

SR 202 Improvement Project: SR 520 to Sahalee Way NE,  
Wetland Mitigation Site #2 (**Happy Valley**) USACE IP 2004-00024

SR 202 Junction with 244th Avenue Northeast Signalization and  
Channelization (MP 12.92 to MP 13.04) & Temporary Signal (MP 13.00)  
NWS-2005-1158

SR 520: West Lake Sammamish Parkway to SR 202 Widening (MP11.40 to  
12.83) NWS-2007-1926

**Northwest Region**

**2014 MONITORING REPORT  
Wetlands Program**

*Issued March 2015*



**Washington State  
Department of Transportation**

Environmental Services Office

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## Wetland Mitigation Site #2 (Happy Valley)

- SR 202 Improvement Project: SR 520 to Sahalee Way NE IP 200400024
- SR 202 Junction with 244th Avenue Northeast Signalization and Channelization (MP 12.92 to MP 13.04) & Temporary Signal (MP 13.00) NWS-2005-1158
- SR 520: West Lake Sammamish Parkway to SR 202 Widening (MP11.40 to 12.83) NWS-2007-1926



General Site Information			
<b>USACE Permit Numbers</b>	200400024, NWS-2005-1158, NWS-2007-1926		
<b>Mitigation Location</b>	At the intersection of SR 202 and Sahalee Way, King County		
<b>LLID Number</b>	1220631476556		
<b>Construction Date</b>	2006-2007		
<b>Monitoring Period</b>	2008-2017		
<b>Year of Monitoring</b>	7 of 10		
<b>Type of Impact</b>	Wetland		Buffer
<b>Area of Project Impact</b>	Permanent	Indirect	Permanent
	4.39 acres	0.15 acre	4.99 acres
<b>Type of Mitigation</b>	Wetland Establishment	Wetland Enhancement	Buffer Enhancement
<b>Area of Mitigation<sup>1</sup></b>	5.43 acres	1.72 acres	5.76 acres

<sup>1</sup>Additional wetland acreage provided by SR 202 Sahalee Way (Turple). See Appendix 3 for acreage break down by site and mitigation ledger. Impact source (USACE 2004), (USACE 2005), and (USACE 2007). Mitigation acreage sourced from (WSDOT 2005, 2007).

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

Performance Standards	2014 Results <sup>2</sup>	Management Activities
Wetland hydrology	Not present in all intended areas (See Appendix 3, Table 3)	
Native facultative or wetter woody species will achieve 50% coverage	47% cover (CI <sub>80%</sub> = 39-55%).	Installed 50 twinberry honeysuckle ( <i>Lonicera involucrata</i> ) in northeastern scrub-shrub wetland area in December 2014.
Three native facultative or wetter vegetation species will achieve 6% or greater relative cover in the scrub-shrub wetland community	Five woody species with > 6% relative cover across wetland	
Three native facultative or wetter vegetation species will achieve 6% or greater relative cover in each forested wetland community	Five woody species with > 6% relative cover across wetland	
Relative cover of red alder ( <i>Alnus rubra</i> ) and black cottonwood ( <i>Populus balsamifera</i> ), will be less than 30% for each species in the wetland creation and enhancement areas	Red alder: 2% cover Black cottonwood: 3% cover	
Native upland buffer woody species will achieve 35% coverage in each upland buffer community.	86% cover (CI <sub>95%</sub> = 80-93%).	
Three native upland vegetation species will achieve 6% relative cover in each buffer community	Five woody species with > 6% relative cover across the buffer community	
King County listed Class A weeds and reed canarygrass ( <i>Phalaris arundinacea</i> ), non-native blackberries ( <i>Rubus</i> sp.), Scotch broom ( <i>Cytisus scoparius</i> ), Japanese knotweed ( <i>Reynoutria japonica</i> ), and purple loosestrife ( <i>Lythrum salicaria</i> ), will not exceed 20% coverage in each forested, scrub-shrub, and emergent wetland and upland buffer community	25% invasive cover	Weed control was conducted on four separate occasions in 2014.

