Tonquin Trail Feasibility Study

July 2004

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PLANNING + DESIGN

TONQUIN TRAIL FEASIBILITY STUDY

July 2004

Prepared for:

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City of Tualatin
City of Wilsonville
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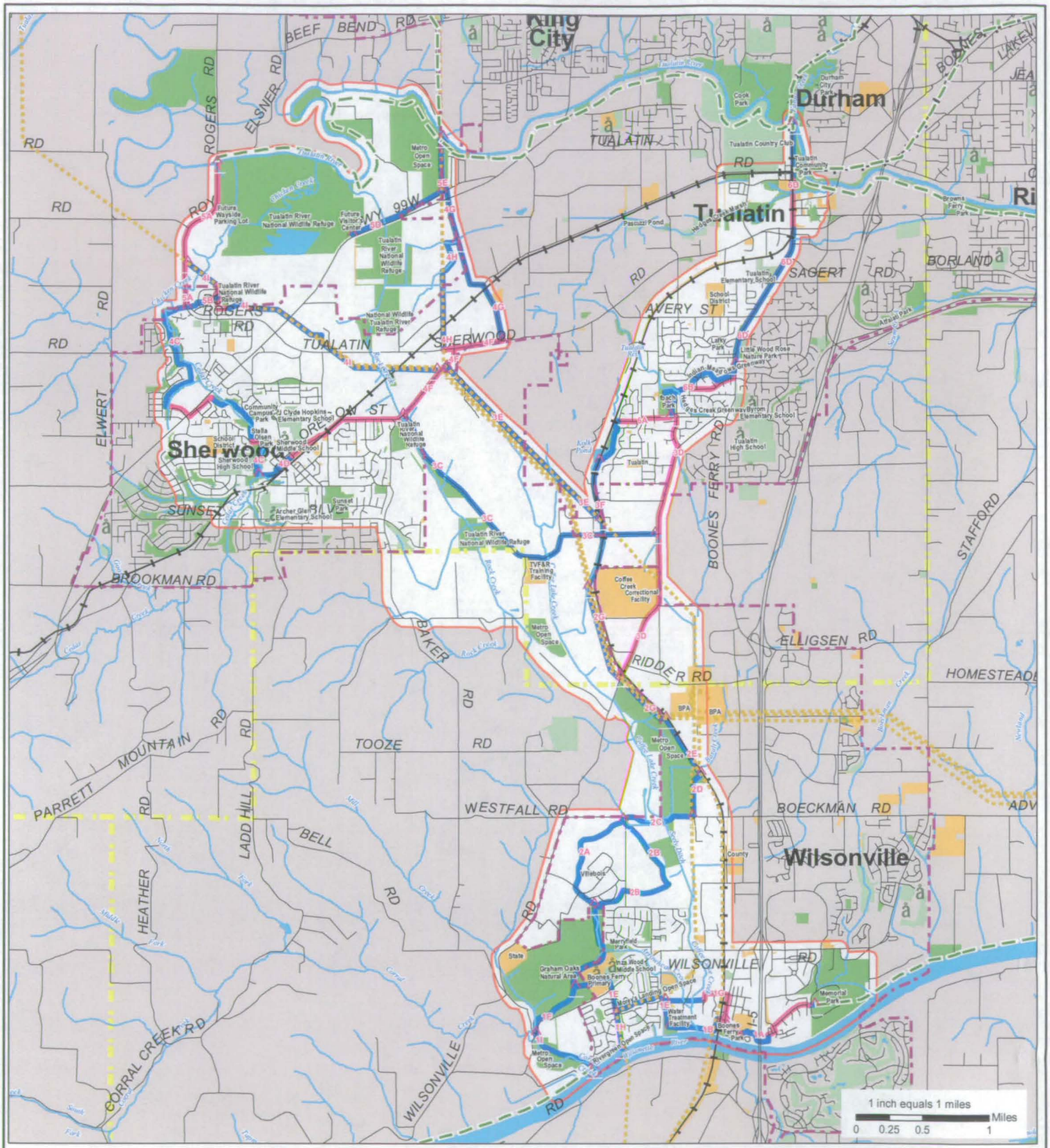

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Cover Photos:
Looking north at the kolk ponds in Tualatin (Johnnie and William Koller Wetlands Park)
Metro-owned property along the Coffee Lake Creek Wetlands in Wilsonville
Along the boardwalk in Stella Olson Park in Sherwood

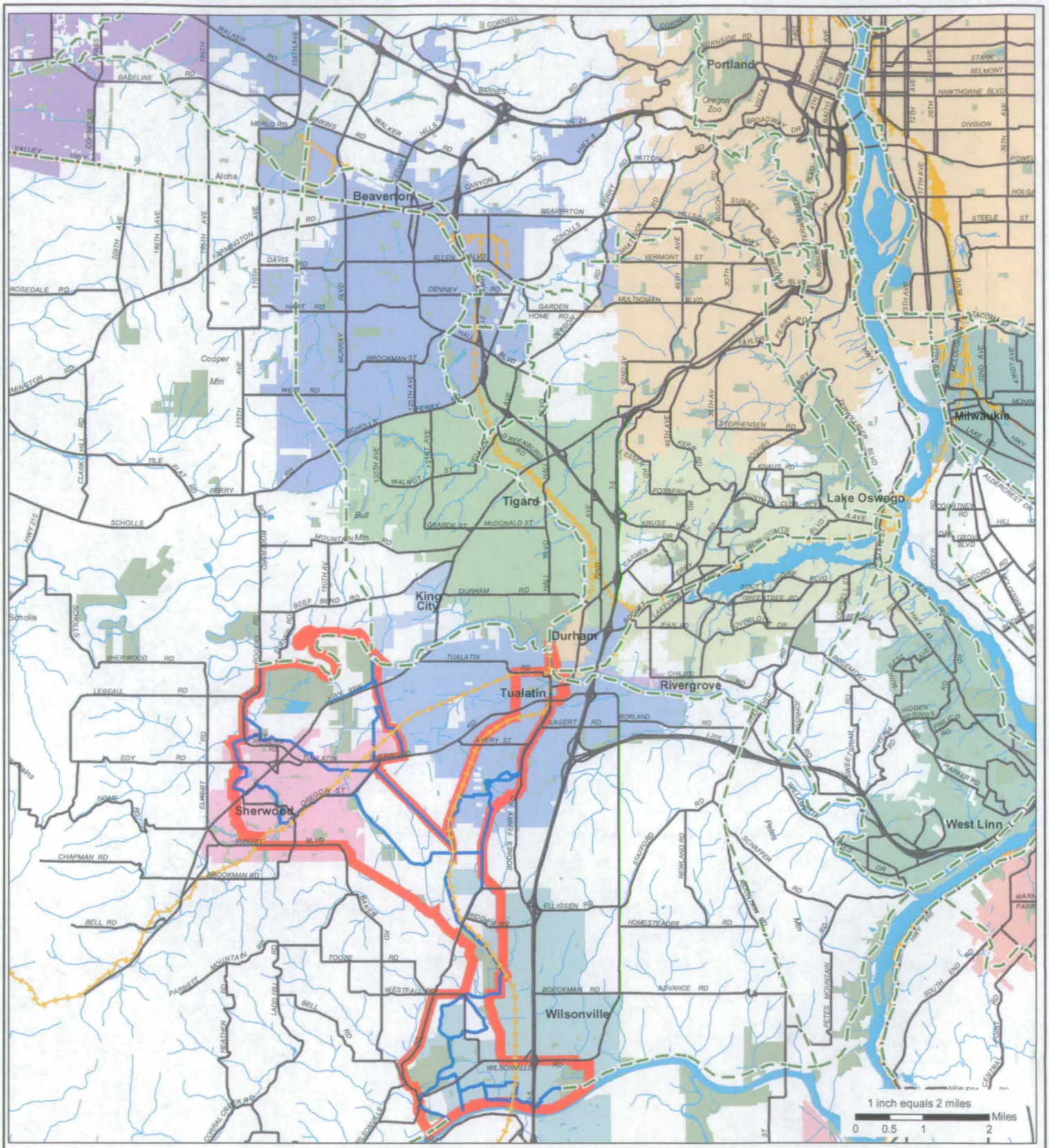
Executive Summary

The Tonquin Trail Feasibility Study examines the potential alignments for a regional non-motorized trail that links the cities of Wilsonville, Sherwood, and Tualatin. The trail, when built, will also serve to connect the Willamette and Tualatin Rivers, the existing Fanno Creek Greenway Trail, and the future Willamette and Tualatin River Greenways, thereby making it an important regional project. The purpose of this study is to provide the preliminary foundation to plan, design, and construct the trail segments. This study summarizes the existing conditions in the area, describes and evaluates alignment options, and presents some pertinent information with regard to the design, phasing, and implementation of the trail. The City of Wilsonville, the City of Tualatin, the City of Sherwood, Washington County, U.S. Fish and Wildlife Service, Metro, and other local partners worked together to create this document.

The Tonquin Geologic Area has been identified by Metro as a regionally-significant open space that warrants preservation. The uniqueness of the landscape is what prompted Columbia Region Association of Governments (CRAG), the predecessor of Metro, to propose acquisition of these lands as early as 1971. Metro listed the area as a unique open space to be protected under its *Metropolitan Greenspaces Master Plan* in 1992. Using money from a 1995 voter-approved bond measure, Metro has purchased 487 acres in the Tonquin area. Metro updated the conceptual alignment for the Tonquin Trail on the Regional Bicycle System map and Regional Pedestrian System map as part of the Regional Transportation Plan (RTP) in December of 2003.

The Tonquin Trail is basically in the shape of a 'Y,' with the length of each leg of the 'Y' equal to about 4 miles. The total length of the completed trail will therefore be about 12 miles. The base of the 'Y' begins at the Willamette River in Wilsonville. A northwestern spur extends past Sherwood and a northeastern spur reaches Tualatin.

Overall, much of the Tonquin Trail is feasible to develop as a regional trail. Many portions of the trail will be planned for construction over the next year. This includes the portion of trail in the Graham Oaks Natural Area (formerly the Wilsonville Tract), the Villebois development, and the trail along the Boeckman Road extension. These segments should be completed by 2008, and will connect the Willamette River and the Coffee Lake Creek Wetlands. Also, the construction of some trail segments rely on future opportunities such as the planned I-5/99W Connector or the proposed water line/trail being considered by the City of Sherwood. As a regional trail, the future success of the Tonquin Trail will require a joint effort by multiple agencies and local jurisdictions. Future Regional Transportation Plan (RTP) amendments are needed to add the project to the RTP Financially Constrained System, which would make preliminary engineering and construction of the project eligible for federal and state funding. When built, the Tonquin Trail will provide tremendous opportunities for transportation, recreation, and environmental education in this region.



Tonquin Trail

Connecting the Willamette River to the Tualatin River

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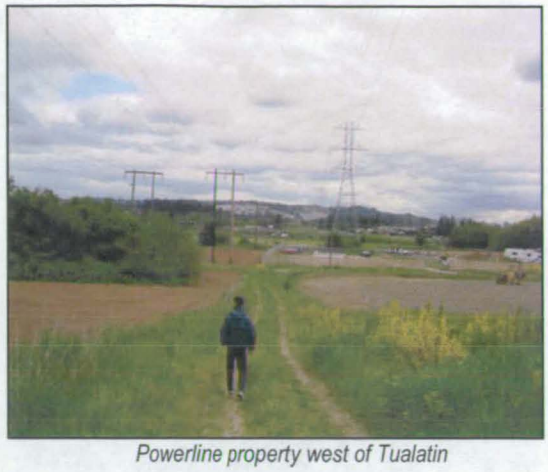
Introduction

The Tonquin Trail, when built, will connect the Willamette River with the Tualatin River. It could also provide access to the Tualatin River National Wildlife Refuge, schools, neighborhoods, parks, employment centers, town centers, and the Tonquin Geologic Areas. Sections of the Tonquin Trail are already being designed for construction, including the trails in Graham Oaks Natural Area (a regional Metro/City of Wilsonville park project formerly known as the Wilsonville Tract). The Tonquin Trail is basically in the shape of a 'Y,' with the length of each leg of the 'Y' equal to about 4 miles. The total length of the completed trail will therefore be about 12 miles. The base of the 'Y' begins at the Willamette River in Wilsonville. The northwestern spur extends past Sherwood ending at the Tualatin River, and a northeastern spur reaches Tualatin, also terminating at the Tualatin River.



Powerline property west of Tualatin

This study examines the potential alignments for a regional non-motorized trail that connects the cities of Wilsonville, Sherwood, and Tualatin. This trail will also connect with the existing Fanno Creek Greenway Trail and the future Tualatin River Greenway, thereby making it an important regional project. The purpose of this study is to provide the preliminary foundation to plan, design, and construct the trail segments. This study summarizes the existing conditions in the area, describes and evaluates the options, and presents some pertinent information with regard to the design, phasing, and implementation of the trail. This study is a cooperative effort undertaken by the City of Wilsonville, the City of Tualatin, the City of Sherwood, Washington County, U.S. Fish and Wildlife Service, Metro, and other local partners. Representatives from these organizations served on a Working Group to guide the development of this study.

For planning purposes, the Tonquin Area has been divided into seven (7) segments of equal size. These segments include multiple possibilities for the trail. Aerial base maps with have been produced for each study segment and a summary sheet has been produced for each segment. Also, a description of the potential trail alignments is included in a matrix that corresponds to the aerial maps.

Existing Conditions

A multitude of factors have converged on the Wilsonville, Sherwood, and Tualatin area, prompting the need to look more closely at the feasibility of the Tonquin Trail. Some of these forces have been at work for 15,000 years, but other energies are just beginning to arise. From the Bretz Floods to the planned Villebois Development, there are numerous reasons that make this area suitable for a regional trail.

Located between Tualatin (to the north), Wilsonville (to the south), and Sherwood (to the west and north), the Tonquin area consists of numerous "kolk[1]" ponds, wetlands, hills, and ridges between the Willamette River and the Tualatin River. There are about 14 scoured out "kolk" ponds between Tualatin and Sherwood. Between Tualatin and Wilsonville, the Coffee Lake Creek Wetlands provide an important wildlife corridor. To the north of this area, Rock Creek provides another important wildlife corridor. This creek was actually a large river before a geological upheaval diverted it.

Planning History

The uniqueness of the landscape is what prompted the Columbia Region Assoc. of Governments (CRAG), the predecessor of Metro, to propose acquisition of these lands as early as 1971. Metro listed the area as a unique open space to be protected under its *Metropolitan Greenspaces Master Plan* in 1992 and *Open Space Bond Measure Acquisition Plan* in 1995. Metro purchase 487 acres in the area, primarily using these voter-approved bond funds. In terms of the trail, Metro added a conceptual alignment for the Tonquin Trail to the Regional Bicycle System Map and Regional Pedestrian System Map as part of the Regional Transportation System Plan (RTP) in December of 2003.

Geological History

About 15,000 years ago, a glacial ice dam in western Montana gave way and released a torrential deluge of ice, rock, debris and water across Western Montana and Idaho, along the Columbia River Gorge through Washington and Oregon all the way to the Willamette Valley. This, along with other associated events known as the Bretz (or Missoula) Floods, scoured the landscape, carrying large boulders and carving out new geological formations. The Tonquin Geologic Area south of Portland, Oregon, is one of the areas that was transformed by this great flooding[2].

The Kolk ponds pictured here in Wilsonville were carved by the Bretz Floods

Cultural History

The Willamette Valley was once a giant lake that provided a home to mastodons and other mammals that roamed its shores. Gradually, the lake receded, and the local Native Americans, the Kalapuya Indians, utilized the land for hunting and travel. The Atfalati, or the Tualatin Indians, were the branch of the Kalapuya that lived in this region. They traveled from the Willamette River to the slopes of the Coast Range and from present day Wilsonville to the Columbia River. The Atfalati set up winter camps near present day Beaverton and Cedar Mill, while the warmer months found them

[1] Kolk ponds are pot-hole lakes carved out by large-scale floods.

[2] Allen, John Eliot and Marjorie Burns. 1986. *Cataclysms on the Columbia.* Portland, OR: Timber Press.

roaming the valley for plants to harvest, fish to catch, and animals to hunt. They traveled from dozens of small villages along the Tualatin River in cedar canoes to trading centers near present day Oregon City. The arrival of the fur traders and explorers in the late 19th century signaled a decline for the Tualatin Indians.

Following the fur traders and explorers, farmers settled **Sherwood** as early as 1853. By 1870, the area around present day Sherwood was experiencing a steady stream of settlers and their families. In 1885, J.C. Smock granted the railroad a right-of-way through his property, and in 1889, he named the town that developed around the streets near the railroad tracks, "Smockville." When the town was officially incorporated in 1892, the town leaders settled on Sherwood, a more "sophisticated" sounding name. The name was inspired by the nearby forest, which reminded some residents of England's Sherwood Forest. By 1911, the population of Sherwood had grown to 350 residents, and the town limits were one square mile. Today, Sherwood's city limits have expanded to 4.5 miles, and the population has blossomed to over 14,000 people.

At the same time that farmers were settling into present day Sherwood, Samuel Galbreath began a ferry service across the Tualatin River. In 1856, Galbreath built the first bridge crossing the river, and the name of the town was changed from Galbreath to Bridgeport. Bridgeport thrived by attracting business from Portland throughout the Willamette Valley, based on its location along Boones Ferry Road. In 1886, the town of **Tualatin** emerged on the banks of the Tualatin River opposite Bridgeport. Platted by John Sweek, who profited from the sale of a right-of-way to the Portland & Willamette Railway Company, Tualatin grew rapidly. Tualatin was incorporated in 1913. The population has grown considerably, and today Tualatin has over 24,000 residents. The bones of the first resident of Tualatin, Tu Tu Tuala, a female mastodon, believed to be approx 11,300 years old, were found in 1947 and can be seen today at City Hall.

Before the construction of the I-5 Bridge, the Boones family ferried Oregonians across the Willamette

Further south, Alphonso Boone was the first settler of present day **Wilsonville** when he arrived by wagon train in 1846 with his family. Alphonso Boone was the grandson of the famous pioneer, Daniel Boone. Shortly after, Alphonso Boone and his son Jesse began ferry service across the Willamette River. The ferry, along with the newly built Boones Ferry Road, allowed travel and commerce between Salem and Portland. The community of Boones Landing sprang up around the ferry landing and the newly built road. In 1880, the community's name was changed to Wilsonville, in honor of the town's first postmaster. The start of the 20th century saw the railroad transform Wilsonville. When the railroad trestle was completed in 1907, the new train depot became the hub of activity and businesses moved north from the riverbank to be closer to the depot. The ferry operation still flourished, making as many as 300 trips a day across the river, until it closed in 1954 with the opening of the I-5 Boones Bridge. The freeway stimulated population growth in Wilsonville, from 3000 people in the mid-1980's to over 15,000 people today.

