

SUPPLEMENTAL WATERSHED PLAN NO. IV & ENVIRONMENTAL ASSESSMENT

FOR REHABILITATION OF FLOODWATER RETARDING
STRUCTURE NO. 5 OF THE PLUM CREEK WATERSHED



HAYS, CALDWELL, AND TRAVIS COUNTIES, TEXAS

PREPARED BY



IN COOPERATION WITH

Caldwell-Travis Soil and Water Conservation District

Hays County Soil and Water Conservation District

Plum Creek Conservation District

OCTOBER 2008

**Supplemental Watershed Plan No. IV & Environmental Assessment
For
Rehabilitation of Floodwater Retarding Structure No. 5
of the
Plum Creek Watershed
Hays, Caldwell, and Travis Counties, Texas**

Prepared By:
U.S. Department of Agriculture
Natural Resources Conservation Service

In Cooperation With:
Caldwell-Travis Soil and Water Conservation District
Hays County Soil and Water Conservation District
Plum Creek Conservation District

AUTHORITY

The original watershed work plan was prepared, and works of improvement have been installed, under the authority of the Watershed Protection and Flood Prevention Act of 1954 (Public Law 83-566) as amended. The rehabilitation of floodwater retarding structure No. 5 is authorized under Public Law 83-566 (as amended), and as further amended by Section 313 of Public Law 106-472

ABSTRACT

Historical floods in the past forty-four years since Floodwater Retarding Structure No. 5 was constructed have caused the auxiliary spillway to function on at least two occasions. Urban development has occurred adjacent to the detention pool, auxiliary spillway and embankment areas. A significant increase in local traffic has occurred downstream of FRS No. 5 due to urbanization in the vicinity and the construction of a new nearby high school. These factors have caused concerns regarding the hydraulic capacity of the dam and human health and safety. As a result, the dam has been reclassified as a high hazard class (c) dam which fails to comply with current dam safety and performance criteria. Local project sponsors have chosen to rehabilitate the dam to address the identified safety deficiencies. The purposes of the proposed rehabilitation of floodwater retarding structure No. 5 are to maintain present level of flood control benefits and comply with current performance and safety standards. Rehabilitation of the site will require the following modifications to the structure: raise the top of the dam 3.5 feet with earth fill, install a new 24" hooded inlet type principal spillway, connect the existing principal spillway and new principal spillway outlets to discharge into a newly installed impact basin, install a toe drain system, lower the auxiliary spillway crest 0.4 foot and install a splitter dike. Project installation cost is estimated to be \$2,383,400, of which \$1,693,800 will be paid from the Small Watershed Rehabilitation funds and \$689,600 from local funds.

COMMENTS AND INQUIRIES

Comments and inquires must be received by April 25, 2008. Submit comments and inquires to: Steven Bednarz, Assistant State Conservationist, Water Resources, USDA/NRCS, 101 South Main, Temple, Texas 76501 (254-742-9871).

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

SUPPLEMENTAL WATERSHED AGREEMENT NUMBER IV

Between the

Plum Creek Conservation District (PCCD)

Local Organization

Caldwell-Travis Soil and Water Conservation District (Caldwell-Travis SWCD)

Local Organization

Hays County Soil and Water Conservation District (Hays County SWCD)

Local Organization

(Hereinafter referred to as the Sponsoring Local Organization)

and the

Natural Resources Conservation Service

United States Department of Agriculture

(Hereinafter referred to as the NRCS)

Whereas, The Watershed Work Plan Agreement for Plum Creek Watershed, State of Texas, executed by the Sponsoring Local Organization named therein and the Service, became effective on the 18th day of August, 1960; and

Whereas, the Supplemental Watershed Work Plan Agreement for Plum Creek Watershed, State of Texas, executed by the Sponsoring Local Organization named therein and the Service, became effective on the 16th day of July, 1971; and

Whereas, the Supplemental Watershed Work Plan Agreement No. II for Plum Creek Watershed, State of Texas, executed by the Sponsoring Local Organization named therein and the Service, became effective on the 24th day of May, 1978; and

Whereas, the Supplemental Watershed Work Plan Agreement No. III for Plum Creek Watershed, State of Texas, executed by the Sponsors named therein and the SCS, became effective on the 12th day of January, 1995; and

Whereas, in order to carry out the watershed work plan for said watershed, it has become necessary to modify said Watershed Work Plan Agreement; and

Whereas, in order to extend the watershed plan for said Floodwater Retarding Structure (FRS) No. 5 beyond its current evaluated life, it has become necessary to modify said watershed agreement; and

Whereas, the rehabilitation of said FRS No.5 has been authorized under the authority of the Watershed Protection and Flood Prevention Act (PL 83-566) as amended by the Watershed Rehabilitation Amendments (PL 106-472) provides the authority for rehabilitation; and

Whereas, it has become necessary to modify said watershed work plan by modifying FRS No. 5 to bring it up to current performance and safety standards and to extend the service life of the dam for an additional 100 years; and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to the NRCS; and

Whereas, a Supplemental Watershed Plan/Environmental Assessment which modifies the Watershed Work Plan for said watershed has been developed through the cooperative efforts of the Sponsoring Local Organization and the NRCS, which plan is annexed to and made a part of this agreement; and

Now, therefore, the Secretary of Agriculture through the NRCS and the Sponsoring Local Organization hereby agree upon the following modifications of the terms, conditions, and stipulations of said watershed agreement,

(1) Paragraph No. 2 is modified to read as follows:

The Sponsoring Local Organization will acquire or provide assurance that landowners or water users have acquired such water, mineral, or other natural resources rights pursuant to State law as may be needed in the installation and operation of the works of improvement. Any costs incurred shall be borne by the Sponsoring Local Organization and these costs shall not be considered part of the total cost when calculating any cost share.

(2) Paragraph No. 12 is modified to read as follows:

This plan may be amended or revised only by mutual agreement of the parties hereto, except that NRCS may de-authorize or terminate funding at any time it determines that the sponsoring local organization has failed to comply with the conditions of this agreement. In this case, NRCS shall promptly notify the sponsoring local organization in writing of the determination and the reasons for the de-authorization of project funding, together with the effective date. Payments made to the sponsoring local organization or recoveries by NRCS shall be in accord with the legal rights and liabilities of the parties when project funding has been de-authorized. An amendment to incorporate changes affecting a specific measure may be made by mutual agreement between NRCS and the sponsoring local organization having specific responsibilities for the measure involved.

(3) Paragraph No. 14 is modified to include the most recent provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act as follows:

The sponsoring local organization hereby agrees to comply with all of the policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. 4601 et. seq. as further provided by Uniform Relocation Assistance and Real Property Acquisition for Federally Assisted Programs, 49 CFR Part 24, and 7 C.F.R. Part 21) when acquiring real property interests for this federally assisted project. If the sponsoring local organization is legally unable to comply with the real property acquisition requirements of the Act, it agrees that, before any Federal financial assistance is furnished; it will provide a statement to that effect, supported by an opinion of the chief legal officer of the state containing a full discussion of the facts and law involved. This statement may be accepted as constituting compliance.

(4) Paragraph No. 15 is modified to include the most recent non-discrimination statement as follows:

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotope, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 795-6382 (TDD). USDA is an equal opportunity provider and employer.

(5) Paragraph No. 16 in accordance with Certification Regarding Drug-Free Workplace Requirements (7 CFR 3017, Subpart F) is modified to read as follows:

By signing this Watershed Agreement, the sponsoring local organization is providing the certification set out below. If it is later determined that the sponsoring local organization knowingly rendered a false certification, or otherwise violated the requirements of the Drug-Free Workplace Act, the NRCS, in addition to any other remedies available to the Federal Government, may take action authorized under the Drug-Free Workplace Act.

Controlled substance means a controlled substance in Schedules I through V of the Controlled Substances Act (21 U.S.C. 812) and as further defined by regulation (21 CFR 1308.11 through 1308.15);

Conviction means a finding of guilt (including a plea of nolo contendere) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes;

Criminal drug statute means a Federal or non-Federal criminal statute involving the manufacturing, distribution, dispensing, use, or possession of any controlled substance;

Employee means the employee of a grantee directly engaged in the performance of work under a grant, including: (i) all direct charge employees; (ii) all indirect charge employees unless their impact or involvement is insignificant to the performance of the grant; and, (iii) temporary personnel and consultants who are directly engaged in the performance of work under the grant and who are on the grantee's payroll. This definition does not include workers not on the payroll of the grantee (e.g., volunteers, even if used to meet a matching requirement; consultants or independent contractors not on the grantees' payroll; or employees of sub-recipients or subcontractors in covered workplaces).

Certification:

A. The sponsoring local organization certify that they will or will continue to provide a drug-free workplace by:

- (1) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against

employees for violation of such prohibition;

- (2) Establishing an ongoing drug-free awareness program to inform employees about: –
 - (a) The danger of drug abuse in the workplace;
 - (b) The grantee’s policy of maintaining a drug-free workplace;
 - (c) Any available drug counseling, rehabilitation, and employee assistance programs; and
 - (d) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.
 - (3) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (1);
 - (4) Notifying the employee in the statement required by paragraph (1) that, as a condition of employment under the grant, the employee will:
 - (a) Abide by the terms of the statement; and
 - (b) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction;
 - (5) Notifying the NRCS in writing, within ten calendar days after receiving notice under paragraph (4) (b) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notice shall include the identification number(s) of each affected grant;
 - (6) Taking one of the following actions, within 30 calendar days of receiving notice under paragraph (4) (b), with respect to any employee who is so convicted—
 - (a) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or
 - (b) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency.
 - (7) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (1), (2), (3), (4), (5), and (6)
- B. The sponsoring local organization may provide a list of the site(s) for the performance of work done in connection with a specific project or other agreement.

C. Agencies shall keep the original of all disclosure reports in the official files of the agency.

(6) Paragraph No. 19 regarding the term of Supplemental Watershed Agreement No. IV is added to read as follows:

The term of this supplemental watershed agreement is for the evaluated life of the rehabilitation of FRS No. 5 (100 years) and does not commit the NRCS to assistance of any kind beyond the end of the evaluated life of rehabilitated FRS No. 5 unless agreed to by all parties. The 100 year term of this supplemental watershed agreement applies only to the specific portions of the agreement directly related to the rehabilitation of FRS No. 5.

(7) Paragraph No. 20 regarding the Rehabilitation of Floodwater Retarding Structure (FRS) No. 5 is added to read as follows:

The amount and percentages of the Total Eligible Project Cost to be paid by the PCCD and the NRCS are as follows:

<u>Works of Improvement</u>	<u>PCCD</u>	<u>NRCS</u>	<u>Total Eligible Project Cost</u>
Rehabilitation of FRS No.5	\$689,600 35%	\$1,280,600 65%	\$1,970,200 100%

The NRCS is responsible for the engineering services and project administration costs (\$413,200) it incurs. However, these costs are not used in the calculation of the federal cost share. Therefore, they are not included in Total Eligible Project Cost above. Also, costs of water, mineral and other resource rights, as well as federal, state and local permits are the responsibility of the PCCD and are not counted toward local cost share.

An amount up to the percentage rate specified may be satisfied by the PCCD for rehabilitation cost of an element such as engineering, real property acquisition or construction. The decision to, and arrangements for, such action will be negotiated between the PCCD and the NRCS and will be included in a project agreement executed immediately before implementation. The costs to the NRCS will not exceed 100 percent of the construction cost.

(8) Paragraph No. 21 regarding Operation and Maintenance (O&M) of rehabilitated FRS No. 5 is added to read as follows:

The Sponsoring Local Organization will be responsible for the operation, maintenance, and any needed replacement of parts or portions of rehabilitated FRS No. 5 that have a service life of less duration than the evaluated life (100 years) of the structure by actually performing the work or arranging for such work, in accordance with a new O&M Agreement. The new O&M agreement will be entered into before federal funds are obligated and continue for the evaluated life. Although the Sponsoring Local Organization's responsibility to the Federal Government for O&M ends when the O&M Agreement expires, the Sponsoring Local Organization acknowledges that continued responsibilities associated with works of improvement may exist beyond the evaluated life. Specifically, the PCCD will be responsible for the operation and maintenance of rehabilitated FRS No. 5, with participation from the Hays County SWCD, as indicated in the new operation and maintenance agreement.

(9) Paragraph No. 22 regarding an Emergency Action Plan is added to read as follows:

The Sponsoring Local Organization agrees to develop an Emergency Action Plan (EAP) before any rehabilitation construction activities begin stating the responsibilities for the development, implementation and review of actions necessary to provide safety to individuals downstream of FRS No. 5 should extreme flooding occur.

(10) Paragraph No. 23 is added to read as follows:

The Sponsoring Local Organization agrees to participate in and comply with applicable Federal flood plain management and flood insurance programs before construction starts.

(11) Paragraph No. 24 is added to read as follows:

The Sponsoring Local Organization will obtain and bear the cost for all necessary Federal, State, and local permits required by law, ordinance, or regulation for installation of the works of improvement. These costs shall not be considered part of the total cost when calculating any cost share.

The Sponsoring Local Organization and the NRCS further agree to all other terms, conditions, and stipulations of said watershed agreement not modified herein.

Caldwell-Travis Soil and Water Conservation District

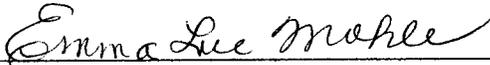
Local Organization

By 

Title President

Date 8/13/08

The signing of this agreement was authorized by a resolution of the governing body of the Caldwell-Travis SWCD adopted at a meeting held on 8-13-08.


(Secretary, Local Organization)

Hays County Soil and Water Conservation District

Local Organization

By 

Title Chairman

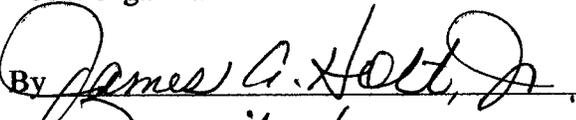
Date Oct. 8, 2008

The signing of this agreement was authorized by a resolution of the governing body of the Hays County SWCD adopted at a meeting held on Oct 8, 08.


(Secretary, Local Organization)

Plum Creek Conservation District

Local Organization

By 

Title President

Date Oct 21, 2008

The signing of this agreement was authorized by a resolution of the governing body of the Plum Creek Conservation District adopted at a meeting held on 10/21/08.


