SR 500 St Johns Blvd Interchange (Lower Burnt Bridge) Mitigation Site

USACE NWS-2009-1104

Southwest Region

2014 MONITORING REPORT

Wetlands Program

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USACE NWS-2009-1104

General Site Information			
USACE NWS Number	2009-1104		
Mitigation Location	Burnt Bridge Creek near confluence with Cold Creek, city of Vancouver, Clark County		
LLID Number	1226675456605		
Construction Date	2013		
Monitoring Period	2014-2024		
Year of Monitoring	1 of 10		
Area of Project Impact[1]	0.24 acre		
Type of Mitigation	Wetland Creation	Wetland Buffer Enhancement	Riparian Buffer Enhancement
Planned Area of Mitigation	0.86 acre	2.27 acre	6.67 acre

[1]Impact and mitigation acreage sourced from SR 500 / St. Johns Blvd. Interchange Final Critical Areas Mitigation Report (WSDOT 2011).

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Summary of Monitoring Results and Management Activities (2014)

Performance Standards	2014 Results[2]	Management Activities
Evidence of ponding or saturated soils (within 12 inches) in the wetland for 10% of the growing season	Present	
90% survival of plantings in the area identified on the Revegetation Concept as scrub-shrub, wetland buffer, and riparian enhancement area	95% survival ($CI_{80\%}$= 93-96%)	
15% or less cover of blackberries (*Rubus* species) and class B noxious weeds	Cover is visually estimated at 5%.	
Class A noxious weeds Japanese Knotweed (*Fallopia japonica*) and Purple Loosestrife (*Lythrum salicaria*) treated so that none exist on site	Both species were observed.	The presence and location of these species were communicated to the headquarters restoration crew.
Reed canary grass (*Phalaris arundinacea*) shall not exceed 25% cover	Cover is visually estimated at < 5% overall.	

Report Introduction

This report summarizes first-year (Year-1) monitoring activities at the State Route (SR) 500 Lower Burnt Bridge Mitigation Site. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site development. Monitoring activities included vegetation surveys, photo-documentation, and assessments of wetland hydrology. Hydrology monitoring occurred on March 6, March 20, and April 10. Vegetation monitoring activities occurred on August 11 and August 12.

[2] Estimated values are presented with their corresponding statistical confidence interval. For example, 95% ($CI_{80\%}$ = 93-96% cover) means we are 80% confident that the true cover value is between 93% and 96%.

What is the SR 500 Lower Burnt Bridge Mitigation Site?

This 9.8-acre mitigation site (Figure 1) is a partly new and partly enhanced wetland created adjacent to Burnt Bridge Creek at the confluence with Cold Creek. This site was created to compensate for the loss of 0.24 acre of wetlands, 1.56 acres of wetland buffer, and 4.3 acres of riparian buffer due to road improvements along SR 500. The 0.86 acres of created wetland, and surrounding 2.27 acres of enhanced wetland buffer and 6.67 acres of riparian buffer enhancement are designed to provide mitigation for lost wetland functions including hydrologic, water quality, and wildlife habitat.

