



City of Tigard
River Terrace
community plan

City of Tigard
Transportation System Plan Addendum

June 2014

ACKNOWLEDGEMENTS

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CITY STAFF

Kenny Asher, Community Development Director
Brian Rager, Interim Public Works Director
Tom McGuire, Assistant Community Development Director
Susan P Shanks, Project Manager and Senior Planner
Judith Gray, Senior Transportation Planner
Michael Stone, City Engineer
Mike McCarthy, Senior Project Engineer
Marissa Grass, Associate Planner

This addendum was completed by DKS Associates of Portland, Oregon, Principal – Carl Springer and Transportation Planner – Kevin Chewuk.



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Introduction

In 2010, the city of Tigard updated the community's Transportation System Plan, hereafter referred to as the TSP. The TSP serves as a long term guide for city transportation investments by incorporating the vision of the community into an equitable and efficient transportation system. It evaluates the current transportation system and outlines policies and projects that are important to protecting and enhancing the quality of life in Tigard through the next 20 years by balancing the needs of walking, bicycling, driving, transit and freight. The City Council adopted the TSP on November 23, 2010.

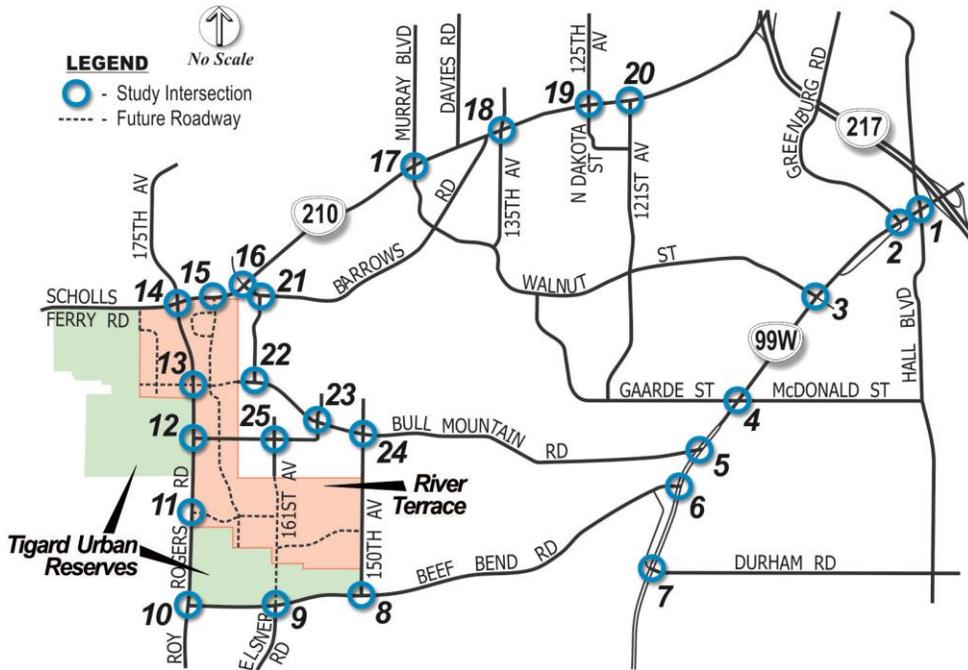
Since the adoption of the TSP in 2010, the West Bull Mountain Concept Plan (WBMCP) was completed and adopted by Washington County and the city. The area now known as River Terrace (and formerly known as West Bull Mountain) was also annexed to the city. This addendum provides an update to the TSP specific to the River Terrace study area and contributes to the city's broader goal of completing a River Terrace Community Plan.

The nearly 500 acres encompassing the River Terrace Community Plan study area was brought into the Metro Urban Growth Boundary in 2002 and 2011 to accommodate future growth. This land, coupled with adjacent City of Tigard Urban Reserves, was studied to identify appropriate areas for urbanization, natural resource protection, and trunk infrastructure. Prior to establishing and as a part of adopting the needed zoning to allow for development in suitable areas, the city was required to update all public facilities plans, including the TSP. This effort began with the West Bull Mountain Concept Plan, which will serve as the foundation for the River Terrace Community Plan, upon which new information obtained from this system analysis and stakeholder input was used to address changing transportation needs in the area.

Lands within the River Terrace Community Plan study area are within the Urban Growth Boundary (UGB) and will be addressed in this community plan to describe their intended zoning and development implementation. Lands within the Urban Reserve are not available for urban development until they are brought into the UGB.

This transportation system analysis includes two levels, local and regional. The local level analysis includes the immediate River Terrace Community Plan study area, and is generally bounded by Scholls Ferry Road to the north, Beef Bend Road to the south, Roshak Road/ 150th Avenue to the east, and Roy Rogers Road to the west. The regional level analysis includes several major streets that provide connections to the River Terrace Community Plan study area. The 25 intersections shown in Figure 1 have been identified as study intersections.

Figure 1: Study Area



Transportation Vision for River Terrace

The River Terrace Community Plan envisions an interconnected network of multi-modal streets, one that conforms with the rolling topography and builds upon and connects with the existing streets in the area. The streets are designed to accommodate all modes of travel for users of all ages and abilities where possible. They are also designed to safely connect people to where they need to go, providing residents and visitors with a number of travel choices to their destinations. The streets are also envisioned to be more than just places for automobile travel, recognizing that they are also where people gather, walk, bike, access transit, and park their vehicles.

As a major street connection through the River Terrace area, Roy Rogers Road will continue to connect residents, commuters, and visitors to the regional transportation system. It will be designed in a manner to serve the through travel demand, while still being viewed as an asset to the neighborhood rather than a barrier. Those walking and cycling will be accommodated with safe and comfortable facilities along the street and at each street intersection. For those driving, the street will be widened to four travel lanes with a center turn lane or median.

To the east and west of Roy Rogers Road will be a connected network of streets and shared-use paths providing on- and off-street connections to schools, parks, housing and shopping. Primary street connections to Roy Rogers Road for those driving in the River Terrace area will be via Lorenzo Lane, Bull Mountain Road, and a new street located midway between Bull Mountain Road and Beef Bend Road. These streets will employ design techniques to create safe, slow streets without significantly

changing vehicle capacity. These design techniques will help mitigate the impacts of traffic on adjacent residences and effectively balance safety, comfort, and mobility.

Those walking and biking in the River Terrace area will be accommodated primarily through sidewalks, off-street trails, or on-street shared facilities. Bike lanes, or parallel off-street facilities, will be required along the major street system (i.e. along arterial and collector streets). Off the main street system will be a network of comfortable, low-stress walking and biking routes between neighborhoods and local parks, schools, and shopping areas.

South Cooper Mountain Concept Plan Coordination

The City of Beaverton is currently involved in a concept planning process for the South Cooper Mountain annexation area, located northwest of the Scholls Ferry Road/175th Avenue intersection. The long range build-out of this area (both UGB areas and Urban Reserves) is estimated to include over 8,100 housing units and more than 450 jobs. These updated housing and employment assumptions for the South Cooper Mountain Concept Plan were incorporated into the traffic analysis work for the River Terrace Community Plan to coordinate these two parallel planning efforts. This helped to more accurately forecast future traffic volumes along streets in the area, including regional routes such as Scholls Ferry Road and 175th Avenue-Roy Rogers Road that provide primary access to both sites.

Future Growth in River Terrace

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 maintaining or enhancing transportation system operations.

The nearly 500 acres in the River Terrace Community Plan area were designated with specific land uses in the West Bull Mountain Concept Plan. These land uses were adopted by the city of Tigard in 2012. They serve as the foundation for the development of zoning in the River Terrace Community Plan area.

The impact of the increased vehicle trip generation on the surrounding transportation system, as a result of the adopted land uses, was evaluated through the year 2035. The new information obtained from this system analysis was used to refine the recommendations contained in the West Bull Mountain Concept Plan. The result is a set of transportation improvements and standards that updates the Tigard TSP for the River Terrace area.

Traffic Forecasting

Future traffic forecasts were prepared for 2035 for two major scenarios:

- **2035 Existing Tigard TSP** – This scenario assumes the land uses within Washington County’s version of Metro’s Regional Travel Demand Forecast Model. This scenario includes 3,294 households and 391 employees in the River Terrace area and closely matches the forecast of the 2010 Tigard Transportation System Plan.¹ It assumes build-out of the urban reserves in the region outside of the City of Tigard planning influence area, and some growth within the Tigard urban reserves. It also includes the improvement projects listed in the “Baseline Transportation System Improvements” section and the traffic volumes shown in Figures 2a and 2b.
- **2035 River Terrace Update** – This scenario assumes the highest level of potential development for the River Terrace area (2,587 households and 149 employees). It assumes build-out of the urban reserves in the region outside of the City of Tigard planning influence area (e.g. South Copper Mountain area), but no growth within the Tigard urban reserves. It also includes the improvement projects listed in the “Baseline Transportation System Improvements” section and the traffic volumes shown in Figures 2a and 2b.

¹ - This scenario is assumed to closely match the forecast of the 2010 Tigard TSP, but is not identical since different versions of the Regional Travel Demand Model were used. The land uses are based on the disaggregated Washington County Model.

