

# **INFORMATION HANDOUT**

## **MATERIALS INFORMATION**

RETAINING WALL AS-BUILT PLANS  
CONFUSION HILL DECOMMISSION, GEOTECHNICAL RECOMMENDATIONS DATED  
OCTOBER 29, 2009

## **WATER QUALITY**

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
NORTH COAST REGION

401 Certification

**ROUTE: 01-Men-101-99.4/R100.4**





CONT. 01-02-58-24 1962-67

RECOMMENDED BY DIVISION OF HIGHWAYS

DATE	BY	REVISION
01	10/1/53	17
02	10/1/53	18
03	10/1/53	19

APPROVED: *[Signature]*  
 APPROVED: *[Signature]*  
 APPROVED: *[Signature]*

### UNITS REQUIRED PER SHORT PANEL SECTION

WALL HEIGHT FEET	SHORT STRINGERS IN FRONT OF WALL			SHORT STRINGERS IN REAR OF WALL		
	16'-0" to 17'-0"	17'-0" to 18'-0"	18'-0" to 19'-0"	16'-0" to 17'-0"	17'-0" to 18'-0"	18'-0" to 19'-0"
4.00	1	1	1	1	1	1
5.33	2	2	2	2	2	2
6.67	3	3	3	3	3	3
8.00	4	4	4	4	4	4
9.33	5	5	5	5	5	5
10.67	6	6	6	6	6	6
12.00	7	7	7	7	7	7
13.33	8	8	8	8	8	8
14.67	9	9	9	9	9	9
16.00	10	10	10	10	10	10
17.33	11	11	11	11	11	11
18.67	12	12	12	12	12	12
20.00	13	13	13	13	13	13
21.33	14	14	14	14	14	14
22.67	15	15	15	15	15	15
24.00	16	16	16	16	16	16
25.33	17	17	17	17	17	17
26.67	18	18	18	18	18	18
28.00	19	19	19	19	19	19
29.33	20	20	20	20	20	20
30.67	21	21	21	21	21	21
32.00	22	22	22	22	22	22
33.33	23	23	23	23	23	23
34.67	24	24	24	24	24	24
36.00	25	25	25	25	25	25

NOTE - This table applies only to short panel sections for curved walls and includes units for both front and rear of a 9.5' element of wall.

### CURVATURE CHART - 1 TO 6 BATTER

THIS DATA, OMITTING HEIGHT RESTRICTIONS, CAN BE USED FOR VERTICAL WALLS

DESIGN METHOD	A. BASE WIDTH 5.5'	B. BASE WIDTH 7.7'	C. BASE WIDTH 9.9'	D. BASE WIDTH 12.1'	E. BASE WIDTH 14.3'	F. BASE WIDTH 16.5'
METHOD 1	0° to 0°-26'	0° to 0°-20'	0° to 0°-14'	0° to 0°-12'	0° to 0°-10'	0° to 0°-8'
METHOD 2	4°-59' to 5°-25'	3°-34' to 3°-54'	2°-47' to 3°-01'	2°-16' to 2°-28'	1°-55' to 2°-05'	1°-18' to 1°-26'

**METHOD 1.** - DEFLECTION ANGLE  
 Use normal play in both holes of standard parts. Maximum deflection shown on top of wall. This method is applicable to vertical or battered walls. Chart shows smallest radius which can be used for each design of wall.

**METHOD 2.**  
 Use short panel sections 6'-6" base or rear in addition to play in both holes. Curvature chart indicates number of bins in each group, including a modified bin, necessary to build a curved wall of a required height and radius.

**METHOD 3.**  
 To build a Design "D" wall 20'00" high on a 1400' radius curve, use Method 2 with one set of short stringers in each group of five panels.

**METHOD 4.** SPECIAL CORNER FACE  
 Use special shop fabricated corner connection pieces. Batter, height, angle, direction of turn, and base width determine the dimension limitations applicable on this method. For design, design for a specific turn. Rear stringers are omitted and it may be necessary to increase the base width of adjacent bins to provide needed stability. This method is an alternative for Method 3.

Right angle turns in battered walls can be made by erecting one complete bin vertically in the corner.

NOTE - Use Chart X and Table Y shown on Standard Plan C8-B to determine base width to height ratio for the various surcharges on both vertical and battered walls.



M.P. 65201

NOTE - This table applies only to battered walls and includes units for both front and rear of a 10' element of wall.

### UNITS REQUIRED PER TRANSVERSE SECTION

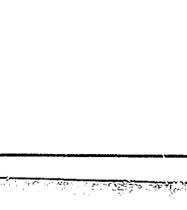
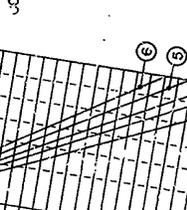
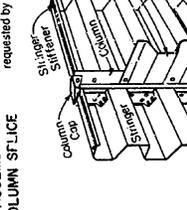
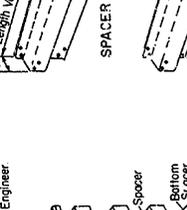
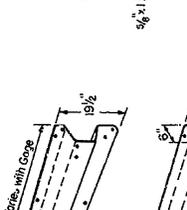
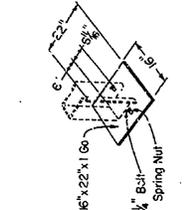
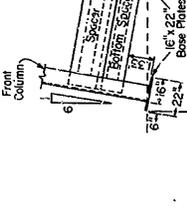
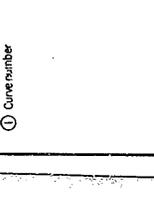
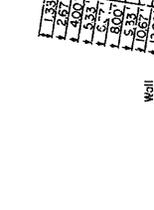
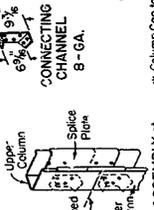
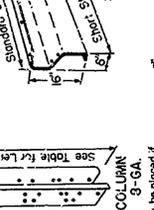
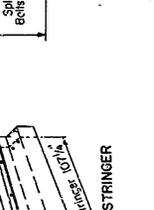
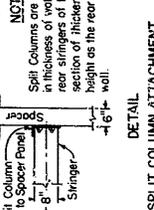
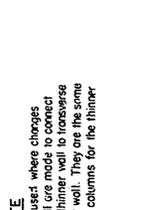
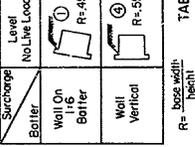
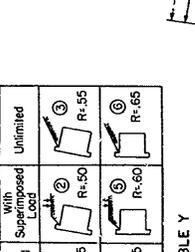
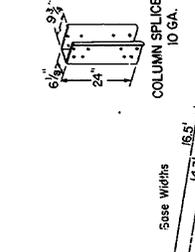
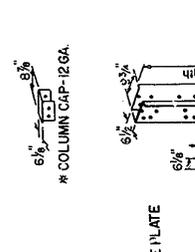
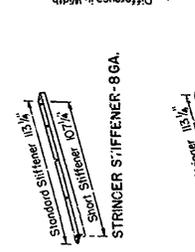
WALL BEARINGS HEIGHT FEET	FRONT COLUMN HEIGHT IN FEET			REAR COLUMN HEIGHT IN FEET			SPACERS			BOB SAWCER			UNITS REQUIRED PER PANEL SECTION		
	16'-0" to 17'-0"	17'-0" to 18'-0"	18'-0" to 19'-0"	16'-0" to 17'-0"	17'-0" to 18'-0"	18'-0" to 19'-0"	16'-0" to 17'-0"	17'-0" to 18'-0"	18'-0" to 19'-0"	16'-0" to 17'-0"	17'-0" to 18'-0"	18'-0" to 19'-0"	16'-0" to 17'-0"	17'-0" to 18'-0"	18'-0" to 19'-0"
4.00	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5.33	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
6.67	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
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24.00	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
25.33	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
26.67	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
28.00	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
29.33	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
30.67	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
32.00	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
33.33	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
34.67	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
36.00	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25

STATE OF CALIFORNIA  
 TRANSPORTATION AGENCY  
 DEPARTMENT OF PUBLIC WORKS  
 DIVISION OF HIGHWAYS  
 DESIGN DATA FOR  
**METAL CRIB WALL C8-A1**  
 REVISION 02-68

CONT. 01-085524 1965-67

APPROVAL RECOMMENDED  
 HAZEL L. 1965  
 Registered Civil Engineer No. 2945

NOTE: Split Columns are used where changes in thickness of wall are made to connect rear stringers of thinner wall to transverse section of thicker wall. They are the same height as the rear columns for the thinner wall.



DETAIL - BASE PLATE PLACEMENT

DETAIL - SPLIT COLUMN ATTACHMENT

DETAIL - COLUMN SPlice PLATE

DETAIL - CRIB ASSEMBLY FRONT COLUMN

DETAIL - CRIB ASSEMBLY REAR COLUMN

DETAIL - CRIB ASSEMBLY FRONT COLUMN

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DETAIL - CRIB ASSEMBLY REAR COLUMN

DETAIL - CRIB ASSEMBLY FRONT COLUMN

WALL TYPE	h	L
"A"	3"	6'-7 1/2"
"B"	1 1/2"	8'-9"
"C"	5"	10'-11 1/2"
"D"	10"	15'-2 1/2"
"E"	14"	15'-4 1/2"
"F"	18"	17'-8 1/2"

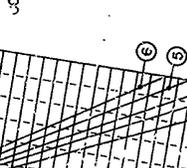
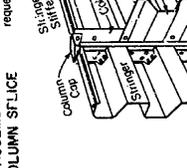
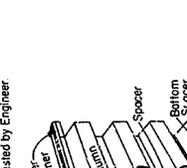
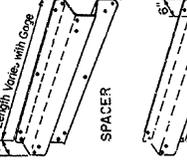
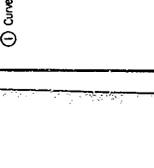
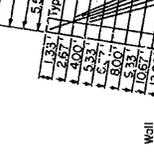
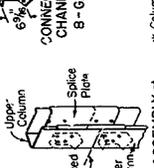
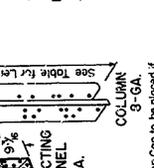
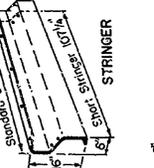
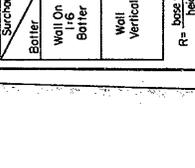
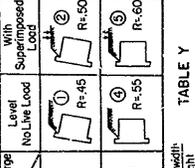
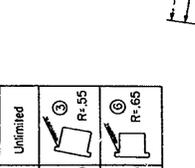
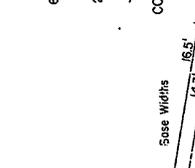
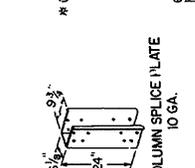
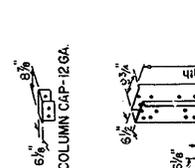
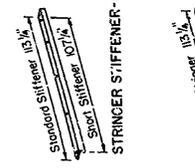
\* NOTE - Distance "h" for Type "A" is a minimum dimension, from Rear Column Base. All bolts to be 1/4" with a minimum length of 1 1/2".

GENERAL NOTES  
 Design "Type" to be shown on all crib layouts.  
 For Design Data see Standard Plan CS-A-1.

STATE OF CALIFORNIA  
 TRANSPORTATION AGENCY  
 DEPARTMENT OF PUBLIC WORKS  
 DIVISION OF HIGHWAYS

CONSTRUCTION DETAILS FOR  
**METAL CRIB WALL CS-B**

REVISION 4-22-68



DETAIL - CRIB ASSEMBLY FRONT COLUMN

DETAIL - CRIB ASSEMBLY REAR COLUMN

DETAIL - CRIB ASSEMBLY FRONT COLUMN

DETAIL - CRIB ASSEMBLY REAR COLUMN

DETAIL - CRIB ASSEMBLY FRONT COLUMN

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DETAIL - CRIB ASSEMBLY FRONT COLUMN

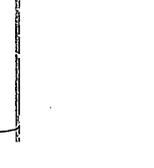
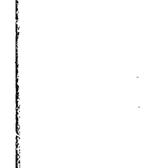
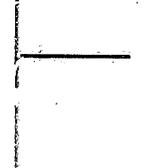
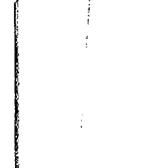
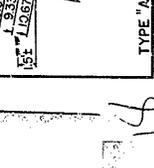
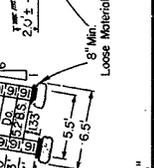
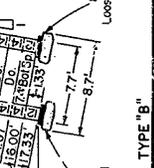
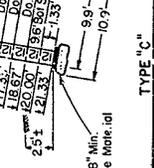
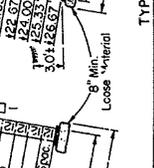
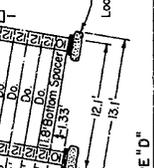
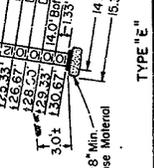
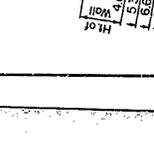
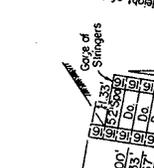
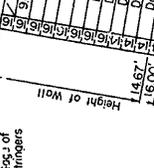
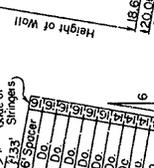
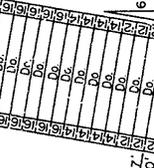
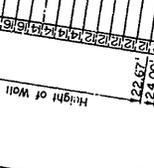
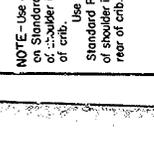
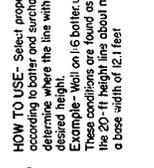
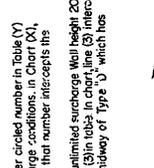
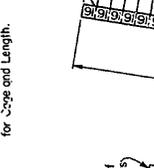
DETAIL - CRIB ASSEMBLY REAR COLUMN

DETAIL - CRIB ASSEMBLY FRONT COLUMN

DETAIL - CRIB ASSEMBLY REAR COLUMN

DETAIL - CRIB ASSEMBLY FRONT COLUMN

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DETAIL - CRIB ASSEMBLY FRONT COLUMN

DETAIL - CRIB ASSEMBLY REAR COLUMN

DETAIL - CRIB ASSEMBLY FRONT COLUMN

DETAIL - CRIB ASSEMBLY REAR COLUMN

DETAIL - CRIB ASSEMBLY FRONT COLUMN

DETAIL - CRIB ASSEMBLY REAR COLUMN

DETAIL - CRIB ASSEMBLY FRONT COLUMN

DETAIL - CRIB ASSEMBLY REAR COLUMN

DETAIL - CRIB ASSEMBLY FRONT COLUMN

DETAIL - CRIB ASSEMBLY REAR COLUMN

DETAIL - CRIB ASSEMBLY FRONT COLUMN

DETAIL - CRIB ASSEMBLY REAR COLUMN

WALL TYPE	h	L
"A"	3"	6'-7 1/2"
"B"	1 1/2"	8'-9"
"C"	5"	10'-11 1/2"
"D"	10"	15'-2 1/2"
"E"	14"	15'-4 1/2"
"F"	18"	17'-8 1/2"

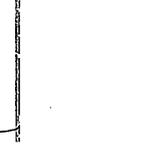
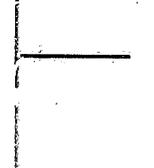
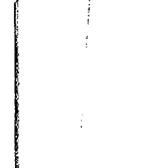
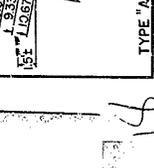
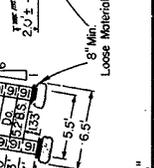
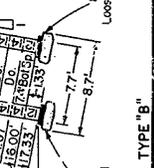
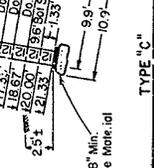
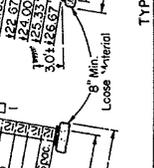
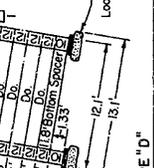
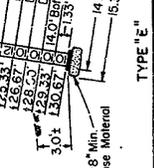
\* NOTE - Distance "h" for Type "A" is a minimum dimension, from Rear Column Base. All bolts to be 1/4" with a minimum length of 1 1/2".

GENERAL NOTES  
 Design "Type" to be shown on all crib layouts.  
 For Design Data see Standard Plan CS-A-1.

STATE OF CALIFORNIA  
 TRANSPORTATION AGENCY  
 DEPARTMENT OF PUBLIC WORKS  
 DIVISION OF HIGHWAYS

CONSTRUCTION DETAILS FOR  
**METAL CRIB WALL CS-B**

REVISION 4-22-68



DETAIL - CRIB ASSEMBLY FRONT COLUMN

DETAIL - CRIB ASSEMBLY REAR COLUMN

DETAIL - CRIB ASSEMBLY FRONT COLUMN

DETAIL - CRIB ASSEMBLY REAR COLUMN

DETAIL - CRIB ASSEMBLY FRONT COLUMN

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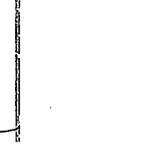
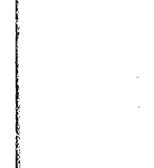
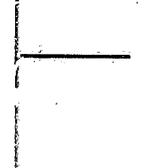
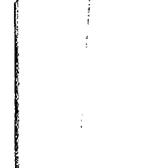
\* NOTE - Distance "h" for Type "A" is a minimum dimension, from Rear Column Base. All bolts to be 1/4" with a minimum length of 1 1/2".

GENERAL NOTES  
 Design "Type" to be shown on all crib layouts.  
 For Design Data see Standard Plan CS-A-1.

STATE OF CALIFORNIA  
 TRANSPORTATION AGENCY  
 DEPARTMENT OF PUBLIC WORKS  
 DIVISION OF HIGHWAYS

CONSTRUCTION DETAILS FOR  
**METAL CRIB WALL CS-B**

REVISION 4-22-68



DETAIL - CRIB ASSEMBLY FRONT COLUMN

DETAIL - CRIB ASSEMBLY REAR COLUMN

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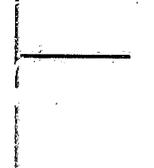
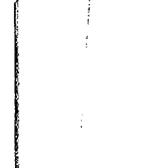
\* NOTE - Distance "h" for Type "A" is a minimum dimension, from Rear Column Base. All bolts to be 1/4" with a minimum length of 1 1/2".

GENERAL NOTES  
 Design "Type" to be shown on all crib layouts.  
 For Design Data see Standard Plan CS-A-1.

