

**SR 18: 180th Avenue SE to Maple Valley (MP 12.57 to MP
16.55) (Wetland KA) Mitigation Site
C7444, (C6832) (C6008)**

USACE NWP (23) 1999-4-00171

Northwest Region

2010 MONITORING REPORT

Wetland Assessment and Monitoring Program

Issued May 2010



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SR 18: 180th Avenue SE to Maple Valley (Wetland KA) Mitigation Site

USACE NWP Number 1999-4-00171



General Site Information	
USACE NWP Number	1999-4-00171
WSDOT Contract Number	C7444 (C6008) (C6832)
Mitigation Location	SE corner SR 18 at the Jenkins Creek Bridge, King County
Construction Date	2003
Monitoring Period	2004-2013
Year of Monitoring	7 of 10
Area of Project Impact	0.14 acre
Type of Mitigation	Wetland Restoration
Area of Mitigation	0.19 acre

Summary of Monitoring Results and Management Activities (2009)

Performance Standards	2009 Results ¹	Management Activities
At least 25% aerial cover of woody wetland species involving at least three species (Performance Standard 3) (Year –5)	70% (CI _{80%} = 56-84%) 8 species	
Control all King County-listed Class A, B-designate, and County-selected priority noxious weed species (Performance Standard 5a)	Noxious weeds not observed on site	Weed control
Less than 25% aerial cover of reed canarygrass (Performance Standard 5b)	Less than 5 percent	Weed control

Report Introduction

This report summarizes seventh-year (Year-7) monitoring activities at the State Route (SR) 18 180th Avenue to Maple Valley (Wetland KA) Mitigation Site. The performance standards for year-7 and year-10 are the same as those for year-5. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site development. Monitoring activities documented in this report include 2009 vegetation surveys, photo-documentation (September 15), and 2010 wetland hydrology observations (February 18, March 3, March 17).

¹ Estimated values are presented with their corresponding statistical confidence interval. For example, 70% (CI_{80%} = 56-84% cover) means we are 80% confident that the true aerial cover value is between 56% and 84%.

What is the SR 18 Wetland KA mitigation site?

The Wetland KA mitigation site is intended to provide 0.14 acre of wetland restoration. This site was replanted after a group of trees in Wetland KA was inadvertently cut during project construction. The removal of these trees was an unintentional deviation from the project permit. The replanting and restoration of this site provides partial compensation for the violation. Additional compensation is provided at the SR 18: 180th Avenue SE to Maple Valley (Kendal 2) mitigation site.

