



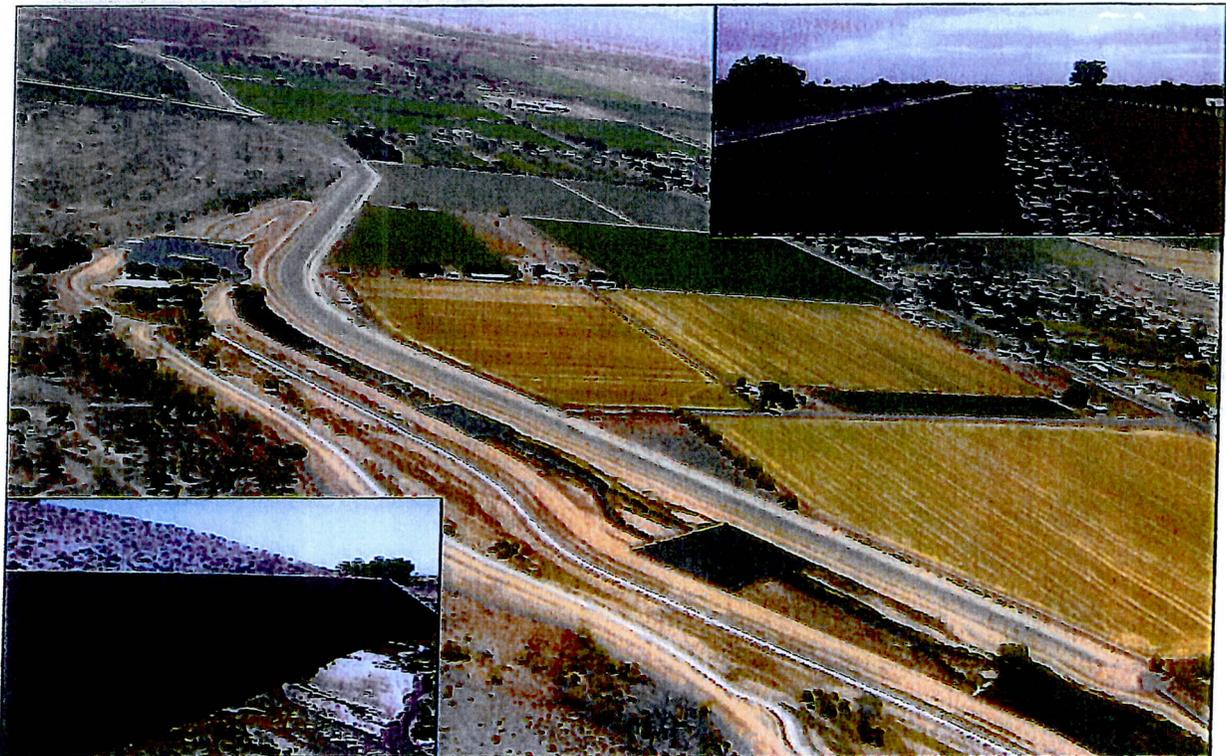
**US Army Corps
of Engineers**

**Los Angeles District
Geotechnical Branch
Dam and Levee Safety Section**

Appendix H

O & M Plan

**NATIONAL FLOOD INSURANCE PROGRAM, LEVEE SYSTEM
EVALUATION REPORT (NLSE) FOR TRES RIOS NORTH LEVEE,
MARICOPA COUNTY, ARIZONA**



Center: Tres Rios North Levee looking downstream.
Lower Left: Downstream end of interior drainage outlet flap gates.
Upper Right: Near upstream end on levee crest looking upstream.

by
US Army Corps of Engineers
Los Angeles District, Geotechnical Branch
915 Wilshire Boulevard, Los Angeles CA 90017
November 2012

Appendix H

O and M Plan



**US Army Corps
of Engineers**
Los Angeles District



*Detention Basin/Low Flow Ditch
Looking East*



*Collector Channel Looking East from
Top of the Single Box Culvert*

OPERATION, MAINTENANCE, REPAIR, REPLACEMENT, AND REHABILITATION MANUAL (OMRR&RM)



*RCB Culvert Outlet
with Flap Gates*



*Detention Basin
Looking West*

TRES RIOS ENVIRONMENTAL RESTORATION PROJECT FLOOD CONTROL NORTH LEVEE- PHASE 1A (105th Avenue to 115th Avenue)

Maricopa County, Arizona
December 2007



*Collector Channel Looking East with
Irrigation Side Drain on the North side*



*Levee Looking East with Levee
Riprap Slope Protection*



**US Army Corps
of Engineers**

Los Angeles District

**OPERATION, MAINTENANCE,
REPAIR, REPLACEMENT,
AND
REHABILITATION MANUAL**

**TRES RIOS ENVIRONMENTAL
RESTORATION PROJECT
FLOOD CONTROL NORTH LEVEE-
PHASE 1A
(105th Avenue to 115th Avenue)**

Maricopa County, Arizona
December 2007

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OPERATION, MAINTENANCE, REPAIR, REPLACEMENT, AND REHABILITATION MANUAL

TRES RIOS ENVIRONMENTAL RESTORATION PROJECT FLOOD CONTROL NORTH LEVEE-PHASE 1A (105th Avenue to 115th Avenue) MARICOPA COUNTY, ARIZONA

PART I - INTRODUCTION

AUTHORITY

1. This manual is prepared pursuant to the Code of Federal Regulations, Title 33, Article 208.10, Section 7, 68 Stat 809; 33 USC 709, which directs the operation and maintenance procedures for all structures and facilities constructed by the United States for local flood protection. In accordance with paragraph 10 of Section (a), and subsequent Engineering Regulations adopted by the Department of the Army, an Operation and Maintenance Manual for each completed project will be furnished to local interests to assist them in carrying out their obligations. The Code of Federal Regulations (Extract) is included in this manual as Appendix I. Certain maintenance activities may require authorization under Section 404 of the Clean Water Act (33 U.S.C. 1344), Section 10 of the Rivers and Harbor Act of 1899 (33 U.S.C. 403), or Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended (33 U.S.C. 1413).
2. The preparation of the Operation, Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R) manual is governed by ER 1150-2-301, which contains information applicable to projects for which operation and maintenance is a responsibility of local interests; and ER 1110-2-401, which provides instructions for the preparation of operation and maintenance manuals outlining the responsibilities of those local sponsors that have entered into binding agreements with the Secretary of the Army to be solely responsible for the OMRR&R, and to pay 100 percent of the associated project (OMRR&R) costs.

PURPOSE

3. This manual is intended to guide the operation and maintenance of Federally constructed flood control facilities under the auspices of the local sponsor. This manual specifies the policies and procedures which are part of the statutory responsibilities of the U.S. Army Corps of Engineers with regard to the operation and maintenance of these facilities.

PARTS OF MANUAL

4. The manual is prepared in seven parts.

- a. PART I Part I is an introduction to this manual.
- b. PART II Part II consists of a description of the project along with pertinent information and construction history.
- c. PART III Part III consists of a summary of general operation and maintenance responsibilities.
- d. PART IV Part IV consists of the operation procedures for all facilities and appurtenant structures.
- e. PART V Part V discusses maintenance procedures with corollary responsibilities, including periodic inspections and the training of personnel.
- f. PART VI Part VI describes reporting requirements of the various required reports.
- g. PART VII Part VII describes the procedures for submitting a permit application to the Corps of Engineers, Regulatory Branch, (Regulatory Branch) and includes a Section 404 permit application with current instructions.

APPENDICES

- 5. There are six appendices included in the manual:
 - a. APPENDIX I Code of Federal Regulations (Extract).
 - b. APPENDIX II Authorizing Document and Project Cooperation Agreement (PCA)
 - c. APPENDIX III Sample of Semiannual Reporting Forms
 - d. APPENDIX IV Sample Permit Application
 - e. APPENDIX V Basis for Recommending Repairs. This appendix is expanded beyond the features of the authorized project to assist in evaluating other non-Federal flood control projects.
 - f. APPENDIX VI Maps and Data Sheets. This appendix includes project summary sheets along with a project maps.

SCOPE OF MANUAL

6. Basic operation and maintenance procedures are included in this manual for Federally-constructed flood control facilities under the jurisdiction of the local sponsor. Essential instructions are provided in sufficient detail to insure proper operation of the flood control protective works and maintenance of these facilities in a manner that will assure their continued functioning

PART II - PROJECT INFORMATION

AUTHORIZATION

1. The Tres Rios Environmental Restoration Project was authorized in accordance with the provisions of Section 101(b)(4) of Water Resources Development Act of 2000 (WRDA 2000), Public Law 106-541 (PL 106-541), and under authority given in Section 6 of Public Law 761, Seventy-fifth Congress, June 28, 1938, which reads in part as follows:

“The Secretary of War (now Secretary of the Army) is hereby given authorized and directed to cause preliminary examination and surveys for flood control.....at the following named localities-Gila River and tributaries, Arizona and New Mexico.”

GENERAL

2. This manual was prepared so it can be used as a guide for the operation and maintenance of the Tres Rios flood control levee-phase 1A, hereafter Tres Rios Phase 1A Project in Maricopa County, Arizona and as a guide for simplifying the reporting of operation and maintenance. Tres Rios Phase 1A is one of multiple phases of the overall Tres Rios Environmental Restoration Project which was designed and constructed first.

The Tres Rios 1A project consists of a 1.34-mile long compacted earth-fill levee (105th Ave. to 115th Ave.) of which 1.1 miles belong to the new levee and about a quarter (0.25) of a mile belongs to the existing Holly Acres Levee (see plates 4 thru. 10). The Tres Rios Phase 1A Project also composes of the following features:

- a. Three access ramps including turnaround to allow for getting on and coming off from the levee crest (see plates 11 thru. 13).
- b. Four compacted earth-fill guide dikes armoring with 27” and 33” riprap. Three of them orient at 90-degree angle with respect to the levee centerline. One is located near 95th Avenue. (see plates 14 thru. 17).
- c. Two gravel surfaced Operation and Maintenance (O&M) Roads, one is located on top of levee and along the levee crest and the other is situated between the toe of the levee landside (landside) slope and the collector channel (see plates 18 to 20). Each O&M Road extends from 105th Avenue to 115th Avenue.
- d. A 1.1-mile long reinforced concrete trapezoidal channel extends from 105th Avenue to 113th Avenue (see plates 21 thru. 26).

- e. A 14 ac-ft. earthen detention basin located on the backside (landside) of the levee between the 113th Avenue berm and Avondale Avenue (115th Ave). See plates 27 thru. 29.
- f. Two reinforced concrete box culverts with trash racks and flap gates. One carries inflows from the Collector Channel into the basin and the other conveys outflows for the detention basin and discharges into the Gila River (see plates 30 & 32).
- g. Several concrete irrigation canal connection structures that join the existing concrete canal with the collector channel.
- h. An 858 ft. long earthen trapezoidal drainage ditch (115th Ave. Drainage Ditch) that conveys nuisance and low flows from the detention basin through the RCB culvert into the Gila River. The culvert is located on the riverside of the levee (see plate 33).

LOCATION

- 3. The Tres Rios Environmental Restoration Project is located approximately 9 (nine) miles west of downtown of Phoenix and includes the confluence of the Salt, Gila, and Aqua Fria Rivers. Because of the confluence of the three rivers within the close proximity, the project has been identified as “Tres Rios.” In Spanish language, Tres Rios means “three rivers”. Phase 1A is located at the upstream end of the Tres Rios Environmental restoration Project. It is located between 105th Avenue and 115th Avenue (now Avondale Boulevard) in the City of Tempe and City of Phoenix, Maricopa County, Arizona. Plate 1 in this manual provides a general overview of the overall project area.

PERTINENT INFORMATION

4. The project area is generally characterized by a broad alluvial valley surrounded by steeply sloped mountains ranges that rise several thousand feet above the valley floors. The sub-basin is bounded on the south by the Sierra Estella, the South Mountains, and the Buckeye Hills; on the west by the White Tanks Mountains; and on the north by the Wickenburg, Hieroglyphic, and New River Mountains (City of Phoenix 1997).

The project activities occur mostly within the river floodplain. However, the project area encompasses terrestrial lands north and south of the Gila and Salt Rivers. The surrounding land is relatively flat and rural. The general land uses in the project area consist of rural residential, agricultural and agribusiness, light industry, 91st Avenue Waste Water Treatment Facilities, public and semipublic areas, and vacant land.

In 1990, the population in Maricopa County totaled approximately 2.1 million people and included 547,211 families, with approximately 3.8 people per family. The Maricopa County Association of Government (MAG) projects that: the county's population will grow to approximately 3.7 million people by the year 2010 (MAG, 1997).

In comparing with the 35 largest population centers in the United States, the Phoenix metropolitan area increased from a rank of 33 in 1970 to 20 in 1988 and is projected to be the 8th largest population center by the early 2000's (CH2M Hill, 1997)

CLIMATE

5. The project area is characteristic of the Sonoran desert: hot and dry. The average annual daily maximum temperature is 85°F. On average, 91 days per year are above 100°F. Average annual daily minimum temperature is 57°F. On average, 9 days per year are below freezing. The potential evapotranspiration is slightly less than precipitation only in January. During the rest of the year, the soil moisture budget is deficient.

METEOROLOGY

6. Average annual precipitation is less than 8 inches. Precipitation is about equally divided between the summer and winter seasons. Summer storms are typically local, high-intensity thunderstorms, and generally occur from July to September. Storms on record have produced 5 inches of rainfall in a 24-hour period. Winter storms are typically wide-spread cyclonic storms with long duration, low intensity rain.

CONSTRUCTION HISTORY

CONSTRUCTION CONTRACT

7. The construction contract of the Tres Rios Phase 1A is as follows:

Specifications: IFB No. W912PL-05-B-0004
Contractor: TPA-CKY Joint Venture
302 West 5th Street, #310
San Pedro, California 90731

Contract Award Date: 13 June 2005
Note to Proceed Date: 24 August 2005
Completion Date: 06 February 2007
Contract Cost: 4.2 million dollars

Description: General description of construction for Tres Rios Phase 1A is indicated in 2a through 2h under GENERAL above.

In addition to construction history described above, the following projects and facilities were also constructed near or within vicinity of the Tres Rios Phase 1A project.

A. Salt River Project System.

Flows in the Salt River are controlled by a series of upstream dams built by the U.S. Bureau of Reclamation (USBR) and operated by Salt River Project (SRP). The SRP system is comprised of six reservoirs and seven dams on the Salt and Verde Rivers as shown on **figure 4**.

The dams on the Salt River include Roosevelt Dam, Horse Mesa Dam, Mormon Flat Dam, Stewart Mountain Dam, and Granite Reef Dam. Horseshoe Dam and Bartlett Dam are found on the Verde River. The reservoirs receive runoff from a combined watershed of more than 12,600 square miles.

Roosevelt Dam is the oldest and largest in the SRP system. It was originally authorized by Congress in 1903 for water supply and power generation. The construction of the dam was completed in 1911. In 1978, Congress authorized the modification of Roosevelt Dam. The modifications were to include a new storage allocation for flood control. The modifications to the Dam began in 1989 and were completed in 1996. The Dam began operating under the new Water Control Manual in 1997.

B. Tres Rios Demonstration Project

The Phoenix Metropolitan area is serviced by a regional wastewater treatment plant located at 91st Avenue and the Salt River. The plant discharges approximately 100 million gallon per day (mgd) (155 cfs or 307 ac-ft per day) of effluent to the Salt River. The treatment plant is operated by the City of Phoenix on behalf of the Multi-City

Subregional Operating Group (SROG). SROG represents a consortium of cities including Phoenix, Mesa, Glendale, Tempe and Scottsdale.

In 1992, the USBR was authorized by Sections 1605 and 1608 of Public Law 102-575 to participate in the development of a demonstration wetlands project at the 91st Avenue plant. In 1995, the SROG and the USBR built the Tres Rios Demonstration Project on the 91st Avenue Waste Water Treatment Plant (WWTP) site and within the floodway of the Salt River below the 91st Avenue plant. The Tres Rios Demonstration Project provides final treatment of approximately 2 mgd (3 cfs or 6 ac-ft per day) of effluent. The project consists of 10 acres of constructed wetlands and research facilities. The City of Phoenix and the USBR operate and monitor the wetlands, collecting water quality readings, water use readings, plant and animal counts.

C. Holly Acres Levee

In 1983-84, the Flood Control District of Maricopa County (FCDMC) constructed a bank stabilization and levee project on the north bank of the Salt River in the Tres Rios project area. This is an existing flood protection structure extending from 113th Avenue downstream to El Mirage Road (123rd Avenue). The levee was design to provide 100-year flood protection in conjunction with a proposed Bureau of Reclamations dam, but this dam was never built. This levee can accommodate 115,000 cubic feet per second (cfs) (3,256m³/sec) of flow with three feet of freeboard – far less than the 100-year flow of 227,000 cfs (7,080 m³/sec) at the Salt River/Gila River confluence. However, at the flow of approximately 100,000 cfs (2,832 m³/sec), the river flows over the north bank near 99th Avenue and can then flow north around the Holly Acres Levee. There is no danger of levee overtopping, since it is outflanked before the river level rises high enough. In addition, outflanking is not likely to cause serious damage to this levee, as it is armored with stones on both sides.

D. Salt River Channelization

In 1996, Maricopa County Department of transportation (MCDOT) and the Flood Control District of Maricopa County (FCDMC) completed channelization of the Salt River from 48th Street to Price Road, a distance of approximately 7.5 miles. The channelization included soil cement and gabion bank protection with grade control and drop structures. The channelization is designed to convey flood waters and eliminate erosion and channel migration. The design capacity is just over 250,000 cfs at Rural (Scottsdale) Road bridge. The construction also included a construction of a defined confluence with Indian Bend Wash.

E. 91st Avenue Wastewater Treatment Plant (WWTP) Bank Stabilization

The 91st Avenue WWTP has a constructed flood protection project along the north bank

of the Salt River. The bank stabilization project extends approximately 2000 ft. The project was designed for the 100-year flood.

F. 116th Avenue Bridge and Approach Roads

Maricopa County Department of transportation constructed a new bridge across the Gila River at 116th Avenue in 1998. This 116th Avenue was called out in this Operation, Maintenance, Repair, Replacement, and Rehabilitation Manual (OMRRRM) as 115th Avenue.

G. Phoenix International Raceway

The Raceway is located on the south bank of the Gila River and has parking areas in the Gila River channel and adjacent to the south road.

PROJECT DATA SHEETS

8. Project Data Sheets and Maps. Project data sheets in Appendix VI consist of an information page and a respective map for key elements of the project within this manual. These sheets furnish general information about the construction data, storm flow data, location of levee, guide dikes, access ramps, etc. Additional information can be obtained from the “As-Built” drawings, which are furnished separately.

PROJECT PERFORMANCE

GENERAL

9. The 1.34-mile levee is a part of the overall approximately 4-mile long levee extending from 105th Avenue to the Aqua Fria River. Other flood control features including concrete channel, guide dikes, detention basin, RCB culverts and interior drainage will be constructed and improved to provide 100-year flood protection. Levee height varies from about 3 ft at the upstream end (105th Ave.) to about 5 ft. at Avondale Boulevard. The levee was armored with 15” riprap protection with toe-down launching stone configuration along the riverside slope and 3”+ thick rock mulch on the landside slope.

HISTORICAL, CULTURAL AND ARCHEOLOGICAL RESOURCES

10. Within the Salt River and from 105th Ave. to Avondale Blvd. there is no indication of any pre-historic site or historic sites existed.

ENVIRONMENTAL EFFECTS

11. There will be no major impacts associated with construction and operation of a flood control Levee, Collector Channel, Detention Basin and RCB Culverts.

RECREATION FEATURES

12. There is no recreation proposed for Tres Rios Phase 1A.

PROJECT COOPERATION AGREEMENT

13. The Army Corps of Engineers, Los Angeles District and the City of Phoenix have entered into a PROJECT COOPERATION AGREEMENT (PCA) for this project on April 14th, 2004 as required by Public Law (99-622). A copy of the duly executed PROJECT COOPERATION AGREEMENT (PCA) is included as Appendix II.

EMERGENCY OPERATIONS

14. General. -- The operation program which includes flood emergency procedures, is in four phases: (a) Pre-Stormflow phase; (b) Initial stormflow phase; (c) Final stormflow phase; and (d) Post-stormflow phase. Each of these phases include varying degrees of mobilization or demobilization, patrolling (including operation and maintenance), and reporting. Pertinent information on these phases is given in Part IV.

Liaison with Department of the Army, Corps of Engineers.-- During all four phases of operation, the Flood Control District of Maricopa County has the responsibility of maintaining close liaison with the Reservoir Operation Center of the Department of the Army, Corps of Engineers, Los Angeles District. Exchange of hydrologic and hydraulic data, including precipitation and stormflow data, will be coordinated between the two agencies. Pertinent information on liaison and coordination is given in extracts from the Los Angeles District's Natural Disaster Activities, OM 500-1-1, (revised annually).

Points of Contact:

- (a) Army Corps of Engineers, Los Angeles District Reservoir
Operation Control Center (ROC).
Radio: WUK4-ROC
Telephone #: (213) 452-3623
(213) 452-3527
- (b) Flood Control District of Maricopa County.
Telephone #: (602) 506-1501
- (c) FEMA - Disaster Field Office
Telephone #: (480) 649-2100
- (d) State of Arizona - Office of Emergency Services
Telephone #: (602) 244-0504 or (800) 411-2336

REGULATORY PERMITS

15. The FCDMC (Flood Control District of Maricopa County), in coordination with the Corps Project Manager, shall contact the Corps of Engineers Regulatory Branch. The Regulatory Branch issues permits to authorize discharges of dredged or fill material (including excavation) into waters of the United States pursuant to Section 404 of the Clean Water Act, and structures or work in or affecting navigable waters of the U.S. pursuant to Section 10 of the Rivers and Harbors Act of 1899. Certain activities associated with the operation and maintenance of flood control projects which take place within waters of the U.S. may require permits unless:

- a. a regional general permit has been issued by the Regulatory Branch for maintenance of the flood control project, or
- b. the activity qualifies for the maintenance exemption.

The exemption is for maintenance, including emergency reconstruction of recently damaged parts, of currently serviceable structures such as levees, riprap, O&M roads including access ramps and turn-around, concrete lined channels, RCB culverts, concrete irrigation canal connections and waterways. The bottom of an unlined channel or basin is not considered a structure, even when enclosed by levees/berms. Maintenance does not include any modification that changes the character, scope, or size of the original fill design. Emergency reconstruction must occur within a reasonable period of time after damage occurs (typically within one year) to qualify for this exemption.

For further Section 404 guidance, See PART V, MAINTENANCE and INSPECTION, and PART VII, REGULATORY PERMIT PROGRAM of this manual.

PART III -SUMMARY OF OPERATION AND MAINTENANCE RESPONSIBILITIES

OPERATION AND MAINTENANCE REGULATIONS

1. This manual implements the basic regulations applicable to operation and maintenance of Federally-constructed flood control structures which are contained in Article 208.10 of the Code of Federal Regulations, Title 33. An extract of the regulation is included as Appendix I of this manual.
2. Section (a) of Article 208.10 states:

"(1) The structures and facilities constructed by the United States for local flood protection shall be continuously maintained in such a manner and operated at such times and for such periods as may be necessary to obtain the maximum benefits."
3. This section details the procedures prescribed by the Secretary of the Army pertaining to both operation and maintenance of flood control facilities, including the establishment of an agency responsible for implementing these procedures, the inspection of the flood control structures, and the reporting of their condition.
4. In accordance with ER 1110-2-401, the District Engineer may update the manual for changed conditions or, if warranted, to correct conditions discovered during inspections. Such updating will be performed in consultation with the project sponsor.

AGENCIES RESPONSIBLE FOR OPERATION AND MAINTENANCE

5. Organizations responsible for operation and maintenance: The Flood Control District of Maricopa County and the Department of the Army, Corps of Engineers, Los Angeles District, are separately required to maintain organizations capable of adequately operating and maintaining the project units for flood control. The County shall appoint an official (referred to "Superintendent" in the basic regulations) who shall be responsible for the development and proper functioning of that County's operation and maintenance organization in accordance with instructions in this manual.
6. Assistance to be furnished by the District Engineer. The District Engineer shall:
 - a. Furnish to the Superintendent "as-constructed" reproducible drawings of the flood-control improvements, as soon as they are available after completion of construction.
 - b. Make prior determination that any proposed encroachment, improvement, excavation, or construction within the rights-of-way, or alteration of the flood control works, will not impact the levee and dikes integrity, channel capacity or flow characteristics, or the flood control structures; and furnish the Superintendent with a written approval.
 - c. Assist the Superintendent, as may be practicable, in the performance of his duties in

ascertaining storm development having flood-producing potentialities, assembling flood-fighting forces and material, and initiating and carrying out flood-fighting operations.

FUNCTIONS OF THE OPERATION AND MAINTENANCE ORGANIZATIONS

FUNCTIONS

7. General. The functions of the organizations responsible for the operation and maintenance of the flood control system are traditionally divided into two categories: those concerned with operation or use of the flood control facilities, and those involved in the continuing maintenance of the facilities themselves. These functions are detailed in PART IV and PART V of this manual, respectively, and are summarized here. Also, reporting functions are detailed in PART VI of this manual, and Section 404 permit requirements are detailed in PART VII.

OPERATION

8. General. Operation, as defined in this context, encompasses all uses of the flood control system or any of its components. The principal and overriding purpose of the system is clearly the conveyance of storm-runoff in such a way that the impact of the runoff on the urbanized areas through which it passes is minimized and the efficient functioning of the project produces the benefits set forth in the project authorization. There is, however, an increasing awareness of the system's functional possibilities with respect to other purposes; the attitude of the Government toward alternative uses is generally favorable where such uses are compatible with the system's primary purpose. The operation function, then, is subdivided as follows:

a. Flood Operation. The flood operation function includes responsibility for operating the project in accordance with Federal flood control regulations. There are several aspects to flood-operation procedures.

b. Mobilization. The mobilization function includes responsibility for providing sufficient equipment, material, and trained personnel for adequate operation of the project units in times of flood emergency.

c. Coordination. The coordination function requires that appropriate measures be taken to insure that the activities of all local organizations connected with the protective works are coordinated with the operating agency during flood periods.

d. Inspection. The inspection function provides for scheduled patrolling of flood control activities during periods of storm runoff in order to detect and correct any condition which endangers the structure. Also included in this function is a complete inspection following each major high water period, to ascertain if any other damage has occurred.

e. Multi-Purpose. Multi-purpose Use is the term applied to all uses of flood control facilities which do not involve conveyance of storm runoff. They include, but are not limited to, water conservation, wetland / wildlife habitat, water quality functions, and development for increased land utilization.

MAINTENANCE

9. Functions. Maintenance includes all activities concerned with insuring proper and continued functioning of the project units. The aspects of the maintenance function are as follows:

a. Inspection. The inspection function requires that such inspections shall be made as are necessary to insure that the flood control facilities are maintained in a properly functioning condition. Those inspections may include, as necessary, test programs to determine the condition of those features, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary, where such cannot be adequately ascertained by direct inspection. Programs of this type may be used in making current and long-range maintenance policies. If "test programs" and "investigations" involve activities which discharge fill material (includes excavation) into waters of the United States, or involve work or structures in or affecting navigable waters of the United States, permits should be obtained from the Regulatory Branch of the responsible District Office of the Corps of Engineers (Regulatory Branch) prior to commencement of the activity.

b. Training. The training function includes responsibility for implementing a program, subject to Corps review, to provide an adequate number of trained personnel to perform the various functions of operation and maintenance under either normal or flood-emergency conditions.

c. Public Interest. The public-interest function includes the responsibility for providing police protection of the project units and the responsibility for public health and safety in connection with the various flood control facilities.

REVIEW AND REPORTING REGULATIONS

10. Project Review. Federal regulations require that no improvement or construction within the project right-of-way or change in any feature of the flood control facilities be made without prior determination by the District Engineer or his authorized representative, and that the improvement or alteration will not adversely affect the structural integrity of the levee, dikes, channel and appurtenant facilities, the hydraulic functioning of the flood control facilities (such as causing a change to the water surface profile or introducing wave action), nor violate environmental agreements. This responsibility includes all determinations concerning multi-purpose uses of the project. The regulations also imply a corollary responsibility which requires inspection and supervision of work at all stages of construction to insure that such work adheres to proper engineering standards. These responsibilities are categorized as the project review function. Any improvements or construction within the project right-of-way or change in any feature of the flood

control facilities must also be authorized by the Regulatory Branch if the work involves discharges of fill or excavated material into waters of the United States, or involves work or structures in or affecting navigable waters of the United States.

11. Reports. Federal regulations require that the operating and maintaining agency prepare a semi-annual report to the District Engineer covering operation and maintenance of the flood control facilities, together with such supplemental or supporting reports as are required by the District Engineer.

PART IV - OPERATION

INTRODUCTION

GENERAL

1. The term "operation", as defined in PART III, encompasses all uses of the flood control system or any of its components. Clearly, the principal use of the system, the purpose for which it was designed and constructed, is to collect and convey storm runoff in such a way that its impact on urban areas is minimized. The maintenance program and flood-operation procedures are oriented toward this purpose.
2. Alternate uses are permitted under special circumstances. Federal regulations forbid the use of protective works for other than flood control purposes if that use adversely impacts flood operations or maintenance of the protective works; the District Engineer is responsible for evaluating a proposed use and determining whether or not a conflict or incompatibility exists. If the proposed alternate use requires work which involves discharges of excavated or fill material (including debris) into waters of the United States, or involves work or structures in or affecting navigable waters of the United States, the local sponsor or the proponent of the changed use may need a permit from the Regulatory Branch. Such a use may not be implemented without approval of the District Engineer.
3. The following sections present the federal directive for operation of the facilities, the current flood-operation procedures, with their corollary functions, and a discussion of the current status of multi-purpose use activities.

FLOOD-OPERATION PROCEDURES

GENERAL

4. The operation program, which specifies flood-operation procedures, consists of four phases: pre-stormflow, initial stormflow, final stormflow, and post-stormflow. Each phase is characterized by a degree of mobilization or demobilization - a patrol procedure which includes inspection/operation of field facilities including levee, guide dikes, collector channel, flap gates, trash racks, and any immediate maintenance, and a reporting requirement. Pertinent information on these phases follows.

PRE-STORMFLOW PHASE

5. Operations. The pre-stormflow phase occurs whenever the National Weather Service forecasts rainfall of more than 0.30 inches per hour, or more than 2.00 inches in a 24-hour period **within the Salt-Gila River watershed**. The operations during this phase are described below.

a. Mobilization. Only such mobilization is required as is necessary to perform the operations under the pre-stormflow phase.

b. Patrolling. The completed flood control improvements should be rapidly but completely patrolled to determine their readiness to accommodate stormflow. The responsibilities of the patrols include the following:

(1) Spreading ground headworks and diversion works should be set to keep stormflows from inundating the spreading grounds, unless an operator is continuously on duty to monitor the conditions of the works during stormflow.

(2) Detention basin should be free of sediment including the low-flow ditch. The basin and low-flow ditch invert slopes should be maintained to match designed invert slopes.

(3) RCB Culverts including trash racks and flap gates should be free of any debris including sediment and checked for proper seating.

(4) Collector Channel and irrigation side-drain connections should be freed of any debris and their proper seating checked.

(5) Drainage Channel should be free of sediment.

(6) Equipment and material should be readied for use at debris-accumulation locations or at other locations where trouble might occur.

c. Reporting. No written reports are required for submittal to the District Engineer. However, internal documentation may be helpful if flow increases to the point where a stormflow report is required.

INITIAL STORMFLOW PHASE

6. Operations. The initial stormflow phase begins when rainfall begins. The major operations during this phase are described below.

a. Mobilization. Such mobilization is required as is necessary to perform the operations under the initial stormflow phase. However, the operation and maintenance organization should be alerted for full mobilization.

b. Patrolling. The completed flood control improvements should be given a routine patrolling.

(1) The requirements for the pre-stormflow phase should be checked to ensure that they

have been met.

- c. Reporting. No written reports are required for submittal to the District Engineer. However, internal documentation may be helpful if flow increases to the point where a stormflow report is required.

FINAL STORMFLOW PHASE

7. Operations. The final stormflow phase occurs when the water surface elevation observed at any project unit equipped with streamflow gaging apparatus reaches the staff gage level at one-third capacity (see Appendix V for information of Gila River at 116th Ave. streamflow gage). Flood-operations begin at this point; the major responsibilities during this phase are described below.

- a. Mobilization. Full mobilization is required. Sponsor must have a "Storm Operations Manual" which establishes a staffing plan for flood fighting with shifts established for 24-hour operation. Staff must be either on duty or on-call.

- b. Patrolling. Patrolling of the project units should be complete and comprehensive. If not deemed an emergency by the Corps, an after-the-fact permit may be required (where the District Engineer issues a permit authorizing the emergency corrective measures completed during the storm). The responsibilities of the patrols include the following:

- (1) The staff gage level with time of reading should be recorded.
- (2) Photographs should be made at locations where stormflow damage is occurring or has occurred, where such damage has been repaired, where unusual conditions are noted, or where visual records may be useful in making maintenance determinations.
- (3) Detention basin including low-flow ditch design invert slopes should be checked for properly drain.
- (4) RCB Culverts trash racks and flap gates should be checked for proper operation.
- (5) Channels and irrigation side-drain connections connecting to the Collector Channel should be examined for proper functioning.
- (6) All debris accumulations that would reduce channel capacity including drainage channel should be dislodged or removed at the discretion of the patrolling unit.
- (7) Any condition endangering any flood control structure should be corrected.

- c. Reporting. A stormflow report is required to supplement the spring semiannual report. In addition, the Reservoir Regulation Section of the U.S. Army Corps of Engineers should be notified

immediately whenever a staff gage level indicates that stormflow has reached one-third of the channel capacity. If stormflow is very large or if unusual damage occurs, a special report may also be required.

POST-STORMFLOW PHASE

8. Operations. The post-stormflow phase occurs when the water surface elevations at the various project units equipped with streamflow gaging equipment fall below the staff gage readings indicated on the data sheets in Appendix VI, and available meteorologic or hydrologic data indicate decreasing flow. The phase ends after storm runoff has stopped, and all the major operations indicated below have been performed.

a. Mobilization. Some demobilization is possible during this phase; however, full demobilization should be delayed until the operations for this phase have been completed.

b. Patrolling. The project units should be rapidly but completely inspected. The responsibilities of the patrols include the following:

- (1) All damaged flood control facilities should be located, reported, and photographed.
- (2) Detention basin should be checked for sediment including the low-flow ditch. Detention basin should be checked to ascertain whether the accumulation of debris has reached the point where removal should be effected.
- (3) RCB Culverts including trash racks and flap gates should be free of sediment/debris and their proper seating checked.
- (4) Channels and irrigation side-drain connections should be free of sediment and examined for proper seating
- (5) Channels should be checked to ascertain whether or not the accumulation of debris/sediment has reached the point where removal should be effected.
- (6) All entrances of conduits should be freed of debris.
- (7) Appropriate temporary or permanent repairs of damaged flood control facilities should be initiated.
- (8) Equipment and materials should be inventoried and made ready for subsequent stormflow.

c. Reporting. No written reports are required for submittal to the District Engineer. However, internal documentation may be helpful if a stormflow report or a special report will be required.

COORDINATION WITH THE U.S. ARMY CORPS OF ENGINEERS

9. The operation and maintenance organization is responsible for maintaining close liaison with the Reservoir Regulation Section of the District during all four phases of operation. Exchange of hydrologic and hydraulic data, including precipitation and stormflow data, is useful in the operation procedures of both agencies. Pertinent information on liaison and coordination is given in the flood-emergency manual SPL OM 500-1-1, titled "Natural Disaster Activities", published annually by the District. This manual also covers flood-emergency assistance procedures.

AUXILIARY FUNCTIONS

10. Corollary to the flood-operation procedures outlined above are several related responsibilities described by Federal regulations and listed below:

a. Coordination. The Code of Federal Regulations, Title 33, article 208.10, section (a) reads in part as follows:

"(9) Appropriate measures shall be taken by local authorities to insure that the activities of all local organizations operating public or private facilities connected with the protective works are coordinated with those of the Superintendent's organization during flood periods."

b. Inspection. The Code of Federal Regulations, Title 33, article 208.10, section (g) reads in part as follows:

"(2) Operation. Both banks of the channel shall be patrolled during periods of high water, and measures shall be taken to protect those reaches being attacked by the current or by wave wash. 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 banks, riprap, deflection dikes and walls, drainage outlets, or other flood control structures repaired."

MULTI-PURPOSE USE

GENERAL

11. Multi-purpose use is the term applied to any use of the flood control system or its components which involves activities other than the conveyance of storm runoff. The Code of Federal Regulations, Title 33, article 208.10, section (h), states in part:

"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 therefore."

The criterion which forms the basis for such approval is the requirement that a proposed use not adversely affect the functioning of the protective facilities. Determinations of this nature are made as part of the review procedures outlined in PART V of this manual.

12. Although the project was designed for and its principal use remains flood control, there is an increasing awareness of the systems possibilities for use in other activities. The Government's attitude toward such alternative uses is generally favorable where such uses are compatible with flood control. Any proposed uses which involve discharges of dredged or fill material (including excavation) into waters of the United States, or involve work or structures in or affecting navigable waters of the United States, may require a permit from the Regulatory Branch. The use may also have to comply with the 404 (b) (1) guidelines which regulates activities in wetlands that are water and non-water dependent.

13. However, the National Environmental Policy Act of 1969 requires the preparation of a detailed statement on the environmental impact of any proposed action involving Federally-constructed facilities. This requirement particularly includes proposals for multi-purpose use. State and local regulations may require assessments. In any event it is the responsibility of the applicant to satisfy all regulations which are applicable to his proposed work. Approval of multi-purpose use may also be subject to public meeting procedures in addition to the usual environmental review procedures. The current multi-purpose uses involving the project are discussed in PART II, PROJECT INFORMATION.

WATER CONSERVATION

14. The use of the flood control system in water conservation is compatible with the system's basic purpose. However, it should be noted that the easements or rights-of-way which permit the passage of storm runoff and irrigation water sometimes are written to allow only the passage of storm/irrigation runoff; legal difficulties of this type must be resolved before a water distribution plan may be implemented.

RECREATION

15. Various local recreation and planning agencies whose jurisdictions include parts of the flood control system may become increasingly interested in the recreational possibilities of the flood control rights-of-way. Since these lands are likely to remain in their present condition for some time, investment in the development of recreation facilities on them for public use seems justified; the Government's attitude encourages such use. Any proposed recreational facilities that involve discharges of dredged or fill material (including excavation) into waters of the United States, or involves work or structures in or affecting navigable waters of the United States, shall be authorized by the Regulatory Branch in a Corps permit.

16. Recreational features have been or can be developed within the basins of flood control dams and along the berm roadways of the channels in the form of bicycle, hiking, and equestrian trails. This development generally involves special berm and invert access ramps, under crossings and protective fencing, and occasionally more extensive recreational features.

17. Such uses generally do not interfere with flood control activities; some concern must be given, however, for the maintenance of proper access control to prevent unauthorized access to areas beyond the recreation limits, particularly during the storm season. Recreation proposals are evaluated through the usual review procedures, coordinated with the Recreation Resource Specialists of the District.

DEVELOPMENT FOR INCREASED LAND UTILIZATION

18. To increase the utilization of lands adjacent to these rights-of-way, proposals to use the berm roadway space for structure, parking or loading are common. In any event, a proposed development must be compatible with existing land use zoning. Since the United States does not establish zoning regulations, the responsibility for insuring compatibility of existing zoning with a proposed land use lies with the applicant, and any conflicts must be resolved before approval is granted by the United States. Any proposed private developments that involve discharges of dredged or fill material (including excavation) into waters of the United States, or involves work or structures in or affecting navigable waters of the United States, shall be authorized by the Regulatory Branch in a Corps permit.

MISCELLANEOUS

19. Proposals are frequently made for temporary use of flood control facilities or rights-of-way for a variety of purposes other than those previously discussed. Such proposals are highly diverse, ranging from motion picture filming to bus driver training classes, and are seldom in the interest of the general public. The Government's attitude is one of tolerance, as long as the requirement of no adverse effect on the protective works is met. Any proposal that involves discharges of dredged or

fill material (including excavation) into waters of the United States, or involves work or structures in or affecting navigable waters of the United States, shall be authorized by the Regulatory Branch in a Corps permit.

20. All such proposals are evaluated under the usual review procedure; consideration must be given to the loading which a proposed use would produce on channel or other related structures, the effects on channel capacity, the maintenance of proper access control, potential conflicts with other multi-purpose uses or normal operation procedures, and other such factors.

WETLANDS/WILDLIFE HABITAT

21. The Corps is required by law to regulate discharges of dredged or fill material (including excavation) into waters of the United States which includes compliance with the Endangered Species Act and the Fish and Wildlife Coordination Act. These regulated activities may involve impacts to wetlands/wildlife habitats that may require revised maintenance procedures and/or mitigation for impacts to wetlands and wildlife habitats. The Regulatory Branch should be contacted when maintenance activities and/or other activities may require a permit which impacts wetland/wildlife habitats or involves impacts to species listed as endangered or proposed for listing.

22. Should the periodic removal of accumulated sediment within detention basin, RCB culverts including inlets/outlets and channels area be deemed necessary, excavation and dredging maintenance activities shall consider potential impacts on existing resources, including but not limited to, sensitive species, inland water quality, aquatic and emergent vegetation and wildlife, economics, and other general environmental resources. The periodic removal of accumulated sediment shall occur in a manner consistent with the sections on frequency of sediment removal and 404 permit requirements in Part V.

WATER QUALITY FUNCTIONS

23. The Corps requires compliance with Sections 401, 402, and 404 of the Federal Water Pollution Control Act of 1972 which supports the preservation and establishment of wetlands as biomass treatment of many various pollutants, including nutrients, suspended materials, and other pollutants. Operation and maintenance impacts shall be coordinated with the Regulatory Branch and Local Water Quality Control Agency to avoid, minimize, and mitigate for impacts to wetland water quality functions.

PART V - MAINTENANCE and INSPECTION

INTRODUCTION

OVERALL MAINTENANCE RESPONSIBILITIES

1. The previously referenced article of the Code of Federal Regulations, Title 33, section (b), states, ". . .The Superintendent shall provide at all times such maintenance as may be required to insure serviceability of the structures in time of flood." Although the broad scope of this directive allows considerable freedom of interpretation, it clearly implies a responsibility to detect and correct any condition which might adversely affect the functioning of the flood control system. Explicitly defined are the maintenance function, which involves actual repair and restoration procedures; and the inspection function, which includes programs and procedures necessary to detect hazardous or malfunctioning conditions.
2. Implicit in this directive are also several additional functions which are less directly related to the immediate maintenance requirements, but which affect the continued functioning of the system in a manner appropriate to its design purposes. These implicit functions include the training, public-interest, project review, and reporting functions.

MAINTENANCE ASPECTS OF APPENDIX VI

3. The data sheets of Appendix VI provide relevant information of significant features of specific features or units of the project. This information includes a brief construction history; locations of levee, channel, guide dikes, RCB culverts, access ramps to levee, detention basin, and other pertinent features. Also provided is a list of features the condition of which is to be checked for the semiannual reports.
4. It is the intention to make these data sheets as comprehensive and accurate as possible, particularly with respect to levee, channel, dikes, vehicular access to the levee O&M roads and berms, since this type of information is critical to efficient inspection and maintenance procedures. It is therefore requested that any observed discrepancy from the features listed be reported to the Operations Branch of the District, so that the manual may be revised to reflect such changes.

MAINTENANCE FUNCTION

ROUTINE MAINTENANCE MEASURES

5. Code Requirements. The Code of Federal Regulations, under referenced Title 33, specifies in some detail the routine maintenance procedures for various types of flood control facilities. These can be best summarized as follows:

“(b) Levees - (1) Maintenance. The Superintendent shall provide at all times such maintenance as may be required to insure serviceability of the structures in time of flood. Measures shall be taken to promote the growth of sod, exterminate burrowing animals, and to provide for routine mowing of the grass and weed, removal of wild growth and drift deposits, and repair of damage caused by erosion or other forces. Where practicable, measures shall be taken to retard bank erosion by planting of willows or other suitable growth on areas riverward of the levees. Periodic inspections shall be made by the Superintendent to insure that the above maintenance measures are being effectively carried out and, further, to be certain that:

- (i) No unusual settlement, sloughing, or material loss of grade or levee cross section has taken place;
- (ii) No caving has occurred on either the land side or the river side 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 wells 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 rock 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;
- (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 rapidly, 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.

...Immediate steps will be taken to correct dangerous conditions disclosed by such inspections.”

“(d) Drainage Structure- (1) Maintenance. Adequate measures shall be taken to insure that inlet and outlet channels are kept opened 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:

- (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 structure which might endanger its 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”.

"..(g) Channels and floodways - (1) Maintenance. Periodic inspection 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 work.

...Immediate steps will be taken to correct dangerous conditions disclosed by such inspections. Measures will be taken by the Superintendent to promote growth of grass on bank slopes and earth deflection dikes. The Superintendent shall provide for periodic repair and cleaning of debris basins, check dams and related structures as may be necessary."

The referenced article of Title 33 further states that the Superintendent shall provide for periodic repair and maintenance of floodwalls, drainage structures, closure structures as may be necessary.

6. 404 Permit Requirements: Title 33, parts 320-330, states that maintenance or other activities in which discharges of dredged or fill material (including excavation and substrate disturbance involving vegetation removal) into waters of the U.S., including but not limited to channels, flood ways, and impoundments, require the responsible entity to apply for and obtain a Clean Water Act Section 404 permit from the Regulatory Branch prior to commencement of such activities. In some cases a Section 10 permit may also be required.

7. Exemptions from 404 Permit Requirements. Maintenance activities of currently serviceable structures and emergency reconstruction of recently damaged parts are generally exempt from the

404 permit requirement. Examples of structures are dikes, dams, levees, groins, riprap, and concrete lined channels and floodways. The bottom of an unlined (earthen or "soft") channel or basin is not considered to be a structure, even when beset by levees. Modifications or character change in scope or size of original fill designs is not considered to be maintenance. Emergency reconstruction must occur within a reasonable period of time after damage occurs (typically within one year) to qualify for the exemption. Concrete lined channels and other structures with shoals that support significant wetland vegetation growth may no longer be serviceable and thus not eligible for the 404 permit exemption; the Regulatory Branch must be notified prior to initiation of maintenance activities in such instances.

ESTHETIC TREATMENT MAINTENANCE

8. General. Urbanization adjacent to flood control projects has increased significantly in recent years and is expected to continue. Correspondingly, this has increased project visibility necessitating the need not only for a higher quality project esthetic treatment, but also for better maintenance of the finished product. With regard to current economic conditions, careful consideration should be given to future maintenance needs during preliminary planning and design stages of project development. Plant material and earth-tone colored gravel and rock play an important role in esthetic treatment since they provide intrinsic beauty, erosion control, environmental quality, and if utilized correctly, low-maintenance characteristics. Other than plant species selection, slope steepness can be the most important factor affecting low-maintenance potential. Slopes exceeding 3 horizontal to 1 vertical are generally more labor intensive (and more expensive) to landscape initially as well as maintain later. This applies not only to plant material, gravel, and rock, but to hardscape surfaces (grouted stone, ornamental concrete and pavers) as well. The use potential of machinery (mowers, etc.) decreases proportionally as slopes increase from 3:1. It is therefore becoming increasingly more important that project slopes maintain steepness ratios not exceeding 3:1, wherever and whenever possible.

9. Esthetic treatment maintenance shall maintain or improve upon the original design concept level of esthetic quality and utilitarian effectiveness.

10. Hardscaping. Hardscaping, which must be maintained to appear as originally placed, basically consists of the following features:

- a. Gravel and stone ground covers - remove debris, regrade gravel and stone areas as necessary, and supplement as needed with in-kind material.
- b. Paving systems - (including grouted stone, concrete and pavements) - regrout, repair, repave, replace material in-kind, excavate and regrade, as necessary. Keep areas clean and free of debris.
- c. Fencing - (including planters, artificial stonework, and bollards). Replace material in-kind, repair, repaint or restrain, as necessary.

- d. Head walls - include in periodic inspections for structural integrity, and repair as necessary.
- e. Graffiti and vandalism – repair and remove as necessary, immediately and continually to discourage further damage.

11. Frequency of Sediment Removal. As part of maintenance requirements for the detention basin, RCB culverts and channels, it is recommended that O&M activities should be carried out quarterly. Sediment removal is required for the detention basin, RCB culverts and channels in order to maintain the design flood protection function. Sediment will not be allowed to accumulate to the upper grade limit line or fill up of the low-flow ditch within the detention basin. Once sediment deposition exceeds this limit, the sediment must be removed to the design invert.

NON-ROUTINE MAINTENANCE

12. Certain maintenance procedures which are not explicitly described as routine by the sections of referenced Title 33 are implied by the directive to insure serviceability in times of flood. Such procedures would include repair of any damage caused by storm runoff, maintenance of the berm O&M roadways, the right-of-way fencing, entrance gates and concrete irrigation canal connections (so as to provide unimpeded access to the project units at all times), restoration of subdrain system, and other such required maintenance which occurs on an irregular basis.

INSPECTION FUNCTION

INSPECTIONS

13. General. The Code of Federal Regulations, under the referenced article of Title 33, states that 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 at such intermediate times as such may be necessary to insure the best possible care of the protective works.

14. Purpose. The purpose of these inspections is to determine whether or not each project unit and the flood control system are in a properly functioning condition and to insure that the facilities receive proper attention so that the equipment is ready for use to provide safe and efficient operation with a minimum chance of failure during operation. The scope of the preventive maintenance inspections includes adjusting, lubricating, and repairing equipment and replacing worn or defected parts. This responsibility involves locating and recommending repairs for any damage which may have been caused by storm runoff or the action of other natural forces, insuring that access to all project units is maintained at all times, and preventing unauthorized encroachment on or access to

the project right-of-way. The Code of Federal Regulations is quite specific on this point; section (a), under the referenced article of Title 33, reads in part:

"(4) No encroachment or trespass which will adversely affect the efficient operation or maintenance of the project works shall be permitted upon the rights-of-way for the protective facilities."

15. Visual Inspection and Reports. Visual inspection and reporting of all conditions are a main method of supplying information for a maintenance program. Conscience's visual inspection furnishes evidence of the proper functioning flood control system. The criteria in Appendix IV provides a basis for determining the extent of investigation and repair need to correct defects and restore the facility to full design. Figures 1, 2 and 3 of Part VI provides a complete listing of reporting features.

INVESTIGATION AND TEST PROGRAM

16. Purpose. The investigation and test program is designed to provide criteria for making current and long-range maintenance determinations. A test program is to be initiated whenever the condition of a reporting feature cannot be adequately determined by direct inspection. An investigation program is to be initiated when the cause of a reporting feature's condition and the necessary corrective actions are not immediately apparent.

17. Types of Programs. The various types of programs are described below.

a. In general, most investigation and test programs are recommended when the spring semiannual report is prepared. Those programs, which are completed in time to implement repairs during the summer months, are classified as "short-term programs".

b. Those programs that require more than one year to develop adequate information are termed "continuing programs".

c. Certain reporting features require "periodic programs" whose initiation and continuance is a function of regularly established annual periods rather than by specific recommendations during the semiannual inspections. Such periodic test programs may in turn recommend investigation programs which may be implemented on a short-term, continuing, or periodic basis.

18. Special Test Program Requirements. Certain recurrent problems with reporting features require more detailed discussion.

a. Concrete Cracking. Whenever a test program is recommended to determine the

condition of cracks in reporting features, the test program will include measurements to determine if the crack is stable; or if not, the rate of displacement and crack progression. If the test program indicates that the crack is stable, the appropriate repair is recommended in the semiannual report. However, if the crack is found to be active, an investigation program is recommended to determine the cause of the crack and the necessary corrective action.

- b. Scour Areas. Any unlined channel may experience scour. This is especially true where major side channels or side drains enter the channel. An annual test program is required to determine the extent of this scour and to follow its effects; this test program will include a survey to plot the channel profile in areas that scour is noted.
- c. Any improvements, excavation, construction, or alteration, which involve discharges of dredged or fill material (including excavation) into waters of the United States, or involves work or structures in or affecting navigable waters of the United States, shall be authorized by the Regulatory Branch under a Corps permit.

TRAINING FUNCTION

TRAINING RESPONSIBILITIES

19. Program. The training responsibilities of the operation and maintenance organization include the establishment, with annual evaluation and revision, of a regularly scheduled program to provide training in certain critical areas.

- a. Inspection Training. Inspection training will be designed to insure uniform inspection procedures, uniform reporting, and inspection controls over repairs and project construction; to qualify alternative personnel for each type of inspection; and to supplement and verify adequacy of the inspectors.
- b. Repair Training. Repair training is intended to insure uniform repair procedures and competent workmanship. A corollary responsibility is the development of standard repair methods, in cooperation with the District. These methods should be documented in written form to insure that the techniques and procedures are not lost with personnel changes.
- c. Investigation and Test Training. Training in the investigation and test program will be designed to develop and maintain uniform methods, procedures, and valid program results.
- d. Operation Training. Operation training is designed to maintain crews adequately

trained in operational procedures. Such training shall conform to the specifications of the flood-emergency manual, SPL OM 500-1-1, titled "Natural Disaster Activities", published annually by the District.

PUBLIC-INTEREST FUNCTION

POLICE PROTECTION

20. The operation and maintenance organization is responsible for providing police protection for the project units, obtaining adequate ordinances protecting the units, and obtaining limited police authority for the operation and maintenance organization. Adequate policing will minimize litter and damage due to malicious mischief. The organization is responsible for removing litter and repairing any such damage, including graffiti removal.

PUBLIC HEALTH AND SAFETY

21. The operation and maintenance organization should develop liaison with organizations responsible for public health in order to prevent the accumulation of waste discharges, insect-breeding areas, and other menaces in the flood control rights-of-way.

22. The Code of Federal Regulations, under referenced Title 33, clearly states that unimpaired access to all flood control facilities by authorized personnel be provided at all times. However, this access must be restricted to prevent trespassing or uses which might interfere with flood control. The facilities may be regarded as an attractive nuisance, and adequate fencing must be provided to prevent unauthorized persons, especially children, from gaining access to the right of-way and harming either themselves or the facilities. However, security provisions must consider recreational uses, where applicable.

PROJECT REVIEW

AUTHORIZATION

23. The basic authorization of the Project review function derives from the Code of Federal Regulations, Title 33, article 208.10, section (a), which reads in part as follows:

"(5) No improvement shall be passed over, under, or through the walls, levees, improved channels or floodways, nor shall any excavation or construction be permitted within the limits of the project right-of-way, nor shall any change be made in any feature of the works without prior

determination by the District Engineer or his authorized representative that such improvement, excavation, construction, or alteration will not adversely affect the functioning of the protective facilities. Such improvements or alterations as may be found to be desirable and permissible under the above determination shall be constructed in accordance with standard engineering practice. Advice regarding the effect of proposed improvements or alterations on the functioning of the project and information concerning methods of construction acceptable under standard engineering practice shall be obtained from the District Engineer or, if otherwise obtained, shall be submitted for his approval."

24. These specifications apply to the Project review for all Federally authorized flood control facilities.

REVIEW PROCEDURES

25. Federal regulations assign the responsibility for providing an interface between the general public and the U.S. Army Corps of Engineers project review to the Local Sponsor. Applications for permits are submitted to the Local Sponsor, which requests comments from the District and then issues or denies a permit. This procedure applies to all facilities for which reports are made to the Corps of Engineers, but does not apply on those units for which reports are not made.

26. The review procedures adopted by the Corps of Engineers in the Los Angeles District are detailed in the "Flood Control Projects Manual".

27. Request for temporary or permanent modification of flood control improvements must first be submitted to the Local Sponsor, before the Los Angeles District can approve the modification. These applications will be reviewed by the Local Sponsor and then sent the Operations Branch of the Los Angeles District for consideration before any application is approved for a permit. Each application, which is reviewed by the District, will be adequately evaluated in order to determine whether any modification will adversely affect the ability, safety, or functioning of the flood control facilities. When such an evaluation by the District has determined that approval can be given, the conditions which must be adhered to will be incorporated with the permit. Only at this time should the Local Interest issue the permit for modification. Executed copies of the permit as issued shall be furnished to the Operations Branch of the District.

28. The District maintains "as permit constructed" plans which reflect all changes or modifications in the project units. Maintenance of current plans requires drawings or prints of all proposed work and a completion notice to indicate that a project is finished.

29. An important part of the project review procedure is the requirement that an appropriate block-letter levee station number visible from invert, access ramps, or berm roadway be placed

wherever possible to identify the location of a reporting feature for inspections or maintenance work. On channel walls the block-lettering should be at a height above the invert which is convenient for lettering and readily visible. On dumped or grouted stone side slopes, the lettering should be applied on flush mortared pad areas. This identification is the responsibility of the operation and maintenance organization. Where initial stationing was placed as a part of the construction contract, the local sponsor is responsible for maintaining the markings.

PROJECT INSPECTIONS

30. The operation and maintenance organization will inspect project construction to insure that improvements or alterations do not interfere with the proper functioning of the project and that the construction follows acceptable standard engineering practice. These inspections will also verify locations to insure that the "as-permit constructed" plans accurately reflect the actual condition of the project unit.

PART VI - OPERATION & MAINTENANCE REPORTS

REPORT FUNCTIONS

GENERAL REPORTING ACTIVITIES

1. The basis for the report function is given in the Code of Federal Regulations, Title 33, article 208.10, section (a) which reads in part as follows:

"(6) It shall be the duty of the Superintendent to submit a semiannual report to the District Engineer covering inspection, maintenance, and operation of the protective works."

2. Although the operation and maintenance organization is required to submit several types of operation and maintenance reports to the District Engineer, all reporting activities must be oriented toward the submittal of two basic reports each year. These semiannual reports are then supplemented by additional reports as necessary.

3. The following sections of this chapter define the required reports, report organization, and reporting terminology. The reports can be narrative letter reports or summarized on a form designed by the sponsor. The suggested forms included in this document have been used on other projects and are included as examples. The only requirement is that the information identified be included in the reports.

TYPES OF REPORTS

4. Semiannual Operation and Maintenance Report. The semiannual reports, which are the basic communication on the functioning of the flood control system, are prepared in two phases: the spring phase, which indicates the maintenance requirements of the project units at the end of the flood season; and the fall phase, which indicates the ability of those units to accommodate storm runoff after the summer maintenance. The two phases, with the supporting reports which may accompany the basic reports, give a successively revised picture of the operation and maintenance of the project from the start of one flood season to the start of the next.

5. Quarterly Operation and Maintenance Report. Federal regulations require a complete inspection at least every 90 days to determine the need for temporary or permanent maintenance and to initiate the necessary maintenance for the project units. However, because two such quarterly inspections coincide with the two phases of semiannual reports, the requirements for quarterly reports are as follows:

January	A separate report is required on a rapid inspection to determine maintenance needs. A copy of this report is also included with the spring semiannual report.
April	The April quarterly inspection is for the sole purpose of determining whether conditions exist that would interfere with the detailed inspection required for the spring phase of the semiannual report. A separate report is not required, since the results of the April inspection are indicated on the semiannual report form.
July	The July quarterly inspection is essentially a progress report on summer maintenance. A separate report is not required, although a copy must be included in the fall semiannual report.
October	Maintenance work performed during the summer is repeated in the fall phase of the semiannual report; a separate report for the quarterly inspection is not required.

The required separate quarterly reports need only be very brief summary descriptions of maintenance needs and the status of the project units.

6. Investigation and Test Program Report. A supplemental report that accompanies the fall phase of the semiannual report is the investigation and test report. Such a report presents the findings of each test program which is carried out to determine the condition of a reporting feature and the results of each investigation program undertaken to determine the cause of a reporting feature's condition and the necessary corrective action.

7. Stormflow Operation Report. A supporting report which accompanies the spring phase of the semiannual report is the stormflow operation report, which contains the log of operations for each project unit during those periods in which storm runoff is above the staff gage reading indicated on the data sheets in Appendix V. The log report form shall be the responsibility of the operation and maintenance organization.

8. Special Reports. Special reports are prepared to describe any unusual occurrence which affects the flood control system; such phenomenon may include large flood flows or unusual damage from storm runoff, earthquakes, or other causes. A Special Report is to be transmitted to the District Engineer within one week of the occurrence. A copy is to accompany the next following semiannual report.

9. Manual Revision Report. The revision report should include comments, suggestions, and additional data from those directly concerned with operation and maintenance, as well as policy-making, administration, funding, and programming information. The District is particularly concerned with maintaining the accuracy of this manual; since it will be periodically revised,

observed discrepancies or inaccuracies and comments relative to the manual's effectiveness in fulfilling its intended function will be incorporated where appropriate.

REPORT ORGANIZATION

10. Time of Submittal. The spring phase of the semiannual report shall be submitted to the District Engineer on or before 1 June and the fall phase on or before 1 December. Included with these reports are any quarterly reports, investigation and test reports, stormflow reports, and manual revision reports. Special reports are transmitted as indicated previously.

11. Fiscal Statements. Information on cost of operation and maintenance is required as part of the semiannual report. Actual costs are to be given when possible, as shown on the sample transmittal letter in **Appendix III**. Estimates may be used for items where actual costs are not available. Operation and maintenance costs for any work performed or paid for by the operation and maintenance organization are to be shown irrespective of the source of funds. Costs for work performed by other agencies and not reimbursed by the operation and maintenance organization are not required.

12. Inclusions in Semiannual Report.

a. The list of reports which may be included in the spring submittal is given below.

- (1) Spring phase of the semiannual operation and maintenance report (including the April inspection).
- (2) Copy of the January quarterly report.
- (3) Stormflow operation reports.
- (4) Manual revision reports.
- (5) Special reports (the originals of which were previously submitted).

b. The list of reports which may be included in the fall submittal is given below.

- (1) Fall phase of the semiannual operation and maintenance report (including the October inspection)

- (2) July quarterly report.
- (3) Investigation and test program reports.

REPORTING TERMINOLOGY

13. All those features of the project units that must be inspected, operated, and maintained (and hence reported on) are called reporting features for the purpose of this manual. Each such feature is defined here so that use of these terms will be consistent and clear. The tabulation of reporting features organized by general terms is given in **Figures, 1, 2, & 3.**

SEMIANNUAL REPORT

REPORT FORMAT

14. Forms to Be Used. The reporting agency has the option to use narrative report, reporting agency form, or use the Corps forms SPL 403 & 403a. The Corps forms SPL 403 and SPL 403a and instructions for preparation of these forms will be supplied to the operation and maintenance organization by the District upon request. A sample of semiannual narrative letter and inspection reports is presented in **Appendix III.**

PREPARATION FOR THE SPRING SEMIANNUAL INSPECTION

15. Spring Housecleaning. Effective inspection and maintenance requires physical and visual accessibility to all reporting features. Debris and vegetation should be cleared away, although meticulous neatness is not required. The guiding principle should be that to the general public the appearance of the project units reflects on the competency and adequacy of the flood control facilities. A specific task to be performed is the removal of debris obscuring inspection or hindering maintenance. Debris accumulations in the channels, RCB culverts, culvert inlet and outlet and structures and detention basin should be removed. Vegetation obscuring inspection of channel, detention basin and RCB culvert inlet & outlet structures condition should be removed, eradicated, or trimmed, as applicable.

16. Relationship to April Quarterly Report. As previously stated, the April quarterly report is made for the sole purpose of determining whether conditions exist that would interfere with the detailed inspection required for the spring phase of the semiannual reports. A separate April quarterly report is not necessary; the results of this inspection are noted on the semiannual report. If the reporting feature is inaccessible, the notations are not made until subsequent inspection indicates that the feature has been "house cleaned" and is ready for the spring inspection.

THE SPRING SEMIANNUAL INSPECTION

17. As the inspection is performed, the handwritten notations to be made in the indicated columns are given below.

a. Column 5. Any deviation of the reporting features from the "as-constructed" drawings is reported in column 5. The terminology to be used in reporting such deviations must correspond to that on the data sheets in Appendix VI. If the deviation exists because the feature is being constructed under permit or lease, use the term "active permit"; if no deviation exists, the abbreviation "AC" for "as-constructed" is placed in the column.

b. Notations are made in columns 6 through 18 in all cases where a deviation is reported, where there is an "active permit" feature, or an investigation or test program is recommended or is being continued from a preceding year. In all other cases no notation is made.

(1) Columns 6 through 13 inclusive are used to indicate the eight categories into which deviation causes have been divided

- (a) Column 6. Normal deterioration, progressive wear, or displacement.
- (b) Column 7. Loadings, including debris, vehicles, and structures.
- (c) Column 8. Vegetation.

- (d) Column 9. Modification of adjacent facilities, including side drains, utilities, bridges, or other project construction activities.
- (e) Column 10. Public mischief and / or litter.
- (f) Column 11. Flood emergency flow.
- (g) Column 12. Storm runoff.
- (h) Column 13. Other.

The applicable column is marked with either an "X" or a circled number referencing a note on a backup page; all other columns are indicated with a "-".

(2) Column 14. This column applies only to those reporting features for which an investigation or testing program is recommended or is being continued from the preceding year. This status is denoted with an "X" to indicate that an investigation or test program is recommended, "T" to indicate that a program is being continued from a preceding year, and a "-" to indicate that no program is involved. The "Inspection Function" in PART V discusses the basis for recommending investigation or test programs.

(3) Column 15. This column is used to indicate the recommended repair for the deviation reported in column 5. The terminology used must correspond with that given in Appendix V. For some recommended repairs supplemental information is supplied; this information may be a station identification, a quantity of materials needed, or a circled number which corresponds to an explanatory note on a backup page. In general the recommended repair should be listed without regard to when the repair would be required or when it could be made, since such decisions are made in the operation and maintenance organization's office.

(4) Filing in columns 16 and 17 is normally the responsibility of the operation and maintenance office; consideration is given to the type of repair recommended, the estimated time required, and the availability of personnel.

(a) Column 16. Column 16 will contain the programmed repair completion dates of the current summer, as estimated with regard to maintenance priorities. The official responsible for approving these dates must initial them. When the column is not applicable, write a "-".

(b) Column 17. Column 17 will be used only if the repairs are to be accomplished within the next three years. Repairs which cannot be effected during the current summer may be programmed within the next three years with revisions made annually. When the column is not applicable, write a "-".

(5) Column 18. Column 18 may be used as part of the spring semiannual report or may be deferred until the fall phase. If used during the spring phase, the column contains a circled number which references an explanatory note concerning the deferral of repairs on a backup page. This explanation must either contain the scheduled date of repair or indicate that the work has been or will be corrected in conjunction with project work. A "-" indicates that no repair is involved.

c. Columns 19 and 20 are not used during the spring phase of the semiannual report.

d. Column 21. Column 21 indicates any deviations noted and corrected during the period 15 October to 15 April; a circled number with a corresponding explanatory note details the type of deviation(s) noted, the cause thereof, the repairs made, and the date such repairs were completed. No other type of entry is required.

18. The spring semiannual report should be reviewed by the organization superintendent for signature. The reports are then used to make at least two copies of the entire report, one copy of which is filed for reference by the operation and maintenance organization and another of which is submitted to the District as indicated in the "Report Organization" subsection of "Report Functions" in this Part. The reports are then filed by the operation and maintenance organization for use in preparing the fall semiannual report.

FALL SEMIANNUAL REPORT

GENERAL

19. The fall semiannual report describes the final inspection of repairs and project construction scheduled for completion before the start of the flood season. It also serves to verify that the project units are ready for stormflow.

PREPARATION OF FORMS

20. As previously indicated, the reporting agency has the option to use narrative report, reporting agency form, or use the Corps SPL 403 & 403a forms.

21. If using Corps SPL 403 & 403a forms, note the following instructions: During the course of the fall semiannual inspection columns 18 through 21 are completed for all reporting features which required entries in columns 6 through 17; in other cases no entries in these columns are made.

a. Column 18. If column 18 was not used during the spring phase; it is now completed with a circled number which references an explanatory note concerning the deferral of repairs on a backup page. This explanation must either include the scheduled date of repair or indicate that the work has been or will be corrected in conjunction with project work. A "-" indicates that no repair is involved.

b. Column 19. Column 19 contains required information on a scheduled investigation and test program, if applicable (see Column 14). This column may contain a completion date when the program was finished before the fall semiannual report, the letter "T" to indicate that the program will continue, or a "-" when no program is involved. The results of a completed program will be submitted in the supporting investigation and test program report.

c. Column 20. Column 20 is used to indicate the status of repairs scheduled for completion the preceding summer. The entry consists of the inspector's initials to indicate completion of the inspection, or a "-" to indicate that no repair or construction is involved.

d. Column 21. Column 21 provides a place for indicating any remarks as may be required to clarify conditions found during repairs. The entry will be a circled number which references an explanatory note on a backup page. A "-" indicates that no clarification is required.

22. The fall semiannual report should be reviewed by the organization superintendent for signature. The reports are used to make at least one copy, which is forwarded to the District as indicated in the "Report Organization" subsection of "Report Functions" section of this Part. The originals are then filed for reference by the operation and maintenance organization.

FIGURE 1
REPORTING FEATURES FOR FLOOD CONTROL LEVEE AND GUIDE DIKES

TERM	GENERAL		TYPICAL REPORTING FEATURE	
		INCLUSION	ALONG LEVEE & DIKES	AT A LEVEE STATION
EARTHWORK		Fills, cuts, slopes, levees, Dikes, Embankments	Earthwork, general Streambed Earth levee & dikes Earth Levee roadways	Levee Berm access ramp
STONEWORK		Grouted or ungrouted riprap/stone facings, bedding matreial and filters Gabion mattress basket & stone	Stonework, general Riprap slope protection Grouted stone protection, levee access ramp Stone toedown protection, levee Gabion mattress protection, levee& Dikes	Grouted stone protection, 107th Ave. Ramp between Sta 202+00 and 203+00. East 115 th Ave. Dike, Sta. 158+00.00 West 113 th Ave. dike, Sta. 163+85.90 East 113 th Ave. Dike, Sta.171+64.54 95 th Ave. Dike, Near line of sight of 95 th Avenue.
PUBLIC UTILITY		Sewer, water, gas, electricity, telephone	Public utility	
FENCING		Right-of-Way fencing, Headwall pipe rails at RCB culvert inlet/outlet structures, access gates.	Fencing, levee	Pipe gates and pipe rails.
BITUMINOUS SURFACING		Levee landside slope, O&M roadways, Ramps & Turnaround	Surfaced levee O&M roads, Surfaced levee landside slope	Surfaced berm-access ramp Surfaced levee Slope & O&N roads, Sta.153+72.90 to Sta. 224+62.57
STAFF GAGE		Gage I.D. and station houses		Staff Gage at Avondale Avenue Bridge, levee Sta. 153+72.90
SPREADING GROUNDS DIVERSION		Pipes, gates, and other facilities for diversion of water		Spreading grounds diversion
RIGHTS-OF-WAY		Access ways and ramps, encroachments, loadings, and uses	Rights-of-way	Rights-of-way
SPECIAL FEATURES		Approved chemical and mechanical means		Control mosquito breeding ground.

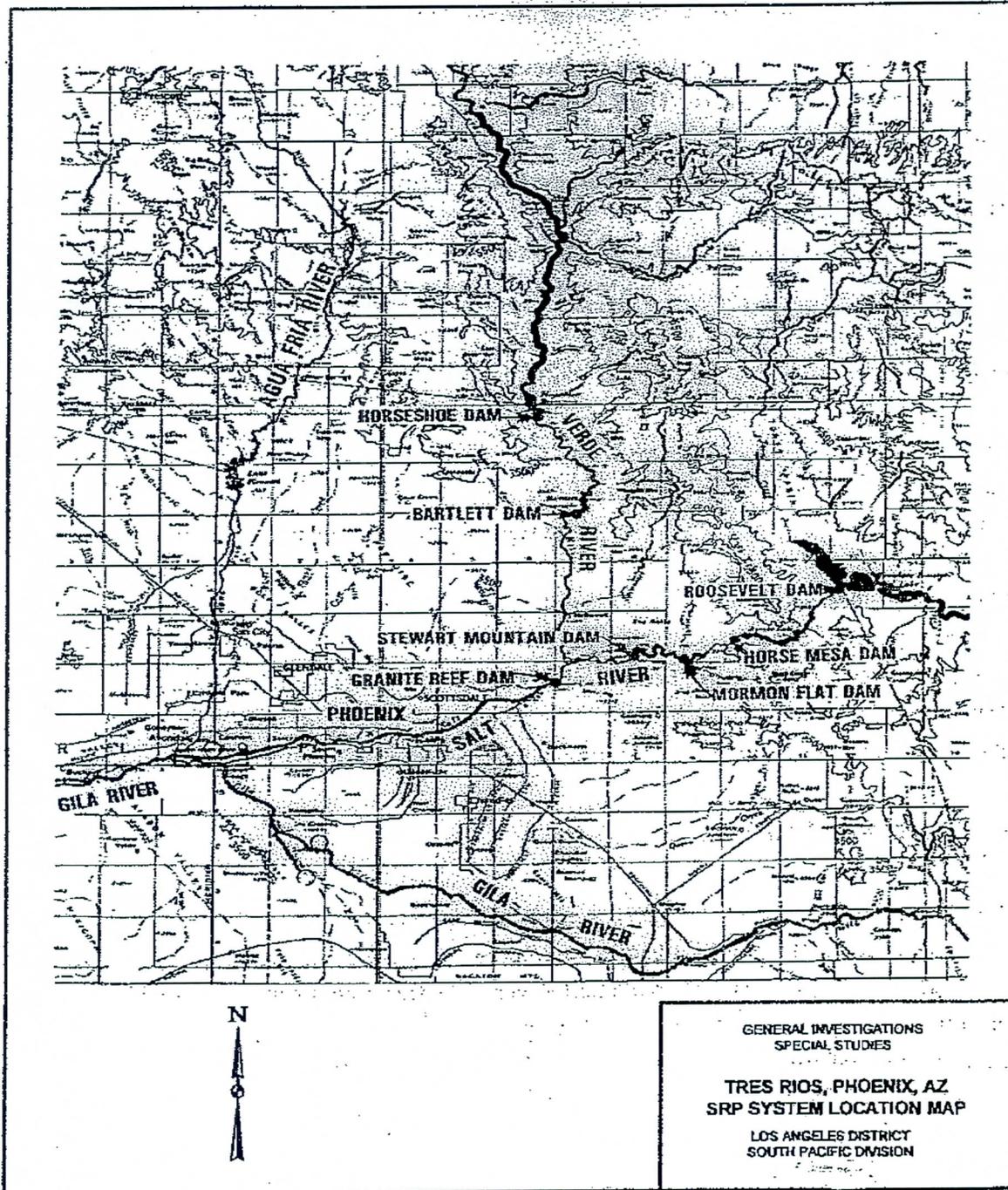
FIGURE 2
REPORTING FEATURES FOR FLOOD CONTROL CHANNEL

TERM	GENERAL		TYPICAL REPORTING FEATURE	
	INCLUSION		ALONG CHANNEL	AT A CHANNEL STATION
CONCRETEWORK	Concrete channel, irrigation side drain structures, public utilities, bridges, RCB culverts		Concrete channel invert Concrete channel side slopes Concrete toe protection Concrete RCB culvert walls Concrete RCB culvert roof slab Reinforced concrete pipe	Concrete inlet structure Concrete Outlet structure Concrete irrigation connections

FIGURE 3
REPORTING FEATURES FOR DETENTION BASIN

TERM	INCLUSIONS	IN AND AROUND THE BASIN	EMBANKMENT AND BASIN
EARTHWORK	Fills, cuts, slopes, basin, low-flow channel, embankments	Earth north O&M roadway	Earth embankment Earth embankment-access road Earth basin-access road
STONEWORK	Grouted stone for RCB culvert inlet/outlet structures, basin inlet.	Stone for inlet and outlet of RCB culverts	
SIDE DRAIN	MCDOT Side drains near basin N-W corner	Inlet pipe	Inlet pipe
PUBLIC UTILITY	Sewer, gas, water, oil, electricity, telephone	Public utility	Public utility
FENCING	Right-of-way fencing, pipe rails, gates	Fencing	Fencing
BITUMINOUS SURFACING	Basin cut slopes and O&M roads	basin cut slopes	Surfaced basin embankment-access ramp Surfaced basin slope around the basin
STORAGE CAPACITY	Storage capacity		storage capacity
STAFF GAGE			Staff gages
RIGHTS-OF-WAY	Access ways and ramps, encroachments, loadings, land use	Rights-of-way	Rights-of-way

Figure 7 SRP System Location Map



PART VII - REGULATORY PERMIT PROGRAM

GENERAL

APPLICABLE LAWS AND STATUTES

1. Laws. The Corps permit program is based mainly on three Acts of Congress.
 - Section 9 and 10 of the RIVERS AND HARBORS ACT of 1899 prohibit unauthorized construction in navigable waters of the United States.
 - Section 404 of the CLEAN WATER ACT governs disposal of dredged or fill material in waters of the United States.
 - Section 103 of the MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT of 1972 regulates transportation of dredged material for the purpose of dumping into ocean waters.

2. Statutes. Other statutes also affect Corps regulatory authority.
 - The NATIONAL ENVIRONMENTAL POLICY ACT of 1969 defines the national policy for encouragement of productive harmony between man and his environment, as evaluated through Environmental Impact Statements and Assessments.
 - The FISH AND WILDLIFE PRESERVATION ACT of 1956 requires the Corps to coordinate permit applications with State and Federal Fish and Wildlife agencies.
 - The NATIONAL HISTORIC PRESERVATION ACT of 1966 requires coordination on matters concerning historic and archaeological preservation.
 - The COASTAL ZONE MANAGEMENT ACT of 1972 requires that activities comply with and be certified by a State's coastal zone management program.
 - The ENDANGERED SPECIES ACT of 1973 requires coordination to insure protection of endangered and threatened species.
 - The EXECUTIVE ORDER 11988 of 1977 requires that the District Engineer avoid authorizing floodplain development whenever practicable.

WATERS DEFINED

3. Waters of the United States. Waters of the United States, which are subject to Corps of Engineers' jurisdiction under Section 404 of the Clean Water Act, include:
 - Territorial seas, measured seaward a distance of three miles;
 - Coastal and inland waters, lakes, rivers and streams, and their tributaries;
 - Interstate waters and their tributaries;
 - Wetlands adjacent to all the above waters; and

- Isolated wetlands and lakes, intermittent streams, and other waters that are not part of a tributary system to interstate waters or to navigable waters of the United States, the degradation or destruction of which could affect interstate commerce.

4. Navigable Waterways of the Los Angeles District.

- Pacific Ocean, Harbors and Estuaries, Colorado River

AUTHORITIES

5. General. The Congress of the United States has assigned to the U.S. Army Corps of Engineers the responsibility for regulation of construction and other work in the waters of the United States. The Corps is charged with protecting our nation's harbors and navigation channels from destruction and encroachments, and with restoring and maintaining environmental quality. This is accomplished by regulating activity in three areas: discharge of dredged or fill material in coastal and inland waters and wetlands; construction and dredging in navigable waters of the United States; and transport of dredged material for dumping into ocean waters.

6. Major Federal Coordinating Agencies.

- U.S. Fish and Wildlife Service
- National Marine Fisheries Service
- Environmental Protection Agency

7. Major State and Local Coordinating Agencies.

- California State Lands Division
- California Department of Fish and Game
- California Water Quality Control Board
- California Coastal Commission
- Arizona Department of Game and Fish
- Arizona Department of Environmental Quality
- Various city and county agencies in project areas

REQUIRED PERMITS

PURPOSE OF PERMIT PROGRAM

8. The Corps Permit Program, administered by the Regulatory Division, seeks to insure that our nation's water resources and wetlands are used in the best interest of the public. This includes consideration of environmental, cultural and other public interest concerns.

PERMIT REQUIREMENTS

9. Who should Obtain a Permit? Any person, firm, or agency (including Federal, state, and local governmental agencies) planning to work in waters of the United States should first contact the Corps of Engineers regarding the need to obtain a permit from the Regulatory Branch. Permits, licenses, variances, or similar authorization may also be required by other Federal, state and local statutes.

10. The necessary permits are required even when land next to or under the water is privately owned. Both the property owner and contractor may be held liable for violation of Federal law if work begins before permits have been obtained. Penalties for proceeding with work without a permit issued by the Corps may include:

- Removal of work and restoration of area.
- Administrative penalties of up to \$25,000 per day for each violation.
- Fine of up to \$50,000 per day for each violation.
- Up to three years in prison.

11. Typical Activities Requiring Permits.

a. General. The listed activities in waters of the United States may require permits.

- Construction of such structures as piers, wharves, bulkheads, dolphins, marinas, ramps and floats.
- Placement of wires and cables over the water, pipes or cables under the water, and intake and outfall pipes.
- Dredging, excavation and depositing of fill and dredged material.
- Transport of dredged material for the purpose of dumping into ocean waters.
- Any construction of revetments, groins, breakwaters, levees, dams, dikes and weirs.
- Placement of riprap and road fills.
- Grading or land leveling activities.
- Sand mining and related activities.

b. Wetlands.

(1) Wetlands are those areas that are inundated or saturated by surface or ground water (either fresh or salt) at a frequency and duration sufficient to support vegetation adapted for life in saturated soil condition.

(2) Wetlands and other saturated soils associated with coastal and inland waters may be of considerable value to the public interest, even though they are not directly or actively used by the public. Examples of such values are: water retention to limit flooding; ground water recharge areas; filtering of contaminated surface water; nutrient source for aquatic organisms; and resting, breeding,

cover and feeding habitat for wildlife.

(3) Wetlands and other special aquatic sites are afforded additional protection in the Corps of Engineers' section 404 permitting program.

(4) Wetlands include such areas as swamps, marshes, bogs, estuaries, certain unique pond systems, and inland and coastal shallows. These wetland types are characterized by:

- Predominance of aquatic or emergent wetland vegetation. Some species of these plants are non-persistent and are obviously present only during the growing season (e.g. loose strife, ludwigia, annual knotwoods and salt marsh fleabane). Others are persistent and can typically be found standing even during the non-growing season (e.g. cordgrass, common pickleweed, cattails, willows, bulrush, soft rushes and sedges, alder, mulefat, cottonwood, and sycamore).
- Type of water regime (saltwater vs. freshwater, tidal vs. nontidal, and either permanently flooded in the case of aquatic systems or occasionally to regularly flooded in the case of flats, marshes and swamps). If the water regime is not apparent during the summer or non-growing season or if the high water mark is not apparent, evaluation of soil characteristics can determine the identity of a wetland.

12. Factors Considered in Issuing a Permit. Overall, a permit must be found to be not contrary to the public interest. All factors which may be relevant to the proposal must be considered. Among those are: conservation, economics, aesthetics, general environmental concerns, wetlands, fish and wildlife values, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety and conservation, water quality, energy needs, safety, food production and, in general, the needs and welfare of the people. In addition, the public interest review and, of equal importance, an analysis of alternative project designs that avoid negative impacts to the aquatic ecosystem must be conducted and considered.

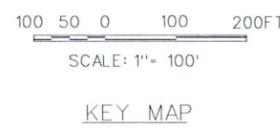
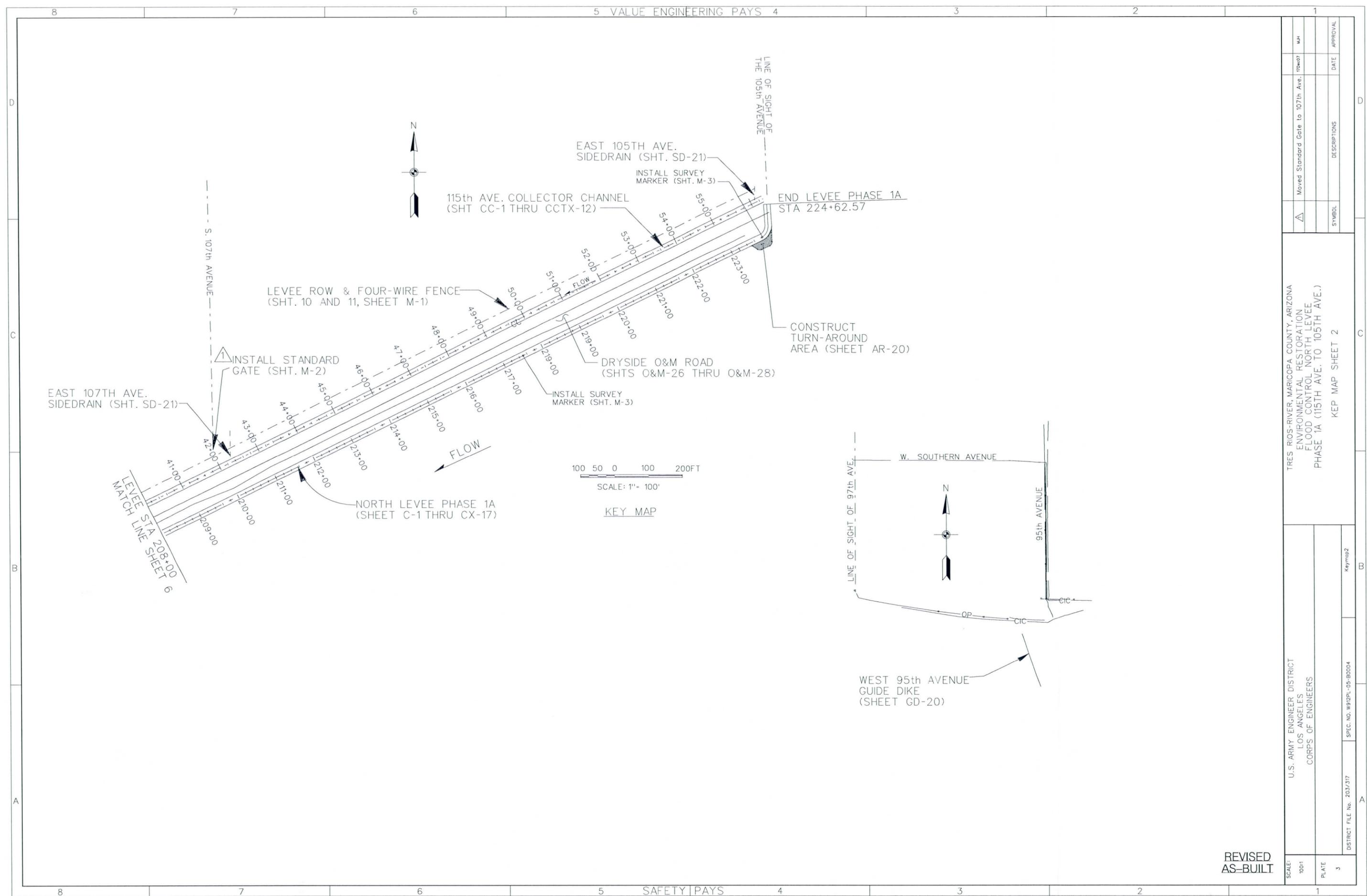
13. Permit Fees. Some permits, such as nationwide permits, do not require a fee. Fees for other permits are assessed according to the proposed use. For example, the fee for work to be done for commercial and industrial use is \$100; for private or noncommercial use, the fee is \$10. The applicant will be notified of the required fee. No fee is required for Federal, state, or local government agencies. Permit fees are subject to future changes.

PERMIT APPLICATION

14. A sample of the Department of Army Permit Application is included in Appendix IV. Actual permit applications can be obtained from the Regulatory Branch.

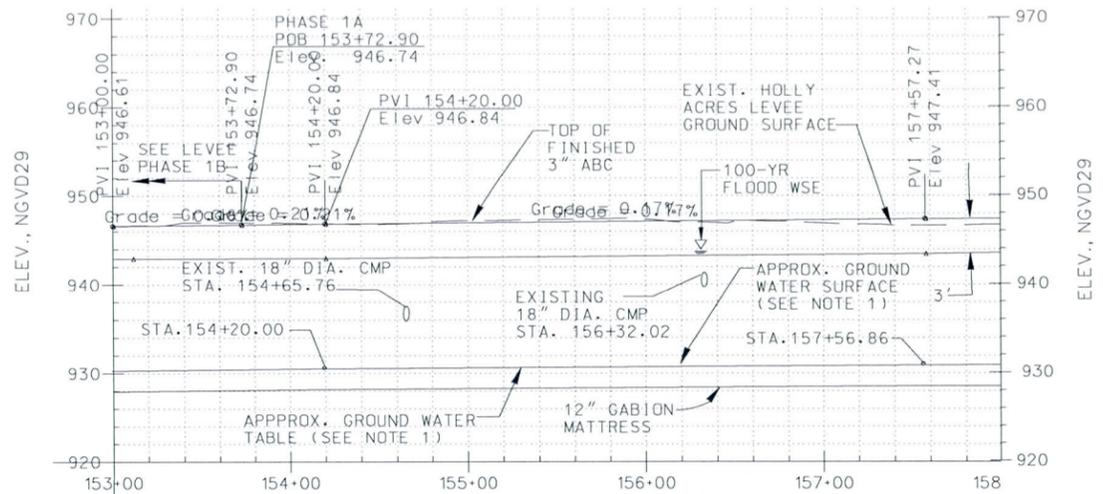
APPENDICES

- I CODE OF FEDERAL REGULATIONS (EXTRACTED)
- II AUTHORIZING DOCUMENT AND PROJECT COOPERATION AGREEMENT (PCA)
- III SAMPLE REPORTING FORMS
- IV SAMPLE PERMIT APPLICATION
- V BASIS FOR RECOMMENDING REPAIRS
- VI DATA SHEETS AND MAPS



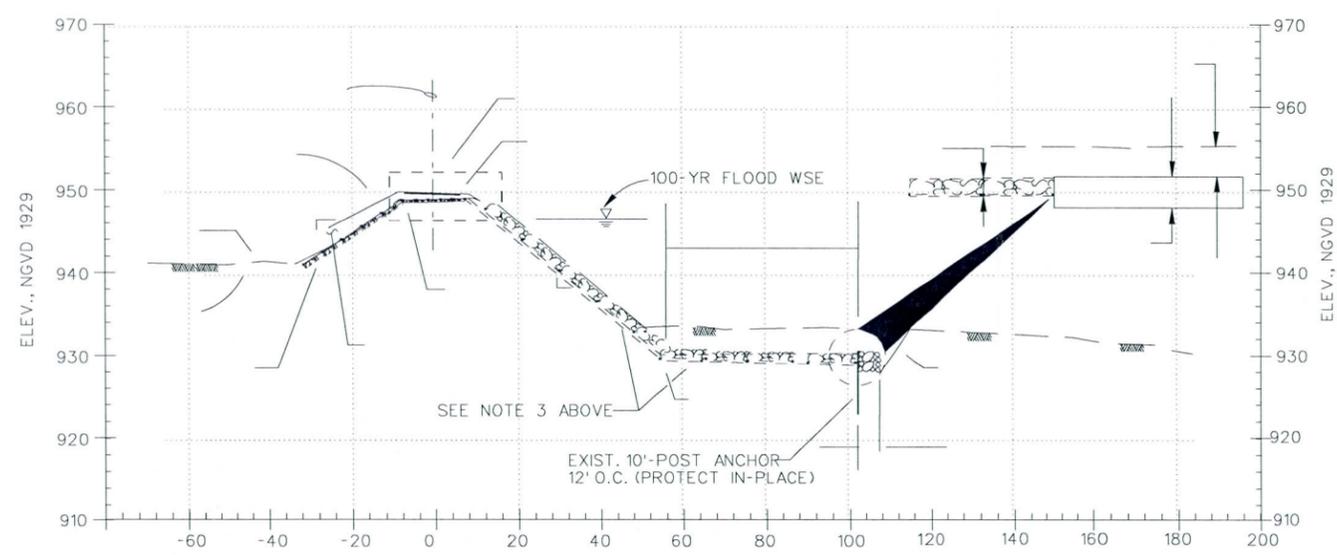
SCALE: 1"=100'	U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS		DISTRICT FILE No. 203/317	SPEC. NO. W912PL-05-B0004	Keymap2				
	PLATE 3								
SYMBOL	DESCRIPTIONS	DATE	APPROVAL	TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) KEP MAP SHEET 2					
				<table border="1"> <tr> <td>▲</td> <td>Moved Standard Gate to 107th Ave. 17Dec07</td> <td></td> <td></td> </tr> </table>	▲	Moved Standard Gate to 107th Ave. 17Dec07			<table border="1"> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>
▲	Moved Standard Gate to 107th Ave. 17Dec07								

REVISED
AS-BUILT



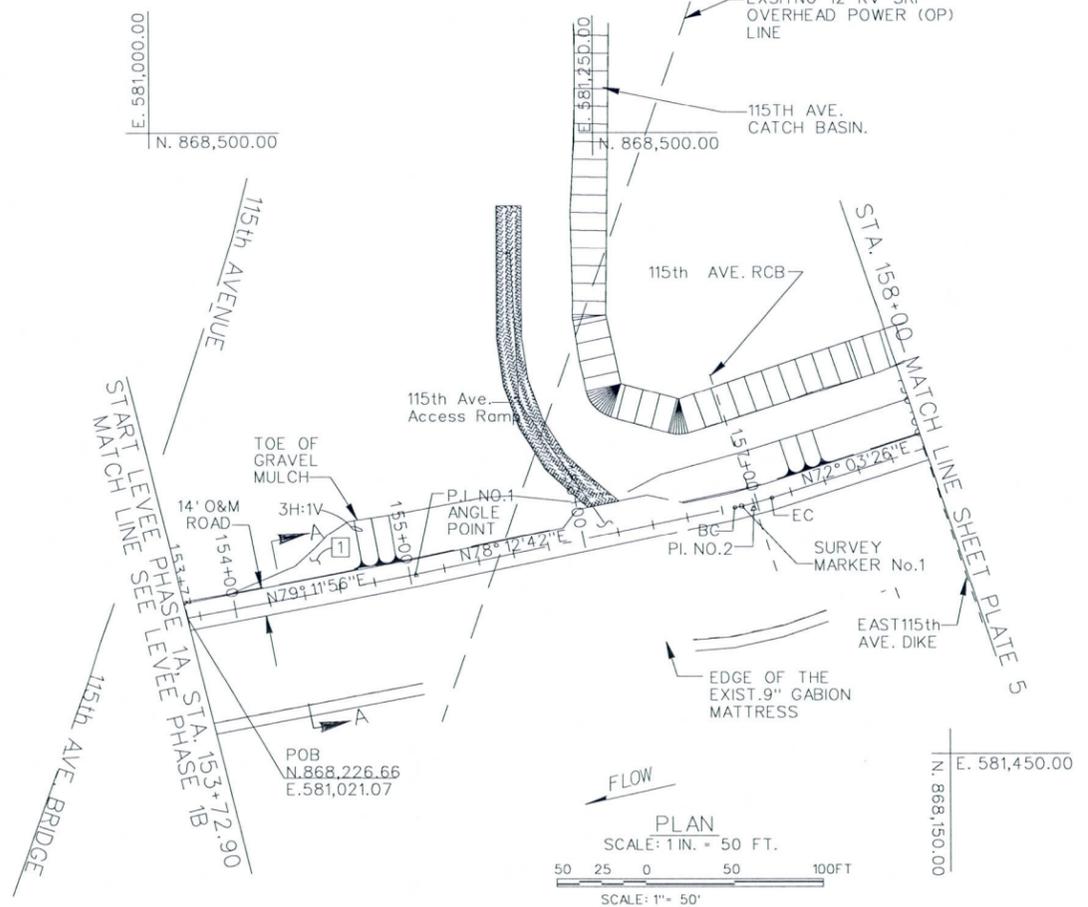
LEVEE CONTROL LINE PROFILE

HORIZ. SCALE: 1" = 10'
VERT. SCALE: 1" = 50'



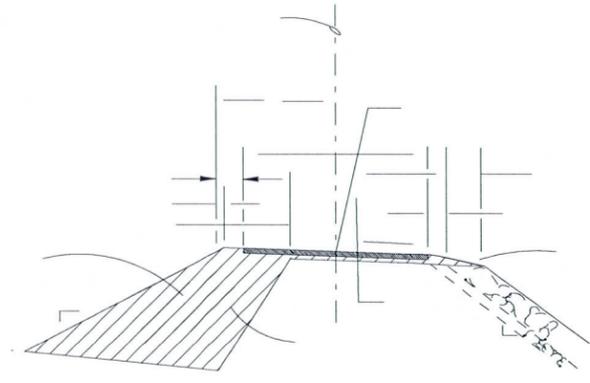
SECTION A-A TYP (STA 154+00 TO 168+00)

N.T.S.



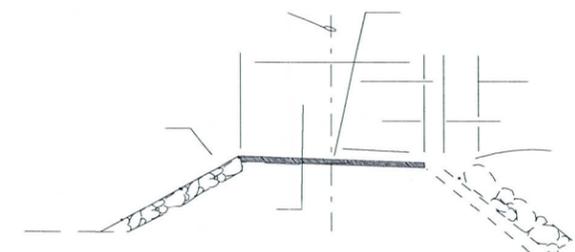
PLAN

SCALE: 1 IN. = 50 FT.
SCALE: 1" = 50'



DETAIL X LOOKING EAST

N.T.S.

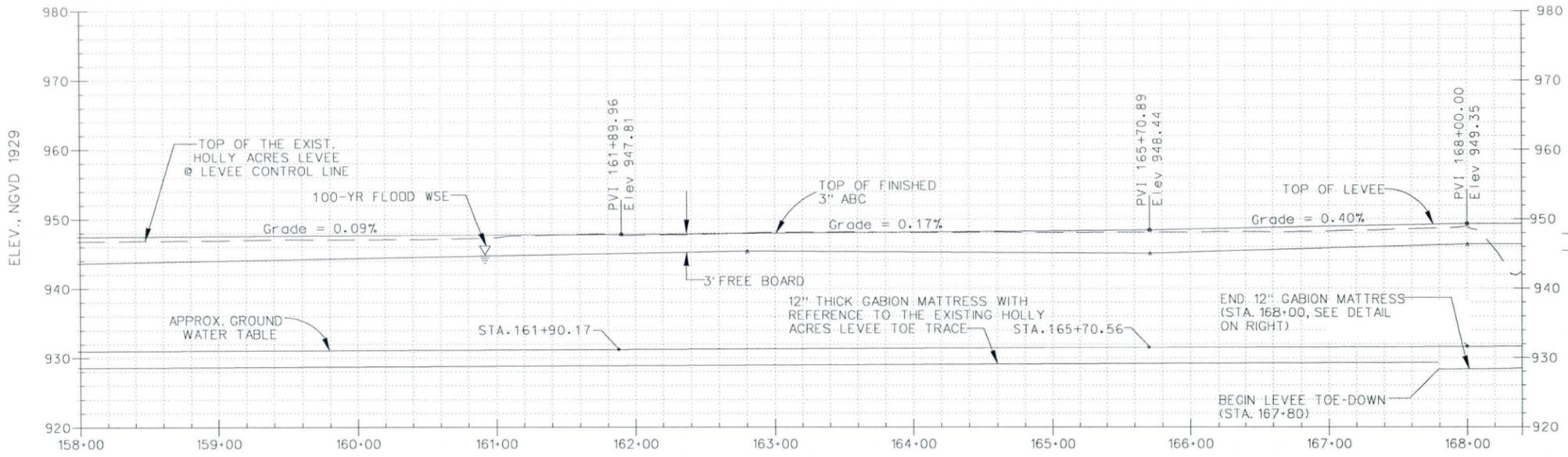


TYP SECTION STA 153+72.90 TO 154+00

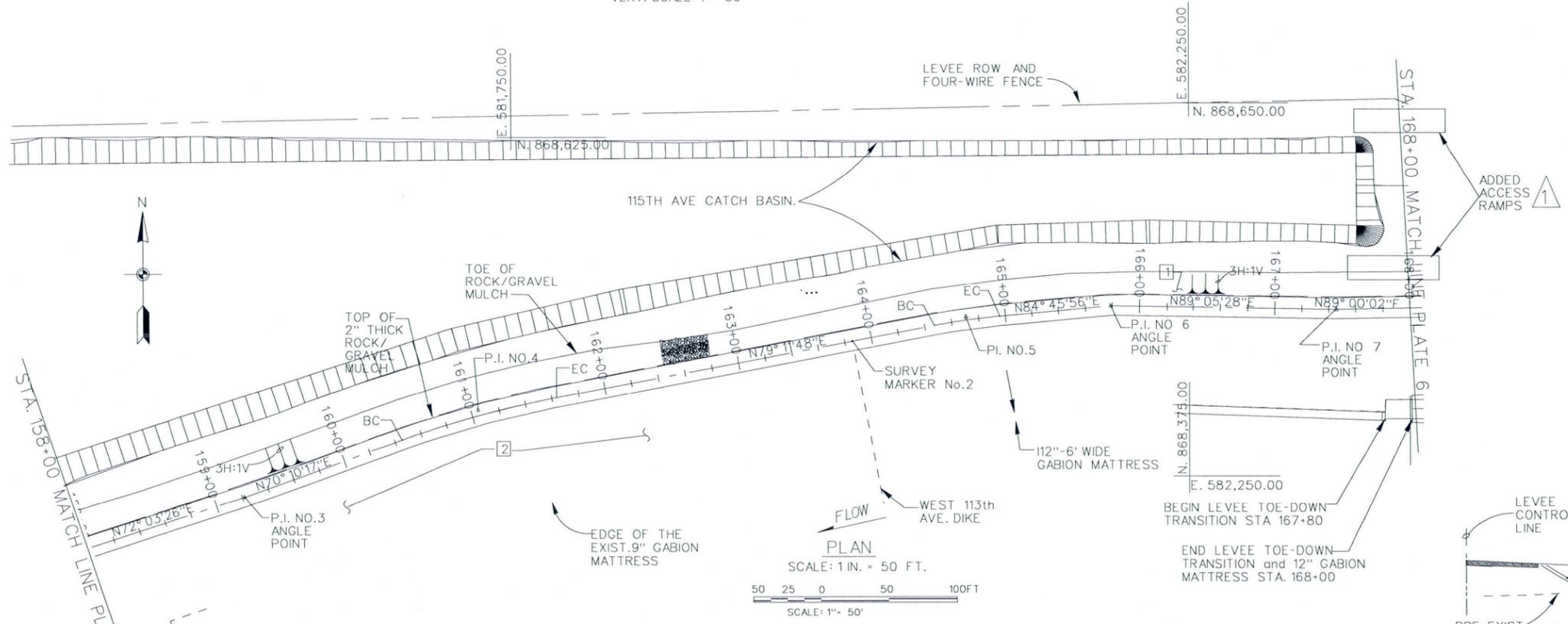
N.T.S.

LEVEE HORIZONTAL CONTROL CURVE AND ANGLE POINT DATA								
P.I. NO.	NORTHING	EASTING	Δ°	R(FT.)	T(FT.)	L(FT.)	B.C. Sta	E.C. Sta
1 Sta. 155+03.18	868,251.07	581,149.04	ANGLE PT.	0.00	0.00	0.00	N/A	N/A
2	868,290.80	581,339.41	6° 09' 15" LT	200.00'	10.75'	21.48'	156+86.90	157+08.38

SCALE: 50'	U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	SPEC. NO. W92PL-05-B0004	DISTRICT FILE NO. 203/322	DATE	APPROVAL
				SYMBOL	DESCRIPTIONS
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) LEVEE PLAN, PROFILE, TYPICAL SECTIONS AND DETAIL STA. 153+72.90-00 TO STA. 158+00					
AS-BUILT					

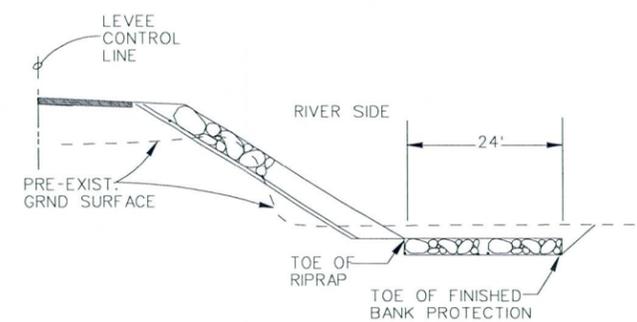
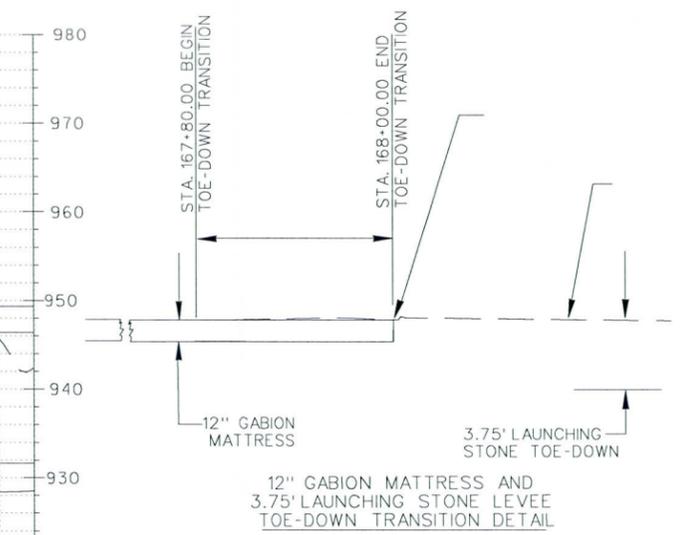


LEVEE CONTROL LINE PROFILE
HORIZ. SCALE: 1" = 10'
VERT. SCALE: 1" = 50'



PLAN
SCALE: 1 IN. = 50 FT.
SCALE: 1" = 50'

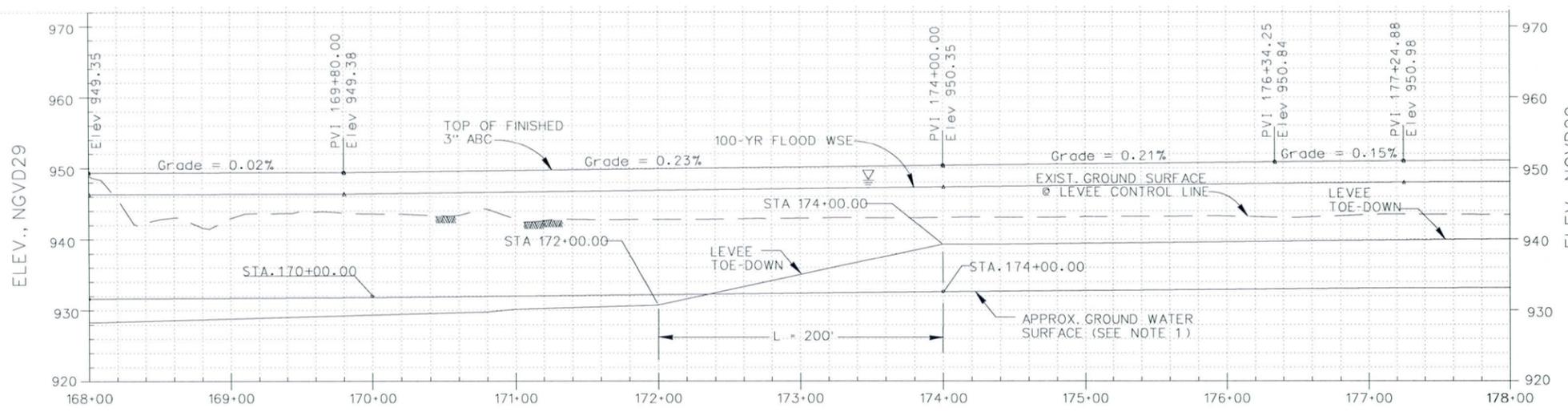
LEVEE CONTROL LINE HORIZ. CURVE AND ANGLE POINT DATA								
P.I. NO.	NORTHING	EASTING	Δ°	R(FT.)	T(FT.)	L(FT.)	B.C. Sta	E.C. Sta
3 Sta. 159+21.75	868,359.84	581,552.63	ANGLE PT.	0.00	0.00	0.00	N/A	N/A
4	868,421.86	581,724.61	9° 01'31"RT	750.00'	59.19'	118.14'	160+45.38	161+63.52
5	868,490.69	582,085.30	5° 34'08"RT	500.00'	24.32'	48.60'	164+47.21	164+95.80
6 Sta. 165+78.87	868,500.48	582,192.24	ANGLE PT.	0.00	0.00	0.00	N/A	N/A
7 Sta. 167+45.13	868,497.85	582,358.48	ANGLE PT.	0.00	0.00	0.00	N/A	N/A



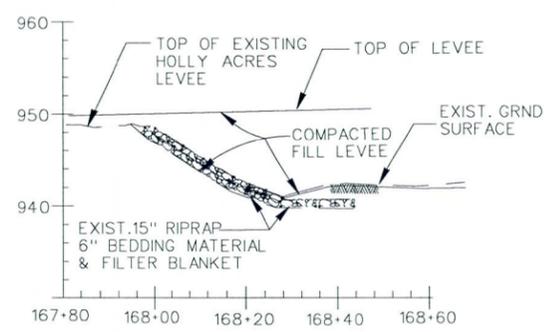
1983 FCDMC AS-BUILTS OF BANK STABILIZATION (TYP)
LOOKING EAST STA. 153+72.90 TO 168+00
N.T.S.

REVISED AS-BUILT

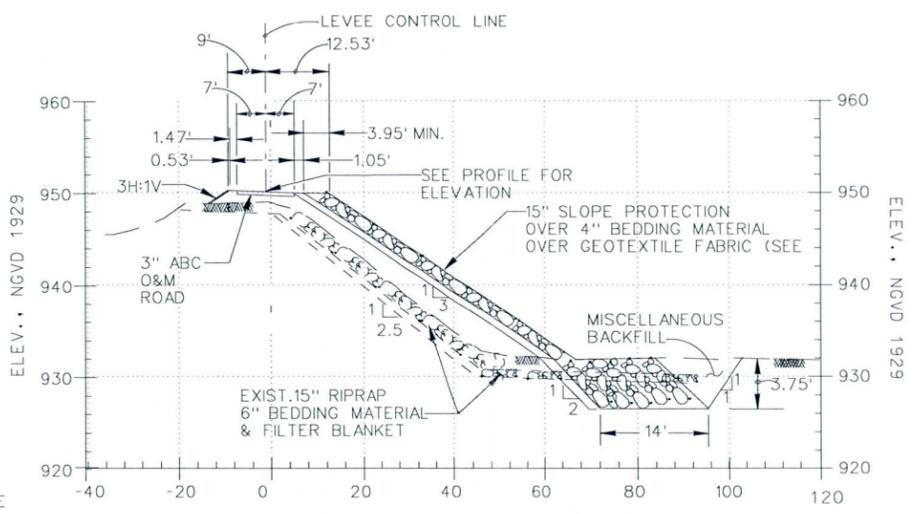
TRES RIOS RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) LEVEE PLAN, PROFILE AND SECTIONS STA. 158+00 TO STA. 168+00	
U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	SCALE: 50/1 PLATE: 5
ADDED ACCESS RAMPS	DATE: 10/26/07
DESCRIPTIONS	M/JH
SYMBOL	APPROVAL
DISTRICT FILE No. 203/333 SPEC. NO. W92PL-05-80004	



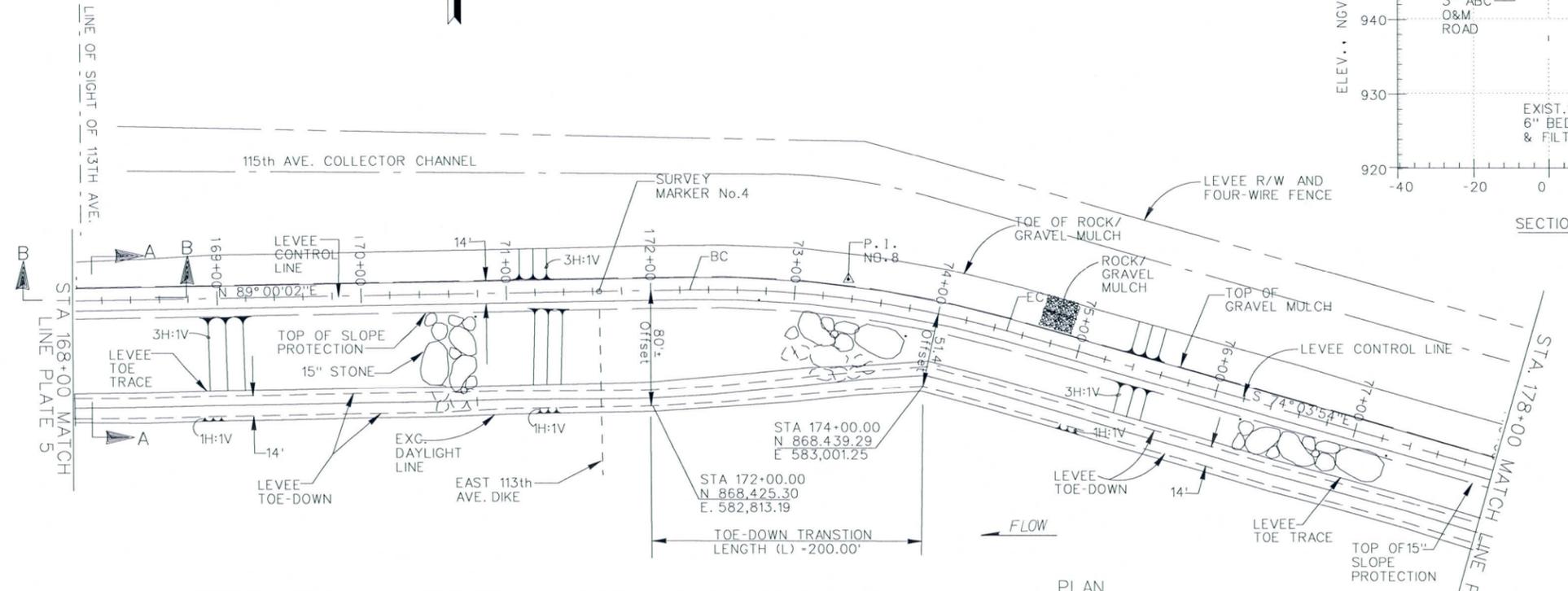
LEVEE CONTROL LINE AND TOE-DOWN PROFILE
 HORIZ. SCALE: 1" = 10'
 VERT. SCALE: 1" = 50'



SECTION B-B
 N.T.S.