STATE OF CALIFORNIA  
 TRANSPORTATION AGENCY  
 DEPARTMENT OF PUBLIC WORKS  
 DIVISION OF HIGHWAYS

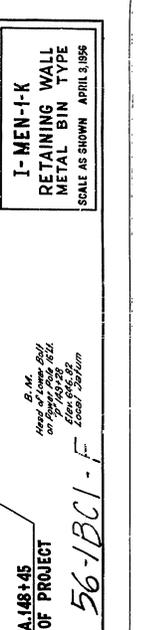
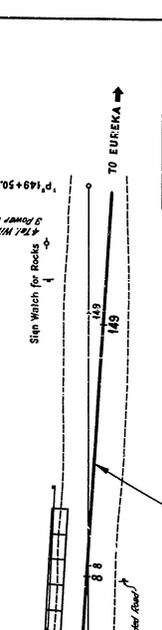
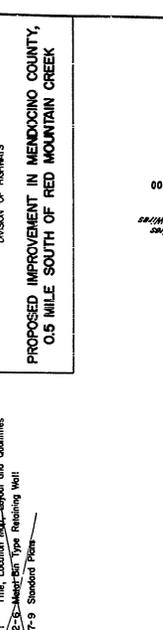
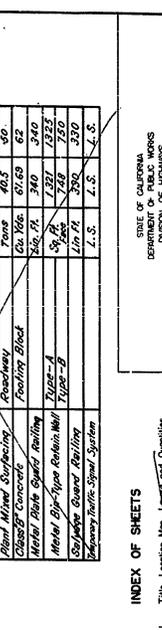
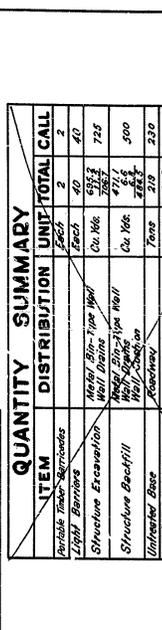
CONSTRUCTION DETAILS FOR  
**METAL CRIB WALL CS-B**

REVISION 4-22-68



APR 30 1956  
 J. H. ...  
 ...

ITEM	QUANTITY	DISTRIBUTION	UNIT	TOTAL	CALL
Structure Excavation	1		Sq. Ft.	100	100
Structure Backfill	1		Sq. Ft.	100	100
Structure Foundation	1		Sq. Ft.	100	100
Structure Siding	1		Sq. Ft.	100	100
Structure Windows	1		Sq. Ft.	100	100
Structure Doors	1		Sq. Ft.	100	100
Structure Roofing	1		Sq. Ft.	100	100
Structure Painting	1		Sq. Ft.	100	100
Structure Electrical	1		Sq. Ft.	100	100
Structure Plumbing	1		Sq. Ft.	100	100
Structure Heating	1		Sq. Ft.	100	100
Structure Cooling	1		Sq. Ft.	100	100
Structure Fire Protection	1		Sq. Ft.	100	100
Structure Security	1		Sq. Ft.	100	100
Structure Accessibility	1		Sq. Ft.	100	100
Structure Maintenance	1		Sq. Ft.	100	100
Structure Energy Efficiency	1		Sq. Ft.	100	100
Structure Sustainability	1		Sq. Ft.	100	100
Structure Resilience	1		Sq. Ft.	100	100
Structure Innovation	1		Sq. Ft.	100	100
Structure Quality	1		Sq. Ft.	100	100
Structure Safety	1		Sq. Ft.	100	100
Structure Health	1		Sq. Ft.	100	100
Structure Comfort	1		Sq. Ft.	100	100
Structure Convenience	1		Sq. Ft.	100	100
Structure Reliability	1		Sq. Ft.	100	100
Structure Durability	1		Sq. Ft.	100	100
Structure Flexibility	1		Sq. Ft.	100	100
Structure Scalability	1		Sq. Ft.	100	100
Structure Interoperability	1		Sq. Ft.	100	100
Structure Compatibility	1		Sq. Ft.	100	100
Structure Portability	1		Sq. Ft.	100	100
Structure Reusability	1		Sq. Ft.	100	100
Structure Recoverability	1		Sq. Ft.	100	100
Structure Resiliency	1		Sq. Ft.	100	100
Structure Robustness	1		Sq. Ft.	100	100
Structure Fault Tolerance	1		Sq. Ft.	100	100
Structure Security	1		Sq. Ft.	100	100
Structure Privacy	1		Sq. Ft.	100	100
Structure Integrity	1		Sq. Ft.	100	100
Structure Availability	1		Sq. Ft.	100	100
Structure Reliability	1		Sq. Ft.	100	100
Structure Maintainability	1		Sq. Ft.	100	100
Structure Supportability	1		Sq. Ft.	100	100
Structure Comprehensibility	1		Sq. Ft.	100	100
Structure Predictability	1		Sq. Ft.	100	100
Structure Measurability	1		Sq. Ft.	100	100
Structure Testability	1		Sq. Ft.	100	100
Structure Debuggability	1		Sq. Ft.	100	100
Structure Reconfigurability	1		Sq. Ft.	100	100
Structure Interchangeability	1		Sq. Ft.	100	100
Structure Replaceability	1		Sq. Ft.	100	100
Structure Upgradeability	1		Sq. Ft.	100	100
Structure Extensibility	1		Sq. Ft.	100	100
Structure Portability	1		Sq. Ft.	100	100
Structure Reusability	1		Sq. Ft.	100	100
Structure Recoverability	1		Sq. Ft.	100	100
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Structure Reliability	1		Sq. Ft.	100	100
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Structure Supportability	1		Sq. Ft.	100	100
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Structure Interchangeability	1		Sq. Ft.	100	100
Structure Replaceability	1		Sq. Ft.	100	100
Structure Upgradeability	1		Sq. Ft.	100	100
Structure Extensibility	1		Sq. Ft.	100	100



INDEX OF SHEETS  
 Sheet No. 1 Title, Location Map, Layout and Quantities  
 Sheet No. 2, 3, 4, 5, 6, 7, 8, 9 Metal Bin Type Retaining Wall  
 Sheet Nos. 7-9 Standard Plans

AS BUILT PLANS  
 Contract No. 56-1841-F  
 Date Completed  
 Document No. 20000-233

PROPOSED IMPROVEMENT IN MENDOCINO COUNTY,  
 0.5 MILE SOUTH OF RED MOUNTAIN CREEK

I-MEN-I-K  
 RETAINING WALL  
 METAL BIN TYPE  
 SCALE AS SHOWN APRIL 3, 1956

MADE BY: J. KENNEDY  
 TRACED BY: R. LAWTON  
 CHECKED BY: J. KENNEDY  
 APRIL 3, 1956

GENERAL NOTES  
 1. The location of the retaining wall is shown on the location map.  
 2. The location of the retaining wall is shown on the location map.  
 3. The location of the retaining wall is shown on the location map.  
 4. The location of the retaining wall is shown on the location map.  
 5. The location of the retaining wall is shown on the location map.  
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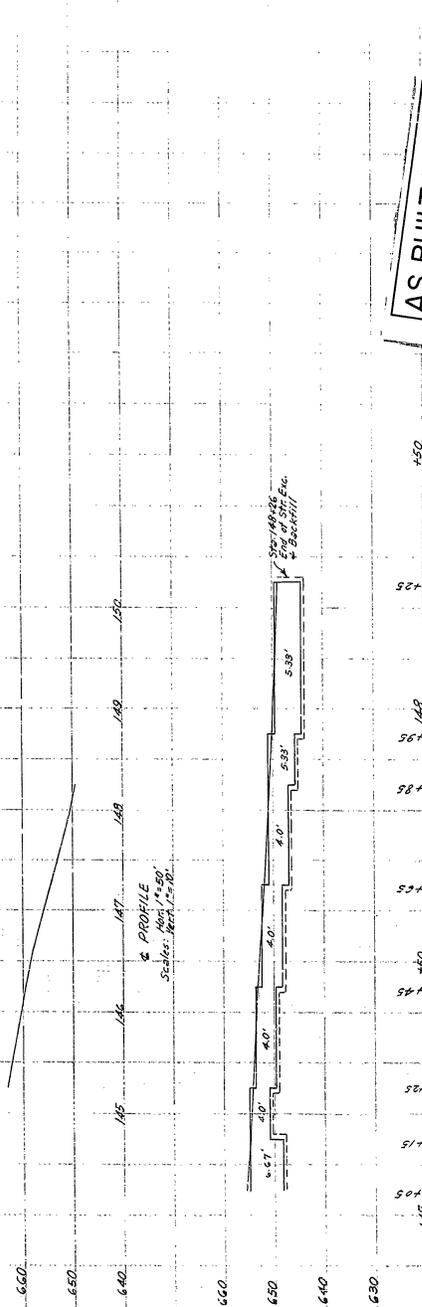
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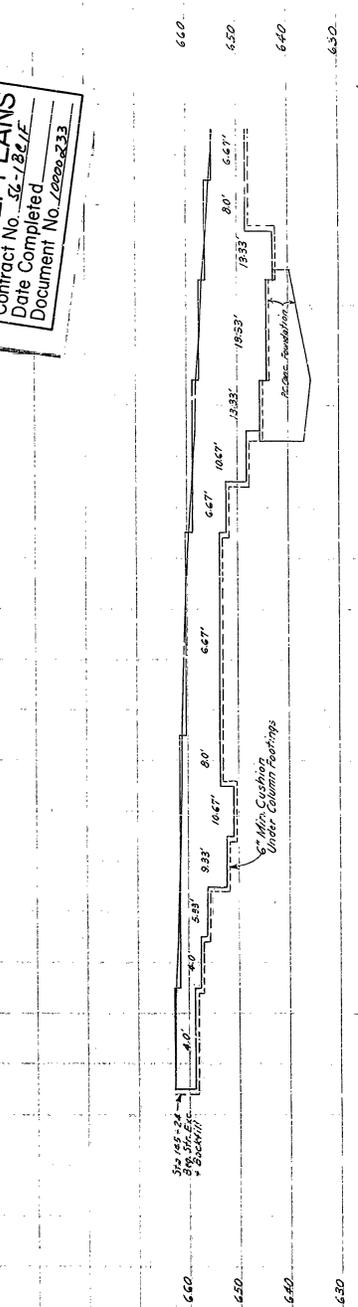
SECTION THROUGH CENTER OF THE WALL  
 CROSS SECTIONS  
 SCALE: 1/8" = 1'-0"

ER-49(1) Unit 1  
 To accompany plans dated April 30, 1956.

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |



**AS BUILT PLANS**  
 Contract No. 56-1B(1)F  
 Date Completed  
 Document No. 10000-233

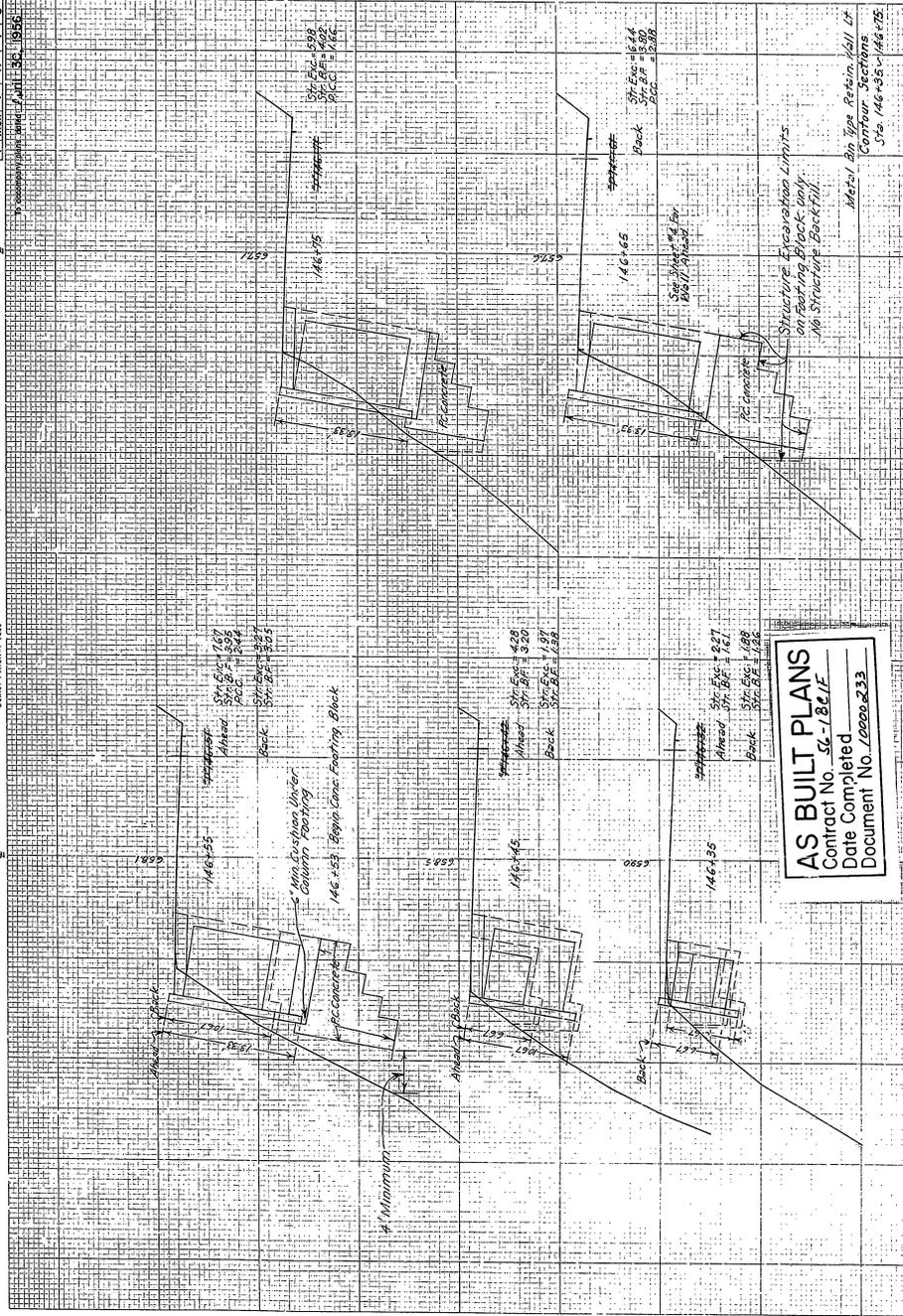


Metal Bin Type Retaining Wall  
 Scale: 1/8" = 1'-0"

56-1B(1)-F  
 I A 50 1 K 1



Men	K	4	9
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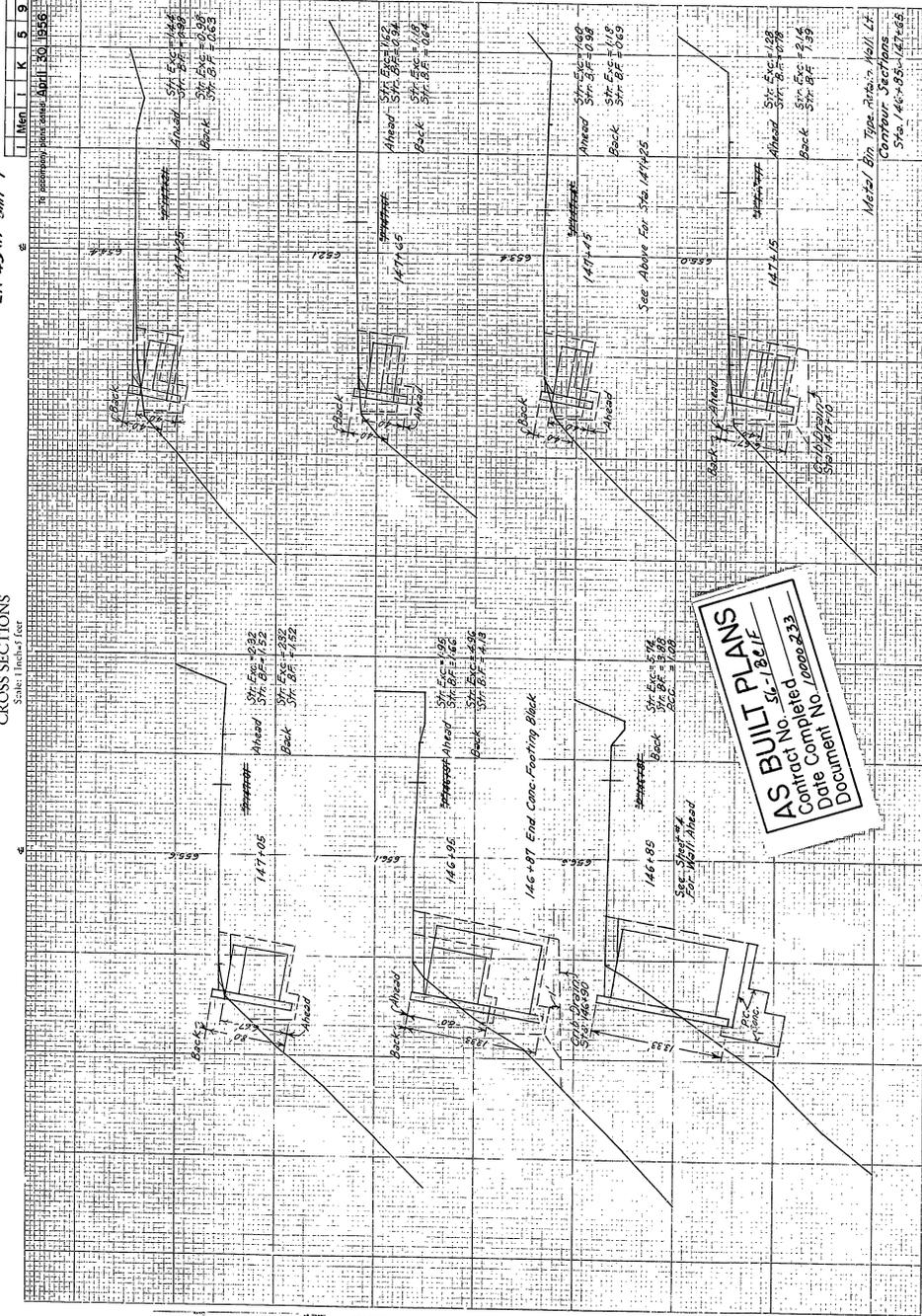
**AS BUILT PLANS**  
 Contract No. 56-18C1-F  
 Date Completed \_\_\_\_\_  
 Document No. 10000-233