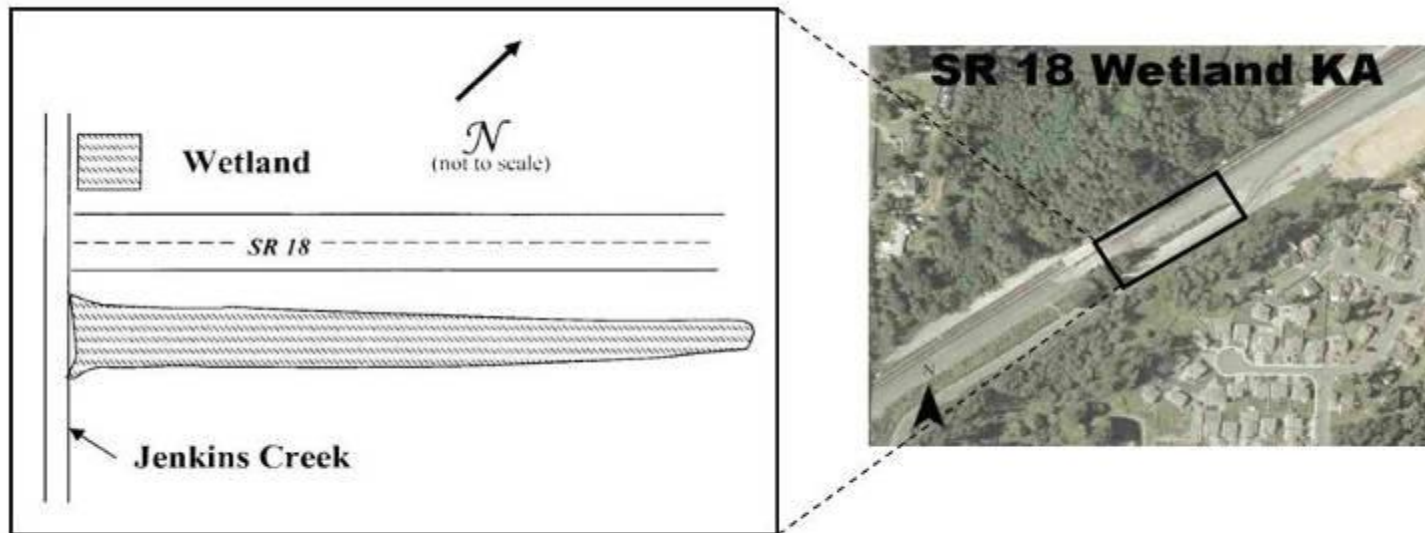


Figure 1 Site Sketch

The site is a replanted forested wetland adjacent to Jenkins Creek and SR 18 in King County. A planting plan is attached in Appendix 4 and permanent photo point images are included in Appendix 5.

What are the performance criteria for this site?

Permit Requirement 1

The monitoring reports you submit for this project must also describe the replanting success of the restoration of Wetland KA.

The following performance standards were excerpted from the *SR 18 180th Avenue to Maple Valley (Jenkins Creek) Mitigation Plan*.

Performance Standard 1 (Year-7)

Forested wetland mitigation areas will be comprised of a planted and native naturally colonizing plant community with 25 percent or more areal (*sic*) cover involving at least three species of woody plant species adapted for life in saturated soil conditions (facultative or wetter).

Performance Standard 2

All King County-listed Class A, B-designate, and County-selected priority noxious weed species will be controlled in the season they are first identified on the mitigation site.

Performance Standard 3

The enhancement and restoration areas shall contain no more than 25 percent areal (*sic*) cover by reed canarygrass at any point during the lifetime of the monitoring period.

Appendix 1 provides the complete text of the performance standards for this project, and Appendix 4 shows the planting plan (Cleveland 2003).

How were the performance standards evaluated?

To evaluate standards for vegetative cover, a baseline was established parallel to SR 18. Sampling transects were established perpendicular to the baseline using a systematic random sampling method.

The line intercept method was used to estimate woody cover (Performance Standard 1). Qualitative estimates were used to determine invasive species cover (Performance Standards 2 and 3).

For additional details on the methods, see Appendix 2 of this report or view the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2008).

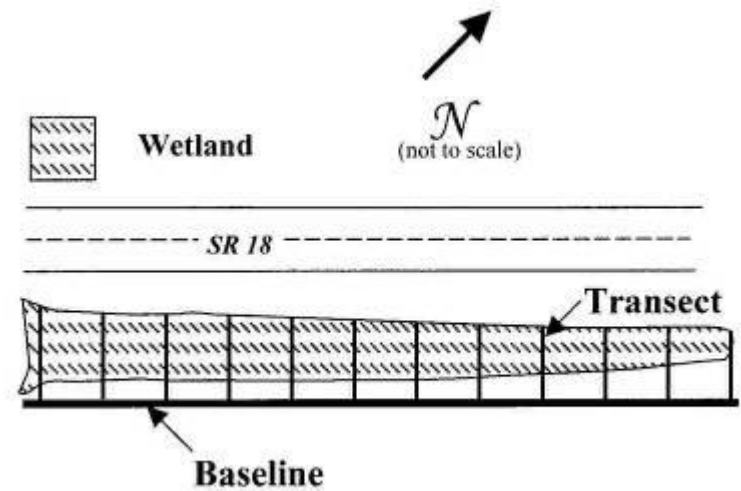


Figure 2 Site Sampling Design (2009)

How is the site developing?

The site continues to regenerate lost wetland functions through establishment of native vegetation. With multiple replanting efforts and natural colonization, aerial cover of the woody canopy continues to expand. Aggressive weed control has successfully lowered the aerial cover of *Phalaris arundinacea* (reed canarygrass) to a level that exceeds the threshold stated in the performance standard. With weed control, the forested wetland should continue to develop as intended. Wetland hydrology is present in all intended areas of the site. A mid-term delineation conducted in October 2009 determined 0.19 acre of wetland is present, achieving the intended 0.14 acre of restored wetland. A connection to the creek and cover by woody species provides flood flow attenuation and exports organic material. The cover of herbaceous plants provides nutrient, toxicant, and sediment retention.