SECTION A-A TYP (STA 168+00 TO STA 168+40)

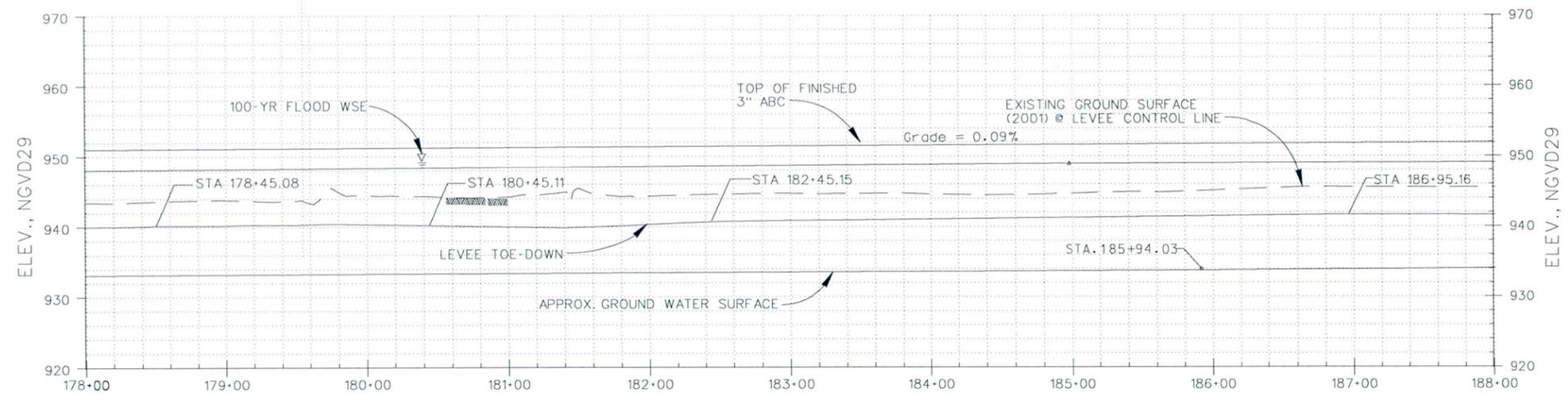


PLAN
 SCALE: 1 IN. = 50 FT.
 SCALE: 1" = 50'

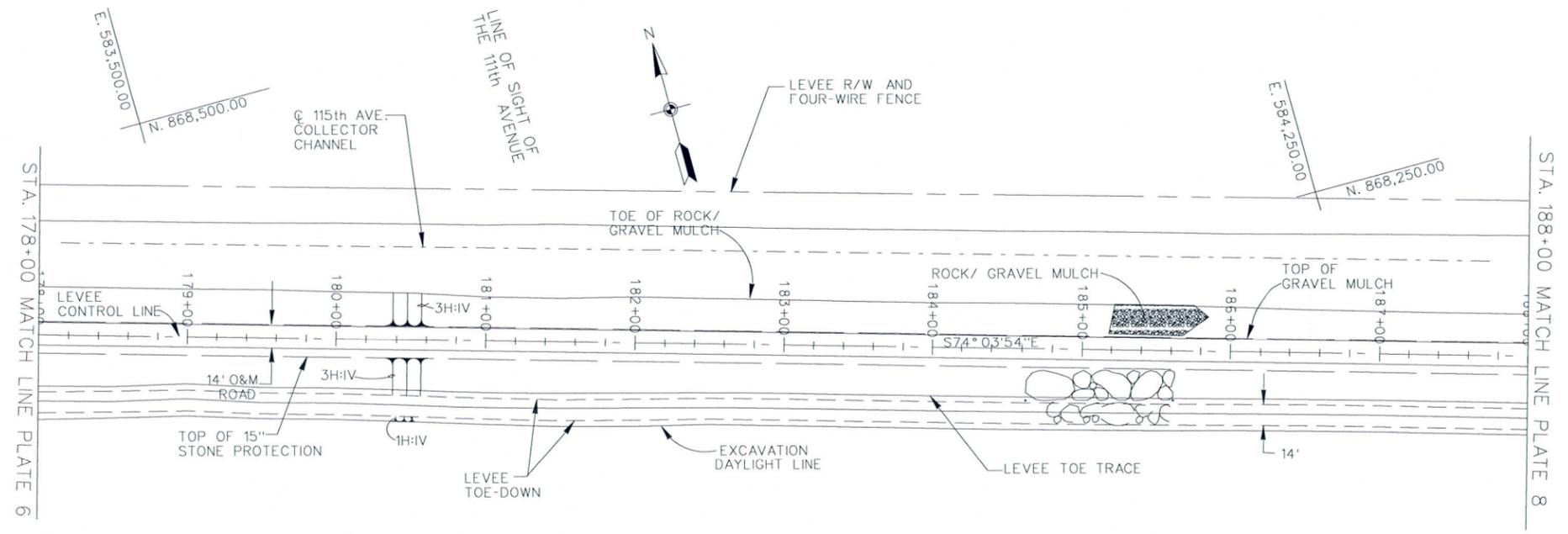
LEVEE HORIZONTAL CONTROL CURVE DATA								
P.I. NO.	NORTHING	EASTING	Δ°	R(FT)	T(FT.)	L(FT.)	B.C. Sta.	E.C. Sta.
8	868,508.21	582,952.54	16° 56' 03"	750.00	111.65'	221.67'	172+27.64	174+49.31

SCALE	50:1	DATE		APPROVAL
PLATE	6	SYMBOL		DESCRIPTIONS
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) LEVEE PLAN, PROFILE AND SECTIONS STA. 168+00 TO STA. 178+00				
U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS				
DISTRICT FILE No. 203/324 SPEC. NO. W929PL-05-B0004				

AS-BUILT



LEVEE CONTROL LINE AND TOE-DOWN PROFILE
 VERT. SCALE: 1" = 10'
 HORIZ. SCALE: 1" = 50'



PLAN
 SCALE: 1 IN. = 50 FT.
 SCALE: 1" = 50'

AS-BUILT

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 1A (115TH AVE. TO 105TH AVE.)
 LEVEE, PLAN AND PROFILE
 STA. 178+00 TO STA. 188+00

U.S. ARMY ENGINEER DISTRICT
 LOS ANGELES
 CORPS OF ENGINEERS

DISTRICT FILE No. 203/125
 SPEC. NO. W922PL-05-B0004

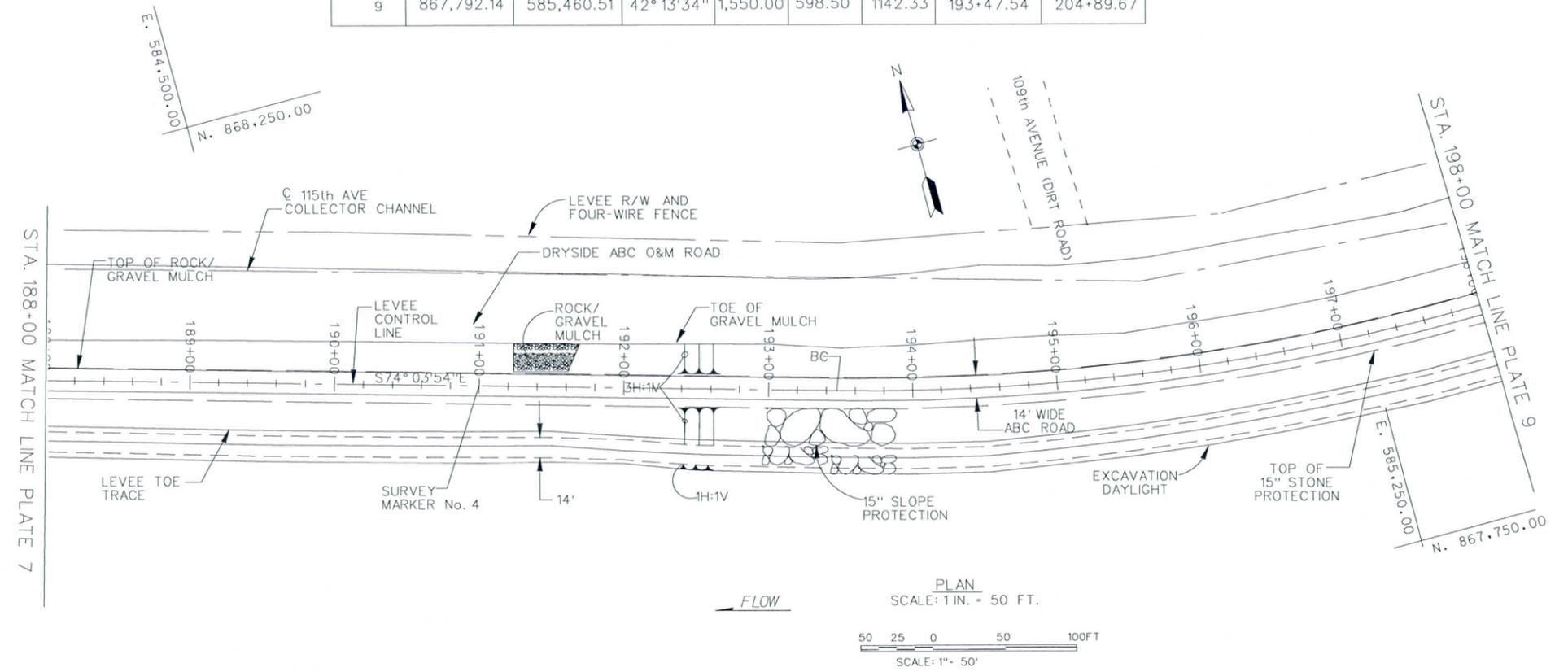
SCALE: 50'
 PLATE: 7

SYMBOL	DESCRIPTIONS	DATE	APPROVAL



LEVEE CONTROL LINE AND TOE-DOWN PROFILE
 HORIZ. SCALE: 1" = 50'
 VERT. SCALE: 1" = 10'

LEVEE CONTROL LINE HORIZONTAL CURVE DATA								
P.I. NO.	NORTHING	EASTING	Δ°	R(ft)	T(ft.)	L(ft)	B.C. Sta.	E.C. Sta.
9	867,792.14	585,460.51	42° 13' 34"	1,550.00	598.50	1142.33	193+47.54	204+89.67



PLAN
 SCALE: 1 IN. = 50 FT.
 SCALE: 1" = 50'

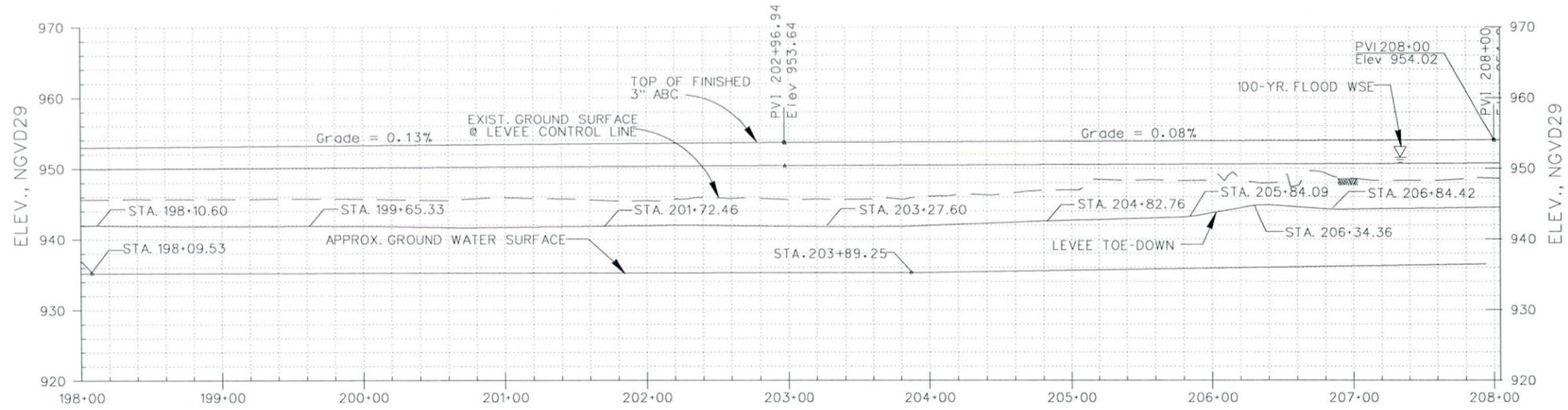
AS-BUILT

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 1A (115TH AVE. TO 105TH AVE.)
 LEVEE PLAN AND PROFILE
 STA. 188+00 TO STA. 198+00

U.S. ARMY ENGINEER DISTRICT
 LOS ANGELES
 CORPS OF ENGINEERS

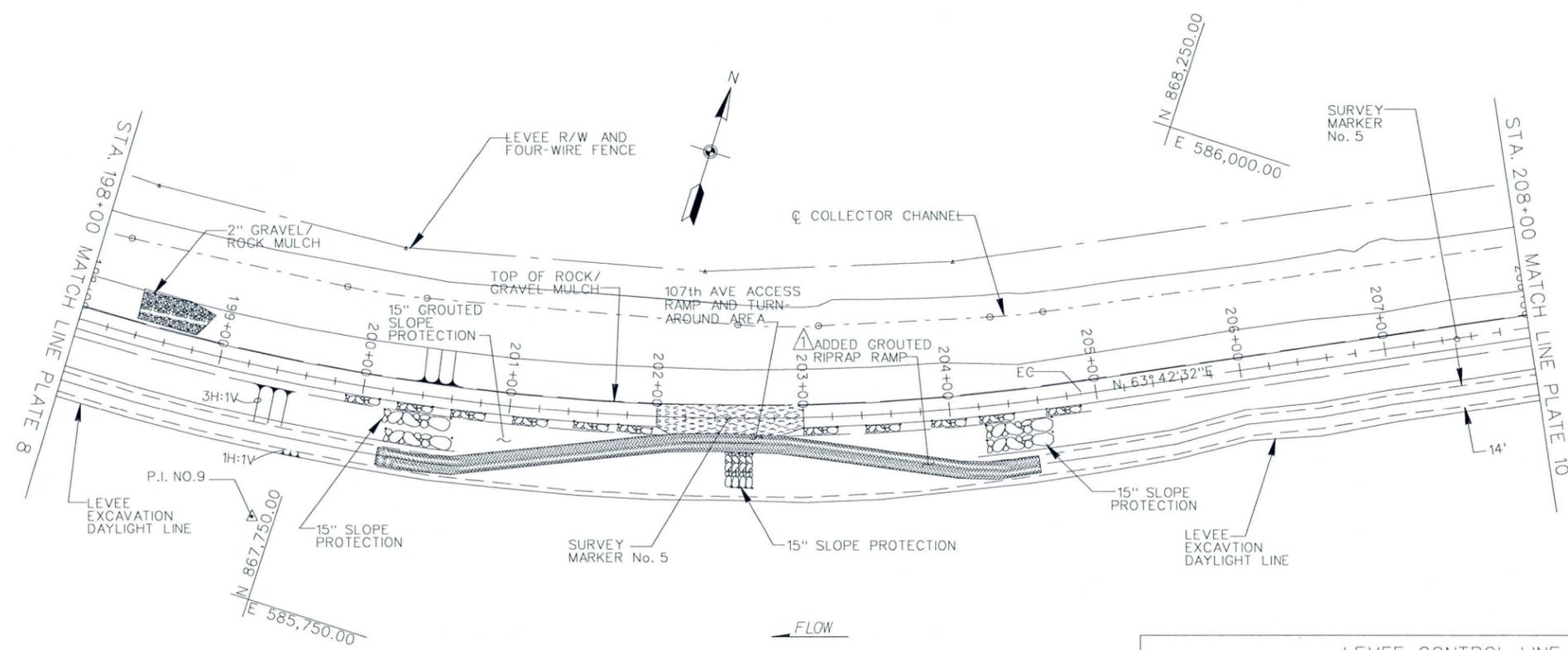
SYMBOL	DESCRIPTIONS	DATE	APPROVAL

DISTRICT FILE NO. 203/326
 SPEC. NO. #92PL-05-B0004



LEVEE CONTROL LINE AND TOE-DOWN PROFILE

HORIZ. SCALE: 1" = 50'
VERT. SCALE: 1" = 10'

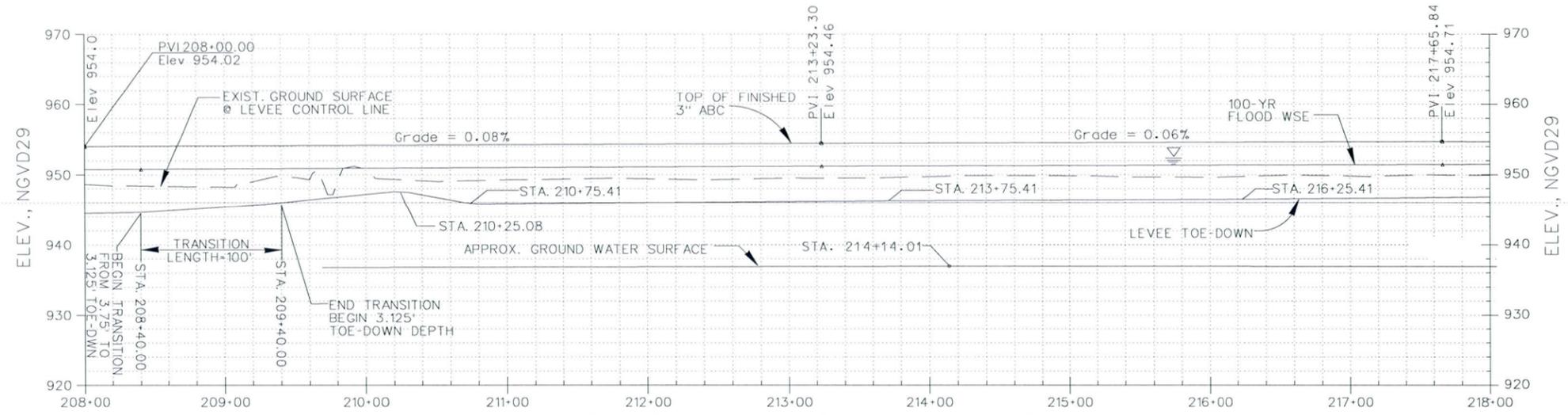


PLAN
SCALE: 1 IN. = 50 FT.
SCALE: 1" = 50'

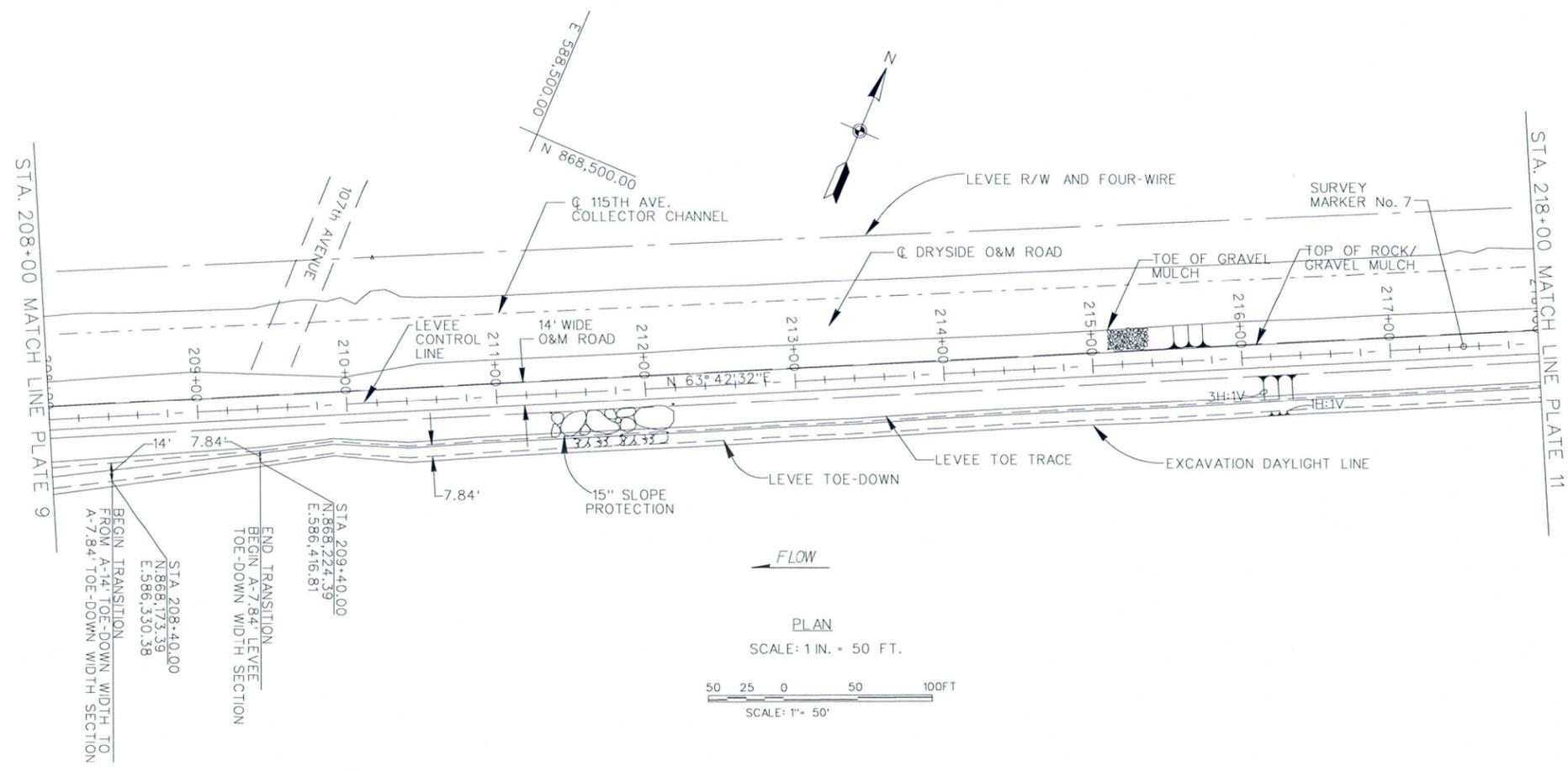
LEVEE CONTROL LINE HORIZONTAL CURVE DATA								
P.I. NO.	NORTHING	EASTING	Δ°	R(ft)	T(ft.)	L(ft)	B.C. Sta.	E.C. Sta.
9	867,792.14	585,460.51	42° 13' 34"	1,550.00	598.50	1142.33	193+47.54	204+89.67

REVISED
AS-BUILT

SCALE: 50:1	U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	DISTRICT FILE No. 203/327	SPEC. NO. W92PL-05-B0004	ADDED GROUDED RIPRAP RAMP	DATE	APPROVAL
				REMOVED GROUDED SLOPE PROTECTION NOTES	DATE	APPROVAL
SCALE: 9	U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	DISTRICT FILE No. 203/327	SPEC. NO. W92PL-05-B0004	TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) LEVEE PLAN AND PROFILE STA. 198+00 TO 208+00		



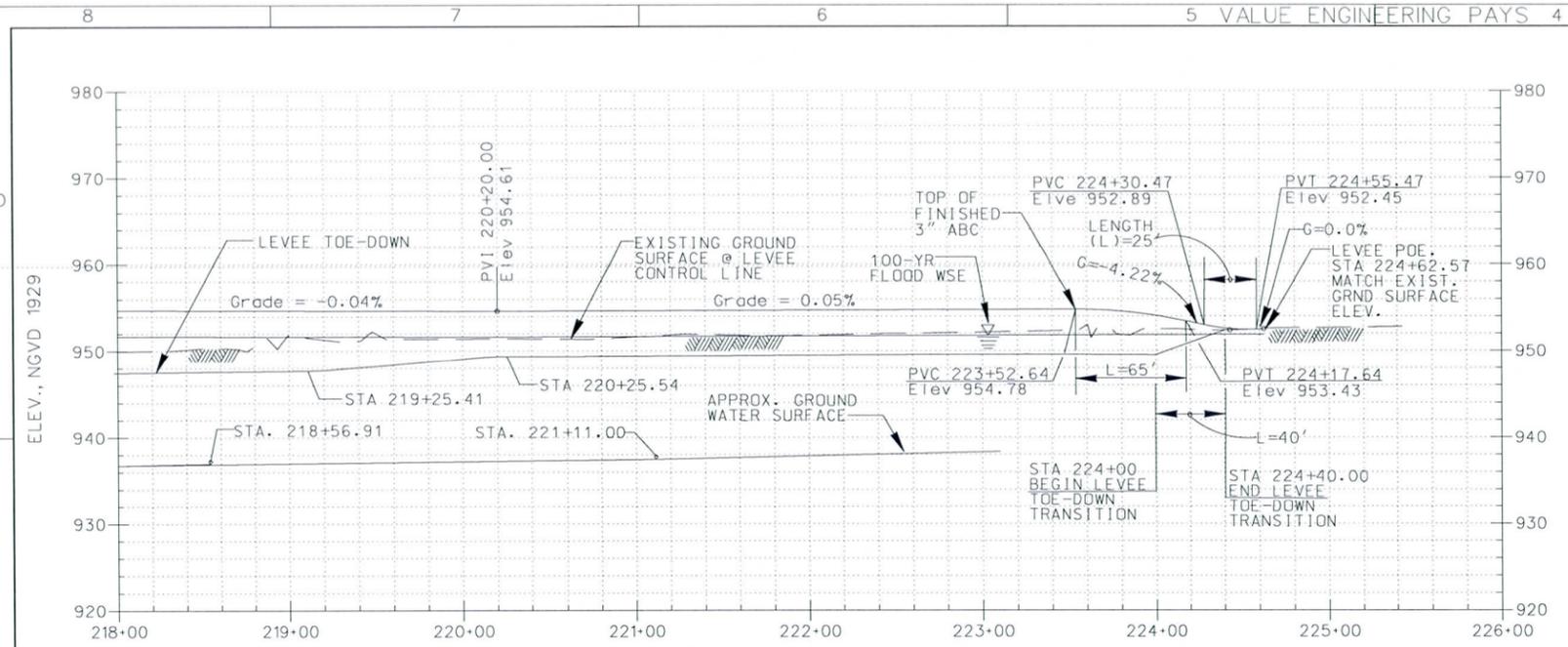
LEVEE CONTROL LINE AND TOE-DOWN PROFILE
 HORIZ. SCALE: 1" = 50'
 VERT. SCALE: 1" = 10'



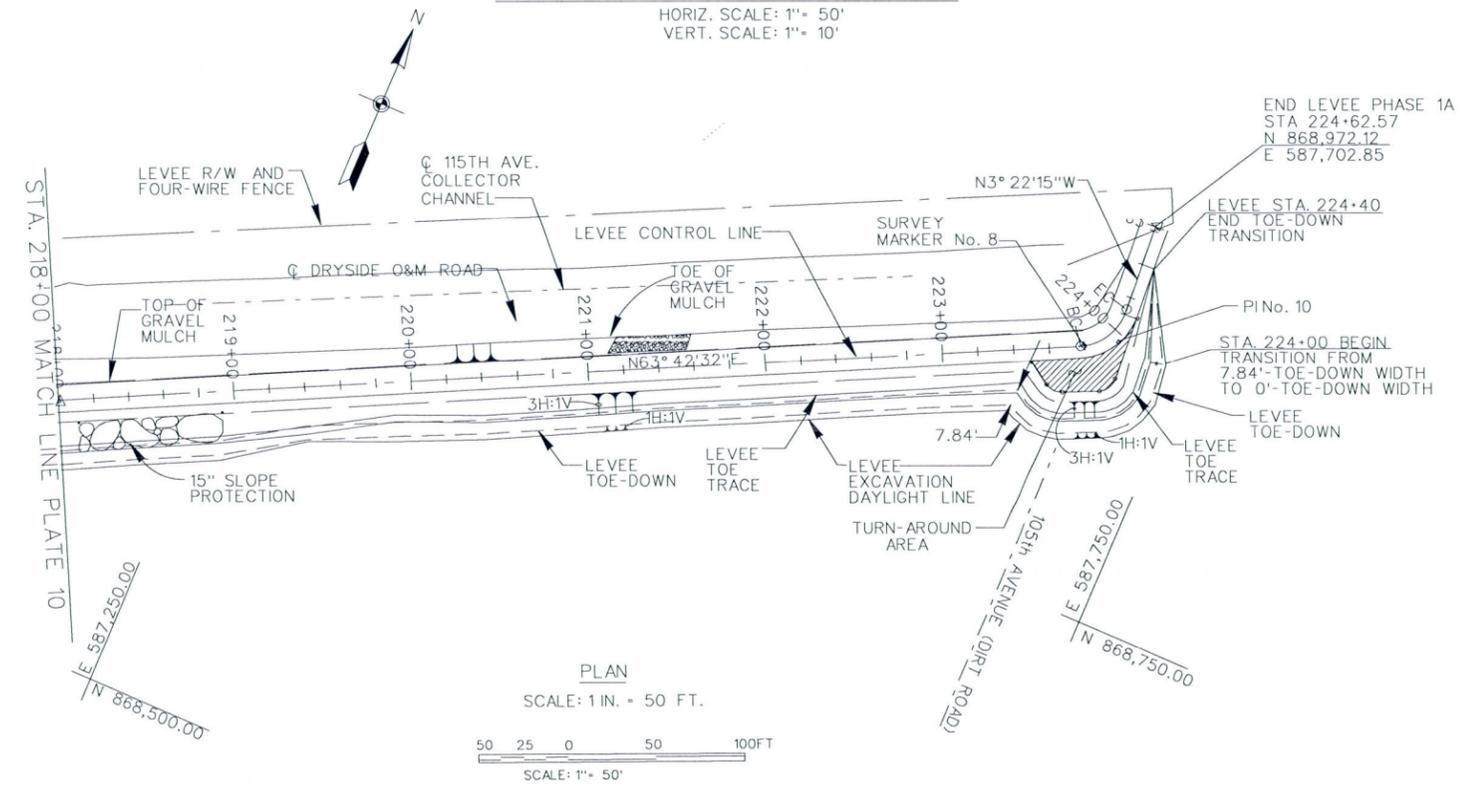
PLAN
 SCALE: 1 IN. = 50 FT.
 SCALE: 1" = 50'

U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS		TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.)	
SCALE	50:1	SYMBOL	DESCRIPTIONS
PLATE	10	DATE	APPROVAL
DISTRICT FILE No. 203/338		SPEC. NO. W92P1-05-80004	
LEVEE PLAN AND PROFILE STA. 208+00 TO STA. 218+00			

AS-BUILT



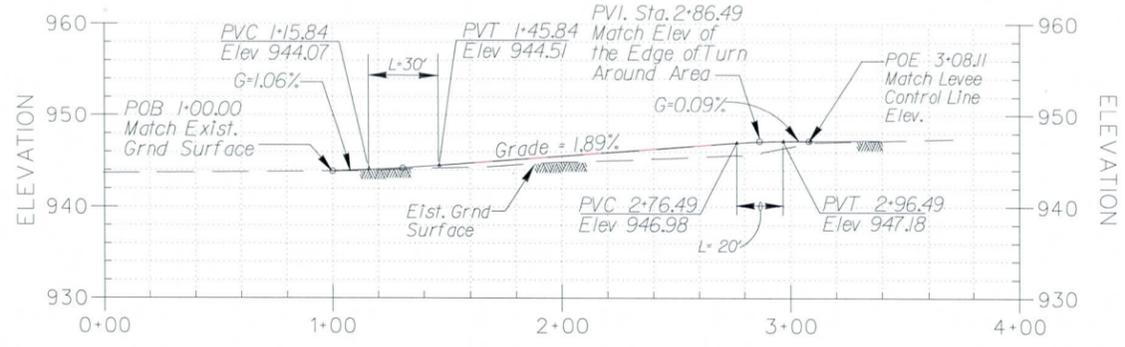
LEVEE CONTROL LINE AND TOE-DOWN PROFILE
 HORIZ. SCALE: 1" = 50'
 VERT. SCALE: 1" = 10'



PLAN
 SCALE: 1 IN. = 50 FT.
 SCALE: 1" = 50'

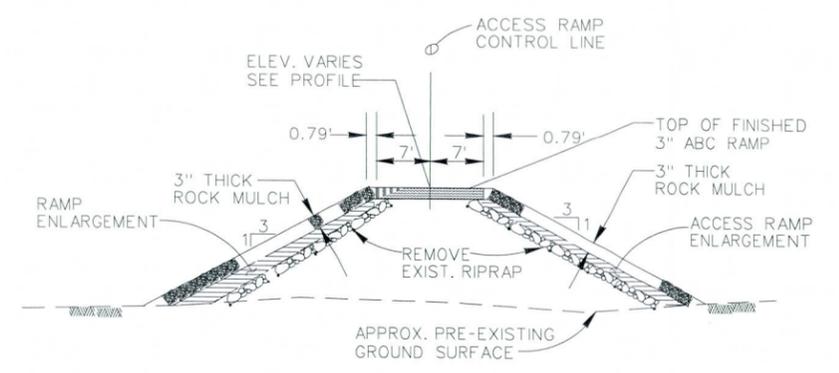
AS-BUILT

SCALE: 50'	TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) LEVEE PLAN AND PROFILE STA. 218+00 TO STA. 224+62.57		
	U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS		
PLATE 11	DISTRICT FILE No. 203/139	SPEC. NO. W922PI-05-B0004	
	SYMBOL	DESCRIPTIONS	DATE
			APPROVAL



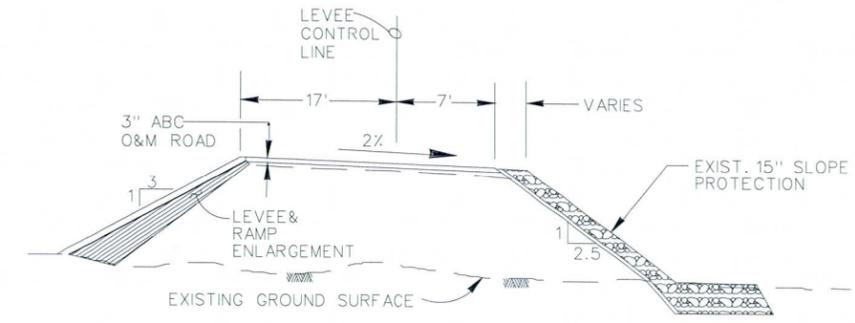
115TH AVE. ACCESS RAMP Q. PROFILE

SCALE: VERT. 1 IN. = 10 FT.
SCALE: HORIZ. 1 IN. = 40 FT.

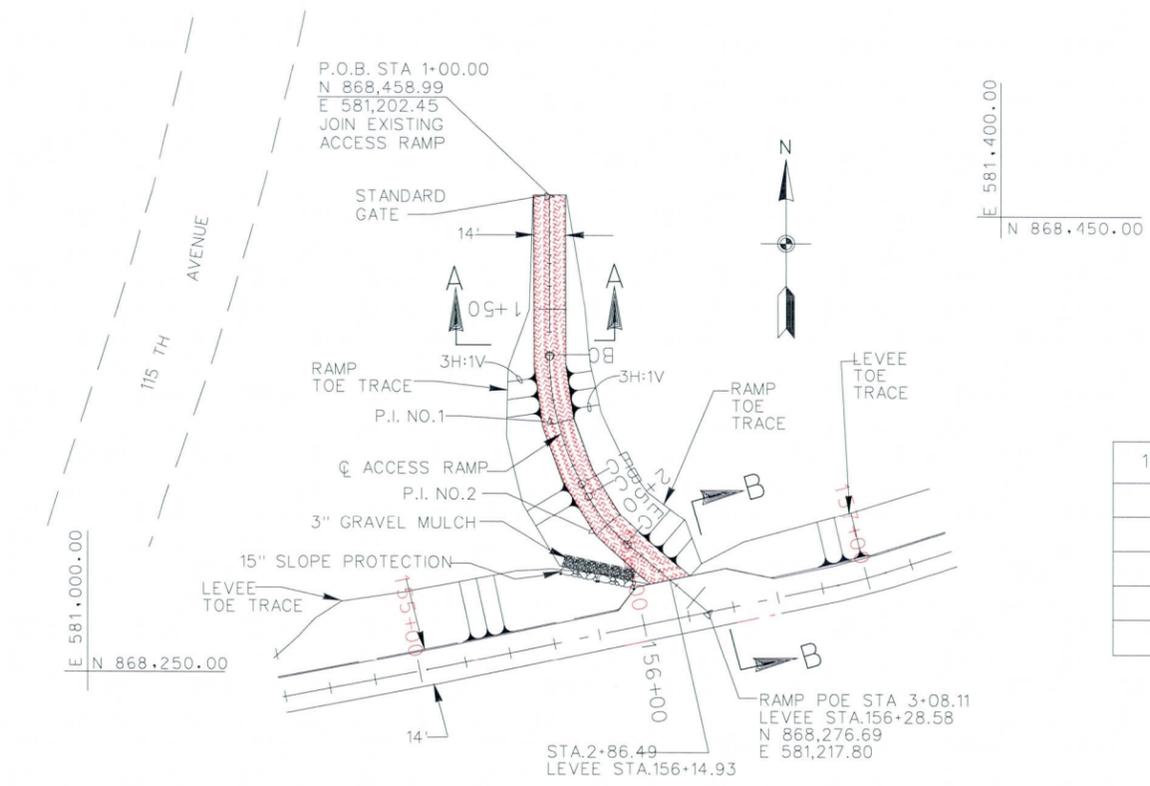


SECTION A-A
N.T.S.

P.I. NO.	NORTHING	EASTING	Δ°	R(ft)	T(ft.)	L(ft)	B.C. Sta.	E.C. Sta.
1	868,359.38	581,202.42	27° 43'55" LF	120.00	29.62	58.08	1+69.99	2+28.07
2	868,315.39	581,225.52	22° 22'58" LT	70.00	13.58	27.35	2+34.29	2+61.63



SECTION B-B
LEVEE STA. 156+00 TO STA 156+40
N.T.S.

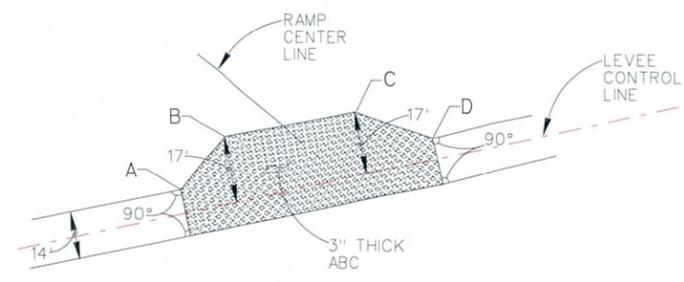


115TH AVE. ACCESS RAMP PLAN

SCALE: 1 IN. = 40 FT.



POINT	LEVEE STA.	NORTHING	EASTING
A	155+90.00	868,277.10	581,323.30
B	156+00.00	868,287.49	581,240.35
C	156+40.00	868,295.66	581,279.50
D	156+60.00	868,291.40	581,300.82



ENLARGED TURNAROUND AREA DETAIL
N.T.S.

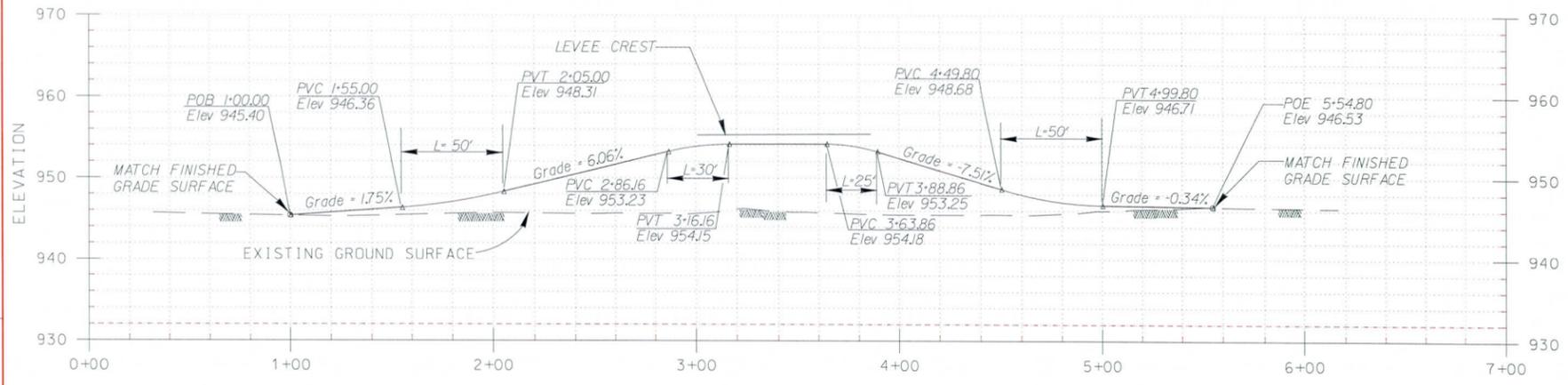
SYMBOL	DESCRIPTIONS	DATE	APPROVAL

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
ENVIRONMENTAL RESTORATION
FLOOD CONTROL NORTH LEVEE
PHASE 1A (115TH AVE. TO 105TH AVE.)
115th AVENUE ACCESS RAMP
PLAN, PROFILE, SECTION AND DETAIL

SCALE	PLATE
40:1	12

SPEC. NO. W92PL-05-B0004
DISTRICT FILE No. 203/339

AS-BUILT

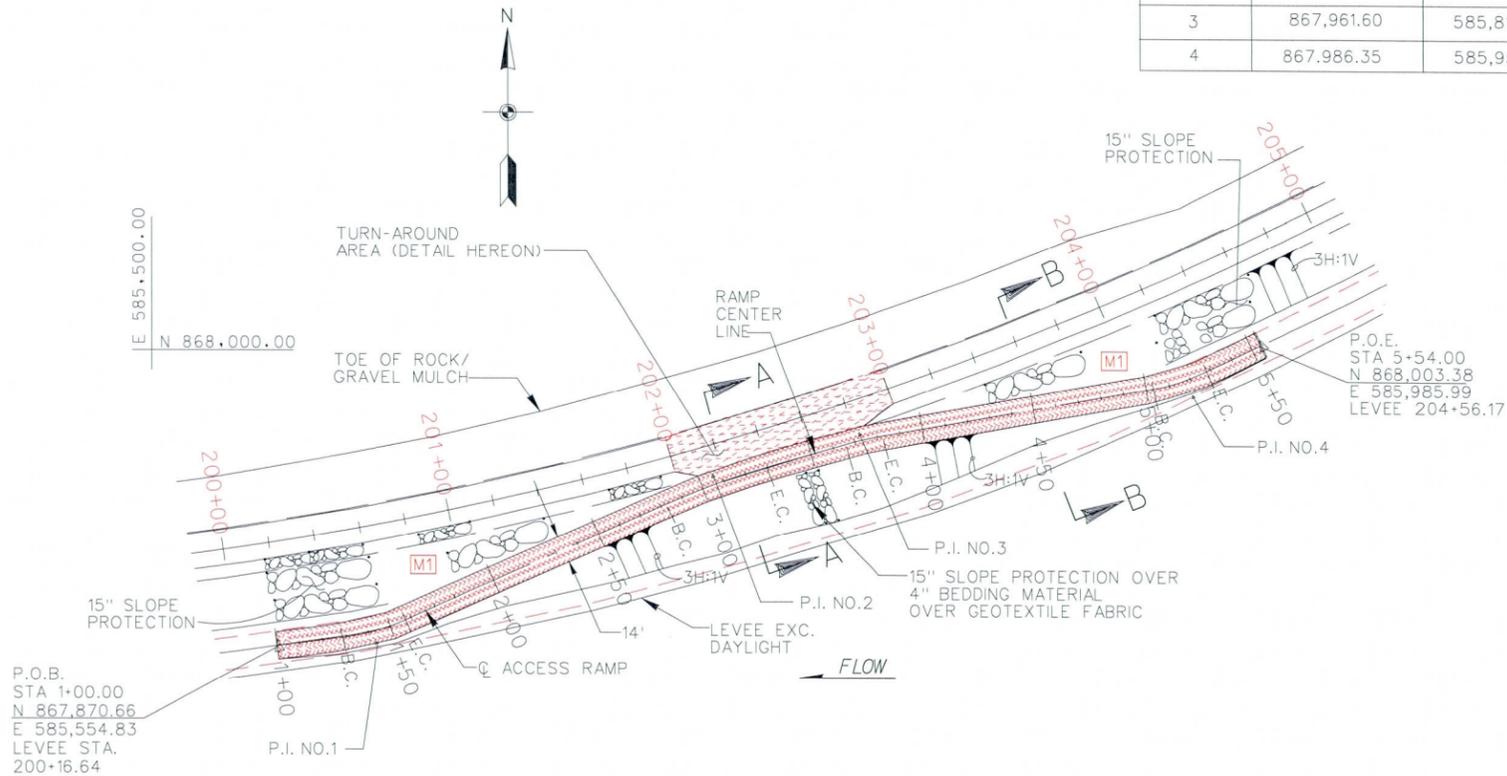


107TH AVE. ACCESS RAMP @ PROFILE

SCALE: VERT. 1 IN. = 10 FT.
SCALE: HORIZ. 1 IN. = 40 FT.

107TH AVE. ACCESS RAMP @ HORIZONTAL CURVE DATA

P.I. NO.	NORTHING	EASTING	Δ°	R(ft)	T(ft.)	L(ft)	B.C. Sta.	E.C. Sta.
1	867,876.33	585,597.80	16° 28' 02" LF	100.00	28.88'	28.74'	1+28.88	1+57.62
2	867,942.62	585,746.77	7° 43' 35" RT	350.00	124.94	47.20	2+82.56	3+29.76
3	867,961.60	585,811.83	6° 10' 51" RT	150.00	36.04	16.18	3+65.80	3+81.98
4	867,986.35	585,951.07	15° 54' 26" LF	90.00	120.76	24.99	5+02.74	5+27.72

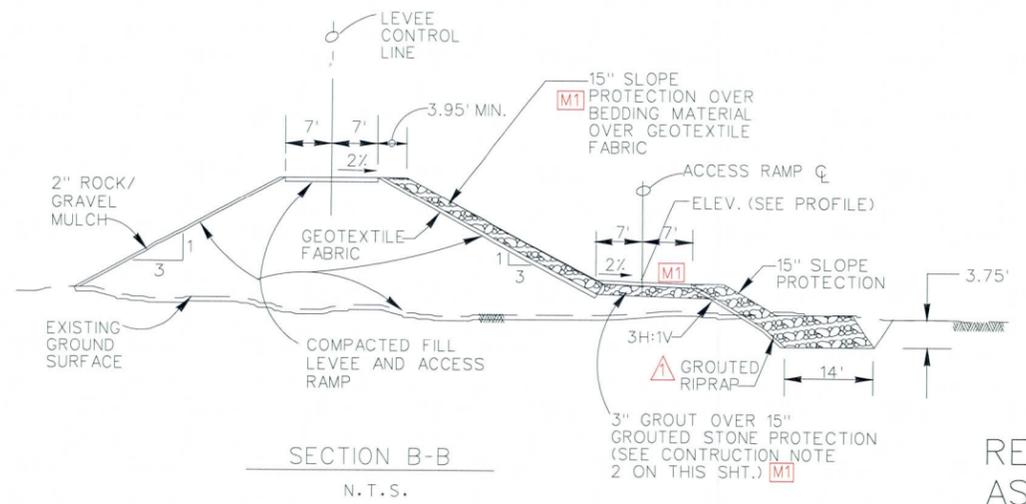
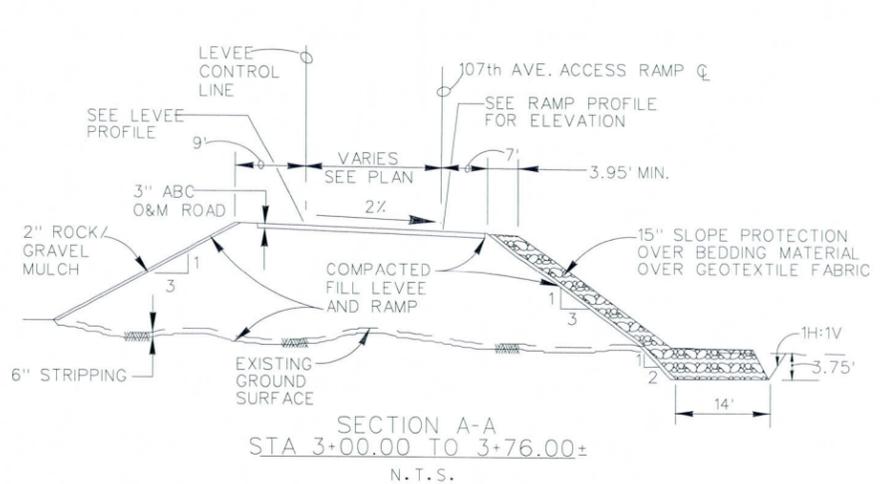
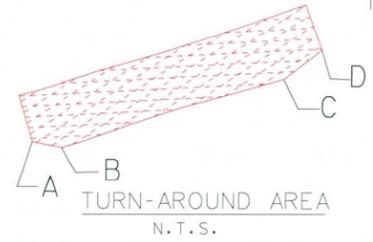


107TH AVE. ACCESS RAMP PLAN

SCALE: 1 IN. = 40 FT.
SCALE: 1" = 40'

107TH AVE. TURN AROUND HORIZ CONTROL POINTS DATA

POINT	LEVEE STA.	NORTHING	EASTING
A	202+00.00	867,947.14	585,728.83
B	202+08.67	867,945.38	585,739.08
C	202+84.65	867,967.58	585,812.11
D	203+00.00	867,977.50	585,824.65



REVISED AS-BUILT

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
▲	Added Grouted Riprap Removed Grouted Slope Protection Ramps		
M1	MODIFIED THE DWG BY DELETING GROUT AND 3" ABC FOR THE RAMP UPPER SLOPE AND THE DAM ROAD RESPECTIVELY. ADDED 15" GROUTED STONE AND 3" THICK GROUT FOR THE ENTIRE DAM ROAD SURFACE.		

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
ENVIRONMENTAL RESTORATION
FLOOD CONTROL NORTH LEVEE
PHASE 1A (115TH AVE. TO 105TH AVE.)

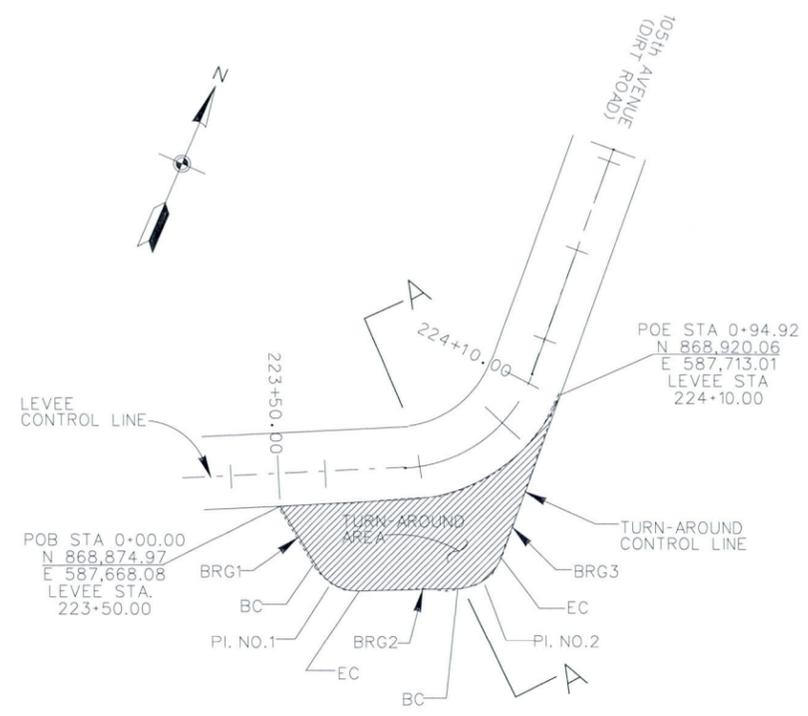
107TH AVE. ACCESS RAMP
PLAN, PROFILE AND SECTIONS

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SPEC. NO. W912PL-05-B0004

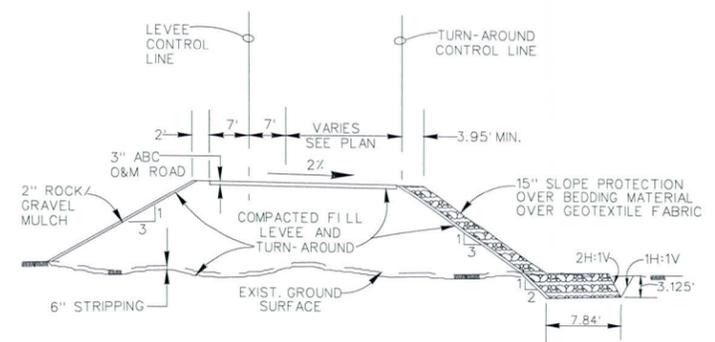
DISTRICT FILE No. 203/340

SCALE: 40:1	PLATE 13
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TURN-AROUND AREA PLAN
N.T.S.

TURN-AROUND CONTROL LINE HORIZONTAL CURVE DATA									BEARING TANGENT	
P.I. NO.	NORTHING	EASTING	Δ°	R(ft.)	T(ft.)	L(ft.)	B.C. Sta.	E.C. Sta.	BRG1	Bearing
1	868,862.81	587,685.23	60° 12' 14" LF	10.00	5.80	10.51	0+15.23	0+25.73	BRG2	N65° 07' 19" E
2	868,876.84	587,715.49	68° 24' 29" LF	10.00	6.80	11.94	0+46.49	0+58.43	BRG3	N3° 17' 10" W



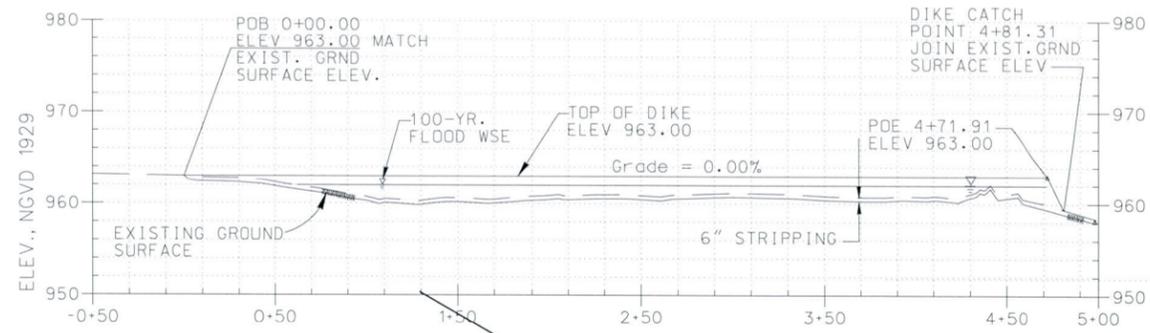
SECTION A-A TYP
RAMP STA. 00+00.00 TO STA. 0+94.92
LEVEE STA. 223+50.00 TO STA. 224+10.00
N.T.S.

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

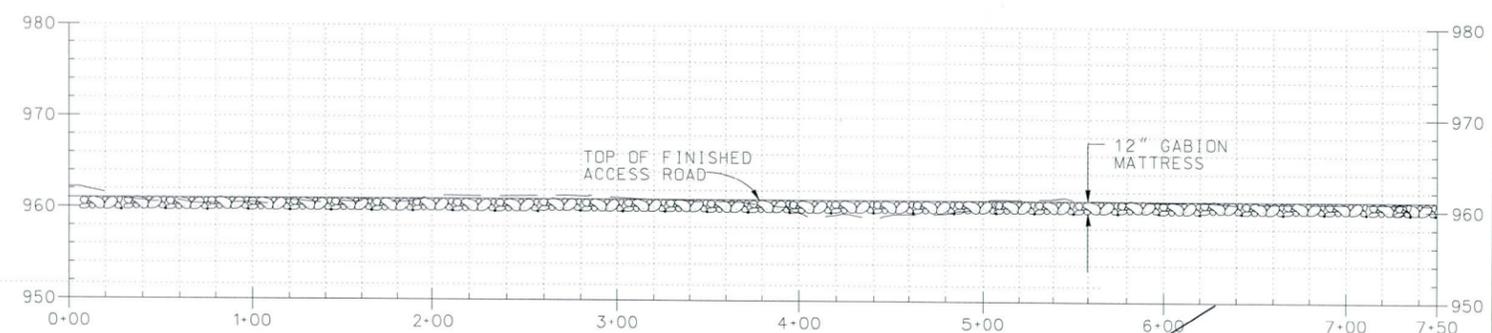
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
ENVIRONMENTAL RESTORATION
FLOOD CONTROL NORTH LEVEE
PHASE 1A (115TH AVE. TO 105TH AVE.)
105TH AVE. TURN-AROUND AREA PLAN AND SECTION

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS
DISTRICT FILE No. 203/241
SPEC. NO. W92PL-05-B0004
SCALE: 50:1
PLATE 14

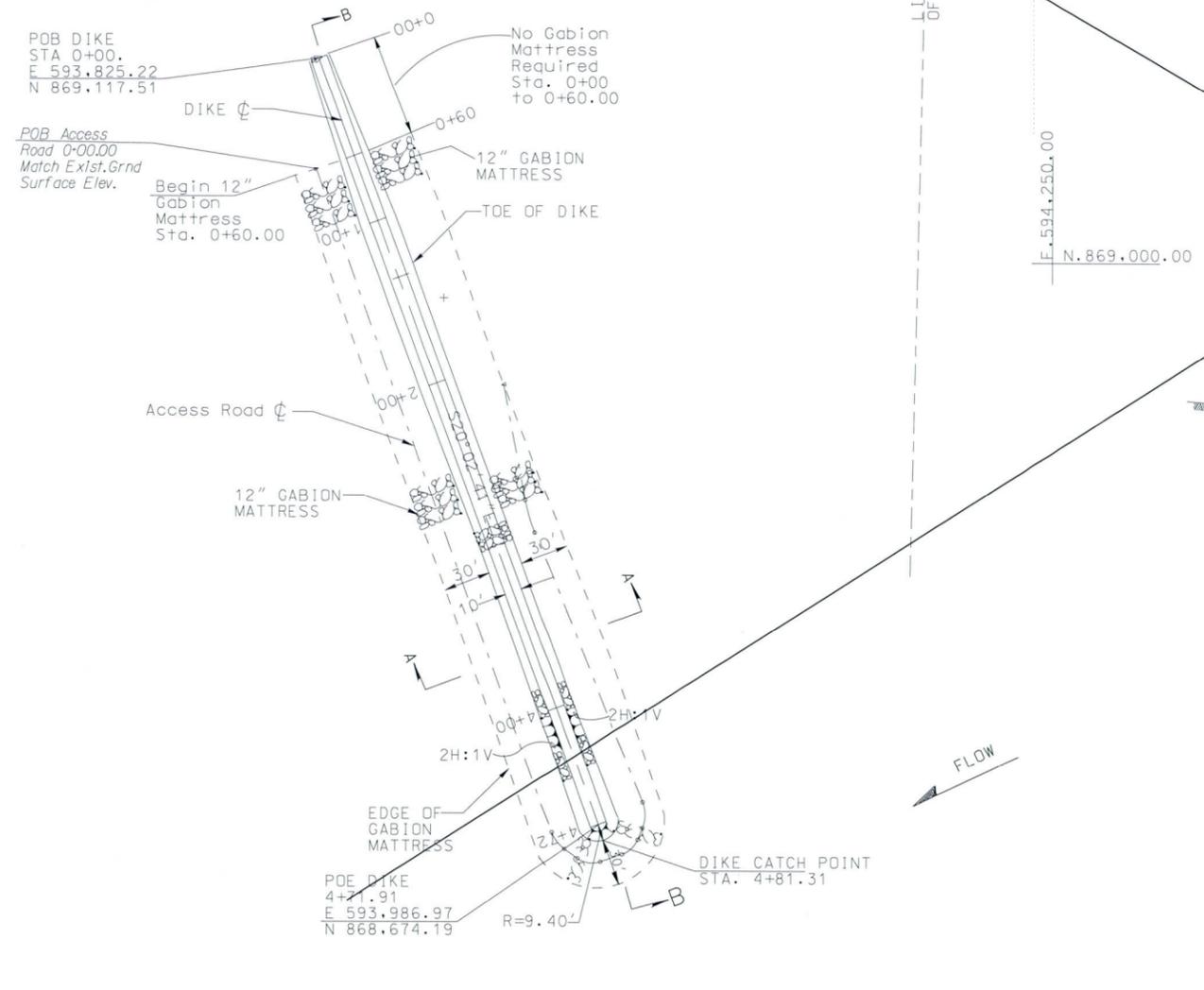
AS-BUILT



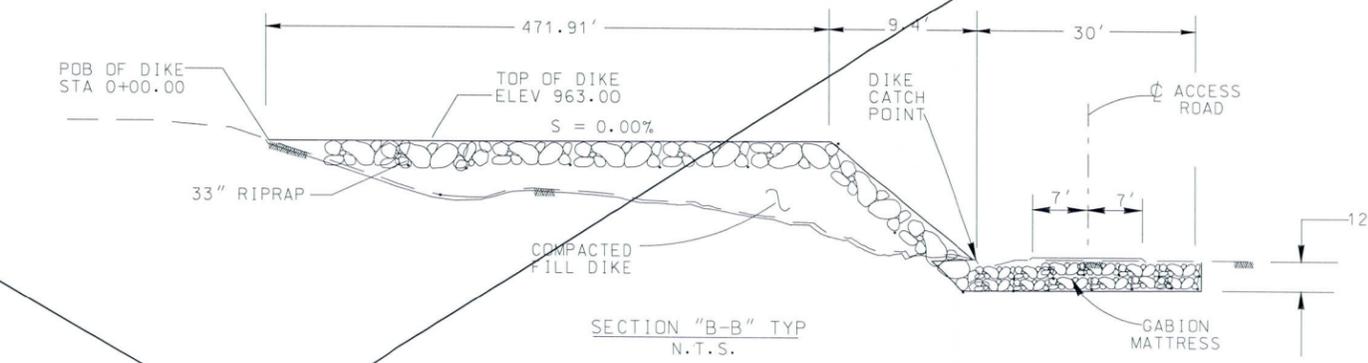
DIKE C PROFILE
VERT. SCALE: 1" = 10'
HORIZ. SCALE: 1" = 100'



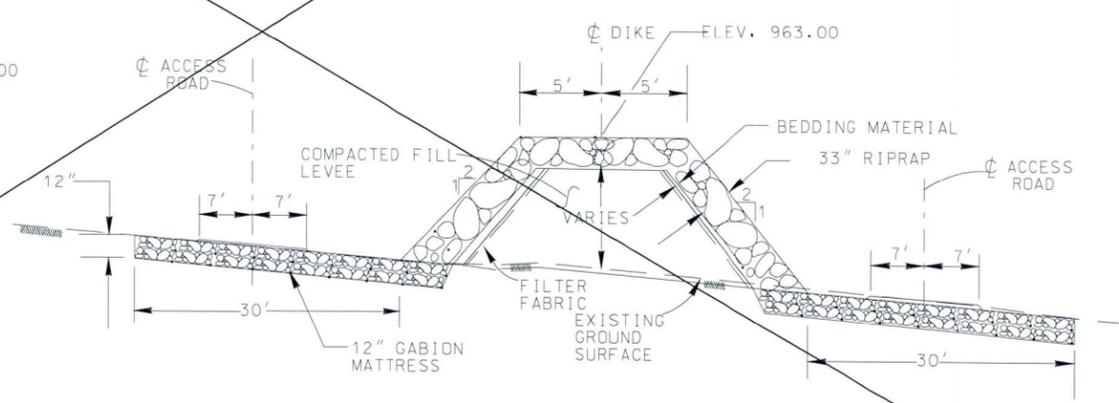
ACCESS ROAD C PROFILE
VERT. SCALE: 1" = 100'
HORIZ. SCALE: 1" = 200'



95th AVENUE DIKE AND ACCESS ROAD PLAN
SCALE: 1" = 50'



SECTION "B-B" TYP
N.T.S.



SECTION "A-A" TYP

ACCESS ROAD C HORIZ. CONTROL DATA							
P. I. No	NORTHING	EASTING	BEARING ANGLE	Δ	R	T	L
POB	869,053.43	593,823.69					
1	868,663.64	593,961.81	S19°30'43"E	35°13'58"L+	20.00'	6.35'	12.30'
2	868,650.14	593,980.91	S54°44'41"E	54°12'51"L+	15.00'	7.68'	14.19'
3	868,659.18	594,007.22	N71°02'27"E	48°33'01"L+	15.00'	6.76'	12.71'
4	868,679.63	594,015.69	N22°29'27"E	44°18'09"L+	20.00'	8.14'	15.46'
5	868,852.23	593,946.61	N21°48'42"W	11°11'50"R+	100.00'	9.80'	19.54'
POE	868,928.66	593,932.29	N10°36'52"W				

DELETED

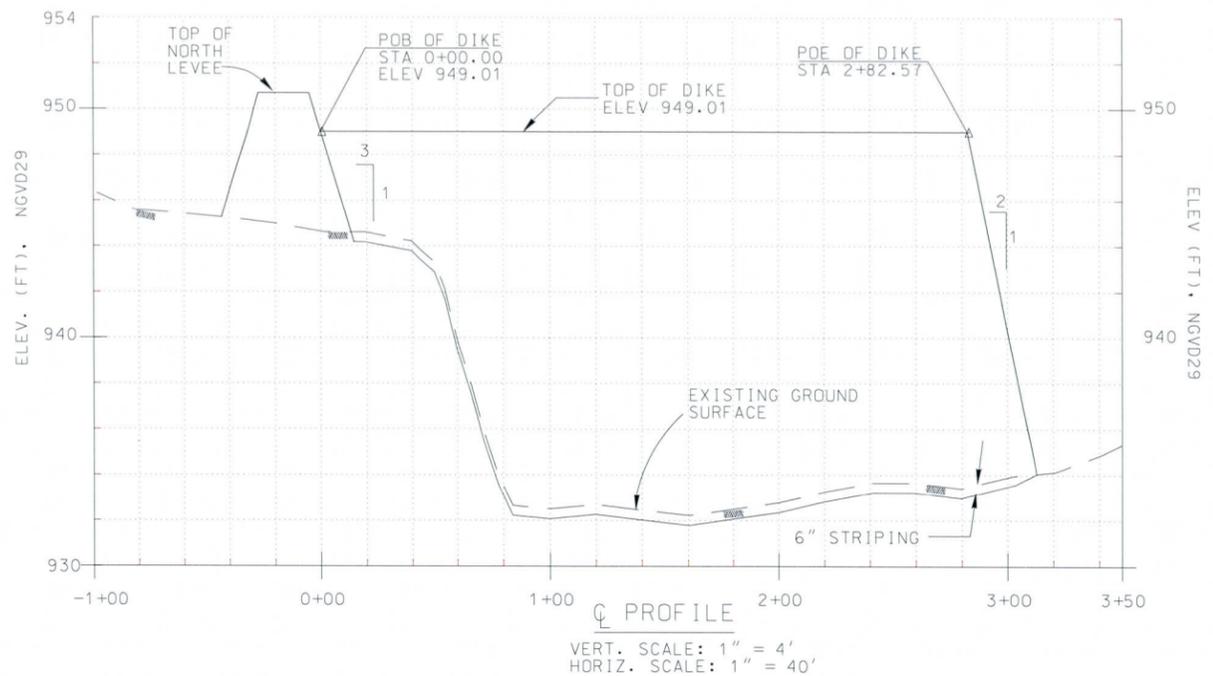
TRES RIOS RIVER, MARICOPA COUNTY, ARIZONA
ENVIRONMENTAL RESTORATION
FLOOD CONTROL NORTH LEVEE
PHASE 1A (115TH AVE. TO 105TH AVE.)
95th AVENUE DIKE AND ACCESS ROAD
PLANS, PROFILES AND SECTIONS

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

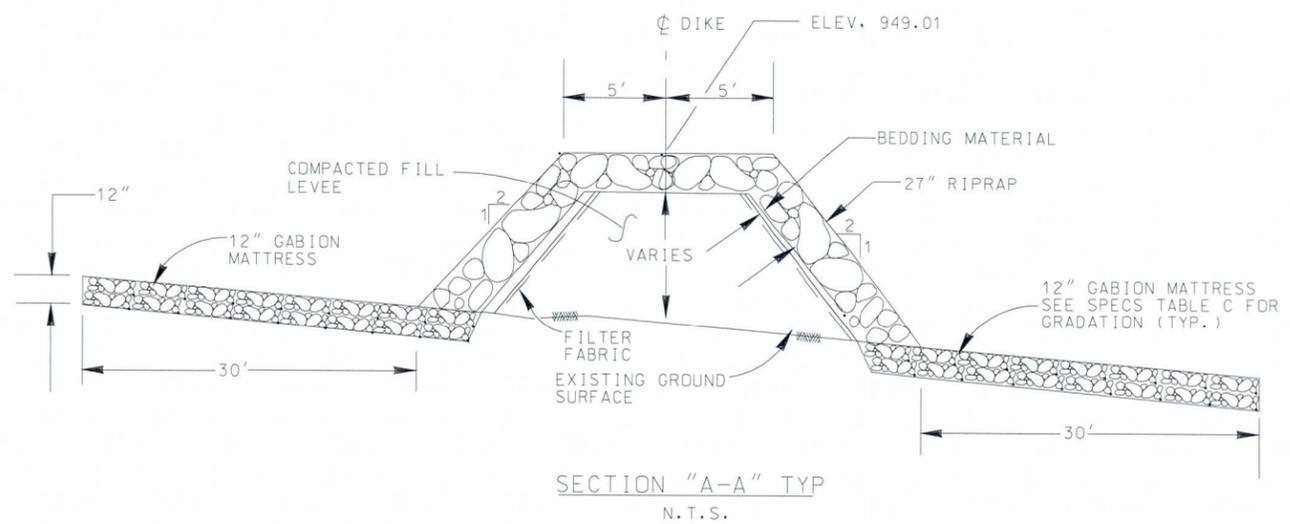
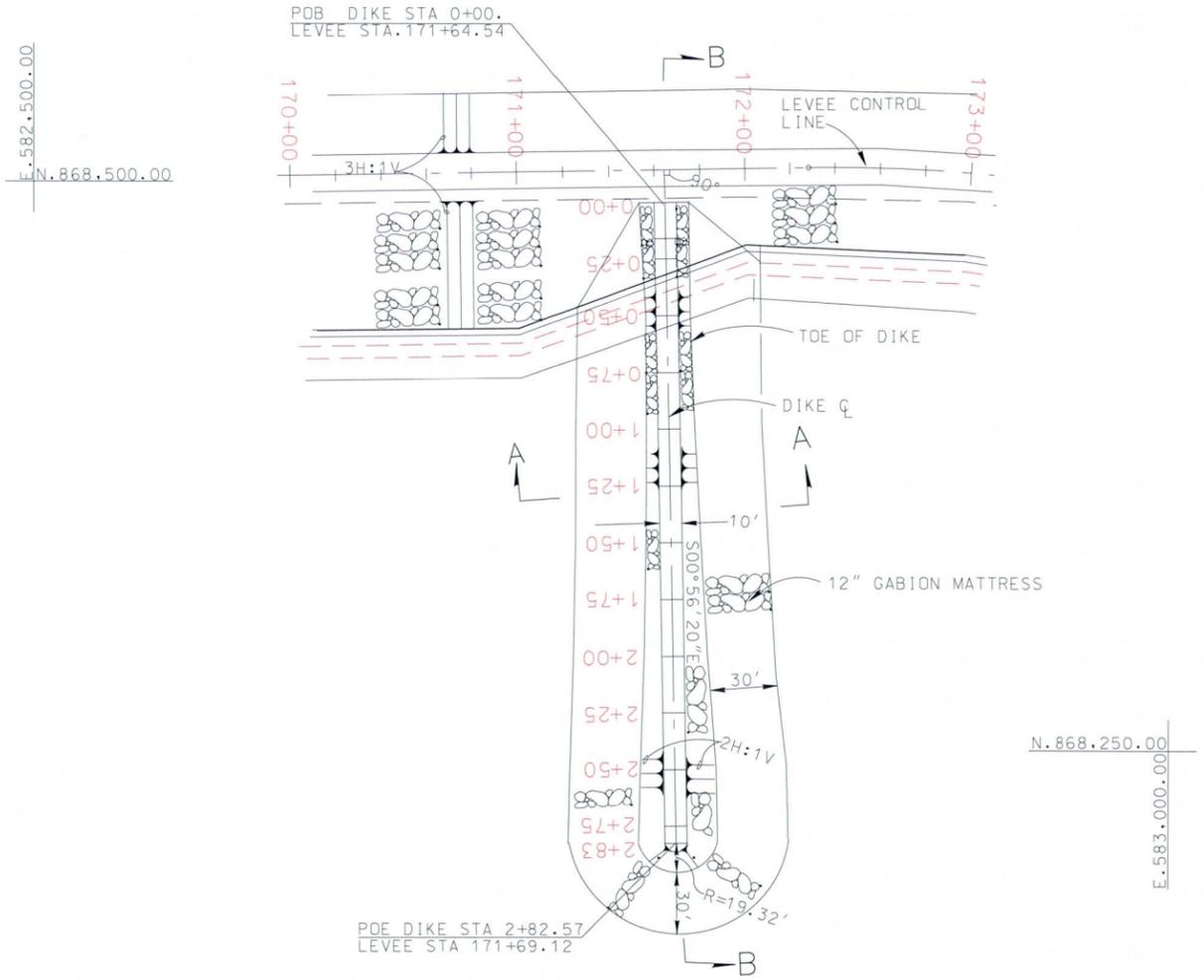
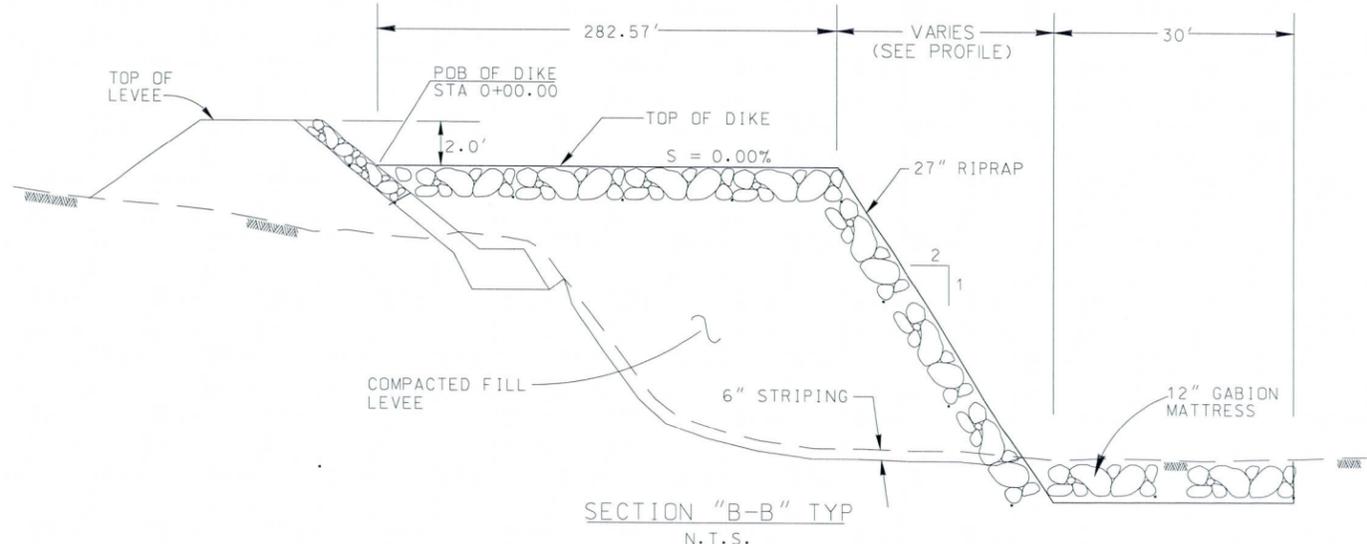
SCALE: 40:1
PLATE 15

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

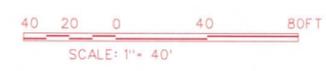
DISTRICT FILE No. 2037442 SPEC. NO. W92PL-05-B0004



DIKE NO.2 @ HORIZ. CONTROL DATA			
POINT	NORTHING	EASTING	BEARING ANGLE
P.O.B.	868.491.13	582.778.22	S00°56'20"E
P.O.E.	868.208.60	582.782.85	



EAST 113th AVENUE DIKE PLAN
SCALE: 1" = 40'



AS-BUILT

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
ENVIRONMENTAL RESTORATION
FLOOD CONTROL NORTH LEVEE
PHASE 1A (115TH AVE. TO 105TH AVE.)

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

DISTRICT FILE No. 203/343
SPEC. NO. W92PL-05-B0004

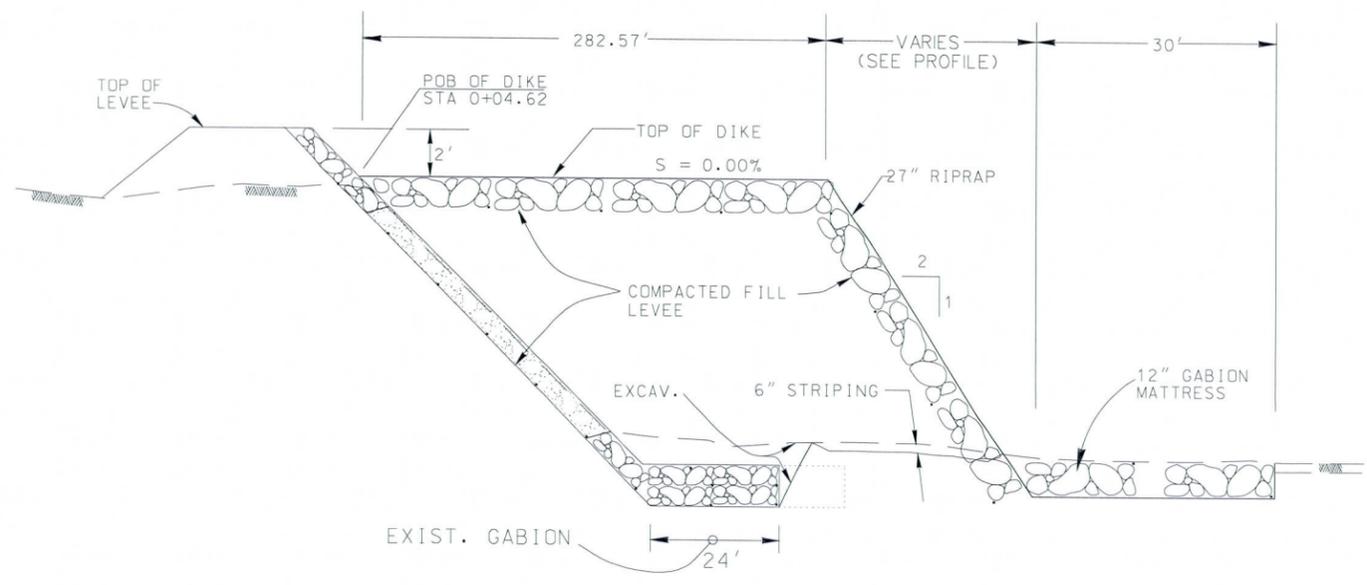
SYMBOL	DESCRIPTIONS	DATE	APPROVAL

EAST 113th AVENUE DIKE
PLAN, PROFILE AND SECTIONS

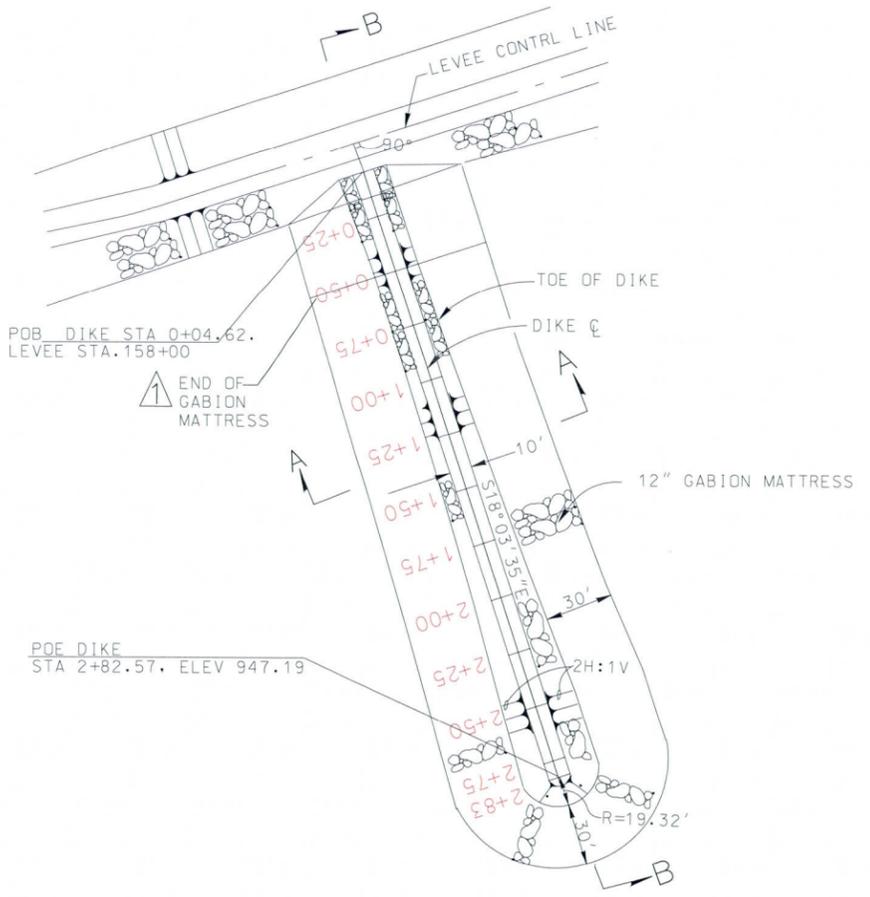


PROFILE
 VERT. SCALE: 1" = 4'
 HORIZ. SCALE: 1" = 40'

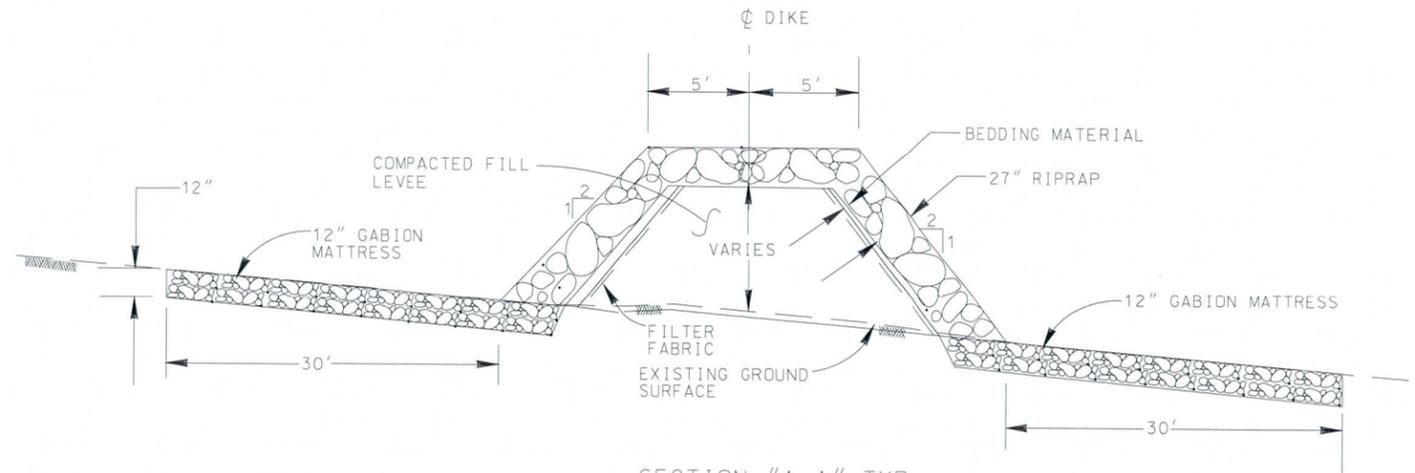
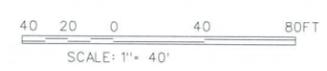
DIKE NO. 4 Q HORIZ. CONTROL DATA			
POINT	NORTHING	EASTING	BEARING ANGLE
P.O.B.	868,309.86	581,440.84	S18°03'35"E
P.O.E.	868,045.60	581,527.02	



SECTION "B-B" TYP
 N.T.S.



EAST 115th AVENUE DIKE PLAN
 SCALE: 1" = 40'



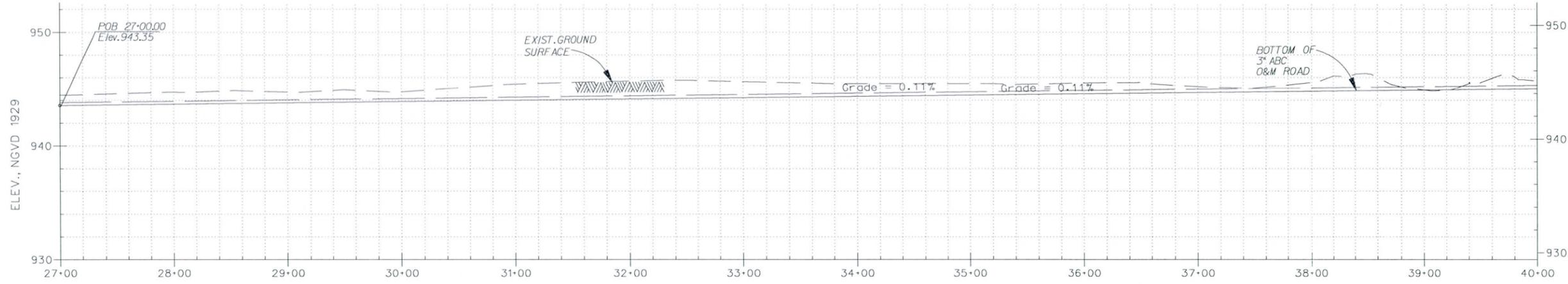
SECTION "A-A" TYP
 N.T.S.

REVISED
 AS-BUILT

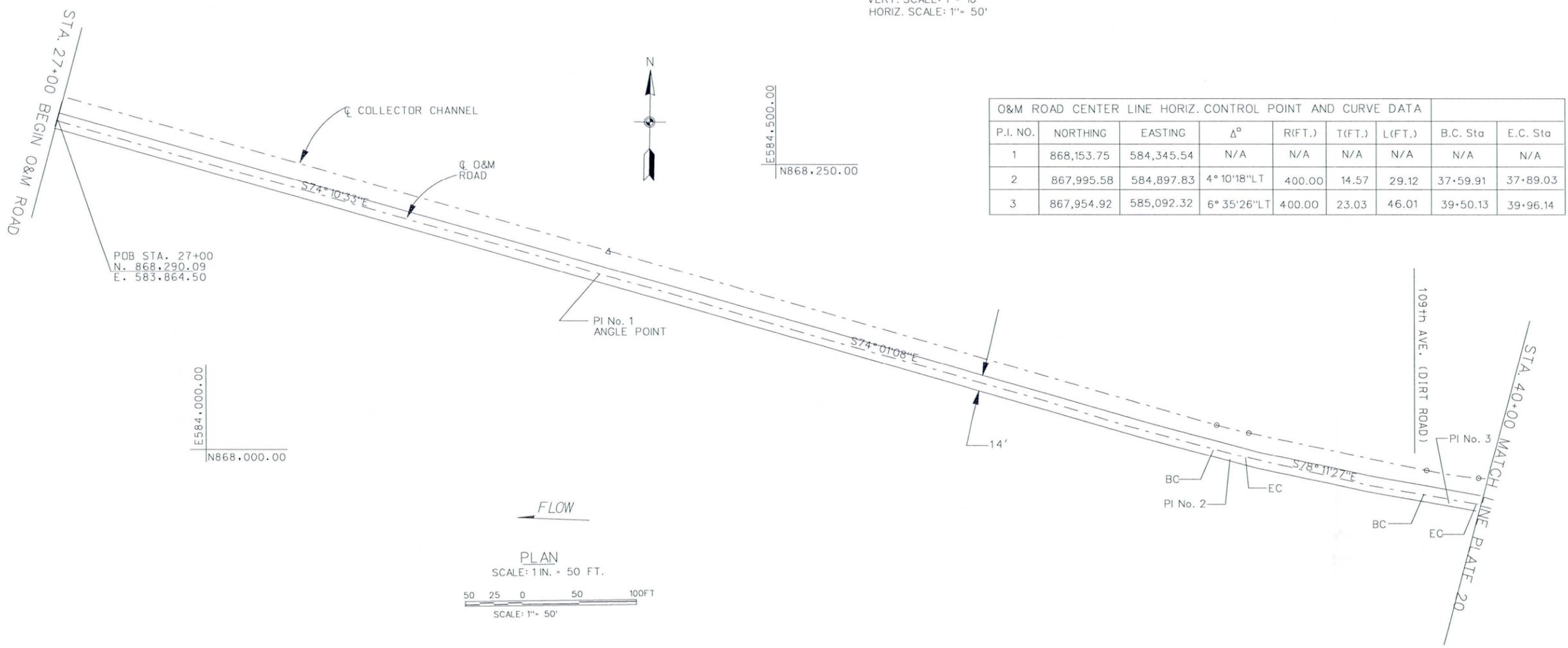
DATE	APPROVAL	DESCRIPTIONS	SYMBOL
3/20/08	MJH	Revised e. 115th Ave. Dike Plan	A

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 1A (115TH AVE. TO 105TH AVE.)
 EAST 115th AVENUE DIKE
 PLAN, PROFILE AND SECTIONS

U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	DISTRICT FILE No. 203/345	SPEC. NO. W92P1-05-B0004
SCALE: 401	PLATE: 18	



DRYSIDE O&M ROAD CENTER LINE PROFILE
 VERT. SCALE: 1" = 10'
 HORIZ. SCALE: 1" = 50'

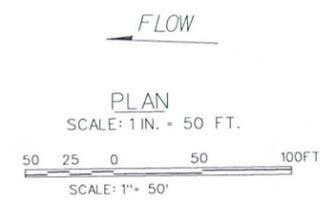


O&M ROAD CENTER LINE HORIZ. CONTROL POINT AND CURVE DATA								
P.I. NO.	NORTHING	EASTING	Δ°	R(FT.)	T(FT.)	L(FT.)	B.C. Sta	E.C. Sta
1	868,153.75	584,345.54	N/A	N/A	N/A	N/A	N/A	N/A
2	867,995.58	584,897.83	4° 10' 18" LT	400.00	14.57	29.12	37+59.91	37+89.03
3	867,954.92	585,092.32	6° 35' 26" LT	400.00	23.03	46.01	39+50.13	39+96.14

POB STA. 27+00
 N. 868,290.09
 E. 583,864.50

E584,000.00
 N868,000.00

E584,500.00
 N868,250.00

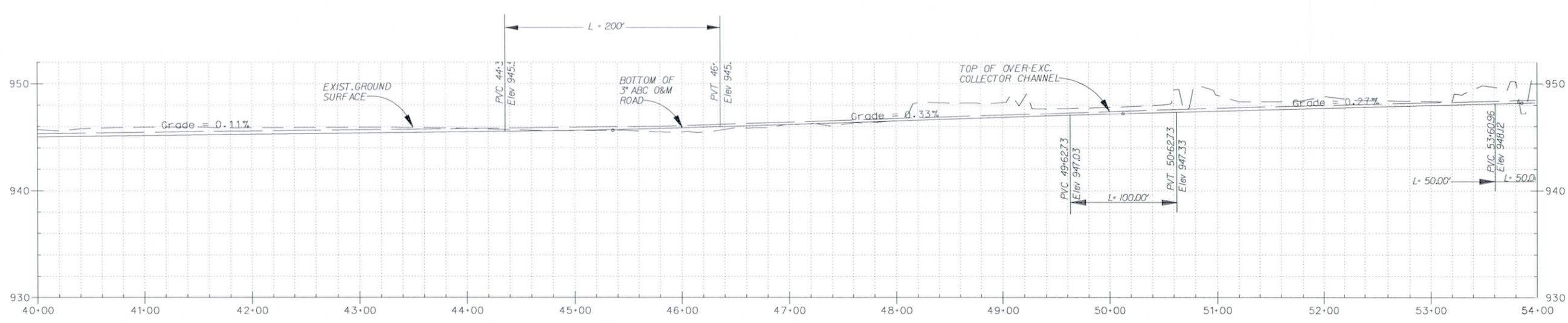


SYMBOL	DESCRIPTIONS	DATE	APPROVAL

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 1A (115TH AVE. TO 105TH AVE.)
 DRYSIDE O&M ROAD
 PLAN AND PROFILE
 STA. 27+00 TO STA. 40+00

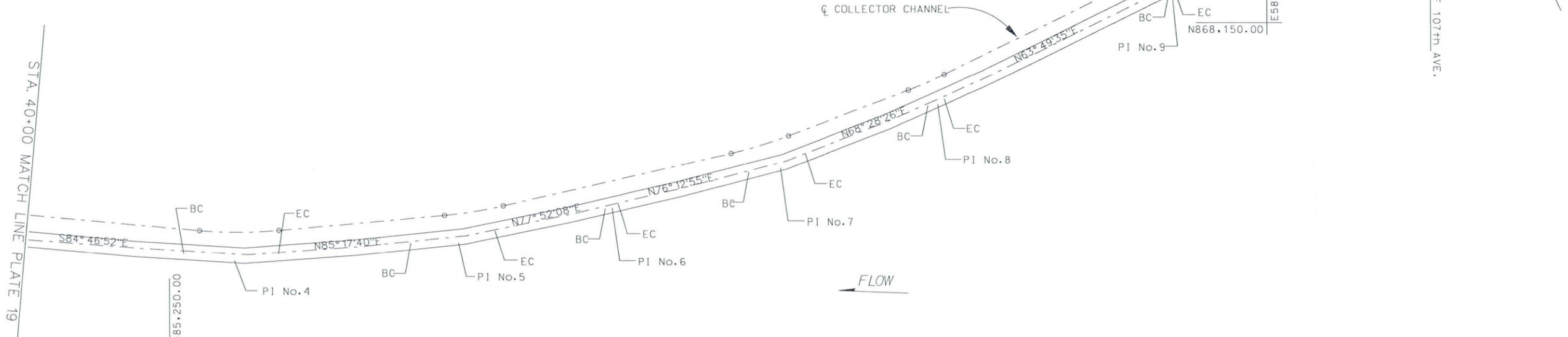
SCALE:	50'
PLATE:	19
DISTRICT FILE No.	203/346
SPEC. NO.	W92PL-05-B0004

AS-BUILT



DRYSIDE O&M ROAD CENTER LINE PROFILE
 VERT. SCALE: 1" = 10'
 HORIZ. SCALE: 1" = 50'

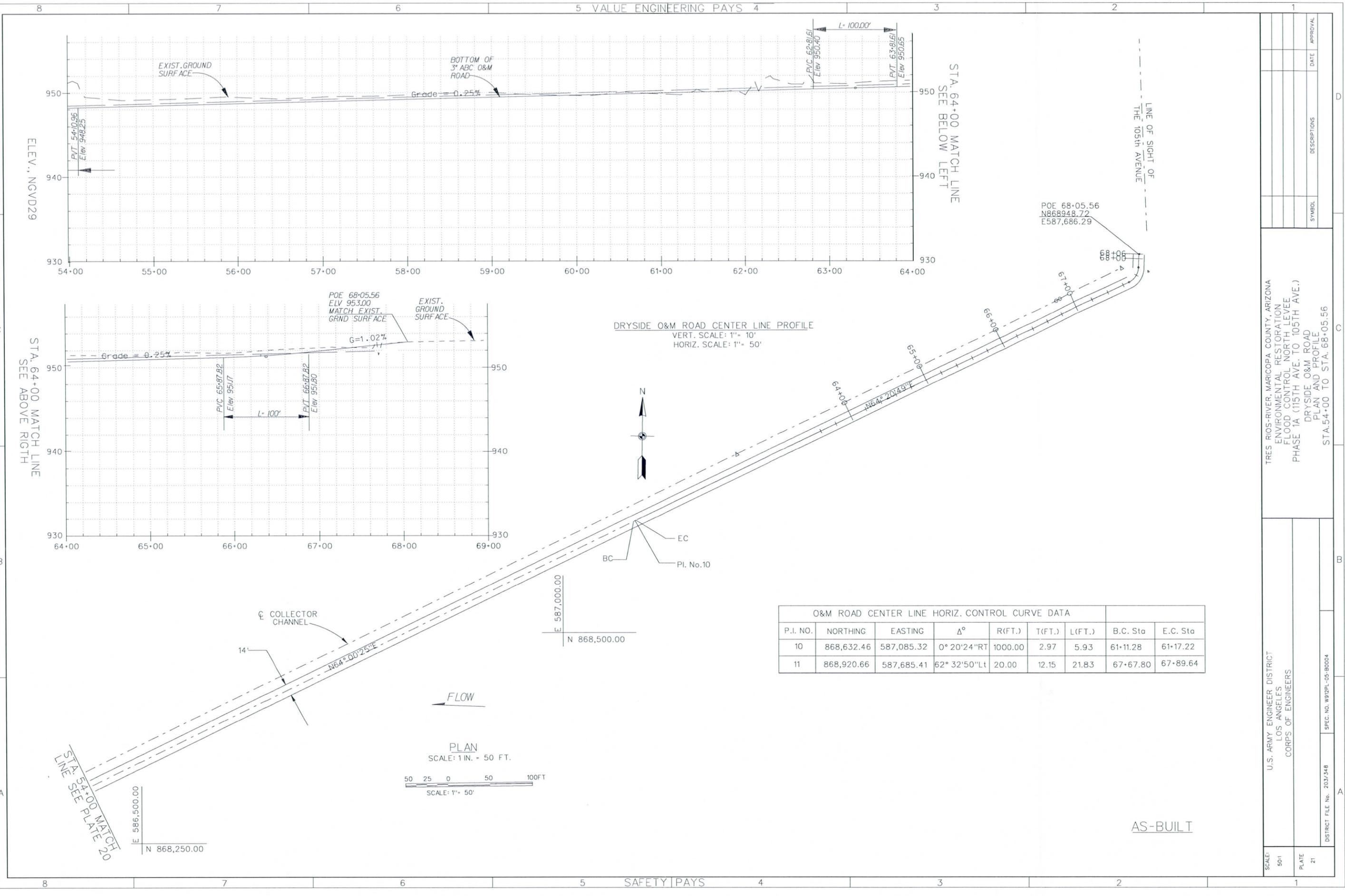
O&M ROAD CENTER LINE HORIZONTAL CURVE DATA								
P.I. NO.	NORTHING	EASTING	Δ°	R(FT.)	T(FT.)	L(FT.)	B.C. Sta	E.C. Sta
4	867,935.37	585,306.34	9° 55' 28" LT	500.00	43.41	86.61	41+44.61	42+31.22
5	867,951.99	585,508.17	7° 25' 32" LF	600.00	38.93	77.76	43+51.39	44+29.15
6	867,983.03	585,652.59	1° 39' 13" LT	400.00	5.77	11.54	45+32.16	45+43.70
7	868,020.01	585,803.33	7° 44' 30" LT	400.00	27.06	54.05	46+66.07	47+20.12
8	868,077.04	585,947.92	4° 38' 51" LT	200.00	8.12	16.22	48+40.37	48+56.59
9	868,183.16	586,163.83	0° 10' 51" RT	1000.00	1.58	3.15	50+87.48	50+90.63



PLAN
 SCALE: 1 IN. = 50 FT.
 SCALE: 1" = 50'

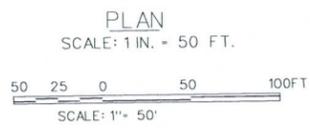
AS-BUILT

SCALE:	50'
PLATE:	20
U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) DRYSIDE O&M ROAD PLAN AND PROFILE STA. 40+00 TO STA. 54+00	
SYMBOL	DESCRIPTIONS
DATE	APPROVAL
DISTRICT FILE No. 203/347 SPEC. NO. W912PL-05-80004	



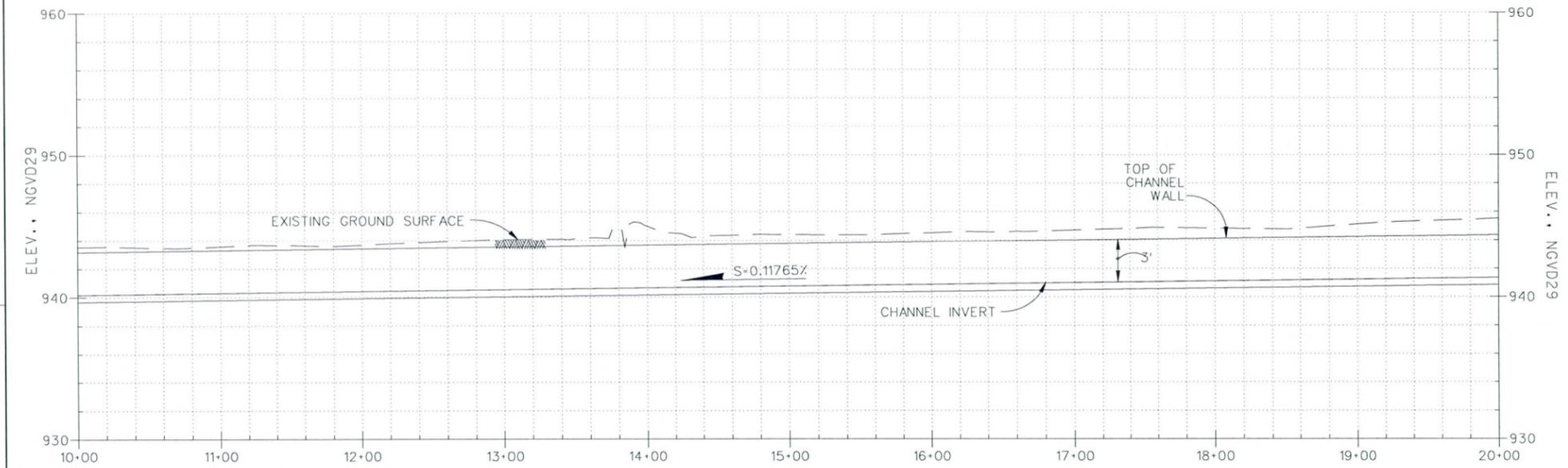
DRYSIDE O&M ROAD CENTER LINE PROFILE
 VERT. SCALE: 1" = 10'
 HORIZ. SCALE: 1" = 50'

O&M ROAD CENTER LINE HORIZ. CONTROL CURVE DATA								
P.I. NO.	NORTHING	EASTING	Δ°	R(FT.)	T(FT.)	L(FT.)	B.C. Sta	E.C. Sta
10	868,632.46	587,085.32	0° 20'24" RT	1000.00	2.97	5.93	61+11.28	61+17.22
11	868,920.66	587,685.41	62° 32'50" Lt	20.00	12.15	21.83	67+67.80	67+89.64

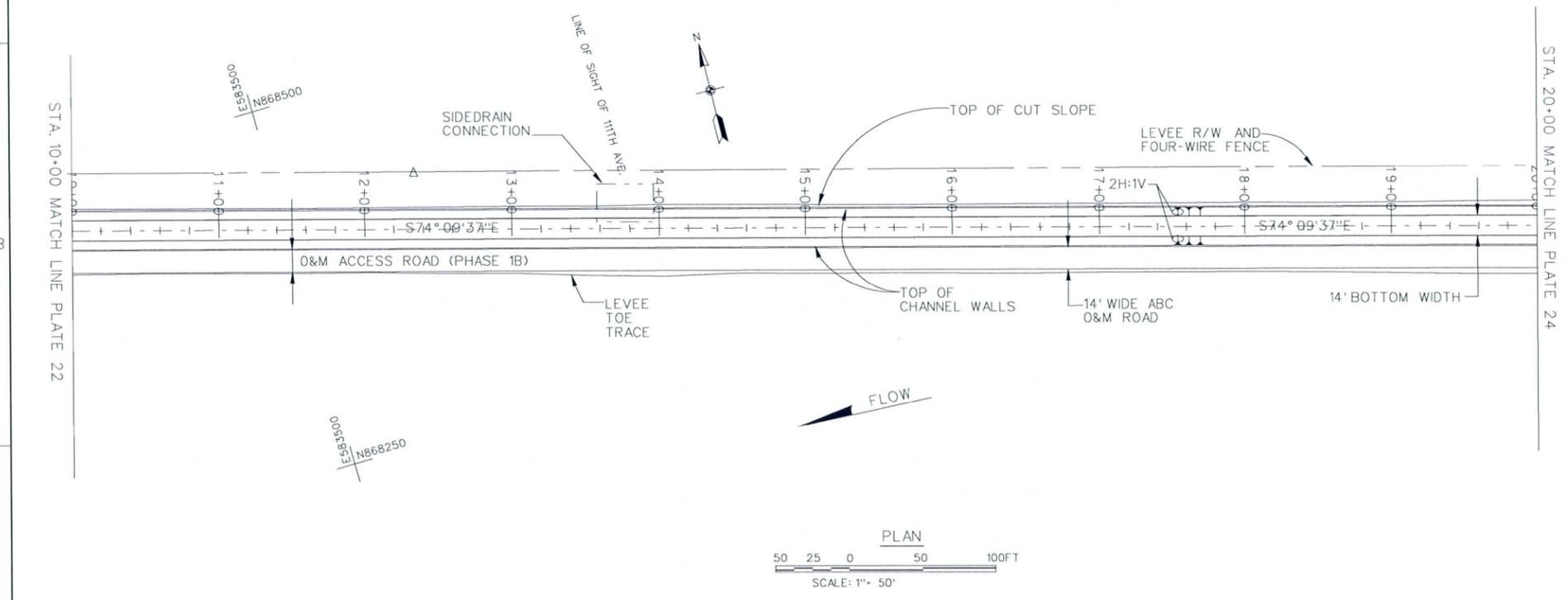


AS-BUILT

SCALE: 50'	TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) DRYSIDE O&M ROAD PLAN AND PROFILE STA. 54+00 TO STA. 68+05.56		
	U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	DISTRICT FILE No. 2037/48	SPEC. NO. W92PL-05-B0004
PLATE 21	DATE	APPROVAL	



CHANNEL ϕ PROFILE
 VERT. SCALE: 1in = 5ft
 HORIZ. SCALE: 1in = 50ft



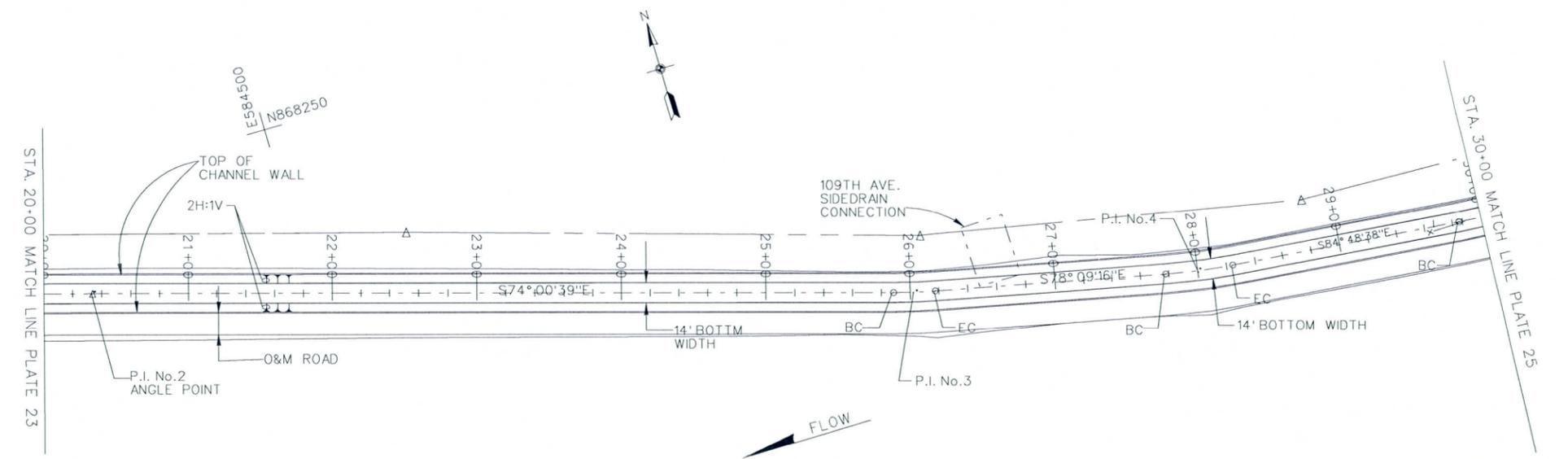
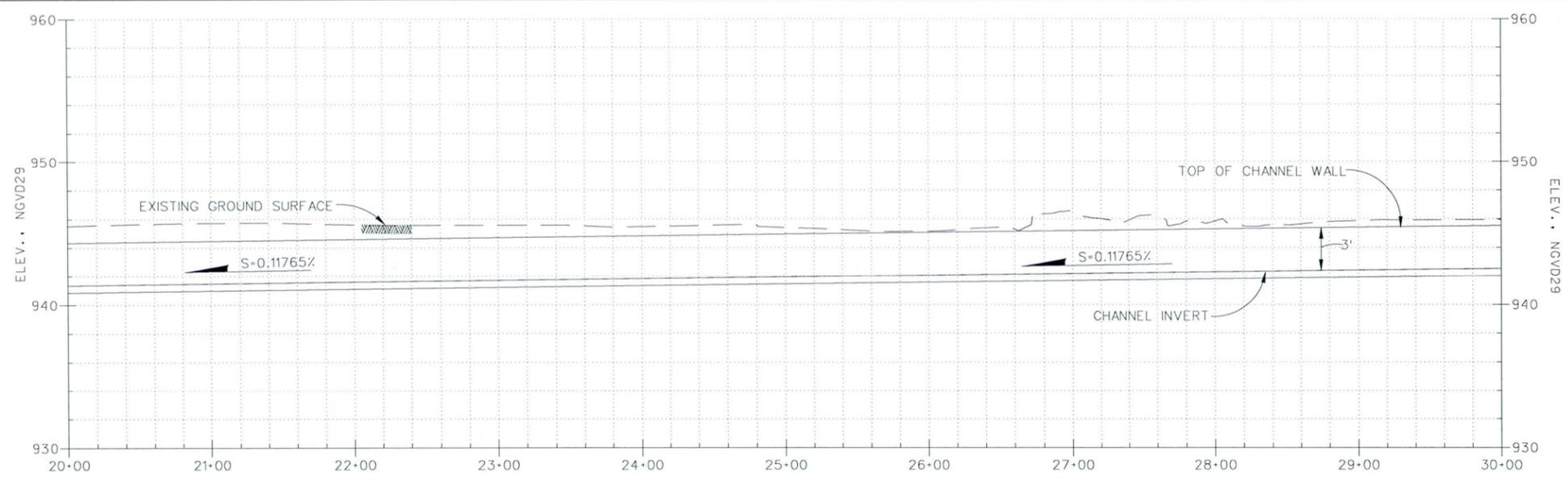
PLAN
 SCALE: 1" = 50'

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 1A (115TH AVE. TO 105TH AVE.)
 115th AVE. COLLECTOR CHANNEL
 PLAN AND PROFILE
 STA. 10+00 TO STA. 20+00

SCALE:	50:1
PLATE:	23
DISTRICT FILE No. 203/352	SPEC. NO. W922PL-05-B0004

AS-BUILT



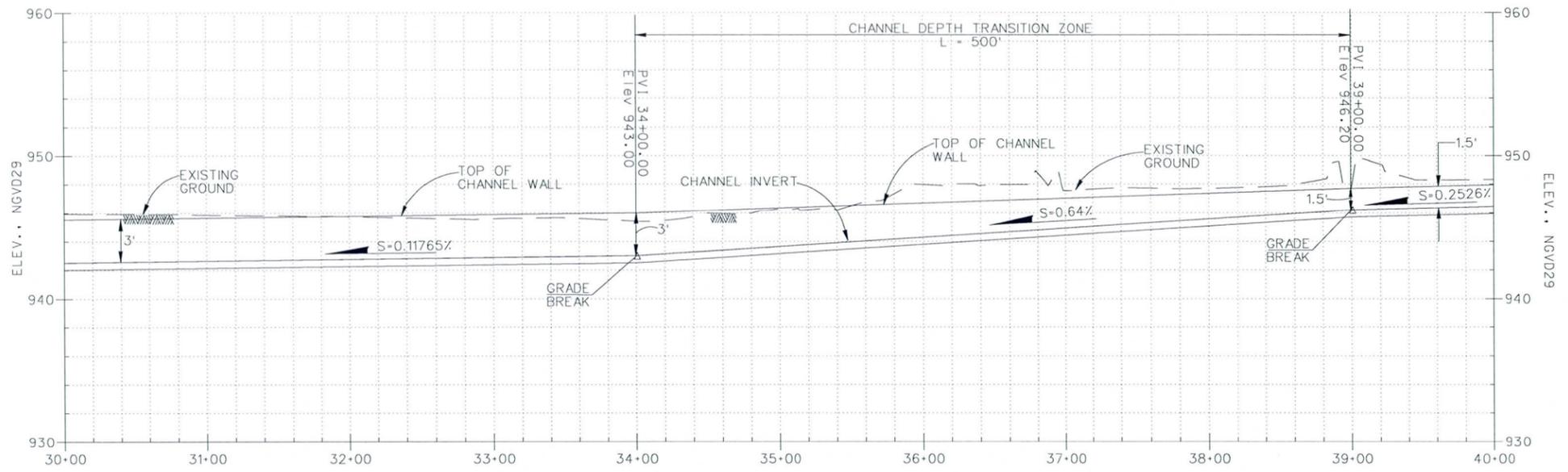
CHANNEL Q HORIZONTAL CONTROL CURVE DATA								
P.I. No.	NORTHING	EASTING	Δ°	R(FT)	T(FT)	L(FT)	B.C. STA.	E.C. STA.
2	868,174.36	584,352.57	ANGLE PT.	0.00	0.00	0.00	N/A	N/A
3	868017.52	584899.90	4° 08' 38"	400.00	14.47	28.93	25+87.68	26+16.61
4	867,976.85	585,093.80	6° 39' 22"	400.00	23.26	46.47	27+77.00	28+23.46
5	867,956.94	585,313.05	10° 24' 25"	400.00	36.43	72.65	29+83.93	30+56.58

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

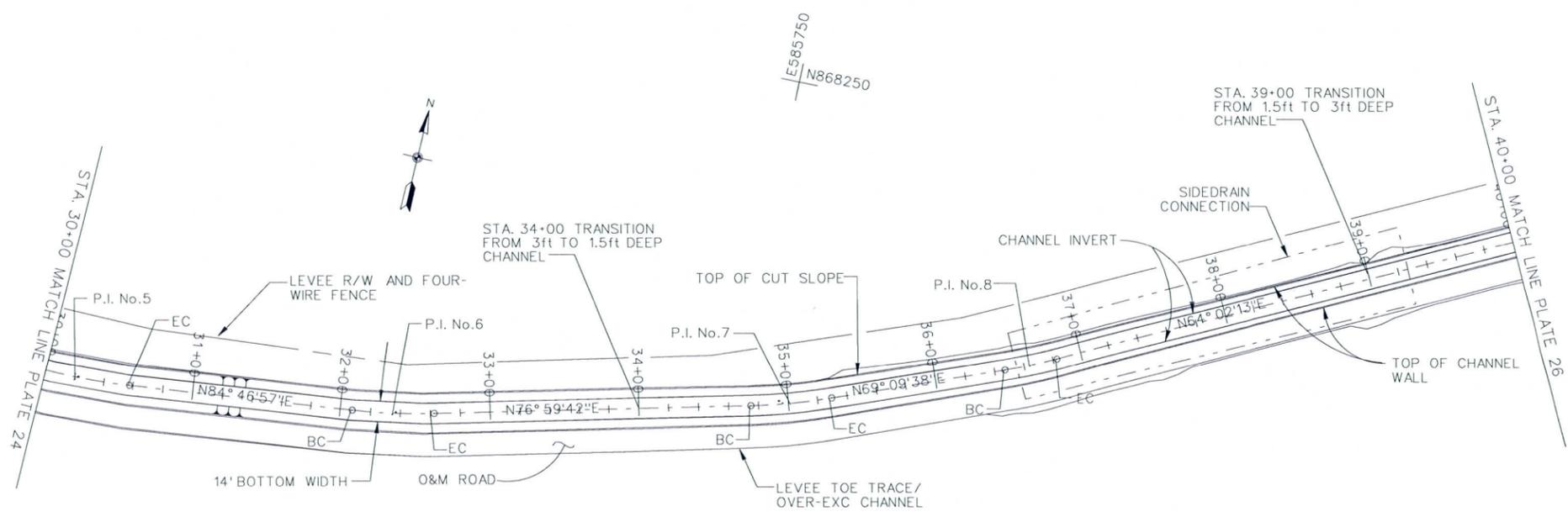
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 1A (115TH AVE. TO 105TH AVE.)
 115th AVE. COLLECTOR CHANNEL
 PLAN AND PROFILE
 STA. 20+00 TO 30+00

SCALE:	50:1
PLATE:	24
DISTRICT FILE No.	203/353
SPEC. NO.	W92PL-05-B0004

AS-BUILT



CHANNEL ϕ PROFILE
 VERT. SCALE: 1in = 5ft
 HORIZ. SCALE: 1in = 50ft



PLAN
 SCALE: 1" = 50'

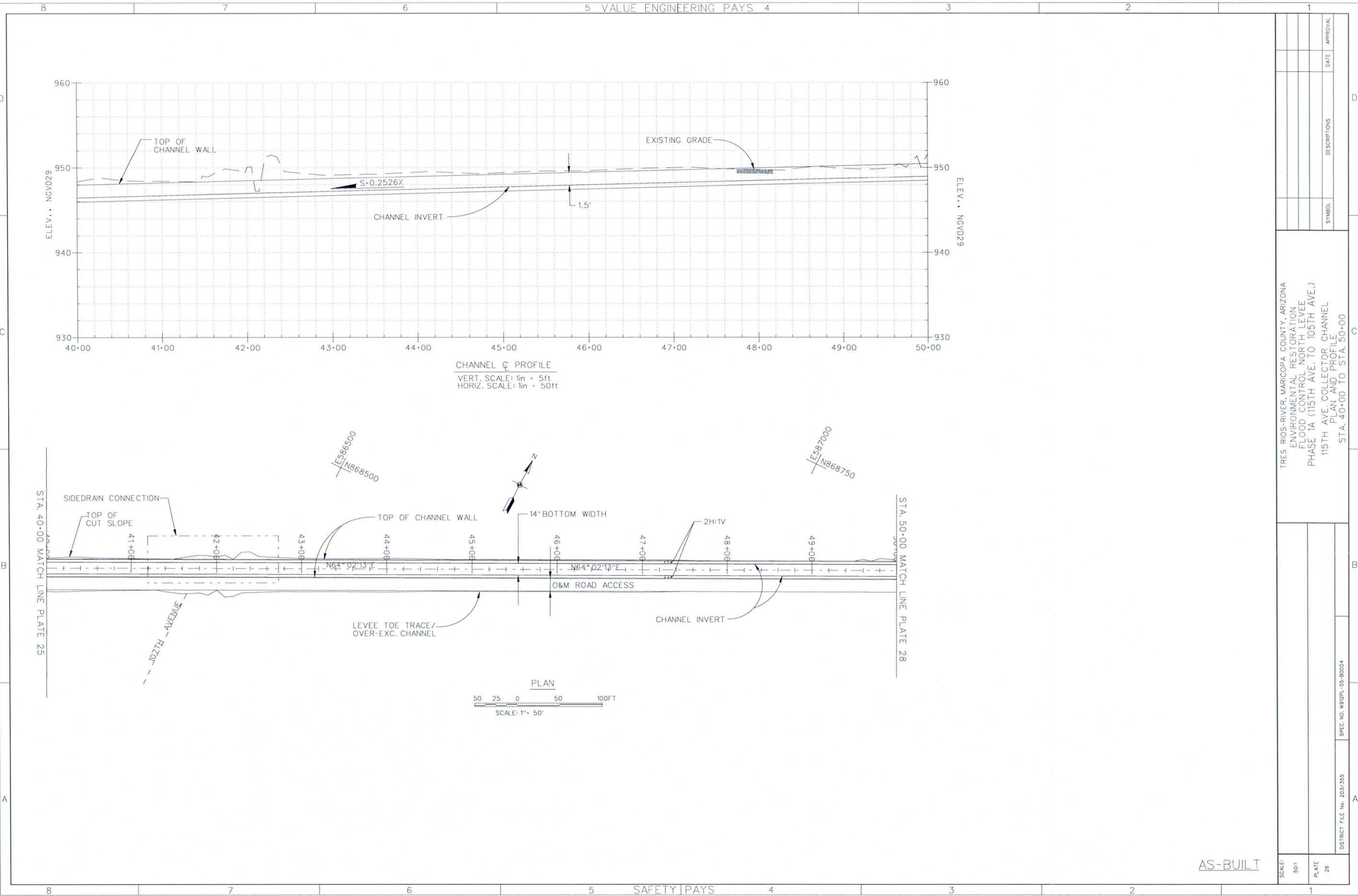
CHANNEL ϕ HORIZONTAL CURVE DATA								
P.I. No.	NORTHING	EASTING	Δ°	R(FT)	T(FT)	L(FT)	B.C. STA.	E.C. STA.
5	867,956.94	585,313.05	10° 24' 25"	400.00	36.43	72.65	29+83.93	30+56.58
6	867,976.44	585,526.56	7° 47' 15"	400.00	27.23	54.37	32+07.33	32+61.69
7	868,036.52	585,786.71	7° 50' 04"	400.00	27.39	54.69	34+74.07	35+28.77
8	868,094.36	585,938.66	5° 07' 25"	400.00	17.90	35.77	36+46.07	36+81.84

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

TRES RIOS RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 1A (115TH AVE. TO 105TH AVE.)
 115th AVE. COLLECTOR CHANNEL
 PLAN AND PROFILE
 STA. 30+00 TO STA. 40+00

SCALE: 50:1
 PLATE: 25
 SPEC. NO. W91221-05-B0004
 DISTRICT FILE No. 203/354

AS-BUILT

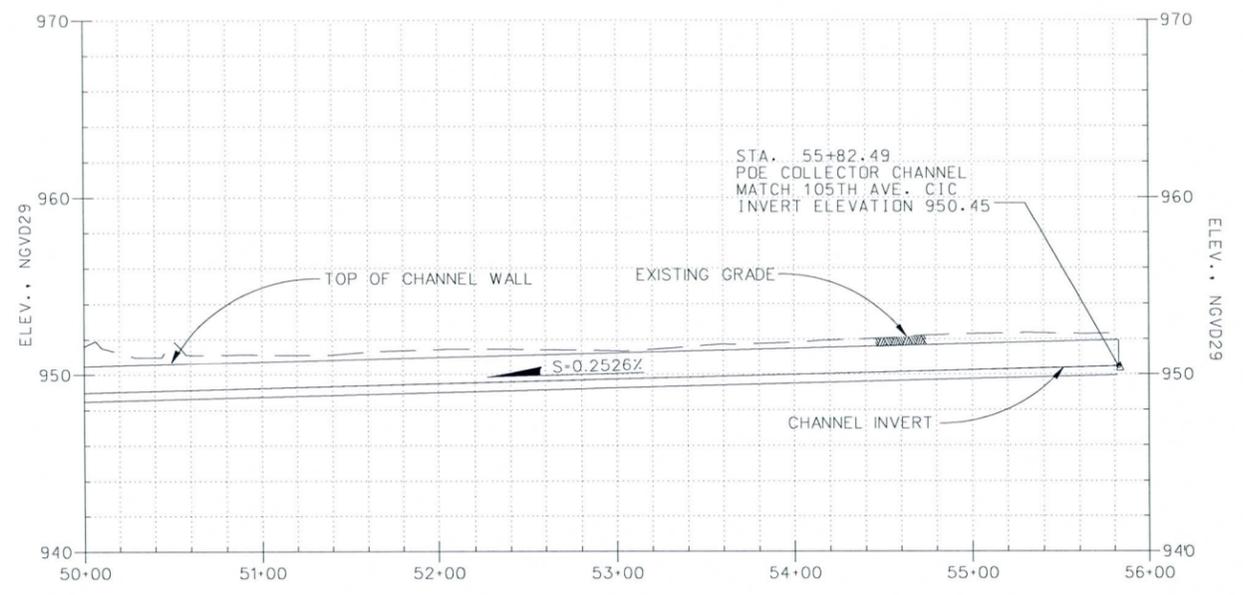


CHANNEL \bar{C} PROFILE
 VERT. SCALE: 1in = 5ft
 HORIZ. SCALE: 1in = 50ft

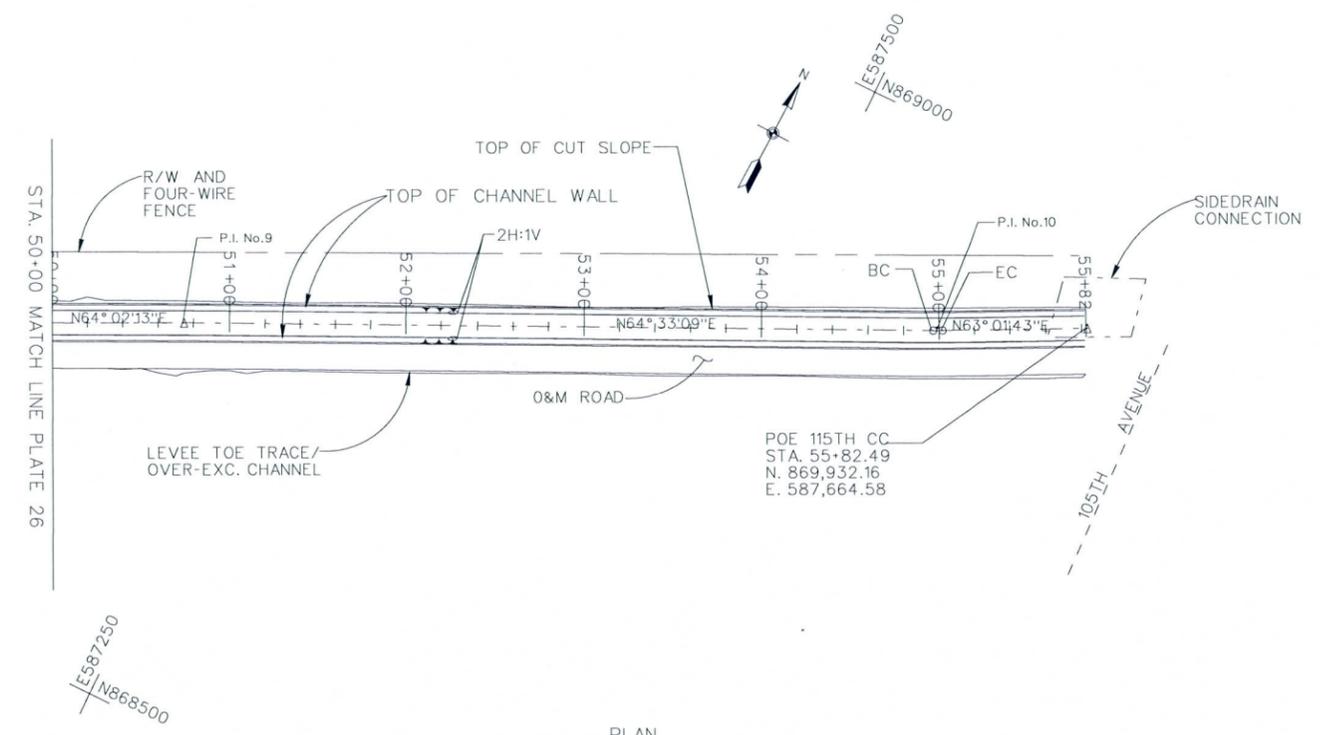
PLAN
 SCALE: 1" = 50'

AS-BUILT

SCALE: 50:1	PLATE 26	DISTRICT FILE No. 203/355	SPEC. NO. W812PL-05-80004	TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) 115TH AVE. COLLECTOR CHANNEL PLAN AND PROFILE STA. 40+00 TO STA. 50+00	SYMBOL	DESCRIPTIONS	DATE	APPROVAL



CHANNEL \bar{C} PROFILE
 VERT. SCALE: 1in = 5ft
 HORIZ. SCALE: 1in = 50ft



PLAN
 50 25 0 50 100FT
 SCALE: 1" = 50'

CHANNEL \bar{C} HORIZONTAL CONTROL CURVE DATA								
P.I. No.	NORTHING	EASTING	Δ°	R(FT)	T(FT)	L(FT)	B.C. STA.	E.C. STA.
9	868,711.45	587,205.95	ANGLE PT.	0.00	0.00	0.00	N/A	N/A
10	868,894.10	587,589.79	1° 31'26"	200.00	2.66	5.32	54+95.91	55+01.23

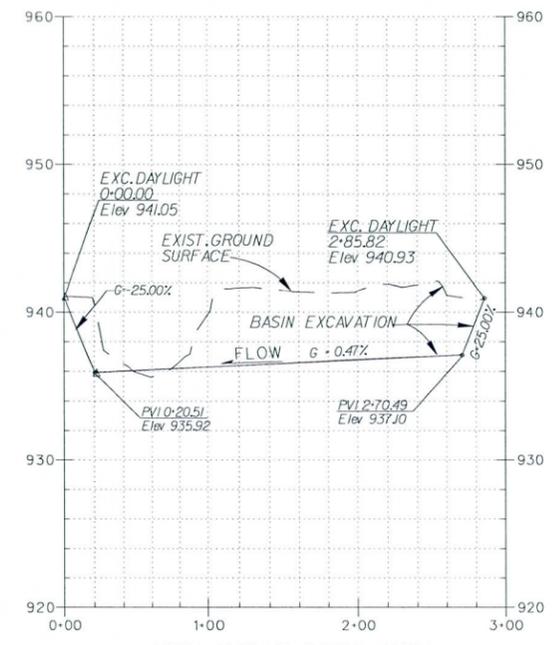
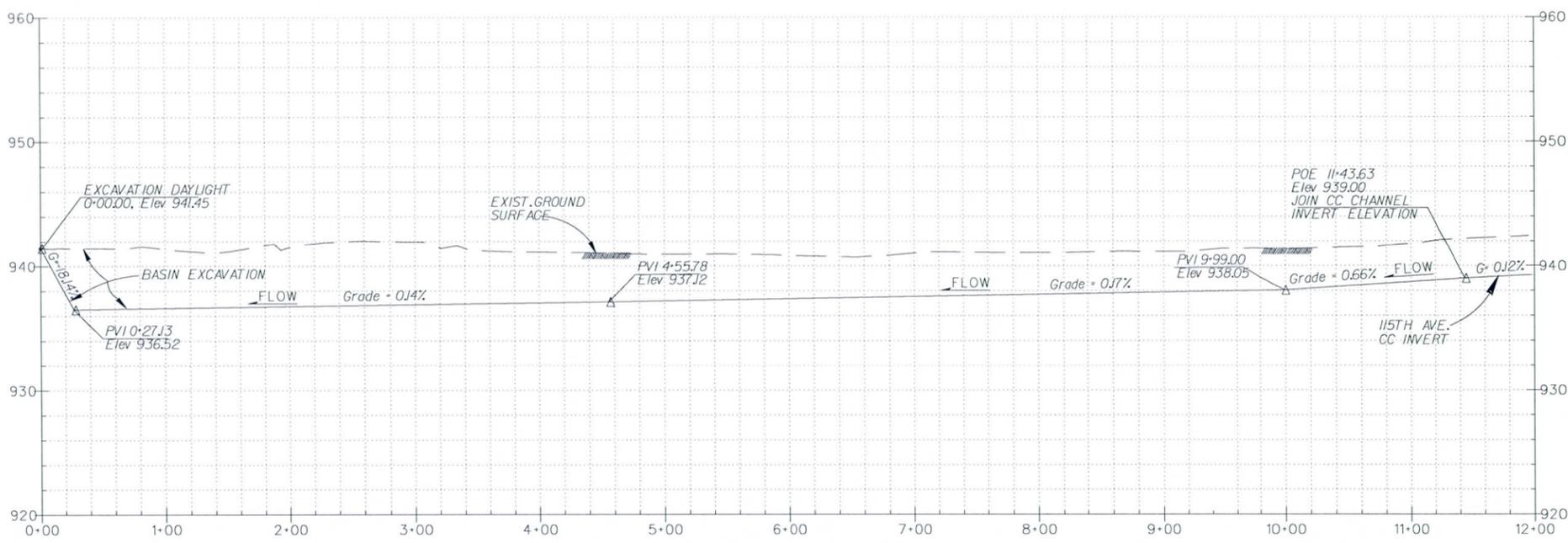
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 1A (115TH AVE. TO 105TH AVE.)
 115TH AVENUE COLLECTOR CHANNEL
 PLAN AND PROFILE
 STA. 50+00 TO STA. 55+82.49

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

AS-BUILT

SCALE: 50'
 PLATE: 27

DISTRICT FILE No. 2013/356
 SPEC. NO. W922PL-05-B0004



TOE OF BASIN CUT SLOPE (CATCH POINT) P.I. DATA

P.I. No.	NORTHING	EASTING	EXISTING GRADE ELEV.	FINISHED GRADE ELEV.
1	868,604.91	581,259.79	940.7	937.0
2	868,613.44	582,373.94	941.8	939.0
3	868,559.81	582,374.34	942.5	939.0
4	868,559.92	582,106.79	941.6	938.0
5	868,512.62	581,829.15	941.1	937.0
6	868,484.08	581,705.57	941.0	936.6
7	868,382.79	581,393.72	940.8	936.0
8	868,349.91	581,297.93	935.9	935.9
9	868,358.62	581,265.30	941.0	936.0
10	868,397.29	581,256.86	940.8	936.2

115TH AVENUE CATCH BASIN E-W CONTROL LINE PROFILE PROFILE WAS DRAWN LOOKING NORTH

HORIZONTAL SCALE: 1" = 10'
VERTICAL SCALE: 1" = 100'

BASIN E-W CONTROL LINE HORIZONTAL CONTROL POINTS DATA

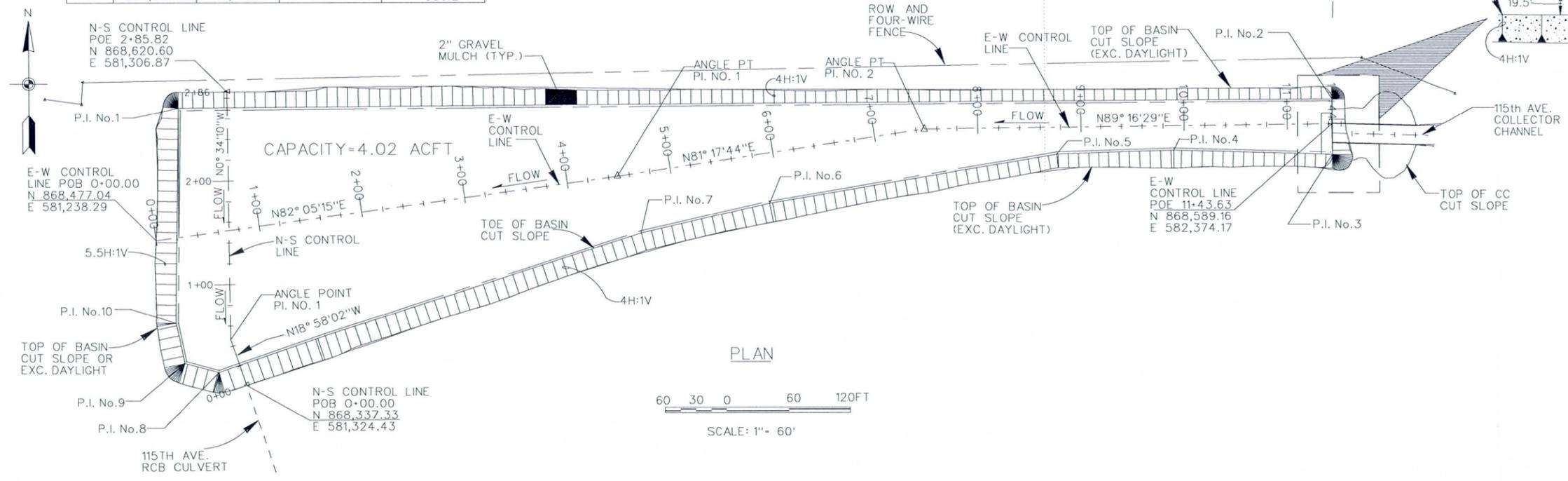
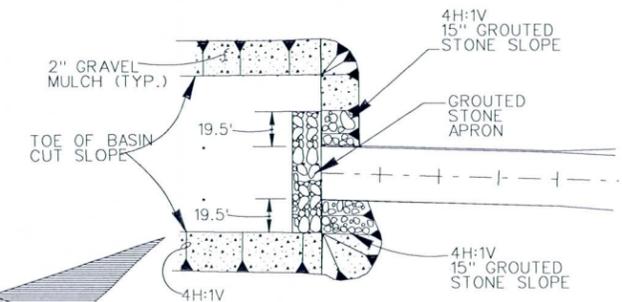
P.I. No.	STA.	NORTHING	EASTING
1	4+86.58	868,538.79	581,682.60
2	7+48.36	868,584.16	581,978.93

BASIN N-S CONTROL LINE HORIZONTAL CONTROL POINTS DATA

P.I. No.	STA.	NORTHING	EASTING
1	0+46.71	868,381.51	581,309.25

115TH AVENUE CATCH BASIN N-S CONTROL LINE PROFILE PROFILE WAS DRAWN LOOKING WEST

HORIZONTAL SCALE: 1" = 10'
VERTICAL SCALE: 1" = 100'



SCALE: 1" = 60'

AS-BUILT

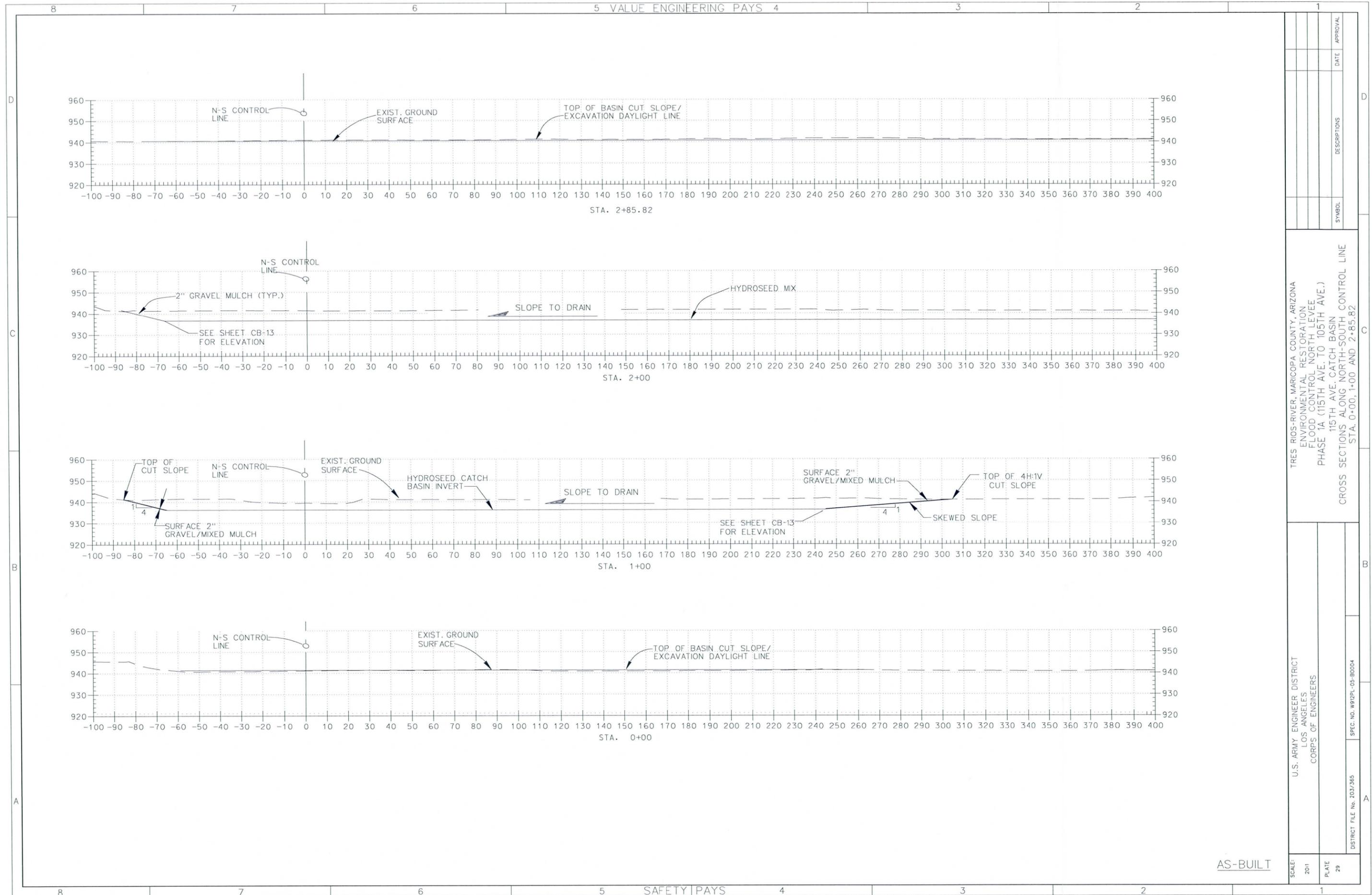
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
ENVIRONMENTAL RESTORATION
FLOOD CONTROL NORTH LEVEL
PHASE 1A (115TH AVE. TO 105TH AVE.)
115TH AVENUE CATCH BASIN
PLAN AND PROFILES

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SCALE:	60:1
PLATE:	28

DISTRICT FILE No. 203/364
SPEC. NO. W92PL-05-B0004

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

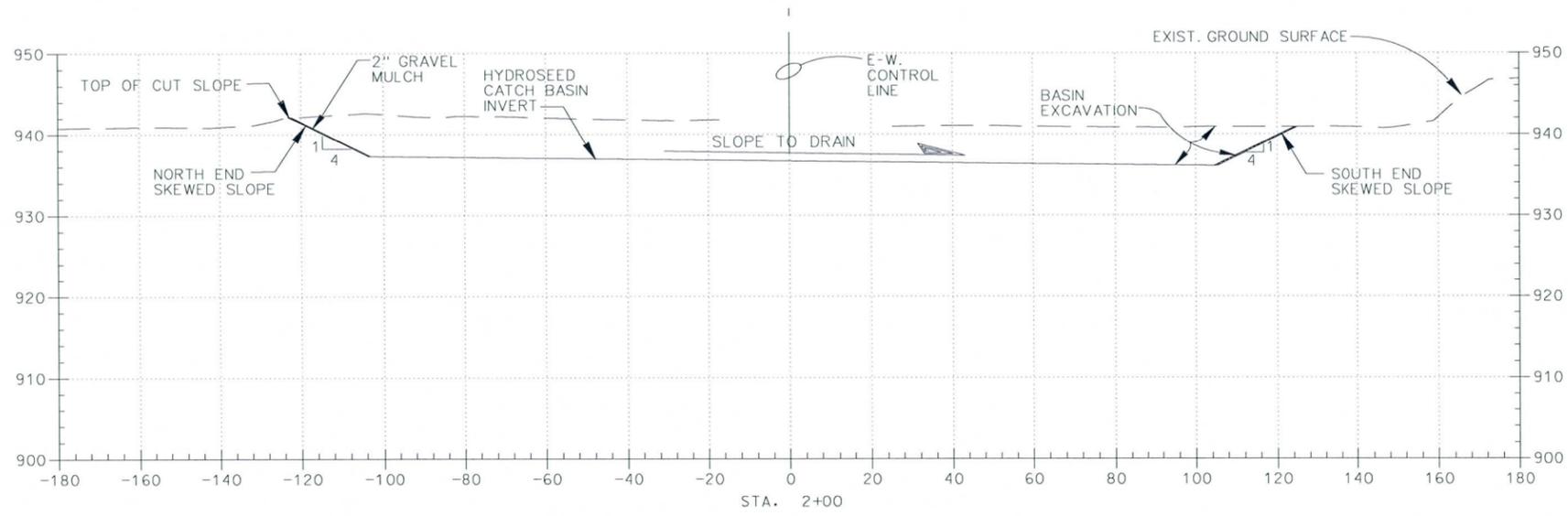
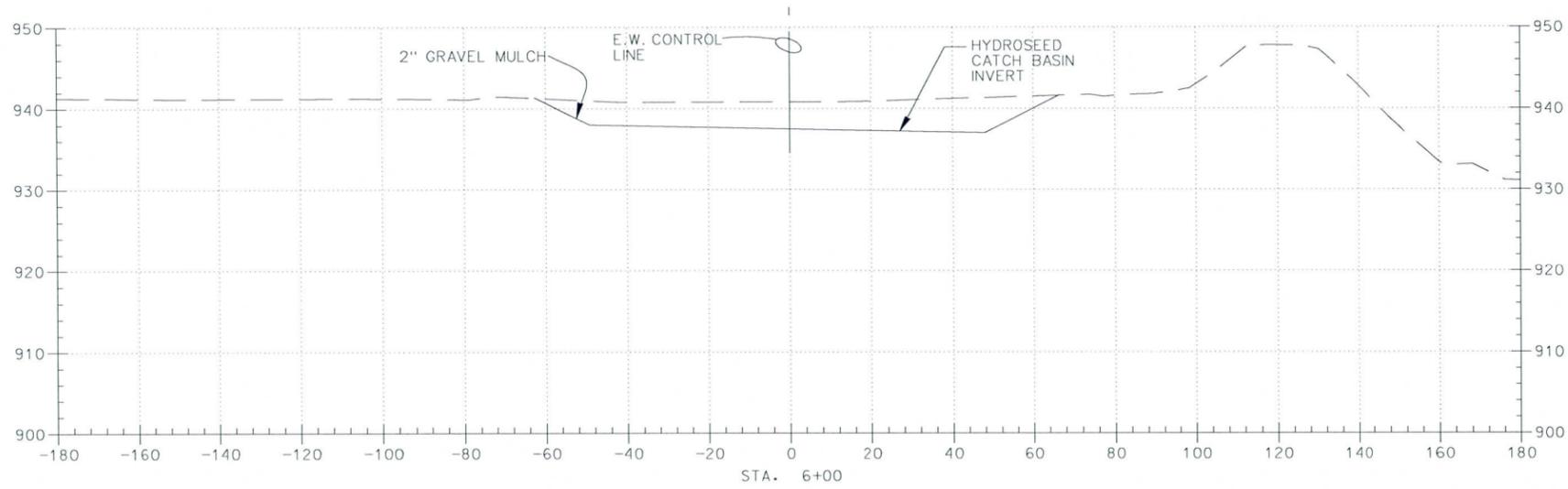
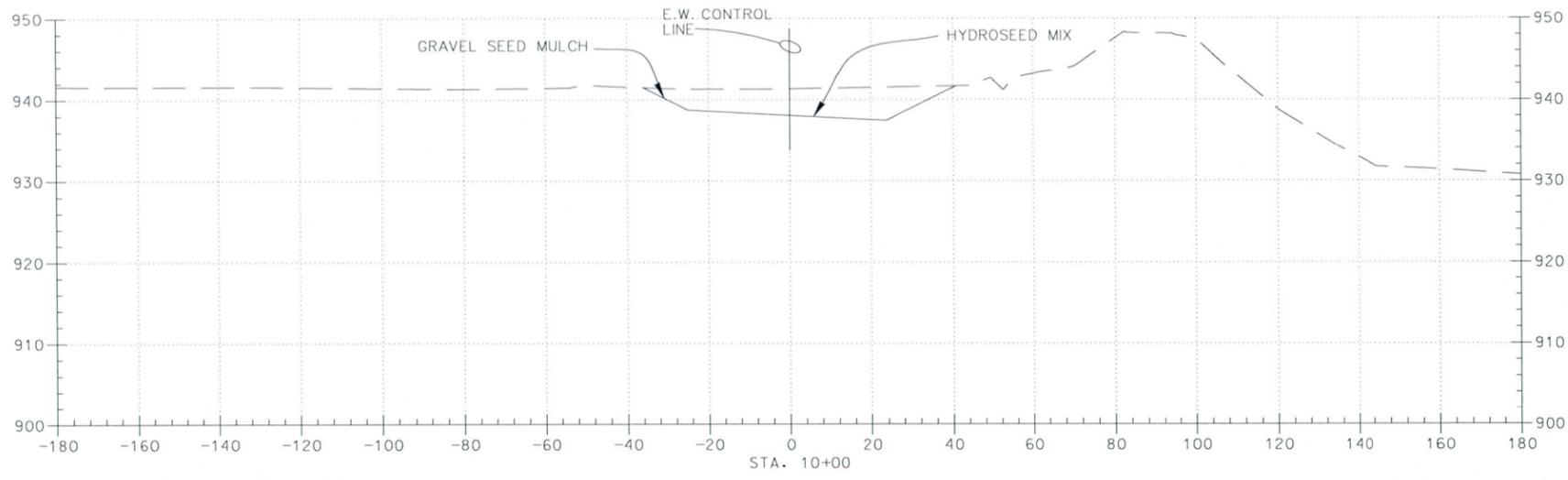


SYMBOL	DESCRIPTIONS	DATE	APPROVAL

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 1A (115TH AVE. TO 105TH AVE.)
 CROSS SECTIONS ALONG NORTH-SOUTH CONTROL LINE
 STA. 0+00, 1+00 AND 2+85.82

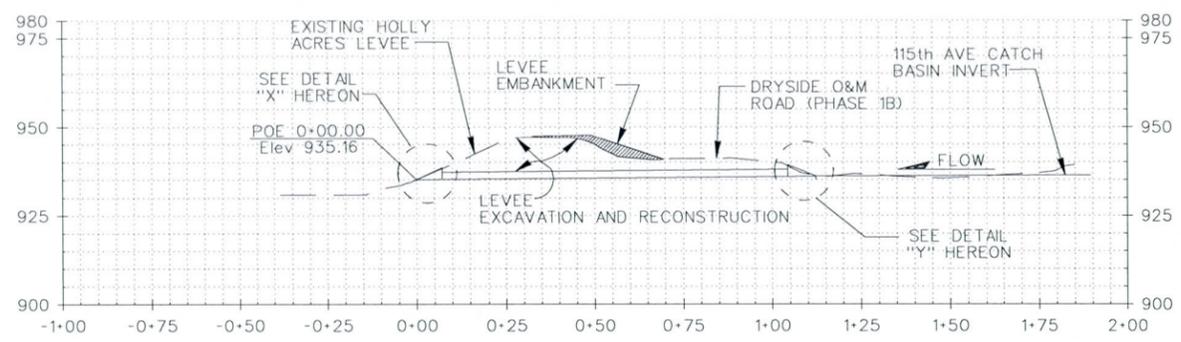
U.S. ARMY ENGINEER DISTRICT
 LOS ANGELES
 CORPS OF ENGINEERS
 DISTRICT FILE No. 203/365
 SPEC. NO. W912PL-05-B0004
 SCALE: 20'
 PLATE 29

AS-BUILT

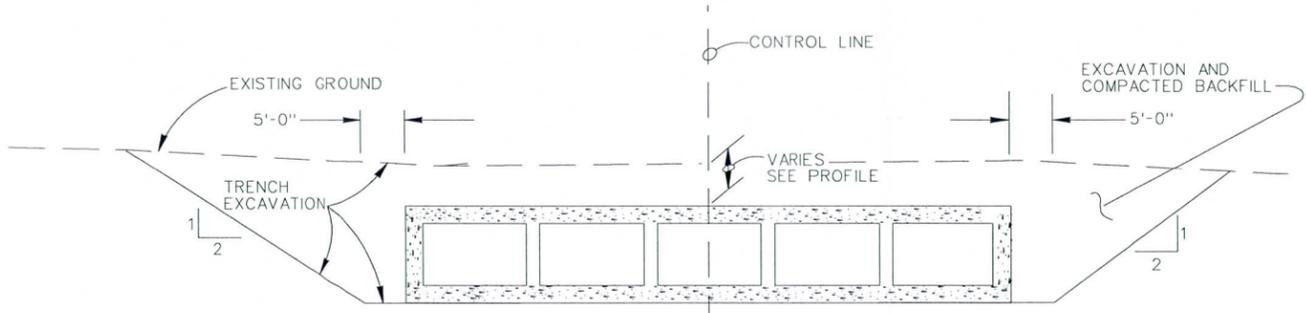


AS-BUILT

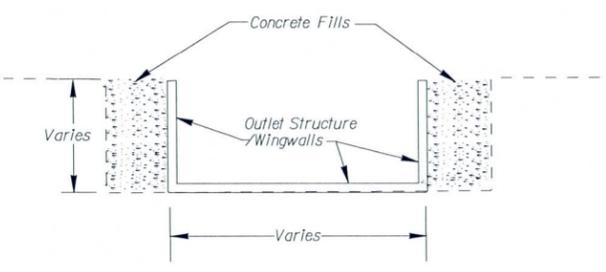
SCALE: 20:1	U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	DISTRICT FILE No. 2037386	SPEC. NO. W92PL-05-B0004	DATE	APPROVAL
				SYMBOL	DESCRIPTIONS
PLATE 30	TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) 115TH AVE. CATCH BASIN CROSS SECTIONS ALONG EAST-WEST CONTROL LINE STA. 2+00, 6+00 AND 10+00				



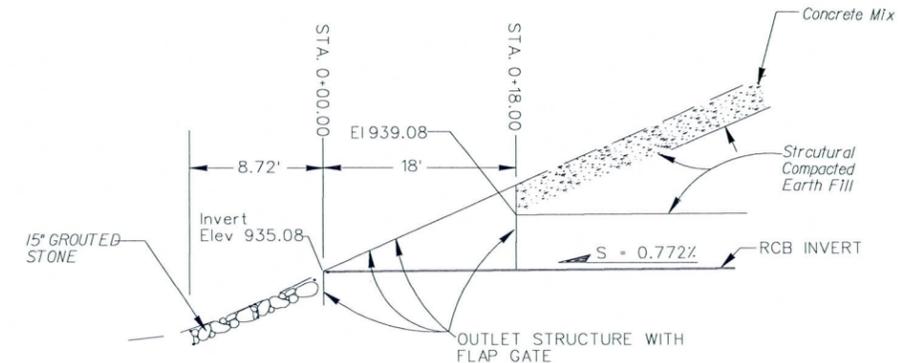
HORIZONTAL 1"=50ft VERTICLE 1"=25ft RCB CULVERT CONTROL LINE PROFILE PROFILE WAS DRAWN LOOKING WEST



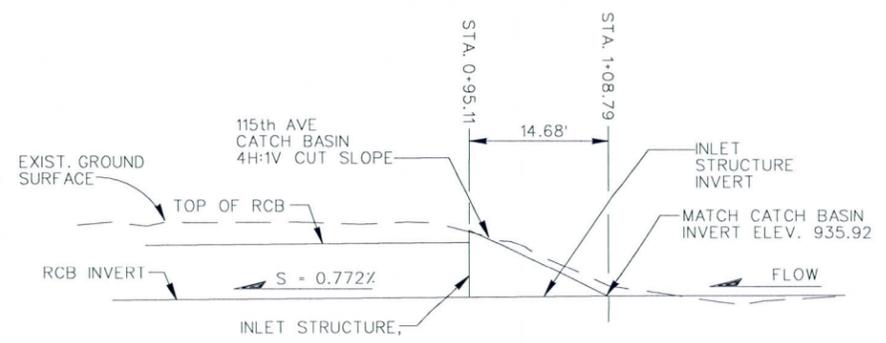
SECTION A-A N.T.S.



