

**PINE MOUNTAIN DAM  
GENERAL REEVALUATION STUDY  
ARKANSAS**

**PROJECT MANAGEMENT PLAN**

*Prepared by:*



U.S. Army Corps of Engineers  
Little Rock District  
Southwestern Division

*In Coordination With:*

River Valley Regional Water District

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# **PINE MOUNTAIN DAM GENERAL REEVALUATION STUDY ARKANSAS**

## **PROJECT MANAGEMENT PLAN**

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**CHAPTER I – PURPOSE AND SCOPE**

**1. PROJECT PURPOSE**

The purpose of this project is to provide a source of clean drinking water to the River Valley Regional Water District (non-Federal sponsor, RVRWD). RVRWD is in support of the project. RVRWD members are comprised of the Cities of Van Buren, Alma, Kibler, and Mountainburg, the Cedarville Waterworks Facilities Board of Crawford County, the Concord Waterworks Facilities Board of Crawford County, and the Highway 71 Water Users Association. Some members of the District provide water to other cities and entities in Arkansas and Oklahoma.

The project area is generally rural and is located in north Central Crawford County. The topography is mountainous with steep valleys and large rock outcrops.

This Project Management Plan (PMP) covers the scope, schedule, and cost estimate to accomplish the Preconstruction Engineering and Design (PED) - phase General Reevaluation Study of the authorized plan. These activities include review of previous design work, review and reevaluation of the authorized plan to ensure that it remains technically sound, economically justified, and environmentally and publicly acceptable, including a complete and thorough Environmental Impact Statement (EIS) and extensive public involvement and coordination. The culmination of the General Reevaluation Study is a General Reevaluation Report (GRR), which will accompany the EIS as a decision package.

**2. DEFINITION OF A PROJECT MANAGEMENT PLAN:**

a. The PMP defines the planning and evaluation approach, activities to be accomplished, schedule, and associated costs. This Project Management Plan details the activities to be conducted under a 100% federally-funded General Reevaluation study of the authorized plan.

b. The PMP should be considered a living document. Because planning is an iterative process without a predetermined outcome, changes may be associated with reformulation and evaluations of the alternatives. With clear descriptions of the scopes and assumptions outlined in the PMP, deviations are easier to identify. The impacts to time or funding would be assessed and decisions would be made on how to proceed. The PMP provides the basis for any changes.

c. The PMP provides the scope for activities including the preparation and approval of the PED phase general reevaluation report. Since the PMP represents a contract among project participants, it will be used as the basis to determine if the project has been developed in accordance with established procedures and previous agreements. The PMP reflects mutual agreements of the District, Division, Sponsors, and HQUSACE of the scope, critical assumptions, methodologies, and level of detail for the studies that are to be conducted. Review of the draft report will occur to insure that the GRR has been developed consistent with these

agreements. The objective is to provide early assurance that the project is developed in a way that is supported by Corps guidance.

d. The PMP is a management tool. It includes scopes of work that are used for funds allocation by the Project Manager. It forms the basis for identifying commitments to the non-Federal sponsor and serves as a basis for performance measurement.

## CHAPTER II

### PINE MOUNTAIN DAM, ARKANSAS RECONNAISSANCE-LEVEL ANALYSIS (PED PHASE)

#### 1. AUTHORITY

Pine Mountain Lake was originally authorized for construction by the *Flood Control Act of 1965* as part of Public Law 89-298, 79 STAT 1073, of October 27, 1965. The act was entitled *Public Works - Rivers and Harbors*. The project is included in Section 204, Title II - Flood Control, and reads in part as follows:

*"Sec. 204. The following works of improvement for the benefit of navigation and the control of destructive floodwaters and other purposes are hereby adopted and authorized to be prosecuted under the direction of the Secretary of the Army and the supervision of the Chief of Engineers in accordance with the plans in the respective reports hereinafter designated and subject to the conditions set forth therein....."*

*.....ARKANSAS RIVER BASIN.....  
.....General Projects.....*

*.....The Project for flood protection on Lee Creek, Arkansas and Oklahoma, is hereby authorized substantially in accordance with the recommendations of the Chief of Engineers in House Document Numbered 270, Eighty-ninth Congress....."*

The authorized plan of improvement of Lee Creek consists of a multiple-purpose project. The original project purposes were flood control, municipal and industrial water supply, and recreation (including fish and wildlife enhancement). The project is located on an Extraordinary Resource Water (ERW), the most stringent water quality designation under the State of Arkansas regulation. According to the State of Arkansas Regulation 2, impoundments built on ERW streams can only be for the purpose of providing water supply, although mitigation features to ensure appropriate down stream flows and water quality standards for fish, wildlife and ecosystem environments are permissible.

#### 2. PURPOSE

PED phase activities would consist of preparation of a General Reevaluation Report (GRR) to bring the project into accordance with the Water Resources Development Act of 1986, as amended (WRDA 86), the Water Resources Development Act of 2007 and the Arkansas Department of Environmental Quality (ADEQ) Regulation 2.

The reconnaissance level analysis resulted in the finding that there is a Federal interest in continuing the PED phase. The purpose of this analysis was to document the basis for this finding and establish the general scope of future PED activities, as such the analysis has been incorporated into this chapter of the PMP to presents the reconnaissance overview and initial formulation rationale.

### 3. LOCATION, NON-FEDERAL SPONSOR AND CONGRESSIONAL DISTRICTS

a. The study area is located in north-central Crawford County, Arkansas and Sequoyah County, Oklahoma. The location of Crawford County is highlighted in the figure below. The authorized Pine Mountain Dam location is about 12 miles north of the city of Van Buren at stream mile 35.7 on Lee Creek, a tributary of the Arkansas River.



b. The non-Federal sponsor for the PED phase and project implementation is the River Valley Regional Water District (RVRWD). RVRWD members are comprised of the Cities of Van Buren, Alma, Kibler, and Mountainburg, the Cedarville Waterworks Facilities Board of Crawford County, the Concord Waterworks Facilities Board of Crawford County, and the Highway 71 Water Users Association. Some members of the District provide water to other cities and entities in Arkansas and Oklahoma. The local sponsor has expressed strong support for the project and for participating in the cost shared effort.

c. The study area lies within the jurisdiction and interest of the following Congressional Districts:

- 1) Senator Lincoln (AR) and Senator Pryor (AR)
- 2) Congressman Boozman (AR-3)
3. Senator Inhofe (OK) and Senator Coburn (OK)
4. Congressman Boren (OK-2)

#### **4. PRIOR REPORTS AND EXISTING PROJECTS**

a. The following reports were reviewed as a part of this study:

*ARKANSAS RIVER NAVIGATION STUDY, DRAFT PHASE I FEASIBILITY STUDY*, U.S. Army Corps of Engineers, August 2003

*SUMMARY INFORMATION REPORT, PINE MOUNTAIN DAM*, U.S. Army Corps of Engineers, April 2003

*WATER SUPPLY FEASIBILITY STUDY*, River Valley Regional Water District, Prepared by Burrough Brasuell Corp and Garver Engineers. November, 2001

*LIMITED REEVALUATION REPORT (LRR)*, U.S. Army Corps of Engineers, September 1998

*RICE-CARDEN LEVEE, FORT SMITH, AR SECTION 205 DPR*, U.S. Army Corps of Engineers, June 1993

*MAY BRANCH, FORT SMITH, AR SECTION 205 Reconnaissance*, U.S. Army Corps of Engineers, March 1992

*MILL CREEK, FORT SMITH, AR SECTION 205 DPR*, U.S. Army Corps of Engineers, June 1985

*LITTLE MASSARD CREEK, FORT SMITH, AR SECTION 205 DPR*, U.S. Army Corps of Engineers, June 1983

*RECONNAISSANCE REPORT FOR FORT SMITH-VAN BUREN STUDY*, U.S. Army Corps of Engineers, November 1980

*PINE MOUNTAIN LAKE, LEE CREEK, ARKANSAS, GENERAL DESIGN MEMORANDUM NO. 1 (GENERAL)*, U.S. Army Corps of Engineers, February 1980

*DRAFT FINAL ENVIRONMENTAL STATEMENT (DFES)*, U.S. Army Corps of Engineers, February 1980

*PINE MOUNTAIN REVISITED, An Archeological Study in the Arkansas Ozarks*, Arkansas Archeological Survey, Project No. 363, June 1980

*FLOOD CONTROL WATER CONSERVATION AND OTHER ALLIED PURPOSES, LEE CREEK, WESTERN ARKANSAS AND EASTERN OKLAHOMA*, U.S. Army Corps of Engineers, December 1964.  
(Authorizing Document)

b. Existing Projects

The McClellan-Kerr Arkansas River Navigation System transects the study area and the project is on Lee Creek which is a tributary of the Arkansas River.

## 5. PLAN FORMULATION

During a study, six planning steps that are set forth in the Water Resource Council's Principles and Guidelines are repeated to focus the planning effort and eventually to select and recommend a plan for authorization. The six planning steps are: 1) specify problems and opportunities, 2) inventory and forecast conditions, 3) formulate alternative plans, 4) evaluate effects of alternative plans, 5) compare alternative plans, and 6) select a recommended plan. The iterations of the planning steps typically differ in the emphasis that is placed on each of the steps. In the early iterations, those conducted during the reconnaissance phase, the step of specifying problems and opportunities is emphasized. The initial screening of preliminary plans that results from the other steps is very important to the scoping of the follow-on studies (in this case PED activities).

The Reconnaissance Phase Analysis approval letter from HQ USACE, dated 29 March 2004, authorized a PED-phase General Reevaluation study of the authorized plan. The letter did not allow evaluation or consideration of additional measures, plans, and project purposes.

In WRDA 07 the following language was added

*Sec. 3012. Pine Mountain Dam, Arkansas.*

*The Pine Mountain Dam feature of the project for flood protection, Lee Creek, Arkansas and Oklahoma, authorized by section 204 of the Flood Control Act of 1965 (79 Stat. 1078), is modified –*

*(1) to add environmental restoration as a project purpose;*

*and*

*(2) to direct the Secretary to finance the non-Federal share of the cost of the project, including treatment and distributions components, over a 30-year period in accordance with section 103(k) of the Water Resources Development Act of 1986 (33 U.S.C. 2213(k)).*

Any reference to reformulation or evaluation of additional measures, plans, or project purposes will not be included in the General Reevaluation Study, except as required to comply with National Environmental Policy Act (NEPA) requirements.

The sub-paragraphs that follow present the results of the initial iterations of the planning steps that were conducted during the reconnaissance level analysis. This information will serve as the basis for future efforts and provide structure for the GRR, and be refined in future iterations of the planning steps that will be accomplished during the General Reevaluation Report and Design.

a. Project Background

*Description of Authorized Plan (from the 1964 Authorizing Report)*

"Pine Mountain Dam would be located on Lee Creek at mile 35.7 in Crawford County, Arkansas. The authorized plan of improvement would include an earth embankment dam 2,620 feet long, rising to a height of 168 feet above the streambed. An uncontrolled concrete service spillway 150 feet long with a crest elevation 783 feet above mean sea level would discharge flood flows, which exceed the reservoir capacity. An ungated morning glory type inlet structure and a 10-foot diameter outlet conduit would release flood flows stored between the top of the conservation pool and the spillway crest. The reservoir would provide a storage capacity of 124,160 acre-feet: 40,320 for flood control; 81,340 for water supply; and 2,500 for sediment reserve. The water surface would cover an area of 2,850 acres at the top of the flood control pool and 2,300 acres at the top of the conservation pool."

The total project costs and benefits (1964 Report, General Design Memorandum #1, February 1980, and 1998 LRR) were examined and updated. An estimated (2003) breakdown follows:

Category	Average Annual Benefit	Allocated Annual Cost	Separable B/C	Apportioned Cost	Cost Share (2003)
Flood Control	\$1,582,000	\$1,250,486	1.27	\$20,790,000	65/35
Water Supply	\$6,788,000	\$5,001,945	1.36	\$83,160,000	100% non-Fed
Recreation	\$558,000	\$503,743	1.11	\$ 8,375,000	50/50
Navigation	TBD	TBD		TBD	TBD
<b>TOTALS</b>	<b>\$8,928,000</b>	<b>\$6,756,174</b>	<b>1.32</b>	<b>\$112,325,000</b>	

NOTE: Project purposes, allocation and apportionment to be re-verified in detail in the GRR.

*Project History & Progression*

As noted above, previous detailed evaluations and updates of the costs and benefits were conducted through 1998. The project cost has been further updated to 2003 and is about \$112 million. The City of Fort Smith, Arkansas had previously expressed intent to be the non-Federal sponsor for the project. In 1980, for a variety of reasons, the City of Fort Smith formally withdrew as the local sponsor. Final design activities, including completion of environmental compliance activities, were suspended at that time. In 1996, in response to potential deauthorization due to language in WRDA 1986, the Corps began limited reevaluations in order to assess the continued viability of a potential project. The first Limited Reevaluation Report (LRR) was completed in 1998 with a finding that the authorized project, as modified in the 1980 General Design Memorandum (GDM), remained justified.

In 2002, the RVRWD (sponsor) initiated congressional action on the project and has been successful in obtaining ongoing funding for PED. Congressional adds in FY02, FY03, and FY04 for PED have resulted in this reconnaissance level report. Recent evaluations have recognized the need for reformulation to meet the intent of WRDA 1986, preparation of an EIS to meet current environmental compliance laws and regulations, new detailed economic analysis, and a complete update of engineering design and costs.

b. Problems & Existing Conditions

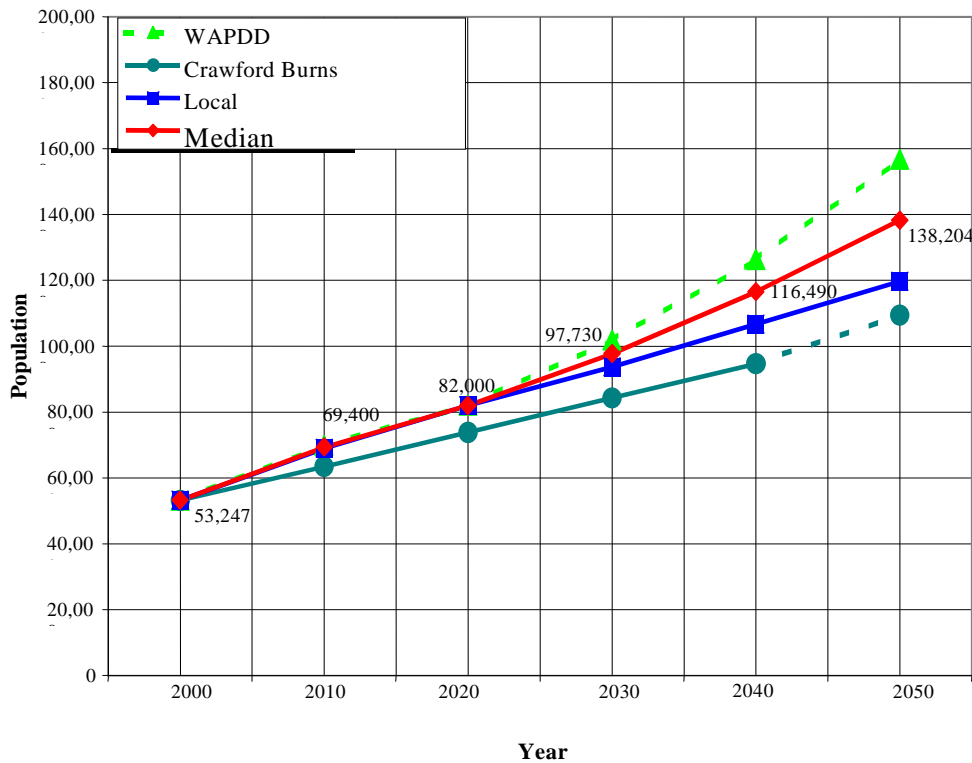
A number of public concerns have been identified during the course of the reconnaissance study. Initial concerns and solutions were expressed in the project authorization. Additional input was received through coordination with the sponsor and initial coordination with other agencies. The evaluation of public concerns often reflects a range of needs perceived by the public. This section describes these needs in the context of problems that can be addressed through comprehensive water and related land resource planning. Major categories of identified problems and existing conditions to be evaluated are as follows:

*Environmental*

Lee Creek is identified at the state level as an Extraordinary Resource Waterway in Arkansas and an Outstanding Resource Water in Oklahoma. It is listed on the Registry of Arkansas Natural and Scenic Rivers. The stream does not have a sustained perennial flow and can intermittently dry up or experience large scouring flows. Development on or along Lee Creek (such as a dam) would have significant environmental impacts. Previously proposed projects (local and federal) areas along Lee Creek were not formulated to provide additional environmental values above and beyond mitigation as an integral part of the project. Previous reports have not indicated the presence of any threatened or endangered species within the area. However, it is known that major cultural resources exist within the study area. The stream corridor contains wetlands in varying states of quality.