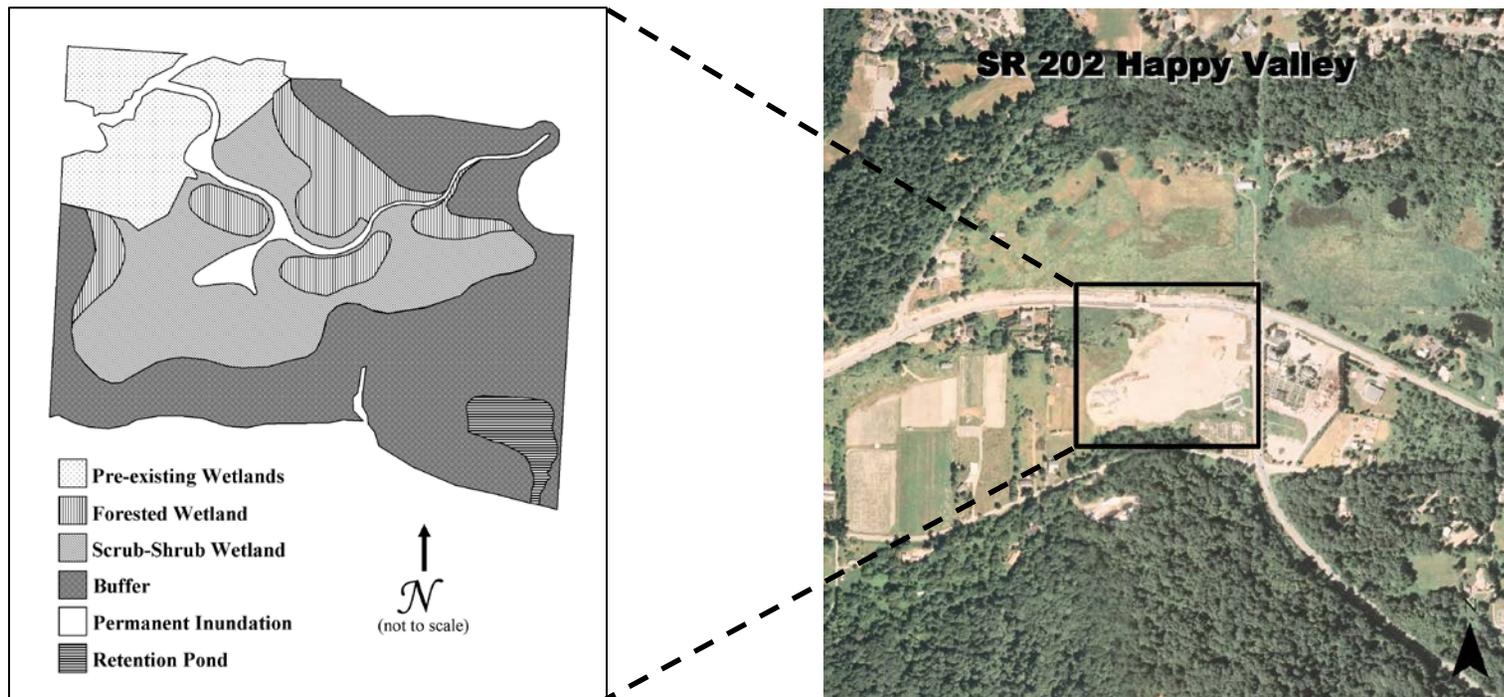
<sup>2</sup> Estimated values are presented with their corresponding statistical confidence interval. For example, 47% (CI<sub>80%</sub> = 39-55% cover) means we are 80% confident that the true cover value is between 39% and 55%.

## **Report Introduction**

This report summarizes Year-7 monitoring activities at the State Route (SR) 202 Happy Valley 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 17, April 3, and April 24, 2014. Vegetation monitoring occurred on July 28- 30, 2014.

## What is the SR 202 Sahalee Way (Happy Valley) Mitigation Site?

This 16.7 -acre property (Figure 1) contains a new wetland established on the south side of SR 202, approximately 1.5 miles east of Lake Sammamish. This site was established to partially compensate for the loss of 4.39 acres of wetlands due to road improvements along SR 202 and SR 520. The rest of the mitigation for this project is taking place at SR 202 Sahalee Way NE Wetland Mitigation Site #1 (Turkey). The mitigation at these sites is intended to provide the following functions: flood flow alteration, sediment removal, nutrient/toxicant removal, erosion control and shoreline stabilization, production/export of organic matter, general habitat suitability, habitat for aquatic invertebrates, habitat for amphibians, and general fish habitat.



**Figure 1 Site Sketch**

The SR 202 Sahalee Way Happy Valley Mitigation Site consists of established forested and scrub-shrub wetlands surrounded by upland buffer on all sides but the northwest corner. Evans Creek runs through the northwest corner of the site and an unnamed tributary, designed to function as a backwater channel, runs through the center. Directions to the site are included in Appendix 2.

## What are the performance standards for this site?

### Year 7

#### Performance Standard 1

The soils will be saturated to the surface, or standing water will be present in a monitoring well at 12 inches below the surface or less, for a consecutive number of days greater than or equal to 12.5 percent of the growing season. Wetland hydrology will be determined using indicators of wetland hydrology, as listed in the Washington State Wetlands Identification and Delineation Manual (Ecology publication #96-94).

#### Performance Standard 2

Native facultative or wetter woody species will achieve 50 percent coverage in each scrub-shrub and forested wetland community. Native colonizing vegetation will be counted in this coverage calculation.

#### Performance Standard 3

Three native facultative or wetter vegetation species will achieve six percent or greater relative cover in the scrub-shrub wetland community.

#### Performance Standard 4

Three native facultative or wetter vegetation species will achieve six percent or greater relative cover in each forested wetland community.

#### Performance Standard 5

Relative cover of red alder and black cottonwood will be less than 30 percent for each species in the wetland creation and enhancement areas.

#### Performance Standard 6

Native upland buffer woody species will achieve 35 percent coverage in each upland buffer community. Native colonizing vegetation will be counted in this coverage calculation.

#### Performance Standard 7

Three native upland vegetation species will achieve six percent relative cover in each buffer community

#### Performance Standard 8

King County listed Class A weeds and reed canarygrass, non-native blackberries (*Rubus* sp.), Scot's broom, Japanese knotweed, and purple loosestrife will not exceed 20 percent coverage in each forested, scrub-shrub, and emergent wetland and upland buffer community.

