
SUPPLEMENT TO STANDARD
OPERATION AND MAINTENANCE
MANUAL

SACRAMENTO RIVER
FLOOD CONTROL PROJECT

UNIT NO. 135

EAST LEVEE OF SUTTER BY-PASS
FROM
THE SUTTER BUTTES SOUTHERLY TO
ITS JUNCTION WITH THE FEATHER RIVER
AND
THE EAST AND WEST LEVEES OF WADSWORTH CANAL
AND
LEVEES OF INTERCEPTING CANALS



SACRAMENTO DISTRICT
CORPS OF ENGINEERS
U. S. ARMY
SACRAMENTO, CALIFORNIA

CORPS OF ENGINEERS

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Prepared in the Sacramento District
Corps of Engineers, U. S. Army
Sacramento, California, dated May 1953

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LOCATION	ADDITION OR REVISION	DATE
1-04 f.	Add contract no. 59-2	Nov 1963
Exhibit B	Add drawing no. 50-1-3531	Nov 1963
1-04 g.	Add contract no. DACW05-68-C-0077	Dec 1968
Exhibit B	Add drawing no. 50-4-4393	Dec 1968
Exhibit F	Add letter of acceptance dated 24 Dec 1968	Dec 1968
1-04 h.	Add contract no. DACW05-71-C-0041	Mar 1971
Exhibit B	Add drawing no. 4-4-588	Mar 1971
Exhibit F	Add letter of acceptance dated 17 Mar 1971	Mar 1971
1-04 i	Add subparagraph i.	Jul 2009
2-02 b.	Addition to subparagraph b	Jul 2009
2-02 d.	Addition to subparagraph d	Jul 2009
Exhibit B	Add drawing no. 50-04-6235	Jul 2009
Exhibit F	Add copy of letter of transfer dated 22 Jul 2009	Jul 2009
Exhibit F	Add copy of letter of transfer dated 6 Dec 1951	22 Dec 2010
Exhibit F	Add copy of letter of transfer dated 8 Dec 1951	22 Dec 2010
Exhibit F	Add copy of letter of acceptance dated 18 Dec 1951	22 Dec 2010
Exhibit F	Add copy of letter of transfer dated 16 Feb 1959	22 Dec 2010
Exhibit F	Add copy of letter of transfer dated 25 Feb 1971	22 Dec 2010
Exhibit F	Add copy of letter of transfer dated 22 Nov 1968	2 Feb 2011
Exhibit F	Add copy of letter of transfer dated 29 Nov 2016	29 Dec 2016

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C	Plates of Suggested Flood Fighting Methods.....	Unattached (Contained in Standard Manual)
D	Check List No. 1 - Levee Inspection Report.....	Unattached (Contained in Standard Manual)
E	Check Lists - Levees, Channels and Structures...	Sheets 1 thru 8
F	Letter of Acceptance by State Reclamation Board.	2 Sheets
G	Semi-Annual Report Form.....	Sheets 1 and 2

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and levees - see R 1-03c

SECTION I - INTRODUCTION

1-01. Location. - The improvement covered by this manual is that part of the Sacramento River Flood Control Project which includes the east levee of Sutter By-pass from the Sutter Buttes to the confluence of the Sutter By-pass and the Feather River, the channel and levees of Wadsworth Canal, and the adjacent Intercepting Canals. The Sutter By-pass is a leveed floodway which conveys excess flood waters from the Sacramento River. The Wadsworth Canal and Intercepting Canals convey drainage water lying easterly from Sutter Buttes to the Sutter By-pass. Pumping plants No. 1, No. 2 and No. 3 discharge drainage waters through the east levee of Sutter By-pass at locations as shown on drawings of Exhibit B.

The levees of this unit are located in Levee District No. 1 and a small portion on the southerly end near junction of Sutter By-pass and the Feather River lies within Reclamation District No. 803 and Reclamation District No. 823, in Sutter County, California and in the general vicinity between the towns of Meridian and Nicolaus. The location of the completed unit covered by this manual is shown on Exhibit A-1.

1-02. Protection Provided. - Sutter By-pass and Wadsworth Canal are essential features of the Sacramento River Flood Control Project. The primary function of the Sutter By-pass is to divert excessive over-flow waters of the Sacramento River and its tributaries. Wadsworth Canal and adjacent Intercepting Canals convey drainage water lying easterly from Sutter Buttes. The levees of this unit provide protection to adjacent agricultural lands against flood water in Sutter By-pass and Wadsworth Canal. The grade of the adopted flood plane in Sutter Bypass varies from elevation 56.7 at Long Bridge Crossing to 42.0 at the junction with the Feather River. The grade of the adopted flood plane in

Wadsworth Canal varies from elevation 57.3 at the intercepting canals to elevation 53.2 at its junction with the Sutter Bypass. (All elevations are referred to U.S.C.E. datum). The levee grade provides for a freeboard of 6 feet above the flood plane in Sutter Bypass and in Wadsworth Canal. The project flood capacity in Sutter Bypass is 178,000 cubic feet per second from Long Bridge to Tisdale Bypass and 216,000 cubic feet per second from Tisdale Bypass to the Feather River north levee. It is estimated that a flow of 1,500 cubic feet per second in Wadsworth Canal will produce the adopted flood plane profile within this portion of the unit.

1-03. Project Works. - The project works covered by this manual include the following:

a. East levee of Sutter Bypass from Sutter Buttes southerly (downstream) 21.8 miles to its junction with north levee of the Feather River as constructed by local interests and/or as enlarged by the Corps of Engineers and the State of California to adopted grade and section.

b. Levees on both banks and channel of Wadsworth Canal from the Intercepting Canals to the junction with Sutter Bypass a distance of 4.43 miles or from traverse station 243/00 to 0/00, as shown on Drawing No. 50-4-1949-3 of Exhibit B. These levees were built by local interests and re-constructed by the Corps of Engineers to adopted grade and section.

c. Existing Intercepting Canals and levees as constructed by local interests, details of which are shown in Exhibit B. A portion of the West Intercepting Canal and levee was re-constructed by the Corps of Engineers to adopted grade and section, as shown on Drawing No. 50-4-1680 of Exhibit B.

1-04. Construction Data. - Unit No. 135 of the flood control works described in this manual forms an integral part of the Sacramento River Flood Control Project. Original levees and channels of this unit were built by local interests. However, due to inadequacy of existing levees, necessary construction to bring levees to project standards was completed as follows:

a. Enlargement to adopted grade and section of a portion of the east levee of Sutter Bypass was constructed by contract under supervision of the Corps of Engineers from station 1/62 to station 484/00 as shown in Exhibit B. Drawing No. 50-4-1945-2 in 5 sheets and designated as Part "A". Work was started on 11 November 1941 and completed on 16 December 1942.

b. Enlargement to adopted grade and section of a portion of the east levee of Sutter Bypass was constructed by contract under

supervision of the Corps of Engineers from station 800/00 to station 1137/62.38 and 0/66 to 16/50 as shown in Exhibit B, Drawing No. 50-4-1946-2 in 4 sheets and designated as Part "B". Work was started on 11 November 1941 and completed on 16 December 1942.

c. Enlargement to adopted grade and section of the east and west levees of Wadsworth Canal from the Intercepting Canals to Sutter Bypass was constructed by contract under supervision of the Corps of Engineers as shown in Exhibit B, Drawing No. 50-4-1949-3, in 3 sheets and designated as Part "C". Work was started on 11 November 1941 and completed on 16 December 1942.

d. Enlargement to adopted grade and section of the east levee of Sutter Bypass was constructed by contract under supervision of the State of California from station 331/00 to 692/00 as shown in Exhibit B, Drawing No. 50-4-2772, in one sheet and designated as Project "B". Work was performed during 1941 and 1942.

(West of Mallott Rd) e. Construction of the East Intercepting Canal and levees was performed by local interests. Re-construction of the West Intercepting Canal and Adjacent South Levee was performed under supervision of the Corps of Engineers from station 0/45 to station 69/40 as shown in Exhibit B, Drawing No. 50-4-1680, in one sheet. Work on the West Intercepting Canal was completed on 1 March 1939. (Canal E. of the State)

1-05. Contractor.- In addition to work performed by local interests and the State of California, necessary work done by the Corps of Engineers in bringing both levees of Wadsworth Canal and the east levee of Sutter Bypass, as described in paragraph 1-04, a, b, and c, to adopted grade and section, was performed under Contract No. 3251 by H. Earl Parker, Inc., contractor. Required work done to construct the West Intercepting Canal and adjacent south levee was performed under Job Order No. 467. [see p. 3A for revisions to 1-04] →

1-06. Flood Flows.- For purposes of this manual, the term "flood" or "high water period" shall refer to flows when the water surface in Sutter Bypass reaches or exceeds the reading of 50.0 on the State of California Division of Water Resources gage at Long Bridge. The continuous water stage recorder and staff gage are set on U.S. Corps of Engineers datum. Zero of the gage is set at 0.0, U.S.C.E. Datum.

1-07. Assurances Provided by Local Interests.- Assurance of cooperation by local interests is provided by State legislation, as contained in Chapter 3, Part 2, Division 5 of the State Water Code (see paragraph 2-02a of the Standard Manual).

1-08. Acceptance by State Reclamation Board.- Responsibility for operating and maintaining the completed works was officially accepted by the Reclamation Board of the State of California on 18 December 1951, as shown on the attached letters of acceptance, Exhibit F.

1-09. Superintendent.- The name and address of the Superintendent appointed by local interests to be responsible for the continuous inspection, operation, and maintenance of the project works shall be furnished the District Engineer, and in case of any change of Superintendent, the District Engineer shall be so notified.

FA = LEVEE REPAIR, BANK PROTECTION, CHANNEL RECT. SPEL 2914,
CONT. # 64-0026 DWG# 4-4-536 COMPLETED 21 OCT 63

ELSON
END
E 7.0

* 1-04
contd.

f. Emergency levee repair to Sutter Bypass levees from Wadsworth Canal to Gilsizer Slough was accomplished under Contract No. DA-04-167-CIVENS-99-2 by H. Earl Parker, Inc. during the period from 29 July 1958 to 14 November 1958. Specification No. 2463, Drawing No. 50-1-3531.

g. Bank protection on east levee of Sutter Bypass (Site 4) was accomplished by Spike Voucouris under Contract No. DACW05-68-C-0077 and completed on 5 November 1968. Specification No. 3492. Drawing No. 50-4-4393.

h. Emergency repairs consisting of about 800 feet of levee construction and 2,300 feet of bank protection on the right bank of the Feather River in the vicinity of Nelson Bend just downstream from its junction with the east levee of the Sutter Bypass were accomplished by H. E. Parker, Inc. under Contract No. DACW05-71-C-0041 and were completed on 19 February 1971. Specification No. 3903. Drawing No. 4-4-588.

1-04 i. Farm Road Site, Wadsworth Canal

Repairs were completed under PL 84-99 to correct excessive under-seepage noted during high water events at the confluence of the Wadsworth Canal and the Sutter Bypass. The repairs consisted of 3000 feet of a soil-cement-bentonite (SCB) cutoff wall constructed along the East Levee of the Sutter Bypass and Wadsworth Canal, in Sutter County. The soil-cement-bentonite was mixed in a trough and then placed in the excavated trench where it displaced slurry. The actual construction of the cutoff wall took place from Unit 1 levee mile 4.48 (Sutter Bypass) to levee mile 0.5 (Wadsworth Canal). The depth of the SCB cutoff wall ranges from 40 to 61 feet along the alignment. Construction was completed by JAG Construction on July 21, 2008 in accordance with Specification Number 1520, Design File Number 50-04-6235 and Contract Number W91238-08-C-0008.

During construction, an abandoned gas line was removed near Levee Mile 0.02 of the Wadsworth Canal and an existing piezometer was discovered near Levee Mile 4.43 on the crest of the East Levee of the Sutter Bypass. The cap is marked "Monitoring Well" and is located approximately 105' east of the metal gate posts on the landside of the levee crown. There are two additional piezometers located at the landside toe of the levee below the "monitoring well" location noted on the as-built plans. These piezometers were installed in 2007 as part of a seepage study by the Project Geology Section in the Division of Engineering, California Department of Water Resources. During the life of the piezometers, water level data should be provided to the Soil Design Section, Army Corps of Engineers, Sacramento District. The piezometers are currently equipped with electronic data loggers which automatically monitor water levels at a specified interval. These instruments should be checked periodically to ensure proper operation. Calibration tests should be performed at least annually by taking a manual water level reading without removing the instrument and comparing it to the data logger reading. These checks and readings can be coordinated with the Project Geology Section, DWR. If these data loggers are removed or become inoperable, readings should be taken manually once per quarter and daily during and for one week following a flood event. A flood event is defined in the Standard Operation and Maintenance Manual and in the inspection paragraph of this document.