Permit Requirement:

(Describe the replanting success of the restoration of Wetland KA)

Replanting of the site has been successful. Many of the plantings and volunteer species appear to be well established and have grown vigorously over the last several growing seasons. The wetland was replanted in 2005, providing an even distribution of native woody plants. Many of the original plants have reached heights ranging between three and four meters, while the newer plantings are approximately one meter tall.

Results for Performance Standard 3

(At least 25% aerial cover of woody wetland species, involving at least three species):

Aerial cover of native woody species is 70% ($CI_{80\%} = 56-84\%$). This estimate exceeds the threshold (Photo 1). Eight native woody species are present on site and all are designated facultative or wetter (Appendix 3). Therefore, the second part of the performance standard has been achieved. Many *Spiraea douglasii* (hardhack) plants have colonized areas vacant of other native woody species.



Photo 1 Woody Cover in Forested Wetland (September 2009)

Results for Performance Standard 5a

(Control all King County-listed Class A, B-designate, and County-selected priority noxious weed species):

King County-listed Class A, B-designate, and County-selected priority noxious weed species were not observed on site during 2009 monitoring activities.

Results for Performance Standard 5b

(Less than 25% aerial cover of reed canarygrass):

Aerial cover of *Phalaris arundinacea* (reed canarygrass) is qualitatively estimated at less than 5 percent. This cover values is below the performance measure threshold. Remaining areas of reed canarygrass scattered sparsely throughout the wetland, but native herbs have emerged in areas that were previously colonized by reed canarygrass.

What is planned for this site?

The region has plans to continue weed control on site. This site has achieved final year standards for two years in a row and is being proposed for early closeout.

Appendix 1 – Goals and Performance Standards

The performance standards used for this site are based on performance standards excerpted from the *SR 18: 180th Ave SE to Maple Valley, Washington (MP 12.57 to MP 16.55) Final Wetland Mitigation Plan* (Antieau and Krueger 2001), the *SR 18 180th Avenue to Maple Valley (Jenkins Creek) Mitigation Plan Addendum* (Brown 2002), and Permit Requirements from USACE Regulatory Branch Letter (2002, p.3) (Permit1999-4-00171). The criteria addressed this year are identified in **bold** font. Other tasks and standards will be addressed in the indicated monitoring year.

Mitigation Goals

The Jenkins Creek wetlands/floodplain complex provides important wetland and stream functions, and is a high quality system despite the surrounding levels of development. In the rapidly urbanizing Covington Sub-basin, the Jenkins Creek wetland system provides significant wildlife habitat, including habitat for migration/travel, escape, resting, forage, and reproduction. Jenkins Creek supports salmonid populations. Adjacent wetlands are integral to in-stream habitat, providing wintering habitat, water temperature moderation, inputs of detritus and woody debris, escape cover.

While the Jenkins Creek system currently provides significant wildlife and fish habitat, the overall quality and quantity of functioning could be improved using restoration and enhancement of degraded wetland and stream areas in that system. The proposed compensatory mitigation for this project is intended to replace wetland types and wetland functions that will be lost due to project construction. Proposed mitigation is anticipated to mitigate loss of the following functions:

- **Fish and Wildlife Habitat**: mitigation will increase available habitat for fish and wildlife, increase habitat and floodplain connectivity, and provide additional winter refugia for fish.
- **Food chain support**: mitigation will increase available wildlife forage material and detrital input to Jenkins Creek.
- **Stream temperature moderation**: mitigation will increase shade and canopy closure over the streams, while also enhancing potentials for recruiting large woody debris.
- **Floodwater attenuation**: mitigation will increase the floodplain area.
- **Nutrient/contaminant trapping**: mitigation will provide an increased area of vegetated floodplain having opportunity to intercept and transform road-runoff contaminants, fertilizers, herbicides, and other pollutants from residential and agricultural activities upstream.

Aside from wetland preservation, a combination of creation, restoration, and enhancement activities will be used to obtain these benefits. Overall, these activities will attempt to achieve 5.71 acres of palustrine forested wetland and 0.20 acre of emergent wetland as mitigation for the loss of 0.81 acre of palustrine forested and emergent wetland.