56-18C1-F  
 I. Merz I K 3

STATE OF CALIFORNIA, DEPARTMENT OF PUBLIC WORKS  
 DIVISION OF HIGHWAYS  
**CROSS SECTIONS**  
 Scale: 1 inch = 10 feet

ER-49 (1) Unit 1

Men 1 K 5 9  
 April 30 1956



**AS BUILT PLANS**  
 Contract No. 56-1BCLF  
 Date Completed  
 Document No. 1000233

56-1BCL-F I Men 1 K 4

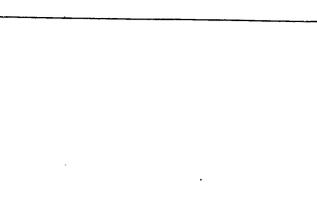
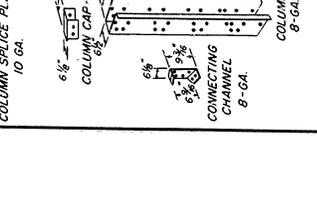
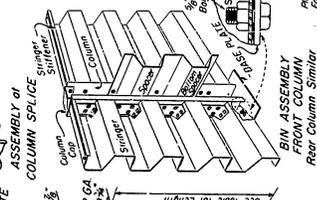
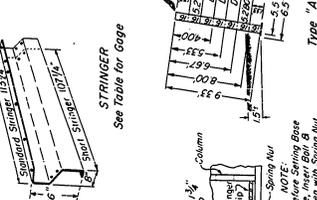
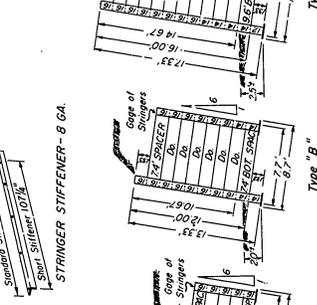
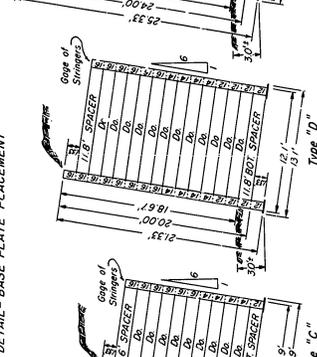
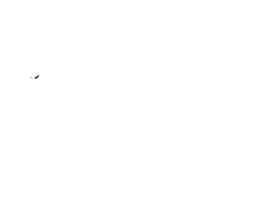
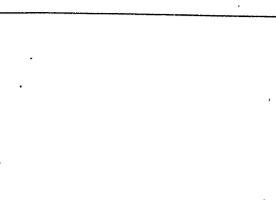
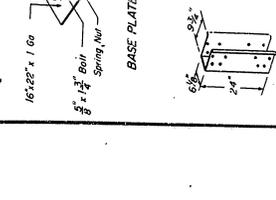
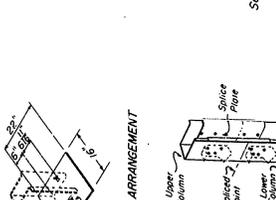
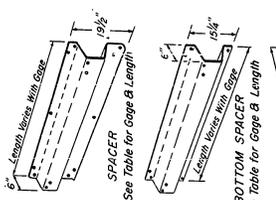
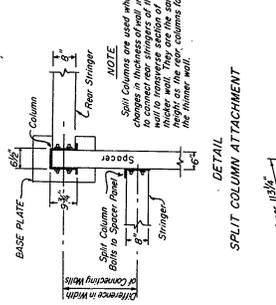
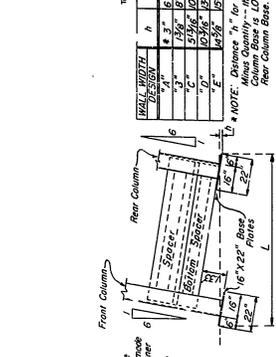


ER-49(1) *Vol. 1*

APPROVED: April 20, 1956  
 [Signature]

WALL HEIGHT	h	L
10'-0"	3'-0"	15'-0"
12'-0"	3'-0"	18'-0"
14'-0"	3'-0"	21'-0"
16'-0"	3'-0"	24'-0"
18'-0"	3'-0"	27'-0"
20'-0"	3'-0"	30'-0"
22'-0"	3'-0"	33'-0"
24'-0"	3'-0"	36'-0"
26'-0"	3'-0"	39'-0"
28'-0"	3'-0"	42'-0"
30'-0"	3'-0"	45'-0"

To accommodate Posts Installed April 30, 1956.



UNITS REQUIRED PER TRANSVERSE SECTION

WALL HEIGHT	10'-0"	12'-0"	14'-0"	16'-0"	18'-0"	20'-0"	22'-0"	24'-0"	26'-0"	28'-0"	30'-0"
10'-0"	1	1	1	1	1	1	1	1	1	1	1
12'-0"	1	1	1	1	1	1	1	1	1	1	1
14'-0"	1	1	1	1	1	1	1	1	1	1	1
16'-0"	1	1	1	1	1	1	1	1	1	1	1
18'-0"	1	1	1	1	1	1	1	1	1	1	1
20'-0"	1	1	1	1	1	1	1	1	1	1	1
22'-0"	1	1	1	1	1	1	1	1	1	1	1
24'-0"	1	1	1	1	1	1	1	1	1	1	1
26'-0"	1	1	1	1	1	1	1	1	1	1	1
28'-0"	1	1	1	1	1	1	1	1	1	1	1
30'-0"	1	1	1	1	1	1	1	1	1	1	1

CURVATURE DATA

WALL HEIGHT	10'-0"	12'-0"	14'-0"	16'-0"	18'-0"	20'-0"	22'-0"	24'-0"	26'-0"	28'-0"	30'-0"
10'-0"	1	1	1	1	1	1	1	1	1	1	1
12'-0"	1	1	1	1	1	1	1	1	1	1	1
14'-0"	1	1	1	1	1	1	1	1	1	1	1
16'-0"	1	1	1	1	1	1	1	1	1	1	1
18'-0"	1	1	1	1	1	1	1	1	1	1	1
20'-0"	1	1	1	1	1	1	1	1	1	1	1
22'-0"	1	1	1	1	1	1	1	1	1	1	1
24'-0"	1	1	1	1	1	1	1	1	1	1	1
26'-0"	1	1	1	1	1	1	1	1	1	1	1
28'-0"	1	1	1	1	1	1	1	1	1	1	1
30'-0"	1	1	1	1	1	1	1	1	1	1	1

UNITS REQUIRED PER SHORT PANEL SECTION

WALL HEIGHT	10'-0"	12'-0"	14'-0"	16'-0"	18'-0"	20'-0"	22'-0"	24'-0"	26'-0"	28'-0"	30'-0"
10'-0"	1	1	1	1	1	1	1	1	1	1	1
12'-0"	1	1	1	1	1	1	1	1	1	1	1
14'-0"	1	1	1	1	1	1	1	1	1	1	1
16'-0"	1	1	1	1	1	1	1	1	1	1	1
18'-0"	1	1	1	1	1	1	1	1	1	1	1
20'-0"	1	1	1	1	1	1	1	1	1	1	1
22'-0"	1	1	1	1	1	1	1	1	1	1	1
24'-0"	1	1	1	1	1	1	1	1	1	1	1
26'-0"	1	1	1	1	1	1	1	1	1	1	1
28'-0"	1	1	1	1	1	1	1	1	1	1	1
30'-0"	1	1	1	1	1	1	1	1	1	1	1

UNITS REQUIRED PER TRANSVERSE SECTION

WALL HEIGHT	10'-0"	12'-0"	14'-0"	16'-0"	18'-0"	20'-0"	22'-0"	24'-0"	26'-0"	28'-0"	30'-0"
10'-0"	1	1	1	1	1	1	1	1	1	1	1
12'-0"	1	1	1	1	1	1	1	1	1	1	1
14'-0"	1	1	1	1	1	1	1	1	1	1	1
16'-0"	1	1	1	1	1	1	1	1	1	1	1
18'-0"	1	1	1	1	1	1	1	1	1	1	1
20'-0"	1	1	1	1	1	1	1	1	1	1	1
22'-0"	1	1	1	1	1	1	1	1	1	1	1
24'-0"	1	1	1	1	1	1	1	1	1	1	1
26'-0"	1	1	1	1	1	1	1	1	1	1	1
28'-0"	1	1	1	1	1	1	1	1	1	1	1
30'-0"	1	1	1	1	1	1	1	1	1	1	1

UNITS REQUIRED PER TRANSVERSE SECTION

WALL HEIGHT	10'-0"	12'-0"	14'-0"	16'-0"	18'-0"	20'-0"	22'-0"	24'-0"	26'-0"	28'-0"	30'-0"
10'-0"	1	1	1	1	1	1	1	1	1	1	1
12'-0"	1	1	1	1	1	1	1	1	1	1	1
14'-0"	1	1	1	1	1	1	1	1	1	1	1
16'-0"	1	1	1	1	1	1	1	1	1	1	1
18'-0"	1	1	1	1	1	1	1	1	1	1	1
20'-0"	1	1	1	1	1	1	1	1	1	1	1
22'-0"	1	1	1	1	1	1	1	1	1	1	1
24'-0"	1	1	1	1	1	1	1	1	1	1	1
26'-0"	1	1	1	1	1	1	1	1	1	1	1
28'-0"	1	1	1	1	1	1	1	1	1	1	1
30'-0"	1	1	1	1	1	1	1	1	1	1	1

NOTE: This Table Shows Only Units Required For Standard Walls. Units Required For Curved Walls And Walls With Posts Installed April 30, 1956, Shall Be As Shown On Page 27 Of Section 27 Wall.

56-1BC1-F METAL BIN TYPE RETAINING WALLS

AS BUILT PLANS  
 Contract No. 56-1BE1F  
 Date Completed  
 Document No. 10000-233



# NO AS BUILT CORRECTIONS

CORRECTIONS: CONTRACT NO. 04-44008

CORRECTIONS BY: Tim Schwabz  
DATE: 09-23-2003

CORRECTIONS TRANSFERRED BY: ml  
DATE: 02-03-2005

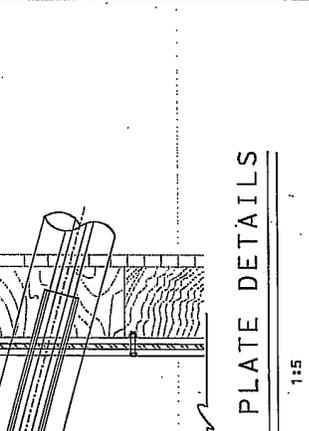
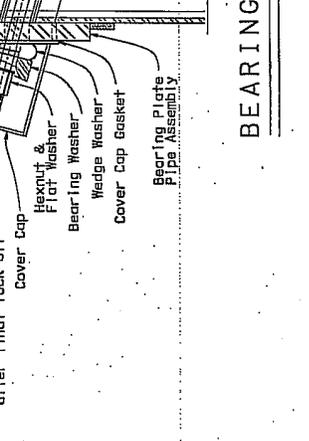
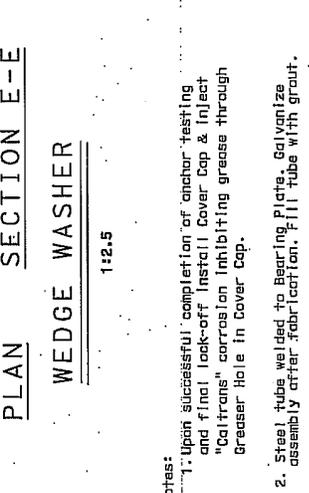
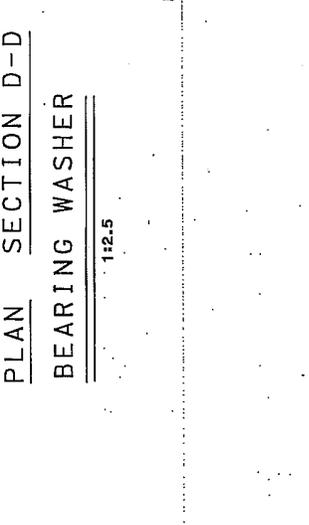
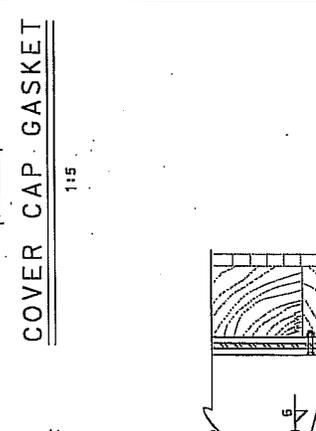
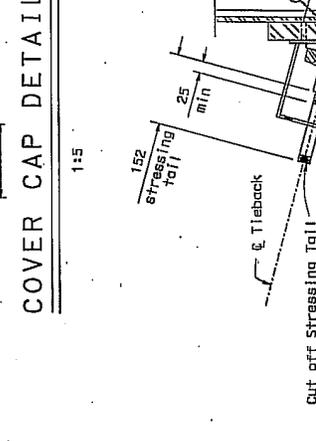
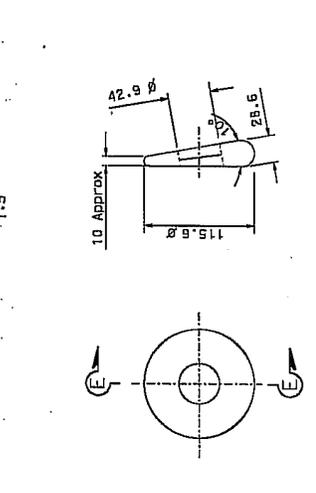
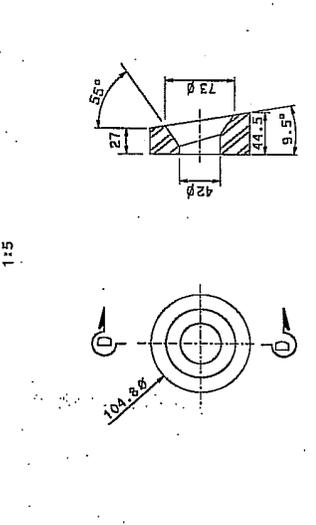
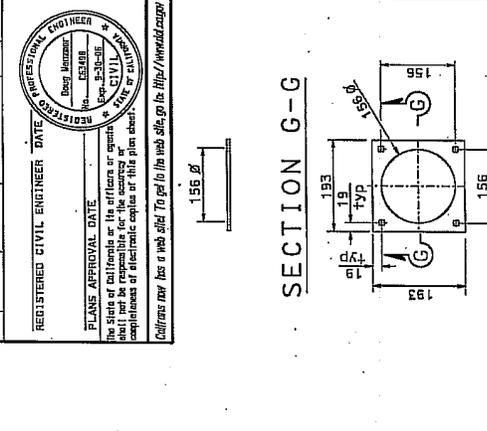
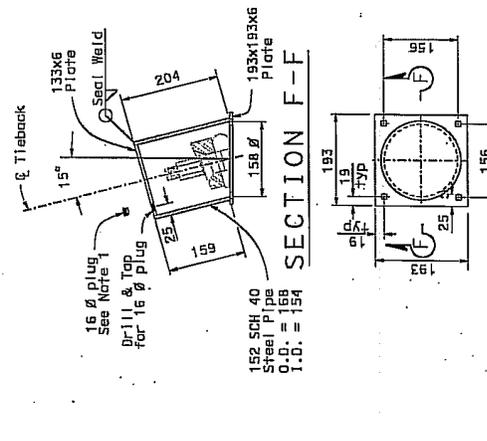
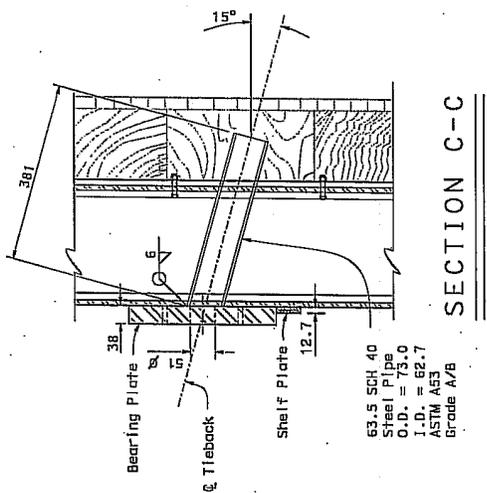
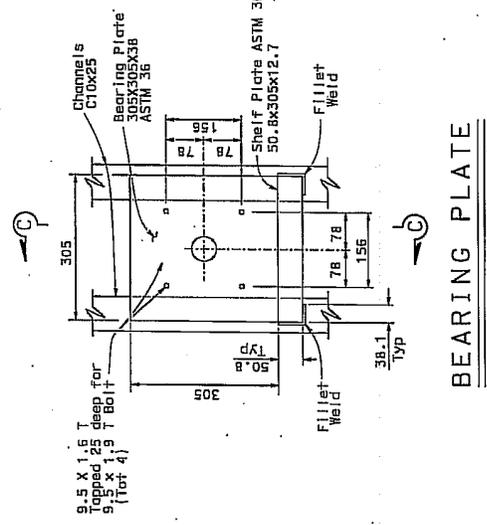


DESIGN BY	BOG HARTZNER	CHECKED	
DETAILS BY	MIKE HERTZEL	CHECKED	
QUANTITIES BY		CHECKED	
PREPARED BY: BOG HARTZNER DATE: 02-03-2005			

STATE OF CALIFORNIA	
DEPARTMENT OF TRANSPORTATION	
PROJECT NO.	04-44008-3-Subpart 1
CONTRACT NO.	04-44008-3-Subpart 1
DATE	02-03-2005

DIVISION OF ENGINEERING SERVICES	10E0007
STRUCTURAL DESIGN	10E0007
DESIGN BRANCH	1
DATE	09.16
PROJECT NO.	04-44008-3-Subpart 1
CONTRACT NO.	04-44008-3-Subpart 1
DATE	02-03-2005

RETAINING WALL AT PM 100	1	2	5
TIEBACK WALL DETAILS NO 1	1	2	5



- Notes:
- Upon successful completion of anchor testing and final lock-off install Cover Cap & Inject "Caltrans" corrosion inhibiting grease through Greaser Hole in Cover Cap.
  - Steel tube welded to Bearing Plate. Galvanize assembly after fabrication. Fill tube with grout.

