

# ATTACHMENT 3

WORK PLAN

## DESCRIPTION OF THE AMETHYST BASIN PROJECT

### PROJECT LOCATION

The Amethyst Basin project is located in the City of Victorville along the Oro Grande Wash. The Basin is located approximately 0.5 mile west of Interstate 15, approximately 1.7 miles north of the California Aqueduct, and approximately 0.7 mile east of U.S. Highway 395. The Oro Grande Wash is an intermittent stream which receives water from the Cajon Pass area of the San Bernardino Mountains as well as from desert floor runoff and flows in a northeast direction, terminating at the Mojave River. See Fig. 1 for aerial of the project vicinity and Fig. 2 for location map.



**Fig 1** - Oblique Aerial Photo looking northerly towards the study area

Longitude: -117.368  
Latitude: 34.460

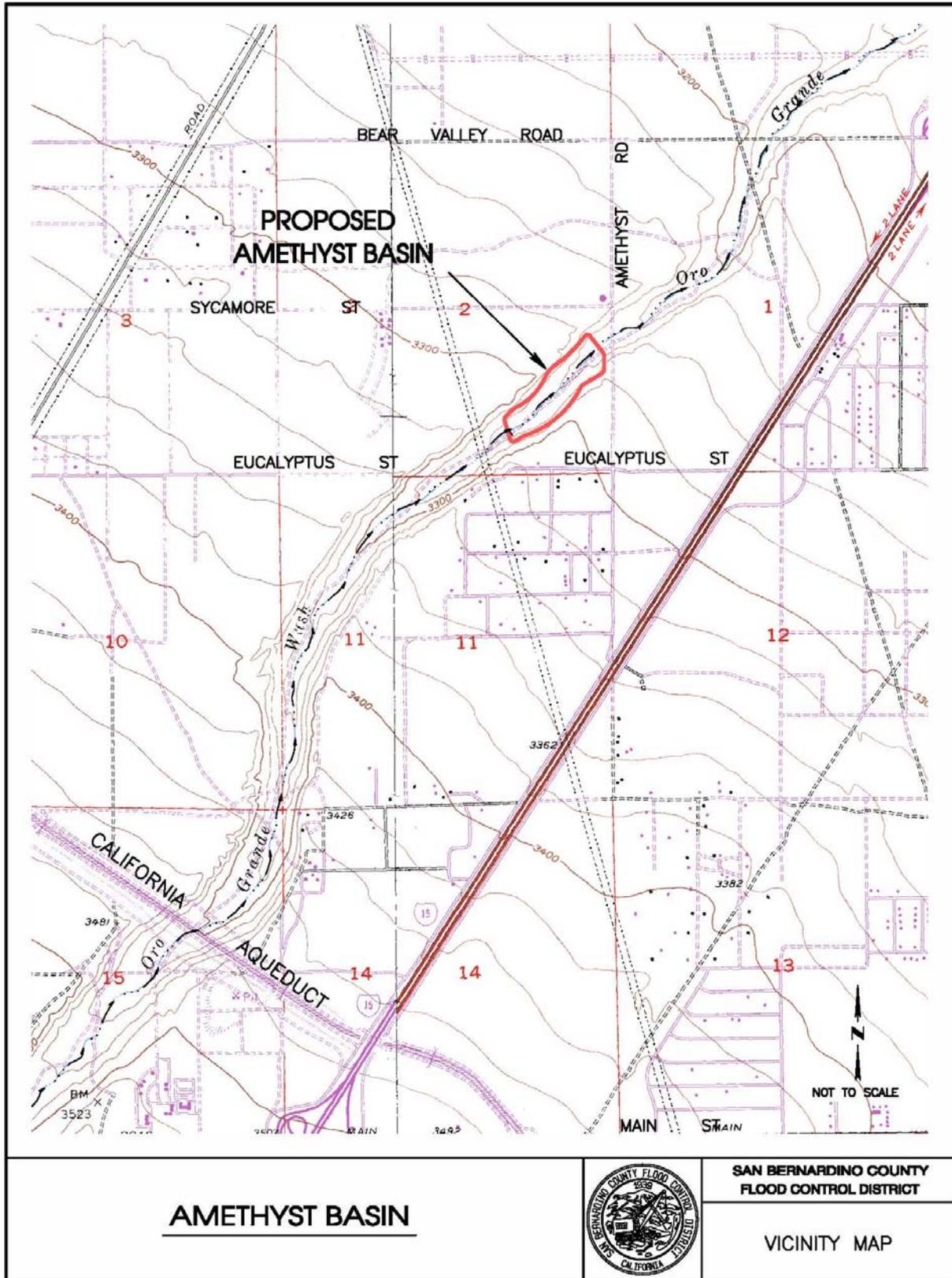
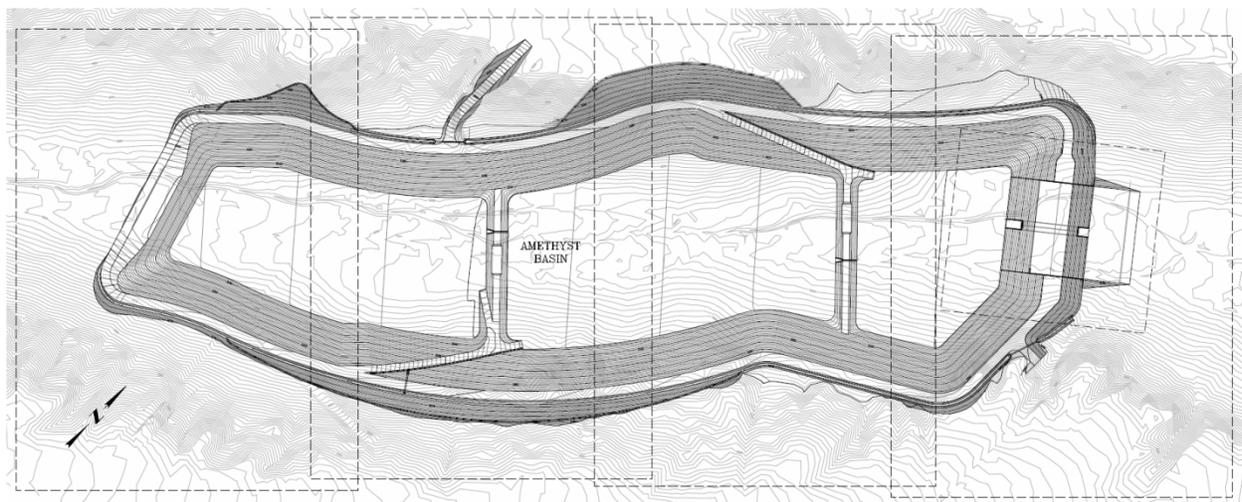


