

**I-5 SR 432 Talley Way Interchange  
(Sandy Bend) Mitigation Site**

**USACE NWP (23) NWS-2009-444**

**Southwest Region**

**2014 MONITORING REPORT**

**Wetlands Program**

*Issued March 2015*



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# I-5 SR 432 Talley Way Interchange (Sandy Bend) Mitigation Site

## USACE NWP (23) NWS-2009-444



General Site Information			
<b>USACE NWP 23 Number</b>	NWS-2009-444		
<b>Mitigation Location</b>	West of SR 411 and south of Sandy Bend Road, just north of the Kelso/Longview area in Cowlitz Co.		
<b>LLID Number</b>	1229119462282		
<b>Construction Date</b>	2010-2011		
<b>Monitoring Period</b>	2012-2022		
<b>Year of Monitoring</b>	3 of 10		
<b>Type of Project Impact</b>	Permanent Wetland	Permanent Buffer	
<b>Area of Project Impact</b>	3.38 acres <sup>1</sup>	5.87 acres <sup>2</sup>	
<b>Type of Mitigation</b>	Wetland Establishment	Wetland Enhancement	Buffer Enhancement
<b>Planned Area of Mitigation<sup>3</sup></b>	4.56 acres <sup>2</sup>	0.47 acres <sup>2</sup>	3.37 acres <sup>2</sup>

<sup>1</sup> (USACE 2009)

<sup>2</sup> (WSDOT 2009)

<sup>3</sup> The impacts for this project are being mitigated for at two mitigation sites, Sandy Bend and Carrolls Creek. Carrolls Creek includes an additional 13.6 acres of wetland enhancement and 11.68 of buffer enhancement.

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## Summary of Monitoring Results and Management Activities (2014)

Performance Standards	2014 Results <sup>4</sup>	Management Activities
Presence of wetland hydrology	Present in most of the intended wetland area	
<b>[Forested Wetland]</b> Minimum density of 400 living native trees per acre	2,758 trees/acre (CI <sub>80%</sub> = 2,166-3,350)	
<b>[Forested Wetland]</b> Minimum density of 4,000 living native shrubs per acre	2,260 shrubs/acre (CI <sub>80%</sub> = 1,978-2,542)	
<b>[Forested Wetland]</b> At least 2 species of native trees and 4 species of native shrubs; No single species over 60% cover	3 tree species and 6 shrub species; none > 60% cover	
<b>[Scrub-Shrub Wetland]</b> Minimum density of 4,000 living native shrubs per acre	4,231 shrubs/acre (CI <sub>80%</sub> = 3,697-4,764)	
<b>[Scrub-Shrub Wetland]</b> At least 4 species of native shrubs; No single species over 60% cover	7 shrub species; none > 60% cover	
<b>[Buffer]</b> Minimum density of 400 living native trees per acre	815 trees/acre (CI <sub>80%</sub> = 485-1,144)	
<b>[Buffer]</b> Minimum density of 4,000 living native shrubs per acre	4,910 shrubs/acre (CI <sub>80%</sub> = 4,561-5,260)	
<b>[Buffer]</b> At least 2 species of native trees and 4 species of native shrubs; No single species over 60% cover	4 tree species and 9 shrub species; none > 60% cover	
Minimum 50% cover of native FACW and wetter species in the emergent zone	49% cover (CI <sub>80%</sub> = 43-56%)	
At least 5 species of native herbaceous FACW and wetter species in the emergent area; No single species over 70% cover	13 species; none > 70% cover	
Blackberry ( <i>Rubus</i> species) and Class A noxious weeds will not exceed 15% cover	1% cover (CI <sub>80%</sub> = 0-1%)	Weed control conducted during three visits in 2013 and one visit in 2014
Reed canarygrass ( <i>Phalaris arundinacea</i> ) will be managed at a threshold 10% below the baseline conditions	1.8% cover (CI <sub>80%</sub> = 0.6-3.0%); Baseline = 2.6% cover	

<sup>4</sup> Estimated values are presented with their corresponding statistical confidence interval. For example, 2,758 trees/acre (CI<sub>80%</sub> = 2,166-3,350) means we are 80% confident that the true density value is between 2,166 and 3,350 plants per acre.

