

# PROJECT MANAGEMENT PLAN

JOHN REDMOND DAM AND RESERVOIR, KANSAS  
WATERSHED FEASIBILITY STUDY

PROJECT MANAGER: Cynthia Kitchens

SPONSOR: Kansas Water Office

Prepared by  
Tulsa District  
U.S. Army Corps of Engineers

September 2006

The attached Project Management Plan for the John Redmond Dam and Reservoir, Kansas, Watershed Feasibility Study has been reviewed and is hereby approved [with consensus of the Corporate Board].

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Approved  
Miroslav P. Kurka  
District Commander  
Chairman

**ENDORSEMENTS**

The John Redmond Dam and Reservoir, Kansas, Watershed Feasibility Study Project Management Plan has been reviewed and approved as indicated below:

<u>Sponsor</u>	<u>Date</u>
Kansas Water Office _____	_____

Board Members

Miroslav P. Kurka  
District Engineer, Chairman \_\_\_\_\_

John H. Roberts  
Deputy for Programs and Project Management \_\_\_\_\_

Jim Bodron  
Chief, Civil Works Branch, PPMD \_\_\_\_\_

Ralph Hight  
Chief, Engineering and Construction Division \_\_\_\_\_

Ross Adkins  
Chief, Public Affairs \_\_\_\_\_

Steve Peterson  
Chief, Information Management Office \_\_\_\_\_

John Roselle  
District Counsel \_\_\_\_\_

Billy Banks  
Chief, Operations Division \_\_\_\_\_

Susan Haslett  
Chief, Planning & Envr. Division \_\_\_\_\_

Diane Fortelka  
Chief, Resource Management Office \_\_\_\_\_

Steve Zeltner  
Chief, Real Estate Division \_\_\_\_\_

Rick Hedrick  
Chief, Contracting Division \_\_\_\_\_

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## PROJECT MANAGEMENT PLAN

### JOHN REDMOND DAM AND RESERVOIR, KANSAS WATERSHED FEASIBILITY STUDY

#### SECTION 1. - INTRODUCTION

**1.0. GENERAL.** This Project Management Plan (PMP) was prepared in accordance with Engineering Regulation (ER) 5-1-11, dated 17 August 2001; Engineering Circular (EC) 1105-2-208, dated December 1994; and ER 1105-2-100, dated April 2000. The PMP was developed in cooperation with the sponsor, the Kansas Water Office, and describes the scope, schedule, and budget for accomplishing the feasibility study tasks. The purpose of the feasibility study is to evaluate aquatic ecosystem restoration, wetland and riparian restoration and protection, and source water protection measures in the watershed of John Redmond Dam and Reservoir, Kansas.

The Water Resources Development Act of 1986 mandated cost sharing and reporting requirements. As a part of accountability requirements, the U.S. Army Corps of Engineers adopted Project Management that has become a standard within the private sector as a means of providing a quality product on time and within budget.

An important element of Project Management is the development of a PMP of which this is the first iteration. The PMP is a working document that can be used as a guide to help facilitate development and subsequent completion of the feasibility study. The purpose of the PMP is to ensure that both the Federal Government and the non-Federal proponent are aware of and in agreement with such items as project scope, schedule, cost, and treatment of contingencies, where applicable. The study will be executed through compliance with Corps of Engineers regulations, as well as Federal, State, and local laws.

**1.1. PROJECT BACKGROUND.** The John Redmond Dam and Reservoir project was authorized by the Flood Control Act of 1950, approved 17 May 1950; Public Law 81-516a, House Document 442, 80<sup>th</sup> Congress, 2d Session. At the top of the conservation pool, the lake has a surface area of 8,084 acres. The lake's watershed covers 3,015 square miles. Project construction began in June 1959. The project was completed for full flood control operation in September 1964. All major construction was completed in December 1965. John Redmond Dam and Reservoir is

an important water supply source for the state of Kansas and is used by Kansas to operate their State Water Marketing Program and the Neosho-Cottonwood Water Assurance District which supplies water for municipal and industrial purposes. This watershed feasibility study will identify effective restoration and maintenance measures that will ensure long-range availability of habitat, storage capacity and ecosystem function within the John Redmond Dam and Reservoir and watershed.

**1.2. STUDY AUTHORIZATION.** The study authority for this feasibility study is the Flood Control Act of 1965 (Public Law 89-298). Section 208 of this act reads in part:

*"The Secretary of the Army is hereby authorized and directed to cause surveys for flood control and allied purposes, including channel and major drainage improvements, and floods aggravated by or due to wind or tidal effects, to be made under the direction of the Chief of Engineers, in drainage areas of the United States and its territorial possessions which include the localities specifically named in this section. ... Grand (Neosho) River, Oklahoma and Kansas (including navigation)."*

Congress has provided funding for this study by the Consolidated Appropriations Resolution in 2003, Public Law 108-7.

The John Redmond Dam and Reservoir, Kansas, reconnaissance study was conducted under Section 216 of the Flood Control Act of 1965, as a part of the Neosho River Basin Kansas Section 905(b) Analysis. The John Redmond Dam and Reservoir watershed area is generally defined as the upper basin of the Neosho River. This watershed area includes 3,015 square miles of drainage area and contains two other Federal reservoirs: Marion Reservoir (on the Cottonwood River) and Council Grove Lake (on the Neosho River). The 905(b) Analysis developed the necessary documentation to recommend initiation of a feasibility study for John Redmond Dam and Reservoir watershed. The study area differs from the general definition of the John Redmond Dam and Reservoir watershed by excluding the watershed areas of Marion Reservoir and Council Grove Lake, resulting in a watershed area of 2,500 square miles.

**1.3. PRIOR STUDIES AND REPORTS.** The following reports were reviewed as part of the Section 905(b) Analysis phase:

1.3.1. The Kansas Water Plan, Fiscal Year 2003 (and basin supplements).

1.3.2. Kansas Water Office, Neosho River Basin Reconnaissance Study, Priority Issues, Draft 2003.

- 1.3.3. Kansas River and Stream Corridor Management Guide by the Kansas State Conservation Commission, undated, circa 2000.
- 1.3.4. Channel-Bed Elevation Changes Downstream from Large Reservoirs in Kansas, Water Resources Investigation Report 01-4205, United States Geological Survey, Kyle E. Juracek.
- 1.3.5. Geomorphic Effects of Overflow Dams on the Lower Neosho River, Kansas, Water Resources Investigation Report 99-4147, United States Geological Survey, Kyle E. Juracek.
- 1.3.6. Compilation and Review of Completed Restoration and Mitigation Studies in Developing an Evaluation Framework for Environmental Resources, Volume I, by Timothy D. Feather, Donald T. Capan - IWR Report 95-R-4, April 1995.
- 1.3.7. Compilation and Review of Completed Restoration and Mitigation Studies in Developing an Evaluation Framework for Environmental Resources, Volume II, by Timothy D. Feather, Donald T. Capan - IWR Report 95-R-5, April 1995.
- 1.3.8. National Review of Corps Environmental Restoration Projects, by Joy D. Muncy, Dr. J. Craig Fischenich, E. A. Dardeau - IWR Report 96-R-27, Investments Research Program November 1996.
- 1.3.9. Effects of Photoperiod on Behavior and Courtship of the Neosho madtom (Noturus placidus), by Angela G. Bulger, Mark Wildhaber and David Edds in Journal of Freshwater Ecology 17:1, March 2002.
- 1.3.10. Ictalurid Populations in Relation to the Presence of a Main-Stem Reservoir in a Midwestern Warmwater Stream with Emphasis on the Threatened Neosho Madtom, by Mark L. Wildhaber, Vernon M. Tabor, JoAnne E. Whitaker, Ann L. Allert, Daniel W. Mulhern, Peter J. Lamberson, and Kenneth L. Powell in Transactions of the American Fisheries Society 129:1264-1280, 2000.
- 1.3.11. Natural and Anthropogenic Influences on the Distribution of the Threatened Neosho Madtom in a Midwest Warmwater Stream, by Mark L. Wildhaber, Ann L. Allert, Christopher J. Schmitt, Vernon M. Tabor, Daniel Mulhern, Kenneth L. Powell and Scott P. Sowa in Transactions of the American Fisheries Society 129:243-261, 2000.

1.3.12. Breeding Behavior and Reproductive Life History of the Neosho Madtom, *Noturus placidus* (Teleostei: Ictaluridae), by Angela G. Bulger, Christopher D. Wilkinson, David R. Edds and Mark L. Wildhaber in Transactions of the Kansas Academy of Science 105: 106-124, 2002.

1.3.13. Neosho Madtom Distribution and Abundance in the Spring River, by Chris Wilkinson, David Edds, Joseph Dorlac, Mark L. Wildhaber, Christopher J. Schmitt, and Ann Allert in The Southwestern Naturalist 41: 1 March 1996.

1.3.14. Potential Effects of Interspecific Competition on Neosho Madtom (*Noturus placidus*) Populations, by Mark L. Wildhaber, Ann L. Allert, and Christopher J. Schmitt in Journal of Freshwater Ecology 14: 1 March 1999.

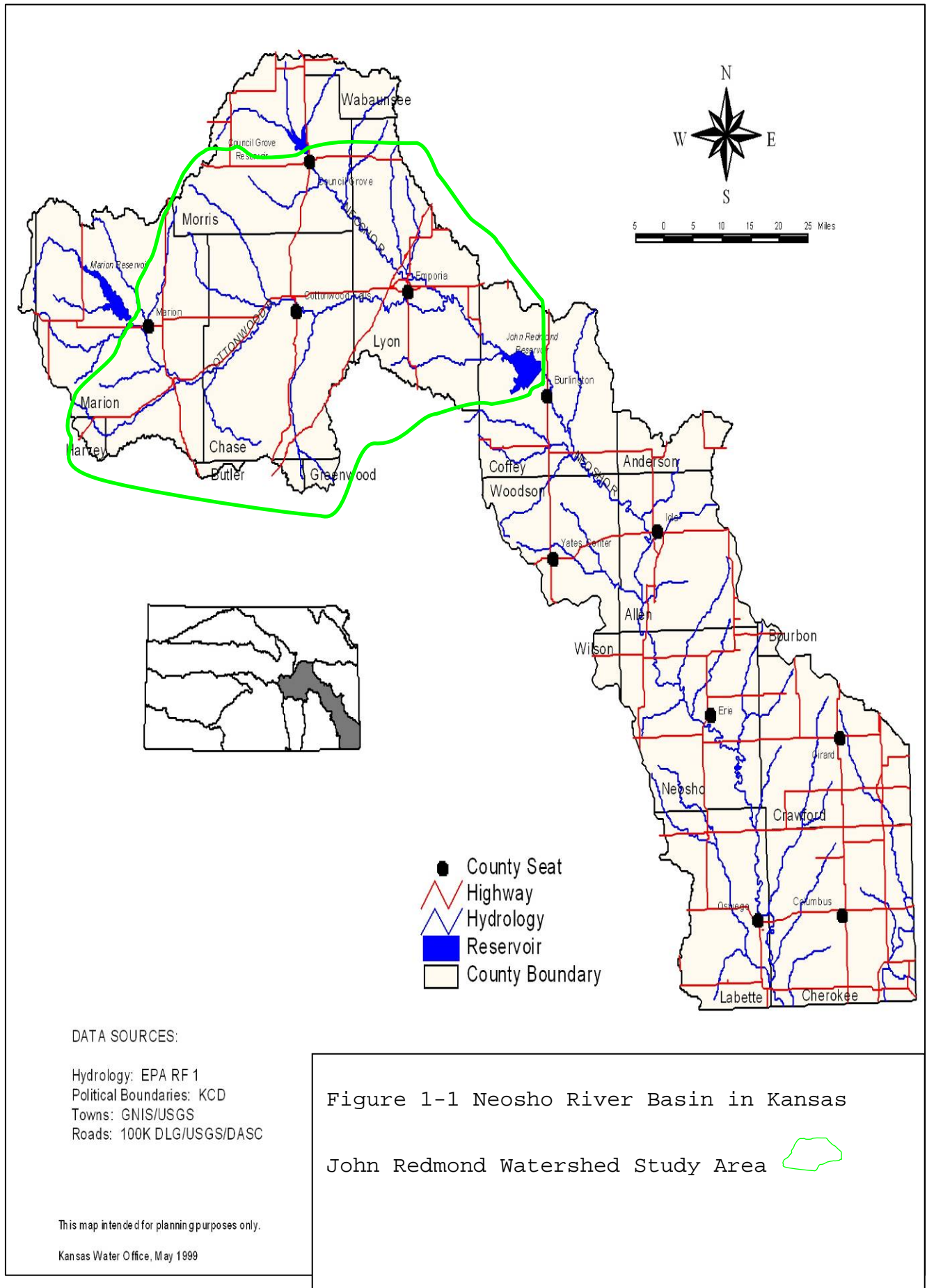
1.3.15. Threatened fishes of the world: *Noturus placidus* Taylor, 1969 (Ictaluridae), by Janice L Albers, Mark L. Wildhaber and Douglas B. Noltie in Environmental Biology of Fishes 2004.