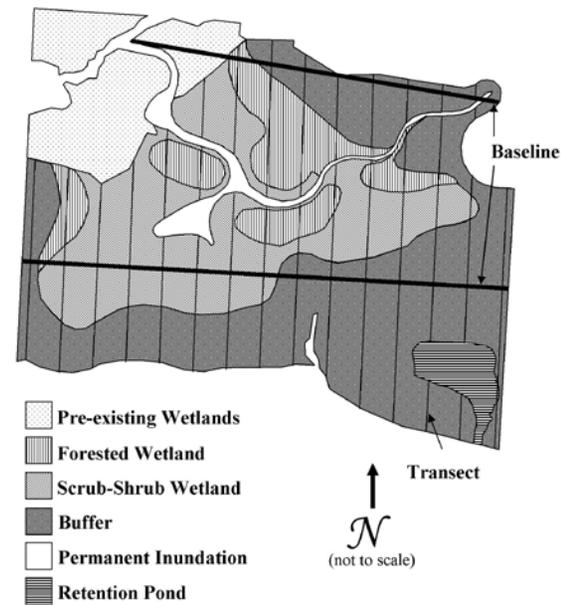
Appendix 1 shows the planting plan (WSDOT 2009).

## 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), *the Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Version 2.0) (USACE 2010) (Performance Standard 1).

To evaluate standards for vegetative cover, a segmented baseline was established parallel to the north and south border of the site (Figure 2). The forested and scrub shrub wetland were sampled as one unit due to difficulty in distinguishing the zones from one another. Twenty-four sampling transects were randomly placed perpendicular to the baseline. The line intercept method was used to determine woody cover and relative cover by species, across the wetland and buffer zones (Performance Standards 2, 3, 4, 5, 6, and 7). Twenty-three 20-meter sample units were sampled in the wetland and 10, 20-meter sample units were sampled in the buffer. The cover of King County Class A weeds and invasive species was estimated qualitatively with visual estimates (Performance Standard 8).

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?

The site has developed into a dynamic wetland and continues to change due to beaver presence in the wetland. Higher and more water in the wetland has created more ponds and emergent communities as well as bringing in more reed canarygrass (*Phalaris arundinacea*) seed upstream from Evans creek.

The woody cover is just shy of meeting the year-7 performance standard, despite the extensive beaver herbivory that has occurred over the last few years. No current beaver herbivory was observed during this year's monitoring and many of the willows and cottonwoods that have been harvested by the beaver are beginning to regenerate (Photo 1).

The planted vegetation in the wetland and buffer communities continues to mature and provide habitat for birds, small mammals and fish. Thirty-five avian species, including raptors, passerines and waterfowl have been observed utilizing the site in various ways. Several amphibian species have been observed breeding on-site and several types of mammal scat were observed

High emergent cover in the large inundated area likely provides nutrient/toxicant and sediment removal functions while the deciduous shrubs in this zone likely provide for the exportation of organic material



**Photo 1**  
**Regenerating cottonwood (July 2014)**

Results for Performance Standard 1  
(Wetland Hydrology):

Wetland hydrology was not present in all intended areas during the March and April 2014 site visits. Although most intended wetland areas were inundated or saturated to the soil surface during the early part of the growing season (Photo 2), well four which is in the highest portions of the forested wetlands did not consistently meet the hydrologic criteria. Well four failed to meet the hydrological criteria on the visit conducted on April 3; it did meet the criteria on the other two visits. It was documented in the 2010 and 2013 delineations that this area was determined to be upland habitat. See Appendix 3 for hydrology data and Appendix 1 for sample pit locations.

Results for Performance Standard 2  
(Native facultative or wetter woody species will achieve 50% coverage in each scrub-shrub and forested wetland community):

The cover of native facultative or wetter woody species is estimated at 47% (CI<sub>80%</sub> = 39-55% (Photo 3). This is just below the performance standard. As the willows and poplars regenerate from the beaver herbivory this cover should increase.



**Photo 2**  
**Inundation in the wetland (March 2014)**

Results for Performance Standards 3 and 4

(Three native facultative or wetter vegetation species will achieve 6% or greater relative cover in each forested and scrub/shrub wetland community):

Both woody wetland zones were sampled together. Across the entire wetland, four species provided more than six percent relative cover. These species include Sitka willow (*Salix sitchensis*), Pacific willow (*Salix lasiandra*), Oregon ash (*Fraxinus latifolia*), and cluster rose (*Rosa pisocarpa*). In the past black cottonwood (*Populus balsamifera*) and Pacific ninebark (*Physocarpus capitatus*) met this criteria, but due to beaver activity the relative cover of these two species has decreased below the threshold. The relative cover of all species is included in Appendix 3.

Results for Performance Standard 5

(Relative cover of red alder and black cottonwood will be less than 35% for each species):

The relative cover of red alder and black cottonwood is two percent and three percent respectively.

Results for Performance Standard 6

(Native upland buffer woody species will achieve 30% coverage in each upland buffer community):

The cover of native upland buffer woody species is estimated at 86% (CI<sub>95%</sub> = 80-93%) (Photo 4). This is the third year in a row that the buffer has met the final-year year-ten performance standard.



**Photo 3**  
**Wetland woody cover (July 2014)**



**Photo 4**  
**Buffer woody cover (July 2014)**

Results for Performance Standard 6

(Three native upland vegetation species will achieve 6% relative cover in each buffer community):

Across the entire buffer, five species provided more than six percent relative cover. These species include snowberry (*Symphoricarpos albus*), tall oregongrape (*Mahonia aquifolium*), Douglas-fir (*Pseudotsuga menziesii*), bigleaf maple (*Acer macrophyllum*), and black cottonwood. The relative cover of all species is included in Appendix 3.

