

**Meeting of the Central Valley Flood Protection Board  
May 24, 2013**

**Staff Report – Encroachment Permit**

**Stockton East Water District (SEWD)**

**Caprini Low Water Crossing Fish Passage Improvement Project,  
San Joaquin County**

---

**1.0 – ITEM**

Consider approval of Permit No. 18817 (Attachment B)

**2.0 – APPLICANT**

Stockton East Water District (SEWD)

**3.0 – LOCATION**

The project is located in the Mormon Slough approximately 3,300 feet downstream of the Jack Tone Road Bridge. (Mormon Slough, San Joaquin County, see Attachment A)

**4.0 – DESCRIPTION**

Applicant proposes to replace existing culverts to improve fish passage on the Mormon Slough at the Caprini Crossing (see Attachment C).

**5.0 – PROJECT ANALYSIS**

The applicant is proposing to replace the existing CMP culverts, concrete roadway and apron, with three (3) 10-feet by 12-feet box culverts. The sides of the culverts will be backfilled with native material and capped with an 8-inch concrete slab to match the existing roadway. The channel will be graded approximately 125-feet upstream and 125-feet downstream of the crossing to at 0.5% longitudinal slope.

Approximately 1,000 cubic yards of native material will be removed from the channel and replaced with 450 cubic yards of engineered streambed material and approximately 200 cubic yards of bank revetment consisting of 18-inch boulders with sand and silt for bank stability. The upper portions of the banks will be revegetated with a native seed mix. This project conforms to all applicable Title 23 standards.

## **5.1 – Hydraulic Analysis**

A hydraulic analysis was performed using the hydraulic model HEC-RAS, a one-dimensional model developed by the U.S. Army Corps of Engineers (USACE). Existing conditions (base model) were compared to post-project conditions (design model) for the 100-year and 200-year flood events. The 100-year and 200-year flows were estimated to be 12,844 cfs and 12,965 cfs, respectively.

Results show that for the 100-year and 200-year flows, the crossing is submerged by more than 17-feet of water. This is a low-water crossing and as such, this elevation difference was expected. Existing non-federal levees were not overtopped for any of the model conditions. The minimum freeboard is 1.46 and 1.13 feet for the 100-year and 200-year flows, respectively. The minimum freeboard occurred at a distance of 482-feet from the crossing location. The water surface elevations upstream of the crossing will be lowered under the proposed design, thereby increasing the freeboard. Therefore, the proposed project will not have a negative impact on the 100-year and 200-year water surface elevations.

## **5.2 – Geotechnical Analysis**

The proposed project has no significant geotechnical impacts as the culverts will be constructed in the low-flow portion of the channel.

## **5.3 – Additional Staff Analysis**

The proposed project is one of thirty-seven (37) instream structures to be retrofitted or modified, which were identified by the U.S. Fish and Wildlife Service to improve fish passage in the Mormon Slough, Stockton Diverting Canal and Calaveras River channels (below Bellota Weir). The original construction of the low water crossing was done by the USACE under the PL 84-99 project modification for the Mormon Slough (USACE As-builts File No. CA 13-60, dated August 6, 1969).

## **6.0 – AGENCY COMMENTS AND ENDORSEMENTS**

The comments and endorsements associated with this project, from all pertinent agencies are shown below:

- The U.S. Army Corps of Engineers 208.10 comment letter has been received for this application. The USACE District Engineer has no objection to the project, subject to conditions. The letter is incorporated into the permit as Exhibit A.

- San Joaquin County Flood Control and Water Conservation District (SJCFWCD) endorsed the project with conditions. The conditions will be incorporated into the permit as Exhibit B.

## **7.0 – CEQA ANALYSIS**

Board staff has prepared the following California Environmental Quality Act (CEQA) determination:

The Board, as a Responsible Agency under CEQA, has reviewed Initial Study/Mitigated Negative Declaration (IS/MND) and Mitigation Monitoring Plan (SCH No. 2009082001, September 2009) for the Lower Calaveras River Anadromous Fish Barriers Improvement Project, prepared by the lead agency, the Stockton East Water District. These documents including project design and may be viewed or downloaded from the Central Valley Flood Protection Board website at <http://www.cvfpb.ca.gov/meetings/2013/04-26-2013> under a link for this agenda item. The documents are also available for review in hard copy at the Board and Stockton East Water District offices.

The Stockton East Water District determined that the project would not have a significant effect on the environment on March 15, 2009 and subsequently filed a Notice of Determination with the State Clearinghouse on March 21, 2009. Board staff finds that although the proposed project could have a potentially significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. The project proponent has incorporated mandatory mitigation measures into the project plans to avoid identified impacts or to mitigate such impacts to a point where no significant impacts will occur. These mitigation measures are included in the project proponent's Mitigation Monitoring Plan and address impacts to air quality, biological resources, cultural resources, geology and soils, hydrology and water quality, hazards and hazardous materials, transportation and circulation. The description of the mitigation measures are further described in the adopted Mitigation Monitoring Plan.

