APPENDIX A-3: Cost Engineering

ALISO CREEK MAINSTEM
ECOSYSTEM RESTORATION STUDY
Orange County, California

September 2017

US Army Corps
of Engineers

Orange County Public Works
Environmental Resources
Department

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CLARIFICATION SHEET

EXPANATORY NOTE FOR DEVELOPMENT OF ALTERNATIVES

The development of the focused array of alternatives (described in Chapter 3 of the Draft IFR) consisted of assessing measures which could be combined with each base alternative (i.e. Base Alternative 2, 3, and 4) to create variations of the alternatives. Cost effectiveness and incremental cost analysis was utilized to develop cost effective alternatives.

This appendix refers to a list of the measures, also referred to as "additional measures". It should be noted some measures listed were subsequently screened out, and not carried forward in the alternatives development. Some of the names appear differently in other reports, and are noted here for clarification, if applicable.

The table below summarizes these actions.

Measure	**Other Names Used**	**Screening: Retained?**
East Bank Access Road Construction		Yes; combined with Base alt
Repurposing of AWMA Road	Old AWMA Road	Yes; combined with Base alt
Reconnection of Abandoned Oxbow		Yes
Stream Lengthening Downstream of Wood Canyon Creek Confluence	Sinuosity or Stream Lengthening downstream of Wood Canyon Creek	Yes
Wood Canyon Connection		Yes
Recontouring of Existing Channel Betwn ACWHEP and AWMA Rd Bridge		Yes
Sulphur Creek Connection		Yes, but added to base alternatives
Removal of two 10 ft high vertical drop structures		Yes
Widening in vicinity of Aliso Creek Road Bridge		Yes
Recontouring Existing Channel from 1,400 ft upstream of Aliso Creek Road Bridge to Pacific Park Drive		No
Skate Park/Soccer Field Relocation		No
Stream Lengthening at Skate Park		No
Stream Lengthening Downstream of Pacific Park Drive	Sinuosity downstream of Pacific Park Drive	Yes
Construction of Newbury Riffle Structure	Newbury Riffle Weir	Yes
FRM (Flood Risk Management) Riprap Bank Protection	Streambank Protection (Buried)	Yes, but not under FRM category
Construction of Backwater Areas		No

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ALISO CREEK ECOSYSTEM RESTORATION STUDY
ORANGE COUNTY, CALIFORNIA

TSP DRAFT
COST APPENDIX
ALTERNATIVES 2, 3, AND 4

Prepared for:

U.S. Army Corps of Engineers
Los Angeles District
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Los Angeles, California 90053

September 2015

TETRA TECH

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TABLE OF CONTENTS

LIST OF ATTACHMENTS

1. INTRODUCTION

1.1 General

The Aliso Creek watershed is located in Orange County, California, draining the area from the Cleveland National Forest to the Pacific Ocean. The Aliso Creek Ecosystem Stabilization project is intended to stabilize the existing stream bank and invert, to provide riparian habitats, and to achieve aquatic wildlife connectivity within the project limits. The area in which the project will be implemented (referred to as the project site) extends from the South Orange County Wastewater Authority (SOCWA) Coastal Treatment Plant (CTP) Bridge (downstream) to Pacific Park Drive (upstream). This reach of the creek contains both natural and fully engineered sections that are experiencing various degrees of degradation. Four proposed alternatives are being evaluated for the project: a No Action alternative and three design alternatives.

1.2 Purpose

The purpose of this appendix is to present preliminary cost estimates for the design alternatives that are consistent with the feasibility level of design to be used in an economic analysis of the alternatives. The costs discussed in this appendix are not for budgetary purposes and are subject to change.

1.3 Design Features

The design features of the alternatives have been developed at the feasibility level. The features include components necessary to implement the baseline design and additional measures that would provide further benefits (see Design Appendix). The primary construction components include excavation and filling; installation of riprap and grouted riprap structures; clearing and grubbing; modification of storm drain outlets; channel connections; construction of roadways; installation of decomposed granite and natural trails; demolition of existing pavement, concrete, and riprap; and landscaping.

2. COST ESTIMATES FOR ALTERNATIVES

2.1 Basis of Estimates

The available design documents for the project elements are the following:

- Aliso Creek Ecosystem Restoration Study, Alternative Design Drawings (Attachment of the Design Appendix), Tetra Tech, November 2014

- Aliso Creek Ecosystem Restoration Study, Design Appendix, which is part of the Tentatively Selected Plan (TSP)

2.2 Design Alternatives

Cost estimates have been developed for the four alternatives: a No Action alternative and three design alternatives. The design alternatives are themselves broken into baseline design features and additional measures that could be incorporated into the baseline design.

Alternative 1 is the No Action alternative; therefore, no construction costs are associated with it. The baseline design of Alternative 2 extends only from the SOCWA CTP Bridge on the downstream end to the Aliso Creek Wetland Habitat Enhancement Project (ACWHEP) structure on the upstream end. Alternative 2 is designed to stabilize the existing streambed and provide a new floodplain within the margins of the incised channel. The baseline design of Alternative 3 is intended to balance the earthwork to minimize the import and export of materials while raising the streambed to reconnect with the historical floodplain. This balancing is achieved primarily by raising/lowering the streambed profile and varying the spacing of the riffle structures. The difference between Alternative 4 and Alternative 3 is that the streambed in the baseline design of Alternative 4 would be raised to an intermediate elevation between those of Alternative 2 and Alternative 3.

Each alternative consists of the baseline features and the following additional measures:

A. East bank access road construction

B. Repurposing of AWMA Road

C. Reconnection of abandoned oxbow

D. Stream lengthening downstream of Wood Canyon Creek confluence

E. Wood Canyon Creek connection

F. Re-contouring of existing channel between ACWHEP and the AWMA Road Bridge

G. Sulphur Creek connection

H. Removal of two 10-foot- high vertical drop structures

I. Widening in the vicinity of the Aliso Creek Road Bridge

J. Re-contouring of the existing channel from 1,400 feet upstream of the Aliso Creek Road Bridge to Pacific Park Drive

K. Skate park/soccer field relocation

L. Stream lengthening at skate park

M. Stream lengthening downstream of Pacific Park Drive

N. Construction of Newbury riffle structures

FRM. (Flood Risk Management). Riprap bank protection

BA. Construction of backwater areas

These additional measures are considered optional at this time, and have been estimated separately from the baseline design. Any analysis of the measures would need to ensure that all associated markups referenced in this report are added to the measures total cost in order to be comparable to the baseline.

2.2.1 Quantities

The cost estimate is based on project quantity take-offs that have been calculated in accordance with the design documents mentioned in Section 2.1. The quantity calculation process is discussed in the following subsections, and detailed quantity take-offs are provided in Attachment B. The detailed quantities assume the following waste/loss factors for the project materials:

Soil swell/shrinkage	10 percent
Riprap overplacement	15 percent
Asphalt/concrete overplacement/loss	10 percent
Geotextile fabric waste/loss	5 percent

2.3 Unit Costs and Assumptions

2.3.1 Unit Cost Development

The alternative cost estimates consist of unit costs that have been obtained from various sources, which include the Micro-Computer Aided Cost Estimating System (MCACES) cost database, RSMeans, recent project bids, and other recently completed construction cost estimates. The assumptions for the primary cost items are discussed in Sections 2.3.2 and 2.3.3.

2.3.2 Borrow/Disposal Areas and Materials

A goal of the project is to reuse excavated material from the channel for all fill material requirements. There will be no earthen borrow material brought to the project site for use within the channel. However, all stone materials will be trucked to the site and are assumed to be available in the greater Orange County area.

Any excess earthen material is assumed to be disposed of within the project limits. The disposal area has not been determined as of the time of this estimate. However, it is assumed that any excess earthen would be hauled by truck to the disposal location and stockpiled until it is placed, lightly compacted, and graded outside the channel footprint. Thus, no landfill tipping fees on excess earth would be required.

2.3.3 Construction Cost Item Assumptions

The primary construction components of this project are described in the following subsections, along with the assumptions used in developing the construction cost estimates for both the baseline features and the additional measures.

2.3.3.1 Clearing and Grubbing

This construction cost item includes the clearing and grubbing of the existing channel slopes before any earthwork is performed. It involves the use of a hydraulic excavator, a dozer, and trucks for removal of material.

2.3.3.2 Excavation by Hydraulic Excavators

This construction cost item includes the excavation of material in the existing channel bed and slopes. The unit cost accounts for excavating with the use of hydraulic excavators and assumes that 25 percent of the total excavation quantity in each reach would be completed in rugged conditions that would limit the productivity of the excavating crew. The use of front-end loaders is assumed for pushing the excavated material to a local stockpile. The excavated area would be graded as necessary.

2.3.3.3 Loading and Hauling to On-Site Disposal Location

This construction cost item includes the loading and hauling of all excess excavated material to the selected on-site disposal location. The haul trucks are assumed to travel an average of 2 miles (one way) to transport the material to the disposal location. The quantity for this item accounts for any excavated material that is not reused as backfill in each reach.

2.3.3.4 Placement of Compacted Fill in Channel

This construction cost item includes the placement fill material to form the new channel layout. The unit cost assumes that 100 percent of the required fill quantity for a particular reach would be material excavated from the same reach. However, if more fill is required in a given reach, then it is assumed that the fill material would come from one of the two abutting reaches. The unit cost assumes that the fill would be transported from a local stockpile, placed with a front-end loader, compacted with a vibratory roller, and then finally graded.

2.3.3.5 Placement of Compacted Fill in Disposal Location

This construction cost item includes the placement of all unused excavated earthen material. The unit cost assumes that the fill would be obtained from a stockpile at the disposal location, placed with a front-end loader, lightly compacted, and graded to match the local terrain.

2.3.3.6 Installation of Sheet Pile Retaining Wall

This construction cost item includes the driving of a steel sheet pile retaining wall. The sheet pile wall is assumed to consist of piles weighing 27 pounds per square foot that would be installed by a subcontractor with typical pile-driving equipment.

2.3.3.7 Placement of 9- and 18-Inch-High Riprap Riffle Structures

This construction cost item includes the placement of riprap riffle structures within the channel bed. The unit cost accounts for purchasing the stone material, transporting the material to the project site, and placing the stone over a geotextile layer by means of hydraulic excavators.

2.3.3.8 Placement of Grouted 6-Foot High Riprap Riffle Structures

This construction cost item includes the placement of large riprap riffle structures within the channel bed. The unit cost accounts for purchasing the stone material, transporting the material to the project site, placing the stone over a geotextile layer with the use of hydraulic excavators, and grouting the stone in place. In certain reaches, overexcavation would also be required to place the rock in the designated locations.

2.3.3.9 Placement of Riprap Bank

This construction cost item includes the placement of a riprap bank as erosion protection for the utilities and roadways that run through this project site. The unit cost accounts for purchasing the stone material, transporting the material to the project site, and placing the stone over a geotextile layer with the use of hydraulic excavators. In certain areas, overexcavation would also be required to achieve the placement depths.

2.3.3.10 Installation of Riprap Downdrain for Existing Pipe Outlet

This construction cost item includes the installation of a downdrain structure that consists of riprap. The unit cost accounts for purchasing the riprap material, transporting the material to the project site, and placing the stone with the use of hydraulic excavators over a geotextile layer. Placement of the riprap for the downdrain would also require some excavation.

2.3.3.11 Modifications to Existing Storm Drain Outlets

This construction cost item includes modifications of various storm drain outlets along the channel. It is assumed that the storm drain modifications would require some earthwork, demolition, and replacement of piping, and placement of riprap.

2.3.3.12 Construction of Paved Access Road

This construction cost item includes the placement of a new asphalt-paved access road. The road is assumed to be 16 feet wide, and the unit cost accounts for the placement of an aggregate base as well.

2.3.3.13 Channel Connection (Wood Canyon Creek Confluence)

This construction cost item includes the construction activities required to connect Wood Canyon Creek to the newly designed channel. The channel connection is assumed to require earthwork and the placement of a riprap channel.

2.3.3.14 Channel Connection (Sulphur Creek)

This construction cost item includes the construction activities required to connect Sulphur Creek to the newly designed channel. The channel connection is assumed to require earthwork, installation of grouted and ungrouted riprap, storm drain construction, and planting of vegetation.

2.3.3.15 Removal of Existing Drop Structures

This construction cost item includes the removal of two concrete drop structures. The cost estimate assumes that the structures would be demolished, and all materials would be hauled off site for disposal.

2.3.3.16 Removal of Existing Grouted Riprap at Drop Structures

This construction cost item includes the removal of grouted riprap at the drop structure locations. The unit cost assumes that all removed material would be hauled off site for disposal, and a tipping fee would be paid at the landfill or other disposal location.

2.3.3.17 Removal of Existing Grouted Riprap Downstream of AWMA Road

This construction cost item includes the removal of grouted riprap just downstream of AWMA Road. The unit cost assumes that all removed material would be hauled off site for disposal, and a tipping fee would be paid at the landfill or other disposal location.

2.3.3.18 Demolition of ACWHEP Structure

This construction cost item includes the removal of the top layers of the ACWHEP structure, which is assumed to consist of grouted riprap with a concrete slab on the top. The rest of the required earthwork is assumed to be included in the other earthwork items. The unit cost assumes that all removed material would be hauled off site for disposal, and a tipping fee would be paid at the landfill or other disposal location.

2.3.3.19 Hydroseeding of Slopes

This construction cost item includes the hydroseeding of all slopes in the newly constructed channels.

2.3.3.20 Installation of Landscape Improvements

This construction cost item includes the landscape planting within the newly constructed channel. The unit costs for this item were obtained cost estimate for the Los Angeles River Ecosystem Restoration Project (Tetra Tech, 2014a). The unit costs are assumed to account for all required vegetation, because no planting plans have been established at this time.

2.3.3.21 Demolition of Skate Park

This construction cost item includes the demolition of the existing concrete surface of the skate park. The unit cost assumes that all concrete would be transported off site and disposed of at an appropriate facility.

2.3.3.22 Removal of Buildings

This construction cost item includes the demolition of several small structures at the skate park/soccer field complex.

2.3.3.23 Removal of Canopy Structures

This construction cost item includes the demolition of any canopy structures at the skate park/soccer field complex.

2.3.3.24 Removal of Concrete Paving

This construction cost item includes the demolition of any concrete pavement at the skate park/soccer field complex. The removed material would require hauling and disposal, with the associated costs.

2.3.3.25 Removal of Asphalt Paving

This construction cost item includes the demolition of the asphalt-paved parking lots and driveways at the skate park/soccer field complex. It is assumed that all removed asphalt would be hauled off site for disposal.

2.3.3.26 Removal and Salvaging of Electrical Poles

This construction cost item includes the demolition of existing electrical poles at the skate park/soccer field complex. It is assumed that the contractor would be able to salvage these poles.

2.3.3.27 Removal of Artificial Grass

This construction cost item includes the removal of the artificial grass on the soccer field. It is assumed that the grass would be removed in such a manner that it could be reused at the new skate park/soccer field complex.

2.3.3.28 Removal of Fence

This construction cost item includes the removal of all the fencing at the skate park/soccer field complex.

2.3.3.29 Installation of Concrete Skate Park

This construction cost item includes the construction of the new skate park facility, which is assumed to be a similar concrete-constructed park located across Alicia Parkway in the parking lot of the Federal Building.

2.3.3.30 Artificial Grass Placement

This construction cost item includes the placement of two artificial-turf soccer fields at the new skate park/soccer field complex. The cost estimate assumes that the material for one of the new soccer fields would be the artificial turf salvaged from the demolished soccer field. The other field would require the purchase of new artificial grass.

2.3.3.31 Building Reconstruction

This construction cost item includes the installation of two new prefabricated steel buildings for the skate park/soccer field complex. The new structures are assumed to be similar to the demolished structures at the original complex.

2.3.3.32 Canopy Placement

This construction cost item includes the installation of new canopies at the new skate park/soccer field complex.

2.3.3.33 Asphalt Placement

This construction cost item includes the installation of a new asphalt parking lot at the new skate park/soccer field complex.

2.3.3.34 Removal of Existing Asphalt Concrete Pavement

This construction cost item includes the demolition of the existing asphalt concrete access road that runs parallel to the existing channel. It is assumed that all demolished material would be hauled off site for disposal.

2.3.3.35 Repurposing of AWMA Road

This construction cost item includes the repurposing of the existing AWMA Road, which would involve removing the current asphalt roadway and installing a decomposed granite trail.

2.3.3.36 Installation of 6-Foot-Wide Decomposed Granite Trail

This construction cost item includes the installation of a 6-foot-wide decomposed granite trail. To create a level surface for the trail, fill would be required. A masonry block wall would also be required to contain the fill beneath the decomposed granite surfacing.

2.4 Price Level

The effective price level date for the cost estimates is November 2015. This date applies to all elements of the alternative cost estimates.

2.5 Spreadsheet Estimates

Alternative cost estimates have been developed for all construction activities shown in the alternative design drawings. These estimates are provided in Attachment 3 and the cost estimates provided in the spreadsheet are organized by construction components within each reach.

2.6 Project Markups and Functional Costs

2.6.1 Escalation

No escalation has been included in the cost estimates.

2.6.2 Alternative Contingencies

An abbreviated risk analysis (ARA) was completed to develop the contingencies for each of the design alternatives. A single risk register was developed because of the similarity of the construction components associated with the three alternatives and their measures. The individual construction element contingencies calculated from the risk register were then extracted and applied to the construction costs of each alternative to generate the weighted construction contingencies. The ARA and the spreadsheet of calculated construction contingencies are provided in Attachment 4.

2.6.3 Real Estate

No real estate costs have been included in the alternative cost estimates.

2.6.4 Relocation

No relocation costs have been included in the alternative cost estimates.

2.6.5 Mobilization and Demobilization

Costs for this item were estimated at 6 percent of the construction costs. This item includes transporting equipment and crews to the project site, as well as setting up site facilities and staging areas.

2.6.6 Diversion and Control of Water

Costs for this item were estimated at 4.0 percent of the construction costs. This item includes all costs incurred by the contractor for diverting and controlling water within the project work areas. It is assumed that the contractor would most likely complete the construction reach by reach and would coffer off the upstream and downstream ends of each reach with earthen coffer dams. During construction it is assumed the flows would be diverted around the site through diversion piping, and well points would be installed throughout the reach under construction.

The total cost of dewatering for each reach within each alternative has been compared with other similar projects, and has been found to be within reason for this level of analysis. Each additional measure is also assumed to incur additional dewatering costs. Therefore the 4.0 percent markup has been applied to each additional design measure within the cost estimate.

2.6.7 Planning, Engineering, and Design

Costs for this item were estimated at 15.5 percent of the construction costs. This item covers the preparation of plans and specifications and engineering during construction. This percentage was provided and verified by the U.S. Army Corps of Engineers, Los Angeles District, Cost Engineering Division.

2.6.8 Supervision and Administration

Costs for this item were estimated at 6.5 percent of the construction costs. This item covers construction management during the construction phase. This percentage was provided and verified by the Los Angeles District, Cost Engineering Division.

2.6.9 Adaptive Management

Costs for this item were estimated at 3.0 percent of the construction costs. This item covers all required monitoring and adaptive management after construction is completed.

2.6.10 Operations and Maintenance

Costs for this item account for the routine work that is expected to occur each year over the life cycle of the project. Costs were developed for operations and maintenance (O&M) on the basis of the percentages of the original installation costs for each item. A majority of these percentages have been used on recent similar projects and were modified slightly to account for the specifics of this project. A table with the overall O&M costs for each alternative is provided in Attachment 5.

3. REFERENCES

Tetra Tech (Tetra Tech, Inc.). On-going, 2014. Design Appendix for Aliso creek Ecosystem Restoration Study, Prepared for the U.S. Army Corps of Engineers, Los Angeles District, Los Angeles, California.

Tetra Tech. 2014a. Los Angeles River Ecosystem Restoration Feasibility Report, Cost Engineering Appendix, October, 2014.

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USACE. 2008a. Civil Works Cost Engineering, Engineering Regulation 1110-2-1302. Department of the Army, Washington, D.C. September 15.

USACE. 2008b. Construction Cost Estimating Guide for Civil Works. Engineering Technical Letter 1110-2-573. Department of the Army, Washington, D.C. September 30.

USACE. 2014. Civil Works Construction Cost Index System. Engineering Manual 1110-2-1304. Department of the Army, Washington, D.C. March 31, 2014.