DIST	COUNTY	ROUTE	% COMPLETE	PAGE	TOTAL SHEETS	SHEET NO.
01	Men	1	98.6	2	5	5

REGISTERED CIVIL ENGINEER DATE: \_\_\_\_\_  
 DESIGN APPROVAL DATE: \_\_\_\_\_  
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 Calltrans may use a web site. To get to the web site, go to the file://www.calltrans.gov





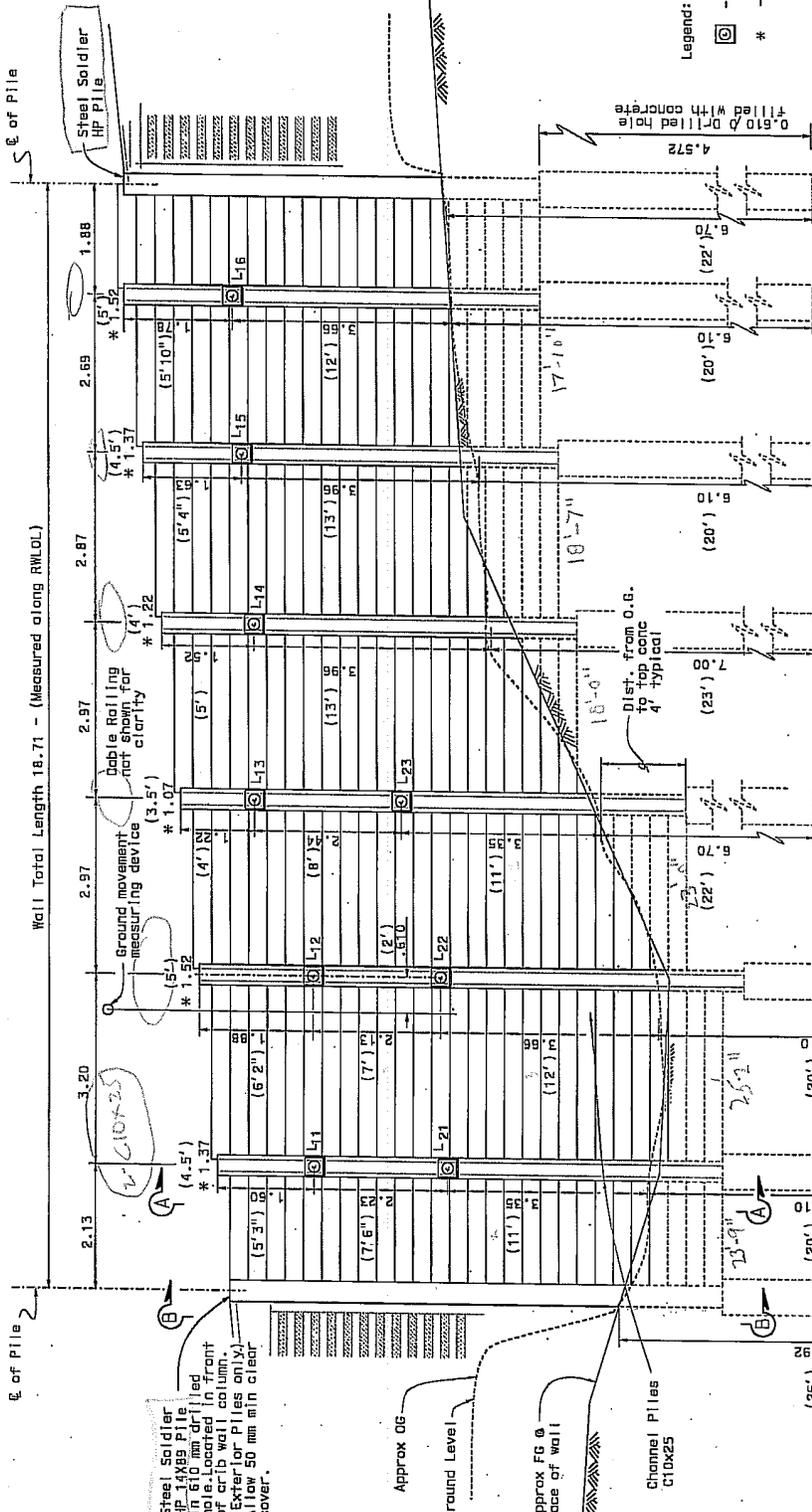
REGISTERED CIVIL ENGINEER DATE: 09-12-03  
 PROFESSIONAL ENGINEER

PLANS APPROVAL DATE: 09-12-03  
 The State of California or its officers or agents shall not be responsible for the correctness or completeness of electronic copies of this plan sheet.

California now has a web site to get the web site, go to: <http://www.sdsds.org>

Tie-Back No.	Angle Decline	Unbonded Length	Bonded Length
L-11	17°	9.14 m	18.60 m
L-12	16°	9.14 m	20.57 m
L-13	16°	9.14 m	20.57 m
L-14	16°	9.14 m	18.60 m
L-15	16°	9.14 m	14.63 m
L-16	16°	9.14 m	14.63 m
L-21	30°	9.14 m	14.32 m
L-22	20°	9.14 m	14.32 m
L-23	25°	9.14 m	14.32 m

Legend:  
 ⊗ - Indicates Tieback Anchor Assembly  
 \* - Distance from top backfill grade vertically down to level of first tieback.



GENERAL NOTES  
 WORKING STRESS DESIGN

DESIGN: Bridge Design Specifications (1993 AASHTO with Interims and revision by Caltrans).  
 LIVE LOAD: Surcharge - 0.6 Level Earth.  
 SOIL PARAMETERS: Layer 1 Layer 2 Layer 3 (For determination of design lateral earth pressure)  
 $\gamma$  (kN/m<sup>3</sup>) 18.95 21.21 21.99  
 $\phi$  (°) 30° 45° 45°  
 $c$  (kPa) 9.6 9.6 96.0  
 STRUCTURAL STEEL: Working Stress Design  $f_y = 345$  MPa  
 $f_u = 190$  MPa

ELEVATION  
 1:40

STRUCTURAL TIMBER: Treated Douglas Fir, grade no. 1 or better. Timber to be full width.  
 PRESTRESSING STEEL: 25 mm Grade 150 A722 Bar (Epoxy coated).  
 T - Design force per Tieback=250 kN (Top row)  
 T - Design force per Tieback=290 kN (Bottom row)  
 $f_{pu}$  = Minimum Tensile Strength of prestressing steel, (kN) (one weight per square millimeter)  
 $A_s$  = Minimum cross section area of prestressing steel in Tieback Tendon, (square millimeter)  
 $A_s$  (min) = 1.5 T  
 $A_s$  (min) = 0.75  $f_{pu}$   
 ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

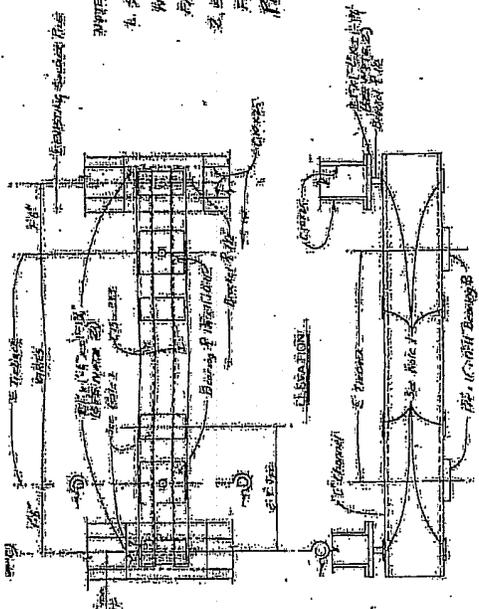
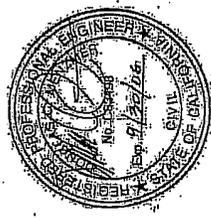
	DESIGN ENGINEER	DESIGN BRANCH	1	DESIGN NO.	99-6
	BY: Doug Metzgar	BY: Uta Barton	BY: Uta Barton	DATE: 09-24-2003	DATE: 09-24-2003
DESIGN	DETAILS	QUANTITIES	IN METERS UNLESS OTHERWISE SHOWN	STATE OF CALIFORNIA	DEPARTMENT OF TRANSPORTATION
DESIGN	DETAILS	QUANTITIES	IN METERS UNLESS OTHERWISE SHOWN	STRUCTURE DESIGN	RETAINING WALL AT PM 100
DESIGN	DETAILS	QUANTITIES	IN METERS UNLESS OTHERWISE SHOWN	DESIGN BRANCH	TIEBACK WALL DETAILS NO. 4
DESIGN	DETAILS	QUANTITIES	IN METERS UNLESS OTHERWISE SHOWN	DESIGN NO.	99-6
DESIGN	DETAILS	QUANTITIES	IN METERS UNLESS OTHERWISE SHOWN	DATE: 09-24-2003	DATE: 09-24-2003



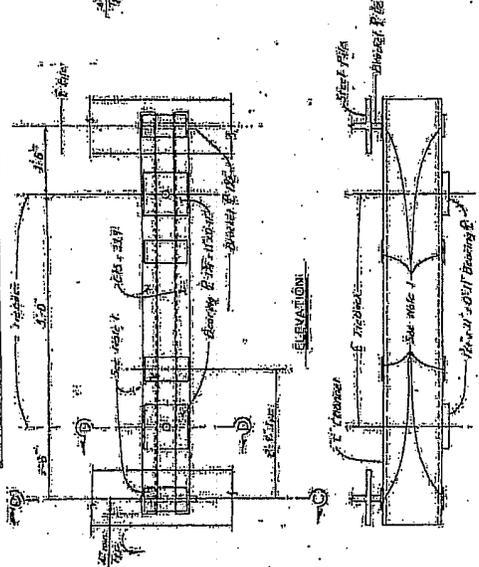
AS-DESIGNED  
 AS-BUILT'S NOT RECOVERABLE  
 Contract No.: 01-470104  
 Structure Rep.: John Railey  
 Date Prepared: 5/22/07

Sheet 2 of 7

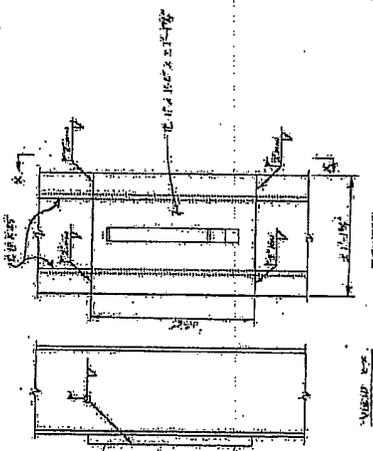
Handwritten notes in Chinese characters, likely providing design specifications or construction details for the structure.



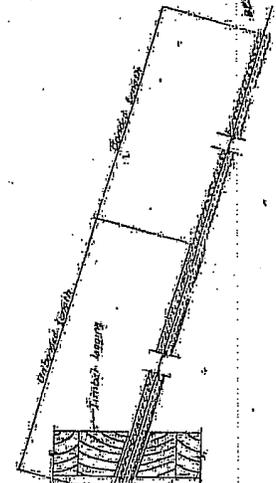
WALLER DETAIL  
 @ RRP 12' x 8' x 8' 3/4" WALLER SECTION



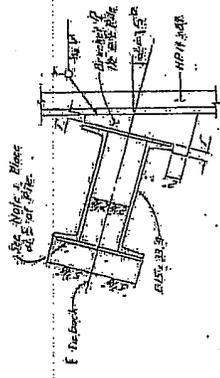
WALLER DETAIL  
 @ RRP 12' x 8' x 8' 3/4" WALLER SECTION



WALLER DETAIL  
 @ RRP 12' x 8' x 8' 3/4" WALLER SECTION



SECTION D-D

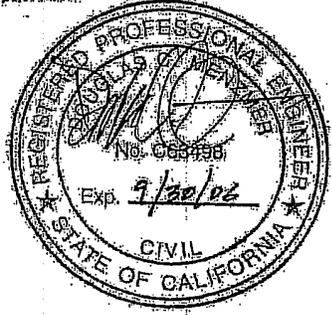
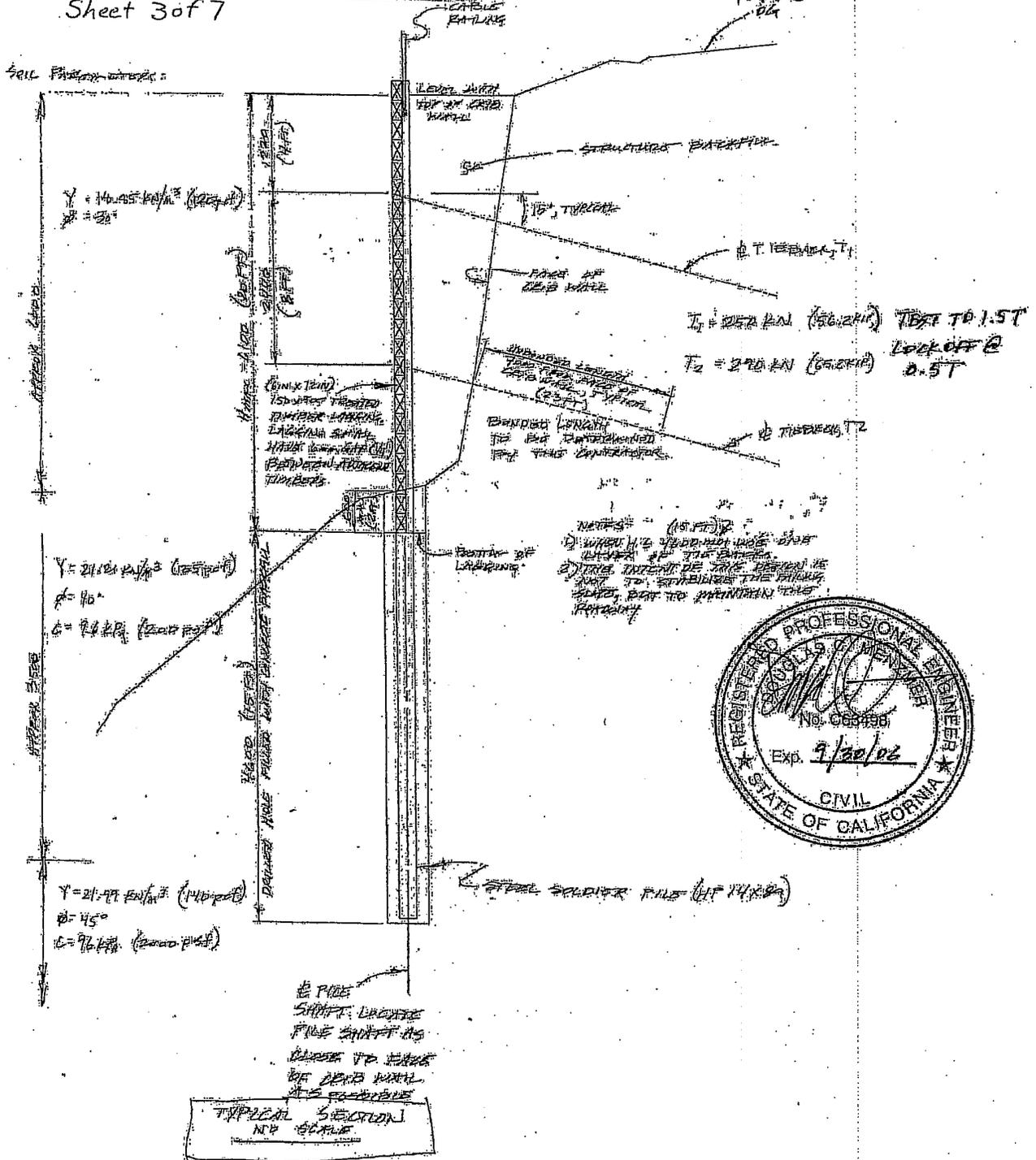


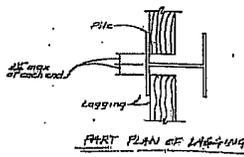
SECTION C-C

AS-DESIGNED  
 AS-BUILTS NOT RECOVERABLE  
 Contract No.: 01-470104  
 Structure Rep.: John Railey  
 Date Prepared: 5/22/07

EMERGENCY REPAIR  
 AT CAMPBELL HILL  
 TIEBACK WALL  
 01-META-1-100  
 EA 01-407023  
 OK

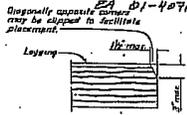
Sheet 3 of 7





PART PLAN OF LAGGING

EMERGENCY REPAIR AT  
 COMPANION HILL TRENCH WALL  
 01-MED-1-100  
 SA 01-407/AB



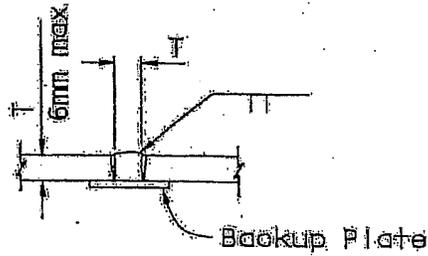
PART ELEVATION OF LAGGING  
 No Scale

AS-DESIGNED  
 AS-BUILT NOT RECOVERABLE  
 Contract No.: 01-470104  
 Structure Rep.:  
 Date Prepared:

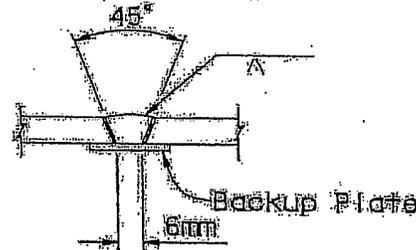
Sheet 4 of 7



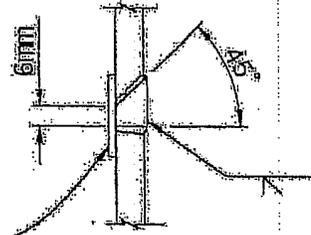
EMERGENCY REPAIR  
 AT CONFUSION MILL  
 TIEBACK WALL  
 01-PLAN-1-100  
 EA 01-467103



**SQUARE GROOVE**



**SINGLE VEE-GROOVE**



**SINGLE BEVEL-GROOVE**

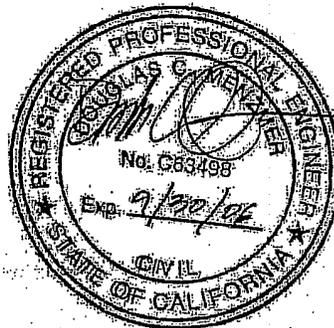
**PILE WELDING DETAIL-BUTT JOINTS**

**Notes:**

1. Single Vee-Groove And Square Groove Permitted for all positions.
2. Single Bevel-Groove permitted for horizontal joints only
3. For purpose of non-destructive testing pile shall be considered a main tension member from top of pile to 2m below bottom of lagging. The remaining embeded portion of the pile shall be considered a main compression member.

