

35% Design Documentation Report (DDR)

South Sacramento County Streams Project Flood Damage Reduction Group

Florin Creek from Franklin Blvd to Highway 99 (Section 2D1)

Sacramento, California

Contract W91238-10-D-0016, Task Order 0004, Modification 02

Project Number: XXXXXX
Specification Number: XXXX

November 21, 2012



**US Army Corps
of Engineers
Sacramento District**

SYLLABUS

1. Channel Design

- Length: 5,750 LF
- Existing Bank Elevation: 16 feet to 26 feet (NAVD 88)
- Water Surface Elevation: to be determined by hydraulic analysis
- Free Board: 3 feet
- Channel Bottom Width: 9 feet to 26 feet
- Bank Slope: 1.5H:1V where constrained by encroachments, and 2H:1V elsewhere
- Low Flow Channel: Reinforced concrete low flow channel liner, extending 2.8 feet up each channel bank
- Channel Easement: Ranges from 61 feet to 80 feet

2. Reinforced Concrete Flood Wall

- Length: Final length to be determined after hydraulic analysis, current estimated length is 1,600 LF (800 LF per bank)
- Wall top elevation: To be determined after hydraulic analysis
- Wall thickness; 1.0-foot
- Footing thickness: 1.5-feet
- Footing width: To be determined after wall height is known

3. Patrol Road

- No patrol roads are proposed.

4. Right-of-Way Acquisition

- Flood channel easement required from 34+36 to Center Parkway along the south side of Florin Creek

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ACRONYMS AND ABBREVIATIONS

ABC	Aggregate Base Course
AASHTO	American Association of State Highway and Transportation Officials
BMP	Best Management Practice
CASQA	California Stormwater Quality Association
CESPK	Corps of Engineers, Sacramento District
cfs	Cubic Feet per Second
CMP	Corrugated Metal Pipe
Corps or USACE	United States Army Corps of Engineers
CSWRCB	California State Water Resources Control Board
DDR	Design Documentation Report
Dia	Diameter
DM	Design Memorandum
DWR	Department of Water Resources
EDR	Engineering Documentation Report
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EM	Engineering Manual
ER	Engineering Report
ETL	Engineering Technical Letter
FONSI	Finding of No Significant Impact
FOUO	For Official Use Only
Ft or ft	Feet
FY	Fiscal Year
GHT2	Genterra/Hultgren – Tillis/Taber, LLC.
HQUSACE	Head Quarters of the United States Army Corps of Engineers
LB	Left Bank
LF	Linear Feet
LM	Levee Mile
Min	Minimum
msl	Mean Sea Level
NAVD	North American Vertical Datum
NGVD	National Geodetic Vertical Datum
No.	Number
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
P&S	Plans and Specification
PDT	Project Development Team
R	Right
RB	Right Bank
RCP	Reinforced Concrete Pipe
RD	Reclamation District
RM	River Mile
ROW	Right of Way

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ACRONYMS AND ABBREVIATIONS (continued)

RR&R	Repair, Replacement, and Rehabilitation
SRFCP	Sacramento River Flood Control Project
Sta	Station
SWPPP	Stormwater Pollution Prevention Plan
USACE	United States Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VE	Value Engineering
WDID	Waste Discharge Identification Number
WSE	Water Surface Elevation

1.0 INTRODUCTION

1.1 Project Background

The South Sacramento County Streams Flood Damage Reduction Project was authorized by the Water Resources Development Act of 1999. The selected plan described in the Final Feasibility Report (prepared in 1998) includes a combination of flood protection features including raising and extending of levees, the installation of floodwalls, and modifications to existing channel geometry. The U.S. Army Corps of Engineers (Corps), the State of California Reclamation Board, and the Sacramento Area Flood Control Agency (SAFCA) are all cost-sharing partners for project implementation. A Limited Reevaluation Report (LRR) to analyze and establish revised hydrology for the project was completed in 2004. A Project Cooperation Agreement between these agencies was executed in May 2005. A Design Documentation Report (DDR) for the Final Hydraulic Design was prepared in March 2009, and included updated hydraulic and risk analyses conducted for the final design of the South Sacramento County Streams Flood Damage Reduction Project. As a result of the updated hydraulic analysis, proposed flood protection improvements were subsequently refined.

In March 2011 the Corps authorized Contract No. W91238-10-D-0010, Task Order 0011 with MGE Engineering (MGE) to prepare an Engineering Appendix to the Post Authorized Change Report (PACR) for the South Sacramento Streams Project. The scope of work for this task order included an alternative analysis, conceptual design, preparation of the Engineering Appendix for the PACR, surveying and field data collection, identification of relocations including utility relocations, determination of right of way lines, and quantity take-offs.