Fig 2 - Location Map

## PROJECT DESCRIPTION

Amethyst Basin (formerly known as Oro Grande Basin #9) is located entirely within the Oro Grande Wash. This Basin is critical to the flood reduction and water recharge efforts of both the San Bernardino Flood Control District and the Mojave Water Agency. Amethyst Basin is part of a three basin project that will help to eliminate any potential increase in flood hazard due to planned development in the area. Further, the construction of the Basin will alleviate stress on other facilities downstream of the site, thus allowing the regional flood control system to function more effectively. The proposed basin and emergency spillway are designed to meet 100-year and 1000-year flows respectively per District standards. The Basin will be earthen bottom and will include inlet, outlet and transition structures, channels and/or closed conduits, transition structures, wingwalls, headwalls, cut-off walls, basin embankments, emergency spillway, access roadways along tops of the embankments and around the basins and access ramps to the basin floor.

Amethyst Basin covers approximately 30 acres and flows in the southwest to northeast direction. Two weakened dikes each of 5-foot high are proposed within this basin to enhance groundwater recharge. These dikes subdivide the basin into three sub-basins. Basin embankment slopes will be constructed at 3 to 1 ratio (3H:1V) for the interior slopes and at 2 to 1 ratio (2H:1V) for the exterior slopes, with a minimum top width of 20 feet. A 20-foot wide access road is located along the top of embankment and around the basin. Three access ramps to the basin floors will be provided at each sub-basin for maintenance purposes. The access ramps shall also have a minimum width of 20 feet. (See Fig. 3) For detailed grading see grading plan sheets G-2 thru G-5 found at the end of this attachment.



**Fig 3 - Amethyst Basin Plan**

The embankments will have a maximum height of approximately 32 feet. The south west embankment is connected to the upstream existing grade/natural flow path via a 113-foot wide spillway; while the north east outlet structure and emergency spillway will discharge into natural stream bed via a double 9'Wx8'H reinforced concrete box. Maximum depth of excavation is expected to be approximately 17 feet along the basin southerly end. The three sub-basins are connected to each other via 24" reinforced concrete pipes at the two weakened dikes. Fencing and locked gates will be installed to prevent unwanted intrusion into the basin.

## 1 - GOALS AND OBJECTIVES

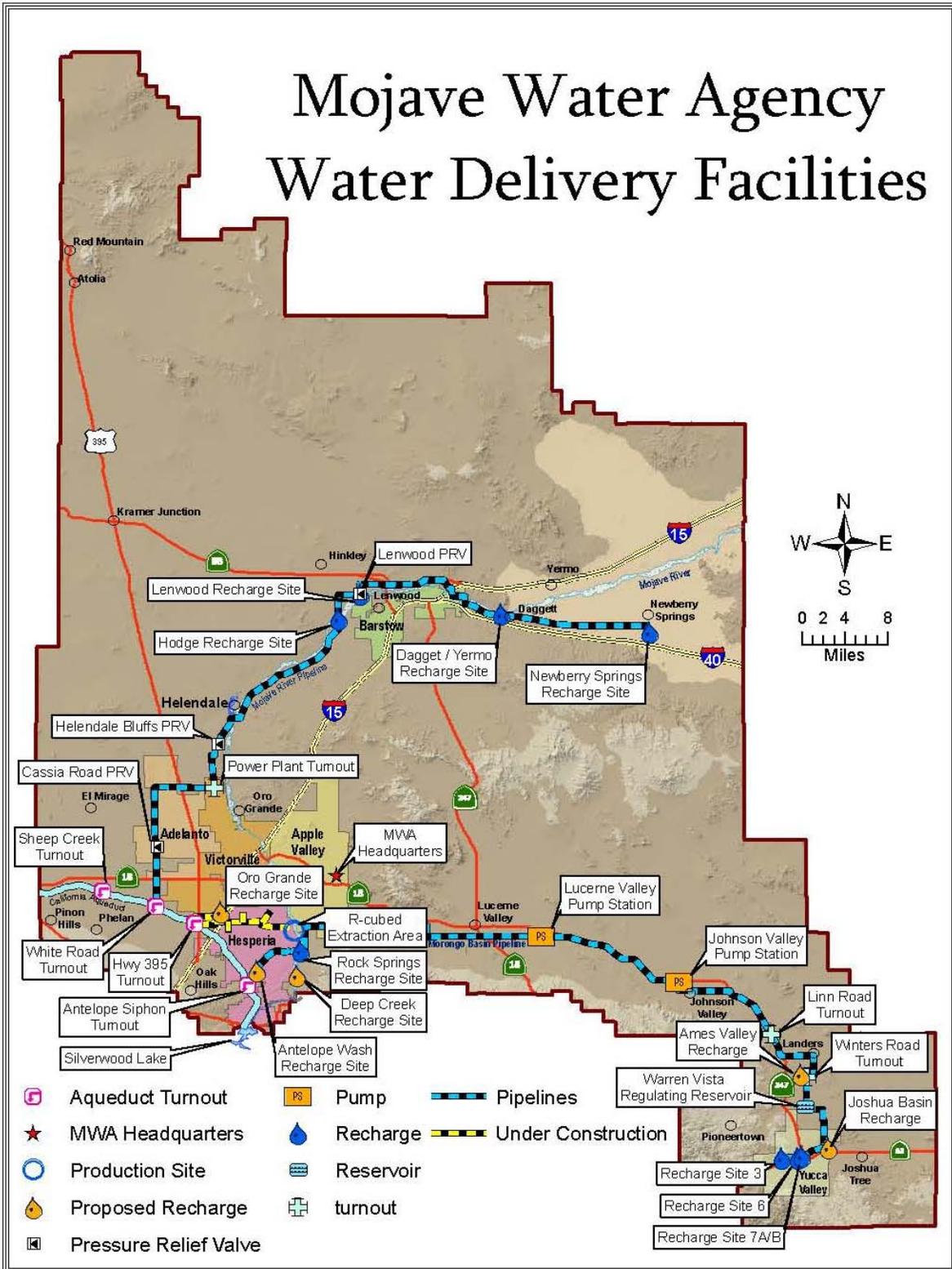
San Bernardino County Flood Control District's main objective for this project is to improve flood control protection by reducing peak flows and volumes thereby reducing potential flood hazards downstream of the site. Amethyst Basin is located in a watershed producing 6,550 cubic feet per second of runoff. The objective will be to capture and detain approximately 20% or 1,323 cubic feet per second of the runoff produced by the watershed. In addition, the project site has been identified as a "high priority" project in the Mojave Water Agencies (MWA) 2004 Integrated Regional Water Management Plan as a vital component to the MWA Oro Grande Retention Pond project which is currently under construction and will begin being utilized for groundwater recharge in the near future. The recharge component of this project is a secondary objective or benefit that will actualize after the retention ponds by MWA are in place. The project site will increase the recharge capabilities of the retention ponds by an estimated 2,600 acre-feet per year, for a total of 3,600 acre-foot per year. Without the Amethyst Basin project, the existing MWA facility currently under construction will only be able to deliver at most 1,000 acre-feet per year. The additional increase in recharge capabilities provided by the project will help to alleviate the water demand in the Alto Subarea of the Mojave Basin Area along with help to achieve the SBCFCD's main objective to improve flood protection.

