Scholls Ferry Road Conceptual Design Plan

Technical Memorandum – Multi-Modal Examples

Prepared for

Multnomah County
1600 SE 190th Avenue
Portland, OR 97233

December 2008

CITATION

This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), local government, and State of Oregon funds.

The contents of this document do not necessarily reflect views or policies of the State of Oregon.

Parametrix. 2008. Scholls Ferry Road Conceptual Design Plan
Technical Memorandum – Multi-Modal Examples.
Prepared by Parametrix, Portland, Oregon. December 2008.

CERTIFICATION

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal, as a professional engineer licensed to practice as such, is affixed below.

_____

Prepared by Shelley Oylear

_____

Checked by Anne Sylvester

_____

Approved by Brian Bierwagen

TABLE OF CONTENTS

ACRONYMS

MUTCD	Manual of Uniform Traffic Control Devices
Sharrow	Pavement marking illustrating that a street is intended for shared bicycle and vehicle use

1. INTRODUCTION

The Scholls Ferry Road Conceptual Design Plan Project seeks to identify bicycle and pedestrian improvements along the Scholls Ferry corridor from the Sunset Highway south to the Washington County line. This technical memorandum will present potential options for providing bike and/or pedestrian facilities given the existing policy and physical constraints and opportunities in the corridor.

Scholls Ferry Road is classified as a minor arterial in urban unincorporated Multnomah County and connects Skyline Boulevard and the Sunset Highway with the Raleigh Hills town center in Washington County. The Multnomah County Transportation System Plan calls for multi-modal facilities along minor arterials, however, physical constraints in the Scholls Ferry corridor could make the implementation of the standard minor arterial roadway section unreasonable. Treatment options for the roadway need to balance the vehicular capacity requirements along Scholls Ferry Road with the needs of bicyclists and pedestrians.

2. VARIETY OF TREATMENTS

Arterials within the urban area are required to accommodate all travel modes. How the different travel modes are best accommodated is determined by considering many factors including the needs of specific users, existing physical constraints, and cost effectiveness. The following are typical facilities to be considered for Scholls Ferry Road.

2.1 STRIPED TRAVEL LANES

The striped travel lanes can vary from 10- to 14-feet. Studies have shown that as travel speeds decrease, the width of a travel lane has less impact on lane capacity. For safety, a travel lane striped at 11 or 12 feet is effective, while wider lanes may be needed to accommodate freight traffic or road curvature to reduce tracking into adjacent lanes.

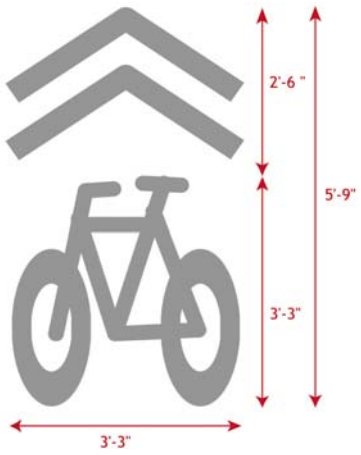
2.2 WIDE OUTSIDE LANE

A wide outside lane is typically larger than a standard lane and includes a paved travel lane with or without sideline striping. These lanes can be as wide as 14- to 15-feet. The striping is not used specifically to identify a bicycle lane, rather it serves to alert motorists to the edge of the travel lane (e.g., "fog line"). Often these roadways may be adequate and safe for bicycle travel with minimal signing and striping.

2.3 SHARED LANE MARKINGS ("SHARROWS")

Some communities use high-visibility pavement markings to delineate specifically where bicyclists should operate within the travel lane. These markings, known as shared lane markings or "sharrows," are often used on streets where dedicated bicycle lanes are desirable, but are not possible due to physical or other constraints. Sharrows are placed strategically in the travel lane to alert motorists to the presence of bicycle traffic, while also encouraging cyclists to ride at an appropriate distance from the edge of the roadway or the "door zone" of adjacent parked cars. As with bicycle lanes, sharrows clearly marks space for bicyclists and have been shown to draw riders off of adjacent sidewalks and onto the roadway, a desirable outcome given the inherent dangers of sidewalk riding. The arrow reinforces the correct direction of travel, an issue of great importance for bicycling safety. Placed in a linear pattern along a corridor (typically every 100-200 feet), sharrows also encourage cyclists to ride in a straight line so their movements are predictable to motorists. Sharrows made of thermoplastic tend to last longer than paint. The sharrow has been an experimental marking but has been approved for inclusion in the next edition of the Manual of Uniform Traffic Control Devices (MUTCD).