## **Report Introduction**

This report summarizes third-year (Year-3) monitoring activities at the Interstate (I) 5 Sandy Bend Mitigation Site. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site development. Monitoring activities in 2014 included vegetation surveys, photo-documentation, and assessments of wetland hydrology. Hydrology monitoring occurred on March 11, April 2, and April 15. Vegetation monitoring was conducted on July 14 to 16.

## What is the I-5 Sandy Bend Mitigation Site?

This 8.5-acre mitigation site (Figure 1) is located in Cowlitz County directly west of SR 411. This site was created to compensate in part for the loss of 3.38 acres of wetlands due to improvements at the I-5/SR 432 interchange. The newly established scrub-shrub floodplain and forested wetland complex are designed to create floodplain conditions and stream connectivity to Sandy Bend Creek, supporting seasonally and occasionally flooded hydrologic regimes. The mitigation site is intended to improve water quality, hydrologic, and habitat functions.



**Figure 1 Site Sketch**

The SR 432 Sandy Bend Mitigation Site connects to Sandy Bend Creek, a tributary to the Cowlitz River, on the west side of the site. Emergent, scrub-shrub, and forested wetland areas are interspersed and surrounded by an upland buffer. Appendix 2 includes site directions.

## What are the performance standards for this site?

### Performance Standard 1

The soils will be saturated to the surface, or standing water will be present 12 inches or less below the surface for at least 10 percent of the growing season (growing season as defined in the Soil Survey of Clark County, WA., USDA, 1972) in years when rainfall meets or exceeds the 30-year precipitation average.

### Performance Standard 2

**[Forested Wetland]** Minimum density of 400 living native trees per acre

### Performance Standard 3

**[Forested Wetland]** Minimum density of 4,000 living native shrubs per acre

### Performance Standard 4

**[Forested Wetland]** At least two species of native trees and four species of native shrubs will be present in the forested area. No single species will provide more 60 percent total aerial cover.

### Performance Standard 5

**[Scrub-Shrub Wetland]** Minimum density of 4,000 living native shrubs per acre

### Performance Standard 6

**[Scrub-Shrub Wetland]** At least four species of native shrubs will be present in the Scrub Shrub area. No single species will provide more 60 percent total aerial cover.

### Performance Standard 7

**[Buffer]** Minimum density of 400 living native trees per acre

### Performance Standard 8

**[Buffer]** Minimum density of 4,000 living native shrubs per acre

### Performance Standard 9

**[Buffer]** At least two species of native trees and four species of native shrubs will be present in the forested area. No single species will provide more 60 percent total aerial cover.

Performance Standard 10

Minimum of 50 percent aerial cover of native facultative wet and wetter species within the emergent zone.

Performance Standard 11

At least five species of native herbaceous facultative wet and wetter species will be present in the emergent area. No single species will provide more 70 percent total aerial cover.

Performance Standard 12

The aerial extent of blackberry species and Class A noxious weeds will not exceed 15 percent in the combined emergent, scrub shrub, forest, and buffer planting areas at either mitigation site.