Results for Performance Standard 8

(King County listed Class A weeds and select invasive species will not exceed 20% coverage in each planting zone):

The cover of the listed invasive species is estimated at 25 percent. The majority of the cover is comprised of reed canarygrass (*Phalaris arundinacea*) (Photo 5). There were also two small patches of purple loosestrife (*Lythrum salicaria*) one in the north central portion of the wetland and one in the southwest section.



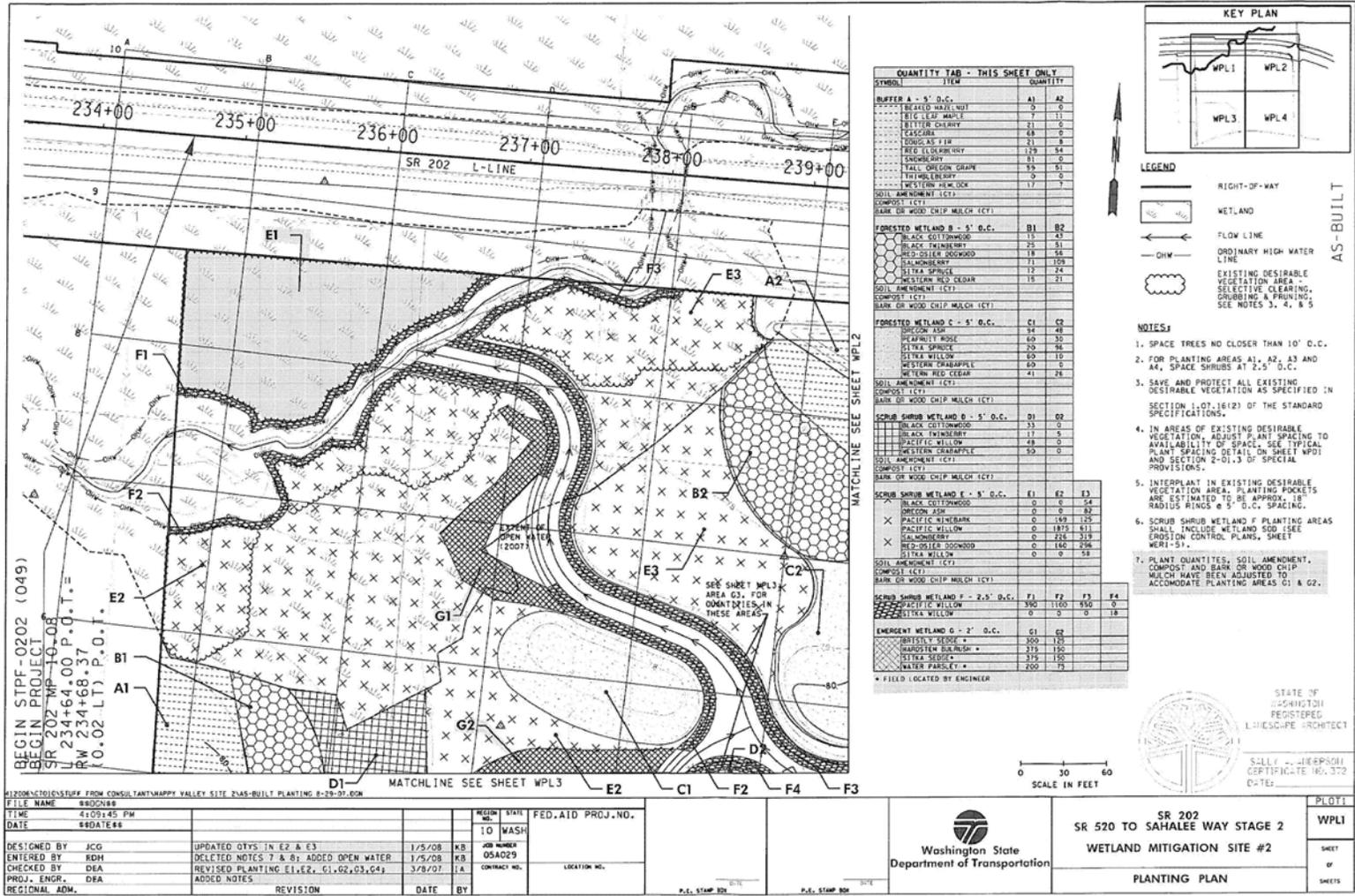
**Photo 5**  
**Reed canarygrass in NW corner of the site (July 2014)**

