US Army Corps of Engineers.

SAN FRANCISCO DISTRICT

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Regulatory Branch
333 Market Street
San Francisco, CA 94105-2197 PROJECT MANAGER: Gordon Liu TELEPHONE: (415) 977-8463 Email: gliu@spd.usace.army.mil

1. **Introduction:** Browning-Ferris Industries (BFI) and Lemos Farm (Contact: Mr. Jim Gunderson) have applied for a Department of the Army permit to stabilize the bed and repair damage throughout the length of the Corinda Los Trancos Creek (CLTC) which is located adjacent to the Ox Mountain Sanitary Landfill near Half Moon Bay in western San Mateo County, California. The work consists of three project elements: (1) the primary project which entails channel reconstruction for approximately 1,200 linear feet; (2) secondary work that involves spot or localized bank stabilization, and (3) ongoing creek channel maintenance. The project is located in a rural area downstream of the Ox Mountain Sanitary Landfill, which is regularly monitored to avoid excessive sediment discharge into the Creek. Approximately 0.47 acre of jurisdictional wetlands of the U.S. in the CLTC channel will be impacted by this project. This application is being processed pursuant to the provisions of Section 404 of the Clean Water Act (33 U.S.C. 1344).

2. **Project Description:** The purpose of this project, as shown on the attached drawings, is to repair bank erosion damage, reduce creek downcutting, rebuild the approximately 5 to 12 feet of channel bed lost to recent stream bottom erosion, create a low flow area on the channel bottom for habitat enhancement, and regrade side slopes to a maximum 2H:1V slope ratio to conform to the approximate historic top of bank. The project also includes replanting and revegetating slope banks to minimize erosion potential and improve riparian and aquatic habitat. As shown in the attached drawings, the applicants' plans Figure 1-9 through Figure 9-9, the project will entail the disturbance, removal or fill of approximately 4,040 cubic yards (cy) of material into CLTC. The severely incized creek channel bottom would be restored to its pre-flood erosion conditions of 1997 elevation using compacted fill material and rock ramp drop structures to reduce stream velocities and provide low flow pooling areas. Banks would be graded and sloped to 2H:1V and stabilized using COIR (a brand name for coconut fiber) fiber roll toe protection placed at the base of the channel banks, with erosion control matting and native plants used to stabilize the upper portion of the channel banks. Approximately 1,350 linear feet of stream will be affected on CLTC above Highway 92. Appropriate protection measures have been incorporated into the plan to protect California red-legged frogs, a Federally listed endangered species which inhabit this creek. The project has three components: (1) the primary project; (2) smaller secondary projects; and (3) on-going creek channel maintenance. Below is a detailed discussion of each aspect of the project:

Primary Project

The primary project includes major construction/restoration of approximately 1,200 linear feet of a badly eroding/downcutting stream segment in the mid- and upper-reaches of CLTC. The construction will stabilize the current bed degradation and bank erosion in this portion of the project reach. The project essentially involves the placement of fill within the bottom of the creek channel and the reduction of bed slope through the use or grade control structures.

A. **Vegetation Removal.** The project will require clearing and removal of vegetation below the proposed fill line in the creek channel. At present, the vegetation along the west bank has

been severely impacted by erosion. All significant trees have been mapped and identified within the reconstruction area. The grade control structures and the placement of fill have been adjusted to minimize the number of trees to be removed. Twenty-four trees of 12-inch diameter or greater will be removed for this project. All protocols specified in the California red-legged frog report prepared by John Garcia and Associates (GANDA) will be implemented.

B. Fill Placement. Clean suitable fill will be moved from the borrow areas and placed in the channel in thin lifts. Compaction equipment and watering trucks will be used to attain appropriate compaction levels ensuring the stability of fill. Appropriate soil tests will be completed to insure proper moisture content and composition values are achieved as the fill is being placed.

C. Constructed Bank Slopes. A portion of the channel fill will include the construction of stable 2H:1V bank slopes. These bank slopes will be compacted and placed in accordance with the soil engineers' recommendations. The finished bank slopes will be hydro-seeded with a grass seed mixture that includes a quick growing, rye grass and native Californian grasses. After seeding an erosion control fiber blanket will be placed on the slope and fastened in place. Planting of the bank slope will be completed by placing holes in the installed blanket.

D. Grade Control Structures. An important part of the restoration effort is to reduce the slope of the constructed channel and reduce some of the erosive energy in the channel. A series of grade control structures will be used to reduce the channel bed slope. These drop structures will be constructed using a gradation of 250-lb to 2,000-lb rock. An under layer of clean concrete ruble may be used in the construction of these drops. All grade structures will be keyed in the bed and banks at least 4 to 6 feet at the base and a minimum of 6 feet into the banks. At the base of each structure will be a plunge or open pool of water. These pools serve to dissipate energy of the flow as well as provide increased bed morphology and open water. The upper zone of the rock scour protection will be planted with willow staking. This technique aids in the establishment of vegetation at the edges of the structure. As the willows mature, their roots bind the rock into stronger interwoven armor. The crest of the structure will be constructed with a low spot in the center. This will force low stream flows into the center of the channel and reduce the likelihood on constant incipient erosion in and around these structures.

E. Low-flow Channel. The cross-section of the channel will be varied. Generally, a 10-foot by 2-foot low flow channel will be constructed along with an in-stream flood bench. The in-stream bench will be located at the two-year flow line and will generally represent the ordinary high water expected in the channel. In some instances terraces would be incorporated on either side of the channel. These benches would be planted with appropriate riparian tree species.

F. Planting Plan. Extensive revegetation will be completed. Most of the west bank within the construction zone will be replaced. The construction project will remove several trees, however, over 200 new trees and several hundred willow stakes and plantings will be installed to revegetate the creek corridor. Generally, riparian tree species such as alder and willow will be established along the low channel, in-stream terraces, and at the base of the bank slopes. Mild bank slopes will be planted with a variety of scrubby native coastal plants. The upper bank top will be planted with appropriate canopy trees.

G. Vegetative Buffers. The project will maintain at least a 50-foot buffer from the edge of ordinary high water in the channel. The terrace provides an approximately 5-foot buffer, the upper bank slope provides another 35 feet and an additional 5

feet at the top of bank provide an average buffer of 50 feet between the existing agricultural operation to the west. The buffer on the east is generally in excess of 200 feet and will not be affected as part of the proposed reconstruction.

H. Construction Erosion and Dust Control Plan. A detailed erosion control plan has been prepared. The following is an excerpt that highlights the major components of the plan:

- **Temporary Creek Flow Diversion.** Flow in CLTC will be diverted around the project site during construction through two 6-inch flexible plastic drainpipes. The diversion will begin at the concrete ford upstream of the site and will re-enter the Creek approximately 100 feet downstream of the lowest drop structure.

- **Silt Fencing.** A silt fence will be installed along the upper boundary of the borrow areas to divert surface runoff from the bare soils and will be maintained there during the course of the project.

Permanent Erosion Protection Methods

- **Rock Drop Structures.** As described previously.

- **COIR Logs.** Sixteen-inch diameter COIR fiber logs, planted with five willow stakes, will be used to line the edge of the low flow channel. Two to three logs will line each side of the low-flow channel, and one log will be placed at the base of the 2H:1V fill slope on the west edge of the Creek.

- **Grass-Lined Drainage Swale.** Drainage from the watershed west of the project site (Lemo's agricultural field) will be collected in a parabolic grass-lined drainage swale and conveyed to a culvert where it can safely enter the Creek without causing erosion. The swale will be planted with erosion control seed mix previously specified, fertilized, mulched with straw, and covered with biodegradable erosion control fabric to ensure adequate performance before the grass reaches maturity.

- **Earth Berm.** A one-foot high berm will be constructed at the top of bank to direct surface water runoff from adjoining land away from the fill slope. Flow will be directed to one of the drainage culverts that enter the Creek.

- **Drainage Culverts.** To minimize the potential for gully formation, runoff from west of the project site will be conveyed to one of several corrugated metal pipe culverts the enter the Creek.

- **Outlet Protection.** Vegetated rock aprons will be constructed on the channel terrace at the outlet of each drainage culvert.

Secondary Projects (Lower Reach)

Local or spot repair of small sections of failing banks and reconstruction of failing gabion baskets in CLTC will be completed between Highway 92 and the Landfill scale house. At present, there are three sites in the lower reach that should be repaired to minimize future bank failures. There are also numerous small locations where, in the next three to eight years, repair will likely be needed. This plan will specifically address the three current sites.

- **Site 1.** This site is approximately 20 feet upstream of the Highway 92 culvert. Portions of the west and east bank immediately upstream of the culvert are undercut. Several large Douglas fir trees may be weakened. The bank areas will be excavated back and 250 to 500-lb rocks will be placed at the base of the bank slope. This rock will be keyed into the bank a minimum five feet on upstream and downstream ends. The rock will be underlain by filter fabric. This rock will be joint planted with willow stakes.

- **Site 2.** This site is 800 feet upstream of Highway

92 and is 20 feet long. High velocity flow at the base of previously placed gabions is eroding the east bank very near the haul road. The repair for this site would be very similar to the repair of Site 1. Rock toe protection would be placed and flow would be redirected into the center of the channel. The rock joints would be planted with willow stakes or alder plantings.

- **Site 3.** This site is located directly below the scale house at Station 14+50. The creek channel has flanked a gabion drop structure at this location and is eroding the west bank and causing significant local channel bed downcutting. This site would be repaired by regrading the bed and bank and using soil filled rock to stabilize the degradation. A series of three 16-inch diameter COIR fiber logs would be placed at the base of the repaired slope and planted with willow stakes. This technique is currently being used successfully upstream near the large eucalyptus trees at Station 30+00.

On-going Creek Channel Maintenance

Creek channel maintenance and management will continue for a period of five years after completion of the construction. This maintenance and management would include: (a) removal of leaning, or downed trees, (b) thinning and limbing of willows and alders where they significantly block or deflect flows, and (c) repair of future occurrences of small bank failures using biotechnical approaches including fiber rock rolls, planted rock, fiber/rolls/biologs, erosion blankets and willow and alder planting.

3. **State Approvals:** The applicants state that they have notified the Regional Water Quality Control Board, San Francisco Bay Region, to determine the need for State water quality certification. If the State Water Resources Control Board determines that this project is consistent with the California Water Quality Control Plan Requirements adopted by the Regional Board and Sections 301, 302, 303, 306 and 307 of the Clean Water Act, the State will issue a Certificate of Conformance with Water Quality Standards to the project proponent. Those parties concerned with any water quality problems that may be associated with this project should write to the Executive Officer, California Regional Water Quality Control Board, San Francisco Bay Region, 1515 Clay Street, Suite 1400, Oakland, California 94612.

4. **Environmental Assessment:** Corps of Engineers has assessed the environmental impacts of the action proposed in accordance with the requirements of the National Environmental Policy Act of 1969 (Public Law 91-190), and pursuant to Council on Environmental Quality's Regulations, 40 CFR 1500-1508, and Corps of Engineers' Regulations, 33 CFR 230 and 325, Appendix B. Unless otherwise stated, the other worksheets and supporting data used in the preparation of this Preliminary Environmental Assessment are on file in the South Section, Regulatory Branch, Corps of Engineers, 333 Market Street, San Francisco, California.

a. IMPACTS ON THE AQUATIC ECOSYSTEM

(1) <u>Physical / Chemical Characteristics and Anticipated Changes</u>

Details of the project along with its associated impacts on environmental conditions are contained in the applicants' Stream Corridor Restoration Plan for CLTC. These documents are available for public review in the Army Corps of Engineer's (Corps) San Francisco District Office, at the San Mateo County Planning Department and at the Half Moon Bay Public Library. In general, the applicants' Restoration Plan proposes placement of compacted fill in the channel bottom to restore the channel to 1997 pre-flood conditions, placement of rock ramp drop structures to reduce channel velocities and create pools, and erosion control protection and enhancement planting along the channel banks.