In November 2011, Wood Rodgers, Incorporated (WRI) completed a hydrology and hydraulic (H&H) analysis of the South Sacramento County Streams and tributary watersheds for the City of Sacramento. Due to actual development patterns that were different than the assumptions used by prior H&H studies, this analysis yielded a lower water surface elevation for Florin Creek than that predicted by the 2009 HDR Final Hydraulic Design.

The right of way research for Florin Creek performed under Task Order 0011 determined the available right of way for most of the project reach did not have sufficient width to permit the construction of floodwalls and patrol roads. Corps regulations require patrol roads be constructed adjacent to floodwalls for flood fighting and observation purposes. During this period it was confirmed that Florin Creek was an incised channel, as described in the 1998 Feasibility Study. The combination of lower than expected water surface elevations and Florin Creek being an incised channel resulted in the determination that floodwalls would not be required for flood protection.

The results from the City of Sacramento hydraulic model provided insight into the present and future conditions within the South Sacramento Streams Project area, which caused the Engineering Appendix to the PACR to be no longer necessary. In April 2012 the Corps issued a modification to Task Order 0011 ordering MGE to halt work on the

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Engineering Appendix to the PACR and prepare a close out report to document the investigations regarding the feasibility of the proposed improvements, alternative improvements considered, recommended project improvements, and partial conceptual design plans.

2.0 PERTINENT DATA

2.1 Project Description

Since publication of the 1998 Feasibility Report for the South Sacramento Streams Project, the proposed flood protection measures for Florin Creek have undergone several revisions. The primary reason for the evolution of the proposed improvements has been changes in the assumptions used in the hydraulic analyses for evaluation of the Morrison Creek stream system of which Florin Creek is a part. A more detailed description of the hydraulic analyses will be presented later in this report.

The improvements proposed for Florin Creek in the 1998 Feasibility Report consisted of sheet pile floodwalls, approximately 1 to 2 feet above the bank elevations, on the north and south banks from Franklin Blvd. to Highway 99. Modifications would be made to the existing bridge crossings to resist pressure flow, more efficiently pass flows and prevent backwater from above each bridge from leaving the channel prism.

In December 2004 a Limited Reevaluation Report (LRR) for the South Sacramento Streams Project was issued. During preliminary engineering and design work performed after the 1998 Feasibility Report, it was found the hydraulic modeling previously performed was not adequate for design purposes. Further the HEC-1/UNET hydrologic model used in 1998 was found to be incompatible with the model used by Sacramento County. This caused revisions to the project hydrology, which required the hydraulic model to be re-run. The revised hydraulic modeling resulted in the following proposed improvements for Florin Creek:

- Sheet pile floodwalls on the north and south banks 5.6 feet in height
- Channel deepening of 0.5 feet to 1 foot in depth
- Drop structures at Franklin Blvd., Center Parkway and Highway 99
- Bridge modifications to resist pressure flow
- Addition of additional barrels to the box culverts at Center Parkway and Persimmon Avenue
- Channel widening where permitted by right of way and existing surrounding development

In 2009 a Hydraulic Design Documentation Report (HDDR) was prepared by HDR that refined the hydraulic analysis for the South Sacramento Streams Project and incorporated revisions to the LRR hydraulic model that were done by Parsons Brinkerhoff (PB) in 2006. The HDDR refined the water surface elevations for Florin Creek; however, the scope of proposed improvements remained unchanged from the LRR.

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MGE Engineering (MGE) was issued a task order in March 2011 to prepare an Engineering Appendix for a Post Authorization Change Report (PACR). The scope of work included the development of a new flood control design alternate for each creek in the South Sacramento Streams Project, right of way research and mapping, additional topographic surveys and utility location research. The right of way research task determined there was insufficient right of way for Florin Creek to permit patrol roads adjacent to the proposed floodwalls. The lack of right of way for patrol roads became an issue, because the Corps requires patrol roads adjacent to floodwalls. As work progressed on the Engineering Appendix to the PACR, it was determined that Florin Creek was an incised channel, and not a levied channel. The result from this determination was floodwalls would not necessarily be required, thereby removing the need for patrol roads. The combination of these factors caused the Corps to order work be stopped on the Engineering Appendix to the PACR, and a reevaluation of the flood control measures for Florin Creek.

The Florin Creek Project from 150 feet downstream of Franklin Blvd. to Highway 99, detailed in this DDR, will consist of the following elements:

- HEC-RAS hydraulic modeling of Morrison Creek and its tributaries (which includes Florin Creek) to identify, develop and assess the floodplains for each creek.
- Development of floodplain inundation maps that illustrate residual risk of the existing conditions and future conditions.
- Channel widening of Florin Creek, where possible, within the limits of the existing right of way and surrounding development.
- Construction of a floodwall (if necessary) between Persimmon Avenue and Highway 99. The limits of the floodwall will be determined by the hydraulic modeling.
- Low flow concrete invert in the channel.
- Channel maintenance access features including reconstruction of the maintenance vehicle access ramps to the channel invert.
- Provisions for a weir or spillway in the north bank of Florin Creek at Florin Creek Park. Design and construction of the diversion structure will be part of a future project by Sacramento Area Flood Control Agency (SAFCA).

