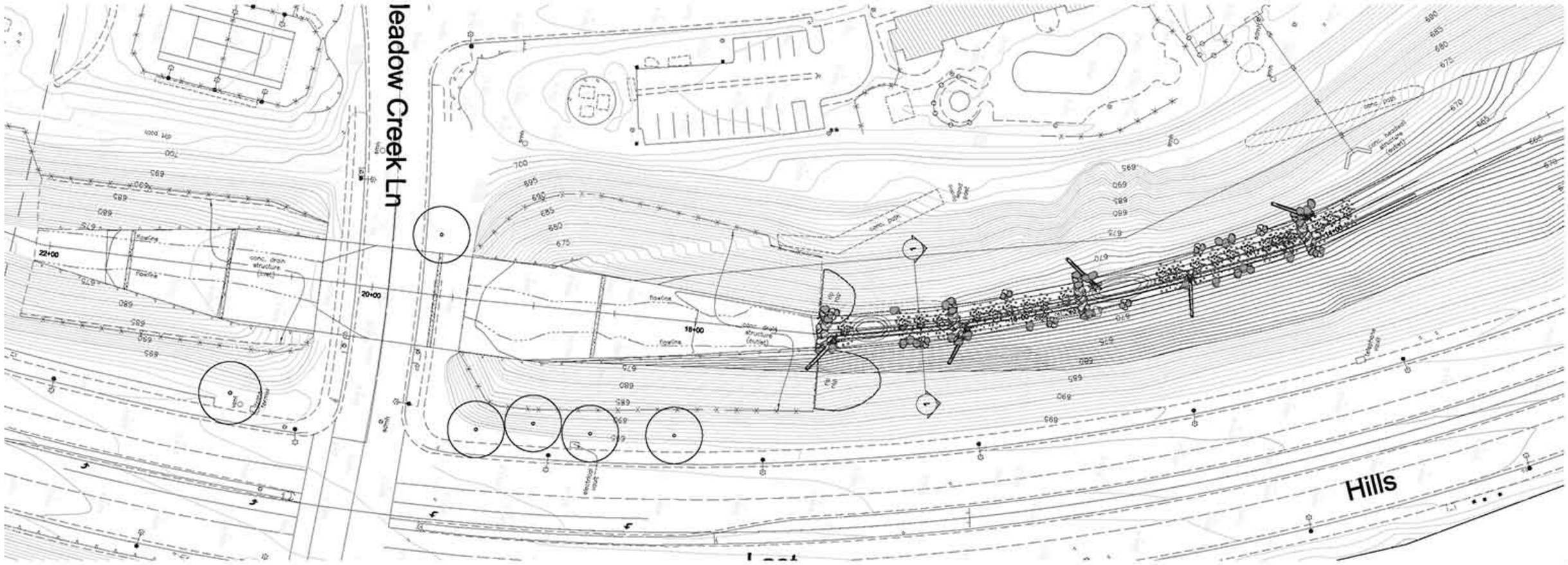

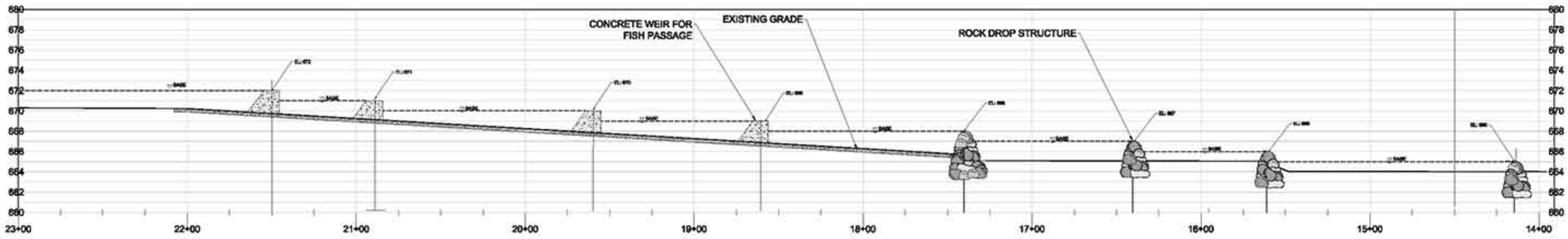

REVISIONS | DATE

APPROVED
design:
operations:

QUESTA ENGINEERING CORP.

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date: 9-25-2015

FISH PASSAGE
LAS VIRGENES CREEK BANK STABILIZATION, STREAM RESTORATION AND FISH BARRIER ENHANCEMENT
CALABASAS, CA

PROJECT NO.1500058 | CONTRACT NO.

SHEET NO. 20
OF : TBD

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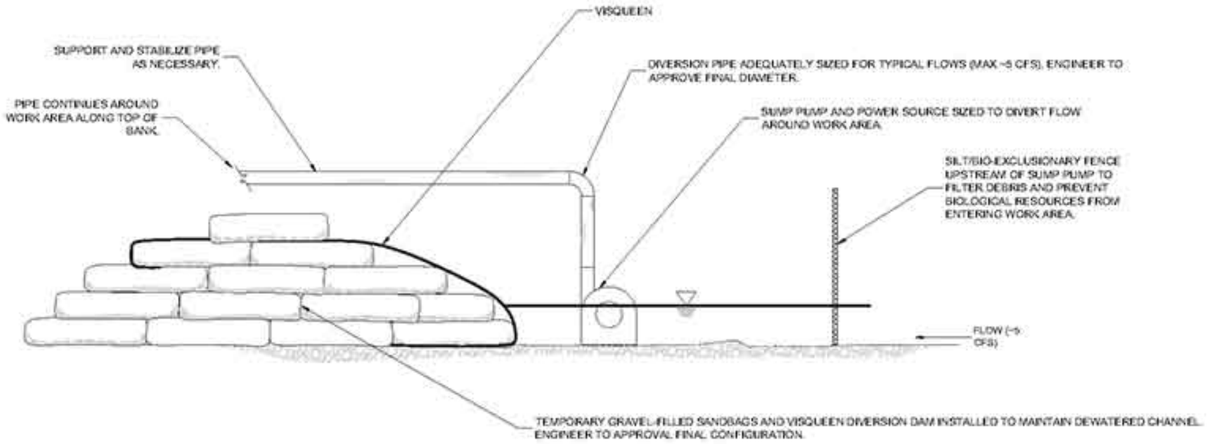

1 TEMPORARY PLASTIC AND SANDBAG COFFER DAM
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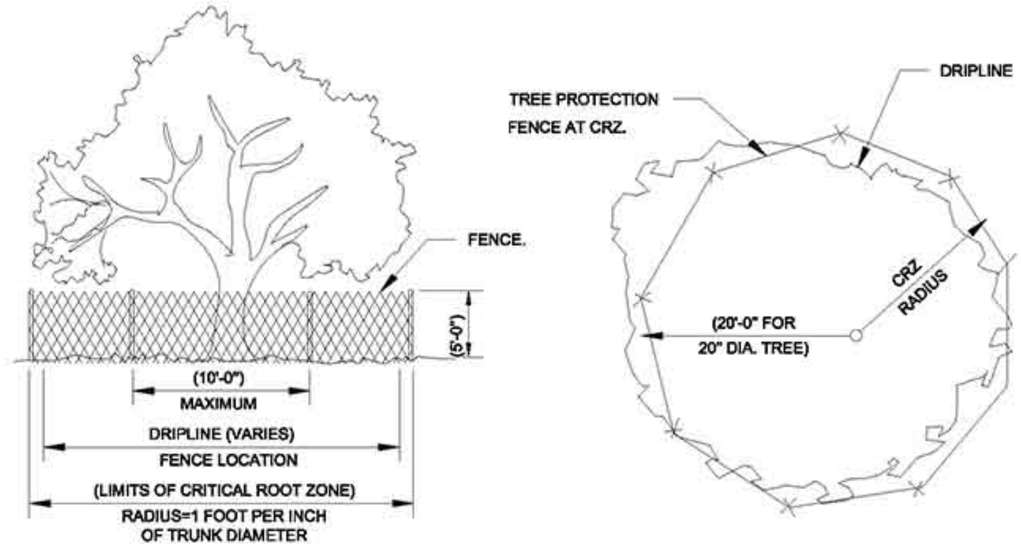
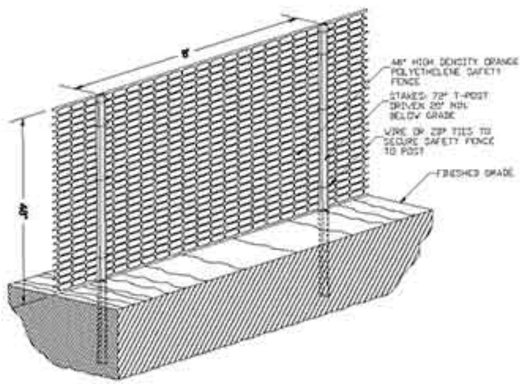
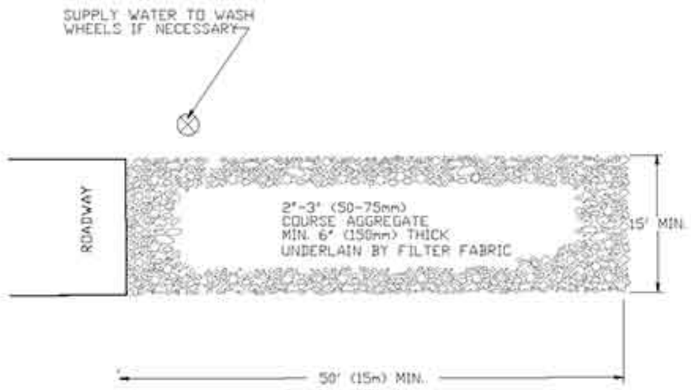


2 TREE PROTECTION
NTS



NOTES:
1. ALL SENSITIVE AREAS SHALL BE PROTECTED AS PER PLAN.
2. ALL TREES IN THE CONSTRUCTION AREA NOT SPECIFICALLY DESIGNATED FOR REMOVAL SHALL BE PRESERVED AND PROTECTED WITH HIGH VISIBILITY FENCE AS PER PLAN.
3. WHEN PRACTICABLE, INSTALL HIGH VISIBILITY 3 FEET OUTSIDE OF THE DRIP LINE OF THE TREE.
4. SAFETY FENCE SHOULD BE FASTENED SECURELY TO THE T-POSTS.
5. THE FENCING MUST REMAIN IN PLACE DURING ALL PHASES OF CONSTRUCTION; ANY CHANGE OF THE PROTECTIVE FENCING MUST BE APPROVED.

