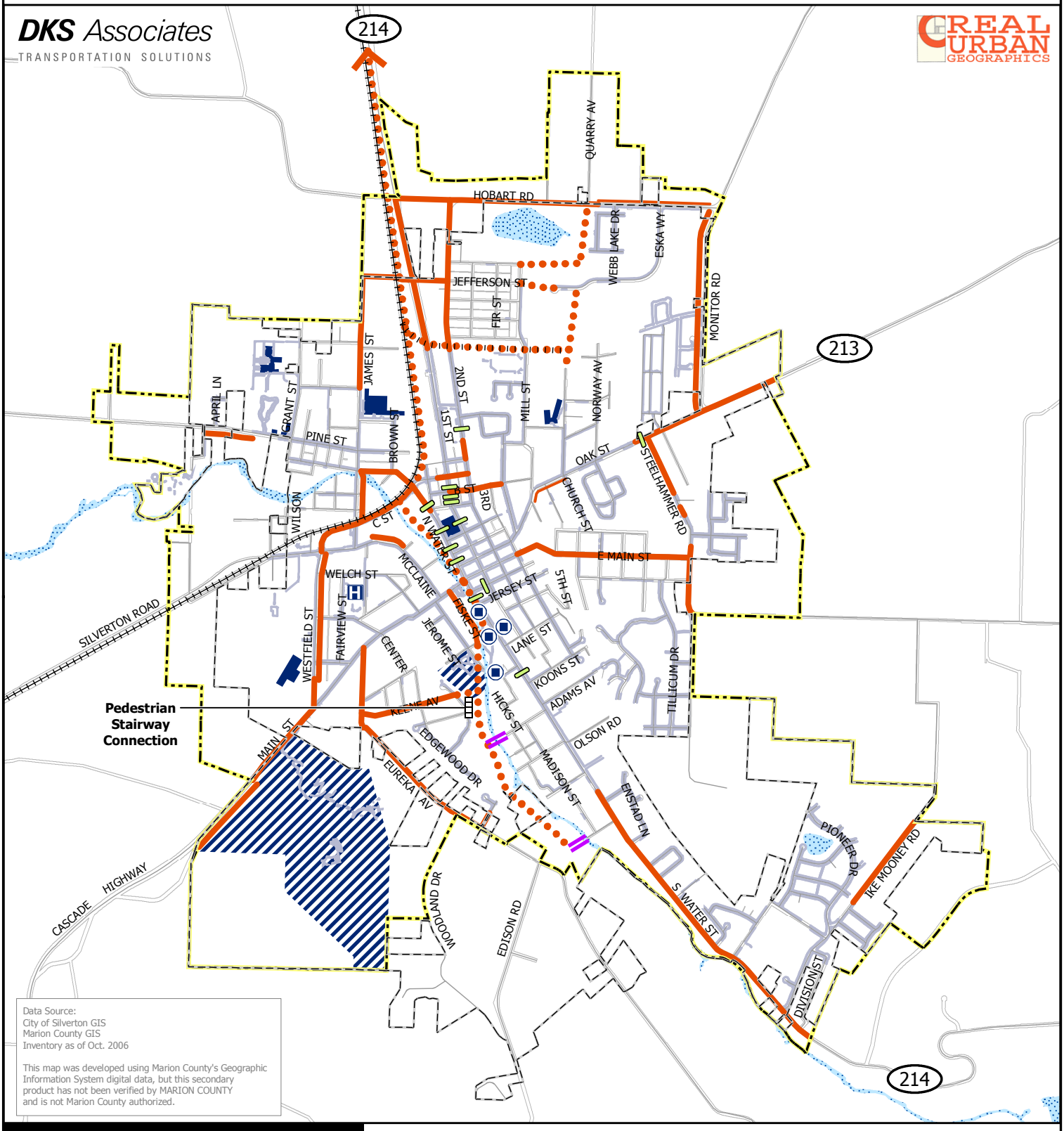


FIGURE 5-1

Pedestrian Master Plan

0 0.25 0.5 Miles

not to scale

Legend

- City Limit
- Road
- Railroad
- Hospital
- Pedestrian Crossing Enhancements
- Proposed Sidewalk
- Proposed Multi-Use Trail
- Proposed Pedestrian Bridge
- Existing Sidewalk
- Urban Growth Boundary
- Civic/Government
- School
- Water

City of Silverton
Transportation System Plan

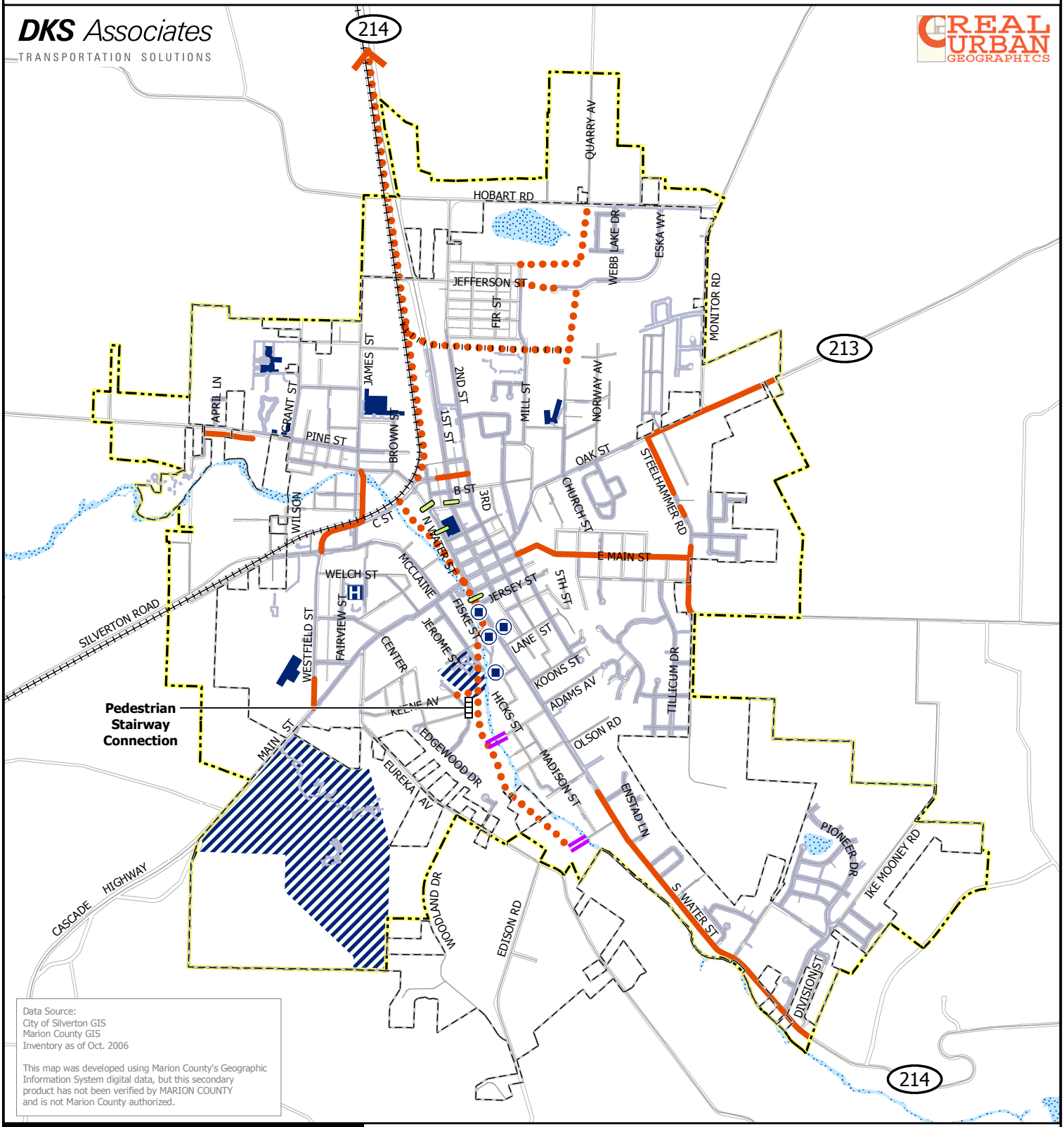


FIGURE 5-2

Pedestrian Action Plan

0 0.25 0.5 Miles

not to scale

Legend

- City Limit
- Road
- Railroad
- Hospital
- Pedestrian Crossing Enhancements
- Proposed Sidewalk
- Proposed Multi-Use Trail
- Proposed Pedestrian Bridge
- Existing Sidewalk
- Urban Growth Boundary
- Civic/Government
- School
- Water

Table 5-1: Pedestrian Master Plan and Action Plan Projects

Priority	Project	Location/Side	From	To	Plan	Cost ($1,000)
Sidewalks on Existing Arterials and Collectors						
High	Oak Street	Both	Steelhammer Road	City limits	Action	$357
High	Pine Street (gap infill)	Both	Grant Street	City limits	Action	$164
High	South Water Street	Both	Smith Street	City limits	Action	$945
High	C Street	Both	McClaine Street	James Street	Action	$157
High	Steelhammer Road	Both	Oak Street	Evans Valley Road	Action	$388
High	C Street	South	Front Street	2nd Street	Action	$26
High	James Street	East	C Street	North Water Street	Action	$53
High	James Street	West	C Street	Brooks Street	Action	$16
High	Westfield Street	Both	Main Street	Existing section	Action	$21
High	Main Street	Both	3rd Street	Steelhammer Road	Action	$567
Med	Oak Street	South	Mill Street	Steelhammer Road	Master	$283
Med	North Water Street	South	James Street	C Street	Master	$53
Med	North Water Street	East	C Street	A Street	Master	$41
Med	C Street	North	James Street	North Water Street	Master	$195
Med	James Street	Both	Florida Street	City Limits	Master	$164
Med	Westfield Street	East	Main Street	McClaine Street	Master	$252
Med	B Street	Both	1st Street	Mill Street	Master	$130
Med	1st Street	Both	Hobart Road	Existing section	Master	$483
Med	Jefferson Street	Both	2nd Street	James Street	Master	$210
Med	West Main Street	North	Westfield Street	City limits	Master	$95
Med	Keene Avenue	Both	Eureka Avenue	Coolidge Street	Master	$315
Med	Ike Mooney Road	Both	Existing section	City limits	Master	$172
Med	2nd Street	Both	Whittier Street	Hobart Road	Master	$483
Low	McClaine Street	North	Craig Street	Phelps Street	Master	$37
Low	Fiske Street	Both	Main Street	Charles Avenue	Master	$199
Low	2nd Street (gap infill)	East	Whittier Street	D Street	Master	$61
Low	Eureka Avenue	Both	Main Street	Bee Lane	Master	$525
Low	Monitor Road	West	Hobart Road	Oak Street	Master	$335
Low	Hobart Road	North	1st Street	Monitor Road	Master	$578
Low	Hobart Road	South	1st Street	Lanham Lane	Master	$389
Local Multi-Use Trail						
High	Off-street path #1		C Street	Hobart Road	Action	$338

Priority	Project	Location/Side	From	To	Plan	Cost ($1,000)
High	Off-street path #2		Charles Avenue	Peach Street	Action	$262
Med	Off-street path #3 (Creek trail)		C Street	Silverton Library	Master	$150
Med	Pedestrian Stairway Connection		Coolidge Park	Anderson Drive	Master	$60
Med	Off-street path #4 (2nd Street)		Whittier Street	Oak Street	Master	$263
Med	Pedestrian Bridge		Cowing Street		Master	$80
Low	Off-street path #5		Existing rail line alignment	Church Street extension	Master	$188
Low	Pedestrian Bridge		Peach Street		Master	$80
Low	Off-street path #6		Eska Way	Existing Church Street alignment	Master	$173
Low	Off-street path #7		Jefferson Street	Eska Way	Master	$48
Low	Off-street path #8		Lincoln Street	East side of Webb Lake	Master	$143
Sidewalks on New Arterials/Collectors						
Westside Connector #1		North/South	Silverton Road	Pine Street	Master	**
Eastside Connector #4		North/South	Oak Street (Hwy 213)	Pioneer Drive	Master	**
Northside Connector #5		East/West	James Street	2nd Street	Master	**
				Sidewalks on Existing Arterials and Collectors		$7,351
				Local Multi-Use Trail		$1,806
				*Pedestrian Crossing Improvements**		$142
				ADA Safety Audit and Annual Improvement Program		$330
				Total Pedestrian Action Plan Cost		**$3,679**
				Total Pedestrian Master Plan Cost		**$9,619**

Notes: * Pedestrian Crossing Improvements are included in Table 5-3
**Project costs are included in the Motor Vehicle Plan (Chapter 8)

Another pedestrian need that was identified includes ADA accessible curb cuts for all downtown streets and destinations (e.g. schools, hospital, and shopping). A citywide safety audit within Silverton is also needed to identify problem areas that do not currently meet ADA standards. The implementation of an ADA program would include provisions for undertaking this task, as well as the actual reconstruction of deficient curb locations. The priority locations will be determined after the inventory has been conducted. A phased construction plan, with specific priority given to key downtown locations should be included as part of the program. The list may be updated over time depending on current funding availability, but will provide a starting point for project selection. This project is included in the Action Plan shown in the table above.

ARTERIAL CROSSING ENHANCEMENTS

Pedestrian safety is another major issue; specifically pedestrian conflicts with motor vehicles. These conflicts can be reduced by providing direct links to buildings from public rights-of-way,

considering neighborhood traffic management, providing safe roadway crossing points and analyzing/reducing the level of pedestrian/vehicle conflicts in every land use application.

Table 5-2 summarizes several potential crossing enhancements that can be applied within the City of Silverton. Each crossing location will be reviewed to determine the appropriate combination of improvements. For example, curb extensions are effective for reducing crosswalk lengths, and exposure to conflicting vehicles, but these are only reasonable where on-street parking is provided on both sides of the roadway. The curb extension 'shadows' the parked cars. A standard detail for curb extensions with on street parking is included in the technical appendix and should be followed for all new curb extension projects within the City. Another example includes pedestrian count down timers, which can only be applied at existing or new traffic signal controlled crossings. The examples shown in Table 5-2 represent a tool box of solutions for pedestrian enhancements.

