



Technical Memorandum

Date: February 10, 2015

To: Mitch Farro, Projects Manager, Pacific Coast Fish, Wildlife and Wetlands Restoration Association

From: Rachel Shea, P.E., Engineering Geomorphologist, Michael Love & Associates, Inc.
Michael Love, P.E., Principal Engineer, Michael Love & Associates, Inc.

Subject: Interim As-Built Survey for the Strawberry Creek Restoration Project at Redwood National Park in Orick, CA (CDFW FRGP #P1110508)

CC: Darci Short, Redwood National Park

Summary

The memo presents the results of the interim as-built for the portions of the Strawberry Creek Restoration Project constructed in 2014. As-built drawing are shown as redline changes to the design plans (March 2012, Revision 1), and are presented in Attachment A. The as-built survey was conducted only for the project components constructed during the summer and fall of 2014, which included:

- Mainstem of Strawberry Creek from Station 0+00 to 11+96
- West Tributary Slough Channel from Stations 0+00 to approximately 2+00
- 5 Log Step and Pools
- 2 Log V-Weirs and Pools
- 1 Rock Weir and Pool
- 8 Log Habitat Structures
- 8 Crib Walls
- 10 Nurse Logs
- 600 feet of side channel

At the time of the as-built survey, the fencing was not installed and the project area was not planted.

The West Tributary culvert replacement and restoration of approximately 150 feet of the West Tributary upstream of the culvert shown on the design plans were not constructed.

Staff from PCFWWRA supervised the construction, with input from Michael Love & Associates (MLA) regarding log structure installation and channel grading.

The constructed channels and planting mounds matched the design plans within acceptable tolerances and it is expected that the constructed portions of the project will perform as designed once fencing and planting are completed.



As-Built Survey Results

MLA performed an as-built survey of the construction portions of the project on November 7, 2014. The survey was conducted using a total station. Horizontal and vertical control was based on the temporary and permanent benchmarks established by MLA prior to construction. Data collected included:

1. Thalweg survey of the Mainstem and West Tributary channels with point spacing approximately every 25 feet
2. Invert elevations of Log Step structures
3. Centerlines of Planting Mounds with point spacing approximately every 50 feet
4. Locations of Log Habitat Structures and Nurse Logs
5. Nine cross sections extending across the channel from the outside edges of the Planting Mounds

Field inspections and the as-built survey documented the following deviations from the plans:

- 1) The downstream portion of the Strawberry Creek Mainstem and east Planting Mound were realigned to the west between Stations 0+00 and 2+75 to reduce the amount of gravel and fill material needed for the planting mound on the west side of this portion of channel. This was performed at the direction of MLA during construction.
- 2) The two side channels to the west of Station 6+00 were eliminated due to construction access difficulty with inundated ground. Equivalent lengths of side channel were constructed along the south side of the West Tributary Planting Mound and along the west side of the Strawberry Creek Planting Mounds from the West Tributary and connecting to the side channel at the existing CMP outfall to the northwest of the West Tributary. This was performed at the direction of MLA during construction.
- 3) Nurse Log placement was revised by MLA as necessary to place them adjacent to the constructed side channels.
- 4) The Log Crib Walls at the East Tributary and downstream reach of the existing Strawberry Creek channel were field located by PCFWWRA during construction.
- 5) Log Habitat Structures were installed in locations directed by MLA.
- 6) Upon excavation, it was determined that the buried CMP near station 12+00 of Strawberry Creek was found to be 48" in diameter, and the outlet invert was found to be approximately 1.5 feet lower than shown on the design plans. Therefore, the 1.5-foot drop at the culvert outfall shown on the design plans did not exist. To facilitate fish passage to the culvert, the Facing Class RSP was eliminated and one Rock Weir and two log Vee Weirs were constructed to create 6-inch drops in the water surface profile from the culvert outfall to the new channel thalweg. The rock weir was installed 0.6 feet above the culvert invert to retain natural streambed material within the culvert.



- 7) The Planting Mound on the east side of Strawberry Creek was extended upstream from station 9+50 to Station 10+25 due to lower than expected existing ground in this area. The extended Planting Mound will provide suitable elevations for planting spruce and alder trees.
- 8) The As-Built cross sections and profiles reflect minor deviations from the design. The deviations will not affect the anticipated performance of the project.

This As-Built plan set represents an interim as-built document for the project. A final As-built plan set will be completed once the West Tributary culvert replacement and channel restoration are implemented.

Attachment 1: Interim As-Built Plans (11,7/14)

REDWOOD NATIONAL PARK

DESIGN PLANS FOR CONSTRUCTION OF

STRAWBERRY CREEK RESTORATION PROJECT

REDWOOD NATIONAL PARK (RNP)
March, 2012
FINAL PLANS

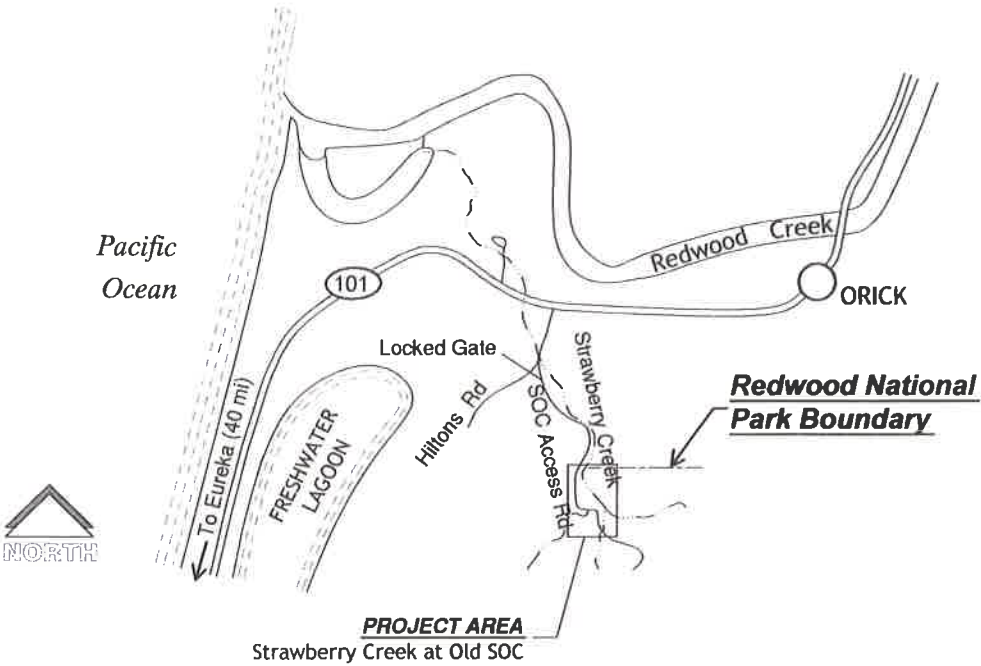
Prepared For:

- Redwood National Park (RNP)
- Pacific Coast Fish, Wildlife and Wetlands Restoration Association (PCFWRA)

Michael Love 4/14/2014
DESIGNED— Michael A. Love
Michael Love & Associates



SHEET No.	DESCRIPTION
1	TITLE SHEET
2	ABBREVIATIONS, LEGEND AND GENERAL NOTES
3	SITE OVERVIEW PLAN
4	NOTES
5	EROSION CONTROL AND WATER MANAGEMENT PLAN
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18	STRAWBERRY CREEK GRADING CROSS SECTIONS 4
19	WEST FORK TRIBUTARY TYPICAL CROSS SECTIONS
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22	WEST FORK TRIBUTARY CULVERT DETAILS 1
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24	PLANTING MOUND DETAILS
25	ROCK WEIR DETAIL
26	LOG STEP POOL DETAILS
27	LOG WEIR AND POOL DETAILS
28	LOG STRUCTURE NOTES AND ANCHORING DETAIL
29	LOG CRIB WALL DETAILS
30	LOG HABITAT STRUCTURE DETAILS
31	PLANTING PLAN
32	PLANTING DETAILS AND NOTES 1
33	PLANTING DETAILS AND NOTES 2
AB-1	AS-BUILT CROSS SECTIONS



LOCATION MAP
NOT TO SCALE

AS-BUILT

Date: Nov 7, 2014

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PO Box 4477 • Arcata, CA 95521 • (707) 476-8938
PROJECT: Pacific Coast Fish, Wildlife and Wetlands Restoration Assoc.
MANAGEMENT:

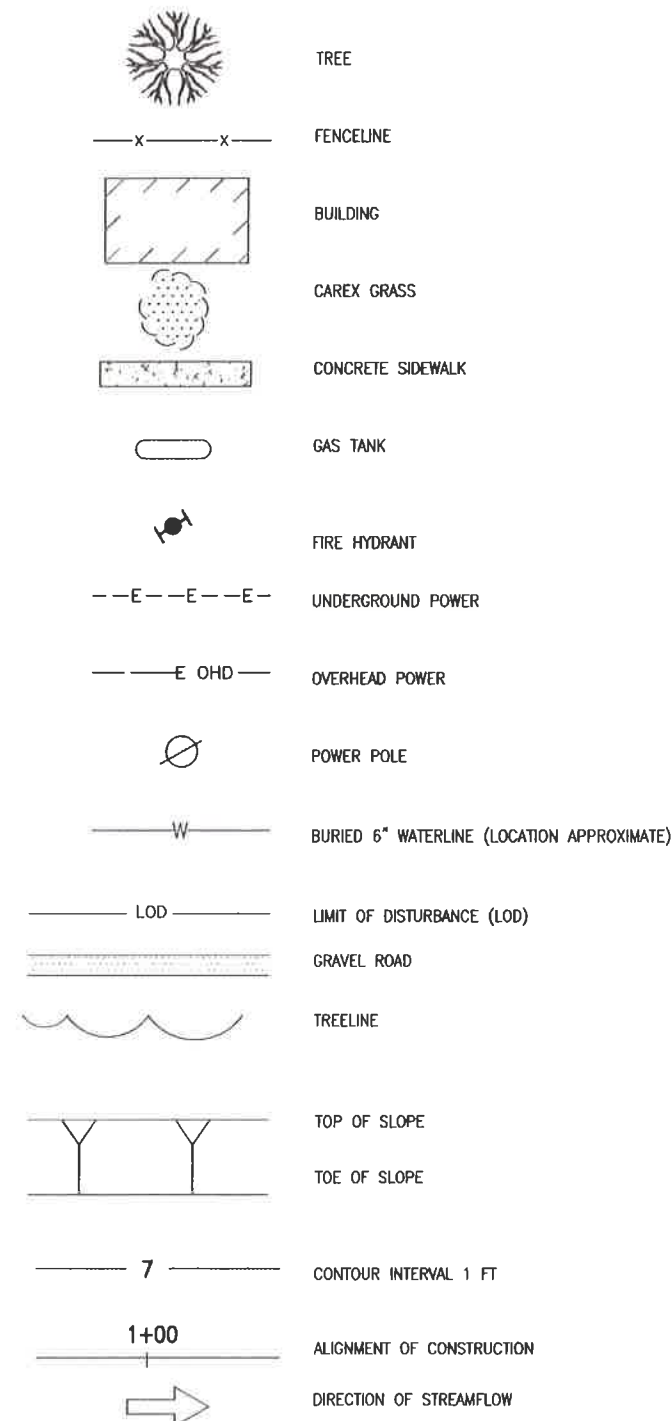
REVISIONS:
4/11/2014

REDWOOD NATIONAL PARK
Strawberry Creek
Restoration Project

TITLE SHEET

DATE: March 2012
SUBMITTAL: FINAL
DESIGN: ML / RS / AL
DRAWN: Llanos
SHEET:

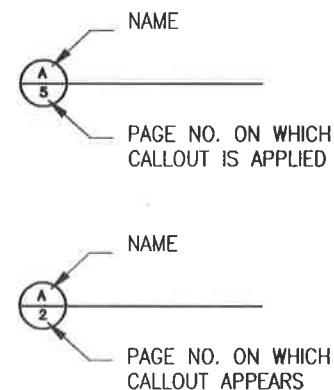
Legend



Standard Abbreviations

APPROX	APPROXIMATELY
CL	CENTERLINE
CONC	CONCRETE
CMPA	CORRUGATED METAL PIPE ARCH
DIA	DIAMETER
(E)	EXISTING
ELEV	ELEVATION
FT	FEET
FL	FLOW LINE
(X:1)	HORIZONTAL : VERTICAL
IN	INCHES
EG	EXISTING GROUND
FG	FINISHED GROUND
LOD	LIMIT OF DISTURBANCE
MAX	MAXIMUM
MIN	MINIMUM
(N)	NEW
NTS	NOT TO SCALE
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
RSP	ROCK SLOPE PROTECTION
STA	STATION
TYP	TYPICAL
TBD	TO BE DETERMINED
W/	WITH

DRAWING SYMBOLS



Survey Control Notes

1. Survey conducted by MLA, November 18, 2009. Based on Control set by Graham Mathews & Associates.
2. Horizontal Datum: NAD83, California State Plane Zone 1 (feet)
3. Vertical Datum: NAVD88 (feet)

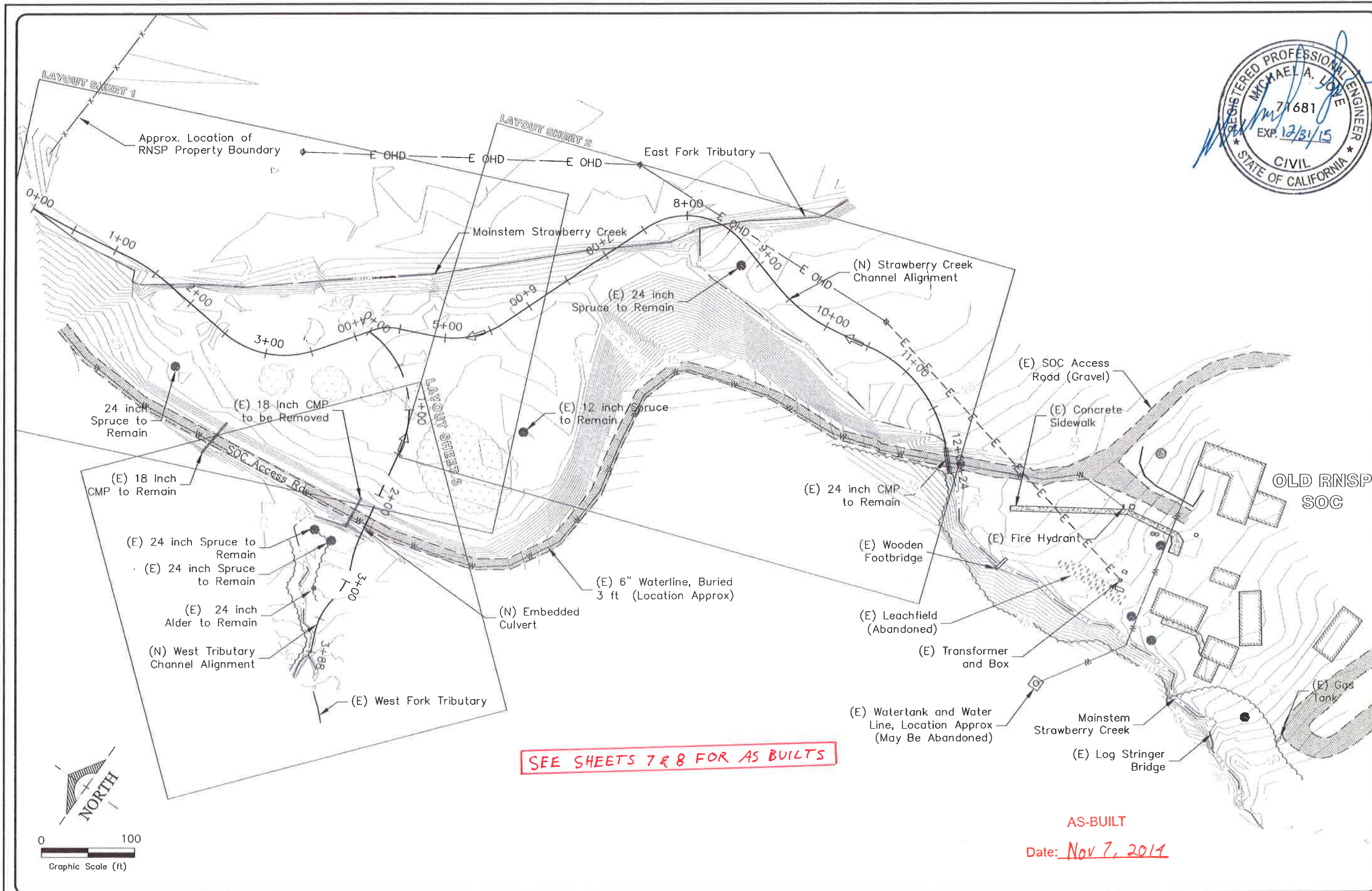
General Notes

1. The term "Owner" is defined as an authorized representative of designated by the National Park Service (NPS). All improvements shall be accomplished under the approval, inspection and to the satisfaction of the Owner
2. In the unlikely event cultural resources (i.e., historical, archaeological, and paleontological resources, and human remains) are discovered during grading or other construction activities, work shall be immediately suspended until a qualified NPS cultural resources specialist has evaluated the find. Additional consultation and protection measures may be required under Section 106 of the National Historic Preservation Act and its implementing regulations 36 CFR 800. If any fragment of or complete human burials or human remains are encountered work shall be immediately suspended in that location until the coroner, NPS Law Enforcement Officers and qualified NPS cultural resources specialists have evaluated the find.
3. If hazardous materials or what appear to be hazardous materials are encountered, stop work in the affected area immediately and contact 911 or the appropriate agency for further instruction.
4. All work shall comply with State of California Department of Transportation May 2006 Standard Plans & Specifications (Caltrans 2006) and the Contract Documents unless noted otherwise.
5. Contractor is responsible for complying with all project permits. Owner is responsible for obtaining and providing copies of all necessary project permits. Copies of all permits shall remain on site.
6. All utilities shown (if any) were located from above ground visual structures. No utility research was conducted for the site. Notify Underground Service Alert (DigAlert) prior to any grading or excavation within the site by calling 1-800-227-2600.
7. Placed materials not conforming to specifications shall be removed and replaced as directed by the Owner at no additional cost to the Owner.
8. The contractor, before submitting a bid for this project, shall visit the construction site and thoroughly familiarize themselves with all existing conditions above and below ground. Before submitting a bid, Bidders shall be satisfied as to the accuracy and completeness of these Specifications and Construction Documents regarding the nature and extent of all work described.
9. The contractor shall immediately notify the Owner upon discovering significant discrepancies, errors or omissions in the plans. Prior to proceeding, the Owner shall have the plans revised to clarify identified discrepancies, errors or omissions.
10. Traffic control shall conform to Caltrans, 2006, MUTCD, and of the MUTCD California Supplement.
11. Contractor shall maintain a clean and orderly work site.
12. Contractor shall be responsible for providing their own water and power for operations, irrigation and dust control. Water shall not be pumped from the creek for use in construction activities.

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Date: Nov 7, 2014





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4/11/2014

REDWOOD NATIONAL PARK
 Strawberry Creek
 Restoration Project

SITE OVERVIEW PLAN

DATE	March 2012
SUBMITTAL	FINAL
DESIGN	ML / RS / AL
DRAWN	Llanos
SHEET	3 of 33

Clearing and Grubbing Notes

- 1. Clearing and Grubbing shall be in accordance with Caltrans, 2006 Section 16 and WQCB (2003) EC-2.
- 2. Invasive Grass Grubbing shall occur to the Limits of Grubbing Shown. Grubbing depths of up to 3 feet are expected to fully remove invasive grass. Grubbing shall be directed by Owner.
- 3. Invasive grass material grubbed from the project area and Himalaya Berry plants shall be stockpiled on the SOC property in locations designated by owner. Grubbed material contains a noxious weed and shall be isolated from other construction materials at all times.
- 4. The limit of disturbance does not denote the limit of clearing and grubbing. The extent of clearing shall be minimized to the extent possible to allow maneuverability of equipment.
- 5. Woody material shall be dispersed throughout the project area at the direction of the Owner. All trees designated to remain shall be protected.
- 6. Tree protection shall consist of blaze orange fence installed around the drip line of the tree. Fencing shall be installed prior to Clearing and Grubbing. No heavy equipment shall be used within the limit of tree protection.

Sequence of Construction

Work phasing shall occur as follows:

- 1. Mobilization
- 2. Installation of fish screens and removal of fish from work area.
- 3. Installation of cofferdams, clear water diversions dewatering, and sediment control as needed within work area.
- 4. Clearing and grubbing of work area.
- 5. Installation of Temporary Access Road for West Tributary Culvert installation.
- 6. Installation of New West Fork Tributary culvert.
- 7. Removal of the Temporary Access Road and Construction of Planting Mound Ceres as necessary for construction access.
- 8. In-stream channel work, placement of wood structures and construction of Planting Mounds.
- 9. Removal of fish screens, clear water diversions, cofferdams, and dewatering devices.
- 10. Stabilization of the work area and planting, installation of Elk Exclusion Fencing, and planting.
- 11. Demobilization.

Construction Sequencing and Access Notes:

- 1. Contractor shall sequence operations to provide weed free excavated material for Planting Mound construction.
- 2. Imported Borrow cores in Planting Mounds shall be used for construction access and work platforms within the wetland area.
- 3. The SOC Access Road shall remain open during construction of the West Tributary Culvert replacement. Contractor is responsible for maintaining access to the old SOC area.
- 4. Buried telephone, electric, water and other utility lines shall be protected or temporarily relocated during construction to prevent interruption of service.

Excavation Notes

- 1. Excavation, backfill, and embankment construction shall be in accordance with Caltrans 2006 Section 19 Earthwork, specifically Section 19-2, and 19-6 unless otherwise specified.
- 2. Excavation will include excavation and handling of saturated soils. Contractor shall be prepared to dewater and /or transport saturated soil in a manner that prevents excess discharge or spillage of soils or water within the construction access area or on adjacent properties or roadways. Should any discharge occur, the Contractor shall be responsible for immediate and complete clean up. Multiple handling of materials may be necessary.
- 3. Unless otherwise specified, finished grading shall be plus or minus 0.1 foot. The tolerance for horizontal locations shall be plus or minus 1 foot.
- 4. At the completion of construction, portions of the SOC Access Road used for construction access shall be restored to pre-construction or better conditions.

- 5. The ground surface after grubbing will serve as FG unless otherwise specified. FG in grubbed areas shall be constructed to maintain positive drainage towards the stream channel.

Erosion & Sediment Control Notes

General Notes

- 1. Erosion and sediment control shall comply with the California Stormwater Quality Association Stormwater Best Management Practice Handbook for Construction, 2003 (WQCB, 2003).
It is the responsibility of the contractor to minimize erosion and prevent the transport of sediment to the adjacent stream and sensitive areas. Unless otherwise noted, apply WQCB (2003) Best Management Practices (BMP's).
The Contractor, as necessary, shall implement other BMP's specified in WQCB (2003) dictated by site conditions. Contractor shall be responsible for all fines and cleanup resulting from a stormwater pollution violation.
- 2. Contractor shall keep project areas generating dust well watered during the term of the contract (WE-1).
- 3. Discharges of potential pollutants from construction sites shall be prevented using source controls to the maximum extent practicable. Potential pollutants include but are not limited to: sediment, trash, nutrients, pathogens, petroleum hydrocarbons, metals, concrete, cement, asphalt, lime, paint, stains, glues, wood products, pesticides, herbicides, chemicals, hazardous waste, sanitary waste, vehicle or equipment wash water and chlorinated water.
Other solid waste, trash, and debris, shall be placed in collection areas or containers. Food waste and other animal attracting trash shall be placed in bear-proof containers and daily removed off site. The construction site shall be cleared of solid waste daily, or as necessary, and regular removal and proper disposal shall be arranged. (NS-8,9,10, WM-1,2,4,5,6,9,10).
- 4. Soil and material stockpiles shall be properly protected to minimize sediment and pollutant transport from the construction site (WM-3).

Temporary Stream Isolation, Diversion, and Dewatering Measures

- 1. Temporary Stream Isolation, Diversion, and Dewatering will be necessary during in-channel construction and shall conform to these construction documents and the following specifications. See Typical D1 Sheet 6 and WQCB (2003):
 - a. NS-2 Dewatering Operations
 - b. NS-5 Clear Water Diversion
 - c. EC-9 Earth Dikes and Drainage Swales
 - d. EC-10 Velocity Dissipation DevicesCaltrans 2003 19-3-03 (Temporary Sheet Pile Cofferdam)
- 2. Prior to commencing any excavation or demolition work, the fish screens shall be installed and fish and other aquatic organisms removed from the work area. Contractor shall coordinate with the Owner who will be responsible for removing fish and for scheduling placement of fish screens, stream isolation, and dewatering measures. The Owner's designated Fisheries Biologist is responsible for siting the best location for fish screens.
- 3. Filter Fabric Isolation shall be used as necessary with other isolation measures to construct the Imported Borrow cores of the Planting Mounds that will be used for construction access.
- 4. Temporary Cofferdams shall consist of super sandbags, driven sheet pile, or another approved device to minimize inflow of water to the work area. Driven Sheet Piles shall only be installed where specified. Additional Super Sand bags can be used within the work area as necessary.
- 5. Earth dikes shall be constructed of salvaged material. Material shall only be salvaged from the existing stream channel in locations where excavation is specified. Sand / gravel bags are acceptable. Burlap shall not be used. Earth dike shall be located as specified and as necessary within the work area.
- 6. For pumped clearwater diversions, contractor shall be responsible for providing pumps and pipes with adequate capacity to maintain suitably dewatered conditions in the work area during construction and to divert streamflow during non-work hours.
- 7. Dewatering of the isolated work area may be necessary during in-channel

- construction. Contractor shall be prepared to implement dewatering operations so that dewatering occurs in a timely manner and does not negatively impact the construction schedule.
- 8. Contractor shall coordinate with Fisheries Biologist during work area dewatering for additional fish removal.
- 9. Contractor shall use gravity stream diversion pipe as much as feasible. Overtopping of Clearwater Diversion Earth Dikes shall not be allowed during operation of the gravity pipe stream diversion.
- 10. The outlet of the gravity pipe, stream bypass pump or any other concentrated flow shall be placed on a washed cobble energy dissipater at least 3 feet x 3 feet and 1-foot thick placed in the channel upstream of the downstream fish screen.
- 11. The outlet of the dewatering pump shall be to a suitably sized gravity bag filter or other approved dewatering device a minimum of 50 feet from the work area on a flat area able to receive water and allow it to percolate into the soils.
- 12. Any pumps used on-site shall be placed on absorbent pads. The contractor shall have spill containment materials located at the site, with operators trained in spill control procedures.
- 13. When required Temporary Clearwater Diversion shall be continually operated until work area is fully stabilized.
- 14. Fill from earth dikes and sand bags shall be incorporated into the planting mounds or disposed of off site.

Permanent Seeding and Straw Mulching

- 1. Site stabilization, shall include the following, unless otherwise noted:
 - a. Seed Mix: at discretion of Owner.
 - b. Straw Mulch in accordance with EC-6. Straw shall be certified 100% weed free.
- 2. Permanent seeding and straw mulch shall be installed in all areas disturbed by the project, above bankfull elevation, unless specified otherwise.