## **8.0 – SECTION 8610.5 CONSIDERATIONS**

1. Evidence that the Board admits into its record from any party, State or local public agency, or nongovernmental organization with expertise in flood or flood plain management:

*The Board will make its decision based on the evidence in the permit application and attachments, this staff report, and any other evidence presented by any individual or group.*

2. The best available science that related to the scientific issues presented by the executive officer, legal counsel, the Department or other parties that raise credible scientific issues.

*The accepted industry standards for the work proposed under this permit as regulated by Title 23 have been applied to the review of this permit.*

3. Effects of the decision on the entire State Plan of Flood Control:

*The proposed low water crossing will have no adverse effect on facilities of the State Plan of Flood Control and is consistent with the Central Valley Flood Protection Plan.*

4. Effects of reasonable projected future events, including, but not limited to, changes in hydrology, climate, and development within the applicable watershed:

*There will be no effects to the proposed project from reasonable projected future events.*

## **9.0 – STAFF RECOMMENDATION**

Staff recommends that the Board adopt the CEQA findings, approve the permit, and direct staff to file a Notice of Determination with the State Clearinghouse.

## **10.0 – LIST OF ATTACHMENTS**

- A. Location Maps and Photos
- B. Draft Permit No. 18817
- C. Design Drawings

Design Review:	Angeles Caliso
Environmental Review:	James Herota, Andrea Mauro
Document Review:	Gary Lemon P.E., Len Marino P.E.



# CAPRINI LOW-WATER CROSSING

## FISH PASSAGE IMPROVEMENT PROJECT

### PRELIMINARY DESIGN



VICINITY MAP  
NOT TO SCALE

SHEET INDEX

- C1 COVER SHEET
- C2 EXISTING CONDITIONS BASEMAP
- C3 CHANNEL PLAN & PROFILE
- C4 ROADWAY PLAN & PROFILE
- C5 DETAILS 1 OF 3
- C6 DETAILS 2 OF 3
- C7 DETAILS 3 OF 3

ABBREVIATIONS

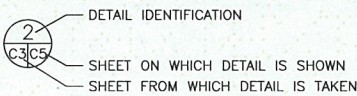
AB	AGGREGATE BASE	L	LENGTH
APN	ASSESSOR'S PARCEL NUMBER	LF	LINEAR FEET
BMP	BEST MANAGEMENT PRACTICE	MIN	MINIMUM
CMP	CORRUGATED METAL PIPE	(N)	NEW
CC	CONCRETE	NTS	NOT TO SCALE
CY	CUBIC YARD	R	RADIUS
DIA	DIAMETER	RD	ROAD
(E)	EXISTING	RSP	ROCK SLOPE PROTECTION
EG	EXISTING GROUND	SHT	SHEET
EL	ELEVATION	STA	STATION
EP	EDGE OF PAVEMENT	TBD	TO BE DETERMINED
ESM	ENGINEERED STREAMBED MATERIAL	TEMP	TEMPORARY
FG	FINISHED GRADE	TYP	TYPICAL
H	HORIZONTAL	V	VERTICAL
ID	INSIDE DIAMETER		

NOTES

PLANS PREPARED BY:  
CALIFORNIA DEPARTMENT OF WATER  
RESOURCES, FISH PASSAGE IMPROVEMENT  
PROGRAM

IN PARTNERSHIP WITH:  
STOCKTON EAST WATER DISTRICT

DETAIL REFERENCE CONVENTION



LEGEND

- EXISTING GROUND CONTOURS
- FINISHED GRADE CONTOURS
- EXISTING EDGE OF ROAD
- SURVEYED POINT
- PARCEL LINE



PROJECT OVERVIEW

SCALE: 1" = 40'  
0 20' 40' 80'

REVISION NO.	DATE	DESCRIPTION



CALIFORNIA DEPARTMENT OF WATER  
RESOURCES

FISH PASSAGE IMPROVEMENT PROGRAM

901 P STREET, SACRAMENTO, CA

WWW.WATER.CA.GOV/FISHPASSAGE

COVER SHEET

CAPRINI LOW-WATER CROSSING  
FISH PASSAGE IMPROVEMENT PROJECT  
PRELIMINARY DESIGN

PRELIMINARY  
NOT FOR CONSTRUCTION

BAR IS ONE INCH  
ON ORIGINAL  
DRAWINGS; ADJUST  
SCALE FOR  
REDUCED PLOTS

DATE: 10/12/2012

DRAWN BY: CH  
CHECKED BY: RB & TG

SHEET: C1



This page intentionally left blank.