Table 5-2: Potential Crossing Enhancement Tools

Improvement	Description	Illustration	Cost Range
Marked Crosswalk	White, thermoplastic markings at street corner. Alternative material could include non-white color or textured surfaces.		$500 to $1,000 each crossing
Raised Crosswalk	Crosswalks that are level with the adjacent sidewalks, making pedestrians more visible to approaching traffic.		$4,000
New Corner Sidewalk Ramp	Construct ADA compliant wheelchair ramps consistent with city standards		$3,000 to $5,000 each corner
Median Refuge	Construct new raised median refuge area. Minimum width 6 feet, and minimum length of 30 feet. Curb can be mountable to allow emergency vehicles to cross, if required.		$3,000 to $10,000 depending on overall length and amenities.

Improvement	Description	Illustration	Cost Range
Pedestrian Count Down Timer Signal	Install supplemental pedestrian signal controls to indicate the time remaining before crossing vehicles get 'green' signal indication.		$500 each signal head
Curb Extensions	Construct curb extension on road segments with on-street parking. Reduces pedestrian crossing area, and exposure to vehicle conflicts.		$5,000 to $8,000 depending on design amenities and aesthetic treatments.
Mid-Block Pedestrian Signal and Crossing	Construct new pedestrian signal that is synchronized with major street traffic progression to reduce interruption of through traffic. Appropriate near high pedestrian generators.		$100,000 to $150,000

Several "pedestrian crossing enhancement" locations were identified. A screening evaluation was conducted for arterial streets within Silverton to identify roadway segments that should be considered for enhanced pedestrian crossing treatments. The criterion used was based on roadway daily volumes, posted speeds, and proximity to pedestrian generators based on published guidelines[16] in the *Traffic Control Devices Handbook*.

In setting priorities for the Pedestrian Action Plan, school access was given a high priority to improve safety. However, beyond simply building more sidewalks, school safety involves education and planning. Many cities have followed guidelines provided by Federal Highway Administration and the Institute of Transportation Engineers. Implementing plans of this nature has demonstrated accident reduction benefits in several cities in Oregon. However, this type of work requires staffing and coordination by the Silverton School District as well as the City to be effective.

Locations for crossing enhancements have been identified by the City as well as previous work conducted for the Silverton Downtown Development Plan[17]. The crossing locations are classified into three primary geographic districts, including: gateway, core, and civic areas.

[16] *Manual of Uniform Traffic Control Devices Handbook*, Institute of Transportation Engineers, 2001; Chapter 13, Table 13-2.
[17] Silverton Downtown Development Plan, City of Silverton July 2007

Table 5-3 lists the Pedestrian Master Plan and Action Plan crossing improvements. The crossing enhancements are categorized by geographical area and given a general priority. One option for implementation includes the creation of a crossing enhancement that has a defined budget every year and implements one or two crossings as funding becomes available. The "safe routes to school" initiative also provides another avenue for partnerships or grants. Crossing enhancements projects should have a separate pool of money for distribution

Table 5-3: Pedestrian Master Plan Crossing Improvements

Priority	Project	District	Location	Plan	Cost ($1,000s)
High	Crossing enhancements (North leg)	Gateway	1st Street/A Street	Action	$10
High	Crossing enhancements (North leg)	Civic	Water Street/A Street	Action	$10
High	Install median refuge, project to reduce crossing distance	Core	Water Street/Lewis Street	Action	$25
High	Crossing enhancements (Mid-block)	Civic	North Water Street/Eugene Field	Action	$10
Med	Crossing enhancements	n/a	Steelhammer Road	Master	$10
Med	Crossing enhancements (Mid-block/one side)	Core	1st Street/between Park Street and A Street	Master	$10
Med	Crossing enhancements (Mid-block)	n/a	North 1st Street/Bow Tie Lane	Master	$12
Med	Crossing enhancements (South leg)	Civic	South Water Street/Wesly Street	Master	$10
Med	Close crosswalk (West leg)	Core	1st Street/Lewis Street	Master	$5
Low	Crossing enhancements (North and South legs)	Core	1st Street/B Street	Master	$20
Low	Crossing enhancements (South leg)	Gateway	Water Street/Park Street	Master	$10
Low	Crossing enhancements (South leg)	Core	Water Street/High Street	Master	$10
			Total Pedestrian Crossing Enhancement Action Plan Cost		**$55**
			Total Pedestrian Crossing Enhancement Master Plan Cost		**$142**

CHAPTER 6 : BICYCLE

This chapter summarizes the existing and future bicycle facility needs in the City of Silverton, outlines the criteria to be used to evaluate needs, identifies improvement strategies, and recommends an Action Plan of bikeway projects to effectively mitigate deficiencies.

FACILITIES

There are three main bicycle route facility types: bike lanes, bicycle accommodation, or off-street bike paths/multi-use trails.

- ***Bike lanes*** are areas within the street right-of-way designated specifically for bicycle use. Federal research has indicated that bike lanes are the most cost effective and safe facilities for bicyclists when considering all factors of design. Bicycle lanes adjacent to the curb are preferred to bicycle lanes adjacent to parked cars or bicycle lanes combined with sidewalks. According to the Oregon Bicycle and Pedestrian Plan[18], on-street bike lanes should be six-feet wide. Provision of a bicycle lane not only benefits bicyclists but also motor vehicles which gain greater shy distance/emergency shoulder area. Additionally, pedestrians gain a buffer between walking areas and moving vehicles. On reconstruction projects, bicycle lanes of five feet may be considered due to right-of-way constraints.
- ***Bicycle accommodations*** are where bicyclists and autos share the same travel lane, including a wider outside lane and/or bicycle boulevard treatment (priority to through bikes on local streets). Widening the curb travel lane (for example, from 12 feet to 14 or 15 feet) can provide bicycle accommodations. This extra width is more accommodating to bicycle travel and provides a greater measure of safety.
- ***Multi-use paths*** are generally off-street routes (typically recreationally focused) that can be used by several transportation modes, including bicycles, pedestrians and other non-motorized modes (i.e. skateboards, roller blades, etc.). Wide sidewalks (greater than eight feet), can also be considered multi-use paths, however, the provision of wide sidewalks should not preclude the provision of on-street bike lanes. The shared space on the wide sidewalks can decrease pedestrian levels of service as well as pose adverse safety problems for both bikers and pedestrians. Off-street trails in the City of Silverton are planned for 10-12 feet in width[19], which is desirable for mixed-use activity (pedestrian and bike).

STRATEGIES

Bikeway improvements are aimed at closing the gaps in the bicycle network along arterial and collector roadways, in additional to providing multi-modal links to improve livability. Several strategies were identified to address bicycle system needs and to guide project prioritization. This prioritization process helps to focus community investment on those projects that are most effective at meeting critical needs, while deferring other projects of lesser value.

[18] Oregon Department of Transportation, *Oregon Bicycle and Pedestrian Plan*, Adopted June, 1995.

The strategies were ranked by the Technical Advisory Committee (TAC) for use in this TSP[20].The strategies for bicycle facilities (listed in order of importance) are:

- Construct bicycle lanes on all arterials and collectors to meet City of Silverton, Marion County or ODOT facilities
- Connect key bicycle corridors to schools, parks, and activity centers
- Fill in gaps in the network where some bikeways exist (arterials and collectors)
- Provide bicycle corridors that commuters might use
- Provide a regional pathway facility connecting to neighboring communities
- Provide bicycle corridors that access retail areas
- Provide bicycle corridors that connect to major recreational facilities
- Provide bicycle parking at key destinations
- Provide bicycle corridors that connect neighborhoods

NEEDS

Bicycle goals and policies for the area aim to provide safe, continuous, and accessible facilities. Striped bike lanes are present on a few roadways west and east of downtown in Silverton but have limited connectivity from the north and south.

Bicycle trips are different from pedestrian and motor vehicle trips. Common bicycle trips are longer than walking trips and generally shorter than motor vehicle trips. Where walking trips are attractive at lengths of a quarter mile (generally not more than a mile), bicycle trips are attractive up to three miles. Bicycle trips can generally fall into three groups: commuting, activity-based and recreational. Commuter trips are typically home/work/home (sometimes linking to transit) and are made on direct, major connecting roadways and/or local streets. Bicycle lanes provide good accommodations for these trips. Activity based trips can be home-to-school, home-to-park, home-to-neighborhood commercial or home-to-home. Many of these trips are made on local streets with some connections to arterials and collectors. Their needs are for lower volume/speed traffic streets, safety and connectivity.

Recreational trips share many of the needs of both the commuter and activity-based trips, but create greater needs for off-street routes, connections to rural routes and safety. Typically, recreational bike trips will exceed the normal bike trip length.

System continuity and connectivity, and safety are key issues for bicyclists. The lack of safe facilities and gaps in the system cause the most significant problems for bicyclists traveling to and from downtown Silverton. The following needs have been identified for bicycle access and circulation along within the City of Silverton.

Local/Regional Connectivity

The existing bicycle network includes a combination of striped bicycle lanes and shared facilities. There is limited signage and designation of through bicycle routes serving the gateways into downtown. The 2000 TSP identified several on-street facilities on existing arterial and collector roadways. Due to limited right-of-way availability and slow speeds through the downtown core, bicycle lanes are not appropriate or feasible. All of the local and regional bicycle lane connections that are identified will transition to shared facilities through downtown Silverton. The designation of through bicycle routes and shared facilities will require additional signage and will be included on the project list.

[20] Technical Advisory Committee Meeting, March 3, 2007.

Bicycle Parking

The existing bicycle parking is limited in downtown Silverton. To facilitate bicycle trips, bicycle parking should be provided with short-term and long-term spaces. Lack of proper storage facilities discourages potential riders from traveling by bicycle. Bicycle racks should be located at significant activity generator including schools, parks, and retail areas. The attractiveness of bike parking may also be improved by providing covered parking or secured facilities where bicycles may be locked away. To the extent possible, bike parking should be visible, inviting and integrated with building, street front and landscape design.

BICYCLE MASTER PLAN AND ACTION PLAN

To meet transportation performance standards and serve future growth, the future transportation system needs multi-modal improvements to manage the forecasted travel demand. The extent of the recommended multi-modal improvements for Silverton is significant. Future growth can be accommodated with significant investment in transportation improvements.

The Bicycle Master plan is an overall plan that summarizes the list of bicycle-related projects throughout Silverton, providing a long-term map for planning bicycle facilities. The Master Plan is shown in Figure 6-1 and summarized in Table 6-1. The Master Plan identifies improvements to provide a connected bicycle network within the City of Silverton along all arterial and collector roadways. Typically local streets do not require delineated bicycle lanes as traffic volumes and speeds are low enough that bicycles and motor vehicles can share the same right-of-way safely. As development occurs, streets are rebuilt, and other opportunities (such as grant programs) arise, projects on the Master Plan should also be pursued.

The planning level cost estimates provided are based on general unit costs for transportation improvements, but do not reflect the unique project elements that can significantly add to project costs. Each of these project costs will need further refinement to detail right-of-way requirements and costs associated with special design details as projects are pursued. Based on the City's input, the list of bicycle projects were reviewed to determine if any of the identified locations could restripe bicycle lanes with the existing cross-section if parking was removed on one side of the street. Three locations were identified that met the established cross-section criteria including:

- 1st Street (between Hobart Street and B Street)
- Oak Street (between Norway Street to Steelhammer Road)
- Pioneer Drive (between South Water Street and Ike Mooney Road)

The cost estimates for these restriping projects are significantly lower than the construction of new bicycle lanes that require roadway widening. Each bicycle project was ranked based on how well it met the improvement strategies that were identified. A high, medium, and low designation was given to each project to indicate a general priority that the projects should be implemented.

From the Bicycle Master Plan, a more specific, shorter term, Action Plan was developed. The Action plan consists of projects that are reasonably expected to be funded by the year 2030. The TSP goals and policies and improvement strategies were used to rank the bicycle projects. In creating the Bicycle Action Plan, priority was given to completing the network (taking advantage of existing bike lanes) and providing bicycle access around land uses that are attractive to bicycle riders, such as schools, recreation and retail areas. The highest ranking City projects expected to be funded are included in the Action Plan. The Bicycle Master Plan and Action Plan and are shown in Table 6-1.

City of Silverton
Transportation System Plan

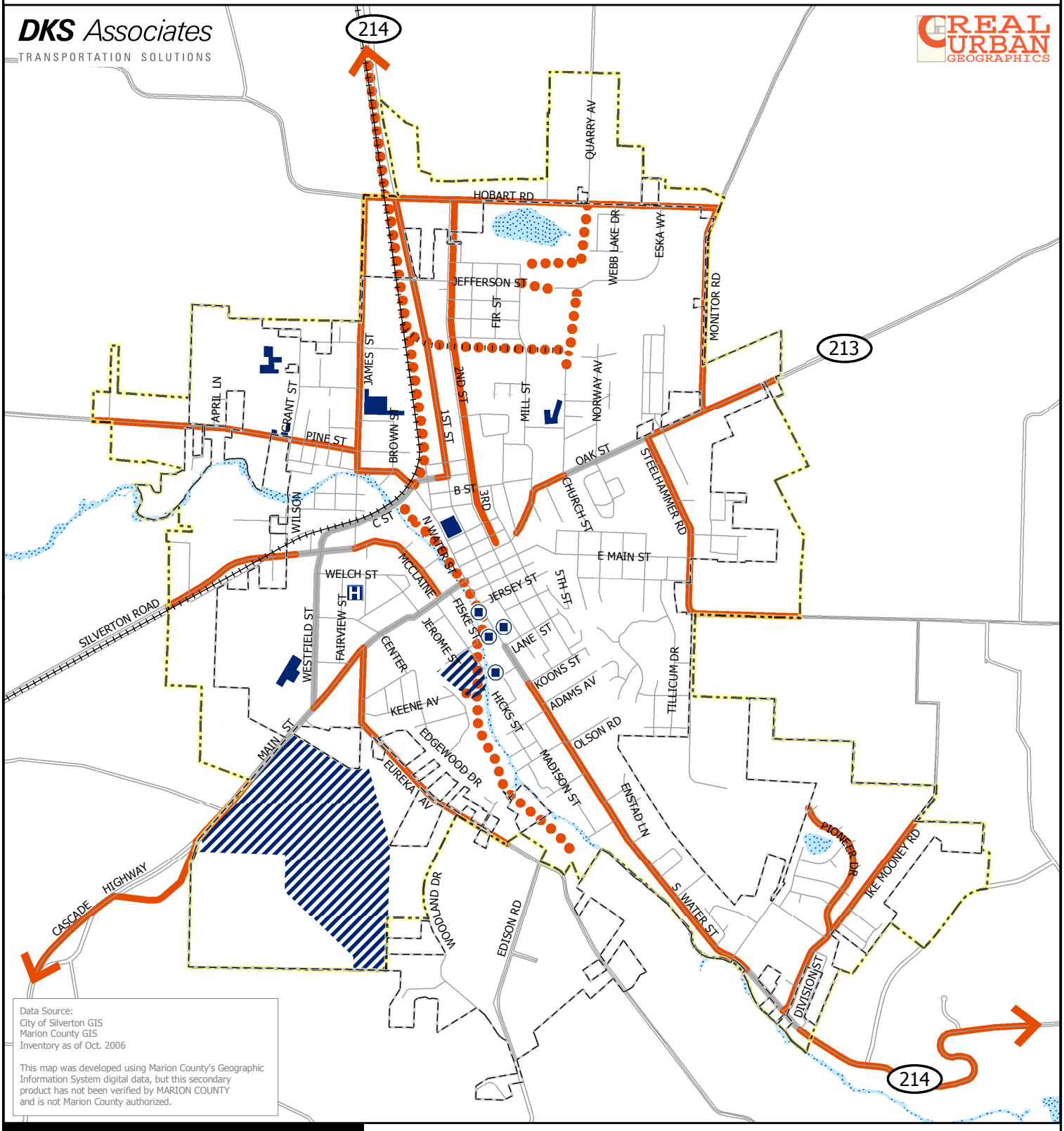


FIGURE 6-1

Bicycle Master Plan

0 0.25 0.5 Miles

not to scale

Legend

- Proposed Bicycle Lanes
- Existing Bicycle Lanes
- Proposed Multi-Use Trail
- Urban Growth Boundary
- City Limit
- Hospital
- Civic/Government
- School
- Roads
- Railroad
- Abandoned
- Water