Recent Activity

Growth

Wilsonville, Sherwood, and Tualatin are all experiencing rapid growth and development. The most significant single development is the Villebois mixed-use "village" in Wilsonville. The new development, designed by Costa Pacific Communities, will provide 2,300 new residential units of varying size and configuration. It will also have commercial retail spaces, internal parks, and a central plaza. This 480-acre development is bordered to the east and south with recently acquired Metro open space. The Villebois developers understand the importance of trails and open space and want to connect their internal network of off-street trails to the larger regional trail system.

Property Acquisitions

Over the past nine years, Metro has acquired 487 of acres of greenspaces in the Tonquin area. These include over 184 acres in the Coffee Lake Creek Wetlands, and also the 230-acre Graham Oaks Natural Area (formerly known as the Wilsonville Tract). This also includes more than 21,000 lineal feet of stream frontage. The Graham Oaks Natural Area property is a mix of forested terrain, seasonal wetlands, and open farmland, with some frontage on Mill Creek. The property is adjacent to Boones Ferry Primary School, Wood Middle School, and the West Linn - Wilsonville School District's Center for Research in Environmental Sciences and Technologies (CREST), an environmental learning center for students and citizens.

Partnerships

As a regional trail, there are multiple agencies that will have a stake in the future of the Tonquin Trail. This includes the Cities of Wilsonville, Tualatin, Sherwood, Tigard, Washington County, Clackamas County, U.S. Fish and Wildlife Service, Three Rivers Land Conservancy, Tualatin River Keepers and Metro. Most of these agencies and non-profit organizations have been involved in the study's planning process.

The 230-acre Graham Oaks Natural Area greenspace is a joint project between Metro and the City of Wilsonville

Environmental Education

The Tonquin Geologic Area provides a glimpse at the power of nature worthy of interpretation. In addition, the 1,268 acres of Tualatin River National Wildlife Refuge land along with the over 487 acres of open space acquired by Metro, and the presence of the West Linn-Wilsonville School District's Environmental Learning Center, provides many opportunities for environmental education. The trail has the potential to connect to and capture these environmental resources, becoming the primary means for the public to experience these resources.

Planning Efforts

A number of related planning efforts are underway in the Tonquin area that may affect the future of the Tonquin Trail.

The planning effort with the greatest potential impact on the Tonquin Trail is the **I-5/Hwy 99W Connector Study**. This study is being led by Washington County, in coordination with ODOT, Metro, Clackamas County, and the Cities of Sherwood, Tualatin and Wilsonville. The study will

address the alignment and function of an arterial connection in the general corridor. Some of the concepts that will be explored will identify possible arterial connections using existing road alignments as much as possible. No specific funding or alignment has been identified thus far. A number of options are being considered, including using existing roads such as Tualatin-Sherwood Rd., Tonquin Rd., and Boeckman Rd. The connector should accommodate potential Tonquin Trail connections in the Sherwood area.

TriMet is currently studying the use of the north-south Portland & Western railroad corridor for **high-speed commuter rail**. The environmental work and preliminary engineering have been completed. The Federal Transit Administration has given TriMet approval to proceed into final design. The proposed 14.7-mile project would travel between the Beaverton Transit Center and Wilsonville, and would also serve the communities of Tigard and Tualatin. According to TriMet, the Commuter Rail will operate weekdays every 30 minutes during morning and afternoon rush hours and the trains will travel at an average speed of 37 miles per hour, with a top speed of 60 miles per hour. The Wilsonville Station is proposed to be located in the industrial area of Wilsonville, west of I-5, and the Tualatin station would be located along the trackway adjacent to Haggen's Market, near Tualatin-Sherwood Road and Boones Ferry Road.

Additional planning efforts in the area have been recently completed or are now underway. Metro is leading a study to identify additional **industrial lands** within the Urban Growth Boundary in the vicinity of the Tonquin Geologic Area.

Stella Olsen Park in Sherwood features trails and boardwalks through wetlands areas

The City of Wilsonville, in coordination with the Oregon Department of Transportation and Metro, recently completed an Environmental Assessment (EA) for the **Boeckman Road —Tooze Road Connector** Project. The project will extend and connect the western terminus of Boeckman Road to Tooze Road and widen and reconstruct Tooze Road between 110th Avenue and Grahams Ferry Road and Boeckman Road between 95th Avenue and the new connection. The EA assessed the impacts of different alignment options (to nearby businesses, residents, land, and wildlife, for example), and identified ways to avoid or minimize impacts. The Boeckman Road-Tooze Road Connector had been identified as a critical east-west arterial in Wilsonville's Transportation System Plan (2003). The road will include a 10' trail on the south side of the roadway to provide a connection for the Tonquin Trail. Construction should be completed by December of 2006.

The City of Sherwood recently completed a streetscape master plan and is working on a new Transportation System Plan, while the City of Wilsonville recently completed its Transportation System Plan, and is beginning work on a new Bicycle and Pedestrian Master Plan, and a Parks and Recreation Master Plan. Additionally, the City of Tualatin is working on a number of planning projects including the Eastside Downtown Plan and plans for the Tualatin River bicycle-pedestrian crossing to connect to the Fanno Creek Greenway Trail and the planned Tualatin River Greenway Trail.

Environmental and Land Use Characteristics

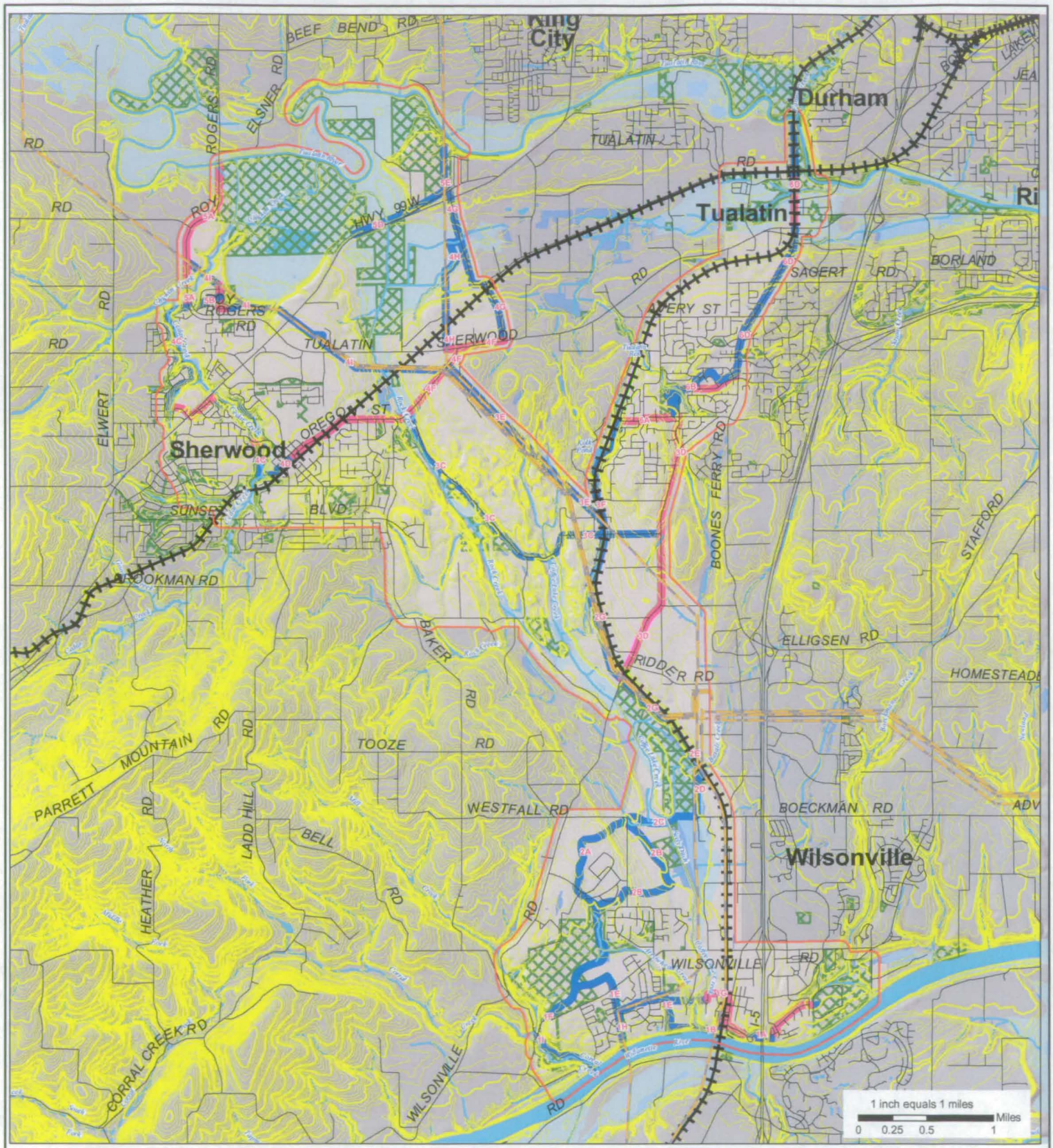
The area features numerous wetlands, streams, and lakes. There are also numerous forested canyons, hills and steep slopes that were carved out by the Bretz floods. Vegetation includes big-leaf maple, Douglas fir, red alder and Western red cedar, along with vine maple and Oregon hazel. Birds include woodpeckers, nuthatches, warblers, flycatchers and other songbirds. Known mammals in the area include deer, raccoons, opossums and bobcats.

The kolk ponds south of Tualatin are remnants of the Bretz Floods

The numerous topological features created by the Bretz Floods create challenges for the trail. As can be seen in Figure 1, the Tonquin Trail will primarily follow lower elevation valleys in the area.

Though the project area encompasses a wide range of land use types with denser development prevalent to the north towards Tualatin and south in Wilsonville, much of the land use character is rural with considerable farm, orchard, and ranch lands present. Equestrian use of the area is clearly evident. Parcels tend to be large, which could provide some simplification of future trail easement negotiation. This characteristic may change as higher density development occurs within the Urban Growth Boundary. Higher density development is constrained by the presence of the Tonquin Geologic Area and its associated wetlands, streams, and geological formations that occupy the landscape.

The Tualatin Wildlife Refuge is home to numerous birds and mammals



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Proposed Trail Alignment Options
- On-Street Alignment
- Off-Street Alignment
- Trail Study Area
- BPA Powerlines
- Railroad Lines
- USGS 10' Contours
- USGS 50' Contours
- Public Parks and Open Space
- Streams and Rivers
- 100 Year Flood Plain
- Wetlands

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Figure 1: Tonquin Area Environmental Characteristics

Key Destinations near Tonquin Trail Study Area

Parks and Greenspaces

Memorial Park - Wilsonville

This large park provides passive and active recreation activities for Wilsonville's citizens and employees. There are playing fields, play equipment and several picnic areas. The park has internal walking and jogging paths and also provides a boat dock on the Willamette River.

Boones Ferry Park - Wilsonville

This small park is located at the historical location of the actual Boone's Ferry crossing of the Willamette River. There is an interpretive sign about the history of the ferry. This park provides visual access to the Willamette River. The park also functions as the trailhead for the Boones Ferry Park-Memorial Park path that leads pedestrians and cyclists along the Willamette River towards Memorial Park.

Willamette River Water Treatment Plant and Park - Wilsonville

This water treatment plant and park opened in 2002 and is accessible to the public during daylight hours. The facility has a paved path, a park area and water features. There are native plantings, interpretive signage and a viewing platform of the Willamette River.

Graham Oaks Natural Area - Wilsonville

This 230-acre open space is a mixture of forest, wetlands, open space, and a filbert orchard. Plans for this property include bicycle and walking trails, picnic shelters, interpretive signage, habitat restoration, and restrooms.

Sunset Park - Sherwood

The newly redesigned park will include a trail, two soccer fields, an interactive water feature and play areas.

Stella Olsen Park - Sherwood

Stella Olsen Memorial Park in downtown Sherwood includes upland forest, wetlands and Cedar Creek. The park has paved trails as well as boardwalk trails though the wetlands area. The park also hosts concerts and celebrations for the residents of Sherwood.

Tualatin River National Wildlife Refuge - Sherwood

The establishment of the Tualatin River National Wildlife Refuge began in 1992, led by local residents, the City of Sherwood, U.S. Fish and Wildlife Service, Metro, and other regional partners. The U.S. Fish and Wildlife Service has acquired 1,268 acres of the proposed 3,058-acre target and is in the process of planning for public use facilities on the Refuge. The Tualatin River National Wildlife Refuge is one of ten "Urban Refuges" in the United States and was established to protect, enhance, and manage upland, wetland, and riparian habitats for a variety of migratory birds, resident

The Tualatin River National Wildlife Refuge provides habitat for bald eagles, herons, and many other animal species.

fish and wildlife, as well as for the enjoyment of people. The Refuge is part of the National Wildlife Refuge System. The National Wildlife Refuge System is the only network of lands of the U.S. Fish and Wildlife Service that is devoted specifically to wildlife.

A groundbreaking ceremony for the construction of new visitor service facilities was held in May 2004. Construction is scheduled to begin in Summer 2004 with a goal of completion by mid-2005. Once this construction is complete, the Steinborn Unit of the Refuge will open to the public and will include entry road and parking area off 99W, wayside overlook off Roy Rogers Road, seasonal and year-round walking trails, wildlife and scenic overlooks, educational study sites and photography blind. Future plans call for an environmental education shelter, fishing platform, wildlife center and headquarters building. A map of the Refuge (Steinborn Unit) is included in the Appendices.

The Refuge's year-round trails and viewing areas will be fully ADA accessible. Bicycles will not be allowed on trails; however, bicycle racks will be available in parking areas. The trails will not be accessible to equestrians.

Johnnie and William Koller Wetland Park – Tualatin

This (as yet) undeveloped park contains the best examples of kolk ponds in the Tonquin area. The park property is publicly accessible, and an informal dirt path provides access to the kolk ponds and wetlands. The Tonquin Trail will most likely pass through this park, and the park could provide an excellent opportunity for environmental education.

The kolk ponds at Johnnie and William Koller Wetland Park are remnants of the Bretz floods

Ibach Park - Tualatin

Ibach Park (pronounced "I-back") is a 19.4-acre active park that has an award-winning playground that translates history into an interactive educational play area for children. The play area design reflects Tualatin's significant historic eras: pre-historic, Native American, and pioneer. Interpretive signs in the park offer information about the cultural as well as natural history of the area. The park also has trails connecting to the Hedges Creek Greenway

Tualatin Community Park - Tualatin

Tualatin Community Park is a large multi-purpose park with a boat ramp, restrooms and picnic facilities. The park will be connected to Cook Park in Tigard, Durham City Park, and the Fanno Creek Greenway Trail when the forthcoming Tualatin River bike/pedestrian bridge is completed in 2005.

Evidence of bike use at Wood Middle School in Wilsonville

Schools

A number of schools are located in the Tonquin Trail area. The planning and design of the trail should account for connections to these schools. The school names and addresses are included in Table 1.

Table 1: Schools in Area

Schools	Address
Wilsonville	
Boones Ferry Primary	11495 SW Wilsonville Road
Inza Wood M.S.	11055 SW Wilsonville Road
Wilsonville H.S.	6800 SW Wilsonville Road
Sherwood	
J Clyde Hopkins E.S.	800 N. Sherwood Blvd
Archer Glen E.S.	16155 Sunset Blvd
Sherwood M.S.	400 N. Sherwood Blvd
Sherwood H.S.	1155 Meinecke Road
Tualatin	
Byrom E.S.	21800 SW 91st St
Tualatin E.S.	19945 SW Boones Ferry Road
Tualatin H.S.	22300 SW Boones Ferry Road

Major Employment Centers

The Tonquin Trail can provide a route for commuters in the Sherwood, Tualatin, and Wilsonville areas. The study area includes a number of employment areas. Table 2 lists the largest employers in and near the study area. Additional employment centers may be added as Metro adds additional industrial parcels within the Urban Growth Boundary.

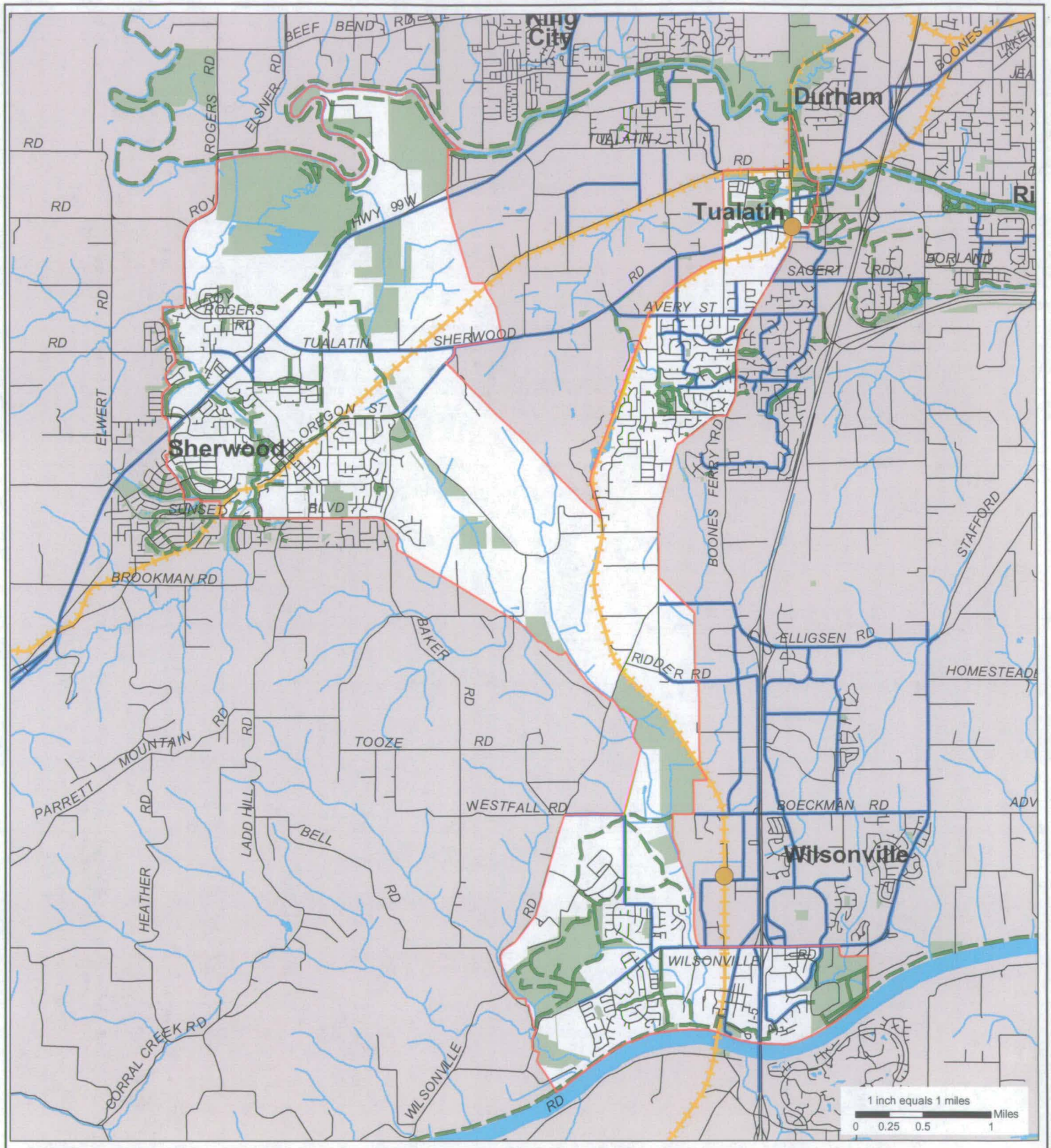
Table 2: Major Employers in Area

Businesses	Employment	Address
Wilsonville		
Coffee Creek Correctional Facility	250-499	24499 SW Grahams Ferry Road
Nike Footwear	250-499	27255 SW 95th Ave
Mentor Graphics	500+	8005 SW Boeckman Rd
In Focus Systems	500+	27700 SW Parkway Ave #B
Sysco Food Services of Portland	500+	26250 SW Parkway Center Drive
Xerox Office Printing Business Unit	1000+	26600 SW Parkway Avenue
Fullman Kinetics	250-499	26055 SW Canyon Creek Rd
Sherwood		
Allied Systems	250-499	2300 Oregon Street
Tualatin		
Legacy Meridian Park Hospital	500+	19300 SW 65th Ave

Source: Clackamas County, Individual Employers

Bicycle, Pedestrian, and Trail Connections

To the north lies the Tualatin River Greenway and to the south, the Willamette River Greenway. The Tonquin Trail has the potential to link these two major waterways together, as well as Metro's 230-acre Graham Oaks Natural Area, the 184-acre open space on Coffee Lake Creek, the Tualatin River National Wildlife Refuge, and the numerous local parks and open spaces in the area.
In addition, there are existing and planned multi-use trails that would connect to the Tonquin area. Wilsonville, Sherwood, and Tualatin have existing local trails and greenways that serve their residents. The Fanno Creek Greenway Trail and the Beaverton Power Line Trail north of the Tualatin River provide connections to the larger Metro Regional trail system. Funding has been recently secured for the Fanno Creek bridge extension across the Tualatin River is planned for construction within the next three years. This connection will link Tualatin Community Park, Durham City Park, and Cook Park in Tigard.