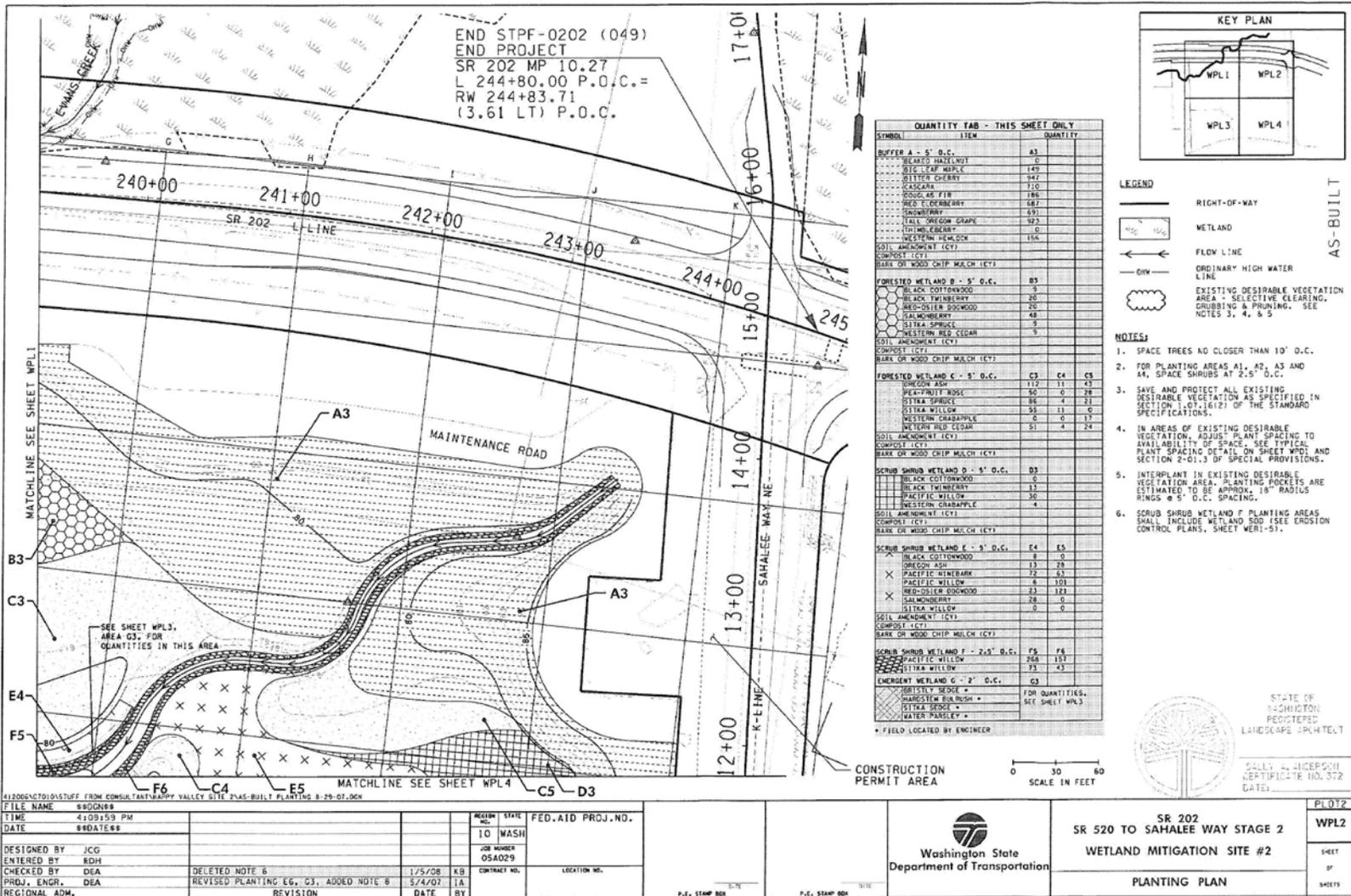
**What is planned for this site?**

Continued weed control. Plant replacement needs will be assessed in late summer 2015.