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Attachments

LIST OF ATTACHMENTS

A. Site Plan

B. Quantity Take-Offs

C. Alternative Cost Estimates

D. Abbreviated Risk Analysis

E. Operations and Maintenance Costs

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Attachment A

Site Plan

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Site Plan


N
W
E
S
Wood Canyon Creek
Sulphur Creek
Aliso Creek
ACWHEP Structure
Regional Treatment Plant
Abandoned Oxbow
S-bend
Coastal Treatment Plant
Aliso & Wood Canyons Park
Soka University of America
Pacific Park Dr
Aliso Creek Rd
Aliso Creek Rd
La Paz Rd
Plaza de Lapaz
Kite Hill
Foothill
Palmilla
La Veta
Niguel Woods
Niguel Summit
Coronado Pointe
Pacesette
Lake Chateau
Legend
Aliso Geomorphic Centerline (2009)
Data Source: Tetra Tech 2014
Aerial Source: BING 2014
0
0.25
0.5
1
Miles

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Attachment B

Quantity Take-Offs

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Quantity Estimate - Alternative 2 - Stabilizing D/S of ACWHEP Structure

Project ID: **T32516**

oject Title: Aliso Creek Ecosystem Restoration

Date: **11/5/14**

				Quantity Breakdowns by Reaches								
				Study Reach No.								
				4	5	6	7	8	9	10	11	12
No.	Contract Items	Unit	Net Quantity	CTP Bridge (Sta.69+70) to Abandoned Oxbow (Sta.133+00)	Abandoned Oxbow (Sta.133+00) to Wood Cyn Crk Confluence (Sta.167+80)	Wood Cyn Crk Confluence (Sta.167+80) to ACWHEP (Sta.185+50)	ACWHEP (Sta.185+50) to High Banks (Sta.211+00)	High Banks (Sta.211+00) to Sulphur Crk Confluence (Sta.245+19)	Sulphur Crk Confluence (Sta.245+19) to Ex. Drop Str No.1 (Sta.261+85)	Ex. Drop Str No.1 (Sta.261+85) to Ex. Drop Str No.2 (Sta.275+73)	Ex. Drop Str No.2 (Sta.275+73) to Foxborough Park (Sta.302+00)	Foxborough Park (Sta.302+00) to Pacific Park Dr (Sta.331+33)
	Baseline Design											
1	Clearing and Grubbing	AC	56.85	37.92	12.13	6.80						
2	Excavation (Channel Grading)		224,600	96,700	80,900	47,000						
3	Compacted Fill (Channel Grading)	CY	50,300	17,600	21,700	11,000						
	Net Earthwork (Net Excavation)	CY	**169,300**	**77,300**	**57,000**	**34,900**						
4	Riprap Downdrain for Ex. Pipe Outlet	EA	5	3	2	0						
5	Ex. Storm Drain Outlet Modification	EA	0									
6	Hydroseed Slopes	SY	79,306	52,337	20,593	6,376						
7	Landscape Improvements	LS	1									
8	Riprap Protection at Wood Canyon Creek Confluence	CY	340		340							

				Quantity Breakdowns by Reaches								
				Study Reach No.								
				4	5	6	7	8	9	10	11	12
No.	Contract Items	Unit	Net Quantity	CTP Bridge (Sta.69+70) to Abandoned Oxbow (Sta.133+00)	Abandoned Oxbow (Sta.133+00) to Wood Cyn Crk Confluence (Sta.167+80)	Wood Cyn Crk Confluence (Sta.167+80) to ACWHEP (Sta.185+50)	ACWHEP (Sta.185+50) to High Banks (Sta.211+00)	High Banks (Sta.211+00) to Sulphur Crk Confluence (Sta.245+19)	Sulphur Crk Confluence (Sta.245+19) to Ex. Drop Str No.1 (Sta.261+85)	Ex. Drop Str No.1 (Sta.261+85) to Ex. Drop Str No.2 (Sta.275+73)	Ex. Drop Str No.2 (Sta.275+73) to Foxborough Park (Sta.302+00)	Foxborough Park (Sta.302+00) to Pacific Park Dr (Sta.331+33)
	Additional Measurs (A, B, E, F, H, I, J)											
	Additional Measure A											
A.1	6" AC, 16' wide SOCWA Access Road (East Bank)	LF	16,460	5,340	3,310	1,420	2,550	3,170	670			
	Additional Measure B											
B.1	Ex. AC Pavement Removal (West Bank)	SY	18,622	11,089	7,533							
B.2	Repurposing of AWMA Rd (4" DG, 12' wide, West Bank)	LF	8,380	4,990	3,390							
	Additional Measure E											
E.1	Channel Connection (Riprap, Wood Canyon Creek Confluence)	LS	1		1							
	Additional Measure F											
F.1	Excavation (Channel Grading)	CY	29,098				2,106	24,413	2,578			
F.2	Compacted Fill (Channel Grading)	CY	167				4	163	0			
	Net Earthwork (Net Excavation)	CY	**28,900**				**2,100**	**24,200**	**2,600**			
	Additional Measure H & I											
HI.1	Ex. Drop Structure Removal	EA	2						1	1		
HI.2	Clearing and Grubbing	AC	10.14						4	4.72	1.42	
HI.3	Excavation (Channel Grading)		81,500						31,700	38,000	11,800	
HI.4	Compacted Fill (Channel Grading)	CY	10,100						4,200	4,700	1,200	
	Net Earthwork (Net Excavation)	CY	**70,400**						**27,100**	**32,800**	**10,500**	
HI.5	Riprap (18" High Riffle Structure, Total of 3)	CY	1,982						0	1,982	0	
HI.6	Riprap (6' High Riffle Structure, Total of 3)	CY	6,033						2,011	2,011	2,011	
HI.7	Sheet Pile Retaining Wall	SF	78,783						21,827	44,026	12,930	
HI.8	Ex. Storm Drain Outlet Modification	EA	9						2	7		
HI.9	Hydroseed Slopes	SY	10,265						726	3,114	6,425	
HI.10	Landscape Improvements	LS	1									
HI.11	16' wide Paved Access Road (East Bank U/S of AWMA Road)	LF	2,745						885	1,430	430	
HI.12	Ex. Grouted Riprap Removal (4' Drop Str. D/S of Aliso Creek Road)	CY	600						600			
	Additional Measure J											
J.1	Clearing and Grubbing	AC	23.93								11.52	12.41
J.2	Excavation (Channel Grading)		118,500								64,800	53,700
J.3	Compacted Fill (Channel Grading)	CY	80,000								32,900	47,100
	Net Earthwork (Net Excavation)	CY	**30,500**								**28,600**	**1,900**
J.4	Riprap (18" High Riffle Structure, Total of 6)	CY	12,987								9,020	3,967
J.5	Riprap (6' High Riffle Structure, Total of 1)	CY	4,018								0	4,018
J.6	Hydroseed Slopes	SY	27,329								8,495	18,834
J.7	Landscape Improvements	LS	1									
J.8	16' wide Paved Access Road (East Bank U/S of AWMA Road)	LF	960								960	

				Quantity Breakdowns by Reaches								
				Study Reach No.								
				4	5	6	7	8	9	10	11	12
No.	Contract Items	Unit	Net Quantity	CTP Bridge (Sta.69+70) to Abandoned Oxbow (Sta.133+00)	Abandoned Oxbow (Sta.133+00) to Wood Cyn Crk Confluence (Sta.167+80)	Wood Cyn Crk Confluence (Sta.167+80) to ACWHEP (Sta.185+50)	ACWHEP (Sta.185+50) to High Banks (Sta.211+00)	High Banks (Sta.211+00) to Sulphur Crk Confluence (Sta.245+19)	Sulphur Crk Confluence (Sta.245+19) to Ex. Drop Str No.1 (Sta.261+85)	Ex. Drop Str No.1 (Sta.261+85) to Ex. Drop Str No.2 (Sta.275+73)	Ex. Drop Str No.2 (Sta.275+73) to Foxborough Park (Sta.302+00)	Foxborough Park (Sta.302+00) to Pacific Park Dr (Sta.331+33)
	Flood Risk Management (FRM)											
1	Riprap Bank Protection	CY	31,667	10,532	10,714	3,826	2,004	4,591	0			

Quantity Estimate - Alternative 2 - Stabilizing D/S of ACWHEP
Project ID: **T32516**
Project Title: Aliso Creek Ecosystem Restoration (Additional Measures Only)
Date: **9/4/14**

Channel Lengthening (Additional Measures C, D, L, and M)

				Additional Measure				Construction	Notes
				C	D	L	M		
No.	Contract Items	Unit	Net Quantity	Abandoned Oxbow (Sta.119+00 to Sta.134+00)	D/S of Wood Cyn Creek (Sta.156+20 to Sta.170+70)	Near Skate Park (Sta.272+44 to Sta.286+15)	D/S of Pacific Park Drive (Sta.289+67 to Sta.309+30)	Note	
	Base Design								
1	Excavation (Channel Grading)	CY	178,900	22,000	50,200	29,600	77,100		quantity based on Inroads
2	Compacted Fill (Channel Grading)	CY	60,700	5,300	6,600	8,000	40,800		quantity based on Inroads, adjusted for riprap placement
	Additional Measures								
3	Excavation (Channel Grading)	CY	543,800	290,300	94,800	56,600	102,100		quantity based on Inroads; subtract 27,600 CY to account for Skate Park Re
4	Compacted Fill (Channel Grading)	CY	45,800	2,300	6,000	8,800	28,700		quantity based on Inroads, adjusted for riprap placement
	Change in Excavation	CY	**364,900**	268,300	44,600	27,000	25,000		
	Change in Compacted Fill	CY	**(14,900)**	(3,000)	(600)	800	(12,100)		
	Base Design								
5	Riprap (18" High Riffle Structure)	CY	15,236			5,224	10,012	3	
	Additional Measures								
6	Riprap (18" High Riffle Structure)	CY	15,236			5,224	10,012		

Skate Park / Soccer Field Relocation (Additional Measure K)

No.	Contract Items	Unit	Net Quantity	
1	Mobilization	LS	1	
2	Remove Skate Ring	SY	2,220	
3	Remove Building - 25'x35'	EA	1	
4	Remove Building - 20'x40'	EA	1	
5	Remove Canopies	EA	2	
6	Remove Concrete Paving	LS	1	2,000 SY
7	Remove Asphalt Paving	LS	1	5,400 SY
8	Remove & Salvage Electrical Poles	EA	15	
9	Remove Artifical Grass - 360'x210'	LS	1	
10	Removal of Fence	LS	1	
11	Excavation	CY	104,000	Microstation file used: Total area of 253,440 SF and Avg excavation depth of 11'

Quantity Estimate - Alternative 2 - Stabilizing D/S of ACWHEP
Project ID: **T32516**
Project Title: Aliso Creek Ecosystem Restoration (Additional Measures Only)
Date: **11/11/14**

AM F - Recontouring of Ex. Channel between ACWHEP and AMWA
(no plans were prepared: Microstaiton and InRoads were used for grading quantities only.)

				7	8	9	Notes
No.	**Contract Items**	**Unit**	**Net Quantity**	ACWHEP (Sta.185+50) to High Banks (Sta.211+00)	High Banks (Sta.211+00) to Sulphur Crk Confluence (Sta.245+19)	Sulphur Crk Confluence (Sta.245+19) to Ex. Drop Str No.1 (Sta.261+85)	
	Additional Measures						
1	Excavation (Channel Grading)	CY	29,098	2,106	24,413	2,578	quantity based on Inroads
2	Compacted Fill (Channel Grading)	CY	167	4	163	0	quantity based on Inroads, adjusted for riprap placement
	Net Earthwork (Net Excavation)	CY	**28,900**	**2,100**	**24,200**	**2,600**	
	East 1 Area						
	Excavation (Channel Grading)			37			
	Compacted Fill (Channel Grading)			0			
	East 2 Area						
	Excavation (Channel Grading)			317			
	Compacted Fill (Channel Grading)			0			
	East 3 Area						
	Excavation (Channel Grading)			91			
	Compacted Fill (Channel Grading)			0			
	East 4 Area						
	Excavation (Channel Grading)			684	75		
	Compacted Fill (Channel Grading)			0	1		
	East 5 Area						
	Excavation (Channel Grading)				4,119		
	Compacted Fill (Channel Grading)				45		
	East 6 Area						
	Excavation (Channel Grading)				4,573		
	Compacted Fill (Channel Grading)				3		
	East 7 Area						
	Excavation (Channel Grading)				1,767		
	Compacted Fill (Channel Grading)				2		
	West 1 Area						
	Excavation (Channel Grading)			196			
	Compacted Fill (Channel Grading)			2			
	West 2 Area						
	Excavation (Channel Grading)			45			
	Compacted Fill (Channel Grading)			0			
	West 3 Area						
	Excavation (Channel Grading)			156			
	Compacted Fill (Channel Grading)			0			
	West 4 Area						
	Excavation (Channel Grading)			580			
	Compacted Fill (Channel Grading)			1			
	West 5 Area						
	Excavation (Channel Grading)				369		
	Compacted Fill (Channel Grading)				13		
	West 6 Area						
	Excavation (Channel Grading)				2,488		
	Compacted Fill (Channel Grading)				51		
	West 7 Area						
	Excavation (Channel Grading)				1,027		
	Compacted Fill (Channel Grading)				4		
	West 8 Area						
	Excavation (Channel Grading)				6,751		
	Compacted Fill (Channel Grading)				1		
	West 9 Area						
	Excavation (Channel Grading)				3,246	2,578	
	Compacted Fill (Channel Grading)				43	0	

ALTERNATIVE 2 - STREAM LENGTHENING

updated: **8/28/2014**

Table 3.1 - Summary of Stream Lengthening (Additional Measure)

	Design Control Line (Baseline)			Additional Measure	Net Gain
	Station		Length	Length	Length
Location	Begin	End	[ft]	[ft]	[ft]
D/S of Wood Cyn Creek	155+72	170+24	1453	1505	52
near Skate Park	272+44	286+15	1372	1485	114
D/S of Pacific Park Drive	289+67	309+30	1963	1996	32
				Total Net Gain [ft]:	**198**

1. Stream lengthening near the Skate Park should take place in conjunction with another additional measure, the Skate Park/Soccer Field removal.

Quantity Estimate - Alternative 2 - Stabilizing D/S of ACWHEP
Project ID: **T32516**
Project Title: Aliso Creek Ecosystem Restoration
Date: **9/4/14**

Riprap Bank Protection

								Quantity Breakdowns by Reaches								
								Reach 1	**Reach 2**	**Reach 3**	**Reach 4**	**Reach 5**	**Reach 6**	**Reach 7**	**Reach 8**	**Reach 9**
	No.	**Begin Station**	**End Station**	**Length**	**Ht**	**V (CF)**	**V (CY)**	CTP Bridge (Sta.69+70) to Abandoned Oxbow (Sta.133+00)	Abandoned Oxbow (Sta.133+00) to Wood Cyn Crk Confluence (Sta.167+80)	Wood Cyn Crk Confluence (Sta.167+80) to ACWHEP (Sta.185+50)	ACWHEP (Sta.185+50) to High Banks (Sta.211+00)	High Banks (Sta.211+00) to Sulphur Crk Confluence (Sta.245+19)	Sulphur Crk Confluence (Sta.245+19) to Ex. Drop Str No.1 (Sta.261+85)	Ex. Drop Str No.1 (Sta.261+85) to Ex. Drop Str No.2 (Sta.275+73)	Ex. Drop Str No.2 (Sta.275+73) to Foxborough Park (Sta.302+00)	Foxborough Park (Sta.302+00) to Pacific Park Dr (Sta.331+33)
W. Bank	1	79+40	81+90	250	16	24,597	911	911								
E. Bank	2	84+00	93+00	900	16	88,548	3,280	3,280								
W. Bank	3	97+10	99+30	220	16	21,645	802	802								
E. Bank	4	99+50	104+50	500	16	49,193	1,822	1,822								
W. Bank	5	111+60	116+80	520	16	51,161	1,895	1,895								
E. Bank	6	115+75	120+75	500	16	49,193	1,822	1,822								
E. Bank	7	138+50	143+50	500	16	49,193	1,822		1,822							
W. Bank	8	148+40	152+40	400	16	39,355	1,458		4,446							
E. Bank	9	155+50	167+70	1220	16	120,032	4,446		4,446							
W. Bank	10	167+90	173+40	550	16	54,113	2,004			2,004						
E. Bank	11	176+50	181+50	500	16	49,193	1,822			1,822						
E. Bank	12	186+00	189+50	350	16	34,435	1,275				1,275					
E. Bank	13	208+50	213+00	450	16	44,274	1,640				729	911				
E. Bank	14	220+00	223+00	300	16	29,516	1,093					1,093				
E. Bank	15	226+00	231+00	500	16	49,193	1,822					1,822				
E. Bank	16	243+00	245+10	210	16	20,661	765					765				
								10,532	10,714	3,826	2,004	4,591				

$ 125.00 cy

$ 3,958,375.00 total

$ 502.97 per lf

ALTERNATIVE 2 - RIFFLE QUANTITIES

Reaches	Type	Riffle Structure Station	Width (ft)	Drop Height (in)	Drop Length (ft.)	Pool Length (ft.)	X-sect'l Area (SF)	Volume (CF)	Volume (CY)		
4	Riprap (18")	80+00	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	85+00	203.21	18	30	20	267.7	54399.3	2015		
	Riprap (18")	90+00	211.71	18	30	20	267.7	56674.8	2099		
	Riprap (18")	95+00	200.308	18	30	20	267.7	53622.5	1986		
	Riprap (18")	99+50	268.44	18	30	20	267.7	71861.4	2662		
	Riprap (18")	104+50	253.4	18	30	20	267.7	67835.2	2512		
	Riprap (18")	109+25	199.87	18	30	20	267.7	53505.2	1982		
	Riprap (18")	114+00	199.93	18	30	20	267.7	53521.3	1982		
	Riprap (18")	118+75	201.19	18	30	20	267.7	53858.6	1995		
	Riprap (18")	123+50	200.18	18	30	20	267.7	53588.2	1985		
	Riprap (18")	128+50	200.24	18	30	20	267.7	53604.2	1985	18" total	23186
5	Riprap (18")	134+00	201.24	18	30	20	267.7	53871.9	1995		
	Riprap (18")	139+00	200.6	18	30	20	267.7	53700.6	1989		
	Riprap (18")	143+00	218.2	18	30	20	267.7	58412.1	2163		
	Riprap (18")	147+50	199.74	18	30	20	267.7	53470.4	1980		
	Riprap (18")	152+00	227.6	18	30	20	267.7	60928.5	2257		
	Riprap (18")	156+50	201.56	18	30	20	267.7	53957.6	1998		
	Riprap (18")	161+00	200.52	18	30	20	267.7	53679.2	1988		
	Riprap (18")	166+00	200.89	18	30	20	267.7	53778.3	1992	18" total	16362
6	Riprap (18")	171+00	208.17	18	30	20	267.7	55727.1	2064		
	Riprap (18")	176+00	200.02	18	30	20	267.7	53545.4	1983		
	Riprap (18")	181+00	202.26	18	30	20	267.7	54145.0	2005	18" total	6052
7	Riprap (18")	186+50	199.16	18	30	20	267.7	53315.1	1975		
	Riprap (18")	193+00	204.24	18	30	20	267.7	54675.0	2025		
	Riprap (18")	198+50	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	204+00	200.13	18	30	20	267.7	53574.8	1984	18" total	7967
	Riprap (9")	209+00	204	9	15	20	226.4	46185.6	1711	9" total	1711
8	Riprap (9")	215+00	200.24	9	15	20	226.4	45334.3	1679	9" total	1679
	Riprap (18")	221+00	204.94	18	30	20	267.7	54862.4	2032		
	Riprap (18")	228+00	204.05	18	30	20	267.7	54624.2	2023		
	Riprap (18")	233+00	210.6	18	30	20	267.7	56377.6	2088		
	Riprap (18")	238+00	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	245+00	203.27	18	30	20	267.7	54415.4	2015	18" total	10141
9	Riprap (18")	252+00	200	18	30	20	267.7	53540.0	1983	18" total	1983
	Riprap (6')	259+10	100	72	120	30	543.04	54304.0	2011	6' total	2011
10	Riprap (6')	263+10	100	72	120	30	543.04	54304.0	2011	6' total	2011
	Riprap (18")	266+70	100	18	30	20	267.7	26770.0	991		
	Riprap (18")	271+70	100	18	30	20	267.7	26770.0	991	18" total	1982
11	Riprap (6')	276+70	100	72	120	30	543.04	54304.0	2011	6' total	2011
	Riprap (18")	281+70	100	18	30	20	267.7	26770.0	991		
	Riprap (18")	286+70	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	291+70	209.32	18	30	20	267.7	56035.0	2075		
	Riprap (18")	296+70	200.4	18	30	20	267.7	53647.1	1987		
	Riprap (18")	301+70	200.08	18	30	20	267.7	53561.4	1984	18"total	9020
12	Riprap (18")	306+70	200.01	18	30	20	267.7	53542.7	1983		
	Riprap (18")	311+70	200.08	18	30	20	267.7	53561.4	1984	18" total	3967
	Riprap (6')	316+70	199.8	72	120	30	543.04	108499.4	4018	6' total	4018

Quantity Estimate - Alternative 3 - Raising of streambed to achieve reconnection to historic floodplain

Project ID: **T32516**

Project Title: Aliso Creek Ecosystem Restoration

Date: **11/5/14**

				Quantity Breakdowns by Reaches								
				Study Reach No.								
				4	5	6	7	8	9	10	11	12
No.	**Contract Items**	**Unit**	**Net Quantity**	CTP Bridge (Sta.69+70) to Abandoned Oxbow (Sta.133+00)	Abandoned Oxbow (Sta.133+00) to Wood Cyn Crk Confluence (Sta.167+80)	Wood Cyn Crk Confluence (Sta.167+80) to ACWHEP (Sta.185+50)	ACWHEP (Sta.185+50) to High Banks (Sta.211+00)	High Banks (Sta.211+00) to Sulphur Crk Confluence (Sta.245+19)	Sulphur Crk Confluence (Sta.245+19) to Ex. Drop Str No.1 (Sta.261+85)	Ex. Drop Str No.1 (Sta.261+85) to Ex. Drop Str No.2 (Sta.275+73)	Ex. Drop Str No.2 (Sta.275+73) to Foxborough Park (Sta.302+00)	Foxborough Park (Sta.302+00) to Pacific Park Dr (Sta.331+33)
	Baseline Design											
1	Clearing and Grubbing	AC	104	35.0	20.0	9.6	12.8	20.5	5.8			
2	Excavation (Channel Grading)		566,900	165,900	59,800	13,100	85,500	193,800	48,800			
3	Compacted Fill (Channel Grading)	CY	487,200	105,700	183,200	132,100	5,500	43,000	17,700			
	Net Earthwork (Net Excavation)	CY	**31,000**	**49,600**	**(141,700)**	**(132,200)**	**79,500**	**146,500**	**29,300**			
4	Riprap (9" High Riffle Structure, Total of 2)	CY	3,390	0	0	0	1,711	1,679	0			
5	Riprap (18" High Riffle Structure, Total of 41)	CY	65,692	23,186	16,363	6,052	7,967	10,141	1,983			
6	Riprap (6' High Riffle Structure, Total of 4)	CY	0	0	0	0	0	0	0			
7	Riprap Downdrain for Ex. Pipe Outlet	EA	6	3	2	0	1					
8	Ex. Storm Drain Outlet Modification	EA	6				2	4				
9	Hydroseed Slopes	SY	122,167	52,337	20,593	6,376	7,141	26,281	9,439			
10	Landscape Improvements	LS	1									
11	6' wide DG Trail (Station 210+00 to 240+40 along West Bank)	LF	2,430				100	2,330				
12	4" DG, 12' wide Trail (West Bank)	LF	960				470	490				
13	Riprap Protection at Wood Canyon Creek Confluence	CY	340		340							
14	Ex. Grouted Riprap Removal (Drop Str. Immediately D/S of AWMA Road)	CY	385						385			