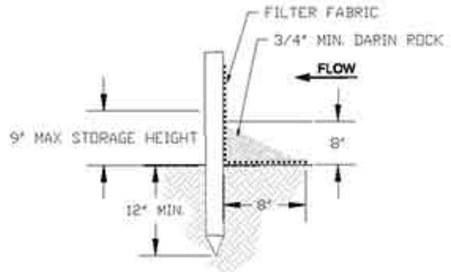
3 CONSTRUCTION BARRIER FENCH
NTS



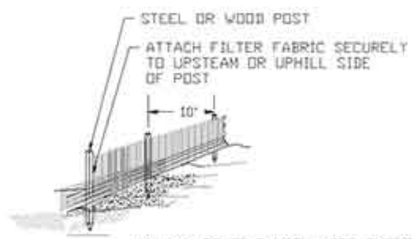
PLAN

NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABLIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

4 TEMPORARY GRAVEL CONSTRUCTION ENTRANCE
NTS



SECTION VIEW



*10' MAX SPACING WITH WIRE SUPPORTED FENCE.
6' MAX SPACING WITHOUT WIRE SUPPORT MESH.

SPACING AND LAYOUT

5 SILT/BIO-EXCLUSION FENCING
NTS

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REVISIONS	DATE

APPROVED
design:
operations:

QUESTA ENGINEERING CORP.

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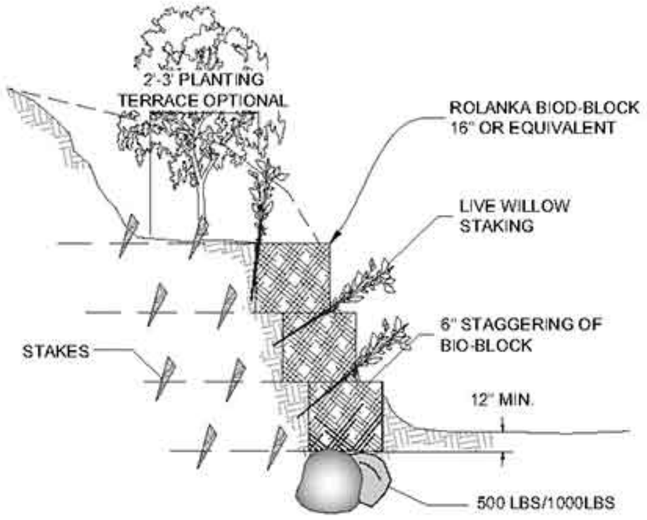
date: 9-24-15

LAS VIRGENES CREEK FISH BARRIER ENHANCEMENT
SITE PROTECTION DETAILS
CALABASAS, CA

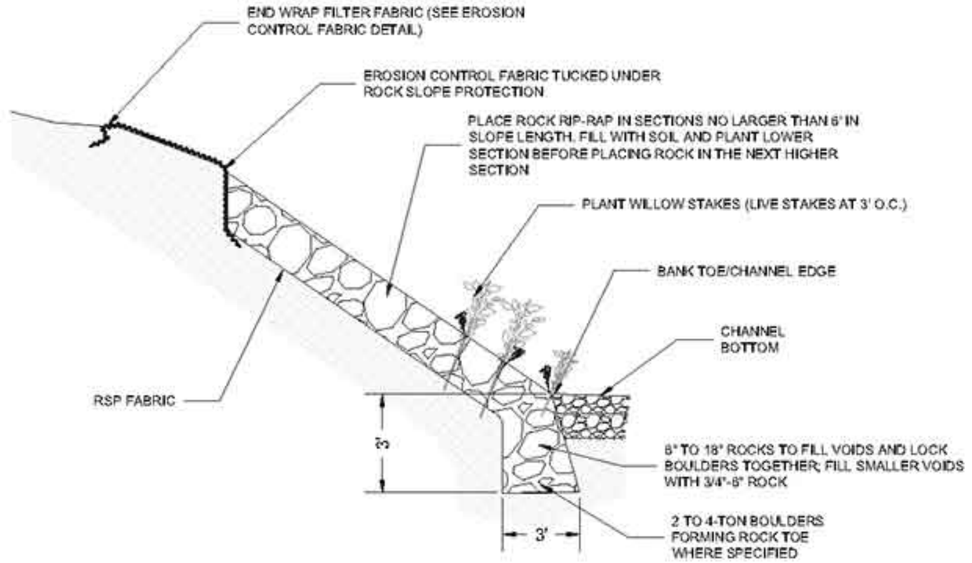
PROJECT NO.1500058
CONTRACT NO.

SHEET NO. 21
OF : TBD

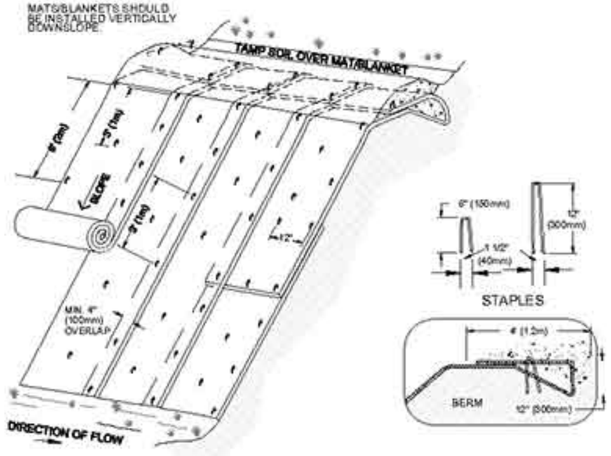


NOTE: KEY IN BIO-BLOCK UPSTREAM AND DOWNSTREAM EXTENT WITH BOULDER CLUSTER OR LARGE WOOD STRUCTURE

1 BANK STABALIZATION COIR BIO-BLOCK
NTS

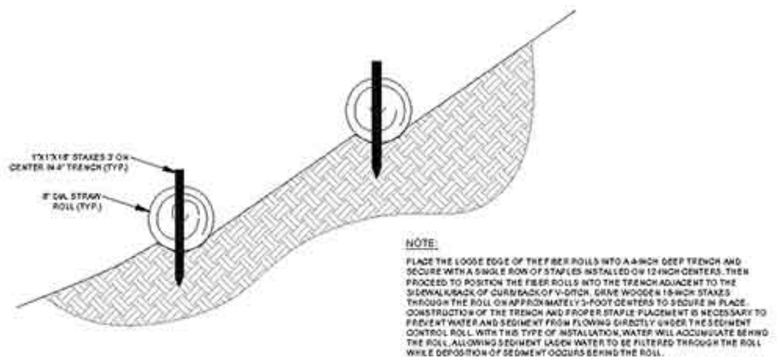


2 PLANTED ROCK REVETMENT
NTS



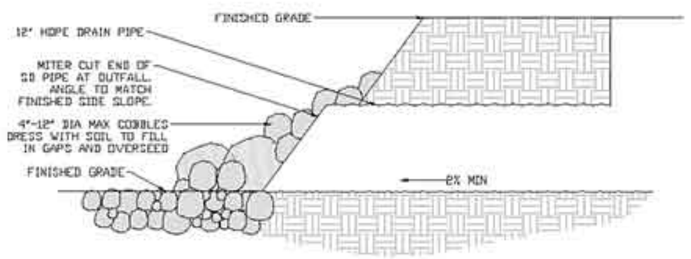
NOTES:
1. EROSION CONTROL BLANKETS/MATS SHALL BE BIODEGRADABLE (SEE SPECS)
2. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS
3. MATS/ BLANKETS SHALL HAVE GOOD SOIL CONTACT.
4. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
5. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.

3 EROSION CONTROLL FABRIC
NTS



NOTE:
PLACE THE LOOSE EDGE OF THE FIBER ROLLS INTO A 4-INCH DEEP TRENCH AND SECURE WITH A SINGLE ROW OF STAPLES INSTALLED ON 12-INCH CENTERS. THEN PROCEED TO POSITION THE FIBER ROLLS INTO THE TRENCH ADJACENT TO THE SIDEWALL/BACK OF CURB/BACK OF V-DITCH. DRIVE WOODEN 18-INCH STAKES THROUGH THE ROLL ON APPROXIMATELY 3-FOOT CENTERS TO SECURE IN PLACE. CONSTRUCTION OF THE TRENCH AND PROPER STAPLE PLACEMENT IS NECESSARY TO PREVENT WATER AND SEDIMENT FROM FLOWING DIRECTLY UNDER THE SEDIMENT CONTROL ROLL. WITH THIS TYPE OF INSTALLATION, WATER WILL ACCUMULATE BEHIND THE ROLL, ALLOWING SEDIMENT LADEN WATER TO BE FILTERED THROUGH THE ROLL WHILE DEPOSITION OF SEDIMENT OCCURS BEHIND THE ROLL.

4 WATTLES
NTS



5 OUTFALL PROTECTION
NTS

REVISIONS	DATE

APPROVED
design:
operations:

QUESTA ENGINEERING CORP.

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date: 9-24-15

LAS VIRGENES CREEK FISH BARRIER ENHANCEMENT
EROSION CONTROL DETAILS
CALABASAS, CA

PROJECT NO.1500058
CONTRACT NO.