1.3.16. Upper Neosho River Drought Contingency Plan dated 10 December 2003.

1.3.17. Correlations among densities of stream fishes in the upper Neosho River, with focus on the federally threatened Neosho madtom (*Noturus placidus*), by Jeremy S. Tiemann, David P. Gillette, Mark L. Wildhaber, and David R. Edds, in Transactions of the Kansas Academy of Science, Vol. 107, no. 1 / 2, p. 17-24 (2004).

1.3.18. Effects of Lowhead Dams on Riffle-Dwelling Fishes and Macroinvertebrates in a Midwestern River, by Jeremy S. Tiemann and David P. Gillette, in Transactions of the American Fisheries Society 133:705-717, 2004.

1.3.19. Initial Appraisal of the Neosho River Logjam, John Redmond Reservoir, Kansas, February 2005, by the U.S Army Corps of Engineers, Tulsa District.



**1.4. STUDY AREA DESCRIPTION.** The John Redmond Dam and Reservoir is located about 3 miles northwest of Burlington in Coffey County, Kansas, on the Neosho River. (See Figure 1-1.) The Neosho River originates northwest of Council Grove, Kansas, and flows generally southeasterly from the Council Grove to John Redmond Reservoir. The drainage area above John Redmond Dam covers 3,015 square miles. Two major Corps lakes are located upstream of John Redmond Dam: Council Grove Lake and Marion Reservoir. There are also three city and county lakes within the John Redmond Dam and Reservoir watershed which include Wolf Creek Lake, Iola City Lake, and Neosho Falls City Lake.

1.4.1. The Neosho River Basin is physiographically diverse. The Osage Plains is a major division that is further subdivided into three subdivisions, the Cherokee Lowlands, the Osage Cuestas, and the Flint Hills Uplands.

1.4.2. The Osage Cuestas of the Osage Plains comprise nearly all of eastern Kansas south of the Kansas River. The Osage Cuestas consist of a series of northeast-southwest, irregularly trending, east-facing escarpments with gently rolling plains between. The underlying strata area consists of unequally resistant, alternating hard and soft Pennsylvanian formations of limestone and shale. The Neosho River flows in a general southeasterly direction transverse to the direction of the escarpments and against the dip of the rock formations. Marion and John Redmond reservoirs as well as 11 counties in southeastern Kansas fall within this physiographic region.

1.4.3. The Flint Hills of the Osage Plains cover an area about 20 miles wide extending from north to south entirely across Kansas. The surface is gently rolling and has elevations of 1,500 to 1,600 feet in some places. The name is derived from the large amount of flinty or cherty limestone. Council Grove Reservoir, Kansas, is located within this physiographic region. Counties in Kansas that fall within this region are Chase, Morris, Butler, Greenwood, and Wabaunsee.

1.4.4. The storage volumes in John Redmond Reservoir available for water supply, flood control, and other purposes are being reduced by sedimentation. While sedimentation accumulation is anticipated in any reservoir, these water resources storages have a significant value, which is integral to the infrastructure of the region and the state. In addition, sediment is accumulating at an unanticipated rate within limits

of the conservation pool. This has resulted in the need to evaluate reallocation of storage among project purposes.

1.4.5. The Ozark Plateau Aquifer system and the Spring River are water resources shared by Kansas, Missouri, and Oklahoma which require increased interstate cooperation and management to meet current and long-term growth demands, provide good quality water, and meet minimum desirable stream flow. There have been dramatic declines in the static water level of the Ozark Plateau aquifer in far southeast Kansas. This confined aquifer moves into southeast Kansas from the Ozark Plateau high in Missouri. Rapidly growing demand, particularly in Missouri, have lead to the de-clines. A study commissioned by Missouri American Water Company projects possible water shortages in as few as 10 years if drought conditions should exist and there are increasing water demands with the expected continued growth in the region. Groundwater flow in the Ozark Plateau aquifer moves out of Missouri into the southeastern corner of Kansas and into Oklahoma. Increased withdrawals in Missouri will impact the amount of water flowing into Kansas.

1.4.6. High and increasing phosphorous loads in Marion Reservoir's water and sediment indicate significant issues for watershed management in the Neosho Basin. While the public and the media associate the algal blooms with Marion Reservoir, the source of the problem lies upstream and has been developing for some time, likely decades. Because John Redmond Reservoir is downstream of Marion Reservoir and, therefore, receives the outflow of Marion Reservoir, concern has been expressed about the risks of similar problems at John Redmond Reservoir.

1.4.7. Presently, 34 threatened or endangered State-listed species of animals and plants reside within the basin and about 5 more migrate through the basin. Ten of these State listed species are also Federally listed. Past losses and continuing impacts to habitat pose high risks to continued existence of these species. The loss of any species is an ecological warning of unhealthy changes to the environment.

1.4.8. The loss of wetlands in the Neosho Basin, estimated to be a 50% loss or greater, is partly responsible for several habitat and water quality problems. These include increased stream levels of fecal coliform, nutrients, agrochemicals, and sediment from agricultural practices. Also, declining species and species diversity have occurred because of the lost habitat. Declining base flow levels in streams is linked to the loss of wet-land infiltration and runoff delay times. The overall

negative impacts begin with changes in the natural hydro-geomorphic processes of the stream and riparian ecosystem.

1.4.9. Stream water quality is poor in many areas because of contaminants such as fecal coliform bacteria, ammonia and associated effects of low dissolved oxygen and high algae content.

1.4.10. A logjam has been accumulating in the Neosho River starting at the mouth of the river at John Redmond Reservoir and building upstream along the river since the early 1970's. Area storms in 2004 have recently caused an increase in the amount of debris coming down the Neosho River and an increase in the accumulation of logs and debris as the logjam "builds" upstream. The upstream encroachment precluded river access using the Jacobs Creek boat ramp in 2004 and 2005. In the absence of remedial actions, there is a relatively high probability the ramp will remain closed in the future due to additional accumulations of woody debris carried by flood flows, reference Prior Studies and Reports, paragraph 1.3.19.

**1.5. PLANNING FORMULATION CRITERIA.** The objective of the feasibility study is to investigate structural and nonstructural measures for ecosystem restoration and other purposes within the John Redmond Dam and Reservoir watershed. The national or Federal objective of water and related land resources planning is to contribute to National Economic Development (NED) consistent with protecting the Nation's environment. This objective is pursued under national environmental statutes, applicable executive orders, and other Federal planning requirements. The maximization of both national contributions below is the ultimate objective. Contributions to NED are increases in the net value of the national output of goods and services expressed in monetary units and are the direct net benefits that accrue in the planning area and the rest of the Nation. The Corps has a second national objective for National Ecosystem Restoration (NER). Contributions to NER are improvements to the nation's ecosystems through preservation and restoration efforts. The NER contributions are measured by changes in the amount and value of habitat in a system context. The system changes are formulated to improve the potential for long-term survival of aquatic, wetland, and terrestrial complexes as self-regulating, functioning systems. The value of ecosystem restoration outputs shall equal or exceed their cost. Protection measures are included as part of restoration initiatives to prevent future degradation of an ecosystem's structure and function.

**1.5.1. STATEMENT OF PROBLEMS AND OPPORTUNITIES.** Various water resources problems have been identified in the watershed. In response to the Section 905(b) Analysis which identified and assessed a number of these problems, the Kansas Water Office (KWO) seeks to work with the U.S. Army Corps of Engineers (Corps of Engineers) to address several of these issues. The interests and objectives expressed by the state, below, are fully compatible with the Corps of Engineers' environmental operating principles. This feasibility study will integrate ongoing efforts of watershed protection, including the State of Kansas Watershed Restoration and Protection Strategy (WRAPS), and an analysis of an array of alternatives into a holistic plan of ecosystem restoration and protection for John Redmond Reservoir and watershed.

1.5.1.1. The KWO desires to identify effective restoration and maintenance measures that will ensure the long-range availability of habitat, storage capacity, and ecosystem function within John Redmond Reservoir and watershed, Kansas. The eutrophication and siltation total maximum daily load (TMDL) have been developed by the Kansas Department of Health and Environment (KDHE) and approved by the Environmental Protection Agency for John Redmond Reservoir. The state endorses water resources problems evaluation through widespread development and adoption of the state's WRAPS program. This strategy utilizes a planning and management framework that engages stakeholders in a process to identify watershed restoration and protection needs, establish watershed management goals, create a cost effective action plan to achieve goals, and implement the action plan for natural resource concerns, including water quality, public water supply reservoir protection, flooding issues, and wetland and riparian habitat protection or restoration. Implementing this strategy above all Federal reservoir is important in the states efforts to reduce sediment and other ecosystem-degrading pollutant loads from the watersheds. The state desires to institute reservoir and watershed restoration activities to reduce negative impacts to ecosystem quality due to excessive sediment and nutrient loading to John Redmond Reservoir.

1.5.1.2. The KWO is concerned about sedimentation and woody debris collections in the Neosho River arm of John Redmond Reservoir and is interested in exploring opportunities to restore channel capacity, recreation opportunities, and avoid ecosystem losses. The Neosho River logjams appear to have consolidated and expanded in the river near the reservoir before

2004. From the filling of the Reservoir in 1964 until about 1990, boating access between the Reservoir and the River was possible. During the late 1980's and early 1990's, boating between the river and the reservoir was dependent on a combination of reservoir levels, river flows, and changing logjam conditions. In 1991 or shortly thereafter, access between the river and the reservoir was not possible. In 2004, the greatest accumulation of debris occurred since construction of the Reservoir. The logjam that existed at the beginning of 2004 was about 3/8 of a mile long. After the heavy spring rains and resulting river flows, the logjam had increased to over 1.5 miles. The severe ice storm in 2002 and higher than normal runoff in the spring of 2004 are generally believed to have caused enough additional debris to be added to the previous logjam so that in June 2004 the Jacobs Creek Landing boat ramp was unusable. The closest river access to Jacobs Creek Landing is about 8 river miles upstream at Hartford, Kansas. Hartford overlooks the Neosho River and adjoins the Flint Hills National Wildlife Refuge (Refuge). The property around the logjams at the Neosho River and Eagle Creek is owned by the Federal government and managed by the U.S. Army Corps of Engineers as part of the lands required for operation of the Reservoir. The Corps-managed lands upstream of the Reservoir comprise the Refuge. The Refuge is managed by the U.S. Fish and Wildlife Service and extends about 3 miles upstream of Hartford to the vicinity of Neosho Rapids, Kansas.

**1.5.2. PLANNING OBJECTIVES.** The two national objectives above are general statements of emphasis and are not specific enough for plan formulation. The water and related land resource problems and opportunities for this study are stated as more specific objectives to provide focus for the formulation of solutions. The objectives reflect the problems and opportunities and represent desired positive changes. The specific planning objectives are:

- a. Preserve storage in John Redmond Reservoir for flood control, water supply, and other authorized purposes.
- b. Revitalize John Redmond Reservoir for flood control, water supply, and other authorized purposes.
- c. Reduce watershed contributions of sediment and harmful chemicals, such as phosphorous into John Redmond Reservoir.

- d. Restore riparian habitat (including native grass buffer zones) that improves the value and function of the ecosystem.
- e. Restore wetlands that improve the value and function of the ecosystem.
- f. Restore aquatic riverine habitat that improves the value and function of the ecosystem.
- g. Preserve riparian habitat (including native grass buffer zones) essential to the value and function of restored habitat above.
- h. Preserve wetlands essential to the value and function of restored habitat above.
- i. Preserve aquatic habitat essential to the value and function of restored habitat above.
- j. Protect public resources, utilities, including power, water, and transportation, from the impacts of flooding, bank erosion, and channel changes.
- k. Protect wetland and grasslands from invasive plant species.

**1.5.3. PLANNING CONSTRAINTS.** Whereas the planning objectives represent a desired positive change, planning constraints represent restrictions that should not be violated. If these constraints are not met, mitigating measures must be considered, as appropriate. The planning constraints are:

- a. Avoid negative impacts to threatened or endangered and other species in the study area.
- b. Avoid or minimize negative impacts to historic, cultural, and archaeological resources.
- c. Avoid negative impacts to wetlands.
- d. Avoid negative impacts to bottomland hardwoods.
- e. Minimize temporary negative impacts to water quality, particularly turbidity. Avoid long-term impacts.

f. Minimize negative implementation impacts to landowners, agricultural interests, and the auxiliary agricultural, municipal, and industrial infrastructure.

**1.6. ALTERNATIVES TO CONSIDER DURING FEASIBILITY.** The Corps of Engineers is required to consider "No Action" as one of the alternatives to comply with requirements of the National Environmental Policy Act (NEPA). "No Action" is the condition reasonably expected to prevail over the period of analysis, given current conditions and trends, and assuming that no project would be implemented by the Federal Government to achieve the planning objectives. "No Action", which is synonymous with the "Future Without Project Condition," forms the basis from which all other alternative plans are measured.