COIR fiber rolls, erosion blankets, willow staking, fill material, rock ramp, and rock gabion baskets will

be used, where needed, to restore and stabilize toe slope banks at a 2H:1V or greater ratio. Specific highlights are summarized below:

Substrate: The project will utilize primarily integrated or biotechnical bank protection techniques to replace and stabilize existing substrate and channel bank habitat. Erosion of up to 10 feet has occurred along the Creek, resulting in bank failure and loss of mature riparian trees due to erosion from undercutting. However, toe protection and installation of boulder drop structures (ramps) are proposed to trap sediments, stabilize the restored creek bottom, deflect flow to create new habitat pools, and reduce stream velocities so that the aquatic habitat will be improved. This will be a significant adverse, temporary impact but will be beneficial over the long term as bank stability is improved.

Streamflow and Drainage Patterns - All bank repair and creek bed restoration would be confined to the period of July 15 to October 15, when low-flow creek conditions typically prevail at the site. No repairs and restoration work or operation of equipment would be allowed to occur in the active low-flow channel. The installation of the seven rock ramp drop/grade control structures, to correct the steep vertical profile of the Creek, could alter streamflow pattern, decrease flow velocities, and reduce localized scouring.

Installation of these seven rock ramp drop structures will slow down the flow in the creek channel substantially which would prevent any scouring and erosion of the creek banks. This is deemed to be a major beneficial impact for the preservation of the creek hydrology on a long term basis.

Flood Control Function of Wetlands - The Federal Emergency Management Agency's (FEMA) National Flood Insurance Program classified a portion of CLTC as Zone A *(Community Panel #060-311 0225C, August 5, 1986).* The applicants' analysis of the FEMA map concludes that the 100-year flood levels are contained within the channel from Highway 92 to approximately the Landfill scale house. The proposed project is a stream bank restoration project and will not affect the existing conveyance capacity of the Creek, representing a less than significant impact to flooding.

The project would not result in changes in the amount of water in the Creek either within the project reach or downstream. However, the reduction in grade afforded by the proposed drop structures could result in an increase in the total area of land inundated by the Creek. This could be taken to represent an increase in the water available to wetlands, which would be a positive impact. Consequently, the impacts to the amount of the surface water available to any water body or wetland will be less than significant.

Aquifer Recharge - Groundwater is currently intercepted by the existing incized channel at the project site. This interception/conveyance of groundwater flow will be reduced by the project

The proposed improvements at the project site would not be expected to substantially reduce the amount of groundwater available for public water supply uses, since it would not be utilizing groundwater for any purpose. Taken within the context of overall aquifer recharge capacity in the local area (and given the watercourse which flows through the project site would continue to contribute to aquifer recharge), the project would not cause any change in aquifer recharge capacity.

Erosion/Sedimentation Rate - The work being done is to repair accelerated erosion problems which were exacerbated by winter storms in recent years. Improvement work is being done to reduce the potential for slope failure and stop active creek erosion and downstream sedimentation. The creek channel erosion will be curtailed by the installation of the seven rock ramp drop/grade control structures, to correct the steep vertical profile of the Creek, reduce velocities, eliminate downcutting, and reduce

accelerated erosion and incizing.

The objective of this proposed construction work in the creek channels is intended to prevent future erosion to the slopes of both banks with reduced sediment loading. Thus, these measures substantially improve the water quality of this perennial creek on a long term basis.

Water Quality - The project will enhance the water quality by reducing erosion from the creek bed as well as both banks, thus reducing the sediment loading from the normal flow on a long term basis.

(2) Biological Characteristics and Anticipated Changes

Wetlands (Special Aquatic Site) - This proposed project is to restore and enhance approximately 0.84 acre of wetland and aquatic habitat to compensate for the 0.47 acre of wetlands which will be temporarily affected. Proposed mitigation will consist of :

1. protecting existing sensitive habitat: A high level of effort will be made to protect portions of the Creek where stabilization work is not needed. These areas presently support sensitive wildlife species. These areas will be fenced (temporary construction fencing) as needed during implementation.

2. creating new stream bottom wetlands habitat: Compensatory waters and wetlands will be created by regrading and enhancement planting of creek banks with native riparian species, at a replacment ratio of not less than 1:1.

3. enhancing and restoring existing degraded wetland and riparian habitat: This project provides for a net increase of pond-like aquatic habitat by placement of rock ramp drop structures and accompanying rock-lined plunge pools to slow the flow of water, provide shallow ponding areas, and create diversity within the channel section.

4. incorporating of mitigation measures to protect California red-legged frog in the designs: This project provides open area excavation for seasonal flooding to allow creation of areas of shallow water as habitat for the California red-legged frog, as well as provide suitable areas for establishment of willows, alders, sedges, rushes, and wetland forbs; 0.84 acre of the habitat type will be created, including pools associated with the drop structures.

The overall objective is to ensure that no net loss of aquatic site or decrease in functional habitat value will occur on a long term basis.

Endangered Species - CLTC is a perennial creek. The aquatic habitat conditions support amphibians and various aquatic invertebrate species, such as California red-legged frog (*Rana aurora draytonii*) and less likely San Francisco garter snake (*Thamnophis sirtalis tetrataenia*). Any sensitive plant and wildlife species will benefit from this project which will create new sustainable aquatic habitat which contains the components (water, soil, slope, vegetation canopies, etc.) suited to their unique needs, as well as control of invasive exotics in existing degraded habitat.

GANDA reviewed several sources of information as part of listed threatened or endangered species assessment for this CLTC Restoration Project, including the Environmental Impact Report for the Ox Mountain Sanitary Landfill Expansion (Harding Lawson Associates, 1991) and the California Natural Diversity Database (CNDDB). California red-legged frog and San Francisco garter snake were the only two endangered species found within this project boundary.

The primary aquatic species impacted upon would be the California red-legged frog. These impacts were considered to be minimal due to the fact that there are only two possible small areas along the CLTC corridor which might support the frog. Two instream sediment retention basins provide the best

possible habitat. The proposed project may adversely affect California red-legged frogs. Direct impacts could occur during project construction and during ongoing maintenance of the sediment basins. Indirect impacts are possible due to short term loss of vegetation in the Creek.

The direct impacts on the San Francisco garter snake is considered highly unlikely due to the fact that during the endangered species survey with 4,694 trap nights, none of this species were captured on the project site.

Wetland mitigation measures described above will minimize these effects during construction which will provide a long term benefit after the project is completed. The Corps will enter into consultation with the U.S. Fish and Wildlife Service regarding impacts to these species in accordance with Section 7 of the Endangered Species Act.

Habitat for Fish, Other Aquatic Organisms, and Wildlife - CLTC is a perennial creek. The aquatic habitat conditions support amphibians and various aquatic invertebrate species. No fish have been observed in CLTC and the California Department of Fish and Game does not consider the Creek a fish-bearing stream *(San Mateo County, 1991).*

The project site is in the Pilarcitos Creek watershed, a basin which hosts a variety of plant communities. Representative plant communities within the watershed include coastal scrub/chaparral, non-native grassland, riparian woodlands, and mixed evergreen woodland. The Pilarcitos Creek watershed supports aquatic species typical of the coastal drainages of the Santa Cruz Mountains, including Pacific Tree frog, sculpin, three-spine stickleback, and various aquatic insects *(San Mateo County, 1991).*

The impacts on other aquatic species are possible but considered to be highly remote due to the fact that the construction is only a short term effect with the emphasis on the enhancement of the aquatic species habitat which would be beneficial on a long term basis.

b. IMPACTS ON RESOURCES OUTSIDE THE AQUATIC ECOSYSTEM

(1) <u>Physical Characteristics and Anticipated Changes</u>

Air Quality - Project activity would have minor, short-term impacts on air quality in the vicinity of the project site. Based on the relative minor size of the proposed project and limited to an evaluation of air quality impacts only within Corps of Engineers' (Corps) jurisdictional areas, the Corps has determined that the total direct and non-direct project emissions would not exceed the de minimis threshold levels of 40 CFR 93.153. Therefore, the proposed project would conform to the State Air Quality Implementation Plan (SIP) for California.

Noise Conditions - Construction activity would have minor, short term impacts on the ambient noise levels in the project site vicinity. Construction of the project would involve the use of heavy equipment and would increase acoustic activity in these areas. Adverse effects from noise due to construction activities would be short-term in nature, and minor in magnitude.

Geological Conditions - The project is located in the northern end of the Santa Cruz Mountains, within the Coastal Ranges Geomorphic province. The area is characterized by rugged terrain consisting of sub-parallel mountain ridges and intervening valleys.

Corinda Los Trancos Canyon is relatively long and narrow (approximately 2.5 miles long, 0.35 mile wide) with natural side slopes averaging about 20 to 50 percent or more. In the vicinity of the existing landfill there are steeper slopes resulting from excavation. The Canyon is characterized by a narrow alluvial floor trending roughly north-south and bounded to the east and west by rugged ridges.

Topographic elevations in the basin range from

140 feet in the base of the canyon to 1,740 feet on the adjacent ridge top.

The project site is underlain by heavy folded Lompico sandstone and Monterey shale in depositional contact with the Montara quartz diorite. The total depth of alluvium and weathered bedrock approaches 150 feet.

Construction of the project would alter the topography in the immediate vicinity of CLTC corridor. The existing eroded slopes will be regraded to a slope of approximately 2H:1V. In addition, construction will require removal of vegetation and soil disturbance, increasing the potential for temporary, construction-related erosion. Soil erosion could temporarily increase siltation and sedimentation in CLTC as well as contribute to slope instability and would be potentially significant without mitigation.

(2) <u>Biological Characteristics and Anticipated Changes</u>

Riparian Habitat (Not in Corps' Jurisdiction) - CLTC also supports a fragmented mature riparian woodland consisting of alders and willows. Riparian woodland vegetation lines the bottom two-third's of the deeply incised CLTC channel. Dominant plant species within the riparian zone include willow *(Salix sp.*), which form a dense canopy near the top-third of the stream channel in portions of the site, and red alder (*alnus oregana*) near the bottom of the channel. Under story vegetation consists of Californian blackberry (*Rubus ursinus*), California black current (*Ribes malvaceum*), thimbleberry *(Rubus parviflorus velutins*), bracken fern (*Pteridium aquilimum*), western sword fern (*Polystichum munitum*), and stinging nettle (*Urtica holosericea*).

The CLTC corridor provides habitat for a variety of wildlife including Virginia opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), California meadow vole (*Mieotus californicus*), black-tailed deer (*Odocoileus hemionus*), raccoon (*Procyon lotor*), and brush rabbit (*Sylvilagus backmanii*).

In order to reduce the height and steepness of the eroded banks, clean fill will be placed in the incised channel, and bank slopes will be constructed in a 1,200-foot portion of the creek channel. As part of the construction, some riparian vegetation will be removed. Twenty-four trees of 12-inch diameter or greater have identified as needing removal. The removal of this vegetation will temporarily impact the habitat needs wildlife that currently use the project area. This is potentially significant impact. However, over 200 new trees and several hundred willow stakes and plantings will be installed to revegetate the creek corridor.

Other Terrestrial Habitat – The upper slopes of the Canyon are dominated by coastal scrub/chaparrel and grassland. The chaparral plant community is dominated by coyote brush *(Baccharis pilularis consanguinea),* and sticky monkey flower *(Mimulus aurantiacus).* Portions of the western slope of the Canyon consist of Douglas fir *(Pseudodotsuga menziesii)* woodlands.