City of Silverton
Transportation System Plan

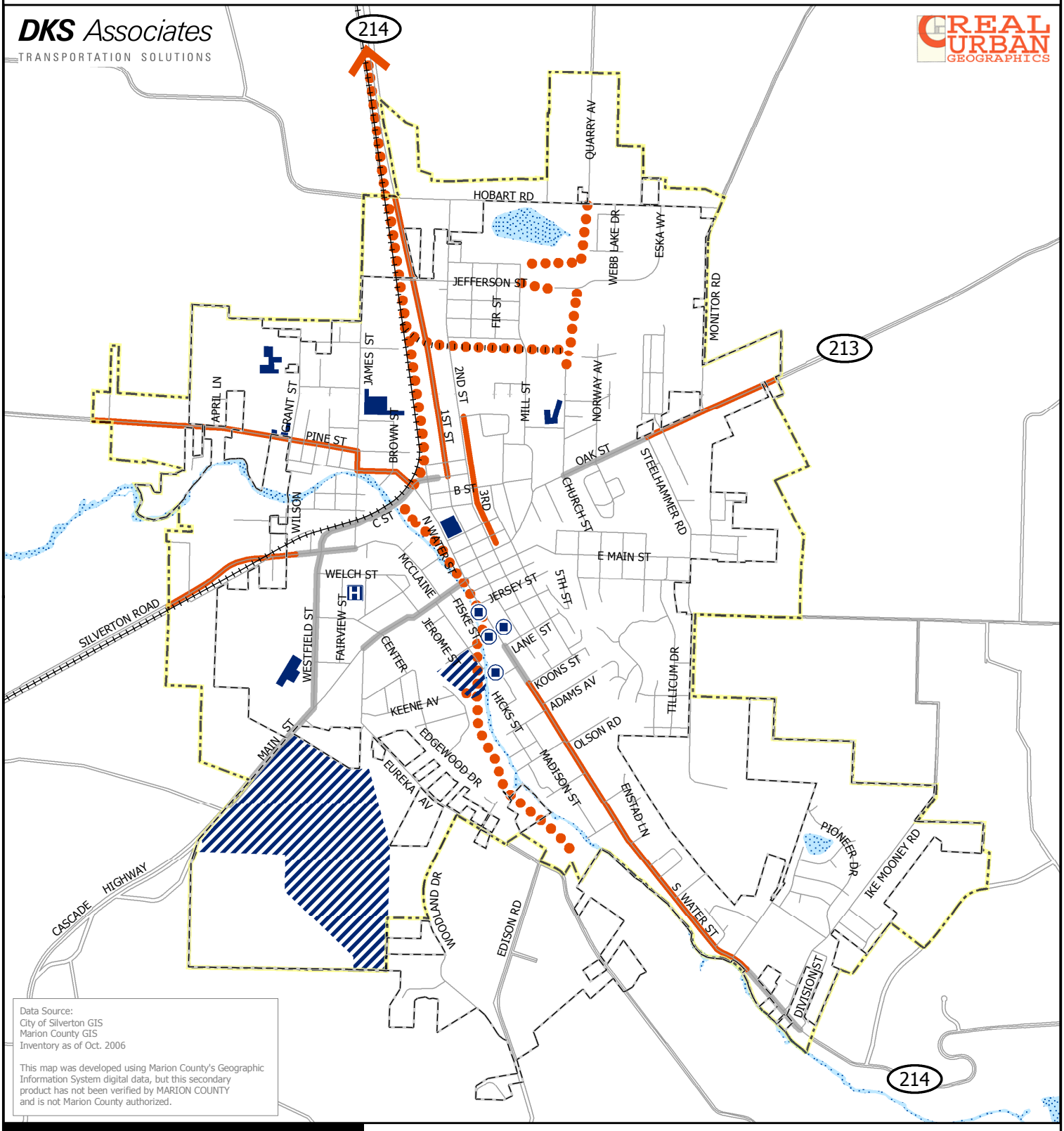


FIGURE 6-2

Bicycle Action Plan

0 0.25 0.5 Miles

not to scale

Legend

- Proposed Bicycle Lanes
- Existing Bicycle Lanes
- Proposed Multi-Use Trail
- Urban Growth Boundary
- City Limit
- Hospital
- Civic/Government
- School
- Roads
- Railroad
- Abandoned
- Water

Table 6-1: Bicycle Master Plan and Action Plan Projects

Priority	Project	Location/Side	From	To	Plan	Cost ($1,000s)
Bike Lanes on Existing Arterials & Collectors						
High	1st Street	Both	Hobart Road	B Street	Action	$68
High	Oak Street	Both	Steelhammer Road	East City limits	Action	$255
High	North Water Street	Both	James Street	C Street	Action	$143
High	South Water Street	Both	Lane Street	Pioneer Drive	Action	$500
High	Pine Street	Both	West City limits	James Street	Action	$345
High	Silverton Road	Both	West City limits	Existing section	Action	$262
High	2nd Street	Both	Bow Tie Lane	Oak Street	Action	$5
Med	Oak Street	Both	Norway Street	Steelhammer Road	Master	$14
Med	Eureka Avenue	Both	Main Street	South City limits	Master	$645
Med	Main Street	Both	Westfield Street	Water Street	Master	$465
Med	Oak Street	Both	3rd Street	Church Street	Master	$192
Med	McClaine Street	Both	Existing section	Main Street	Master	$255
Med	Monitor Road	Both	Oak Street	Hobart Road	Master	$480
Med	Ike Mooney Road	Both	Pioneer Drive	East City limits	Master	$340
Med	Pioneer Drive	Both	South Water Street	Ike Mooney Road	Master	$36
Med	Evans Valley Road	Both	Steelhammer Road	East City limits	Master	$270
Med	Steelhammer Road	Both	Oak Street	Evans Valley Road	Master	$420
Low	2nd Street	Both	Hobart Road	Bow Tie Lane	Master	$287
Low	James Street	Both	Hobart Road	North Water Street	Master	$645
Low	Hobart Road	Both	James Street	Monitor Road	Master	$825
Bike Lanes on New Arterials & Collectors						
Westside Connector #1		North/South	Silverton Road	Pine Street	Master	*
Eastside Connector #4		North/South	Oak Street (Hwy 213)	Pioneer Drive	Master	*
Northside Connector #5		East/West	James Street	2nd Street	Master	*
Local Multi-Use Trail						
High	Off-street path #1		C Street	Hobart Road	Action	**
High	Off-street path #2		Charles Avenue	Peach Street	Action	**
Med	Off-street path #3 (Creek trail)		C Street	Silverton Library	Master	**
Med	Off-street path #4 (2nd Street)		Whittier Street	Oak Street	Master	**
Med	Pedestrian Bridge		Cowing Street	Hobart Road	Master	**
Low	Off-street path #5		Existing rail line alignment	Church Street extension	Master	**
Low	Pedestrian Bridge		Peach Street	Existing Church Street alignment	Master	**
Low	Off-street path #6		Eska Way	Existing Church Street alignment	Master	**
Low	Off-street path #7		Jefferson Street	Eska Way	Master	**
Low	Off-street path #8		Lincoln Street	East side of Webb Lake	Master	**

Project	From	To	Plan	Cost ($1000's)
Regional Bikeway				
Regional bikeway connection	Silverton City Limits	Stayton	Master	-
Regional bikeway connection	Silverton City Limits	Salem	Master	-
Regional bikeway connection	Silverton City Limits	Mt. Angel	Master	-
Regional bikeway connection	Silverton City Limits	Wayside Park	Master	-
Regional bikeway connection	Silverton City Limits	Reservoir	Master	-
Other Bicycle Projects				
Bicycle Route Signage (shared bicycle facilities)		Throughout Silverton	Master	$25
Bicycle Parking		Downtown locations and key destinations	Master	$20
		Bike Lanes on Existing Arterials & Collectors		$6,452
		Other Bicycle Projects		$45
		Total Bicycle Action Plan Cost		**$1,578**
		Total Bicycle Master Plan Cost		**$6,497**

Notes: *Project costs are included in the Motor Vehicle Plan (Chapter 8)
**Project costs are included in the Pedestrian Plan (Table 5-1)

COMPLEMENTING LAND USE ACTIONS

Since the provision of a bicycle network will not be fully utilized without the supporting infrastructure, it is in the City's best interest to make bicycle options available. The City Zoning Code shall provide on-site bicycle parking requirements based on land use categories (i.e. residential, commercial, industrial and service zones).

As new development occurs, it is important that connections or accessways are provided to link the development to the existing bicycle and pedestrian facilities in as direct manner as is reasonable. If a development fronts a bikeway or sidewalk (as shown in the Bicycle or Pedestrian Master Plans), the developer shall be responsible for providing the bikeway or walkway facility as part of any half-street improvement required for project mitigation

CHAPTER 7 : TRANSIT

This chapter summarizes existing and future transit needs in the City of Silverton, and outlines strategies and an Action Plan to effectively mitigate deficiencies. The criteria used in evaluating transit needs and the strategies for addressing these needs were identified through work with the City's Technical Advisory Committee (TAC).

STRATEGIES

Several improvement strategies were developed to meet transit needs in Silverton. These strategies were ranked as part of this TSP update[21]. The strategies, which rely on coordination with the City of Silverton as well as other regional transit service providers, include (listed in order of importance):

- Provide park-and-ride lots and support van pools/car pools
- Improve rail facilities to support recreational/commuter rail services
- Rescheduling of CARTS to allow better commuter service to Salem
- Improve the dial-a-ride program (expanded service hours and more service)
- Explore the feasibility of local fixed-route transit service
- Expand regional transit services to surrounding communities
- Construct transit stop amenities (shelters, lights, benches, etc)
- Update roadway design standards to support future fixed-route transit service

NEEDS

The projected size of Silverton in the future year (2030) limits the probability of a fixed route transit system. Typically, a population of 25,000 is considered reasonable to conduct a transit feasibility study. Although local fixed-route transit is not a likely option for Silverton, other improvements to the existing transit system were identified for transit service and access within the City of Silverton including:

Local/Regional Connectivity

As Silverton population grows, it is likely that the number of people working in Salem will also continue to grow and the community will continue to expand as a bedroom community. Based on these characteristics the need for efficient, commuter service to Salem will expand. Adjustments to the future regional and local system must include the rescheduling of CARTS (Chemeketa Area Regional Transportation System), the commuter connection to Salem, to accommodate typical work hour schedules. Coordination will be required with the transit service provider in Salem (Cherriots) to provide this regional connection.

[21] Technical Advisory Committee Meeting, February 2, 2007.

Bus Stops

The existing regional transit service route provided by Chemeketa Area Regional Transportation System (CARTS) has three bus stops in Silverton, at Roth's Grocery Store, Safeway/Rite-aid and Downtown. Bus stop amenities, such as bus shelters, secure bicycle parking and street lighting are also important enhancements to the existing and proposed transit stops.

Enhancements to Dial-a-Ride Service

The Silver Trolley is the dial-a-ride service and serves as a primary component of the transit service provided within Silverton. Future improvements that would enhance the current service include additional vehicles to accommodate more passengers and expanded service hours.

Park-and-Ride Lot

The need for a west side park-and-ride lot was identified in the previous TSP to serve as a transfer point between the intercity and intracity bus routes as well as a parking lot for carpool and vanpool users. This lot would provide approximately 100 stalls at a location to be determined in the future. One potential park-and-ride location was identified near the Public Works Shop. Further site analysis will be required before a final location for a new park-and-ride can be determined.

TRANSIT MASTER PLAN AND ACTION PLAN

To meet transportation performance standards and serve future growth, the future transportation system needs multi-modal improvements to manage the forecasted travel demand. Future growth can be accommodated with significant investment in transportation improvements. The effectiveness of transit service is supported by a quality pedestrian and bicycle system. Pedestrian and bicycle system improvements, as detailed in Chapters 5 and 6, respectively, should serve transit services as well as other activity centers (e.g. schools, recreation, and retail areas).

The Transit Master Plan project list was determined based on the identified needs, policies and project feasibility. The transit master plan projects are summarized in Table 7-1 and shown in Figure 7-1. The City of Silverton owns and operates the intercity paratransit service and will be responsible for service enhancements. The City of Silverton shall coordinate with CARTS (Chemeketa Area Regional Transportation System) and Cherriots (the transit service provider in Salem) to incorporate changes to the regional bus service with the City.

Each transit project was ranked based on how well it met the improvement strategies that were identified. A high, medium, and low designation was given to each project to indicate a general priority that the projects should be implemented. Planning level cost estimates were also provided for each project, based on the most recent available data.

A Transit Action Plan project list was created to identify high priority transit projects that are reasonably expected to be funded or implemented by the year 2030, which meets the requirements of the updated TPR[22]. The Transit Master Plan and Action Plan projects are summarized in Table 7-1.