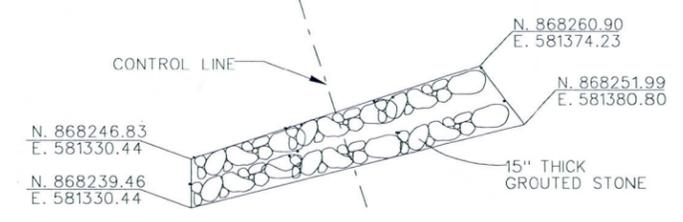
SECTION B-B N.T.S.



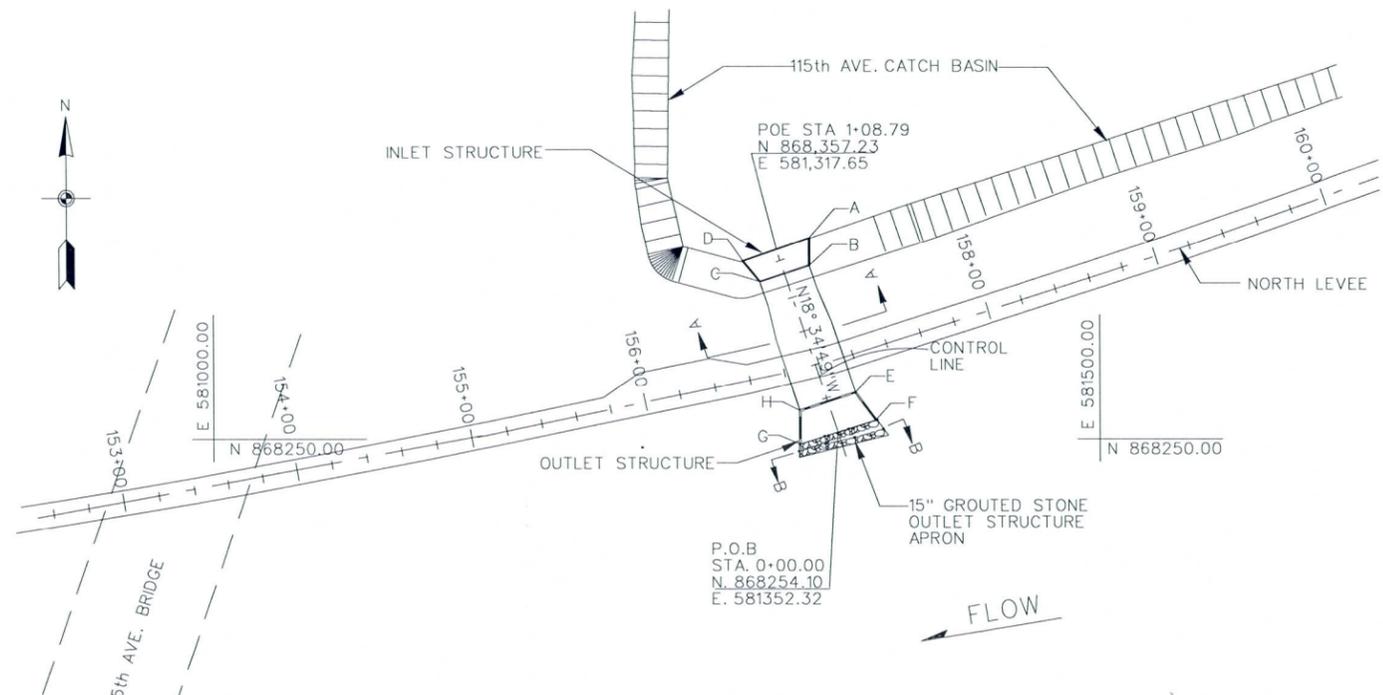
DETAIL "X" TYP N.T.S.



DETAIL "Y" TYP N.T.S.



15' GROUTED STONE OUTLET STRUCTURE APRON PLAN N.T.S.



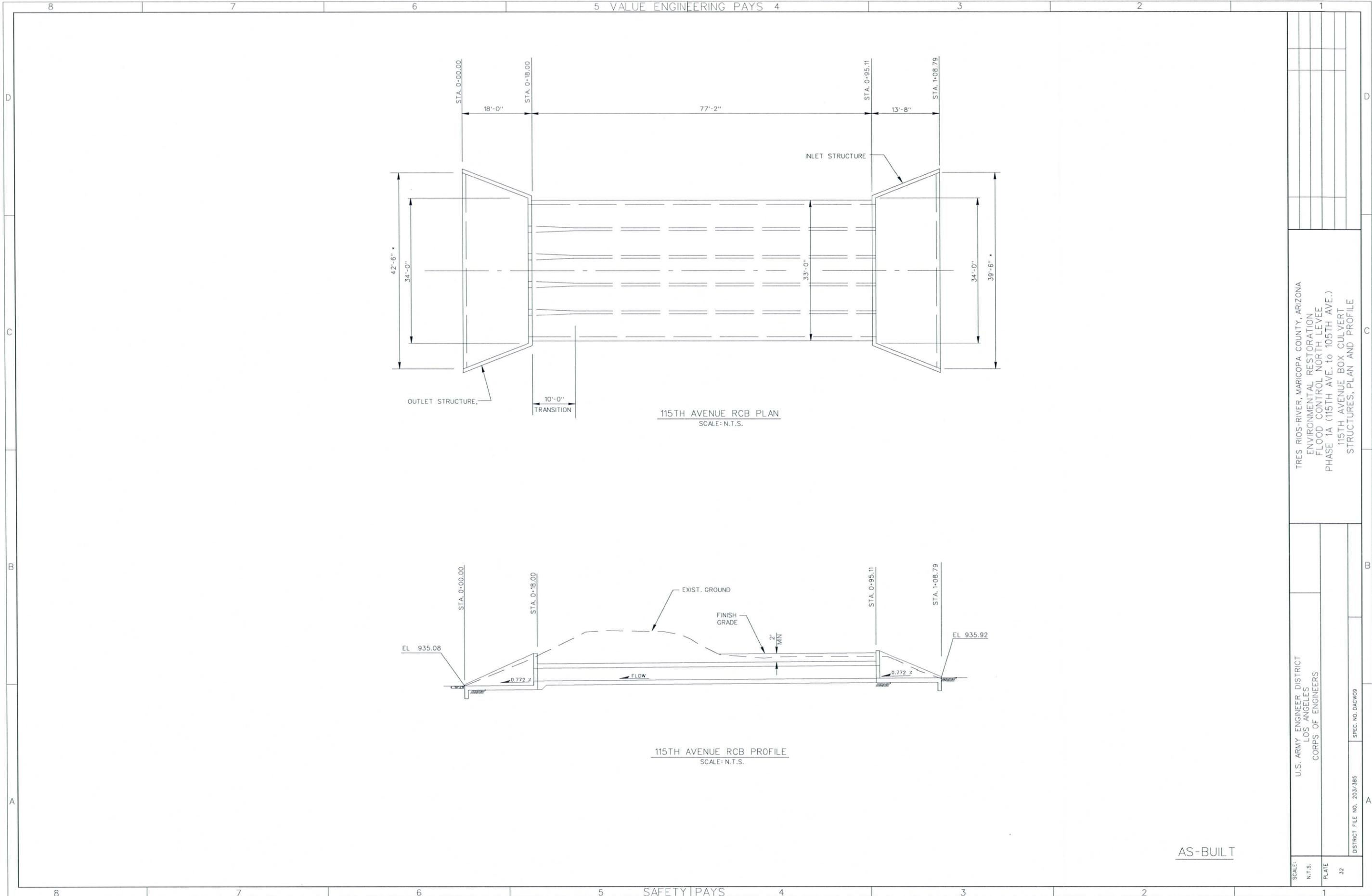
RCB PLAN SCALE: 1 IN. = 50 FT.

INLET STRUCTURE COORDINATES. CONTROL DATA			OUTLET STRUCTURE COORDINATES CONTROL DATA		
POINT	NORTHING	EASTING	POINT	NORTHING	EASTING
A	N 868,363.62	E 581,336.25	E	N. 868,276.31	E. 581,362.23
B	N 868,347.97	E 581,336.23	F	N. 868,260.74	E. 581,373.73
C	N 868,338.64	E 581,308.42	G	N. 868,247.04	E. 581,330.94
D	N 868,350.67	E 581,298.54	H	N. 868,265.91	E. 581,330.92

AS-BUILT

SCALE:	501	PLATE	31
U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS			
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) 115TH AVENUE RCB CULVERT PLAN, PROFILE AND DETAILS			
SYMBOL	DESCRIPTIONS	DATE	APPROVAL

DISTRICT FILE No. 115AveRCB.dgn SPEC. NO. W912PL-05-B0004



115TH AVENUE RCB PLAN
SCALE: N.T.S.

115TH AVENUE RCB PROFILE
SCALE: N.T.S.

AS-BUILT

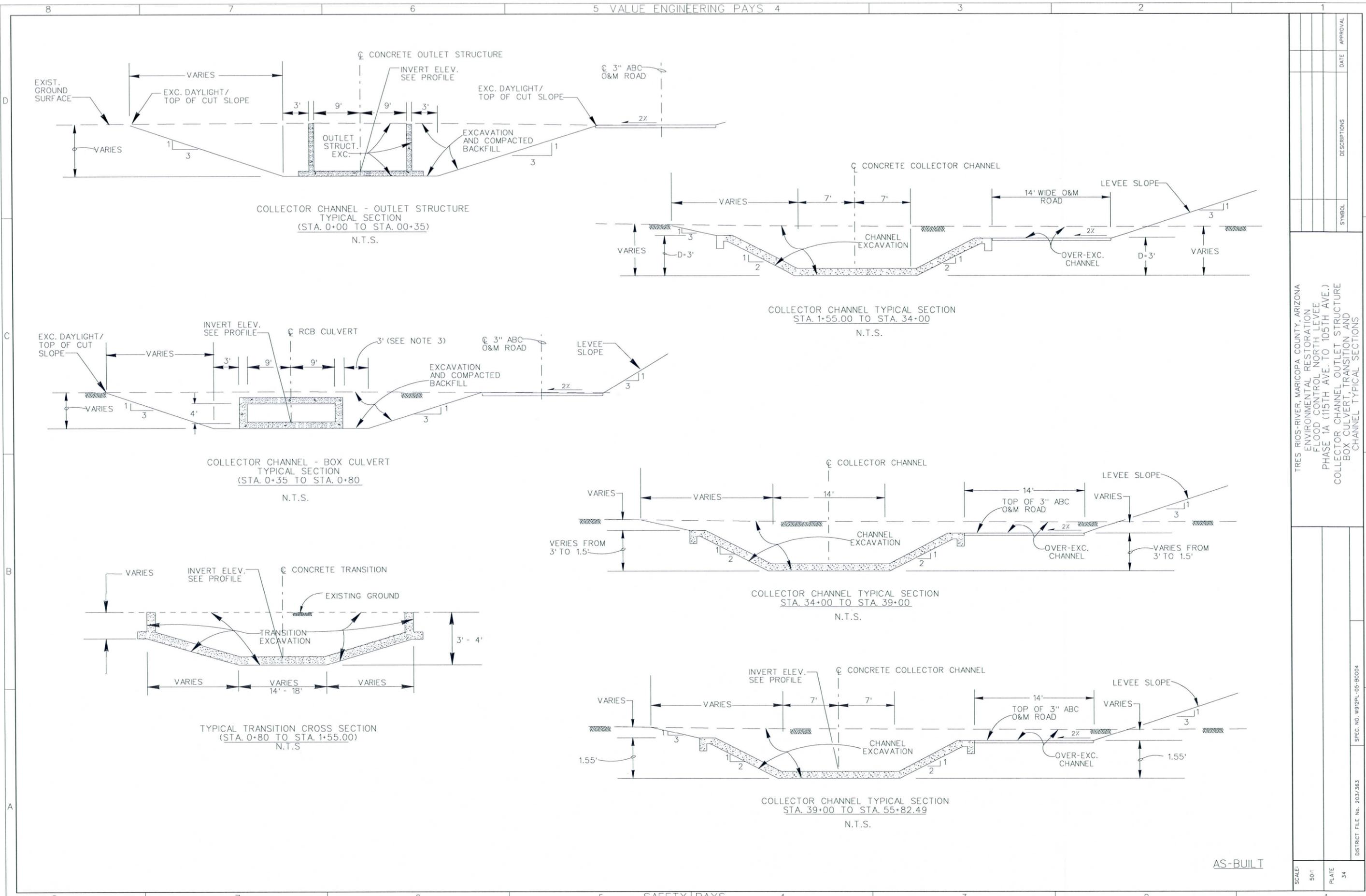
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
ENVIRONMENTAL RESTORATION
FLOOD CONTROL NORTH LEVEE
PHASE 1A (115TH AVE. to 105TH AVE.)
115TH AVENUE BOX CULVERT
STRUCTURES, PLAN AND PROFILE

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SCALE:
N.T.S.
PLATE
32

DISTRICT FILE NO. 203/385

SPEC. NO. DACW09

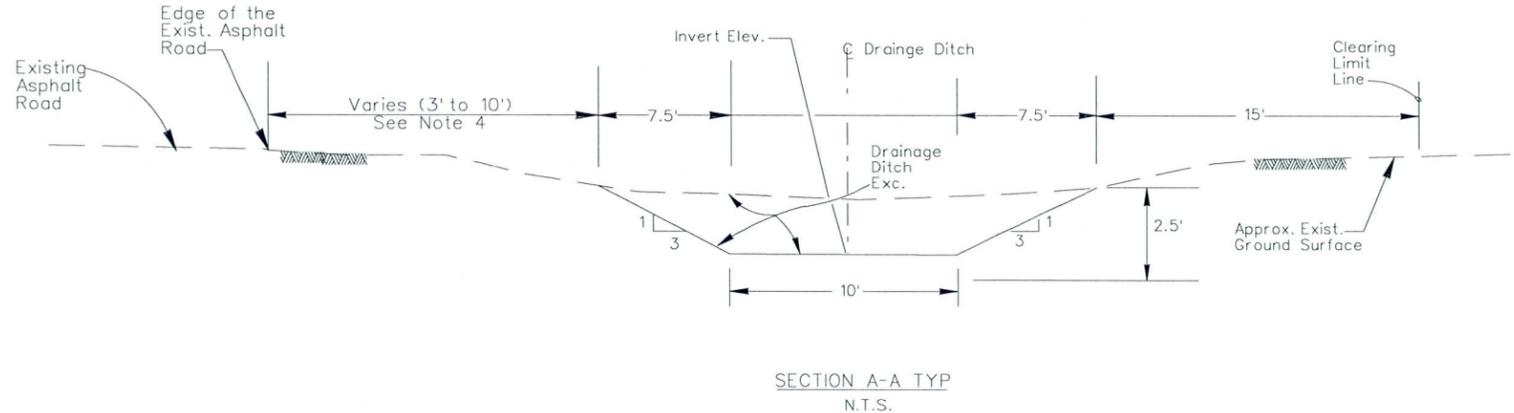
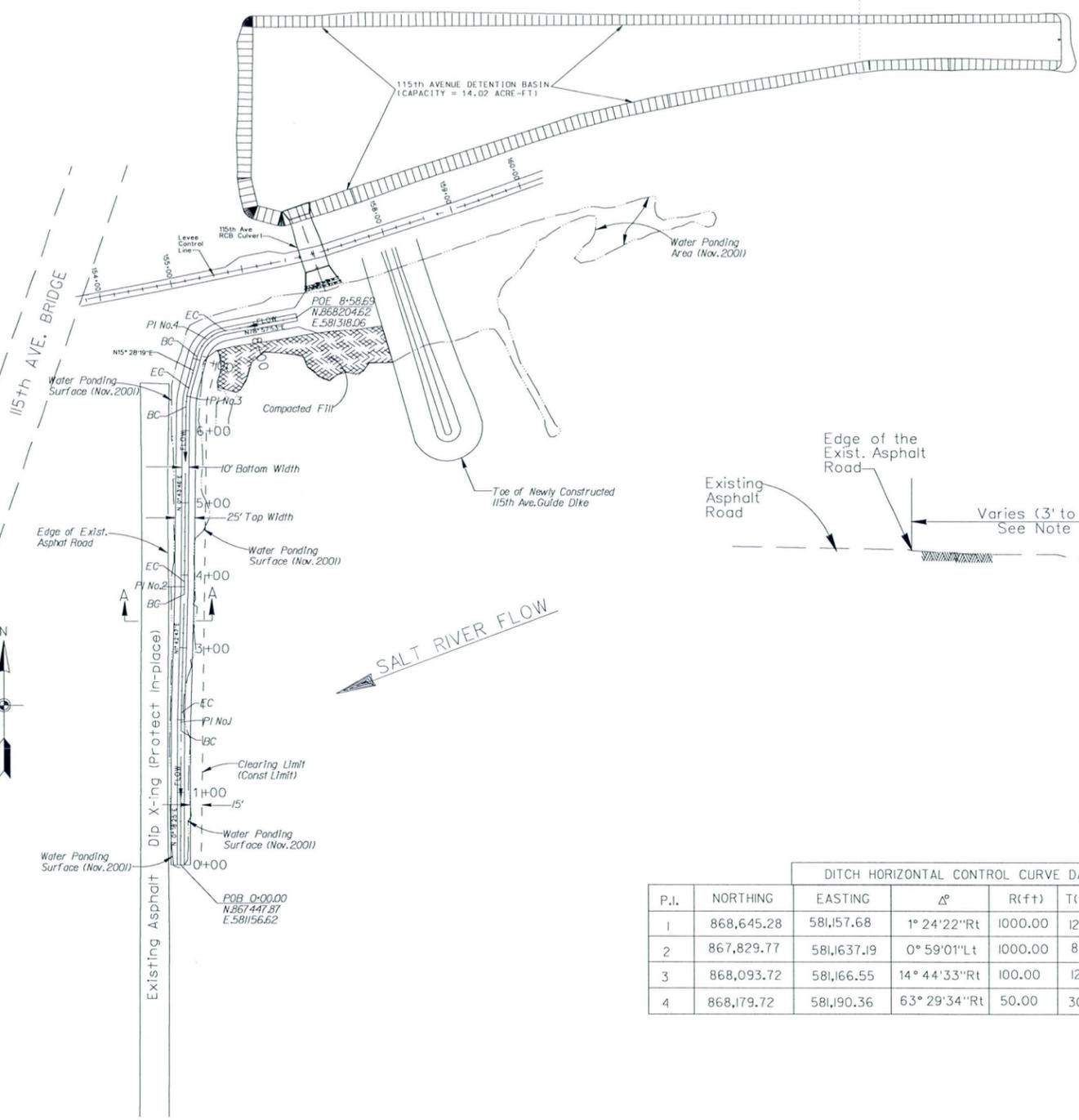
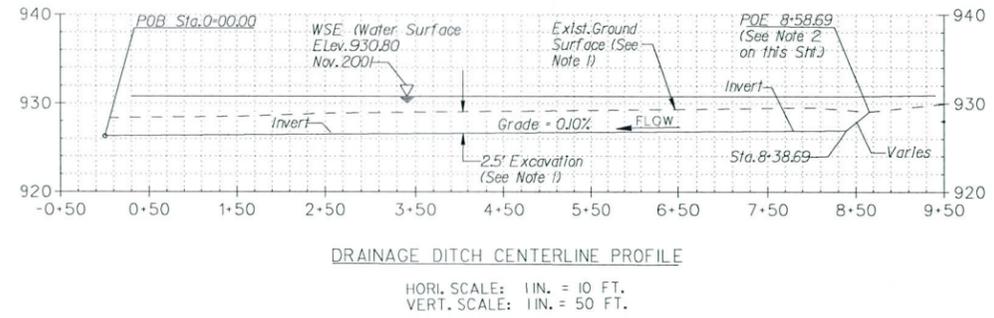


SYMBOL	DESCRIPTIONS	DATE	APPROVAL

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 1A (115TH AVE. TO 105TH AVE.)
 COLLECTOR CHANNEL OUTLET STRUCTURE
 BOX CULVERT, TRANSITION AND
 CHANNEL TYPICAL SECTIONS

DISTRICT FILE No. 203/363	SPEC. NO. W92PL-05-B0004
SCALE: 50'	PLATE 34

AS-BUILT



DITCH HORIZONTAL CONTROL CURVE DATA								
P.I.	NORTHING	EASTING	Δ°	R(ft)	T(ft)	L(ft)	B.C Sta	E.C Sta
1	868,645.28	581,157.68	1° 24' 22" Rt	1000.00	12.27	24.54	1+85.14	2+09.68
2	867,829.77	581,1637.19	0° 59' 01" Lt	1000.00	8.58	17.17	3+73.40	3+90.57
3	868,093.72	581,166.55	14° 44' 33" Rt	100.00	12.94	25.73	6+33.02	6+58.75
4	868,179.72	581,190.36	63° 29' 34" Rt	50.00	30.94	55.41	7+04.11	7+59.52

SCALE:	100'	PLATE	36
U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS			
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) 115th AVENUE DRAINAGE DITCH PLAN, PROFILE AND SECTIONS			
DISTRICT FILE No. 203/367A		SPEC. NO. W92PL-05-B0004	
APPROVAL	DATE	DESCRIPTIONS	SYMBOL

AS-BUILT

APPENDIX I

CODE OF FEDERAL REGULATIONS (EXTRACT)

CODE OF FEDERAL REGULATIONS (EXTRACT)

TITLE 33 - NAVIGATION AND
NAVIGABLE WATERS

Chapter II - Corps of Engineers,
Department of the Army

PART 208 - FLOOD CONTROL REGULATIONS

AUTHORITY: § 208.10 issued under Sec. 7, 58 Stat. 890; 33 U.S.C. 709.

§ 208.10 *Local flood protection works; maintenance and operation of structures and facilities* - (a) *General*. (1) The structures and facilities constructed by the United States for local flood protection shall be continuously maintained in such a manner and operated at such times and for such periods as may be necessary to obtain the maximum benefits.

(2) The State, political subdivision thereof, or other responsible local agency, which furnished assurance that it will maintain and operate flood control works in accordance with regulations prescribed by the Secretary of the Army, as required by law, shall appoint a permanent committee consisting of or headed by an official hereinafter called the "Superintendent," who shall be responsible for the development and maintenance of, and directly in charge of, an organization responsible for the efficient operation and maintenance of all of the structures and facilities during flood periods and for continuous inspection and maintenance of the project works during periods of low water, all without cost to the United States.

(3) A reserve supply of materials needed during a flood emergency shall be kept on hand at all times.

(4) No encroachment or trespass which will adversely affect the efficient operation or maintenance of the project works shall be permitted upon the rights-of-way for the protective facilities.

(5) No improvement shall be passed over, under, or through the walls, levees, improved channels or floodways, nor shall any excavation or construction be permitted within the limits of the project right-of-way, nor shall any change be made in any feature of the works without prior determination by the District Engineer of the Department of the Army or his authorized representative that such improvement, excavation, construction, or alteration will not adversely affect the functioning of the protective facilities. Such improvements or alterations as may be found to be desirable and permissible under the above determination shall be constructed in accordance with standard engineering practice. Advice regarding the effect of proposed improvements or alterations on the functioning of the project and information concerning methods of construction acceptable under standard engineering practice shall be obtained from the District Engineer or, if otherwise obtained, shall be submitted for his approval. Drawings or prints showing such improvements or alterations as finally constructed shall be furnished the District Engineer after completion of the work.

(6) It shall be the duty of the Superintendent to submit a semiannual report to the District Engineer covering inspection, maintenance, and operation of the protective works.

(7) The District Engineer or his authorized representatives shall have access at all times to all portions of the protective works.

(8) Maintenance measures or repairs which the District Engineer deems necessary shall be promptly taken or made.

(9) Appropriate measures shall be taken by local authorities to insure that the activities of all local organizations operating public or private facilities connected with the protective works are coordinated with those of the Superintendent's organization during flood periods.

(10) The Department of the Army will furnish local interests with an Operation and Maintenance Manual for each completed project, or separate useful part thereof, to assist them in carrying out their obligations under this part.

(b) *Levees* - (1) *Maintenance*. The Superintendent shall provide at all times such maintenance as may be required to insure serviceability of the structures in time of flood. Measures shall be taken to promote the growth of sod, exterminate burrowing animals, and to provide for routine mowing of the grass and weed, removal of wild growth and drift deposits, and repair of damage caused by erosion or other forces. Where practicable, measures shall be taken to retard bank erosion by planting of willows or other suitable growth on areas riverward of the levees. Periodic inspections shall be made by the Superintendent to insure that the above maintenance measures are being effectively carried out and, further, to be certain that:

(i) No unusual settlement, sloughing, or material loss of grade or levee cross section has taken place;

(ii) No caving has occurred on either the land side or the river side 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 wells 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;

(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. Immediate steps will be taken to correct dangerous conditions disclosed by such inspections. Regular maintenance repair measures shall be accomplished during the appropriate season as scheduled by the Superintendent.

(2) *Operation*. During flood periods the

levee shall be patrolled continuously to locate possible sand boils or unusual wetness of the landward slope and 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 overtopped;

(iv) No other conditions exist which might endanger the structure.

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.

(c) *Flood walls* - (1) *Maintenance*. Periodic inspections shall be made by the Superintendent to be certain that:

(i) No seepage, saturated areas, or sand boils are occurring;

(ii) No undue settlement has occurred which affects the stability of the wall or its water tightness;

(iii) No trees exist, the roots of which might extend under the wall and offer accelerated seepage paths;

(iv) The concrete has not undergone cracking, chipping, or breaking to an extent which might affect the stability of the wall or its water tightness;

(v) There are no encroachments upon the right-of-way which might endanger the structure or hinder its functioning in time of flood;

(vi) Care is being exercised to prevent accumulation of trash and debris adjacent to walls, and to insure that no fires are being built near them;

(vii) No bank caving conditions exist riverward of the wall which might endanger its stability;

(viii) Toe drainage systems and pressure relief wells are in good working condition and that such facilities are not becoming clogged.

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. Measures to eliminate encroachments and effect repairs found necessary by such inspections shall be undertaken immediately. All repairs shall be accomplished by methods acceptable in standard engineering practice.

(2) *Operation*. Continuous patrol of the wall shall be maintained during flood periods to locate possible leakage at monolith joints or seepage underneath the wall. Floating plant or boats will not be allowed to lie against or tie up to the wall. Should it become necessary during a flood emergency to pass anchor cables over the wall, adequate measures shall be taken to protect the concrete and construction joints. Immediate steps shall be taken to correct any condition which endangers the stability of the wall.

(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. Where drainage structures are provided with stop log or other emergency closures, the condition of the equipment and its housing shall be inspected regularly and a trial installation of the emergency closure shall be made at least once each year. 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 structure which might endanger its 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) *Operation.* Whenever high water conditions impend, all gates will be inspected a short time before water reaches the invert of the pipe and any object 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. Manually operated gates and valves shall be closed as necessary to prevent inflow of flood water. All drainage structures in 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 any adverse condition.

(e) *Closure structures - (1) Maintenance.* Closure structures for traffic openings shall be inspected by the Superintendent every 90 days to be certain that:

(i) No parts are missing;

(ii) Metal parts are adequately covered with paint;

(iii) All movable parts are in satisfactory working order;

(iv) Proper closure can be made promptly when necessary;

(v) Sufficient materials are on hand for the erection of sand bag closures and that the location of such materials will be readily accessible in times of emergency.

Tools and parts shall not be removed for other use. Trial erections of one or more closure structures shall be made once each year, alternating the structures chosen so that each gate will be erected at least once in each 3-year period. Trial erection of all closure structures shall be made whenever a change is made in key operating personnel. Where railroad operation makes trial erection of a closure structure infeasible, rigorous inspection and drill of operating personnel may be substituted therefor. Trial erection of sand bag closures is not required. Closure materials will be carefully checked prior to and following flood periods, and damaged or missing parts shall be repaired or replaced immediately.

(2) *Operation.* Erection of each movable closure shall be started in sufficient time to permit completion before flood waters reach the top of the structure sill. Information regarding the proper method of erecting each individual closure structure, together with an estimate of the time required by an experienced crew to complete its erection will be given in the Operation and Maintenance Manual which will be furnished local interests upon

completion of the project. Closure structures will be inspected frequently during flood periods to ascertain that no undue leakage is occurring and that drains provided to care for ordinary leakage are functioning properly. Boats or floating plant shall not be allowed to tie up to closure structures or to discharge passengers or cargo over them.

(f) *Pumping plants - (1) Maintenance.* Pumping plants shall be inspected by the Superintendent at intervals not to exceed 30 days during flood seasons and 90 days during off-flood seasons to insure that all equipment is in order for instant use. At regular intervals, proper measures shall be taken to provide for cleaning plant, building, and equipment, repainting as necessary, and lubricating all machinery. Adequate supplies of lubricants for all types of machines, fuel for gasoline or diesel powered equipment, and flash lights or lanterns for emergency lighting shall be kept on hand at all times. Telephone service shall be maintained at pumping plants. All equipment, including switch gear, transformers, motors, pumps, valves, and gates shall be trial operated and checked at least once every 90 days. Megger tests of all insulation shall be made whenever wiring has been subjected to undue dampness and otherwise at intervals not to exceed one year. A record shall be kept showing the results of such test. Wiring disclosed to be in an unsatisfactory condition by such tests shall be brought to a satisfactory condition or shall be promptly replaced. Diesel and gasoline engines shall be started at such intervals and allowed to run for such length of time as may be necessary to insure their serviceability in times of emergency. Only skilled electricians and mechanics shall be employed on test and repairs. Operating personnel for the plant shall be present during tests. Any equipment removed from the station for repair or replacement shall be returned or replaced as soon as practicable and shall be trial operated after reinstallation. Repairs requiring removal of equipment from the plant shall be made during off-flood seasons insofar as practicable.

(2) *Operation.* Competent operators shall be on duty at pumping plants whenever it appears that necessity for pump operation is imminent. The operator shall thoroughly inspect, trial operate, and place in readiness all plant equipment. The operator shall be familiar with the equipment manufacturers' instructions and drawings and with the "Operating Instructions" for each station. The equipment shall be operated in accordance with the above-mentioned "Operating Instructions" and care shall be exercised that proper lubrication is being supplied all equipment, and that no overheating, undue vibration or noise is occurring. Immediately upon final recession of flood waters, the pumping station shall be thoroughly cleaned, pump house sumps flushed, and equipment thoroughly inspected, oiled and greased. A record or log of pumping plant operation shall be kept for each station, a copy of which shall be furnished the District Engineer following each flood.

(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. Measures will be taken by the Superintendent to promote the growth of grass on bank slopes and earth deflection dikes. The Superintendent shall provide for periodic repair and cleaning of debris basins, check dams, and related structures as may be necessary.

(2) *Operation.* Both banks of the channel shall be patrolled during periods of high water, and measures shall be taken to protect those reaches being attacked by the current or by wave wash. Appropriate measures shall be taken to prevent the formation of jams of ice or 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 banks, riprap, deflection dikes and walls, drainage outlets, or other flood control structures repaired.

(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 repaired or replaced without delay. Areas used for ponding in connection with pumping plants or for temporary storage of interior runoff during flood periods shall not be allowed to become filled with silt, debris, or dumped material. The Superintendent shall take proper steps to prevent restriction of bridge openings and, where practicable, shall provide for temporary raising during floods of bridges which restrict channel capacities during high flows.

(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. (Sec. 3, 49 Stat. 1571, as amended; 33 U.S.C. 701C) {9 F.R. 9999, Aug. 17, 1944; 9 F.R. 10203, Aug. 22, 1944}

APPENDIX II

**AUTHORIZING DOCUMENT
AND
PROJECT COOPERATION AGREEMENT (PCA)**

110989..

PROJECT COOPERATION AGREEMENT
BETWEEN
THE DEPARTMENT OF THE ARMY
AND
THE CITY OF PHOENIX

FOR THE CONSTRUCTION OF THE
TRES RIOS, ARIZONA,
ECOSYSTEM RESTORATION, FLOOD CONTROL, AND RECREATION
PROJECT FEATURES ON THE NORTH SIDE OF THE GILA AND SALT RIVERS

THIS AGREEMENT is entered into this 14th day of
April, 2004, by and between the Department of the Army (hereinafter the
"Government"), represented by the Assistant Secretary of the Army (Civil Works), and the
City of Phoenix, (hereinafter the "Non-Federal Sponsor"), represented by the Deputy City
Manager.

WITNESSETH, THAT:

WHEREAS, construction of the Tres Rios, Arizona Ecosystem Restoration and
Flood Control Project at Maricopa County, Arizona (hereinafter the "Authorized Project")
was authorized by Section 101 (b)(4) of the Water Resources Development Act of 2000
(WRDA 2000);

WHEREAS, the Government and the Non-Federal Sponsor desire to enter into a
Project Cooperation Agreement (hereinafter the "Agreement") for construction of a
separable element of the Authorized Project whose features are located on the north side of
the Salt River (hereinafter the "Project", as defined in Article I.A. of this Agreement);

WHEREAS, Sponsor is the management agency for the 91st Avenue Wastewater
Treatment Plant Sub Regional Operating Group (SROG), which also includes the cities of
Glendale, Mesa, Scottsdale, and Tempe, Arizona.

WHEREAS, a separate and subsequent Project Cooperation Agreement is intended
to be implemented for the separable element of the Authorized Project whose features are
located on the south side of the Salt River on lands that include those owned by the Gila
River Indian Community;

WHEREAS, Section 103 of the Water Resources Development Act of 1986, Public
Law 99-662, as amended, specifies the cost-sharing requirements applicable to the Project;

WHEREAS, Section 221 of the Flood Control Act of 1970, Public Law 91-611, as
amended, and Section 103 of the Water Resources Development Act of 1986, Public Law
99-662, as amended, provide that the Secretary of the Army shall not commence
construction of any water resources project, or separable element thereof, until each

non-Federal sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element;

WHEREAS, the Non-Federal Sponsor does not qualify for a reduction of the maximum non-Federal cost share pursuant to the guidelines that implement Section 103(m) of the Water Resources Development Act of 1986, Public Law 99-662, as amended;

WHEREAS, Section 902 of Public Law 99-662 establishes the maximum amount of costs for the Authorized Project and sets forth procedures for adjusting such maximum amount; and

WHEREAS, the Government and Non-Federal Sponsor have the full authority and capability to perform as hereinafter set forth and intend to cooperate in cost-sharing and financing of the construction of the Project in accordance with the terms of this Agreement.

NOW, THEREFORE, the Government and the Non-Federal Sponsor agree as follows:

ARTICLE I - DEFINITIONS AND GENERAL PROVISIONS

For purposes of this Agreement:

A. The term "Project" under this PCA shall mean the ecosystem restoration features, the flood control features, the recreation features, and the environmental education features as defined in this Article and as generally described in the Tres Rios, Arizona, Feasibility Study dated September 2000, and the Report of the Chief of Engineers, dated 12 December, 2000.

B. The term "Ecosystem restoration features" shall mean a pump station and water distribution system to reestablish and support about 775 acres of native vegetation and wildlife habitat within and along approximately an 8 mile reach of the Salt River; a regulating wetland about 290 acres in size to equalize diurnal variations in discharges from the 91st Avenue treatment plant; a 300 million gallon per day pump station to convey flow of water from such treatment plant to the regulating wetland; approximately 128 acres of wetlands along the north bank of the Salt River; a water pipeline in the overbank wetland leading to series of riparian corridors totaling about 38 acres west of El Mirage Road; a series of open water/or marsh areas totaling about 134 acres within the Gila River channel west of El Mirage Road; and selective grading of locations within the Salt and Gila River channels to convey surface water to supply about 69 acres of riparian habitat.

C. The term "flood control features" shall mean approximately 6 miles of flood control levee ranging in height from 4 to 10 feet on the north bank of the Salt River approximately between the regulating wetland and Dysart Road.

D. The term "recreation features" shall mean approximately 11 miles of multi-use trails, parking lots with kiosks, and other features including ramadas, park benches, shaded areas, comfort stations, drinking fountains and informative signage.

E. The term "environmental education features" shall mean an interpretive center that includes displays and supplemental learning materials.

F. The term "total project costs" shall mean all costs incurred by the Non-Federal Sponsor and the Government in accordance with the terms of this Agreement directly related to construction of the Project. Subject to the provisions of this Agreement, the term shall include, but is not necessarily limited to: continuing planning and engineering costs incurred after October 1, 1985; advanced engineering and design costs; pre-construction engineering and design costs; engineering and design costs during construction; the costs of monitoring and adaptive management in accordance with Article II.T. of this agreement; the costs of investigations to identify the existence and extent of hazardous substances in accordance with Article XV.A. of this Agreement; costs of historic preservation activities in accordance with Article XVIII.A. of this Agreement; actual construction costs, supervision and administration costs; costs of participation in the Project Coordination Team in accordance with Article V of this Agreement; costs of contract dispute settlements or awards; the value of lands, easements, rights-of-way, relocations, and suitable borrow and dredged or excavated material disposal areas for which the Government affords credit in accordance with Article IV of this Agreement; and costs of audit in accordance with Article X of this Agreement. The term does not include any costs for operation, maintenance, repair, replacement, or rehabilitation; any costs due to betterments; or any costs of dispute resolution under Article VII of this Agreement.

G. The term "total project ecosystem restoration costs" shall mean that portion of the total project costs that the Government assigns to the ecosystem restoration features

H. The term "total project flood control costs" shall mean that portion of the total project costs that the Government assigns to the flood control features.

I. The term "total project recreation costs" shall mean that portion of the total project costs that the Government assigns to the recreation features.

J. The term "total project environmental education facilities costs" shall mean that portion of the total project costs that the Government assigns to the environmental education features.

K. The term "financial obligation for construction" shall mean a financial obligation of the Government, other than an obligation pertaining to the provision of lands, easements, rights-of-way, relocations, and borrow and dredged or excavated material disposal areas, that results or would result in a cost that is or would be included in total project costs.

L. The term "non-Federal proportionate share" shall mean the ratio of the Non-Federal Sponsor's total cash contribution required in accordance with Articles II.D.1., II.D.3,

II.E.2, II.F.2 and II.G.2 of this Agreement to total financial obligations for construction, as projected by the Government.

M. The term "period of construction" shall mean the time from the date the Government first notifies the Non-Federal Sponsor in writing, in accordance with Article VI.B. of this Agreement, of the scheduled date for issuance of the solicitation for the first construction contract to the date that the U.S. Army Engineer for the Los Angeles District (hereinafter the "District Engineer") notifies the Non-Federal Sponsor in writing of the Government's determination that, except for monitoring and adaptive management, construction of the Project is complete.

N. The term "highway" shall mean any public highway, roadway, street, or way, including any bridge thereof.

O. The term "relocation" shall mean providing a functionally equivalent facility to the owner of an existing utility, cemetery, highway or other public facility, when such action is authorized in accordance with applicable legal principles of just compensation or as otherwise provided in the authorizing legislation for the Project or any report referenced therein. Providing a functionally equivalent facility may take the form of alteration, lowering, raising, or replacement and attendant removal of the affected facility or part thereof.

P. The term "fiscal year" shall mean one fiscal year of the Government. The Government fiscal year begins on October 1 and ends on September 30.

Q. The term "functional portion of the Project" shall mean a portion of the Project that is suitable for tender to the Non-Federal Sponsor to operate and maintain in advance of completion of the entire Project. For a portion of the Project to be suitable for tender, the District Engineer must notify the Non-Federal Sponsor in writing of the Government's determination that the portion of the Project is complete and can function independently and for a useful purpose, although the balance of the Project is not complete.

R. The term "betterment" shall mean a change in the design and construction of an element of the Project resulting from the application of standards that the Government determines exceed those that the Government would otherwise apply for accomplishing the design and construction of that element.

S. The term "monitoring" shall mean monitoring of the ecosystem restoration features during the first five years following construction of the ecosystem restoration features, in order to assure that the ecosystem restoration features function properly. This term shall include, but is not necessarily limited to, monitoring the success of vegetation and habitat establishment in the ecosystem restoration features area; monitoring the restored aquatic resources associated with the ecosystem restoration features; monitoring wildlife resources associated with the restored habitats; and monitoring and early identification of the establishment of wildlife that has the potential to become a hazard to aviation safety.

T. The term "adaptive management" shall mean changes made to the ecosystem restoration features that are based on monitoring results and deemed necessary to attain the objectives of the ecosystem restoration features following their construction. The term shall include, but is not necessarily limited to, adjustments due to unforeseen circumstances and changes to structures or their operations or management methods.

U. The term "costs of water" shall mean all costs incurred by the Non-Federal Sponsor, in accordance with Article II.K. of this Agreement, to acquire, secure and maintain the quantity of water that the Government determines is necessary for the construction, operation, and maintenance of the Project. As of the effective date of this Agreement, the Cost of Water that is estimated to be continually necessary for construction, operation and maintenance of the Project is estimated to be \$1,356,600 annually, at October 2003 price level.

ARTICLE II -OBLIGATIONS OF THE GOVERNMENT AND THE NON-FEDERAL SPONSOR

A. The Government, subject to receiving funds appropriated by the Congress of the United States (hereinafter, the "Congress") and using those funds and funds provided by the Non-Federal Sponsor, shall expeditiously construct the Project, applying those procedures usually applied to Federal projects, pursuant to Federal laws, regulations, and policies.

1. The Government shall afford the Non-Federal Sponsor the opportunity to review and comment on the solicitations for all contracts, including relevant plans and specifications, prior to the Government's issuance of such solicitations. The Government shall not issue the solicitation for the first construction contract until the Non-Federal Sponsor has confirmed in writing its willingness to proceed with the Project. To the extent possible, the Government shall afford the Non-Federal Sponsor the opportunity to review and comment on all contract modifications, including change orders, prior to the issuance to the contractor of a Notice to Proceed. In any instance where providing the Non-Federal Sponsor with notification of a contract modification or change order is not possible prior to issuance of the Notice to Proceed, the Government shall provide such notification in writing at the earliest date possible. To the extent possible, the Government also shall afford the Non-Federal Sponsor the opportunity to review and comment on all contract claims prior to resolution thereof. The Government shall consider in good faith the comments of the Non-Federal Sponsor, but the contents of solicitations, award of contracts, execution of contract modifications, issuance of change orders, resolution of contract claims, and performance of all work on the Project (whether the work is performed under contract or by Government personnel), shall be exclusively within the control of the Government.

2. Throughout the period of construction, the District Engineer shall furnish the Non-Federal Sponsor with a copy of the Government's Written Notice of Acceptance of Completed Work for each contract for the Project.

3. As of the effective date of this Agreement, \$6,198,810.05 of Federal funds have been made available for the Authorized Project of which \$6,198,810.05 is available for the Project. The Government makes no commitment to budget for additional Federal funds for the Authorized Project. Notwithstanding any other provision of this Agreement, the Government's financial participation in the Authorized Project, including the Project, is limited to this amount together with any additional funds that the Congress may appropriate for the Authorized Project. In the event that the Congress does not appropriate Federal funds for the Authorized Project sufficient to meet the Federal share of the costs of work on the Project and other elements of the Authorized Project in the then-current or upcoming fiscal year, the Government shall notify the Non-Federal Sponsor of the insufficiency of funds and the parties, within the Federal and non-Federal funds available for the Project, shall suspend construction or terminate this Agreement in accordance with Article XIV.B. of this Agreement. To provide for this eventuality, the Government may reserve a percentage of total Federal funds available for the Project and an equal percentage of the total funds contributed by the Non-Federal Sponsor in accordance with Articles II.D., II.E. and II.F. of this Agreement, as applicable, and a percentage of the total funds contributed by the Non-Federal Sponsor in accordance with Article II.G. of this Agreement, as applicable, as a contingency to pay costs of termination, including any costs of resolution of contract claims and contract modifications.

B. The Non-Federal Sponsor may request the Government to accomplish betterments. Such requests shall be in writing and shall describe the betterments requested to be accomplished. If the Government in its sole discretion elects to accomplish the requested betterments or any portion thereof, it shall so notify the Non-Federal Sponsor in a writing that sets forth any applicable terms and conditions, which must be consistent with this Agreement. In the event of conflict between such a writing and this Agreement, this Agreement shall control. The Non-Federal Sponsor shall be solely responsible for all costs due to the requested betterments and shall pay all such costs in accordance with Article VI.C. of this Agreement.

C. When the District Engineer determines that, except for monitoring and adaptive management, the entire Project is complete or that a portion of the Project has become a functional portion of the Project, the District Engineer shall so notify the Non-Federal Sponsor in writing and furnish the Non-Federal Sponsor with an Operation, Maintenance, Repair, Replacement, and Rehabilitation Manual (hereinafter the "OMRR&R Manual") and with copies of all of the Government's Written Notices of Acceptance of Completed Work for all contracts for the Project or the functional portion of the Project that have not been provided previously. Upon such notification, the Non-Federal Sponsor shall operate, maintain, repair, replace, and rehabilitate the entire Project or the functional portion of the Project in accordance with Article VIII of this Agreement. Further, on the date of such notice, the monitoring and adaptive management period described in paragraph T.1. of this Article shall begin for the entire Project, or functional portion of the Project pertaining to the ecosystem restoration features, as applicable. The monitoring and adaptive management of the ecosystem restoration features shall be performed concurrently with the Non-Federal

Sponsor's responsibilities for operation, maintenance, repair, replacement, and rehabilitation of the ecosystem restoration features in accordance with Article VIII of this Agreement.

D. The Non-Federal Sponsor shall contribute a minimum of 35 percent, but not to exceed 50 percent, of total project flood control costs in accordance with the provisions of this paragraph.

1. The Non-Federal Sponsor shall provide a cash contribution equal to 5 percent of total project flood control costs in accordance with Article VI.B. of this Agreement.

2. In accordance with Article III of this Agreement, the Non-Federal Sponsor shall provide all lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas that the Government determines the Non-Federal Sponsor must provide for the construction, operation, and maintenance of the flood control features, and shall perform or ensure performance of all relocations that the Government determines to be necessary for the construction, operation, and maintenance of the flood control features.

3. If the Government projects that the value of the Non-Federal Sponsor's contributions under paragraphs D.1. and D.2. of this Article and Articles V, X, and XV.A. of this Agreement will be less than 35 percent of total project flood control costs, the Non-Federal Sponsor shall provide an additional cash contribution, in accordance with Article VI.B. of this Agreement, in the amount necessary to make the Non-Federal Sponsor's total contribution equal to 35 percent of total project flood control costs.

4. If the Government determines that the value of the Non-Federal Sponsor's contributions provided under paragraph D.2. of this Article and Articles V, X, and XV.A. of this Agreement has exceeded 45 percent of total project flood control costs, the Government, subject to the availability of funds, shall reimburse the Non-Federal Sponsor for any such value in excess of 45 percent of total project flood control costs. After such a determination, the Government, in its sole discretion, may provide any remaining lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas and perform any remaining relocations on behalf of the Non-Federal Sponsor that are required for the flood control features.

E. The Non-Federal Sponsor shall contribute 35 percent of total project ecosystem restoration costs in accordance with the provisions of this paragraph.

1. In accordance with Article III of this Agreement, the Non-Federal Sponsor shall provide all lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas that the Government determines the Non-Federal Sponsor must provide for the construction, operation, and maintenance of the ecosystem restoration features, and shall perform or ensure performance of all relocations that the Government determines to be necessary for the construction, operation, and maintenance of the ecosystem restoration features.

2. If the Government projects that the value of the Non-Federal Sponsor's contributions under paragraphs E.1. of this Article and Articles V, X, and XV.A. of this Agreement will be less than 35 percent of total project ecosystem restoration costs, the Non-Federal Sponsor shall provide an additional cash contribution, in accordance with Article VI.B. of this Agreement, in the amount necessary to make the Non-Federal Sponsor's total contribution equal to 35 percent of total project ecosystem restoration costs.

3. If the Government determines that the value of the Non-Federal Sponsor's contributions provided under paragraph E.1. of this Article and Articles V, X, and XV.A. of this Agreement has exceeded 35 percent of total project ecosystem restoration costs, the Government, subject to the availability of funds, shall reimburse the Non-Federal Sponsor for any such value in excess of 35 percent of total project ecosystem restoration costs. After such a determination, the Government, in its sole discretion, may provide any remaining lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas and perform any remaining relocations on behalf of the Non-Federal Sponsor that are required for the ecosystem restoration features.

F. The Non-Federal Sponsor shall contribute 50 percent of total project recreation costs in accordance with the provisions of this paragraph.

1. In accordance with Article III of this Agreement, the Non-Federal Sponsor shall provide all lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas that the Government determines the Non-Federal Sponsor must provide for the construction, operation, and maintenance of the recreation features, and shall perform or ensure performance of all relocations that the Government determines to be necessary for the construction, operation, and maintenance of the recreation features.

2. If the Government projects that the value of the Non-Federal Sponsor's contributions under paragraphs F.1. of this Article and Articles V, X, and XV.A. of this Agreement will be less than 50 percent of total project recreation costs, the Non-Federal Sponsor shall provide an additional cash contribution, in accordance with Article VI.B. of this Agreement, in the amount necessary to make the Non-Federal Sponsor's total contribution equal to 50 percent of total project recreation costs.

3. If the Government determines that the value of the Non-Federal Sponsor's contributions provided under paragraph F.1 of this Article and Articles V, X, and XV.A. of this Agreement has exceeded 50 percent of total project recreation costs, the Government, subject to the availability of funds, shall reimburse the Non-Federal Sponsor for any such value in excess of 50 percent of total project recreation costs. After such a determination, the Government, in its sole discretion, may provide any remaining lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas and perform any remaining relocations on behalf of the Non-Federal Sponsor that are required for the recreation features.

G. The Non-Federal Sponsor shall contribute 100 percent of total project environmental education facilities costs in accordance with the provisions of this paragraph.

1. In accordance with Article III of this Agreement, the Non-Federal Sponsor shall provide all lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas that the Government determines the Non-Federal Sponsor must provide for the construction, operation, and maintenance of the environmental education features, and shall perform or ensure performance of all relocations that the Government determines to be necessary for the construction, operation, and maintenance of the environmental education features.

2. In addition to the contributions of the Non-Federal Sponsor under paragraph G.1. of this Article, the Non-Federal Sponsor shall provide a cash contribution equal to 100 percent of the total project environmental education facilities costs in accordance with Article VI.B. of this Agreement.

H. The Non-Federal Sponsor may request the Government to provide lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas or perform relocations on behalf of the Non-Federal Sponsor. Such requests shall be in writing and shall describe the services requested to be performed. If in its sole discretion the Government elects to perform the requested services or any portion thereof, it shall so notify the Non-Federal Sponsor in a writing that sets forth any applicable terms and conditions, which must be consistent with this Agreement. In the event of conflict between such a writing and this Agreement, this Agreement shall control. The Non-Federal Sponsor shall be solely responsible for all costs of the requested services and shall pay all such costs in accordance with Article VI.C. of this Agreement. Notwithstanding the provision of lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas or performance of relocations by the Government, the Non-Federal Sponsor shall be responsible, as between the Government and the Non-Federal Sponsor, for the costs of cleanup and response in accordance with Article XV.C. of this Agreement.

I. The Government shall perform a final accounting in accordance with Article VI.D. of this Agreement to determine the contributions provided by the Non-Federal Sponsor in accordance with paragraphs B., D., E., F., G., and H. of this Article and Articles V, X, and XV.A. of this Agreement and to determine whether the Non-Federal Sponsor has met its obligations under paragraphs B., D., E., F., and G. of this Article.

J. The Non-Federal Sponsor shall not use Federal funds to meet the Non-Federal Sponsor's share of total project costs under this Agreement unless the Federal granting agency verifies in writing that the expenditure of such funds is expressly authorized by statute.

K. The Non-Federal Sponsor shall, for so long as the Project remains authorized, acquire, secure, provide, and maintain the quantity of water for such periods that the Government determines is necessary for the construction, operation, and maintenance of the Project, at no cost to the Government.

L. The Non-Federal Sponsor shall prevent obstructions of or encroachments on Project lands, easements, and rights-of-way (including prescribing and enforcing regulations to prevent such obstructions or encroachments) which might reduce the environmental restoration or level of flood protection it affords, or hinder its operation and maintenance, or interfere with the proper functioning of the Project.

M. The Non-Federal Sponsor shall prevent future recreation features or facilities, or the use thereof, from significantly impacting or interfering with the intended functions of the ecosystem restoration and flood control features of the Project.

N. The Non-Federal Sponsor shall provide and maintain necessary access roads, parking areas, and other public use facilities, open and available to all on equal terms.

O. The Non-Federal Sponsor shall participate in and comply with applicable Federal floodplain management and flood insurance programs.

P. Not less than once each year, the Non-Federal Sponsor shall inform affected interests of the limitations of the protection afforded by the Project.

Q. The Non-Federal Sponsor shall publicize flood plain information in the area concerned and shall provide this information to zoning and other regulatory agencies for their use in preventing unwise future development in the flood plain and in adopting such regulations as may be necessary to prevent unwise future development and to ensure compatibility with protection levels provided by the Project.

R. The Non-Federal Sponsor shall comply with Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S.C. 701b-12), which requires a Non-Federal interest to have prepared within one year after the date of signing this Agreement, a floodplain management plan. The plan shall be designed to reduce the impacts of future flood events in the project area, including but not limited to, addressing those measures to be undertaken by Non-Federal interests to preserve the level of flood protection provided by this Project. As required by Section 402, as amended, the Non-Federal interest shall implement such plan not later than one year after completion of construction of the Project. The Non-Federal Sponsor shall provide an information copy of the plan to the Government upon its preparation.

S. The costs of identification, survey and evaluation of historic properties and the costs of mitigation and data recovery activities associated with historic preservation shall be shared in accordance with the provisions of Article XVIII of this Agreement.

T. During the monitoring and adaptive management period, the Government shall perform monitoring and, if necessary, adaptive management of the ecosystem restoration features in accordance with the provisions of this paragraph.

1. The monitoring and adaptive management period shall be a period of five years beginning on the date of the District Engineer's notice to the Non-Federal Sponsor

in accordance with Article II.C. of this Agreement that the entire Project, or a functional portion of the Project pertaining to the ecosystem restoration features, is complete. If the District Engineer's notice addresses only a functional portion of the Project pertaining to the ecosystem restoration features, the monitoring and adaptive management period for that functional portion shall be a period of five years beginning on the date of such notice. Any monitoring or adaptive management required or performed after such five year period shall be the responsibility of the Non-Federal Sponsor at no cost to the Government.

2. Monitoring results shall be compared to success criteria identified for the ecosystem restoration features to determine if adaptive management measures are necessary. The total costs of monitoring shall not exceed one percent of the total cost of the ecosystem restoration features of the Project.

3. Adaptive management shall be undertaken if the Government, after consultation with the Non-Federal Sponsor, determines adjustments or changes are necessary to attain the objectives of the ecosystem restoration features. The total cost of adaptive management shall not exceed one percent of the total cost of the ecosystem restoration features of the Project.

ARTICLE III -LANDS, RELOCATIONS, DISPOSAL AREAS, AND PUBLIC LAW 91-646 COMPLIANCE

A. The Government, after consultation with the Non-Federal Sponsor, shall determine the lands, easements, and rights-of-way required for the construction, operation, and maintenance of the Project, including those required for relocations, borrow materials, and dredged or excavated material disposal. The Government in a timely manner shall provide the Non-Federal Sponsor with general written descriptions, including maps as appropriate, of the lands, easements, and rights-of-way that the Government determines the Non-Federal Sponsor must provide, in detail sufficient to enable the Non-Federal Sponsor to fulfill its obligations under this paragraph, and shall provide the Non-Federal Sponsor with a written notice to proceed with acquisition of such lands, easements, and rights-of-way. In such general written descriptions, the Government shall delineate which of such lands, easements, and rights-of-way are required for the flood control features, the ecosystem restoration features, the recreation features, and the environmental education features. Prior to the end of the period of construction, the Non-Federal Sponsor shall acquire all lands, easements, and rights-of-way set forth in such descriptions. Furthermore, prior to issuance of the solicitation for each construction contract, the Non-Federal Sponsor shall provide the Government with authorization for entry to all lands, easements, and rights-of-way the Government determines the Non-Federal Sponsor must provide for that contract. For so long as the Project remains authorized, the Non-Federal Sponsor shall ensure that lands, easements, and rights-of-way that the Government determines to be required for the operation and maintenance of the Project and that were provided by the Non-Federal Sponsor are retained in public ownership for uses compatible with the authorized purposes of the Project.

B. The Government, after consultation with the Non-Federal Sponsor, shall determine the improvements required on lands, easements, and rights-of-way to enable the proper disposal of dredged or excavated material associated with the construction, operation, and maintenance of the Project. Such improvements may include, but are not necessarily limited to, retaining dikes, wasteweirs, bulkheads, embankments, monitoring features, stilling basins, and de-watering pumps and pipes. The Government in a timely manner shall provide the Non-Federal Sponsor with general written descriptions of such improvements in detail sufficient to enable the Non-Federal Sponsor to fulfill its obligations under this paragraph, and shall provide the Non-Federal Sponsor with a written notice to proceed with construction of such improvements. In such general written descriptions, the Government shall delineate which of such improvements are required for the flood control features, the environmental restoration features, the recreation features, and the environmental education features. Prior to the end of the period of construction, the Non-Federal Sponsor shall provide all improvements set forth in such descriptions. Furthermore, prior to issuance of the solicitation for each Government construction contract, the Non-Federal Sponsor shall prepare plans and specifications for all improvements the Government determines to be required for the proper disposal of dredged or excavated material under that contract, submit such plans and specifications to the Government for approval, and provide such improvements in accordance with the approved plans and specifications.

C. The Government, after consultation with the Non-Federal Sponsor, shall determine the relocations necessary for the construction, operation, and maintenance of the Project, including those necessary to enable the removal of borrow materials and the proper disposal of dredged or excavated material. The Government in a timely manner shall provide the Non-Federal Sponsor with general written descriptions, including maps as appropriate, of such relocations in detail sufficient to enable the Non-Federal Sponsor to fulfill its obligations under this paragraph, and shall provide the Non-Federal Sponsor with a written notice to proceed with such relocations. In such general written descriptions, the Government shall delineate which of such relocations are necessary for the flood control features, the environmental restoration features, the recreation features, and the environmental education features. Prior to the end of the period of construction, the Non-Federal Sponsor shall perform or ensure the performance of all relocations as set forth in such descriptions. Furthermore, prior to issuance of the solicitation for each Government construction contract, the Non-Federal Sponsor shall prepare or ensure the preparation of plans and specifications for, and perform or ensure the performance of, all relocations the Government determines to be necessary for that contract.

D. The Non-Federal Sponsor in a timely manner shall provide the Government with such documents as are sufficient to enable the Government to determine the value of any contribution provided pursuant to paragraphs A., B., or C. of this Article. Upon receipt of such documents the Government, in accordance with Article IV of this Agreement and in a timely manner, shall determine the value of such contribution; include such value in total project costs; assign that value to total project flood control costs, total project environmental restoration costs, total project recreation costs, or total project environmental education facilities cost; and afford credit for such value toward the Non-Federal Sponsor's

share of total project flood control costs, total project environmental restoration costs, total project recreation costs, or total project environmental education facilities costs.

E. The Non-Federal Sponsor shall comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 C.F.R. Part 24, in acquiring lands, easements, and rights-of-way required for the construction, operation, and maintenance of the Project, including those necessary for relocations, borrow materials, and dredged or excavated material disposal, and shall inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

ARTICLE IV -CREDIT FOR VALUE OF LANDS, RELOCATIONS, AND DISPOSAL AREAS

A. The Non-Federal Sponsor shall receive credit toward its share of total project costs for the value of the lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas that the Non-Federal Sponsor must provide pursuant to Article III of this Agreement for the flood control features, ecosystem restoration features and recreation features, and for the value of the relocations that the Non-Federal Sponsor must perform or for which it must ensure performance pursuant to Article III of this Agreement for the flood control features, ecosystem restoration features and recreation features. However, the Non-Federal Sponsor shall not receive credit for the value of separable lands, easements, rights-of-way, relocations, or borrow and dredged or excavated material disposal areas that the Non-Federal Sponsor must provide or perform pursuant to Article III of this Agreement for the environmental education features. Further, the Non-Federal Sponsor shall not receive credit for the value of any lands, easements, rights-of-way, relocations, or borrow and dredged or excavated material disposal areas that have been provided previously as an item of cooperation for another Federal project. The Non-Federal Sponsor also shall not receive credit for the value of lands, easements, rights-of-way, relocations, or borrow and dredged or excavated material disposal areas to the extent that such items are provided using Federal funds unless the Federal granting agency verifies in writing that such credit is expressly authorized by statute.

B. For the sole purpose of affording credit in accordance with this Agreement, the value of lands, easements, and rights-of-way, including those necessary for relocations, borrow materials, and dredged or excavated material disposal, shall be the fair market value of the real property interests, plus certain incidental costs of acquiring those interests, as determined in accordance with the provisions of this paragraph.

1. Date of Valuation. The fair market value of lands, easements, or rights-of-way owned by the Non-Federal Sponsor on the effective date of this Agreement shall be the fair market value of such real property interests as of the date the Non-Federal Sponsor provides the Government with authorization for entry thereto. The fair market value of

lands, easements, or rights-of-way acquired by the Non-Federal Sponsor after the effective date of this Agreement shall be the fair market value of such real property interests at the time the interests are acquired.

2. General Valuation Procedure. Except as provided in paragraph B.3. of this Article, the fair market value of lands, easements, or rights-of-way shall be determined in accordance with paragraph B.2.a. of this Article, unless thereafter a different amount is determined to represent fair market value in accordance with paragraph B.2.b. of this Article.

a. The Non-Federal Sponsor shall obtain, for each real property interest, an appraisal that is prepared by a qualified appraiser who is acceptable to the Non-Federal Sponsor and the Government. The appraisal must be prepared in accordance with the applicable rules of just compensation, as specified by the Government. The fair market value shall be the amount set forth in the Non-Federal Sponsor's appraisal, if such appraisal is approved by the Government. In the event the Government does not approve the Non-Federal Sponsor's appraisal, the Non-Federal Sponsor may obtain a second appraisal, and the fair market value shall be the amount set forth in the Non-Federal Sponsor's second appraisal, if such appraisal is approved by the Government. In the event the Government does not approve the Non-Federal Sponsor's second appraisal, or the Non-Federal Sponsor chooses not to obtain a second appraisal, the Government shall obtain an appraisal, and the fair market value shall be the amount set forth in the Government's appraisal, if such appraisal is approved by the Non-Federal Sponsor. In the event the Non-Federal Sponsor does not approve the Government's appraisal, the Government, after consultation with the Non-Federal Sponsor, shall consider the Government's and the Non-Federal Sponsor's appraisals and determine an amount based thereon, which shall be deemed to be the fair market value.

b. Where the amount paid or proposed to be paid by the Non-Federal Sponsor for the real property interest exceeds the amount determined pursuant to paragraph B.2.a. of this Article, the Government, at the request of the Non-Federal Sponsor, shall consider all factors relevant to determining fair market value and, in its sole discretion, after consultation with the Non-Federal Sponsor, may approve in writing an amount greater than the amount determined pursuant to paragraph B.2.a. of this Article, but not to exceed the amount actually paid or proposed to be paid. If the Government approves such an amount, the fair market value shall be the lesser of the approved amount or the amount paid by the Non-Federal Sponsor, but no less than the amount determined pursuant to paragraph B.2.a. of this Article.

3. Eminent Domain Valuation Procedure. For lands, easements, or rights-of-way acquired by eminent domain proceedings instituted after the effective date of this Agreement, the Non-Federal Sponsor shall, prior to instituting such proceedings, submit to the Government notification in writing of its intent to institute such proceedings and an appraisal of the specific real property interests to be acquired in such proceedings. The Government shall have 60 days after receipt of such a notice and appraisal within which to review the appraisal, if not previously approved by the Government in writing.

a. If the Government previously has approved the appraisal in writing, or if the Government provides written approval of, or takes no action on, the appraisal within such 60-day period, the Non-Federal Sponsor shall use the amount set forth in such appraisal as the estimate of just compensation for the purpose of instituting the eminent domain proceeding.

b. If the Government provides written disapproval of the appraisal, including the reasons for disapproval, within such 60-day period, the Government and the Non-Federal Sponsor shall consult in good faith to promptly resolve the issues or areas of disagreement that are identified in the Government's written disapproval. If, after such good faith consultation, the Government and the Non-Federal Sponsor agree as to an appropriate amount, then the Non-Federal Sponsor shall use that amount as the estimate of just compensation for the purpose of instituting the eminent domain proceeding. If, after such good faith consultation, the Government and the Non-Federal Sponsor cannot agree as to an appropriate amount, then the Non-Federal Sponsor may use the amount set forth in its appraisal as the estimate of just compensation for the purpose of instituting the eminent domain proceeding.

c. For lands, easements, or rights-of-way acquired by eminent domain proceedings instituted in accordance with sub-paragraph B.3. of this Article, fair market value shall be either the amount of the court award for the real property interests taken, to the extent the Government determined such interests are required for the construction, operation, and maintenance of the Project, or the amount of any stipulated settlement or portion thereof that the Government approves in writing.

4. Incidental Costs. For lands, easements, or rights-of-way acquired by the Non-Federal Sponsor within a five-year period preceding the effective date of this Agreement, or at any time after the effective date of this Agreement, the value of the interest shall include the documented incidental costs of acquiring the interest, as determined by the Government, subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of costs. Such incidental costs shall include, but not necessarily be limited to, closing and title costs, appraisal costs, survey costs, attorney's fees, plat maps, and mapping costs, as well as the actual amounts expended for payment of any Public Law 91-646 relocation assistance benefits provided in accordance with Article III.E. of this Agreement.

C. After consultation with the Non-Federal Sponsor, the Government shall determine the value of relocations in accordance with the provisions of this paragraph.

1. For a relocation other than a highway, the value shall be only that portion of relocation costs that the Government determines is necessary to provide a functionally equivalent facility, reduced by depreciation, as applicable, and by the salvage value of any removed items.

2. For a relocation of a highway, the value shall be only that portion of relocation costs that would be necessary to accomplish the relocation in accordance with the design standard that the State of Arizona would apply under similar conditions of geography and traffic load, reduced by the salvage value of any removed items.

3. Relocation costs shall include, but not necessarily be limited to, actual costs of performing the relocation; planning, engineering and design costs; supervision and administration costs; and documented incidental costs associated with performance of the relocation, but shall not include any costs due to betterments, as determined by the Government, nor any additional cost of using new material when suitable used material is available. Relocation costs shall be subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of costs.

4. Any credit afforded for the value of relocations performed within the Project boundaries is subject to satisfactory compliance with applicable Federal labor laws covering non-Federal construction, including, but not limited to, 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a *et seq.*), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 *et seq.*) and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c)). Crediting may be withheld, in whole or in part, as a result of the Non-Federal Sponsor's failure to comply with its obligations under these laws.

D. The value of the improvements made to lands, easements, and rights-of-way for the proper disposal of dredged or excavated material shall be the costs of the improvements, as determined by the Government, subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of costs. Such costs shall include, but not necessarily be limited to, actual costs of providing the improvements; planning, engineering and design costs; supervision and administration costs; and documented incidental costs associated with providing the improvements, but shall not include any costs due to betterments, as determined by the Government.

ARTICLE V -PROJECT COORDINATION TEAM

A. To provide for consistent and effective communication, the Non-Federal Sponsor and the Government, not later than 30 days after the effective date of this Agreement, shall appoint named senior representatives to a Project Coordination Team. Thereafter, the Project Coordination Team shall meet regularly until the end of the period of construction. The Government's Project Manager and a counterpart named by the Non-Federal Sponsor shall co-chair the Project Coordination Team.

B. The Government's Project Manager and the Non-Federal Sponsor's counterpart shall keep the Project Coordination Team informed of the progress of construction and of significant pending issues and actions, and shall seek the views of the Project Coordination Team on matters that the Project Coordination Team generally oversees.

C. Until the end of the period of construction, the Project Coordination Team shall generally oversee the Project, including issues related to design; plans and specifications; scheduling; real property and relocation requirements; real property acquisition; contract awards and modifications; contract costs; the application of and compliance with 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a *et seq.*), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 *et seq.*) and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c)) for relocations; the Government's cost projections; final inspection of the entire Project or functional portions of the Project; preparation of the proposed OMR&R Manual; performance of monitoring and adaptive management; anticipated requirements and needed capabilities for performance of operation, maintenance, repair, replacement, and rehabilitation of the Project; requirements of the monitoring; implementation of any adaptive management changes; and other related matters. This oversight shall be consistent with a project management plan developed by the Government after consultation with the Non-Federal Sponsor.

D. The Project Coordination Team may make recommendations that it deems warranted to the District Engineer on matters that the Project Coordination Team generally oversees, including suggestions to avoid potential sources of dispute. The Government in good faith shall consider the recommendations of the Project Coordination Team. The Government, having the legal authority and responsibility for construction of the Project, has the discretion to accept, reject, or modify the Project Coordination Team's recommendations.

E. The costs of participation in the Project Coordination Team shall be included in total project costs and cost shared in accordance with the provisions of this Agreement. However, the Non-Federal Sponsor shall not receive credit for the costs of participation in the Project Coordination Team that pertain to the environmental education features.

ARTICLE VI -METHOD OF PAYMENT

A. The Government shall maintain current records of contributions provided by the parties and current projections of total project costs and costs due to betterments. By July 1st of each year and at least quarterly thereafter, the Government shall provide the Non-Federal Sponsor with a report setting forth all contributions provided to date and the current projections of total project costs, of total costs due to betterments, of the maximum amount of total project costs determined in accordance with Article XIX of this Agreement, of the components of total project costs, of each party's share of total project costs, of the Non-Federal Sponsor's total cash contributions required in accordance with Articles II.B., II.D., II.E., II.F., II.G., and II.H. of this Agreement, of the non-Federal proportionate share, and of the funds the Government projects to be required from the Non-Federal Sponsor for the upcoming fiscal year. On the effective date of this Agreement, total project costs for Phases I-III are projected to be \$90,810,000 (at October 2003 price levels), and the Non-Federal Sponsor's cash contribution required under Article II.D. of this Agreement is projected to be

\$15,749,000 with an estimated \$18,290,000 in LERRDS, (at October 2003 price levels). Such amounts are estimates subject to adjustment by the Government and are not to be construed as the total financial responsibilities of the Government and the Non-Federal Sponsor.

B. The Non-Federal Sponsor shall provide the cash contribution required under Articles II.D.1., II.D.3., II.E.2., II.F.2., and II.G.2. of this Agreement in accordance with the provisions of this paragraph.

1. Not less than 30 calendar days prior to the scheduled date for issuance of the solicitation for the first construction contract, the Government shall notify the Non-Federal Sponsor in writing of such scheduled date and the funds the Government determines to be required from the Non-Federal Sponsor to meet the non-Federal proportionate share of projected financial obligations for construction through the first fiscal year of construction, including the non-Federal proportionate share of financial obligations for construction incurred prior to the commencement of the period of construction. Not later than such scheduled date, the Non-Federal Sponsor shall provide the Government with the full amount of the required funds by delivering a check payable to "FAO, USAED, Los Angeles" to the District Engineer or verifying to the satisfaction of the Government that the Non-Federal Sponsor has deposited the required funds in an escrow or other account acceptable to the Government, with interest accruing to the Non-Federal Sponsor or presenting the Government with an irrevocable letter of credit acceptable to the Government for the required funds or providing an Electronic Funds Transfer in accordance with procedures established by the Government.

2. For the second and subsequent fiscal years of construction, the Government shall notify the Non-Federal Sponsor in writing, no later than 60 calendar days prior to the beginning of that fiscal year, of the funds the Government determines to be required from the Non-Federal Sponsor to meet the non-Federal proportionate share of projected financial obligations for construction for that fiscal year. No later than 30 calendar days prior to the beginning of the fiscal year, the Non-Federal Sponsor shall make the full amount of the required funds for that fiscal year available to the Government through any of the payment mechanisms specified in Article VI.B.1. of this Agreement.

3. The Government shall draw from the funds provided by the Non-Federal Sponsor such sums as the Government deems necessary to cover: (a) the non-Federal proportionate share of financial obligations for construction incurred prior to the commencement of the period of construction; and (b) the non-Federal proportionate share of financial obligations for construction as they are incurred during the period of construction.

4. If at any time during the period of construction the Government determines that additional funds will be needed from the Non-Federal Sponsor to cover the non-Federal proportionate share of projected financial obligations for construction for the current fiscal year, the Government shall notify the Non-Federal Sponsor in writing of the additional funds required, and provide an explanation of why additional funds are required, and the Non-Federal Sponsor, no later than 90 calendar days from receipt of such notice,

shall make the additional required funds available through any of the payment mechanisms specified in Article VI.B.1. of this Agreement.

C. In advance of the Government incurring any financial obligation associated with additional work under Article II.B. or II.H. of this Agreement, the Non-Federal Sponsor shall provide the Government with the full amount of the funds required to pay for such additional work through any of the payment mechanisms specified in Article VI.B.1. of this Agreement. The Government shall draw from the funds provided by the Non-Federal Sponsor such sums as the Government deems necessary to cover the Government's financial obligations for such additional work as they are incurred. In the event the Government determines that the Non-Federal Sponsor must provide additional funds to meet its cash contribution, the Government shall notify the Non-Federal Sponsor in writing of the additional funds required and provide an explanation of why additional funds are required. Within 90 calendar days thereafter, the Non-Federal Sponsor shall provide the Government with the full amount of the additional required funds through any of the payment mechanisms specified in Article VI.B.1. of this Agreement

D. Upon completion of the Project or termination of this Agreement, and upon resolution of all relevant claims and appeals, the Government shall conduct a final accounting and furnish the Non-Federal Sponsor with the results of the final accounting. The final accounting shall determine total project costs, each party's contribution provided thereto, and each party's required share thereof. The final accounting also shall determine costs due to betterments and the Non-Federal Sponsor's cash contribution provided pursuant to Article II.B. of this Agreement.

1. In the event the final accounting shows that the total contribution provided by the Non-Federal Sponsor is less than its required share of total project costs plus costs due to any betterments provided in accordance with Article II.B. of this Agreement, the Non-Federal Sponsor shall, no later than 90 calendar days after receipt of written notice, make a cash payment to the Government of whatever sum is required to meet the Non-Federal Sponsor's required share of total project costs plus costs due to any betterments provided in accordance with Article II.B. of this Agreement by delivering a check payable to "FAO, USAED, Los Angeles" to the District Engineer or providing an Electronic Funds Transfer in accordance with procedures established by the Government.

2. In the event the final accounting shows that the total contribution provided by the Non-Federal Sponsor exceeds its required share of total project costs plus costs due to any betterments provided in accordance with Article II.B. of this Agreement, the Government shall, subject to the availability of funds, refund the excess to the Non-Federal Sponsor no later than 90 calendar days after the final accounting is complete. In the event existing funds are not available to refund the excess to the Non-Federal Sponsor, the Government shall seek such appropriations in the next possible budget cycle as are necessary to make the refund in the succeeding fiscal year.

ARTICLE VII -DISPUTE RESOLUTION

As a condition precedent to a party bringing any suit for breach of this Agreement, that party must first notify the other party in writing of the nature of the purported breach and seek in good faith to resolve the dispute through negotiation. If the parties cannot resolve the dispute through negotiation, they may agree to a mutually acceptable method of non-binding alternative dispute resolution with a qualified third party acceptable to both parties. The parties shall each pay 50 percent of any costs for the services provided by such a third party as such costs are incurred. The existence of a dispute shall not excuse the parties from performance pursuant to this Agreement.

ARTICLE VIII - OPERATION, MAINTENANCE, REPAIR, REPLACEMENT, AND REHABILITATION (OMRR&R)

A. Upon notification in accordance with Article II.C. of this Agreement and for so long as the Project remains authorized, the Non-Federal Sponsor shall operate, maintain, repair, replace, and rehabilitate the entire Project or the functional portion of the Project, at no cost to the Government, in a manner compatible with the Project's authorized purposes and in accordance with applicable Federal and State laws as provided in Article XI of this Agreement and specific directions prescribed by the Government in the OMRR&R Manual and any subsequent amendments thereto.

B. The Non-Federal Sponsor hereby gives the Government a right to enter, at reasonable times and in a reasonable manner, upon property that the Non-Federal Sponsor owns or controls for access to the Project for the purpose of inspection and, if necessary, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the Project. If an inspection shows that the Non-Federal Sponsor for any reason is failing to perform its obligations under this Agreement, the Government shall send a written notice describing the non-performance to the Non-Federal Sponsor. If, after 90 calendar days from receipt of notice, the Non-Federal Sponsor continues to fail to perform, then the Government shall have the right to enter, at reasonable times and in a reasonable manner, upon property that the Non-Federal Sponsor owns or controls for access to the Project for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the Project. No completion, operation, maintenance, repair, replacement, or rehabilitation by the Government shall operate to relieve the Non-Federal Sponsor of responsibility to meet the Non-Federal Sponsor's obligations as set forth in this Agreement, or to preclude the Government from pursuing any other remedy at law or equity to ensure faithful performance pursuant to this Agreement.

ARTICLE IX -INDEMNIFICATION

The Non-Federal Sponsor shall hold and save the Government free from all damages arising from the construction, operation, maintenance, repair, replacement, and

rehabilitation of the Project and any Project-related betterments, except for damages due to the fault or negligence of the Government or its contractors.

ARTICLE X -MAINTENANCE OF RECORDS AND AUDIT

A. Not later than 60 calendar days after the effective date of this Agreement, the Government and the Non-Federal Sponsor shall develop procedures for keeping books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to this Agreement. These procedures shall incorporate, and apply as appropriate, the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 C.F.R. Section 33.20. The Government and the Non-Federal Sponsor shall maintain such books, records, documents, and other evidence in accordance with these procedures and for a minimum of three years after the period of construction and resolution of all relevant claims arising therefrom. To the extent permitted under applicable Federal laws and regulations, the Government and the Non-Federal Sponsor shall each allow the other to inspect such books, documents, records, and other evidence.

B. Pursuant to 32 C.F.R. Section 33.26, the Non-Federal Sponsor is responsible for complying with the Single Audit Act Amendments of 1996, 31 U.S.C. Sections 7501-7507, as implemented by Office of Management and Budget (OMB) Circular No. A-133 and Department of Defense Directive 7600.10. Upon request of the Non-Federal Sponsor and to the extent permitted under applicable Federal laws and regulations, the Government shall provide to the Non-Federal Sponsor and independent auditors any information necessary to enable an audit of the Non-Federal Sponsor's activities under this Agreement. The costs of any non-Federal audits performed in accordance with this paragraph shall be allocated in accordance with the provisions of OMB Circulars A-87 and A-133, and such costs as are allocated to the Project shall be included in total project costs and cost shared in accordance with the provisions of this Agreement. However, the Non-Federal Sponsor shall not receive credit for such allocated costs of non-Federal audits that pertain to the environmental education features.

C. In accordance with 31 U.S.C. Section 7503, the Government may conduct audits in addition to any audit that the Non-Federal Sponsor is required to conduct under the Single Audit Act Amendments of 1996. Any such Government audits shall be conducted in accordance with Government Auditing Standards and the cost principles in OMB Circular No. A-87 and other applicable cost principles and regulations. The costs of Government audits performed in accordance with this paragraph shall be included in total project costs and cost shared in accordance with the provisions of this Agreement.

ARTICLE XI -FEDERAL AND STATE LAWS

In the exercise of their respective rights and obligations under this Agreement, the Non-Federal Sponsor and the Government agree to comply with all applicable Federal

and State laws and regulations, including, but not limited to: Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d) and Department of Defense Directive 5500.11 issued pursuant thereto; Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army"; and all applicable Federal labor standards requirements including, but not limited to, 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a *et seq.*), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 *et seq.*) and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c)).

ARTICLE XII -RELATIONSHIP OF PARTIES

A. In the exercise of their respective rights and obligations under this Agreement, the Government and the Non-Federal Sponsor each act in an independent capacity, and neither is to be considered the officer, agent, or employee of the other.

B. In the exercise of its rights and obligations under this Agreement, neither party shall provide, without the consent of the other party, any contractor with a release that waives or purports to waive any rights such other party may have to seek relief or redress against such contractor either pursuant to any cause of action that such other party may have or for violation of any law.

ARTICLE XIII -OFFICIALS NOT TO BENEFIT

No member of or delegate to the Congress, nor any resident commissioner, shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom.

ARTICLE XIV -TERMINATION OR SUSPENSION

A. If at any time the Non-Federal Sponsor fails to fulfill its obligations under Article II.B., II.D., II.E., II.F., II.G., VI, or XVIII.C. of this Agreement, the Assistant Secretary of the Army (Civil Works) shall terminate this Agreement or suspend future performance under this Agreement unless he determines that continuation of work on the Project is in the interest of the United States or is necessary in order to satisfy agreements with any other non-Federal interests in connection with the Project.

B. If the Government fails to receive annual appropriations in amounts sufficient to meet Project expenditures for the then-current or upcoming fiscal year, the Government shall so notify the Non-Federal Sponsor in writing, and 60 calendar days thereafter either party may elect without penalty to terminate this Agreement or to suspend future performance under this Agreement. In the event that either party elects to suspend future performance under this Agreement pursuant to this paragraph, such suspension shall remain

in effect until such time as the Government receives sufficient appropriations or until either the Government or the Non-Federal Sponsor elects to terminate this Agreement.

C. In the event that either party elects to terminate this Agreement pursuant to this Article or Article XV of this Agreement, both parties shall conclude their activities relating to the Project and proceed to a final accounting in accordance with Article VI.D. of this Agreement.

D. Any termination of this Agreement or suspension of future performance under this Agreement in accordance with this Article or Article XV of this Agreement shall not relieve the parties of liability for any obligation previously incurred. Any delinquent payment shall be charged interest at a rate, to be determined by the Secretary of the Treasury, equal to 150 per centum of the average bond equivalent rate of the 13-week Treasury bills auctioned immediately prior to the date on which such payment became delinquent, or auctioned immediately prior to the beginning of each additional 3-month period if the period of delinquency exceeds 3 months.

ARTICLE XV - HAZARDOUS SUBSTANCES

A. After execution of this Agreement and upon direction by the District Engineer, the Non-Federal Sponsor shall perform, or cause to be performed, any investigations for hazardous substances that the Government or the Non-Federal Sponsor determines to be necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (hereinafter "CERCLA"), 42 U.S.C. Sections 9601-9675, that may exist in, on, or under lands, easements, and rights-of-way that the Government determines, pursuant to Article III of this Agreement, to be required for the construction, operation, and maintenance of the Project. However, for lands that the Government determines to be subject to the navigation servitude, only the Government shall perform such investigations unless the District Engineer provides the Non-Federal Sponsor with prior specific written direction, in which case the Non-Federal Sponsor shall perform such investigations in accordance with such written direction. All actual costs incurred by the Non-Federal Sponsor for such investigations for hazardous substances shall be included in total project costs and cost shared in accordance with the provisions of this Agreement, subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of costs. However, the Non-Federal Sponsor shall not receive credit for costs incurred by the Non-Federal Sponsor for such investigations for hazardous substances that pertain to the environmental education features.

B. In the event it is discovered through any investigation for hazardous substances or other means that hazardous substances regulated under CERCLA exist in, on, or under any lands, easements, or rights-of-way that the Government determines, pursuant to Article III of this Agreement, to be required for the construction, operation, and maintenance of the Project, the Non-Federal Sponsor and the Government shall provide prompt written notice to each other, and the Non-Federal Sponsor shall not proceed with the acquisition of the real property interests until both parties agree that the Non-Federal Sponsor should proceed.

C. The Government and the Non-Federal Sponsor shall determine whether to initiate construction of the Project, or, if already in construction, whether to continue with work on the Project, suspend future performance under this Agreement, or terminate this Agreement for the convenience of the Government, in any case where hazardous substances regulated under CERCLA are found to exist in, on, or under any lands, easements, or rights-of-way that the Government determines, pursuant to Article III of this Agreement, to be required for the construction, operation, and maintenance of the Project. Should the Government and the Non-Federal Sponsor determine to initiate or continue with construction after considering any liability that may arise under CERCLA, the Non-Federal Sponsor shall be responsible, as between the Government and the Non-Federal Sponsor, for the costs of clean-up and response, to include the costs of any studies and investigations necessary to determine an appropriate response to the contamination. Such costs shall not be considered a part of total project costs. In the event the Non-Federal Sponsor fails to provide any funds necessary to pay for clean up and response costs or to otherwise discharge the Non-Federal Sponsor's responsibilities under this paragraph upon direction by the

Government, the Government may, in its sole discretion, either terminate this Agreement for the convenience of the Government, suspend future performance under this Agreement, or continue work on the Project.

D. The Non-Federal Sponsor and the Government shall consult with each other in accordance with Article V of this Agreement in an effort to ensure that responsible parties bear any necessary clean up and response costs as defined in CERCLA. Any decision made pursuant to paragraph C. of this Article shall not relieve any third party from any liability that may arise under CERCLA.

E. As between the Government and the Non-Federal Sponsor, the Non-Federal Sponsor shall be considered the operator of the Project for purposes of CERCLA liability. To the maximum extent practicable, the Non-Federal Sponsor shall operate, maintain, repair, replace, and rehabilitate the Project in a manner that will not cause liability to arise under CERCLA.

ARTICLE XVI -NOTICES

A. Any notice, request, demand, or other communication required or permitted to be given under this Agreement shall be deemed to have been duly given if in writing and either delivered personally, by telegram or mailed by first-class, registered, or certified mail, as follows:

If to the Non-Federal Sponsor:

Deputy City Manager
City of Phoenix
200 West Washington Street, Room 1200
Phoenix, AZ 85003-1611

If to the Government:

Deputy District Engineer
Department of the Army
Corps of Engineers
Los Angeles District
ATTN: CESPL-PM-C
P.O. Box 532711
Los Angeles, California 90053-2325

B. A party may change the address to which such communications are to be directed by giving written notice to the other party in the manner provided in this Article.

C. Any notice, request, demand, or other communication made pursuant to this Article shall be deemed to have been received by the addressee at the earlier of such time as it is actually received or seven calendar days after it is mailed.

ARTICLE XVII -CONFIDENTIALITY

To the extent permitted by the laws governing each party, the parties agree to maintain the confidentiality of exchanged information when requested to do so by the providing party.

ARTICLE XVIII - HISTORIC PRESERVATION

A. The costs of identification, survey and evaluation of historic properties shall be included in total project costs and cost shared in accordance with the provisions of this Agreement.

B. As specified in Section 7(a) of Public Law 93-291 (16 U.S.C. Section 469c(a)), the costs of mitigation and data recovery activities associated with historic preservation shall be borne entirely by the Government and shall not be included in total project costs, up to the statutory limit of one percent of the total amount authorized to be appropriated for the Project.

C. The Government shall not incur costs for mitigation and data recovery that exceed the statutory one percent limit specified in paragraph B. of this Article unless and until the Assistant Secretary of the Army (Civil Works) has waived that limit in accordance with Section 208(3) of Public Law 96-515 (16 U.S.C. Section 469c-2(3)). Any costs of mitigation and data recovery attributable to the flood control features, or the ecosystem restoration features, that exceed the one percent limit shall not be included in total project costs but shall be cost shared between the Non-Federal Sponsor and the Government consistent with the minimum non-Federal cost sharing requirements for the underlying flood control purpose, or the non-Federal cost sharing requirements for the underlying ecosystem restoration purpose, as follows: 35 percent borne by the Non-Federal Sponsor, and 65 percent borne by the Government. Any costs of mitigation and data recovery attributable to the recreation features that exceed the one percent limit shall not be included in total project costs but shall be cost shared between the Non-Federal Sponsor and the Government consistent with the non-Federal cost sharing requirements for the underlying recreation purpose, as follows: 50 percent borne by the Non-Federal Sponsor, and 50 percent borne by the Government.

ARTICLE XIX -SECTION 902 PROJECT COST LIMITS

The Non-Federal Sponsor has reviewed the provisions set forth in Section 902 of Public Law 99-662, as amended, and understands that Section 902 establishes the maximum amount of total project costs for the Authorized Project. Notwithstanding any other provision of this Agreement, the Government shall not make a new Project financial obligation, make a Project expenditure, or afford credit toward total project costs for the value of any contribution provided by the Non-Federal Sponsor, if such obligation, expenditure, or credit would result in total project costs exceeding this maximum amount, unless otherwise authorized by law. On the effective date of this Agreement, this maximum

amount is estimated to be \$133,086,000, as calculated in accordance with ER 1105-2-100 using October 1, 2003 price levels and allowances for projected future inflation. The Government shall adjust this maximum amount in accordance with Section 902 of Public Law 99-662, as amended.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement, which shall become effective upon the date it is signed by the Assistant Secretary of the Army (Civil Works).

DEPARTMENT OF THE ARMY

CITY OF PHOENIX

A municipal corporation

Frank Fairbanks, City Manager

BY: *John Paul Woodley*
for John Paul Woodley
Assistant Secretary of the Army
(Civil Works)

BY: *Andrea Tevlin*
Andrea Tevlin
Deputy City Manager

By Memorandum, dated
March 8, 2004, delegated to:
Richard G. Thompson
Colonel, US Army
District Engineer

ATTEST: *Vicky Miel*
Vicky Miel, City Clerk

DATE: *14 May 2004*

DATE: *APR 19 2004*

CERTIFICATE OF AUTHORITY

I, William Bock, do hereby certify that I am the principal legal officer of the City of Phoenix, that the City of Phoenix is a legally constituted public body with full authority and legal capability to perform the terms of the Agreement between the Department of the Army and the City of Phoenix in connection with the Tres Rios, Arizona Project, and to pay damages in accordance with the terms of this Agreement, if necessary, in the event of the failure to perform, as required by Section 221 of Public Law 91-611 (42 U.S.C. Section 1962d-5b), and that the persons who have executed this Agreement on behalf of the City of Phoenix have acted within their statutory authority.

IN WITNESS WHEREOF, I have made and executed this certification this
16 day of APRIL 2004.

William Bock
William F. Bock
City of Phoenix
Chief Counsel
DUB

CERTIFICATION REGARDING LOBBYING

The undersigned certifies, to the best of his or her knowledge and belief that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Andrea Tevlin

Andrea Tevlin
Deputy City Manager
City of Phoenix, Arizona

DATE: April 19, 2004

APPROVED BY CITY COUNCIL:

DATE: April 14, 2004 - Item No. 71

APPENDIX III

SAMPLE REPORTING FORMS

APPENDIX III

SEMIANNUAL REPORTING FORMS (OPTIONAL)

INSTRUCTION FOR USE

GENERAL

1. The use of sample forms presented in this appendix is optional. Other means of reporting, as other tabular presentations or the Corps forms, can be used providing that the same basic information, operation and maintenance criteria, and maintenance accomplishment are provided. Both the spring and fall semiannual operation and maintenance reports submitted to the Corps of Engineers, Los Angeles District, are organized in basically the same way.

SEMIANNUAL LETTER REPORT

2. Sample semiannual letter report is provided in this appendix. In general, the samples are self-explanatory. Semiannual report presents a statement of:
- a. The physical condition of the protective works as summarized from the logs of inspection.
 - b. Performance of protective works during floods and flood-fighting activities during the past.
 - c. Prosecutions for encroachment or trespass.
 - d. Permits issued for rights-of-entry or use of rights-of-way.
 - e. Permits issued for improvements or construction with the flood-control improvement right-of-way.
 - f. Maintenance measured taken; nature, date of construction, date of removal of temporary repairs, date of permanent repairs.
 - g. Fiscal statement of cost of maintenance and operation for the period.

SAMPLE SEMIANNUAL LETTER REPORT

Date:

District Engineer
U.S. Army Corps of Engineers
Los Angeles District
P.O. Box 2711
Los Angeles, California 90053

Dear Sir:

The semiannual report for the period (15 October 20__ to 15 April 20__) or (15 April 20__ to 15 October 20__) on the Tres Rios Environmental Restoration, Flood Control North Levee-Phase 1A is as follows:

a. The physical condition of the protective works is indicated by the inspection reports, copies of which are enclosed 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 of anticipated maintenance operations for the following 6 months)

b. During this report period, major high water periods occurred on the following dates:

<u>DATE</u>	<u>MAX ELEVATION</u>
_____	_____
_____	_____
_____	_____

c. The inspection has indicated *(no)* or *(the following)* encroachment or trespass upon the project rights-of-way.

Action or prosecution for abatement of these encroachments or trespasses is summarized as follows:
(or state none have been necessary)

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

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

e. The status of maintenance measures indicated in the previous reports as required or as suggested by the representatives of the Commander is as follows:

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

f. The fiscal statement of the gross operation and maintenance expenditures for the current report period is as follows:

Stormflow operations	\$ _____
Inspection and reporting	_____
New permit inspection	_____
Maintenance & Repairs	_____
TOTAL	\$ _____

Comments on these expenditures are as follows:

(Comments)

Sincerely,

(name), Superintendent of Works

Enclosures

SEMIANNUAL INSPECTION REPORT
(To be submitted on 1 June and 1 December)

Project: TRES RIOS ENVIRONMENTAL RESTORATION,
FLOOD CONTROL NORTH LEVEE-PHASE 1A.

Inspector-in-charge: _____ Date: _____

Superintendent: _____ Date: _____

INSPECTION AND MAINTENANCE

FEATURE INSPECTED

CONDITIONS

1. Levee
 - a. Levee Frontslope including levee toe-down. (report any settlement, undermining, erosion or gulying)
 - b. Levee backslope. (report any landscaping, settlement, erosion or gulying)
 - c. Sod Growth
 - d. Gullies, Cracks, Holes
 - e. Levee O&M Roads (report vegetation, settlement, base failure)
 - f. Access Ramps/Turn-Around. (report on surfacing deterioration, areas requiring patching)
2. Guide Dikes
 - a. Dikes (report any settlement and erosion)
 - b. Gabion Mattress (report any settlement, undermining and gabion basket damage)
3. Collector Channel including Concrete Irrigation Sidedrains (report any damage to concrete walls and invert, construction joints, any cracks, spalls, or abrasive wear.).
4. Grouted Stone (report stone deterioration, settlement, displacement, sliding and cracking)
 - a. Grouted stone protection
 - b. Dumped stone protection

5. Detention Basin including low flow ditch (report vegetation growth and sediment/debris accumulation)
 - a. Rock mulch side slope protection
 - b. Basin design slope to drain
6. RCB Culverts (report any damage to walls, invert and top slabs, construction joints, cracks, or spalls)
 - a. Inlet Structures (report any damage to wingwalls/headwall/invert)
 - b. Trash Rack (indicate if repairs are needed for various items of metal work)
 - c. Outlet Structures (report any damage to grouted stone, concrete wingwalls/headwall/invert)
 - d. Flap Gate (indicate if repairs are needed for each flap gate)
7. Drainage Channel (record aggradation and degradation of drainage channel by visual observation)
8. Access Gates and Four-Wire Fence (indicate if repairs are needed for various items of metal works for gates and report any damage to wire, posts or galvanizing for fence)

ACTION PLANNED OR TAKEN TO CORRECT DEFICIENCIES

APPENDIX IV

SAMPLE PERMIT APPLICATION

SAMPLE PERMIT APPLICATION

The following pages provide detailed instructions for preparing the Department of Army Permit Application. If you have any questions, please call the Corps of Engineers, Regulatory Branch that has jurisdiction over your area.

**Instructions for Preparing a
Department of the Army Permit Application**

Blocks 1 through 4. To be completed by Corps of Engineers.

Block 5. Applicant's Name. Enter the name of the responsible party or parties. If the responsible party is an agency, company, corporation or other organization, indicate the responsible officer and title. If more than one party is associated with the application, please attach a sheet with the necessary information marked **Block 5**.

Block 6. Address of Applicant. Please provide the full address of the party or parties responsible for the application. If more space is needed, attach an extra sheet of paper marked **Block 6**.

Block 7. Applicant Telephone Number(s). Please provide the number where you can usually be reached during normal business hours.

Blocks 8 through 11. To be completed if you choose to have an agent.

Block 8. Authorized Agent's Name and Title. Indicate name of individual or agency, designated by you, to represent you in this process. An agent can be an attorney, builder, contractor, engineer or any other person or organization. *Note:* An agent is not required.

Block 9 and 10. Agent's Address and telephone number. Please provide the complete mailing address of the agent, along with the telephone number where he/she can be reached during normal business hours.

Block 11. Statement of Authorization. To be completed by applicant if an agent is to be employed.

Block 12. Proposed Project Name or title. Please provide name identifying the proposed project (i.e., Landmark Plaza, Burned Hills Subdivision or Edsall Commercial Center).

Block 13. Name of Waterbody. Please provide the name of any stream, lake, marsh or other waterway to be directly impacted by the activity. If it is a minor (no name) stream, identify the waterbody the minor stream enters.

Block 14. Proposed Project Street Address. If the proposed project is located at a site having a street address (not a box number), please enter here.

Block 15. Location of Proposed Project. Enter the county and state where the proposed project is located. If more space is required, please attach a sheet with the necessary information marked **Block 15**.

Block 16. Other Location Descriptions. If available, provide the Section, Township and Range of the site and/or the latitude and longitude. You may also provide description of the proposed project location, such as lot numbers, tract numbers or you may choose to locate the proposed project site from a known point (such as the right descending bank of Smith Creek, one mile down from the Highway 14 bridge). If a large river or stream, include the river mile of the proposed project site if known.

Block 17. Directions to the Site. Provide directions to the site from a known location or landmark. Include highway and street numbers as well as names. Also provide distances from known locations and any other information that would assist in locating the site.

Block 18. Nature of Activity. Describe the overall activity or project. Give appropriate dimensions of structures such as wingwalls, dikes (identify the materials to be used in construction, as well as the methods by which the work is to be done), or excavations (length, width, and height). Indicate whether discharge of dredged or fill material is involved. Also, identify any structure to be constructed on a fill, piles or float supported platforms.

The written descriptions and illustrations are an important part of the application. Please describe, in detail, what you wish to do. If more space is needed, attach an extra sheet of paper marked **Block 18**.

Block 19. Proposed Project Purpose. Describe the purpose and need for the proposed project. What will it be used for and

why? Also, include a brief description of any related activities to be developed as the result of the proposed project. Give the approximate dates you plan to both begin and complete all work.

Block 20. Reason(s) for Discharge. If the activity involves the discharge of dredged and/or fill material into a wetland or other waterbody, including the temporary placement of material, explain the specific purpose of the placement of the material (such as erosion control).

Block 21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards. Describe the material to be discharged and amount of each material to be discharged within Corps jurisdiction. Please be sure this description will agree with your illustrations. Discharge material includes: rock, sand, clay, concrete, etc.

Block 22. Surface Areas of Wetlands or Other Waters Filled. Describe the area to be filled at each location. Specifically identify the surface areas, or part thereof, to be filled. Also include the means by which the discharge is to be done (backhoe, dragline, etc.). If dredged material is to be discharged on an upland site, identify the site and the steps to be taken (if necessary) to prevent runoff from the dredged material back into a waterbody. If more space is needed, attach an extra sheet of paper marked **Block 22.**

Block 23. Is any portion of the Work Already Complete? Provide any background on any part of the proposed project already completed. Describe the area already developed, structures completed, any dredged or fill material already discharged, the type of material, volume in cubic yards, acres filled, if a wetland or other waterbody (in acres or square feet). If the work was done under an existing Corps permit, identify the authorization if possible.

Block 24. Names and Addresses of Adjoining Property Owners, Lessees, etc., Whose Property Adjoins the Project Site. List complete names and full mailing addresses of the adjacent property owners (public and private) lessees, etc., whose property adjoins the waterbody or aquatic site where the work is being proposed so that they may be notified of the proposed activity (usually by public notice). If more space is needed, attach an extra sheet of paper marked **Block 24.**

Information regarding adjacent landowners is usually available through the office of the tax assessor in the county of counties where the project is to be developed.

Block 25. Information about Approvals or Denials by Other Agencies. You may need the approval of other Federal, state or local agencies for your project. Identify any application you have submitted and the status, if any (approved or denied) of each application. You need not have obtained all other permits before applying for a Corps permit.

Block 26. Signature of Applicant or Agent. The application must be signed by the owner or other authorized party (agent). This signature shall be an affirmation that the party applying for the permit possesses the requisite property rights to undertake the activity applied for (including compliance with special conditions, mitigation, etc.).

DRAWINGS AND ILLUSTRATIONS

General Information

Three types of illustrations are needed to properly depict the work to be undertaken. These illustrations or drawings are identified as a **Vicinity Map**, a **Plan View** or a **Typical Cross-section Map**. Identify each illustration with a figure or attachment number.

Please submit one original, or good quality copy, of all drawings on 8 ½x11 inch plain white paper (tracing paper or film may be substituted). Use the fewest number of sheets necessary for your drawings or illustrations.

Each illustration should identify the project, the applicant, and the type of illustration (vicinity map, plan view or cross section). **While illustrations need not be professional (many small, private illustrations are prepared by hand), they should be clear, accurate and contain all necessary information.**

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT
(33 CFR 325)

OMB APPROVAL NO. 0710-003
Expires October 1996

Public reporting burden for this collection of information is estimated to average 5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction

PRIVACY ACT STATEMENT

Authority: 33 USC 401, Section 10; 1413, Section 404. Principal Purpose: These laws require permits authorizing activities in, or affecting, navigable waters of the United States, the discharge of dredged or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. Routine Uses: Information provided on this form will be used in evaluating the application for a permit. Disclosure: Disclosure of requested information is voluntary. If information is not provided, however, the permit application cannot be processed nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETED
--------------------	----------------------	------------------	-------------------------------

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE <i>(an agent is not required)</i>
6. APPLICANT'S ADDRESS	9. AGENT'S ADDRESS
7. APPLICANT'S PHONE NOS. W/ AREA CODE	10. AGENT'S PHONE NOS. W/ AREA CODE
a. Residence	a. Residence
b. Business	b. Business

11. STATEMENT OF AUTHORIZATION

I hereby authorize, _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

NAME, LOCATION AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (SEE INSTRUCTIONS)

13. NAME OF WATERBODY, IF KNOWN *(if applicable)*

14. PROJECT STREET ADDRESS *(if applicable)*

15. LOCATION OF PROJECT

COUNTY

STATE

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN, (SEE INSTRUCTIONS)

17. DIRECTIONS TO THE SITE, (SEE INSTRUCTIONS)

18. Nature of Activity (Description of project, include all features)

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

21. Type(s) of Material Being Discharged and the Amount of each Type in Cubic Yards

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

23. Is any Portion of the Work Already Complete? Yes _____ No _____ IF YES, DESCRIBE THE COMPLETED WORK

24. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).

25. List of Other Certifications or Approvals/Denials Received from other Federal, State or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
--------	----------------	-----------------------	--------------	---------------	-------------

* Would include but is not restricted to zoning, building, and flood plain permits

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT

DATE

SIGNATURE OF AGENT

DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowingly same to contain any false, fictitious or fraudulent statements or entry,

APPENDIX V

BASIS FOR RECOMMENDING REPAIRS

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APPENDIX V

BASIS FOR RECOMMENDING REPAIRS

PART I - GENERAL

PURPOSE

1. This appendix provides a basis for recommending repairs of the reporting features for which deviations are reported in the semiannual reports. This basis includes general and specific criteria for the project, the terminology to be used in noting deviations, and the terminology to be used in specifying repairs.
2. Pertinent information is provided here to familiarize operation and maintenance personnel with some of the considerations involved in designing of the project features and the condition of which is to be reported on. Although this manual can not include all the specialized knowledge required by a designer, the information provided will enable the personnel, in particular the inspectors, to determine the implications of any observed deviations and recommend the proper preventive or restorative maintenance.

DEFINITION OF DEVIATION

3. A deviation refers to a departure from the "as-constructed" ("as-built") or "as permit constructed" condition of a reporting feature. It is this deviation which is reported in the spring semiannual report.

RECOMMENDATION OF REPAIRS

4. A list of common repairs terminology is included here with an explanation of the repair purpose or procedure although no attempt is made to enumerate all possible repair conditions. Where the explanation is omitted, the purpose or procedure is self-evident. The terms are organized by the general terms under which the reporting features are categorized, but a corrective action may be applicable to more than one type of problem. Thus the organization or terminology given here needs not be strictly adhered to; whatever corrective action is appropriate to rectify a problem should be recommended. Note that in certain instances the deviation or repair terminology has been omitted. Typical terminology for these portions has not yet been developed

PART II - FLOOD CONTROL LEVEE AND GUIDE DIKES

GENERAL

Basic Concept

1. The terms FLOOD CONTROL LEVEE and GUIDE DIKES are defined as embankments whose primary purpose are to furnish flood protection from seasonal high water and which is subject to water loading for period of only a few days, weeks or years. Setback levees are levee that are built landward of existing banks to prevent the rubble wall bank from failure due to the levee surcharge or to prevent possible failure due to undermining of the slag bank. Some of the factors which were considered in levee and dikes are foundation underseepage, seepage through embankment, slope stability, and settlement.

EARTHWORK

Definition

2. The general term EARTHWORK encompasses all uses of earth, which serve a direct function in the flood control system, including fills, cuts, slopes, levees and dikes.

General Design Criteria

3. Pertinent information on design criteria applicable to earthwork is given below.
- a. **COMPACTED FILL.** Earth around structures must be maintained at an original grade to preserve design loading and must be kept tight against the structure.
 - b. **SURFACE DRAINAGE.** All areas must be free draining. Furthermore, surface drainage must be kept from seeping into any shrinkage cracks between the earth and the face of the structure. Otherwise, the earth will become saturated, resulting in undue stress on the structure or excessive seepage to an outlet or erosion of fill.
 - c. **SETTLEMENT.** All structures must be closely observed for signs of settlement in the surrounding earth; settlement must be investigated to determine whether there has been loss of material because of seepage.

Specific Design Criteria

4. Pertinent information on design criteria applicable to specific reporting features is given below
- a. **STREAMBED:**
 - (1) **GRADE CONTROL.** Established grades are to be maintained to prevent undermining of toe protection. The results of aggradation, degradation, or subsidence must be corrected.

(2) PONDING CONTROL. To promote insect control and health protection the earth invert must be maintained in a free-draining condition so that ponding stagnant pools are eliminated.

(3) DEBRIS AND VEGETATION CONTROL. Debris, objectionable growth, shoal, and waste materials must not encroach on the invert. Excess material that will not move readily with low flows must be removed. Measures must be taken to control objectionable growth by approved chemical or mechanical means. Conversely, vegetation growth for which the design has accounted, usually by increasing channel size or levee height, should be removed.

b. EARTH LEVEE AND GUIDE DIKES:

(1) SETTLEMENT. Settlement and sloughing that cause material change in levee/dike grade or cross section must be remedied. For minor changes due to nominal consolidation of materials, the levee and dikes should be restored to original line and grade with materials similar to the existing levee. If the changes in line or grade are greater than one foot, an investigation must be made to determine the cause before permanent restoration work is started.

(2) SEEPAGE. Both the landside and the riverside of the levee must be inspected for evidence of piping seepage through the levee, saturated areas, or sand boils. Such conditions must be investigated immediately and appropriate remedial action initiated.

(3) EROSION CONTROL. Levee tops must be maintained so that water will not collect and spill down the back slopes to cause erosion of the levee. Growth of grass should be encouraged to help stabilize these slopes.

(4) PEST CONTROL. Burrowing animals, which may be the cause of levee and dike failure as water erodes and saturates the levee and dikes, must be examined. Dens and runways formed within the levee must be opened up and backfilled with thorough compaction.

(5) VEGETATION CONTROL. Grasses should be encouraged where erosion control is required but growth must be maintained to prevent objectionable weed growth. Vegetation which produces deep roots that may lead to seepage, saturation, subdrain clogage or erosion problems if the roots are allowed to die and decay should be controlled. Approved chemical treatments may be used for control of growth.

c. LEVEE BERM ROADWAY: Full access under all weather conditions must be maintained for necessary operation and maintenance equipment, although this access must be restricted to authorized personnel. This requirement includes erosion control to prevent the formation of ruts which might interfere with vehicular access and measures to remove debris and trash which tends to accumulate on the roadway.

d. LEVEE BERM-ACCESS RAMP: All access points to the berm roadway are to be gated and kept locked in order to prevent unauthorized use of the flood control facilities; the gates, however, must be maintained in workable condition for use by operation and maintenance personnel.

Deviations

5. The terminology to be used in reporting deviations is as follows:
- a. Local settlement, sloughing, and ponding.
 - b. Seepage, saturated areas, and water-pressure boils.
 - c. Erosion.
 - d. Rodent holes.
 - e. Inadequate shallow root vegetation.
 - f. Deep root vegetation.
 - g. Changed line, grade, or section.
 - h. Separation of a fill at the junction with structure.
 - i. Debris accumulation.
 - j. Other

Repair Terminology

6. Typical repair terminology for recommending repairs is as follows:

<u>TERMINOLOGY</u>	<u>REPAIR PURPOSE OR PROCEDURE</u>
Crowing	For water runoff from berms, fills, embankments, and levees.
Piping	Open and recompact seepage paths through the levee.
Seeding slopes	For erosion control.
Exterminating burrowing animals	Open and compactly fill burrow holes to maintain levee and embankment integrity.
Filling and compacting	To restore line and grade.
Eradicating deep root vegetation	Accomplished prior to extensive growth to prevent seepage decay paths of subdrain clogage.
Seepage path removal	Remove and compactly fill between structures and earths; direct water away from structure-earth junctions.

Resloping area to drain

To correct a situation caused by modified adjacent facilities.

STONEWORK

Definition

7. The general term: STONEWORK includes all grouted or ungrouted stone and riprap for facings and revetments, and sand and bedding materials and filter.