The shared-use arrow was developed with the intention of addressing the deficiencies of wide outside lanes mentioned above. Furthermore, for situations in which sufficient pavement width exists to choose between striping a bicycle lane or leaving a wide outside lane, the shared-use arrow may offer a third option, "bridging the gap" between the two existing treatments.



2.4 PAVED SHOULDER

A paved shoulder is a wider, paved outside travel lane with striping 3- to 6-feet from the edge of pavement. Parking along the shoulder may or may not be allowed along. Shoulders are an acceptable facility for conveying bicyclists, especially on low traffic roadways.

2.5 BICYCLE LANE

A bike lane is a 5- to 6-foot wide portion of the paved roadway that is designated for the preferential or exclusive use of bicyclists by striping, signing and pavement marking. Bike lanes convey bicyclists in the same direction as the vehicles in the adjacent travel lane.

2.6 SHARED PATH

A multi-use path is a route, separated from other roads by a barrier or open space that is designed to accommodate a mix of non-automotive users (e.g. walkers, runners, strollers, wheelchair users, roller skaters, and bicyclists). These paths are usually 10 to 12-feet wide for two way traffic, and 8 to 10 feet for one-way travel, and are appropriate in corridors where driveways are less frequent to reduce potential conflicts with traffic. A physical barrier can enhance the sense of security for users, especially children and the hearing and sight impaired, and adds comfort along higher speed roadways. A shared path with a barrier can be at the same grade as the roadway reducing the costs that curb and gutters generally add to road improvement projects. Because of the space is shared between multiple users, potential conflicts can occur between users if there is insufficient space or great difference in desired travel speeds.

2.7 SIDEWALKS

Sidewalks are usually between 5- and 8-feet in width. They are typically located along roadways and are separated from vehicle traffic by a curb. Sidewalks are more comfortable for users if there is a buffer from traffic with a planting strip, parking or a bike lane. The use of sidewalks as bicycle facilities is generally discouraged because cycling on sidewalks can present safety conflicts to both cyclists and pedestrians.

2.8 ELEVATED WALKWAY "BOARDWALK"

In some situations an elevated walkway or boardwalk may be an appropriate treatment option as an alternative to a concrete sidewalk. An elevated sidewalk supported by a variety of footings options with wooden, plastic, or concrete decking material provides flexible design to best suit the prevailing conditions. Boardwalks are often used in areas with sensitive environments, such as wetlands or slopes. Boardwalks are suitable for pedestrians, but are less comfortable for bicyclists and rollerbladers because of the noise and vibration from surfacing materials. Installation is more complicated and typically has a higher cost. Maintenance requirements depend greatly on the materials used. A boardwalk also presents an option for a pervious surface to reduce stormwater runoff impacts.

2.9 RAISED BIKE LANE

Raised bike lanes incorporate the convenience of riding on the street with some physical separation, achieved with a mountable curb. The mountable curb lets motorists know that they are straying into the bike lane when they feel the slight bump created by the curb; it

allows cyclists to enter or leave the bike lane to turn left, or overtake another cyclist; and it allows drivers to cross the bike lane to turn right.

The mountable curb should have a 4:1 or flatter slope, with no lip, so a bicycle tire is not caught during crossing maneuvers. The raised bike lane drains to the roadway and not to the curb or sidewalk; requiring that drainage grates be installed in the travel lanes. The raised bike lane is dropped prior to intersections, where the roadway elevation is uniform.

