



2014 - 2019

TUALATIN RIVER

TOTAL MAXIMUM DAILY LOAD

IMPLEMENTATION PLAN

City of West Linn, Oregon

AUGUST 2003

REVISED JUNE 2014

City of West Linn
22500 Salamo Road
West Linn, Oregon 97068

City of West Linn

Tualatin River TMDL Implementation Plan

We, the undersigned, hereby submit this Tualatin River TMDL Implementation Plan. We certify under penalty of law that this document and all attachments were prepared under our direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on our inquiry of the person, or persons, who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of our knowledge and belief, true, accurate and complete. We are aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Date 6-10-14
Signature Michael Cardwell

Mike Cardwell, Environmental Services Supervisor

Date 6/10/14
Signature Lance Calvert

Lance Calvert, West Linn Public Works Director

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1.0 – Introduction & Background

The Tualatin River and numerous tributaries do not currently meet several of the State of Oregon Water Quality, (WQ) standards. These standards assure that beneficial uses of the river and tributaries, such as swimming, fish consumption and fish rearing are protected. The Federal Clean Water Act, section 303, requires states to develop WQ standards to support uses beneficial to public water bodies. Where WQ standards are not being met, the water body is listed on the 303(d) list of WQ limited water bodies for that parameter. The State of Oregon, through the Oregon Department of Environmental Quality (DEQ), is required to develop Total Maximum Daily Loads (TMDL's) to determine how to best meet Water Quality standards for that parameter. As part of the Tualatin River TMDL, DEQ developed a Water Quality Management Plan (WQMP) to describe the overall framework for implementing the Tualatin River TMDL. The WQMP includes a description of activities, programs, legal authorities and other measures for which DEQ and other designated management agencies (DMAs) have regulatory responsibility. A DMA is “a federal, state or local governmental agency that has legal authority of a sector or source contributing pollutants, and is identified as such by the Department of Environmental Quality in a TMDL.”

Along with other cities and agencies in the Tualatin Subbasin, the City of West Linn has been named by Oregon DEQ as a Designated Management Agency. The City has legal authority over a sector or source contributing pollutants on the 614 acres within the City limits. The Tualatin River flows for approximately 2.5 river miles along the south side of the City. The Tualatin River is currently listed as a water quality limited river for 5 parameters: Temperature, Total Settleable Volatile Solids, and (TVS) to address Dissolved Oxygen, (DO) violations; pH and Chlorophyll A, which regulate Total Phosphorus concentrations; Mercury and bacteria.

TMDLs, the WQMP, and associated implementation plans and activities are designed to restore water quality to comply with water quality standards. In this way designated beneficial uses, such as aquatic life, drinking water supplies and water contact recreation, will be protected. When implemented, the TMDL will result in a cleaner, healthier Tualatin River for current and future generations.

The total permissible pollutant load established by the TMDL program is allocated to point, non-point, background, and future sources of pollution. Wasteload Allocations, (WLAs) are portions of the total load that are allotted to the point sources of pollution, such as sewage treatment plants, industries or a city's storm conveyance system. The WLAs are used to establish effluent limits in discharge permits. The City of West Linn is subject to Wasteload Allocations under our NPDES permit. Load Allocation (LAs) are portions of the TMDL that are attributed to either natural background sources, such as soils, or from non-point sources such as urban, agricultural, and/or forestry activities. This plan addresses only the LA portion of the TMDL that the city is responsible for.

2.0 – Geographic Region of Interest

The Tualatin River subbasin is located in the northwestern portion of the Willamette Basin. The Tualatin River originates in the Coast Range of Oregon, west of the city of Portland and flows to the Willamette River just upstream of Willamette Falls at river mile 28. The 712 square mile Tualatin River Subbasin is located mainly in Washington County, with small portions located in Multnomah, Clackamas, Yamhill, Tillamook and Columbia Oregon counties. See Figure 1 on page 7.

Land use in the Tualatin River Subbasin is 39 percent forestry, 35 percent agriculture and 26 percent urban, residential, and industrial. Ecoregions range from moderate elevation Valley Foothills to low elevation Prairie Terraces and Willamette River Gallery Forest. The fish population includes a number of salmonid species, including winter steelhead, Coho and resident cutthroat trout.

West Linn is located at the confluence of the Tualatin and Willamette Rivers. The City of West Linn covers approximately 7.4 square miles and is located entirely within Clackamas County; bounded on the north by the City of Lake Oswego, on the East by the Willamette River, on the south by the Tualatin River and on the west by unincorporated Clackamas County. The Tualatin River receives approximately 13% of the city's average annual volume of stormwater runoff, which is roughly 614 acres; while the Willamette River receives 87%. Figure 2 depicts the watershed boundaries of each within the City limits.

The Tualatin River in West Linn runs along 4 open spaces, 2 large city parks, wetlands, public and private detention ponds, swales, open channels, natural drainage ways and homes. This part of West Linn is made up of residential and publically owned property. There are three main creeks that flow into the Tualatin River: Fritchie Creek, Summerlinn Creek and Dollar Creek along with 12 small (18 inches or smaller) outlet pipe systems that collect residential stormwater runoff. Because a significant portion of the Tualatin riparian zone is city owned, the city has imposed the Tualatin River Riparian Protection Ordinance (# 1576). This ordinance complies fully with Title 13 of Metro's Functional Plan and will be discussed further in Chapter 10.

The average annual rainfall in West Linn is 47 inches. Approximately 75% of the total precipitation occurs during the 6 months between October and March. The 7.4 square mile city has approximately 107 miles of stormwater mains, 2500 catch basin, 105 pollution control manholes, 40 ponds and 54 underground detention tanks, all of which are maintained by the City's Environmental Services Division of Public Works.

The City of West Linn is a part of a group of co-permittees in the Clackamas County who share in the responsibility of complying with the Phase 1, Municipal Separate Storm Sewer (MS4) National Pollutant Discharge Elimination System (NPDES) Permit # 101348. The current permit for which the Clackamas County group is operating under runs from 3/16/2012 to 3/1/2017. The Clackamas County permit holders are: Clackamas County, the Cities of Gladstone, Milwaukie, Oregon City, Happy Valley, Rivergrove, West Linn; Clackamas County Service District #1 and Surface Water Management Agency of Clackamas County.

Tualatin River TMDL Implementation Plan 2014 – 2019

Figure 1 – Tualatin River Watershed

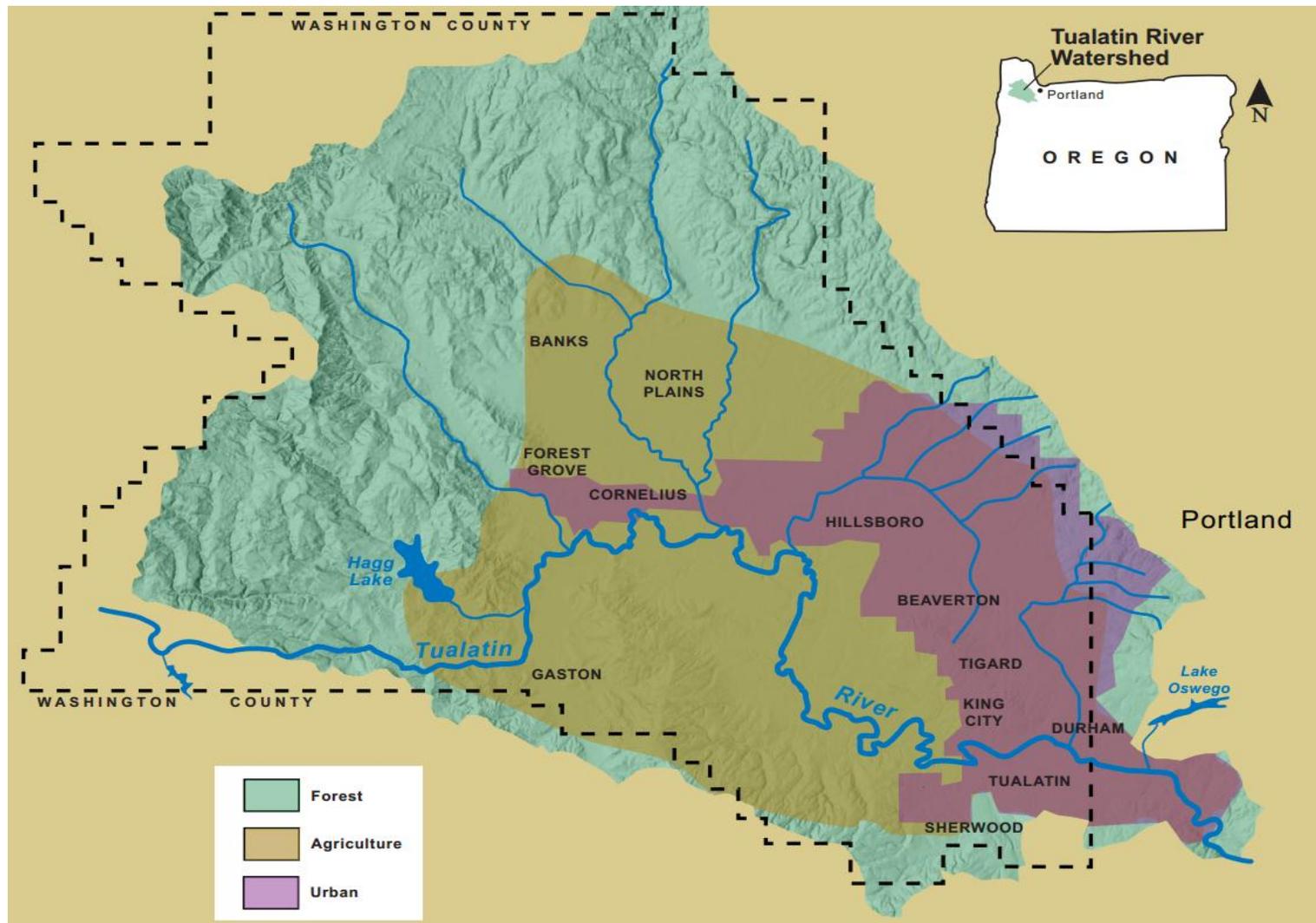
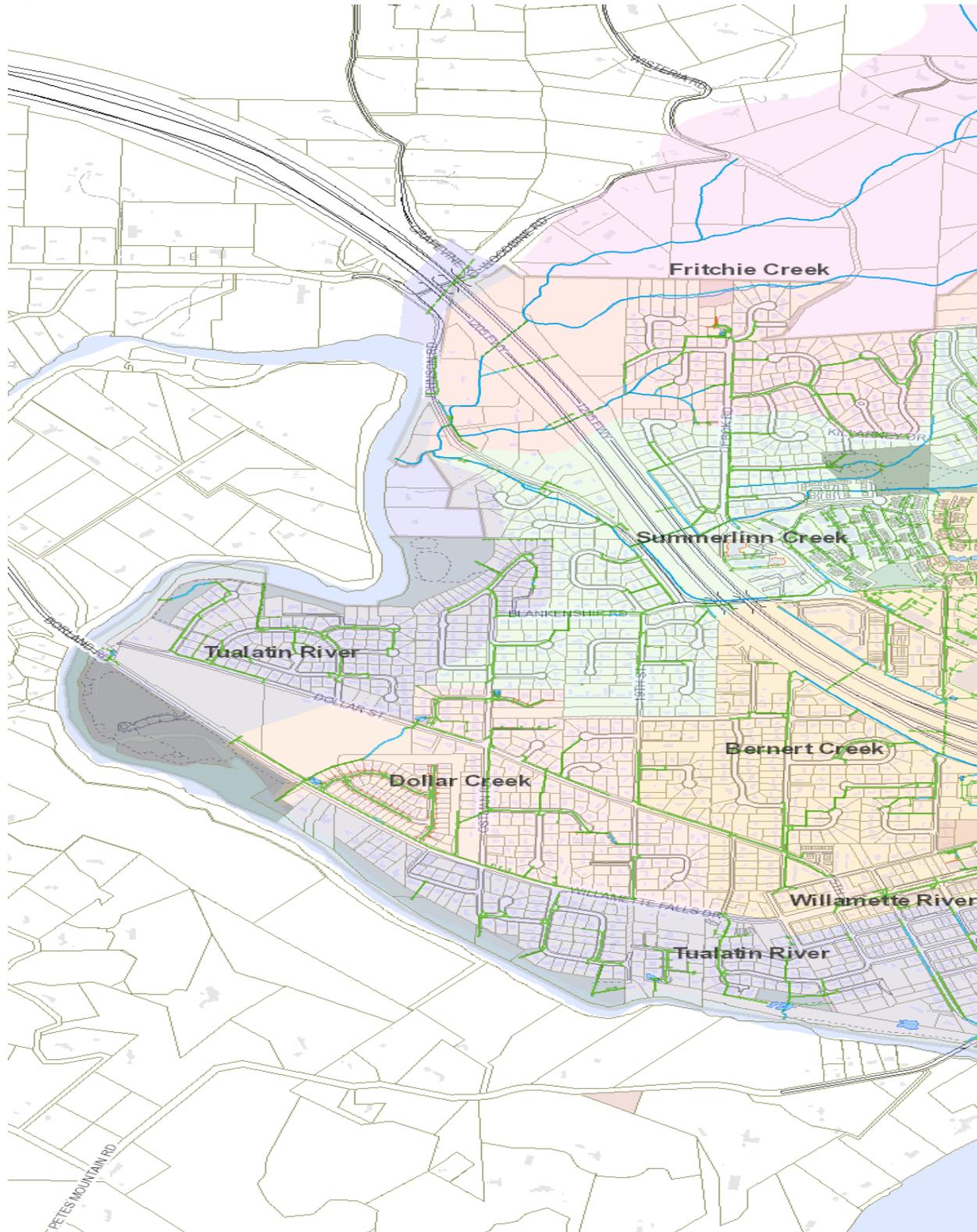


Figure 2 – Tualatin & Willamette River Boundary



Figure 3 – Stormwater Conveyance System and Drain Basins



3.0 – Goals & Objectives

The goal of this Implementation Plan is to identify the ongoing and planned management strategies to improve watershed health and address requirements of the Tualatin River TMDL related to reductions in bacteria (E. coli), Total Phosphorus, in-stream heat, TVS and Mercury loading.