A slurry boil was observed on the waterside toe of the levee near construction station 25+00 (Levee Mile 0.4 on the Wadsworth Canal) in June, 2008. The cause of the boil was determined to be slurry leaking through narrow, laterally extensive cracks in the "hardpan-type" foundation soil layer below the levee. Staff from the Corps of Engineers Soil Design Branch determined the hardpan was a good foundation material and the slurry leak was not a threat to the levee integrity. The levee was degraded 50 feet to each side of the leak down to the hardpan layer, approximately 18 feet below the levee crown. The levee was then rebuilt using the excavated material and compacted to contract specifications after all unsatisfactory soil was removed. To ensure stability during the repair, two pieces of geo-grid were installed 2 feet from the edge of the cutoff wall during the reconstruction. The grids were installed on the landside slope and do not extend across the crown of the levee or the cutoff wall. They were 100 feet and 40 feet long respectively and 13 feet wide with 1 foot of overlap. This grid was left in place after construction was completed, and will not affect the performance of the levee. No further slurry boils were noted. Details on this can be found in the Soil Design memo attached as Appendix G.

SECTION II - FEATURES OF THE PROJECT SUBJECT TO FLOOD CONTROL REGULATIONS

2-01. Channels. -

a. Description. The principal features consist of:

(1) Channels or Floodways. When flood discharge exceeds the carrying capacity of the Sacramento River along Butte Basin, water overflows into that basin through natural overflow channels and over Moulton and Colusa Weirs. The overflow waters, after passing through Butte Basin, are concentrated in Sutter Bypass which has a width of 4,000 feet at its upper end, levees 18 to 20 feet in height, and a project flood capacity of 178,000 cubic feet per second above, and 216,000 cubic feet per second below Tisdale Bypass with a freeboard of six feet. Flows in the Sacramento River are further relieved at Tisdale Weir from which waters are discharged through a leveed bypass (Tisdale Bypass) into Sutter Bypass. Waters of the drainage area lying easterly from Sutter Buttes are conveyed by the Wadsworth Canal and adjacent Intercepting Canals to Sutter Bypass. Wadsworth Canal has a project flood capacity of 1,500 cubic feet per second and a freeboard of six feet.

b. Inspection. -

(1) Pertinent Requirements of the Code of Federal Regulations. Flood Control Regulations, Far. 208.10(g)(1) are quoted in part as follows:

- "(g) Channels and Floodways (1) Maintenance. Periodic inspections of improved channels and floodways shall be made by the Superintendent to be certain that:
- (i) The channel or floodway is clear of debris, weeds, and wild growth;
 - (ii) The channel or floodway is not being restricted by the depositing of waste materials, building of unauthorized structures or other encroachments;
 - (iii) The capacity of the channel or floodway is not being reduced by the formation of shoals;
 - (iv) Banks are not being damaged by rain or wave wash, and that no sloughing of banks has occurred;
 - (v) Riprap sections and deflection dikes and walls are in good condition;
 - (vi) Approach and egress channels adjacent to the improved channel or floodway are sufficiently clear

of obstructions and debris to permit proper functioning of the project works.

Such inspections shall be made prior to the beginning of the flood season and otherwise at intervals not to exceed 90 days. Immediate steps will be taken to remedy any adverse conditions disclosed by such inspections...."

(2) The purpose of the flood-flow channels inspection is to insure that conditions which affect the channel capacity will remain the same, as far as possible, as those considered in the design assumptions and that no new conditions develop that may affect the stability of the project structures. At each inspection required by Par. 208.10(g)(1) of the Flood Control Regulations, particular attention will, therefore, be given the following:

- (a) Location, extent and size of vegetal growth.
- (b) Unauthorized operations within the flood-flow channel right-of-way, such as excavations, buildings, and other structures, levees, bank protection, or training dikes.
- (c) Rubbish and industrial waste disposal.
- (d) Changes in the channel bed such as aggradation or degradation, which would interfere with free-flow from side drainage structures or induce local meanders that would scour the banks.
- (e) Operations of any nature upstream from the project that would affect flow conditions within the limits of the flood control project.
- (f) Condition of project structure.

1. Channel walls:

- a. Deviation from alignment and grade.
- b. Development of cracks and spalls.
- c. Mechanical injuries.

2. Fencing:

- a. Injuries to posts, fencing or barbed wire.
- b. Damage to galvanizing.

3. Earth fills:

- a. Settlement.
- b. Erosion of levee slopes.
- c. Excessive seepage or saturation area back of fills.
- d. Condition of bank protection - concrete or stone blanket.

4. Right-of-way:

- a. Presence of dumped refuse.
- b. Encroachment or trespass

(3) No excavation within the limits of the Sutter Bypass, Wadsworth Canal or the Intercepting Canals will be permitted unless an excavation permit has been approved by the State Reclamation Board.

(4) If any work is done to improve flow conditions in Sutter Bypass, Wadsworth Canal or the Intercepting Canals, it should be coordinated with the District Engineer to insure that proper provisions are made for channel alignment and capacity to conform to the existing project.

(5) The intent of these inspections is to disclose all conditions which in any way affect the stability of the structures and their functioning for the control of floods. Each inspection report should note and comment on any repair measures that have been taken since the last inspection. In making these inspections, the check sheets included as Exhibit E shall be explicitly followed.

c. Maintenance..-

(1) Pertinent Requirements of the Code of Federal Regulations.

Flood Control Regulations, Par. 208.10(g) (1) are quoted in part as follows: "...Immediate steps will be taken to remedy any adverse conditions disclosed by such inspection...."

(2) Shoaling or aggradation at the inlets or outlets of side drainage structures may render them inoperative. It is, therefore, imperative that all drains be kept open and unobstructed at all times.

(3) Dumped rock or other suitable types of protection should be placed at locations found by experience to be critical trouble points, with a view to stabilizing the channel alignment and preserving the general uniformity of the bank lines.

(4) Sediment and debris plugs or other obstructions should be removed from the channel to prevent any tendency for the flows to be deflected within the channel. The heavy material likely to accumulate in the new channel at the mouths of tributaries should be removed to keep the channel clear.

(5) The channel and right-of-way shall be kept reasonably clear of debris, refuse matter, or industrial wastes.

(6) Weeds and other vegetal growth in the channel shall be cut in advance of the flood season and together with all debris, removed from the channel.

(7) All eroded concrete shall be repaired as soon as erosion approaches a depth of 4 inches. For this purpose, it is recommended that the repair be made by thoroughly cleaning the surface by sandblasting and building up the section with pneumatically placed Portland cement mortar. All evidence of settlement, uplift, or failure of concrete structures shall be referred to the State Engineer for analysis and remedial measures.

(8) All damage to fencing, whether resulting from accidental or willful injuries or from corrosion, shall be promptly repaired with new material in order to maintain satisfactory protection to the public.

(9) All subdrainage structures which have become cemented due to the evaporation of ground water or other causes, shall be thoroughly cleaned out and repacked with fresh gravel.

d. Operation. -

(1) Pertinent Requirements of the Code of Federal Regulations, Par. 208.10(g)(2), are quoted in part as follows:

"(g) Channels and floodways.....(2) Operation. Both banks of the channel shall be patrolled during periods of high water.... Appropriate measures shall be taken to prevent the formation of jams.....of debris. Large objects which become lodged against the bank shall be removed. The improved channel or floodway shall be thoroughly inspected immediately following each major high water period as soon as practicable thereafter all snags and other debris shall be removed and all damage to....walls, drainage outlets or other flood control structures repaired."

(2) It shall be the duty of the Superintendent to maintain a patrol of the project works during all periods of flood in excess of a reading of 50.0 on the gage at Long Bridge as indicated in paragraph 1-06 of this manual. The Superintendent shall dispatch a message by the most suitable means to the District Engineer whenever the water surface at Long Bridge reaches the gage reading indicated above. The Superintendent shall cause readings to be taken at said gage at intervals

of one to two hours during the period when the water surface is above the flood-flow stage indicated above and record the time of the observations. One copy of the readings shall be forwarded to the District Engineer immediately following the flood, and a second copy transmitted as an inclosure to the semi-annual report in compliance with paragraph 3-03c of the Standard Manual.

2-02. Levees.

a. Description. The levees described in this manual are located along the Easterly side of Sutter By-pass from Long Bridge Southerly to the confluence of Sutter By-pass and the Feather River. Also along both banks of Wadsworth Canal from the Intercepting Canals to its junction with Sutter By-pass and the Southerly levee of the Intercepting Canals. All levees of this unit have been built to adopted grade and section by new construction, except the Southerly levees of the Intercepting Canals which were built by local interests. For more complete detail of items included in construction of above mentioned levees, refer to the "As Constructed" drawings of Exhibit B. Structures affecting levee maintenance are listed in Exhibit E.

b. Inspection.

(1) Pertinent Requirements of the Code of Federal Regulations. Flood Control Regulations, paragraph 208.10(b)(1), are quoted in part as follows:

"(b) Levees - (1) Maintenance . . . Periodic inspection shall be made by the Superintendent . . . to be certain that:

- (i) No unusual settlement, sloughing, or material loss of grade of levee cross section has taken place;
- (ii) No caving has occurred on either the landside or the riverside of the levee which might affect the stability of the levee section;
- (iii) No seepage, saturated areas, or sand boils are occurring;
- (iv) Toe drainage systems and pressure relief walls are in good working condition, and that such facilities are not becoming clogged;

- (v) Drains through the levees and gates on said drains are in good working condition;
- (vi) No revetment work or riprap has been displaced, washed out, or removed;
- (vii) No action is being taken, such as burning grass and weeds, during inappropriate seasons, which will retard or destroy the growth of sod; (see Note (a) at end of subparagraph (1).)
- (viii) Access roads to and on the levee are being properly maintained;
- (ix) Cattle guards and gates are in good condition;
- (x) Crown of levee is shaped so as to drain readily, and roadway thereon, if any, is well shaped and maintained;
- (xi) There is no unauthorized grazing or vehicular traffic on the levees;
- (xii) Encroachments are not being made on the levee right-of-way which might endanger the structure or hinder its proper and efficient functioning during times of emergency.

Such inspections shall be made immediately prior to the beginning of the flood season immediately following each major high water period, and otherwise at intervals not exceeding 90 days; and such intermediate times as may be necessary to insure the best possible care of the levee..."

Note (a)

Since the growth of sod on the slopes of the levees of this project is not practicable and as the nature of the levee growth warrants burning thereof to facilitate inspection, the provisions of subparagraph b(1) of the regulations inconsistent therewith shall not apply. In place of item (vii), therefore, the following shall be observed:

Weeds, grasses and debris on the levee are burned during appropriate seasons, where not dangerous or impracticable, in order to permit the detection of cracks, holes, burrows, slips, and other damage and to permit the detection and extermination of burrowing animals and that grass and weeds on levee slopes be mowed where removal by burning is dangerous or impracticable, such as on peat levees or where burning would constitute a hazard.

(2) To insure the taking of such maintenance measures as will be required for proper functioning of the levee, the following items shall be specifically covered in each inspection:

- (a) Aggradation or degradation of the stream bed along the toe.
- (b) Settlement of levee fill.
- (c) Erosion of levee slopes; both sides of levees.
- (d) Presence of seepage; saturated areas, or sand boils back of levee.
- (e) Condition of access roads and roadway on levee.

** See p. 10a for additions* →
c. Maintenance. -

(1) Repairs to Levee Embankment. Methods used for repair or reconstruction of the levee fill will depend on the extent of the damaged section. If of small extent, the most suitable method will be to bring the levee back to line and grade by a fill made in 6-inch layers of earth free from brush, roots, sod, or other unsuitable matter. If of larger extent, the fill should be made in the same manner as the original construction, of selected material from borrow pits approved for the project, placed in uniform layers of loose material and not more than 6 inches in depth and compacted in accordance with the specifications under which the work was completed or compacted according to approved construction practices.

(2) Depredations of Burrowing Animals. Dens and runways formed within the levee by burrowing animals are frequently the causes of levee failures during flood stages. Burrowing animals such as muskrats, ground hogs, ground squirrels, moles and gophers, found in the levee should be exterminated. The dens and runways should be opened up and thoroughly compacted as they are backfilled. Levees kept properly cleared are not seriously menaced by burrowing animals as they prefer areas where a protective cover, such as high grass, weeds, and brush, is found. Several methods of extermination are found effective, such as trapping, baiting, and poison gases, depending on the type of animal

*2-02b
contd.

2-02 b. Inspection.

[NOTE: Change request incorrectly refers to this addition as (2)]

- (3) The repaired area should be visually inspected at the beginning and end of each flood season, and during and after each flood event for at least 3 events. A flood event is defined in the Operation and Maintenance manual "when the water surface in the Sutter Bypass reaches or exceeds the reading of 50.0 on the State of California Division of Water Resources gage at Long Bridge." Inspections should be completed on a daily basis during the flood event and should be performed on foot to properly characterize any issues. The crown of the levee should be inspected for signs of settlement of the cutoff wall. Settlement may cause a small void at the top of the cutoff wall approximately 3 to 5 feet below the levee crown. Typically settlement of earth materials is significantly complete within 1 to 2 years post-construction.