## 2 - PURPOSE AND NEED

The population in the project area increased more than threefold in 20 years, from about 90,000 in 1980 to more than 300,000 in 1999 (Ron Rector, High Desert Regional Economic Development Authority, oral commun. 2000). Victorville and similar communities experienced an increase by more than 40%. The main purpose of Amethyst Basin is to provide flood control protection, reduce peak flow and volume, thus eliminating potential flood hazards to the drastic increase in development downstream of the site. The need for additional flood protection arises because of the overwhelming development that has both upstream and downstream which has significantly increased the amount of impervious area thereby increasing the magnitude of flood peak flows and volumes. The Basin outlet system will be designed to meet Q100 and Q1000 at the spillway per County of San Bernardino Flood Control District's standards.

The secondary purpose of this project is groundwater recharge which will be administered by the Mojave Water Agency. Amethyst Basin is an element of the Mojave Water Agency's Integrated Regional Water Management Plan (IRWM). See Fig. 4 for the Mojave Water Agency showing existing and planned facilities.

The Amethyst Basin is located within the Alto subarea water boundary as defined in the IRWM. the Alto subarea encompasses the project area and as discussed previously has experienced a drastic increase in population resulting in a enormous increase in demand for water needs both residential and commercial. Consequently, the Alto subarea will need increased replenishment of the ground water via storm water and SWP recharge as discussed in the IRWM.



**Fig 4 - Mojave Water Agency Facilities Map (Mojave IRWM)**

The recharge components will allow MWA to become less dependent on supplies from the State Water Project (SWP) during drought periods or when the Sacramento Delta is under stress. By implementing the proposed project, MWA is transforming SWP water into a more reliable, sustainable water source that local retail water service providers can rely upon as a consistent blending source for their impaired groundwater supplies. The proposed project would contribute to the benefits allowing MWA to:

- Store SWP water in the Upper Mojave River groundwater basin and extract and deliver this stored water, when needed, to retail water service providers their use, including blending with other groundwater sources that are naturally impaired;
- Provide construction jobs and promote the economic recovery;
- Build a sustainable water delivery system that provides long-term benefits to the local area.

**The recharge component of this project is not part of the grant.**

### 3 - PROJECT LIST

Amethyst Basin is the only project in this proposal. The Table below provides details on the proposed Project, including the name, an abstract, current status and implementing agency

Name of Proposed Project	Project Abstract	Implementing Agency	Status of Project Elements
Amethyst Basin	See Project Description above	San Bernardino County - Flood Control District	<ul style="list-style-type: none"> <li>• DSOD Submittal completed. Basin is not jurisdictional.</li> <li>• CEQA is complete (4/24/2012)</li> <li>• 60% Design Plans and Specifications are completed.</li> <li>• 90% Plans and Specifications being developed.</li> <li>• Environmental permits and Right-of-Way acquisition is currently underway.</li> <li>• Construction is Scheduled for December 2013</li> </ul>

#### 4 - INTEGRATED ELEMENTS OF PROJECTS

The parties participating in this project are San Bernardino County Flood Control District (SBCFCD) as the sole grant applicant and the Mojave Water Agency (MWA) as a supportive and interested party for the project. Amethyst Basin was identified as a high Priority project in the Mojave Water Agency's 2004 Integrated Regional Water Management Plan. An agreement between the SBCFCD and MWA will be prepared to address the use of the basin for water recharge. The Amethyst Basin project being proposed for funding is a component of an overall effort to improve the Oro Grande Wash by reducing the risk of flooding to properties downstream, enhance public safety and provide ground water recharge. Construction of Amethyst Basin is the first basin component of the overall system. A second basin (Mesa Linda) is planned to be constructed just upstream of the California Aqueduct and a third basin (Bus Barn) downstream of Seneca Road. They are in the preliminary design phase and will be constructed in the next phase for additional reduction of the flow in the Oro Grande Wash. See Fig 5 for location of the project and the future basins.



**Fig. 5 - Amethyst and Future Basins Location Map**

In 1969 the Corps of Engineers completed a critical segment of channel on Oro Grande Wash system consisting of approximately 5800 L.F. of an open concrete channel and reinforced concrete box. The improvements begin at the Mojave River as a reinforced concrete box and extend upstream under 8th Street south to Forest Avenue where it turns to parallel Hesperia Road. This reach is a highly developed commercial and residential area. The improvements continue upstream to Verde Street where the box transitions to a concrete rectangular channel and continues upstream through Center Street.

The size of the box varies from 20' wide x 9.5' high at the Mojave River to 13' wide x 14' high at the upper end. The rectangular channel is 18' wide x 11.5' high. According to the Victorville Master Plan of Drainage, the existing improvement was designed for 5,000 cfs. The peak flow rates calculated for the MPD by Williamson and Schmid at that time in accordance with the 1986 San Bernardino County Hydrology Manual indicated a full build out (ultimate), full conveyance Q100 of 10,900 cfs at the Mojave River.