Figure 1. Caprini Low Flow Crossing (flow moves from left to right)



Figure 4. Roughness upstream of the crossing





Figure 3. Roughness downstream of the crossing



STATE OF CALIFORNIA  
THE RESOURCES AGENCY  
**THE CENTRAL VALLEY FLOOD PROTECTION BOARD**

**PERMIT NO. 18817 BD**

**This Permit is issued to:**

Stockton East Water District  
6767 E. Main St.  
Stockton, California 95215

To remove and replace existing CMP culverts with three 10' by 12' feet box culverts. Remove approximately 1,000 cubic yards of native material and replace with 450 cubic yards of engineered streambed material and 200 cubic yards of bankline rock. The replacement structure will tie into an existing concrete roadway. The project crosses Mormon Slough approximately 0.65 miles downstream of Jack Tone Road in San Joaquin County. (Section 1, T1N, R7E, MDB&M, San Joaquin County Flood Control and Water Conservation District, Mormon Slough, San Joaquin County).

**NOTE:** Special Conditions have been incorporated herein which may place limitations on and/or require modification of your proposed project as described above.

**(SEAL)**

Dated: \_\_\_\_\_

\_\_\_\_\_  
Executive Officer

**GENERAL CONDITIONS:**

**ONE:** This permit is issued under the provisions of Sections 8700 – 8723 of the Water Code.

**TWO:** Only work described in the subject application is authorized hereby.

**THREE:** This permit does not grant a right to use or construct works on land owned by the Sacramento and San Joaquin Drainage District or on any other land.

**FOUR:** The approved work shall be accomplished under the direction and supervision of the State Department of Water Resources, and the permittee shall conform to all requirements of the Department and The Central Valley Flood Protection Board.

**FIVE:** Unless the work herein contemplated shall have been commenced within one year after issuance of this permit, the Board reserves the right to

# ATTACHMENT B

change any conditions in this permit as may be consistent with current flood control standards and policies of The Central Valley Flood Protection Board.

**SIX:** This permit shall remain in effect until revoked. In the event any conditions in this permit are not complied with, it may be revoked on 15 days' notice.

**SEVEN:** It is understood and agreed to by the permittee that the start of any work under this permit shall constitute an acceptance of the conditions in this permit and an agreement to perform work in accordance therewith.

**EIGHT:** This permit does not establish any precedent with respect to any other application received by The Central Valley Flood Protection Board.

**NINE:** The permittee shall, when required by law, secure the written order or consent from all other public agencies having jurisdiction.

**TEN:** The permittee is responsible for all personal liability and property damage which may arise out of failure on the permittee's part to perform the obligations under this permit. If any claim of liability is made against the State of California, or any departments thereof, the United States of America, a local district or other maintaining agencies and the officers, agents or employees thereof, the permittee shall defend and shall hold each of them harmless from each claim.

**ELEVEN:** The permittee shall exercise reasonable care to operate and maintain any work authorized herein to preclude injury to or damage to any works necessary to any plan of flood control adopted by the Board or the Legislature, or interfere with the successful execution, functioning or operation of any plan of flood control adopted by the Board or the Legislature.

**TWELVE:** Should any of the work not conform to the conditions of this permit, the permittee, upon order of The Central Valley Flood Protection Board, shall in the manner prescribed by the Board be responsible for the cost and expense to remove, alter, relocate, or reconstruct all or any part of the work herein approved.

## **SPECIAL CONDITIONS FOR PERMIT NO. 18817 BD**

**THIRTEEN:** Submitted drawings and specifications shall be stamped and signed by a registered engineer and a copy sent to the Central Valley Flood Protection Board prior to the commencement of work.

**FOURTEEN:** All work approved by this permit shall be in accordance with the submitted drawings and specifications except as modified by special permit conditions herein. No further work, other than that approved by this permit, shall be done in the area without prior approval of the Central Valley Flood Protection Board.

**FIFTEEN:** The mitigation measures approved by the CEQA lead agency and the permittee are found in its Mitigation and Monitoring Reporting Program (MMRP) adopted by the CEQA lead agency. The permittee shall implement all such mitigation measures.

**SIXTEEN:** The permittee shall contact the Department of Water Resources by telephone, (916) 574-0609, and submit the enclosed postcard to schedule a preconstruction conference. Failure to do so at least 10 working days prior to start of work may result in delay of the project.

**SEVENTEEN:** The permittee is responsible for all liability associated with construction, operation, and maintenance of the permitted facilities and shall defend, indemnify, and hold the Central Valley Flood Protection Board and the State of California; including its agencies, departments, boards, commissions, and their respective officers, agents, employees, successors and assigns (collectively, the "State"), safe and harmless, of and from all claims and damages arising from the project undertaken pursuant to this permit, all to the extent allowed by law. The State expressly reserves the right to supplement or take over its defense, in its sole discretion.

# ATTACHMENT B

EIGHTEEN: The permittee shall defend, indemnify, and hold the Central Valley Flood Protection Board and the State of California, including its agencies, departments, boards, commissions, and their respective officers, agents, employees, successors and assigns (collectively, the "State"), safe and harmless, of and from all claims and damages related to the Central Valley Flood Protection Board's approval of this permit, including but not limited to claims filed pursuant to the California Environmental Quality Act. The State expressly reserves the right to supplement or take over its defense, in its sole discretion.

