Excerpts of "Plan for Riparian Habitat Restoration Buffer and Visual Buffer Planting" - October 2013 - Updated June 2016
Prepared by Watsonville Wetlands Watch - Jonathan Pilch, Director of Restoration Programs

Area A – 50 foot riparian buffer

Outstanding Requirements:

County Condition I.F.2 (pg. 3): Submit restoration plans that detail the riparian restoration to take place, including a 5 year monitoring and maintenance plan for the restoration project.

Area B – HWY 1 visual buffer area, which includes Cal Tran's right-of-way and areas on your property that would contribute to the visual buffer

Outstanding Requirements:

County Condition I.F.1 (pg. 3): Submit landscape plans that include details for a vegetative visual buffer to be planted on site and outside of Highway 1 right of way at the north property line of APN 052-511-06

Area C- Vegetation planted along Ranport Road

Outstanding Requirements:

County Condition V.E (pg. 5): Plantings within the Ranport Road right of way must be maintained in perpetuity by the property owner and shall be removed at the expense of the property owner at the County's request.

Restoration and Landscape Plans:

Area A – 50 foot Riparian Habitat Buffer

Existing Conditions: The Williams Tree Service Property contains 2.2 acres of riparian habitat on the east and west sides of the Harkins Slough channel that runs through the property, located on parcel APN 052-511-08. The riparian habitat is located near the headwaters of the east branch of upper Harkins Slough. Just downstream of the property, Harkins Slough opens into a larger habitat that supports willow scrub, emergent freshwater marsh, freshwater wetland, oak woodland and coastal prairie habitat and includes a number of permanently protected properties, including the Harkins Unit of the US Fish and Wildlife Service Ellicot Slough Reserve, the Harkins Unit of the Watsonville Sloughs Ecological Reserve owned by the California Department of Fish and Wildlife as well as a number of conservation easements. Harkins Slough is an important body of water within the greater Watsonville Slough System, supporting a diversity of wildlife species including important resident and migratory bird species, State and federally listed threatened, endangered, and species of special concern and provides water for recycled water distribution and groundwater recharge.

Riparian Habitat Buffer: The outstanding permit requirement by Santa Cruz County is County Condition I.F.2, which requires the submittal of a restoration plans that detail the riparian restoration to take place, including a 5 year monitoring and maintenance plan for the restoration project. The restoration plan was submitted to the County by Williams Tree Service in the fall of 2013 and the County subsequently required Williams Tree Service to implement the restoration plan.

A portion of the riparian buffer planting was planted in 2012 as in that year, at the request of Williams Tree Service, Watsonville Wetlands Watch directed Williams Tree Service staff in the installation of native plants adjacent to Harkins Slough within the 50 foot riparian habitat buffer. The County subsequently determined that those native plants that had survived from this original planting may be counted toward meeting the objective of restoring the riparian buffer. A survey of this area was conducted in June of 2013 and then again June of 2016 to determine the survival and coverage of native plants installed. The following native plants previously installed were recorded and will serve to support the effort to complete installation of the required 50 foot riparian buffer, per Santa Cruz County approval.

Table 1. Existing Native Plant Material from Previous Planting Efforts, June 24, 2013

Species	Common Name	
Carex barbarae	Santa Barbara Sedge	7
Euthamia occidentalis	Western Goldenrod	1
Frangula californica	Coffeeberry	1
Juncus effusus	Bog Rush	1
Juncus patens	Common Rush	1
Lonicera involucrata	Twinberry	2
Quercus agrifolia	Coast Live Oak	6
Ribes sanguineum	Pink Flowering Currant	1
Rubus ursinus	California Blackberry	7
Salix laevigata	Yellow Willow	4
Salix laesiolepis	Arroyo Willow	7
Sambucus nigra	Blue Elderberry	3
Satureja douglausii	Yerba buena	1
Total		42

Installation of Riparian Habitat Buffer

The total acreage for the riparian habitat buffer is .63 acres.