A future companion project will be the construction of a detention basin in Florin Creek Park downstream of Persimmon Avenue. The proposed basin will receive Florin Creek overflow and reduce the overall water surface elevation to permit flood flows to be contained within the Florin Creek channel without floodwalls. When the water surface elevation within the channel falls below the critical elevation, drainage from the detention basin will be released back into the channel. SAFCA will be the project proponent.

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Due to the previously described right of way limitations, no patrol roads are planned for this project. Access to the channel for maintenance will be limited to the access ramps located at Franklin Blvd, Center Parkway, Persimmon Avenue and La Mancha Way.

Environmental limitations for the Giant Garter Snake prevent utility potholing within 200 feet of Florin Creek until after May 1, 2013. Franklin Blvd is a significant utility corridor, with a large water line and AT&T fiber optic duct structure crossing the channel. It is assumed from previous research that the water line and AT&T facilities have minimal cover under the channel. As a result, no channel deepening is proposed to be shown on the 35% and 65% plans until the depth of the utilities can be confirmed by potholing.

Table 1 - Design Elements

Location	Feasibility Report 1998	Limited Reevaluation Report 2004	Franklin Channel Project 2012
150 feet downstream of Franklin Blvd to Highway 99	<ul style="list-style-type: none"> • Floodwalls – 1 to 2 feet above surrounding ground • Bridge Modifications to resist pressure flow 	<ul style="list-style-type: none"> • Floodwalls – 5.6 feet above surrounding ground • Bridge Modifications to resist pressure flow • Channel deepening between 0.5 to 1.0 feet • Drop structures at Franklin Blvd., Center Parkway and Highway 99 • Additional barrels to the box culverts at Center Parkway and Persimmon Avenue • Channel widening where permitted by right of way and existing surrounding development 	<ul style="list-style-type: none"> • Channel widening of Florin Creek, where possible, within the limits of the existing right of way and surrounding development. • Construction of a floodwall (if necessary) between Persimmon Avenue and Highway 99. • Low flow concrete invert in the channel. • Channel maintenance access features including reconstruction of the maintenance vehicle access ramps to the channel invert.

Table 2 – Summary of the Channel Design Presented in the Plans and Specifications

Component	Description	Value	Comment
Florin Creek Channel	Type	Residential and Commercial Development	EM 1110-2-1913 Design and Construction of Levees
	Current project type	Remediation	Flood damage reduction
	Bank Elevation	xxxx (Min)	Existing ground elevations
	Water surface elevation	xxxx	NAVD 88, 100-year recurrence + 3 feet of freeboard (FEMA standard)
	Length	5,750 ft	
	Channel bottom width	9 ft to 26 ft	
	Low flow channel lining	Reinforced Concrete	Concrete low flow channel liner extending 2.8 feet up each channel bank
	Bank slope	1.5:1 (where constrained by encroachments), and 2:1 elsewhere	Per Guidance in CESPCK Geotechnical Levee Practice SOP03
	Channel easement	61 -80 ft	
	Freeboard	3 ft	California Code of Regulations, Title 23: "3 ft Minimum for Major/Minor and 4 to 6 ft for ByPass Levees"
Proposed remediation	Channel widening		

3.0 ENGINEERING STUDIES, INVESTIGATIONS, AND DESIGN

Engineering design completed is in accordance with USACE guidance where available. Experience and engineering judgment were applied throughout, and where USACE guidance was unavailable. Appendix A includes the bid schedule, documentation of the monthly PCSC progress reports, Project Development Team (PDT) meeting minutes, design review meeting minutes, and utility coordination.

Standards and design guidance references are summarized on Table 3.