				Quantity Breakdowns by Reaches								
				Study Reach No.								
				4	5	6	7	8	9	10	11	12
No.	Contract Items	Unit	Net Quantity	CTP Bridge (Sta.69+70) to Abandoned Oxbow (Sta.133+00)	Abandoned Oxbow (Sta.133+00) to Wood Cyn Crk Confluence (Sta.167+80)	Wood Cyn Crk Confluence (Sta.167+80) to ACWHEP (Sta.185+50)	ACWHEP (Sta.185+50) to High Banks (Sta.211+00)	High Banks (Sta.211+00) to Sulphur Crk Confluence (Sta.245+19)	Sulphur Crk Confluence (Sta.245+19) to Ex. Drop Str No.1 (Sta.261+85)	Ex. Drop Str No.1 (Sta.261+85) to Ex. Drop Str No.2 (Sta.275+73)	Ex. Drop Str No.2 (Sta.275+73) to Foxborough Park (Sta.302+00)	Foxborough Park (Sta.302+00) to Pacific Park Dr (Sta.331+33)
	Additional Measures (A, B, E, G, H, I, J)											
	Additional Measure A											
A.1	6" AC, 16' wide SOCWA Access Road (East Bank)	LF	16,460	5,340	3,310	1,420	2,550	3,170	670			
	Additional Measure B											
B.1	Ex. AC Pavement Removal (West Bank)	SY	18,622	11,089	7,533							
B.2	Repurposing of AWMA Rd (4" DG, 12' wide, West Bank)	LF	8,380	4,990	3,390							
	Additional Measure E											
E.1	Channel Connection (Riprap, Wood Canyon Creek Confluence)	LS	1		1							
	Additional Measure G											
G.1	Channel Connection (Riprap, Sulphur Creek)	LS	1					1				
	Additional Measure H & I											
HI.1	Ex. Drop Structure Removal	EA	2						1	1		
HI.2	Clearing and Grubbing	AC	10.14						4	4.72	1.42	
HI.3	Excavation (Channel Grading)		81,500						31,700	38,000	11,800	
HI.4	Compacted Fill (Channel Grading)	CY	10,100						4,200	4,700	1,200	
	Net Earthwork (Net Excavation)	CY	**70,400**						**27,100**	**32,800**	**10,500**	
HI.5	Riprap (18" High Riffle Structure, Total of 3)	CY	1,983						0	1,983	0	
HI.6	Riprap (6' High Riffle Structure, Total of 3)	CY	6,034						2,011	2,011	2,011	
HI.7	Sheet Pile Retaining Wall	SF	78,783						21,827	44,026	12,930	
HI.8	Ex. Storm Drain Outlet Modification	EA	9						2	7		
HI.9	Hydroseed Slopes	SY	10,265						726	3,114	6,425	
HI.10	Landscape Improvements	LS	1									
HI.11	16' wide Paved Access Road (East Bank U/S of AWMA Road)	LF	2,745						885	1,430	430	
HI.12	Ex. Grouted Riprap Removal (4' Drop Str. D/S of Aliso Creek Road)	CY	600						600			
	Additional Measure J											
J.1	Clearing and Grubbing	AC	23.93								11.52	12.41
J.2	Excavation (Channel Grading)		118,500								64,800	53,700
J.3	Compacted Fill (Channel Grading)	CY	80,000								32,900	47,100
	Net Earthwork (Net Excavation)	CY	**30,500**								**28,600**	**1,900**
J.4	Riprap (18" High Riffle Structure, Total of 6)	CY	12,988								9,022	3,967
J.5	Riprap (6' High Riffle Structure, Total of 1)	CY	4,018								0	4,018
J.6	Hydroseed Slopes	SY	27,329								8,495	18,834
J.7	Landscape Improvements	LS	1									
J.8	16' wide Paved Access Road (East Bank U/S of AWMA Road)	LF	960								960	

				Quantity Breakdowns by Reaches								
				Study Reach No.								
				4	5	6	7	8	9	10	11	12
No.	Contract Items	Unit	Net Quantity	CTP Bridge (Sta.69+70) to Abandoned Oxbow (Sta.133+00)	Abandoned Oxbow (Sta.133+00) to Wood Cyn Crk Confluence (Sta.167+80)	Wood Cyn Crk Confluence (Sta.167+80) to ACWHEP (Sta.185+50)	ACWHEP (Sta.185+50) to High Banks (Sta.211+00)	High Banks (Sta.211+00) to Sulphur Crk Confluence (Sta.245+19)	Sulphur Crk Confluence (Sta.245+19) to Ex. Drop Str No.1 (Sta.261+85)	Ex. Drop Str No.1 (Sta.261+85) to Ex. Drop Str No.2 (Sta.275+73)	Ex. Drop Str No.2 (Sta.275+73) to Foxborough Park (Sta.302+00)	Foxborough Park (Sta.302+00) to Pacific Park Dr (Sta.331+33)
	Flood Risk Management (FRM)											
1	Riprap Bank Protection	CY	31,521	10,532	10,495	3,899	2,004	4,591	0			

Quantity Estimate - Alternative 3 - Raising of streambed to achieve reconnection to historic floodplain

Project ID: **T32516**

Project Title: Aliso Creek Ecosystem Restoration (Additional Measures Only)

Date: **9/4/14**

Channel Lengthening (Additional Measures C, D, L, and M)

				Additional Measure				Construction	Notes
				C	D	L	M		
No.	Contract Items	Unit	Net Quantity	Abandoned Oxbow (Sta.119+00 to Sta.134+00)	D/S of Wood Cyn Creek (Sta.156+20 to Sta.170+70)	Near Skate Park (Sta.272+44 to Sta.286+15)	D/S of Pacific Park Drive (Sta.289+67 to Sta.309+30)	Note	
	Base Design								
1	Excavation (Channel Grading)	CY	150,100	22,000	21,400	29,600	77,100		quantity based on Inroads
2	Compacted Fill (Channel Grading)	CY	208,200	78,300	81,100	8,000	40,800		quantity based on Inroads, adjusted for riprap placement
	Additional Measures								
3	Excavation (Channel Grading)	CY	388,800	196,300	33,800	56,600	102,100		quantity based on Inroads; subtract 27,600 CY to account for Skate Park Re
4	Compacted Fill (Channel Grading)	CY	204,000	86,100	80,400	8,800	28,700		quantity based on Inroads, adjusted for riprap placement
	Change in Excavation	CY	**238,700**	174,300	12,400	27,000	25,000		
	Change in Compacted Fill	CY	**(4,200)**	7,800	(700)	800	(12,100)		
	Base Design								
5	Riprap (18" High Riffle Structure)	CY	27,181	5,965	5,978	5,225	10,012	3	
	Additional Measures								
6	Riprap (18" High Riffle Structure)	CY	25,690	4,474	5,978	5,225	10,012		
	Change in Riprap	CY	**(1,491)**	(1,491)	0	0	0		

Skate Park / Soccer Field Relocation (Additional Measure K)

No.	Contract Items	Unit	Net Quantity	
1	Mobilization	LS	1	
2	Remove Skate Ring	SY	2,220	
3	Remove Building - 25'x35'	EA	1	
4	Remove Building - 20'x40'	EA	1	
5	Remove Canopies	EA	2	
6	Remove Concrete Paving	LS	1	2,000 SY
7	Remove Asphalt Paving	LS	1	5,400 SY
8	Remove & Salvage Electrical Poles	EA	15	
9	Remove Artifical Grass - 360'x210'	LS	1	
10	Removal of Fence	LS	1	
11	Excavation	CY	104,000	Microstation file used: Total area of 253,440 SF and Avg excavation depth of 11'

Potential Backwater Areas

updated: **11/14/2014**

1. Backwater areas are created by excavating the disturbed area to the 1 foot above the top of 2-year channel (5 feet above the bottom of the 2-year channel invert). This will ensure the WSE between the 2-year and 10-year WSEs would provide water for the backwater areas.

2. For the abandoned oxbow area, the potential channel lengthening site is turned into a backwater area. This backwater creation would replace the channel lengtheing measure. This backwater area is applied only to Alt 3 and 4, which raises the streambed elevations. For Alt 2, creating backwater area would involve excessive amount of excavation.

3. For the Skate Park area, the park needs to be relocated, including excavation, prior to creation of backwater area. Excavation for backwater area does not include excavation for Skate Park relocation. The potential channel lengthening site is turned into a backwater area.

	Disturbed Area [SF]	EG [FT]	FS [FT]	Avg Depth [FT]	Excavation [CY]
Oxbow	270000	70	64	6	22500
upstream of ACWHEP (Left Bank)	87000	105	101	4	4800
upstream of ACWHEP (Right Bank)	68000	106	103	3	2800
Skate Park	102400	160	159	1	1400

ALTERNATIVE 3 - STREAM LENGTHENING

updated: **8/28/2014**

Table 3.1 - Summary of Stream Lengthening (Additional Measure)

	Design Control Line (Baseline)			Additional Measure	Net Gain
	Station		Length	Length	Length
Location	Begin	End	[ft]	[ft]	[ft]
D/S of Wood Cyn Creek	159+57	167+69	812	871	60
near Skate Park	272+44	286+15	1,372	1,485	114
D/S of Pacific Park Drive	289+67	309+30	1,963	1,996	32
				Total Net Gain [ft]:	**206**

1. Stream lengthening near the Skate Park should take place in conjunction with another additional measure, the Skate Park/Soccer Field removal.

Quantity Estimate - Alternative 3 - Raising of streambed to achieve reconnection to historic floodplain

Project ID: **T32516**

Project Title: Aliso Creek Ecosystem Restoration

Date: **9/4/14**

Riprap Bank Protection

								Quantity Breakdowns by Reaches								
								Reach 1	**Reach 2**	**Reach 3**	**Reach 4**	**Reach 5**	**Reach 6**	**Reach 7**	**Reach 8**	**Reach 9**
	No.	**Begin Station**	**End Station**	**Length**	**Ht**	**V (CF)**	**V (CY)**	CTP Bridge (Sta.69+70) to Abandoned Oxbow (Sta.133+00)	Abandoned Oxbow (Sta.133+00) to Wood Cyn Crk Confluence (Sta.167+80)	Wood Cyn Crk Confluence (Sta.167+80) to ACWHEP (Sta.185+50)	ACWHEP (Sta.185+50) to High Banks (Sta.211+00)	High Banks (Sta.211+00) to Sulphur Crk Confluence (Sta.245+19)	Sulphur Crk Confluence (Sta.245+19) to Ex. Drop Str No.1 (Sta.261+85)	Ex. Drop Str No.1 (Sta.261+85) to Ex. Drop Str No.2 (Sta.275+73)	Ex. Drop Str No.2 (Sta.275+73) to Foxborough Park (Sta.302+00)	Foxborough Park (Sta.302+00) to Pacific Park Dr (Sta.331+33)
W. Bank	1	80+00	82+50	250	16	24,597	911	911								
E. Bank	2	84+00	93+00	900	16	88,548	3,280	3,280								
W. Bank	3	97+70	99+90	220	16	21,645	802	802								
E. Bank	4	99+50	104+50	500	16	49,193	1,822	1,822								
W. Bank	5	112+20	117+40	520	16	51,161	1,895	1,895								
E. Bank	6	115+75	120+75	500	16	49,193	1,822	1,822								
E. Bank	7	138+50	143+50	500	16	49,193	1,822		1,822							
W. Bank	8	149+00	153+00	400	16	39,355	1,458		4,373							
E. Bank	9	156+00	168+00	1200	16	118,064	4,373		4,300	73						
W. Bank	10	168+50	174+00	550	16	54,113	2,004			2,004						
E. Bank	11	177+00	182+00	500	16	49,193	1,822			1,822						
E. Bank	12	186+00	189+50	350	16	34,435	1,275				1,275					
E. Bank	13	208+50	213+00	450	16	44,274	1,640				729	911				
E. Bank	14	220+00	223+00	300	16	29,516	1,093					1,093				
E. Bank	15	226+00	231+00	500	16	49,193	1,822					1,822				
E. Bank	16	243+00	245+10	210	16	20,661	765					765				
								10,532	10,495	3,899	2,004	4,591				

$ 125.00 cy

$ 3,940,125.00 total

$ 501.93 per lf

ALTERNATIVE 3 - RIFFLE QUANTITIES

Reaches	Type	Riffle Structure Station	Width (ft)	Drop Height (in)	Drop Length (ft.)	Pool Length (ft.)	X-sect'l Area (SF)	Volume (CF)	Volume (CY)		
	Riprap (18")	80+00	200	18	30	20	268	53540	1983		
	Riprap (18")	85+00	203.21	18	30	20	268	54399	2015		
	Riprap (18")	90+00	211.71	18	30	20	268	56675	2099		
	Riprap (18")	95+00	200.308	18	30	20	268	53622	1986		
	Riprap (18")	99+50	268.44	18	30	20	268	71861	2662		
4	Riprap (18")	104+50	253.4	18	30	20	268	67835	2512		
	Riprap (18")	109+25	199.87	18	30	20	268	53505	1982		
	Riprap (18")	114+00	199.93	18	30	20	268	53521	1982		
	Riprap (18")	118+75	201.19	18	30	20	268	53859	1995		
	Riprap (18")	123+50	200.18	18	30	20	268	53588	1985		
	Riprap (18")	128+50	200.24	18	30	20	268	53604	1985	18" total	23186
	Riprap (18")	134+00	201.24	18	30	20	268	53872	1995		
	Riprap (18")	139+00	200.6	18	30	20	268	53701	1989		
	Riprap (18")	143+00	218.2	18	30	20	268	58412	2163		
5	Riprap (18")	147+50	199.74	18	30	20	268	53470	1980		
	Riprap (18")	152+00	227.6	18	30	20	268	60929	2257		
	Riprap (18")	156+50	201.56	18	30	20	268	53958	1998		
	Riprap (18")	161+00	200.52	18	30	20	268	53679	1988		
	Riprap (18")	166+00	200.89	18	30	20	268	53778	1992	18" total	16363
	Riprap (18")	171+00	208.17	18	30	20	268	55727	2064		
6	Riprap (18")	176+00	200.02	18	30	20	268	53545	1983		
	Riprap (18")	181+00	202.26	18	30	20	268	54145	2005	18" total	6052
	Riprap (18")	186+50	199.16	18	30	20	268	53315	1975		
	Riprap (18")	193+00	204.24	18	30	20	268	54675	2025		
7	Riprap (18")	198+50	200	18	30	20	268	53540	1983		
	Riprap (18")	204+00	200.13	18	30	20	268	53575	1984	18" total	7967
	Riprap (9")	209+00	204	9	15	20	226	46186	1711	9" total	1711
	Riprap (9")	215+00	200.24	9	15	20	226	45334	1679	9" total	1679
	Riprap (18")	221+00	204.94	18	30	20	268	54862	2032		
8	Riprap (18")	228+00	204.05	18	30	20	268	54624	2023		
	Riprap (18")	233+00	210.6	18	30	20	268	56378	2088		
	Riprap (18")	238+00	200	18	30	20	268	53540	1983		
	Riprap (18")	245+00	203.27	18	30	20	268	54415	2015	18" total	10141
9	Riprap (18")	252+00	200	18	30	20	268	53540	1983	18" total	1983
	Riprap (6')	259+10	100	72	120	30	543	54304	2011	6' total	2011
	Riprap (6')	263+10	100	72	120	30	543	54304	2011	6' total	2011
10	Riprap (18")	266+70	100	18	30	20	268	26770	991		
	Riprap (18")	271+70	100	18	30	20	268	26770	991	18" total	1983
	Riprap (6')	276+70	100	72	120	30	543	54304	2011	6' total	2011
	Riprap (18")	281+70	100	18	30	20	268	26800	993		
11	Riprap (18")	286+70	200	18	30	20	268	53540	1983		
	Riprap (18")	291+70	209.32	18	30	20	268	56035	2075		
	Riprap (18")	296+70	200.4	18	30	20	268	53647	1987		
	Riprap (18")	301+70	200.08	18	30	20	268	53561	1984	18"total	9022
	Riprap (18")	306+70	200.01	18	30	20	268	53543	1983		
12	Riprap (18")	311+70	200.08	18	30	20	268	53561	1984	18" total	3967
	Riprap (6')	316+70	199.8	72	120	30	543	108499	4018	6' total	4018

Quantity Estimate - Alternative 4 - Raising of streambed to achieve reconnection to historic floodplain
Project ID: **T32516**
oject Title: Aliso Creek Ecosystem Restoration
Date: **11/5/14**

				Quantity Breakdowns by Reaches								
				Study Reach No.								
				4	5	6	7	8	9	10	11	12
No.	Contract Items	Unit	Net Quantity	CTP Bridge (Sta.69+70) to Abandoned Oxbow (Sta.133+00)	Abandoned Oxbow (Sta.133+00) to Wood Cyn Crk Confluence (Sta.167+80)	Wood Cyn Crk Confluence (Sta.167+80) to ACWHEP (Sta.185+50)	ACWHEP (Sta.185+50) to High Banks (Sta.211+00)	High Banks (Sta.211+00) to Sulphur Crk Confluence (Sta.245+19)	Sulphur Crk Confluence (Sta.245+19) to Ex. Drop Str No.1 (Sta.261+85)	Ex. Drop Str No.1 (Sta.261+85) to Ex. Drop Str No.2 (Sta.275+73)	Ex. Drop Str No.2 (Sta.275+73) to Foxborough Park (Sta.302+00)	Foxborough Park (Sta.302+00) to Pacific Park Dr (Sta.331+33)
	Baseline Design											
1	Clearing and Grubbing	AC	104	35.0	20.0	9.6	12.8	20.5	5.8			
2	Excavation (Channel Grading)		884,300	271,900	119,900	41,600	166,800	231,400	52,700			
3	Compacted Fill (Channel Grading)	CY	279,400	32,300	113,200	84,600	1,400	31,800	16,100			
	Net Earthwork (Net Excavation)	CY	**577,000**	**236,400**	**(4,600)**	**(51,500)**	**165,300**	**196,400**	**35,000**			
4	Riprap (18" High Riffle Structure, Total of 46)	CY	73,371	23,796	13,881	7,932	9,915	13,881	3,966			
5	Riprap (6' High Riffle Structure, Total of 4)	CY	0	0	0	0	0	0	0			
6	Riprap Downdrain for Ex. Pipe Outlet	EA	6	3	2	0	1					
7	Ex. Storm Drain Outlet Modification	EA	6				2	4				
8	Hydroseed Slopes	SY	122,167	52,337	20,593	6,376	7,141	26,281	9,439			
9	Landscape Improvements	LS	1									
10	6' wide DG Trail (Station 210+00 to 240+40 along West Bank)	LF	2,430				100	2,330				
11	4" DG, 12' wide Trail (West Bank)	LF	960				470	490				
12	Riprap Protection at Wood Canyon Creek Confluence	CY	340		340							
13	Ex. Grouted Riprap Removal (Drop Str. Immediately D/S of AWMA Road)	CY	385						385			