The Section 905(b) analysis recommended that the planning effort continue into the feasibility phase. As part of the reconnaissance study, a series of structural and nonstructural alternatives were considered during the plan formulation phase. Many of these alternatives were eliminated. However, the following alternatives were considered for further consideration and will be studied in detail during the feasibility phase:

**1.6.1. "No Action".** The "No Action" plan was carried further into the evaluation. However, the plan would not satisfy the planning objectives to determine appropriate environmental restoration measures as well as to provide water supply, recreation, and fish and wildlife benefits.

**1.6.2. Potential Alternatives.**

**1.6.2.1. Riparian Buffers.** Riparian buffers along watercourses can reduce sediments, nutrient load, pesticides, fertilizer (including phosphorous), and bacteria in streams. Riparian buffers would be composed of native grasses. The widths of buffers would vary according to basin location and other factors. Opportunities exist for preservation and restoration. These buffers have been demonstrated to be effective in reducing sediment and agrochemicals that would enter adjoining watercourses, and they slow rainfall runoff thereby allowing greater rates of infiltration that recharges groundwater and supports base flows in streams. In addition to tremendous water quality benefits, these areas also aid a broad range of wildlife, provide sources for rich trapped topsoil, offer drought reserve grasses and forbs for livestock, and may have associated tax breaks for property assessment.

#### 1.6.2.2. Fencing.

a. **Riparian.** Fencing of riparian zones to eliminate unmanaged livestock grazing could essentially eliminate vegetation losses from browsing and trampling, limit the proximity of fecal material to the watercourse, reduce bank erosion from cattle trails and lack of ground cover, and would reduce overall stream sediment loading.

b. **Corps Lands.** Fencing of Corps lake property adjoining private lands would eliminate the loss of vegetation and associated impacts to plant species and wildlife due to accidental cattle access and grazing. Most Federal lake property is either posted or fenced, but as land use changes occur around lakes, posted areas may be insufficient to protect the land and habitat resources entrusted to the Corps.

1.6.2.3. Controlled Livestock Stream Access. Controlled livestock stream access through riparian buffers or off-stream watering areas (assumes riparian areas are fenced) could provide livestock with higher quality water than farm ponds or in-stream watering, while drastically reducing the environmental impacts of uncontrolled access.

1.6.2.4. Preserve/Restore Existing Wetlands. Wetlands slow both runoff and floodwater velocities, retard erosion, encourage sediment deposition, filter pollutants (including phosphorous), contribute to groundwater recharge, support base flows in streams, and provide rare habitat for wildlife. Opportunities exist to preserve limited remaining wetland resources. The larger opportunity is for restoration of riverine wetland areas that have been drained and converted to other uses since the basin was settled.

1.6.2.5. Timber Management. Timber management can increase the growth of high value trees, increase the ecological value of riparian forest, and improve stream quality by ensuring a diverse mixture of healthy trees, under story, and grass vegetation that slows the rate of erosion and encourages sediment deposition. Managed harvesting of selected timber is encouraged as part of timber management and would provide income opportunities. Managed and restored riparian growth tend to increase stream shading and provide cooler, more naturally regulated water temperatures which benefits the in-stream habitat.

**1.6.2.6. Controlled Burning.** Controlled burning can effectively maintain buffer zones, grass, brush, or trees.

**1.6.2.7. Over Bank Shaping.** Over bank shaping can provide opportunities to restore damages from livestock and poorly selected agricultural stream crossing. Shaping to retard or store flood flows or runoff can augment the beneficial effects of grass buffers and wetlands.

**1.6.2.8. Bendway Weirs and Rock Vanes.** Bendway weirs and rock vanes (stream hard points) can restore aquatic habitat and slow the loss of stream bank erosion (including grass and tree buffer areas) or reverse the erosion process and facilitate accretion.

**1.6.2.9. Erosion Control.** Live stake, pole, and grass plantings could also reduce erosion and buffer losses while creating wildlife habitat and shading the stream.

**1.6.2.10. Low Head Dam Alteration.** Breaching, removal, or abutment channeling of low head dams on the Neosho or Spring Rivers would aid in restoring hydro-geomorphic and ecologic function to reaches of the rivers. Benefits would include increased channel capacity and therefore reduce over bank flooding. More natural conditions of groundwater interaction, sediment transport, gravel transport and shoaling, channel meander, and over bank flooding would all contribute to a more natural ecosystem. The restoration of natural stream flow, even for a single river reach previously dammed, would benefit fish, mussel, and amphibian species, including several threatened or endangered species that exist in the area and associated food-chain species.

**1.6.2.11. John Redmond Reservoir Revitalization.** Rehabilitation" refers to major repairs of structural components, and repair or replacement of operating equipment, to ensure proper functioning for authorized purposes. "Restoration" refers to returning a degraded asset (especially environmental and cultural) to its original, desired condition. "Revitalization", as used here, is meant to imply the improvement and/or increase in beneficial outputs, short of project replacement. Revitalization encompasses rehabilitation and restoration, but also includes increased or new beneficial exploitation of underutilized assets. The state is interested in opportunities to revitalize the reservoir's water resources purposes. The scope of revitalization efforts will focus on sedimentation and reservoir storage purposes. Some features of storage evaluations

incorporate the Neosho River Logjam.

**1.6.2.12. John Redmond Reservoir, Neosho River Logjam.** Aspects of the logjam may be evaluated as part of reservoir revitalization, but other efforts will examine the recreation, ecosystem, and project operations separately.

## **SECTION 2. - SCOPE OF STUDIES**

**2.0. INTRODUCTION.** This section of the PMP describes the primary tasks that will be accomplished during the feasibility study. The feasibility report will document the planning, engineering, design, environmental, and real estate activities that will form the basis for a potential decision to recommend Federal participation in construction of the recommended plan. The feasibility report will then be sent to Congress as the Chief of Engineer's Report with a recommendation that Congress authorize the project for construction.

2.0.1. The work required for the feasibility study consists of detailed technical studies and field investigations to identify opportunities. The study results will be compiled in a feasibility report and companion NEPA document.

2.0.2. The feasibility report will describe the identified problems, the plans formulated, the engineering and economic feasibility of each alternative, as well as the social and environmental constraints and impacts for each alternative. The report will include the design, costs, benefits, and impacts of the recommended plan. The work follows the guidelines set forth in the Planning Guidance Notebook, ER 1105-2-100, dated April 22, 2000, and other published Corps of Engineers regulations and guidance.

**2.1. BASIC REQUIREMENTS.** The work will be performed with built-in checkpoints that allow an opportunity for the local sponsor to determine if the sponsor wants to continue with the feasibility study as described in this scope of studies. Full study of some of the alternatives identified during the reconnaissance study will require a significant expenditure of funds. Construction-oriented alternatives will require aerial photography, surveying, geotechnical studies, real estate effort and cultural resource studies. The first year of this study will involve a cursory evaluation of potential alternatives in order to exclude some of the less justified alternatives from further study. Basic hydrology and hydraulics analyses, engineering designs, environmental studies, and real estate studies will be developed in sufficient detail to evaluate each alternative. The second year of the study will begin the full evaluation of each alternative required by ER 1105-2-100.

2.1.1. The work to be performed consists of developing alternatives to provide ecosystem restoration and other water resources benefits; evaluating the alternatives to determine

which would result in the greatest net NED and NER; and selecting a recommended plan of action. This work will be accomplished by analyzing existing conditions; identifying optimal environmental restoration sites in the basin; evaluating an array of alternative plans from which detailed plans will be developed; preparing construction, real estate, relocation, and maintenance and operation cost estimates; computing annual benefits; developing annual costs; evaluating the financial capability of the sponsor; assessing environmental impacts of the selected plan(s), including impacts on biological, socioeconomic, and cultural resources, recreation, and land use; determining possible mitigation measures; determining design criteria and developing design, costs, and benefits of the recommended plan; and preparing the required report to present the study's findings and recommendations.

**2.2. PLAN FORMULATION.** The lead planner from the District's Planning and Environmental Division will coordinate the plan formulation process, with involvement and assistance from the project delivery team, which includes the local sponsor coordinator. Management of the plan formulation effort includes such activities as participating in team meetings, preparing study management documents, coordinating with the local sponsor and other agencies, and integrating technical investigations. The lead planner will summarize the results of the technical studies leading to plan selection in the plan formulation section of the feasibility report. The report will document the alternative formulation, evaluation, and selection process used to identify the NED plan and the tentatively selected plan.

2.2.1. The feasibility study follows the six-step planning process specified in the Planning Guidance Notebook, ER 1105-2-100. Generally the process is: (1) identify the problems and opportunities; (2) describe existing and future without-project conditions; (3) formulate alternative plans that address planning objectives; (4) evaluate the alternatives against specified criteria, (5) compare alternative plans, and (6) select a plan for recommendation.

2.2.2. Screening of alternatives is an iterative process in which a preliminary set of alternatives is identified. For each alternative, conceptual design, cost estimates, preliminary ecosystem restoration, and NED net benefit analysis are developed. This information, along with information obtained from the local sponsor and the interested public, is used to screen the various alternatives to select the recommended alternative(s) for which a detailed evaluation is conducted.

Alternatives are evaluated in a risk-based framework as specified in ER 1105-2-100. Cost Effectiveness and Incremental Cost Analyses are performed to compare the alternatives and determine the NER plan. The locally preferred plan will also be evaluated if it differs from the NER plan. Annual and periodic activities for operating and maintaining the completed project are also described in the final report. This includes the environmental mitigation sites that might be required. See Appendices A and B for cost estimates and schedules for these tasks.

**2.3. MAJOR STUDY TASKS.** Major study tasks for the feasibility study are briefly described below. Completion of these tasks should lead to a feasibility study meeting the goals and objectives outlined in previous sections. As the study progresses, the relative importance of these tasks may vary, other tasks may be identified, and some tasks may be deleted. Scopes of service revisions require the concurrence of the Corps of Engineers and the local sponsor. A description of the party or parties responsible for each task is likewise provided in this section.

**2.3.1. Bathymetric Mapping.** An updated bathymetric map (lake bottom contour map) of John Redmond reservoir will be prepared for accurate volume estimation for lake modeling and for evaluation of recent sedimentation patterns and storage losses. It is anticipated that this task will be performed by the Kansas Biological Survey (KBS).

**2.3.2. Watershed Modeling Using SWAT.** The Soil and Water Assessment Tool (SWAT) watershed model will be applied to the entire watershed above John Redmond Reservoir. This model incorporates multiple input layers including land use / land cover, digital elevation, soils, hydrologic networks, meteorology, and others. Once sufficiently calibrated to the John Redmond Reservoir watershed, this powerful tool will be used to evaluate multiple scenarios involving to include watershed best management practices (BMPs). It is anticipated that this task will be completed by Kansas State University (KSU) personnel with review support provided by the Corps of Engineers.

**2.3.3. Reservoir Modeling Using CE-QUAL-W2.** The Corps of Engineers reservoir hydrodynamic and water quality model, CE-QUAL-W2, will be used to simulate reservoir response to a variety of watershed-based alternatives for ecosystem restoration. The primary purpose of this effort will be to evaluate sediment delivery and distribution in the reservoir. Output from the SWAT modeling effort as described above will serve as input to the lake model. Secondary efforts will be the evaluation of nutrient dynamics and eutrophication responses to alternatives to the extent possible with existing water quality information. Confidence in secondary findings will be dependent upon the extent of historical data available for model calibration. It is anticipated that this task will be completed by the Corps of Engineers with review support provided by KBS.

**2.3.4. Riparian Area/Stream Channel Assessment.** An important task for the study will be evaluation and quantification of riparian habitat in the John Redmond Reservoir watershed. In addition, it will be necessary to develop some estimate of stream channel condition and assess relative contribution of stream banks as a source of sediment loading. It is anticipated that riparian area assessment can be conducted using land use / land cover information assembled for the SWAT modeling exercise, though a ground truth evaluation of this information may be necessary. A variety of methods useful for stream channel assessment will be evaluated. It is anticipated that this task will be completed primarily by KWO/KSU.

**2.3.5. Assessment of Log Jam Removal Alternatives.** Building upon the Corps of Engineers initial review of log jam removal alternatives, further study will be devoted to identification of the most cost-effective means of wood debris removal. It is anticipated that this evaluation will be conducted primarily by the KWO with assistance from the Corps of Engineers.

**2.3.6. Initial Dredging Assessment.** Under this task, an initial assessment of gross costs of alternatives for removal of accumulated sediment contributing to ecosystem degradation and impacts to other project water resources purposes would be evaluated. This assessment would include gross costs, quantities, real estate requirements, environmental considerations, and other factors needed to assess the viability of dredging options. It is anticipated that the Corps of Engineers would be responsible for this task. This task does not include detailed evaluations that would require coordination

among resource agencies, associated NEPA coordination, or detailed evaluations of dredging, environmental assessment and mitigation, dredged material contamination analysis, or dredged material disposal.