SHEET NO. 22
OF : TBD

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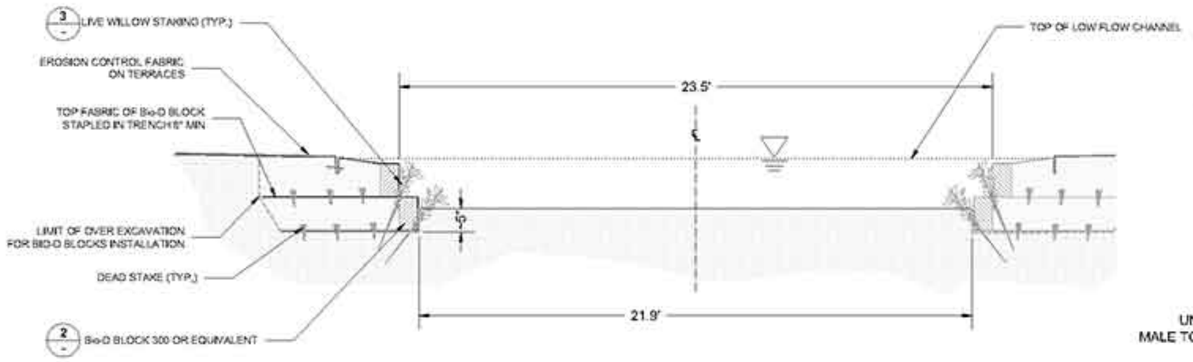
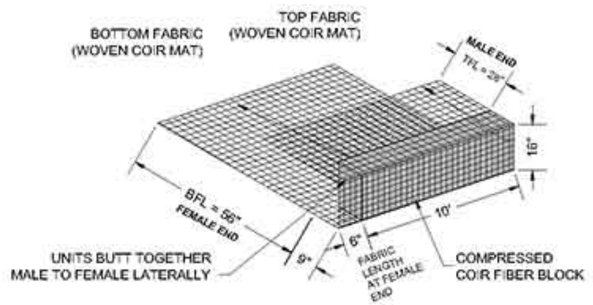
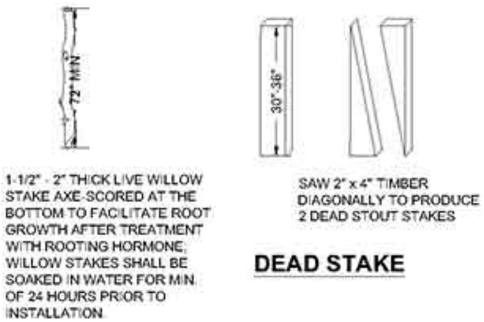


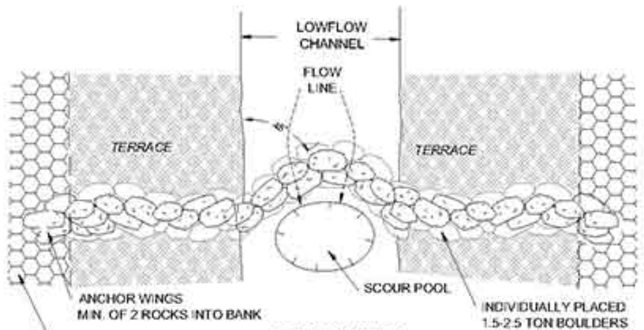
1 TYPICAL LOWFLOW CHANNEL CONSTRUCTION
NTS



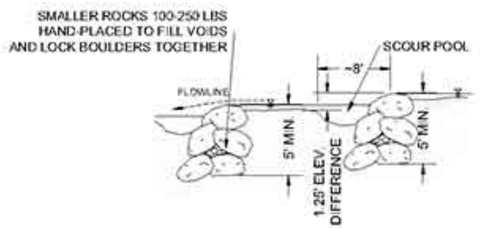
2 Bio-D BLOCK 300
NOT TO SCALE



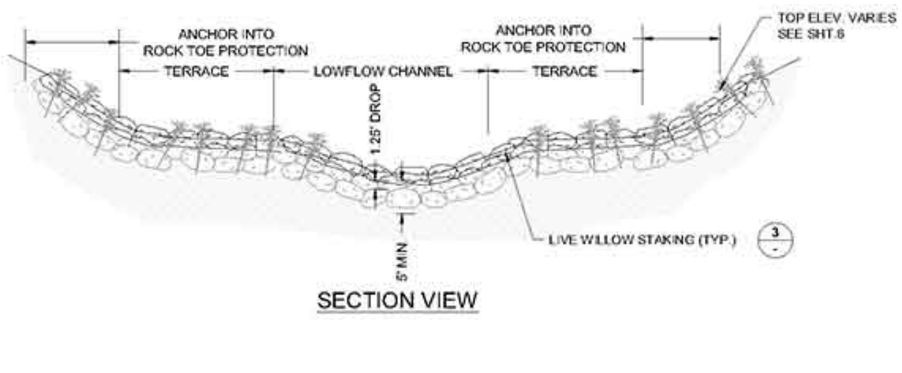
3 STAKING
NOT TO SCALE



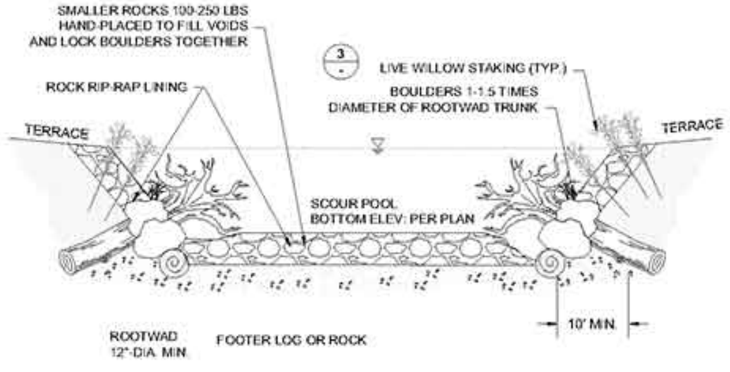
PLAN VIEW



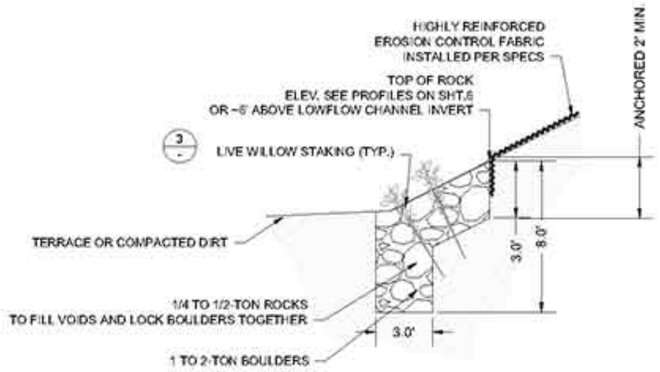
SIDE VIEW



SECTION VIEW

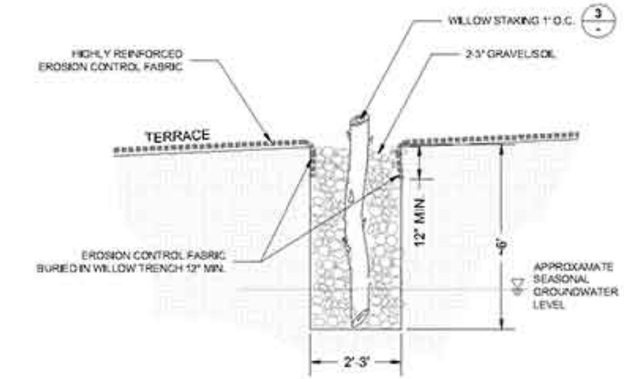


4 ROOTWAD INSTALLATION AND SCOUR POOL
NOT TO SCALE



5 ROCK DROP STRUCTURE
NOT TO SCALE

6 ROCK TOE PROTECTION
NTS



7 WILLOW TRENCH AND EROSION CONTROLL FABRIC
NTS

REVISIONS	DATE

APPROVED
design:
operations:

QUESTA ENGINEERING CORP.

scale: 1" = 40'
drawn: DR
checked: --
date: 9-24-15

LAS VIRGENES CREEK FISH BARRIER ENHANCEMENT
BANK STABALIZATION DETAILS
CALABASAS, CA

PROJECT NO.1500058 CONTRACT NO.

SHEET NO. 23
OF : TBD

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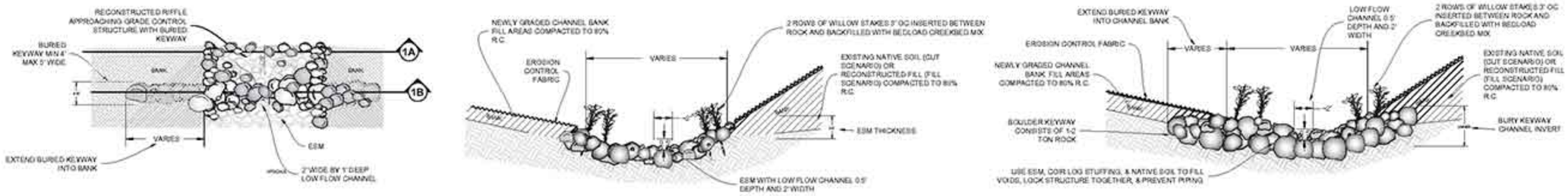
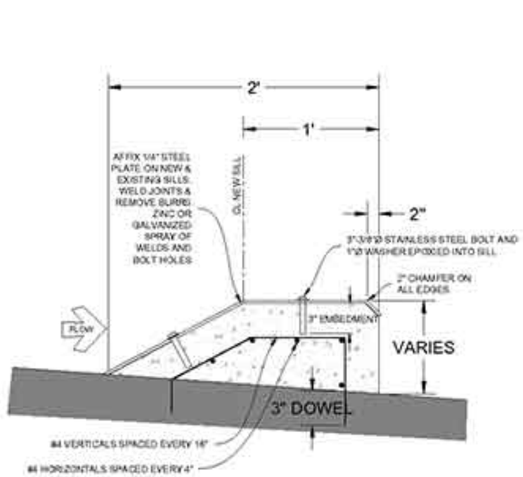
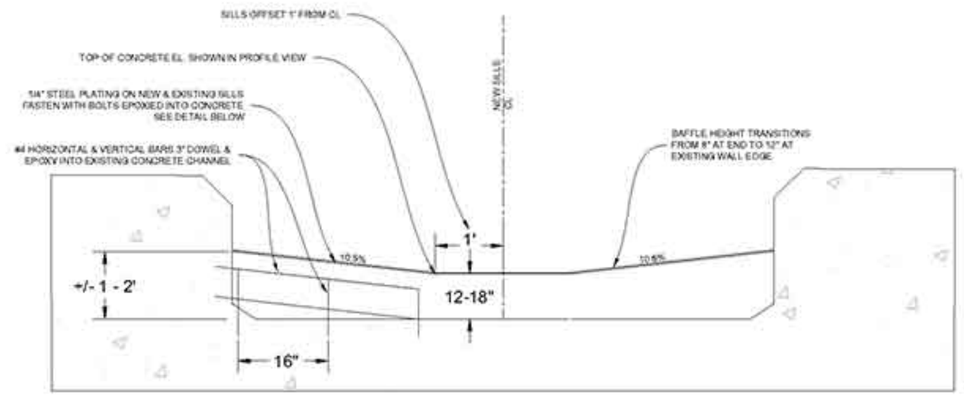


1 CONSTRUCTED RIFFLE AND GRADE CONTROL BAFFLE PLAN AND SECTIONS
NTS



SIDE VIEW



SECTION VIEW

2 CONCRETE FISH PASSAGE WEIR
NTS

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REVISIONS | DATE

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design:
operations:

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date: 9-24-15

LAS VIRGENES CREEK FISH BARRIER ENHANCEMENT
WIER AND RIFFLE DETAILS
CALABASAS, CA

PROJECT NO.1500058 | CONTRACT NO.