Raised bike lanes cost more to construct, as the travel lanes and bike lanes must be paved separately, and a narrow paving machine is required for paving the bike lane. The additional construction costs are mitigated by reduced long-term maintenance costs, as the bike lane portion receives less wear and tear than the travel lanes. Additionally; the bike lane accumulates less debris requiring less frequent sweeping; and the bike lane stripe doesn't need frequent repainting, especially if a concrete curb is placed between asphalt travel lanes and asphalt bike lanes (this also increases the visibility of the separation). Raised bike lanes are otherwise designed, marked and operated as conventional at-grade bike lanes. Adjacent to a curb and sidewalk, a barrier curb separates the raised bike lane from the sidewalk; the curb can be lower than conventional height, to avoid elevating the sidewalk more than necessary. Bicyclists proceed at signalized intersections as they would in an at-grade, striped bike lane, and make left turns by leaving the bike lane and positioning themselves correctly in the roadway.

3. MULTI-MODAL IMPROVEMENT OPTIONS

3.1 SUMMARY OF EXISTING CONDITIONS

Scholls Ferry Road is classified as a minor arterial. The adopted County roadway section for an urban minor arterial requires a right of way width of 89 feet and improvement width of 70 feet, which includes two travel lanes, a center turn lane, bikes lanes, planter strips and sidewalks. There is insufficient existing right of way and buildable width to provide this cross-section. The character of the roadway and land uses are unlike a typical urban arterial and more rural in roadway character and suburban in land use. The standard section for a rural arterial requires 60 feet of right of way and an improvement width of 36 feet, which includes two travel lanes and paved shoulder. This section is more consistent with the available right-of-way and character of the corridor. However, it does not adequately address the needs to accommodate bicyclists and pedestrians along the corridor and to convey them safely to connecting facilities. The minor arterial and existing roadway sections are illustrated in the attached tables.

The available buildable width along Scholls Ferry Road for the length of the study area is approximately 50 feet. There is a 750-foot segment within the full 6,550-foot study corridor where 50 feet of width is not available. The available width in this segment is closer to 40 or 42 feet. This portion of the corridor has two key constraints that influence the ability to provide a full 50-foot facility width. There is an existing stone wall on the eastside of the roadway, approximately 300 feet in length, and situated just a few feet from the edge of pavement. Another constraint is the presence of severe cut and fill slopes on both sides of the roadway.

Photo 1: Typical Existing Section

Photo 2: Constrained Existing Section

3.2 POTENTIAL IMPROVEMENT OPTIONS

A range of reasonably feasible options for modifying the existing cross-section of Scholls Ferry Road to accommodate all travel modes have been identified. Graphics are provided at the end of this document to illustrate these roadway section options and to highlight the function and design considerations for each.

In general the existing cross sections are 50 feet wide. As noted above, this width is available along the most of the corridor with some minor cut slopes and small retaining walls. In the

narrower roadway segments these sections would require some additional modifications such as creating an elevated walkway rather than a standard sidewalk or building larger retaining walls.

In each of the options, a shared travel lane with bicycle and motor vehicles is proposed for the southbound travel lane. This would entail widening the existing southbound travel lane from 11 / 12-feet to 14-feet. Bicycles traveling downhill will be traveling at speeds closer to that of the motorists and can mix easier and more safely with traffic than in the northbound or uphill directions where the speed differential would be greater. Because of the speed differences between bicycles and pedestrians downhill, a shared pedestrian facility in the southbound direction is not recommended.

- Minor Arterial (Preferred Standard) – includes two travel lanes, a center turn lane or additional travel lane, 6 foot bikes lanes and sidewalks on both sides of the street.

- Minor Arterial (Minimum Standard) - includes two travel lanes, a center turn lane or additional travel lane, 5 foot bikes lanes and sidewalks on both sides of the street.