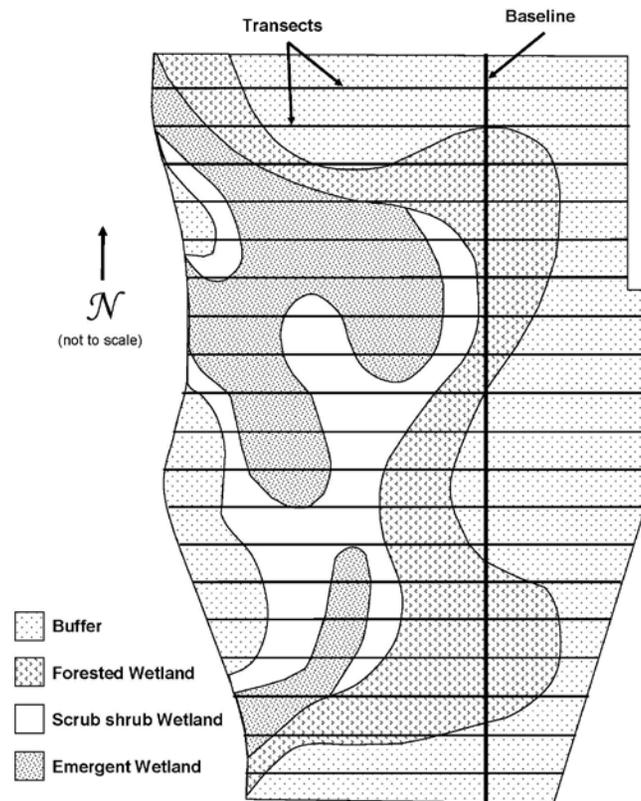
Performance Standard 13

The aerial extent of Reed Canarygrass in the Thompson mitigation site will be managed at a threshold 10 percent below the existing baseline conditions established in Performance Standard 6A.

Appendix 1 shows the as-built planting plan (WSDOT 2012).

## How were the performance standards evaluated?

To evaluate standards for vegetative density and cover, a 240-meter baseline was established north-south through the middle of the site (Figure 2). Twenty-four sampling transects were placed perpendicular to the baseline using a systematic random sampling method. The point-line method was used to determine the cover of noxious weeds across the site (Performance Standards 12 and 13) and the cover of herbaceous vegetation in the emergent area (Performance Standards 10 and 11). Twenty-three 50-meter-long point-line sample units (100 points each) were randomly positioned along the transects across the site to sample for noxious weeds. Twenty-five 10-meter-long point-line sample units (20 points each) were randomly positioned along the transects in the emergent area to sample for herbaceous vegetation. The unequal-area belt transect method was used to determine the density of native woody species in the forested wetland (Performance Standards 2, 3, and 4), scrub-shrub wetland (Performance Standards 5 and 6), and buffer (Performance Standards 7, 8, and 9). One-meter-wide belt transect sample units were positioned along the entire length of the transects in each of these zones.



**Figure 2 Site Sampling Design (2014)**

WSDOT staff collected hydrology data using methods described in the *Technical Standard for Water-Table Monitoring of Potential Wetland Sites* (USACE 2005) and *Water Table Monitoring Project Design* (USACE 2006) (Performance Standard 1).

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

## How is the site developing?

For the most part, this site is developing as expected and is currently meeting or nearly meeting all of its year-3 performance standards. The cover of noxious weeds is very low across the site and diverse native plant communities are developing at a reasonable pace in each zone. The only performance standard that is not, at least ostensibly, close to being met is for the density of native shrubs in the forested wetland (Performance Standard 3). The sampling results for this standard of 2,260 shrubs/acre ( $CI_{80\%} = 1,978-2,542$ ) are well below the performance standard target of 4,000 shrubs per acre. Considered on its own, however, this result is somewhat misleading. The overall native woody density (tree and shrub species together) in this zone is sufficient. The mix of tree and shrub species, however, is almost equal, rather than heavily skewed toward shrubs as the performance standards imply it should be. Another factor complicating this matter is the definition of a tree species. Pacific crabapple (*Malus fusca*) is generally considered a small tree species, but can also develop as a shrub. This species accounts for over half of the woody plants counted as trees in this zone, so if it were counted as a shrub it would alter the results significantly and Performance Standard 3 would either be met or nearly so. Regardless, the higher percentage of tree species does not appear to be functionally detrimental and it does not seem practical to replant this zone, at this stage in its development, in order to meet the specifics of this performance standard.

The emergent wetland has developed a diverse community of native herbaceous species. The cover of these species is, however, somewhat patchy, with near-total cover of native emergent vegetation in some areas and bare ground or dominance by spatulaleaf loosestrife (*Lythrum portula*), a low-growing non-native obligate wetland species, in other areas. WSDOT monitoring staff will keep a close eye on this zone to ensure that it continues its positive trajectory and non-native species do not hinder its development.