[22] *OAR Chapter 660*, Department of Land Conservation and Development, Division 012, Transportation Planning, adopted on March 15, 2005, effective April, 2005.

City of Silverton
Transportation System Plan

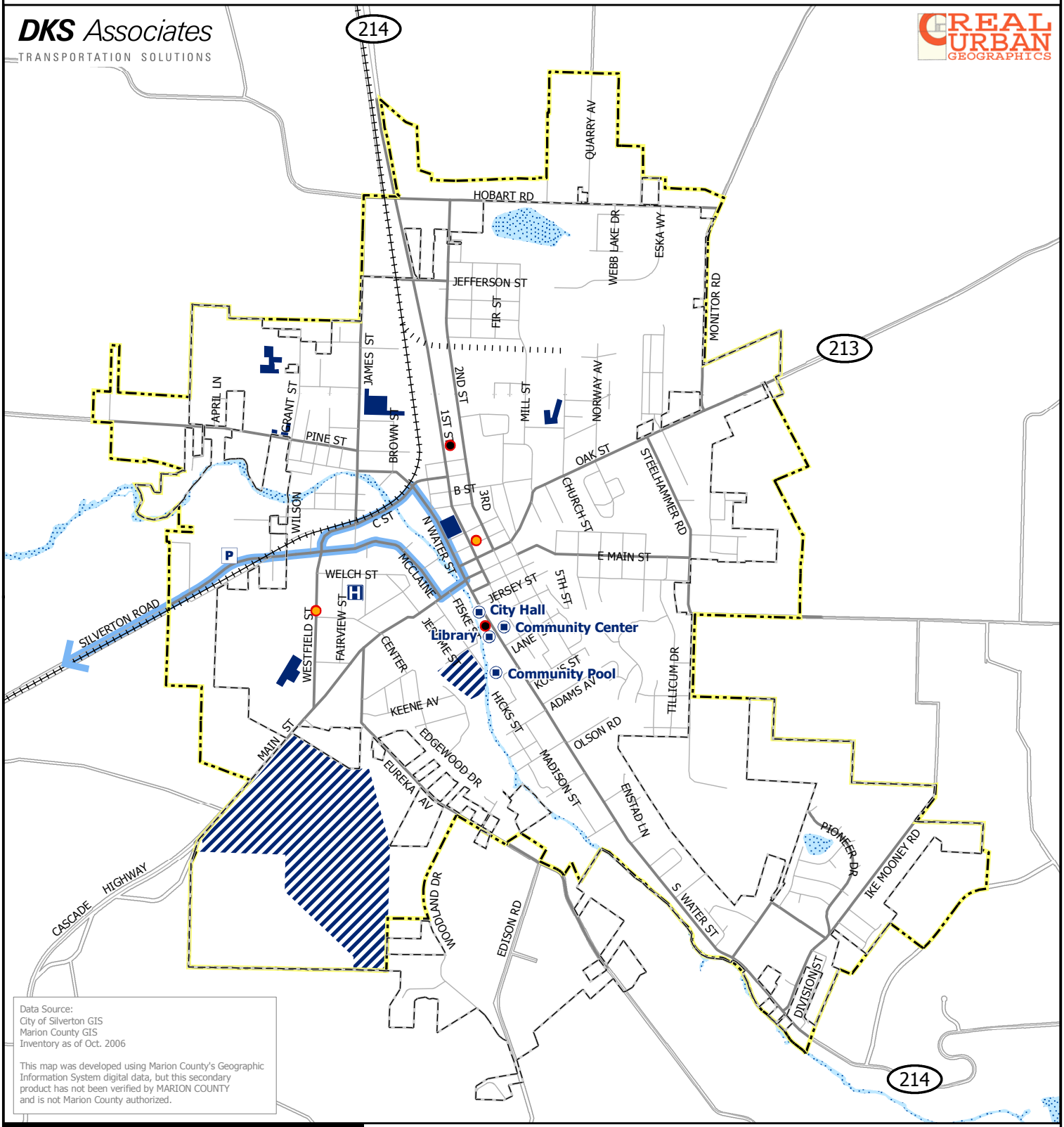


FIGURE 7-1

Transit Master Plan

0 0.25 0.5 Miles

not to scale

Legend

- Existing CARTS Bus Stop
- Proposed CARTS Bus Stop
- Park-and-Ride Lot
- Potential CARTS Commuter Connection Route
- Hospital
- Civic/Government
- School
- Water
- Park
- Urban Growth Boundary
- Major Street
- Local Street
- County Roads
- Railroad
- Abandoned
- City Limit

Table 7-1: Transit Master Plan and Action Plan Projects

Priority	Project	Description	Plan	Cost ($1,000s)
High	Commuter Connection to Salem	Enhance fixed route commuter connection to and from Salem. One new bus stop location will be added in downtown Silverton.	Action	$100/Year
High	Bus shelters	Install bus shelters at the two existing commuter connections at Roth's Grocery Store and the Silver Falls Library	Action	$20
High	Park-and-Ride Lot	Implement west-side park-and-ride lot to serve transit and carpool users. Specific location to be determined.	Action	$350
Medium	Bicycle Parking	Install secure bicycle parking at Park-and-Ride Lot	Master	$10
Medium	Dial-a-ride services	Enhance dial-a-ride services, including hours of operation and expanded service, and one additional vehicle.	Master	$52/Year
Low	Local Fixed Route Transit Feasibility Study	Future population growth will dictate when this project will occur (generally 25,000 people).	Master	$50
		Total Transit Action Plan Project Cost (for 23 years)		**$2,670**
		Total Transit Master Plan Project Cost (for 23 years)		**$3,926**

CHAPTER 8 : MOTOR VEHICLE

This chapter summarizes motor vehicle system capacity needs for future conditions in the City of Silverton. The following sections outline strategies used to evaluate needs and recommends plans for motor vehicles (automobiles and trucks). The Motor Vehicle modal plan was developed to be consistent with other jurisdictional plans including Marion County's Regional Transportation System Plan (RTSP) and Oregon Department of Transportation's Highway Plan.

FUTURE CAPACITY DEFICIENCIES

As outlined in Chapter 4, traffic volumes were forecasted for the 2030 roadway system within the City of Silverton. The analysis for the forecasted 2030 growth was a No-Build scenario including only transportation system improvements in Silverton that are expected to be constructed in the near future. These projects include the construction of traffic signals and geometric modifications at C Street/1st Street (Hwy 214) and C Street/Water Street (Hwy 212). Assuming these improvements were in place, the forecasted 2030 design hour traffic volumes were applied to study area intersections and reanalyzed. Under the future (2030) No-Build scenario there are several intersections within the TSP study area that do not meet jurisdictional performance standards.

STRATEGIES

To meet performance standards and serve future growth, the future transportation system needs significant multi-modal improvements and strategies to manage the forecasted travel demand. The City of Silverton's Special Transportation Area (STA) designation was approved by the Oregon Transportation Commission in September 2007. This highway designation is applied to a highway segment when an existing downtown business district straddles the state highway in an urban center. The objective of this designation is to provide access to community activities, businesses and residences and to accommodate pedestrian, bicycle and transit movement along and across the highway in a downtown/business district area. The STA designation results in higher mobility standards for the future year analysis[23]. This higher mobility standard permits the City to allow higher levels of congestion, which could reduce the need for road widening and better balance the through traffic needs with community desires for a pedestrian friendly district. The impact of future growth would be severe without investment in transportation improvements. Strategies for meeting automobile facility needs include the following:

- Transportation System Management (TSM), including:
  - Neighborhood Traffic Management
  - Access Management
  - Local Circulation Enhancements
- Transportation Demand Management (TDM)
- Roadway Extensions to Improve Circulation

[23] The STA designation changes the v/c mobility standard to 0.95 for ODOT facilities through downtown.

- Traffic Signals on Arterial/Collector Intersections
- Mitigate all Intersections to State and Local performance standards
    - Additional Traffic Signals on Arterial/Collector Intersections
    - Intersection Modifications

The following sections outline the type of improvements that would be necessary as part of a long-range Motor Vehicle Master Plan. Phasing of implementation will be necessary since all improvements cannot be done at once. This will require prioritization of projects and periodic updating to reflect current needs. The following sections are a guide to managing growth in Silverton as it occurs over the next 23 years.

TRANSPORTATION SYSTEM MANAGEMENT (TSM)

Transportation system Management (TSM) focuses on low cost strategies to enhance operational performance of the transportation system by seeking solutions to immediate transportation problems, finding ways to better manage transportation, maximize mobility, and treating all modes of travel as a coordinated system. These types of measures include such things as traffic signal improvements, neighborhood traffic management, access management, and local street connectivity.

Neighborhood Traffic Management (NTM)

Neighborhood Traffic Management (NTM) is a term that has been used to describe traffic control devices typically used in residential neighborhoods to slow traffic or possibly reduce the volume of traffic. NTM is descriptively called traffic calming due to its ability to improve neighborhood livability. Silverton currently has limited neighborhood traffic management elements, such as on-street parking, in place on streets within the study area. The city may consider traffic calming measures and work with the community to find the traffic calming solution that best meets their needs and maintains roadway function.

The City could consider adopting a neighborhood traffic management program. This program would help prioritize implementation and address issues on a systematic basis rather than a reactive basis. Criteria should be established for the appropriate application of NTM in the City. This would address warrants, standards for design, funding, the required public process, use on collectors/arterials (fewer acceptable measures – medians) and how to integrate NTM into all new development design. NTM projects on state facilities are required to meet ODOT standards. Pavement textures, chokers, on-street parking and traffic circles are prohibited on state highways. Curb extensions would only be supported on state highways in locations designated as Special Transportation Areas.

In addition to adopting a neighborhood traffic management program, the City should consider modifying the Traffic Impact Study requirements for development applications. This would include a neighborhood impact assessment and mitigation program if the development is anticipated to add significant traffic volumes (or change vehicle speeds) on surrounding local or neighborhood route streets in a residential area. Thresholds used to determine an impact may be similar to the following:

- Local residential street volumes should not increase above 1,200 average daily trips.
- Local residential or neighborhood route residential street speeds should not exceed 28 miles per hour (85^{th} percentile speed).

- Impacts should be analyzed if the proposed project would increase volumes on a local residential or neighborhood route residential street by more than 25 vehicles in a peak hour.

Table 8-1 lists common NTM applications and suggests which devices may be supported by the Silverton Fire District. Any NTM project should include coordination with emergency agency staff to ensure public safety is not compromised.

Table 8-1: Traffic Calming Measures by Roadway Functional Classification

Traffic Calming Measure	Roadway Classification		
	Arterial	Collector	Neighborhood/Local Street
Curb Extensions	Supported	Supported	Calming measures are okay on lesser response routes that have connectivity (more than two accesses) and are accepted and field tested by the Silverton Fire District.
Medians and Pedestrian Islands	Supported	Supported	
Pavement Texture*	Supported	Supported	
Speed Hump	Not Supported	Not Supported	
Raised Crosswalk	Not Supported	Not Supported	
Speed Cushion (provides emergency pass-through with no vertical deflection)	Not Supported	Not Supported	
Choker	Not Supported	Not Supported	
Traffic Circle	Not Supported	Not Supported	
Diverter (with emergency vehicle pass through)	Not Supported	Supported	
Chicanes	Not Supported	Not Supported	

Notes: * Pavement texture is not supported for crosswalks located in the Downtown core.
Traffic calming measures are supported with the qualification that they meet Silverton Fire District guidelines including minimum street width, emergency vehicle turning radius, and accessibility/connectivity.

Access Management

Access Management is a broad set of techniques that balance the need to provide efficient, safe and timely travel with the ability to allow access to the individual destination. Proper implementation of access management techniques will promote reduced congestion, reduced accident rates, less need for highway widening, conservation of energy, and reduced air pollution.

Access management involves the control or limiting of access on arterial and collector facilities to maximize their capacity and preserve their functional integrity. Numerous driveways erode the capacity of arterial and collector roadways and introduce a series of conflict points that present the potential for crashes and interfere with traffic flow. Preservation of capacity is particularly important on higher volume roadways for maintaining traffic flow and mobility. Whereas local and neighborhood streets primarily function to provide direct access, collector and arterial streets serve greater traffic volume with the objective of facilitating through travel. Silverton, as with every city, needs a balance of streets that provide access with streets that serve mobility.

Several access management strategies were identified to improve access and mobility in Silverton:

- Work with land use development applications to consolidate driveways, provide crossover easements, and take access from lower class roads where feasible. Existing, non-conforming

accesses would only be subject to review and revision upon site improvement or a land use application.

- Implement access spacing standards for new developments and construction, including the prohibition of new single family residential access on arterials and collectors
- Access to arterial roadways should only be permitted for public roads. However, parcels shall not be landlocked by access spacing policies.
- Establish City access spacing standards to prohibit the construction of access points within the influence area of intersections. The influence area is that area where queues of traffic commonly form on the approach to an intersection (typically within 150 feet). In a case where a project has less than 150 feet of frontage, the site would need to explore potential shared access, or if that were not practical, place driveways as far from the intersection as the frontage would allow (permitting for 5 feet from the property line). However, full access may not be permitted in these conditions (e.g. restriction to right-in/right-out access)
- Implement City access spacing standards for new construction on County facilities within the urban growth boundary
- Meet ODOT access requirements on State facilities
- Establish maximum access spacing standards to promote connectivity.

The City of Silverton has historically struggled with the issue of limiting residential access to collector roadways. This is due to the desire to maintain the roadway as a public place that creates a friendly pedestrian and bicycle environment, as opposed to backing properties with fences that wall-off and isolate the roadway. To address this concern and implement the recommended access restrictions, the following measures shall be required:

- Provide a local street grid with 150-foot to 250-foot spacing that allows back-to-back lots along local streets with side yards to the collector roadway. In addition, prohibit the use of fences along lot lines that front the collector roadway, or
- Require lots with frontage along the collector roadway to orient the front of the home to the collector, but provide rear-alley or driveway motor vehicle access.

New development and roadway projects involving City street facilities should meet the recommended access spacing standards summarized in Table 8-2. In cases where physical constraints or unique site characteristics limit the ability for the access spacing standards shown in Table 8-2 to be met, the City of Silverton should retain the right to grant an access spacing variance. All requests for an access spacing variance should be required to complete an access management plan, which should include at a minimum the following items:

- Review of the existing access conditions within the study area (defined the property frontage plus the distance of the minimum access spacing requirement). This should include a review of the last three years of crash data, as well as collection of traffic volume information and intersection operations analysis.
- Short term analysis of the study area safety and operations with the proposed access configuration, as well as with a configuration that would meet access spacing standards.
- Long term analysis of the study area safety and operations with the proposed access configuration. This scenario should also include consideration of the long-term redevelopment potential of the area and discussion of how access spacing standards may be achieved.