AS-DESIGNED  
 AS-BUILTS NOT RECOVERABLE  
 Contract No.: 01-470104  
 Structure Rep.: John Railey  
 Date Prepared: 5/22/07

Sheet 5 of 7



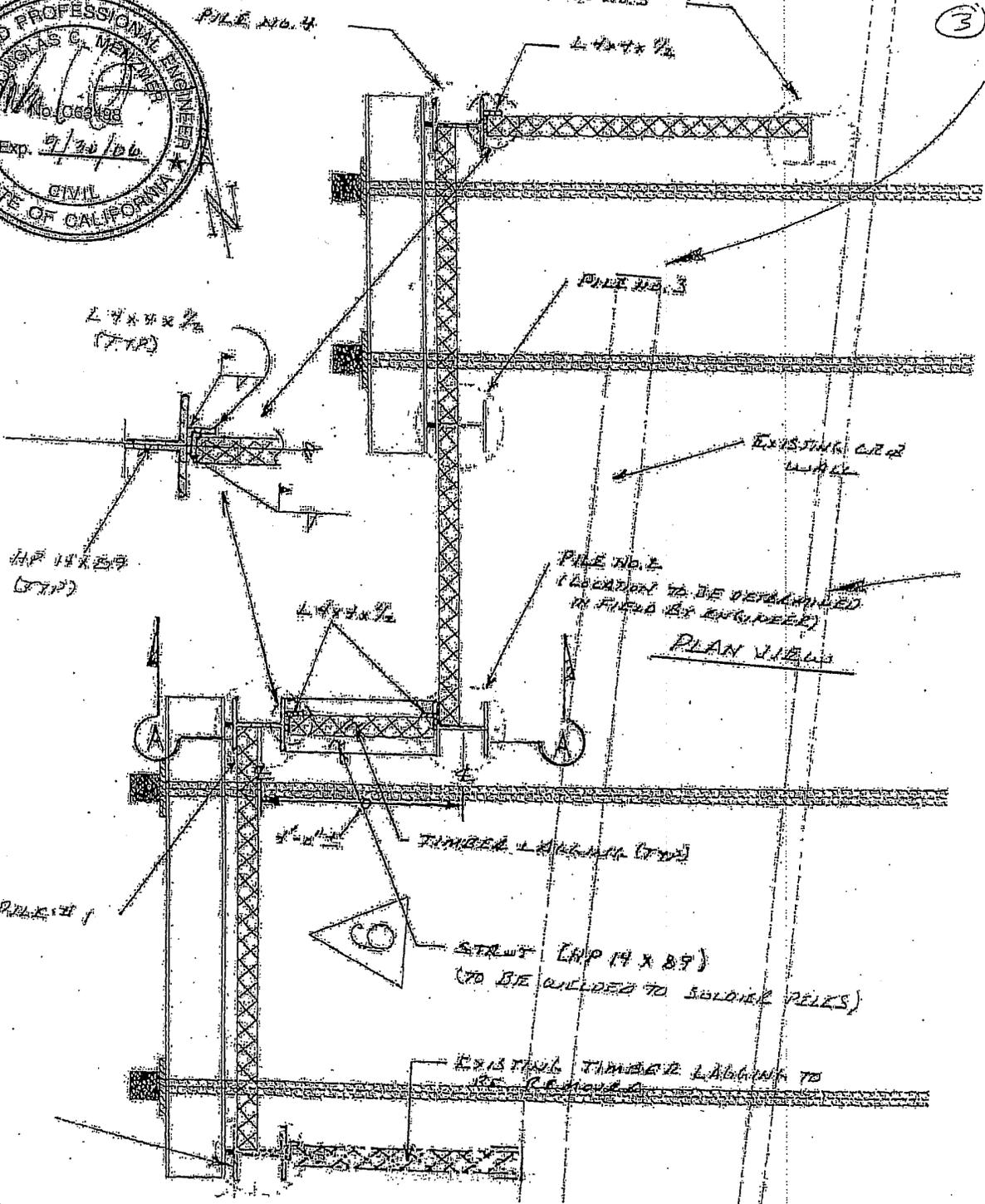
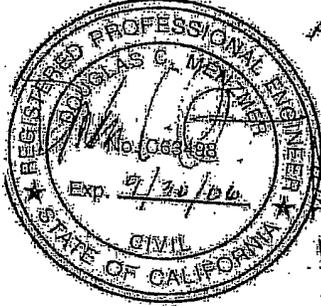
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**AS-BUILTS NOT RECOVERABLE**

Contract No.: 01-470104  
 Structure Rep.: John Railey  
 Date Prepared: 5/22/07

12/19/2008 09:40

CONFUSION WILL EMERGENCY PROJECT  
 EA 01-470104  
 SOLID PILE THE BALE WITH REPAIR

SHEET 2 OF 7



**AS-DESIGNED**  
**AS-BUILT NOT RECOVERABLE**  
 Contract No.: 01-470104  
 Structure Rep.: John Roiley  
 Date Prepared: 5/22/07

0271472005 09:58 AM 4/9/2008 10:00 AM

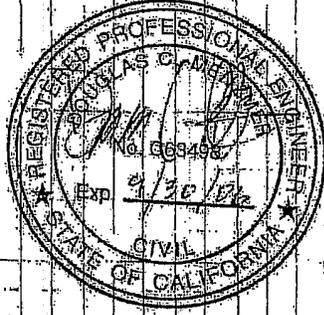
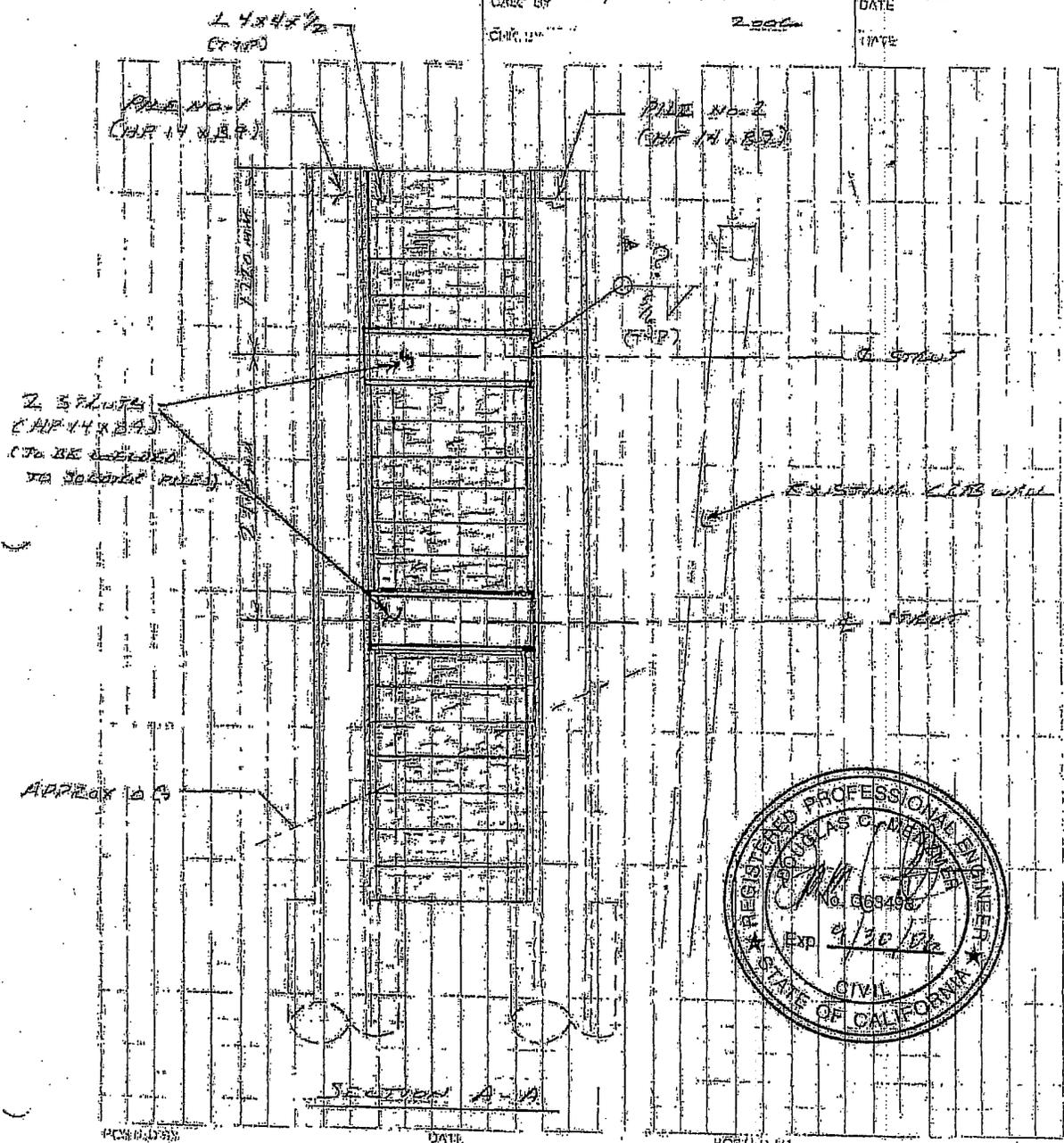
WINDERSVILLE

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION  
 QUANTITY CALCULATIONS  
 DC GEN 4501 BLD (10-53 REV 1/02) 73113529-0

SHEET 7 OF 7

(4)

CONFUSION HILL EMBANKMENT PROJECT  
 EA CONTRACT NO. 7  
 SCHEDULE PAGE / TIEBACK WALL REPAIR  
 DATE 2006

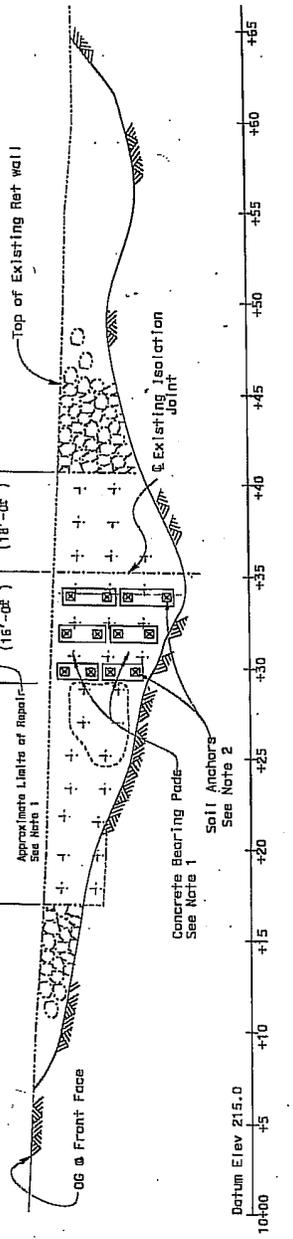


PCN 010731 DATE: 05/22/07

DIST	COUNTY	ROUTE	BLANKS PER FOOT	PRICE	SHEET NO.	TOTAL SHEETS
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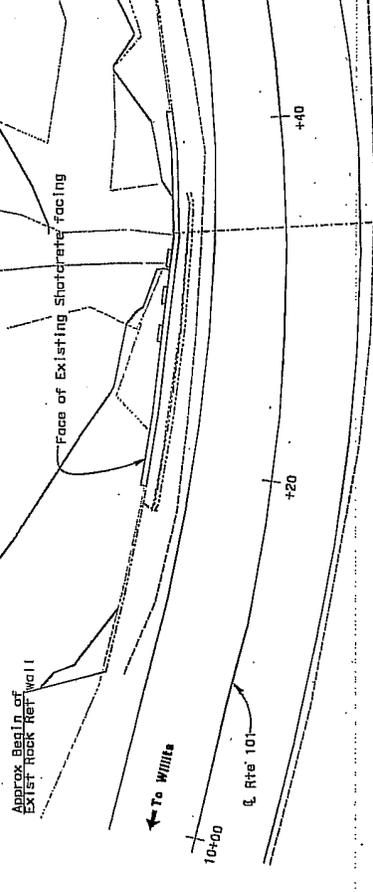
REGISTERED CIVIL ENGINEER  
*R. J. Bailey* 2-17-06  
 PROFESSIONAL ENGINEER  
 No. 4229  
 Exp. 3-31-08  
 CIVIL  
 REGISTERED PROFESSIONAL ENGINEER  
 No. 4229  
 Exp. 3-31-08  
 CIVIL

PLANS APPROVAL DATE  
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**MIRRORED ELEVATION (DEVELOPED)**  
 1 : 125

**AS-DESIGNED**  
**AS-BUILTS NOT RECOVERABLE**  
 Contract No.: 01-470104  
 Structure Rep.: John Bailey  
 Date Prepared: 5/22/07



**PLAN**  
 1 : 125

**TYPICAL SECTION**  
 1 : 125

**INDEX TO PLANS**

SHEET NO.	TITLE
1	GENERAL PLAN
2	STRUCTURE PLAN
3	RETAINING WALL DETAILS

- Notes:  
 1. Number and Locations of Concrete Bearing Pads shall be determined in the field by the Engineer  
 2. Number and Locations of Additional Soil Anchors shall be determined in the field by the Engineer

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

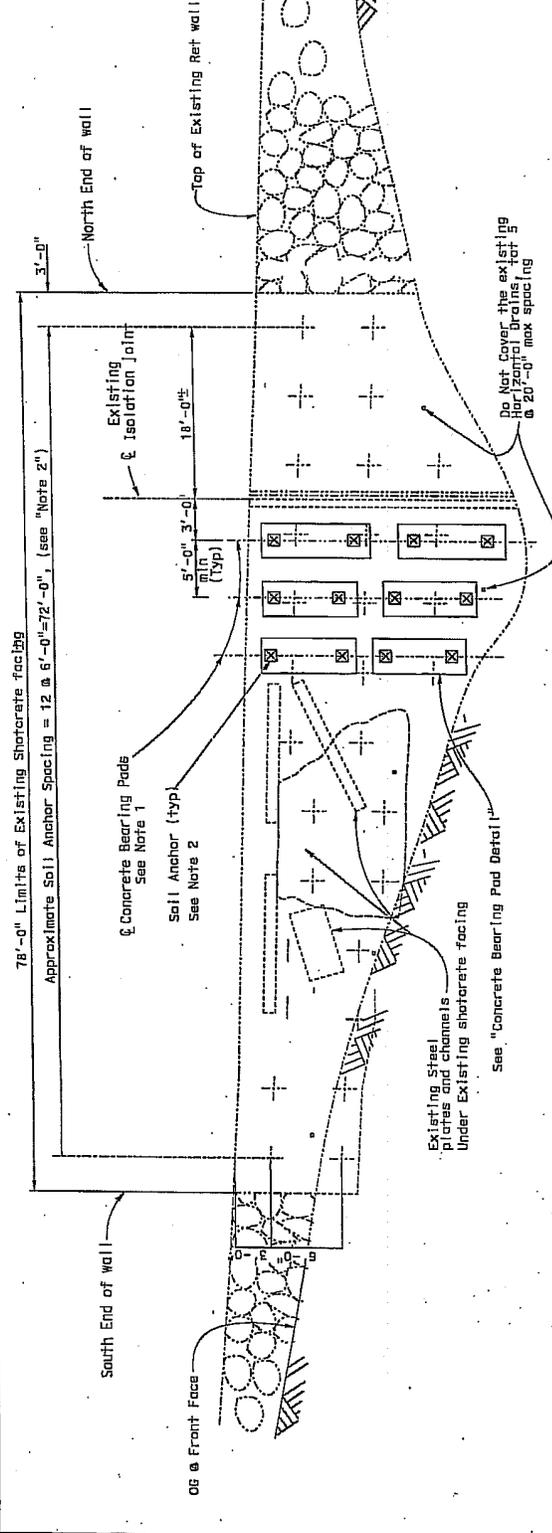
Location 6

DESIGN ENGINEER	DESIGN QUANTITIES	DESIGN DETAILS	DESIGN LAYOUT	DESIGN SPECIFICATIONS	DESIGN CHECKS	DESIGN APPROVAL	DESIGN DATE	DESIGN SCALE	DESIGN SHEET NO.	DESIGN TOTAL SHEETS
STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION DIVISION OF STRUCTURES STRUCTURE DESIGN 1 EMERGENCY RETAINING WALL REPAIR AT PN 99.9 (2006) GENERAL PLAN SHEET NO. 3 TOTAL SHEETS 3 FILE # 99-1117-eval 1902-16.sgn										

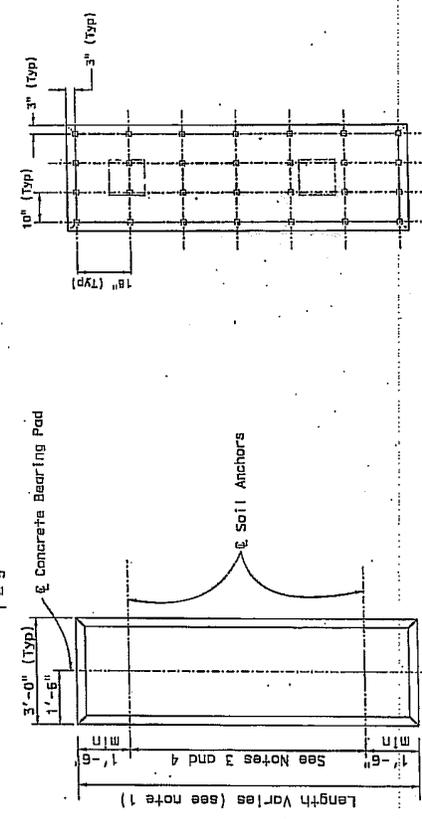
DIST	COUNTY	ROUTE	PROJECT	SHEET	TOTAL SHEETS
01	Men	101		23	33



PLANS APPROVAL DATE  
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**MIRRORED ELEVATION (DEVELOPED)**  
 1" = 5'