A surface expression of settlement may include:

- Longitudinal cracking parallel to the levee crown on the patrol road/levee crown surface.
- Longitudinal cracking parallel to the levee crown landward and riverward of the crown hinge points.
- "Dishing" or concave-shaped patrol road/levee crown surface.
- Sinkhole formation in the patrol road/levee crown.

In addition, the inspector should note any of the following:

- Depressions, changes in grade, bulges, erosion or cracking on the levee slope
- Rodent activity
- Excessive vegetation growth

If any of the above conditions are noted, especially if significant changes have occurred since the previous inspection, then the conditions should be repaired as part of the normal levee maintenance program.

If any of the following are noted, the sponsor should coordinate with the Corps of Engineers to determine a proper solution:

- Boils or other signs of excessive seepage landside of levee toe, especially during and after high water events
- Seepage, slumps, excessive erosion, or soil discoloration on or near the levee in the area around levee mile .4 on the Wadsworth Canal

present and the time of year the work is done. Advice concerning the best methods in each locality can be obtained from the County agricultural agent.

(3) Access Roads. Access roads to the levees shall be maintained in such condition that they will be accessible at all times to trucks used to transport equipment and supplies for maintenance of flood fighting.

d. Operation.

(1) Pertinent Requirements of the Code of Federal Regulations. Flood Control Regulations, Par. 208.10(b)(2) are quoted in part as follows:

"(2) Operation. During flood periods, the levee shall be patrolled continuously to locate possible sand boils or unusual wetness of the landward slope to be certain that:

- (i) There are no indications of slides or sloughs developing.
- (ii) Wave wash or scouring action is not occurring.
- (iii) No low reaches of levee exist which may be over-topped.
- (iv) No other conditions exist which might endanger the structures.

Appropriate advance measures will be taken to insure the availability of adequate labor and materials to meet all contingencies. Immediate steps will be taken to control any condition which endangers the levee and to repair the damaged section."

** see p. 11a for additions*

2-03. Drainage and Irrigation Structures. -

a. Description. Drainage and irrigation structures which extend through the levees are listed as follows:

INTERCEPTING CANALS

(See Drawing No. 50-10-2816)

Location Section No.:	Size & Kind of Pipe :	Other Structure Description :	Elev. of In-vert at Pipe
10	15" Iron Pipe Pump	with 15 H.P. Motor in Canal	57.9
12	8" Iron Pipe Pump	with 7½ H.P. Motor in Canal	58.4
19	12" Iron Pipe Pump	with 10 H.P. Motor in Canal	57.3
22	30" C.M.P.		54.8

For location of Section No. see Profile Drawing No. 50-10-2816 of Exhibit "B".

STRUCTURES AFFECTING LEVEE MAINTENANCE

Location (Station)	Corrugated Metal Pipes	Gates Model No.	Steel Pipe	Other Structure Descriptions	Elev. of Invert at Pipe
--------------------	------------------------	-----------------	------------	------------------------------	-------------------------

WADSWORTH CANAL (See Drawing No. 50-4-1949-3)

98/02			15"	East levee	54.9
157/35(West)			6"	Across Canal	58.4
159/38(East)			Gas Pipe		
160/25	36"	Calco #100		East levee	47.5
184/87	24"	Calco #100		East levee	49.2
228/00	12"			East levee	51.4
61/10			10"	West levee	55.9
93/50			12"	West levee	56.5
93/55			15"	West levee	56.3
158/35	36"	Calco #100		West levee	46.6
174/60			15"	West levee	58.2
174/63			24"	West levee	57.1
226/00			15"	West levee	57.0

Note: Calco gate Model No. 100 is placed on the outlet end of pipes. It closes against face pressures, and opens automatically to permit outflow whenever the pressure is reversed by a change in water levels.

Calco gate Model No. 101 is a slide gate which operates by hand screw on a steel frame.

Calco gate Model No. 109 is a heavy-duty rectangular slide gate.

* 2-02d
Contd

2-02 d. Operation

- (2) Any encroachment into the levee right-of-way must be coordinated with the Corps of Engineers as specified in Paragraph 3-01, Sub-Section e of the *Revised Standard Operation and Maintenance Manual, Sacramento River Flood Control Project*, dated May 1955.

STRUCTURES AFFECTING LEVEE MAINTENANCE

(Continued)

Location (Station)	Corrugated Metal Pipes	Gates Model No.	Steel Pipe	Other Structure Descriptions	Elev. of Invert at Pipe
<u>EAST LEVEE SUTTER BY-PASS (See Drawing No. 50-4-1946-2)</u>					
44720			24"		49.3
14146		3-6'x8' valves #109		3-4'x6' Concrete Conduits (Pumping Plant No. 1)	25.1
32115	24"			Pipe abandoned - Plugged with concrete	
37710			16"		51.2
44915			18"		52.1
58219		5-#109 5-flap gates		5-4'x6' Concrete Conduits (Pumping Plant No. 2)	28.5
76200	36"			Pipe abandoned - Plugged with concrete	
96630		2-#109 Wood gates		2-4'x6' Concrete Conduits (Pumping Plant No. 3)	30.6
106960			18"		53.2
109480			16"		53.0
113980				P.G. & E. Co. gas pipe line crossing	

b. Inspection.

(1) Pertinent Requirements of the Code of Federal Regulations, Flood Control Regulations, Par. 208.10 (d)(1), are quoted in part as follows:

"(d) Drainage Structures (1) Maintenance - Adequate measures shall be taken to insure that inlet and outlet channels are kept open and that trash, drift, or debris is not allowed to accumulate near drainage structures. Flap gates and manually operated gates and valves on drainage structures shall be examined, oiled and trial operated at least once every 90 days..... Periodic inspections shall be made by the Superintendent to be certain that:

- (i) Pipes, gates, operating mechanism, riprap and headwalls are in good condition;
- (ii) Inlet and outlet channels are open;
- (iii) Care is being exercised to prevent the accumulation of trash and debris near the structures and that no fires are being built near bituminous coated pipes;
- (iv) Erosion is not occurring adjacent to the structures which might endanger their water tightness or stability.

Immediate steps will be taken to repair damage, replace missing or broken parts, or remedy adverse conditions disclosed by such inspections."

(2) At each inspection required by paragraph 4-02 (b)(2) of the Standard Manual, the following items, if applicable, shall be particularly noted:

- (a) Debris or other obstructions to flow.
- (b) Condition of pipes and gates.
- (c) Damage or settlement of pipe.
- (d) Condition of concrete-cracks, spalls, erosion.

c. Maintenance.

(1) All eroded concrete shall be repaired as soon as any reinforcing steel is exposed or before erosion reaches a depth of 4 inches. For this purpose it is recommended that the repair be made by thoroughly cleaning the surface by sandblasting and building up the concrete to its original section with pneumatically-placed Portland cement mortar. All evidences of settlement, uplift, or failure of concrete structures should be referred to the State Engineer for analysis and recommendation of remedial measures.

(2) If the inspection shows that the automatic drainage structures have been jammed in an open position by debris or other obstructions, they shall be thoroughly cleaned so that they swing freely to a true closure. If any parts of the gates have been damaged or broken, they shall be replaced by new parts.

(3) Compliance with the provisions prescribed above pertaining to drainage structures is essential for proper maintenance of the levee system covered by this manual. Levee failures caused by neglected drainage structures are of common occurrence; it is, therefore, of utmost importance that these structures always be kept in perfect working condition in accordance with the regulations,

(4) Care should be taken not to bury any of the side drainage inlets in the event that it becomes necessary to fill any of the low-lying pockets in back of the levee. Plans for the maintenance of drainage facilities at any such points should be submitted to the State Engineer for approval before such work is started.

d. Operation.

(1) Pertinent Regulations of the Code of Federal Regulations. Flood Control Regulations, Par. 208.10 (d)(2) are quoted in part as follows:

"(2) Operation. Whenever high water conditions impend, all gates will be inspected in short time before water reaches the invert of the pipe and objects which might prevent closure of the gate shall be removed. Automatic gates shall be closely observed until it has been ascertained that they are securely closed..... All drainage structures in the levees shall be inspected frequently during floods to ascertain whether seepage is taking place along the lines of their contact with the embankment. Immediate steps shall be taken to correct and adverse conditions."

(2) The outlets of side drainage structures inundate at relatively low river stages. They should, therefore, be inspected at the first sign of a rise in the river to make certain that the gates are not jammed in an open position and thus allow flood waters to enter behind the levee.

2-04. Miscellaneous Facilities. -

a. Description. Miscellaneous structures or facilities which were constructed as a part of, or existed in conjunction with the protective works, and which might affect their functioning, include the following:

(1) Bridges. (for further details see Exhibit B)

- (a) A reinforced concrete bridge across Wadsworth Canal at Station 65 / 70 - Franklin Road crossing.
- (b) A reinforced concrete bridge across Wadsworth Canal at Station 128 / 25 - Yuba City - Colusa Highway.
- (c) A railroad bridge crossing Wadsworth Canal at Station 159 / 75 - Sacramento Northern Railroad.
- (d) A reinforced concrete highway bridge crossing Wadsworth Canal at Station 174 / 25.
- (e) A reinforced concrete bridge crossing Wadsworth Canal at Station 228 / 00 - Butte House Road.
- (f) East levee of Sutter By-pass - State Highway No. 24 bridge at Station 303 / 75.
- (g) East levee of Sutter By-pass - highway bridge at approximately Station 1137 / 60. (State Highway 20)
- (h) East Levee of Sutter By-pass - railroad bridge at approximately Station 1139 / 80 (Long Bridge) - Sacramento Northern Railroad.
- (i) East levee of Sutter By-pass - Old Highway Bridge at Station 16 / 50 (stub traverse location).

(2) Utility Crossing.

- (a) A 6" steel gas pipe line crossing Wadsworth Canal at Station 159 / 38.
- (b) Across East levee of Sutter By-pass - F.G.&E. Co. gas line crossing at approximately Station 1139 / 80.

(3) Structures Crossing Intercepting Canals.

- (a) Section 2 - Bridge Crossing (Mallott Road).

- (b) Section 11 - Wooden Flume Crossing.
- (c) Section 13 - Bridge Crossing.
- (d) Section 16 - Bridge Crossing (East Butte Road).
- (e) Section 29 - Wooded Flume Crossing.
- (f) Section 51 - Bridge Crossing (Township Road).
- (g) Section 57 - Bridge Crossing.
- (h) Section 59 - Bridge Crossing.
- (i) Section 64 - Bridge Crossing.
- (j) Section 74 - Bridge Crossing.

NOTE: For location of Sections referred to above
see Profile Drawing No. 50-10-2816,
EXHIBIT "B". *In profilebook*

(4) Hydrographic Facilities. Water gaging facilities within Unit No. 135 are listed as follows:

- (a) Continuous water stage recorder and staff gage in Sutter By-pass at Long Bridge.
- (b) Staff gage in Sutter By-pass at State Pumping Plant No. 3.
- (c) Continuous water stage recorder and staff gage in Wadsworth Canal at Butte House Road Bridge.
- (d) Staff gage in Sutter By-pass at State Pumping Plant No. 2.
- (e) Staff gage in Sutter By-pass at State Pumping Plant No. 1.

b. Inspection and Maintenance.

(1) Pertinent Requirements of the Code of Federal Regulations. Flood Control Regulations, Par. 208.10 (h) (1), are quoted in part as follows:

- "(h) Miscellaneous Facilities. (1) Maintenance. Miscellaneous structures and facilities constructed as a part of the protective works and other structures and facilities which function as a part of, or affect the efficient functioning of the protective works, shall be periodically inspected by the Superintendent and appropriate maintenance measures taken. Damaged or unserviceable parts shall be replaced without delay. . . ."

(2) Inspection of the miscellaneous facilities shall be made at the same time that the inspection of the other features of the project are made, and shall be reported on check list No. 3, sheet No. 4 of EXHIBIT E.

(3) The interest of the Corps of Engineers and the responsibility of the local interests in the existing highway and railroad bridges is confined to their effect on the safety and functioning of the flood control channel, but any conditions noted in the inspections that may affect them in any way should, as a matter of courtesy, be brought to the attention of the agencies maintaining and operating them. If the inspection of any miscellaneous structure, either existent or constructed in the future under permit, discloses any condition that indicates the probability of failure during periods of high water, the Superintendent shall address a letter to the owner of the structure, quoting this manual as authority and inviting attention to the conditions observed and requesting that immediate steps be taken to correct them. A copy of such a letter shall be forwarded to the District Engineer for his information. A report on the action taken by the owner shall be submitted to the District Engineer to accompany the next semi-annual report under provisions of paragraph 3-03c of the Standard Manual. A suggested report form is included as EXHIBIT G of this manual.

