

SR 500 Thurston Way Interchange Wetland Mitigation Site

USACE (IP) 200001392

Southwest Region

2010 MONITORING REPORT

Wetland Assessment and Monitoring Program

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General Site Information			
USACE (IP) Number	200001392		
Mitigation Location	East of Devine Road and south of Burnt Bridge Creek, Clark County		
LLID Number	1226124456329		
Construction Date	2006-2007		
Monitoring Period	2008-2012		
Year of Monitoring	3 of 5		
Area of Project Wetland Impact	0.40 acre		
Type of Mitigation	Wetland Enhancement	Buffer Enhancement	Floodplain Establishment
Area of Mitigation	2.75 acres	0.75 acres	0.50 acres

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Summary of Monitoring Results and Management Activities (2010)

Performance Standards	2010 Results ¹	Management Activities
Minimum 80% cover of native species within the emergent zone	91% (CI _{95%} = 86-95%) cover	
Minimum 40% cover of native wetland shrub species within the scrub-shrub zone	87% (CI _{80%} = 78-97%) cover	
Minimum 80% survival of native wetland tree and shrub species within the forested wetland zone.	Greater than 80% survival	
Minimum 80% survival of planted tree and shrub species within the forested buffer	Greater than 80% survival	
Reed canarygrass will be controlled in all planting zones of the wetland mitigation site	6% cover qualitatively	Site was reviewed throughout the 2010 growing season; no major weed control needs identified.

Report Introduction

This report summarizes third-year (Year-3) monitoring activities at the State Route (SR) 500 Thurston Way Interchange Mitigation Site. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site development. **Year-5 (final year) standards are addressed and have been achieved.** Results for year-5 can be viewed in Appendix 3. Monitoring activities included vegetation surveys and photo-documentation. Vegetation monitoring occurred on August 2nd through the 4th 2010.

¹ Estimated values are presented with their corresponding statistical confidence interval. For example, 91% (CI_{95%} = 86-95%) cover means we are 95% confident that the true aerial cover value is between 86% and 95%.

What is the SR 500 Thurston Way Interchange Mitigation Site?

This 4.0-acre mitigation site (Figure 1) contains emergent, scrub-shrub, forested and open water/aquatic bed wetlands adjacent to Burnt Bridge Creek. This site was established to compensate for the loss of 0.4 acre of wetlands due to road improvements at the Thurston Way interchange. Included within the 4.0 acre wetland mitigation property, several hundred feet of realigned creek channel have been created (see excavation as-builts in Appendix 4). The realigned creek is currently functioning as a side channel with the intent of developing into a portion of the floodplain of Burnt Bridge Creek. The development of the 0.5 acre floodplain is to be accomplished when the City of Vancouver institutes its overall Greenway Plan. The mitigation site is designed to enhance fish and wildlife habitat functions (Leonard 2004).