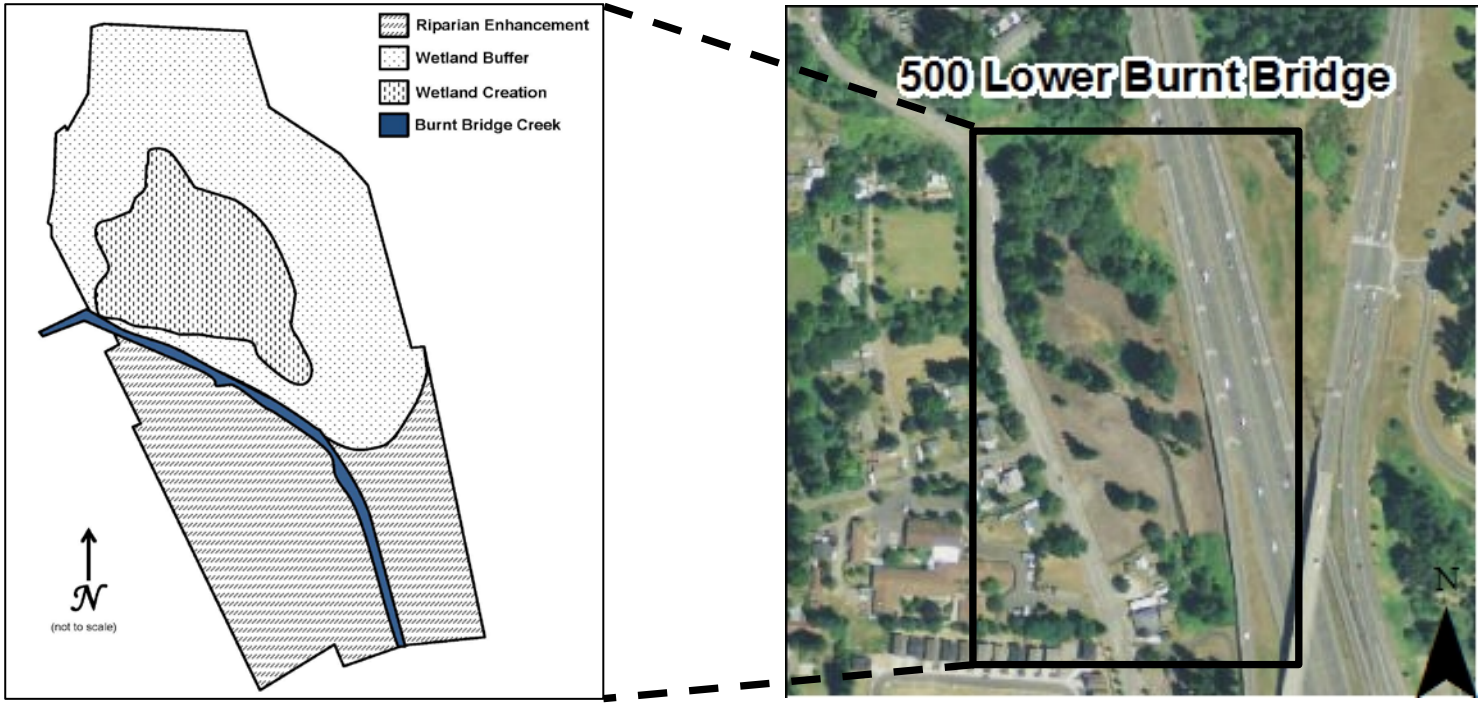


Figure 1 Site Sketch

The SR 500 Lower Burnt Bridge Mitigation Site contains one created low area adjacent to Burnt Bridge Creek upstream of its confluence with Clear Creek. Riparian and wetland buffer areas flank the channel of Burnt Bridge Creek. Appendix 2 includes site directions.

What are the performance standards for this site?

Year 1

Performance Standard 1
There will be evidence of ponding or saturated soils (within 12 inches) in the wetland for 10 percent of the growing season.

Performance Standard 2
At monitoring year 1, there will be a minimum survival rate of 90 percent in the area identified on the Revegetation Concept as scrub-shrub, wetland buffer, and riparian enhancement areas.

Performance Standard 3
The aerial extent of blackberry species and Class B (Washington Department of Agriculture and Clark County Weed Board) noxious weeds will not exceed 15 percent in the combined scrub-shrub, buffer, and riparian planting areas, exclusive to each mitigation site.

Performance Standard 4
If/when detected, Class A noxious weeds (Washington Department of Agriculture and Clark County Weed Board), Japanese Knotweed, and Purple Loosestrife shall be treated so that the species do not exist on the site. These species shall not be included in the 15 percent cover allowed for invasive species.

Performance Standard 5
At monitoring years 1, 3, 5, and 7, the aerial extent of reed canary grass at the Lower Burnt Bridge Creek mitigation site shall not exceed 25 percent total cover in the wetland creation areas.

Appendix 1 shows the as-built planting plan (WSDOT 2011).

How were the performance standards evaluated?