General Design Criteria

8. Pertinent information on design criteria applicable to stonework is given below.
 - a. **FILTER LAYER.** Filter layers are placed under ungrouted stonework to prevent its settlement due to loss of levee material through the stones. There may be one or more filter and drain layers of different grading depending upon the grading of the underlying material. In the event of settlement in stonework, the continuity of these layers should be investigated when restoring the stonework to line and grade. These layers permit the free passage of water and prevent failure of the surfacing from local and area-wide hydrostatic pressure. Slopes and inverts that have drain and/or filter layers must be carefully inspected to see that no condition is permitted to develop that would inhibit the functioning of these drainage layers.
 - b. **VEGETATION CONTROL.** Vegetation control will be required for all areas of stonework to prevent displacement of the stone by root growth as well as from eddies induced by accumulation of debris on brush growing through the stonework. Vegetation control is also an important consideration in protecting continuity of the filter layers under stonework.

Specific Design Criteria

9. Pertinent information on design criteria applicable to specific reporting features is presented below:
 - a. **UNGROUTED STONE/RIPRAP SIDE SLOPES:** UngROUTED riprap and stone are subject to displacement, sliding or settlement, and shall be maintained to the established line and grade. Stones and riprap showing deterioration shall be replaced or protected from further weathering effects by grouting. Settlement in a riprap/stone side slope should be investigated to determine if the failure is in the earth levee or in the filter layers under the stonework. The heavy riprap toe protection including toe-down of the levee and riprap side slope should be checked to see that there has been no displacement after each storm flow in the Salt River.
 - b. **RIPRAP TOE-DOWN PROTECTION:** Riprap toe protection is the foundation for the earth levee toe and riprap side slope. The toe-down protection is subject to displacement from excessive side cutting of water flows. Earth, riprap and grading shall be used to shift the low flow area away from the toe protection and maintain the invert grade.

c. CRACKS: Grouted riprap must be inspected for cracks indicating movements or distress in the lining. Development of cracks is essentially important if layers of fills are under the facing; continued cracking may indicate settlement of the earth levee. Hairline cracks may be expected because of shrinkage in the grouted or because of temperature changes; however, if movement of these stresses should concentrate so that larger cracks develop, they must be sealed to prevent excessive water from entering them.

d. GUIDE DIKES (East 115th Ave. Dike near Sta. 158+00.00, West 113th Ave. Dike near Sta. 164+00.00, East 113th Ave. Dike near Sta. 172+00.00 and 95th Ave. Dike): These guide dikes provide additional protection for the levee. The dikes were constructed of compacted earth fill armoring with 27" and 33" thick riprap with filter layers under the riprap. A 12"-30" wide gabion mattress was installed around each dike. Regular investigation should be made to determine if the scour occurring or water undermining gabion mattress for the dikes.

Deviations

10. The terminology to be used in reporting deviations is as follows:
- a. Stone/Riprap deterioration
 - b. Settlement, displacement, and sliding
 - c. Progressive grout cracking
 - d. Discontinuity of filter areas
 - e. Vegetation
 - f. Debris accumulation
 - g. Other

Repair Terminology

11. Typical repair terminology for recommending repairs is as follows:

<u>TERMINOLOGY</u>	<u>REPAIR PURPOSE OR PROCEDURE</u>
Replacing deteriorated or displaced stone	To prevent erosion of levee and dikes
Seal cracked grouted stone of	Chip, clean, and dry pack to prevent loss fill materials.

PUBLIC UTILITY

Definition

12. The general term PUBLIC UTILITY includes sewer, water, gas, oil, electricity, telephone or any other utility lines which overcross or undercross the channel.

General Design Criteria

13. Continuing liaison with utility personnel will reduce maintenance problems by providing utility installation and construction crews with adequate information on design, construction, operations, and maintenance of flood control facilities. Leaks in utility pipes near or under the channel or changes in the earthwork or concretework configuration must be corrected in order to minimize the probability of channel failure.

Deviations

14. The terminology to be used in reporting deviations is as follows:
- a. Leakage or seepage along pipe
 - b. Visible changes in other reporting features along utility alignment
 - c. Safety fencing condition
 - d. Other

Repair Terminology

15. Typical repair terminology for recommending repairs is as follows:

TERMINOLOGY

REPAIR PURPOSE OR PROCEDURE

Replacement

Patching

Caulking or remortaring

Support or suspension replacement

Reconditioning of safety fencing.

Flood control structure restoration necessitated
By utility failure

Reconstruction to be effected by utility
owner

FENCING

Definition

16. The general term FENCING includes safety pipe rails at RCB culvert inlet/outlet structures, four-wire R-O-W fence, and access gates.

General Design Criteria

17. Pertinent information on general design criteria applicable to fencing is given below:
- a. Fencing must be intact at all times.
 - b. Broken or lost caps on posts must be replaced to prevent water from collecting in pipe base and rusting the metal.
 - c. Galvanizing on pipe and wire mesh must be checked for excessive weathering or oxidation.
 - d. Alignment and tension must be regularly tested and adjusted.
 - e. Gates must be secured and regularly adjusted for ease of operation
 - f. Gate reflectors must be checked for damage and replaced as necessary

Deviations

18. The terminology to be used in reporting deviations is as follows:
- a. Metal and coating of wire, tension wires, posts, caps, fittings, clips, braces, cables and chains.
 - b. Tension, bending and attachment of fabrics.
 - c. Alignment and mounting of fabrics, posts, gate posts, and gates.
 - d. Padlocks and security hardware
 - e. Missing fence accessories
 - f. Traffic fence guards including reflectors and guard rails.
 - g. Vegetation
 - h. Other

Repair Terminology

19. Typical repair terminology for recommending repairs is as follows:

TERMINOLOGY

REPAIR PURPOSE OR PROCEDUR

Paiting and recoating

Paint with rust inhibitor and aluminum finish coat.

Replacement

Realignment and readjustment

BITUMINOUS SURFACING

Definition

20. The general term BITUMINOUS SURFACING includes surfaced aggregate base course (ABC) O&M (Operation&Maintenance) roadways, surfaced rock mulch levee landside slope, surfaced berm roadways, surfaced access ramps and turn-around.

General Design Criteria

21. Pertinent information applicable to bituminous surfacing is given below.
- a. Surfaced O&M roadways, berm roadways, surfaced access ramps and turnaround must be maintained to permit passage of vehicles at all times for operation, maintenance, and repair.
 - b. Surfaced levee landside slope must be maintained so that rock mulch thickness shall remain uniformly along the face of the slope.
 - c. Weed growth must be controlled to keep the road open, passable, and identifiable under all weather conditions.
 - d. Roadways and access ramps must be inspected for condition of surfacing, development of cracks and ruts, and condition of shoulders.
 - e. Levee landside slope must be inspected for condition of surfacing, development of ruts created by ATV (All Terrain Vehicle) or other type of vehicles.
 - f. Adequate drainage must be maintained.
 - g. Depressions must be repaired by filling to grade or by removal and replacement of subgrade.

Deviations

22. The terminology to be used in reporting deviations is as follows:
- a. Excessive vegetation
 - b. Undermining or reveling of lips and edges.
 - c. Settlement
 - d. Scatter
 - e. Deterioration of joint areas at streets
 - f. Base or subgrade failure
 - g. Areas requiring patching
 - h. Inadequate curb or cutoff
 - i. Other

Repair Terminology

23. Typical repair terminology for recommending repairs is as follows:

TERMINOLOGY

REPAIR PURPOSE OR PROCEDUR

Eradicating vegetation

Patching

Installing cutoff

Install below grade to control reveling

Resurfacing

Restoring or Installing curbs

To control drainage

Replacement of bituminous surfacing with
Concrete.

To control chronic conditions

STAFF GAGE

Definition

24. The general term, STAFF GAGE, refers to a set of individual which enable the operation personnel to ascertain the water surface elevation.

General Design Criteria

25. Staff gages should be aligned in a vertical position and the elevations marked on them should be clearly legible. Any lateral or vertical displacement or any significant decrease in the legibility of marking should be corrected.

Deviations

26. The terminology to be used in reporting deviations is as follows:

- a. Vertical Alignment
- b. Horizontal displacement.
- c. Legibility
- d. Deterioration of painting
- e. Other

Repair Terminology

27. Typical repair terminology for recommending repairs is as follows:

TERMINOLOGY

Restore alignment

Renew staff gage markings

Repaint

Replace staff gages as needed

SPREADING GROUND DIVERSION

Definition

28. The general term, SPREADING GROUND DIVERSION, includes all facilities involved in diverting portions of channel flow into spreading grounds or river to replenish underground water supplies

General Design Criteria

29. Pertinent information on general design criteria applicable to spreading ground diversions is given below.

- a. Flap gates are normally positioned to maximum the use of ordinary channel flow. The flap gates must be closed during flood operations, but may be opened during periods of decreasing flow to maximize utilization of storm runoff.
- b. Drainage channel shall be properly maintained to obtain full operation function. Such full operation function shall not prevent water ponding at the RCB culvert outlet.
- c. Debris interference with flap gate operations must be corrected to prevent flooding or failure.

RIGHT-OF-WAY

Definition

30. The general term, RIGHT-OF-WAY, includes access ways, access ramps, encroachments, loadings near levee and channel structures, and various land uses interfering with effective operation and maintenance.

General Design Criteria

31. Areas adjacent to flood control levee and channels must permit the access necessary to comply with all operation and maintenance requirements. The levee and channel flood control facilities are designed for specific loadings; any condition which might change these loadings must be prevented.

Deviations

32. The terminology to be used in reporting deviations is as follows:

- a. Discontinuity of berm roadway and access ramp
- b. Controlled access to public streets or turn-arounds
- c. Width of berm roadway
- d. Type of encroachment, including parking, storage, fence, structures, overhead clearance, underground pipes, and joint use of maintenance access with others for such purposes as landscaping and control of weeds and trash
- e. Land status
- f. Other deviation that restricts effective flood control protection, operation, maintenance, and/or community betterment

Repair Terminology

33. The repair terminology to be used in recommending repairs is as follows:

<u>TERMINOLOGY</u>	<u>REPAIR PURPOSE OR PROCEDURE</u>
Retention of adequate width berm roadway	To prevent encroachments across right-of-way
Maintenance of continuous Berm roadway	Where access to streets at bridge or turnarounds, or under bridge accessways
Removal of encroachments	

Land Use

To preserve minimum width right-of-way adjacent to channel for flood control use

Maintenance of controlled access and other security controls

To restrict access to authorized persons

SPECIAL FEATURE

Definition

34. The term SPECIAL FEATURE includes reporting features that do not fit into other general term areas or that normally fit under other general terms but that also involve special problems.

General Design Criteria

35. Pertinent information on general design criteria applicable to each special feature is given below.

- a. MOSQUITO ABATEMENT. Elimination of ponding areas, wherever practical, and to eliminate insect breeding elsewhere.

Deviations

36. The terminology to be used in reporting deviations for each special feature is as follows:

- a. MOSQUITO ABATEMENT. Prevent mosquito breeding.

Repair Terminology

37. The repair terminology to be used in recommending repairs is as follows:

TERMINOLOGY

Mosquito control

REPAIR PURPOSE OR PROCEDURE

To eliminate water ponding areas by means of draining the ponds dried.

PART III - FLOOD CONTROL CHANNEL

GENERAL

Basic Design Concept

1. The broad design concept for the flood control channels involves a relatively nonrigid channel lining supported by uniform bearing and loading provided by the surrounding earth. For a trapezoidal channel this concept presumes that the earth supports the walls. For a rectangular channel, this concept presumes that when the channel is empty the walls support the dry earth behind them and when the channel is full the earth supports the walls.

CONCRETEWORK

Definition

2. The general term CONCRETEWORK encompasses all concrete structures which function as part of the flood control system. This includes all concretework integrally a part of project to include but not limited to channels, side drain structures including inlet/outlet and public utilities.

General Design Criteria

3. Pertinent information on design criteria applicable to concretework is given below.
 - a. GENERAL. All concretework must be checked for evidence of deterioration, structural cracking, or displacement. The source of the trouble must be located and eliminated, and remedial work must be completed before loss of strength occurs in the structure.
 - b. CRACKING. Minor shrinkage and temperature cracking occurs in most concrete structures, but continued development of crack patterns and increases in size of cracks are evidence of stress and possible loss of integrity in the structure. Large cracks that will allow considerable water to penetrate the wall or slab must be sealed to prevent migration of backfill material through the crack and damage to the wall or subdrain system caused by the increased water pressure.
 - c. JOINTS. If joints show continued evidence of opening or closing other than as a result of temperature stresses, the cause must be determined. Joint openings that permit the earth to be carried away must be sealed. Spalling must be investigated and repaired to

protect the reinforcement and to prevent further erosion resulting from abrasion during stormflows. Vegetation must be controlled to prevent joint displacement or leakage resulting from root growth or decay.

Specific Design Criteria

4. Pertinent information on design criteria applicable to specific reporting features is presented below.

a. CONCRETE CHANNEL AND RCB CULVERT INVERTS:

(1) EROSION. Concrete invert is subject to abrasion from sand, gravel, and debris carried by stormflows. This problem is particularly critical where the invert is a structural slab carries steel reinforcement from the channel walls. Repairs must be made to the slab before they are materially weakened by erosion and before the cover on the main steel reinforcement has been reduced to two inches.

(2) LOADING. Invert slabs are designed for uniform loading from water; any concentrated loads such as vehicles (other than passenger cars and pickup trucks) should not be permitted without an investigation considering the condition of the slab, the amount and type of reinforcement, the type of subgrade material, and the location of a water table. This investigation should be handled in accordance with the usual project review procedures.

(3) DISPLACEMENT. Displacement of invert slabs may be caused by settlement, undermining, uplift, or by reaction of the adjacent wall where the invert serves as a wall footing. Cracking should be sealed. If the slab has settled, undermining should be investigated. Settlement, due to consolidation or subsidence of the subgrade, must be corrected when the integrity of the structure is threatened or when damage is sustained during stormflow. Mud jacking to correct settlement of invert slabs may be used except where a subdrain system is under the slab or at the base of an adjacent channel wall.

(4) DEBRIS AND VEGETATION. Debris or vegetation must not be allowed to accumulate on the invert slabs including inlet/outlet structures'. Such accumulations may become a public health hazard or may cover a source of trouble requiring maintenance; as such, they should be removed at least on a semi-annual basis. If debris and vegetation are permitted to occur over a long period of time, a Section 404 permit may be required prior to removing the accumulation from the invert.

(5) JOINTS. Leaky joints which permit the passages of earth indicate the need for an investigation program to determine the cause of the leakage. Remedial action should then be taken on the subdrain system to restore the filters and bedding materials and to seal the leaky joints.

b. CONCRETE CHANNEL SIDE SLOPES:

- (1) CRACKING. Concrete side slopes are generally reinforced for temperature stresses only. Therefore, a careful investigation must be made of extensive cracking. Cracks should then be sealed. The cause of cracks should be determined and a corrective plan developed.
- (2) ENCROACHMENTS. Encroachments are not permitted on the rights-of way unless properly permitted. Such encroachments might interfere with access to the channel invert or berm, or change the loadings on the channel structure or foundation.
- (3) DRAINAGE. Grading behind channel side slopes must be maintained to properly drain toward the channel.

c. RCB CULVERT WALLS:

- (1) RCB culvert walls must be inspected for evidence of movement from line and grade.
- (2) CRACKING. Cracking of RCB culvert walls must be sealed.
- (3) DEFLECTION. Concrete walls are designed for a stable deflection. Tilting may be caused by rotation of the wall or by excessive backfill pressures caused by saturation or surcharge loading. Some deflection may be expected at the top of walls; however, such walls must be inspected regularly to be certain that the deflection is not increasing.

d. RCB CULVERT TOP SLABS: There is one RCB beneath the levee near 115th Avenue (Avondale Blvd) called 115th Avenue RCB culvert and one under the berm at 113th Avenue called 113th Avenue RCB culvert. A change in deflection of a roof slab is symptomatic of excess loadings. Similar problems may result from additional surcharge loadings which could occur as a result of subsequent additional compacted fill. In either case, prompt investigation and remedial action are necessary.

e. RCB CULVERT INLET & OUTLET STRUCTURES: 113th Avenue RCB culvert concrete inlet structure conveys storm runoff and irrigation waters from the Collector Channel into the detention basin. 115th Avenue RCB culvert concrete inlet structure takes storm runoff and irrigation waters from detention basin and discharges into the river. These structures include concrete wingwalls and headwalls. Inlet and outlet structures must be inspected for evidence of movement, especially for evidence of joint opening, since this may result in saturation of the structure fill; movement may also result in seepage from the structure. Either condition must be remedied.

f. RCB CULVERT TRASH RACK AND FLAP GATES:

- (1) Improper seating must be corrected.

- (2) Hinges must be kept rust free and lubricated.
- (3) The trash racks bars must be secured in place to insure proper functioning.
- (4) Debris must be cleared away.

g. CONCRETE IRRIGATION SIDEDRAINS: There are several concrete irrigation side drains connecting to the collector channel along its north side by means of dip crossing/reinforced concrete pipes. In such sidedrains, leakage, cracks or changes in deflection can result in rapid disintegration. Excessive loading beyond the design loading is not allowed since this will damage irrigation sidedrains and subsequently damage the concrete channel. Cracks should then be sealed. The cause of cracks should be determined and a corrective plan developed.

Deviations

- 5. The terminology to be used in reporting deviations is as follows:
 - a. Deterioration, wear, and spalling
 - b. Cracking, active or stable
 - c. Displacement including settlement.
 - d. Joint leakage and deterioration of expansion joint material
 - e. Water leakage and ponding
 - f. Movement of RCB culvert inlet/outlet structures
 - g. Improper flap gate and trash rack seating, seals and operation
 - h. Accumulation of pollutant materials
 - i. Debris accumulation
 - j. Other

Repair Terminology

- 6. Typical repair terminology for recommending repairs is as follows:

TERMINOLOGY

REPAIR PURPOSE OR PROCEDURE

Sealing cracked concrete

Where cracks permit the mitigation of earth, repair by sawing, chipping, cleaning, and dry cleaning, and dry packing of concrete. In areas without subdrain systems, subgrade areas shall be pressure grouted to restore uniform structure bearing.

Restoring scoured or eroded areas

Where the area is permitted to a depth between 1-¹/₂ and 2 inches, saw and chip the area to a uniform 2-inch depth, and concrete the area flush with existing.

Resealing expansion

Use bituminous material.

Invert repairing

Flap Gate lubrication and renewal of gate seals

PART IV – DETENTION BASIN

GENERAL

Basin Concept

1. The general term DETENTION BASIN refers to an open excavation or depression in earth's surface with sloping sides whose primary purpose is provide storage of waters either permanently or temporarily. Detention basin presented in this Appendix was designed to hold water temporarily.

DETENTION BASIN STORAGE CAPACITY

Definition

2. The general term DETENTION BASIN STORAGE CAPACITY refers to the capacity of the detention basin to store storm runoff from the surrounding area.

General Design Criteria

3. Pertinent information on design criteria applicable to detention basin is given below.
 - a. EXCAVATION. Graded earth surface around the basin including north O&M road must be maintained at the design grades to prevent water overtopping the roadway.
 - b. SLOPE TO DRAIN. All areas within the basin including low flow channel must be free to drain toward the through-levee RCB culvert. Basin bottom/invert slope shall be maintained to preserve original design grade and prevent water ponding and mosquito breeding ground.
 - c. DEBRIS AND VEGETATION CONTROL. Debris and vegetation control will be required for all areas within the basin including basin cut slopes. Clearing of debris and vegetation to make the basin function as designed is a must do task for operation and maintenance. Measures must be taken to control objectionable growth by approved chemical or mechanical means.

Specific Design Criteria

4. Pertinent information on design criteria applicable to reporting features for the detention basin overlaps to some extent with those applicable to flood control channel and levee, which are detailed in Parts II and III in this Appendix. Additional reporting which apply to detention basin will be presented here.

- a. GRADE CONTROL. Established grades on basin invert are to be maintained to prevent water ponds built-up. The result of aggradation or degradation must be reported.
- b. 113th Avenue RCB culvert outlet and 115th Avenue RCB culvert inlet must be monitored and maintained periodically. Debris accumulation at these outlet/inlet structures must be cleaned so that water can drain freely to the river. Otherwise it will cause water back up and retain in the channel and basin, and subsequence creating potential mosquito breeding ground.
- c. To maintain a required storage capacity of the basin, early detection and timely removal of any debris/sediment accumulation must be performed. Removal of debris and sediment in the basin should be made during each periodic inspection. After each major debris-producing storm a survey should be made to determine the actual amount of accumulation. The results of these estimates and survey should be noted in the appropriate operation and maintenance report. The design storage volume is indicated in Appendix VI, MAPS AND DATA SHEETS.
- d. BASIN CUT SLOPES. Established basin cut slope are to be maintained to prevent erosion. Basin slopes were surfaced with a 4"-thick rock mulch layer. Established basin cut slopes shall be properly maintained to insure the integrity of the basin slopes. Report of aggradation or degradation shall be required.

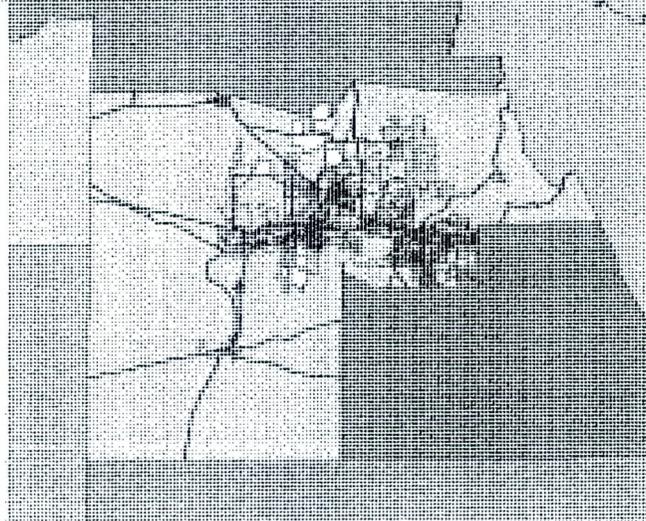
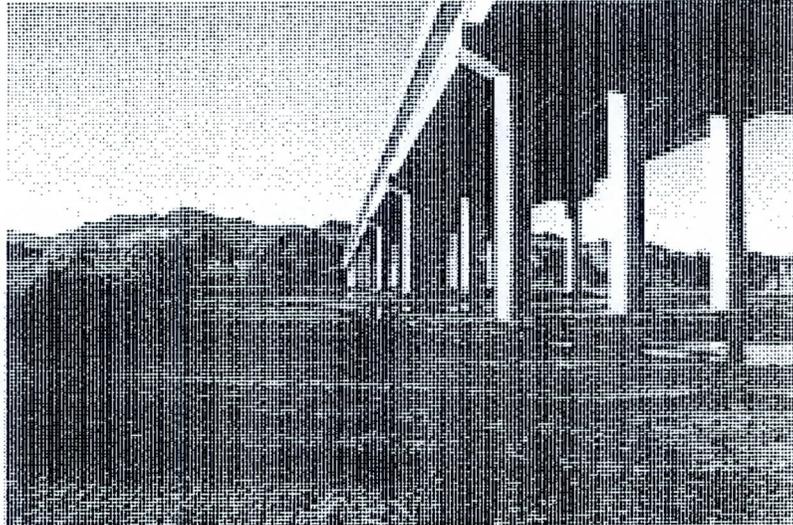
Deviation

5. The terminology to be used in reporting deviations is as follows:
- a. Debris accumulation
 - b. Capacity reduce by %
 - c. Changed line, grade or section
 - d. Vegetation
 - e. Ponding
 - f. Side slope Erosion

Repair Terminology

6. Typical repair terminology for recommending repairs is as follows:

<u>TERMINOLOGY</u>	<u>REPAIR PURPOSE OR PROCEDURE</u>
Removal of debris/sediment	To restore established volume and avoid creation of water ponding areas.
Filling and compacting	To restore line and grade
Resurface side slopes with Rock mulch	For erosion control
Resloping basin invert to drain	To correct situation caused by water flows.



HOVER CURSOR OVER PHOTOS AND ICONS FOR DESCRIPTION AND SELECT ANY FOR FURTHER INFORMATION

Gage ID History	Site Data	Brief Rating	Water Year Peaks
Runoff History	Precip. Info.	Streamflow Home	

GAGE ID HISTORY

ID	Elev of Instr. in GH	Elev of Instr. in feet M.S.L.	Period
6848	1.15	928.29	12/16/98 - present

SITE DATA

LOCATION	LOCATED ON THE AVONDALE BOULEVARD CROSSI OF THE GILA RIVER, JUST NORTH OF PHOENIX INTERNATIONAL RACEWAY		
DRAINAGE AREA	43,300 MI ²		
JURISDICTION	AVONDALE, ARIZONA		
WATERSHED	MIDDLE GILA		
SECTION/TOWNSHIP/RANGE	NW1/4 NW1/4 SE1/4 S36 T1N R1W		
LATITUDE	N 33° 22' 56.2"		
LONGITUDE	W 112° 18' 29.0"		
USGS QUAD MAP	TOLLESON 7.5-MINUTE		
STREAMGAGE INSTALLATION DATE	DECEMBER 16, 1998 (WY 1999)		
PERIOD OF AVAILABLE DATA RECORD	DECEMBER 16, 1998 - CURRENT YEAR		
LENGTH OF AVAILABLE RECORD (AS OF 10/01/06)	7.79 YEARS		
QUALITY OF AVAILABLE DATA	GOOD		
STAGE GAGE TYPE	PRESSURE TRANSDUCER		
DEVICE CALIBRATION	40 INCR./FT. AS OF 12/16/98		
STAFF GAGE	NONE		
CREST STAGE GAGE	NONE		
ZERO GAGE HEIGHT ELEVATION	927.14 FEET M.S.L.		
STAGE GAGE ELEVATION	1.15 FEET GAGE HEIGHT		
POINT OF ZERO FLOW	UNDETERMINED		
EXTREME FOR PERIOD OF RECORD	49,394 CFS	9.15 FEET G.H	2/13

RATING INFORMATION

<i>RATING TABLE</i>			
<i>CURRENT RATING NUMBER 1, APPLIED AS OF DECEMBER 16, 1998</i>			
GAGE HEIGHT (FEET)	DISCHARGE (CFS)	GAGE HEIGHT (FEET)	DISCHARGE (CFS)

0.0	0	7.0	26,721
1.0	500	8.0	36,302
2.0	1,415	9.0	47,547
3.0	2,728	10.0	61,023
4.0	5,763	11.0	76,613
5.0	11,135	12.0	94,283
6.0	17,989	12.3	100,000

WATER YEAR PEAKS

Water Year	Peak Gage Height (feet)	Peak Discharge (cfs)	Date of Peak
2007			
2006	NONE	0	NONE
2005	9.15	49,394	2/13/05
2004	NONE	0	NONE
2003	NONE	0	NONE
2002	0.43	418	11/5/01
2001	NONE	0	NONE
2000	0.25	364	11/26/99
1999	NONE	0	NONE

RUNOFF EVENT HISTORY

Annual Report
Mean Daily Flow



Date of Peak	Time of Peak	Runoff Period	Duration (hours)	Peak Stage feet G.H.	Peak Discharge (cfs)	Water Year
		Select for a plot of these data				
3/7/05	01:32	03/07 01:32 - 03/07 19:32	18.0	1.35	935	200

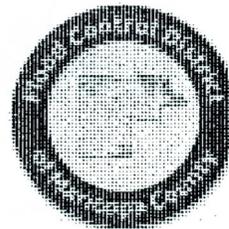
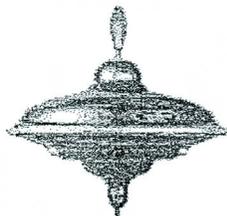
3/1/05	07:32	02/28 13:32 - 03/02 22:32	57.0	1.85	1,347	200
2/22/05	04:32	02/20 19:32 - 02/28 07:32	180	5.35	13,326	200
2/13/05	02:17	02/11 14:07 - 02/20 18:52	221	9.15	49,394	200
1/28/05	02:15	01/26 17:00 - 02/03 23:16	198	4.05	5,981	200
1/13/05	20:15	01/12 14:15 - 01/17 11:15	117	4.25	6,828	200
1/8/05	20:15	01/08 14:15 - 01/12 11:15	93.0	4.15	6,397	200
1/5/05	02:14	01/01 11:09 - 01/08 08:15	165	7.85	34,904	200
11/5/01	10:03	11/04 09:27 - 11/06 12:05	50.6	0.43	418	200
11/23/99	07:04	11/23 07:04 - 11/30 23:25	184	0.25	364	200

CREST STAGE GAGE INFORMATION

CREST GAGE NUMBER	PIN ELEVATION (FEET, GAGE HEIGHT)	CREST GAGE NUMBER	PIN ELEVATION (FEET, GAGE HEIGHT)
N/A			

STAFF GAGE INFORMATION

STAFF GAGE RANGE	LOW POINT	STAFF GAGE INFORMATION



APPENDIX VI

PROJECT MAP AND DATA SHEET

APPENDIX VI

PROJECT MAP AND DATA SHEET

GENERAL

1. This appendix contains a data sheet for the Tres Rios Flood Control North Levee-Phase 1A which was constructed by the Federal Government. A comprehensive map of the project is included in this Appendix.
2. The data sheet has a section called "Reporting Features," which lists all features of the project unit whose condition is to be reported in the semiannual reports submitted by the operation and maintenance organization to the U.S. Army Corps of Engineers, Los Angeles District.

PROJECT MAP AND DATA SHEET
TRES RIOS FLOOD CONTROL NORTH LEVEE-PHASE 1A

Construction Data

Contract No.:	W912PL-05-C-0013	Contract Award Date:	13 June 2005
Contractor:	TPA-CKY Joint Venture	Notice to Proceed Date:	24 August 2005
		Completion Date:	06 February 2007

Specifications: IFB No. W912PL-05-B-0004
Plans: District File No. 203/311 thru. 203/393

Project Title: TRES RIOS ENVIRONMENTAL RESTORATION PROJECT
FLOOD CONTROL NORTH LEVEE-PHASE 1A
(105th Avenue to 115th Avenue)
Maricopa County, Arizona

Local Sponsor: City of Phoenix-Water Services Department
Project Cooperation Agreement (PCA) Signed Date: 19 April 2004

Operation and Maintenance Agency: Flood Control District of Maricopa County
Operation and Maintenance Transferred to: Flood Control District of Maricopa County

Staff Gages: Located on the Avondale Boulevard Crossing of the Gila River, Just North of Phoenix International Raceway.

Pertinent Design Data.

Levee:	
Type	Compacted earth-fill
Length, Exist. Holly Acres Levee	1,427.11 ft.
Length, New levee	5,662.57 ft.
Total Length	7,089.68 ft.
Height	0 to 7 ft
Side Slope	1V on 2.5H and 1V on 3H for Exist. Holly Acres and new levee respectively.
Slope Protection	15" riprap on the riverside slope and 3" rock mulch on landside slope
Toedown	Depth (H) = 3.75 ft. and Length (L) = 14 ft. for Sta. 167+80.00 to Sta. 172+00.00 and Sta. 174+00.00 to Sta. 208+40.00. Depth (H) varies and length (L) =14 ft. for Sta. 172+00 to Sta. 174+00

Gabion Mattress (12"-6" unit) Sta. 153+72.90 to Sta. 168+00.00, except under guide dike.

Guide Dikes:

Type	Compacted earth-fill
Length	335.31 ft. for 95 th Ave. Dike and 282.57 ft. for each (East 113 th , West 113 th and East 115 th Dikes)
Height	0 ft. to 16 ft.
Side Slope	1V on 2H.
Slope and Top of Dike Protection	27" riprap for East 113 th Ave., East 113 th Ave. and East 115 th Ave. Dikes. 33" riprap for 95 th Ave. Dikes
Gabion Mattress	12"-30' wide gabion mattress for each dike.

Access Ramps and Turnaround:

Top of levee at levee sta.156+28.58
(115th Ave. Access Ramp)

Length	208.11 ft.
Height	0 ft to 1.3ft.
Side Slope	1V on 3H
Slope Protection	3" thick rock mulch
Finished Surface	3" ABC

Top of levee at levee sta.202+00 to 203+00
(107th Ave. Access Ramp)

Length	454.80 ft.
Height	0 ft to 6ft.
Side Slope	1V on 3H
Slope Protection	Same as the levee
Finished surface	Grouted stone

Top of levee at levee east end
(105th Ave. Turnaround)

Height	Same as the levee.
Side Slope	Same as the levee
Slope Protection	Same as the levee
Finished surface	3" ABC

115th Avenue Collector Channel:

Type	Reinforced concrete trapezoidal channel
Length	5,582.49 ft.
Depth	1.55 ft. to 4 ft.
Side Slope	1V on 2H

113th Avenue and 115th Avenue RCB Culverts:

Type 18ft. X 4ft Reinforced concrete box at 113th Avenue
5-5ft. X 3ft. cells Reinforced concrete box at 115th Ave.

115th Avenue Detention Basin

Type Earthen basin.
Capacity 14.03 AcFt.
Depth 2ft. to 5ft.
Side Slope Protection 3" rock mulch

REPORTING FEATURES

LEVEE:

Earthwork, general
Riprap slope protection, riverside
Toe-down riprap protection, riverside
3" rock mulch slope protection, landside
3" ABC O&M Roads, levee crest and levee toe
East 115th Avenue Dike
West 113th Avenue Dike
East 113th Avenue Dike
95th Avenue Guide Dike
115th Ave Access Ramp
107th Ave Access Ramp
105th Ave. Turnaround
5-5' wide x 3' high RCB Culvert (cells)
RCB Culvert Trash Racks & Flap Gates
RCB Culvert Inlet/Outlet Structures
Gate
Gate
Gate
Survey markers No.1
Survey markers No.2
Survey markers No.3
Survey markers No.4
Survey markers No.5
Survey markers No.6
Survey markers No.7
Survey markers No.8
FCDMC's 18" RCP
(Located at the N-W corner of the Detention basin)

REFERENCING

AT LEVEE STATION

Entire Length
Entire Length
Entire Length
Entire Length
Entire Length
Sta. 158+00.00
Sta. 163+85.90
Sta. 171+64.54
Off levee east end, near 95th Ave.
Sta. 156+28.58
Sta. 202+00 to Sta. 203+00
Sta. 224+00
Sta. 157+00.00

At beginning of 115th Ave.Ramp
At 107th Ave. Access Ramp
At levee Sta. 224+62.57
Sta. 156+90.00
Sta. 163+85.00
Sta. 171+64.54
Sta. 191+00.00
Sta. 202+50.00
Sta. 207+50.00
Sta. 217+50.00
Sta. 223+80.00
Sta. 156+00.00

COLLECTOR CHANNEL:

Concrete Channel Invert and Side Slopes
RCB Culvert at 113th Ave. Bern
RCB Culvert Trash Rack & Outlet Apron
Concrete Irrigation Side Drain
Concrete Irrigation Side Drain
Concrete Irrigation Side Drain
Concrete Irrigation Side Drain
Concrete Irrigation Side Drain

AT CHANNEL STATION

Entire Channel
Sta. 1+55.00

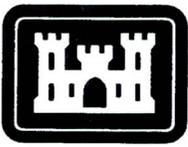
Sta. 0+30.00
Sta. 13+60.00
Sta. 41+90.00
Sta. 42+40.00
Sta. 55+82.49

DETENTION BASIN

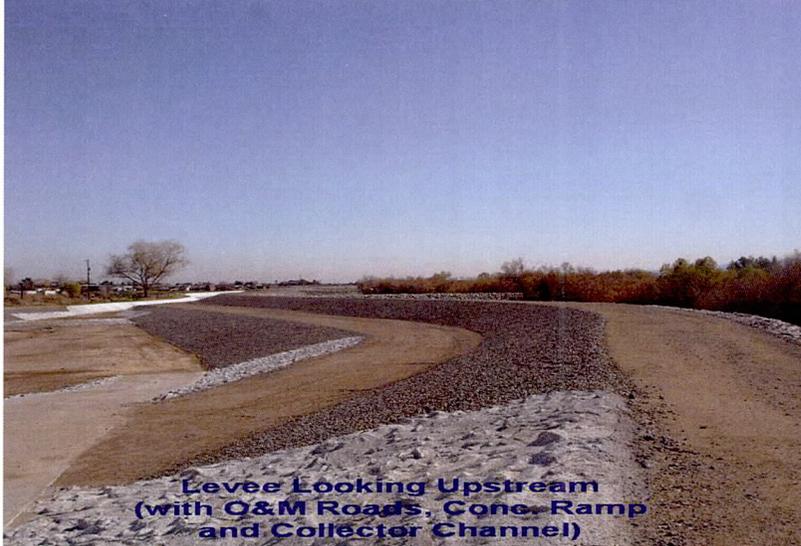
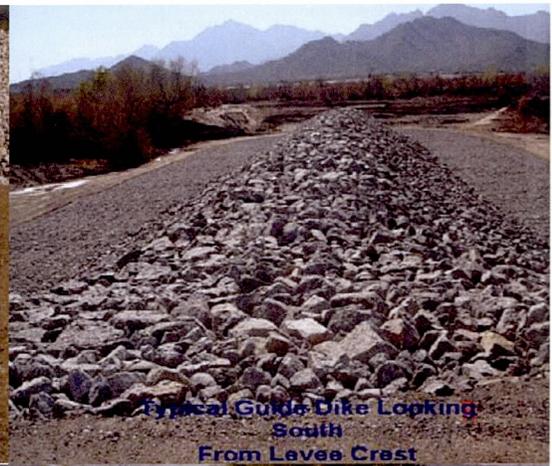
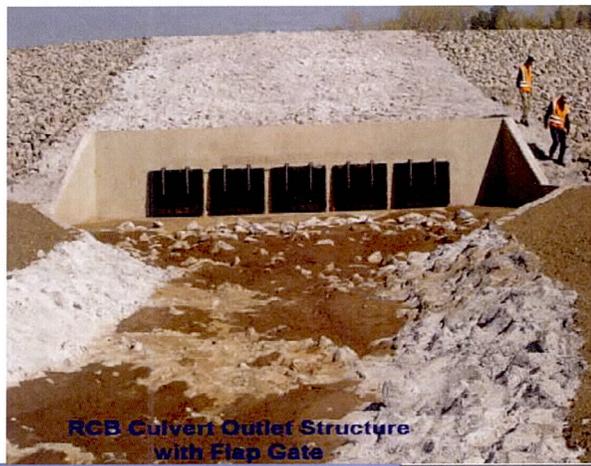
Capacity in %
Basin Invert including Low Flow Ditch
Basin Cut Slopes
3" ABC surfaced North O&M Road
Pipe Inlet

AT BASIN STATION

Entire Basin
Entire Basin
Entire Basin
Entire Roadway
Basin N-W Corner



**US Army Corps
of Engineers**
Los Angeles District



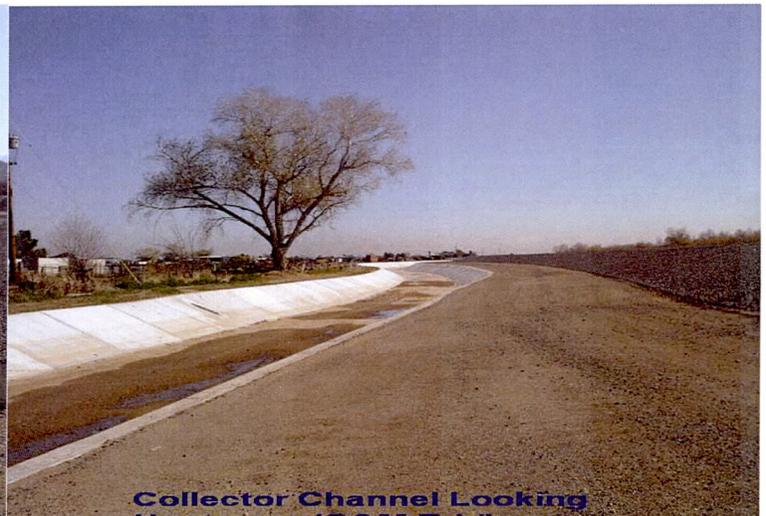
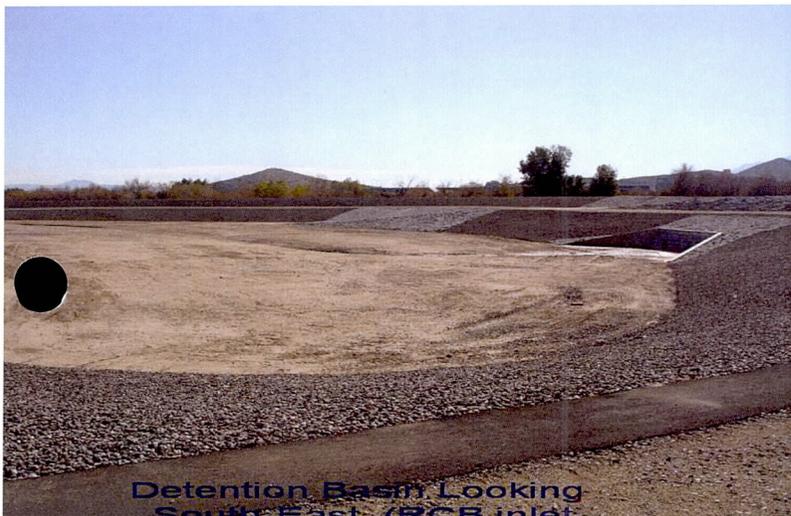
OPERATION, MAINTENANCE, REPAIR, REPLACEMENT, AND REHABILITATION MANUAL (OMRR&RM)

TRES RIOS ENVIRONMENTAL RESTORATION PROJECT FLOOD CONTROL NORTH LEVEE- PHASE 1B

(115th Avenue to El Mirage Road)

Maricopa County, Arizona

April 2009





**US Army Corps
of Engineers**

Los Angeles District

**OPERATION, MAINTENANCE,
REPAIR, REPLACEMENT,
AND
REHABILITATION MANUAL**

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OPERATION, MAINTENANCE, REPAIR, REPLACEMENT, AND REHABILITATION MANUAL

TRES RIOS ENVIRONMENTAL RESTORATION PROJECT FLOOD CONTROL NORTH LEVEE-PHASE 1B (115th Avenue to El Mirage Road) MARICOPA COUNTY, ARIZONA

PART I - INTRODUCTION

AUTHORITY

1. This manual is prepared pursuant to the Code of Federal Regulations, Title 33, Article 208.10, Section 7, 68 Stat 809; 33 USC 709, which directs the operation and maintenance procedures for all structures and facilities constructed by the United States for local flood protection. In accordance with paragraph 10 of Section (a), and subsequent Engineering Regulations adopted by the Department of the Army, an Operation and Maintenance Manual for each completed project will be furnished to local interests to assist them in carrying out their obligations. The Code of Federal Regulations (Extract) is included in this manual as Appendix I. Certain maintenance activities may require authorization under Section 404 of the Clean Water Act (33 U.S.C. 1344), Section 10 of the Rivers and Harbor Act of 1899 (33 U.S.C. 403), or Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended (33 U.S.C. 1413).
2. The preparation of the Operation, Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R) manual is governed by ER 1150-2-301, which contains information applicable to projects for which operation and maintenance is a responsibility of local interests; and ER 1110-2-401, which provides instructions for the preparation of operation and maintenance manuals outlining the responsibilities of those local sponsors that have entered into binding agreements with the Secretary of the Army to be solely responsible for the OMRR&R, and to pay 100 percent of the associated project (OMRR&R) costs.

PURPOSE

3. This manual is intended to guide the operation and maintenance of Federally constructed flood control facilities under the auspices of the local sponsor. This manual specifies the policies and procedures which are part of the statutory responsibilities of the U.S. Army Corps of Engineers with regard to the operation and maintenance of these facilities.

PARTS OF MANUAL

4. The manual is prepared in seven parts.
 - a. PART I Part I is an introduction to this manual.
 - b. PART II Part II consists of a description of the project along with pertinent information and construction history.
 - c. PART III Part III consists of a summary of general operation and maintenance responsibilities.
 - d. PART IV Part IV consists of the operation procedures for all facilities and appurtenant structures.
 - e. PART V Part V discusses maintenance procedures with corollary responsibilities, including periodic inspections and the training of personnel.
 - f. PART VI Part VI describes reporting requirements of the various required reports.
 - g. PART VII Part VII describes the procedures for submitting a permit application to the Corps of Engineers, Regulatory Branch, (Regulatory Branch) and includes a Section 404 permit application with current instructions.

5. In addition to the main report, there are appendices, as follows:
 - a. APPENDIX I Code of Federal Regulations (Extract).
 - b. APPENDIX II Authorizing Document and Project Cooperation Agreement (PCA)
 - c. APPENDIX III Sample of Semiannual Reporting Forms
 - d. APPENDIX IV Sample Permit Application
 - e. APPENDIX V Basis for Recommending Repairs. This appendix is expanded beyond the features of the authorized project to assist in evaluating other non-Federal flood control projects.
 - f. APPENDIX VI Maps and Data Sheets. This appendix includes project summary sheets along with a project maps.

SCOPE OF MANUAL

6. Basic operation and maintenance procedures are included in this manual for Federally-constructed flood control facilities under the jurisdiction of the local sponsor. Essential instructions are provided in sufficient detail to insure proper operation of the flood control protective works and maintenance of these facilities in a manner that will assure their continued functioning

PART II - PROJECT INFORMATION

AUTHORIZATION

1. The Tres Rios Environmental Restoration Project was authorized in accordance with the provisions of Section 101(b)(4) of Water Resources Development Act of 2000 (WRDA 2000), Public Law 106-541 (PL 106-541), and under authority given in Section 6 of Public Law 761, Seventy-fifth Congress, June 28, 1938, which reads in part as follows:

“The Secretary of War (now Secretary of the Army) is hereby given authorized and directed to cause preliminary examination and surveys for flood control.....at the following named localities-Gila River and tributaries, Arizona and New Mexico.”

GENERAL

2. This manual was prepared so it can be used as a guide for the operation and maintenance of the Tres Rios flood control levee-phase 1B, hereafter Tres Rios Phase 1B project or Levee-Phase 1B in Maricopa County, Arizona and as a guide for simplifying the reporting of operation and maintenance. Tres Rios Phase 1B is one of multiple phases of the overall Tres Rios Environmental Restoration Project which was designed and constructed after completion of design and construction of levee-phase 1A (first segment). Levee-phase 1B is the second segment of the three-segment levee system.

The Tres Rios 1B project consists of about 600-foot long compacted earth-fill levee and about 1-mile long modified existing Holly Acres Levee extending from El Mirage Road to 115th Avenue (now Avondale Boulevard- see plates 3 thru. 11). Existing Holly Acres Levee was originally designed and constructed by the Flood Control District of Maricopa County. The Tres Rios phase 1B project is modified to satisfy requirements of flood protection for the overall Tres Rios levee system. It also composes of the following features:

- a. An approximate 1-mile long reinforced concrete trapezoidal channel extends from El Mirage Road to 115th Avenue (see plates 26 thru. 32).
- b. An 8.5 ac-ft. earthen detention basin located at the north east corner of the modified Holly Acres Levee and the El Mirage Road including the basin O&M Road (north side) and the concrete access ramp (see plates 34 & 35).
- c. A five-cell reinforced concrete box (RCB) culvert with trash rack and flap gate (see plate 20).

- d. A four-18” diameter reinforced concrete pipe culvert with inlet and outlet structures including headwalls and wingwalls to convey flows through and under the El Mirage roadway (see plate 33).
- e. A 27” grouted stone diversion channel to convey flows from the RCB culvert to the RCP culvert (see plate 33)
- f. Four compacted earth-fill guide dikes armoring with riprap and gabion mattress. These guide dikes orient at 90-degree angle with respect to the levee centerline (see plate 16 thru. 19).
- g. Three access ramps to allow for getting on and coming off from the levee crest including turn-around areas (see plate 13 thru. 15).
- h. Several landing/turnaround areas are located through out the levee for accessibility (see plate 12 and as-built drawings).
- i. Two gravel surfaced Operation and Maintenance (O&M) Roads. One is on the levee crest and the other is located between toe of levee backside (landside) slope and the Collector Channel respectively. Each O&M Road has the same length that of the levee (see plate 21 thru. 25).
- j. Several concrete irrigation canal connections connecting the existing concrete canals with the collector channel are located through out the project site (see as-built drawings)

LOCATION

3. The Tres Rios Environmental Restoration Project is located approximately 9 (nine) miles west of downtown of Phoenix and including the confluence of the Salt, Gila, and Aqua Fria Rivers. Because of the confluence of the three rivers within the close proximity, the project has been identified as “Tres Rios.” In Spanish language, Tres Rios means “three rivers”. Levee-Phase 1B is located immediately downstream of levee-phase 1A of the Tres Rios levee system. It is located between El Mirage Road and 115th Avenue (now Avondale Boulevard) in the City of Tempe and City of Phoenix, Maricopa County, Arizona

PERTINENT INFORMATION

4. The project area is generally characterized by a broad alluvial valley surrounded by steeply sloped mountains ranges that rise several thousand feet above the valley floors. The sub-basin is bounded on the south by the Sierra Estrella, the South Mountains, and the Buckeye Hills; on the west by the White Tanks Mountains; and on the north by the Wickenburg, Hieroglyphic, and New River Mountains (City of Phoenix 1997).

The project activities occur mostly within the river floodplain. However, the project area encompasses terrestrial lands north and south of the Gila and Salt Rivers. The surrounding land is relatively flat and rural. The general land uses in the project area consist of rural residential, agricultural and agribusiness, light industry, 91st Avenue Waste Water Treatment Facilities, public and semipublic areas, and vacant land.

In 1990, the population in Maricopa County totaled approximately 2.1 million people and included 547,211 families, with approximately 3.8 people per family. The Maricopa County Association of Government (MAG) projects that: the county's population will grow approximately 3.7 million people by the year 2010 (MAG, 1997).

When comparing with the 35 largest population centers in the United States, the Phoenix metropolitan area increased from a rank of 33 in 1970 to 20 in 1988 and is projected to be the 8th largest population center by the early 2000's (CH2M Hill, 1997)

CLIMATE

5. The project area is characteristic of the Sonoran desert: hot and dry. The average annual daily maximum temperature is 85°F. On average, 91 days per year are above 100°F. Average annual daily minimum temperature is 57°F. On average, 9 days per year are below freezing. The potential evapotranspiration is slightly less than precipitation only in January. During the rest of the year, the soil moisture budget is deficient.

METEOROLOGY

6. Average annual precipitation is less than 8 inches. Precipitation is about equally divided between the summer and winter seasons. Summer storms are typically local, high-intensity thunderstorms, and generally occur from July to September. Storms on record have produced 5 inches of rainfall in a 24-hour period. Winter storms are typically wide-spread cyclonic storms with long duration, low intensity rain.

CONSTRUCTION HISTORY

CONSTRUCTION CONTRACT

7. The construction contract of the Tres Rios Phase 1B is as follows:

Specifications: IFB No. W912PL-05-B-0004
Contractor: ERS-JV (Joint Venture)
302 West 5th Street, Suite 310
San Pedro, California 90731

Contract Award Date: 28 August 2007
Note to Proceed Date: 28 November 2007
Completion Date: 12 November 2008
Contract Cost: about 4.0 million dollars

Description: General description of the constructed features for Tres Rios Phase 1B are indicated in 2a through 2i under GENERAL above.

In addition to construction history, the following projects and facilities that were constructed near or within vicinity of the Tres Rios Phase 1B project.

A. Salt River Project System.

Flows in the Salt River are controlled by a series of upstream dams built by U.S. Bureau of Reclamation (USBR) and operated by Salt River Project (SRP). The SRP system is comprised of six reservoirs and seven dams on the Salt and Verde Rivers as shown on **figure 4.**

The dams on the Salt River include Roosevelt Dam, Horse Mesa Dam, Mormon Flat Dam, Stewart Mountain Dam, and Granite Reef Dam. Horseshoe Dam and Bartlett Dam are found on the Verde River. The reservoirs receive runoff from a combined watershed of more than 12,600 square miles.

Roosevelt Dam is the oldest and largest in the SRP system. It was originally authorized by Congress in 1903 for water supply and power generation. The construction of the dam was completed in 1911. In 1978, Congress authorized the modification of Roosevelt Dam. The modifications were to include a new storage allocation for flood control. The modifications to the Dam began in 1989 and were completed in 1996. The Dam began operating under the new Water Control Manual in 1997.

B. Tres Rios Demonstration Project

The Phoenix Metropolitan area is serviced by a regional wastewater treatment plant located at 91st Avenue and the Salt River. The plant discharges approximately 100 million gallon per day (mgd) (155 cfs or 307 ac-ft per day) of effluent to the Salt River. The treatment plant is operated by the City of Phoenix on behalf of the Multi-City Subregional Operating Group (SROG). SROG represents a consortium of cities including Phoenix, Mesa, Glendale, Tempe and Scottsdale.

In 1992, the USBR was authorized by Sections 1605 and 1608 of Public Law 102-575 to participate in the development of a demonstration wetlands project at the 91st Avenue

plant. In 1995, the SROG and the USBR built the Tres Rios Demonstration Project on the 91st Avenue Waste Water Treatment Plant (WWTP) site and within the floodway of the Salt River below the 91st Avenue plant. The Tres Rios Demonstration Project provides final treatment of approximately 2 mgd (3 cfs or 6 ac-ft per day) of effluent. The project consists of 10 acres of constructed wetlands and research facilities. The City of Phoenix and the USBR operate and monitor the wetlands, collecting water quality readings, water use readings, plant and animal counts.

C. Holly Acres Levee

In 1983-84, the Flood Control District of Maricopa County (FCDMC) constructed a bank stabilization and levee project on the north bank of the Salt River in the Tres Rios project area. This is an existing flood protection structure extending from 113th Avenue downstream to El Mirage Road (123rd Avenue). The levee was design to provide 100-year flood protection in conjunction with a proposed Bureau of Reclamations dam, but this dam was never built. This levee can accommodate 115,000 cubic feet per second (cfs) ($3,256\text{m}^3/\text{sec}$) of flow with three feet of freeboard – far less than the 100-year flow of 227,000 cfs ($7,080\text{m}^3/\text{sec}$) at the Salt River/Gila River confluence. However, at the flow of approximately 100,000 cfs ($2,832\text{m}^3/\text{sec}$), the river flows over the north bank near 99th Avenue and can then flow north around the Holly Acres Levee. There is no danger of levee overtopping, since it is outflanked before the river level rises high enough. In addition, outflanking is not likely to cause serious damage to this levee, as it is armored with stones on both sides.

D. Salt River Channelization

In 1996, the Arizona Department of transportation (MCDOT) and the Flood Control District of Maricopa County (FCDMC) completed channelization of the Salt River from 48th Street to Price Road, a distance of approximately 7.5 miles. The channelization included soil cement and gabion bank protection with grade control and drop structures. The channelization is designed to convey flood waters and eliminate erosion and channel migration. The design capacity is just over 250,000 cfs at rural (Scottsdale) Road bridge. The construction also included a construction of a defined confluence with Indian Bend Wash.

E. 91st Avenue Wastewater Treatment Plant (WWTP) Bank Stabilization

The 91st Avenue WWTP has a constructed flood protection project along the north bank of the Salt River. The bank stabilization project extends approximately 2000 ft. The project was designed for the 100-year flood.

F. 116th Avenue Bridge and Approach Roads

Maricopa County Department of transportation constructed a new bridge across the Gila River at 116th Avenue in 1998. This 116th Avenue was called out in this Operation, Maintenance, Repair, Replacement, and Rehabilitation Manual (OMRRRM) as 115th Avenue.

G. Phoenix International Raceway

The Raceway is located on the south bank of the Gila River and has parking areas in the Gila River channel and adjacent to the south road.

H. Tres Rios Levee-Phase 1A

In February 2007, the U.S. Army Corps of Engineers, Los Angeles District completed construction of levee-phase 1A (115th Avenue/Avondale Boulevard to 105th Avenue), a distance of approximately 1.34 miles. Levee-phase 1A construction consisted of riprap slope armoring, gabion bank protection and other associated features including collector channels, guide dikes, detention basin and reinforced concrete box culvert. The Tres Rios levee system can accommodate 227,000 cubic feet per second (cfs) of flow with three feet of freeboard. The levee system was design to provide 100-year flood protection.

PROJECT DATA SHEETS

8. Project Data Sheets and Maps. Project data sheets in Appendix VI consist of an information page and a respective map for key elements of the project within this manual. These sheets furnish general information about the construction data, storm flow data, location of levee, guide dikes, access ramps, etc. Additional information can be obtained from the “As-Built” drawings, which are furnished separately.

PROJECT PERFORMANCE

9. Levee-phase 1B extends from 115th Avenue/Avondale Boulevard to El Mirage Road. The flood control features include the levee and guide dikes that provide 100-year level of flood protection (227,000 cfs). The interior drainage features include a concrete collector channel, detention basin, and RCB and RCP culverts. The levee height ranges from 5 ft at 115th Avenue to 20 ft at El Mirage Road. The levee was armored with 15-inch river-run stone protection and launchable toe stone along the riverside slope and 4-inch-plus thick rock mulch on the landside slope.

HISTORICAL, CULTURAL AND ARCHEOLOGICAL RESOURCES

10. Within the Salt River and from 115th Ave. to El Mirage Road, there is no indication of any pre-

historic site or historic sites existed.

ENVIRONMENTAL EFFECTS

11. There will be no major impacts associated with construction and operation of a flood control Levee, Collector Channel, Detention Basin, RCB and RCP Culverts.

RECREATION FEATURES

12. There is no recreation proposed for Tres Rios Phase 1B.

PROJECT COOPERATION AGREEMENT

13. The Army Corps of Engineers, Los Angeles District and the City of Phoenix have entered into a PROJECT COOPERATION AGREEMENT (PCA) for this project on April 14th, 2004 as required by Public Law (99-622). A copy of the duly executed PROJECT COOPERATION AGREEMENT (PCA) is included as Appendix II.

EMERGENCY OPERATIONS

14. General. -- The operation program which includes flood emergency procedures, is in four phases: (a) Pre-Stormflow phase; (b) Initial stormflow phase; (c) Final stormflow phase; and (d) Post-stormflow phase. Each of these phases include varying degrees of mobilization or demobilization, patrolling (including operation and maintenance), and reporting. Pertinent information on these phases is given in Part IV.

Liaison with Department of the Army, Corps of Engineers.-- During all four phases of operation, the Maricopa County Flood Control District has the responsibility of maintaining close liaison with the Reservoir Operation Center of the Department of the Army, Corps of Engineers, Los Angeles District. Exchange of hydrologic and hydraulic data, including precipitation and stormflow data, will be coordinated between the two agencies. Pertinent information on liaison and coordination is given in extracts from the Los Angeles District's Natural Disaster Activities, OM 500-1-1, (revised annually).

Points of Contact:

- (a) Army Corps of Engineers, Los Angeles District Reservoir
Operation Control Center (ROC).
Radio: WUK4-ROC
Telephone #: (213) 452-3623
(213) 452-3527
- (b) Maricopa County Flood Control District.
24 Hour Emergency Assistance:
Telephone #: (602) 506-1501
- (c) FEMA - Disaster Field Office
Telephone #: (480) 649-2100
- (d) State of Arizona - Office of Emergency Services
Telephone #: (602) 244-0504 or (800) 411-2336

REGULATORY PERMITS

15. The FCDMC (Flood Control District of Maricopa County), in coordination with the Corps Project Manager, shall contact the Corps of Engineers Regulatory Branch. The Regulatory Branch issues permits to authorize discharges of dredged or fill material (including excavation) into waters of the United States pursuant to Section 404 of the Clean Water Act, and structures or work in or affecting navigable waters of the U.S. pursuant to Section 10 of the Rivers and Harbors Act of 1899. Certain activities associated with the operation and maintenance of flood control projects which take place within waters of the U.S. may require permits unless:

- a. a regional general permit has been issued by the Regulatory Branch for maintenance of the flood control project, or
- b. the activity qualifies for the maintenance exemption.

The exemption is for maintenance, including emergency reconstruction of recently damaged parts, of currently serviceable structures such as levees, riprap, O&M roads including access ramps and turn-around, concrete lined channels, RCB culverts, concrete irrigation canal connections and waterways. The bottom of an unlined channel or basin is not considered a structure, even when enclosed by levees/berms. Maintenance does not include any modification that changes the character, scope, or size of the original fill design. Emergency reconstruction must occur within a reasonable period of time after damage occurs (typically within one year) to qualify for this exemption.

For further Section 404 guidance, See PART V, MAINTENANCE and INSPECTION, and PART VII, REGULATORY PERMIT PROGRAM of this manual.

PART III -SUMMARY OF OPERATION AND MAINTENANCE RESPONSIBILITIES

OPERATION AND MAINTENANCE REGULATIONS

16. This manual implements the basic regulations applicable to operation and maintenance of Federally-constructed flood control structures which are contained in Article 208.10 of the Code of Federal Regulations, Title 33. An extract of the regulation is included as Appendix I of this manual.

17. Section (a) of Article 208.10 states:

"(1) The structures and facilities constructed by the United States for local flood protection shall be continuously maintained in such a manner and operated at such times and for such periods as may be necessary to obtain the maximum benefits."

18. This section details the procedures prescribed by the Secretary of the Army pertaining to both operation and maintenance of flood control facilities, including the establishment of an agency responsible for implementing these procedures, the inspection of the flood control structures, and the reporting of their condition.

19. In accordance with ER 1110-2-401, the District Engineer may update the manual for changed conditions or, if warranted, to correct conditions discovered during inspections. Such updating will be performed in consultation with the project sponsor.

AGENCIES RESPONSIBLE FOR OPERATION AND MAINTENANCE

20. Organizations responsible for operation and maintenance: The Maricopa County Flood Control District and the Department of the Army, Corps of Engineers, Los Angeles District, are separately required to maintain organizations capable of adequately operating and maintaining the project units for flood control. The County shall appoint an official (referred to "Superintendent" in the basic regulations) who shall be responsible for the development and proper functioning of that County's operation and maintenance organization in accordance with instructions in this manual.

21. Assistance to be furnished by the District Engineer. The District Engineer shall:

a. Furnish to the Superintendent "as-constructed" reproducible drawings of the flood-control improvements, as soon as they are available after completion of construction.

b. Make prior determination that any proposed encroachment, improvement, excavation, or construction within the rights-of-way, or alteration of the flood control works, will not impact the levee and dikes integrity, channel capacity or flow characteristics, or the flood control structures; and furnish the Superintendent with a written approval.

c. Assist the Superintendent, as may be practicable, in the performance of his duties in

ascertaining storm development having flood-producing potentialities, assembling flood-fighting forces and material, and initiating and carrying out flood-fighting operations.

FUNCTIONS OF THE OPERATION AND MAINTENANCE ORGANIZATIONS

FUNCTIONS

22. General. The functions of the organizations responsible for the operation and maintenance of the flood control system are traditionally divided into two categories: those concerned with operation or use of the flood control facilities, and those involved in the continuing maintenance of the facilities themselves. These functions are detailed in PART IV and PART V of this manual, respectively, and are summarized here. Also, reporting functions are detailed in PART VI of this manual, and Section 404 permit requirements are detailed in PART VII.

OPERATION

23. General. Operation, as defined in this context, encompasses all uses of the flood control system or any of its components. The principal and overriding purpose of the system is clearly the conveyance of storm-runoff in such a way that the impact of the runoff on the urbanized areas through which it passes is minimized and the efficient functioning of the project produces the benefits set forth in the project authorization. There is, however, an increasing awareness of the system's functional possibilities with respect to other purposes; the attitude of the Government toward alternative uses is generally favorable where such uses are compatible with the system's primary purpose. The operation function, then, is subdivided as follows:

a. Flood Operation. The flood operation function includes responsibility for operating the project in accordance with Federal flood control regulations. There are several aspects to flood-operation procedures.

b. Mobilization. The mobilization function includes responsibility for providing sufficient equipment, material, and trained personnel for adequate operation of the project units in times of flood emergency.

c. Coordination. The coordination function requires that appropriate measures be taken to insure that the activities of all local organizations connected with the protective works are coordinated with the operating agency during flood periods.

d. Inspection. The inspection function provides for scheduled patrolling of flood control activities during periods of storm runoff in order to detect and correct any condition which endangers the structure. Also included in this function is a complete inspection following each major high water period, to ascertain if any other damage has occurred.

e. **Multi-Purpose.** Multi-purpose Use is the term applied to all uses of flood control facilities which do not involve conveyance of storm runoff. They include, but are not limited to, water conservation, wetland / wildlife habitat, water quality functions, and development for increased land utilization.

MAINTENANCE

24. **Functions.** Maintenance includes all activities concerned with insuring proper and continued functioning of the project units. The aspects of the maintenance function are as follows:

a. **Inspection.** The inspection function requires that such inspections shall be made as are necessary to insure that the flood control facilities are maintained in a properly functioning condition. Those inspections may include, as necessary, test programs to determine the condition of those features, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary, where such cannot be adequately ascertained by direct inspection. Programs of this type may be used in making current and long-range maintenance policies. If "test programs" and "investigations" involve activities which discharge fill material (includes excavation) into waters of the United States, or involve work or structures in or affecting navigable waters of the United States, permits should be obtained from the Regulatory Branch of the responsible District Office of the Corps of Engineers (Regulatory Branch) prior to commencement of the activity.

b. **Training.** The training function includes responsibility for implementing a program, subject to Corps review, to provide an adequate number of trained personnel to perform the various functions of operation and maintenance under either normal or flood-emergency conditions.

c. **Public Interest.** The public-interest function includes the responsibility for providing police protection of the project units and the responsibility for public health and safety in connection with the various flood control facilities.

REVIEW AND REPORTING REGULATIONS

25. **Project Review.** Federal regulations require that no improvement or construction within the project right of-way or change in any feature of the flood control facilities be made without prior determination by the District Engineer or his authorized representative, and that the improvement or alteration will not adversely affect the structural integrity of the levee, dikes, channel and appurtenant facilities, the hydraulic functioning of the flood control facilities (such as causing a change to the water surface profile or introducing wave action), nor violate environmental agreements. This responsibility includes all determinations concerning multi-purpose uses of the project. The regulations also imply a corollary responsibility which requires inspection and supervision of work at all stages of construction to insure that such work adheres to proper

engineering standards. These responsibilities are categorized as the project review function. Any improvements or construction within the project right-of-way or change in any feature of the flood control facilities must also be authorized by the Regulatory Branch if the work involves discharges of fill or excavated material into waters of the United States, or involves work or structures in or affecting navigable waters of the United States.

26. Reports. Federal regulations require that the operating and maintaining agency prepare a semi-annual report to the District Engineer covering operation and maintenance of the flood control facilities, together with such supplemental or supporting reports as are required by the District Engineer.

PART IV - OPERATION

INTRODUCTION

GENERAL

1. The term "operation", as defined in PART III, encompasses all uses of the flood control system or any of its components. Clearly, the principal use of the system, the purpose for which it was designed and constructed, is to collect and convey storm runoff in such a way that its impact on urban areas is minimized. The maintenance program and flood-operation procedures are oriented toward this purpose.
2. Alternate uses are permitted under special circumstances. Federal regulations forbid the use of protective works for other than flood control purposes if that use adversely impacts flood operations or maintenance of the protective works; the District Engineer is responsible for evaluating a proposed use and determining whether or not a conflict or incompatibility exists. If the proposed alternate use requires work which involves discharges of excavated or fill material (including debris) into waters of the United States, or involves work or structures in or affecting navigable waters of the United States, the local sponsor or the proponent of the changed use may need a permit from the Regulatory Branch. Such a use may not be implemented without approval of the District Engineer.
3. The following sections present the federal directive for operation of the facilities, the current flood-operation procedures, with their corollary functions, and a discussion of the current status of multi-purpose use activities.

FLOOD-OPERATION PROCEDURES

GENERAL

4. The operation program, which specifies flood-operation procedures, consists of four phases: pre-stormflow, initial stormflow, final stormflow, and post-stormflow. Each phase is characterized by a degree of mobilization or demobilization - a patrol procedure which includes inspection/operation of field facilities including levee, guide dikes, collector channel, flap gates, trash racks, and any immediate maintenance, and a reporting requirement. Pertinent information on these phases follows.

PRE-STORMFLOW PHASE

5. Operations. The pre-stormflow phase occurs whenever the National Weather Service forecasts rainfall of more than 0.30 inches per hour, or more than 2.00 inches in a 24-hour period. The operations during this phase are described below.

a. Mobilization. Only such mobilization is required as is necessary to perform the operations under the pre-stormflow phase.

b. Patrolling. The completed flood control improvements should be rapidly but completely patrolled to determine their readiness to accommodate stormflow. The responsibilities of the patrols include the following:

(1) Spreading ground headworks and diversion works should be set to keep stormflows from inundating the spreading grounds, unless an operator is continuously on duty to monitor the conditions of the works during stormflow.

(2) Detention basin should be free of sediment including the low-flow ditch. The basin and low-flow ditch invert slopes should be maintained to match designed invert slopes.

(3) RCB and RCP Culverts including trash rack should be free of any debris including sediment and checked for proper seating. Flap gates should be inspected for proper functioning.

(4) The El Mirage Collector Channel and irrigation side-drain connections should be freed of any debris and their proper seating checked.

(5) Diversion Channels should be free of sediment and debris.

(6) Equipment and material should be readied for use at debris-accumulation locations or at other locations where trouble might occur.

c. Reporting. No written reports are required for submittal to the District Engineer. However, internal documentation may be helpful if flow increases to the point where a stormflow report is required.

INITIAL STORMFLOW PHASE

6. Operations. The initial stormflow phase begins when rainfall begins. The major operations during this phase are described below.

a. Mobilization. Such mobilization is required as is necessary to perform the operations under the initial stormflow phase. However, the operation and maintenance organization should be alerted for full mobilization.

b. Patrolling. The completed flood control improvements should be given a routine patrolling.

(1) The requirements for the pre-stormflow phase should be checked to ensure that they have been met.

c. Reporting. No written reports are required for submittal to the District Engineer. However, internal documentation may be helpful if flow increases to the point where a stormflow report is required.

FINAL STORMFLOW PHASE

7. Operations. The final stormflow phase occurs when the water surface elevation observed at any project unit equipped with streamflow gaging apparatus reaches the staff gage level at one-third capacity (see Appendix VI for information of Gila River at 116th Ave. streamflow gage). Flood-operations begin at this point; the major responsibilities during this phase are described below.

a. Mobilization. Full mobilization is required. Sponsor must have a “Storm Operations Manual” which establishes a staffing plan for flood fighting with shifts established for 24-hour operation. Staff must be either on duty or on-call.

b. Patrolling. Patrolling of the project units should be completed and comprehensive. If not deemed an emergency by the Corps, an after-the-fact permit may be required (where the District Engineer issues a permit authorizing the emergency corrective measures completed during the storm). The responsibilities of the patrols include the following:

(1) The staff gage level with time of reading should be recorded.

(2) Photographs should be made at locations where stormflow damage is occurring or has occurred, where such damage has been repaired, where unusual conditions are noted, or where visual records may be useful in making maintenance determinations.

(3) Detention basin including low-flow ditch design invert slopes should be checked.

(4) RCB Culvert trash racks and flap gates should be checked for proper operation.

(5) Channels and irrigation side-drain connections connecting to the El Mirage Collector Channel should be examined for proper functioning.

(6) All debris accumulations that would reduce channel capacity including detention basin and diversion channel should be dislodged or removed at the discretion of the patrolling unit.

(7) Any condition endangering any flood control structure should be corrected.

c. Reporting. A stormflow report is required to supplement the spring semiannual

report. In addition, the Reservoir Regulation Section of the U.S. Army Corps of Engineers should be notified immediately whenever a staff gage level indicates that stormflow has reached one-third of the channel capacity. If stormflow is very large or if unusual damage occurs, a special report may also be required.

POST-STORMFLOW PHASE

8. Operations. The post-stormflow phase occurs when the water surface elevations at the various project units equipped with streamflow gaging equipment fall below the staff gage readings indicated on the data sheets in Appendix VI, and available meteorologic or hydrologic data indicate decreasing flow. The phase ends after storm runoff has stopped, and all the major operations indicated below have been performed.

a. Mobilization. Some demobilization is possible during this phase; however, full demobilization should be delayed until the operations for this phase have been completed.

b. Patrolling. The project units should be rapidly but completely inspected. The responsibilities of the patrols include the following:

- (1) All damaged flood control facilities should be located, reported, and photographed.
- (2) Detention basin should be checked for sediment including the low-flow ditch. Detention basin should be checked to ascertain whether the accumulation of debris has reached the point where removal should be effected.
- (3) RCP and RCB Culverts including trash racks and flap gates should be free of sediment/debris and their proper seating checked.
- (4) Channels and irrigation side-drain connections should be free of sediment and examined for proper seating
- (5) Channels should be checked to ascertain whether or not the accumulation of debris/sediment has reached the point where removal should be effected.
- (6) All entrances of conduits should be freed of debris.
- (7) Appropriate temporary or permanent repairs of damaged flood control facilities should be initiated.
- (8) Equipment and materials should be inventoried and made ready for subsequent stormflow.

c. Reporting. No written reports are required for submittal to the District Engineer.

However, internal documentation may be helpful if a stormflow report or a special report will be required.

COORDINATION WITH THE U.S. ARMY CORPS OF ENGINEERS

9. The operation and maintenance organization is responsible for maintaining close liaison with the Reservoir Regulation Section of the District during all four phases of operation. Exchange of hydrologic and hydraulic data, including precipitation and stormflow data, is useful in the operation procedures of both agencies. Pertinent information on liaison and coordination is given in the flood-emergency manual SPL OM 500-1-1, titled "Natural Disaster Activities", published annually by the District. This manual also covers flood-emergency assistance procedures.

AUXILIARY FUNCTIONS

10. Corollary to the flood-operation procedures outlined above are several related responsibilities described by Federal regulations and listed below:

a. Coordination. The Code of Federal Regulations, Title 33, article 208.10, section (a) reads in part as follows:

"(9) Appropriate measures shall be taken by local authorities to insure that the activities of all local organizations operating public or private facilities connected with the protective works are coordinated with those of the Superintendent's organization during flood periods."

b. Inspection. The Code of Federal Regulations, Title 33, article 208.10, section (g) reads in part as follows:

"(2) Operation. Both banks of the channel shall be patrolled during periods of high water, and measures shall be taken to protect those reaches being attacked by the current or by wave wash. 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 banks, riprap, deflection dikes and walls, drainage outlets, or other flood control structures repaired."

MULTI-PURPOSE USE

GENERAL

11. Multi-purpose use is the term applied to any use of the flood control system or its components which involves activities other than the conveyance of storm runoff. The Code of Federal Regulations, Title 33, article 208.10, section (h), states in part:

"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 therefore."

The criterion which forms the basis for such approval is the requirement that a proposed use not adversely affect the functioning of the protective facilities. Determinations of this nature are made as part of the review procedures outlined in PART V of this manual.

12. Although the project was designed for and its principal use remains flood control, there is an increasing awareness of the systems possibilities for use in other activities. The Government's attitude toward such alternative uses is generally favorable where such uses are compatible with flood control. Any proposed uses which involve discharges of dredged or fill material (including excavation) into waters of the United States, or involve work or structures in or affecting navigable waters of the United States, may require a permit from the Regulatory Branch. The use may also have to comply with the 404 (b) (1) guidelines which regulates activities in wetlands that are water and non-water dependent.

13. However, the National Environmental Policy Act of 1969 requires the preparation of a detailed statement on the environmental impact of any proposed action involving Federally-constructed facilities. This requirement particularly includes proposals for multi-purpose use. State and local regulations may require assessments. In any event it is the responsibility of the applicant to satisfy all regulations which are applicable to his proposed work. Approval of multi-purpose use may also be subject to public meeting procedures in addition to the usual environmental review procedures. The current multi-purpose uses involving the project are discussed in PART II, PROJECT INFORMATION.

WATER CONSERVATION

14. The use of the flood control system in water conservation is compatible with the system's basic purpose. However, it should be noted that the easements or rights-of-way which permit the passage of storm runoff and irrigation water sometimes are written to allow only the passage of storm/irrigation runoff; legal difficulties of this type must be resolved before a water distribution

plan may be implemented.

RECREATION

15. Various local recreation and planning agencies whose jurisdictions include parts of the flood control system may become increasingly interested in the recreational possibilities of the flood control rights-of-way. Since these lands are likely to remain in their present condition for some time, investment in the development of recreation facilities on them for public use seems justified; the Government's attitude encourages such use. Any proposed recreational facilities that involve discharges of dredged or fill material (including excavation) into waters of the United States, or involves work or structures in or affecting navigable waters of the United States, shall be authorized by the Regulatory Branch in a Corps permit.

16. Recreational features have been or can be developed within the basins of flood control dams and along the berm roadways of the channels in the form of bicycle, hiking, and equestrian trails. This development generally involves special berm and invert access ramps, under crossings and protective fencing, and occasionally more extensive recreational features.

17. Such uses generally do not interfere with flood control activities; some concern must be given, however, for the maintenance of proper access control to prevent unauthorized access to areas beyond the recreation limits, particularly during the storm season. Recreation proposals are evaluated through the usual review procedures, coordinated with the Recreation Resource Specialists of the District.

DEVELOPMENT FOR INCREASED LAND UTILIZATION

18. To increase the utilization of lands adjacent to these rights-of-way, proposals to use the berm roadway space for structure, parking or loading are common. In any event, a proposed development must be compatible with existing land use zoning. Since the United States does not establish zoning regulations, the responsibility for insuring compatibility of existing zoning with a proposed land use lies with the applicant, and any conflicts must be resolved before approval is granted by the United States. Any proposed private developments that involve discharges of dredged or fill material (including excavation) into waters of the United States, or involves work or structures in or affecting navigable waters of the United States, shall be authorized by the Regulatory Branch in a Corps permit.

MISCELLANEOUS

19. Proposals are frequently made for temporary use of flood control facilities or rights-of-way for a variety of purposes other than those previously discussed. Such proposals are highly diverse, ranging from motion picture filming to bus driver training classes, and are seldom in the interest of the general public. The Government's attitude is one of tolerance, as long as the requirement of no

adverse effect on the protective works is met. Any proposal that involves discharges of dredged or fill material (including excavation) into waters of the United States, or involves work or structures in or affecting navigable waters of the United States, shall be authorized by the Regulatory Branch in a Corps permit.

20. All such proposals are evaluated under the usual review procedure; consideration must be given to the loading which a proposed use would produce on channel or other related structures, the effects on channel capacity, the maintenance of proper access control, potential conflicts with other multi-purpose uses or normal operation procedures, and other such factors.

WETLANDS/WILDLIFE HABITAT

21. The Corps is required by law to regulate discharges of dredged or fill material (including excavation) into waters of the United States which includes compliance with the Endangered Species Act and the Fish and Wildlife Coordination Act. These regulated activities may involve impacts to wetlands/wildlife habitats that may require revised maintenance procedures and/or mitigation for impacts to wetlands and wildlife habitats. The Regulatory Branch should be contacted when maintenance activities and/or other activities may require a permit which impacts wetland/wildlife habitats or involves impacts to species listed as endangered or proposed for listing.

22. Should the periodic removal of accumulated sediment within detention basin, RCB culverts including inlets/outlets and channels area be deemed necessary, excavation and dredging maintenance activities shall consider potential impacts on existing resources, including but not limited to, sensitive species, inland water quality, aquatic and emergent vegetation and wildlife, economics, and other general environmental resources. The periodic removal of accumulated sediment shall occur in a manner consistent with the sections on frequency of sediment removal and 404 permit requirements in Part V.

WATER QUALITY FUNCTIONS

23. The Corps requires compliance with Sections 401, 402, and 404 of the Federal Water Pollution Control Act of 1972 which supports the preservation and establishment of wetlands as biomass treatment of many various pollutants, including nutrients, suspended materials, and other pollutants. Operation and maintenance impacts shall be coordinated with the Regulatory Branch and Local Water Quality Control Agency to avoid, minimize, and mitigate for impacts to wetland water quality functions.

PART V - MAINTENANCE and INSPECTION

INTRODUCTION

OVERALL MAINTENANCE RESPONSIBILITIES

1. The previously referenced article of the Code of Federal Regulations, Title 33, section (b), states, ". . .The Superintendent shall provide at all times such maintenance as may be required to insure serviceability of the structures in time of flood." Although the broad scope of this directive allows considerable freedom of interpretation, it clearly implies a responsibility to detect and correct any condition which might adversely affect the functioning of the flood control system. Explicitly defined are the maintenance function, which involves actual repair and restoration procedures; and the inspection function, which includes programs and procedures necessary to detect hazardous or malfunctioning conditions.
2. Implicit in this directive are also several additional functions which are less directly related to the immediate maintenance requirements, but which affect the continued functioning of the system in a manner appropriate to its design purposes. These implicit functions include the training, public-interest, project review, and reporting functions.

MAINTENANCE ASPECTS OF APPENDIX VI

3. The data sheets of Appendix VI provide relevant information of significant features of specific reaches or units of the project. This information includes a brief construction history; locations of gaging stations or streamflow measuring equipment, access ramps to channel invert or berm roadways, bridges, and other pertinent features. Also provided is a list of features the condition of which is to be checked for the semiannual reports.
4. It is the intention to make these data sheets as comprehensive and accurate as possible, particularly with respect to vehicular access to the channel invert and berms, since this type of information is critical to efficient inspection and maintenance procedures. It is therefore requested that any observed discrepancy from the features listed be reported to the Operations Branch of the District, so that the manual may be revised to reflect such changes.

MAINTENANCE FUNCTION

ROUTINE MAINTENANCE MEASURES

5. Code Requirements. The Code of Federal Regulations, under referenced Title 33, specifies in some detail the routine maintenance procedures for various types of flood control facilities. These can be best summarized as follows:

“(b) Levees - (1) Maintenance. The Superintendent shall provide at all times such maintenance as may be required to insure serviceability of the structures in time of flood. Measures shall be taken to promote the growth of sod, exterminate burrowing animals, and to provide for routine mowing of the grass and weed, removal of wild growth and drift deposits, and repair of damage caused by erosion or other forces. Where practicable, measures shall be taken to retard bank erosion by planting of willows or other suitable growth on areas riverward of the levees. Periodic inspections shall be made by the Superintendent to insure that the above maintenance measures are being effectively carried out and, further, to be certain that:

- (i) No unusual settlement, sloughing, or material loss of grade or levee cross section has taken place;
- (ii) No caving has occurred on either the land side or the river side 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 wells 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 rock 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;
- (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 rapidly, 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.

...Immediate steps will be taken to correct dangerous conditions disclosed by such inspections.”

“(d) Drainage Structure- (1) Maintenance. Adequate measures shall be taken to insure that inlet and outlet channels are kept opened 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:

- (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 structure which might endanger its 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”.

"..(g) Channels and floodways - (1) Maintenance. Periodic inspection 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 work.

...Immediate steps will be taken to correct dangerous conditions disclosed by such inspections. Measures will be taken by the Superintendent to promote growth of grass on bank slopes and earth deflection dikes. The Superintendent shall provide for periodic repair and cleaning of debris basins, check dams and related structures as may be necessary."

The referenced article of Title 33 further states that the Superintendent shall provide for periodic repair and maintenance of floodwalls, drainage structures, closure structures as may be necessary.

6. 404 Permit Requirements: Title 33, parts 320-330, states that maintenance or other activities in which discharges of dredged or fill material (including excavation and substrate disturbance involving vegetation removal) into waters of the U.S., including but not limited to channels, flood ways, and impoundments, require the responsible entity to apply for and obtain a Clean Water Act Section 404 permit from the Regulatory Branch prior to commencement of such activities. In some cases a Section 10 permit may also be required.

7. Exemptions from 404 Permit Requirements. Maintenance activities of currently serviceable structures and emergency reconstruction of recently damaged parts are generally exempt from the

404 permit requirement. Examples of structures are dikes, dams, levees, groins, riprap, and concrete lined channels and floodways. The bottom of an unlined (earthen or "soft") channel or basin is not considered to be a structure, even when beset by levees. Modifications or character change in scope or size of original fill designs is not considered to be maintenance. Emergency reconstruction must occur within a reasonable period of time after damage occurs (typically within one year) to qualify for the exemption. Concrete lined channels and other structures with shoals that support significant wetland vegetation growth may no longer be serviceable and thus not eligible for the 404 permit exemption; the Regulatory Branch must be notified prior to initiation of maintenance activities in such instances.

Esthetic Treatment Maintenance

8. General. Urbanization adjacent to flood control projects has increased significantly in recent years and is expected to continue. Correspondingly, this has increased project visibility necessitating the need not only for a higher quality project esthetic treatment, but also for better maintenance of the finished product. With regard to current economic conditions, careful consideration should be given to future maintenance needs during preliminary planning and design stages of project development. Plant material and earth-tone colored gravel and rock play an important role in esthetic treatment since they provide intrinsic beauty, erosion control, environmental quality, and if utilized correctly, low-maintenance characteristics. Other than plant species selection, slope steepness can be the most important factor affecting low-maintenance potential. Slopes exceeding 3 horizontal to 1 vertical are generally more labor intensive (and more expensive) to landscape initially as well as maintain later. This applies not only to plant material, gravel, and rock, but to hardscape surfaces (grouted stone, ornamental concrete and pavers) as well. The use potential of machinery (mowers, etc.) decreases proportionally as slopes increase from 3:1. It is therefore becoming increasingly more important that project slopes maintain steepness ratios not exceeding 3:1, wherever and whenever possible.

9. treatment maintenance shall maintain or improve upon the original design concept level of esthetic quality and utilitarian effectiveness.

10. Hardscaping. Hardscaping, which must be maintained to appear as originally placed, basically consists of the following features:

- a. Gravel and stone ground covers - remove debris, regrade gravel and stone areas as necessary, and supplement as needed with in-kind material.
- b. Paving systems - (including grouted stone, concrete and pavements) - regrout, repair, repave, replace material in-kind, excavate and regrade, as necessary. Keep areas clean and free of debris.
- c. Fencing - (including planters, artificial stonework, and bollards). Replace material in-kind, repair, repaint or restrain, as necessary.

- d. Head walls - include in periodic inspections for structural integrity, and repair as necessary.
- e. Graffiti and vandalism – repair and remove as necessary, immediately and continually to discourage further damage.

11. Frequency of Sediment Removal.

a. As part of maintenance requirements for the detention basin, RCP and RCB culverts and channels, it is recommended that O&M activities should be carried out quarterly. The sediment removal required for the detention basin, RCP and RCB culverts and channels shall be needed to maintain the design flood protection. Sediment would not be allowed to accumulate to the upper grade limit line or fill up of the low-flow ditch within the detention basin. Once sediment deposition exceeds this limit, the sediment must be removed to the design invert.

NON-ROUTINE MAINTENANCE

12. Certain maintenance procedures which are not explicitly described as routine by the sections of referenced Title 33 are implied by the directive to insure serviceability in times of flood. Such procedures would include repair of any damage caused by storm runoff, maintenance of the berm O&M roadways, the right-of-way fencing, entrance gates and concrete irrigation canal connections (so as to provide unimpeded access to the project units at all times), restoration of subdrain system, and other such required maintenance which occurs on an irregular basis.

INSPECTION FUNCTION

INSPECTIONS

13. General. The Code of Federal Regulations, under the referenced article of Title 33, states that 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 at such intermediate times as such may be necessary to insure the best possible care of the protective works.

14. Purpose. The purpose of these inspections is to determine whether or not each project unit and the flood control system are in a properly functioning condition and to insure that the facilities receive proper attention so that the equipment is ready for use to provide safe and efficient operation with a minimum chance of failure during operation. The scope of the preventive maintenance inspections includes adjusting, lubricating, and repairing equipment and replacing worn or defected parts. This responsibility involves locating and recommending repairs for any damage which may

have been caused by storm runoff or the action of other natural forces, insuring that access to all project units is maintained at all times, and preventing unauthorized encroachment on or access to the project right-of-way. The Code of Federal Regulations is quite specific on this point; section (a), under the referenced article of Title 33, reads in part:

"(4) No encroachment or trespass which will adversely affect the efficient operation or maintenance of the project works shall be permitted upon the rights-of-way for the protective facilities."

15. Visual Inspection and Reports. Visual inspection and reporting of all conditions are a main method of supplying information for a maintenance program. Consciences visual inspection furnishes evident of the proper functioning flood control system. The criteria in Appendix IV provides a basic for determining the extent of investigation and repair need to correct defects and restore the facility to full design. Figure 2 of Part VI provides a complete listing of reporting features.

INVESTIGATION AND TEST PROGRAM

17. Purpose. The investigation and test program is designed to provide criteria for making current and long-range maintenance determinations. A test program is to be initiated whenever the condition of a reporting feature cannot be adequately determined by direct inspection. An investigation program is to be initiated when the cause of a reporting feature's condition and the necessary corrective actions are not immediately apparent.

18. Types of Programs. The various types of programs are described below.

- a. In general, most investigation and test programs are recommended when the spring semiannual report is prepared. Those programs, which are completed in time to implement repairs during the summer months, are classified as "short-term programs".
- b. Those programs that require more than one year to develop adequate information are termed "continuing programs".
- c. Certain reporting features require "periodic programs" whose initiation and continuance is a function of regularly established annual periods rather than by specific recommendations during the semiannual inspections. Such periodic test programs may in turn recommend investigation programs which may be implemented on a short-term, continuing, or periodic basis.

19. Special Test Program Requirements. Certain recurrent problems with reporting features require more detailed discussion.

- a. Concrete Cracking. Whenever a test program is recommended to determine the condition of cracks in reporting features, the test program will include measurements to determine if the crack is stable; or if not, the rate of displacement and crack progression. If the test program indicates that the crack is stable, the appropriate repair is recommended in the semiannual report. However, if the crack is found to be active, an investigation program is recommended to determine the cause of the crack and the necessary corrective action.
- b. Scour Areas. Any unlined channel may experience scour. This is especially true where major side channels or side drains enter the channel. An annual test program is required to determine the extent of this scour and to follow its effects; this test program will include a survey to plot the channel profile in areas that scour is noted.
- c. Any improvements, excavation, construction, or alteration, which involve discharges of dredged or fill material (including excavation) into waters of the United States, or involves work or structures in or affecting navigable waters of the United States, shall be authorized by the Regulatory Branch under a Corps permit.

TRAINING FUNCTION

TRAINING RESPONSIBILITIES

20. Program. The training responsibilities of the operation and maintenance organization include the establishment, with annual evaluation and revision, of a regularly scheduled program to provide training in certain critical areas.

- a. Inspection Training. Inspection training will be designed to insure uniform inspection procedures, uniform reporting, and inspection controls over repairs and project construction; to qualify alternative personnel for each type of inspection; and to supplement and verify adequacy of the inspectors.
- b. Repair Training. Repair training is intended to insure uniform repair procedures and competent workmanship. A corollary responsibility is the development of standard repair methods, in cooperation with the District. These methods should be documented in written form to insure that the techniques and procedures are not lost with personnel changes.
- c. Investigation and Test Training. Training in the investigation and test program will be designed to develop and maintain uniform methods, procedures, and valid program results.

- d. Operation Training. Operation training is designed to maintain crews adequately trained in operational procedures. Such training shall conform to the specifications of the flood-emergency manual, SPL OM 500-1-1, titled "Natural Disaster Activities", published annually by the District.

PUBLIC-INTEREST FUNCTION

POLICE PROTECTION

21. The operation and maintenance organization is responsible for providing police protection for the project units, obtaining adequate ordinances protecting the units, and obtaining limited police authority for the operation and maintenance organization. Adequate policing will minimize litter and damage due to malicious mischief. The organization is responsible for removing litter and repairing any such damage, including graffiti removal.

PUBLIC HEALTH AND SAFETY

22. The operation and maintenance organization should develop liaison with organizations responsible for public health in order to prevent the accumulation of waste discharges, insect-breeding areas, and other menaces in the flood control rights-of-way.

23. The Code of Federal Regulations, under referenced Title 33, clearly states that unimpaired access to all flood control facilities by authorized personnel be provided at all times. However, this access must be restricted to prevent trespassing or uses which might interfere with flood control. The facilities may be regarded as an attractive nuisance, and adequate fencing must be provided to prevent unauthorized persons, especially children, from gaining access to the right of-way and harming either themselves or the facilities. However, security provisions must consider recreational uses, where applicable.

PROJECT REVIEW

AUTHORIZATION

24. The basic authorization of the Project review function derives from the Code of Federal Regulations, Title 33, article 208.10, section (a), which reads in part as follows:

"(5) No improvement shall be passed over, under, or through the walls, levees, improved channels or floodways, nor shall any excavation or construction be permitted within the limits of the project right-of-way, nor

shall any change be made in any feature of the works without prior determination by the District Engineer or his authorized representative that such improvement, excavation, construction, or alteration will not adversely affect the functioning of the protective facilities. Such improvements or alterations as may be found to be desirable and permissible under the above determination shall be constructed in accordance with standard engineering practice. Advice regarding the effect of proposed improvements or alterations on the functioning of the project and information concerning methods of construction acceptable under standard engineering practice shall be obtained from the District Engineer or, if otherwise obtained, shall be submitted for his approval."

25. These specifications apply to the Project review for all Federally authorized flood control facilities.

REVIEW PROCEDURES

26. Federal regulations assign the responsibility for providing an interface between the general public and the U.S. Army Corps of Engineers project review to the Local Sponsor. Applications for permits are submitted to the Local Sponsor, which requests comments from the District and then issues or denies a permit. This procedure applies to all facilities for which reports are made to the Corps of Engineers, but does not apply on those units for which reports are not made.

27. The review procedures adopted by the Corps of Engineers in the Los Angeles District are detailed in the "Flood Control Projects Manual".

28. Request for temporary or permanent modification of flood control improvements must first be submitted to the Local Sponsor, before the Los Angeles District can approve the modification. These applications will be reviewed by the Local Sponsor and then sent the Operations Branch of the Los Angeles District for consideration before any application is approved for a permit. Each application, which is reviewed by the District, will be adequately evaluated in order to determine whether any modification will adversely affect the ability, safety, or functioning of the flood control facilities. When such an evaluation by the District has determined that approval can be given, the conditions which must be adhered to will be incorporated with the permit. Only at this time should the Local Interest issue the permit for modification. Executed copies of the permit as issued shall be furnished to the Operations Branch of the District.

29. The District maintains "as permit constructed" plans which reflect all changes or modifications in the project units. Maintenance of current plans requires drawings or prints of all proposed work and a completion notice to indicate that a project is finished.

30. An important part of the project review procedure is the requirement that an appropriate

block-letter levee station number visible from invert, access ramps, or berm roadway be placed wherever possible to identify the location of a reporting feature for inspections or maintenance work. On channel walls the block-lettering should be at a height above the invert which is convenient for lettering and readily visible. On dumped or grouted stone side slopes, the lettering should be applied on flush mortared pad areas. This identification is the responsibility of the operation and maintenance organization. Where initial stationing was placed as a part of the construction contract, the local sponsor is responsible for maintaining the markings.

PROJECT INSPECTIONS

31. The operation and maintenance organization will inspect project construction to insure that improvements or alterations do not interfere with the proper functioning of the project and that the construction follows acceptable standard engineering practice. These inspections will also verify locations to insure that the "as-permit constructed" plans accurately reflect the actual condition of the project unit.

PART VI - OPERATION & MAINTENANCE REPORTS

REPORT FUNCTIONS

GENERAL REPORTING ACTIVITIES

1. The basis for the report function is given in the Code of Federal Regulations, Title 33, article 208.10, section (a) which reads in part as follows:

"(6) It shall be the duty of the Superintendent to submit a semiannual report to the District Engineer covering inspection, maintenance, and operation of the protective works."

2. Although the operation and maintenance organization is required to submit several types of operation and maintenance reports to the District Engineer, all reporting activities must be oriented toward the submittal of two basic reports each year. These semiannual reports are then supplemented by additional reports as necessary.

3. The following sections of this chapter define the required reports, report organization, and reporting terminology. The reports can be narrative letter reports or summarized on a form designed by the sponsor. The suggested forms included in this document have been used on other projects and are included as examples. The only requirement is that the information identified be included in the reports.

TYPES OF REPORTS

4. Semiannual Operation and Maintenance Report. The semiannual reports, which are the basic communication on the functioning of the flood control system, are prepared in two phases: the spring phase, which indicates the maintenance requirements of the project units at the end of the flood season; and the fall phase, which indicates the ability of those units to accommodate storm runoff after the summer maintenance. The two phases, with the supporting reports which may accompany the basic reports, give a successively revised picture of the operation and maintenance of the project from the start of one flood season to the start of the next.

5. Quarterly Operation and Maintenance Report. Federal regulations require a complete inspection at least every 90 days to determine the need for temporary or permanent maintenance and to initiate the necessary maintenance for the project units. However, because two such quarterly inspections coincide with the two phases of semiannual reports, the requirements for quarterly reports are as follows:

January	A separate report is required on a rapid inspection to determine maintenance needs. A copy of this report is also included with the spring semiannual report.
April	The April quarterly inspection is for the sole purpose of determining whether conditions exist that would interfere with the detailed inspection required for the spring phase of the semiannual report. A separate report is not required, since the results of the April inspection are indicated on the semiannual report form.
July	The July quarterly inspection is essentially a progress report on summer maintenance. A separate report is not required, although a copy must be included in the fall semiannual report.
October	Maintenance work performed during the summer is repeated in the fall phase of the semiannual report; a separate report for the quarterly inspection is not required.

The required separate quarterly reports need only be very brief summary descriptions of maintenance needs and the status of the project units.

6. Investigation and Test Program Report. A supplemental report that accompanies the fall phase of the semiannual report is the investigation and test report. Such a report presents the findings of each test program which is carried out to determine the condition of a reporting feature and the results of each investigation program undertaken to determine the cause of a reporting feature's condition and the necessary corrective action.

7. Stormflow Operation Report. A supporting report which accompanies the spring phase of the semiannual report is the stormflow operation report, which contains the log of operations for each project unit during those periods in which storm runoff is above the staff gage reading indicated on the data sheets in **Appendix V**. The log report form shall be the responsibility of the operation and maintenance organization.

8. Special Reports. Special reports are prepared to describe any unusual occurrence which affects the flood control system; such phenomenon may include large flood flows or unusual damage from storm runoff, earthquakes, or other causes. A Special Report is to be transmitted to the District Engineer within one week of the occurrence. A copy is to accompany the next following semiannual report.

9. Manual Revision Report. The revision report should include comments, suggestions, and additional data from those directly concerned with operation and maintenance, as well as policy-making, administration, funding, and programming information. The District is particularly concerned with maintaining the accuracy of this manual; since it will be periodically revised,

observed discrepancies or inaccuracies and comments relative to the manual's effectiveness in fulfilling its intended function will be incorporated where appropriate.

REPORT ORGANIZATION

10. Time of Submittal. The spring phase of the semiannual report shall be submitted to the District Engineer on or before 1 June and the fall phase on or before 1 December. Included with these reports are any quarterly reports, investigation and test reports, stormflow reports, and manual revision reports. Special reports are transmitted as indicated previously.

11. Fiscal Statements. Information on cost of operation and maintenance is required as part of the semiannual report. Actual costs are to be given when possible, as shown on the sample transmittal letter in **Appendix III**. Estimates may be used for items where actual costs are not available. Operation and maintenance costs for any work performed or paid for by the operation and maintenance organization are to be shown irrespective of the source of funds. Costs for work performed by other agencies and not reimbursed by the operation and maintenance organization are not required.

12. Inclusions in Semiannual Report.

a. The list of reports which may be included in the spring submittal is given below.

- (1) Spring phase of the semiannual operation and maintenance report (including the April inspection).
- (2) Copy of the January quarterly report.
- (3) Stormflow operation reports.
- (4) Manual revision reports.
- (5) Special reports (the originals of which were previously submitted).

b. The list of reports which may be included in the fall submittal is given below.

- (1) Fall phase of the semiannual operation and maintenance report (including the October inspection)

- (2) July quarterly report.
- (3) Investigation and test program reports.

REPORTING TERMINOLOGY

13. All those features of the project units that must be inspected, operated, and maintained (and hence reported on) are called reporting features for the purpose of this manual. Each such feature is defined here so that use of these terms will be consistent and clear. A tabulation of reporting features organized by general terms is given in **Figures 1, 2 and 3**

SEMIANNUAL REPORT

REPORT FORMAT

14. Forms to Be Used. The reporting agency has the option to use narrative report, reporting agency form, or use the Corps forms SPL 403 & 403a. The Corps forms SPL 403 and SPL 403a and instructions for preparation of these forms will be supplied to the operation and maintenance organization by the District upon request. A sample of semiannual narrative letter and inspection reports is presented in **Appendix III**.

PREPARATION FOR THE SPRING SEMIANNUAL INSPECTION

15. Spring Housecleaning. Effective inspection and maintenance requires physical and visual accessibility to all reporting features. Debris and vegetation should be cleared away, although meticulous neatness is not required. The guiding principle should be that to the general public the appearance of the project units reflects on the competency and adequacy of the flood control facilities. A specific task to be performed is the removal of debris obscuring inspection or hindering maintenance. Debris accumulations in the channels, RCB culverts, culvert inlet and outlet and structures and detention basin should be removed. Vegetation obscuring inspection of channel, detention basin and RCB culvert inlet & outlet structures condition should be removed, eradicated, or trimmed, as applicable.

16. Relationship to April Quarterly Report. As previously stated, the April quarterly report is made for the sole purpose of determining whether conditions exist that would interfere with the detailed inspection required for the spring phase of the semiannual reports. A separate April quarterly report is not necessary; the results of this inspection are noted on the semiannual report. If the reporting feature is inaccessible, the notations are not made until subsequent inspection indicates that the feature has been "house cleaned" and is ready for the spring inspection.

THE SPRING SEMIANNUAL INSPECTION

17. As the inspection is performed, the handwritten notations to be made in the indicated columns are given below.

a. Column 5. Any deviation of the reporting features from the "as-constructed" drawings is reported in column 5. The terminology to be used in reporting such deviations must correspond to that on the data sheets in Appendix VI. If the deviation exists because the feature is being constructed under permit or lease, use the term "active permit"; if no deviation exists, the abbreviation "AC" for "as-constructed" is placed in the column.

b. Notations are made in columns 6 through 18 in all cases where a deviation is reported, where there is an "active permit" feature, or an investigation or test program is recommended or is being continued from a preceding year. In all other cases no notation is made.

(1) Columns 6 through 13 inclusive are used to indicate the eight categories into which deviation causes have been divided

- (a) Column 6. Normal deterioration, progressive wear, or displacement.
- (b) Column 7. Loadings, including debris, vehicles, and structures.
- (c) Column 8. Vegetation.

- (d) Column 9. Modification of adjacent facilities, including side drains, utilities, bridges, or other project construction activities.
- (e) Column 10. Public mischief and / or litter.
- (f) Column 11. Flood emergency flow.
- (g) Column 12. Storm runoff.
- (h) Column 13. Other.

The applicable column is marked with either an "X" or a circled number referencing a note on a backup page; all other columns are indicated with a "-".

(2) Column 14. This column applies only to those reporting features for which an investigation or testing program is recommended or is being continued from the preceding year. This status is denoted with an "X" to indicate that an investigation or test program is recommended, "T" to indicate that a program is being continued from a preceding year, and a "-" to indicate that no program is involved. The "Inspection Function" in PART V discusses the basis for recommending investigation or test programs.

(3) Column 15. This column is used to indicate the recommended repair for the deviation reported in column 5. The terminology used must correspond with that given in Appendix V. For some recommended repairs supplemental information is supplied; this information may be a station identification, a quantity of materials needed, or a circled number which corresponds to an explanatory note on a backup page. In general the recommended repair should be listed without regard to when the repair would be required or when it could be made, since such decisions are made in the operation and maintenance organization's office.

(4) Filing in columns 16 and 17 is normally the responsibility of the operation and maintenance office; consideration is given to the type of repair recommended, the estimated time required, and the availability of personnel.

(a) Column 16. Column 16 will contain the programmed repair completion dates of the current summer, as estimated with regard to maintenance priorities. The official responsible for approving these dates must initial them. When the column is not applicable, write a "-".

(b) Column 17. Column 17 will be used only if the repairs are to be accomplished within the next three years. Repairs which cannot be effected during the current summer may be programmed within the next three years with revisions made annually. When the column is not applicable, write a "-".

(5) Column 18. Column 18 may be used as part of the spring semiannual report or may be deferred until the fall phase. If used during the spring phase, the column contains a circled number which references an explanatory note concerning the deferral of repairs on a backup page. This explanation must either contain the scheduled date of repair or indicate that the work has been or will be corrected in conjunction with project work. A "-" indicates that no repair is involved.

c. Columns 19 and 20 are not used during the spring phase of the semiannual report.

d. Column 21. Column 21 indicates any deviations noted and corrected during the period 15 October to 15 April; a circled number with a corresponding explanatory note details the type of deviation(s) noted, the cause thereof, the repairs made, and the date such repairs were completed. No other type of entry is required.

18. The spring semiannual report should be reviewed by the organization superintendent for signature. The reports are then used to make at least two copies of the entire report, one copy of which is filed for reference by the operation and maintenance organization and another of which is submitted to the District as indicated in the "Report Organization" subsection of "Report Functions" in this Part. The reports are then filed by the operation and maintenance organization for use in preparing the fall semiannual report.

FALL SEMIANNUAL REPORT

GENERAL

19. The fall semiannual report describes the final inspection of repairs and project construction scheduled for completion before the start of the flood season. It also serves to verify that the project units are ready for stormflow.

PREPARATION OF FORMS

20. As previously indicated, the reporting agency has the option to use narrative report, reporting agency form, or use the Corps SPL 403 & 403a forms.

21. If using Corps SPL 403 & 403a forms, note the following instructions: During the course of the fall semiannual inspection columns 18 through 21 are completed for all reporting features which required entries in columns 6 through 17; in other cases no entries in these columns are made.

a. Column 18. If column 18 was not used during the spring phase; it is now completed with a circled number which references an explanatory note concerning the deferral of repairs on a backup page. This explanation must either include the scheduled date of repair or indicate that the work has been or will be corrected in conjunction with project work. A "-" indicates that no repair is involved.

b. Column 19. Column 19 contains required information on a scheduled investigation and test program, if applicable (see Column 14). This column may contain a completion date when the program was finished before the fall semiannual report, the letter "T" to indicate that the program will continue, or a "-" when no program is involved. The results of a completed program will be submitted in the supporting investigation and test program report.

c. Column 20. Column 20 is used to indicate the status of repairs scheduled for completion the preceding summer. The entry consists of the inspector's initials to indicate completion of the inspection, or a "-" to indicate that no repair or construction is involved.

d. Column 21. Column 21 provides a place for indicating any remarks as may be required to clarify conditions found during repairs. The entry will be a circled number which references an explanatory note on a backup page. A "-" indicates that no clarification is required.

22. The fall semiannual report should be reviewed by the organization superintendent for signature. The reports are used to make at least one copy, which is forwarded to the District as indicated in the "Report Organization" subsection of "Report Functions" section of this Part. The originals are then filed for reference by the operation and maintenance organization.

FIGURE 1

REPORTING FEATURES FOR FLOOD CONTROL LEVEE, GUIDE DIKES AND ACCESS RAMPS INCLUDING TURN-AROUND

<u>GENERAL</u>		<u>TYPICAL REPORTING FEATURE</u>	
TERM	INCLUSION	ALONG LEVEE, GUIDE DIKES & ACCESS RAMPS	AT LEVEE STATION
EARTHWORK	Fills, cuts, slopes, levees, Dikes, Embankments and Access Ramp	Earthwork, general Streambed, Earth levee & dikes Earth Levee roadways and Ramps	Levee and Guide Dikes Stations. Access ramps at 115 th Ave. west-Levee Sta. 153+72.90
STONework	UngROUTed or grouted riprap/stone facings, bedding matreial and filters Gabion mattress basket & stone	Stonework, general Riprap slope protection. Grouted stone protection, levee access ramp. Stone toedown protection, .levee and Guide Dikes Gabion mattress protection.	Grouted stone protection, 115th Ave. West Ramp at Sta. 148+00.00 West 121th ^l Ave. Dike, Sta. 112+00.00 West 119th ^h Ave. dike, Sta. 119+69.00 East 119th Ave. Dike, Sta.126+46.76 West 117th Ave. Dike, Sta. 141+14.66.
ASPHALT	Fills and Re-surface	Asphalt Work and re-surfacing- 115 th Avenue Turn-Around.	Turn-Around at 115 th Avenue West Ramp – Sta. 153+72.90
PUBLIC UTILITY	Sewer, water, gas, electricity, telephone	Public utility	103+20.00 and 151+80.00.
FENCING	Right-of-Way fencing, access gates.	Fencing, levee	103+00.00 to Sta. 153+72.90 for ROW Fence.
BITUMINOUS SURFACING	Levee landside slope, O&M roadways and Ramps	Surfaced levee O&M roads, Surfaced levee landside slope	Surfaced access ramp Surfaced levee Slope & O&M roads, Sta. 103+00.00 to Sta. 153+72.90
STAFF GAGE	Gage I.D. and station houses		Staff Gage at Avondale Avenue Bridge, levee Sta. 153+72.90
SPREADING GROUNDS DIVERSION	Pipes, gates, and other facilities for diversion of water		Spreading grounds diversion
RIGHTS-OF-WAY	Access ways and ramps, encroachments, loadings, and uses	Rights-of-way	Rights-of-way
SPECIAL FEATURES	Approved chemical and mechanical means		Control mosquito breeding ground.

FIGURE 2

REPORTING FEATURES FOR EL MIRAGE AVENUE CHANNEL & DIVERSION CHANNEL, IRRIGATION SIDEDRAINS, DRAINAGE DITCH AND RCB & RCP CULVERTS

<u>GENERAL</u>		<u>TYPICAL REPORTING FEATURE</u>	
<u>TERM</u>	<u>INCLUSION</u>	<u>ALONG CHANNELS, DITCH AND CULVERTS</u>	<u>AT CHANNEL & LEVEE STATIONS</u>
CONCRETEWORK	Concrete channel, irrigation side drain structures, drainage ditch, public utilities, bridges, RCB & RCP culverts including Inlet and Outlet Structures	Concrete channel invert Concrete channel side slopes Concrete channel toe protection Concrete ditch invert & side slopes Concrete RCB culvert walls, Roof and Floor Slabs. Concrete Wingwalls, Headwalls and Aprons Reinforced concrete pipe.	Channel Sta. 3+00.00 to 51+51.26 for the El Mirage Rd. Channel. Levee Sta. 153+72.90 for concrete drainage ditch (west of 115 th Ave). Levee Sta. 105+80.00, 111+90.00, 114+30.00, 115+40.00, 126+20.00, 128+65.00, 141+40.00, 141+80.00 & 152+00.00 for Irrigation Sidedrains. Levee Sta. 103+00 for RCB Culvert. RCP Culvert Crosses the El Mirage Road.
GROUTED STONE	Grouted stone Diversion Channel. Channel Invert and Side Slopes.	Diversion Channel connecting RCB Culvert and RCP Culvert	Levee Sta. 103+00.00
FENCING AND ACCESS GATES	Right-of-Way fencing, safety pipe rails and access gates.	Channel ROW fence. Turn-Around access gate. RCP culvert safety pipe rails	Levee 103+00.00 to Sta. 153+72.90 for ROW Fence. Immediate East and west of the El Mirage Road for RCP culvert safety pipe rails. Levee Sta. 153+72.90 for turn around at 115 th Ave. west.

FIGURE 3
REPORTING FEATURES FOR DETENTION BASIN

<u>GENERAL</u>		<u>TYPICAL REPORTING FEATURE</u>	
TERM	INCLUSIONS	IN AND AROUND THE BASIN	AT BASIN STATION
EARTHWORK	Fills, cuts, slopes, basin, low-flow channel, embankments, Walkway and O&M Road including Concrete Ramp	Basin interior including cut slopes and invert (bottom) North O&M Road South O&M Walkway	Sta. 0+00.00 to Sta. 7+32.75
GROUTWORK	Grout for Over Flow Swale on the North side of the Basin	Basin north side slope	Approx. Sta. 2+50.00
SIDE DRAIN	MCDOT Exist. 18" CMP Side drain near basin S-W corner	Pipe inlet & outlet including pipe itself	Immediate west of Sta. 0+00.00
PUBLIC UTILITY	Sewer, gas, water, oil, electricity, telephone	Public utility	Public utility
FENCING	Right-of-way fencing, pipe rails, gates	North and west of the basin	
BITUMINOUS SURFACING	Basin cut slopes and O&M roads	basin cut slopes	Surfaced basin embankment-access ramp Surfaced basin slope around the basin
STORAGE CAPACITY	Storage capacity		storage capacity
STAFF GAGE			Staff gages
RIGHTS-OF-WAY	Access ways and ramps, encroachments, loadings, land use	Rights-of-way	Rights-of-way

PART VII - REGULATORY PERMIT PROGRAM

GENERAL

APPLICABLE LAWS AND STATUTES

1. Laws. The Corps permit program is based mainly on three Acts of Congress.
 - Section 9 and 10 of the RIVERS AND HARBORS ACT of 1899 prohibit unauthorized construction in navigable waters of the United States.
 - Section 404 of the CLEAN WATER ACT governs disposal of dredged or fill material in waters of the United States.
 - Section 103 of the MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT of 1972 regulates transportation of dredged material for the purpose of dumping into ocean waters.

2. Statutes. Other statutes also affect Corps regulatory authority.
 - The NATIONAL ENVIRONMENTAL POLICY ACT of 1969 defines the national policy for encouragement of productive harmony between man and his environment, as evaluated through Environmental Impact Statements and Assessments.
 - The FISH AND WILDLIFE PRESERVATION ACT of 1956 requires the Corps to coordinate permit applications with State and Federal Fish and Wildlife agencies.
 - The NATIONAL HISTORIC PRESERVATION ACT of 1966 requires coordination on matters concerning historic and archaeological preservation.
 - The COASTAL ZONE MANAGEMENT ACT of 1972 requires that activities comply with and be certified by a State's coastal zone management program.
 - The ENDANGERED SPECIES ACT of 1973 requires coordination to insure protection of endangered and threatened species.
 - The EXECUTIVE ORDER 11988 of 1977 requires that the District Engineer avoid authorizing floodplain development whenever practicable.

WATERS DEFINED

3. Waters of the United States. Waters of the United States, which are subject to Corps of Engineers' jurisdiction under Section 404 of the Clean Water Act, include:
 - Territorial seas, measured seaward a distance of three miles;
 - Coastal and inland waters, lakes, rivers and streams, and their tributaries;
 - Interstate waters and their tributaries;
 - Wetlands adjacent to all the above waters; and

- Isolated wetlands and lakes, intermittent streams, and other waters that are not part of a tributary system to interstate waters or to navigable waters of the United States, the degradation or destruction of which could affect interstate commerce.

4. Navigable Waterways of the Los Angeles District.

- Pacific Ocean, Harbors and Estuaries, Colorado River

AUTHORITIES

5. General. The Congress of the United States has assigned to the U.S. Army Corps of Engineers the responsibility for regulation of construction and other work in the waters of the United States. The Corps is charged with protecting our nation's harbors and navigation channels from destruction and encroachments, and with restoring and maintaining environmental quality. This is accomplished by regulating activity in three areas: discharge of dredged or fill material in coastal and inland waters and wetlands; construction and dredging in navigable waters of the United States; and transport of dredged material for dumping into ocean waters.

6. Major Federal Coordinating Agencies.

- U.S. Fish and Wildlife Service
- National Marine Fisheries Service
- Environmental Protection Agency

7. Major State and Local Coordinating Agencies.

- California State Lands Division
- California Department of Fish and Game
- California Water Quality Control Board
- California Coastal Commission
- Arizona Department of Game and Fish
- Arizona Department of Environmental Quality
- Various city and county agencies in project areas

REQUIRED PERMITS

PURPOSE OF PERMIT PROGRAM

8. The Corps Permit Program, administered by the Regulatory Branch, seeks to insure that our nation's water resources and wetlands are used in the best interest of the public. This includes consideration of environmental, cultural and other public interest concerns.

PERMIT REQUIREMENTS

9. Who should Obtain a Permit? Any person, firm, or agency (including Federal, state, and local governmental agencies) planning to work in waters of the United States should first contact the Corps of Engineers regarding the need to obtain a permit from the Regulatory Branch. Permits, licenses, variances, or similar authorization may also be required by other Federal, state and local statutes.

10. The necessary permits are required even when land next to or under the water is privately owned. Both the property owner and contractor may be held liable for violation of Federal law if work begins before permits have been obtained. Penalties for proceeding with work without a permit issued by the Corps may include:

- Removal of work and restoration of area.
- Administrative penalties of up to \$25,000 per day for each violation.
- Fine of up to \$50,000 per day for each violation.
- Up to three years in prison.

11. Typical Activities Requiring Permits.

a. General. The listed activities in waters of the United States may require permits.

- Construction of such structures as piers, wharves, bulkheads, dolphins, marinas, ramps and floats.
- Placement of wires and cables over the water, pipes or cables under the water, and intake and outfall pipes.
- Dredging, excavation and depositing of fill and dredged material.
- Transport of dredged material for the purpose of dumping into ocean waters.
- Any construction of revetments, groins, breakwaters, levees, dams, dikes and weirs.
- Placement of riprap and road fills.
- Grading or land leveling activities.
- Sand mining and related activities.

b. Wetlands.

(1) Wetlands are those areas that are inundated or saturated by surface or ground water (either fresh or salt) at a frequency and duration sufficient to support vegetation adapted for life in saturated soil condition.

(2) Wetlands and other saturated soils associated with coastal and inland waters may be of considerable value to the public interest, even though they are not directly or actively used by the public. Examples of such values are: water retention to limit flooding; ground water recharge areas; filtering of contaminated surface water; nutrient source for aquatic

organisms; and resting, breeding, cover and feeding habitat for wildlife.

(3) Wetlands and other special aquatic sites are afforded additional protection in the Corps of Engineers' section 404 permitting program.

(4) Wetlands include such areas as swamps, marshes, bogs, estuaries, certain unique pond systems, and inland and coastal shallows. These wetland types are characterized by:

- Predominance of aquatic or emergent wetland vegetation. Some species of these plants are non-persistent and are obviously present only during the growing season (e.g. loose strife, ludwigia, annual knotwoods and salt marsh fleabane). Others are persistent and can typically be found standing even during the non-growing season (e.g. cordgrass, common pickleweed, cattails, willows, bulrush, soft rushes and sedges, alder, mulefat, cottonwood, and sycamore).
- Type of water regime (saltwater vs. freshwater, tidal vs. nontidal, and either permanently flooded in the case of aquatic systems or occasionally to regularly flooded in the case of flats, marshes and swamps). If the water regime is not apparent during the summer or non-growing season or if the high water mark is not apparent, evaluation of soil characteristics can determine the identity of a wetland.

12. Factors Considered in Issuing a Permit. Overall, a permit must be found to be not contrary to the public interest. All factors which may be relevant to the proposal must be considered. Among those are: conservation, economics, aesthetics, general environmental concerns, wetlands, fish and wildlife values, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety and conservation, water quality, energy needs, safety, food production and, in general, the needs and welfare of the people. In addition, the public interest review and, of equal importance, an analysis of alternative project designs that avoid negative impacts to the aquatic ecosystem must be conducted and considered.

13. Permit Fees. Some permits, such as nationwide permits, do not require a fee. Fees for other permits are assessed according to the proposed use. For example, the fee for work to be done for commercial and industrial use is \$100; for private or noncommercial use, the fee is \$10. The applicant will be notified of the required fee. No fee is required for Federal, state, or local government agencies. Permit fees are subject to future changes.

PERMIT APPLICATION

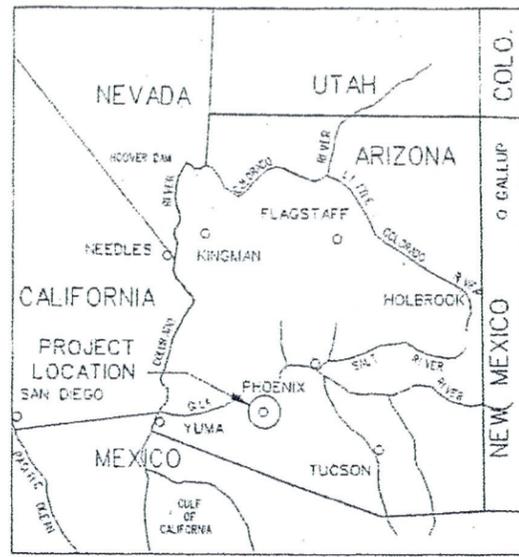
14. A sample of the Department of Army Permit Application is included in Appendix IV. Actual permit applications can be obtained from the Regulatory Branch.

APPENDICES

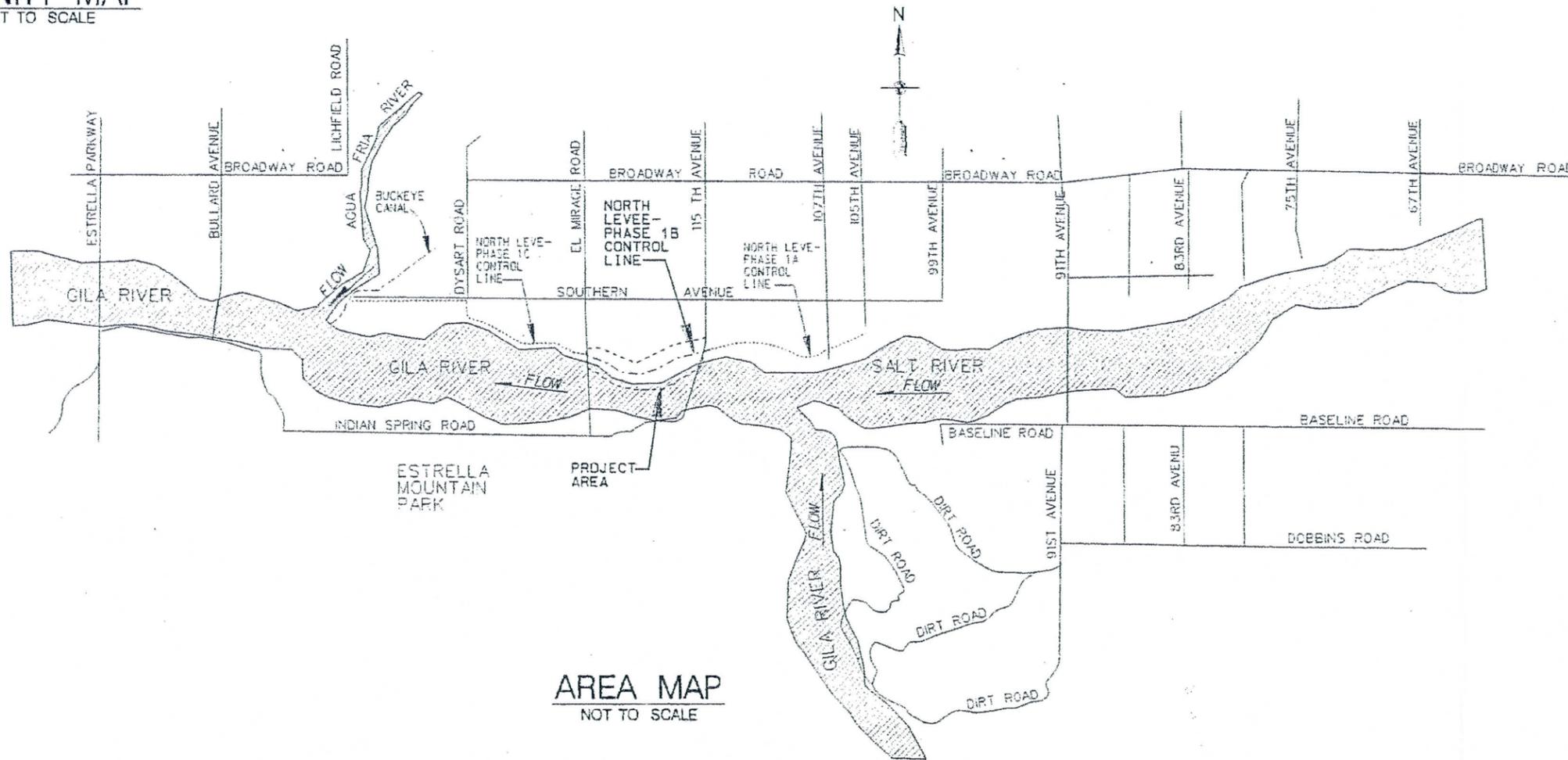
- I Code of Federal Regulations (Extract)
- II Authorizing Document and Project Cooperation Agreement (PCA)
- III Sample Reporting Forms
- IV Sample Permit Application
- V Basis for Recommending Repairs
- VI Data Sheets and Maps

U.S. Army Corps of Engineers – Los Angeles District
 in cooperation with
 The City of Phoenix
 Tres Rios Environmental Restoration
 Flood Control North Levee – Phase 1B
 (El Mirage Road to 115th Avenue)

October 2006



VICINITY MAP
 NOT TO SCALE



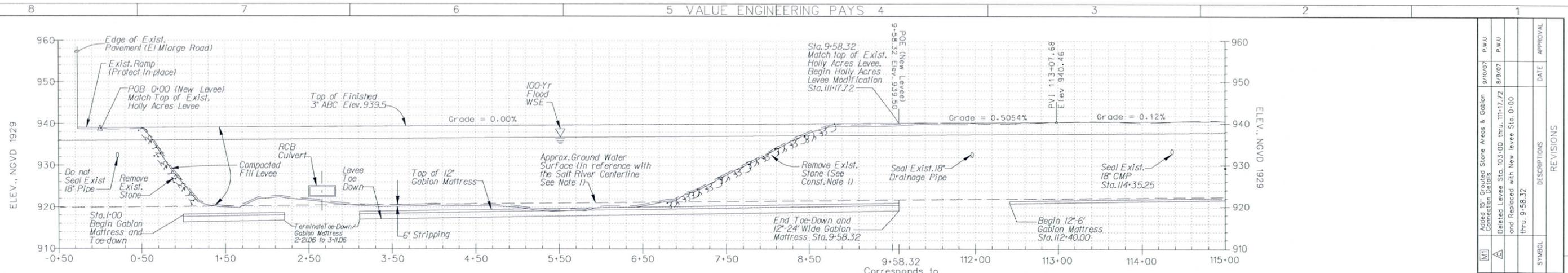
AREA MAP
 NOT TO SCALE

THIS PROJECT WAS DESIGNED BY THE LOS ANGELES DISTRICT OF THE U.S. ARMY CORPS OF ENGINEERS. THE DESIGN OF THE PROJECT AND THE PREPARATION OF THESE DRAWINGS AND SPECIFICATIONS IS THE RESPONSIBILITY OF THE DISTRICT ENGINEER. THE DISTRICT ENGINEER'S OFFICE HAS REVIEWED THESE DRAWINGS AND SPECIFICATIONS AND APPROVES THEM FOR CONSTRUCTION. THE DISTRICT ENGINEER'S OFFICE HAS REVIEWED THESE DRAWINGS AND SPECIFICATIONS AND APPROVES THEM FOR CONSTRUCTION.