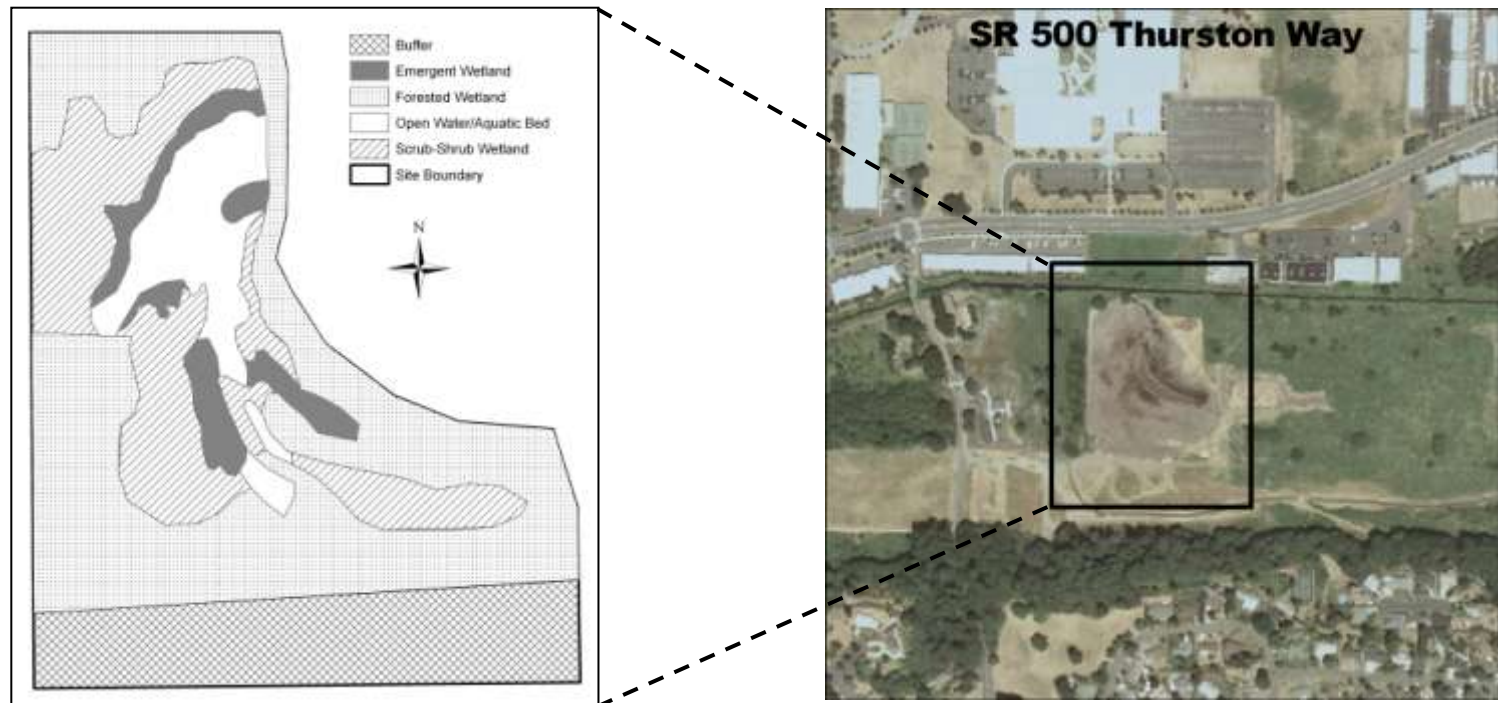


Figure 1 Site Sketch

The SR 500 Thurston Way Mitigation Site is comprised of an enhanced wetland and upland buffer adjacent to Burnt Bridge Creek.

What are the performance standards for this site? (Year-3)

Performance Standard 1

At year 3, there will be a minimum of 80% cover of native species within the emergent zone.

Performance Standard 2

At year 3, there will be a minimum of 40% cover of native wetland shrub species within the scrub-shrub zone.

Performance Standard 3

At year 3, there will be a minimum of 80% survival of native wetland tree and shrub species within the forested wetland zone.

Performance Standard 4

At years 1 and 3, there will be a minimum of 80% survival of planted tree and shrub species within the forested buffer

Performance Standard 5

At years 1 and 3 and 5, reed canarygrass will be controlled in all planting zones of the wetland mitigation site.

Appendix 1 provides the complete text of the performance standards for this project, and Appendix 4 shows the planting plan (Corlett 2008).

How were the performance standards evaluated?

To evaluate standards for vegetative cover, two baselines were established. A 152-meter baseline was oriented along the length of the upland buffer. Ten sampling transects were randomly placed perpendicular to the baseline (Figure 2). The line intercept method was used to estimate woody cover in the combined scrub/shrub forested zone (Performance Standard 2). To evaluate vegetative survival in the forested wetland zone and the buffer qualitative estimates were made (Performance Standards 3 and 4). The second 103-meter baseline was placed parallel to the southern border just north of the buffer. Twenty sampling transects were randomly placed perpendicular to the baseline. The point intercept method was used to estimate cover of native emergent species (Performance Standard 1).

Based on several summer 2010 field reviews, no chemical treatment of Reed Canarygrass or other species was deemed necessary.