(4) The purpose of maintenance work is to insure continuous satisfactory operation of miscellaneous facilities. It is, therefore, important in such work that all possible causes of future trouble be found and corrected. Particular attention should be given to minor weaknesses which may be an indication of future trouble.

c. Operation.

(1) Requirements of the Code of Federal Regulations. Flood Control Regulations, Par. 208.10(h)(2) are quoted as follows:

"(2) Operation. Miscellaneous facilities shall be operated to prevent or reduce flooding during periods of high water. Those facilities constructed as a part of the protective works shall not be used for purposes other than flood protection without approval of the District Engineer unless designed therefor."

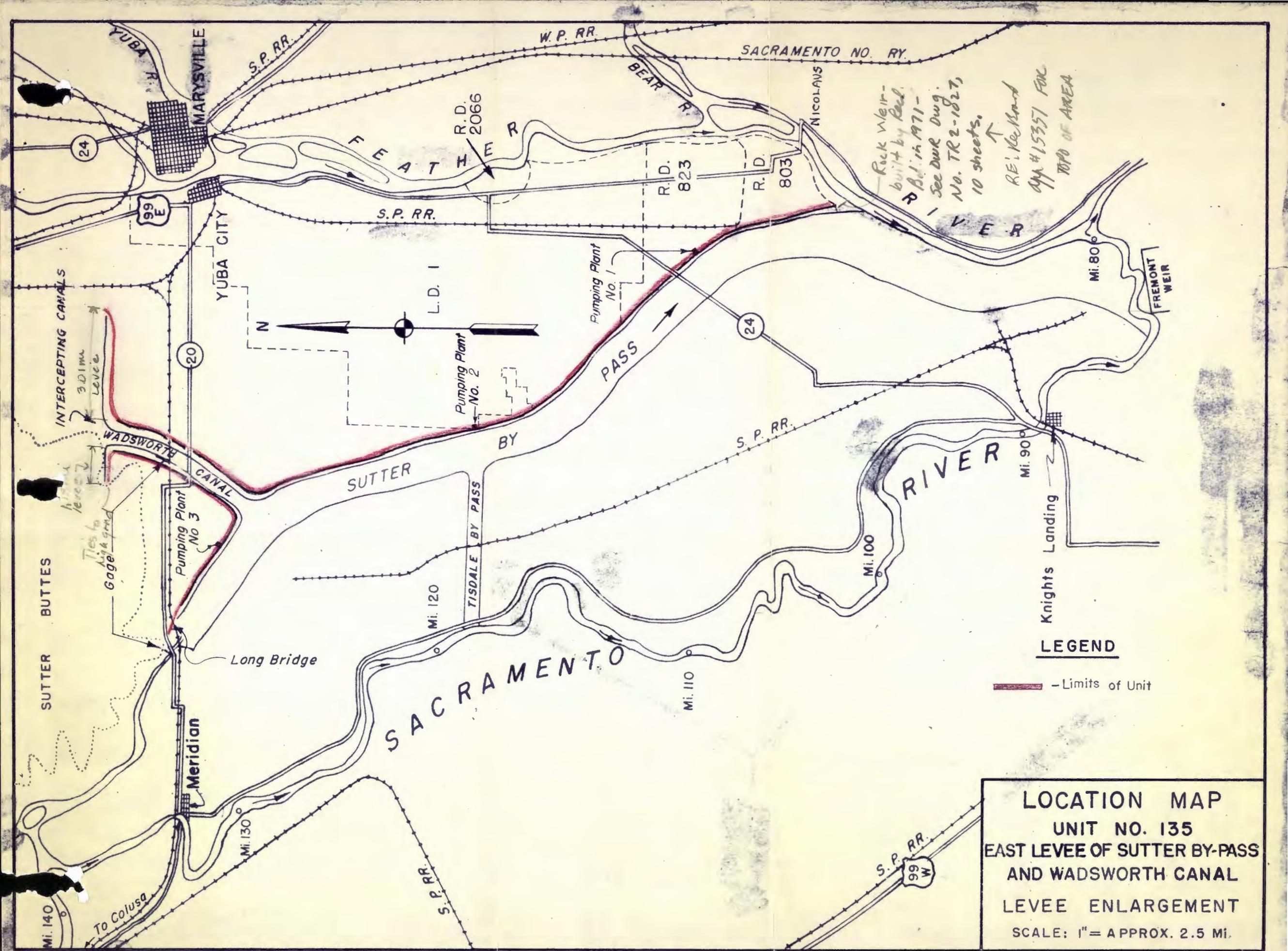
SECTION III - REPAIR OF DAMAGE TO PROJECT WORKS AND METHODS OF COMBATING FLOOD CONDITIONS.

3-01. - Repair of Damage. In the event of serious damage to the project works, whether due to flood conditions or other causes, and which may be beyond the capability of local interests to repair, the Superintendent will contact a representative of the State of California who coordinates maintenance of project works of the Sacramento River Flood Control Project. The State representative will give assistance or advice, or will determine appropriate action to be taken.

3-02. - Applicable Methods of Combating Floods. For applicable methods of combating flood conditions reference is made to Section V of the Standard Manual, where the subject is fully covered.

EXHIBIT A
FLOOD CONTROL REGULATIONS
(See Standard Manual)

EXHIBIT A
Unattached



Rock Weir -
 built by Reel.
 P.B. in 1971 -
 See DWG. No. TR 2-1027,
 10 sheets.
 R.E. Keeland
 App #15357 FOR
 TOP OF AREA

LEGEND

 - Limits of Unit

LOCATION MAP
UNIT NO. 135
EAST LEVEL OF SUTTER BY-PASS
AND WADSWORTH CANAL
LEVEL ENLARGEMENT
 SCALE: 1" = APPROX. 2.5 Mi.

EXHIBIT B

"AS CONSTRUCTED"

DRAWINGS

See separate folder for the following drawings:

<u>File No.</u>	<u>Title</u>
50-4-1945-2	PART "A" - East Levee Sutter Bypass from its junction with the West Levee of the Feather River Northerly 9.1 miles. Sheets 1 to 5, inclusive.
50-4-1946-2	PART "B" - East Levee Sutter Bypass from 2.4 miles below Mouth of Wadsworth Canal to Sutter Buttes. Sheets 1 to 4, inclusive.
50-4-1949-3	PART "C" - East and West Levees of Wadsworth Canal from its Mouth to Intercepting Canal. Sheets 1 to 3 inclusive.
50-10-2816	Profile of East Intercepting Canal. Sheet 1. (<i>East of Mallott Road</i>)
50-4-2772	Improvement and Enlargement of East Levee of Sutter Bypass. 1 Sheet (Plan by State of California).
50-4-1680	West Intercepting Canal. 1 Sheet. (<i>West of Mallott Rd</i>)
	Additional drawings of cross-sections, structures, and miscellaneous facilities are available in the office of the District Engineer, Sacramento, California
50-1-3531	Emergency levee repairs to Sutter Bypass from Wadsworth Canal to Gilsizer Slough, in 5 sheets

These are listed in Binder

50-4-4393	Bypass Levee Revetment Yolo and Sutter Bypass Levees, in 7 sheets.
4-4-588	Emergency Repairs, Levee Construction and Bank Protection, Vicinity of Nelson Bend, in one sheet.

50-04-6235 Farm Road Site on the Wadsworth Canal, PL 84-59.

Rock Weir built by DWR in 1971 - DWR Div No. TR2-1027 (10 sheets)
RE: RECORD PERMIT # 15351 for type of area (1959)

EXHIBIT C

PLATES OF SUGGESTED FLOOD FIGHTING METHODS

(See Standard Manual)

EXHIBIT C
Unattached

EXHIBIT D
CHECK LIST NO. 1
LEVEE INSPECTION REPORT
(See Standard Manual)

EXHIBIT D
Unattached

EXHIBIT E
CHECK LISTS OF LEVEES,
CHANNEL AND STRUCTURES

For definition of "flood" of "high water period", see paragraph 1-06 of this manual

CHECK LIST NO. 2

EAST LEVEE OF SUTTER BY-PASS

AND BOTH LEVEES OF WADSWORTH CANAL

AND INTERCEPTING CANALS

Inspector's Report Sheet No. _____

Inspector _____

Date _____

Superintendent _____

Item	Remarks
(a) Location by Station	
(b) Settlement, sloughing, or loss of grade	
(c) Erosion of both slopes of levees	
(d) Condition of roadways, including ramps	
(e) Evidence of seepage	
(f) Condition of farm gates and fencing.	
(g) Maintenance measures taken since last inspection	
(h) Comments	

INSTRUCTIONS FOR COMPLETING SHEET 2, EXHIBIT E
(To be printed on back of sheet 2)

- Item (a) Indicate levee station of observation, obtained by pacing from nearest reference point; indicate right or left bank.
- Item (b) If sufficient settlement of earthwork has taken place to be noticeable by visual observation, indicate amount of settlement in tenths of a foot. If sloughing has caused a change in slope of the embankment sections, determine the new slope. Note areas where erosion or gullyng of the section has occurred.
- Item (c) If sufficient erosion or gullyng of back face of back toe of levee has taken place to be noticeable by visual inspection, indicate area affected and depth.
- Item (d) Note any natural change in any section of roadway or ramps. Indicate any inadequacy in surface drainage system.
- Item (e) Indicate any evidence of seepage through the embankment section.
- Item (f) Indicate the serviceability of all farm gates across the embankments and roadway, and indicate if repainting is required.
- Item (g) Indicate maintenance measures that have been performed since last inspection and their condition at the time of this inspection.
- Item (h) Record opinion, if any, of contributory causes for conditions observed and also any observations not covered under other columns.

NOTE: One copy of the Inspector's Report is to be mailed to the District Engineer immediately on completion, and one copy is to be attached to and submitted with the Superintendent's semi-annual report.

CHECK LIST NO. 3

CHANNEL AND RIGHT-OF-WAY

UNIT NO. 135

Inspector's Report Sheet No. _____

Inspector _____

Date _____

Superintendent _____

Item	Remarks
(a) Name of channel and location by stations	
(b) Vegetal growth in channel	
(c) Debris and refuse in channel	
(d) New construction within right-of-way	
(e) Extent of aggradation or degradation	
(f) Condition of riprapped section	
(g) Condition of bridges	
(h) Measures taken since last inspection	
(i) Comments	

INSTRUCTIONS FOR COMPLETING SHEET 4, EXHIBIT E
(To be printed on the back of sheet 4)

- Item (a) Indicate station of observation obtained by pacing from nearest reference point.
- Item (b) Note nature, extent, and size of vegetal growth within the limits of flood flow channel.
- Item (c) Note nature and extent of debris and refuse that might cause clogging of the conduits of the irrigation intake works, or the bridges over the channel.
- Item (d) Report any new construction along the diversion channel that has come to the attention of the inspector and that might affect the functioning of the project.
- Item (e) Indicate any change in grade or alignment of the channels, either by deposition or sediment or scour, that is noticeable by visual inspection. Estimate amount and extent.
- Item (f) Indicate any change that has taken place in the riprap such as disintegration of the rock, erosion, or movement of the rock. Note the presence of vegetal growth through the riprap.
- Item (g) Note any damage or settlement of the footings of the bridges. Indicate condition of wooden structures and if repainting is required. Indicate condition of bridge approaches, headwalls, and other appurtenances.
- Item (h) Indicate maintenance measures that have been performed since the last inspection and their condition at time of this inspection.
- Item (i) Record opinion, if any, of contributory causes for conditions observed, also any observations not covered under other columns.

NOTE: One copy of the Inspector's Report is to be mailed to the District Engineer immediately on completion, and one copy is to be attached to and submitted with the Superintendent's semi-annual report.