The objectives of this Implementation Plan include applying adequate management strategies for pollution prevention (e.g., erosion control, riparian protection strategies, and stormwater management strategies as detailed in the City’s Stormwater Management Plan, 2012), evaluating strategies annually for effectiveness and implementing adaptive management as necessary.

In addition, the Oregon Administrative rule (OAR 340-042-0080(3)) requires that a TMDL Implementation Plan must include the following 6 elements:

1. Management Strategies that will be used to achieve load allocations
2. A timeline and schedule to achieve measurable milestones
3. A plan for periodic review and revision of the implementation plan
4. Evidence of compliance with applicable statewide land use requirements
5. Any other analyses or information as specified in DEQ’s Water Quality Management Plan
6. Implement and revise the plan as needed.

This Plan fulfills the requirements of the Oregon Administrative Rule.

The intent of the Plan is to function in concert with the City’s NPDES Phase 1 permit. A large part of the permit includes the Stormwater Management Plan or SWMP. The SWMP is organized into eight major stormwater program elements:

1. Illicit Discharge Detection and Elimination
2. Industrial and Commercial Facilities
3. Construction Site Runoff Control
4. Education and Outreach
5. Public Involvement and Participation
6. Post-Construction Site Runoff
7. Pollution Prevention for Municipal Operations
8. Stormwater Management Facilities Operations and Maintenance.

See Appendix C on page 34 for a thorough explanation of each element.

4.0 – TMDL Parameters, Allocations & Sources of Pollutants

TMDLs have been developed in the Tualatin watershed for E. coli, pH and Chlorophyll A (Total Phosphorus), Mercury, Dissolved Oxygen, and in-stream water temperature. The following table summarizes each TMDL parameter, measurement method and load allocations.

Table 1 – TMDL

Parameters	Measurement Method	Load Allocation
In-stream Temperature	Surrogate: Shade	Attaining “System Potential Vegetation” conditions.
E. coli Bacteria	E.coli	<i>Summer:</i> 12,000 counts/100ml during storms. <i>Winter:</i> 5,000 counts/100ml
pH and Chlorophl A (Total Phosphorus)	Lab: Total Phosphorus	0.14 mg/L in most instances. Only applies from May 1 to Oct. 31
Dissolved Oxygen	Lab: Winkler method and field meter	20% reduction in “Settleable Volatile Solids in Runoff” in the summer
Mercury	Direct	27 percent reduction from all sources.

4.1 Escherichia coli (E.coli)

According to the January 2001 Tualatin TMDL, the following E. coli Load Allocations (LAs) apply to all River and tributary segments in West Linn:

Summer (May 1st-Oct 31st): 12,000 colonies/100ml during storms and 406 colonies/100ml during all other times. Winter (Nov. 1st-April 30th): 5,000 colonies/100ml during storms and 406 colonies/100ml during all other times.

E. coli is an indicator of contamination by human or animal waste. It serves as a proxy for other pathogens such as other harmful bacteria, viruses, amoebas, etc. Such pathogens may cause infections of the eyes, ears, skin, and gastro enteric systems for those who engage in water-contact recreation. E.coli bacteria can enter surface water bodies from many sources, including: the feces of wild mammals, tame and wild waterfowl, wild songbirds, pets, and livestock. The bacteria can enter the waters while the host animal is in, sitting above or flying above the creek. It can also be washed in from riparian and upland areas during storm events. In unusual instances, it can be discharged into the creek during dry weather from a “point source” such as a failing septic system. Illegal dumping of garbage and yard debris can be a source of bacteria as well. Storm runoff may flow through the material carrying pollutants with it, including bacteria.

4.2 Total Phosphorus (pH and Chlorophyll A)

The EPA approved Total Maximum Daily Loads (TMDLs) for Total Phosphorus in the Tualatin River in 1988 and again in 1994. The DEQ issued the most recent amendment TMDL for Total Phosphorus in the Tualatin River watershed in 2012 to accommodate new summertime pollutant sources. The 2001 TMDL's Load Allocations (LA) is for Total Phosphorus. As delineated by the 2001 Total Phosphorus TMDL, the summer (May 1st to October 31st) instream median concentration for Total Phosphorus is 0.14 or 0.13 mg/L in West Linn. Naturally-occurring (i.e. background) levels of phosphorus in the waters of the Tualatin River Watershed are known to be relatively high due to the large amount of phosphorus-rich groundwater which enters the river and tributaries from springs. According to Tables 42 and 48 in the 2001 TMDL document's Total Phosphorus section, the estimated background levels of phosphorus in the watershed are identical to the load allocations that were granted by DEQ to nonpoint sources (storm water running off of a field into the creek is a nonpoint source, for example), so there is no allowance in the TMDL for additional discharge of phosphorus beyond background levels in at least some instances.

Sources for this TMDL are typically pollutants that attach themselves to soil particles and enter waterways by being transported through erosive mechanisms. The Phosphorus TMDL has historically been addressed by management measures that control the release of sediments into the environment through Erosion Control Programs.

4.3 Dissolved Oxygen (Total Settleable Volatile Solids)

The DEQ established a new TMDL for dissolved oxygen (DO) – this one based largely on reducing the levels of Total Settleable Volatile Solids, (TVS), in the Tualatin River watershed in 2001. Levels of Settleable Volatile Solids are believed to play a role in contributing to the amount of instream DO that bed sediments take as organic material is consumed or decomposes. The DO TMDL's Load Allocations that were issued are for Settleable Volatile Solids, (SVS). The DO TMDL's Load Allocations are expressed in terms of a required percent reduction of SVS in stormwater runoff. In the main stem of the Tualatin River, the required reduction is 20% from May 1st to October 31st.

The causes for this type of pollution are: agricultural runoff, urban runoff, natural sources, untreated sewage and flow alteration.

4.4 Mercury (as set out by Willamette TMDL)

The TMDL has established a 27% reduction over time from all sources (point and non-point sources) of Mercury compared to current loading levels. The Willamette TMDL for Mercury applies to the Tualatin River because the Tualatin River is a Willamette River tributary. Although the water quality criteria for Mercury in the Willamette River's water column is currently being met at all times or nearly all times, excessive levels of mercury have accumulated in certain species of the watershed's fish.

The stated objective of the Mercury TMDL is to reduce average fish tissue concentrations in the Willamette River so that all fish species are safe for human consumption. The multiple fish consumption advisories for Mercury in the Willamette Basin and the numerous 303(d) listings indicate that this beneficial use is not currently being met. DEQ acknowledges that it may take many years, perhaps even decades, to ultimately achieve the desired reduction in fish tissue concentrations of Mercury. In establishing interim water quality guidance values, DEQ considered the criteria and thresholds utilized when fish consumption advisories are issued.

Mercury is a naturally occurring element found in high concentrations in cinnabar deposits. In Oregon, Mercury was mined commercially and used extensively in gold and silver amalgamation (Brooks, 1971; Park and Curtis, 1997). Mercury is present in other rock types and soil types in Clackamas County, given the role that volcanoes have played in our geologic history. Mercury is also naturally present in geothermal areas and in many types of native vegetation; significant amounts can be released into the atmosphere during wild/forest fires. Mercury has been used historically in fungicide formulations and can still be found in many commercial products, including fluorescent lights, thermometers, automobile switches and dental amalgam. Illegal dumping of solid waste containing mercury can also be a source.

Mercury can enter surface water bodies in many ways. One way that it can be transported to surface waters is through stormwater runoff. Some of the Mercury in stormwater runoff may be washed from impervious surfaces after having been deposited on the surface from the atmosphere. It is thought that air deposition sources account for approximately 7% in the Willamette River Basin of which the Tualatin River is a tributary. DEQ analysis of potential sources of Mercury concluded that the vast majority of Mercury loading to the Willamette comes from runoff from lands receiving atmospheric deposition (via land runoff or direct deposition to water) and erosion of native soils.

Stormwater runoff can also carry Mercury if it erodes Mercury-containing soils.

Sources include: Erosion of soils from agricultural, forest, urban and commercial/industrial areas and lands; runoff and soil erosion from new development, redevelopment and commercial and industrial areas; soil disturbance related to road maintenance; illegal dumping of solid waste; spills and illicit discharges of certain materials.

4.5 Temperature

Salmonids require cool, well-oxygenated water to survive. Elevated water temperature is a common problem in many tributaries in the Willamette River Basin, resulting in TMDL load allocations designed to protect and remedy impaired aquatic habitats. Water temperatures in excess of water quality standards make streams unsuitable for cold-water fish and other cold-water aquatic species. Excessively warm streams lead to a variety of ill effects on many salmon and trout species, ranging from decreased spawning success to death (USEPA, 2003). Given the opportunity, juvenile and adult salmon will occupy water that is 13 to 18 degrees Celsius (°C) (55 to 64 degrees Fahrenheit (°F)), with warmer water selected only if excess food is available. Water

temperatures of approximately 23 to 25 °C (73 to 77 °F) are lethal to salmon and steelhead. Colder water is required for spawning, as genetic abnormalities or mortality of salmonid eggs can occur above 11 °C (52 °F), (Washington State Department of Ecology, 2000). The maximum temperature that salmonids can tolerate varies with species, life-stage (e.g., fry, fingerling or adult), prior acclimation, oxygen availability, duration of warmer temperature and the presence of pollutants.

5.0 – Existing & Proposed Management Strategies for Temperature

This section describes the City’s TMDL Implementation Plan to address temperature. Section 5.1 provides a summary of the load allocations and shade cures that are provided in the Willamette TMDL documents. Section 5.2 presents an analysis of current shade conditions with respect to the load allocations. Section 5.3 provides a summary of the City’s current management strategies to address the load allocations. Section 5.4 outlines the timeline and schedule for implementation and Section 5.5 summarizes proposed monitoring and reporting.

5.1 TMDL Load Allocations for Temperature

There are several factors that can contribute to elevated instream temperatures such as changes in watershed processes and channel morphology, climate, geographic location, riparian vegetation, dams, reservoirs and point sources such as industrial waste water discharges (DEQ 2006). DEQ has found that the largest contributor to elevated temperatures is the increased impacts from solar radiation loads due to disturbances of riparian vegetation. In response to this finding, DEQ has defined effective shade targets as a surrogate measure for addressing temperature. Effective shade is determined through the use of shade curves on a region-specific basis. DEQ has developed region specific shade curves for areas within the Willamette Basin. The shade curves, used along with stream orientation and width, provide a target for percent effective shade and corresponding solar radiation loading (DEQ 2006).

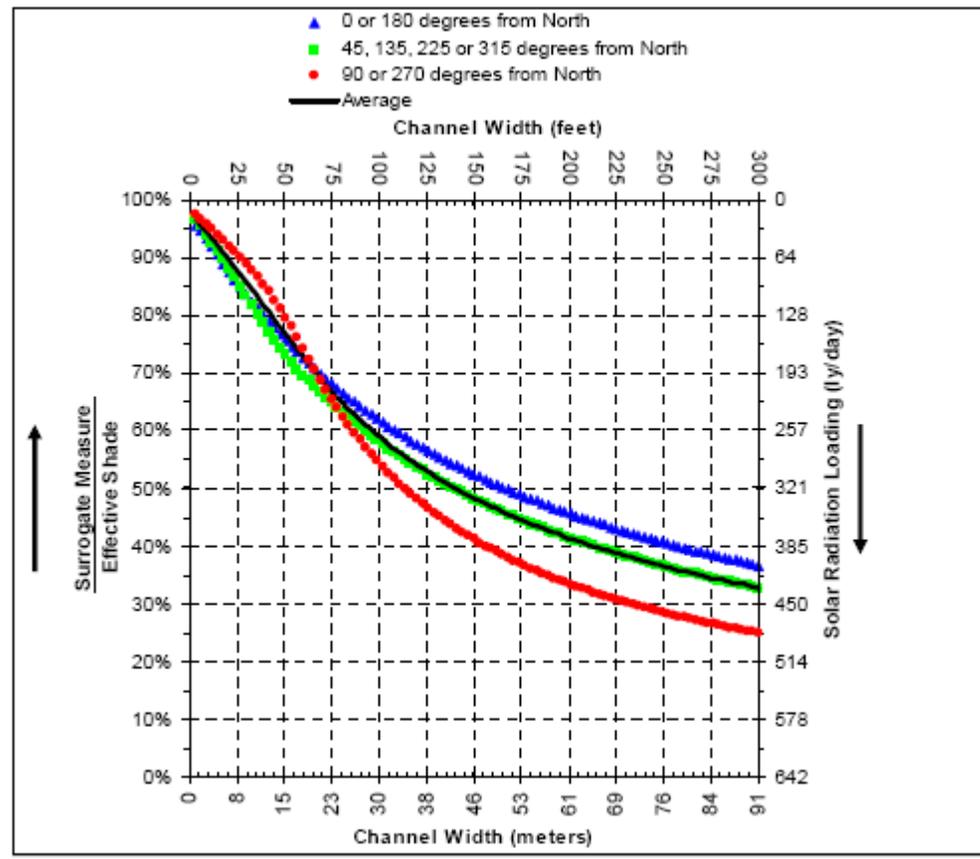
Shade is more effective on narrower streams than wider streams because shadows from trees in the riparian zone will cover a larger percent of water surface. Since the majority of the Willamette River’s tributaries within the City of West Linn’s urban growth boundary (UGB) are 20 feet wide or less, riparian vegetation casting shade over the streams is expected to be very effective. DEQ developed shade curves to project the effective shade that riparian vegetation would provide at maturity.