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- Trail Study Area
- Proposed Trails
- Existing Trails
- Bike Lanes or Shared Roadways
- Public Parks and Open Space
- Future Commuter Rail Stops
- Railroad Lines

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Figure 2. Bicycle and Pedestrian Connections Map

Utility Corridors

Linear corridors present valuable opportunities that must be explored when searching for alignment options. The Bonneville Power Administration (BPA) and Portland General Electric (PGE) utility corridors present opportunities for trail alignments.

The utility lines in the study area provide opportunities for the Tonquin Trail

The "eastern" BPA corridor is 100 feet wide and is owned outright by the BPA. This power line parallels the railroad right-of-way from the Willamette River to Basalt Creek, just north of Boeckman Road. However, there are encroachments and a few private easements along the BPA property. The utility corridor heads north through industrial properties and then heads northwest though the Coffee Creek Correctional Facility to Oregon St. in Sherwood. Here, it heads due north, crossing the Metro-owned property on the Tualatin River towards King City and Beaverton, where there are existing sections of trail on this right-of-way.

The "western" BPA corridor is 300 feet wide, but the land underneath the power lines is owned privately, and the BPA maintains easement agreements with the multiple property owners. This power line parallels the railroad right-of-way just south of Ridder Rd. It veers away from the "eastern" BPA power line at Oregon St. and heads northwest past Roy Rogers Rd. in Sherwood. It passes through a mix of industrial properties, greenspaces, and agricultural land.

At the time of writing, initial discussion was underway in Sherwood regarding the construction of a water line and trail in the eastern BPA power line right-of-way that is located to the east and north of downtown Sherwood.

Rail Corridor

The north-south Portland & Western railroad alignment could provide an opportunity for the Tonquin Trail. Currently the line serves freight trains. The proposed 14.7 mile Washington County Commuter Train will travel between Wilsonville and Beaverton be on the existing single track, with siding or passing tracks added in certain sections. Funding for the final design and construction of the line is being worked on and the line could begin operating as early as 2006. The average train speed will be 37 miles per hour, with a maximum speed of 60 miles per hour. The railroad right-of-way is 70 feet wide. The train is scheduled to operate every 30 minutes during morning and evening peak times. A rail-with-trail could be accommodated within the rail right-of-way as long as a buffer is provided between the trail and the rail line. Initial contact has been made with TriMet, which is managing the project Additional negotiations will need to involve Portland & Western Railroad, ODOT Rail Division, and TriMet.

The rail corridors provide a flat, albeit constrained space for potential trail alignments

In order to use the rail corridor for a regional trail, additional discussions and shared use agreements with the Portland & Western Railroad, ODOT Rail Division, and TriMet are necessary.

Major Roadway Crossings

Roadway crossings are an important consideration in the alignment and design of an urban trail. Table 3 lists the key characteristics of major roadways that intersect potential routes of the Tonquin Trail.

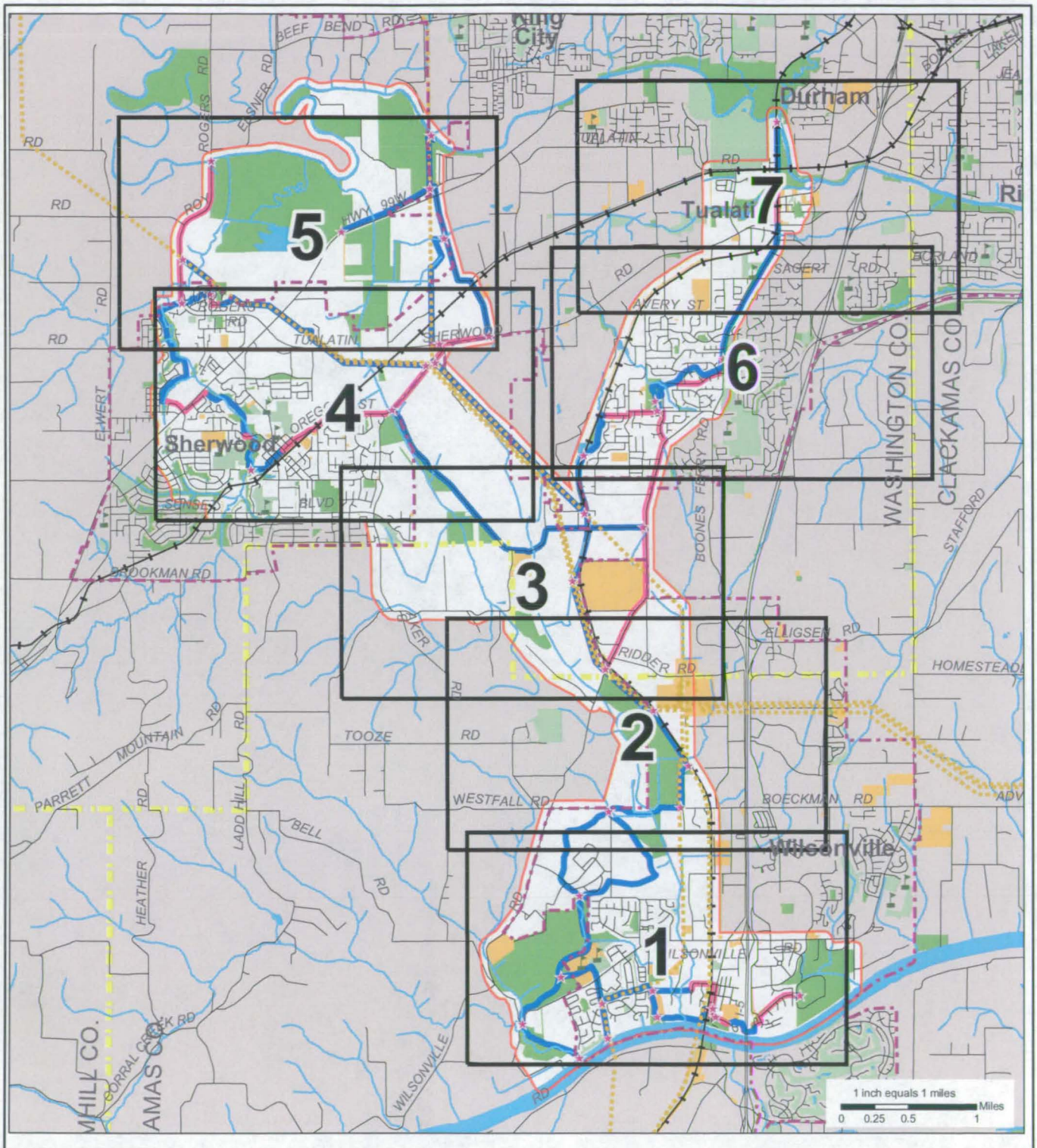
Table 3: Roadway Characteristics in the Study Area

Roadway	Seg.	# of Lanes	Posted Speed	Traffic Volume*	Sight Distance**	Side-walks	Bike Lanes
SW Boones Ferry Rd.	1	2	25	Low	good	yes	yes
Wilsonville Rd.	1	3	35	Moderate	good	yes	yes
Boeckman Rd.	2	3	35	Moderate	good	yes	yes
SW Tonquin Rd.	3	2	45	Moderate	poor	no	no
SW Grahams Ferry Rd.	3	2	45	Low	poor	no	no
Sunset Blvd.	4	2	35	Low	good	yes	no
W Division St.	4	2	25	Low	good	some	no
NE Oregon St.	4	2	25	Low	good	One side	yes
Adams Ave.	4	2	25	Low	good	yes	no
SW Tual.-Sherwood Rd.	4	3	45	Moderate	good	yes	yes
SW Cipole Rd.	4,5	2	45	Moderate	poor	no	no
Hwy. 99W	4,5	5	55	High	good	no	yes-shoulder
SW Roy Rogers Rd.	5	2	35	High	good	no	no
SW Boones Ferry Rd.	6,7	2,3	20-35 (varies)	High	varies	yes	portions

* Traffic volumes:
low: fewer than 3000 vehicles per day
moderate: between 3000 – 10,000 vehicles per day
high: greater than 10,000 vehicles per day

** Sight distance
poor: less than 300 feet
good: greater than 300 feet

Study Area Segments



Tonquin Trail

Connecting the Willamette River to the Tualatin River

Proposed Trail Alignment Options
- On-Street Alignment
- Off-Street Alignment
- Segment Map Boundaries
- Trail Study Area
- Trail Option End Points

- Schools
- BPA Powerlines
- Railroad Lines
- Urban Growth Boundary
- County Lines
- Land in Public Ownership
- Public Parks and Open Space
- Other Parks, Open Space, School Fields, Cemeteries, Golf Courses

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Figure 3. Segment Index Map

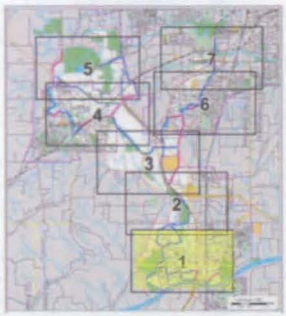
Willamette River to Graham Oaks Natural Area

Segment 1

Summary

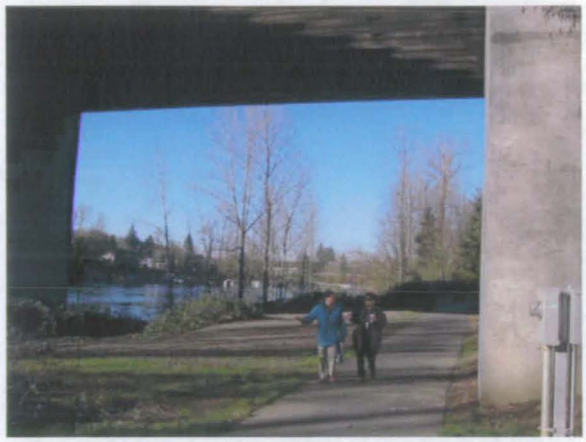
From:	Willamette River	To:	Graham Oaks Natural Area
Jurisdiction:	Wilsonville	Character:	Suburban

Summary: This segment of the Tonquin Trail will connect the Willamette River with the Graham Oaks Natural Area and the planned Villebois development. There are four potential starting points for the trail: the Metro Open Space near Corral Creek, Rivergreen Open Space, the Willamette River Water Treatment Plant, and Memorial Park.



Land Use Connections

- Memorial Park
- Boones Ferry Park
- Graham Oaks Natural Area
- Willamette River
- Water Treatment Plant
- Villebois Development



Existing trail section under I-5 overpass

Crossings

Major Roadways	Streams
Boones Ferry Rd. Wilsonville Rd.	Coffee Lake Creek Corral Creek Arrowhead Creek

Bike/Ped Connections

On-street (Bike Lanes/Sidewalks)	Off-street (Shared use Paths)
Wilsonville Rd.	Boones Ferry-Memorial Park Path Willamette River Water Treatment Plant Trail Morey's Landing Powerline Trail

Existing Morey's Landing Powerline Trail

Relevant Plans

City of Wilsonville Parks and Recreation Plan
City of Wilsonville Bicycle and Pedestrian Plan
City of Wilsonville TSP
Wilsonville Tract (Graham Oaks Natural Area) Master Plan
Villebois Village Master Plan

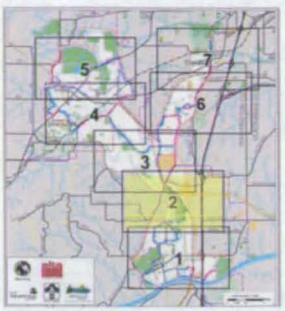
Graham Oaks Natural Area to Coffee Lake Wetlands

Segment 2

Summary

From:	Graham Oaks Natural Area	To:	Coffee Lake Wetlands
Jurisdiction:	Wilsonville	Character:	Open Space

Summary: This segment will take the trail users from the Villebois Development through the Coffee Lake Creek Wetlands. There is basically one preferred option for this segment and it runs from Villebois to the east side of the Metro-owned Coffee Lake Creek Wetlands (the upland area).



Land Use Connections

- Villebois Development
- Coffee Lake Creek Wetlands

Eastern side of Coffee Lake Creek Wetlands near Boeckman

Crossings

Major Roadways	Streams
Boeckman Rd. Grahams Ferry Rd.	Basalt Creek

Bike / Ped Connections

On-street (Bike Lanes/Sidewalks)	Off-street (Shared use Paths)
none	none

Coffee Lake Creek Wetlands

Relevant Plans

City of Wilsonville Parks and Recreation Plan
City of Wilsonville Bicycle and Pedestrian Plan
City of Wilsonville TSP
Villebois Village Master Plan
Wilsonville Tract (Graham Oaks Natural Area) Master Plan

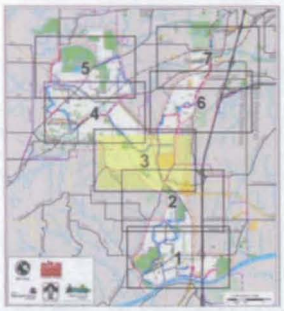
Coffee Lake Creek Wetlands to SW Tonquin Rd.

Segment 3

Summary

From:	Coffee Lake Creek Wetlands	**To:**	Tonquin Rd.
Jurisdiction:	Wilsonville Washington Co.	**Character:**	Open Space, Rural

Summary: This segment will take the trail users from the Coffee Lake Creek Wetlands to the "Y" in the trail. The northwest alignments will head towards Sherwood and the Northeastern alignments will head to Tualatin. This area has numerous wetlands areas and steep slopes, making the connection to Sherwood difficult. The connection to Wilsonville may need to follow the railroad.



Land Use Connections

- Coffee Creek Correctional Facility
- Coffee Lake Creek Wetlands
- Historic Tonquin substation

The power lines may provide a route for the Tonquin Trail

Crossings

Major Roadways	Streams
SW Tonquin Rd. SW Grahams Ferry Rd.	Coffee Lake Creek

Bike/Ped Connections

On-street (Bike Lanes/Sidewalks)	Off-street (Shared use Paths)
none	none

Historic Tonquin substation along rail line

Relevant Plans

City of Wilsonville Parks and Recreation Plan
City of Wilsonville Bicycle and Pedestrian Plan
City of Wilsonville TSP

Sherwood Area

Segment 4

Summary

From:	Tonquin Rd.	To:	SW Tualatin-Sherwood Rd.
Jurisdiction:	Sherwood	Character:	Rural- Suburban

Summary: This segment connects the "main stem" of the Tonquin Trail to the Cedar Creek Greenway in Sherwood, which is partially constructed. There are two main connections to Sherwood, one using Oregon St, and another using the BPA Power line (which maintains easements on private land). The City of Sherwood is looking at the possibility of building a water line and trail along this power line.

Land Use Connections

- Sunset Park
- Archer Glen Elem. School
- Stella Olsen Park
- J. Clyde Hopkins Elem. School
- Sherwood High School

A jogger on the Stella Olsen Trail

Crossings

Major Roadways	Streams
Hwy. 99W NE Oregon St. SW Tualatin-Sherwood Rd. Roy Rogers Rd.	Rock Creek Cedar Creek

Bike/Ped Connections

On-street (Bike Lanes/Sidewalks)	Off-street (Shared use Paths)
NE Oregon St.	Cedar Creek Greenway Saint Charles Path Stella Olsen Park Path Heron Ridge Power Line Path

Existing path adjacent to Roellich Dr.

Relevant Plans

City of Sherwood Trails Plan
City of Sherwood TSP

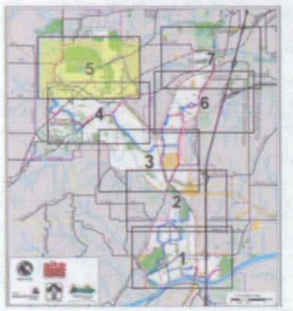
Tualatin River National Wildlife Refuge Area

Segment 5

Summary

From:	SW Tualatin Sherwood Rd.	**To:**	Tualatin River
Jurisdiction:	Sherwood	**Character:**	Rural- Suburban

Summary: This segment provides access to the Tualatin River from the Sherwood area. The two access points to the Tualatin River are located at the Tualatin River National Wildlife Refuge and The Metro-Owned Morand Property. The Refuge will be opened to the public in the Summer of 2005, but will not allow bicycles on their ADA-accessible trails. When funding is available, a master plan for the Metro-owned natural area will be developed. Bicycle and pedestrian trail access will be incorporated in the plan.



