

Tonquin Employment Area Concept Plan: Preferred Concept Plan Report

October 2010

Final Report



Tonquin Employment Area Concept Plan Project Team

City of Sherwood



Angelo Planning Group



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Leland Consulting Group





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Appendix A: I-5 to 99W Connector Study Alternative 7 Figure

Appendix B: Draft Employment Industrial (EI) Zone District

Supporting Documents (not included as attachments to this document)

Sherwood Planning Staff TEA Concept Plan Memorandum (August 3, 2010)

**Angelo Planning Group TEA Employment Industrial Zone- Planning Commission
Comments Memorandum (August 3, 2010)**

**DKS Associates TPR Analysis Assumptions and Methodology Memorandum (March 22,
2010)**



**Leland Consulting Group 20-Year Employment Forecast Methodology Memorandum
(November 11, 2009)**

Preliminary Concept Alternatives Analysis Report (September 2009)

**Leland Consulting Group Area 48 Potential Employers and Facility Types Memorandum
(April 29, 2009)**

Area 48 Concept Plan: Existing Conditions Report (May 2009)

**Stakeholder Advisory Committee Meeting Notes: January 14, 2009, April 8, 2009,
October 7, 2009 and June 9, 2010**

**Technical Advisory Committee Meeting Notes: April 8, 2010, October 12, 2009 and June
7, 2010**

Planning Commission Minutes: July 13, 2010, August 10, 2010 and August 24, 2010



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I. Summary

The Tonquin Employment Area Preferred Concept Plan is intended to guide future development of approximately 300 acres near Sherwood's eastern boundary in an area that is expected to help fulfill the City's and, in part, the region's future employment needs. The Preferred Concept Plan identifies the anticipated employment types this area will best accommodate, the associated number of jobs, and the key infrastructure needs that will support this future employment population. The Preferred Concept Plan Report provides background information on regional policy and physical opportunities and constraints that guided the planning process and a summary of the process that resulted in the selection of a preferred alternative. Elements of the Preferred Concept Plan are detailed in Section IV of this report and include:

- Land Use and Employment Assumptions
- Transportation System Needs
- Infrastructure Needs

The Plan includes draft policies and implementation measures that will support the growth of employment in the area. As described in Sections V and VI of the Preferred Concept Plan, implementation includes recommended language to be incorporated into the City of Sherwood's Comprehensive Plan and a new Employment Industrial (EI) zoning district that will regulate development in the Tonquin Employment Area.

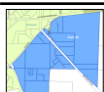
II. Background

A. Policy Framework

The Tonquin Employment Area (previously referred to as Study Area 48) shown on Figure I-1 was added to the Urban Growth Boundary (UGB) by the Metro Council in 2004 (Ordinance 04-1040B). The area includes approximately 300 acres of property adjacent to the City of Sherwood's eastern boundary and south of SW Tualatin-Sherwood Road.

Before the land in the Tonquin Employment Area can be converted to urban use, Metro requires that a concept plan complying with Title 11 of the *Urban Growth Management Functional Plan* be prepared by the city that will specify development policies, implementation strategies and define anticipated services for the new urban area. The cities of Sherwood and Tualatin entered into a Memorandum of Understanding (MOU) agreeing that Sherwood would be the service provider for the area from the existing city limits east to SW

Figure II-1: Tonquin Employment Area



124th (City of Sherwood Resolution 2007-083, see Exhibit A-2 in the *Area 48 Concept Plan: Existing Conditions Report*, March 2009). The MOU further grants the City of Tualatin general control over access onto the future extension of SW 124th, with both cities agreeing to participate in funding future improvements to the street. The MOU requires both cities to concept plan the area in a way that limits direct access onto SW Tualatin-Sherwood Road and the future SW 124th extension. Both cities agree that the area will generally be considered for industrial-type zoning.

The Tonquin Employment Area is designated an Industrial Area per Title 4 of Metro's *Urban Growth Management Functional Plan*. Title 4 requires that cities limit retail commercial uses and professional services in areas designated for industrial uses. To protect industrial areas, Title 4 limits non-industrial uses to ensure that they primarily serve the needs of workers in the area. For Industrial Areas, Title 4 states, "new buildings for stores, branches, agencies or other outlets for retail uses and services cannot occupy more than 5,000 square feet of sales or service area in a single outlet, or in multiple outlets that occupy more than 20,000 square feet of sales or service area in a single building or in multiple buildings that are part of the same development project".

Another Title 4 requirement that shapes future growth and development in the Tonquin Employment Area is one that governs subdividing designated Industrial Areas (see Subsection 3.07.430.D). Title 4 requirements stipulate:

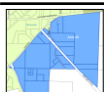
Lots or parcels smaller than 50 acres may be divided into any number of smaller lots or parcels.

Lots or parcels larger than 50 acres may be divided into smaller lots and parcels pursuant to a master plan approved by the city or county so long as the resulting division yields at least one lot or parcel of at least 50 acres in size.

Lots or parcels 50 acres or larger, including those created pursuant to paragraph (2) of this subsection, may be divided into any number of smaller lots or parcels pursuant to a master plan approved by the city or county so long as at least 40 percent of the area of the lot or parcel has been developed with industrial uses or uses accessory to industrial use, and no portion has been developed, or is proposed to be developed with uses described in subsection A of this section.

Only one parcel in the Tonquin Employment Area meets the 50-acre threshold, the approximately 90 acre parcel in the northeast corner of the site, at the intersection of SW Tualatin-Sherwood Road and SW 124th Street.

Once the City of Sherwood adopts the Tonquin Employment Area Concept Plan, and Metro acknowledges that it meets the *Urban Growth Management Functional Plan*, this area becomes eligible for annexation to the City of Sherwood.



In June 2010 Metro designated the area immediately south of the Tonquin Employment Area as an Urban Reserve.¹ The planning for future land uses in the Tonquin Employment Area was conducted in anticipation of urban uses being planned for areas to the south and the recommendations in the Preferred Concept Plan are consistent with, and do not preclude, growth in the Urban Reserve.

B. City Annexation Policy

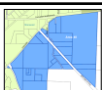
Once the Preferred Concept Plan is adopted, parcels within the Tonquin Employment Area can be annexed to the City of Sherwood. The most common way to annex is authorized by ORS 222.170 in which annexation can be initiated by a majority of the property owners and registered voters in the area to be annexed. In a city-initiated annexation, authorized by ORS 222.120, the city would initiate the annexation and place it on the ballot. In this scenario, a majority of the registered voters in the area proposed for annexation must vote to be annexed to the City of Sherwood. In addition, in either method of annexation, the residents of Sherwood must vote for the area to be annexed to the city.

Annexation can include one, more than one or all of the properties within the Tonquin Employment Area. There is no minimum or maximum amount of area that can be annexed at any one time, provided the property is within the urban growth boundary and the future land uses and infrastructure needs are identified through an approved concept plan. Consideration of whether to bring an area into the city limit includes whether the area can be adequately served by public utilities, proximity to the existing city boundaries, and whether the annexation would provide for efficient provision of services.

C. Physical Features

Three existing roadways create part of the boundary of the Tonquin Employment Area: SW Oregon Street, SW Tualatin-Sherwood Road, and SW 124th Street (future extension). The location of this site at the intersection of arterial level streets affords it good visibility and access. There is a unique opportunity for this area to develop in a compatible manner with existing development to the north and west and with future development to the east in the City of Tualatin, which will follow the *Southwest Tualatin Concept Plan*. There are several man-made and natural features internal to the site that also help define the Tonquin Employment Area. These features are shown on Figure III-1.

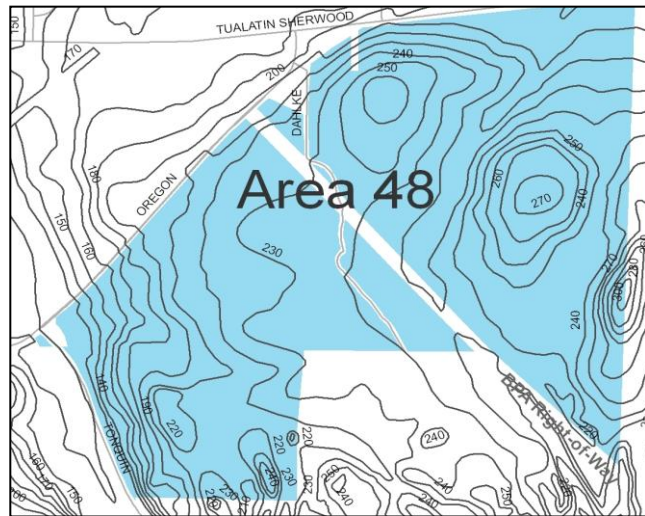
¹ Senate Bill 1011, enacted by the 2007 Oregon State Legislature, enables Metro and the three Metro area counties to designate "Urban and Rural Reserves". These reserves determine where urban growth boundaries in the Portland Metro region will — and will not — expand to accommodate population and employment growth over the next 40 to 50 years.



1. Natural Features

Prominent natural features on the site include the buttes in the northeast corner, wetlands associated with this topography, and steep slopes that form the western border (see Figure II-2). The land within the Tonquin Employment Area is not predominantly flat nor are there large areas of steep slopes. There are a few areas of slopes exceeding 25%, but generally the slopes are less than 10%. Most of the land in the northeastern portion of the study area has traditionally been used for agricultural purposes. The site elevations range from approximately 300 feet at the eastern edge to 140 feet at the southwestern edge.

Figure II-2: Tonquin Employment Area Slope



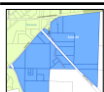
A portion of the Tualatin River National Wildlife Refuge borders the southwestern boundary of the Tonquin Employment Area. The U.S. Fish and Wildlife Service set aside this 3,060 acre as an urban refuge providing wetland, riparian, and upland habitats for migratory birds, threatened and endangered species, fish, other resident wildlife, and as a scenic area.

As can be seen on aerials of the area (See Figure IV-1), a significant portion of the Tonquin Employment Area is covered by trees and vegetation. It is also part of three watersheds; the Rock Creek, Hedges Creek and Upper Coffee Lake Creek drainage area.² The western portion of the site is within Rock Creek watershed and drains into the Refuge. The Hedges Creek Basin includes the central portion of the site and extends along SW Tualatin Sherwood Road, draining into the Tualatin River. The southeastern portion of the Tonquin Employment Area drains into Coffee Lake Creek and, ultimately, the Willamette River; it is also in close proximity to the 100-year floodplain along SW Tonquin Road near Rock Creek.

2. Physical Features

Utility right-of-ways and easements, most prominently one belonging to the Bonneville Power Administration (BPA), run diagonally across the site. These create areas of constraint, where development will be restricted, as well as opportunities where preservation of natural areas

² Clean Water Services Design and Construction Standards require a vegetated corridor, or riparian buffer, to be provided and maintained around natural features upon urban development. At the local level, Clean Water Services and its member cities provide for water quality management within the Tualatin River Basin and will apply to the Tonquin Employment Area.



could contribute to a parkway/trail-type feel along a collector street system or to open space that helps define an industrial campus.³

The City of Tualatin owns a water reservoir in the northwestern portion of the study area.

III. Concept Planning Process Overview

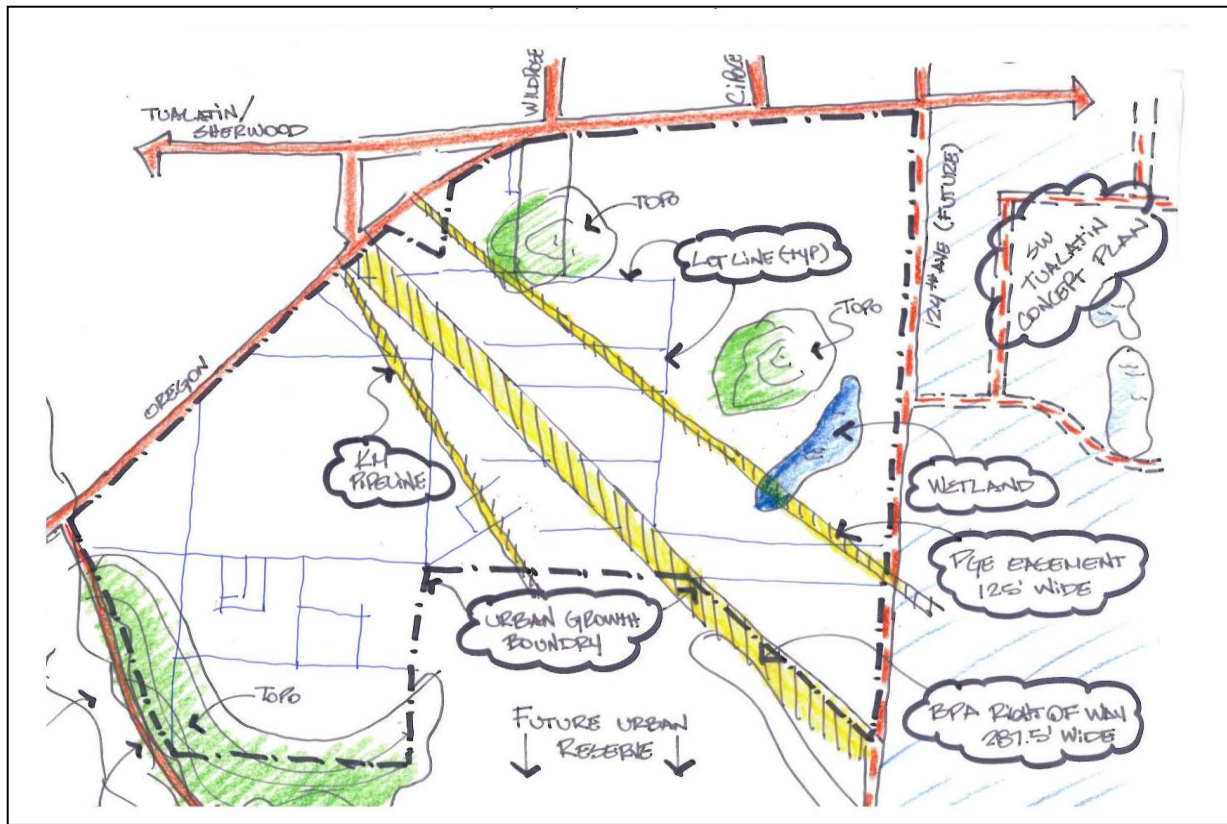
A. Phase I: Existing Conditions

Phase I of the concept planning process included researching and documenting the existing conditions on the site and developing preliminary development concepts. City staff and project consultants generated, reviewed, and refined the information for the first phase of the project. Guiding the process was a Technical Advisory Committee (TAC) consisting of representatives from ODOT, Metro, Washington and Clackamas Counties, the City of Tualatin, Clean Water Services, Raindrops to Refuge, Tualatin Valley Fire and Rescue, Bonneville Power Administration, Portland General Electric, Kinder Morgan, and the City's Parks and Urban Renewal Boards, as well as a Stakeholder Advisory Committee (SAC) consisting of all area property owners. The SAC met two times during Phase I to discuss project objectives and to provide feedback on future land uses and transportation facilities on the site. Both groups continued to meet during Phase II of the project to review technical information and to provide suggestions for what became the Preferred Concept Plan.

A public open house was also held in the spring of 2009 to provide an opportunity for property owners outside of the study area and other interested parties to review the project objectives and background information.

³ Metro Ord. 04-1040B states "Title 11 planning shall incorporate the general location of the projected right-of-way for the Tonquin Trail as shown on the 2004 Regional Transportation Plan (Exhibit F, page 3, item II.D.4)." The general location of the Tonquin Trail will be shown on the Final Preferred Concept Plan.



Figure III-1: Existing Conditions

Phase I work resulted in an existing conditions report (*Area 48 Concept Plan: Existing Conditions Report* March 2009) that detailed the existing physical conditions on the site. The information found in this report, including information on utility infrastructure, public facilities, natural resources, cultural and historic resources, and the transportation system, informed a series of two consultant Project Team design workshops held in April and May 2009 to explore possible development concepts for the area. The outcome of the two design workshops was three Preliminary Concept Plan Alternatives. Phase I work also resulted in a set of Project Goals and Evaluation Criteria (Table III-1) developed to steer the project towards a suitable land use and transportation system that will support future employment in the Tonquin Employment Area. This list was consulted in the development of three concept alternatives and ultimately was used to guide the selection of the Preferred Concept Plan.



Table III-1: Tonquin Employment Area Goals and Evaluation Criteria

Goals	Evaluation Criteria	Criteria Type
Adequate public and private utilities are proposed.	The plan can be served by public and private utilities per the Water, Stormwater and Sanitary Sewer Master Plans	Qualitative
Transportation connectivity is provided.	The plan provides local vehicular connectivity as well as multimodal (bike/ped) options.	Quantitative
Transportation performance standards are maintained.	The resultant performance levels at key intersections meet City, County and State standards, as applicable.	Quantitative
The plan provides the ability to serve truck (freight) traffic.	Identified existing truck routes are preserved and new routes are established as necessary to serve the area.	Qualitative
Infrastructure costs are taken into consideration.	Capital cost (planning level capital cost of construction of major roads, water, sewer and stormwater systems)	Quantitative
The plan encourages sound economic development.	The plan is consistent with the market study for the area and Sherwood's Economic Opportunities Analysis.	Qualitative
The plan provides opportunities for various industrial users.	The plan is responsive to multiple user types and provides opportunities for a variety of industrial/employment uses.	Qualitative
Provide appropriate level of commercial use to support needs of area's employees.	The plan identifies and provides the appropriate level and location(s) of limited commercial use.	Qualitative
Preserve significant natural resources.	The plan preserves significant natural resources where appropriate and feasible, including riparian areas and upland habitat.	Qualitative
Include Tonquin Trail elements.	The plan considers the potential Tonquin Trail alignments.	Qualitative
The plan meets the requirements of Metro Ordinance 04-1040B.	The proposed plan is consistent with the requirements of Ordinance 04-1040B and Metro Title 11.	Qualitative
Coordinate with SW Tualatin Concept Plan.	The proposed plan coordinates with the SW Tualatin Concept Plan.	Qualitative
Consider the I-5/99W Connector Project.	The proposed plan considers the I-5/99W Connector Project.	Qualitative
The plan meets the provisions of the MOU with Tualatin.	The proposed plan is consistent with the provisions of the MOU with Tualatin.	Qualitative



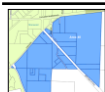
Goals	Evaluation Criteria	Criteria Type
Involve the broader Sherwood Community in the Planning Process.	Provide opportunities for property owners and interested parties to participate in the plan's development.	Qualitative
Consider access and response times for emergency services.	Maintain and enhance the transportation network to and through the area to provide adequate accessibility for first responders.	Qualitative

B. Phase II: Tonquin Employment Area Concept Planning

The Preferred Concept Plan is the result of the second and final phase of the concept planning process. Phase II explored in more detail the three Preliminary Concept Plan Alternatives developed in 2009. The *Preliminary Concepts Alternatives Analysis Report* (September 2009) provides a summary of alternatives developed, including a description of each alternative and a qualitative and quantitative analysis that informed the selection of a Preferred Concept. The analysis of alternatives explored the physical opportunities and constraints of the site and made assumptions regarding the level of development and the types of employment the area could support. Specifically, land use assumptions and information on infrastructure (transportation, sanitary sewer, water, and storm drainage) needs and costs were developed for each of the three alternative concepts.