				Quantity Breakdowns by Reaches								
				Study Reach No.								
				4	5	6	7	8	9	10	11	12
No.	Contract Items	Unit	Net Quantity	CTP Bridge (Sta.69+70) to Abandoned Oxbow (Sta.133+00)	Abandoned Oxbow (Sta.133+00) to Wood Cyn Crk Confluence (Sta.167+80)	Wood Cyn Crk Confluence (Sta.167+80) to ACWHEP (Sta.185+50)	ACWHEP (Sta.185+50) to High Banks (Sta.211+00)	High Banks (Sta.211+00) to Sulphur Crk Confluence (Sta.245+19)	Sulphur Crk Confluence (Sta.245+19) to Ex. Drop Str No.1 (Sta.261+85)	Ex. Drop Str No.1 (Sta.261+85) to Ex. Drop Str No.2 (Sta.275+73)	Ex. Drop Str No.2 (Sta.275+73) to Foxborough Park (Sta.302+00)	Foxborough Park (Sta.302+00) to Pacific Park Dr (Sta.331+33)
	Additional Measures (A, B, E, G, H, I, J)											
	Additional Measure A											
A.1	6" AC, 16' wide SOCWA Access Road (East Bank)	LF	16,460	5,340	3,310	1,420	2,550	3,170	670			
	Additional Measure B											
B.1	Ex. AC Pavement Removal (West Bank)	SY	18,622	11,089	7,533							
B.2	Repurposing of AWMA Rd (4" DG, 12' wide, West Bank)	LF	8,380	4,990	3,390							
	Additional Measure E											
E.1	Channel Connection (Riprap, Wood Canyon Creek Confluence)	LS	1		1							
	Additional Measure G											
G.1	Channel Connection (Riprap, Sulphur Creek)	LS	1					1				
	Additional Measure H & I											
HI.1	Ex. Drop Structure Removal	EA	2						1	1		
HI.2	Clearing and Grubbing	AC	10.14						4	4.72	1.42	
HI.3	Excavation (Channel Grading)		81,500						31,700	38,000	11,800	
HI.4	Compacted Fill (Channel Grading)	CY	10,100						4,200	4,700	1,200	
	Net Earthwork (Net Excavation)	CY	**70,400**						**27,100**	**32,800**	**10,500**	
HI.5	Riprap (18" High Riffle Structure, Total of 41)	CY	1,982						0	1,982	0	
HI.6	Riprap (6' High Riffle Structure, Total of 4)	CY	6,033						2,011	2,011	2,011	
HI.7	Sheet Pile Retaining Wall	SF	78,783						21,827	44,026	12,930	
HI.8	Ex. Storm Drain Outlet Modification	EA	9						2	7		
HI.9	Hydroseed Slopes	SY	10,265						726	3,114	6,425	
HI.10	Landscape Improvements	LS	1									
HI.11	16' wide Paved Access Road (East Bank U/S of AWMA Road)	LF	2,745						885	1,430	430	
HI.12	Ex. Grouted Riprap Removal (4' Drop Str. D/S of Aliso Creek Road)	CY	600						600			
	Additional Measure J											
J.1	Clearing and Grubbing	AC	23.93								11.52	12.41
J.2	Excavation (Channel Grading)		118,500								64,800	53,700
J.3	Compacted Fill (Channel Grading)	CY	80,000								32,900	47,100
	Net Earthwork (Net Excavation)	CY	**30,500**								**28,600**	**1,900**
J.4	Riprap (18" High Riffle Structure, Total of 41)	CY	12,989								9,022	3,967
J.5	Riprap (6' High Riffle Structure, Total of 4)	CY	4,018								0	4,018
J.6	Hydroseed Slopes	SY	27,329								8,495	18,834
J.7	Landscape Improvements	LS	1									
J.8	16' wide Paved Access Road (East Bank U/S of AWMA Road)	LF	960								960	

				Quantity Breakdowns by Reaches								
				Study Reach No.								
				4	5	6	7	8	9	10	11	12
No.	Contract Items	Unit	Net Quantity	CTP Bridge (Sta.69+70) to Abandoned Oxbow (Sta.133+00)	Abandoned Oxbow (Sta.133+00) to Wood Cyn Crk Confluence (Sta.167+80)	Wood Cyn Crk Confluence (Sta.167+80) to ACWHEP (Sta.185+50)	ACWHEP (Sta.185+50) to High Banks (Sta.211+00)	High Banks (Sta.211+00) to Sulphur Crk Confluence (Sta.245+19)	Sulphur Crk Confluence (Sta.245+19) to Ex. Drop Str No.1 (Sta.261+85)	Ex. Drop Str No.1 (Sta.261+85) to Ex. Drop Str No.2 (Sta.275+73)	Ex. Drop Str No.2 (Sta.275+73) to Foxborough Park (Sta.302+00)	Foxborough Park (Sta.302+00) to Pacific Park Dr (Sta.331+33)
	Flood Risk Management (FRM)											
1	Riprap Bank Protection	CY	31,521	10,532	10,495	3,899	2,004	4,591	0			

Quantity Estimate - Alternative 4 - Raising of streambed to achieve reconnection to historic floc
Project ID: **T32516**
Project Title: Aliso Creek Ecosystem Restoration (Additional Measures Only)
Date: **9/4/14**

Channel Lengthening (Additional Measures C, D, L, and M)

				Additional Measure				Construction	Notes
				C	D	L	M		
No.	**Contract Items**	**Unit**	**Net Quantity**	Abandoned Oxbow (Sta.119+00 to Sta.134+00)	D/S of Wood Cyn Creek (Sta.156+20 to Sta.170+70)	Near Skate Park (Sta.272+44 to Sta.286+15)	D/S of Pacific Park Drive (Sta.289+67 to Sta.309+30)	**Note**	
	Base Design								
1	Excavation (Channel Grading)	CY	199,000	40,100	52,200	29,600	77,100		quantity based on Inroads
2	Compacted Fill (Channel Grading)	CY	136,800	35,900	52,100	8,000	40,800		quantity based on Inroads, adjusted for riprap placement
	Additional Measures								
3	Excavation (Channel Grading)	CY	388,800	196,300	33,800	56,600	102,100		quantity based on Inroads; subtract 27,600 CY to account for Skate Park Re
4	Compacted Fill (Channel Grading)	CY	204,000	86,100	80,400	8,800	28,700		quantity based on Inroads, adjusted for riprap placement
	Change in Excavation	CY	**189,800**	156,200	(18,400)	27,000	25,000		
	Change in Compacted Fill	CY	**67,200**	50,200	28,300	800	(12,100)		
	Base Design								
5	Riprap (18" High Riffle Structure)	CY	27,136	5,949	5,949	5,226	10,012	3	
	Additional Measures								
6	Riprap (18" High Riffle Structure)	CY	25,648	4,462	5,949	5,226	10,012		
	Change in Riprap	CY	**(1,487)**	(1,487)	0	0	0		

Skate Park / Soccer Field Relocation (Additional Measure K)

No.	**Contract Items**	**Unit**	**Net Quantity**	
1	Mobilization	LS	1	
2	Remove Skate Ring	SY	2,220	
3	Remove Building - 25'x35'	EA	1	
4	Remove Building - 20'x40'	EA	1	
5	Remove Canopies	EA	2	
6	Remove Concrete Paving	LS	1	2,000 SY
7	Remove Asphalt Paving	LS	1	5,400 SY
8	Remove & Salvage Electrical Poles	EA	15	
9	Remove Artificial Grass - 360'x210'	LS	1	
10	Removal of Fence	LS	1	
11	Excavation	CY	104,000	Microstation file used: Total area of 253,440 SF and Avg excavation depth of 11'

Potential Backwater Areas

updated: **11/14/2014**

1. Backwater areas are created by excavating the disturbed area to the 1 foot above the top of 2-year channel (5 feet above the bottom of the 2-year channel invert). This will ensure the WSE between the 2-year and 10-year WSEs would provide water for the backwater areas.

2. For the abandoned oxbow area, the potential channel lengthening site is turned into a backwater area. This backwater creation would replace the channel lengtheing measure. This backwater area is applied only to Alt 3 and 4, which raises the streambed elevations. For Alt 2, creating backwater area would involve excessive amount of excavation.

3. For the Skate Park area, the park needs to be relocated, including excavation, prior to creation of backwater area. Excavation for backwater area does not include excavation for Skate Park relocation. The potential channel lengthening site is turned into a backwater area.

	Disturbed Area [SF]	EG [FT]	FS [FT]	Avg Depth [FT]	Excavation [CY]
Oxbow	270000	70	64	6	22500
upstream of ACWHEP (Left Bank)	87000	105	101	4	4800
upstream of ACWHEP (Right Bank)	68000	106	103	3	2800
Skate Park	102400	160	159	1	1400

ALTERNATIVE 4 - STREAM LENGTHENING

updated: **8/28/2014**

Table 3.1 - Summary of Stream Lengthening (Additional Measure)

	Design Control Line (Baseline)			Additional Measure	Net Gain
	Station		Length	Length	Length
Location	Begin	End	[ft]	[ft]	[ft]
D/S of Wood Cyn Creek	159+57	167+69	812	871	60
near Skate Park	272+44	286+15	1,372	1,485	114
D/S of Pacific Park Drive	289+67	309+30	1,963	1,996	32
				Total Net Gain [ft]:	**206**

1. Stream lengthening near the Skate Park should take place in conjunction with another additional measure, the Skate Park/Soccer Field removal.

Quantity Estimate - Alternative 4 - Raising of streambed to achieve reconnection to historic floodplain

Project ID: **T32516**

Project Title: Aliso Creek Ecosystem Restoration

Date: **9/4/14**

Riprap Bank Protection

								Quantity Breakdowns by Reaches								
								Reach 1	**Reach 2**	**Reach 3**	**Reach 4**	**Reach 5**	**Reach 6**	**Reach 7**	**Reach 8**	**Reach 9**
	No.	**Begin Station**	**End Station**	**Length**	**Ht**	**V (CF)**	**V (CY)**	CTP Bridge (Sta.69+70) to Abandoned Oxbow (Sta.133+00)	Abandoned Oxbow (Sta.133+00) to Wood Cyn Crk Confluence (Sta.167+80)	Wood Cyn Crk Confluence (Sta.167+80) to ACWHEP (Sta.185+50)	ACWHEP (Sta.185+50) to High Banks (Sta.211+00)	High Banks (Sta.211+00) to Sulphur Crk Confluence (Sta.245+19)	Sulphur Crk Confluence (Sta.245+19) to Ex. Drop Str No.1 (Sta.261+85)	Ex. Drop Str No.1 (Sta.261+85) to Ex. Drop Str No.2 (Sta.275+73)	Ex. Drop Str No.2 (Sta.275+73) to Foxborough Park (Sta.302+00)	Foxborough Park (Sta.302+00) to Pacific Park Dr (Sta.331+33)
W. Bank	1	80+00	82+50	250	16	24,597	911	911								
E. Bank	2	84+00	93+00	900	16	88,548	3,280	3,280								
W. Bank	3	97+70	99+90	220	16	21,645	802	802								
E. Bank	4	99+50	104+50	500	16	49,193	1,822	1,822								
W. Bank	5	112+20	117+40	520	16	51,161	1,895	1,895								
E. Bank	6	115+75	120+75	500	16	49,193	1,822	1,822								
E. Bank	7	138+50	143+50	500	16	49,193	1,822		1,822							
W. Bank	8	149+00	153+00	400	16	39,355	1,458		4,373							
E. Bank	9	156+00	168+00	1200	16	118,064	4,373		4,300	73						
W. Bank	10	168+50	174+00	550	16	54,113	2,004			2,004						
E. Bank	11	177+00	182+00	500	16	49,193	1,822			1,822						
E. Bank	12	186+00	189+50	350	16	34,435	1,275				1,275					
E. Bank	13	208+50	213+00	450	16	44,274	1,640				729	911				
E. Bank	14	220+00	223+00	300	16	29,516	1,093					1,093				
E. Bank	15	226+00	231+00	500	16	49,193	1,822					1,822				
E. Bank	16	243+00	245+10	210	16	20,661	765					765				
								10,532	10,495	3,899	2,004	4,591				

$ 125.00 cy

$ 3,940,125.00 total

$ 501.93 per lf

ALTERNATIVE 4 - RIFFLE QUANTITIES

Reaches	Type	Riffle Structure Station	Width (ft)	Drop Height (in)	Drop Length (ft.)	Pool Length (ft.)	X-sect'l Area (SF)	Volume (CF)	Volume (CY)		
4	Riprap (18")	79+20	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	84+00	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	88+80	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	93+60	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	98+40	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	103+20	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	108+00	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	112+80	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	117+60	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	122+40	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	127+20	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	132+00	200	18	30	20	267.7	53540.0	1983	18" Total	23796
5	Riprap (18")	136+80	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	141+60	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	146+40	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	151+20	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	156+00	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	160+80	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	165+60	200	18	30	20	267.7	53540.0	1983	18" Total	13881
6	Riprap (18")	170+40	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	175+20	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	180+00	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	184+80	200	18	30	20	267.7	53540.0	1983	18" Total	7932
7	Riprap (18")	189+60	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	194+40	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	199+20	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	204+00	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	208+80	200	18	30	20	267.7	53540.0	1983	18" Total	9915
8	Riprap (18")	213+60	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	218+40	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	223+20	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	228+00	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	232+80	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	237+60	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	242+40	200	18	30	20	267.7	53540.0	1983	18" Total	13881
9	Riprap (18")	247+20	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	252+00	200	18	30	20	267.7	53540.0	1983	18" Total	3966
	Riprap (6')	259+10	100	72	120	30	543.04	54304.0	2011	6" Total	2011
10	Riprap (6')	263+10	100	72	120	30	543.04	54304.0	2011	6' total	2011
	Riprap (18")	266+70	100	18	30	20	267.7	26770.0	991		
	Riprap (18")	271+70	100	18	30	20	267.7	26770.0	991	18" total	1982
11	Riprap (6')	276+70	100	72	120	30	543.04	54304.0	2011	6' total	2011
	Riprap (18")	281+70	100	18	30	20	267.7	53540.0	993		
	Riprap (18")	286+70	200	18	30	20	267.7	53540.0	1983		
	Riprap (18")	291+70	209.32	18	30	20	267.7	56035.0	2075		
	Riprap (18")	296+70	200.4	18	30	20	267.7	53647.1	1987		
	Riprap (18")	301+70	200.08	18	30	20	267.7	53561.4	1984	18"total	9022
12	Riprap (18")	306+70	200.01	18	30	20	267.7	53542.7	1983		
	Riprap (18")	311+70	200.08	18	30	20	267.7	53561.4	1984	18" total	3967
	Riprap (6')	316+70	199.8	72	120	30	543.04	108499.4	4018	6' total	4018

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Attachment C

Alternative Cost Estimates

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ALISO CREEK ECOSYSTEM RESTORATION FEASIBILITY STUDY
COST ESTIMATE SUMMARY

COST AND QUANTITY SUMMARIES BY ALTERNATIVE

Date: 17-Nov-14

BASELINE CONSTRUCTION COSTS:

Item No.	Item Description	UOM	Unit Costs	Alternative 2		Alternative 3		Alternative 4	
				Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost
1	Mobilization / Demobilization	LS	*6.00%*	1	$221,357	1	$997,888	1	$1,251,964
2	Diversion and Control of Water	LS	*4.00%*	1	$147,571	1	$665,258	1	$834,642
3	Clearing and Grubbing	ACRE	*$5,200.00*	56.9	$295,620	103.7	$539,240	105.0	$546,000
4	Excavation - Hydraulic Excavators	CY	*$3.75*	224,600	$954,550	567,100	$2,410,175	884,300	$3,758,275
5	Load and Haul to On-Site Stockpile	CY	*$6.50*	174,300	$1,132,950	322,100	$2,093,650	647,500	$4,208,750
6	Compacted Fill (In Channel)	CY	*$3.65*	50,300	$213,775	487,200	$2,070,600	279,300	$1,187,025
7	Compacted Fill (Disposal Location)	CY	*$2.95*	174,300	$514,185	199,200	$587,640	604,900	$1,784,455
8	Riprap (9" High Riffle Structure)	CY	*$100.00*	0	$0	3,390	$339,000	0	$0
9	Riprap (18" High Riffle Structure)	CY	*$100.00*	0	$0	65,692	$6,569,200	73,371	$7,337,100
10	Demo ACWHEP Structure	LS	*$250,000.00*	0	$0	1	$250,000	1	$250,000
11	Riprap Downdrain for Ex. Pipe Outlet	EA	*$3,500.00*	5	$17,500	6	$21,000	6	$21,000
12	Ex. Strom Drain Outlet Mod.	EA	*$10,000.00*	0	$0	6	$60,000	6	$60,000
13	Hydroseed Slopes	SY	*$1.00*	79,306	$79,306	122,167	$122,167	122,167	$122,167
14	Landscape Improvements	ACRE	*$16,500.00*	26.6	$438,900	80.7	$1,331,550	80.7	$1,331,550
15	6' Wide Decomp. Granite Trail w/ Block Wall	LF	*$46.00*	0	$0	2,430	$111,780	2,430	$111,780
16	12' Wide Decomposed Granite Trail	LF	*$22.25*	0	$0	960	$21,360	960	$21,360
17	Riprap Protection at Wood Canyon Creek	CY	*$125.00*	340	$42,500	340	$42,500	520	$65,000
18	Ex. Grouted Riprap Removal (D/S of AWMA)	CY	*$160.00*	0	$0	385	$61,600	385	$61,600
19	*Construction Subtotal (1)*	LS	-	*4,058,215*		*18,294,608*		*22,952,668*	
20	Planning, Engineering and Design	%	*15.50%*	629,023		2,835,664		3,557,664	
21	Construction Management	%	*6.50%*	263,784		1,189,150		1,491,923	
22	Adaptive Management	%	*3.00%*	121,746		548,838		688,580	
23	*Construction Subtotal (2)*	LS	-	*5,072,768*		*22,868,260*		*28,690,835*	
24	Construction Contingency	%	-	33.01%		32.63%		33.19%	
25	***Total Baseline Costs***	***LS***	-	***6,747,394***		***30,329,672***		***38,212,878***	

MEASURES CONSTRUCTION COSTS:

Measure	Measure Description	UOM	Quantity	Alternative 2	Alternative 3	Alternative 4
				Total Costs	Total Costs	Total Costs
A	East Bank Access Road Construction	LS	*1*	*2,082,190*	*2,082,190*	*2,082,190*
B	Repurposing of AWMA Road	LS	*1*	*788,900*	*788,900*	*788,900*
C	Abandoned Oxbow Reconnection	LS	*1*	*4,043,281*	*2,582,085*	*1,974,957*
D	Stream Lengthening D/S of Wood Cyn. Crk.	LS	*1*	*672,122*	*186,868*	*132,303*
E	Wood Canyon Creek Connection	LS	*1*	*49,500*	*49,500*	*49,500*
F	Re-contour Channel from ACWHEP - AWMA	LS	*1*	*436,458*	*0*	*0*
G	Sulphur Creek Connection	LS	*1*	*0*	*1,787,500*	*1,787,500*
H	Remove 10-ft High Vertical Drop Struct.	LS	*1*	*88,000*	*88,000*	*88,000*
I	Widening Near Aliso Creek Road	LS	*1*	*7,253,481*	*7,250,511*	*7,243,086*
J	Re-contour from Sheet Pile to Pacific Park	LS	*1*	*3,809,344*	*4,123,136*	*4,040,086*
K	Skate Park Relocation	LS	*1*	*3,994,815*	*3,994,815*	*3,994,815*
L	Stream Lengthening at Skate Park	LS	*1*	*402,314*	*402,314*	*402,314*
M	Stream Lengthening D/S of Pacific Park Dr	LS	*1*	*376,750*	*376,750*	*376,750*
N	Newbury Riffles	LS	*1*	*154,000*	*0*	*0*
FRM	Flood Risk Management	LS	*1*	*4,354,213*	*4,334,138*	*4,334,138*
BA	Backwater Areas	LS	*1*	*0*	*474,705*	*474,705*

Note: The total costs for the measures do not include PED, S&A or contingencies.

	Planning, Engineering and Design	%	-	15.50%	15.50%	15.50%
	Construction Management	%	-	6.50%	6.50%	6.50%
	Adaptive Management	%	-	3.00%	3.00%	3.00%
	Contingency	%	-	33.40%	32.29%	32.08%

Note: The markups listed above should be applied to each measure item to be comparable with the total baseline costs.