From the Corps of Engineers project upstream to Bear Valley Road, there are various levels of improvements ranging from earth graded/natural earth to rock lined trapezoidal channels. However, it is recommended that some reaches be left as is, i.e. rock lined or natural trapezoidal channels coupled with an adequately designed designated flood plain. This approach would work well in areas where the wash has not been encroached upon by development. The golf course and possibly the park would be candidates for this plan.

Areas where encroachment exists such as the Mobile Home Park downstream of the I-15 freeway would require hard-lined channel improvements.

From Bear Valley Road upstream to the California Aqueduct the wash is primarily natural and contained within a very broad and deep arroyo. A detailed hydraulic analysis was not done but it appears the major storm flows would be contained within the arroyo. The arroyo ranges in size from 20 feet deep and 700 feet wide near Bear Valley Road to 60 feet deep and 1500 feet wide at the California Aqueduct. However, it is recommended that the wash be left natural with adequate flood plain established to preclude encroachment.

## 5 - REGIONAL MAP

The following maps are displaying the location of Amethyst Basin Stormwater Reduction Project in relation to the State Plan Flood Control (SPFC) (Fig 6), the Mojave Water Agency Integrated Water Management Plan (Fig 7), the Victorville Master Plan of Drainage watershed map (Fig 8) and the district facility map (Fig 9)

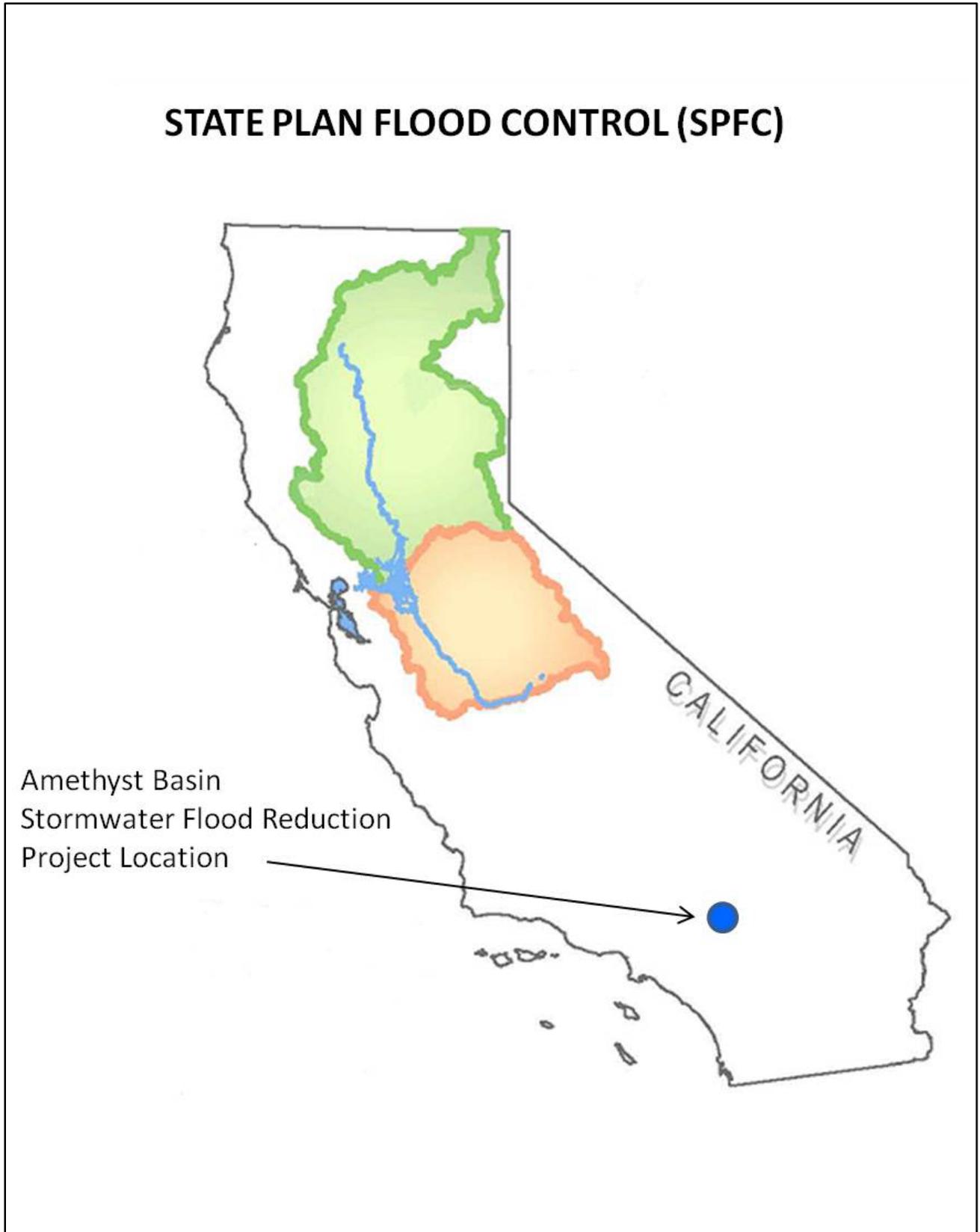
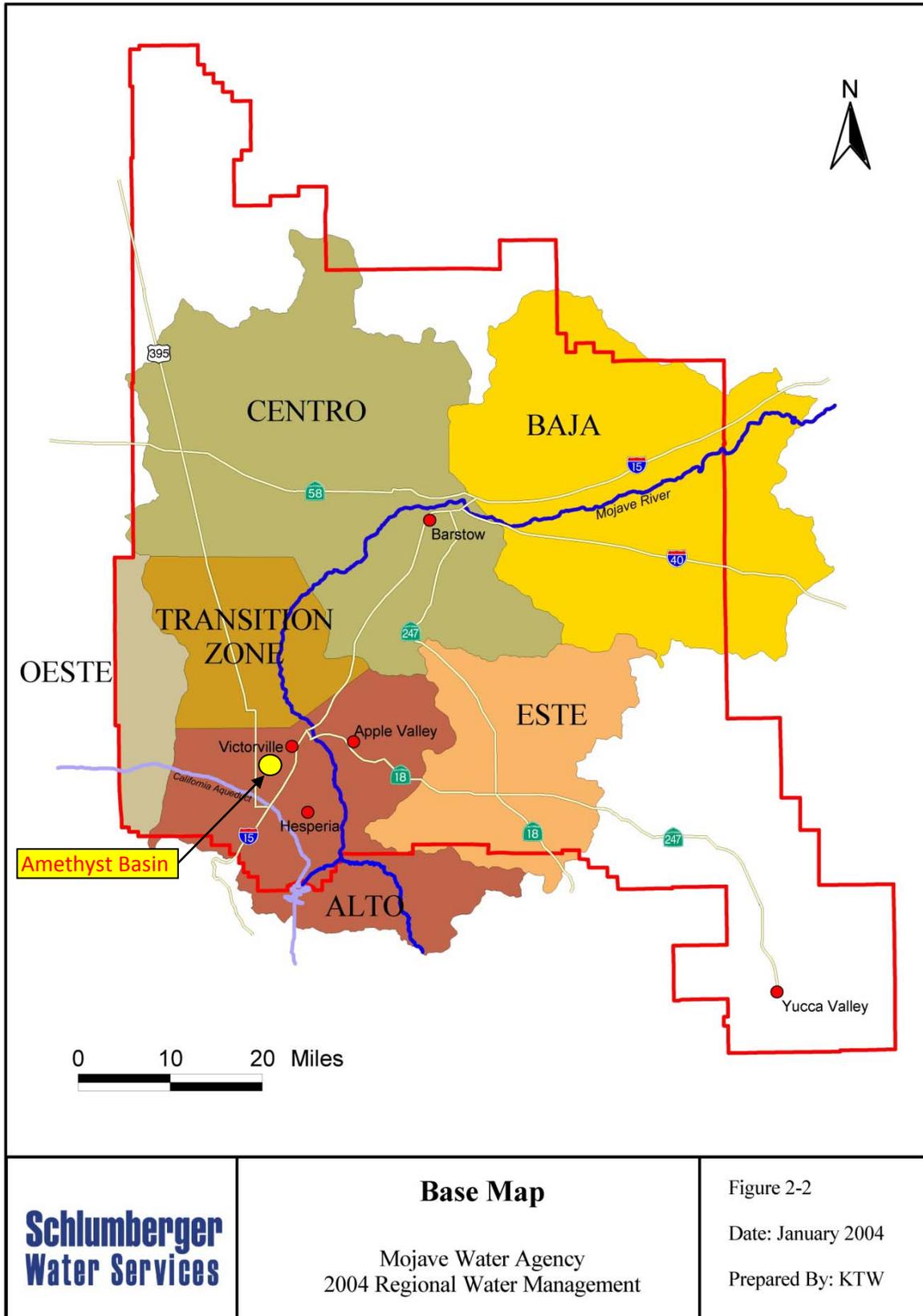