The transportation analysis performed as part of the second phase concluded that development in the Tonquin Employment Area will require an east-west connection from SW 124th Avenue to SW Oregon Street through the site. This collector-level roadway is a vital component of future development because it would help to facilitate east-west mobility through the area and would serve as a parallel route to SW Tualatin-Sherwood Road by connecting to SW Blake Street in the *Southwest Tualatin Concept Plan* area. Beyond the internal circulation function it provides, this collector is shown to provide an overall benefit to the existing transportation system, in particular by reducing future traffic demand on SW Tualatin-Sherwood Road. All three of the Preliminary Concept Alternatives included this necessary east-west collector. The conceptual alignment for this roadway is shown on Figure IV-1.

A striking conclusion from the analysis was that the land use and infrastructure variables explored did not definitively point to one Concept Alternative being the clear choice for further refinement. All three of the Preliminary Concept Alternatives adequately met the Goals and Evaluation Criteria (Table III-1) by illustrating a land use pattern and supportive infrastructure that could promote sound economic development and provide opportunities for various industrial users. As documented in the *Preliminary Concepts Alternatives Analysis Report*, with the exception of differences in the internal circulation systems explored, there were few differences between the alternatives that could be used for significant comparative analysis.

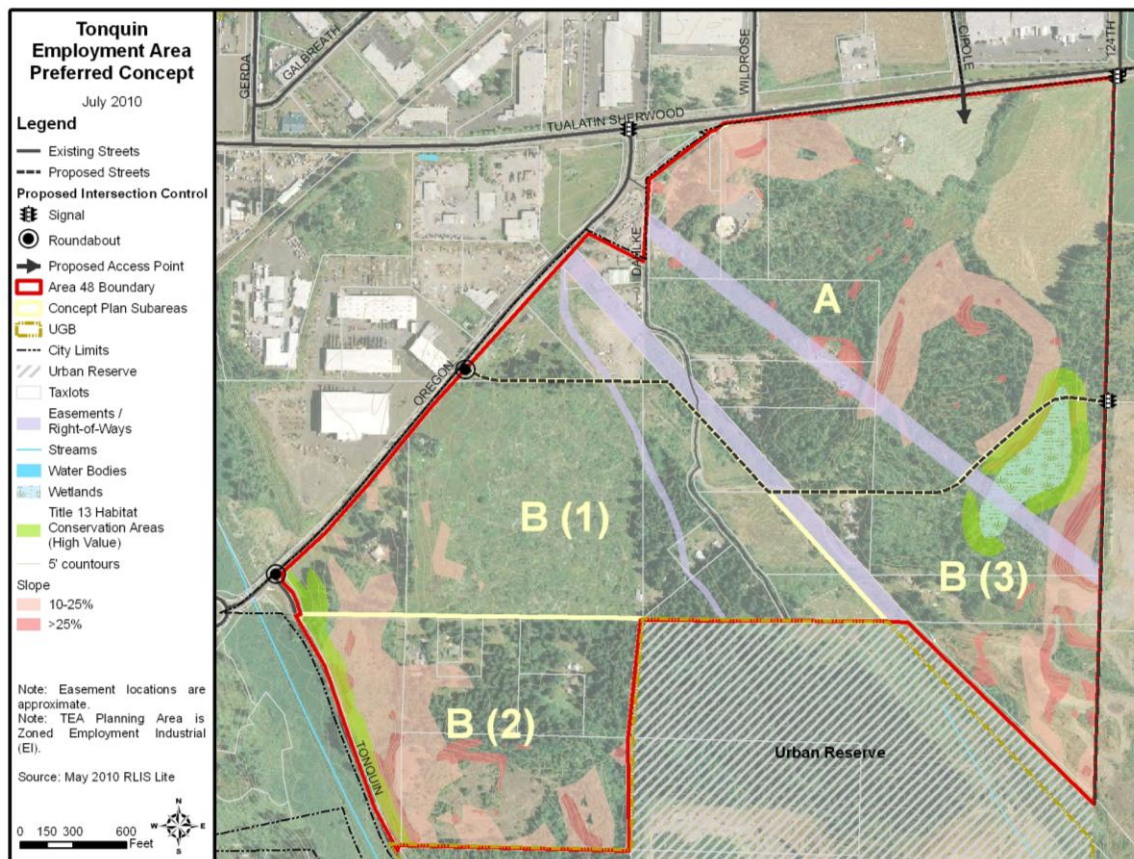


IV. Tonquin Employment Area Preferred Concept Plan

A. Overview

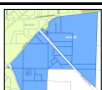
A graphical representation of the Preferred Concept Plan for the Tonquin Employment Area is shown in Figure IV-1. While no one Preliminary Concept Alternative directly led to a clear choice for the future development of the Tonquin Employment Area, some additional analysis further shaped what is proposed as the Tonquin Employment Area Preferred Concept. Parcel lines and property ownership were not defining factors in the development of the three Preliminary Concept Alternatives. Developing a rational and implementable concept plan, however, required a closer accounting of property ownership. This was particularly important when meeting the requirements of the *Urban Growth Management Functional Plan* Title 4, the intent of which is to create and preserve large lots for industrial development in the Metro area. Specifically, the requirements assigned to the Tonquin Employment Area include preserving a parcel 50 acres in size or larger for industrial uses. A distinguishing characteristic of the Preferred Concept Plan is that it shows a proposed alignment for a future east-west collector street that minimizes the bisection of developable land. In particular, the proposed location of this future collector preserves over fifty of the most developable acres of the largest parcel of land in the northeast corner of the site, as well as keeps whole the second largest (~30 acre) parcel.



Figure IV-1: Tonquin Employment Area Preferred Concept Plan

The other distinguishing characteristic of the Preferred Concept Plan is the division of the Tonquin Employment Area into two areas: Area A, north of the proposed collector, and Area B, south of the proposed roadway. These areas are distinguished not only by their relationship to the proposed internal street network, but also their location in respect to the BPA easement and their orientation to the existing street network (Area A to SW Tualatin-Sherwood Road; Area B generally to SW Oregon Street and the new collector roadway). It is also assumed that Area A, due to its visibility from the intersection of SW 124th Avenue /SW Tualatin-Sherwood Road and SW Oregon Street/SW Tonquin Road, will be first to develop and that parts of Area B, due in large part to the lack of visibility and transportation access in the short term, will develop later. To better examine the likely phasing of development, Area B was further divided into Subareas B(1), B(2) and B(3). Each of the four delineated subareas were assessed for their likely development potential (type and amount) and assigned future employment numbers. The Tonquin Employment Area 20-Year Employment Forecast, as presented in Subsection B and summarized in Table IV-1 of this report, details both the expected employment in each subarea and the percentage of development expected over the 20-year time horizon.

Also considered in the development of the Preferred Concept Plan were potential alignments for the Tonquin Trail. The Cities of Wilsonville, Sherwood and Tualatin have partnered with Metro



and Washington County to develop the Tonquin Trail that will stretch from the Tualatin River National Wildlife Refuge, just north of Sherwood, to the Willamette River at Graham Oaks Natural Area in Wilsonville. Once completed, this primarily off-street trail will serve as a bike and pedestrian pathway for transportation, recreation and environmental education in this region. In 2005, a feasibility study was conducted to establish the preferred route for the Tonquin Trail. It is possible that a segment of the trail will run through the Tonquin Employment Area, conceivably along portions of the Bonneville Power Administration (BPA) right-of-way and the future east-west collector; alternatively, it is also possible that trail will be located adjacent to, or outside the Tonquin Employment Area. Preferred trail alignments will not be known until the Master Planning phase of trail planning is completed; the exact location of the trail through or near the Tonquin Employment Area will likely be determined as part of the development review process, through right-of-way dedication requirements.

B. Land Use and Employment Assumptions

1. Employment Forecast

As shown below in Table IV-1, the Tonquin Employment Area is projected to accommodate 2,290 jobs during the next 20 years. Approximately 83 percent of total forecasted employment (1,909 jobs) is projected to be industrial employment. The remaining 17 percent of forecasted employment (381 jobs) is projected to be a mix of retail/commercial services and office employment supporting the industrial uses and employees.

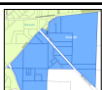


Table IV-1: Tonquin Employment Area 20-Year Employment Forecast

Area / Component	Total Acres	Buildable Acres	Employment Type	FAR	Building Area (s.f.)	Job Density (empl. per 1,000 s.f.) ^{2/}	% Developed in 20 Years	Total Jobs in 20 Years	Jobs/Net Acre in 20 years	Total Jobs at Buildout	Jobs/Net Acre at Buildout	Land Use Assumptions
A - All	129.1	101.8	Retail/Commercial Services and Light Industrial ^{1/}				100%					5-acre Commercial Site ^{3/} Remaining Acreage: 100% Light Industrial
Retail/Commercial Services		5.0	Retail/Commercial Services	0.35	76,230	2.5	100%	191		191		
Light Industrial		96.8	Light Industrial	0.20	843,322	1.6	70%	945		1,349		
B(1) - All	71.0	67.3	Retail/Commercial Services and Light Industrial				100%					5-acre Commercial Site Remaining Acreage: 100% Light Industrial
Retail/Commercial Services		5.0	Retail/Commercial Services	0.35	76,230	2.5	100%	191		191		
Light Industrial		62.3	Light Industrial	0.20	542,758	1.6	70%	608		868		
B(2)	48.1	36.3	Light Industrial	0.20	316,246	1.6	50%	253		506		100% Light Industrial
B(3)	47.9	29.8	Light Industrial	0.20	259,618	1.6	25%	104		415		100% Light Industrial
Total	296.1	235.2			2,114,402			2,290	10	3,520	15	

Notes

^{1/} Flex space is anticipated to be one of the dominant building types in the light industrial areas.

^{2/} Employment density figures derived from the City of Sherwood Economic Development Strategy.

^{3/} Commercial site(s) includes retail and commercial services.

Sources: Leland Consulting Group, City of Sherwood Economic Development Strategy 2007 and Metro 1999 Employment Density Study.

2. Assumptions

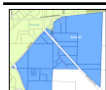
The 20-year employment forecast for the Tonquin Employment Area was developed based on the following assumptions:

The Tonquin Employment Area (formerly known as Study Area 48) was annexed into the Urban Growth Boundary with the express intent of increasing the inventory of land available for industrial employment uses. Therefore, the forecast assumes that the vast majority of the study area (225 net acres) will develop as industrial uses.

In addition to industrial uses, the Tonquin Employment Area is anticipated to accommodate up to 10 net acres of retail/commercial uses.⁴ Commercial uses are intended to accommodate business-serving retail and commercial services targeted to nearby businesses and workers, and are therefore not expected to have a regional draw. Limited office uses may be incorporated into the centers.

The forecast assumes a floor area ratio (FAR) of 0.20 and an average job density of 1.6 employees per 1,000 square feet of building area for light industrial areas and an FAR of 0.35

⁴ As proposed in Appendix B, the draft Employment Industrial zone chapter, a maximum of one commercial development, not to exceed five (5) acres in size, may be permitted on each side of the future collector street connecting SW 124th Avenue to SW Oregon Street.



and an average job density of 2.5 employees per 1,000 square feet of building area for retail/commercial services areas. These FAR and job density assumptions are derived from the City of Sherwood Economic Development Strategy and confirmed in Metro's 1999 Employment Density Study.

Given that the Tonquin Employment Area is large, spanning nearly 300 gross acres, and the fact that certain subareas – B(2) and B(3) in particular – are constrained by poor transportation access, visibility, utility easements, wetlands, and other site challenges, the entire planning area is not anticipated to achieve 100 percent build out during the next 20 years.

Subareas A and B(1), which have good transportation access and visibility and high traffic intersections, are anticipated to develop first. In 20 years, the retail/commercial services components of these subareas are expected to be fully built out and the light industrial components are expected to achieve 70 percent build out.

Subareas B(2) and B(3) are anticipated to develop more slowly than Subareas A and B(1) due to their more significant site and development constraints. In 20 years, these subareas are projected to achieve a range of 25 to 50 percent build out.

Growth assumptions for all subareas were calibrated to fall between the low and medium growth forecasts for industrial jobs in the 2007 City of Sherwood Economic Development Strategy (Strategy). This assumption reflects that most, but not all, new industrial jobs in Sherwood will locate in the Tonquin Employment Area. Although this analysis forecasts job growth through approximately 2030 while the Strategy forecasts job growth through 2025, the difference is likely to be minimal due to the current economic recession that will result in several years of zero job growth or even net job losses, neither of which was predicted in the Strategy.

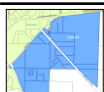
C. Transportation System

The purpose of the transportation analysis is to summarize the transportation impacts of the proposed Tonquin Employment Area Preferred Concept Plan to meet Transportation Planning Rule (TPR) requirements. The following includes a review of existing transportation conditions and standards, as well as the projected traffic operations with the existing zoning and proposed zoning for the year 2030.

1. Study Area and Transportation Facilities

The Tonquin Employment Area is bordered by SW Tualatin-Sherwood Road to the north, SW 124th Avenue to the east,⁵ SW Tonquin Road to the south, and SW Oregon Street to the west. The Tonquin Employment Area is considered the project study area; for purposes of transportation analysis, a larger area is being considered for potential impacts from rezoning the

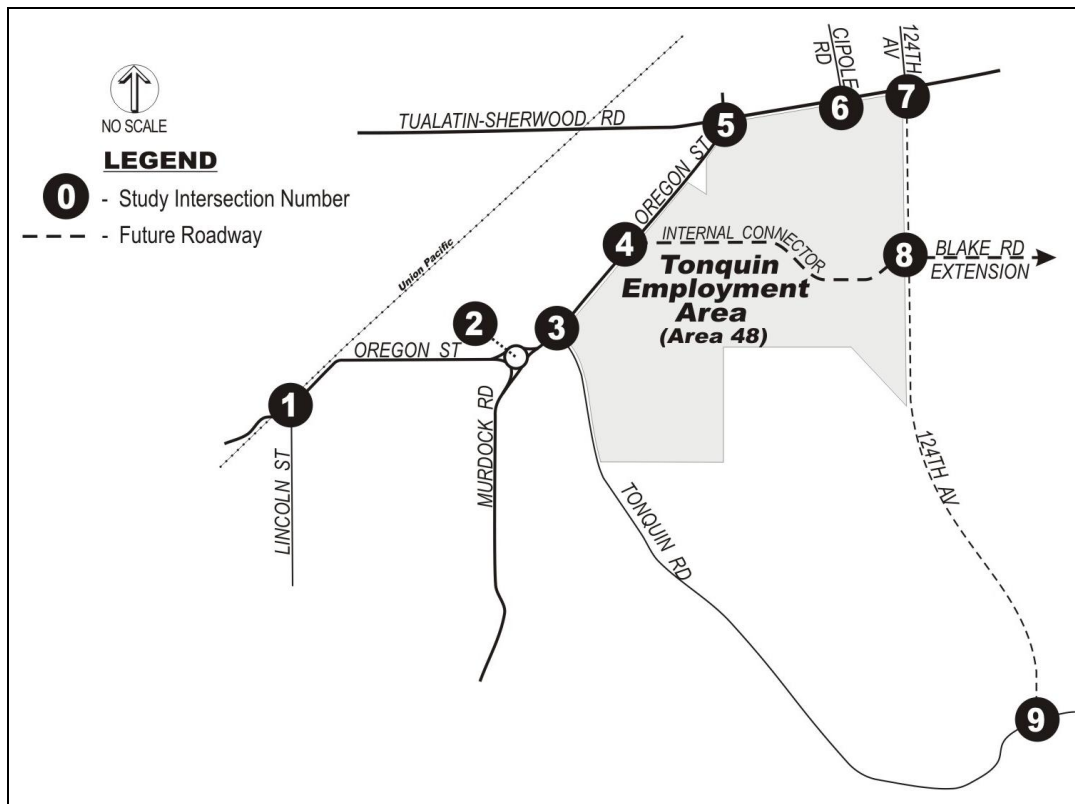
⁵ SW 124th Avenue is a planned transportation facility but is not yet built.



study area for more intensive uses (see Figure IV-2, Transportation Analysis Area). Nine study intersections were selected for analysis based on proximity to the study area and potential impacts from land use intensification within the study area:

- SW Oregon Street/SW Lincoln Street (1)
- SW Oregon Street/SW Murdock Road (2)
- SW Oregon Street/SW Tonquin Road (3)
- SW Oregon Street/Internal Connector (4)
- SW Tualatin-Sherwood Road/SW Oregon Street (5)
- SW Tualatin-Sherwood Road/SW Cipole Road (6)
- SW Tualatin-Sherwood Road/SW 124th Avenue (7)
- SW 124th Avenue/Internal Connector (SW Blake Road Extension) (8)
- SW 124th Ave/SW Tonquin Road (9)

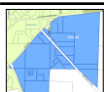


Figure IV-2: Transportation Analysis Area

Pedestrian Facilities

An inventory of sidewalks along key roadways within the transportation analysis area was conducted. Currently, SW Tualatin-Sherwood Road has sidewalks on both sides in this area. Oregon Street has sidewalks on both sides near the SW Tualatin-Sherwood Road intersection and also near the intersections with SW Murdock Road and SW Tonquin Road. Along SW Oregon Street between SW Tualatin-Sherwood Road and SW Tonquin Road, sidewalks are currently located on the west side of the street. Sidewalks are also present on the majority of the south side of SW Oregon Street between SW Lincoln Street and SW Murdock Road. SW Murdock Road has sidewalks along the west side of the street. Sidewalks are not provided on Tonquin Road. SW Lincoln Street and SW Cipole Road both have sidewalks on the east side of the street in the transportation analysis area.

In general, the pedestrian network provides connectivity to most of the streets in the vicinity of the Tonquin Employment Area. However, the current gaps in the pedestrian system along SW Oregon Street do not allow pedestrians from Old Town Sherwood to access the proposed Tonquin Employment Area.



Bicycle Facilities

To assess the adequacy of bicycle facilities within the vicinity of the Tonquin Employment Area, a brief field inventory of designated bike lanes and shoulder bikeways along key roadways was conducted. There are bike lanes in both directions along SW Tualatin-Sherwood Road and on SW Oregon Street from SW Tualatin-Sherwood Road to SW Murdock Road.⁶ No other key roads in the area have bike lanes.

Public Transit

Public transit service is currently not offered in the transportation analysis area. The nearest transit service (TriMet Routes 12 and 94) is located over a mile away in Old Town Sherwood. Tri-Met's commuter rail service, Westside Express Service (WES), includes a stop in Tualatin at 18955 SW Boones Ferry Road.⁷

Motor Vehicle Facilities

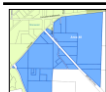
Field inventories were conducted to determine characteristics of roadways within the transportation analysis area. Data collected included posted speed limits, roadway lanes, lane configurations, and intersection controls. These characteristics define corridor capacity and operating speeds through the street system, which affect travel path choices for drivers in the vicinity of the Tonquin Employment Area. The summary of area roadway characteristics is listed in Table IV-2.

Table IV-2: Existing Key Transportation Analysis Area Roadway Characteristics

Roadway	Agency	Functional Classification	Posted Speed Limit (mph)	Number of Lanes	Lane Width (ft)	Shoulder Width (ft)
SW Tualatin-Sherwood Road	County	Arterial	45	3	12	6.0
SW Oregon Street	County	Arterial	35	3	12	1.5
SW Murdock Road	City	Arterial	35	2	12	1.5-8.0
SW Tonquin Road	County	Arterial	55	2	11	1.5
SW Cipole Road	County	Collector	45	2	11	1.5
SW 124th Avenue	County	Arterial	35	5	12	6
SW Lincoln Street	City	Local Road	25	2	11	6

⁶ Note: The bike lanes are not continuous through the SW Tualatin Sherwood Road to SW Murdock Road stretch of roadway.