Figure 2a: 2035 Traffic Volumes (PM Peak)

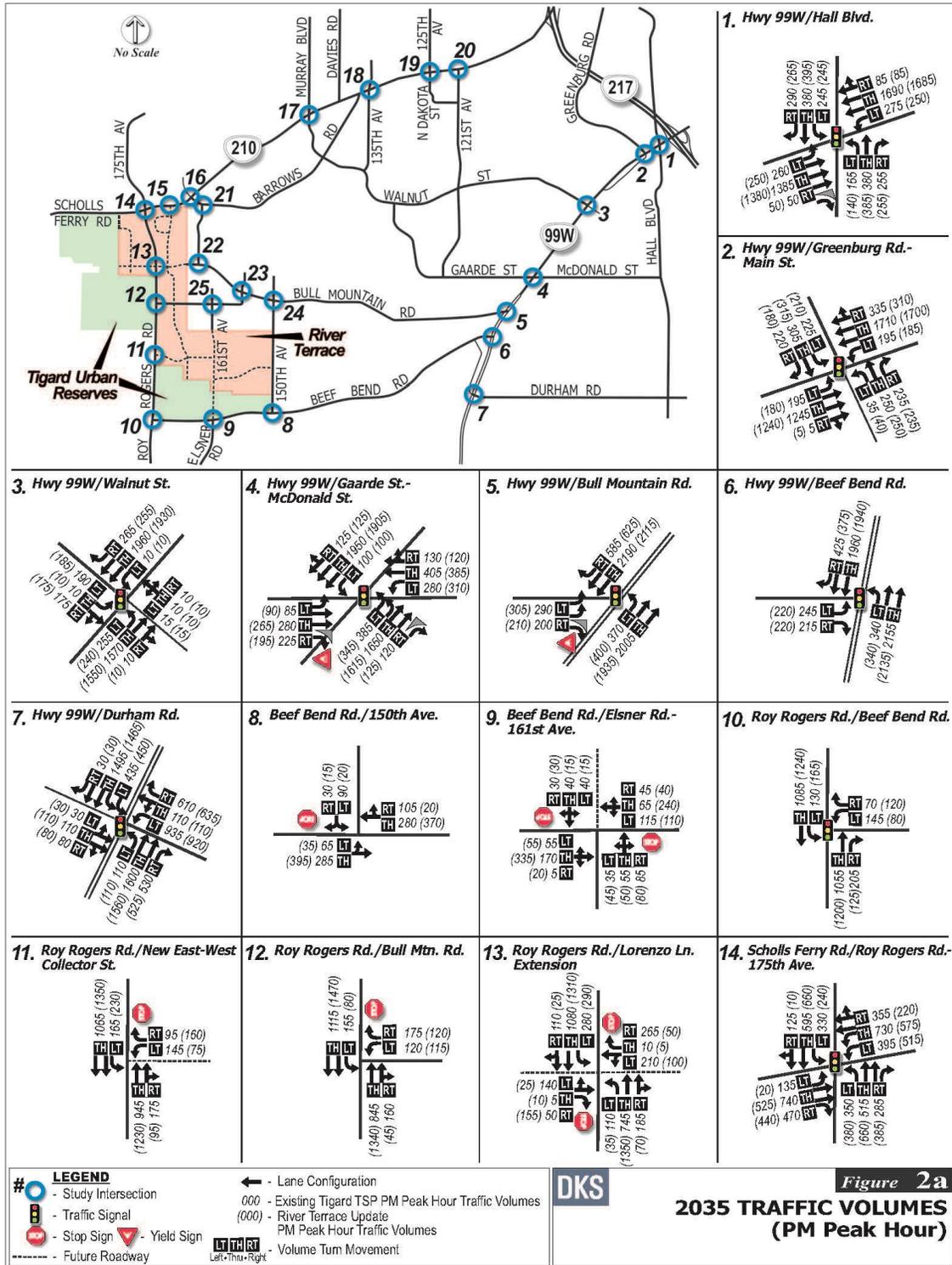
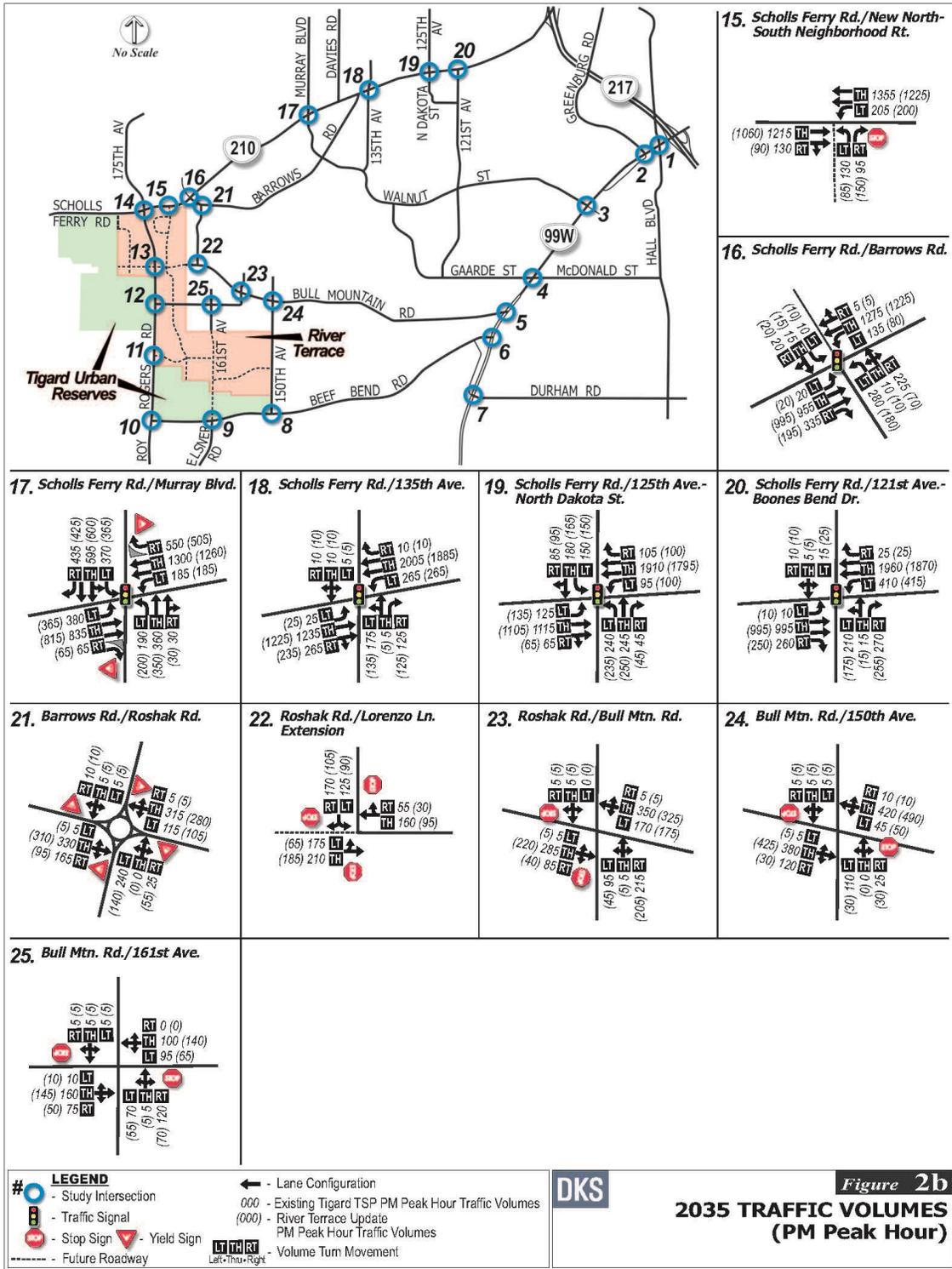


Figure 2b: 2035 Traffic Volumes (PM Peak)



Baseline Transportation System Improvements

The starting point for the 2035 system analysis relied on the list of street system improvement projects located in the study area or at study intersections contained in the Tigard, Beaverton, and Washington County Transportation System Plans. Since these projects are expected to be funded (i.e. are identified as financially constrained), they were used in the baseline traffic forecasts for the River Terrace Community Plan analysis for 2035. In addition, the street extensions envisioned in the West Bull Mountain Concept Plan were assumed, despite not being funded, since they will be needed before development can occur. The improvements that were assumed include:

- Lorenzo Lane extension, Woodhue Street extension, 161st Avenue extension, two north-to-south routes (one to the east and one west of Roy Rogers Road), and two east-to-west routes south of Bull Mountain Road (Source: West Bull Mountain Concept Plan)
- Scholls Ferry Road widening to five lanes from Teal-Horizon Boulevard to west of 175th Avenue-Roy Rogers Road (Source: Washington County)
- Roy Rogers Road widening to five lanes from just north of Scholls Ferry Road to the south Urban Growth Boundary, north of Beef Bend Road² (Source: Draft Washington County TSP)
- Traffic signal installation at the Roy Rogers Road/Beef Bend Road intersection (Source: Washington County)
- Durham Road widening to five lanes from Highway 99W to Upper Boones Ferry Road (Source Tigard TSP Project # 39 and # 40)
- Davies Road extension from Scholls Ferry Road to Barrows Road, and closure of the existing Barrows Road (east) connection to Scholls Ferry Road (Source Beaverton TSP Project # 41 and # 252)
- Highway 99W/ Gaarde Street-McDonald Street intersection improvements to include widening Highway 99W to add a third southbound through lane, a second northbound left turn lane and a northbound right turn lane, and widening Gaarde-McDonald Street to add a second through lane (Source: Tigard TSP Project # 66k)

In addition, several non-specific improvement projects were identified at study intersections along Highway 99W in the Tigard Transportation System Plan. This includes improvements at the Walnut Street, and Durham Road intersections. Further refinement is necessary to determine the extent of improvements that could be achieved with the allocated TSP budget at each of these locations. Lacking these specific details, no baseline improvements were assumed to occur at these intersections despite being financially constrained in the Tigard Transportation System Plan.

² - This project is included in the Draft Washington County TSP and is assumed to be needed by 2035.

Estimating Driving Trips

A determination of future street network needs requires the ability to accurately forecast travel demand resulting from estimates of future population and employment in the River Terrace study area, and the rest of the city and Metro region. The objective of the transportation planning process is to provide the information necessary for making decisions about how and where improvements should be made to create a safe and efficient transportation system.