*Growth*

The Northwest Arkansas/Northeast Oklahoma region is the fastest growing area in Arkansas and one of the fastest growing areas in the U.S. Research at the University of Arkansas, Center for Business and Economic Research, projected that the population of the region would surpass that of the Central Arkansas/Little Rock region by 2005. Based upon 2007 population of approximately 60,000 and constant growth of 1.5% for lower bound and 2.0% for upper bound the estimates for population for 2050 are 115,000 and 140,000 respectively. Surrounding areas and adjacent Sequoyah County, Oklahoma are expected to sustain growth rates that are similar.



Previous growth is beginning to put significant pressure on a wide range of public services. Transportation, electrical, water, & sewer utilities, schools, and other services are in the early stages of experiencing significant growth and budgetary pressures. Water is a resource that is vital to the continued economic well being of the region. Water demands are expected to increase in the future generally in proportion to population increases up to about a maximum of 64MGD in 2050. The current water supply in the region is projected to be fully utilized as early as the year 2018, and projected increases in demand cannot be economically met by groundwater sources or by treatment of existing surface water sources.

Without significant investment in public infrastructure, the region's growth potential will be severely hampered, thus shifting economic opportunities to areas more conducive to growth and development. Water resource development is considered the key element by local interests. An abundant and economic water supply is critical long term to the quality of life in any particular area. Increased demand in the region that is not offset by an increased supply will result in much higher water rates and eventually a flat to downward economic curve for the entire region.

Growth also presents an ongoing problem in terms of flood damages. Future runoff from developed areas combined with development that is permitted by floodplain mapping that may be outdated due to urbanization, can result in significant flood damages in areas that were previously agricultural. Floodplain mapping and the Flood Insurance Rate Map (FIRM) in the area is currently based upon Arkansas River flooding; the significant and coincident effects of the Lee Creek tributary were not fully considered due to the previous agricultural nature of the floodplain along Lee Creek.

## *Water Management*

The City of Fort Smith owns and operates the lower Lee Creek Reservoir located downstream of the project site on Lee Creek. The primary water management problem associated with the reservoir is the seasonal dry-up of Lee Creek, which is associated with a management scenario of near zero firm yield. The reservoir capacity is insufficient to capture and retain all of the seasonal flood flows on Lee Creek so that significant quantities of water are allowed to pass downstream and are permanently lost to the Arkansas River. The small reservoir is drawn down significantly through the end of August and relies on winter storm events to begin the refilling process each year.

Corps management of the 11 upstream Corps reservoirs and the McClellan-Kerr navigation system is tied to the gage at Van Buren on the Arkansas River. This gage is downstream of the confluence of Lee Creek and the Arkansas River. Above the Van Buren gage is about 7500 square miles of uncontrolled drainage below those 11 reservoirs. The Lee Creek drainage area is about 450 square miles out of the 7500 currently uncontrolled (6%).

### c. Opportunities

#### *Environmental Benefits for Fisheries*

There is potential to formulate a multipurpose project with ecosystem restoration benefits. As originally authorized, the project would have reserved a flow of 55 cfs for "fish and wildlife" purposes downstream of the dam. Additionally, a multi-tiered intake structure was included for temperature control as part of the project to ensure that the downstream area remained a warm water native fishery. The benefits were qualitatively discussed but not evaluated or analyzed. Lee Creek is a natural stream habitat with good to excellent quality. Additional analysis and coordination would help determine if alteration of the hydrology to provide sustained perennial flows and stable velocities could increase environmental values.

Formulation of the project with integral environmental benefits upstream might include stocking of the upstream reservoir with native fish such as spotted and smallmouth bass, thus providing mitigated environmental values upstream. The productivity, survivability and sustainability of the native warm water fishery might be increased with a project specifically formulated from the start to provide habitat. Past practice for many Corps projects in Arkansas and Oklahoma has resulted in complete replacement of warm water fisheries and aquatic habitat by cold water fisheries requiring concerted annual efforts such as stocking programs for maintenance. As a result, viable native warm water fisheries have diminished greatly in Arkansas. Increasing this type of environmental resource in the region is considered to be significant due to the relative scarcity of such a resource as a result of past practices.

The Reconnaissance Phase Analysis approval letter from HQ USACE, dated 29 Mar 04, did not allow evaluation of any project purposes not originally authorized, including ecosystem restoration, under PED-phase activities. However, in the Water Resources Development Act of 2007 environmental restoration was added as a project purpose. While environmental restoration

will not be studied as a purpose, mitigation features and water storage to maintain state water quality standards and fish, wildlife and ecosystem habitat will be considered.

### *Water Supply*

As originally authorized, the Pine Mountain project would provide a municipal and industrial water supply in the amount of about 60 MGD. Previous analysis has determined that the project could be designed to provide up to 92 MGD.

The local sponsor for the project is the River Valley Regional Water District, comprised of 7 participating member organizations. Assuming historical population growth rates, new water sources will be needed by 2018. By 2050, the members are projected to have a need of about 35MGD on average and 64MGD peak capacity. In addition to the sponsor members, surrounding areas in the region are experiencing similar growth and increased needs for future water sources.

There is an opportunity for a water supply project to be developed that will provide a regional water source for communities in both Arkansas and Oklahoma. Sufficient quantities of water can be developed to provide for population growth, environmental purposes, and navigation. Additionally, there is an opportunity to benefit the smaller water supply reservoir downstream by providing a firm yield that would keep the reservoir full year round.

#### d. Planning Objectives

##### *National Objective*

1) The national or Federal objective of water and related land resources planning is to contribute to national economic development consistent with protecting the nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. Contributions to National Economic Development (NED) are increases in the net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct net benefits that accrue in the planning area and the rest of the nation.

NER contributions result from creating new habitat or increasing the value of existing habitat and are measured in terms of non-monetary outputs. NED contributions include increases in the net value of national output of goods and services and can be measured in terms of monetary outputs such as reductions in flood damages and emergency response costs.

##### *Specific Planning Objectives*

The national objectives of National Economic Development and National Ecosystem Restoration are general statements and not specific enough for direct use in plan formulation. The water and related land resource problems and opportunities identified in this study are stated as specific planning objectives to provide focus for the formulation of alternatives. These planning objectives reflect the problems and opportunities and represent desired positive changes in the without project conditions. The planning objectives are specified as follows:

- 1) Contribute to meeting water supply needs of the RVRWD water supply service area over the 50-year period of analysis. Currently the projected 50-year water supply is approximately 65 MGD.

e. Planning Constraints

Unlike planning objectives that represent desired positive changes, planning constraints represent restrictions that should not be violated. The planning constraints identified in this study are as follows:

*Availability of Water*

Existing federal, state, county, tribal and private water laws, and agreements will impact plan formulation and implementation. Any proposed project must take into account ownership/control water rights.

*Maintenance of Floodway Capacity*

Formulation must be done in such a way that a project would not substantially reduce the existing flood protection in downstream areas. Specifically, operation of the project must be performed in such a way as to not decrease flood control benefits of the overall system. The project should not impact the safety of existing bridges and other infrastructure.

*Proximity of Recreation to Restoration*

Projects must be formulated in such a way as to avoid significant impacts from any planned recreational facilities to restoration areas.

*Cultural Resources*

The study area contains numerous cultural resource sites, which must be considered in development of any specific plan.

*Endangered Species*

Any potential project would be required under the Endangered Species Act to not jeopardize the continued existence of threatened or endangered species or to destroy or adversely modify their habitat.

*Local Acceptability*

Any plan must be acceptable to local residents and consistent with local planning efforts.

*Displacement of People*

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 requires any local sponsor acquiring land for a project involving the Federal government to comply with the provisions of this act.

*Vector Control*

Incorporate vector control into the design, operation, and maintenance aspects of the project. The introduction of water bodies could provide increased opportunities for mosquito breeding.

### *Rapid Growth*

The steady growth in the area creates increasing competition for water and land resources. Project formulation must account for future conditions and provide regional benefits. The study area is an urbanizing setting and it is recognized that restoration efforts will not be able to achieve historic ecosystem conditions.

### *Real Estate*

Real Estate costs can significantly affect project costs. Since right-of way costs may not be uniform with respect to location within the study area or width of acquisition, real estate costs represent a constraint on the location and dimensions of potential alternatives. Existing federal, state, county, tribal and private land ownership will impact real estate appraisals and acquisitions.

### *Water Quality Integrity*

Flows out of the reservoir should closely match or exceed existing water quality and meet the anti-degradation standards of both Arkansas and Oklahoma.

### *Environmental Restoration*

As stated in previous section, environmental restoration was added in WRDA 07 as a project purpose. Due to the degradation of the existing habitat upstream, environmental restoration was no considered as one of the project purposes.

### *Flood Damage Reduction*

The original project authorization calls for the "...control of destructive floodwaters...". No flood storage will be built into the system because of the ERW designation. If a flood should occur when the reservoir is full, the water will pass through the spillway as if the dam was not there.

### *No Primary Contact*

If the alternative chosen in a new reservoir, no primary contact will be allowed due to Arkansas Department of Health's regulations for drinking water reservoirs.

## f. Alternative Development Rationale

The alternatives are developed for the purposes related specifically to the requirements for a Corps of Engineers Reconnaissance level report. Following the completion of the General Reevaluation Report, EIS, and project authorization by Congress, if required, detailed design analysis and preparation of plans and specifications would take place. Initial alternatives were formulated, and will be expanded and refined in the GRR, to address a comprehensive Federal regional project to:

Comply with NEPA and other state and federal environmental laws and regulations; including the original project authorization intent consistent with the body of law since enacted;

Provide an acceptable means of capturing water and utilizing it to help support appropriate water budgets for balanced project purposes;

Ensure that the project would not increase flood flows or worsen flooding conditions downstream;

Provide decision makers with information that could be utilized to help determine the balance between construction costs, real estate costs, and social and environmental issues and concerns;

Provide a framework for responding to future urban development in the floodplain, consistent with Executive Order 11988;

Match existing and proposed improvements where possible to take advantage of local improvements and to be consistent with the future master planning efforts of the local communities.

#### g. Alternative Development and Evaluation Process

The study process involves developing and refining, through successive iterations, alternative solutions to the defined problems. Solutions are evaluated based upon the degree to which they address study objectives and take advantage of identified opportunities while remaining within the limitations imposed by the identified constraints. The general criteria that are required to be met are as follows:

- *Technical Feasibility*: Solutions must be technically capable of performing the intended function, have the ability to address the problem, and conform to Corps of Engineers technical standards, regulations, and policies;
- *Environmental Acceptability*: Solutions must comply with all applicable environmental laws, including the National Environmental Policy Act;

Solutions may be evaluated on water quality, air quality, habitat quality and wetland destruction. Criteria will be solicited from the public at the public meetings. They will also be identified using institutionally and scientifically recognized criteria. The appropriate mitigation ratios will be assigned once those criteria are identified.

- *Economic Feasibility*: Solutions must be economically justifiable in that the economic benefits or, in the case of ecosystem restoration NER (non-monetary) benefits, must exceed the economic costs, in accordance with applicable regulations, policies, and procedures; and
- *Public Acceptability*: Solutions must be publicly acceptable as evidenced by a cost sharing non-Federal sponsor and further documented through an open public involvement process that incorporates the public's input into the formulation of the solutions.

#### h. Measures to Address Identified Planning Objectives.

Initially, specific measures were developed to satisfy the four criteria. Measures are stand alone features that address the defined problems. There are numerous measures that can be utilized depending upon site location, technical considerations, environmental conditions, and a host of other factors. In determining the set of measures to be evaluated for this study, consideration was given to previous authorization reports, public input and suggestions, Corps experience with similar opportunities, technical considerations based upon the specifics of the area, and considerations related to the project authorization and Corps primary missions.

A management measure is a feature or activity at a site, which address one or more of the planning objectives. A wide variety of measures were considered, some of which were found to be infeasible due to technical, economic, or environmental constraints. Each measure was assessed and a determination made regarding whether it should be retained in the formulation of alternative plans. The measures to be more fully considered are presented below:

1) No Action. The Corps is required to consider the option of “No Action” as one of the alternatives in order to comply with the requirements of the National Environmental Policy Act (NEPA). No Action assumes that no project would be implemented by the Federal Government or by local interests to achieve the planning objectives. No Action plan includes the future condition expected to occur, *including* firmly-planned actions by other Federal, and non-Federal, parties.