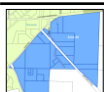
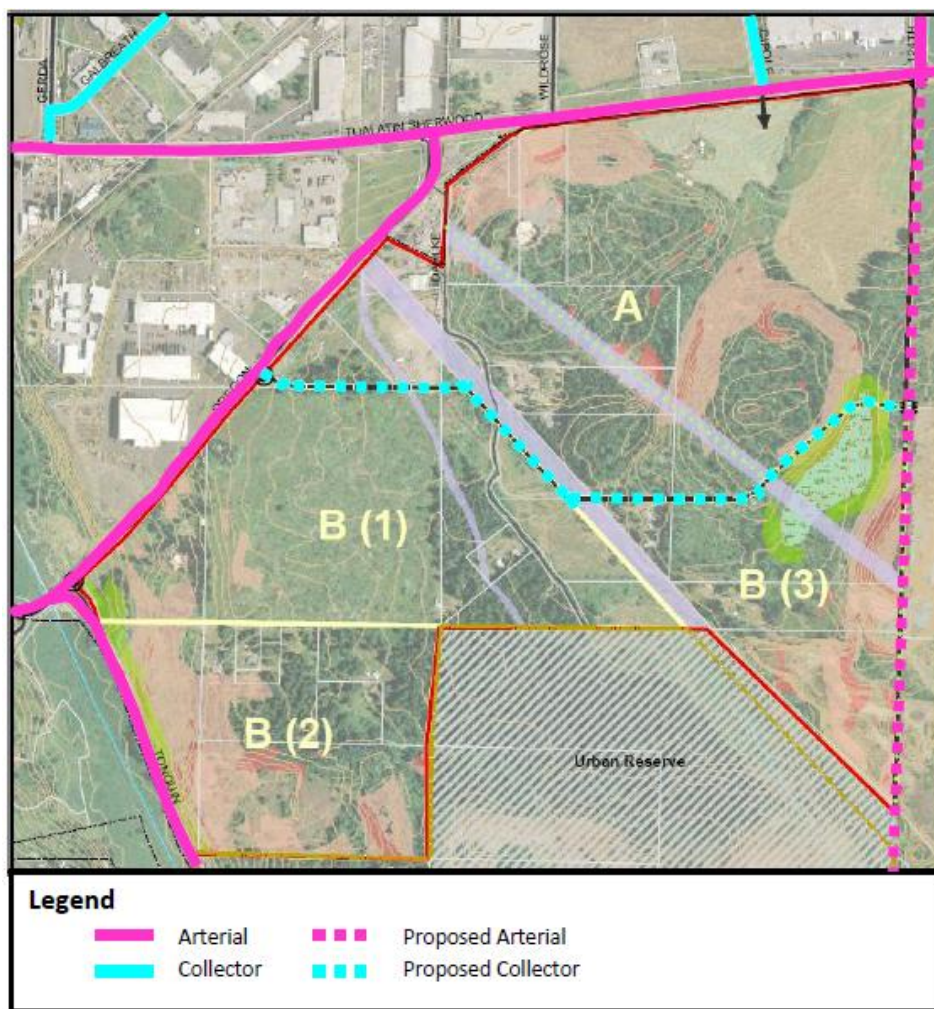
⁷ It is anticipated that opportunities to upgrade and extend public transit service to the Tonquin Employment Area will be evaluated as increases in employment population warrant. With WES service approximately two miles from the Tonquin Employment Area, it is conceivable that future large employers in this area will look at van pooling or shuttles from the Tualatin WES station.



Functional Class

The proposed Tonquin Employment Area is bordered by SW Tualatin-Sherwood Road to the north, SW 124th Avenue to the east, SW Tonquin Road to the south, and SW Oregon Street to the west. Each of these roadways is classified as an arterial. Additional key streets in the transportation analysis area include SW Murdock Road (classified as an arterial) and SW Cipole Road (classified as a collector). The development of the Tonquin Employment Area will require a new roadway network to be constructed through the area to facilitate connectivity. The proposed primary east-west connection is a collector roadway that would help to facilitate east-west mobility through the Tonquin Employment Area and would serve as a parallel route to SW Tualatin-Sherwood Road by connecting to SW Blake Street in the *Southwest Tualatin Concept Plan* area. The exact location of the intersection of SW Blake Street and SW 124th will be determined through coordination between the cities of Sherwood and Tualatin when more in-depth site analysis has been conducted. The existing and proposed functional classification of the roadways serving the future Tonquin Employment Area can be seen in Figure IV-3.

Figure IV-3: Proposed Functional Classification



2. Transportation Standards and Opportunities/Constraints

The following subsections describe the transportation standards for the street network serving the proposed Tonquin Employment Area, including functional classification, access spacing, and mobility.

Access Management Spacing Standards

Proper roadway access spacing is important to maintain operations and safety. While all parcels must be allowed access, it is desired that access points on major roadways be limited. This can be accomplished by limiting parcel access to side streets or reducing access points by requiring closure, relocation, and/or consolidation. However, it can be difficult to modify existing access locations and it is best to incorporate appropriate access spacing practices upon initial development or redevelopment to limit the amount of management required in the future. The access management spacing standards that are established by agencies to guide this process vary depending on the classification of the roadway. Access spacing standards for transportation analysis area roadways are identified in Table IV-3.

Table IV-3: Access Management Spacing Standards

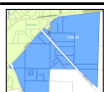
Facility (by Agency)	Minimum Access Spacing (ft)	Maximum Access Spacing (ft)
Washington County ^a		
- Arterial	600	-
- Collector	100	-
City of Sherwood ^b		
- Arterial	600	1,000
- Collector	100	400

^aSource: Washington County Community Development Code, Article V. Section 501-8.5.B

^bSource: Sherwood TSP, Table 8-12

Opportunities and Constraints for Roadway Connections

Access spacing requirements constrain the potential locations for the proposed east-west connector through the Tonquin Employment Area. On SW Oregon Street, roughly 3,000 feet of property frontage exist between the SW Oregon Street/SW Tonquin Road intersection and SW Oregon Street and the driveway entrance located just south of SW Tualatin-Sherwood Road. In the event that the SW Oregon Street/SW Tonquin Road intersection is shifted northeast, it would limit the amount of available roadway space for the proposed east-west connector intersection with SW Oregon Street. Accounting for the shift in intersection alignment, it is likely that one full-access intersection would be located along SW Oregon Street to provide access to a collector roadway through the site. In addition, there is a potential for one or two other right-in/right-out access points on SW Oregon Street to connect to local roadways. These access points, if provided, will need to be reviewed with Washington County to coordinate access management policies and standards.



At the main east-west connector intersection along SW Oregon Street, a roundabout has been proposed for traffic control. Because of the existing roundabouts on SW Oregon Street, a roundabout at this location is consistent with current transportation engineering design practice to meet driver expectations and use only one type of traffic control device on a given stretch of roadway. If a roundabout is ultimately selected, topographic constraints should be considered when selecting the appropriate location along SW Oregon Street as roundabouts require a level site.

The main consideration in proposing a location for an east-west collector to connect to SW 124th Avenue is the proposed extension of SW Blake Street as it is shown in the *Southwest Tualatin Concept Plan*.⁸ The extension of SW Blake Street would be a major collector between SW 115th Avenue and SW 124th Avenue. The intersection of SW Blake Street and SW 124th Avenue is likely the only full access intersection on SW 124th Avenue that may be permitted along the study area and should be the connection point for an east-west collector through the site. Additional right-in/right-out connections to local streets may be possible along SW 124th Avenue. Potentially a second full access intersection may be feasible (based on access spacing requirements) if it is located at the south edge of the site and connects to a future collector or arterial roadway.

Access from the site to SW Tualatin-Sherwood Road can be provided via the existing traffic signals at SW 124th Avenue and SW Cipole Road. In addition, a third connection to SW Tualatin-Sherwood Road may be possible for a right-in/right-out local street at SW Wildrose Place (located between SW Cipole Road and SW Oregon Street).

Access to SW Tonquin Road to the south is somewhat limited by topographic constraints, but a single access to the site was assumed as shown in Figure IV-3.

Mobility Standards

Intersection operations are important to consider to ensure that mobility needs of the transportation system are being met. The performance standard for intersections controlled by the City of Sherwood is Level of Service (LOS) D.⁹ The maximum volume/capacity (v/c) ratio specified by Washington County is 0.99 for signalized intersections.¹⁰ The minimum operational standard for unsignalized intersections specified by Washington County is LOS E.¹¹

Relationship to the I-5 to 99W Connector Project

Transportation planning in the southwest Metro area has been in flux over the past three years due to the effort to plan a major facility improvement between I-5 and Highway 99W in the

⁸ 2010 Update- *Southwest Tualatin Concept Plan*, August 2010.

⁹ Page 8-25, City of Sherwood Transportation System Plan, March 15, 2005.

¹⁰ Washington County 2020 Transportation Plan, Adopted October 29, 2002, Table 5.

¹¹ *ibid*



Tualatin, Sherwood, and Wilsonville area. Recently, the I-5 to 99W Connector Study concluded with a Project Steering Committee recommendation for Metro to include Alternative 7 (shown on the map in Appendix A) in the Metro RTP update process. As shown, the recommended future improvements with this alternative would have significant changes to the transportation system in the Tonquin Employment Area, including:

- Completion of the SW 124th Avenue Extension south of SW Tualatin-Sherwood Road as a 5-lane roadway connection to a new southern arterial
- Completion of constructing a new 5-lane southern arterial from Highway 99W (south of Brookman Road) to I-5 (north of the North Wilsonville interchange)
- Completion of widening SW Tualatin-Sherwood Road to 5-lanes (included in the baseline conditions)
- Completion of an extension of Herman Road as a 3-lane roadway from SW Cipole Road to Highway 99W
- Completion of an extension of Lower Boones Ferry Road to Tualatin Road and widening of the corridor to 5-lanes from I-5 to Herman Road. *(Note: This project is not in the Regional Transportation Plan Financially Constrained Network.)*

This series of improvements would provide enhanced circulation and capacity in the transportation analysis area, including opportunities for freight traffic to reach Highway 99W or I-5 on three corridors (instead of just using SW Tualatin-Sherwood Road). Many of the project recommendations in the I-5 to 99W Connector Study are not funded and, therefore, cannot be assumed as “committed” when analyzing the future traffic operations and impacts of the Tonquin Employment Area. However, there are recommendations in the I-5 to 99W Connector Study that are in the transportation analysis area (e.g., providing right of way on SW 124th Avenue for an ultimate 5-lane arterial cross section and maintaining arterial standard access control) and these improvements should be incorporated into the Tonquin Employment Area Preferred Concept Plan as feasible and necessary for the future transportation system in the area.

3. Existing Traffic Conditions

The following sections summarize the existing transportation facilities in the transportation analysis area, (pedestrian, bicycle, public transit, and motor vehicle facilities), provide a review of adopted transportation standards, and summarize the existing traffic volumes and operations.

Motor Vehicle Volumes

The five existing intersections within the transportation analysis area were selected for focused analysis in order to address areas of concern along the associated major roadways and to monitor impacts of potential built-out within the Tonquin Employment Area. Traffic volumes



along SW Tualatin-Sherwood Road were obtained from the Sherwood Adams Avenue North Improvement Project¹² and volumes at the other study intersections were from the Sherwood Cannery Site PUD Project.¹³ Traffic counts for the study intersections were performed in November 2008 and January 2009.¹⁴ Turn movement counts were conducted at the study intersections during the weekday PM peak hour (4:00 to 6:00 p.m.). The count data was then used as a basis for evaluating traffic performance at the study intersections for existing PM peak hour conditions. The existing PM peak hour traffic volumes at study intersections are shown in Figure IV-4.

The traffic volumes were compared to year 2006 historic data in the study area documented in the I-5 to 99W Connector Project.¹⁵ Current traffic volumes were found to have decreased significantly during the PM peak hour on SW Tualatin-Sherwood Road in the westbound direction, with reductions up to 300 vehicles per hour. While these reductions in traffic volume could be a result of day-to-day or seasonal fluctuation, they could also be the result of decreased traffic volumes in the area due to current economic conditions or they could reflect driver route changes to other less congested corridors.

¹² Sherwood Adams Avenue North Improvements Project: Existing and Future Conditions Technical Memorandum, DKS Associates, December 2008.

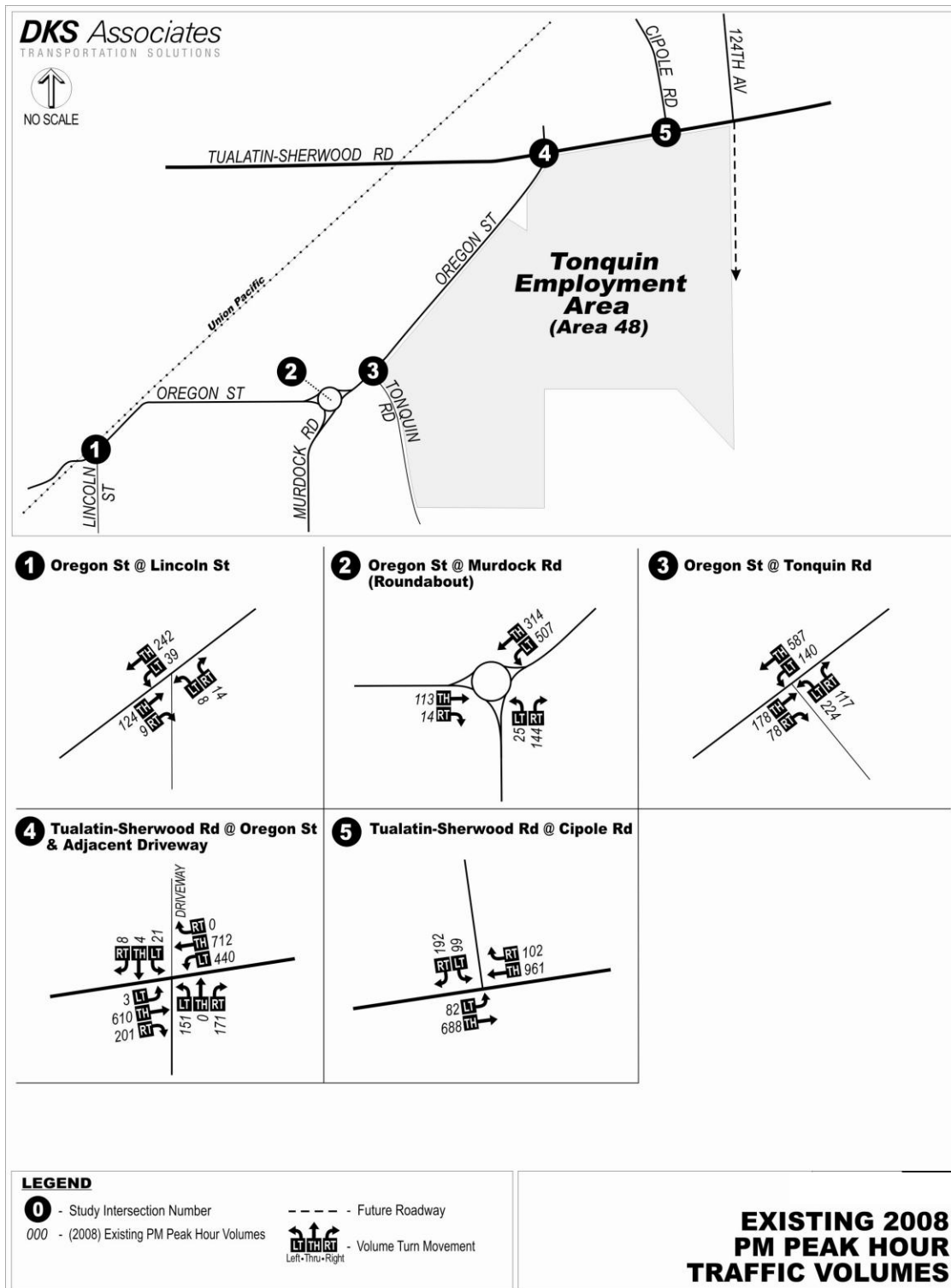
¹³ Sherwood Cannery Site PUD Project: Traffic Impact Analysis Report, DKS Associates, March 2009.

¹⁴ Traffic counts for the Adams Avenue North Improvements Project were performed in November 2008 and traffic counts for the Cannery Site PUD Project were performed in November 2008 and January 2009

¹⁵ I-5 to 99W Connector Project: Baseline Transportation Conditions Report, David Evans and Associates and DKS Associates, April 2007.



Figure IV-4: Existing 2008 PM Peak Hour Traffic Volumes



Existing Intersection Operations

The PM peak hour intersection volumes were used to determine the existing study intersection operating conditions based on the 2000 Highway Capacity Manual (HCM)¹⁶ methodology for signalized and unsignalized intersections. Roundabout analysis was performed using SIDRA INTERSECTION, a popular and well recognized transportation software program. The results of this analysis are listed in Table IV-4 for the PM peak hour. As listed, each of the signalized study intersections meet mobility standards during the PM peak hour. The unsignalized intersection of SW Oregon Street/SW Tonquin Road fails to meet LOS standards due to the heavy volume of left turns from SW Tonquin Road.

Table IV-4: Existing Intersection Performance (PM Peak Hour)

Intersection	Delay (sec)	LOS	V/C	MOEs	
				Agency	Standard
Signalized Intersections					
SW Tualatin-Sherwood Rd/ SW Oregon St	22.2	C	0.76	County	v/c ≤ 0.99
SW Tualatin-Sherwood Rd/ SW Cipole Rd	14.8	B	0.69	County	v/c ≤ 0.99
Unsignalized Intersections					
SW Oregon Street/ SW Murdock Rd (Roundabout)	0.35	A	0.39	City	LOS D
SW Oregon Street/ SW Tonquin Rd	>100	A/F	>1.00	County	LOS E
SW Oregon Street/SW Lincoln Street	10.3	A/B	0.04	City	LOS D
<u>Signalized/Roundabout Intersection:</u> Delay = Average Intersection Delay (sec.) LOS = Level of Service V/C = Volume-to-Capacity Ratio Shaded values do not meet standards			<u>Unsignalized Intersection:</u> Delay = Critical Movement Approach Delay (sec.) LOS = Major Street LOS/Minor Street LOS V/C = Critical Movement Volume-to-Capacity Ratio		

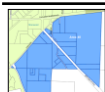
4. Transportation System Impacts

The transportation system impacts of future development in the Tonquin Employment Area are summarized in the following sections. The future conditions evaluation includes future forecasting, a summary of planned roadway improvements, and motor vehicle intersection capacity analysis.

Future Land Use

Transportation Analysis Zone (TAZ) land use allocations for horizon years that have been used for planning efforts in the area (e.g., the Sherwood TSP and the Metro RTP) were reviewed and

¹⁶ 2000 Highway Capacity Manual, Transportation Research Board, Washington DC, 2000.



the portion of the land use that corresponds to the Draft Tonquin Employment Area Concept Plan was estimated and summarized in Table IV-5. The study area was not forecasted to develop as an urban industrial area in the year 2020 forecasts that were utilized to develop the Sherwood and Washington County TSPs. However, the land use forecasts used to develop the 2030 and 2035 forecasts for Metro RTP Updates and the I-5 to 99W Connector Study did incorporate urbanization of the concept plan area.