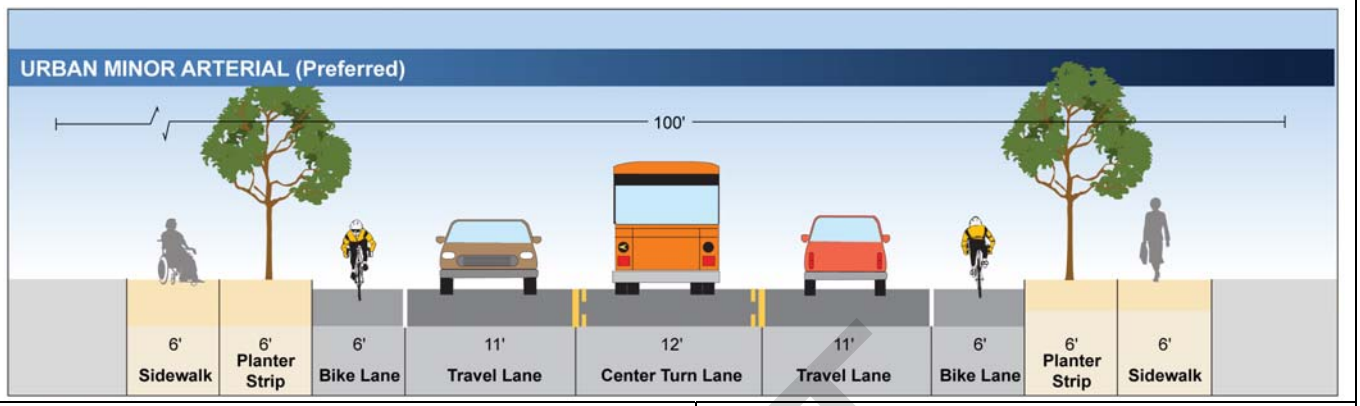
- Option 1 – includes a 12 to 14-foot shared use pathway along the east side of the road adjacent to the outside northbound travel lane. This pathway would be separated from the vehicle travel lane by a barrier. The outside northbound travel lane would be widened from 11-feet in width to 14-feet.

- Option 2 – includes a 6-foot bike lane along the east side of the road immediately adjacent to the outside northbound travel lane. A 6-foot raised sidewalk with curb and gutter would be provided along the west side of the roadway.

- Option 3 – includes a 6-foot raised bike lane along the east side of the road adjacent to the outside northbound travel lane, and a 5 to 6-foot raised sidewalk with curb and gutter immediately to the east of the bike lane.

- Minor Arterial (Interim) - includes two travel lanes northbound and one travel lane southbound, 6 foot paved shoulders and a 2 foot gravel shoulder on both sides of the roadway.

Scholls Ferry Road Conceptual Design Plan Project — Urban Minor Arterial (Preferred Std)



Cross Section Summary

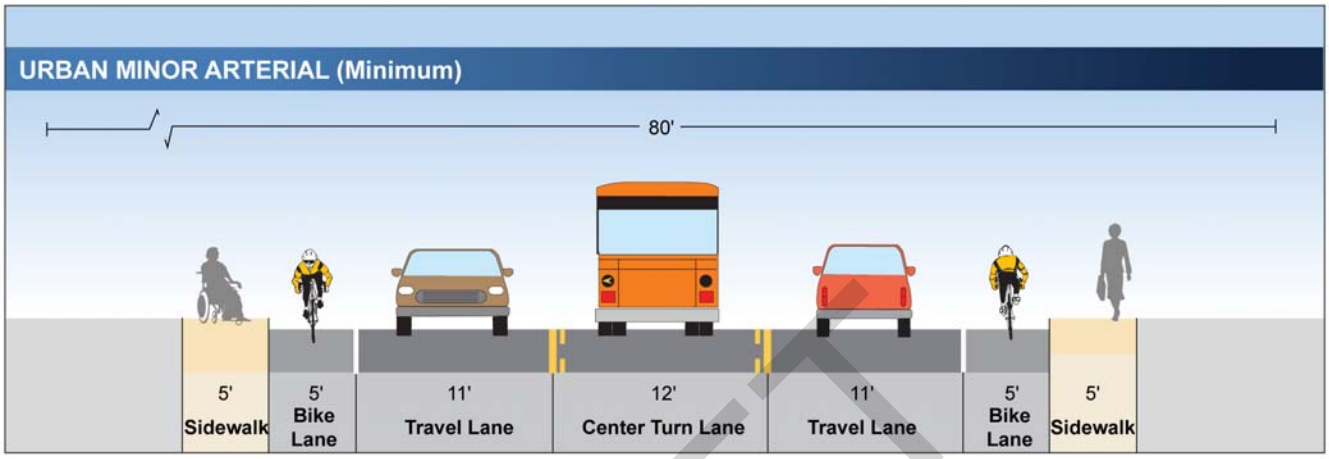
Right of Way Width: 100 ft Total Width: 70 ft