(2) Water Supply Measures

Dam on the Mulberry River

Use Clear Creek and other area streams as a water source

Institute Conservation Measures

Levees and Pumping Station

Construct Wells and Infiltration Galleries along the Arkansas River

Use Wells North of Van Buren

Offsite Storage Areas to capture excess waters from Arkansas River

Construct a Dam on lower Clear Creek and Webber Creek to yield 35

MGD

Reexamine alternatives in 1980 draft EIS as amended by current law and regulations

Use Beaver Lake as a water source

Use Blue Mountain as a water source

Expand Lake Fort Smith

Wister Lake as a Water Source

Tenkiller Ferry Lake as a Water Source

Poteau River as a Water Source

Plans incorporating restoration and water supply in other ares

Waste Water recycling/reclamation

Institute Conservation Measures

i. Preliminary Plans. Preliminary plans are comprised of one or more management measures that survived the initial screening. The descriptions and results of the evaluations of the preliminary plans that were considered in this study are presented below:

1) Preliminary Plans Eliminated from Further Consideration:

The requirements have changed dramatically since the original authorization of the project. The following plans that were evaluated before are no longer viable alternatives:

<b>Alternative</b>	<b>Meets planning Objectives</b>	<b>Issues</b>
Dam on Mulberry River	Yes	Same problems as Lee Creek, but greater cost of transmission
Use Clear Creek and other area streams as a water source	maybe not	Water supplies in intermittent streams are not reliable;
Construct a Weir on Lee Creek	NO	Would not supply water
Flood Warning	NO	Would not supply water
Flood Proofing	NO	Would not supply water
Levees and pumping stations	NO	Would not supply water
Channelization of Lee Creek	NO	Would not supply water

2) Preliminary Plans for further Consideration:

Based upon the initial measures described above, plans for further consideration in the GRR include:

<b>Alternative</b>	<b>Meets planning Objectives</b>	<b>Issues</b>
Construct Wells and Infiltration Galleries along the Arkansas River	Yes	
Use wells north of Van Buren	Yes	
Offsite Storage Areas to capture excess waters from Arkansas River	Yes	May be an issue with AHD, but should not be eliminated.
Construct a Dam on lower Clear Creek and Webber Creek to yield 35 MGD	Yes	
Reexamine alternatives in 1980 draft EIS as amended by current law and regulations	Yes	Goes against Arkansas Regulations. Large public backlash.
Use Beaver Lake	Yes	Requires 61 miles of pipeline; has 128799 AF allocated (12882 congressionally).
Use Table Rock as a Water Source	Yes	Has 95 AF allocated.
Use Blue Mountain as a water Source	Yes	Requires 47 miles of pipeline; may require structural modification; has 1550 AF allocated.

Expand Lake Fort Smith	Yes	Dependable yield of basin has been captured?
Wister Lake as a water source	Yes	Requires legislative action to remove water from the state.
Tenkiller Ferry Lake as a water source	Yes	Requires legislative action to remove water from the state.
Poteau River as a water source	maybe not	Requires legislative action to remove water from the state. May have higher costs due to pumping across the river.

All plans will include integral formulation of separable recreation features appropriate to each particular plan considered. Plans will also include wastewater recycling and conservation efforts on the part of the RVRWD.

3) Alternative Implementation Authorities: The Corps has adequate and sufficient authorities to implement any alternative or measure currently envisioned.

j. Conclusions from the Preliminary Screening. The preliminary screening indicates that the multipurpose alternatives that include the Corps primary missions and comply with WRDA 86 have the greatest potential for implementation. The currently authorized project, with changes due to new regulations and guidance, has potential for implementation if legislative direction and/or policy considerations are made. The potential magnitude and types of benefits (average annual - reconnaissance level estimates) from the proposed actions would include:

Water Supply Benefits of up to 90MGD  
Regional Economic Developments (RED) benefits

Likewise, environmental impacts are expected from construction of a major structure and the inundation of approximately 3000 acres of woodlands that would potentially include land purchases and set asides as mitigation. A complete Environmental Impact Statement will be required.

The authorized plan would cost \$112 million (2003 updated estimate), including design-phase modifications from the 1980 GDM. Based on this information, alternatives to address the planning objectives appear viable.

## 6. FEDERAL INTEREST

The main purpose of this reservoir is water supply. There is an interest in Federal Water Supply; however, it is not one of the Corps of Engineers mission areas.

The originally authorized project for agricultural flood control, water supply, recreation, and fish and wildlife enhancement would still be justified utilizing the benefit categories for which the project is authorized. New projects based upon these benefit categories do not currently receive budgetary priority. However, this does not preclude a federal interest in pursuing a reformulated project in accordance with WRDA 1986 and WRDA 2007 in

cooperation with a cost sharing local sponsor with congressional support. Accordingly, it is in the federal interest to continue PED phase activities in the form of a cost shared General Reevaluation Report to determine the level of federal participation warranted, if any, in accordance with current laws and policies.

## **7. PRELIMINARY FINANCIAL ANALYSIS**

WRDA 2007 states that the General Reevaluation Report will be paid for at total government expense up front. The local Sponsor, River Valley Regional Water District, is responsible for 25% of the total cost to prepare the report when the project goes into construction. The local sponsor is also aware of the cost sharing requirements for potential project implementation.

## **8. ASSUMPTIONS, EXCEPTIONS AND QUALITY OBJECTIVES**

a. GRR Phase Assumptions: The following assumptions will provide a basis for the General Reevaluation study:

### 1) Without Project Condition

In the absence of future actions towards a federal multipurpose project, economic development of a growing region of the United States will be hindered due to lack of a viable long term water supply to meet the region's needs. Recreation opportunities will be limited in the vicinity, causing economic benefits attributable to recreation to be transferred out of the area to those areas where residents must currently travel to enjoy lake based recreation.

### 2) Previous Reports

a. As discussed in this reconnaissance level analysis, detailed design activities to approximately the 95% level of completion have been previously performed, including preparation of draft environmental documentation. While many conditions may have changed since 1980, many others have not. The results of the body of technical work will be utilized and built upon to the maximum practical extent. The existence of this large body of previous work has been fully considered in developing the reconnaissance level GRR estimate.

b. Policy Statements, Exceptions, and Streamlining Initiatives: The study will be conducted in accordance with the Principles and Guidelines and the Corps of Engineers regulations. Exceptions to established guidance have been identified that will streamline the study process that will not adversely impact the quality of the GRR. Approval of the Reconnaissance Level Analysis by HQ USACE results in the approval of the following policy statements, exceptions and streamlining initiatives:

1) Since the project was originally authorized based upon agricultural flood damage reduction benefits and water supply benefits, these benefit categories can still be used towards project justification.

2) Draft Report: As a streamlining initiative, submittal of the Draft Report to Division and release to the public for public comments is scheduled to occur concurrently. Early

HQ participation in the GRR scoping meeting and subsequent participation in the AFB/IRC is anticipated to provide sufficient guidance to proceed with this schedule.

3) We will use Multi Criteria Decision Analysis (MCDA) when determining which plan contains the most national benefits. MCDA allows the Corps of Engineers to evaluate criteria that may have no quantifiable economic value but are in the Federal interest.

c. Other Approvals Required: None

d. Quality Objectives: PED Phase studies will be accomplished to meet the following quality objectives:

1. Adequate evaluations will be conducted to meet the requirements of the National Environmental Policy Act and other environmental legislation.
2. Project costs for the selected plan will be developed to a level of certainty where the ultimate project cost will be within 10% of the GRR phase estimate.
3. PED Phase studies will conform to the requirements of ER 1105-2-100.
4. Agency Technical Review and Independent External Peer Review will be carried out in accordance with the Review Plan located in Chapter XIV.

## **9. GRR MILESTONES**

The Milestone Schedule for the GRR is detailed in Chapter IV.

## **10. GRR COST ESTIMATE**

The Cost Estimate for the GRR is detailed in Chapter V

## **11. VIEWS OF OTHER RESOURCE AGENCIES**

Because of the funding and time constraints of the reconnaissance level analysis, only limited and informal coordination has been conducted with other resource agencies. Extensive coordination and involvement during the conduct of the General Reevaluation study will include, at a minimum, the following agencies:

- U.S. Fish and Wildlife Service
- U.S. Forest Service
- U.S. Department of Agriculture
- U.S. Department of Transportation
- U.S. Environmental Protection Agency
- U.S. Geologic Survey
- U.S. Park Service
- U.S. Bureau of Indian Affairs
- U.S. Federal Aviation Administration
- U.S. Bureau of Land Management
- State of Arkansas, Office of the Governor
- State of Oklahoma, Office of the Governor
- Arkansas Game and Fish Commission

Arkansas Soil and Water Commission  
Arkansas Department of Environmental Quality  
Arkansas Department of Parks and Tourism  
Arkansas State Historic Preservation Office  
Arkansas Natural Heritage Commission  
Arkansas Highway and Transportation Department  
Oklahoma Department of Wildlife Conservation  
Oklahoma Department of Environmental Quality  
Oklahoma Water Resources Board  
Oklahoma Department of Transportation  
Oklahoma Tourism and Recreation Department  
Oklahoma State Historic Preservation Office

## **12. POTENTIAL ISSUES AFFECTING CONTINUATION OF THE PED PHASE**

a. Based on the schedule of milestones in Paragraph 9, completion of the GRR (Milestone 9) would be in October 2012 with a potential Congressional Authorization, if needed, in a subsequent Water Resource Development Act. The schedule is based upon optimum resource conditions (study scope, manpower, federal and non-federal funding) that may or may not be realized.



River Valley  
**Regional Water District**

**409 Main Street  
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Fax: 501.471.8969**

December 22, 2003

Colonel Benjamin H. Butler, P.E.  
District Engineer  
US Army Engineer District, Little Rock  
PO Box 867  
Little Rock, AR 72203-0867

Re: Letter of Intent for the Pine Mountain Dam, Arkansas Project

Dear Colonel Butler:

We have been very pleased to work with your planning staff on the Reconnaissance Level Analysis for the Preconstruction Engineering and Design (PED) phase to address a federal project that would provide potential regionalized benefits in the areas of flood control, navigation, ecosystem restoration, water supply, and recreation. We are expressing our strong support for the project and we are willing and financially able to participate as a cost sharing local sponsor. We understand that under current rules the PED phase would be cost shared 75% federal and 25% local. The estimated cost of the PED phase is \$8 million of which our share would be \$2 million.

We also understand that the PED phase could potentially be continued by the Corps at 100% federal cost, and that there are no guarantees regarding future federal participation in a project. In consideration of all of the factors, advantages, and disadvantages of cost sharing versus 100% federally funded, we have determined that it is in our best interest to fully participate as a cost sharing local sponsor.

We fully support the Reconnaissance Level Analysis and are looking forward to its certification by the Corps. We are anxious to move forward with our participation in the development of the Project Management Plan for the PED phase and execute a model Design Agreement.

Sincerely,

Harry Short  
Chairman, RVRWD

cc: RVRWD Board Members  
Mr. Kirby Rowland, PE, Garver Engineers

## **CHAPTER III - SCOPES OF WORK**

### **1. Detailed Scopes of Work**

For each task that is included in the work breakdown structure, the scope describes the work, including specific activities, to be accomplished in narrative form. The scopes of work were developed by the study team, including representatives of the non-Federal sponsor. The scopes also reflect the policy exceptions and streamlining initiatives that have been approved in the Reconnaissance Analysis. The detailed scopes of work for the GRR study follow.

### **2. Durations of Tasks**

The durations for the tasks will be entered into the project's network analysis system (P2), early during the general reevaluation study.

### **3. Costs of Tasks**

The scopes of work for the tasks are grouped by the parent tasks that they support. The total estimates for the parent tasks are shown in P2.

### **4. Work Task**

The work to be performed consists of a PED level of effort according to the task descriptions presented in the attachment titled "Work Task." Only the major tasks required are given. The following descriptions are intended to reflect the entire study scope, including work to be performed by the Corps, A-E contract services, and local sponsors' in-kind services.

### **5. Funding Schedule**

Study funding required to support the work effort by milestone, by fiscal year, and by task, is included as Attachment E, Study Funding Schedule.

## Detailed Scopes of Work

### 30000 Preconstruction Engineering and Design (PE&D)

#### 30A00 Reevaluation/Post Authorization Change (LRR/GRR)

##### 30AX0 PE&D Program & Project Mgmt

Start GRR. Start the General Reevaluation Report

Supervision – Direct Charge – FY0X. . This task involves overseeing the project manager, reporting to division and headquarters, and sharing information with the Project Management Team.

Programs Management. This task involves preparation of the Federal budget for current year and future years. Includes monitoring cost and accounting allocations in coordination with the Study Manager/Project Manager.

Project Management, Planning Division and Plan Formulation Branch Management. The Project Manager is the primary point of contact and responsible for development and negotiation of the PCA, MOAs and other customer agreements. Periodic meetings will be held between the Corps and the Sponsor to report on the status of the study and responsible in-kind services and credits. Monthly status reports covering selected financial measurements and performance will be provided by the project manager.

Budgetary management responsibilities include tracking and documenting the funds and budget (accounting) of the study; documenting appropriations, including interpretation of current and future budgetary guidance; submitting project data sheets, justification sheets and other testimonial fact sheets as required; monitoring and reprogramming study funds, executing current year and future funds; processing schedules of obligations and expenditures; monitoring project financial performance and coordinating with study and project managers on project financial performance; assessing District manpower allocations versus available funds, assuming district operating budget includes appropriate hired labor and contract amounts; coordinating future funds allocations and manpower requirements with other District elements; setting up and documenting all cost key accounts, and reviewing pre-and post-labor reports.

The Project Manager will coordinate with the sponsor for the management of and coordination with Corps review, coordination of cost-sharing procedures, and management of budgets and schedules for the study. Negotiation of tasks and costs, review of reports, and participation in meetings on study results and issues are included in this task.

### 30AA0 Engr & Design

#### 30AA0.1 Surveys and Mapping

This task will begin with a data collection period. Existing aerial photo and topographic maps of the various study areas will be obtained. Existing Geographical Information System (GIS)

mapping will be obtained and reviewed for applicability. The mapping will be utilized for the preparation of plates suitable for inclusion in the report. The plates will depict both existing and planned facilities. A preliminary list of mapping items includes, but is not limited to:

H&H X-section Surveys. Aerial photography and LIDAR of the channel will be obtained. This task is the precursor to H&H design. It will be contracted out.

Floor Elevation Surveys. This entails surveys to locate structures in the area.

Design Spot Elevations. This survey will be used to verify the LIDAR survey and to obtain a good cross section of the area at the dam site.

Appropriate mapping will be acquired and existing maps utilized during the course of the GRR will be reviewed and updated as new technical information is generated. Mapping will be in sufficient detail to provide necessary information for completion of the design. This may include:

- (a) Coverage and sufficient detail to complete the hydrologic, hydraulic, geotechnical, and sedimentation studies.
- (b) Coverage and sufficient detail to prepare /update design of the project
- (c) Location of existing and proposed future infrastructure.
- (d) Land ownership and land use.
- (e) The 100-year floodplain and identified areas of river aggradations, degradation and bank erosion.
- (f) Cultural resources.
- (g) Regulatory (section 404) related information.
- (h) The existing and proposed open space components.
- (i) Vegetative habitat and wetlands.

The mapping will be utilized for developing hydraulic, geomorphic, and sediment analyses as well as design. It will also be the basis of plates suitable for inclusion in the report and engineering appendices. The plates will depict both existing and planned facilities and be of a format that is compatible with the sponsor's GIS database.

GIS Information.

Build Digital Base Map Database and Develop Base Maps for Alternatives  
Negotiate Data Exchange Agreements, Synchronize Internal/External Data Sources and

Develop Large Data Set Exchange Processes  
Create Map Templates for Public Display  
Perform appropriate GIS Analysis

Real Estate. Obtain the rights of entry for the dam site.