Summary of work completed between 2013 and the present: No additional work toward the completion of the riparian buffer has been undertaken since the submittal of the restoration plan by Williams Tree Service in October of 2013. Correspondingly, the number of live native plants counted in the 2013 census has decreased from 102 to 42 counted in the 2016 survey. While the number of native plants on site has decreased, the vigor of those native plants that have survived is high. The required plants to be installed within the riparian buffer have therefore been increased in order to compensate for the loss of previously planted native plants on site. Work towards completion of the riparian habitat buffer requirement will be initiated per the description below in accordance with the timeline determined by Santa Cruz County.

Site preparation: Due to a lack of maintenance of prior plantings, site preparation activities will be required to prepare the site prior to planting. In order to ensure survival of native plantings, invasive plant species growing within the riparian buffer area will need to be controlled prior to planting. In order to achieve this, all invasive plants, such as poison hemlock, *Conium maculatum*, will be mowed prior to seed set. In the fall months, any living invasive plants should be hand grubbed and removed from the site to the maximum extent feasible. **A 4" – 5" wood chip mulch layer will then spread throughout the riparian buffer planting** area in order to suppress the germination of invasive plants that would compete with the native plantings. No soil disturbance activities to prepare the site will be utilized due to the presence of native plants that were either installed in previous years or have begun

to grow on site during the time since the set-back from the slough channel was established in the summer of 2012. There are small populations of perennial pepperweed, *Lepidium latifolium*, and Vinca, *Vinca minor*, that will be treated with an herbicide specified for use within a riparian buffer and applied by a licensed applicator. No other herbicide should be used within the riparian buffer due to impacts of sensitive plant species. Due to the proximity of water and associated impacts to aquatic life, no surfactants will be used with the herbicide.

Installation of Native Plant Material: Native plant material will be installed within the 50 foot buffer in order to create dense native riparian habitat. Existing vegetation constitutes approximately 8% of the area within the buffer and includes arroyo willow trees, coast live oak, Santa Barbara sedge, as well as other plants listed in the existing conditions section above. An additional 817 native plants will be installed throughout the buffer in the quantities listed below (Table 2.). Native plants will be installed at the planting spacing listed in Table 2 and are designed to constitute the listed total percent cover of area. Plants will be installed into native soil. No additional soil amendments will be utilized, due to the high fertility of the soil adjacent to Harkins Slough and the desire to not add nutrients to the slough environment that can impair water quality. Native plants will be installed so that the root crown is level with the soil surface and wood chip will be placed up to the stem of each plant so as to provide a weed free growing area around the native plant. All drainage swales within the riparian buffer areas will be planted and treated with standard erosion control best management practices, including the installation a biodegradable erosion control blankets and installation of native plants at no greater than 5 foot spacing.

Table 2. Native Plant Material for Installation of Riparian Buffer

Species	Common Name	spacing	% of Area	Qty
Existing Vegetation			8.0%	
Achillea millifolium	Yarrow	3	1.0%	27
Artemisia douglasiana	Mugwort	3	3.0%	80
Carex barbarae	Santa barbara sedge	3	2.0%	53
Elymus tritkoides	Creeping wild rye	3	6.0%	160
Euthamia occidentalis	Marsh goldenrod	3	4.0%	107
Frangula californica	Coffeeberry	8	3.0%	11
Heracleum maximum	Cow parsnip	4	1.0%	15
Juncus patens	Spreading rush	4	3.0%	45
Juncus effusis	Bog rush	4	2.0%	30
Quercus agrifolia	Coast Live Oak	8	1.0%	4
Rosa californica	California rose	4	2.0%	30
Rubus ursinus	California blackberry	5	9.0%	86
Salix lasiolepis	Arroyo willow	10	36.0%	86
Salix lasiandra	Yellow willow	10	17.0%	41
Symphoricarpos albus	Snowberry	3	1.0%	27
Symphyotrichum chilense	California aster	4	1.0%	15
Total			100.0%	817

Irrigation: A drip irrigation system will be installed in order to apply irrigation water at a rate of 2 - 4 gallons per hour per plant and should be operated as needed for two years after the installation so as to ensure sufficient soil moisture in the root zone for the installed plants.

Installation of Exclusionary Fencing: A four foot high split rail fence will be installed along the perimeter of the habitat buffer in order to separate the working yard from the riparian habitat buffer.