CHECK LIST NO. 4

DRAINAGE AND IRRIGATION STRUCTURES

UNIT NO. 135

Inspector's Report Sheet No. _____

Inspector _____

Superintendent _____

Date _____

(a) Location by Station	(b) Bank	(c) Debris or other obstruction to flow	(d) Damage or settlement of pipe or conduit	(e) Condition of concrete headwall or invert paving	(f) Condition of right-of-way adjacent to structure	(g) Repair Measures Taken since last Inspection	(h) Comments
Section No: 10 12 19 22	Left Left Left Left						
Station 98 / 02 159 / 38 160 / 25 184 / 87 228 / 00	Left Left Left Left Left						
61 / 10 93 / 50 93 / 55 157 / 35	Right Right Right Right						

INTERCEPTING CANALS

WADSWORTH CANAL

CHECK LIST NO. 4

DRAINAGE AND IRRIGATION STRUCTURES

UNIT NO. 135

Inspector's Report Sheet No. _____

Inspector _____

Superintendent _____

Date _____

(a) Location by Station	(b) Bank	(c) Debris or other obstruction to flow	(d) Damage or settlement of pipe or conduit	(e) Condition of concrete headwall or invert paving	(f) Condition of right-of-way adjacent to structure	(g) Repair Measures Taken Since last Inspection	(h) Comments
158 / 35	Right						
174 / 60	Right						
174 / 63	Right						
226 / 00	Right						
44 / 20	Left						
141 / 46	Left						
321 / 15	Left						
377 / 10	Left						
449 / 15	Left						
582 / 19	Left						
762 / 00	Left						
966 / 30	Left						
1069 / 60	Left						
1094 / 80	Left						

(continued)

WADSWORTH CANAL

EAST LEVEE BUTTER BY-PASS

INSTRUCTIONS FOR COMPLETING SHEETS 6 & 7, EXHIBIT E
(To be printed on back of sheets 6 & 7)

- (1) Enter station of all structures under column (a) for check list.
- (2) Inspect inlet, barrel, and outlet for accumulation of sediment, rubbish, and vegetal matter. Note condition under column (c).
- (3) If any settlement or damage to the pipe, barrel, or invert of the drain has occurred, estimate the location and amount. Note particularly if any backfill has come into the pipe or been disturbed. Record observations under column (d).
- (4) Inspect the concrete portions of the structures for evidence of settlement, cracks, "pop-outs", spaces, abrasive wear, or other deterioration. Record conditions under column (e).
- (5) Inspect backfill area adjacent to structure for evidence of erosion caused by overflow of the drainage structure and note conditions in column (f).
- (6) Under column (g) indicate physical measures that have been taken to correct conditions reported in last inspection, and their condition at time of this inspection.
- (7) Under column (h) record opinion, if any, of contributory causes for conditions observed, also any observations not covered under other columns.
- (8) A copy of the inspector's report is to be mailed to the District Engineer immediately on completion, and a record copy shall be attached to the Superintendent's semi-annual report.

EXHIBIT F
LETTER OF ACCEPTANCE
BY STATE RECLAMATION BOARD



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
1325 J STREET
SACRAMENTO CA 95814-2922

NOV 29 2016

Ms. Leslie M. Gallagher
Executive Officer
Central Valley Flood Protection Board
3310 El Camino Avenue, Room 151
Sacramento, CA 95821

Dear Ms. Gallagher:

The purpose of this letter is to notify the Central Valley Flood Protection Board of the completion of an effort to update the Operation and Maintenance Manual Supplements for the Sacramento River Flood Control Project and the Lower San Joaquin River Levees and Lower San Joaquin River and Tributaries Project. These updates are a compilation of revisions made to the project over time and where we had record of a transfer letter to the Board. These updated supplements are the most current version and should be utilized as the baseline version for any future project modifications.

This process and the compiled updates have been coordinated with the Central Valley Flood Protection Board and Department of Water Resources staffs for review and comment. All comments have been addressed or incorporated into the manuals.

The Board staff has been provided a copy of the manuals in electronic format. Future updates will include entire unit supplements so updates can be seen in context with the entire unit supplement. The list of completed supplements, by the unit number and title, are attached. If you have any questions regarding this transmittal, please contact Gary Kamei at 916-557-6845.

Sincerely,

A handwritten signature in black ink, appearing to read "D. G. Ray", written over a horizontal line.

David G. Ray, P.E.
Colonel, U.S. Army
District Commander

Enclosures

Standard O&M Manual Sacramento River Flood Control Project	
Unit No.	Project Name
101	RD 341 Sherman Island
102	E. Levee of Sac River, Isleton to Threemile Slough & N. Levee of Threemile Slough from Sac River to SJ River
103	Both Levees of Georgiana Slough & E. Levee of Sac River from Walnut Grove to Isleton
104	Levees around Grand Island
105	Levees Around Reyer Island
106	S. Levee Lindsey Slough & W. Levee of Yolo BP from Lindsey Slough to Watson Hollow and N. Levee of Watson Hollow Drain
107	Levees Around Hastings Tract
108	Levees Around Peters Tract
109	West Levee of Yolo Bypass & E. Levee of Cache Slough
110	Levees Around Sutter Island
111	E. Levee of Sac River from Freeport to Walnut Grove
112	Levees Around Merritt Island
113	E. Levee Yolo Bypass, N. Levee Miner Slough, W. Levees Sutter Slough, Elkhorn Slough & Sac River, All Bordering RD 999
114	W. Levee of Sac River from Northern Boundary of RD 765 to Southern Boundary of RD 307
115	E. Levee of Sac River from Sutterville Rd to Northern Boundary of RD 744
116	W. Levee of Sac River from Sac Weir to Mi 51.2 & S. Levee of Sac Bypass & E. Levee of Yolo Bypass from Sac Bypass to Southern Boundary of RD 900
117	E. Levee Sac River through City of Sac from Tower Bridge to Sutterville Rd
118.1	E. Levee of Sac River from American River to Tower Bridge & S. Levee of American River from Mayhews Downstream to Sac River
118.2	N. Levee American River, E. Levee Natomas Canal, Both Levees Arcade Creek, S. Levee Linda Creek, & Magpie Creek Diversion Channel
118.2 Sup	Vegetation on Mitigation Sites E. Levee of Sac River from American River to Tower Bridge & S. Levee of American River from Mayhews Downstream to Sac River
119	Putah Creek Channel & Levees & W. Levee of Yolo Bypass from Yolo Causeway Downstream 3 mi. Includes O&M manual for the Yolo Basin wetlands, and South Fork Putah Creek Preserve Restoration Section 1135 Authorization.
120	Relocated Willow Slough Channel & Levees & W. Levee Yolo Bypass from mouth of Relocated Willow Slough to Yolo Causeway
121	R. Levee of Yolo Bypass from Willow Slough Bypass to Woodland Rd RD2035
122.1	W. Levee of Sac River from Mi 70.8 to Sac Weir & N. Levee of Sac Bypass & E. Levee of Yolo Bypass from Woodland Hwy to Sac Bypass
123	W. Levee of Sac River from East End of Fremont Weir to Mi 70.8 & E. Levee of Yolo Bypass from East End Fremont Weir to Woodland Hwy RD 1600

124	N. Levee of American River from Natomas E. Canal to Sac River & E. Levee of Sac River from Natomas Cross Canal to American River. Includes supplement, Vegetation on Mitigation Sites.
125	Back Levee of RD 1000
126	Cache Creek Levees & Settling Basin Yolo Bypass to High Ground
127	Knights Landing Ridge Cut & Sac River & Yolo BP Levees of RD's 730 and 819 & S. Levee of Sycamore Slough
128	E. Levee of Sac River from Sutter Bypass to Tisdale Weir all within RD 1500
129	S. Levee of Tisdale By-Pass from E. Levee Sac River to W. Levee Sutter BP & W. Levee of Sutter BP Downstream to E. Levee of Sac River
130	W. Levee Sac River from Sycamore Slough to Wilkins Slough (Mi. 89.9 to Mi. 117.8)
131	W. Levee Sac River from Wilkins Slough to Colusa (Mi. 117.8 to Mi. 143.5)
132	Back Levees of RD 108
133	E. Levee of Sac River from Winship School to Tisdale BP & N. Levee of Tisdale BP & W. Levee of Sutter BP from Long Bridge to Tisdale BP
134	Levees of RD 70, E. Levee of Sac River from Butte Slough Outfall Gates to Winship School & W. Levee of Sutter BP from Butte Slough Outfall Gates to Long Bridge
135	E. Levee of Sutter BP from Sutter Buttes Southerly to Junction with Feather River & E. & W. Levees of Wadsworth Canal & Levee of Intercepting Canals
136	E. Levee of Sac River from Butte Slough Outfall Gates to the Princeton-Afton Rd (Mi. 138.3 to Mi. 164.4)
137	W. Levee of Sac River from North End of Princeton Warehouse to Colusa Bridge
138	E. Levee of Sac River from Parrott-Grant Line to Princeton-Afton Rd
139	W. Levee of Sac River from N. Boundary of LD 2 to North End of Princeton Warehouse
140	W. Levee of Sac River in LD 1 (Mi. 170.5 to Mi. 184.7). Includes mitigation site O&M manual, Yuba County
141.1	E. Levee of Feather River from Bear River to Natomas CC & S. Levee of Bear River & Both Levees of Yankee Slough. Parts 1 and 2
141.2	E. Levee of Feather River from Bear River to Natomas CC & S. Levee of Bear River & Both Levees of Yankee Slough. Parts 1 and 2
142	Back Levee of RD 1001
143	W. Levee of Feather River from North Boundary of RD 823 to E. Levee of Sutter Bypass
144	W. Levee of Feather River from North Boundary of LD 1 to North Boundary of RD 823
145	E. Levee of Feather River, S. Levee of Yuba River, Both Levees of WPRR Intercepting Channel, W. Levee of South Dry Creek & N. Levee of Bear River
146	N. Levee of Bear River & S. Levee of South Dry Creek RD 817 & Vicinity of Wheatland
147	Levee Around the City of Marysville & N. Levee of Yuba River to a Point 1.8 Mi. Upstream from Marysville

148	W. Levee of Feather River from North Boundary of RD 777 to North Boundary of LD 1
149	S. Levee of Yuba River Maintenance Area No. 8
151	E. Levee Feather River from Honcut Creek to Marysville & S. Levee of Honcut Creek & E. Levee of RD 10
152	W. Levee of Feather River from N. Boundary of RD 777 to Western Canal Intake (Levee of Drainage District No. 1)
153	Lower Butte Creek Channel Improvement, Colusa, Glenn & Butte Counties
154	Moulton Weir & Training Levee Sacramento River
155	Colusa Weir & Training Levee Sacramento River
156	Tisdale Weir & Bypass
157	Fremont Weir, Sacramento River
158	Sacramento Weir, Sacramento River
159	Pumping Plants No. 1, 2 & 3, Sutter Bypass
160	Sutter Butte Canal Headgate
161	Butte Slough Outfall Gates
162	Knights Landing Outfall Gates, Sacramento River

Standard O&M Manual San Joaquin River

Unit No.	Project Name
1	Right Bank Levee of the San Joaquin River & French Camp Slough within RD 404
2	Right Bank Levee of the San Joaquin River & French Camp Slough within RD 17
3	North Levee of Stanislaus River & East Levee of the San Joaquin River within RD 2064, 2075, 2094 and 2096
4	East Levee of San Joaquin River within RD 2031
5	East Levee of the San Joaquin River Within RD No. 2092
6	East Levee of the San Joaquin River in RD Nos. 2063 & 2091
7	West Levee of San Joaquin River & North Levee of Old River RD Nos. 524 & 544
8	Right Banks of Old River & Salmon Slough Within RD No. 1 & RD No. 2089
9	Levees Around RD No. 2062 & San Joaquin County Flood Control District Area No.2
10	West Levee of Paradise Cut RD No. 2058 & SJ County Flood Control District, Area No.2
11	West Levee of San Joaquin River from Durham Bridge to Paradise Dam Within RD No. 2085 & 2095
12	West Levee of San Joaquin River From Opposite Mouth of Tuolumne River Downstream to Stanislaus County Line Within RD Nos. 2099, 2100, 2101, & 2102
13	West Levee of the San Joaquin River in RD No. 1602



**DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922**

REPLY TO
ATTENTION OF

Flood Protection and Navigation Section

JUL 22 2009

Mr. Jay Punia, Executive Officer
Central Valley Flood Protection Board
3310 El Camino Ave., Rm. LL40
Sacramento, California 95821

Dear Mr. Punia:

This letter is to transfer the U.S. Army Corps of Engineers (Corps) recently completed portion of work performed under the PL 84-99, Flood Control and Coastal Emergencies (FCCE) (33 U.S.C. 701n) (69 Stat. 186) for emergency management activities. Emergency repairs were made to rehabilitate underseepage along the east levee of the Wadsworth Canal at the intersection of the canal and the Sutter Bypass Unit 1, levee mile 4.48 (east levee Sutter Bypass) to levee mile 0.5 (Wadsworth Canal). Additional information about the repair and its location may be found in the document titled, *PL 84-99 Cost-Share Program, Sacramento River Basin No. 18, Sutter County, California, 'Farm Road Site' on the Wadsworth Canal, Final Geotechnical Report.*

This work meets the requirements of the existing Operation and Maintenance Manuals (O&M) for the PL 84-99 Rehabilitation and Inspection Program (RIP); and therefore, said flood control work is transferred as of the date of this letter to Central Valley Flood Protection Board for operation, maintenance, repair, replacement, and rehabilitation (OMRR&R).

The repairs were completed by JAG Construction, in accordance with Specification Number 1520, Design File Number 50-04-6235 and Contract Number W91238-08-C-0008. As-constructed drawings and revisions to the Operation and Maintenance Manual are enclosed.

If you have any questions regarding this project, please contact the Project Manager, Ms. Laura Whitney-Tedrick, at (916) 557-7455. If you have any questions regarding this transfer, please contact Ms. Meegan Nagy at (916) 557-7257 or Mr. Robert Murakami at (916) 557-6738, Flood Protection and Navigation Section.