PROJECT: **Aliso Creek Ecosystem Restoration**
DETAIL: *Cost Estimate Summary By Reach*
COMPUTED BY: SKV
CHECKED BY:

PROJECT NO: T32516
DATE: 11/17/2014

ALTERNATIVE 2 - BASELINE IMPROVEMENTS

Item No.	Item Description	UOM	Unit Cost	Reach 4		Reach 5		Reach 6		Reach 7		Reach 8		Reach 9		Reach 10		Reach 11		Reach 12	
				Sta. 69+70 to 133+00		Sta. 133+00 to 167+80		Sta. 167+80 to 185+50		Sta. 185+50 to 211+00		Sta. 211+00 to 245+19		Sta. 245+19 to 261+85		Sta. 261+85 to 275+73		Sta. 275+73 to 302+00		Sta. 302+00 to 331+33	
				Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost
1	Mobilization / Demobilization	LS	6.00%	1	$103,952	1	$75,640	1	$41,765	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
2	Diversion and Control of Water	LS	4.00%	1	$69,302	1	$50,426	1	$27,843	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
3	Clearing and Grubbing	ACRE	$5,200.00	37.9	$197,184	12.1	$63,076	6.8	$35,360	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0
4	Excavation - Hydraulic Excavators	CY	$4.25	96,700	$410,975	80,900	$343,825	47,000	$199,750	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
5	Load and Haul to On-Site Stockpile	CY	$6.50	79,100	$514,150	59,200	$384,800	36,000	$234,000	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
6	Compacted Fill (In Channel)	CY	$4.25	17,600	$74,800	21,700	$92,225	11,000	$46,750	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
7	Compacted Fill (Disposal Location)	CY	$2.95	79,100	$233,345	59,200	$174,640	36,000	$106,200	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
8	Riprap (9" High Riffle Structure)	CY	$100.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
9	Riprap (18" High Riffle Structure)	CY	$100.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
10	Demo ACHWEP Structure	LS	$250,000.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
11	Riprap Downdrain for Existing Pipe Outlet	EA	$3,500.00	3	$10,500	2	$7,000	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
12	Existing Strom Drain Outlet Modifications	EA	$10,000.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
13	Hydroseed Slopes	SY	$1.00	52,337	$52,337	20,593	$20,593	6,376	$6,376	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
14	Landscape Improvements	ACRE	$16,500.00	14.5	$239,250	8.0	$132,000	4.1	$67,650	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0
15	6' Wide Decomposed Granite Trail w/ Block Wall	LF	$46.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
16	12' Wide Decomposed Granite Trail	LF	$22.25	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
17	Riprap Protection at Wood Canyon Creek Confluence	CY	$125.00	0	$0	340	$42,500	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
18	Existing Grouted Riprap Removal (D/S of AWMA Rd.)	CY	$160.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
	Total Construction Cost per Reach:			**$1,905,795**		**$1,386,725**		**$765,695**		**$0**		**$0**		**$0**		**$0**		**$0**		**$0**	

PROJECT: **Aliso Creek Ecosystem Restoration**
DETAIL: *Cost Estimate Summary By Reach*
COMPUTED BY: SKV
CHECKED BY:

PROJECT NO: T32516
DATE: 11/17/2014

ALTERNATIVE 2 - ADDITIONAL DESIGN MEASURES

Item No.	Item Description	UOM	Unit Cost	Measure A		Measure B		Measure C		Measure D		Measure E		Measure F		Measure G		Measure H	
				SOCWA Access Road Construction		Repurposing of AWMA Road		Abandoned Oxbow Reconnection		Stream Lengthening D/S of Wood Canyon Crk.		Wood Canyon Creek Connection		Re-contour Channel from ACWHEP - AWMA		Sulphur Creek Connection		Remove 10-ft High Vertical Drop Struct.	
				Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost
1	Mobilization / Demobilization	LS	6.00%	1	$113,574	1	$43,031	1	$220,543	1	$36,661	1	$2,700	1	$23,807	0	$0	1	$4,800
2	Diversion and Control of Water	LS	4.00%	1	$75,716	1	$28,687	1	$147,028	1	$24,441	1	$1,800	1	$15,871	0	$0	1	$3,200
3	Clearing and Grubbing	ACRE	$5,200.00	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0
4	East Bank Access Road Construction	LF	$115.00	16,460	$1,892,900	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
5	Existing AC Pavement Removal	SY	$28.50	0	$0	18,622	$530,727	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
6	12' Wide Decomposed Granite Trail	LF	$22.25	0	$0	8,380	$186,455	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
7	Excavation - Hydraulic Excavators	CY	$4.25	0	$0	0	$0	268,300	$1,140,275	44,600	$189,550	0	$0	28,900	$122,825	0	$0	0	$0
8	Load and Haul to On-Site Stockpile	CY	$6.50	0	$0	0	$0	268,300	$1,743,950	44,600	$289,900	0	$0	28,900	$187,850	0	$0	0	$0
9	Compacted Fill (In Channel)	CY	$4.25	0	$0	0	$0	0	$0	0	$0	0	$0	200	$850	0	$0	0	$0
10	Compacted Fill (Disposal Location)	CY	$2.95	0	$0	0	$0	268,300	$791,485	44,600	$131,570	0	$0	28,900	$85,255	0	$0	0	$0
11	Riprap (18" High Riffle Structure)	CY	$100.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
12	Channel Connection (Wood Canyon Creek Confluence)	LS	$45,000.00	0	$0	0	$0	0	$0	0	$0	1	$45,000	0	$0	0	$0	0	$0
13	Channel Connection (Sulfur Creek)	LS	$1,625,000	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
14	Existing Droop Structure Removal	EA	$40,000.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	2	$80,000
	Total Construction Cost per Reach:			**$2,082,190**		**$788,900**		**$4,043,281**		**$672,122**		**$49,500**		**$436,458**		**$0**		**$88,000**	

Item No.	Item Description	UOM	Unit Cost	Measure I		Measure J		Measure K		Measure L		Measure M		Measure N		FRM		BA	
				Widening Near Aliso Creek Road		Re-contour from Sheet Pile to Pacific Park Dr		Skate Park Relocation		Stream Lengthening at Skate Park		Stream Lengthening D/S of Pacific Park Drive		Newbury Riffles		Flood Risk Management (Riprap Bank Prot.)		Backwater Areas	
				Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost
1	Mobilization / Demobilization	LS	6.00%	1	$395,644	1	$207,782	1	$217,899	1	$21,944	1	$20,550	1	$8,400	1	$237,503	0	$0
2	Diversion and Control of Water	LS	4.00%	1	$263,763	1	$138,522	1	$145,266	1	$14,630	1	$13,700	1	$5,600	1	$158,335	0	$0
3	Clearing and Grubbing	ACRE	$5,200.00	10.1	$52,728	23.9	$124,436	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0
4	Excavation - Hydraulic Excavators	CY	$4.25	81,500	$346,375	117,500	$499,375	104,000	$442,000	27,000	$114,750	25,000	$106,250	0	$0	0	$0	0	$0
5	Load and Haul to On-Site Stockpile	CY	$6.50	71,400	$464,100	38,000	$247,000	104,000	$676,000	26,200	$170,300	25,000	$162,500	0	$0	0	$0	0	$0
6	Compacted Fill (In Channel)	CY	$4.25	10,100	$42,925	79,500	$337,875	0	$0	800	$3,400	0	$0	0	$0	0	$0	0	$0
7	Compacted Fill (Disposal Location)	CY	$2.95	71,400	$210,630	38,000	$112,100	104,000	$306,800	26,200	$77,290	25,000	$73,750	0	$0	0	$0	0	$0
8	Riprap (18" High Riffle Structure)	CY	$100.00	1,982	$198,200	12,987	$1,298,700	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
9	Riprap, Grouted (6' High Riffle Structure)	CY	$150.00	6,033	$904,950	4,018	$602,700	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
10	Riprap, Newbury Riffles (18" High)	CY	$100.00	0	$0	0	$0	0	$0	0	$0	0	$0	1,400	$140,000	0	$0	0	$0
11	Sheet Pile Retaining Wall	SF	$48.50	78,783	$3,820,976	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
12	Existing Storm Drain Outlet Modification	EA	$10,000.00	9	$90,000	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
13	Hydroseed Slopes	SY	$1.00	10,265	$10,265	27,329	$27,329	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
14	Landscape Improvements	ACRE	$16,500.00	2.5	$41,250	6.3	$103,125	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0
15	16' Wide Paved Access Road	LF	$115.00	2,745	$315,675	960	$110,400	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
16	Ex. Grouted Riprap Removal (D/S of Aliso Creek Rd.)	CY	$160.00	600	$96,000	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
17	Demolition Skate Park	SY	$20.00	0	$0	0	$0	2,220	$44,400	0	$0	0	$0	0	$0	0	$0	0	$0
18	Remove Building - 25' x 35'	EA	$7,500.00	0	$0	0	$0	1	$7,500	0	$0	0	$0	0	$0	0	$0	0	$0
19	Remove Building - 20' x 40'	EA	$7,500.00	0	$0	0	$0	1	$7,500	0	$0	0	$0	0	$0	0	$0	0	$0
20	Remove Canopies	EA	$1,000.00	0	$0	0	$0	2	$2,000	0	$0	0	$0	0	$0	0	$0	0	$0
21	Remove Concrete Paving	SY	$35.00	0	$0	0	$0	2,000	$70,000	0	$0	0	$0	0	$0	0	$0	0	$0
22	Remove Asphalt Paving	SY	$28.50	0	$0	0	$0	38,800	$1,105,800		$0	0	$0	0	$0	0	$0	0	$0
23	Remove and Salvage Electrical Poles	EA	$750.00	0	$0	0	$0	15	$11,250	0	$0	0	$0	0	$0	0	$0	0	$0
24	Remove Artificial Grass	SF	$0.25	0	$0	0	$0	75,600	$18,900	0	$0	0	$0	0	$0	0	$0	0	$0
25	Remove Fence	LF	$10.00	0	$0	0	$0	2,250	$22,500	0	$0	0	$0	0	$0	0	$0	0	$0
26	Skate Park Concrete	SY	$115.00	0	$0	0	$0	2,200	$253,000	0	$0	0	$0	0	$0	0	$0	0	$0
27	Artificial Grass Placement	SF	$2.50	0	$0	0	$0	151,200	$378,000	0	$0	0	$0	0	$0	0	$0	0	$0
28	Building Reconstruction	EA	$25,000.00	0	$0	0	$0	2	$50,000	0	$0	0	$0	0	$0	0	$0	0	$0
29	Canopies Placement	EA	$5,500.00	0	$0	0	$0	2	$11,000	0	$0	0	$0	0	$0	0	$0	0	$0
30	Asphalt Placement	SF	$22.50	0	$0	0	$0	10,000	$225,000	0	$0	0	$0	0	$0	0	$0	0	$0
31	Riprap Bank Protection	CY	$125.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	31,667	$3,958,375	0	$0
	Total Construction Cost per Location:			**$7,253,481**		**$3,809,344**		**$3,994,815**		**$402,314**		**$376,750**		**$154,000**		**$4,354,213**		**$0**

PROJECT: **Aliso Creek Ecosystem Restoration**
DETAIL: *Cost Estimate Summary By Reach*
COMPUTED BY: SKV
CHECKED BY:

PROJECT NO: T32516
DATE: 11/17/2014

ALTERNATIVE 3 - BASELINE IMPROVEMENTS

Item No.	Item Description	UOM	Unit Cost	Reach 4		Reach 5		Reach 6		Reach 7		Reach 8		Reach 9		Reach 10		Reach 11		Reach 12	
				Sta. 69+70 to 133+00		Sta. 133+00 to 167+80		Sta. 167+80 to 185+50		Sta. 185+50 to 211+00		Sta. 211+00 to 245+19		Sta. 245+19 to 261+85		Sta. 261+85 to 275+73		Sta. 275+73 to 302+00		Sta. 302+00 to 331+33	
				Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost
1	Mobilization / Demobilization	LS	6.00%	1	$271,688	1	$186,429	1	$99,786	1	$133,854	1	$249,808	1	$56,323	0	$0	0	$0	0	$0
2	Diversion and Control of Water	LS	4.00%	1	$181,125	1	$124,286	1	$66,524	1	$89,236	1	$166,539	1	$37,549	0	$0	0	$0	0	$0
3	Clearing and Grubbing	ACRE	$5,200.00	35.0	$182,000	20.0	$104,000	9.6	$49,920	12.8	$66,560	20.5	$106,600	5.8	$30,160	0.0	$0	0.0	$0	0.0	$0
4	Excavation - Hydraulic Excavators	CY	$4.25	165,900	$705,075	59,800	$254,150	13,300	$56,525	85,500	$363,375	193,800	$823,650	48,800	$207,400	0	$0	0	$0	0	$0
5	Load and Haul to On-Site Stockpile	CY	$6.50	60,200	$391,300	0	$0	0	$0	80,000	$520,000	150,800	$980,200	31,100	$202,150	0	$0	0	$0	0	$0
6	Compacted Fill (In Channel)	CY	$4.25	105,700	$449,225	183,200	$778,600	132,100	$561,425	5,500	$23,375	43,000	$182,750	17,700	$75,225	0	$0	0	$0	0	$0
7	Compacted Fill (Disposal Location)	CY	$2.95	0	$0	0	$0	0	$0	17,300	$51,035	150,800	$444,860	31,100	$91,745	0	$0	0	$0	0	$0
8	Riprap (9" High Riffle Structure)	CY	$100.00	0	$0	0	$0	0	$0	1,711	$171,100	1,679	$167,900	0	$0	0	$0	0	$0	0	$0
9	Riprap (18" High Riffle Structure)	CY	$100.00	23,186	$2,318,600	16,363	$1,636,300	6,052	$605,200	7,967	$796,700	10,141	$1,014,100	1,983	$198,300	0	$0	0	$0	0	$0
10	Demo ACHWEP Structure	LS	$250,000.00	0	$0	0	$0	1	$250,000	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
11	Riprap Downdrain for Existing Pipe Outlet	EA	$3,500.00	3	$10,500	2	$7,000	0	$0	1	$3,500	0	$0	0	$0	0	$0	0	$0	0	$0
12	Existing Strom Drain Outlet Modifications	EA	$10,000.00	0	$0	0	$0	0	$0	2	$20,000	4	$40,000	0	$0	0	$0	0	$0	0	$0
13	Hydroseed Slopes	SY	$1.00	52,337	$52,337	20,593	$20,593	6,376	$6,376	7,141	$7,141	26,281	$26,281	9,439	$9,439	0	$0	0	$0	0	$0
14	Landscape Improvements	ACRE	$16,500.00	25.4	$419,100	16.0	$264,000	8.1	$133,650	11.7	$193,050	15.7	$259,050	3.8	$62,700	0.0	$0	0.0	$0	0.0	$0
15	6' Wide Decomposed Granite Trail w/ Block Wall	LF	$46.00	0	$0	0	$0	0	$0	100	$4,600	2,330	$107,180	0	$0	0	$0	0	$0	0	$0
16	12' Wide Decomposed Granite Trail	LF	$22.25	0	$0	0	$0	0	$0	470	$10,458	490	$10,903	0	$0	0	$0	0	$0	0	$0
17	Riprap Protection at Wood Canyon Creek Confluence	CY	$125.00	0	$0	340	$42,500	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
18	Existing Grouted Riprap Removal (D/S of AWMA Rd.)	CY	$160.00	0	$0	0	$0	0	$0	0	$0	0	$0	385	$61,600	0	$0	0	$0	0	$0
	Total Construction Cost per Reach:			**$4,980,951**		**$3,417,857**		**$1,829,406**		**$2,453,983**		**$4,579,821**		**$1,032,591**		**$0**		**$0**		**$0**	

PROJECT: **Aliso Creek Ecosystem Restoration**
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ALTERNATIVE 3 - ADDITIONAL DESIGN MEASURES

Item No.	Item Description	UOM	Unit Cost	Measure A SOCWA Access Road Construction		Measure B Repurposing of AWMA Road		Measure C Abandoned Oxbow Reconnection		Measure D Stream Lengthening D/S of Wood Canyon Crk.		Measure E Wood Canyon Creek Connection		Measure F Re-contour Channel from ACWHEP - AWMA		Measure G Sulphur Creek Connection		Measure H Remove 10-ft High Vertical Drop Struct.	
				Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost
1	Mobilization / Demobilization	LS	6.00%	1	$113,574	1	$43,031	1	$140,841	1	$10,193	1	$2,700	0	$0	1	$97,500	1	$4,800
2	Diversion and Control of Water	LS	4.00%	1	$75,716	1	$28,687	1	$93,894	1	$6,795	1	$1,800	0	$0	1	$65,000	1	$3,200
3	Clearing and Grubbing	ACRE	$5,200.00	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0
4	East Bank Access Road Construction	LF	$115.00	16,460	$1,892,900	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
5	Existing AC Pavement Removal	SY	$28.50	0	$0	18,622	$530,727	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
6	12' Wide Decomposed Granite Trail	LF	$22.25	0	$0	8,380	$186,455	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
7	Excavation - Hydraulic Excavators	CY	$4.25	0	$0	0	$0	174,300	$740,775	12,400	$52,700	0	$0	0	$0	0	$0	0	$0
8	Load and Haul to On-Site Stockpile	CY	$6.50	0	$0	0	$0	166,500	$1,082,250	12,400	$80,600	0	$0	0	$0	0	$0	0	$0
9	Compacted Fill (In Channel)	CY	$4.25	0	$0	0	$0	7,800	$33,150	0	$0	0	$0	0	$0	0	$0	0	$0
10	Compacted Fill (Disposal Location)	CY	$2.95	0	$0	0	$0	166,500	$491,175	12,400	$36,580	0	$0	0	$0	0	$0	0	$0
11	Riprap (18" High Riffle Structure)	CY	$100.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
12	Channel Connection (Wood Canyon Creek Confluence)	LS	$45,000.00	0	$0	0	$0	0	$0	0	$0	1	$45,000	0	$0	0	$0	0	$0
13	Channel Connection (Sulfur Creek)	LS	$1,625,000	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	1	$1,625,000	0	$0
14	Existing Droop Structure Removal	EA	$40,000.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	2	$80,000
	Total Construction Cost per Reach:			**$2,082,190**		**$788,900**		**$2,582,085**		**$186,868**		**$49,500**		**$0**		**$1,787,500**		**$88,000**	

Item No.	Item Description	UOM	Unit Cost	Measure I Widening Near Aliso Creek Road		Measure J Re-contour from Sheet Pile to Pacific Park Dr		Measure K Skate Park Relocation		Measure L Stream Lengthening at Skate Park		Measure M Stream Lengthening D/S of Pacific Park Drive		Measure N Newbury Riffles		FRM Flood Risk Management (Riprap Bank Prot.)		BA Backwater Areas	
				Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost
1	Mobilization / Demobilization	LS	6.00%	1	$395,482	1	$224,898	1	$217,899	1	$21,944	1	$20,550	0	$0	1	$236,408	1	$25,893
2	Diversion and Control of Water	LS	4.00%	1	$263,655	1	$149,932	1	$145,266	1	$14,630	1	$13,700	0	$0	1	$157,605	1	$17,262
3	Clearing and Grubbing	ACRE	$5,200.00	10.1	$52,728	23.9	$124,436	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0
4	Excavation - Hydraulic Excavators	CY	$4.25	81,500	$346,375	118,500	$503,625	104,000	$442,000	27,000	$114,750	25,000	$106,250	0	$0	0	$0	31,500	$133,875
5	Load and Haul to On-Site Stockpile	CY	$6.50	71,400	$464,100	38,500	$250,250	104,000	$676,000	26,200	$170,300	25,000	$162,500	0	$0	0	$0	31,500	$204,750
6	Compacted Fill (In Channel)	CY	$4.25	10,100	$42,925	80,000	$340,000	0	$0	800	$3,400	0	$0	0	$0	0	$0	0	$0
7	Compacted Fill (Disposal Location)	CY	$2.95	70,400	$207,680	38,500	$113,575	104,000	$306,800	26,200	$77,290	25,000	$73,750	0	$0	0	$0	31,500	$92,925
8	Riprap (18" High Riffle Structure)	CY	$100.00	1,983	$198,300	12,988	$1,298,800	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
9	Riprap, Grouted (6' High Riffle Structure)	CY	$150.00	6,034	$905,100	4,018	$602,700	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
10	Riprap, Newbury Riffles (18" High)	CY	$100.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
11	Sheet Pile Retaining Wall	SF	$48.50	78,783	$3,820,976	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
12	Existing Storm Drain Outlet Modification	EA	$10,000.00	9	$90,000	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
13	Hydroseed Slopes	SY	$1.00	10,265	$10,265	27,329	$27,329	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
14	Landscape Improvements	ACRE	$16,500.00	2.5	$41,250	22.9	$377,190	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0
15	16' Wide Paved Access Road	LF	$115.00	2,745	$315,675	960	$110,400	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
16	Ex. Grouted Riprap Removal (D/S of Aliso Creek Rd.)	CY	$160.00	600	$96,000	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
17	Demolition Skate Park	SY	$20.00	0	$0	0	$0	2,220	$44,400	0	$0	0	$0	0	$0	0	$0	0	$0
18	Remove Building - 25' x 35'	EA	$7,500.00	0	$0	0	$0	1	$7,500	0	$0	0	$0	0	$0	0	$0	0	$0
19	Remove Building - 20' x 40'	EA	$7,500.00	0	$0	0	$0	1	$7,500	0	$0	0	$0	0	$0	0	$0	0	$0
20	Remove Canopies	EA	$1,000.00	0	$0	0	$0	2	$2,000	0	$0	0	$0	0	$0	0	$0	0	$0
21	Remove Concrete Paving	SY	$35.00	0	$0	0	$0	2,000	$70,000	0	$0	0	$0	0	$0	0	$0	0	$0
22	Remove Asphalt Paving	SY	$28.50	0	$0	0	$0	38,800	$1,105,800	0	$0	0	$0	0	$0	0	$0	0	$0
23	Remove and Salvage Electrical Poles	EA	$750.00	0	$0	0	$0	15	$11,250	0	$0	0	$0	0	$0	0	$0	0	$0
24	Remove Artificial Grass	SF	$0.25	0	$0	0	$0	75,600	$18,900	0	$0	0	$0	0	$0	0	$0	0	$0
25	Remove Fence	LF	$10.00	0	$0	0	$0	2,250	$22,500	0	$0	0	$0	0	$0	0	$0	0	$0
26	Skate Park Concrete	SY	$115.00	0	$0	0	$0	2,200	$253,000	0	$0	0	$0	0	$0	0	$0	0	$0
27	Artificial Grass Placement	SF	$2.50	0	$0	0	$0	151,200	$378,000	0	$0	0	$0	0	$0	0	$0	0	$0
28	Building Reconstruction	EA	$25,000.00	0	$0	0	$0	2	$50,000	0	$0	0	$0	0	$0	0	$0	0	$0
29	Canopies Placement	EA	$5,500.00	0	$0	0	$0	2	$11,000	0	$0	0	$0	0	$0	0	$0	0	$0
30	Asphalt Placement	SF	$22.50	0	$0	0	$0	10,000	$225,000	0	$0	0	$0	0	$0	0	$0	0	$0
31	Riprap Bank Protection	CY	$125.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	31,521	$3,940,125	0	$0
	Total Construction Cost per Location:			**$7,250,511**		**$4,123,136**		**$3,994,815**		**$402,314**		**$376,750**		**$0**		**$4,334,138**		**$474,705**	

PROJECT: **Aliso Creek Ecosystem Restoration**
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ALTERNATIVE 4 - BASELINE IMPROVEMENTS