Land Use Connections

- Tualatin River National Wildlife Refuge
- Metro Open Space – Morand Property

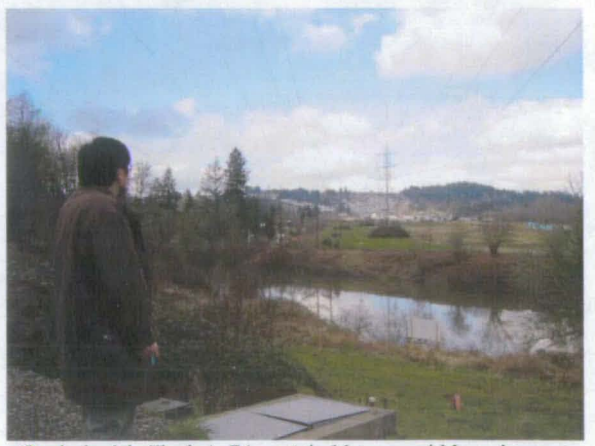
The location of the future Wayside access to the TRNW Refuge

Crossings

Major Roadways	Streams
Hwy. 99W NE Oregon St. SW Tualatin-Sherwood Rd. Roy Rogers Rd. Cipole Rd.	Rock Creek Cedar Creek Chicken Creek

Bike / Ped Connections

On-street (Bike Lanes/Sidewalks)	Off-street (Shared use Paths)
None	Cedar Creek Greenway
	Heron Ridge Power Line Path



Overlook of the Tualatin River at the Metro-owned Morand property

Relevant Plans

City of Sherwood Trails Plan
City of Sherwood TSP
Tualatin River National Wildlife Refuge Land Acquisition Plan
Tualatin River National Wildlife Refuge – Steinborn Unit Trails Plan

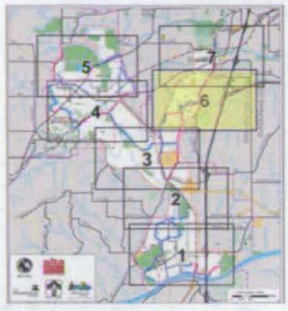
Ibach Park Area

Segment 6

Summary

From:	SW Tonquin Loop	To:	SW Sagert St.
Jurisdiction:	Tualatin	Character:	Suburban-

Summary: This segment provides access to the kolk ponds at the unimproved Johnnie and William Koller Wetlands Park. Here, a boardwalk trail may be necessary. The trail will then connect to Ibach Park and the existing Indian Meadows Greenway.



Land Use Connections

- Johnnie and William Koller Wetlands Park – (Kolk Ponds)
- Ibach Park
- Little Wood Rose Nature Park
- Tualatin Elem. School

Existing demand path near kolk ponds

Crossings

Major Roadways	Streams
SW Grahams Ferry Rd. SW Boones Ferry Rd.	Hedges Creek

Bike / Ped Connections

On-street (Bike Lanes/Sidewalks)	Off-street (Shared use Paths)
SW Sagert SW Tualatin-Sherwood Rd. SW Avery St.	Hedges Creek Greenway Indian Meadows Greenway

Existing Indian Meadows path

Relevant Plans

City of Tualatin TSP

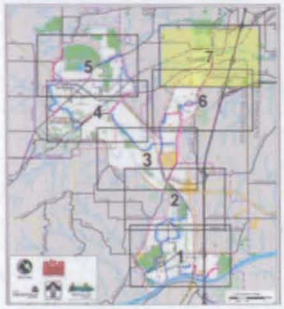
Tualatin Community Park Area

Segment 7

Summary

From:	SW Sagert St.	**To:**	Tualatin River
Jurisdiction:	Tualatin	**Character:**	Suburban

Summary: This segment will take Tonquin Trail users to the Tualatin River at Tualatin Community Park. The planned bicycle/pedestrian bridge here will provide access to the Fanno Creek Regional Trail, the future Tualatin River Greenway Trail, Cook Park and Durham City Park.



Land Use Connections

- Tualatin River
- Tualatin Community Park
- Cook Park
- Tualatin Elem. School
- Durham Park

Boones Ferry Road

Crossings

Major Roadways	Streams
SW Boones Ferry Rd. SW Tualatin Sherwood Rd.	Hedges Creek

Bike/Ped Connections

On-street (Bike Lanes/Sidewalks)	Off-street (Shared use Paths)
SW Sagert St. SW Tualatin-Sherwood Rd. SW Boones Ferry	Fanno Creek Greenway Trail (Future) Tualatin River Greenway Trail

Location of the future Tualatin River bike/ped bridge

Relevant Plans

City of Tualatin TSP
Tualatin River Bicycle and Pedestrian Bridge Plans

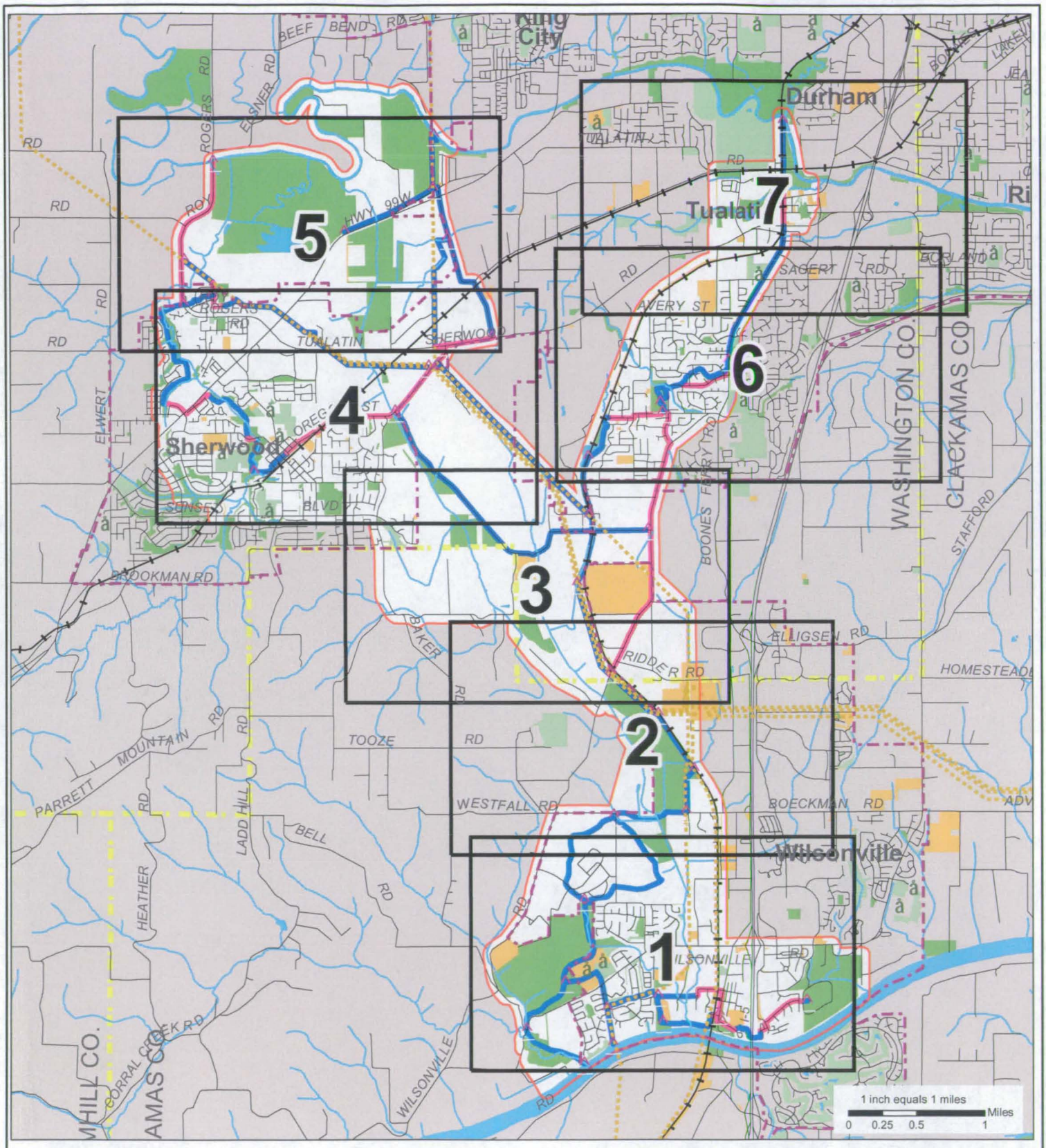
Alignment Options

The alignment options for the Tonquin Trail are presented on the maps and the matrix that follows. The length of the trail study area has been divided into seven (7) segments. Each segment contains at least one option for the trail alignment. The seven (7) segments are summarized on the following pages.

The matrix describes the characteristics of each section of trail. The matrix also summarizes the important issues regarding implementation of the each section of trail. Information regarding property ownership, crossings, and outstanding issues have been summarized here.

Alignment options that have been eliminated from further discussion by the project team and/or working group during the study process are included in the matrix.

Not all of the trail sections are designated as off-street regional trails. Due to topographic, land use, and right-of-way constraints, there are on-street portions of the Tonquin Trail. The on-street portions are either on low-volume residential streets or on wide sidewalks on collector or arterial streets. About 58% (19.7 miles) of the proposed alignments are off-street and 42% (14.4 miles) are proposed to be on-street. Metro's goal is to develop a final trail alignment that is at least 75% off-street.



Tonquin Trail

Connecting the Willamette River to the Tualatin River

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Proposed Trail Alignment Options
- On-Street Alignment
- Off-Street Alignment
- Segment Map Boundaries
- Trail Study Area
- Trail Option End Points

- Schools
- BPA Powerlines
- Railroad Lines
- Urban Growth Boundary
- County Lines
- Land in Public Ownership
- Public Parks and Open Space
- Other Parks, Open Space, School Fields, Cemeteries, Golf Courses

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Segment 1

Legend

- Trail Option End Points
- Schools

Proposed Trail Alignment Options

- On-Street Alignment
- Off-Street Alignment
- Existing Trails
- Other Proposed Trails
- Urban Growth Boundary
- BPA Powerlines
- Railroad Lines
- Stream Centerlines
- Trail Study Area
- Neighboring Map Boundaries
- Steep Slopes Greater than 25%
- Wetlands
- Public Parks and Open Space
- Other Parks, Open Space, School Fields, Cemeteries, Golf Courses
- Land in Public Ownership

0 0.2 0.4 Miles

2A
2B
2B
1E
1E
1E
1G
1H
1F
1I
1B
1A
Villebois
110TH AV
110TH AV
Ditch
County
BOBERG RD
W BARBER ST
SW GRAHAMS FERRY RD
State
Graham Oaks Natural Area
Merryfield Park
CAMELOT ST
BROWN RD
KINSMAN RD
SEELY AV
Inza Wood Middle School
Boones Ferry Primary
WILSONVILLE RD
ORCHARD DR
Arrowhead Creek
Coffee Lake Creek
INDUSTRIAL WAY
BOONES FERRY RD
SW BELL RD
Morey's Landing Open Space
WILLAMETTE WAY W
WILLAMETTE WAY E
Water Treatment Facility
TAUCHMAN ST
INTERSTATE 5
SW PARKWAY AV
MEMORIAL DR
Memorial Park
WILSON LN
KALYCA ST
Boones Ferry Park
Willamette River
Metro Open Space
Corral Creek
Rivergreen Open Space

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Segment 2

Legend

- Trail Option End Points
- Schools

Proposed Trail Alignment Options

- On-Street Alignment
- Off-Street Alignment
- Existing Trails
- Other Proposed Trails
- Urban Growth Boundary
- BPA Powerlines
- Railroad Lines
- Stream Centerlines
- Trail Study Area
- Neighboring Map Boundaries
- Steep Slopes Greater than 25%
- Wetlands
- Public Parks and Open Space
- Other Parks, Open Space, School Fields, Cemeteries, Golf Courses
- Land in Public Ownership

Miles
0 0.2 0.4

Metro Open Space
Rock Creek
WHEATLAND DR
ELLIGSEN WAY
3D
SW CLUTTER RD
SW RIDDER RD
Metro Open Space
BPA
BPA
2G
Metro Property Alignment Option
Coffee Lake Creek
Metro Open Space
2E
Basalt Creek
HILLMAN CT
SW TOOZE RD
SW GRAHAMS FERRY RD
2D
95TH AV
SW BOONES FERRY RD
SW TOOZE RD
BOECKMAN RD
2C
Seely Ditch
INTERSTATE 5
110TH AV
2A
2B
County
BERG RD

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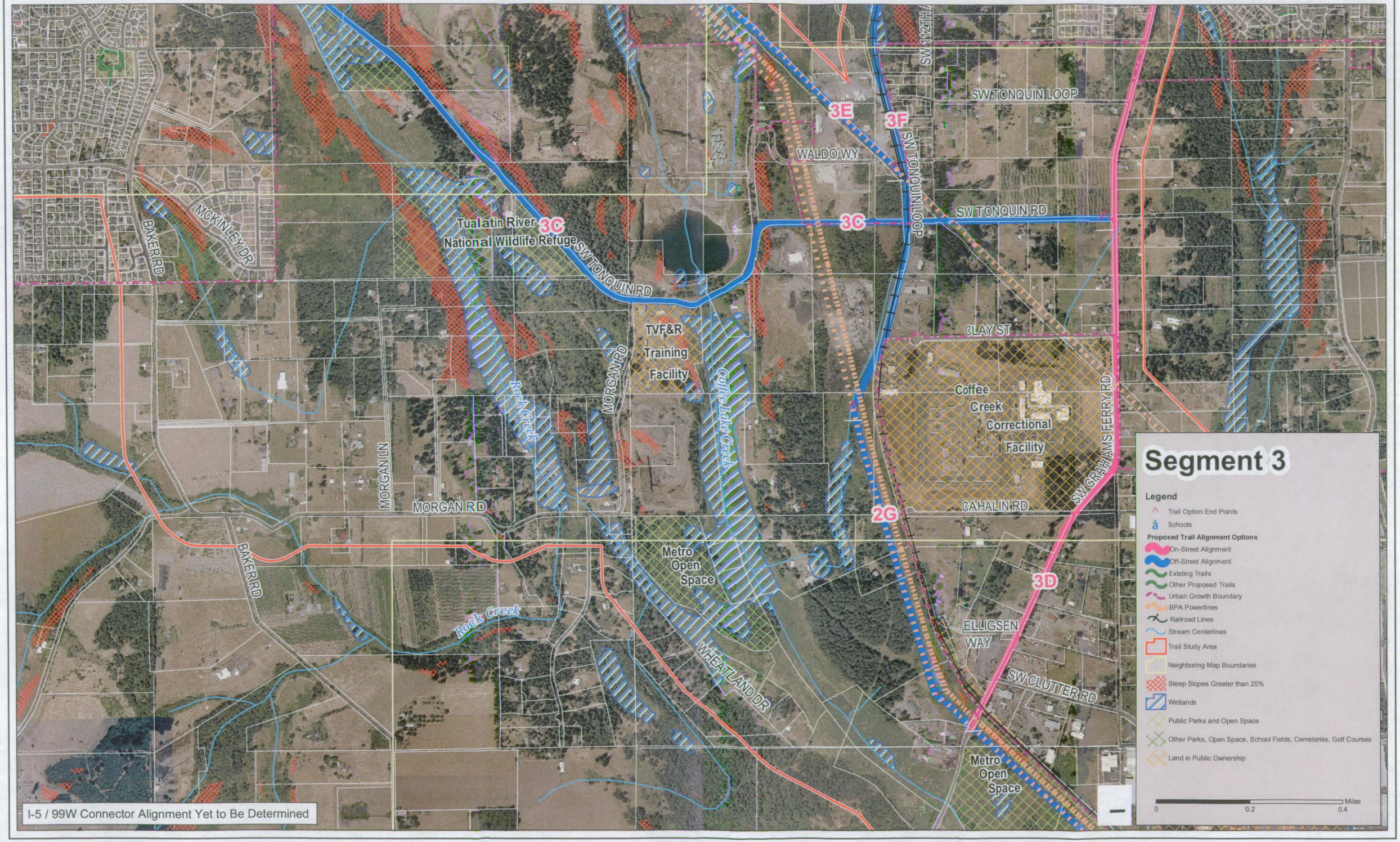

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Segment 4

Legend

- Trail Option End Points
- Schools

Proposed Trail Alignment Options

- On-Street Alignment
- Off-Street Alignment
- Existing Trails
- Other Proposed Trails
- Urban Growth Boundary
- BPA Powerlines
- Railroad Lines
- Stream Centerlines
- Trail Study Area
- Neighboring Map Boundaries
- Steep Slopes Greater than 25%
- Wetlands
- Public Parks and Open Space
- Other Parks, Open Space, School Fields, Cemeteries, Golf Courses
- Land in Public Ownership

0 0.2 0.4 Miles

5A
5B
4I
4C
4H
4F
4D
3E
3C
National Wildlife Refuge
CEDARVIEW WAY
Cedar Creek
SW ROY ROGERS RD
EDY RD
99W
SW LANGER DR
Tualatin River National Wildlife Refuge
SW CERDA LN
SW GALBREATH DR
SW TUALATIN-SHERWOOD RD
NE OREGON ST
SW DAHLKE LN
SHERWOOD BLVD
CENTURY DR
ADAMS AV
MEINECKE PKY
Community Campus Park
J Clyde Hopkins Elementary School
Rock Creek
NW MEINECKE RD
Stella Olsen Park
School District
Sherwood High School
NW WASHINGTON ST
Sherwood Middle School
Tualatin River National Wildlife Refuge
SW TONQUIN RD
WILDLIFE HAVEN CT
SAINT CHARLES WAY
W DIVISION ST
PINE ST
Sunset Park
Archer Glen Elementary School
SUNSET BLVD

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Segment 5

Legend

- Trail Option End Points
- Schools

Proposed Trail Alignment Options

- On-Street Alignment
- Off-Street Alignment
- Existing Trails
- Other Proposed Trails
- Urban Growth Boundary
- BPA Powerlines
- Railroad Lines
- Stream Centerlines
- Trail Study Area
- Neighboring Map Boundaries
- Steep Slopes Greater than 25%
- Wetlands
- Public Parks and Open Space
- Other Parks, Open Space, School Fields, Cemeteries, Golf Courses
- Land in Public Ownership