Different vegetation types have the capability of providing a different amount a shade. Since vegetation can vary regionally, the shade curves created by DEQ and presented in the Willamette TMDL were created to make certain system potential vegetation characteristics for each geographic area were taken into account appropriately when projecting effective shade goals. For the Lower Willamette Subbasin, shade curves were created based on ecoregions. Ecoregions describe regions with relative likeness of ecological systems and are identified through patterns of soil composition, vegetation, climate, and topography (DEQ 2006).

Potential vegetation type, height, canopy overhang, and canopy density were estimated for each identified ecoregion within the Lower Willamette Subbasin, and subsequently used to develop the shade curves. West Linn falls within two ecoregions: 1) Willamette Valley Prairie Terraces, and 2) Willamette Valley Foothills.

Although portions of West Linn fall within three designated areas for determining effective shade, they all provide approximately the same effective shade percentage for streams 20 feet wide. The majority of the City falls within the Willamette Valley Prairie Terraces ecoregion of the Lower Willamette Subbasin associated with the shade curve; see Figure 5–1 on this page. As mentioned above, this curve was generated assuming soils, vegetation, climate, and topography specific to the City of West Linn. This is meant to act as guideline, since site specific conditions could inhibit the vegetation from reaching the height and overhang values used to generate the curves (DEQ 2006).

Figure 4 – Effective Shade Curve for West Linn



Since most tributaries within the City of West Linn’s UGB are less than 20 feet wide, the percent effective shade was taken from Figure 3 using a channel width range of 0–20 feet. This resulted in an effective shade goal for the City of between 90% – 98%. This is interpreted to mean

historically prevalent riparian vegetation should block the majority (at least 90%) of solar radiation loading from the streams' water surface. It should be noted that based on this curve, percent effective shade decreases significantly as the width of the channel increases. Because of this, the most effective way to manage temperature in the Tualatin River is through its smaller, narrower tributaries.

5.2 Analysis of Current Riparian Area Conditions With Respect to Shade

The City of Gresham along with Pacific Habitat Services conducted a study on the benefits of effective shade on streams (Majidi 2007). The Gresham study looked at the amount of solar radiation blocked by riparian stream buffers of varying stream widths, aspects, and groupings of stream bank plantings (i.e. south only versus south and north stream bank plantings). The study made a key determination that the effective shade benefit of riparian plantings is diminished beyond 50 feet from a stream edge for typical regional riparian species. The results of the Gresham study are applicable to perennial creeks averaging 20 feet in width or less, which would describe the tributaries that flow into the Tualatin in West Linn. These streams receive the most effective shade benefit from riparian plantings. After a thorough examination of the City of West Linn mapping system, Map Optix, it was concluded that the entire riparian zone along the Tualatin River, Fritchie Creek, Summerlinn Creek and Dollar Creek is planted to 95% of its capacity. Although it could not be determined by analyzing the map if these plantings are shade producing or not. Ground – truthing will better help us to inventory what is planted along the streams and Tualatin River.

5.3 Management Strategies to Address Load Allocations for Riparian Zones

This section describes the proposed strategies that the City of West Linn has taken and will continue to undertake to address temperature, including preserving and enhancing effective shade along creeks and streams in areas within the city limits. As mentioned above, 95% of the riparian zones along the tributaries and Tualatin River are already planted. Therefore, protecting the vegetation that already exists in these areas is an important implementation strategy.

5.3.1 Preserve Existing Forest Canopy

The City of West Linn will continue to regulate property through the Community Development Codes, as listed below and the Municipal Codes. All of the properties along the creeks are privately owned and are subject to the Community Tree Ordinance number 1542 which states in part, “....the purpose of (this ordinance) is to ensure that the City and any areas that may become part of the City of West Linn will continue to realize the benefits provided by its urban forest, and to establish a process and standards which will minimize uncontrolled cutting or destruction of trees or wooded areas within West Linn....it is the goal through implementation of this ordinance and through other measures designed to encourage and promote tree conservation and planting on both public and private lands, to maintain and increase tree canopy coverage within the City.” Along with the enforcement of the Community Tree Ordinance 1542, the following is a list of all the Community Development Code's that have

elements in them that protect existing shaded areas and are consistent with Metro’s Title 3 and Title 13 model ordinances:

1. Chapter 27.000 – Flood Management Areas
2. Chapter 28.000 – Willamette and Tualatin River Protection
3. Chapter 31.000 – Erosion Control
4. Chapter 32.000 – Water Resource Area Protection
5. Chapter 33.000 – Stormwater Management
6. Chapter 54.000 – Landscaping
7. Chapter 55.000 – Design Review

5.3.2 Increase Existing Shade and Riparian Habitat Quality

In conjunction with efforts to preserve existing shade areas, the City of West Linn is proposing the following activities to increase and enhance riparian buffers:

1. Conduct a city wide ground - truthing evaluation to define stream buffers of a sufficient width to maximize effective shade for all applicable TMDL water bodies, (Tualatin & Willamette Rivers). Such buffers would promote the maintenance of shade but also reduce the potential loading to streams of pollutants such as sediment and phosphorus. This evaluation would allow the City to identify priority sites for additional riparian forest and understory plantings. The ground – truthing would also identify existing cold water refugia locations and/or good places to create deeply shaded areas for fish to rest.
2. A targeted public education campaign for the residents that own property along the creeks and river. At a minimum this would include sending each property owner “how to” pamphlets to encourage them to continue to create healthy riparian zones.
3. Develop partnerships with watershed councils and not – for – profit groups with defined interest in the Tualatin River Basin and other tributaries within the city limits. Support partnerships through staff participation efforts and as applicable, through financial contributions.
4. Develop an incentive program to promote riparian habitat restoration on private land.
5. Evaluate areas within the city limits that have an overgrowth of blackberries and other invasive weeds and formulate a plan/schedule to replant these areas with native species.
6. Develop a mitigation program to replace unavoidable losses of riparian forest canopy within the designated water quality buffer. Such losses may be the result of channel erosion, infrastructure repair & replacement, removal of hazard trees or natural disasters.
7. Continue to spend \$5000 on tree planting within the city limits.
8. Monitor temperature in the Tualatin River and tributaries to document status and eventual trends with respect to water quality standards.

6.0 – Management Strategies for Total Volatile Solids/DO TMDL

The Tualatin River was identified as a water quality limited for Dissolved Oxygen, (DO) because the DO levels fell below those required to sustain the river fish populations. This lack of DO can be attributed to many demands on the oxygen including sediment oxygen demand, (SOD). SOD is characterized by solids that contain organics and decompose aerobically thus consuming oxygen in the water column.

The Tualatin TMDL associates the cause of SOD to be largely attributed to the Total Volatile Solids, (TVS). TVS are a component of the Total Suspended Solids, (TSS) and as such the proposed non-point source management measures are targeted at reducing TSS sources.

Four Management measures have been in effect since the first Implementation Plan was written in 2003; these practices and policies will continue to be utilized into the future. They are: 1. Erosion Prevention 2. Street Sweeping 3. Stream Channel Stabilization & Riparian Restoration and 4. Riparian Protection. Proposed management measures for non-point sources relating to volatile solids are listed in Table 1 below. Each management measure is defined by the potential source areas, a description of the management action, and a recommended measure of performance and the name of the legal authority to institute the measure.

Table 2 – Management Measures to Address Total Volatile Solids/Dissolved Oxygen

BMP	Potential Source Area	Management Action	Performance Measures	Legal Authority
1. Erosion Prevention	New Development Redevelopment In-fill Construction	Erosion Prevention Enforcement Public Education Erosion permit/inspections	Number of non-compliance and/or number of stop work orders issued	Ordinances, Public Works Standards, Practices, Program, NPDES Permit, And Surface Water Management Plan
2. Street Sweeping	Street sediment runoff	Routine Street Sweeping	Quantity of solids removed	ESD Program NPDES Permit
3. Riparian Restoration	Stream banks Instream erosion	Identify restoration opportunities Seek outside funding for projects Encourage public participation	Project identified and completed Grants awarded Public awareness ads in local papers/newsletters	Surface Water Management Plan Municipal Code & CDC's
4. Riparian Protection	Stream banks Instream erosion	Ground Truthing activities Enforce Ordinances	Quality of Riparian area-no degradation Number of violation Public Awareness in local papers	Tualatin River Protection Plan Tree Protection Ordinance Public Education

6.1 Erosion Prevention

The City of West Linn has a comprehensive and active Erosion Prevention Program. One full-time employee reviews plans, performs inspections and enforces erosion prevention measures at construction sites. This program has been and will continue to be a significant element of reducing sediment solid contributions to our water ways. The Engineering Division of Public Works uses the Erosion Prevention and Sediment Control Planning and Design Manual from December 2008 as a guide to Erosion Control. City Codes call for submittal of erosion prevention/sediment control plans for all permit applicants including single family permits. Each plan is expected to be presented in a clear fashion; information demonstrating what preventive measures will be taken to avoid sediment from leaving the construction site. Enforcement of permit violations occur in a three step progression: 1st: a written notice of the inspection findings and required corrections. 2nd: Should the corrections not be implemented, a notice of non-compliance is issued with the required corrections. 3rd: Should corrections remain unaddressed, a stop work order is then issued. An Environmental Protection Guide is given to each erosion control permit holder at the start of each construction project. See Appendix A to read the full version of the Environmental Protection Guide and see a copy of the Permit Application Form.

6.2 Street Sweeping

The City of West Linn owns its own sweeper truck and employs a part-time employee to operate it. The Environmental Services Division is in charge of this program and has every street swept between 3 and 6 times per year. The city is divided into 6 street sweeping zones.

6.3 Riparian Area Management

This section describes the proposed strategies that the City will undertake to address temperature including preserving and enhancing effective shade along Fritchie, Summerlinn and Dollar Creeks and the Tualatin River.

6.3.1 Stream Channel Stabilization & Riparian Restoration

The City of West Linn is currently operating under the December 2006 Surface Water Management Plan. Chapter 5 of the Surface Water Management Plan is dedicated to stream condition and water quality channel stabilization. Streambank stabilization usually involves bio-engineering techniques that utilize natural vegetation and live staking's arranged in a structurally sound pattern that can help stabilize eroding stream banks, lower suspended sediment concentrations and provide for better fish habitat. Chapter 5 also recommends: tree planting, vegetative buffers, instream stabilization, and increase floodplain function. Emphasis is placed on areas that are owned by the City or where easements allow for improvements. The Surface Water Management Plan is a great source that the City uses for managing storm runoff.

6.3.2 Riparian Protection

The City of West Linn currently has a Community Development Code in place that protects a set buffer of creek areas with the city. This code prohibits alteration of stream channels and the riparian area without first acquiring the proper environmental permits from the City. Two other codes exist that serve to protect the riparian areas: the Tualatin River Protection overlay and the Water Resource Area, Chapter 32 of the Community Development Codes. Also, the Tree Protection Ordinance is a large component in protecting riparian areas especially in the land development stages.

7.0 – Management Strategies for Mercury & Phosphorus TMDL’s

Controlling erosion and sediment will be the most effective way to reduce Mercury and keep it from entering our water ways. The City of West Linn considers the elimination of illicit discharges, maintaining city streets, (street sweeping & road repair) and extensive stormwater conveyance system cleaning as important elements to Tualatin River and Willamette River TMDL Implementation Plans. The Environmental Services Division, (ESD) work on all public aspects of the stormwater conveyance system i.e., maintains and cleans pollution control manholes, detention tanks, bio-swales, catch basins and water quality ponds.

Mercury monitoring is now required for the Clackamas County MS4 permit holders. As of May 2014, West Linn along with the Cities of Oregon City and Milwaukie has taken 2 rounds of Mercury samples in each of our perspective cities. A review of the monitoring results will take place as a group at an Oregon Association of Clean Water Agencies, (ACWA) quarterly meeting. The City has included the results of the samples in the November 2013 NPDES Annual Report.

Public education on the detrimental impacts of both Phosphorus and Mercury is another important element that the City is committed to do by sending out pamphlets about pesticides to residents that live next to the river and tributaries.

8.0 – Management Strategies for E. coli TMDL

As mentioned in section 4, E. coli is an indicator of contamination by human or animal waste. It serves as a proxy for other pathogens such as other harmful bacteria, viruses, amoebas, etc. Although we can't work up any procedures and practices for complete elimination of animal feces such as wild animals, birds and ducks, we do have some measure of control over human activity that causes bacteria to show up in the river. The City of West Linn has several programs that directly help to reduce E. coli.

8.1 Pet Waste Program

This West Linn Parks Department manages this program. The department maintains 49 dog waste dispensers installed throughout the parks and open spaces. ESD monitors water quality facilities for pet waste issues. If a facility is observed to have issues, City staff distributes door hangers in the neighboring area to educate the public about pet waste and its detrimental

impact on our water ways. The number of times the City distributes door hangers is recorded in the NPDES Annual Report.

8.2 Illicit Discharge Detection and Elimination Program

This program can be found in the 2012 Stormwater Management Plan, (SWMP) in the City of West Linn's NPDES Permit, Element #1. The City's Standard Operating Procedure focuses heavily on dry weather field screening of 6 high priority outfalls. If flow is detected in an outfall, a series of parameters are taken, such as: pH, temperature and conductivity. Further investigation or source tracking is done if the parameters are outside of the norm. For conductivity, this would include flows with a conductivity level that exceeds 500 $\mu\text{S}/\text{cm}$. For pH, this would include flow with a pH outside of the range from 6.5 to 8.5. A sample would be collected and brought to a testing lab. Laboratory analysis may consist of bacteria, metals; nutrients, hydrocarbons or other analyses deemed appropriate based on the observation and suspected sources from field screening. Analytical results may either be used to support further identification of the source of flow, or to provide any back up documentation that may be necessary for enforcement activities. If an illicit discharge is indicated based on exceedances of the pollutant parameter action levels, then the source of discharge will be investigated following sample collection activities. This program is fully supported legally by Municipal Code # 4.063 which states that it is unlawful to discharge or cause to be discharged directly or indirectly into the City storm sewer system and or a surface water body.