(Secretary, Local Organization)

Natural Resources Conservation Service
United States Department of Agriculture

Approved By Donald W. Gohmert
NRCS State Conservationist

Date OCT 22 2008

Table of Contents

Supplemental Watershed Agreement No. IV	iii
Summary of Supplemental Watershed Plan No. IV and Environmental Assessment	1
Project Name	1
Sponsors	1
Description of Recommended Plan	1
Resource Information	1
Problem Identification	2
Alternative Plans Considered	3
Description of Alternatives	3
Project Purpose	4
Principal Project Measure	4
Project Costs	4
Project Benefits	4
Other Impacts	5
Environmental Values Changed or Lost	5
Major Conclusions	5
Areas of Controversy	5
Issues to be Resolved	5
Purpose and Need for Action	6
Introduction	6
Purpose and Need for the Project	6
Watershed Problems and Opportunities	7
Scope of the Environmental Assessment	8
Affected Environment	9
Existing Conditions	9
Original Project	9
Description of Existing Dam	9
Existing Structural Data	11
Physical Features and Environmental Factors	11
Status of Operation and Maintenance	15
Sedimentation	15
Breach Analysis and Hazard Classification	15
Potential Modes of Dam Failure	16
Consequences of Dam Failure	18
Alternatives	23
Formulation Process	23
Alternatives Considered but Eliminated from Detail Study	23
Description of Alternative Plans	24
Comparison of Alternatives	27
Environmental Consequences	29
Dam Safety	29
Human Health and Safety	29
Flood Damages	30
Threatened and Endangered Species	30
Cultural and Historic Resources	30
Prime Farmland	31
Wetlands	31
Air Quality	31
Water Quality	32
Water Quantity	32
Aesthetics	32
Sedimentation	33
Land Values	33
Fish and Wildlife Habitat	34
Recreational Opportunities	35

Environmental Justice	35
Cumulative Impacts.....	35
Controversy	36
Risk and Uncertainty	36
Consultation and Public Participation	37
Project Sponsors.....	37
Planning Team.....	37
Public Participation	37
Provisions of the Preferred Alternative	39
Preferred Alternative	39
Rationale for Alternative Preference	39
Purpose	40
Measures to be Installed.....	40
Comparison of Structural Data	40
Permits, Compliance and Requirements Prior to Construction	41
Potential Permits Needed	41
Compliance with Local, State, and Federal Laws	41
Operation, Maintenance, and Replacement Agreement	41
Memorandum of Understanding	42
Project Agreement.....	42
Emergency Action Plan.....	42
Cost, Installation and Financing.....	42
References	43
List of Preparers	45
Steering Committee Members	46
Appendices	47
Appendix A – Tables 1 through 6.....	48
Table 1 Estimated Installation Cost	59
Table 2 Estimated Cost Distribution, Structural and Non-Structural Measures	50
Table 3 Revised Structural Data – Dam with Planned Storage Capacity.....	51
Table 4 Estimated Average Annual NED Costs	53
Table 5 Estimated Average Annual Flood Damage Reduction Benefits	54
Table 6 Comparison of NED Benefits and Costs.....	55
Appendix B – Letters and Oral Comment Received on Draft Supplemental Plan - EA.....	56
Discussion and Disposition of Comments on Final Draft Supplemental Plan - EA	67
Appendix C – Support Maps and Site Photos	69
Appendix D – Investigation and Analysis	71
Appendix E – Consultation and Public Scoping Process.....	76
Appendix F – Watershed Project Map.....	77
List of Tables:	
A. Identified Concerns	8
B. Existing Structural Data for Plum Creek Watershed FRS No. 5	11
C. U.S. Fish and Wildlife Service (T & E Species List for Hays County).....	14
D. Effects of Breach of FRS No. 5 to Downstream Crossings.....	19
E. Comparison of Effects of Alternatives	27
F. Monetary Effects of Alternatives	28
G. Comparison of Structural Data.....	40
H. Effects of the Recommended Plan on Resources of National Recognition.....	71
1. Estimated Installation Costs	49
2. Estimated Cost Distribution, Structural and Non-Structural Measures	50
3. Structural Data – Dam with Planned Storage Capacity.....	51
4. Estimated Average Annual NED Costs.....	53
5. Estimated Average Annual Flood Damage Reduction Benefits.....	54
6. Comparison of NED Benefits and Costs	55

SUPPLEMENTAL WATERSHED PLAN NO. IV & ENVIRONMENTAL ASSESSMENT

SUMMARY OF SUPPLEMENTAL PLAN/ENVIRONMENTAL ASSESSMENT

Project Name: Rehabilitation of Floodwater Retarding Structure (FRS) No. 5, Plum Creek Watershed, Hays County, Texas

Sponsoring Local Organizations (SLO): Plum Creek Conservation District (PCCD), Caldwell-Travis Soil and Water Conservation District (Caldwell-Travis SWCD), and the Hays County Soil and Water Conservation District (Hays County SWCD).

Description of Recommended Plan: This alternative consists of adding a new 24” hooded inlet type principal spillway at elevation 645.1, leaving the existing drop inlet type principal spillway in place, installing an impact basin to replace the existing plunge pool, and connecting both principal spillway outlets to a single discharge pipe as an entrance into the new impact basin. The crest elevation of the existing auxiliary spillway will be lowered 0.4 feet to elevation 663.4, a splitter dike will be added and the entrance section will be realigned. The top of the dam would be raised by 3.5 feet with earth fill, the back slope of the embankment will be extended to maintain a 3:1 slope while raising the dam and a toe drain system will be installed along the back toe of the embankment. All disturbed areas will be re-vegetated using adapted species. The evaluated life of the structure will be extended for an additional 100 years.

Resource Information:

Size of planning area: 4,431 acres

Land Cover	Acres	Percent
Cropland	143	3.2
Grassland	3,380	76.3
Urban	814	18.4
Woodland	94	2.1
Total	4,431	100.0

Land Ownership	Acres	Percent
Private	4,341	98.0
State-Local	90	2.0
Federal	0	0.0
Total	4,431	100.0

Number of farms in planning area: 30

Average farm size: 252 Acres

Prime and important farmland in planning area: 337 Acres

Number of minority farmers: 0

Number of limited resource farmers: 0

Project Beneficiary Profile: The planning area is primarily comprised of a mixture of agricultural land and urban residential and commercial development. The majority of the planning area is either within the City Limits of Kyle or the Extra Territorial Jurisdiction (ETJ) of the City of Kyle. Significant additional future development is anticipated. The reservoir is used for flood control, part of the City of Kyle's Stormwater Pollution Prevention Plan (SWPPP), and limited, incidental recreational activities. Abandonment of the dam by excavating a breach section through the embankment would result in increased flood damages to downstream property, residences and roadways. The elimination of the reservoir would also result in modifications to the SWPPP, and a loss of recreational opportunities even as limited as they may be. As such, private landowners, recreational users, local governments, and the State government are the primary beneficiaries of this project.

According to the 2006 US Census, approximately 50.4% of the population within Hays County is male and 49.6% is female. The 2006 per capita income for Hays County was \$24,411, compared to Texas per capita income of \$29,074 and \$31,472 for the United States. The population of the county is about 93 percent white, about 4 percent black, about 1 percent Native American, about 1 percent Asian, and about 1 percent from 2 or more races. Ethnicity population within the county is about 68 percent non-Hispanic and about 32 percent Hispanic. Project area demographic information is assumed comparable to Hays County data with the exception of the downstream urban area affected by the breach. About 60% of the residents within the breach area are Hispanic and 40% are non-Hispanic.

Wetlands: FRS No. 5 provides approximately 33.5 acres of shallow and deep water lacustrine (Cowardin Classification) habitat. These areas are open waters and do not meet the definition of a wetland under the Clean Water Act of 1972.

Flood plains: Approximately 479 acres are located downstream within the breach area of FRS No. 5.

Highly erodible cropland: None

Fisheries: Currently there is a 33.5 surface acre sediment pool that serves as a warm water fishery (lacustrine – Cowardin Classification). The Natural Resources Conservation Service (NRCS) did not conduct surveys to determine species composition.

Threatened and Endangered species: There are no species federally or state listed as threatened or endangered or suitable habitat for listed species in or close to the proposed project site.

Cultural resources: No historic properties are present in the planned project area (i.e. eligible for National Register of Historic Places).

Problem Identification: Residential development in the downstream watershed since FRS No. 5 was originally constructed has resulted in the dam not meeting current dam safety standards. Since a failure of the dam would result in potential loss of life and significant damage to downstream infrastructure and properties, both the Natural Resources Conservation Service (NRCS) and the State of Texas have agreed that the dam should be reclassified from low hazard to high hazard. Approximately 100 people downstream are at risk should the dam fail. This is a

conservative figure, considering it is based only on people living within the breach area of FRS No. 5 and does not include motorists traveling on Goforth Road, Bunton Lane and Heidenreich Lane downstream of the dam. According to the Texas Department of Transportation, Goforth Road, located within the downstream breach area, had a 2005 average daily traffic count of about 2,100 vehicles. Average daily traffic counts were not available for the other 2 roads.

Alternative Plans Considered: Alternative plans considered are the (1) No Action or Future Without Project (controlled breach of FRS No. 5); (2) Decommission of FRS No. 5 (partial removal of FRS No. 5); (3) Rehabilitation of FRS No. 5 by raising the top of dam 3.5 feet, adding an additional principal spillway and connecting the existing principal spillway outlet with the new outlet to discharge into a newly installed impact basin, installing a toe drain system, lowering the auxiliary spillway crest 0.4 foot, adding a splitter dike, realigning the entrance section and extending the back slope to maintain a 3:1 slope while raising the dam; and (4) Relocation of at-risk downstream properties located within breach area of the dam.

Brief Description of Each Alternative

Alternative No. 1 – Future Without Project

This alternative, which does not involve federal action, consists of excavating a breach in the dam of sufficient size to safely pass the 100-year, 24-hour frequency flood event. This breach would be a minimum size opening in the dam from top of dam down to the valley floor, which would eliminate the structure's ability to store water. In order not to impede flows through the breached embankment and to remove potential safety hazards, the principal spillway components would also be removed. Downstream flooding conditions would be similar to those that existed prior to the construction of the dam. This course of action would minimize the sponsor's dam safety liability but would not eliminate all liability. The material (about 30,000 cu yd) would be placed in the present easement area.

Since the 100-year floodplain would be enlarged (about 59%) due to the absence of flood protection, any potential future downstream development would be altered to account for the enlarged 100-year floodplain. The City of Kyle's Stormwater Pollution Prevention Plan would require modification. The dam and land currently covered by the sediment pool would be maintained as a greenbelt area. The estimated cost of this alternative is \$852,400.

Alternative No. 2 - Decommission FRS No. 5.

This alternative removes the storage function of the dam and reconnects, restores, and stabilizes the stream and floodplain functions. Downstream flooding conditions would be similar to those that existed prior to the construction of the dam. Partial removal of the embankment would consist of excavating a breach in the dam of sufficient size to safely pass the 100-year, 24-hour frequency flood event. This would eliminate the structure's ability to store water. In order not to impede flows through the breached embankment and to remove potential safety hazards, the principal spillway components would also be removed. Excavated material (about 35,000 cu yd) would be placed in the sediment and detention pool areas and all exposed areas would be vegetated as needed for erosion control (about 30 acres). Riparian vegetation would be established along the stream channel (about 4 acres). Channel work would be installed to reconnect the stream channel through the sediment pool. A grade stabilization structure would be installed to prevent head cutting and prevent sediment from being relocated to downstream areas.

Since the 100-year floodplain would be enlarged (about 59%) due to the absence of flood protection, any potential future downstream development would be altered to account for the enlarged 100-year floodplain. The City of Kyle’s Stormwater Pollution Prevention Plan would require modification. The dam and land currently covered by the sediment pool would be maintained as a greenbelt area. Estimated cost of this alternative is \$1,536,300.

Alternative No. 3 – Rehabilitation of FRS No. 5

This alternative consists of adding a new 24” hooded inlet type principal spillway at elevation 645.1, leaving the existing drop inlet type principal spillway in place, installing an impact basin to replace the existing plunge pool and connecting both principal spillway outlets to a single discharge pipe as an entrance into the new impact basin. The crest elevation of the existing auxiliary spillway would be lowered 0.4 foot to elevation 663.4, a splitter dike would be added and the entrance section would be realigned. The top of the dam would be raised by 3.5 feet with earth fill. The back slope would be extended to maintain a 3:1 slope when raising the dam and a toe drain system would be installed along the back toe of the embankment. All disturbed areas would be re-vegetated to adapted species. Modifications to FRS No. 5 would insure compliance with current safety and performance standards. The evaluated life of the structure would be extended for an additional 100 years. The 100-year floodplain downstream of FRS No. 5 would be unchanged. The dam would continue to provide flood damage reduction benefits downstream. Estimated cost is \$2,383,400.

Alternative No. 4 – Relocation of At-Risk Downstream Properties

This alternative consists of relocating 35 downstream properties that would be at-risk due to a catastrophic breach of FRS No. 5 at an estimated cost of \$2,769,700. The relocation of these at risk properties would maintain the low hazard classification of FRS No. 5. In order to ensure that future downstream development would not include inhabitable at-risk structures, this alternative also includes the purchasing of deed restrictions on all remaining land within the breach zone at an estimated cost of \$1,026,400. In order for FRS No. 5 to meet current safety and performance standards, foundation drains costing \$120,000 would be installed. The 100-year floodplain downstream of FRS No. 5 would be unchanged. The dam would continue to provide flood damage reduction benefits downstream. After accounting for administration costs of \$72,200, total estimated cost of this alternative is \$3,988,300.

Project Purpose: The original purpose of FRS No. 5 was flood prevention. The purpose of the rehabilitation project is to maintain present level of flood control benefits and comply with current performance and safety standards.

Principal Project Measure: Rehabilitation of FRS No. 5 by installing an additional principal spillway, raising the top of the dam, installing an impact basin, and making modifications to the auxiliary spillway.

Project Costs:	<u>Federal funds</u>	<u>Other Funds</u>	<u>Total</u>
	\$1,693,800	\$689,600	\$2,383,400

Project Benefits: Economic benefits of the project are derived from assuring the continued performance of FRS No. 5 by meeting current performance and safety standards. Benefits are based on continuing flood protection to the downstream area and avoiding projected costs

associated with implementing Alternative No. 1. Total average annual benefits are estimated to be \$215,000, which include updated agricultural downstream benefits (\$27,600), reduction of sediment and erosion downstream (\$3,000), non-agricultural flood reduction benefits (\$117,900), avoidance of modifications to the City of Kyle's Stormwater Pollution Prevention Plan (\$24,600), and saving the sponsors the cost of a controlled breach (\$41,900). Also, the risk of loss of life (about 100 residents located within the breach area and unknown number of motorists traveling on downstream roadways) from a dam failure would be minimized.