SHEET NO. 24
OF : TBD

PROPOSED ROCK WIER
PROPOSED POOL
PROPOSED RIFFLE
PROPOSED CHANNEL TOE
CONCRETE CULVERT
MEADOW CREEK LANE
END CONCRETE APRON
STA:17+24
EL: 665.67
CONCRETE WEIR
FOR FISH PASSAGE
ROCK DROP STRUCTURE
ROCK DROP STRUCTURE
ROCK DROP STRUCTURE
ROCK DROP STRUCTURE
PROPOSED GRADE
EXISTING GRADE
1.1%
.5%
POOL
RIFFLE
POOL
RIFFLE
POOL
RIFFLE
680
676
672
668
664
660
656
652
22+00
21+00
20+00
19+00
18+00
17+00
16+00
15+00
14+00
0
60
100
Feet

REVISIONS | DATE

APPROVED
design:
operations:

QUESTA ENGINEERING CORP.

scale: AS NOTED
drawn: MM
checked: ___
date: 9-24-2015

FISH PASAGE PROPOSED
LAS VIRGENES CREEK BANK STABILIZATION, STREAM RESTORATION AND FISH BARRIER ENHANCEMENT
CALABASAS, CA

PROJECT NO.1500058 | CONTRACT NO.

SHEET NO.
OF : TBD

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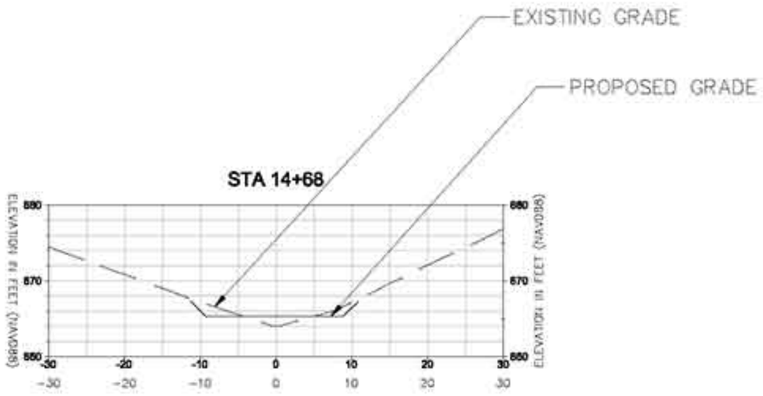
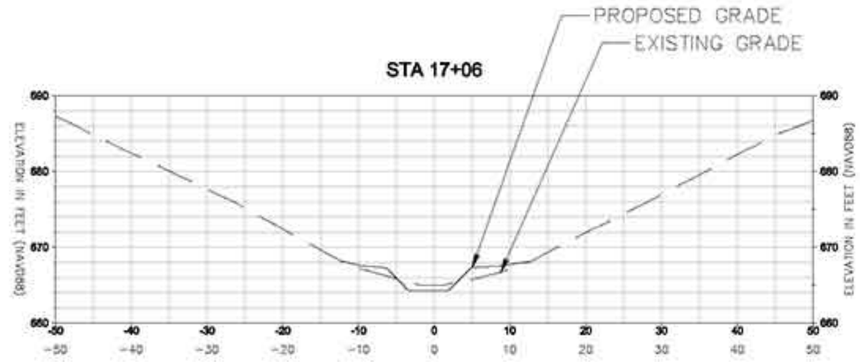


SECTION 1



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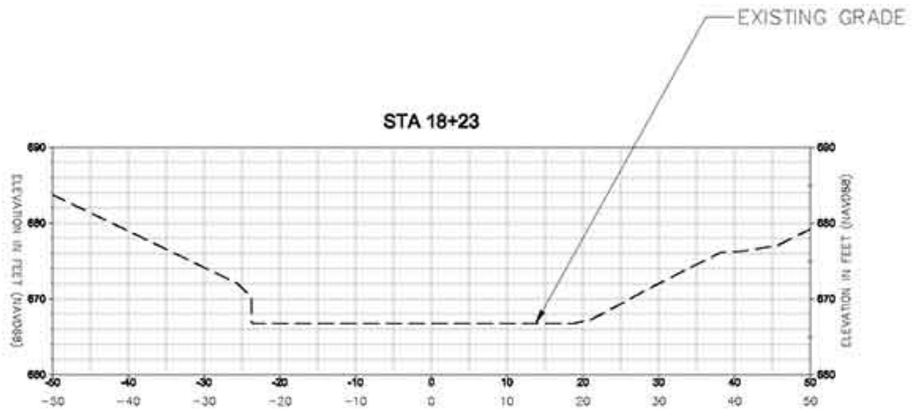
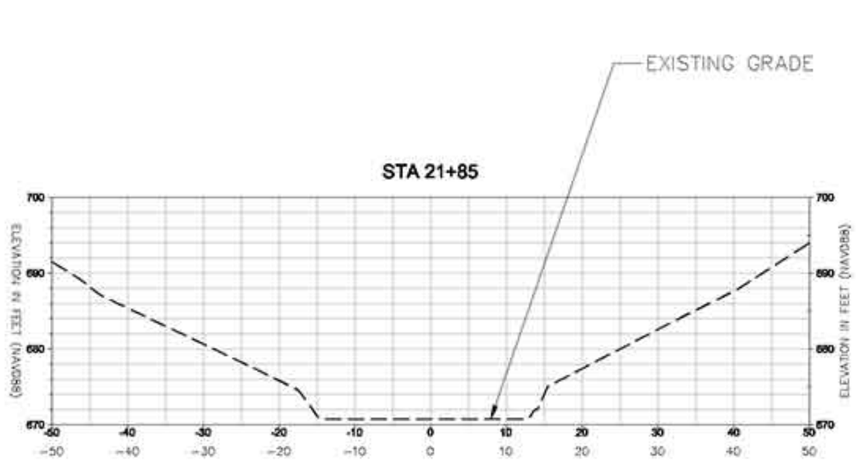


SECTION 3



SECTION 4

REVISIONS	DATE

APPROVED
design:
operations:

QUESTA ENGINEERING CORP

scale: AS NOTED
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date: 9-24-2015

FISH PASAGE SECTIONS
LAS VIRGENES CREEK BANK STABILIZATION, STREAM RESTORATION AND FISH BARRIER ENHANCEMENT
CALABASAS, CA

PROJECT NO.1500058 CONTRACT NO.

SHEET NO. ___
OF : 180

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Need and Urgency

Las Virgenes Creek Restoration Project – Phase II is an important step in the continued efforts by the City of Calabasas to rehabilitate Las Virgenes Creek to its natural conditions. Currently, much of the creek consists of unstable banks and gullies, and obstructive flood flows due to invasive plant species and broken concrete liners. Flood Plain mapping by the Federal Emergency Management Agency (FEMA) indicates that the channel bank slopes and bottom of the Las Virgenes Creek Contain a FEMA recognized 100-year floodplain area. Development in the 1960s led to the construction of a concrete liner along the west side of the creek that has since failed and fallen into the creek bed. Erosion due to these conditions has contributed to increased sediment and nutrient loading in Las Virgenes Creek, Malibu Creek, and ultimately the Santa Monica Bay. These are issues that will eventually need to be addressed, and would serve to benefit the region better if these issues are addressed sooner rather than later.

Assistance from the Santa Monica Mountains Conservancy through the Proposition 1 Grant program is especially necessary, as the project is currently short $980,500 of the total $2,977,235 required for project implementation. Funds that have already been secured for the project include $500,000 from the City of Calabasas General Fund, $676,735 from the Department of Water Resources' Urban Streams Restoration Program, and $820,000 from the Integrated Regional Water Management Plan Proposition 84 Grant Program.

Project Benefits

Ecosystem. The proposed project primarily involves creek restoration. Currently, the ecosystem of Las Virgenes Creek has deviated extensively from its natural conditions due to development and the introduction of invasive plant species such as the Brazilian Pepper Tree, and various species of palms. In addition to the problems contributed by exotic plant species, native wildlife has been severely impacted. Currently, there are no known migratory dish within the project area, due to both Rindge Dam, located further downstream of the project area in Malibu Creek State Park, and due to the culvert under Meadow Creek Lane, located within the project area. California State Parks is seeking to remove Rindge Dam, and upon removal, the remaining barrier would be the Meadow Creek Lane culvert. In order to facilitate fish migration, the project will include construction of a series of rock step pools to gradually raise the channel bed to the invert elevation of the culvert, and add a series of baffles in the culvert in order to reduce stream velocities through the culvert. After completion of these steps, and upon removal of Rindge Dam by California State Parks, Las Virgenes Creek will be clear of obstructions throughout its length.

Water Quality and Supply. Presently, water quality within the Malibu Creek Watershed is impacted by conditions present in Las Virgenes Creek. Diverted flows due to broken concrete

liners and invasive plant species have contributed to significant erosion and nutrient loading within the Malibu Creek Watershed. As such, the project design will include measures to minimize erosion and water quality degradation. An objective of the proposed project is to reduced erosion by stabilizing creek banks using innovative bioengineering techniques such as willow planted rock rip rap on lower slopes and earthen fill stabilized with coir end wrapped geogrids and coir blankets on the upper slopes. The project will not increase demand for water, will not contribute to the depletion of groundwater supplies, nor will it result in a net deficit in aquifer lowering or lowering of the local groundwater table.

Watershed Protection. The project is located within the Malibu Creek Watershed. By providing for the rehabilitation and restoration of riverine and riparian habitat, by instituting erosion control measures and providing bank stabilization, and by removing barriers to fish migration, this project will help to strengthen the health of the whole of the Malibu Creek watershed. Las Virgenes Creek is an important tributary to the watershed. Added flood control mitigation and increased water quality will help bolster the cumulative health of the watershed and receiving waters.

Public Benefits. The project also includes plans for construction of two trails along the length of the creek, and is being planned to strike a careful balance between these public access and ecological protection. Trails will be placed in such a way so as to protect the habitats being restored on the creek bottom. The project is large enough so that this balance can be feasible. This project will provide public access beginning at the northernmost end of the project at Agoura Road and continuing down to the De Anza Park. There will be several points in which the public can access the trail, including one for students at AE Wright Middle School, and at De Anza Park. The project is located in a relatively dense area of development with a mixture of residential and commercial zones. The residential community is composed several thousand apartment units, hundreds of condominiums and several schools. One school abuts the creek. The project will serve both the immediately surrounding community, and those nearby such as in the nearby cities of Agoura Hills, San Fernando Valley and LA County unincorporated area. Construction of the trails will encourage the public to engage in physical activity such as jogging, hiking and bicycling, thereby improving public health. Although the project as a whole will incorporate a trail, funds requested from SMMC's Proposition 1 Grant Program will be used solely towards the rehabilitation of the creek. Funds already secured from other grant programs will be used toward development of the trail.