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

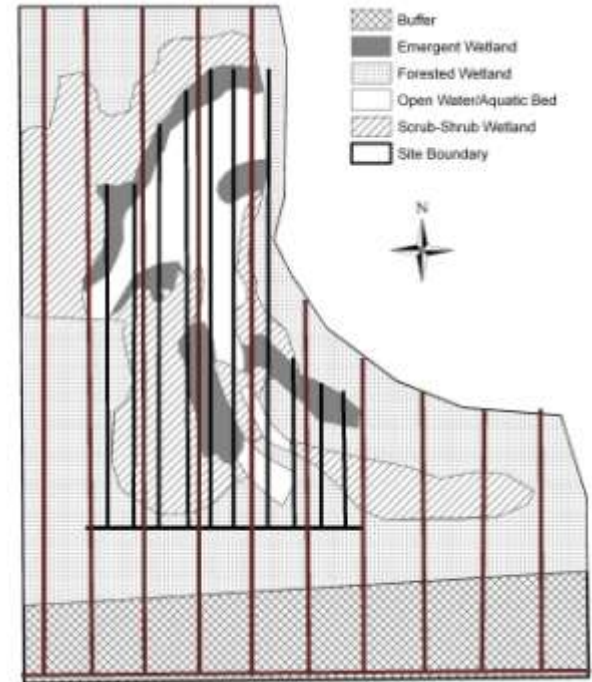


Figure 2 Site Sampling Design (2010)

How is the site developing?

This site is developing quite well and is currently achieving all Year-3 standards and final year (Year-5) performance standards (See Appendix 3). Cover of planted woody species has increased dramatically since construction (Photo 1) and cover of non-native invasive species is low. As the site has developed the scrub/shrub and forested wetlands zones are indistinguishable.

The intended function of wildlife habitat is being supported. Fifteen species of birds have been observed during the 3-year monitoring period, with several nests located on site. Deer and coyote scat have been observed on site, as well as recent beaver herbivory. Numerous garter snakes and Pacific chorus frogs have been observed, as well as larvae, in the permanently inundated areas of the site. In addition to the native wildlife observed, non-native bullfrogs have been seen in the areas of inundation in and around the site.

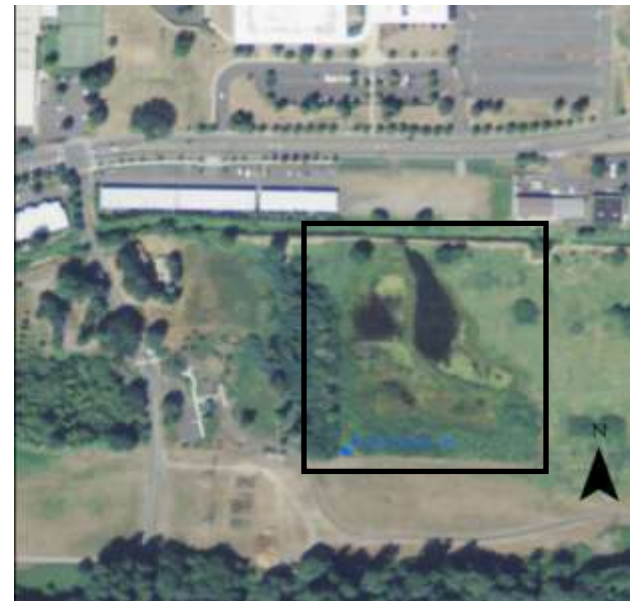


Photo 1.
The ortho-photo on the left (2002) illustrates site during construction and the ortho-photo on the right (2009) illustrates the increase in woody cover.

Results for Performance Standard 1

(At year 3, there will be a minimum of 80% cover of native species within the emergent zone):

Aerial cover of native facultative and wetter plants is 91 percent (CI_{95%} = 86-95) (Photo 2). This is in excess of the Year-3 standard. This cover value likely meets the Year-5 performance standard (90 percent); however the low end of the confidence interval does fall below the target value (See Appendix-3). The dominant herbaceous species observed include ovate spikerush (*Eleocharis ovata*), soft rush (*Juncus effusus*), hardstem bulrush (*Schoenoplectus acutus*) and broadleaf cattail (*Typha latifolia*).