WSDOT staff collected hydrology data using methods described in the *Corps of Engineers Wetlands Delineation* Manual (Environmental Laboratory 1987), *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Version 2.0) (USACE 2010) (Performance Standard 1). Four permanent hydrology pit locations have been established. During each monitoring visit, visual observations were made to determine the extent of inundation and surface saturation. Depth and location of standing water was recorded. At each pit location, in the absence of inundation or surface saturation, subsurface observations were made.

To evaluate the standard for vegetative survival, a 405-meter segmented baseline was established on the east and west sides of the site and sampled to the creek in the middle (Figure 2). Twenty-five sampling transects were placed perpendicular to the baseline using a systematic random sampling method. The unequal-area belt transect method was used to estimate percent survival of planted vegetation (Performance Standard 2). Twenty-five one-meter-wide belt transect sample units were positioned along the sampling transects. The cover of invasive species on-site was visually estimated (Performance Standards 3-5).

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

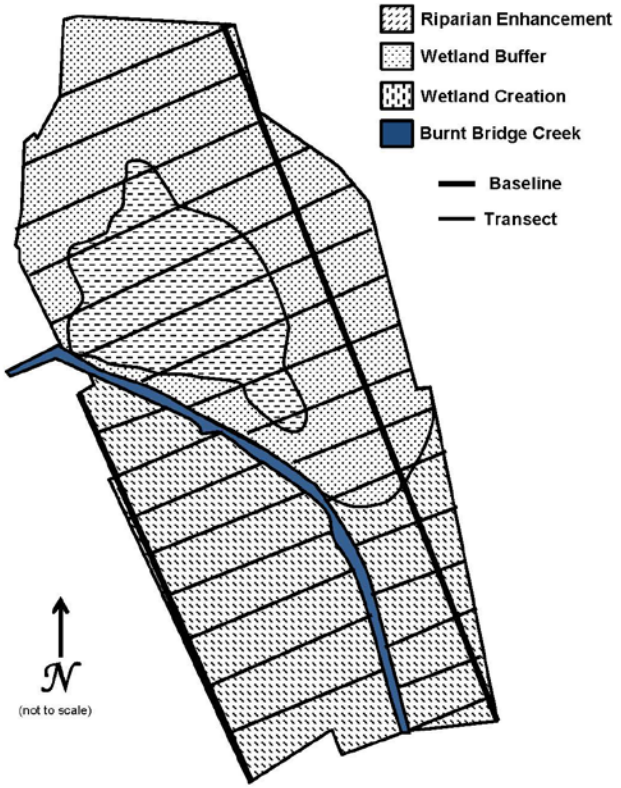


Figure 2 Site Sampling Design (2014)

How is the site developing?

Lower Burnt Bridge mitigation site is becoming established. The site has high plant diversity with no areas of widespread mortality.

Weed cover is estimated well below the performance standard threshold, but it would be fairly easy for weeds to spread if left untreated. The restoration crew has been notified of the weed issues on this site.

There are several oaks in the south eastern section of the riparian enhancement area that are dead. The "drywater time release" watering system next to the oaks does not appear to be working. Mortality of oaks appears to be close to 50 percent in this area. Density of woody species across the site is 5,818 plants/acre ($CI_{80\%}$= 5,301-6,334). This should meet the standard in year-3 of 4,000 woody species per acre.

Results for Performance Standard 1
(Wetland hydrology present):

In 2014, soils were saturated to the surface for two consecutive hydrology monitoring visits in the spring. (Appendix 3, Table 1) (Photo 1). At the third visit, soils were saturated in the emergent zone, but not the scrub shrub zone. Hydrology will continue to be monitored and the site will be delineated in year five.

Results for Performance Standard 2
(Scrub-shrub, wetland buffer, and riparian buffer zones will have 90% survival of planted vegetation):

The estimated survival of plants in the scrub-shrub, wetland buffer, and riparian zones combined is 95 percent ($CI_{80\%}$= 93-96%) (Photo 2). This estimate exceeds the performance standard target.