Table 3 - Standards and Design Guidance References

Design Component	Manual	Reference
Channel		
Guidance	EM 1110-2-1913 (30 April 00)	Design and Construction of Levees
Guidance	SOP03 (11 April 2008)	Sacramento Geotechnical Levee Practice
Guidance	CA Title 23	California Code of Regulations Title 23 "Water"
Guidance	ER 1110-2-1150 (31 Aug 99)	Engineering and Design for Civil Works Project
Guidance	ER 1110-1-12 (21 July 06)	Engineering and Design Quality Management
Hydraulics	ER 1110-2-1405 (30 Sep 82)	Hydraulic Design for Local Flood Protection Projects
Guidance	ER 1105-2-101 (03 Jan 06)	Planning-Risk Analysis for Flood Damage Reduction Studies
Hydrology	EM 1110-2-1413 (15 Jan 87)	Hydrologic Analysis of Interior Areas
Hydraulics	EM 1110-2-1416 (15 Oct 93)	River Hydraulics
Guidance	EM 1110-2-1417 (31 Aug 94)	Flood Runoff Analysis
Hydrology	EM 1110-2-1419 (31 Jan 95)	Hydrologic Engineering Requirements for Flood Damage Reduction Studies
Guidance	EM 1110-2-1205 (15 Nov 89)	Environmental Engineering for Local Flood Control Channels
Hydraulics	EM 1110-2-1601 (30 Jun 94)	Hydraulic Design of Flood Control Channels
Guidance	ER 1110-2-8160 (01 Mar 09)	Referencing Project Elevation Grades to Nationwide Vertical Datums

4.0 HYDRAULIC ANALYSIS

The South Sacramento Streams Group (SSSG) consists of several channels, including Morrison Creek, Unionhouse Creek, Florin Creek, and Elder Creek, that convey stormwater runoff to Beach Lake from a drainage basin that encompasses approximately 125.0 square miles. Near the lower portion of the watershed, each of these streams converge in highly urbanized areas where flooding could result in significant damage. To increase flood protection, the SSSG Flood Damage Reduction Project was authorized in 1999 to raise and extend levees, install floodwalls, and improve channel conveyance by modifying the existing geometry. The United States Army Corps of Engineers (USACE), the Central Valley Flood Protection Board (CVFPB), the Sacramento Area Flood Control Agency (SAFCA) and the City and County of Sacramento are the primary parties involved with the project implementation. As a result of the project, several technical memoranda and reports provided

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the best available design level hydrologic and hydraulic models for the recommended improvements.

In 1998, the USACE produced a report for the Morrison Creek Watershed Basin entitled “San Joaquin River Basin South Sacramento County Streams Investigation California Feasibility Report” which provided the initial hydrologic and hydraulic model foundation for the design improvements for Morrison, Elder, Florin and Unionhouse Creeks. The Technical Memorandum (TM), “South Sacramento County Streams Project – Hydrology Review – Contract No. 501” (Hydrology Review), dated July 2003, and prepared for the USACE by Camp Dresser & McKee Inc. (CDM) in association with HDR Engineering, Inc. (HDR) updated the hydrology for the watershed and utilized refined topographic data for their evaluation. The input and recommendations from this report became the baseline that the County Department of Water Resources used for their own hydrologic models to evaluate future developments. A report entitled “San Joaquin River Basin, South Sacramento Streams Project, Technical Appendix in support of the Limited Reevaluation Report” (LRR), dated July 2004, also was prepared by HDR for the USACE. The LRR utilized the hydrology completed by CDM/HDR in 2003 to refine the basis for the hydraulic design. Parsons Brinkerhoff, Inc. (PB) then utilized the LRR to further refine the hydraulic design for stream reaches between the Union Pacific Railroad (UPRR) and Franklin Boulevard in 2006. The LRR was utilized by PB to prepare construction drawings for the USACE report entitled “South Sacramento County Streams Project, Contract 1B1, Morrison Creek, Franklin Boulevard to the Union Pacific Railroad”, dated 2006-2007. The PB construction drawings were used by HDR and the USACE to develop a hydraulic design report and hydraulic model for the proposed design. Effective February 21, 2007, the Federal Emergency Management Agency (FEMA) approved the LOMR (Case No. 07-09-0266P) that included the certification of the Morrison Creek right bank levee between Beach Lake Road and the Brookfield Drive bridge crossing. This levee certification removed a significant residual Zone A-99 floodplain from the South Sacramento area. Additional levee strengthening projects for both the remaining right (west) and left (east) banks for portions of Unionhouse, Elder, and Florin Creeks were completed in 2009. A LOMR dated September 2012 was submitted to FEMA by the City and County of Sacramento based on the completed work and levee certification provided by the USACE.

The proposed project for Florin Creek will widen the channel within the available right-of-way to maximize the flow capacity without lowering the channel thalweg from Franklin Boulevard to Highway 99. Based on the hypothetical storm events, the increase in channel capacity will not be adequate for large storm events; therefore, a separate project in coordination with the City of Sacramento and the SAFCA will provide offsite storage in a park adjacent to Persimmon Road to contain excess runoff volume. The proposed Florin Creek project authorized in October 2012 will utilize updated hydrologic modeling from the USACE, as well as updated topographic LiDAR data collected in 2008, and supplemented with field survey data collected in 1999. This approach (i.e., using offsite detention storage adjacent to Florin Creek) changes the previous study approach of purchasing additional right-of-way for channel widening, reconstructing three in-line bridge crossings, and constructing floodwalls for the entire length of the channel.