The chaparral vegetation provides a food source for seed-eating species such as California quail (*Callipepla californica*), dark-eyed junco (*Junco hyemalis*), western harvest mouse (*Reithrodotomys megalotis*), and browse for the black-tailed deer (*Odocoileus hemionus*). These woodlands provide nesting habitat for a variety of birds including Swainson's thrush (*Catharus ustulatus*), brown creeper (*Certhia americana*) and raptors such as red-tailed hawk (*Buteo jamaicensis*) and great horned owl (*Budo virginianus*).

During project construction, there will be a temporary loss of aquatic and wetland habitat due to construction of drop structures, channel clearing, grubbing, filling and vegetation removal. These impacts are considered to be only temporary and insignificant.

(3) Socioeconomic Characteristics and Anticipated Changes

Aesthetic Quality - The project is located adjacent to Highway 92, a County-designated scenic road corridor. However, since the project site is not visible from any public highway, the project will not result in any impact to a scenic vista or scenic highway. The only structure affected by the project is a plastic-covered greenhouse that will be removed, but is currently at the top of the western eroding streambank. This structure is used for agricultural purposes and is not considered a historic or scenic structure. The project will also require the removal of several mature alder and willow trees. Since these species are not considered heritage trees by the County, and since they will be replaced as part of the Vegetative Mitigation Plan, their removal is less than significant.

Since the project site is not visible from the adjacent Highway 92 and all removed vegetation during construction will be replanted, the aesthetic impacts from this project are deemed to be minor and short termed.

Agricultural Activity - For a project to have a significant effect on agricultural resources it would convert prime agricultural land to a non-agricultural use or impair the productivity of prime agricultural land. The fields along the west bank of CLTC are considered prime agricultural land and are currently used by Mr. Lemos to grow pumpkins and cut flowers. This project has no direct impact on any agricultural lands. This project at a minimum will arrest any future erosion and preserve existing farmland values on the Lemos property. Because agricultural land is being preserved and vegetative buffers are incorporated, the impacts to agricultural resources are long term and beneficial.

Traffic/Transportation - The project will not result in changes to any traffic patterns after the construction phase has ended. The proposed project would not create any hazards to safety as a result of design features. It would not hinder emergency access or access to nearby uses. It would not result in any hazards or barriers to pedestrians or bicyclists. Development of the project site as proposed would not conflict with adopted policies supporting alternative transportation, and would not have any impacts associated with rail, water or air traffic. During construction, a slight increase in trips along Highway 92 may occur due to the commute of the construction crews and import of rock. However, this increase will be inconsequential in comparison to current traffic loads. This adverse impact will be minor and short termed.

(4) Historic - Cultural Characteristics and Anticipated Changes

A literature check conducted in September 1987 by Northwest Information Center indicated that no prehistoric or historic cultural resources were recorded within the immediate vicinity of the landfill.

A record search and field reconnaissance of the Corinda Los Trancos Canyon was conducted by Archaeological Research Service (ARS) during the preparation of the Environmental Impact Report (EIR) for the landfill expansion project in 1991 to determine the potential for occurrence of archaeological resources on the property. None were identified.

A surface reconnaissance of the project area included examining, on foot, the entire valley floor from the base of the present fill down to the lowest area planned for the 1992 landfill expansion were conducted. A hand trowel was used to remove small divots of vegetation and to examine the underlying soil. The surface soil appeared to be almost uniform yellowish-buff-colored, loose sandy loam. The walls of the lower slopes of the Canyon were visually inspected for indication of rock outcroppings, terraces, springs or other features which would have potentially attracted prehistoric or historic era occupants. None of these features were discovered.

A Corps of Engineers' archaeologist is currently conducting a cultural resources assessment of the permit area, involving review of published and unpublished data on file with city, State, and Federal agencies. If, based upon assessment results, a field investigation of the permit area is warranted, and cultural properties listed or eligible for listing on the National Register of Historic Places are identified during the inspection, the Corps of Engineers will coordinate with the State Historic Preservation Officer to take into account any project effects on such properties.

Although no cultural resources were detected or have been recorded from the property, it is still possible that subsurface archaeological materials may be present at the project site, obscured by dense vegetation or siltation along the watercourse. It is remotely possible that such materials could be encountered during the site preparation and construction. If a permit is granted, it will be conditioned to stop proposed construction work immediately if any cultural resources were found and contact the Corps.

c. SUMMARY OF INDIRECT IMPACTS

None have been identified.

d. SUMMARY OF CUMULATIVE IMPACTS

The project does not involve impacts which are individually limited but cumulatively considerable, because the project will incorporate project specific mitigation measures. This project, once constructed, will reduce erosion and sedimentation problems of CLTC, thereby reducing cumulative water quality impacts associated with erosion.

e. CONCLUSIONS AND RECOMMENDATIONS

Based on an analysis of the above identified impacts, a preliminary determination has been made that it will not be necessary to prepare an Environmental Impact Statement (EIS) for the subject permit application. The Environmental Assessment for the proposed action has, however, not yet been finalized and this preliminary determination may be reconsidered if additional information is developed.

5. **Alternatives Analysis:** Evaluation of this activity's impacts includes application of the guidelines promulgated by the Administrator of the Environmental Protection Agency under Section 404(b)(1) of the Clean Water Act (33 U.S.C. 1344(b)).

As a starting point for the restoration design, three basic alternatives have been developed:

Alternative 1 – Limited Fill, Grade Stabilization, and Revegetation: Under this alternative, minimal fill would be placed in the channel. The project would entail constructing a series of six 4 to 6-foot high drop structures within the channel bed. Scour pools could be provided at drops for frog habitat. Minor channel cuts and fills would be needed at individual drop structures. The drop structures would reduce the overall slope of the channel bed, reducing sediment transport capability and bed scour. Integral to this alternative is the expansion of the upstream sediment detention basin to reduce peak flows in the Creek. Under this alternative, none of the existing semi-vertical bank slopes would be cut back. Instead, toe stabilization would be achieved utilizing planted rock revetment, and biotechnical toe protection measures such as installed COIR fiber rolls and fiber rock rolls. Schematic plans, profiles and cross-sections for this alternative are shown on Figures 3-9 and 4-9.

This is the least environmentally intrusive or impacting alternative since this alternative is limited to channel bed stabilization and protection from further bank erosion and toe scour. Near vertical banks would be left in their existing condition and some further slumping and lateral retreat of the banks could be expected prior to long-term stabilization.

Bank toe scour protection would be placed 3 to 4 feet above the bed of the Creek. These areas would be planted using live stakes of willows and alders. Native vegetation would also colonize these areas and natural vegetation succession could be expected. The benefits of this option include reduction of impacts to riparian vegetation and lower cost.

Constructing the grade control structures will require heavy equipment access to the existing bed of the Creek. Thus, most of the vegetation at the bottom of the channel and several feet above the bed would be removed or damaged, and reestablished after construction. This channel repair alternative will need maintenance through the early stages of channel bed evolution.

Alternative 2 – Increased Fill, Grade Stabilization, Stable Bank Slope Construction: Alternative 2 represents the increased fill alternative. The goal is to place enough fill in the creek channel, rebuilding the creek bed so that stable 2H:1V bank slopes could be constructed without cutting into the existing bank slopes. This alternative would increase the depth of fill so that slopes and top of bank areas could be reduced and restored. Generally a 2H:1V slope would be constructed. An in-stream bench could also be incorporated into the bottom plane of the creek alignment. These slopes would be planted and stabilized in a similar manner to Alternative 1. The length of the project and the number of grade control structures would be increased. The height of the grade control structures would also be increased. Fill material for the Creek could come either from grading on Lemos property (shown on the schematic plans) or from excavation areas within the BFI property.

Alternative 2 represents an increased amount of fill would be placed in the creek bed. This alternative seeks to restore the channel bed elevation to the greatest extent possible. Grade control structures would be used to anchor fill material and significantly reduce the overall slope of the channel bed. All existing riparian vegetation would be removed below the fill lines. Some mature riparian vegetation may be salvaged and worked around on the west bank within the reconstruction zone. Vegetation on the east bank above the fill line would remain. Some trimming and pruning of this vegetation may be required to allow the construction work. This alternative represents considerable short-term impacts to the existing riparian corridor. However, in the long-term it provides for full restoration of the Creek and stabilizes the bank slopes on the Lemos side of the Creek. Restoration of the riparian vegetation is expected to be rapid due to foggy summer conditions and ideal growing conditions. Like Alternative 1, a construction access road would need to be graded. It is likely that the creek bed would be used for access to the construction areas.

Alternative 3 – Increase Fill, Grade Stabilization and Steeper Bank Slopes: Alternative 3 represents a restorative approach which seeks to replace the lost top of bank farmland. Under this alternative (Figure 5-9) farmland would be restored that was lost to the lateral retreat of the creek banks. Fill would be placed and grade control structures would be used as in Alternative 2. The existing top of bank in the upper reaches would be moved to the east, similar to its position in 1992. In order to rebuild the bank top, the current center line of the channel would be moved to the east, and a fill slope of 1.5H:1V would be constructed. Constructing a stable steep bank slope, would likely require extensive sub-drains and a geogrid reinforcement system. A sub-drain would likely have to be installed to ensure slope stability. A small terrace would be constructed at the base of the slope to provide a buttress and increase protection against scour.

This alternative has all the same impacts as Alternative 2, however, it encompasses steeper banks slopes. This alternative restores the lost of farmland acreage, but has several significant drawbacks. First, construction of the steep bank slopes would be difficult and costly. Geogrid reinforcement would have to be installed 3 to 4 feet below the surface of

the farmland, severely restricting its use. It will be more difficult to establish revegetation on steeper bank slopes and they will be more susceptible to erosion during the grow-in period. The steeper bank slopes will also limit access to the Creek. Given the limited amount of farmland gained combined with increased impacts, this alternative provides little extra restorative value.

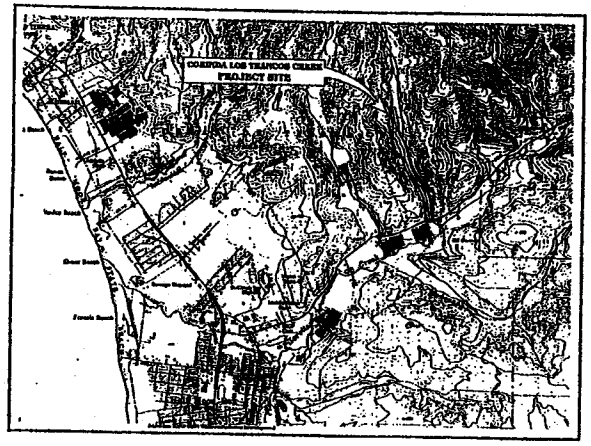
Conclusions: Alternative 2 provides the best balance between restoration of the Creek, and minimizing further impacts to the creek zone in a cost-effective manner. The project will have significant short-term construction impacts but, through internal mitigation, such as bank planting, drop structure scour pool construction, and biotechnical toe slope protection, these impacts can be minimized.

6. **Public Interest Evaluation:** The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity and its intended use on the public interest. Evaluation of the probable impacts which the proposed activity may have on the public interest requires a careful weighing of all those factors which become relevant in each particular case. The benefits which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. The decision whether to authorize a proposal, and if so the conditions under which it will be allowed to occur, are therefore determined by the outcome of the general balancing process. That decision will reflect the national concern for both protection and utilization of important resources. All factors which may be relevant to the proposal must be considered including the cumulative effects thereof. Among those are conservation, economics, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership, and, in general, the needs and welfare of the people.