Results for Performance Standard 1  
(Presence of wetland hydrology):

Three hydrology monitoring visits were conducted in 2014 on March 11, April 2, and April 15. During each of these visits most of the emergent wetland and scrub-shrub wetland were inundated or saturated to the soil surface (Photo 1). During the first visit, four shallow groundwater monitoring wells were installed. The wells were placed in more questionable areas near the intended wetland boundary; one in the scrub-shrub wetland and three in the forested wetland (Appendix 1). During the first visit, only one well reading indicated water within 12 inches of the soil surface. These readings, however, were taken only about five to 10 minutes after well installation and are, therefore, likely not accurate due to inadequate time for equilibration of the water level within the well. During the second visit, three out of four wells registered water within 12 inches of the soil surface. During the third visit, all of the well readings were below 12 inches (Appendix 3, Table 1).



**Photo 1**  
**Inundation in the wetland (March 2014)**

The longer-range climate data for this period shed little light on these well readings. The three-month period before the last two visits (1/1/2014–3/31/2014) was wetter than normal (Appendix 3, Table 3), but the entire 2013-2014 water year (10/1/2013–9/30/2014) was drier than normal. The precipitation for the ten days prior to each visit, however, does correlate with the well readings (Appendix 3, Table 2), indicating that the hydrology on this site is flashy and highly dependent on precipitation. During the ten days prior to each of the first two visits precipitation equaled 3.49 and 2.67 inches, respectively. During the ten days prior to the last visit, precipitation equaled 0.06 inches.

Results for Performance Standard 2

**([Forested Wetland])** Minimum density of 400 living native trees per acre):

The density of native tree species in the forested wetland (Photo 2) is estimated at 2,758 trees/acre ( $CI_{80\%} = 2,166-3,350$ ). This includes Pacific crabapple (*Malus fusca*), which is generally considered a small tree species, but can also develop as a shrub. Without Pacific crabapple, the density is estimated at 1,297 trees/acre ( $CI_{80\%} = 1,000-1,594$ ) and Oregon ash (*Fraxinus latifolia*) is easily the dominant species, with some red alder (*Alnus rubra*) mixed in.



**Photo 2**  
**Woody density in the forested wetland (July 2014)**

Results for Performance Standard 3

**([Forested Wetland])** Minimum density of 4,000 living native shrubs per acre):

The density of native shrubs species in the forested wetland (Photo 2) is estimated at 2,260 shrubs/acre ( $CI_{80\%} = 1,978-2,542$ ). If Pacific crabapple were included as a shrub species, the estimate would be 3,720 shrubs/acre ( $CI_{80\%} = 3,108-4,333$ ). This performance standard is not being met without Pacific crabapple and is possibly being met with it. Either way, the overall native woody density in the forested wetland is 5,018 plants/acre ( $CI_{80\%} = 4,303-5,733$ ), which means the true value is likely equal to or above the total density target of Performance Standards 1 and 2 added together.

Results for Performance Standard 4

**([Forested Wetland])** At least 2 species of native trees and 4 species of native shrubs; No single species over 60% cover):

Three tree species are present in the forested wetland: Oregon ash (*Fraxinus latifolia*), Pacific crabapple (*Malus fusca*), and red alder (*Alnus rubra*). Six shrub species are present in the forested wetland: redosier dogwood (*Cornus alba*), Pacific ninebark (*Physocarpus capitatus*), salmonberry (*Rubus spectabilis*), Sitka willow (*Salix sitchensis*), Pacific willow (*Salix lasiandra*), and snowberry (*Symphoricarpos albus*). No single species in this zone accounts for more than 60 percent cover.

Results for Performance Standard 5

**[Scrub-Shrub Wetland]** Minimum density of 4,000 living native shrubs per acre):

The density of native shrub species in the scrub-shrub wetland (Photo 3) is estimated at 4,231 shrubs/acre ( $CI_{80\%} = 3,697-4,764$ ). This about equals the performance standard target. The total native woody density in this zone, including tree species, is estimated at 4,833 plants/acre ( $CI_{80\%} = 4,086-5,581$ ).

Results for Performance Standard 6

**[Scrub-Shrub Wetland]** At least 4 species of native shrubs; No single species over 60% cover):

Seven shrub species are present in the scrub-shrub wetland: redosier dogwood (*Cornus alba*), hardhack (*Spiraea douglasii*), snowberry (*Symphoricarpos albus*), Pacific ninebark (*Physocarpus capitatus*), Pacific willow (*Salix lasiandra*), salmonberry (*Rubus spectabilis*), and Sitka willow (*Salix sitchensis*). No single species in this zone accounts for more than 60 percent cover.