Sincerely,


LTC, D3E
For
Thomas C. Chapman, P.E.
Colonel, U.S. Army
District Engineer

- 2 Enclosure(s)
1. Supplement to Standard Operation & Maintenance Manual
2. AS-BUILT

C
O
P
Y

THE RECLAMATION BOARD
STATE OF CALIFORNIA

C
O
P
Y

17 March 1971

File No.: 4130.70.615
Your Contract: DACW05-71-C-0041

District Engineer
U. S. Army Corps of Engineers
650 Capitol Mall
Sacramento, California 95814

Dear Sir:

Reference is made to your letter of February 25, 1971, concerning transfer to the State of California of the emergency repair work on the Feather River at Nelson Bend, Right Bank, for maintenance and operation.

This work was constructed in conformance with Specification No. 3903, Contract No. DACW05-71-C-0041 and Drawing No. 4-4-588.

The Reclamation Board at its meeting of March 12, 1971, formally accepted the above-referred to work for operation and maintenance.

Sincerely yours,

/s/ A. E. McCollam
A. E. McCOLLAM
Chief Engineer and General Manager

EXHIBIT F

SPKCO-0

25 February 1971

The Reclamation Board
State of California
1416 - 9th Street, Room 1335
Sacramento, California 95814

Gentlemen:

Reference is made to the joint inspection of 23 February 1971 on the PL 99 emergency repair work at Feather River (Nelson Bend) and the Sutter Bypass. This inspection was made for the purpose of reviewing the completed contract work with State of California representatives, for acceptance.

The emergency repair work consisted of 795 feet of levee setback with bank protection, and restoration of 2308 feet of bank protection work on the Feather River right bank at Nelson Bend. The work was completed on 19 February 1971, in accordance with Specification No. 3903, Contract DACW05-71-C-0041, Drawing No. 4-4-588.

The work was performed under the general authority of Section 5 of the Flood Control Act of 18 August 1941, as amended (Public Law 99, 84th Congress, 1st Session). Therefore, said work together with the waterway banks contiguous thereto, shall be operated and maintained by the State of California commencing 26 February 1971.

This portion of the project work will be added by amendment to the Operation and Maintenance Manual, Supplement No. 135 Sacramento River Flood Control Project. Copies will be furnished your office at a later date.

Sincerely yours,

ROMPALA/p

COLEMAN

done
JAMES C. DONOVAN
Colonel, CE
District Engineer

JAMES H. HIGMAN
Lieutenant Colonel, CE
Deputy District Engineer

HENSON

DONOVAN

Copy furnished:
BWR, ATTN: John Wright

O OCE
O SPD

cc: Engr Div-Lev & Chan
Engr Div-Prog Dev
Valley
F&A

Unit 135

To Jack O 26/2/71

C
O
P
Y

C
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P
Y

THE RECLAMATION BOARD
STATE OF CALIFORNIA

DEC 24 1968

4130.55.605

District Engineer
Corps of Engineers
U. S. Army
650 Capitol Mall
Sacramento, California 95814

Dear Sir:

Reference is made to your letter of November 22, 1968 concerning transfer to the State of California of the Sutter and Yolo Bypass Levee Revetment Project, Sites 1, 2, 3 and 4 for maintenance and operation.

This work was constructed in accordance with Specification No. 3492, Contract No. DACW05-C-0077, Drawing No. 50-4-4393.

The Reclamation Board, at its meeting of December 20, 1968, formally accepted the above referred to work for operation and maintenance.

Sincerely yours,

/s/ A. E. McCOLLAM
A. E. McCOLLAM
Chief Engineer and
General Manager

EXHIBIT F

SPKCO-0

22 November 1968

The Reclamation Board
State of California
1416 - 9th Street, Room 1335
Sacramento, California 95814

Gentlemen:

Reference is made to the joint inspection of 21 November 1968, made for the purpose of transferring four completed rock revetment sites to the State of California for operation and maintenance. This work consists of two sites on the Yolo Bypass east levee and one site each on the Sutter Bypass east and west levees, as delineated on the attached inclosure. The work was constructed as part of the Sacramento River Major and Minor Tributaries Flood Control Project and completed on 5 November 1968, in accordance with Specification No. 3492, Contract No. DACW05-68-C-0077, Drawing No. 50-4-4393.

The work was performed under the general authority of the Flood Control Act of 22 December 1944 (Public Law 534, 78th Congress, 2nd Session) and now meets the requirements of the Sacramento River Major and Minor Tributaries Flood Control Project. Therefore, said work, together with waterway banks contiguous thereto, is transferred to the State of California for operation and maintenance.

This portion of the project work will be added by amendment to the Operation and Maintenance Manual, Supplement Nos. 122, 129 and 135, Sacramento River Major and Minor Tributaries Flood Control Project, and furnished to your office at a later date.

Sincerely yours,

1 Incl
As stated

CRAWFORD YOUNG
Colonel, CE
District Engineer

[Signature]
ROMPALA/jmc

[Signature]
COLEMAN

[Signature]
HENSON

[Signature]
HART

[Signature]
YOUNG

*WMTS
122, 129,
135*

[Signature]
22
HK

- CF:
- DWR
- OCE
- SPD

CERTIFIED MAIL

cc: Engrg Div (Lev & Chan); Engrg Div (Prog Dev); Valley; F&A(Cordano)
RETURN RECEIPT REQUESTED

copy to Jensen & Huber 25 NOV 68/K

SUMMARY OF SACRAMENTO RIVER MAJOR & MINOR TRIBUTARIES PROJECT
CONTRACT NO. 68-C-0077

YOLO BYPASS LEFT BANK:

SITE	STONE PROTECTION STATION	LINEAL FEET	DESCRIPTION
1.	102+00 to 116+00	1400 feet	1.8 mile upstream from Sacramento Bypass
2.	254+00 to 316+00	*6030 feet	Downstream from State Highway 16

SUTTER BYPASS RIGHT BANK:

3.	426+43 to 481+50	5507 feet	Downstream from Karnak Pump
----	------------------	-----------	-----------------------------

SUTTER BYPASS LEFT BANK:

4.	0+00 to 3+60	360 feet	Near Gilsizer Slough
----	--------------	----------	----------------------

*170 feet by others

Units 122, 129, 135

REGISTERED

RETURN RECEIPT REQUESTED

WBH:pnp

16 FEB 1959

SPKKO-P

*RD 1660 for West Side
State Water Resour East Side*

The Reclamation Board
State of California
1215 "O" Street
Sacramento 14, California

16 Feb 59

Gentlemen:

Reference is made to the emergency repair program on the Sacramento River Flood Control Project formulated as a result of requests from local interests, joint inspections and investigations participated in by State, local and Corps of Engineers representatives.

Emergency repairs have been completed under the general authority of Public Law 99, 84th Congress, 1st Session, on both levees of the Sutter Bypass from Wadsworth Canal to Gilsizer Slough.

The emergency work consisted of the construction of relief wells and seepage drains and was completed 14 November 1958 in accordance with Specification No. 2463, Contract No. DA-04-167-CIVENG-59-2 and Drawing No. 50-1-3531.

The above work as completed is hereby transferred to the State of California for operation and maintenance as an appurtenance of the levee reach in this area transferred to the State on 8 December 1951.

A copy of this letter is being transmitted to the Department of Water Resources.

Sincerely yours,

A. E. McCOLLAM
Colonel, CE
District Engineer

Copy furnished:
Dept Water Res
23rd & "R" Sts
Sacto, Calif.

O.C.E.
SoFacDivnEngr

cc: Opers Br ✓

Units 138, 135

*W/levee E/levee
1660 State*

*See Units 71 & 76
Letter # 8*

REGISTERED

RETURN RECEIPT REQUESTED

OPERATIONS BRANCH

This copy was furnished on 24 Feb. 1953
B. de A.

Accepted Items

December 18, 1951

The Board accepted the transfer from the Corps of Engineers, in letters of dates listed below, the following reaches of levees and their contiguous waterway banks where applicable for flood control operation and maintenance, as complete and meeting the requirements of the Sacramento River Flood Control Project.

No.	Date of Letter	Levee Location	Remarks
1-2	1 Dec. 1951	N. and S. Training* Levees Moulton Weir*	Maintained by State
3-4	Do	N. and S. Training* Levees Colusa Weir*	Maintained by State
6	3 Dec. 1951	W. Levee Sacramento River, Mile 177.5 Mile 174.1	Maintained as Maintenance Area No. 2
9	4 Dec. 1951	E. Levee Yolo By-pass Fremont* Weir to Miner Slough*	N. 2 mi. maintained by State. Remainder by local districts. Conditioned upon completion of levee section and no acceptance of banks of Sacramento Deep Water Channel.
10 11	Do	N.&S. Levees Sacra- mento By-pass*	Maintained by State. Waterward slopes on 4 to 1 not required.
21a	6 Dec. 1951	Back levee Egbert District*	Maintained by R. D. No. 536
22	6 Dec. 1951	W. Levee Yolo By-pass Lindsey* Slough to Watson Hollow Drain*	Maintained by R. D. No. 536
24	Do	N. Levee Watson Hollow Drain*	Do
16	6 Dec. 1951	W. Levee Sacramento River Mile 59.0 to Lake Wash- ington Barge Canal	Maintained by R. D. No. 900
18	Do	W. Levee Sacramento Riv. Mile 50.8 to 50.5	Bank protection contract. Maintained by R. D. No. 765

Copy to USE D.

1

Accepted Items

No. Date of Letter

Levee Location

Remarks

6 6 Dec. 1951

Levees of Wadsworth Canal*
South levees of E. and W.
Intercepting Canals.

Maintained by State. Water-
ward slopes on 4 to 1 not
required.

(12) (13) (14) (15)

7 7 Dec. 1951

Site 2 Part A. W. Levee
Sacramento River-Mile
28.5 -Grand Island.

Maintained by R.D. No. 3.
Completed contract.

= 329

(87-A)

= 331

(89-A)

Site 1, Part B. E. levee
Sacramento River-Mile 15.0
Brannan Island.

Maintained by R.D.No. 2067
Completed contract.

8 8 Dec. 1951

W. levee Sacramento River
Mile 163.8 to Mile 143.5
except 320 ft. at Colusa
Warehouse & Mile 146.1
to Mile 146.4.

Maintained as Maintenance
Area No. 1.

(51) (52) (53) (54) (55) (56) (57)

8 Do

E. levee Sacramento River,
Mile 153.3 to Mile 152.7;
Mile 149.9 to Mile 149.7;
Mile 149.4 to Mile 149.0;
at Colusa Weir; Mile 143.3
to Mile 140.2; Mile 139.3
to Mile 138.2.

Maintained by State
Separate completed contracts.

(58) (59) (60) (61) (62) (63)

8 Do

E. levee Sacramento River
Mile 138.2 to Mile 137.9;
Mile 136.9 to Mile 133.8;
Mile 133.2 to Mile 132.3;
Mile 131.8 to Mile 125.9;
Mile 125.8 to Mile 123.1;
Mile 122.6 to Mile 122.0.

Maintained by R.D.No. 70,
Completed contracts.

(64) (65) (66) (67) (68) (69) (70)

8 Do

West levee, Sutter By-pass*

Maintained by R.D.Nos. 70,
1660, 1500. Condition upon
completion of remaining
part to standard section.

(71) (72) (73)

8 Do

North levee Tisdale
By-pass†

Maintained by R.D.No. 1660.
Waterward slope of 4 to 1
not required.

(74)

8 Do

South levee Tisdale
By-pass†

Maintained by R.D.No. 1500.
Waterward slope of 4 to 1
not required.

(75)

8 Do

East levee Sutter
By-pass*.

Maintained by State.

(76)

9 Do

W. levee Sacramento River
Mile 35.15 to 35.86.

Maintained by R.D.No. 150
(Merritt Island). Completed
contract bank protection.