AS-BUILT

Date: Nov 7, 2014



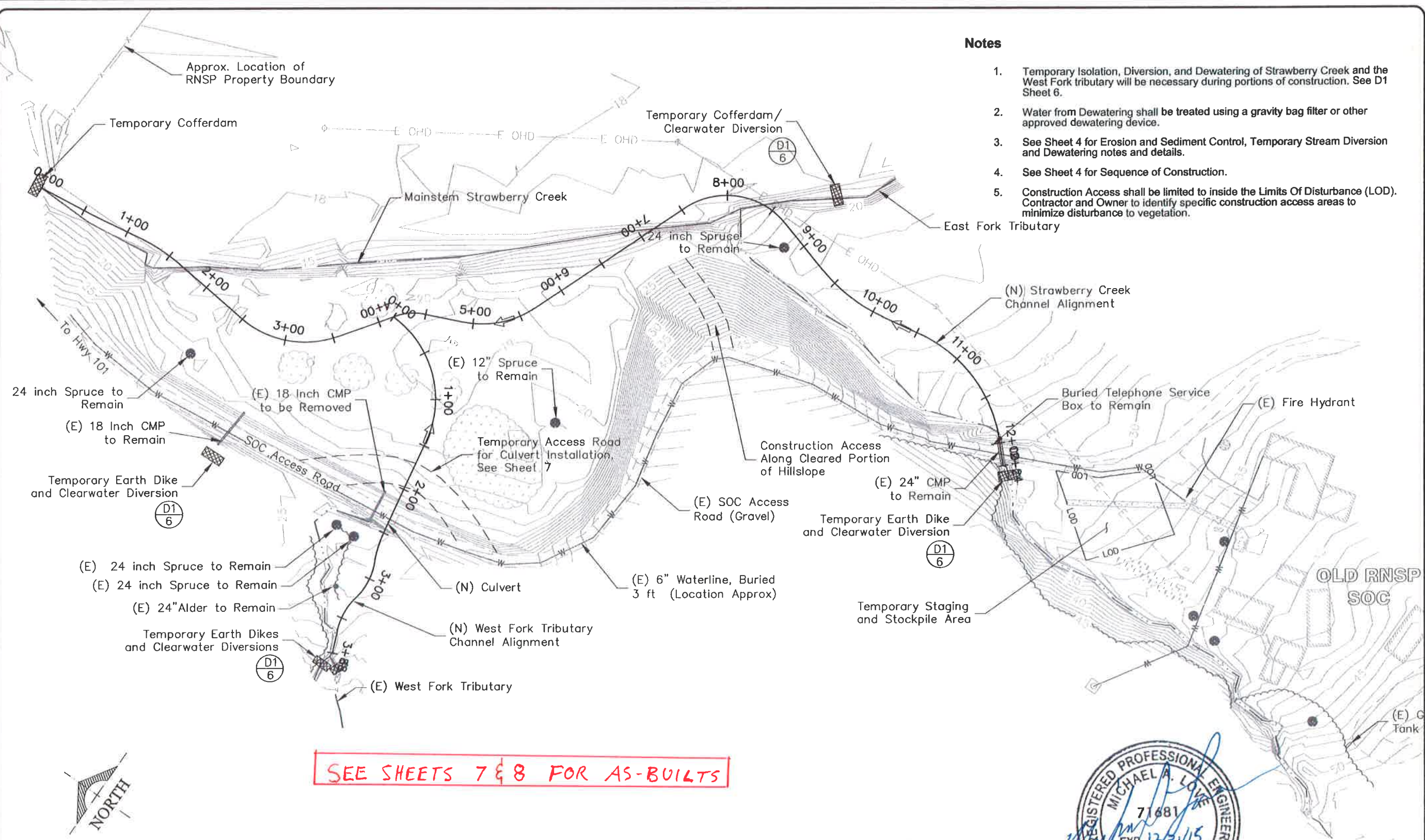
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PROJECT MANAGEMENT: Pacific Coast Fish, Wildlife and Wetlands Restoration Assoc.

REVISIONS:
4/11/2014

REDWOOD NATIONAL PARK
Strawberry Creek
Restoration Project

NOTES

DATE: March 2012
SUBMITTAL: FINAL
DESIGN: ML / RS / AL
DRAWN: Llanos
SHEET: 4 of 33



Notes

1. Temporary Isolation, Diversion, and Dewatering of Strawberry Creek and the West Fork tributary will be necessary during portions of construction. See D1 Sheet 6.
2. Water from Dewatering shall be treated using a gravity bag filter or other approved dewatering device.
3. See Sheet 4 for Erosion and Sediment Control, Temporary Stream Diversion and Dewatering notes and details.
4. See Sheet 4 for Sequence of Construction.
5. Construction Access shall be limited to inside the Limits Of Disturbance (LOD). Contractor and Owner to identify specific construction access areas to minimize disturbance to vegetation.

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PROJECT: Pacific Coast Fish, Wildlife and Wetlands Restoration Assoc.
MANAGEMENT:

REVISIONS:
4/11/2014

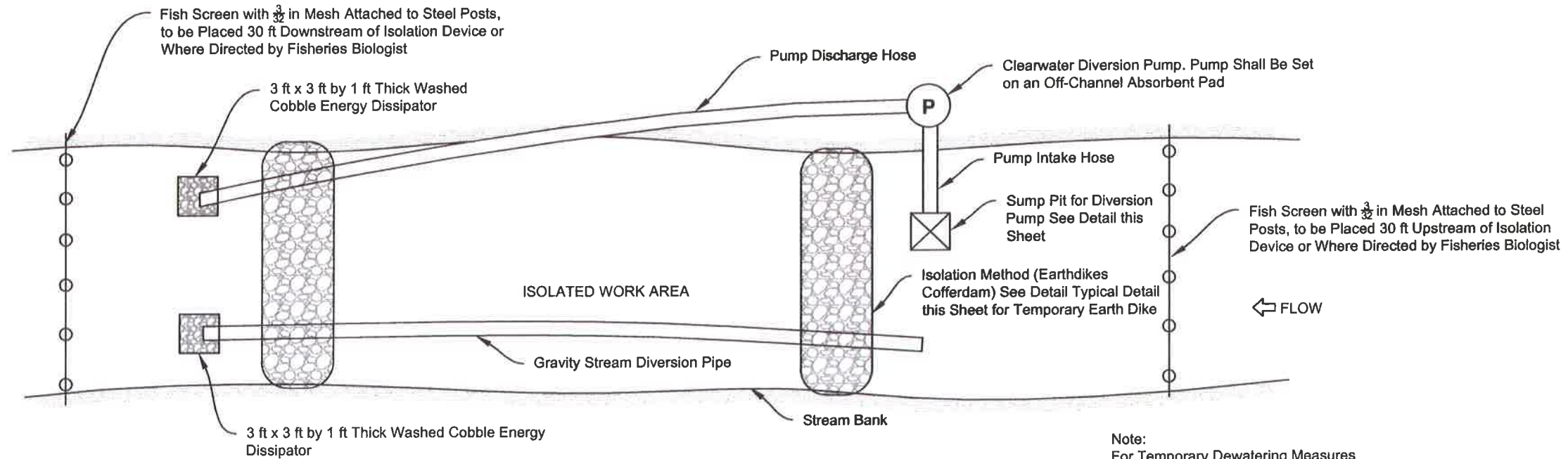
REDWOOD NATIONAL PARK
Strawberry Creek
Restoration Project

**EROSION CONTROL
AND WATER
MANAGEMENT PLAN**

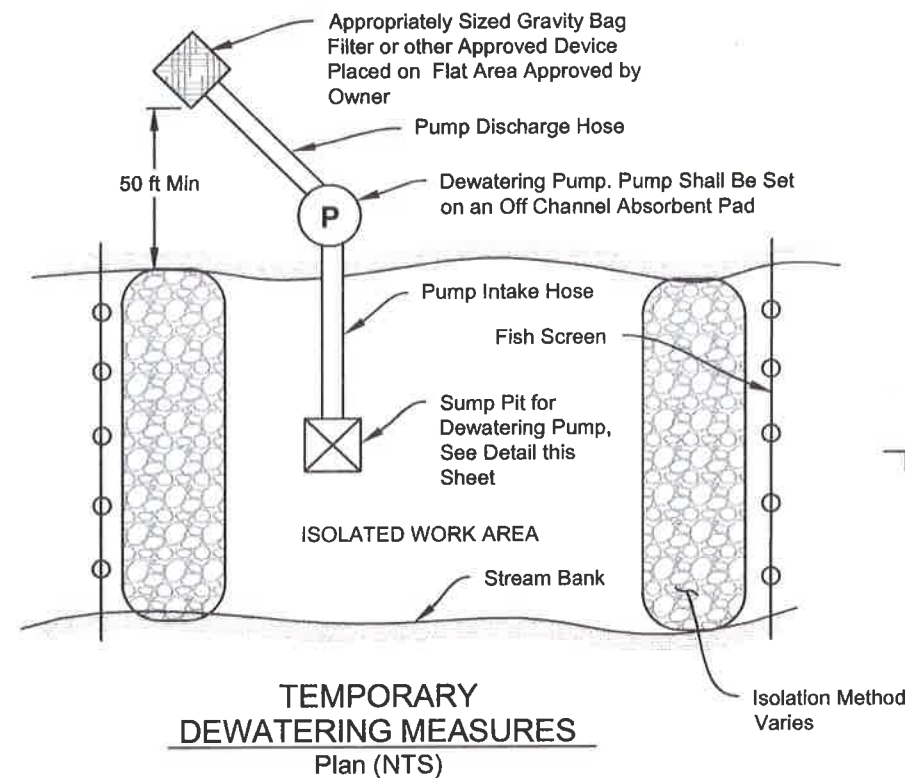
DATE
March 2012
SUBMITTAL
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DESIGN
ML / RS / AL
DRAWN
Llanos
SHEET

AS-BUILT
Date: Nov 7, 2014

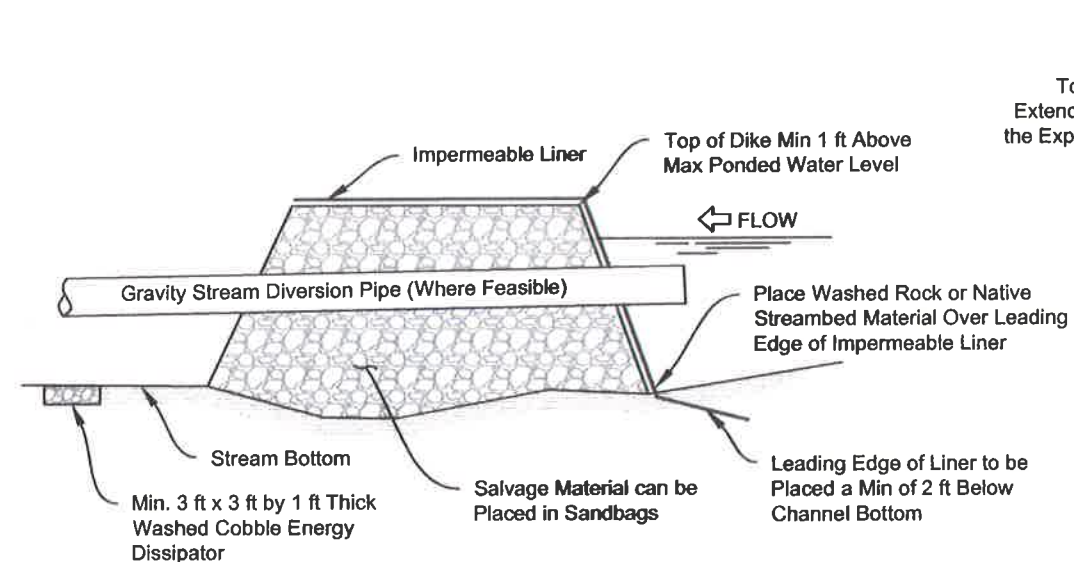




TEMPORARY CLEAR WATER DIVERSION
Plan (NTS)

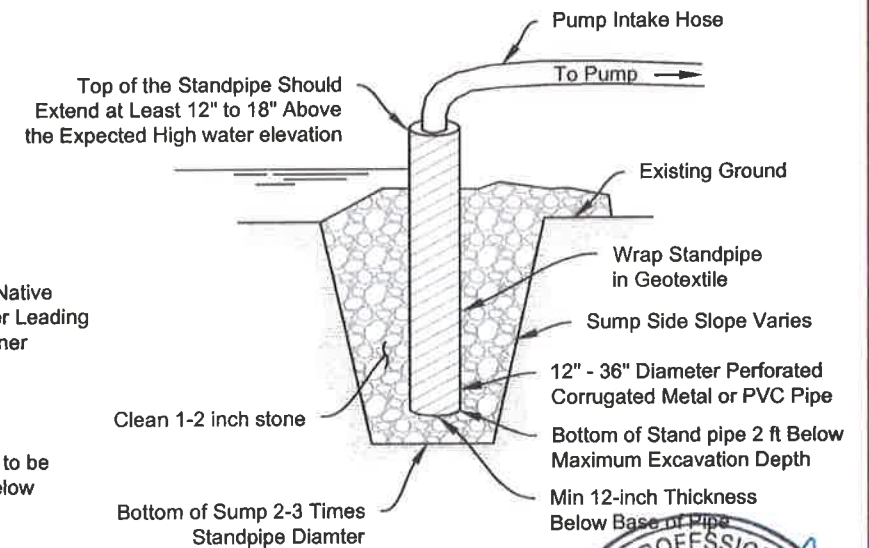


TEMPORARY DEWATERING MEASURES
Plan (NTS)



TEMPORARY EARTH DIKE
Profile (NTS)

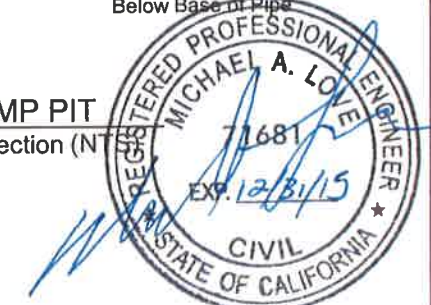
D1 WATER MANAGEMENT
4,5,7,8,9 Details

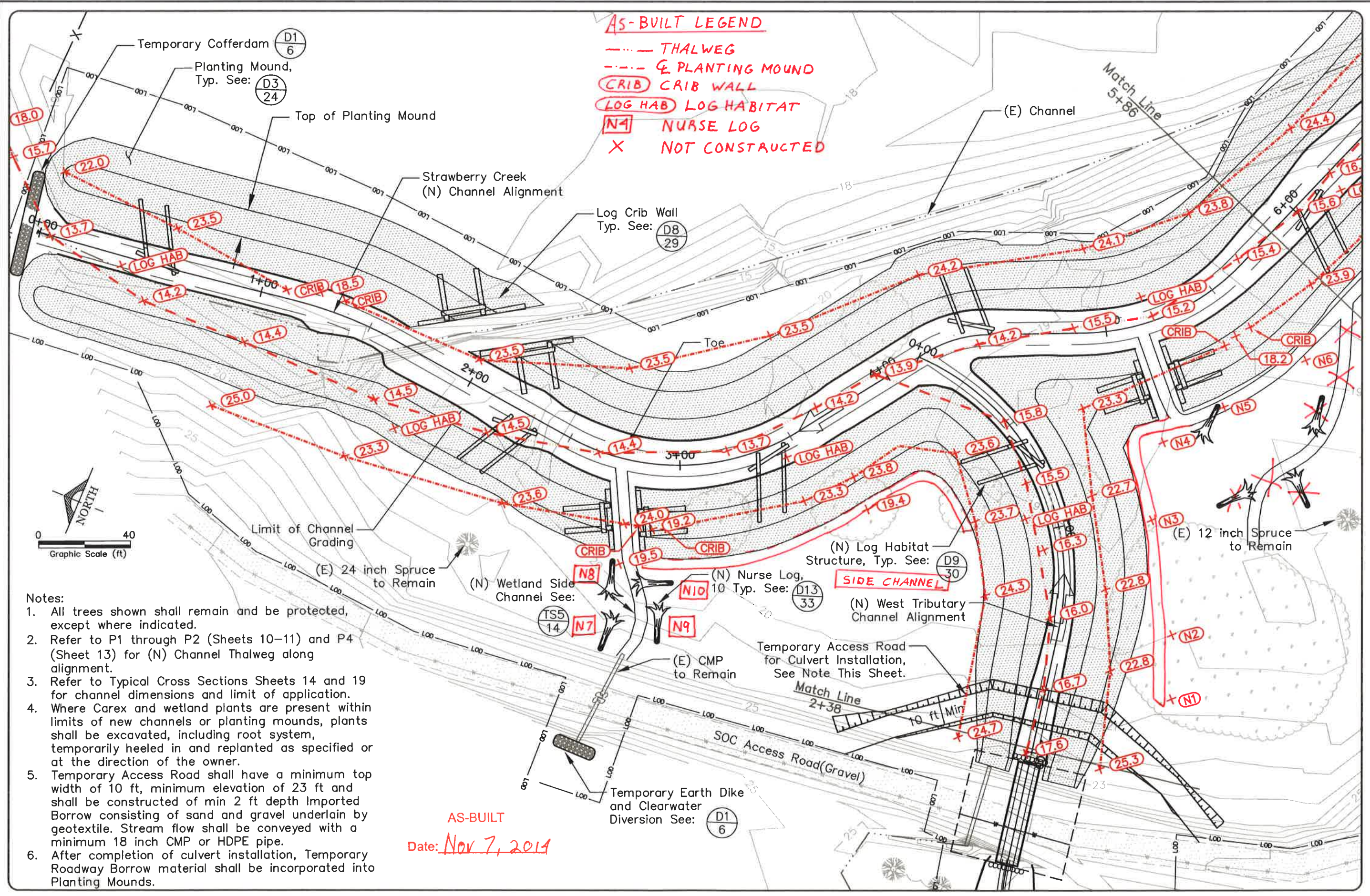


SUMP PIT
Cross Section (NTS)

AS-BUILT

Date: Nov 7, 2014





AS-BUILT LEGEND
--- THALWEG
--- & PLANTING MOUND
CRIB CRIB WALL
LOG HAB LOG HABITAT
N4 NURSE LOG
X NOT CONSTRUCTED

- Notes:
1. All trees shown shall remain and be protected, except where indicated.
 2. Refer to P1 through P2 (Sheets 10-11) and P4 (Sheet 13) for (N) Channel Thalweg along alignment.
 3. Refer to Typical Cross Sections Sheets 14 and 19 for channel dimensions and limit of application.
 4. Where Carex and wetland plants are present within limits of new channels or planting mounds, plants shall be excavated, including root system, temporarily heeled in and replanted as specified or at the direction of the owner.
 5. Temporary Access Road shall have a minimum top width of 10 ft, minimum elevation of 23 ft and shall be constructed of min 2 ft depth Imported Borrow consisting of sand and gravel underlain by geotextile. Stream flow shall be conveyed with a minimum 18 inch CMP or HDPE pipe.
 6. After completion of culvert installation, Temporary Roadway Borrow material shall be incorporated into Planting Mounds.

AS-BUILT
Date: Nov 7, 2014

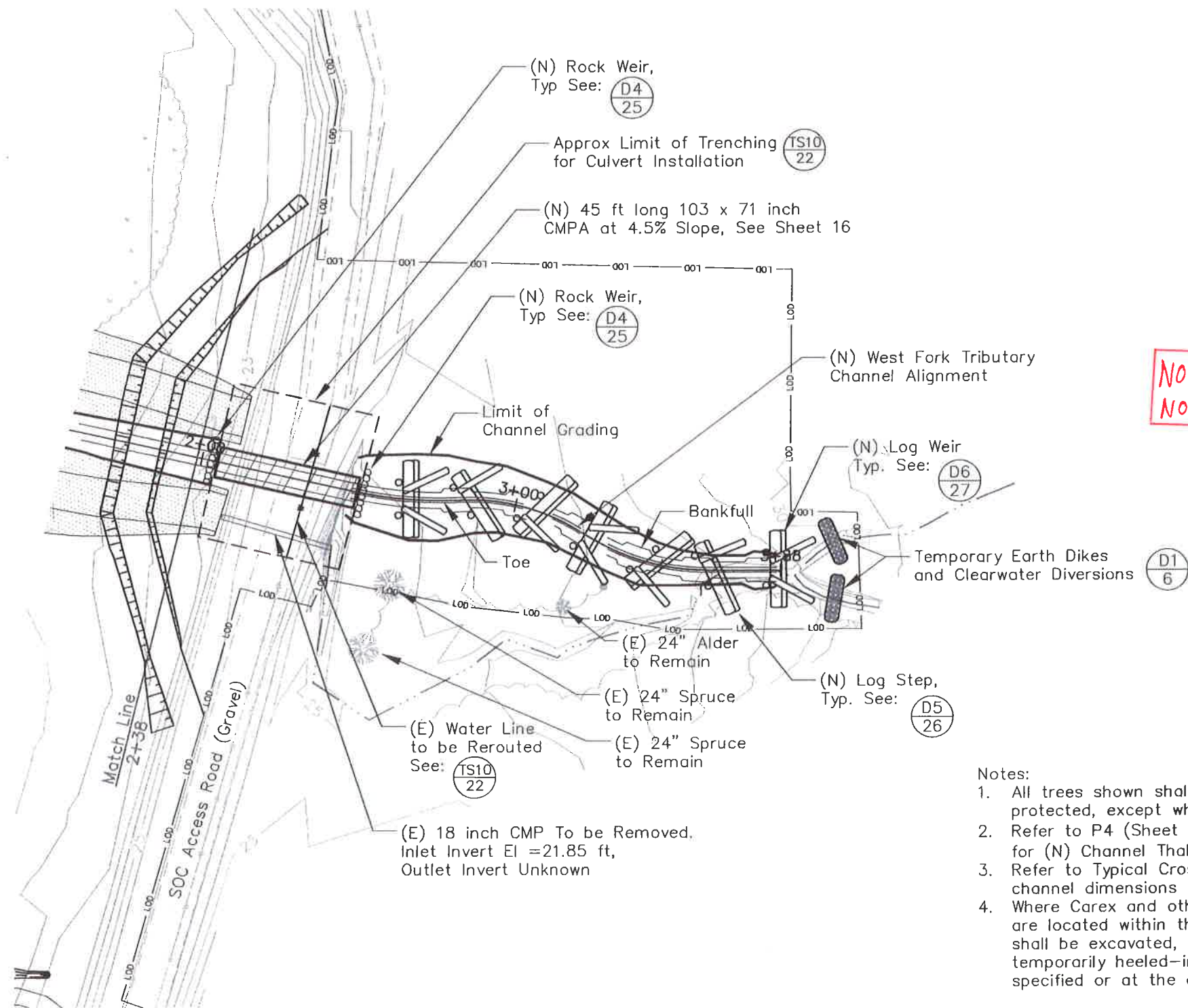
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PROJECT: Pacific Coast Fish, Wildlife and Wetlands Restoration Assoc.

REVISIONS:
4/11/2014

REDWOOD NATIONAL PARK
Strawberry Creek
Restoration Project

LAYOUT SHEET 1

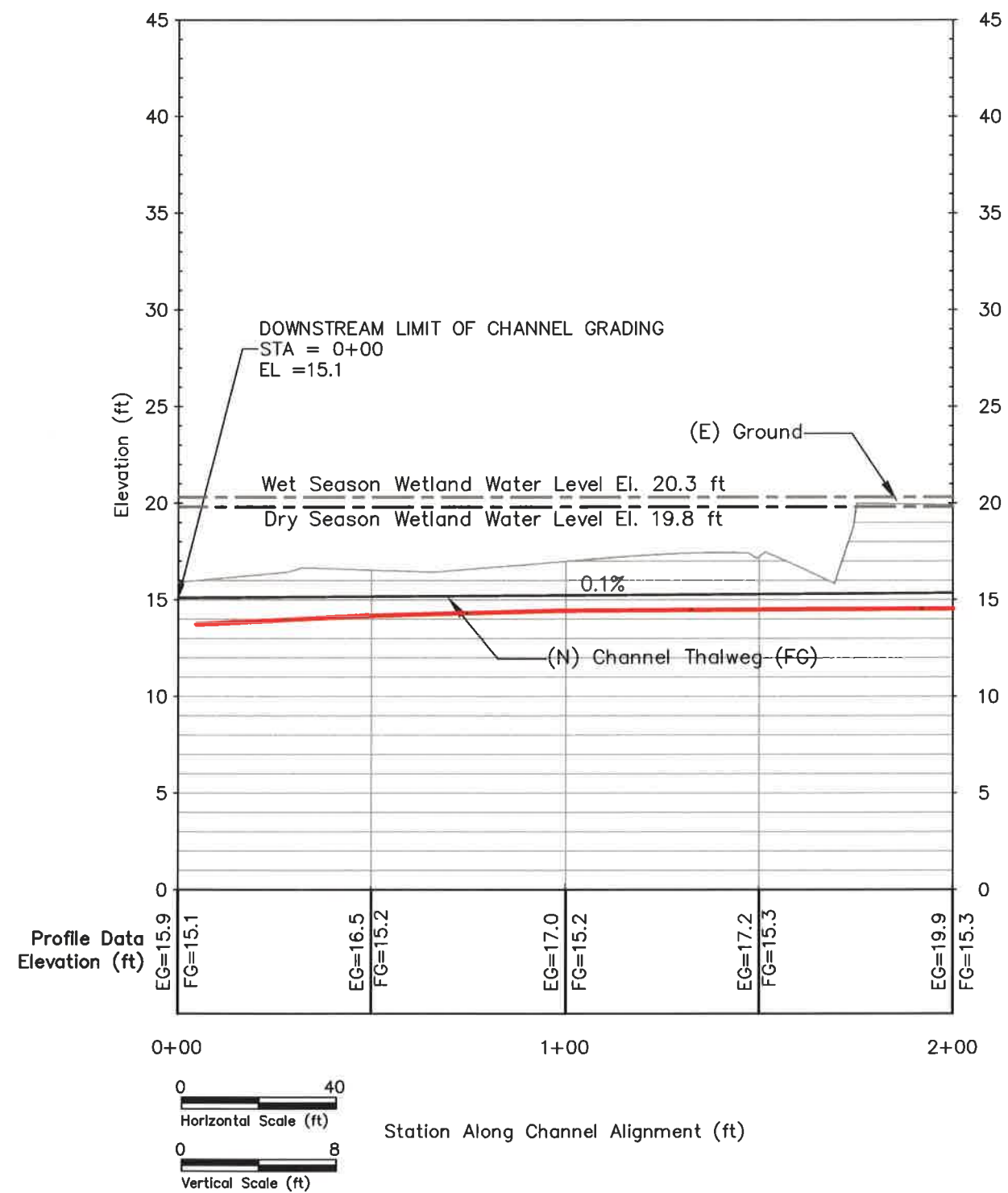
DATE	March 2012
SUBMITTAL	FINAL
DESIGN	ML / RS / AL
DRAWN	Llanos
SHEET	



NOT CONSTRUCTED
NOV 7, 2014

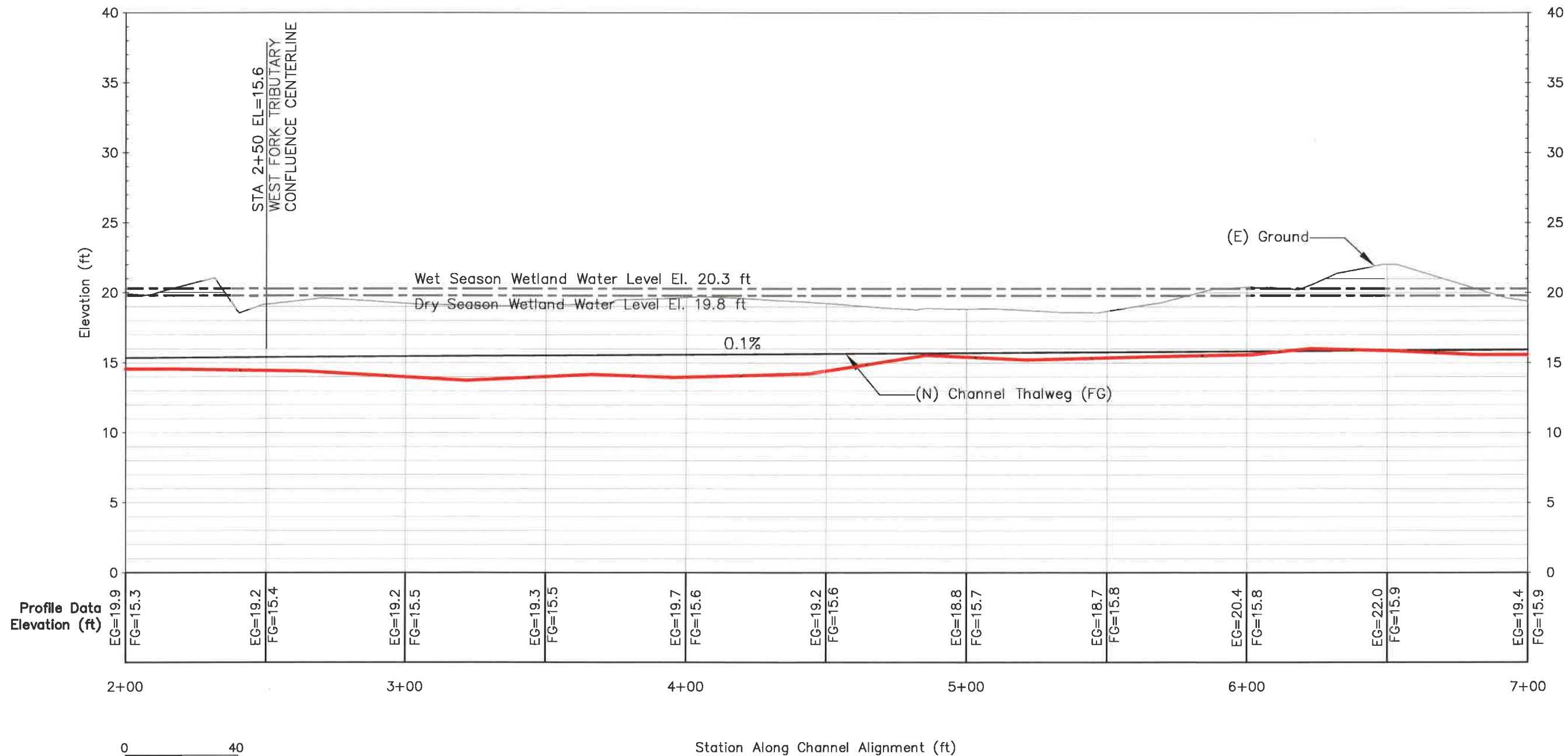
- Notes:
1. All trees shown shall remain and be protected, except where indicated.
 2. Refer to P4 (Sheet 13) and P5 (Sheet 22) for (N) Channel Thalweg along alignment.
 3. Refer to Typical Cross Sections Sheet 19 for channel dimensions and limit of application.
 4. Where Carex and other native wetland plants are located within the limit of grading, plants shall be excavated, including root system, temporarily heeled-in and replanted as specified or at the direction of the Owner.