Proposition 1 as Stated in Water Code Section 79732(a)

The project achieves several of the objectives outlined in Water Code Section 79732(a). Objective 4, which seeks to protect and restore aquatic, wetland, and migratory bird ecosystems, including fish and wildlife corridors and the acquisition of water rights for instream

flow, will especially be addressed by this project. The project will remove exotic and invasive plant species through 1.5 miles of Las Virgenes Creek, replant banks with native species, and restore fish passage through Meadow Creek Lane Culvert. Seeing as this project is part of The Malibu Creek Watershed, a main tributary to the North Santa Monica Bay, the project will address objective 10, which call for the protection and restoration of coastal watersheds, including bays. Flood Management, as described in objective 11, will also be addressed in this project through the removal of key barriers such as fallen concrete lining and exotic plant species.

Objectives of the California Water Action Plan

The project directly complies with two of the objectives of the California Water Action Plans. Action 4, which calls for the protection and restoration of important ecosystems, will especially be addressed in this project. The project will restore the natural riverine and riparian habitat of the creek, and will also address barriers to fish migration. Currently, Las Virgenes Creek consists of a large number of invasive plant species including varieties of pepper trees, fan palms, and eucalyptus, which will be removed. Native species will be reintroduced allowing for increased species diversity, provide creek shading, and reduce flood flow obstructions. Fish migration will also be addressed especially at the southern end of the project, with the addition of a series of rock-drop structures, designed to aid fish passage through this portion of the creek.

Action 8, which calls for increased flood protection, will be addressed in this project. Currently, Las Virgenes Creek and its surrounding communities are at an increased flood risk due to obstructions from broken concrete liners that have fallen into the creek, and overgrowth from non-native plant species. The broken concrete liners also have diverted flows toward creek banks, resulting in significant erosion, contributing to sediment loading in the creek, and ultimately contributing an increased risk in flooding. The entire project's vegetation landscape will be managed so as to prevent obstructions through the area's FEMA designated 100-year floodplain.

Reduction of GHG Emissions

A detailed description of how the project helps meet the State's greenhouse gas emissions reductions targets has been included in Appendix A of this application. This document includes a quantification of the metric tons of CO2 or CO2e removed or avoided, and an explanation of the methodology used to quantify this figure.

Relevant State and Regional Plans and Policies

The project is in compliance with the City's following plans: City of Calabasas 2030 General Plan, Las Virgenes Gateway Master Plan, and the City of Calabasas Creeks Master Plan.

City of Calabasas 2030 General Plan. Section IV of the General Plan includes a Conservation Element which calls for the restoration of riparian corridors to natural or quasi-natural states, where deemed feasible and without creating public safety concerns. The 2030 General Plan was prepared by the City of Calabasas Planning department in 2008.

City of Calabasas Las Virgenes Gateway Master Plan. Goal 2 of Chapter 2 calls for the preservation of the environmental integrity of natural features and the prevention of significant environmental impact. The Las Virgenes Gateway Master Plan was prepared by the City of Calabasas Planning Department in 1998.

City of Calabasas Creeks Master Plan. This comprehensive plan was created with the goals of preserving and managing the three main creeks that flow within the City of Calabasas, including Las Virgenes Creek. The Creeks Master Plan was created by the City of Calabasas Public Works Department in 2006.

Additionally, the project complies with the Draft Malibu Creek Watershed Enhanced Watershed Management Program prepared through a collaborative effort by the City of Calabasas and other stakeholders of the Malibu Creek Watershed, including Los Angeles County Flood Control District. The project is identified as one of the Watershed Control Measures of chapter 5 of the plan.

The project also complies with the Greater Los Angeles County Region Integrated Regional Water Management Plan. Chapter 5 of this plan lists the project as a GLAC IRWMP Approved Project , and in fact, has received an allotment of funding under Proposition 84, round 3, based on this plan.

Matching Funds

Currently, the City has secured approximately $1,996,735 for the project. A total of $500,000 from the City of Calabasas General Fund, $676,735 from the California Department of Water Resources Urban Streams Restoration Program, and $820,000 from the Department of Water Resources Proposition 84 Integrated Water Management Implementation Grant Program. The entire project is expected to cost approximately 2,977,235, which leaves a shortfall of $980,500 for the project.

Disadvantaged Communities

Although the immediately surrounding community is not a disadvantaged community as defined by the CalEnviroScreen 2.0 tool, there are disadvantaged communities are located within a 10 mile radius of the project site. Such communities include the communities located at census tract 6037134521 and 6037134001, both of which have a CalEnviroScreen Score of

76-80%. Many of the natural and open space features of the City of Calabasas are used by many members of communities located outside of the city boundaries. Implementation of this project would thereby aid not only the communities immediately surrounding the area, but also those nearby.

State and Local Conservation Corps

The City has submitted the project for review by both State and Local Conservation Corps. Both the Ventura County and Los Angeles County Chapters of the Conservation Corps have offered their services in implementation of the project. Their responses have been included in Appendix B of this application.

New and Innovative Technologies

With the success of the bioengineering methods pioneered in Phase I of the project, Phase II will also place a heavy emphasis on these innovative techniques. Stream restoration and fish habitat enhancement and barrier removal in the Meadow Creek Lane area will include removal of pieces of broken concrete from the channel bottom and grade stabilization using large rock, channel bank slope restoration and stabilization using willow planted rock rip rap, lower slopes, and earthen fill stabilized with coir end-wrapped geogrids, and coir blankets on the upper slopes. Upper slopes will be pole-planted with native willow and cottonwood. A series of rock step pools will be constructed to gradually raise the channel bed to the invert elevation of the culvert over a distance of 400 lineal feet, and ass a series of baffles in the culvert barrel to reduce stream velocities.

Monitoring and Reporting

As revegetation of the creek occurs, a qualified biologist will coordinate site management as necessary to ensure that construction is being done in accordance with the specifications in the plan, working drawings, permit conditions issued by various agencies. Since bank stabilization is a major component of successful plant community restoration, a key focus will be checking for signs of incipient instability; another focus will be the repair of stabilization structures. The qualified engineer will determine if field adjustments to the plans are necessary. If field adjustments are made, they will be documented in as-built plans or by other appropriate means.

Monitoring during the 5-year plant establishment period will be based on a combination of annual individual plant survival count at specific planting transects (for years 1 and 2) and percent canopy cover (after the first 2 years). Monitoring will be conducted by a qualified restoration specialist and will occur each fall (from approximately September 1-November 1) and before the plants incur leaf loss. Observations will be made to identify significant factors

affecting plant survival. Panoramic photographs will be taken to document the overall success of the project.

Annual reports, if required, will be submitted to the appropriate agencies, beginning the first year after construction for each permitted project. In addition to evaluating the factors discussed below, these reports will include photographs taken from permanent photo points that provide north, south, east, and west area views of each site, as well as photos of vegetation sampling plots and a bed profile comparison.

Monitoring for compliance with performance criteria will commence following completion of planting and initial assessment of the project. The first annual report will be submitted within one year of completion of planting at the mitigation sites. An as-built report will be filed within eight weeks of project completion.

Appendix A

Greenhouse Gas Reductions

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Rincon Consultants, Inc.
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November 4, 2015
Job No. 15-01621

Alex Farassati
City of Calabasas
100 Civic Center Way
Calabasas, CA 91302

Subject: Greenhouse Gas Emissions and Sequestration Inventory – Las Virgenes Creek Restoration Project

Dear Mr. Farassati:

Rincon Consultants, Inc. is pleased to submit the Greenhouse Gas (GHG) Emissions and Sequestration Summary Report for the Las Virgenes Creek restoration project. This report serves as a quantification of GHG emission reduction associated with the Las Virgenes Creek restoration project, including calculations and emission factors used to calculate the carbon sequestration associated with the restoration tree growth and carbon production associated with the restoration and maintenance activities over a 40 year time frame. Based on our analysis of the project's carbon flow, the Las Virgenes Creek Restoration Project would result in a total reduction of carbon dioxide equivalent (CO_2e) emissions. Using conservative industry accepted GHG emission and sequestration methodologies, the results of the restoration and maintenance activities over a 40 year timeframe would be a net decrease of between 2,394 and 2,848 metric tons of CO_2e.

If you have any questions regarding this summary report, please feel free to contact us.

Sincerely,

RINCON CONSULTANTS, INC.

Ryan Gardner, MESM, LEED AP
Sustainability Associate

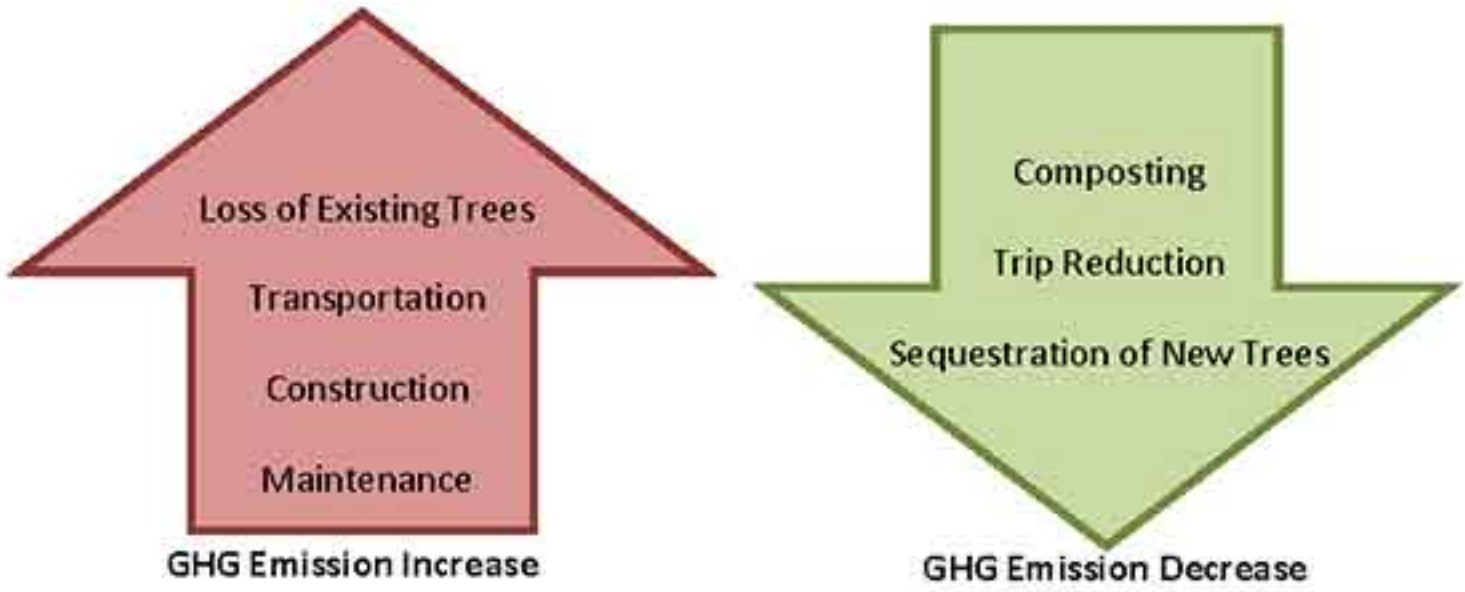
Erik Feldman, MS, LEED AP
Senior Program Manager