**2.3.7. Sediment Management Measures on Corps of Engineers' Project Lands.** This task would include evaluation of relative contribution and significance of sediment loads occurring from Corps of Engineers project lands and impacts to overall sediment budget of John Redmond Reservoir. If deemed significant, measures to be implemented on Corps of Engineers lands would be identified for implementation. It is anticipated that the Corps of Engineers would complete this task.

**2.3.8. Gage Installation and Continuous Turbidity Monitoring.** As a means of quantifying the sediment budget for John Redmond Reservoir, gages capable of continuous monitoring for turbidity (as a surrogate for sediment concentration) would be installed on the Neosho River at Americus, KS, and at Plymouth, KS, on the Cottonwood River. In addition, a similar gage would be installed in the John Redmond Reservoir tailwaters as a measure of sediment output. Periodic collection of water samples for suspended solids analysis would facilitate development of a regression relationship between suspended sediment (mg/l) and continuously-monitored turbidity readings (nephelometric turbidity units, NTU). It is anticipated that equipment installation, calibration, sample collection, data management, and regression relationship development would be completed by the U.S. Geological Survey (USGS) under a cooperative Federal agreement with the Corps of Engineers.

See Appendices A and B for cost estimates and schedules for these tasks.

**2.4. ENGINEERING AND DESIGN ANALYSIS, COST ESTIMATES, AND PRELIMINARY DRAWINGS.** This task includes preparing conceptual and detailed designs ecosystem/environmental restoration measures within the John Redmond Dam and Reservoir Watershed area. Preliminary designs will be prepared for the various alternatives using a level of detail sufficient to allow the screening of each alternative.

2.4.1. A site plan will be developed for all necessary project features, such as wetland areas, structural measures, relocations, etc. Currently available topographic information will be utilized as much as possible; however, if material

quantities cannot be estimated within plus or minus 20% of their probable actual values, additional topographic survey information will be obtained.

2.4.2. Detailed engineering design of the National Economic Development (NED) plan will be described in the design subsection of the engineering appendix to the feasibility report. The detailed drawings will present a plan of the overall project; plan and profiles; and typical sections of the major structural features, along with any other pertinent details such that the engineering concepts and considerations are readily apparent.

2.4.3. Detailed cost estimates will be prepared for final design plans. Unit costs will be current average unit costs of materials. Minor features may be estimated on a lump sum basis after determining the size of the feature and comparing costs of similar features. The detailed cost estimates will be included in the engineering and design appendix.

2.4.4. Once the project costs have been determined, an average annual cost for each alternative will be developed using the currently authorized Federal discount rate. Interest accruing during construction will be determined and added to the project cost. The total project investment will then be amortized over a 100-year period of analysis. An annual estimate of operation and maintenance and any major replacements will be determined and added to the amortized value. See Appendices A and B for cost estimates and schedules for these tasks.

**2.5. SOCIOECONOMIC STUDIES AND ANALYSIS.** The existing social, economic, and demographic conditions for the project area will be documented in the feasibility report. The with- and without-project conditions will also be described in the report. The without-project condition reflects actions that may be taken in the absence of a Federal project.

2.5.1. The economic benefits of ecosystem restoration and other water resources features will be determined by the Tulsa District.

2.5.2. A preliminary review of available real estate, geotechnical, design, hydrology and hydraulics, and environmental data will be made to evaluate preliminary alternatives, screening out unjustified alternatives and selecting justified alternatives for further investigation. The selected alternatives will be further evaluated in more detail to determine the best alternative for implementation. Selection criteria will be based

on economic costs and benefits, environmental benefits, and social acceptability criteria.

2.5.3. Social impacts from the project will be evaluated for communities and groups within the project's area of influence. Socioeconomic impacts will include income distribution; employment distribution; population distribution and composition; fiscal condition of State and local governments; quality of community life; life, health, and safety factors; displacements; long-term productivity; energy requirements; and conservation. Impacts to minorities and low-income groups are also evaluated and incorporated into the environmental justice analysis in the NEPA document. Census data for the social and economic impacts of the affected area will be utilized in the analysis. Available census data will be supported with local data indicators where available. The social and economic impacts of the proposed modifications and mitigation measures are evaluated, and any impacts on the environment from the proposed project that can be translated to economic and social losses or gains are identified and evaluated.

2.5.4. A narrative report of the socioeconomic impacts and environmental restoration benefits evaluation will be included as an Economic and Social Analysis Appendix in the feasibility report. The quantifiable benefits will be displayed in the report. The discussion of benefits will be supported by a description of the methodology used, surveys conducted, documentation of the sources of material, and a display of the results of the analyses. A description of supporting studies will also be included. See Appendices A and B for cost estimates and schedules for these tasks.

**2.6. FINANCIAL ANALYSIS.** The non-Federal sponsor will provide a Statement of financial capability and a financing plan for supporting its share of the proposed multipurpose project recommended as a result of the feasibility study. The Statement of Financial Capability will provide evidence of the sponsor's authority to utilize the identified source(s) of funds and its capability to obtain remaining funds, if any are required. This will require evidence that sufficient funds are currently available or that the sponsor has a large revenue base and a good bond rating.

2.6.1. The financing plan will include a current schedule of estimated Federal and non-Federal costs by fiscal year; a schedule of the sources and use of non-Federal funds during and after construction by fiscal year; and the method of finance for

all non-Federal outlays, including OMRR&R associated with the project.

2.6.2. The financial analysis will provide data and information that demonstrates that the sponsor is creditworthy. If the sponsor is relying on non-guaranteed debt to obtain remaining funds, the analysis will include data and information to demonstrate that the projected revenues are reasonably certain and sufficient to cover the sponsor's stream of costs through time.

2.6.3. The District Commander will assess the non-Federal sponsor's financial capability in accordance with EC 1105-2-180, dated 29 January 1988, which provides procedures and responsibilities for financial analysis in support of construction recommendations. The assessment will demonstrate that: 1) the sponsor has adequate funds to meet its financial obligations as delineated by the project funding schedule provided by the Corps; 2) the reliability of the sources of funds has been demonstrated; 3) the sponsor has full and legal access to those funds; and 4) all parties providing funding essential to meeting the sponsor's financial obligation are legally committed to providing those funds.

**2.7. REAL ESTATE PLAN.** In accordance with ER 405-1-12, Chapter 12, a Real Estate Plan (REP) that outlines the minimum real estate requirement for the proposed project will be prepared as an appendix to the feasibility report. The REP will provide a description of the area; the acreage and proposed estates; a discussion of any land owned by State, Federal, or local public entities or the sponsor; an estimate of the relocation assistance required under Public Law 91-646; the M-CACES cost estimate for real estate; a discussion of the local sponsor's ability to acquire Lands, Easements, Rights-of-Way, Relocations and Disposal area (LERRD's); a discussion of mineral activity, if any; a schedule of land acquisition; a preliminary assessment of the facilities or utilities to be relocated; and any other real estate information relevant to the project. The District Counsel will prepare an opinion of compensability regarding existing utility easements.

2.7.1. The Real Estate Division will prepare a gross appraisal of land requirements in accordance with the Real Estate Handbook (ER 405-1-12). The appraisal foundation will be based on the necessary estates to be acquired, i.e., fee or type of easement. Data will be collected on the local real estate market regarding recent sales and offers for sale of improved and unimproved

properties comparable to the right-of-way required for alternative plans. Research will involve searching deed records and contacting local appraisers, brokers, attorneys, central appraisal districts, and others knowledgeable of the local real estate market. This market information will be the basis for the values of the various types of properties within the proposed project. During the initial formulation phase of the feasibility study, an assessment of the potential real estate costs associated with initial alternative sites will be evaluated to help in selection of the recommended plan of improvement.

2.7.2. Real Estate Division will obtain right-of-entry permits for activities that require entry onto private property during the feasibility phase investigation. Rights-of-entry will be tabulated into a graphic format for use by field crews in property access activities. In addition, Real Estate staff will attend meetings with the project delivery team or sponsor when necessary. Additional information for the costs and schedules for this task can be found in Appendices A and B.

**2.8. ENVIRONMENTAL STUDIES.** Environmental studies will include all activities necessary to comply with the NEPA and all applicable environmental laws and regulations.

2.8.1. Public involvement includes interagency coordination between the Tulsa District, Federal and state natural resource agencies, environmental and community groups, and interested parties. Meetings will be held to discuss data collection needs, alternatives, and environmental concerns. Newsletters, fact sheets, and/or individually written letters will be generated to keep interested parties updated on the status of the project. Planning and Environmental (PE) Division will perform all work. Public involvement activities will include public meetings/workshops and interagency meetings. Coordination with State, Federal, and local agencies will be initiated immediately and maintained throughout the NEPA process.

2.8.2. Environmental impacts associated with construction and operation of the project will be discussed and addressed in the NEPA document in accordance with 40 CFR Part 1501. Categories of impacts to be addressed include air quality, riparian vegetation, faunal communities, floodplains and wetlands, wild and scenic rivers, water supply, threatened and/or endangered species, hazardous, toxic, and radiological waste (HTRW), soils, agriculture, cultural resources, economic impacts, and cumulative impacts. Although performed by PE Division technical staff, the

HTRW assessment will be included in the Engineering Appendix in accordance with ER 1110-2-1150.

2.8.3. All functional elements of the District will be involved in determining impacts. Planning and Environmental Division is the lead element for this activity. Most work will be performed by the Corps with contributions by Kansas state agencies.

2.8.4. Coordination with the U.S. Fish and Wildlife Service (USFWS) and the Kansas Department of Wildlife and Parks (KDWP), will be accomplished in accordance with the Fish and Wildlife Coordination Act of 1958. Study funds will be made available to the USFWS in accordance with the Act for justified fish and wildlife studies. Additional coordination with the USFWS will be required for threatened and endangered species in accordance with the Endangered Species Act of 1973. (The Service funds Threatened and Endangered Species studies and Section 7 consultation.) Coordination with natural resource agencies will be the responsibility of Planning and Environmental Division. Support from other Tulsa District functional elements will also be required.

2.8.5. A USFWS Coordination Act Report (CAR) or Planning Aid Letter will be furnished by the USFWS for inclusion in the NEPA document. A detailed evaluation will be conducted of possible actions that would offset unavoidable impacts associated with the project. Planning and Environmental Division will be responsible for funding all USFWS activities, report review, and dissemination of information to the natural resource agencies. Potential environmental restoration sites will be initially screened for potential cultural and environment impacts prior to more extensive inventories of cultural resources for the recommended plan. Depending on the outcome of the survey conducted by a qualified archeologist, additional investigations may be necessary. Section 106 of the National Historic Preservation Act of 1966, as amended, requires Federal agencies or project sponsors seeking Federal funding and/or permits to conduct cultural resource surveys to locate, identify, and evaluate historic properties in advance of approving an undertaking. Cultural resource surveys and evaluations of effects of undertakings on historic properties will be performed in consultation with the State Historic Preservation Office (SHPO) and affected Native American tribes.

2.8.5. As part of the notification process required by 40 CFR Part 1502.19, Planning and Environmental Division will prepare and publish a Notice of Intent (NOI) to prepare a Draft

Supplemental EIS requesting public comment on the document (if a Supplemental EIS is determined to be necessary). The NOI will be published in the Federal Register along with the name and address of a point of contact for sending comments or obtaining a copy of the document. The public has 45 days to review and comment upon the draft document, although an extension of 15 days may be requested. If a Supplement to an EIS is not deemed necessary, an Environmental Assessment will be prepared as the NEPA document

2.8.6. After completion of the Draft EIS (assuming it is necessary) and public review and comment period, Planning and Environmental Division will respond to review comments, revise the document, and prepare a Final EIS in accordance with 40 CFR Part 1502.9.

2.8.7. After review and evaluation of public comments, the District may decide to conduct additional workshops or hearings on the project.

2.8.8. After public review of the Draft EIS (if required) and end of commenting period, the District will respond to all review comments in accordance with 40 CFR Part 1503 and Part 1502.9. The comments and District responses to the comment will be included in the Final EIS. Planning and Environmental Division, with the support of other technical and functional elements of the District, will complete this task.

2.8.9. As part of the notification process required by 40 CFR Part 1502.19, Planning and Environmental Division will prepare and publish a NOA of the Final EIS (if required). The public has 30 days to comment on the document. The NOA will be published in the Federal Register along with the name and address of a point of contact for sending comments or obtaining a copy of the document. A response will be provided to all comments received.

2.8.10. If necessary, the District will prepare a Record of Decision (ROD) in accordance with procedures found in 40 CFR Parts 1506.1, 1505.2, and 1505.3 for the signature of the final decision maker as prescribed by applicable Corps regulations. Incoming letters of comment on the final EIS will be furnished for review by the decision-maker that signs the ROD. If an EA is deemed to be the appropriate NEPA document and significant impacts are not identified, the Tulsa District Engineer will sign the Finding of No Significant Impact (FONSI).

2.8.11. Cultural Resources. Cultural resources investigations are mandated by Section 106 of the National Historic

Preservation Act of 1966 (as amended), and require identification of all historic properties that may be affected by a Federal undertaking. "Historic properties" includes both archaeological sites and historic standing structures that are eligible for listing on the National Register of Historic Places (NRHP).