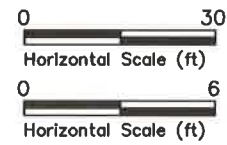
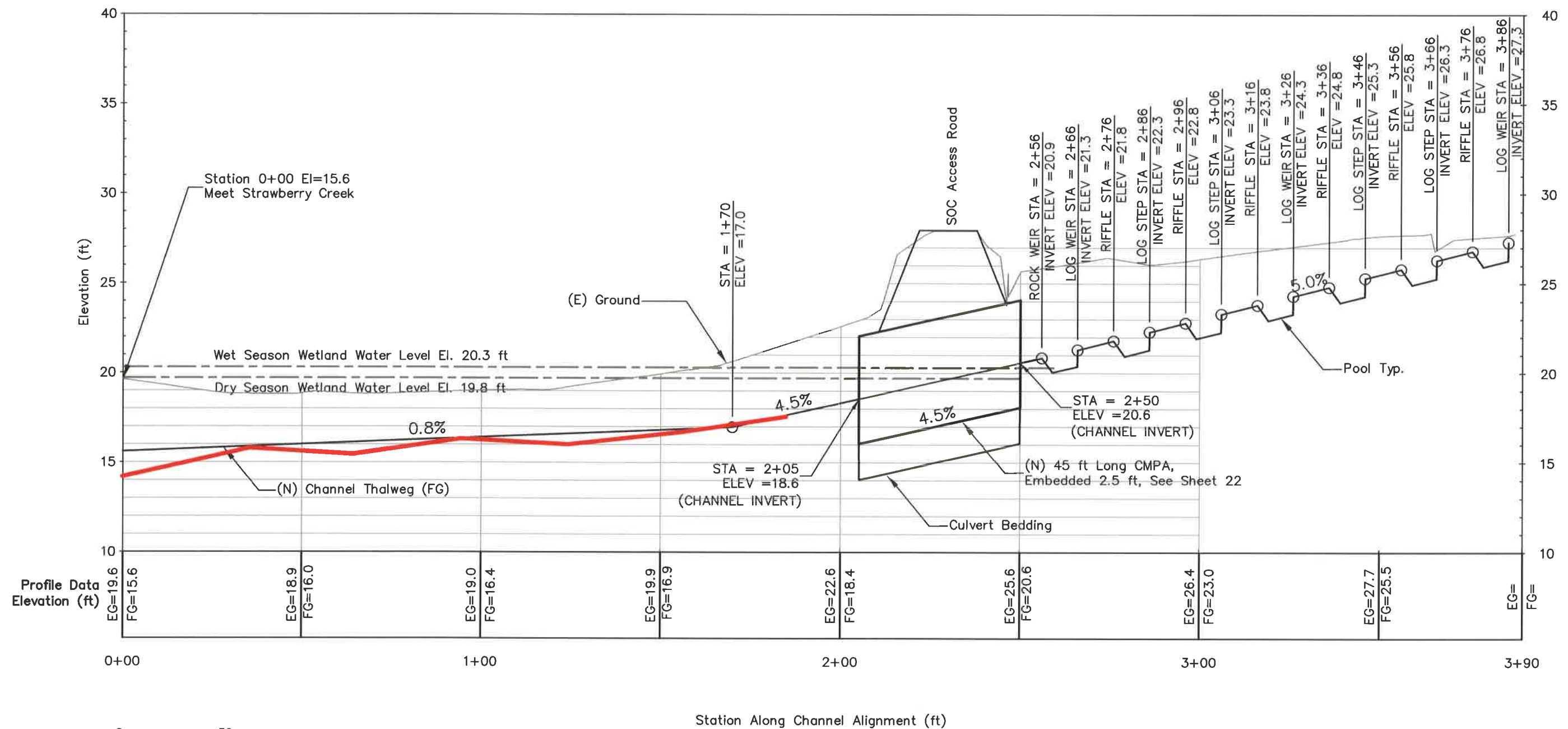
STRAWBERRY CREEK
Profile

AS-BUILT
Date: Nov 7, 2014



P2
7.8
STRAWBERRY CREEK
Profile

AS-BUILT
Date: Nov 7, 2014



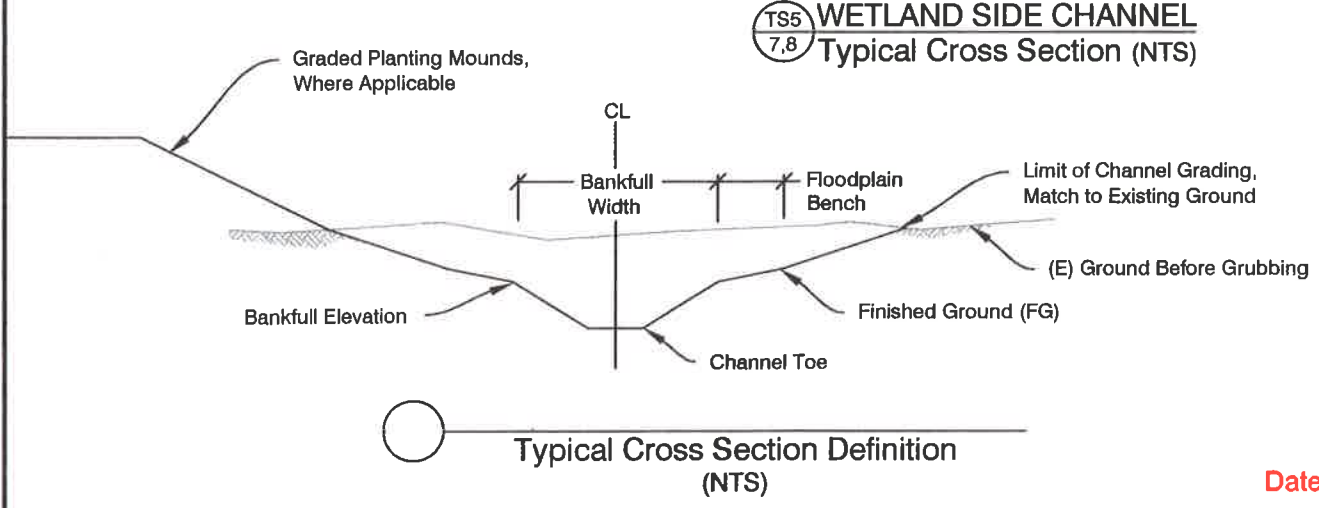
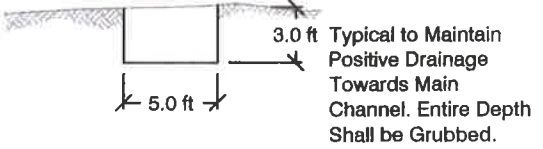
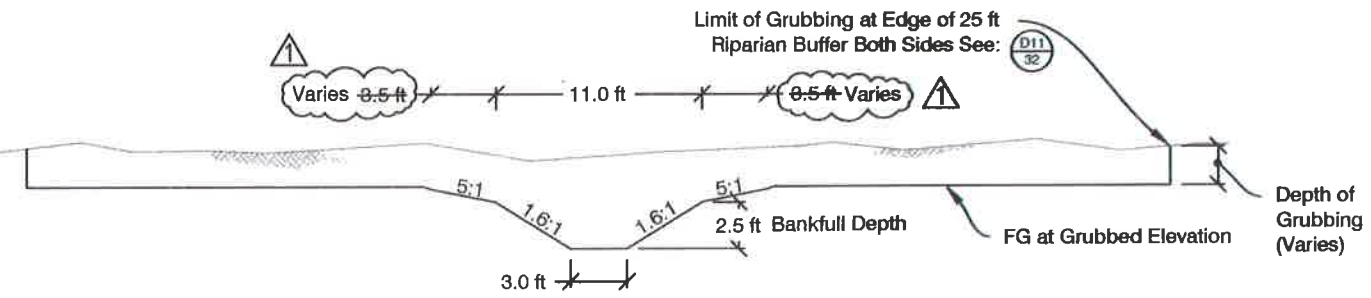
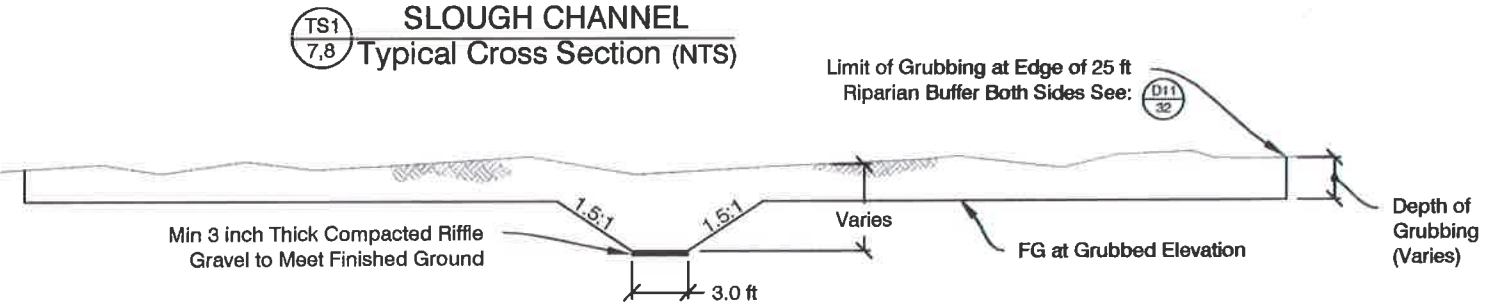
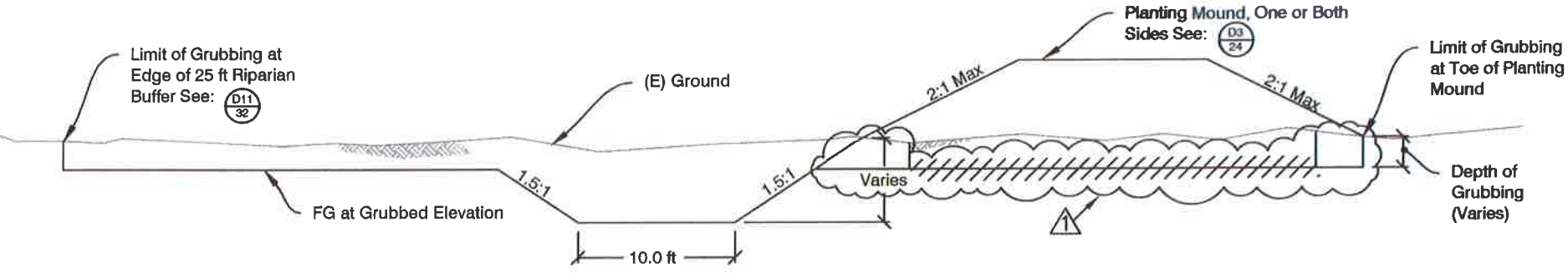
P4
7,9,26,27
WEST FORK TRIBUTARY CULVERT
Profile1

AS-BUILT
Date: NOV 7, 2014
UPSTREAM 1+85
NOT CONSTRUCTED

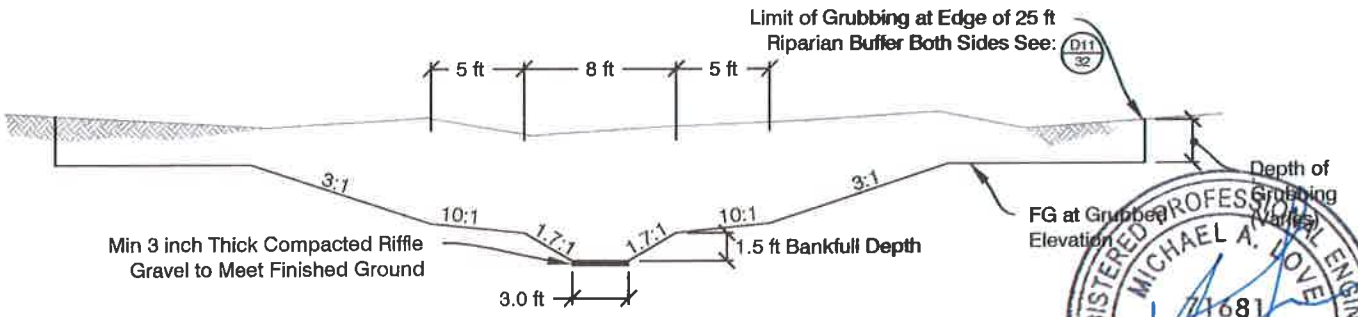
TABLE OF TYPICAL CROSS SECTION APPLICATION
ALONG STRAWBERRY CREEK ALIGNMENT

Station	to	Station	Applied Cross Section
0+00	to	9+85	(TS1) Slough Channel
9+85	to	--	(DS 26) Log Step
9+85	to	10+10	(TS4) Riffle
10+15	to	10+30	(TS3) Pool
10+30	to	--	(DS 26) Log Step
10+30	to	10+55	(TS4) Riffle
10+60	to	10+75	(TS3) Pool
10+75	to	--	(DS 26) Log Step
10+75	to	11+00	(TS4) Riffle
11+05	to	11+20	(TS3) Pool
11+20	to	--	(DS 26) Log Step
11+20	to	11+45	(TS4) Riffle
11+50	to	11+65	(TS3) Pool
11+65	to	--	(DS 26) Log Step
11+65	to	11+96	(TS2) Culvert Outlet Channel

Notes:
 1. All cross sections are oriented looking up-station.
 2. At stations where Typical Sections are not defined, transition gradually between defined sections upstream and downstream.
 3. See Sheets 15 to 18 for detailed Grading Cross Sections.



AS-BUILT
 Date: Nov 7, 2014



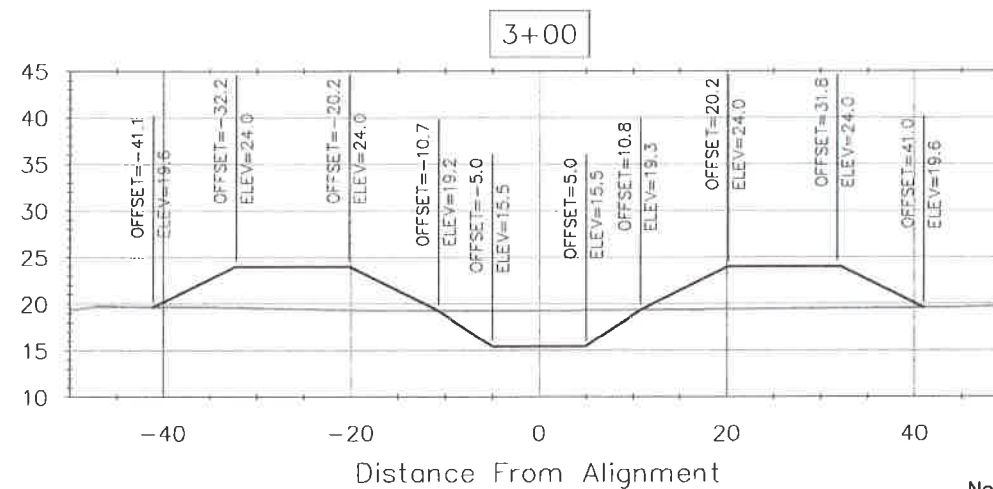
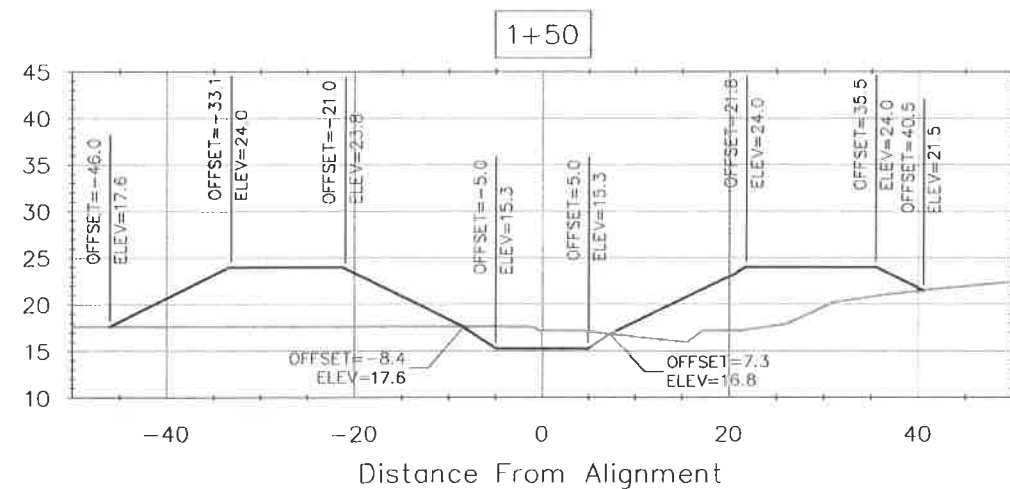
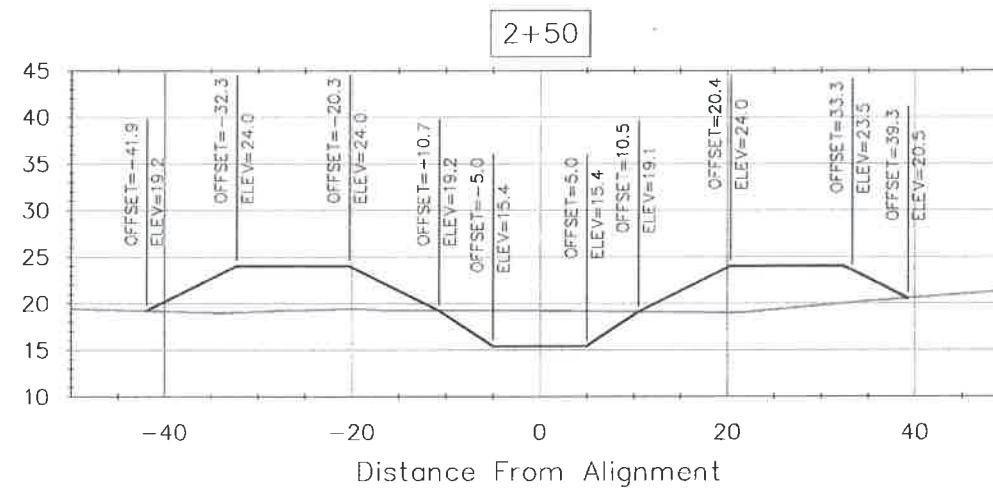
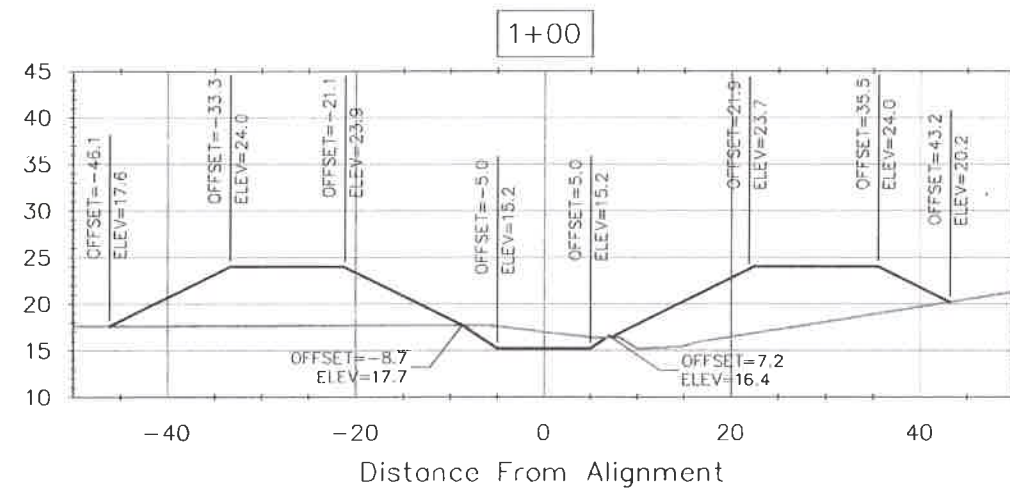
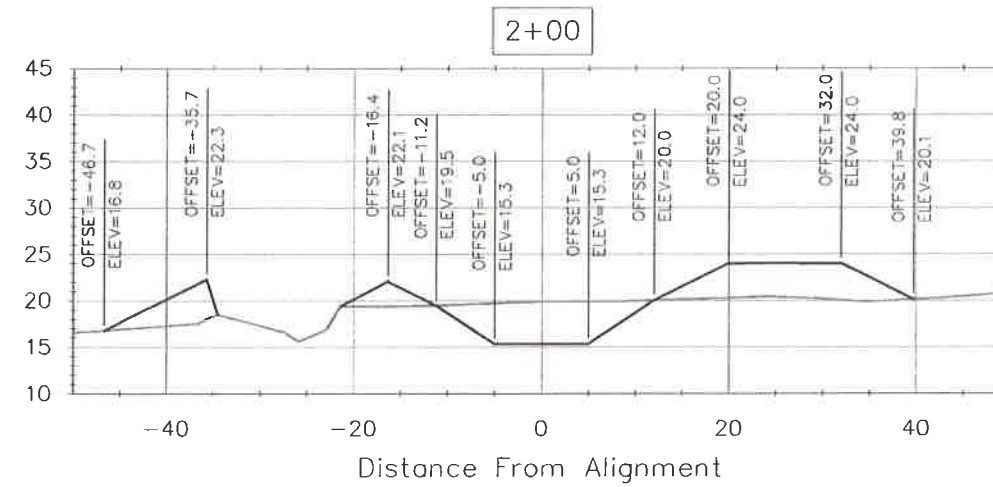
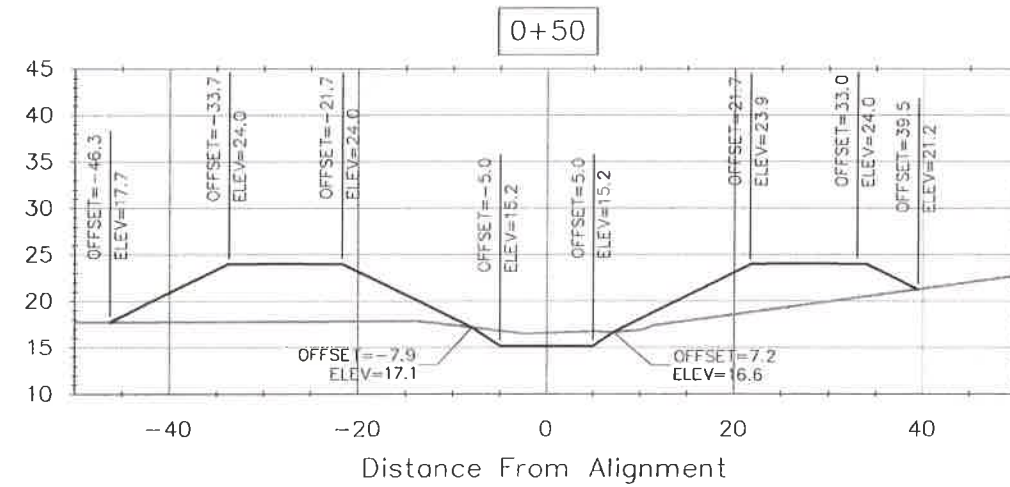
Michael Love & Associates
 PO Box 4477 • Arcata, CA 95521 • (707) 478-8938
 PROJECT: Pacific Coast Fish, Wildlife and Wetlands Restoration Assoc.