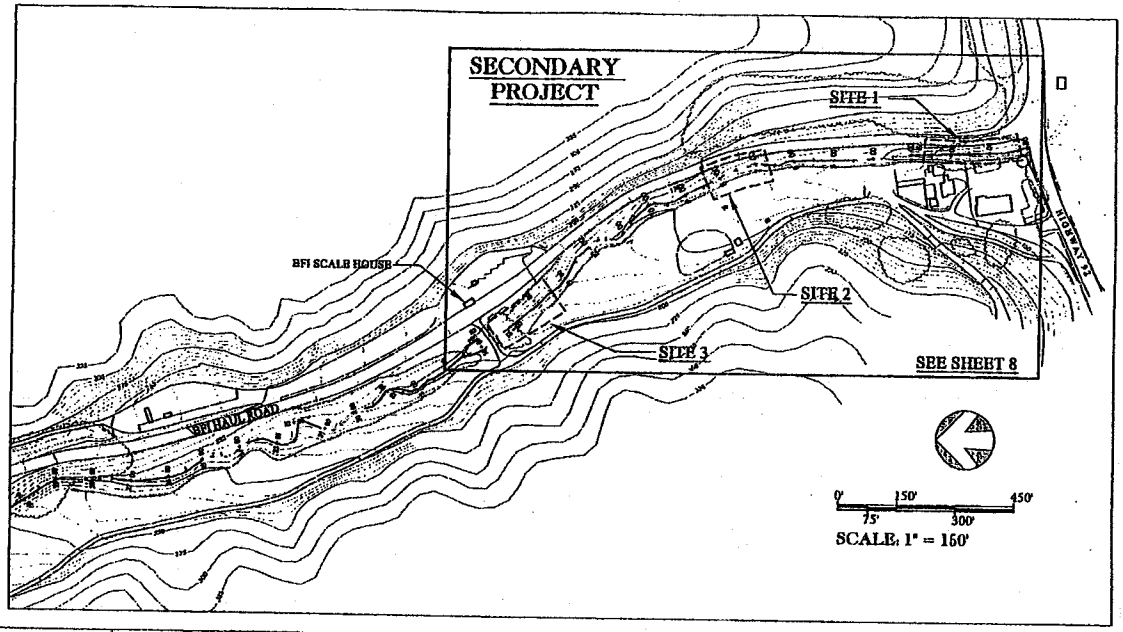
7. **Consideration of Comments:** The Corps of Engineers is soliciting comments from the public, Federal, State and local agencies and officials, Indian Tribes, and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

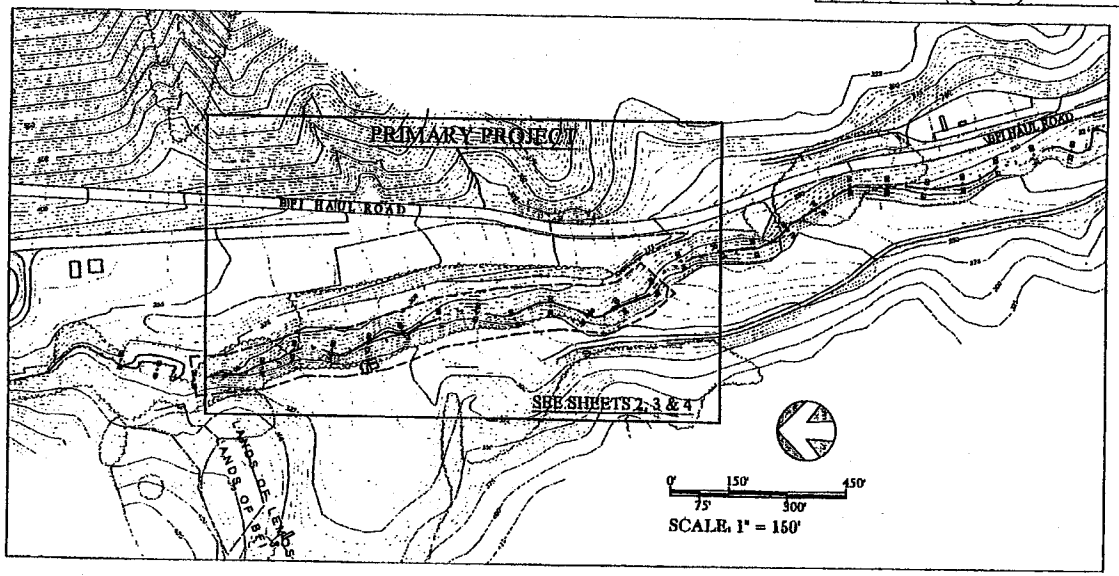
8. **Submission of Comments:** Interested parties may submit, in writing, any comments concerning this activity. Comments should include the applicants' name, the number, and the date of this Notice and should be forwarded so as to reach this office within the comment period specified on page one of this Notice. Comments should be sent to the Regulatory Branch. It is Corps policy to forward any such comments which include objections to the applicant for resolution or rebuttal. Any person may also request, in writing, within the comment period of this Notice that a public hearing be held to consider this application. Requests for public hearings shall state, with particularity, the reasons for holding a public hearing. Additional details may be obtained by contacting the applicant whose address is indicated in the first paragraph of this Notice, or by contacting Gordon Liu of our office at telephone (415)-977-8463. Details on any changes of a minor nature which are made in the final permit action will be provided on request.

CORINDA LOS TRANCOS CREEK
RESTORATION & MANAGEMENT PLAN



LOCATION MAP





SHEET INDEX

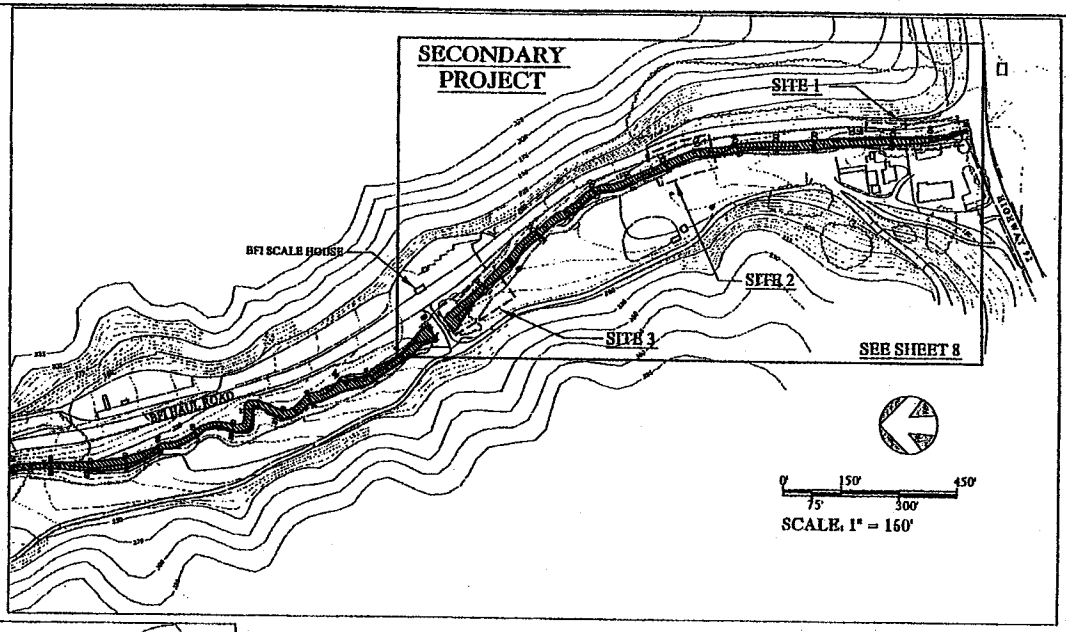
NO.	REV.	DATE	BY	DESCRIPTION	APPD
1	1	6-8-99	LL	ROAD TO INCORPORATE CLIENT'S COMMENTS AS SHOWN	

Questa Engineering Corporation
Civil, Environmental, and Water Resource Engineers
P.O. Box 29156
1220 Brickyard Cove Road
Point Richmond, CA 94820
(510) 236-6114
(FAX) 236-2435

DESIGN	S.T./W.L.
DRAWN	A.V.
CHK'D	S.T./W.L.
APP'D	N.H.

CORINDA LOS TRANCOS CREEK
RESTORATION PLAN
PROJECT AREAS, INDEX & LOCATION MAP
BROWNING-FERRIS INDUSTRIES
HALF MOON BAY, CALIFORNIA

SIZE D	JOB/DWG NO. 98012 15	REV. C1
SCALE	1" = 50'	
DATE	6-8-99	
SHEET	1 OF 9	



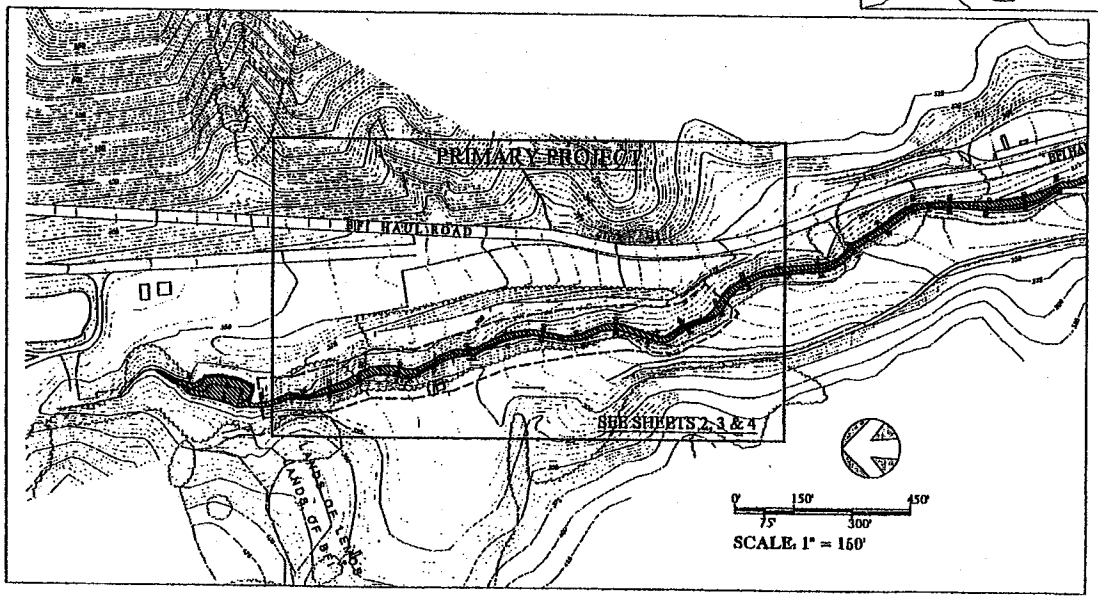


Table 1: Determination of Jurisdictional Area per Hydraulic Modeling of 2-year Flow or Ordinary High Water

Station	Width (ft)	Area (sq ft)	Station	Width (ft)	Area (sq ft)
0	5		2400	13	2600
200	16	3200	2600	28	5600
400	18	3600	2800	14	2800
600	16	3200	3000	16	3200
800	20	4000	3200	18	3600
1000	19	3800	3400	14	2800
1200	19	3800	3600	12	2400
1400	13	2600	3800	14	2800
1600	44	8800	4000	15	3000
1800	20	4000	4200	14	2800
2000	25	5000	4400	24	4800
2200	22	4400	4600	13	2600
	Jurisdictional Area	1.96 acres			
	Square feet	85,400			