Table IV-5: Concept Plan Area Land Use Forecasts

Scenario	Relevant Plan	Households	Retail Employees	Non-Retail Employees	Total Employees
2020	Sherwood and Washington County TSPs	12	0	0	0
2030	I-5 to 99W Connector Study	7	164	1,910	2,074
2035	Current Metro RTP	7	175	2,032	2,207
Proposed Concept Plan 2030	Tonquin Concept Plan	0	114	2,176	2,290

As listed in Table IV-5, the Draft Tonquin Employment Area Concept Plan land use estimates for the year 2030¹⁷ total 2,290 employees. Compared to the 2030 Metro forecast used for past RTP Updates and the I-5 to 99W Connector Study, this represents an increase of 216 employees. However, the proposed Concept Plan land use estimates have less retail and more industrial types of employment. The lower amount of retail employees reduces the trip generation potential of the proposed land use, which based on model trip rates for the affected TAZ would represent an increase of approximately 30 PM 2- hour vehicle trips over what was included in the 2030 Metro forecasts.

The adopted Transportation System Plans for Sherwood and Washington County did not assume urban development in the concept plan area. Therefore, TPR analysis for impact on those adopted plans should consider the full development impact and not just the increment of growth beyond what is included in Metro 2030 or 2035 forecasts. The full trip increment is summarized in Table IV-6 (year 2030 proposed trips vs. previously evaluated year 2020 trips). As listed in Table IV-6, urbanization in the study is consistent with the Draft Tonquin Employment Area Concept Plan would represent an increase of approximately 1,120 PM peak period trips.

¹⁷ 20-Year Employment Forecast Methodology, prepared by Leland Consulting Group, November 11, 2009.

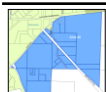


Table IV-6: Metro Travel Demand Model Trip Comparison for Tonquin Employment Area

Scenario	Land Use			PM 2 Hour Model Trips		
	HH	RET	OTH	In	Out	Total
2020 Sherwood and Washington County TSPs	12	0	0	9	5	14
2030 Tonquin Employment Area	0	114	2,176	270	864	1,134
Difference (Tonquin minus RTP)	-12	114	2176	261	859	1,120

Notes:

HH = Households

RET = Retail Employees

OTH = Non-retail employees

(includes all other employment types)

Future Forecasting Methodology

Future travel demand forecasting for the Tonquin Employment Area utilized the 2030 model developed by Metro, Washington County, and DKS Associates for the I-5 to 99W Connector Study. Future 2030 PM peak hour volumes for the Existing Zoning and Proposed Zoning scenarios were developed for the study area by adjusting the travel demand model trip tables to reflect the land use listed in Table IV-5. The 2030 Existing Zoning scenario included no land use growth in the project area (as considered in the 2020 Sherwood and Washington County TSPs), while total land use and trips from the 2030 Metro RTP model were increased to the projected totals for the *Southwest Tualatin Concept Plan*.¹⁸ A post processing technique following NCHRP 255 methodology¹⁹ was used to refine model travel forecasts to the volume forecasts used for 2030 intersection analysis for both scenarios. These volumes were then used to analyze and determine future impacts from the proposed concept plan area on the planned roadway network.

In order to provide a baseline comparison for the Tonquin Employment Area Concept Plan alternatives, the 2030 No Build scenario was established. The 2030 No Build scenario evaluates future traffic volumes and assumes the planned roadway geometry and limited development of the Tonquin Employment Area based on existing zoning.

Planned Area Roadway Improvements

The future operations of the study intersections were analyzed with the assumed completion of the financially constrained roadway improvements included in Metro's 2035 Regional Transportation Plan (RTP).

¹⁸ *Draft Southwest Tualatin Concept Plan*, Prepared for City of Tualatin, August 2005.

¹⁹ *Highway Traffic Data for Urbanized Area Project Planning and Design – National Cooperative Highway Research Program Report 255*, Transportation Research Board, Washington DC. 1982.



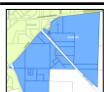
The roadway improvements identified as “reasonably likely to be funded” in the 2030 travel demand model were:

- Widening of SW Tualatin-Sherwood Road and Roy Rogers Road to 5-lanes from Teton Avenue in Tualatin to Borchers Drive in Sherwood
- Completion of the Adams Avenue South Extension
- Completion of the Adams Avenue North Extension
- Intersection geometric, turn lane, and signal phasing improvements at Highway 99W/Tualatin-Sherwood Road
- Completion of the SW 124th Avenue extension from SW Tualatin-Sherwood Road to SW Tonquin Road
- Widening of SW Tonquin Road to 3-lanes
- Signalization of SW Tualatin-Sherwood Road/Gerda Lane
- Completion of SW 112th Extension to Myslony Street in Tualatin
- New east-west roadway through the Tualatin Employment Area connecting SW 124th Avenue to SW Blake Street

Future 2030 Volumes

The 2030 PM peak hour study intersection volumes for the existing zoning and the proposed zoning scenarios were compared and are shown in Figure IV-5. Volumes were relatively similar between the two scenarios with intersections experiencing both projected increases and decreases in individual turn movements. The largest increase in volume is projected to occur along the new internal connector roadway. This collector facility as proposed would carry approximately 500 trips during the PM peak hour and would serve both site traffic and trips that are continuing west from the SW Blake Road Extension. Both the westbound through movement at the intersection of SW 124th Avenue/SW Blake Road and the westbound left movement at SW Oregon Street/Internal Connector are expected to increase over 200 vehicles during the PM peak hour.

The Internal Connector would serve as a parallel facility to SW Tualatin-Sherwood Road and improve connectivity of the transportation system. With the proposed concept plan and the additional collector, projected volumes would be reduced at the intersections of SW Tualatin-Sherwood Road/124th Avenue and SW Tualatin-Sherwood Road/SW Cipole Road. Roadway users heading southwest through the Tonquin Employment Area would use a variety of routes



and help spread the volumes through the study area for an overall reduction in individual intersection volumes at these intersections.

2030 Intersection Operations

A capacity analysis of area intersections was completed for the 2030 Existing Zoning and the 2030 Proposed Tonquin Employment Area zoning. The results of the capacity analysis are listed in Table IV-7, which indicates that the intersection of SW Oregon Street/SW Tonquin Road would fail to meet the v/c ratio standard for the 2030 Existing Zoning condition.

With the added development of the Tonquin Employment Area, the intersection of SW Oregon Street/SW Tonquin Road would actually improve with shifted traffic patterns (V/C improves to 2.09 from 2.25).

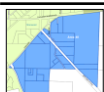


Figure IV-5: Future 2030 Existing Zoning and 2030 Proposed Zoning PM Peak Hour Traffic Volumes

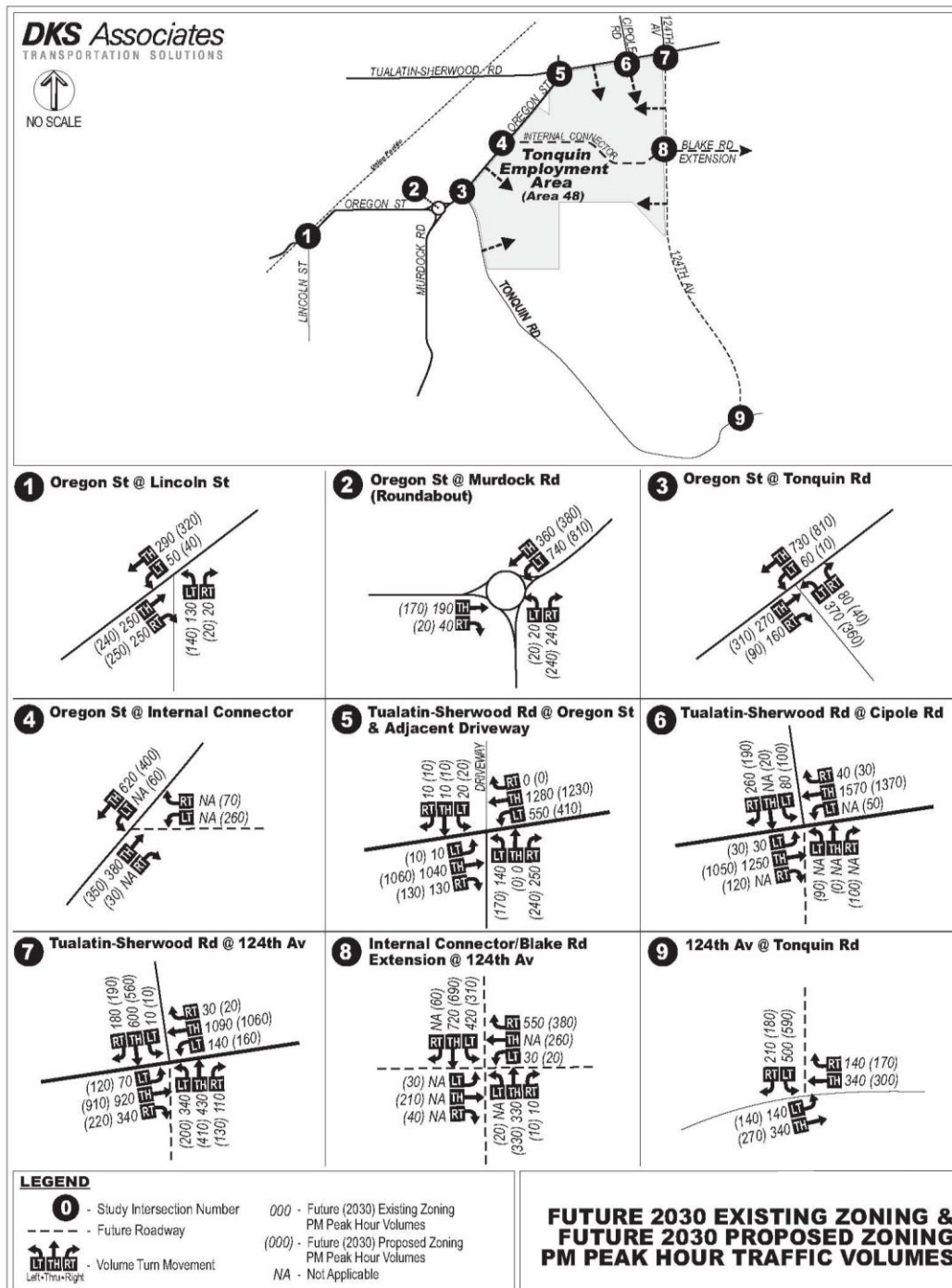


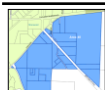
Table IV-7: 2030 PM Peak Hour Intersection Performance

		Intersection Performance (Delay LOS V/C)	
Intersection	Agency	2030 Existing Zoning	2030 Proposed Zoning
Signalized Intersections			
SW Tualatin-Sherwood Rd / SW Oregon St	County	23.0 C 0.84	20.5 C 0.77
SW Tualatin-Sherwood Rd / SW Cipole Rd	County	8.2 A 0.66	11.5 B 0.66
SW Tualatin-Sherwood Rd / SW 124th Ave	County	51.0 D 0.97	46.4 D 0.92
SW 124th Ave / SW Blake Rd Extension/Internal Connector	County	26.3 C 0.62	40.1 D 0.80
SW 124th Ave/ SW Tonquin Road	County	22.2 C 0.75	25.0 C 0.79
Unsignalized Intersections			
SW Oregon St / SW Murdock Rd	City	0.93 A 0.50	0.68 A 0.56
SW Oregon St / SW Tonquin Rd	County	A/F 2.25	A/F 2.09
SW Oregon St/ SW Lincoln St	City	A/C 0.32	A/D 0.47
SW Oregon St / SW Blake Rd Extension/Internal Connector	County	-	B 0.59
2-Way Stop Intersection LOS: A/A = Major Street turn LOS/ Minor Street turn LOS			
All-Way Stop/Signalized/Roundabout Intersection LOS: LOS = Level of Service Delay = Average delay per vehicle (seconds) V/C = Volume to Capacity Ratio			

Recommendation

The traffic impact analysis completed for the proposed future urbanization of the Tonquin Employment Area found that if the site were rezoned for employment uses, as proposed in Table IV-1, and employment reached the level noted in Table IV-5 the resulting traffic increase would not significantly affect the surrounding transportation system and would satisfy the requirements of the Transportation Planning Rule, Oregon Revised Statute (OAR) 660-012-0060. The proposed rezone would not require additional off-site transportation improvements (beyond the reasonably likely to be funded roadway improvements included in Metro's RTP and assumed for this analysis, as listed under the *Planned Area Roadway Improvements* subsection above) since there would not be a significant effect to the transportation system.²⁰

²⁰ In the event that existing transportation facilities are not adequate at the time of development (i.e., the Tonquin Employment Area develops in advance of the projects programmed in the RTP), specific improvements may be



D. Infrastructure Analysis

The following summarizes the sewer, water and storm drainage network associated with the Tonquin Employment Area Preferred Concept Plan alternative as shown on Figure IV-1 and the employment assumptions in Table IV-1. A description of existing infrastructure considerations is provided, as well as a description of the internal infrastructure systems for the Preferred Concept Plan. The Preferred Concept Plan assumes 2,290 new jobs in the Tonquin Employment Area over the next 20 years. This employment forecast was used to prepare the operations analysis and mitigation for the Preferred Concept Plan. A planning level cost estimate is also provided for this preferred alternative. The estimate includes both on- and off-site improvements needed to provide the necessary infrastructure network.

Note: While titled “proposed”, all figures included in this section are conceptual and are not intended to indicate the exact location of future utilities. Exact locations of sanitary sewer, water, and stormwater facilities will be determined through the development review process and will likely be built in conjunction with the development of the road network.

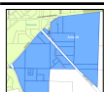
1. Sanitary Sewer System Analysis and Performance

Sanitary sewer service can be provided to the Tonquin Employment Area by the City of Sherwood and Clean Water Services (CWS). The sanitary sewer system was evaluated for its ability to accept the wastewater from the planning area using information provided in the *Sanitary System Master Plan for City of Sherwood, July 2007* (sanitary master plan), prepared by Murray, Smith, and Associates. Based on that evaluation, improvements needed to serve the area were identified.

For areas within its city limits, Sherwood shares wastewater management responsibilities with CWS. Sherwood is responsible for the maintenance of sanitary sewers smaller than 24 inches in diameter located within city limits, and CWS is responsible for the maintenance of interceptor sewers 24 inches and larger, sewage lift stations, and force mains. CWS conveys sewage to the Sherwood Pump Station, which discharges into the Upper Tualatin Interceptor. Sewage is conveyed to the Durham Advanced Wastewater Treatment Facility for treatment.

Sanitary sewer service can be provided to the Tonquin Employment Area by Sherwood’s Rock Creek interceptor, also referred to as the Onion Flat Trunk. The 2007 sanitary master plan identifies capacity improvements to the Rock Creek interceptor needed to serve growth in the basin, including the Tonquin Employment Area. In addition to improvements made by Sherwood

needed to accommodate the proposed development at the time of development approval. Needed transportation improvements will be identified during development review and their provision will be part of the conditions of approval.



to serve new customers, CWS will need to construct a new interceptor and expand the Sherwood Pump Station.²¹

Sherwood's sanitary sewer system serves two drainage basins, the Rock Creek basin and the Cedar Creek basin. The Tonquin Employment Area is in the Rock Creek basin. The sanitary sewer system serving the area is shown in Figure IV-6, as well as the improvements identified in Sherwood's sanitary master plan. The Rock Creek basin is currently served by a trunk sewer that starts as an 18-inch diameter pipe at the Sherwood Pump Station and eventually becomes a 15-inch diameter pipe as it progresses upstream. The Tonquin Employment Area would be served by sanitary sewers connecting to the 15-inch diameter pipe north of the intersection of SW Oregon Street and SW Tonquin Road and to an existing 8-inch sewer in SW Tualatin-Sherwood Road.

The approximately 300 acres in the Tonquin Employment Area will be developed in mixed-use commercial, office, and light industrial land uses employing 2,290 people based on estimates detailed in the Land Use and Employment Assumptions (Section IV.B) of this report. The design wastewater flows reported in the Sherwood sanitary master plan for commercial, office, and light industrial land uses are 3,660 gallons per acre per day plus 1,760 gallons per acre per day for peak infiltration and inflow, for a total contribution of 5,420 gallons per acre per day. Developing the approximately 300 acres in the Tonquin Employment Area is expected to contribute 1,626,000 gallons of wastewater per day to the Sherwood sanitary sewer system during wet weather. The sanitary master plan reports that peak flows were evaluated using a hydrograph approach combining loading from sanitary flows, steady wet-weather infiltration, and storm induced inflows rather than applying peaking factors.

²¹ The *Sanitary System Master Plan for City of Sherwood* reports that CWS plans to upgrade the Sherwood Pump Station and force main to serve saturation development.

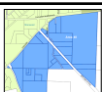
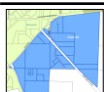
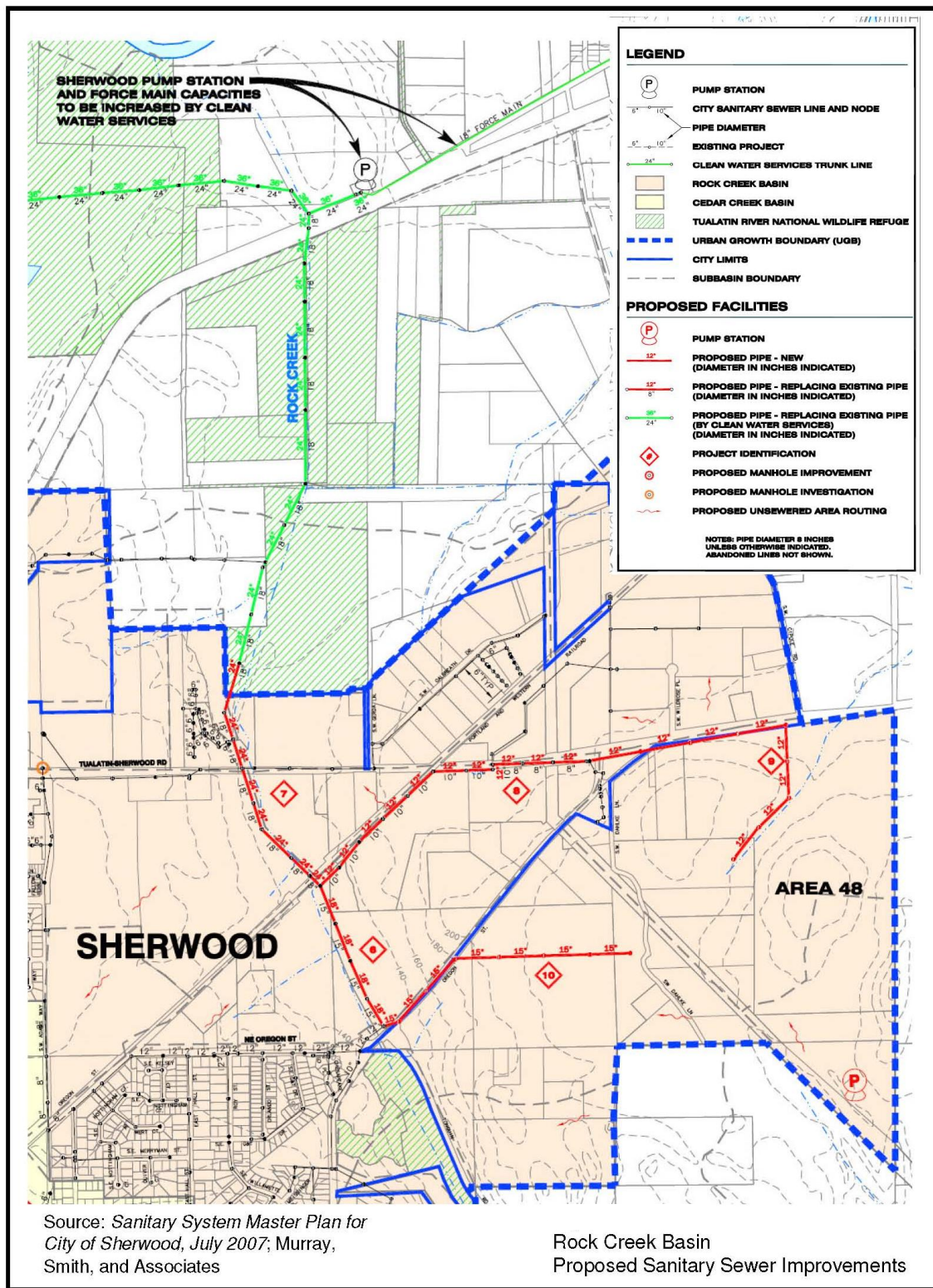


Figure IV-6: Conceptual Sanitary Sewer Improvements



Needed Improvements

Sewer improvements with a total estimated cost of \$6,890,000 (rounded) will be needed to serve the Tonquin Employment Area at saturation development. In addition, CWS plans to upgrade the Sherwood Pump Station and force main to serve saturation development. System development charges will also be assessed as the area develops. The sewer improvements include:

- Approximately \$4,357,813 in trunk sewer improvements to serve the Rock Creek Basin and the Tonquin Employment Area.
- Approximately \$2,532,000 for local sewer improvements within the development to extend sewer service from the trunk sewers to individual lots.