NINETEEN: The Central Valley Flood Protection Board, Department of Water Resources, and San Joaquin County Flood Control and Water Conservation District shall not be held liable for any damages to the permitted encroachment(s) resulting from flood fight, operation, maintenance, inspection, or emergency repair.

TWENTY: No construction work of any kind shall be done during the flood season from November 1st to April 15th without prior approval of the Central Valley Flood Protection Board.

TWENTY-ONE: The permittee shall be responsible for the repair of any damages that may occur to the project levees and/or any other flood control facilities due to construction, operation, or maintenance of the proposed project.

TWENTY-TWO: Backfill material for excavations shall be placed in 4- to 6-inch layers and compacted to at least the density of the adjacent, firm, undisturbed material.

TWENTY-THREE: All debris generated by this project shall be disposed of outside the Mormon Slough.

TWENTY-FOUR: After each period of high water, trees, brush, sediment, and other debris shall be kept cleared from the fish passage culverts and disposed of outside the floodway to maintain the capacity and flowage area of the Mormon Slough.

TWENTY-FIVE: The permittee shall maintain the permitted encroachment(s) and the project works within the utilized area in the manner required and as requested by the authorized representative of the Department of Water Resources, San Joaquin County Flood Control and Water Conservation District, or any other agency responsible for maintenance.

TWENTY-SIX: If the installation of the fish passage culverts results in any adverse hydraulic impacts or scouring to the Mormon Slough the permittee shall provide appropriate mitigation acceptable to the Central Valley Flood Protection Board prior to the next flood season.

TWENTY-SEVEN: The permitted encroachment(s) shall not interfere with operation and maintenance of the flood control project. If the permitted encroachment(s) are determined by any agency responsible for operation or maintenance of the flood control project to interfere, the permittee shall be required, at permittee's cost and expense, to modify or remove the permitted encroachment(s) under direction of the Central Valley Flood Protection Board or Department of Water Resources. If the permittee does not comply, the Central Valley Flood Protection Board may modify or remove the encroachment(s) at the permittee's expense.

TWENTY-EIGHT: The permittee may be required, at permittee's cost and expense, to remove, alter,

# ATTACHMENT B

relocate, or reconstruct all or any part of the permitted encroachment(s) if removal, alteration, relocation, or reconstruction is necessary as part of or in conjunction with any present or future flood control plan or project or if damaged by any cause. If the permittee does not comply, the Central Valley Flood Protection Board may remove the encroachment(s) at the permittee's expense.

TWENTY-NINE: If the project, or any portion thereof, is to be abandoned in the future, the permittee or successor shall abandon the project under direction of the Central Valley Flood Protection Board and Department of Water Resources, at the permittee's or successor's cost and expense.

THIRTY: The permittee shall comply with all conditions set forth in the letter from the Department of the Army dated April 25, 2013, which is attached to this permit as Exhibit A and is incorporated by reference.

THIRTY-ONE: The permittee shall comply with all conditions set forth in the letter from the San Joaquin County Flood Control and Water Conservation District dated September 8, 2012, which is attached to this permit as Exhibit B and is incorporated by reference.

THIRTY-TWO: Upon completion of the project, the permittee shall submit as-built drawings to: Department of Water Resources, Flood Project Inspection Section, 3310 El Camino Avenue, Suite 256, Sacramento, California 95821.





DEPARTMENT OF THE ARMY  
U.S. Army Engineer District, Sacramento  
Corps of Engineers  
1325 J Street  
Sacramento, California 95814-2922

ATTACHMENT B  
EXHIBIT A

REPLY TO  
ATTENTION OF

Flood Protection and Navigation Section (18817)

APR 25 2013

Mr. Jay Punia, Executive Officer  
Central Valley Flood Protection Board  
3310 El Camino Avenue, Room 151  
Sacramento, California 95821

Dear Mr. Punia:

We have reviewed a permit application by Stockton East Water District (application number 18817). These plans include removing and replacing existing CMP culverts with three 10' by 12' feet box culverts. The project also includes removing approximately 1,000 cubic yards of native material and replacing with 450 cubic yards of engineered streambed material and 200 cubic yards of bankline rock. The replacement structure will tie into an existing concrete roadway. The project crosses Mormon Slough approximately 0.65 miles downstream of Jack Tone Road, at 37.961936°N 121.159389°W NAD83, San Joaquin County, California.

The District Engineer has no objection to approval of this application by your Board from a flood control standpoint, subject to the following conditions:

- a. That in the event trees, brush, or debris are cleared, they shall be properly disposed of by either complete burning or complete removal outside the limits of the project right-of-way.
- b. That the proposed work shall not be performed during the flood season of November 1 to April 15, unless otherwise approved in writing by your Board.
- c. That the proposed work shall not reduce the channel flow capacity or change the channel flow in such a way that may cause damage to the existing channel embankment.
- d. That the proposed work shall not interfere with the integrity of the flood risk reduction project; easement access; or maintenance, inspection, and flood fighting procedures.
- e. That the proposed rockwork shall be placed uniformly and properly transitioned into the natural bank at both ends
- f. That in the event erosion occurs at the site, the eroded areas shall be repaired and bank protection placed to prevent future erosion.