Miles: 0 0.2 0.4

Tualatin River
Eastside of Powerline Alignment Option
Powerline Alignment Option
SW 135TH TER
Metro Open Space
5E
4G
SW CIPOLE RD
5A
Future Wayside Parking Lot
SW SCHOLLS SHERWOOD RD
Chicken Creek
Tualatin River National Wildlife Refuge
Future Visitor's Center
5D
Tualatin River National Wildlife Refuge
Onion Flat
4H
SW HERMAN RD
SW ROY ROGERS RD
4I
99W
5A
5B
4I
Tualatin River National Wildlife Refuge
Chicken Creek
CEDARVIEW WAY
Cedar Creek
SW ROY ROGERS RD
4G
SW CIPOLE RD
4C
EDY RD
99W
SW LANGER DR
Tualatin River National Wildlife Refuge
SW GERDA LN
SW GALBREATH DR
SW TUALATIN-SHERWOOD RD
4H
4F

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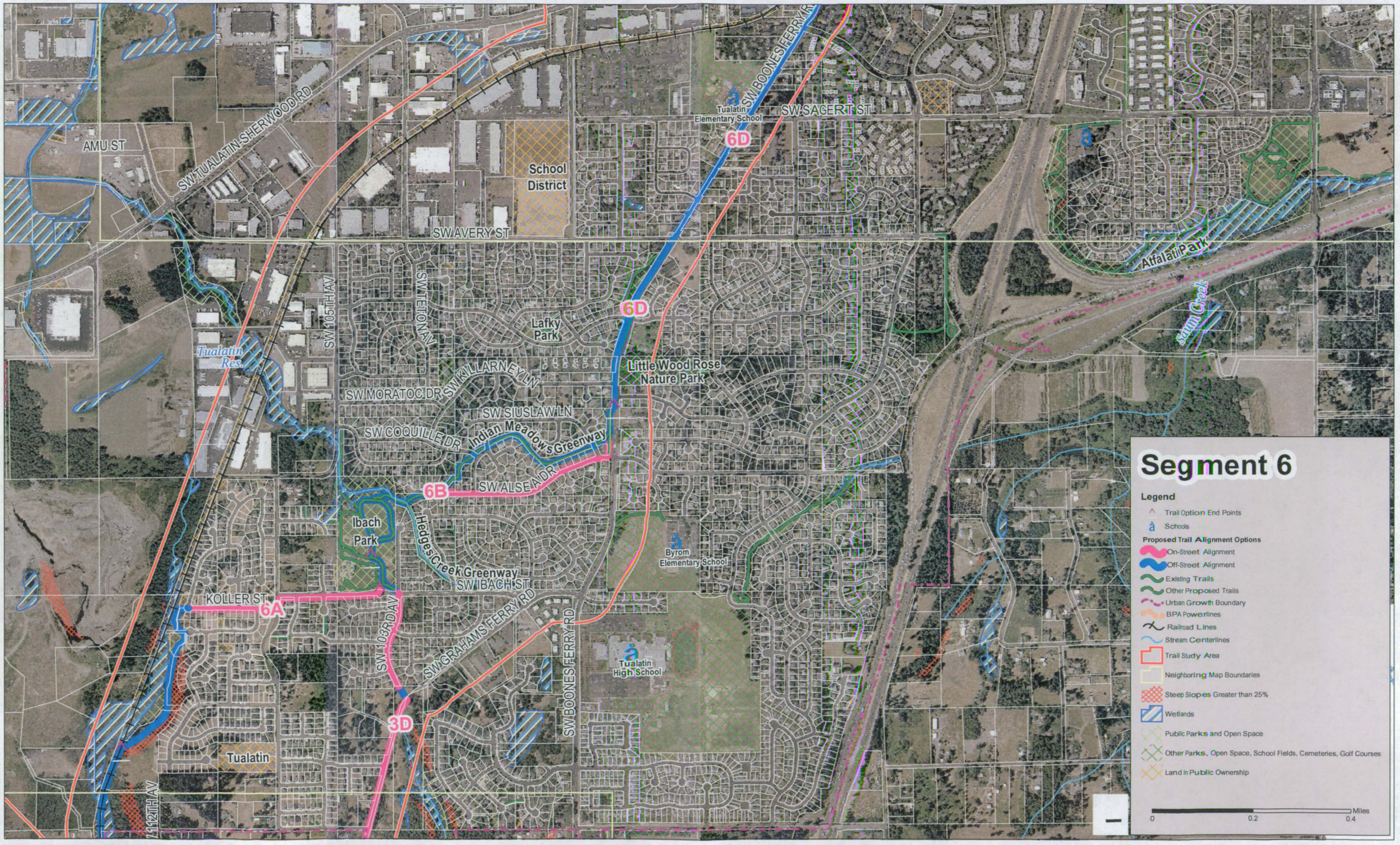

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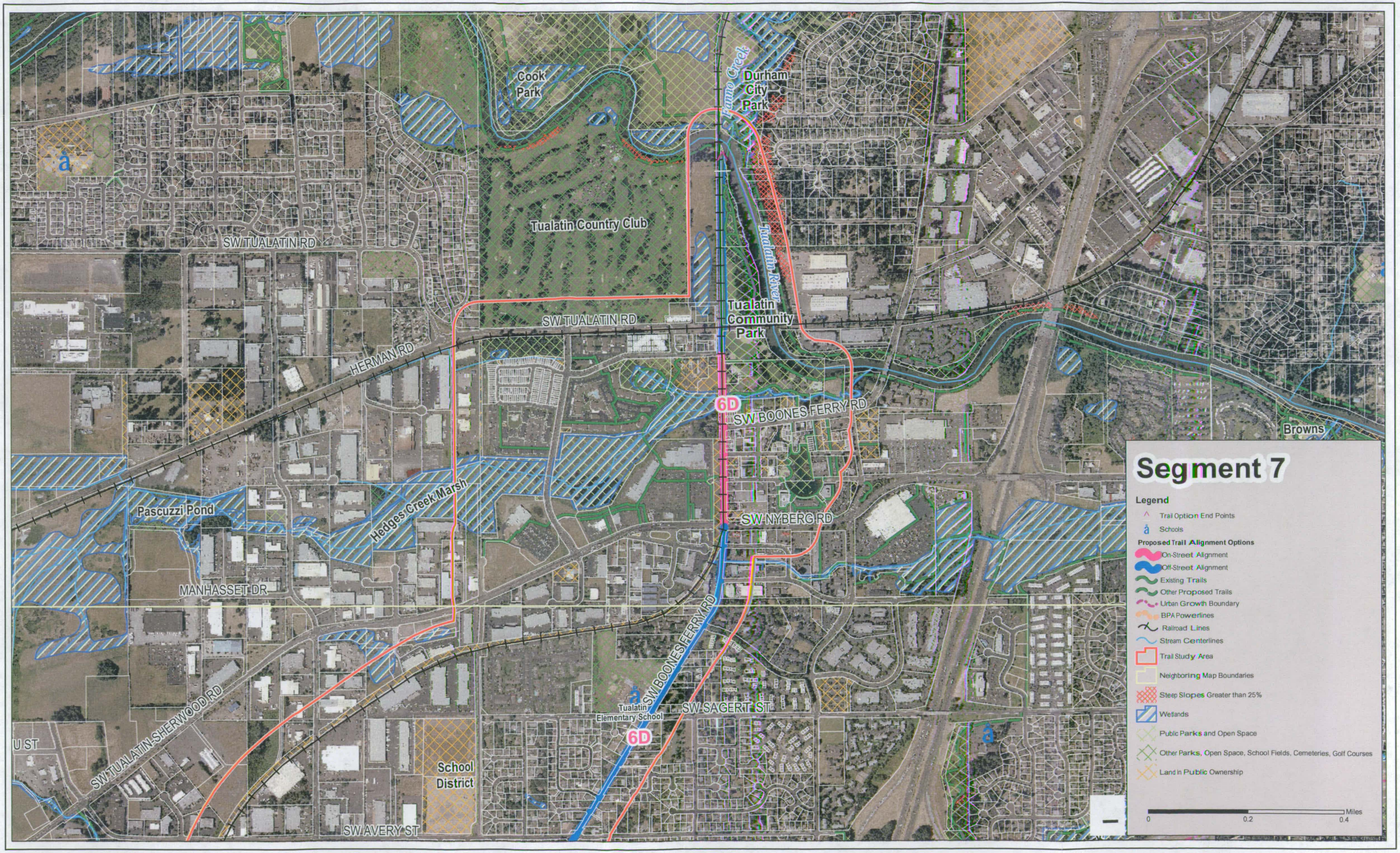

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Description Matrix

Note: Some alignment options have been eliminated by the project team and/or working group during the study process. These eliminated alignment descriptions are included in Appendix A.

Segments					Implementation			
Options	**Location**	**Type**	**Length (miles)**	**Description**	**Plans for Trail Segment**	**Acquisition/ Easement**	**General Improvements**	**Major Road/ Stream Crossings**
Segment 1: Willamette River to Graham Oaks Natural Area								
1A	Memorial Park to Boones Ferry Park	off-street and on-street	1.0	This existing path provides visual access and proximity to the Willamette River. A proposed cantilevered bike/ped crossing along the I-5 bridge (South Interstate Trail) would connect this path to Charbonneau, south of the Willamette River. This route also uses a public driveway and an on-street connection along Wilson Ln.	Existing path: Memorial-Boones/Day Dream Path; Potential bike/ped bridge across Willamette River	None	Widen and regrade portion of path to make ADA compliant. Signage along "driveway section".	None
1B	Boones Ferry Park to Water Treatment Facility	off-street and on-street	0.5	This path would cross the railroad using an existing underpass at 2nd St. It would then need to cross Coffee Lake Creek to connect with the existing Water Treatment Facility path.	Metro has identified a regional trail along the northern side of the Willamette River.	3 properties	New paved path	Boones Ferry Rd., - unsignalized; Coffee Lake Creek
1E	Water Treatment Facility to Graham Oaks Natural Area	off-street	1.2	This existing path connects the Water Treatment Facility to Wilsonville Rd. The path along the Treatment Plant provides visual access to the Willamette River. The route to Graham Oaks Natural Area uses the existing Morey's Landing power line trail, which connects to Willamette Way East, a low volume road. A wide sidewalk could be provided on the east side of the street. Here the route would cross Wilsonville Rd. and follow the CREST/ Boones Ferry Primary School parking lot to access the Graham Oaks Natural Area.	Existing path. Plans for loop trail.	Negotiation with City needed about trail maintenance and hours of operation.	Wide sidewalk on Willamette Way East. New paved path south of Morey's Landing.	Wilsonville Rd. (signalized)
1F	Graham Oaks Natural Area (Graham Oaks Natural Area)	off-street	1.6	This area was recently master planned by the City of Wilsonville and Metro. The Natural Area will provide environmental education, open space, trails, and native vegetation. The school parking lot will serve as the trailhead. The Tonquin Trail will follow the alignment designated in the master plan along the eastern boundary of the property.	City of Wilsonville/Metro – Graham Oaks Natural Area Master Plan	None needed.	New paved path, boardwalk.	Wilsonville Rd. - unsignalized, Corral Creek (optional)
1G	5th St. /Brown Rd. Connection	off-street and on-street	0.7	This connection provides an alternative route between Boone's Ferry Park and the Water Treatment Facility. This route is also dependent on the alignment of the proposed Brown Rd. extension.	Proposed Brown Rd. extension	3 properties	New paved path and widened sidewalks	None
1H	Powerline Trail	off-street	0.3	This path would provide visual access to the Willamette River south of Willamette Way East. A deck structure would need to be constructed to provide views. In addition, tree limbs would need to be trimmed near the river. The Rivergreen Homeowners Association owns the property.	Wilsonville Transportation System Plan, 2003	Negotiation/easement needed from Rivergreen Homeowners Association.	New paved path and viewing deck structure	None
1I	Metro Open Space	off-street	0.5	This path would follow Corral Creek in the recently acquired Metro Open Space and cross Wilsonville Road to the Graham Oaks Natural Area. Unfortunately, the Metro property does not provide direct access to the Willamette River.	Wilsonville Transportation System Plan, 2003	None needed for Metro property. To provide access to river, 2 properties needed.	New paved path, creek bridge, and viewing deck structure	Corral Creek and Wilsonville Rd.
Segment 2: Graham Oaks Natural Area-Villebois-Coffee Lake Creek Wetlands								
2A	Villebois-West	off-street	0.9	This paved path will be constructed with the Villebois development. It will loop around the western side of the developed portions of Villebois. It will connect with the future path along Boeckman Rd. and the eastern loop trail. This path will be separated from any roadways and will be part of a wide protected greenway.	Will be constructed with Villebois. City of Wilsonville 1994 Parks and Rec Plan: Coffee Lake-Wood Trail	Provided by Costa Pacific Communities (developer)	New paved path to be constructed Costa Pacific Communities (developer)	None

Segments					Implementation			
Options	**Location**	**Type**	**Length (miles)**	**Description**	**Plans for Trail Segment**	**Acquisition/ Easement**	**General Improvements**	**Major Road/ Stream Crossings**
2B	Villebois-East	off-street	1.3	This paved path will be constructed with the Villebois development. It will connect with the future path along Boeckman Rd. It will loop around the eastern side of the developed portions of Villebois. It will connect with the future path along Boeckman Rd. and the western loop trail. This trail will be adjacent to the roadway.	Will be constructed with Villebois. City of Wilsonville 1994 Parks and Rec Plan: Coffee Lake-Wood Trail	Provided by developer	New paved path to be constructed by developer	Barber Rd., Villebois Dr.,
2C	Boeckman Rd. to Metro Open Space (BPA)	off-street	0.6	This paved 10-foot path will be constructed along the south side of the Boeckman Rd. extension. The path will connect to the Villebois loop trails. It will also connect with future trails on the Coffee Lake Creek Wetlands property. The alignment will be determined by the Environmental Analysis.	Will be constructed with Villebois/Boeckman Rd. City of Wilsonville 1994 Parks and Rec Plan: Coffee Lake-Wood Trail, Burlington Northern Trail	Part of planned project.	New paved path to be constructed.	Boeckman Rd.
2D	BPA-west	off-street power line trail	0.3	This path would follow the eastern edge of the Metro-owned Coffee Lake Creek Wetlands property. It will probably follow along the eastern side of the BPA power lines. This segment will connect to the Boeckman Rd. path.	None.	Metro property.	New paved path needed. Boardwalk may be needed.	Boeckman Rd. Basalt Creek
2E	Metro Property alignment	off-street	0.6	This route would parallel the RR along the east side of Coffee Lake Creek Wetlands. In Segment 2, alignment could use the upland, Metro-owned property tc the west of the RR.	City of Wilsonville 1994 Parks and Rec Plan: Burlington Northern Trail	Negotiation with BPA may be needed.	New paved path.	Basalt Creek
2G	BPA-west	off-street power line trail	1.2	This route veers west and traverses through undeveloped lots and between sand and gravel quarries. The BPA maintains easements along these private properties.	None	Metro owns the land south of Grahams Ferry Rd. BPA maintains easements on the private properties to the north. Additional private properties.	New paved path needed.	Grahams Ferry Rd.
Segment 3: Coffee Lake Creek Wetlands to SW Tonquin Rd.								
3C	Tonquin Rd.	Tonquin: on-street	2.5	This route would travel along Tonquin Rd. past properties owned by the Tualatin River National Wildlife Refuge. Currently, the road receives a good amount of truck traffic and does not have adequate sidewalks or shoulders for pedestrian or bike access. After crossing Oregon St., it would connect with the proposed power line trail. This road may be improved to provide a connection between I-5 and 99W.	Potential alignment for I-5-99W Connector. Study currently underway	Acquisition of properties may be necessary.	A wide path should be constructed if this road is widened as a connection between I-5 and 99W	Tonquin Rd., NE Oregon St.
3D	SW Grahams Ferry Rd.	on-street	2.2	This route would follow Grahams Ferry Road heading northeast. Currently, there is a wide shoulder on Graham's Ferry Rd., but no sidewalks. A wide sidewalk and bike lanes should be provided.	None	None needed.	Wide sidewalks and bike lanes needed.	SW Grahams Ferry Rd., SW 103rd
3E	BPA Powerline (east): Tonquin Lp. – Oregon St.	off-street	1.6	This path would use the BPA-owned property. Most of the property underneath the power lines is vacant, but near Oregon St, the land is being used by horse-owners, who may maintain an easement on the BPA property. Also, in order to safely cross Tualatin-Sherwood Rd., the route should veer away form the power line and cross at the Oregon St. signal.	None.	Further property-ownership research and negotiation with BPA needed.	New paved path needed.	None.
3F	Rail with Trail/Boardwalk	off-street	1.0	This alignment would use the railroad right-of-way and possibly private properties to the west of the railroad. As the trail approaches the Johnnie and William Koller Wetlands Park kolk ponds, it could veer west off of the railroad right-of-way and travel on the ponds as a boardwalk trail. It would cross under the second trestle east towards the existing earthen trail.	None.	Further negotiation with railroad, TriMet, and ODOT needed. 3-4 properties	New paved path and boardwalk needed.	Kolk pond