Photo 1
Inundation in the newly created wetland (April 2014)

Photo 2
Survival of planted vegetation in riparian buffer (August 2014)

Results for Performance Standard 3
(No more than 15% blackberry species and Class B noxious weeds):

Cover of blackberries and class B noxious weeds is visually estimated at five percent. This value is below the performance standard threshold. Class B species present include scotch broom (*Cytisus scoparius*), poison hemlock (*Conium maculatum*), tansy ragwort (*Jacobaea vulgaris*), and annual bugloss (*Anchusa arvensis*) (Photo 3).

Results for Performance Standard 4
(Class A noxious weeds, Japanese Knotweed, and Purple Loosestrife observed and treated):

Purple loosestrife and non-native knotweed (*Fallopia* species) was observed onsite during monitoring activities. The presence and location of these species was communicated to the WSDOT headquarters restoration crew.

Results for Performance Standard 5
(No more than 25% cover reed canary grass):

Reed canary grass cover is visually estimated at less than five percent overall. This value is below the performance standard threshold.

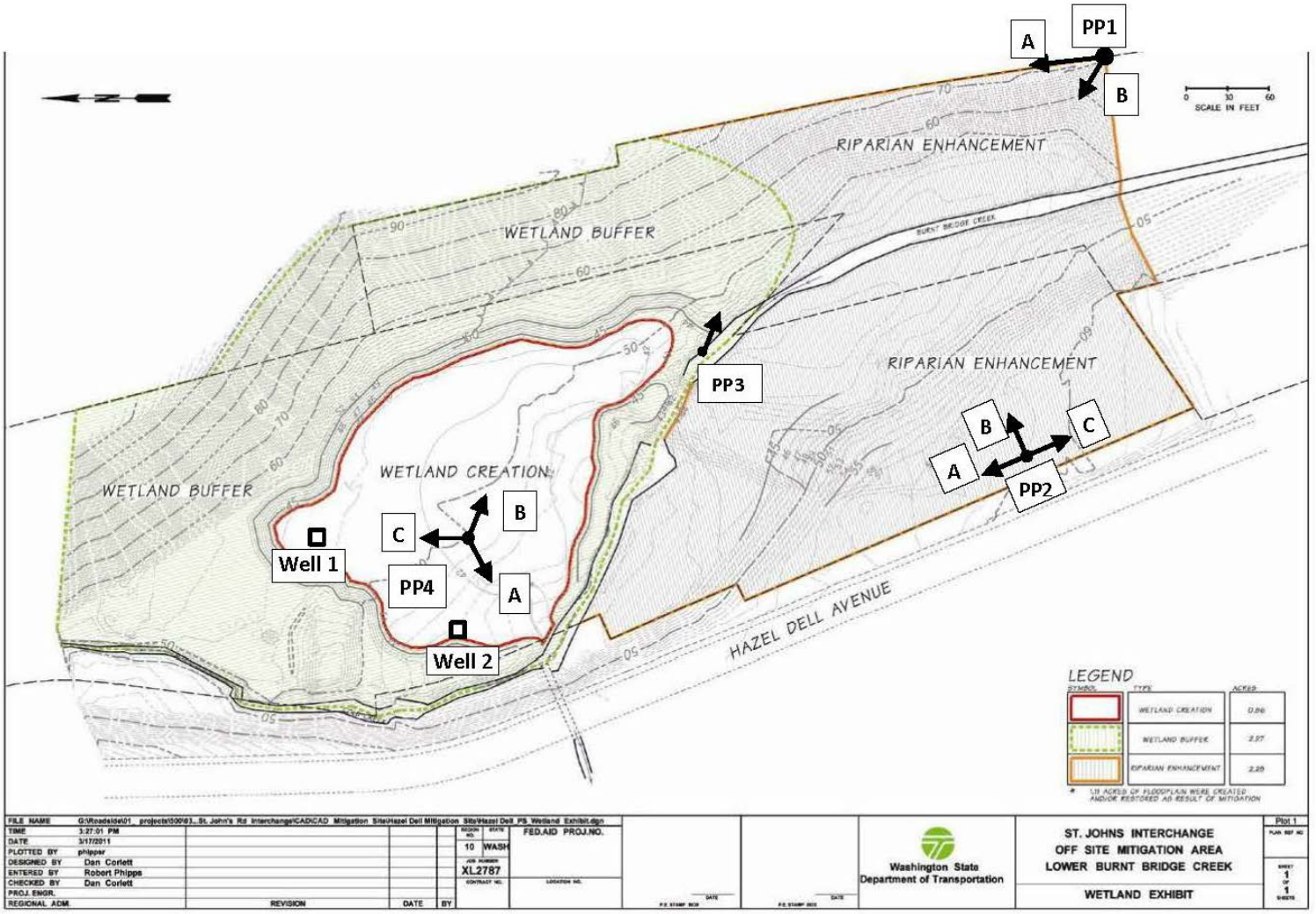
Photo 3
Annual bugloss on creek bank (August 2014)