The cost estimates are based on unit prices in the sanitary master plan, which are based on construction pricing in 2007. Current construction pricing is similar to that in 2007, so no pricing adjustments have been made.

The sanitary master plan identified the following trunk sewer improvements with a total estimated project cost of \$4,357,813 in 2007 as being needed to extend service to the Tonquin Employment Area at saturation development:

- Capacity Upgrade - Rock Creek Trunk - 1,436 linear feet of 15-inch diameter Rock Creek Trunk would be replaced with new 18-inch diameter pipe from Manhole 414NSan to Manhole 402NSan. This is shown as Project 6 on Figure IV-6. The sanitary master plan estimated the project cost of this sewer at \$356,128.
- Capacity Upgrade - Rock Creek Trunk - Approximately 1,349 linear feet of 18-inch diameter Rock Creek Trunk would be replaced with new 24-inch diameter pipe from Manhole 402NSan to Manhole 396NSan. This is shown as Project 7 on Figure IV-7. The sanitary master plan estimated the project cost of this sewer at \$366,928.
- Capacity Upgrade – Tonquin Employment Area North - Approximately 3,011 linear feet of 8-inch and 10-inch diameter collection pipe would be replaced with new 12-inch diameter pipe from Manhole 402NSan to Manhole 440NSan. This is shown as Project 8 on Figure IV-7. The sanitary master plan estimated the project cost of this sewer at \$683,497.
- Collection System Extension – Tonquin Employment Area North – The collection system would be extended from Manhole 402NSan, with approximately 3,280 linear feet of new 12-inch diameter pipe to serve Area 48. This is shown as Project 9 on Figure IV-7. The sanitary master plan estimated the project cost of this sewer at \$744,560.



- Collection System Extension – Tonquin Employment Area South – The collection system would be extended from Manhole 414NSan, with approximately 2,650 linear feet of new 15-inch diameter pipe to serve the south side of Area 48. This is shown as Project 10 on Figure IV-7. The sanitary master plan estimated the project cost of this sewer at \$630,700.
- CWS Rock Creek Trunk - Approximately 5,200 linear feet of 18-inch diameter trunk will need to be upsized to 24-inch diameter pipe from the city limits to the existing 24-inch diameter Sherwood. Using the unit estimating price of \$272 per linear foot in the sanitary master plan, the estimated project cost of this sewer was \$1,576,000.

The sanitary master plan reports that CWS plans to upgrade the Sherwood Pump Station and force main to serve saturation development.

In addition to the improvements identified in the sanitary master plan, approximately 12,000 linear feet of local sewers will be needed within the Tonquin Employment Area to extend sewer service to the lots. Using the unit estimating price in the sanitary master plan for 8-inch diameter sewer of \$211 per linear foot, the estimated cost of 12,000 feet of local sewers is estimated to cost \$2,532,000.

Sanitary sewer improvements are expected to be located within road right-of-way.

2. Water System Analysis and Performance

Water service can be provided to the Tonquin Employment Area from the City of Sherwood's water system. The water system was evaluated for its ability to provide adequate pressure and supply peak hour and fire demands for the Preferred Concept Plan based on information provided in *Water System Master Plan for City of Sherwood, August 2005* (water master plan), prepared by Murray, Smith, and Associates. Based on that evaluation, improvements needed to serve the planning area were identified.

Water service can be provided to the Tonquin Employment Area from the City of Sherwood's 380-ft pressure zone. According to the water master plan, the 380-ft pressure zone is designed to provide a minimum pressure of 50 psi at elevations of approximately 250-feet. Approximately 270 (90%) of the 296 acres in the planning area are below an elevation of 250 ft, except for approximately 12 acres along the extreme northeast edge of the property which has elevations of 250 to 305 feet, and a second area of approximately 15 acres in the northeastern portion of the property that has elevations of approximately 250 to 270 feet. If system pressure was 52 psi at an elevation of 250 feet, it would be approximately 47 psi at an elevation of 270-feet and approximately 27 psi at an elevation of 305 feet. Given the small amount of area above an elevation of 250-feet, water system pressures should generally be adequate for typical office, commercial, and light industrial development.



The 380-ft pressure zone is the lowest and largest pressure zone in the City of Sherwood system and serves 2,513 of the 2,994 acres in the water service area. The pressure zone is developed in residential, commercial and industrial land uses. The zone is served by gravity from a 2 million gallon reservoir.²² All four of the city's groundwater wells and the city's Tualatin Supply Connection supply the 300-foot pressure zone directly. The city has a capital improvement plan identifying water mains, additional storage reservoirs and new water source development needed to meet demands at saturation development.

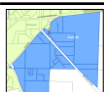
The Tonquin Employment Area will be developed in mixed-use commercial, office, and light industrial land uses employing 2,290 people, based on estimates detailed in the Land Use and Employment Assumptions (Section IV.B) of this report. The Sherwood water master plan does not separately estimate water demand for these land uses, so water demand in the planning area was estimated assuming that there will be no process water uses and applying an average day demand of 45 gallons per employee per day, making total average day demand 103,500 gallons per day in the Tonquin Employment Area when it is fully developed. This is equivalent to a peak demand of 430 gpm if all use occurs over an 8-hour work day with a peaking factor of 2. The water master plan recommends a fire flow demand of 3,500 gpm with duration of 3 hours for office, commercial, and light industrial land uses. Since the fire flow requirement is higher, it will govern design of the water distribution system.

Needed Improvements

Based on the results of hydraulic modeling reported by MSA, Inc. in the water master plan, the 380-ft pressure zone should have adequate capacity to serve the Tonquin Employment Area. The water distribution system can be served from two existing water mains:

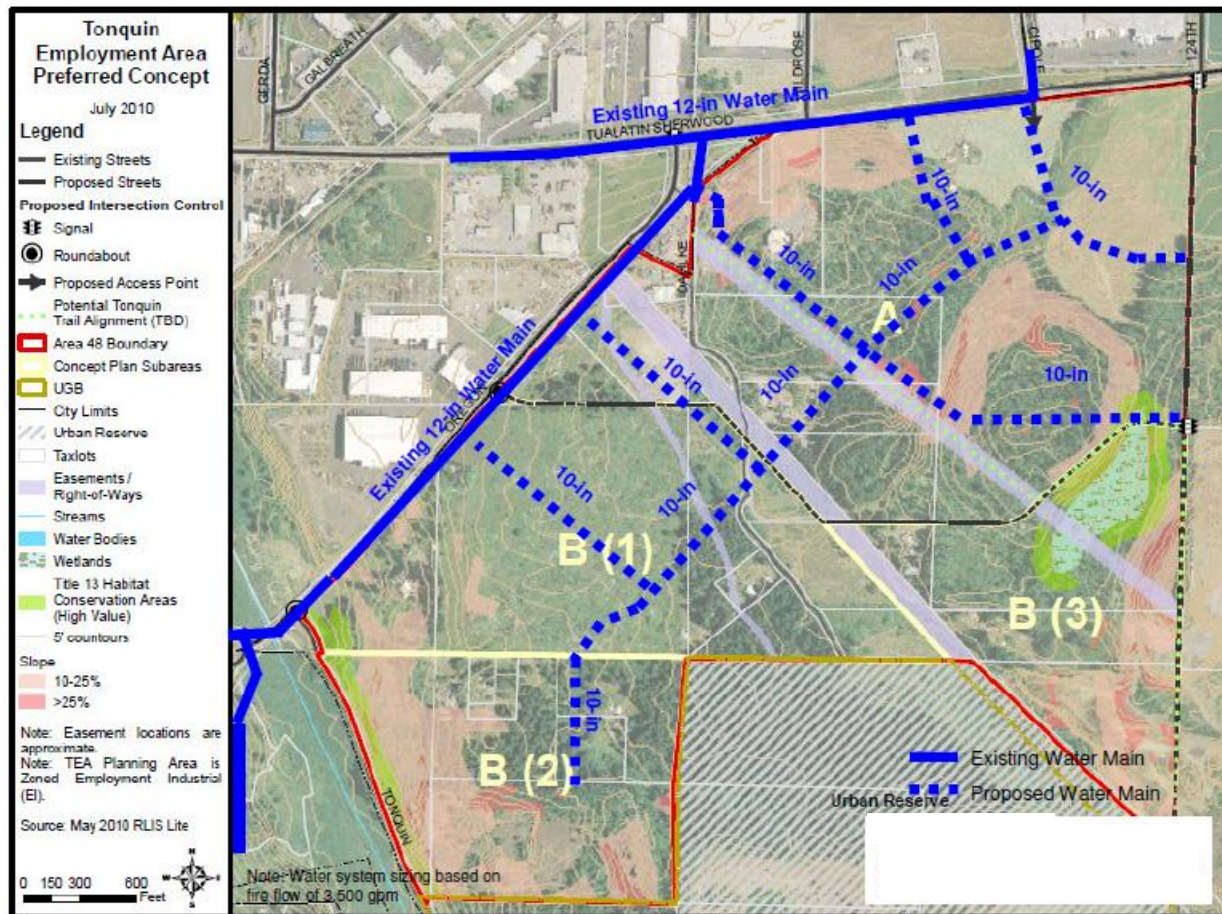
- An existing 12-inch diameter water main in SW Oregon Street along the west side of the Tonquin Employment Area. The main in SW Oregon Street is connected to existing water mains in the 380-ft pressure zone on its north and south ends and appears to have a good source of supply from both directions. With a supply from each end, the existing 12-inch water main in SW Oregon Street can supply a fire flow of 3,500 gpm at a velocity of approximately 5 feet per second, which is well within acceptable design limits. The water master plan indicates that the existing 12-inch main should be able to deliver the required fire flow for existing light commercial development along SW Oregon Street, which has the same required fire flow as the planning area.
- An existing 12-inch diameter water main in SW Tualatin-Sherwood Road along the north side of Area 48. The main in SW Tualatin-Sherwood Road is connected to the 380-ft pressure zone at SW Oregon Street and appears to have a good source of supply from

²² Note: the City has a 4 million gallon water reservoir in the 380 zone (Snyder Park) that will be operational in time to serve future development in the Tonquin Employment Area.



its west end. With a supply from one end, the existing 12-inch water main should be able to supply a fire flow of 3,500 gpm at a velocity of 9.93 feet per second, which is within acceptable design limits.

Figure IV-7: Conceptual Water Distribution System



The internal water system concept was developed to support the employment projections for the Preferred Concept Plan. Water main velocities were limited to a maximum of 15 feet per second under fire flow conditions. Approximately 12,000 feet of 10-inch diameter pipe would be needed to provide water service to the area, as shown in Figure IV-7. The estimated construction cost of the water system is \$2,600,000, as shown in Table IV-8. In addition to the costs of constructing the water mains within the Tonquin Employment Area, system development charges would be assessed as the area develops.



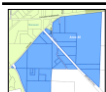
Table IV-8: Estimated Water Distribution System Project Costs

Item	Quantity	Unit	Unit price	Item price
10-inch water main in new development	12,000	Linear feet	\$112	\$1,344,000
Fire hydrant assemblies	20	Each	\$4,500	\$90,000
10-inch gate valves	16	Each	\$2,400	\$38,400
Tap existing water main	5	Each	\$5,000	\$25,000
Subtotal				\$1,497,400
Overhead and profit at 20%				\$299,480
Subtotal				\$1,796,880
Contingencies, engineering, legal, and management at 45%				\$808,596
Total estimated project cost				\$2,605,476
Rounded to				\$2,600,000

3. Storm Drainage System Analysis and Performance

This section describes the conceptualized stormwater infrastructure needed to serve the Tonquin Employment Area. The 296.1 acre planning area drains to three different receiving waters: Hedges Creek, Upper Coffee Lake Creek, and Rock Creek. An analysis of stormwater system improvements needed as a result of future development in the Tonquin Employment Area has been completed for each of these drainage basins and is consistent with the concepts presented in the Stormwater Master Plan for the City of Sherwood (June 2007) and the CWS Design and Construction Standards (June 2007). With mixed-commercial and light industrial development expected in the planning area, regional stormwater facilities were sized for each drainage basin and planning level cost estimates have been included. This analysis addresses the major publicly owned stormwater management facilities.

Topography, soil type, the amount of impervious area, and storm intensity and duration are important parameters for determining stormwater runoff volume and peak flow rates. To be consistent with CWS Standards, the Santa Barbara Urban Hydrograph Method (SBUH) was used to estimate runoff volume and peak flow rates for the 25-year, 24-hour and 100-year, 24-hour storms. CWS provides an equation for use in calculating the water quality peak flow rate and total water quality volume in Section 4.05.6 of the 2007 Design and Construction Standards.



Peak flows and storm water volumes were developed for the Draft Preferred Concept Plan for this analysis. The Soil Conservation Service (SCS) Technical Release 55 (TR-55) associates land use type with a percentage of impervious area and a Curve Number (CN), based on hydrologic soil type. Hydrologic soil types of B, C, and D are present in the Tonquin Employment Area. See Table IV-9 below for a summary of the land-use classifications, associated impervious area percentage and CNs that were used for the analysis.

Table IV-9: Percent Imperviousness and CN based on Land Use Type

Land Use	Percent Imperviousness	Curve Number for Hydrologic Soil Groups			
		A	B	C	D
Mixed Commercial	85%	89	92	94	95
Industrial	72%	81	88	91	93
Open Space (grass cover >75%)	10%	39	61	74	80

The regional stormwater facility for each basin is sized for water quality purposes only. This is based on the assumption that the developer will provide on-site detention. Therefore, the facilities were designed to treat the water quality storm (dry weather storm event totaling 0.36 inches of precipitation falling in 4 hours with an average annual storm return period of 96 hours), in accordance with CWS requirements.

The Santa Barbara Urban Hydrograph (SBUH) method was used to produce stormwater runoff volumes and peak flow rates for the 25-year, 24-hour and 100-yr, 24-hour storms. Rainfall volumes for the 25 and 100-year events were consistent with CWS standards and the adopted master plan; 3.9-inches in 24 hours for the 25-year event and 4.5-inches in 24 hours for the 100-year event. See Table IV-10 for the results.

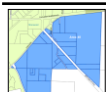


Table IV-10: SBUH Results Summary

Drainage Basin	Impervious Area in Drainage Basin (acres)	WQ Storm Peak Design Flow Rate (cfs)	WQ Storm Total Runoff Volume (ft3)	25-Year, 24-Hour Storm Peak Design Flow Rate (cfs)	25-Year, 24-Hour Storm Total Runoff Volume (ft3)	100-Year, 24-Hour Storm Peak Design Flow Rate (cfs)	100-Year, 24-Hour Storm Total Runoff Volume (ft3)
Coffee Lake Creek	28.1	2.55	36,740	13.91	574,107	16.58	681,420
Hedge Creek	69.5	6.30	90,790	28.91	1,311,633	34.19	1,549,206
Rock Creek	28.1	7.48	107,661	34.42	1,539,929	40.76	1,820,478

Needed Improvements

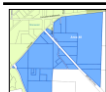
Three regional stormwater facilities will be needed. Their size is based on the peak flows and runoff volumes provided by the previously described analysis. Each facility is an extended dry basin, designed to CWS standards. The facilities have been designed to provide water quality treatment, and it is assumed that detention will be provided on-site, by the developer. The area required for each extended dry basin footprint is shown by basin in Table IV-11. The facility identifiers in Table IV-11 are consistent with the projects listed in the 2007 Stormwater Master Plan for the City of Sherwood.

Table IV-11: Area of Regional Stormwater Facility by Basin

Drainage Basin	Facility Identifier	Required Area for Regional Stormwater Facility (acres)
Coffee Lake Creek	CL-1	0.57
Hedge Creek	HC-1	1.04
Rock Creek	RC-5	1.17

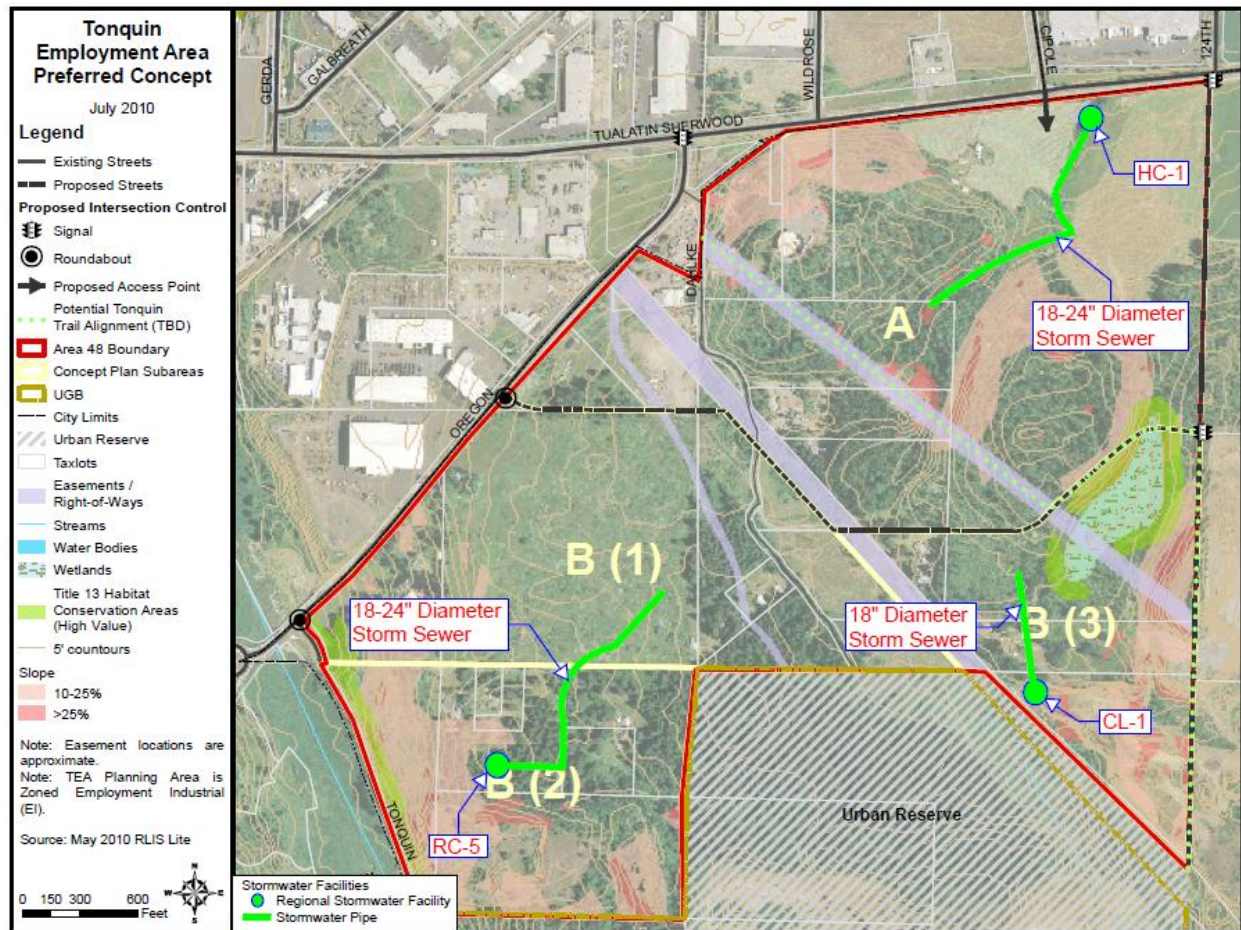
For locations of the facilities, see Figure IV-8.