Other Impacts: Although minimal in monetary value, incidental recreational opportunities associated with FRS No. 5 would not only be maintained, but could be enhanced due to a quicker draw-down time of the detention pool following storm events due to the installation of an additional principal spillway at a lower elevation. Administrative costs associated with the National Flood Insurance Program for at least 35 downstream properties would not be incurred. Debris clean-up following major storm events could be done sooner.

Environmental Values Changed or Lost: Installation of the preferred alternative would disturb only a minimal amount of grassland and mesquite vegetation. After the installation of the impact basin and modification to the principal spillway, the sediment pool would return to the preconstruction size and elevation, and all disturbed areas would be replanted with adapted native and/or introduced grasses. Installation of the preferred alternative would have very minor adverse impacts to wildlife habitat associated with the clearing of grassland and mesquite trees. Only minor temporary impacts on the sediment pool and water quality (turbidity and sedimentation) associated with construction would be anticipated. No compensatory mitigation is planned.

Major Conclusions: Rehabilitation of FRS No. 5 would minimize the risk of loss of life within the breach area, would have only a very minor impact to the environment, and would allow the continuance of flood prevention benefits.

Areas of Controversy: There are no known areas of controversy.

Issues to be Resolved: Any discharge of dredged or fill material in a water of the US associated with rehabilitation of FRS No. 5 would require a Department of the Army permit under Section 404 of the Clean Water Act of 1972. Also, for projects with disturbances equal to or greater than five acres it is necessary to have a Stormwater Pollution Prevention Plan (SWPPP) in place at least 48 hours prior to and during construction of the proposed project and filing a Notice of Intent with the Texas Commission on Environmental Quality is required. A Notice of Termination (NOT) must be filed once the site has reached final stabilization. The Sponsoring Local Organizations would be responsible for developing an Emergency Action Plan (EAP) prior to construction and would review and update the EAP annually with local emergency response officials.

PURPOSE AND NEED FOR ACTION

INTRODUCTION

Within the Plum Creek Watershed major changes in land use from a rural setting to an urban setting has occurred in large portions of the watershed. This land use change has occurred upstream and downstream of many of the floodwater retarding structures in the Plum Creek Watershed. The Texas Commission on Environmental Quality (TCEQ) and the NRCS have mutually determined that Plum Creek Watershed FRS No. 5 is a high hazard structure based on current criteria. The auxiliary spillway has functioned at least twice in the past. There are human health and safety concerns about the performance of this dam.

When Plum Creek Watershed was planned, the original intent of the floodwater retarding structures was to protect downstream agricultural areas of the watershed and prevent adverse economic and physical effect of flooding throughout the entire watershed community. The economy in the Plum Creek Watershed area was almost entirely agricultural (cropland and grassland) when the original planning was completed; however, forty-seven years later, the population growth from the expanding Austin metropolitan area and the Austin-San Antonio urban strip along Interstate Highway 35 has consumed much of the watershed. As a result, the population of Hays County where FRS No. 5 is located has grown from 20,000 in 1960 to more than 130,000 in 2007. Specifically, the population has increased dramatically since 1990, from 65,614 to 130,325 in 2006 (US Bureau of Census). Changes in the economy, land use, and population growth within the Plum Creek Watershed have been especially noticeable in the vicinity of the eighteen constructed floodwater retarding structures in Plum Creek Watershed.

FRS No. 5 is located within the City limits of Kyle. The majority of the 3,952 acre drainage area for the site is in the City limits of Kyle, and the area downstream of the site is in the ETJ of Kyle. The watershed for FRS No. 5 heads northwest of Interstate Highway 35, a major thoroughfare between Austin and San Antonio. As a result of the increasing population of Kyle's growth (from 5,314 in 2000 to 20,655 in 2006), FRS No. 5 needs to be upgraded to meet current performance and safety standards and ensure continued protection of the watershed and the lives of people downstream.

PURPOSE AND NEED FOR THE PROJECT

This Supplemental Watershed Plan/Environmental Assessment was prepared to evaluate the rehabilitation of FRS No. 5. FRS No. 5 was originally installed under the authority of the Watershed Protection and Flood Prevention Act of 1954 (PL83-566) as amended. The rehabilitation of FRS No. 5 is authorized under Public Law 83-566 (as amended), and as further amended by Section 313 of Public Law 106-472.

The purposes of the FRS No. 5 rehabilitation project are to maintain present level of flood control benefits and comply with the current performance and safety standards. FRS No. 5 was built in 1963 in a rural setting and is now strongly influenced by high population growth and land development due to proximity to the Interstate 35 corridor between Austin and San Antonio. In particular, there are 35 residences, one public property, and three roadways with moderate to heavy use downstream that would be impacted by a dam failure of FRS No. 5. These roadways, Goforth Road, Bunton Lane and Heidenreich Lane, serve as the main routes between several

residential developments, the downtown area of the City of Kyle, businesses along Interstate 35 and a public school. This risk of loss of life has caused the dam to be reclassified as a high hazard dam. Rehabilitation of FRS No. 5 is needed to protect downstream properties and infrastructure, and reduce the risk of loss of life. The rehabilitation of FRS No. 5 would allow for the service life of the dam to be extended for a minimum of 100 additional years.

WATERSHED PROBLEMS AND OPPORTUNITIES

The primary concern is the safety of FRS No. 5 and the potential problems that failure of the dam would cause. Approximately 100 people living downstream of FRS No. 5 are at risk should the dam fail. This estimate does not include motorists that might be traveling on Goforth Road, Bunton Lane and Heidenreich Lane which are all located downstream of the dam. Goforth Road runs parallel to the dam approximately 2,000 feet downstream, Bunton Lane is perpendicular to the dam and parallel to Bunton Branch downstream of the dam and Heidenreich Lane crosses Bunton Branch further downstream and is perpendicular to Bunton Lane. Bunton Branch, the ephemeral stream on which FRS No. 5 was constructed, meanders back and forth below the dam and crosses Bunton Lane three times and Heidenreich Lane once causing significant concern should the dam overtop and fail.

Currently FRS No. 5 is functioning as originally planned and providing downstream flood damage protection from the 35-year, 24-hour storm. However there is a possibility of the dam failing from overtopping if a storm occurs greater than the structure was constructed to control. Total estimated damages from a catastrophic breach of FRS No. 5 would approach \$3,000,000 and the risk of loss of human life would be significant.

Following is a list of opportunities that would be realized through the implementation of this watershed rehabilitation plan:

- Comply with current dam safety criteria
- Protect human health and safety
- Protect infrastructure and transportation system
- Maintain flood control benefits and prevent increased flooding in the floodplain
- Maintain or improve water quality
- Protect fish and wildlife habitats
- Maintain incidental recreational opportunities
- Prevent sponsors and others from costly consequences of a controlled breach

SCOPE OF THE ENVIRONMENTAL ASSESSMENT

A scoping process was used to determine the issues significant in defining the problems, and formulating and evaluating alternatives. Scoping included public meetings, written request for input from state, local and federal agencies, and a coordination meeting with appropriate agencies. A steering committee of sponsors and local citizens was also formed to solicit input.

Table A presents the results of the scoping process:

<i>Table A – Identified Concerns</i>			
Economic, social, environmental, and cultural concerns	Degree of Concern	Degree of Significance to Decision Making	Remarks
Dam Safety	High	High	
Human Health & Safety	High	High	
Flood Damages	High	High	
T&E Species	Low	Low	None identified
Cultural Resources	Low	Low	None identified
Prime Farm Lands	High	High	
Wetlands	Low	Low	
Air Quality	Low	Low	
Water Quality	Medium	Medium	
Water Quantity	Medium	Medium	
Aesthetics	Medium	Medium	
Sedimentation and Erosion	Medium	Medium	
Land Values	Medium	Medium	
Fish & Wildlife Habitat	Medium	Medium	
Recreation	Low	Low	
Environmental Justice	High	High	

AFFECTED ENVIRONMENT

This Supplemental Plan/Environmental Assessment is for the watershed (drainage area) upstream of FRS No. 5 and the downstream area affected by a breach of the existing dam (Appendix C). FRS No. 5 was constructed on Bunton Branch, a tributary of Plum Creek approximately 4 miles above the confluence of Bunton Branch and Plum Creek and about 1.5 miles northeast of the City of Kyle. The Plum Creek Watershed is located in the San Marcos River Basin. Plum Creek and San Marcos River watersheds are located in the Guadalupe River Basin. A description of the Plum Creek Watershed can be found in the Plum Creek Watershed Work Plan dated April 1960.

The rehabilitation project area is 4,431 acres that consists of the drainage area of FRS No. 5 plus the area downstream that would be inundated by a breach of the dam. The project area is located within both the City Limits of Kyle and the ETJ of the City of Kyle, Hays County, Texas. Land uses within the rehabilitation project area include residential, commercial, lakes, highways, grazing lands, cropland, utility right-of-ways and open areas.

EXISTING CONDITIONS

Original Project

The Plum Creek Watershed Plan was approved for operation in August 1960 under the authority of Public Law 83-566, as amended. The plan provides for application of conservation practices for watershed protection and flood prevention. The local Sponsors are the PCCD, the Caldwell-Travis SWCD and the Hays County SWCD. Federal assistance was provided by the United States Department of Agriculture (USDA), Soil Conservation Service (now the Natural Resources Conservation Service or NRCS). A total of eighteen FRS were planned and constructed during 1962 through 1975. Three previous supplements to the original 1960 plan have been prepared and approved.

Description of Existing Dam

FRS No. 5 was originally designed and constructed in 1963 as a low hazard class (a) dam, a hazard classification given to dams that do not pose a threat to loss of life. FRS No. 5 was constructed as a homogenous earth fill embankment with one vegetated auxiliary spillway. The 2007 survey depicts the front and back slopes to be 3:1 even though the "As-Builts" indicate the slopes were originally constructed to 2.5:1. The top of dam elevation is 668.0. The auxiliary spillway has a 310 foot bottom width and the crest elevation is 663.8. The principal spillway consist of 250 feet of 30-inch inside diameter prestressed concrete lined steel cylinder pipe connected to a 2-foot 4-inch by 8-foot 4-inch by 13-foot 9-inch inlet with a crest elevation of 649.4. The inlet structure has a 12-inch gated outlet with an invert elevation of 636.15 to facilitate lowering the permanent water level for repairs and maintenance. The inlet structure also contains four 25-inch by 12-inch ports (two on each side wall) with an invert elevation of 645.1. The original sediment pool consisted of a 41-acre lake containing 197 acre feet of capacity. There were no foundation drains planned or installed when FRS No. 5 was originally constructed. The original FRS No. 5 was repaired/modified in 1968 and again in 1993. Repairs and modifications included: embankment slope repair, waterway re-establishment, removal of orifice plates and vent pipe, enlarging existing ports and adding new ports, and installation of a rock riprap wave berm. Originally the total storage capacity below the elevation of the auxiliary spillway was 2,270 acre-feet with 493 acre-feet reserved for sediment accumulation over a 50-

year period. The remaining 1,777 acre-feet was reserved for floodwater detention storage. The maximum height of the dam is 38 feet. The surface area of the current sediment pool is about 33.5 acres according to 2007 aerial photography and a water and sediment volume survey conducted by the Department of Geology at Baylor University. FRS No. 5 was constructed as a low hazard dam designed to store the sediment expected to accumulate over a 50-year period and provide floodwater storage. Sufficient floodwater detention storage was provided for a 2.88 percent chance of the auxiliary spillway functioning in any year (35-year, 24 hour storm).

The embankment is in excellent condition. The Bermuda grass vegetative cover on the embankment and auxiliary spillway has provided a stable, non-erosive surface for the past 44 years. The embankment and auxiliary spillway are fenced to control grazing from livestock. No brush or trees are allowed to grow on the embankment or in the auxiliary spillway. The inlet and principal spillway were visually inspected, and an internal camera was used to inspect the conduit. Both are in excellent condition. The dam has no visual stability or foundation problems; however a seep area originates along the left side of the auxiliary spillway at approximate station 14+50 and extends across the floor of the spillway as it moves toward the outlet section. It appears that feral hogs in the vicinity have been utilizing the seep as a wallow. A game trail leads from the outlet channel below the plunge pool, up the auxiliary spillway and across the embankment at approximate station 28+00.

The entire east side of FRS No. 5 is bordered by a housing addition. However, according to officials with the local tax appraisal district, current formulas used to estimate values of properties adjacent to FRS No. 5 do not include an amenity value factor due to the presence of the site. Land between the housing addition and the permanent water level of the sediment pool is owned by a single landowner. Several years ago the landowner allowed an access route to be constructed to the sediment pool area from the housing addition. Land on the west side of the sediment pool is also owned by a single landowner. Even though the presence of FRS No. 5 provides for limited recreational activities, visitor-days and consequent benefits are estimated to be minimal.

Existing Structural Data:

Table B shows the existing structural data for Plum Creek Watershed FRS No. 5:

Year Completed	1963
Drainage Area	3,949 acres
Stream	Bunton Branch, a tributary of Plum Creek
Purposes	Flood Prevention, Watershed Protection
Embankment Type	Homogenous Earthfill
Embankment Height	38 feet (ft.)
Embankment Volume	176,580 cubic yards
Embankment Crest Length	2164 ft. (excluding auxiliary spillway)
Embankment Slopes	3:1
Sediment storage	493 acre-feet
Flood storage	1,777 acre-feet
Principal Spillway:	
Type	Reinforced Concrete
Inlet Height	16.75 ft. ^{1/}
Conduit Size	30 inches
Stages	1
Auxiliary Spillway:	
Type	Vegetated
Width	310 ft.
Principal Spillway Crest ^{2/}	649.4 ft. MSL (North American Vertical Datum 1988 [NAVD88])
Sediment Pool Crest (ported) ^{2/}	645.1 ft. MSL (NAVD88)
Auxiliary Spillway Crest ^{2/}	663.8 ft. MSL (NAVD88)
Top of Dam (Minimum Crest) ^{2/}	668 ft. MSL (NAVD88)

^{1/} Overall height 16.75 feet, inside dimensions 2.33 feet by 8.33 feet by 13.75 feet (crest).

^{2/} All existing elevations adjusted to NAVD88

Physical Features and Environmental Factors

Project location: The Plum Creek Watershed, located in Hays, Caldwell, and Travis Counties, Texas, is comprised of 97,000 acres (about 151.6 square miles). Of this total, the drainage area for FRS No. 5 is 3,952 acres or about 6.18 square miles (407 acres of the drainage area is considered non-contributing watershed since it is occupied by a cement plant that is predominately quarried limestone pits and totally enclosed by a dike). The watershed for FRS No. 5 heads approximately 2.25 miles northwest of Interstate Highway 35, Hays County, Texas. Plum Creek Watershed FRS No. 5 is located at Latitude, decimal degree 30.00 and Longitude, decimal degree -97.84. The watershed is located within the Guadalupe River Basin as delineated by the United States Water Resources Council, hydrologic unit number 12100201.