2.8.11.1. The critical element of a project study, in regards to initiating cultural resources investigations, is identification of the project area - the area of potential effect - and identification of the full extent of spatial (breadth and depth) impacts (i.e., earth movement; equipment staging; road construction, etc.), including surface and subsurface aspects.

2.8.11.2. The John Redmond Dam and Reservoir Watershed area is a large area with the potential for large areas of impacts for specific Federal actions. No specific areas were identified during the reconnaissance study within the watershed area, and no specific projects (i.e., wetlands restoration; sediment control structures) have been identified yet. As with many drainage areas, there is a high probability of recording prehistoric and historic cultural resources near streams of both high- and low-order. The cost of investigations is generally higher in these areas than in areas without year-round flowing water (i.e., undissected uplands or high plains). The cost of professional cultural resources investigations is high in general and will continue to increase over the life of the feasibility study. If investigations are initiated in 3-4 years, the costs will be higher than today, although the budget will likely remain unchanged.

2.8.11.3. The extent of in-house coordination with State and Federal agencies, and with Indian tribes - all mandated by Federal law - is likely to be substantial for a project of this size. Mitigation of adversely impacted historic properties will likely require development of a Memorandum of Agreement with several signatories.

2.8.11.4. The cultural resources scope of work covers the identification of historic properties, not mitigation for adverse impacts on these properties. The following tasks will be addressed in the identification of historic properties: (a) background research, (b) pedestrian investigation of project areas, (c) subsurface investigation of project areas, and (d) determination of NRHP eligibility for sites and structures. The cultural resources tasks and associated costs can be phased

over the life of the feasibility stage of the project. Mitigation costs could potentially be addressed in the construction phase of the project.

2.8.11.5. Most tasks associated with cultural resources investigations can be accomplished concurrent to other tasks in the feasibility study, and rarely comprise a critical task in project management. However, this is possible if significant resources are identified and will be adversely impacted.

2.8.11.6. Additional information concerning the costs and schedules for this task can be found in Appendices A and B.

**2.9. PUBLIC INVOLVEMENT AND COORDINATION.** A project delivery team (PDT) consisting of the project manager, lead planner, public affairs specialist, social scientist, NEPA coordinator, and the local sponsor will oversee implementation of the public involvement plan. Close communication between technical staff and the PDT will be required to ensure the release of accurate information about study activities to the local community, property owners, interest groups, local officials, and the media. These activities include preparing for and conducting public workshops and coordination meetings with other agencies and interested persons. Coordination with local Watershed Restoration and Protection Strategy (WRAPS) projects in the study area will be an important component of the study.

2.9.1. The PDT will develop and distribute letters, notices, news articles, radio announcements or other methods, such as e-mail and dedicated Internet page within the Tulsa District's Web page, to inform the public of meetings and workshops. The team will maintain a public involvement mailing list of interested persons, media, agencies, or groups for notification of study events. They will also maintain memoranda of the public meetings and prepare a brief summary of the comments received during and after the workshops and how they were addressed.

2.9.2. The results of the public involvement activities will be documented in an appendix on coordination activities. The appendix will be part of the feasibility report. Additional information concerning the costs and schedules for this task can be found in Appendices A and B.

**2.10. PROJECT AND STUDY MANAGEMENT.** The feasibility study will be managed under the guidance of ER 5-1-11, Program and Project Management, and will follow the six-step planning process

specified in the Planning Guidance Notebook, ER 1105-2-100. Under ER 5-1-11, the PM provides leadership to a multi-disciplined team with responsibility for assuring that the project stays focused on the customer's needs and expectations and that all work is done in accordance with the PMP and approved business processes.

**2.10.1. Lead Planner.** The Lead Planner from the District's Planning and Environmental Division will lead the team in day-to-day activities and coordinate the plan formulation process and preparation of the feasibility report. Management of the plan formulation effort will include activities such as team meetings, preparation of study management documents, technical coordination with the local sponsor and other agencies, and integration of all technical investigations. The Lead Planner will summarize the results of the technical studies leading to plan selection in the feasibility report. The report will document the alternative formulation, evaluation, and selection process used to identify the tentatively selected plan.

2.10.1.1. As part of the formulation process, the study will consider technical feasibility, economic feasibility, environmental impact, real estate acquisition, and views of the USFWS, the local sponsor, and study proponents. The Lead Planner will lead the study team in screening alternatives. Based on review of existing data and limited field reconnaissance, the team will develop concept level designs and cost estimates and conduct a preliminary benefit-to-cost analysis of alternatives. This information, plus information obtained from the USFWS, will be used to screen alternatives.

2.10.1.2. The PM will be responsible for letters exchanged with the local sponsor that affect study costs, scopes, and/or schedules; official correspondence with higher authority on similar subjects; internal memoranda that bear on significant study elements, and, in general, any other correspondence that affects significant aspects of the study.

2.10.1.3. The PM will be responsible for preparation and management of internal funds control documents for allocation and management of the study. The PM will monitor expenditures, prepare project management reports, and report study status and issues to the District Engineer and the Project Review Board. This includes preparation of budget documents and financial reports.

2.10.1.4. The PM will update the PMP and schedule at least annually, tracking all changes to the scope, cost, or schedule of the study. These changes will be based upon consultations with team members, study area visits, and meetings with the non-Federal sponsor.

2.10.1.5. The Project Delivery Team will ensure that the study will accomplish the goals established, proceed at the anticipated rate, and that the items in the Scope of Studies are followed. Additional information concerning the costs and schedules for this task can be found in Appendices A and B.

**2.10.2. Progress Meetings.** At least once each quarter during the study period, or more often if deemed necessary by the PDT, progress meetings or telephone conference calls will be held to review and discuss the study's progress, problems, or other issues. The meetings will be held in a location mutually agreed upon by the Corps of Engineers and the local sponsor. The costs to the local sponsor of attending meetings will be considered a part of project management costs and will be included in the annual and final accounting of study costs. The PDT will prepare a written Memorandum for the Record (MFR) of the team meetings or telephone conference calls. The MFR's will be numbered sequentially and will identify persons participating, subjects discussed, and conclusions reached. A copy of these reports will be available to study team members and the Executive Committee to keep them informed of the progress of the work items underway.

**2.10.3. Technical Meetings.** The PDT will hold periodic meetings with technical elements to review study progress; prepare budget documentation; monitor and manage funds; prepare project-related correspondence; coordinate with Federal, State, and local agencies to inform them of the alternatives identified and the progress of the study; participate in Executive Committee meetings as requested; and provide guidance and support as required to ensure responsiveness to questions and concerns from the start of the study to review and approval of the final report.

**2.10.4. Monitoring of Funds.** The PDT will use the Corps Financial Management System (CEFMS) and Project Management software called P2 to monitor and manage study funds. The team will use reports generated from this software to monitor the obligation and expenditures of funds, prepare funds transfer with other agencies, and track funding progress.

**2.10.5. Budgeting.** The general investigation study process requires preparation of quarterly and annual budget documentation and monitoring of study expenditures. Budget documentation may consist of project cost estimates, benefit estimates, study cost estimates, and related project information sheets needed to support budget requests. Budget documents shall be updated periodically during each year in support of budget reviews and to reflect changing interest rates or cost estimates.

**2.10.6. Contracts.** Contract negotiation and administration may require that some or all of the following items be performed for each study element by individuals other than those employed by the local sponsor or the U.S. Army Corps of Engineers, Tulsa District: preparation of a scope of work and a cost estimate; selection and negotiation of a contractor; monitoring progress of the work, and reviewing interim and final products.

**2.10.7. Agency Coordination.** Coordination with other agencies is imperative for successful project implementation and this will require on-site visits and/or correspondence with Federal, State, and local government agencies; institutions, businesses; or groups with expertise, responsibilities, or resources related to drainage, flood control, transportation, agricultural activities, environmental resources, or other areas of interest to this study. Particular attention will be directed to the agencies, special interest groups, affected cities, the U.S. Fish and Wildlife Service, and those responsible for existing physical facilities directly related to or affected by the study.

**2.10.8. In-Kind Services Report.** If the local sponsor provides in-kind services, the local sponsor will need to provide a written statement at least quarterly of its services performed during that period to obtain credit. For contracts, the request should be supported by a copy of the contractor's billing or written report of progress. The statement of in-kind services will identify the study activity, the number of staff hours involved, and the associated costs. In-kind credit will be verified and documented by the Project Manager following consultation with functional elements within the district.

**2.10.9. Feasibility Report.** The feasibility report will consist of a main report, either an Environmental Impact Statement or an Environmental Assessment; whichever document is applicable to satisfy NEPA requirements, and technical appendices. The report will be a complete decision-making document; with plan formulation based on technical studies data and published reports applicable to the project study area. The main report will be

written in an easy-to-understand style using graphics, illustrations, and/or photographs to summarize study findings.

**2.10.9.1.** The length and detail of the Environmental Impact Statement, Environmental Assessment, or other applicable document will conform to the regulations contained in 40 CFR, Parts 1500-1508, "National Environmental Policy Act," dated 29 November 1978.

**2.10.9.2.** The appendices will be technical reports written for technical reviewers. The length and detail of the appendix will be sufficient to cover the main aspects of the subject and will follow applicable regulations for each discipline. As a minimum, appendices for the following subjects will be prepared: Economic and Social Analysis; Engineering (which will include sections for Geology and Soils, Hydrology and Hydraulics, HTRW, and Design and Cost Estimates); Real Estate Plan; Pertinent Correspondence; and Financial Capability Analysis.

**2.10.10. Review and Acceptance.** During the feasibility study, the Government and the local sponsor will review the technical products as required. An independent, interdisciplinary peer technical review team will review the products (technical appendix). Southwestern Division (SWD) will assure quality compliance, and Headquarters (USACE) will evaluate for policy compliance. After responses are made to the review comments and the draft report has been modified accordingly, the feasibility report will be reviewed by appropriate Federal, State, and local government officials; local agencies; and interested groups and individuals. Their comments will be included in the final report.

**2.10.11. Review Contingency.** During the review process, the report will be submitted for Washington level review. These reviews may require that Tulsa District personnel and the local sponsor participate in preparing responses to the review comments to ensure that report approval is processed in a timely manner. The amount of work during review is determined by the number and nature of review comments and cannot be predetermined. To ensure that the local sponsor is afforded an opportunity to participate in any significant effort as a result of that review, a separate item will be included for that activity. In accordance with EC 1105-2-108, funding for this activity will be the lesser of 5% or \$50,000; the line item included in the study cost estimate will be 5% of the total study cost.

**2.10.12. Issue Resolution Conferences.** Two issue resolution conferences are mandatory during the feasibility phase - the Feasibility Scoping Meeting (FSM) and the Feasibility Review Conference (FRC). The FSM is called early in the study, soon after the NEPA scoping process and the preliminary plan formulation and evaluation have been accomplished. The FSM helps everyone to focus the study on key alternatives, define the depth of analysis required, and refine study constraints.

2.10.12.1. The FRC is held prior to the release of the draft Environmental Impact Statement (EIS) and draft feasibility report, unless an Alternative Formulation Briefing (AFB) was held early in the study phase. It is expected that the AFB will replace the FRC during this study. The AFB occurs after the final array of alternatives has been evaluated, and the District is prepared to identify the plan it will recommend. The AFB will normally occur late in the study phase as a forum to obtain concurrence of the local sponsor and higher authority. If Washington-level policy concerns are resolved by the AFB, the District would be allowed to submit the draft feasibility report concurrently for Washington level review and public release of the draft EA. This process saves the time involved in the sequential review process. After the tentatively selected plan is identified, the AFB would be scheduled to ensure that the Corps and the local sponsor focus their resources on alternatives that are in the Federal interest.

2.10.12.2. The AFB will be attended by the District, the local sponsor, SWD, and HQUSACE and may be held as a telephone conference. The purpose of the AFB is to review study findings concerning problems and needs; evaluate the array of alternatives and determine their consistency with Federal interest; and review the preliminary analysis of the impacts of alternatives. This meeting will be a key decision point in determining whether alternatives meet Federal policies and should be recommended for project implementation. If the local sponsor has a preferred alternative that differs from the tentatively selected plan, it will be identified and reviewed at this time. Background material in the form of pre-conference materials will be sent to SWD and HQUSACE at least 35 days prior to the conference. The design and costs presented at the AFB will be at a level of detail sufficient to screen alternatives and select the plan that will be subject to a detailed analysis. Discussion and resolution of all policy issues are documented in the AFB Policy Guidance Memorandum prepared by HQUSACE.

**2.10.13. Final Report Documentation.** The final feasibility report (including the final NEPA document) will incorporate the review comments from agencies, the public, SWD, and HQUSACE resulting from review of the draft document. The SWD Commander will prepare a public notice to announce endorsement of the final report. HQUSACE will prepare a written assessment of the final report to document compliance with current policy. The Chief of Engineers will prepare a brief summary of the report and send it to the Assistant Secretary of the Army for Civil Works (ASA (CW)). The Office of Management and Budget (OMB) will notify the ASA of the Administration's position on transmitting the report to Congress for authorization. If recommended by the OMB, the ASA will transmit the report with the recommendations to Congress. At that point, the feasibility phase will be complete.