For the purpose of this study we have assumed that regional water quality facilities will be constructed; however, alternative development opportunities are possible. Regional detention facilities or combination regional detention/water quality facilities are possible. Alternatively, developers could be required to construct all of their stormwater management facilities on-site; with no regional detention or water quality facilities.



It is recommended that developers be made aware of the advantages of implementing low impact development approaches (LIDA) for stormwater quality and detention purposes. The appropriate LIDA will minimize stormwater runoff generated by the development and is considered the most appropriate method of stormwater management where possible. LIDA shall be designed and constructed in accordance with CWS's 2007 Design and Construction Standards (Section 4.07).

Figure IV-8: Conceptual Stormwater System



Cost estimates for the stormwater infrastructure projects in each basin are summarized in Table IV-12.

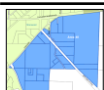


Table IV-12: Conceptual Level Cost Estimates for Stormwater Projects by Basin

Item No.	Description	Total
Coffee Lake Creek Regional Stormwater Facility		
1	2500 CY of Excavation and Grading	\$50,000
2	0.57 AC Landscaping and Temporary Irrigation	\$17,100
3	200 LF Access Road	\$10,000
4	700 LF Access Control Fencing	\$17,500
5	Pre-Treatment (Sedimentation MH)	\$10,000
6	Inlet and Outlet Structures	\$17,500
7	Plant Maintenance	\$3,075
8	5% Erosion Control	\$6,350
	Total Estimated Construction Cost	\$131,525
	45% Contingency, Administration, and Engineering	\$59,186
	Total Estimated Project Cost	\$190,711
	Rounded to	\$191,000
Hedges Creek Regional Stormwater Facility		
1	5100 CY of Excavation and Grading	\$102,000
2	1.04 AC Landscaping and Temporary Irrigation	\$31,200
3	450 LF Access Road	\$22,500
4	1000 LF Access Control Fencing	\$25,000
5	Pre-Treatment (Sedimentation MH)	\$10,000
6	Inlet and Outlet Structures	\$17,500
7	Plant Maintenance	\$8,850
8	5% Erosion Control	\$10,853
	Total Estimated Construction Cost	\$227,903
	45% Contingency, Administration, and Engineering	\$102,556
	Total Estimated Project Cost	\$330,459
	Rounded to	\$331,000
Rock Creek Regional Stormwater Facility		
1	6000 CY of Excavation and Grading	\$120,000
2	1.17 AC Landscaping and Temporary Irrigation	\$35,100
3	475 LF Access Road	\$23,750
4	1100 LF Access Control Fencing	\$27,500
5	Pre-Treatment (Sedimentation MH)	\$10,000
6	Inlet and Outlet Structures	\$17,500
7	Plant Maintenance	\$8,850
8	5% Erosion Control	\$12,135
	Total Estimated Construction Cost	\$254,835
	45% Contingency, Administration, and Engineering	\$114,676
	Total Estimated Project Cost	\$369,511
	Rounded to	\$370,000
Conveyance Infrastructure		
1	1800 LF 18-inch Diameter Storm Sewer Trunk Piping	\$270,000
2	1800 LF 24-inch Diameter Storm Sewer Trunk Piping	\$315,000
3	(9) 48-inch Diameter Manholes	\$47,835
	Total Estimated Construction Cost	\$632,835
	45% Contingency, Administration, and Engineering	\$284,776
	Total Estimated Project Cost	\$917,611
	Rounded to	\$918,000



E. Infrastructure Financing Analysis

The infrastructure financing analysis summarizes the projected infrastructure costs and funding sources associated with the development of the Tonquin Employment Area. The intent of the analysis is to discover if any financial gaps exist between the costs to prepare the Tonquin Employment Area for development and the fees that such development will generate as it occurs.

The analysis categorizes costs into three main categories:

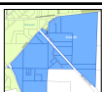
- **Development site costs:** These are costs that are internal to development parcels such as driveways, internal circulation, utility extensions, and utility connections to buildings. Developers typically are responsible for such costs as a part of development. Thus, the analysis excludes development site costs.
- **Onsite costs:** These costs are for improvements within the Tonquin Employment Area boundaries (hence, “onsite”) that will benefit many different properties and are not attributable to any single development site. In this analysis, onsite costs that will be a public financing obligation are limited to the main east-west connector road (and its associated underground utilities) and one roundabout that will be located at the intersection of SW Oregon Street and the east-west collector.
- **Offsite costs:** Offsite costs are for infrastructure investments that will be made outside the Tonquin Employment Area boundaries, but that are necessary to serve the level of development planned in the Area.

The infrastructure financing analysis summarizes the cost estimates for infrastructure improvements in each of the main infrastructure categories: transportation, water, sanitary sewer, stormwater, and parks. It includes summaries of the anticipated costs and a comparison of those costs to the anticipated revenues from development under a 20-year development horizon. As described in this section, the analysis indicates that mandatory fees and charges that private developers are assessed at the time of development are expected to generate enough revenues to finance all required onsite and offsite infrastructure improvements. Although fees from development are expected to fully fund the needed infrastructure, the analysis concludes with a description of public financing tools that could be utilized to help offset developer costs as an incentive to spur new investment and job creation.

1. Transportation

Transportation Costs

The transportation infrastructure analysis, developed by DKS Associates and included in Section IV.C of this report, identifies transportation infrastructure improvements that will be required in the Tonquin Employment Area to serve development over the next 20+ years.



The projected cost of onsite transportation infrastructure in the Tonquin Employment Area is \$6.4 million. This includes \$5.6 million for the construction of a 4,000-foot east-west collector street from SW Oregon Street to SW 124th Street, which will serve as the primary access road through the area. It also includes \$800,000 for one roundabout on SW Oregon Street to connect to the future east-west collector. Based on the consultant team's assessment of transportation needs, development in the Tonquin Employment Area is not anticipated to trigger any offsite transportation improvements.

Transportation Revenues

Development in the Area will contribute to transportation funding in three primary ways:

- Development site infrastructure. Developers will be responsible for improvements within development parcels.
- City of Sherwood TIF. The City of Sherwood assesses a transportation impact fee (TIF) on all new development, which is assigned to one of six general use categories: residential, recreational, institutional/medical, commercial/services, office, or port/industrial. TIFs are calculated based on the total trips a development is projected to generate. Within each general use category, a fee is assigned to different types of facilities and reflects the magnitude of the impacts the facility is anticipated to have on the local transportation system. For example, the fee for a specialty retail center (\$10,961 per 1,000 square feet of gross leasable area) is higher than the fee for a general light industrial facility (\$2,421 per 1,000 square feet of gross floor area) because retail uses, which attract visitors throughout the day, generate more trips—and, thus, have a much greater impact on the transportation system—than industrial uses, which have a low job density and relatively few visitors. TIF fees generated by new development will be used to finance required Area transportation improvements such as the east-west collector road.
- Washington County TDT. Washington County assesses a transportation development tax (TDT) when a building permit or occupancy permit is issued for new development. Remodeling, temporary uses, and state and federal government buildings are exempt. Calculated on a per-unit basis for residential development and on a varying basis for different types of commercial and industrial development, the TDT is based on the estimated traffic generated by each type of development. The TDT is collected and distributed to cities for use in making transportation capital improvements designed to



accommodate growth. Eligible projects are on major roads, including sidewalks and bike lanes, as well as transit capital projects.²³

Figure IV-1, shows the Tonquin Employment Area Concept Plan and its associated subareas. Table IV-13 below shows projected 20-year TIF revenues for the area. Development in the Tonquin Employment Area is projected to produce \$4.6 million in TIF revenues, which may be used to finance the east-west collector and other onsite transportation improvements.

Table IV-13: Projected TIF Revenues for Tonquin Employment Area

Subarea/ Employment Type	Total Acres	Buildable Acres	FAR	Building Area (s.f.)	% Developed in 20 Years	Building Area (s.f.) in 20 years	Land Use Category	TIF Assessment	TIF Assessment Unit	Estimated TIF Assessment
A - All	129.1	101.8								
Retail/Commercial Services		5.0	0.35	76,230	100%	76,230	Specialty Retail Center	\$10,961	per 1,000 SF of GLA	\$835,523
Light Industrial		96.8	0.20	843,322	70%	590,325	General Light Industrial	\$2,421	per 1,000 SF of GFA	\$1,429,248
B(1) - All	71.0	67.3								
Retail/Commercial Services		5.0	0.35	76,230	100%	76,230	Specialty Retail Center	\$10,961	per 1,000 SF of GLA	\$835,523
Light Industrial		62.3	0.20	542,758	70%	379,930	General Light Industrial	\$2,421	per 1,000 SF of GFA	\$919,857
B(2) Light Industrial	48.1	36.3	0.20	316,246	50%	158,123	General Light Industrial	\$2,421	per 1,000 SF of GFA	\$382,834
B(3) Light Industrial	47.9	29.8	0.20	259,618	25%	64,904	General Light Industrial	\$2,421	per 1,000 SF of GFA	\$157,141
Total	296.1	235.2		2,114,402		1,345,743				\$4,560,127

Source: Leland Consulting Group and the City of Sherwood

Table IV-14 shows projected 20-year TDT revenues for the Area. Development in the Tonquin Employment Area is projected to produce \$8.6 million in TDT revenues, which may be used to finance the east-west collector and other onsite transportation improvements.

²³ Levied countywide and in effect since July 2009, the TDT replaced the Washington County Traffic Impact Fee (TIF). The TDT doubled the TIF rates developers pay for the impact new development has on the transportation system. The new rate is being phased in over 4 years, through July 1, 2012. After July 1, 2013 the rates can increase at a rate of no more than 10% per year, based on an index tracking the costs of road construction material, labor, and right-of-way. Non-residential developments which had land use approvals prior to July 1, 2009 are charged based on the prior TIF rates. Developments may also receive credits for constructing eligible transportation improvements.

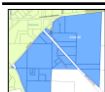


Table IV-14: Projected TDT Revenues for Tonquin Employment Area

Subarea/ Employment Type	Buildable Acres	Average FAR	Building Area (s.f.)	% Developed in 20 Years	Building Area (s.f.) in 20 years	Land Use Category	TDT Assessment Fee (7/1/2012)	TDT Assessment Unit	Estimated TDT Assessment
A - All	101.8								
Retail/Commercial Services	5.0	0.35	76,230	100%	76,230	Specialty Retail Center	\$10,913	per 1,000 SF of GFA	\$831,898
Light Industrial	96.8	0.20	843,322	70%	590,325	General Light Industrial	\$5,835	per 1,000 SF of GFA	\$3,444,547
B(1) - All	67.3								
Retail/Commercial Services	5.0	0.35	76,230	100%	76,230	Specialty Retail Center	\$10,913	per 1,000 SF of GFA	\$831,898
Light Industrial	62.3	0.20	542,758	70%	379,930	General Light Industrial	\$5,835	per 1,000 SF of GFA	\$2,216,893
B(2) Light Industrial	36.3	0.20	316,246	50%	158,123	General Light Industrial	\$5,835	per 1,000 SF of GFA	\$922,647
B(3) Light Industrial	29.8	0.20	259,618	25%	64,904	General Light Industrial	\$5,835	per 1,000 SF of GFA	\$378,717
Total	235.2		2,114,402		1,345,743				\$8,626,600

Source: Leland Consulting Group and Washington County

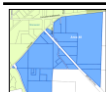
At \$13.2 million, the TIF and TDT fees generated by development in the Tonquin Employment Area during the next 20 years are projected to significantly exceed the cost of onsite transportation costs (\$6.4 million). However, depending on the pace of development, the east-west collector may need to be constructed in two phases if sufficient revenues are not available to finance the entire project at once.

Within the broader Tonquin Employment Area, it is anticipated that Subareas A and B (1), which have the best existing access and visibility, will develop first. Much of Subarea A, which includes the proposed retail/commercial services center at the intersection of 124th and Tualatin-Sherwood Road, can be accessed from existing roadways and could develop prior to the construction of the east-west collector. If Subarea A achieves 50 percent build out (including full development of the five-acre commercial center) early on, for example, TIF and TDT revenues assessed to new development would exceed the estimated \$3.6 million needed to construct half of the east-west collector and the roundabout at SW Oregon Street and SW Tualatin-Sherwood Road. Further, any development that occurs in Area B is anticipated to require access from the new east-west collector. Thus, development in Area B could help finance the first phase of the east-west collector on a “pay as you go” basis. Developers who provide upfront financing for the east-west collector may be eligible for a TDT or TIF credit.

2. Water

Water Costs

The Water System Concept Design, developed by CH2M HILL and included in Section IV.D of this report, identifies water system infrastructure improvements that will be required for the Tonquin Employment Area, which will be served by the City of Sherwood.



The total construction cost estimate for Tonquin Employment Area water improvements is \$2.6 million and includes a 45 percent contingency for engineering, legal, and management expenses.

Water Revenues

The water system improvements described above are considered development site improvements that would be the responsibility of developers. Thus, while the City of Sherwood may be required to finance the upfront costs associated with providing water facilities in conjunction with the east-west collector, there will be no public utility obligations to fund water infrastructure in the Tonquin Employment Area.²⁴

Development within the Tonquin Employment Area will generate revenues based on system development charges (SDCs) that are levied on development as it occurs. These fees, assessed by the City of Sherwood, will enable the city to build and maintain the internal capacity to serve the area. The City of Sherwood assesses a one-time water SDC to new development to help finance costs associated with building capital facilities needed to accommodate growth. The SDC ranges from \$6,319 for a ¾" meter to \$568,781 for an 8" meter.

3. Sanitary Sewer

Sanitary Sewer Costs

The Sanitary Sewer System Concept Design developed by CH2M Hill (see Section IV.D) identifies sanitary sewer system infrastructure improvements that will be required for the Tonquin Employment Area, which will be served by the City of Sherwood and Clean Water Services (CWS).

The total construction cost estimate for area sanitary sewer system improvements is \$6.9 million. This includes approximately \$4.4 million in trunk sewer improvements and \$2.5 million is local sewer improvements within the development to extend the sewer from the trunk to individual lots.

Sanitary Sewer Revenues

Based on CH2M HILL's analysis of sanitary sewer infrastructure requirements, it is assumed that private development will bear the total cost of sanitary sewer improvements associated with build out in the Tonquin Employment Area.

²⁴ As development occurs, the City will be reimbursed for these water system improvements through system development charges generated by new development.



Specifically, developer requirements will include:

- Development site infrastructure. Developers will be responsible for all onsite infrastructure costs.
- Connection fees/SDCs. Depending on the diameter of the sewer line, the City of Sherwood or CWS will assess SDCs to new development to finance connection charges, which may include:
 - a. Direct connections to the district sewer system;
 - b. Indirect connections to the district sewer system including, but not limited to, building additions, or expansions, which include sanitary facilities;
 - c. Change in the use of an existing connection; and
 - d. Substantial increase(s) in the flow of or alteration of the character of sewage to an existing connection.

For commercial and industrial uses, connection fees will be calculated as Dwelling Unit Equivalents (DUEs) based on the estimated or actual metered flow in incoming water, or metered effluent. The fees are calibrated to match the expected true cost of any offsite improvements required by the development. Thus, there will be no unmet funding obligation as a result of development in the Area.

4. Stormwater

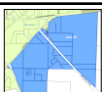
Stormwater Costs

The Stormwater System Concept Design developed by CH2M HILL (see Section IV.D) identifies storm drainage system infrastructure improvements that will be required for the Tonquin Employment Area, which will be served by the City of Sherwood.

The total construction cost estimate for area stormwater improvements, including a 45 percent contingency for administration and engineering expenses, is \$918,000. This includes improvements to three regional stormwater treatment facilities as well as conveyance infrastructure improvements.

Stormwater Revenues

Based on CH2M HILL's analysis of stormwater infrastructure requirements, it is assumed that private development will bear the total cost of stormwater improvements associated with development of the area.



Specifically, developer requirements will include:

- Development site infrastructure. Developers will be responsible for all development site infrastructure costs, including, at a minimum, the provision of stormwater detention facilities.²⁵
- Regional stormwater treatment facilities (assuming developers are not required to construct all their stormwater management facilities on site).
- SDCs. The City of Sherwood will assess the following SDCs to new development to finance local and regional storm drainage facilities:
 - a. Water quantity SDC
 - b. Water quality SDC
 - c. Storm drainage SDC

Regional water quantity and water quality SDCs established by the City of Sherwood are calculated as Equivalent Service Units (ESUs) based on the total area of impervious surface attributed to a new development.²⁶ The City's storm drainage SDC is calculated on a per-square-foot basis, based on the total area of impervious surface attributed to a new development.²⁷ These fees are calibrated to match the expected true cost of any offsite local and regional stormwater improvements required by the development. Thus, there will be no unmet funding obligation as a result of development in the Tonquin Employment Area.

5. Parks

Although the analysis of the Area's onsite infrastructure and public facilities needs does not specifically identify any parks projects, the Area could include public parks and open space.

The City of Sherwood assesses a Parks SDC of \$75 per employee on new development. As shown in Table IV-15, based on proposed development projections, the Tonquin Employment Area is projected to generate \$172,000 in Parks SDC revenues.

²⁵ Developers could be required to construct all stormwater management facilities within development sites. Under this scenario, no regional water quality facilities would be needed.

²⁶ One ESU = 2,640 square feet of impervious surface. Currently, CWS assesses new development a water quantity SDC of \$275 per ESU and a water quality SDC of \$225 per ESU.

²⁷ Currently, the City of Sherwood's storm drainage SDC is \$0.043 per square foot of impervious surface.