SCALE	1:1
SHEET	1
DESIGNED BY	MANABY B. P.
CHECKED BY	DATE: 9/27/06
APPROVED BY	DATE: 9/27/06
PREPARED UNDER THE DIRECTION OF	COLONEL ALEX C. DORNSTALDER
DISTRICT ENGINEER	DISTRICT ENGINEER
DISTRICT FILE NO.	3103
SHEET NO.	WHICR-105 R1004
FILE NAME	As 10/15/06.dwg

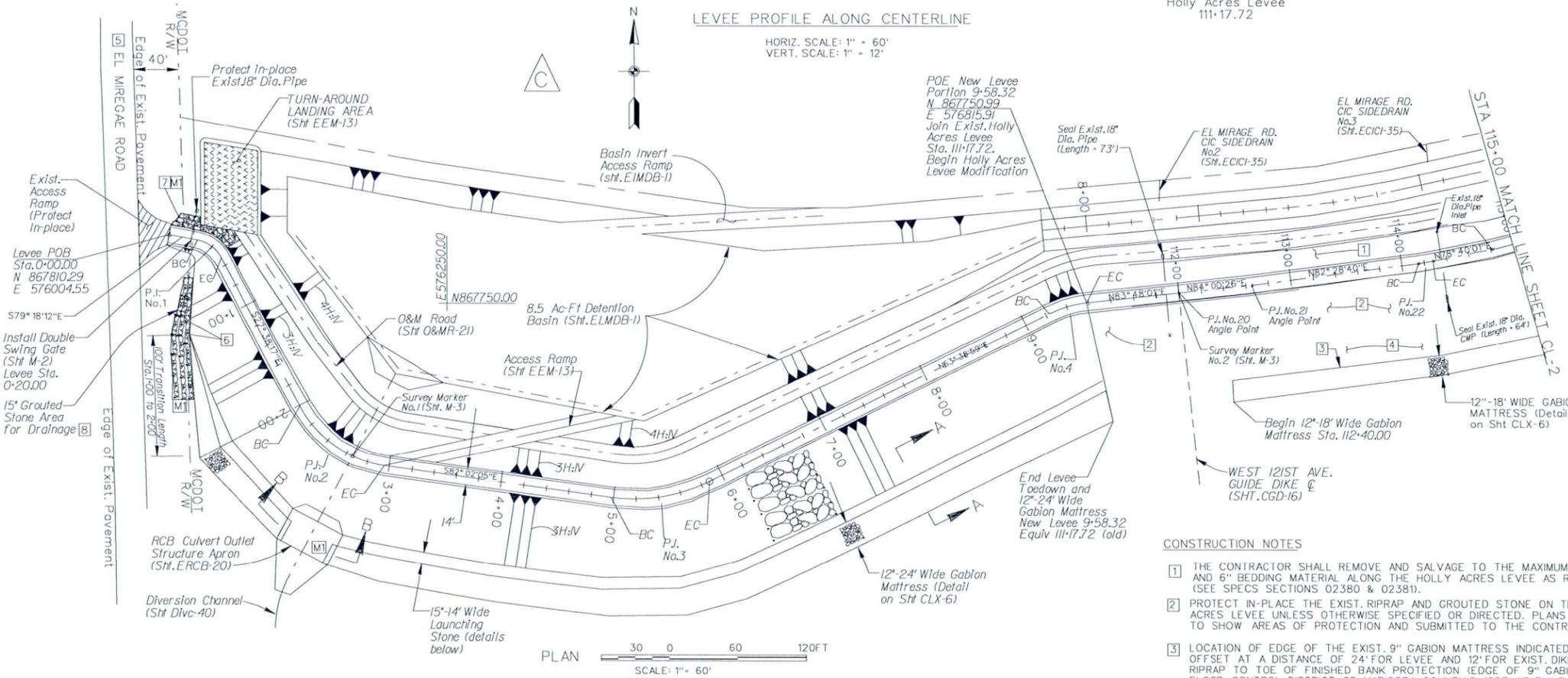
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE)
 PROJECT AREA AND VICINITY MAPS

NO.	DATE	REVISIONS



LEVEE PROFILE ALONG CENTERLINE
 HORIZ. SCALE: 1" = 60'
 VERT. SCALE: 1" = 12'

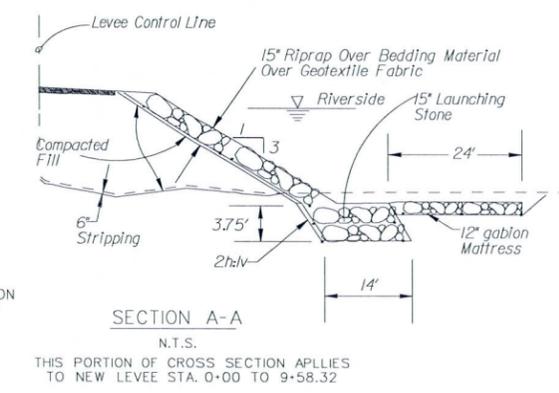
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21	867,766.69	576,962.57	ANGLE POINT



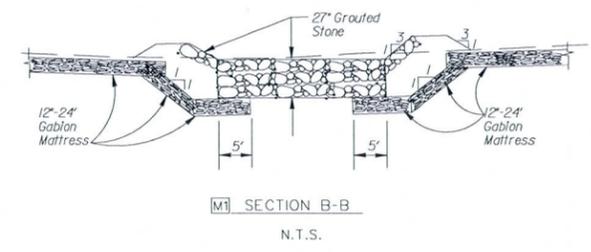
PLAN SCALE: 1" = 60'

P.I. NO.	NORTHING	EASTING	Δ°	R(FT.)	T(FT.)	L(FT.)	B.C. Sta.	E.C. Sta.
1	867,802.87	576,043.86	51° 39' 55" RT	30	14.52	27.05	0+25.48	0+52.53
2	867,613.27	576,143.13	54° 23' 48" LF	100.00	51.39	94.94	2+00.63	2+95.57
3	867,571.71	576,440.17	34° 18' 56" LF	150.00	46.31	89.84	4+97.80	5+87.64
4	867,749.07	576,798.24	20° 09' 02" RT	100.00	17.11	35.17	9+23.15	9+58.32
22	867,787.12	577,117.35	3° 48' 39" LT	200.00	6.65	13.30	114+14.73	114+28.04

- NOTES
- GROUND WATER TABLE LEVEL INDICATED ON THE PROFILE APPLIES TO SPRING AND WINTER SEASONS. IT IS ABOUT 2 FT. LOWER DURING FALL AND SUMMER.
 - LEVEE TOE-DOWN IS NOT REQUIRED FOR STA. 111+17.72 TO STA. 153+72.90 ALONG THE EXISTING HOLLY ACRES LEVEE.
 - 12'-18" WIDE GABION MATTRESS IS NOT REQUIRED UNDERNEATH THE 121ST AVE. DIKE WITHIN THE GUIDE DIKE'S FOOTPRINTS.
 - SEE SHEETS ELMDB-1 FOR DETAILS OF TYPICAL CROSS SECTION FOR STA. 0+00.00 TO 9+58.32 AND CLX-6 FOR STA. 111+17.72 TO STA. 148+88.50
 - 12'-18" WIDE GABION MATTRESS SHALL BE REQUIRED FROM STA. 117+17.72 TO STA. 127+10.00 EXCEPT GUIDE DIKES



SECTION A-A
 N.T.S.
 THIS PORTION OF CROSS SECTION APPLIES TO NEW LEVEE STA. 0+00 TO 9+58.32



SECTION B-B
 N.T.S.

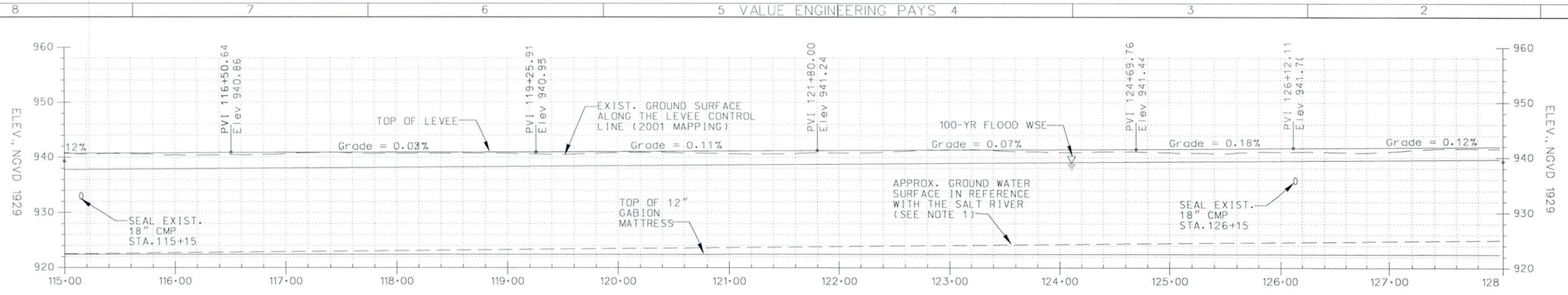
CONSTRUCTION NOTES

- THE CONTRACTOR SHALL REMOVE AND SALVAGE TO THE MAXIMUM EXTENT POSSIBLE EXIST. 15" RIPRAP AND 6" BEDDING MATERIAL ALONG THE HOLLY ACRES LEVEE AS REQUIRED AND INDICATED ON THE PLAN (SEE SPECS SECTIONS 02380 & 02381).
- PROTECT IN-PLACE THE EXIST. RIPRAP AND GROUTED STONE ON THE RIVERSIDE SLOPE OF THE EXISTING HOLLY ACRES LEVEE UNLESS OTHERWISE SPECIFIED OR DIRECTED. PLANS WILL BE PREPARED BY THE CONTRACTOR TO SHOW AREAS OF PROTECTION AND SUBMITTED TO THE CONTRACTING OFFICER FOR APPROVAL.
- LOCATION OF EDGE OF THE EXIST. 9" GABION MATTRESS INDICATED ON THE PLAN IS APPROXIMATED. IT WAS OFFSET AT A DISTANCE OF 24' FOR LEVEE AND 12' FOR EXIST. DIKES MEASURED HORIZONTALLY FROM TOE OF RIPRAP TO TOE OF FINISHED BANK PROTECTION (EDGE OF 9" GABION MATTRESS) RESPECTIVELY BASED ON THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY'S 1983 AS-BUILT DRAWINGS OF BANK STABILIZATION FOR HOLLY ACRES LEVEE. THE CONTRACTOR SHALL LOCATE AND EXPOSE THE EDGE OF THE EXIST. 9" MATTRESS IN ORDER TO TIE WITH THE NEW 12" GABION MATTRESS. THE NEW GABION AND THE EXIST. GABION MATTRESSES SHALL BE TIED IN THE SAME WAY THE NEW GABION MATTRESSES ARE TO BE TIED TOGETHER. SPIRAL TIES SHOULD BE CONSIDERED AS ONE OF THE METHODS FOR FASTENING MATTRESSES TOGETHER (SPECS SECTION 02371 PAR. 3.3)
- PROTECT IN-PLACE EXIST. 9" GABION MATTRESS. EXCAVATION IS REQUIRED TO EXPOSE EDGE OF THE EXIST. 9" GABION MATTRESS. EXCAVATION DEPTH VARIES FROM APPROX. 1 FOOT TO 2 FEET BELOW THE EXIST. GROUND SURFACE. THE CONTRACTOR SHALL TAKE SPECIAL CARE NOT TO DAMAGE THE EXIST. 9" GABION MATTRESSES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REPLACE IN-KIND DAMAGED GABION MATTRESSES AS THE RESULT OF THE CONSTRUCTION ACTIVITIES AT NO COST TO THE GOVERNMENT. IT IS ANTICIPATED THAT STANDING WATER IN THE EXCAVATION AREA WILL REMAIN THERE FOR AT LEAST 36 HOURS PERIOD. (SEE ENCLOSED PHOTOS IN SPECS).
- PROTECT IN-PLACE THE EL MIRAGE ROAD.
- LEVEE TOE-DOWN AND GABION MATTRESS SHALL BEGIN AT LEVEE STA. 1+00 AND TRANSIT TO A FULL 14' WIDE TOE-DOWN AND 24' WIDE GABION MATTRESS. OUTER EDGE OF THE GABION MATTRESS MUST NOT EXTEND BEYOND THE MCDOT R/W WHICH IS 40 FT. FROM EDGE OF THE EXIST. EL MIRAGE ROAD INDICATED IN THE PLAN.
- DRY SIDE (BACK SIDE) OF LEVEE STA. 0+00 TO 0+50 SHALL BE AMORED WITH 15" GROUTED STONE. MINIMUM GRADING OF THE LEVEE CREST IS REQUIRED TO OBTAIN TOP OF FINISHED 3" ABC O&M ROAD FOR THIS PARTICULAR AREA.
- 15" GROUTED STONE IS REQUIRED FOR AN AREA OF APPROX. 110' LONG AND VARIES IN WIDTH. INSTALLATION OF 15" GROUTED STONE SHALL FOLLOW EXISTING CONTOURS SUCH THAT FLOW CAN BE WITHIN DEFINED DITCH CONFIGURATION.

AS-BUILT
 PLATE 3

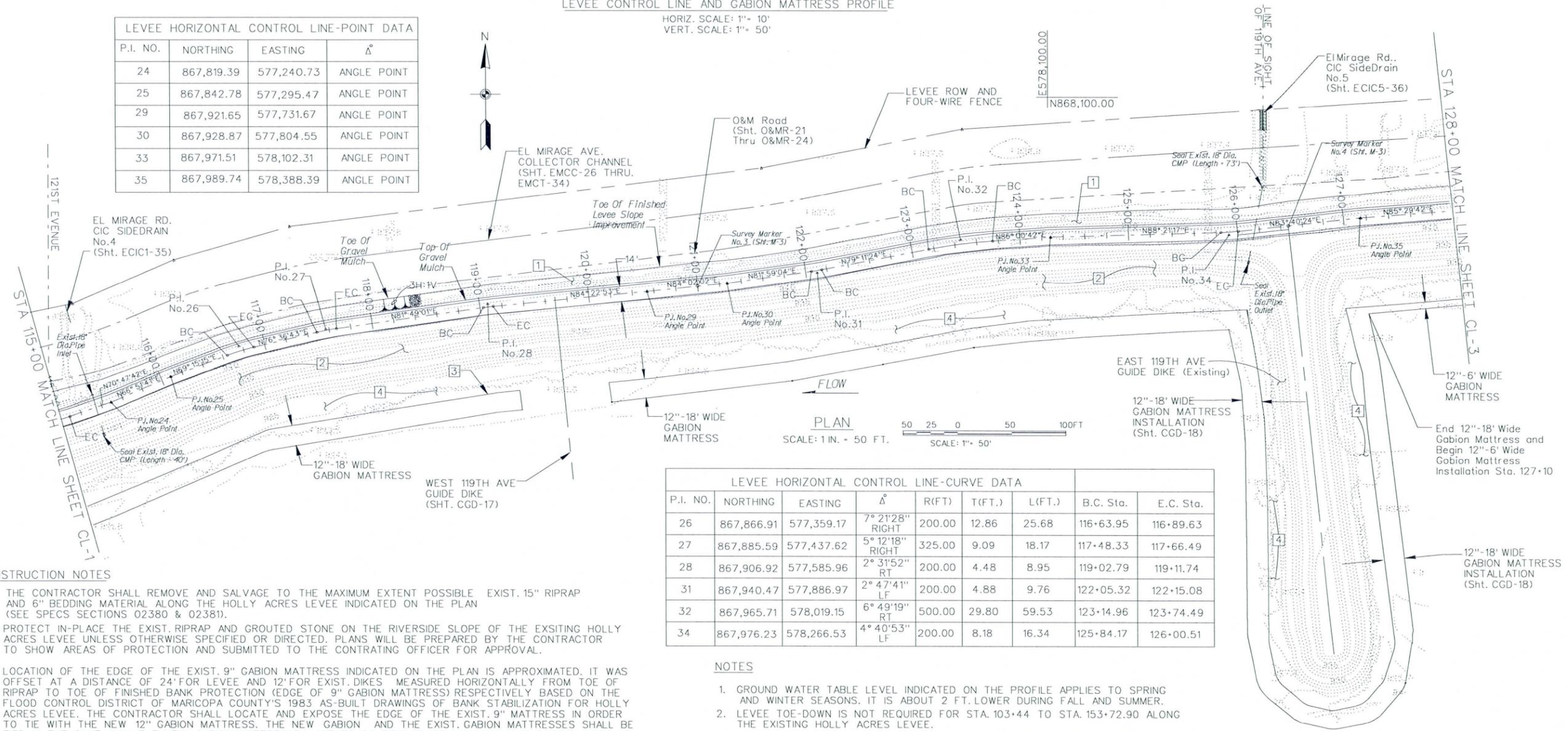


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	U.S. ARMY ENGINEER DISTRICT LOS ANGELES	
	THOMAS H. SAGE, P.E., CHIEF DESIGN BRANCH	
	SPEC. NO. W919PL-07-B-0003	
	DISTRICT FILE NO. 203/404	
	TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE) PLAN AND PROFILE STA. 0+00 TO 9+58.32 (New Levee) AND 111+17.72 TO 115+00 (Holly Acres Levee)	
	REVISIONS	
	SYMBOL	DESCRIPTIONS
	DATE	APPROVAL
	8/10/07	P.W.U.
	8/9/07	P.W.U.
	11/17/72	and Replaced with New Levee Sta. 0+00 thru. 9+58.32
	9/30/50	Added 15' Grouted Stone Area & Gabion Connection Details



P.I. NO.	NORTHING	EASTING	Δ°
24	867,819.39	577,240.73	ANGLE POINT
25	867,842.78	577,295.47	ANGLE POINT
29	867,921.65	577,731.67	ANGLE POINT
30	867,928.87	577,804.55	ANGLE POINT
33	867,971.51	578,102.31	ANGLE POINT
35	867,989.74	578,388.39	ANGLE POINT

LEVEE CONTROL LINE AND GABION MATTRESS PROFILE
 HORIZ. SCALE: 1" = 10'
 VERT. SCALE: 1" = 50'



P.I. NO.	NORTHING	EASTING	Δ°	R(FT)	T(FT.)	L(FT.)	B.C. Sta.	E.C. Sta.
26	867,866.91	577,359.17	7° 21'28" RIGHT	200.00	12.86	25.68	116+63.95	116+89.63
27	867,885.59	577,437.62	5° 12'18" RIGHT	325.00	9.09	18.17	117+48.33	117+66.49
28	867,906.92	577,585.96	2° 31'52" RT	200.00	4.48	8.95	119+02.79	119+11.74
31	867,940.47	577,886.97	2° 47'41" LF	200.00	4.88	9.76	122+05.32	122+15.08
32	867,965.71	578,019.15	6° 49'19" RT	500.00	29.80	59.53	123+14.96	123+74.49
34	867,976.23	578,266.53	4° 40'53" LF	200.00	8.18	16.34	125+84.17	126+00.51

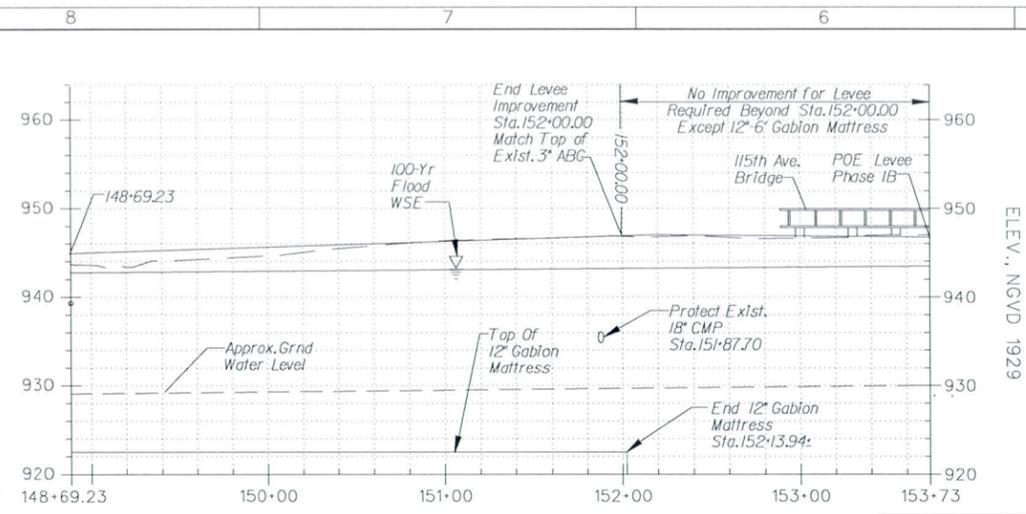
- NOTES
- GROUND WATER TABLE LEVEL INDICATED ON THE PROFILE APPLIES TO SPRING AND WINTER SEASONS. IT IS ABOUT 2 FT. LOWER DURING FALL AND SUMMER.
 - LEVEE TOE-DOWN IS NOT REQUIRED FOR STA. 103+44 TO STA. 153+72.90 ALONG THE EXISTING HOLLY ACRES LEVEE.
 - 12"-6" WIDE GABION MATTRESS IS NOT REQUIRED UNDERNEATH THE WEST 119TH AVE. DIKE WITHIN THE GUIDE DIKE'S FOOTPRINT.
 - SEE SHEET CLX-6 FOR DETAILS OF TYPICAL CROSS SECTION STA. 103+44.00 TO STA. 148+88.50
 - 12"-18" WIDE GABION MATTRESS SHALL BE REQUIRED FROM STA. 103+44.00 TO STA. 127+10.00 AND AROUND THE EAST 119th AVE. GUIDE DIKE.

CONSTRUCTION NOTES

- THE CONTRACTOR SHALL REMOVE AND SALVAGE TO THE MAXIMUM EXTENT POSSIBLE EXIST. 15" RIPRAP AND 6" BEDDING MATERIAL ALONG THE HOLLY ACRES LEVEE INDICATED ON THE PLAN (SEE SPECS SECTIONS 02380 & 02381).
- PROTECT IN-PLACE THE EXIST. RIPRAP AND GROUTED STONE ON THE RIVERSIDE SLOPE OF THE EXSITING HOLLY ACRES LEVEE UNLESS OTHERWISE SPECIFIED OR DIRECTED. PLANS WILL BE PREPARED BY THE CONTRACTOR TO SHOW AREAS OF PROTECTION AND SUBMITTED TO THE CONTRATING OFFICER FOR APPROVAL.
- LOCATION OF THE EDGE OF THE EXIST. 9" GABION MATTRESS INDICATED ON THE PLAN IS APPROXIMATED. IT WAS OFFSET AT A DISTANCE OF 24' FOR LEVEE AND 12' FOR EXIST. DIKES MEASURED HORIZONTALLY FROM TOE OF RIPRAP TO TOE OF FINISHED BANK PROTECTION (EDGE OF 9" GABION MATTRESS) RESPECTIVELY BASED ON THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY'S 1983 AS-BUILT DRAWINGS OF BANK STABILIZATION FOR HOLLY ACRES LEVEE. THE CONTRACTOR SHALL LOCATE AND EXPOSE THE EDGE OF THE EXIST. 9" MATTRESS IN ORDER TO TIE WITH THE NEW 12" GABION MATTRESS. THE NEW GABION AND THE EXIST. GABION MATTRESSES SHALL BE TIED IN THE SAME WAY THE NEW GABION MATTRESSES ARE TO BE TIED TOGETHER. SPIRAL TIES SHOULD BE CONSIDERED AS ONE OF THE METHODS FOR FASTENING MATTRESSES TOGETHER (SPECS SECTION 02371 PAR. 3.3)
- PROTECT IN-PLACE EXIST. 9" GABION MATTRESS. EXCAVATION IS REQUIRED TO EXPOSE EDGE OF THE EXIST. 9" GABION MATTRESS. EXCAVATION DEPTH VARIES FROM APPROX. 1 FOOT TO 2 FEET BELOW THE EXIST. GROUND SURFACE. THE CONTRACTOR SHALL TAKE SPECIAL CARE NOT TO DAMAGE THE EXIST. 9" GABION MATTRESSES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REPLACE IN-KIND DAMAGED GABION MATTRESSES AS THE RESULT OF THE CONSTRUCTION ACTIVITIES AT NO COST TO THE GOVERNMENT. IT IS ANTICIPATED THAT STANDING WATER IN THE EXCAVATION AREA WILL REMAIN THERE FOR AT LEAST 36 HOURS PERIOD. (SEE ENCLOSED PHOTOS IN SPECS).

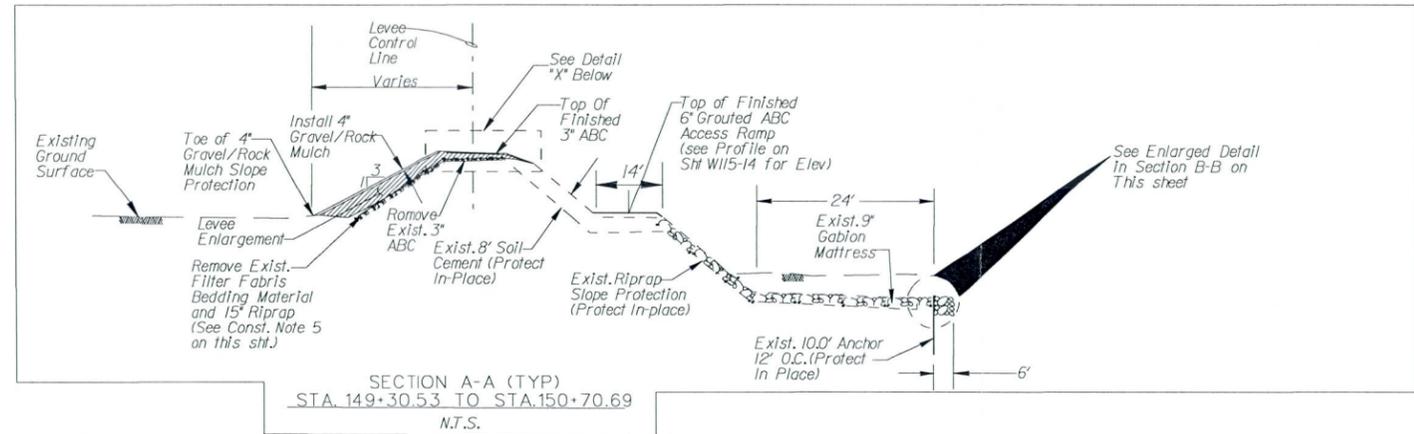
AS-BUILT
 PLATE 4
 602 263-1100
 Blue State Center
 CALL COLLECT

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U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	THOMAS H. SAGE, P.E. CHIEF DESIGN BRANCH	SPEC. NO. W912PL-07-B-0003	DISTRICT FILE NO. 203/405
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE)		PLAN AND PROFILE STA. 115+00 TO STA. 128+00	
Added Construction Notes		REVISIONS	
SYMBOL	DESCRIPTIONS	DATE	APPROVAL

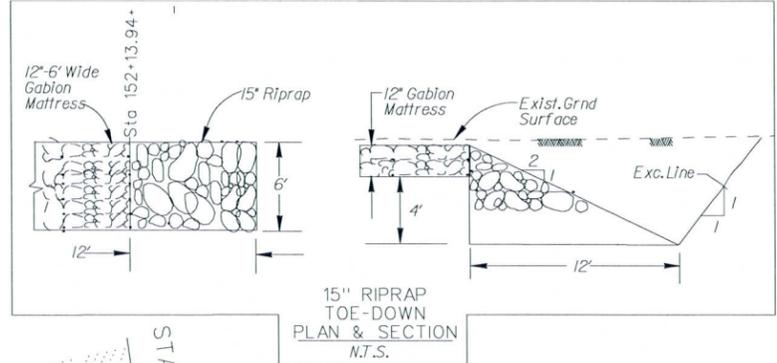


LEVEE CONTROL LINE AND GABION MATTRESS PROFILE
STA. 148+69.23 TO STA. 153+72.90
HORIZ. SCALE: 1" = 10'
VERT. SCALE: 1" = 50'

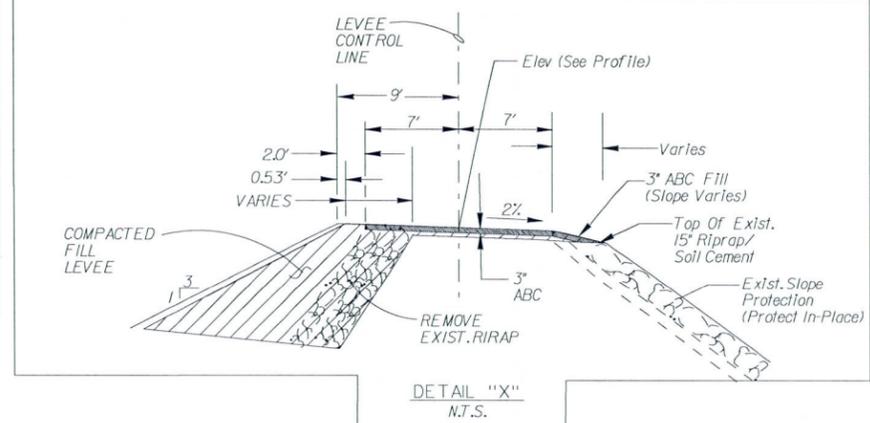
NOTES
1. GROUND WATER TABLE LEVEL INDICATED ON THE PROFILE APPLIES TO SPRING AND WINTER SEASONS. IT IS ABOUT 2 FT. LOWER DURING FALL AND SUMMER.



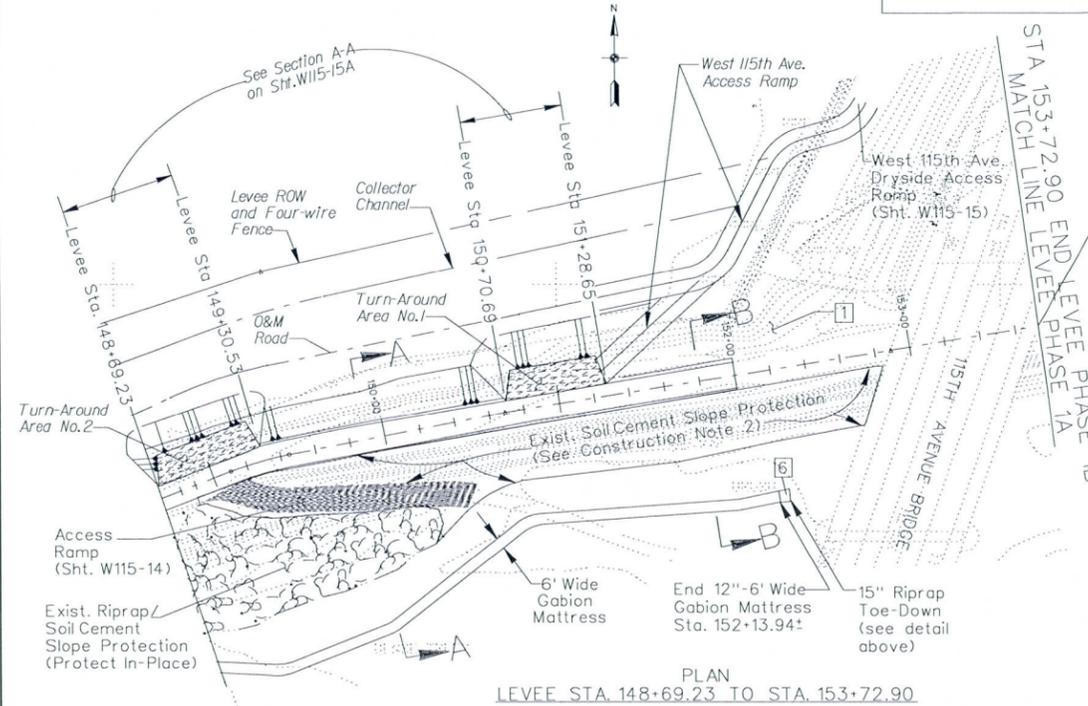
SECTION A-A (TYP)
STA. 149+30.53 TO STA. 150+70.69
N.T.S.



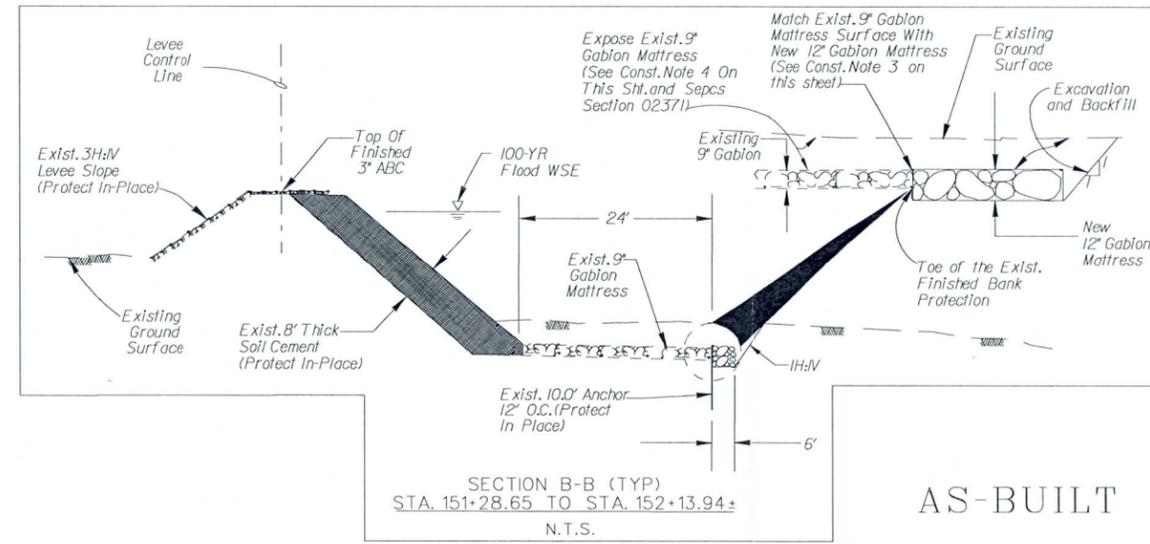
15' RIPRAP
TOE-DOWN
PLAN & SECTION
N.T.S.



DETAIL "X"
N.T.S.



PLAN
LEVEE STA. 148+69.23 TO STA. 153+72.90
HORIZ. SCALE: 1" = 10'
VERT. SCALE: 1" = 50'



SECTION B-B (TYP)
STA. 151+28.65 TO STA. 152+13.94
N.T.S.

AS-BUILT
PLATE 7

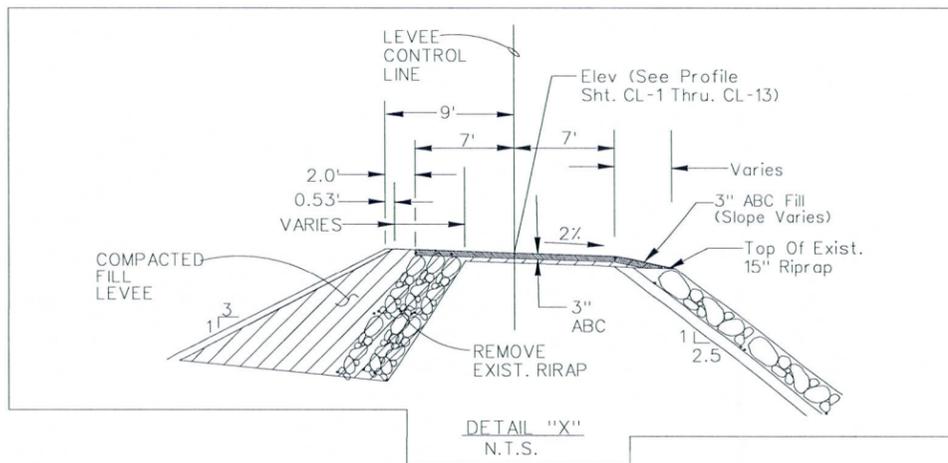
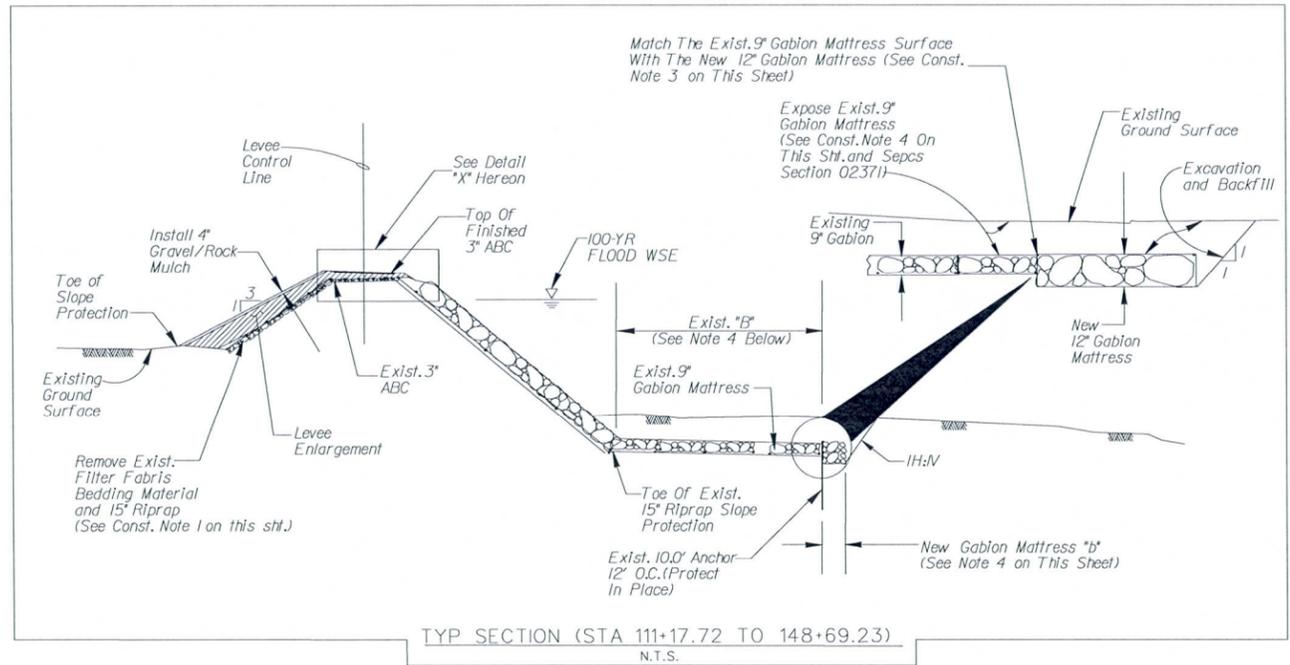
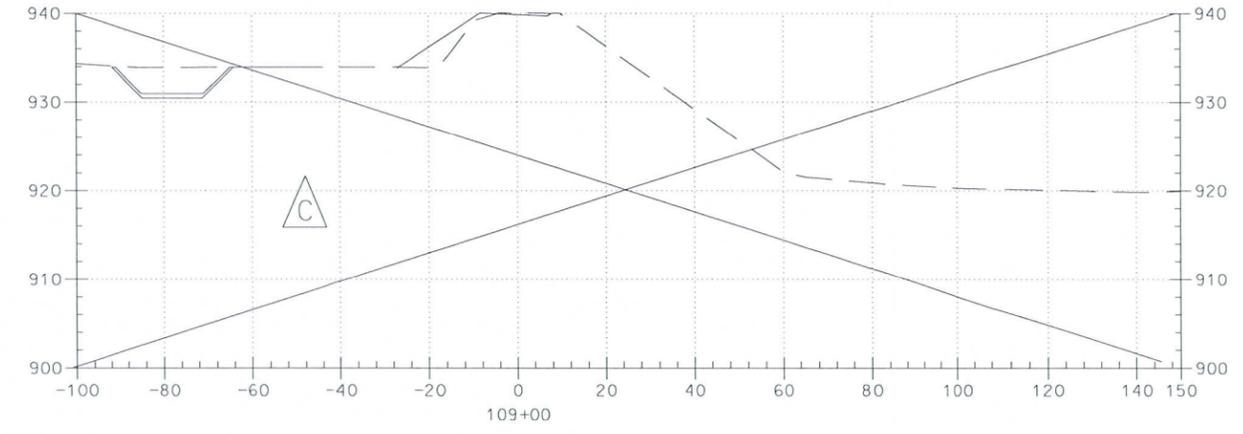
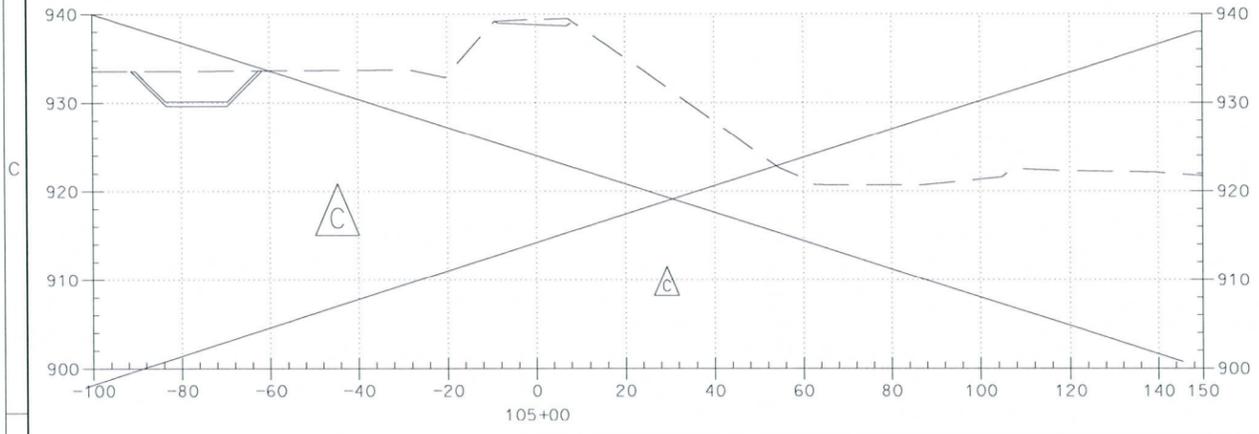
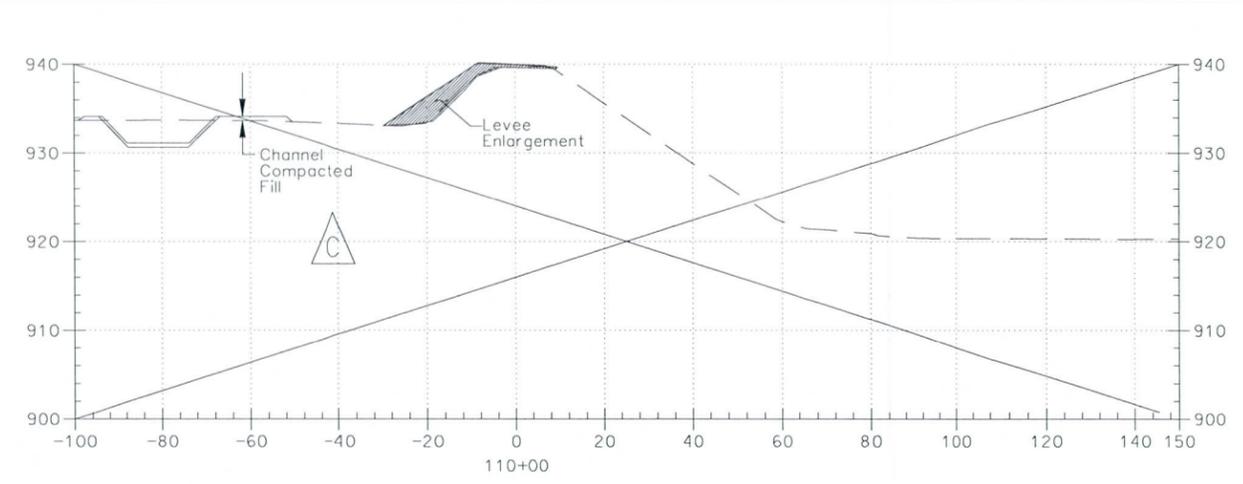
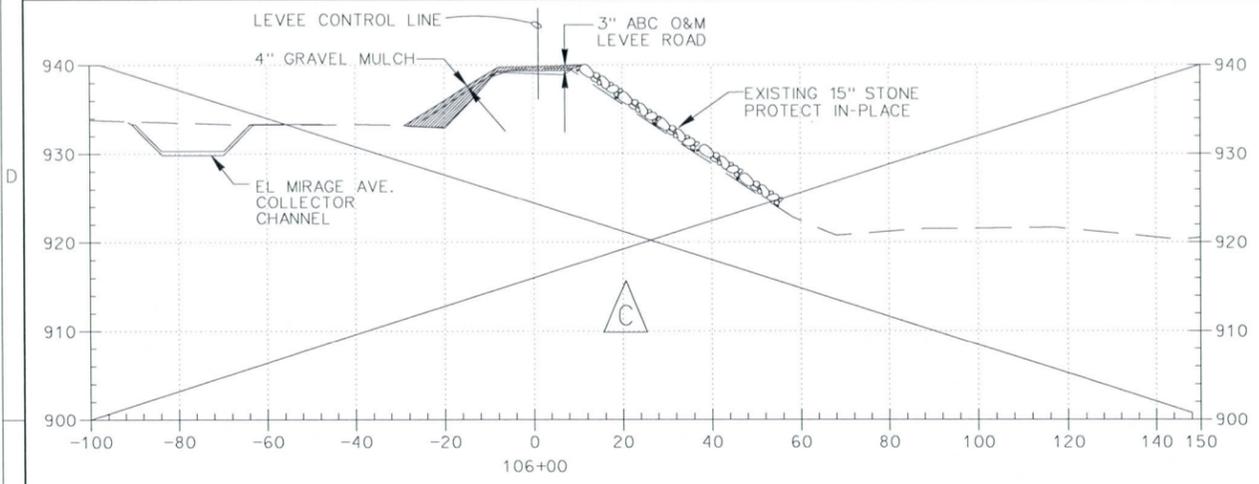
CONSTRUCTION NOTES

- 1 PROTECT IN PLACE EXISTING RIPRAP.
- 2 EXISTING 8' SOIL CEMENT SLOPE PROTECTION SHALL BE PROTECTED IN-PLACE, EXCEPT NOTED OR DIRECTED OTHERWISE.
- 3 LOCATION OF THE EDGE OF THE EXIST. 9" GABION MATTRESS INDICATED ON THE HOLLY ACRES LEVEE PLANS IS APPROXIMATED. IT WAS OFFSET AT A DISTANCE OF 24' MEASURED HORIZONTALLY FROM TOE OF THE EXIST. RIPRAP TO TOE OF FINISHED BANK PROTECTION (EDGE OF 9" GABION MATTRESS) BASED ON THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY'S 1983 AS-BUILT DRAWINGS OF BANK STABILIZATION FOR HOLLY ACRES LEVEE. THE CONTRACTOR SHALL LOCATE AND EXPOSE THE EDGE OF THE EXIST. 9" MATTRESS IN ORDER TO TIE WITH THE NEW 12" GABION MATTRESS. THE NEW GABION AND THE EXIST. GABION MATTRESSES SHALL BE TIED IN THE SAME WAY THE NEW GABION MATTRESSES ARE TO BE TIED TOGETHER. SPIRAL TIES SHOULD BE CONSIDERED AS ONE OF THE METHODS FOR FASTENING MATTRESSES TOGETHER (SPECS SECTION 02371 PAR. 3.3)

CONSTRUCTION NOTES CONT.

- 4 SOIL EXCAVATION IS REQUIRED TO EXPOSE EDGE OF THE EXIST. 9" GABION MATTRESS. EXCAVATION DEPTH VARIES FROM APPROX. 1 FOOT TO 2 FEET BELOW THE EXIST. GROUND SURFACE. THE CONTRACTOR SHALL TAKE SPECIAL CARE NOT TO DAMAGE THE EXIST. 9" GABION MATTRESSES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REPLACE IN-KIND FOR DAMAGED GABION MATTRESSES AS THE RESULT OF THE CONSTRUCTION ACTIVITIES AT NO COST TO THE GOVERNMENT. IT IS ANTICIPATED THAT STANDING WATER IN THE EXCAVATION AREA WILL REMAIN THERE FOR AT LEAST 36 HOURS PERIOD. (SEE ENCLOSED PHOTOS IN THE SPECS)
- 5 THE CONTRACTOR SHALL REMOVE AND SALVAGE TO THE MAXIMUM EXTENT POSSIBLE EXIST. 15' RIPRAP AND 6" BEDDING MATERIAL ALONG THE HOLLY ACRES LEVEE (SEE SPECS SECTIONS 02380 & 02381).
- 6 BASED ON THE AS-BUILT DRAWINGS FOR BANK STABILIZATION OF HOLLY ACRES LEVEE OF FLOOD CONTROL DISTRICT OF MARICOPA COUNTY DATED MAY 12TH, 1984, EXISTING 9" GABION MATTRESS WAS TERMINATED ABOUT 50 FT. WEST OF 115TH AVE. (AVONDALE) BRIDGE CENTERLINE. THE CONTRACTOR SHALL END 12"-6" WIDE GABION MATTRESS WHERE THE EXIST. 9" GABION TERMINATED.

SCALE:	501	SHEET:	CL-5	DISTRICT FILE NO. 203/408	THOMAS H. SAGE, P.E. CHIEF DESIGN BRANCH	U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	DESIGNED BY: D.P. DRAWN BY: P.U. CHECKED BY: D.P.	TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE) DETAILED LEVEE PLAN, PROFILE AND SECTIONS STA. 148+69.23 TO STA. 153+72.90	SYMBOL	DESCRIPTIONS	REVISIONS	DATE	APPROVAL
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CONSTRUCTION NOTES

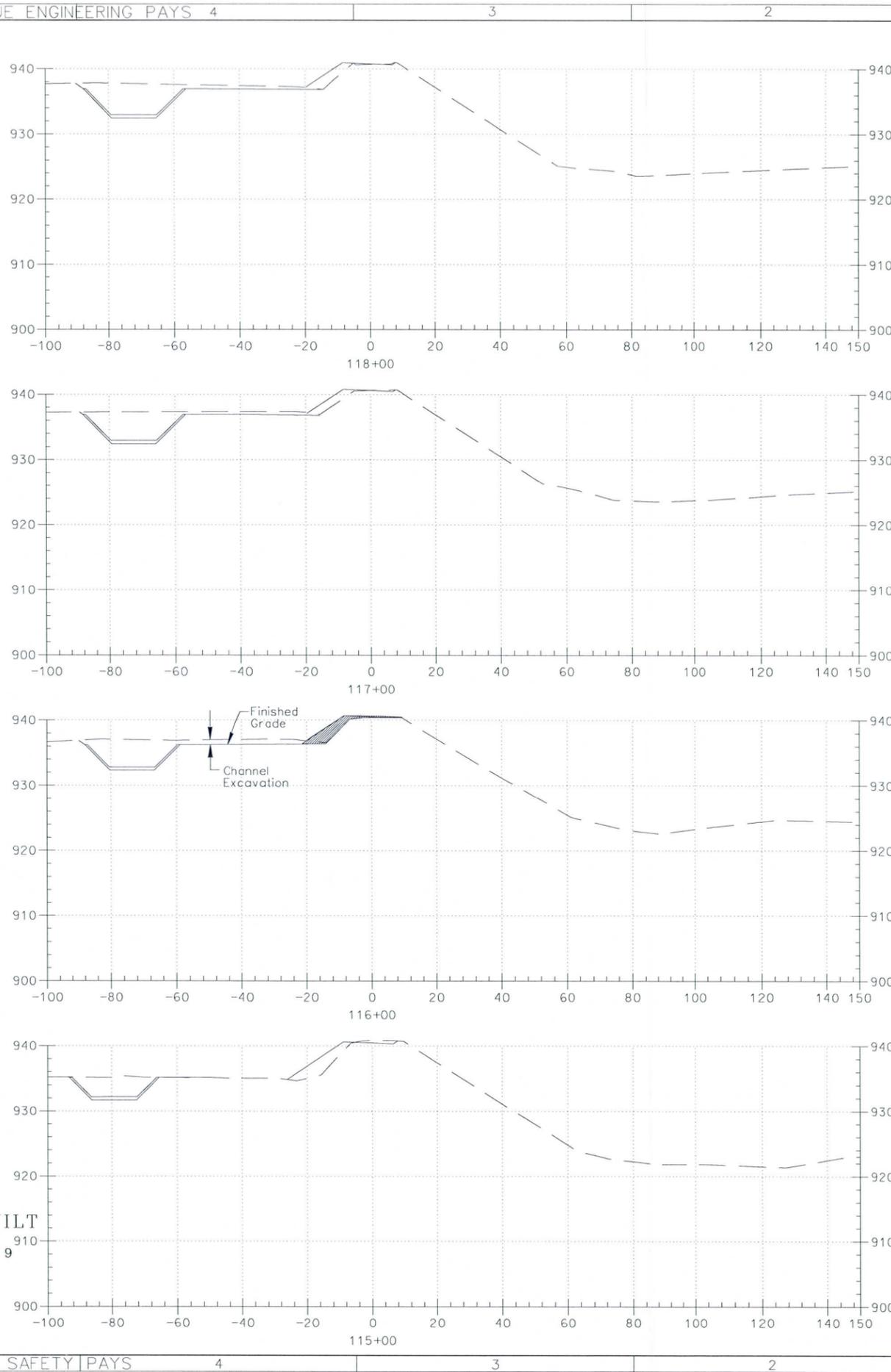
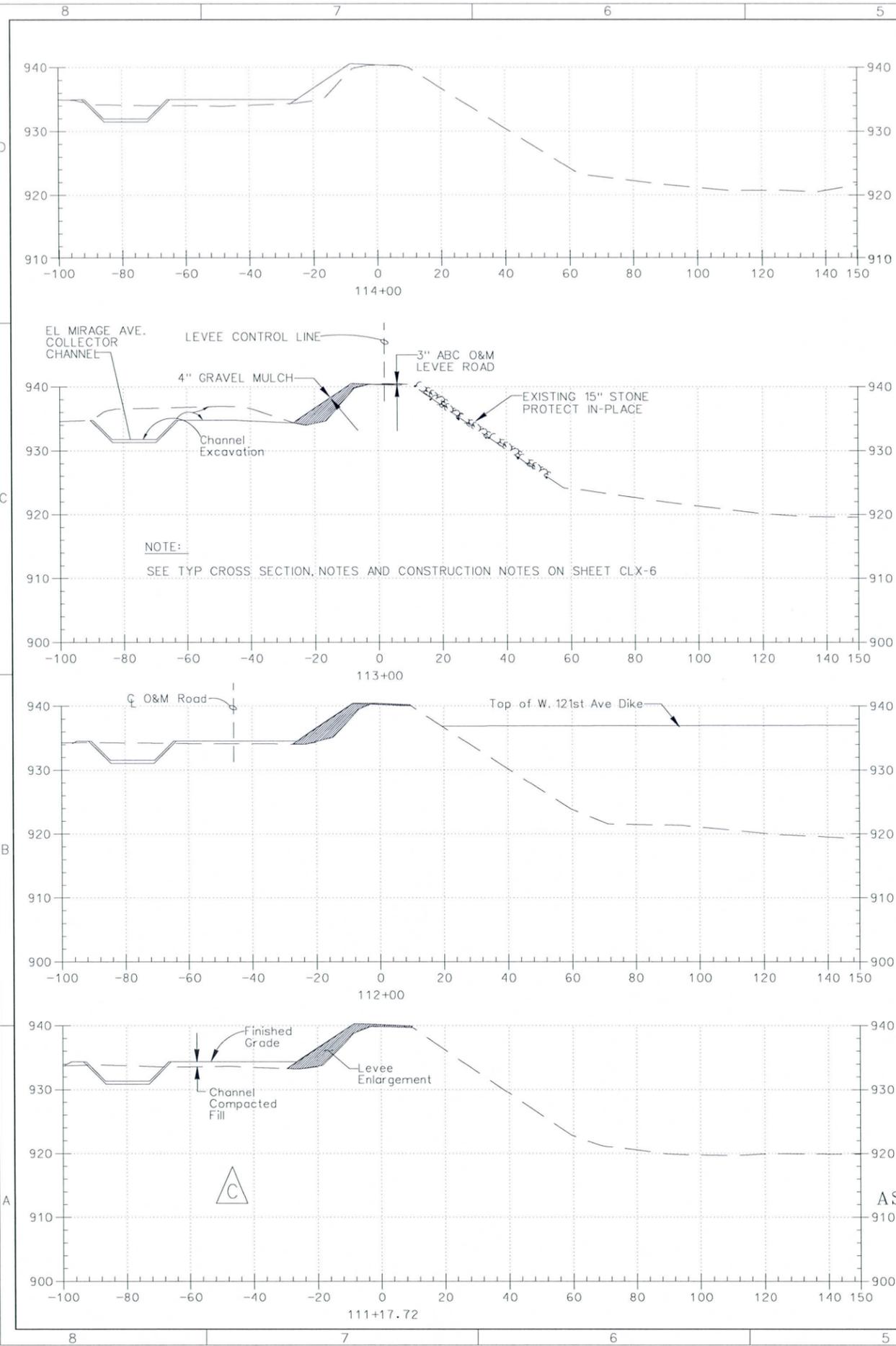
- 1 THE CONTRACTOR SHALL REMOVE AND SALVAGE TO THE MAXIMUM EXTENT POSSIBLE EXIST. 15" RIPRAP AND 6" BEDDING MATERIAL ALONG THE HOLLY ACRES LEVEE (SEE SPECS SECTIONS 02380 & 02381).
- 2 PROTECT IN-PLACE EXISTING RIPRAP AND GROUTED STONE ON THE RIVERSIDE SLOPE OF THE EXISTING HOLLY ACRES LEVEE UNLESS OTHERWISE SPECIFIED OR DIRECTED.
- 3 LOCATION OF THE EDGE OF THE EXIST. 9" GABION MATTRESS INDICATED ON THE HOLLY ACRES LEVEE PLANS IS APPROXIMATED. IT WAS OFFSET AT A DISTANCE OF 24" MEASURED HORIZONTALLY FROM TOE OF RIPRAP TO TOE OF FINISHED BANK PROTECTION (EDGE OF 9" GABION MATTRESS) BASED ON THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY'S 1983 AS-BUILT DRAWINGS OF BANK STABILIZATION FOR HOLLY ACRES LEVEE. THE CONTRACTOR SHALL LOCATE AND EXPOSE THE EDGE OF THE EXIST. 9" MATTRESS IN ORDER TO TIE WITH THE NEW 12" GABION MATTRESS. THE NEW GABION AND THE EXIST. GABION MATTRESSES SHALL BE TIED IN THE SAME WAY THE NEW GABION MATTRESSES ARE TO BE TIED TOGETHER. SPIRAL TIES SHOULD BE CONSIDERED AS ONE OF THE METHODS FOR FASTENING MATTRESSES TOGETHER (SPECS SECTION 02371 PAR. 3.3)
- 4 SOIL EXCAVATION IS REQUIRED TO EXPOSE EDGE OF THE EXIST. 9" GABION MATTRESS. EXCAVATION DEPTH VARIES FROM APPROX. 1 FOOT TO 2 FEET BELOW THE EXIST. GROUND SURFACE. THE CONTRACTOR SHALL TAKE SPECIAL CARE NOT TO DAMAGE THE EXIST. 9" GABION MATTRESSES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REPLACE IN-KIND FOR DAMAGED GABION MATTRESSES AS THE RESULT OF THE CONSTRUCTION ACTIVITIES AT NO COST TO THE GOVERNMENT. IT IS ANTICIPATED THAT STANDING WATER IN THE EXCAVATION AREA WILL REMAIN THERE FOR AT LEAST 36 HOURS PERIOD. (SEE ENCLOSED PHOTOS IN THE SPECS)

NOTES:

1. CROSS SECTIONS ARE DRAWN LOOKING UPSTREAM IN THE DIRECTION OF ADVANCING STATIONS.
2. LEVEE ENLARGEMENT IS REQUIRED FOR STA. 111+17.72 TO STA. 151+28.65.
3. THE CONTRACTOR SHALL REMOVE AND SALVAGE TO THE MAXIMUM EXTENT POSSIBLE EXIST. 15" RIPRAP AND 6" BEDDING MATERIAL ALONG THE HOLLY ACRES LEVEE (SEE SPECS SECTIONS 02380 & 02381).
4. B=18' FOR STA. 111+17.72 TO STA. 127+10.00, AND b=6' FOR STA. 127+10.00 TO STA. 151+28.65

AS-BUILT
PLATE 8

SCALE: 20'	SHEET CLX-6	SUBMITTED BY: THOMAS H. SAGE, P.E. CHIEF, DESIGN BRANCH	DESIGNED BY: LOS ANGELES CORPS OF ENGINEERS	DRAWN BY:	CHECKED BY:	FILE NAME: CLX6.DGN	DISTRICT FILE NO. 203/408	SPEC. NO. W92PL-07-B-0003	TYP SECTION 111+17.72 TO 148+69.23	PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE) FLOOD CONTROL NORTH LEVEE ENVIRONMENTAL RESTORATION TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA	D.P. R-12-07	REVISIONS
												SYMBOL



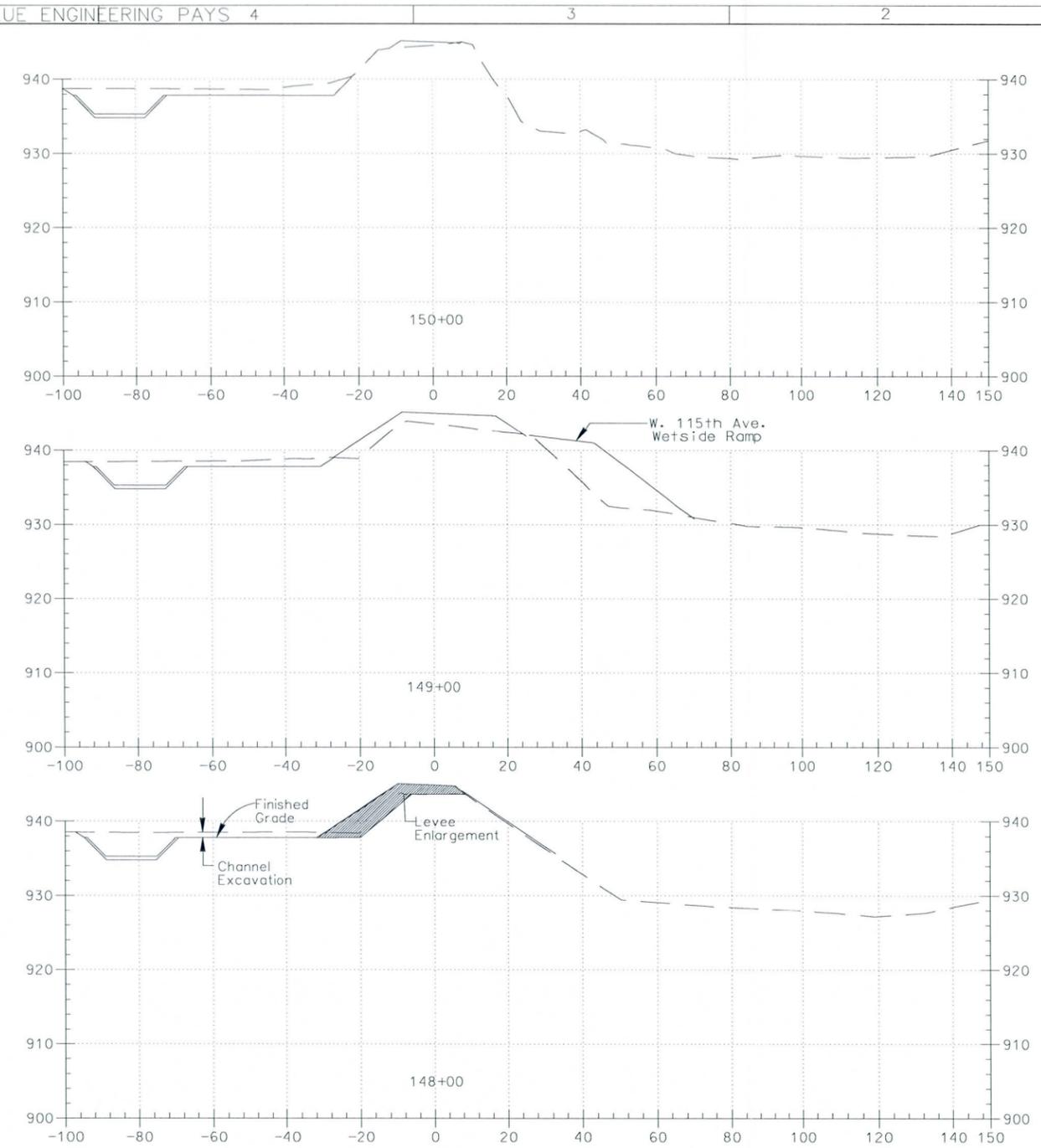
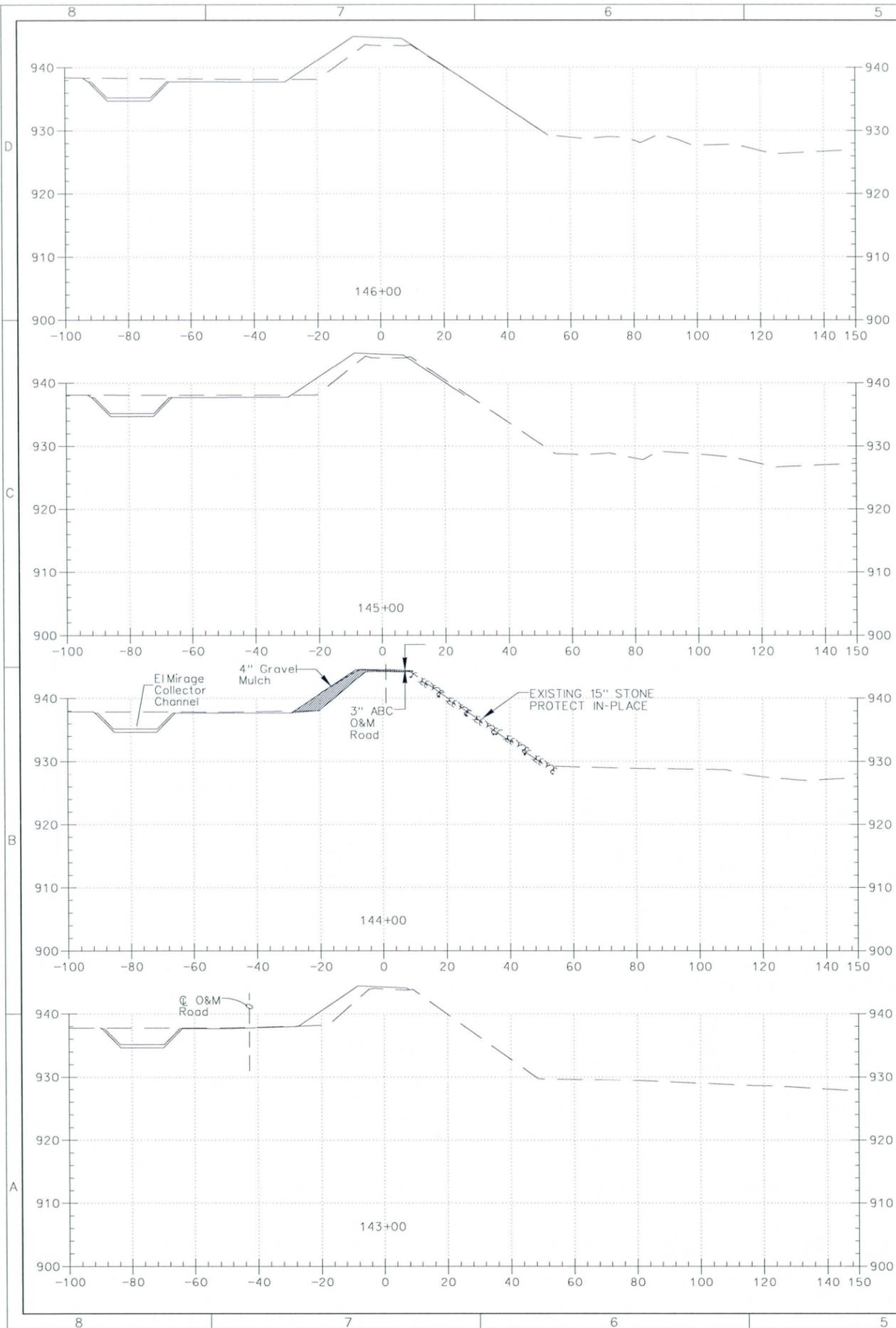
AS-BUILT
PLATE 9

REVISIONS	
SYMBOL	DESCRIPTIONS
Δ	Deleted X-Sect. Sta. 111+00.
	Included X-Sect. Sta. 111-17.71
DATE	APPROVAL

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
ENVIRONMENTAL RESTORATION
FLOOD CONTROL NORTH LEVEE
PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE)

SCALE: 20:1	DESIGNED BY: LOS ANGELES CORPS OF ENGINEERS	DRAWN BY:	CHECKED BY:	FILE NAME: CLX7.DGN
SHEET CLX-7	SUBMITTED BY: THOMAS H. SAGE, P.E. CHIEF, DESIGN BRANCH	SPEC. NO. W912PL-07-B-0003		DISTRICT FILE NO. 203/

CROSS SECTIONS
STA. 111+17.72 TO 118+00

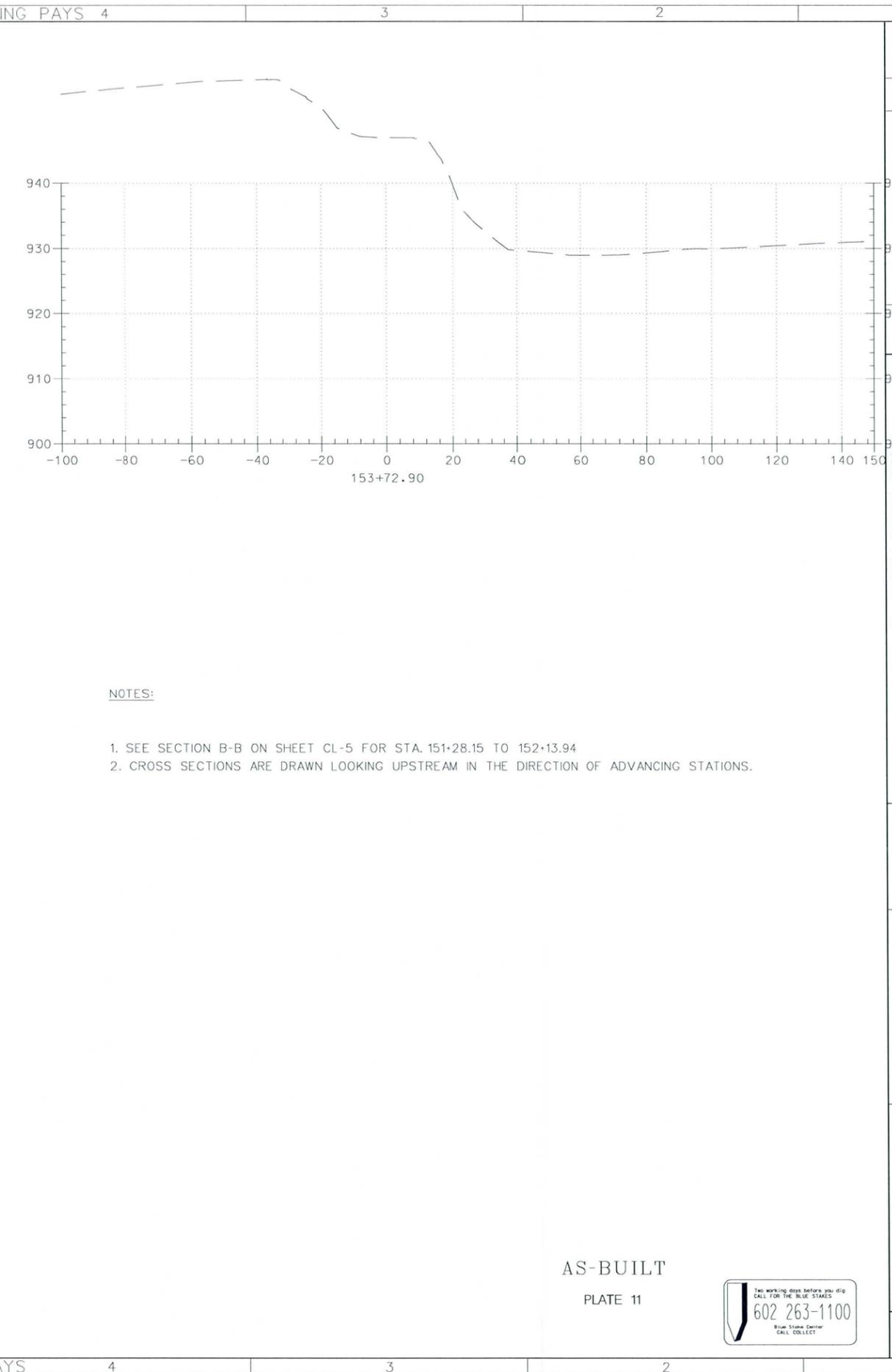
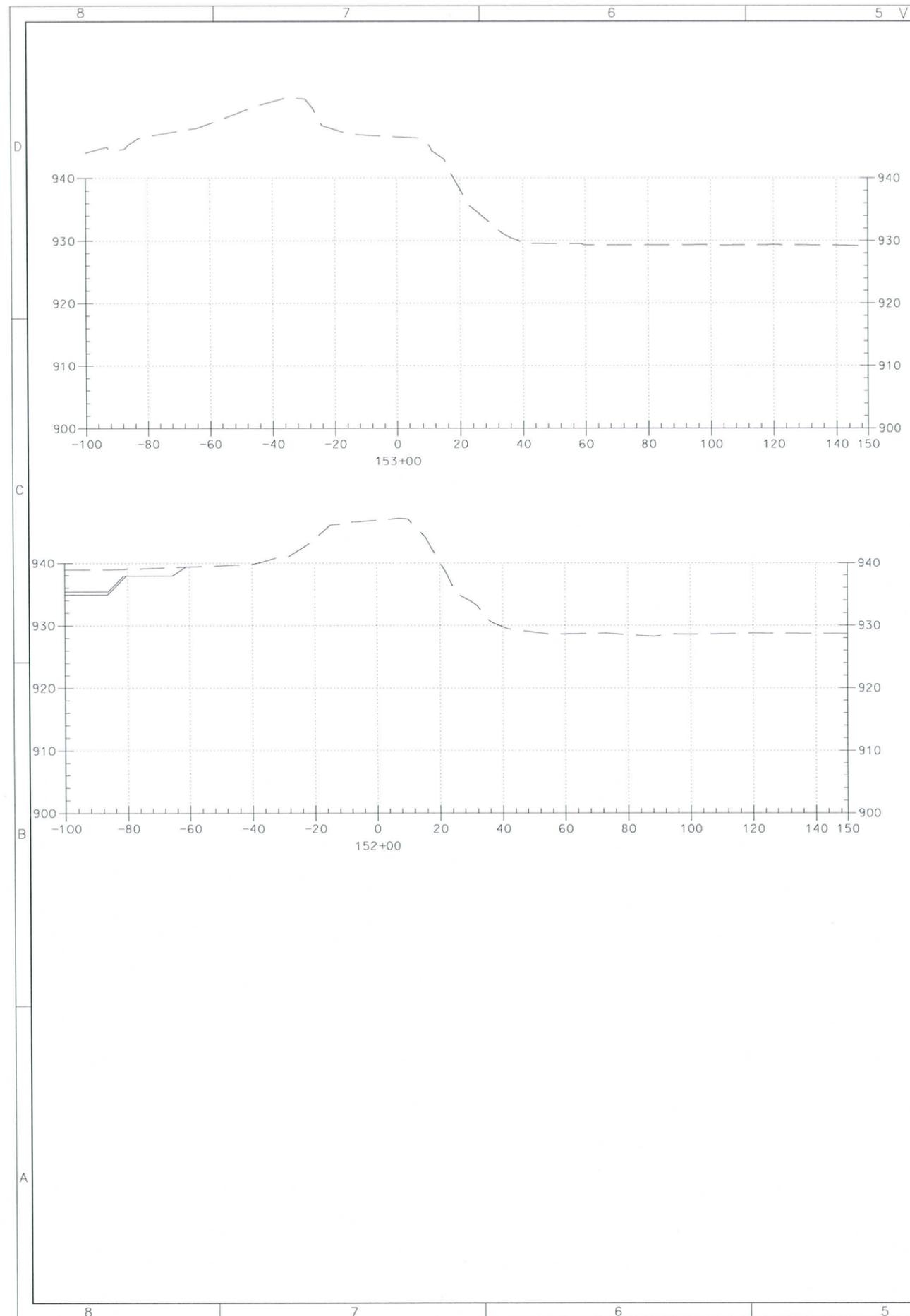


- NOTES:
1. SEE TYP CROSS SECTION, NOTES AND CONSTRUCTION NOTES ON SHEET CLX-6 FOR STA. 143+00 TO STA. 152+00.00
 2. SEE SECTION A-A ON SHEET CL-5 FOR STA. 149+30.53 TO 150+70.69
 3. CROSS SECTIONS ARE DRAWN LOOKING UPSTREAM IN THE DIRECTION OF ADVANCING STATIONS.

AS-BUILT
PLATE 10



SCALE: 20:1	DESIGNED BY: U.S. ARMY ENGINEER DISTRICT LOS ANGELES		FILE NAME: CLX11.Dgn
	DRAWN BY: CORPS OF ENGINEERS		
SHEET CLX-11	CHECKED BY: THOMAS H. SAGE, P.E. CHIEF, DESIGN BRANCH		DISTRICT FILE NO. 203/414
	SPEC. NO. W912PL-07-B-0003		
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE)			CROSS SECTIONS STA. 143+00 TO 150+00
REVISIONS SYMBOL DESCRIPTIONS DATE APPROVAL			



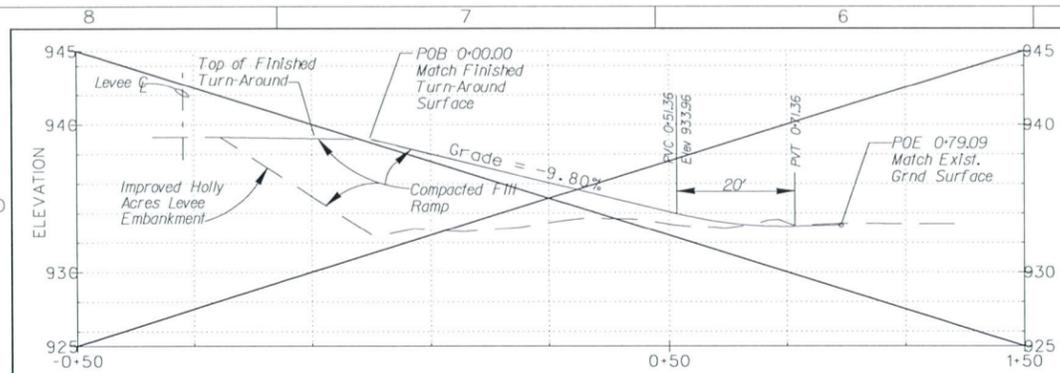
NOTES:

1. SEE SECTION B-B ON SHEET CL-5 FOR STA. 151+28.15 TO 152+13.94
2. CROSS SECTIONS ARE DRAWN LOOKING UPSTREAM IN THE DIRECTION OF ADVANCING STATIONS.

AS-BUILT
PLATE 11

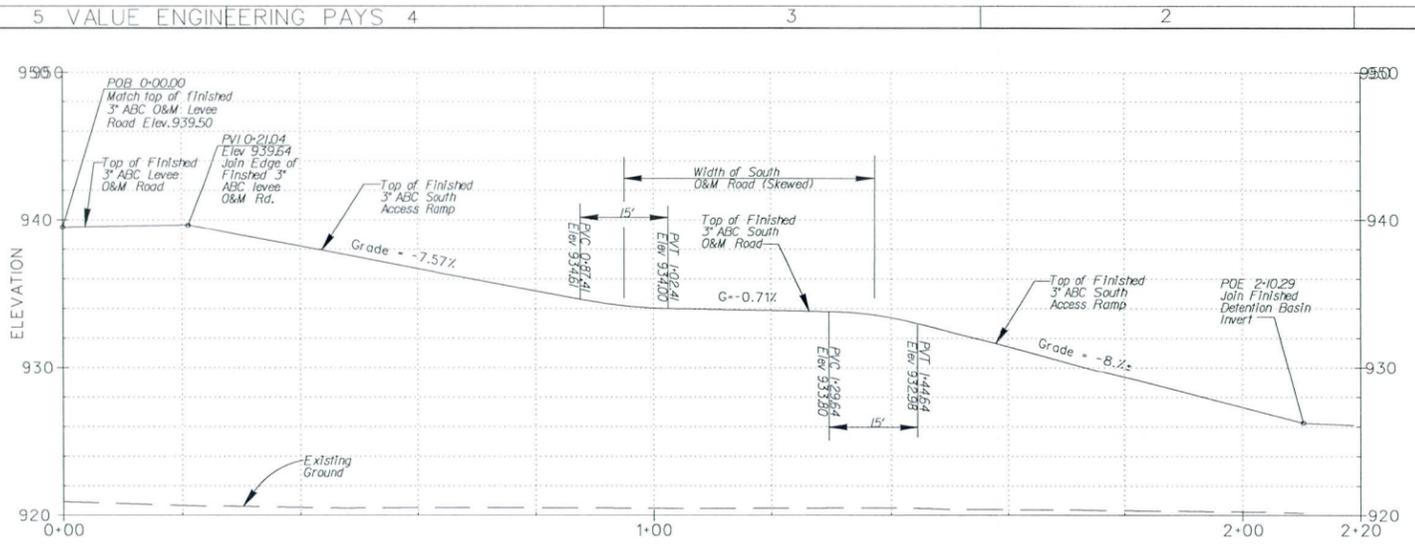


SCALE: 20:1	DESIGNED BY: U.S. ARMY ENGINEER DISTRICT LOS ANGELES	DESIGNED BY: U.S. ARMY ENGINEER DISTRICT LOS ANGELES	DESIGN NO. W912PL-07-B-0003	FILE NAME: CL12.Dgn
	CHECKED BY:	CHECKED BY:		
SHEET CLX-12	SUBMITTED BY: THOMAS H. SAGE, P.E. CHIEF, DESIGN BRANCH		DISTRICT FILE NO. 2037/415	
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE) CROSS SECTIONS STA. 152+00.00 TO 153+72.90				REVISIONS DATE APPROVAL



RAMP CENTER LINE PROFILE

HORIZ. SCALE: 1 IN. = 10 FT.
VERT. SCALE: 1 IN. = 20 FT.

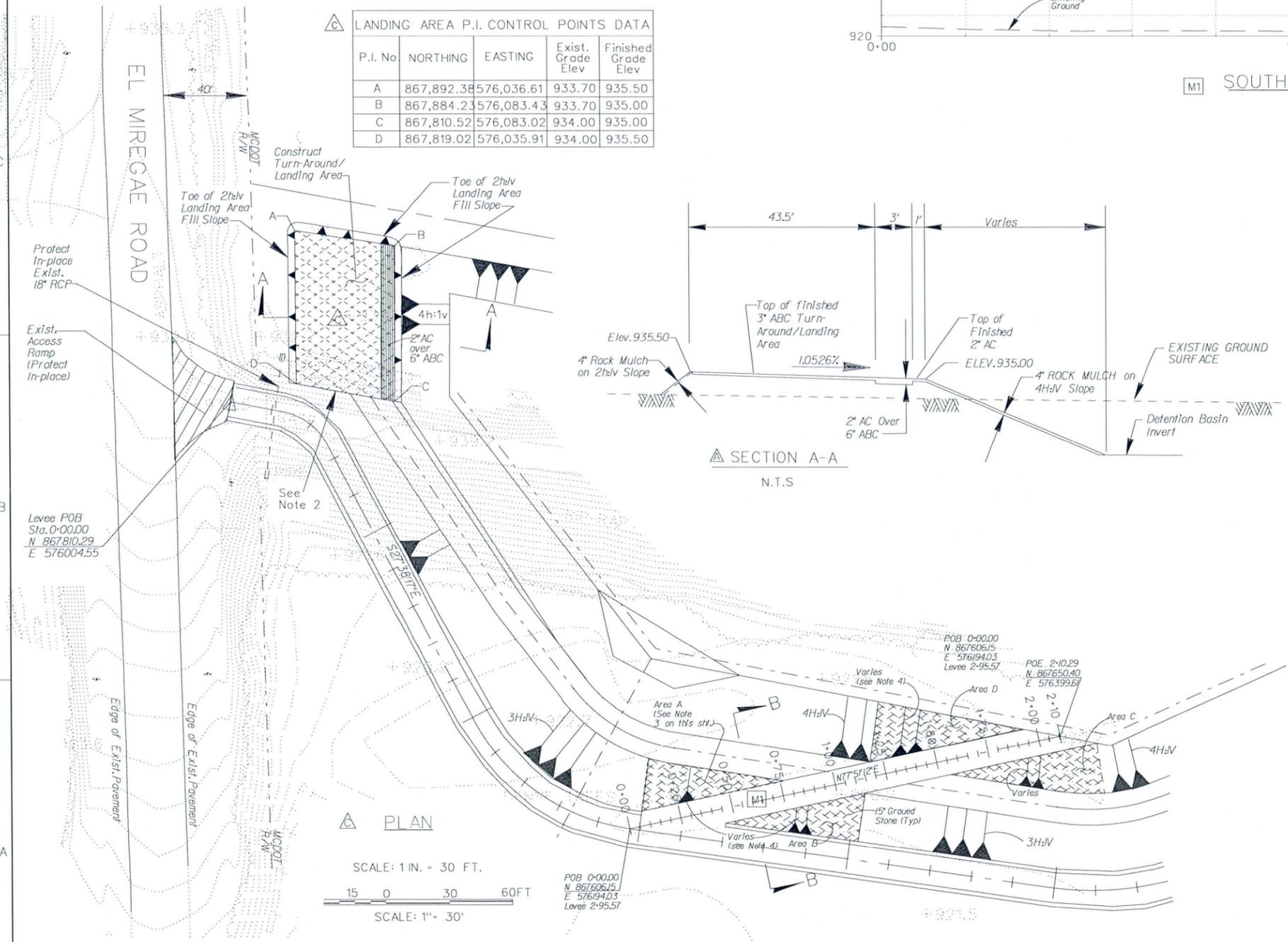


SOUTH RAMP CENTER LINE PROFILE

N.T.S.

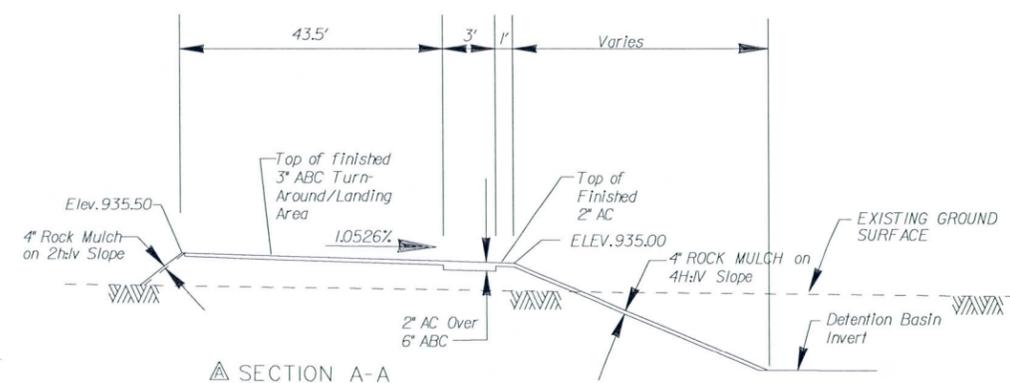
LANDING AREA P.I. CONTROL POINTS DATA

P.I. No	NORTHING	EASTING	Exist. Grade Elev	Finished Grade Elev
A	867,892.38	576,036.61	933.70	935.50
B	867,884.23	576,083.43	933.70	935.00
C	867,810.52	576,083.02	934.00	935.00
D	867,819.02	576,035.91	934.00	935.50



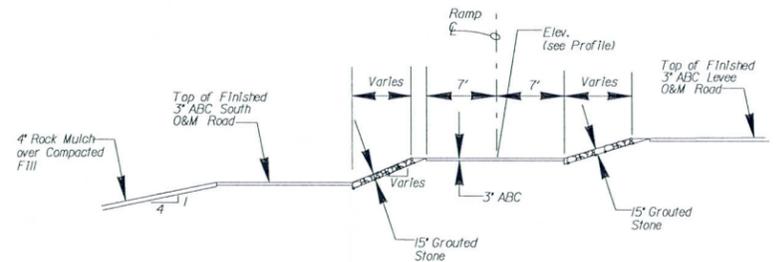
PLAN

SCALE: 1 IN. = 30 FT.
SCALE: 1" = 30'



SECTION A-A

N.T.S.



SECTION B-B

N.T.S.

NOTES:

- 4" THICK GRAVEL/ROCK MULCH SHALL BE APPLIED ON THE COMPACTED 2H:1V FILL SLOPES OF THE LANDING AREA.
- COMPACTED FILL TO MATCH DESIGN ELEVATION
- 15" GROUTED STONE IS REQUIRED FOR AREAS A, B, C & D.
- TOP AND TOE OF FINISHED 15" GROUTED STONE SLOPES SHALL MATCH EDGE OF FINISHED 3" ABC O&M ROADS AND BASIN INVERT.

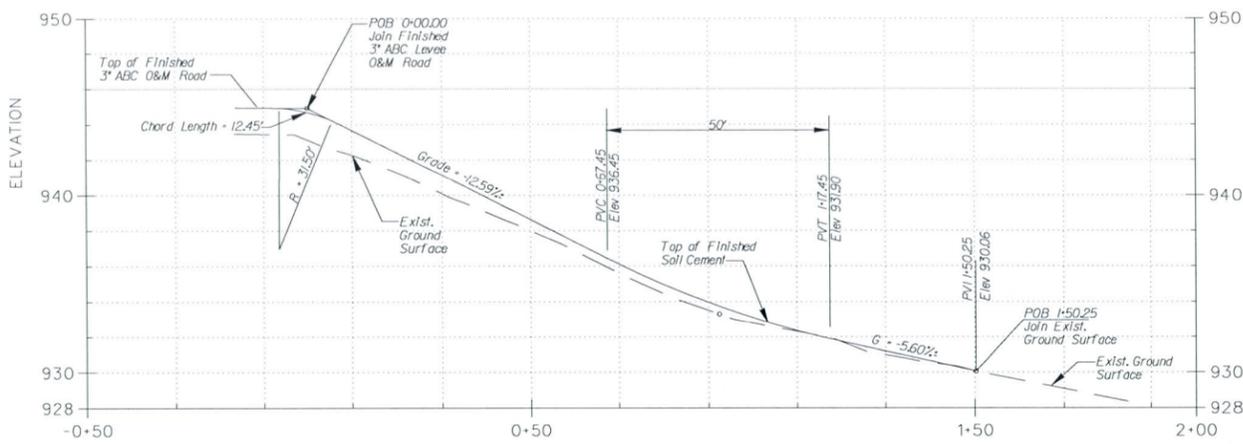
SYMBOL	DESCRIPTIONS	DATE	APPROVAL
M1	Added Access Ramp Plan, Profiles & Section	9/10/07	
	Deleted Profile, Revised Plan and Section	8/8/07	
	Revised Section A-A and Note 1	7/10/07	

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
ENVIRONMENTAL RESTORATION
FLOOD CONTROL NORTH LEVEE
PHASE 1B (EL MIREGAE ROAD TO 115TH AVENUE)
EAST EL MIREGAE ROAD TURN-AROUND/LANDING AREA
PLAN AND SECTIONS

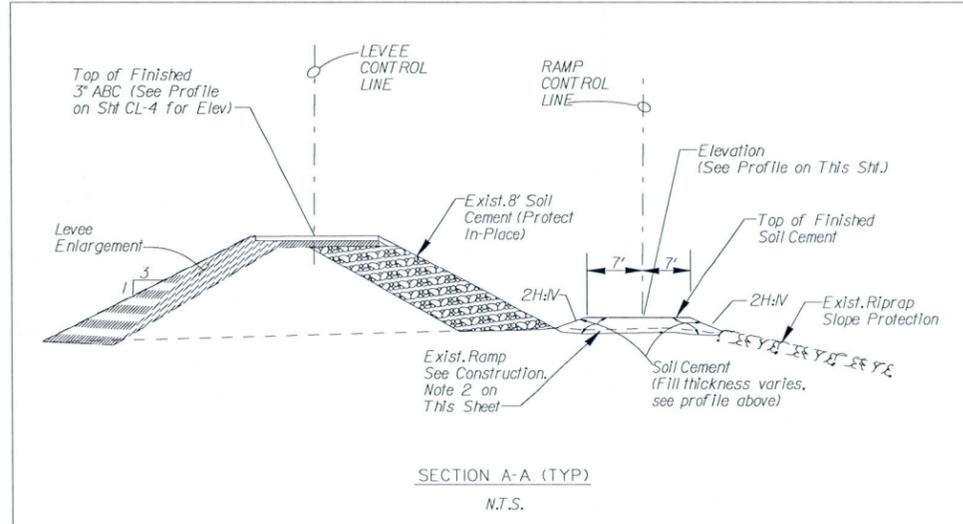
DESIGNED BY: D.P. LOS ANGELES	FILE NAME: EEMAR.dgn
DRAWN BY: D.P.	
CHECKED BY: P.U.	
U.S. ARMY ENGINEER DISTRICT	
CORPS OF ENGINEERS	
THOMAS H. SAGE, P.E.	
CHIEF, DESIGN BRANCH	
SPEC. NO. W92PL-07-B-0003	
DISTRICT FILE NO. 203/418	

AS-BUILT
PLATE 12

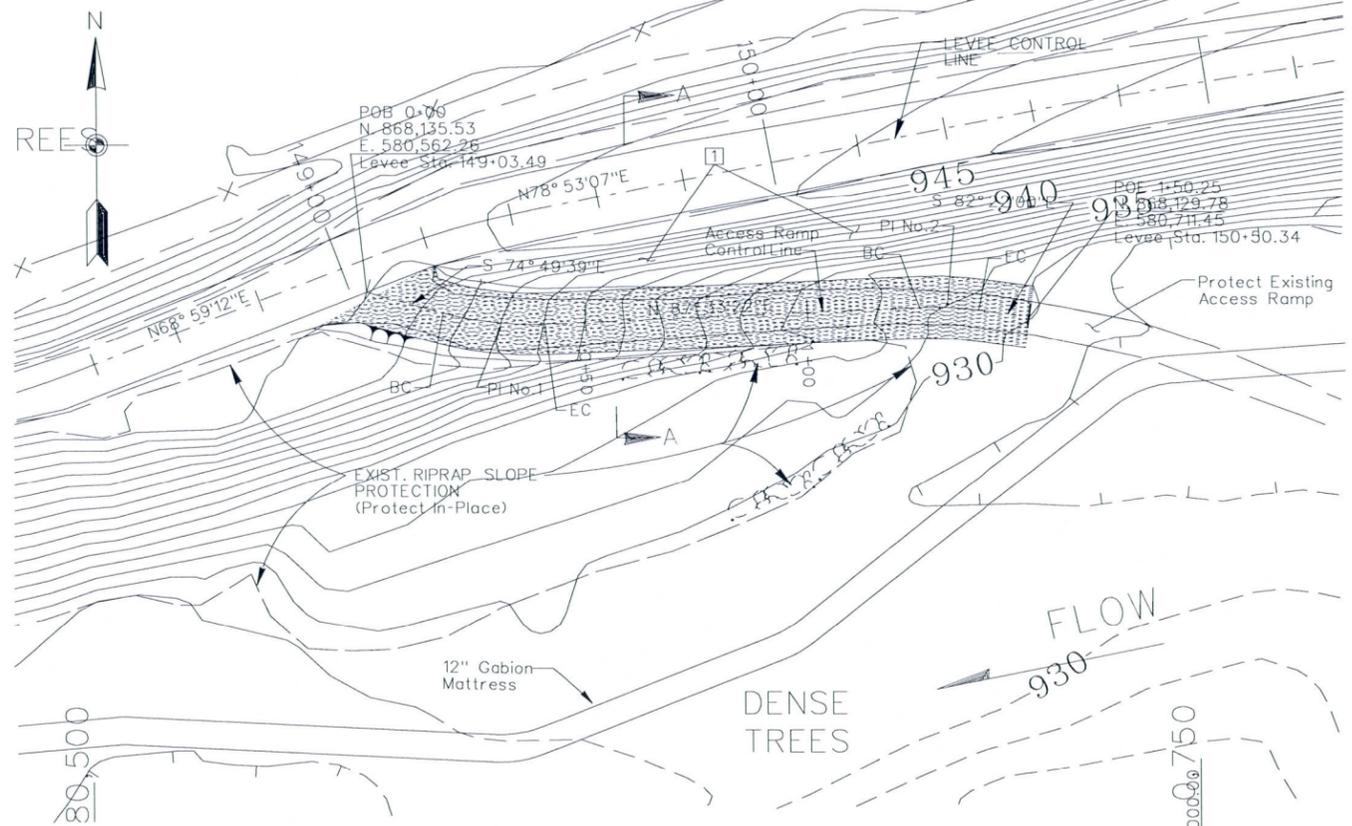




CONTROL LINE PROFILE
 H: 1 IN. = 20 FT.
 V: 1 IN. = 5 FT.



SECTION A-A (TYP)
 N.T.S.



W. 115th AVENUE ACCESS RAMP
 PLAN
 SCALE: 1 IN. = 20 FT.

HORIZONTAL CONTROL LINE - CURVE DATA								
P.I.	NORTHING	EASTING	Δ°	R(FT.)	T(FT.)	L(FT.)	B.C. Sta.	E.C. Sta.
1	869,127.83	580,590.67	17° 36' 58" Left	75.00	11.62	23.06	0+17.81	0+40.87
2	868,132.21	580,693.32	10° 04' 37" Right	75.00	6.61	13.19	1+25.38	1+38.58

CONSTRUCTION NOTES:

- EXISTING 8' SOIL CEMENT SLOPE PROTECTION, PROTECT IN-PLACE. THE CONTRACTOR SHALL PREPARE AND SUBMIT PLANS SHOWING AREAS OF PROTECTION (SOIL CEMENT AREAS) TO THE GOVERNMENT FOR REVIEW AND APPROVAL.
- EXISTING ACCESS RAMP SHALL BE MODIFIED TO MEET LEVEE IMPROVEMENT DESIGN DIMENSIONS. IT IS ASSUMED THAT TOP OF THE EXISTING ACCESS RAMP CONTAINS SOIL CEMENT AND GROUTED ABC. THE CONTRACTOR SHALL REMOVE ALL LOOSE MATERIAL INCLUDING GRAVEL, DIRT ETC. AND APPLY WATER JET FOR CLEANING BEFORE APPLYING NEW MATERIALS. THE CONTRACTOR IS REQUIRED TO PROVIDE PLAN(S) AND DETAILS SHOWING AREA(S) OF REPAIR AND DESCRIBE BRIEFLY METHOD OF REPAIR TO THE CONTRACTING OFFICER FOR APPROVAL PRIOR TO ANY CONSTRUCTION WORK ON THIS ACCESS RAMP.

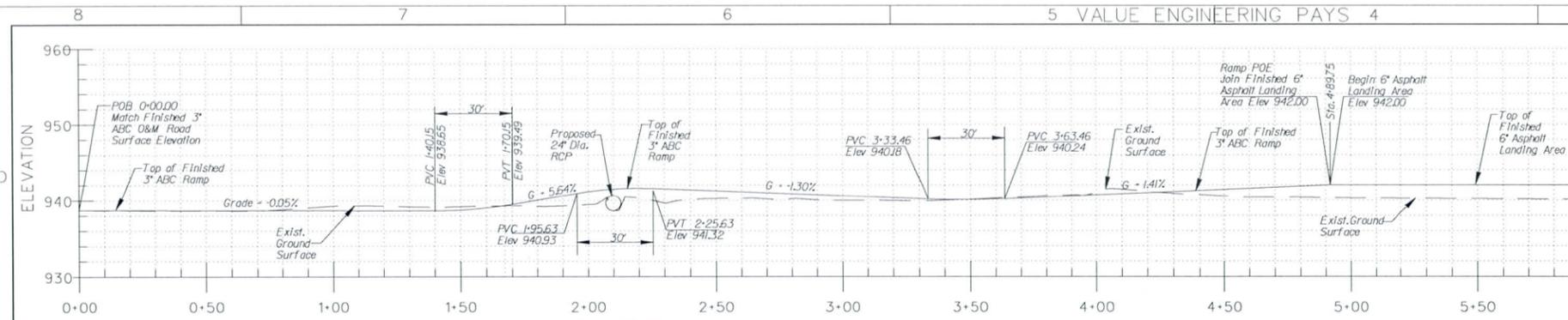
AS-BUILT
 PLATE 13



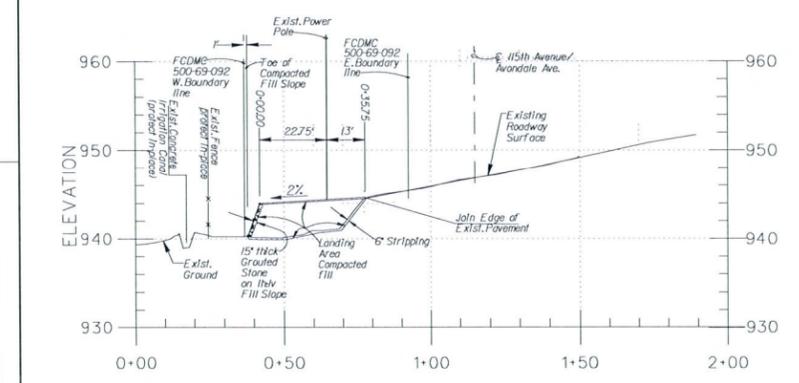
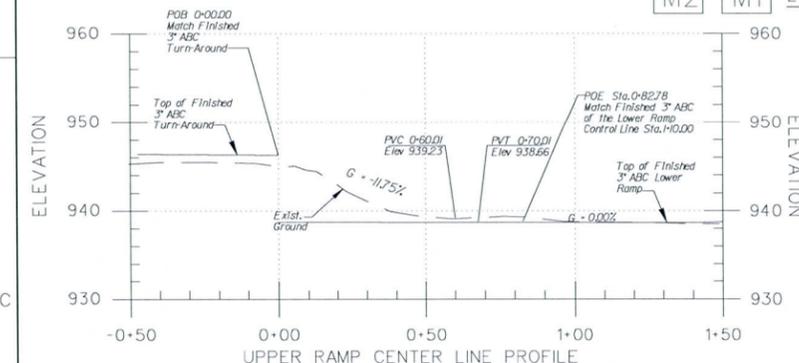
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE)
 W. 115th AVENUE WETSIDE ACCESS RAMP
 PLAN, PROFILE AND SECTIONS

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

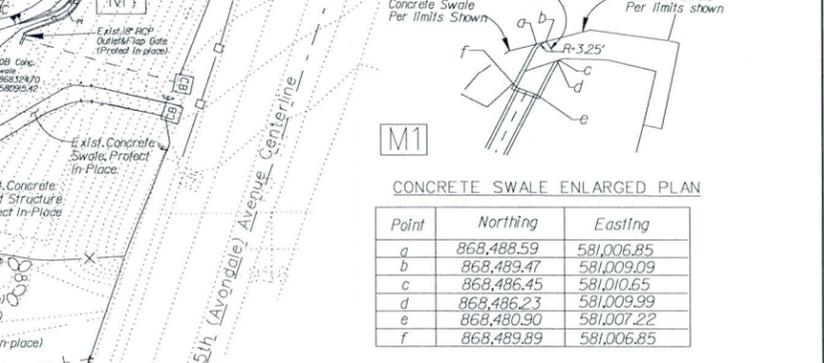
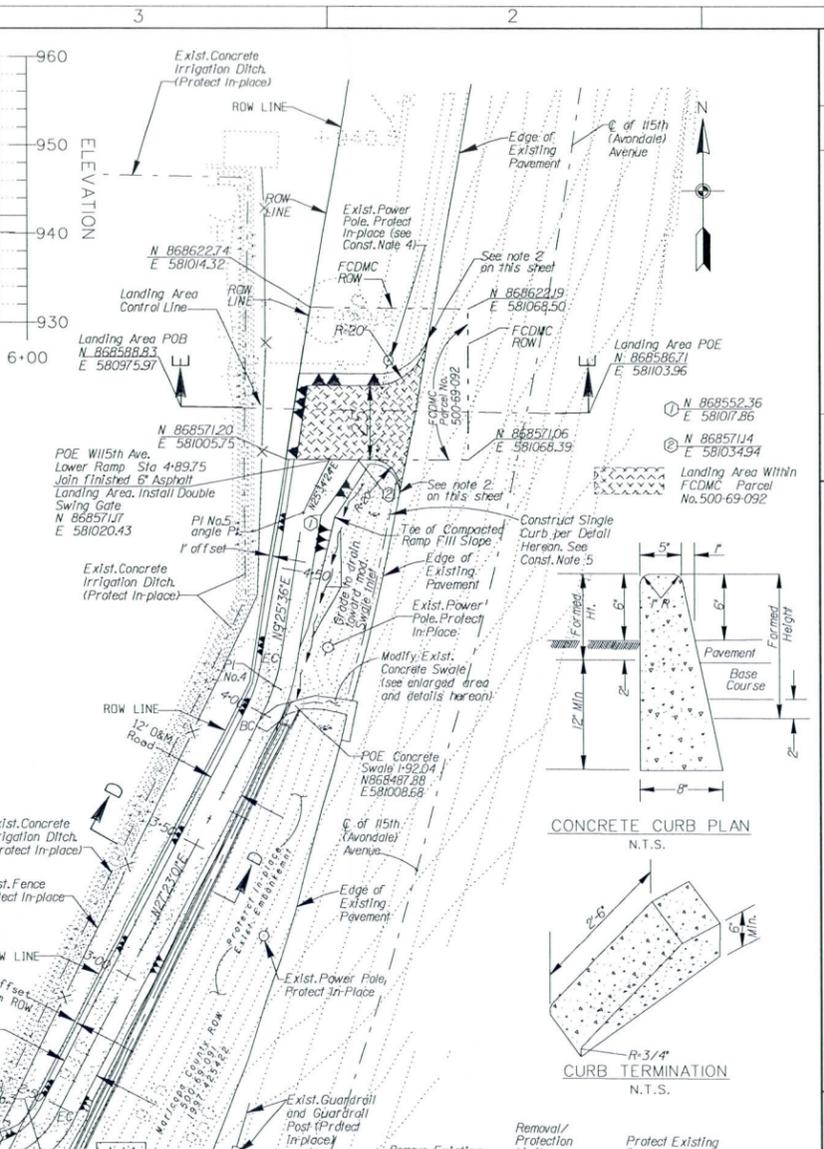
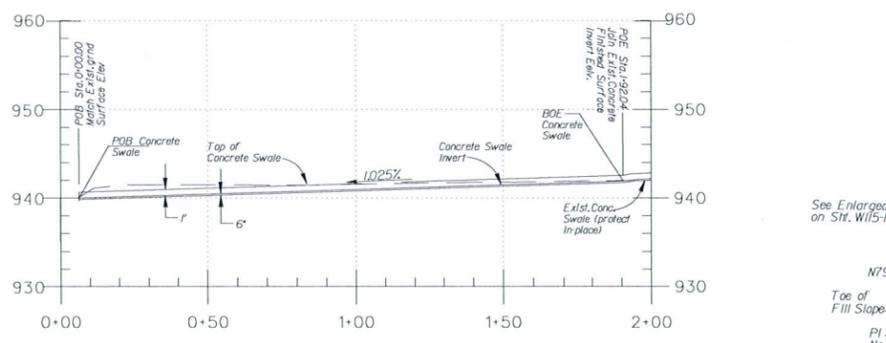
DESIGNED BY: U.S. ARMY ENGINEER DISTRICT
 DRAWN BY: LOS ANGELES
 CHECKED BY: CORPS OF ENGINEERS
 THOMAS H. SAGE, P.E., CHIEF, DESIGN BRANCH
 FILE NAME: W115WAR.Dgn
 SPEC. NO. W912P1-07-B-0003
 DISTRICT FILE NO. 203/417



P.I.	NORTHING	EASTING	Δ°	R(Ft)	T(Ft)	L(Ft)	B.C Sta	E.C Sta
1	868,255.91	580,840.00	51° 18' 25" Lt	30.00	14.41	26.86	0+98.44	1+25.30
2	868,328.37	580,877.01	52° 40' 21" Rt	30.00	14.85	27.58	1+77.41	2+04.99
3	868,336.30	580,920.75	52° 20' 41" Lt	30.00	14.74	27.41	2+19.85	2+47.26
4	868,492.89	581,001.86	17° 57' 25" Lt	60.00	9.48	18.80	3+99.38	4+18.19
5	868,553.35	581,011.90	Angle Point	N/A	51.81	N/A	N/A	N/A



Point	Equiv Levee Sta.	Northing	Easting
A	150+76.55	868,201.68	580,724.13
B	151+05.03	868,209.75	580,771.97
C	151+08.75	868,194.08	580,778.83
D	150+70.90	868,184.36	580,721.78



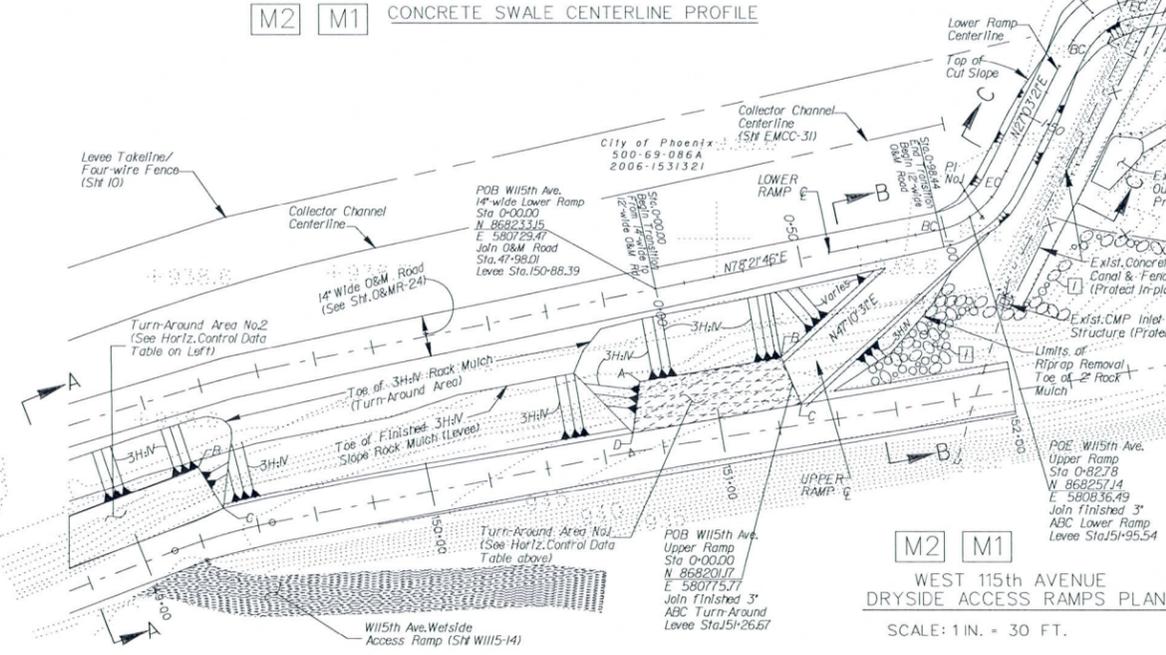
P.I.	NORTHING	EASTING	Δ°
1	868,330.43	580,931.74	44° 36' 44" Lt

R(Ft)	T(Ft)	L(Ft)	B.C Sta.	E.C Sta.
12	4.92	9.34	0+12.37	0+21.72

AS-BUILT PLATE 14
 602 263-1100
 Blue State Center CALL COLLECT

- NOTES:**
- Removal of exist. fence and replacement of the new one on the west side of the Lower Access Ramp and the landing area is required for construction purposes. Existing fence on the east side of the Lower Access Ramp shall be protected in-place.
 - End of curve radius shall join edge of the existing pavement.
 - See Sheet W115-15A for Sections A-A, B-B, C-C and D-D.
- CONSTRUCTION NOTES:**
- Protect in-place existing riprap
 - Exist. Irrigation sliedrain pipe and flap gate shall be removed and replaced. The contractor is required to submit plan and details of sliedrains in connection with the 24" RCP for approval by the Government unless otherwise.
 - Exist. Irrigation sliedrain pipe and flap gate shall be removed and replaced. The contractor is required to submit plan and details of sliedrains in connection with the 24" RCP for approval by the Government.
 - Protect the Existing Power Pole During Construction and in Compliance with the Safety Section mentioned elsewhere in the Specs.
 - Align the curb parallel to existing pavement of the roadway including horizontal and vertical control datum so that water can properly drain. POB (south end) & POE (north end) of curb shall be at the existing concrete swale and landing area respectively.

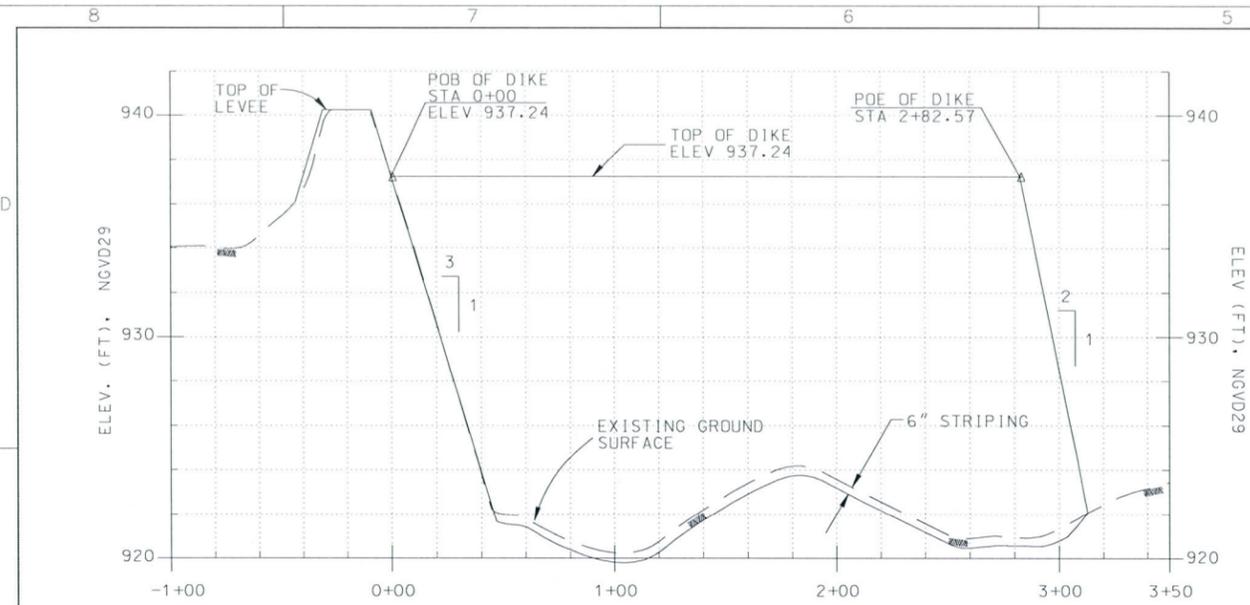
Point	Equiv Levee Sta.	Northing	Easting
A	148+74.49	868,153.76	580,524.15
B	149+25.79	868,172.81	580,574.25
C	149+30.14	868,158.79	580,582.59
D	148+69.23	868,136.31	580,525.25



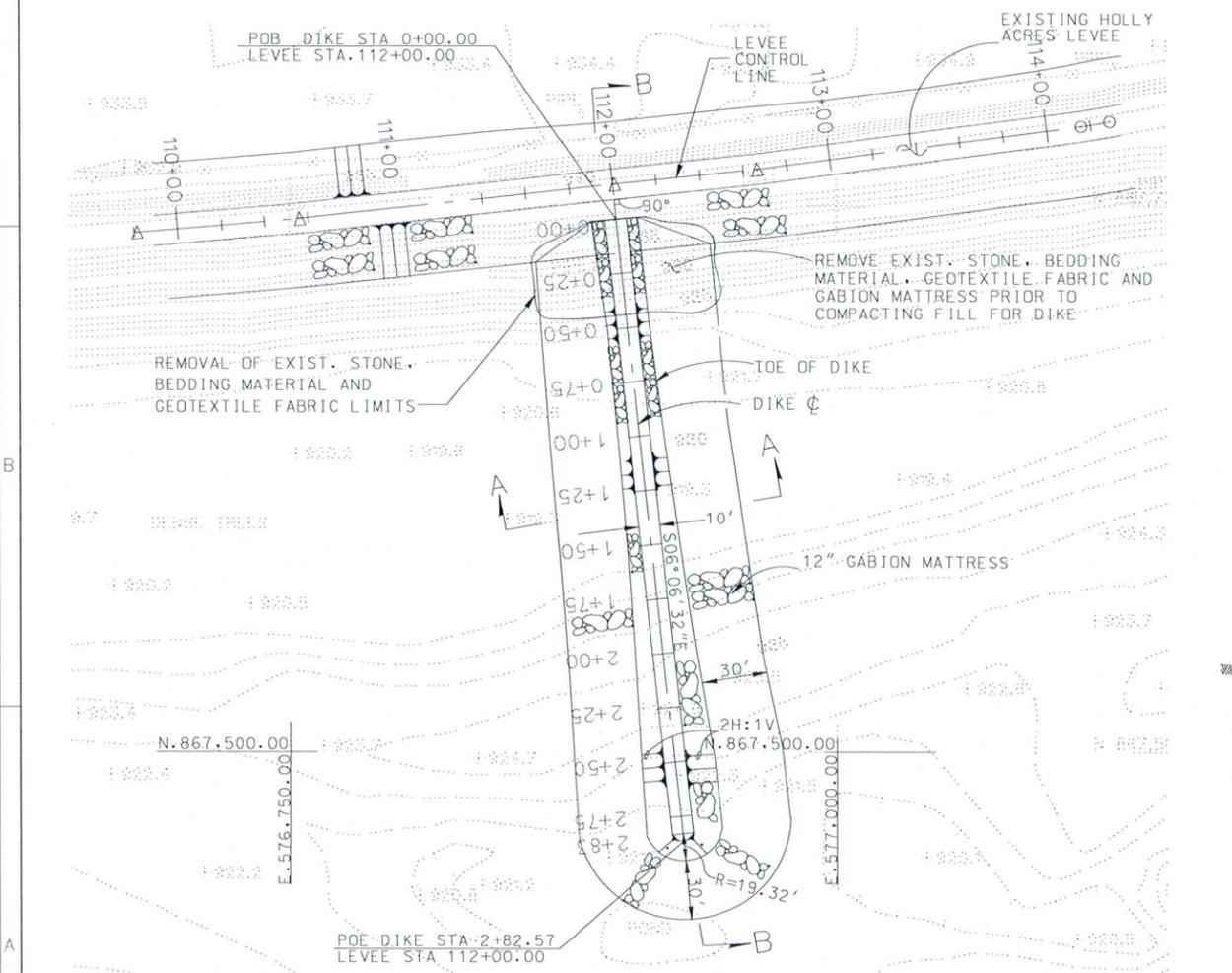
WEST 115th AVENUE DRYSIDE ACCESS RAMPS PLAN
 SCALE: 1 IN. = 30 FT.

SCALE: 30:1	DESIGNED BY: D.P.	FILE NAME: W15DAR.dgn
SHEET: W15-15	DRAWN BY: P.J.	DISTRICT FILE NO. 203/418
	CHECKED BY: D.P.	
	CORPS OF ENGINEERS	
	ARTHUR Y. JUNG, P.E.	
	CHIEF DESIGN BRANCH	
	SPEC. NO. W92PL-07-B-0003	
	REVISIONS	
	DESCRIPTIONS	
	DATE	
	APPROVAL	

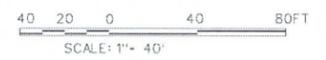
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 1B (EL MIRAGE ROAD TO 115th AVENUE)
 WEST 115th AVE. DRYSIDE ACCESS RAMPS
 PLANS, PROFILES AND SECTIONS



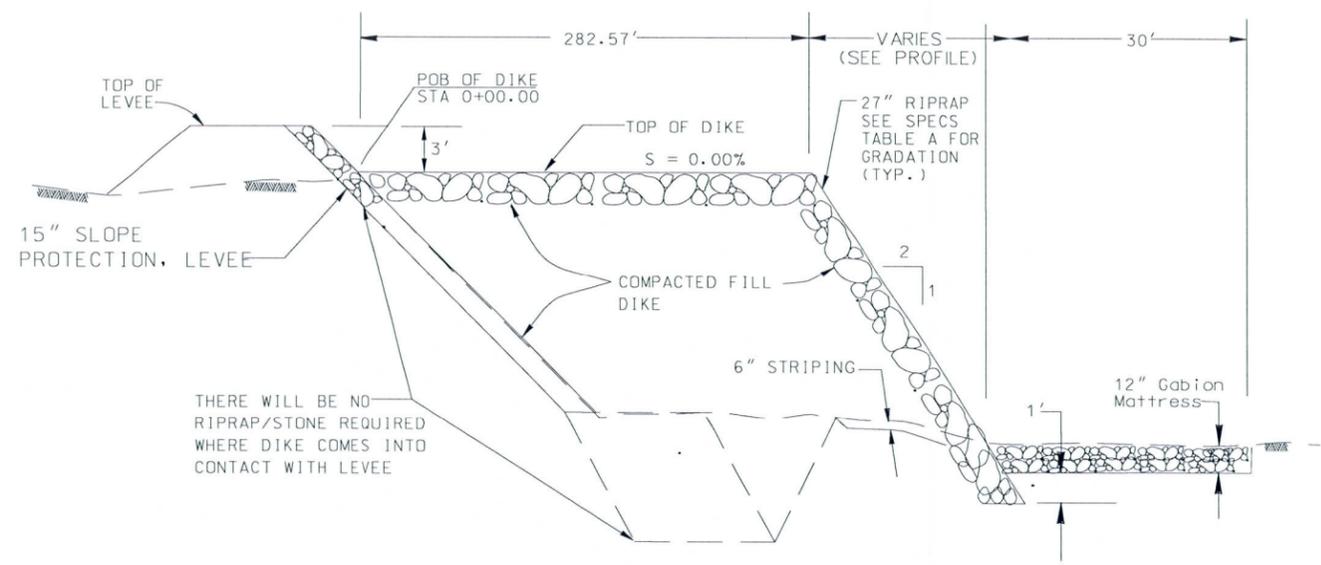
PROFILE
 VERT. SCALE: 1" = 4'
 HORIZ. SCALE: 1" = 40'



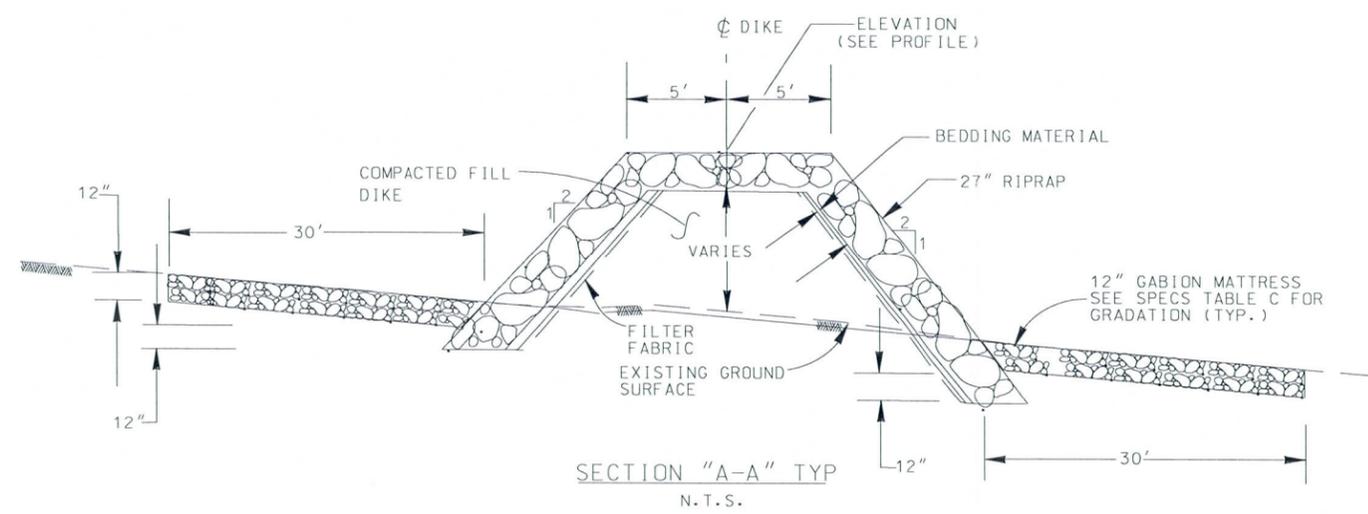
WEST 121st AVENUE DIKE PLAN
 SCALE: 1" = 40'



DIKE CONTROL LINE HORIZ. POINTS DATA			
POINT	NORTHING	EASTING	BEARING ANGLE
P.O.B.	867,743.94	576,899.15	S06°06'32"E
P.O.E.	867,459.19	576,929.77	



SECTION "B-B" TYP
 N.T.S.



SECTION "A-A" TYP
 N.T.S.