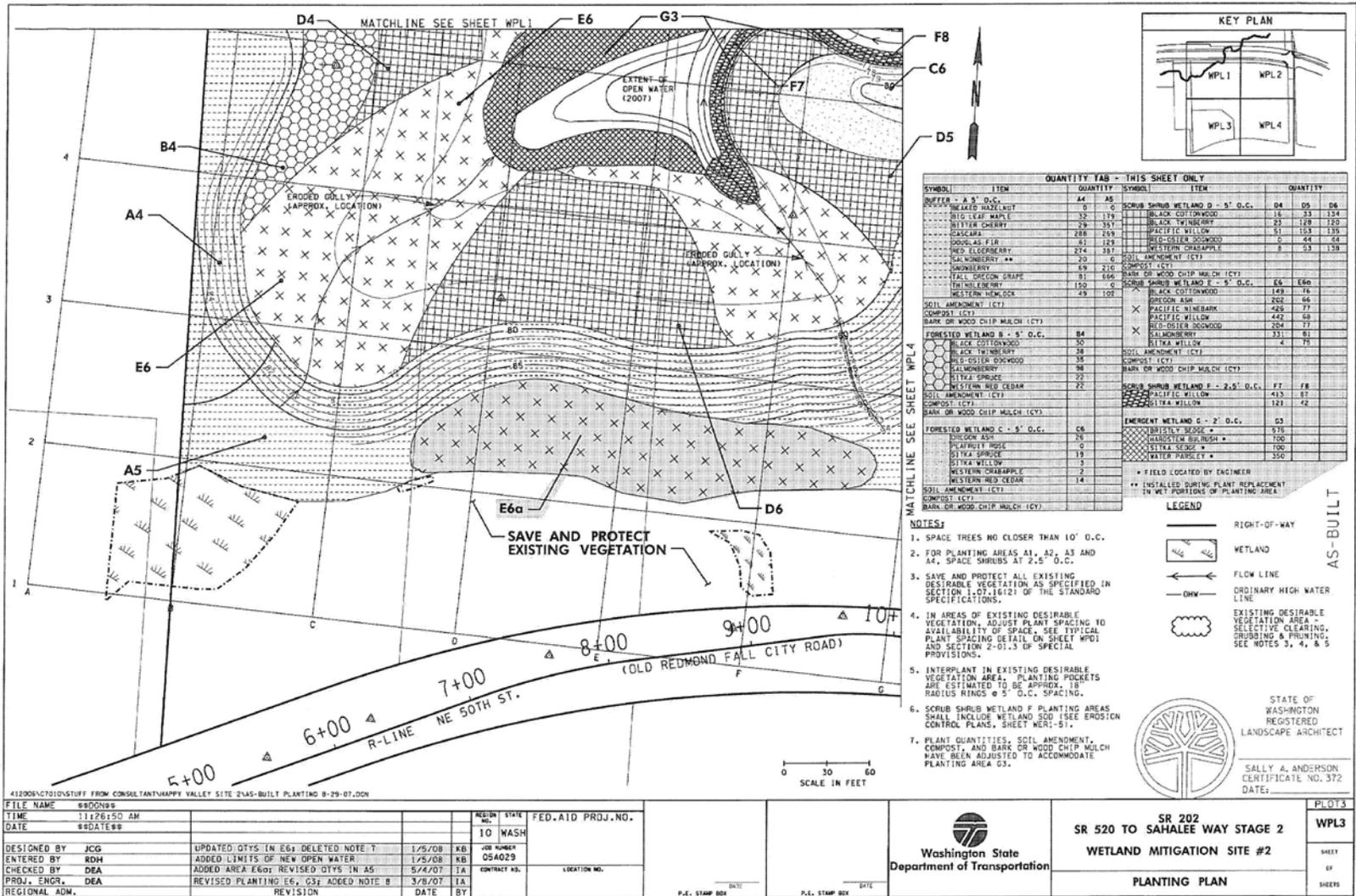
# Appendix 1 – As-built

(from WSDOT 2009)





4120062010151577 FROM CONSULTANT HAPPY VALLEY SITE 2x4x-BUILT PLANTING 8-20-07.DWG		REVISION STATE		FED. AID PROJ. NO.		PL 012	
FILE NAME	8902088	10	WASH			WPL2	
TIME	4:09:59 PM					SHEET	
DATE	8/24/08					OF	
DESIGNED BY	JCG	JOB NUMBER	054029	CONTRACT NO.		SHEETS	
ENTERED BY	RDH	LOCATION NO.					
CHECKED BY	DEA	DELETED NOTE B	1/5/08	DATE	BY		
PROJ. ENGR.	DEA	REVISED PLANTING E6, C3, ADDED NOTE B	5/4/07	IA			
REGIONAL ADM.		REVISION					





41200\VC101051\OFF FROM CONSULTANT\HAPPY VALLEY SITE 2\AS-BUILT PLANTING 8-29-07.DGN

FILE NAME: 880686  
 TIME: 4:10:23 PM  
 DATE: 8/24/08

DESIGNED BY: JCG  
 ENTERED BY: RDH  
 CHECKED BY: DEA  
 PROJ. ENGR. DEA  
 REGIONAL ADM. DEA

REVISION: 10 WASH  
 JOB NUMBER: 05A029  
 CONTRACT NO.:  
 LOCATION NO.:  
 DATE: 1/5/08  
 BY: KB

FED.A10 PROJ.NO.  
 LOCATION NO.

P.E. STAMP BOX  
 P.E. STAMP BOX



SR 202  
 SR 520 TO SAHALEE WAY STAGE 2  
 WETLAND MITIGATION SITE #2  
 PLANTING PLAN  
 PL014  
 WPL4  
 SHEET  
 OF  
 SHEETS

QUANTITY TAB - THIS SHEET ONLY		
SYMBOL	ITEM	QUANTITY
	BUFFER A - 5' D.C.	A6
	BEAKED HAZELHUT	0
	BIG LEAF MAPLE	153
	BITTER CHERRY	187
	CASCARA	199
	DOUGLASS FIR	157
	RED FLOUNDERBERRY	248
	SNOWBERRY	161
	TALL OREGON GRAPE	269
	THIMBLEBERRY	0
	WESTERN HEMLOCK	210
	WESTERN RED CEDAR	4
	SOIL AMENDMENT (CY)	
	COMPOST (CY)	
	BARK OR WOOD CHIP MULCH (CY)	
	FORESTED WETLAND C - 5' D.C.	C7
	ORIGON ASH	15
	WEAVERLY ROSE	0
	SITKA SPRUCE	0
	SITKA WILLOW	0
	WESTERN CHAMAPPLE	0
	WESTERN RED CEDAR	15
	SOIL AMENDMENT (CY)	
	COMPOST (CY)	
	BARK OR WOOD CHIP MULCH (CY)	
	SCRUB SHRUB WETLAND D - 5' D.C.	D7
	BLACK COTTONWOOD	8
	BLACK TWINDENY	175
	PACIFIC WILLOW	85
	WESTERN CHAMAPPLE	160
	SOIL AMENDMENT (CY)	
	COMPOST (CY)	
	BARK OR WOOD CHIP MULCH (CY)	
	SCRUB SHRUB WETLAND E - 5' D.C.	E7
	BLACK COTTONWOOD	0
	OREGON ASH	77
	PACIFIC SILVERBARK	114
	PACIFIC WILLOW	160
	RED-OILIER DOGWOOD	99
	SAL MONSIEY	40
	SITKA WILLOW	46
	SOIL AMENDMENT (CY)	
	COMPOST (CY)	
	BARK OR WOOD CHIP MULCH (CY)	
	SCRUB SHRUB WETLAND F - 2.5' D.C.	F9
	PACIFIC WILLOW	97
	SITKA WILLOW	75
	EMERGENT WETLAND G - 2' D.C.	
	BRISTLY SCODE	FOR QUANTITIES, SEE SHEET WPL3
	HANDSOME BULRUSH	
	SITKA SCODE	
	WATER PARSLEY	
	* FIELD LOCATED BY ENGINEER	