### **30AA0.2 Hydrology & Hydraulics**

The following is a listing of subtasks to be performed by the Little Rock District under, Hydrologic and Hydraulic Studies.

*General:* The hydrologic work effort for this study will include a collection and review of all applicable previous studies, analysis, results, mapping, and reports. Frequency discharges will be determined using information available. Frequency of inundation will be determined to establish flow rates which would be exceeded for specified durations. Low-flows for the study reach will be determined for potential sources of water. A complete update of the period of record and reevaluation of the firm yield for water supply purposes performed. Documentation will be provided at the completion of the study. Report review, response to comments, and support to the Study Manager are included in the work effort.

#### Hydrology

Literature Review. Research, collect, and review hydrologic information from Corps of Engineers, USGS, sponsor, other public agencies, and private consultants.

Frequency Discharges. Utilize recently developed COE discharge-frequency information to establish frequency discharges at selected locations in the study reach. Provide 1-, 2-, 5-, 10-, 20-, 50-, 100-, and 500-year discharges for each location. These will be developed for both the with and without project condition.

Balanced Hydrographs. Develop balanced hydrographs at selected locations. The balanced hydrographs will be used for detailed sediment transport analyses. NOTE: historic flood hydrographs may also be required.

Tributary Drainage. Locate all tributaries. Prepare tables of sizes and locations for all tributaries, verify information with field reconnaissance. Determine frequency and volume of surface water runoff from tributaries.

Risk and Uncertainty. Develop related hydrologic parameters, such as equivalent length of record at selected locations, for use in the HEC-FDA computer program.

Coordination. Attend meetings, conferences, and coordinate as required and assist in plan formulation.

Documentation. Prepare hydrologic documentation presenting discharge-frequency results, inundation-frequency-durations, and low flow results for Without-Project

Conditions and for each of the alternatives evaluated. Incorporate any of the groundwater and water quality results, if available, from other sources.

Technical Review. Prepare independent technical review comments and attend review conferences. Address review comments and prepare final appendix. File study material.

## Hydraulics

*General:* The following Hydraulics documentation and cost support information focuses on flood control and water supply for the Pine Mountain Dam. The hydraulic work for this task will be performed through the updating, conversion and calibration of existing models (HEC-HMS) into use of the Corps Water Management System (CWMS) computer modeling program as a functional forecasting and analysis tool. Other models may be utilized such as ResSim and Mike 11 as appropriate. The end product for the Hydraulics Engineering Task will be to incorporate the information obtained from the subtasks listed below into a Hydrologic and Hydraulic Appendix to the final report.

Flood Hydraulics Analysis – Baseline Conditions: This subtask will start with a review and collection of existing data and immediately proceed into the development and/or conversion of any existing models. The analysis includes the following:

- a. Develop and calibrate base model and compare results against prior existing model information.
- b. Conduct field and data reconnaissance. This area to include various plans/drawings acquisition as well as site and structure measurements (e.g., bridges, inlet structures).
- c. Incorporation into the base model the latest master plans information for structures and features within the river including major side drain details, bank stabilization areas, and gravel mining activity.
- d. Plot 1-, 2-, 5-, 10-, 20-, 50-, 100-, and 500-year floodplain delineations.
- e. Develop hydraulic input information (normally eight frequency discharge events) in support of economic HEC-FDA program.
- f. Generate non-damaging (channel capacity) and/or channel-forming discharge.
- g. Develop flood-forecast model based upon historical data.
- h. Build HEC-RAS model.
- i. Modify HEC-RAS model and calibrate to simulate dam breach scenarios.

With Project Alternative Analyses: This subtask will reassess the study reach, at a commensurate level of detail, for a condition that incorporates the various project features and results in the development of the final configuration for the recommended plan. This effort will involve the following processes:

- a. Participate in a scoping exercise to determine the parameters to consider in the study process.

- b. Modify and execute the HEC-RAS model analysis for all of the considered alternatives and assess project impact. Support input information into the economic HEC-FDA program as required.
- c. Refine recommended alternative.
- d. Conduct a residual overflow analysis.
- e. Perform a sediment analysis on the recommended alternative and compare the results against the baseline conditions model information. The impacts of project life conditions will also be assessed.
- f. Estimate and quantify the operation and maintenance (O&M) impacts of the recommended alternative over its project life.
- g. Design pertinent hydraulic mitigation features to insure project viability. This area may involve the design of such features as guide dikes, grade control structures, and localized bank stabilization measures.
- h. Design appropriate minimum flow features to ensure adequate an adequate flow downstream that will preserve any existing warm-water fisheries. The design should make sure proper water quality, including proper dissolved oxygen levels, is maintained over the life of the project.

**Risk and Uncertainty Analysis:** This subtask will be developed so that the viability of the various design alternatives can be quantified. The analysis will include the determination of which variables result in the largest changes in flood inundations. The analysis will assign risk factors to the sensitivity that will result in a confidence level, i.e., the amount of confidence that the flood inundation depths are accurate.

**Documentation:** All data collected and/or developed will be displayed in a hydraulic appendix to the final report. In addition, this subtask will include the development of formal written communications and interim reports required during the progress of the study effort.

**Coordination:** All data collected and/or developed will be fully coordinated with the study team and the local sponsor. This subtask will also include such additional activities/efforts as meeting attendance, response to review comments, and technical briefings.

### Geomorphic Assessment

**Stream Classification:** This subtask will involve classification of the stream from the headwaters to Lee Creek Reservoir. Areas of major involvement will include:

- a. Collection of field data including, but not limited to: sediment samples, bankfull cross-sections, flood prone widths, etc.
- b. Processing field data for, but not limited to: bankfull cross-sectional area, entrenchment ratio, hydraulic mean depth, D10, D50, D84, etc.
- c. Based on observed, measured, and calculated data, the stream will be classified into discrete reaches using an applicable classification system.

Sediment Analysis for Baseline Conditions: This subtask will involve an evaluation of sediment transport effects on the study reach (including immediate adjacent boundary areas). Areas of major involvement will include:

- a. Conduct a quantitative sediment transport analysis based on the existing condition study discharges and calibrate as required.
- b. Execute a sediment sampling program.
- c. Determine impact of sediment analysis on inundation and water surface profiles.
- d. Development of a sediment budget for assessment of long-term stability within specified reaches.
- e. Development of a sediment budget for assessment of various reach stability during selected flooding events.

Channel Stability Analysis: This subtask will augment the sediment analysis. It will only be performed for the recommended alternative. This analysis will assure that there are no major bank or erosion problems. Included in this subtask are the following study efforts:

- a. Evaluate the lateral channel stability conditions through a qualitative geomorphic analysis.
- b. Assess local scour conditions at major structural features within the channel (i.e., bridges, power lines, drain inlets, and grade control(s)).
- c. Determine channel velocities and associated bank shear stresses.

EIS Alternatives Analysis (other than the 1980 plan). Research and create alternatives to Pine Mountain Dam, including, but limited to, those included in the 1980 plan.

H&H Appendix and EIS Reports. Write the appendix for the GRR and the EIS.

### **30AA0.3 Eng & Design Analysis**

The purpose of design efforts will be primarily to assist in analysis and location of the project. Designs are intended to be of sufficient detail to begin plans and specifications.

Design Assistance. The work will include preparation of preliminary designs and plates, assisting in plan formulation, in-house review, response to comments, and support to the Study Manager and other Study Team Members.

Quantity Calculations. Quantities of the various project features will be made. Details of the quantities will be summarized for estimating purposes.

#### Geologic Studies

Geologic Framework Research. This task consists of summarizing existing, published information relating to:

- a. Regional and local geology and geomorphology
- b. Geologic hazards, including seismic design considerations

Constructability Analysis. This task will include foundation preparation and grouting, excavatability of foundation material including blasting techniques, stone protection and determination of equipments to use.

Documentation, Coordination, Reviews (Geology). This task covers the documentation and technical review of the geological studies and will include coordination required in assembling the Geotechnical Appendix. The project geologist will be available to coordinate the work, attend milestone functions and provide reviews.

### Materials Studies

Geotechnical Field Explorations. This phase would involve reviewing previously obtained subsurface information and assumptions concerning the location of the dam. It would also involve reviewing the excavation plan for the dam.

Constructability Analysis. The constructability analysis is related to types of equipment required, specification requirements, and construction considerations in support of the cost analysis for each project feature considered. This task will also include excavatability, determination of equipments to use, and special processing/handling requirements for on-site materials.

Documentation, Reviews, and Coordination. This task will cover the review of the materials studies and will include coordination required in assembling the Geotechnical Appendix.

### Soils Studies

Constructability Analysis. This task will include foundation preparation, excavatability, determination of equipments to use, and special processing/handling requirements for required engineered fills.

Slope Stability Analysis. This task will address the preliminary slope requirements for earthen berms and temporary and permanent excavation. Seismic design will be included.

Seepage Analysis. This task will address the need for seepage cutoff walls, seepage berms and filters required to ensure control of any seepage.

Documentation, Reviews, and Coordination (Soils Design). This task will document the Geotechnical studies. This task will include publication of all gathered and/or created data and conclusions into a Geotechnical Appendix to the final report. Members of the geotechnical study team will be available to coordinate their work and attend key meeting.

### **30AB0 Socio/Economics**

The Economic Studies will be conducted pursuant to the “Planning Guidance Notebook” (ER 1105-2-100). The work will be performed by the Little Rock District Planning Section and its contractors. The purpose of socioeconomic studies is to assist in problem identification, to characterize the social and demographic characteristics of the affected populations, and to quantify benefits and costs of proposed solutions.

The project benefits will be updated in accordance with ER 1110-2-11500, paragraphs 4-1b(1) and 4-1b(2) : Plan for Economic Updates.

“The actions in the plan require the reanalysis of the previously completed study, utilizing current planning criteria and policies. The new economic study is required due to the changed condition and/or assumption. The study will develop a reasonable estimate of current project benefits examining with/without project conditions.

Therefore, the methods logic, and reanalysis of the original report, as well as any additional reports, will be reevaluated to determine if the methods, logic, and results are sound. The results may affirm the previous plan; reformulate and modify it as appropriate; or find that no plan is currently justified. If the results are sound and no significant changes to the with and without project conditions have occurred, the plan to update the project benefits will consist of the following:

NED Benefit Evaluation:

The Lee Creek project was authorized based on House Document 270 of the 89<sup>th</sup> Congress. The report justified the project based on flood damage reduction, recreation, and water supply benefits. Only water supply benefits can be realized in this project.

#### Water Supply Benefits

The benefits from municipal and industrial water supply are society’s willingness to pay for the increase in the value of goods and services attributable to the water supply. In absence of such direct measures, the benefits from a water supply plan are measured by the resource cost of the alternative most likely to be implemented in the absence of that plan. Risk analysis techniques are required for formulation, evaluation, and investment decisions studies. Sensitivity analysis of key variables such as least cost alternative cost, future demand for water and future availability of water supplies is required.

If the methods and logic of the previous study(ies) can not be determined to be reasonable then the above NED benefit evaluation procedures will be carried out using the appropriate rationale.

Meetings and Coordination:

Attend meetings and coordinate with study team members, participate in review processes, as necessary.

#### Prepare Economic Appendix:

All economic investigations conducted during the feasibility study will be documented, and a detailed economics appendix will be prepared by the Corps for inclusion in the General Reevaluation Report. All Corps guidance for Economic Analysis will be followed. A full list of guidance documents can be found on the Corps' Headquarters Web Site. This includes, but is not limited to, ER 1105-2-101. The appendix will provide the methodology used to determine the recommended plan of improvement, information sources, procedures, and will contain suggestions and methods for using the data collected. Damages/costs categories outlined in the preceding paragraphs will be reported, as will additional categories of damage/cost that may be identified. Documentation will be in sufficient detail to allow for a reasonable judgment of the accuracy and validity of the information and resulting damage/cost calculations. Deficiencies in the data obtained or non-availability of data will be reported.

### **30AC0 Environmental**

The Environmental Studies task will include incorporation of information obtained from the Fish and Wildlife Studies and Cultural Resources Studies tasks. The District Planning and Environmental Office will contract out the work.

The Environmental Studies Task will include all efforts required to coordinate and develop the required NEPA, Section 7 of the Endangered Species Act, and Section 404(b)(1) documentation, including the necessary public notices. Additionally, the Environmental Evaluation prepared in the 905(b) Analysis will be expanded into an Environmental Impact Statement (EIS).

EIS Contract. This task includes the money needed to award the contract for the Environmental Impact Statement. The contractor will be responsible for conducting everything from the Agency Scoping meeting to the issuance of the Final EIS.

EIS Preparation. Preparation of the EIS will include ecological and biological support staff services, recreational support staff services, cultural resources support staff services, field reconnaissance where required, and coordination of U.S. Fish and Wildlife Service funding for the Coordination Act Report. The following tasks will be included in the EIS:

Develop detailed outline of EIS

Write detailed project description based on information provided by the Study Manager, ensure that viable alternatives met environmental objectives. Develop criteria for elimination and selection of the alternatives, develop detailed project description of the preferred alternative based on previous feasibility report and updated concept designs (new reservoir to include inundated land and changes to creek, water supply lines, recreation facilities, water supply demand, and construction requirements) and other viable alternatives.

Review reports prepared by Hydrology & Hydraulics, Geotechnical Engineering, Economics and other disciplines, based on this report write the Purpose and Need.

Resource Inventory. Biological Resources Surveys (includes report writing)

- a. Record/Literature Review.
- b. Reconnaissance Survey.
- c. Focused Species Surveys of the concerned species, these surveys would need to follow protocol surveys, per species 3 to 6 surveys may required.
- d. Prepare Biological Assessment if T&E in project area.
- e. Perform modify HEP analysis for the viable alternatives.

Surveys for other environmental resources (land use, surface and ground water, landforms, geomorphology, noise, aesthetics, recreation, HTRW, transportation, utilities and all other resources).

Section 404 (b)(1) Anal. A 404 permit will need to be applied for if the final outcome of the GRR is for a dam.

GRR Water Quality Certification. Conduct water sampling at various locations of the project area and review feasibility level geotechnical studies in order to develop a detailed plan of the water resources and identify major concerns.

Mitigation Analysis. Develop mitigation plans, provide options for species to be planted, success criteria, goals, provide alternatives for restoration, and develop mitigation monitoring plan.

Environmental Settings for each resources/ Existing Environmental Conditions.

Environmental Impacts by resources for the Proposed Action and all viable alternatives.

Cumulative, short term/long term impact analysis

Draft EIS. First Administrative Draft EIS

Incorporate Comments and preparation of second Admin DEIS

Draft EIS

Respond to Public Comments

Admin FEIS

GRR EIS complete. Incorporate Internal Comments and Preparation of FEIS

Preparation of Correspondence. This task will include preparation of the Notice of Availability, filing of the EIS with the EPA, work related to the Public Hearing, and other applicable correspondence.

Management and Coordination. The report will be coordinated with Federal, State and local governments and agencies as well as interested groups and individuals. In-house review of the report will also be performed. All state and federal agencies with jurisdiction or interest in the project will be solicited for involvement as a cooperating agency.