Topography: The project area lies within the gently rolling hills along the western extreme of the Black Prairie Physiographic Area near the junction with the Edwards Plateau Physiographic Area. The Balcones Escarpment forms an abrupt boundary between the Black Prairie and the Edwards Plateau near the head of the watershed of FRS No. 5. The topography is gently undulating to gently rolling, and relief is low.

Soils and Geology: Soils in the vicinity of the FRS No. 5 dam, spillway, and reservoir area are typical of those found in the Heiden-Houston Black soil association. The gently to moderately sloping soils adjacent to FRS No. 5 consist of Branyon clay, Houston Black clay, and Heiden clay, eroded. The narrow, irregularly shaped area along Bunton Branch, both above and below the dam and detention pool, consists of Tinn clay soils, frequently flooded (USDA, June 1984).

FRS No. 5 is located on the Pecan Gap Formation of Upper Cretaceous Age. The underlying material is relatively erodible chalk and clay-shale.

The alluvial deposits consist of highly plastic, medium to stiff clays overlying the highly weathered claystone at shallow to moderate depths. Some thin basal layers of fine to coarse gravel occur above the claystone.

Climate: Average annual rainfall is slightly less than 33.5 inches. Normal temperatures range from an average daily high of 96.7 degrees Fahrenheit in August to an average daily low of 37.8 degrees in January. The normal freeze-free period of 264 days extends from March 10 to November 30.

Cultural Resources: No prior cultural resources identification activities have been conducted in the FRS No. 5 project area. The dam and reservoir were constructed in 1963, prior to implementation of the National Historic Preservation Act and other historic preservation laws that now require NRCS (Soil Conservation Service at that time) to consider effects to significant cultural resources.

A search of the Native American Consultation Database was conducted to determine if there were any Indian tribes that might attach religious or cultural significance to historic properties that could be located in the proposed project area. This was done in accordance with 36 CFR 800.2 (c)(i) of the Advisory Council on Historic Preservation Regulations. No tribes listed land area claims that included Hays County, Texas (NPS 2007).

A search of the Texas Archeological Sites Atlas, completed in October 2007 did not reveal any recorded archeological or historic sites in the vicinity of the proposed project (THC 2007). NRCS and the Texas State Historic Preservation Officer (SHPO) have agreed that a cultural resources survey should be completed on all areas of new disturbance associated with potential rehabilitation measures. Accordingly, the NRCS cultural resources specialist conducted a survey of areas of potential new disturbance associated with the prospective rehabilitation alternative at FRS No. 5 in October 2007. These areas have been subject to various disturbances associated with original construction and other activities including farming/ranching practices, roads, trails, and more recently, urbanization.

No cultural resources were found in the areas of potential new disturbance associated with rehabilitation measures at FRS No. 5 and overall there appears to be low potential for subsurface cultural deposits in these areas.

The NRCS has determined pursuant to 36 CFR 800.4(d) that there are no properties included in or eligible for the National Register of Historic Places within the area of potential effect of the alternative resulting in rehabilitation of FRS No. 5. This determination was reported to the SHPO in November 2007 for review and concurrence (letter on file). The SHPO concurred in the determinations on December 18, 2007 (letter on file).

It should be noted that additional cultural resources investigations would be necessary should the no action or decommissioning alternatives be selected. At this time, areas of potential effect for alternatives other than rehabilitation have not been specifically identified.

Prime Farmland: Soils in the project work area were evaluated by the USDA-NRCS in accordance with requirements of the Farmland Protection Policy Act (FPPA). The proposed project work area impacted by the rehabilitation of FRS No. 5 does contain Important Farmland as defined by the FPPA (9.2 acres Prime and Unique Farmland; 0 acres Statewide/Local Important), however the total soil index score of 85, utilizing the land evaluation and site assessment form AD-1006, was less than the 160 point threshold and “need not be given further consideration for protection” [7 CFR 658.4 (c) 2]. Completed forms and a letter documenting this determination are on file.

Fish and Wildlife Resources: FRS No. 5 is located within the City limits of Kyle in Hays County, Texas in a watershed that is currently experiencing significant development upstream and downstream. The structure provides approximately 33.5 acres of warm water fisheries composed of deep water and shallow water habitat. Land use adjacent to the auxiliary spillway and all along the east side of the detention pool is heavily developed housing additions. Land along the west side of the detention pool is used primarily for livestock grazing. The land cover is predominantly poor condition rangeland with a dense overstory of 6-8 foot tall mesquite and other invading brush species. FRS No. 5 currently provides habitat for small mammals, neo-tropical songbirds, shore birds, various water fowl, and a variety of fish species. Various species of reptiles and amphibians also inhabit the project site.

Threatened and Endangered Species: According to information provided by the U.S. Fish & Wildlife Service (USFWS), there are ten species federally listed as endangered and one species federally listed as threatened in Hays County, Texas. According to the Texas Parks and Wildlife Department (TPWD), Wildlife Division, Diversity and Habitat Assessment Programs, nine species are state listed as endangered and seven species are state listed as threatened in Hays County, Texas.

Investigations by NRCS biologists identified no individuals or suitable habitat for any species federally or state listed as threatened or endangered. The proposed project would have no effect on threatened or endangered species.

Table C shows the Federally and State Listed Threatened and Endangered Species for Hays County:

<i>Table C – Federally and State Listed T & E Species for Hays County</i>				
Common Name	Scientific Name	Species Group	Federal Status	State Status
Barton Springs salamander	<i>Eurycea sosorum</i>	Amphibians	E	
Blanco blind salamander	<i>Eurycea robusta</i>	Amphibians		T
San Marcos salamander	<i>Eurycea nana</i>	Amphibians	T	T
Texas blind salamander	<i>Typhlomolge rathbuni</i>	Amphibians	E	E
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	Birds		E
Arctic Peregrine Falcon	<i>Falco peregrinus tundris</i>	Birds		T
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Birds		T
Black-capped Vireo	<i>Vireo atricapilla</i>	Birds	E	E
Golden-cheeked Warbler	<i>Dendroica chrysoparia</i>	Birds	E	E
Whooping Crane	<i>Grus americana</i>	Birds		E
Zone-tailed Hawk	<i>Buteo albonotatus</i>	Birds		T
Peck's cave amphipod	<i>Stygobromus (=Stygonectes) pecki</i>	Crustaceans	E	
Fountain darter	<i>Etheostoma fonticola</i>	Fishes	E	E
San Marcos gambusia	<i>Gambusia georgei</i>	Fishes	E	E
Comal Springs dryopid beetle	<i>Stygoparnus comalensis</i>	Insects	E	
Comal Springs riffle beetle	<i>Heterelmis comalensis</i>	Insects	E	
Red Wolf	<i>Canis rufus</i>	Mammals		E
Cagle's Map Turtle	<i>Graptemys caglei</i>	Reptiles		T
Texas Horned Lizard	<i>Phrynosoma cornutum</i>	Reptiles		T
Texas wild-rice	<i>Zizania texana</i>	Flowering Plants	E	E

Wetlands: The pool area of Plum Creek FRS 5 is a lacustrine, limnetic, permanently flooded, diked/impounded wetland system (L1OWHh), with a palustrine, emergent, persistent, seasonally flooded system (PEMIC) where the ephemeral stream enters the pool according to information provided by the National Wetland Inventory Map for the Buda Quadrangle (USDI, 1993). The sediment pool is approximately 33.5 acres in size and is at an elevation of approximately 645.1 feet above sea level. For the purpose of the National Wetland Inventory Maps, all water bodies visible on aerial photography that are less than 20 acres in size are considered to be in the palustrine system unless depth information is available or an active wave-formed or bedrock shoreline feature is visible. Riverine (ephemeral) and palustrine wetland systems exist upstream and downstream of Plum Creek FRS 5. These areas are considered wetland systems under the Cowardin classification system (Classification of Wetlands and Deepwater Habitats of the United States, 1979, by Cowardin, Lewis M. et al.) and do not meet the definition of a wetland under the Clean Water Act of 1972.

STATUS OF OPERATION AND MAINTENANCE

PCCD is responsible for the maintenance of FRS No. 5. PCCD and the Hays County SWCD are jointly responsible for the operation of the structure. Inspections of the dam indicated that the dam is being operated and maintained properly. Hays County prevents development from encroaching upon the 100-year floodplain.

The dam is in excellent condition. A thick stand of bermudagrass covers the front and back slopes of the dam and the auxiliary spillway. Trees and brush are not allowed to grow on the slopes of the embankment or in the auxiliary spillway. The inlet structure and principal spillway were visually inspected and an internal camera was used to inspect the conduit. Both are in excellent condition.

SEDIMENTATION

Investigations indicate that the dam, including the principal spillway, is structurally sound and is being properly maintained. The sediment survey and predictive soil loss equations completed in 2007, indicates that there are over 100 years of available sediment storage capacity remaining below elevation 645.1 (existing port elevation). The accumulated sediment in the sediment and detention storage areas was not tested as it will not be disturbed during the rehabilitation of the FRS No. 5.

The original planned total sediment volume was 493 ac-ft or 9.86 ac-ft/yr. This volume was broken down as follows: 197 ac-ft in the sediment pool (below elevation 645.1, port elevation), 230 ac-ft of sediment reserve (between the port elevation of 645.1 and the principal spillway crest elevation of 649.4), and 66 ac-ft of aerated sediment storage in the detention pool (above elevation of 649.4).

The 2007 sediment volume survey conducted by Baylor University showed an accumulation of 55.8 ac-ft of sediment volume indicating that the actual sediment rate was 1.27 ac-ft /yr. The survey also indicated that 164.5 ac-ft of volume remained below the sediment pool elevation of 645.1 (available for future sediment storage). The fine-grained rocks and soils, gentle topography and stable land use suggest comparatively low sedimentation rates. With the continued change in land use from agricultural to a rural urban interface, the estimated future sediment rate is calculated to be 1.629 ac-ft per year. The rehabilitation design of FRS No. 5 is for an evaluated life of 100 years. The remaining available sediment volume is 164.5 ac-ft (below elevation 645.1). The sediment volume needed for the 100 year evaluated life of the rehabilitated structure is 162.9 ac-ft. An additional 40 ac-ft is available for aerated sediment.

BREACH ANALYSIS AND HAZARD CLASSIFICATION

Plum Creek Watershed FRS No. 5 does not meet current dam design and safety requirements. The dam was originally constructed in 1963 as a class (a) low hazard structure for the purpose of protecting downstream agricultural lands from flooding. Exceptional population growth in the area since 1963 has dramatically changed the land use to predominately suburban. As a result of this population growth, 35 residences, one public property, and three roadways are now at risk from a catastrophic breach of FRS No. 5.

The NRCS hazard classification now identifies this dam as a class (c) high hazard structure. The Texas Commission on Environmental Quality, Dam Safety Program, has agreed on the

reclassification of the structure to “high hazard”. The high hazard classification is based on the risk of loss of life concerning at-risk residences and three moderately to heavily used county roads located in the downstream dam breach flood zone area. FRS No. 5 has been identified as a high hazard dam primarily as a result of thirty-five at-risk residences located downstream within the breach area. Also, one public property is located within the breach area, as well as Goforth Road, Bunton Lane and Heidenreich Lane, three county roads which are well used transportation routes between several residential developments and a newly constructed public school. Bunton Creek, on which FRS No. 5 is constructed, is actually crossed by Bunton Lane three different times within a 2,000 feet stretch of road approximately 1.5 miles downstream of the dam.

Breach studies indicate that Goforth Road would be overtopped by approximately twenty feet of floodwaters if the dam failed, resulting in extensive property and infrastructure damages, and Bunton Lane would be overtopped by approximately 15 feet, 10 feet, and 5 feet, respectively at the three crossings. Heidenreich Lane would be overtopped by approximately 3 feet of floodwater if the dam were to overtop and fail. Even though about 2,100 vehicles utilize it daily, Goforth Road is not considered a major highway. However, its location within the breach area did have an affect on reclassification of FRS No. 5.

Thirty-five residential properties (12 houses and 23 mobile homes) and one public property downstream of the dam would be at-risk in the event of a breach, resulting in about 100 lives being endangered. The breach floodwaters would reach and inundate the first floor elevations of 18 residences (12 houses and 6 mobile homes) and the public property. Eight of the residences (7 houses and one mobile home) would flood at a depth (over 4 feet) and velocity that would cause major structural damages and possibly even remove the structures from their foundations. Anybody inside of the houses at this time would face an extremely dire predicament. Floodwaters from a breach would be below first-floor elevations of seventeen other residences, all mobile homes. However, the homes would be surrounded by floodwaters from 1.8 to nearly 3 foot in depth. Considering the potential foundational instability of mobile homes, the velocity and depth of the debris-laden floodwaters could result in unexpected and irrational reactions by the occupants, thus putting themselves in a dangerous situation. Table D contains information regarding depth of floodwaters.

Although the structure is presently sound, there is always the risk of failure. The most likely cause of FRS No. 5 failing is by overtopping. In the unlikely event that the structure was overtopped and failed, the most serious failure would be a breach in the highest point. This would result in a breach hydrograph that has a peak discharge of 64,500 cubic feet per second (cfs). Fair weather conditions were assumed to develop the breach hydrograph. The reservoir pool elevation was static at top of dam with non-storm conditions downstream. See Appendix C, Breach Inundation Map and Appendix D, Investigation and Analysis, Hydrology.

POTENTIAL MODES OF DAM FAILURE

Both NRCS and the State of Texas recognize that Plum Creek Watershed FRS No. 5 is now a high hazard dam. Several potential modes of failure were examined as follows:

Sedimentation – Sediment can be deposited in both the sediment pool (the area below the principal spillway crest) and flood detention pool (the area between the principal spillway crest and the auxiliary spillway crest). When the sediment pool has filled to the elevation of the principal spillway inlet, the pool no longer has permanent water storage. As the detention pool loses storage due to sediment deposition, the auxiliary spillway operates, or has flowage, more

often and is therefore subject to erosion. A potential mode of failure exists as the auxiliary spillway continues to degrade, and depth and frequency of flow increases. The dam will ultimately breach.