**KEY PLAN**

**LEGEND**

- RIGHT-OF-WAY
- WETLAND
- FLOW LINE
- ORDINARY HIGH WATER LINE
- EXISTING DESIRABLE VEGETATION AREA - SELECTIVE CLEARING, CRUBBING & PRUNING. SEE NOTES 3, 4, & 5

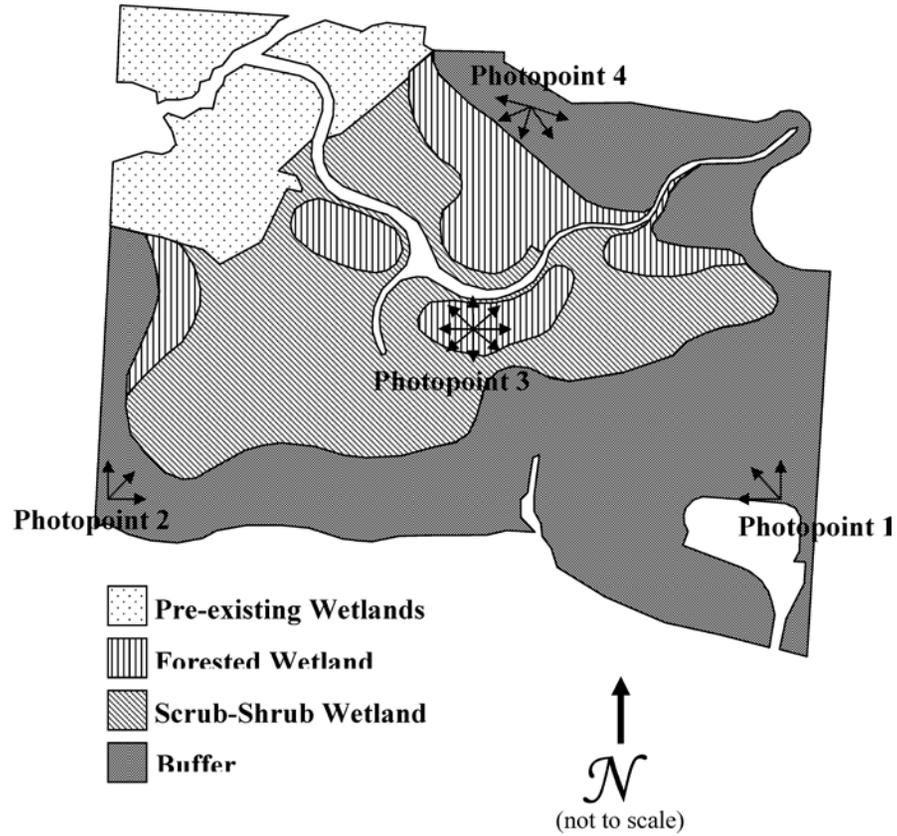
**NOTES:**

- SPACE TREES NO CLOSER THAN 10' D.C.
- FOR PLANTING AREAS A1, A2, A3 AND A4, SPACE SHRUBS AT 2.5' D.C.
- SAVE AND PROTECT ALL EXISTING DESIRABLE VEGETATION AS SPECIFIED IN SECTION 1.01.1612 OF THE STANDARD SPECIFICATIONS.
- IN AREAS OF EXISTING DESIRABLE VEGETATION, ADJUST PLANT SPACING TO AVAILABILITY OF SPACE. SEE TYPICAL PLANT SPACING DETAIL ON SHEET WPL1 AND SECTION 2-0.1.3 OF SPECIAL PROVISIONS.
- INTERPLANT IN EXISTING DESIRABLE VEGETATION AREA. PLANTING POCKETS ARE ESTIMATED TO BE APPROX. 18" RADIUS RINGS @ 5' D.C. SPACING.
- SCRUB SHRUB WETLAND F PLANTING AREAS SHALL INCLUDE WETLAND SOO (SEE EROSION CONTROL PLANS, SHEET WER1-5).

STATE OF WASHINGTON  
 REGISTERED LANDSCAPE ARCHITECT  
 SULLY J. HENDERSON  
 CERTIFICATE NO. 372  
 DATE:

SCALE IN FEET  
 0 30 60

# Photo Point and Ground Monitoring Well Locations



## Appendix 2 – Photo Points

The photographs below were taken from permanent photo-points on July 30, 2014 and document current site development.



**Photo Point 1a**



**Photo Point 1b**



**Photo Point 1c**



**Photo Point 2a**

The photographs below were taken from permanent photo-points on July 30, 2014 and document current site development.



**Photo Point 2b**



**Photo Point 2c**



**Photo Point 3a**



**Photo Point 3b**

The photographs below were taken from permanent photo-points on July 30, 2014 and document current site development.



**Photo Point 3c**



**Photo Point 3d**



**Photo Point 3e**



**Photo Point 3f**

The photographs below were taken from permanent photo-points on July 30, 2014 and document current site development.