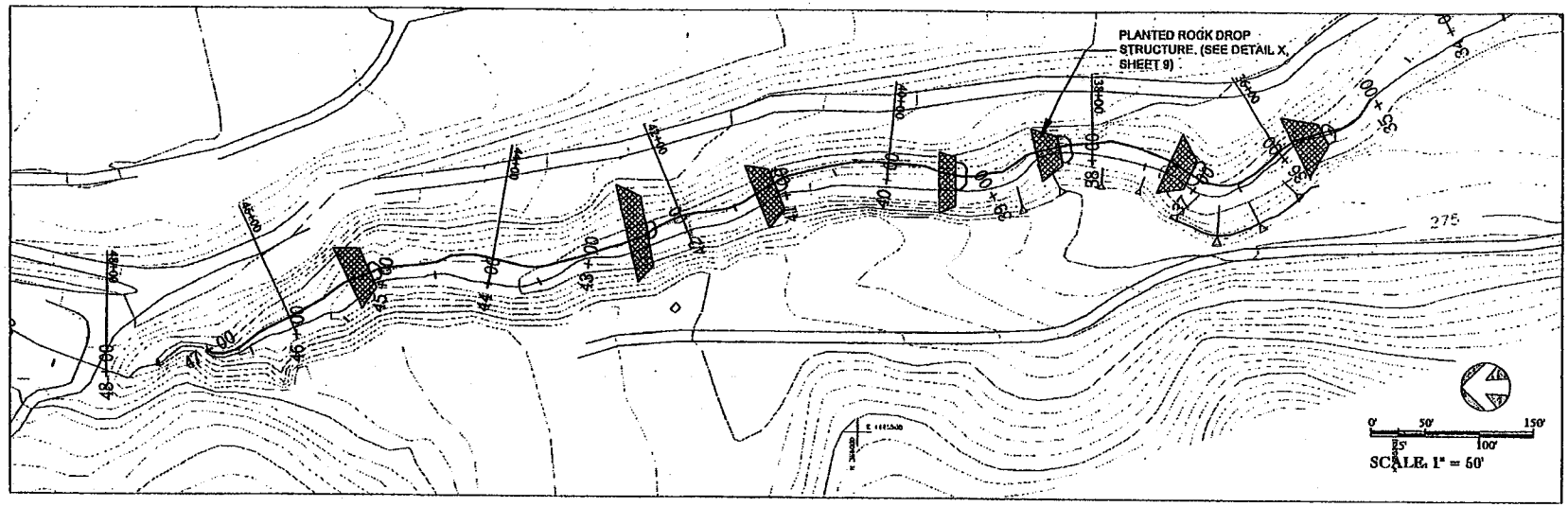
BY	NO.	DATE	BY	DESCRIPTION	APVD
S	1	6-8-98	LL	REVISE TO RESPONSE CLIENT'S COMMENTS AS NOTED	

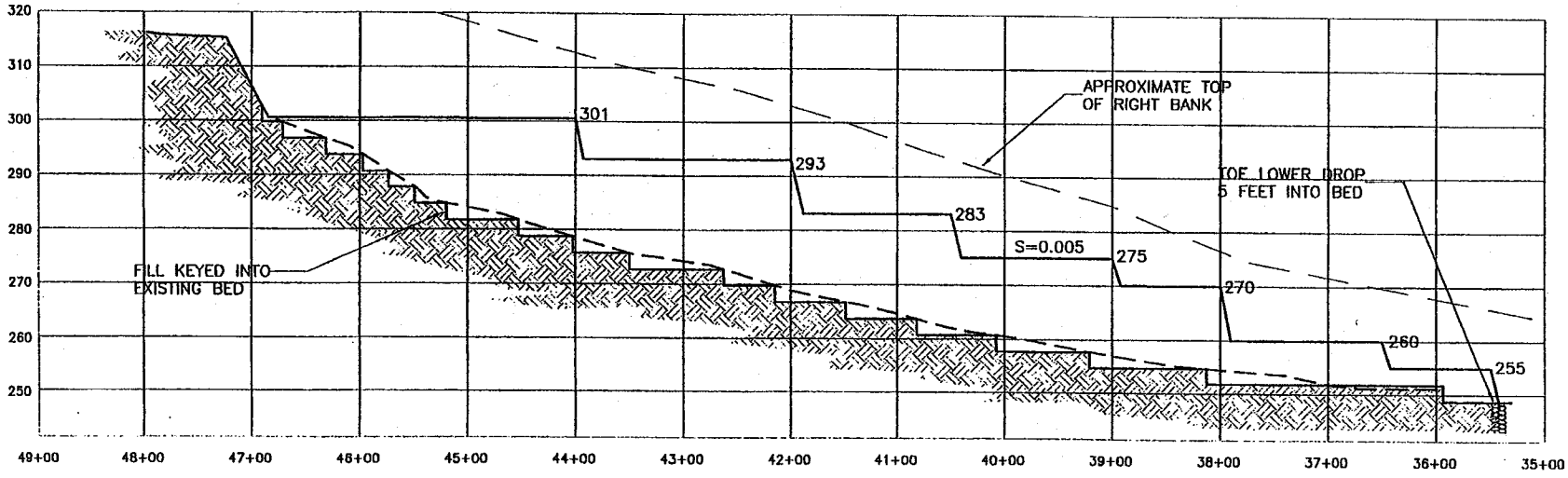
Questa Engineering Corporation
Civil, Environmental, and Water Resource Engineers
P.O. Box 79160
1220 Rutherford Cross Road
Point Richmond, CA 94820
(510) 236-6114
(FAX) 236-2435

DESIGN	S.T./W.L.
DRAWN	A.V.
CHK'D	S.T./W.L.
APVD	N.H.

CORINDA LOS TRANCOS CREEK
RESTORATION PLAN
JURISDICTIONAL WETLANDS MAP
BROWNING-FERRIS INDUSTRIES
HALF MOON BAY, CALIFORNIA

SIZE	JOB/DWG No.	REV
D	98012.15	C1
SCALE	1" = 50'	
DATE	6-8-98	
	2 OF 9	





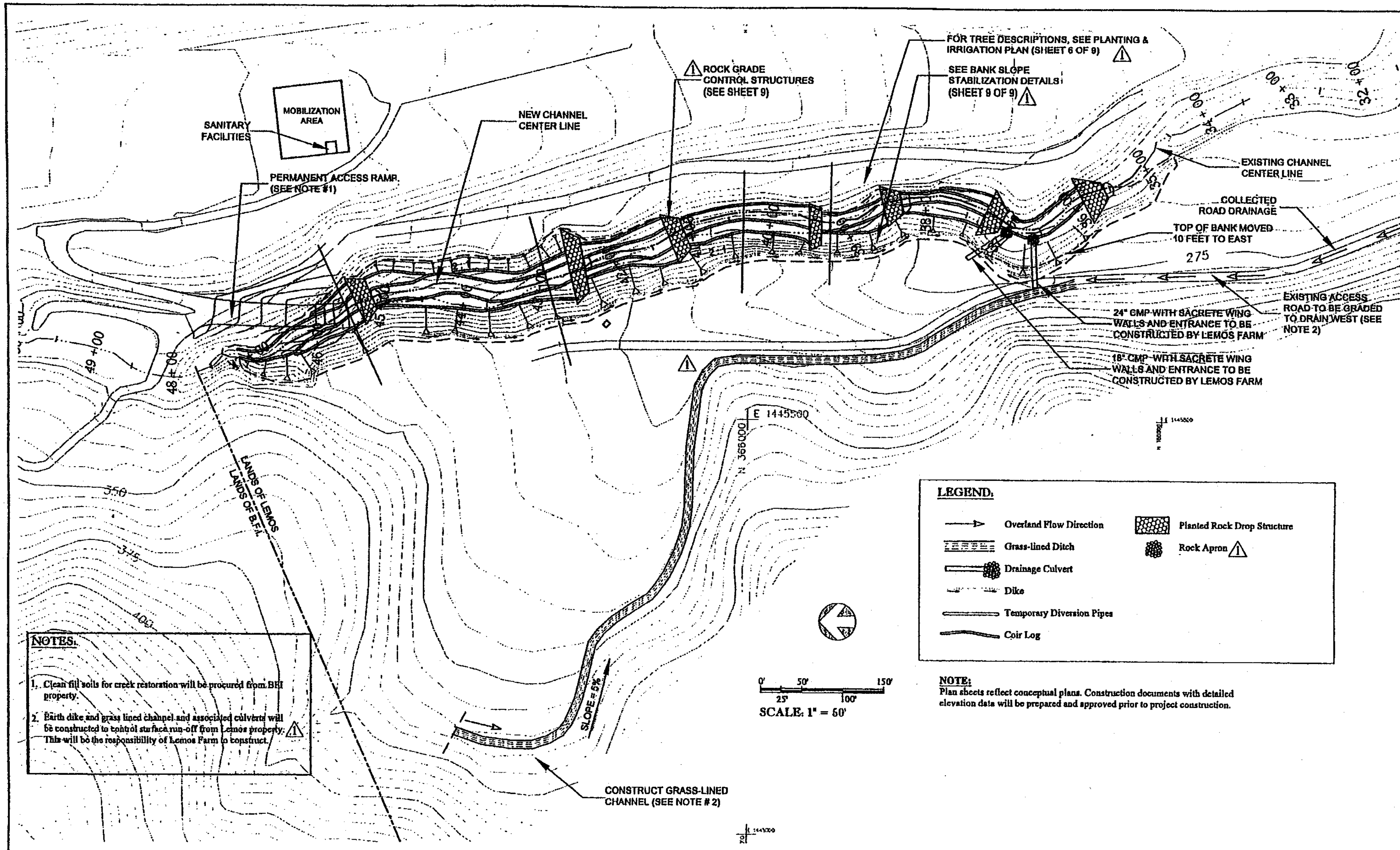
GR	SIZ.	DATE	BY	DESCRIPTION	APVD
3	1	6-15-99	LL	REVISE TITLE BLOCK FOR CLIENT'S COMMENT ONLY	

Questa Engineering Corporation
Civil, Environmental, and Water Resource Engineers
P.O. Box PB34
1220 Bridgeport Cove Road
Point Richmond, CA 94807
(510) 236-6114
(FAX) 236-5163

DESIGN	S.T./W.L.
DRAWN	A.V.
CHK'D	S.T./W.L.
APVD	N.H.

CORINDA LOS TRANCOS CREEK RESTORATION PLAN
PLAN AND PROFILE
BROWNING-FERRIS INDUSTRIES
HALF MOON BAY, CALIFORNIA

SIZE	JOB/CAB NO.	REV
D	98012 18	C1
SCALE	1" = 50'	
DATE	6-15-99	
	3 OF 9	


FOR TREE DESCRIPTIONS, SEE PLANTING & IRRIGATION PLAN (SHEET 6 OF 9)
SEE BANK SLOPE STABILIZATION DETAILS (SHEET 9 OF 9)
ROCK GRADE CONTROL STRUCTURES (SEE SHEET 9)
NEW CHANNEL CENTER LINE
MOBILIZATION AREA
SANITARY FACILITIES
PERMANENT ACCESS RAMP. (SEE NOTE #1)
EXISTING CHANNEL CENTER LINE
COLLECTED ROAD DRAINAGE
TOP OF BANK MOVED 10 FEET TO EAST
275
EXISTING ACCESS ROAD TO BE GRADED TO DRAIN WEST (SEE NOTE 2)
24" CMP WITH SACRETE WING WALLS AND ENTRANCE TO BE CONSTRUCTED BY LEMOS FARM
18" CMP WITH SACRETE WING WALLS AND ENTRANCE TO BE CONSTRUCTED BY LEMOS FARM
32 + 00
33 + 00
34 + 00
35 + 00
48 + 00
49 + 00
E 1445500
N 366000
LANDS OF LEMOS
LANDS OF B.F.I.
350
375
400
SLOPE = 5%
CONSTRUCT GRASS-LINED CHANNEL (SEE NOTE # 2)
LEGEND:
Overland Flow Direction
Grass-lined Ditch
Drainage Culvert
Dike
Temporary Diversion Pipes
Coir Log
Planted Rock Drop Structure
Rock Apron
0' 25' 50' 100' 150'
SCALE: 1" = 50'

NOTES:

1. Clean fill soils for creek restoration will be procured from BFI property.
2. Earth dike and grass lined channel and associated culverts will be constructed to control surface run-off from Lemos property. This will be the responsibility of Lemos Farm to construct.