The travel demand forecasting process generally involves estimating travel patterns for new development based on the decisions and preferences demonstrated by existing residents, employers and institutions around the region. Travel demand models are mathematical tools that help us understand future commuter, school and recreational travel patterns including information about the length, mode and time of day a trip will be made. The latest travel models are suitable for motor vehicle and transit planning purposes, and can produce total volumes for autos, trucks and buses on each street and highway in the system. Model forecasts are refined by comparing outputs with observed counts and behaviors on the local transportation system. This refinement step is completed before any evaluation of system performance is made. Once the traffic forecasting process is complete, the 2035 volumes are used to determine the areas of the street network that are expected to be congested and that may need future investments to accommodate growth.

Washington County has a travel demand model that is based on Metro’s regional travel demand model. For River Terrace, the Washington County travel demand model was refined to reflect the proposed land use and roadway network.

Land Use and Motor Vehicle Trip Assumptions

The zoning developed during the River Terrace Community Plan process equates to about 2,587 housing units and a neighborhood commercial/mixed-use area with approximately 40,000 square feet. To convert concept plans of neighborhood commercial land uses into forecasts in the travel demand model, estimates of land use by acreage were converted into employment figures (i.e. number of retail employees or other employees). Table 1 describes the assumptions that were used. In the Tigard TSP, vehicle trips within the River Terrace area were estimated based on around 700 additional housing units³, i.e. 3,294 vs. 2,587 housing units as shown in Table 1.

³ The land uses in the urban and urban reserve areas of River Terrace were combined into a single Transportation Analysis Zone (TAZ) in the disaggregated Washington County Model used for the “Existing Tigard TSP” scenario. They have since been separated. This is one of the reasons why there are more housing units in the “Existing Tigard TSP” scenario than in the “River Terrace Update” scenario.

Future vehicle trips generated by the River Terrace area were estimated by applying travel demand model trip generation rates by land use type, which were developed based on the rates in the existing Bull Mountain neighborhoods just to the east of the River Terrace area. Overall, the River Terrace Community Plan area is expected to generate about 1,500 motor vehicle trips during the p.m. peak hour, or about 100 less than what is currently assumed in the Tigard TSP, i.e. 1,580 vs. 1,489 trips as shown in Table 1.

Table 1: Land Use Assumptions for the River Terrace Community Plan

Scenario	Housing Units	Retail Employees	Other Employees	PM Peak Hour Vehicle Trips Ends
2035 Existing Tigard TSP *	3,294	43	348	1,580
2035 River Terrace Update	2,587	29	120	1,489

*Based on the disaggregated Washington County Model

2035 Motor Vehicle Operations

Motor vehicle conditions were evaluated during the 2035 evening peak hour at the twenty-five intersections reviewed. The evaluation utilized 2000 Highway Capacity Manual methodology for signalized and 2010 Highway Capacity Manual methodology for unsignalized intersections.

After assuming the transportation system improvement projects with expected funding contained in the Tigard, Beaverton and Washington County Transportation System Plans, several intersections are expected to exceed mobility targets under each scenario (as shown in Table 2). Many of these intersections were previously forecasted to exceed standards in the Tigard, Beaverton, and Washington County Transportation System Plans. In fact, the “2035 River Terrace Update” scenario has slightly better operations at many intersections than reported in the Tigard TSP since the level of development would be less than assumed in the “2035 Existing Tigard TSP” scenario.

The recommended improvements for the intersections that are expected to exceed mobility targets can be seen in Table 3. It should be noted that the Metro Regional Transportation Plan, Tigard Transportation System Plan, Washington County Transportation System Plan, and West Bull Mountain Concept Plan recommend various improvements, including intersection improvements along Highway 99W at the Walnut Street, Gaarde Street-McDonald Street, and Durham Road intersections; widening of Roy Rogers Road to five lanes; and installation of traffic signals at the Roy Rogers Road/ New E-W Collector Street, Roy Rogers Road/ Bull Mountain Road, and Roy Rogers Road/ Lorenzo Lane Extension intersections. This updated system analysis reaffirms the need for capacity and safety improvements at these locations.

Table 2: Motor Vehicle Operations (PM Peak Period)

ID	Intersection (traffic control)**	Mobility Target	2013 Existing Conditions		2035 Existing Tigard TSP		2035 River Terrace Update	
			V/C	LOS	V/C	LOS	V/C	LOS
1	Highway 99W/ Hall Boulevard (signalized)	0.99 v/c	0.81	D	0.98	E	0.97	E
2	Highway 99W/ Greenburg Road-Main Street (signalized)	0.99 v/c	0.76*	C	0.94	E	0.92	D
3	Highway 99W/ Walnut Street (signalized)	0.99 v/c	0.76*	B	1.03	C	0.93	C
4	Highway 99W/ Gaarde Street-McDonald Street (signalized)	0.99 v/c	0.89*	C	0.96	D	0.95	D
5	Highway 99W/ Bull Mountain Road (signalized)	0.99 v/c	0.77*	B	1.03	C	1.03	D
6	Highway 99W/ Beef Bend Road (signalized)	0.99 v/c	0.85	C	1.01	D	0.99	D
7	Highway 99W/ Durham Road (signalized)	0.99 v/c	0.90	E	1.17	F	1.15	F
8	Beef Bend Road/ 150 th Avenue (unsignalized)	0.99 v/c	0.10	B	0.32	C	0.09	C
9	Beef Bend Road/ Elsner Road-161 st Avenue extension (unsignalized)	0.99 v/c	0.03	B	0.40	C	0.65	E
10	Roy Rogers Road/ Beef Bend Road (signalized)***	0.90 v/c	0.99	F	0.87	C	0.93	D
11	Roy Rogers Road/ New E-W Collector Street (unsignalized)***	0.99 v/c	-	-	>1.50	F	>1.50	F
12	Roy Rogers Road/ Bull Mountain Road (unsignalized)***	0.99 v/c	0.34	E	>1.50	F	>1.50	F
13	Roy Rogers Road/ Lorenzo Lane Extension (unsignalized)***	0.99 v/c	-	-	>1.50	F	>1.50	F
14	Scholls Ferry Road/ Roy Rogers Road-175 th Avenue (signalized)***	0.99 v/c	0.92	D	1.06	F	0.87	D
15	Scholls Ferry Road/ New N-S Collector Street (unsignalized)	0.99 v/c	-	-	>1.50	F	>1.50	F
16	Scholls Ferry Road/ Barrows Road (signalized)	0.99 v/c	0.58	B	0.72	C	0.61	B
17	Scholls Ferry Road/ Murray Boulevard (signalized)	0.99 v/c	0.85	D	1.06	F	1.04	F
18	Scholls Ferry Road/ 135 th Avenue (signalized)	0.99 v/c	0.61	A	0.87	C	0.79	B
19	Scholls Ferry Road/ 125 th Avenue-North Dakota Street (signalized)	0.99 v/c	0.77	C	1.00	E	0.96	E
20	Scholls Ferry Road/ 121 st Avenue (signalized)	0.99 v/c	0.68	B	0.82	C	0.76	B
21	Barrows Road/ Roshak Road (roundabout)	0.99 v/c	0.34	A	0.56	B	0.43	A
22	Roshak Road/ Lorenzo Lane extension (unsignalized)	0.99 v/c	-	-	0.61	C	0.35	B
23	Roshak Road/ Bull Mountain Road (unsignalized)	0.99 v/c	0.30	C	1.21	F	0.70	D
24	Bull Mountain Road/ 150 th Avenue (unsignalized)	0.99 v/c	0.15	B	0.72	F	0.27	D
25	Bull Mountain Road/ 161 st Avenue (unsignalized)	0.99 v/c	0.03	B	0.37	C	0.24	B

Bolded red values indicate intersection exceeds the v/c (volume/capacity) mobility target or operates with a Level of service “F”.

* Intersection is impacted by queuing from adjacent intersections along Highway 99W. Travel demand may not always be served, thus the intersection may operate closer to capacity at times during peak periods.

** V/C ratio, LOS and delay reported as the intersection average at signalized locations and worst stop controlled approach at unsignalized locations

*** Roy Rogers Road was assumed to be widened to five lanes by 2035.

Table 3: Recommended Intersection Improvements

ID	Intersection (existing traffic control)	Mobility Target	2035 with Planned Intersection Solution		Planned Intersection Solution
			V/C	LOS	
5	Highway 99W/ Bull Mountain Road (signalized)	0.99 v/c	*	*	Improvements such as additional northbound left turn lane (would require an additional receiving lane on Bull Mountain Road)
7	Highway 99W/ Durham Road (signalized)	0.99 v/c	*	*	Improvements such as additional turn lanes (Source: Tigard TSP Project # 66n)
11	Roy Rogers Road/ New E-W Collector Street (unsignalized)	0.99 v/c	0.67	B	Widen Roy Rogers Road to 5 lanes; Install a traffic signal (Source: West Bull Mountain Concept Plan)
12	Roy Rogers Road/ Bull Mountain Road (unsignalized)	0.99 v/c	0.66	B	Widen Roy Rogers Road to 5 lanes; Install a traffic signal (Source: Draft Washington County TSP; West Bull Mountain Concept Plan)
13	Roy Rogers Road/ Lorenzo Lane Extension (unsignalized)	0.99 v/c	0.82	C	Widen Roy Rogers Road to 5 lanes; Install a traffic signal (Source: Draft Washington County TSP; West Bull Mountain Concept Plan)
14	Scholls Ferry Road/ Roy Rogers Road-175th Avenue (signalized)	0.99 v/c	0.88	D	Widen Roy Rogers Road to 5 lanes (Source: Draft Washington County TSP; West Bull Mountain Concept Plan)
15	Scholls Ferry Road/ New N-S Collector Street (unsignalized)	0.99 v/c	0.36	C	Restrict access to right-in, right-out, left-in only
17	Scholls Ferry Road/ Murray Boulevard (signalized)	0.99 v/c	1.07	F	Enhanced transit and other demand management options**

Bolded red values indicate intersection exceeds the v/c (volume/capacity) mobility target or operates with a level of service “F”.