- Sidewalks and bike lanes on both sides
- Center turn lane or additional travel lane

Considerations

- Bike lane northbound separates slower moving bicycles climbing uphill
- Additional width improves sight distance along curves
- Bicycle lanes and planter strip serves as buffer between sidewalk and travel lane
- Sidewalk on both sides of roadway increases pedestrian safety
- Bicyclists and pedestrians in separate facilities, reduces conflicts
- Cost – Higher compared to other options due to wider pavement, curb, sidewalk, and more grading required
- Stormwater – Wider impermeable area and stormwater piping on both sides of roadway required

Scholls Ferry Road Conceptual Design Plan Project — Urban Minor Arterial (Minimum Std)



Cross Section Summary

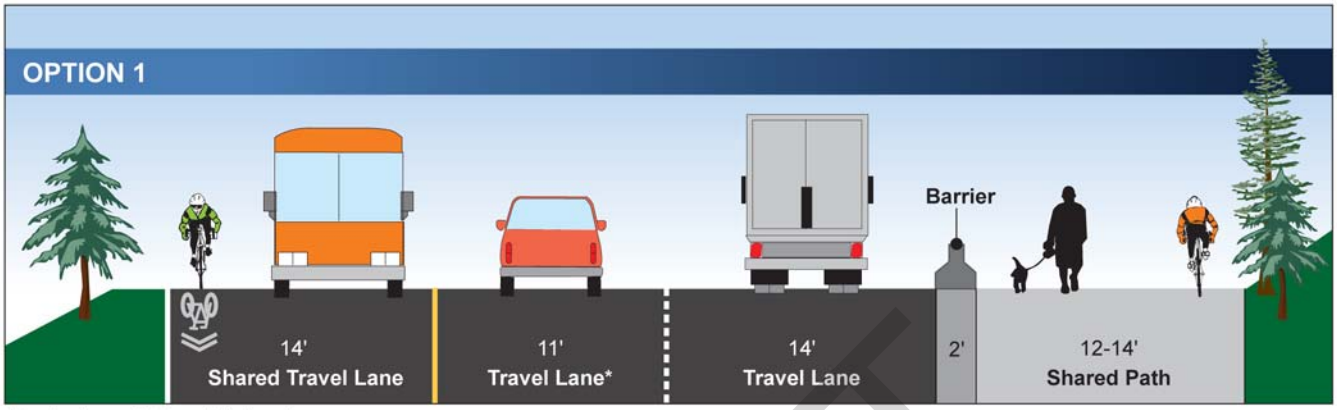
Right of Way Width: 80 ft Total Width: 54 ft

- Narrower sidewalk and bike lane than preferred
- Sidewalks and bike lanes on both sides
- Center turn lane or additional travel lane

Considerations

- Bike lane northbound separates slower moving bicycles climbing uphill
- Additional width improves sight distance along curves
- Bicycle lanes serves as buffer between sidewalk and travel lane
- Sidewalk on both sides of roadway increases pedestrian safety
- Bicyclists and pedestrians in separate facilities, reduces conflicts
- Cost – Higher compared to other options due to wider pavement, curb, sidewalk, and more grading required
- Stormwater – Wider impermeable area and stormwater piping on both sides of roadway

Scholls Ferry Road Conceptual Design Plan Project — Option 1



*Center Lane is in uphill direction.