NOTE:
Plan sheets reflect conceptual plans. Construction documents with detailed elevation data will be prepared and approved prior to project construction.

Questa Engineering Corporation
Civil, Environmental, and Water Resource Engineers

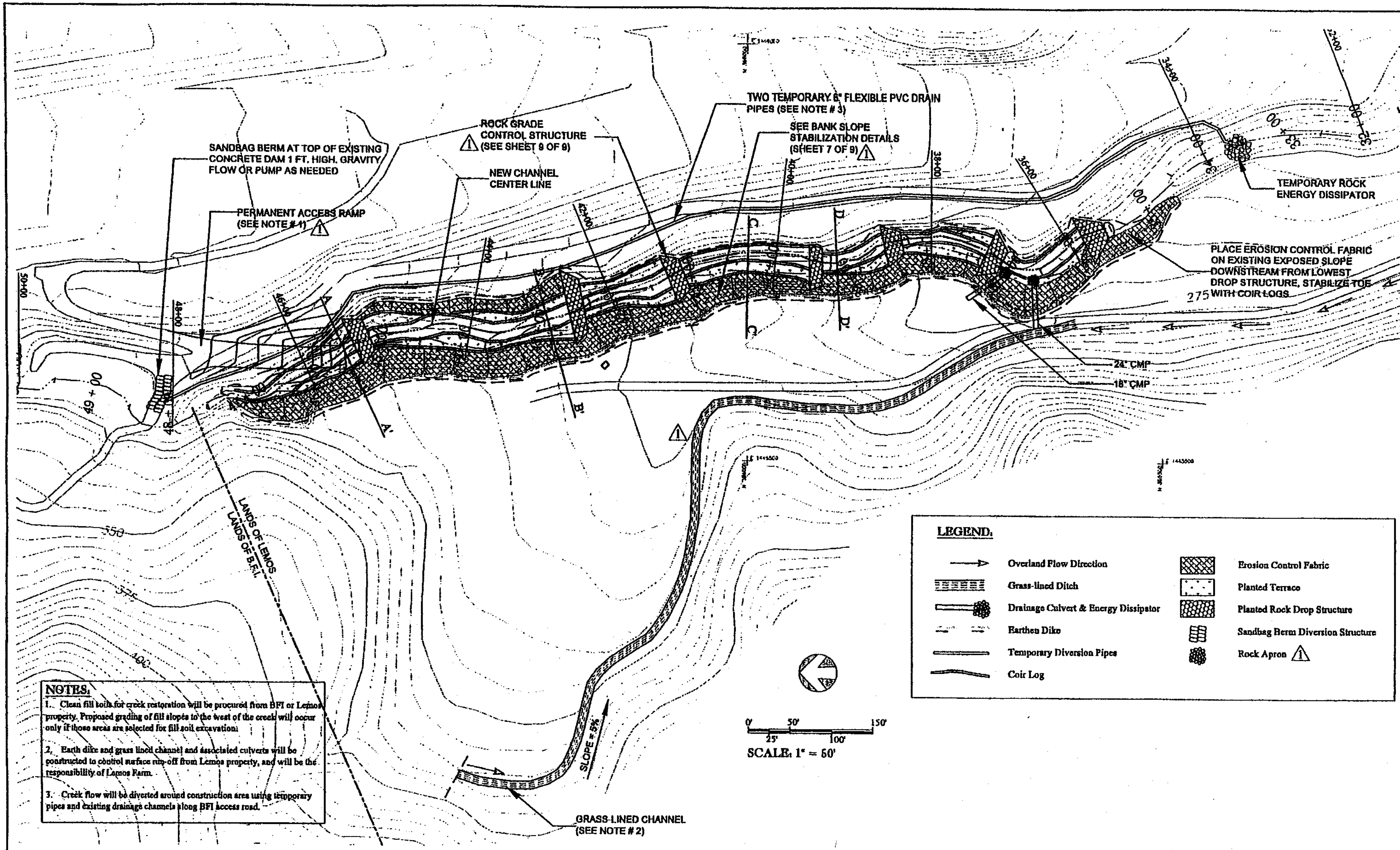
DESIGN	DRAWN	CHK'D	APPV'D
S.T./W.L.	L.I.	S.T./W.L.	N.H.

CORINDA LOS TRANCOS CREEK
RESTORATION PLAN
GRADING PLAN
BROWNING-FERRIS INDUSTRIES
HALF MOON BAY, CALIFORNIA

SIZE	JOB NO.	REV
D	98012 13	B1

SCALE 1" = 50'
DATE 8-14-99
4 OF 9

98012 13 B1 GradingPlan


SANDBAG BERM AT TOP OF EXISTING CONCRETE DAM 1 FT. HIGH. GRAVITY FLOW OR PUMP AS NEEDED
PERMANENT ACCESS RAMP (SEE NOTE # 1)
ROCK GRADE CONTROL STRUCTURE (SEE SHEET 9 OF 9)
NEW CHANNEL CENTER LINE
TWO TEMPORARY 6" FLEXIBLE PVC DRAIN PIPES (SEE NOTE # 3)
SEE BANK SLOPE STABILIZATION DETAILS (SHEET 7 OF 9)
TEMPORARY ROCK ENERGY DISSIPATOR
PLACE EROSION CONTROL FABRIC ON EXISTING EXPOSED SLOPE DOWNSTREAM FROM LOWEST DROP STRUCTURE, STABILIZE TOE WITH COIR LOGS
24" CMP
18" CMP
GRASS-LINED CHANNEL (SEE NOTE # 2)
SLOPE = 5%
LANDS OF LEMOS
LANDS OF B.F.I.
50+00
49 + 00
48+00
46+00
44+00
42+00
40+00
38+00
36+00
34+00
32+00
A
A'
B
B'
C
C'
D
D'
275
350
375
400

NOTES:

1. Clean fill soils for creek restoration will be procured from BFI or Lemos property. Proposed grading of fill slopes to the west of the creek will occur only if those areas are selected for fill soil excavation.
2. Earth dike and grass lined channel and associated culverts will be constructed to control surface run-off from Lemos property, and will be the responsibility of Lemos Farm.
3. Creek flow will be diverted around construction area using temporary pipes and existing drainage channels along BFI access road.

LEGEND:

- Overland Flow Direction
- Grass-lined Ditch
- Drainage Culvert & Energy Dissipator
- Earthen Dike
- Temporary Diversion Pipes
- Coir Log
- Erosion Control Fabric
- Planted Terrace
- Planted Rock Drop Structure
- Sandbag Berm Diversion Structure
- Rock Apron

0' 25' 50' 100' 150'

SCALE: 1" = 50'

Questa Engineering Corporation
Civil, Environmental, and Water Resource Engineers

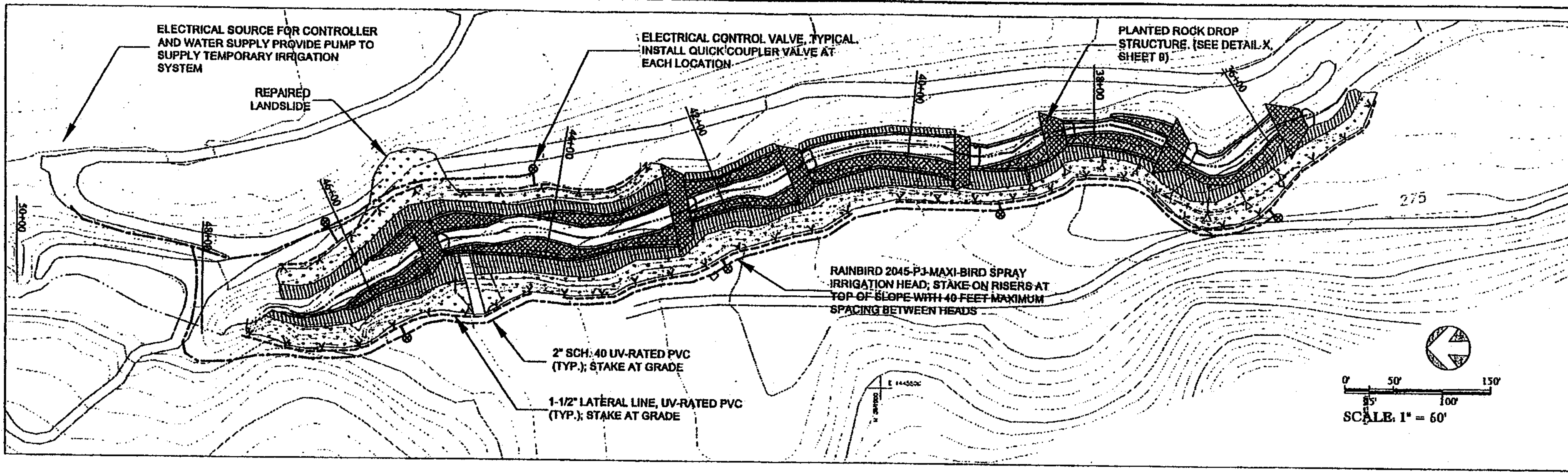
DESIGN	S.T./W.L.
DRAWN	A.V.
CHK'D	S.T./W.L.
APPV'D	N.H.

CORINDA LOS TRANCOS CREEK
RESTORATION PLAN
EROSION CONTROL PLAN
BROWNING-FERRIS INDUSTRIES
HALF MOON BAY, CALIFORNIA

SIZE	JOB/CAD NO.	REV
D	98012 09	C1

SCALE 1" = 50'
DATE 6-15-99

5 OF 9



EXISTING TREE KEY:

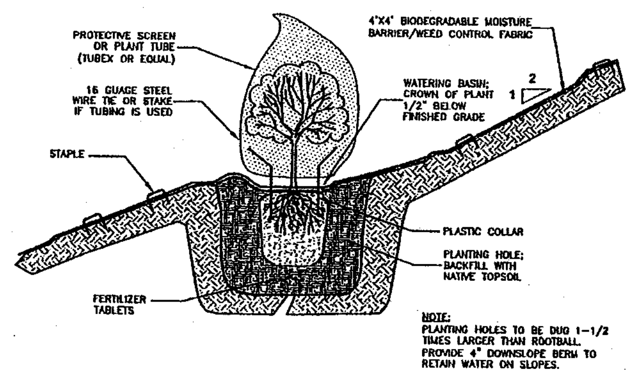
Number	Species	Diameter	Status	Number	Species	Diameter	Status
1	Alder	14"	preserve	26	Alder	30"	preserve
2	Alder	16"	preserve	27	Alder	20"	preserve
3	Willow	12"	remove	28	Alder	26"	preserve
4	Willow	20"	preserve	29	Alder	30"	preserve
5	Alder	12"	remove	30	Alder	20"	preserve
6	Willow	13-15"	preserve	31	Alder	19"	preserve
7	Willow	22"	preserve	32	Alder	17"	preserve
8	Willow	30"	preserve	33	Alder	15"	remove
9	Willow	15"	remove	34	Alder	20"	remove
10	Alder	12"	preserve	35	Alder	15"	remove
11	Alder	18"	remove	36	Alder	12"	preserve
12	Alder	15"	remove	37	Alder	12"	preserve
13	Alder	30"	preserve	38	Alder	22"	remove
14	Alder	24"	preserve	39	Alder	18"	remove
15	Alder	24"	remove	40	Alder	12"	remove
16	Alder	15"	remove	41	Alder	12"	remove
17	Alder	15"	remove	42	Alder	24"	remove
18	Alder	15"	remove	43	Alder	26"	remove
19	Alder	20"	preserve	44	Alder	15"	remove
20	Alder	16"	preserve	45	Alder	12"	remove
21	Alder	18"	preserve	46	Willow	13"	remove
22	Alder	20"	preserve	47	Willow	12"	remove
23	Alder	18"	remove	48	Willow	20"	preserve
24	Alder	20"	preserve	49	Willow	12"	remove
25	Alder	20"	preserve	50	Willow	20"	remove

PLANTING & IRRIGATION NOTES:

1. Plants shall be arranged in clusters of three or more of the same species in each group to provide a more natural appearance. Alternate clusters in random, non-linear pattern. Each plant to be provided with browse protection cage as shown in planting detail. Plants to be grown from stock native to western San Mateo County.
2. Plants to be irrigated with a temporary, at-grade irrigation system using UV-resistant, SCH 40 PVC, clearly marked for non-potable water use. Irrigation heads shall be staked to 30" risers at top of bank to irrigate new plants. Irrigation spray heads to be Rainbird 2045-PJ MAXI-BIRD-08, or equivalent, placed to provide head to head coverage as shown. Space heads maximum 40 ft. apart to provide suitable coverage.
3. The irrigation system shown on these drawings is diagrammatic. The irrigation supply is at the existing sediment detention pond north of the project, as well as existing electrical source. Contractor shall design/build irrigation system using a pump capable of delivering 25-35 PSI and 33 G.P.M. flow to each valve, or to substitute additional valves or low-flow irrigation heads as needed to provide sufficient flow to irrigate plants. Contractor to provide an irrigation controller to serve the temporary system. Irrigation electrical source is at the parking area adjacent to the sediment detention pond.
4. Provide irrigation system design details to Project Engineer prior to installation.
5. Flag all locations of plants, using different colors for each species, prior to installation.