* Due to the range of potential solutions at these intersections, the intersection operations with a planned solution could not be evaluated. It was assumed that these investments would allow the intersections to meet mobility targets.

** This intersection is within the City of Beaverton and under Washington County jurisdiction. Capacity issues have been identified at this intersection, but no feasible motor vehicle capacity solutions could be identified at this time. Long range planning efforts for South Cooper Mountain in Beaverton may provide other solutions.

Sensitivity Analysis

A few scenarios were tested to help supplement the ultimate design recommendations for the new N-S Collector Street and the future intersection with Scholls Ferry Road. These scenarios are discussed below.

- *Traffic control at the New N-S Collector Street/ Scholls Ferry Road intersection*

This scenario tested the traffic control at the Scholls Ferry Road/ New N-S Collector Street intersection with and without a traffic signal. With a traffic signal, full motor vehicle access would

be allowed at the intersection. Without a signal, access would be limited to right-in, right-out, left-in only. Left turns from the new N-S Collector Street to Scholls Ferry Road would be prohibited.

An unsignalized intersection would have little impact during the evening peak period since the left-turn demand from the new N-S Collector Street to Scholls Ferry Road is not expected to be significant. However, drivers (around 90 trips during the morning peak and 85 trips during the evening peak periods, plus others throughout the day) would have to re-route to either Roshak Road or Roy Rogers Road to access Scholls Ferry Road. Operations at the two adjacent intersections (Scholls Ferry Road/ Roy Rogers Road-175th Avenue and Scholls Ferry Road/ Barrows Road), would also not be expected to be significantly impacted.

A signalized intersection, on the other hand, would potentially impact westbound approaches to both the Roy Rogers Road-175th Avenue and new N-S Collector Street intersections. However, drivers wishing to travel west on Scholls Ferry Road would not have to travel out of direction or travel through the adjacent Bull Mountain neighborhood to the east. A signalized intersection at this location meets Washington County's signal and intersection spacing standards and may likely meet signal warrants in the future.

The final recommendation includes a signal at the Scholls Ferry Road/ New N-S Collector intersection to minimize impacts to the adjacent neighborhood to the east and to provide a signalized crossing for pedestrians and bicyclists at this location. The nearest intersections to the east and west are approximately 1,000 feet away. The signal is to be installed only when it meets warrants. Until such time as a signal is warranted, a pedestrian signal should be considered as an interim or permanent intersection improvement at this location. Any intersection improvements must meet operational standards.

- *Alignment of the New N-S Collector Street between Scholls Ferry Road and the Lorenzo Lane extension*

This scenario tested different alignments for the new N-S Collector Street between Scholls Ferry Road and the Lorenzo Lane extension, with one alignment being more direct and the other being more circuitous. Overall, the more direct alignment is expected to attract more drivers who would have previously used Roshak Road or Roy Rogers Road to access Scholls Ferry Road.⁴ The more direct alignment is expected to slightly reduce motor vehicle travel demand along both of these adjacent routes. This, however, does not take the design of the street into consideration, which would also significantly affect driver behavior.

The final recommendation includes a more direct route and utilizes design treatments to encourage slow travel speeds while allowing for efficient through movements. The more direct route also avoids impacts to a significant tree grove.

⁴ This finding is based on professional judgment. The travel demand model is not sensitive enough to test subtle street alignment changes.

- *Cross-section of the New N-S Collector Street*

This scenario tested the impacts of the new N-S Collector Street with two travel lanes (one travel lane in each direction) and three travel lanes (one travel lane in each direction with a center turn lane/median). Overall, the three-lane cross-section provides slightly more motor vehicle capacity than the two-lane cross-section. While left-turn demand at mid-block locations along the new N-S Collector Street is expected to be minimal, the center lane could be used for landscaping or pedestrian crossing refuges, acting as a way to visually narrow the paved street width. It could also provide an opportunity to more effectively manage access to the new N-S Collector street by limiting the locations where full access is allowed.

The final recommendation includes a landscaped median that is wide enough to allow for left turn lanes at specific locations where warranted.

Street Functional Classification

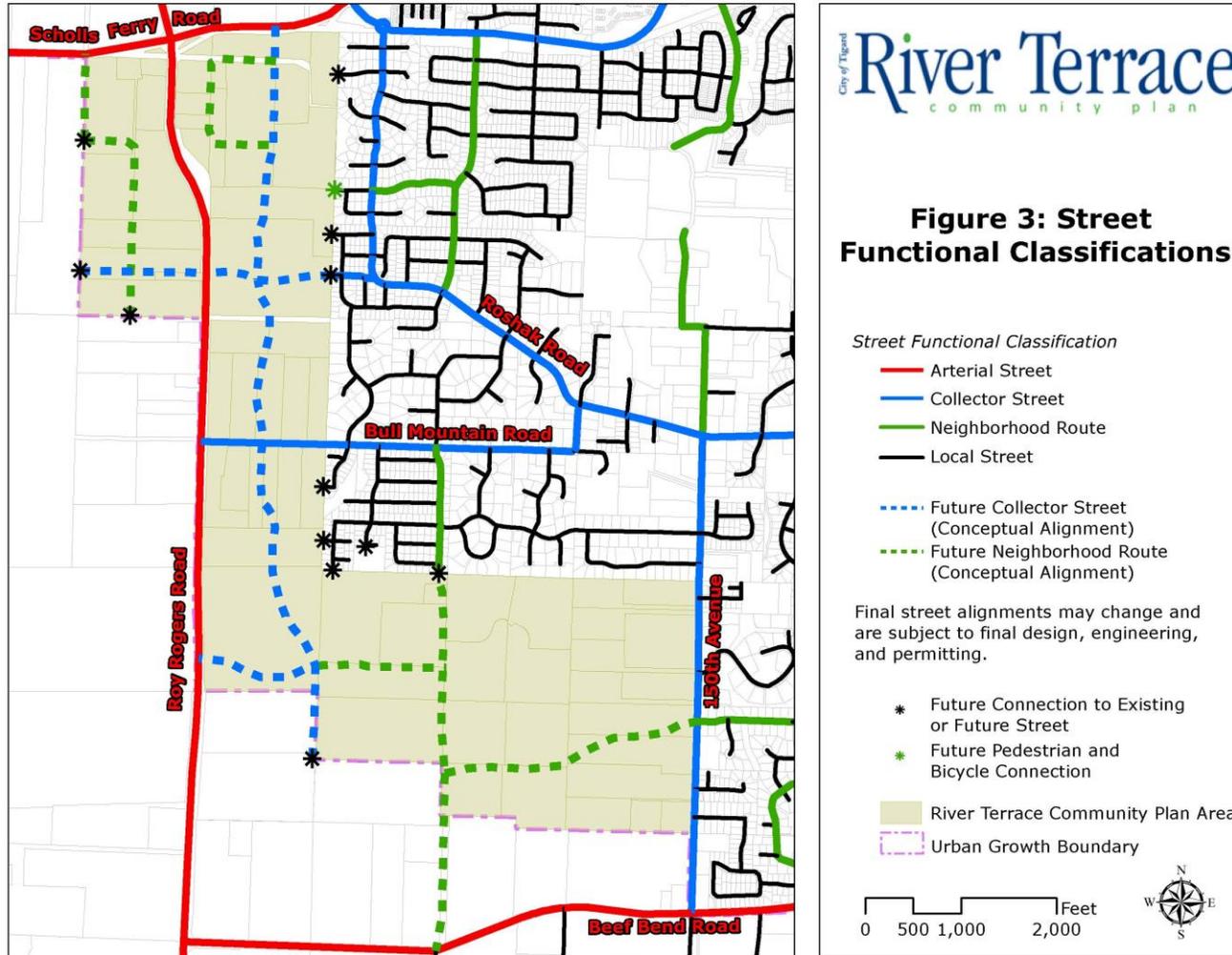
To manage the street network, streets in the River Terrace Community Plan area are classified based on a hierarchy according to the intended purpose of each street, as shown in Figure 3. From highest to lowest intended vehicular usage, the classifications are arterials, collectors, neighborhood routes, and local streets. Streets with a higher intended usage generally provide more efficient traffic movement (or mobility), while streets with lower intended usage provide greater access for shorter trips to local destinations such as businesses or residences.

The recommended functional classifications of streets in the West Bull Mountain Concept Plan were reviewed during the River Terrace Community Plan process against the city's standards and the updated system analysis information. The classifications of two streets, a north-to-south route east of and parallel to Roy Rogers Road (connecting Scholls Ferry Road with the south end of the planning area) and an east-to-west route south of Bull Mountain Road (connecting Roy Rogers Road with the main north-to-south River Terrace street), were changed to collector streets from neighborhood routes to reflect anticipated traffic volumes and to be consistent with other collector streets in the city.

- **Arterials** are intended to serve as the main travel routes. These streets serve the highest volume of motor vehicle traffic and are primarily utilized for longer distance regional trips. The only streets in the River Terrace area classified as arterials are Beef Bend Road, Roy Rogers Road, and Scholls Ferry Road.
- **Collector Streets** are intended to connect many parts of the city and serve traffic traveling to and from arterial streets. These streets provide greater accessibility to neighborhoods, often connecting to major activity generators and provide efficient through movement for local traffic. In the River Terrace area, Bull Mountain Road, 150th Avenue, the Lorenzo Lane extension, a north-to-south route east of and parallel to Roy Rogers Road, and an east-to-west route south of Bull Mountain Road are classified as collectors.

- **Neighborhood Routes** often connect the neighborhoods to arterial or collector streets. These streets serve as major neighborhood routes and generally provide more direct property access (via driveways) than collector streets. In River Terrace, neighborhood routes are expected to include the Woodhue Street extension, 161st Avenue extension, a north-to-south route west of Roy Rogers Road, and two east-to-west routes south of Bull Mountain Road.
- **Local Streets** provide more direct access to residences without serving through travel. These streets are often lined with residences and are designed to serve lower volumes of traffic with a statutory speed limit of 25 miles per hour. All remaining streets in River Terrace will be designed as local streets.