Objectives and Performance Standards

Objective 1: Wetland Areal Extent and Wetland Hydrology

The wetland mitigation actions involving creation and restoration must demonstrate a total of 1.48 acres or more that support wetland hydrology. Hydrology in zones of creation and restoration will be monitored in Monitoring Years One, Two, Three, Five, Seven, and Ten. Monitoring wells will be left in place to facilitate data analysis during plant establishment.

Performance Standards: Monitoring Years One through Five

PS1. Creation and restoration areas must demonstrate a total of 1.48 acres or more that support wetland hydrology (Table 3).

Monitoring/Delineation Schedule

A determination of areal extent will be during the hydrology monitoring period using standard wetland delineation methodology using these monitoring data. The boundary and areal extent of the area supporting wetlands hydrology will be determined using an instrument survey or other reliable methods of determining area.

Potential Contingency Actions

1. Regrade the site to achieve the required acreage supporting hydroperiods that meet the hydrology criterion for wetlands (Environmental Laboratory 1987). “Hydrology criterion” inundation or saturation within 12 inches of the surface for 12.5% of the growing season March 1 - October 31.

Objective 2: Vegetation

The mitigation program is intended to enhance 0.20 acre of emergent wetland (3 percent), enhance 4.23 acres of forested habitat (72 percent), and create and restore 1.48 acres of forested wetland (25 percent) (Table 3). Each of these habitats is expected to be dominated by native plant species. Wetland plant communities are expected to appear to be succeeding towards the intended forested and emergent communities.

Performance standards: Monitoring Year One (one year after planting)

PS2. At the end of the first growing season all planted material shall be alive and healthy (all dead material will be replaced). The enhancement and restoration areas shall contain no more than 25% areal cover by reed canarygrass at any point during the lifetime of the monitoring period.

Performance standards: Monitoring Year Two and Three

PS3. Three years after planting, emergent wetland mitigation areas will be comprised of a planted and native naturally colonizing plant community with 60% or more areal cover involving at least three non-invasive herbaceous plant species adapted for life in saturated soil conditions (facultative-wet or wetter). Forested wetland mitigation areas will be comprised of a plant and native naturally colonizing plant community with 15% or more areal cover involving at least three species of woody plant species adapted for life in saturated soil conditions (facultative or wetter).

PS4. Three years after planting, upland buffer zones will be comprised of a planted and native naturally colonizing plant community with 15% or more areal cover involving at least three woody plant species.

PS5. All King County-listed Class A, B-designate, and County-selected priority noxious weed species will be controlled in the season they are first identified in the season they are first identified on the mitigation site. Reed canarygrass (a King County Weed of Concern) is expected to be present during the life of this mitigation effort due to the abundant and adjacent source of propagules, as well as the presence of reed canarygrass on the mitigation site. The enhancement and restoration areas shall contain no more than 25% areal cover by reed canarygrass at any point during the lifetime of the monitoring period.

Performance Standards: Monitoring Year Five, Seven, and Ten

PS6. Five years after planting, emergent wetland mitigation areas will be comprised of a planted and native naturally colonizing plant community with 75% or more areal cover involving at least three non-invasive herbaceous plant species adapted for life in saturated soil conditions (facultative-wet or wetter). **Forested wetland mitigation areas will be comprised of a planted and native naturally colonizing plant community with 25% or more areal cover involving at least three species of woody plant species adapted for life in saturated soil conditions (facultative or wetter).**

PS7. Five years after planting, the buffer will be comprised of a planted and native naturally colonizing plant community with 25% or more areal cover involving at least three woody plant species.

Monitoring Schedule

Once during the middle part of the growing season in Monitoring Years One, Two, Three, Five, Seven, and Ten.