What is planned for this site?

The region has plans replant and to continue weed control as needed.

Appendix 1 – As-Built Planting Plan with Photo Point Locations and Hydrology Pit or Well Locations

(from WSDOT 2011)



ROADSIDE RESTORATION PLANT MATERIAL SCHEDULE

Plant Code	Botanical Name	Common Name	Height or Condition	Root Type	A.S.N.S.	Spacing	Layout	Notes	Irrigation Status	Percent of mix	NC2	NC3	NC4	NC5	NC6	NC7	NC8	NC9	Total in mix
TMX - TREE MIX ROADSIDE	Acer ginnala 'Flame'	Flame Amur Maple	2' - 3'	cont	1.2.1 type 8	where staked		fall planting	see plans	na	1	29	22	4	3	2	0	0	61
	Acer saccharum 'Green Mountain'	Green Mountain Sugar Maple	1" cal.	cont	1.4	where staked		fall planting	see plans	na	1	13	23	5	3	11	0	0	56
	Amelanchier x grandiflora 'Autumn Brilliance'	Autumn Brilliance Serviceberry	3' - 4'	cont.	1.3.2	where staked		fall planting	see plans	na	2	11	18	2	0	2	0	0	35
	Calocedrus decurrens	Incense Cedar	4' - 6'	cont	3.2.4 type 4	where staked		fall planting	see plans	na	2	11	19	11	1	1	0	0	45
	Chamaecyparis nootkatensis	Yellow Alaskan Cedar	4' - 6'	cont	3.2.4 type 4	where staked		fall planting, light branched	see plans	na	0	4	4	0	0	9	0	0	17
	Cornus nuttalli	Pacific Dogwood	1" cal.	cont	1.2.4 type 8	where staked		fall planting	see plans	na	3	8	7	2	3	0	0	0	23
	Fraxinus Americana 'Autumn Purple'	Autumn Purple Ash	1" cal.	cont	1.2.2 type 1	where staked		fall planting	see plans	na	2	14	4	5	2	0	0	0	27
	Populus tremuloides	Quaking Aspen	1" cal	cont	1.2.1 type 1	where staked		fall planting	see plans	na	6	23	40	22	3	0	0	0	95
	Pseudotsuga menziesii	Douglas Fir	4' - 6'	cont	3.2.4 type 4	where staked		fall planting	see plans	na	6	40	57	37	7	0	0	0	147
	Quercus garryana	Oregon White Oak	5' - 10'	cont	1.2.1 type 1	where staked		fall planting	see plans	na	0	0	0	0	0	0	70	0	70
	Thuja plicata 'Hogani'	Hogan Cedar	4' - 6'	cont	3.2.4 type 4	where staked		fall planting	see plans	na	2	17	11	12	3	0	0	0	45
SMA - SHRUB MIX A ROADSIDE	Amelanchier alnifolia	Saskatoon Serviceberry	18" - 24"	b.r.	1.3.2	where staked	triangle	multi-stem	N	10%	115	880	955	635	85	90	0	0	2760
	Aronia melanocarpa	Black Chokeberry	18" - 24"	b.r.	1.3.2	5' oc	triangle		N	10%	115	880	955	635	85	90	0	0	2760
	Holodiscus discolor	Oceanspray	18" - 24"	b.r.	2.1.3.4	5' oc	triangle		N	5%	55	440	475	320	45	50	0	0	1285
	Mahonia aquifolium	Tall Oregon Grape	#1	cont	4.2.4 type 4	5' oc	triangle		N	25%	286	2200	2385	1590	210	215	0	0	6885
	Ribes sanguineum	Flowering Currant	#1	cont	2.2.4 type 3	4' oc	triangle		N	5%	55	440	475	320	45	50	0	0	1285
	Rosa rugosa	Rugosa Rose	18" - 24"	b.r.	2.2.3 type 2	5' oc	triangle		N	20%	230	1750	1910	1275	170	170	0	0	5505