REVISIONS:
 4/11/2014

REDWOOD NATIONAL PARK
 Strawberry Creek
 Restoration Project

STRAWBERRY CREEK
 TYPICAL CROSS SECTIONS

DATE: March 2012
 SUBMITTAL: FINAL
 DESIGN: ML / RS / AL
 DRAWN: Llanos
 SHEET:

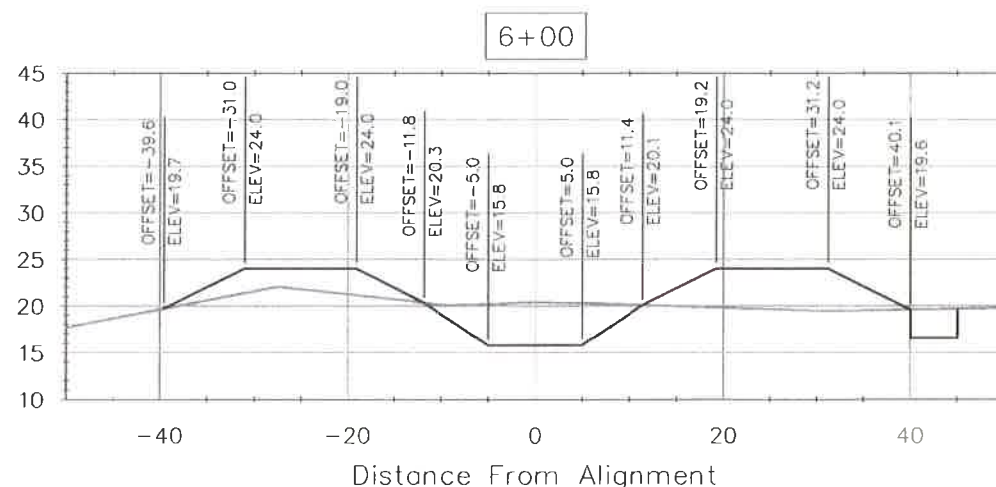
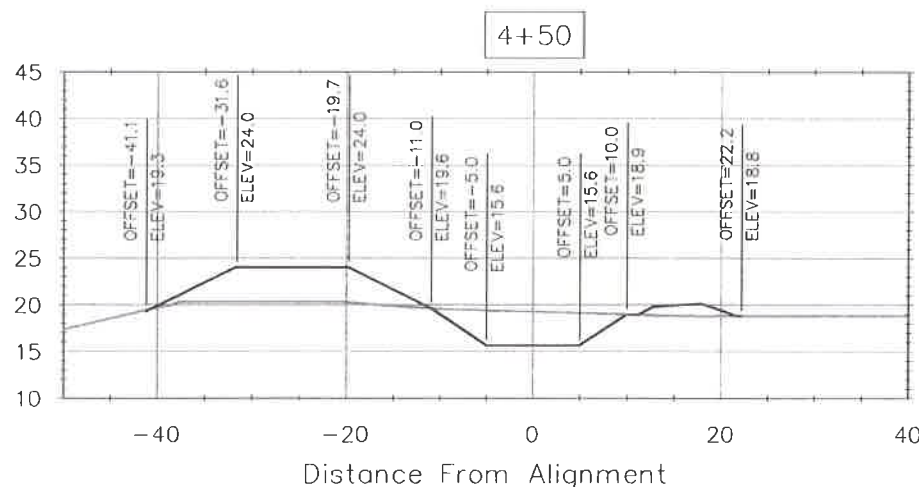
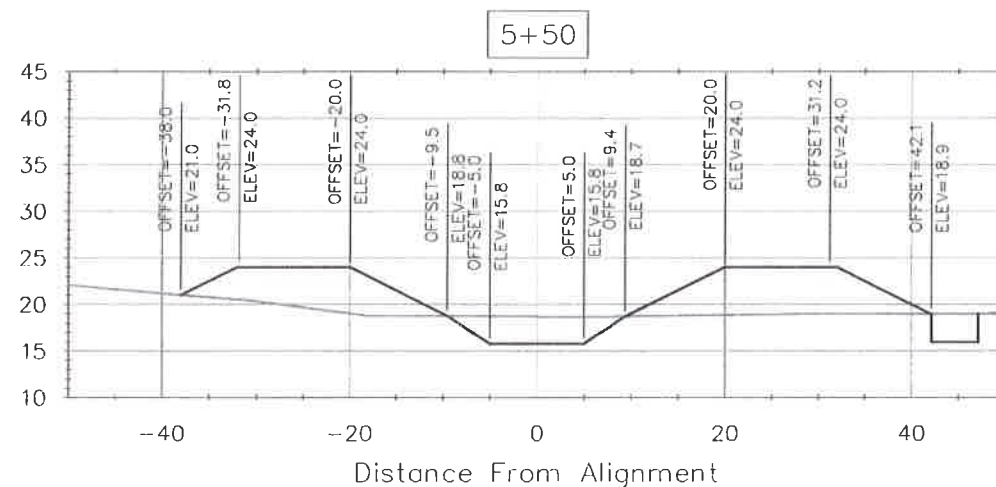
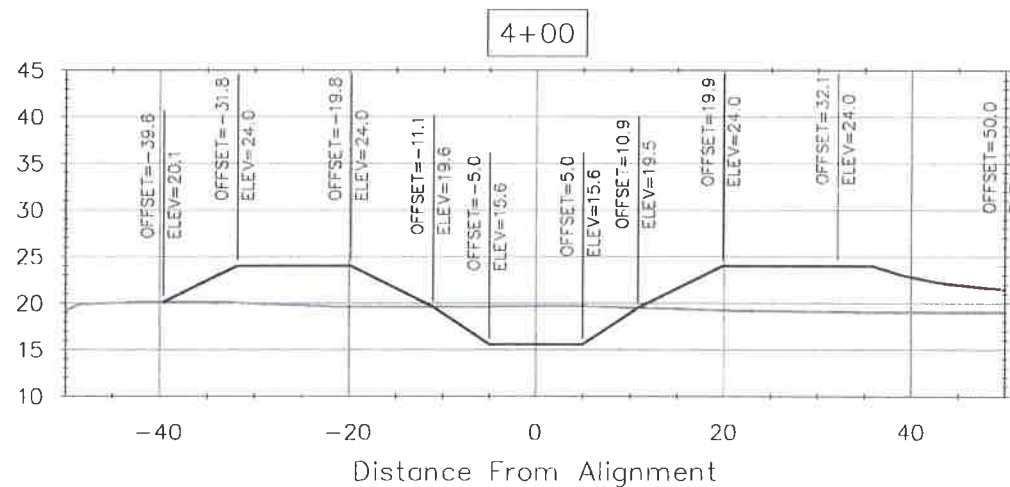
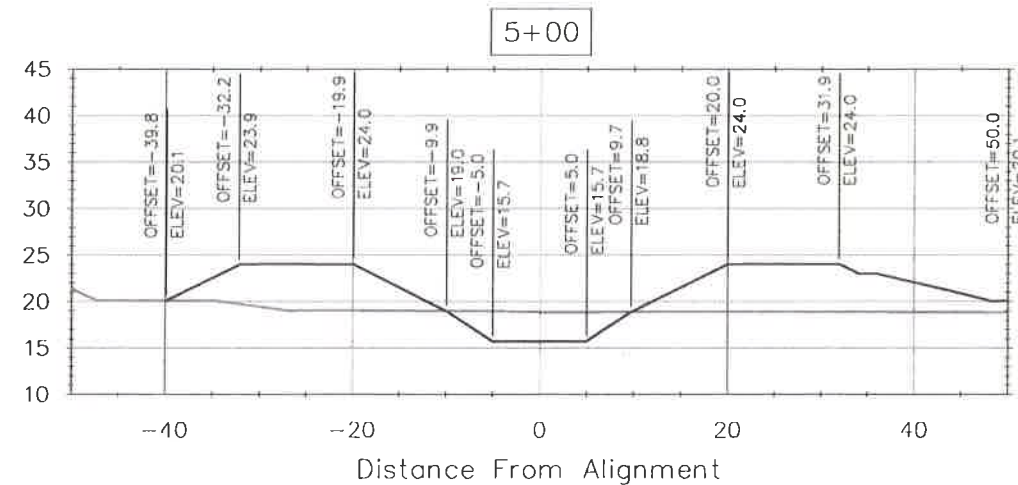
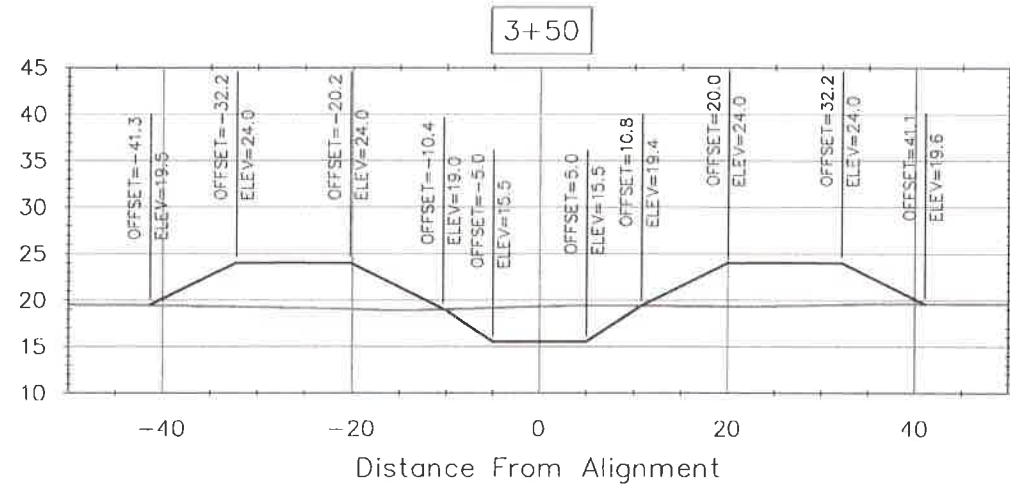


SEE SHEET AB-1
FOR AS-BUILT
CROSS SECTIONS



AS-BUILT
Date: Nov 7, 2014

- Notes:
1. All cross sections are oriented looking up-station.
 2. Existing Ground elevation may vary from shown after grubbing. Offsets and elevations will vary with grubbing depth.

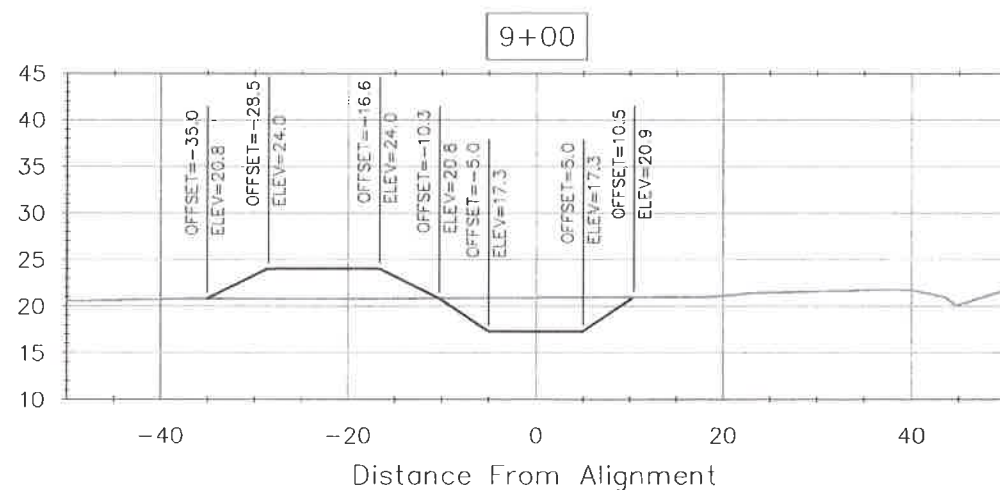
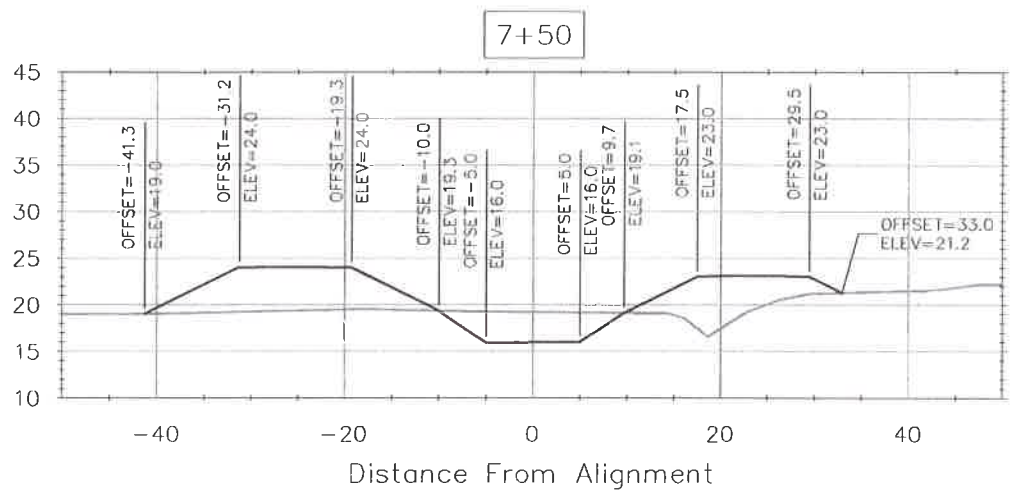
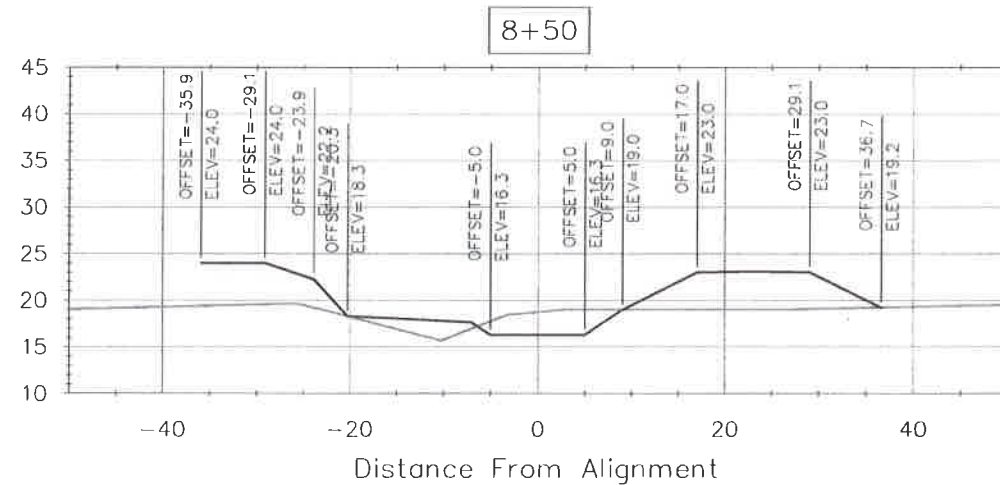
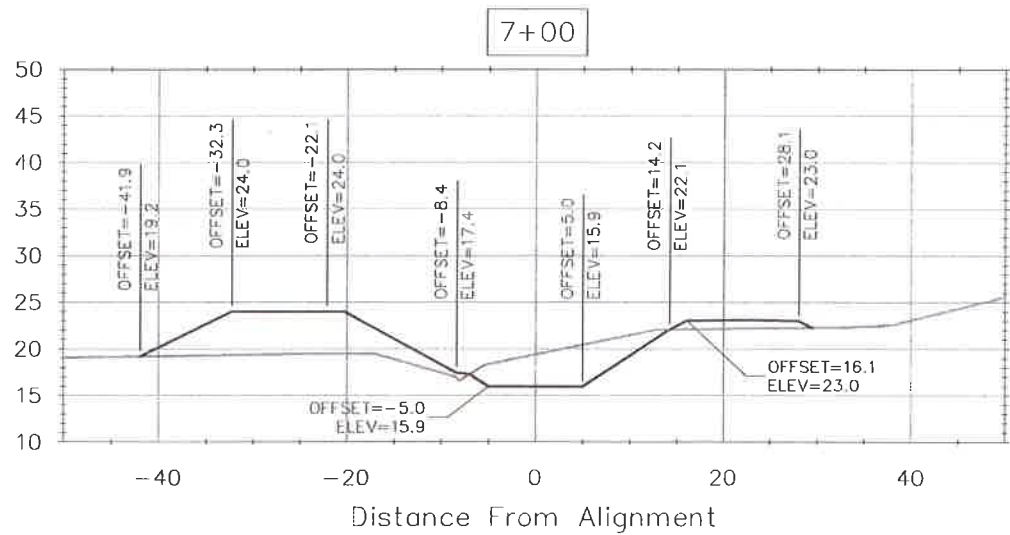
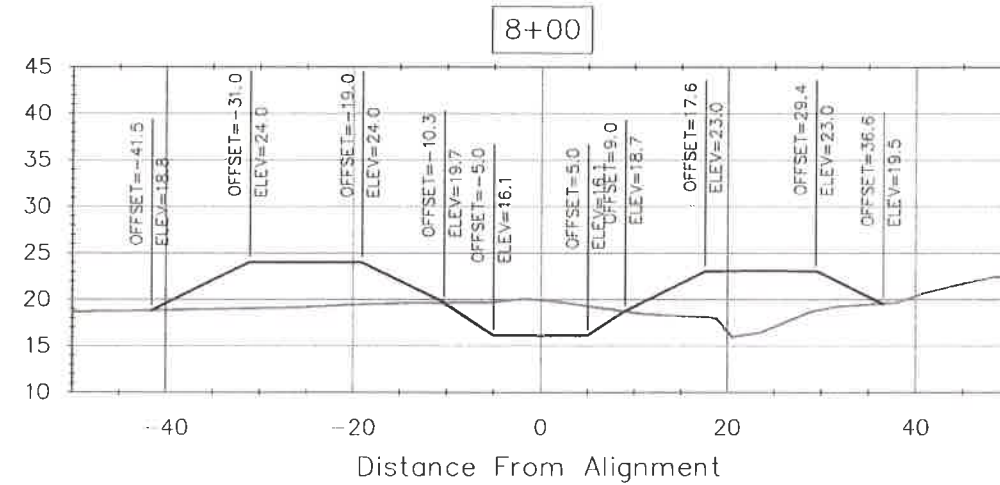
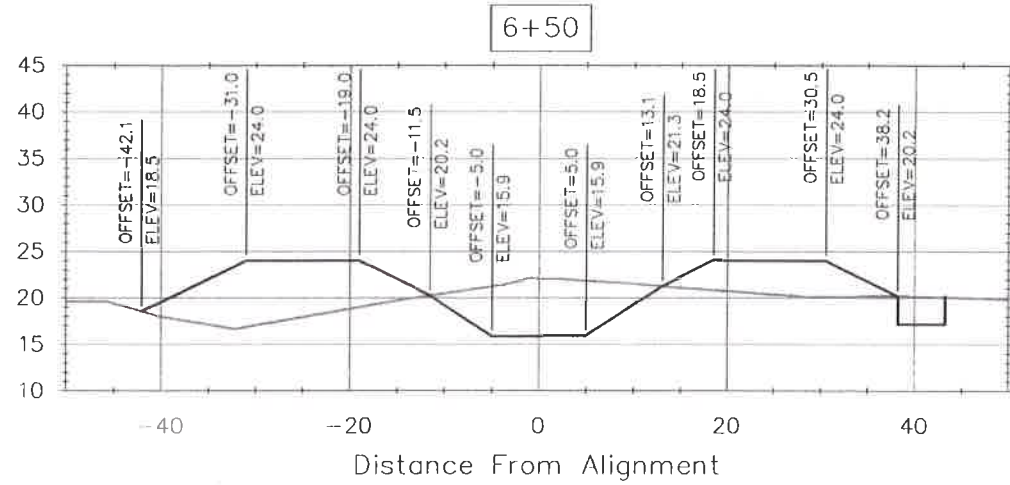


SEE SHEET AB-1
FOR AS-BUILT
CROSS SECTIONS



AS-BUILT
Date: Nov 7, 2014

- Notes:
1. All cross sections are oriented looking up-station.
 2. Existing Ground elevation may vary from shown after grubbing. Offsets and elevations will vary with grubbing depth.

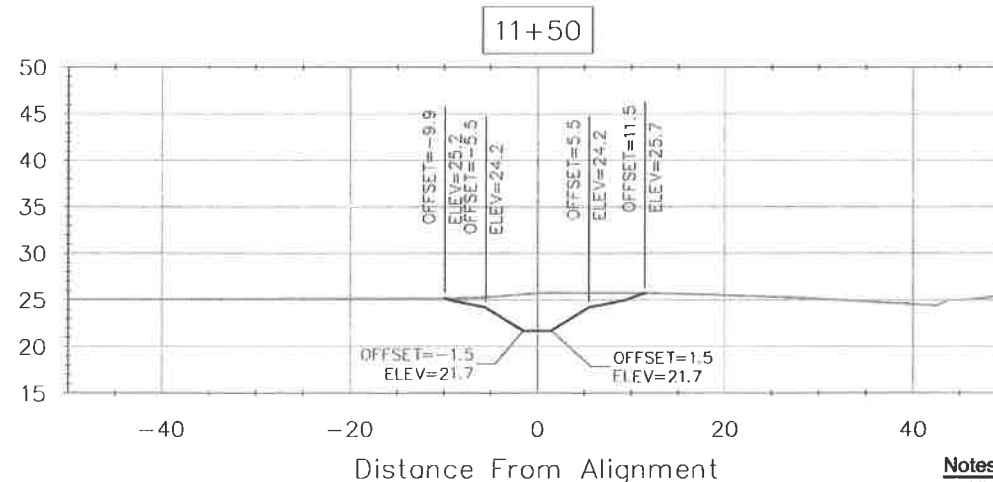
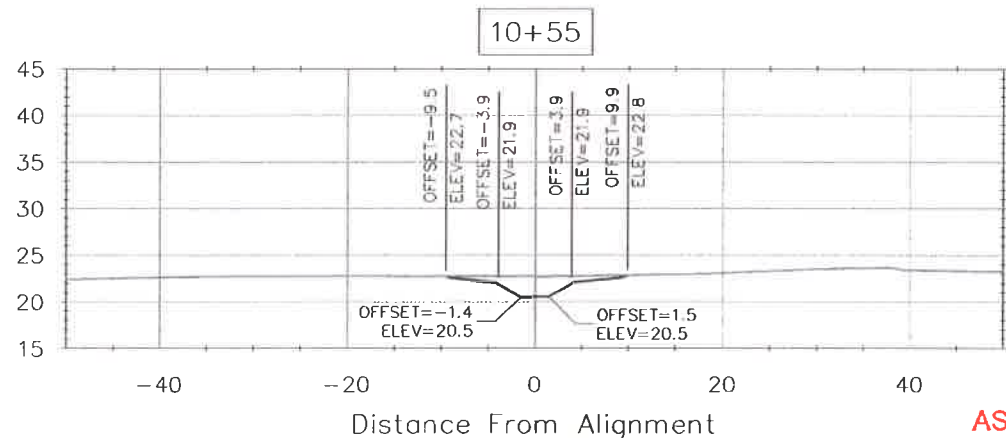
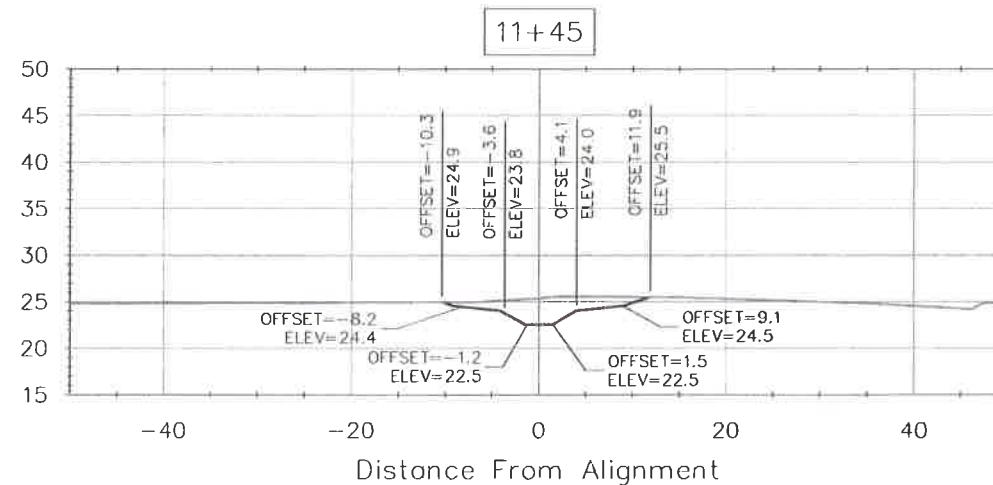
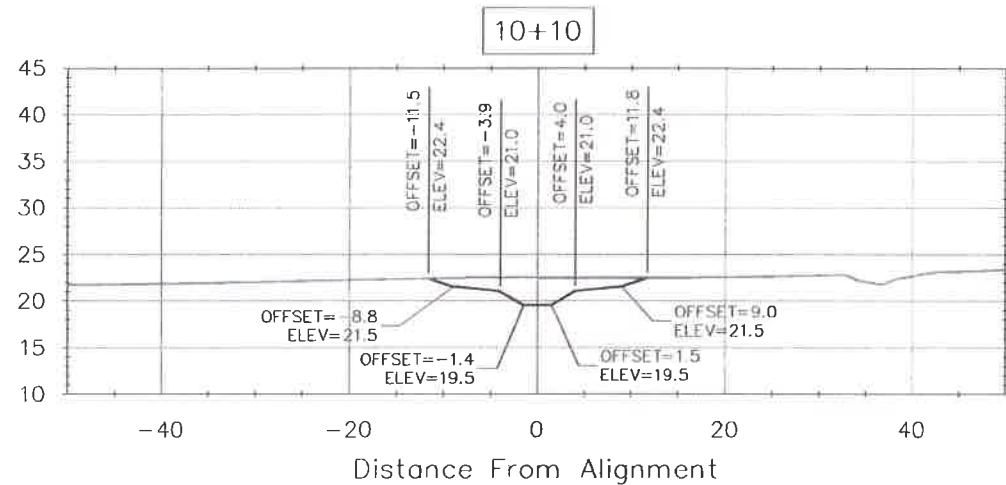
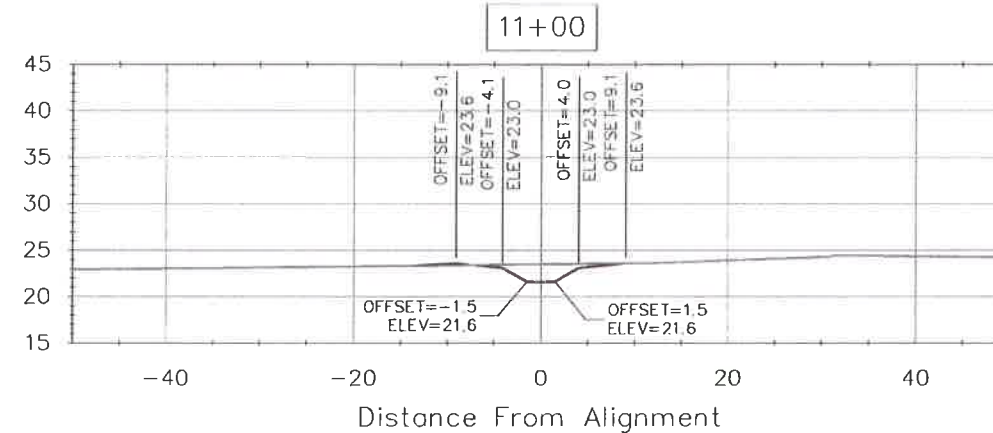
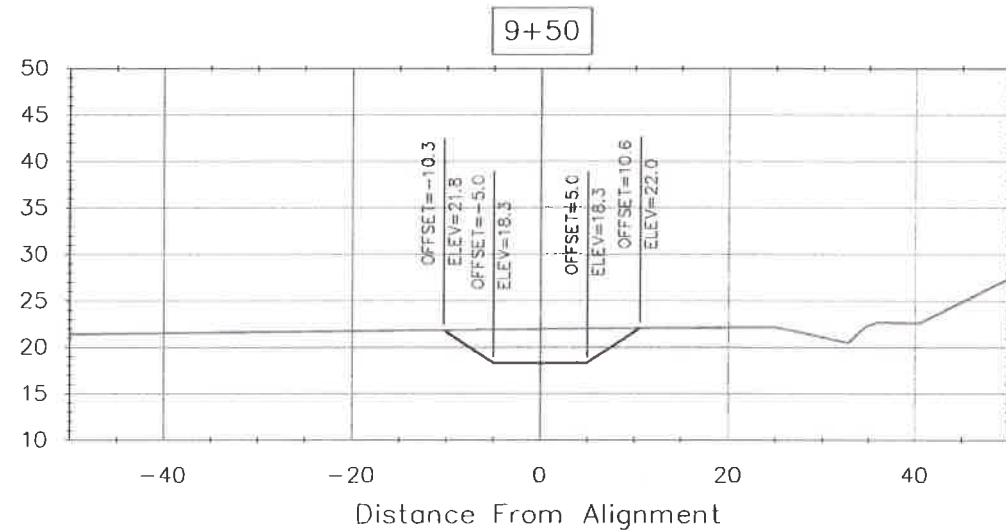


SEE SHEET AB-1
FOR AS-BUILT
CROSS SECTIONS



AS-BUILT
Date: Nov 7, 2014

- Notes:
1. All cross sections are oriented looking up-station.
 2. Existing Ground elevation may vary from shown after grubbing. Offsets and elevations will vary with grubbing depth.
 3. Grubbing within Riparian Buffer not shown.