8.3 Private Stormwater Facilities Inspection, Operation and Maintenance Program

This program was developed in 2013 and is run by the Environmental Services Division, (ESD) of Public Works. This is the 8th element of the City's 2012 SWMP as laid out by the NPDES permit. The City of West Linn is obligated to practice this program in order to verify that privately owned and or operated stormwater management facilities and controls are inspected, operated and maintained for effective pollutant removal, infiltration and flow control to the maximum extent possible. Annual maintenance reminders are sent out in June of each year to owners of private stormwater facilities. This program is legally supported by Municipal Code # 4.070 which states in part that storm drainage facilities are to be managed by the person responsible. Municipal Code # 5.425 lists nuisances affecting public health is also applicable to this program and helps to reduce bacteria from entering the Tualatin River.

8.4 Infiltration/Exfiltration and Cross Connection Program

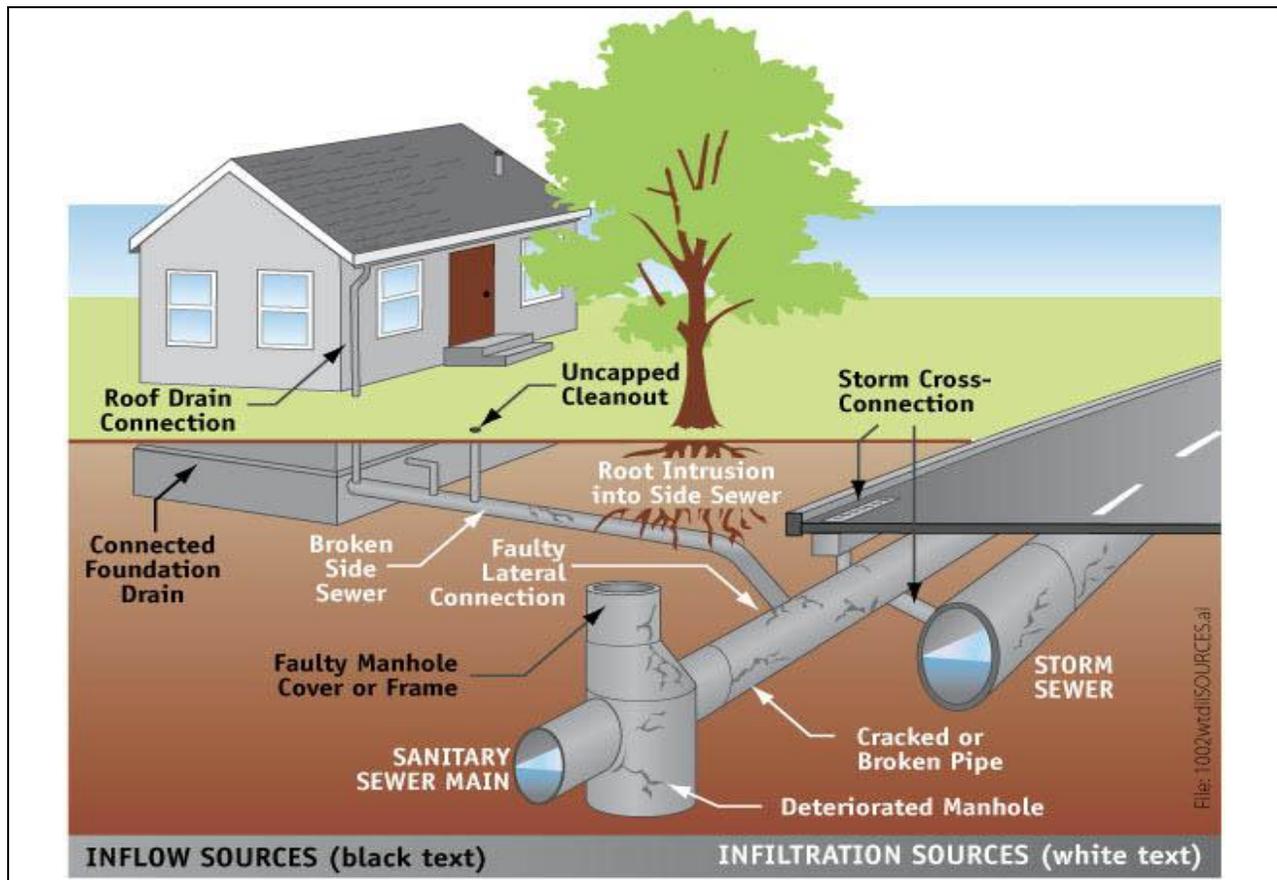
West Linn Public Works has a very extensive and proactive infiltration/exfiltration and cross connection, (CC) elimination program. In 2014, the City is in its 4th year of Cured-in-Place Piping (CIPP) program. After an exhaustive analysis of the conditions of the sewer mains, using smoke and dye testing and flow monitoring, the city has determined that CIPP was the best use of funds to eliminate infiltration/exfiltration and CC's of the sewer system. Table 2, on the next page, serves to illustrate the level of commitment ESD has to eliminating bacteria producing

CC's, leaks and exfiltration. The City is committed to installing CIPP on all concrete and terracotta sewer pipes throughout the entire city, starting with the worst neighborhoods first.

Table 3 –Sewer CIPP Program Progress

Year of Project	Fiscal Year projects were completed	Linear Feet CIPP Installed
1 st	2010-2011	10,200
2 nd	2011-2012	16,000
3 rd	2012-2013	11,500
4 th	2013-2014	18,000

Figure 5 – Bacteria Producing Cross Connection and Exfiltration

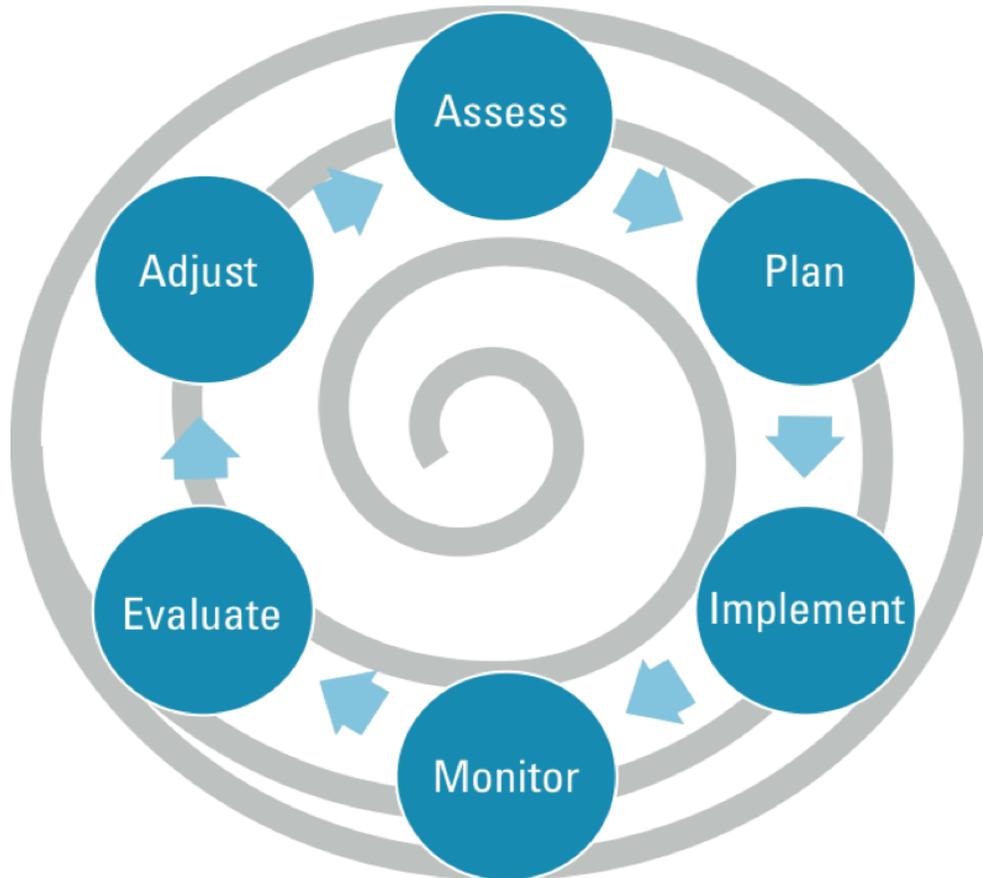


9.0 – Reasonable Assurance of Implementation

The proposed plan as a whole provides reasonable assurance that the TMDL's for temperature, Mercury, DO, E.coli and Total phosphorus will be addressed. The management measures will be evaluated in the 4th quarter of each year after completing the NPDES Annual Report, (due to DEQ in November, and while activities in the last year are fresh on our minds), for effectiveness and efforts will be adapted accordingly.

The following outlines the framework in which the City assures that the load allocations will be addressed through Adaptive Management. Here, Adaptive Management is defined as: *A structured, iterative process designed to refine and improve stormwater programs over time by evaluating results and adjusting actions on the basis of what has been learned.* This framework involves an iterative process that allows the City to (1) Assess the present non-point pollutant sources and condition of water bodies (2) Plan future actions based on past and present goals and objectives (3) Implement BMPs, Restoration & Monitoring (4) Monitor data of water quality and implementation effectiveness from tracking and assessment documentation (5) Evaluate: Compare Monitoring with Objectives (6) Adjust by capturing & sharing discoveries and revise Implementation Plan as needed.

Figure 6 – City of West Linn Adaptive Management



10.0 – Evidence of Compliance with Applicable Land Use Requirements

To implement statewide land use planning goals, Metro developed Title 3 and Title 13 of the Urban Growth Management Plan to address development in the riparian corridor. The purpose of Title 3 is to implement the Oregon Statewide Land Use Goals 6 and 7 that address protecting streams, rivers, wetlands, and floodplains. Title 3 provides this protection by avoiding, limiting, or mitigating the impact on these areas from development. This Title limits development in identified Water Quality Resource Areas (WQRAs) and Flood Management Areas (FMAs) and it limits development that would cause any extent of erosion within the Metro Boundary. Title 3 defines the WQRA as the protected water feature and associated vegetated corridor adjacent to the water feature and provides the method for determining the appropriate width of this vegetated corridor. Native vegetation within the WQRA should be maintained, enhanced or restored, if disturbed. Metro developed the Water Quality and Flood Management Areas map identifying these areas with input from the cities and counties within the Metro region. Table 3.07–3 in Metro’s Title 3 is shown below and summarizes the vegetated buffer widths for protected water features.

Table 3.07-3 - Protected Water Features
(Section 3.07.340(B)(2)(a))

Protected Water Feature Type (see definitions)	Slope Adjacent to Protected Water Feature	Starting Point for Measurements from Water Feature	Width of Vegetated Corridor
Primary Protected Water Features ¹	< 25%	<ul style="list-style-type: none"> Edge of bankfull flow or 2-year storm level; Delineated edge of Title 3 wetland 	50 feet
Primary Protected Water Features ¹	≥ 25% for 150 feet or more ⁵	<ul style="list-style-type: none"> Edge of bankfull flow or 2-year storm level; Delineated edge of Title 3 wetland 	200 feet
Primary Protected Water Features ¹	≥ 25% for less than 150 feet ⁵	<ul style="list-style-type: none"> Edge of bankfull flow or 2-year storm level; Delineated edge of Title 3 wetland 	Distance from starting point of measurement to top of ravine (break in ≥25% slope) ³ , plus 50 feet. ⁴
Secondary Protected Water Features ²	< 25%	<ul style="list-style-type: none"> Edge of bankfull flow or 2-year storm level; Delineated edge of Title 3 wetland 	15 feet
Secondary Protected Water Features ²	≥ 25% ⁵	<ul style="list-style-type: none"> Edge of bankfull flow or 2-year storm level; Delineated edge of Title 3 wetland 	50 feet

¹ Primary Protected Water Features include: all perennial streams and streams draining greater than 100 acres, Title 3 wetlands, natural lakes and springs

² Secondary Protected Water Features include intermittent streams draining 50-100 acres.

³ Where the Protected Water Feature is confined by a ravine or gully, the top of ravine is the break in the ≥ 25% slope (see slope measurement in Appendix).

⁴ A maximum reduction of 25 feet may be permitted in the width of vegetated corridor beyond the slope break if a geotechnical report demonstrates that slope is stable. To establish the width of the vegetated corridor, slope should be measured in 25-foot increments away from the water feature until slope is less than 25% (top of ravine).

⁵ Vegetated corridors in excess of 50-feet for primary protected features, or in excess of 15-feet for secondary protected features, apply on steep slopes only in the uphill direction from the protected water feature.

10.1 Title 13 – Nature in Neighborhoods

Title 13 model ordinance was created by Metro in 2006. It was created to provide clear objective standards and a discretionary review process for implementation of Oregon Statewide Land Use Goal 5. Goal 5 is focused on the protection of natural resources, open spaces, scenic and historic areas. The purpose of Title 13 is to provide guidelines in order for local jurisdictions to 1) conserve, protect, and restore a continuous ecologically viable streamside corridor that is integrated with upland wildlife habitat and 2) control and prevent water pollution in order to protect public health and improve the region’s water quality.

Title 13 focuses on regulating development that would affect riparian or upland wildlife habitat, as documented on the Habitat Conservation Area (HCA) map that Metro has produced. The HCA map was created by Metro and should be adopted by local jurisdictions in the same manner as the Water Quality and Flood Management Areas map developed for Title 3 compliance. HCA priority levels (high, medium, and low) were assigned to areas by cross-referencing habitat classifications (e.g. Class I and Class II Riparian and Class A and Class B Upland Wildlife) and urban development values.