Fig. 6



**Fig. 7**

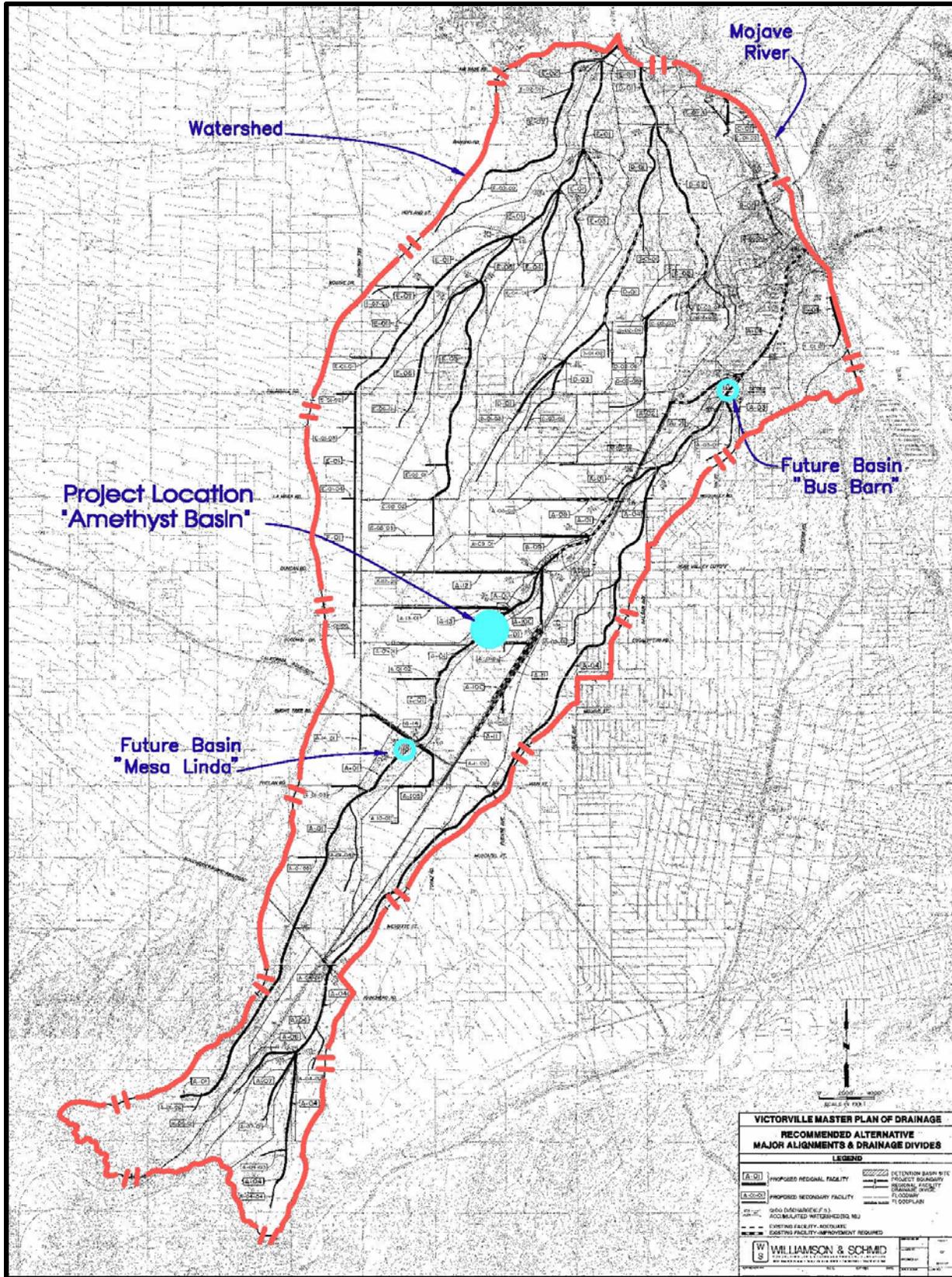


Fig. 8

## 6 - COMPLETED WORK

The Work that has been completed or expected to be completed prior to the grant award date are as follow:

- a) CEQA permit is completed 4/24/2012.
- b) Application has been submitted to Clean Water Act section 401 Water Quality Certification, submitted to the California Regional Water Quality Control Board, Lahontan Region (Water Board)
- c) Application has been submitted to the California Department of Fish and Game (CDFG), in accordance with Section 1602 of the California Fish and Game code.
- d) Application has been submitted to the U.S. Army Corps of Engineers, in accordance with Section 404 of the Clean Water Act and the general conditions of Nationwide Permit 33.
- e) Construction drawings 100% complete
- f) Specifications 100% complete

## 7 - EXISTING DATA AND STUDIES

Multiple reports, drainage studies, basin analysis, preliminary plans and cost estimates have been prepared by the County of San Bernardino Flood Control District for the Oro Grande Wash including Amethyst Basin and other proposed basins upstream and downstream of Amethyst. In addition, the Corps of Engineers has also studied the Oro Grande Wash and the following reports have been included at the end of this attachment:

- A. Victorville Master Plan of Drainage dated March 1992  
*The Master Plan of Drainage is a planning tool to implement drainage improvements. The report recommended improvements for the Oro Grande Wash.*
- B. Oro Grande Wash detention basin study.  
*Oro Grande Wash is the focus of this study. It was prepared to develop a planning level detention basin plan along Oro Grande Wash for the purpose of prioritizing basin construction.*
- C. Final hydrology study for Amethyst Basin.
- D. Completed Plans, Specifications and Cost Estimates to the 60% level.
- E. Initial Study / Mitigated Negative Declaration for Amethyst Basin.

We are only including the reports necessary to support the grant application. However all reports for Oro Grande Wash including Amethyst basin are available for review by the Department of Water Resources (DWR) for this grant application.

8 - PROJECT MAP

A site map showing the Project geographical location and the surrounding area is attached (Fig. 2) and District's facilities map showing Amethyst basin (Fig 9)

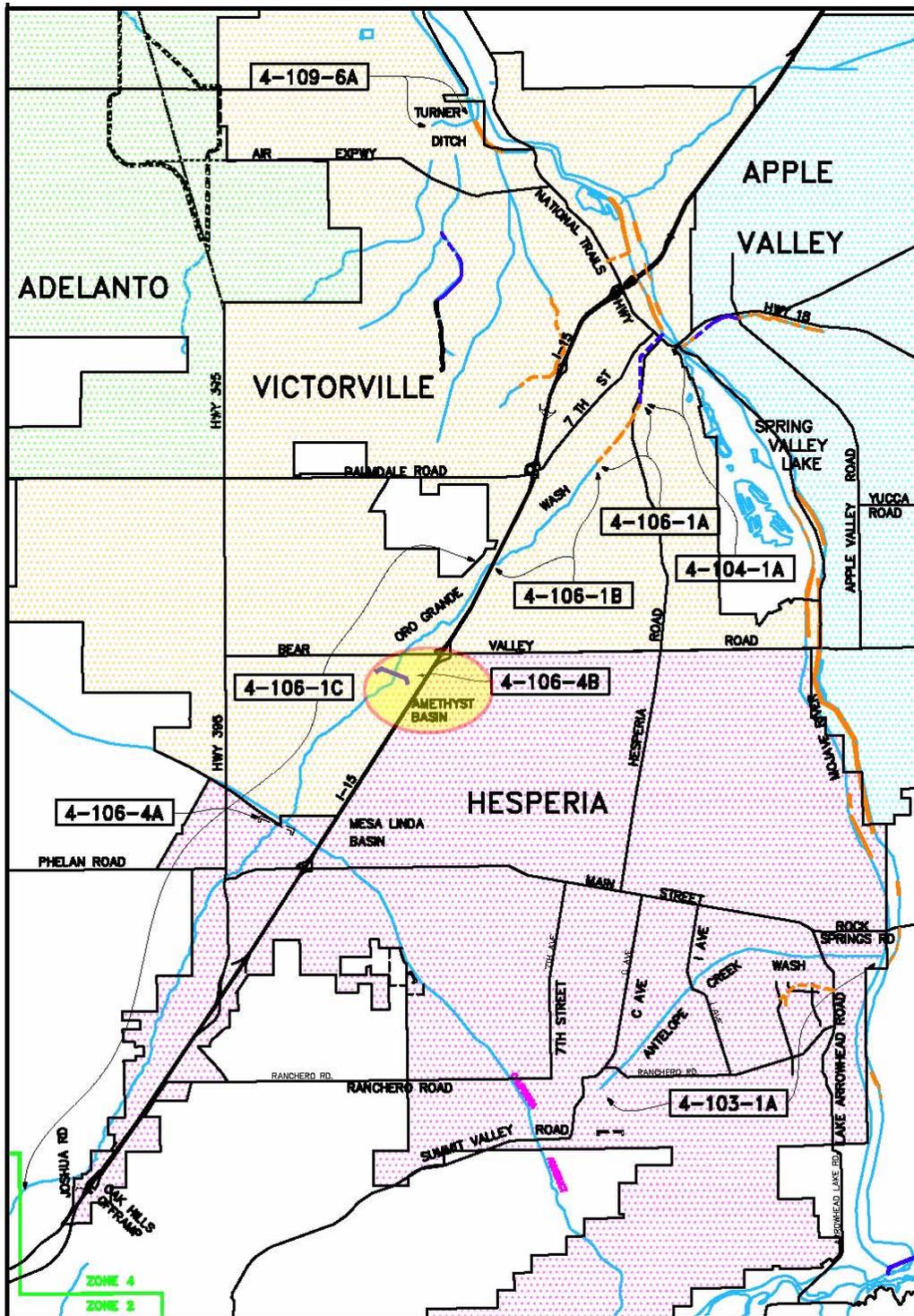
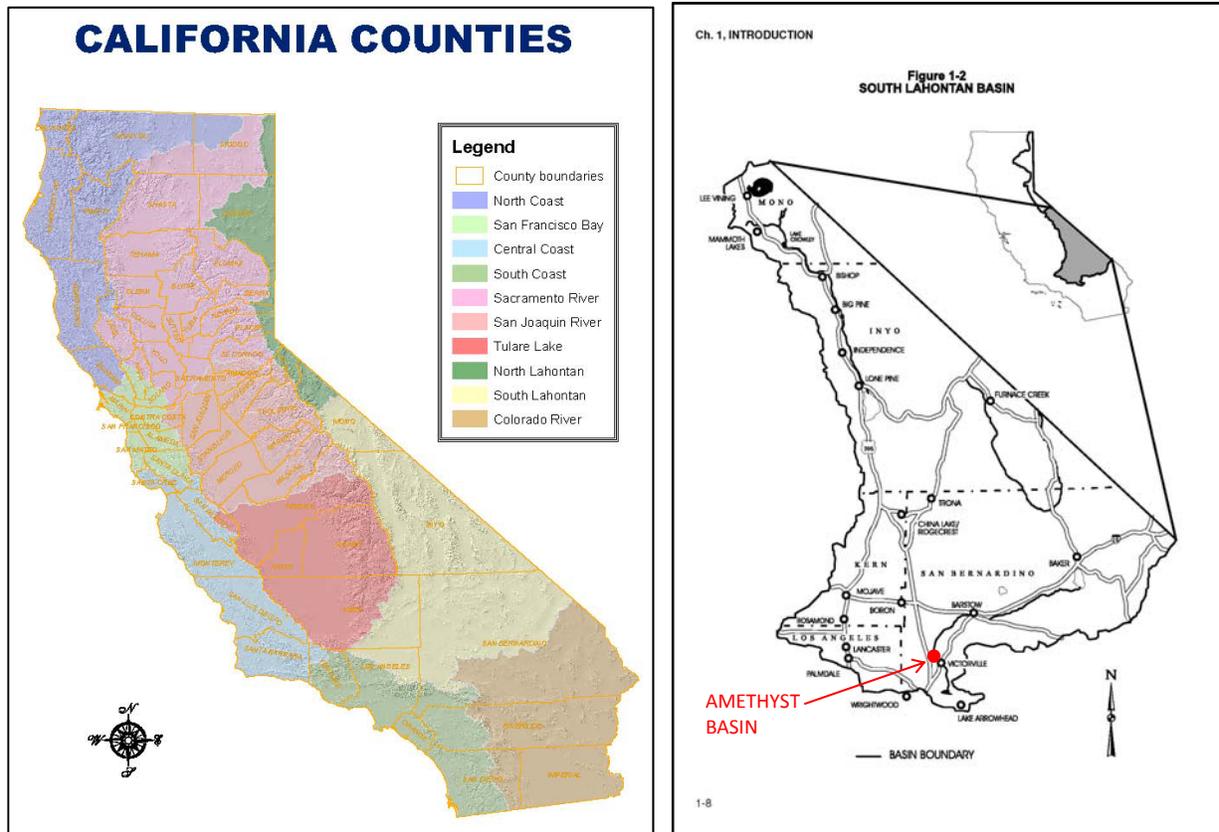