## **Public Involvement**

The goals of this task are: 1) promote understanding of the Corps planning and project implementation process; 2) obtain public input regarding problems, opportunities, constraints, alternatives, outputs, impacts and costs; 3) coordinate the planning effort with the efforts of other Federal, state, and local agencies. The sponsor, Corps technical study manager, Corps Environmental Office and the contractor creating the EIS will be responsible for this work.

Conduct Initial Public Workshop (Milestone). An initial public meeting will be held early in the schedule to serve to announce and introduce the study to interested parties. The initial public meeting will be part of the required NEPA process for scoping of the Environmental Impact Statement (EIS). Scoping issues, concerns, and opportunities will be discussed. Public input will be obtained and incorporated into the plan formulation process and the EIS.

Conduct Final Public Workshop (Milestone). A Final Public Meeting will be held to present the findings of the Draft Report and Draft Environmental Impact Statement. Direct comment from the public will be obtained for incorporation into the Final Report and Final EIS.

## **LRR3070 F&W Coord Act Rpt**

The Fish and Wildlife Studies will be conducted in accordance with the Fish and Wildlife Coordination Act. The work will be performed by a technical team which, at a minimum, consists of the Corps of Engineers, the US Fish and Wildlife Service (USFWS), the Arkansas Game & Fish Commission, and the State of Arkansas Department of Environmental Quality. The technical team will perform data collection, species identification, habitat modeling, and riparian mapping to arrive at the baseline conditions. Through Habitat Evaluation Procedures (HEP), the technical team will develop project alternatives and analyze any project induced environmental effects/benefits. A product of this task is the preparation of a (USFWS) Final Coordination Act Report. The report will define the environmental effects of the selected alternative and incorporate the findings of the technical team and any comments from interested parties.

## **30AD0 HTRW Studies**

The purpose of this task is to identify the HTRW contamination potential in the study area.

Framework Research. This task consists of summarizing existing, published information relating to HTRW.

Phase I Site Assessment. This task will consist of a full phase I Site Assessment report for the project. The phase I report will look at existing soil and ground water contamination in the project area and will provide recommendations for follow-up investigative Phase II Site Assessment or similar HTRW work, if necessary. It is not likely that the report will identify areas of existing ground water contamination in proximity to the project area. If necessary at some later phase of this project, most likely during the Engineering Design phase, a Phase II Site Assessment or a variation thereof would be initiated. The Phase II will include field work (field exploration consisting of ground water and or soil samples) to better define the potential of the ground water pollution.

HTRW Field Explorations. No tasks are anticipated for HTRW field explorations, since the limit of HTRW within the project area is well known and there are no potential areas of contamination known at this time.

### **30AE0 Cultural Resources**

Preliminary cultural resource surveys were conducted in 1979. A determination of eligibility for listing in the National Register of Historic Places and potential impacts by the project were completed. A pedestrian survey of the project's area of potential effects (APE), and National Register evaluations were completed. The results of the analysis concluded that 12 archeological sites were eligible for the National Register of Historic Places and required large scale excavation efforts. In addition, 28 archeological sites needed to be tested for eligibility for inclusion to the register. It is possible that many of these 28 sites would also require large scale excavation efforts. A contractor will be solicited to conduct site-specific investigations to re-identify and re-evaluate the condition of these 40 archeological sites. The resulting report will be reviewed and approved by the Corps. A GIS database of identified cultural resources will be generated for the project. The Corps will review and participate in the development of the Cultural Resources report/EIS to ensure meeting federal requirements for incorporation into the report.

Recognizing that the study area is rich in cultural resources, the tasks to be performed by the Corps's project archeologist include coordination with various interested tribes and the Arkansas State Historic Preservation Officer, negotiation of the required agreements, and development of any needed mitigation plans. As the lead agency, the Corps is responsible for compliance with the National Historic Preservation Act.

The Cultural Resources Studies Task will be conducted in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, 36 CFR 800 "Protection of Historic Properties," and Corps Engineering Regulation 1105-2-100. The Little Rock District will conduct this task in cooperation with the State Historic Preservation Officer (SHPO) and other interested parties. This task will determine the impacts of the alternative plans on historical, architectural, and archaeological resources within the various study areas.

Sufficient archival and field surveys will be conducted to re-identify and re-evaluate the condition of cultural sites within the study's Area of Potential Effect (APE). If project alternatives are found that will have an effect on sites eligible or potentially eligible for the National Register, further consultation with SHPO will occur and the Advisory Council on Historic Preservation (ACHP) and other interested parties will be given an opportunity to

comment. If necessary, the Corps may enter into a Programmatic Agreement with SHPO, ACHP, and a non-Federal sponsor to stipulate ways to avoid or reduce the effects of project alternatives on cultural resources.

The end-product of this task is a detailed report that describes all cultural resources within the APE and assesses the impacts of each project alternative on these resources. The report will also describe the range of additional future evaluation, preservation or mitigation efforts and the associated costs of these studies. The findings of this task will be documented in an appendix to the Environmental Impact Statement.

### **30AF0 Cost Estimate**

The detailed baseline cost estimate in MII, the second generation of Micro-computer Aided Cost Estimating System (MCACES), for the project will be developed. The final cost estimate for the project will be reported using the appropriate work breakdown structure. The Cost Engineering and Support Section will be responsible for performing all work needed to complete this task.

This work will be performed by the Government. The above MII cost estimates for this project will be prepared based on the quantity take-offs for all the design items included in the Scope of Work. The guidance in accordance with Engineering Instructions (EI) Number 01D010, Construction Cost Estimated dated 1 September 1997 will be followed in preparing these estimates. The baseline cost estimate for the project will be fully funded cost estimate based on the project schedule. It will include all Federal and Non-Federal cost for real estate, facility and utility relocations, excavated material disposal and borrow areas, mitigation, construction, engineering and design, and construction management with the appropriate contingencies and inflation associated with each of these through project completion. A design evaluation that requires additional studies as opposed to proceeding with a higher contingency to reduce the uncertainties and improve the estimated cost would require a modification to this scope. The cost engineering work for this project will include MCACES estimates for construction, operation and maintenance, repair, replacement, and rehabilitation for each of the features and development of a construction schedule.

The project will require application of risk analysis methods per current guidance and regulations to develop contingencies for cost and schedule in accordance with CECW-CE (1110) memorandum dated July 3, 2007. This is applicable for all decision documents requiring Congressional authorization for projects exceeding \$40 million.

### **30AH0 Plan Formulation**

Plan formulation includes reviewing and refining the plans selected for study during the reconnaissance phase and other plans developed during the course of the study. Plan formulation will be sufficient to assist with evaluation of alternatives for the EIS and optimization of the authorized plan.

The annual and periodic activities and responsibilities for operating and maintaining (O&M) the completed project will be described and closely coordinated with other requirements (e.g., cost estimates and environmental monitoring). The general magnitude of these activities will be described for all alternatives in detail; however, more detail will be provided for the

alternative(s) recommended for implementation. All requirements of 33 CFR 208 and other Federal regulations specifying operation and maintenance requirements will be clearly described so that Sponsor's future responsibilities will be known.

Plan formulation will ensure that the report is prepared in accordance with ER 1105-2-100, ER 5-7-1, EC 1105-2-206, EC 1105-2-208, P&G, NEPA, and other pertinent engineering, environmental, and economic guidance and regulations. The report will identify and justify the recommended plan, as well as evaluate the locally-preferred plan, if different from the recommended plan.

The following tasks will be accomplished:

Prepare an Assessment of Existing Conditions. A detailed assessment of present conditions will be used as a baseline reference against which future without project and with-project conditions are contrasted.

Develop a formulation approach to be used in forecasting future without and with project conditions.

A forecast will be made of future without-project conditions within the study area. The forecast techniques used to estimate future without-project conditions will be used for the future with-project conditions. Time periods for future-without-project forecasting will be defined for a period of fifty-years.

Objectives and opportunities defined in the reconnaissance analysis for the study area will be used. Overall, objectives will be quantified as defined by the evaluation methods adopted for use in the study.

The physical, economic and institutional constraints will be defined.

Alternative measures or groups of measures for flood control, water supply, recreation and riparian restoration (fish and wildlife enhancement) will be identified, where appropriate and not prohibited, and analyzed in sufficient detail to support the EIS.

Costs and multi-purpose outputs of each alternative will be assessed, where appropriate and not prohibited, in sufficient detail to support the EIS.

The authorized plan will be optimized based on biological and technical merits, costs, ability of measure(s) to meet objectives, NED and NER benefits including recreation, implementability and other factors where appropriate and not prohibited.

Implementation Studies involves determining the financial and legal arrangements required to implement the recommended plans, including methods of financing the project. A financial capability analysis will examine whether or not the Sponsor has the organizational, legal, and financial capability to undertake the required financial obligations for implementing and maintaining the project after it is authorized for construction by Congress.

**Financial Planning.** This subtask will begin with a review of the reconnaissance study assessment of local financial interest and capability. Cost sharing, alternative repayment options for any incidental project purposes, and other financial options will be defined. Two financing plans will be determined, a federally supportable plan and a locally preferred plan. If there is a difference between these two plans, then the Sponsors will be required to pay any cost differential.

**Documentation and Coordination.** A draft and final financial and cost recovery section of the report will be prepared. Analysis and documentation will be reviewed and coordinated.

**Institutional Framework Studies.** This task includes a complete analysis regarding the legal agreements and arrangements that will be required to implement any Corps recommended plan. Legal issues in regards to water rights, required intergovernmental agreements, and the legal framework for implementation will be analyzed and developed to a level of detail sufficient to proceed with a recommended plan. The task includes all coordination, meetings, legal analysis, language development, and documented acceptance of, and agreement to, the Institutional Framework Plan by all required appropriate parties as necessary to achieve implementation of the recommended plan. The following will be accomplished under this task.

Study management includes all study, project, and program activities, in accordance with current guidelines outlined in ER 1105-2-100, ER 5-7-1, EC 5-1-48, EC 1105-2-206 and EC 1105-2-208 providing detailed information for the work done for others, coordinates with Project Management on technical requirements of Engineering Division, establishing study milestones, developing networks to include work activities, task schedules, critical path networks and funding schedules, directing, monitoring, and modifying assigned work items as required and agreed upon by the Sponsor, reviewing results and reports provided by the technical support staff, correspondence, report preparation and review, inter-organization coordination, conference preparation and presentation. Coordinate with the Project Manager involving periodic meetings held with the Sponsors to report on technical issues and the status of the study and in-kind services and credits. Study Management Team meetings will be held on a quarterly basis, or more frequently if necessary.

Study management will ensure that all required tasks and coordination is performed, resulting in the production of a quality report document. Technical coordination and inter-disciplinary planning are the responsibilities of the Study Manager. Study management will monitor the scope and progress of the activities of the study to ensure that the study remains on track, within budget and on schedule, and that any potential impacts on scope, schedule, and cost are fully coordinated with the Executive Committee and resolved. The study manager will ensure that the study is conducted in an open coordination and collaboration process. In addition, the sponsor will be informed on an ongoing basis of the Corps activities and the sponsor will keep the Corps informed of any information that may have a bearing on the study effort. Substantive written, electronic and verbal communications between the COE the sponsor shall be retained for the record. The sponsor shall inform/include the Corps relative to sponsor meetings and activities to the maximum extent. The Corps and sponsors will provide information on activities, meetings, communications, and other matters between the parties in a timely manner.

The Technical Manager will serve as coordinator among the various engineering functions to provide quality assurance, appropriate technical representation and participation in study team meetings, resolve technical issues, and insure products are delivered in a timely manner, manage budgets and schedules, and report on study status.

### **30AJ0 Report Documentation**

Draft Report w/NEPA and ATR. The work will be in accordance with ER 1105-2-100, Chapter 2, EC 1105-2-206, EC 1105-2-208 and ER 110-2-1150, paragraph 10c. Report preparation includes the compilation of all study team products into an initial draft report. The work will include collection and assembly of pertinent data, writing, editing, typing, and drafting the draft and final Reports, Environmental Impact Statement, and related technical documents and appendices.

Policy Compliance Review (concurrent with public Review). The quality control objective is to achieve PED phase documents and services that meet or exceed customer requirements, and are consistent with Corps policies and regulations. This work includes all costs associated with Corps internal technical review of study products to assure that technical products and processes comply with law, policies, regulations and sound technical practices of the involved disciplines. The independent evaluation will focus on whether the technical results of the study are reasonable for reaching a decision on whether there is potential for project implementation.

The guidelines for independent technical review are set forth in the Southwest Division Quality Management Plan, CESWD, and in the corresponding District Quality Management Plan.

Final Report with NEPA. The work will be in accordance with ER 1105-2-100, Chapter 2, EC 1105-2-206, EC 1105-2-208 and ER 110-2-1150, paragraph 10c. Report preparation includes the compilation of all study team products from the initial draft report into a final report. The work will include reviewing, revising, reproducing, and distributing the final Reports, Environmental Impact Statement, and related technical documents and appendices.

All study team members will be involved in the formulation and review of the reports. A Review Conference and two comment periods will be held to assure that all comments and views are incorporated.

This task also includes any possible requirements for additional rewriting, unforeseen technical modifications, reformulation, or documentation as a result of the Washington-level review process, (i.e., submittal of the report to the OMB by the ASA).

ATR Resource - All work will be done in accordance with EC 1105-2-410 Peer Review of Decision Documents. Work will be coordinated with the Southwest Division and the Water Management and Reallocation Planning Center of Expertise. Tasks for the ATR are covered in Chapter XIV Review Plan.

IEPR Resource - All work will be done in accordance with EC 1105-2-410 Peer Review of Decision Documents. Work will be coordinated with the Southwest Division and the Water Management and Reallocation Planning Center of Expertise. Tasks for the IEPR are covered in Chapter XIV Review Plan.

### **30AK0 All Other Studies**

**Real Estate:** The study of the real estate within the study area is of prime importance to the feasibility of environmental restoration and multipurpose project solutions which may involve flood control (if appropriate and not prohibited), recharge and recovery facilities, infrastructure construction, recreation (if allowable), education and interpretation of project features and other related purposes.

Right of Entry Agreements. Right-of-Entry agreements to perform on-site study or testing under this PMP will be executed. This task will be accomplished by the Corps of Engineers and or assigned to the non-federal sponsor.

Real Estate Value Assessment. This subtask will include preparation of preliminary real estate cost estimates for project right-of-way requirements. Areas already under local sponsor control will be considered.

Real Estate Plan. The Real Estate Plan will follow the decision on the “selected plan” and will detail the real estate aspects of the project, unusual or complex real estate issues and their approaches, and a generalized implementation schedule to show that real estate interests can be acquired by the local sponsor prior to project implementation.

Gross Appraisal of Properties. The subtask consist of preparation of a Gross Appraisal of all study area properties for the market value of lands. Real Estate is required to prepare a gross appraisal for the project and works closely with the non-federal sponsor.