Results for Performance Standard 7

**[Buffer]** Minimum density of 400 living native trees per acre):

The density of native tree species in the buffer (Photo 4) is estimated at 815 trees/acre ( $CI_{80\%} = 485-1,144$ ). The dominant tree species in this zone is red alder (*Alnus rubra*).



**Photo 3**  
**Woody density in the scrub-shrub wetland (July 2014)**



**Photo 4**  
**Woody density in the buffer (July 2014)**

Results for Performance Standard 8

(**[Buffer]** Minimum density of 4,000 living native shrubs per acre):

The density of native shrub species in the buffer (Photo 4) is estimated at 4,910 shrubs/acre ( $CI_{80\%} = 4,561-5,260$ ). The dominant shrub species in this zone are tall oregongrape (*Mahonia aquifolium*) and snowberry (*Symphoricarpos albus*).

Results for Performance Standard 9

(**[Buffer]** At least 2 species of native trees and 4 species of native shrubs; No single species over 60% cover):

Four tree species are present in the forested wetland: red alder (*Alnus rubra*), black cottonwood (*Populus balsamifera*), bigleaf maple (*Acer macrophyllum*), and western red cedar (*Thuja plicata*). Eight shrub species are present in the forested wetland: tall oregongrape (*Mahonia aquifolium*), snowberry (*Symphoricarpos albus*), western serviceberry (*Amelanchier alnifolia*), redosier dogwood (*Cornus alba*), Pacific ninebark (*Physocarpus capitatus*), Indian plum (*Oemleria cerasiformis*), Sitka willow (*Salix sitchensis*), and salmonberry (*Rubus spectabilis*). No single species in this zone accounts for more than 60 percent cover.

Results for Performance Standard 10

(Minimum 50% cover of native FACW and wetter species in the emergent zone):

The cover of native herbaceous facultative wet or wetter species in the emergent wetland (Photo 5) is estimated at 49% ( $CI_{80\%} = 43-56\%$ ), about equal to the performance standard target.



**Photo 5**  
**Herbaceous cover in the emergent wetland (July 2014)**

### Results for Performance Standard 11

(At least 5 species of native herbaceous FACW and wetter species in the emergent area; No single species over 70% cover):

Thirteen species of native herbaceous facultative wet or wetter species are present in the emergent wetland: slough sedge (*Carex obnupta*), common spikerush (*Eleocharis palustris*), pointed rush (*Juncus oxymeris*), davy mannagrass (*Glyceria leptostachya*), small-fruited bulrush (*Scirpus microcarpus*), soft rush (*Juncus effusus*), blunt spikerush (*Eleocharis obtusa*), tufted hairgrass (*Deschampsia caespitosa*), marsh seedbox (*Ludwigia palustris*), tapertip rush (*Juncus acuminatus*), curvepod yellowcress (*Rorippa curvisiliqua*), soft-stem bulrush (*Schoenoplectus tabernaemontani*), and broom sedge (*Carex scoparia*). No single species in this zone accounts for more than 70 percent cover.

### Results for Performance Standard 12

(Blackberry Species and Class A noxious weeds will not exceed 15% cover):

No Class A noxious weeds were observed on-site. The cover of blackberry species across the site is estimated at 1% ( $CI_{80\%} = 0-1\%$ ), well below the performance standard threshold. The cover was primarily of Himalayan blackberry (*Rubus armeniacus*), with some cutleaf blackberry (*Rubus laciniatus*) present as well.