New development restrictions differ depending on the HCA priority level as well as zoning type. The 495 page Wetland, Riparian and Wildlife Habitat Inventory Report was prepared by Winter Brook in January 2005 and can be found by following the link and choosing West Linn under View Local Wetland Inventory maps and reports:
http://www.oregon.gov/dsl/WETLAND/Pages/lwi_obtain.aspx.

10.2 Title 3 and Title 13 Comparison

Both Title 3 and Title 13 promote the protection of vegetative buffers around water bodies. In addition, both titles contain language that promotes the maintenance and restoration of native vegetation. The goal for Title 3 is to protect water quality and flood areas while Title 13 aims to protect and improve riparian and wildlife habitat. Because Title 3 and Title 13 have different goals, the methods for implementation and performance standards are not identical. Title 13 is more specific than Title 3 in that it has specific numerical targets. However, Title 13 also enables the cities to use their own discretion when defining the protective buffer areas by evaluating the economic effects (urban development values), which is not a component of Title 3 (Metro 1998 and Metro 2005).

10.3 West Linn Compliance with Title 3/13 Requirements

Chapter 32.000, Water Resource Area Protection, of West Linn’s development code implements the intent of Title 3 as developed by Metro. Substantial changes are planned for Chapter 32 and are expected to be approved in June 2014. The purpose of the revisions are to amend the WRA regulations to protect the functions of wetlands, streams and riparian areas at least to the degree provided by current regulations, while minimizing unnecessary

impediments for appropriate development. This chapter establishes objectives to protect water resource areas, which are defined by the chapter as water features and their associated vegetated corridors. This chapter establishes a vegetative corridor protected from development with goals of “maintaining or reducing stream temperatures; maintaining natural stream corridors; minimizing erosion, nutrient and pollutant loading into water.” This chapter of the City’s development code specifically defines the protection and improvement of microclimate and shade in streamside areas as well as mitigation requirements for replacement of water quality and ecological values as objectives.

Chapter 32.000 also includes an adopted version of Table 3.07–3 from Title 3. The chapter also prohibits non–native or invasive species to be planted in new lawn or garden areas; prohibits uncontained areas of hazardous materials; prohibits the planting of nuisance or prohibited plants; and prohibits trimming or removing existing native vegetation unless it is meant to reestablish native vegetation in place of non–native or invasive vegetation within the water resource area. Any construction, including fill, strip, or pipe installation, is prohibited in the delineated water resource area without a permit.

Permits submitted for construction within a water resource area must fulfill numerous provisions. Examples of such provisions are that water resource areas must be identified; natural drainage ways shall be maintained; and impacts on water resource areas must be minimized and alternatives avoiding negative impacts to water resource areas must be considered first. Roads, driveways, and utilities should only cross water resource areas when no practical alternatives exist. Consistent with the Title 3 model ordinance, Chapter 32.000 of West Linn’s development code also provides specific mitigation requirements when it has been demonstrated that no practicable alternatives to development in the water quality resource area exists.

West Linn is currently implementing Title 3 through Chapter 32.000 of its Community Development Code. Continued implementation of Title 3 represents one of West Linn’s implementation strategies for protecting existing shade along riparian corridors. Title 3 is generally enforced by the City through development review. If removal of vegetation occurs on private property, it is difficult for the City to identify the action, but the City does enforce on private property through the City’s code enforcement process, which is based on complaints received and city employee observations while on duty.

With regards to Title 13, the City has coordinated with Metro to amend their code language to also comply with Title 13 requirements, and Metro has approved of the City’s efforts. The City has adopted selective wording from the Title 13 Model Ordinance into Chapter 32.000 of its development code. Specifically, reference to the two methods to accomplish the purposes of the chapter is adopted from the Title 13 Model Ordinance. These methods are to “protect and improve functions and values that contribute to fish and wildlife habitat in urban streamside areas” and to “provide mitigation standards for the replacement of both water quality values

and ecological functions and values lost through development” adjacent to water resource areas. In addition, the City has conducted a separate inventory of riparian areas and amended the adopted Table 3.07–3 from Title 3 to require a 100 foot setback from areas defined as riparian corridors by the West Linn Riparian Corridor Inventory as defined in Ordinance 1545. This is more stringent than setback requirements for secondary protected water features, as required by Title 3.

The City has amended portions of its Comprehensive Plan, Goal 15: “Willamette River Greenway”, to address Title 13 in the summer of 2008.

10.4 Design Standards for New Development

The City of West Linn is currently undertaking measures in addition to the Water Resource Area Protection Chapter of the Community Development Code that have the potential for reducing stream temperatures. Although shade is the surrogate measure defined by DEQ to address the temperature TMDL, the City is pursuing other activities including the use of infiltration for stormwater runoff disposal activities to promote reduction in surface water temperatures.

As development occurs, increases in impervious areas can decrease the natural pre-development levels of groundwater recharge. Because less water infiltrates into the ground, less groundwater recharge occurs. This can result in a reduction of summer stream base flows which in turn results in higher temperatures due to unnaturally shallow base-flow conditions. By using best management practices and low impact development design techniques associated with development that promotes the infiltration of runoff, groundwater recharge is increased thus potentially augmenting stream flows during the warmer dry season, and reducing temperature impacts.

The City of West Linn recognizes the importance of infiltration and groundwater recharge in their Surface Water Management Plan (City of West Linn Surface Water Management Plan 2006). Chapter 5 – Water Quality, references a number of structural water quality improvement techniques that promote stream and associated riparian area improvement and overall water quality enhancement. The Surface Water Management Plan references the use of tree planting and vegetative buffers for natural resource enhancement and lists a number of structural BMPs for water quality enhancement. One type of structural BMP referenced is bio-swales, which can infiltrate and promote groundwater recharge. Also, the reduction of effective impervious surface is recommended as a BMP for the improvement of water quality through the use of porous pavers and other structural, low impact development techniques. The City recognizes the fact that the increase of impervious surface has significant detrimental effects to surface water quality.

Chapter 5 of the Surface Water Management Plan also recommends that the City review existing publications as a first step in revisiting City codes and regulations in order to promote Low Impact Development, (LID) in designs. The City has revised the West Linn Transportation

System Plan in 2008 to promote Low Impact Street Design and has already implemented projects with a green street design component. In addition, the City has recently adopted the Sustainable West Linn Strategic Plan, which provides recommendations and associated timeline for various City Departments and community sectors with respect to sustainable activities. Use of native vegetation and implementation of green building practices are two such recommendations referenced.

11.0 – Monitoring

Two types of monitoring are described in this section. Implementation monitoring relates to the tracking of BMP (management strategy) implementation and ensuring that BMP implementation goals are met. Environmental Effectiveness monitoring relates to the analysis and evaluation of stormwater and instream concentrations of pollutants with respect to meeting pollutant load reduction benchmarks.

11.1 Implementation Monitoring

West Linn is required to submit an annual compliance report in November that summarizes implementation activities for all BMPs in the NPDES Stormwater Management Plan and this TMDL plan.

11.2 Environmental Effectiveness Monitoring

The City of West Linn has been conducting effectiveness monitoring in the form of sample collection and analysis at 3 instream and 1 stormwater outfall sites throughout the City for many years. The City of West Linn is currently participating in a coordinated monitoring program with 8 other Clackamas County co-permittees. The Comprehensive Clackamas County NPDES MS4 Stormwater Monitoring Plan outlines which studies and activities the co-permittees must accomplish as well as what samples to take. The CCC Plan was first submitted to DEQ on September 1st, 2012 and updated June 30th, 2013. As of 2014, the Clackamas co-permittees have taken two rounds of mercury samples, received their Macro-Invertebrate Study from Cole Ecological, Inc. and had the US Geological Survey finish the Water Quality characterization of Pesticides in the co-permittees streams in Clackamas County.

12.0 – Identification of Responsible Participants

The City of West Linn’s Environmental services Division of the Public Works Department plays the lead role in implementing the components of this plan as set forth. The following outlines the specific department and which elements of the management measures they may be involved with:

Table 4 – Responsible Participants

Planning Department	Tualatin River Protection Ordinances
	Riparian Protection Ordinances
	Tree Protection Ordinances
	Land Use Requirements

Table 4 continued – Responsible Participants

Public Works Department	Erosion Control Program Implementation (Engineering) Riparian Restoration Projects Stream Channel Stabilization Street Sweeping Development Standards Public Awareness
Parks Department	Wet Waste Program Restoration Projects within Public Parks Channel Stabilization within Public Parks Tree Protection Ordinances

The Oregon State Department of Transportation plays a role to some degree as a 0.64 mile segment of I-205 is within the Tualatin River catchment area with the City of West Linn. The responsible parties are also included in the Matrix in Appendix C.

13.0 – Funding for Implementation Plan

Funding for the management measures is primarily handled within two separate funds: the Environmental Services Fund and the General Fund. The Environmental Services Fund is supported out of sanitary and storm sewer rates charged to the citizens of West Linn. Programs budgeted under this fund are directly related to those services. Environmental regulatory programs and Capital Improvement projects are budgeted under this fund. The General Fund is primarily supported by property taxes and state allocations, most City departments and divisions are funded under this fund.

14.0 – Citation to Legal Authorities

The City has legal authority to enforce Community Development Codes and Ordinances. The following is a list of all our Plans & Rules that protect both the Tualatin and Willamette Rivers.

Community Development Codes

1. Chapter 27.000 – Flood Management Areas
2. Chapter 28.000 – Willamette and Tualatin River Protection
3. Chapter 31.000 – Erosion Control
4. Chapter 32.000 – Water Resource Area Protection
5. Chapter 33.000 – Stormwater Management
6. Chapter 54.000 – Landscaping
7. Chapter 55.000 – Design Review

Penalties and enforcement procedures are defined in the Municipal Code in Chapter 4 - Surface Water Management; specifically # 4.062 ‘Private Responsibilities’ which covers Private Stormwater Facilities and # 5.477 which covers private property Erosion Control.

Appendix A

Erosion Control Policy

5.477 Erosion

(1) No owner or person in charge of any project, building, structure, or parcel of land may intentionally or inadvertently allow any visible or measurable erosion which has entered, or is likely to enter, a public storm drainage facility or any surface water body as determined by the following criteria:

(a) Deposition of soil, sand, dirt, dust, mud, rock, gravel, refuse, or any other organic or inorganic material exceeding one cubic foot in volume in a public right-of-way or public property, or into the City surface water drainage system either by direct deposit, dropping, discharge, or as a result of erosion; or

(b) Flow of water over bare soils, turbid, or sediment laden flows, or bare soil slopes, where the flow of water is not filtered or captured on the property owner's parcel of land; or

(c) Earth slides, mud flows, land slumping, slope failure, or other earth movement that leaves, or is likely to leave, the property of origin.

(2) Owners and persons in charge of any project, building, structure, or parcel of land shall be solely responsible for the cleanup of sidewalks, roadways, natural drainage ways, and adjacent properties of any debris, soil, dirt and foreign materials originating or derived from their building, structure or parcel of land.

Appendix B – Environmental Protection Guide

Protecting the Environment

The City of West Linn places a high value on the conservation of natural resources. Construction activities without proper erosion and sediment control protection can contribute large amounts of sediment and other pollutants to streams, rivers, wetland and ponds. Construction can also be harmful to trees, including the trunk, canopy and roots. This guide helps to explain the environmental requirements mandated by the City during the construction process.

Construction Sequence

Erosion Control and Tree Protection must be installed, inspected and approved prior to any site work. Upon approval, a notice (green tag for erosion and yellow for tree protection) will be posted by the site inspector(s). It must be visible at all times, until approval of the final inspection.

Fees

Fees will be according to the current City of West Linn fee schedule.

Following the Law

West Linn Code prohibits the discharge of sediment-laden water and other construction-related pollutants to storm sewer or waterways. Obtain all Federal and State permits if required for your site. The City of West Linn's Municipal Tree Ordinance and Tree Technical Manual are applicable to all building sites.

Enforcement

If the site falls into disrepair or otherwise fails to meet erosion control and or tree protection codes and standards, a notice of non-compliance, stop work order or fines may be issued with corrective action required. Violation of tree protection standards may also include fines and or mitigation. Upon receipt of an erosion control permit the developer enters into an agreement with the city stating that in the event an emergency occurs and is not repaired within 24 hours of the time that the city notifies the developer, the city may hire a contractor or employ city staff to repair the erosion problem and bill the developer 125% of the cost to the city.

Tree Protection Notes and Practices

- All trees 6" diameter breast height (DBH) or greater are subject to tree protection measures.
- Trees that are within the otherwise approved building footprint will not require a separate tree removal permit. The City may require shifting of building footprints to save significant trees.
- Tree Protection Zone (TPZ) will normally be measured at ½ foot radius per caliper inch for any given tree. The City may require a greater area as deemed necessary.
- All trees to be preserved shall be protected with six foot high chain link fences along the length of the TPZ. Fences are to be mounted on 2 " diameter galvanized iron posts, driven into the ground to a depth of at least 2 feet at no more than 10 foot spacing.
- Trees on neighboring properties may require protection fencing for roots.
- All specification, rules, regulation and penalties as defined in the City's Tree Ordinance and Tree Technical Manual shall apply.

Stormwater Treatment and Detention

- For Commercial and residential site development, all newly created impervious areas that are 500 SF or more, whether or not replacing existing impervious areas, are required to provide stormwater treatment to bring site discharge into compliance with current City water quality requirements.
- Development or redevelopment creating 5,000 SF of new impervious area now requiring treatment and detention.
- Developers may mitigate impervious areas by various means, as approved by the City Engineer to reduce the threshold listed above or to reduce facility size. Methods contained in the City of Portland Storm Water Manual, as modified by the City of West Linn may be used in mitigation as approved by the City Engineer.
- Stormwater facilities must be aesthetically blended into the surrounding landscaping to the greatest possible extent.

Preventing Erosion

Evaluate the Site

The diagram on the next sheet illustrates the key points to protecting individual building sites. Every building site is unique and should be evaluated for potential erosion and sediment loss. It is not difficult to predict where soil will erode. Rain falling and water flowing over bare ground will create erosion. Understanding the drainage on the site and where storm water runoff will flow is critical in planning for erosion control.