Documentation, Coordination. The real estate section of the appendix will provide a summarization of all tasks performed in providing the above information, including text and plates. The real estate task will also include in-house report review, response to comments, and support to the Study Manager and others during the study phase.

Unless specified above, either the Corps of Engineers or the local sponsor may assume responsibility for many of these tasks and subtasks. Some tasks such as overall study coordination of real estate matters and resolution of internal comments, and technical review cannot be delegated to the sponsor.

### **30AM0 Wash Level Approval**

The Washington Level Review (WLR) involves the process for the submittal, assessment and processing of reports to Congress. The details and requirements of the WLR are outlined in ER 1105-2-100.

The WLR begins with receipt of the report and accompanying documents by each Washington echelon and terminates after final written documentation and resolution of the results of the review. All review considerations shall be documented as part of the WLR decision-making process. The 90-day state and agency review and filing of the final EIS with the EPA shall be on-going concurrently with the WLR. Based on the results of the WLR, the District may elect to provide additional information in the report. Such information may be in the form of revised

pages or a supplement to the report. The written documentation prepared by the WLR staff shall indicate revisions made to the report by the District. Such revisions will normally be reflected in the final Report, by the Chief of Engineers, where appropriate to do so.

## CHAPTER IV – ASSUMPTIONS AND CONSTRAINTS

### 1. Assumptions

- Beginning in FY07, Federal funding will be available as needed to meet the scheduled milestones
- Work conducted as part of the 1980 General Design Memorandum will be the starting point for General Reevaluation of the authorized plan
- A waiver from the construction restrictions on any Extraordinary Resource Waterway site will be obtainable to allow construction the dam should one of these sites be selected as the final preferred alternative.
- An Environmental Impact Statement will be required to fulfill NEPA requirements.
- This project is a Water Supply project with incidental ecosystem benefits.

### 2. Constraints

- Water supply for municipal and industrial purposes cannot exceed 90 percent of total project benefits to remain eligible for federal participation; there are different rules for agricultural purposes. This project exceeds that 90% recommendation and is not budgeted through the Corps of Engineers normal budget process.
- Maximum costs of the project are restricted to the level determined by a Section 902 Analysis.
- The authorized project site, Lee Creek, is currently designated as an Extraordinary Resources Waterway under the Arkansas State Water Quality Standards, which prohibits significant physical alterations of the habitat unless certain conditions are met, in which case the ERW designation would be removed.
- Lee Creek is currently designated as an Outstanding Resource Water (ORW) in the state of Oklahoma. The ORW designation prohibits construction of an impoundment on a designated waterway. Oklahoma maintains that this designation would prohibit the construction of dams built outside of the state, in this case Arkansas

## CHAPTER V – GENERAL REEVALUATION STUDY SCHEDULE

### 1. SCHEDULE DEVELOPMENT

All schedules are developed using P2. The network is based upon the tasks that are listed in Chapter III, Scope of Studies. Major milestones that are defined in Attachment C, CESWD Milestone System, are also included in the schedules.

### 2. FUNDING CONSTRAINTS

Funding for the first Fiscal Year of the study is normally limited because of the uncertainty in the initiation or agreement execution date. This constraint has been reflected in the development of the study schedule. Following the first year, an optimum schedule based upon unconstrained funding has been assumed for subsequent Fiscal Years.

### 2. MILESTONE SCHEDULE

#### 3.

Activity ID	Activity Name	Start	Finish	Milestone - Civil Works
106581 Pine Mountain Lake, AR - PED		30-Apr-04 A	9-Jun-15	
106581.00500 Project Management Plan (PMP)		30-Apr-04 A	25-Sep-09	
PMP0020	Start PMP	30-Apr-04 A		CW030
PMP0040	Review e-PMP		30-Jan-09 A	
PMP0050	Approve PMP		25-Sep-09	CW040
106581.30000 Plan, Eng & Des (PE&D)		18-Jan-06 A	9-Jun-15	
106581.30000.30A00 ReEval/PAC Rpt (LRR/GRR)				
106581.30000.30AX0 PE&D Prog & Proj Mgmt		18-Jan-06 A	30-Mar-07 A	
LRR2850	Start GRR	18-Jan-06 A		CW140
LRR2830.01	Receive FY06 Fed Funds		18-Jan-06 A	
LRR2830.02	Receive FY07 Fed Funds		30-Mar-07 A	
106581.30000.30AA0 Engr & Design				
106581.30000.30AA0.1 Surveys				
106581.30000.30AA0.2 Hydrology and Hydraulics				
106581.30000.30AA0.3 Engineering				
106581.30000.30AC0 Environmental		26-Jun-09	17-Jul-14	
LRR2985	EIS contract award		26-Jun-09	
LRR3090	GRR Water Quality Certification		1-Nov-10	CW220
LRR3030	GRR EIS complete		16-Jul-14	CW210
LRR3110	GRR ROD signed		17-Jul-14	CW230
106581.30000.30AB0 Socio/Economics		14-Nov-11	14-Nov-11	
LRR2970.12	Draft Appx Complete		14-Nov-11	
106581.30000.30AD0 HTRW Studies				
106581.30000.30AE0 Cultural Resources				
106581.30000.30AF0 Cost Estimate				
106581.30000.30AG0 Public Involvement				
106581.30000.30AH0 Plan Formulation				

106581.30000.30AJ0 Report Documentation		27-Apr-10	2-Oct-14	
PR1001	ATR Review of Alternative Plans Milestone		27-Apr-10	
LRR3440	Submit Draft LRR/GRR Report		8-Jun-11	CW150
LRR3450	Start GRR Public Review	16-Nov-11		CW250
PR2102	IEPR Draft EIS/GRR issue resolution conf		11-Jul-12	
PR3102	Final Draft EIS/GRR issue resolution conf		7-Apr-14	
LRR3540	Submit Final GRR Rpt		18-Sep-14	CW160
LRR3510	Issue GRR Div Cmdr's Notice		2-Oct-14	CW260
106581.30000.30AK0 All Other Studies				
106581.30000.30AM0 Wash Level Approval		25-May-10	9-Jun-15	
LRR3561	Feasibility Scoping Meeting		25-May-10	CW050
LRR3561.1	Guidance Memo (FSM)		9-Jun-10	CW060
LRR3566	Guidance Memo (Draft Feasibility)		13-Jan-12	CW060
LRR3562	Alternative Formulation Briefing		8-Aug-12	CW190
LRR3562.1	Guidance Memo (AFB)		22-Aug-12	CW060
LRR3580	GRR Report Approval		18-Sep-14	CW170
A1030	Agreement Submittal (PED)		18-Sep-14	CW080
A1040	Agreement Approval (PED)		24-Oct-14	CW090
LRR3600	Submit GRR Chief's Report		17-Nov-14	CW270
A1050	CW Review Board Meeting	31-Mar-15		
LRR3650	GRR Report to Congress		9-Jun-15	CW180
106581.30000.30DNC Value Eng/Mgmt (VE/VM)		28-Feb-12	28-Feb-12	
A3360	Certify VE/VM complete		28-Feb-12	CW290

## CHAPTER VI – GENERAL REEVALUATION STUDY COST ESTIMATE

### 1. BASIS FOR THE COST ESTIMATE

a. The cost estimate is based upon a summation of the costs that were identified for the individual tasks in detailed scopes of work that are included in Chapter III, Detailed Scopes of Work. Study cost estimates include allowances for inflation so that the non-Federal sponsor is fully aware of its financial commitment.

b. Appropriate contingencies and contingency management are not included in the P2 study costs due to metrics set by upper level management. Experience has shown that approximately 20 percent of the study costs should be reserved for activities after the release of the draft report. Contingencies in the amount required to raise the costs of activities after the draft report amount has not been added to the cost estimate.

### 4. GENERAL REEVALUATION STUDY COSTS

Activity ID	Activity Name	Start	Finish	At Completion Total Cost
106581 Pine Mountain Lake, AR - PED		01-Jan-98 A	18-Dec-13	\$5,150,000.00
A1000	Pre P2 Work Items (inactive)	01-Apr-04 A	03-May-04 A	\$0.00
1	Pre P2 Work	01-Apr-04 A	02-Sep-08 A	\$221,426.61
<b>106581.00500</b>	<b>Project Management Plan (PMP)</b>	<b>01-Jan-98 A</b>	<b>25-Sep-09</b>	<b>\$305,917.62</b>
PMP0010	Conduct Prog and Proj Mgt (Pre-GRR)	01-Jan-98 A	03-Jan-05 A	\$200,136.32
PMP0030.1	Complete Draft PMP	01-Feb-08 A	03-Nov-08 A	\$4,299.00
PMP0030	Complete Draft PMP FY07	01-Sep-04 A	03-Nov-08 A	\$101,482.30
<b>106581.30000</b>	<b>Plan, Eng &amp; Des (PE&amp;D)</b>	<b>03-Oct-05 A</b>	<b>18-Dec-13</b>	<b>\$4,612,655.77</b>
106581.30000.30A00	ReEval/PAC Rpt (LRR/GRR)			\$0.00
106581.30000.30AX0	PE&D Prog & Proj Mgmt	03-Oct-05 A	17-Sep-10	\$154,353.37
LRR2851.1	PE&D Prog & Proj Mgt (FY06)	18-Jan-06 A	31-Oct-06 A	\$17,036.16
LRR2851.2	PE&D Prog & Proj Mgt (FY07)	01-Oct-06 A	28-Sep-07 A	\$50,198.08
LRR2851.3	PE&D Prog & Proj Mgt (FY08)	01-Oct-07 A	03-Oct-08 A	\$50,152.29
LRR2850.1	Supervision - Direct Charge FY07	02-Oct-06 A	08-Jan-09 A	\$9,966.84
LRR2851.4	PE&D Prog & Proj Mgt (FY09)	22-Oct-08 A	15-Apr-10	\$27,000.00
<b>106581.30000.30AA0</b>	<b>Engr &amp; Design</b>	<b>02-Sep-08 A</b>	<b>2-Apr-13</b>	<b>\$917,208.19</b>
106581.30000.30AA0.1	Surveys	10-Sep-08 A	2-Apr-13	\$322,428.19
LRR2860.01	H&H X-section Surveys	10-Sep-08 A	30-Oct-09	\$216,499.40
LRR2860.02	Floor Elevation Surveys	14-Dec-09	11-Mar-10	\$74,000.00
LRR2860.03	Design Spot Surveys	17-Nov-09	10-Nov-10	\$23,000.00
LRR2860.05	Real Estate	26-Aug-10	21-Dec-10	\$8,928.80
<b>106581.30000.30AA0.2</b>	<b>Hydrology and Hydraulics</b>	<b>02-Sep-08 A</b>	<b>14-Jun-11</b>	<b>\$289,680.00</b>
LRR2880.01	Research and Gather Existing Data	02-Sep-08 A	23-Apr-09	\$9,640.00
LRR2880.02	Field Tasks	23-Apr-09	18-Jun-09	\$21,150.00
LRR2880.07	Geomorphic Assessment	19-Jun-09	14-Aug-09	\$95,000.00
LRR2880.08	EIS Alternatives Analysis (Other than 1980 Plan)	17-Aug-09	13-Oct-09	\$22,500.00
LRR2880.03	Hydrology	2-Nov-09	2-Nov-09	\$45,000.00
LRR2880.06	Hydraulics	2-Nov-09	8-Dec-09	\$36,000.00

LRR2880.04	Spillway Adequacy Study	9-Dec-09	7-Jan-10	\$13,700.00
LRR2880.05	Reservoir Simulation	8-Jan-10	29-Jan-10	\$9,700.00
LRR2885	H&H Appendix and EIS Reports	17-Aug-09	14-Jun-11	\$36,990.00
106581.30000.30AA0.3	Engineering	16-Oct-08 A	14-Jun-11	\$305,100.00
LRR2872	EIS Alternative Analysis	26-Jan-10	26-Jan-10	\$45,000.00
LRR2890	Design Assistance	26-Jan-10	8-Nov-10	\$121,850.00
LRR2895	Geologic, Material, and Soil Studies	26-Jan-10	8-Nov-10	\$50,000.00
LRR2895.01	Engineering Appendix	10-Nov-10	10-Mar-11	\$33,750.00
LRR2871	Technician Support	02-Feb-09 A	10-Mar-11	\$39,500.00
LRR2890.05	Quantity Calculations	26-Aug-10	14-Jun-11	\$15,000.00
106581.30000.30AC0	Environmental	18-Jan-06 A	29-Jan-13	\$2,300,821.66
LRR2978	Agency Scoping Meeting	18-Jan-06 A	01-Aug-06 A	\$15,255.92
LRR2979	Public Scoping Meeting	18-Jul-06 A	31-Oct-06 A	\$21,493.33
LRR3070	F&W Coord Act Rpt	20-Aug-08 A	23-Apr-09	\$61,350.00
LRR2978.1	Agency Scoping Meeting FY09	26-Oct-09	26-Oct-09	\$21,700.00
LRR2979.1	Public Scoping Meeting FY09	26-Oct-09	26-Oct-09	\$25,200.00
LRR3021	DEIS Public Meeting	14-Jul-11	27-Jul-11	\$23,700.00
LRR2985.1	EIS Contract	20-Aug-08 A	27-Jan-12	\$2,132,122.41
106581.30000.30AB0	Socio/Economics	21-Nov-08 A	30-Jan-13	\$313,400.00
LRR2930	Economic Analysis	23-Apr-09	23-Apr-09	\$1,100.00
LRR2930.3.1	WS Demand Analysis	23-Apr-09	30-Sep-09	\$120,000.00
LRR2930.3	Water Supply Economic Analysis	02-Nov-09	2-Nov-09	\$78,800.00
LRR2970.01	Eval of Existing Conditions	21-Nov-08 A	24-Nov-10	\$25,000.00
LRR2930.3.3	WS Future Availability Analysis	10-Dec-10	10-Dec-10	\$30,000.00
LRR2970	Economic Appendix	19-Sep-11	30-Jan-13	\$58,500.00
106581.30000.30AD0	HTRW Studies	8-Oct-09	21-Oct-10	\$25,000.00
LRR3171	Framework Research	8-Oct-09	8-Oct-09	\$25,000.00
106581.30000.30AE0	Cultural Resources	16-Sep-08 A	24-Jun-11	\$801,797.55
LRR3210	Cultural Resources LOE	16-Sep-08 A	24-Jun-11	\$801,797.55
106581.30000.30AF0	Cost Estimate	26-Aug-10	21-Oct-11	\$71,500.00
LRR3320	Project/OMRR&R Cost Est	26-Aug-10	10-Nov-10	\$35,200.00
LRR3315	EIS Alternatives Cost Estimate	15-Jun-11	13-Sep-11	\$16,300.00
TR2000	ITR by Walla Walla	15-Jun-11	21-Oct-11	\$20,000.00
106581.30000.30AG0	Public Involvement	03-Apr-06 A	21-May-09	\$0.00
106581.30000.30AH0	Plan Formulation	18-Jan-06 A	27-Dec-11	\$113,725.00
LRR3410	Plan Formulation	23-Apr-09	15-Jun-11	\$88,725.00
LRR3412	GIS Support	18-Jan-06 A	27-Dec-11	\$25,000.00
106581.30000.30AJ0	Report Documentation	23-Apr-09	16-Apr-13	\$335,850.00
RES1000	ATR Resource	23-Apr-09	23-Apr-09	\$50,000.00
RES2000	IEPR Resource	23-Apr-09	23-Jun-11	\$200,000.00
LRR3530	Final Report w/NEPA	5-Feb-13	2-Apr-13	\$85,850.00
106581.30000.30AK0	All Other Studies	27-Oct-09	25-Jan-10	\$0.00
106581.30000.30AM0	Wash Level Approval	19-Jun-09	18-Dec-13	\$50,000.00
LRR3570	Final Policy Compl Review	20-Jul-12	16-Aug-12	\$50,000.00
106581.30000.30DNC	Value Eng/Mgmt (VE/VM)	29-May-09	3-Aug-09	\$30,000.00
A3350	VE/VM	29-May-09	29-May-09	\$30,000.00

## CHAPTER VII – WORK BREAKDOWN STRUCTURE

The project WBS is included in P2.