Photo 2
Emergent cover in Wetland (August 2010)

Results for Performance Standard 2

(At year 3, there will be a minimum of 40% cover of native wetland shrub species within the scrub-shrub zone):

Aerial cover of woody species in the forested and scrub-shrub zones is estimated to be 87 percent (CI_{80%} = 78-97), greatly exceeding Year-3 performance standard. This cover value likely meets the Year-5 performance standard (80 percent); however the low end of the confidence interval does fall below the target value (See Appendix-3) (Photo 3 – next page).

Results for Performance Standard 3

(At year 3, there will be a minimum of 80% survival of native wetland tree and shrub species within the forested wetland zone):

Survival of native wetland tree and shrub species within the forested wetland zone is qualitatively estimated at greater than 80 percent. Dominant species include redosier dogwood (*Cornus sericea*), Pacific willow (*Salix lucida* ssp. *lasiandra*), and Pacific ninebark (*Physocarpus capitatus*). A qualitative estimate of high native woody cover prompted sampling for Year-5 woody cover standards (See Appendix 3).

Results for Performance Standard 4

(At years 1 and 3, there will be a minimum of 80% survival of planted tree and shrub species within the forested buffer):

Survival of planted tree and shrub species within the forested buffer is qualitatively estimated at greater than 80 percent (Photo 4). Dominant species observed include snowberry (*Symphoricarpos albus*), tall oregongrape (*Mahonia aquifolium*), roses (*Rosa* spp.), and Douglas-fir (*Pseudotsuga menziesii*). A qualitative estimate of high native woody cover prompted sampling for Year-5 woody cover standards (See Appendix 3).

Results for Performance Standard 5

(Control reed canarygrass in all planting zones of the wetland mitigation site):

Reed canary grass within the site has not hindered the achievement of the other vegetative standards and was qualitatively estimated at six percent cover. Based on several summer 2010 field reviews, no chemical treatment of Reed Canarygrass was deemed necessary.



Photo 3
Woody cover in Wetland (August 2010)



Photo 4
Woody cover in Buffer (August 2010)

What is planned for this site?

The site will be continued to be monitored for weed control needs including Reed Canarygrass and Purple Loostripe, species that have occurred on site in limited amounts in the past. Targeted weed control methods will be used as needed throughout the 2011 growing season.

WSDOT SW Region will evaluate the benefit of removing sapling cottonwood that has sprouted throughout the upland buffer zone for the long term survival of other upland woody species including Oregon White Oak.

WSDOT will analyze the site for potential early closeout with permitting agencies as final year performance standards are currently being met.

Appendix 1 – Performance Standards

The following excerpt is from the *Wetland Report and Mitigation Plan for the SR 500 Thurston Way Interchange* (Leonard 2004). The performance criteria addressed this year are identified in **bold** font.

Performance Objectives and Success Standards

Performance Objective 1: Create native emergent wetland areas in excavated areas of the wetland mitigation site.

Success Standard 1: At year 1, there will be a minimum of 60% cover of native species within the emergent zone.

***Success Standard 2:* At year 3, there will be a minimum of 80% cover of native species within the emergent zone.**

***Success Standard 3:* At year 5, there will be a minimum of 90% cover of native species within the emergent zone.**

Performance Objective 2: Native wetland shrubs will dominate the scrub-shrub zone of the wetland mitigation site.

Success Standard 1: At year 1, there will be a minimum of 80% survival of planted species within the scrub-shrub zone.

***Success Standard 2:* At year 3, there will be a minimum of 40% cover of native wetland shrub species within the scrub-shrub zone.**

***Success Standard 3:* At year 5, there will be a minimum of 80% cover of native wetland shrub species within the scrub-shrub zone.**

Performance Objective 3: Native wetland trees and understory shrubs will dominate the forested wetland zone of the wetland mitigation site.

Success Standard 1: At year 1, there will be a minimum of 80% survival of planted tree and shrub species within the forested wetland zone.