Segments					Implementation			
Options	**Location**	**Type**	**Length (miles)**	**Description**	**Plans for Trail Segment**	**Acquisition/ Easement**	**General Improvements**	**Major Road/ Stream Crossings**
Segment 4: Sherwood Area								
4C	Stella Olsen Park/ Cedar Creek Greenway	off-street; on-street	2.4	This route will primarily use the existing path in Stella Olsen Park and planned improvements along the Cedar Creek Greenway in Sherwood. The existing path and boardwalk in Stella Olsen Park provide access to wetlands, open space, and other natural areas. This route will cross 99W at Meinecke to the existing trail/ greenspace, and continue north to Roy Rogers Rd.	Portions existing. City of Sherwood	Would need to negotiate crossing with Railroad/ODOT	Improve/widen existing path and complete gaps.	Railroad tunnel near Division. 99W Crossing. Cedar Creek Stream Crossing
4D	Oregon St.: Stella Olsen – Tonquin Rd.	on-/off-street	1.2	This section would use local streets to connect to Oregon St. As part of Urban Renewal improvements, the alleyways between Park Street and Adams Street on Oregon St. will be used as a ped/bikeway. This will connect to the railroad. The new civic center (City Hall/Library) will be located on Oregon Street.	City of Sherwood Trails Plan	None needed.	Crossing improvements.	NW Washington St.
4F	Oregon St.: Tonquin Rd. - Tualatin-Sherwood	on-street	1.0	This route will follow Oregon St. to Tualatin-Sherwood Rd. Sections of this road have been upgraded to include sidewalks and bike lanes. Remaining portions will need to be improved with a widened sidewalk.	City of Sherwood Trails Plan	None needed.	New widened sidewalk path on portions of Oregon St.	Adams Ave., Rock Creek
4G	Cipole Rd.	on-street	1.5	This route would be possible if Cipole Rd. were improved to include a wide sidewalk and bike lanes. Currently, there are no sidewalks or bike lanes on most of the street.	None.	None needed.	New widened sidewalk path and/or bike lanes on Cipole	Tualatin-Sherwood Rd. and 99W
4H	Power line –Tualatin-Sherwood to Metro Property (Morand Property)	off-street	1.0	The trail would follow the BPA Power line to the north towards the Metro Open Space, north of 99W. BPA owns most of this portion of trail. A new railroad crossing would be needed north of Tualatin-Sherwood Rd. Where BPA's ownership ends, the trail should head east along the upland section of land, parallel to the Rock Creek tributary towards Cipole Rd.	None.	2 properties	New paved path needed. New Railroad crossing needed.	99W at signal
4I	Powerline- Oregon St. to Roy Rogers	off-street	3.1	The BPA maintains an easement on these private properties under the power lines. Recently, there has been interest in the City of Sherwood to obtain an easement along these same properties for a water supply line for Sherwood coupled with a path. If the plan to acquire an easement is pursued, this path would connect the Tonquin Trail to the northern portion of Sherwood. This path would require major crossing treatments at 99W, Tualatin-Sherwood Rd., and a railroad crossing.	Water line/ Path being considered by City of Sherwood	Multiple properties. Negotiation with City of Sherwood, BPA, railroad needed.	New paved path needed. Crossing improvements, railroad crossing, and creek bridge	99W, Tualatin-Sherwood Rd.,
Segment 5: Tualatin River National Wildlife Refuge Area								
5A	SW Roy Rogers Rd.	on-street	1.2	Currently, Roy Rogers Rd. has a wide shoulder as it approaches the Tualatin River National Wildlife Refuge. There is currently no sidewalk. The improvements should extend to the north of the Tualatin River in order to connect to the proposed Tualatin River Greenway on the north side of the river. The planned Wayside Parking lot will provide seasonal access to the Refuge's walking trails.	None	Optional acquisition would allow for off-street path.	Pave/ stripe shoulder and construct sidewalk.	SW Roy Rogers Rd.
5B	Heron Ridge Powerline	off-street power line trail	0.3	This recently completed power line trail traverses through a new subdivision and connects SW Roy Rogers Rd. with the proposed power line trail on the east side of Seely Rd.	Completed	None needed.	Grading for ADA, Crossing Improvements	SW Roy Rogers Rd.
5D	99W Connection	on-street	0.7	A wide sidewalk along the north side of 99W would provide a much-needed connection between the Metro Open Space and the Tualatin Wildlife Refuge. Unfortunately, the right-of-way along this stretch of 99W is constrained by a narrow bridge and by the travel lanes.	None	Acquisition needed if roadway is widened. (ODOT Roadway)	New wide sidewalk	Rock Creek – existing bridge
5E	Metro Open Space (Morand Property)	on- and off-street	0.5	This Metro-owned property has a maintenance road that, if paved, would be suitable for a regional trail. This road runs along the eastern boundary of the property and is adjacent to private residences. A vegetative buffer should be provided between the trail and the private properties. Otherwise, the trail could be routed to the west of this road, closer to the power line. The Morand Property provides excellent access to the Tualatin River. The trail would need to switch back near the river to provide ADA-compliant access.	Metro acquired this property to provide public access to Tualatin River.	None needed.	Paved path needed	None.

Segments					Implementation			
Options	**Location**	**Type**	**Length (miles)**	**Description**	**Plans for Trail Segment**	**Acquisition/ Easement**	**General Improvements**	**Major Road/ Stream Crossings**
Segment 6: Ibach Park area								
6A	Kolk Pond Trail-Ibach Park via Koller St.	off-street; on-street	0.8	This path will use the existing earthen path adjacent to the Kolk ponds and the concrete path north of the water detention center. The path will access the neighborhood using Koller Street and then jog to Ibach Court, where it will access Ibach Park and the Hedges Creek Greenway.	Existing off-street section	None needed.	Current earthen path near Kolk Pond needs to be paved. Boardwalk may be necessary.	SW Ibach St.
6B	Ibach Park-Boones Ferry Rd.	existing off-street and proposed on-street	1.4	This segment will use the existing Indian Meadows Greenway that connects Ibach Park and SW Boones Ferry Rd. The path surface varies between packed gravel and asphalt. The width also varies between six and 10 feet, and there are a few grade issues. An alternative on-street option should be provided on Alsea Drive to accommodate "through" cyclists.	Existing	None needed.	Path may need to be widened in certain sections. Signage needed	SW Boones Ferry Rd.
6D	Boones Ferry Rd.	on-street or off-street	1.9	Along this section, the path will take advantage of the future roadway expansion of Boones Ferry Road. Currently, the road is three lanes with sidewalks and bike lanes along much of the road. A separated path along the west side of the street could be included with future widening and provide for Tonquin Trail users. Currently, there are a number of existing, disconnected paths along the west side of the street.	Planned widening/ upgrading of roadway. Schedule unknown.	None needed.	Wide sidewalk/ path on West side of road needed.	SW Boones Ferry Rd.
Segment 7: Tualatin Community Park								
6D	Boones Ferry Rd. (continued)	on-street or off-street	(continued)	The trail will be routed along the west side of SW Boones Ferry, north to SW. Nyberg Rd. Between Nyberg and SW Tualatin Rd., the Tonquin Trail will travel on-street. North of SW Tualatin Rd., the trail will be an off-street path as it travels through Tualatin Community Park parallel to the railroad tracks. Here, it will connect with the planned Tualatin River bike/ped bridge.	Planned widening/ upgrading of roadway. Schedule unknown. Planned Tualatin River bike/ped bridge	None needed.	Wide sidewalk/ path on West side of road needed. Paved path in Tualatin Community Park.	SW Nyberg Rd. SW Boones Ferry Rd. SW Tualatin Rd.

Alignment Evaluation

Evaluation Criteria

The Tonquin Trail Study Area has been divided into seven segments, and each segment may have one or more potential trail alignment possibilities. In cases where there are multiple possibilities, the potential trail alignments have been screened and evaluated using the following criteria. For the preliminary screening, a system of "+," "o," and "-" is being used (on the accompanying evaluation matrix). A "+" indicates favorable conditions, a "o" indicates mixed or neutral conditions, and a "-" indicates unfavorable conditions.

Importance of Connection

This criterion evaluates connectivity and access to other trails or bikeways, schools, parks, residential, commercial or employment areas. Highest priority is given to trail options that provide a necessary north-south link between the Willamette River to the Tualatin River. High priority is also given to options that provide access to park areas, bodies of water, and natural spaces that reflect the character of the unique Tonquin Geologic Area.

Safety - Roadway Crossings

Trail-roadway crossings will be assessed and evaluated based on existing crossing treatment (if any), roadway traffic speed, sight visibility, and volume. Typically, the fewer the roadway crossings, the higher the evaluative score.

Cost/ Ease of Implementation

This criterion will score options that may have a relatively high cost of acquisitions, design, engineering, and/or construction, especially where crossing improvements, fencing, or other expensive infrastructure improvements would be necessary. Trails which may require boardwalks, environmental mitigation, or grade separated crossings will score lower than a flat, upland trail through a publicly owned parcel.

Consistency with Local Plans or Projects

The purpose of this criterion is to determine the compatibility/conflict of a potential alignment with existing local plans and projects. If an option has been identified by an adopted/approved local plan (Comp. Plan, TSP, CIP, etc...), it will receive a better rating than one that has not been identified.

Avoids Private Property Impacts

This will account for lands where property easements or acquisitions are required. The fewer the acquisitions or easements needed, the better the relative score.

Potential for Environmental Education/Access

This criterion will identify the ability of the trail segment to provide opportunities for environmental interpretation along the various features associated with the Tonquin Geologic Area, the Willamette River, and the Tualatin River. This includes visual and proximal access to kolk ponds, wetlands, streams, and geological formations.

Aesthetics/Comfort

This criterion measures the quality of the proposed trail from the perspective of the user. It considers potential views, environmental aesthetics, and environmental characteristics such as noise, and air quality. For example, an on-street route along a major roadway would receive a lower rating than an off-street route adjacent to a stream.

Evaluation Matrix

Note: Some alignment options have been eliminated by the project team and/or working group during the study process. These eliminated alignment descriptions have been included in Appendix A.

Segments			Screening Criteria						
Options	Location	Type	Importance of Connection	Safety-Roadway Crossings	Cost/Ease of Implementation	Consistent with Local Plans/ Projects	Avoids Private Property Impacts	Potential for Environ Education / Access	Aesthetics / Comfort
Segment 1: Graham Oaks to Graham Oaks Natural Area									
1A	Memorial Park to Boones Ferry Park	off-street and on-street	+	+	+	+	+	+	+
1B	Boones Ferry Park to Water Treatment Facility	off-street and on-street	+	+	-	+	-	+	+
1E	Water Treatment Facility to Graham Oaks Natural Area (Graham Oaks Natural Area)	off-street	+	+	+	+	+	+	+
1F	Graham Oaks Natural Area (Graham Oaks Natural Area)	off-street	+	+	+	+	+	+	+
1G	5th St. – Brown Road Connection	off-street and on-street	+	+	-	O	-	+	+
1H	Powerline Trail	off-street	+	+	+	O	O	+	+
1I	Metro Open Space	Off-street	O	+	+	O	+	+	+
Segment 2: Graham Oaks Natural Area-Villebois-Coffee Lake Bottoms									
2A	Villebois-West	off-street	+	+	+	+	+	+	+
2B	Villebois-East	off-street	+	+	+	+	+	+	+
2C	Boeckman Rd. to Metro Open Space (BPA)	off-street	+	O	+	+	+	+	+

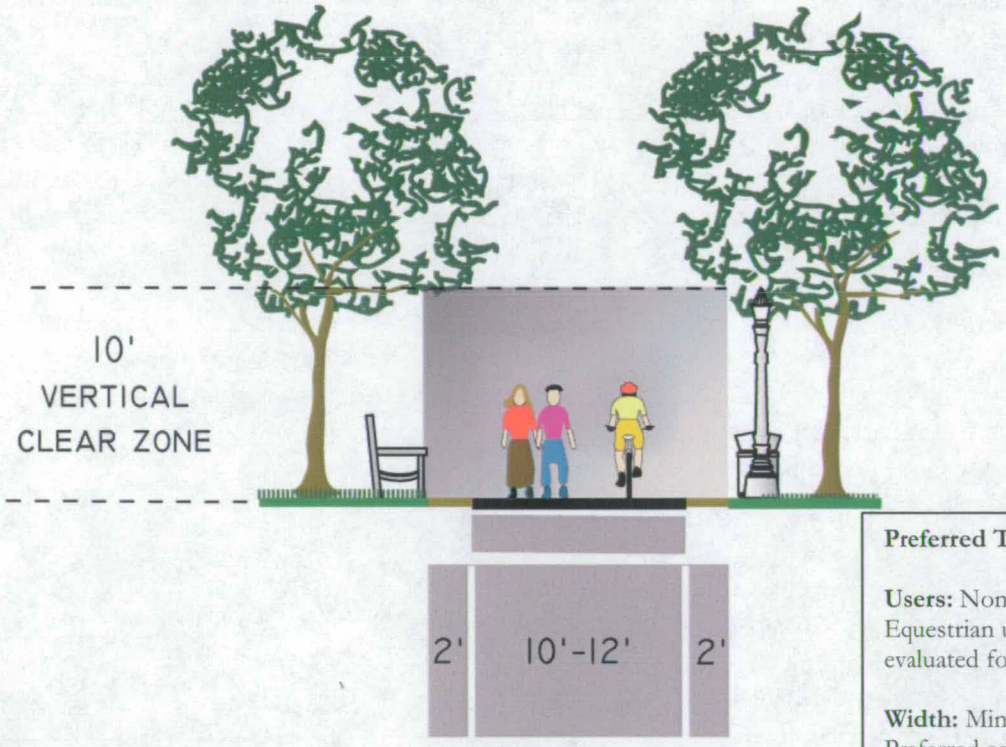
Segments			Screening Criteria						
Options	Location	Type	Importance of Connection	Safety-Roadway Crossings	Cost/Ease of Implementation	Consistent with Local Plans/ Projects	Avoids Private Property Impacts	Potential for Environ Education / Access	Aesthetics / Comfort
2D	BPA-west	off-street powerline trail	+	+	+	+	+	o	o
2E	Metro Property Alignment	off-street	+	+	+	o	+	+	+
2G	BPA-west	off-street powerline trail	+	-	-	o	-	o	-
Segment 3: Coffee Lake Bottoms to SW Tonquin Rd									
3C	Tonquin Rd.	on-street	+	-	-	o	-	o	o
3D	SW Grahams Ferry Rd.	on-street	+	-	-	+	-	-	-
3E	BPA Powerline	off-street	+	+	o	o	o	+	+
3F	Rail with Trail/ Boardwalk	off-street	+	+	-	o	o	+	+
4C	Saint Charles/ Stella Olsen Park/ Cedar Creek Greenway	existing off-street	+	+	+	-	o	+	o
4D	Oregon St.	on-/off-street	+	o	o	-	o	+	+
4E	Adams Ave. connection to 99W	on-/off-street	+	-	-	-	-	+	-
4G	Cipole Rd.	on- and off-street	+	-	-	+	-	o	+
4H	BPA Powerline	off-street	+	+	o	o	o	o	+

Segments			Screening Criteria						
Options	Location	Type	Importance of Connection	Safety-Roadway Crossings	Cost/Ease of Implementation	Consistent with Local Plans/ Projects	Avoids Private Property Impacts	Potential for Environ Education / Access	Aesthetics / Comfort
4I	BPA Powerline - Roy Rogers Rd.	off-street	o	-	-	+	-	+	+
Segment 5: Tualatin River National Wildlife Refuge Area									
5A	SW Roy Rogers Rd.	on-street	+	o	+	+	o	+	+
5B	Heron Ridge Powerline	off-street powerline trail	+	o	+	+	+	o	+
5C	Tual River Nat Wildlife Refuge	off-street	+	+	o	o	o	+	+
5D	99W	off-street	+	o	-	+	o	+	-
5E	Metro Open Space (Morand property)	off-street	+	+	+	+	+	+	+
Segment 6: Ibach Park area									
6A	Kolk Pond Trail-Ibach Park via Koller St.	off-street; on-street	+	o	-	+	o	o	+
6B	Ibach Park-Boones Ferry Rd.	existing off-street	+	+	+	+	o	+	+
6D	Boones Ferry Rd.	on-street or off-street	+	-	o	+	-	o	o
Segment 7: Tualatin Community Park									
6D	Boones Ferry Rd. (continued)	on-street or off-street	+	-	o	+	-	+	o

Design and Implementation

Recommended Standard Trail Designs

The following designs represent recommended "typicals" for the Tonquin Trail.



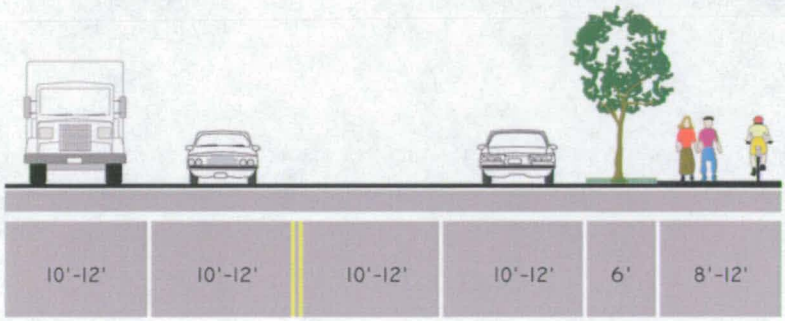
Preferred Trail Surface: Asphalt

Users: Non-motorized vehicles. Equestrian use should be evaluated for each trail section

Width: Minimum easement: 14'
Preferred easement: 30'

Recommended Shared Use Path (off-street)

Note: 12-foot wide paved sections should be used as a standard for regional trails. 10-foot wide sections could be used in "pinch-point" locations that have physical or environmental constraints.



Recommended Wide Sidewalk Option within Road Right-of-way

Trail-Roadway Crossings

Like most trails in built urban areas, the Tonquin Trail must cross roadways at certain points. These roadway crossings may be designed at-, below-, or above-grade. At-grade crossings create a potentially high level of conflict between trail users and motorists. However, well-designed crossings have not historically posed a safety problem, as evidenced by the thousands of successful trails around the United States with at-grade crossings. Designing safe grade crossings is a key to safe implementation of the Tonquin Trail.

Trail-roadway crossings should comply with the AASHTO[3], ODOT[4], and MUTCD[5] and any local standards that may apply. In some cases, a required trail crossing may be so dangerous or expensive (e.g., to build an undercrossing or overcrossing) as to affect the feasibility of the entire alignment. However, in most cases, trail crossings can be properly designed at-grade to a reasonable degree of safety and to meet existing traffic and safety standards.

Evaluation of trail crossings involves analysis of vehicular and trail user traffic pattern, including speeds, street width, traffic volumes (average daily traffic, peak hour traffic), line of sight, and trail user profile (age distribution, destinations). This plan identifies the most appropriate crossing options given available information, which must be verified and/or refined through the actual engineering and construction document stage.

Basic Crossing Prototypes

The proposed intersection approach in this plan is based on established standards, published technical reports, and the experiences from existing facilities. Virtually all crossings fit into one of four basic categories:

- **Type 1: Unprotected/Marked**
  Unprotected/marked crossings include trail crossings of residential, collector, and sometimes major arterial streets or railroad tracks.

- **Type 2: Route Users to Existing Intersection**
  Trails that emerge near existing intersections may be routed to these locations, provided that sufficient protection is provided at the existing intersection.

- **Type 3: Signalized/Controlled**
  Trail crossings that require signals or other control measures due to traffic volumes, speeds, and trail usage.

- **Type 4: Grade-separated**
  Bridges or undercrossings provide the maximum level of safety but also generally are the most expensive and have right-of-way, maintenance, and other public safety considerations.

[3] American Association of State Highway and Traffic Officials
[4] Oregon Department of Transportation
[5] Manual on Uniform Traffic Control Devices

Type 1: Unprotected/Marked Crossings

An unprotected crossing (Type 1) consists of a crosswalk, signing and often no other devices to slow or stop traffic. The approach to designing crossings at mid-block locations depends on an evaluation of vehicular traffic, line of sight, trail traffic, use patterns, vehicle speed, road type and width and other safety issues such as the proximity of schools. The following thresholds outlined recommend where unprotected crossings may be acceptable:

Type 1 Crossing

- Install crosswalks at all trail-roadway crossings
- Maximum traffic volumes:
  - ≤ 15,000 ADT (average daily traffic volume)
  - up to 15,000 ADT on two-lane roads, preferably with a median.
  - up to 12,000 ADT on four-lane roads with median.
- Maximum travel speed
  - 35 mi/h
- Minimum line of sight:
  - 25 mi/h zone: 250 feet
  - 35 mi/h zone: 350 feet
  - 45 mi/h zone: 450 feet

On two-lane residential and collector roads below 15,000 ADT (average daily traffic volume) with average vehicle speeds of 35 mi/h or less, crosswalks and warning signs ("Bike Xing") should be provided to warn motorists, stop signs and slowing techniques (bollards/geometry) should be used on the trail approach. Care should be taken to keep vegetation and other obstacles out of the sight line for motorists and trail users. Engineering studies should be done to determine the appropriate level of traffic control and design.