### SECTION 3. - WORK BREAKDOWN STRUCTURE

**3.0. WORK BREAKDOWN STRUCTURE.** The Work Breakdown Structure (WBS) is a task-oriented hierarchy of the scope of study and is embodied in a codified system that organizes the study in a logical manner. The final product for this phase is the completion of a feasibility report. As the study progresses, additional WBS information will be provided to update the PMP. The following table lists generic WBS codes for this project.

TABLE 3-1

#### WORK BREAKDOWN STRUCTURE CODES

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<u>WBS Code</u>	<u>Related Work Effort/Product</u>
<u>Project Task</u>	
FE -1	Project Management
FE- 2	Plan Formulation
FE- 3	Public Involvement
FE- 4	Survey/Mapping
FE- 5	Environmental
FE- 6	Socioeconomic
FE- 7	Hydrology/Hydraulics
FE- 8	Geotechnical Data
FE- 9	Design and Costs
FE-10	Real Estate Studies
FE-11	Prepare DPR
FE-12	Quality Assurance
FE-13	Policy Compliance
FE-14	In-Progress Review (IPR)
FE-15	Draft Report
FE-16	Independent Technical Review (ITR)
FE-17	Feasibility Review Conference (FRC)
FE-18	Incorporate Comments
FE-19	Final Report
FE-20	Division Engineers Final Notice
FE-21	Water Quality Sampling
FE-22	Model Calibration/Implementation

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**SECTION 4. - ORGANIZATION BREAKDOWN STRUCTURE**

**4.0. GENERAL.** The Organization Breakdown Structure (OBS) has been developed through coordination with the resource elements involved in the project. Overall project management is provided by the Project Manager (PM) in Programs and Project Management Division. The Lead Planner in Planning and Environmental Division provides study supervision and coordination. The functional managers provide technical resources for the study team and must maintain the schedule and costs of their technical resources to meet overall study objectives.

4.0.1. The technical managers provide quality assurance of contracted products or services provided through their area of expertise, as described in their Quality Assurance Plan. The managers ensure that independent technical reviews are utilized to provide quality control of in-house products.

4.0.2. Table 4-1, the Organizational Breakdown Structure, identifies the organizations that provide resources into completing the specific tasks necessary to complete the feasibility study.

**TABLE 4-1**

**ORGANIZATIONAL BREAKDOWN STRUCTURE**

<b>Resource</b>	<b>Technical Element/Description</b>
PP-C	Programs and Project Management - Civil Works Branch
PE-P	Planning and Environmental (PE) Division - Planning Branch
PE-E	PE Division - Environmental Analysis and Compliance Branch
RO	Regulatory Office
PA	Public Affairs Office
EC-D	Engineering and Construction (E&C) Division - Design Branch
EC-H	E&C Division - Hydrology and Hydraulics Branch
OD	Operations Division
OC	Office of Counsel
RE	Real Estate Division

#### **4.1. PROGRAMS AND PROJECT MANAGEMENT DIVISION.**

**4.1.1. Civil Works Branch (PP-PM).** The PM resides in the Civil Works Branch and provides overall management and leadership of the project. The PM is responsible and accountable for successful completion and delivery of the project to the customer within established costs, schedules, and quality parameters. The PM assures that the customer's interests are properly represented within the U.S. Army Corps of Engineers and serves as the primary point of contact between the customer and the Corps.

#### **4.2. PLANNING AND ENVIRONMENTAL DIVISION**

**4.2.1. Planning Branch (PE-P).** Planning Branch provides the Lead Planner who coordinates preparation of the technical data and provides plan formulation to identify a selected plan. Planning Branch prepares the study document, the feasibility report. The economist in Planning Branch conducts the economic analyses used to determine project benefits. The social scientist in Planning Branch assists with public involvement coordination activities.

**4.2.2. Environmental Analysis and Compliance Branch (PE-E).** The Environmental Analysis and Compliance Branch is providing technical support for this project and also preparing the environmental documents needed for the selected plan. They also coordinate with the U.S. Fish and Wildlife Service (USFWS) for the Service's Coordination Act Report. In conjunction with the Service, they develop a mitigation plan to offset the project's impact on environmental and cultural resources. The archeologist in this branch evaluates impacts to cultural/historic resources. Other technical staff in the branch determines the potential for hazardous and toxic waste materials (HTRW) within the study area.

**4.3. Regulatory Office (RO).** As part of environmental compliance, the Regulatory Office provides guidance in accordance with Section 404 of the Clean Water Act and Section 401 water quality certification. Depending on the project scope, the Regulatory Project Manager will issue a nationwide permit or prepare an application for an individual permit on behalf of the applicant. After the designated comment period, a Section 404 permit for the project will be issued, with permit conditions stated.

#### **4.4. CONTRACTING DIVISION.**

**4.4.1. Civil Contracts Branch (CT-C).** This branch administers and provides any professional services contracts that would be needed on the project.

#### **4.5. ENGINEERING AND CONSTRUCTION DIVISION.**

**4.5.1. Civil Design Section (EC-DC).** This section provides the design engineers that develop design features of the selected plan, prepare the quantity estimates, determine the necessary utility relocations, and prepare the signed engineering drawings. They prepare the right-of-way drawings that show the fee acquisition areas needed for the project. These drawings and other information regarding real estate requirements are provided to the Real Estate Division.

**4.5.2. Geotechnical Engineering and Dam Safety Section (EC-DD).** This section coordinates the detailed soil investigation and soils testing needed for design of the selected plan. The work for this study will most likely be performed by contract. This section will provide the typical section to be used by the design engineers. They will also obtain necessary field survey information to verify field conditions for preparation of detailed plans.

**4.5.3. Cost Engineering Section (EC-DA).** The Cost Engineering Section prepares the detailed cost estimate (M-CACES format) from the materials quantities and includes the real estate estimate to determine the project implementation cost of the selected plan.

**4.5.4. Hydrology and Hydraulics (H&H) Branch (EC-HA).** H&H Branch provides the hydrologic and hydraulic data needed to determine the design criteria of the selected plan. They determine the existing and modified hydrologic conditions within the study area and help identify alternative plans. They provide the data needed by the economist in Planning Branch to determine the economic benefits of the proposed plan.

**4.6. REAL ESTATE DIVISION.** Real Estate Division (RE) provides an estimate of the values of the lands, easements, rights-of-way or disposal areas, and associated administrative costs required for the project. Their lands estimate is provided to Cost Engineering Branch for inclusion in the total implementation cost estimate.

**4.7. OFFICE OF COUNSEL.** The Office of Counsel (OC) provides guidance as needed throughout the study. It provides review compliance with the NEPA and legal reviews of draft and final Project Cooperation Agreements prior to construction. This office also provides the preliminary legal opinion of whether a facility or utility being acquired for the project is due compensation.

**4.8. PUBLIC AFFAIRS OFFICE.** The Public Affairs Office (PAO) provides assistance with the public involvement activities needed to keep the public informed of study activities.

**4.9. OPERATIONS DIVISION.** Operations Division (OD) provides a review of the proposed project to determine the costs of operation and maintenance, including rehabilitation, repair, and replacement of features. Operations Division also assists with determination of potential impacts of alternative plans on project operations and project purposes.

**4.10. SOUTHWESTERN DIVISION (SWD) AND HEADQUARTERS (HQUSACE).** SWD provides quality assurance and HQUSACE provides policy guidance on project specific issues. HQUSACE will prepare the Chief of Engineers report signifying approval of the report recommendation. The Assistant Secretary of the Army for Civil Works reviews the report and requests the Office of Management and Budget (OMB) to review it for compliance with the President's program. With approval of the OMB, the report can be released to Congress for authorization and funding.

**4.11. LOCAL SPONSOR.** The Kansas Water Office is the local cost-sharing sponsor for this study and will be considered a study team member. As such they will be highly involved in the study process. The local sponsor will provide in-kind services and a cash contribution during the study that represents 50% of study funding requirements.

**SECTION 5. - RESPONSIBILITY ASSIGNMENT MATRIX**

**5.0. RESPONSIBILITY ASSIGNMENT MATRIX.** The Responsibility Assignment Matrix showing the organizational responsibilities for performance of the Work Breakdown Structure is shown in Table 5.1.

TABLE 5-1

RESPONSIBILITY ASSIGNMENT MATRIX

Major Activities	Local Sponsor	Programs & Project Management	PER	Engineering & Construction	Real Estate	Office Of Counsel	Southwestern Division	Head-quarters
Project Management	X	P						
Plan Formulation	X	X	P	X				
Public Involvement	X	X	P	X	X			
Surveying/mapping				P				
Environmental			P			X		
Socioeconomic			P					
Hydrology/Hydraulics				P				
Geotechnical Data				P				
Design & Costs				P	X			
Real Estate Studies					P	X		
Prepare DPR			P	X	X			
Quality Assurance			X				P	
Policy Compliance		X	X	X	X	X	X	P
Review Support	X	X	P	X	X	X		
WQ Sampling/modeling	X		p					
Note: X = Involvement								
P = Primary								

**SECTION 6. - RESOURCE ALLOCATION PLAN**

**6.0. RESOURCE ALLOCATION PLAN.** The work tasks for this project have been developed through coordination with the various organizational resource elements involved in the study. The following resource table lists the funding amount by Tulsa District organization resources, CEFMS resource codes, and organization symbols.

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TABLE 6-1  
RESOURCE TABLE

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CEFMS RESOURCE CODE	RESOURCE ORGANIZATION	RESOURCE SYMBOL	FUNDING
M500000	Executive Office	CESWT-DE	
M5E0000	Office of Counsel	CESWT-OC	
M5H0000	Program & Project Management	CESWT-PP	
M5H0300	PPMD, Civil Works	CESWT-PP-PM	
M5L1AAA	E&C Division	CESWT-EC	
	H&H Branch	CESWT-EC-HM	
	Cost Estimating Branch	CESWT-EC-CM	
	Civil Design Branch	CESWT-EC-CD	
M5K2000	Plng & Envr Division	CESWT-PE	
M5K2200	Env Anal. & Compliance Br.	CESWT-PE-E	
M5K2100	Planning Branch	CESWT-PE-P	
M5R4000	Regulatory Office	CESWT-RO	
M5N0000	Real Estate Division	CESWT-RE	
M5N0300	RE, Appraisal	CESWT-RE-E	
M5N0500	RE, Acquisition Branch	CESWT-RE-A	
M5P0000	Contracting Division	CESWT-CT	
M5P0500	Contr, Civil Branch	CESWT-CT-C	
M5R0AAA	Operations Division	CESWT-OD	
	Office of Counsel	CESWT-OC	

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## **SECTION 7. - THE REAL ESTATE PLAN**

**7.0. THE REAL ESTATE PLAN.** The Real Estate Plan includes all tasks necessary to provide cost estimates for the real estate activities associated with a proposed alternative. The initial real estate activity is to provide rights-of-entry (ROE) for the any areas that will be investigated. This activity will include identification of property ownerships within the John Dam and Reservoir, Kansas, watershed for potential project lands, and request and processing of rights-of-entry from these owners. Rights-of-entry will be completed prior to any ground investigation activities of Tulsa District staff or its contractors, or local sponsor personnel. The ROE task will be performed by Tulsa District staff.

**7.1. REAL ESTATE APPRAISAL.** An appraisal will be made of the various alternatives considered in the feasibility study. The local real estate market will be researched to gather data about recent sales of comparable properties. The research may involve searching deed records and contacting local appraisers, brokers, attorneys, central appraisal districts, and others knowledgeable of the local real estate market. This market information will be the basis for the valuation of the various properties within the project area. A detailed inspection of selected areas for environmental restoration may be performed. After all fieldwork is completed, a written report will be prepared. Tulsa District staff or Southwestern Division Regional staff will prepare this appraisal.

## **SECTION 8. - MANAGEMENT CONTROL PLAN**

**8.0. MANAGEMENT CONTROL PLAN.** The Project Manager (PM) will manage this feasibility study with periodic assistance and assessment from other members of the team. The lead planner, Real Estate managers, and project team members will conduct day-to-day technical activities to ensure tight control on time and cost of project execution. A variety of management control tools have been provided through the Project Management system and through working level relationships with members of the study team. The tools include computer software designed for project and resource scheduling and funds control. In addition, the PM will have frequent informal contact as well as formal meetings with resource managers and project team members. The District and Division Project Review Boards (PRB) will be kept informed of the project status. In addition, the Corps of Engineers Financial Management System (CEFMS) will be used to control funds within the Tulsa District.

**8.1. REPORTING REQUIREMENTS.** Study status reports will be sent on a quarterly basis to Congressional representatives and Corps higher authority, when requested.