	Symphoricarpos albus	Common Snowberry	18" - 24"	b.r.	2.2.2 type 1	5' oc	triangle		N	25%	286	2200	2385	1590	210	215	0	0	6885
SMB - SHRUB MIX B RIPARIAN / STREAM BUFFER	Cornus stolonifera	Red Osier Dogwood	18" - 24"	b.r.	2.2.3 type 2	5' oc	triangle		N	20%	0	75	795	145	0	30	0	0	1045
	Oemleria cerasiformis	Indian Plum	18" - 24"	b.r.	1.3.2	5' oc	triangle		N	20%	0	75	795	145	0	30	0	0	1045
	Holodiscus discolor	Oceanspray	18" - 24"	b.r.	2.1.3.4	5' oc	triangle		N	5%	0	20	200	35	0	5	0	0	260
	Mahonia aquifolium	Tall Oregon Grape	#1	cont	4.2.4 type 4	5' oc	triangle		N	10%	0	40	400	70	0	15	0	0	525
	Philadelphus lewisii	Mock Orange	18" - 24"	b.r.	2.2.4 type 3	5' oc	triangle		N	5%	0	20	200	35	0	5	0	0	260
	Physocarpus capitatus	Pacific Ninebark	18" - 24"	b.r.	2.2.3 type 2	5' oc	triangle		N	15%	0	50	595	115	0	20	0	0	780
	Polystichum munitum	Western Sword Fern	18" - 24"	b.r.	4.2.2 type 2	5' oc	triangle	groups of 7-9	N	10%	0	40	400	70	0	15	0	0	525
	Symphoricarpos albus	Common Snowberry	18" - 24"	b.r.	2.2.2 type 1	4' oc	triangle		N	15%	0	50	595	115	0	20	0	0	780
SMC - SHRUB MIX C URBAN 1	Cotoneaster dammeri 'Coral Beauty'	Coral Beauty Cotoneaster	#1	cont.	4.1.2.1 type 1	4' oc	triangle		N	50%	0	285	660	0	0	0	0	0	945
	Euonymous alatus 'Compacta'	Dwarf Winged Euonymous	#1	cont	2.2.5 type 2	4' oc	triangle	groups of 15	Y	5%	0	30	65	0	0	0	0	0	95
	Itea virginia 'Henry's Garnet'	Henry's Garnet Sweetspire	#1	cont.	2.2.2 type 1	4' oc	triangle		N	15%	0	85	200	0	0	0	0	0	285
	Mahonia aquifolium 'Compacta'	Compact Oregon Grape	#1	cont.	4.2.4 type 4	4' oc	triangle	groups of 7-9	N	15%	0	85	200	0	0	0	0	0	285
	Parthenocissus tricuspidata	Boston Ivy	#1	cont.	6.4.7 type 7	where staked			N	na	0	15	50	0	0	0	0	0	65
	Ribes sanguineum	Flowering Currant	#1	cont	2.2.4 type 3	4' oc	triangle		N	5%	0	30	65	0	0	0	0	0	95
	Rosa rugosa	Rugosa Rose	18" - 24"	b.r.	2.2.3 type 2	4' oc	triangle		N	10%	0	55	130	0	0	0	0	0	185
SMC - SHRUB MIX D LOW URBAN 2	Mahonia aquifolium 'Compacta'	Compact Oregon Grape	#1	cont.	4.2.4 type 4	4' oc	triangle	groups of 7-9	N	20%	0	45	240	20	0	250	0	0	555
	Cotoneaster dammeri 'Coral Beauty'	Coral Beauty Cotoneaster	#1	cont.	4.1.2.1 type 1	4' oc	triangle		N	80%	0	180	865	85	0	1000	0	0	2230
EMA - EMERGENT MIX A WETLAND	Carex aquatilis	Water sedge	6" min.	b.r.	n/a	12" o.c.	triangle		N	na	0	300	0	0	0	0	0	0	300
	Carex obnupta	Slough Sedge	6" min.	b.r.	n/a	12" o.c.	triangle		N	na	0	500	0	0	0	0	0	1320	1820
	Eleocharis palustris	Spike Rush	6" min.	b.r.	n/a	12" o.c.	triangle		N	na	0	200	0	0	0	0	0	0	200
	Scirpus microcarpus	Small-fruited Bulrush	6" min.	b.r.	n/a	12" o.c.	triangle		N	na	0	1000	0	0	0	0	0	880	1880