5.0 GEOTECHNICAL DESIGN

The Geotechnical Appendix to the DDR supports the basic concept of the proposed design. The geotechnical report is presented in Appendix B. The slope stability analysis within the report found the banks of Florin Creek would be stable at a slope of 1.5H:1V, with a safety factor of 1.6 for the sudden drawdown condition. The banks of the existing channel are generally flatter than 1.5H:1V, except for the portion from Station 16+50 (Franklin Blvd) to Station 35+50 (just downstream of Center Parkway) which has an existing slope of 1.5H:1V. The proposed channel design will maintain the existing bank slope of 1.5H:1V to Station 35+50 and then transition to a bank slope 2H:1V which will extend to Highway 99. This will result in the largest channel cross section possible within the existing right of way.

6.0 CIVIL DESIGN

6.1 Florin Creek Channel

The purpose of the Florin Creek channel design is to create the largest channel prism possible within the limits of the existing channel right of way.

6.1.1 Existing Right of Way

The existing channel right of way between Franklin Blvd and Center Parkway ranges from 61 feet to 70 feet, depending on location. From Franklin Blvd to Brookfield Drive the right of way is a constant 70 feet; however, the width between the existing chain link channel fencing ranges from 50 to 56 feet depending on location.

Between Brookfield Drive and Center Parkway the right of way varies from a minimum of 61 feet on the upstream side of the Brookfield Drive bridge to a maximum of 69 feet at Station 34+36 (the west end of the Catholic Diocese property west of Center Parkway). The width between the existing chain link channel fencing ranges from 55 to 57 feet within these limits.

Between Station 34+36 and Center Parkway the north line of the Catholic Diocese property encroaches into the existing channel prism; however, the distance between the existing chain link channel fencing is generally 50 feet wide. The south channel fencing is located south of the Diocese property line indicating there may be a non-recorded easement or agreement between the Flood Control District and the church.

From Center Parkway to Highway 99 the right of way is a uniform 80 feet. Between Center Parkway and Station 54+34 the distance between the existing channel fencing is 49 feet. Once past Station 54+34, the fences transition to the north and south and approximately follows the channel right of way.

6.1.2 Surrounding Development

Along both sides of the Florin Creek channel from Franklin Blvd to approximately Station 35+50 residential development has been allowed to encroach into the channel right of way. Many of the homes have permanent improvements, such as sheds and swimming pools, built within the channel right of way. East of Station 35+50 to Highway 99 the right of way has been kept clear of permanent residential improvements. On the north side of Florin Creek between Center Parkway and Persimmon Avenue (Station 44+20 to Station 60+00) there are water lines within the creek right of way and between Persimmon Avenue and Highway 99 (Station 60+50 to Station 71+00) there is a bike path.

These described encroachments will affect the extent to which the channel can be widened.

6.1.3 Channel Improvement Design

Based on the right of way limitations previously discussed, it has been determined that between Franklin Blvd and approximately Station 35+50 all channel improvements will be limited to area between the channel chain link fencing. Within these limits the existing channel bank slope is 1.5H:1V. The channel bottom width within these limits will be a minimum of 11 feet, with the bank slopes (maintained at 1.5H:1V) daylighting 3 feet from the existing fence.

From Station 35+50 to Highway 99 the channel widening will occur predominately to the north side of the channel. Between Station 35+50 to Center Parkway the channel excavation will daylight 10 feet from the north right of way fence. From Center Parkway to Persimmon Avenue (Station 44+20 to Station 60+00) the north channel excavation will daylight 16 feet from the north fence to avoid the parallel water lines within the right of way. In order to maintain the widest possible bottom width of 18 feet, the bank slopes between Station 44+20 to Station 60+00 will need to be 1.5H:1V. If a 2H:1V bank slope is maintained in this area the bottom width will be reduced to 8 feet, which is less than the existing width of 11 feet. Between Persimmon Avenue and Highway 99 (Station 60+50 to Station 71+00) the north channel excavation will daylight approximately 25 feet from the right of way fence to accommodate the existing bike path. Along the south bank the channel excavation will daylight 5 feet from the south right of way fence. The bank slopes will be maintained at 2H:1V, with an expected bottom width of 26 feet.

The preliminary channel hydraulic analysis indicates that between Persimmon Avenue and Highway 99 (Station 60+50 to Station 71+00) there will need to be a floodwall constructed for a portion of that reach on both the north and south channel banks. The actual length of floodwall required will be determined once the project hydraulic analysis is completed; however, for the 35% submittal it is proposed to be 800 lf on each bank. The east parapet of the Persimmon Dr bridge

will be extended by 3 feet, with a positive connection to the floodwalls. It is expected the final floodwall limits will be determined prior to submission of the 65% plans.