## **CHAPTER VIII – QUALITY CONTROL PLAN**

### **1. QUALITY CONTROL PLAN OBJECTIVE**

The quality control objective is to achieve products, documents, and services that meet or exceed customer requirements, and are consistent with Corps policies and regulations.

### **2. GUIDELINES FOLLOWED FOR TECHNICAL REVIEW**

The guidelines for independent technical review are set forth in the Southwest Division Quality Management Plan, and in the SWL Quality Management Plan, Chapter VIII..

### **3. DOCUMENTS TO BE REVIEWED AND SCHEDULE FOR REVIEW ACTIVITIES**

a. All of the products of the tasks listed in the detailed scopes of work in Chapter III, Scope of Work, will be subject to independent technical review. Seamless Single Discipline Review will be accomplished prior to the release of materials to other members of the study team or integrated into the overall study. Section chiefs shall be responsible for accuracy of the computations through design checks and other internal procedures, prior to the independent technical review.

*ATR Checklists will be developed at a later date.*

b. Independent product review will occur prior to major decision points in the planning process at the CESWD milestones so that the technical results can be relied upon in setting the course for further study. These products would include documentation for the CESWD mandatory milestone conferences (GRR Scoping Meeting), HQUSACE issue resolution conferences (AFB & IRC) and the draft and final reports. These products shall be essentially complete, with supporting appendices, before review is undertaken. Since this quality control will have occurred prior to each milestone conference, the conference is free to address critical outstanding issues and set direction for the next step of the study, since a firm technical basis for making decisions will have already been established. In general, the independent technical review will be initiated at least two weeks prior to submission of documentation for a CESWD mandatory milestone conference and at least two weeks prior to the submission of documentation for a HQUSACE issue resolution conference. The ITR team for this project will include the following members:

c. For products that are developed under contract, the contractor will be responsible for quality control through an independent technical review. Quality assurance of the contractor's quality control will be the responsibility of the district.

### **4. DEVIATIONS FROM THE APPROVED QUALITY MANAGEMENT PLAN**

No deviations to the approved quality management plan have been made.

## **5. COST ESTIMATE FOR QUALITY MANAGEMENT**

The costs for conducting independent technical review are included in the individual scopes of work that are included in Chapter III, Scope of Work. Quality management activities of Branch and Division Chiefs are included in Supervision and Administration.

## **6. PMP QUALITY CERTIFICATION**

The Chief, Planning and Environmental Office has certified that 1) the independent technical review process for this PMP has been completed, 2) all issues have been addressed, 3) the streamlining initiatives proposed in this PMP will result in a technically adequate product, and 4) appropriate quality control plan requirements have been adequately incorporated into this PMP.

## **7. REVIEW CERTIFICATION**

The certification requirement applies to all documentation that will be forwarded to either CESWD or HQUSACE for review or approval. The Chief, Planning and Environmental Office will certify the pre-conference documentation for the HQUSACE issue resolution conferences and the draft report. The final report, which includes the signed recommendation of the District Commander, will be certified by the District Commander. This certification will follow the example that is included as Appendix H of the CESWD Quality Management Plan and will be signed by the Chief, Planning Division, and the District Commander.

## **8. IEPR and ATR**

The IEPR and ATR will be conducted according to the Review Plan in Chapter XIV and EC 1105-2-410 "Review of Decision Documents", dated August 22, 2008.

## CHAPTER IX – RISK MANAGEMENT

### **Purpose:**

The purpose of the Risk Management Plan is to provide a systematic process of identifying, analyzing, and responding to risk for the entire project life cycle. This will be accomplished by the PDT through creation of a Risk Management Matrix which will be reviewed on a regular basis per the Communications Plan (i.e. PDT meetings). When a project is determined to be other than low-risk, the risk must be identified, and associated control procedures defined in the PMP. Only the responsible district or division Commander may provide final PMP approval in the event of an overall project risk rating of high, or extremely, high, respectively.

### **Background:**

USACE, as part of its vision of becoming One Corps, Acting Virtually, in a Learning Organization, is standardizing its processes world-wide. The USACE Process and Reference used in development of this Risk Management Plan is: [Risk Management Plan - REF8007G](http://www.hnd.usace.army.mil/p2/tutor/ref8007G.htm)  
<http://www.hnd.usace.army.mil/p2/tutor/ref8007G.htm>

### **Risk Management Matrix Development Procedure:**

The procedure for completing the Risk Management Matrix is as follows:

1. Quality Objective Identification Phase:

2. Risk Identification Phase: Next the team will use a brainstorming technique to identify all risks associated with each of the quality objectives. The team may then break into smaller teams to categorize the risks into risk types.

- If preferred alternative is designated as an ERW, conditions outlined in Regulation 2.310 must be met or the project would not be allowed by the State of Arkansas.
- The project cost and schedule could be negatively impacted if federal priorities do not allow funding to keep pace with the established execution schedule.
- Stakeholder opposition could generate lawsuits resulting in delays and legal fees.
- Stakeholder requirements could generate additional alternatives to be considered and increasing cost and delaying completion.
- Weather delays to fieldwork schedule.
- Contractors may not be able to perform contracted work according to the budgeted cost and schedule.
- Lack of response by property owners to the economic flood damage reduction survey may require door-to-door contact, which could increase cost and schedule.
- Agencies from both Oklahoma and Arkansas may not support the authorized plan.
- Oklahoma communities that are not part of the RVRWD may not support the authorized plan.
- Significant design changes may be necessary to meet current dam safety and security requirements, which could increase costs and reduce net benefits.

3. Risk Analysis Phase: Risks are reviewed and risks are categorized into groupings for further assessment and evaluation. The risks are evaluated for “Impact” and for “Probability of Occurrence”. A Risk Rating is performed using these parameters (*see Attachment: Methodology for Rating Risk Elements on Risk Identification Matrix*).

4. Risk Management Phase: Risk responses (accept, avoid, or mitigate) are developed for the risks along with actions to be taken.

5. Risk Identification Matrix: The team completes a risk matrix (*see Attached sample: Risk Identification Matrix*) with all of the information developed in the previous phases.

6. The PDT determines how frequently the risk management actions should be reviewed and the risk review activity should be scheduled and documented in the Communications Plan and added as milestones to the schedule. The team should review this risk matrix with identified actions on a regular basis to add additional items as they become apparent and ensure the actions to mitigate the risks are being carried through. The risk matrix should be appended to the ‘living’ project management plan (PMP).

7. If a PDT member identifies a potential risk, they can complete a Risk Analysis Sheet to the PM. The PM will coordinate this with the PDT per the Communications Plan and assign appropriate action items to mitigate the risk. (see attached Risk Analysis Form)

**Methodology for Rating Risk Elements**  
**On Risk Identification Matrix**

**Weights for Impacts – I:**

**Negligible- N = 1**

An event which, if it occurred, would have *no effect* on the program.

**Minor- Mi = 2**

An event which, if it occurred, would cause only a *small cost/schedule increase*. Requirements would still be achieved.

**Moderate- Mo= 3**

An event which, if it occurred, would cause *moderate cost/schedule increases*, but requirements would still be met.

**Serious- S = 4**

An event which, if it occurred, would cause *major cost/schedule increases*. Secondary requirements may not be achieved.

**Critical- C = 5**

An event which, if it occurred, would cause *program failure* (inability to achieve minimum requirements.)

**Weights for Probability of Occurrence- Po:**

**0-10% = 1** Very unlikely to occur.

**11-40% = 2** Unlikely to occur.

**41-60% = 3** May occur about half the time.

**61-90% = 4** Likely to occur.

**91-100% = 5** Very likely to occur.

**Risk Ratings – I x Po:**

**High- H = 18 – 25**

**Medium- M = 9 – 17**

**Low- L = 1 - 8**

In addition to the requirements of the program-level risk management plan, the following

<b>ID:</b>	<b>Date Identified:</b>
<b>WBS Item:</b>	<b>Risk Statement:</b>
<b>Severity:</b>	<p><i>[This is a simple statement of what the risk is. Examples:</i></p> <ul style="list-style-type: none"> <li>• A new technology is being used for some aspect of the project, what is the risk associated with the technology failing or not working as expected?</li> <li>• On a horizontal construction project such as steam or sewer lines, there's a risk of running into unidentified underground utilities. What are the implications?</li> <li>• A barracks renovation is timed for completion to support a currently deployed battalion. There's no place else to house the troops on-post if the schedule slips. What are the implications?</li> <li>• On a lock project, there's a risk of the cofferdam being overtopped. What are the risk(s) and implications?]</li> </ul>
<b>Probability:</b>	
<b>Originator:</b> <i>[Who identified it?]</i>	
<b>Owner:</b> <i>[Who is responsible for managing the risk?]</i>	
<b>Context:</b> <i>[What's the background for this? How did we get to this point?]</i>	
<b>Trigger:</b> <i>[What will trigger this risk?]</i>	
<b>Risk Response:</b> Accept?    Avoid?    Mitigate? <ul style="list-style-type: none"> <li>• ACCEPT <i>[If we <b>accept</b> the risk, do we need a contingency plan or some other response? If we accept, is the customer ready to get additional funds or delay schedule or other response, if that's appropriate?</i></li> <li>• AVOID <i>[If we can <b>avoid</b> the risk, describe how we avoided it. Did we eliminate the threat or cause? Choose alternatives?]</i></li> <li>• MITIGATE <i>[If we <b>mitigated</b>, what did we do? Reduce the probability of occurrence of the event? Did we change the approach such as off-loading the risk through insurance or other</i></li> </ul>	

<i>means? Did we set up an additional amount of management reserve to cover identified eventualities?]</i>		
<b>Risk Control:</b> <i>[Will workarounds be required? Corrective actions in mid-stream? Implementation of a contingency plan?]</i>		
<b>Status:</b> <i>[Specify the date of last review of this risk and what the PDT did at that point.]</i>		
<b>Lesson(s) Learned:</b> <i>[If there is a lesson applicable to other projects, document here and feed back through the Observations/Suggestion process of the PMBP Manual.]</i>		
<b>Approved by:</b> <i>[Approving Official signs off and dates in this block.]</i>	<b>Closing Date:</b>	<b>Closing Rationale:</b>

### Risk Identification Matrix

Requirement (Threshold)	Risk	I	Po	R	Manage/Mitigate

**I = Impact: Negligible – N; Minor – M; Moderate – Mo; Serious – S; Critical – C;**  
**Po = Probability of Occurrence: 0-10%; 11-40%; 41-60%; 61-90%; 91-100%**  
**R = Rating: High – H; Medium – M; Low – L**

### Risk Identification Matrix

Requirement (Threshold)	<i>Risk</i>	<i>I</i>	<i>Po</i>	<i>R</i>	<i>Manage/Mitigate</i>

**I = Impact: Negligible – N; Minor – M; Moderate – Mo; Serious – S; Critical – C;**  
**Po = Probability of Occurrence: 0-10%; 11-40%; 41-60%; 61-90%; 91-100%**  
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### Risk Identification Matrix

Requirement (Threshold)	<i>Risk</i>	<i>I</i>	<i>Po</i>	<i>R</i>	<i>Manage/Mitigate</i>

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**Po = Probability of Occurrence: 0-10%; 11-40%; 41-60%; 61-90%; 91-100%**  
**R = Rating: High – H; Medium – M; Low – L**

## Risk Identification Matrix


**I = Impact: Negligible – N; Minor – M; Moderate – Mo; Serious – S; Critical – C;**

**Po = Probability of Occurrence: 0-10%; 11-40%; 41-60%; 61-90%; 91-100%**

**R = Rating: High – H; Medium – M; Low – L**

## CHAPTER X – COMMUNICATIONS MANAGEMENT

This section of the PMP assures that all work preformed is accomplished according to the Project Management Business Processes as detailed in ER 5-1-11. Consistent with these guidelines, the PM is responsible for providing the key communication role in managing the project scope, quality, cost, budget and schedule; facilitating actions to resolve potential or existing issues, and reporting the status, delays, and change in scope of the project to clients and higher authorities. A communications plan is being developed as part of the overall activities. It identifies the project stakeholders, and the Communication Strategy to be used during the course of this study. The strategy includes the communication methods, frequency of communication, and types of information being conveyed to the stakeholders and the public in general.

Effective communication is critical to the meaningful exchange of ideas, desires, requirements and plans. In order to fully understand the needs and expectations of customers, partners and stakeholders, the PDT must practice effective communications techniques, with emphasis on listening. Better listening leads to better understanding and better service.

Communication Principles: Throughout the lifetime of the project, the following communication principles will be followed:

- Listen to all constituencies both inside and outside USACE regarding issues of importance to them, respecting their viewpoints. Seek opportunities for synergy.
- Communicate early, clearly, completely, honestly, accurately and often with all constituencies on issues of importance.
- Incorporate communication as an integral part of the project management business process.
- Be accessible to all constituencies and respond promptly without censorship or misinformation.
- Proactively inform the public and other constituencies of the Corps' vital role in areas where we have special expertise.
- Do what we say we will do.

Communication Strategy: Communication will occur at several levels on this project.

First, regular meetings will be held with members of the PDT to ensure that the project is progressing as planned. Other meetings will be held to work out details specific to each discipline.

Secondly, developments on the project will be reported monthly to the PRB. This will allow not only include an update on the project status but also provides a forum for the resolution of major issues. It will also serve as an opportunity to collectively look ahead and anticipate issues that might potentially cause problems.

The PM will attend the quarterly board meetings of the River Valley Regional Water District (the sponsor) to provide project updates and obtain sponsor input and feedback throughout the study process.

The PDT needs to be **proactive** rather than **reactive** on this project. Every member of the PDT will have the authority to call a meeting at any time (i.e. it does not require an action by the PM). This encourages communication rather than provide discouragement.