NOTES:

1. All material shall meet the requirements of the American Standard for Nursery Stock, 2004.
2. A letter of compliance with the "American Standard of Nursery Stock" is required from the supplier for all plant material.
3. Plants to be randomly mixed within designated plant groups as approved by the Engineer unless specified otherwise.
4. All plant crowns to be free of bark mulch where applicable.
5. See planting details and Special Provisions.

B&B Balled and Burlaped
B.R. Bare Root
Cont. Container
O.C. On Center
A.S.N.S. American Standards for Nursery Stock

FILE NAME	G:\Roadside\01 projects\500\03...St. John's Rd Interchange\CAD\PS&E Sheets\Addendum\L2787_Roadside_PS.dgn						
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DATE	1/25/2011				JOB NUMBER		
PLOTTED BY	phippsr				CONTRACT NO.		LOCATION NO. XL2787
DESIGNED BY	R. PHIPPS						
ENTERED BY	R. PHIPPS						
CHECKED BY	D. CORLETT						
PROJ. ENGR.	L. WINGER						
REGIONAL ADM.	B. GERNHART	REVISION	DATE	BY			

P.E. STAMP BOX DATE

P.E. STAMP BOX 1-25-11 DATE

Washington State Department of Transportation

SR 500
ST JOHNS BLVD. - INTERCHANGE

PLANTING PLAN

Plot 1
PLAN SHEET NO. NC1
SHEET OF SHEETS

Appendix 2 – Photo Points

The photographs below were taken from permanent photo-points on August 11, 2014 and document current site development.

Photo Point 1a

Photo Point 1b

Photo Point 2a

Photo Point 2b

Photo Point 2c

Photo Point 3

Photo Point 4a

Photo Point 4b

Photo Point 4c

Driving Directions:

From I-5 take exit 1D for 4th Plain Boulevard. Continue east toward East 4th Plain Boulevard. Turn left onto East 4th Plain Boulevard. Turn left onto St Johns Boulevard. Continue on St Johns Boulevard until it passes under SR 500. The site will be on the left.

Appendix 3 – Data Tables

Table 1 Hydrology Observations

Date	Surface Observations	Well ID #	Water Level (inches below soil surface unless otherwise noted)
March 6, 2014	Creation area is partially inundated and mostly saturated.	1	Inundated at surface (0 inches)
		2	3”
March 20, 2014	Less water on site than first visit. Creeks are flowing swiftly but creation area is inundated only at the mouth. Beaver are active on site. Wells were not installed during this visit. Pits were dug and hydrology was measured in depth from soil surface.	1	Saturated to the surface
		2	Saturated to the surface
April 10, 2014	Emergent area saturated. Scrub-shrub area not saturated.	1	2”
		2	12”

Literature Cited

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