FRS No. 5 was designed with a 50-year sediment storage life. A water and sediment volume survey was conducted on FRS No. 5 reservoir in 2007. The sediment survey and predictive soil loss equations indicate that while some sediment has accumulated, FRS No. 5 has sufficient storage capacity remaining for at least another 100 years. With the change in upstream land use, the actual sediment rates were dramatically lower than originally planned. Future sediment load is expected to remain at a low rate as the land use continues to change from agricultural to urban. Therefore, in the near future, sedimentation presents a low potential mode of failure for FRS No. 5.

Hydrologic Capacity – Hydrologic failure of a dam can occur by breaching the auxiliary spillway or overtopping the dam during a storm event. The integrity and stability of the auxiliary spillway is dependent on the depth, velocity, and duration of flow; the vegetative cover; and the spillway's resistance to erosion. The integrity and stability of the embankment during overtopping is dependent on the depth, velocity, and duration of flow; the vegetative cover; and the embankment's resistance to erosion.

FRS No. 5 was originally designed to temporarily store the runoff from 6.97 inches of rain falling in 6 hours plus an additional 4.4' of elevation without overtopping the embankment. Current criteria require FRS No. 5 to temporarily store the Probable Maximum Precipitation (PMP) storm of 30.6" in 6 hours without overtopping the embankment. The PMP storm is the maximum design storm required by the State of Texas Dam Safety Office. The possibility of a storm of this magnitude occurring is very low, but if it does occur, the current auxiliary spillway will perform at greater depths for longer durations, and the dam will overtop. These conditions could lead to the possible breaching of the auxiliary spillway, the embankment or both. FRS No. 5 is currently performing as originally designed and is expected to continue to perform into the future; however, it does not meet current dam safety design criteria for a high hazard dam. Therefore, the potential for FRS No. 5 to fail due to a deficiency in hydrologic capacity is judged to be high.

Seepage – Seepage is the primary geotechnical concern on FRS No. 5. Embankment and foundation seepage can contribute to failure of an embankment by removing (piping) soil material through the embankment or foundation. As the soil material is removed, voids can be created, allowing ever increasing amounts of water to flow through the embankment or foundation until the dam collapses due to the internal erosion. Seepage that increases with an increase in pool elevation is an indication of a potential problem, as is stained or muddy water. Foundation and embankment drainage systems can alleviate the seepage problem by removing the water without allowing soil particles to be transported away from the dam.

FRS No. 5 shows visible signs of seepage toward the lower one-half of the outlet section of the auxiliary spillway. The seepage begins along the left side of the auxiliary spillway and extends out into the center of the auxiliary spillway. No sloughing or any other indications of embankment instability were noticed. FRS No. 5 is protected with a thick cover of bermudagrass, and no trees are present on the embankment or in the auxiliary spillway. Therefore, in the near future, seepage presents a low potential mode of failure for FRS No. 5.

Seismic – The integrity and stability of an earthen embankment are dependent on the presence of a stable foundation. Foundation movement through consolidation, compression, or lateral movement can create weak zones or voids within an embankment, separation of the principal spillway conduit joints, or in extreme cases, complete collapse of the embankment.

FRS No. 5 is located in the Algermissen Seismic Zone 0. There are no indications that any foundation movement has occurred in the past that would weaken the integrity of the embankment or any of the components of the structure, and none is anticipated in the future. Seismic activity creates only a very small potential as a mode for failure of FRS No. 5.

Embankment Slope Failure - An embankment slope failure allows increased saturation and weakens the integrity of the dam during the PMP and could result in a catastrophic failure. Slope failure can also create slides and sloughing that lower the top of dam elevation so that overtopping may occur during the PMP.

The front slope was previously repaired twice, once in 1968 and again in 1993. Slope failure problems associated with the repairs were the result of wave erosion caused by slow draw down time. In addition to repairing the slope and adding a rock rip rap wave berm, the orifice plate was removed, existing ports were enlarged and additional ports were added to help reduce the draw down time. Following these repairs and modifications to the principal spillway, FRS No. 5 has not shown any visible signs of slope failure or sloughing or any other noticeable indications of instability on the embankments. The embankments of FRS No. 5 are protected with a thick cover of bermudagrass, and there are no trees present on the embankments. Therefore, embankment slope failure presents a low potential mode of failure for FRS No. 5, but it should continue to be monitored in the future.

Material Deterioration - Material used in the principal spillway system and fences are normal, common construction materials, but they are subject to weathering and chemical reaction due to natural elements within the soil, water, and atmosphere. Concrete components can deteriorate and crack, metal components can rust and corrode, and leaks can develop. Embankment failure can occur from internal erosion caused by these leaks.

Based on available information and field observations, the structure appears to be in extremely good condition with no evidence of deterioration on any of the materials that would require structural repair at this time. A pipe inspection video of the existing principal spillway conduit was viewed to assess the condition of the existing conduit. The conduit appears to be in excellent condition. As a result, the potential failure of the existing dam due to deteriorating components is judged to be low. However, due to the age of the existing structural components, FRS No. 5 should continue to be monitored annually and after significant storm events.

CONSEQUENCES OF DAM FAILURE

All of the structural components of the dam are in very good condition. However, the dam does not meet current safety standards for a dam in this location, and there is a risk of the dam failing from overtopping. An analysis of the dam indicated that a storm of the PMP magnitude would overtop the dam. The risk of dam failure is low, but the consequences of such a failure if it were to occur would likely be catastrophic.

Thirty-five residences and one public property downstream of the dam would be at-risk in the event of a breach, resulting in about 100 people being subjected to the risk of loss of life. The

breach floodwaters would reach the first floor elevations of 18 residences, and depth and/or velocity of floodwaters would cause all residents' lives to be endangered.

If the dam fails, Goforth Road, a well used county road downstream of FRS No. 5 would be overtopped by approximately twenty feet of floodwater at a maximum velocity of 8.5 feet per second (Table D). All vehicles on Goforth Road would be washed downstream, and the road surface would be damaged and impassable. Traffic would be disrupted while the roadway was being repaired. Bunton Lane, another well used county road below FRS No. 5, has three crossings over Bunton Creek. These crossings would be inundated by water in depths ranging from 5 to 15 feet deep. Heidenreich Lane, which is further downstream, is the primary entrance into another residential development (outside of the breach area). It would be overtopped by three feet of floodwater following a breach of FRS No. 5.

Table D shows the effects of a breach of FRS No. 5 on downstream properties and crossings.

Table D – Effects of Breach of FRS No. 5 to Downstream Properties and Crossings

Downstream Properties/Crossings	Depth Above First Floor Elevation (ft)	Depth Above Ground Elevation (ft)	Depth Over X-ing (ft)	Daily Traffic Count (#)	Maximum Velocity ^{1/}
12 Houses	0.1 – 8	0.9 – 8.9	-	-	-
6 Mobile Homes	0.1 – 1	2.5 – 5	-	-	-
17 Mobile Homes	-	1.8 – 2.9	-	-	-
1 Public Property	0.6	2	-	-	-
Goforth Road	-	-	20	2,100	8.5
Bunton Lane (X-ing # 1)	-	-	15	NA	4.4
Bunton Lane (X-ing # 2)	-	-	10	NA	3.7
Bunton Lane (X-ing # 3)	-	-	5	NA	2.7
Heidenreich Lane	-	-	3	NA	2.3

^{1/} Maximum velocity for identified crossing in feet per second.

Total damages from a catastrophic breach of FRS No. 5 are estimated to be about \$2 million for residential properties (includes contents), \$560,000 for all road crossings, nearly \$271,000 for affected agricultural lands, and close to \$33,000 in traffic detour costs. As a result of a breach, approximately 30,000 cubic yards of fill material from the dam would move downstream, clogging stream channels and increasing flooding on roads and bridges.



Goforth Road Crossing approximately 0.4 mile downstream of FRS No. 5 would be completely submerged by floodwater to a depth of nearly 20 feet by a failure of the dam. 2005 Texas Department of Transportation average daily traffic count for Goforth Road was 2,100 vehicles



Bunton Lane - Low Water Crossing #1 approximately 1.2 miles downstream of FRS No. 5. A breach of FRS No. 5 would totally submerge the area pictured above to a depth approaching 15 feet. Depth approximated by the tip of yellow arrow.



Bunton Lane - Crossing #2 approximately 1.5 miles downstream of FRS No. 5. A breach of FRS No. 5 would submerge the crossing a maximum of 10 feet.



Bunton Lane - Crossing #3 approximately 1.6 miles downstream of FRS No. 5. A breach of FRS No. 5 would submerge the crossing a maximum of 5 feet.



Looking downstream from the centerline of the dam across the outlet section of the auxiliary spillway. Ten of these homes would be affected by a breach of FRS No. 5.

ALTERNATIVES

FORMULATION PROCESS

A 100-year evaluated life was established as well as a 100-year period of analysis. All alternatives were planned to function for a minimum of 100-years with proper maintenance. Alternatives are eligible for financial assistance under the Watershed Protection and Flood Prevention Act (PL 83-566) as amended by the Watershed Rehabilitation Amendments of 2000 (Public Law 106-472). To be eligible for federal assistance, an alternative must meet the requirements as contained in the Watershed Rehabilitation Amendments of 2000.

The Future Without Project alternative serves as a baseline to evaluate the other alternatives. It depicts the most probable future conditions in the absence of a federally assisted project. PCCD is the entity that owns the easements for the dam, and is responsible for determining what action to take if the dam is not brought up to current performance and safety standards.

Based on conditions set forth by the Future Without Project baseline, present conditions were developed. The dam does not meet current safety standards for a dam in this location, and there is a risk of the dam failing from overtopping. An analysis of the dam indicated that the PMP would overtop the dam. Appendix C shows the area that will be flooded if the dam breached under fair weather conditions.

Failure of the dam would result in significant damage and risk of loss of life. PCCD considered the following options in deciding the most likely course of action:

- Modify the dam to comply with current safety standards with Federal assistance.
- Modify the dam to comply with current safety standards without Federal assistance.
- Take no action and accept the risk of the dam failing sometime in the future.
- Breach the dam to eliminate the risk of failure from a catastrophic storm event.

After considering the options, PCCD decided that their best option in the absence of Federal assistance is to breach the dam and eliminate the risk of the damages from a failure. Accepting the risk of the dam failure was deemed unacceptable, and no entity was identified which would accept the responsibility of the present dam.

Alternatives eligible for financial assistance under The Watershed Protection and Flood Prevention Act (PL 83-566) as amended by the Watershed Rehabilitation Amendments of 2000 and alternatives ineligible for financial assistance were developed. To be eligible for federal assistance, an alternative must meet the requirement as contained in Public Law 106-472.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

A wide range of non-structural and structural measures were considered singly and in combination as alternatives were formulated. Non-structural measures included flood plain management, liability insurance, zoning, flood warning systems, flood proofing of properties, and installation of storm water detention structures. These non-structural alternatives were either cost prohibitive or did not meet the purpose of the project.

Several structural measures were considered but eliminated from detailed study. These included decommissioning of the dam by total removal of the embankment, raising the dam with a concrete parapet wall, raising the dam and installing a roller compacted concrete (RCC) spillway on top of the dam, and increasing the capacity of the auxiliary spillway.

Decommissioning of the dam by total removal of the embankment was eliminated due to cost considerations. Raising the dam with a concrete parapet wall was eliminated due to cost and possible problems with the strength of existing fill within the dam. Project costs associated with raising the top of the dam and installing an RCC spillway on top of the dam would far outweigh benefits from this alternative. And, the alternative to provide increased capacity of the auxiliary spillway was eliminated due to inability to provide enough width at the existing site location. Location of a housing addition immediately adjacent to the existing auxiliary spillway restricted this alternative from being feasible.

DESCRIPTION OF ALTERNATIVE PLANS

The following is a description of the alternative plans that were developed:

Alternative No. 1 – No Action or Future Without Project

Under this alternative, no additional federal funds would be expended on the project. This alternative consists of excavating a breach in the dam of sufficient size to safely pass the 100-year, 24-hour frequency flood event with no influence on the water surface profile. This breach would be a minimum size opening in the dam from top of dam down to the valley floor, which would eliminate the structure's ability to store water. The principal spillway components would also be removed to eliminate potential injury to visitors from adjacent neighborhoods. Downstream flooding conditions would be similar to those that existed prior to the construction of the dam. This course of action would minimize the sponsor's dam safety liability but would not eliminate all liability. The excavated material (about 30,000 cu yd) would be placed in the present easement area. The remaining portion of the embankment and the land currently covered by the sediment pool would be maintained as a greenbelt area.

Since the 100-year floodplain would be enlarged due to the absence of flood protection, any potential future downstream development would be altered to account for the enlarged floodplain. The City of Kyle's Stormwater Pollution Prevention Plan would require modification. Without the presence of FRS No. 5, floodwaters from a 100-year storm event would overtop Goforth Road by about 4.5 feet causing extensive road damage and interrupting traffic until repairs could be made. Multiple crossings on Bunton Lane and the crossing on Heidenreich Lane would also be overtopped without the presence of FRS No. 5 causing additional costly damages. The estimated cost of this alternative is \$852,400.

Alternative No. 2 - Decommission FRS No. 5

This alternative removes the storage function of the dam and reconnects, restores, and stabilizes the stream and floodplain functions. Although complete removal of the embankment is sometimes required for decommissioning, a partial removal of the embankment would take place. Partial removal of the embankment would consist of excavating a breach in the dam of sufficient size to safely pass the 100-year, 24-hour frequency flood event with no influence on the water surface profile. This would eliminate the structure's ability to store water. Downstream flooding conditions would be similar to those that existed prior to the construction of the dam. Since the 100-year floodplain would

be enlarged due to the absence of flood protection, any potential future downstream development would be altered to account for the enlarged 100-year floodplain. The City of Kyle's Stormwater Pollution Prevention Plan would require modification. The remaining portion of the embankment and land currently covered by the sediment pool would be maintained as a greenbelt area. Excavated material (about 35,000 cu yd) would be placed in the sediment and detention pool areas and all exposed areas would be vegetated as needed for erosion control (about 30 acres). Channel work would be installed to reconnect the stream channel through the sediment pool. Riparian vegetation would be established along the stream channel (about 4 acres). A grade stabilization structure (GSS) would be installed to prevent head cutting and prevent sediment from being relocated to downstream areas.

In order not to impede flows through the breached embankment, the principal spillway components would be removed. Removal of the components would also insure that visitors would not be subject to injury by climbing on or around the exposed components. Without the presence of FRS No. 5, floodwaters from a 100-year storm event would overtop Goforth Road by about 4.5 feet causing extensive road damage and interrupting traffic until repairs could be made. Multiple crossings on Bunton Lane and the crossing on Heidenreich Lane would also be overtopped without the presence of FRS No. 5 causing additional costly damages. The estimated cost of this alternative is \$1,536,300.