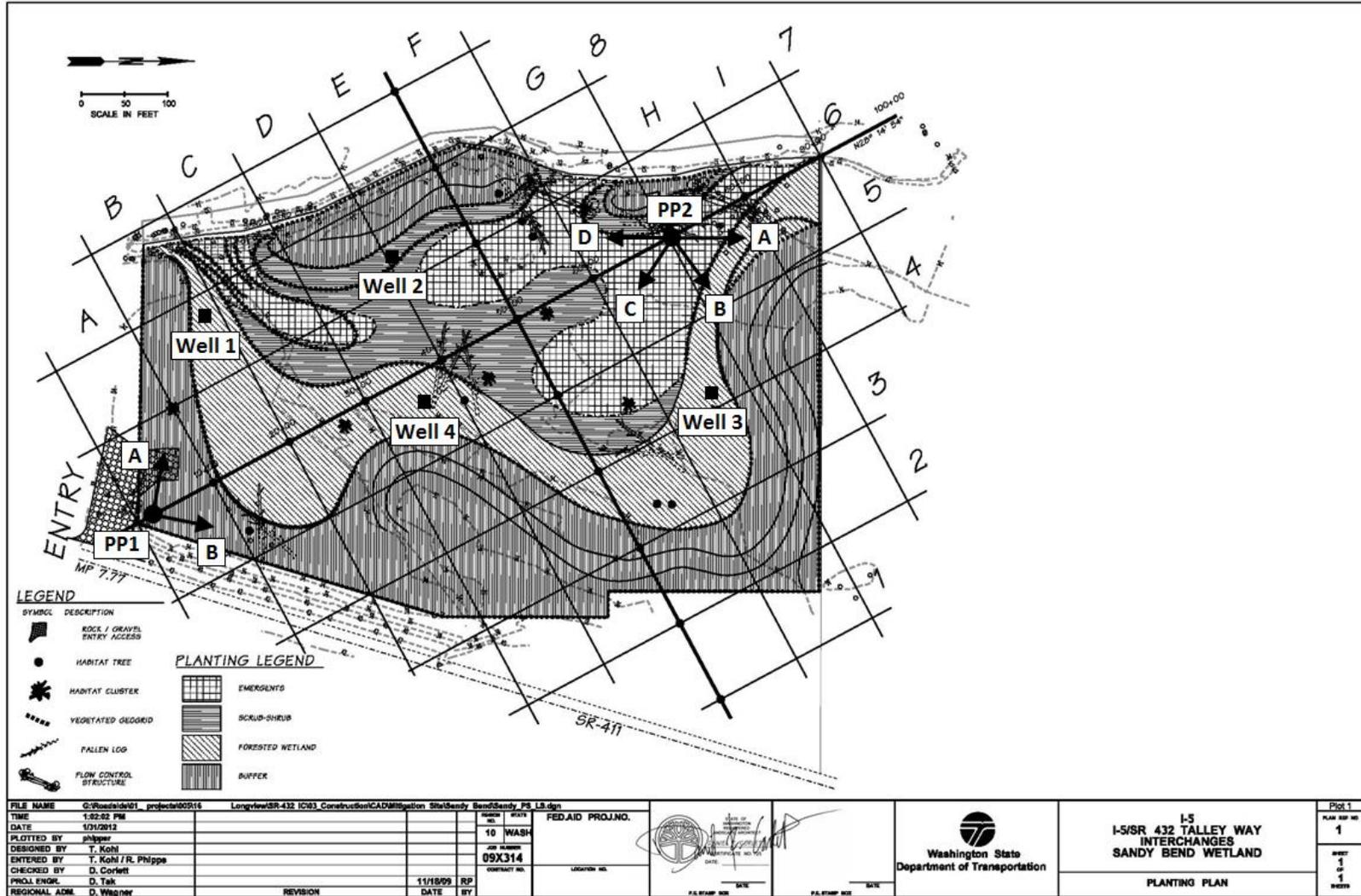
### Results for Performance Standard 13

(Reed Canarygrass will be managed at a threshold 10% below the baseline conditions):

A map, provided by WSDOT southwest region, of the baseline conditions for reed canarygrass on-site (Appendix 4) shows an area for the limits of preconstruction reed canarygrass that equals 0.22 acre. Since the entire site is 8.5 acres, this equates to 2.6 percent cover of reed canarygrass across the site. The current cover of reed canarygrass (*Phalaris arundinacea*) across the site is estimated at 1.8% ( $CI_{80\%} = 0.6-3.0\%$ ). Given the confidence interval, this does not definitively show that the current cover of reed canarygrass is at least 10 percent below the baseline conditions. It does, however, show that cover of reed canarygrass on-site is still quite low, and reed canarygrass does not currently seem to pose any significant threat to the successful development of desirable vegetation on-site.