On roadways with low to moderate volumes of traffic (< 15,000 ADT) and a need to control traffic speeds, a raised crosswalk may be the most appropriate crossing design to improve pedestrian visibility and safety. The crosswalks are raised 150 mm above the roadway pavement, similar to speed humps, to an elevation that matches the adjacent sidewalk. The top of the crosswalk is flat and typically made of asphalt, patterned concrete, or brick pavers. Brick or unit pavers should be discouraged because of potential problems related to pedestrians, bicycles and ADA requirements for a continuous, smooth, vibration-free surface. Tactile treatments are needed at the sidewalk/street boundary so that visually impaired pedestrians can identify the edge of the street. Costs can range from $5,000 to $20,000 per crosswalk, depending on the width of the street, the drainage improvements affected, and the materials used for construction. Also, some jurisdictions, such as Wilsonville do not allow the installation of raised crosswalks.

A flashing yellow beacon costing between $15,000 and $30,000, may be used, preferably one that is activated by the trail user rather than operating continuously. Some jurisdictions have successfully used a flashing beacon activated by motion detectors on the trail, triggering the beacon as trail users

approach the intersection. This equipment, while slightly more expensive, informs motorists about the presence of trail users.

Crossings of higher volume arterials over 15,000 ADT may be unprotected in some circumstances - for example, if they have 85th percentile speeds of 30 mi/h or less and have only two lanes of traffic. Such crossings would not be appropriate, however, if a significant number of school children used the trail.

Type 1+: Raised Crosswalk

Type 2: Route Users to Existing Intersection

Crossings within 250 feet of an existing signalized intersection with pedestrian crosswalks are typically diverted to the signalized intersection for safety purposes. For this option to be effective, barriers and signing may be needed to direct trail users to the signalized crossings. In most cases, signal modifications would be made to add pedestrian detection and to comply with the ADA. In many cases, such as on most community trails parallel to roadways, crossings are simply part of the existing intersection and are not a significant problem for trail users.

Type 3 Crossing

Type 3: Signalized/Controlled Crossings

New signalized crossings are recommended for crossings more than 250 feet from an existing signalized intersection and where 85th percentile travel speeds are 40 mi/h and above and/or ADT exceeds 15,000 vehicles. Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity and safety.

Trail signals are normally activated by push buttons, but also may be triggered by motion detectors. The maximum delay for activation of the signal should be two minutes, with minimum crossing times determined by the width of the street. The signals may rest on flashing yellow or green for motorists when not activated, and should be supplemented by standard advanced warning signs. Typical costs for a signalized crossing range from $150,000 to $250,000.

Type 4 Grade-Separated Undercrossing

Type 4: Grade-Separated Crossings

Grade-separated crossings may be needed where ADT exceeds 25,000 vehicles, and 85th percentile speeds exceed 45 mi/h. Safety is a major concern with both

Type 4 Grade-Separated Overcrossing

overcrossings and undercrossings. In both cases, trail users may be temporarily out of sight from public view and may have poor visibility themselves.

Other challenges with undercrossings include conflicts with utilities, drainage, flood control, and maintenance requirements. Overcrossings also pose potential concerns about visual impact and functional appeal, since some users may not want to use them do to the added travel distance needed for ADA-compliant approach ramps. No grade-separated crossings are recommended for the Tonquin Trail.

Trail Features

There are a number of amenities that make a trail inviting to the user. Below are some common items that make trail systems stand out.

Interpretive Installations
Interpretive installations and signs can enhance the trail experience by providing information about the history of the Tonquin Geologic Area and the Bretz Floods. Installations can also discuss local ecology, environmental concerns, and other educational information.

Water Fountains and Bicycle Parking
Water fountains provide water for people (and pets, in some cases) and bicycle racks allow trail users to safely park their bikes if they wish to stop along the way, particularly at parks and other desirable destinations.

Pedestrian-Scale Lighting and Furniture
Pedestrian-scale lighting improves safety and enables the trail to be used year-round. It also enhances the aesthetic of the trail. Lighting fixtures should be consistent with other light fixtures in the area.

Providing benches at key rest areas and viewpoints encourages people of all ages to use the trail by ensuring that they have a place to rest along the way. Benches can be simple (e.g., wood slates) or more ornate (e.g., stone, wrought iron, concrete).

Maps and Signage
A comprehensive signing system makes a trail system stand out. Informational kiosks with maps at trailheads and other pedestrian generators can provide enough information for someone to use the trail with little introduction – perfect for areas with high out-of-area visitation rates such as the Graham Oaks Natural Area. In addition, trail markers along the Tonquin Trail will assist with wayfinding while giving the Tonquin Trail a unique identity.

Art Installations
Local artists can be commissioned to provide art for the trail, making it uniquely distinct. Many trail art installations are functional as well as aesthetic, as they may provide places to sit and play on.

Summary of Costs

The implementation cost of the Tonquin Trail is estimated at approximately $9.5 million. This does not include the acquisition or easement costs. It also does not include trail costs for the Villebois, Boeckman Rd., and Graham Oaks sections, which are being constructed as part of separate, independent processes.

Table 4. Planning Level Cost Estimates

Item	Costs per linear mile	Unit Costs
Paved Regional Trail*- Asphalt (12')	$300,000	
Trail Widening (2')	$25,000	
Wide Sidewalk-Concrete (10', one-side of street)	$340,000	
Boardwalk	$1,000,000	
Signing	$1,500	
Striping/Stenciling and Signing (on-street)	$20,000	
Creek Bridge (prefabricated, 50 ft. span)		$75,000
Platform Deck Structure (wooden)		$20,000
Type I Crossing (marked crosswalk)		$5,000
Type I+ Crossing (raised crosswalk/flashing lights)		$20,000
Trail Info Kiosk		$3,000

* Trail costs include: clearing and grubbing, excavation, grading, paving and shoulders.

Table 5. Capital Costs (Excludes Property Acquisitions/Easements)

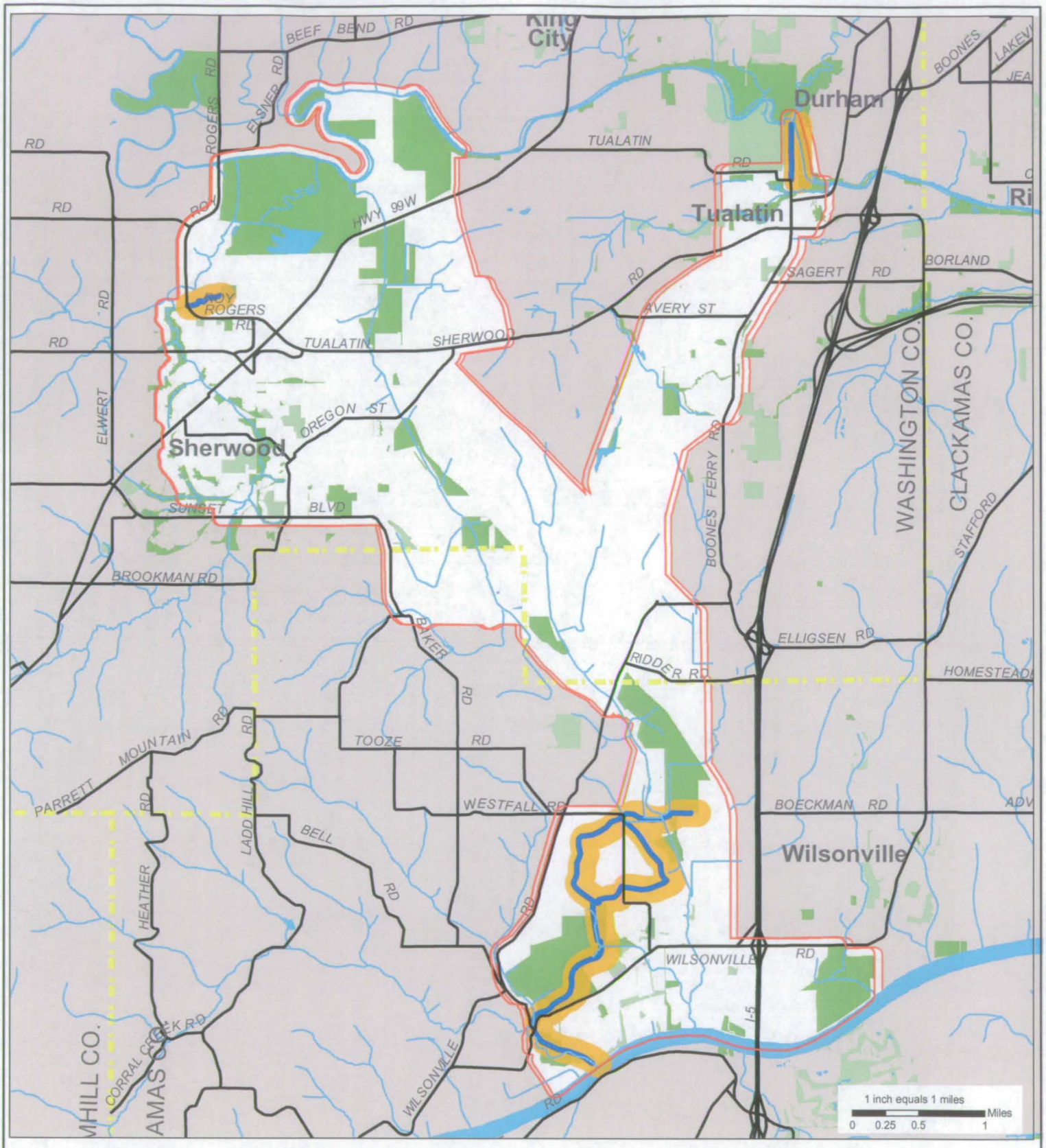
Trail Section			Capital Costs					
Trail Section	Length (miles)	Type of Improvements	Trail and Sidewalk Costs	Boardwalks, Platforms	Creek Bridge	Roadway Crossings	Signage and Striping	Total Costs
1A	1.0	Signing, Type I crossing, regrading of Boones Path	$60,000			$5,000	$1,500	$66,500
1B	0.5	Trail, creek bridge, signing	$150,000		$75,000		$750	$225,750
1E	1.2	Wide sidewalk, signing	$68,000				$1,800	$69,800
1F	2.1	Trail, boardwalk, and signing	NA (slated for construction)				$1,050	$1,050
1G	0.7	Wide sidewalk, trail, 2 creek bridges, and signing	$300,000		$100,000		$1,050	$401,050
1H	0.3	Trail, ramp, and viewing platform	$100,000	$20,000			$450	$120,450
1I	0.5	Trail on Metro property, signing, creek bridge, platform, Type I+ crossing	$150,000	$20,000	$75,000	$20,000	$3,150	$268,150
2A	0.9	Trail and signing	NA (slated for construction)				$1,350	$1,350
2B	1.3	Trail and signing	NA (slated for construction)				$1,950	$1,950
2C	0.6	Trail, creek bridge, and signing	NA (slated for construction)				$900	$900
2D	0.3	Trail, Type I+ crossing, boardwalk, and signing	$100,000	$200,000	$75,000	$20,000	$450	$395,450
2E	0.6	Trail and signing	$180,000				$900	$180,900
2G	1.2	Trail, creek bridge, Type I+ crossing, and signing	$360,000		$75,000	$20,000	$1,800	$456,800
3C	2.5	Wide sidewalk and signing	$850,000				$3,750	$853,750
3D	2.2	Wide sidewalk and signing	$750,000				$3,300	$753,300
3E	1.6	Trail and signing	$480,000				$2,400	$482,400
3F	1.0	Trail, boardwalk, and signing	$255,000	$475,000			$1,500	$731,500
4C	2.4	Trail, Type I+ and Type 2 crossing, and signing	$390,000			$25,000	$3,600	$418,600
4D	1.2	Wide sidewalk and signing	$408,000				$1,800	$409,800
4F	1.0	Wide sidewalk, Type I crossing, and signing	$340,000			$5,000	$1,500	$346,500
4G	1.5	Wide sidewalk and signing	$510,000				$2,250	$512,250
4H	1.0	Trail, railroad crossing, and signing	$300,000			$20,000	$1,500	$321,500
4I	3.1	Trail and signing	$930,000				$4,650	$934,650
4J	0.5	Trail and signing	$150,000				$750	$150,750
5A	1.2	Wide sidewalk and signing	$408,000				$1,800	$409,800
5B	0.3	Type I crossing and signing	NA			$5,000	$450	$5,450
5D	0.7	Wide sidewalk, striping, and signing	$240,000				$17,500	$257,500
6A	0.8	Trail, Type 1+ crossing, stenciling, and signing	$120,000			$20,000	$20,000	$160,000
6B	1.4	Trail widening, stenciling, and signing, drainage improvements	$35,000				$35,000	$70,000
6D	1.9	Wide sidewalk, trail, and signing	$650,000				$2,850	$652,80
TOTAL CAPITAL COSTS (inclusive of multiple alignment options)								**$9.7 million**

Phasing Approach

The phases have been grouped into three categories based on a comparative analysis in terms of ease of implementation. In general, many of the alignments will be opportunity driven. Phase I projects represent projects that are fairly straightforward in terms of implementation and will bring immediate increase in utility of portions of the Tonquin Trail system. These projects focus on completion and enhancement of the main trail connections between the Willamette and Tualatin Rivers and also target trail improvements that are relatively inexpensive to implement. For the most part, these Phase I projects are on land owned by a public entity and are least likely to encounter restrictive permitting or easement processes. While the completion of the initial phase of projects will result in disconnected trail segments, the improvements will provide access to important features in the area. Over time, as the rest of the Tonquin Trail sections are constructed, the gaps will be completed to result in a continuous trail that seamlessly connects to the regional trail system.

Table 6: Project Phasing Priorities: Phase 1

Trail Section	Length (miles)	Type of Improvements	Lead Responsibility	Comments
1F - Graham Oaks	2.1	Trail, boardwalk, and signing	Metro	
1I - Metro open space	0.5	Trail, signing, creek bridge, platform (master plan needed)	Metro	
2A - Villebois West	0.9	Trail and signing	Costa Pacific, City of Wilsonville	
2B - Villebois East	1.3	Trail and signing	Costa Pacific, City of Wilsonville	
2C - Boeckman to Metro open space	0.6	Trail, creek bridge, and signing	City of Wilsonville	
6D - Tualatin Community Park	1.9	Wide sidewalk, trail, and signing	City of Tualatin	Path connection to new bridge



Tonquin Trail

Connecting the Willamette River to the Tualatin River

Trail Study Area
Proposed Trail Alignment Options
Phase 1 Priorities
County Lines
Public Parks and Open Space
Other Parks, Open Space, School Fields, Cemeteries, Golf Courses

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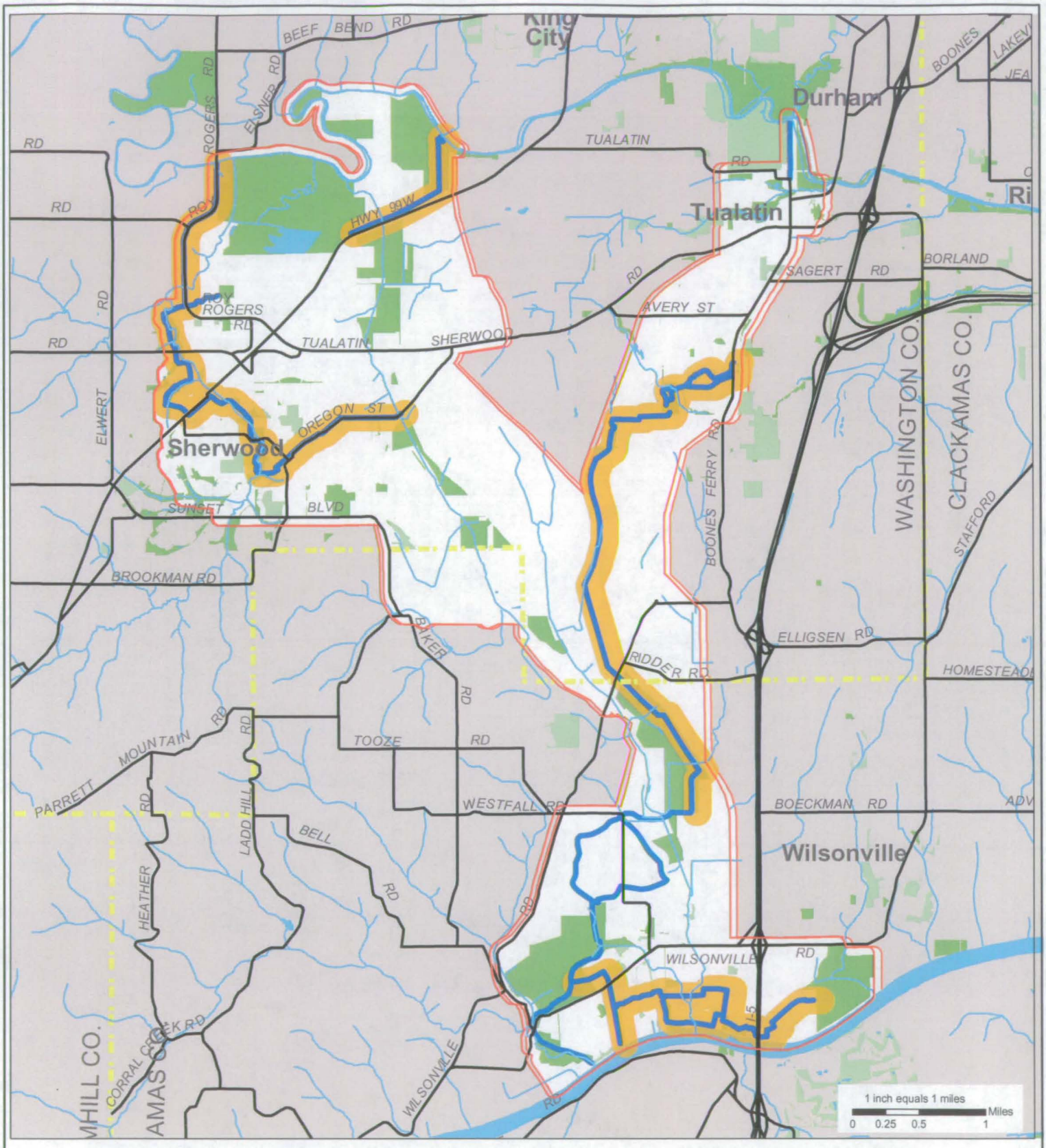
Figure 4. Phase 1 Map