Cross Section Summary

Pavement Width: 39 ft Total Width: 53-55 ft

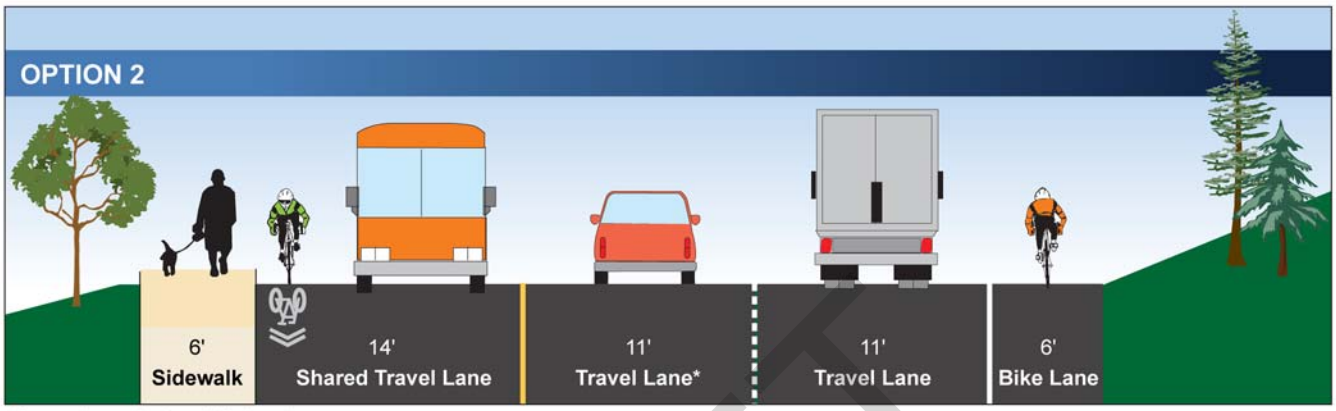
- Separated shared path on uphill side
- Concrete barrier or guardrail between path and travel lane
- Wide outside lanes
- Southbound travel lane with shared lane marking for bicycles

Considerations

- Barrier between roadway provides a better sense of security and safety for bicycles and pedestrians
- Potential maintenance challenges for separated areas
- Additional width improves vehicle sight distance along the inside of curves
- Lower traffic driveway crossings on east side of roadway
- Barrier discourages-prevents off tracking into bikeway/walkway
- Breaks in barrier for driveways and crossing locations creates safety hazard
- Bicycles and pedestrians in shared space could result in conflicts, although bike speeds will be slower uphill
- Guardrail and/or barrier likely required on downhill shared lane
- Cost – median compared to other options due to wider pavement, barrier, and more grading required
- Stormwater – Wider impermeable area and sheet flow off west edge. Requires storm system due to barrier and path on east side of roadway

Scholls Ferry Road Conceptual Design Plan Project

Option 2



*Center Lane is in uphill direction.