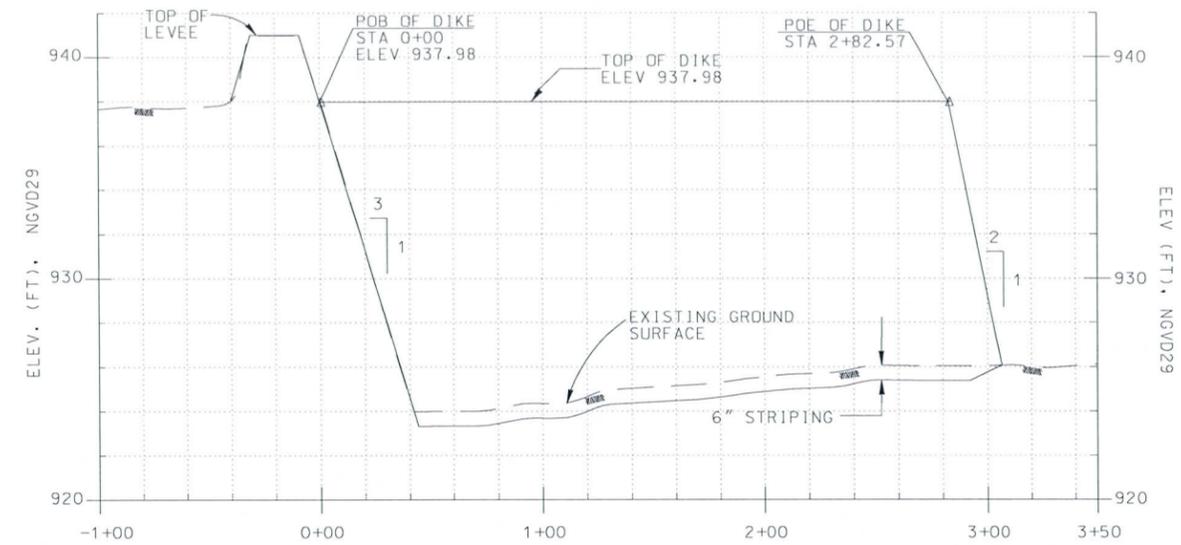
NOTES:

- REFER TO SHEET 6 FOR THE GENERAL LOCATION OF DIKE

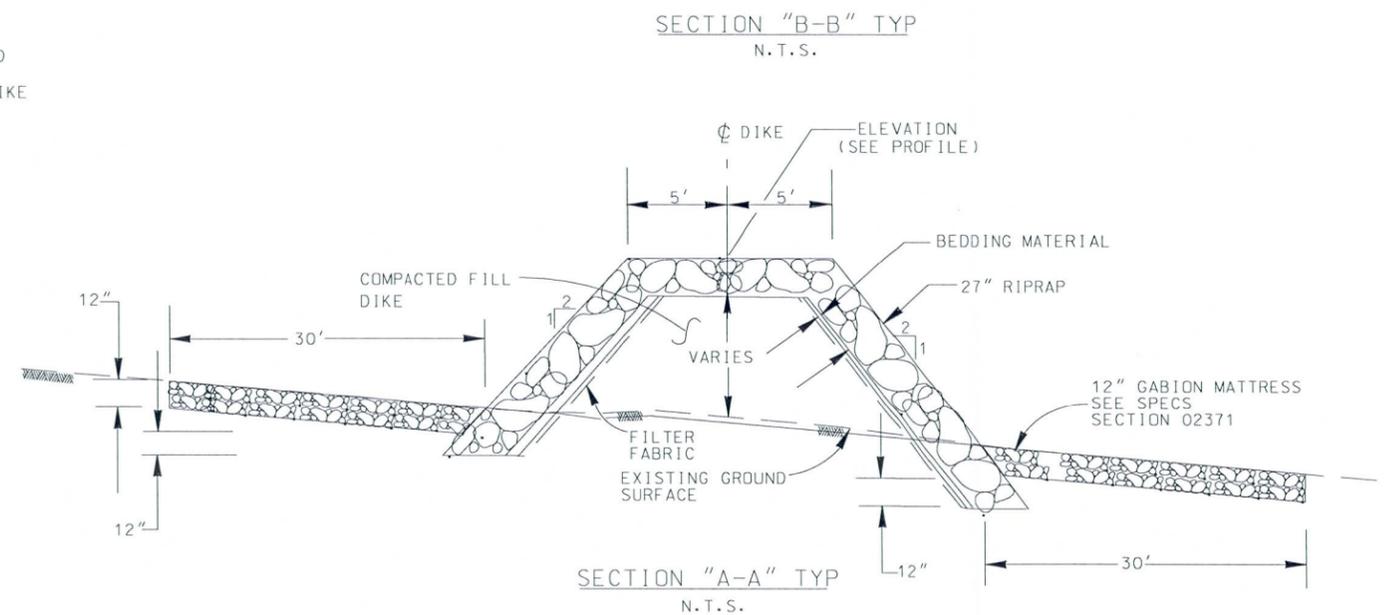
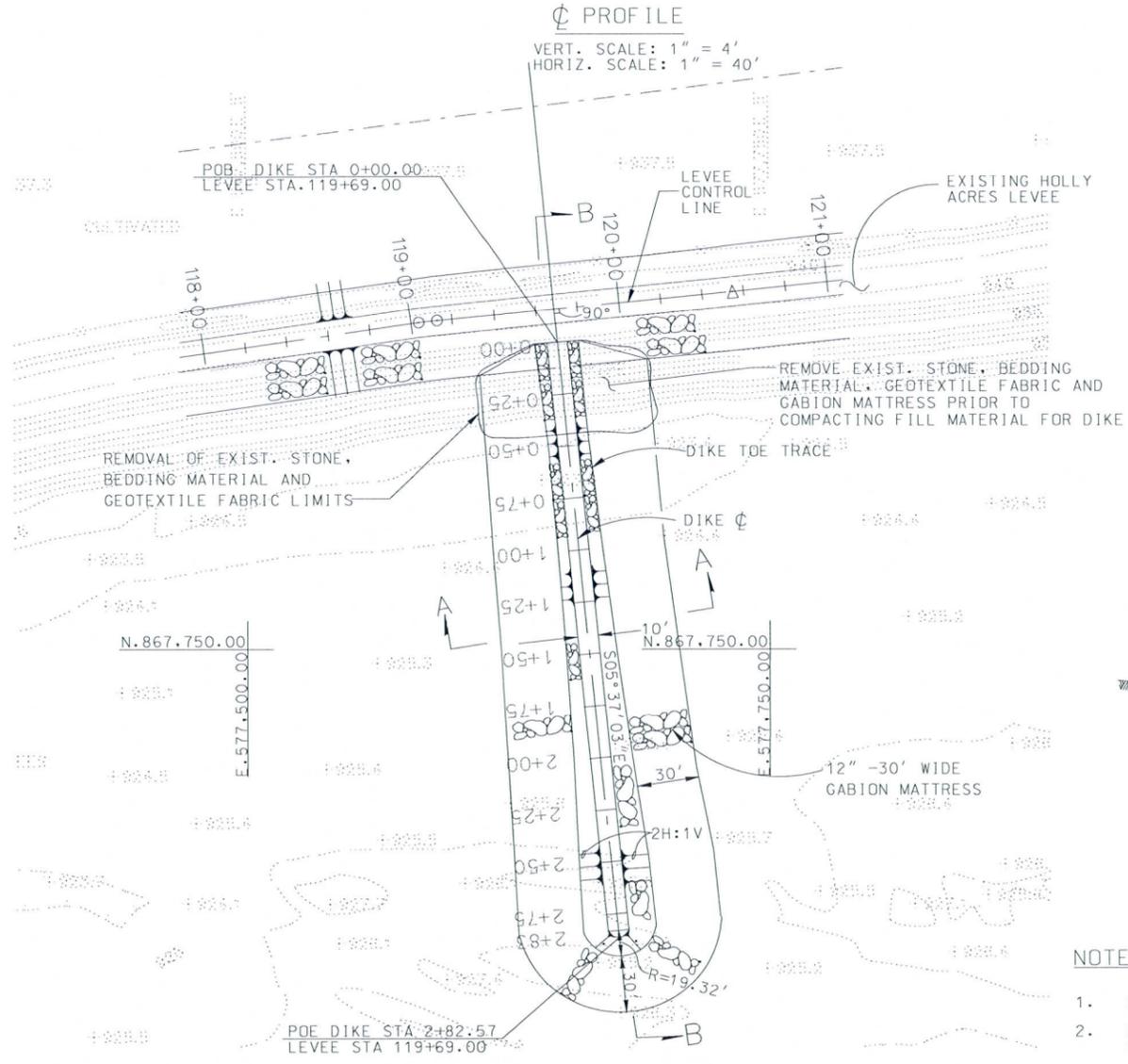
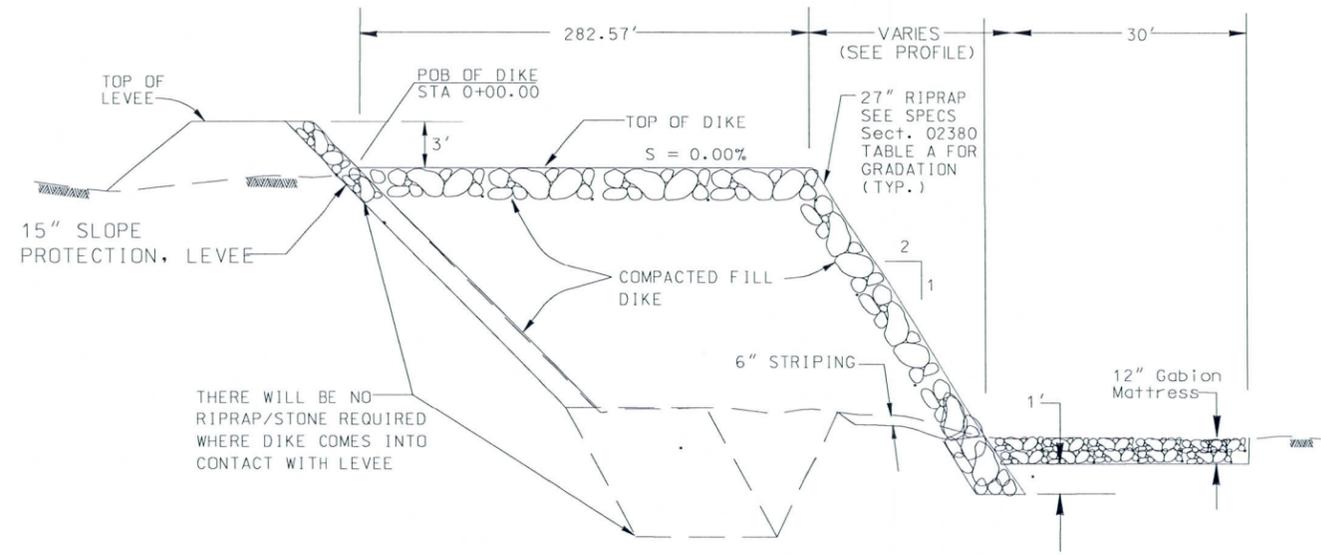
AS-BUILT
 PLATE 16



SCALE: 40:1	SHEET CGD-16	SUBMITTED BY: THOMAS H. SAGE, P.E. CHIEF DESIGN BRANCH	DESIGNED BY: U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	DRAWN BY: CHECKED BY:	FILE NAME: CGD16.Dgn	DISTRICT FILE NO. 203/448	SPEC. NO. W92PL-07-B-0003	DATE	APPROVAL
									REVISIONS
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 'B' (EL MIRAGE ROAD TO 115TH AVENUE) WEST 121st AVENUE DIKE PLAN, PROFILE AND SECTIONS									



DIKE CONTROL LINE HORIZ. POINTS DATA			
POINT	NORTHING	EASTING	BEARING ANGLE
P.O.B.	867,897.04	577,648.96	S05°37'03"E
P.O.E.	867,612.03	577,676.99	



NOTES:

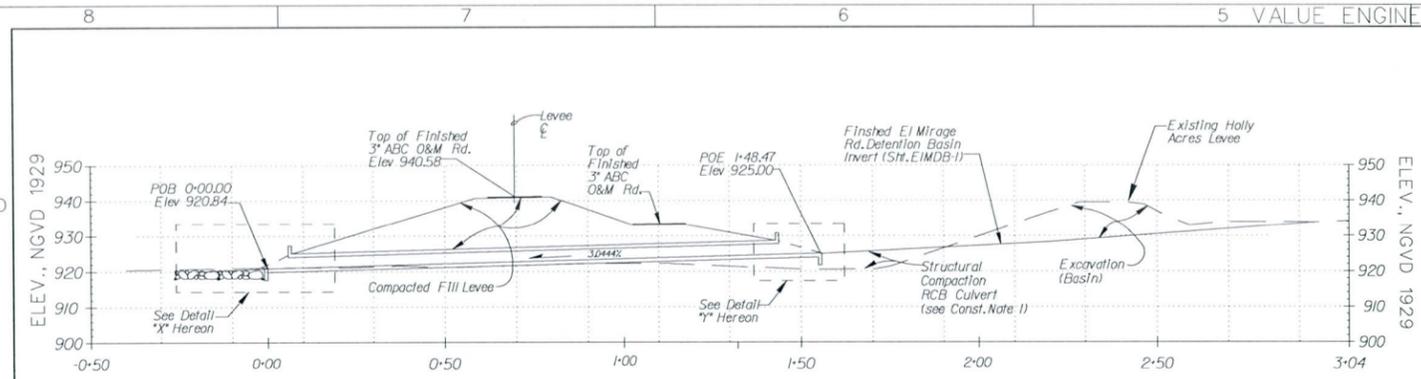
1. REFER TO SHEET 6 FOR THE GENERAL LOCATION OF DIKE
2. EXISTING GABION MATTRESS UNDERNEATH THE DIKE IS NOT SHOWN ON THE PLAN.



WEST 119th AVENUE DIKE PLAN
SCALE: 1" = 40'

AS-BUILT
PLATE 17
602 263-1100
Blue State Center
CALL COLLECT

DESIGNED BY: LOS ANGELES CORPS OF ENGINEERS	DRAWN BY:	CHECKED BY:	FILE NAME: CG07.Dgn
U.S. ARMY ENGINEER DISTRICT	THOMAS H. SAGE, P.E.	CHEF, DESIGN BRANCH	SPEC. NO. W92PL-07-B-0003
SCALE: 40:1	SHEET: 000-17	DISTRICT FILE NO. 203/420	
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE)			WEST 119th AVENUE DIKE PLAN, PROFILE AND SECTIONS
SYMBOL		DESCRIPTIONS	REVISIONS
DATE	APPROVAL		



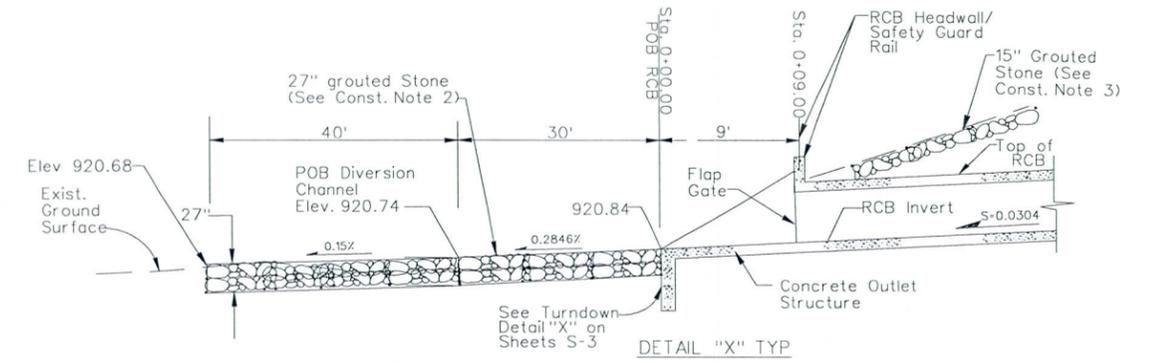
RCB CONTROL LINE PROFILE
HORIZONTAL 1 in = 25 ft
VERTICLE 1 in = 25 ft

RCB INLET STRUCTURE
HORIZ. CONTROL POINTS DATA

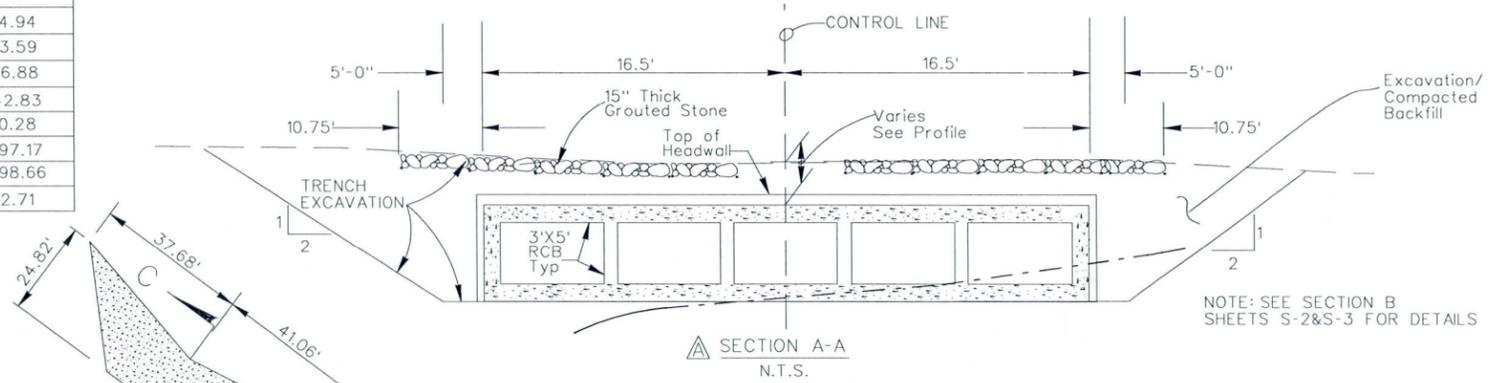
POINT	NORTHING	EASTING
A	N 867,720.35	E 576,179.23
B	N 867,687.39	E 576,204.37
C	N 867,679.40	E 576,246.66
D	N 867,673.03	E 576,215.43
E	N 867,688.50	E 576,186.27

RCB CONCRETE OUTLET STRUCTURE AND
27" GROUTED STONE APRON STRUCTURE
HORIZ. CONTROL POINTS DATA

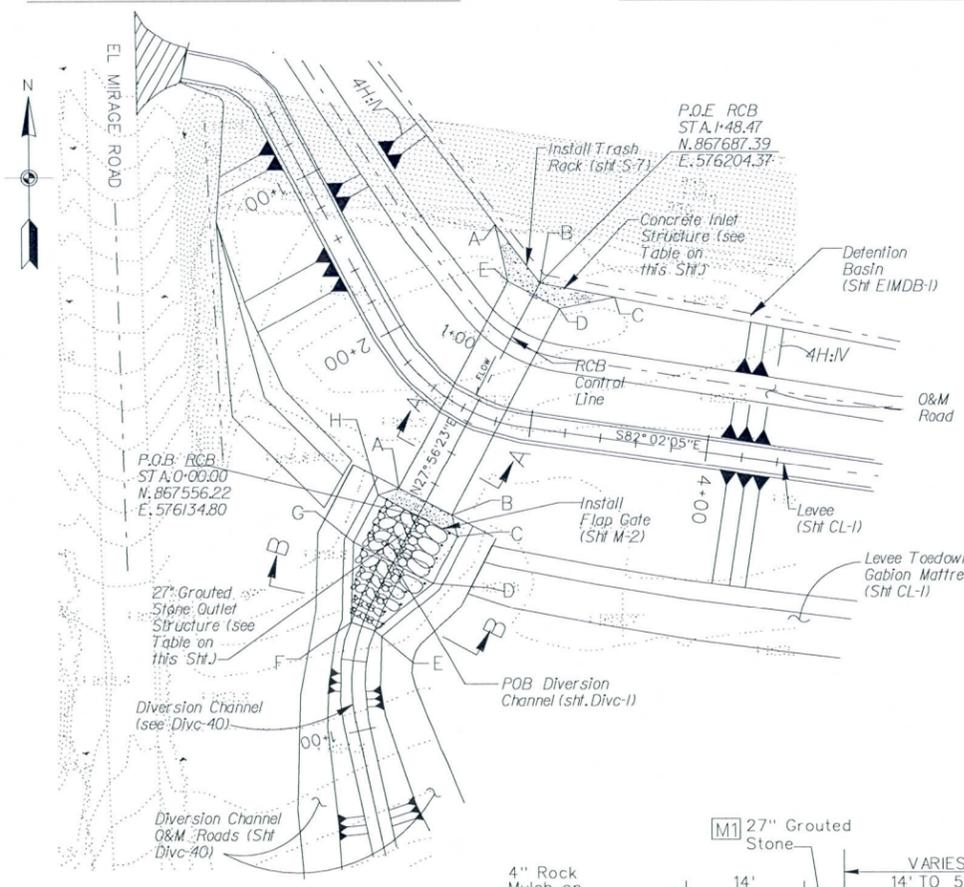
POINT	NORTHING	EASTING
A	N 867,571.90	E 576,124.94
B	N 867,556.44	E 576,153.59
C	N 867,544.51	E 576,156.88
D	N 867,518.01	E 576,142.83
E	N 867,491.36	E 576,110.28
F	N 867,495.96	E 576,097.17
G	N 867,541.43	E 576,098.66
H	N 867,567.94	E 576,112.71



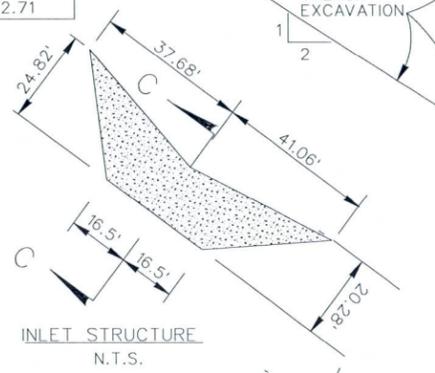
DETAIL "X" TYP
N.T.S.



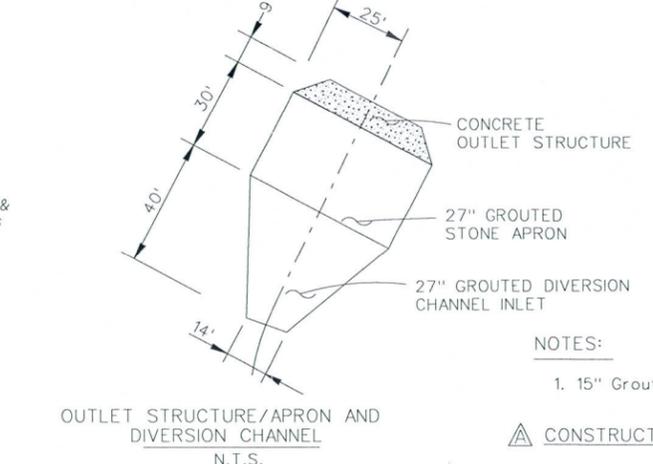
SECTION A-A
N.T.S.



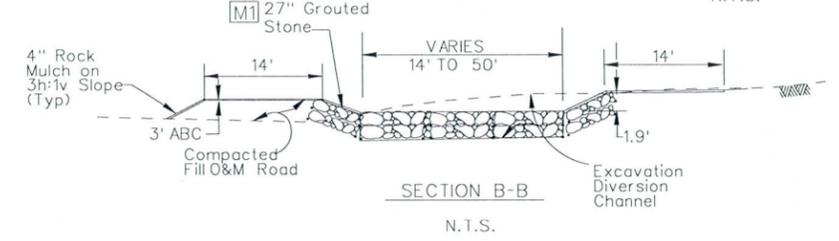
RCB PLAN
SCALE: 1 IN. = 50 FT.



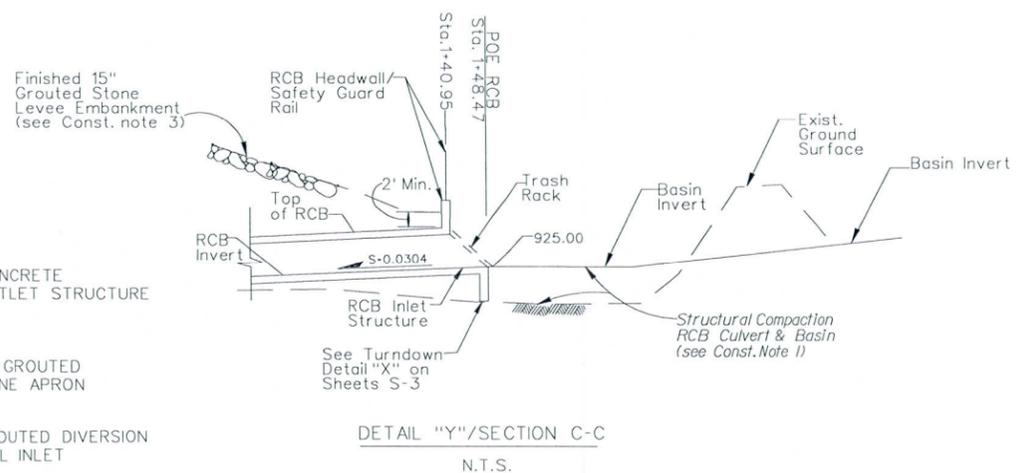
INLET STRUCTURE
N.T.S.



OUTLET STRUCTURE/APRON AND
DIVERSION CHANNEL
N.T.S.



SECTION B-B
N.T.S.



DETAIL "Y" / SECTION C-C
N.T.S.

NOTES:

- 1. 15" Grouted Stone on the face of levee is not shown on the plan for RCB culvert

CONSTRUCTION NOTES:

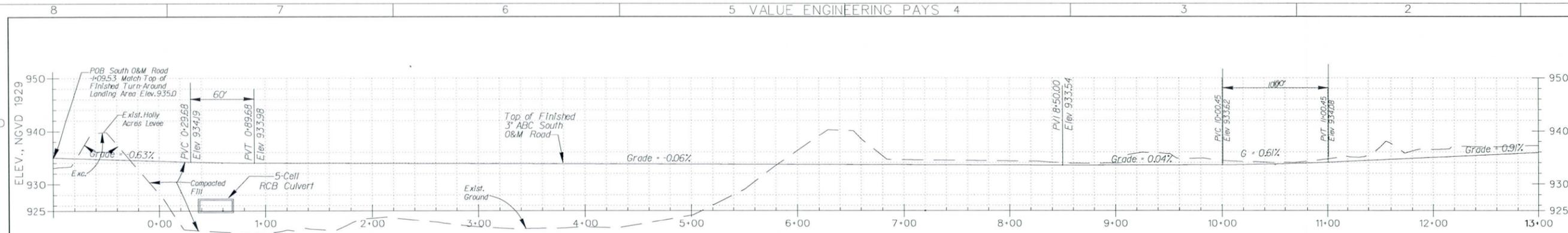
1. STRUCTURAL COMPACTION IS REQUIRED FOR THE RCB CULVERT. COMPACTED FILL HEIGHT RANGES FROM ABOUT 4 FT. FOR THE UPSTREAM END OF THE RCB CULVERT TO INCHES FOR THE DOWN STREAM END.
2. INSTALL 27" GROUTED STONE FOR THE OUTLET STRUCTURE APRON AND A 40FT. SECTION OF THE DIVERSION CHANNEL. THIS MAY REQUIRE EXCAVATION AS WELL AS COMPACTED FILL OF THE EXISTING GROUND SURFACE TO OBTAIN A DESIRABLE GRADE AND DEPTH SPECIFIED ON THE DRAWING.
3. INSTALL 15" GROUTED STONE ON THE FACE OF THE LEVEE RIVERSIDE SLOPE EXTENDING FROM TOP TO TOE OF LEVEE SLOPE AND COVERING ENTIRE WIDTH OF THE RCB CULVERT.

AS-BUILT
PLATE 20



DESIGNED BY: D.P.	DESIGNED BY: D.P.	DESIGNED BY: D.P.	DESIGNED BY: D.P.
DRAWN BY: D.P.	DRAWN BY: D.P.	DRAWN BY: D.P.	DRAWN BY: D.P.
CHECKED BY: P.J.	CHECKED BY: P.J.	CHECKED BY: P.J.	CHECKED BY: P.J.
FILE NAME: ERCB20.dgn	FILE NAME: ERCB20.dgn	FILE NAME: ERCB20.dgn	FILE NAME: ERCB20.dgn
DISTRICT FILE NO. 203/423			
U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS			
THOMAS H. SAGE, P.E. CHIEF DESIGNER			
DATE: 8/10/07	DATE: 8/10/07	DATE: 8/10/07	DATE: 8/10/07
APPROVAL:	APPROVAL:	APPROVAL:	APPROVAL:
SYMBOL	SYMBOL	SYMBOL	SYMBOL
DESCRIPTIONS	DESCRIPTIONS	DESCRIPTIONS	DESCRIPTIONS
REVISIONS	REVISIONS	REVISIONS	REVISIONS

TRES RIOS RIVER, MARICOPA COUNTY, ARIZONA
ENVIRONMENTAL RESTORATION
FLOOD CONTROL NORTH LEVEE
PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE)
EL MIRAGE ROAD RCB CULVERT
PLAN, PROFILE, SECTION AND DETAILS



SOUTH O&M ROAD CENTERLINE PROFILE

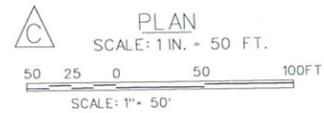
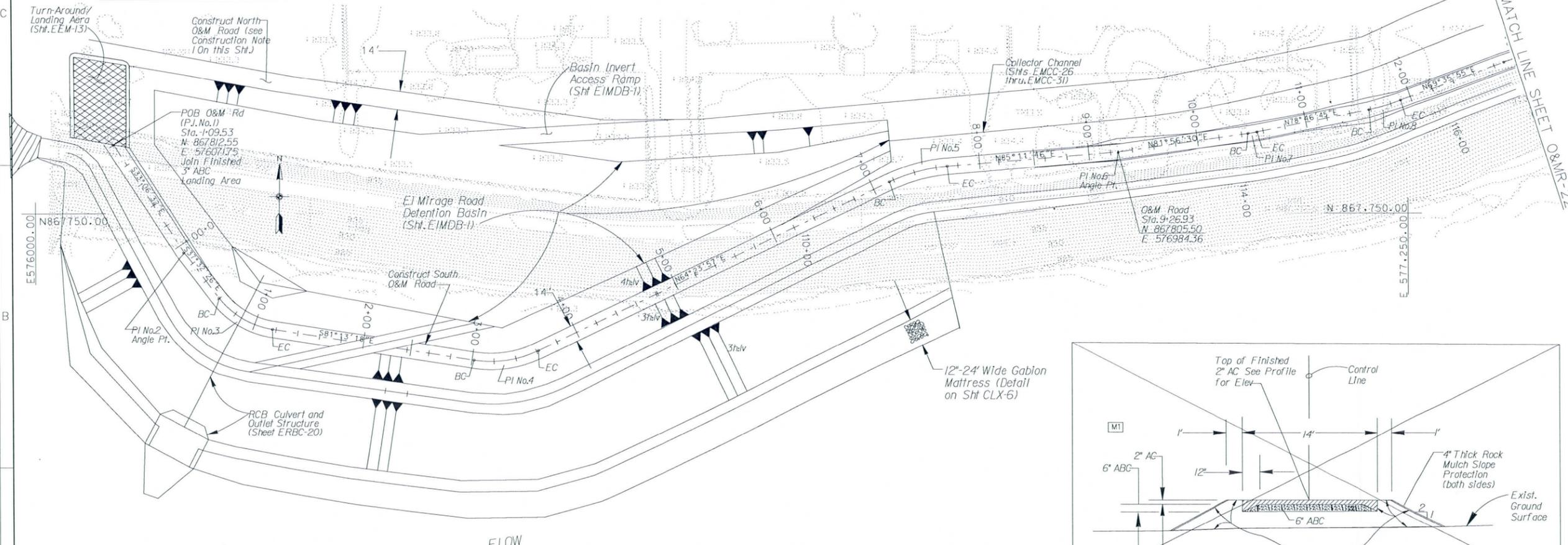
SOUTH O&M ROAD CENTER LINE HORIZ. CONTROL POINTS & CURVE DATA

P.I. NO.	NORTHING	EASTING	Δ°	R(FT.)	T(FT.)	L(FT.)	B.C. Sta	E.C. Sta
1 (POB)	867,812.55	576,071.75	N/A	N/A	N/A	N/A	POB Sta. 0+00.00	
2 (Angle Pt.)	867,714.62	576,135.61	N/A	N/A	N/A	N/A	P.I. Sta. 0+07.38	
3	867,649.32	576,185.79	43° 40' 52" Lt	75.00	30.06	57.18	0+59.68	1+16.86
4	867,611.79	576,428.83	34° 22' 45" Lt	100.00	30.94	60.00	3+01.79	3+61.79

VERT. SCALE: 1" = 10'
HORIZ. SCALE: 1" = 50'

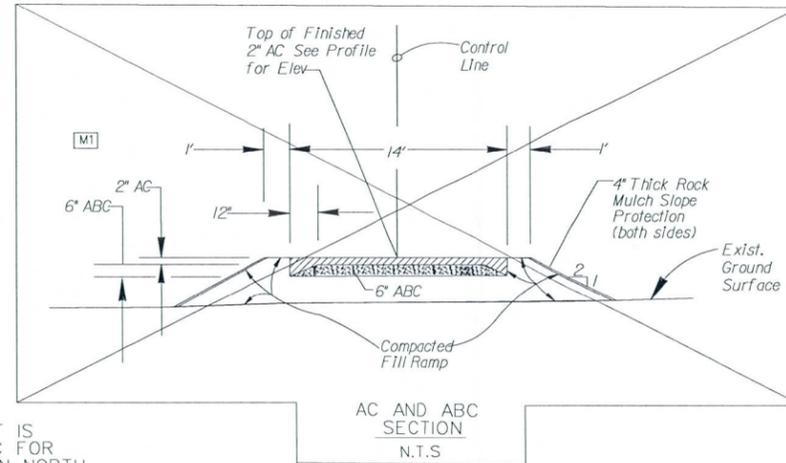
SOUTH O&M ROAD CENTER LINE HORIZ. CONTROL POINT & CURVE DATA

P.I. NO.	NORTHING	EASTING	Δ°	R(FT.)	T(FT.)	L(FT.)	B.C. Sta	E.C. Sta
5	867,790.09	576,800.96	Angle Point	N/A	N/A	N/A	P.I. Sta. 7+43.49	
6	867,805.50	576,984.36	Angle Point	N/A	N/A	N/A	P.I. Sta. 9+26.93	
7	867,822.79	577,106.48	3° 09' 45" Lt	150.00	4.14	8.28	10+46.13	10+54.41
8	867,846.93	577,228.18	9° 10' 49" Lt	200.00	16.06	32.05	11+58.28	11+90.33



CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL LAYOUT AND CONSTRUCT THE NORTH O&M ROAD THAT IS PARALLEL TO THE PROPOSED FOUR-WIRE R/W FENCE. TOP OF FINISHED 3" ABC FOR NORTH O&M ROAD SHALL BE SET AT ELEV. 935.00 ALONG THE DETENTION BASIN NORTH SIDE ONLY.



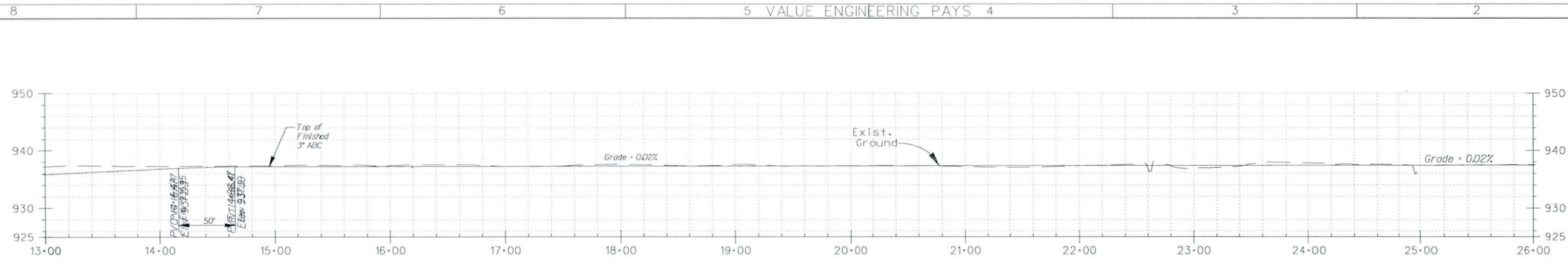
AS-BUILT
PLATE 21



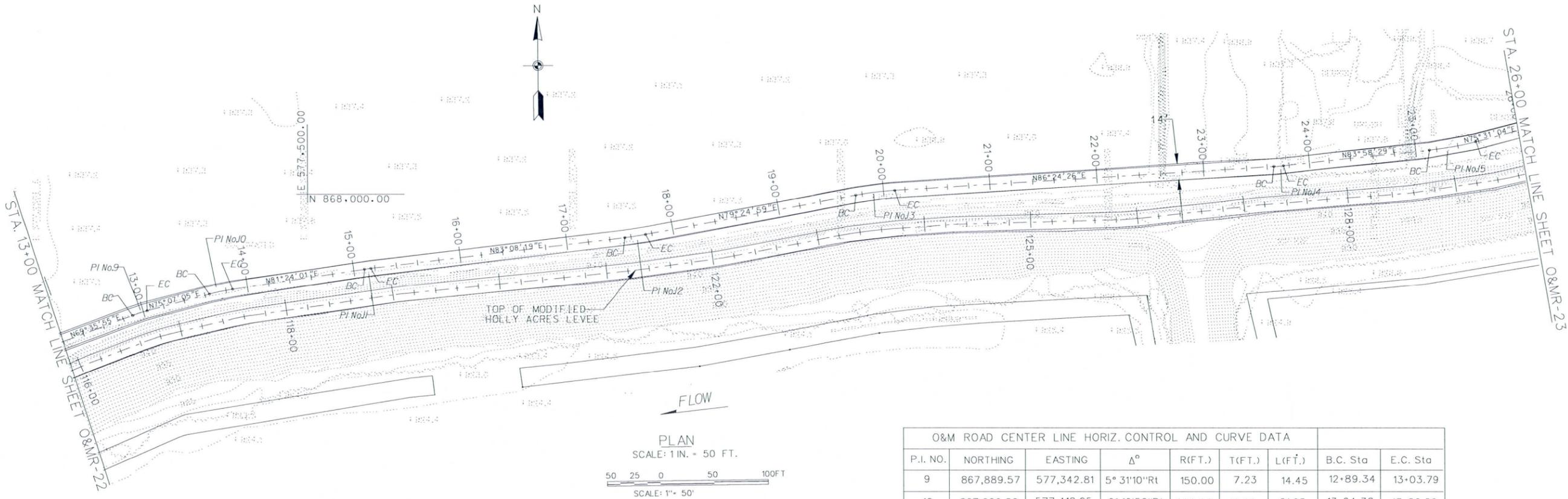
DATE	DESCRIPTIONS	APPROVAL
9/10/07	Deleted AC and ABC Section	P.W.U.
9/11/07	Deleted O&M Rd. 0+00.00 to 9+26.93 and Replaced with New O&M Road	P.W.U.
1-09-53 to 9-26-93		

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
ENVIRONMENTAL RESTORATION
FLOOD CONTROL NORTH LEVEE
PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE)
EL MIRAGE ROAD O&M ROAD
PLAN AND PROFILE STA. 1+09.53 TO STA. 13+00
AC AND ABC SECTIONS

DESIGNED BY: D.P.	FILE NAME: O&M21.DGN
DRAWN BY: D.P.	
CHECKED BY: P.J.	
U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	
THOMAS H. SAGE, P.E. CHIEF, DESIGN BRANCH	
SPEC. NO. W912PL-075-B-0003	
DISTRICT FILE NO. 203/424	
SUBMITTED BY:	
SHEET	
SCALE:	



O&M ROAD CENTER LINE PROFILE
 VERT. SCALE: 1" = 10'
 HORIZ. SCALE: 1" = 50'

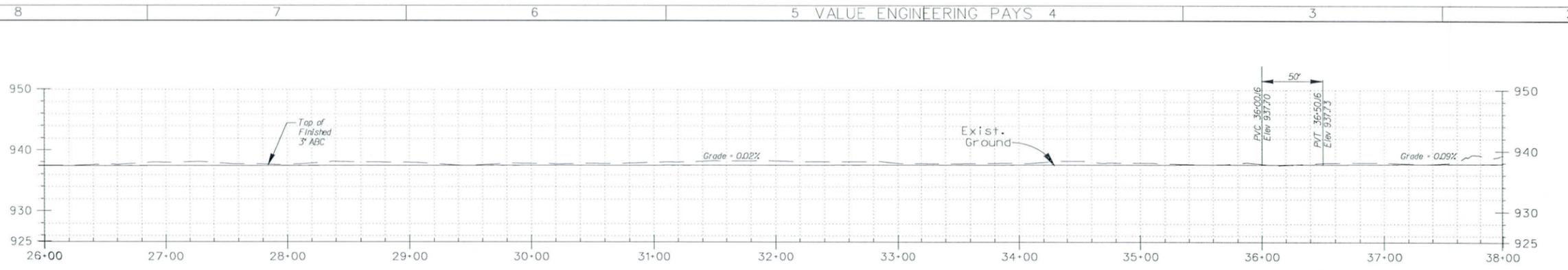


O&M ROAD CENTER LINE HORIZ. CONTROL AND CURVE DATA								
P.I. NO.	NORTHING	EASTING	Δ°	R(FT.)	T(FT.)	L(FT.)	B.C. Sta	E.C. Sta
9	867,889.57	577,342.81	5° 31'10"Rt	150.00	7.23	14.45	12+89.34	13+03.79
10	867,909.80	577,418.95	6° 16'56"Rt	200.00	10.98	21.93	13+64.36	13+86.29
11	867,930.43	577,555.36	1° 14'18"Rt	200.00	3.03	6.07	15+10.25	15+16.31
12	867,960.42	577,804.60	3° 43'20"Lt	300.00	9.75	19.49	17+54.57	17+74.06
13	868,002.28	578,028.63	6° 59'27"Rt	300.00	18.32	36.60	19+73.90	20+10.50
14	868,025.98	578,406.07	2° 25'07"Lt	200.00	4.25	8.49	23+66.11	23+74.60
15	868,043.26	578,569.75	8° 27'25"Lt	300.00	22.18	44.28	25+12.77	25+57.05

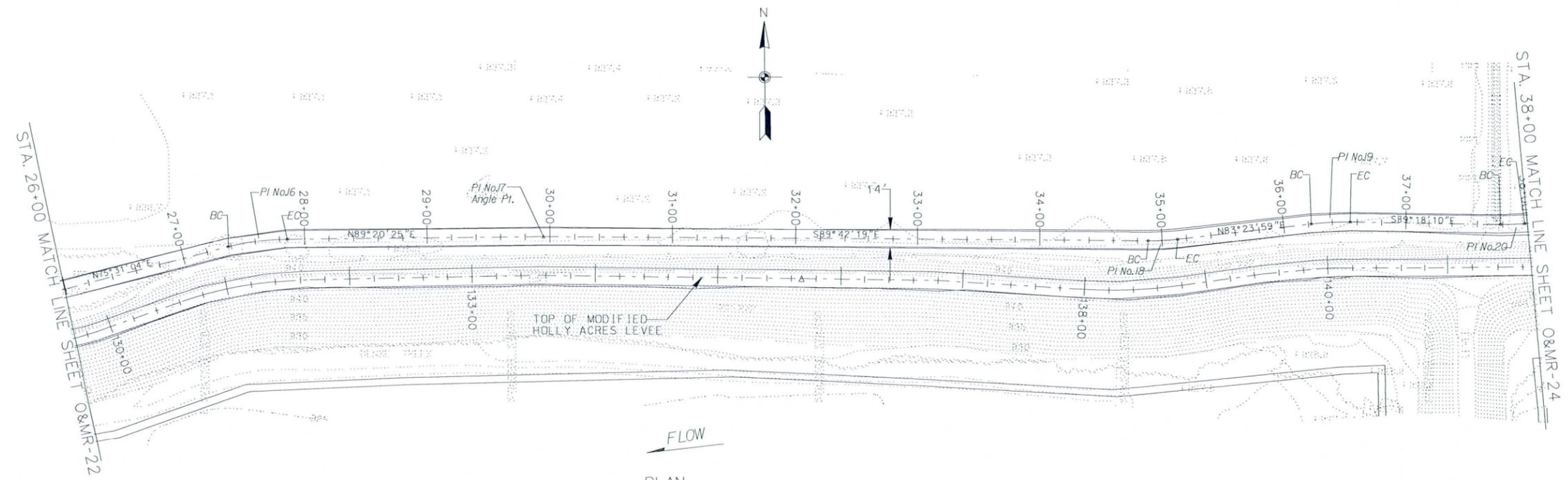
AS-BUILT
 PLATE 22



SCALE:	SHEET:	SUBMITTED BY:	DESIGNED BY:	DRAWN BY:	CHECKED BY:	REVISIONS	
						SYMBOL	DESCRIPTIONS
50:1	O&M-22	THOMAS H. SAGE, P.E. CHIEF DESIGN BRANCH	U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	LOS ANGELES CORPS OF ENGINEERS			
DISTRICT FILE NO. 203/425			SPEC. NO. W97P1-075-B-0003			FILE NAME: O&M22.DGN	
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE) EL MIRAGE ROAD O&M ROAD PLAN AND PROFILE STA. 13+00 TO STA. 26+00							



DRYSIDE O&M ROAD CENTER LINE PROFILE
 VERT. SCALE: 1" = 10'
 HORIZ. SCALE: 1" = 50'



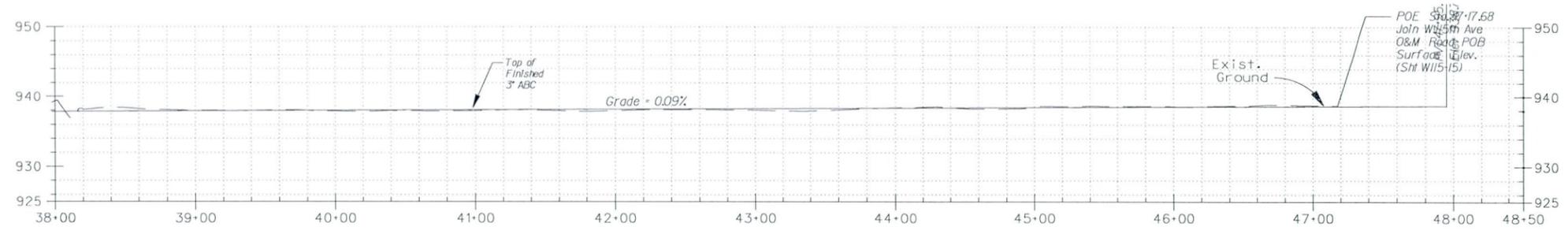
PLAN
 SCALE: 1 IN. = 50 FT.
 SCALE: 1" = 50'

O&M ROAD CENTER LINE HORIZ. CONTROL AND CURVE DATA								
P.I. NO.	NORTHING	EASTING	Δ°	R(FT.)	T(FT.)	L(FT.)	B.C. Sta	E.C. Sta
16	868,100.06	578,545.05	10° 28'47" Lt	250.00	22.93	45.73	25+94.73	26+40.46
17	868,113.47	578,792.28	14° 59'29" Rt	250.00	32.89	65.41	28+16.72	28+82.13
18	868,111.15	579,527.88	8° 30'14" Lt	250.00	18.59	37.11	35+66.25	36+03.35
19	868,133.67	579,681.87	9° 50'15" Rt	250.00	21.52	42.92	37+18.88	37+61.80
20	868,133.67	579,681.87	9° 50'15" Rt	250.00	21.52	42.92	37+18.88	37+61.80

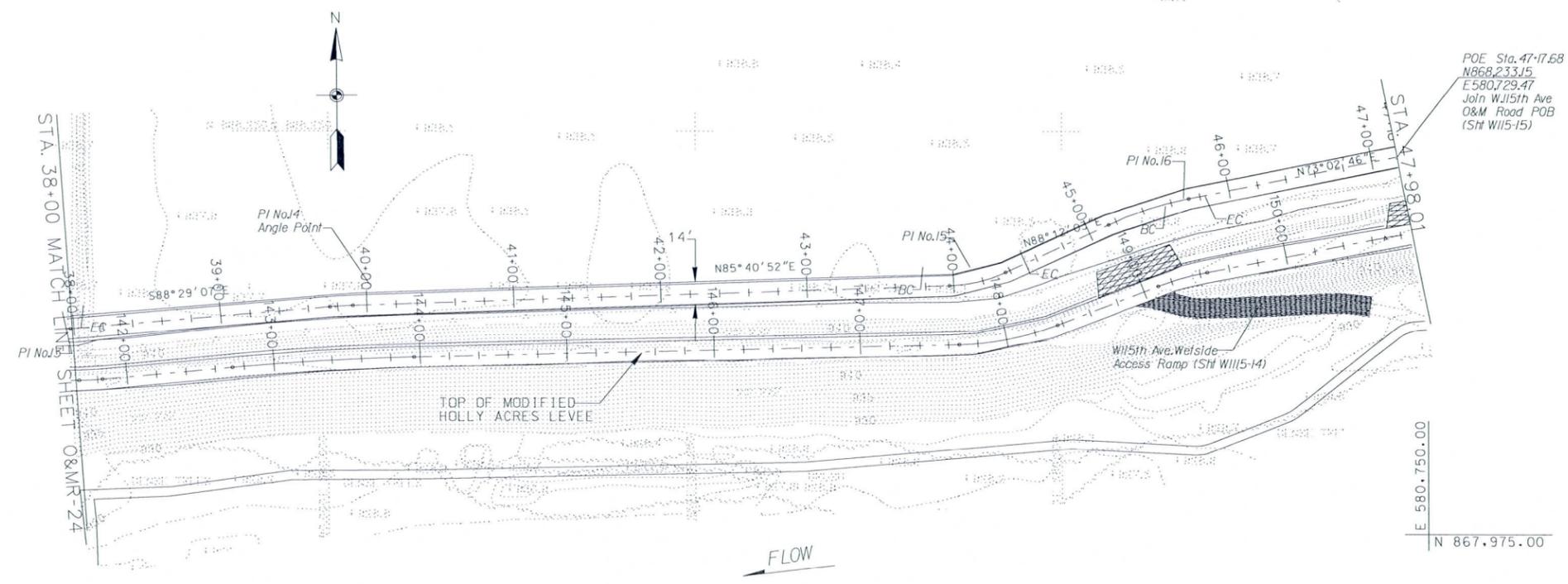
AS-BUILT
 PLATE 23



SCALE: 501	SHEET O&M-23	DESIGNED BY: D.P.		FILE NAME: O&M23.DGN	
		DRAWN BY: D.P.			
SUBMITTED BY: THOMAS H. SAGE, P.E. CHIEF, DESIGN BRANCH		CHECKED BY: P.U.		DISTRICT FILE NO. 203/428	
SPEC. NO. W97PL-075-B-0003					
U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS		TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE) EL MIRAGE ROAD O&M ROAD PLAN AND PROFILE STA. 26+00 TO STA. 38+00			
REVISIONS		SYMBOL	DESCRIPTIONS	DATE	APPROVAL



DRYSIDE O&M ROAD CENTER LINE PROFILE
 VERT. SCALE: 1" = 10'
 HORIZ. SCALE: 1" = 50'



PLAN
 SCALE: 1 IN. = 50 FT.
 SCALE: 1" = 50'

O&M ROAD CENTER LINE HORIZ. CONTROL AND CURVE DATA								
P.I. NO.	NORTHING	EASTING	Δ°	R(FT.)	T(FT.)	L(FT.)	B.C. Sta	E.C. Sta
21	868,198.55	580,008.94	2° 57' 54" Rt	300.00	7.76	15.52	39+74.84	39+90.37
22	868,145.45	580,443.32	22° 49' 41" Lt	100.00	20.19	39.84	43+97.04	44+36.89
23	868,198.55	580,558.44	13° 19' 46" Rt	250.00	29.21	58.16	45+14.26	45+72.42

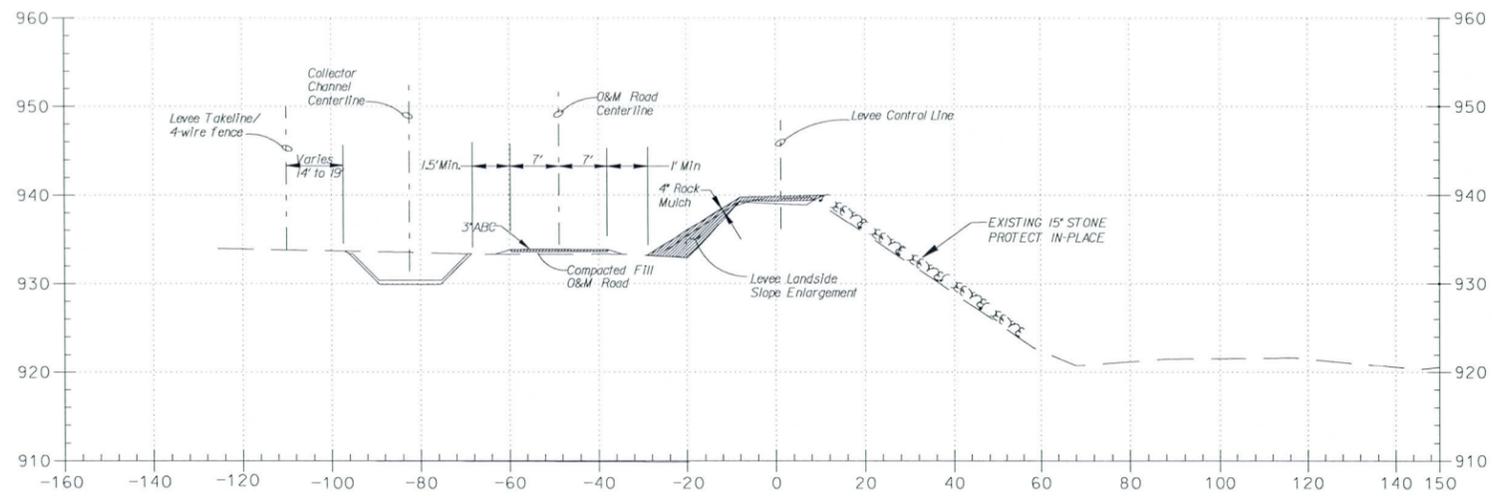
REVISIONS		
SYMBOL	DESCRIPTIONS	DATE

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 'B' (EL MIRAGE ROAD TO 115TH AVENUE)
 EL MIRAGE ROAD O&M ROAD
 PLAN AND PROFILE
 STA. 38+00 TO STA. 47+17.68

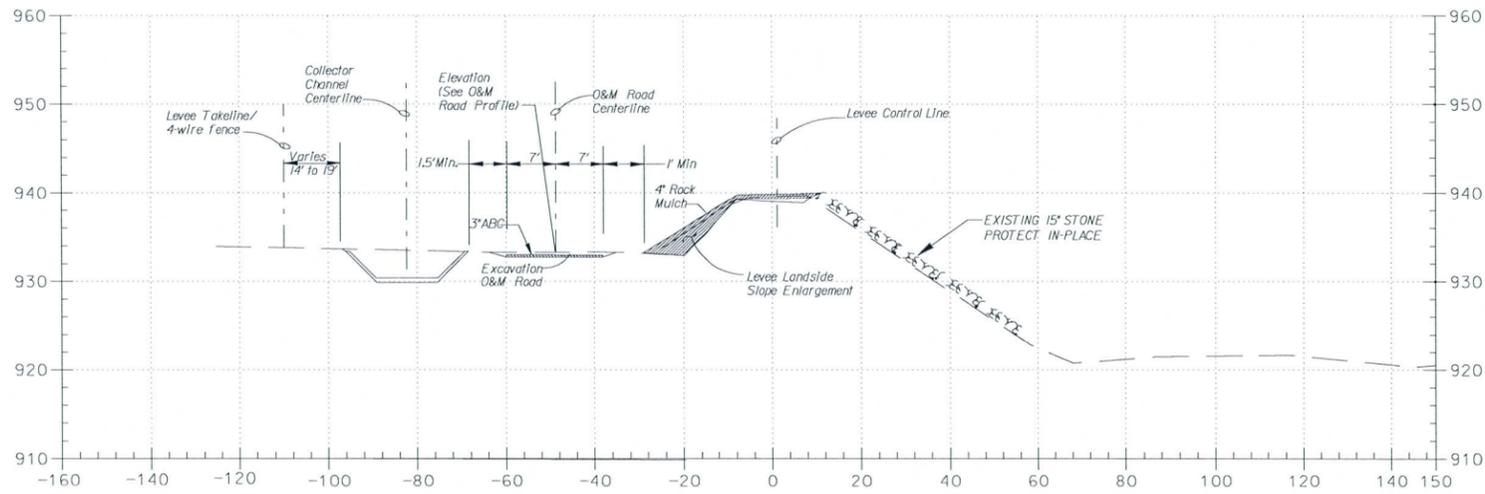
DESIGNED BY: D.P.	FILE NAME: O&M24.DGN
DRAWN BY: D.P.	
CHECKED BY: P.U.	
U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	
THOMAS H. SAGE, P.E. CHIEF, DESIGN BRANCH	
SUBMITTED BY:	
DISTRICT FILE NO. 203/427	
SPEC. NO. W913P-075-B-0003	

AS-BUILT
 PLATE 24





▲ TYPICAL CROSS SECTION
IN FILL AREA
N.T.S.



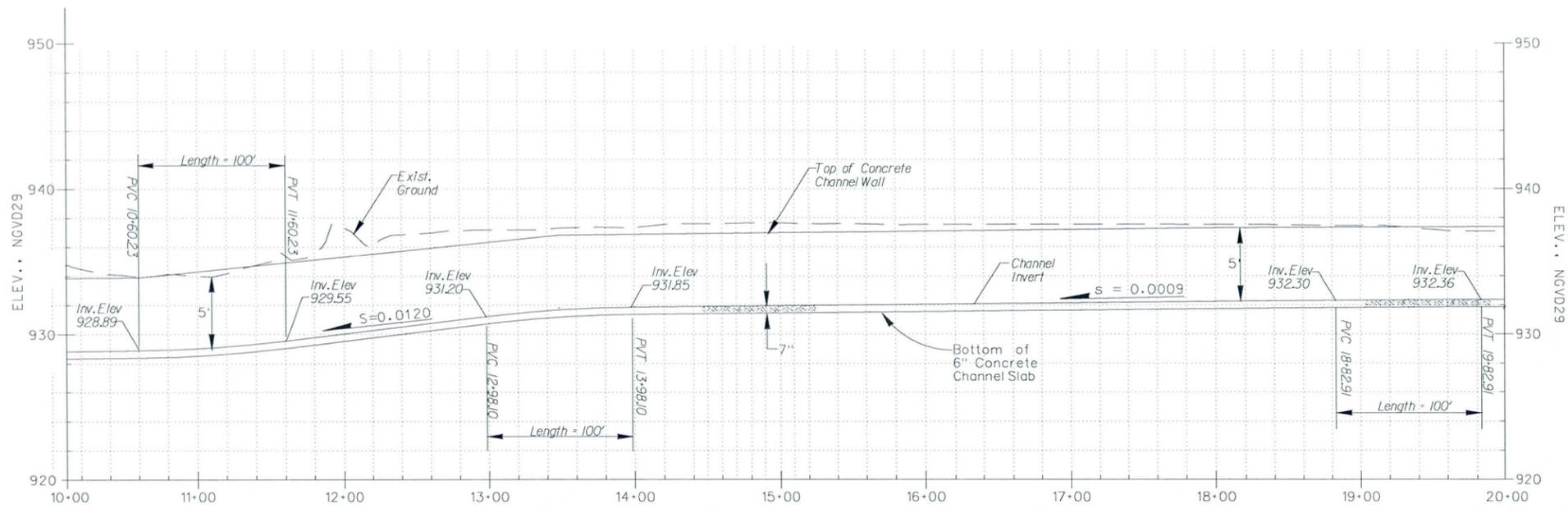
▲ TYPICAL CROSS SECTION
IN CUT AREA
N.T.S.

NOTES:

CROSS SECTIONS ARE DRAWN LOOKING UPSTREAM IN THE DIRECTION OF ADVACING STATION

AS-BUILT
PLATE 25

SCALE:	20:1	DESIGNED BY:	U.S. ARMY ENGINEER DISTRICT LOS ANGELES	7/10/07	P.W.U.
SHEET:	X8ret-25	CHECKED BY:	CORPS OF ENGINEERS	Revised Typical Sections	
SUBMITTED BY:	THOMAS H. SAGE, P.E. CHIEF, DESIGN BRANCH	FILE NAME:	X8ret125.DGN	SYMBOL	APPROVAL
DISTRICT FILE NO. 203/428	SPEC. NO. W92PL-075-B-0003	TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE) EL MIRAGE ROAD O&M ROAD		DESCRIPTIONS	DATE
TYPICAL CROSS SECTIONS				REVISIONS	

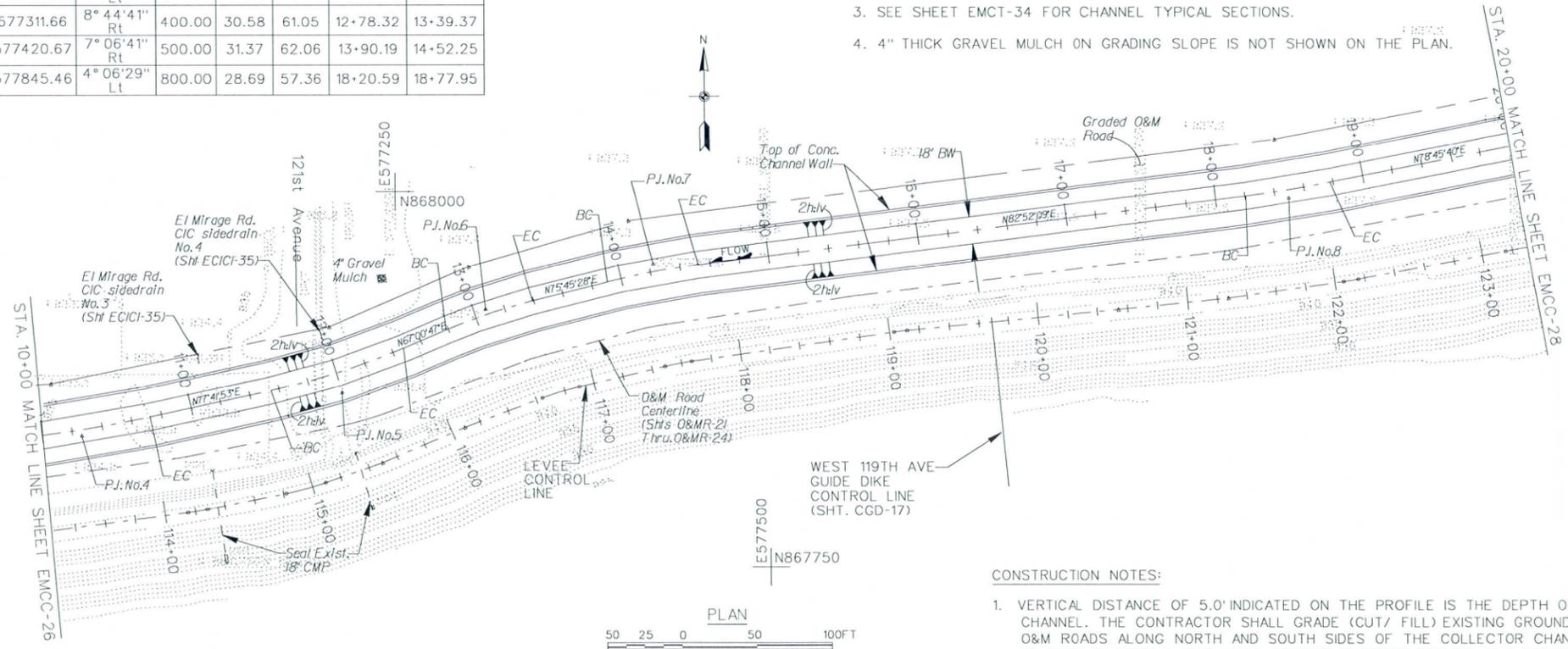


△ C PROFILE
 VERT. SCALE: 1in = 5ft
 HORIZ. SCALE: 1in = 50ft

CHANNEL \bar{C} HORIZONTAL CONTROL CURVE DATA								
P.I. No.	NORTHING	EASTING	Δ°	R(Ft)	T(Ft)	L(Ft)	B.C. STA.	E.C. STA.
4	867839.73	577038.78	6° 59' 58" LT	800.00	48.93	97.73	9+74.85	10+72.58
5	867877.57	577212.30	10° 41' 05" LT	500.00	46.76	93.24	11+54.49	12+47.73
6	867919.72	577311.66	8° 44' 41" RT	400.00	30.58	61.05	12+78.32	13+39.37
7	867947.39	577420.67	7° 06' 41" RT	500.00	31.37	62.06	13+90.19	14+52.25
8	868000.53	577845.46	4° 06' 29" LT	800.00	28.69	57.36	18+20.59	18+77.95

NOTES:

- SEE SHEET CMCX-32 FOR CROSS SECTIONS.
- SEE SHEET 5 FOR UTILITY RELOCATIONS/REMOVAL LIMITS.
- SEE SHEET EMCT-34 FOR CHANNEL TYPICAL SECTIONS.
- 4" THICK GRAVEL MULCH ON GRADING SLOPE IS NOT SHOWN ON THE PLAN.



PLAN
 SCALE: 1" = 50'

CONSTRUCTION NOTES:

- VERTICAL DISTANCE OF 5.0' INDICATED ON THE PROFILE IS THE DEPTH OF THE CONCRETE CHANNEL. THE CONTRACTOR SHALL GRADE (CUT/ FILL) EXISTING GROUND SURFACE FOR BOTH O&M ROADS ALONG NORTH AND SOUTH SIDES OF THE COLLECTOR CHANNEL. GRADING SHALL BE DONE IN SUCH A WAY THAT POSITIVE SLOPE(S) TOWARD THE COLLECTOR CHANNEL SHALL BE ACHIEVED. FINISHED GRADED GROUND SURFACE SHALL BE SURFACED WITH 3" ABC ROCK MULCH FOR THE O&M ROAD ALONG THE SOUTH SIDE OF THE CHANNEL.

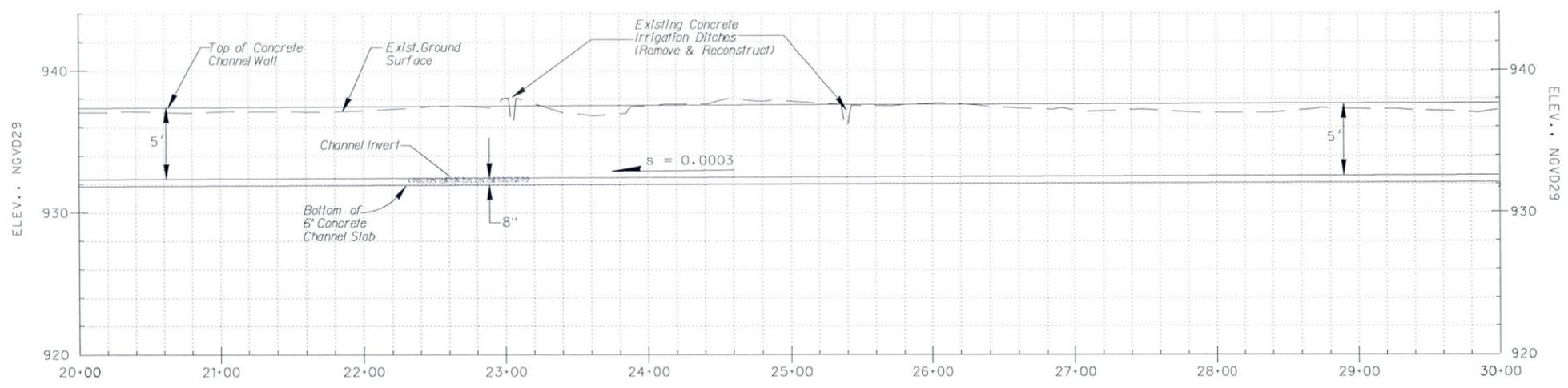
SYMBOL	DESCRIPTIONS	DATE	APPROVAL
△	Changed Channel Wall and Invert slab thickness from 6" to 8"	8-12-07	P.W.U.

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 1B (EL MIRAGE ROAD TO 115TH AVE.)
 EL MIRAGE ROAD COLLECTOR CHANNEL
 PLAN AND PROFILE
 STA. 10+00 TO STA. 20+00

DESIGNED BY: J.Y.	U.S. ARMY ENGINEER DISTRICT	FILE NAME: EMC27.DGN
DRAWN BY: J.Y./D.P.	LOS ANGELES	
CHECKED BY: D.P.	CORPS OF ENGINEERS	
SUBMITTED BY: THOMAS H. SAGE, P.E.	CHIEF, DESIGN BRANCH	
DISTRICT FILE NO. 2037/430		
SPEC. NO. W912P-07-B-0003		

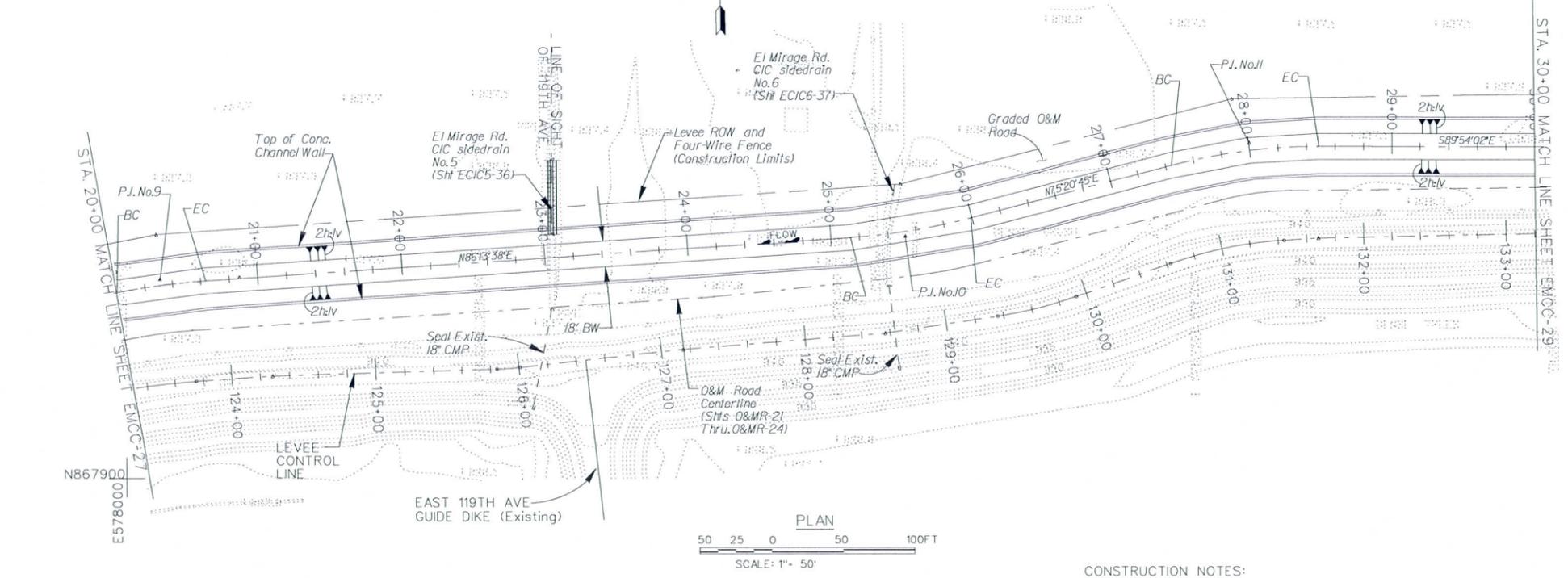
AS-BUILT
 PLATE 27





P.I. No.	NORTHING	EASTING	Δ°	R(Ft)	T(Ft)	L(Ft)	B.C. STA.	E.C. STA.
9	868035.99	578023.90	7° 27' 58" Rt	500.00	32.62	65.16	19+98.56	20+31.18
10	868070.57	578548.33	10° 52' 53" Lt	450.00	42.86	85.46	25+13.80	25+99.26
11	868131.35	578780.78	14° 45' 13" Rt	400.00	51.79	103.00	27+44.88	28+47.88

Q_c PROFILE
 VERT. SCALE: 1in = 5ft
 HORIZ. SCALE: 1in = 50ft



NOTES:

1. SEE SHEET CMCX-32 FOR CROSS SECTIONS.
2. SEE SHEET 5 FOR UTILITY RELOCATIONS/REMOVAL LIMITS.
3. SEE SHEET EMCT-34 FOR CHANNEL TYPICAL SECTIONS.
4. 4" THICK GRAVEL MULCH ON GRADING SLOPE IS NOT SHOWN ON THE PLAN.

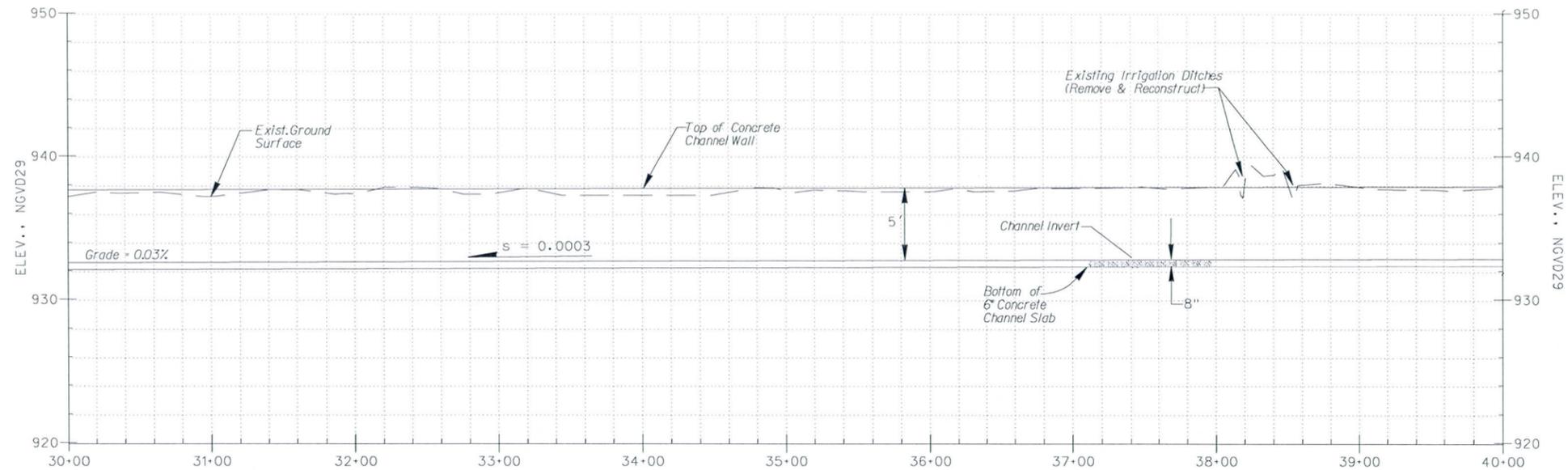
CONSTRUCTION NOTES:

1. VERTICAL DISTANCE OF 5.0' INDICATED ON THE PROFILE IS THE DEPTH OF THE CONCRETE CHANNEL. THE CONTRACTOR SHALL GRADE (CUT/ FILL) EXISTING GROUND SURFACE FOR BOTH O&M ROADS ALONG NORTH AND SOUTH SIDES OF THE COLLECTOR CHANNEL. GRADING SHALL BE DONE IN SUCH A WAY THAT POSITIVE SLOPE(S) TOWARD THE COLLECTOR CHANNEL SHALL BE ACHIEVED. FINISHED GRADED GROUND SURFACE SHALL BE SURFACED WITH 3" ABC ROCK MULCH FOR THE O&M ROAD ALONG THE SOUTH SIDE OF THE CHANNEL.

AS-BUILT
 PLATE 28
 602 263-1100
 Blue Stamp Center
 CALL COLLECT

SCALE:	DESIGNED BY:	FILE NAME:
90:1	U.S. ARMY ENGINEER DISTRICT	EMCC28.DGN
SHEET:	DRAWN BY:	
EMCC-28	LOS ANGELES	
	CORPS OF ENGINEERS	
	CHECKED BY:	
	THOMAS H. SAGE, P.E.	
	CHIEF, DESIGN BRANCH	
	SPEC. NO. W912P-07-B-0003	
	DISTRICT FILE NO. 203/431	
	REVISIONS	
	SYMBOL	DESCRIPTIONS
△	Changed Channel Wall and Invert slab thickness from 6" to 8"	DATE
	P.W.U.	APPROVAL
	8-12-07	

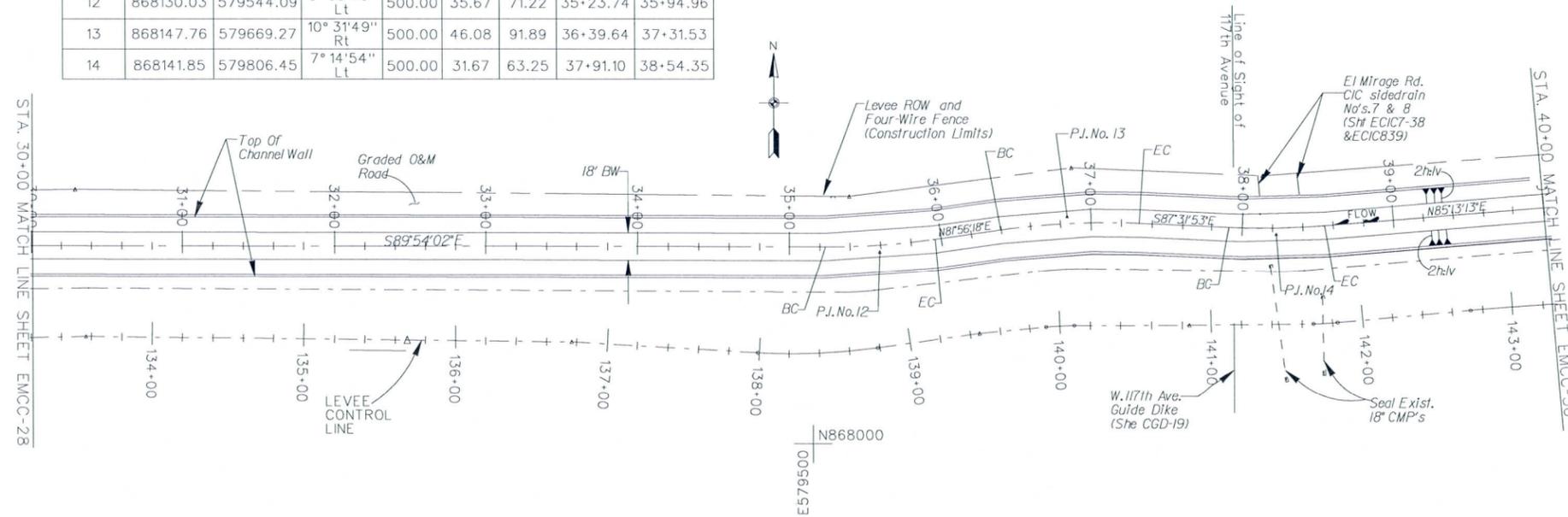
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 1B (EL MIRAGE ROAD TO 115TH AVE.)
 EL MIRAGE ROAD COLLECTOR CHANNEL
 PLAN AND PROFILE
 STA. 20+00 TO STA. 30+00



CHANNEL Q HORIZONTAL CONTROL CURVE DATA

P.I. No.	NORTHING	EASTING	Δ°	R(Ft)	T(Ft)	L(Ft)	B.C. STA.	E.C. STA.
12	868130.03	579544.09	8° 09' 40" Lt	500.00	35.67	71.22	35+23.74	35+94.96
13	868147.76	579669.27	10° 31' 49" Rt	500.00	46.08	91.89	36+39.64	37+31.53
14	868141.85	579806.45	7° 14' 54" Lt	500.00	31.67	63.25	37+91.10	38+54.35

Q PROFILE
 VERT. SCALE: 1in = 5ft
 HORIZ. SCALE: 1in = 50ft



NOTES:

- SEE SHEET CMCX-32 FOR CROSS SECTIONS.
- SEE SHEET 5 FOR UTILITY RELOCATIONS/REMOVAL LIMITS.
- SEE SHEET EMCT-34 FOR CHANNEL TYPICAL SECTIONS.
- 4" THICK GRAVEL MULCH ON GRADING SLOPE IS NOT SHOWN ON THE PLAN.



CONSTRUCTION NOTES:

- VERTICAL DISTANCE OF 5.0' INDICATED ON THE PROFILE IS THE DEPTH OF THE CONCRETE CHANNEL. THE CONTRACTOR SHALL GRADE (CUT/ FILL) EXISTING GROUND SURFACE FOR BOTH O&M ROADS ALONG NORTH AND SOUTH SIDES OF THE COLLECTOR CHANNEL. GRADING SHALL BE DONE IN SUCH A WAY THAT POSITIVE SLOPE(S) TOWARD THE COLLECTOR CHANNEL SHALL BE ACHIEVED. FINISHED GRADED GROUND SURFACE SHALL BE SURFACED WITH 3" ABC ROCK MULCH FOR THE O&M ROAD ALONG THE SOUTH SIDE OF THE CHANNEL.

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 1B (EL MIRAGE ROAD TO 115TH AVE.)
 EL MIRAGE ROAD COLLECTOR CHANNEL
 PLAN AND PROFILE
 STA. 30+00 TO STA. 40+00

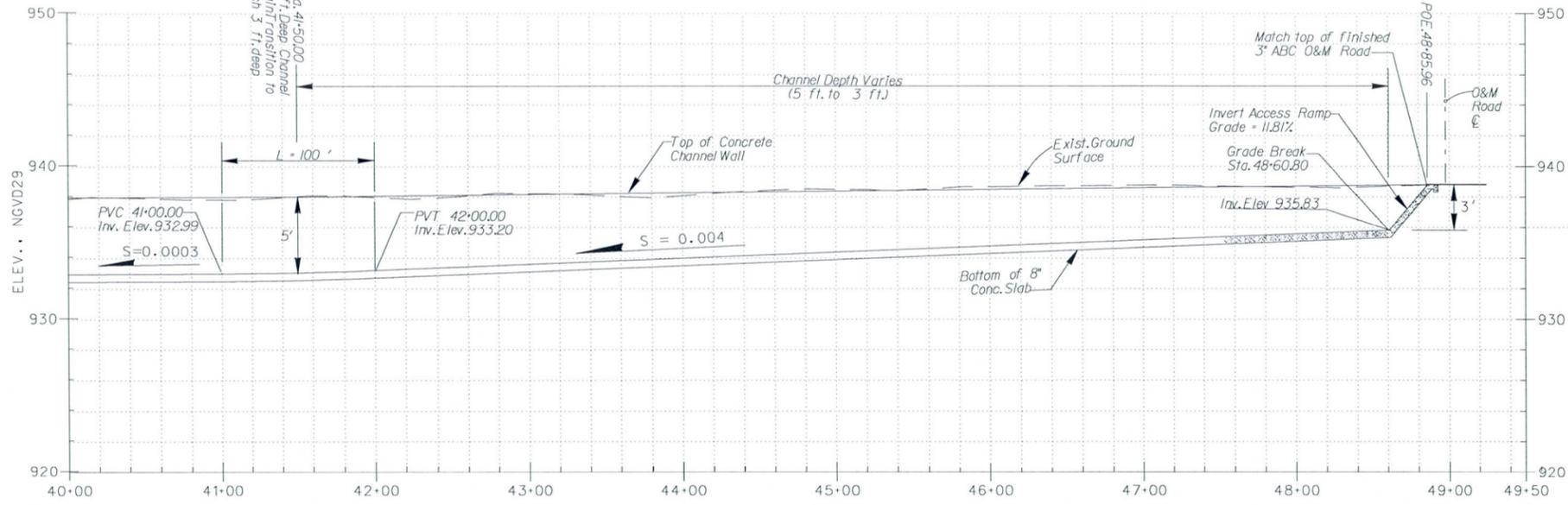
DESIGNED BY: J.V.	FILE NAME: EMC28.DGN
DRAWN BY: J.V./D.P.	
CHECKED BY: D.P.	
U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	
THOMAS H. SAGE, P.E. CHIEF DESIGN BRANCH	
SPEC. NO. W913P-07-B-0003	
DISTRICT FILE NO. 203/432	
SCALE: 50:1	
SHEET: EMC-28	
SHEETS:	

AS-BUILT
 PLATE 29



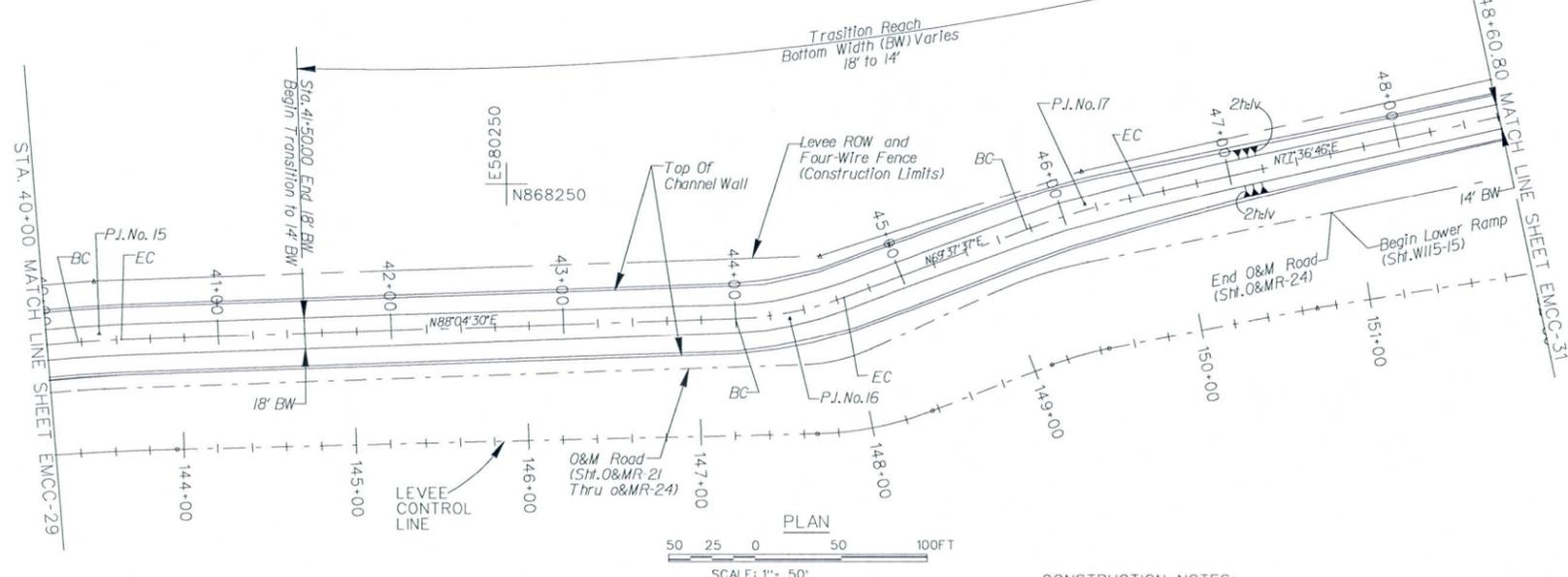
REVISIONS

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
△	Changed Channel Wall and Invert slab thickness from 6" to 8"	8-12-07	P.W.U.



Q PROFILE
 VERT. SCALE: 1in = 5ft
 HORIZ. SCALE: 1in = 50ft

CHANNEL Q HORIZONTAL CONTROL CURVE DATA								
P.I. No.	NORTHING	EASTING	Δ°	R(Ft)	T(Ft)	L(Ft)	B.C. STA.	E.C. STA.
15	868159.17	580013.57	2° 51'17" Rt	500.00	12.46	24.91	40+18.06	40+42.97
16	868172.67	580415.22	18° 26'52" Lt	200.00	32.48	64.40	43+99.92	44+64.31
17	868235.86	580585.38	7° 59'09" Rt	500.00	34.90	69.69	45+78.45	46+48.13



PLAN
 SCALE: 1" = 50'

NOTES:

- SEE SHEET CMX-32 FOR CROSS SECTIONS.
- SEE SHEET 5 FOR UTILITY RELOCATIONS/REMOVAL LIMITS.
- SEE SHEET EMCT-34 FOR CHANNEL TYPICAL SECTIONS.
- 4" THICK GRAVEL MULCH ON GRADING SLOPE IS NOT SHOWN ON THE PLAN.

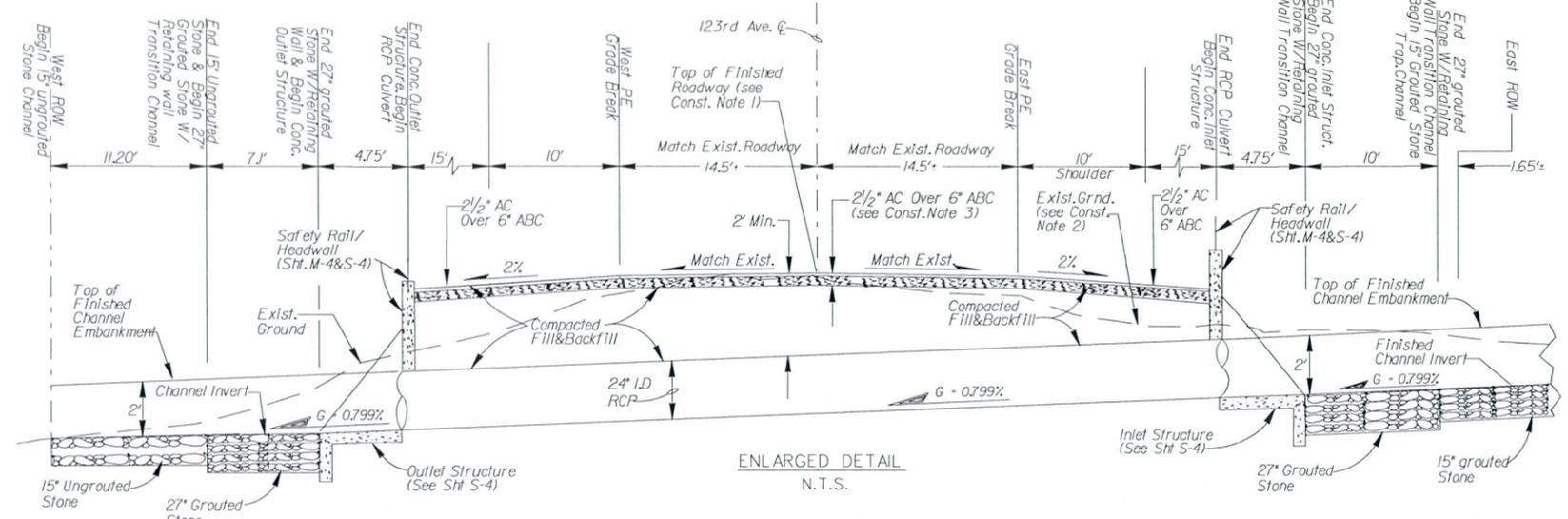
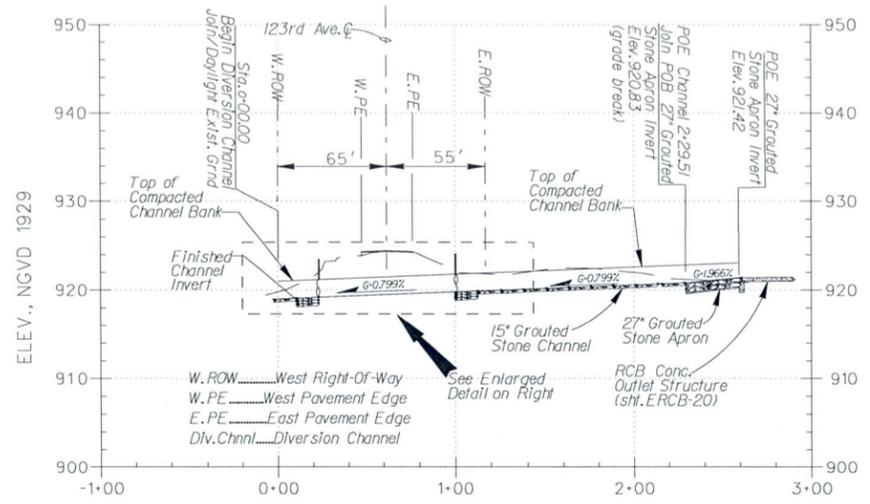
CONSTRUCTION NOTES:

- VERTICAL DISTANCE OF 5.0' INDICATED ON THE PROFILE IS THE DEPTH OF THE CONCRETE CHANNEL. THE CONTRACTOR SHALL GRADE (CUT/ FILL) EXISTING GROUND SURFACE FOR BOTH O&M ROADS ALONG NORTH AND SOUTH SIDES OF THE COLLECTOR CHANNEL. GRADING SHALL BE DONE IN SUCH A WAY THAT POSITIVE SLOPE(S) TOWARD THE COLLECTOR CHANNEL SHALL BE ACHIEVED. FINISHED GRADED GROUND SURFACE SHALL BE SURFACED WITH 3" ABC ROCK MULCH FOR THE O&M ROAD ALONG THE SOUTH SIDE OF THE CHANNEL.

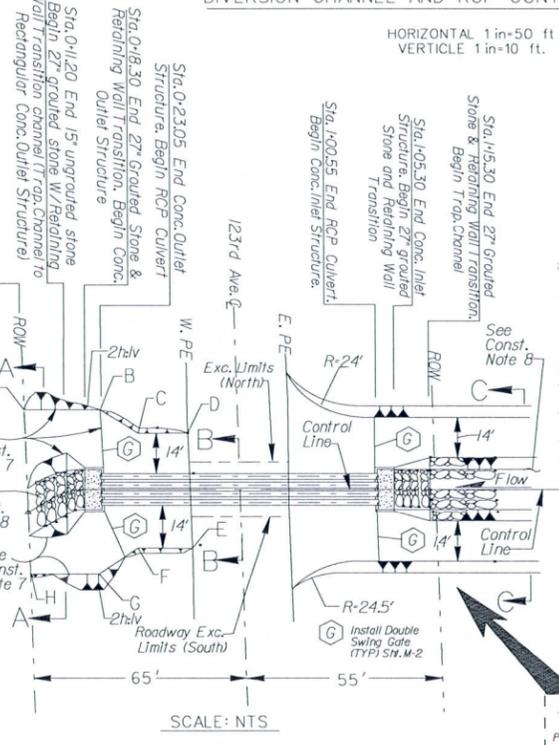
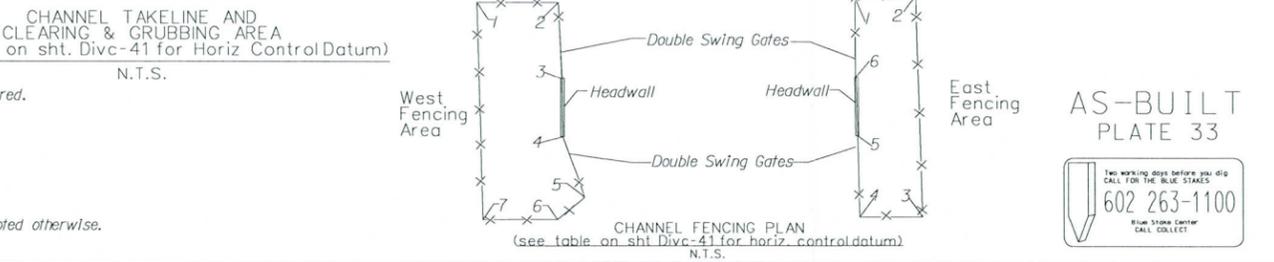
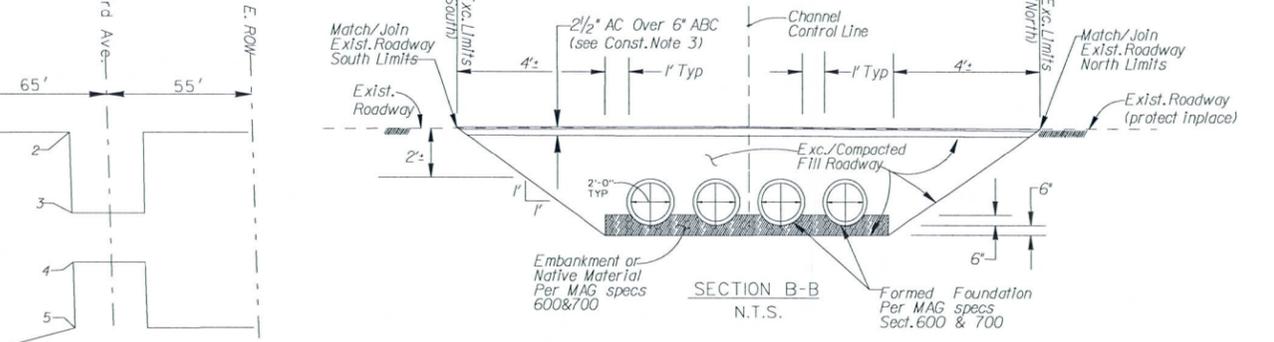
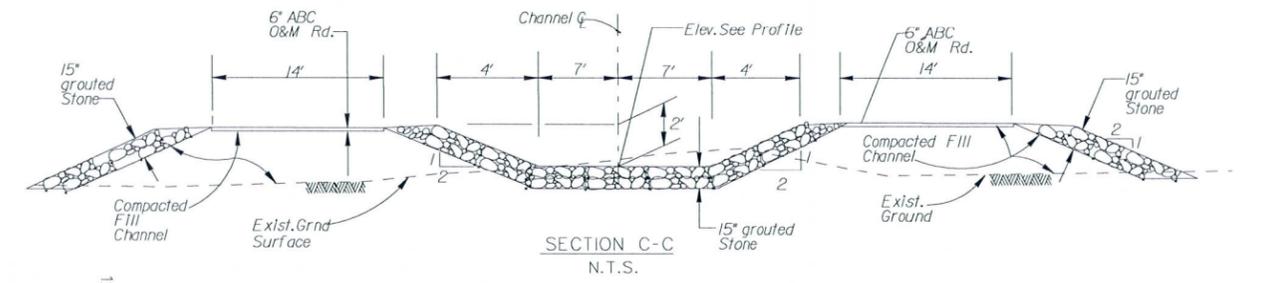
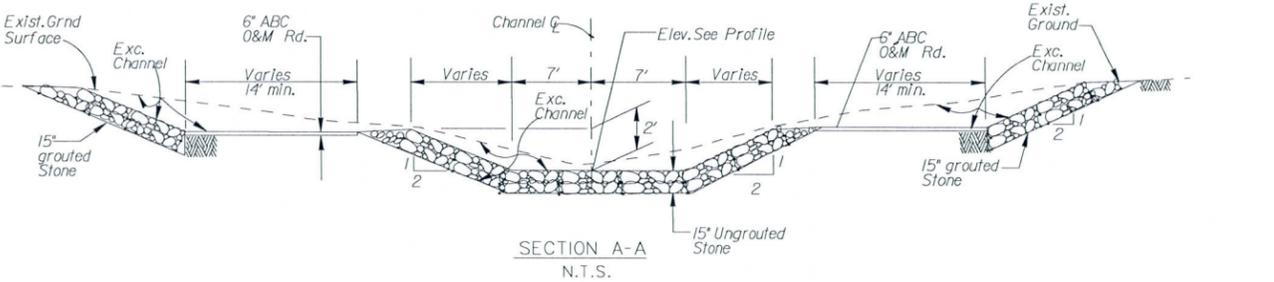
AS-BUILT
 PLATE 30



DESIGNED BY: J.V.	U.S. ARMY ENGINEER DISTRICT	LOS ANGELES
DRAWN BY: J.V./D.P.	CORPS OF ENGINEERS	
CHECKED BY: D.P.		
THOMAS H. SAGE, P.E.	CHIEF DESIGN BRANCH	
FILE NAME: EMC303D0N		
SPEC. NO. W92PL-07-B-0003		
DISTRICT FILE NO. 203/433		
DATE: 8-2-07	SYMBOL: Δ	DESCRIPTIONS: Deleted Channel Sta. 48+60.8 to 51+00
DATE: 8-2-07	SYMBOL: Δ	Changed Channel Depth from 4' to 5' and Wall and Invert slab thickness from 6" to 8"
REVISIONS		
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA		
ENVIRONMENTAL RESTORATION		
FLOOD CONTROL NORTH LEVEE		
PHASE 1B (EL MIRAGE ROAD TO 115TH AVE.)		
EL MIRAGE ROAD COLLECTOR CHANNEL		
PLAN AND PROFILE		
STA. 40+00 TO STA. 48+60.80		

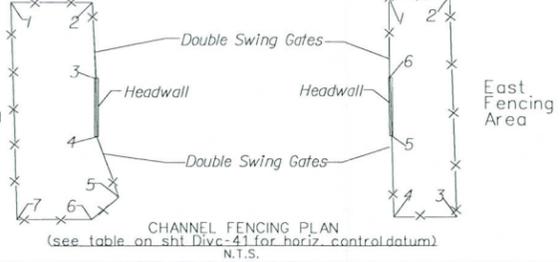


P.J. No.	NORTHING	EASTING	Δ	R(FT)	T(FT)	L(FT)	B.C.Sta.	E.C.Sta.
1	867484.75	575923.47	3.44°28'R	14.25	4.45	8.63	0+09.41	0+18.04
2	867484.75	575096.89	62°03'37\"/>					



P.I.	NORTHING	EASTING
A	867512.43	575911.11
B	867512.48	575932.62
C	867504.25	575943.39
D	867504.29	575957.28
E	867464.21	575958.49
F	867464.25	575943.25
G	867455.31	575932.25
H	867455.27	575912.66

- CONSTRUCTION NOTES:**
- Elevation of top of finished 123rd Avenue shall match the existing roadway elevation. This applies to every point along the roadway cross section.
 - Exist. ground surface shown does not represent the current ground condition, especially the one on the east side of the 123rd Avenue where compacted fill channel will be required.
 - Minimum Pavement Replacement with 2-1/2\"/>



AS-BUILT
PLATE 33
602 263-1100
Blue Stone Center
CALL COLLECT

DESIGNED BY: D.P.
DRAWN BY: D.P.
CHECKED BY: P.U.
CORPS OF ENGINEERS

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

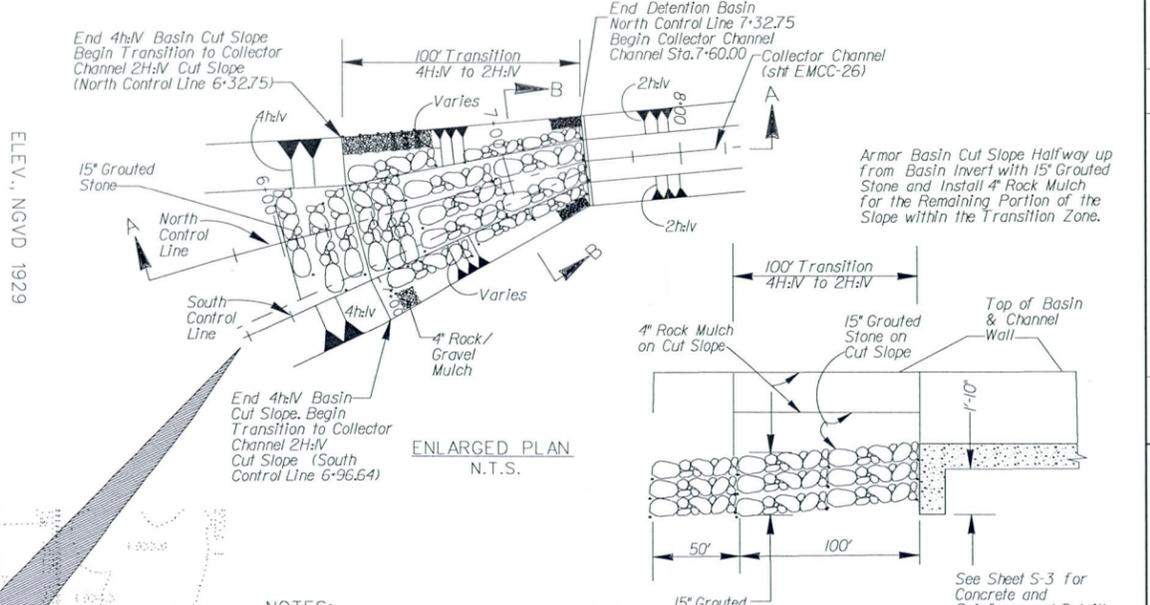
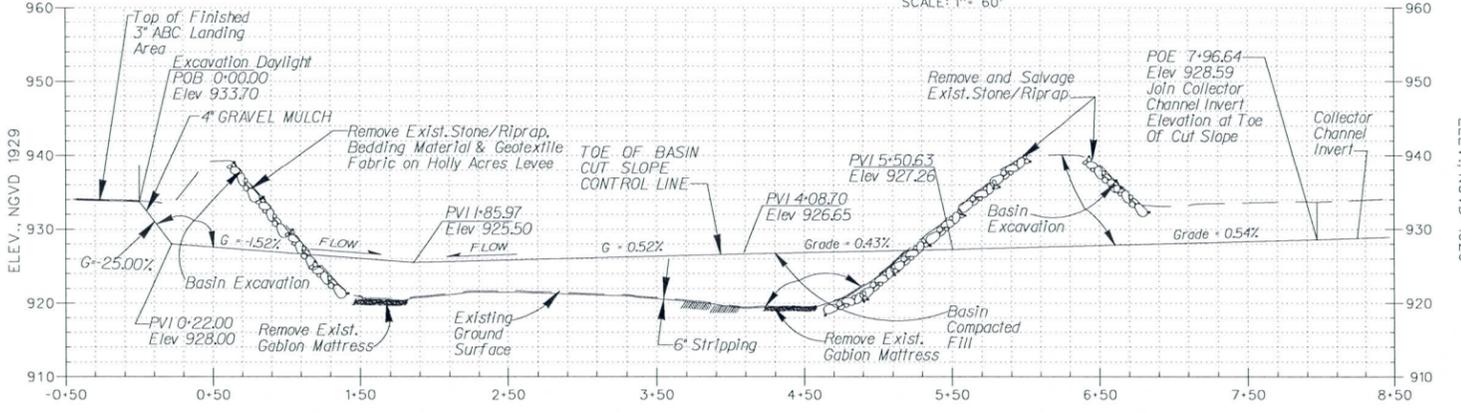
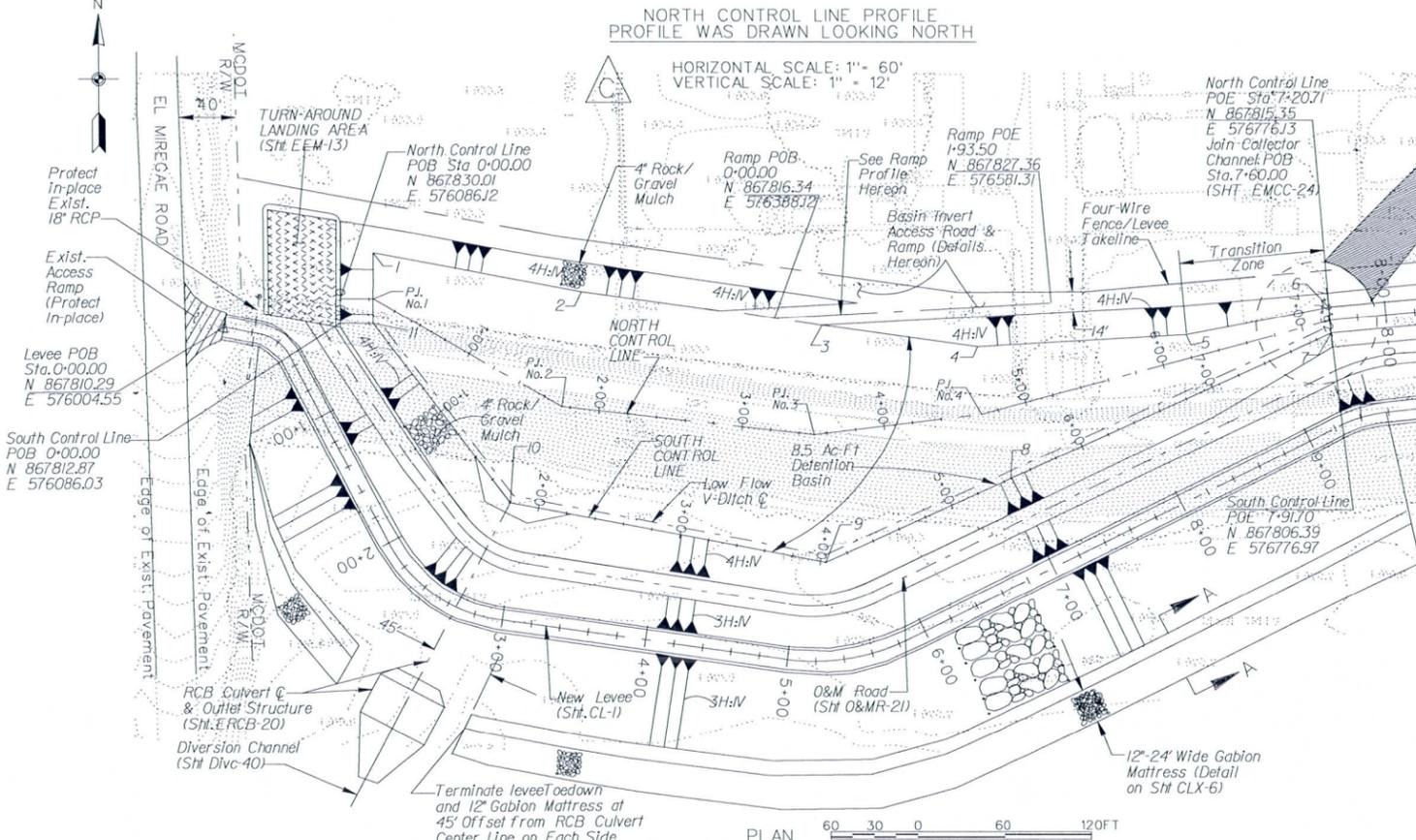
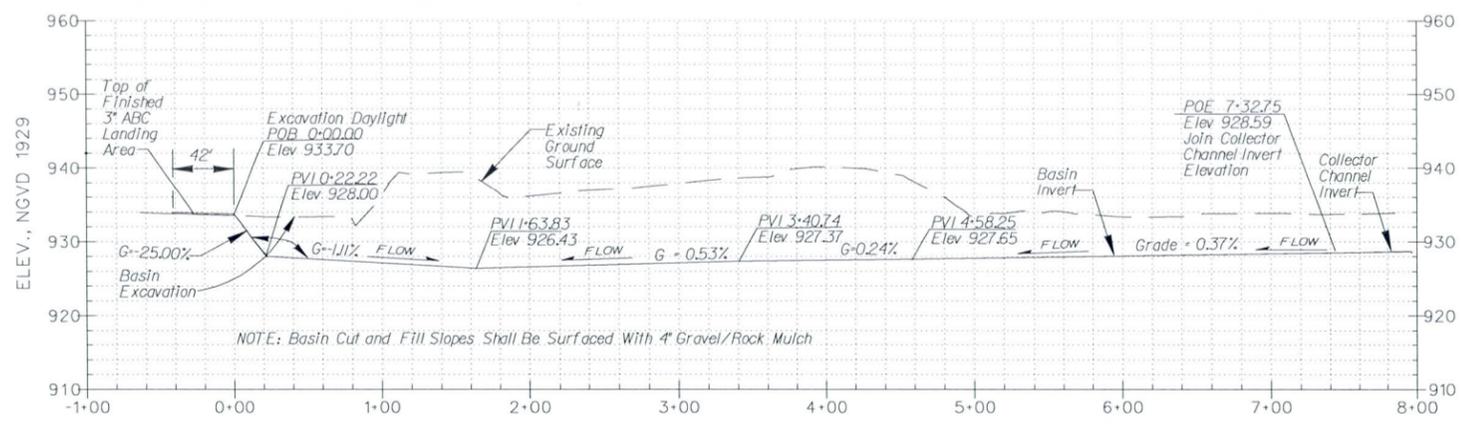
ARTHUR Y. JUNG, P.E.
CHIEF DESIGN BRANCH

FILE NAME: Divc1Dgn
SPEC. NO. W92PL-07-B-0003
DISTRICT FILE NO. 203/443

SCALE: 50:1
SHEET: Divc-40
APPROVAL: [Signature]
DATE: 7/22/08
SYMBOL: 4-RCP Culvert
DESCRIPTIONS: Deleted Div. Channel Contract Plan, Sections & Details. Redesign of Div. Channel and end of 4-RCP Culvert

REVISIONS

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
ENVIRONMENTAL RESTORATION
FLOOD CONTROL NORTH LEVEE
PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE)
EL MIRAGE ROAD DIVERSION CHANNEL AND RCP CULVERT
PLAN, PROFILE, SECTIONS AND DETAILS



- NOTES:**
- CAPACITY OF THIS EL MIRAGE ROAD DETENTION BASIN = 8.5 ACRE-FT.
 - SEE SHEET ELMDB-2 FOR TYPICAL SECTIONS
- CONSTRUCTION NOTES:**
- EXCAVATION OF THE DETENTION BASIN REQUIRES DEMOLITION AND REMOVAL OF THE EXIST. HOLLY ACRES LEVEE. P.I. POINTS DATA GIVEN IN THE TABLE BELOW ARE FOR TOE OF CUT/FILL SLOPE. THESE DATA SHALL BE USED TO DETERMINE LIMITS OF REMOVAL (FROM TOP TO BOTTOM) OF THE EXIST. HOLLY ACRES LEVEE. THE CONTRACTOR SHALL SALVAGE TO THE MAXIMUM EXTENT POSSIBLE MATERIALS EXCAVATED FROM THE EXIST. HOLLY ACRES LEVEE, INCLUDING STONE/RIPRAP PER SPECIFICATIONS SECTIONS 02380 & 02381. SEE SHEET ELMDB-3 FOR EXCAVATION PLAN.
 - HYDROSEED THE ENTIRE BOTTOM OF THE BASIN (AREA = 1.7 ACRES) PER SPECIFICATIONS

TOE OF BASIN CUT/FILL SLOPE (CATCH POINT) P.I. DATA

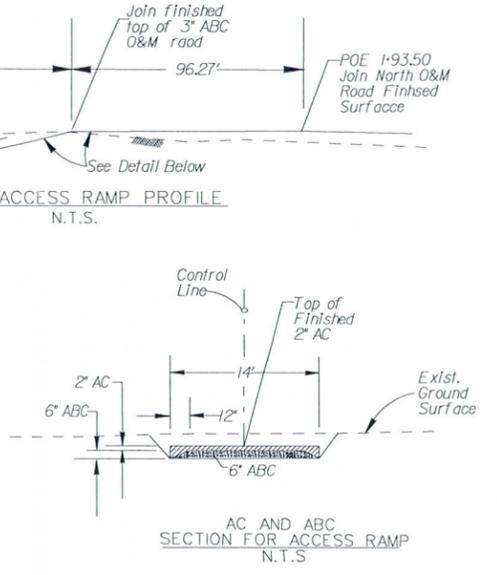
P.I. No.	NORTHING	EASTING	EXISTING GRADE ELEV.	FINISHED GRADE ELEV.
1	867,812.74	576,108.79	933.5	928.00
2	867,735.02	576,254.17	933.7	928.00
3	867,810.98	576,426.53	933.3	928.00
4	867,796.57	576,529.88	933.0	928.00
5	867,805.01	576,675.33	933.5	928.00
6	867,824.31	576,775.30	933.8	928.59
7	867,806.40	576,776.97	933.8	928.59
8	867,704.57	576,553.02	932.0	927.26
9	867,645.82	576,423.81	919.8	926.65
10	867,687.36	576,204.39	926.15	925.00
11	867,812.65	576,097.39	934.1	928.00

NORTH CONTROL LINE HORIZONTAL CONTROL POINTS DATA

P.I. No.	STA.	NORTHING	EASTING
1	0+22.22	867,836.18	576,097.96
2	1+86.05	867,754.79	576,240.15
3	3+62.95	867,735.22	576,415.97
4	4+80.47	867,749.42	576,532.62

SOUTH CONTROL LINE HORIZONTAL CONTROL POINTS DATA

See Top of Basin Cut/Fill Slope P.I. Data Table Above for Horiz. Control Points 8 thru. 11



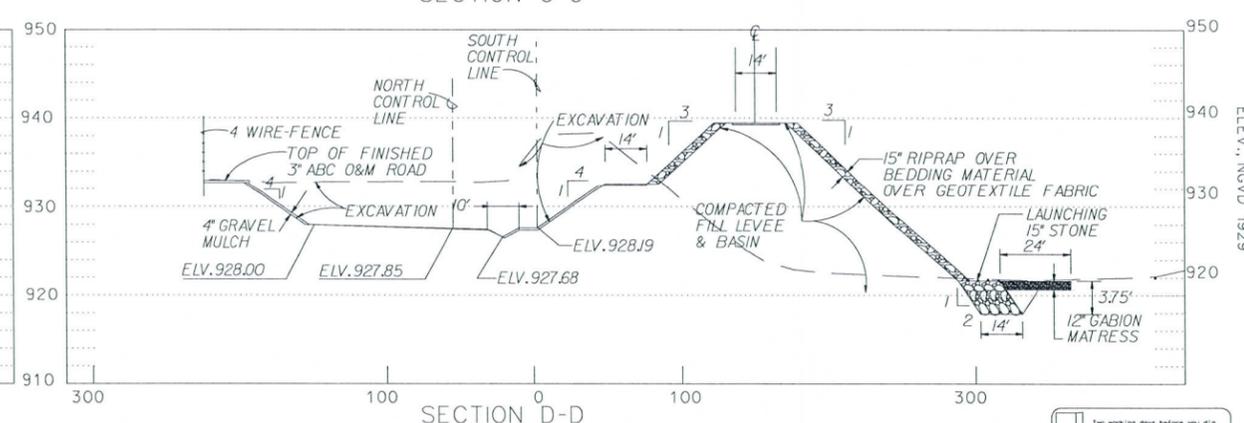
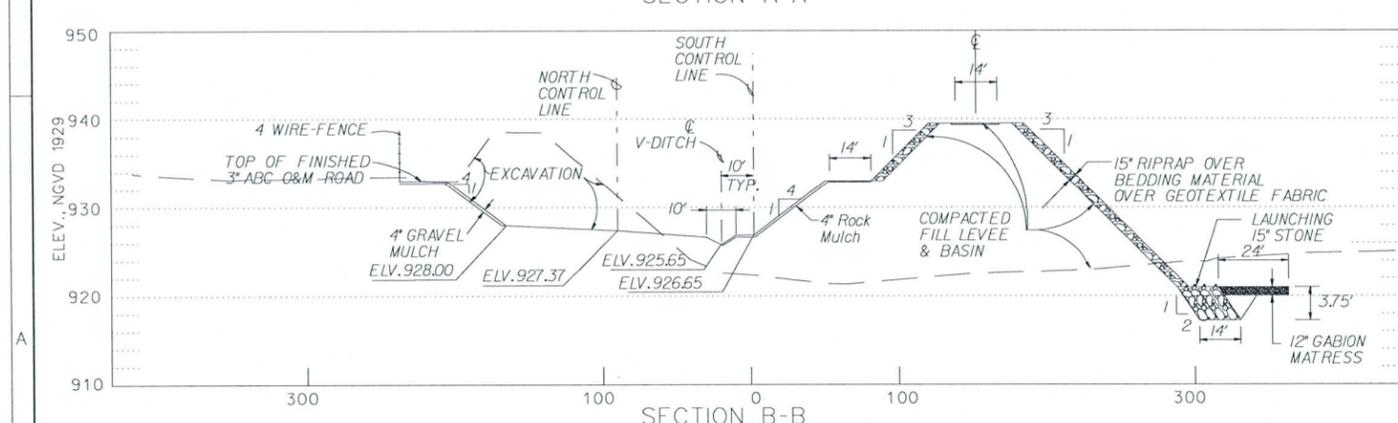
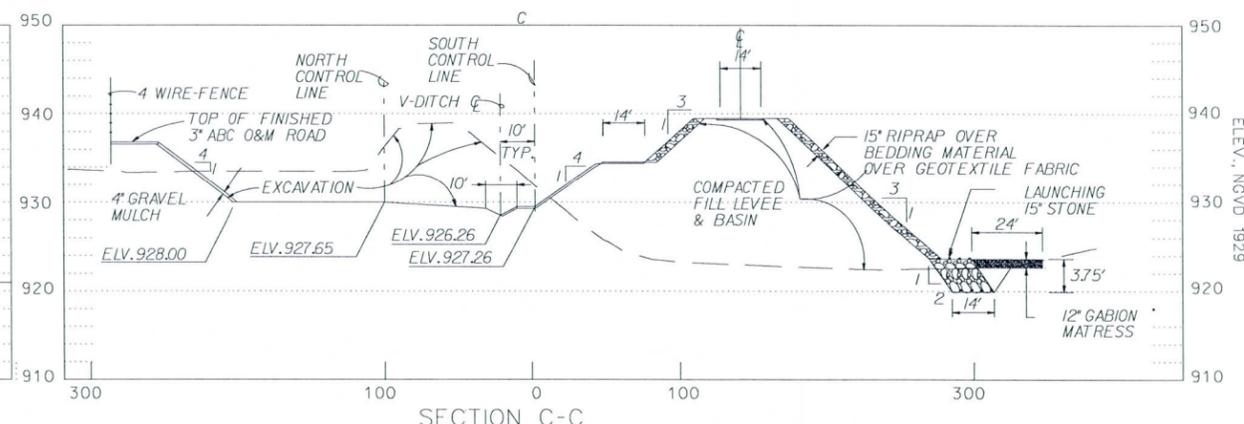
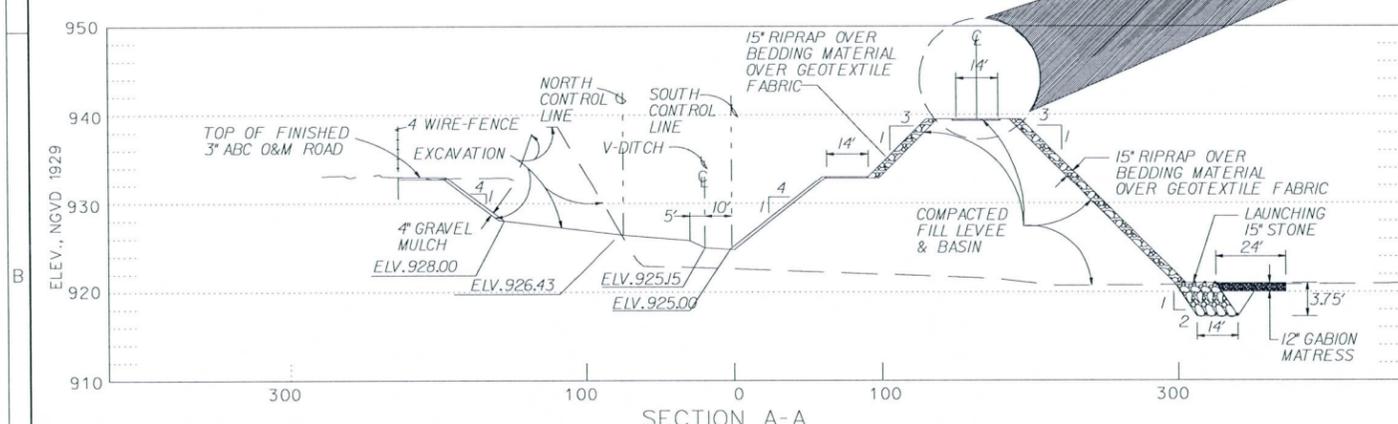
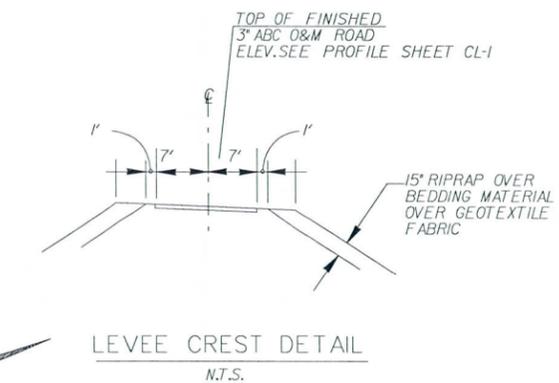
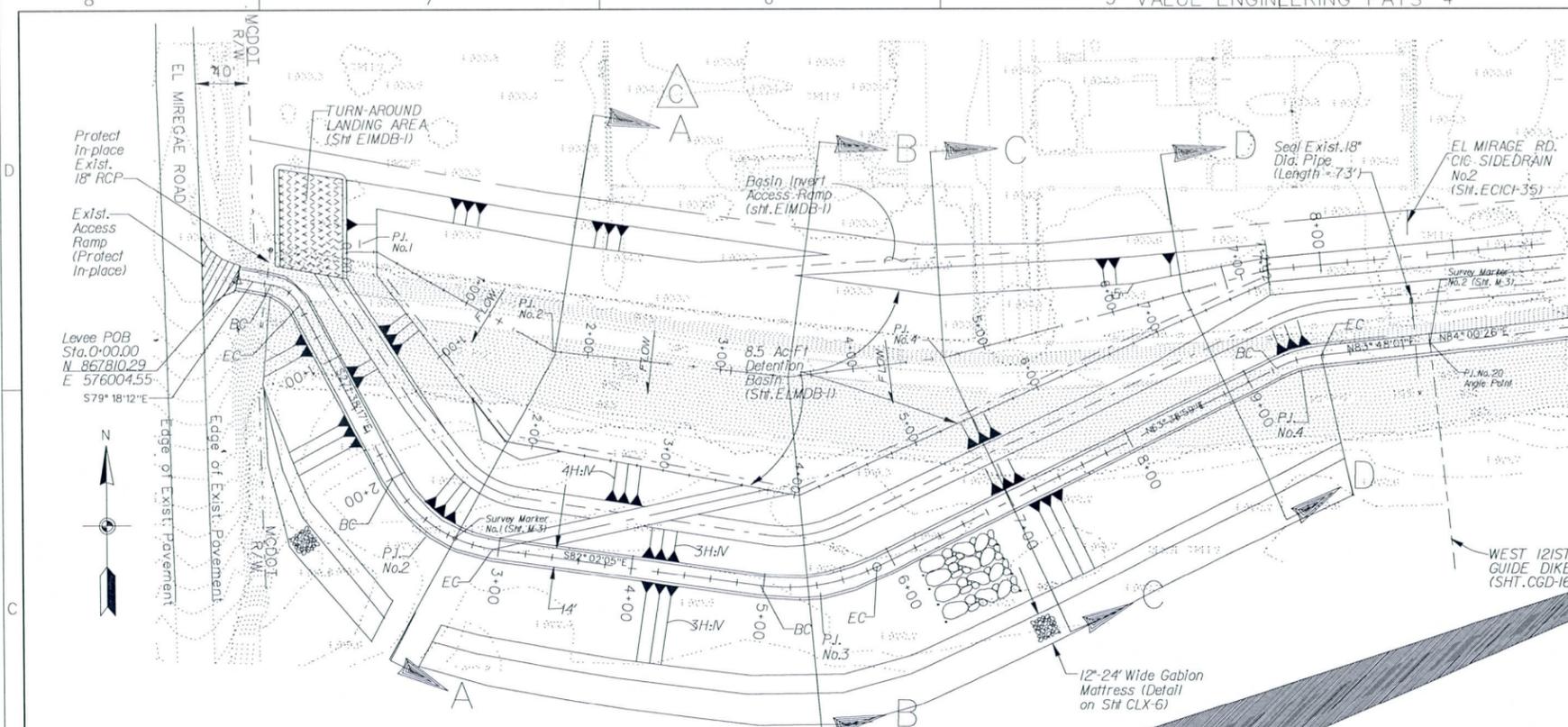
AS-BUILT
PLATE 34

DESIGNED BY: D.P.
DRAWN BY: T.C.
CHECKED BY: P.U.
CORPS OF ENGINEERS
THOMAS H. SAGE, P.E.
CHIEF DESIGN BRANCH
SPEC. NO. W972P-07-B-0003
DISTRICT FILE NO. 203/468

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
ENVIRONMENTAL RESTORATION
FLOOD CONTROL NORTH LEVEE
PHASE 1B (EL MIRAGE ROAD TO 115TH AVE.)
EL MIRAGE ROAD DETENTION BASIN
PLAN, PROFILE AND SECTIONS

SYMBOL DESCRIPTIONS REVISIONS APPROVAL DATE

SCALE: 60:1
SHEET ELMDB-1
SHEETS



AS-BUILT
PLATE 35



SCALE:	DESIGNED BY:	FILE NAME:	REVISIONS
AS SHOWN	P.J.	ELMOB-2.Dgn	
SHEET	CHECKED BY: D.P.		
EMOB-2			
SHEETS			

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
△	Revised 27" stone to 15" Stone on X-Section	8/10/07	
△	Deleted 760' long Collector Channel and added 1.8 Acres Detention Basin	8/10/07	

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 1B (EL MIRAGE ROAD TO 115TH AVE.)
 EL MIRAGE ROAD DETENTION BASIN
 TYPICAL SECTIONS

APPENDIX I

CODE OF FEDERAL REGULATIONS (EXTRACT)

CODE OF FEDERAL REGULATIONS (EXTRACT)

TITLE 33 - NAVIGATION AND
NAVIGABLE WATERS

Chapter II - Corps of Engineers,
Department of the Army

PART 208 - FLOOD CONTROL REGULATIONS

AUTHORITY: § 208.10 issued under Sec. 7, 58 Stat. 890; 33 U.S.C. 709.