Success Standard 2: At year 3, there will be a minimum of 80% survival of native wetland tree and shrub species within the forested wetland zone.

Success Standard 3: At year 5, there will be a minimum of 40% cover of native wetland tree and shrub species within the forested wetland zone.

Performance Objective 4: Native conifer and deciduous tree species and associated understory shrubs will dominate the forested upland buffer zone of the wetland mitigation site.

Success Standard 1: At years 1 and 3, there will be a minimum of 80% survival of planted tree and shrub species within the forested buffer

Success Standard 2: At year 5, there will be a minimum of 40% areal cover of native wetland tree and shrub species within the forested buffer.

Performance Objective 5: Limit growth and spread of reed canarygrass throughout the wetland mitigation site to ensure the success of performance objectives 1 through 4.

Success Standard: At years 1 and 3 and 5, reed canarygrass will be controlled in all planting zones of the wetland mitigation site.

PERMIT REQUIREMENTS

The following excerpt is from the USACE Permit # 20000139. Requirements addressed this year are identified in **bold** font.

4. The Wetland Report and Mitigation Plan for the SR 500 Thurston Way Interchange dated May 7, 2001 must be implemented. Mitigation monitoring reports will be due annually after the mitigation work is completed. **All reports must be submitted to Corps, Seattle District, Regulatory Branch.**

Appendix 2 – Methods

To evaluate standards for vegetative cover, two baselines were established. A 152-meter baseline was oriented along the length of the upland buffer. Ten sampling transects were randomly placed perpendicular to the baseline (Figure 2). The line intercept method was used to estimate aerial cover of woody species in the buffer and the combined scrub/shrub forested zone (Performance Standard 2, 3, and 4 **Year-5**). Respectively, ten and fourteen randomly positioned 10-meter sample units, were placed along sampling transects in the combined buffer and scrub/shrub forested zones. To evaluate vegetative survival in the forested wetland zone and the buffer qualitative estimates were made (Performance Standards 3 and 4 **Year-3**). The second 103-meter baseline was placed parallel to the southern border just north of the buffer. Twenty sampling transects were randomly placed perpendicular to the baseline. The point intercept method was used to estimate aerial cover of native herbaceous species in the emergent zone (Performance Standard 1 **Years-3 and 5**). To estimate cover in the emergent wetland, 35 randomly positioned 10-meter point-line sample units (20 points each) were placed along sampling transects in this zone. Photographs were taken to evaluate tree and shrub growth.

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 (below) was used to perform the analysis on data collected (Performance Standards 1 and 2 in **Year-3** and 1, 2, 3, and 4 in **Year-5**). In this equation, the precision level (*B*) equals half the maximum acceptable confidence interval width multiplied by the sample mean.