**8.2. CHANGE CONTROL PLAN.** Changes to the scope, cost, or schedules are not forecast at this time. However, it would be unrealistic to expect the project to be completed without some scope, schedule, or cost changes. In the event that a schedule or cost change is needed, the PM and the project delivery team will carefully consider all alternative measures prior to presenting change requests to the District PRB. All measures to prevent or mitigate changes to either the schedule or cost of the project will be evaluated prior to the submission of recommendations to the District PRB. Information submitted to the PRB will fully describe the alternatives considered and the recommendations. The District PRB will evaluate the PM recommendations then will submit them to the Division PRB for action or approval, along with necessary supporting documentation.

**SECTION 9. - REFERENCES TO STATUTES, REGULATIONS,  
AND GUIDANCE**

**9.0. LEGAL REQUIREMENTS.** The principal Engineer Regulation (ER) that guides the Corps of Engineers planning process is ER 1105-2-100, Planning Guidance Notebook, dated 22 April 2000, U.S. Army Corps of Engineers. Appendix A of ER 1105-2-100 contains references to the applicable statutes, public laws, executive orders, and engineering regulations that guide preparation of Corps feasibility studies. Additional references that will be utilized during the completion of work tasks include the following:

EC 1105-2-208, "Preparation and Use of Project Management Plans," 23 December 1994, U.S. Army Corps of Engineers.

EC 1165-2-203, "Technical and Policy Compliance Review," Department of the Army, U.S. Army Corps of Engineers, 15 October 1996.

ER 1110-2-1150, "Engineering and Design of Civil works Projects", 31 August 1999.

ER 5-1-11, "Program and Project Management Regulation," Department of the Army, U.S. Army Corps of Engineers, 4 March 1998.

CECW-PM, Planning Guidance Letter 97-1, "WRDA 96 Implementation," 19 November 1996, U.S. Army Corps of Engineers.

CECW-PE, Planning Guidance Letter 97-10, "Shortening the Planning Process," 26 March 1997, U.S. Army Corps of Engineers.

Economic and Environmental Principles and Guidelines for Water and Related Land Resource Implementation Studies, 1983.

Economic and Environmental Consideration for Incremental Cost Analysis in Mitigation Planning, IWR Report 91-r-1, 1991.

## SECTION 10. - QUALITY CONTROL PLAN

**10.0. PROJECT DELIVERY TEAM.** The study is assigned to and executed under the general funds and schedule management of the PM. The PM is responsible for ensuring that the products and services of the team meet the quality, expectations, and cost/schedule commitments made to the customer. In general, the study is directed by the Lead Planner and is executed by team members. The project delivery team is a multi-disciplinary group consisting of members of the functional elements of the district and may include members from other districts, the A-E community or local sponsor personnel. Team members have adequate training, technical expertise, and experience to perform the work required.

**10.1. STUDY PROGRESS.** Overall progress of the study is maintained through the project schedule and budget. Study progress is also measured through coordination mechanisms, such as monthly Project Review Board meetings, team meetings, in-progress-review meetings, and issue resolution conferences. Review meetings and issue resolution conferences are scheduled to maintain coordination, support, and policy guidance from Division and Headquarters. A Feasibility Scoping Meeting is scheduled to follow the NEPA scoping meeting (public workshop). An Alternative Formulation Briefing is also scheduled to achieve early Headquarters acceptance of the recommendation prior to report preparation.

**10.2. TECHNICAL, LEGAL, AND POLICY REVIEW.** Technical products from plan formulation, environmental, economics, engineering, cost estimating, real estate, and other disciplines essential to preparing a quality report will have an independent technical review. Reviews will be ongoing throughout the study, using a review team of engineers and scientists. The reviewers will represent the appropriate disciplines utilized in the study. Participants include but are not limited to disciplines covering Civil Engineering, Water Resources Planning, Biology, Archeology, Economics, Law, and Real Estate.

10.2.1. The independent technical review team will be composed of senior level technical staff, with oversight provided by senior technical managers. The review team may perform individual or group reviews. They will review the decision document, technical appendix applicable to their discipline, and any A-E contractor reports that are part of the study. Participants of the review team will be provided with a Technical Review Checklist (Figure 10-1). The checklist will facilitate

their review and help ensure that the decision document of the study conforms to regulations, guidance, and sound professional practice. The checklist is not intended to replace the reviewer's technical expertise or engineering judgement. Reviewer concerns or comments should be noted along with the checklist. Review team members will provide written comments to the Lead Planner. The Lead Planner will coordinate a written response through the study team members. The PM will facilitate any meetings with the review and study teams if responses to comments are deemed inadequate. Sponsor issues or concerns will also be resolved through coordination efforts of the PM. Each functional area is responsible for scheduling and coordinating additional checks and/or reviews as required by their functional area. Final responsibility for resolution of technical review issues will reside with the technical functional chief at the District. The functional chief will sign the Certification of Independent Technical Review (Figure 10-2) documenting that major concerns and issues were considered and resolved.

10.2.2. The review team will sign the Completion of Independent Technical Review (Figure 10-3), and District Counsel will sign the Certification of Legal Review (Figure 10-4). The project delivery team and the technical reviewers are listed in Tables 11-1 and 12-1.. (The list will be updated if there are personnel changes or changes in work load.) Documentation of in-progress reviews and the final quality control review will be maintained in the project files and will be available to the PM.

10.2.3. A policy compliance review will be conducted in accordance with guidance provided in EC 1165-2-203, dated 15 October 1996. The policy compliance review ensures that the proposed action is consistent with the overall goals and objectives of the Civil Works program. An important milestone in policy review occurs at the Alternative Formulation Briefing. At this briefing, policy issues that have been identified will be addressed. Appendix B of EC 1165-2-203 presents a checklist of items considered during that review.

**10.3. COORDINATION DOCUMENTATION.** Project information documenting project delivery team meetings, study status, decisions, or issue resolution is maintained in the District's project files. This includes technical review coordination and completion and the Certifications of Technical and Legal Review. Examples of other pertinent technical data or correspondence available in the project files include:

Site maps/locations of the project area  
Real estate requirements, including right-of-entry  
permits, right-of-way maps, and easements  
Technical data and appendix  
Environmental Assessment, EIS, and FONSI  
Section 404 Determination and Permit  
Technical review comments  
Fact sheets  
Project related correspondence and memoranda  
Letter of support

**FIGURE 10-1**  
**TECHNICAL REVIEW CHECKLIST**

1. **STUDY AUTHORITY.** Does the study conform to the intent of the cited study authority?

2. **SCOPE OF INVESTIGATION**

a. Have the water resource related problems been fully and clearly evaluated?

b. Have all significant resource uses been adequately considered?

c. Have all foreseeable short- and long-term needs been adequately considered?

3. **OBJECTIVE OF INVESTIGATION.** Are planning objectives clearly stated?

4. **PLAN FORMULATION**

a. Have the assumptions and rationale for the without-project condition been explicitly stated and are they reasonable?

b. Have all reasonable alternatives, including nonstructural and no action plans, been adequately addressed?

c. Have alternatives that are not implementable by the Corps been fully considered?

d. For water supply, has a range of measures been adequately considered that can, over time, balance water demand for various purposes with water availability?

e. Has a justified plan been identified and properly evaluated?

f. Have a sufficient number of alternatives been analyzed to determine if there is a justified plan?

g. Is there sufficient rationale for any recommended departure from the NED plan?

- h. Are the reasons for selection of major elements of the recommended plan sound and adequate?
- i. Does the selected plan conform to existing policy? If not, have the reasons for departure been adequately documented?
- j. Would staged construction be appropriate?
- k. Is the selected plan consistent with applicable comprehensive plans for the area?
- l. Have both beneficial and adverse effects been adequately evaluated for the selected plan and alternatives?
- m. Has acquisition of necessary land for future project elements been adequately considered?

**5. ECONOMIC ANALYSIS**

- a. Has adequate consideration been given to trade-offs between economic and environmental effects?
- b. Do the combined beneficial economic and environmental quality effects outweigh the combined adverse economic and environmental effects?
- c. Are separable features, including mitigation measures, incrementally justified?
- d. Does the report state the benefit-to-cost ratio (BCR) for the recommended plan assuming existing conditions prevail over the period of analysis?
  - 1. Annual Charges
    - (a) Do the interest rate and the amortization period conform to present practice?
    - (b) Has interest during construction been correctly calculated and included in the economic analysis?
  - 2. Benefit Evaluation
    - (a) Have NED benefits been evaluated in accordance with appropriate guidelines and procedures? If not,

are acceptable reasons for deviation from standard procedures furnished?

(b) Is the benefit estimate mathematically correct?

(c) Are the assumptions regarding future alternative conditions clearly stated and justified, and are these assumptions reasonable?

(d) Have all known benefits been included in the benefit estimate?

(e) Are the economic projections reasonable?

(f) Have methodologies and assumptions been explained in sufficient detail?

(g) Is the information and data adequate to reasonably support the benefit estimate?

(h) Is the without-project condition reasonable and believable, and does it actually reflect how non-Federal interests will act if the resource under study is not developed?

(i) Have possibilities of windfall benefits and appropriate special cost sharing been thoroughly investigated?

(j) Are average annual benefits on the same time basis as average annual costs?

(k) Have possible negative benefits been adequately considered and evaluated?

(l) If NED employment benefits are claimed, is the area still eligible?

(m) If as a result of investigations by planning and regulatory staffs it is apparent that an activity to be conducted by a project beneficiary is not in the public interest, has (have) the projected economic benefit(s) associated with that activity been eliminated?

(n) If recreation benefits are claimed, does the report include an adequate description of competing

facilities and their existing and expected future use with and without the proposed project? Also, does the report adequately distinguish between and describe the impacts on peak versus average use in the with- and without-project conditions?

**6. HYDROLOGY AND HYDRAULICS**

- a. Does the hydrologic and hydraulic engineering analysis conform to current criteria?
- b. Have water control plans been developed to the point that pertinent regulation schedules and water control diagrams have been prepared?
- c. Have the regulation schedules and water control diagrams been coordinated with the local sponsor/project owner?
- d. Has an interim water control plan for control of water during construction been prepared?
- e. If this is the final document before plans and specifications, are all necessary engineering studies to assure that the proposed project will function as intended (including physical and mathematical models) completed or ongoing during PED?
- f. Have the engineering analyses identified project impacts upstream and downstream of the project?
- g. Are the residual flooding problems and other necessary project impact information adequate to form a basis for the OMR&R cost estimate and to provide a full disclosure of project performance for the local sponsor?

**7. RISK AND UNCERTAINTY - SENSITIVITY ANALYSIS**

- a. Have the plans and their effects been sufficiently examined to determine the uncertainty inherent in the data or in the assumptions of future economic, demographic, social, attitudinal, environmental, and technological trends?
- b. Have the areas of sensitivity been adequately identified and proper analysis performed so that decisions can be made with knowledge of the degree of reliability of available information?
- c. Does the report address the risk and uncertainty of the without-project condition assumptions, and does it test for sensitivity?

d. Have the advantages and costs of reducing risk and uncertainty been adequately considered in the planning process?

**8. ENGINEERING**

a. Is the supporting engineering data of sufficient detail to adequately describe the proposed design?

b. Have adequate subsurface investigations been made to reasonably assure that the foundation is satisfactory?

c. Does the structural stability analysis conform to current criteria?

d. Are special design provisions required for seismic resistance?

e. Has an adequate inspection and monitoring plan been developed and a means of providing feedback to the designers been provided?

f. Is the proposed project based on sound engineering, and will the intended purpose be performed over the life of the project?

g. Is the construction schedule and period reasonable?

h. Are there any potential problems that could result from structural failure or operational procedure? If so, are measures proposed or available to minimize or eliminate the impact?

i. Are there any potential problems that could result from a catastrophic natural event? If so, are measures proposed or available to minimize or eliminate the impact?

j. Have all the necessary project features assumed in the engineering analysis, both existing or proposed (either by the Corps project or some other future effort), been identified and any necessary real estate subjugation taken to ensure project function and viability over the life of the project?

9. **OPERATION, MAINTENANCE, AND REPLACEMENT**

- a. Does the report indicate the physical criteria for satisfactory project performance that can be used as a basis for establishing sponsor's operation, maintenance, and repair and land use management responsibilities?
- b. Are annual costs for operation, maintenance, and replacement reasonable?

10. **REAL ESTATE PLAN**

- a. Do the real estate interests to be acquired adequately reflect land requirements necessary for recommended project elements?
- b. Are the cost estimates for land requirements reasonable?
- c. Is the acquisition schedule for land requirements reasonable?
- d. Are there estimates of the number and types of ownership?
- e. Is there an estimate of the acreage involved in each project purpose?
- f. Does the study include the proposed estates, and are they appropriate?
- g. Is there an estimate of the number of Uniform Relocation Assistance displaced persons and businesses?
- h. Is there an estimate of the number and type of utility or facility relocations?
- i. Does the initial Real Estate Cost Estimate include estimates for lands and damages, including lands associated with the relocation of facilities, utilities, etc.; URA relocations; and administrative costs to acquire the necessary land and contingencies?