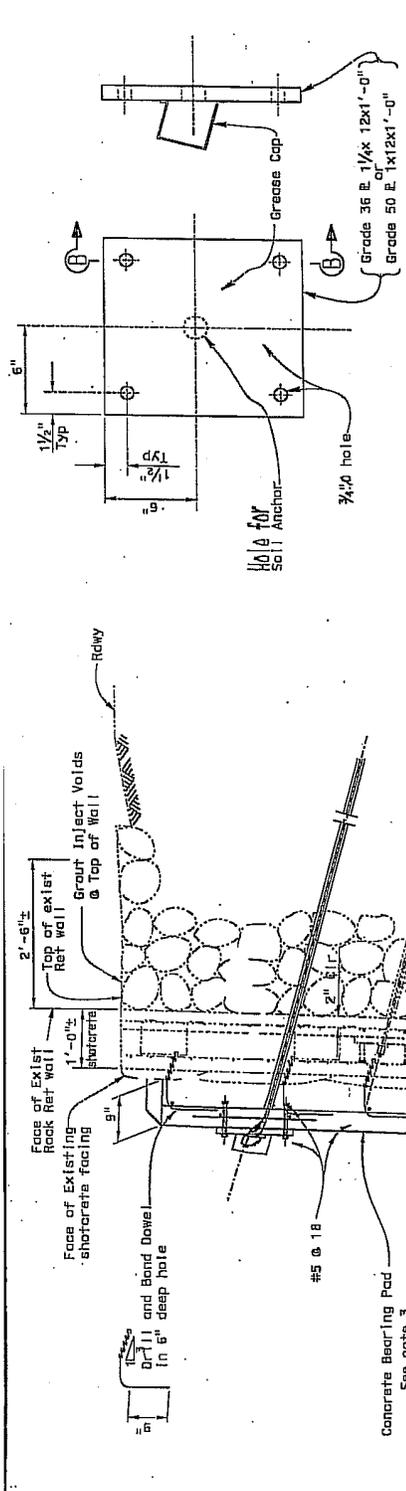


**DIMENSIONS**  
 CONCRETE BEARING PAD DETAIL  
 No Scale

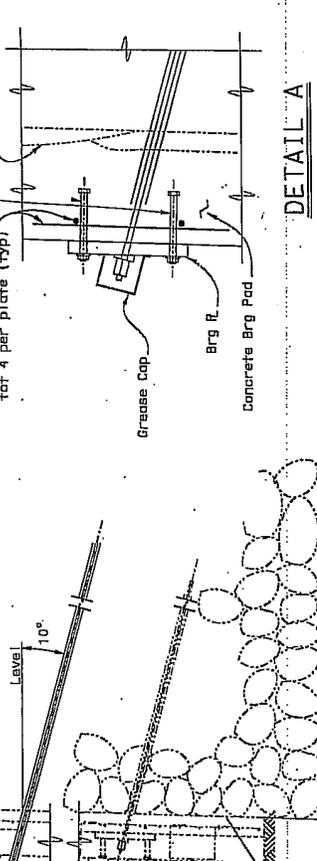
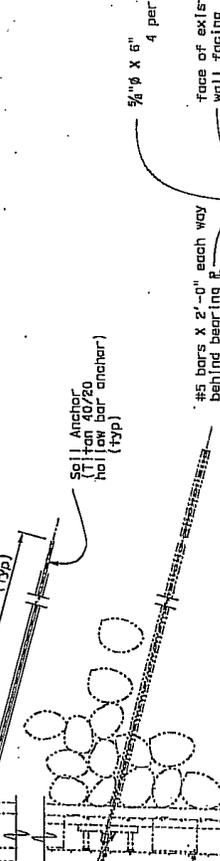
**AS-DESIGNED**  
**AS-BUILT NOT RECOVERABLE**  
 Contract No.: 01-470104  
 Structure Rep.: John Bailey  
 Date Prepared: 5/22/07

- Notes:
- Number, Length and locations of Bearing Pads shall be determined in the field as directed by the Engineer
  - Locations of Soil Nails to be determined in the field by the Engineer
  - Distance between adjacent Soil Anchors shall be 5'-0" min along their entire length to avoid group effects within the bonded zone.
  - Anchor spacing & locations may be adjusted in the field with the following provisions:
    - Max Horiz & Vert Anchor spacing = 6'-0"
    - Max Vert Center-to-center @ top & bottom of wall = 6'-0"
- ..... Indicates existing structure

STATE OF CALIFORNIA	DEPARTMENT OF TRANSPORTATION	PROJECT NO. 067	EMERGENCY RETAINING WALL REPAIR AT PM 99.9 (2005)
SECTION	BY	DATE	DATE
DETAILS	John Bailey	5/22/07	5/22/07
QUANTITIES	John Bailey		
DESIGNED BY	John Bailey		
CHECKED BY	John Bailey		
APPROVED BY	John Bailey		
PROJECT NO.	067	PROJECT TITLE	EMERGENCY RETAINING WALL REPAIR AT PM 99.9 (2005)
SCALE	No Scale	DATE PLOTTED	5/17/07
FILE NO.	01-470104	DATE PLOTTED	5/17/07



**AS-BUILT NOT RECOVERABLE**  
 Contract No.: 91-470104  
 Structure Rep.: John Bailey  
 Date Prepared: 5/22/07



Notes:  
 1. Concrete Brg Pad, min  $f_c = 3600$  psi (25 Mpa)  
 Grease Cap shall be filled with Corrosion Inhibiting grease  
 2. See "Concrete Bearing Pad Detail" on "Structure Plan" sheet for drill and bond dowel pattern and bearing pad dimensions  
 3. Location of Soil Anchors and limits of repair to be determined by the Engineer

DESIGN BY	John Bailey	CHECKED BY	K. Harper
DETAILS BY	John Bailey	CHECKED BY	K. Harper
QUANTITY BY	John Bailey	CHECKED BY	
DATE	10/11/07	SCALE	AS SHOWN

# Memorandum

*Flex your power!  
Be energy efficient!*

**To:** LENA ASHLEY  
Design Branch Chief  
E-3

**Date:** October 29, 2009

**File:** 01-MEN-101-PM 98.9/100.8  
EA: 01-397540  
Decommission Existing  
Roadway

**From:** **DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF ENGINEERING SERVICES**  
**GEOTECHNICAL SERVICES – MS 5**

**Subject:** Confusion Hill Decommission, Geotechnical Recommendations

## 1. Introduction

This report provides preliminary geotechnical recommendations for the removal of an abandoned section U.S. Route 101 between PM 98.9 and PM 100.8, in northwestern Mendocino County, California. The above referenced section of U.S. Route 101 was abandoned in order to bypass a landslide that has caused rockfall, debris flows, and distress to the roadway, over the past 45 years resulting in numerous traffic delays. An alternate alignment was recently completed located to the west of the abandoned alignment. Recommendations contained within this GDR are based on field observations, a complete reconnaissance of the terrain within the project limits, and review of available geologic literature.

## 2. Existing Facilities

The section of roadway to be decommissioned traverses a steep west-facing slope on the east side of the South Fork of the Eel River (Attachment A). The roadway was constructed utilizing a cut excavated into the slope and is supported by a series of earth retaining walls. There is a side hill viaduct on the south end of the abandoned alignment. Several rockfall mitigation systems exist at roadway elevation and on the slope above. Attachment A shows the approximate location of the structures and rockfall mitigation systems to be removed. In addition to the structures and rockfall mitigation systems, all culverts and asphalt within the decommissioned section of the roadway will be removed and the remaining roadway prism out-sloped (Attachment A). The cut slopes along the abandoned alignment have slope ratios that range from 1(v):0.75(h) to near vertical. The existing cut heights range up to an estimated 40m (130 ft).

## 3. Pertinent Reports and Investigations

The following documents were reviewed in preparation of this report:

Blake, M.C., and Jones, L.J., 1981, The Franciscan Assemblage and related rocks in Northern California: A reinterpretation, *in* The Geotectonic Development of California, editor Ernst, W.G., Prentice-Hall, Englewood Cliffs, N.J.

Department of Transportation, Division of Engineering Services, Geotechnical Services, 2004, Preliminary Geotechnical Report: internal Caltrans Memorandum, EA 01-397511.

Department of Transportation, Division of Engineering Services, Geotechnical Services, 2005, Addendum to foundation recommendations for South Fork Eel River Br. 10-299: internal Caltrans Memorandum, EA 01-397511.

Department of Transportation, Division of Engineering Services, Geotechnical Services, 2005, Foundation recommendations for South Fork Eel River Br. 10-299: internal Caltrans Memorandum, EA 01-397511.

Department of Transportation, Division of Engineering Services, Geotechnical Services, 2005, Addendum to foundation recommendations for South Fork Eel River Br. 10-300: internal Caltrans Memorandum, EA 10-397511.

Department of Transportation, Division of Engineering Services, Geotechnical Services, 2005, Preliminary Foundation report, retaining wall no. 1930: internal Caltrans Memorandum, EA 01-397511.

Department of Transportation, Division of Engineering Services, Geotechnical Services, 2005, Foundation recommendations for South Fork Eel River Br. 10-300: internal Caltrans Memorandum, EA 01-397511.

Department of Transportation, Division of Engineering Services, Geotechnical Services, 2005, Foundation report, retaining wall no. 1902: internal Caltrans Memorandum, EA 01-397511.

#### **4. Physical Setting**

The physical setting of the project site and the surrounding area was reviewed to provide climate, topography and drainage. The site itself is located approximately 8 km (5 miles) northwest of Leggett, California. The following is a discussion of that review:

##### **Climate**

Climate data contained within this section was obtained from the Western Regional Climate Center web site, <http://www.wrcc@dri.edu>. The nearest weather station is Richardson Grove State Park, California (047404). That weather station is located approximately 6 miles north of the project. The average annual precipitation, for the area, is 68.84 in with the majority (94 %) of the precipitation occurring in the months of October through April. The annual average total snowfall in the area averages 0.4 in with snowfall recorded in the months of December, January and March. The monthly average maximum temperature is 86.7 degrees F and occurs in the month of August. The monthly average minimum temperature is 37.2 degrees F and occurs in the month of January.

### **Topography and Drainage**

The project area is located within the Piercy 7.5 Minute USGS Quadrangle dated 1969. Moderately steep sloping mountains on either side of the South Fork Eel River characterize the project area. The native hill slope above and below the roadway has a slope angle of approximately 40 degrees. The roadway is at an elevation of 820 ft on the south end of the project and approximately 680 ft on the north end of the project. The elevation of the river to the west of the roadway is approximately 580 ft. The elevation of the top of the hillside to the east of the roadway is approximately 2050 ft. All streams, creeks, and sub-drainage systems, flow into the South Fork Eel River. The South Fork Eel River flows in a northwest trend and drains into the main stem of the Eel River at Dyersville.

### **5. Exploration and Investigations**

A field investigation was conducted in order to determine the scope of the geotechnical considerations required for decommissioning of the above referenced segment of U.S. Route 101. Fieldwork was completed in 2009.

### **6. Geology**

#### **Regional Geology**

The project site is located in the Northern Coast Ranges Geomorphic Province. The Coast Ranges Province is composed primarily of rocks of the Franciscan Complex. The Franciscan Complex has been divided into three parallel belts (Blake and Jones, 1981). They are the Coastal Belt, the Central Belt, and the Yolla Bolly Belt from west to east. Transform faults and east dipping thrust faults form the boundaries between these belts. Holocene active strike slip faults (San Andreas, Maacama, etc.) have further complicated

the geology of the area. Bedrock underlying the project area is composed of the Late Cretaceous to Early Tertiary aged sedimentary rocks of the Coastal Belt.

According to Manson and others (2003) the Coastal Belt of the Franciscan Complex is divided into the Coastal terrane and the Yager terrane. Bedrock at the project site is Coastal terrane. Yager terrane occurs north of Red Mountain Creek and east of the South Fork Eel River to the north of the project site. The Coastal terrane is typically a broken formation characterized by zones of brittle anastomosing shears, boudinage, tight folding, and faulting, as well as by zones of relatively coherent bedded sections. Manson's report (2003) describes the broken formation as mainly gray, thickly bedded sandstone with siltstone and shale interbeds. Although the sedimentary bedding is prominent in outcrops, it is not possible to trace individual beds for great distances. The outcrops commonly represent relatively intact blocks of rock bounded by shear zones. The massive, hard sandstone blocks bounded by weak shear zones, result in slides of large intact blocks of rock and the overlying colluvium.

### **Site Geology**

Bedrock within the projects limits consists of a massive sandstone unit and an interbedded sandstone and shale unit (see Plate 1). The massive sandstone unit (TKfms) is almost entirely massive sandstone beds. The beds of this unit are 10m (33 feet) thick or more. Thin shale beds, thicknesses of 15cm (6 inches) or less, sometimes mark the boundaries between sandstone beds. The interbedded sandstone and shale unit (TKfsh) consists of up to 80 percent sandstone and 20 percent shale. Individual beds of shale and sandstone of this unit are up to 3m (10 feet) thick. The sandstone present in both units primarily consists of a dark gray, decomposed to moderately weathered, very intensely to moderately fractured, very soft to hard sandstone. The mudstone/shale layers generally consist of blackish gray, to grayish black, to black, decomposed to intensely weathered, very intensely to intensely fractured, very soft to moderately hard mudstone. This unit tends to exhibit shear striations in the texture of the body of the rock. The mudstone/shale beds tend to slake when exposed to air and moisture.

Younger surficial units cover the bedrock in a number of areas. The youngest of these units is artificial fill (af), embankments on which the abandoned roadway was constructed. The fill consists of soil and rock excavated from the nearby cuts. Recent stream channel deposits (Qsc) cover most of the bedrock along the present path of the Eel River. The stream channel deposits consist of unconsolidated sand, gravel, cobbles and boulders. The soils within project limits generally consist of slightly compact to very dense, brown to grayish brown, clayey, silty, sand and gravel, with scattered cobbles and boulders. The clasts are primarily angular in shape.

The large slide on the eastside of the Eel River shown on Plate 1 is known as the Confusion Hill landslide. The Confusion Hill slide appears to be a deep seated wedge-type block failure within the bedrock. Two active debris flows (Qdf) are associated with the Confusion Hill slide. The debris flows are shallow surficial failures. A much larger inactive landslide (Qols) encompassed the active "Confusion Hill Slide" has been mapped on the east side of the roadway.

## **Seismicity**

The project is on the northern end of the San Andreas Fault zone. The San Andreas Fault zone is the major boundary between the Pacific plate to the west and the North American plate to the east. The active San Andreas Fault is 23 km (14 miles) to the southwest of the site. The Whale Gulch-Bear Harbor fault is 15 km (9 miles) to the west. The Maacama-Brush Mountain Fault is 15 km (9 miles) southeast of the site and the Lake Mountain fault is 30 km (19 miles) east. The San Andreas Fault system terminates in the Mendocino triple junction where the North American plate, the Pacific plate and the Gorda Plate meet. The Mendocino triple junction is one of the most seismically active areas of California. The Mendocino triple junction is approximately 38 km (24 miles) northeast of the project.

The Petrolia, California earthquakes of April 25-26, 1992, occurred in the area of the Mendocino triple junction and were well instrumented by the California Department of Conservation, Division of Mines and Geology (CDMG), Office of Strong Motion Studies in their report no. OSMS 92-05 (1992). These three earthquakes consisted of a  $M_s$  6.9 mainshock on April 25, 1992, and two aftershocks of  $M_s$  6.2 and 6.5. The CDMG describes the source mechanism of the mainshock as pure thrust motion and the source mechanism of the two aftershocks as strike-slip motion. Horizontal accelerations were recorded on the Rio Dell Overpass 24 km (15 miles) from the epicenter of the mainshock and 72 km (45 miles) from the project site. The nearest station to this project site that strong motion was recorded during this earthquake sequence was in Rockport approximately 35km (22 miles) southwest. Horizontal accelerations recorded for the mainshock were 0.03g at Rockport and for the aftershocks 0.06g was recorded for the second aftershock. The maximum horizontal acceleration recorded at the Shelter Cove station 30 km (19 miles) to the northwest was 0.52g during the second aftershock.

The following table summarizes the nearby faults, their maximum credible earthquakes, the distance from the project and the estimated peak ground accelerations that can be expected at the project during a maximum credible earthquake.

<i>Fault</i>	<i>Style</i>	<i>Distance from project</i>	<i>MCE</i>	<i>R.I. (yr)</i>	<i>PGA</i>
San Andreas	Strike-slip	23 km southwest	8.0	210	0.37 g
Whale Gulch-Bear Harbor	Not known	15 km west	7.5	Unknown	0.36 g
Maacama-Brush Mountain	Strike-slip	15 km southeast	7.25	220	0.31 g
Lake Mountain	Not known	30 km northeast	6.25	141	0.10 g
Bartlett Springs-Round Valley	Strike-slip	30 km east	6.75	218	0.14 g
Garberville-Briceland	Strike-slip	14 km north	6.9	220	0.29 g
Cascadia Subduction Zone	Reverse	77 km northwest	8.5	150-500	0.18 g
Mendocino-Mattole Canyon	Strike-Slip	60 km northwest	8.0	50	0.18 g

No active faults are known to cross the site so the hazard of surface rupture during an earthquake is not likely.

## 7. Geologic Considerations

### Slope Stability

Based on our geotechnical investigations and mapping conducted by the California Geological Survey (2003), the abandoned roadway traverses a large active landslide complex. The approximate limits of the landslide complex (Qls) are shown on Plate 1. Movement of the slide results in frequent plane, wedge, and toppling failures. Numerous rockfall mitigation systems exist along the abandoned alignment and on the slope above. Two active debris flows (Qdf) associated with the Confusion Hill slide are also shown on Plate 1. A debris flow barrier exists near post mile 99.98.

### Surface Water

The South Fork of the Eel River is located below and adjacent to the section of roadway to be decommissioned (Attachment A). Several ravines and gullies emanating from the slope above the abandoned alignment drain into the South Fork Eel River. The ravines and gullies only flow during storm events and quickly drain after periods of rain. The gullies have gradients of approximately 40 degrees.

### Erosion

The finished slopes of the decommissioned alignment will be prone to surface erosion. Recommendations are provided below for fill and channel slope ratios but Landscape Architecture should be consulted to determine appropriate erosion control measures.

### Ground Water

It is unlikely that ground water will be encountered during the decommissioning of the abandoned alignment.

## **Rippability**

All materials associated encountered during the decommissioning of the abandoned alignment are considered rippable.

## **8. Geotechnical Recommendations**

Recommendations pertaining to the existing facilities along the section of roadway to be decommissioned are provided below in order of increasing post mile.

### **1) Confusion Hill Viaduct VI 10-288 P.M. 99.69**

#### **A.) Original Function**

The function of the side hill viaduct was to span over a rock avalanche/debris chute that was depositing materials on the traveled way of U.S. Route 101. The structure was not designed for supporting the hill slope nor was it designed for retaining loose colluvium and debris materials.

#### **B.) Recommendations**

It is recommended to completely remove the viaduct and all structural elements to the ground surface. The piles supporting the structure can be cut off at or just below the ground surface. The rock avalanche/debris chute is sporadically active and steps should be taken to ensure the safety of the workers involved in the demolition of the structure.

### **Imported Rock Slope Protection above the roadway at approximate P.M. 99.76**

#### **A.) Original Function**

The rock slope protection was utilized to help retain landslide debris and to improve the stability of the hill slope due to chronic ground movement occurring approximately 40 feet above the highway.

#### **B.) Recommendation**

Leave the RSP in-place in order to mitigate slope movement and hillslope erosion.

### **Stone Masonry Wall below the highway at approximate P.M. 99.77**

#### **A.) Original Function**

The stone masonry wall was designed to support the roadway embankment. This small stone masonry retaining wall is also adding local stability to the hill slope.