PDT Roles and Responsibilities: for communications on the project shall be as follows:

- District Engineer (DE) - is ultimately responsible for all that happens or fails to happen on the project. The DE shall receive regular reports through the monthly Project Review Board (PRB) briefings and on an as needed basis throughout the course of the project. Any issue that threatens the success of the project should be brought to the DE's attention. At his discretion the DE may choose to communicate directly with the customer or other stakeholders when sensitive issues arise.
- Public Affairs Officer (PAO) - shall be responsible for managing all media relations and outreach. All media queries shall be directed to the PAO.
- Project Manager (PM) - is responsible for providing leadership to the PDT and facilitating communications among team members. Additionally the PM assures customer involvement throughout the process and ensures mutual understanding of the customer's role in project success. The PM is the District's primary interface with the customer for the project. So that the organization speaks with one voice the PM coordinates all matters relating to the project, and ensures that the customer's requirements are conveyed and understood. The PM will encourage and facilitate team members in communicating directly with the customer organization on issues related to execution of their specialty area of the project. It is critical that individual PDT members keep the PM and other PDT members informed of issues, customer concerns and circumstances of the project. The PM shall be responsible for keeping an updated list of contacts and interested parties as an appendix to this document.
- Study Manager (SM) – reports critical problems and activities to the PM as necessary to maintain the team mission. The SM has responsibility for disseminating project information to the study team. The SM also provides guidance to the study team to ensure planning objectives are achieved and evaluation criteria are addressed.
- Biologist – reports critical problems and activities related to the Environmental Impact Statement to the SM.
- Design Coordinator (DC) – reports critical problems and activities to the PM as necessary to maintain the team mission. The DC has responsibility for disseminating project information to in-house engineering staff and technical reviewers. On projects where Architect-Engineer firms (A-E) are contracted to provide engineering services the DC shall manage all communications with the A-E.
- Contracting Officer (CO) - is responsible for issuing the Invitation for Bids (IFB) or Request for Proposal (RFP) Documents to potential contractors. After the award of the contract the all communications with the contractor shall be directed through the CO.

The PM is responsible for ensuring the project is established promptly in P2 and CEFMS, and verifying that the project work item has been created.

## CHAPTER XI – CHANGE MANAGEMENT

The management of this project will be accomplished under the methods and procedures of the Project Management Business Processes as detailed in ER 5-1-11 (REF8009G – Change Management Plan). Consistent with these guidelines, the PM is responsible for managing the project scope, quality, cost, budget and schedule; facilitating actions to resolve potential or existing issues, and reporting the status of the project to clients and higher authorities. Sponsors will have a degree of decision-making authority on the project.

Changes to this project may occur at any time or point in the study process. Changes may be requested by various stakeholders including:

1. Internal PDT Members:
2. District Leadership
3. Sponsor
4. Division/Headquarters

The PM serves as the principle responsible authority for project change coordination. Consistent with ER 5-1-11, all change requests should be made using the change request form. All change requests that increase overall costs, create schedule delays, or reduce project quality must be approved by the SWL Project Review Board. The customer will be notified before a change request is submitted to the PRB. The PM will review the change request, verify impacts, and determine the appropriate approval authority. Contingency reserves for costs and schedule have been created to assist with managing project risks associated with unknowns. The PM has the authority to utilize reserves to make changes needed to manage project risks.

## Pine Mountain Change Request Form

Date:

Requested by:

Request No.:

Request
<b>Change Description:</b>
<b>Justification:</b>
<b>Narrative Description of Impact:</b>
<b>Scope Impact:</b>
<b>Cost Impact:</b>
<b>Quality Impact:</b>
<b>Schedule Impact:</b>
<b>Risk Impact:</b>
Coordination
<b>Team:</b>
Resolution of Change
<input type="checkbox"/> Approved <input type="checkbox"/> Disapproved
<b>Basis of Action:</b>
<b>PM Signature:</b>

## CHAPTER XII – ACQUISITION STRATEGY

The Project Manager (PM) is responsible for the evaluating the available resources. Team members are responsible for assisting the PM in developing an acquisition strategy based on time frames, workload, and availability of specialized persons. Resource providers may assist the project's team members to determine the work delegation for the project. Supervisors and project team members have the additional responsibility of identifying work conflicts with other projects. Program Managers have the final responsibility for identifying and outlining contracting needs. The acquisition strategy for this project is still under development. Initial plans for contract support include the following activities:

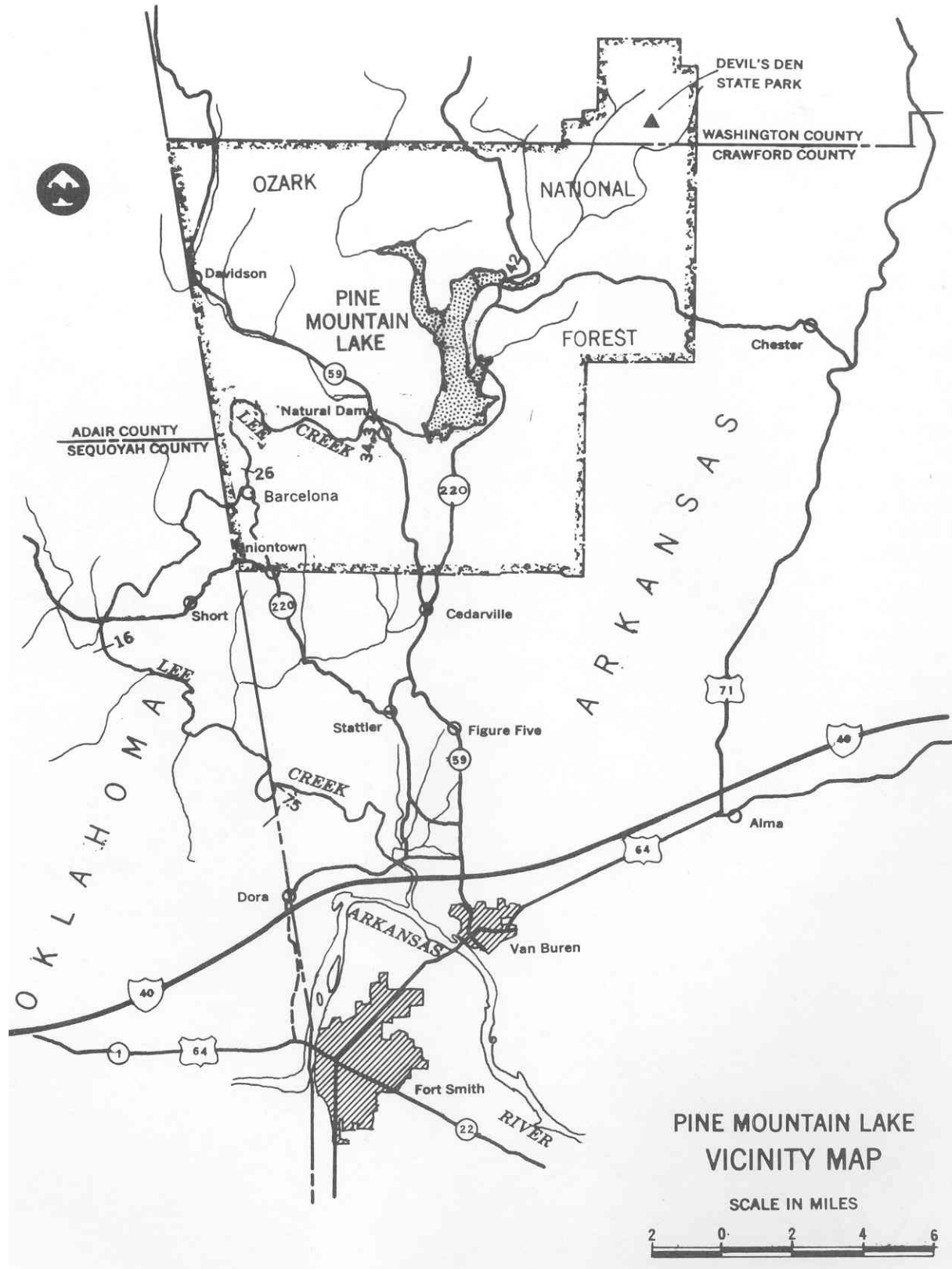
- Water Demand Analysis (Economic)
- Recreation Survey (Economic)
- H&H cross-section surveys
- Sediment Sampling
- Water Quality Sampling
- Cultural Resources Surveys

## **CHAPTER XIII – SAFETY AND OCCUPATIONAL HEALTH**

All work will be performed according to the District Safety Plan that follows the Corps Safety Manual, EM 385-1-1. The safety policy of the District is to provide a safe and healthful work environment for all employees and contractors.

## CHAPTER XIV –REVIEW PLAN

**ATTACHMENT A - PROJECT AREA MAP**



DESIGN QUALITY CONTROL PLAN (DQCP)

(COMPLEX PROJECT)

Pine Mountain Lake  
Project

Crawford County, Arkansas  
Installation or Location

\_\_\_\_\_  
Programmed Amount (PA)

\_\_\_\_\_  
Funds Source

1. Management Philosophy - Recognizing that quality is achieved by individuals performing work functions carefully and in conformance with requirements, the intent and purpose of this Design Quality Control Plan (DQCP) is to set forth specific procedures for planning, coordinating, developing, checking, reviewing, and scheduling. Adherence to these procedures will ensure the development of high quality design efforts that are consistent with Corps of Engineers standards of quality.

2. Management Approach - These specific procedures will primarily focus on the establishment of a design team whose skills correspond to those needed for this project and the processes to ensure quality is designed into the project. A Design Coordinator and Lead Designers have been selected to coordinate procedures, interpret criteria and directives to designers and technicians, accomplish quality control reviews at appropriate times, and ensure communication is maintained within the design team and upper levels of management in the District..

3. Management Structure - The management of the projects will be in accordance with the Detailed Scopes of Work (Chapter 3 of the PMP). A brief outline of each team member's duties, as related to quality, is as follows:

a. Design Coordinator (DC) - The DC shall influence quality by ensuring the team members follow the requirements of the DQCP. In addition, the DC ensures continuity throughout the project and stresses responsibility of the team rather than individuals. During construction, the DC shall participate in Partnering and prepare and maintain a log to track Requests for Information.

b. Lead Designers (LD) - The LD is expected to influence quality more than the other design team members because of direct involvement in design.

4. Scheduling - A design schedule showing the sequence of events involved in carrying out the design tasks has been developed by the Project Manager (PM) and DC. It is issued separately but shall be considered part of this DQCP. The designer review and correction periods have been clearly shown. Dates of all critical events are shown. The schedule will be updated as required to ensure adequate internal review. Schedules must be updated/ extended when funds are delayed or significant other delays (environmental problems) are encountered. .

5. Cost Control - The Design Coordinator and Lead Designers will monitor the design costs and product costs of each discipline as work progresses. The amount of time that was allocated at the start of the project for each discipline will also be closely monitored to ensure that the total costs are within the budget. When one discipline needs more money, then the team will review all other disciplines to determine if the funds should be reallocated. Should additional funds be

required, then the team will advise the Design Coordinator, who then advises the Project Manager. If necessary, the Project Manager will acquire more funds from the user.

6. Communications - This is one of the most important parts of total quality management. To ensure that communication exists on the team, meetings will be held regularly and at all major milestones in the schedule of work. Any team member can request a meeting of the team when he or she has a question or needs information. Team meetings will be documented by Memorandum for Record (MFR) and will note customer input.

7. Checklists and Certifications - The following checklists will be utilized to document design quality control and design quality verification actions.

a. At the completion of the 15 percent, 30 percent, 60 percent, and 90 percent design stages, the design team will meet to conduct a design coordination review. These meetings will always be conducted at the above design stages and may or may not correspond to the specified review submittal phases. The lead designers will certify that all required actions and checks have been performed for each design stage.

b. During the review periods, each designer's work will be reviewed by a senior engineer or architect or his/her immediate supervisor. A discipline specific checklist will be used where appropriate.

c. The performance of any AE that provided services on a project will be completed by the Design Coordinator in Doctor Checks.

d. The comments will be reviewed by the section chief for adequacy for the particular project, the D.C. and the section chief will sign the documents initially and finally when the checklists have been completed at the end of the design process.

e. A copy of the DQCP and checklists will be maintained on the LAN as a resource for others at M:\Eng Shared\E&C QMP\DQCP and Checklist Samples\. A hard copy signed document will be retained in the D.C.'s file.

8. Independent Review - All phases of the design will be reviewed by the independent reviewers. The main focus of the independent review team will be interdisciplinary coordination, specification completeness and compatibility with the drawings, cost estimate accuracy in quantities, and functionality review.

9. Project Feedback

a. Each primary designer will make field visits during construction, documented by a brief report and included as part of the DQCP. Coordination of the visits and review of the reports will be accomplished by the Design Coordinator.

b. A Lessons Learned file has been established for ongoing input of items. This document is read prior to the start of any project for past problems to be avoided. It is the responsibility of the Section Chief to update the Lessons Learned Document and the DC to ensure a copy is distributed prior to project start-up.

c. A consolidated database of Lessons Learned can be found on the CESWD Intranet site at: <https://kme.usace.army.mil/ELL/Pages/ELLMain.aspx>

## ATTACHMENT C LIST OF ACRONYMS

AFB	Alternative Formulation Briefing
ASA (CW)	Assistant Secretary of the Army for Civil Works
CESWD	Southwest Division (also SWD)
DE	Division Engineer (Division Commander)
EA	Environmental Assessment
EC	Engineering Circular
EIS	Environmental Impact Statement
EP	Engineering Pamphlet
ER	Engineering Regulation
FONSI	Finding of No Significant Impact
H&H	Hydrology and Hydraulics
HQUSACE	Headquarters, U.S. Army Corps of Engineers
HTRW	Hazardous, Toxic and Radioactive Waste
MSC	Major Subordinate Command
NED	National Economic Development
NEPA	National Environmental Policy Act
OMRR&R	Operation, Maintenance, Repair, Replacement, and Rehabilitation
P&G	Water Resources Council's Principles and Guidelines
PED	Planning Engineering and Design
PMP	Project Management Plan
PPMD	Programs and Project Management Division
PMP	Project Management Plan
ROD	Record of Decision
S&A	Supervision and Administration
SWD	Southwest Division (CESWD)
USACE	U.S. Army Corps of Engineers
USF&WL	U.S. Fish and Wildlife Service
WRDA	Water Resources Development Act

**ATTACHMENT D**  
**STUDY FUNDING SCHEDULE**  
**PINE MOUNTAIN DAM**  
**PROJECT MANAGEMENT PLAN**  
**BUDGET BREAKDOWN BY FY in 2009**

<b>FY 10:</b>		
Federal Cash:		\$1,900,000
<b>FY 11:</b>		
Federal Cash:		\$310,000
<b>FY 12:</b>		
Federal Cash:		\$575,000
<b>FY 13:</b>		
Federal Cash:		\$245,000
<b>FY 14:</b>		
Federal Cash:		\$50,000
<b>TOTALS:</b>		
Federal Cash:		\$3,444,000

Total Received as of Apr 09 \$1,709,965

**ALL AMOUNTS SUBJECT TO AVAILABILITY OF FUNDS THROUGH NORMAL APPROPRIATIONS AND BUDGETARY PROCESS, FEDERAL AND NON-FEDERAL.**