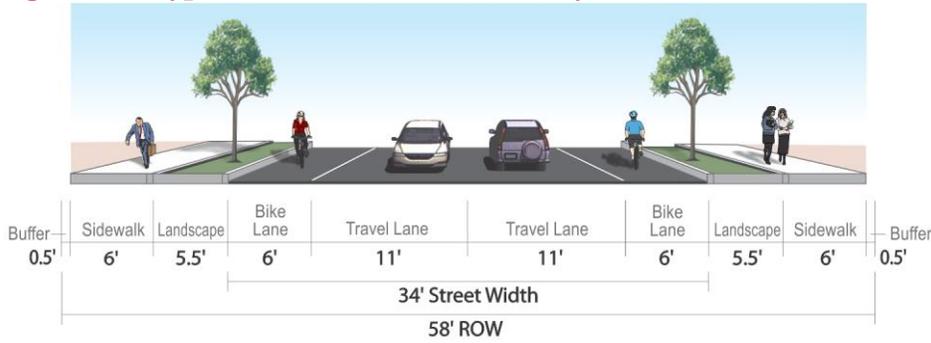
Figure 3: Street Functional Classifications



Street Design

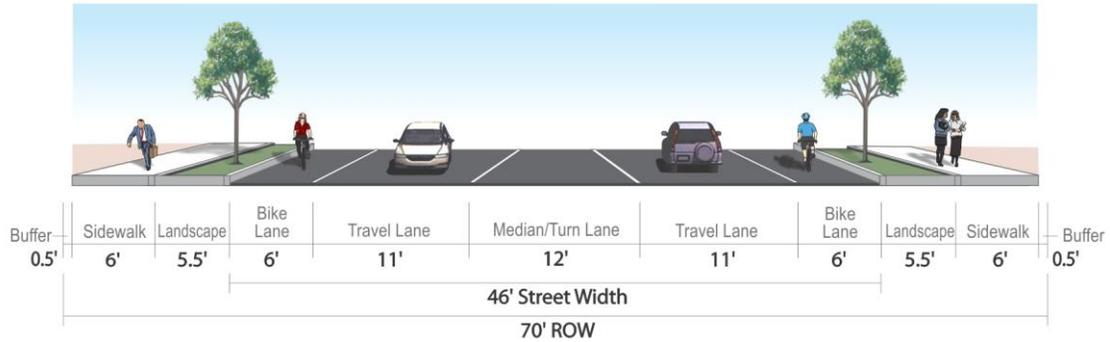
The applicable typical street cross sections for the River Terrace Community Plan area can be seen in Figures 4a, 4b, 4c, and 4d. The recommended street design for the future collector street through the neighborhood commercial area (Lorenzo Lane extension) includes on-street parking. This would require a modification to the Tigard Street Utility Improvement Standards, which currently only allows on-street parking along collector streets in the downtown urban renewal district. The conceptual street design for the future collector street that runs in a north-south direction parallel to Roy Rogers Road would also require modifications to the city's street design standards to allow for the inclusion of the River Terrace Trail and on-street parking in its design. The conceptual design for this street, identified as River Terrace Boulevard, is shown in Figure 5.

Figure 4a: Typical Section for a 2-Lane City Collector



* A shared-use path could replace the required sidewalk and bike lane on the adjacent side of the street

Figure 4b: Typical Section for a 3-Lane City Collector

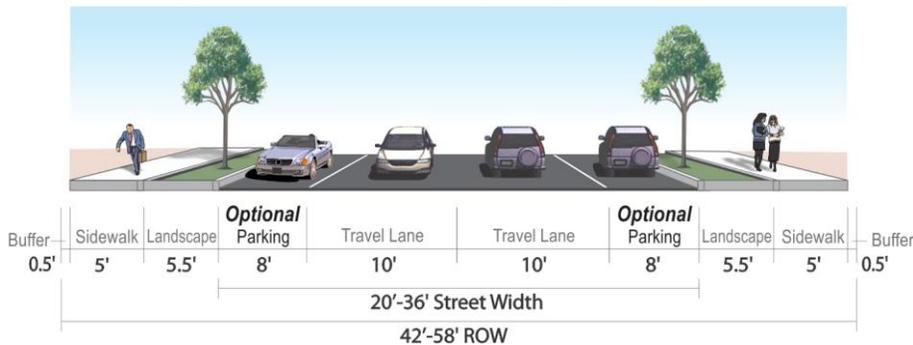


* A shared-use path could replace the required sidewalk and bike lane on the adjacent side of the street

Figure 4c: Typical Section for a Collector in the Neighborhood Town Center



Figure 4d: Typical Section for a City Neighborhood Route



* Optional parking area could also be a bike lane in areas with hilly topography

Figure 5: River Terrace Boulevard Design Concept



While the application of typical street cross sections will work in many situations, there are several future streets in the River Terrace area that are in need of additional design treatments or are envisioned to be different from the typical cross sections. They are as follows:

- **The main N-S Collector Street**, also identified as River Terrace Boulevard, is parallel to and east of Roy Rogers Road. It is envisioned as a boulevard that seamlessly integrates the River Terrace Trail into its design, provides safe and comfortable multi-modal travel options, and includes high-quality pedestrian-scale design treatments that defines it as the neighborhood’s signature street. A conceptual design for this street is shown in Figure 5. Key elements of the design include two vehicle travel lanes divided by a landscaped median, a 12-foot multi-modal trail parallel to the street on the west side,⁵ and areas for large street trees along and down the middle of the street. No on-street bicycle facilities are proposed. It is intended for slower-moving bicyclists to use the trail. Faster-moving bicyclists would have the option of using the trail, sharing the street with cars, or using the bicycle facilities on Roy Rogers Road.

In order to successfully balance mobility with safety and comfort, it will be important to control speeds along this street through a variety of design approaches so as to facilitate through travel but not attract cut-through traffic. One potential design treatment involves the construction of roundabouts at key intersections as shown in Figure 7. Traffic calming treatments include on-street parking and a landscaped median and bulbouts that are sizeable enough to support large trees. Such treatments visually narrow the roadway and create friction along the edges, which has been shown to encourage drivers to proceed more slowly and carefully. On the other hand, individual driveways for residences are not proposed, as driveways can significantly interrupt efficient through travel movements.

The overall design of the street should serve to enhance the neighborhood and the adjacent residences and not serve as a barrier or feel unsafe to those who will live on either side of it in the future. Since homes will not access the street directly by car, it will be important to create design standards for street-facing facades and yards to ensure a high-quality and safe public realm. Where topography allows, homes should either face the street, with vehicle access taken from side streets, or be oriented with their sides to the street with enough windows to allow for many “eyes on the street” opportunities.

Lastly, it will be important to allow the alignment to shift to the east or west in response to topography and stream crossings. Design flexibility will also be necessary along the entire length to accommodate topography, stream crossings, and different land uses. On-street parking and the westernmost sidewalk, for example, may not always be feasible or necessary in all locations. It may even be desirable to allow exceptions to the city’s block length standards in order to reduce the number of trail-side street crossings, thereby creating a more continuous trail experience. In

⁵ A trail down the center median was considered and rejected for safety reasons.

general, the final alignment and design of the River Terrace Boulevard may change subject to engineering, permitting, and emergency vehicle access.

- **The widening of Roy Rogers Road** should include safe and appropriate bicycle and pedestrian facilities along its whole length while continuing to function as a main north-south vehicular route through the region. Design recommendations include the creation and implementation of a high-quality edge treatment that serves to unify and define the River Terrace area along this segment of the corridor.
- **The Lorenzo Lane extension** travels through the only neighborhood commercial area in River Terrace. As such, it will be important to control speeds along this street and make it comfortable for pedestrians and bicyclists. Recommended traffic calming techniques include narrowing of the street width with curb extensions and mid-block chokers or pedestrian refuge islands, and providing visual cues with on-street parking and planted bulbouts in parking lanes. It will also be important to carefully design the future intersection of Lorenzo Lane with Roshak Road, which exists just outside the River Terrace area in unincorporated Washington County.
- **The 161st Avenue extension** connects an existing single family residential neighborhood in the north to Beef Bend Road in the south. With a fairly direct and steep route, it will be important to design this street to make it unattractive to cut-through traffic and to keep travel speeds at safe levels. A roundabout is recommended at the intersection with the Woodhue Street extension, and an all-way stop is recommended at the intersection with the future E-W Neighborhood Route, both of which are near a future school site. The design of the roundabout will be an important factor for controlling motor vehicle travel speeds and ensuring visibility for pedestrians. Potential design solutions to control travel speeds include curving the road to deflect the path of vehicles, narrowing the width of the travel lanes, and visually narrowing the width of the street by including on-street parking and planted bulbouts in the parking lanes.
- **The Luke Lane extension** provides a local connection option for existing Bull Mountain residents and future River Terrace residents. It will be important to design this extension so as to discourage cut-through traffic. This extension should only be allowed via a circuitous route through a future River Terrace neighborhood to the main N-S Collector Street to the west. It will also be important to retrofit the existing cul-de-sac portion of this street with sidewalks when the street is extended to the west.