Parcels shall not be landlocked by access spacing policies. Opportunities should be explored to provide future access through neighboring parcels and an interim access may be granted. Non-conforming access (defined per Table 8-2) should work to achieve a condition as close to standard as possible. For example, a private access may be permitted to an arterial roadway if no other option (e.g. access to a side street) exists; however, the private access would then be required to meet the minimum driveway spacing of 250 feet listed in Table 8-2.

Table 8-2: Recommended Access Spacing Standards for City Street Facilities

Street Facility	Maximum spacing* of roadways	Minimum spacing* of roadways	Minimum spacing** of roadway to driveway***	Minimum Spacing* driveway to driveway***
Arterial	1,000 feet	500 feet	250 feet	250 feet or combine
Collector:	500 feet	250 feet	150 feet	150 feet or combine
Neighborhood/Local	500 feet	250 feet	10 feet	10 feet

Notes: *Measured centerline to centerline

**Measured near street curb to near driveway edge

***Private access to arterial roadways shall only be granted through a requested variance of access spacing policies (which shall include an access management plan evaluation)

In addition to implementing access spacing standards, the City of Silverton shall require an access report for new access points, proposed to serve commercial and industrial developments, stating that the driveway/roadway is safe as designed and meets adequate stacking, sight distance and deceleration requirements as set by ODOT, Marion County and American Association of State Highway and Transportation Officials (AASHTO). Generally, the need for an access report is triggered by land use actions, design reviews, or land divisions.

Any proposed accesses to State facilities must be approved by ODOT. The *1999 Oregon Highway Plan* identifies access management objectives for all classifications of roadways under State jurisdiction. Both Highway 214 and Highway 213 are classified as District Highways by ODOT, which maintain a management objective that balances the needs of through traffic movement with direct property access. Based on these objectives, ODOT has established access spacing standards for all highway classifications that vary with proximity to urbanized areas and changes in posted speeds. These standards are also provided in the *1999 Oregon Highway Plan*. Table 8-3 identifies the ODOT access spacing standards for District Highways that are applicable within the Silverton urban growth boundary. Note that the spacing standards below are only to be applied to accesses on the same side of the highway.

Table 8-3: Minimum Access Spacing Standards for ODOT District Highways

Posted Speed	Minimum Distance between Accesses (Private or Public)
55 mph or more	700 feet
50 mph	550 feet
40-45 mph	500 feet
30-35 mph	350 feet
25 mph or less	350 feet

ODOT's access management requirements are implemented through OAR 734-051. These rules outline the criteria and procedure for approach permitting decisions, including the application process, conditions under which deviations from established access spacing standards can be allowed, and procedures for appealing decisions.

Marion County also maintains access spacing standards for facilities under County jurisdiction. For County roads within the City's Urban Growth Boundary, the County will use the City's adopted spacing standards[24].

Local Street Connectivity

Many of the existing local street networks, such as those in the downtown area, provide good connectivity with multiple options for travel in any direction. However, some of the newer residential neighborhoods have been developed with limited opportunities for movement into and out of the developments, with some neighborhoods funneling all traffic onto a single street. This type of street network results in out-of-direction travel for motorists and contributes to an imbalance of traffic volumes, which impacts residential frontage. This can result in the need for investments in wider roads, traffic signals and turn lanes that could otherwise be avoided.

By providing connectivity between neighborhoods, out-of-direction travel and vehicle miles traveled (VMT) can be reduced, accessibility between various travel modes can be enhanced and traffic levels can be balanced out between various streets. Additionally, public safety response time is reduced.

Some of these local connections can function in coordination with other street improvements to mitigate capacity deficiencies by better dispersing traffic. Several roadway connections will be needed within neighborhood areas to reduce out of direction travel for vehicles, pedestrians and bicyclists. This is most important in the areas where a significant amount of new development is possible.

Figure 8-1 shows the proposed Local Street Connectivity Plan for Silverton. In most cases, the connector alignments are not specific and are aimed at reducing potential neighborhood traffic impacts by better balancing traffic flows on neighborhood routes. The arrows shown in the figures represent potential connections and the general direction for the placement of the connection[25]. In each case, the specific alignments and design will be better determined as part of development review. The criteria used for providing connections is as follows:

- Every 300 feet, a grid for pedestrians and bicycles
- Every 500 feet, a grid for automobiles

[24] Marion County Rural Transportation System Plan, July 2005.
[25] Other local street connections may be required as the City conducts development review.

To protect existing neighborhoods from potential traffic impacts of extending stub end streets, connector roadways shall incorporate neighborhood traffic management into their design and construction. All stub streets shall have signs indicating the potential for future connectivity. Additionally, new development that constructs new streets, or street extensions, must provide a proposed street map that:

- Provides full street connections with spacing of no more than 530 feet between connections except where prevented by barriers
- Provides bike and pedestrian access ways in lieu of streets with spacing of no more than 330 feet except where prevented by barriers
- Limits use of cul-de-sacs and other closed-end street systems to situations where barriers prevent full street connections
- Includes no close-end street longer than 220 feet or having no more than 25 dwelling units
- Includes street cross-sections demonstrating dimensions of ROW improvements, with streets designed for posted or expected speed limits

The arrows shown on the local connectivity map, Figure 8-1, indicate priority connections only and represent future local and neighborhood routes.

Topography, railroads and environmental conditions, such as the Silver Creek, limit the level of connectivity in Silverton. Other stub end streets in the City's road network may become cul-de-sacs, extended cul-de-sacs or provide local connections. Pedestrian connections from the end of any stub end street that results in a cul-de-sac will be mandatory as future development occurs. The goal is to improve city connectivity for all modes of transportation.

Traffic Signal Spacing

Traffic signals that are spaced too closely on a corridor can result in poor operating conditions and safety issues due to the lack of adequate storage for vehicle queues. A minimum traffic signal spacing of 1,000-feet should be required for arterial and collector facilities outside of the Special Transportation Area (STA). Different signal spacing standards may be applied to lower classifications of roadways. ODOT identifies ½ mile as the desirable spacing of signalized intersections on regional and statewide highways but recognizes that shorter signal spacing may be appropriate due to a number of factors including existing road layout and land use patterns.

Functional Classification

The proposed functional classification map for streets in Silverton is shown in Figure 8-2. Any street not designated as an arterial, collector or neighborhood route is considered a local street. The functional classifications within the City are defined below.

Arterial Streets

Arterial streets serve to interconnect the City. These streets link major commercial, residential, industrial and institutional areas. Arterial streets are typically spaced about one mile apart to assure accessibility and reduce the incidence of traffic using collectors or local streets for through traffic in lieu of a well placed arterial street. The maximum interval for arterial spacing within the City shall be 3,000 feet. Access control is the key feature of an arterial route. Arterials are typically multiple miles in length.

Collector Streets

Collector streets provide both access and circulation within and between residential and commercial/industrial areas. Collectors differ from arterials in that they provide more of a citywide circulation function, do not require as extensive control of access (compared to arterials) and penetrate residential neighborhoods, distributing trips from the neighborhood and local street system. The maximum interval for collector roadways shall be 1,500 feet. Collectors are typically greater than 0.5 to 1.0 miles in length.

Neighborhood Routes

Neighborhood routes are usually long relative to local streets and provide connectivity to collectors or arterials. Because neighborhood routes have greater connectivity, they generally have more traffic than local streets and are used by residents in the area to get into and out of the neighborhood, but do not serve citywide/large area circulation. They are typically about a quarter to a half-mile in total length. Traffic from cul-de-sacs and other local streets may drain onto neighborhood routes to gain access to collectors or arterials. Because traffic needs are greater than a local street, certain measures should be considered to retain the neighborhood character and livability of these routes. Neighborhood traffic management measures are often appropriate (including devices such as speed humps, traffic circles and other devices - refer to later section in this chapter). However, it should **not** be construed that neighborhood routes automatically get speed humps or any other measures. While these routes have special needs, neighborhood traffic management is only one means of retaining neighborhood character and vitality.

Local Streets

Local streets have the sole function of providing access to immediate adjacent land. Service to "through traffic movement" on local streets is deliberately discouraged by design. All other city streets in Silverton not designated above as collector streets or neighborhood routes are considered to be local streets.

Criteria for Changes to Functional Classification

The criteria used to assess functional classification have two components: the extent of connectivity and the frequency of the facility type. Maps can be used to determine regional, city/district and neighborhood connections. The frequency or need for facilities of certain classifications is not routine or easy to package into a single criterion. While planning textbooks call for arterial spacing of a mile, collector spacing of a quarter to a half-mile, and neighborhood connections at an eighth to

a sixteenth of a mile, this does not form the only basis for defining functional classification.

Changes in land use, environmental issues or barriers, topographic constraints, and demand for facilities can change the frequency for routes of certain functional classifications. While spacing standards can be a guide, they must consider other features and potential long term uses in the area (some areas would not experience significant changes in demand, where others will). It is acceptable for the city to re-classify street functional designations to have different naming conventions, however, the general intent and purpose of the facility, whatever the name, should be consistent with regional, state and federal guidelines.

By planning an effective functional classification of Silverton streets, the City can manage public facilities pragmatically and cost effectively. These classifications do not mean that because a route is an arterial it is large and has lots of traffic. Nor do the definitions dictate that a local street should only be small with little traffic. Identification of connectivity does not dictate land use or demand for facilities. The demand for streets is directly related to the land use. The highest level connected streets have the greatest potential for higher traffic volumes, but do not necessarily have to have high volumes as an outcome, depending upon land uses in the area. Typically, a significant reason for high traffic volumes on surface streets at any point can be related to the level of land use intensity within a mile or two. Many arterials with the highest level of connectivity have only 35 to 65 percent "through traffic". Without the connectivity provided by arterials and collectors, the impact of traffic intruding into neighborhoods and local streets goes up substantially.

Functional Classification Changes in Silverton

The 2000 TSP established a functional classification for Silverton that included arterials, collectors, and neighborhood collectors. The proposed functional classification differs from the existing approved functional classification. Neighborhood routes were not defined in the existing functional classification. The classifications of several roadways within the study area have been revised. The key changes include increasing the number of arterial roadways to create a connected network that serves regional trips at key gateways into the City, maintaining and updating the collector system to reflect changing land uses, and providing neighborhood routes that serve clear connections from neighborhoods that feed into the collector and arterial network.

A revised functional classification map is illustrated in Figure 8-2. The recommended changes to the functional classification defined in the 2000 TSP are also summarized below.

- Monitor Road is upgraded from a collector to an arterial
- Hobart Road is upgraded from a collector to an arterial
- Pine Street is upgraded from a collector to an arterial
- James Street between Florida Drive and C Street changes from a neighborhood collector to a collector; the segment between Pine Street and North Water Street becomes an arterial
- North Water Street between James Street and C Street changes to an arterial street
- Brown Street is classified as a neighborhood route
- McClaine Street is upgraded from a neighborhood collector to an arterial
- Welch Street is classified as a neighborhood route
- Fairview Street is classified as a neighborhood route
- Main Street between Eureka Avenue and North Water Street is upgraded from a

neighborhood collector to an arterial

- 2nd Street between C Street and Oak Street is reclassified as a collector
- 2nd Street between Oak Street becomes a neighborhood route
- Steelhammer Road is upgraded to a collector
- Main Street between North Water Street and Steelhammer Road becomes a collector
- Jefferson Street between James Street and Mill Street becomes a neighborhood route
- Mill Street is added as a neighborhood route

City of Silverton
Transportation System Plan

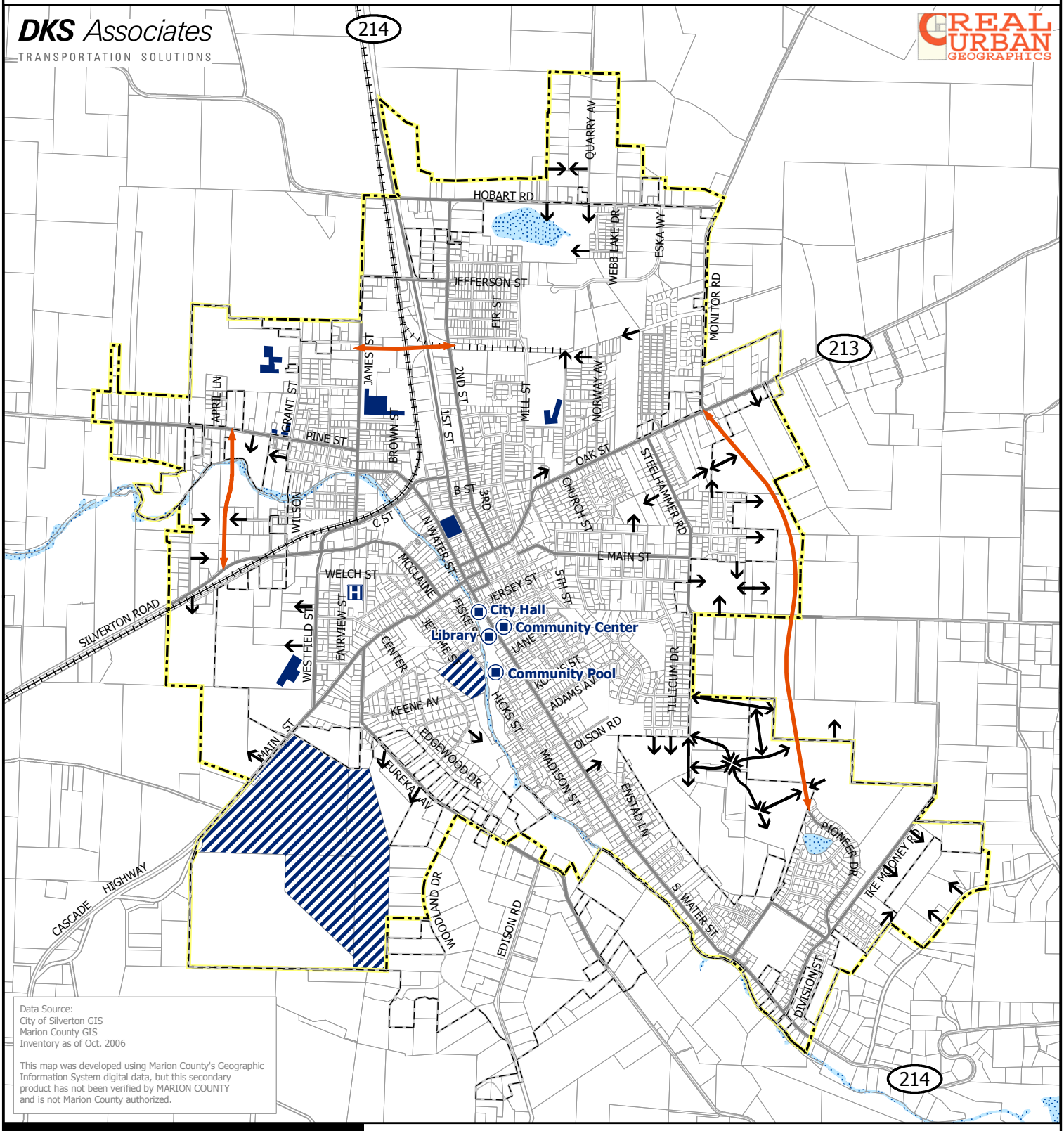


FIGURE 8-1

Local Street Connectivity

0 0.25 0.5 Miles

not to scale

Legend

- Local/Neighborhood Street Connection
- Proposed Collector
- Urban Growth Boundary
- City Limit
- Hospital
- Civic/Government
- School
- Water
- Park
- Major Street
- Local Street
- County Roads
- Railroad
- Abandoned