Table 7: Project Phasing Priorities: Phase 2

Trail Section	Length (miles)	Type of Improvements	Lead Responsibility	Comments
1A - Memorial Park to Boones Ferry Park	1.0	Signing, Type I crossing, regrading of Boones Path	City of Wilsonville	
1B - Boones Ferry Park to Willamette Treatment facility	0.5	Trail, creek bridge, signing	City of Wilsonville	
1E - Willamette Treatment facility to Graham Oaks	1.2	Wide sidewalk, signing	City of Wilsonville	
1G - Brown Rd. Connection	0.7	Wide sidewalk, trail, 2 creek bridges, and signing	City of Wilsonville	1G is an alternative to 1B
1H - Powerline trail	0.3	Trail, ramp, and viewing platform	Rivergreen Homeowners Association, City of Wilsonville	
2D - BPA west	0.3	Trail, Type I+ crossing, boardwalk, and signing	Metro	Master plan needed
2E - Metro property	0.6	Trail and signing	Metro	Master plan needed
2G - BPA west	1.2	Trail, creek bridge, Type I+ crossing, and signing	Metro	Master plan needed
3F - Rail with Trail	1.0	Rail with Trail, boardwalk, and signing	City of Tualatin, Metro	This project requires the approval of TriMet, ODOT, and the Portland & Western railroad.
4C - Cedar Creek Greenway	2.4	Trail, Type I+ and Type 2 crossing, and signing	City of Sherwood	
4D - Oregon St.	1.2	Wide sidewalk and signing	City of Sherwood	
5A - SW Roy Rogers Rd.	1.2	Wide sidewalk and signing	City of Sherwood, Washington County	
5D - 99W Connection	0.7	Wide sidewalk, striping, and signing on North side	ODOT	Would be possible if Hwy 99W is re-striped, reconfigured, or widened.
5E - Metro Property	0.5	Trail and signing	Metro	Master plan needed
6A - Kolk Pond trail	0.8	Trail, Type 1+ crossing, stenciling, and signing	City of Tualatin	
6B - Ibach Park	1.4	Trail widening, stenciling, and signing	City of Tualatin	



Tonquin Trail

Connecting the Willamette River to the Tualatin River

Trail Study Area
Proposed Trail Alignment Options
Phase 2 Priorities
County Lines
Public Parks and Open Space
Other Parks, Open Space, School Fields, Cemeteries, Golf Courses

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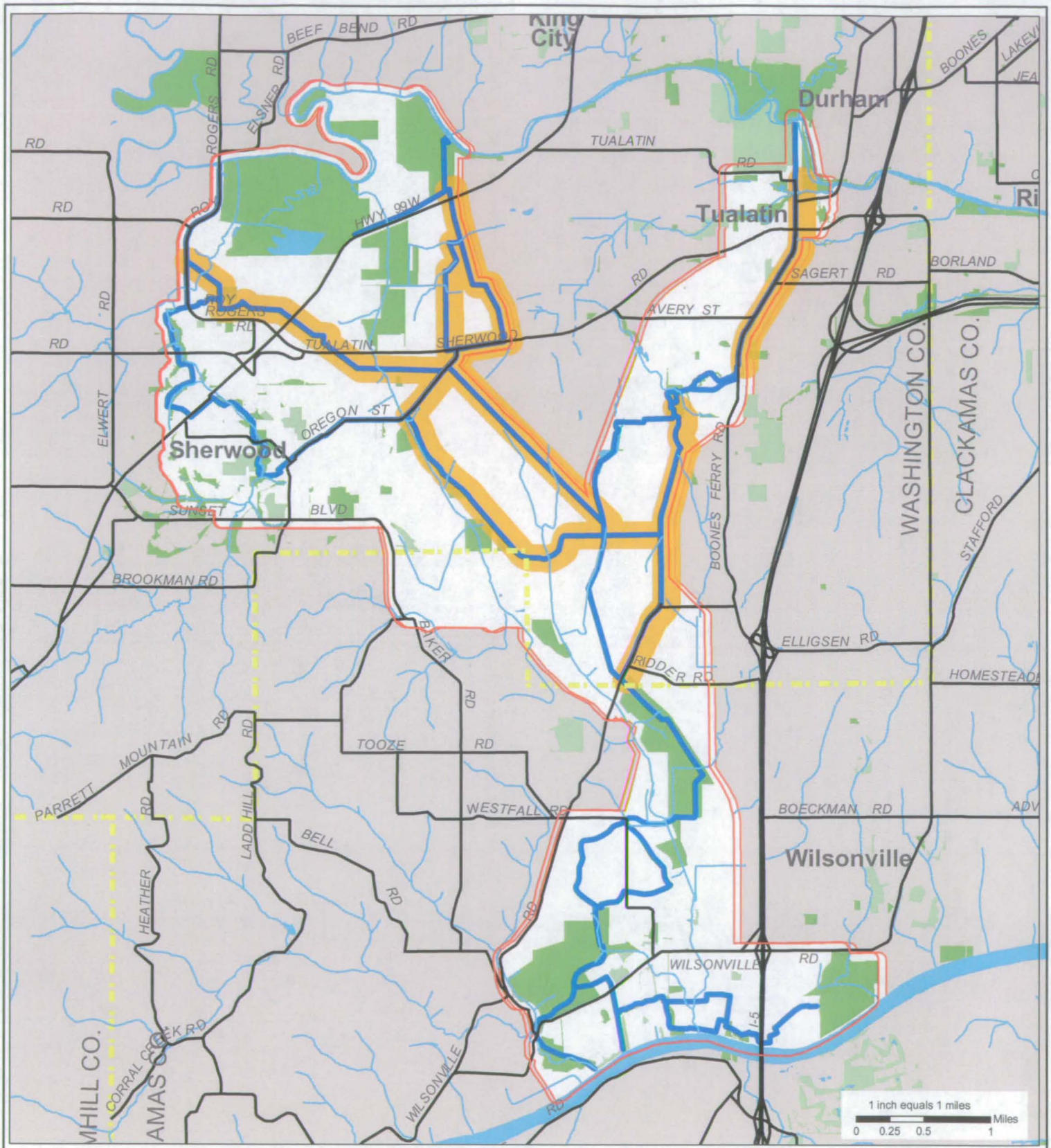
Figure 5. Phase 2 Map

Table 8: Project Phasing Priorities: Phase 3

Trail Section	Length (miles)	Type of Improvements	Lead Responsibility	Comments
3C - Tonquin Rd.	2.5	Wide sidewalk and signing	Washington County	Dependent on selection of Tonquin as I-5-99W Connector and subsequent improvements
3D - SW Grahams Ferry Rd.	2.2	Wide sidewalk and signing	City of Wilsonville, City of Tualatin	Dependent on roadway improvements to Grahams Ferry
3E - BPA Powerline	1.6	Trail and signing	Metro, BPA	Master plan needed. Approval needed from BPA and easement holders.
4F - Oregon St.	1.0	Wide sidewalk, Type I crossing, and signing	City of Sherwood	
4G - Cipole Rd.	1.5	Wide sidewalk and signing	Washington County	
4H - Powerline: Tualatin-Sherwood Rd. to Metro property	1.0	Trail, railroad crossing, and signing	City of Sherwood	
4I - Powerline: Oregon St. to Roy Rogers	3.1	Trail and signing	City of Sherwood	
6D - Boones Ferry Rd.	1.9	Wide sidewalk, trail, and signing	City of Tualatin	



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- Trail Study Area
- Proposed Trail Alignment Options
- Phase 3 Priorities
- County Lines
- Public Parks and Open Space
- Other Parks, Open Space, School Fields, Cemeteries, Golf Courses

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Figure 6. Phase 3 Map

Recommended Maintenance Schedule

The following table summarizes a recommended maintenance schedule for the Tonquin Trail system. These guidelines address maintenance on the off-street portions of the trails. On-street portions should be maintained per the standards of the responsible jurisdiction.

Table 9: Maintenance Tasks and Frequency of Need

Item	Frequency
Inspections	Seasonal - at both beginning and end of summer
Signage Replacement	1 - 3 years
Pavement Markings Replacement	1 - 3 years
Major damage response (fallen trees, washouts, flooding)	Schedule based on priorities
Pavement Sealing, Potholes	5 - 15 years
Introduced tree and shrub plantings, trimming	Every 1- 3 years
Culvert Inspection	Before winter and after major storms
Cleaning Ditches	As needed
Trash Disposal	Weekly during high use; twice monthly during low use
Lighting Luminaire Repair	Once a year
Pavement Sweeping/Blowing	As needed, before high use season. Weekly in fall.
Boardwalk maintenance	Twice a year
Maintaining culvert inlets	Inspect before the onset of the wet season, then again in early fall
Shoulder plant trimming (weeds, trees, brambles)	Twice a year: middle of growing season and early fall
Waterbar maintenance (earthen trails)	Annually
Site furnishings, replace damaged components	As needed
Graffiti Removal	Weekly, as needed
Fencing Repair	Inspect monthly for holes and damage, repair immediately
Shrub/Tree Irrigation for introduced planting areas	Weekly during summer months until plants are established
Litter Pick-up	Weekly for high use; twice a month for low use

Funding Sources

The following table summarizes public funding sources for the Tonquin Trail. Some of these funds are restricted to the type of improvements that qualify for assistance. Typically, state and federal funds require trail and roadway improvements to comply with current Americans With Disabilities Act (ADA) Guidelines for accessibility.

Table 10: Funding Sources for the Tonquin Trial

Source	Description	Funding Cycle
MTIP Funding	Federal transportation funds coordinated by Metro. Funds can be used for Preliminary Engineering, ROW acquisition and construction.	2 years
Recreational Trails Grants	Coordinated by Oregon State Parks. Funds can be used for ROW acquisition and construction.	Annual
Land and Water Conservation Fund (LWCF)	Federal funds coordinated by Oregon State Parks. Funds can be used for ROW acquisition and construction.	Annual
Measure 66 funds from Oregon State Lottery	Coordinated by Oregon State Parks. Funds can be used for ROW acquisition and construction.	2 years
Transportation Enhancement Projects	Administered by Oregon Department of Transportation (ODOT). Must serve transportation need.	When federal funds available
Oregon Bike / Ped Grants	Administered by ODOT's Bike Program Project. Must be in a public ROW.	2 years
Community Development Block Grants	Federal funds administered by counties and cities for areas with low and moderate income households. Parks projects are eligible.	Annual
System Development Charges (SDCs).	Fees on new construction allocated for parks, streets and public improvements. Where available, funds can be used for ROW acquisition and trail construction	Varies
Local / regional bond measures approved by the voters	Funds can be used for ROW acquisition, engineering, design and trail construction.	Varies
Local Improvement Districts (LIDs)	Districts are typically created by local property owners, imposing a "new tax" to fund improvements. Funds can be used for ROW acquisition and trail construction.	Varies
Tax Increment Financing / Urban Renewal Funds	Park or trail project must be located in an urban renewal district which meets certain economic criteria and is approved by a local governing body.	Varies
Local Traffic Safety Commissions	Funding for street crossings and signals.	Varies

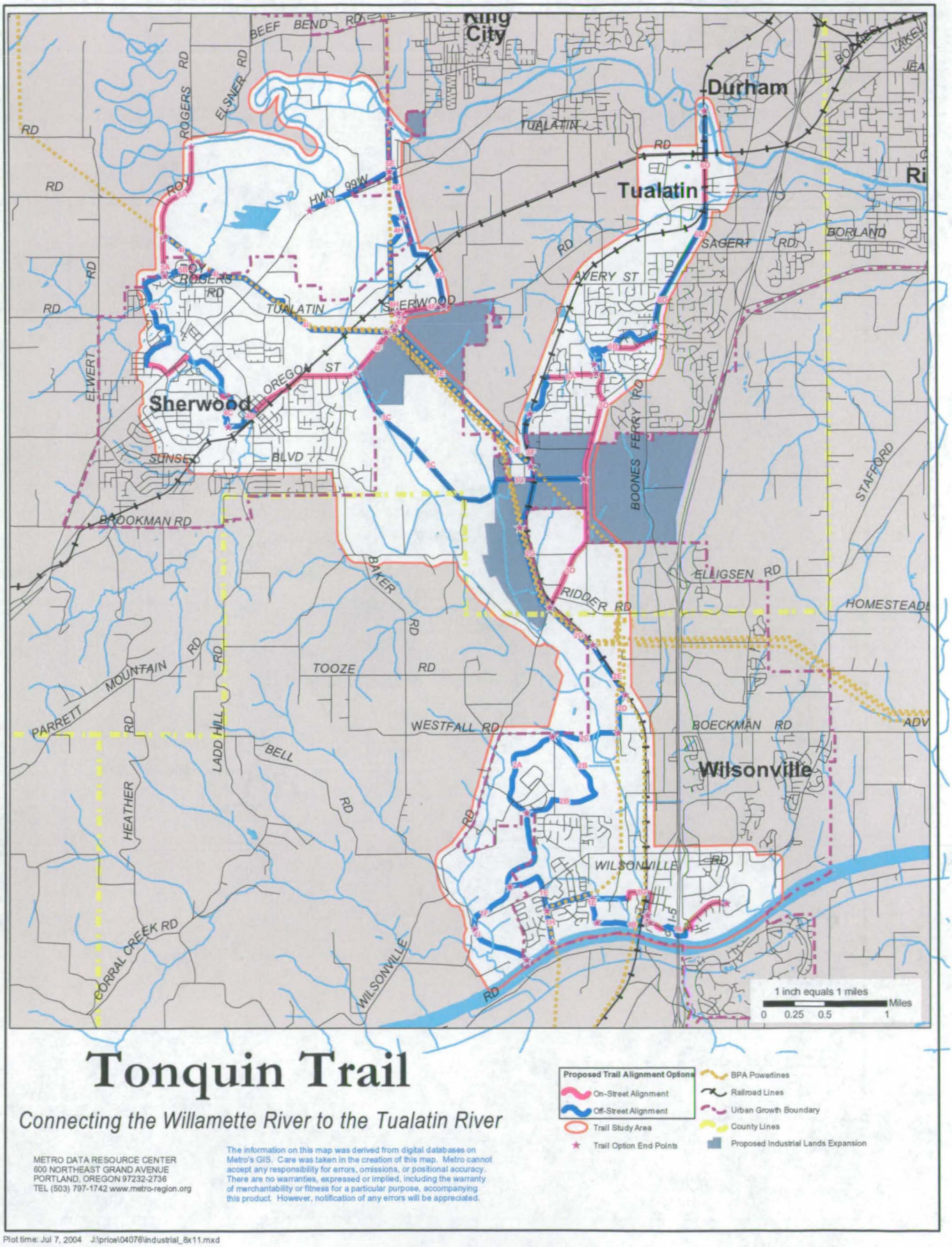
Appendix A: Eliminated Alignments - Descriptions

Segments				
Options	**Location**	**Type**	**Length (miles)**	**Description**
1C	Boones Ferry Park Rail Alignment	off-street rail with trail (RWT)	-	This path would follow the west side of the Burlington Northern Railroad. This rail alignment will be used for the planned 14.7 mile commuter train between Wilsonville and Beaverton.
1D	Coffee Lake Creek/ Seely Ditch	off-street streamside trail	-	This path would follow Coffee Creek between the Willamette River and Villebois. South of Wilsonville Rd., the creek passes through large undeveloped parcels. Between Wilsonville Rd, and Evergreen Drive, the properties surrounding the Creek are smaller residential or industrial lots. The available land surrounding the creek is extremely constrained.
2F	BPA-east	off-street	-	This route would veer away from the Coffee Lake Bottoms and head due north using BPA property east of Garden Acres Rd. The BPA owns most of this property and permits use to commercial and agricultural users.
3A	Coffee Lake Creek	off-street streamside trail; on-street	-	This alignment would follow Coffee Lake Creek. A portion of this section would use an existing private road to the west of Coffee Lake Creek. It would need to cross a private property to the Metro-owned property adjacent to Coffee Creek, southeast of Morgan Rd. This section would connect to Baker Rd. and then Sunset Blvd.
3B	TVF&R to Sunset Blvd.	off-street	-	This path connects the proposed BPA trail to Sherwood. It would require acquisitions or easements across 5-6 private properties. This path would require boardwalks and bridges to cross wetlands and steep slopes.
4A	Sunset Blvd.	on-street	-	Currently, this roadway has an 8' sidewalk with no bike lanes. It provides access to the newly redesigned Sunset Park and connects to Saint Charles, which has an existing north-south greenway. Traffic calming features for Sunset Blvd. are currently in design.
4E	Adams Ave.	on-street	-	This path will follow Adams Street to the north along an 8' sidewalk that is separated from the street by a planting strip.
5C	Tual River Nat Wildlife Refuge	off-street		This trail though the Wildlife Refuge would use existing maintenance roads that provide access to the refuge and the Tualatin River. Currently, there is no public access to and within the refuge, but plans are underway to open the refuge to the public. This access trail would connect to the future Tualatin River Greenway.
6C	SW Teton	on-street	-	This on-street segment connects the Hedges Park Greenway with the potential RWT. It uses residential streets and may not be necessary.

Appendix B: Eliminated Alignments - Evaluation

Segments			Screening Criteria						
Options	Location	Type	Importance of Connection	Safety-Roadway Crossings	Cost/Ease of Implementation	Consistent with Local Plans/ Projects	Avoids Private Property Impacts	Potential for Environ Education / Access	Aesthetics / Comfort
1C	Boones Ferry Park Rail Alignment to Coffee Lake Bottoms	off-street rail with trail (RWT)	-	-	-	-	O	O	O
1D	Coffee Lake Creek/ Seely Ditch	off-street streamside trail	O	O	-	-	-	+	-
2F	BPA-east	off-street	O	-	-	O	O	O	-
3A	Coffee Lake Creek	off-street streamside trail	+	O	-	O	-	O	-
3B	TVF&R to Sunset Blvd.	off-street	+	+	-	O	-	O	-
4A	Sunset Blvd.	on-street	+	-	-	+	O	O	+
4B	Sunset Park to Division	off-street	O	+	+	-	O	+	+
4F	Oregon St./RWT	off-street	+	O	-	-	O	O	O
6C	SW Teton	on-street	-	-	-	+	-	O	+

Appendix C: Industrial Lands Map



Tonquin Trail

Connecting the Willamette River to the Tualatin River

Proposed Trail Alignment Options
- On-Street Alignment
- Off-Street Alignment
- Trail Study Area
- Trail Option End Points

- BPA Powerlines
- Railroad Lines
- Urban Growth Boundary
- County Lines
- Proposed Industrial Lands Expansion

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Appendix D: Tualatin River Nat. Wildlife Refuge Acquisition Map