Maintenance of Riparian Buffer: The entire riparian buffer will be maintained weed-free in order to prevent the establishment and spread of non-native weed species that will limit the establishment of the riparian buffer plantings. Most non-native invasive weed species on site will be removed by hand or with a weed-whip set at a height no lower than 4" above the soil surface in order to limit the impact of this activity on wildlife. All non-native weed species with that are annual or biannual with the exception of annual grasses will be removed by hand only. Invasive perennial plants, such as Vinca, Perennial pepperweed, Bermuda grass, Kukya grass, or other species that will not respond to hand removal methods will be treated with an herbicide approved for use adjacent to a wetland. Applications will be made by a licensed applicator. Planting basins of installed native plants should be maintained free of weeds and maintained regularly so that installed plants receive sufficient sunlight and soil moisture. In order to facilitate maintenance of the riparian plantings, each shrub will be flagged with colored flagging tape and each herbaceous plant should be flagged with either a pin flag or flagging tape. All flagging will be removed after two years.

Performance Measures: The riparian buffer installation is designed to meet or exceed the following performance measures:

Vegetative Cover, including all plant species: The performance standard for vegetative cover is important to ensure that bare ground does not persistent within the habitat buffer which could create conditions for soil erosion or establishment of invasive plants. Wood chip mulch used for weed suppression or naturally occurring litter would be included as a vegetation layer for the purpose of measuring this metric, as this will inhibit soil erosion or establishment of invasive plants.

Table 3. Riparian Buffer Cover Performance Metric

Riparian Buffer	Year I	Year II	Year III	Year IV	Year V
Total Percent Cover	70%	80%	90%	90%	90%

Native Plant Survival: The performance standard for native plantings will be measured in over-all plant survival.

Table 4. Riparian Buffer Native Plant Survival Performance Metric

Riparian Buffer	Year I	Year II	Year III	Year IV	Year V
Native Plant Species	90%	90%	90%	80%	80%

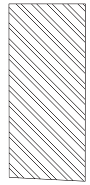
Native Plant Understory, including grasses and herbaceous plants: The performance standard for native grass and herbaceous plants will be measured in percent cover of native plant species. Percent herbaceous cover will be monitored along permanent transect lines, utilizing the point intercept method

to establish percent cover of native and non-native species with sufficient point collection to ensure statistical significance.

Table 5. Riparian Buffer Native Herbaceous Understory Performance Metric

Riparian Buffer	Year III	Year IV	Year V
Native herbaceous understory	30%	40%	40%

See L1 for hatching of Riparian Buffer Area



Area B: Highway 1 Visual Buffer

Existing Conditions and Work Completed to Date: The Williams Tree Service Property is currently in view from the Highway 1 corridor. A visual buffer should be planted on site and outside of the Highway 1 right of way at the north property line. Currently there are several native plant species growing in this area, including coast live oak, California blackberry, coyote brush and dogwood. Additionally in spring of 2013, Williams Tree Service installed 31 coast redwood, *Sequoia sempervirens*, within the interior of the property that will serve to support the visual buffer planting planned for November and December of 2013, as approved by Santa Cruz County. This planting appears as Visual Buffer 2 on the project location map. The coast redwoods were planted in 2 rows; one with 15 trees and a second with 16 trees. No other work has been completed since the submission of project plans in October 2013, however some existing native plants have increased growth and screening on site.

Installation of the Visual Buffer: The total acreage for this planting should be approximately .2 acres in order to install sufficient vegetation to block the view of the property from the Highway 1 corridor. The project proponent of permit application #161014 has provided a visual buffer landscape plan which specifies the quantities and species of native plants proposed for use to provide visual screening based on their simulation designs.

Site preparation: Little site preparation will be required for the installation of plant material to achieve the desired percent cover of native plant material within the visual buffer. No soil disturbance activities to prepare the site should be utilized due to the presence of native plants. The limited populations of non-native plants found growing on the site currently should be removed through hand grubbing methods prior to installation of native plants. No additional soil disturbance activities will be required or undertaken.