SEE SHEET AB-1
FOR AS-BUILT
CROSS SECTIONS



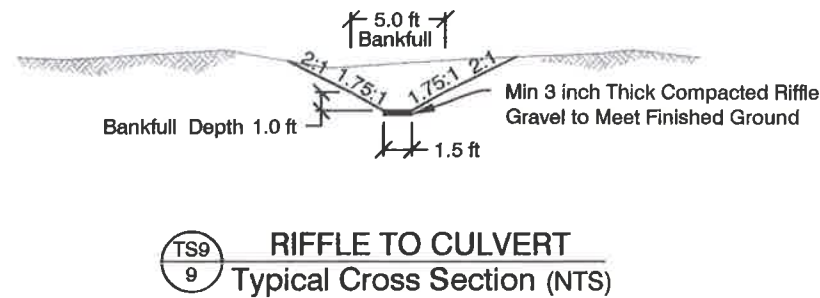
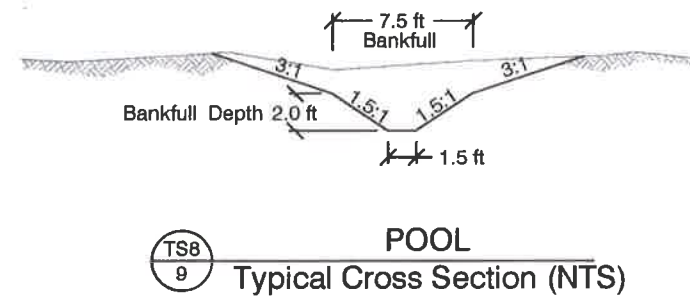
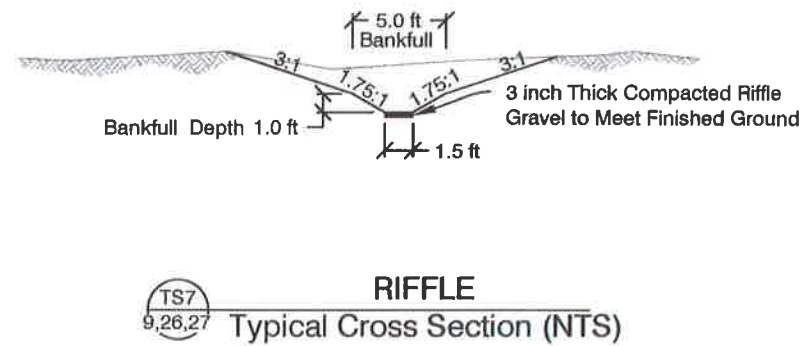
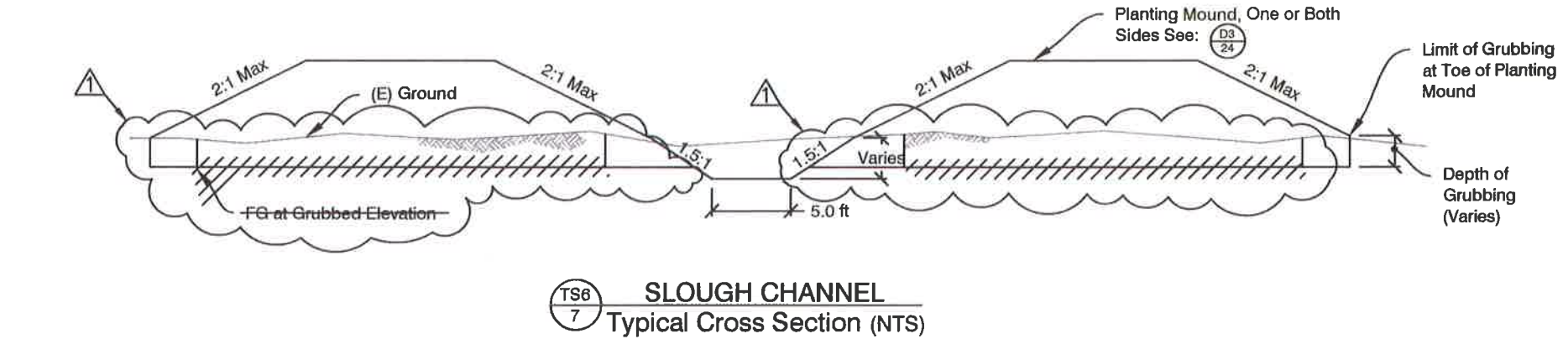
- Notes:
1. All cross sections are oriented looking up-station.
 2. Existing Ground elevation may vary from shown after grubbing. Offsets and elevations will vary with grubbing depth.
 3. Grubbing within Riparian Buffer not shown.

AS-BUILT
Date: Nov 7, 2014

TABLE OF TYPICAL CROSS SECTION APPLICATION
ALONG WEST FORK TRIBUTARY ALIGNMENT

Station	to	Station	Applied Cross Section
0+20	to	2+05	(TS6) Slough Channel
2+05	to	2+48	(TS10/22) New Culvert
2+48	to	2+56	(TS9) Riffle to Culvert
2+56	to	--	(D6/27) Rock Weir
2+59	to	2+66	(TS8) Pool
2+66	to	--	(D6/27) Log Weir
2+66	to	2+76	(TS9) Riffle
2+79	to	2+86	(TS8) Pool
2+86	to	--	(D5/26) Log Step
2+86	to	2+96	(TS9) Riffle
2+99	to	3+06	(TS8) Pool
3+06	to	--	(D5/26) Log Step
3+06	to	3+16	(TS9) Riffle
3+19	to	3+26	(TS8) Pool
3+26	to	--	(D6/27) Log Weir
3+26	to	3+36	(TS9) Riffle
3+39	to	3+46	(TS8) Pool
3+46	to	--	(D5/26) Log Step
3+46	to	3+56	(TS9) Riffle
3+59	to	3+66	(TS8) Pool
3+66	to	--	(D5/26) Log Step
3+66	to	3+76	(TS9) Riffle
3+79	to	3+86	(TS8) Pool
3+86	to	--	(D6/27) Log Weir

- Notes:
1. All cross sections are oriented looking up-station.
 2. At stations where Typical Sections are not defined transition gradually between defined sections upstream and downstream.
 3. See Sheets 20 to 21 for detailed Grading Cross Sections.
 4. Grubbing not required up-stream of the West Tributary Culvert.



NOT CONSTRUCTED
NOV 7, 2014



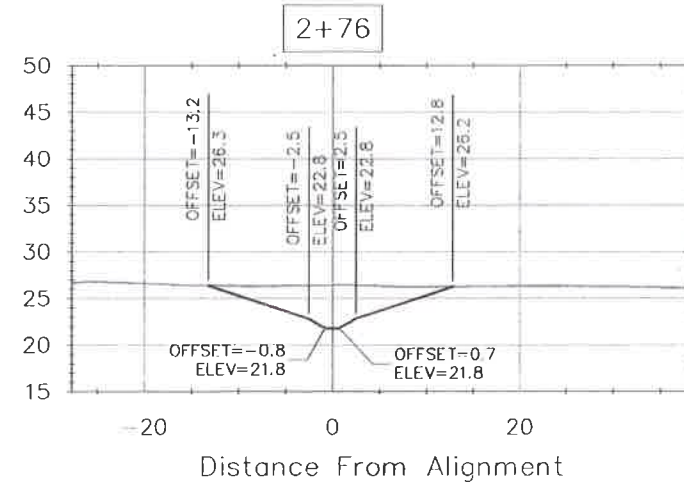
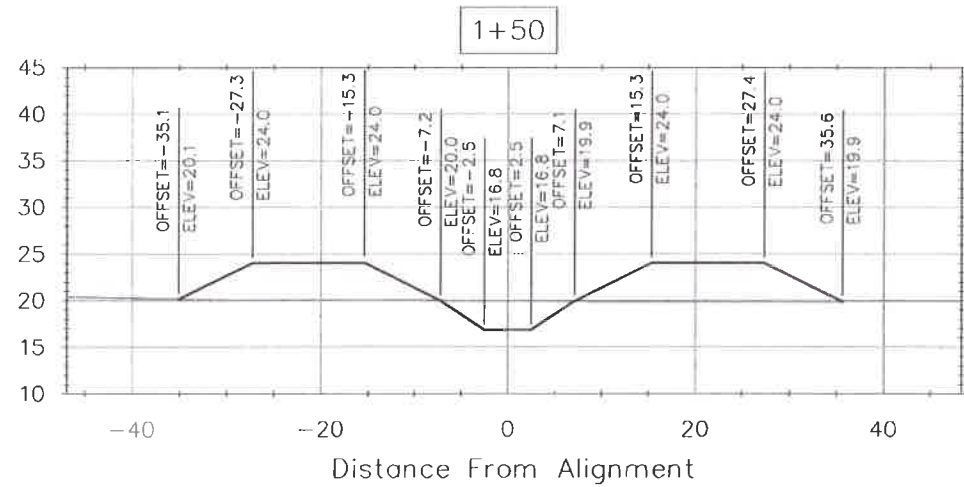
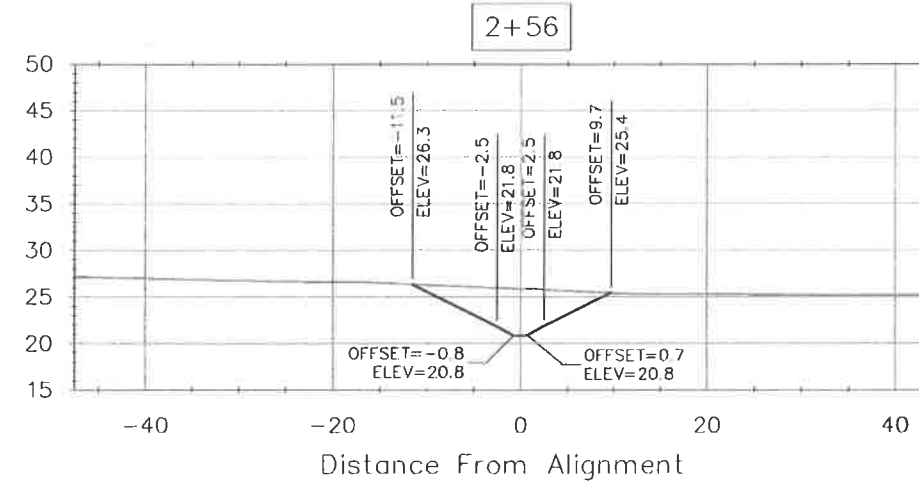
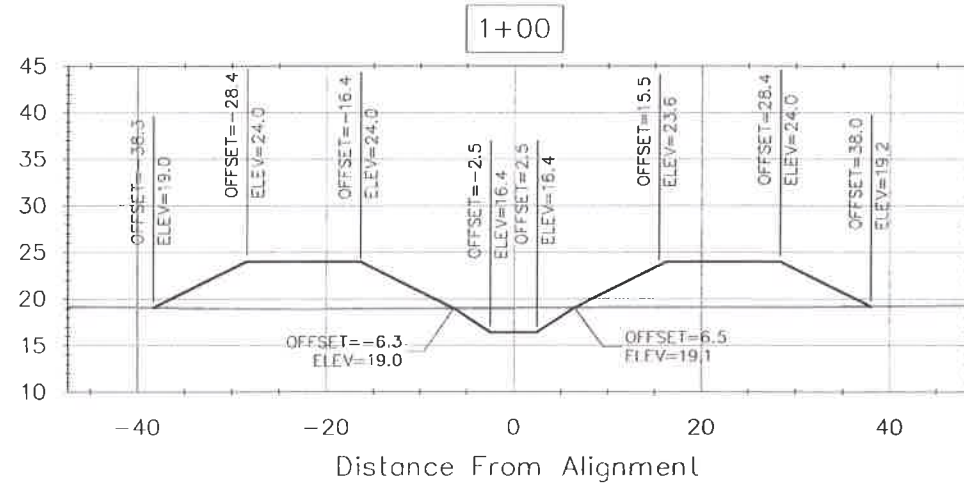
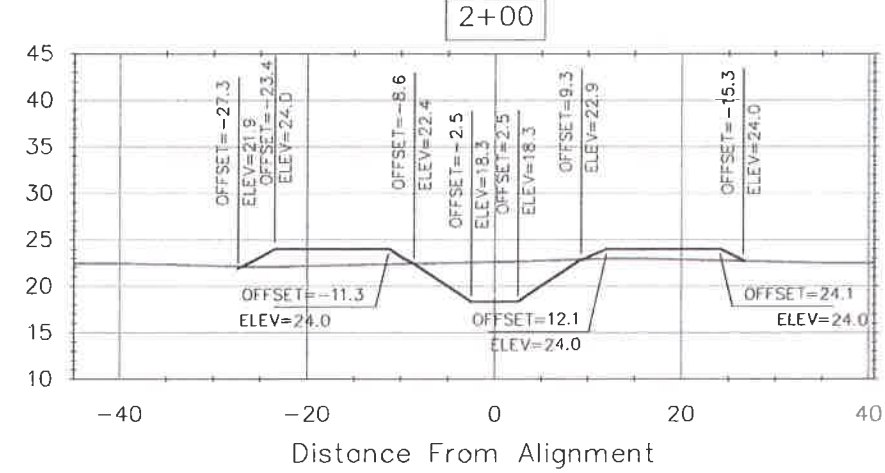
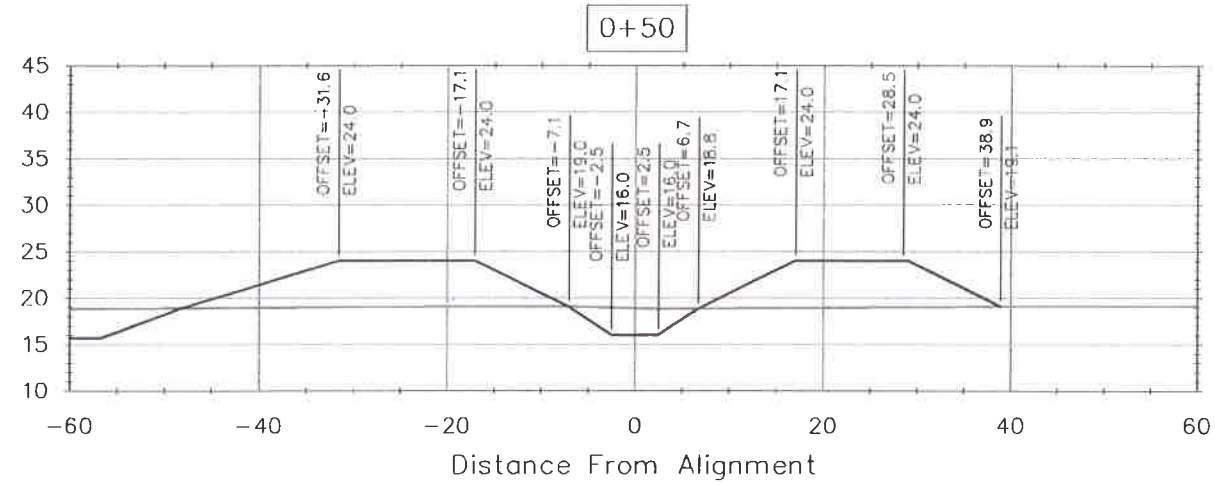
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REVISIONS:
4/11/2014

REDWOOD NATIONAL PARK
Strawberry Creek
Restoration Project

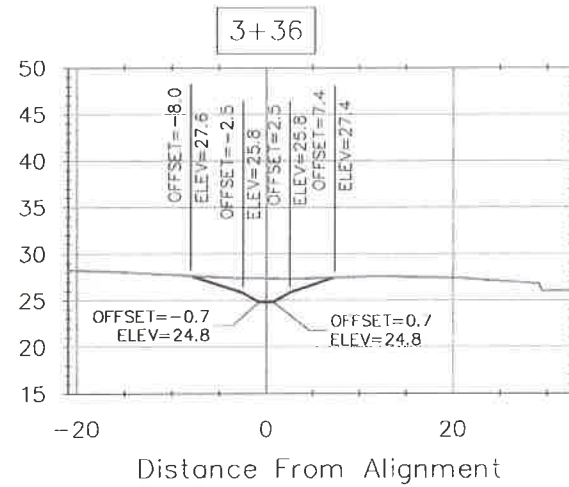
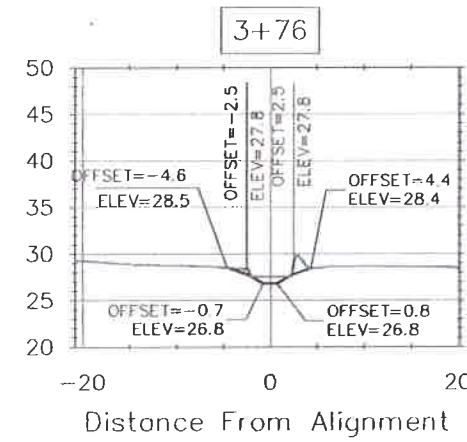
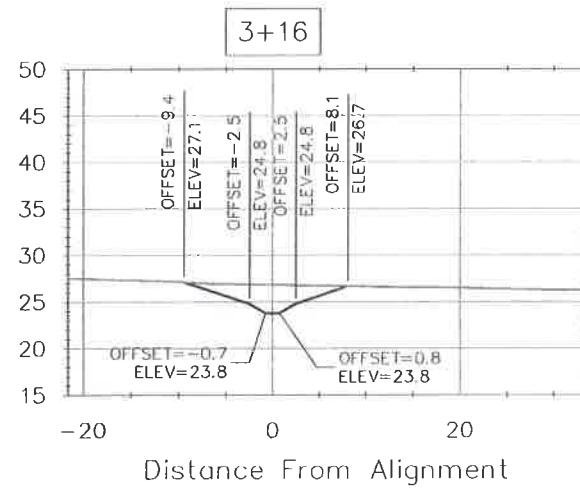
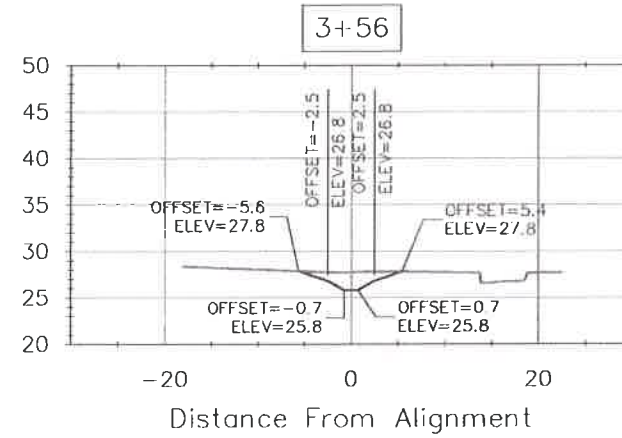
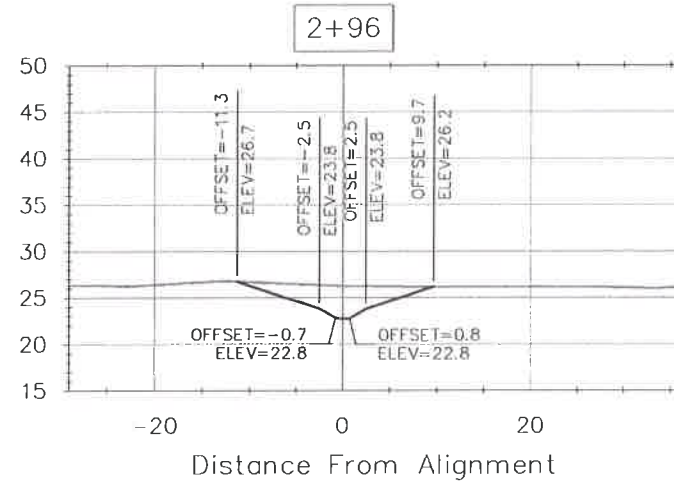
WEST FORK TRIBUTARY
TYPICAL CROSS SECTIONS

DATE: March 2012
SUBMITTAL: FINAL
DESIGN: ML / RS / AL
DRAWN: Llanos
SHEET:



NOT CONSTRUCTED
NOV 7, 2014

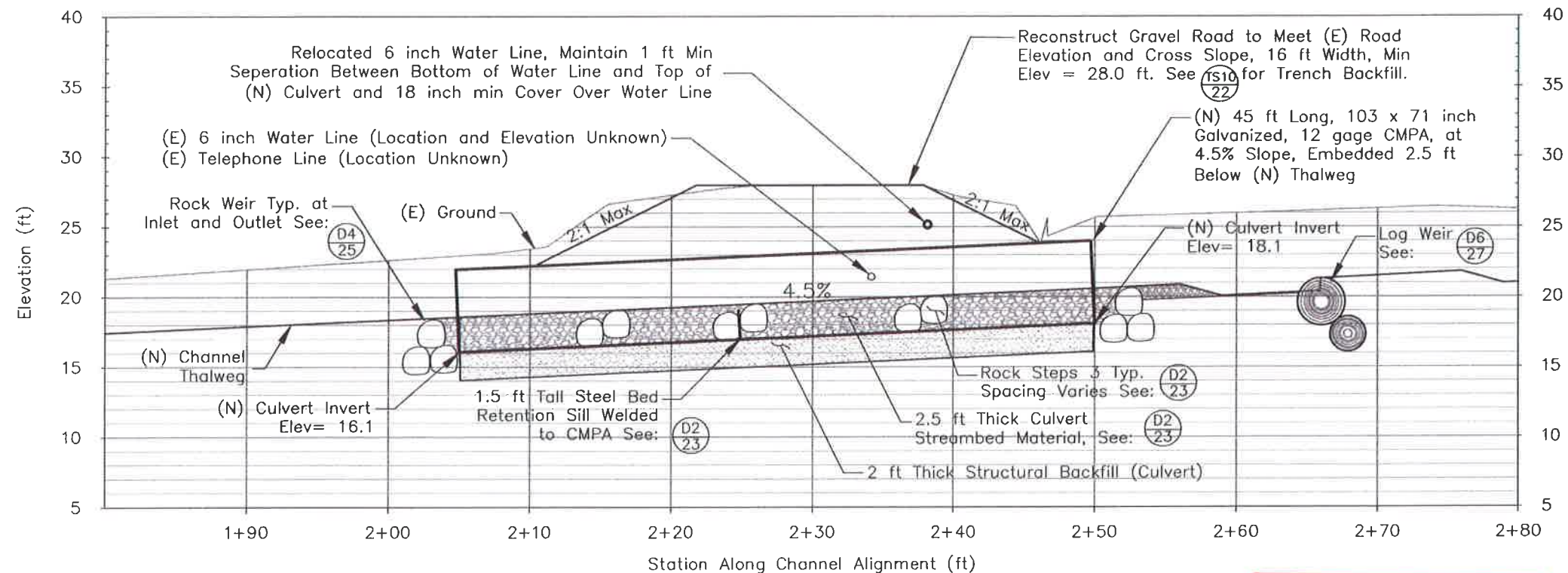




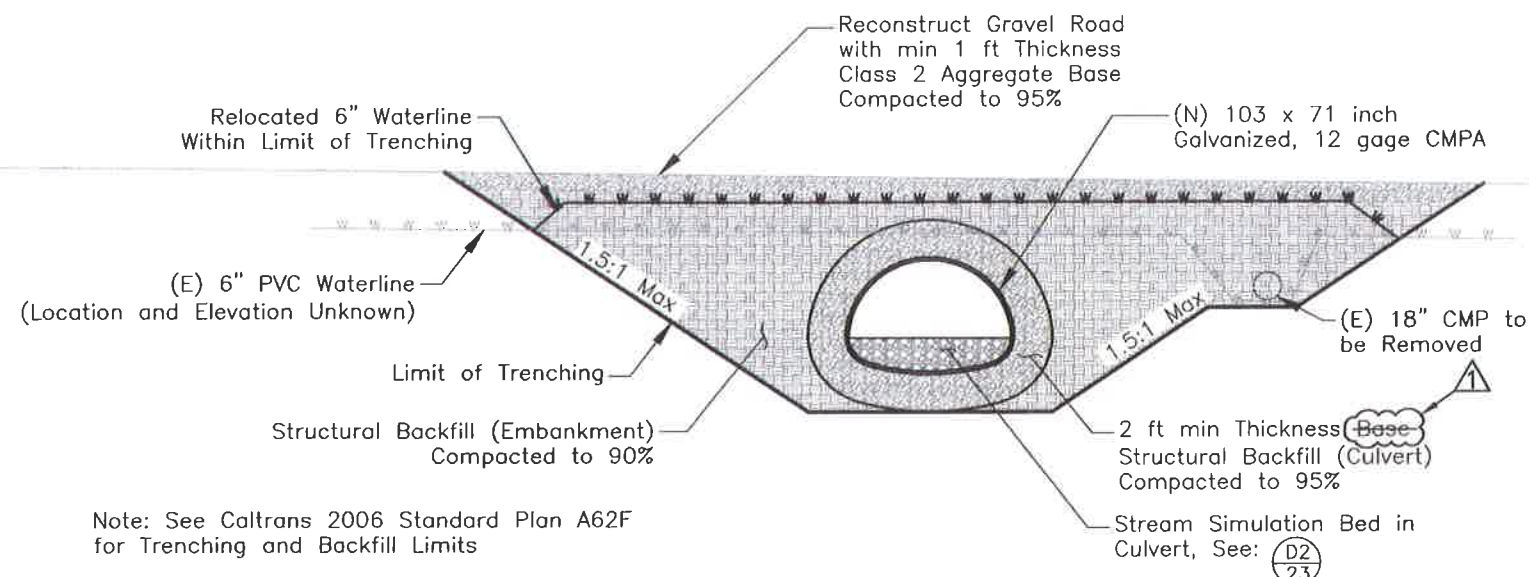
NOT CONSTRUCTED
NOV 7, 2014



- Notes:
1. All cross sections are oriented looking up-station.
 2. Existing Ground elevation may vary from shown after grubbing. Offsets and elevations will vary with grubbing depth.



WEST FORK TRIBUTARY CULVERT
Detail Profile



WEST FORK TRIBUTARY CULVERT
Typical Section (NTS)



West Fork Tributary Culvert Replacement Specifications

Material Specifications

1. Structural Backfill (Culvert) shall conform to Section 19-3.06 of Caltrans, 2006. Shall have no less than 20% sand, and shall conform to the following gradation:

Sieve Size	Percent Passing
3"	100%
No. 4	35-100%
No. 30	20-100%

2. Structural Backfill (Embankment) shall conform to Section 19-3.06 for backfill material to be compacted to a relative compaction of no less than 90%.
3. Suitable salvaged materials for Structural Backfill (Embankment) shall be separated and stockpiled for re-use.

Installation Specifications

1. Installation of the West Fork Tributary Culvert replacement shall be installed as specified in the contract documents and in accordance with Section 19 of Caltrans 2006.
2. During Structural Excavation, suitable materials shall be separated and stockpiled for re-use as structural backfill (Embankment).
3. Structural Backfill (Culvert) shall be compacted to a relative compaction of no less than 95%.
4. Structural Backfill (Embankment) shall be compacted to a relative compaction of no less than 90%.

Temporary and Permanent Re-Routing of Existing Water Line

Material Specifications

1. Materials and work shall conform to ASTM, American Water Works, Chapter 16 Article 4 of the Title 22 of the California Code of Regulations (2010), and other relevant standards. All methods and materials shall be approved by the Orick Community Services district prior to installation.
2. All temporary pipe material shall be Schedule 80 PVC, HDPE, or steel pipe.
3. Bedding and backfill material for pipelines shall consist of Class 3 1/2 inch max Class 2 Aggregate Base as specified in Section 25 of Caltrans, 2006.

Installation Specifications

1. Contractor shall maintain an in-service water supply line to SOC buildings during the project. If continuous water service to the work area will be interrupted during portions of the work, the Contractor shall notify the Owner a minimum of one week in advance of anticipated water shutdowns. The maximum duration for a water shutdown is eight (8) hours.
2. Contractor shall be responsible for verifying pipe sizes, particularly the Outside Diameter (O.D.) of all pipes at connection points, to ensure that commonly available coupling hardware and gaskets will accommodate the existing pipes PRIOR to cutting into any pipe.
3. Water main and service pipe shall be installed in conformance with AWWA C600, and pipe manufacturer's recommendation.
4. All pipe shall be centered in the trench and laid on compacted bedding.
5. Water main and service pipe ends and service hardware shall be thoroughly cleaned before the pipe is joined. Whenever work ceases for any reason, all exposed pipe ends and hardware shall be closed with a watertight fitting, plug, or cover. The interior of the pipe shall be kept free from dirt and debris as the work progresses.
6. Pressure and bacteria testing and disinfection of new water mains and services shall be successfully performed in accordance with AWWA C600 and C651 and accepted by the Owner prior to placing the new pipeline and services into service.
7. Bedding and backfill shall be installed a minimum thickness of 1-foot completely surrounding the pipe and compacted to 95%.