(81)

(2)

Accepted Items

No.	Date of Letter	Levee Location	Remarks
(91) 10	8 Dec. 1951	Cross levee Steamboat Slough to Sacramento River.*	Maintained by R.D. No. 3 (along U.S.spoil bank).
(140) 11	Do	N. levee American River from Jibboom St. Bridge to Sacramento River.	Maintained by R.D. No. 1000.
(141) 11	Do	E. levee Sacramento River American River to Natomas Cut.	Maintained by R.D.No. 1000.
(142) 11	Do	E. bank Sacramento River At Moulton Weir.	Maintained by State.
(143) 11	Do	E. Levee Sacramento River Mile 158.5 to Mile 164.4.	Maintained partly by State; remainder by Levee District.No. 3, Glenn County, Completed Contract.
(146) 11	Do	W. levee Sacramento River Mile 61.8 to Mile 62.65.	Maintained by Maintenance Area No. 4. Completed contract.
(147) 11	Do	W. Levee Sacramento River Mile 62.65 to Mile 63.1.	Maintained by R.D. No. 537 Completed contract.
(148) 11	Do	Sacramento Weir.	Maintained by State.
(152) 11	Do	Fremont Weir.	Maintained by State.
(153) (156) (157) 11	Do	W. Levee Sacramento River Mile 87.6 to Mile 88.4; Mile 89.2 to Sycamore Slough	Maintained by R.D. No. 730 Completed contracts.
(158) 11	Do	W. Levee Sacramento River Mile 100.6 to Mile 101.4	Maintained by Sacramento River West Side Levee District. Completed contract.
(160) (161) (162) (163) 11	Do	W. Levee Feather River except: 3.31 Mi. North from Nicolaus Bridge; 1400 ft. in Yuba City; from Sta.774+80 to Sta. 1188+00 of "Y.C.H.B" Traverse.	Maintained by Maintenance Area No. 3, Levee Dist. Nos. 1 & 9 of Sutter Co. Recl. Dist.No. 777 and State.
(164) 11	Do	E. Levee Sacramento River, Natomas Cut to Feather River	Maintained by Recl.Dist.No.1001.
(165) (166) (167) (168) (169) (170) 11	Do	E. Levee Feather River from mouth to Mile 26.5, except from 2.37 miles of Nicolaus Bridge to Bear River	Maintained by R.D. Nos. 1001 and 784.

Accepted
Items

No.	Date of Letter	Levee Location	Remarks
(171) (172) 11	8 Dec. 1951	Marysville levees from W.P.R.R. at Simmerly Slough E. to Yuba River and from D St. Bridge on Yuba River upstream to Valley Meat Co.	Maintained by Marysville Levee Commission.
(173) (174) 11	Do	N. Levee Simmerly Slough from W.P.R.R. to S.P.R.R. and E. Levee Feather River from Simmerly Slough upstream 4.8 miles	Maintained by R.D. No. 10 Completed contract.
(175) 11	Do	N. Levee Yuba River from back levee of Marysville upstream 1.8 miles	Maintained by Marysville Levee Commission.
(176) 11	Do	S. Levee Yuba River from S.N.R.R. to S.P.R.R.	Maintained by R.D. No. 784.
(177) 11	Do	N. Levee Bear River from Feather River to W.P.R.R. Interceptor	Maintained by R.D. No. 784.
(178) 11	Do	E. Levee R.D. 784 (W. Levee W.P.R.R. Interceptor) Bear River to intersection with W.P.R.R. in S $\frac{1}{2}$ Sec. 17, T. 14 N., R. 4 E.	Maintained by R.D. No. 784.
(179) (180) 11	Do	S. Levee American River from 16th St. Bridge to Mayhew except from S.N.R.R. to a point 800 ft. E. of W.P.R.R.	Maintained by American River Flood Control District.
(181) (182) (183) (184) (185) (186) (187) (188) 11	Do	W. Levee Yolo By-pass from Sacramento* River to Putah Creek except from N. line Cache Cr. Settling Basin to S.N.R.R. & from old Willow Slough pipes south 1.48 mi.*	Maintained by State and R. D. #2035.
(190) 11	Do	N.&S. levees Willow Slough Interceptor*	Maintained by State and R. D. No. 2035.
(191) (192) 11	Do	N.&S. levees of Putah Creek	Maintained by State.
(197) (198) 11	Do	N.&S. levees Sycamore Slough from Sacramento River to Knights Landing Outfall Gates	Maintained by R.D. 730 and Sacramento River West Side Levee District.

(21)

4

Accepted
Items

No. Date of Letter Levee Location Remarks

12 8 Dec. 1951

Five reaches of Ryer Island levee along Miner Slough as follows:

- a. Junction Miner and Sutter Sloughs westerly 5000 feet.
- b. From State Highway Bridge West. 3035 ft.
- c. Spec. 1473, Sta. 53+00 to 64+00 about one mi. No. of Ryde Road. *Mile 29.4 to 29.6*
- d. Spec. 1473, Sta. 0+00 to 12+00 being 600 ft. each side of Ryde Road. *Mile 30.4 to 30.6*
- e. Ryer Island cut-off levee beginning at east bank of Cache Slough and extending upstream 3,300 feet at junction of Cache and Miner Sloughs.

Maintained by R.D. No. 501. All are completed separate contracts.

Covered by letter dated 16 Nov. 1951

321 → (79A) ✓

303 Covered by letter dated

(53A) ✓

304 17 Nov. 1951

(54A) ✓

(23)

(50)

*No waterway banks contiguous to these levees.

REGISTERED MAIL
Return Receipt
Requested

SPKEA 824.3(Sac. Riv. F.C.P.)

8 DEC 1951

The Reclamation Board
State of California
1100 "O" Street
Sacramento 14, California

824.3(SAC.R.FCP)SPK

Gentlemen:

Reference is made to your letter of 4 May 1951 acknowledging that certain reaches of the levees of the Sacramento River Flood Control Project and the waterway bank contiguous to said levee reaches meet the requirements of the project as authorized prior to the Flood Control Act of 1944.

The levee reaches in question are located as follows:

a. Westerly levee of the Sacramento River.

- 51 (1) Mile 163.8 (Princeton) to Mile 155.3. 137
- 52 (2) Mile 155.3 to Mile 154.3.
- 53 (3) Mile 154.3 to Mile 152.1.
- 54 (4) Mile 152.1 to Mile 151.3.
- 55 (5) Mile 151.3 to Mile 146.4.
- 56 (6) Mile 146.1 to Upstream outskirts of Colusa.
- 57 (7) Upstream outskirts of Colusa to Mile 143.5 (Colusa Bridge), excepting 320 lin. ft. at Colusa Warehouse Mile 144.2.

b. Easterly levee of the Sacramento River.

- 58 (1) Mile 155.3 (Terrill's Landing) to Mile 152.7 (South Line Begg's Ranch). 136

Letter No. 8

Items 51 to 76

SPEKA 824.5(Sac.Riv. F.C.P.)
The Reclamation Board

- (59) (2) Mile 149.9 to Mile 149.7 (Graham's Ranch).
- (60) (3) Mile 149.4 (Farnsworth Pump) to Mile 149.0 (Sailor Bend).
- (61) (4) At Colusa Weir.
- (62) (5) Mile 143.3 (Arnold's) to Mile 140.2.
- (63) (6) Mile 139.3 to Mile 138.2 (Butte Slough Outfall Gates).
- (64) (7) Mile 138.2 (Butte Slough Outfall Gates) to Mile 137.9 (Marty's Pump).
- (65) (8) Mile 136.9 (Opposite Steidelmayer's Pump) to Mile 134.0 (Meridian Bridge).
- (66) (9) Mile 134.0 (Meridian Bridge) to Mile 133.8.
- (67) (10) Mile 133.2 to 132.3.
- (68) (11) Mile 131.8 to Mile 125.9.
- (69) (12) Mile 125.8 to Mile 123.1.
- (70) (13) Mile 122.6 to Mile 122.0.

c. Westerly levee of the Sutter Bypass.

- (71) (1) Butte Slough Outfall Gates to Tisdale Bypass. 133
- (72) (2) Tisdale Bypass to a point 5.8 miles northerly from Sacramento River. 133
- (73) (3) From a point 5.8 miles northerly from Sacramento River to Sacramento River. 133

(74) d. Northerly levee of Tisdale Bypass. 133

(75) e. Southerly levee of Tisdale Bypass. 129

(76) f. Easterly levee of the Sutter Bypass from high ground near Longbridge to Feather River. 135

The records of this office show that your Board has accepted the levees covered by Items a.(1), a.(3), a.(5), a.(6), b.(4), b.(5), b.(6), b.(7), b.(8), b.(9), b.(10), b.(11), b.(12), b.(13), c.(1), c.(2), d. and e., above as complete. Accordingly the waterway bank contiguous to

SPKKA 924.3(Sac.Riv. F. C. P.)
 The Reclamation Board

said Items is hereby transferred to the State of California for maintenance and operation.

The levee covered by Items a.(2), a.(4), a.(7), b.(1), b.(2), b.(5), c.(3) and f. above, although complete, has not been formally transferred as contemplated by the Project documents. Accordingly the levee covered by said Items, together with the waterway bank contiguous thereto, is hereby transferred to the State of California for maintenance and operation.

The maintenance work required under the provisions of the Sacramento River Flood Control Project shall be performed in accordance with existing Flood Control Regulations which have been prescribed by the Secretary of the Army pursuant to Section 3 of the Act of Congress approved 22 June 1936, as amended and supplemented. As provided under paragraph 208.10(10) of these regulations, a maintenance manual covering these works is in process of preparation and will be furnished your Board upon completion.

A copy of this letter is being transmitted to the State Engineer.

FOR THE DISTRICT ENGINEER:

Sincerely yours,

- Copy Furnished:
- ✓ Office, Chief of Engineers.
 - ✓ So. Pac. Div. Engineer.
 - ✓ State Engineer.
 - ✓ Engr. Div. (2)
 - ✓ C. de Arrieta

H. R. Reifsnnyder
 Lt. Colonel, Corps of Engineers
 Executive Officer

Original	OHH
Date	12-7-51
Exec. O	2
Chief	B
Ad. Asst.	
Chf. Tech	
Asst.	
Manag.	
Office	
Spec.	
Oper.	
Engr's	
R. E.	
Proc.	
Port.	
Legal	
Supply	

Letter No. 8

Items 51 to 76

Design
 Bundale

REGISTERED MAIL
Return Receipt
Requested

Letter No. 4

4

SPEKA 824.3(Sac. Riv. F.C.P.)

6 DEC 1951

The Reclamation Board
State of California
1100 "O" Street
Sacramento 14, California

Reference:

R.B. letter 2 April 1952

Levees formally accepted
by the Board on 18 Dec. 1951.
No further construction desired.

Gentlemen:

Reference is made to your letter of 2 July 1951 acknowledging that certain reaches of the levees of the Sacramento River Flood Control Project and the waterway bank contiguous to said levee reaches meet the requirements of the project as authorized prior to the Flood Control Act of 1944.

The levee reaches in question are located as follows:

Mile 106 to 158

- ✓ 12. a. Westerly levee of Wadsworth Canal from Sutter Bypass to the west intercepting channel. 135
- ✓ 13. b. Easterly levee of Wadsworth Canal from Sutter Bypass to the east intercepting channel. 135
- ✓ 14. c. Levee of west intercepting channel from Wadsworth Canal westerly to high ground. 135
- ✓ 15. d. Levee of east intercepting channel from Wadsworth Canal easterly to high ground. 135

The levee reaches cited above, although complete, have not been formally transferred as contemplated by the Project documents. Accordingly the said reaches of levee, together with the waterway bank contiguous thereto, are hereby transferred to the State of California for maintenance and operation.

The maintenance work required under the provisions of the Sacramento River Flood Control Project shall be performed in accordance with existing

Reach No. 24

Items 12 to 15

4

C. de ARRIETA

SPKKA 824.3 (Sac. Riv. F.C.P.)
The Reclamation Board

Letter No. 4

(4)

Flood Control Regulations which have been prescribed by the Secretary of the Army pursuant to Section 3 of the Act of Congress approved 22 June 1936, as amended and supplemented. As provided under paragraph 208.10(10) of these regulations, a maintenance manual covering these works is in process of preparation and will be furnished your Board upon completion.

A copy of this letter is being transmitted to the State Engineer.

FOR THE DISTRICT ENGINEER:

Sincerely yours,

Copy Furnished:
Office, Chief of Engrs.
So. Pac. Div. Engr.
State Engineer
Engr. Div. (2)
C. de Arrieta

H. R. Reifsnyder
Lt. Colonel, Corps of Engineers
Executive Officer

DEC 29 1936

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THE RECLAMATION BOARD
of the
STATE OF CALIFORNIA

April 2, 1952

District Engineer
Sacramento District
Corps of Engineers, U.S. Army
Sacramento 8, California

Dear Sir:

1. This is in acknowledgement of your letter of 6 December 1951, File SPIKKA 824.3 (Sac. Riv. F.C.P.), transferring levees and banks of Wadsworth Canal and its East and West Intercepting Canals to the Reclamation Board.

2. The Reclamation Board on December 18, 1951, formally accepted as complete these canals and levees for State operation and maintenance. These canals which form the contiguous waterward banks of the levees, were originally constructed at cost of local interests while Corps of Engineers have enlarged the levees. The State of California has by law continuously maintained both the canals and levees under the provisions of Section 8361 of the Water Code of the State of California. The Federal Flood Control Act of December 22, 1944, provides that the waterward slope of the Wadsworth Canal levees be constructed on slopes of four horizontal to one vertical. This construction is not required. Present levees are ample.