Potential Contingency Actions

1. Before the beginning of Monitoring Year One, all dead or unhealthy plants will be replaced. Thus, monitoring 100% survival in Monitoring Year One, (Performance Standard PS3) will be verifying this.
2. If the site does not meet performance standards PS4 and PS5 (Monitoring Year Three), additional planting will be conducted. Live, containerized plant material will be replanted and monitored to assure that coverage meets performance standards S6 and S7 (Monitoring Year Five).
3. If the site does not meet performance standards PS6 (vegetation not succeeding in directions that displace or weaken reed canarygrass), and PS7 and PS8 (Monitoring Year Five), resource agencies will be consulted for advice on further measures to remedy problems at the site. The monitoring schedule will be extended and such reasonable measures will be conducted as necessary to establish appropriate wetland vegetation. WSDOT will perform all reasonable measures considered necessary to establish and maintain a functioning wetlands/buffer system that meets the goals objectives of this monitoring plan.
4. The mitigation plan uses and promotes the growth of native vegetation. King County Class A, B-designate, and County-selected priority noxious weed species will be controlled in the season they are first identified on the site. -In the event that reed canarygrass in the enhancement and restoration areas exceeds 25% areal cover at any point during

the monitoring period, a range of techniques will be employed to bring the area into compliance. These techniques include hand pulling and off-site disposal, hand-spraying or wiping with Rodeo, flaming, trampling (crushing), and/or mowing.

Objective 3: Wildlife Habitat

Wildlife cover and forage availability for birds and small mammals should increase substantially. Addition of native plants, logs with rootwads, logs, log rolls, brush piles, and herpetofaunal hibernacula will increase habitat diversity and structure in newly revegetated areas. Generally, the creation, restoration, enhancement, and preservation of forested and emergent wetlands habitats are intended to provide feeding, breeding, and resting habitat for birds, small mammals, amphibians, and reptiles. Such activity will also benefit fish in Jenkins Creek and its tributary by reducing water temperatures and contributing detrital and woody debris.

Performance Standards: Monitoring Year One (one year after planting)

PS8. All habitat structures identified on the plans have been placed on the site.

Performance Standards: Monitoring Year Two and Three

PS9. Habitat structures identified in the plans are still in place and functional.

Performance Standards: Monitoring Year Five, Seven, and Ten

None.

Monitoring Schedule

Once during Monitoring Years One, Two, and Three.

Potential Contingency Actions

1. Install or replace habitat structures that are missing, damaged, lost, non-functional

MONITORING PLAN

WSDOT's Wetland Mitigation Monitoring Program (Monitoring Program) uses objective-based monitoring to document success and change in WSDOT's wetland mitigation sites. Monitoring protocols are based on specific objectives written in each project's wetland mitigation plan, combined with evaluation of current site conditions. A customized monitoring program is developed for each site. The monitoring Program uses a variety of ecological monitoring techniques and protocols, including those outlined in Horner and Raedeke (1989) and WSDOT (2000b). Many standard techniques such as permanent transect lines, plots, and photo points are still used however the number and placement of those depend on specific objectives. Locations of photo points and transects, if used, are not selected until the first year of monitoring. Statistical precision and accuracy are used to determine the number and configuration of transect and sample plots.

The Monitoring Program will begin monitoring hydroperiod in the wetland creation portion of the site immediately after completion of the grading plan, but prior to construction of the planting plan. During this period, hydrology will be monitored at least twice monthly using shallow groundwater wells or other means of observing soil saturation/inundation. After the planting plan has been constructed, Monitoring Year One will commence at the start of the subsequent year. Beginning with the first growing season after construction of the planting plan, the Monitoring Program will monitor the mitigation site for at least ten years. Parameters to be monitored during this ten-year period include hydroperiod and vegetation, as described above.

Reports for the ten-year monitoring period (including a report for each of Monitoring Years One, Two, Three, Five, Seven, and Ten) will be issued to the Corps of Engineers Seattle District Regulatory Branch, Washington State Department of Ecology, King County Department and Environmental Services, and other appropriate resource agencies for review and comment. Successful mitigation will be measured by attainment of the performance standards described in this mitigation effort meets the stated performance standards earlier than anticipated.

CONTINGENCY ACTIONS

WSDOT anticipates the mitigation goal will be achieved by accurately completing the grading and planting plans. However, contingency actions, as described above, may be needed to correct unforeseen problems. Such actions may consist of regarding the site in the case of insufficient hydroperiod, or replanting the site in the case of planting failure. However, natural recruitment of native wetland species and upland species (in the buffer) will be counted toward achieving performance standards for Vegetation. Should areal coverage of wetland or buffer plants consistently fall short of desired performance standards, WSDOT will consult with appropriate agencies in determining what additional measures could be implemented to ensure establishment of viable wetland and upland plant communities.