-2-

g. That the removed CMP culverts and 1,000 yards of removed material shall be completely removed outside the limits of the project right-of-way.

h. That the proposed streambed material shall be placed so there are no abrupt grade changes in the channel.

A file (SPK-2013-00101) has been opened because a Section 10 and/or Section 404 permit may be required. Please advise the applicant to contact the U.S. Army Corps of Engineers, Sacramento District, Regulatory Division, 1325 J Street, Room 1350, Sacramento, California 95814, telephone (916) 557-5250.

A copy of this letter is being furnished to Mr. Don Rasmussen, Chief, Flood Project Integrity and Inspection Branch, 3310 El Camino Avenue, Suite LL30, Sacramento, CA 95821.

Sincerely,

A handwritten signature in black ink, reading "Rick L. Poeppelman". The signature is fluid and cursive, with the first name "Rick" and last name "Poeppelman" clearly legible.

Rick L. Poeppelman, P.E.  
Chief, Engineering Division



SAN JOAQUIN COUNTY

## FLOOD CONTROL & WATER CONSERVATION DISTRICT

P. O. BOX 1810  
1810 EAST HAZELTON AVENUE  
STOCKTON, CALIFORNIA 95201  
TELEPHONE (209) 468-3000  
FAX NO. (209) 468-2999

# Attachment B Exhibit B

November 8, 2012

Central Valley Flood Protection Board  
3310 El Camino Avenue  
Sacramento, California 95821

Attention: Floodway Protection Section

SUBJECT: CENTRAL VALLEY FLOOD PROTECTION BOARD PERMIT APPLICATION  
FOR STOCKTON EAST WATER DISTRICT FISH PASSAGE IMPROVEMENT PROJECT  
IN MORMON SLOUGH, ASSESSOR'S PARCEL NOS. 103-220-12 AND 103-220-13,  
PW-1200031

Gentlemen:

Reference is made to the Central Valley Flood Protection Board's Permit Application of Stockton East Water District (Permittee) to construct fish passage improvements at an existing low-water crossing structure (Caprini Low Water Crossing) in Mormon Slough. Improvements will consist of: (a) Replacing the existing CMP culverts, concrete roadway and apron, with three 10-feet by 12-feet box culverts; (b) backfill the sides of the culverts with native material and cap it with an eight-inch concrete slab; (c) remove approximately 1,000 cubic yards of native material from the channel and replace with 450 cubic yards of engineered streambed material and approximately 200 cubic yards of rocks, consisting of 18-inch boulders down to sands and silt for bank stability; and (d) re-vegetate the bank's upper portion with native seed mix.

The project is located in Mormon Slough approximately 3,300 feet downstream of the Jack Tone Road Bridge, in San Joaquin County, Section C M Weber Grant, Township 1 North, Range 7 East, Mount Diablo Base and Meridian, adjacent to properties identified as San Joaquin County Assessor's Parcel Nos. 103-220-12 and 103-220-13.

The San Joaquin County Flood Control and Water Conservation District (District) has reviewed the Central Valley Flood Protection Board's Permit Application of the Permittee and has the following comments:

1. The District shall not be responsible for maintenance of the facilities specified in this Permit.
2. The District shall not be held responsible for any damages to the permitted encroachments due to the District's operation, maintenance, flood fight, inspection or emergency repairs of Mormon Slough.
3. The Permittee or Successors-in-Interest shall be responsible for the modification or possible removal of the facilities, as requested by the District, if required for any future flood control plans at the Permittee or Successors-in-Interest's sole cost and expense.
4. The Permittee shall be liable for any damage to Mormon Slough that may occur as a result of this project.



Central Valley Flood Protection Board  
PERMIT APPLICATION FOR  
STOCKTON EAST WATER DISTRICT

-2-

5. The project shall be constructed in accordance with the plans dated June 2010, submitted with the application dated August 13, 2012. Any revisions to the project will require submittal of the revised plans to the District for review and approval.
6. No work shall be allowed in Mormon Slough between November 1st and April 15th.
7. The Permittee or Successors-in-Interest shall properly maintain the encroachments, in accordance with applicable current or future local, State, and Federal standards.
8. Rock Slope Protection shall be placed in a manner such that no reduction in channel cross-section or increase in base flood elevation will result.
9. Excess excavated material shall be transported from the project site and disposed of at an approved location.
10. Access roads shall be kept open at all times for maintenance.
11. Stockpiled materials, coffer dams, and construction equipment shall be removed from the floodway prior to November 1st.
12. The Permittee shall restore Mormon Slough's invert and levees to the condition that existed prior to commencement of work.
13. Backfill material within the channel, within the levee or within 15 feet of the levee toe, shall be placed in four-to-six inch layers with approved material and compacted to a minimum of 90 percent relative compaction pursuant to ASTM D-1557. Compaction tests by a certified soils laboratory is required to verify compaction.
14. Upon completion of the project, Stockton East Water District or Successors-in-Interest shall submit a hard copy and an electronic copy in AutoCAD and pdf format of the as-built drawings to:

San Joaquin County Flood Control and Water Conservation District  
1810 East Hazelton Avenue  
Stockton, California 95205, and

San Joaquin Area Flood Control Agency  
22 East Weber Avenue  
Stockton, California 95202

If there are any questions regarding these comments, please contact me at (209) 953-7617.