**Photo Point 3g**



**Photo Point 4a**



**Photo Point 4b**



**Photo Point 4c**

The photographs below were taken from permanent photo-points on July 30, 2014 and document current site development.



**Photo Point 4d**



**Photo Point 4e**

**Driving Directions:**

From I-5 northbound take exit 14 for WA-520 W/WA-520 E toward Seattle/Redmond. Keep right at the fork to continue toward WA-520 E and merge onto WA-520 E. Take the WA-202 E exit. Merge onto Redmond Way/WA-202. Continue to follow WA-202. Turn Right on Sahalee Way and park inside gate on site.

# Appendix 3 – Data Tables

**Table 1 – Proposed Wetland Mitigation Areas for SR 202 Improvement Project: SR 520 to Sahalee Way NE**

Site	Mitigation Type	Area (acres)
Happy Valley	Established wetland	5.43
	Enhanced buffer	5.76
	Enhanced wetland	1.72
Turple	Established wetland	2.64
	Enhanced buffer	2.31
	Enhanced wetland	0.80

**Table 2 – Impacts by Project**

Project Name	USACE Permit Number	Permanent <sup>3</sup> Wetland Impact	Permanent Wetland Buffer Impact
SR 202–SR 520 to Sahalee Way NE	200400024	2.57 ac	4.0
SR 202 Jct. 244 <sup>th</sup> Ave. NE	NWS-2005-1158	0.08 ac	0.14 ac
SR 520 WLSP to SR 202	NWS-2007-1926 SOD	1.74 ac	0.85 ac
<b>Totals (ac)</b>		<b>4.39 ac</b>	<b>4.99 ac</b>

<sup>3</sup> Impact source (USACE 2004), (USACE 2005), and (USACE 2007).

Table 3 Hydrology Observations

Date	Surface Observations	Water Level (inches below soil surface unless otherwise noted)	
March 16, 2014	The site is almost completely under water.	Well 1	3.5" inundation
		Well 2	4.5" inundation
		Well 3	4.5" inundation
		Well 4	6"
		Well 5	7" inundation
		Well 6	6" inundation
April 3, 2014	The site is inundated.	Well 1	Saturated to the soil surface
		Well 2	Saturated to the soil surface
		Well 3	Saturated to the soil surface
		Well 4	<b>16.5"</b>
		Well 5	Saturated to the soil surface
		Well 6	Saturated to the soil surface
April 24, 2014	Approximately 90% of the wetland area is inundated or saturated to the surface.	Well 1	1"
		Well 2	2"
		Well 3	Saturated to the soil surface
		Well 4	6"
		Well 5	1"
		Well 6	1.5" inundation

Table 4 Relative Woody Cover in the Wetland

Species	Relative Cover
hardhack ( <i>Spiraea douglasii</i> )	3%
redosier dogwood ( <i>Cornus alba</i> )	2%
twinberry honeysuckle ( <i>Lonicera involucrata</i> )	3%
black cottonwood ( <i>Populus balsamifera</i> )	3%
Nootka rose ( <i>Rosa nutkana</i> )	0%
cluster rose ( <i>Rosa pisocarpa</i> )	8%
Pacific ninebark ( <i>Physocarpus capitatus</i> )	4%
Pacific willow ( <i>Salix lasiandra</i> )	33%
Oregon ash ( <i>Fraxinus latifolia</i> )	6%
tall oregongrape ( <i>Mahonia aquifolium</i> )	1%
snowberry ( <i>Symphoricarpos albus</i> )	3%
Sitka willow ( <i>Salix sitchensis</i> )	18%
Pacific crabapple ( <i>Malus fusca</i> )	0%
Scouler's willow ( <i>Salix scouleriana</i> )	5%
willows ( <i>Salix spp.</i> )	8%
Sitka spruce ( <i>Picea sitchensis</i> )	1%
bigleaf maple ( <i>Acer macrophyllum</i> )	0%
red alder ( <i>Alnus rubra</i> )	2%

Table 5 Relative Woody Cover in the Buffer

Species	Relative Cover
snowberry ( <i>Symphoricarpos albus</i> )	21%
hardhack ( <i>Spiraea douglasii</i> )	2%
tall oregongrape ( <i>Mahonia aquifolium</i> )	24%
Douglas-fir ( <i>Pseudotsuga menziesii</i> )	18%
Pacific willow ( <i>Salix lasiandra</i> )	0%
bigleaf maple ( <i>Acer macrophyllum</i> )	12%
red elderberry ( <i>Sambucus racemosa</i> )	4%
Sitka spruce ( <i>Picea sitchensis</i> )	1%
Pacific crabapple ( <i>Malus fusca</i> )	0%
Cascara buckthorn ( <i>Frangula purshiana</i> )	0%
red alder ( <i>Alnus rubra</i> )	2%
salmonberry ( <i>Rubus spectabilis</i> )	1%
black cottonwood ( <i>Populus balsamifera</i> )	10%
Sitka willow ( <i>Salix sitchensis</i> )	1%
willows ( <i>Salix spp.</i> )	1%
redosier dogwood ( <i>Cornus alba</i> )	0%
rugosa rose ( <i>Rosa rugosa</i> )	1%
Scouler's willow ( <i>Salix scouleriana</i> )	2%

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8. [WSDOT] Washington State Department of Transportation. 2009. SR 202 SR 520 to Sahalee Way Stage 2 Wetland Mitigation Site #2 As-Built Planting Plan.
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