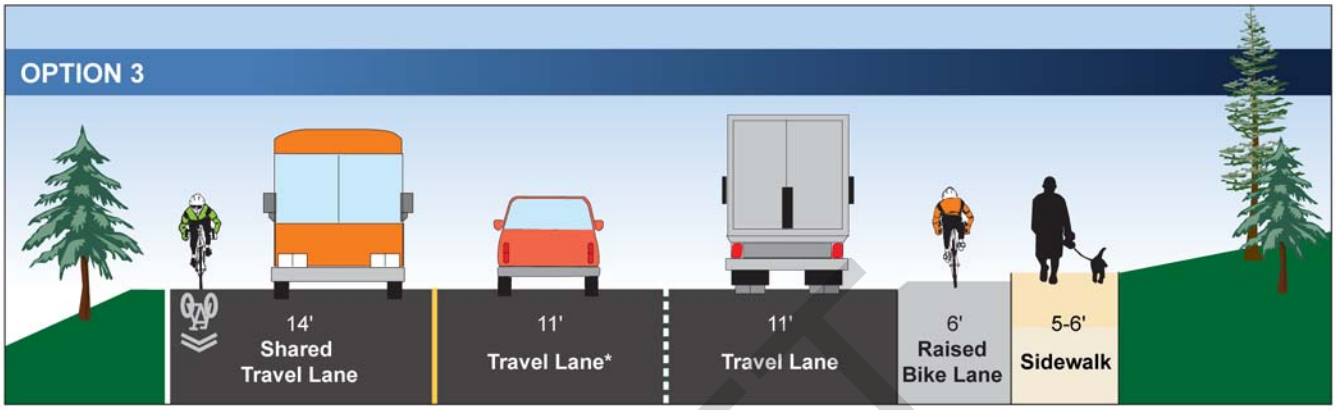
Cross Section Summary

- Pavement Width: 42 ft Total width: 48 ft
- Separated sidewalk on west side
- Wider southbound travel lane with shared lane marking for bicycles
- Bike lane northbound

Considerations

- Bike lane northbound separates slower moving bicycles climbing uphill
- Additional width improves vehicle sight distance along the inside of curves
- No buffer between sidewalk and travel lane
- Sidewalk would better serve driveways/residences on west side of roadway
- Eliminates barrier hazards to provide breaks for driveways
- Sidewalk could be a boardwalk in narrower segments
- Bicyclists and pedestrians in separate facilities, reduces conflicts
- Cost – Lower due to narrow pavement and less grading required. Added cost due to curb and storm system on west edge and east edge to drain ditch
- Stormwater – Less impermeable area but requires piping stormwater on west edge due to sidewalk and east edge to drain ditch

Scholls Ferry Road Conceptual Design Plan Project — Option 3



*Center Lane is in uphill direction.

Cross Section Summary

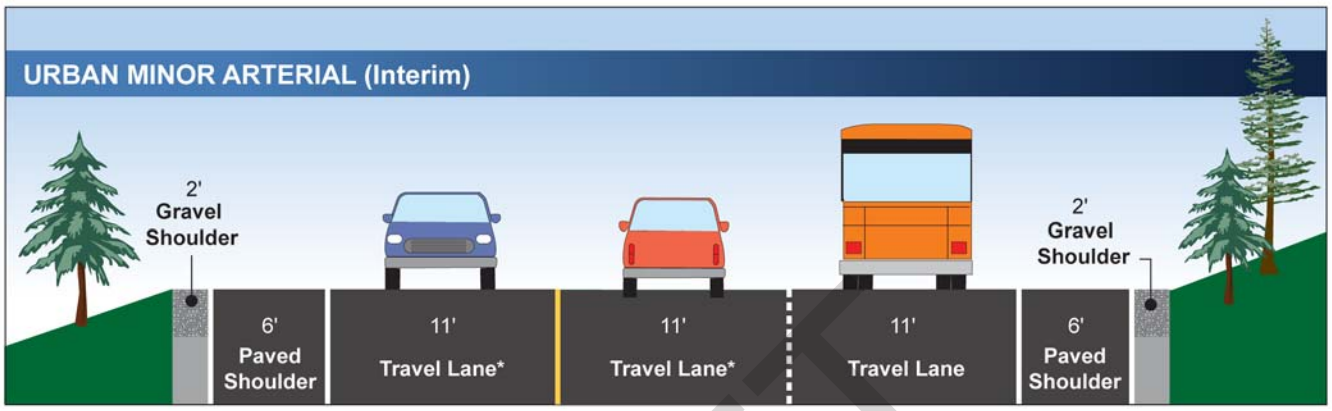
Pavement Width: 36 ft Total width: 47-48 ft

- Sidewalk on east side of roadway
- Raised bike lane on east side of roadway
- Wider southbound travel lane with shared lane marking for bicycles

Considerations

- Raised bike lane provides visual and vertical separation from travel way and sidewalk
- Raised bike lane discourages off tracking into bike lane
- Bike lane acts as a buffer between traffic for pedestrians
- Additional width improves sight distance along the inside of curves
- Lower traffic driveway crossings on east side of roadway
- Bicyclists and pedestrians in separate facilities, reduces conflicts
- Eliminates barrier hazards to provide breaks for driveways
- Cost – Lower compared to other options due to narrow width and less grading
- Stormwater – Less impermeable area and allows sheet flow off west edge. Storm system required on east edge

Scholls Ferry Road Conceptual Design Plan Project — Urban Minor Arterial (Interim)



*Center Lane is in uphill direction.