Sincerely,



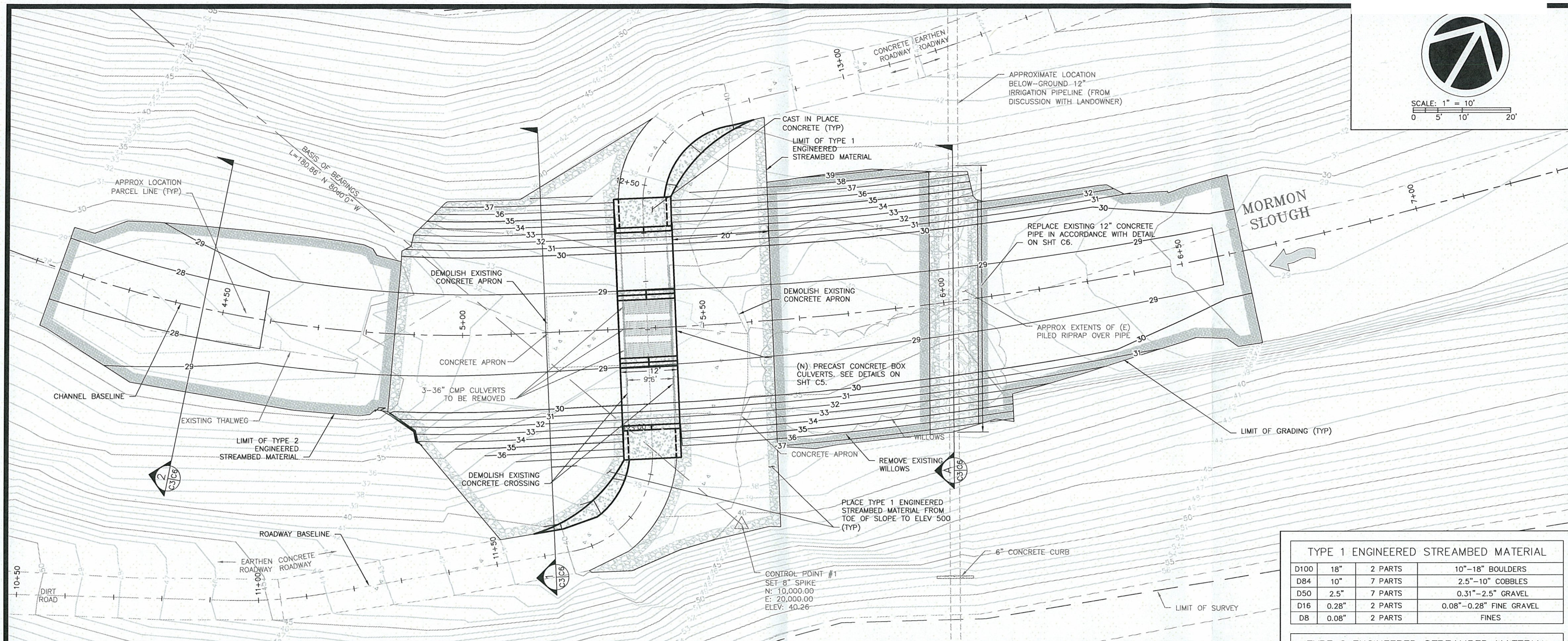
JOHN I. MAGUIRE  
Engineering Services Manager

JIM:SS:to  
FM-12K002-T1





SCALE: 1" = 10'  
0 5' 10' 20'



#### TYPE 1 ENGINEERED STREAMBED MATERIAL

D100	18"	2 PARTS	10"-18" BOULDERS
D84	10"	7 PARTS	2.5"-10" COBBLES
D50	2.5"	7 PARTS	0.31"-2.5" GRAVEL
D16	0.28"	2 PARTS	0.08"-0.28" FINE GRAVEL
D8	0.08"	2 PARTS	FINES