Alternative No. 3 – Rehabilitation of FRS No. 5

This alternative consists of modifying FRS No. 5 to meet current performance and safety standards for a high hazard dam. The modification would consist of rehabilitation of FRS No. 5 by raising the top of dam 3.5 feet to elevation 671.5, adding a new 24" diameter hooded inlet type principal spillway at elevation 645.1 and adding an impact basin to serve as the outlet for both principal spillways. The auxiliary spillway crest elevation would be lowered 0.4 foot to elevation 663.4, a splitter dike would be installed and the entrance section would be realigned. The back slope of the embankment would be extended to maintain a 3:1 slope when raising the dam and a toe drain system would be installed along the back toe of the embankment. All disturbed areas would be re-vegetated to adapted species. By installing the secondary principal spillway at a lower elevation, floodwater detention storage would be provided for a 1 percent chance of the auxiliary spillway functioning in any year (100-year frequency). The evaluated life of the structure would be extended for an additional 100 years. The 100-year floodplain downstream of FRS No. 5 would be unchanged. The dam would continue to provide flood damage reduction benefits downstream. Estimated cost of this alternative is \$2,383,400.

Alternative No. 4 – Relocation of At-Risk Downstream Properties.

Because 35 inhabitable properties are located downstream of FRS No. 5 within the breach inundation area, relocation of properties at-risk at a cost of \$2,769,700 was included as an alternative. The relocation of these at risk properties would maintain the low hazard classification of FRS No. 5. PCCD is familiar with the provisions as set forth by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 601 et seq.), and would be responsible for ensuring such provisions are met. Thirty-five families (approximately 100 people) would be relocated out of the breach area to other parts of the county. The area acquired by the PCCD would be maintained as a greenbelt area. The existing 100-year floodplain would not change. However, in order to ensure that future downstream development would not include inhabitable at-risk structures, this alternative also consists of purchasing deed restrictions on all remaining land within the breach zone at an estimated cost of \$1,026,400. In order for FRS No. 5 to meet current

safety and performance standards, foundation drains costing \$120,000 would be installed. The 100-year floodplain downstream of FRS No. 5 would be unchanged. After accounting for administration costs of \$72,200, total estimated cost of this alternative is \$3,988,300.

For water and related land resources implementation studies, standards and procedures have been established in formulating alternative plans. These standards and procedures are found in "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G)". According to P&G, an alternative that reasonably maximizes net national economic development benefits is to be formulated. This alternative is to be identified as the national economic development (NED) plan. During the process of formulating alternatives, the NED alternative was determined to be one of the four alternatives listed above.

COMPARSION OF ALTERNATIVES

Table E compares effects of each of the alternatives.

<i>Table E – Comparison of Effects of Alternatives</i>				
Resource Concerns	Alternative No. 1 Future Without Project	Alternative No. 2 Decommission FRS No. 5	Alternative No. 3 Rehabilitation of FRS No. 5	Alternative No. 4 Relocate at-risk Properties
NED Account ¹				
Project Investment	\$852,400	\$1,536,300	\$2,383,400	\$3,863,700
Annual Benefits	\$0	\$41,900	\$215,000	\$215,000
Annual Costs	\$0	\$76,500	\$120,200	\$201,100
Net Benefits	\$0	(\$34,600)	\$94,800	\$13,900
EQ Account ²				
Wetlands	None present	None present	None present	None present
Prime Farm Lands	Minimal effect to about 9.2 acres.	Minimal effect to about 9.2 acres.	Minimal effect to about 9.2 acres.	Minimal effect to about 9.2 acres.
Water Quality	Increased sediment loads would occur downstream.	Efforts would be made to stabilize existing sediment and to prevent headcutting.	Impacts would be of a temporary nature during construction in accordance with state laws.	Impacts would be of a temporary nature during relocation activities.
Water Quantity	Loss of the sediment pool (33.5 acres).	Loss of the sediment pool (33.5 acres).	Maintain permanent water in sediment pool (33.5 acres).	Maintain permanent water in sediment pool (33.5 acres).
Sedimentation and Erosion	Minor erosion during construction. Sediment pool converted to open area.	Minor erosion during construction. Sediment pool converted to open area.	Minor erosion during construction. 15 acres disturbed during construction.	Minor erosion during relocation activities. 29 acres disturbed during relocation activities.
Air Quality	Minor adverse during construction.	Minor adverse during construction	Minor adverse during construction.	Minor adverse during relocation activities.
Fish and Wildlife Habitat	Conversion of 33.5 acres of shallow and deep water habitat to riverine habitat. Area would be vegetated through natural regeneration and maintained as a greenbelt area.	Conversion of 33.5 acres of shallow and deep water habitat to riverine habitat. Area would be vegetated to native species preferred by resident wildlife species.	Fish and wildlife habitat maintained.	Fish and wildlife habitat maintained.
Threatened & Endangered Species	No effect	No effect	No Effect	No Effect
RED Account ³				
Land Values	Minimal effect.	Minimal effect.	No Effect	Decrease in value for 29 acres within downstream greenbelt.

Resource Concerns	Alternative No. 1 Future Without Project	Alternative No. 2 Decommission FRS No. 5	Alternative No. 3 Rehabilitation of FRS No. 5	Alternative No. 4 Relocate at-risk Properties
OSE Account ⁴				
Aesthetics	Area covered by sediment pool would be maintained as a greenbelt area.	Area covered by sediment pool would be maintained as a greenbelt area.	Total of 15 acres affected by construction activities and would be reseeded.	Area acquired downstream would be maintained as a greenbelt area.
Dam Safety	Threat of dam failure would be removed.	Threat of dam failure would be removed.	Threat of dam failure is reduced.	Threat of dam failure would remain.
Flood Damages	Downstream flood damages would increase.	Downstream flood damages would increase.	Continued protection from flooding.	For relocated properties, flood damages eliminated. Continued protection from flooding for other properties.
Human Health and Safety	Reduced threat to loss of life. More frequent flooding.	Reduced threat to loss of life. More frequent flooding.	Reduced threat to loss of life. Increased flood protection.	Reduced threat to loss of life.
Recreation	Loss of activities due to loss of sediment pool. Greenbelt area could provide recreational opportunities.	Loss of activities due to loss of sediment pool. Greenbelt area could provide recreational opportunities.	Recreation opportunities maintained.	Recreation opportunities maintained. Greenbelt area could provide recreational opportunities.
Cultural Resources	Potential effect if cultural resources present	Potential effect if cultural resources present	No effect	Potential effect if cultural resources present
Environmental Justice	Minority property owners would experience greater flood damages.	Minority property owners would experience greater flood damages.	No effect	Flood damages would be eliminated for minority property owners, but they would experience disruption of community cohesion.

¹ NED – National Economic Development: Sponsors would incur \$852,400 cost in the absence of federal action. This annualized cost (\$41,900) is included instead as a benefit for Alternatives 2, 3, and 4 since it would not be incurred if any alternative except number one were adopted.

² EQ – Environmental Quality

³ RED – Regional Economic Development

⁴ OSE – Other Social Effects

Table F compares the monetary effects and associated impacts of the alternatives.

Item	Alternative No. 1 Future Without Project	Alternative No. 2 Decommission FRS No. 5		Alternative No. 3 Rehabilitation of FRS No. 5		Alternative No. 4 Relocate at-risk Properties	
	Benefits	Benefits	Change in Benefits	Benefits	Change in Benefits	Benefits	Change in Benefits
Flood Damage Reduction Benefits ^{2/}	\$0	\$0	\$0	\$148,500	\$148,500	\$148,500	\$148,500
Avoidance of Modifications for SWPPP	\$0	\$0	\$0	\$24,600	\$24,600	\$24,600	\$24,600
Avoidance of Cost of Sponsor's Breach	\$0	\$41,900	\$41,900	\$41,900	\$41,900	\$41,900	\$41,900
Total	\$0	\$41,900	\$41,900	\$215,000	\$215,000	\$215,000	\$215,000

^{1/} All numbers reflect 2007 prices.

^{2/} Updated using applicable indices and updated data. Although the level of protection is greater with Alternative No. 3 compared to Alternative No. 4, difference in benefits is insignificant.

ENVIRONMENTAL CONSEQUENCES

The following is a description of the effects that each alternative would have on the economic, social, environmental, and cultural concerns identified during the scoping process determined to be significant to decision making. The present conditions are described to provide a better understanding of the effects.

DAM SAFETY

- **Present Conditions** – The dam does not meet current safety standards for a dam in this location and there is a risk of the dam failing from overtopping. An analysis of the dam indicated that a storm of the PMP magnitude would overtop the dam. The risk of dam failure is low but the consequences of such a failure if it were to occur would likely be catastrophic. A breach study was made to determine the effects of a one time catastrophic breach of the existing dam. The breach of the existing dam was considered to be overtopping of the dam with a breach as wide as the maximum height of the dam. The flow from the breach would overtop Goforth Road with approximately 20 feet of water at a maximum velocity of 8.5 feet per second. Additionally, three crossings on Bunton Lane would be overtopped by 5 to 15 feet of water respectively and the crossing on Heidenreich Lane would be overtopped by 3 feet of floodwater.
- **Alternative No. 1** - The threat of the dam failing would be removed through a controlled breach of the dam thereby eliminating any concern for dam safety. The 100-year floodplain would be enlarged due to the absence of flood protection.
- **Alternative No. 2** - The threat of the dam failing would be removed by decommissioning the dam and removing a portion of the embankment by a controlled breach. Other conditions as described in Alternative No. 1 would apply.
- **Alternative No. 3** - The risk of the dam failing from overtopping would be reduced by raising the effective height of the dam and installing an additional principal spillway thereby reducing the threat of a catastrophic breach.
- **Alternative No. 4** - Relocation of the at-risk properties downstream would remove danger to occupants of the structures. The threat of a breach from overtopping would remain.

HUMAN HEALTH & SAFETY

- **Present Conditions** – Although the dam is structurally safe, there is a threat of failure from overtopping by the occurrence of a PMP storm. There is a significant threat to human life and safety from dam failure. Thirty-five residences downstream of FRS No. 5 would be affected by a breach, endangering 100 people. The breach of FRS No. 5 would overtop Goforth Road, Bunton Lane and Heidenreich Lane, potentially endangering the lives of motorists. Currently all road crossings overtop to some degree from a 25-year storm event or greater.
- **Alternative No. 1** - No threat from failure. However, potential threat from flooding would increase, potentially endangering motorists.
- **Alternative No. 2** - Same as Alternative No. 1.
- **Alternative No. 3** - Threat to human life and safety from a dam failure would be reduced. Flood protection would continue for residents and motorists downstream of FRS No. 5.

- **Alternative No. 4** - Threat to residential human life and safety from a dam failure would be eliminated for the relocated families. Flooding conditions for road crossings downstream of FRS No. 5 would be the same as present conditions and the threat of dam failure would remain.

FLOOD DAMAGES

- **Present Conditions** – The current dam provides complete protection from the 35-year, 24-hour event storm. However, damages from storms greater than this would continue.
- **Alternative No. 1** - Downstream flooding and damages to property and infrastructure would increase. Hays County would incur additional costs from repairing increased flood damages to road crossings downstream of FRS No. 5. The limits of the 100-year floodplain would increase, which would affect potential future development.
- **Alternative No. 2** - Same as Alternative No. 1
- **Alternative No. 3** - There would be continued protection from flooding. Threat of a catastrophic breach would be reduced due to FRS No. 5's ability to sustain the PMP storm without overtopping the dam. Although the level of protection is greater than Alternative No. 4, the difference in damage reduction benefits is insignificant.
- **Alternative No. 4** - Flood damages would be eliminated for relocated residences. Flood damage protection maintained for other downstream properties and road crossings. However, threat of dam failure would remain.

THREATENED AND ENDANGERED (T&E) SPECIES

- **Present Conditions** - Current habitat is composed of an approximately 33.5-acre open water sediment pool and low quality rangeland with invading brush species. There are no species federally or state listed as threatened or endangered or suitable habitat for listed species in or close to the proposed project site.
- **Alternative No. 1** - No Effect.
- **Alternative No. 2** - No Effect.
- **Alternative No. 3** - No Effect.
- **Alternative No. 4** - No Effect.

CULTURAL AND HISTORIC RESOURCES

- **Present Conditions** – No known cultural resources are being affected.
- **Alternative 1** - There would be potential to affect cultural resources (should any be present) in areas where earth fill from dam is placed and in areas of any necessary modifications to infrastructure downstream.
- **Alternative 2** - There would be potential to affect cultural resources (should any be present) in previously undisturbed areas where earth fill from dam is placed and in areas of any necessary modifications to infrastructure downstream.
- **Alternative 3** - NRCS has conducted a cultural resources survey of the proposed rehabilitation work areas and no known cultural resources would be affected by this alternative. In the event of a discovery of a potentially eligible cultural resource during construction, all work would cease until a cultural resource specialist evaluates the site and recommends a course of action to be followed.
- **Alternative 4** - There would be potential to affect cultural resources (should any be present) in areas where structures would be removed from the breach area and in areas of any necessary modifications to infrastructure downstream.

PRIME FARMLANDS

- **Present Conditions** – There are about 9.2 acres of prime farmland located in the proposed project work area and approximately 328 acres of prime farmland located downstream in the project area; however there would be no effect under present conditions. The Farmland Protection Policy Act (FPPA) of 1981, as amended, states in 7 CFR 658.2 “farmland does not include land already in or committed to urban development or water storage”.
- **Alternative 1** – This alternative could cause flooding on approximately 35 acres of land located downstream of FRS No. 5 that is classified as prime farmland. This area is in the 100-year floodplain and is presently protected from out of bank flows from storm events less than a 35-year event. A controlled breach of FRS No. 5 would allow crop damages and increase scour erosion to occur during most storm events.
- **Alternative 2** – Same as Alternative No. 1.
- **Alternative 3** – A total of 9.2 acres in the proposed project work area are in soils classified as “Prime and Unique Farmland” and are subject to the FPPA. A composite rating for the soils in the proposed project work area scored a total of 85 points in Part VII of the form AD-1006. The FPPA law states that sites that score less than 160 would need no further consideration; therefore the 9.2 acres affected is considered minimal.
- **Alternative No. 4** – Same as Present Conditions.