## 11. COST ESTIMATES

- a. Are quantity and cost estimates reasonable and in adequate detail?
- b. Are cost estimates assembled by the code of accounts in EC 1110-2-538?
- c. Are contingency allowances documented and distributed? Are they adequate to ensure high probability of achieving implementation within estimated costs?
- d. Are engineering and design and supervision and administration charges reasonable and/or in conformance with current experience?
- e. Have induced and associated costs been given proper treatment? Is this mitigation/environmental?
- f. Has the work to be performed by local interests, as required by the items of local cooperation, been properly included in the cost estimate?
- g. Have trade-offs between risk and costs been explicitly identified as areas for detailed evaluation in proper design?
- h. Does the overall project cost estimate reflect the costs associated with State and local permit actions required to implement the recommended plan?

## 12. COST ALLOCATION

- a. Is the cost allocation in conformance with existing policies?
- b. Has the necessity for sub-allocation been adequately considered?
- c. Have all project purposes been included in the allocation?

13. COST APPORTIONMENT

- a. Is the apportionment of cost to local interests in conformance with present policy and evaluation procedure?
- b. Are there special circumstances associated with the project that warrant consideration of increased non-Federal cost sharing?

14. COMPLIANCE WITH NATIONAL ENVIRONMENTAL POLICY ACT

- a. Have the necessary technical studies and coordination been conducted in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, and other applicable environmental laws?
- b. Has mitigation of adverse effects been considered in each alternative plan and evaluated in accordance with appropriate Corps of Engineer guidelines?
- c. Is the appropriate NEPA document (EA/FONSI or EIS) included in the report?
- d. Has the NEPA document been developed and coordinated in accordance with ER 200-2-2?
- e. Have the environmental impacts of all reasonable alternatives been properly evaluated and displayed?
- f. Will the activity to be conducted require a Department of the Army permit (e.g., Section 404 or Section 10 permit), and if so, has the activity been included in the environmental documentation of the project as required by the NEPA?
- g. Is the appropriate Fish and Wildlife Coordination Act document included in the report?
- h. Have HTRW site assessment results been incorporated in environmental considerations?
- i. Is Section 7 coordination required on endangered species?

j. Have environmental issues been adequately and thoroughly considered in plan formulation, including impacts on historic and cultural resources?

**15. COORDINATION**

a. Has there been adequate coordination with appropriate State, local, and Federal agencies and have their views been considered in formulating the recommended plan?

b. Has coordination conformed to law, executive orders, and agreements between agencies, and, if not, has the departure been satisfactorily explained?

c. Have the proper preservation, conservation, historical, and scientific interests been consulted, and were their views given adequate consideration during plan formulation?

**16. PUBLIC INVOLVEMENT**

a. Was adequate public involvement conducted during the planning process to fully inform interested parties and to ascertain their views?

b. Have any international implications associated with the recommended plan been properly addressed?

**17. LOCAL COOPERATION**

a. Are the items to be furnished by local interests those normally required under the law and by present policy, and, if not, is adequate support given for classifying the items as those to be furnished by local interests?

b. If recreation or fish and wildlife enhancement is included in multiple-purpose projects, is a letter of intent from non-Federal interests included in accordance with Public Law 89-72?

c. Have reporting officers established that local interests fully understand and are willing and capable of furnishing the local cooperation specified?

d. Has the non-Federal sponsor requested special conditions different from provisions in the model PA, and, if so, have these conditions been agreed to by HQUSACE and the ASA(CW)?

**18. FINANCIAL ANALYSIS**

a. Does the report include a letter of intent to cost share from the non-Federal sponsor?

b. Does the non-Federal sponsor's letter of intent to cost share provide evidence of the sponsor's authority to utilize the identified source or sources of funds and provide information on the non-Federal sponsor's capability to obtain remaining funds, if any?

c. If the sponsor is relying on third party contributions, does the letter of intent include comparable data for the third party together with evidence of its legal commitment to the sponsor?

d. If a non-Federal sponsor's financing depends on contributions of funds by a third party or parties, and the non-Federal sponsor does not have the capability to meet its financial obligations without said contribution, does the report have a separate statement of financial capability and financing plan for the contributions from the third party or parties?

**19. POLICY ASPECTS**

a. Does the proposed project conform to policies established by law and USACE directives governing Federal participation?

b. Has the review considered current Administration policies and decisions, as well as directions, actions, and interpretations by the OMB and the ASA (CW)?

**FIGURE 10-2**  
**CERTIFICATION OF INDEPENDENT TECHNICAL REVIEW**

Significant concerns and the explanation of the resolution are as follows:

(Describe the major technical concerns, possible impact and resolution)

As noted above, all concerns resulting from independent technical review of the project have been considered. The report and all associated documents required by the National Environmental Policy Act have been fully reviewed.

\_\_\_\_\_  
Chief, Planning and Environmental  
Division

\_\_\_\_\_  
Date

\_\_\_\_\_  
Chief, Engineering and Construction  
Division

\_\_\_\_\_  
Date

\_\_\_\_\_  
Chief, Operations Division

\_\_\_\_\_  
Date

\_\_\_\_\_  
Chief, Real Estate Division

\_\_\_\_\_  
Date

**FIGURE 10-3**  
**COMPLETION OF INDEPENDENT TECHNICAL REVIEW**

The District has completed the feasibility study of the John Redmond Dam and Reservoir, Kansas, Watershed. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project, as defined in the Quality Control Plan. During the independent technical review, compliance with established policy principles and procedures utilizing justified and valid assumptions was verified. This included review of assumptions, methods, procedures, and material used in analyses; alternatives evaluated; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing Corps policy. An independent District team accomplished the independent technical review.

\_\_\_\_\_  
Technical Review Team Leader

\_\_\_\_\_  
Date

Signatures Team Members:

**FIGURE 10-4**  
**CERTIFICATION OF LEGAL REVIEW**

The draft report, John Redmond Dam and Reservoir, Kansas, Watershed Feasibility Study, including all associated documents required by the National Environmental Policy Act, has been fully reviewed by the Office of Counsel, Tulsa District and is approved as legally sufficient.

\_\_\_\_\_  
DISTRICT COUNSEL

\_\_\_\_\_ day of \_\_\_\_\_, 200\_

## SECTION 11. - PROJECT DELIVERY TEAM MEMBERS

**11.0. PROJECT DELIVERY TEAM MEMBERS.** The team for the John Redmond Dam and Reservoir, Kansas Watershed Feasibility Study will be comprised of team members from Programs and Project Management Division, Planning and Environmental (PE) Division, Real Estate Division, Public Affairs Office, Office of Counsel, Regulatory Office, Contracting Division, Engineering & Construction Division, Operations Division and the local sponsor. Collectively, the team members are responsible for reviewing the progress of the portion of the study for which they are responsible, identifying potential problem areas and determining actions required for the resolution of any problems. The Project Manager (PM) will serve as the Corps of Engineers team leader and is the primary point of contact with the customer. The PM will manage resources, data and commitments for this program. Effective coordination is essential for study execution, therefore informal communications are encouraged for information gathering and coordination purposes and the team will use formal lines of communication only when a scope definition or cost issue requires resolution. Functional managers and branch and section chiefs will use the commercial software package Microsoft Project to ensure that manpower and staffing requirements are sufficient to provide the necessary resources in a timely manner. That software is capable of managing multiple projects and tasks and will be used in conjunction with other project management software to keep the project schedule and the PMP up to date. A listing of team members is shown in the following table.

**TABLE 11-1****JOHN REDMOND DAM AND RESERVOIR, KANSAS WATERSHED  
FEASIBILITY STUDY PROJECT DELIVERY TEAM MEMBERS**

NAME	TITLE	ADDRESS	TELEPHONE/FAX
Cynthia Kitchens	Project Manager	USAED -Tulsa District	Phone: 918-669-7042 FAX 918-669-7546
Steve Nolen	Envr. Analysis & Compliance Br Chief	USAED -Tulsa District	Phone: 918-669-7660 FAX 918-669-7546
Marc Masnor	PE-P - Lead Planner	USAED -Tulsa District	Phone: 918-669-7349 FAX 918-669-7546
Tony Clyde	PE-E Limnologist	USAED -Tulsa District	Phone: 918-669-7556 FAX 918-669-7546
David Gade	PE-E Limnologist	USAED -Tulsa District	Phone: 918-669-7579 FAX 918-669-7546
Russ Wyckoff	EC-HA Hydrologist	USAED -Tulsa District	Phone: 918-669-7107 FAX 918-669-7579
Mark Burkholder	E&C - Civil Design Chief	USAED -Tulsa District	Phone: 918-669-7146 FAX 918-669-7579
Ken Shingleton	PE-E Archeologist	USAED -Tulsa District	Phone: 918-669-7661 FAX 918-669-7546
Keith Francis	OC - Legal	USAED -Tulsa District	Phone: 918-669-7364 FAX 918-669-7579
James Fry	OD-KF John Redmond Project Manager	USAED -Tulsa District	Phone: 316-321-9974 FAX 620-658-4919

**TABLE 11-1 (Cont'd)**

**JOHN REDMOND DAM AND RESERVOIR, KANSAS WATERSHED  
FEASIBILITY STUDY PROJECT DELIVERY TEAM MEMBERS**

NAME	TITLE	ADDRESS	TELEPHONE/FAX
Rick Gardner	RE-A Lead Realty Specialist	USAED -Tulsa District	Phone: 918-669-7090 FAX 918-669-xxxx
	USFWS	Kansas	Phone: 316-xxx-xxxx FAX 316-xxx-xxxx
	Kansas Water Office	Kansas	Phone: 316-xxx-xxxx FAX 316-xxx-xxxx
	Kansas Biological Survey	Kansas	Phone: 316-xxx-xxxx FAX 316-xxx-xxxx
	Kansas State University	Manhattan, Kansas	Phone: 316-xxx-xxxx FAX 316-xxx-xxxx
	USGS		Phone: xxx-xxx-xxxx FAX xxx-xxx-xxxx
	WRAPS	Kansas	Phone: 316-xxx-xxxx FAX 316-xxx-xxxx
	KS Parks & Wildlife		

**SECTION 12. - INDEPENDENT TECHNICAL REVIEW**

12.0. **INDEPENDENT TECHNICAL REVIEW TEAM MEMBERS**. Fort Worth District will be responsible for the Independent Technical Review (ITR) of this study.

**TABLE 12-1  
INDEPENDENT TECHNICAL REVIEW TEAM MEMBERS**

<b>NAME</b>	<b>EXPERTISE</b>	<b>PHONE</b>
Elston Eckhardt	Plan Formulation	817-886-1681
Steve Armstrong	Civil	
Craig Loftin	Hydrology/Hydraulics	
Milton Schmidt	Cost Engineering	
Anita Branch	Geotech	
Mead Sams	Economics	
Rocky Lee	Real Estate	
Mark Harberg	Environmental	

**APPENDIX A**  
**FEASIBILITY COST ESTIMATE**

<b>Primary Task</b>	<b>Primary Agency</b>	<b>Total Cost</b>
Bathymetric mapping	KSBS	\$30,000
SWAT Watershed modeling	KSU (Corps Review)	\$33,000
Reservoir Modeling- CE-QUAL-W2	Corps (KSBS Review)	\$50,000
Riparian / Channel Assessment	KWO/KSU	\$40,000
Assessment of Log Jam Alternatives	KWO	\$30,000
Initial Dredging Assessment	Corps	\$50,000
Sediment Mgmt. on Corps of Engineers lands	Corps	\$12,000
Gage installation and continuous turbidity monitoring	USGS	\$200,000
Feasibility Study and Report Economic Analysis(\$25K) Alternative Formulation(\$20K) Feasibility Scoping Meeting(\$5K) Plan Evaluation(\$20K) Hydrology(\$25K) Preliminary Design and cost estimates(\$15K) Alternative Screening(\$15K) Prepare Draft report(\$20K) Independent Technical Review(\$25K) Prepare draft final report(\$20K) HQ review (\$0) Final Report(\$10K) Chiefs Signature(\$0)	Corps	\$200,000
NEPA documentation Public Meeting(\$10) Environmental Analysis(\$25) Cultural Resource Analysis(\$5) Prepare Draft report(\$15) Independent Technical Review(\$10) Prepare draft final report(\$10) HQ review(\$0) Final Report(\$5)	Corps	\$80,000
Establish sediment mgmt goals	WRAPS Teams**	0
Strategies for sediment mgmt	WRAPS Teams**	0
Total Feasibility Study Estimate		\$725,000.00
50% Cost Share		\$362,500.00
Local Sponsor In-Kind		\$133,000.00
Local Sponsor Cash		\$229,500.00

**APPENDIX B**  
**PROJECT SCHEDULE**

**APPENDIX C**  
**FEASIBILITY COST SHARING AGREEMENT**

**APPENDIX D**

**NEOSHO RIVER BASIN, KANSAS SECTION 905(b) ANALYSIS (WRDA 86)**