Fig 9 - Flood Control District's Facility Map

## 9 - PROJECT SPECIFICS:

The Amethyst Basin Project is not part of the State Plan of Flood Control (SPFC), see Fig. 6. The Amethyst Basin is located in the Victorville area in the County of San Bernardino, within the Lahontan Regional Watershed boundary (Fig 10)



**Fig 10 - South Lahontan boundary Map**

## 10 - PROJECT TIMING AND PHASING

This Project is a component of an overall watershed management system. Amethyst Basin is one of three basins which when constructed, will reduce the discharge downstream to meet the capacity of the Corps of Engineers existing facility downstream. Though Amethyst Basin is a component of an overall system, the project operates on a stand-alone basis. The Basin will function by itself and will reduce the 100-year peak flows/runoff from 6,550 cfs to 5,230 cfs providing a reduction of approximately 20 percent. The Basin also compliments the Mojave Water Agency's Oro Grande Retention Pond Project located in this area.

*Table 4 – Typical Work Plan Outline*

*Category (a): Direct Project Administration Costs*

Task 1: Administration

The San Bernardino County Flood Control District (SBCFCD or DISTRICT) will perform all project management tasks. These tasks consist of, in large part, tracking day to day progress of the design and construction activity of the project. Administrative cost will include contract administration, reviewing project budget, allocate appropriate overhead and administrative expenses required to complete the project.

**Deliverables: Preparation of invoices and other deliverables as required.**

Task 2: Labor Compliance Program

The San Bernardino County Flood Control District will submit a Labor Compliance Program to the Department of Water Resources

**Deliverable: Submission of Labor Compliance Program**

Task 3: Reporting

- 3.1. The SBCFCD will prepare and submit monthly and or quarterly progress reports to the Department of Water Resources' project representative pursuant to the grant agreement. The progress report will describe activities undertaken, accomplishments of each task during the reporting period, milestones achieved, and any problems encountered in the performance of the work under the grant agreement. The description of activities and accomplishments of each task during the reporting period shall be in sufficient detail to provide a basis for payment of invoices and shall be translated into percent of task work completed for the purpose of calculating invoice amounts.
- 3.2. Prepare annual reports pursuant to the grant agreement.
- 3.3. Prepare and submit a draft final report that summarizes project accomplishments to the Department of Water Resources project representative for review and comment. The report will include the following:
- a. An introduction section including a summary of the conditions the project is to alleviate, the project's objective, the scope of the project, and a brief description of the approach and techniques used during the project.
  - b. Deliverables previously submitted as outlined in the Schedule of Completion.
  - c. Any additional information that is deemed appropriate by the DWR's Project Representative and/or Contractor Project Representative.
  - d. Indicate whether the goals of the project have been met.
  - e. Include information collected in accordance with the project Monitoring and Reporting Plan, including a determination of the effectiveness of the project in preventing or reducing pollution and the results of the monitoring program.
- 3.4. Prepare a final report that addresses the draft final report comments by DWR.