WETLANDS

- **Present Conditions** - The sediment pool for FRS No. 5 is composed of a 33.5-acre lacustrine (Cowardin Classification) wetland system with deep water and shallow water habitats. Stream channels above FRS No. 5 are ephemeral. There are no areas that meet the definition of a wetland under the Clean Water Act in the project area.
- **Alternative No. 1** - This alternative would convert the 33.5-acre sediment pool to an ephemeral stream with limited riparian zone and upland grassland. The upland grassland would most likely be maintained as grazing for cattle or, if abandoned, convert to a mesquite stand due to the heavily established mesquite presently in the project site. Without FRS No. 5 in place, the increased flows due to development upstream would cause the ephemeral stream to incise, and the increased sediment loads would increase aggradation downstream.
- **Alternative No. 2** - This alternative would convert the 33.5-acre sediment pool to an ephemeral stream with adjacent riparian zone and upland grassland. Reshaping the ephemeral channel and establishing riparian vegetation would help stabilize banks and reduce erosion. The installation of a GSS would reduce incising, prevent head cuts from moving upstream, and reduce aggradation downstream. The upland grassland, without constant maintenance, would most likely convert to a mesquite stand.
- **Alternative No. 3** - The 33.5-acre sediment pool would be temporarily impacted due to construction activities. The pool would be lowered to make modifications to the principal spillway inlet structure, outlet pipe and impact basin, and to make needed modifications to the dam. Downstream turbidity might be temporarily increased during the construction period. The sediment pool would be returned to preconstruction size and elevation after construction is completed.
- **Alternative No. 4** – There would be no impact to the sediment pool.

AIR QUALITY

- **Present Conditions** - No air quality problems have been specifically identified.
- **Alternative No. 1** - Impacts would be of a temporary nature associated with earthmoving and other construction activities. These conditions would only be present during

construction activities and until the disturbed areas are re-vegetated. Any minimal dust and particulate emissions should be easily controlled by the construction contractors using standard dust mitigation techniques.

- **Alternative No. 2** - Same as Alternative No. 1.
- **Alternative No. 3** - Same as Alternative No. 1.
- **Alternative No. 4** - Same as Alternative No. 1 except to a lesser degree.

WATER QUALITY

- **Present Conditions** - No water quality problems have been specifically identified. Data on the quality of runoff in the sediment pool is limited. There is a potential of pollutants from the upstream urbanized area being carried in the runoff. Also, organic material and sediment deposited in the sediment pool affects the quality of the water.
- **Alternative No. 1** - Impacts would be of a temporary nature associated with earthmoving and other construction activities. Sediment in stream flow would be carried downstream. Increased flows due to the removal of FRS No. 5 would increase erosion and cause the stream to incise. Sediments and pollutants that are currently captured in the sediment pool would move downstream, increasing sediment loads and increasing aggradation downstream.
- **Alternative No. 2** - Same as Alternative No. 1 except to a lesser degree since re-vegetation and grade control measures are planned in the present sediment pool area.
- **Alternative No. 3** - Impacts would be of a temporary nature associated with earthmoving and other construction activities. These conditions would only be present during construction activities and until the disturbed areas are re-vegetated. The Stormwater Pollution Prevention Plan (SWPPP) required under the Texas Pollutant Discharge Elimination System (TPDES) and the Texas Commission on Environmental Quality (TCEQ) Storm Water Construction General Permit would minimize any degradation of water quality during construction.
- **Alternative No. 4** - Same as Alternative No. 3 except to a lesser degree.

WATER QUANTITY

- **Present Conditions** – Bunton Branch on which FRS No. 5 is constructed is an ephemeral stream. The amount of water contained in the sediment pool area of FRS No. 5 is dependent on rainfall and runoff.
- **Alternative No. 1** – During storm events, flood flows would move downstream adding to volume and peaks as it moves, thus increasing the floodplain to conditions existing prior to construction of the dam.
- **Alternative No. 2** - Same as Alternative No. 1.
- **Alternative No. 3** - During construction the sediment pool would be ineffective for a period of 2 to 3 months while the new principal spillway and outlet pipe are being installed. This condition would only be present until the lowest gated port in the principal spillway is closed following construction.
- **Alternative No. 4** – Same as present conditions except for reduction in sediment pool volume with time.

AESTHETICS

- **Present Conditions** – FRS No. 5's sediment pool consists of a 33.5 acre water body that provides livestock water and limited recreational activities for adjacent landowners. There is currently residential development adjacent to the east side of the detention pool and adjacent to the auxiliary spillway. Visibility of the sediment pool is available to adjacent landowners.

- **Alternative No. 1** – This alternative would leave a significant portion of the embankment in place. The material (about 30,000 cu yd) would be placed in the present easement area. The remaining portion of the embankment and the land currently covered by the sediment pool would be maintained as a greenbelt area.
- **Alternative No. 2** - This alternative would leave a significant portion of the embankment in place. Excavated material (about 35,000 cu yd) would be placed in the sediment and detention pool areas and all exposed areas would be vegetated as needed for erosion control (about 30 acres). The remaining portion of the embankment and land currently covered by the sediment pool would be maintained as a greenbelt area. Riparian vegetation would be established along the stream channel (about 4 acres). Channel work would be installed to reconnect the stream channel through the sediment pool.
- **Alternative No. 3** - About 15 acres would be affected by construction activities and would require reseeding to adapted native or introduced species following construction. Conditions following rehabilitation would be very similar to current conditions.
- **Alternative No. 4** - Same as Present Condition except the area acquired downstream (residential acreage) would be maintained as a greenbelt area.

SEDIMENTATION

- **Present Conditions** – Sedimentation of the reservoir was surveyed in 2007 and the report indicated that 164.5 acre-feet of capacity remains at or below elevation 645.1. The sediment contained in the sediment and detention areas of the structure has not been tested.
- **Alternative No. 1** - Current sediment deposits would be dislodged and transported downstream by the erosion process (headcutting created by breaching of FRS No. 5) until natural re-vegetation occurs. This process would continue until the incised ephemeral stream channel through the sediment deposit becomes stable.
- **Alternative No. 2** – Current sediment deposits would be stabilized with a GSS; however major flows would cause some sediment to be transported downstream.
- **Alternative No. 3** – Sediment volume of the structure would be provided for the next 100 plus years. Testing of the sediment would not be needed as it would not be disturbed during construction activities.
- **Alternative No. 4** - Same as Alternative 3.

LAND VALUES

- **Present Conditions** – Land immediately below the dam, adjacent to the east side of the sediment pool, and along the west side of the sediment pool are within the City Limits of Kyle. Land immediately upstream of the sediment pool is in Kyle’s Extra Territorial Jurisdiction (ETJ). All of the land within the floodplain downstream of the dam is also in Kyle’s ETJ.
- **Alternative No. 1** – According to local development projections, growth is expected to continue along the I-35 corridor between Austin and San Antonio. Although property on the west side of the sediment pool is currently agricultural use (grazing land), this land could be developed into residential lots, although the current landowner has not expressed interest in subdividing the property. According to officials with the local tax appraisal district, current formulas used to estimate values of properties adjacent to FRS No. 5 do not include an amenity value factor due to the presence of the site. Therefore, there would be no impact to land values adjacent to the sediment pool. There is currently residential development downstream of FRS No. 5 on Bunton Lane. However, the enlarged floodplain would not affect the subdivision. Potential future downstream

development would be altered to account for the enlarged 100-year floodplain.

- **Alternative No. 2** - Same as Alternative No. 1.
- **Alternative No. 3** – No effect.
- **Alternative No. 4** – Thirty-five downstream properties at-risk from a catastrophic breach of FRS No. 5 would be relocated to other areas in the county. In order to ensure that future development does not occur within the breach zone, this alternative also consists of purchasing deed restrictions on remaining land within the breach zone outside of the 100-year floodplain.

FISH AND WILDLIFE HABITAT

- **Present Conditions** – FRS No. 5 provides approximately 33.5 acres of deep water and shallow water habitat. There is currently residential development on the east side of the lake adjacent to the detention pool and adjacent to the auxiliary spillway. The majority of the land west of the lake adjacent to the detention pool is private undeveloped land used primarily for livestock grazing. The land cover is predominantly poor condition rangeland with a predominance of mesquite brush and low quality annual and perennial cool and warm season grasses and forbs. FRS No. 5 currently provides habitat for small mammals, neo-tropical songbirds, shore birds, various water fowl, and a variety of fish species. Various species of reptiles and amphibians also inhabit the project site.
- **Alternative No. 1** - This alternative would convert 33.5 acres of deep and shallow water habitat to an ephemeral stream with associated upland habitat. Breaching FRS No. 5 would adversely impact all aquatic and amphibious species presently using the sediment pool, small mammals and reptiles that use open water, and all aquatic avian species. Aggradation would adversely impact fisheries downstream, and increased flows would adversely impact downstream riparian zones through erosion and lateral movement of the stream channel. The increase in open grassland would benefit seed eating species, small mammals such as rats and mice, and reptile species such as snakes and lizards. The open grassland would produce larger insect populations and therefore benefit insect eating species such as bobwhite quail, raccoons, and possum. The increase in open areas with prey species would benefit predator species such as raptors, coyote, and bobcat.
- **Alternative No. 2** - This alternative would have the same ultimate impacts as Alternative No. 1, but with stream channel shaping and planting of riparian vegetation, the habitats would function in less time and would be more stable than Alternative No. 1.
- **Alternative No. 3** - This alternative would have only minor temporary adverse impact to current fish and wildlife habitat. Lowering the water level for the installation of the additional 24-inch principal spillway would cause a lack of dissolved oxygen and increase in water temperature which would adversely impact existing fish populations. Temporary turbidity due to the construction activities could impact fish and waterfowl habitat in the sediment pool and downstream during the construction period. After construction, the sediment pool would be unchanged from its present condition, but downstream flows during storm events would reach higher rates of flow more frequently and in a shorter time frame. Due to raising the top of the dam and straightening the entrance to the auxiliary spillway, approximately 10 acres north of the dam and 13 acres south of the dam would be converted from a shrub-scrub habitat to an improved grassland.
- **Alternative No. 4** – About 33.5 acres of open water (lacustrine – Cowardin Classification) habitat and associated shoreline areas would be maintained. Acquired downstream properties would be converted into a greenbelt area, enhancing fish and wildlife habitat and natural resources.

RECREATION

- **Present Conditions** – Even though the presence of FRS No. 5 provides for limited recreational activities, visitor-days and consequent benefits are estimated to be minimal.
- **Alternative No. 1** - Recreational opportunities for FRS No. 5 would be lost.
- **Alternative No. 2** - Same as Alternative No. 1.
- **Alternative No. 3** – Although minimal in monetary value, incidental recreational opportunities associated with FRS No. 5 would not only be maintained, but could be enhanced due to a quicker draw-down time of the detention pool following storm events due to the installation of an additional principal spillway at a lower elevation.
- **Alternative No. 4** – Same as Present Conditions.

ENVIRONMENTAL JUSTICE

- **Present Conditions** – Downstream minority property owners benefit from flood protection.
- **Alternative No. 1** – Downstream minority property owners would be subject to increased flooding.
- **Alternative No. 2** - Same as Alternative No. 1.
- **Alternative No. 3** – Same as Present Conditions. In addition to continued flood protection, the threat to human life and safety from a dam failure would be reduced for minority property owners.
- **Alternative No. 4** – Although flood damages would be eliminated for downstream minority property owners, community cohesion would be disrupted and, depending upon the area(s) selected for relocation, possibly even destroyed.

CUMULATIVE IMPACTS

The combined, incremental effects of human activity, referred to as cumulative impacts, are in some cases a serious threat to the environment. While they may be insignificant by themselves, cumulative impacts accumulate over time, from one or more sources and can result in the degradation of important resources. The assessment of cumulative impacts in National Environmental Policy Act (NEPA) documents is required by the Council of Environmental Quality (CEQ) regulations (1987). Cumulative impacts result when the effects of an action are added to or interact with other effects in a particular place and within a particular time. It is the combination of these effects, and any resulting environmental degradation, that is the focus of this cumulative impact analysis. As a result of the scoping process and discussions with resource agencies and interested groups; no cumulative impacts were identified for this project.

Outside actions in addition to those evaluated here are not known. Additional improvements (not already planned as part of Alternative No. 3) to the dam, sediment pool, and auxiliary spillway are not planned at this time. The potential for upstream development may affect hydrology or hydraulics, but the type and extent are not known. Although the project area is located both within the City Limits of the City of Kyle and the ETJ area of the City of Kyle, it is not anticipated that Alternative No. 3 would adversely affect future development. To the contrary, it is projected that the rehabilitation of FRS No. 5 would allow any conceived future development (upstream and/or downstream) to be unimpeded. Upstream/downstream land uses are anticipated to continue in a trend toward urbanization in both the short term and long term. As such, cumulative effects as a result of the Rehabilitation Alternative No.3 are not anticipated.

CONTROVERSY

There are no known areas of controversy.

RISK & UNCERTAINTY

The areas of risk and uncertainty associated with this project lie in the accuracy of estimating flood flows, flood elevations, cost estimates associated with each alternative, property values, the reliability of future projections, and the assessment of impacts on damages. The uncertainty of flood flows and water surface elevations has the potential for increased damages as new properties are converted from agricultural to residential and commercial use. It is possible these uncertainties could lead to increased risk to human life in the event of a dam breach. Hydrologic methods and computer modeling used in this analysis are consistent with the standards of practice at this time. However, the tributary is not gauged and no verification of storm flows is possible. Cost estimates were developed from available historic data. Factors discovered during actual design, notably the bearing capacity of the existing structure and availability of suitable material for construction could affect these estimates. The potential impacts for each alternative are estimated using techniques that relate potential damage to lost opportunity. However, these methods are in part based on professional judgment and actual experience could be different.

The Sponsors currently own easements that meet minimum Public Law 83-566 requirements. However, these easements are at an elevation below top of dam. Although any future upstream development must adhere to current easement restrictions, there is the possibility of development below top of dam elevation. Such development could be at risk from flooding during events which exceed the elevation of upstream easements.

Within the context of this study effort, all alternatives were considered on a comparable basis. There does not appear to be any area that by using different procedures or making more intensive studies would have resulted in a different decision.

CONSULTATION & PUBLIC PARTICIPATION

PROJECT SPONSORS:

Sponsors of the Plum Creek Watershed project and of the FRS No. 5 rehabilitation project are PCCD, Hays County SWCD and the Caldwell-Travis SWCD. PCCD agreed to be the lead sponsor and to provide coordination of the project.

PLANNING TEAM:

An Interdisciplinary Planning Team provided for the “technical” administration of this project. Technical administration includes tasks pursuant to the NRCS nine-step planning process, and planning procedures outlined in the NRCS-National Planning Procedures Handbook. Some of the tasks undertaken by the Interdisciplinary Planning Team include but are not limited to: Preliminary Investigations, Hydrologic and Engineering Analysis, Reservoir Sedimentation Surveys, Economic Analysis, Evaluating Environmental Concerns, Formulating and Evaluating Alternatives, and Writing the Supplemental Plan/EA. Informal discussions amongst the planning team, sponsors, NRCS, and landowners were conducted throughout the planning period.