Emissions and Sequestration Analysis

Rincon Consultants, Inc. is pleased to submit the Greenhouse Gas (GHG) Emissions and Sequestration Inventory for the Las Virgenes Creek restoration project. We understand that the City of Calabasas intends to apply for Proposition 1 Competitive Gran Program funding and as part of the application, is required to demonstrate the quantifiable GHG emission reductions expected from the planting and establishment of native vegetation during the Las Virgenes Creek restoration process. In accordance to the Proposition 1 Grant reporting requirements, this report includes an analysis of the vegetative biomass proposed to be removed and the fossil fuels that will be emitted as part of the restoration and maintenance activities over a 40 year time frame. Additionally, this Inventory includes an estimation of the net carbon sequestration that will occur as the biomass involved in the restoration process grows and absorbs CO_2. The quantification of greenhouse gas reductions was completed utilizing calculation methodologies outlined in the California Air Resources Board's Compliance Offset Protocol for Urban Forest Projects.

Las Virgenes Creek Restoration Summary

The Las Virgenes Creek restoration project is located within the City of Calabasas in Los Angeles County, between Highway 101 and the Agoura Road Bridge. Las Virgenes Creek lies within the Malibu Creek Watershed, which provides habitat for numerous species, including, steelhead trout, the southwestern pond turtle, Arroyo toad, Pacific tree frog, American goldfinches, song sparrows, coyotes, and mountain lions (City of Calabasas, 2015). In 1977, an approximately 400- linear foot segment of creek was lined with concrete to control seasonal flooding. Lining the Creek disturbed the wildlife corridor and removed all riparian habitat from this segment. The City Council approved a conceptual design of the Las Virgenes Creek Restoration project in 2003, and then in in 2007 the project began to restore this segment to a natural, thriving creek habitat. The goals of the Las Virgenes Creek restoration project specifically include creating a stable channel that: increases the wildlife corridor, creates and extends the riparian zone, protects existing infrastructure, maintains the current level of flood control, and creates a community amenity. According to Questa Engineering, approximately 333 invasive and non-native trees will be removed and replaced by 975 native tree species. The restoration will require the use of vehicles to for the transport trees and the removal and disposal of waste, construction equipment to clear and grade the channel, as well as long term maintenance and watering of the restored area. Each of these actions will generate an associated increase or decrease of GHG emissions. This report will tabulate those emissions and determine the overall GHG benefit of the project. The following actions will be investigated:



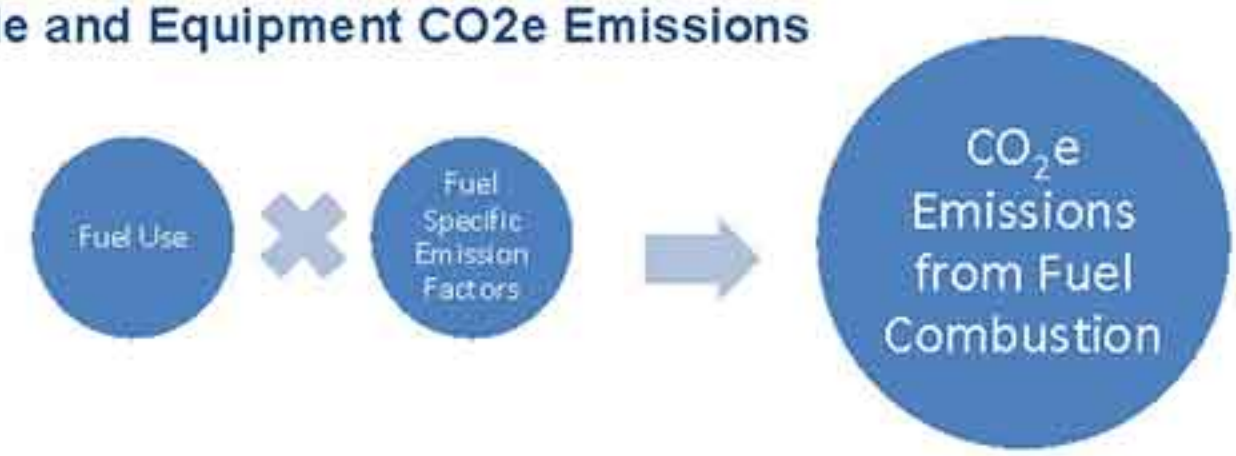
Summary of Methodologies

The quantification of greenhouse gas reductions associated with the Las Virgenes Creek restoration project was completed utilizing calculation methodologies outlined in CARB's Compliance Offset Protocol for Urban Forest Projects. The offset protocol has been developed to quantify sequestration of carbon for carbon offset purposes and includes long term monitoring and annual reporting requirements. The general methodology followed is represented by the following equation.

$$\textit{Project GHG Reductions} = \textbf{\textit{Project Tree } CO_2e} \textit{ Sequestration} - \textit{Vehicle } CO_2e \textit{ emissions} - \textit{Equipment } CO_2e \textit{ Emissions}$$

The vehicle and restoration equipment emissions were quantified using the California Emissions Estimator Model (CalEEMod) software developed for the South Coast Air Quality Management District (SCAQMD) by estimating the types and number of pieces of equipment that would be used on-site during the phases of the restoration project. Net sequestration data was determined using the complete survey approach outlined by the CARB Urban Forestry Methodology developed for their Can-n-trade Compliance Offset Protocol along with the ecoSmart Landscape tool, which is approved by CARB for compliance offset protocol calculations. Added to this methodology was emissions from water use which was calculated in CalEEMod as well as the benefit of composting which was calculated using the CalEPA derived methodology and emission factor. Additionally, Rincon conducted a sensitivity analysis to determine approximate benefits due to vehicle trip diversion. These additional steps are not required by the compliance offset protocol, however, provide a more complete picture of the net emissions which can be expected from the project over the next 40 years. The following section provides a more detailed description of the methodology followed in this analysis.

Vehicle and Equipment CO2e Emissions



To model the expected GHG emissions associated with the project's removal of existing trees, operation of equipment, and transportation of contractors to and from the site, Rincon utilized the California Emissions Estimator Model CalEEMod. The model was developed to estimate the emissions occurring from the construction and operation of development projects within California and includes emission factors for fuel consumption, water use, energy use, and waste generation. CalEEMod estimates both stationary and mobile emissions associated with the restoration project's construction process and provides the total Carbon Dioxide Equivalent (CO_2e) emissions which include emissions of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). A complete equipment list was provided to Rincon for inclusion in the analysis by Questa Engineering. Expected equipment includes skid steers, excavators, cement and mortar mixers, and graders. A full output from CalEEMod can be found in Appendix B.

In addition to the CalEEMod analysis, Rincon will also analyze consumption based emissions that include the fuel used during the transport of plants from the nursery to the restoration site, as well as the waste trees removal and transport to a composting facility. The nursery that will provide the new trees has not yet been selected; therefore, Rincon will calculate the emissions that would be expected from both the nearest and farthest nursery as provided by Questa Engineering. The nearest native plant nursery was found to be located seven miles away, while the furthest option was 96 miles. These values will be included as a range of emissions possibilities based on the final emission value. U.S. Energy Information Administration data for diesel fuel emissions used to calculate CO_2e emissions from transportation. For the analysis, the following variables were utilized.

GHG Emissions by Source

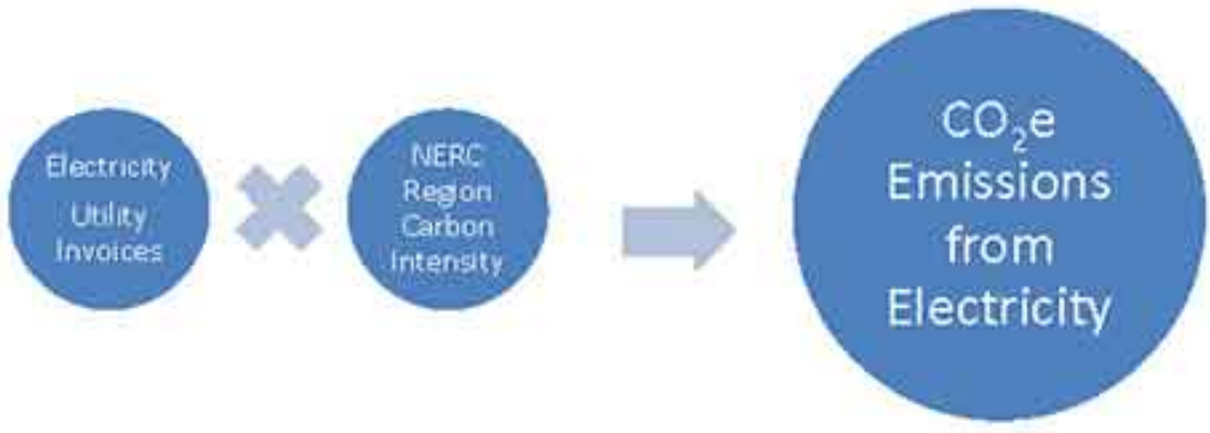
Location Name	Distance to Site	Medium Truck MPG[1]	Trips Required (One Way)	Total Miles Traveled	Gallons Used
Mountain Restoration Trust	7	8	18	126	16
Tree of Life	96	8	18	1,728	216

[1] Medium Truck MPG was derived from the Environmental Defense Funds, Greenhouse Gas Management for Medium-Duty Truck Fleets, 2014

Waste Disposal

Waste generated during the Las Virgenes Creek restoration project would be anticipated to primarily be green waste. According to the description provided by Questa Engineering, the project will involve removal of 333 invasive and non-native tree species that would be chipped and composted onsite. To determine the GHG emissions associated with waste disposal, the weight of above ground biomass to be removed was estimated using the ecoSmart Landscapes tool. The tool estimates above ground biomass based on the diameter breast height (DBH) of the tree and species specific data on biomass of species with that specific DBH. Rincon then utilized the California Environmental Protection Agency's methodology for estimating GHG emissions reductions for compost from commercial organic waste. The reduction factor of 0.42 metric tons (MT) CO_2e per ton of feedstock takes into account the increased emissions generated through transportation, process, and fugitive emissions as well as emission reductions due to increased soil carbon storage, decreased water use, decreased soil erosion, and decreased fertilizer use associated with the use of compost.