An example of street trees placed in the parking lane to visually narrow the street

Multi-Modal Connectivity

The aggregate effect of local street design impacts the effectiveness of the regional system when local travel is restricted by a lack of connecting routes, and local trips are forced onto the regional network.⁶ Therefore, streets should be designed to keep through motor vehicle trips on arterial streets and provide local trips with alternative routes. Street system connectivity is critical because roadway networks provide the backbone for bicycle and pedestrian travel in the region. Metro’s local street connectivity principal encourages communities to develop a connected network of local streets to provide a high level of access, comfort, and convenience for bicyclists and walkers that travel to and among centers. To improve connectivity of the region’s arterial system and support walking, bicycling and access to transit, the Metro Regional Transportation Functional Plan requires that, to the extent possible, major arterial streets be spaced at one-mile intervals, and minor arterial or collector streets to be spaced at half-mile intervals.⁷

In addition, to improve local access and circulation, and preserve capacity on the region’s arterial system, each local Transportation System Plan must include a conceptual map of new streets for all contiguous areas of vacant and redevelopable lots and parcels of five or more acres that are zoned to allow residential or mixed-use development. Full street connections should be provided at least every 530 feet (or 1/10th of a mile) or pedestrian and bicycle connections every 330 feet if a full-street connection is not possible. Cul-de-sac or other closed-end street designs are also restricted to circumstances in which barriers prevent full street extensions and such streets are limited in length to 200 feet and the number of dwellings along the street to no more than 25.

The City of Tigard street spacing standards are consistent with the Metro Regional Transportation Functional Plan, requiring full street connections every 530 feet.⁸ The city standards differ slightly from the regional standards by allowing the perimeter of blocks to measure up to 2,000 feet in length, however, the city requires pedestrian and bicycle connections every 330 feet⁹ in these instances, consistent with the regional standard.

A multi-modal connectivity plan for the River Terrace area is shown in Figure 6. It specifies the general location where new streets or shared-use paths could potentially be installed as nearby areas are developed or as the opportunity arises. The purpose of the plan is to ensure that new developments accommodate circulation between adjacent neighborhoods to improve connectivity for all modes of transportation.

⁶ Metro 2035 Regional Transportation Plan, Local Street Network Concept

⁷ Metro Regional Transportation Functional Plan, Section 3.08.110 Street System Design Requirements

⁸ City of Tigard Community Development Code, Section 18.810.030, Subsection H

⁹ City of Tigard Community Development Code, Section 18.810.040

Walking and Biking

Residents in the River Terrace area will be able to safely and efficiently travel between destinations via any number of active transportation modes, such as walking and biking. A system of sidewalks, bikeways, and trails will provide access to key destinations such as parks, schools, and commercial areas—improving the overall health and livability of the neighborhood. Figure 6 illustrates the walking and biking network envisioned for the River Terrace Community Plan area.

Walking and Biking Gaps

Due to the rural nature of the abutting land uses, most streets in and around the River Terrace area have not been improved to urban standards and generally lack facilities for pedestrian and bicycle users. The exception is a short segment along Roshak Road, which provides a sidewalk on both sides of the street between Barrows Road and SW 159th Terrace, in an area with newer residential development. However, those walking in the study area typically have to walk along the edge of a street, which at times have posted speeds that range up to 40 miles per hour. These travel speeds are generally not conducive to shared walking and biking travel. Table 4 shows the streets with pedestrian and bicycle facilities.

Most of the major streets connecting the River Terrace area to nearby shopping and employment, including Scholls Ferry Road, Roy Rogers Road, Beef Bend Road, Bull Mountain Road, and 150th Avenue, lack adequate pedestrian and bicycle facilities. These streets are under the jurisdiction of Washington County, and will require further coordination before any improvements are implemented.

Scholls Ferry Road, as an east-to-west through-street traversing reasonably flat terrain, is an important connection for bicycle travel in the study area. It provides a link for bicyclists to other key routes in the region, including Roy Rogers Road and Murray Boulevard. It has been designated as a bike route, but lacks bike lanes along much of the corridor, although a shoulder of varying width is provided along much of the street. Bike lanes are provided along Scholls Ferry Road east of Teal Boulevard-Horizon Boulevard; however, bicyclists from the study area must ride along the shoulder for over a mile before reaching this facility. Scholls Ferry Road is currently being widened through the River Terrace area and will include continuous bike lanes to Teal Boulevard-Horizon Boulevard once construction is complete. Roy Rogers Road is also a designated bike route that provides a north-to-south connection to and within the study area. It provides accommodations for bicyclists via a shoulder bikeway.



A cyclist riding along the shoulder of Roy Rogers Road

Table 4: Existing Pedestrian and Bicycle Facilities

Roadway (limits)	Pedestrian Facilities	Bike Facilities
Roy Rogers Road (Scholls Ferry Road to Beef Bend Road)	Shoulder	Shoulder
Scholls Ferry Road (Roy Rogers Road to Barrows Road)	Shoulder	Shoulder
Beef Bend Road (Roy Rogers Road to 150 th Avenue)	None	None
Bull Mountain Road (Roy Rogers Road to Roshak Road)	Intermittent sidewalks	None
150 th Avenue (Bull Mountain Road to Beef Bend Road)	Intermittent sidewalks	None
Roshak Road (Barrows Road to Bull Mountain Road)	Sidewalks on both sides north of SW 159 th Terrace; intermittent on west side south of SW 159 th Terrace	None
Barrows Road (Scholls Ferry Road to Roshak Road)	Sidewalks on north side	None (Bike lanes east of Roshak Road)

Walking and Biking Improvements

River Terrace has many stream corridors and the potential for many neighborhood and community parks. To best serve the needs of future residents to travel to these scenic, natural, and recreational areas, a high quality network of low-stress pedestrian and bicycle facilities is envisioned. For pedestrians, sidewalks will be required on all future streets. For bicyclists, dedicated facilities will vary based on the street classification. Arterial and collector streets will have either bike lanes or shared use paths.

Additionally, the pedestrian and bicycle facilities in River Terrace are planned to be fully integrated with the existing trail and bikeway network and the planned active transportation projects in the Metro Regional Trail and Greenways Plan. These measures will help ensure that future River Terrace residents will be able to access goods and services on foot and by bicycle, both within and outside of the area.

While motor vehicle traffic volumes on collector and neighborhood streets, like the new N-S Collector Street and the 161st Avenue extension, are expected to be within typical ranges for those facilities, the rolling topography provides challenges. This condition is generally not conducive to shared walking and biking travel, and may require some streets to include bike lanes that would typically not (such as on neighborhood routes).

Trails

Figure 6 illustrates the potential active transportation network for the River Terrace Community Plan area. The emphasis of this network is on connecting residents to existing and future trails, as defined in the Metro Regional Trail and Greenways Plan, as well as key destinations within and near the River Terrace Community Plan area, including the neighborhood commercial area in the north and the future school in the south.

The future River Terrace Trail will be integrated with the new N-S Collector Street, connecting the proposed trail on the north side of Scholls Ferry Road (as part of Beaverton's South Cooper Mountain Concept Plan) with 150th Avenue, north of Beef Bend Road. It will provide an alternate and less steep walking and biking route to the Westside Trail, located to the east of the River Terrace area. In addition, the future Southern Access Trail will connect the River Terrace Trail near the Woodhue Street Extension/ 161st Avenue Extension intersection with 150th Avenue, north of Woodhue Street, and will offer views of the valley.

Future connections from the River Terrace area to the Westside Trail will be possible via a trail just south of Scholls Ferry Road, linking the northern end of the River Terrace Trail to Barrows Road, and a future trail connecting the southern end of the River Terrace Trail with the Beef Bend Road/ 150th Avenue intersection. Future connections from the River Terrace area to the Ice Age Tonquin Trail will be possible via a trail linking the New E-W Collector Street/ New N-S Collector Street intersection with the Roy Rogers Road/ Beef Bend Road intersection.

Street Crossings

River Terrace is surrounded by three major streets, namely Scholls Ferry Road to the north, Roy Rogers Road to the west, and Beef Bend Road to the south.

As a major street connection through the River Terrace area, Roy Rogers Road should be designed to be an asset to the neighborhood rather than a barrier. Roy Rogers Road is currently a two lane rural arterial street with posted speeds between 45 and 55 miles per hour, but it is expected to be widened and improved to urban standards in the future. With the River Terrace commercial area and the future school site on the east side of the street and residential neighborhoods on both sides of the street, safe and comfortable pedestrian and bicycle crossings must be provided in convenient areas to encourage ease of access between the neighborhoods and to the commercial area and future school.