Installation of Native Plant Material: Native plant material should be installed within the visual buffer in order to create a dense and tall visual buffer. Existing native plants that support visual screening will be maintained in order to ensure ongoing visual screening. Plants will be installed into native soil. A slow release fertilizer will be utilized within the planting hole in order to provide fertility to support quick growth of installed plants. Native plants are to be installed so that the root crown is level with the soil surface. The planting basin will be covered with a layer of wood chips at a depth of 4 inches to extend out in a 2' circumference so as to reduce weed competition within the planting basin.

Irrigation: A drip irrigation system will be installed in order to apply irrigation water at a rate of 2 - 4 gallons per hour per plant and will be operated as needed for two years after the installation so as to ensure sufficient soil moisture in the root zone for the installed plants.

Maintenance of Visual Buffer: The entire visual buffer will be maintained weed-free in order to prevent the establishment and spread of non-native weed species that will limit the establishment of the riparian buffer plantings. Most non-native invasive weed species on site will be removed by hand or with a weed-whip set at a height in order to limit the impact of this activity on wildlife. Planting basins of installed native plants will be maintained free of weeds and maintained regularly so that installed plants receive sufficient sun-light and soil moisture. In order to facilitate maintenance of the plantings, each shrub will be flagged with colored flagging tape. All flagging should be removed after two years.

Performance Measures: The visual buffer installation is designed to meet or exceed the following performance measures:

Visual Buffer Planting Survival, including all tree and shrub species. This performance metric will include the percent survival of installed native plants to meet the following survival percentages:

Table 7. Visual Buffer Planting Survival

Visual Buffer	Year I	Year II	Year III	Year IV	Year V
Tree and Shrub Species	100%	100%	100%	90%	90%

Native Plant Vigor. This performance metric is designed to reflect the vigor of installed plants and ensure that vigor is maintained at a sufficient level to support good long term growth and establishment of the visual buffer. Vigor will be recorded on a scale of 1 - 5.

Table 8. Visual Buffer Vigor Rating

Visual Buffer	Year I	Year II	Year III	Year IV	Year V
Average Vigor	4	4	4	4	4

Annual Performance Monitoring:

Monitoring of performance of the riparian and visual buffer plantings will be conducted annually for a five year period, per the Santa Cruz County requirement. Annual monitoring will document existing conditions in relation to the performance metrics detailed within this restoration and landscape plan. Measurements of percent cover will be made in the late spring or early summer of each year. If a performance measure is not achieved, commensurate action, including replanting of native plant species or improved maintenance practices will be made so as to ensure the performance metric will be met in the following year.

An annual monitoring report will be provided to Santa Cruz County by January 1 of each year. The monitoring plan will document performance to date in relation to performance metrics, provide a summary of maintenance actions performed during the year, document any planned management requirements to meet future performance metrics based on that year's monitoring results, and make recommendations for maintenance in future years.

Monitoring and reporting will be conducted by a qualified biologist or botanist.

Table 9. Annual Maintenance and Monitoring Schedule:

Williams Tree Service Visual and Riparian Buffer Maintenance Schedule												
Riparian Buffer	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maintain installed plant's planting basin free of weeds		■	■	■	■	■	■	■	■	■	■	
Remove invasive plants throughout the planting area		■	■	■	■	■	■	■	■	■	■	
Maintain irrigation system, as needed			■	■	■	■	■	■	■	■		
Visual Buffer												
Maintain installed plant's planting basin free of weeds		■	■	■	■	■	■	■	■	■	■	
Remove invasive plants throughout the planting area		■	■	■	■	■	■	■	■	■	■	
Maintain irrigation system			■	■	■	■	■	■	■	■		
Performance Monitoring												
Coordinate Monitoring					■	■	■					
Install replacement native plants if required to meet the following year's performance metric, if necessary											■	■
Review draft monitoring report								■				
Send annual monitoring report to Santa Cruz County											■	

Landscape Plan

GREGORY LEWIS LANDSCAPE ARCHITECT #2176
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LICENSED LANDSCAPE ARCHITECT GREGORY LEWIS No. 2176 Signature 4/30/2018 Renewal Date 6/29/16 Date STATE OF CALIFORNIA

Pacific Coast Hardwoods
1400 Ranport Road, Watsonville, CA

Revision	
Date	6/29/16
Scale	As Noted
Drawn	Greg
Job	
Sheet	L2
of	