Revegetate the Site

Prevent erosion on individual lots with ground cover. The soils are not left bare during home construction. Sites are covered with straw mulch and/or vegetation to prevent erosion from occurring.

Effective Individual Lot Best Management Practices (BMP)

Temporary Mulching & Seeding

- Establish vegetation to protect soils from erosion and keep sites clean.
- Protect exposed soils from erosion until vegetation is established.
- Use straw or wood mulch, compost, hydro seeding, or Rolled Erosion Control Products (RECPs) when temporary seeding is not practical. Mulch can be utilized in any weather at any time.

Sediment Control Practices

- Install straw wattles (fiber rolls), sediment fences, compost socks, or other sediment controls on the contour to prevent concentrated flow and protect perimeters.

Construction Entrances & Tracking

- As vehicles leave construction sites, sediment may be tracked onto adjacent roads. Those pollutants can get washed into storm drains, are a nuisance to drivers and vehicles, and can cause accidents.
- Stabilize driveway with a rock base over geo-textile fabric to prevent tracking onto roadways.
- Immediately clean up tracking in streets with brooms, shovels, or a professional street sweeper. Do not use water to clean pavement.

Inlet Protection

- Protect drainage inlets from receiving polluted storm water through the use of inlet protection devices. Inlet protection should be maintained on a regular basis. If not maintained you may be responsible for cleaning the downstream catch-basin(s) prior to approval of the final inspection.
- Connect roof-drain downspouts, foundation drains, wall-drains, or other storm drains to an approved collection system immediately after installation.
- Do not pump sediment laden water off-site. I.E. Water that accumulates in foundations.

Concrete Washout

- Use a designated concrete washout area to avoid wash water from concrete tools or trucks from entering storm drains.
- Maintain washout area and dispose of concrete waste on a regular basis.

Waste Containment

- Keep your site clean. Pick up construction waste and litter each day. Potential pollutants should be stored so they do not become sources of storm water contamination.

Soil Stockpile Placement and Protection

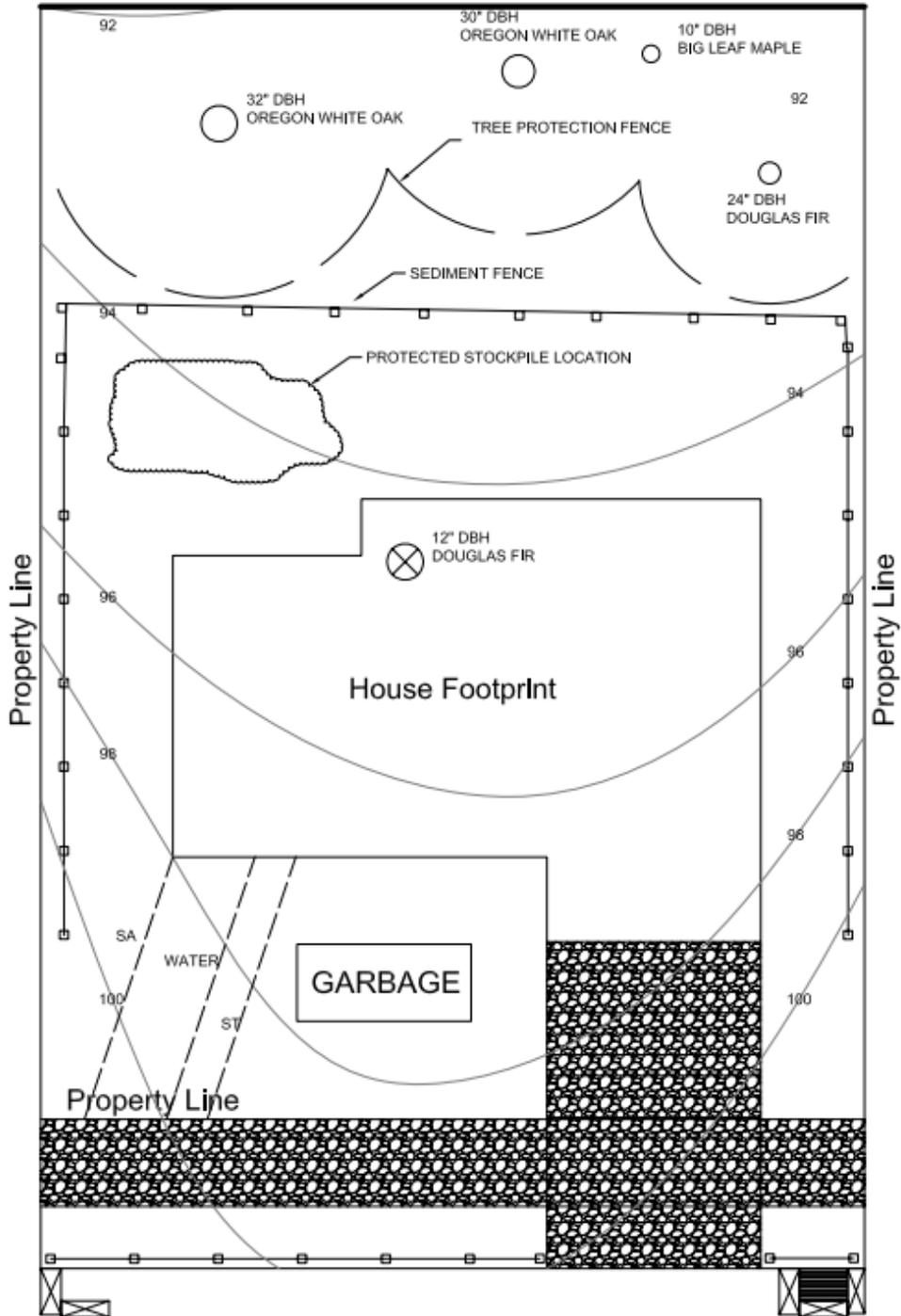
- Place stockpiled soil away from critical areas such as streams, drainage ways, and storm drain inlets. Temporarily seed and mulch, or cover stockpiles immediately to protect against erosion. Use sediment control around the base of stockpiled soil.

Training & Inspections

- At minimum the site steward must inspect a site weekly, and after each storm event greater than 1/2 inch. Document all inspections and keep this documentation on-site and updated. The permittee must be able to provide this information to the City upon request. Maintain BMPs on a regular basis and replace as necessary.
- Train and educate construction crews to better understand the effects of storm water pollution from construction projects and learn ways to prevent or minimize pollution on the job.

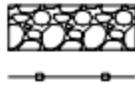
Please refer to the Clackamas County Erosion and Sediment Control Manual for more information. It is available at <http://www.co.clackamas.or.us/wes/documents/designmanual.htm>.

ENVIRONMENTAL PROTECTION SAMPLE SITE PLAN



Storage of construction materials is not allowed in the right of way
Sediment tracking onto the street is not allowed
Site Plan scale shall be not less than 1 inch = 10 ft,
unless other scale is approved by the City

SITE PLAN NOTES



Entrance should be 20 feet in length 2-3" clean crushed rock. After excavating soil from the area, apply 6-12" layer over entire entrance. Use geotextile under the stone if place on unfirm soil. Install gravel sidewalk subgrade. If sidewalks are not required install sediment fence at front.



Show and install sediment fence on downhill grade from exposed areas.



Show and install inlet protection on all catch basins and at downhill side of lot at curbline.



GARBAGE

Waste Containment shall be shown on plan to indicate where construction waste will be contained for both liquids and solids.



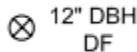
Show contours for entire site on 2' intervals, when slopes exceed 15% use 5' intervals, unless otherwise approved.



Show and label location of all utilities at the site.



Show all trees on site. Include: Location of trunk, species, diameter (DBH) for all trees over 6", and tree protection fence location. Tree protection fence will normally be installed at a 1/2 ft radius per caliper inch, for any given tree.



Trees to be removed shall be marked with an X. Trees within approved building footprint may be removed without a separate permit. All other trees shall require a tree removal permit.



Show location of stockpile areas. Identify erosion protection measures.

GENERAL NOTES

Site plan scale must be no less than 1 Inch = 10 FT, unless another scale is approved by the City.

Show location of utility easements and/or tree protection areas. Wetlands and waterways must also be located on plan.

Cover all exposed areas that have potential for erosion with seed and straw, mulch, or compost. Other alternatives include, barkdust or plastic. Steep slopes may require additional best management practices to prevent erosion. May 1 through September 30, the duration of soil exposure shall be kept to a maximum of 21 days. All disturbed soil that remains exposed 21 days or more during construction shall be treated with an erosion control cover, following grading or construction, until soils are revegetated or otherwise stabilized. October 1 through April 30, duration of soil exposure shall be kept to a maximum of 7 days.

The site must be stabilized in order to gain final inspection approval, which means 100% ground cover on all disturbed areas. Additional long-term erosion control measures may be required on steep slopes. All erosion BMP's must also be removed.



**EROSION AND SEDIMENT CONTROL
PERMIT APPLICATION FORM**
22500 Salamo Rd. Box 800; West Linn, OR 97068
Phone: (503)722-5500 Fax: (503)656-4106
Email: kle@westlinnoregon.gov



PROJECT NAME AND LOCATION		
Project Name:		
Address:		
City: West Linn	State: OR	Zip: 97068
Tax Lot:		
Map No.:		

APPLICANT INFORMATION (Owner, Developer, or General Contractor)		
Applicant Name:		
Address:		
City:	State:	Zip:
Phone:	Fax:	
Email:		

Architect/Engineering Firm		
Name:		
Project Manager:		
Phone:		
Fax:		
Email:		

OWNER INFORMATION		
<input type="checkbox"/> Same As Above		
Property Owner Name:		
Address:		
City:	State:	Zip:
Phone:	Fax:	
Email:		

General Contractor		
<input type="checkbox"/> Same As Above		
Name:		
Project Manager:		
CCB No:	City/Metro lic. no:	
Phone:	Fax:	
Email:		

Applicants Designated EC Inspector Information (24-Hour contact)		
Name:		
Address:		
City:	State:	Zip:
Phone:	Fax:	
Email:		

PROJECT INFORMATION	
Total Site Acreage (acres):	
Total Construction Area (acres):	
Total Disturbed Area (ft ²):	
Storm water runoff during construction will flow to:	
<input type="checkbox"/> Creek/Stream (provide name):	
<input type="checkbox"/> Infiltration Device	
<input type="checkbox"/> Municipal Storm Sewer or drainage system.	
<input type="checkbox"/> Ditch	
<input type="checkbox"/> Other:	

Nature of Activity	
<input type="checkbox"/> Single Family	
<input type="checkbox"/> Multi-Family Residential	
<input type="checkbox"/> Commercial	
<input type="checkbox"/> Industrial	
<input type="checkbox"/> Highway	
<input type="checkbox"/> Utilities	
<input type="checkbox"/> Other:	

PERMIT FEES	
Application Fee	\$
First year Annual Fee	\$
Total Fee	\$

This permit is issued for construction as described upon the attached plans. This permit is issued subject to the following conditions:

1. I understand that the City's sole function is to review the plans and inspect the work to assure compliance with City code and that the City assumes no responsibility of any kind for the accuracy or suitability of the work submitted. I accept full responsibility for compliance with all applicable city, state, regional, and federal laws, ordinances, franchise agreements, regulations, and codes which apply to the work for which this permit is issued.
2. I agree to inform all contractors, subcontractors, or any other persons performing work under this permit of the provisions of this permit and assure their compliance with those provisions. I agree to ensure that all construction will conform to the City's Public Works Construction Standards, the approved construction drawings, all specific conditions of approval, and any on-site revisions required by the City Engineer.
3. I agree to allow access by City employees or its representatives to the property where construction is being performed.
4. I agree to hold the City of West Linn and its employees harmless from any and all damages or expenses caused by work under this permit and hereby accept all liability for damage to persons and/or property caused in the process of completing this work.
5. I agree to restore the work area or any areas damaged in the course of work to original or better condition, current codes, and to City Engineer satisfaction and to pay all costs to repair or replace any property damaged while work is being performed under this permit and acknowledge that failure to pay these costs when due will constitute a violation of the terms of the permit and the City may avail itself to any and all legal remedies.
6. I agree to comply with the City of West Linn Erosion Control Rules and Regulations. I further agree that I am responsible for daily monitoring and, if necessary adjustment of the erosion control structures to comply with these rules. I acknowledge that failure to adhere to these requirements will result in enforcement action(s) to bring this site into compliance. In the event an erosion emergency occurs and is not repaired within 24 hours of the time the City notifies the permittee, the City may hire a contractor or employ City staff to repair the erosion problem and bill the permittee 125% of the cost to the City.
7. I understand that all sites with an area greater than 5 acres are required to have an approved Oregon DEQ 1200c permit in addition to this permit. For all sites over 5 acres DEQ approval is required prior to approval of this permit.

By my signature below I certify that I have read the foregoing conditions under which the permit is issued, am duly authorized to represent the contractor, company, and/or owner, and do hereby agree to comply with those conditions and any additional conditions of approval following processing of the permit. Work may not start until plans are reviewed and approved by City.

Applicant Signature: _____ Date: _____

PUBLIC WORKS – ENGINEERING DIVISION - STAFF ONLY		
Permit Issued By:	_____	Date: _____
Fee Received:	\$ _____	Receipt Number: _____
PROJECT NUMBER:	_____	

Erosion Control Program Manager _____ Date _____

Approval: _____ :

With this permit issued, applicant shall submit all necessary reports and one set of construction plans consisting of the following for review and approval. (Please see the example drawings)

CONSTRUCTION PLAN	
Cover page (See Example Drawing)	DEQ approval letter (For Sites over 5 acres)
Grading and Erosion Control Plan page(s) (See Example Drawing)	Army Corps of Engineers Permit (For Work in Drainage ways)
Standard Detail Page(s) (See Erosion Prevention and Sediment Control Planning and Design Manual)	Oregon Dept of State Lands Permit (For Work In Drainage ways)
Existing Conditions page(s)	Stream Bypass Plan (For Work in Drainage ways)
Demolition Plan page(s) (If Applicable)	

APPENDIX C

Summary of Strategies to Address Bacteria and Mercury TMDL West Linn SWMP Implementation Status

Key to Pollutant Symbols
 A full circle (●) indicates the BMP is expected to address the parameter.
 An empty circle (○) indicates the BMP may be expected to address the parameter.
 A blank cell indicates that the effect of the BMP is unknown at this time.