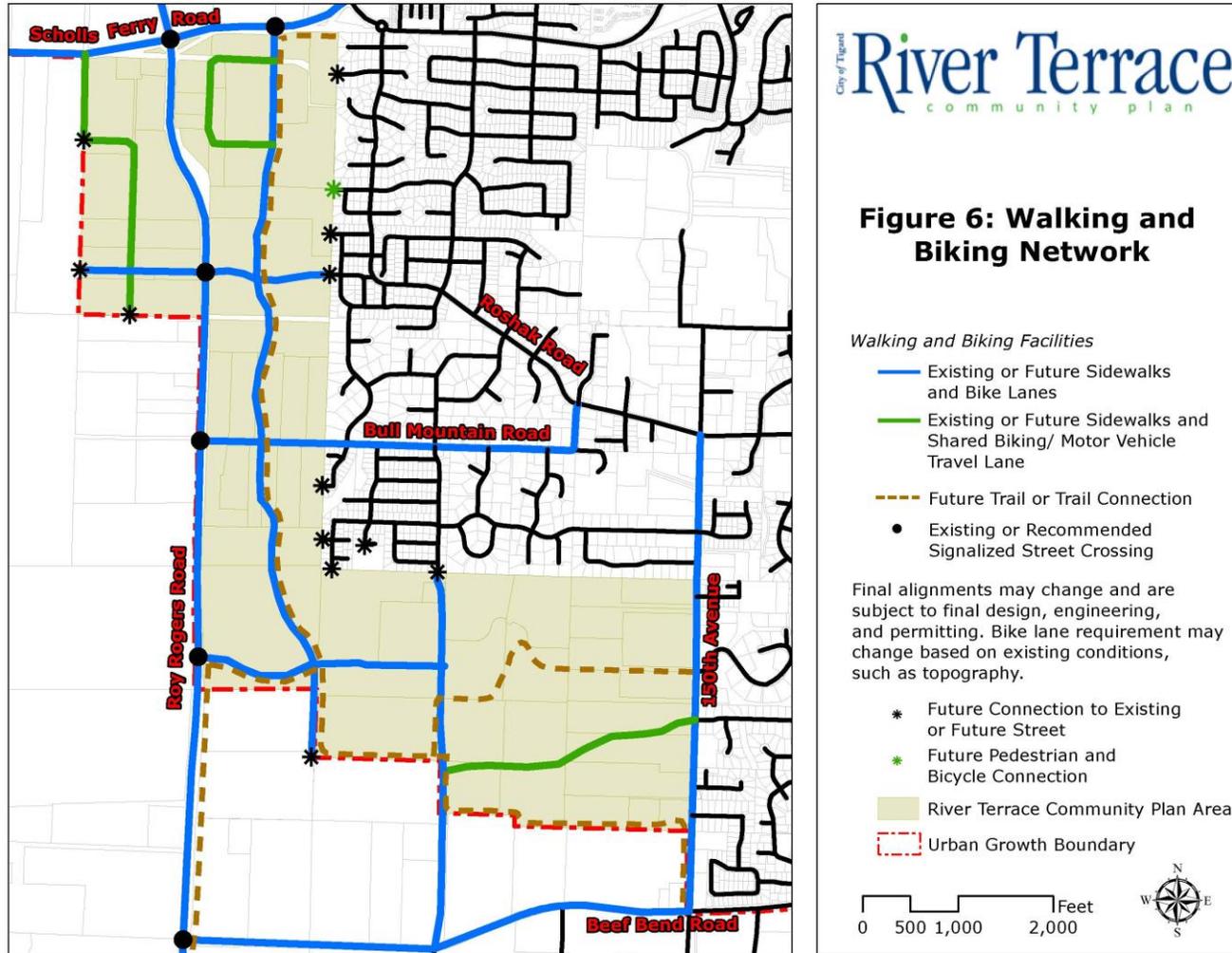
Crossings along Roy Rogers Road must comply with the Washington County mid-block crossing policy.¹⁰ Each proposed crossing would have to be evaluated based on existing and planned roadway characteristics, observed speeds and volumes, pedestrian trip generators, proximity of existing traffic signals, sight distance, topography and other considerations. At-grade crossings are not permitted

¹⁰ 2035 Washington County Transportation System Plan, Chapter 4- Active Transportation and Transit, Page 4-24, Draft, January 2013

within 300 feet of an existing signalized intersection. Due to the travel speeds, and expected widening of Roy Rogers Road, the County standard would likely require pedestrian actuated signals/beacons or pedestrian over- or under-crossings. Since traffic signals will likely be needed at several proposed and existing intersections along Roy Rogers Road between Scholls Ferry Road and Beef Bend Road (see Figure 6), including the Lorenzo Lane extension, Bull Mountain Road, and the new E-W Collector south of Bull Mountain Road, no additional crossings of Roy Rogers Road are recommended.

Scholls Ferry Road is currently being widened to urban standards. River Terrace residents will need safe and convenient places to cross to access the new proposed high school at the northwest corner of Scholls Ferry Road and Roy Rogers Road, various future South Cooper Mountain trails, and other services and amenities to the north. As envisioned, the new N-S Collector Street currently intersects Scholls Ferry Road approximately half way between the Roy Rogers Road/ Scholls Ferry Road and the Barrows Road/ Scholls Ferry Road intersections. The new N-S Collector Street is expected to be heavily used by pedestrians and bicyclists since it includes the River Terrace Trail in its design. As such, the final recommendation for this intersection includes a signal at the Scholls Ferry Road/ New N-S Collector intersection for the benefit of all travel modes. Until such time as a signal is warranted, however, it will be important to consider a pedestrian signal as an interim or permanent intersection improvement.

Figure 6: Pedestrian and Bicycle Framework



Transit

The River Terrace Community Plan sets the stage for future transit, recognizing that the type and extent of service improvements will play out over time. Specifics of transit service will depend on the actual rate and type of development built, Tri-Met resources and policies, and consideration of local options. The land use designations in the River Terrace Community Plan area make transit a viable option in the future.

Both Beef Bend Road and Bull Mountain Road have been identified on the 2035 Conceptual Bus Network in the Regional Transportation Plan. While these streets are not guaranteed to have transit service in the future, they have been identified by the region as important bus connections from the River Terrace area to Highway 99W. In addition, Tri-Met's Westside Service Enhancement Plan envisions future express bus service along Scholls Ferry Road from Washington Square to Roy Rogers Road. This route could potentially include a bus stop near the proposed signalized intersection of the new N-S Collector Street with Scholls Ferry Road. Service would potentially run daily throughout most of the day with fairly frequent service (15 to 20 minute headways) during peak times and half-hour to hour headways during off times. The River Terrace Community Plan will provide walking and biking accommodations and connections that enhance the future viability of potential transit service along these routes.

Summary of Transportation System Recommendations

Intersection improvements needed to support future growth and new development within the River Terrace Community Plan area are summarized in Table 3. Overall, an estimated \$164 million in transportation system improvements are expected to be needed to support the growth conceptually planned for in the full planning area. Of these investments, an estimated \$94 million are needed in the River Terrace area (see Table 5), while over \$70 million are needed outside of the River Terrace area (see Table 6).

Estimated costs for individual projects are shown in Tables 5 and 6, but not all of these costs are meant to be born by River Terrace alone. Financial responsibility for these improvements are to be shared by the city, Washington County, ODOT, and private development, with cost shares to be sorted out at a later date. Cost estimates include planning level costs for construction, engineering, and project administration. They also include some basic assumptions about the need for bridges and stormwater facilities to treat and manage street runoff. Projects 1, 5, 6, 7, 10, 12, and 22 assume bridges. Project costs are subject to change based on final design, engineering, and permitting.

The recommended improvements can be seen in Figures 7 and 8, with the project numbers corresponding with those in Tables 5 and 6. Not all recommended improvements are required to be in place prior to developing land within the River Terrace Community Plan area. In general, the need to upgrade existing streets and intersections will be driven by the multi-modal access needs of adjacent properties.

Several of the projects listed in Tables 5 and 6 and shown on Figures 7 and 8 were previously identified in other studies or plans surrounding the River Terrace Community Plan area, such as the Tigard Transportation System Plan, Washington County Transportation System Plan, Metro Regional Transportation Plan, and West Bull Mountain Concept Plan. This updated system analysis reaffirms the need for these improvements, many of which are driven by regional traffic issues and are not entirely caused by growth within the River Terrace Community Plan area.

Table 5: Recommended Transportation System Improvements in River Terrace

Project ID	Project Description	Project Summary	Total Estimated Cost	Jurisdiction
Projects Constructing New Streets and Trails in River Terrace				
1	Neighborhood Route (west of Roy Rogers Rd)	Create a new north-to-south 2-lane city neighborhood route, west of Roy Rogers Road	\$7,000,000	Tigard
2	Lorenzo Lane Extension (west of Roy Rogers Rd)	Extend Lorenzo Lane from the west UGB to Roy Rogers Road, as a 2-lane city collector street	\$2,500,000	Tigard
3	Lorenzo Lane Extension (east of Roy Rogers Rd)	Extend Lorenzo Lane from Roshak Road to Roy Rogers Road, as a 2-lane city collector street with on-street parking	\$3,500,000	Tigard
4	Neighborhood Route (east of Roy Rogers Rd, north of Lorenzo Ln)	Create a new 2-lane city neighborhood route, linking the properties adjacent to Roy Rogers Road with the new N-S Collector Street	\$4,000,000	Tigard
5	N-S Collector Street (east of Roy Rogers Rd, Scholls Ferry Rd to Lorenzo Ln)	Create a new north-to-south 3-lane city collector street and trail, between Scholls Ferry Road and the Lorenzo Lane extension*	\$13,000,000	Tigard
6	N-S Collector Street (east of Roy Rogers Rd, Lorenzo Ln to Bull Mountain Rd)	Create a new north-to-south 3-lane city collector street and trail, between the Lorenzo Lane extension and Bull Mountain Road*	\$10,000,000	Tigard
7	N-S Collector Street (east of Roy Rogers Rd, Bull Mountain Rd to South UGB)	Create a new north-to-south 3-lane city collector street and trail, between Bull Mountain Road and the South UGB*	\$17,000,000	Tigard
8	E-W Collector Street (Roy Rogers Rd to N-S Collector Street)	Create a new east-to-west 2-lane city collector street, between Roy Rogers Road and the new N-S Collector	\$2,500,000	Tigard

Project ID	Project Description	Project Summary	Total Estimated Cost	Jurisdiction
Street				
9	E-W Neighborhood Route (N-S Collector Street to 161st Ave)	Create a new east-to-west 2-lane city neighborhood route, between the new N-S Collector Street and 161 st Avenue	\$2,500,000	Tigard
10	161st Avenue Extension (Hazeltine Ln to Woodhue St Extension)	Extend 161 st Avenue from Hazeltine Lane to the Woodhue Street Extension, as a 2-lane city neighborhood route	\$5,000,000	Tigard
11	161st Avenue Extension (Woodhue St Extension to Beef Bend Rd)	Extend 161 st Avenue from the Woodhue Street Extension to Beef Bend Road, as a 2-lane city neighborhood route**	\$3,500,000	Washington County/ Tigard
12	Woodhue Street Extension (161st Ave Extension to 150th Ave)	Extend Woodhue Street from 150th Avenue to the 161st Avenue Extension, as a 2-lane city neighborhood route	\$6,000,000	Tigard
NA	East-West River Terrace Trail and Connection	Construct River Terrace Trail and trail connection from Roy Rogers Rd to 150 th Ave	\$6,500,000	Tigard
TOTAL (Projects Constructing New Streets/Trails in River Terrace)			\$83,000,000	
Projects Improving Existing or Proposed Intersections in/adjacent to River Terrace				
13	Roy Rogers Road/ New E-W Collector Street Intersection Improvement	Install a traffic signal	\$1,000,000	Washington County
14	Roy Rogers Road/ Bull Mountain Road Intersection Improvement	Install a traffic signal	\$1,000,000	Washington County
15	Roy Rogers Road/ Lorenzo Lane Extension Intersection Improvement	Install a traffic signal	\$1,000,000	Washington County
16	Scholls Ferry Road/ New N-S Collector Street Intersection Improvement	Install a traffic signal***	\$1,000,000	Washington County
17	New Neighborhood Route east of Roy Rogers/ New N-S Collector Street Intersection Improvement	Install a roundabout****	\$1,500,000	Tigard

Project ID	Project Description	Project Summary	Total Estimated Cost	Jurisdiction
18	Bull Mountain Road/ New N-S Collector Street Intersection Improvement	Install a roundabout****	\$1,500,000	Tigard
19	New E-W Collector Street/ New N-S Collector Street Intersection Improvement	Install a roundabout****	\$2,000,000	Tigard
20	Woodhue Street Extension/ 161 st Avenue Extension Intersection Improvement	Install a roundabout****	\$2,000,000	Tigard
TOTAL (Projects Improving Existing/Proposed Intersections in River Terrace)			\$11,000,000	
Total Recommended Transportation System Improvements in River Terrace			\$94 million	

* This cost estimate assumes a concrete street. Final pavement selection to be determined at time of development.