Item No.	Item Description	UOM	Unit Cost	Reach 4		Reach 5		Reach 6		Reach 7		Reach 8		Reach 9		Reach 10		Reach 11		Reach 12	
				Sta. 69+70 to 133+00		Sta. 133+00 to 167+80		Sta. 167+80 to 185+50		Sta. 185+50 to 211+00		Sta. 211+00 to 245+19		Sta. 245+19 to 261+85		Sta. 261+85 to 275+73		Sta. 275+73 to 302+00		Sta. 302+00 to 331+33	
				Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost
1	Mobilization / Demobilization	LS	6.00%	1	$388,269	1	$174,161	1	$106,295	1	$214,544	1	$296,675	1	$72,020	0	$0	0	$0	0	$0
2	Diversion and Control of Water	LS	4.00%	1	$258,846	1	$116,107	1	$70,863	1	$143,029	1	$197,784	1	$48,013	0	$0	0	$0	0	$0
3	Clearing and Grubbing	ACRE	$5,200.00	35.0	$182,000	20.0	$104,000	10.0	$52,000	13.0	$67,600	21.0	$109,200	6.0	$31,200	0.0	$0	0.0	$0	0.0	$0
4	Excavation - Hydraulic Excavators	CY	$4.25	271,900	$1,155,575	119,900	$509,575	41,600	$176,800	166,800	$708,900	231,400	$983,450	52,700	$223,975	0	$0	0	$0	0	$0
5	Load and Haul to On-Site Stockpile	CY	$6.50	239,200	$1,554,800	6,700	$43,550	0	$0	165,400	$1,075,100	199,500	$1,296,750	36,700	$238,550	0	$0	0	$0	0	$0
6	Compacted Fill (In Channel)	CY	$4.25	32,300	$137,275	113,200	$481,100	84,600	$359,550	1,400	$5,950	31,800	$135,150	16,000	$68,000	0	$0	0	$0	0	$0
7	Compacted Fill (Disposal Location)	CY	$2.95	196,600	$579,970	6,700	$19,765	0	$0	165,400	$487,930	199,500	$588,525	36,700	$108,265	0	$0	0	$0	0	$0
8	Riprap (9" High Riffle Structure)	CY	$100.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
9	Riprap (18" High Riffle Structure)	CY	$100.00	23,796	$2,379,600	13,881	$1,388,100	7,932	$793,200	9,915	$991,500	13,881	$1,388,100	3,966	$396,600	0	$0	0	$0	0	$0
10	Demo ACHWEP Structure	LS	$250,000.00	0	$0	0	$0	1	$250,000	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
11	Riprap Downdrain for Existing Pipe Outlet	EA	$3,500.00	3	$10,500	2	$7,000	0	$0	1	$3,500	0	$0	0	$0	0	$0	0	$0	0	$0
12	Existing Strom Drain Outlet Modifications	EA	$10,000.00	0	$0	0	$0	0	$0	2	$20,000	4	$40,000	0	$0	0	$0	0	$0	0	$0
13	Hydroseed Slopes	SY	$1.00	52,337	$52,337	20,593	$20,593	6,376	$6,376	7,141	$7,141	26,281	$26,281	9,439	$9,439	0	$0	0	$0	0	$0
14	Landscape Improvements	ACRE	$16,500.00	25.4	$419,100	16.0	$264,000	8.1	$133,650	11.7	$193,050	15.7	$259,050	3.8	$62,700	0.0	$0	0.0	$0	0.0	$0
15	6' Wide Decomposed Granite Trail w/ Block Wall	LF	$46.00	0	$0	0	$0	0	$0	100	$4,600	2,330	$107,180	0	$0	0	$0	0	$0	0	$0
16	12' Wide Decomposed Granite Trail	LF	$22.25	0	$0	0	$0	0	$0	470	$10,458	490	$10,903	0	$0	0	$0	0	$0	0	$0
17	Riprap Protection at Wood Canyon Creek Confluence	CY	$125.00	0	$0	520	$65,000	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
18	Existing Grouted Riprap Removal (D/S of AWMA Rd.)	CY	$160.00	0	$0	0	$0	0	$0	0	$0	0	$0	385	$61,600	0	$0	0	$0	0	$0
	Total Construction Cost per Reach:			**$7,118,273**		**$3,192,951**		**$1,948,734**		**$3,933,301**		**$5,439,047**		**$1,320,362**		**$0**		**$0**		**$0**	

PROJECT: **Aliso Creek Ecosystem Restoration**
DETAIL: *Cost Estimate Summary By Reach*
COMPUTED BY: SKV
CHECKED BY:

PROJECT NO: T32516
DATE: 11/17/2014

ALTERNATIVE 4 - ADDITIONAL DESIGN MEASURES

Item No.	Item Description	UOM	Unit Cost	Measure A		Measure B		Measure C		Measure D		Measure E		Measure F		Measure G		Measure H	
				SOCWA Access Road Construction		Repurposing of AWMA Road		Abandoned Oxbow Reconnection		Stream Lengthening D/S of Wood Canyon Crk.		Wood Canyon Creek Connection		Re-contour Channel from ACWHEP - AWMA		Sulphur Creek Connection		Remove 10-ft High Vertical Drop Struct.	
				Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost
1	Mobilization / Demobilization	LS	6.00%	1	$113,574	1	$43,031	1	$107,725	1	$7,217	1	$2,700	0	$0	1	$97,500	1	$4,800
2	Diversion and Control of Water	LS	4.00%	1	$75,716	1	$28,687	1	$71,817	1	$4,811	1	$1,800	0	$0	1	$65,000	1	$3,200
3	Clearing and Grubbing	ACRE	$5,200.00	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0
4	East Bank Access Road Construction	LF	$115.00	16,460	$1,892,900	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
5	Existing AC Pavement Removal	SY	$28.50	0	$0	18,622	$530,727	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
6	12' Wide Decomposed Granite Trail	LF	$22.25	0	$0	8,380	$186,455	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
7	Excavation - Hydraulic Excavators	CY	$4.25	0	$0	0	$0	156,200	$663,850	0	$0	0	$0	0	$0	0	$0	0	$0
8	Load and Haul to On-Site Stockpile	CY	$6.50	0	$0	0	$0	106,000	$689,000	0	$0	0	$0	0	$0	0	$0	0	$0
9	Compacted Fill (In Channel)	CY	$4.25	0	$0	0	$0	50,200	$213,350	28,300	$120,275	0	$0	0	$0	0	$0	0	$0
10	Compacted Fill (Disposal Location)	CY	$2.95	0	$0	0	$0	77,700	$229,215	0	$0	0	$0	0	$0	0	$0	0	$0
11	Riprap (18" High Riffle Structure)	CY	$100.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
12	Channel Connection (Wood Canyon Creek Confluence)	LS	$45,000.00	0	$0	0	$0	0	$0	0	$0	1	$45,000	0	$0	0	$0	0	$0
13	Channel Connection (Sulfur Creek)	LS	$1,625,000	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	1	$1,625,000	0	$0
14	Existing Droop Structure Removal	EA	$40,000.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	2	$80,000
	Total Construction Cost per Reach:			**$2,082,190**		**$788,900**		**$1,974,957**		**$132,303**		**$49,500**		**$0**		**$1,787,500**		**$88,000**	

Item No.	Item Description	UOM	Unit Cost	Measure I		Measure J		Measure K		Measure L		Measure M		Measure N		FRM		BA	
				Widening Near Aliso Creek Road		Re-contour from Sheet Pile to Pacific Park Dr		Skate Park Relocation		Stream Lengthening at Skate Park		Stream Lengthening D/S of Pacific Park Drive		Newbury Riffles		Flood Risk Management (Riprap Bank Prot.)		Backwater Areas	
				Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost	Quant.	Total Cost
1	Mobilization / Demobilization	LS	6.00%	1	$395,077	1	$220,368	1	$217,899	1	$21,944	1	$20,550	0	$0	1	$236,408	1	$25,893
2	Diversion and Control of Water	LS	4.00%	1	$263,385	1	$146,912	1	$145,266	1	$14,630	1	$13,700	0	$0	1	$157,605	1	$17,262
3	Clearing and Grubbing	ACRE	$5,200.00	10.1	$52,728	23.9	$124,436	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0
4	Excavation - Hydraulic Excavators	CY	$4.25	81,500	$346,375	118,500	$503,625	104,000	$442,000	27,000	$114,750	25,000	$106,250	0	$0	0	$0	31,500	$133,875
5	Load and Haul to On-Site Stockpile	CY	$6.50	70,400	$457,600	30,500	$198,250	104,000	$676,000	26,200	$170,300	25,000	$162,500	0	$0	0	$0	31,500	$204,750
6	Compacted Fill (In Channel)	CY	$4.25	10,100	$42,925	80,000	$340,000	0	$0	800	$3,400	0	$0	0	$0	0	$0	0	$0
7	Compacted Fill (Disposal Location)	CY	$2.95	70,400	$207,680	30,500	$89,975	104,000	$306,800	26,200	$77,290	25,000	$73,750	0	$0	0	$0	31,500	$92,925
8	Riprap (18" High Riffle Structure)	CY	$100.00	1,982	$198,200	12,989	$1,298,900	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
9	Riprap, Grouted (6' High Riffle Structure)	CY	$150.00	6,033	$904,950	4,018	$602,700	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
10	Riprap, Newbury Riffles (18" High)	CY	$100.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
11	Sheet Pile Retaining Wall	SF	$48.50	78,783	$3,820,976	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
12	Existing Storm Drain Outlet Modification	EA	$10,000.00	9	$90,000	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
13	Hydroseed Slopes	SY	$1.00	10,265	$10,265	27,329	$27,329	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
14	Landscape Improvements	ACRE	$16,500.00	2.5	$41,250	22.9	$377,190	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0	0.0	$0
15	16' Wide Paved Access Road	LF	$115.00	2,745	$315,675	960	$110,400	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
16	Ex. Grouted Riprap Removal (D/S of Aliso Creek Rd.)	CY	$160.00	600	$96,000	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
17	Demolition Skate Park	SY	$20.00	0	$0	0	$0	2,220	$44,400	0	$0	0	$0	0	$0	0	$0	0	$0
18	Remove Building - 25' x 35'	EA	$7,500.00	0	$0	0	$0	1	$7,500	0	$0	0	$0	0	$0	0	$0	0	$0
19	Remove Building - 20' x 40'	EA	$7,500.00	0	$0	0	$0	1	$7,500	0	$0	0	$0	0	$0	0	$0	0	$0
20	Remove Canopies	EA	$1,000.00	0	$0	0	$0	2	$2,000	0	$0	0	$0	0	$0	0	$0	0	$0
21	Remove Concrete Paving	SY	$35.00	0	$0	0	$0	2,000	$70,000	0	$0	0	$0	0	$0	0	$0	0	$0
22	Remove Asphalt Paving	SY	$28.50	0	$0	0	$0	38,800	$1,105,800	0	$0	0	$0	0	$0	0	$0	0	$0
23	Remove and Salvage Electrical Poles	EA	$750.00	0	$0	0	$0	15	$11,250	0	$0	0	$0	0	$0	0	$0	0	$0
24	Remove Artificial Grass	SF	$0.25	0	$0	0	$0	75,600	$18,900	0	$0	0	$0	0	$0	0	$0	0	$0
25	Remove Fence	LF	$10.00	0	$0	0	$0	2,250	$22,500	0	$0	0	$0	0	$0	0	$0	0	$0
26	Skate Park Concrete	SY	$115.00	0	$0	0	$0	2,200	$253,000	0	$0	0	$0	0	$0	0	$0	0	$0
27	Artificial Grass Placement	SF	$2.50	0	$0	0	$0	151,200	$378,000	0	$0	0	$0	0	$0	0	$0	0	$0
28	Building Reconstruction	EA	$25,000.00	0	$0	0	$0	2	$50,000	0	$0	0	$0	0	$0	0	$0	0	$0
29	Canopies Placement	EA	$5,500.00	0	$0	0	$0	2	$11,000	0	$0	0	$0	0	$0	0	$0	0	$0
30	Asphalt Placement	SF	$22.50	0	$0	0	$0	10,000	$225,000	0	$0	0	$0	0	$0	0	$0	0	$0
31	Riprap Bank Protection	CY	$125.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	31,521	$3,940,125	0	$0
	Total Construction Cost per Location:			**$7,243,086**		**$4,040,086**		**$3,994,815**		**$402,314**		**$376,750**		**$0**		**$4,334,138**		**$474,705**	

UNIT COST CALCULATIONS

ITEM NO.	COST ITEM DESCRIPTION / SUB-COST ITEMS	UOM	QUANTITY	UNIT COST	TOTAL COST
1	**Excavation - Channel**				
.01	Excavation - Channel Grading	CY	1,000	$ 4.24	$ 4,241
	a) Excavation	*CY*	*750*	*$ 1.95*	*$ 1,463*
	b) Excavation - Rugged Conditions	*CY*	*250*	*$ 3.30*	*$ 825*
	b) Push to Stockpile	*CY*	*1,100*	*$ 1.25*	*$ 1,375*
	c) Finish Grading	*SY*	*1,156*	*$ 0.50*	*$ 578*
					Rounded Unit Cost Used:
				Excavation - Channel	***$ 4.25/CY***
2	**Compacted Fill - In Channel**				
.01	Compacted Fill - Channel Grading	CY	1,000	$ 4.19	$ 4,191
	a) Processing Crew	*HR*	*7.5*	*$ 75.00*	*$ 563*
	b) Channel Backfill	*CY*	*1,100*	*$ 2.00*	*$ 2,200*
	c) Channel Compaction	*CY*	*1,000*	*$ 1.15*	*$ 1,150*
	d) Finish Grading	*SY*	*556*	*$ 0.50*	*$ 278*
					Rounded Unit Cost Used:
				Compacted Fill - In Channel	***$ 4.25/CY***
3	**Sheet Pile Retaining Wall**				
.01	Sheet Pile Retaining Wall	SF	10,000	$ 48.25	$ 482,500
	a) Sheet Pile Installation (27-psf)	*SF*	*10,000*	*$ 48.25*	*$ 482,500*
					Rounded Unit Cost Used:
				Sheet Pile Retaining Wall	***$ 48.50/SF***
4	**Riprap (9" High Riffle Structure)**				
.01	Riprap Riffle Structure	CY	3,390	$ 98.76	$ 334,786
	a) Over Excavation	*CY*	*1,000*	*$ 4.50*	*$ 4,500*
	b) Push to Stockpile	*CY*	*1,100*	*$ 1.25*	*$ 1,375*
	c) Geotextile Fabric	*SY*	*3,406*	*$ 5.00*	*$ 17,031*
	d) Riprap Placement	*CY*	*3,899*	*$ 80.00*	*$ 311,880*
					Rounded Unit Cost Used:
				Riprap (9" High Riffle Structure)	***$ 100.00/CY***
5	**Riprap (18" High Riffle Structure)**				
.01	Riprap Riffle Structure	CY	81,650	$ 97.75	$ 7,981,373
	a) Over Excavation	*CY*	*20,500*	*$ 4.50*	*$ 92,250*
	b) Push to Stockpile	*CY*	*22,550*	*$ 1.25*	*$ 28,188*
	c) Geotextile Fabric	*SY*	*69,827*	*$ 5.00*	*$ 349,136*
	d) Riprap Placement	*CY*	*93,898*	*$ 80.00*	*$ 7,511,800*
					Rounded Unit Cost Used:
				Riprap (18" High Riffle Structure)	***$ 100.00/CY***

UNIT COST CALCULATIONS

MEASURE	MEASURE / ITEM DESCRIPTION	UOM	QUANTITY	UNIT COST	TOTAL COST
6	**Riprap (6' High Riffle Structure)**				
.01	Riprap Riffle Structure	CY	8,044	$ 145.73	$ 1,172,288
a)	*Geotextile Fabric*	*SY*	*6,812*	*$ 5.00*	*$ 34,062*
b)	*Riprap Placement*	*CY*	*9,251*	*$ 80.00*	*$ 740,048*
c)	*Grout Placement*	*CY*	*2,655*	*$ 150.00*	*$ 398,178*
				Rounded Unit Cost Used:	
				Riprap (6' High Riffle Structure)	***$ 150.00/CY***
7	**Buried Riprap Bank Protection**				
.01	Buried Riprap	CY	3,280	$ 121.29	$ 397,823
a)	*Over Excavation*	*CY*	*6,560*	*$ 4.50*	*$ 29,520*
b)	*Push to Stockpile*	*CY*	*7,216*	*$ 1.25*	*$ 9,020*
c)	*Subsurface Base Stone*	*CY*	*1,257*	*$ 45.75*	*$ 57,523*
d)	*Riprap Placement*	*CY*	*3,772*	*$ 80.00*	*$ 301,760*
				Rounded Unit Cost Used:	
				Buried Riprap Bank Protection	***$ 125.00/CY***
8	**Paved Access Road**				
.01	16' Wide Asphalt Access Road	LF	5,280	$ 110.71	$ 584,555
a)	*Roadway Base Layer*	*SY*	*10,795*	*$ 13.50*	*$ 145,728*
b)	*6" Thick Asphalt Concrete*	*SY*	*10,325*	*$ 42.50*	*$ 438,827*
				Rounded Unit Cost Used:	
				Paved Access Road	***$ 115.00/LF***
9	**Decomposed Granite Trail w/ Block Wall**				
.01	DG Trail - 4" Thick and 6' Wide	LF	5,280	$ 46.00	$ 242,866
a)	*Compacted Fill*	*CY*	*645*	*$ 3.15*	*$ 2,030*
b)	*Engineered Block Retention System*	*SF*	*15,840*	*$ 11.50*	*$ 182,160*
c)	*Decomposed Granite, Material*	*TON*	*750*	*$ 50.00*	*$ 37,482*
d)	*Decomposed Granite, Placement*	*SF*	*34,848*	*$ 0.60*	*$ 20,909*
e)	*Decomposed Granite, Water Costs*	*KGA*	*30*	*$ 9.50*	*$ 285*
				Rounded Unit Cost Used:	
				Decomposed Granite Trail w/ Block Wall	***$ 46.00/LF***
10	**New Trail**				
.01	6' Wide Ashpalt Trail	LF	5,280	$ 30.23	$ 159,630
a)	*Grading*	*SY*	*3,520*	*$ 0.50*	*$ 1,760*
b)	*Roadway Base Layer*	*SY*	*3,872*	*$ 13.50*	*$ 52,270*
c)	*4" Asphalt Concrete*	*SY*	*3,520*	*$ 30.00*	*$ 105,600*
				Rounded Unit Cost Used:	
				New Trail	***$ 30.25/LF***

UNIT COST CALCULATIONS

MEASURE	MEASURE / ITEM DESCRIPTION	UOM	QUANTITY	UNIT COST	TOTAL COST
11	**Hydroseeding**				
.01	Hydroseeding Slopes	SY	10,000	$ 0.93	$ 9,298
	a) Seeding, 215-lb/acre	*ACRE*	*2.07*	*$ 4,500.00*	*$ 9,298*
					Rounded Unit Cost Used:
				Hydroseeding	***$ 1.00/SY***
12	**Clearing and Grubbing**				
.01	Clear and Grub	ACRE	10	$ 5,151.00	$ 51,510
	a) Clear and Grub	*ACRE*	*10*	*$ 2,450.00*	*$ 24,500*
	b) Load and Haul Brush	*CY*	*500*	*$ 12.75*	*$ 6,380*
	c) Tipping Fee, Green Material	*CY*	*500*	*$ 41.25*	*$ 20,630*
					Rounded Unit Cost Used:
				Clearing and Grubbing	***$ 5,200.00/ACRE***
13	**Load and Haul, On-Site**				
.01	Load and Haul	CY	10,000	$ 6.40	$ 64,000
	a) Load Trucks	*CY*	*10,000*	*$ 0.65*	*$ 6,500*
	b) Cycle Haul (2-mi haul, 10-mph avg.)	*CY*	*10,000*	*$ 5.75*	*$ 57,500*
					Rounded Unit Cost Used:
				Load and Haul, On-Site	***$ 6.50/CY***
14	**Existing AC Pavement Removal**				
.01	Asphalt Pavement Demolition	SY	1,000	$ 28.34	$ 28,340
	a) Demo Asphalt	*CY*	*167*	*$ 130.00*	*$ 21,670*
	b) Load and Haul Asphalt Off-Site	*CY*	*250*	*$ 16.75*	*$ 4,190*
	c) Tipping Fee, Asphalt	*TON*	*225*	*$ 11.00*	*$ 2,480*
					Rounded Unit Cost Used:
				Existing AC Pavement Removal	***$ 28.50/SY***
15	**Existing Drop Structure Removal**				
.01	Reinforced Concrete Demolition	EA	1	$ 40,010.00	$ 40,010
	a) Demo Concrete	*CY*	*100*	*$ 300.00*	*$ 30,000*
	b) Load and Haul Concrete	*CY*	*150*	*$ 16.75*	*$ 2,510*
	c) Tipping Fee, Reinforced Concrete	*TON*	*150*	*$ 50.00*	*$ 7,500*
					Rounded Unit Cost Used:
				Existing Drop Structure Removal	***$ 40,000.00/EA***

UNIT COST CALCULATIONS

MEASURE	MEASURE / ITEM DESCRIPTION	UOM	QUANTITY	UNIT COST	TOTAL COST
17	**Compacted Fill - Disposal Site**				
.01	Compacted Fill at Disposal Site	CY	1,000	$ 2.93	$ 2,927
	a) Processing Crew	*HR*	*7.5*	*$ 75.00*	*$ 563*
	b) Backfill with Dozer	*CY*	*1,100*	*$ 1.75*	*$ 1,925*
	c) Rough Grading	*SY*	*556*	*$ 0.25*	*$ 139*
	d) Light Compaction	*CY*	*1,000*	*$ 0.30*	*$ 300*
					Rounded Unit Cost Used:
				Compacted Fill - Disposal Site	***$ 2.95/CY***
18	**Demo Grouted Riprap**				
.01	Riprap Demolition	CY	1,000	$ 156.75	$ 156,750
	a) Demo Grouted Riprap	*CY*	*1,000*	*$ 65.00*	*$ 65,000*
	b) Load and Haul Off-Site	*CY*	*1,000*	*$ 16.75*	*$ 16,750*
	c) Tipping Fee, Grouted Riprap	*TON*	*1,500*	*$ 50.00*	*$ 75,000*
					Rounded Unit Cost Used:
				Demo Grouted Riprap	***$ 160.00/CY***
19	**Riprap Downdrain**				
.01	Riprap Downdrain	EA	5	$ 3,474.05	$ 17,370
	a) Excavation	*CY*	*5*	*$ 4.50*	*$ 20*
	b) Geotextile Fabric	*SY*	*250*	*$ 5.00*	*$ 1,250*
	c) Riprap Placement	*TON*	*201*	*$ 80.00*	*$ 16,100*
					Rounded Unit Cost Used:
				Riprap Downdrain	***$ 3,500.00/EA***
20	**Wood Canyon Creek Confluence**				
.01	Riprap Placement at Wood Canyon Creek	LS	1	$ 43,250.00	$ 43,250
	a) Earthwork	*CY*	*100*	*$ 4.50*	*$ 450*
	b) Geotextile Fabric	*SY*	*650*	*$ 5.00*	*$ 3,250*
	c) Riprap	*CY*	*500*	*$ 80.00*	*$ 40,000*
					Rounded Unit Cost Used:
				Wood Canyon Creek Confluence	***$ 45,000.00/EA***