§ 208.10 *Local flood protection works; maintenance and operation of structures and facilities* - (a) *General*. (1) The structures and facilities constructed by the United States for local flood protection shall be continuously maintained in such a manner and operated at such times and for such periods as may be necessary to obtain the maximum benefits.

(2) The State, political subdivision thereof, or other responsible local agency, which furnished assurance that it will maintain and operate flood control works in accordance with regulations prescribed by the Secretary of the Army, as required by law, shall appoint a permanent committee consisting of or headed by an official hereinafter called the "Superintendent," who shall be responsible for the development and maintenance of, and directly in charge of, an organization responsible for the efficient operation and maintenance of all of the structures and facilities during flood periods and for continuous inspection and maintenance of the project works during periods of low water, all without cost to the United States.

(3) A reserve supply of materials needed during a flood emergency shall be kept on hand at all times.

(4) No encroachment or trespass which will adversely affect the efficient operation or maintenance of the project works shall be permitted upon the right-of-way for the protective facilities.

(5) No improvement shall be passed over, under, or through the walls, levees, improved channels or floodways, nor shall any excavation or construction be permitted within the limits of the project right-of-way, nor shall any change be made in any feature of the works without prior determination by the District Engineer of the Department of the Army or his authorized representative that such improvement, excavation, construction, or alteration will not adversely affect the functioning of the protective facilities. Such improvements or alterations as may be found to be desirable and permissible under the above determination shall be constructed in accordance with standard engineering practice. Advice regarding the effect of proposed improvements or alterations on the functioning of the project and information concerning methods of construction acceptable under standard engineering practice shall be obtained from the District Engineer or, if otherwise obtained, shall be submitted for his approval. Drawings or prints showing such improvements or alterations as finally constructed shall be furnished the District Engineer after completion of the work.

(6) It shall be the duty of the Superintendent to submit a semiannual report to the District Engineer covering inspection, maintenance, and operation of the protective works.

(7) The District Engineer or his authorized representatives shall have access at all times to all portions of the protective works.

(8) Maintenance measures or repairs which the District Engineer deems necessary shall be promptly taken or made.

(9) Appropriate measures shall be taken by local authorities to insure that the activities of all local organizations operating public or private facilities connected with the protective works are coordinated with those of the Superintendent's organization during flood periods.

(10) The Department of the Army will furnish local interests with an Operation and Maintenance Manual for each completed project, or separate useful part thereof, to assist them in carrying out their obligations under this part.

(b) *Levees* - (1) *Maintenance*. The Superintendent shall provide at all times such maintenance as may be required to insure serviceability of the structures in time of flood. Measures shall be taken to promote the growth of sod, exterminate burrowing animals, and to provide for routine mowing of the grass and weed, removal of wild growth and drift deposits, and repair of damage caused by erosion or other forces. Where practicable, measures shall be taken to retard bank erosion by planting of willows or other suitable growth on areas riverward of the levees. Periodic inspections shall be made by the Superintendent to insure that the above maintenance measures are being effectively carried out and, further, to be certain that:

(i) No unusual settlement, sloughing, or material loss of grade or levee cross section has taken place;

(ii) No caving has occurred on either the land side or the river side 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 wells 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;

(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. Immediate steps will be taken to correct dangerous conditions disclosed by such inspections. Regular maintenance repair measures shall be accomplished during the appropriate season as scheduled by the Superintendent.

(2) *Operation*. During flood periods the

levee shall be patrolled continuously to locate possible sand boils or unusual wetness of the landward slope and 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 overtopped;

(iv) No other conditions exist which might endanger the structure.

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.

(c) *Flood walls* - (1) *Maintenance*. Periodic inspections shall be made by the Superintendent to be certain that:

(i) No seepage, saturated areas, or sand boils are occurring;

(ii) No undue settlement has occurred which affects the stability of the wall or its water tightness;

(iii) No trees exist, the roots of which might extend under the wall and offer accelerated seepage paths;

(iv) The concrete has not undergone cracking, chipping, or breaking to an extent which might affect the stability of the wall or its water tightness;

(v) There are no encroachments upon the right-of-way which might endanger the structure or hinder its functioning in time of flood;

(vi) Care is being exercised to prevent accumulation of trash and debris adjacent to walls, and to insure that no fires are being built near them;

(vii) No bank caving conditions exist riverward of the wall which might endanger its stability;

(viii) Toe drainage systems and pressure relief wells are in good working condition and that such facilities are not becoming clogged.

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. Measures to eliminate encroachments and effect repairs found necessary by such inspections shall be undertaken immediately. All repairs shall be accomplished by methods acceptable in standard engineering practice.

(2) *Operation*. Continuous patrol of the wall shall be maintained during flood periods to locate possible leakage at monolith joints or seepage underneath the wall. Floating plant or boats will not be allowed to lie against or tie up to the wall. Should it become necessary during a flood emergency to pass anchor cables over the wall, adequate measures shall be taken to protect the concrete and construction joints. Immediate steps shall be taken to correct any condition which endangers the stability of the wall.

(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. Where drainage structures are provided with stop log or other emergency closures, the condition of the equipment and its housing shall be inspected regularly and a trial installation of the emergency closure shall be made at least once each year. 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 structure which might endanger its 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) *Operation.* Whenever high water conditions impend, all gates will be inspected a short time before water reaches the invert of the pipe and any object 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. Manually operated gates and valves shall be closed as necessary to prevent inflow of flood water. All drainage structures in 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 any adverse condition.

(e) *Closure structures - (1) Maintenance.* Closure structures for traffic openings shall be inspected by the Superintendent every 90 days to be certain that:

(i) No parts are missing;

(ii) Metal parts are adequately covered with paint;

(iii) All movable parts are in satisfactory working order;

(iv) Proper closure can be made promptly when necessary;

(v) Sufficient materials are on hand for the erection of sand bag closures and that the location of such materials will be readily accessible in times of emergency.

Tools and parts shall not be removed for other use. Trial erections of one or more closure structures shall be made once each year, alternating the structures chosen so that each gate will be erected at least once in each 3-year period. Trial erection of all closure structures shall be made whenever a change is made in key operating personnel. Where railroad operation makes trial erection of a closure structure infeasible, rigorous inspection and drill of operating personnel may be substituted therefor. Trial erection of sand bag closures is not required. Closure materials will be carefully checked prior to and following flood periods, and damaged or missing parts shall be repaired or replaced immediately.

(2) *Operation.* Erection of each movable closure shall be started in sufficient time to permit completion before flood waters reach the top of the structure sill. Information regarding the proper method of erecting each individual closure structure, together with an estimate of the time required by an experienced crew to complete its erection will be given in the Operation and Maintenance Manual which will be furnished local interests upon

completion of the project. Closure structures will be inspected frequently during flood periods to ascertain that no undue leakage is occurring and that drains provided to care for ordinary leakage are functioning properly. Boats or floating plant shall not be allowed to tie up to closure structures or to discharge passengers or cargo over them.

(f) *Pumping plants - (1) Maintenance.* Pumping plants shall be inspected by the Superintendent at intervals not to exceed 30 days during flood seasons and 90 days during off-flood seasons to insure that all equipment is in order for instant use. At regular intervals, proper measures shall be taken to provide for cleaning plant, building, and equipment, repainting as necessary, and lubricating all machinery. Adequate supplies of lubricants for all types of machines, fuel for gasoline or diesel powered equipment, and flash lights or lanterns for emergency lighting shall be kept on hand at all times. Telephone service shall be maintained at pumping plants. All equipment, including switch gear, transformers, motors, pumps, valves, and gates shall be trial operated and checked at least once every 90 days. Megger tests of all insulation shall be made whenever wiring has been subjected to undue dampness and otherwise at intervals not to exceed one year. A record shall be kept showing the results of such test. Wiring disclosed to be in an unsatisfactory condition by such tests shall be brought to a satisfactory condition or shall be promptly replaced. Diesel and gasoline engines shall be started at such intervals and allowed to run for such length of time as may be necessary to insure their serviceability in times of emergency. Only skilled electricians and mechanics shall be employed on test and repairs. Operating personnel for the plant shall be present during tests. Any equipment removed from the station for repair or replacement shall be returned or replaced as soon as practicable and shall be trial operated after reinstallation. Repairs requiring removal of equipment from the plant shall be made during off-flood seasons insofar as practicable.

(2) *Operation.* Competent operators shall be on duty at pumping plants whenever it appears that necessity for pump operation is imminent. The operator shall thoroughly inspect, trial operate, and place in readiness all plant equipment. The operator shall be familiar with the equipment manufacturers' instructions and drawings and with the "Operating Instructions" for each station. The equipment shall be operated in accordance with the above-mentioned "Operating Instructions" and care shall be exercised that proper lubrication is being supplied all equipment, and that no overheating, undue vibration or noise is occurring. Immediately upon final recession of flood waters, the pumping station shall be thoroughly cleaned, pump house sumps flushed, and equipment thoroughly inspected, oiled and greased. A record or log of pumping plant operation shall be kept for each station, a copy of which shall be furnished the District Engineer following each flood.

(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. Measures will be taken by the Superintendent to promote the growth of grass on bank slopes and earth deflection dikes. The Superintendent shall provide for periodic repair and cleaning of debris basins, check dams, and related structures as may be necessary.

(2) *Operation.* Both banks of the channel shall be patrolled during periods of high water, and measures shall be taken to protect those reaches being attacked by the current or by wave wash. Appropriate measures shall be taken to prevent the formation of jams of ice or 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 banks, riprap, deflection dikes and walls, drainage outlets, or other flood control structures repaired.

(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 repaired or replaced without delay. Areas used for ponding in connection with pumping plants or for temporary storage of interior runoff during flood periods shall not be allowed to become filled with silt, debris, or dumped material. The Superintendent shall take proper steps to prevent restriction of bridge openings and, where practicable, shall provide for temporary raising during floods of bridges which restrict channel capacities during high flows.

(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. (Sec. 3, 49 Stat. 1571, as amended; 33 U.S.C. 701C) {9 F.R. 9999, Aug. 17, 1944; 9 F.R. 10203, Aug. 22, 1944}

APPENDIX II

**AUTHORIZING DOCUMENT
AND
PROJECT COOPERATION AGREEMENT (PCA)**

110989..

PROJECT COOPERATION AGREEMENT
BETWEEN
THE DEPARTMENT OF THE ARMY
AND
THE CITY OF PHOENIX

FOR THE CONSTRUCTION OF THE
TRES RIOS, ARIZONA,
ECOSYSTEM RESTORATION, FLOOD CONTROL, AND RECREATION
PROJECT FEATURES ON THE NORTH SIDE OF THE GILA AND SALT RIVERS

THIS AGREEMENT is entered into this 14th day of
April, 2004, by and between the Department of the Army (hereinafter the
"Government"), represented by the Assistant Secretary of the Army (Civil Works), and the
City of Phoenix, (hereinafter the "Non-Federal Sponsor"), represented by the Deputy City
Manager.

WITNESSETH, THAT:

WHEREAS, construction of the Tres Rios, Arizona Ecosystem Restoration and
Flood Control Project at Maricopa County, Arizona (hereinafter the "Authorized Project")
was authorized by Section 101 (b)(4) of the Water Resources Development Act of 2000
(WRDA 2000);

WHEREAS, the Government and the Non-Federal Sponsor desire to enter into a
Project Cooperation Agreement (hereinafter the "Agreement") for construction of a
separable element of the Authorized Project whose features are located on the north side of
the Salt River (hereinafter the "Project", as defined in Article I.A. of this Agreement);

WHEREAS, Sponsor is the management agency for the 91st Avenue Wastewater
Treatment Plant Sub Regional Operating Group (SROG), which also includes the cities of
Glendale, Mesa, Scottsdale, and Tempe, Arizona.

WHEREAS, a separate and subsequent Project Cooperation Agreement is intended
to be implemented for the separable element of the Authorized Project whose features are
located on the south side of the Salt River on lands that include those owned by the Gila
River Indian Community;

WHEREAS, Section 103 of the Water Resources Development Act of 1986, Public
Law 99-662, as amended, specifies the cost-sharing requirements applicable to the Project;

WHEREAS, Section 221 of the Flood Control Act of 1970, Public Law 91-611, as
amended, and Section 103 of the Water Resources Development Act of 1986, Public Law
99-662, as amended, provide that the Secretary of the Army shall not commence
construction of any water resources project, or separable element thereof, until each

non-Federal sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element;

WHEREAS, the Non-Federal Sponsor does not qualify for a reduction of the maximum non-Federal cost share pursuant to the guidelines that implement Section 103(m) of the Water Resources Development Act of 1986, Public Law 99-662, as amended;

WHEREAS, Section 902 of Public Law 99-662 establishes the maximum amount of costs for the Authorized Project and sets forth procedures for adjusting such maximum amount; and

WHEREAS, the Government and Non-Federal Sponsor have the full authority and capability to perform as hereinafter set forth and intend to cooperate in cost-sharing and financing of the construction of the Project in accordance with the terms of this Agreement.

NOW, THEREFORE, the Government and the Non-Federal Sponsor agree as follows:

ARTICLE I - DEFINITIONS AND GENERAL PROVISIONS

For purposes of this Agreement:

A. The term "Project" under this PCA shall mean the ecosystem restoration features, the flood control features, the recreation features, and the environmental education features as defined in this Article and as generally described in the Tres Rios, Arizona, Feasibility Study dated September 2000, and the Report of the Chief of Engineers, dated 12 December, 2000.

B. The term "Ecosystem restoration features" shall mean a pump station and water distribution system to reestablish and support about 775 acres of native vegetation and wildlife habitat within and along approximately an 8 mile reach of the Salt River; a regulating wetland about 290 acres in size to equalize diurnal variations in discharges from the 91st Avenue treatment plant; a 300 million gallon per day pump station to convey flow of water from such treatment plant to the regulating wetland; approximately 128 acres of wetlands along the north bank of the Salt River; a water pipeline in the overbank wetland leading to series of riparian corridors totaling about 38 acres west of El Mirage Road; a series of open water/or marsh areas totaling about 134 acres within the Gila River channel west of El Mirage Road; and selective grading of locations within the Salt and Gila River channels to convey surface water to supply about 69 acres of riparian habitat.

C. The term "flood control features" shall mean approximately 6 miles of flood control levee ranging in height from 4 to 10 feet on the north bank of the Salt River approximately between the regulating wetland and Dysart Road.

D. The term "recreation features" shall mean approximately 11 miles of multi-use trails, parking lots with kiosks, and other features including ramadas, park benches, shaded areas, comfort stations, drinking fountains and informative signage.

E. The term "environmental education features" shall mean an interpretive center that includes displays and supplemental learning materials.

F. The term "total project costs" shall mean all costs incurred by the Non-Federal Sponsor and the Government in accordance with the terms of this Agreement directly related to construction of the Project. Subject to the provisions of this Agreement, the term shall include, but is not necessarily limited to: continuing planning and engineering costs incurred after October 1, 1985; advanced engineering and design costs; pre-construction engineering and design costs; engineering and design costs during construction; the costs of monitoring and adaptive management in accordance with Article II.T. of this agreement; the costs of investigations to identify the existence and extent of hazardous substances in accordance with Article XV.A. of this Agreement; costs of historic preservation activities in accordance with Article XVIII.A. of this Agreement; actual construction costs, supervision and administration costs; costs of participation in the Project Coordination Team in accordance with Article V of this Agreement; costs of contract dispute settlements or awards; the value of lands, easements, rights-of-way, relocations, and suitable borrow and dredged or excavated material disposal areas for which the Government affords credit in accordance with Article IV of this Agreement; and costs of audit in accordance with Article X of this Agreement. The term does not include any costs for operation, maintenance, repair, replacement, or rehabilitation; any costs due to betterments; or any costs of dispute resolution under Article VII of this Agreement.

G. The term "total project ecosystem restoration costs" shall mean that portion of the total project costs that the Government assigns to the ecosystem restoration features

H. The term "total project flood control costs" shall mean that portion of the total project costs that the Government assigns to the flood control features.

I. The term "total project recreation costs" shall mean that portion of the total project costs that the Government assigns to the recreation features.

J. The term "total project environmental education facilities costs" shall mean that portion of the total project costs that the Government assigns to the environmental education features.

K. The term "financial obligation for construction" shall mean a financial obligation of the Government, other than an obligation pertaining to the provision of lands, easements, rights-of-way, relocations, and borrow and dredged or excavated material disposal areas, that results or would result in a cost that is or would be included in total project costs.

L. The term "non-Federal proportionate share" shall mean the ratio of the Non-Federal Sponsor's total cash contribution required in accordance with Articles II.D.1., II.D.3,

II.E.2, II.F.2 and II.G.2 of this Agreement to total financial obligations for construction, as projected by the Government.

M. The term "period of construction" shall mean the time from the date the Government first notifies the Non-Federal Sponsor in writing, in accordance with Article VI.B. of this Agreement, of the scheduled date for issuance of the solicitation for the first construction contract to the date that the U.S. Army Engineer for the Los Angeles District (hereinafter the "District Engineer") notifies the Non-Federal Sponsor in writing of the Government's determination that, except for monitoring and adaptive management, construction of the Project is complete.

N. The term "highway" shall mean any public highway, roadway, street, or way, including any bridge thereof.

O. The term "relocation" shall mean providing a functionally equivalent facility to the owner of an existing utility, cemetery, highway or other public facility, when such action is authorized in accordance with applicable legal principles of just compensation or as otherwise provided in the authorizing legislation for the Project or any report referenced therein. Providing a functionally equivalent facility may take the form of alteration, lowering, raising, or replacement and attendant removal of the affected facility or part thereof.

P. The term "fiscal year" shall mean one fiscal year of the Government. The Government fiscal year begins on October 1 and ends on September 30.

Q. The term "functional portion of the Project" shall mean a portion of the Project that is suitable for tender to the Non-Federal Sponsor to operate and maintain in advance of completion of the entire Project. For a portion of the Project to be suitable for tender, the District Engineer must notify the Non-Federal Sponsor in writing of the Government's determination that the portion of the Project is complete and can function independently and for a useful purpose, although the balance of the Project is not complete.

R. The term "betterment" shall mean a change in the design and construction of an element of the Project resulting from the application of standards that the Government determines exceed those that the Government would otherwise apply for accomplishing the design and construction of that element.

S. The term "monitoring" shall mean monitoring of the ecosystem restoration features during the first five years following construction of the ecosystem restoration features, in order to assure that the ecosystem restoration features function properly. This term shall include, but is not necessarily limited to, monitoring the success of vegetation and habitat establishment in the ecosystem restoration features area; monitoring the restored aquatic resources associated with the ecosystem restoration features; monitoring wildlife resources associated with the restored habitats; and monitoring and early identification of the establishment of wildlife that has the potential to become a hazard to aviation safety.

T. The term "adaptive management" shall mean changes made to the ecosystem restoration features that are based on monitoring results and deemed necessary to attain the objectives of the ecosystem restoration features following their construction. The term shall include, but is not necessarily limited to, adjustments due to unforeseen circumstances and changes to structures or their operations or management methods.

U. The term "costs of water" shall mean all costs incurred by the Non-Federal Sponsor, in accordance with Article II.K. of this Agreement, to acquire, secure and maintain the quantity of water that the Government determines is necessary for the construction, operation, and maintenance of the Project. As of the effective date of this Agreement, the Cost of Water that is estimated to be continually necessary for construction, operation and maintenance of the Project is estimated to be \$1,356,600 annually, at October 2003 price level.

ARTICLE II -OBLIGATIONS OF THE GOVERNMENT AND THE NON-FEDERAL SPONSOR

A. The Government, subject to receiving funds appropriated by the Congress of the United States (hereinafter, the "Congress") and using those funds and funds provided by the Non-Federal Sponsor, shall expeditiously construct the Project, applying those procedures usually applied to Federal projects, pursuant to Federal laws, regulations, and policies.

1. The Government shall afford the Non-Federal Sponsor the opportunity to review and comment on the solicitations for all contracts, including relevant plans and specifications, prior to the Government's issuance of such solicitations. The Government shall not issue the solicitation for the first construction contract until the Non-Federal Sponsor has confirmed in writing its willingness to proceed with the Project. To the extent possible, the Government shall afford the Non-Federal Sponsor the opportunity to review and comment on all contract modifications, including change orders, prior to the issuance to the contractor of a Notice to Proceed. In any instance where providing the Non-Federal Sponsor with notification of a contract modification or change order is not possible prior to issuance of the Notice to Proceed, the Government shall provide such notification in writing at the earliest date possible. To the extent possible, the Government also shall afford the Non-Federal Sponsor the opportunity to review and comment on all contract claims prior to resolution thereof. The Government shall consider in good faith the comments of the Non-Federal Sponsor, but the contents of solicitations, award of contracts, execution of contract modifications, issuance of change orders, resolution of contract claims, and performance of all work on the Project (whether the work is performed under contract or by Government personnel), shall be exclusively within the control of the Government.

2. Throughout the period of construction, the District Engineer shall furnish the Non-Federal Sponsor with a copy of the Government's Written Notice of Acceptance of Completed Work for each contract for the Project.

3. As of the effective date of this Agreement, \$6,198,810.05 of Federal funds have been made available for the Authorized Project of which \$6,198,810.05 is available for the Project. The Government makes no commitment to budget for additional Federal funds for the Authorized Project. Notwithstanding any other provision of this Agreement, the Government's financial participation in the Authorized Project, including the Project, is limited to this amount together with any additional funds that the Congress may appropriate for the Authorized Project. In the event that the Congress does not appropriate Federal funds for the Authorized Project sufficient to meet the Federal share of the costs of work on the Project and other elements of the Authorized Project in the then-current or upcoming fiscal year, the Government shall notify the Non-Federal Sponsor of the insufficiency of funds and the parties, within the Federal and non-Federal funds available for the Project, shall suspend construction or terminate this Agreement in accordance with Article XIV.B. of this Agreement. To provide for this eventuality, the Government may reserve a percentage of total Federal funds available for the Project and an equal percentage of the total funds contributed by the Non-Federal Sponsor in accordance with Articles II.D., IIE. and IIF. of this Agreement, as applicable, and a percentage of the total funds contributed by the Non-Federal Sponsor in accordance with Article II.G. of this Agreement, as applicable, as a contingency to pay costs of termination, including any costs of resolution of contract claims and contract modifications.

B. The Non-Federal Sponsor may request the Government to accomplish betterments. Such requests shall be in writing and shall describe the betterments requested to be accomplished. If the Government in its sole discretion elects to accomplish the requested betterments or any portion thereof, it shall so notify the Non-Federal Sponsor in a writing that sets forth any applicable terms and conditions, which must be consistent with this Agreement. In the event of conflict between such a writing and this Agreement, this Agreement shall control. The Non-Federal Sponsor shall be solely responsible for all costs due to the requested betterments and shall pay all such costs in accordance with Article VI.C. of this Agreement.

C. When the District Engineer determines that, except for monitoring and adaptive management, the entire Project is complete or that a portion of the Project has become a functional portion of the Project, the District Engineer shall so notify the Non-Federal Sponsor in writing and furnish the Non-Federal Sponsor with an Operation, Maintenance, Repair, Replacement, and Rehabilitation Manual (hereinafter the "OMRR&R Manual") and with copies of all of the Government's Written Notices of Acceptance of Completed Work for all contracts for the Project or the functional portion of the Project that have not been provided previously. Upon such notification, the Non-Federal Sponsor shall operate, maintain, repair, replace, and rehabilitate the entire Project or the functional portion of the Project in accordance with Article VIII of this Agreement. Further, on the date of such notice, the monitoring and adaptive management period described in paragraph T.1. of this Article shall begin for the entire Project, or functional portion of the Project pertaining to the ecosystem restoration features, as applicable. The monitoring and adaptive management of the ecosystem restoration features shall be performed concurrently with the Non-Federal

Sponsor's responsibilities for operation, maintenance, repair, replacement, and rehabilitation of the ecosystem restoration features in accordance with Article VIII of this Agreement.

D. The Non-Federal Sponsor shall contribute a minimum of 35 percent, but not to exceed 50 percent, of total project flood control costs in accordance with the provisions of this paragraph.

1. The Non-Federal Sponsor shall provide a cash contribution equal to 5 percent of total project flood control costs in accordance with Article VI.B. of this Agreement.

2. In accordance with Article III of this Agreement, the Non-Federal Sponsor shall provide all lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas that the Government determines the Non-Federal Sponsor must provide for the construction, operation, and maintenance of the flood control features, and shall perform or ensure performance of all relocations that the Government determines to be necessary for the construction, operation, and maintenance of the flood control features.

3. If the Government projects that the value of the Non-Federal Sponsor's contributions under paragraphs D.1. and D.2. of this Article and Articles V, X, and XV.A. of this Agreement will be less than 35 percent of total project flood control costs, the Non-Federal Sponsor shall provide an additional cash contribution, in accordance with Article VI.B. of this Agreement, in the amount necessary to make the Non-Federal Sponsor's total contribution equal to 35 percent of total project flood control costs.

4. If the Government determines that the value of the Non-Federal Sponsor's contributions provided under paragraph D.2. of this Article and Articles V, X, and XV.A. of this Agreement has exceeded 45 percent of total project flood control costs, the Government, subject to the availability of funds, shall reimburse the Non-Federal Sponsor for any such value in excess of 45 percent of total project flood control costs. After such a determination, the Government, in its sole discretion, may provide any remaining lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas and perform any remaining relocations on behalf of the Non-Federal Sponsor that are required for the flood control features.

E. The Non-Federal Sponsor shall contribute 35 percent of total project ecosystem restoration costs in accordance with the provisions of this paragraph.

1. In accordance with Article III of this Agreement, the Non-Federal Sponsor shall provide all lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas that the Government determines the Non-Federal Sponsor must provide for the construction, operation, and maintenance of the ecosystem restoration features, and shall perform or ensure performance of all relocations that the Government determines to be necessary for the construction, operation, and maintenance of the ecosystem restoration features.

2. If the Government projects that the value of the Non-Federal Sponsor's contributions under paragraphs E.1. of this Article and Articles V, X, and XV.A. of this Agreement will be less than 35 percent of total project ecosystem restoration costs, the Non-Federal Sponsor shall provide an additional cash contribution, in accordance with Article VI.B. of this Agreement, in the amount necessary to make the Non-Federal Sponsor's total contribution equal to 35 percent of total project ecosystem restoration costs.

3. If the Government determines that the value of the Non-Federal Sponsor's contributions provided under paragraph E.1. of this Article and Articles V, X, and XV.A. of this Agreement has exceeded 35 percent of total project ecosystem restoration costs, the Government, subject to the availability of funds, shall reimburse the Non-Federal Sponsor for any such value in excess of 35 percent of total project ecosystem restoration costs. After such a determination, the Government, in its sole discretion, may provide any remaining lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas and perform any remaining relocations on behalf of the Non-Federal Sponsor that are required for the ecosystem restoration features.

F. The Non-Federal Sponsor shall contribute 50 percent of total project recreation costs in accordance with the provisions of this paragraph.

1. In accordance with Article III of this Agreement, the Non-Federal Sponsor shall provide all lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas that the Government determines the Non-Federal Sponsor must provide for the construction, operation, and maintenance of the recreation features, and shall perform or ensure performance of all relocations that the Government determines to be necessary for the construction, operation, and maintenance of the recreation features.

2. If the Government projects that the value of the Non-Federal Sponsor's contributions under paragraphs F.1. of this Article and Articles V, X, and XV.A. of this Agreement will be less than 50 percent of total project recreation costs, the Non-Federal Sponsor shall provide an additional cash contribution, in accordance with Article VI.B. of this Agreement, in the amount necessary to make the Non-Federal Sponsor's total contribution equal to 50 percent of total project recreation costs.

3. If the Government determines that the value of the Non-Federal Sponsor's contributions provided under paragraph F.1 of this Article and Articles V, X, and XV.A. of this Agreement has exceeded 50 percent of total project recreation costs, the Government, subject to the availability of funds, shall reimburse the Non-Federal Sponsor for any such value in excess of 50 percent of total project recreation costs. After such a determination, the Government, in its sole discretion, may provide any remaining lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas and perform any remaining relocations on behalf of the Non-Federal Sponsor that are required for the recreation features.

G. The Non-Federal Sponsor shall contribute 100 percent of total project environmental education facilities costs in accordance with the provisions of this paragraph.

1. In accordance with Article III of this Agreement, the Non-Federal Sponsor shall provide all lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas that the Government determines the Non-Federal Sponsor must provide for the construction, operation, and maintenance of the environmental education features, and shall perform or ensure performance of all relocations that the Government determines to be necessary for the construction, operation, and maintenance of the environmental education features.

2. In addition to the contributions of the Non-Federal Sponsor under paragraph G.1. of this Article, the Non-Federal Sponsor shall provide a cash contribution equal to 100 percent of the total project environmental education facilities costs in accordance with Article VI.B. of this Agreement.

H. The Non-Federal Sponsor may request the Government to provide lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas or perform relocations on behalf of the Non-Federal Sponsor. Such requests shall be in writing and shall describe the services requested to be performed. If in its sole discretion the Government elects to perform the requested services or any portion thereof, it shall so notify the Non-Federal Sponsor in a writing that sets forth any applicable terms and conditions, which must be consistent with this Agreement. In the event of conflict between such a writing and this Agreement, this Agreement shall control. The Non-Federal Sponsor shall be solely responsible for all costs of the requested services and shall pay all such costs in accordance with Article VI.C. of this Agreement. Notwithstanding the provision of lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas or performance of relocations by the Government, the Non-Federal Sponsor shall be responsible, as between the Government and the Non-Federal Sponsor, for the costs of cleanup and response in accordance with Article XV.C. of this Agreement.

I. The Government shall perform a final accounting in accordance with Article VI.D. of this Agreement to determine the contributions provided by the Non-Federal Sponsor in accordance with paragraphs B., D., E., F., G., and H. of this Article and Articles V, X, and XV.A. of this Agreement and to determine whether the Non-Federal Sponsor has met its obligations under paragraphs B., D., E., F., and G. of this Article.

J. The Non-Federal Sponsor shall not use Federal funds to meet the Non-Federal Sponsor's share of total project costs under this Agreement unless the Federal granting agency verifies in writing that the expenditure of such funds is expressly authorized by statute.

K. The Non-Federal Sponsor shall, for so long as the Project remains authorized, acquire, secure, provide, and maintain the quantity of water for such periods that the Government determines is necessary for the construction, operation, and maintenance of the Project, at no cost to the Government.

L. The Non-Federal Sponsor shall prevent obstructions of or encroachments on Project lands, easements, and rights-of-way (including prescribing and enforcing regulations to prevent such obstructions or encroachments) which might reduce the environmental restoration or level of flood protection it affords, or hinder its operation and maintenance, or interfere with the proper functioning of the Project.

M. The Non-Federal Sponsor shall prevent future recreation features or facilities, or the use thereof, from significantly impacting or interfering with the intended functions of the ecosystem restoration and flood control features of the Project.

N. The Non-Federal Sponsor shall provide and maintain necessary access roads, parking areas, and other public use facilities, open and available to all on equal terms.

O. The Non-Federal Sponsor shall participate in and comply with applicable Federal floodplain management and flood insurance programs.

P. Not less than once each year, the Non-Federal Sponsor shall inform affected interests of the limitations of the protection afforded by the Project.

Q. The Non-Federal Sponsor shall publicize flood plain information in the area concerned and shall provide this information to zoning and other regulatory agencies for their use in preventing unwise future development in the flood plain and in adopting such regulations as may be necessary to prevent unwise future development and to ensure compatibility with protection levels provided by the Project.

R. The Non-Federal Sponsor shall comply with Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S.C. 701b-12), which requires a Non-Federal interest to have prepared within one year after the date of signing this Agreement, a floodplain management plan. The plan shall be designed to reduce the impacts of future flood events in the project area, including but not limited to, addressing those measures to be undertaken by Non-Federal interests to preserve the level of flood protection provided by this Project. As required by Section 402, as amended, the Non-Federal interest shall implement such plan not later than one year after completion of construction of the Project. The Non-Federal Sponsor shall provide an information copy of the plan to the Government upon its preparation.

S. The costs of identification, survey and evaluation of historic properties and the costs of mitigation and data recovery activities associated with historic preservation shall be shared in accordance with the provisions of Article XVIII of this Agreement.

T. During the monitoring and adaptive management period, the Government shall perform monitoring and, if necessary, adaptive management of the ecosystem restoration features in accordance with the provisions of this paragraph.

1. The monitoring and adaptive management period shall be a period of five years beginning on the date of the District Engineer's notice to the Non-Federal Sponsor

in accordance with Article II.C. of this Agreement that the entire Project, or a functional portion of the Project pertaining to the ecosystem restoration features, is complete. If the District Engineer's notice addresses only a functional portion of the Project pertaining to the ecosystem restoration features, the monitoring and adaptive management period for that functional portion shall be a period of five years beginning on the date of such notice. Any monitoring or adaptive management required or performed after such five year period shall be the responsibility of the Non-Federal Sponsor at no cost to the Government.

2. Monitoring results shall be compared to success criteria identified for the ecosystem restoration features to determine if adaptive management measures are necessary. The total costs of monitoring shall not exceed one percent of the total cost of the ecosystem restoration features of the Project.

3. Adaptive management shall be undertaken if the Government, after consultation with the Non-Federal Sponsor, determines adjustments or changes are necessary to attain the objectives of the ecosystem restoration features. The total cost of adaptive management shall not exceed one percent of the total cost of the ecosystem restoration features of the Project.

ARTICLE III -LANDS, RELOCATIONS, DISPOSAL AREAS, AND PUBLIC LAW 91-646 COMPLIANCE

A. The Government, after consultation with the Non-Federal Sponsor, shall determine the lands, easements, and rights-of-way required for the construction, operation, and maintenance of the Project, including those required for relocations, borrow materials, and dredged or excavated material disposal. The Government in a timely manner shall provide the Non-Federal Sponsor with general written descriptions, including maps as appropriate, of the lands, easements, and rights-of-way that the Government determines the Non-Federal Sponsor must provide, in detail sufficient to enable the Non-Federal Sponsor to fulfill its obligations under this paragraph, and shall provide the Non-Federal Sponsor with a written notice to proceed with acquisition of such lands, easements, and rights-of-way. In such general written descriptions, the Government shall delineate which of such lands, easements, and rights-of-way are required for the flood control features, the ecosystem restoration features, the recreation features, and the environmental education features. Prior to the end of the period of construction, the Non-Federal Sponsor shall acquire all lands, easements, and rights-of-way set forth in such descriptions. Furthermore, prior to issuance of the solicitation for each construction contract, the Non-Federal Sponsor shall provide the Government with authorization for entry to all lands, easements, and rights-of-way the Government determines the Non-Federal Sponsor must provide for that contract. For so long as the Project remains authorized, the Non-Federal Sponsor shall ensure that lands, easements, and rights-of-way that the Government determines to be required for the operation and maintenance of the Project and that were provided by the Non-Federal Sponsor are retained in public ownership for uses compatible with the authorized purposes of the Project.

B. The Government, after consultation with the Non-Federal Sponsor, shall determine the improvements required on lands, easements, and rights-of-way to enable the proper disposal of dredged or excavated material associated with the construction, operation, and maintenance of the Project. Such improvements may include, but are not necessarily limited to, retaining dikes, wasteweirs, bulkheads, embankments, monitoring features, stilling basins, and de-watering pumps and pipes. The Government in a timely manner shall provide the Non-Federal Sponsor with general written descriptions of such improvements in detail sufficient to enable the Non-Federal Sponsor to fulfill its obligations under this paragraph, and shall provide the Non-Federal Sponsor with a written notice to proceed with construction of such improvements. In such general written descriptions, the Government shall delineate which of such improvements are required for the flood control features, the environmental restoration features, the recreation features, and the environmental education features. Prior to the end of the period of construction, the Non-Federal Sponsor shall provide all improvements set forth in such descriptions. Furthermore, prior to issuance of the solicitation for each Government construction contract, the Non-Federal Sponsor shall prepare plans and specifications for all improvements the Government determines to be required for the proper disposal of dredged or excavated material under that contract, submit such plans and specifications to the Government for approval, and provide such improvements in accordance with the approved plans and specifications.

C. The Government, after consultation with the Non-Federal Sponsor, shall determine the relocations necessary for the construction, operation, and maintenance of the Project, including those necessary to enable the removal of borrow materials and the proper disposal of dredged or excavated material. The Government in a timely manner shall provide the Non-Federal Sponsor with general written descriptions, including maps as appropriate, of such relocations in detail sufficient to enable the Non-Federal Sponsor to fulfill its obligations under this paragraph, and shall provide the Non-Federal Sponsor with a written notice to proceed with such relocations. In such general written descriptions, the Government shall delineate which of such relocations are necessary for the flood control features, the environmental restoration features, the recreation features, and the environmental education features. Prior to the end of the period of construction, the Non-Federal Sponsor shall perform or ensure the performance of all relocations as set forth in such descriptions. Furthermore, prior to issuance of the solicitation for each Government construction contract, the Non-Federal Sponsor shall prepare or ensure the preparation of plans and specifications for, and perform or ensure the performance of, all relocations the Government determines to be necessary for that contract.

D. The Non-Federal Sponsor in a timely manner shall provide the Government with such documents as are sufficient to enable the Government to determine the value of any contribution provided pursuant to paragraphs A., B., or C. of this Article. Upon receipt of such documents the Government, in accordance with Article IV of this Agreement and in a timely manner, shall determine the value of such contribution; include such value in total project costs; assign that value to total project flood control costs, total project environmental restoration costs, total project recreation costs, or total project environmental education facilities cost; and afford credit for such value toward the Non-Federal Sponsor's

share of total project flood control costs, total project environmental restoration costs, total project recreation costs, or total project environmental education facilities costs.

E. The Non-Federal Sponsor shall comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 C.F.R. Part 24, in acquiring lands, easements, and rights-of-way required for the construction, operation, and maintenance of the Project, including those necessary for relocations, borrow materials, and dredged or excavated material disposal, and shall inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

ARTICLE IV -CREDIT FOR VALUE OF LANDS, RELOCATIONS, AND DISPOSAL AREAS

A. The Non-Federal Sponsor shall receive credit toward its share of total project costs for the value of the lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas that the Non-Federal Sponsor must provide pursuant to Article III of this Agreement for the flood control features, ecosystem restoration features and recreation features, and for the value of the relocations that the Non-Federal Sponsor must perform or for which it must ensure performance pursuant to Article III of this Agreement for the flood control features, ecosystem restoration features and recreation features. However, the Non-Federal Sponsor shall not receive credit for the value of separable lands, easements, rights-of-way, relocations, or borrow and dredged or excavated material disposal areas that the Non-Federal Sponsor must provide or perform pursuant to Article III of this Agreement for the environmental education features. Further, the Non-Federal Sponsor shall not receive credit for the value of any lands, easements, rights-of-way, relocations, or borrow and dredged or excavated material disposal areas that have been provided previously as an item of cooperation for another Federal project. The Non-Federal Sponsor also shall not receive credit for the value of lands, easements, rights-of-way, relocations, or borrow and dredged or excavated material disposal areas to the extent that such items are provided using Federal funds unless the Federal granting agency verifies in writing that such credit is expressly authorized by statute.

B. For the sole purpose of affording credit in accordance with this Agreement, the value of lands, easements, and rights-of-way, including those necessary for relocations, borrow materials, and dredged or excavated material disposal, shall be the fair market value of the real property interests, plus certain incidental costs of acquiring those interests, as determined in accordance with the provisions of this paragraph.

1. Date of Valuation. The fair market value of lands, easements, or rights-of-way owned by the Non-Federal Sponsor on the effective date of this Agreement shall be the fair market value of such real property interests as of the date the Non-Federal Sponsor provides the Government with authorization for entry thereto. The fair market value of

lands, easements, or rights-of-way acquired by the Non-Federal Sponsor after the effective date of this Agreement shall be the fair market value of such real property interests at the time the interests are acquired.

2. General Valuation Procedure. Except as provided in paragraph B.3. of this Article, the fair market value of lands, easements, or rights-of-way shall be determined in accordance with paragraph B.2.a. of this Article, unless thereafter a different amount is determined to represent fair market value in accordance with paragraph B.2.b. of this Article.

a. The Non-Federal Sponsor shall obtain, for each real property interest, an appraisal that is prepared by a qualified appraiser who is acceptable to the Non-Federal Sponsor and the Government. The appraisal must be prepared in accordance with the applicable rules of just compensation, as specified by the Government. The fair market value shall be the amount set forth in the Non-Federal Sponsor's appraisal, if such appraisal is approved by the Government. In the event the Government does not approve the Non-Federal Sponsor's appraisal, the Non-Federal Sponsor may obtain a second appraisal, and the fair market value shall be the amount set forth in the Non-Federal Sponsor's second appraisal, if such appraisal is approved by the Government. In the event the Government does not approve the Non-Federal Sponsor's second appraisal, or the Non-Federal Sponsor chooses not to obtain a second appraisal, the Government shall obtain an appraisal, and the fair market value shall be the amount set forth in the Government's appraisal, if such appraisal is approved by the Non-Federal Sponsor. In the event the Non-Federal Sponsor does not approve the Government's appraisal, the Government, after consultation with the Non-Federal Sponsor, shall consider the Government's and the Non-Federal Sponsor's appraisals and determine an amount based thereon, which shall be deemed to be the fair market value.

b. Where the amount paid or proposed to be paid by the Non-Federal Sponsor for the real property interest exceeds the amount determined pursuant to paragraph B.2.a. of this Article, the Government, at the request of the Non-Federal Sponsor, shall consider all factors relevant to determining fair market value and, in its sole discretion, after consultation with the Non-Federal Sponsor, may approve in writing an amount greater than the amount determined pursuant to paragraph B.2.a. of this Article, but not to exceed the amount actually paid or proposed to be paid. If the Government approves such an amount, the fair market value shall be the lesser of the approved amount or the amount paid by the Non-Federal Sponsor, but no less than the amount determined pursuant to paragraph B.2.a. of this Article.

3. Eminent Domain Valuation Procedure. For lands, easements, or rights-of-way acquired by eminent domain proceedings instituted after the effective date of this Agreement, the Non-Federal Sponsor shall, prior to instituting such proceedings, submit to the Government notification in writing of its intent to institute such proceedings and an appraisal of the specific real property interests to be acquired in such proceedings. The Government shall have 60 days after receipt of such a notice and appraisal within which to review the appraisal, if not previously approved by the Government in writing.

a. If the Government previously has approved the appraisal in writing, or if the Government provides written approval of, or takes no action on, the appraisal within such 60-day period, the Non-Federal Sponsor shall use the amount set forth in such appraisal as the estimate of just compensation for the purpose of instituting the eminent domain proceeding.

b. If the Government provides written disapproval of the appraisal, including the reasons for disapproval, within such 60-day period, the Government and the Non-Federal Sponsor shall consult in good faith to promptly resolve the issues or areas of disagreement that are identified in the Government's written disapproval. If, after such good faith consultation, the Government and the Non-Federal Sponsor agree as to an appropriate amount, then the Non-Federal Sponsor shall use that amount as the estimate of just compensation for the purpose of instituting the eminent domain proceeding. If, after such good faith consultation, the Government and the Non-Federal Sponsor cannot agree as to an appropriate amount, then the Non-Federal Sponsor may use the amount set forth in its appraisal as the estimate of just compensation for the purpose of instituting the eminent domain proceeding.

c. For lands, easements, or rights-of-way acquired by eminent domain proceedings instituted in accordance with sub-paragraph B.3. of this Article, fair market value shall be either the amount of the court award for the real property interests taken, to the extent the Government determined such interests are required for the construction, operation, and maintenance of the Project, or the amount of any stipulated settlement or portion thereof that the Government approves in writing.

4. Incidental Costs. For lands, easements, or rights-of-way acquired by the Non-Federal Sponsor within a five-year period preceding the effective date of this Agreement, or at any time after the effective date of this Agreement, the value of the interest shall include the documented incidental costs of acquiring the interest, as determined by the Government, subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of costs. Such incidental costs shall include, but not necessarily be limited to, closing and title costs, appraisal costs, survey costs, attorney's fees, plat maps, and mapping costs, as well as the actual amounts expended for payment of any Public Law 91-646 relocation assistance benefits provided in accordance with Article III.E. of this Agreement.

C. After consultation with the Non-Federal Sponsor, the Government shall determine the value of relocations in accordance with the provisions of this paragraph.

1. For a relocation other than a highway, the value shall be only that portion of relocation costs that the Government determines is necessary to provide a functionally equivalent facility, reduced by depreciation, as applicable, and by the salvage value of any removed items.

2. For a relocation of a highway, the value shall be only that portion of relocation costs that would be necessary to accomplish the relocation in accordance with the design standard that the State of Arizona would apply under similar conditions of geography and traffic load, reduced by the salvage value of any removed items.

3. Relocation costs shall include, but not necessarily be limited to, actual costs of performing the relocation; planning, engineering and design costs; supervision and administration costs; and documented incidental costs associated with performance of the relocation, but shall not include any costs due to betterments, as determined by the Government, nor any additional cost of using new material when suitable used material is available. Relocation costs shall be subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of costs.

4. Any credit afforded for the value of relocations performed within the Project boundaries is subject to satisfactory compliance with applicable Federal labor laws covering non-Federal construction, including, but not limited to, 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a *et seq.*), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 *et seq.*) and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c)). Crediting may be withheld, in whole or in part, as a result of the Non-Federal Sponsor's failure to comply with its obligations under these laws.

D. The value of the improvements made to lands, easements, and rights-of-way for the proper disposal of dredged or excavated material shall be the costs of the improvements, as determined by the Government, subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of costs. Such costs shall include, but not necessarily be limited to, actual costs of providing the improvements; planning, engineering and design costs; supervision and administration costs; and documented incidental costs associated with providing the improvements, but shall not include any costs due to betterments, as determined by the Government.

ARTICLE V -PROJECT COORDINATION TEAM

A. To provide for consistent and effective communication, the Non-Federal Sponsor and the Government, not later than 30 days after the effective date of this Agreement, shall appoint named senior representatives to a Project Coordination Team. Thereafter, the Project Coordination Team shall meet regularly until the end of the period of construction. The Government's Project Manager and a counterpart named by the Non-Federal Sponsor shall co-chair the Project Coordination Team.

B. The Government's Project Manager and the Non-Federal Sponsor's counterpart shall keep the Project Coordination Team informed of the progress of construction and of significant pending issues and actions, and shall seek the views of the Project Coordination Team on matters that the Project Coordination Team generally oversees.

C. Until the end of the period of construction, the Project Coordination Team shall generally oversee the Project, including issues related to design; plans and specifications; scheduling; real property and relocation requirements; real property acquisition; contract awards and modifications; contract costs; the application of and compliance with 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a *et seq.*), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 *et seq.*) and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c)) for relocations; the Government's cost projections; final inspection of the entire Project or functional portions of the Project; preparation of the proposed OMR&R Manual; performance of monitoring and adaptive management; anticipated requirements and needed capabilities for performance of operation, maintenance, repair, replacement, and rehabilitation of the Project; requirements of the monitoring; implementation of any adaptive management changes; and other related matters. This oversight shall be consistent with a project management plan developed by the Government after consultation with the Non-Federal Sponsor.

D. The Project Coordination Team may make recommendations that it deems warranted to the District Engineer on matters that the Project Coordination Team generally oversees, including suggestions to avoid potential sources of dispute. The Government in good faith shall consider the recommendations of the Project Coordination Team. The Government, having the legal authority and responsibility for construction of the Project, has the discretion to accept, reject, or modify the Project Coordination Team's recommendations.

E. The costs of participation in the Project Coordination Team shall be included in total project costs and cost shared in accordance with the provisions of this Agreement. However, the Non-Federal Sponsor shall not receive credit for the costs of participation in the Project Coordination Team that pertain to the environmental education features.

ARTICLE VI -METHOD OF PAYMENT

A. The Government shall maintain current records of contributions provided by the parties and current projections of total project costs and costs due to betterments. By July 1st of each year and at least quarterly thereafter, the Government shall provide the Non-Federal Sponsor with a report setting forth all contributions provided to date and the current projections of total project costs, of total costs due to betterments, of the maximum amount of total project costs determined in accordance with Article XIX of this Agreement, of the components of total project costs, of each party's share of total project costs, of the Non-Federal Sponsor's total cash contributions required in accordance with Articles II.B., II.D., II.E., II.F., II.G., and II.H. of this Agreement, of the non-Federal proportionate share, and of the funds the Government projects to be required from the Non-Federal Sponsor for the upcoming fiscal year. On the effective date of this Agreement, total project costs for Phases I-III are projected to be \$90,810,000 (at October 2003 price levels), and the Non-Federal Sponsor's cash contribution required under Article II.D. of this Agreement is projected to be

\$15,749,000 with an estimated \$18,290,000 in LERRDS, (at October 2003 price levels). Such amounts are estimates subject to adjustment by the Government and are not to be construed as the total financial responsibilities of the Government and the Non-Federal Sponsor.

B. The Non-Federal Sponsor shall provide the cash contribution required under Articles II.D.1., II.D.3., II.E.2., II.F.2., and II.G.2. of this Agreement in accordance with the provisions of this paragraph.

1. Not less than 30 calendar days prior to the scheduled date for issuance of the solicitation for the first construction contract, the Government shall notify the Non-Federal Sponsor in writing of such scheduled date and the funds the Government determines to be required from the Non-Federal Sponsor to meet the non-Federal proportionate share of projected financial obligations for construction through the first fiscal year of construction, including the non-Federal proportionate share of financial obligations for construction incurred prior to the commencement of the period of construction. Not later than such scheduled date, the Non-Federal Sponsor shall provide the Government with the full amount of the required funds by delivering a check payable to "FAO, USAED, Los Angeles" to the District Engineer or verifying to the satisfaction of the Government that the Non-Federal Sponsor has deposited the required funds in an escrow or other account acceptable to the Government, with interest accruing to the Non-Federal Sponsor or presenting the Government with an irrevocable letter of credit acceptable to the Government for the required funds or providing an Electronic Funds Transfer in accordance with procedures established by the Government.

2. For the second and subsequent fiscal years of construction, the Government shall notify the Non-Federal Sponsor in writing, no later than 60 calendar days prior to the beginning of that fiscal year, of the funds the Government determines to be required from the Non-Federal Sponsor to meet the non-Federal proportionate share of projected financial obligations for construction for that fiscal year. No later than 30 calendar days prior to the beginning of the fiscal year, the Non-Federal Sponsor shall make the full amount of the required funds for that fiscal year available to the Government through any of the payment mechanisms specified in Article VI.B.1. of this Agreement.

3. The Government shall draw from the funds provided by the Non-Federal Sponsor such sums as the Government deems necessary to cover: (a) the non-Federal proportionate share of financial obligations for construction incurred prior to the commencement of the period of construction; and (b) the non-Federal proportionate share of financial obligations for construction as they are incurred during the period of construction.

4. If at any time during the period of construction the Government determines that additional funds will be needed from the Non-Federal Sponsor to cover the non-Federal proportionate share of projected financial obligations for construction for the current fiscal year, the Government shall notify the Non-Federal Sponsor in writing of the additional funds required, and provide an explanation of why additional funds are required, and the Non-Federal Sponsor, no later than 90 calendar days from receipt of such notice,

shall make the additional required funds available through any of the payment mechanisms specified in Article VI.B.1. of this Agreement.

C. In advance of the Government incurring any financial obligation associated with additional work under Article II.B. or II.H. of this Agreement, the Non-Federal Sponsor shall provide the Government with the full amount of the funds required to pay for such additional work through any of the payment mechanisms specified in Article VI.B.1. of this Agreement. The Government shall draw from the funds provided by the Non-Federal Sponsor such sums as the Government deems necessary to cover the Government's financial obligations for such additional work as they are incurred. In the event the Government determines that the Non-Federal Sponsor must provide additional funds to meet its cash contribution, the Government shall notify the Non-Federal Sponsor in writing of the additional funds required and provide an explanation of why additional funds are required. Within 90 calendar days thereafter, the Non-Federal Sponsor shall provide the Government with the full amount of the additional required funds through any of the payment mechanisms specified in Article VI.B.1. of this Agreement

D. Upon completion of the Project or termination of this Agreement, and upon resolution of all relevant claims and appeals, the Government shall conduct a final accounting and furnish the Non-Federal Sponsor with the results of the final accounting. The final accounting shall determine total project costs, each party's contribution provided thereto, and each party's required share thereof. The final accounting also shall determine costs due to betterments and the Non-Federal Sponsor's cash contribution provided pursuant to Article II.B. of this Agreement.

1. In the event the final accounting shows that the total contribution provided by the Non-Federal Sponsor is less than its required share of total project costs plus costs due to any betterments provided in accordance with Article II.B. of this Agreement, the Non-Federal Sponsor shall, no later than 90 calendar days after receipt of written notice, make a cash payment to the Government of whatever sum is required to meet the Non-Federal Sponsor's required share of total project costs plus costs due to any betterments provided in accordance with Article II.B. of this Agreement by delivering a check payable to "FAO, USAED, Los Angeles" to the District Engineer or providing an Electronic Funds Transfer in accordance with procedures established by the Government.

2. In the event the final accounting shows that the total contribution provided by the Non-Federal Sponsor exceeds its required share of total project costs plus costs due to any betterments provided in accordance with Article II.B. of this Agreement, the Government shall, subject to the availability of funds, refund the excess to the Non-Federal Sponsor no later than 90 calendar days after the final accounting is complete. In the event existing funds are not available to refund the excess to the Non-Federal Sponsor, the Government shall seek such appropriations in the next possible budget cycle as are necessary to make the refund in the succeeding fiscal year.

ARTICLE VII -DISPUTE RESOLUTION

As a condition precedent to a party bringing any suit for breach of this Agreement, that party must first notify the other party in writing of the nature of the purported breach and seek in good faith to resolve the dispute through negotiation. If the parties cannot resolve the dispute through negotiation, they may agree to a mutually acceptable method of non-binding alternative dispute resolution with a qualified third party acceptable to both parties. The parties shall each pay 50 percent of any costs for the services provided by such a third party as such costs are incurred. The existence of a dispute shall not excuse the parties from performance pursuant to this Agreement.

ARTICLE VIII - OPERATION, MAINTENANCE, REPAIR, REPLACEMENT, AND REHABILITATION (OMRR&R)

A. Upon notification in accordance with Article II.C. of this Agreement and for so long as the Project remains authorized, the Non-Federal Sponsor shall operate, maintain, repair, replace, and rehabilitate the entire Project or the functional portion of the Project, at no cost to the Government, in a manner compatible with the Project's authorized purposes and in accordance with applicable Federal and State laws as provided in Article XI of this Agreement and specific directions prescribed by the Government in the OMRR&R Manual and any subsequent amendments thereto.

B. The Non-Federal Sponsor hereby gives the Government a right to enter, at reasonable times and in a reasonable manner, upon property that the Non-Federal Sponsor owns or controls for access to the Project for the purpose of inspection and, if necessary, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the Project. If an inspection shows that the Non-Federal Sponsor for any reason is failing to perform its obligations under this Agreement, the Government shall send a written notice describing the non-performance to the Non-Federal Sponsor. If, after 90 calendar days from receipt of notice, the Non-Federal Sponsor continues to fail to perform, then the Government shall have the right to enter, at reasonable times and in a reasonable manner, upon property that the Non-Federal Sponsor owns or controls for access to the Project for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the Project. No completion, operation, maintenance, repair, replacement, or rehabilitation by the Government shall operate to relieve the Non-Federal Sponsor of responsibility to meet the Non-Federal Sponsor's obligations as set forth in this Agreement, or to preclude the Government from pursuing any other remedy at law or equity to ensure faithful performance pursuant to this Agreement.

ARTICLE IX -INDEMNIFICATION

The Non-Federal Sponsor shall hold and save the Government free from all damages arising from the construction, operation, maintenance, repair, replacement, and

rehabilitation of the Project and any Project-related betterments, except for damages due to the fault or negligence of the Government or its contractors.

ARTICLE X -MAINTENANCE OF RECORDS AND AUDIT

A. Not later than 60 calendar days after the effective date of this Agreement, the Government and the Non-Federal Sponsor shall develop procedures for keeping books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to this Agreement. These procedures shall incorporate, and apply as appropriate, the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 C.F.R. Section 33.20. The Government and the Non-Federal Sponsor shall maintain such books, records, documents, and other evidence in accordance with these procedures and for a minimum of three years after the period of construction and resolution of all relevant claims arising therefrom. To the extent permitted under applicable Federal laws and regulations, the Government and the Non-Federal Sponsor shall each allow the other to inspect such books, documents, records, and other evidence.

B. Pursuant to 32 C.F.R. Section 33.26, the Non-Federal Sponsor is responsible for complying with the Single Audit Act Amendments of 1996, 31 U.S.C. Sections 7501-7507, as implemented by Office of Management and Budget (OMB) Circular No. A-133 and Department of Defense Directive 7600.10. Upon request of the Non-Federal Sponsor and to the extent permitted under applicable Federal laws and regulations, the Government shall provide to the Non-Federal Sponsor and independent auditors any information necessary to enable an audit of the Non-Federal Sponsor's activities under this Agreement. The costs of any non-Federal audits performed in accordance with this paragraph shall be allocated in accordance with the provisions of OMB Circulars A-87 and A-133, and such costs as are allocated to the Project shall be included in total project costs and cost shared in accordance with the provisions of this Agreement. However, the Non-Federal Sponsor shall not receive credit for such allocated costs of non-Federal audits that pertain to the environmental education features.

C. In accordance with 31 U.S.C. Section 7503, the Government may conduct audits in addition to any audit that the Non-Federal Sponsor is required to conduct under the Single Audit Act Amendments of 1996. Any such Government audits shall be conducted in accordance with Government Auditing Standards and the cost principles in OMB Circular No. A-87 and other applicable cost principles and regulations. The costs of Government audits performed in accordance with this paragraph shall be included in total project costs and cost shared in accordance with the provisions of this Agreement.

ARTICLE XI -FEDERAL AND STATE LAWS

In the exercise of their respective rights and obligations under this Agreement, the Non-Federal Sponsor and the Government agree to comply with all applicable Federal

and State laws and regulations, including, but not limited to: Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d) and Department of Defense Directive 5500.11 issued pursuant thereto; Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army"; and all applicable Federal labor standards requirements including, but not limited to, 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a *et seq.*), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 *et seq.*) and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c)).

ARTICLE XII -RELATIONSHIP OF PARTIES

A. In the exercise of their respective rights and obligations under this Agreement, the Government and the Non-Federal Sponsor each act in an independent capacity, and neither is to be considered the officer, agent, or employee of the other.

B. In the exercise of its rights and obligations under this Agreement, neither party shall provide, without the consent of the other party, any contractor with a release that waives or purports to waive any rights such other party may have to seek relief or redress against such contractor either pursuant to any cause of action that such other party may have or for violation of any law.

ARTICLE XIII -OFFICIALS NOT TO BENEFIT

No member of or delegate to the Congress, nor any resident commissioner, shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom.

ARTICLE XIV -TERMINATION OR SUSPENSION

A. If at any time the Non-Federal Sponsor fails to fulfill its obligations under Article II.B., II.D., II.E., II.F., II.G., VI, or XVIII.C. of this Agreement, the Assistant Secretary of the Army (Civil Works) shall terminate this Agreement or suspend future performance under this Agreement unless he determines that continuation of work on the Project is in the interest of the United States or is necessary in order to satisfy agreements with any other non-Federal interests in connection with the Project.

B. If the Government fails to receive annual appropriations in amounts sufficient to meet Project expenditures for the then-current or upcoming fiscal year, the Government shall so notify the Non-Federal Sponsor in writing, and 60 calendar days thereafter either party may elect without penalty to terminate this Agreement or to suspend future performance under this Agreement. In the event that either party elects to suspend future performance under this Agreement pursuant to this paragraph, such suspension shall remain

in effect until such time as the Government receives sufficient appropriations or until either the Government or the Non-Federal Sponsor elects to terminate this Agreement.

C. In the event that either party elects to terminate this Agreement pursuant to this Article or Article XV of this Agreement, both parties shall conclude their activities relating to the Project and proceed to a final accounting in accordance with Article VI.D. of this Agreement.

D. Any termination of this Agreement or suspension of future performance under this Agreement in accordance with this Article or Article XV of this Agreement shall not relieve the parties of liability for any obligation previously incurred. Any delinquent payment shall be charged interest at a rate, to be determined by the Secretary of the Treasury, equal to 150 per centum of the average bond equivalent rate of the 13-week Treasury bills auctioned immediately prior to the date on which such payment became delinquent, or auctioned immediately prior to the beginning of each additional 3-month period if the period of delinquency exceeds 3 months.

ARTICLE XV - HAZARDOUS SUBSTANCES

A. After execution of this Agreement and upon direction by the District Engineer, the Non-Federal Sponsor shall perform, or cause to be performed, any investigations for hazardous substances that the Government or the Non-Federal Sponsor determines to be necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (hereinafter "CERCLA"), 42 U.S.C. Sections 9601-9675, that may exist in, on, or under lands, easements, and rights-of-way that the Government determines, pursuant to Article III of this Agreement, to be required for the construction, operation, and maintenance of the Project. However, for lands that the Government determines to be subject to the navigation servitude, only the Government shall perform such investigations unless the District Engineer provides the Non-Federal Sponsor with prior specific written direction, in which case the Non-Federal Sponsor shall perform such investigations in accordance with such written direction. All actual costs incurred by the Non-Federal Sponsor for such investigations for hazardous substances shall be included in total project costs and cost shared in accordance with the provisions of this Agreement, subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of costs. However, the Non-Federal Sponsor shall not receive credit for costs incurred by the Non-Federal Sponsor for such investigations for hazardous substances that pertain to the environmental education features.

B. In the event it is discovered through any investigation for hazardous substances or other means that hazardous substances regulated under CERCLA exist in, on, or under any lands, easements, or rights-of-way that the Government determines, pursuant to Article III of this Agreement, to be required for the construction, operation, and maintenance of the Project, the Non-Federal Sponsor and the Government shall provide prompt written notice to each other, and the Non-Federal Sponsor shall not proceed with the acquisition of the real property interests until both parties agree that the Non-Federal Sponsor should proceed.

C. The Government and the Non-Federal Sponsor shall determine whether to initiate construction of the Project, or, if already in construction, whether to continue with work on the Project, suspend future performance under this Agreement, or terminate this Agreement for the convenience of the Government, in any case where hazardous substances regulated under CERCLA are found to exist in, on, or under any lands, easements, or rights-of-way that the Government determines, pursuant to Article III of this Agreement, to be required for the construction, operation, and maintenance of the Project. Should the Government and the Non-Federal Sponsor determine to initiate or continue with construction after considering any liability that may arise under CERCLA, the Non-Federal Sponsor shall be responsible, as between the Government and the Non-Federal Sponsor, for the costs of clean-up and response, to include the costs of any studies and investigations necessary to determine an appropriate response to the contamination. Such costs shall not be considered a part of total project costs. In the event the Non-Federal Sponsor fails to provide any funds necessary to pay for clean up and response costs or to otherwise discharge the Non-Federal Sponsor's responsibilities under this paragraph upon direction by the

Government, the Government may, in its sole discretion, either terminate this Agreement for the convenience of the Government, suspend future performance under this Agreement, or continue work on the Project.

D. The Non-Federal Sponsor and the Government shall consult with each other in accordance with Article V of this Agreement in an effort to ensure that responsible parties bear any necessary clean up and response costs as defined in CERCLA. Any decision made pursuant to paragraph C. of this Article shall not relieve any third party from any liability that may arise under CERCLA.

E. As between the Government and the Non-Federal Sponsor, the Non-Federal Sponsor shall be considered the operator of the Project for purposes of CERCLA liability. To the maximum extent practicable, the Non-Federal Sponsor shall operate, maintain, repair, replace, and rehabilitate the Project in a manner that will not cause liability to arise under CERCLA.

ARTICLE XVI -NOTICES

A. Any notice, request, demand, or other communication required or permitted to be given under this Agreement shall be deemed to have been duly given if in writing and either delivered personally, by telegram or mailed by first-class, registered, or certified mail, as follows:

If to the Non-Federal Sponsor:

Deputy City Manager
City of Phoenix
200 West Washington Street, Room 1200
Phoenix, AZ 85003-1611

If to the Government:

Deputy District Engineer
Department of the Army
Corps of Engineers
Los Angeles District
ATTN: CESPL-PM-C
P.O. Box 532711
Los Angeles, California 90053-2325

B. A party may change the address to which such communications are to be directed by giving written notice to the other party in the manner provided in this Article.

C. Any notice, request, demand, or other communication made pursuant to this Article shall be deemed to have been received by the addressee at the earlier of such time as it is actually received or seven calendar days after it is mailed.

ARTICLE XVII -CONFIDENTIALITY

To the extent permitted by the laws governing each party, the parties agree to maintain the confidentiality of exchanged information when requested to do so by the providing party.

ARTICLE XVIII - HISTORIC PRESERVATION

A. The costs of identification, survey and evaluation of historic properties shall be included in total project costs and cost shared in accordance with the provisions of this Agreement.

B. As specified in Section 7(a) of Public Law 93-291 (16 U.S.C. Section 469c(a)), the costs of mitigation and data recovery activities associated with historic preservation shall be borne entirely by the Government and shall not be included in total project costs, up to the statutory limit of one percent of the total amount authorized to be appropriated for the Project.

C. The Government shall not incur costs for mitigation and data recovery that exceed the statutory one percent limit specified in paragraph B. of this Article unless and until the Assistant Secretary of the Army (Civil Works) has waived that limit in accordance with Section 208(3) of Public Law 96-515 (16 U.S.C. Section 469c-2(3)). Any costs of mitigation and data recovery attributable to the flood control features, or the ecosystem restoration features, that exceed the one percent limit shall not be included in total project costs but shall be cost shared between the Non-Federal Sponsor and the Government consistent with the minimum non-Federal cost sharing requirements for the underlying flood control purpose, or the non-Federal cost sharing requirements for the underlying ecosystem restoration purpose, as follows: 35 percent borne by the Non-Federal Sponsor, and 65 percent borne by the Government. Any costs of mitigation and data recovery attributable to the recreation features that exceed the one percent limit shall not be included in total project costs but shall be cost shared between the Non-Federal Sponsor and the Government consistent with the non-Federal cost sharing requirements for the underlying recreation purpose, as follows: 50 percent borne by the Non-Federal Sponsor, and 50 percent borne by the Government.

ARTICLE XIX -SECTION 902 PROJECT COST LIMITS

The Non-Federal Sponsor has reviewed the provisions set forth in Section 902 of Public Law 99-662, as amended, and understands that Section 902 establishes the maximum amount of total project costs for the Authorized Project. Notwithstanding any other provision of this Agreement, the Government shall not make a new Project financial obligation, make a Project expenditure, or afford credit toward total project costs for the value of any contribution provided by the Non-Federal Sponsor, if such obligation, expenditure, or credit would result in total project costs exceeding this maximum amount, unless otherwise authorized by law. On the effective date of this Agreement, this maximum

amount is estimated to be \$133,086,000, as calculated in accordance with ER 1105-2-100 using October 1, 2003 price levels and allowances for projected future inflation. The Government shall adjust this maximum amount in accordance with Section 902 of Public Law 99-662, as amended.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement, which shall become effective upon the date it is signed by the Assistant Secretary of the Army (Civil Works).

DEPARTMENT OF THE ARMY

CITY OF PHOENIX
A municipal corporation
Frank Fairbanks, City Manager

BY: *John Paul Woodley*
for John Paul Woodley

Assistant Secretary of the Army
(Civil Works)

By Memorandum, dated
March 8, 2004, delegated to:
Richard G. Thompson
Colonel, US Army
District Engineer

BY: *Andrea Tevlin*

Andrea Tevlin
Deputy City Manager

ATTEST: *Vicky Miel*

Vicky Miel, City Clerk

DATE: *19 May 2004*

DATE: APR 19 2004

CERTIFICATE OF AUTHORITY

I, William Bock, do hereby certify that I am the principal legal officer of the City of Phoenix, that the City of Phoenix is a legally constituted public body with full authority and legal capability to perform the terms of the Agreement between the Department of the Army and the City of Phoenix in connection with the Tres Rios, Arizona Project, and to pay damages in accordance with the terms of this Agreement, if necessary, in the event of the failure to perform, as required by Section 221 of Public Law 91-611 (42 U.S.C. Section 1962d-5b), and that the persons who have executed this Agreement on behalf of the City of Phoenix have acted within their statutory authority.

IN WITNESS WHEREOF, I have made and executed this certification this

16 day of APRIL 2004.

William Bock
William F. Bock
City of Phoenix
Chief Counsel

CERTIFICATION REGARDING LOBBYING

The undersigned certifies, to the best of his or her knowledge and belief that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Andrea Tevlin

Andrea Tevlin
Deputy City Manager
City of Phoenix, Arizona

DATE: April 19, 2004

APPROVED BY CITY COUNCIL:

DATE: April 14, 2004 - Item No. 71

APPENDIX III

SAMPLE REPORTING FORMS

APPENDIX III

SEMIANNUAL REPORTING FORMS (OPTIONAL)

INSTRUCTION FOR USE

GENERAL

1. The use of sample forms presented in this appendix is optional. Other means of reporting, as other tabular presentations or the Corps forms, can be used providing that the same basic information, operation and maintenance criteria, and maintenance accomplishment are provided. Both the spring and fall semiannual operation and maintenance reports submitted to the Corps of Engineers, Los Angeles District, are organized in basically the same way.

SEMIANNUAL LETTER REPORT

2. Sample semiannual letter report is provided in this appendix. In general, the samples are self-explanatory. Semiannual report presents a statement of:
- a. The physical condition of the protective works as summarized from the logs of inspection.
 - b. Performance of protective works during floods and flood-fighting activities during the past.
 - c. Prosecutions for encroachment or trespass.
 - d. Permits issued for rights-of-entry or use of rights-of-way.
 - e. Permits issued for improvements or construction with the flood-control improvement right-of-way.
 - f. Maintenance measured taken; nature, date of construction, date of removal of temporary repairs, date of permanent repairs.
 - g. Fiscal statement of cost of maintenance and operation for the period.

SAMPLE SEMIANNUAL LETTER REPORT

Date:

District Engineer
U.S. Army Corps of Engineers
Los Angeles District
P.O. Box 2711
Los Angeles, California 90053

Dear Sir:

The semiannual report for the period (15 October 20__ to 15 April 20__) or (15 April 20__ to 15 October 20__) on the Tres Rios Environmental Restoration, Flood Control North Levee-Phase 1A is as follows:

a. The physical condition of the protective works is indicated by the inspection reports, copies of which are enclosed 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 of anticipated maintenance operations
for the following 6 months)*

b. During this report period, major high water periods occurred on the following dates:

<u>DATE</u>	<u>MAX ELEVATION</u>

c. The inspection has indicated *(no)* or *(the following)* encroachment or trespass upon the project rights-of-way.

Action or prosecution for abatement of these encroachments or trespasses is summarized as follows:
(or state none have been necessary)

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

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

e. The status of maintenance measures indicated in the previous reports as required or as suggested by the representatives of the Commander is as follows:

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

f. The fiscal statement of the gross operation and maintenance expenditures for the current report period is as follows:

Stormflow operations	\$ _____
Inspection and reporting	_____
New permit inspection	_____
Maintenance & Repairs	_____
TOTAL	\$ _____

Comments on these expenditures are as follows:

(Comments)

Sincerely,

(name), Superintendent of Works

Enclosures

SEMIANNUAL INSPECTION REPORT
(To be submitted on 1 June and 1 December)

Project: TRES RIOS ENVIRONMENTAL RESTORATION,
FLOOD CONTROL NORTH LEVEE-PHASE 1A.

Inspector-in-charge: _____ Date: _____

Superintendent: _____ Date: _____

INSPECTION AND MAINTENANCE

FEATURE INSPECTED

CONDITIONS

1. Levee
 - a. Levee Frontslope including levee toe-down. (report any settlement, undermining, erosion or gullying)
 - b. Levee backslope. (report any landscaping, settlement, erosion or gullying)
 - c. Sod Growth
 - d. Gullies, Cracks, Holes
 - e. Levee O&M Roads (report vegetation, settlement, base failure)
 - f. Access Ramps/Turn-Around. (report on surfacing deterioration, areas requiring patching)
2. Guide Dikes
 - a. Dikes (report any settlement and erosion)
 - b. Gabion Mattress (report any settlement, undermining and gabion basket damage)
3. Collector Channel including Concrete Irrigation Sidedrains (report any damage to concrete walls and invert, construction joints, any cracks, spalls, or abrasive wear.).
4. Grouted Stone (report stone deterioration, settlement, displacement, sliding and cracking)
 - a. Grouted stone protection
 - b. Dumped stone protection

5. Detention Basin including low flow ditch (report vegetation growth and sediment/debris accumulation)
 - a. Rock mulch side slope protection
 - b. Basin design slope to drain
6. RCB Culverts (report any damage to walls, invert and top slabs, construction joints, cracks, or spalls)
 - a. Inlet Structures (report any damage to wingwalls/headwall/invert)
 - b. Trash Rack (indicate if repairs are needed for various items of metal work)
 - c. Outlet Structures (report any damage to grouted stone, concrete wingwalls/headwall/invert)
 - d. Flap Gate (indicate if repairs are needed for each flap gate)
7. Drainage Channel (record aggradation and degradation of drainage channel by visual observation)
8. Access Gates and Four-Wire Fence (indicate if repairs are needed for various items of metal works for gates and report any damage to wire, posts or galvanizing for fence)

ACTION PLANNED OR TAKEN TO CORRECT DEFICIENCIES

APPENDIX IV

SAMPLE PERMIT APPLICATION

SAMPLE PERMIT APPLICATION

The following pages provide detailed instructions for preparing the Department of Army Permit Application. If you have any questions, please call the Corps of Engineers, Regulatory Branch that has jurisdiction over your area.

**Instructions for Preparing a
Department of the Army Permit Application**

Blocks 1 through 4. To be completed by Corps of Engineers.

Block 5. Applicant's Name. Enter the name of the responsible party or parties. If the responsible party is an agency, company, corporation or other organization, indicate the responsible officer and title. If more than one party is associated with the application, please attach a sheet with the necessary information marked **Block 5**.

Block 6. Address of Applicant. Please provide the full address of the party or parties responsible for the application. If more space is needed, attach an extra sheet of paper marked **Block 6**.

Block 7. Applicant Telephone Number(s). Please provide the number where you can usually be reached during normal business hours.

Blocks 8 through 11. To be completed if you choose to have an agent.

Block 8. Authorized Agent's Name and Title. Indicate name of individual or agency, designated by you, to represent you in this process. An agent can be an attorney, builder, contractor, engineer or any other person or organization. *Note:* An agent is not required.

Block 9 and 10. Agent's Address and telephone number. Please provide the complete mailing address of the agent, along with the telephone number where he/she can be reached during normal business hours.

Block 11. Statement of Authorization. To be completed by applicant if an agent is to be employed.

Block 12. Proposed Project Name or title. Please provide name identifying the proposed project (i.e., Landmark Plaza, Burned Hills Subdivision or Edsall Commercial Center).

Block 13. Name of Waterbody. Please provide the name of any stream, lake, marsh or other waterway to be directly impacted by the activity. If it is a minor (no name) stream, identify the waterbody the minor stream enters.

Block 14. Proposed Project Street Address. If the proposed project is located at a site having a street address (not a box number), please enter here.

Block 15. Location of Proposed Project. Enter the county and state where the proposed project is located. If more space is required, please attach a sheet with the necessary information marked **Block 15**.

Block 16. Other Location Descriptions. If available, provide the Section, Township and Range of the site and/or the latitude and longitude. You may also provide description of the proposed project location, such as lot numbers, tract numbers or you may choose to locate the proposed project site from a known point (such as the right descending bank of Smith Creek, one mile down from the Highway 14 bridge). If a large river or stream, include the river mile of the proposed project site if known.

Block 17. Directions to the Site. Provide directions to the site from a known location or landmark. Include highway and street numbers as well as names. Also provide distances from known locations and any other information that would assist in locating the site.

Block 18. Nature of Activity. Describe the overall activity or project. Give appropriate dimensions of structures such as wingwalls, dikes (identify the materials to be used in construction, as well as the methods by which the work is to be done), or excavations (length, width, and height). Indicate whether discharge of dredged or fill material is involved. Also, identify any structure to be constructed on a fill, piles or float supported platforms.

The written descriptions and illustrations are an important part of the application. Please describe, in detail, what you wish to do. If more space is needed, attach an extra sheet of paper marked **Block 18**.

Block 19. Proposed Project Purpose. Describe the purpose and need for the proposed project. What will it be used for and

why? Also, include a brief description of any related activities to be developed as the result of the proposed project. Give the approximate dates you plan to both begin and complete all work.

Block 20. Reason(s) for Discharge. If the activity involves the discharge of dredged and/or fill material into a wetland or other waterbody, including the temporary placement of material, explain the specific purpose of the placement of the material (such as erosion control).

Block 21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards. Describe the material to be discharged and amount of each material to be discharged within Corps jurisdiction. Please be sure this description will agree with your illustrations. Discharge material includes: rock, sand, clay, concrete, etc.

Block 22. Surface Areas of Wetlands or Other Waters Filled. Describe the area to be filled at each location. Specifically identify the surface areas, or part thereof, to be filled. Also include the means by which the discharge is to be done (backhoe, dragline, etc.). If dredged material is to be discharged on an upland site, identify the site and the steps to be taken (if necessary) to prevent runoff from the dredged material back into a waterbody. If more space is needed, attach an extra sheet of paper marked **Block 22.**

Block 23. Is any portion of the Work Already Complete? Provide any background on any part of the proposed project already completed. Describe the area already developed, structures completed, any dredged or fill material already discharged, the type of material, volume in cubic yards, acres filled, if a wetland or other waterbody (in acres or square feet). If the work was done under an existing Corps permit, identify the authorization if possible.

Block 24. Names and Addresses of Adjoining Property Owners, Lessees, etc., Whose Property Adjoins the Project Site. List complete names and full mailing addresses of the adjacent property owners (public and private) lessees, etc., whose property adjoins the waterbody or aquatic site where the work is being proposed so that they may be notified of the proposed activity (usually by public notice). If more space is needed, attach an extra sheet of paper marked **Block 24.**

Information regarding adjacent landowners is usually available through the office of the tax assessor in the county of counties where the project is to be developed.

Block 25. Information about Approvals or Denials by Other Agencies. You may need the approval of other Federal, state or local agencies for your project. Identify any application you have submitted and the status, if any (approved or denied) of each application. You need not have obtained all other permits before applying for a Corps permit.

Block 26. Signature of Applicant or Agent. The application must be signed by the owner or other authorized party (agent). This signature shall be an affirmation that the party applying for the permit possesses the requisite property rights to undertake the activity applied for (including compliance with special conditions, mitigation, etc.).

DRAWINGS AND ILLUSTRATIONS

General Information

Three types of illustrations are needed to properly depict the work to be undertaken. These illustrations or drawings are identified as a **Vicinity Map**, a **Plan View** or a **Typical Cross-section Map**. Identify each illustration with a figure or attachment number.

Please submit one original, or good quality copy, of all drawings on 8 ½x11 inch plain white paper (tracing paper or film may be substituted). Use the fewest number of sheets necessary for your drawings or illustrations.

Each illustration should identify the project, the applicant, and the type of illustration (vicinity map, plan view or cross section). **While illustrations need not be professional (many small, private illustrations are prepared by hand), they should be clear, accurate and contain all necessary information.**

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT
(33 CFR 325)

OMB APPROVAL NO. 0710-003
Expires October 1996

Public reporting burden for this collection of information is estimated to average 5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction

PRIVACY ACT STATEMENT

Authority: 33 USC 401, Section 10; 1413, Section 404. Principal Purpose: These laws require permits authorizing activities in, or affecting, navigable waters of the United States, the discharge of dredged or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. Routine Uses: Information provided on this form will be used in evaluating the application for a permit. Disclosure: Disclosure of requested information is voluntary. If information is not provided, however, the permit application cannot be processed nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETED
--------------------	----------------------	------------------	-------------------------------

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE <i>(an agent is not required)</i>
6. APPLICANT'S ADDRESS	9. AGENT'S ADDRESS
7. APPLICANT'S PHONE NOS. W/ AREA CODE	10. AGENT'S PHONE NOS. W/ AREA CODE
a. Residence	a. Residence
b. Business	b. Business

11. STATEMENT OF AUTHORIZATION

I hereby authorize, _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

NAME, LOCATION AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (SEE INSTRUCTIONS)

13. NAME OF WATERBODY, IF KNOWN *(if applicable)*

14. PROJECT STREET ADDRESS *(if applicable)*

15. LOCATION OF PROJECT

_____ COUNTY

_____ STATE

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN, (SEE INSTRUCTIONS)

17. DIRECTIONS TO THE SITE, (SEE INSTRUCTIONS)

18. Nature of Activity (Description of project, include all features)

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

21. Type(s) of Material Being Discharged and the Amount of each Type in Cubic Yards

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

23. Is any Portion of the Work Already Complete? Yes _____ No _____ IF YES, DESCRIBE THE COMPLETED WORK

24. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).

25. List of Other Certifications or Approvals/Denials Received from other Federal, State or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
--------	----------------	-----------------------	--------------	---------------	-------------

* Would include but is not restricted to zoning, building, and flood plain permits

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT

DATE

SIGNATURE OF AGENT

DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowingly same to contain any false, fictitious or fraudulent statements or entry,

APPENDIX V

BASIS FOR RECOMMENDING REPAIRS

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APPENDIX V

BASIS FOR RECOMMENDING REPAIRS

PART I - GENERAL

PURPOSE

1. This appendix provides a basis for recommending repairs of the reporting features for which deviations are reported in the semiannual reports. This basis includes general and specific criteria for the project, the terminology to be used in noting deviations, and the terminology to be used in specifying repairs.
2. Pertinent information is provided here to familiarize operation and maintenance personnel with some of the considerations involved in designing of the project features and the condition of which is to be reported on. Although this manual can not include all the specialized knowledge required by a designer, the information provided will enable the personnel, in particular the inspectors, to determine the implications of any observed deviations and recommend the proper preventive or restorative maintenance.

DEFINITION OF DEVIATION

3. A deviation refers to a departure from the “as-constructed” (“as-built”) or “as permit constructed” condition of a reporting feature. It is this deviation which is reported in the spring semiannual report.

RECOMMENDATION OF REPAIRS

4. A list of common repairs terminology is included here with an explanation of the repair purpose or procedure although no attempt is made to enumerate all possible repair conditions. Where the explanation is omitted, the purpose or procedure is self-evident. The terms are organized by the general terms under which the reporting features are categorized, but a corrective action may be applicable to more than one type of problem. Thus the organization or terminology given here needs not be strictly adhered to; whatever corrective action is appropriate to rectify a problem should be recommended. Note that in certain instances the deviation or repair terminology has been omitted. Typical terminology for these portions has not yet been developed

PART II - FLOOD CONTROL LEVEE AND GUIDE DIKES

GENERAL

Basic Concept

1. The terms FLOOD CONTROL LEVEE and GUIDE DIKES are defined as embankments whose primary purpose are to furnish flood protection from seasonal high water and which is subject to water loading for period of only a few days, weeks or years. Setback levees are levee that are built landward of existing banks to prevent the rubble wall bank from failure due to the levee surcharge or to prevent possible failure due to undermining of the slag bank. Some of the factors which were considered in levee and dikes are foundation underseepage, seepage through embankment, slope stability, and settlement.

EARTHWORK

Definition

2. The general term EARTHWORK encompasses all uses of earth, which serve a direct function in the flood control system, including fills, cuts, slopes, levees and dikes.

General Design Criteria

3. Pertinent information on design criteria applicable to earthwork is given below.

- a. COMPACTED FILL. Earth around structures must be maintained at an original grade to preserve design loading and must be kept tight against the structure.
- b. SURFACE DRAINAGE. All areas must be free draining. Furthermore, surface drainage must be kept from seeping into any shrinkage cracks between the earth and the face of the structure. Otherwise, the earth will become saturated, resulting in undue stress on the structure or excessive seepage to an outlet or erosion of fill.
- c. SETTLEMENT. All structures must be closely observed for signs of settlement in the surrounding earth; settlement must be investigated to determine whether there has been loss of material because of seepage.

Specific Design Criteria

4. Pertinent information on design criteria applicable to specific reporting features is given below

a. STREAMBED:

- (1) GRADE CONTROL. Established grades are to be maintained to prevent undermining of toe protection. The results of aggradation, degradation, or subsidence must be corrected.

- (2) PONDING CONTROL. To promote insect control and health protection the earth invert must be maintained in a free-draining condition so that ponding stagnant pools are eliminated.
 - (3) DEBRIS AND VEGETATION CONTROL. Debris, objectionable growth, shoal, and waste materials must not encroach on the invert. Excess material that will not move readily with low flows must be removed. Measures must be taken to control objectionable growth by approved chemical or mechanical means. Conversely, vegetation growth for which the design has accounted, usually by increasing channel size or levee height, should be removed.
- b. EARTH LEVEE AND GUIDE DIKES:
- (1) SETTLEMENT. Settlement and sloughing that cause material change in levee/dike grade or cross section must be remedied. For minor changes due to nominal consolidation of materials, the levee and dikes should be restored to original line and grade with materials similar to the existing levee. If the changes in line or grade are greater than one foot, an investigation must be made to determine the cause before permanent restoration work is started.
 - (2) SEEPAGE. Both the landside and the riverside of the levee must be inspected for evidence of piping seepage through the levee, saturated areas, or sand boils. Such conditions must be investigated immediately and appropriate remedial action initiated.
 - (3) EROSION CONTROL. Levee tops must be maintained so that water will not collect and spill down the back slopes to cause erosion of the levee. Growth of grass should be encouraged to help stabilize these slopes.
 - (4) PEST CONTROL. Burrowing animals, which may be the cause of levee and dike failure as water erodes and saturates the levee and dikes, must be examined. Dens and runways formed within the levee must be opened up and backfilled with thorough compaction.
 - (5) VEGETATION CONTROL. Grasses should be encouraged where erosion control is required but growth must be maintained to prevent objectionable weed growth. Vegetation which produces deep roots that may lead to seepage, saturation, subdrain clogage or erosion problems if the roots are allowed to die and decay should be controlled. Approved chemical treatments may be used for control of growth.
- c. LEVEE BERM (O&M) ROADWAY: Full access under all weather conditions must be maintained for necessary operation and maintenance equipment, although this access must be restricted to authorized personnel. This requirement includes erosion control to prevent formation of ruts which might interfere with vehicular access and measures to remove debris and trash which tends to accumulate on the roadway.

- d. LEVEE BERM-ACCESS RAMP: All access points to the levee roadway are to be gated and kept locked in order to prevent unauthorized use of the flood control facilities; the gates, however, must be maintained in workable condition for use by operation and maintenance personnel.

Deviations

5. The terminology to be used in reporting deviations is as follows:

- a. Local settlement, sloughing, and ponding.
- b. Seepage, saturated areas, and water-pressure boils.
- c. Erosion.
- d. Rodent holes.
- e. Inadequate shallow root vegetation.
- f. Deep root vegetation.
- g. Changed line, grade, or section.
- h. Separation of a fill at the junction with structure.
- i. Debris accumulation.
- j. Other

Repair Terminology

6. Typical repair terminology for recommending repairs is as follows:

<u>TERMINOLOGY</u>	<u>REPAIR PURPOSE OR PROCEDURE</u>
Crowing	For water runoff from berms, fills, embankments, and levees.
Piping	Open and recompact seepage paths through the levee.
Seeding slopes	For erosion control.
Exterminating burrowing animals	Open and compactly fill burrow holes to maintain levee and embankment integrity.
Filling and compacting	To restore line and grade.
Eradicating deep root vegetation	Accomplished prior to extensive growth to prevent seepage decay paths of subdrain clogage.
Seepage path removal	Remove and compactly fill between structures and earths; direct water away from structure-earth junctions.

Resloping area to drain

To correct a situation caused by modified adjacent facilities.

STONWORK

Definition

7. The general term: STONWORK includes all grouted or ungrouted stone and riprap for facings and revetments, and sand and bedding materials and filter.

General Design Criteria

8. Pertinent information on design criteria applicable to stonework is given below.
 - a. **FILTER LAYER.** Filter layers are placed under ungrouted stonework to prevent its settlement due to loss of levee material through the stones. There may be one or more filter and drain layers of different grading depending upon the grading of the underlying material. In the event of settlement in stonework, the continuity of these layers should be investigated when restoring the stonework to line and grade. These layers permit the free passage of water and prevent failure of the surfacing from local and area-wide hydrostatic pressure. Slopes and inverts that have drain and/or filter layers must be carefully inspected to see that no condition is permitted to develop that would inhibit the functioning of these drainage layers.
 - b. **VEGETATION CONTROL.** Vegetation control will be required for all areas of stonework to prevent displacement of the stone by root growth as well as from eddies induced by accumulation of debris on brush growing through the stonework. Vegetation control is also an important consideration in protecting continuity of the filter layers under stonework.

Specific Design Criteria

9. Pertinent information on design criteria applicable to specific reporting features is presented below:
 - a. **UNGROUTED STONE/RIPRAP SIDE SLOPES:** UngROUTED riprap and stone are subject to displacement, sliding or settlement, and shall be maintained to the established line and grade. Stones and riprap showing deterioration shall be replaced or protected from further weathering effects by grouting. Settlement in a riprap/stone side slope should be investigated to determine if the failure is in the earth levee or in the filter layers under the stonework. The heavy riprap toe protection including toe-down of the levee and riprap side slope should be checked to see that there has been no displacement after each storm flow in the Salt River.
 - b. **RIPRAP TOE-DOWN PROTECTION:** Riprap toe protection is the foundation for the earth levee toe and riprap side slope. The toe-down protection is subject to displacement from excessive side cutting of water flows. Earth, riprap and grading shall be used to shift the low flow area away from the toe protection and maintain the invert grade.

c. CRACKS: Grouted riprap must be inspected for cracks indicating movements or distress in the lining. Development of cracks is essentially important if layers of fills are under the facing; continued cracking may indicate settlement of the earth levee. Hairline cracks may be expected because of shrinkage in the grouted or because of temperature changes; however, if movement of these stresses should concentrate so that larger cracks develop, they must be sealed to prevent excessive water from entering them.

d. GUIDE DIKES (West 121st Ave. Dike - levee Sta. 112+00.00, West 119th Ave. Dike near levee Sta. 120+00.00, East 119th Ave. Dike - levee Sta. 126+50.00 and West 117th Ave. Dike-levee Sta. 141+15.00): These guide dikes provide additional protection for the levee. The dikes were constructed of compacted earth fill armoring with 15” and 27” thick riprap with filter layers under the riprap. A 12”-30’ wide gabion mattress was installed around W. 121st Ave. and W. 119th Ave. Dikes. A 12”-18’ wide gabion mattress was installed around E. 119th Ave. dike by attaching with the existing 9”-12’ wide gabion mattress. A 12”-6’ wide gabion mattress was installed around W. 117th Ave. dike by attaching with the existing 9”-24’ wide gabion mattress. Regular investigation should be made to determine if the scour occurring or water undermining gabion mattress for the dikes.

Deviations

10. The terminology to be used in reporting deviations is as follows:
- a. Stone/Riprap deterioration
 - b. Settlement, displacement, and sliding
 - c. Progressive grout cracking
 - d. Discontinuity of filter areas
 - e. Vegetation
 - f. Debris accumulation
 - g. Other

Repair Terminology

11. Typical repair terminology for recommending repairs is as follows:

<u>TERMINOLOGY</u>	<u>REPAIR PURPOSE OR PROCEDURE</u>
Replacing deteriorated or displaced stone	To prevent erosion of levee and dikes
Seal cracked grouted stone	Chip, clean, and dry pack to prevent loss of fill materials.

PUBLIC UTILITY

Definition

12. The general term PUBLIC UTILITY includes sewer, water, gas, oil, electricity, telephone or any other utility lines which overcross or undercross the channel.

General Design Criteria

13. Continuing liaison with utility personnel will reduce maintenance problems by providing utility installation and construction crews with adequate information on design, construction, operations, and maintenance of flood control facilities. Leaks in utility pipes near or under the channel or changes in the earthwork or concretework configuration must be corrected in order to minimize the probability of channel failure.

Deviations

14. The terminology to be used in reporting deviations is as follows:
- a. Leakage or seepage along pipe
 - b. Visible changes in other reporting features along utility alignment
 - c. Safety fencing condition
 - d. Other

Repair Terminology

15. Typical repair terminology for recommending repairs is as follows:

TERMINOLOGY

REPAIR PURPOSE OR PROCEDURE

Replacement

To provide safe and sound utilities

Patching

Patch

Caulking or remortaring

To obtain serviceable condition for specific time

Support or suspension replacement

Maintain structural integrity

Reconditioning of safety fencing.

Flood control structure restoration necessitated
By utility failure

Reconstruction to be effected by utility
owner

FENCING

Definition

16. The general term FENCING includes safety pipe rails at RCP culvert inlet/outlet structures on east and west side of the EL Mirage Road, four-wire R-O-W fence, and access gates.

General Design Criteria

17. Pertinent information on general design criteria applicable to fencing is given below:
 - a. Fencing must be intact at all times.
 - b. Broken or lost caps on posts must be replaced to prevent water from collecting in pipe base and rusting the metal.
 - c. Galvanizing on pipe and wire mesh must be checked for excessive weathering or oxidation.
 - d. Alignment and tension must be regularly tested and adjusted.
 - e. Gates must be secured and regularly adjusted for ease of operation
 - f. Gate reflectors must be checked for damage and replaced as necessary

Deviations

18. The terminology to be used in reporting deviations is as follows:
 - a. Metal and coating of wire, tension wires, posts, caps, fittings, clips, braces, cables and chains.
 - b. Tension, bending and attachment of fabrics.
 - c. Alignment and mounting of fabrics, posts, gate posts, and gates.
 - d. Padlocks and security hardware
 - e. Missing fence accessories
 - f. Traffic fence guards including reflectors and guard rails.
 - g. Vegetation
 - h. Other

Repair Terminology

19. Typical repair terminology for recommending repairs is as follows:

TERMINOLOGY

Painting and recoating

Replacement

REPAIR PURPOSE OR PROCEDURE

Paint with rust inhibitor and aluminum finish coat.

Realignment and readjustment

BITUMINOUS SURFACING

Definition

20. The general term BITUMINOUS SURFACING includes surfaced aggregate base course (ABC) O&M (Operation&Maintenance) roadways, surfaced rock mulch levee landside slope, surfaced berm (levee) roadways, surfaced access ramps and turn-around.

General Design Criteria

21. Pertinent information applicable to bituminous surfacing is given below.
- a. Surfaced O&M roadways, berm roadways, surfaced access ramps and turnaround must be maintained to permit passage of vehicles at all times for operation, maintenance, and repair.
 - b. Surfaced levee landside slope must be maintained so that rock mulch thickness shall remain uniformly along the face of the slope.
 - c. Weed growth must be controlled to keep the road open, passable, and identifiable under all weather conditions.
 - d. Roadways and access ramps must be inspected for condition of surfacing, development of cracks and ruts, and condition of shoulders.
 - e. Levee landside slope must be inspected for condition of surfacing, development of ruts created by ATV (All Terrain Vehicle) or other type of vehicles.
 - f. Adequate drainage must be maintained.
 - g. Depressions must be repaired by filling to grade or by removal and replacement of subgrade.

Deviations

22. The terminology to be used in reporting deviations is as follows:
- a. Excessive vegetation
 - b. Undermining or reveling of lips and edges.
 - c. Settlement
 - d. Scatter
 - e. Deterioration of joint areas at streets
 - f. Base or subgrade failure
 - g. Areas requiring patching
 - h. Inadequate curb or cutoff
 - i. Other

Repair Terminology

23. Typical repair terminology for recommending repairs is as follows:

TERMINOLOGY

REPAIR PURPOSE OR PROCEDURE

Eradicating vegetation

Patching

Installing cutoff

Install below grade to control releveling

Resurfacing

Restoring or Installing curbs

To control drainage

Replacement of bituminous surfacing with
Concrete.

To control chronic conditions

STAFF GAGE

Definition

24. The general term, STAFF GAGE, refers to a set of individuals which enable the operation personnel to ascertain the water surface elevation.

General Design Criteria

25. Staff gages should be aligned in a vertical position and the elevations marked on them should be clearly legible. Any lateral or vertical displacement or any significant decrease in the legibility of marking should be corrected.

Deviations

26. The terminology to be used in reporting deviations is as follows:
- a. Vertical Alignment
 - b. Horizontal displacement.
 - c. Legibility
 - d. Deterioration of painting
 - e. Other

Repair Terminology

27. Typical repair terminology for recommending repairs is as follows:

TERMINOLOGY

Restore alignment

Renew staff gage markings

Repaint

Replace staff gages as needed

SPREADING GROUND DIVERSION

Definition

28. The general term, SPREADING GROUND DIVERSION, includes all facilities involved in diverting portions of channel flow into spreading grounds or river to replenish underground water supplies

General Design Criteria

29. Pertinent information on general design criteria applicable to spreading ground diversions is given below.
- a. Flap gates are normally positioned to maximum the use of ordinary channel flow. The flap gates must be closed during flood operations, but may be opened during periods of decreasing flow to maximize utilization of storm runoff.
 - b. Drainage channel shall be properly maintained to obtain full operation function. Such full operation function shall not prevent water ponding at the RCB culvert outlet.
 - c. Debris interference with flap gate operations must be corrected to prevent flooding or failure.

RIGHT-OF-WAY

Definition

30. The general term, RIGHT-OF-WAY, includes access ways, access ramps, encroachments, loadings near levee and channel structures, and various land uses interfering with effective operation and maintenance.

General Design Criteria

31. Areas adjacent to flood control levee and channels must permit the access necessary to comply with all operation and maintenance requirements. The levee and channel flood control facilities are designed for specific loadings; any condition which might change these loadings must be prevented.

Deviations

32. The terminology to be used in reporting deviations is as follows:

- a. Discontinuity of berm roadway and access ramp
- b. Controlled access to public streets or turn-arounds
- c. Width of berm roadway
- d. Type of encroachment, including parking, storage, fence, structures, overhead clearance, underground pipes, and joint use of maintenance access with others for such purposes as landscaping and control of weeds and trash
- e. Land status
- f. Other deviation that restricts effective flood control protection, operation, maintenance, and/or community betterment

Repair Terminology

33. The repair terminology to be used in recommending repairs is as follows:

<u>TERMINOLOGY</u>	<u>REPAIR PURPOSE OR PROCEDURE</u>
Retention of adequate width berm roadway	To prevent encroachments across right-of-way
Maintenance of continuous Berm roadway	Where access to streets at bridge or turnarounds, or under bridge accessways
Removal of encroachments	To preserve minimum width right-of-way adjacent to channel for flood control use. Maintenance of controlled access and other security controls
Land Use	To restrict access to authorized persons

SPECIAL FEATURE

Definition

34. The term SPECIAL FEATURE includes reporting features that do not fit into other general term areas or that normally fit under other general terms but that also involve special problems.

General Design Criteria

35. Pertinent information on general design criteria applicable to each special feature is given below.

- a. MOSQUITO ABATEMENT. Elimination of ponding areas, wherever practical, and to eliminate insect breeding elsewhere.

Deviations

36. The terminology to be used in reporting deviations for each special feature is as follows:

- a. MOSQUITO ABATEMENT. Prevent mosquito breeding.

Repair Terminology

37. The repair terminology to be used in recommending repairs is as follows:

<u>TERMINOLOGY</u>	<u>REPAIR PURPOSE OR PROCEDURE</u>
Mosquito control	To eliminate water ponding areas by means of draining the ponds dried.

PART III - FLOOD CONTROL CHANNEL

GENERAL

Basic Design Concept

1. The broad design concept for the flood control channels involves a relatively nonrigid channel lining supported by uniform bearing and loading provided by the surrounding earth. For a trapezoidal channel this concept presumes that the earth supports the walls. For a rectangular channel, this concept presumes that when the channel is empty the walls support the dry earth behind them and when the channel is full the earth supports the walls.

CONCRETEWORK

Definition

2. The general term CONCRETEWORK encompasses all concrete structures which function as part of the flood control system. This includes all concretework integrally a part of project to include but not limited to channels, side drain structures including inlet/outlet and public utilities.

General Design Criteria

3. Pertinent information on design criteria applicable to concretework is given below.
- a. GENERAL. All concretework must be checked for evidence of deterioration, structural cracking, or displacement. The source of the trouble must be located and eliminated, and remedial work must be completed before loss of strength occurs in the structure.
 - b. CRACKING. Minor shrinkage and temperature cracking occurs in most concrete structures, but continued development of crack patterns and increases in size of cracks are evidence of stress and possible loss of integrity in the structure. Large cracks that will allow considerable water to penetrate the wall or slab must be sealed to prevent migration of backfill material through the crack and damage to the wall or subdrain system caused by the increased water pressure.
 - c. JOINTS. If joints show continued evidence of opening or closing other than as a result of temperature stresses, the cause must be determined. Joint openings that permit the earth to be carried away must be sealed. Spalling must be investigated and repaired to

protect the reinforcement and to prevent further erosion resulting from abrasion during stormflows. Vegetation must be controlled to prevent joint displacement or leakage resulting from root growth or decay.

Specific Design Criteria

4. Pertinent information on design criteria applicable to specific reporting features is presented below.

a. CONCRETE CHANNEL AND RCB CULVERT INVERT:

(1) EROSION. Concrete invert is subject to abrasion from sand, gravel, and debris carried by stormflows. This problem is particularly critical where the invert is a structural slab carries steel reinforcement from the channel walls. Repairs must be made to the slab before they are materially weakened by erosion and before the cover on the main steel reinforcement has been reduced to two inches.

(2) LOADING. Invert slabs are designed for uniform loading from water; any concentrated loads such as vehicles (other than passenger cars and pickup trucks) should not be permitted without an investigation considering the condition of the slab, the amount and type of reinforcement, the type of subgrade material, and the location of a water table. This investigation should be handled in accordance with the usual project review procedures.

(3) DISPLACEMENT. Displacement of invert slabs may be caused by settlement, undermining, uplift, or by reaction of the adjacent wall where the invert serves as a wall footing. Cracking should be sealed. If the slab has settled, undermining should be investigated. Settlement, due to consolidation or subsidence of the subgrade, must be corrected when the integrity of the structure is threatened or when damage is sustained during stormflow. Mud jacking to correct settlement of invert slabs may be used except where a subdrain system is under the slab or at the base of an adjacent channel wall.

(4) DEBRIS AND VEGETATION. Debris or vegetation must not be allowed to accumulate on the invert slabs including inlet/outlet structures'. Such accumulations may become a public health hazard or may cover a source of trouble requiring maintenance; as such, they should be removed at least on a semi-annual basis. If debris and vegetation are permitted to occur over a long period of time, a Section 404 permit may be required prior to removing the accumulation from the invert.

(5) JOINTS. Leaky joints which permit the passages of earth indicate the need for an investigation program to determine the cause of the leakage. Remedial action should then be taken on the subdrain system to restore the filters and bedding materials and to seal the leaky joints.

b. CONCRETE CHANNEL SIDE SLOPES:

- (1) CRACKING. Concrete side slopes are generally reinforced for temperature stresses only. Therefore, a careful investigation must be made of extensive cracking. Cracks should then be sealed. The cause of cracks should be determined and a corrective plan developed.
- (2) ENCROACHMENTS. Encroachments are not permitted on the rights-of way unless properly permitted. Such encroachments might interfere with access to the channel invert or berm, or change the loadings on the channel structure or foundation.
- (3) DRAINAGE. Grading behind channel side slopes must be maintained to properly drain toward the channel.

c. RCB CULVERT WALLS:

- (1) RCB culvert walls must be inspected for evidence of movement from line and grade.
- (2) CRACKING. Cracking of RCB culvert walls must be sealed.
- (3) DEFLECTION. Concrete walls are designed for a stable deflection. Tilting may be caused by rotation of the wall or by excessive backfill pressures caused by saturation or surcharge loading. Some deflection may be expected at the top of walls; however, such walls must be inspected regularly to be certain that the deflection is not increasing.

d. RCB CULVERT TOP SLABS: There is one RCB beneath the levee near the El Mirage Road called EL Mirage Road RCB culvert. A change in deflection of a roof slab is symptomatic of excess loadings. Similar problems may result from additional surcharge loadings which could occur as a result of subsequent additional compacted fill. In either case, prompt investigation and remedial action are necessary.

e. RCB CULVERT INLET & OUTLET STRUCTURES: El Mirage Road RCB culvert inlet & outlet structures takes storm runoff and irrigation waters from the EL Mirage Road detention basin. It then conveys the flows via grouted stone diversion channel and RCP culvert crossing the EL Mirage Roadway and discharges into the river on west of the El Mirage Road. These structures include concrete wingwalls and headwalls. Inlet and outlet structures must be inspected for evidence of movement, especially for evidence of joint opening, since this may result in saturation of the structure fill; movement may also result in seepage from the structure. Either condition must be remedied.

f. RCB CULVERT TRASH RACK AND FLAP GATES:

- (1) Improper seating must be corrected.

- (2) Hinges must be kept rust free and lubricated.
- (3) The trash racks bars must be secured in place to insure proper functioning.
- (4) Debris must be cleared away.

g. RCP CULVERT: There are 4-18" Dia. RCP's that are buried under and crossed the El Mirage Road. These RCP's are designed to take certain loads as specified per contract drawings. Excessive loading beyond the allowable (design) loading is not allowed. Leakage, cracks or change in deflection can result in repaid disintegration and subsequent damage to the road and the RCP's.

h. RCP CULVERT INLET & OUTLET STRUCTURES: Inlet and outlet structures for this RCP culvert are located on the immediate east side and west side of the El Mirage Road respectively. These structures include concrete wingwalls and headwalls. Inlet and outlet structures must be inspected for evidence of movement, especially for evidence of joint opening, since this may result in saturation of the structure fill; movement may also result in seepage from the structure. Either condition must be remedied.

i. CONCRETE IRRIGATION SIDEDRAINS: There are several concrete irrigation side drains connecting to the collector channel along the north side by means of reinforced concrete pipes. In such sidedrains, leakage, cracks or changes in deflection can result in rapid disintegration. Excessive loading beyond the design loading is not allowed since this will damage irrigation sidedrains and subsequent damage to the concrete channel. Cracks should then be sealed. The cause of cracks should be determined and a corrective plan developed.

Deviations

5. The terminology to be used in reporting deviations is as follows:
 - a. Deterioration, wear, and spalling
 - b. Cracking, active or stable
 - c. Displacement including settlement.
 - d. Joint leakage and deterioration of expansion joint material
 - e. Water leakage and ponding
 - f. Movement of RCB culvert inlet/outlet structures
 - g. Improper flap gate and trash rack seating, seals and operation
 - h. Accumulation of pollutant materials
 - i. Debris accumulation
 - j. Other

Repair Terminology

6. Typical repair terminology for recommending repairs is as follows:

TERMINOLOGY

REPAIR PURPOSE OR PROCEDURE

Sealing cracked concrete

Where cracks permit the mitigation of earth, repair by sawing, chipping, cleaning, and dry cleaning, and dry packing of concrete. In areas without subdrain systems, subgrade areas shall be pressure grouted to restore uniform structure bearing.

Restoring scoured or eroded areas

Where the area is permitted to a depth between 1-^{1/2} and 2 inches, saw and chip the area to a uniform 2-inch depth, and concrete the area flush with existing.

Resealing expansion

Use bituminous material.

Invert repairing

Flap Gate lubrication and renewal of gate seals

PART IV – DETENTION BASIN

GENERAL

Basin Concept

1. The general term DETENTION BASIN refers to an open excavation or depression in earth's surface with sloping sides whose primary purpose is provide storage of waters either permanently or temporarily. Detention basin presented in this Appendix was designed to hold water temporarily.

DETENTION BASIN STORAGE CAPACITY

Definition

2. The general term DETENTION BASIN STORAGE CAPACITY refers to the capacity of the detention basin to store storm runoff from the surrounding area.

General Design Criteria

3. Pertinent information on design criteria applicable to detention basin is given below.
 - a. EXCAVATION. Graded earth surface in and around the basin including north O&M walkway must be maintained at the design grades to prevent water overtopping the walkway. There is an existing 18" CMP located at the N-E corner of the El Mirage Road and the levee (S-W corner of the basin) that is to be maintained to preserve original design grade for drain toward pipe inlet.
 - b. SLOPE TO DRAIN. All areas within the basin including low flow channel must be free to drain toward the through-levee RCB culvert. Basin bottom/invert slope shall be maintained to preserve original design grade and prevent water ponding and mosquito breeding ground.
 - c. DEBRIS AND VEGETATION CONTROL. Debris and vegetation control will be required for all areas within the basin including basin side slopes. Clearing of debris and vegetation to make the basin function as designed is a must do task for operation and maintenance. Measures must be taken to control objectionable growth by approved chemical or mechanical means.

Specific Design Criteria

4. Pertinent information on design criteria applicable to reporting features for the detention basin overlaps to some extent with those applicable to flood control channel and levee, which are detailed in Parts II and III in this Appendix. Additional reporting which apply to detention basin will be presented here.
 - a. **GRADE CONTROL.** Established grades on basin invert are to be maintained to prevent water ponds built-up. The result of aggradation or degradation must be reported.
 - b. El Mirage Road RCP and RCB culvert inlet and outlet structures must be monitored and maintained periodically. Debris accumulation at these outlet/inlet structures including inside the RCP's and RCB must be cleaned so that water can drain freely to the designated areas. Otherwise it will cause water back up and retain in the channel and basin, and subsequence creating potential mosquito breeding ground.
 - c. To maintain a required storage capacity of the basin, early detection and timely removal of any debris/sediment accumulation must be performed. Removal of debris and sediment in the basin should be made during each periodic inspection. After each major debris-producing storm a survey should be made to determine the actual amount of accumulation. The results of these estimates and survey should be noted in the appropriate operation and maintenance report. The design storage volume is indicated in Appendix VI, MAPS AND DATA SHEETS.
 - d. **BASIN CUT SLOPES.** Established basin cut slope are to be maintained to prevent erosion. Basin slopes were surfaced with a 4"-thick rock mulch layer. Established basin cut slopes shall be properly maintained to insure the integrity of the basin slopes. Report of aggradation or degradation shall be required.

Deviation

5. The terminology to be used in reporting deviations is as follows:
 - a. Debris accumulation
 - b. Capacity reduce by %
 - c. Changed line, grade or section
 - d. Vegetation
 - e. Ponding
 - f. Side slope Erosion

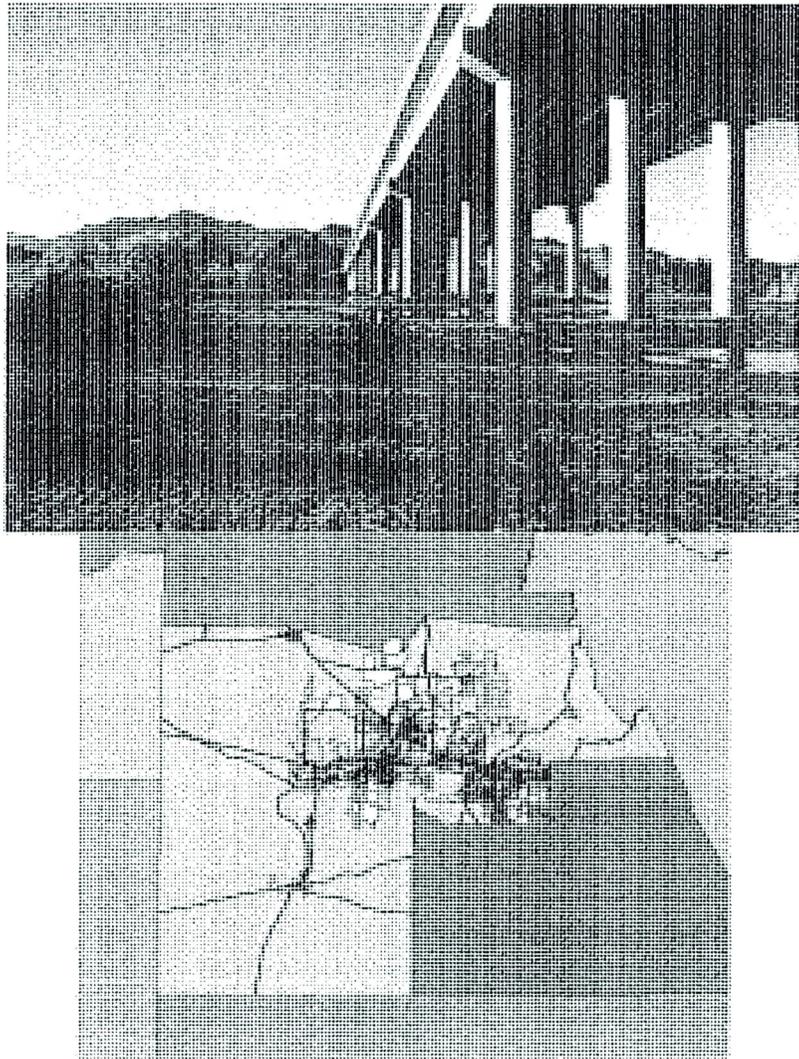
Repair Terminology

6. Typical repair terminology for recommending repairs is as follows:

<u>TERMINOLOGY</u>	<u>REPAIR PURPOSE OR PROCEDURE</u>
Removal of debris/sediment	To restore established volume and avoid creation of water ponding areas.
Filling and compacting	To restore line and grade
Resurface side slopes with Rock mulch	For erosion control
Resloping basin invert to drain	To correct situation caused by water flows.

Wednesday, September 26, 2007 :: 1:54:42 pm

Page Last Updated: December 13, 2006



HOVER CURSOR OVER PHOTOS AND ICONS FOR DESCRIPTION AND SELECT ANY FOR FURTHER INFORMATION

Gage ID History	Site Data	Brief Rating	Water Year Peaks
Runoff History	Precip. Info.	Streamflow Home	

GAGE ID HISTORY

ID	Elev of Instr. in GH	Elev of Instr. in feet M.S.L.	Period
6848	1.15	928.29	12/16/98 - present

SITE DATA

LOCATION	LOCATED ON THE AVONDALE BOULEVARD CROSSI OF THE GILA RIVER, JUST NORTH OF PHOENIX INTERNATIONAL RACEWAY		
DRAINAGE AREA	43,300 MI ²		
JURISDICTION	AVONDALE, ARIZONA		
WATERSHED	MIDDLE GILA		
SECTION/TOWNSHIP/RANGE	NW1/4 NW1/4 SE1/4 S36 T1N R1W		
LATITUDE	N 33° 22' 56.2"		
LONGITUDE	W 112° 18' 29.0"		
USGS QUAD MAP	TOLLESON 7.5-MINUTE		
STREAMGAGE INSTALLATION DATE	DECEMBER 16, 1998 (WY 1999)		
PERIOD OF AVAILABLE DATA RECORD	DECEMBER 16, 1998 - CURRENT YEAR		
LENGTH OF AVAILABLE RECORD (AS OF 10/01/06)	7.79 YEARS		
QUALITY OF AVAILABLE DATA	GOOD		
STAGE GAGE TYPE	PRESSURE TRANSDUCER		
DEVICE CALIBRATION	40 INCR./FT. AS OF 12/16/98		
STAFF GAGE	NONE		
CREST STAGE GAGE	NONE		
ZERO GAGE HEIGHT ELEVATION	927.14 FEET M.S.L.		
STAGE GAGE ELEVATION	1.15 FEET GAGE HEIGHT		
POINT OF ZERO FLOW	UNDETERMINED		
EXTREME FOR PERIOD OF RECORD	49,394 CFS	9.15 FEET G.H	2/13

RATING INFORMATION

<i>RATING TABLE</i>			
<i>CURRENT RATING NUMBER 1, APPLIED AS OF DECEMBER 16, 1998</i>			
GAGE HEIGHT (FEET)	DISCHARGE (CFS)	GAGE HEIGHT (FEET)	DISCHARGE (CFS)

0.0	0	7.0	26,721
1.0	500	8.0	36,302
2.0	1,415	9.0	47,547
3.0	2,728	10.0	61,023
4.0	5,763	11.0	76,613
5.0	11,135	12.0	94,283
6.0	17,989	12.3	100,000

WATER YEAR PEAKS

Water Year	Peak Gage Height (feet)	Peak Discharge (cfs)	Date of Peak
2007			
2006	NONE	0	NONE
2005	9.15	49,394	2/13/05
2004	NONE	0	NONE
2003	NONE	0	NONE
2002	0.43	418	11/5/01
2001	NONE	0	NONE
2000	0.25	364	11/26/99
1999	NONE	0	NONE

RUNOFF EVENT HISTORY

Annual Report
Mean Daily Flow



Date of Peak	Time of Peak	Runoff Period	Duration (hours)	Peak Stage feet G.H.	Peak Discharge (cfs)	Water Year
		Select for a plot of these data				
3/7/05	01:32	03/07 01:32 - 03/07 19:32	18.0	1.35	935	200

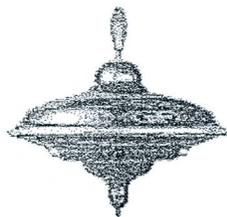
3/1/05	07:32	02/28 13:32 - 03/02 22:32	57.0	1.85	1,347	200
2/22/05	04:32	02/20 19:32 - 02/28 07:32	180	5.35	13,326	200
2/13/05	02:17	02/11 14:07 - 02/20 18:52	221	9.15	49,394	200
1/28/05	02:15	01/26 17:00 - 02/03 23:16	198	4.05	5,981	200
1/13/05	20:15	01/12 14:15 - 01/17 11:15	117	4.25	6,828	200
1/8/05	20:15	01/08 14:15 - 01/12 11:15	93.0	4.15	6,397	200
1/5/05	02:14	01/01 11:09 - 01/08 08:15	165	7.85	34,904	200
11/5/01	10:03	11/04 09:27 - 11/06 12:05	50.6	0.43	418	200
11/23/99	07:04	11/23 07:04 - 11/30 23:25	184	0.25	364	200

CREST STAGE GAGE INFORMATION

CREST GAGE NUMBER	PIN ELEVATION (FEET, GAGE HEIGHT)	CREST GAGE NUMBER	PIN ELEVATION (FEET, GAGE HEIGHT)
N/A			

STAFF GAGE INFORMATION

STAFF GAGE RANGE	LOW POINT	STAFF GAGE INFORMATION



APPENDIX VI

PROJECT MAP AND DATA SHEET

APPENDIX VI

PROJECT MAP AND DATA SHEET

GENERAL

1. This appendix contains a data sheet for the Tres Rios Flood Control North Levee-Phase 1B which was constructed by the Federal Government. A comprehensive map of the project is also included in this Appendix.
2. The data sheet has a section called "Reporting Features," which lists all features of the project unit whose condition is to be reported in the semiannual reports submitted by the operation and maintenance organization to the U.S. Army Corps of Engineers, Los Angeles District.

PROJECT MAP AND DATA SHEET
TRES RIOS FLOOD CONTROL NORTH LEVEE-PHASE 1B

Construction Data

Contract No.:	W912PL-07-C-0023	Contract Award Date:	28 August 2007
Contractor:	ERS-JV (Joint Venture)	Notice to Proceed Date:	28 November 07
		Completion Date:	12 November 08

Specifications: IFB No. W912PL-05-B-0004
 Plans: District File No. 203/394 thru. 203/461

Project Title: TRES RIOS ENVIRONMENTAL RESTORATION PROJECT
 FLOOD CONTROL NORTH LEVEE-PHASE 1B
 (El Mirage Road to 115th Avenue)
 Maricopa County, Arizona

Local Sponsor: City of Phoenix-Water Services Department
Project Cooperation Agreement (PCA) Signed Date: 19 April 2004

Operation and Maintenance Agency: Flood Control District of Maricopa County
Operation and Maintenance Transferred to: Flood Control District of Maricopa County

Staff Gages: Located on the Avondale Boulevard Crossing of the Gila River, Just North of Phoenix International Raceway.

PERTINENT DESIGN DATA.

<u>Levee:</u>	<u>Description</u>
Type	Compacted earth-fill
Length, Exist. Holly Acres Levee	4,255.18 ft.
Length, new levee	958.32 ft.
Total Length	5,213.50 ft.
Height, Exist. Holly Acres Levee	5 ft. to 8 ft.
Height, New Levee	8 ft. to 20 ft.
Front (River) Side Slope, Existing Holly Acres Levee	1V on 2.5 H
Back (Land) Side Slope, Modified Holly Acres Levee	1V on 3.0 H
Front (River) Side Slope, New Levee	1V on 3.0 H
Back (Land) Side Slope, New Levee	1V on 3.0 H
Exist. Holly Acres Levee & New levee Slope Protection	15" riprap on the riverside slope and 4" rock mulch on landside slope.
Toe-down, Existing Holly Acres Levee	As constructed per FCDMC
Toe-Down, new Levee	Depth (H) =3.75 ft. and Length (L)=14 ft. for Sta. 0+00 to Sta.9+58.32

Gabion Mattress (12"-6'unit), Exist. Holly Acres Levee

Sta. 111+17.72 to Sta.152+13.94,
except under guide dikes.

Gabion Mattress (12"-24' unit), New levee
Levee 3" ABC O&M Road (14' wide)

Sta. 0+00.00 to Sta. 9+58.32
Sta. 0+00.00 to 153+72.90

Guide Dikes:

Type
Length

Height
Side Slope
Side Slope and Top of Dike Protection

Gabion Mattress

Description

Compacted earth-fill
282.57 ft. for each (west 121st Ave.
Dike and west 119th Ave. Dike) and
about 200 ft. for each (east 119th Ave.
and west 117th Ave. Dike)
8 ft. to 16 ft.
1V on 2H.
27" riprap for west 121st Ave. and
west 119th Ave. dikes, and 15" riprap
for east 119th Ave. and west 117th
Ave. dikes.
12"-30' wide gabion mattress for west
121st Ave. & west 119th Ave. Dikes.
12"-18' wide gabion mattress for east
119th Ave. dike and 12"-6' wide for
west 117th Ave. dike.

Access Ramps and Turnaround/Landing Area:

Access Ramp, Immediate east of El Mirage Road
Finished Surface

Landing Area, east of the El Mirage Road
Finished Surface

Length, Detention Basin Access Ramp
Top width
Finished Surface

W. 115th Ave. Riverside Ramp

W. 115th Ave. Landside Ramp
Length
Width
Finished Surface

Turnaround Areas 1 &2
Area
Finished Surface
Slope Protection

Description

Existing ramp (Length approx. 40 ft.)
3" ABC

Area=74'X47.5'
3" ABC

210.29 ft.
14 ft.
6" concrete

Existing soil cement ramp (length
approx. 115 ft.)

489.75 ft.
12 ft.
3" ABC

16.5'X14'
3" ABC
same as for levee

Landing Area, Immediate west of 115th Ave.
Area
Finished Surface
Slope Protection

35.75'X25'
6" asphalt over 4" ABC
15" grouted stone on 1V:1H

El Mirage Road Collector Channel

Type

Length

Depth

Invert Slope

Side Slope Ratio

Description

Reinforced concrete trapezoidal channel
4,125.96 ft.
5.0 ft. for Sta. 7+60 to Sta. 41+50.00 and 5.0 ft. at Sta. 41+50.00 to 3.0 ft. at Sta. 48+60.80
S=0.0003 for Sta. 7+60 to Sta. 41+50.00 and S=0.004 for Sta. 41+50 to Sta. 48+60.80
1V:2H

El Mirage Road RCB Culvert

Type

Length

Invert Slope

Inlet Structure

Outlet Structure

Outlet Structural Apron

Description

5-5ft. X 3ft. cell Reinforced concrete box.
148.47 ft.
S = 0.0304
Reinforced concrete including headwall, wingwall & turndown.
Invert Slope (S) = 0.0304
Trash Rack @ inlet
Reinforced concrete including headwall, wingwall & turndown.
Invert Slope (S) = 0.0304.
Flap gate @ outlet.
Concrete side slopes and 27" grouted stone invert. Invert Slope (S) = 0.01966%

El Mirage Road RCP Culvert

Type

Length

Invert Slope

Inlet Structure

Description

4-24" Dia. Reinforced concrete Pipes Culvert
77.50 ft. (across & beneath the El Mirage Rd.).
S = 0.00799
Reinforced concrete including headwall, wingwall & turndown.
Invert Slope (S) = 0.00799.