Specification for Culvert Streambed Material

Material Specifications

1. Culvert Streambed Material shall meet the following gradations and shall be approved by Owner prior to Installation:
- a. 2/3 by weight Riffle Gravel, as specified in the Contract Documents
- b. 1/3 by weight 4 to 6 inch diameter angular rock

Installation Specifications

1. Culvert Streambed Material shall be installed as specified on the Contract Documents and where directed by the Owner.
2. Culvert Streambed Material shall be uniformly mixed and installed such that it does not segregate during installation.
3. Fill voids with smaller material and compact using construction equipment and flooding to obtain a compact, low-permeability mass.
4. After installation, material shall be flooded and further compacted. Continue flooding and compacting until voids are filled and water remains flowing on the surface across the entire length of the installed material.
5. No water used during the flooding process shall be allowed to discharge into the live stream, but may be reused.
6. Fine material washed downstream resulting from flooding shall be fully removed prior to releasing streamflow into project area.

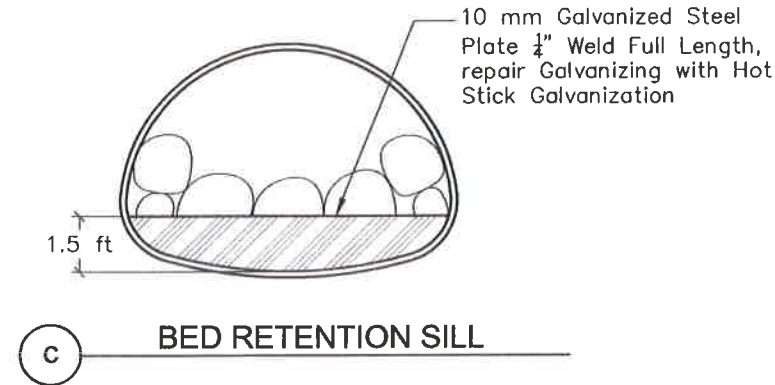
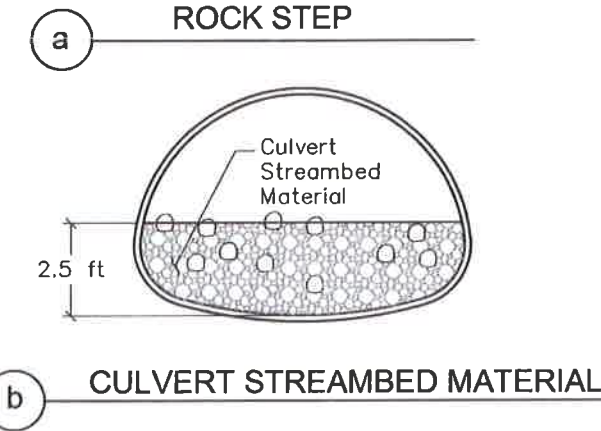
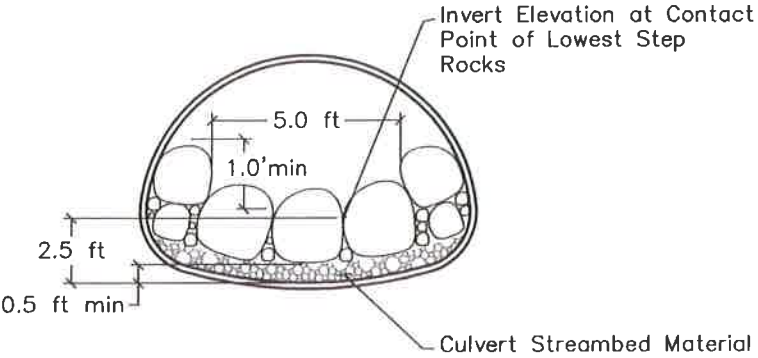
Specification for Rock Steps in Culvert

Material Specifications

1. Rock Step rock shall meet gradations as follows:
- a. 1/4 Ton RSP
2. All rock diameters (D) are measured along the intermediate axis. The least dimension (minor axis) of an individual rock fragment shall not be less than one-third the greatest dimension of the fragment.

Installation Specifications

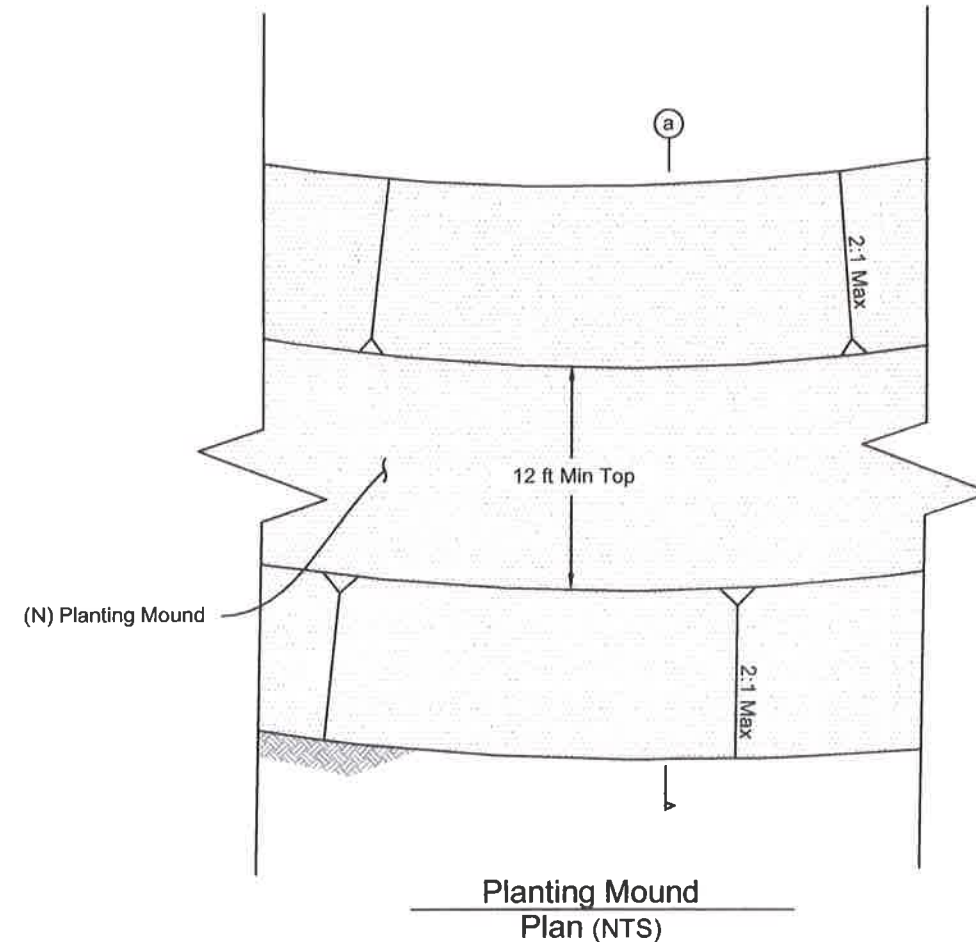
1. Rock Steps shall be installed as specified on the Contract Documents, and where directed by the Owner.
2. Rock shall be placed in accordance with Caltrans, 2006 Section 72 and using "Method A" placement as specified in Caltrans, 2006 Section 72-2.03. No filter cloth shall be installed.
3. All large rock shall be placed individually and secured by machine tamping. Rocks shall have a minimum of four contact points and be securely supported. Rocks shall not be cabled together.
4. Invert elevation of Rock Steps shall be measured at contact point between two lowest step rocks.
5. Crests of rocks shall not protrude more than 0.75 feet beyond finished grade.
6. Footer rocks shall be installed downstream of each Step rock.
7. Where bed retention sill is specified, the footer rock shall be installed downstream of the bed retention sill.



D2
22 Culvert Stream Simulation Channel
Typical Cross Section (NTS)

NOT CONSTRUCTED
NOV 7, 2014





Planting Mound Specification

Material Specifications

- Salvaged Soil shall be soil salvaged from project-related excavation activities. Manmade materials excavated will be considered unsuitable and will become the property of the contractor for offsite disposal. Grubbed Material is considered unsuitable. Other organic material will be considered suitable for use. Excavated material may require dewatering before use.
- Imported Borrow shall conform to Section 19-7 of Caltrans, 2006 and consist of a natural sand or gravel, with no individual fragments larger than 3 inches in diameter, no manmade materials, and a minimum of organic materials. After installation, the material shall remain permeable. Imported Borrow shall be approved by the Owner at the point of origin.

Installation Specifications

- Planting Mounds shall be installed as specified on the Contract Documents, and where directed by the Owner.
- Invasive grasses within the footprint 3 ft of the edge of the Planting Mounds shall be grubbed to fully remove grass roots, as directed by Owner.
- Contractor shall place Imported Borrow within the footprint of Planting Mounds for construction access. Placement of temporary Imported Borrow or salvaged soil outside the limit of the Planting Mounds is acceptable if the material is fully underlain by a material that protects wetland vegetation and if all materials are fully removed at the completion of work.
- Before placement of salvaged soil, the top surface of the Imported Borrow shall be constructed to the elevation specified.
- Place and lightly compact Salvaged Soil to meet finished grade on the Planting Mounds. Reworking of the soil after dewatering may be necessary to meet finished grade. Once soil is placed, area of placement shall not be used for construction equipment access.
- Mound top width and elevation may vary ± 0.5 ft or as directed by Owner.



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PROJECT MANAGEMENT: Pacific Coast Fish, Wildlife and Wetlands Restoration Assoc.

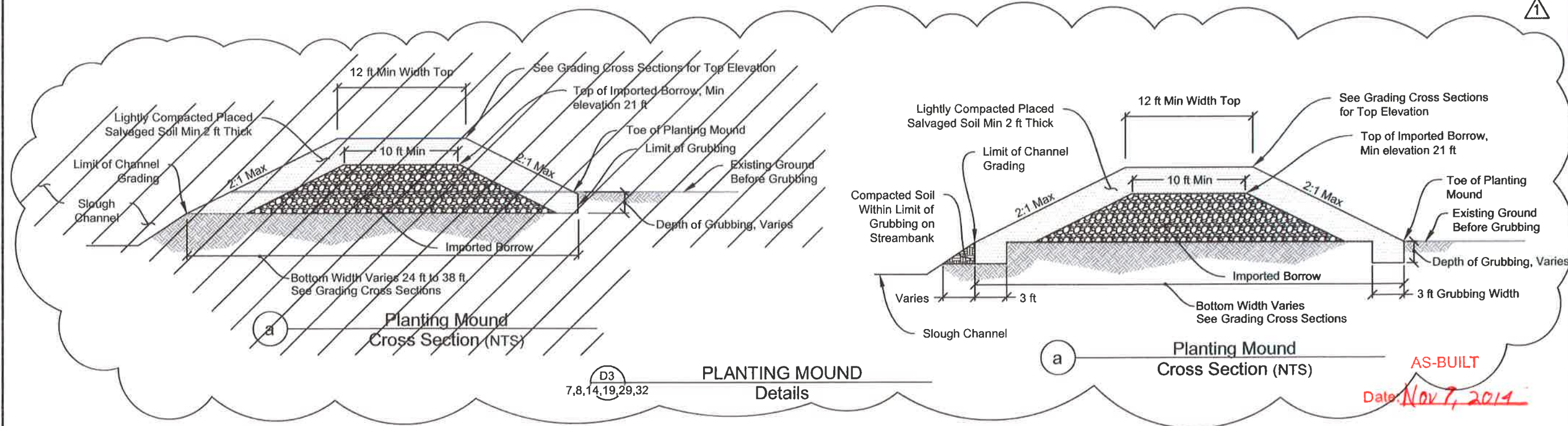
REVISIONS:
4/11/2014

REDWOOD NATIONAL PARK
Strawberry Creek
Restoration Project

PLANTING MOUND
DETAILS

DATE
March 2012
SUBMITTAL
FINAL
DESIGN
ML / RS / AL
DRAWN
Llanos
SHEET

24 of 33



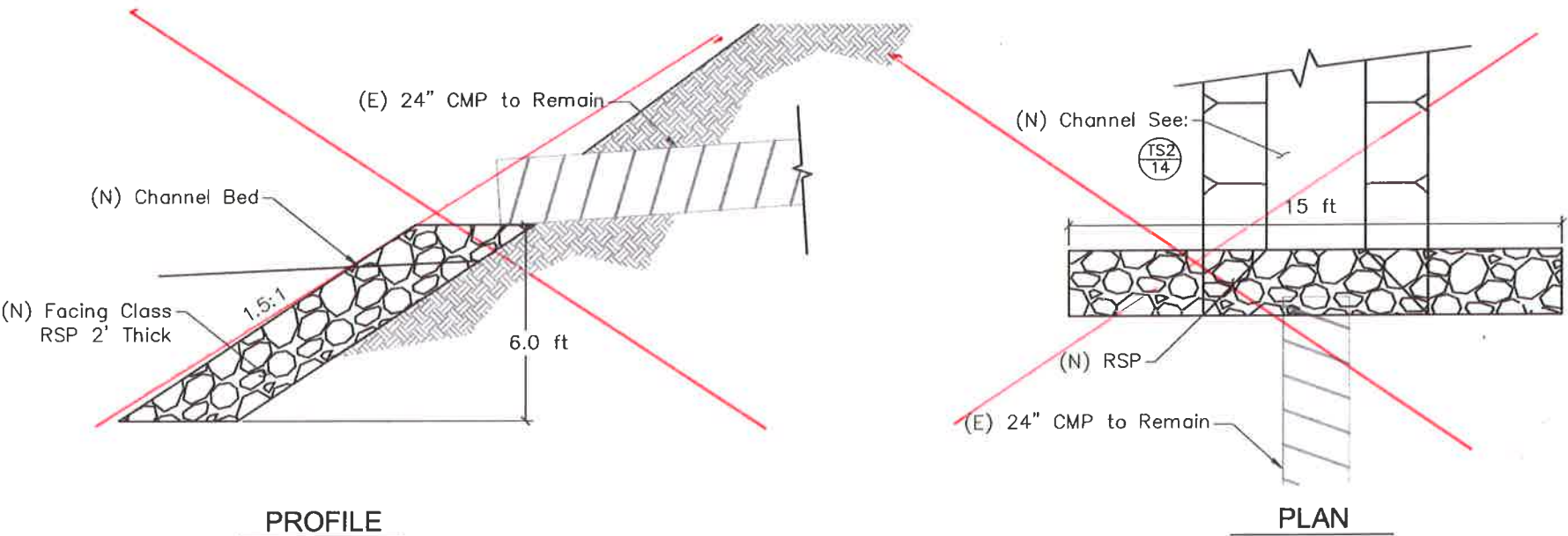
Specification for Rock Slope Protection (RSP)

Material Specifications

- 1. Rock shall be Caltrans (2006) Facing Class.
- 2. Rock shall be placed in accordance with Caltrans, 2006 Section 72 and using "Method A" placement as specified in Caltrans, 2006. No RSP Fabric shall be installed.

Installation Specifications

- 1. RSP shall be installed where specified.
- 2. Install RSP as specified to the line and grade specified on the construction documents.
- 3. All large rock shall be placed individually and secured by machine tamping. Rocks shall have a minimum of four contact points and be securely supported.
- 4. Rocks shall be placed in one-foot lifts and soil placed to fill the voids between rocks. Soil shall be placed to not hinder rock-to-rock contacts.
- 5. Place smaller rocks and salvaged streambed material to fill voids between larger rocks.



PROFILE

PLAN

Specification for Rock Weirs

Material Specifications

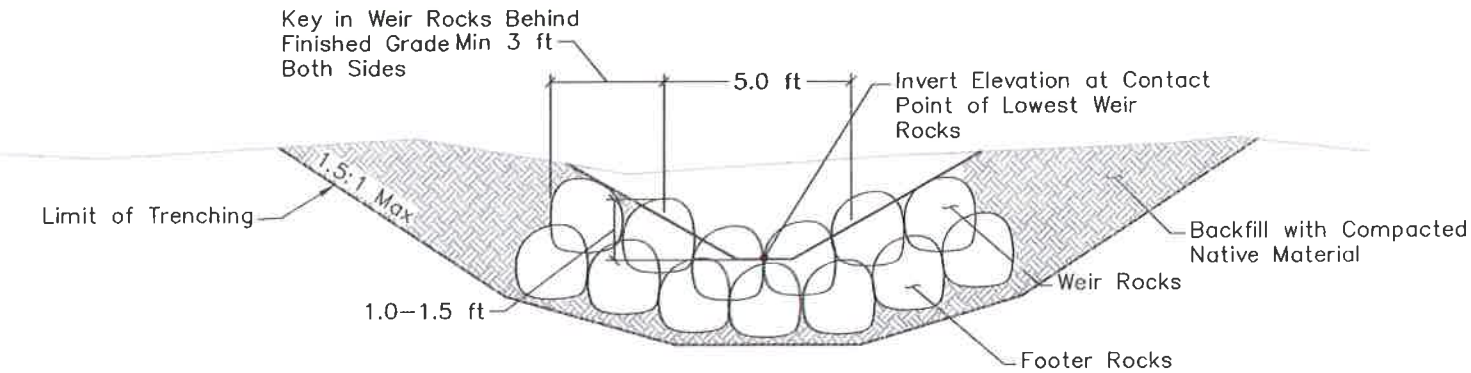
- 1. Rock Weir rock shall meet gradations as follows:
 - a. 1/4 Ton RSP
 - b. Riffle Gravel Shall be as specified in the Contract documents
- 2. All rock diameters (D) are measured along the intermediate axis. The least dimension (minor axis) of an individual rock fragment shall not be less than one-third the greatest dimension of the fragment.

Installation Specifications

- 1. Rock weirs shall be installed as specified on the Contract Documents, and where directed by the Owner.
- 2. Excavate trench to the specified minimum depth for the entire Rock Weir length.
- 3. Rock shall be placed in accordance with Caltrans, 2006 Section 72 and using "Method A" placement as specified in Caltrans, 2006 Section 72-2.03. No filter cloth shall be installed.
- 4. All large rock shall be placed individually and secured by machine tamping. Rocks shall have a minimum of four contact points and be securely supported.
- 5. Invert elevation of Rock Weirs shall be measured at contact point between two lowest Weir Rocks.
- 6. Crests of rocks shall not protrude more than 0.75 feet beyond finished grade. Rocks shall not be cabled together.
- 7. Fill voids with smaller material to obtain a compact, low-permeability mass.
- 8. Backfill channel bottom with compacted Riffle Gravel.
- 9. Backfill streambanks with compacted native material.

REPLACED WITH ROCK WEIR
AND 2 LOG V-WEIRS

D10 8 RSP CULVERT OUTLET DETAIL (NTS)

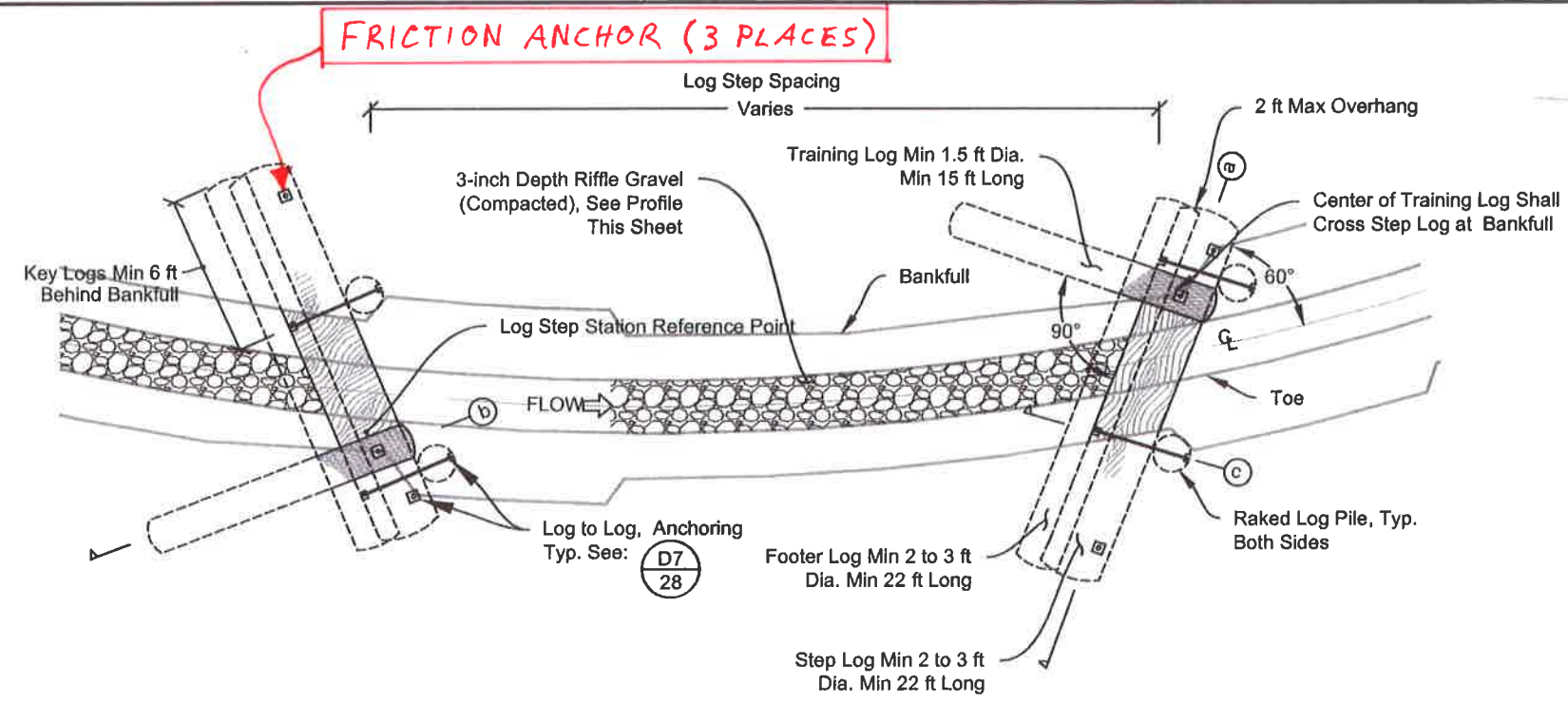


D4 9,22 ROCK WEIR Typical Cross Section (NTS)

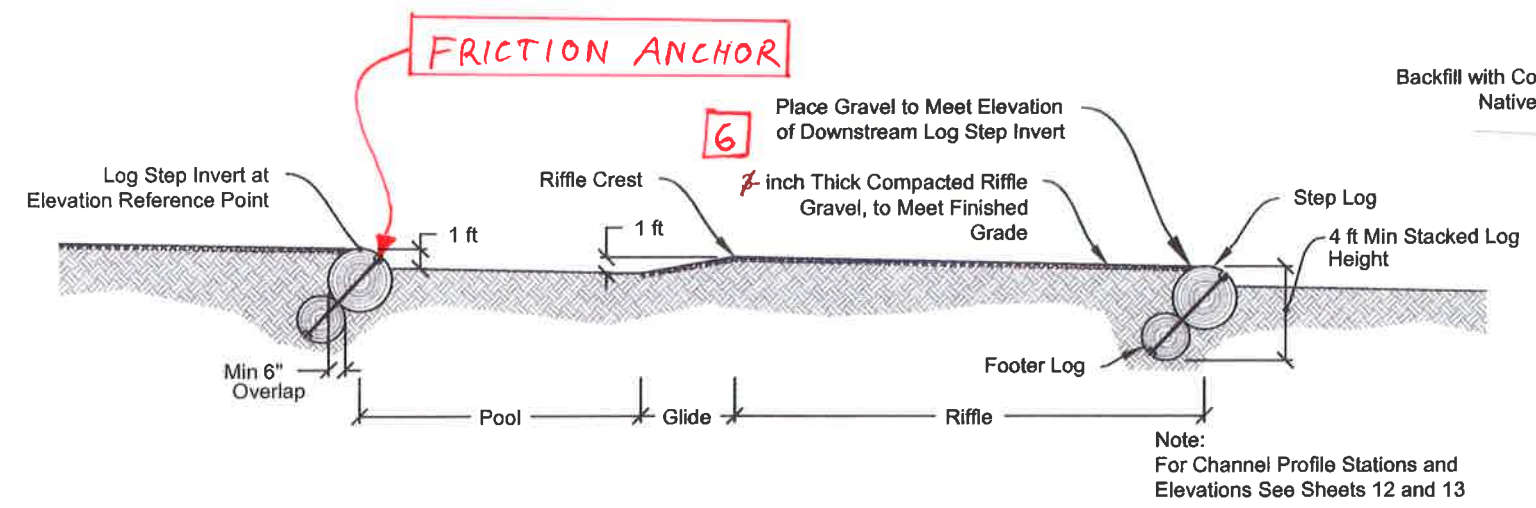
AS-BUILT

Date: Nov 7, 2014



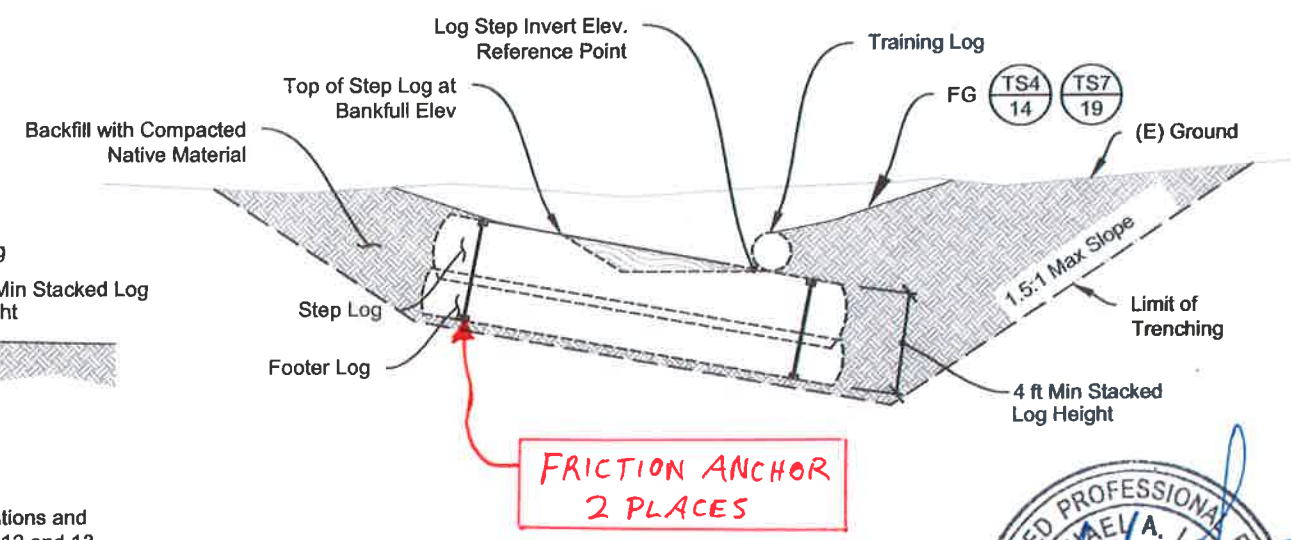
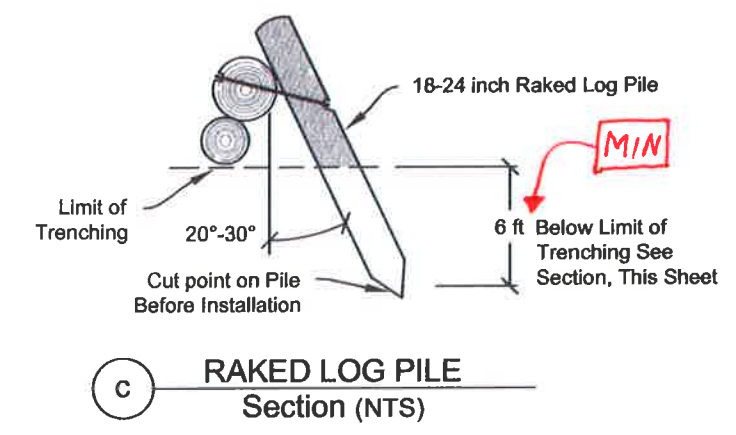
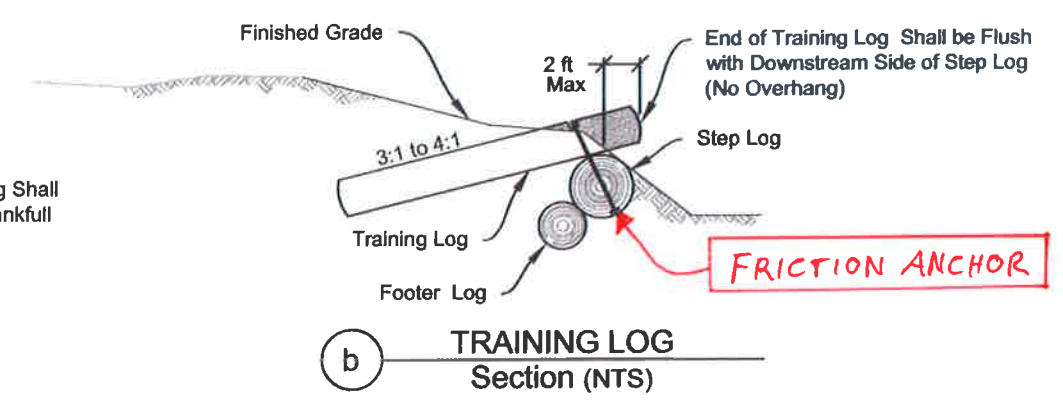