B.) Recommendations

It is recommended to leave the retaining wall intact since this area is prone to landslides and the wall is locally adding stability to the hill slope. The face of the retaining wall is weathered and covered with moss and blends into the surrounding terrain. The small retaining wall presents no discernable visible impact to the area.

**Gravity Bin Wall at approximate P.M. 99.79**

A.) Original Function

The purpose of the bin wall is to support the embankment of the roadway.

B.) Recommendations

Completely remove the bin wall structure.

**Soldier Pile Tie-Back Wall over Bin Wall at approximate P.M. 99.80**

A.) Original Function

The soldier pile wall was constructed in front of a bin wall that was failing due to the re-activation of a local landslide and due to the age and wear of the bin wall. The soldier pile wall was required in order to support the roadway to keep U.S. Route 101 open to travel.

B.) Recommendations

It is recommended to completely remove the soldier pile tie-back wall and all structural elements. The piles and the tiebacks can be cut off at or just below the ground surface leaving the remainder of the piles and tie-backs imbedded. The bin wall located behind the tie-back wall should be completely removed.

**Gravity Bin Wall at approximate P.M. 99.84**

A.) Original Function

The purpose of the bin wall is to support the embankment of the roadway.

B.) Recommendations

Completely remove the bin wall structure.

**Rockfall Barrier above the roadway and Debris Fence at approximate P.M. 99.84**

A.) Original Function

The purpose of the rockfall barrier is to intercept rock and debris falling down the chute above the roadway and direct it into the inboard ditch. The debris fence mounted on k-rail is in place to prevent rock and debris from reaching the traveled way.

B.) Recommendations

It is recommended to completely remove the rockfall barrier above the roadway and all structural supports. The support cables can be cut and removed and the two piles supporting the fence can be cut at or just below the ground surface. The debris fence at roadway elevation should be completely removed as well. The rockfall barrier and debris fence is to be salvaged for future use.

**Stone Wall and Rail at approximate P.M. 99.88**

A.) Original Function

The purpose of the stone wall is to support the embankment of the roadway.

B.) Recommendations

Completely remove the stone wall structure. The rock rail will be salvaged and stockpiled near the removed viaduct at PM 99.69 for Mendocino County.

**Wire Mesh and Cable Drape at approximate P.M. 99.88**

A.) Original Function

The purpose of the wire mesh and cable drape is to mitigate rockfall.

B.) Recommendations

It is recommended to completely remove the cable net and wire mesh and all structural supports. The wire mesh and cable drape is to be salvaged for future use.

**Gravity Bin Wall, Soil Nail Tieback Wall, Stone Wall at approximate P.M. 99.93**

A.) Original Function

These three retaining walls work together to add support the roadway prism and locally the adjacent rock mass.

B.) Recommendations

It is recommended to remove this group of retaining walls.

Immediately above the roadway is a ravine that collects rainfall runoff from the hillslope above and also is also a rockfall/debris flow chute. It is recommended to excavate a channel through roadway prism centered at approximate PM 99.93 to direct rockfall, debris flows and rainfall runoff into an existing drainage swale. The side slopes for this channel can be designed at a slope ratio of 1.5:1.

**Rockfall and Debris Flow Barrier above roadway at approximate P.M. 99.93**

A.) Original Function

The purpose of the rockfall/debris flow barrier is to mitigate rockfall and debris flows emanating from the ravine located above the roadway at this location.

B.) Recommendations

It is recommended to completely remove the fence and all structural supports. The support cables can be cut and removed and the piles supporting the fence can be cut at or just below the ground surface. The rockfall barrier is to be salvaged for future use.

**Stone Wall at approximate P.M. 99.96**

A.) Original Function

The purpose of the stone wall is to support the embankment of the roadway.

B.) Recommendations

It is recommended the stone wall remain in place.

### **Wire Mesh and Cable Drape at approximate P.M. 99.98**

#### A.) Original Function

The purpose of the wire mesh and cable drape is to mitigate rockfall.

#### B.) Recommendations

It is recommended to completely remove the wire mesh and cable drape and all structural supports. The wire mesh and cable drape is to be salvaged for future use.

### **Gravity Bin Wall at approximate P.M. 100.00**

#### A.) Original Function

The purpose of the bin wall is to support the embankment of the roadway.

#### B.) Recommendations

Completely remove the bin wall structure.

### **Culvert removal**

All of the existing culverts, located within the decommissioned section of roadway, will be removed (Attachment A). After the culverts have been removed the side slopes of the excavations should be flattened to a 1.5(h):1(v) slope ratio. In addition, the bottom of the excavation should be lined with appropriately sized rock. The hydraulics branch should be contacted for recommendations for the width of the rock lining (channel width) and the size of the placed rock to be placed at each culvert location.

### **Embankment recommendations**

The sections of the roadway that are supported on embankment can be “out sloped” to create a more natural hill slope appearance. The operation of “out sloping” an embankment involves excavating the outboard edge of the fill slope and placing the material along the inboard ditch and shoulder of the roadway. As the inboard ditch and shoulder of the roadway is filled in and covered up the excavated material continues to be placed extending the material up the hill slope. The amount of material that is excavated from the fill slope and placed against the hill slope is approximately estimated by the amount of material that would produce a 1.5:1 slope ratio passing approximately through the centerline of the roadbed.

## 9. Construction Considerations

We recommend the contractor monitor the slopes above and below the abandoned alignment for movement while removing the viaduct and earth retaining structures and while decommissioning the roadway to ensure the safety of the operation. We recommend the contractor monitor for slope movements using instrumentation (tiltmeters, extensometers, etc.), an array of stakes or survey points, image analysis, direct observation, or some other appropriate method for monitoring slope movements.

The potential for rock fall exists throughout all phases of the project. If the wire mesh, cable drapes, and rockfall/debris flow barriers are to be removed prior to removal of the earth retaining structures, we recommend the contractor construct temporary rockfall barriers to protect workers and equipment and utilize spotters to watch for rockfall.

If you have any questions or require further assistance, please contact Daniel Vann at 707 445-7884 or Charlie Narwold at 707 445-6036.

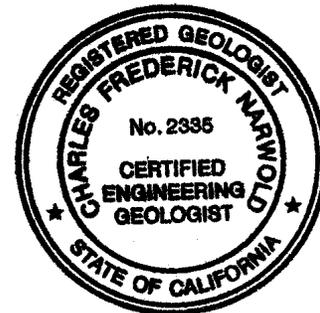
Report by:

 for D.V.

DANIEL VANN  
Engineering Geologist  
Office of Geotechnical Design - North  
Branch B



CHARLIE NARWOLD, C.E.G. #2335  
Senior Engineering Geologist  
Office of Geotechnical Design - North  
Branch B



Attachments

c: OGDN Project File

POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
98.9/100.8		
COUNTY ROUTE	NO.	
Men 101		
REGISTERED CIVIL ENGINEER		
PLANS APPROVED BY		
THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION OR CALTRANS MAY NOT BE HELD RESPONSIBLE FOR ERRORS OR OMISSIONS ON THIS PLAN SHEET.		

**LEGEND**

- Walls (Red line)
- Culverts (Blue line)
- Rock Catchment mesh (Orange grid)
- Post Photograph Progression of slide (Yellow line)
- Environmental Study Limits (Red outline)
- Remove Roadway Prism (Green grid)



**LAYOUT**  
 Confusion Hill Roadway Removal Project  
 Attachment A

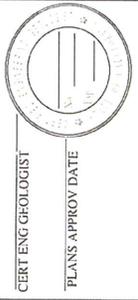
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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED BY	DESIGNED BY	CHECKED BY	DATE REVISED	REVISED BY

BORDER LAST REVISED 4/11/2008

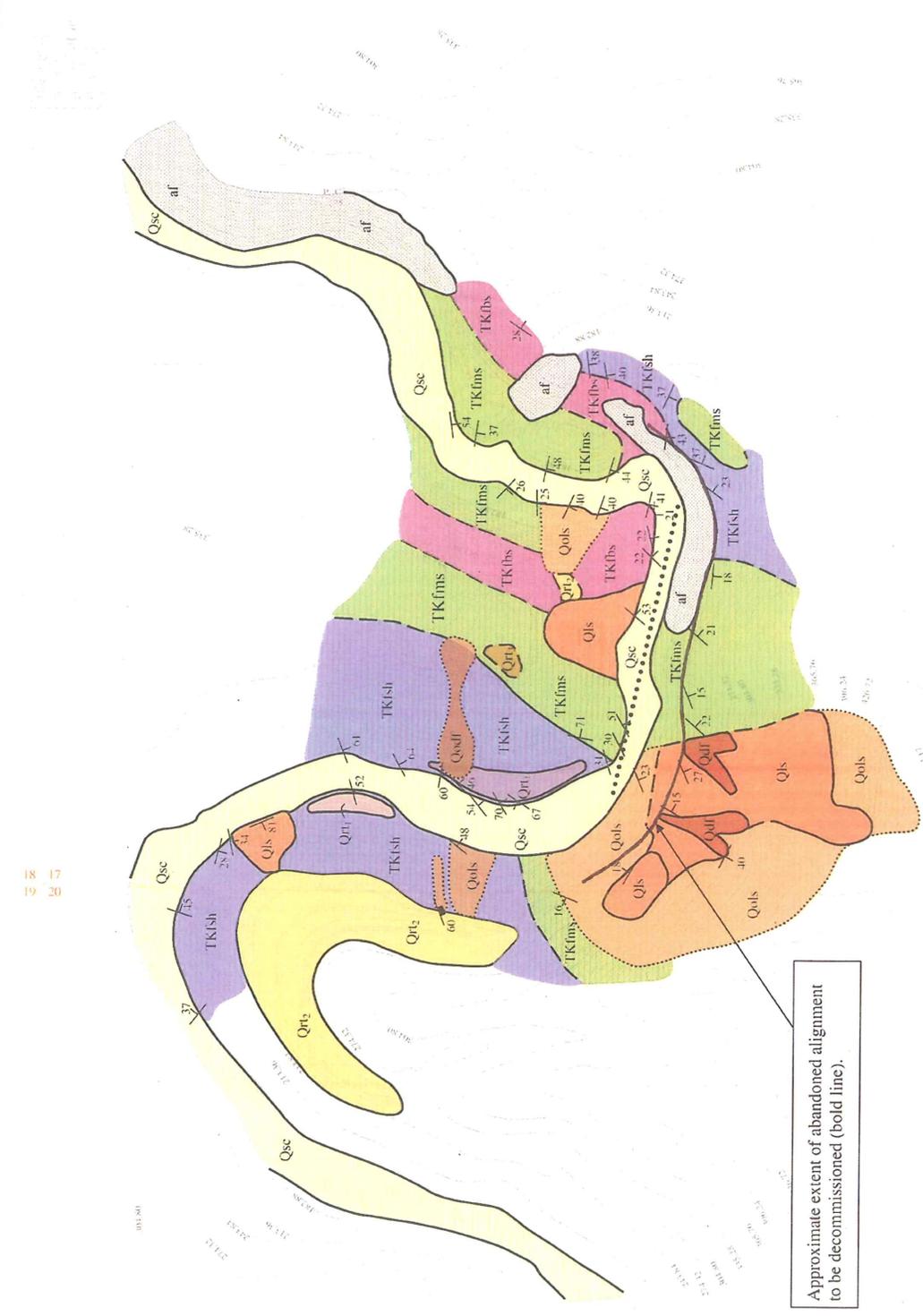
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 TIME PLOTTED => 14:11

Dist	COUNT	ROUTE	Post Miles	SHT
01	MEN	101	98.9/100.8	



CERTIFIED GEOLOGIST  
PLANS APPROVED DATE

- EXPLANATION**
- LEGEND**
- af Artificial Fill
  - Qsc Recent Stream Channel Deposits
  - Qls Active Landslide (Limits shown are approximate)
  - Qdf Active Debris Flow (Limits shown are approximate)
  - Qols Older Inactive Landslide
  - Qodf Older Inactive Debris Flow
  - Qrt1 Youngest River Terrace Deposits
  - Qrt2 Middle River Terrace Deposits
  - Qrt3 Oldest River Terrace Deposits
  - TKlbs Franciscan Assemblage Bedded Sandstone
  - TKfms Franciscan Assemblage Massive Sandstone
  - TKish Franciscan Assemblage Roughly 50% Shale and 50% Sandstone
- SYMBOLS**
- Geologic Contact – dashed where approximately located, dotted where inferred.
  - Strike and Dip of Bedding
  - Fault – dotted where inferred



Approximate extent of abandoned alignment to be decommissioned (bold line).

**PLATE 1. GEOLOGIC MAP**  
 Confusion Hill Decommission  
 01-MEN-101-PM 98.9/100.8  
 01-397540



# California Regional Water Quality Control Board North Coast Region

Geoffrey M. Hales, Chairman



Linda S. Adams  
Acting Secretary for  
Environmental Protection

www.waterboards.ca.gov/northcoast  
5550 Skylane Boulevard, Suite A, Santa Rosa, California 95403  
Phone: (877) 721-9203 (toll free) • Office: (707) 576-2220 • FAX: (707) 523-0135

Edmund G. Brown Jr.  
Governor

April 15, 2011

In the Matter of

## Water Quality Certification

for the

**California Department of Transportation  
Highway 101 - Confusion Hill Decommissioning Project  
WDID No. 1B10074WNME**

APPLICANT: California Department of Transportation  
RECEIVING WATER: Tributaries to the Eel River  
HYDROLOGIC AREA: Eel River Hydrologic Unit No. 111.00  
COUNTY: Mendocino  
FILE NAME: CDOT - HWY 101, Confusion Hill Decommissioning Project

### BY THE EXECUTIVE OFFICER:

1. On June 28, 2010, the North Coast Regional Water Quality Control Board (Regional Water Board) received an application from the California Department of Transportation (Caltrans), requesting Federal Clean Water Act (CWA), section 401, Water Quality Certification for activities related to the proposed Highway 101 – Confusion Hill Decommissioning project (project). Additional project information was received on January 19, 2011. Caltrans proposes to remove the bypassed portion of Highway 101 resulting from the Confusion Hill Roadway Relocation Project. The proposed project will cause disturbances to waters of the United States (U.S.) and waters of the State associated with unnamed tributaries within Eel River Hydrologic Unit No. 111.00 and Benbow Hydrologic Sub-Area 111.32. The Regional Water Board provided public notice of the application pursuant to title 23, California Code of Regulations, section 3858 on March 10, 2011, and posted information describing the project on the Regional Water Board's website. No comments were received.

**California Environmental Protection Agency**

Recycled Paper

2. The proposed project is located on Highway 101 from post mile (PM) 99.8 to PM 100.00, in Mendocino County, south of Piercy. The purpose of the proposed project is to minimize the likelihood of manmade features entering the South Fork Eel River. The project includes: removal of the roadway and eight structures; rock fall mesh; brugg netting; metal beam guard rail; fencing; culverts; and k-rail. Roadway removal will require re-grading the old roadbed to allow for natural drainage and slope stability. In addition, Caltrans is required to revegetate approximately 10 acres (within the roadway relocation area and decommissioning project area) to compensate for impacts to vegetation as part of the Confusion Hill Roadway Relocation Project. The decommissioning project proposes to restore self-sustaining native vegetative cover and to avoid the spread or establishment of invasive plants. The proposed project will result in permanent impacts to waters of the U.S and waters of the State. Caltrans has determined that the total permanent impacts to jurisdictional waters of the U.S. will be 3,000 feet<sup>2</sup> (300 linear feet). However, these impacts are associated with the removal of the existing culverts and the installation of rock slope protection (RSP) to stabilize the drainages. In addition, planting efforts will include restoration of staging areas, fill slopes, and disposal sites associated with the realignment project. The decommissioning project will result in a 2.9-acre decrease in impervious surface, the revegetation of 2.4 acres, and the restoration of 0.33 acres of drainage channels. Therefore, compensatory mitigation for the fill within waters of the U.S. and State is not required.
3. The total disturbed soil area is approximately 3.3 acres, which is estimated on the area of the removed structures, removed pavement, and limits of earthwork. Caltrans' contractor will be required to prepare a Storm Water Pollution Prevention Plan (SWPPP) that will include Best Management Practices (BMPs) for construction and post construction phases of the project. Caltrans will utilize BMPs to provide erosion and sediment control and pollution prevention throughout the project area during construction. All graded areas within the project affected by the construction activities will be appropriately stabilized and BMPs will be implemented to ensure erosion is minimized and controlled.
4. Caltrans has applied for authorization from the United States Army Corps of Engineers to perform the project under their Non-Reporting Nationwide Permit No. 27 (Aquatic Habitat Restoration, Establishment, and Enhancement Activities) pursuant to Clean Water Act, section 404. Caltrans has determined that this project is Categorical Exempt from California Environmental Quality Act (CEQA). In addition, Regional Water Board staff also determined that this project is categorically exempt from CEQA and anticipates filing a notice of exemption.
5. The proposed project construction activities are scheduled to be conducted in 2011 through the end of 2013. The entire project is expected to take approximately

three years to complete; however, the proposed in-channel work will only be conducted between May 15<sup>th</sup> and October 15<sup>th</sup>, when flows are low. Caltrans will utilize BMPs to provide erosion and sediment control and pollution prevention throughout the project area during construction. All graded areas within the project affected by the construction activities will be appropriately stabilized and BMPs will be implemented to ensure erosion is minimized and controlled.

6. The Eel River watershed is listed on the Clean Water Act section 303(d) list as impaired for sediment and temperature. On December 16, 1999, the U.S. EPA established sediment and temperature Total Maximum Daily Loads (TMDLs) for the South Fork Eel River Watershed. Roads are a significant source of sediment in the watershed (directly, from surface erosion, and, indirectly, by triggering landslides). In addition, activities that impact the riparian zone and reduce riparian vegetation are identified as sources contributing to increased stream temperatures. A focus on measures to reduce sediment discharges to surface waters from roads in the watershed, and measures to avoid, minimize, and mitigate impacts on riparian zones is essential for achieving TMDL compliance.
7. Pursuant to Regional Water Board Resolution R1-2004-0087, *Total Maximum Daily Load Implementation Policy Statement for Sediment-Impaired Receiving Waters within the North Coast Region* (Sediment TMDL Implementation Policy), the Executive Officer is directed to "rely on the use of all available authorities, including existing regulatory standards, and permitting and enforcement tools to more effectively and efficaciously pursue compliance with sediment-related standards by all dischargers of sediment waste."
8. To ensure compliance with sediment, temperature and other related Water Quality Objectives within the Basin Plan, and consistent with the U.S. EPA-established TMDLs, adequate wetland and riparian protection and stringent requirements to avoid, minimize, and mitigate the sediment and temperature impacts associated with the proposed project will be incorporated as enforceable conditions this Water Quality Certification. In addition, Caltrans will be required to conduct surface water monitoring, sampling, and analysis in accordance with the conditions of the Water Quality Certification. Additionally, storm water runoff monitoring, sampling, and analysis will be conducted as required by the State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) Permit for Storm Water Discharges from the State of California, Department of Transportation (Caltrans) Properties, Facilities and Activities Order No. 99 – 06 - DWQ. The surface water data collected will be utilized to assess the adequacy of BMPs during construction as well as site specific mitigation measures proposed to minimize impacts to the environment, including sediment and temperature impacts.
9. The federal antidegradation policy requires that state water quality standards include an antidegradation policy consistent with the federal policy. The State

Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The Regional Water Board's Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies. This Order is consistent with applicable federal and State antidegradation policies, as it does not authorize the discharge of increased concentrations of pollutants or increased volumes of treated wastewater, and does not otherwise authorize degradation of the waters affected by this project.