PLANTING LEGEND:

Planting Zone	Name	Spacing	Quantity
Zone A: In-Channel Terrace (20,200 s.f./0.46 ac.)	Common Snowberry (*Symphoricarpus albus*)	5-7 ft.	200
	Mugwort (*Artemisia douglasiana*)	3-5 ft.	200
	Sword Fern (*Polystichum munitum*)	5-7 ft.	200
	Thimbleberry (*Rubus p. var. velutinus*)	5-7 ft.	200
	Red Alder (*Alnus rubra*)	15-20 ft.	50
	Live willow stakes	3-5 ft.	800-drop structures 1200-terraces
Zone A: Total Plants			2850
Zone B: Mid Bank (30,500 s.f./0.70 ac.)	California Blackberry (*Rubus ursinus*)	3-5 ft.	300
	California rose (*Rosa californica*)	5-7 feet	250
	Wild Cucumber (*Mara fabaceus*)	5-7 feet	250
	Coast Elderberry (*Sambucus callicarpa*)	10-15 ft.	40
	California Buckeye (*Aesculus californica*)	15-20 ft.	40
	Red Alder (*Alnus rubra*)	15-20 ft.	50
Zone B: Total Plants			930
Zone C: Upper Bank/Banktop (68,500 s.f./1.57 ac.)	Blue Blossom (*Ceanothus thyrsiflorus*)	5-7 ft.	325
	Coffeeberry (*Rhamnus californica*)	5-7 ft.	350
	Coyote Brush (*Baccharis p. ssp. consanguinea*)	5-7 ft.	350
	Sticky Monkeyflower (*Mimulus auranticus*)	3-5 ft.	325
	Coast Elderberry (*Sambucus callicarpa*)	10-15 ft.	35
	California Buckeye (*Aesculus californica*)	15-20 ft.	35
	Red Alder (*Alnus rubra*)	15-20 ft.	75
Zone C: Total Plants			1495
Total Project			5275



NOTE:
PLANTING HOLES TO BE DUG 1-1/2 TIMES LARGER THAN ROOTBALL. PROVIDE 4" DOWNSLOPE BERM TO RETAIN WATER ON SLOPES.

TREE & SHRUB PLANTING DEEPOT / LEACH TUBES

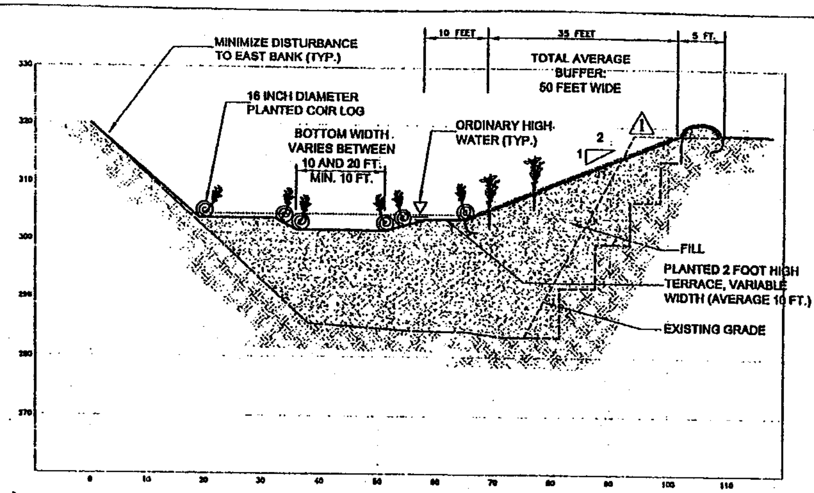
(NOT TO SCALE)

Questa Engineering Corporation
Civil, Environmental, and Water Resources Engineers

DESIGN S.T./W.L. | DRAWN A.V. | CHK'D S.T./W.L. | APP'D N.H.

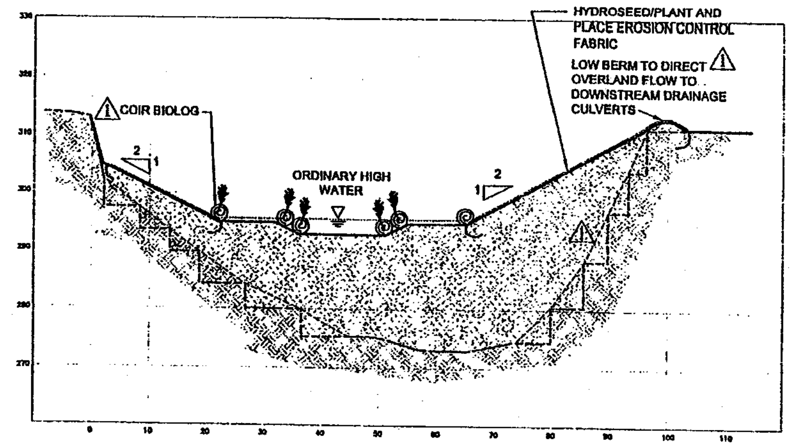
CORINDA LOS TRANCOS CREEK
RESTORATION PLAN
PLANTING & IRRIGATION PLAN
BROWNING FERRIS INDUSTRIES
HALF MOON BAY, CALIFORNIA

SIZE D | JOB NO. 98012 15 | REV A1
SCALE 1" = 50'
DATE 3-6-99
6 OF 10


MINIMIZE DISTURBANCE TO EAST BANK (TYP.)
16 INCH DIAMETER PLANTED COIR LOG
BOTTOM WIDTH VARIES BETWEEN 10 AND 20 FT. MIN. 10 FT.
ORDINARY HIGH WATER (TYP.)
10 FEET
35 FEET
5 FT.
TOTAL AVERAGE BUFFER: 50 FEET WIDE
FILL
PLANTED 2 FOOT HIGH TERRACE, VARIABLE WIDTH (AVERAGE 10 FT.)
EXISTING GRADE

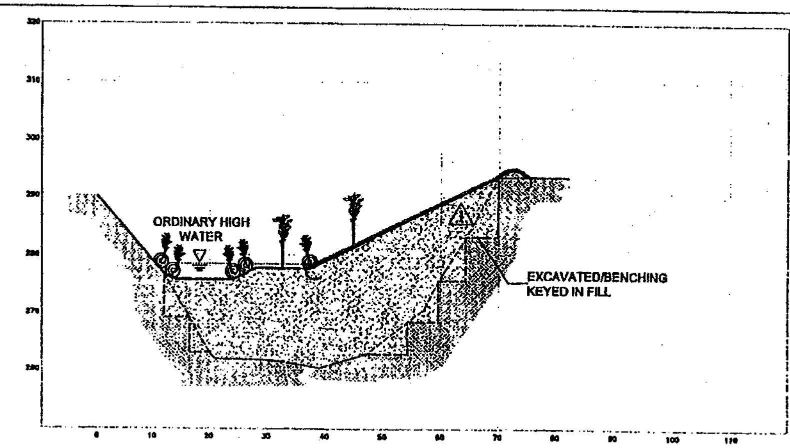
TYPICAL CROSS SECTION A-A'

(LOOKING DOWNSTREAM)



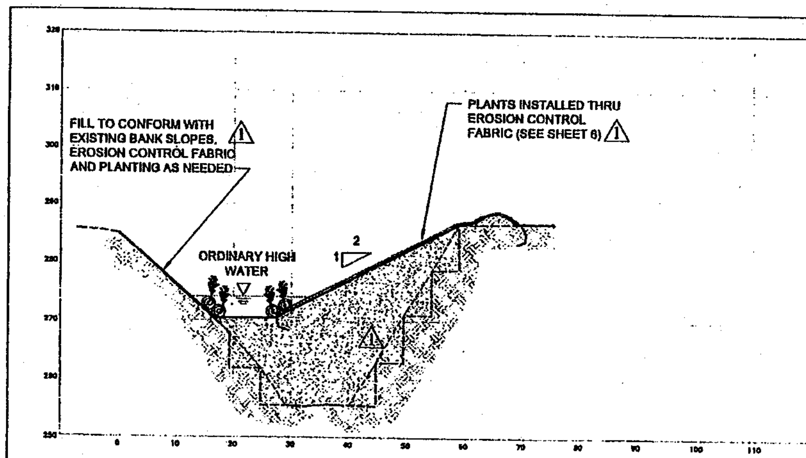
TYPICAL CROSS SECTION B-B'

(LOOKING DOWNSTREAM)



TYPICAL CROSS SECTION C-C'

(LOOKING DOWNSTREAM)



TYPICAL CROSS SECTION D-D'

(LOOKING DOWNSTREAM)

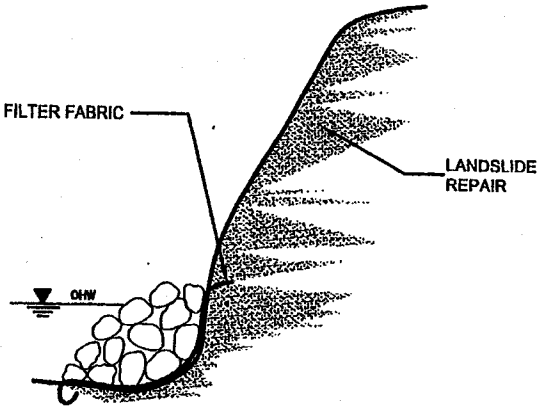
1	1	6-15-99	LL	REVISE SECTIONS AND TITLE BLOCK AS SHOWN	

Questa Engineering Corporation
Civil, Environmental, and Water Resource Engineers

DESIGN	S.T./W.L.
DRAWN	A.V.
CHK'D	S.T./W.L.
APP'D	N.H.