#### TYPE 2 ENGINEERED STREAMBED MATERIAL

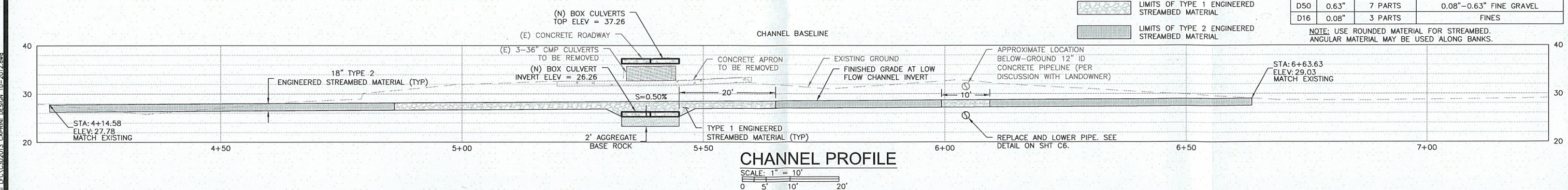
D100	6"	3 PARTS	2.5"-6" COBBLES
D84	2.5"	7 PARTS	0.63"-2.5" GRAVEL
D50	0.63"	7 PARTS	0.08"-0.63" FINE GRAVEL
D16	0.08"	3 PARTS	FINES

NOTE: USE ROUNDED MATERIAL FOR STREAMBED. ANGULAR MATERIAL MAY BE USED ALONG BANKS.

### PLAN

#### LEGEND

- LIMITS OF TYPE 1 ENGINEERED STREAMBED MATERIAL
- LIMITS OF TYPE 2 ENGINEERED STREAMBED MATERIAL



### CHANNEL PROFILE

SCALE: 1" = 10'  
0 5' 10' 20'

REVISION NO. | DATE | DESCRIPTION



CALIFORNIA DEPARTMENT OF WATER  
RESOURCES

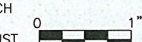
FISH PASSAGE IMPROVEMENT PROGRAM  
901 P STREET, SACRAMENTO, CA  
WWW.WATER.CA.GOV/FISHPASSAGE