Outlet Structure

Safety pipe rail on headwall.
27" grouted stone apron.

Reinforced concrete including
headwall, wingwall & turndown.
Invert Slope (S) = 0.00799
Safety pipe rail on headwall.
27" grouted stone apron.

El Mirage Road Detention Basin

Description

Type
Capacity
Depth
Side Slope Protection

Earthen basin.
8.50 AcFt.
6ft. to 8ft.
4" rock mulch

REPORTING FEATURES

REFERENCING

LEVEE:
Earthwork, general
Riprap slope protection, riverside
Toe-down riprap protection, riverside
4" rock mulch slope protection, landside
3" ABC O&M Roads, levee crest and levee toe

AT LEVEE STATION or OTHERWISE NOTED
Entire Length
Entire Length
Entire Length
Entire Length
Entire Length

GUIDE DIKES:
West 121st Avenue Guide Dike
West 119th Avenue Guide Dike
East 119th Avenue Guide Dike
West 117th Avenue Guide Dike

Sta. 112+00.00
Sta. 119+70.00
Sta. 126+40.00
Sta. 141+00.00.

ACCESS RAMPS/TURNAROUND&LANDING AREAS:

El Mirage Rd. Access Ramp
El Mirage Rd. Landing Area
Detention Basin Concrete Access Ramp
West 115th Ave. Riverside Access Ramp
West 115th Ave. Landside Access Ramp
Turnaround Areas 1 & 2
West 115th Ave. Landing Area

Immediate east of El Mirage Road.
East of El Mirage Road
Sta. 3+00.00
Sta. 149+00.00
Sta. 150+85.00
Sta. 147+00.00 and Sta. 151+00.00
Immediate west of 115th Avenue

EL MIRAGE RD COLLECTOR CHANNEL:
El Mirage Road Collector Channel
Concrete Channel Invert and Side Slopes

AT CHANNEL STATION/OTHERWISE NOTED
Entire channel Length
Entire Channel

EL MIRAGE ROAD RCB CULVERT:

AT RCB CULVERT STATION/OTHERWISE NOTED

5-5' wide x 3' high RCB Culvert (5 cells) RCB Culvert Inlet & Outlet Structures including Trash rack & Flap Gate	Entire Length RCB features
EL MIRAGE ROAD RCP CULVERT: El Mirage Road RCP Culvert including Road. RCP Culvert Inlet/Outlet Structure	AT RCP CULVERT STATION/OTHERWISE NOTED Entire Length & Across & beneath the El Mirage
EL MIREAGE ROAD DETENTION BASIN: El Mirage Road Detention Basin Basin Invert including Low Flow Ditch Basin Cut Slopes Capacity in %	AT BASIN STATION Entire Basin Entire Basin Entire Basin
DIVERSION CHANNEL: Grouted Stone Diversion Channel	AT DIVERSION CHANNEL STATION Entire length (at RCB outlet)
FENCE: Project Fencing	Entire Length
GATE: Gate Gate Gate	At El Mirage Road Access Ramp At El Mirage Road RCB Culvert At West of 115 th Ave. Ramp near landing area west
SURVEY MARKER: Survey markers No.1 Survey markers No.2 Survey markers No.3 Survey markers No.4 Survey markers No.5 Survey markers No.6 Survey markers No.7 FCDMC's 18" CMP (Located at the N-W corner of the Detention basin)	AT LEVEE STATION Sta. 104+00.00 Sta. 112+00.00 Sta. 121+00.00 Sta. 126+46.76 Sta. 133+00.00 Sta. 141+14.66 Sta. 148+00.00 At N-E corner of El Mirage Rd. & Levee
CONCRETE IRRIGATION SIDE DRAIN: Concrete Irrigation Side Drain No.1 Concrete Irrigation Side Drain No.2 Concrete Irrigation Side Drain No.3 Concrete Irrigation Side Drain No.4 Concrete Irrigation Side Drain No.5 Concrete Irrigation Side Drain No.6 Concrete Irrigation Side Drain No.7 Concrete Irrigation Side Drain No.8 Concrete Irrigation Side Drain No.9	AT LEVEE STATION Sta. 105+80.00 Sta. 111+90.00 Sta. 114+35.00 Sta. 115+35.00 Sta. 126+25.00 Sta. 128+65.00 Sta. 141+40.00 Sta. 141+80.00 Sta. 152+20.00

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
Operations and Maintenance Division

Standard Operating Procedure #21

SUBJECT: Removal of Unwanted or Nuisance Vegetation

PURPOSE: To standardize the removal of unwanted, deep-rooted, or nuisance vegetation on FCD structures and right-of-way.

PROCEDURE: Deep Rooted Vegetation

1. The following species have been determined to be deep-rooted and will not be acceptable on all FCD dams, dikes, levees, and earthen slopes:
 - a) Desert Broom
 - b) Ironwood Trees
 - c) Mesquite Trees
 - d) Palo Verde Trees
 - e) Salt Cedar

Deep-rooted vegetation is defined as trees and shrubs having a woody structure penetrating below a 3' ft. depth.

Plants will be stump cut flush with the soil surface and a suitable herbicide will be applied to the stump immediately.

All trees will be kept a minimum of 20' ft. from the toe of the dams, levees, and dikes.

Any tree branches or foliage canopy that reduce the roadway clearance to less than 14' ft. above the road surface or which reduce the width to less than 12' feet, must be trimmed or removed.

2. Deep rooted trees must not be allowed on embankments because they limit access and visibility, and can pose potential hazards by toppling in windstorms, fill cracking by root invasion, or openings of seepage paths by root decay. Any vegetation with an extensive root system or prevents a clear view of the embankment or abutment areas should be removed.
3. **Maintenance of unlined floodways.** To ensure that the integrity of the structure is preserved and that the floodway will function as designed.
 - a) Unwanted vegetation will be removed or destroyed within the flow line of the floodway, collection ditches, or side inlet basins. Remove any trash or debris that may impede flows. If grasses are established, maintain to a height of 6" inches.

**FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
Operations and Maintenance Division**

Standard Operating Procedure #23

SUBJECT: Protected Vegetation

PURPOSE: To identify desirable plant species that should be preserved during vegetation clearing operations.

The following species are considered desirable to provide wildlife habitat. These species are not considered to obstruct flows. However, no stands will be left which will block or divert flows. Removal of these species will be done **only** under special direction from the Environmental Branch and only with a written work order.

Common Name

Scientific Name

Willow

Salix nigra

Cottonwood

Populus fremontii

Cat-tails

Typha Species

Updated 11-5-07

rev. 2005 cfk

50

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
Operations and Maintenance Division

Standard Operating Procedure #28

SUBJECT: To insure that the integrity of the structure is preserved and that the Floodway will function as designed.

PURPOSE: Procedures for the maintenance of unlined floodways

PROCEDURE A.

1. Nuisance or high unwanted vegetation.

Remove and or destroy any woody vegetation within the flow area of the floodway, of the floodway, collection ditches, or side inlet basins. Also, remove trash/debris that will impede flows in these areas. If grasses are established, maintain to the height to six inches.

2. Sediment/silt deposits.

Remove accumulated deposits of loose material to obtain designed grades and cross sections. Loose deposited materials shall not be used for repairs within the floodway unless tested and meets the earth fill criteria in the construction specifications. Depending on the amount of accumulation in the invert, a sediment survey may be required. Ensure any 404 permits are in order to perform the job. The lead operator shall keep a copy the 404 with him at all times.

3. Erosion/deep rills. Contact the Work Control Center for job assessment.

A sample of the stockpiled material that will be used for the repair of the erosion/rills will be submitted for a proctor test through coordination by the Work Control Center. Once the proctor test is completed, repairs of eroded areas may begin by replacing displaced material with approved proctored material. Moisture conditioned material will be placed in lifts not to exceed 6" inches. Each lift will have a compaction test required to meet 95% density or in accordance with the project's specified requirements. If the compaction lift does not meet the 95% criteria, the tested lift will be removed, reprocessed and re-installed accordingly and re-tested. 5 ea. nuclear compaction tests to 1 ea. sand cone test will be the normal. A daily field report(s) will be submitted by the consultant once the job scope is completed along with the density results report. Compaction equipment to be used will be approved through coordination with the Work Control Center as the job plan dictates.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
Operations and Maintenance Division

Standard Operating Procedure #29

SUBJECT: To insure that the integrity of the structure is preserved.

PURPOSE: Procedures for the repair of rodent or animal holes.

PROCEDURE A.

Procedure: Rodent Control

- 1) Gophers can damage the structure by burrowing deep holes with more than one outlet. These can be identified by fresh mounds of soil.
- 2) Ground squirrels can also damage structures even with insignificant numbers and must be treated accordingly.
- 3) After rodent activity has been treated and controlled, holes are to be excavated, filled and compacted with proper density.

Procedure: Rodent & Animal Hole Repair

- 1) Excavate hole to bottom of cavity and remove all loose material.
- 2) Compact bottom area of cavity after applying adequate moisture to achieve 95% compaction.
- 3) The removed clean material may be used again and blended with other suitable material as needed.
- 4) Mix material and add enough water for optimum density.
- 5) Fill in cavity with no more than a six inch compacted lift of material to achieve 95% density using a hand tamper or pneumatic "Pogo" type compactor.
- 6) *See standard drawing #4 for compaction procedures.

DEFICIENCY LEVELS and MAINTENANCE STANDARDS
Operations and Maintenance Division

#1. ACCESS GATES

TYPE	DEFICIENCY NOTED	MAINTENANCE STANDARD
A. General	1. Damaged or missing members.	
	a. Missing gates, panels, or locks	a. Replace with standard panel and appropriate locks (3E-59 or 3E-56)
	b. Broken or missing gate hinges	b. Replace or repair as needed
	c. Members bent or out of alignment causing the gate not to function properly.	c. Repair members and align accordingly
	d. Large space or opening under gate panel	d. Standard calls for 4" inches of clearing
	e. Large voids or erosion around gate post/braces	e. Fill in holes flush & compact to grade with natural fill
B. Chainlink & Wire gates	1. Rusty surfaces	
	a. Rusty surfaces that affect the integrity of the existing gate fabric or wire.	a. Remove damaging rust and either repaint or replace damaged gate fabric or wire.
	b. Holes in chain link gate fabric of more than 6" wide and 12" long	b. Repair or replace damaged section as needed
	c. Chain link gate fabric stretched or bent out more than 6" inches	c. If possible refurbish stretched out chain link fabric or replace sections as needed.
	d. Gates out of adjustment more than 2" inches	d. Adjust gates to within 1/2" inch.
	e. Loose or sagging smooth or barbed wire more than a 2" inch sag	e. Re-stretch wire to remove sag in wire fence.
	f. Missing strands of wire.	f. Re-install missing strands to match up to existing fence.
C. Pipe Gate	1. Surface paint.	
	a. 25% of overall surface of pipe gate needing re-painting	a. Remove any peeling paint, primer and re-paint as needed.
	b. Rusty surface	b. Remove rust, primer and paint.

DEFICIENCY LEVELS AND MAINTENANCE STANDARD
Operations and Maintenance Division

#2. ACCESS ROADS

TYPE	DEFICIENCY NOTED	MAINTENANCE STANDARD
A. General	1. Unsightly condition visible to public (paralleling residences, streets, bridge crossings, etc....).	
	a. Trash/debris, or litter along an access road.	a. Remove trash & debris.
	b. Unwanted or high vegetation.	b. Cut, remove, or chemical spray and follow up if needed for control.
	c. Large rocks or debris.	c. Remove rocks/debris.
	2. Health hazard	
	a. Animal droppings	a. Remove and dispose of accordingly.
	b. Garbage, dead animals causing unpleasant odors or attracting insects	b. Remove and dispose of accordingly.
	2. Restricted roadway	
	a. Any storm debris, or trash that reduces the driving width to less than 10' ft.	a. Clear debris /trash from roadway for access.
	3. Shoulder erosion	
a. Erosion within 1' ft. of the roadway more than 8" inches wide and 12" deep	a. Repair with natural fill and compact as needed.	
B. Asphaltic Concrete	1. Vegetation concerns	
	a. Unwanted or high vegetation	a. Cut, remove and chemical spray if needed
	2. Cracks	
	a. Cracks wider than a ¼" inch.	b. Repair cracks with a suitable fill material.
	3. Potholes	
	a. Potholes no larger than 6" inch in diameter	c. Repair & compact potholes with SS1 oil and coldpatch mix.
	4. Depressions or settlement.	
a. Depressions on the surface deeper than 4" inches.	a. Clean area and fill and compact with SS1 oil & coldpatch material as to re-establish surface area to flush conditions with existing road.	
C. Concrete & Grouted riprap ramps	1. Cracks	
	a. Cracks wider than ½" inch	a. Fill with a suitable filler material.

DEFICIENCY LEVELS AND MAINTENANCE STANDARD
Operations and Maintenance Division

#2. ACCESS ROADS

TYPE	DEFICIENCY NOTED	MAINTENANCE STANDARD
Graded earth/unimproved roads	1. Ruts	
	a. Ruts that are more than 4" inches deep and 8" inches wide.	a. Utilize motor grader rippers to remove ruts and holes, moisture condition properly and re-grade surface to uniform condition. If needed import suitable fill material to re-establish road. Ensure proper dust control methods.
	2. High vegetation	
	a. High weeds growing in the road exceeding 6" inches tall.	a. Cut and remove nuisance vegetation as needed from roadway.

DEFICIENCY LEVELS AND MAINTENANCE STANDARDS
Operations & Maintenance Division

#3. RETENTION BASINS

TYPE	DEFICIENCY NOTED	MAINTENANCE STANDARD
A. Earthen	1. Vegetation	
	a. High or unwanted vegetation taller than 2' ft.	a. Mower operations or hand cut to manage high vegetation to acceptable standard of 6" inches.
	b. Deep-rooted vegetation (Palo Verde, Mesquite, Ironwood, and Salt Cedar trees). Remove or destroy all woody vegetation within the sediment basin.	b. Any volunteer growth that is not part of the original project landscape will be cut, stump treated and removed if needed. All herbicide treatment should be environmentally friendly (consult with Ecology Branch).
	c. Citizen concerns regarding unpleasant odors from stagnant water or annoying insects or other pests.	c. Treat area for insects and schedule follow up treatments as needed. Remove any stagnant water by pumping out with water truck or portable pump.
	d. Dead animals.	d. Remove and dispose of dead animal accordingly.
	b. Trash & debris.	b. Remove trash/debris and dispose of accordingly.
	2. Pollutants	
	a. Oil, gas, or other contaminants.	a. Contact Bob Stevens FCDMC @ 602-506-4073 & Hazardous Material Emergency 602-506-7179 for instructions and dispose of accordingly.
	3. Sediment	
	a. Accumulated silt/sediment in basin invert that adversely affects the integrity of the structure.	a. Remove silt/sediment to restore basin to original or baseline conditions.
B. Concrete Lined Basin	1. Sediment	Concrete lined basins are generally self-cleaning, although excess sediment should be removed for the inspection of the concrete works.
	a. Accumulated sediment/silt on the concrete apron.	a. Remove & dispose of accordingly.
	2. Stagnant water	
	b. Citizen concerns regarding unpleasant odors from stagnant water or annoying insects or other pests.	b. Treat area for insects and schedule follow up treatments as needed. Remove any stagnant water by pumping out with water truck or portable pump.
	3. Cracks	
a. Cracks wider than a ¼"	a. Cracks should be cleaned out and sealed with a suitable filler material.	

DEFICIENCY LEVELS and MAINTENANCE STANDARD
Operations and Maintenance Division

#6. CATCH BASINS

TYPE	DEFICIENCY NOTED	MAINTENANCE STANDARD
A. General	1. Trash & Debris	
	a. Trash & debris located at the inlet of the catch basin opening.	a. Remove obstructions so flows are not restricted.
	b. Unwanted vegetation restricting the catch basin inlet.	b. Remove unwanted vegetation from inlet.
	2. Settlement or movement	
	a. Settlement or movement of walls or invert that has a difference or separation more than ½" inch.	a. Stabilize condition to no more than ¼" inch difference or separation. This could involve repairing voids and or erosion sheet flow damage.
	3. Fire Hazard	
	a. Presence of chemicals, such as gasoline or oil	a. Contact Bob Stevens FCDMC @ 602-506-4073 & Hazardous Material Emergency 602-506-7179 for instructions and dispose of accordingly.
	4. Vegetation	
	a. Vegetation growth in the joints that is more than 6" tall	a. Cut and remove vegetation from joints and if applicable treat with proper herbicide.
B. Steps	1. Defective or missing steps	
	a. Defective or missing step(s) that are broken or missing.	a. Repair or replace so that step(s) are structurally adequate.
C. Catch basins with metal grates	1. Safety hazard	
	a. Safety hazard where grate opening is wider than design	a. Restore to design condition.
	b. High or lower than design elevation	b. Correct to elevation difference of no more than ¼" inch than surrounding area
	2. Settlement or movement	
	a. Separation of more than ½" between apron & frame	a. Stabilize condition to no more than ¼" inch.
	3. Trash & debris	
	a. Trash/debris that is restricting more than 20% of the grate surface	a. Remove obstructions so that flows are not restricted

DEFICIENCY LEVELS and MAINTENANCE STANDARD
Operations and Maintenance Division

#6. CATCH BASINS

TYPE	DEFICIENCY NOTED	MAINTENANCE STANDARD
C. Catch basin with metal grates	1. Safety hazard	
	a. Grate with opening wider than design.	a. Restore to original design.
	b. Higher or lower than the surrounding surface grade.	b. Elevation restored to a difference of no more than ¼" than surrounding grade.
	2. Settlement or movement	
	a. Separation of more than ½" between frame and apron.	a. Reset frame & apron to allow no more than ¼" separation.
	3. Trash & debris	
	a. Trash & debris that is restricting more than 20% of the grate surface.	a. Remove trash and debris to allow for proper drainage.
	4. Damaged or missing	
	a. Broken member of the grate.	a. Repair or replace as needed.
	b. Missing grate	b. Re-install or replace as needed.

DEFICIENCY LEVELS and MAINTENANCE STANDARD
Operations and Maintenance Division

#8. FENCING

TYPE	DEFICIENCY NOTED	MAINTENANCE STANDARD
A. General	1. Missing or broken parts.	
	a. Any defects in the fence line that permits easy access into a District right-of-way.	a. Repair or replace damaged fencing.
	2. Erosion	
	a. Erosion more than 4" deep x 18" wide which allows for an opening underneath the fence line.	a. Fill & compact the depression under the fencing.
B. Wire Fences	1. Damaged parts or members	
	a. Posts that are out of plumb.	a. Straighten out the post.
	b. Top railing bent out of shape more than 3" inches.	b. Repair or replace as needed.
	c. Fabric material stretched out of shape by more than 6" inches.	c. Attempt to re-stretch fabric in place or replace.
	d. Missing or loose tension wires.	d. Re-stretch tension wire accordingly.
	e. Missing or loose barbed wire causing a sagging affect.	e. Re-stretch wire if possible, if not replace as needed.
	f. Deterioration or rust occurring on posts, hinges, panels, etc.	f. Refurbish by removing rust, apply protective coating if applicable, and re-paint. If not applicable, replace as needed.
C. Wooden Fences	1. Loose, damaged, or missing members.	
	a. Loose or missing members that cause the fence to lean or sag more than 3" inches.	a. Refurbish by re-nailing, stapling, or replacing loose members. Adjust fence as needed to proper alignment.
	b. Damage from weather.	b. Refurbish or replace as needed.
	c. Damage from termites.	c. If possible treat wooden fence and or replace sections or members as needed.
D. Masonry fences	1. Cracks, movement, or subsidence.	
	a. Surface cracks wider than 1/2" across the full height of the fence.	a. Attempt to seal any cracks wider than 1/8" inch. Fill cracks with suitable fill material.
	b. Fence is leaning and out of alignment.	b. Replace sections of panels as needed.
D. Masonry fences	2. Loose or missing masonry	
	a. Loose or missing masonry.	a. Re-mortar the loose masonry or replace any missing masonry.
	b. Spalled or chipped sections of masonry. Holes in the masonry.	b. Repair damaged pieces if possible. Patch holes as needed.

DEFICIENCY LEVELS and MAINTENANCE STANDARD
Operations and Maintenance Division

#9. FLAP GATES

TYPE	DEFICIENCY NOTED	MAINTENANCE STANDARD
General		
	1. Loose anchor bolts	
	a. Loose anchor bolts	a. Refasten bolts securely in place
	b. Missing, broken or bent frame or parts that prevent the gate from functioning properly	b. Repair or replace damaged parts & ensure the frame is structurally sound & functioning properly
	c. Flap gate "frozen" and not able to open & close freely	c. Service and lubricate to function properly
	2. Trash/debris	
	a. Trash/debris that prevents the flap gate from opening or closing	a. Remove as needed to function as designed.
	3. Painted flap gates	
	a. Paint is peeling off the flap gate.	a. Clean, remove any rust and re-apply a protective coating.
	4. Graffiti	
	a. Graffiti present on the flap gate metal works.	a. Remove or paint over to match in kind.

DEFICIENCY LEVELS and MAINTENANCE STANDARDS
Operations and Maintenance Division

#10. HANDRAILS

TYPE	DEFICIENCY NOTED	MAINTENANCE STANDARD
A. General	1. Loose, damaged or missing members	
	a. Loose, damaged, broke, or missing members	a. Tighten, repair or replace as needed so that handrail is structurally sound
	b. Surface defects, sharp edges, metal burrs, or splinters that could cause injury	b. Remove sharp edges, burrs, or splinters so surface is free of these hazards.
	2. Deteriorated paint or protective coating	
	a. Peeling or chipping paint that has affected 25% of surface	a. Recoat and or paint to acceptable conditions
B. Metal		
	1. Rusty surfaces	
	a. Rusty surface that affected more than 10% of the surface	a. Surface should be uniformly coated
C. Wooden	1. Damaged member	
	a. Cracking or splitting of a wooden member which causes sagging of the handrail more than 2" inches	a. Structurally adequate member in place with alignment to within 1/2" inch

DEFICIENCY LEVELS and MAINTENANCE STANDARD
Operations and Maintenance Division

#11. INLET & OUTLET STRUCTURES:

TYPE	DEFICIENCY NOTED	MAINTENANCE STANDARD
A. General	1. Trash & debris	
	a. Trash & debris that obstructs the inlet or outlet more than ¼ the height or diameter of the structure.	a. Inlet/outlet clear & free of restriction so as not to restrict flows.
	2. Rodents/animals	
	a. Holes or diggings caused by burrowing animals.	a. Area adjacent to structure free of holes and burrowing animals by initial treatment and follow up for control.
	3. Erosion	
	a. Erosion around the wingwalls or headwalls that create voids leading to the result of undermining or unwanted settlement.	a. Fill & compact voids or holes with proper moisture conditioned material. Lifts should not exceed 6" inches and density results at 95%.
	4. Settlement or movement.	
	a. Settlement or movements that have dropped or uplifted the structure facing or base more than 3" inches.	a. Structure should be re-installed firmly and bedded in place.
	5. Vegetation	
	a. Vegetation 18" tall closer than 2 feet apart located on the apron or within 5' ft. of the structure.	a. Remove vegetation as needed. If applicable, apply proper herbicide to control unwanted vegetation growth.
B. Concrete	1. Structural damage	
	a. Parts of the structure that is cracked, chipped, broken off, or spalled more than 2" deep & 6" in diameter.	a. Remove any damaged pieces or sections; clean thoroughly, patch, replace, or repair as needed.
	2. Graffiti	
	a. Obscenities	a. Re-paint areas of surface affected to match in kind the surroundings.
C. Rock or masonry	1. Structural damage	
	a. Any missing and loose rock or block sections of the structure.	a. Remove any damaged pieces or sections; clean thoroughly, patch, replace, or repair as needed.
D. Metal	1. Worn or deteriorated	
	a. Eroded, rusted, or worn conditions that affect the structural integrity of the inlet/outlet.	a. Repair, refurbish, or replace as needed.

DEFICIENCY LEVELS and MAINTENANCE STANDARD
Operations and Maintenance Division

#12. CHANNEL & STORM DRAIN INVERTS

TYPE	DEFICIENCY NOTED	MAINTENANCE STANDARD
A. General	1. Trash, litter, & debris.	
	a. Trash & debris restricting the intake into a storm drain.	a. Remove any obstructions from inlets and dispose of accordingly.
	b. Debris/trash which impedes flows in a channel invert.	b. Remove any obstructions from the invert and dispose of accordingly.
	c. Citizen concerns involving foul odors or unsightliness.	c. Remove trash, litter, or debris from premises that are causing concern.
	d. Mud or sediment deposits which restrict 10% or more of the structure.	d. Remove accumulated sediment and dispose of accordingly.
	d. Vegetation in excess of 2" inches high protruding through cracks or expansion joints.	d. Cut & remove protruding vegetation and chemically treat if applicable.
	e. Pondered water complaints of foul odors or insects.	e. Pump out water with water truck or portable pump. If not practical, treat for vector concerns and schedule follow up treatments as needed.
	f. Dead animals.	f. Remove dead animal and dispose of accordingly.
	g. Pollution-any hazardous materials.	g. Contact Bob Stevens FCDMC @ 602-506-4073 & Hazardous Material Emergency 602-506-7179 for instructions and dispose of accordingly.
B. Improved channels	1. Deterioration concerns.	
	a. Reinforcement exposed.	a. Remove exposed rust, refurbish, and or repair by patching areas of exposed reinforcement.
	2. Cracks.	
	a. Cracks wider than 3/8" wide x 6" inches deep	a. Cracks in the invert and slopes should be cleaned out and sealed with a suitable filler material.
	b. Cracks wider than 1/4" wide that go completely through the concrete less than 6" inches thick.	b. Cracks in the invert and slopes should be cleaned out and sealed with a suitable filler material.
	3. Settlement or movement.	
	a. Movement or settlement that has displaced the invert facing more than 4" from grade elevation.	a. Attempt to restore securely bedded within 1/4" of grade. If not, remove either by saw cutting or jack hammer methods. Repair damaged section.

DEFICIENCY LEVELS and MAINTENANCE STANDARD
Operations and Maintenance Division

#12. CHANNEL & STORM DRAIN INVERTS

TYPE	DEFICIENCY NOTED	MAINTENANCE STANDARD
C. Grouted riprap	1. Missing riprap or dislodged riprap.	
	a. Missing grouted riprap	a. Clean out area where rock is missing; re-install missing or dislodged riprap with proper grout application. Ensure to use a concrete glue to assist in repair.
D. Unimproved channel invert.	1. Obstructions.	
	a. Deep-rooted vegetation (Palo Verde, Mesquite, Ironwood, and Salt Cedar trees). Remove or destroy all woody vegetation within the sediment basin.	a. Any volunteer growth that is not part of the original project landscape will be cut, stump treated and removed if needed. All herbicide treatment should be environmentally friendly (consult with Ecology Branch).
	b. Vegetation or debris which restricts more than 10% of channel capacity.	b. Remove restrictions and dispose of accordingly.
E. Asphaltic concrete	1. Erosion concerns	
	a. Sheet flow erosion causing damage to the asphalt structure.	a. Repair erosion by filling and compacting with proper moisture conditioned material. If needed, re-grade shoulder to drain properly.
	b. Settlement or movement causing damage to asphalt structure.	b. Cut out damaged section of asphalt and replace accordingly by using SS1 oil and cold patch or hot mix asphalt.
F. Concrete low flow	1. Vegetation.	
	a. High vegetation growing in joints.	a. Remove vegetation so joints are free of vegetation and root growth. Chemically treat if applicable.
	b. Damage from flows to the curbing which does not confine flows as designed.	b. Repair or replace damaged curbing to contain designed flows.
G. Low flow channel	1. Trash, debris or silt.	
	a. Trash, debris or silt plugs that cause flows to divert out of defined low flow.	a. Remove restrictions so that flows stay within defined area.

DEFICIENCY LEVELS and MAINTENANCE STANDARD
Operations and Maintenance Division

#13. LEVEES

TYPE	DEFICIENCY NOTED	MAINTENANCE STANDARD
A. General right-of-way	1. Trash & Debris	
	a. Trash, litter, and debris creating an unsightly condition.	a. Remove & dispose of accordingly.
	2. Fencing damage	
	a. Nuisance vegetation taller than 18" inches.	a. Cut vegetation and chemically spray treatment if applicable.
	b. Cut or damaged fencing or gates.	b. Repair or replace damaged fencing or gates to set standards.
	c. Damaged signs or stationing.	c. Re-furbish or replace as needed any damaged signs.
	3. Rodents	
a. Rodents/animals creating holes or burrows on the crest or embankments.	a. Treat with proper rodenticides and schedule follow up treatments as needed.	
B. Concrete/soil cement structures	1. Structural damage.	
	a. Cracks 1/8" inch or wider on the concrete which can expose reinforcement.	a. Clean out and fill in cracks with suitable fill material.
	b. Erosion, spalling, or deterioration which affects the structural integrity.	b. Repair erosion from runoff/sheetflow. Repair areas where spalling or deterioration has occurred.
	c. Broken or missing protective facing which could allow water or rust to become a concern to the structure.	c. Repair or patch as needed to stabilize concerns.
	2. Graffiti	
a. Obscene material /writings	a. Remove or re-paint as needed to match to existing conditions.	

#13. LEVEES

DEFICIENCY LEVELS and MAINTENANCE STANDARD
Operations and Maintenance Division

TYPE	DEFICIENCY NOTED	MAINTENANCE STANDARD
Earthen levee	1. Structural Damage	
	a. Erosion from sheet runoff causing deep rills on crest or slopes of levee.	a. If erosion/rill is deeper than 2' ft. deep, a proctor test must be taken. Install moisture conditioned material in lifts not to exceed more than 6" high and compaction tests will be administered on every lift and a 95% result or better must be obtained to continue each lift. Unless otherwise specified nuclear compaction tests will be suffice.
	b. Plating material on the access road on the crest of the levee is displaced or missing. Plating missing on the access ramps.	b. Re-grade to design elevation with motor grader by bringing back into place any displaced material from the shoulder. If needed, re-install ABC material on the crest as needed to re-establish safe all-weather access.
	c. Slope protection missing or displaced.	c. Re-install gravel mulch, loose riprap, or grouted riprap as needed.
	2. Deep-rooted vegetation	
	a. Deep-rooted vegetation located on the crest or slopes.	a. Cut & stump treat as need. Remove any large root systems. Fill & compact holes accordingly.
	3. Transverse or longitudinal cracks	
	a. Transverse or longitudinal cracks located on the crest or toe of the levees.	a. Record the station of the crack. Give location; crest, upstream shoulder, downstream shoulder, mid-slope, or toe of levee. Take measurements to include; diameter size, and depth of crack. Include photograph, inspector, date, and structure.
	4. Other	
	a. Report any other dam safety related concerns (sink holes, depressions, slides, or other anomalies).	a. Record the station of the concern. Give location; crest, upstream shoulder, downstream shoulder, mid-slope, or toe of levee. Take measurements to include; diameter size, and depth of depression. Include photograph, inspector, date, and structure.

**Flood Control District of Maricopa County
Maintenance Inspection Report**

Holly Acres-Tres Rios 2011

Holly Acres-Tres Rios		Inspectors Name	Albert Buruato FCDMC
Date of Inspection	03/02/11	Inspectors Name	Erik Arntz FCDMC
O&M Division Manager Name			Date Reviewed

Existing Weather Conditions	Clear & Cool	Recent Rain Fall	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Yes No 1. Crest of Levee

- a. Crest shows evidence of erosion, rilling, deep rooted vegetation, and/or rodent/animal activity
- b. Evidence of holes, cracks or suspicious areas
- c. Additional slope protectoin needed
- d. Survey monuments in need of maintenance or missing
- e. Other (vandalism, liability concerns, etc.)

See Comments: 3,5,6

2. Upstream Slope

- a. Slope shows evidence of erosion, rilling, deep rooted vegetation and/or rodent/animal activity.
- b. Evidence of holes, cracks or suspicious areas
- c. Additional slope protection needed
- f. Other (vandalism, liability concerns, etc.)

See Comments: 1,2,3,4,5,6,7

3. Downstream Slope

- a. Shows evidence of erosion, rilling, deep rooted vegetation, and/or rodent/animal activity
- b. Evidence of holes, cracks or suspicious areas
- c. Additional slope protection needed
- d. Flap gate concerns
- e. Other (Vandalism, liability concerns, etc.)

See Comments: 5,6

Flood Control District of Maricopa County
Maintenance Inspection Report

03/02/11

Holly Acres-Tres Rios 2011

Yes No 4. Abutment

- a. Shows evidence of erosion, rilling, deep rooted vegetation, and/or rodent/animal activity
- b. Evidence of holes, cracks or suspicious areas
- c. Additional slope protection needed
- d. Differential movement
- e. Other (vandalism, liability concerns, etc.)

See Comments: 5,6

5. Maintenance Access roads and ramps

- a. Road shows evidence of erosion, rilling, deep rooted vegetation, and/or rodent/animal activity
- b. Additional slope protection needed
- c. Roads need regrading
- d. Other (vandalism, liability concerns, etc.)

See Comments: 3,5

6. Perimeter fencing and gates

- a. Fence cut or damaged
- b. Damaged gates
- c. Additional fencing or gates needed
- d. Other (vandalism, liability concerns, etc.)

See Comments: 7,8

7. Stationing & Signs

- a. Additional signs needed
- b. Stationing needs to be refurbished
- c. Signs damaged or missing
- d. Subsidence survey markers are missing
- e. Other (vandalism, liability concerns, etc.)

See Comments: 3

Flood Control District of Maricopa County
Maintenance Inspection Report

03/02/11

Holly Acres-Tres Rios 2011

Yes No 8. Diversion Dikes

- | | | |
|--------------------------|-------------------------------------|--|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | a. Deterioration |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | b. Sediment buildup |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | c. Riprap displacement |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | d. Trash or debris concerns |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | e. Other (vandalism, liability concerns, etc.) |

See Comments: 2

Flood Control District of Maricopa County
Maintenance Inspection Report

03/02/11

Holly Acres-Tres Rios 2011

Comments Page 1

Comments 1:

113th Ave end cable fence I-beam leaning next to irrigation ditch. Will monitor.

Comments 2:

Sediment and debris needs to be removed from concrete channel.

Comments 3:

There are no station markers along the project. Install stationing as needed to include stationing on all inlet structures along concrete lined channel and all appurtenant structures.

Comments 4:

Erosion observed on north side of concrete lined channel just east of Avondale Blvd.

Comments 5:

Rilling throughout project.

Comments 6:

Rodent activity throughout project.

Comments 7:

Sta #960+00 fence cut.

Comments 8:

The box culvert at station# 1007+50 and pilot channel of invert will need the sediment removed and invert restored.

Comments 9:

Comments 10:

ANNUAL INSPECTION REPORT

Inspection Date: 5/2/2011	Structure: Tres Rios				
Inspector(s): C.F. Rivera-FCDMC, Erik Arntz-FCDMC	Location: #126.012.10	N/A	NO	YES	MONITOR REPAIR

INSPECTION OBSERVATIONS: Through the use of a levee, groins, riprap and gabions it is hoped it will prevent further erosion of the river bank and the resultant loss of land and improvements. The immediate benefit in this case, will be to protect the Holly Acres sub-division. Authorization: Board of Directors, Flood Control District of Maricopa County, State of Arizona, HB 2457 34th Legislature Appropriate SB 1163. Local sponsors are the Flood Control District of Maricopa County and Arizona Department of Water Resources. Salt-Gila Watershed for all areas upstream of the project.

1. Crest of Structure: 6,600' lf x 12' ft. width.	NA	No	Yes	Mon.	Rep.
a. Settlement, slides, depressions?		✓			
b. Misalignment?		✓			
c. Longitudinal or transverse cracks? None observed.		✓			
d. Animal/rodent holes? Scattered rodent activity along the shoulders of the crest of the levees.			✓		✓
e. Adverse vegetation? New tumbleweed growth noted.			✓		✓
f. Erosion concerns?		✓			
g. Plating material displacement? Minor scattered displacement noted.			✓	✓	
h. Other? Stationing is missing along the east end of the project. Several pertinent structures also need stationing.			✓		✓
i. Fencing or gate concerns? All gates and fencing were operational and secured at time of inspection.		✓			

2. Upstream Slope: Natural compacted backfill material with riprap slope protection	NA	No	Yes	Mon.	Rep.
a. Erosion concerns?		✓			
b. Flap gate or side inlet concerns?		✓			
c. Fencing or gate concerns?		✓			
d. Longitudinal or transverse cracks? None observed.		✓			
e. CSA deterioration?		✓			
f. Settlement, slides, depressions, bulges?		✓			
g. Animal/rodent holes? Scattered rodent activity throughout the project.			✓		✓
h. Gabion protection concerns? Damaged gabion basket at sta. #952+51. *See attached photo at the end of report.					
i. Riprap concerns?		✓			
j. Other?		✓			

ANNUAL INSPECTION REPORT

Inspection Date: 5/2/2011	Structure: Tres Rios				
Inspector(s): C.F. Rivera-FCDMC, Erik Arntz-FCDMC	Location: #126.012.10	N/A	NO	YES	MONITOR REPAIR

3. Downstream Slope: Natural compacted backfill material with newly installed gravel mulch.	NA	No	Yes	Mon.	Rep.
a. Erosion/rilling concerns?		✓			
b. Inadequate slope protection?		✓			
c. Adverse vegetation? New tumbleweed growth.			✓		✓
d. Longitudinal or transverse cracks? None observed.		✓			
e. Inadequate riprap?		✓			
f. Fencing, signs and or gate concerns?		✓			
g. Settlement, slides, depressions, bulges?		✓			
h. Animal/rodent holes? Scattered rodent activity.			✓		✓

4. Instrumentation: Staff gages	NA	No	Yes	Mon.	Rep.
a. List type(s) of instrumentation? Staff gages					
b. Any repair or replacement required?		✓			

5. Concrete low flow channel, basin and culverts	N/A	No	Yes	Mon.	Rep.
a. Erosion concerns from sheet flows or irrigation damage?			✓		✓
b. Low flow channel stable? Temperature & heat cracking noted. Non- structural.			✓	✓	
c. Adverse vegetation? New tumbleweed growth between low flow and toe of levee.			✓		✓
d. Drainage issues?		✓			
e. Project stationing issues? Concrete low flow channel needs stationing.			✓		✓
f. Side inlet chutes or spillway drainage concerns?		✓			
g. Culvert structures stable? Temperature & shrinkage cracks noted. Non-structural.			✓	✓	
h. Vandalism?		✓			
i. Illegal discharge noted into the channel?		✓			
j. Flow restrictions or possible blockage noted? Sediment plugs and vegetation noted.			✓		✓
k. Exposed reinforcement?		✓			
l. Loss of joint material?		✓			
m. Leakage evident?		✓			
n. Basin area stable? High vegetation needs to be mowed. Some scattered deep-rooted vegetation noted.			✓		✓
o. Other		✓			

Flood Control District of Maricopa County O&M Division Manager-Charles F. Klenner

ANNUAL INSPECTION REPORT



Photo No.: 1
Date: 5/2/2011
Description: View is looking west from the far end of the Tres Rios levee system.



Photo No.: 2
Date: 5/2/2011
Description: Damaged gabions near Finger Dike sta. #952+51.

ANNUAL INSPECTION REPORT



Photo No.: 3
Date: 5/2/2011
Description:
Sediment and vegetation
buildup at inlet trash rack.

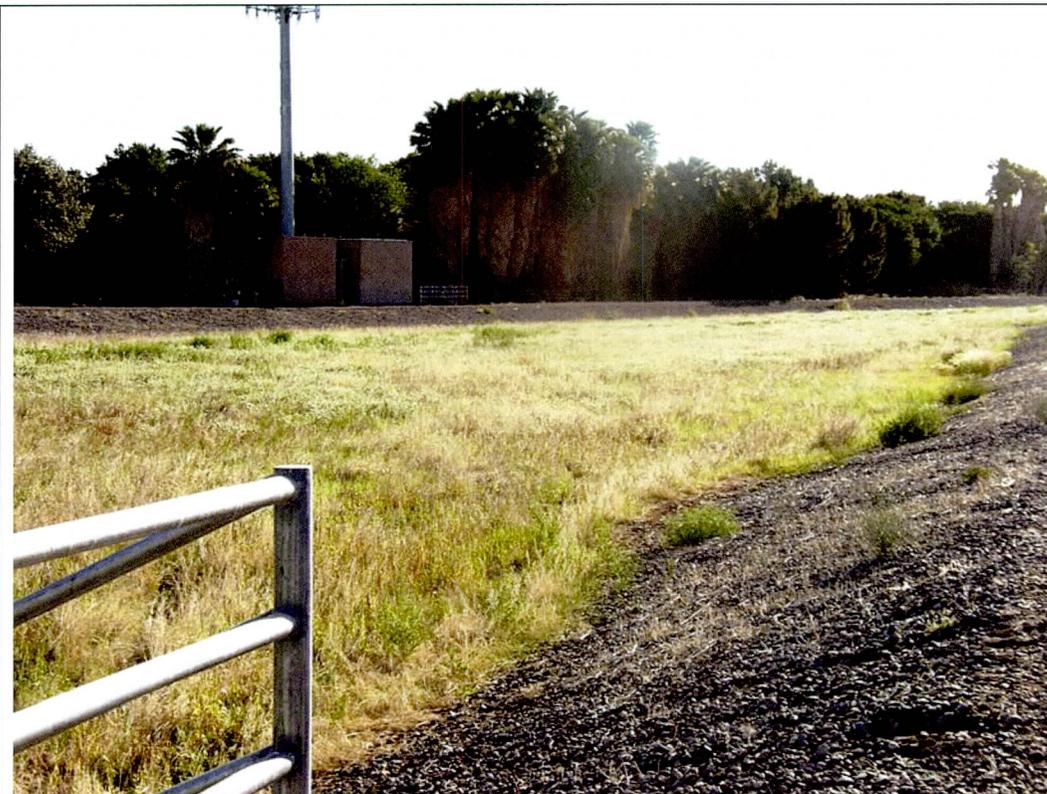


Photo No.: 4
Date: 5/2/2011
Description:
Vegetation in
basin area needs mowed.

ANNUAL INSPECTION REPORT



Photo No.: 5
Date: 5/2/2011
Description: Outlet flap gates.



Photo No.: 6
Date: 5/2/2011
Description: Salt cedar and dense vegetation are choking the outlet channel from the five flap gate outlet.

ANNUAL INSPECTION REPORT

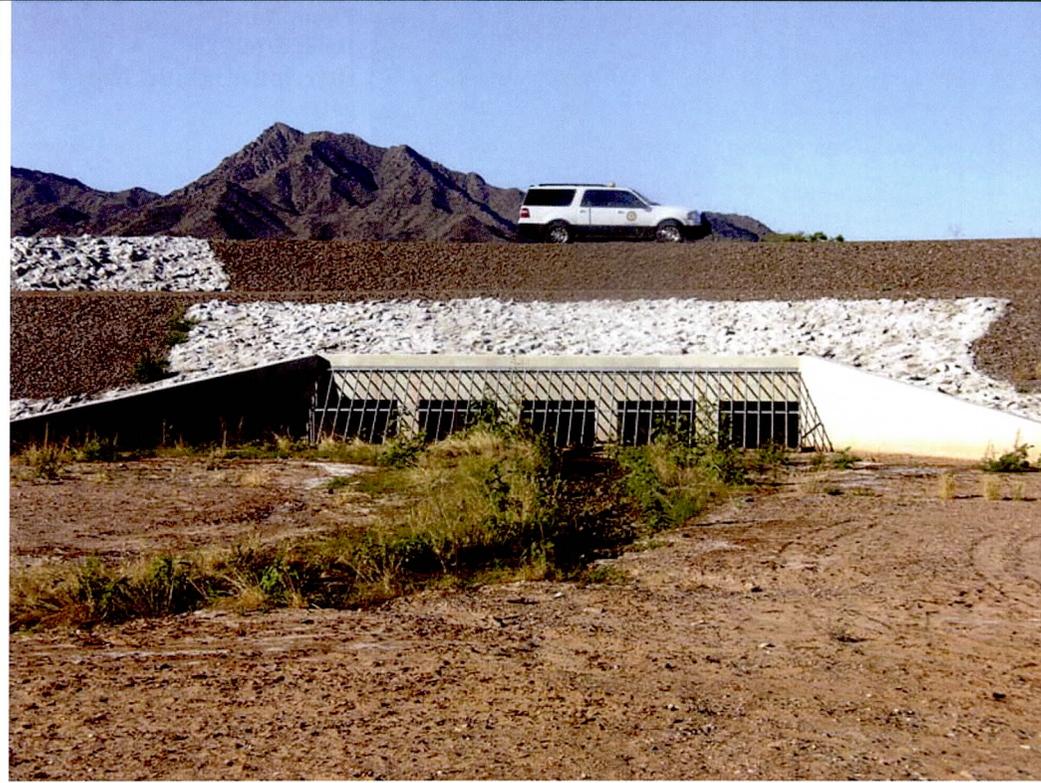


Photo No.: 7
Date: 5/2/2011
Description: 5 box culvert inlet structure.



Photo No.: 8
Date: 5/2/2011
Description: North levee inlet structure located just east of Avondale Blvd., needs a cutoff wall installed to prevent structural damage to the grouted riprap apron.



Flood Control District of Maricopa County

Board of Directors

Fulton Brock, District 1
Don Stapley, District 2
Andrew Kunasek, District 3
Max Wilson, District 4
Mary Rose Wilcox, District 5

www.fcd.maricopa.gov

2801 West Durango Street
Phoenix, Arizona 85009
Phone: 602-506-1501
Fax: 602-506-4601
TT: 602-505-5897

May 22, 2012

Linda Reitz, Secretary
St. John's Irrigation District
10219 W. Southern Ave.
Tolleson, Az. 85353

RE: Tres Rios Levee Project - Interior Drainage Channel

Dear Ms. Reitz:

As you know the U.S. Army Corps of Engineers recently completed construction of the Tres Rios Levee along the North Bank of the Salt and Gila Rivers. The levee extends from the 105th Avenue alignment to El Mirage Road. One component of the levee system is the interior drainage channel constructed along the north side of the levee. This concrete channel collects storm water runoff and conveys it via box culverts through the levee to the river. The channel was also designed to take irrigation tail-water from adjacent agriculture lands. The inlets to accommodate tail-water were placed to align with the existing tail water ditches along the levee and Flood Control District rights-of-way.

Recent inspection of the levee system identified potential damage to the interior drainage system due to frequent and long term irrigation water overflowing berms from adjacent farm fields and properties. This water is flowing across Flood Control District property in an uncontrolled manner to the concrete channel. This channel was not designed to have water constantly flow over the channel liner and over time this could damage the structure, as well as cause erosion on District property. These uncontrolled flows make it difficult for the Flood Control District to maintain our property, causes increased sediment from the erosion into the channel and aggravates vector control issues. The overflow of water and the associated erosion can be seen in the enclosed photographs.

The Flood Control District is requesting that the St. Johns Irrigation District notify its customers along the levee system to maintain the irrigation berms to prevent this uncontrolled flow of irrigation water across Flood Control District property. The Flood Control District appreciates any assistance you can provide.

Sincerely,

A handwritten signature in black ink, appearing to read "T. Phillips".

Timothy S. Phillips, P.E.
Chief Engineer and General Manager

Enclosure: Inspection Photos from 3/15/2012



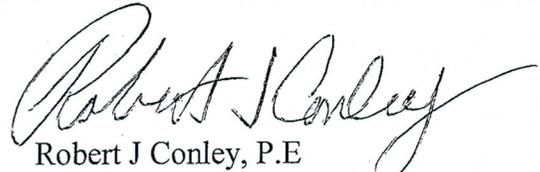
MEMORANDUM FOR RECORD

SUBJECT: **Tres Rios - Video inspection**

Mr. Patel of the Structural Design Section has reviewed the video inspection report submitted by Flood Control District of Maricopa County dated June 2012.

West of 115th Ave- Based on the report submitted by the county and the criteria in levee inspection check list, the overall rating for the RCP would be "Acceptable". The reason for the rating was the inspection report did not indicate any visible water seepage or loss of soils through the joints and the pipe is still structurally sound. However the inspection did find spalling at two locations, but the joints do appear to be closed/ water tight.

East of 115th Ave- Based on the report submitted by the county and the criteria in levee inspection check list, the overall rating for the RCP would be "Minimally Acceptable". The reason is due to spalling/exposed rebar and water seepage through cracks. However it should be noted that entire length of pipe still structurally sound and there is no evidence of soil loss through the joints.


Robert J Conley, P.E
Structural Engineering Section

Tres Rios Outlet Pipe Video Inspection Report



Prepared By

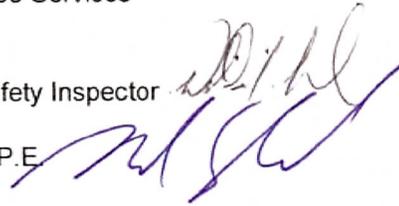
Flood Control District of Maricopa County

June 2012

**Tres Rios Levee
Outlet Pipe
Video Inspection Report
May 2012**

Contractor: ProPipe Professional Pipe Services
Video Date: May 30, 2012

Inspected By: William Leal, Dam Safety Inspector
Reviewed By: Dan Lawrence, P.E.
Approved By: Michael Greenslade, P.E.
Review Date: June 28, 2012



Structure Description:

ProPipe Professional Pipe Services was contracted to conduct a video inspections of 2 RGRCP storm drain pipes located in Avondale, Arizona through a soil cement levee on the north bank of the Gila River. The storm drains penetrate the soil cement levee on the east and west sides of the 116th Avenue bridge crossing of the Gila River.

The pipe inspected on the west side of 116th Avenue bridge and is a 450-mm (18-inch) diameter by 17.0-m (55.8-ft) long reinforced concrete pipe. The pipe inspected on the east side of 116th Avenue bridge a 760-mm (30-inch) diameter by 21-m (69-ft) long reinforced concrete pipe.

The Record Drawings for the 116th Avenue Bridge Over Gila River (Project No. 68832) dated 08-10-1999 are recorded in Metric Units. The inspection log by ProPipe shows the travel distance in english units while the pipe stationing obtained from the Record Drawings are in metric units. Therefore, both units of measurement are presented in this assessment report.

Tres F. Levee
Pipe Assessment KSU Rating

Assessment by Dan Lawrence, P.E. and Michael D. Greenslade, P.E.
Date: 28 June 2012

Using four aspects and condition descriptions adapted from a 1989 ASDSO paper, "Evaluation of the Condition of Principal Spillway Conduits," a review of the videotape inspection of the storm drains as well as the other information provided by the dam safety inspector for major defects was completed. A KSU rating for the condition of the storm drains was then assigned. Attached is the crack log for each pipe section. ProPipe has it's own rating system. Their rating sheets and scores are also attached.

West side of 116th Avenue bridge - 18 inch diameter RGRCP

ProPipe started this video inspection at the upstream end of the pipe. However, after 3 feet into the pipe they ran into rock debris that blocked the travel of the camera. They then went to the downstream end and finished the inspection going from downstream to upstream.

There were two joints that had some minor spalling near the top of the pipe. Joints were within tolerance.

As mentioned there was rock debris in the pipe near the upstream end. There were no cracks noted.

KSU Ratings: Cracks: 9, Corrosion: 9, Lining: 8, Joints: 9

Overall KSU rating = 8

ProPipe Rating = No defects

East side of 116th Avenue bridge - 30 inch diameter RGRCP

ProPipe completed this inspection from the downstream end to the upstream end.

This pipe has several longitudinal cracks in the lining. There were 13 cracks approximately 1/8 inch wide and 5 cracks that were 1/4 inch wide.

One crack extended within 3 pipe sections (approximately 12 ft long). It fluctuates from hairline to 1/4 inch wide. Another 1/8 inch wide crack also extends 12 feet long. An additional crack hairline to 1/8th inch wide is 25 feet long.

The reinforcement was exposed in one location.

Joints were within tolerance. There was no corrosion.

KSU Ratings: Cracks: 5, Corrosion: 9, Lining: 6, Joints: 9

Overall KSU Rating = 5

ProPipe Rating = 12 defects with a grade of 2 and 1 defect with a grade of 5 (See attached Grading PACP System for definition of Grades.)

Note: The ProPipe rating sheet references 16 grade 2 defects and 2 grade 5 defects. The difference is due to the ProPipe video inspection extended beyond the the pipe segment which is not part of this assessment.

KSU Rating

Kansas State University (KSU) Rating System						
Rating	ERL	TTNI	Cracks	Corrosion	Lining	Joints
9	100	25	None; new condition	None; new condition	No loss; new condition	Watertight; gaps well within tolerance
8	90	20	If any they're hairline & of no structural concern	Very little	Slight evidence of abrasion, scouring cracking or spalling	No evidence of seepage at any joint; gaps within tolerance
7	75	15	Minor & free of leaks or evidence of leakage	Minor, no obvious loss of material evident	Minor evidence of abrasion, scouring, cracking or spalling	One or more show signs of minor leakage; gaps within tolerance
6	50	10	Less than 1/8" & show only minor evidence of leakage	Some deterioration of material evident	Some loss to the point that underlying material is exposed at several locations	One or more have signs of leakage and/or deterioration; gaps within tolerance
5	35	5	Less than 1/4" & show evidence of leakage	Significant deterioration at one or more locations evident	Missing on parts of the conduit throughout the length	One or more show evidence of leakage and/or deterioration; gap equals tolerance
4	20	3	Large enough to show considerable evidence of leakage	Deterioration to point of concern for long-term structural integrity of conduit	Loss so substantial that there is concern for the durability of the underlying material	One or more is leaking and /or significantly deteriorated; gap exceeds tolerance
3	10	2	Openings large enough to affect the integrity of the embankment	Corroded to the point of leakage expected at one or more locations	No longer effective throughout the conduit	Leak large enough to affect embankment; gap well beyond tolerance
2	5	1	Embankment is being affected by allowing erosion of the embankment	Corroded so much that leaks are evident	Completely missing	Embankment exposed at one or more joints; alignment of sections affected
1	2	0	Flow occurring outside the conduit as well as inside	Corrosion so substantial that structural integrity of conduit is in question	Not Applicable	Water flowing through joints as freely as in the conduit; ends no longer line up
0	0	0	Conduit no longer main path of flow because of losses through cracks	So much material lost to corrosion that conduit is no longer capable of supporting the fill	Not Applicable	Not Applicable

ERL- Estimated Remaining Life of pipe

TTNI- Time To Next Inspection

Tolerance- Allowable maximum distance for extensibility for the particular type of joint for welded steel and concrete conduits

Definitions

Circumferential: Cracks that span either the entire diameter are circumferential, but cracks that do not span the entire diameter are referenced from a starting and ending point such as 3 o'clock to 9 o'clock (or 3 - 12); and cracks referenced as 12 - 12 are spanning the entire diameter.

Spiral Circumferential: Cracks that span the diameter but do not connect, these may also span the diameter of the pipe more than one time. The starting and ending points are defined as (example) 12 o'clock - 6 o'clock (or 12 - 6).

Longitudinal: Cracks that follow the length of the pipe

Hairline: Crack width typically less than an 1/8-inch. Cracks 1/8-inch or greater are called out to their estimated width measurement.

Joint #- Joints are numbered in the crack log in order that they appear in the video, starting at either the inlet or outlet ends; however, in some cases the entire length of the conduit could not be video inspected either because the cable was not as long as the outlet pipe or the pipe may have been blocked by debris in both cases the camera would have to resume video from the opposite end of the pipe and continue traveling in the other direction as noted in the crack log.

Pipe Station: is the actual pipe station number given in the as built and should be considered the most accurate portrayal of where any anomaly is inside the pipe.

Feet into Pipe: Distance traveled inside the outlet pipe from the beginning of the pipe (either outlet or inlet ends).

Note: It should be noted in some instances cracks were found during the review process that were not spotted during the actual video inspection. In these cases we found it difficult to get a good visual of the crack and could not accurately describe the dimensions of the crack. In some instances it was difficult to determine whether or not a crack actually existed because of the camera's rotation speed. In this case it was referred to as a question, example: If it appeared as though a circumferential crack was shown but very hard to tell; in the description box you will read: Circumferential hairline crack?

Tres Rios Levee
Outlet Pipe Inspection
(West of 116th Ave)
May 2012

Pipe Station	Joint	Ft. in Pipe	M. in Pipe	Description	Photo
4+357	0	0	0.000	Start from upstream inlet	
4+356	1	3.05	0.930	Rock Debris in Pipe	X
4+356		3.06	0.933	Rock Debris Blocking Pipe - Video inspection will restart at the downstream outlet and travel to rock location in pipe.	

Direction of camera travel: **Upstream to Downstream**

Pipe Station	Joint	Ft. in Pipe	M. in Pipe	Description	Photo
4+340	0	0	0.000	Start from Downstream outlet - Will travel to rock located in pipe	
4+342	1	5.1	1.554	Joint Within Tolerance	
4+344	2	14.02	4.273	Joint - Spalling - 1 o'clock	X
4+345	3	16.06	4.895	Joint - Spalling- 12 o'clock	X
4+347	4	22.06	6.724	Joint Within Tolerance	
4+347		22.07	6.727	Minor sediment accumulation on bottom pipe	X
4+349	5	30.05	9.159	Joint Within Tolerance	
4+352	6	38.06	11.601	Joint Within Tolerance	
4+354	7	46.06	14.039	Joint Within Tolerance	
4+354		46.07	14.042	Rock Debris Blocking Pipe - End of Video Inspection	

Direction of camera travel: **Downstream to Upstream**

Note: The camera started at the inlet structure and traveled approximately 3-ft before encountering a rock thus ending the inspection on that specific run. The camera then started on the outlet end and traveled upstream toward the inlet knowing it would encounter the rock inside the pipe. Approximately 50-ft of the 55-ft of pipe was inspected, the loss of 5-ft was due to the rock and minor distance lost from camera placement.

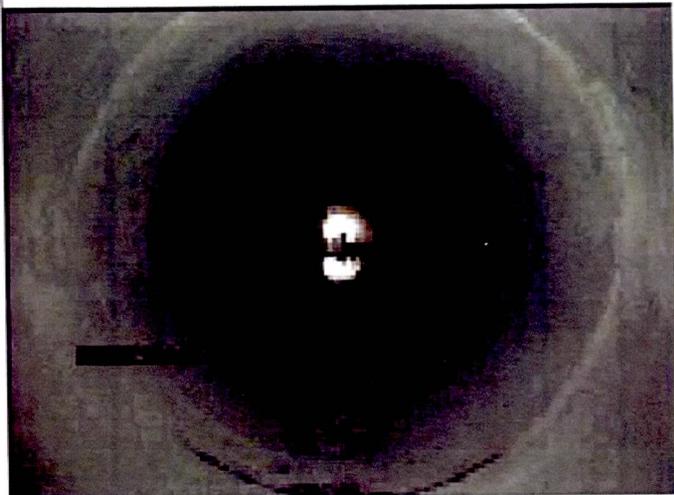
Tres Levee
Outlet Pipe Inspection
(West of 115th Ave)
May 2012



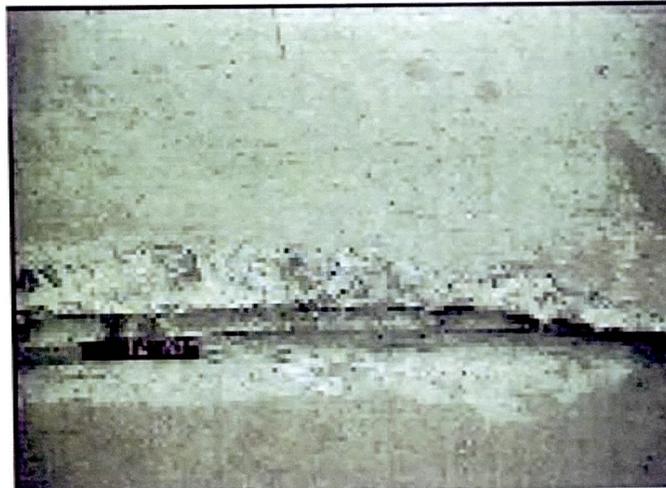
3.06 ft. - Rock Debris Blocking Pipe



3.05 ft.- Pipe Entrance

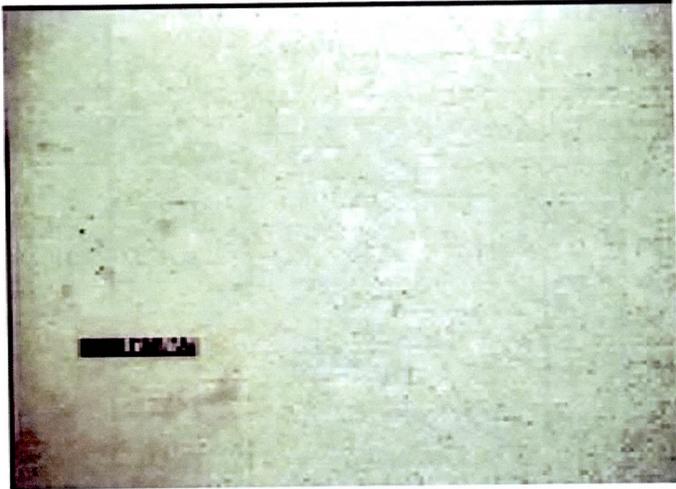


5.10 ft. - General Photo

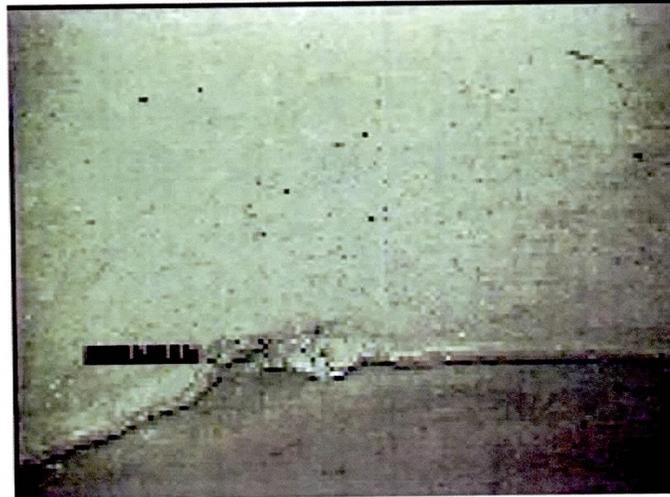


14.02 ft. - 8" Spalling, 1 o'clock

Tres Rios Levee
Outlet Pipe Inspection
(West of 115th Ave)
May 2012



22.00 ft - General Photo



16.06 ft. - 3" Spalling 12 o'clock



22.07 ft. - Minor sediment/rock debris

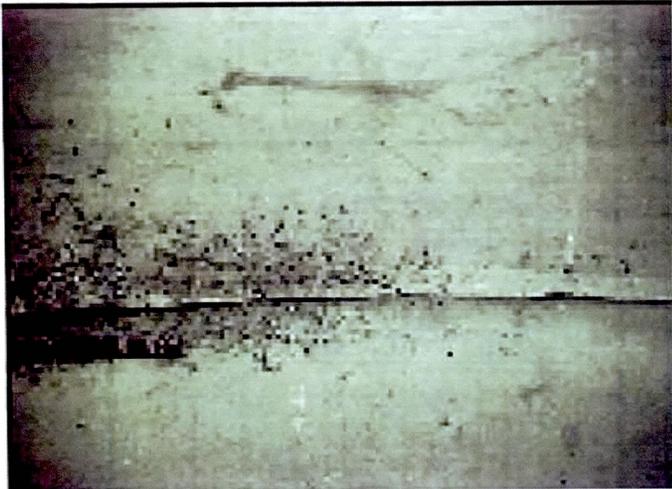
Tres Levee
 Outlet Pipe Inspection
 (East of 116th Ave)
 May 2012

Pipe Station	Joint	Ft. in Pipe	M. in Pipe	Description	Photo
4+373		0.00	0.000	Starting Point (Outlet)	
4+375	1	5.02	1.530	Joint within Tolerance	X
4+375		5.03	1.533	Longitudinal Crack, 5 o'clock, 1/8-inch	
4+377	2	14.00	4.267	Joint - Rebar Exposed, 1 - 2 o'clock	X
4+377		14.02	4.273	Longitudinal Crack, 6 o'clock, 1/8-inch, Starts	
4+378		15.10	4.602	Longitudinal Crack, 6 o'clock, 1/8-inch, Ends	
4+379		20.08	6.120	Longitudinal Crack, 6 o'clock, 1/4-inch, Starts (Ends at 31.04)	
4+379	3	21.03	6.410	Joint - Longitudinal Crack, 6 o'clock, 1/4-inch, Continues	X
4+379		21.05	6.416	Longitudinal Crack, 12 o'clock, 1/8-inch, Starts	
4+381		26.05	7.940	Longitudinal Cracks, 6 o'clock, 1/4-inch, and 12 o'clock, 1/8-inch, Continue	X
4+381		27.15	8.275	Longitudinal Crack, 7 o'clock, 1/4-inch	
4+382	4	29.02	8.845	Joint - Longitudinal Crack, 7 o'clock, 1/4-inch	
4+382		29.09	8.867	Longitudinal Crack, 12 o'clock, 1/8-inch	
4+382		31.04	9.461	Longitudinal Crack, 5 o'clock, 1/8-inch, Ends (Crack started at 20.08- varied in width from hairline up to 1/4")	
4+383		33.10	10.089	Longitudinal Crack, 12 o'clock, 1/8-inch, Ends	
4+384		36.13	11.012	Longitudinal Crack, 5 o'clock, 1/8-inch	
4+384	5	37.05	11.293	Joint within Tolerance	
4+384		36.13	11.012	Longitudinal Crack, 12 o'clock, 1/8-inch (Ends at 61.01)	
4+387	6	45.02	13.722	Joint - Longitudinal Crack, 12 o'clock, 1/8-inch, Continues	
4+388		49.01	14.938	Longitudinal Crack, 12 o'clock, 1/8-inch, Continues	
4+389	7	53.04	16.167	Joint - Longitudinal Crack, 12 - 1 o'clock, 1/8-inch	
4+389		53.05	16.170	Longitudinal Crack, 6 o'clock, 1/8-inch	
4+390		57.11	17.407	Longitudinal Crack, 12 o'clock, 1/8-inch	X
4+392	8	61.01	18.596	Joint - Longitudinal Crack, 12 o'clock, 1/8-inch, Ends (Started at 36.13- mostly hairline cracking)	
4+393		64.07	19.529	Longitudinal Crack, 6 o'clock, 1/8-inch	
4+393		65.05	19.827	Access Gate - End of Video Inspection (Inlet)	

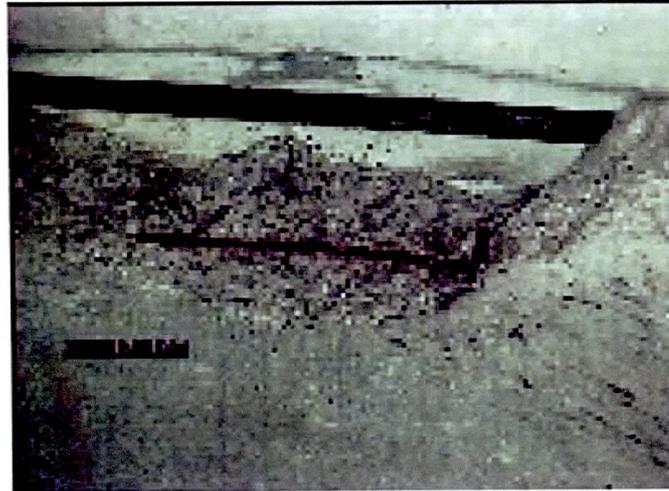
Direction of camera travel: **Downstream to Upstream**

Note: The camera travel distance is approximate due to exact placement of camera inside the pipe and slight loss of distance when traveling inside the pipe (small side to side turns).

Tres Rios Levee
Outlet Pipe Inspection
(East of 115th Ave)
May 2012



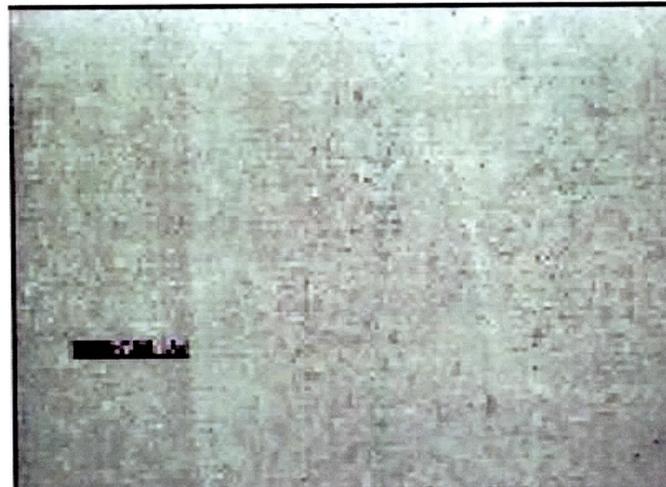
5.02 ft. - General Photo



14.00 ft. Rebar Exposed



21.03 ft. - Longitudinal Cracking

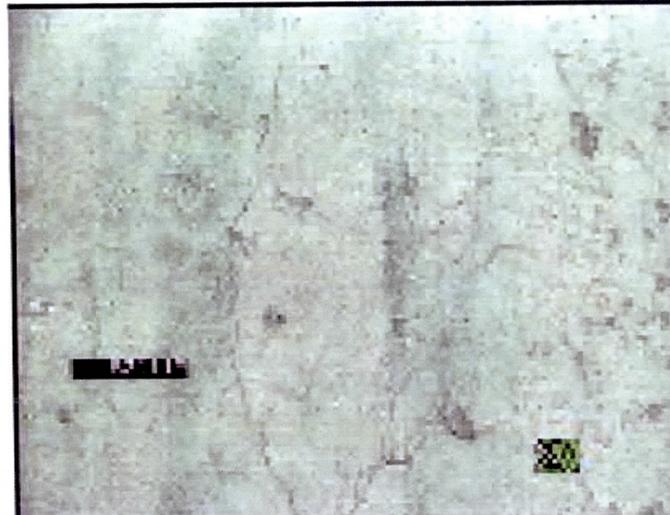


22.00 ft. - General Photo

Tres Levee
Outlet Pipe Inspection
(East of 115th Ave)
May 2012



26.05 ft. Longitudinal Cracking



57.11 ft. - Longitudinal Cracking



PACP Sewer Report

Surveyor's name: JEREMIAH		Surveyor's certificate No: U-511-12771		System owner:		Survey Customer BILL LEAL		Drainage area:		Sheet number: 1			
Work order:		Pipeline segment ref: NORTH-SOUTH		Start date/time: 2012/05/30 07:18		Location (street name and number): WEST PIPE		Locality: AVONDALE					
Further location details:						Upstream manhole No: NORTH		Rim to invert:		Grade to invert:		Rim to grade:	
Downstream manhole No: SOUTH				Rim to invert:		Grade to invert:		Rim to grade:		Use of sewer:	Direction: D	Flow control:	Height: 18
Width:	Shape: C	Material: RCP	Ln. method:	Pipe joint length:	Total length: 3.5	Length surveyed: 3.5	Year laid:	Year rehabilitated:	Media label: 1				
Purpose:		Sewer category:		Pre-cleaning	Date cleaned:	Weather:	Location code:	Additional info: N					

Grade	Amount of Structural Defects	Structural			O&M			Overall Pipe				
		Structural Segment Grade	Structural Pipe Rating	Structural Quick Rating	Structural Pipe Rating Index	Amount of O&M Defects	O&M Segment Grade	O&M Pipe Rating	O&M Quick Rating	O&M Pipe Rating Index	Overall Pipe Rating	Overall Pipe Rating Index
1	0	0				0	0					
2	0	0				0	0					
3	0	0	0	0000	0	0	0	4	4100	4	4	4
4	0	0				1	4					
5	0	0				0	0					



Surveyor's name: **JEREMIAH** System owner: Start date/time: **2012/05/30** Upstream manhole No: **NORTH** Pipeline segment ref: **NORTH-SOUTH** Sheet number: **2**

Distance (Feet) (Meters)	Video Ref.	Group/ Descriptor	Modifier/ Severity	Continuous Defect	S/M/L	Value		%	Joint	Circumferential Location		Image Ref.	Family	Rating	Remarks
						1st	2nd			At/From	to				
0.0	59	AEP											CF		NORTH
0.0	224	MWL						5							
3.5	423	DSZ						25		6		TRES RIOS-NORTH-S OUTH DSZ at 3.526411 ft (D).jpg	O&M	4	LOOSE ROCK UP TO 8-INCH DIAM
3.5	548	MSA													UNABLE TO CONTINUE



PACP Sewer Report

Surveyor's name: JEREMIAH Surveyor's certificate No: U-511-12771 System owner: Survey Customer: BILL LEAL Drainage area: Sheet number: 1

Work order: Pipeline segment ref: NORTH-SOUTH2 Start date/time: 2012/05/30 07:55 Location (street name and number): WEST PIPE Locality: AVONDALE

Further location details: Upstream manhole No: NORTH Rim to invert: Grade to invert: Rim to grade:

Downstream manhole No: SOUTH Rim to invert: Grade to invert: Rim to grade: Use of sewer: Direction: U Flow control: Height: 18

Width: Shape: C Material: RCP Ln. method: Pipe joint length: Total length: 46.6 Length surveyed: 46.6 Year laid: Year rehabilitated: Media label: 1

Purpose: Sewer category: Pre-cleaning: Date cleaned: Weather: Location code: Additional info:

Grade	Amount of Structural Defects	Structural			O&M			Overall Pipe			
		Structural Segment Grade	Structural Pipe Rating	Structural Quick Rating	Structural Pipe Rating Index	O&M Segment Grade	O&M Pipe Rating	O&M Quick Rating	O&M Pipe Rating Index	Overall Pipe Rating	Overall Pipe Rating Index
1	0	0			0	0					
2	0	0			5	10					
3	0	0	0	0000	0	0	10	2500	2	10	2
4	0	0			0	0					
5	0	0			0	0					



Surveyor's name: **JEREMIAH** System owner: Start date/time: **2012/05/30** Upstream manhole No: **NORTH** Pipeline segment ref: **NORTH-SOUTH2** Sheet number: **2**

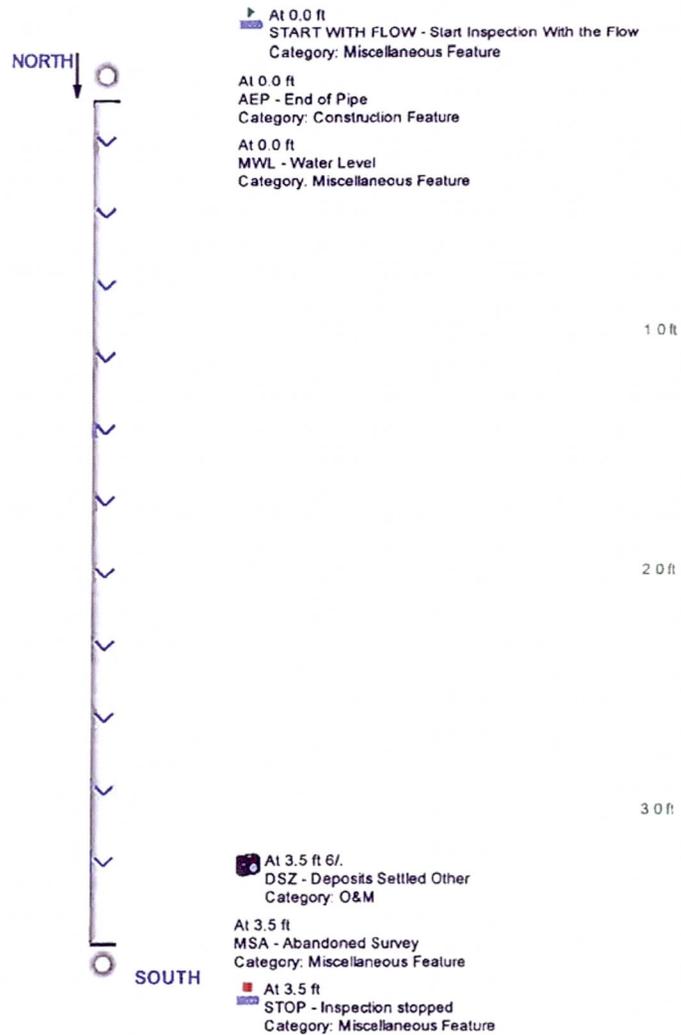
Distance (Feet) (Meters)	Video Ref.	Group/ Descriptor	Modifier/ Severity	Continuous Defect	S/M/L	Value		Joint	Circumferential Location	Image Ref.	Family	Rating	Remarks
						Inches (mm) 1st	% 2nd						
0.0	2	AEP									CF		SOUTH END
0.0	19	MWL					5						
14.2	601	MGO											JOINT
22.4	582	MGO											JOINT
22.5	463	DSGV		S1			5	6		TRES RIOS-NORTH-S OUTH DSGV at 22.49278 ft (U).jpg	O&M	2	ROCKS ON THE BOTTOM OF PIPE
30.4	746	MGO											JOINT
38.5	839	MGO											JOINT
46.5	960	MGO											JOINT
46.6	1009	MSA											UNABLE TO CONTINUE ROCKS ON THE BOTTOM OF PIPE
46.6	463	DSGV		F1			5	6		TRES RIOS-NORTH-S OUTH DSGV at 22.49278 ft (U).jpg	O&M	2	ROCKS ON THE BOTTOM OF PIPE



Main Inspection with Pipe-Run Graph

Project Name:	Pipeline segment ref:	Locality:	Location (street name and number):
TRES RIOS	NORTH-SOUTH	AVONDALE	WEST PIPE
Start date/time:	Width:	Height:	Material:
5/30/2012		18	RCP
Direction:	Length surveyed:	Weather:	Media label:
Downstream	3.5		1

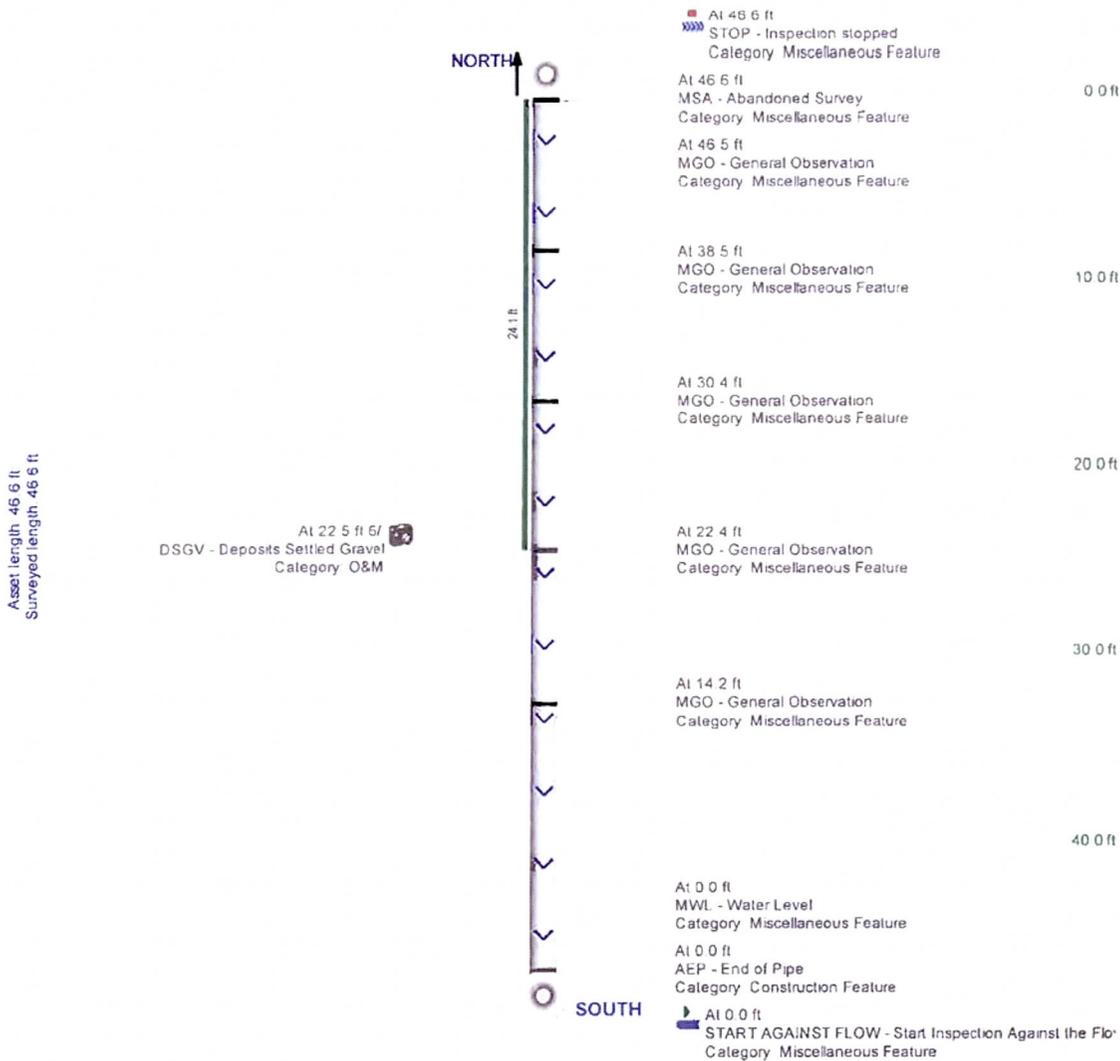
Asset length 3.5 ft.
 Surveyed length 3.5 ft.





Main Inspection with Pipe-Run Graph

Project Name:	Pipeline segment ref:	Locality:	Location (street name and number):
TRES RIOS	NORTH-SOUTH2	AVONDALE	WEST PIPE
Start date/time:	Width:	Height:	Material:
5/30/2012		18	RCP
Direction:	Length surveyed:	Weather:	Media label:
UPSTREAM	46.6		1



Pro-Pipe Professional Pipe Services
 4940 W Watkins St
 Phoenix, Az 85043



602-861-3944

PACP Sewer Report

Surveyor's name: JEREMIAH		Surveyor's certificate No: U-511-12771		System owner:		Survey Customer BILL LEAL		Drainage area:		Sheet number: 1			
Work order:		Pipeline segment ref: NORTH-SOUTH3		Start date/time: 2012/05/30 08:56		Location (street name and number): EAST PIPE		Locality: AVONDALE					
Further location details:						Upstream manhole No: NORTH		Rim to invert:		Grade to invert:		Rim to grade:	
Downstream manhole No: SOUTH				Rim to invert:		Grade to invert:		Rim to grade:		Use of sewer:		Direction: U	
Width:		Shape: C		Material: RCP		Ln. method:		Pipe joint length:		Total length: 185.6		Length surveyed: 185.6	
Purpose:		Sewer category:		Pre-cleaning N		Date cleaned:		Weather:		Location code:		Additional info:	
										Year laid:		Year rehabilitated:	
												Height: 30	
												Media label: 1	

Grade	Amount of Structural Defects	Structural Segment Grade	Structural Pipe Rating	Structural Quick Rating	Structural Pipe Rating Index	Amount of O&M Defects	O&M Segment Grade	O&M Pipe Rating	O&M Quick Rating	O&M Pipe Rating Index	Overall Pipe Rating	Overall Pipe Rating Index
1	0	0	42	522B	2.333333	0	6	2300	2	48	2.285714	
2	16	32				3						6
3	0	0				0						0
4	0	0				0						0
5	2	10				0						0



602-861-3944

Surveyor's name: JEREMIAH System owner: _____ Start date/time: 2012/05/30 Upstream manhole No: NORTH Pipeline segment ref: NORTH-SOUTH3 Sheet number: 2

Distance (Feet) (Meters)	Video Ref.	Group/ Descriptor	Modifier/ Severity	Continuous Defect	S/M/L	Value		%	Joint	Circumferential Location	Image Ref.	Family	Rating	Remarks
						Inches (mm) 1st	2nd							
0.0	1	AEP										CF		SOUTH END
0.0	19	MWL						5						JOINT
5.2	151	MGO												
12.7	227	SRC								2	TRES RIOS-NORTH-S OUTH SRC at 12.67602 ft (U).jpg	S	5	REBAR SHOWING
13.0	359	MGO												JOINT
14.2	422	CL								6	TRES RIOS-NORTH-S OUTH CL at 14.20095 ft (U).jpg	S	2	AT JOINT
20.8	628	CL		S1						6	TRES RIOS-NORTH-S OUTH CL at 20.77723 ft (U).jpg	S	2	JOINT
21.3	688	CL		S2						12	TRES RIOS-NORTH-S OUTH CL at 21.25377 ft (U).jpg	S	2	JOINT
29.2	1027	MGO												JOINT
30.9	688	CL		F2						12	TRES RIOS-NORTH-S OUTH CL at 21.25377 ft (U).jpg	S	2	JOINT
31.3	628	CL		F1						6	TRES RIOS-NORTH-S OUTH CL at 20.77723 ft (U).jpg	S	2	JOINT
37.5	1189	MGO												JOINT



602-861-3944

Surveyor's name: JEREMIAH System owner: Start date/time: 2012/05/30 Upstream manhole No: NORTH Pipeline segment ref: NORTH-SOUTH3 Sheet number: 3

Distance (Feet) (Meters)	Video Ref.	Group/ Descriptor	Modifier/ Severity	Continuous Defect	S/M/L	Value		%	Joint	Circumferential Location		Image Ref.	Family	Rating	Remarks
						1st	2nd			At/From	To				
45.2	1259	CL								12		TRES RIOS-NORTH-S OUTH CL at 45.17618 ft (U).jpg	S	2	AT JOINT
45.2	1299	CL								1		TRES RIOS-NORTH-S OUTH CL at 45.17618 ft (U)0.jpg	S	2	AT JOINT
45.2	1331	MGO													JOINT
49.1	1454	CL								9		TRES RIOS-NORTH-S OUTH CL at 49.08383 ft (U)0.jpg	S	2	
53.4	1582	CL								12		TRES RIOS-NORTH-S OUTH CL at 53.37271 ft (U).jpg	S	2	AT JOINT
53.4	1602	MGO													JOINT
57.9	1699	CL		S3						12		TRES RIOS-NORTH-S OUTH CL at 57.94751 ft (U).jpg	S	2	
61.1	1803	MGO													JOINT
61.1	1699	CL		F3						12		TRES RIOS-NORTH-S OUTH CL at 57.94751 ft (U).jpg	S	2	
64.6	1880	CL		S4						6		TRES RIOS-NORTH-S OUTH CL at 64.61909 ft (U).jpg	S	2	
65.3	1968	MGO										TRES RIOS-NORTH-S OUTH MGO at 65.28625 ft (U).jpg			ACCESS GRATING



602-861-3944

Surveyor's name: JEREMIAH System owner: Start date/time: 2012/05/30 Upstream manhole No: NORTH Pipeline segment ref: NORTH-SOUTH3 Sheet number: 4

Distance (Feet) (Meters)	Video Ref.	Group/ Descriptor	Modifier/ Severity	Continuous Defect	S/M/L	Value		Joint	Circumferential Location	Image Ref.	Family	Rating	Remarks
						Inches (mm)	%						
						1st	2nd	At/From to					
69.1	1880	CL		F4					6	TRES RIOS-NORTH-S OUTH CL at 64.61909 ft (U).jpg	S	2	
69.2	2040	MGO											JOINT
69.2	2050	CL							12	TRES RIOS-NORTH-S OUTH CL at 69.1939 ft (U).jpg	S	2	AT JOINT
73.8	2139	CL							9	TRES RIOS-NORTH-S OUTH CL at 73.76871 ft (U).jpg	S	2	
77.3	2196	MGO											JOINT
85.4	2300	MGO											JOINT
94.0	2427	MGO											JOINT
101.1	2506	MGO											JOINT
109.3	2595	MGO											JOINT
109.4	2630	CL							7	TRES RIOS-NORTH-S OUTH CL at 109.4141 ft (U).jpg	S	2	
117.2	2732	MGO											JOINT
125.4	2859	MGO											JOINT
133.4	2925	MGO											JOINT
141.2	3128	CL							11	TRES RIOS-NORTH-S OUTH CL at 141.1517 ft (U).jpg	S	2	

Not part of this Assessment



602-861-3944

Surveyor's name: JEREMIAH System owner: Start date/time: 2012/05/30 Upstream manhole No: NORTH Pipeline segment ref: NORTH-SOUTH3 Sheet number: 5

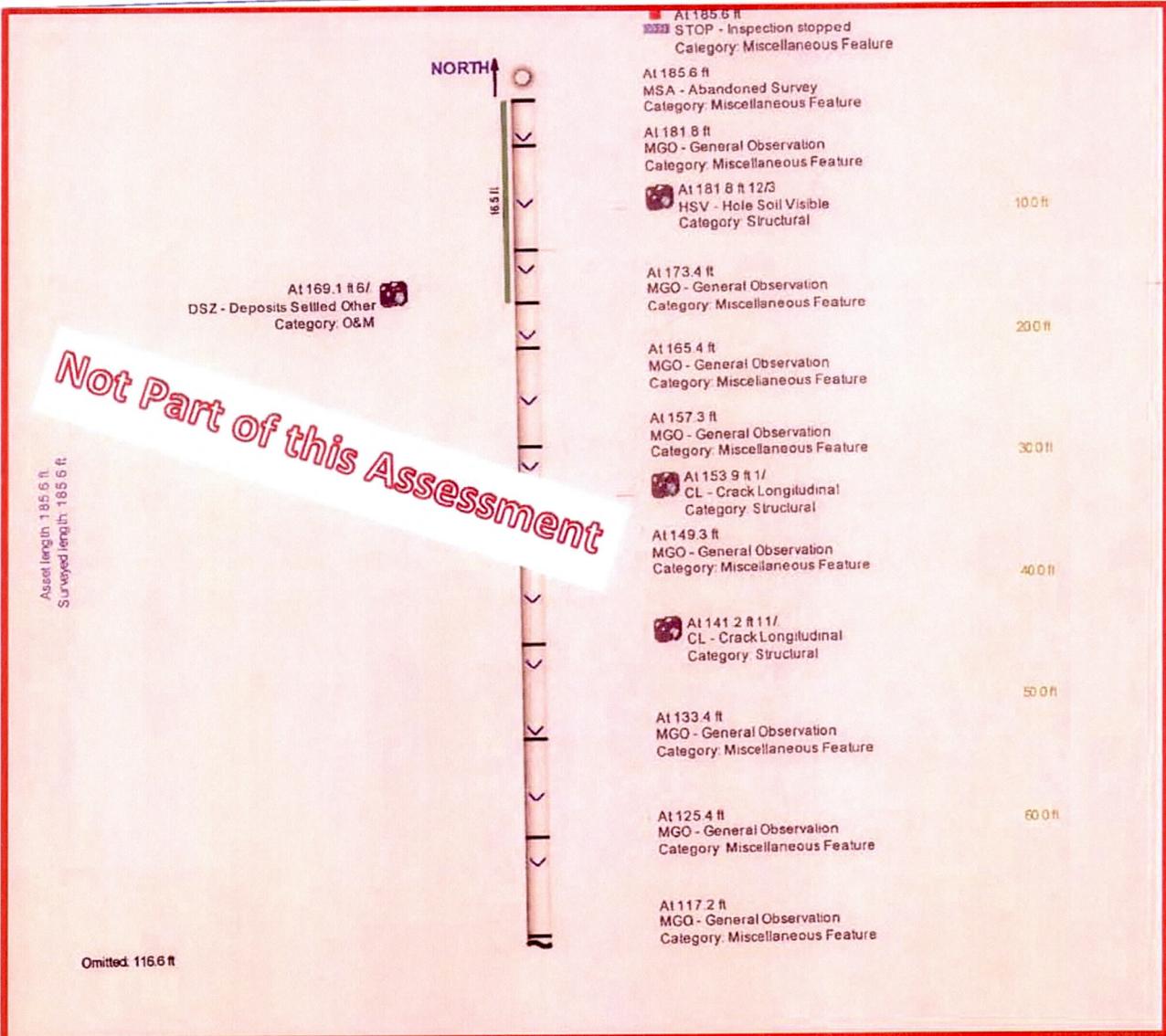
Distance (Feet) (Meters)	Video Ref.	Group/ Descriptor	Modifier/ Severity	Continuous Defect	S/M/L	Value		%	Joint	Circumferential Location		Image Ref.	Family	Rating	Remarks	
						Inches (mm)				At/From	to					
149.3	3246	MGO														JOINT
153.9	3339	CL								1		TRES RIOS-NORTH-S OUTH CL at 153.9231 ft (U).jpg	S	2		
157.3	3428	MGO														JOINT
165.4	3501	MGO														JOINT
169.1	3568	DSZ		S5				5		6		TRES RIOS-NORTH-S OUTH DSZ at 169.0771 ft (U).jpg	O&M	2		ROCKS
173.4	3715	MGO														JOINT
181.8	3849	HSV								12	3	TRES RIOS-NORTH-S OUTH HSV at 181.8484 ft (U).jpg	S	5		
181.8	3914	MGO														JOINT
185.6	4041	MSA														UNABLE TO CONTINUE DUE TO ROCKS IN LINE
185.6	3568	DSZ		F5				5		6		TRES RIOS-NORTH-S OUTH DSZ at 169.0771 ft (U).jpg	O&M	2		ROCKS

Not Part of this Assessment



Main Inspection with Pipe-Run Graph

Project Name: TRES RIOS	Pipeline segment ref: NORTH-SOUTH3	Locality: AVONDALE	Location (street name and number): EAST PIPE
Start date/time: 5/30/2012	Width: 30	Material: RCP	Location code: 1
Direction: UPSTREAM	Length surveyed: 185.6	Weather:	Media label: 1

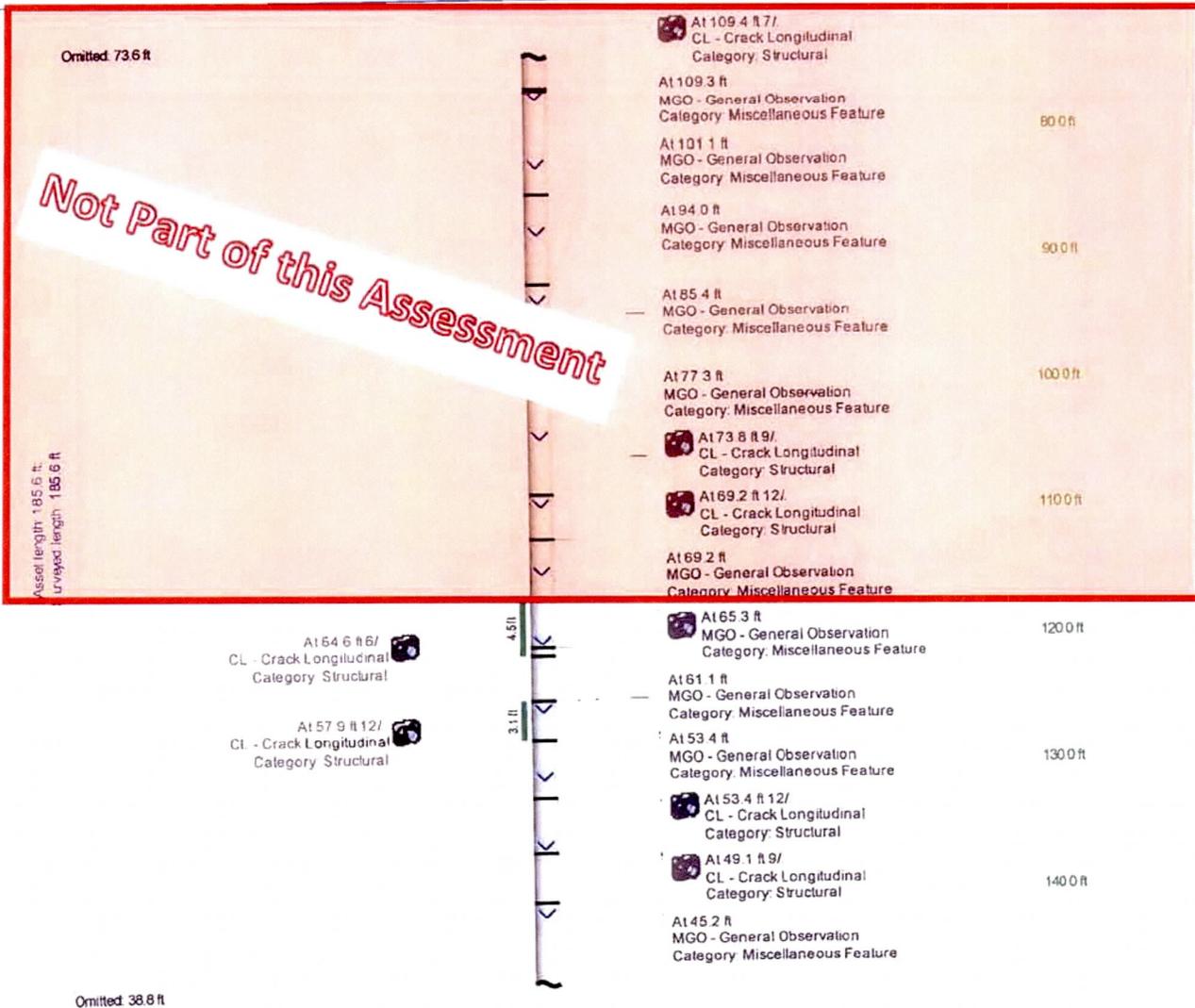




Project Name: TRES RIOS Pipeline segment ref: NORTH-SOUTH3 Locality: AVONDALE Location (street name and number): EAST PIPE

Start date/time: 5/30/2012 Width: Height: 30 Material: RCP Location code:

Direction: UPSTREAM Length surveyed: 185.6 Weather: Media label: 1





602-861-3944

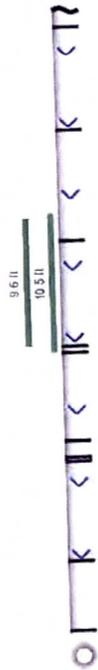
Project Name:	Pipeline segment ref:	Locality:	Location (street name and number):
TRES RIOS	NORTH-SOUTH3	AVONDALE	EAST PIPE
Start date/time:	Width:	Height:	Material:
5/30/2012		30	RCP
Direction:	Length surveyed:	Weather:	Location code:
UPSTREAM	185.6		
			Media label:
			1

Omitted: 139.2 ft

Asset length: 185.6 ft.
 Surveyed length: 185.6 ft

At 21.3 ft 12/
 CL - Crack Longitudinal
 Category: Structural

At 20.8 ft 6/
 CL - Crack Longitudinal
 Category: Structural



- At 45.2 ft 1/
 CL - Crack Longitudinal
 Category: Structural 140.0 ft
- At 45.2 ft 12/
 CL - Crack Longitudinal
 Category: Structural
- At 37.5 ft
 MGO - General Observation
 Category: Miscellaneous Feature 150.0 ft
- At 29.2 ft
 MGO - General Observation
 Category: Miscellaneous Feature
- At 14.2 ft 6/
 CL - Crack Longitudinal
 Category: Structural 160.0 ft
- At 13.0 ft
 MGO - General Observation
 Category: Miscellaneous Feature 170.0 ft
- At 12.7 ft 2/
 SRC - Surface Reinforcement Corroded
 Category: Structural
- At 5.2 ft
 MGO - General Observation
 Category: Miscellaneous Feature 180.0 ft
- At 0.0 ft
 MWL - Water Level
 Category: Miscellaneous Feature
- At 0.0 ft
 AEP - End of Pipe
 Category: Construction Feature
- At 0.0 ft
 START AGAINST FLOW - Start Inspection Against the Fl
 Category: Miscellaneous Feature

PACP Grading System Index Scores for Pipe Condition

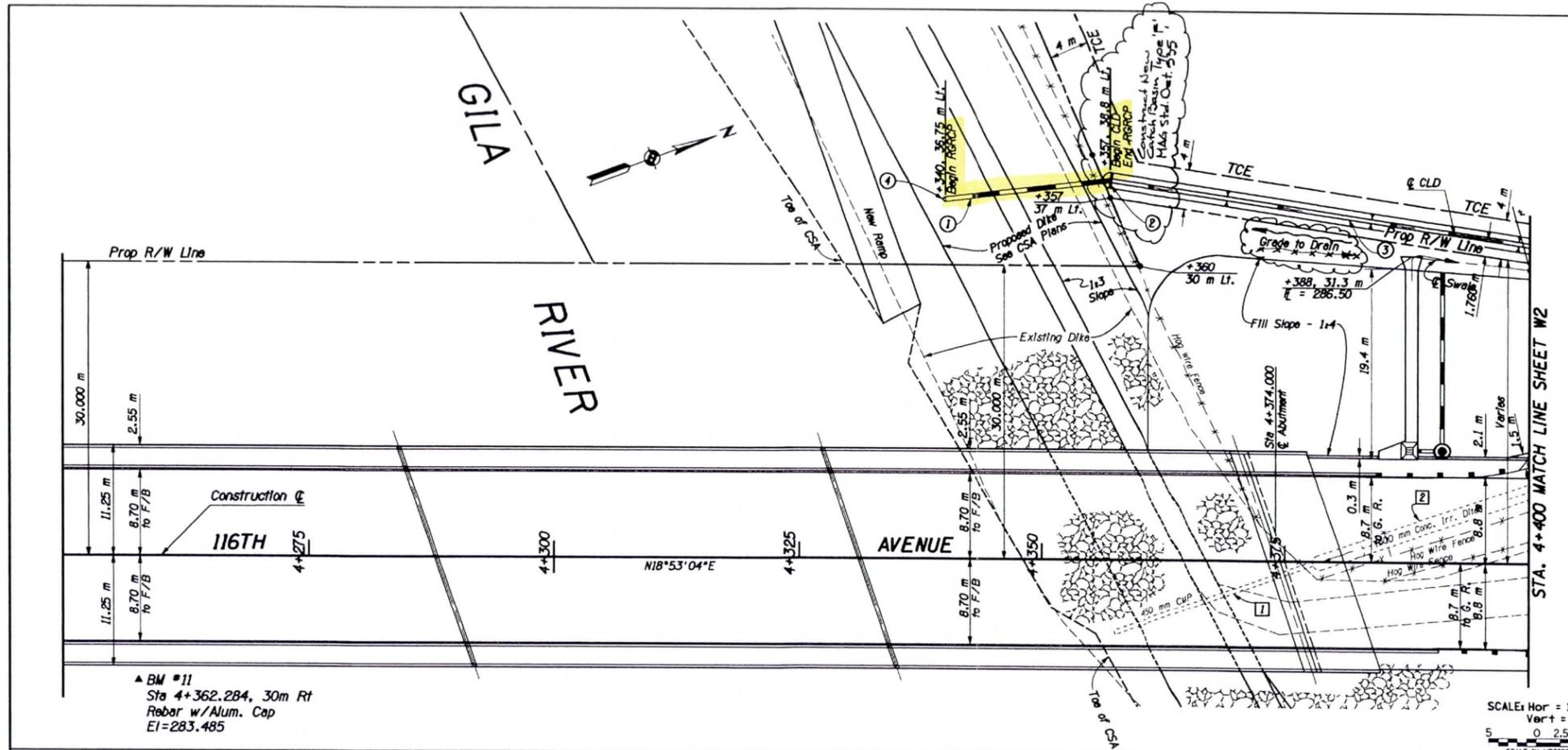
- 5: Immediate attention needed
- 4: Poor; will become Grade 5 in near future
- 3: Fair; moderate
- 2: Good; has not begun to deteriorate
- 1: Excellent; minor defects

Likelihood of Failure as per Defect Grade (from NASSCO)

- 5: Pipe has failed or will likely fail within 5 years
- 4: Pipe will probably fail in 5-10 years
- 3: Pipe may fail in 10-20 years
- 2: Pipe unlikely to fail for at least 20 years
- 1: Failure unlikely in foreseeable future

WHAT DEFINES FAILURE?





F.W.H.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	STP-MMA-018P	29	68	

- REMOVAL/RELOCATE
- Sta. 4+357 to Sta. 4+378, Rt. Remove 450 mm x 22 m Pipe Fill & Compact Voids - LSR
 - Sta. 4+378, Rt. to Sta. 4+400, Lt. Remove 23 m Concrete Ditch Fill & Compact Voids - LSR

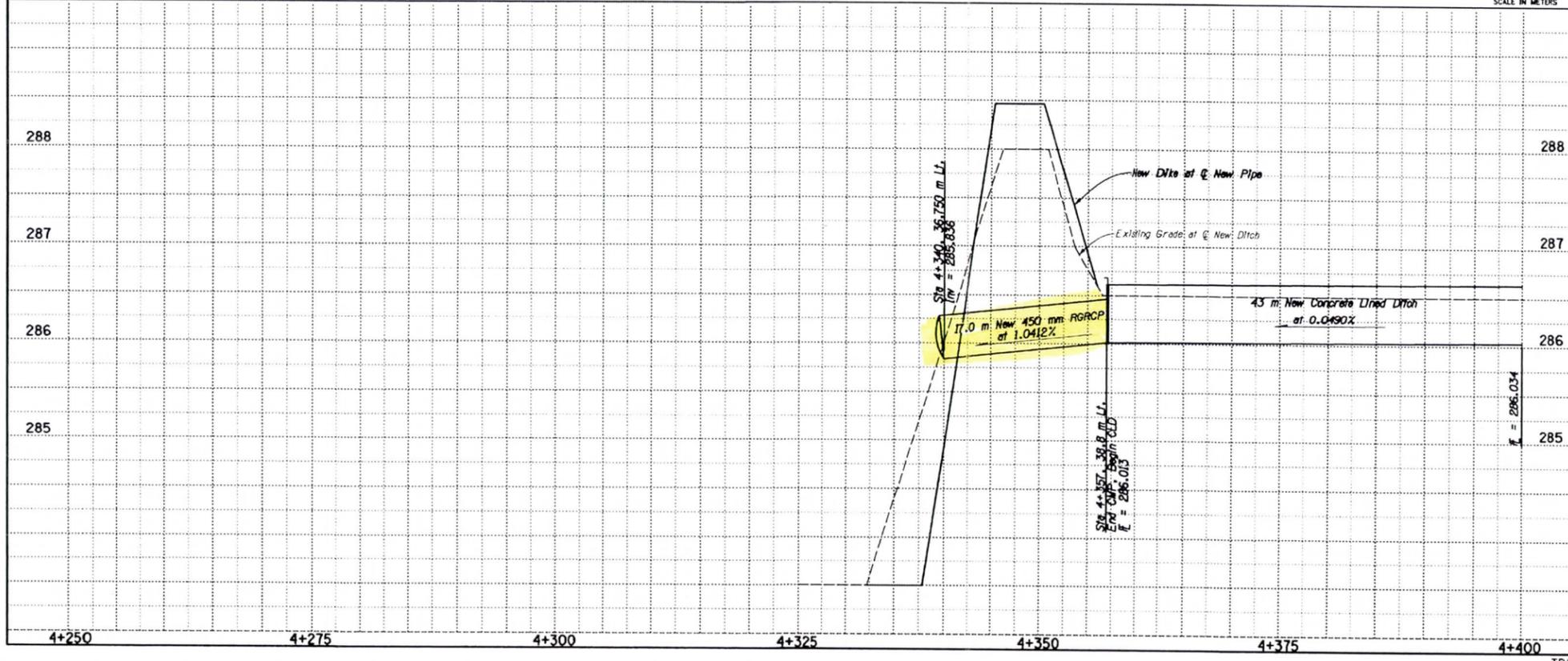
LSR - Part of Lump Sum Removal Item
 CONSTRUCTION

- Sta. 4+340, 36.75 m Lt. to Sta. 4+357, 38.8 m Lt. Install New 450 mm x 17 m RGRCP, Slope +1.0412%
- Sta. 4+357, 38.8 m Lt. Install Pull-up Type Irrigation Gate, See Detail A, Sheet P23. Type F Catch Basin, MAA Std. Det 555
- Sta. 4+357, 38.8 m Lt. to Sta. 4+400, 32.7 m Lt. Install 43 m New Concrete Lined Ditch, See Detail D, Sheet P23.
- Sta. 4+340, 36.750 m Lt. Install New 0.457 m diameter Flap Gate with Settling Collar, See Detail B, Sheet P23.

RECORD DRAWING

RECORD DRAWING NOTATIONS
 These record drawings reflect certain dimensions, details, specifications, and plan revisions prepared by others or obtained from other record drawings which have not been independently verified by Entranco. As a result, Entranco is not responsible for the accuracy, completeness or compliance of such information depicted in these record drawing notations.

ENTRANCO ENGINEERS, INC.
 DATE: 8-10-99



NO.	REVISION	BY	DATE

MARICOPA COUNTY
 DEPARTMENT OF TRANSPORTATION
 ENGINEERING DIVISION

116TH AVENUE BRIDGE
 OVER GILA RIVER
 PROJECT NO. 68832

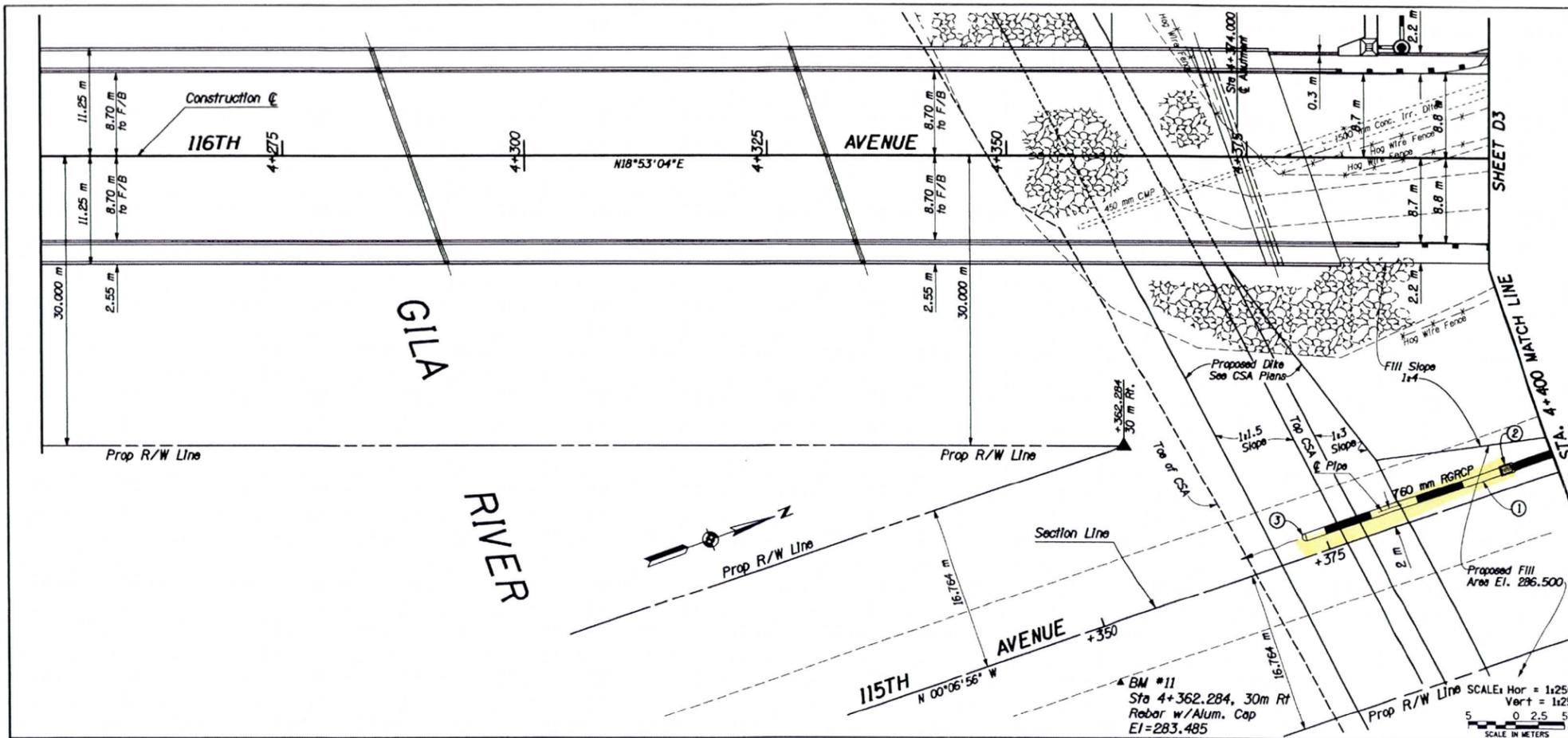
DESIGNED	T. LAVALETTE	2/96
DRAWN	J. GILMORE	7/96
CHECKED	J. S. PEGANY	7/96

BY DATE

ENGINEERING ALLIANCE, INC.
 177 E. Broadway, Suite 100, Phoenix, AZ 85004

IRRIGATION PLAN
 STA 4+250 to STA 4+400

SHEET OF
 W1 4



F.W.H.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	STP-111A-018P	26	68	

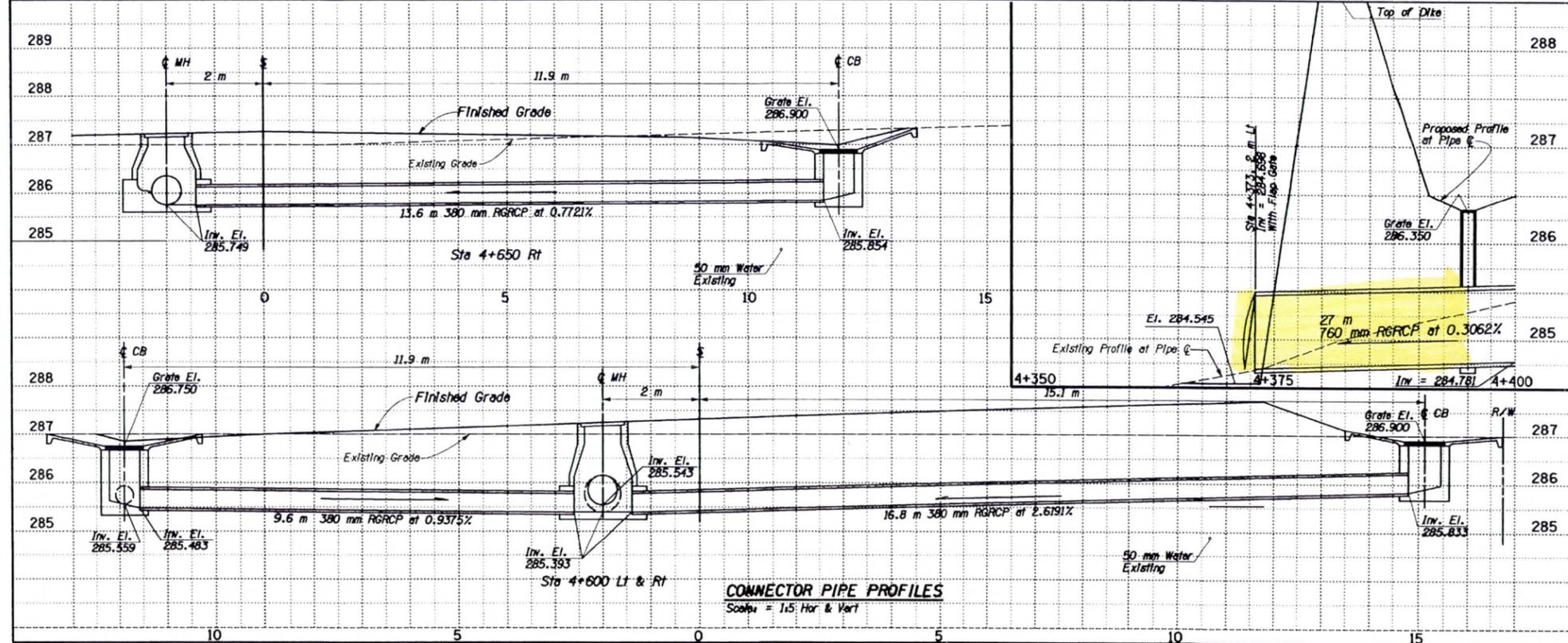
RECORD DRAWING

RECORD DRAWING NOTATIONS

These record drawings reflect certain dimensions, details, specifications, and plan revisions prepared by others or obtained from other record drawings which have not been independently verified by Entranco. As a result, Entranco is not responsible for the accuracy, appropriateness or completeness of such information displayed in these record drawing notations.

ENTRANCO ENGINEERING, INC.
DATE: 8-10-99

- ① Sta. 4+37.3 to Sta. 4+400, 2 m Lt. (Section Line Stationing)
Install New 760 mm x 27 m RGRC
- ② Sta. 4+395, 2 m Lt. (Section Line Stationing)
Install New Catch Basin Type "H" per MAG Detail 538
New Grate per MAG Detail 540-1 Plan IA, TW-1
- ③ Sta. 4+37.3, 2 m Lt. (Section Line Stationing)
Install 0.762 m diameter Flap Gate with Settling Chamber
See Detail B, Sheet P23.



REVISION	BY	DATE

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

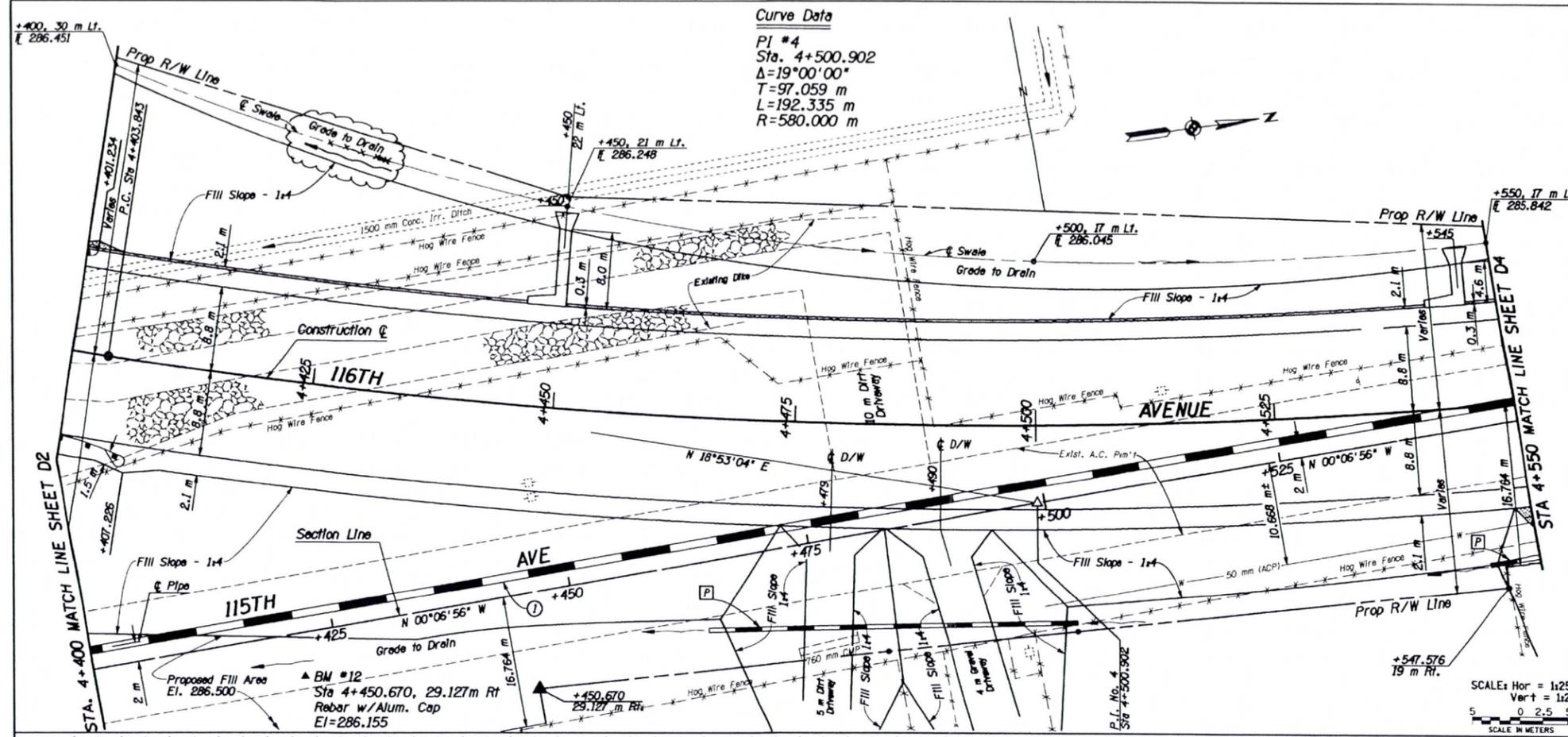
116TH AVENUE BRIDGE
OVER GILA RIVER
PROJECT NO. 68832

DESIGNED	ROBERT MEYERS	DATE	2/96
DRAWN	J. GILMORE		7/96
CHECKED	J. S. PEGANY		7/96

ENGINEERING ALLIANCE, INC.
717 E. Broadway Suite 400 Suite C-100
PHOENIX, ARIZONA 85004

STORM DRAIN PLAN AND PROFILE
STA 4+350 TO STA 4+400

SHEET OF
D2 4



Curve Data
 PI #4
 Sta. 4+500.902
 $\Delta = 19^{\circ}00'00''$
 $T = 97.059$ m
 $L = 192.335$ m
 $R = 580.000$ m

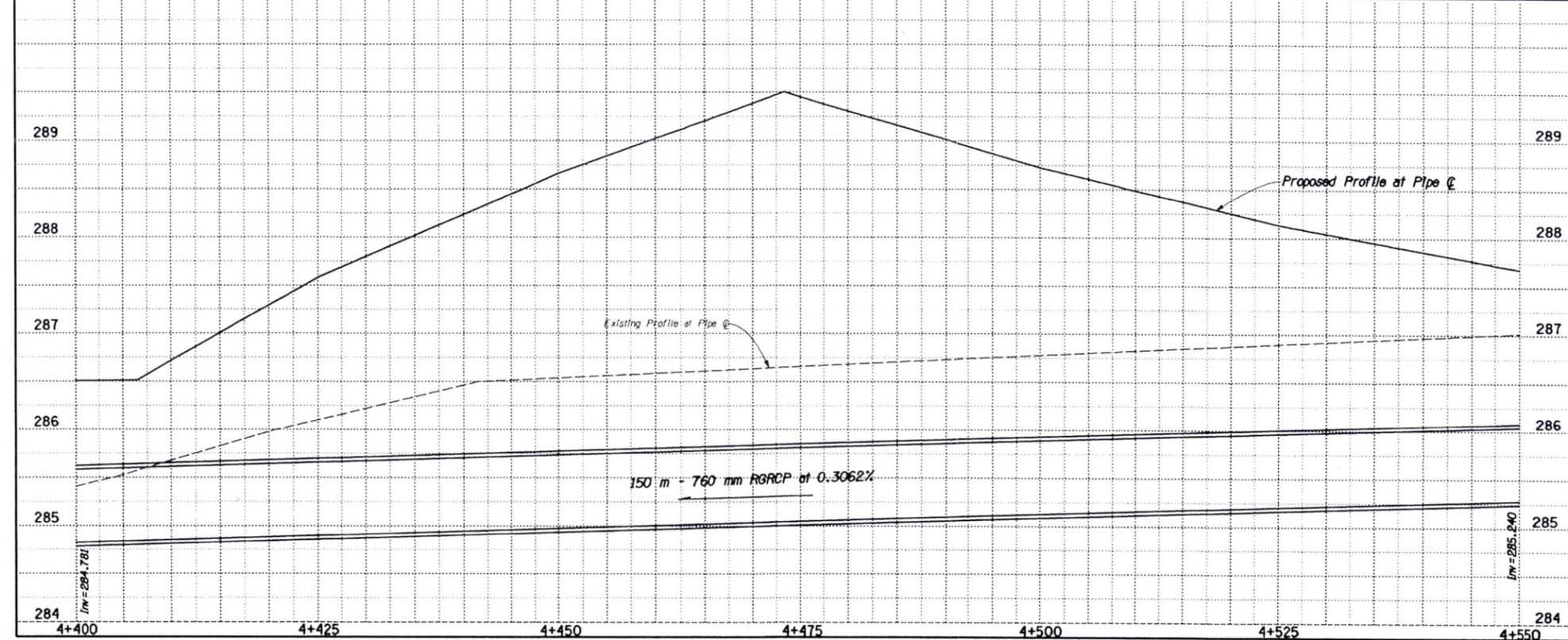
F.W.H.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	STP-111A-0218P	27	68	

RECORD DRAWING

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 These record drawings reflect certain dimensions, details, specifications, and plan revisions prepared by others or obtained from other record drawings which have not been independently verified by Entranco. As a result, Entranco is not responsible for the accuracy, appropriateness, or completeness of such information depicted in these record drawings.
 ENTRANCO ENGINEERING, INC.
 DATE: 8-12-99

- CONSTRUCTION
- ① Sta. 4+400 to Sta. 4+550, 2 m Lt. (Section Line Stationing)
Install 760 mm x 150 m RGRCP

SCALE: Hor = 1:250
 Vert = 1:25
 SCALE IN METERS



[P] For Driveway Culvert, See Sheet P15.

NO.	REVISION	BY	DATE

MARICOPA COUNTY
 DEPARTMENT OF TRANSPORTATION
 ENGINEERING DIVISION

116TH AVENUE BRIDGE
 OVER GILA RIVER
 PROJECT NO. 68832

	DESIGNED	ROBERT MEYERS	2/96
	DRAWN	J. GILMORE	7/96
	CHECKED	J. S. PEGANY	7/96

EA ENGINEERING ALLIANCE, INC.
 787 E. Bellway Home Rd Suite C-200 8502 848-8000
 PHOENIX, ARIZONA 85024

STORM DRAIN PLAN AND PROFILE SHEET OF
 STA 4+400 TO STA 4+550 D3 4

TRACS NO. 5534501C

DEFICIENCY LEVELS and MAINTENANCE STANDARD
Operations and Maintenance Division

#15. TRASH RACKS

TYPE	DEFICIENCY NOTED	MAINTENANCE STANDARD
A. General	1. Loose, bent, broken or missing members	
	a. Frame or bar members bent out of shape or alignment.	a. Repair or replace frame to original design.
	b. Any missing or broken parts of the grate.	b. Repair or replace as needed.
	c. Breakaway pin missing.	c. Re-install breakaway pin to secure the grate.
	d. Trash or debris resulting in flow restrictions.	d. Remove blockage so as to flows are not impeded.
	2. Deteriorated paint or protective coating.	
	a. Paint or protective coating that is peeling, rusting or oxidized.	a. Remove damaged surface paint, coating, or rust and refurbish as needed.