UNIT COST CALCULATIONS

MEASURE	MEASURE / ITEM DESCRIPTION	UOM	QUANTITY	UNIT COST	TOTAL COST
21	**Demo ACWHEP Structure**				
.01	Demo ACWHEP Structure	LS	1	$ 235,140.63	$ 235,141
a)	*Demo Concrete Slab*	*CY*	*125*	*$ 300.00*	*$ 37,500*
b)	*Demo Grouted Riprap*	*CY*	*1,000*	*$ 65.00*	*$ 65,000*
c)	*Load and Haul Concrete and Grouted Riprap*	*CY*	*1,688*	*$ 16.75*	*$ 28,266*
d)	*Tipping Fee*	*TON*	*1,688*	*$ 50.00*	*$ 84,375*
c)	*Demo Inlet/Outlet*	*EA*	*2*	*$ 10,000.00*	*$ 20,000*
				Demo ACWHEP Structure	***Rounded Unit Cost Used: $ 250,000.00/EA***
22	**12' Wide Decomposed Granite Trail**				
.01	Demo and Resurface AWMA Road	LF	1,000	$ 22.23	$ 22,226
a)	*Decomposed Granite, Material*	*TON*	*284*	*$ 50.00*	*$ 14,198*
b)	*Decomposed Granite, Placement*	*SF*	*13,200*	*$ 0.60*	*$ 7,920*
c)	*Decomposed Granite, Water Costs*	*KGA*	*11.4*	*$ 9.50*	*$ 108*
				12' Wide Decomposed Granite Trail	***Rounded Unit Cost Used: $ 22.25/LF***
23	**Sulphur Creek Connection**				
.01	Buried Bank Protection at Aliso-Sulphur Creek Confluence	LS	1	$ 1,634,829.75	$ 1,634,830
a)	*Clearing and Grubbing*	*ACRE*	*3.3*	*$ 5,200.00*	*$ 17,160*
b)	*Grouted Riprap Demolition*	*CY*	*370*	*$ 160.00*	*$ 59,200*
c)	*Excavation (Hydraulic Excavators)*	*CY*	*28,853*	*$ 4.25*	*$ 122,625*
d)	*Load and Haul to Disposal*	*CY*	*11,349*	*$ 6.50*	*$ 73,769*
e)	*Compacted Backfill*	*CY*	*15,913*	*$ 4.25*	*$ 67,630*
f)	*Riprap*	*CY*	*9,168*	*$ 100.00*	*$ 916,800*
g)	*Grouted Riprap*	*CY*	*1,540*	*$ 150.00*	*$ 231,000*
h)	*Geotextile Fabric*	*SY*	*9,565*	*$ 5.00*	*$ 47,825*
i)	*Soil Stabilization*	*SY*	*4,681*	*$ 10.75*	*$ 50,321*
j)	*Stormdrain System*	*LS*	*1*	*$ 32,000.00*	*$ 32,000*
k)	*Vegetation*	*ACRE*	*1.0*	*$ 16,500.00*	*$ 16,500*
				Sulphur Creek Connection	***Rounded Unit Cost Used: $ 1,625,000.00/EA***
24	**Existing Storm Drain Outlet Modifications**				
.01	Demo and Replace Portion of Existing Storm Drains	LS	1	$ 8,187.50	$ 8,188
a)	*Excavate*	*CY*	*50*	*$ 4.50*	*$ 225*
b)	*Demo Storm Drain*	*LF*	*25*	*$ 50.00*	*$ 1,250*
c)	*Place New Storm Drain*	*LF*	*25*	*$ 200.00*	*$ 5,000*
d)	*Riprap Outlet*	*CY*	*15*	*$ 100.00*	*$ 1,500*
c)	*Backfill and Compact*	*CY*	*50*	*$ 4.25*	*$ 213*
				Existing Storm Drain Outlet Modifications	***Rounded Unit Cost Used: $ 10,000.00/EA***

ALISO CREEK ECOSYSTEM RESTORATION FEASIBILITY STUDY
ALL REACHES

UNIT COSTS Date: 10-Sep-15

ITEM #	ITEM DESCRIPTION	UOM	UNIT COST	NOTES
1	Excavation	CY	$ 1.95	3-cy hydraulic excavator
2	Push to Stockpile	CY	$ 1.25	Front end loader crew
3	Finish Grading	SY	$ 0.50	
4	Channel Backfill	CY	$ 2.00	3-cy front end loader crew
5	Channel Compaction	CY	$ 1.15	
6	Steel Sheet Piling	SF	$ 48.25	27-lb/sf sheet pile assumed
7	Over Excavation	CY	$ 4.50	2-cy hydraulic excavator
8	Geotextile Fabric	SY	$ 5.00	
9	Riprap	CY	$ 80.00	Includes material, delivery and placement using hydraul. Excava.
10	Roadway Base Layer	SY	$ 13.50	Assumes 6" thick base
11	6" Asphalt Paving	SY	$ 42.50	Assumes placement with asphalt subcontractor
12	Decomposed Granite, Material	TON	$ 50.00	
13	Decomposed Granite, Placement	TON	$ 0.60	
14	Decomposed Granite, Water Costs	KGA	$ 9.50	
15	Engineered Block Retention System	SF	$ 11.50	Includes mortar and reinforcing steel
16	4" Asphalt Paving	SY	$ 30.00	
17	Hydroseeding	ACRE	$ 4,500.00	
18	Landscape Improvements	ACRE	$ 16,500.00	Taken from LA River Ecosystem Restoration Project cost estimates
19	Asphalt Demolition	CY	$ 130.00	Includes demolition of asphalt only
20	Asphalt Load and Haul Off-Site	CY	$ 16.75	12-cy truck, 20-mile haul one way
21	Tipping Fee, Asphalt	TON	$ 11.00	Assumes asphalt could be taken to recycle plant at lower cost
22	Demo Concrete	CY	$ 300.00	
23	Concrete Load and Haul Off-Site	CY	$ 16.75	12-cy truck, 20-mile haul one way
24	Tipping Fee, Concrete	TON	$ 50.00	
25	Demo Grouted Riprap	CY	$ 65.00	
26	Grouted Riprap Load and Haul Off-Site	CY	$ 16.75	12-cy truck, 20-mile haul one way
27	Tipping Fee, Grouted Riprap	TON	$ 50.00	
28	Subsurface Base Stone	CY	$ 45.75	
29	Clearing and Grubbing	ACRE	$ 2,450.00	
30	Load and Haul Brush, Off-Site	CY	$ 12.75	Assumes 20-mi haule one way
31	Tipping Fee, Green Material	CY	$ 41.25	
32	Load Trucks, Loose Dirt	CY	$ 0.65	Assumes use of 3-cy front end loader
33	Cycle Haul, On-Site	CY	$ 5.75	12-cy trucks, 2-mile one way haul, 10-mph avg.
34	Excavation - Rugged Conditions	CY	$ 3.30	3-cy hydraulic excavator
35	Backfill with Dozer	CY	$ 1.75	
36	Rough Grading	CY	$ 0.25	
37	Light Compaction	CY	$ 0.30	
38	Demolition Skate Park	SY	$ 20.00	Demolition and removal of concrete surface
39	Remove Building - 25' x 35'	EA	$ 7,500.00	
40	Remove Building - 20' x 40'	EA	$ 7,500.00	
41	Remove Canopies	EA	$ 1,000.00	
42	Remove Concrete Paving	SY	$ 35.00	
43	Remove Asphalt Paving	SY	$ 2.50	
44	Remove and Salvage Electrical Poles	EA	$ 750.00	
45	Remove Artificial Grass	SY	$ 0.25	Assumes artificial grass would be re-used at new location
46	Remove Fence	LF	$ 10.00	
47	Demo Inlent/Outlet Structures	EA	$ 10,000.00	
48	Skate Park Construction	SY	$ 115.00	Avg. cost from skatepark.com
49	Artificial Turf Field	SF	$ 2.50	Cost from fieldturf.com $5/sf (reduced 50% b/c of re-use of old turf)
50	Skate Park Buildings	EA	$ 25,000.00	
51	Canopy Installation	EA	$ 5,500.00	
52	Asphalt Parking Lot	SF	$ 22.50	Assumes 4" thick asphalt pavement

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Attachment D

Abbreviated Risk Analysis

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Abbreviated Risk Analysis

Project (less than $40M): **Aliso Creek Mainstem Ecosystem Restoration**
Project Development Stage: **Feasibility (Alternatives)**
Risk Category: **Moderate Risk: Typical Project or Possible Life Safety**

Total Construction Contract Cost = **$ 8,000,000**

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	$ -		20.00%	$ -	$ -
1	09 01 CHANNELS	Mobilization/Demobilization and Site Prep	$ 1,000,000		30.06%	$ 300,559	$ 1,300,558.62
2	09 01 CHANNELS	Earthwork	$ 1,000,000		41.09%	$ 410,895	$ 1,410,895.34
3	09 01 CHANNELS	Riprap	$ 1,000,000		36.79%	$ 367,936	$ 1,367,936.02
4	09 01 CHANNELS	Channel Connections and Storm Drains	$ 1,000,000		24.46%	$ 244,576	$ 1,244,576.13
5	09 01 CHANNELS	Demolition	$ 1,000,000		19.24%	$ 192,436	$ 1,192,436.47
6	09 01 CHANNELS	Landscaping	$ 1,000,000		21.21%	$ 212,053	$ 1,212,053.23
7	09 01 CHANNELS	Sheet Piling	$ 1,000,000		31.47%	$ 314,733	$ 1,314,732.67
8	09 01 CHANNELS	Roadways	$ 1,000,000		19.71%	$ 197,114	$ 1,197,114.33
9			$ -		0.00%	$ -	$ -
12		**Remaining Construction Items**	**$ -**	*0.0%*	0.00%	$ -	$ -
13	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	$ 1,000,000		17.68%	$ 176,847	$ 1,176,847.11
14	31 CONSTRUCTION MANAGEMENT	**Construction Management**	$ 1,000,000		19.40%	$ 194,050	$ 1,194,049.55

Totals					
Real Estate	$ -	0.00%	$ -	$ -	
Total Construction Estimate	$ 8,000,000	28.00%	$ 2,240,303	$ 10,240,303	
Total Planning, Engineering & Design	$ 1,000,000	17.68%	$ 176,847	$ 1,176,847	
Total Construction Management	$ 1,000,000	19.40%	$ 194,050	$ 1,194,050	
Total	$ 10,000,000		$ 2,611,199	$ 12,611,199	

Aliso Creek Mainstem Ecosystem Restoration
Feasibility (Alternatives)
Abbreviated Risk Analysis

Meeting Date: 6-Jun-13

Risk Level

	Negligible	Marginal	Significant	Critical	Crisis
Very Likely	2	3	4	5	5
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3

Risk Element	Feature of Work	Concerns Pull Down Tab (ENABLE MACROS THRU TRUST CENTER) (Choose ALL that apply)	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Likelihood	Impact	Risk Level
Project Scope Growth							
						Max Potential Cost Growth	**75%**
PS-1	Mobilization/Demobilization and Site Prep	• Water care and diversion fully understood, planned?	• Design confidence? • Water care and diversion fully understood, planned?	Design level leaves room for changes; Also water care and diversion plans and assumptions are not fully developed at this time. Therefore costs for this could change significantly as the project progresses.	Possible	Significant	2
PS-2	Earthwork	• Investigations sufficient to support design assumptions?	• Potential for scope growth, added features and quantities? • Project accomplish intent? • Investigations sufficient to support design assumptions?	The project is still in the early stages and each alternative design may change. Any changes or shifts of the current assumed alignments would have significant impacts to this item.	Possible	Critical	3
PS-3	Riprap	• Design confidence?	• Potential for scope growth, added features and quantities? • Design confidence?	See discussion in PS-2	Possible	Critical	3
PS-4	Channel Connections and Storm Drains	• Project accomplish intent?	• Potential for scope growth, added features and quantities? • Project accomplish intent?	This item has a chance of changing significantly as the designs are very limited as to what needs to be done for the channel connections and the storm drain outlet modifications. More items may be required to complete the connections than currently assumed. This item is deemed to be a significant risk.	Possible	Significant	2
PS-5	Demolition	• Water care and diversion fully understood, planned?	No significant risks anticipated.	The demolition is limited and would not be expected to grow, as all major items in the channel are already assumed to be removed in each alternative that they occur.	Unlikely	Marginal	0
PS-6	Landscaping	• Design confidence?	• Potential for scope growth, added features and quantities? • Design confidence?	There are no current design plans or planting plans for the landscaping. Also if the design changes, the areas requiring landscape work would change. This is deemed a possible risk to occur but would only be marginal impact to costs.	Possible	Marginal	1
PS-7	Sheet Piling	• Potential for scope growth, added features and quantities?	• Potential for scope growth, added features and quantities? • Investigations sufficient to support design assumptions? • Potential for scope growth, added features and quantities?	Sheet piling design is at early stages of design. Current estimate is based on general pile weights. The size of the piles and the quantities required are still subject to change. This item would be a significant impact if it occurred.	Possible	Significant	2
PS-8	Roadways	• Design confidence?	• Design confidence?	There is a likelihood that the roadway design may change, but this is not a significant impact to this project.	Possible	Marginal	1
PS-9	0	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0
PS-10	0	• Investigations sufficient to support design assumptions?			Unlikely	Negligible	0
PS-11	0	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0
PS-12	Remaining Construction Items	• Design confidence?			Unlikely	Negligible	0
PS-13	Planning, Engineering, & Design	• Water care and diversion fully understood, planned?	• Potential for scope growth, added features and quantities? • Investigations sufficient to support design assumptions? • Water care and diversion fully understood, planned?	There are still many unknowns in this project, and further investigations remain to be completed prior to final design. Therefore there is a risk that more PED may be required than anticipated if it is shown that curren designs are not adequate upon further review.	Possible	Marginal	1
PS-14	Construction Management	• Water care and diversion fully understood, planned?	• Potential for scope growth, added features and quantities? • Investigations sufficient to support design assumptions? • Water care and diversion fully understood, planned?	If design features change, or a more fully developed water control plan is created, then construction management costs may increase. This is likely to occur, but current percentage used is adequate and not likely to change much.	Possible	Marginal	1

Acquisition Strategy

					Max Potential Cost Growth		30%
AS-1	Mobilization/Demobilization and Site Prep	• Bid schedule developed to reduce quantity risks?	• Contracting plan firmly established? • Requirement for subcontracting? • Bid schedule developed to reduce quantity risks?	This project is at the early design phase, for alternative comparisons. Not much has been determined in the way of the contracting plan and overall subcontracting plan. However, assumptions have been made in those regards and incorporated into the unit prices used. There is a risk that these assumptions may change but it is not anticipated to be signficantly impacted.	Possible	Marginal	1
AS-2	Earthwork	• Contracting plan firmly established?	• Contracting plan firmly established? • Requirement for subcontracting? • Bid schedule developed to reduce quantity risks?	See discussion in AS-1	Unlikely	Negligible	0
AS-3	Riprap	• Contracting plan firmly established?	• Contracting plan firmly established? • Requirement for subcontracting? • Bid schedule developed to reduce quantity risks?	See discussion in AS-1	Unlikely	Negligible	0
AS-4	Channel Connections and Storm Drains	• Contracting plan firmly established?	• Contracting plan firmly established? • Requirement for subcontracting? • Bid schedule developed to reduce quantity risks?	See discussion in AS-1	Unlikely	Negligible	0
AS-5	Demolition	• Contracting plan firmly established?	• Contracting plan firmly established? • Requirement for subcontracting? • Bid schedule developed to reduce quantity risks?	See discussion in AS-1	Unlikely	Negligible	0
AS-6	Landscaping	• Contracting plan firmly established?	• Contracting plan firmly established? • Requirement for subcontracting? • Bid schedule developed to reduce quantity risks?	See discussion in AS-1	Unlikely	Negligible	0
AS-7	Sheet Piling	• Contracting plan firmly established?	• Contracting plan firmly established? • Requirement for subcontracting? • Bid schedule developed to reduce quantity risks?	See discussion in AS-1	Unlikely	Negligible	0
AS-8	Roadways	• Contracting plan firmly established?	• Contracting plan firmly established? • Requirement for subcontracting? • Bid schedule developed to reduce quantity risks?	See discussion in AS-1	Unlikely	Negligible	0
AS-9	0	• Contracting plan firmly established?			Unlikely	Negligible	0
AS-10	0	• Contracting plan firmly established?			Unlikely	Negligible	0
AS-11	0	• Contracting plan firmly established?			Unlikely	Negligible	0
AS-12	Remaining Construction Items	• Contracting plan firmly established?			Unlikely	Negligible	0
AS-13	Planning, Engineering, & Design	• Contracting plan firmly established?	• Contracting plan firmly established? • Requirement for subcontracting? • Bid schedule developed to reduce quantity risks?	See discussion in AS-1	Unlikely	Negligible	0
AS-14	Construction Management	• Contracting plan firmly established?	• Contracting plan firmly established? • Requirement for subcontracting? • Bid schedule developed to reduce quantity risks?	See discussion in AS-1	Unlikely	Negligible	0

Construction Elements

						Max Potential Cost Growth	25%
CE-1	Mobilization/Demobilization and Site Prep	• Special mobilization?	• Water care and diversion plan? • Special mobilization?	This project would require constant water control as the creek is consistently flowing. Therefore the construction would need to be done in phases to help with the diversion of water. This could impact mob/demob as more periods may be required. Cost currently should account for this, but any unforseen changes could significanlty impact costs.	Possible	Significant	2
CE-2	Earthwork	• Water care and diversion plan?	• Water care and diversion plan?	Earthwork for this project is standard and no significant risks are assumed. Diversion and control of water should also be straight forward, but unanticipated problems may arise working in the channel. This is unlikely to occur, but could be significant impact to costs.	Unlikely	Significant	1
CE-3	Riprap	• Water care and diversion plan?	• Water care and diversion plan?	Riprap placement for this project is standard and no significant risks are assumed. Diversion and control of water should also be straight forward, but unanticipated problems may arise working in the channel. This is unlikely to occur, but could be significant impact to costs.	Unlikely	Significant	1
CE-4	Channel Connections and Storm Drains	• Potential for construction modification and claims?	No significant risks anticipated.	These construction activities should be straight forward work for the contractor. No significant risks are assumed to occur during this work.	Unlikely	Negligible	0
CE-5	Demolition	• Water care and diversion plan?	• Water care and diversion plan?	Demolition items for this project is standard and no significant risks are assumed. Diversion and control of water should also be straight forward, but unanticipated problems may arise working in the channel. This is unlikely to occur, but could be significant impact to costs.	Unlikely	Significant	1
CE-6	Landscaping	• Potential for construction modification and claims?	No significant risks anticipated.		Unlikely	Negligible	0
CE-7	Sheet Piling	• Water care and diversion plan?	No significant risks anticipated.		Unlikely	Negligible	0
CE-8	Roadways	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-9	0	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-10	0	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-11	0	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-12	Remaining Construction Items	• Special equipment or subcontractors needed?			Unlikely	Negligible	0
CE-13	Planning, Engineering, & Design	• Water care and diversion plan?	• Water care and diversion plan?	The current lack of a detailed diversion and water control plan is a risk to as more cost could be incurred if significant changes to construction are required once the water control has been analyzed.	Possible	Marginal	1
CE-14	Construction Management	• Water care and diversion plan?	• Water care and diversion plan?	The current lack of a detailed diversion and water control plan is a risk to construction management as more costs may be required to determine the plan and/or fix any problems that arise during construction within the channel.	Possible	Significant	2