OPERATION AND MAINTENANCE

As described above, the goal of the proposed mitigation is to create a functional self-sustaining system that requires little or no maintenance. WSDOT will retain ownership of the site in perpetuity. Maintenance will be conducted on an as-needed basis by WSDOT personnel or designates and is anticipated to focus on maintaining access, repairing vandalism or fencing, correcting erosion or sedimentation problems, collecting trash, and managing King County Class A, B-designate, and County-selected priority noxious weed species.

Permit Requirements

From USACE Regulatory Branch Letter (2002, p.2) (Individual Permit 1999-4-00171)

Because this project involves a permit deviation, you must submit annual wetland mitigation monitoring reports for the original and addendum mitigation plan to our office in a separate report than all other Washington State Department of Transportation (WSDOT) wetland mitigation annual monitoring reports. **The monitoring reports you submit for this project must also describe the replanting success of the restoration of wetland KA.**

From Ecology Water Quality and Certification Permit 1999-4-00171

Each year's monitoring report shall include photographic documentation of the project taken from permanent reference points (Appendix 5).

Appendix 2 - Methods

To assess vegetation standards, a 130-meter baseline was established parallel to the sound wall. Thirteen temporary sampling transects were placed perpendicular to the baseline using a restricted random sampling method (Figure 2). The line intercept method was used to estimate aerial cover of woody species (Performance Standard 1). Thirteen 5-meter line-segment sample units were randomly positioned along the sampling transects.

Sample size analysis confirmed sufficient sampling had been completed based on site sampling objectives and the desired level of statistical confidence. The sample size equation shown here (right) was used to perform the analysis on data collected. In this equation, the precision level equals half the maximum acceptable confidence interval width multiplied by the sample mean.

Qualitative estimates were used to determine invasive species cover (Performance Standards 2 and 3).

For additional details on the methods view the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2008).

$$n = \frac{(z)^2 (s)^2}{(B)^2}$$

n = unadjusted sample size
 z = standard normal deviate
 s = sample standard deviation
 B = precision level

Appendix 3 - Data Tables

Table. Native Woody Species Wetland KA Site (2009)

Scientific Name	Common Name	Wetland Indicator Status
<i>Spiraea douglasii</i>	hardhack	FACW
<i>Salix lucida ssp. lasiandra</i>	Pacific willow	FACW
<i>Cornus sericea</i>	redosier dogwood	FACW
<i>Fraxinus latifolia</i>	Oregon ash	FACW
<i>Salix lucida</i>	Pacific willow	FACW
<i>Picea sitchensis</i>	Sitka spruce	FAC
<i>Thuja plicata</i>	western red cedar	FAC
<i>Populus balsamifera</i>	black cottonwood	FAC
<i>Alnus rubra</i>	red alder	FAC

Appendix 5 – Photo Points

The photographs below (obtained from permanent photo-points) were taken on September 15, 2009 and document current site development.



Photo Point 1



Photo Point 2

Literature Cited

1. Antieau, C. J. and Krueger, P. W. 2001. Final Wetland Mitigation Plan SR 18: Ave SE to Maple Valley, Washington (MP 12.57 to MP 16.55). Washington State Department of Transportation, Northwest Region, Seattle, WA.
2. Brown, B. 2002. SR 18: 180th Ave SE to Maple Valley, Washington, Updated Wetland Mitigation Plan Addendum. Washington State Department of Transportation, Northwest Region, Seattle, WA.
3. Cleveland, C. 2003. SR 18 – 180th to Maple Valley Wetland KA Background and Directions (including map). Letter to Jodie Beall dated 24 April 2003.
4. Ecology. See Washington State Department of Ecology
5. United States Army Corps of Engineers. September 6, 2002. Regulatory Branch Letter (Permit Number 1999-4-00171).
6. Washington State Department of Ecology (Ecology). 1997. Washington State Wetlands Identification and Delineation Manual. Publication No. 96-94, Olympia, WA.
7. Washington State Department of Transportation (WSDOT) WSDOT Wetland Mitigation Site Monitoring Methods (12 June 2008). <http://www.wsdot.wa.gov/NR/rdonlyres/C211AB59-D5A2-4AA2-8A76-3D9A77E01203/0/MethodsWhitePaper052004.pdf>