LOG STEP POOL
Plan (NTS)



LOG STEP POOL
Profile Through Log Step Invert (NTS)

(D5) LOG STEP POOL
8,9,19,12,13,14 Details



AS-BUILT
Date: Nov 7, 2014

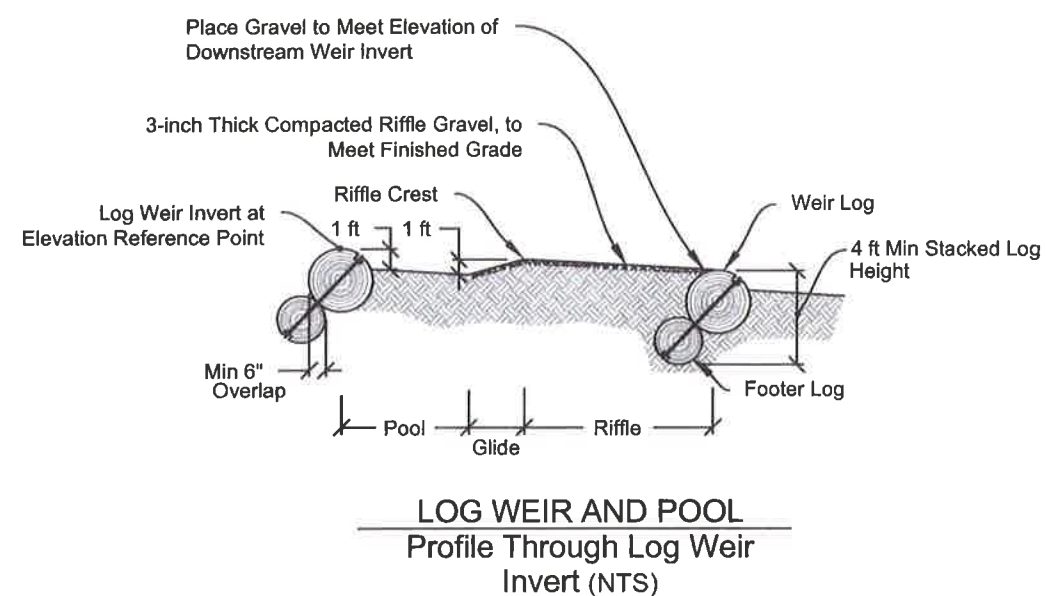
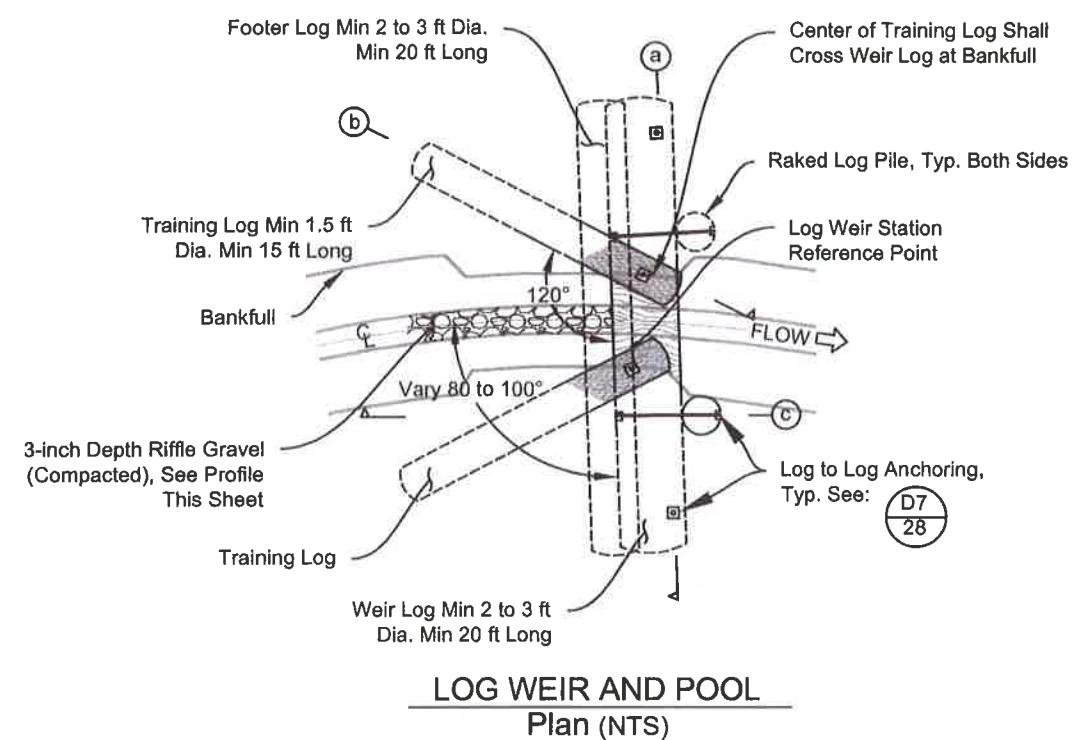


REVISIONS:
4/11/2014

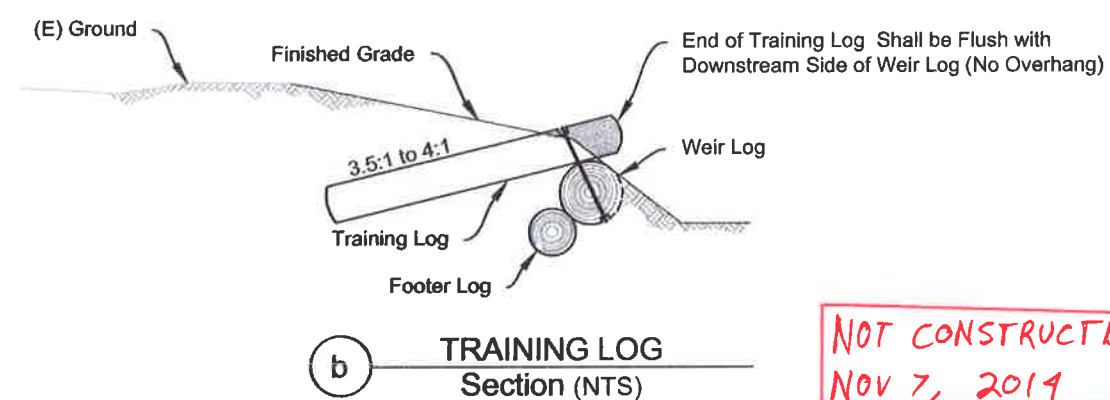
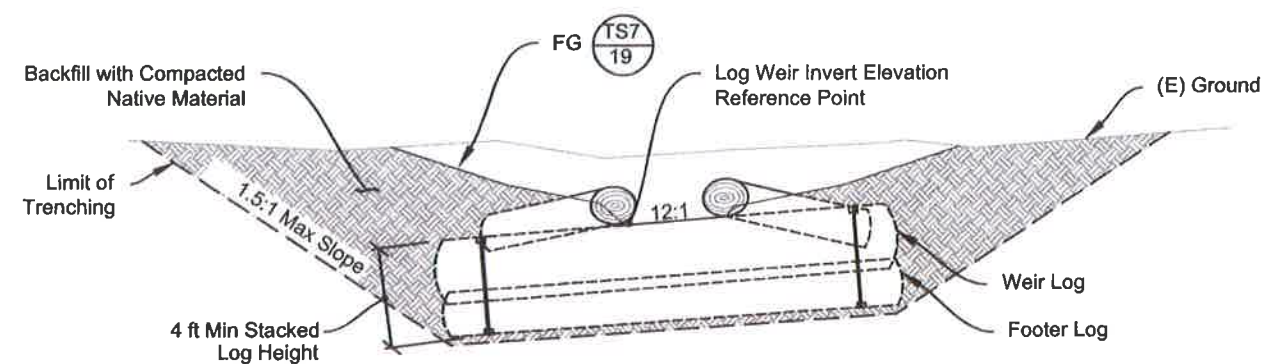
REDWOOD NATIONAL PARK
Strawberry Creek
Restoration Project

LOG STEP POOL
DETAILS

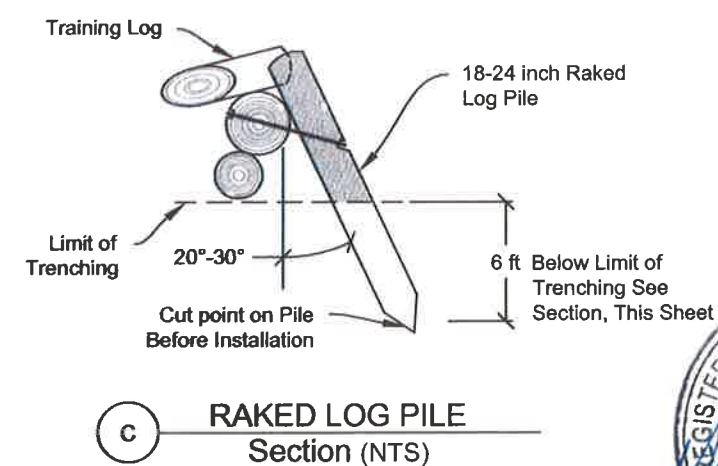
DATE	March 2012
SUBMITTAL	FINAL
DESIGN	ML / RS / AL
DRAWN	Llanos
SHEET	



Note:
For Channel Profile Stations and
Elevations See Sheet 13



NOT CONSTRUCTED
NOV 7, 2014



Specification for Log Steps and Log Weirs

Material Specifications

- 1. Contractor shall use logs provided on site. Logs shall not be cut unless at the direction of the Owner.
- 2. Logs shall meet the dimensions specified in the Contract Documents. Log length shall not be accomplished with joining of multiple logs.
- 3. Pile Logs shall have bark removed.
- 4. Anchoring shall conform to Contract Documents.

Installation Specifications

- 1. Log Step and Log Weirs shall be installed as specified on the Contract Documents, and where directed by the Owner.
- 2. Excavate trench to the specified minimum depth for the entire structure.
- 3. Install logs such that the top of the Step or Weir Log forms the channel invert at the specified station, elevation, and location on the channel cross section.
- 4. The stacked log height shall be a minimum of 4 feet, measured vertically.
- 5. All logs shall be anchored where specified.
- 6. Cut point on tip of Pile Log and drive Pile Logs the specified length into the undisturbed subgrade at the specified pitch. Cut top of pile below finished grade.
- 7. Auger pilot hole may be used to facilitate driving of Raked Pile Logs. Pilot hole shall be at least 8 inches smaller than the Raked Pile Log diameter to ensure adequate skin friction is obtained.
- 8. Backfill channel bottom with compacted Riffle Gravel.
- 9. Backfill streambanks with compacted native material. Backfill under training Logs shall be hand compacted to the satisfaction of the Owner.

Specification for Riffle Gravel

Material Specifications

- 1. Riffle Gravel shall be rounded gravels meeting the following gradations and shall be approved by Owner prior to Installation:
 - a. 80% to 95% finer than 2 inches
 - b. 40% to 60% finer than 0.5 inches
 - c. 5% to 15% finer than #10 Sieve

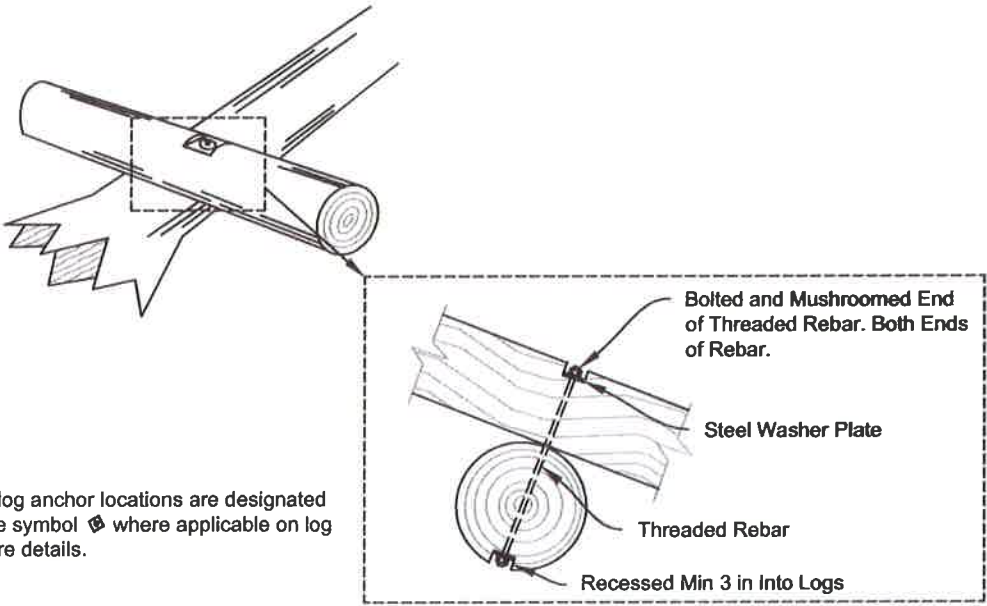
Installation Specifications

- 1. Riffle Gravel shall be installed as specified in the Contract Documents and where directed by the Owner.
- 2. Riffle Gravel shall be uniformly mixed and installed such that it does not stratify during installation. Do not contaminate the Riffle Gravel with soil.
- 3. Fill voids with smaller material and compact using vibratory methods to obtain a compact, low-permeability mass.
- 4. After installation, material shall be flooded and further compacted. Continue flooding and compacting until voids are filled and water remains flowing on the surface across the entire length of the installed material.
- 5. No water used during the flooding process shall be allowed to discharge into the live stream, but may be reused.
- 6. Fine material washed downstream resulting from flooding shall be fully removed prior to releasing streamflow into project area.

FRICTION
ANCHOR

AS-BUILT

Date: Nov 7, 2014



Note:
Log to log anchor locations are designated with the symbol  where applicable on log structure details.

D7
26,27,29,30
LOG TO LOG ANCHORING
Detail Elevation (NTS)

Specification for Anchoring Log Structures

Material Specifications

- 1. Log anchoring shall be in accordance with Contract Documents.
- 2. Threaded rebar, washer and nut shall be steel.
- 3. Threaded rebar shall be a minimum diameter of 1 inch with min 4-inch x 4-inch x 3/8 or 1/2 -inch thick steel washer plate with bolt.

Installation Specifications

- 1. Log Anchoring shall be installed as specified on the Contract Documents, and where directed by the Owner.
- 2. All logs shall be anchored where specified.
- 3. Rebar shall be inserted through the center of the log and bolted on both ends. Rebar, washer, and nut, shall be fully recessed within the log.
- 4. Anchor shall be located a minimum of 2 feet from the end of the log.
- 5. If a through-connection cannot be made with rebar, threaded rebar can be driven a minimum of 1.5-feet into an undersized hole in the bottom log. One washer and nut shall be installed so that the uppermost log cannot move vertically.
- 6. Driven rebar shall be installed where specified or with the permission of the Owner.
- 7. To minimize movement of logs, anchoring shall be installed such that connections are tight.



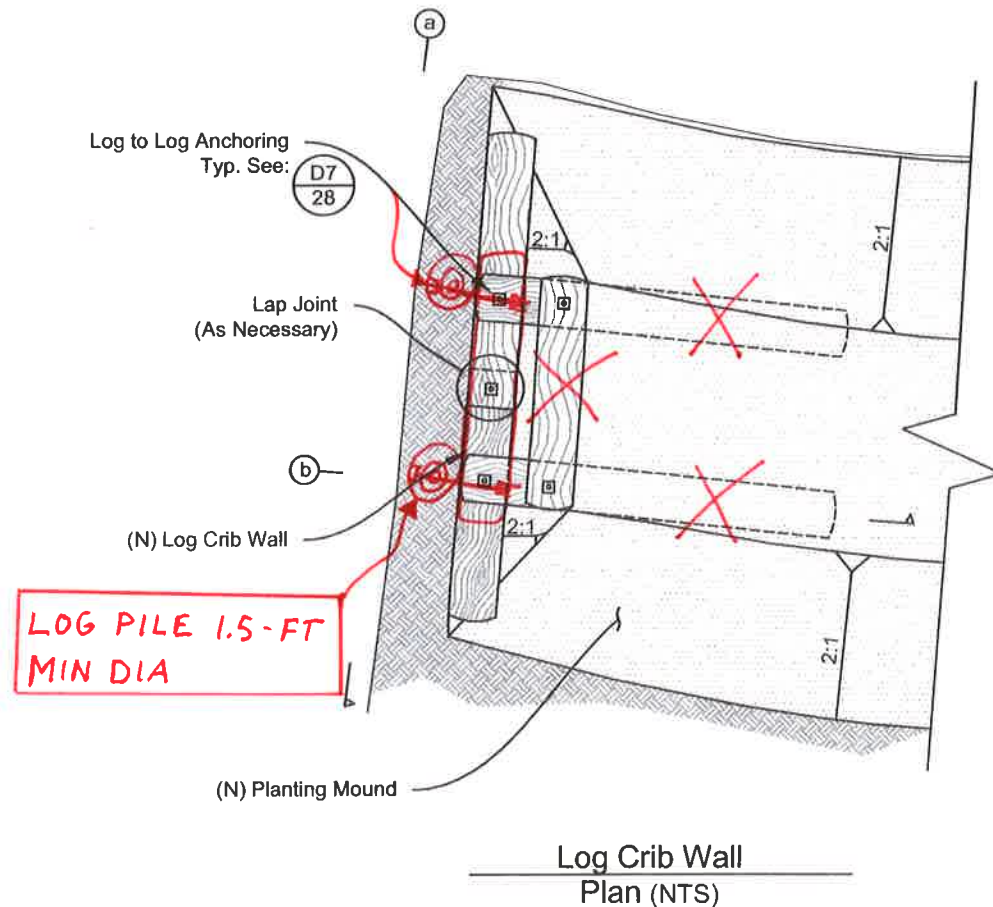
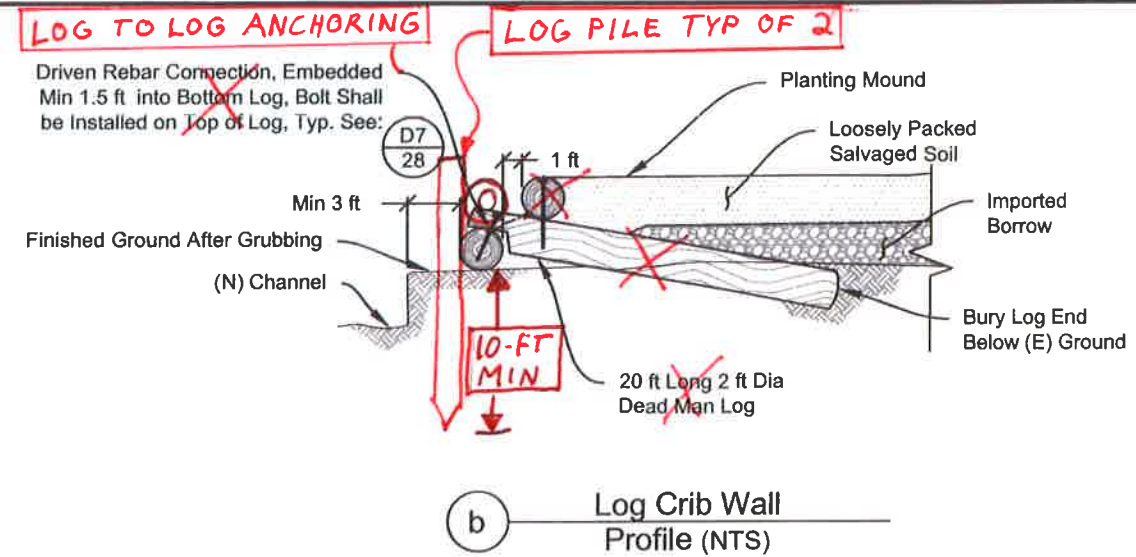
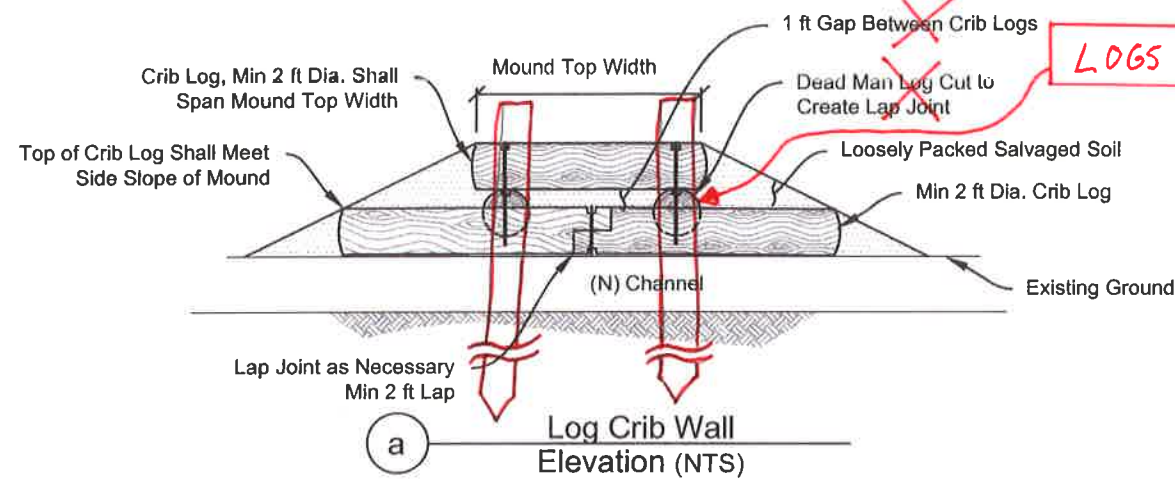
Michael Love & Associates
PO Box 4477 • Arcata, CA 95521 • (707) 476-8938
PROJECT MANAGEMENT: Pacific Coast Fish, Wildlife and Wetlands Restoration Assoc.

REVISIONS:
4/11/2014

REDWOOD NATIONAL PARK
Strawberry Creek
Restoration Project

LOG STRUCTURE NOTES AND ANCHORING DETAIL

DATE	March 2012
SUBMITTAL	FINAL
DESIGN	ML / RS / AL
DRAWN	Llanos
SHEET	28 of 33



Specification for Log Crib Walls

Material Specifications

1. Contractor shall use logs provided on site. Logs shall not be cut unless at the direction of the Owner.
2. Logs shall meet the dimensions specified on the Contract Documents.
3. No single log shall be less than 12 feet in length.
4. Anchoring shall conform to Contract Documents.

Installation Specifications

1. Log Crib Walls shall be installed as specified on the Contract Documents, and where directed by the Owner.
2. Install bottom Crib Logs on the existing ground surface at the locations specified.
3. Cut deadman logs to form a lap joint with a minimum of 2 feet overlap with the bottom crib log. Deadman log shall be cut to create an approximately 1-foot high gap between bottom and top crib logs.
4. Secure deadman to bottom crib log using a driven rebar connection, with bolt located on top of deadman log.
5. Install top crib log as specified, with a driven rebar connection with bolt located on top of crib log.
6. The cribwall height shall be a minimum of 5 feet, measured vertically.
7. All logs shall be anchored where specified.
8. If lap joints are necessary, joint shall overlap a minimum of 2 feet, anchored with Log to Log Anchoring. The surface of the lap joint shall be installed parallel to the ground surface such that the rebar connection is oriented vertically.
9. Backfill crib wall in accordance with Planting Mound Detail, (D3 24).

(D8
7,8,33

LOG CRIB WALL Details

AS-BUILT

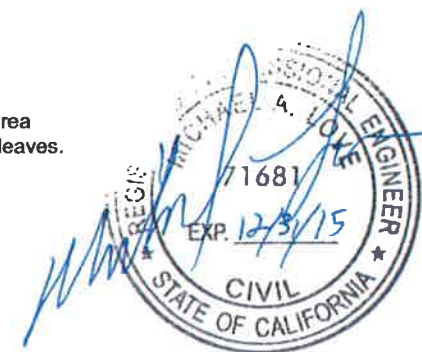
Date: Nov 7, 2014

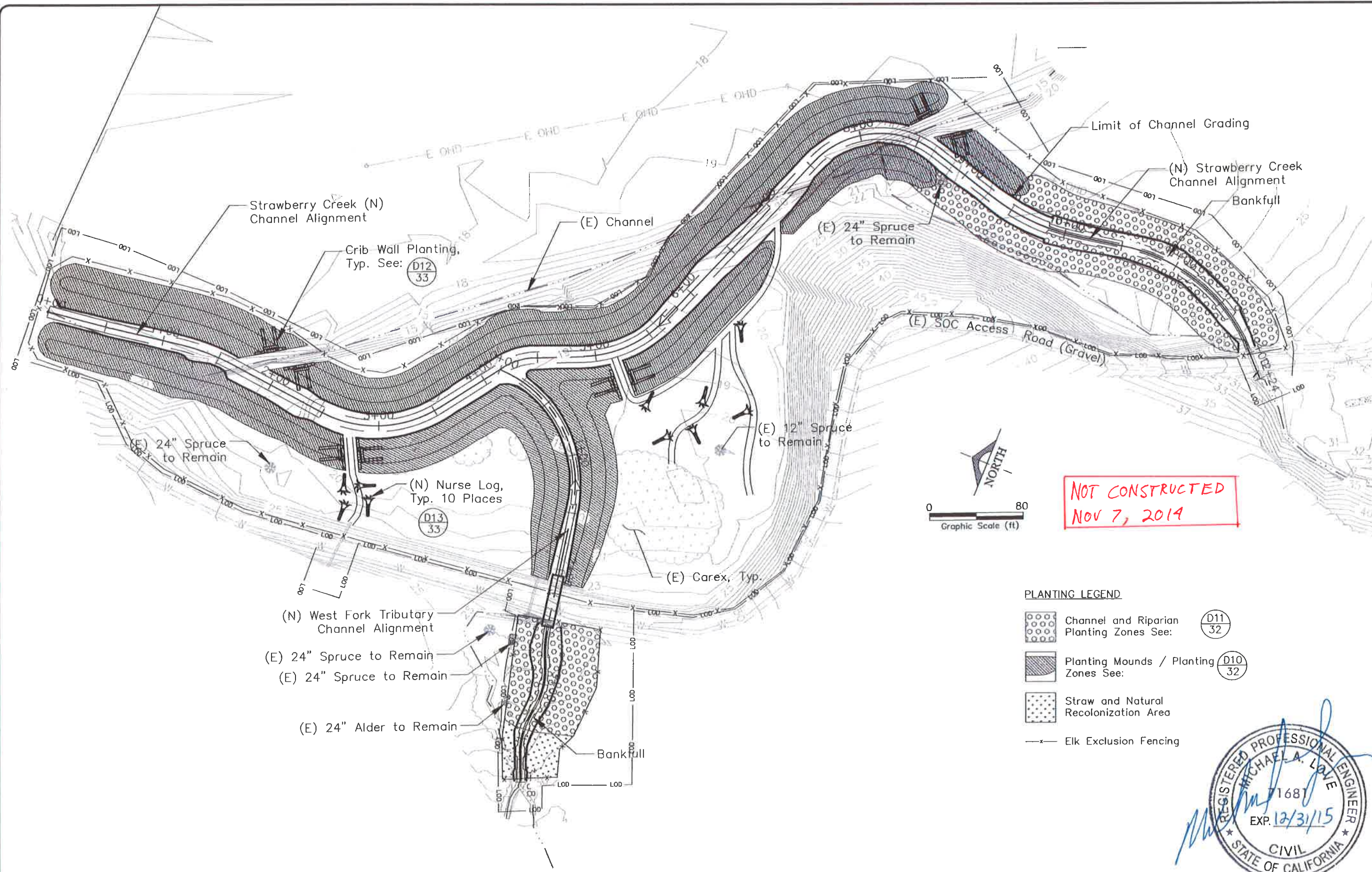




AS-BUILT
Date: Nov 7, 2019

1. Habitat Logs shall be installed as specified on the Contract Documents, and where directed by the Owner.
2. Deadman logs can be installed by either trench excavation or driving them into the streambank. Logs shall be installed so that they are roughly parallel, approximately 10 feet apart, and oriented upstream at an angle of 60 to 80 degrees from the streambank.
3. Downstream Deadman Log shall be installed sloping into the streambank at an approximately 10H:1V pitch.
4. If rootwad is present, rootwad shall face upstream.
5. Cross log shall be placed under the downstream Deadman Log near the channel bottom.
6. Where installed logs cross, provide a minimum of 1 foot overhang.
7. All logs shall be anchored where specified.
8. Backfill excavated trench with compacted native material. Loosely pack area between Cross-Log and streambank with salvaged branches, sticks and leaves.