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

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

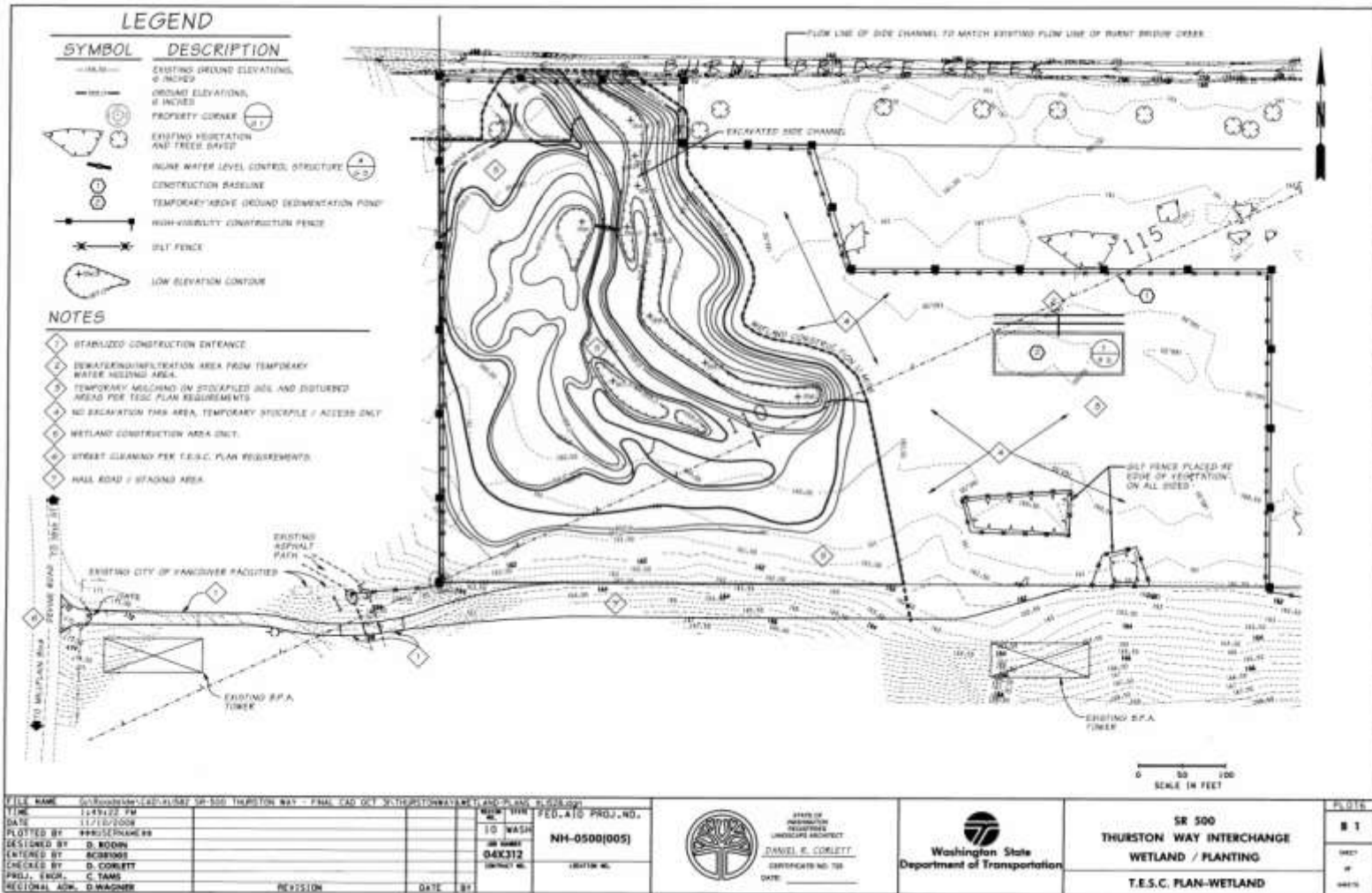
For additional details on the methods view the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2008).

Appendix 3 – Data Table

Table 1 – Final year (2012) Wetland Performance Standards and Monitoring Results

Performance Standards (Year-5)	2010 Results
At least 90% cover of native species within the emergent zone	91% (CI _{95%} = 86-95%) cover
At least 80% cover of native wetland shrub species within the scrub-shrub zone	87% (CI _{80%} = 78-97%) cover
At least 40% cover of native wetland tree and shrub species within the forested wetland zone	87% (CI _{80%} = 78-97%) cover
At least 40% areal cover of native wetland tree and shrub species within the forested buffer	87% (CI _{80%} = 77-97%) cover
Reed canarygrass will be controlled in all planting zones of the wetland mitigation site.	6% cover qualitaively

These performance standards were evaluated using the methods described in Appendix 2.



Appendix 5 – Photo Points

The photographs below were taken from permanent photo-points on August 4th, 2010 and document current site development.



Photo Point 1



Photo Point 2



Photo Point 3



Photo Point 4

Literature Cited

1. Corlett, D. 2008. SR 500/Thurston Way – Devine Road Planting Plan. Washington State Department of Transportation, Southwest Region, Vancouver, WA.
2. Leonard, Bill and Dan Corlett. 2004. Wetland Report and Mitigation Plan for the SR 500 Thurston Way Interchange. Washington State Department of Transportation, Southwest Region, Vancouver, WA.
3. United States Army Corps of Engineers. 1998. Department of the Army Permit Number 200001392.
4. 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>