Project Tree CO2e Sequestration



As plants grow, they absorb CO_2 through their leaves. The CO_2 molecules are then broken down and used by the plant for energy and growth. This process releases O_2 back into the atmosphere. Additionally, some carbon is eventually released back into the atmosphere and the remainder is stored in the biomass of the plant itself. The portion of carbon remaining in the plant biomass is considered sequestered. The rate of sequestration differs depending on age, species, and health of the plants in question. The CARB Compliance Offset Protocol requires that the net gain in carbon sequestration be included in the calculation of total CO_2e reduction. Therefore, Rincon calculated

both the loss of sequestration due to the removal of existing trees as well as the increase in CO_2e resulting from the proposed restoration activities. The ecoSmart Landscape Tool was used for this calculation.

ecoSmart Landscape Tool

In order to calculate the net carbon sequestration for the project, Rincon utilized the ecoSmart Landscape tool jointly developed by UC Davis, the US Forest Service, and Cal Fire. This model uses tree species, size, and location information with species specific allometric equations to calculate biomass and carbon storage. Tree growth curves are used to forecast future carbon storage rates. The Carbon model is the only model approved by the Climate Action Reserve and California Air Resources Board for quantifying and reporting reductions with their Urban Forest Project Protocol. The tool requires the location, species, and DBH of all trees as inputs and provides the expected growth rate and thus carbon sequestration. Rincon used the plant species list provided in the Site Plan (Appendix A) to determine the lost carbon sequestration potential of the removed tree species, as well as the gained carbon sequestration potential of the restoration trees. When complete, the project will include removal of approximately 333 invasive and non-native tree species and replacing them with 975 native tree species. Rincon used the provided DBH measurements and tree species as inputs to the tool.

Substitution of Species

For some species of tree (Scots Pine, Canary Island Pine, California Walnut, Red Willow, and Cottonwood) an exact species was not available in the tool. In these cases, Rincon used a substitute tree from within the same genus and with similar growth attributes. The tree species Cordyline is not included in the tool. Cordyline refers to a group of approximately 15 species of small woody shrubs. Rincon has considered the carbon reduction available from these plants to be de minimis and therefore, Cordyline was excluded from this analysis.

Time Frame

For both the removed trees and the restoration trees, the ecoSmart tool was able to provide the carbon sequestration over a 40 year time frame. Although the planted trees will continue to provide sequestration benefits beyond 40 years, the time frame was based on the grant application guidelines. The tool includes expected mortality of existing trees based on reported DBH (size correlates to age) and the specific biology of the tree species.

Based on the data provided in the tool, several of the tree species currently at the site have total **lifespans of less than 40 years. Additionally, as a Rincon also applied a conservative 25% mortality** rate to the restoration trees. Mortality rate was provided by Questa Engineering. Conservatively, this rate was applied to trees in the first year, meaning they sequestered 0 carbon. However, in the real world we would expect this to occur over the 40 year time frame after at least a portion of the trees had time to sequester carbon. Therefore, this is considered a conservative estimate.

GHG Emission Summary

Based on the GHG emission analysis completed for the Las Virgenes Creek restoration, over a 40 year time frame the project would result in a net carbon reduction of between 2,394 and 2,848 MT of CO_2e. The range of emissions reductions is based on the emissions associated with the nurseries chosen to deliver the restoration trees and the actual diversion of trips provided by improving the active transportation network. A reduction of 2,394 MT of CO_2e is considered a conservative estimate of net GHG reduction provided by the project over a 40 year time frame. The following analysis includes the emission forcing provided by each project characteristic as well as an explanation of the emissions range provided.

GHG Emissions by Source

The following summary provides a review of the data analysis and a ranking of positive and negative emissions by source. The data review is broken down by emission source or sink. Sources of GHG emissions include, stationary fuel consumption, travel related emissions, construction, waste disposal and maintenance. GHG sinks include carbon sequestration, composting, and diverted trips. The loss of carbon sequestration by existing trees over the next 40 years and the emissions from construction and operations were the largest sources of positive emissions. However, the increase in carbon sequestration by the restoration trees far outweighed these emissions. The net benefit of the project was increased through other project characteristics such as composting green waste and increasing the number of expected active transport trips. The following subsection outlines the data reviewed, the emission factors, and the total emissions associated with each source.

CO_2e Emissions by Source

Emission Source	Emissions in Metric Tons
Stationary and/or Mobile Fuel Emissions	631
Carbon Sequestration Loss	1,029
Transportation	0.16 – 2.21
Composting	-32
Carbon Sequestration Gain	-3,912
Diverted Trips	-113 – -565

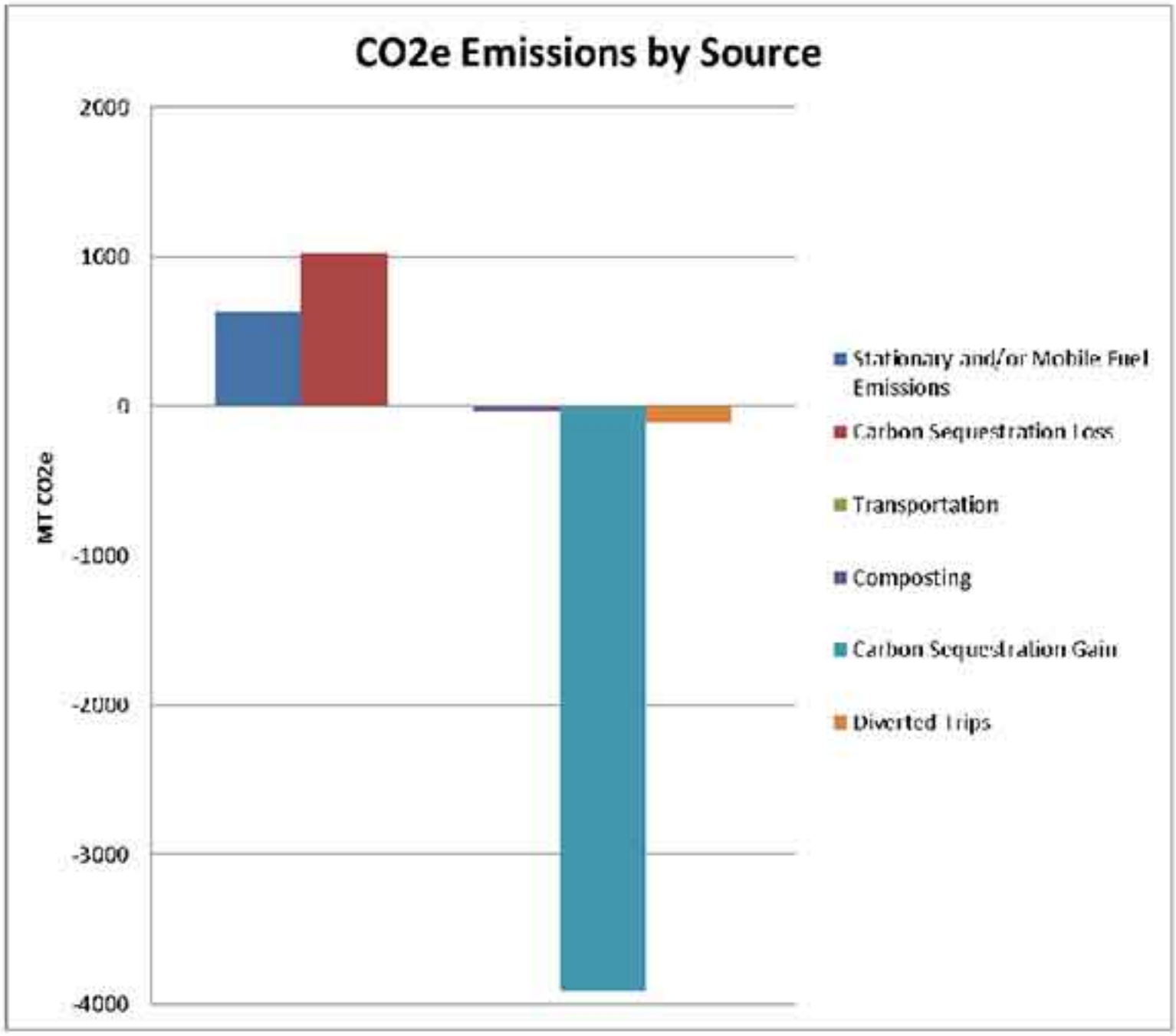


Table of Emission Factors

Rincon utilized various emission factors in order to estimate the GHG benefits of the proposed project. The following table lists the emission factors or models used in the analysis.

Table of Emission Factors

Emission Source	EF	Source
Gasoline CO_2	19.54 lbs/gallon	EIA
Gasoline CH_4	0.0173 g/mile	EIA
Gasoline N_2O	0.0036 g/mile	EIA
Diesel CO_2	10.2 kg/gallon	EIA
Diesel CH_4	0.048 g/mile	EIA

Diesel N_2O	0.0051 g/mile	EIA
Construction Emissions	Various	CalEEMod
Species Specific Sequestration Rates	Various	ecoSmart Landscape Model
Composting Emission Reduction	0.42 MT/ton	CalEPA
Medium Duty Truck Efficiency	8 mpg	Environmental Defense Fund

Vehicle and Equipment CO2e Emissions

Potential GHG emissions from the proposed project include construction-related emissions, direct emissions from operations, and indirect emissions from operation. Operational activities were considered to include vehicle trips to and from the site to maintain the newly planted trees, as well as watering during the first year of establishment. These types of emissions were calculated in the CalEEMod model and utilize standard emission rates from CARB, USEPA, and district supplied emission factor values (CalEEMod User Guide, 2013). Complete CalEEMod results and assumptions can be viewed in Appendix B.

Construction of the proposed project would generate GHG emissions primarily through the operation of construction equipment and truck trips. For this analysis, construction-related GHG emissions were estimated using CalEEMod based on the schedule and equipment usage described in Table 2. Based on CalEEMod results, construction activity for the proposed project would generate an estimated 170 metric tons of CO_2).