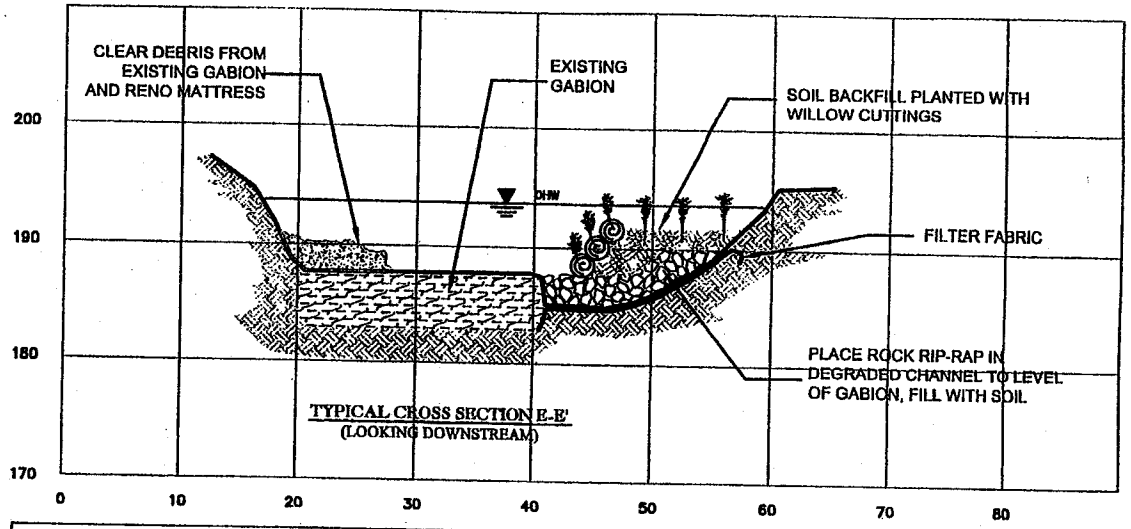
CORINDA LOS TRANCOS CREEK
RESTORATION PLAN
CREEK CROSS-SECTIONS
BROWNING-FERRIS INDUSTRIES
HALF MOON BAY, CALIFORNIA

SIZE	JOB/CAD NO.	REV
D	98012_12	C1
SCALE	AS SHOWN	
DATE	6-15-99	
SHEET	7 OF 9	

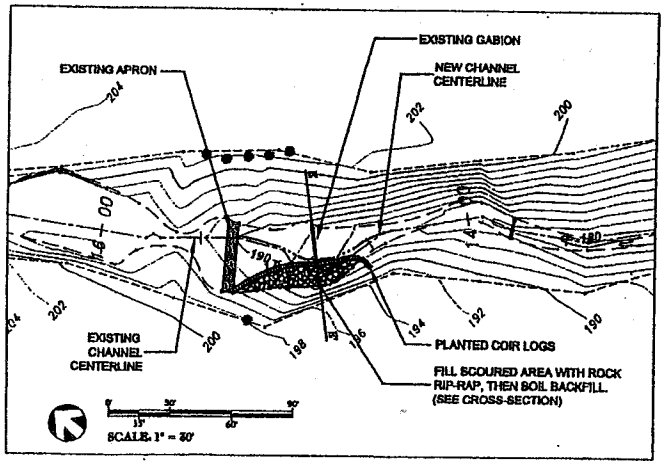


BANK REPAIR DETAIL

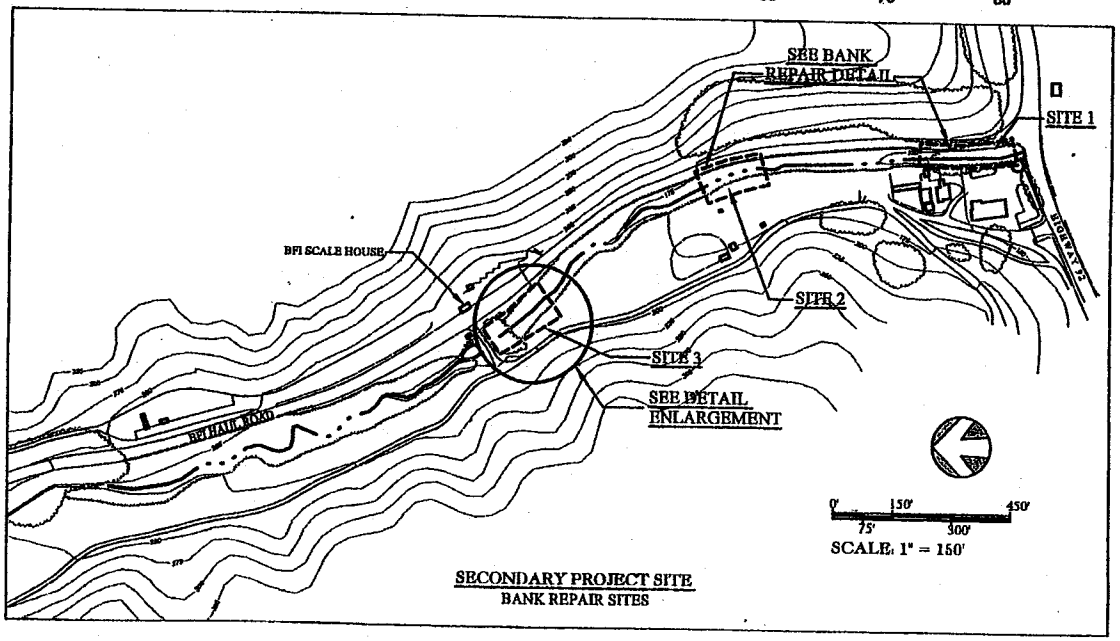
NOT TO SCALE



TYPICAL CROSS SECTION E-E'
(LOOKING DOWNSTREAM)



ENLARGED AREA OF PLAN
BANK STABILIZATION



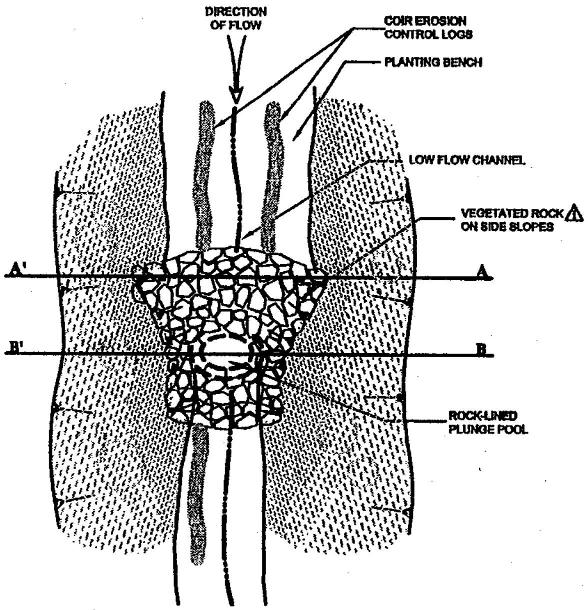
SECONDARY PROJECT SITE
BANK REPAIR SITES

Questa Engineering Corporation
Civil, Environmental, and Water Resource Engineers

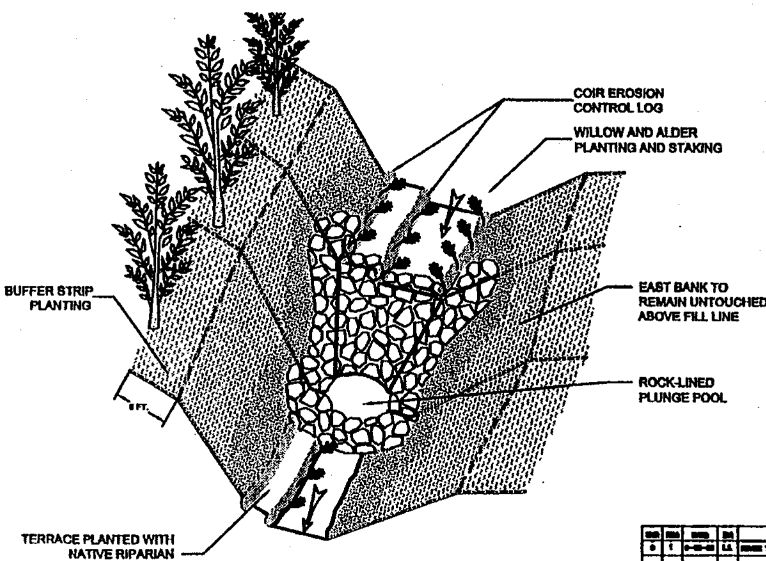
DESIGN	S.T./W.L.
DRAWN	A.V.
CHECKED	S.T./W.L.
APPROVED	N.H.

CORINDA LOS TRANCOS CREEK
RESTORATION PLAN
SECONDARY PROJECT & DETAILS
BROWNING FERRIS INDUSTRIES
HALF MOON BAY, CALIFORNIA

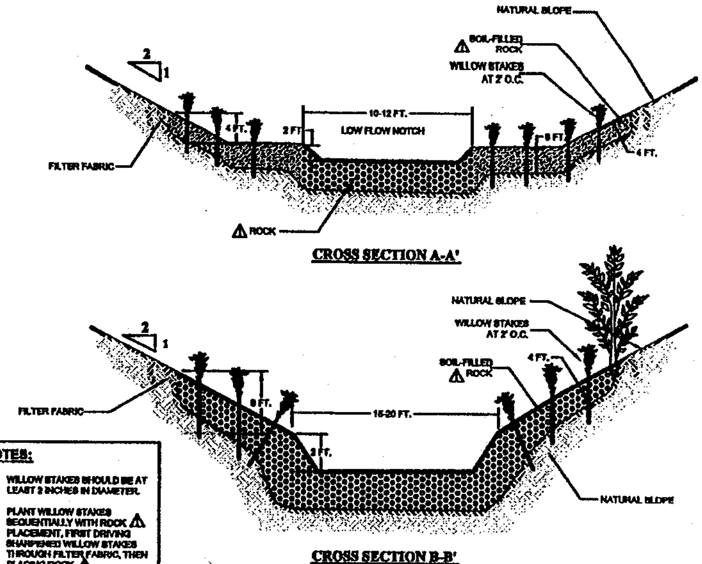
JOB NO.	98012	18
SCALE	AS SHOWN	
DATE	4-28-98	
SHEET	8 OF 9	



DROP STRUCTURE PLAN



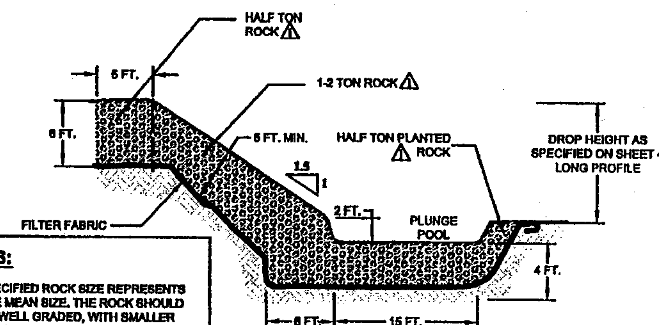
DROP STRUCTURE ISOMETRIC



NOTES:

1. WILLOW STAKES SHOULD BE AT LEAST 2 INCHES IN DIAMETER.
2. PLANT WILLOW STAKES SEQUENTIALLY WITH ROCK PLACEMENT, FIRST DRIVING SHARPENED WILLOW STAKES THROUGH FILTER FABRIC, THEN PLACING ROCK.
3. WRAP ENDS OF FILTER FABRIC MINIMUM 1 FT. INTO SOIL.

DROP STRUCTURE CROSS SECTION



NOTES:

1. SPECIFIED ROCK SIZE REPRESENTS THE MEAN SIZE. THE ROCK SHOULD BE WELL GRADED, WITH SMALLER ROCKS FILLING VOIDS BETWEEN LARGER ROCKS. CLEAN CONCRETE RUBBLE MAY BE USED AS A LOWER COVERED COURSE.
2. FILL VOIDS IN ROCK SURROUNDING PLUNGE POOL WITH SOIL, PLANT WITH WILLOW STAKES.

DROP STRUCTURE PROFILE

Questa Engineering Corporation
Civil, Environmental, and Water Resource Engineers

S.T./W.L.
A.V.
S.T./W.L.
S.T.

CORINDA LOS TRANCOS CREEK
RESTORATION PLAN
CHANNEL DETAILS
BROWNING-FERRIS INDUSTRIES
HALF MOON BAY, CALIFORNIA

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NOT TO SCALE
8-15-96
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