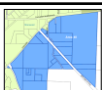


Table IV-15: Projected Parks SDC Revenues for Tonquin Employment Area

Subarea/ Employment Type	Total Acres	Buildable Acres	FAR	Building Area (s.f.)	% Developed in 20 Years	Building Area (s.f.) in 20 years	Job Density (empl. per 1,000 s.f.) ^{1/}	Total Jobs in 20 Years	Sherwood Parks SDC Assessment	Parks SDC Assessment Unit	Estimated Parks SDC
A - All	129.1	101.8									
Retail/Commercial Services		5.0	0.35	76,230	100%	76,230	2.5	191	\$75	per employee	\$14,000
Light Industrial		96.8	0.20	843,322	70%	590,325	1.6	945	\$75	per employee	\$71,000
B(1) - All	71.0	67.3									\$0
Retail/Commercial Services		5.0	0.35	76,230	100%	76,230	2.5	191	\$75	per employee	\$14,000
Light Industrial		62.3	0.20	542,758	70%	379,930	1.6	608	\$75	per employee	\$46,000
B(2) Light Industrial	48.1	36.3	0.20	316,246	50%	158,123	1.6	253	\$75	per employee	\$19,000
B(3) Light Industrial	47.9	29.8	0.20	259,618	25%	64,904	1.6	104	\$75	per employee	\$8,000
Total	296.1	235.2		2,114,402		1,345,743		2,290			\$172,000

^{1/} Employment density figures derived from the City of Sherwood Economic Development Strategy.

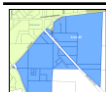
Source: Leland Consulting Group and the City of Sherwood

F. Financing Tool Options

After a thorough examination of potential financing tools, Leland Consulting Group has identified a range of funding tools that may be used to finance transportation and public facilities infrastructure in the Tonquin Employment Area. As described in the Section E above, mandatory fees and charges assessed to new development in the Tonquin Employment Area are anticipated to exceed the cost of required onsite and offsite transportation and infrastructure improvements. Nevertheless, additional funding tools could be used to reduce the obligations of developers as an investment incentive to attract high quality projects that support local and regional planning and economic development objectives.

The funding tools presented below have been selected based on their track record of use in the region. Several transportation funding tools are funded via the Oregon Department of Transportation (ODOT) through competitive grants that are offered annually or biannually. Local funding tools, such as urban renewal and Local Improvement Districts (LIDs), may be used to finance capital improvements within designated geographic areas or special districts. Tools that have little likelihood of being used in the Tonquin Employment Area (e.g., federal earmarks, City general fund money, etc.) are not represented on the list. It is important to note that none of these funding sources are actually committed today. However, now is the time to start laying the groundwork so that they are in place when funds are needed. This groundwork may include tasks such as applying for grants and adding Tonquin Employment Area improvements to local and regional transportation plans²⁸. Seeking financial assistance through

²⁸ This would include identifying the new East/West Collector and the roundabout on SW Oregon as projects in the Sherwood TSP and Metro's RTP.



a range of programs and initiatives is a strategy that is likely to increase opportunities to attract the types of industries and employment that the City and the region have targeted for the Area.

1. Local Funding Tool Options

Tax Increment Financing/Urban Renewal

Tax increment financing (TIF) is one of the most powerful public funding tools for revitalization. TIF is a mechanism where public projects are financed by debt borrowed against the future growth of property taxes in a defined urban renewal district. The assessed value of all properties within the district is set at the time the district is first established (the frozen base). As public and private projects enhance property values within the district, the increase in property taxes over the base (the increment) is set aside. Debt is issued, up to a set maximum amount (the maximum indebtedness), to carry out the urban renewal plan and is repaid through the incremental taxes generated within the district. The duration of urban renewal districts typically ranges from 15 to 25 years. When the district is retired, the frozen base is removed and all property taxes in the district return to normal distribution. The City would need to prepare an urban renewal plan, which would identify specific projects to be funded and the likely funding capacity from tax increment revenues.

Local Improvement District

A Local Improvement District, or LID, is a special assessment district where property owners are assessed a fee to pay for capital improvements such as sidewalks, underground utilities, shared open space, and other features. LIDs are typically petitioned by, and must be supported by, a majority or supermajority of the affected property owners. Since LIDs are funded by private property owners, they can help share the funding burden in a public-private partnership. Further, since it requires private property owner support, it is a good mechanism to help organize property owners around a common goal. Such a mechanism could be a useful tool to fund shared amenities and infrastructure in the Tonquin Employment Area.

Washington County Major Street Transportation Improvement Program (MSTIP)

The MSTIP is a Washington County funding mechanism that uses property tax revenues to issue bonds for capital construction of major transportation projects with countywide benefit. Most of these projects take place on county roads. The program, which generates approximately \$26 million annually, will allocate approximately \$140 million for at least 19 major projects over the next five years. The amount of funding individual projects receive varies greatly depending on the size and scale of the project. Improvements to 124th and Tualatin-Sherwood Road are examples of projects in the Tonquin Employment Area that may be eligible for MSTIP funds.



2. Regional Funding Tool Options

Metropolitan Transportation Improvement Program (MTIP)

Federally funded by the Federal Highway Administration and the Federal Transit Administration, and administered through Metro, MTIP grants are generally authorized for transportation projects. Funds have been allocated for the 2010-2013 funding cycle currently underway. However, now would be the time to seek funding for the next cycle. A project must be listed in the Regional Transportation Plan (RTP) in order to be eligible for MTIP funds. The extension of 124th Street, which includes the construction of a new five-lane street from SW Tualatin-Sherwood Road to SW Tonquin Road, is identified as a project in the RTP. This project is scheduled for completion between 2008 and 2017 at an estimated cost of \$82.5 million. Other identified transportation improvements such as the east-west collector could potentially be added to the list for funding.

3. State/Federal Funding Tool Options

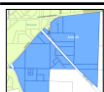
Special Public Works Fund

Business Oregon's (formerly the Oregon Community and Economic Development Department) Special Public Works Fund (SPWF) provides funds for publically owned facilities that support economic and community development in Oregon. Funds are available to public entities (e.g., cities, counties, tribal entities, etc.) for planning, designing, purchasing, improving and constructing publically owned facilities, such as roadways and bridges, storm drainage, wastewater and water systems, and the purchase of land, rights of way and easements necessary for a public facility. While primarily a loan program, grants are available for projects that will create or retain traded-sector jobs. Low interest loans typically range from \$100,000 to \$9 million. Loan terms can be up to the lesser of 25 years or the useful life of a project. Grants are limited to the lesser of \$500,000 or 85 percent of the project cost. The grant amount per project is based on up to \$5,000 per eligible job created or retained.

Oregon Department of Transportation Grant Programs

The Oregon Department of Transportation (ODOT) has numerous grant programs to assist local government and public agencies on projects that encourage "smart" land use and transportation planning, enhance community livability and promote pedestrian and bicycle access and safety. The programs are funded through federal and state transportation funds. The Tonquin Employment Area includes transportation improvements that may be eligible for select ODOT grants.

- Oregon Pedestrian and Bicycle Program (ODOT). A range of pedestrian and bicycle improvements will be a part of the Tonquin Employment Area transportation infrastructure. ODOT provides grants for crosswalks, bike lane striping, and pedestrian crossing islands that fall within the rights-of-way of streets, roads and highways. During the 2010-11 funding cycle, approximately \$5 million in grants ranging from \$100,000 to



\$600,000 were awarded to 16 jurisdictions, including smaller cities, such as Talent and Sweet Home, and larger cities and counties, such as Gresham and Deschutes County.

- Oregon Transportation Enhancements (TE) Program. Using federal transportation funds, ODOT TE grants are awarded to local governments and other public agencies to support projects that improve communities and enhance the experience of traveling. New sidewalks, bike lanes, and pedestrian amenities such as benches and streetlights are eligible TE projects, as are the restoration of historic railroad stations, bus stations, and bridges. During the 2009-11 funding cycle, approximately \$11 million in grants ranging from \$280,000 to \$1.2 million were awarded to 14 jurisdictions throughout Oregon. Pending availability of additional funding, approximately \$5 million was approved for projects on the “reserve” list. Local governments must contribute 10 percent of the project’s cost.

State Transportation Improvement Program (STIP)

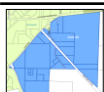
The STIP is Oregon’s adopted four-year investment program for major state and regional transportation systems, including interstate, state, and local highways and bridges, public transportation systems, and federal and tribal roads. It covers all major transportation projects for which funding is approved and project implementation is expected to occur during a certain time frame. The STIP includes all major transportation projects and programs in Oregon that are funded with federal dollars. It also includes state-funded projects that relate to the state highway system, and “regionally significant” locally funded projects in metropolitan areas that affect the state’s transportation system.

Immediate Opportunity Fund (IOF)

The IOF program is administered by the ODOT Financial Services’ Economics and Policy Analysis Unit. It was created in 1988 by the Oregon Transportation Commission (OTC) in order to quickly process and fund transportation improvements that would attract or retain jobs. The fund is a collaborative effort between Business Oregon and ODOT. It is intended as quick-response or incentive funding for either targeted business development projects or business district revitalization projects. Projects are either pulled from a city or county’s transportation system plan (TSP), or are small projects that are not listed in the TSP and may be added onto other larger projects.

The IOF program funds three types of projects, several of which could support development in the Tonquin Employment Area.

- Type A: Specific economic development projects that affirm job retention and job creation opportunities. Maximum grant: \$1,000,000.
- Type B: Revitalization of business or industrial centers to support economic development. Maximum grant: \$250,000.



- Type C: Preparation of Oregon Certified Project Ready Industrial Sites. Maximum grant: \$500,000.

4. Other Funding Options

The financial landscape is changing rapidly and new funding mechanisms are emerging to address a variety of community infrastructure and economic development needs, in particular smart growth projects that link transportation and land use, as well as development that supports energy efficiency and sustainability goals. Examples of recent funding tools and initiatives that the City may wish to track include:

Sustainable Communities Initiative

The Sustainable Communities Initiative is a new collaboration formed in early 2010 between the Department of Housing and Urban Development (HUD), the U.S. Environmental Protection Agency (EPA), and the U.S. Department of Transportation (DOT) encourages better coordination in planning to support smart growth and more efficient development. Currently, most grants are focused on either transportation improvements or planning projects.

Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grants

As part of the 2009 American Recovery and Reinvestment Act, the federal government appropriated \$1.5 billion in discretionary grants to finance capital investments in surface transportation projects that will have a significant impact on the nation, a metropolitan area or a region. While the TIGER grants, which are administered through the Department of Transportation and available to state and local governments through September 2011, have already been awarded, it is possible that the federal government will renew this program or fund a similar program in the future.

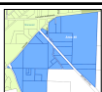
V. Implementation Policies

A. Existing Policies

The City of Sherwood has identified a series of goals, objectives and an action plan in its Economic Development Strategy that will guide future community discussions and decisions on economic growth in the city. The overall economic development vision articulated in the Economic Development Strategy is:

City of Sherwood Economic Development Strategy – Vision Statement

The City of Sherwood will drive economic development and support businesses that provide jobs for our residents by building on our assets and developing the necessary infrastructure to retain existing businesses and support new businesses. Economic development also will be supported by maintaining our livability and character as a clean, healthy, and vibrant suburban community where one can work, play, live, shop and do business.



The Economic Development Strategy includes short-term and long-term strategies to enhance Sherwood's economic opportunities. The Strategy states:

In the short-term, Sherwood should develop a proactive marketing strategy aimed at further defining, enhancing, and attracting existing high-growth industry clusters, including industries such as:

- *Small to mid-size light manufacturing establishments*
- *Specialty contractors and construction firms*
- *Creative service individuals and establishments*
- *Amusement, recreation, sporting and lodging services*
- *Educational facilities*
- *Nursing and health care support services*

Long term strategies should include planning for new industrial sites (with integrated commercial and residential development) within future master-planned employment districts in Area 48. New zoning codes may be needed to accomplish this objective.

Specific to the Tonquin Employment Area (Area 48) the Strategy notes:

Effective economic development strategies must also confront challenges regarding cost effective delivery of adequate project ready sites. At issue is the additional industrial land supply that was brought into the Portland Metro UGB in 2002 and 2004. While the majority of this land does not yet have adequate public roads, sewer, and water lines, the supply increase will likely create a short term industrial land surplus. Hence, Sherwood must carefully evaluate prospective land absorption and return on public investment before making major fiscal expenditures aimed at increasing its industrial land base.

B. Proposed Policies

The following proposed goal and policies are intended to implement the city's objectives for attracting state-identified industry clusters in the Tonquin Employment Area and to support the rationale for include the planning area in the Urban Growth Boundary. Once adopted, it is possible that these goals and policies could be applied to existing employment areas to support a change in land use designation, but they are principally intended to describe opportunities in the TEA and future urban expansion areas.



One of the Oregon Business Development Department's stated goals, as articulated in the 2009 Strategic Plan,²⁹ is to help existing businesses retain jobs while growing and attracting sustainable businesses by focusing value-added services in key industries. The identified industries are Clean Technology, Wood and Forest Products, Technology and Advanced Manufacturing, and Outdoor Gear & Active Wear. Of these four key industries, only one - wood and forest products - is not compatible with the city's and the region's employment goals for the TEA and other employment areas planned for urban levels of development.

Of the proposed policies for the EI zone, two policies are specific to the Tonquin Employment Area; Policy 5 and Policy 6 would not be applicable to other areas within the city. Proposed Policy 5 indicates that only commercial uses that are directly supportive of the employment uses in the vicinity will be permitted. Proposed Policy 6 acknowledges the need for a 50-acre parcel within the area, a requirement imposed when the land became part of the Metro urban growth boundary. If the EI designation is to be applied to urban reserve areas in the future, than the city may desire, or may be required, to modify the policy language to include special circumstances or requirements associated with these new areas.

Tonquin Employment Area Development Goal:

To expand and diversify the Sherwood industrial economic base by establishing employment areas that are suitable for, and attractive to, key industries and industry clusters that have been identified by the State of Oregon and the city's economic development strategy as important to the state and local economy. Employment Industrial areas provide for:

- 1. Large and medium-sized parcels for industrial campuses and other industrial sites that can accommodate a variety of industrial companies and related businesses in the following preferred industry sectors:*

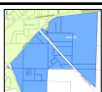
Clean Technology

- Renewable energy/energy efficiency*
- Sustainable environmental products*

Technology & Advanced Manufacturing

- Manufacturing/metals*
- High technology*

²⁹ <http://www.oregon4biz.com/assets/docs/agency-strategic-plan.pdf>



- *Biotechnology and bio-pharmaceuticals*

Outdoor Gear & Active Wear

- *Sports apparel/recreation products*

2. *Flex building space within small- and medium-sized industrial campuses and business parks to accommodate research and development companies, incubator/emerging technology businesses, related materials and equipment suppliers, and or spin-off companies and other businesses that derive from, or are extensions of, larger campus users and developments.*

Policies

1. *Facilitate and foster the siting, development, and growth of employers whose operations can be described as part of the preferred industry sectors desired for Employment Industrial areas.*
2. *Provide development opportunities for employers of varying sizes within the Employment Industrial areas for manufacturing and other industrial uses that fall within preferred industry sectors.*
3. *Encourage business that supply and support preferred industries and that benefit from close proximity to the industry served to located in Employment Industrial areas.*
4. *Permit light industrial uses not associated with the preferred industry sectors in Employment Industrial areas provided that such uses are not incompatible with the types of industry preferred for these areas.*
5. *Only retail and commercial service uses that support employers and employees within and adjacent to the Tonquin Employment Area shall be permitted.*
6. *Encourage and accommodate the creation of larger industrial parcels including at least one parcel 50-acre or larger parcel within Sub-area "A" of the Tonquin Employment Area through zoning provisions that facilitate land assembly consolidations and/or partitioning to create large campus-like industrial sites.*
7. *Encourage aesthetically attractive, well designed industrial uses and sites within development approved for construction in the Employment Industrial areas.*
8. *Where applicable, require development in Employment Industrial areas to be designed within the context of adjacent existing or future employment areas, in particular with respect to site design, building orientation, and the continuation of the existing transportation system.*



9. *Encourage future development designs that are sensitive to the existing natural features of the area and support development proposals that incorporate, preserve, and enhance natural features.*

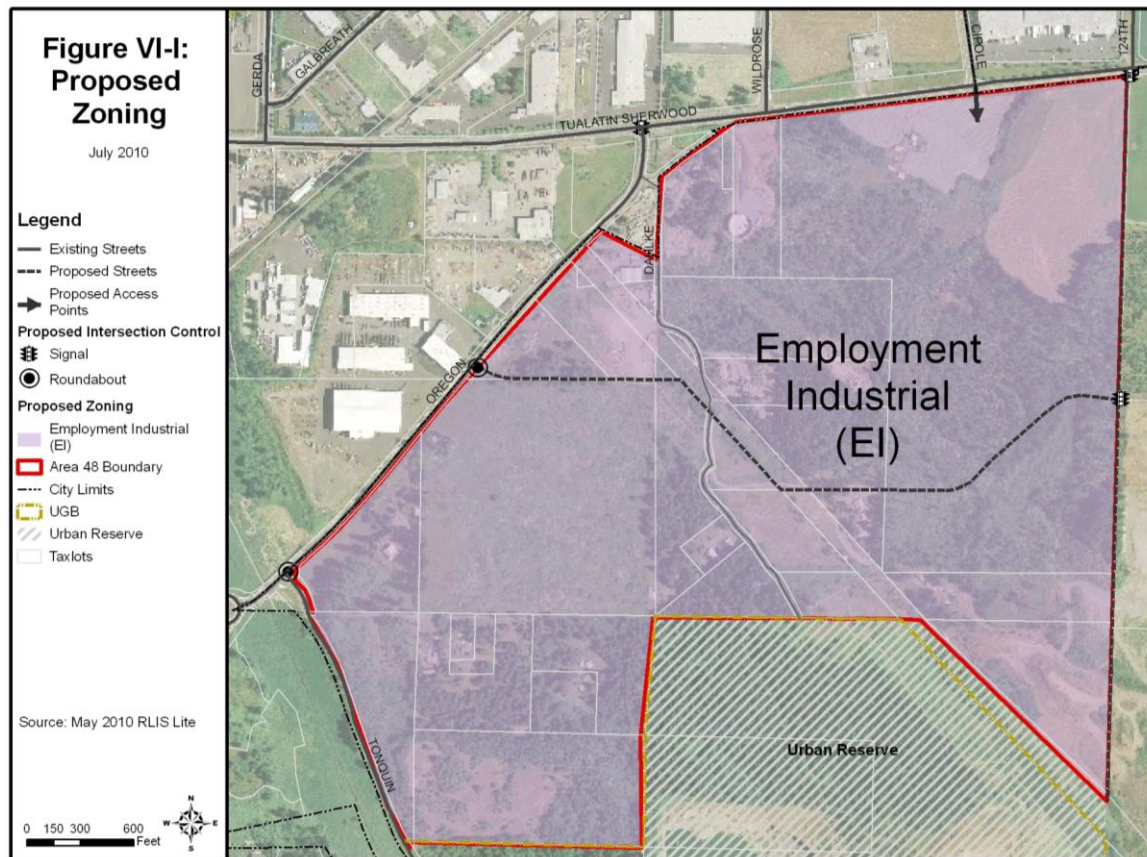
Implementation

1. *The City of Sherwood shall amend the Zoning and Community Development Code to include an Employment Industrial zone that implements the goals and policies in this section.*
2. *The Employment Industrial zone may be applied only to those properties within city limits, or upon their annexation to the city.*

VI. Zoning Code Requirements

A proposed new chapter for the City of Sherwood Zoning and Development Code has been developed in order to implement the Tonquin Employment Area Preferred Concept Plan. Specifically, the Employment Industrial (EI) zone (Appendix B) is intended to implement the city's development strategies for the Tonquin Employment Area. While supportive of economic growth, the EI zone is targeted to support the type of employment opportunities envisioned for the Tonquin Employment Area when it was included in the Urban Growth Boundary. As described below, the zone is intended to promote preferred industry sectors that the city has targeted in its Economic Development Strategy, as reflected in the proposed Comprehensive Plan policies in Section V.B of this report. At the same time, the zone restricts uses that would impede or be inconsistent with the types of employment uses targeted for the area. The EI zone also implements the land division requirements of Metro's Title 4. Figure VI-1 shows the application of the EI zone to the Tonquin Employment Area.