** The majority of this segment is outside River Terrace and the Urban Growth Boundary (UGB) but within Washington County. Street improvements outside the UGB require a rule exception per OAR 660-012-0070.

*** Signal to be installed when it meets warrants. Intersection design and signal must meet operational standards. At the very least, a pedestrian signal should be considered as an interim or permanent intersection improvement at this location.

**** Roundabouts are preferred at these locations but other intersection improvements may be approved by the City Engineer. All intersection improvements subject to more detailed traffic analysis and design and emergency access review at the time of development.

Table 6: Recommended Transportation System Improvements Outside River Terrace

Project ID	Project Description	Project Summary	Total Estimated Cost	Jurisdiction
Projects Upgrading Existing County Streets adjacent to River Terrace				
21	Bull Mountain Road Upgrade to Urban Standards	Improve to a 2/3-lane county collector from Roy Rogers Road to Roshak Road*	\$4,000,000	Washington County & Tigard
22	Roy Rogers Road-175th Avenue Upgrade to Urban Standards	Improve to a five-lane county arterial from just north of Scholls Ferry Road to just south of Beef Bend Road. Will likely need to be completed in two phases, with the first phase stopping at the south UGB	\$35,000,000	Washington County
23	150th Avenue Upgrade to Urban Standards	Improve to a 2/3-lane county collector from Bull Mountain Road to Beef Bend Road	\$4,000,000	Washington County

Project ID	Project Description	Project Summary	Total Estimated Cost	Jurisdiction
NA	Street Connection Improvements	Street improvements at various locations where new streets connect to existing streets	\$2,500,000	Washington County
TOTAL (Projects Upgrading Existing County Streets adjacent to River Terrace)			\$45,500,000	
Projects Improving Existing or Proposed Intersections outside River Terrace				
24	Highway 99W/ Walnut Street Intersection Improvements	Improvements such as additional turn lanes (Tigard TSP Project # 66j)**	\$10,000,000	ODOT
25	Highway 99W/ Bull Mountain Road Intersection Improvements	Improvements such as additional northbound left turn lane (would require an additional receiving lane on Bull Mountain Road)**	\$5,000,000	ODOT
26	Highway 99W/ Durham Road Intersection Improvements	Improvements such as additional turn lanes (Tigard TSP Project # 66n)**	\$10,000,000	ODOT
NA	Other Intersections Beyond River Terrace Study Area Intersections	Other intersections to be added to this list in the future where River Terrace traffic significantly impacts existing intersections on major corridors**	**	ODOT/ Washington County/ Tigard
TOTAL (Projects Improving Existing/Proposed Intersection outside River Terrace)			25,000,000+	
Total Recommended Transportation System Improvements Outside River Terrace			\$70.5+ million	

* Portions of this segment are in the city.

** The project cost attributed to River Terrace will be a proportionate amount based on the number of trips added by River Terrace divided by the capacity added by the improvement.

TSP Amendments

The following provides a summary of the recommended amendments to the Tigard Transportation System Plan resulting from the River Terrace Community Plan.

- The recommended transportation system improvements, shown in Tables 5 and 6, should be adopted to the TSP Multi-Modal Project Improvement List.
- The updated street functional classifications for the River Terrace area should update the classifications shown in the West Bull Mountain Concept Plan. Figure 3 in this document

should provide a supplement to Figure 5-2 in the Tigard TSP for the River Terrace Community Plan area.

- The recommended street design for the future collector street through the neighborhood commercial area (Lorenzo Lane extension) includes on-street parking. The street characteristics table (Table 18.810.1 of the Street Utility Improvement Standards) currently only allows on-street parking along collector streets in the downtown urban renewal district. This should be modified to allow on-street parking in Neighborhood Commercial Centers or other mixed-use areas.
- The recommended street design for the main N-S Collector Street through River Terrace, also known as River Terrace Boulevard, includes many unique design features, such as a trail, that are not currently reflected in any of the city’s existing cross sections. A new cross section should be added to the street characteristics table (Table 18.810.1 of the Street Utility Improvement Standards) to allow this design.
- The typical street cross sections should be modified to include a caveat that in situations where a trail is adjacent to the street, the side of the street adjacent to the trail may not be required to provide additional walking and biking facilities.
- A v/c ratio of 0.99 during the peak hour is recommended as the performance measure for city streets in the River Terrace area. This is consistent with the Metro Regional Transportation Plan mobility target for “Neighborhoods.” Where significant alternative mode provisions are provided that would substantially reduce vehicular travel demand, those effects may be considered in calculations to determine if this standard is met. This recommendation only applies to city streets. County facilities are subject to county performance measures.

Figure 7: Recommended Transportation Improvements in/near River Terrace

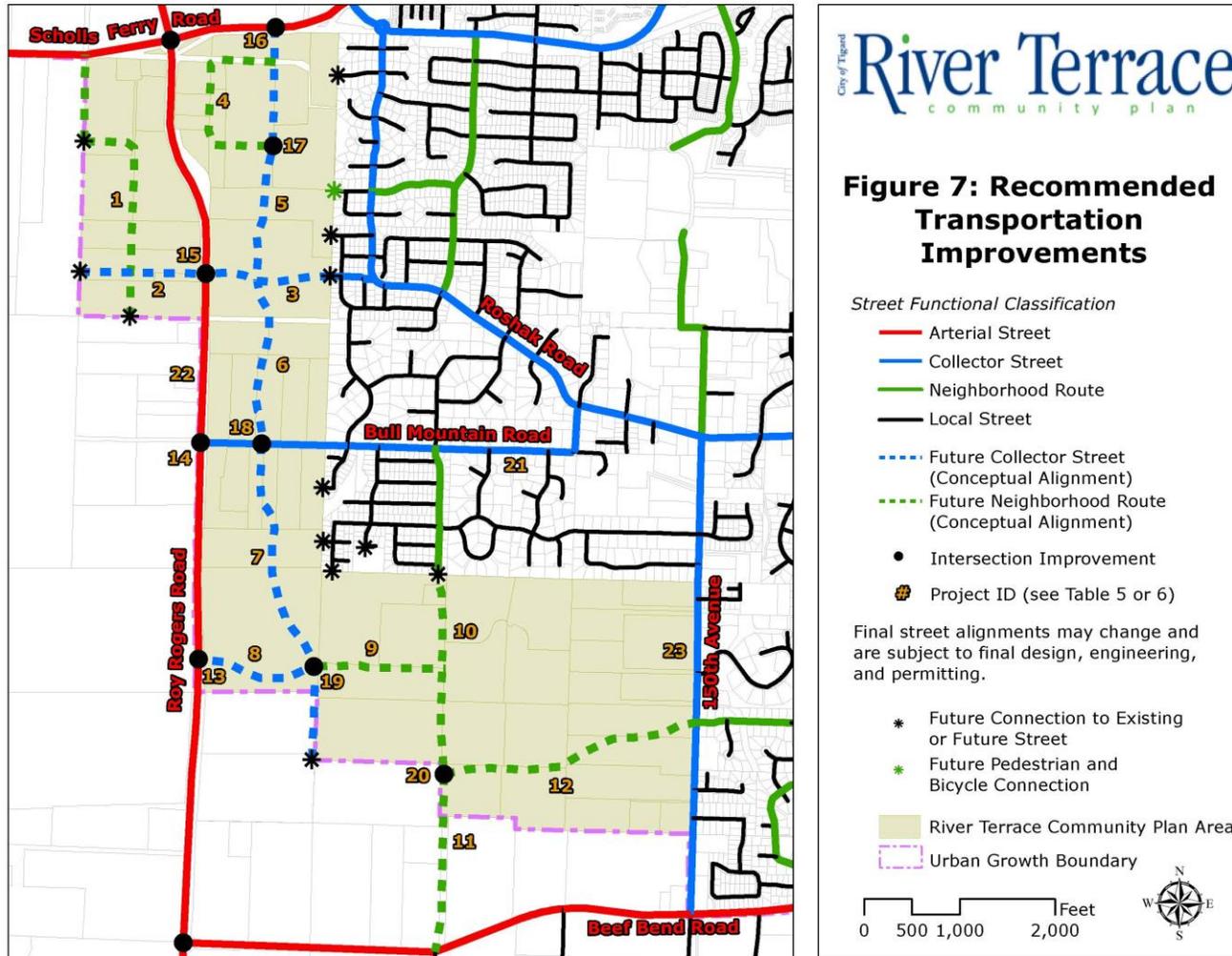


Figure 8: Recommended Transportation Improvements Outside River Terrace