As detailed in the table below, GHG emissions associated with operational activities were also calculated. Emissions associated with water use and maintenance/upkeep of the project were also included. The project does not include any structures or permanent equipment that would result in the release of GHG emissions(electricity, natural gas, ect). Therefore, no emissions resulting from energy use during operation would occur. For the same reason, no water or wastewater would be utilized/generated at the site on an ongoing basis (though water would be needed infrequently and temporarily for initial irrigation for plant establishment). Solid waste generation associated with the proposed project would mostly occur during the initial restoration activities. It is City policy that construction waste be recycled wherever possible, and the project would be subject to the requirements of the City's Construction and Demolition Debris Re-Use and Recycling Program to reduce the amount of waste entering landfills. Recreational users of the trails may generate small amounts of solid waste; however, any increase in solid waste as a result of the proposed project minor and for the purposes of this study have been considered de minimis. Emissions associated with area sources, including landscape maintenance and architectural coating (weatherproofing), would also be negligible due to the lack of buildings associated with the project. However, for the purposes of the project emission modeling, it has been conservatively assumed there would be some operational vehicle trips to the project site, as part of the proposed project is to provide trails to increase connectivity with other trails and between neighborhoods on the northern and southern ends of the project site. Therefore, the proposed project would likely result in trip reduction and an associated reduction in mobile GHG emissions.

Emissions from Construction and Operation over 40 years

Source	Annual Emissions (CO_2e)
Construction (overall)	170 metric tons
Area (yearly)	<1 metric tons
Energy (yearly)	0 metric tons
Mobile (yearly)	11 metric tons
Waste (yearly)	<1 metric tons
Water (1st year)	21 metric tons
Total	**631 metric tons CO_2e**

Composting

As part of the project, 333 trees and plants will be removed from the site and composted. Based on guidance from the ARB's urban forests offsets protocol, Rincon used the ecoSmart Landscape tool to estimate the amount of above ground biomass associated with these trees. The above ground biomass is estimated in the tool using the DBH of the tree along with the plant species. Biological data on each tree species is contained in the tool, and is used to estimate the trees overall biomass given a particular DBH in a given climate zone. Utilizing the tool derived biomass and the CalEPA emission factor of 0.42 MT CO_2e reduction per ton of biomass composted, Rincon calculated the total carbon reduction associated with the composting of the removed biomass (CalEPA 2011).

Emissions Reduction from Composting

Tons Biomass	Reduction Factor (MT CO_2e/Ton Biomass)	MT CO_2e Emissions
75	-0.42	-32

Transportation

Emissions associated with the transportation of plants and materials to the site based on a high and low distance scenarios. Transportation of plants from the nursery to the project site was estimated for two possible nurseries as provided by the applicant. One nursery is located approximately seven miles away while the other is located 96 miles away. Rincon has assumed the transportation would be conducted by a 20 foot flatbed medium duty truck and that 9 round trips would be required (18 trips each way). Using these assumptions, a minimum of 126 miles and a maximum of 1,728 miles will be traveled. Rincon utilized an average of eight miles per gallon for medium duty truck efficiency (EDF 2014). Emission factors for diesel fuel were based on Energy Information Administration data

(EIA 2013). The analysis details a range of emissions from 0.16 Metric tons to 2.21 Metric Tons depending on the nursery or nurseries selected. CO_2 Emissions from transportation are shown in the table below:

CO_2 Emissions from Transportation

Location	Miles Traveled	Gallons Consumed (8 Mpg)	MT CO_2 Emissions (10.2 kg/gallon)
Mountain Restoration Trust	126	16	0.16
Tree of Life	1,728	216	2.2

CH_4 and N_2O emissions generated from transportation are summarized in the table below:

CH_4 and N_2O Emissions from Transportation

Location	Miles Traveled	MT CH_4 (0.048 g/mile)	N_2O (0.0051 g/mile)	Converted to CO_2e
Mountain Restoration Trust	126	0.003	0.0003	0.0003
Tree of Life	1,728	0.0415	0.004	0.0045

The total combined CO2e emissions from transportation are summarized in the table below:

Total CO_2e Emissions from Transportation

Location	MT CO_2e Emissions
Mountain Restoration Trust	0.16
Tree of Life	2.21

Carbon Sequestration Loss

As part of the project approximately 333 trees would be removed. These trees are either invasive or non-native species and therefore, will be replaced by native species as part of the restoration project. The carbon that these trees would have sequestered was estimated by the ecoSmart Landscape calculator based on their current size, expected size at each age, and expected life span. Overall, the 333 trees would be expected to remove a total of 1,029 MT of CO_2e from the atmosphere over the next 40 years.

Sequestration Lost from Removal of Non-Native Species

Species Name	Number of Trees Removed	CO_2 Sequestered Per Tree[2]	Total CO_2 Sequestered
Phoenix Canariensis	2	387	773
Schinus Molle	227	4,774	1,083,757
Schinus Terebinthifo	41	4,774	195,745
Eucalyptus Globulus	54	15,450	834,290
Populus Nigra	8	2,115	16,921
Koelreuteria Bipinnata	1	858	8581
Pinus Halepensis*	4	24,520	98,082
Washingtonia Robusta	38	439	16,695
Ficus Carica	3	6,961	20,882
Total (MT)			**1,029** MT CO_2e

Carbon Sequestration Gain

As part of the project, approximately 975 native trees would be planted. The carbon that these trees will sequester over the next 40 years has been calculated using the ecoSmart Landscape calculator **and a 25% mortality rate was applied to the plantings.** Overall, the 975 trees would be expected to fix a total of 3,912 MT of CO_2e over the next 40 years. Based on the fact that we would expect many of the trees planted as part of the project would live longer than 40 and continue to sequester carbon the emission, the total carbon sequestration gain calculated as part of this project present a conservative estimate of the total carbon sequestration presented from the life of the project.

Sequestration Lost from Removal of Non-Native Species

Species Name	Number of Trees Removed	Lbs. CO_2 Sequestered Per Tree	Total Lbs. CO_2 Sequestered
Sycamore	2	6,877	1,289,400
Cottonwood	227	6,199	274,3062
Live Oak	41	34,310	4,503,2152
Box Elder	54	7,246	271,732
Red Willow	8	6,642	1,992,528
California Walnut	1	7,793	292,239
Total			**-3,912 MT** CO_2

[2] ecoSmart Landscape Calculator – Species specific estimate of carbon sequestration over remaining lifetime. Tree age determined by diameter breast height and allometric calculations.

Diverted Trips

One of the benefits of the proposed project is the development of trails to increase connectivity with other trails and between neighborhoods on the northern and southern ends of the project site. Therefore, the proposed project would likely result in trip reduction and an associated reduction in mobile GHG emissions. Because it is difficult to determine the exact number of trips which will be taken by walking or biking on the trail instead of by car, Rincon conducted a sensitivity analysis under a high and low utilization scenario. Under the low scenario Rincon investigated the effect of 10 trips diverted per day while under the high scenario 50 trips were used. A trip was estimated to be 2 miles on average (round trip) and was assumed to displace a car trip with an efficiency of 23 miles per gallon. Gasoline emission factors from the Energy Information Administration were used in the analysis (EIA 2013). Under the low utilization scenario approximately 113 MT of CO_2e would be reduced. Under the high utilization scenario the CO_2e reduction was estimated to be 565 MT.

CO_2e Reduced Through Active Transport

Trail Utilization Rate	Trips Diverted Daily	Miles Diverted 40 years	MT CO_2e reduced
High	10	292,000	-113
Low	50	1,460,000	-565

References

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Greenhouse Gas Management for Medium-Duty Truck Fleets, Environmental Defense Fund, 2014. http://business.edf.org/files/2014/04/ghg-management-medium-duty.pdf

Carbon Dioxide Emissions Coefficients, Energy Information Administration, 2013 http://www.eia.gov/environment/emissions/co2_vol_mass.cfm

Vegetation Management Tables, Las Virgenes Creek Restoration Project Site Plan, Questa Engineering, Sept 24, 2015.

Appendix B

California Conservation Corps

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Calvin De La Cruz

From: Prop 1@CCC <Prop1@CCC.CA.GOV>
Sent: Thursday, September 10, 2015 10:48 AM
To: Calvin De La Cruz; Prop 1@CCC; inquiry@prop1communitycorps.org
Cc: Alex Farassati; Hsieh, Wei@CCC; Mercado, Juan@CCC; Rochte, Christie@CCC
Subject: RE: Prop 1 Grant Review Materials

Hi Calvin,

Juan Mercado, the Conservation Supervisor at our CCC Camarillo location has responded to the partnership for your project: Las Virgenes Creek Restoration Project – Phase II. CCC can participate in debris removal and creek clean-up, erosion control and biotechnical slope and bank stabilization, removal of non-native invasive species, trail building, fish passage enhancements, and planting with native riparian species.

Please include this email and the Consultation Review Document below with your application as proof that you reached out to the CCC. Please contact Juan Mercado Juan.Mercado@ccc.ca.gov to assist with the proposed budget.

Thank you,

Wei Hsieh, Manager
Programs & Operations Division
California Conservation Corps
1719 24th Street
Sacramento, CA 95816
(916) 341-3154
Wei.Hsieh@ccc.ca.gov

California Conservation Corps
Proposition 1 - Water Bond
Consultation Review Document

Applicant has submitted the required information by email to the California Conservation Corps (CCC):

✓ Yes (applicant has submitted all necessary information to CCC)

After consulting with the project applicant, the CCC has determined the following:

✓ It is feasible for the CCC to be used on the project and the following aspects of the project can be accomplished (deemed compliant).

- CCC can participate in debris removal and creek clean-up, erosion control and biotechnical slope and bank stabilization, removal of non-native invasive species, trail building, fish passage enhancements, and planting with native riparian species.

APPLICANT WILL INCLUDE THIS DOCUMENT AS PART OF THE PROJECT APPLICATION.

From: Calvin De La Cruz [mailto:cdelacruz@cityofcalabasas.com]
Sent: Tuesday, September 08, 2015 8:25 AM
To: Prop 1@CCC
Cc: Alex Farassati
Subject: Prop 1 Grant Review Materials (email 2 of 2)

Dear CCC Prop 1 Coordinator,

This is the second of two emails for the City of Calabasas' submission to the CCC for review. Attached to this email are the Proposed Trail Alignment Plans, and the Vegetation Management Plan for the project. If you have any further questions, or would like more information regarding the project, please feel free to contact me by email or at the number listed below.

Thanks,

Calvin De La Cruz
Environmental Services Assistant
City of Calabasas
(818) 224-1677
cdelacruz@cityofcalabasas.com