City of Silverton
Transportation System Plan

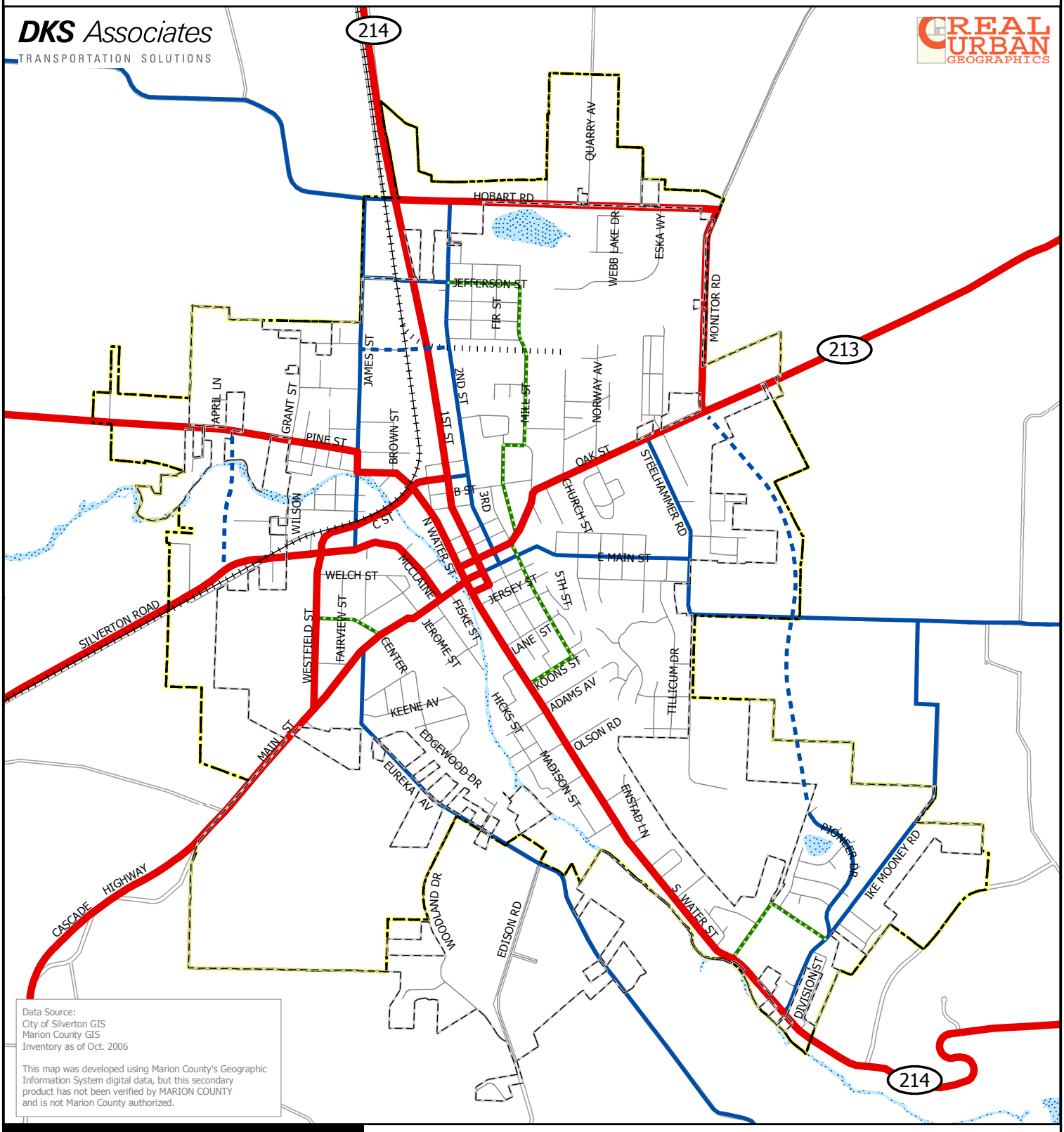


FIGURE 8-2

Functional Classification Map

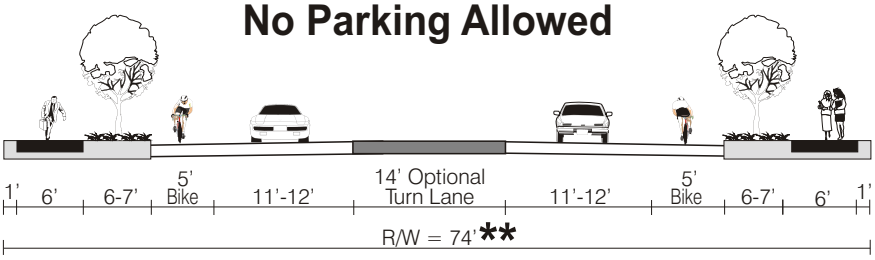
0 0.25 0.5 Miles

not to scale

Legend

- Arterial Street
- Collector Street
- Proposed Collector Street
- Neighborhood Collector
- Local Street
- County Roads
- City Limit
- Urban Growth Boundary
- Water
- Railroad
- Abandoned

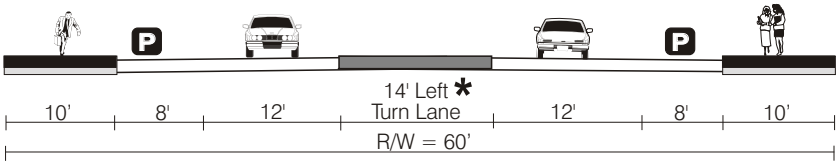
2/3 Lane Highway *
No Parking Allowed



*** ≤30 MPH Use 11' Travel Lane & 6.5' Planter Strip**
>30 MPH Use 12' Travel Lane & 5.5' Planter Strip

** For 2 Lane Section Use Minimum 34' Curb Width

2 Lane Downtown District (STA)
Designated Sections



* Remove Parking When Turn Lane Used

NOTE: Use 5' Building Setback for New Construction

Notes:

1. For new or re-constructed roadways.
2. Turn lane warrants should be reviewed using Highway Research Record No. 211, NCHRP Report No. 279 or other updated/superseding reference.
3. ODOT "Highway Design Manual" requirements supercede city standards.

LEGEND

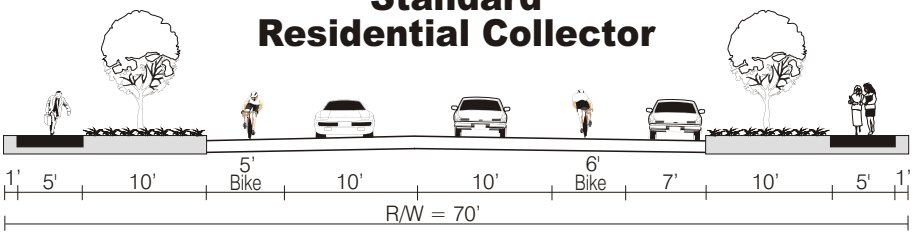
P - On-street Parking Lane (except at intersections)

DKS Associates
TRANSPORTATION SOLUTIONS

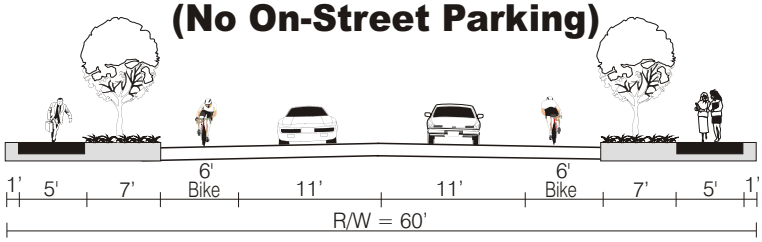
Figure 8-3

ARTERIAL STREETS
STREET CROSS SECTIONS

Standard Residential Collector



2 Lane Section*(3.)/Hillside*(1.)or Infill*(2.) (No On-Street Parking)

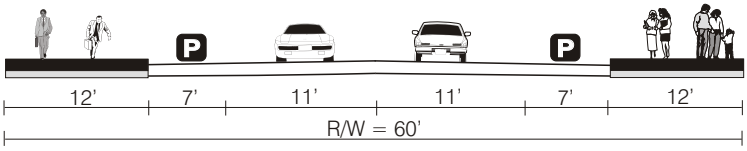


(1.) Cross Slopes ≥ 3.5H:1V for More than 400'

(2.) Infill Defined as > 80% of Lots Already Developed Within 500'

(3.) Row Must be 70' Within 100' of a Collector Intersection and 200' of Arterials, Plus 50' of ROW Taper

2 Lane Section (Downtown District Designated Sections)*



Collector Street Design Characteristics

Vehicle Lane Widths	*10 ft - 11ft*
On-Street Parking	*7 ft*
Bicycle Lanes (minimums)	*5 ft*
Sidewalks (minimums)	*5 ft*
Neighborhood Traffic Management (NTM)	*Under Special Conditions*
Turn Lanes	*When Warranted*
VPD Buildout	*>1500 but ≤4500*
Landscape Strips	*5.5 ft Min*

Notes:

1. For new or re-constructed roadways
2. Turn lane warrants should be reviewed using Highway Research Record No. 211, NCHRP Report No. 279 or other updated/superseding reference.

LEGEND

P - On-street Parking Lane (except at intersections)

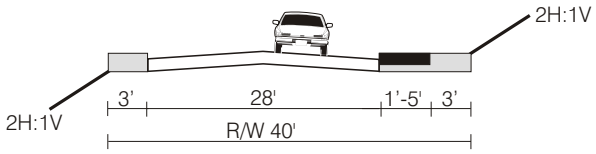
* - No Bike Lane Needed Unless Volume is Over 5,000 Per Day or Posted Speed is Greater than 25 mph.

DKS Associates
TRANSPORTATION SOLUTIONS

Figure 8-4

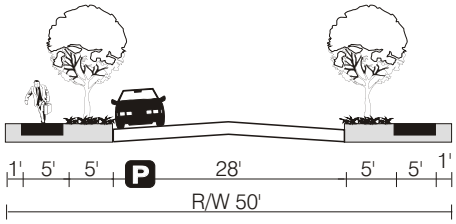
COLLECTOR STREETS STREET CROSS SECTIONS

Local Street/Hillside*



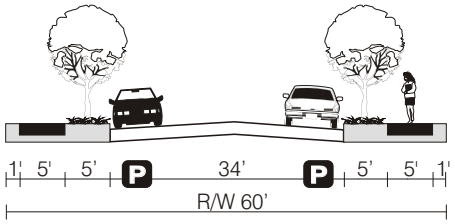
***Cross Slopes ≥3.5 H:IV for More than 300'**

Local Street/Low Volume*



≤300 vpd

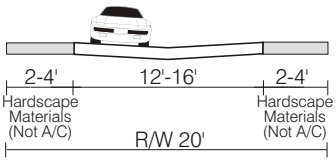
Local Street (On-Street Parking both sides)



>300 vpd, <1500 vpd

* - Not Multi-Family
- Not on Neighborhood Routes
- Subject to Review for Expected Traffic Volumes

Alley (No Parking)



Notes:

1. Selection of placement of sidewalk and planter specific to application. Cross sections show two choices for reference.
2. Width of curb is included in sidewalk or planter strip width when adjacent to street.
3. Samples show the desirable applications given number of lanes; minimum standards can be applied case by case.
4. Actual width of street and sidewalk area can be adjusted within R/W based on modal priorities and adjacent land use.