The invert of the channel will be lined the entire length of the project with a reinforced concrete low flow channel liner, extending approximately 2.8 feet up the channel banks. Under the bridges at Franklin Blvd and Brookfield Drive full channel paving will be installed, extending 25 feet from the upstream and downstream edges of the bridge.

6.2 Ramp Design

Ramps are proposed to be constructed at locations matching the existing ramps to be removed by the proposed channel improvements. The geometry is set by a minimum width of 12 feet, a maximum longitudinal slope of 10:1, and a maximum daylight slope of 3:1. Starting points for the ramps will be shown on the plans at locations that will provide a similar level of access to the channel as the existing ramps. The constructed geometry will be controlled by the parameters mentioned above and in conformance with EM 1110-2-1913. The termination points and angles will be determined during construction.

6.3 Patrol Roads

Patrol roads will not be provided as part of the project design due to right of way limitations.

6.4 Surface Drainage

The areas between the right of way fences and the hinge point of the channel will be sloped 2% toward Florin Creek. All storm runoff will be collected in Florin Creek. Between Persimmon Avenue and Highway 99, where floodwalls are projected to be constructed, the areas outside of the floodwalls (including the bike path north of Florin Creek) will be sloped 2% toward the floodwalls, collected in a local drainage system and discharged into the creek.

6.5 Existing Utilities Affecting the Channel Design

6.5.1 Crossing Utilities

Within the limits of the project there are several locations where utilities cross the channel and numerous locations where existing storm drains outfall into the channel. Many of the crossing utilities appear to be close to the existing channel invert; therefore, until the vertical location of the crossing utilities can be determined by potholing, no lowering of the channel invert is proposed at this time. The existing storm drain outfalls enter Florin Creek through the banks at elevations above the channel invert. These outfall structures will need to be

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removed and reconstructed to the lines and grades of the reconstructed channel banks.

The utilities to be protected in-place or modified are as follows:

Sanitary Sewer

- 39" reinforced concrete pipe (RCP) sewer line crossing under the bridge at Franklin Blvd., west side
- 33" RCP sewer line crossing under the bridge at Franklin Blvd., east side
- Station 40+64, 6" sanitary sewer line. This line crossed the channel approximately 3 feet above the existing channel invert. During a utility field survey for Contract No. W91238-10-D-0010, Task Order 0011 the 6" line was found to be broken and has been subsequently cut and capped. This line will be relocated by others.
- 18" RCP sewer line crossing under the bridge at Persimmon Ave., east side.

AT&T

- 3' x 3' concrete AT&T duct structure for fiber optic lines crossing the channel under the Franklin Blvd bridge.

Gas

- 4" gas line crossing under the channel under the Franklin Blvd bridge.
- 2" gas line crossing under the channel under the Persimmon Ave bridge.

Water

- 30" water line crossing the channel under the Franklin Blvd bridge.
- Station 20+62, 8" water line crossing under the channel.
- 8" water line crossing under the channel at the Brookfield Dr bridge.
- Station 54+04, 6" water line crossing under the channel.
- 10" water line crossing the channel under the Persimmon Ave bridge.

Storm Drain

- 30" RCP storm drain crossing the channel under the east edge of the Franklin Blvd bridge.
- Station 34+66, 8" storm drain outfall in the south channel bank.
- Station 42+30, 24" storm drain outfall in the north channel bank.

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- Station 54+10, 42” storm drain outfall in the north channel bank.
- Station 54+10, 30” storm drain outfall in the south channel bank.
- Station 54+20, 54” storm drain outfall in the north channel bank.
- Station 54+80, 12” storm drain outfall in the north and south channel bank.
- Station 56+50, 12” storm drain outfall in the north and south channel bank.
- Two 15” storm drain outfalls under the north side of the Persimmon Ave bridge.
- Two 12” storm drain outfalls under the south side of the Persimmon Ave bridge.
- Station 63+72, 12” storm drain outfall in the north channel bank.
- Station 66+94, 10” storm drain outfall in the north channel bank.
- Station 67+64, 21” storm drain outfall in the north channel bank.

6.5.2 Parallel Utilities

Between Station 35+58 and Persimmon Avenue there are existing water utilities within the channel right of way running parallel to the north side of the channel. They are as follows:

- From Station 35+58 to Persimmon Avenue, 6” water line with a distance of 1 foot to 3 feet from the north easement line.
- From Center Parkway to Persimmon Avenues, 10” water line with a distance of 14 feet from the north easement line.

In order to protect the existing water lines, the north hinge point of the channel will be located a minimum of 3 feet horizontally from the southerly most water line. Unless these lines are relocated, this will be significant limitation affecting the width of the channel and will cause the channel side slopes to be steepened to a 1.5H:1V slope for a 900 linear foot portion of this reach.

See the Utility Coordination and Research Tables in Appendix A.5.