10. The South Fork Eel River from the middle of Section 29, T23N, R16W (approximately one-half mile upstream of Rattlesnake Creek confluence) to the confluence with the Eel River is designated as a recreational reach under both federal and California Wild and Scenic Rivers Acts. These acts require preservation of the river's free-flowing condition; anadromous and resident fisheries; and outstanding geologic, wildlife, flora and fauna, historic and cultural, visual, recreational, and water quality values. Recreational segments are generally developed, with parallel roads, bridges, and structures. All activities normally associated with public lands are permitted subject to the protection of free flowing conditions and outstanding values. Implementation of the Project would not affect the free-flowing condition of the South Fork Eel River and would not affect the extraordinary values for which the segment was listed.

Receiving Waters: Unnamed Tributaries to the Eel River  
Eel River Hydrologic Unit No. 111.00,  
Benbow Hydrologic Sub-Area No. 111.32.

Filled or Excavated Areas: Permanent - streams (Waters of U.S.): 3,000 feet<sup>2</sup>

Total Linear Impacts: Permanent - streams (Waters of U.S.): 300 linear ft

Dredge Volume : None

Fill Volume : 230 cubic yards

Latitude/Longitude: 39.9244 N / 123.7583 W

ACCORDINGLY, BASED ON ITS INDEPENDENT REVIEW OF THE RECORD, THE REGIONAL WATER BOARD CERTIFIES THAT THE CALTRANS HIGHWAY 101 CONFUSION HILL DECOMMISSIONING PROJECT (FACILITY NO. 1B10074WNME), as described in the application will comply with sections 301, 302, 303, 306 and 307 of the Clean Water Act, and with applicable provisions of state law, provided that the Caltrans complies with the following terms and conditions:

**All conditions of this order apply to Caltrans (and all its employees) and all contractors (and their employees), sub-contractors (and their employees), and any other entity or agency that performs activities or work on the project (including the off-site mitigation lands) as related to this Water Quality Certification.**

1. This certification action is subject to modification or revocation upon administrative or judicial review; including review and amendment pursuant to Water Code section 13330 and title 23, California Code of Regulations, section 3867.
2. This certification action is not intended and shall not be construed to apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent certification application was filed pursuant to title 23, California Code of Regulations, section 3855, subdivision (b) and the application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.
3. The validity this certification is conditioned upon total payment of any fee required under title 23, California Code of Regulations, section 3833, and owed by the applicant.
4. Except as may be modified by any preceding conditions, all certification actions are contingent on: a) the discharge being limited, and all proposed revegetation and mitigation being completed, in strict compliance with the applicant's project description, as approved herein, and b) compliance with all applicable water quality requirements and water quality control plans including the requirements of the Basin Plan, and amendments thereto.
5. All conditions required by this Order shall be included in the Plans and Specifications prepared by Caltrans for the Contractor. In addition, Caltrans shall require compliance with all conditions included in this Order in the bid contract for this project.
6. Caltrans shall construct the project in accordance with the project described in the application and the findings above, and shall comply with all applicable water quality standards as detailed in the Basin Plan.
7. Any change in the design or implementation of the project that would have a significant or material effect on the findings, conclusions, or conditions of this Order must be submitted to the Executive Officer of the Regional Water Board for prior review, consideration, and written concurrence.

8. Caltrans shall provide a copy of this Order and State Water Resources Control Board (SWRCB) Order No. 2003-0017-DWQ to the contractor, all subcontractors, and all utility companies conducting the work, and require that copies remain in their possession at the work site. Caltrans shall be responsible for work conducted by its contractor, subcontractors, or utility companies.
9. The Regional Water Board shall be notified in writing each year at least five working days (working days are Monday – Friday) prior to the commencement of channel, vegetation or ground disturbing activities, grinding activities, or water diversion activities with details regarding the construction schedule, in order to allow Regional Water Board staff to be present on-site during installation and removal activities, and to answer any public inquiries that may arise regarding the project. Caltrans shall provide Regional Water Board staff access to the project site to document compliance with this order.
10. The Resident Engineer (or appropriately authorized agent) shall hold on-site water quality permit compliance meetings (similar to tailgate safety meetings) to discuss permit compliance, including instructions on how to avoid violations and procedures for reporting violations. The meetings shall be held at least every other week, before forecasted storm events, and when a new contractor or subcontractor arrives to begin work at the site. The contractors, subcontractors and their employees, as well as any inspectors or monitors assigned to the project, shall be present at the meetings. Caltrans shall maintain dated sign-in sheets for attendees at these meetings, and shall make them available to the Regional Water Board on request.
11. All activities and best management practices (BMPs) shall be implemented according to the submitted application and the conditions in this certification. BMPs for erosion, sediment, turbidity and pollutant control shall be implemented and in place at commencement of, during, and after any ground clearing activities, construction activities, or any other project activities that could result in erosion, sediment, or other pollutant discharges to waters of the State. The BMPs shall be implemented in accordance with the Caltrans Construction Site Best Management Practice Manual (CCSBMPM) and all contractors and subcontractors shall comply with the CCSBMPM. In addition, BMPs for erosion and sediment control shall be utilized year round, regardless of season or time of year. Caltrans shall stage erosion and sediment control materials at the work site. All BMPs shall be installed properly and in accordance with the manufacturer's specifications. If the project Resident Engineer elects to install alternative BMPs for use on the project, Caltrans shall submit a proposal to Regional Water Board staff for review and concurrence.
12. Caltrans shall prioritize the use of wildlife-friendly biodegradable (not photo-degradable) erosion control products wherever feasible. Caltrans shall not use or

allow the use of erosion control products that contain synthetic netting for permanent erosion control (i.e. erosion control materials to be left in place for two years or after the completion date of the project). If Caltrans finds that erosion control netting or products have entrapped or harmed wildlife, personnel shall remove the netting or product and replace it with wildlife-friendly biodegradable products. Caltrans shall not use or allow the use of erosion control products that contain synthetic materials within waters of the United States or waters of the State at any time. Caltrans shall request approval from the Regional Water Board if an exception from this requirement is needed for a specific location.

13. Work in flowing or standing surface waters, unless otherwise proposed in the project description and approved by the Regional Water Board, is prohibited. If construction dewatering of groundwater is found to be necessary, Caltrans shall use a method of water disposal other than disposal to surface waters (such as land disposal) or Caltrans shall apply for coverage under the Low Threat Discharge Permit or an individual National Pollutant Discharge Elimination System (NPDES) Permit and receive notification of coverage to discharge to surface waters, prior to the discharge.
14. Caltrans is prohibited from discharging waste to waters of the State, unless explicitly authorized by this Order. For example, no debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or concrete washings, welding slag, oil or petroleum products, or other organic or earthen material from any construction or associated activity of whatever nature, other than that authorized by this Order, shall be allowed to enter into waters of the State. In addition, none of the materials listed above shall be placed within 150 linear feet of waters of the State or where the materials may be washed by rainfall into waters of the State.
15. If, at any time, an unauthorized discharge to surface water (including wetlands, rivers or streams) occurs, or any water quality problem arises, the associated project activities shall cease immediately until adequate BMPs are implemented. The Regional Water Board shall be notified promptly and in no case more than 24 hours after the unauthorized discharge or water quality problem arises.
16. Caltrans and their contractor are not authorized to discharge wastewater (e.g., water that has contacted uncured concrete or cement, or asphalt) to surface waters, ground waters, or land. Wastewater may only be disposed of to a sanitary waste water collection system/facility (with authorization from the facility's owner or operator) or a properly-licensed disposal or reuse facility. If Caltrans or their contractor proposes an alternate disposal method, Caltrans or their contractor shall apply for a permit from the Regional Water Board. Plans to reuse or recycle wastewater require written approval from Regional Water Board staff.

17. Caltrans shall submit, subject to approval by the Regional Water Board staff, a dewatering and/or diversion plan that appropriately describe the dewatered or diverted areas and how those areas will be handled during construction. The diversion/dewatering plans shall be submitted no later than 30 days prior to conducting the proposed activity. Information submitted shall include the area or work to be diverted or dewatered and method of the proposed activity. All diversion or dewatering activities shall be designed to minimize the impact to waters of the State and maintain natural flows upstream and downstream. All dewatering or diversion structures shall be installed in a manner that does not cause sedimentation, siltation or erosion upstream or downstream. All dewatering or diversion structures shall be removed immediately upon completion of project activities. The in-channel work will only be conducted between May 15<sup>th</sup> and October 15<sup>th</sup>. This Water Quality Certification does not authorize Caltrans to draft surface waters.
18. Fueling, lubrication, maintenance, storage and staging of vehicles and equipment shall be outside of waters of the United States and the State. Fueling, lubrication, maintenance, storage and staging of vehicles and equipment shall not result in a discharge or a threatened discharge to any waters of the State or the United States. At no time shall the Applicant use any vehicle or equipment which leaks any substance that may impact water quality.
19. Caltrans shall implement appropriate BMPs to prevent the discharge of equipment fluids to the stream channel. The minimum requirements will include: storing hazardous materials at least 150 linear feet outside of the stream banks; checking equipment for leaks and preventing the use of equipment with leaks; pressure washing or steam cleaning equipment to remove fluid residue on any of its surfaces prior to its entering any stream channel in a manner that does not result in a discharge to waters of the State.
20. Caltrans clearly define stream setbacks that limit construction activities as describe in the application and prohibit ground disturbing activities within 50 linear feet of streams during the rainy season (October 15<sup>th</sup> to May 15<sup>th</sup>). If an exception from this requirement is needed for a specific location, Caltrans shall request approval from the Regional Water Board at least 5 working days in advance. At no time shall in-stream activities be conducted outside the work window of May 15<sup>th</sup> to October 15<sup>th</sup>. Exceptions may be granted by Regional Water Board staff on a case by case review, only if the streams are dry or have minimal flow, and CDFG and NMFS have concurred.
21. If work is allowed within the stream channel or on the banks outside of the above referenced work window, Caltrans shall monitor the seventy-two (72) hour forecast from the National Weather Service. When forecast indicates a probability of precipitation of 50 percent or greater within the 72-hour period, or at the onset of

any precipitation, ground disturbing activities shall cease and erosion and sediment control measures shall be implemented to stabilize exposed soils and prevent the mobilization of sediment into the stream channel or adjacent wetland or riparian areas. Caltrans bears full liability should the BMPs employed fail to prevent any discharge to waters of the State that exceeds applicable water quality standards or is beyond the certified area of impact. All earthwork and ground disturbing activities halted due to precipitation may resume when precipitation ceases and a 50 percent or less chance of precipitation is forecast throughout the duration of the subsequent 72-hour weather forecast.

22. Caltrans shall provide analysis and verification that placing non-hazardous waste or inert materials (which may include discarded product or recycled materials) will not result in degradation of water quality, human health, or the environment. All project-generated waste shall be handled, transported, and disposed in strict compliance with all applicable State and Federal laws and regulations. When operations are complete, any excess material or debris shall be removed from the work area and disposed of properly and in accordance with the Special Provisions for the project and/or Standard Specification 7-1.13, Disposal of Material Outside the Highway Right of Way. Caltrans shall submit to the Regional Water Board the satisfactory evidence provided to the Caltrans Engineer by the Contractor referenced in Standard Specification 7-1.13. In accordance with State and Federal laws and regulations, Caltrans is liable and responsible for the proper disposal of waste generated by their project.
23. All imported fill material shall be clean and free of pollutants. All fill material shall be imported from a source that has the appropriate environmental clearances and permits. The reuse of low-level contaminated solids as fill on-site shall be performed in accordance with all State and Federal policies and established guidelines and must be submitted to the Regional Water Board for review and concurrence.
24. Surface water monitoring shall be conducted whenever a project activity is conducted within waters of the State (e.g. demolition and stream diversions). Surface water monitoring shall be conducted when any project activity has, or has the potential to, mobilize sediment and/or alter background conditions within waters of the State. In order to demonstrate compliance with receiving water limitations and applicable water quality standards, field measurements shall be collected whenever a project activity may alter background conditions.
25. Caltrans shall establish effluent, upstream (background) and downstream monitoring locations to demonstrate compliance with all applicable water quality objectives as detailed in the Basin Plan. The downstream location shall be no more than 50 feet from the effluent location. Field measurements shall be taken from each location four times daily for flow, pH, temperature, dissolved oxygen,

total dissolved solids, turbidity and specific conductance. In addition, visual observations shall be made four times daily and include the appearance of the discharge including color, turbidity, floating or suspended matter or debris, appearance of the receiving water at the point of discharge (occurrence of erosion and scouring, turbidity, solids deposition, unusual aquatic growth, etc), and observations about the receiving water, such as the presence of aquatic life. Measurements shall be collected from each sampling location four times daily while work is being conducted within waters of the State.

26. Whenever, as a result of project activities, downstream measurements exceed the following water quality objectives, appropriate measurements shall be collected from all monitoring locations every hour during the period of increase, and shall continue until measurements demonstrate compliance with receiving water limitations and the water quality parameters are no longer increasing as a result of project activities.

pH	<7.0 or >8.5 (any changes >0.5 units)
temperature	>0.5°F above background
dissolved oxygen	<7 milligrams per liter (mg/L)
total dissolved solids	>120 mg/L
turbidity	20% above natural background
specific conductance	>200 micromhos @ 77°F

If any measurements are beyond the water quality objectives 50 feet downstream of the source(s), all necessary steps shall be taken to install, repair, and/or modify BMPs to control the source(s). In addition, the overall distance from the source(s) to the downstream extent of the exceedance shall be measured.

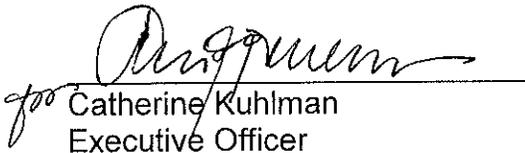
Monitoring results shall be reported to appropriate Regional Water Board staff person by telephone within one hour of taking any measurements that exceed the limits detailed above (turbidity only if it is higher than 20 NTU as well). Upstream and downstream pictures within the working and/or disturbed area shall be taken and submitted to the appropriate Regional Water Board staff via e-mail or fax within 24 hours of the incident. All other monitoring data shall be reported on a monthly basis and is due to the Regional Water Board by the 15<sup>th</sup> of the following month.

27. Rainy Day Reports: Caltrans shall take photos of all areas disturbed by project activities, including all excess materials disposal areas, after rainfall events that generate visible runoff from these areas in order to demonstrate that erosion control and revegetation measures are present and have been installed appropriately and successfully. A brief report containing these photos shall be submitted within 30 days of the rainfall event that generated runoff from the disturbed areas. Once the site has demonstrated appropriate and effective erosion

and sediment control, Caltrans may request a reprieve from this condition from the Regional Water Board.

28. The revegetation of approximately 10 acres (within the roadway relocation area and decommissioning project area) to compensate for impacts to vegetation as part of the Confusion Hill Roadway Relocation Project shall be conducted in accordance with 401 application package. Monitoring reports for the restoration project shall be submitted to the Regional Water Board on December 31, yearly for up to five years following completion of the mitigation project, or until the project has reached achieved the success criteria.
29. In the event of any violation or threatened violation of the conditions of this Order, the violation or threatened violation shall be subject to any remedies, penalties, process or sanctions as provided for under applicable state or federal law. For the purposes of section 401(d) of the Clean Water Act, the applicability of any state law authorizing remedies, penalties, process or sanctions for the violation or threatened violation constitutes a limitation necessary to assure compliance with the water quality standards and other pertinent requirements incorporated into this Order. In response to a suspected violation of any condition of this certification, the State Water Board may require the holder of any federal permit or license subject to this Order to furnish, under penalty of perjury, any technical or monitoring reports the State Water Board deems appropriate, provided that the burden, including costs, of the reports shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. In response to any violation of the conditions of this Order, the Regional Water Board may add to or modify the conditions of this Order as appropriate to ensure compliance.
30. The Regional Water Board may add to or modify the conditions of this Order, as appropriate, and to implement any new or revised water quality standards and implementation plans adopted or approved pursuant to the Porter-Cologne Water Quality Control Act or section 303 of the Clean Water Act.
31. This Order is not transferable. In the event of any change in control of ownership of land presently owned or controlled by Caltrans, Caltrans shall notify the successor-in-interest of the existence of this Order by letter and shall forward a copy of the letter to the Regional Water Board. The successor-in-interest must send to the Regional Water Board Executive Officer a written request for transfer of this Order to discharge dredged or fill material under this Order. The request must contain the following:
  - a. requesting entity's full legal name
  - b. the state of incorporation, if a corporation
  - c. address and phone number of contact person

- d. description of any changes to the project or confirmation that the successor-in-interest intends to implement the project as described in this Order.
32. The authorization of this certification for any dredge and fill activities expires on April 14, 2016. Conditions and monitoring requirements outlined in this Order are not subject to the expiration date outlined above, and remain in full effect and are enforceable.
33. Please contact our staff Environmental Specialist / Caltrans Liaison Jeremiah Puget at (707) 576-2835 or [jpuget@waterboards.ca.gov](mailto:jpuget@waterboards.ca.gov) if you have any questions.

  
Catherine Kuhlman  
Executive Officer

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Weblink: State Water Resources Control Board Order No. 2003-0017 -DWQ, General Waste Discharge Requirements for Dredge and Fill Discharges That Have Received State Water Quality Certification can be found at:  
[http://www.waterboards.ca.gov/board\\_decisions/adopted\\_orders/water\\_quality/2003/wqo/wqo2003-0017.pdf](http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0017.pdf)

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