Best Management Practice or Activity	Addresses Bacteria?	Addresses Mercury and TVS?	Responsible Division/ Department	Measurable Goals (2012 SWMP)	Tracking Measures (2012)	Annual Report Information: Tracking Measure Status, Permit Year 2012-2013	Additional Detail Related to Activities Conducted
Element #1							
Illicit Discharge Detection and Elimination							
Implement the Illicit Discharge Elimination Program	●	●	City of West Linn Environmental Services Division	<ul style="list-style-type: none"> Document and implement the details of the City's IDDE program in a Standard Operating Procedures manual by November 1, 2012. For identified illicit discharges, conduct appropriate actions to remove the discharge in conjunction with time frames outlined in the City's MS4 NPDES Permit. Track and record all identified illicit discharges and how such discharges were removed. 	(1) Track the status of completing the IDDE SOP manual. (2) Track the number, location, resolution, and enforcement activities related to any illicit discharge investigation conducted.	(1) The City of West Linn developed an IDDE SOP (effective date: November 1, 2012). The SOP includes guidelines for identification and enforcement of illicit discharges. (2) There were no illicit discharges discovered during the dry weather field screening activities conducted.	
Conduct Annual Dry Weather Field Screening	○	○	City of West Linn Environmental Services Division	<ul style="list-style-type: none"> Conduct dry weather, illicit discharge inspections annually at all priority outfall locations. Develop pollutant parameter action levels to assist in the identification of non-permissible discharges by November 1, 2012. If necessary, update existing mapping related to outfalls and priority outfall locations in accordance with field observations. 	(1) Track the number and location of high priority outfalls inspected during dry weather illicit discharge inspection activities. (2) Summarize inspection results and indicate outfalls requiring sampling and/or investigations. (3) Indicate the outcome and resolution of any investigation activities conducted.	(1) 14 outfalls were inspected as part of the annual dry weather field screening activities on September 6, 2012. Please note that inspections occurred at the historic priority outfall locations as opposed to the high priority outfall locations identified in the IDDE SOP, due to the fact that inspections occurred prior to the IDDE SOP finalization. (2) Inspection results are provided in Section 6.0 of this report. Inspection results were overall good: no issues with clarity, color or odor. One outfall (Johnson Rd. and Ryan Ct) had some foam detected, but no samples were taken. Wood debris was detected at 13 of the 14 outfalls. No fish were spotted in any of the streams and garbage was found at one site (10th St. @ I-205). (3) Inspection results are provided in Section 6.0 of this report. None of the inspection results warranted follow-up investigations. In accordance with the IDDE SOP, priority inspection locations were updated to better reflect outfalls with solely storm water contribution to receiving waters.	
Implement the Spill Response Program	○	○	City of West Linn Operations Division and Tualatin Valley Fire and Rescue (TVFR) (via contract with the City)	<ul style="list-style-type: none"> Respond to minor spills. Call Tualatin Valley Fire and Rescue to respond to other spills. 	(1) Indicate the number of spills reported to the City of West Linn Environmental Services. (2) Track the number of spills responded to by the City of West Linn Environmental Services and Tualatin Valley Fire and Rescue. (3) Indicate sources, causes, and types of discharges resulting from identified spill activities.	(1) One spill was reported to the Environmental Services Division in the reporting year: The spill was located at the West Linn Paper Company which has its' own permit with DEQ (1200-Z). (2) No spills were responded to by West Linn Environmental Services' personnel during the reporting period. TVF&R responded to 3 spills. (3) See additional information in next column.	(3) Detail related to each spill responded to by TVFR is as follows: Spill 1: (11/5/12) Gasoline Spill at 5665 Hood St. due to a vehicle having mechanical issues. TVF&R put absorbent on the ground and determined the car only spilled gas while it was running. The car was towed away. Spill 2: (11/13/12) Oil spill at 2655 Dillow Dr. due to car mechanical issues. The owner of the car put bark chips on the oil, but cars had driven through it. TVF&R shut down the street and called Public Works. Public Works put down absorbent. Spill 3: (11/21/12) Oil or other combustible liquid spill at I-205 NB @ MP 6. TVF&R determined that the spill was water from the open cargo bed of an onion hauling pickup. No damage to people, property, or the environment was reported on any of the three spills.
Element #2							
Industrial and Commercial Facilities							
Screen Existing and New Industrial Facilities	○	○	City of West Linn Public Works Department	<ul style="list-style-type: none"> Notify DEQ of any existing or new industrial facilities within the City of West Linn jurisdiction that may potentially be subject to an industrial stormwater NPDES permit. 	(1) Track the number of existing or new facilities subject to a stormwater industrial NPDES permit during the permit term.	(1) The City of West Linn has one active 1200-Z permit holder - West Linn Paper Company. There were no new industrial facilities located in West Linn during the permit year.	Once during the permit term, the City of West Linn will review their existing business license inventory and new industrial development applications to determine whether any existing or new facilities would be subject to an industrial stormwater NPDES permit.
Conduct Priority Facility Inspections	○	○	City of West Linn Public Works Department	<ul style="list-style-type: none"> Inspect identified priority industrial or commercial facilities once during the permit term. 	(1) Track the number and outcome of priority facility inspections conducted over the permit term.	(1) No inspections were performed during the 2012 - 2013 reporting year.	Completion of the priority facility inspections is required once during the permit term.

Best Management Practice or Activity	Addresses Bacteria?	Addresses Mercury and TVS?	Responsible Division/ Department	Measurable Goals (2012 SWMP)	Tracking Measures (2012)	Annual Report Information: Tracking Measure Status, Permit Year 2012-2013	Additional Detail Related to Activities Conducted
Element #3 Construction Site Runoff Control							
Implement the Erosion Control Manual	●	○	City of West Linn Public Works and Planning Departments	<ul style="list-style-type: none"> Require submission of erosion control plans for development greater than 1000 ft². Require a copy of all 1200-C permit applications for development greater than five acres. Assess new and redevelopment applications for erosion control compliance during plan review. Require erosion and sediment control plans not in compliance to be amended prior to approval in conjunction with provisions outlined in the Clackamas County Erosion Prevention and Sediment Control Manual (2008). 	(1) Report any updates or modifications to the Clackamas County Erosion Prevention and Sediment Control Planning and Design Manual (2008). (2) Record the number of erosion control permit (City issued and DEQ issued) applications received. (3) Track the number of erosion and sediment control plan reviews completed.	(1) No updates or modifications to the 2008 Clackamas County Erosion Prevention and Sediment Control Planning and Design Manual have occurred. (2) West Linn issued a total of 75 erosion control permits (70 residential and 5 commercial). (3) A total of 75 erosion control plan reviews were conducted (70 residential and 5 commercial).	
Provide Educational Information to Construction Site Operators	○	○	City of West Linn Public Works and Planning Departments	Provide educational information to construction site operators and the general public via brochures, flyers, pamphlets, and attachments to building and grading permit applications.	(1) Verify that this BMP was conducted.	(1) The West Linn Building Department gives all builders and home owners who are applying for an erosion control permit a copy of the West Linn Environmental Protection Guide that is included in the "Guide to Permits and Inspections" booklet. The Environmental Protection Guide is also available at City Hall and on the City website.	
Conduct Erosion Control Inspections and Enforcement	●	●	City of West Linn Engineering Division	<ul style="list-style-type: none"> Conduct an initial and a final site inspection on all sites with an erosion control plan for appropriate erosion control. As necessary, enforce appropriate erosion and sediment control in conjunction with the three-step progression as outlined on the City's website. Require all disturbed areas to be permanently stabilized or vegetated prior to final engineering or building inspection. Ensure a minimum of one additional erosion control inspection is conducted during active construction on all sites with an erosion control plan. 	(1) Track the number of erosion control inspections conducted each year. (2) Report the number of notices of non-compliance and stop work orders issued, and describe the measures used to resolve the issue.	(1) The following number of erosion control inspections were conducted during the 2012-2013 reporting year: First Inspections: Approved: 60 Approved with conditions: 17 NOT Approved: 15 Final Inspections: Approved: 85 Approved with Conditions: 6 NOT Approved: 7 Total Erosion Control Inspections: 190 Violations this reporting period: 0 (2) No notices of non-compliance or stop work orders were issued during the 2012-2013 reporting year. Procedures are listed under additional activities in the column to the right.	Permit violations are issued in a three step enforcement progression as follows: 1st a written notice of the inspection findings and required corrections (Warning) 2nd Should corrections not be implemented, a notice of non-compliance will be issued with the required corrections. 3rd Should corrections remain unaddressed a stop work order will be issued. Additionally, a stop work order may be issued at any time a permit violation occurs.
Element #4 Education and Outreach							
Provide Public Education and Outreach Materials Regarding Stormwater Management	○	○	City of West Linn Public Works Department	<ul style="list-style-type: none"> Utilize newsletters, brochures, bill inserts, City web page, and radio advertisements to promote public awareness of stormwater quality issues and to provide information to encourage public reporting of illicit discharges. Continue to make annual monetary contributions to TB PAC. 	(1) Track the number, types, and topics of public educational materials dispersed to the public annually. (2) Indicate any large-scale public educational campaigns initiated during a given year. (3) Track coordinated public outreach activities with local co-permittees. (4) Record the number of catch basins stenciled in a given year. (5) Track amount donated to TB PAC each year.	(1) The City provides water quality brochures within the City Hall lobby, the City Library, and on the City's Environmental Services website. (2) The City continues to participate with TBPAC and the Regional Coalition for Clean Rivers and Streams. (3) Coordinated efforts included: - Continued to participate in the Regional Coalition of Clean Rivers and Streams; - Member of the Regional Coalition of Clean Rivers & Streams - Member of the Tualatin Basin Public Awareness Committee - Member of the Clackamas River Water Providers - A staff member served on the Clackamas Community College Water Environment School Committee. (4) No catch basins were stenciled during the 2012-2013 reporting year. (5) \$900.00 was donated to TB PAC.	The City provides the following educational material in the first floor lobby of City Hall: "It's so easy...Stream-Friendly Home and Yard Care" and "Construction Site Erosion Prevention: How contractors can save money...and help protect our water resources". According to the Regional Coalition for Clean Rivers and Streams' annual report, they made good strides in educating more people on how to reduce their part in the pollution of our rivers. Their campaign achieved 35% more impressions than the previous year and their performance was greater overall in terms of cost per impression. A 10% increase in web sessions shows that the Coalition's targeting of advertising continues to draw more visitors to the website.
Implement a Pet Waste Program	●		City of West Linn Parks and Recreation Department	<ul style="list-style-type: none"> If pet waste is observed as a problem upon routine maintenance activities at public property, install educational signs and distribute educational door hangers at homes in the immediate vicinity of the identified problem areas. Continue to provide pet waste baggies and disposal areas in City parks for disposal of domestic animal waste. 	(1) Report on activities conducted annually.	(1) The City of West Linn currently has 49 dog waste dispensers installed throughout the parks and open spaces. During the 2012-2013 reporting year, the City spent \$4,920 on bags. City staff monitors water quality facilities for pet waste issues. If a facility is observed to have issues, City staff distributes door hangers in the neighboring area to educate the public about pet waste. During the 2012-2013 reporting year, no facilities were found to be neglecting their responsibilities to pick up their dogs' waste. Also, the City participated in TBPAC's pet waste educational program.	
Participate in a Public Education Effectiveness Evaluation	○	○	City of West Linn Public Works Department	Coordinate with other local, Phase 1 jurisdictions in providing/ compiling information regarding a public education effectiveness evaluation over the permit term.	(1) Report on activities conducted annually.	1) The ACWA Stormwater Committee initiated a coordinated effort to compile existing educational survey information and develop conclusions to inform how public education efforts result in behavioral change. A proposal was received from DHM Consulting. ACWA coordinated with DEQ to ensure that the study would meet DEQ's intended requirements. ACWA developed a cost share breakdown among interested Phase I and Phase II communities, and West Linn has agreed to participate in the effort.	