6.6 Water Quality

On July 1, 2010 a new California Statewide NPDES Permit will be implemented for all construction projects disturbing more than 1 acre of land. This new permit and related Storm Water Pollution Prevention Plan (SWPPP) includes significant changes to SWPPP design, permitting, mitigation, and monitoring. As a result, construction of the project will be required to comply with the new permit.

The following guidelines should be implemented prior to the bidding phase and for the project SWPPP:

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1. The project should comply with new Statewide Permit, CSWRCB GO 2009-0009-DWQ.
2. USACE will prepare the project Notice of Intent (NOI) and obtain a Waste Discharge Identification Number (WDID).
3. New specifications will be implemented into the Contract Documents to comply with the permit requirements and identify Contractor and USACE field personnel requirements.
4. Drawings will be prepared by the contractor to identify location and types of temporary construction Best Management Practices (BMPs). These drawings will consist of both erosion and sediment control plans and details for minimizing surface water pollution resulting from construction disturbance.
5. The drawings and specifications should comply with the Yolo County Planning and Public Works Department "Improvement Standards, Section 1, Stormwater Quality, Erosion, and Sediment Control" for permanent stabilization, planting and water quality protection measures.
6. Meetings with the California State Water Resources Control Board (CSWRCB) should be scheduled to resolve legal and permit issues specific to this Project.
7. Construction Monitoring and Reporting responsibilities should be determined and it is anticipated that the Contractor will be required to provide SWPPP to field personnel. Monitoring requirements are to be based on the Statewide NPDES permit, and Yolo County Stormwater Monitoring requirements.
8. The project specifications will require SWPPP preparation and implementation by the project Contractor with Government review, approval and construction oversight.

Typical temporary BMPs will include inlet protection, fiber rolls, temporary erosion control seeding, silt fences, settlement basins, stabilized construction entrances and concrete wash down areas. Additionally, because of the sensitive natural environment of the Sacramento River, there is a high likelihood of permit requirements for portable water treatment facilities to treat surface and subsurface water prior to discharge. This will require additional identification of treatment facility type, performance, location, monitoring and reporting.

While the Contract Documents will provide specific measure and practices for construction of BMPs, the drawings and specifications will not limit the Contractor in the implementation of additional and supplemental BMPs to ensure compliance with the requirements of the NPDES Statewide permit.

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Permanent storm water quality is provided by the landscaping, channel stabilization treatments and drainage systems improvements that will be part of the constructed project improvements. These temporary and permanent measures will comply with the requirements of the project Environmental Document as well as Local, State, and Federal Regulations.

7.0 TOPOGRAPHIC BASE MAPPING

Initially the base mapping proposed to be used for the channel plans was a LIDAR survey performed in 2008 (NAVD 88 datum), because it is the base mapping used for WRI's hydraulic model for the City of Sacramento. After inserting the LIDAR information in AutoCAD 2012 Civil 3D it became apparent the LIDAR surface would not be detailed enough for civil design purposes, because the LIDAR surface is heavily influenced by the brush and vegetation surrounding the channel.

As part of Contract No. W91238-10-D-0010, Task Order 0011, field survey cross-sections of the channel were performed at 100-foot intervals within the Florin Creek project limits. These cross-sections were inserted into the 1999 aerial survey provided by the Government (which was adjusted from NGVD 29 to NAVD 88). The resulting surface has the detail necessary for accurately depicting the existing channel condition for the channel modification design.

Prior to the modeling efforts to be performed under this task order channel cross-sections will be provided to the modelers. The channel cross-sections will be inserted into the LIDAR surface and will be used for the hydraulic analysis.

8.0 COST ESTIMATES

Micro-Computer Aided Cost Estimating System II or MCACES II, updated with the most current 2011 cost indexes for the cost estimate will be prepared based on the plans and specifications for the 65% submittal. The MCACES II will be referenced in Appendix E, but will be bound separately.

9.0 REAL ESTATE REQUIREMENTS

The right of way research performed under Contract No. W91238-10-D-0010, Task Order 0011 indicates the only location that will need acquisition of a permanent flood control easement is at the Catholic Diocese property downstream of Center Parkway. The location and extent of the permanent easement required is shown on the Real Estate Maps in Appendix F. Temporary work area easements and staging areas are also shown on the maps in Appendix F.

10.0 ENVIRONMENTAL DOCUMENTATION AND COORDINATION

Environmental documentation and coordination is not part of this Scope of Work.

11.0 TECHNICAL REVIEW DOCUMENTATION

A copy of the Statement of Technical Review for the plans and specifications is presented in Appendix C.

Project Development Team (PDT) Review Comments and Responses will also be included in Appendix C once the PDT has completed their reviews and all comments have been closed.