Yours very truly,

THE RECLAMATION BOARD

By /s/ A. M. Barton
A. M. BARTON
Chief Engineer and General Manager

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THE RECLAMATION BOARD
of the
STATE OF CALIFORNIA

April 2, 1952

District Engineer
Sacramento District
Corps of Engineers, U.S. Army
P.O. Box 1739
Sacramento 8, California

Dear Sir:

1. Reference is made to your letter of 8 December 1951, File SPKKA 824.3 (Sac. Riv. F.C.P.), transferring to the Reclamation Board for operation and maintenance of levees and their contiguous waterway banks as follows:

f. East Levee of Sutter Bypass from the Buttes to Feather River.

5. The Reclamation Board formally accepted levees and their contiguous waterward bank listed under items "a" and "b" for flood control operation and maintenance on December 18, 1951.

6. There are no contiguous waterway banks other than the adjacent bypass areas under Items "c", "d", "e" and "f". On December 18, 1951, The Reclamation Board formally accepted the levees covered by these items together with their contiguous bypass areas subject to the provision that the portion of Item "c-1" now having waterward slopes of three horizontal to one vertical would be rectified by Federal construction. All other levees of the Sutter Bypass are now constructed to waterward slopes of four horizontal to one vertical. The Flood Control Act of December 22, 1944, calls for construction of waterward slopes of four horizontal to one vertical on the Tisdale Bypass levees. The existing section of these levees is ample.

Yours very truly,

THE RECLAMATION BOARD

By /s/ A. M. Barton
A. M. BARTON

Chief Engineer and General Manager

NOTE: Only item pertaining to Operation and Maintenance Manual No. 135 is included in the above copy.

EXHIBIT G

SUGGESTED SEMI-ANNUAL REPORT FORM

TO: The District Engineer
Sacramento District
Corps of Engineers
1209-8th Street
Sacramento, California

(1 May 19__)
(1 Nov 19__)

Dear Sir:

The semi-annual report for the period (1 May 19__ to 31 October 19__) (1 November 19__ to 30 April 19__) Sacramento River Unit No. 135, the east levee of Sutter By-pass from its junction with the Feather River northerly to the Sutter Buttes and the East and West levees of Wadsworth Canal, and Intercepting Canals of the Sacramento River Flood Control Project is as follows:

a. The physical condition of the protective works is indicated by the Inspector's Report, copies of which are inclosed, and may be summarized as follows:

(Superintendent's summary of conditions)

It is our intention to perform the following maintenance work in order to repair or correct the conditions indicated:

(Outline the anticipated maintenance operations for the following 6 months.)

b. During this report period, major high water stages (water level at 50.00 on the State of California Division of Water Resources gage at Long Bridge) occurred on the following dates:

<u>Dates</u>	<u>Maximum Elevation</u>
_____	_____
_____	_____
_____	_____

Comments on the behavior of the protective works during such high water periods are as follows:

(Superintendent's log of flood observations)

During the high water stages when the water level reached a height of _____ on the gage or excess thereof (dates) _____, it was necessary to organize and carry out flood operations as follows:

(See Maintenance Manual _____.)

c. The inspections have indicated (no) or (the following) encroachments or trespasses upon the project right-of-way.

d. (No) (_____) permits have been issued for (the following) improvements or construction within the project right-of-way.

Executed copies of the permit documents issued are transmitted for your files.

e. The status of maintenance measures, indicated in the previous semi-annual report as being required or as suggested by the representatives of the District Engineer, is as follows:

(Statement of maintenance operations, item by item with percent completion.)

f. The fiscal statement of the Superintendent's operations for the current report period is as follows:

	<u>Labor</u>	<u>Material</u>	<u>Equipment</u>	<u>Overhead</u>	<u>Total</u>
1. Inspection					
2. Maintenance					
3. Flood fighting operations					
TOTAL					

Respectfully submitted,

Superintendent of Works

MEMORANDUM FOR: Sacramento Resident Office (ATTN: John Sisley)

SUBJECT: Site Visit, Construction of the "Farm Road Site" on the Wadsworth Canal PL 84-99, Sutter County, California on 19 June 2008

1. I (undersigned) arrived at the site and met with Greg Sokolis (USACE) to perform a surgical excavation of the levee to trace the slurry boil first observed by the contractor on 9 June 2008. We attended the safety tailgate meeting held by the contractor. The contractor's representative, Tom (Envirocon), informed me that they would be using the Komatsu PC200 hydraulic excavator with a 4 foot smooth bucket. Greg, Tom and I returned to the site of the slurry boil at station (STA) 25+50. The excavator operator arrived shortly, and began excavation of a trench parallel to the levee and 5 feet southeast of the location most likely to be the site of the original boil. I was unable to detect any slurry. I asked the contractor to excavate 5 feet northwest at the site most-likely to be the original discharge location. I observed wet material with a south-trending linear expression overlying a hardpan-type layer which continued into the location of the initial excavation. This hardpan layer was light yellowish brown (2.5Y 6/4) and was not excavatable with a shovel, and a rock hammer could break-up the material. The hardpan layer was at a depth 18 feet below levee crown as measured by Envirocon personnel. I asked the contractor to excavate a location on the face of the levee in the direction of the trend. The excavator made a 5-foot deep excavation. I saw material at the 3-foot depth in the excavation that looked like a dried fluid flow, but was not sure this was slurry material. At this point Henri Mulder (USACE) arrived onsite.
2. Henri, Greg, Tom and I, re-examined the first exploratory trench, and upon closer examination Henri determined that there was slurry along the wet/dark linear-trending zone. Henri found sandy slurry material inside a crack in the hardpan layer across the entire length of the exploratory trench.



The contractor continued excavation of the exploratory trench along the linear trend identified in the first trench. Several smaller, isolated slurry pockets were seen in and along cracks in the soil. Several times these slurry locations were along the margin of hard blocks in the levee fill which appeared to be the same material as the underlying hardpan. Henri and I concluded that the blocks are derived from the hardpan layer from the original borrow site, which is consistent with their placement in the lower section of the levee fill. We traced the slurry back to slurry wall which actually filled with soil during the emergency placement into the trench after discovery of the initial boil.

3. Henri and I have reached the following conclusions:

- The hardpan layer is a strong competent material that would likely be good foundation material for the levee.
- The slurry appeared to be ascending through the hardpan layer through cracks in the hardpan.
- The hardpan material was used as fill in the lower sections of the levee fill, and was likely taken from the original borrow site.
- The slurry leak does not appear to be a threat to the levee because the slurry appears to be leaking through small pre-existing cracks in the

hardpan. The hardpan layer makes a strong foundation material which is unlikely to be eroded by piping.

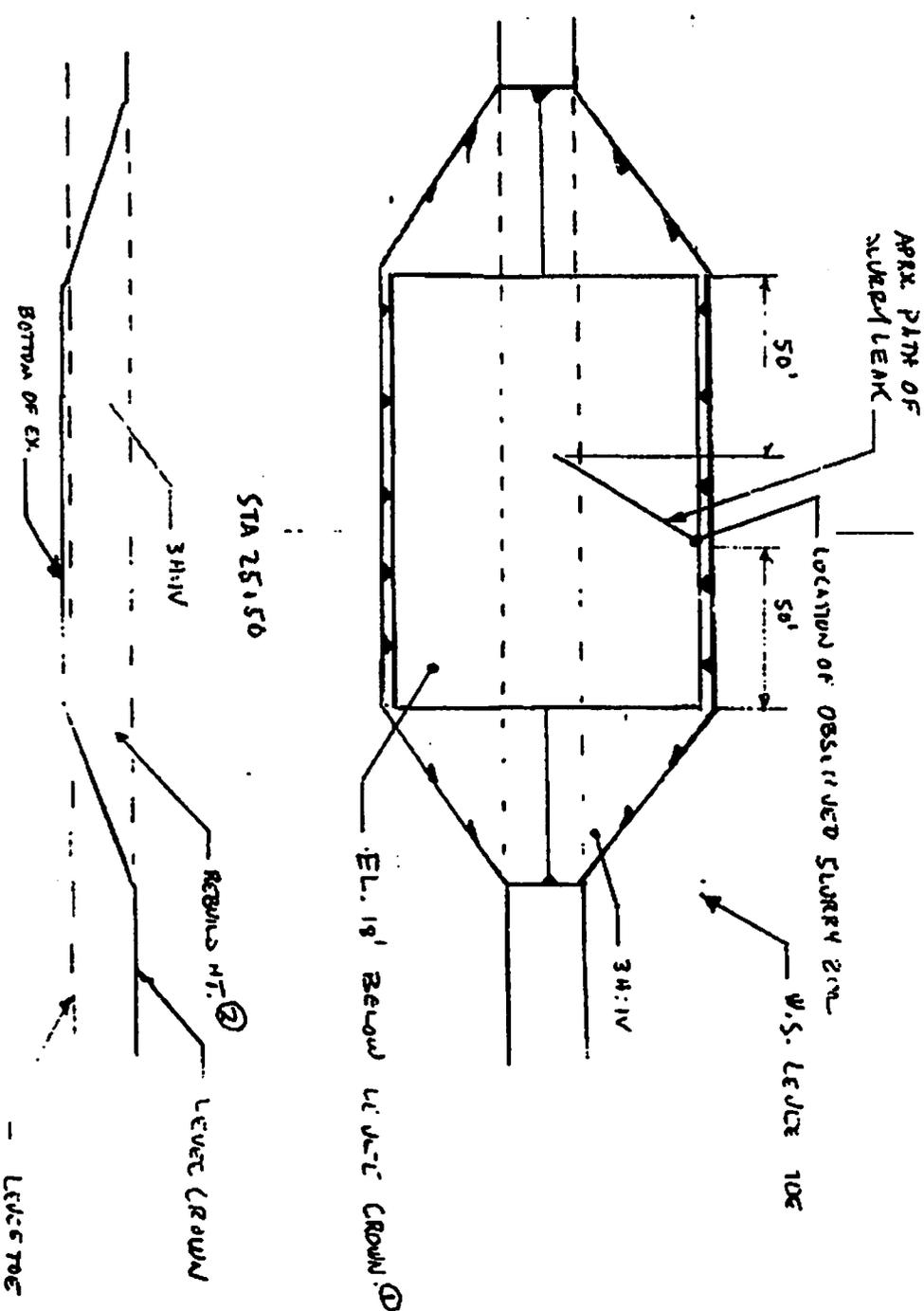
4. Henri and I concur that the following recommendations should apply to the degradation and reconstruction of the levee for this repair:
- Degrade levee 50 feet to each side of the slurry boil and the slurry filled cracks and pockets observed during the 19 June 2008 excavation.
 - Slope-back the excavation at 3H:1V.
 - Degrade levee to hardpan layer (to be verified by Soil Design personnel). We expect this level to be at 18 feet below levee crown.
 - We recommend that the top of the slurry wall be lowered 3 feet (5 feet below crown) to reduce hydrostatic head of the slurry and reduce the potential for additional slurry leaks in this area.
 - The levee should be rebuilt according to the rebuild detail as shown on the project plans.



Erik W. James
Civil Engineer, Soil Design Section

c.c. Engr Div
Design Branch
Section B
Const. Div.
Sac Res Office

NOT TO SCALE



NOTES

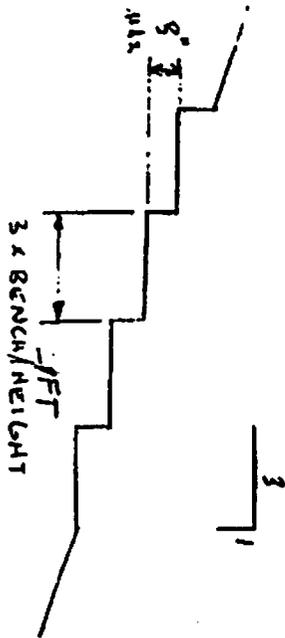
- 1.) FINAL DESIGN TO BE DETERMINED BY SOIL REGION PERSONNEL.
- 2.) REBUILD LEVEE TO 5' ORIGINAL TOP AND INSTALL SLURRY WALL.
- 3.) INSTALL SLURRY WALL (A) AS SHOWN ON PLAN SHEET C-308

20 JUNE 2008

WADSWORTH
LEVEE REBUILD

DRAWN BY:
E.W. JAMES

BENCH DETAIL



FILL PLACEMENT NOTES

- CONTAMINATED SAND REUSE LEVEE MATERIAL PROVIDED THAT ALL CEMENTED SOIL RIBBON ARE REMOVED AND DISCARDED.
- MAXIMUM PARTICLE SIZE IS 3" DIAMETER, MAX. DIMENSION.
- COMPACT ALL FILL IN LOW FURZANUCLE WITH ASTM D698 >95% MOD. DENS.
- 4% OPTIMUM MOISTURE CONTENT.
- MAX LIFT DEPTH IS 6 INCHES AS SHOWN ABOVE.

20 JUNE 2008

WADS WORTH
LEVEE REBUILD

DRAWN BY:
EW. JAMES

2 OF 2