#### CHANNEL PLAN & PROFILE

CAPRINI LOW-WATER CROSSING  
FISH PASSAGE IMPROVEMENT PROJECT  
PRELIMINARY DESIGN

#### PRELIMINARY NOT FOR CONSTRUCTION

BAR IS ONE INCH  
ON ORIGINAL  
DRAWINGS; ADJUST  
SCALE FOR  
REDUCED PLOTS

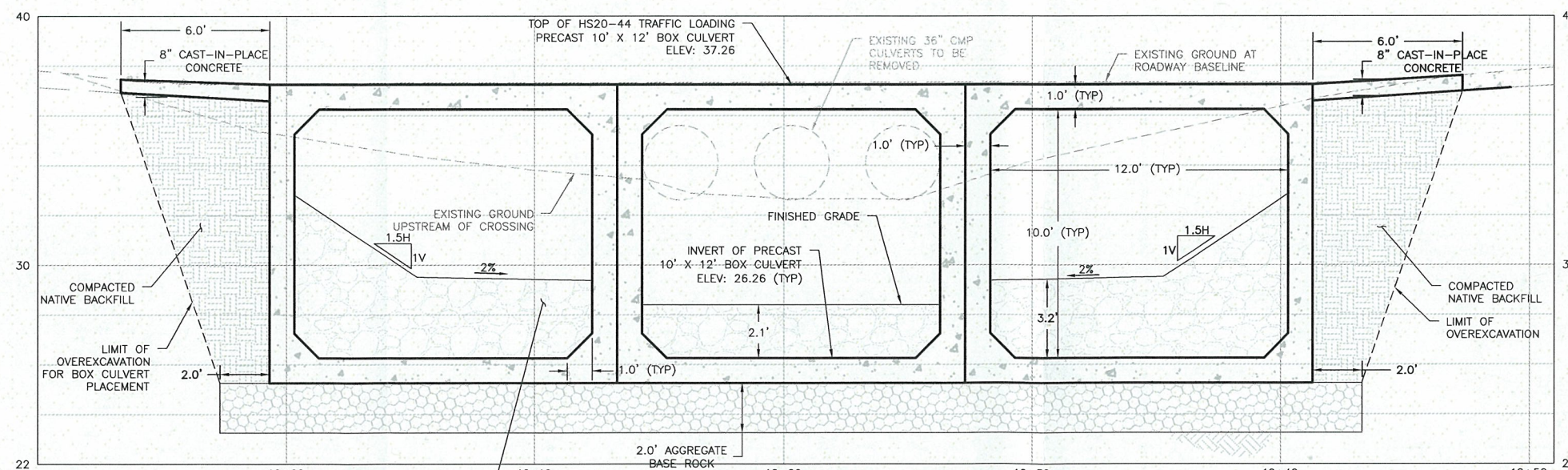
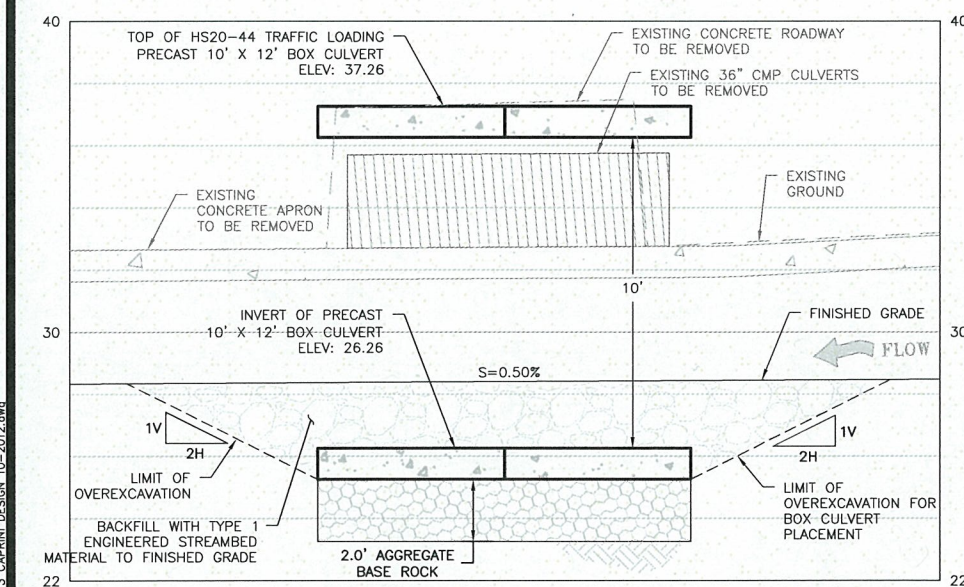
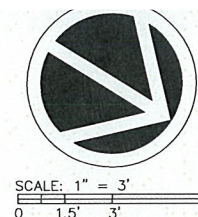
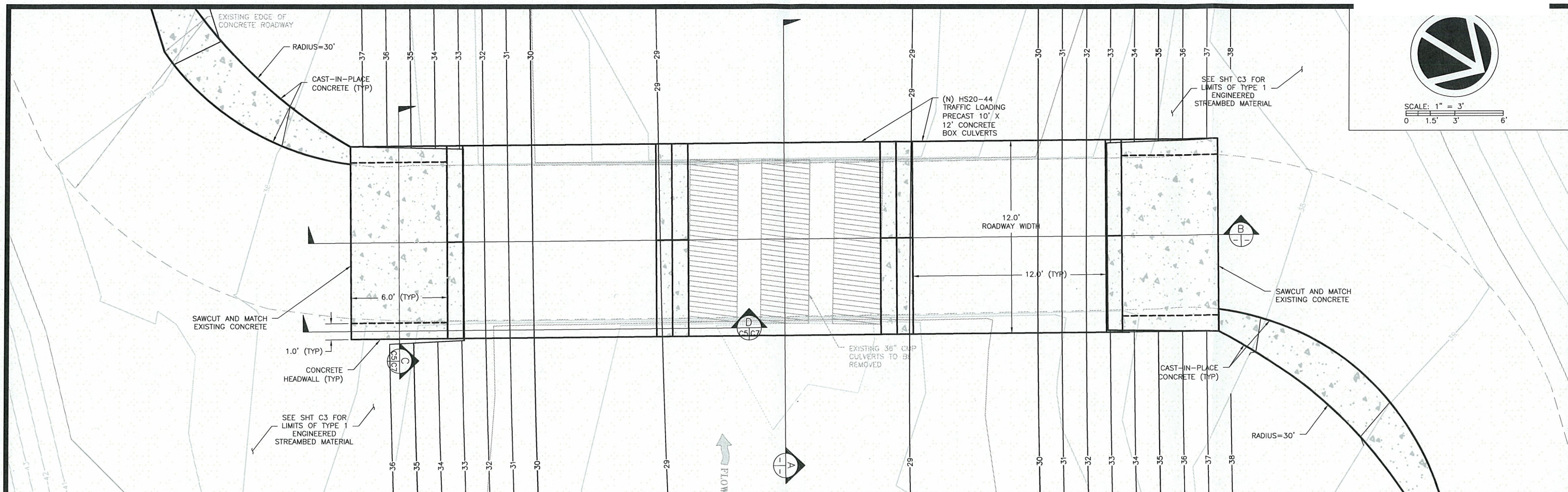


DATE: 10/12/2012

DRAWN BY: CH  
CHECKED BY: RB & TG

SHEET: C3





REVISION NO.	DATE	DESCRIPTION



CALIFORNIA DEPARTMENT OF WATER RESOURCES

FISH PASSAGE IMPROVEMENT PROGRAM

901 P STREET, SACRAMENTO, CA

WWW.WATER.CA.GOV/FISHPASSAGE

DETAILS 1 OF 3

CAPRINI LOW-WATER CROSSING

FISH PASSAGE IMPROVEMENT PROJECT

PRELIMINARY DESIGN

PRELIMINARY  
NOT FOR CONSTRUCTION

BAR IS ONE INCH ON ORIGINAL DRAWINGS; ADJUST SCALE FOR REDUCED PLOTS

DATE: 10/12/2012

DRAWN BY: CH  
CHECKED BY: RB & TG

SHEET: C5