Local/Neighborhood Street Design Characteristics

Vehicle Lane Widths *(minimum widths)*	*10 ft*
On-Street Parking	*7 ft*
Sidewalks *(minimum width)*	*5 ft*
Landscape Strips	*Required Except for Hillside & Certain Infills*
Neighborhood Traffic Management	*Should not be necessary (under special conditions)*
Bike Lanes	*N/A*

LEGEND

P - On-street Parking Lane

<1500 vpd - Guide for Traffic Volume Per Day (does not require conversion of existing routes)

DKS Associates
TRANSPORTATION SOLUTIONS

Figure 8-5

LOCAL/NEIGHBORHOOD STREET CROSS SECTIONS

City of Silverton
Transportation System Plan

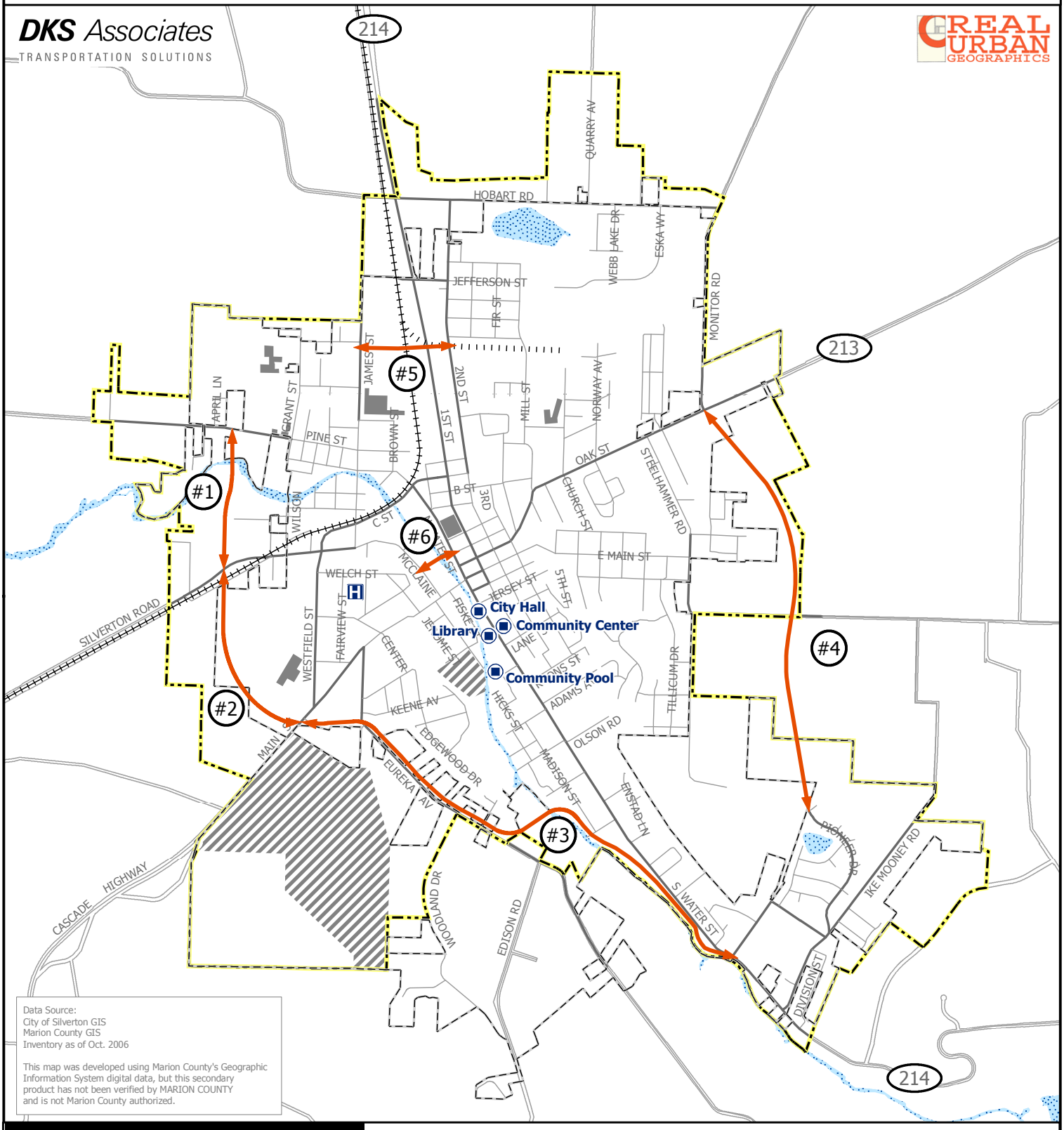


FIGURE 8-6

Potential Collector Roadways

0 0.25 0.5 Miles

not to scale

Legend

- Proposed Roadway Connections
- Civic/Government
- School
- Water
- Park
- Major Street
- Local Street
- Urban Growth Boundary
- City Limit
- Railroad
- Abandoned

City of Silverton
Transportation System Plan

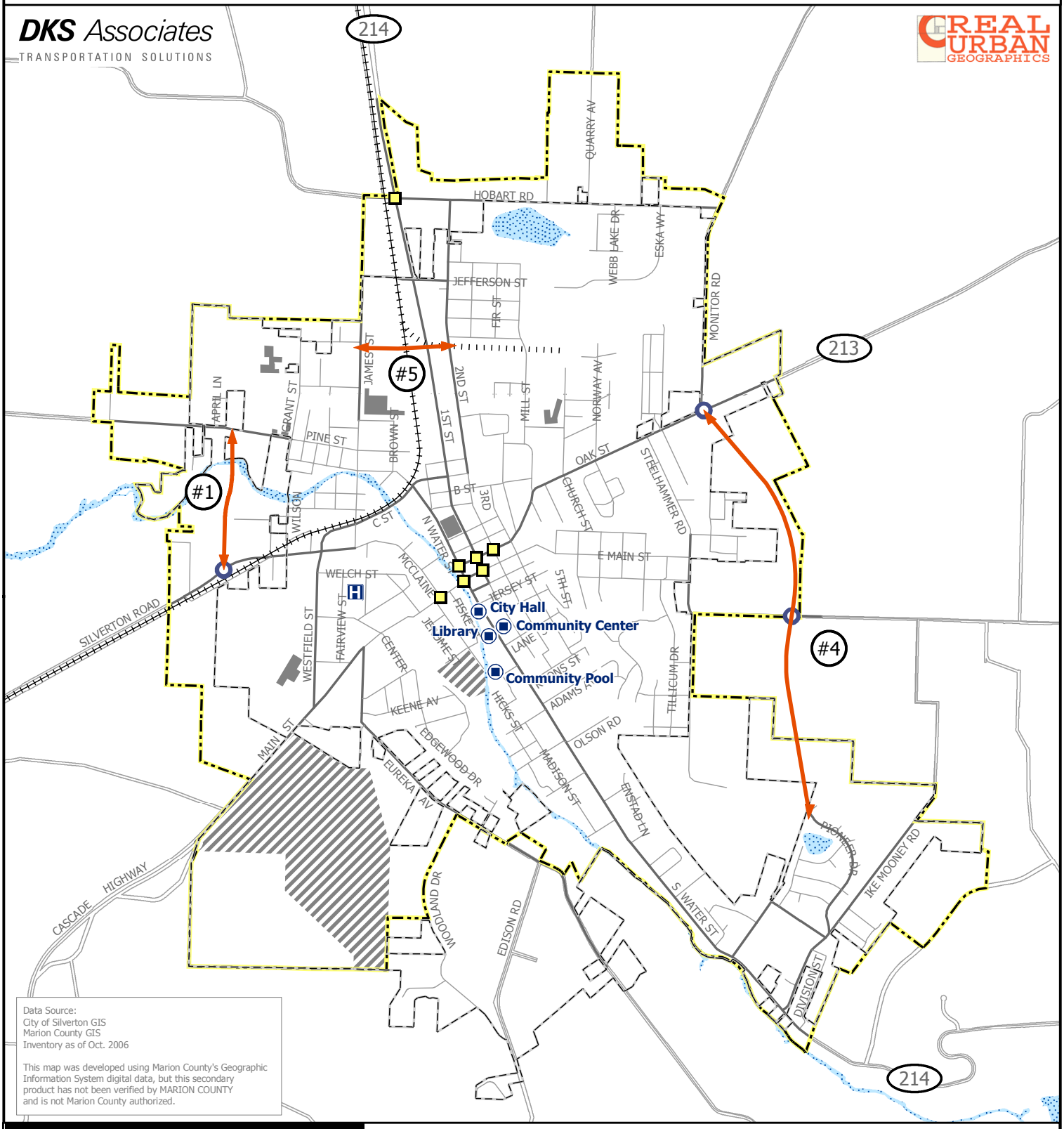


FIGURE 8-7

Motor Vehicle Master Plan

0 0.25 0.5 Miles

not to scale

Legend

- Proposed Roadway Connections
- Proposed Roundabout
- Proposed Signal
- Civic/Government
- School
- Park
- Major Street
- Local Street
- Urban Growth Boundary
- City Limit
- Water
- Railroad
- Abandoned

CHAPTER 9 : OTHER MODES

This chapter summarizes existing and future rail, air, water and pipeline needs in the City of Silverton. While auto, transit, bicycle and pedestrian transportation modes have a more significant effect on the quality of life in Silverton, other modes of transportation must also be considered and addressed. Future needs for rail, air, marine and pipeline infrastructure are identified by their providers and are summarized below.

Rail

One rail line operates through the City of Silverton. The Willamette Valley Railroad currently provides branch rail line service for the shipment of commodities between Salem and Woodburn. The freight line operates two trains per day through the study area with speeds of 10 miles per hour or less. The following existing and forecasted needs have been identified within the City of Silverton:

Rail/Highway Grade Crossing Improvements- Three crossing have been identified for crossing improvements. The following crossings are currently controlled by stop signs and should be upgraded to crossing gates, flashers and pedestrian path features:

- 1st Street (Hwy 214)/Hobart Road
- 1st Street (Hwy 214)/Jefferson Street
- James Street/C Street

Rail Facility Upgrade- The existing rail facility is only used for freight rail service, in the future passenger rail (tourist-oriented) and/or commuter rail options may be introduced. The existing rail system will require facility improvements to accommodate these additional rail uses, as well as further coordination with the Oregon Department of Transportation.

Future Potential Rail Station- If commuter and/or passenger rail is introduced within the City of Silverton a centrally located rail station will be required. A potential, future station location has been identified on the northeast corner of C Street/Water Street. Future development in that area should not preclude this location as a potential station site.

Air

One private airfield facility is located northwest of Silverton. There are currently no existing or planned public airports within the Silverton TSP study area. Passenger service in Silverton is provided via the McNary Field Airport, approximately 20 miles west of Silverton in Salem and at the Portland International Airport, approximately 60 miles north of Silverton. No policies or recommendations in this area of transportation are needed for the City of Silverton within the planning horizon.

Water

No waterways are used for commercial transportation purposes within the Silverton TSP study area. Silver Creek and surrounding park areas and trails are used for recreation. No plans were identified for waterway infrastructure expansion. As such, no policies or recommendations in this area of transportation are provided for Silverton.

Pipeline

All existing pipelines within and passing through Silverton are outside of the maintenance responsibilities of the City. As such, no policies or recommendations in this area of transportation are provided for Silverton.

CHAPTER 10 : FINANCING AND IMPLEMENTATION

This chapter outlines the funding sources that can be used to meet the needs of the future transportation system. The costs for the modal elements of the transportation system plan are outlined and compared to the potential revenue sources. Options are discussed regarding how to balance costs of the plan and revenues.

CURRENT FUNDING STRATEGIES

Transportation funding is commonly viewed as a user fee system where the users of the system pay for infrastructure through motor vehicle fees (such as gas tax and registration fees) or transit fares. However, a greater share of motor vehicle user fees goes to road maintenance, operation and preservation of the system rather than construction of new system capacity. Much of what the public views as new construction is commonly funded (partially or fully) through local improvement districts (LIDs) and frontage or off-site improvements required as mitigation for land development.

The City of Silverton utilizes a number of mechanisms to fund construction of its transportation infrastructure as described below. The first two sources collect revenue each year that is used to repair street facilities or construct new streets, with some restrictions on the type and location of projects. The last program is different in that it does not generate on-going revenue, but is a means to acquire needed property and improvements (Exaction) as development occurs.

State Fuel Tax and Vehicle License Fee

The State of Oregon Highway Trust Fund collects various taxes and fees on fuel, vehicle licenses, and permits. A portion is paid to cities annually on a per capita basis. By statute, the money may be used for any road-related purpose. Silverton currently uses these funds for street operating and maintenance needs.

Oregon gas taxes are collected as a fixed amount per gallon of gasoline served. The gas tax in Oregon has not increased since 1992 (currently 24 cents per gallon.) The tax does not vary with gas prices changes, nor is there an adjustment for inflation. The lack of change since 1992 means that the net revenue collected has gradually eroded as the cost to construct and repair transportation systems has increased. Fuel efficiency in new vehicles has further reduced the revenue stream.

Oregon vehicle registration fees are collected as a fixed amount at the time a vehicle is registered with the Department of Motor Vehicles. Vehicle registration fees in Oregon have recently increased from $15 per vehicle per year to $27 per vehicle per year for passenger cars, with similar increases for other vehicle types. There is no adjustment for inflation tied to vehicle registration fees.

Silverton receives about $350,000 per year in gas tax and vehicle license fee revenue for streets, bikeways and sidewalks. Essentially all of these funds are spent on surface maintenance of local streets and administrative costs. Because there is no index for cost inflation, this revenue level will increase only proportionate with the city's population growth relative to Marion County growth.

System Development Charge

The System Development Charge (SDC) for streets is used as a funding source for capacity adding projects for the transportation system. The SDC is collected from new development based on the proposed land use and size. SDC fees are based on each land use's potential vehicle trip generation. The current SDC rate was set in 1999 and updated in 2005. SDCs are based on the number of Equivalent Length New Daily Trips (ELNDT) estimated for each development. The current SDC rate per PM peak hour trip is $3,535, which includes the SDC reimbursement fee and the SDC improvement fee.

Based on the Action Plans identified in this TSP, the list of capital improvement projects eligible for SDC funding is significantly modified. The revised SDC eligible cost for intersection improvements, roadway reconstruction, pedestrian improvements, and bicycle improvements totals $6,396,992 (this assumes the SDC calculation methodology utilizing 29% SDC share is maintained). The estimated growth in vehicle trips in the 23 year horizon of the TSP is 2,780 pm peak hour trips. Based on these land use forecasts[31], Silverton's SDC rate would be revised to $2,735. The total SDC fees collected over the next 23 years would be approximately $7,603,300.

ODOT Fund Exchange

Silverton has received at least $95,000 annually from ODOT's Fund Exchange. It is anticipated that this money will continue to be a revenue source for operations and maintenance for the City's transportation system.

Exactions

These are improvements that are obtained when development is permitted. Developers are required to improve their frontage and, in some cases, provide off site improvements depending upon their level of traffic generation and the impact to the transportation system. Off-site mitigation measures can include, but are not limited to, Master Plan projects identified in the TSP.

Urban Renewal Funds

An Urban Renewal District (URD) is a tax-funded district within the City. The URD is funded with the incremental increases in property taxes that result from construction of applicable improvements. This type of tax increment financing has been used in Oregon since 1960. Uses of the funding include, but are not limited to, transportation. However, for the purposes of the transportation system plan for the City of Silverton, it is assumed that the future URD funds will be used to implement the Downtown Silverton Improvement Plan[32] and funds will not be available for other transportation system improvements. The estimated amount of urban renewal funds is $100,000 annually, which corresponds to $2.3 million over the 23 year planning horizon. These funds can be used to construct projects located in the downtown area.

[31] This revenue estimate should be refined as more specific development data becomes available.
[32] Silverton Downtown Master Plan, June 2007.

Grants and Donations

Silverton has received grants and donations to fund operations of the Silver Trolley, as well as to construct bicycle and pedestrian improvements. These fund sources include ODOT, Salem Area Mass Transit, the Department of Energy, and private donations. However, these grants and donations are not reliable, renewable funding sources and were not assumed to continue for developing funding strategies in this plan.