**Deliverables: Submission monthly and or quarterly, annual and final reports as specified in the Grant Agreement.**

<i>Table 4 – Typical Work Plan Outline</i>	
<b>Category (b):</b>	<b>Land Purchase/Easement</b>
<p>Task 4: The District is in the process of acquiring multiple parcels consisting of ten vacant lots and one improved lot with a single-family home. In addition, the District already own's three large parcels on project site. Upon completion of acquisition the District will provide DWR with copies of recorded documents, Grand Deed, Title reports and easements.</p> <p style="text-align: center;"><b>Deliverables: recorded documents, Grant Deed, Title Reports, easements etc.</b></p>	
<b>Category (c): Planning/Design/Engineering/Environmental Documentation</b>	
<p>Task 5: Assessment and Evaluation</p> <p style="padding-left: 40px;">5.1 Prepare a Preliminary Design to identify project constraints, benefits and constructability</p> <p style="padding-left: 40px;">5.2 Prepare assessment studies for Geotechnical and Hydrology/Hydraulics in accordance with SBCFCD standards to be utilized for final design.</p> <p style="padding-left: 40px;">5.3 Prepare Preliminary Plans for submittal to Department of Safety of Dams (DSOD) for evaluation and approval.</p> <p style="text-align: center;"><b>Deliverables: Technical studies</b></p>	
<p>Task 6: Final Design</p> <p>Construction plans, project specifications and special provisions, and cost estimates are currently at 60% level and will be provided as part of the application package. The construction Plan set include:</p> <ul style="list-style-type: none"> <li>• Survey Plans</li> <li>• Grading Plans</li> <li>• Basin detailed Plan and Profile</li> <li>• Details</li> <li>• Cross Sections</li> </ul> <p>The construction work, methods and materials will be completed in accordance the San Bernardino County Flood Control District construction standards and with the provisions of the latest edition of the Standard Specifications for Public Works Construction (Green Book) standards.</p> <p style="text-align: center;"><b>Deliverables: Project plans, Cost estimates and specifications at 100 percent completion</b></p>	
<p>Task 7: Environmental Documentation</p> <p>The San Bernardino County Flood Control District has completed the thirty day public review period for the (IS) Initial Study of the project on April 7, 2012. The Board of Supervisors approved the CEQA Findings for the project on April 24, 2012 and copies will provided to DWR</p> <p style="text-align: center;"><b>Deliverable: Approved and adopted CEQA documentation</b></p>	
<p>Task 8: Permitting</p> <p>The proposed Amethyst Basin project will require a 1602 permit from Department of Fish and Game, 401 permit from the Regional Water Quality Control Board and 404 from the Army CORPS of Engineers and the Section 10(a) from the US Fish and Wildlife service are required as set forth in the (IS) Initial Study. The District has applied for the required permits and will submit copies of these permits to DWR upon approval from the referenced agencies.</p> <p style="text-align: center;"><b>Deliverables: Approved Permits for Section 1602, 404, 401.</b></p>	

*Table 4 – Typical Work Plan Outline*

*Category (d): Construction/Implementation*

**Task 9: Construction Contracting**

The District will bid and award a construction contract for the Amethyst Basin Stormwater Flood Reduction Project in accordance with the District construction bidding procedures and the Public Contract Code. The District will prepare the agenda staff report for the Board of Supervisors to approve the plans and specifications and set the bid opening date, advertise for bids, conduct public bid opening, evaluation of bids, preparing agenda staff report for the Board of Supervisors to award the construction contract, award the construction contract, obtain the contractors bonding and insurance and issuing the Notice to Proceed. The District will submit copies of all referenced documentation to DWR upon completion.

**Deliverables:** Board Minute Order approving plans and specifications, final plan holder list, bid summary and bid abstract from bid opening, Board Minute Order awarding construction contract, Notice to Proceed to the construction contractor

**Task 10: Construction**

The San Bernardino County Flood Control District shall construct Amethyst Basin Stormwater Flood Reduction project according to the approved plans and specifications.

**10.1 Mobilization and Site Preparation**

- Install construction trailers and temporary utilities at the project site
- Install orange fencing around the perimeter of the project
- Provide pollution prevention and erosion control at the project site
- Perform pre-construction bird surveys etc. that may be required in the permits
- Perform clearing and grubbing operations
- Perform utility relocation as applicable

**10.2 Project Construction**

Project Construction includes the construction and installation of the following items:

- Construction of associated inlet and outlet structures
- Construction of transition structures, wingwalls, headwalls, cutoff walls
- Construction of basin embankments
- Construct emergency spillway
- Construct double reinforced concrete flood control box
- Install 24 inch reinforced concrete box
- Grade flat surface for access road along top of embankments
- Grade three access ramps to basin floor
- Construct two weakened dikes to subdivide basin

**Deliverables:** Pre-construction photos, construction photos.

*Table 4 – Typical Work Plan Outline*

*Category (e): Environmental Compliance/Mitigation/Enhancement*

Task 11: Environmental Compliance/Mitigation/Enhancement

Compliance and Enhancement:

Per Lahontan Regional Water Quality Control Board the District is to purchase an additional parcel downstream for mitigation and provide enhancement features such as inlet/ outlet control for incoming flows and provide general grading.

Mitigation:

The District will mitigate for 8 acres of squirrel habitat at a ratio of 1.5:1 (approximately 12 acres) as defined by Fish and Game

**Deliverables:** Copies of recorded documentation for mitigation, necessary compliance and approval forms etc.

*Category (f): Construction Administration*

Task 12: Construction Administration

The SBCFCD will provide construction administration and inspection services to ensure proper construction practices are followed according to all applicable construction plans, construction standards, and health and safety codes. An inspector is to be at the job site whenever the construction contractor is working. In addition, the District shall:

- Ensure all dust and noise mitigation measures are followed.
- Monitor working hours
- Prepare daily log of construction activities
- Provide construction survey staking and geotechnical services in support of the construction activities.
- Work with the surrounding neighbors to resolve any complaints that may arise during construction.
- submit all applicable project close-out documents (e.g. contractor payment, punch-list completion etc.)

**Deliverables:** Copies of monthly contractor progress payments