# Appendix 1 – As-built Planting Plan with Photo Point and Hydrology Well Locations

(from WSDOT 2012)



## Appendix 2 – Photo Points

The photographs below were taken from permanent photo-points on July 16, 2014 and document current site development.



**Photo Point 1a**



**Photo Point 1b**



**Photo Point 2a**



**Photo Point 2b**



**Photo Point 2c**



**Photo Point 2d**

**Driving Directions:**

From I-5 south, take Exit 49 toward Castle Rock/Toutle. Turn right onto Huntington Ave North. Continue until you reach North A Street/SR 411 and take a right. Continue until you reach SR 411/Westside Highway and take a left. Drive south on SR 411 for approximately 4 miles. The site is on the left (west) side of the road. Park on the gravel parking pad. A key should be obtained from region personnel.

# Appendix 3 – Hydrology Data

**Table 1. Hydrology Observations.**

Date	Surface Observations	Well ID #	Water Level (inches below soil surface unless otherwise noted)
March 11, 2014 <sup>5</sup>	The emergent and PSS areas all saturated to the surface or inundated to 16 inches. Some of the PFO not wet. Some of the buffer was inundated to 2 inches.	1	Dry to bottom of well (18'') <sup>5</sup>
		2	Dry to bottom of well (18'') <sup>5</sup>
		3	6'' <sup>5</sup>
		4	Dry to bottom of well (18'') <sup>5</sup>
April 2, 2014	PEM inundated. PSS mostly saturated to the soil surface.	1	3.5"
		2	12"
		3	16''
		4	6"
April 15, 2014	Most of the PEM and PSS inundated or saturated to the soil surface.	1	17.5''
		2	Dry to bottom of well (18'')
		3	17.5''
		4	16''

**Table 2. Antecedent conditions for 2014 hydrology monitoring visits (Longview, WA Station 454769) (NRCS 2014).**

Hydrology Monitoring Date	Precipitation (in inches) for the ten days prior to each hydrology monitoring visit										
	1	2	3	4	5	6	7	8	9	10	Total
March 11, 2014	0.5	0.7	0	0.53	1.13	0.2	0.1	0.33	0	missing	<b>3.49</b>
April 2, 2014	0.34	0.11	0.93	0.32	0.24	0.58	0.12	0.03	0	0	<b>2.67</b>
April 15, 2014	0	0	0	0	0	0	0	0.04	0	0.02	<b>0.06</b>

<sup>5</sup> Wells were installed on March 11, 2014. The well readings on this date were taken only about 5-10 minutes after installation, so the readings are likely not accurate due to inadequate time for equilibration of the water level within the newly installed wells.

**Table 3. Comparison of Observed and Normal Precipitation (NRCS 1997)**

**Monthly precipitation data for Longview, Washington (Station #454769)**

		Long-term rainfall records <sup>a</sup>							
	Month	3 yrs. in 10 less than	Average	3 yrs. in 10 more than	Rain fall <sup>a</sup>	Condition dry, wet, normal <sup>b</sup>	Condition Value	Month weight value	Product of previous two columns
1 <sup>st</sup> prior month	March	3.54	4.66	5.42	7.53	W	3	3	9
2 <sup>nd</sup> prior month	Feb	3.25	5.23	6.32	6.79	W	3	2	6
3 <sup>rd</sup> prior month	Jan	3.75	6.35	7.72	4.98	N	2	1	2
								<b>Sum</b>	<b>17</b>

<sup>a</sup> NRCS 2014

<sup>b</sup> Conditions are considered normal if they fall within the low and high range around the average.

Note: If sum is

- 6 - 9 then prior period has been drier than normal
- 10 - 14 then period has been normal
- 15 - 18 then period has been wetter than normal

Condition value:

- Dry (D) =1
- Normal (N) =2
- Wet (W) =3

Conclusions: Wetter than normal precipitation conditions were present prior to hydrology monitoring visits.



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