Best Management Practice or Activity	Addresses Bacteria?	Addresses Mercury and TVS?	Responsible Division/ Department	Measurable Goals (2012 SWMP)	Tracking Measures (2012)	Annual Report Information: Tracking Measure Status, Permit Year 2012-2013	Additional Detail Related to Activities Conducted
Ensure Staff Training for Pest Management	○	○	City of West Linn Street Division and Parks and Recreation Department	Provide training to Public Works and Parks department crews once every two years on proper pesticide and fertilizer application rates and techniques in conjunction with guidelines outlined in the IPM Plan.	(1) Report on training conducted every two years.	(1) The Street Division received 34 hours of training in Pest Management. The Parks Department received a total of 25 hours of training.	
Ensure Staff Training in Spill Response	○	○	City of West Linn Operations Division through a contract with Tualatin Valley Fire and Rescue	Provide OSHA HAZWOPER training and refresher courses to staff initially responding to spills annually.	(1) Track the number of employees receiving OSHA HAZWOPER training annually.	(1) No employees received HAZWOPER training during the 2012-2013 reporting year.	Because of massive staff upheaval, no training was completed this reporting year. We are in the process of identifying new needs.
Promote Staff Education Related to Environmentally Friendly Solutions	○	○	City of West Linn Public Works Department	<ul style="list-style-type: none"> Conduct municipal training for employees associated with stormwater management in the City. Continue to participate in, and attend environmental and water quality related professional meetings and conferences. Continue to maintain a budget for employee attendance of conferences. Continue to coordinate with other local Phase 1 jurisdictions regarding regional water quality efforts. 	(1) Track the number of employees receiving training in stormwater management annually. (2) Track Operations and Engineering staff participation in professional organizations and attendance at relevant conferences.	(1) See Section 6.0 for a summary of NPDES Education Training 2012-2013. (2) Staff participates in the following organizations: - Member of Association of Clean Water Agencies (ACWA) and active participant in the ACWA Phase I Stormwater subcommittee. - Continued collaboration with other co-permittees on Comprehensive Clackamas Stormwater Monitoring Program - Member of the Clackamas Water Education Team. - Member of the Regional Coalition for Clean Rivers and Streams. - TBPAC	
Element #6							
Post-Construction Site Runoff							
Implement Community Development Code and Public Works Design Standards for Stormwater Treatment	●	●	City of West Linn Public Works and Planning Departments	Per City's Development Code, review all new development and applicable redevelopment for conformance with current City stormwater standards and ordinances.	(1) Track the number of development applications reviewed for compliance with the current stormwater requirements for treatment and detention. (2) Track any modifications to the list of currently approved structural stormwater treatment facilities. (3) Track private BMPs that are implemented and their associated drainage areas.	(1) A total of 14 development applications were reviewed for compliance with stormwater treatment and detention standards. (2) There were no modifications to the list of currently approved stormwater treatment and detention facilities. (3) A summary of private water quality facilities (in accordance with the development applications) is provided in Section 6.0.	
Review and Update the Applicable Code and Development Standards related to Stormwater Control	●	●	City of West Linn Public Works and Planning Departments	<ul style="list-style-type: none"> Review the City's current stormwater treatment standards for compliance with new MS4 NPDES permit language. Review the City's current public works development code provisions to ensure that applicable barriers related to the use of LID or GI techniques are minimized and eliminated where practicable. Update the City's existing post-construction stormwater design standards and code language by November 1, 2014. 	(1) Track progress related to the review of the City's code and development standards per provisions in the MS4 NPDES permit.	(1) The City's last update of Design Standards was approved by City Council in November 2009.	Massive amendments to The CDC - Chapter 32 – Water Resource Area Protection are expected to have a final approval in June 2014. These amendments to the regulations are to protect the functions of wetlands, streams and riparian areas at least to the degree provided by current regulations, while minimizing unnecessary impediments for appropriate development.
Element #7							
Pollution Prevention for Municipal Operations							
Conduct Street Area Repair	○	○	City of West Linn Public Works Department	Ensure all road maintenance and repair activities implement appropriate erosion and sediment control to address potential water quality impacts.	None	(1) N/A	Both City crews and contractors are required to implement erosion control measures at all times.
Maintain Public Streets	●	●	City of West Linn Operations Division	Sweep each street between 3 and 6 times per year.	(1) Track the number of sweeps conducted annually. (2) Track the volume of debris removed during sweeping activities. (3) Track the amount (volume) of deicing agent used annually.	(1) 4 City-wide sweeps were conducted during the 2012-2013 reporting year, covering 3278 miles of street. (2) Approximately 997 cubic yards of material was removed. (3) 1000 Gallons of deicing agent was used in the winter of 2012 – 2013.	West Linn purchased a sweeping vehicle and is able to sweep the city more often.
Implement an Integrated Pest Management Program	○	○	City of West Linn Operations Division and Parks and Recreation Department	<ul style="list-style-type: none"> Use the Portland Integrated Pest Management (IPM) Program as a guide for appropriate pesticide and fertilizer application procedures along roadways, within City Parks, and around water quality facilities. Conduct work within public right-of-way only with certified, licensed applicators. 	(1) Track any updates or modifications to the referenced IPM procedures and protocols. (2) Track the amount of money spent on pest management chemicals each year.	(1) Updates to the City's IPM were made in April 2012. The updated IPM has three new sections added. New sections include: A) "Venomous Insect Management" B) "Dog Off Leash Area Pest Management" C) "NPDES General Permit Compliance for Pesticide Use In Or Near Waterways" The City of West Linn uses the City of Portland IPM Program as an informal guide. (2) The City of West Linn estimates the amount spent on Pest Management Chemicals from 7/1/2012 to 6/30/2013 was \$ 7,109.	

Best Management Practice or Activity	Addresses Bacteria?	Addresses Mercury and TVS?	Responsible Division/ Department	Measurable Goals (2012 SWMP)	Tracking Measures (2012)	Annual Report Information: Tracking Measure Status, Permit Year 2012-2013	Additional Detail Related to Activities Conducted
Implement a Program to Reduce the Impact of Stormwater Runoff from Municipal Facilities	○	○	City of West Linn Environmental Services Division	<ul style="list-style-type: none"> Inventory municipal facilities subject to this permit requirement by July 1, 2013. By July 1, 2013, identify and implement strategies to reduce the impact of pollutant discharges from these facilities. 	(1) Track strategies used to minimize pollutant discharge.	(1) A complete inventory of the West Linn Public Works yard was completed June 30th, 2013. Several stormwater and pollution runoff solutions are in place including: oil/water separators, a filtered catch basin, a pollution control manhole, and trench drains to capture harmful contaminants and drain them to the sewer system.	The City developed a Stormwater Pollution Prevention Strategy document for municipal operations. The City has 1 municipal facility that was reviewed as part of this effort. Following review of the Public Works Yard, strategies identified and implemented include building a rain garden in the front of the office building, adjacent to Norfolk Street; installing another oil/water separator catch basin slightly downhill from the new gas and fuel tank; and installing an additional trench on the other side of the Auto Shop that will discharge to the sewer system.
Control Infiltration and Cross Connections to the Stormwater Conveyance System	●		City of West Linn Environmental Services Division	<ul style="list-style-type: none"> Annually investigate for cracking and breakage, and repair as necessary based on the results of the inspection, a minimum of 5,000 linear feet of sanitary lines. Review new and redevelopment plan submittals for possible cross-connections. Inspect for potential cross-connections during dry weather field screening activities. 	<p>(1) Indicate whether any sanitary sewer cross-connections were identified during sanitary line testing, during the plan review process, or during dry-weather field screening activities on an annual basis.</p> <p>(2) Describe any follow-up activities required for identified cross-connections.</p>	<p>(1) No cross connections were discovered during the reporting period</p> <p>(2) N/A</p>	West Linn is its 4 th year of conducting CIPP projects. The Cured In Place Pipe projects were started where the worst infiltration was occurring in the sewer mains in the North part of town that stormwater flows into the Willamette River.
Conduct Master Planning for Stormwater Quality Improvement	●	●	City of West Linn Public Works Department	Ensure water quality is considered during the development of flood control CIPs.	<p>(1) Track any updates or modifications to the current Stormwater Master Plan approved by the City.</p> <p>(2) Track the number of CIP projects implemented each year and discuss the added benefit (water quality, habitat restoration, etc.) of each.</p> <p>(3) Map the location and drainage area of water quality CIPs as they are constructed.</p>	<p>(1) No updates or modifications were made to the Master Plan.</p> <p>(2) The City constructed the following CIPs with a stormwater element: PW1217, 2013 Road Program and OPS Fuel Tank (see next column).</p> <p>(3) These locations are mapped in the City's GIS.</p>	(2) Public Improvement/ Stormwater-related CIPs constructed include: Barrington Storm Line (PW1217) Stopped algae from growing in the gutter in standing water and improved water quality by adding or renovating five catch basins. Fuel Tanks were built at the Operations Yard for all city vehicles to fuel their vehicles. This reduces employee time and vehicle gas costs to fuel at out of town pumps. Reduces carbon emissions and fossil fuel. 2013 Road Program included storm components to remedy street area drainage problems.
Element 8							
Stormwater Management Facilities Operation and Maintenance							
Conduct Stormwater Conveyance System Cleaning and Maintenance	●	●	City of West Linn Environmental Services Division	Perform cleaning and repair promptly based on inspection results.	<p>(1) Track the length of conveyance system inspected.</p> <p>(2) Track the volume of debris removed during cleaning activities.</p>	<p>(1) 456 linear feet of stormwater pipe was inspected and 1,000 feet of drainage ditches were inspected.</p> <p>(2) No reportable volume of debris was removed.</p>	
Conduct Catch Basin Cleaning and Maintenance	●	●	City of West Linn Environmental Services Division	<ul style="list-style-type: none"> Inspect all public catch basins once per year, and clean as needed based on inspection results. Repair or replace catch basins promptly based on inspection results. Update tracking database during each maintenance cycle. 	<p>(1) Track the number of catch basins inspected.</p> <p>(2) Track the volume of debris removed during cleaning activities.</p>	<p>(1) 2931 catch basins were inspected, and 670 catch basins were cleaned during the 2012-2013 reporting year.</p> <p>(2) 49 cubic yards of debris was removed.</p>	
Public Structural Control Facility Cleaning and Maintenance	●	●	City of West Linn Environmental Services Division	Inspect public structural water quality facilities annually and maintain based on inspection results.	<p>(1) Track the number and frequency of structural facilities inspected and maintained.</p> <p>(2) Track the volume of debris removed during cleaning activities.</p>	<p>(1) The following water quality facilities were inspected and maintained during the 2012-2013 reporting year: Pollution control manholes = 148 inspected and 148 maintained Detention tanks = 0 inspected and 0 maintained Bio-swales = 16 inspected and 16 maintained Water quality ponds = 45 inspected 4x/year and 45 maintained</p> <p>(2) Pollution Control manhole maintenance resulted in 24 cubic yards of debris removal.</p>	Environmental Services Storm Water crews routinely perform the following maintenance on all public storm water control facilities: remove, trim & inventory trees, lay mulch, spray for bees & mosquitoes, and remove unwanted and/or overgrown brush, blackberries, and weeds.
Private Water Quality Facility Maintenance Program	●	●	City of West Linn Environmental Services Division	<ul style="list-style-type: none"> Require new private water quality facilities to submit maintenance agreements to the City. Require submittal of annual reports related to inspection and maintenance activities for private water quality facilities with existing maintenance agreements. Continue to work to identify the responsible parties associated with private water quality facilities that do not have an existing maintenance agreement. Provide formalized structural stormwater facilities inspection and maintenance documentation to private facility owners by July 1, 2013. 	<p>(1) Track the number of new maintenance agreements submitted to the City each year.</p> <p>(2) Track number of new and existing annual maintenance reports received each year.</p>	<p>(1) 14 new maintenance agreements were submitted during the 2012-2013 reporting year.</p> <p>(2) A total of 48 maintenance reports were received during the 2012-2013 reporting year. Received maintenance reports reflect existing installed facilities.</p>	Personnel from the Environmental Services Division inspected 270 private water quality facilities in the Spring of 2013.

Appendix D. Summary of Strategies to Address Temperature TMDL TMDL Implementation Plan Progress Report 2012-2013

Best Management Practice or Activity	Commitment/Implementation Strategy	Measurable Goal	Implementation Tracking/Performance Measure	2012–2013 Activities	Responsible Division
Public Education	Include articles regarding temperature-related issues and shade planting projected in the City handouts and mailings.	Ensure a minimum of one temperature-related piece of educational material during the implementation period.	Record temperature-related educational materials.	An article in West Linn Tidings (March 28 th , 2013) describes planting of native trees at the Tualatin Bluff wetlands and removal of non-native vegetation by students at West Linn High School. This effort is part of the City activities during Arbor Week.	Public Works Department
Implement Stormwater Design Standards	Implement provisions of the City's Surface Water Management Plan and development code, which includes provisions for use of infiltration - based stormwater treatment systems and tree planting.	Implement design standards that include Low Impact Development (LID) and additional infiltration-based guidelines for stormwater treatment during the implementation period.	Track modifications to the City's development standards related to use of LID and BMPs for new and redevelopment.	The City of West Linn currently implements the most current City of Portland's Stormwater Management Manual for stormwater quality control for new and redevelopment activities.	Public Works and Planning Departments
Preservation of Existing Shade	Implement provisions of Chapter 32 and Ordinance 1542 of the City's development code, which defines protection and improvement of the City's waterways and encourages tree planting.	Continue to implement Chapter 32 of the City's development code to address Title 3 (Water Quality & Flood Management) of Metro's Urban Growth Management Functional Plan. Adopt language in Chapter 28 and Chapter 29 of the City's development code to further address Title 13 (Nature in Neighborhoods) of Metro's Urban Growth Management Functional Plan requirements.	<ul style="list-style-type: none"> • Track any enforcement actions taken to protect existing shade. • Track modifications to the City's development code to address Title 13. 	<p>Code enforcement action: Case #1: Required removal of a swimming pool and reestablishment of wetlands and tree plantings after the owner had built a swimming pool in the wetlands.</p> <p>Case #2 and #3: Involved the reestablishment of 200 feet of riparian vegetation including trees after the adjacent property owners installed lawn down to the Tualatin Rivers edge.</p> <p>Code Modifications: We are currently rewriting our Water Resource Area Chapter 32 and fully expect it to be approved in June 2014. These changes include most of Metro's Habitat Friendly Development Standards as well as requiring increased mitigation.</p>	Planning Department
Planting Activities for Identified Shade Opportunity Areas	Conduct planting, plant maintenance, and supplemental irrigation activities for the identified shade opportunity areas.	Utilize annual committed funds towards shading and planting activities for identified opportunity areas.	<ul style="list-style-type: none"> • Track ground truthing activities to refine priority opportunity areas. • Track planting activities for public, high priority areas. • Track planting activities for other identified shade opportunity areas. • Track any re-vegetation and maintenance activities required. 	Planting activities: The City of West Linn spent a total of \$9,800 during the reporting year 2012-2013 on the purchase and planting of 60 trees to protect stream corridors and promote shade.	Planning and Parks Department

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