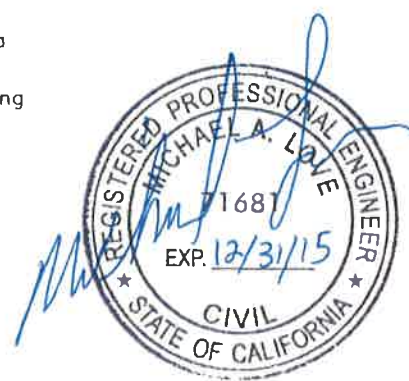


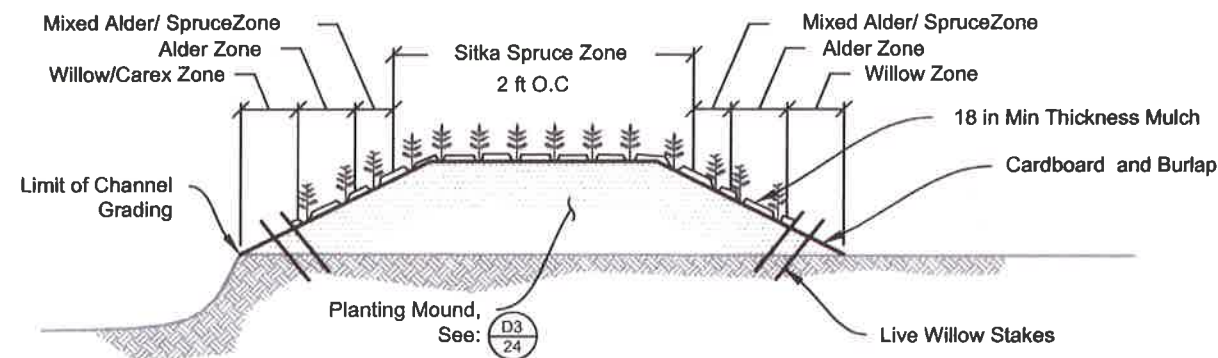
REVISIONS:
4/11/2014

REDWOOD NATIONAL PARK
Strawberry Creek Restoration Project

PLANTING PLAN

DATE	March 2012
SUBMITTAL	FINAL
DESIGN	ML / RS / AL
DRAWN	Llanos
SHEET	

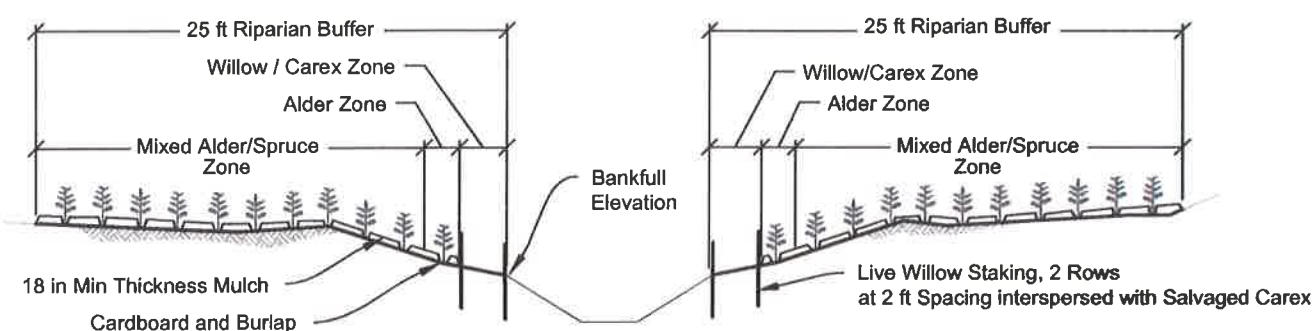




D10
31 Mound Planting Zones
Detail Cross Section (NTS)

PLANTING ZONE	PLANTING DENSITY	ELEVATIONS ON PLANTING MOUNDS
Sitka Spruce Zone	Sitka Spruce at 2 ft O.C.	Elev. 23 ft and higher
Mixed Alder/Spruce Zone	70% Red Alder, 30% Sitka Spruce at 2 ft O.C.	Elev. 22 ft to 23 ft
Alder Zone	Red Alder at 2 ft O.C.	Elev. 20.5 ft to 22 ft
Willow / Carex Zone	Live Willow Stakes at 2 ft O.C. Interspersed with Salvaged Carex	Elev. 19.5 ft to 20.5 ft

Note:
Mulch shall not be installed in the Willow/Carex Zone



D11
31 Channel and Riparian
Planting Zones
Detail Cross Section (NTS)

Specification for Planting Mound and Riparian Area Planting Zones

Material Specifications

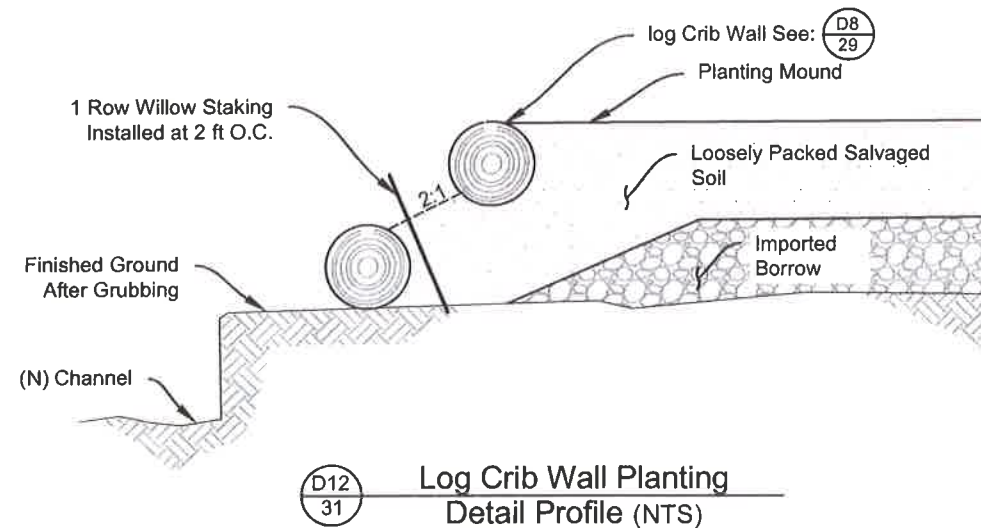
- Plantings shall consist of 2-year old potted Sitka Spruce and Red Alder provided by Owner. Live willow stakes shall be as specified in these Contract Documents.
- Carex shall consist of plants salvaged from the work areas and broken into clumps that contain approximately 1 quart of roots.
- Cardboard shall consist of corrugated cardboard rolled or fanfolded with cornstarch glues. Minimum width shall be 60 inches.
- Burlap shall consist of 10-ounce natural fibers with a minimum width of 60 inches.
- Mulch shall consist of hog fuel and / or shredded redwood bark shredded redwood wood and bark. Mulch shall be manufactured from clean wood and shall have a particle size between 1/8 inch and 1 1/2 inches in thickness and one inch to 8 inches in length; and shall be free of salt and deleterious materials such as clods, coarse objects and rocks.
- Staples shall be 6 inch minimum length and biodegradable.
- No soil amendments shall be installed.
- Owner shall be responsible for watering and maintenance after installation.

Installation Specifications

- Invasive grasses within the limit of planting area shall be grubbed to fully remove grass roots, or to a maximum depth of 3 feet below existing grade. Grubbed material shall be disposed of on-site at the direction of the owner.
- Where existing Carex grasses are present within the limits of excavation of planting mounds, plants shall be excavated to preserve root mat. Grasses shall be stored in a moist, sunny location, with roots covered with soil. Carex shall be replanted along new channel edge and bottom of planting mounds at the direction of the Owner.
- Place cardboard on finished ground surface the full length and width of the planting zone. Cardboard shall overlap a minimum of one foot.
- Place burlap over cardboard the full length and width of the planting zone. Burlap shall overlap a minimum of one foot. Overlaps shall be located a minimum of 3 feet away from cardboard overlaps. Install staples through cardboard and burlap at 5 ft O.C.
- Plantings shall be installed as specified on the Contract Documents, and where directed by the Owner.
- To install plant, cut a small hole, slightly larger than the planting stem through the cardboard and burlap.
- Installation and mulching of plants shall conform to Caltrans, 2006 Section 20 and at the spacing and mulch depth indicated on the Contract Documents. Installed mulch shall not touch stems or branches of planting.
- Stakes, root, or foliage protectors shall not be installed.

NOT CONSTRUCTED
NOV 7, 2014





NOT CONSTRUCTED
NOV 7, 2014

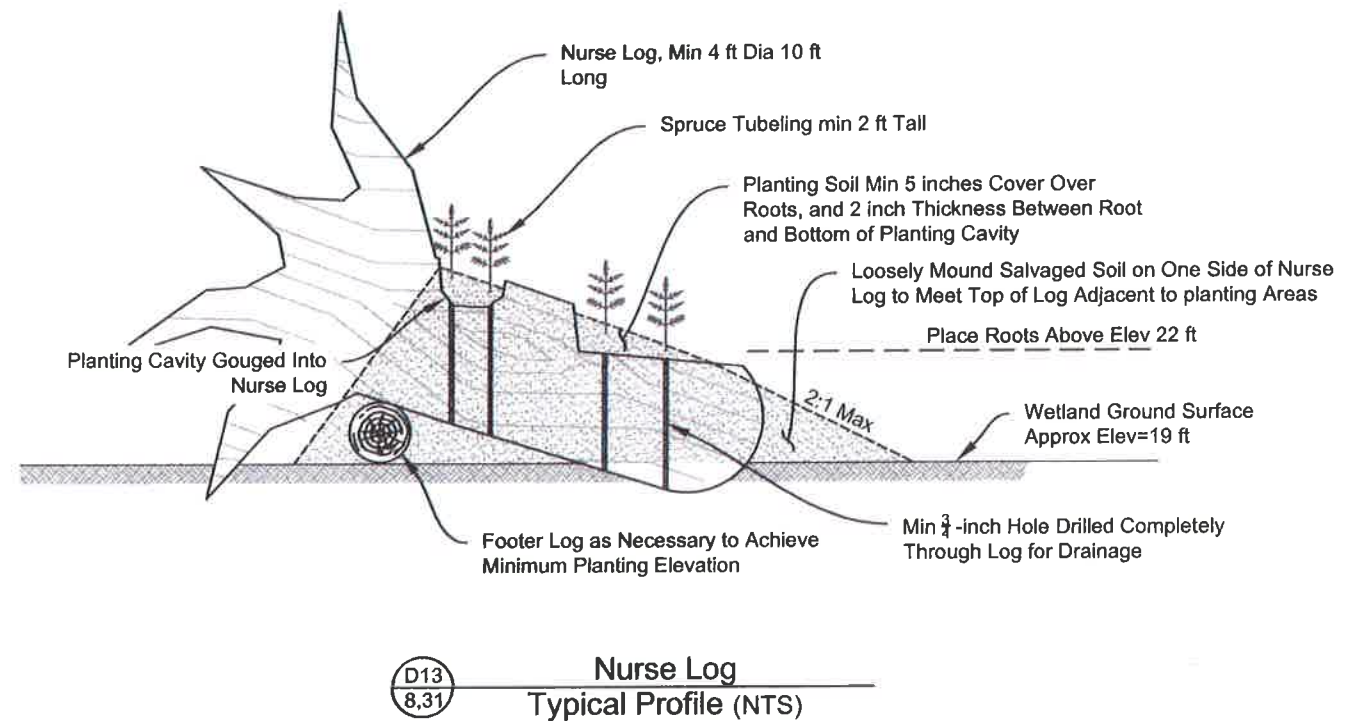
Specification for Live Willow Stakes

Material Specifications

1. Live Willow Stakes shall consist of live willow branches harvested locally at the direction of the Owner.
2. Stakes shall be straight and no shorter than 4 feet in length and ½ to 3 inches in diameter.
3. Harvested material shall be live, freshly cut, and dormant. The plant material shall be free from disease and harmful insects. Basal ends shall be cut cleanly at an angle to facilitate easy insertion into the soil. The tops shall be cut square or blunt.
4. Plant materials shall not be stored greater than 48 hours after harvesting. Plant material shall be protected from drying by means of covering with canvas, burlap or straw and shall be kept moist.
5. No soil amendments shall be installed.
6. Owner shall be responsible for watering and maintenance after installation.

Installation Specifications

1. Live Willow Stakes shall be installed as specified on the Contract Documents, and where directed by the Owner.
2. Create pilot holes to the full depth of the stake installation.
3. Stakes shall be installed at the spacing indicated on the Contract Documents, with approximately 1-foot of stake extending beyond finished grade after installation. Leaf buds shall point up.
4. Stakes shall be pushed or driven into the bank in a method that minimizes crushing and splitting of the top of the cutting. The tops of the cuttings shall be trimmed as necessary to remove split and crushed wood.



NURSE LOGS PLACED AS SHOWN, NOT PLANTED
AS OF NOV 7, 2014

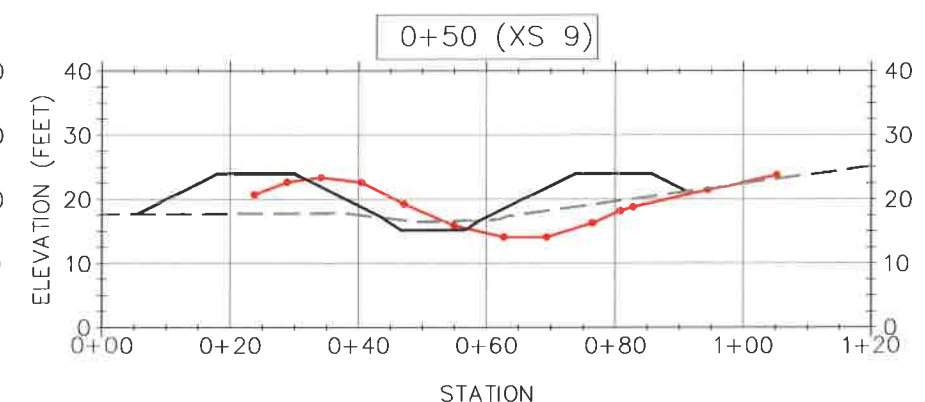
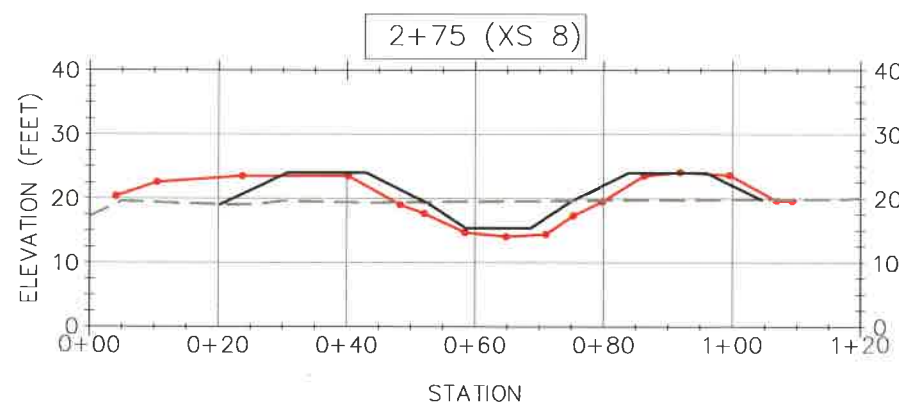
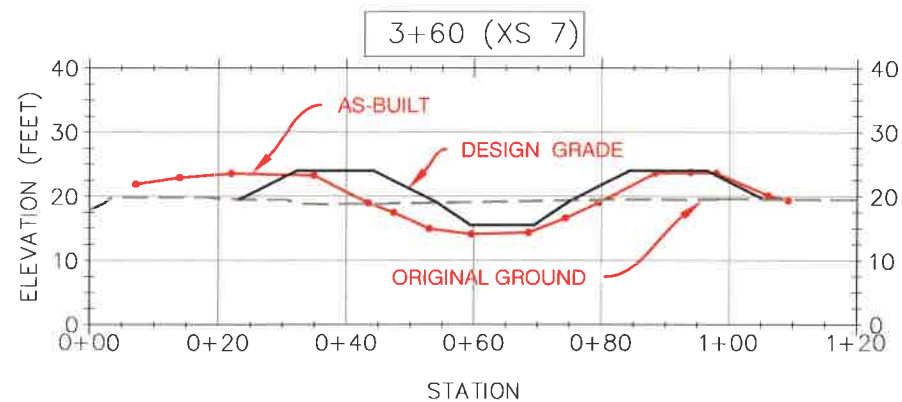
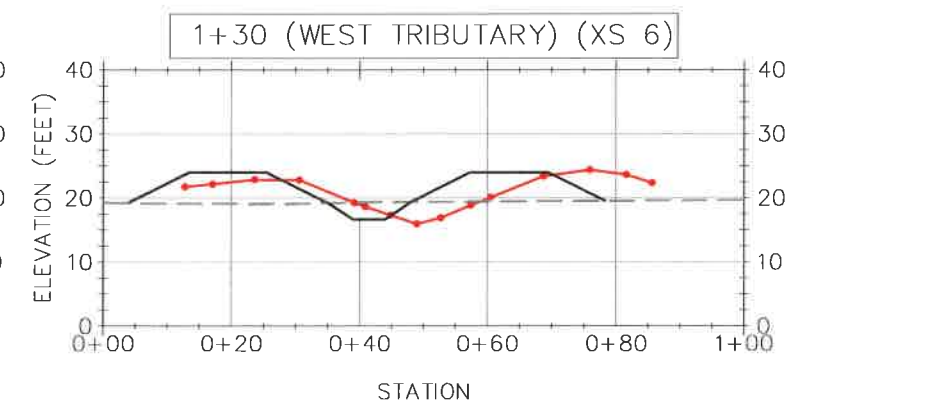
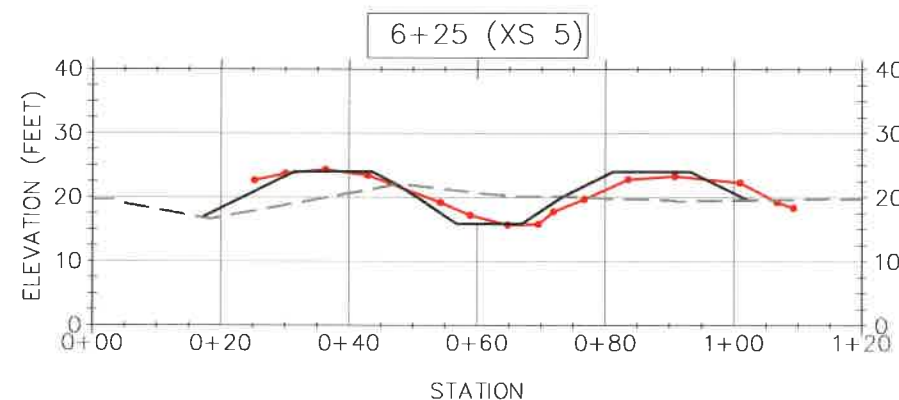
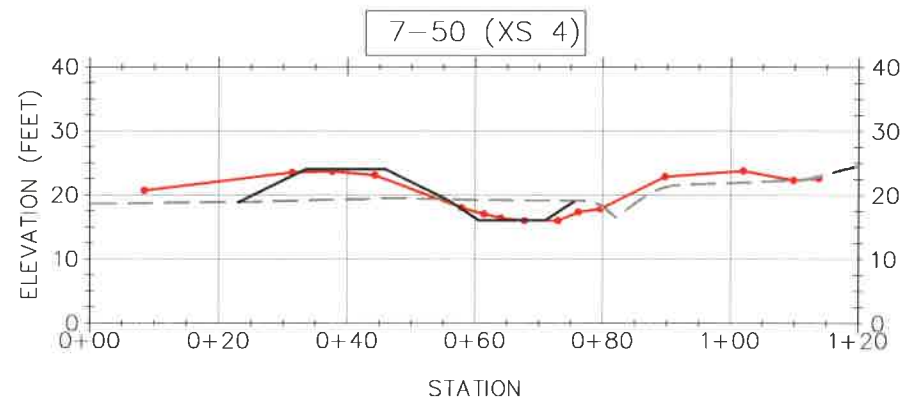
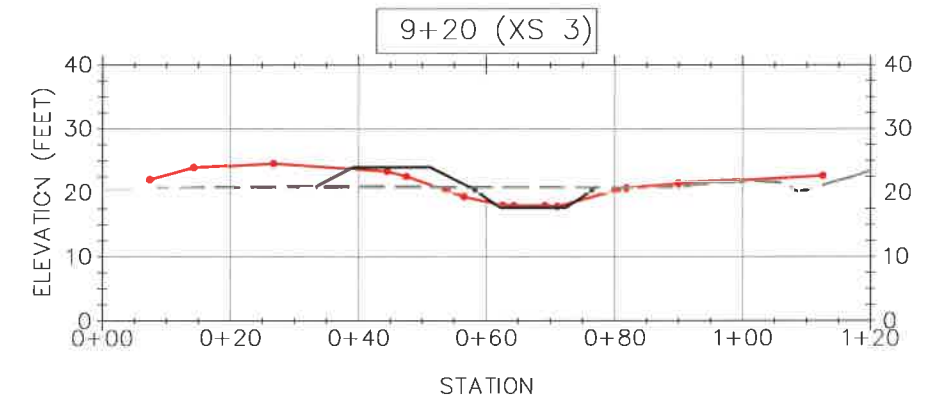
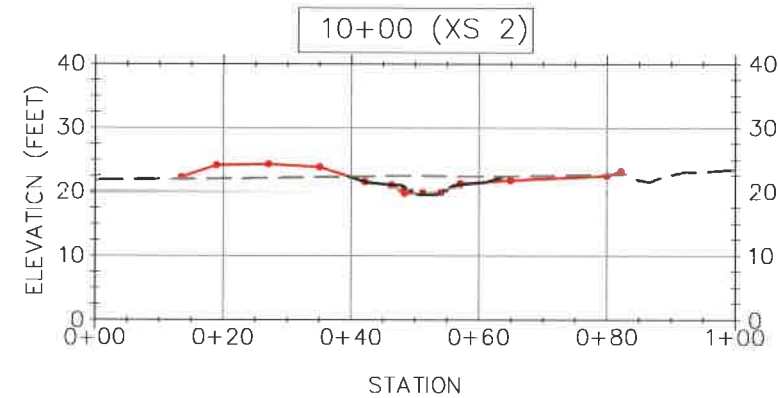
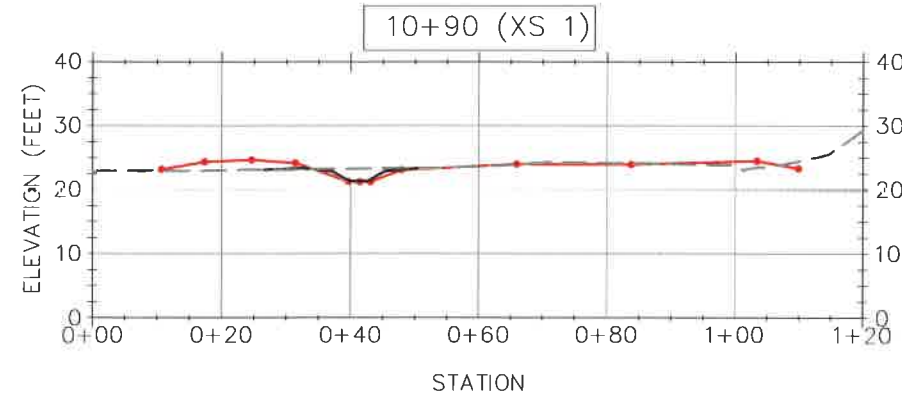
Specification for Nurse Logs

1. Contractor shall use logs provided on-site. Logs shall not be cut unless at the direction of the Owner.
2. Owner shall select logs to be used as Nurse Logs. Logs will typically be the following dimensions:
 - a. Nurse Log: 5 to 12-foot long, 4 to 6-foot diameter log
 - b. Footer Log: 5 to 15-foot long, 1.5 to 2-foot diameter logs.
3. Sitka Spruce tubelings shall have a minimum rooting depth of 5 inches and a minimum of 5 inches of healthy stem and branch growth.
4. Planting Soil shall be acidic with a uniform mix of equal quantities of sand, soil and humus or peat.
5. Soil stabilization matting shall be biodegradable woven coir matting with an open area of 39 to 50%, and a minimum weight of 20 oz/sy.
6. Logs shall not be anchored together.

Installation Specifications

1. Nurse Logs shall be installed as specified on the Contract Documents and / or directed by Owner.
2. Install logs to facilitate use of natural planting areas in logs such as rotten area, splits, or junctions between roots.
3. Cut planting shelves or trenches in nurse log that provide positive drainage. Cut areas shall be a minimum of 8 inches deep and 8 inches wide.
4. Drill drainage holes.
5. Loosely place Planting Soil in cut area.
6. Cover entire area of Planting Soil with double layer soil stabilization matting stapled to wood. Staples shall be placed every 2 inches.
7. Create pilot hole and place tubelings such that roots are covered with a minimum of 5 inches of soil and 2 inches of soil thickness between roots, wood or soil stabilization matting.
8. Plant up to 10 tubelings per nurse logs.
9. Loosely mound Salvaged Soil on one side of Nurse Log adjacent to planting areas to provide additional space for rooting.





AS-BUILT
Date: Nov 7, 2014

Notes:
1. All cross sections are oriented looking up-station.
2. Existing Ground elevation may vary from shown after grubbing. Offsets and elevations will vary with grubbing depth.