Quantities for Current Scope

					Max Potential Cost Growth		20%
Q-1	Mobilization/Demobilization and Site Prep	• Level of confidence based on design and assumptions?	• Level of confidence based on design and assumptions?	Staging and site access plans still need to be developed along with a diversion and control of water plan. Conservative assumptions were made for these items at this time, and these assumptions are likely to change. Any changes could be significant to the costs for this item.	Possible	Significant	2
Q-2	Earthwork	• Sufficient investigations to develop quantities?	• Level of confidence based on design and assumptions? • Sufficient investigations to develop quantities?	Quantities have been calculated using In-Roads to generate accurate quantities based on the current design. However, if further investigations and/or analysis leads to changes in the design then the quantities could increase which would lead to a large impact in costs for this item due to the relative unit cost and the large quantities involved.	Possible	Critical	3
Q-3	Riprap	• Sufficient investigations to develop quantities?	• Level of confidence based on design and assumptions? • Sufficient investigations to develop quantities?	Detailed quantity calculations have been completed and checked. However, if further investigations and/or analysis leads to changes in the design then the quantities could increase which would lead to a large impact in costs for this item due to the relative unit cost and the large quantities involved.	Possible	Critical	3
Q-4	Channel Connections and Storm Drains	• Sufficient investigations to develop quantities?	• Sufficient investigations to develop quantities?	Quantities for this item are based on limited design details. More significant analysis could lead to changes in assumptions used, and could impact costs, especially for the channel connections.	Possible	Significant	2
Q-5	Demolition	• Level of confidence based on design and assumptions?	• Level of confidence based on design and assumptions?	Current demo quantities, especially for the drop structures, are based on limited design levels. General assumptions and calculations were generated, but are subject to some change. This is not anticipated to be significant impact though.	Possible	Marginal	1
Q-6	Landscaping	• Level of confidence based on design and assumptions?	• Level of confidence based on design and assumptions?	Conservative areas were calculated from the design plans for the landscaping quantities. Further refinement of plans could lead to an increase in area required, which with the unit price of the item, could lead to significant cost increases.	Possible	Significant	2
Q-7	Sheet Piling	• Sufficient investigations to develop quantities?	• Level of confidence based on design and assumptions? • Sufficient investigations to develop quantities?	Detailed quantity calculations have been completed and checked. However, if further investigations and/or analysis leads to changes in the design then the quantities could increase which would lead to a large impact in costs for this item due to the relative unit cost and the large quantities involved.	Possible	Critical	3
Q-8	Roadways	• Level of confidence based on design and assumptions?	• Level of confidence based on design and assumptions?	Roadway design is fairly certain and not anticipated to change. However any increases would be significant to the overall costs.	Unlikely	Significant	1
Q-9	0	• Level of confidence based on design and assumptions?			Unlikely	Negligible	0
Q-10	0	• Level of confidence based on design and assumptions?			Unlikely	Negligible	0
Q-11	0	• Level of confidence based on design and assumptions?			Unlikely	Negligible	0
Q-12	Remaining Construction Items	• Appropriate methods applied to calculate quantities?			Unlikely	Negligible	0
Q-13	Planning, Engineering, & Design	• Sufficient investigations to develop quantities?	No significant risks anticipated.		Unlikely	Negligible	0
Q-14	Construction Management	• Level of confidence based on design and assumptions?	No significant risks anticipated.		Unlikely	Negligible	0

Specialty Fabrication or Equipment

							Max Potential Cost Growth	75%
FE-1	Mobilization/Demobilization and Site Prep	• Risk of specialty equipment functioning first time? Test?	No specialty fabrication or equipment required for this project.	No impacts to occur from specialty equipment as none are required for this proejct.	Unlikely	Negligible		0
FE-2	Earthwork	• Unusual parts, material or equipment manufactured or installed?	No specialty fabrication or equipment required for this project.	See discussion in FE-1	Unlikely	Negligible		0
FE-3	Riprap	• Unusual parts, material or equipment manufactured or installed?	No specialty fabrication or equipment required for this project.	See discussion in FE-1	Unlikely	Negligible		0
FE-4	Channel Connections and Storm Drains	• Unusual parts, material or equipment manufactured or installed?	No specialty fabrication or equipment required for this project.	See discussion in FE-1	Unlikely	Negligible		0
FE-5	Demolition	• Unusual parts, material or equipment manufactured or installed?	No specialty fabrication or equipment required for this project.	See discussion in FE-1	Unlikely	Negligible		0
FE-6	Landscaping	• Risk of specialty equipment functioning first time? Test?	No specialty fabrication or equipment required for this project.	See discussion in FE-1	Unlikely	Negligible		0
FE-7	Sheet Piling	• Ability to reasonably transport?	No specialty fabrication or equipment required for this project.	See discussion in FE-1	Unlikely	Negligible		0
FE-8	Roadways	• Unusual parts, material or equipment manufactured or installed?	No specialty fabrication or equipment required for this project.	See discussion in FE-1	Unlikely	Negligible		0
FE-9	0	• Unusual parts, material or equipment manufactured or installed?			Unlikely	Negligible		0
FE-10	0	• Unusual parts, material or equipment manufactured or installed?			Unlikely	Negligible		0
FE-11	0	• Unusual parts, material or equipment manufactured or installed?			Unlikely	Negligible		0
FE-12	Remaining Construction Items	• Ability to reasonably transport?			Unlikely	Negligible		0
FE-13	Planning, Engineering, & Design	• Unusual parts, material or equipment manufactured or installed?	No specialty fabrication or equipment required for this project.	See discussion in FE-1	Unlikely	Negligible		0
FE-14	Construction Management	• Ability to reasonably transport?	No specialty fabrication or equipment required for this project.	See discussion in FE-1	Unlikely	Negligible		0

Cost Estimate Assumptions

					Max Potential Cost Growth		35%
CT-1	Mobilization/Demobilization and Site Prep	• Lack confidence on critical cost items?	• Assumptions related to prime and subcontractor markups/assignments? • Lack confidence on critical cost items?	General percentages were used for Mob/Demob as well as the Diversion and Control of Water. These percentages are assumed to be conservative, however further analysis could lead to significant increases.	Possible	Significant	2
CT-2	Earthwork	• Site accessibility, transport delays, congestion?	• Assumptions regarding crew, productivity, overtime? • Site accessibility, transport delays, congestion?	Current earthwork assumptions are based on large equipment being capable of working at this site for the bulk excavation and fill. It also assumes haul trucks are capable of using existing roads and bridges to transport material through the different reaches. If these assumptions change, costs could be impacted greatly.	Possible	Critical	3
CT-3	Riprap	• Reliability and number of key quotes?	• Site accessibility, transport delays, congestion? • Reliability and number of key quotes?	The existing roads and bridges are currently assumed to be used for bringing in and transporting the stone throughout the reaches. This assumption may need to change which could increase costs by slowing productivity. Also current material quotes could increase as the project progresses.	Possible	Significant	2
CT-4	Channel Connections and Storm Drains	• Assumptions regarding crew, productivity, overtime?	• Assumptions regarding crew, productivity, overtime?	The channel connection at Sulphur Creek is the cost driver for this item, and that cost is based on an estimate from another project for the design of the connection. This cost is outside the current control of this project and could change once incorporated more fully into the design.	Possible	Significant	2
CT-5	Demolition	• Site accessibility, transport delays, congestion?	• Site accessibility, transport delays, congestion?	Site accessibility could be a concern due to the bridges and existing roadways not being sufficient for the construction equipment.	Possible	Significant	2
CT-6	Landscaping	• Reliability and number of key quotes?	• Reliability and number of key quotes?	Current prices are based on the Los Angeles River Feasibility study, and could be subject to change as more detailed plans are developed. Planting plan may also be significantly different than currently assumed.	Possible	Significant	2
CT-7	Sheet Piling	• Reliability and number of key quotes?	• Reliability and number of key quotes?	Sheet piling material prices drive this cost item. If there are significant increases to the quantity, or the current design weight of the piles changes than significant increases could be incurred.	Possible	Critical	3
CT-8	Roadways	• Assumptions regarding crew, productivity, overtime?	• Assumptions regarding crew, productivity, overtime?	The general cres and production rates for installing the new roadways, as well as the asphalt and base material prices, could all be different than currently assumed. Cost impacts could be significant if any of these items change.	Possible	Significant	2
CT-9	0	• Reliability and number of key quotes?			Unlikely	Negligible	0
CT-10	0	• Reliability and number of key quotes?			Unlikely	Negligible	0
CT-11	0	• Reliability and number of key quotes?			Unlikely	Negligible	0
CT-12	Remaining Construction Items	• Lack confidence on critical cost items?			Unlikely	Negligible	0
CT-13	Planning, Engineering, & Design	• Lack confidence on critical cost items?	• Lack confidence on critical cost items?	A general percentage mark-up was used to calculate the cost for this item. The percentage used is well within the typical range for projects of this nature. However there is still a chance that PED costs could increase as project moves forward, but impacts would be marginal.	Possible	Marginal	1
CT-14	Construction Management	• Lack confidence on critical cost items?	• Lack confidence on critical cost items?	A general percentage mark-up was used to calculate the cost for this item. The percentage used is well within the typical range for projects of this nature. However there is still a chance that CM costs could increase as project moves forward, but impacts would be marginal.	Possible	Marginal	1

External Project Risks

						Max Potential Cost Growth	40%
EX-1	Mobilization/Demobilization and Site Prep	• Unanticipated inflations in fuel, key materials?	• Potential for severe adverse weather? • Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials?	There are potentials for flooding to impact construction. Construction schedule should be developed to avoid construction in channel during wet season, but flooding could still cause some issues. Due to costs of some of these alternatives, delays could be incurred from the political realm, which could increase costs more. Lastly, unanticipated inflations in fuel and other materials is always an inherent risk for projects. All these items are possible to occur and could be significant impacts to costs.	Possible	Significant	2
EX-2	Earthwork	• Potential for severe adverse weather?	• Potential for severe adverse weather? • Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials?	See discussion in EX-1	Possible	Significant	2
EX-3	Riprap	• Potential for severe adverse weather?	• Potential for severe adverse weather? • Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials?	See discussion in EX-1	Possible	Significant	2
EX-4	Channel Connections and Storm Drains	• Potential for severe adverse weather?	• Potential for severe adverse weather? • Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials?	See discussion in EX-1	Possible	Significant	2
EX-5	Demolition	• Potential for severe adverse weather?	• Potential for severe adverse weather? • Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials?	See discussion in EX-1	Possible	Significant	2
EX-6	Landscaping	• Potential for severe adverse weather?	• Potential for severe adverse weather? • Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials?	See discussion in EX-1	Possible	Significant	2
EX-7	Sheet Piling	• Potential for severe adverse weather?	• Potential for severe adverse weather? • Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials?	See discussion in EX-1	Possible	Significant	2
EX-8	Roadways	• Potential for severe adverse weather?	• Potential for severe adverse weather? • Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials?	See discussion in EX-1	Possible	Significant	2
EX-9	0	• Potential for severe adverse weather?			Unlikely	Negligible	0
EX-10	0	• Potential for severe adverse weather?			Unlikely	Negligible	0
EX-11	0	• Potential for severe adverse weather?			Unlikely	Negligible	0
EX-12	Remaining Construction Items	• Potential for severe adverse weather?			Unlikely	Negligible	0
EX-13	Planning, Engineering, & Design	• Potential for severe adverse weather?	• Potential for severe adverse weather? • Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials?	See discussion in EX-1	Possible	Significant	2
EX-14	Construction Management	• Potential for severe adverse weather?	• Potential for severe adverse weather? • Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials?	See discussion in EX-1	Possible	Significant	2

Aliso Creek Mainstem Ecosystem Restoration
Feasibility (Alternatives)
Abbreviated Risk Analysis

Typical Risk Elements	Potential Risk Areas													
	Mobilization/Demobilization and Site P	Earthwork	Riprap	Channel Connections and Storm Draine	Demolition	Landscaping	Sheet Piling	Roadways	0	0	0	Remaining Construction Item	Planning, Engineering, & Design	Construction Management
Project Scope Growth	2	3	3	2	-	1	2	1	-	-	-	-	1	1
Acquisition Strategy	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Construction Elements	2	1	1	-	1	-	-	-	-	-	-	-	1	2
Quantities for Current Scope	2	3	3	2	1	2	3	1	-	-	-	-	-	-
Specialty Fabrication or Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cost Estimate Assumptions	2	3	2	2	2	2	3	2	-	-	-	-	1	1
External Project Risks	2	2	2	2	2	2	2	2	-	-	-	-	2	2

CONTINGENCY CALCULATIONS

ALTERNATIVE 2 - BASELINE

Features	Construction Costs	Contingency	Total Cost
Mob/Demob and Site Prep	$ 664,549	30.06%	$ 864,312
Earthwork	$ 2,815,460	41.09%	$ 3,972,333
Riprap	$ 60,000	36.79%	$ 82,074
Channel Connections and Storm Drains	$ -	24.46%	$ -
Demolition	$ -	19.24%	$ -
Landscaping	$ 518,206	21.21%	$ 628,117
Sheet Piling	$ -	31.47%	$ -
Roadways	$ -	19.71%	$ -
PED	$ 629,023	17.68%	$ 740,235
CM & Adapt. Mgmt.	$ 385,530	19.40%	$ 460,323
Total Construction Costs	***$ 5,072,768***	***33.01%***	***$ 6,747,394***

ALTERNATIVE 3 - BASELINE

Features	Construction Costs	Contingency	Total Cost
Mob/Demob and Site Prep	$ 2,202,386	30.06%	$ 2,864,423
Earthwork	$ 7,162,065	41.09%	$ 10,104,958
Riprap	$ 7,221,700	36.79%	$ 9,878,563
Channel Connections and Storm Drains	$ 60,000	24.46%	$ 74,676
Demolition	$ 61,600	19.24%	$ 73,452
Landscaping	$ 1,453,717	21.21%	$ 1,762,050
Sheet Piling	$ -	31.47%	$ -
Roadways	$ 133,140	19.71%	$ 159,382
PED	$ 2,835,664	17.68%	$ 3,337,010
CM & Adapt. Mgmt.	$ 1,737,988	19.40%	$ 2,075,157
Total Construction Costs	***$ 22,868,260***	***32.63%***	***$ 30,329,672***

ALTERNATIVE 4 - BASELINE

Features	Construction Costs	Contingency	Total Cost
Mob/Demob and Site Prep	$ 2,632,606	30.06%	$ 3,423,968
Earthwork	$ 10,938,505	41.09%	$ 15,433,137
Riprap	$ 7,673,100	36.79%	$ 10,496,033
Channel Connections and Storm Drains	$ 60,000	24.46%	$ 74,676
Demolition	$ 61,600	19.24%	$ 73,452
Landscaping	$ 1,453,717	21.21%	$ 1,762,050
Sheet Piling	$ -	31.47%	$ -
Roadways	$ 133,140	19.71%	$ 159,382
PED	$ 3,557,664	17.68%	$ 4,186,658
CM & Adapt. Mgmt.	$ 2,180,503	19.40%	$ 2,603,521
Total Construction Costs	***$ 28,690,835***	***33.19%***	***$ 38,212,878***

CONTINGENCY CALCULATIONS

ALTERNATIVE 2 - MEASURES

Features	Construction Costs	Contingency	Total Cost
Mob/Demob and Site Prep	$ 2,768,561	30.06%	$ 3,600,791
Earthwork	$ 9,076,930	41.09%	$ 12,806,641
Riprap	$ 7,102,925	36.79%	$ 9,716,091
Channel Connections and Storm Drains	$ 135,000	24.46%	$ 168,021
Demolition	$ 1,996,577	19.24%	$ 2,380,718
Landscaping	$ 1,098,969	21.21%	$ 1,332,060
Sheet Piling	$ 3,820,976	31.47%	$ 5,023,436
Roadways	$ 2,505,430	19.71%	$ 2,999,250
PED	$ -	17.68%	$ -
CM & Adapt. Mgmt.	$ -	19.40%	$ -
Total Construction Costs	***$ 28,505,368***	***33.40%***	***$ 38,027,009***

ALTERNATIVE 3 - MEASURES

Features	Construction Costs	Contingency	Total Cost
Mob/Demob and Site Prep	$ 2,770,020	30.06%	$ 3,602,687
Earthwork	$ 7,350,350	41.09%	$ 10,370,609
Riprap	$ 6,945,025	36.79%	$ 9,500,100
Channel Connections and Storm Drains	$ 1,760,000	24.46%	$ 2,190,496
Demolition	$ 1,996,577	19.24%	$ 2,380,718
Landscaping	$ 1,373,034	21.21%	$ 1,664,255
Sheet Piling	$ 3,820,976	31.47%	$ 5,023,436
Roadways	$ 2,505,430	19.71%	$ 2,999,250
PED	$ -	17.68%	$ -
CM & Adapt. Mgmt.	$ -	19.40%	$ -
Total Construction Costs	***$ 28,521,411***	***32.29%***	***$ 37,731,552***

ALTERNATIVE 4 - MEASURES

Features	Construction Costs	Contingency	Total Cost
Mob/Demob and Site Prep	$ 2,701,641	30.06%	$ 3,513,754
Earthwork	$ 6,666,710	41.09%	$ 9,406,061
Riprap	$ 6,944,875	36.79%	$ 9,499,895
Channel Connections and Storm Drains	$ 1,760,000	24.46%	$ 2,190,496
Demolition	$ 1,996,577	19.24%	$ 2,380,718
Landscaping	$ 1,373,034	21.21%	$ 1,664,255
Sheet Piling	$ 3,820,976	31.47%	$ 5,023,436
Roadways	$ 2,505,430	19.71%	$ 2,999,250
PED	$ -	17.68%	$ -
CM & Adapt. Mgmt.	$ -	19.40%	$ -
Total Construction Costs	***$ 27,769,242***	***32.08%***	***$ 36,677,865***

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Attachment E

Operations and Maintenance Costs

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ALISO CREEK ECOSYSTEM RESTORATION FEASIBILITY STUDY
COST ESTIMATE SUMMARY

ANNUAL OPERATIONS AND MAINTENANCE COSTS SUMMARY BY ALTERNATIVE

Date: 17-Nov-14

BASE CONSTRUCTION COSTS:

Item No.	Item Description	O&M %	Alternative 1 Annual O&M Costs	Alternative 2 Annual O&M Costs	Alternative 3 Annual O&M Costs	Alternative 4 Annual O&M Costs
1	Mobilization / Demobilization	*0.00%*	$0.00	$0.00	$0.00	$0.00
2	Diversion and Control of Water	*0.00%*	$0.00	$0.00	$0.00	$0.00
3	Clearing and Grubbing	*0.00%*	$0.00	$0.00	$0.00	$0.00
4	Excavation - Hydraulic Excavators	*0.00%*	$0.00	$0.00	$0.00	$0.00
5	Load and Haul to On-Site Stockpile	*0.00%*	$0.00	$0.00	$0.00	$0.00
6	Compacted Fill (In Channel)	*0.50%*	$0.00	$1,068.88	$10,353.00	$5,935.13
7	Compacted Fill (Disposal Location)	*0.50%*	$0.00	$2,570.93	$2,938.20	$8,922.28
8	Riprap (9" High Riffle Structure)	*0.50%*	$0.00	$0.00	$1,695.00	$0.00
9	Riprap (18" High Riffle Structure)	*0.50%*	$0.00	$0.00	$32,846.00	$36,685.50
10	Demo ACWHEP Structure	*0.00%*	$0.00	$0.00	$0.00	$0.00
11	Riprap Downdrain for Ex. Pipe Outlet	*0.50%*	$0.00	$87.50	$105.00	$105.00
12	Ex. Strom Drain Outlet Mod.	*0.00%*	$0.00	$0.00	$0.00	$0.00
13	Hydroseed Slopes	*2.00%*	$0.00	$1,586.12	$2,443.34	$2,443.34
14	Landscape Improvements	*1.00%*	$0.00	$4,389.00	$13,315.50	$13,315.50
15	6' Wide Decomposed Granite Trail	*0.50%*	$0.00	$0.00	$558.90	$558.90
16	12' Wide Decomposed Granite Trail	*0.50%*	$0.00	$0.00	$106.80	$106.80
17	Riprap Protection at Wood Canyon Creek	*0.50%*	$0.00	$212.50	$212.50	$325.00
18	Ex. Grouted Riprap Removal (D/S of AWMA)	*0.00%*	$0.00	$0.00	$0.00	$0.00
20	***Annual Miscellaneous Inspections and Maintenance***		***25,000***	***25,000***	***25,000***	***25,000***
21	***Annual O&M Costs***		***25,000***	***34,915***	***89,574***	***93,397***
22	***Annual O&M Percentage (Not Inlcuding Item #20)***		***-***	***0.24%***	***0.35%***	***0.30%***

MEASURES CONSTRUCTION COSTS:

Item No.	Item Description	UOM	Quantity	Alternative 1 Annual O&M Costs	Alternative 2 Annual O&M Costs	Alternative 3 Annual O&M Costs	Alternative 4 Annual O&M Costs
A	East Bank Access Road Construction	LS	*1*	-	*5,087*	*7,349*	*6,205*
B	Repurposing of AWMA Road	LS	*1*	-	*1,927*	*2,785*	*2,351*
C	Abandoned Oxbow Reconnection	LS	*1*	-	*9,878*	*9,114*	*5,885*
D	Stream Lengthening D/S of Wood Cyn. Crk.	LS	*1*	-	*1,642*	*660*	*394*
E	Wood Canyon Creek Connection	LS	*1*	-	*121*	*175*	*148*
F	Re-contour Channel from ACWHEP - AWMA	LS	*1*	-	*1,066*	*0*	*0*
G	Sulphur Creek Connection	LS	*1*	-	*0*	*6,309*	*5,327*
H	Remove 10-ft High Vertical Drop Struct.	LS	*1*	-	*215*	*311*	*262*
I	Widening Near Aliso Creek Road	LS	*1*	-	*17,722*	*25,592*	*21,584*
J	Re-contour from Sheet Pile to Pacific Park	LS	*1*	-	*9,307*	*14,553*	*12,039*
K	Skate Park Relocation	LS	*1*	-	*9,760*	*14,100*	*11,904*
L	Stream Lengthening at Skate Park	LS	*1*	-	*983*	*1,420*	*1,199*
M	Stream Lengthening D/S of Pacific Park Dr	LS	*1*	-	*920*	*1,330*	*1,123*
N	Newbury Riffles	LS	*1*	-	*376*	*0*	*0*
FRM	Flood Risk Management	LS	*1*	-	*10,638*	*15,298*	*12,915*
BW	Backwater Areas	LS	*1*	-	*0*	*1,676*	*1,415*

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