Summary

Table 10-1 summarizes the current renewable funding sources, including recent annual revenues and the projected revenues through the planning horizon year 2030. Assuming the renewable funding sources outlined above, the City of Silverton will collect approximately $461,100 for transportation operations and maintenance and $430,578 for capital improvements each year. This revenue will be generated from the state (fuel taxes and license fees), the Urban Renewal Fund, System Development Charges, and other revenue sources. Total revenues to be collected over 23 years between 2007 and 2030 would be $20.5 million with current funding sources and projected population and employment growth.

Table 10-1: Summary of Current Revenues for Transportation

Funding Category	Funding Allocation	Estimated Revenues Through 2030	Annual Amount
New Development (not SDC)	Operations and Maintenance	$143,000	$6,200
State Fuel Apportionment & Vehicle License Fee	Operations and Maintenance	$8,406,000	$365,500
ODOT Fund Exchange	Operations and Maintenance	$2,056,000	$89,400
Urban Renewal Fund	Capital Improvements	$2,300,000	$100,000
System Development Charge	Capital Improvements	$7,603,300	$330,578
	Total O&M Revenues	**$10,605,000**	**$461,100**
	Total Capital Revenues	**$9,903,300**	**$430,578**

Note: The annual amount indicates average annual totals over the last four years.

Source: City of Silverton, Adopted Budget, Fiscal Years 2003-2004 through 2006-2007

PROJECTS AND PROGRAMS

This section presents the recommended projects and programs developed for the City of Silverton to serve local travel for the coming 23 years. The Pedestrian, Bicycle, Transit, and Motor Vehicle projects were identified in the Action Plan for each mode, and represent those projects that have the highest short-term need for implementation to satisfy performance standards or other policies established for the Silverton Transportation System Plan. The costs for the remaining projects noted in the modal Master Plans are identified, but these have not been included in the funding needs analysis for the City because the Action Plan is limited to projects most likely to be funded within the planning horizon. Other projects on the Master Plan list require additional funding, and they are

expected to be built beyond the 23 year horizon or completed with development exactions or other unanticipated funding sources.

Project Cost Estimates

Cost estimates (general planning level) were developed for the projects identified in the motor vehicle, bicycle, transit, and pedestrian elements. Cost estimates from the existing City planned projects were used in this study, if they were determined to be reasonable. Other projects were estimated using general unit costs for transportation improvements, but do not reflect the unique project elements that can significantly add to project costs[33]. Development of more detailed project costs can be prepared in the future with more refined financial analysis. Since many of the projects overlap elements of various modes, the costs were developed at a project level incorporating all modes, as appropriate. It may be desirable to break project mode elements out separately, however, in most cases, there are greater cost efficiencies of undertaking a combined, overall project. Each of these project costs will need further refinement to detail right-of-way requirements and costs associated with special design details as projects are pursued.

All cost estimates are based on 2007 dollars. Historical construction costs price index has increased by 2.5 to 2.75 percent per year according to Engineering News Record research[34] . Construction costs have increased 100 percent in the 20 years from 1979 to 1999.

Other Transportation Programs and Services

In addition to the physical system improvements identified in the previous section, the transportation facilities will require on-going operation and maintenance improvements across a variety of areas. These other transportation programs are recommended to respond to the specific policies and needs in maintaining roadway pavement quality, allocations for implementing neighborhood traffic management, and on-going update and support of related planning documents.

- **Roadway Maintenance:** The annual cost of maintaining the streets and sidewalks within Silverton was estimated at $573,000, a portion of which is paid for by gas tax revenues from the state. This does not include road maintenance responsibilities on the arterial streets that are serviced by Marion County or ODOT. Over 20 years, the City's road maintenance responsibility accounts for $13.2 million. The actual maintenance costs could vary from this estimate.
- **Transit Operations:** The Action Plan for transit service includes the addition of a city operated commuter service to Salem, which would require the purchase of an additional transit vehicle and operating and maintenance costs. The annual cost of providing this service, in combination with improving the Silver Trolley service, was estimated at $150,000 per year. The actual costs could vary from this estimate.
- **Gravel Street Paving:** The annual cost of paving gravel streets in Silverton was estimated at $58,000 per year. This is based on paving the streets that the City has identified as high

[33] General plan level cost estimates do not reflect specific project construction costs, but represent an average estimate. Further preliminary engineering evaluation is required to determine impacts to right-of-way, environmental mitigation and/or utilities. This level of cost-estimating is typically completed during project development and design. Experience has shown that individual projects costs can increase by 25 to 75 percent as a result of the above factors.

[34] Engineering News Record Construction Cost Index as reported for the past ten years for 20 cities around the United States. Reference: http://www.enr.com/features/conEco/costIndexes/constIndexHist.asp

priority gravel roadways for maintenance. Actual costs could vary from this estimate based on drainage needs or other issues.

- **Roadway Reconstruction:** The City's Capital Improvement Plan (CIP) includes a series of roadway reconstruction projects for collector or arterial roadways with failing bases or that are in need of urbanization. The total cost of completing these reconstruction projects was estimated at $8.452 million, a portion of which is SDC eligible. The actual reconstruction costs could vary from this estimate.

Silverton Costs for TSP Action Plans

The costs outlined in the Transportation System Plan to implement the Action Plans for Streets, Transit, Bicycles, and Pedestrians total $24.2 million, and several other recommended transportation operations and maintenance programs would add $13.5 million for a total cost over 23 years of $37.6 million. This total exceeds the expected 23-year revenue estimate of $20.5 million (see Table 10-1) by approximately $17.1 million. Alternative solutions to address this funding deficit for the Action Plan projects are discussed in the next section.

Table 10-2: Silverton Transportation Action Plans Costs over 23 years (2007 Dollars)

Transportation Element	Approximate Cost ($1,000)
System Improvement Projects (Action Plans projects to be funded by City)	
Motor Vehicle	$10,085
Roadway Reconstruction	$8,452
Bicycle	$1,578
Transit	$370
Pedestrian	$3,679
Total Capital Projects	**$24,164**
Operations and Maintenance Programs and Services	
Roadway Maintenance ($378,000 per year)	$8,693
Local Transit Operations ($150,000/yr)	$3,430
Gravel Street Paving ($58,000/yr)	$1,334
Total Operations and Maintenance Programs	**$13,457**
23 YEAR TOTAL in 2007 Dollars	**$37,621**

NEW FUNDING SOURCES AND OPPORTUNITIES

The new transportation improvement projects and action plans will require funding beyond the levels currently collected by the City. There are several potential funding sources for transportation improvements. This section summarizes several funding options available for transportation improvements. These are sources that have been used in the past by agencies in Oregon. In most cases, these funding sources, when used collectively, are sufficient to fund transportation improvements for local communities. Due to the complexity of today's transportation projects, it is necessary to seek several avenues of funding projects. Unique or hybrid funding of projects generally will include these funding sources combined in a new package.

Because of the need to gain public approval for transportation funding, it is important to develop a consensus in the community that supports needed transportation improvements. That is the value of the Transportation System Plan. In most communities where time is taken to build a consensus regarding a transportation plan, funding sources can be developed to meet the needs of the community.

Transportation program funding options range from local taxes, assessments, and charges to state and federal appropriations, grants, and loans. All of these resources can be constrained based on a variety of factors, including the willingness of local leadership and the electorate to burden citizens and businesses; the availability of local funds to be dedicated or diverted to transportation issues from other competing City programs; and the availability and competitiveness of state and federal funds. Nonetheless, it is important for the City to consider all of its options and understand where its power may exist to provide and enhance funding for its Transportation programs.

The following funding sources have been used by cities to fund the capital and maintenance aspects of their transportation programs. There may be means to begin to or further utilize these sources, as described below, to address new needs identified in the Transportation System Plan.

General Fund Revenues

At the discretion of the City Council, the City can allocate General Fund revenues to pay for its Transportation program. General Fund revenues primarily include property taxes, use taxes, and any other miscellaneous taxes and fees imposed by the City. This allocation is completed as a part of the City's annual budget process, but the funding potential of this approach is constrained by competing community priorities set by the City Council. General Fund resources can fund any aspect of the program, from capital improvements to operations, maintenance, and administration. Additional revenues available from this source to fund new aspects of the Transportation program are only available to the extent that either General Fund revenues are increased or City Council directs and diverts funding from other City programs.

Voter-Approved Local Gas Tax

Communities such as Sandy, Woodburn, and Tillamook have adopted local gas taxes by public vote. In Sandy, the tax is one cent per gallon, paid to the city monthly by distributors of fuel. The process for presenting such a tax to voters will need to be consistent with Oregon State law as well as the laws of the City of Silverton.

Transportation Utility Fee Revenue

A number of Oregon cities supplement their street funds with street utility fees. Local cities with adopted street utility fees include Hubbard, Milwaukie, Wilsonville and Tualatin. Establishing user fees to fund applicable transportation activities and/or capital construction ensures that those who create the demand for service pay for it proportionate to their use. The street utility fees are recurring monthly or bi-monthly charges that are paid by all residential, commercial, industrial, and institutional users. The fees are charged proportionate with the amount of traffic generated, so a retail commercial user pays a higher rate than a residential user. Typically, there are provisions for reduced fees for those that can demonstrate they use less than the average rate implies, for example, a resident that does not own an automobile or truck.

From a system health perspective, forming a utility fee also helps to support the ongoing viability of

the program by establishing a source of reliable, dedicated funding for that specific function. Fee revenues can be used to secure revenue bond debt used to finance capital construction. A transportation utility can be formed by Council action and does not require a public vote.

Based on average utility fee rates, a preliminary estimate for transportation utility fee revenue in Silverton ranges from $10 million to $13.5 million over the next 23 years; this corresponds to approximately $43 to $54 per person per year. A specific fee study would be required to establish a fee program for the City of Silverton to determine specific allocations to its residents and merchants.

Exactions

Exactions are improvements that are obtained when development is permitted. Developers are required to improve their frontage and, in some cases, provide off site improvements depending upon their level of traffic generation and the impact to the transportation system. The City of Silverton utilizes exactions today, but the Development Code may need some revision to enforce the TSP Action Plan for development exactions. Based upon review of the TSP Action Plan projects, an assessment was made of potential exactions for frontage improvements where projects were adjacent to vacant parcels or parcels with redevelopment potential. This assessment found that $2.2 million of the Action Plan project costs could be funded through development exactions.

System Development Charge (SDC) Update Study

The SDC revenue assumptions were calculated with an assumed 29% share for future growth (consistent with the existing SDC rate calculation methodology based on population growth). For this TSP update, new population forecasts were developed and it is recommended that an SDC update study be conducted to re-calculate the growth share and/or update calculation methodologies. Based on preliminary calculations from population forecasts, a reasonable estimate for the new SDC growth share could increase from 29% to 35% and generate additional revenue for capital improvement projects.

Other Funding Sources

Local Improvement District Assessment Revenue

The City may set up Local Improvement Districts (LIDs) to fund specific capital improvement projects within defined geographic areas, or zones of benefit. LIDs impose assessments on properties within its boundaries. LIDs may not fund ongoing maintenance costs. They require separate accounting, and the assessments collected may only be spent on capital projects within the geographic area. Citizens representing 33% of the assessment can terminate a LID and overturn the planned projects so projects and costs of a LID must meet with broad approval of those within the boundaries of the LID.

Direct Appropriations

The City can seek direct appropriations from the State Legislature and / or U.S. Congress for transportation capital improvements. There may be projects identified within this Plan for which the City may want to pursue these special, one-time appropriations.

Special Assessments

A variety of special assessments are available in Oregon to defray costs of sidewalks, curbs, gutters, street lighting, parking and CBD or commercial zone transportation improvements. These assessments would likely fall within the Measure 50 limitations. A Portland area example would be the Westside LRT where the local share of funding was voter approved as an addition to property tax.

Debt Financing

Debt financing can also be used to mitigate the immediate impacts of significant capital improvement projects and spread costs over the useful life of a project. Though interest costs are incurred, the use of debt financing can serve not only as a practical means of funding major improvements, but is also viewed as an equitable funding strategy, spreading the burden of repayment over existing and future customers who will benefit from the projects. The obvious caution in relying on debt service is that a funding source must still be identified to fulfill annual repayment obligations.

Voter-Approved General Obligation Bond Proceeds

Subject to voter approval, the City can issue General Obligation (G.O.) bonds to debt finance capital improvement projects. G.O. bonds are backed by the increased taxing authority of the City, and the annual principal and interest repayment is funded through a new, voter-approved assessment on property City-wide (a property tax increase). Depending on the critical nature of any projects identified in the Transportation Plan, and the willingness of the electorate to accept increased taxation for transportation improvements, voter-approved G.O. bonds may be a feasible funding option for specific projects. Proceeds may not be used for ongoing maintenance.

Revenue Bonds

Revenue bonds are debt instruments secured by rate revenue. In order for the City to issue revenue bonds for transportation projects, it would need to identify a stable source of ongoing rate funding. Interest costs for revenue bonds are slightly higher than for general obligation bonds, due to the perceived stability offered by the "full faith and credit" of a jurisdiction.

Recommendations for New Transportation Funds

The City shall consider establishing a transportation utility fee as the backbone of its operations and maintenance funding approach. Street utility fees provide a stable source of dedicated revenue useable for transportation system operations and maintenance and/or capital construction. Rate revenues also secure revenue bond debt if used to finance capital improvements. Transportation utilities will be formed by Council action, and billed through the City utility billing system (e.g. water bills).

The City should also review the Development Code to allow development exactions to fund TSP projects (Action Plan or Master Plan). In addition, the City shall actively pursue grant and other special program funding in order to mitigate the costs to its citizens of transportation capital construction.

A transportation utility fee and the enforcement of development exactions could generate approximately $17.1 million over the next 23 years, as shown in Table 10-3. These additional funds are expected to generate sufficient revenues to fully fund the Action Plan projects and maintenance programs.

Table 10-3: Recommended New Funding Sources for Transportation Programs

Transportation Funding Source	Estimated Revenue ($1,000)
Transportation Utility Fee*	$13,500
Development Exactions	$2,200
SDC Update-Revised Growth Share (35%)	$1,360
20 YEAR TOTAL in 2004 Dollars	**$17,100**

Notes: * Assumes utility fee corresponding to $54 per capita per year (a typical single family household may be charged approximately $7 per month).