The Statement of Legal review has not yet been performed by the USACE for the plans and specifications. Once the legal review has been completed, the official Statement will be provided prior to the advertisement of the plans and specifications and included in Appendix C.

12.0 ECONOMIC ANALYSIS BY USACE

Economic analysis is not part of this Scope of Work.

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APPENDICES

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Appendix A - Design

A.1 – DDR Bid Schedule

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SACRAMENTO COUNTY STREAMS PROJECT
FLORIN CREEK FROM FRANKLIN BLVD TO HIGHWAY 99
SECTION 2D1
SACRAMENTO, CALIFORNIA
DESIGN DOCUMENTATION REPORT BID SCHEDULE
SPECIFICATION NO. xxxx

Item No.	Description	Quantity	Unit of Measure	Unit Price	Total Price
0001					
0002					
0003					
0004					
0005					
0006					
0007					
0008					
0009					
0010					
0011					
0012					
0013					
0014					
0015					
0016					

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Appendix A - Design

A.2 – Monthly Progress Reports

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Appendix A - Design

A.3 – Project Development Team Meeting Minutes

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Appendix A - Design

A.4 – Design Review Meeting Minutes

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Appendix A - Design

A.5 – Utility Coordination and Research Tables

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**SACRAMENTO COUNTY STREAMS PROJECT
 FLORIN CREEK FROM FRANKLIN BLVD TO HIGHWAY 99
 SECTION 2D1
 UTILITY RELOCATIONS/MODIFICATIONS & PROTECT-IN -PLACE**

Utilities to be Protected-in -Place

Utility	Location	Comments
39" RCP Sewer	Franklin Blvd bridge, west side	Crossing utility
33" RCP Sewer	Franklin Blvd bridge, east side	Crossing utility
3' x 3' AT&T Duct Structure	Franklin Blvd bridge	Crossing utility, fiber optic
4" Gas Line	Franklin Blvd bridge	Crossing utility
30" Water Line	Franklin Blvd bridge	Crossing utility
30" Storm Drain	Franklin Blvd bridge, east side	Crossing utility
8" Water Line	Station 20+62	Crossing utility
8" Water Line	Brookfield Dr bridge	Crossing utility
6" Water Line	Station 54+04	Crossing utility
18" RCP Sewer Line	Persimmon Ave bridge, east side	Crossing utility
2" Gas Line	Persimmon Ave bridge	Crossing utility
10" Water Line	Persimmon Ave bridge	Crossing utility
6" Water Line	Station 35+58 to Persimmon Ave	Parallel utility, north side
10" Water Line	Center Parkway to Persimmon Ave	Parallel utility, north side

Utilities to be Relocated/Modified

Utility	Location	Comments
8" Storm Drain Outfall	Station 34+66, south bank	Outfall to be modified
6" Sanitary Sewer Line	Station 40+64	Crossing utility to be relocated by others
24" Storm Drain Outfall	Station 42+30, north bank	Outfall to be modified
42" Storm Drain Outfall	Station 54+10, north bank	Outfall to be modified
30" Storm Drain Outfall	Station 54+10, south bank	Outfall to be modified
54" Storm Drain Outfall	Station 54+20, north bank	Outfall to be modified
12" Storm Drain Outfall	Station 54+80, north bank	Outfall to be modified
12" Storm Drain Outfall	Station 54+80, south bank	Outfall to be modified
12" Storm Drain Outfall	Station 56+50, north bank	Outfall to be modified
12" Storm Drain Outfall	Station 56+50, south bank	Outfall to be modified
15" Storm Drain Outfall	Persimmon Ave bridge, north side	Outfall to be modified
15" Storm Drain Outfall	Persimmon Ave bridge, north side	Outfall to be modified

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SECTION 2D1
UTILITY RELOCATIONS/MODIFICATIONS & PROTECT-IN -PLACE**

Utilities to be Relocated/Modified (Continued)

Utility	Location	Comments
12" Storm Drain Outfall	Persimmon Ave bridge, south bank	Outfall to be modified
12" Storm Drain Outfall	Station 63+72, north bank	Outfall to be modified
10" Storm Drain Outfall	Station 66+94, north bank	Outfall to be modified
21" Storm Drain Outfall	Station 67+64, north bank	Outfall to be modified

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Appendix B - Geotechnical Design Report

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Appendix C - Internal Review Documentation

C.1 – Statement of Independent Technical Review

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Appendix C - Internal Review Documentation

C.2 – Statement of Legal Review (Place holder for insert by USACE)

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Appendix C - Internal Review Documentation

**C.3 – Project Development Team Review Comments and Responses
(Place holder for insert by USACE)**

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**Appendix D – Design Documentation Report Plans
Bound separately**

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Appendix E – MCACES II Cost Estimates

Bound separately

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Appendix F – Real Estate Take Exhibit