Cross Section Summary

Pavement Width: 45 ft Total Width: 49 ft

- Paved shoulder for pedestrians and bikes on both sides
- Additional travel lane uphill

Considerations

- Interim facility at a reduced cost
- Joint use of paved shoulder for bike/ped reduces safety
- No buffer between pedestrian and traveled lanes
- Cost – Lower compared to other options due to narrower pavement and less stormwater and grading required
- Stormwater – Less facilities required due to infiltration and sheet flow off west shoulder

To provide multi-modal improvements and improve safety as quickly as possible, interim improvements could be constructed. These interim improvements may include; constructing a narrower interim section with paved shoulders and no sidewalks in the narrow more difficult areas of the project; constructing Option 1, 2 or 3 in areas where roadway widening is less costly; and in flatter areas acquiring right of way where feasible and constructing either the preferred or minimum width standard roadway section.

With each of the above recommendations, appropriate crossing locations would need to be indentified to ensure safety and best accommodate users. Private driveway and residential street intersections grades at Scholls Ferry Road will also require review to insure that safety and sight distance is maintained or improved.

In addition, once a preferred improvement option has been identified and initial layout completed, it would be appropriate to conduct an evaluation of existing and projected future traffic operations along Scholls Ferry Road and to assess existing traffic crash experience to determine the extent to which these factors would influence final project development. It should be noted that the purpose of this study was to identify bicycle and pedestrian improvements along the Scholls Ferry corridor at the conceptual level including a planning level approach for handling stormwater runoff. The work effort focused on identifying and presenting existing policy considerations, physical constraints and opportunities in the corridor and a range of potential improvement options. The work effort did not include: completing a study area traffic or crash analyses; identifying specific details for the existing stormwater system and/or conducting engineering level stormwater analysis; doing topographical mapping or surveying, identifying utilities; or any measurement of the existing groundline features. Following the identification and selection of a preferred option, the following additional issues and information will need to be addressed:

- Collect traffic volume information and complete a traffic and accident analysis to verify traffic capacity needs,
- Conduct survey and mapping to determine existing terrain widths,
- Develop more refined roadway sections and cost estimates,
- Complete a more detailed stormwater and geotechnical analysis and,
- Coordinate with Tri-Met related to potential future transit service in the corridor and appropriate locations for pedestrian crossings.

The following pages present graphics and a summary of key evaluation factors for each of the improvement options identified and introduced above.

3.3 POTENTIAL DEMAND FOR BICYCLE AND PEDESTRIAN FACILITIES

Consistent with the comments above concerning traffic and crash analysis for Scholls Ferry Road, no data has been collected regarding existing pedestrian and bicycle use along this corridor. However, anecdotal and observational information indicates that existing travel by these modes is low. This may be due to several factors including: perceived unsafe or uncomfortable nature of the existing road for these travel modes, lack of existing transit service along Scholls Ferry Road which would reduce pedestrian demand, and the sometimes steep incline of the roadway which would require extra effort by a pedestrian or bicyclist. It appears that pedestrian demand would likely be higher at the north end of the corridor near the Sunset Highway where multiple roads come together, the topography is less steep and existing facilities are in place. Demand may also be higher at the south end of the corridor

where topography is much less steep and several other roads intersect Scholls Ferry Road. Because of the limited number of homes and the lack of commercial development along Scholls Ferry Road in the study area, it is anticipated that demand for local trips would be small. However, there may be unserved demand for trips to the school, church, offices, retail development, transit and other bicycle corridors in the Sylvan area, and to the grocery store and other commercial development in the Raleigh Hills area. Additionally, there may be demand for longer distance trips between Sylvan and Raleigh Hills.