Figure VI-1: Proposed Zoning

Guidance for the development of the Employment Industrial (EI) zone came from the participants in a Tonquin Employment Area Economic Development Meeting, November 2009, discussing the topic of future employment uses in the area. Participants included key members of the Tonquin Employment Area Concept Plan development team, Tom Nelson, the City's Economic Development Manager, and commercial real estate brokers. Additional input from City staff refined the approach and resulted in the proposed draft EI zone chapter.

The model for the draft Employment Industrial (EI) zone chapter is the city's existing Light Industrial zone. The EI zone is distinguishable from the city's existing LI zone by the new zone's purpose statement, the permitted uses, and dimensional standards addressing the retention of a large (50 acre) parcel. The following purpose statement has been drafted for the EI zone that reflects the proposed policy language and emphasizes that areas with the EI zone designation are intended to be attractive to and suitable for key industries and the businesses that supply them.

Purpose

The EI zoning district provides employment areas that are suitable for, and attractive to, key industries and industry clusters that have been identified by the State of Oregon and the City's economic development strategy as important to the state and local economy. The following are preferred industry sectors for areas zoned EI: Clean Technology; Technology and Advanced Manufacturing; and Outdoor Gear and Active Wear.

Land zoned EI shall provide for large and medium-sized parcels for industrial campuses and other industrial sites that can accommodate a variety of industrial companies and related businesses. Areas zoned EI are also intended to provide the opportunity for flex building space within small- and medium-sized industrial campuses and business parks to accommodate research and development companies, incubator/emerging technology businesses, related materials and equipment suppliers, and or spin-off companies and other businesses that derive from, or are extensions of, larger campus users and developments. Retail and commercial uses are allowed only when directly supporting area employers and employees.

Industrial establishments and support services shall not have objectionable external features and shall feature well-landscaped sites and attractive architectural design, as determined by the Commission.

Reflecting the conversation at the Tonquin Employment Area Economic Development Meeting, the challenge with regulating new employment areas can be characterized as the tension between aspirations, as described in the EI policies and reflected in the purpose statement, and the current, market-driven demand that exists today. In anemic growth periods such as exists today it is politically unpopular to deny permitting any business or industry that brings employment opportunities. However, permitting uses that do not fulfill long-term economic



development objectives may result in short-term employment gains but future land uses that hinder or preclude the identified desired industries. The intent of the proposed EI zone is to provide a unique place for emerging technologies and for the possibility of synergistic clusterings of similar uses, while at the same time allowing for more traditional light industrial uses that could be sited in, or compatibly among, industrial park or campus developments.

Consistent with the zone's purpose statement, uses associated with the three identified key industries are permitted outright. Through a conditional use permit process, uses that can be shown to be "consistent with, or a variation of" target industry uses will also be permitted. No other new uses have been included in the EI zone, but many LI permitted uses have been modified to better meet the objectives of the new employment area(s). Some uses that are permitted in the LI zone are not recommended for the EI zone because they are not closely related to the targeted industries or are uses that have the potential to remove a large amount of buildable land from the available inventory without providing the type of employment envisioned for the EI designated-areas.

The city has recently modified both the Light Industrial (LI) and the General Industrial (GI) zone chapters to include Metro Title 4 limitations on commercial uses in industrial zones. The proposed EI zone also includes these requirements, but they are located in the standards, not the use, section of the chapter. In addition to standards that are identical to the existing LI zone, the EI zone includes provisions that apply to only the Tonquin Employment Area.

Finally, some additional definitions will need to be adopted to describe new terms in the EI zone. Draft definitions have been included at the end of the Employment Industrial (EI) Zone document for convenience, but ultimately should be incorporated into the definitions section of the Zoning and Community Development Code. Proposed definitions have been modified from definitions readily available via dictionary and industry-related internet sites.

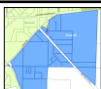
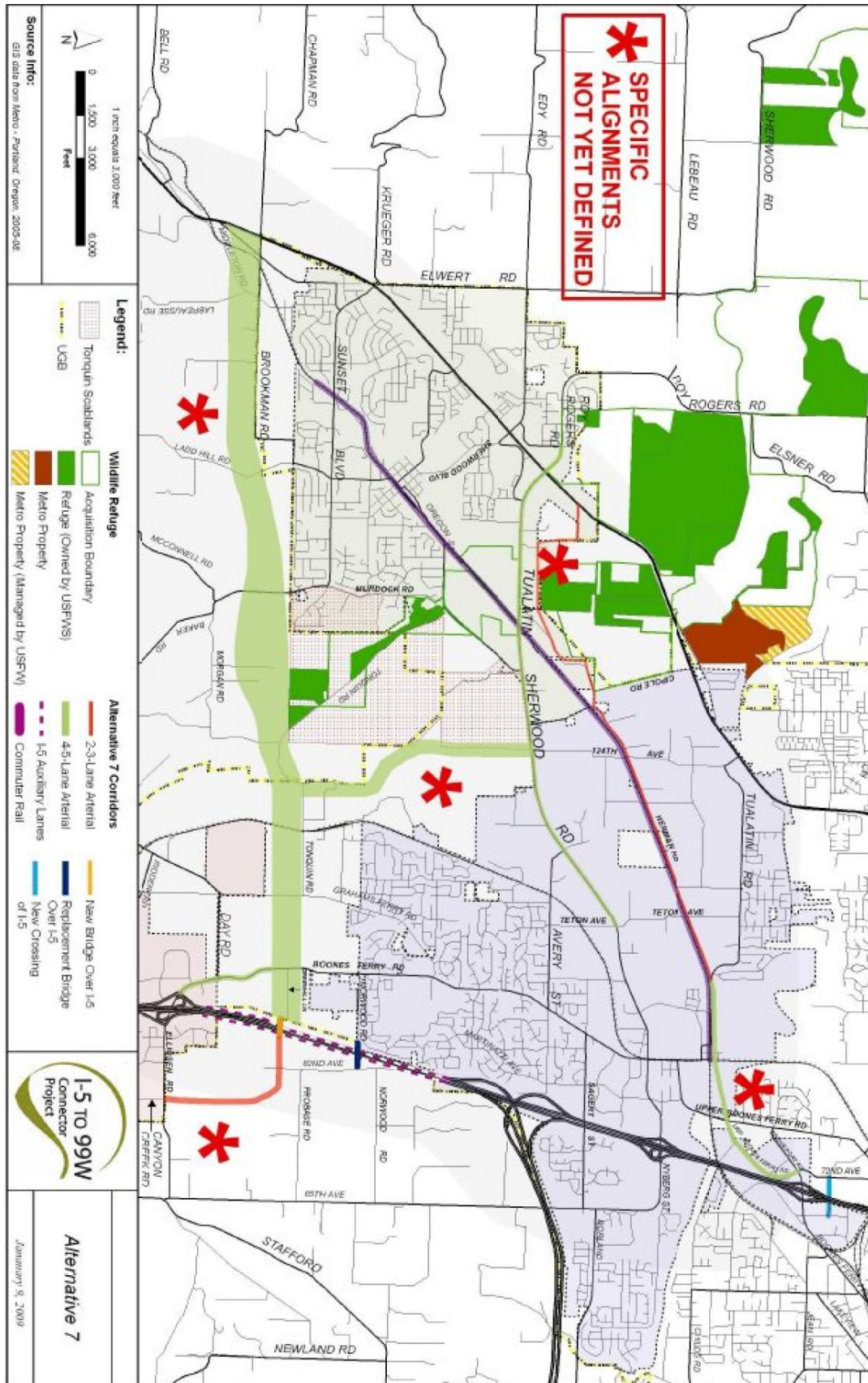


APPENDIX



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Chapter 16.31

EMPLOYMENT INDUSTRIAL (EI)

Sections:

16.31.010 Purpose

16.31.020 Permitted Uses

16.31.030 Conditional Uses

16.31.040 Prohibited Uses

16.31.050 Commercial Nodes Use Restrictions

16.31.055 Tonquin Employment Area (TEA) Commercial Use Restrictions

16.31.060 Dimensional Standards

16.31.070 EI Lots Smaller than 3 Acres

16.31.080 Community Design

16.31.090 Flood Plain

16.31.010 Purpose

The EI zoning district provides employment areas that are suitable for, and attractive to, key industries and industry clusters that have been identified by the State of Oregon and the City's economic development strategy as important to the state and local economy. The following are preferred industry sectors for areas zoned EI: Clean Technology; Technology and Advanced Manufacturing; and Outdoor Gear and Active Wear.

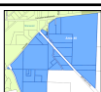
Land zoned EI shall provide for large and medium-sized parcels for industrial campuses and other industrial sites that can accommodate a variety of industrial companies and related businesses. Areas zoned EI are also intended to provide the opportunity for flex building space within small- and medium-sized industrial campuses and business parks to accommodate research and development companies, incubator/emerging technology businesses, related materials and equipment suppliers, or spin-off companies and other businesses that derive from, or are extensions of, larger campus users and developments. Retail and commercial uses are allowed only when directly supporting area employers and employees.

Industrial establishments and support services shall not have objectionable external features and shall feature well-landscaped sites and attractive architectural design, as determined by the Hearing Authority.

16.31.020 Permitted Uses

The following uses are permitted outright, provided such uses meet the applicable design standards contained in Division V and environmental performance standards contained in Division VIII.

- A. Manufacturing, compounding, processing, assembling, packaging, treatment,

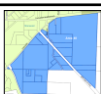


- fabrication or wholesaling of articles or products not prohibited in Section 16.31.040 and associated with the preferred industry sectors identified for the EI zone, particularly those uses associated with the following:
1. Renewable energy/energy efficiency
 2. Sustainable environmental products
 3. Advanced manufacturing
 4. High technology
 5. Biotechnology and biopharmaceuticals
 6. Sports apparel and other recreation products
- B. Research and development and associated manufacturing, except as prohibited in Section 16.31.040.
- C. Contractor's offices, and other offices associated with an approved use in the EI zone.
- D. Public and private utilities.
- E. Laboratories.
- F. Dwelling unit for one (1) security person employed on the premises, and their immediate family.
- G. PUDs subject to the provisions of Chapter 16.40.
- H. Temporary uses, including but not limited to construction and real estate sales offices, subject to Chapter 16.86.
- I. Wireless communication antennas co-located on an existing tower or on an existing building or structure not exceeding the roof of the structure provided the applicant can demonstrate to the satisfaction of the City that the location of the antenna on City-owned property would be unfeasible.
- J. Incidental retail sales or display/showroom directly associated with a permitted use pursuant to 16.31.020. Sales or display space shall be limited to a maximum of 10% of the total floor area of the business, as permitted in Section 16.31.050.

16.31.030 Conditional Uses

The following uses are permitted as Conditional Uses provided such uses meet the applicable environmental performance standards contained in Division VIII and are approved in accordance with Chapter 16.82:

- A. Any use not otherwise listed that can be shown to be consistent or associated with the allowed uses in 16.31.020(A) or contribute to the achievement of the objectives in 16.31.010.
- B. Government facilities, including but not limited to postal, police, fire, and vehicle testing stations.
- C. Light metal fabrication, machining, welding and casting or molding of semi-finished or finished metals.
- D. Transmitters and wireless communication towers.
- E. Restaurants without drive-thru that meet the requirements of 16.31.050 or 16.31.055, as applicable.
- F. Commercial trade schools.
- G. Power generation plants and associated facilities serving a permitted use.
- H. Daycares, preschools, and kindergartens that meet the requirements of 16.31.050 or 16.31.055, as applicable.



- I. Public or private outdoor recreational facilities including parks, playfields and sports and racquet courts.
- J. Personal services, including but not limited to financial, medical and dental, social services, and similar support services that meet the requirements of 16.31.050 or 16.31.055, as applicable.
- K. Business services, including but not limited to financial, real estate, legal, copying and blueprinting, and similar support services that meet the requirements of 16.31.050 or 16.31.055, as applicable.

16.31.040 Prohibited Uses

Any use that is not permitted or conditionally permitted under Section 16.31.20 or Section 16.31.030 is prohibited in the EI zone. In addition, the following uses are expressly prohibited, subject to the provisions of Chapter 16.48 Non-Conforming Uses:

- A. Adult entertainment businesses.
- B. Meat, fish, poultry and tannery processing.
- C. Auto wrecking and junk or salvage yards.
- D. Manufacture, compounding, processing, assembling, packaging, treatment, fabrication, wholesale, warehousing, or storage of toxins or explosive materials, or any product or compound determined by a public health official to be detrimental to the health, safety and welfare of the community.
- E. Rock crushing facilities.
- F. Aggregate storage and distribution facilities.
- G. Concrete or asphalt batch plants.
- H. General purpose solid waste landfills, incinerators, and other solid waste facilities.
- I. Restaurants with drive-thru facilities.
- J. Distribution, warehousing and storage not associated with a permitted use.

16.31.050 Commercial Use Restrictions

Retail and professional services that cater to daily customers, such as restaurants and financial, insurance, real estate, legal, medical and dental offices, shall be limited in the EI zone. New buildings for stores, branches, agencies or other retail uses and services shall not occupy more than 5,000 square feet of sales or service area in a single outlet and no more than 20,000 square feet of sales or service area in multiple outlets in the same development project, and shall not be located on lots or parcels smaller than 5 acres in size. A “development project” includes all improvements proposed through a site plan application.

Notwithstanding the provisions of Section 16.31.055 “Commercial Nodes Use Restrictions”, commercial development permitted under 16.31.050 may only be proposed concurrent with or after industrial development on the same parcel. Commercial development may not occur prior to industrial development on the same parcel.

16.31.055 Tonquin Employment Area (TEA) Commercial Nodes Use Restrictions

- A. Within the Tonquin Employment Area (TEA), only commercial uses that directly support industrial uses located within the TEA are permitted as conditional uses.



- B. Commercial development, not to exceed a total of five (5) contiguous acres in size, may be permitted.
- C. Commercial development may not be located within 300 feet of SW 124th Avenue or SW Oregon Street, and must be adjacent to the proposed east-west collector street.

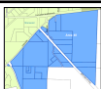
16.31.060 Dimensional Standards

No lot area, setback, yard, landscaped area, open space, off-street parking or loading area, or other site dimension or requirement, existing on, or after, the effective date of this Code shall be reduced below the minimum required by this Code. Nor shall the conveyance of any portion of a lot, for other than a public use or right-of-way, leave a lot or structure on the remainder of said lot with less than minimum Code dimensions, area, setbacks or other requirements, except as permitted by Chapter 16.84.

A. Lot Dimensions

Except as otherwise provided, required minimum lot areas and dimensions shall be:

	<p>Lot area:</p> <p>Industrial Uses:</p> <p>Commercial Uses (subject to Section 16.31.055):</p>	<p>3 acres, except as exempted in Section 16.31.070 "EI Lots Smaller than 3 Acres"</p> <p>10,000 square feet</p>
	Lot width at front property line:	100 feet
	Lot width at building line:	100 feet
	<p>Parcels larger than 50 acres:</p> <p>Lots or parcels larger than 50 acres may be divided into smaller lots and parcels pursuant to a Planned Unit Development approved by the city so long as the resulting division yields at least one lot or parcel of at least 50 acres in size.</p>	
	<p>Partitioning 50 acre parcel:</p> <p>Lots or parcels 50 acres or larger, including those created pursuant to paragraph (4) of this subsection, may be divided into any number of smaller lots or parcels pursuant to a Planned Unit Development</p>	



	approved by the city so long as at least 40 percent of the area of the lot or parcel has been developed with industrial uses or uses accessory to industrial use.	
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B. Setbacks

Except as otherwise provided, required minimum setbacks shall be:

	Front yard:	Twenty (20) feet, except when abutting a residential zone, then there shall be a minimum of forty (40) feet.
	Side yard:	None, except when abutting a residential zone, then there shall be a minimum of forty (40) feet.
	Rear yard:	None, except when abutting a residential zone, then there shall be a minimum of forty (40) feet.
	Corner lots:	Twenty (20) feet on any side facing a street, except when abutting a residential zone, then there shall be a minimum of forty (40) feet.

C. Height

Except as otherwise provided, the maximum height shall be fifty (50) feet, except that structures within one-hundred (100) feet of a residential zone shall be limited to the height requirements of that residential zone.

16.31.070 EI Lots Smaller than 3 Acres

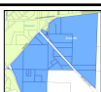
Lots of record prior to October 5, 2010 that are smaller than the minimum lot size required in 16.31.060.A.1 may be developed if found consistent with other applicable requirements of Chapter 16.31 and this Code. Further subdivision of lots smaller than 3 acres shall be prohibited unless Section 16.31.055 applies.

16.31.080 Community Design

For standards relating to off-street parking and loading, energy conservation, historic resources, environmental resources, landscaping, access and egress, signs, parks and open space, on-site storage, and site design, see Divisions V, VIII and IX.

16.31.090 Flood Plain

Except as otherwise provided, Section 16.134.020 shall apply.



New Definitions

Advanced Manufacturing. The application of cutting edge concepts in electronics, computers, software and automation to enhance manufacturing capabilities and improve production. Advanced manufacturing technology is used in all areas of manufacturing, including design, control, fabrication, and assembly. This family of technologies includes robotics, computer-aided design (CAD), computer-aided engineering (CAE), manufacturing resource planning, automated materials handling systems, electronic data interchange (EDI), computer-integrated manufacturing (CIM) systems, flexible manufacturing systems, and group technology.

Biopharmaceuticals. Medical drugs derived from biological sources and produced using biotechnology.

Biotechnology. Technology based on biology, especially when used in agriculture, food science, and medicine, and includes any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use.

Clean Technology. A diverse range of products, services, and processes that harness renewable materials and energy sources, dramatically reduce the use of natural resources, and cut or eliminate emissions and wastes. Clean technology includes wind power, solar power, biomass, hydropower, biofuels, information technology, green transportation, electric motors, and innovations in lighting and other appliances related to energy efficiency.

High Technology. Scientific technology involving the production or use of highly advanced, sophisticated, or specialized systems or devices, especially those used in the fields of electronics and computers.

Renewable Energy. Energy derived from, or effectively using resources which may be naturally replenished. such as sunlight, wind, rain, tides and Renewable energy technologies include those associated with solar power, geothermal heat, wind power, hydroelectricity, and biofuels used for transportation.

Sustainable environmental products. Products that are designed to lessen negative impacts on the natural environment or to enhance the potential longevity of vital human ecological support systems, such as such as the planet's climatic system and systems of agriculture, industry, forestry, fisheries, and the systems on which they depend.