A review of NEPA concerns was initiated early in the planning process by the planning team. Identified NEPA concerns were reviewed and documented.

An NRCS Archaeologist performed a cultural resources survey of the proposed project site. After consultation of the prepared report with the State Historic Preservation Officer, it was determined that no historic properties would be affected.

PUBLIC PARTICIPATION:

A regular monthly board meeting of the PCCD was attended by three NRCS representatives on July 17, 2007 to answer questions about the potential rehabilitation of FRS No. 5 and to review the rehabilitation planning process. The meeting was attended by the full board, executive manager, assistant manager, board secretary, and legal council for the board. On this same day three other NRCS representatives (Economist, Biologist, and Cultural Resources Specialist) conducted a field visit to the site to gather information relevant to the project.

Integral to the planning process is the solicitation of public comments to identify, understand, and address the issues and concerns of the relevant agencies and the public. The sponsors’ intent during the scoping process was to inform agencies and the public about the planning process and solicit their comments in order to identify issues and questions to consider when developing the Supplemental Watershed Plan and Environmental Assessment. During the scoping period, the sponsors announced the commencement of the planning process through various means, invited written comments, and held a public scoping meeting. Opportunities for the public to participate in the planning process occurred at key milestones throughout the process.

An on-site scoping meeting was planned for August 15, 2007 with TCEQ, USFWS, TPWD, the Environmental Protection Agency, interested groups, and individuals being invited by telephone and e-mail. None of the invited agencies, groups or individuals elected to attend the scoping meeting. USFWS and the TPWD furnished information concerning federally and state listed endangered and threatened species in Hays County, Texas through their respective web sites.

Environmental, cultural, and economic concerns were evaluated by NRCS personnel to determine effects of potential rehabilitation alternatives.

A steering committee meeting was held on September 20, 2007, to explain the Watershed Rehabilitation Program and to scope additional resource problems, issues, and concerns of local residents associated with the FRS No. 5 project area. Invitations to participate in the public meeting were made by personal telephone calls and were e-mailed to potentially affected landowners and interested parties around and below FRS No. 5 and reservoir area. A power point presentation and handout material were utilized to provide information to the group.

Potential alternative solutions to bring the Plum Creek Watershed FRS No. 5 into compliance with current dam safety criteria were presented at the initial steering committee meeting. Through verbal and written comments, meeting participants provided input on issues and concerns to be considered in the planning process. Specifically, it was noted that a majority of property owners within the potential breach area were minorities. Due to the nature of minority community cohesion, planning efforts and alternatives considered would need to address this issue.

A second steering committee meeting was held on January 11, 2008, to review the first draft of the Supplemental Plan and Environmental Assessment, summarize planning accomplishments, convey results of the reservoir sedimentation survey, and present various structural and non-structural alternatives.

Comments on the Draft Supplemental Watershed Plan/Environmental Assessment were requested from the following federal, state, and local agencies and organizations. Response letters and disposition of comments are located in Appendix B.

Governor - State of Texas
Texas Office of State-Federal Relations (State Single Point of Contact)
Texas State Soil and Water Conservation Board
Texas Commission on Environmental Quality
Texas Parks & Wildlife Department
Texas Water Development Board
Texas AgriLife Research
Texas Historical Commission
US Army Corps of Engineers, Ft. Worth District
USDI-Bureau of Reclamation
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
USDA-Forest Service
USDA-Farm Service Agency
City of Kyle
Hays County Commissioners Court
Hays County Soil and Water Conservation District
Caldwell-Travis Soil and Water Conservation District
Local Steering Committee members
Plum Creek Conservation District

PROVISIONS OF THE PREFERRED ALTERNATIVE

PREFERRED ALTERNATIVE

Alternative No. 3 is the preferred alternative. The dam would be modified to meet current performance and safety standards for a high hazard dam and the service life of FRS No. 5 would be extended for an additional 100 years. The modification would consist of rehabilitation of FRS No. 5 by raising the top of dam 3.5 feet with earth fill to elevation 671.5, extending the back slope to maintain a 3:1 slope when raising the dam and installing a foundation drain system along the back toe of the embankment. The existing drop inlet type principal spillway would not change except for the addition of an impact basin as the outlet structure. A new 24" hooded inlet type principal spillway would be added at elevation 645.1 and would connect to the outlet of the existing principal prior to entering the impact basin. The existing auxiliary spillway crest would be lowered 0.4 foot to elevation 663.4, a splitter dike would be added and the entrance section would be realigned. Estimated cost is \$2,383,400.

Construction activities would result in the disturbance of approximately 15 acres. The removal of vegetation would only be that necessary to allow rehabilitation of the structure. Disturbed areas would be reestablished to adapted vegetation to reduce erosion.

The sponsors would develop an Emergency Action Plan (EAP) before any rehabilitation construction activities begin stating the responsibilities for the development, implementation and review of actions necessary to provide safety to individuals downstream of the structure should extreme flooding occur.

RATIONALE FOR ALTERNATIVE PREFERENCE

Alternative plans were formulated as required by NRCS policy and "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies" (P&G) (USWRC, 1983). According to P&G, an alternative that reasonably maximizes net national economic development benefits is to be formulated. This alternative is to be identified as the National Economic Development (NED) Plan. Alternative No. 3 (Rehabilitation of FRS No. 5) is the NED plan.

Alternative plans were formulated in consideration of the purposes of the project and concerns expressed during the public scoping process. Formulation of the alternative plans gave consideration to four criteria: completeness, effectiveness, efficiency, and acceptability. Alternative Nos. 1, 2, 3, and 4 all meet the criteria for completeness. Alternative Nos. 1 and 2 remove the safety hazard of the dam from failing but they do not address the primary problem of assuring that downstream flood protection would continue to be provided. Alternative No. 4 was rejected because it would involve the relocation of 35 families out of the floodplain (possibly by the use of eminent domain by the PCCD), causing at a minimum the disruption of cohesion of a minority community. It would also require the purchase of deed restrictions on remaining land within the breach zone.

Alternative No. 3 is the preferred alternative. It meets the purpose and need to maintain the present level of flood control benefits and comply with current performance and safety standards. It also produces the highest net monetary benefits and a local sponsor has agreed to fund the local share of the cost.

PURPOSE

The purposes of the FRS No. 5 rehabilitation project are to maintain the present level of flood control benefits and comply with the current performance and safety standards.

MEASURES TO BE INSTALLED

The recommended plan consists of structural modifications to FRS No. 5 as follows:

- Raise top of dam elevation 3.5 feet from 668.0 feet to 671.5 by using earth fill.
- Install a new secondary principal spillway (hooded inlet type) at elevation 645.1 and install an impact basin to serve as a common outlet for both principal spillways.
- Extend the back slope to maintain a 3:1 slope when raising the dam and install a toe drain system along back toe of embankment.
- Lower auxiliary spillway crest 0.4 foot to elevation 663.4, install a splitter dike and realign the entrance section of the auxiliary spillway.

COMPARISON OF STRUCTURAL DATA

Table G shows comparison of structural data between original as-built and planned rehabilitation:

FRS No. 5	Unit	As Built ^{1/}	Existing Conditions ^{2/}	Planned ^{2/}
Surface Area (Principal Spillway Crest)	acres	41	33.5	33.5
Elevation, Top of Dam (effective)	ft MSL	668.0	668.0	671.5
Principal Spillway	Type	Std. drop inlet, 2 stage	Std. drop inlet, 2 stage	Std. drop inlet, 2 stage, plus hooded inlet
Length of Dam	Ft.	2,163.9	2,163.9	2,200
Elevation, Principal Spillway Crest	ft MSL	649.0	649.4	645.1 ^{5/}
Pipe Diameter, Principal Spillway	in	30	30	30 plus 24
Auxiliary Spillway	type	Veg.	Veg.	Veg.
Elevation, Auxiliary Spillway	ft MSL	663.0	663.8	663.4
Bottom Width, Auxiliary Spillway	Ft.	310	310	250 w/splitter dike
Submerged Sediment Storage	acre-feet	197	164.5	164.5 ^{3/}
Sediment Reserve Below Riser	acre-feet	230	213.5	-
Aerated Sediment Storage	acre-feet	66	-	40 ^{4/}
Flood Storage	acre-feet	1,777	1,978.5	1964.6
Total Storage at Auxiliary Spillway Crest	acre-feet	2,270	2,356.5	2169.1

^{1/} As built data based on 1963 Record Drawings using National Geodetic Vertical Datum of 1929 (NGVD29)

^{2/} Existing and Planned conditions data based on 2007 survey data using North American Vertical Datum of 1988 (NAVD88)

^{3/} 162.8 ac-ft needed for 100 yr. program life, 164.5 ac-ft available at elevation 645.1(port elevation)

^{4/} Needed for 100 year program life

^{5/} Planned principal spillway crest at lower elevation due to installation of new hooded inlet at previous port elevation.

PERMITS, COMPLIANCE AND REQUIREMENTS PRIOR TO CONSTRUCTION

Potential Permits Needed

Any discharge of dredged or fill material in a water of the US associated with rehabilitation of FRS No. 5 would require a Department of the Army permit under Section 404 of the Clean Water Act of 1972. It is likely that any such discharge would be authorized by a general permit such as Nationwide General Permit 3 for Maintenance without a Preconstruction Notification.

For projects with disturbances equal to or greater than five acres it is necessary to have a Stormwater Pollution Prevention Plan (SWPPP) in place at least 48 hours prior to and during construction of the proposed project and filing a Notice of Intent with the TCEQ is required. A Notice of Termination (NOT) must be filed once the site has reached final stabilization. A copy of the Notice of Intent must be submitted by the construction site operator to the operator (City, County, etc.) of the storm sewer system that receives storm water runoff from the construction site.

Compliance with Local, State, and Federal Laws

All applicable local, state, and federal laws will be complied with in the installation of this project. Construction activities will require a SWPPP. U.S. Army Corps of Engineers guidelines indicate that the project will require authorization under Section 404 of the Clean Water Act, and that the project will likely fall within the scope of an existing nationwide permit (NWP#3, Maintenance). Any applicable permits required by the U.S. Army Corps of Engineers will be obtained before any construction activities begin.

Efforts to identify cultural resources have been conducted in compliance with Section 106 and Section 110 (f) and (k) of the National Historic Preservation Act. No historic properties were identified in the areas of Alternative 3 and no known sites are recorded in the vicinity. Ensuing disturbances associated with rehabilitation measures will be monitored for the presence of undiscovered sites by NRCS personnel trained in recognition of cultural resources. In the event of such discovery, appropriate actions will be taken in accordance with the State Level Agreement among NRCS and the Texas State Historic Preservation Officer, the National Programmatic Agreement among NRCS, the National Conference of State Historic Preservation Officers, and the Advisory Council on Historic Preservation, and NRCS General Manual 420, Part 401 guidance.

Operation and Maintenance

The project will be operated and maintained by the Sponsoring Local Organizations. PCCD has the primary responsibilities for maintenance of FRS No. 5. A new Operation and Maintenance (O&M) Agreement will be developed with PCCD and the Hays County SWCD for FRS No. 5 for the 100-year program life of the structure. The new O&M Agreement will be signed before the Project Agreement is signed. O&M activities include but are not limited to inspections, maintenance and repairs of the principal spillways, dam, vegetation and the auxiliary spillway. Based on data from PCCD, it is estimated that O&M activities will cost about \$3,000 per year.

Memorandum of Understanding

The PCCD and NRCS have entered into a Memorandum of Understanding (MOU) to establish a framework under which the PCCD may proceed with work on specific aspects of the proposed rehabilitation project. Accordingly, that specified work might then contribute towards the sponsors 35 percent cost-share obligation.

Project Agreement

The Sponsoring Local Organization responsible for the 35 percent non-federal cost share (PCCD) and the NRCS will enter into a Project Agreement in accordance with the National Contract Grants and Agreement Manual before any work is initiated by either the PCCD or the NRCS.

Emergency Action Plan

The Sponsoring Local Organizations will provide leadership in developing an Emergency Action Plan (EAP) prior to the commencement of construction and will review and update the EAP annually with local emergency response officials. NRCS will provide technical assistance in preparation and updating of the EAP. The breach inundation map and data will be the basis for potential areas to be affected and citizens to be notified. The purpose of the EAP is to identify areas at risk, outline appropriate actions and to designate parties responsible for those actions in the event of a potential failure of FRS No. 5.

COST, INSTALLATION AND FINANCING

The installation of the project will be financed jointly by PCCD and the NRCS. NRCS will use funds appropriated for this purpose. The percentages of the eligible project costs including construction, engineering, project administration, and land rights to be paid by PCCD and the NRCS are as follows:

	<u>PCCD</u>	<u>NRCS</u>	<u>Estimated Project Cost</u>
Rehabilitation of FRS No.5	35 %	65 %	\$1,970,200

An amount up to the percentage rate specified may be satisfied by PCCD for cost of an element such as engineering, real property acquisition or construction. The decision to, and arrangements for, such action will be negotiated between the PCCD and NRCS and will be included in a project agreement executed immediately before implementation. NRCS costs will not exceed 100 percent of the construction cost.

NRCS is responsible for the engineering services and project administration costs (\$413,200) it incurs. However, these costs are not used in the calculation of the federal cost share. These costs are, however, included in the Estimated Installation Cost (Table 1, Appendix A). Also, costs of water, mineral and other resource rights, as well as federal, state and local permits are the responsibility of PCCD and are not counted toward local cost share. See Table 2 in Appendix A for a complete distribution of total rehabilitation costs.

REFERENCES

1. National Park Service, U. S. Department of the Interior, (2007), Native American Consultation Database.
2. Texas Historical Commission, (2007), *Texas Archeological Sites Atlas, Buda, Texas USGS Quad*, 2006.
3. USDA, Soil Conservation Service, (April 1960), *Work Plan, Plum Creek Watershed, Hays, Caldwell and Travis Counties, Texas*, 1960.
4. USDA, Soil Conservation Service, (June 1984), *Soil Survey of Comal and Hays Counties, Texas*, 1984.
5. U.S. Water Resources Council, (1983), *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*, 1983.
6. U.S. Department of the Interior, (1990), *National Wetland Inventory Map, Buda Quadrangle*, 1993.
7. U.S. Fish and Wildlife Service, *Threatened and Endangered Species Lists*, Hays County, Texas, 9/1//2007. Available on line at <http://www.fws.gov/southwest/es/EndangeredSpecies/lists/ListSpecies.cfm>
8. Texas Parks and Wildlife Department, *Threatened and Endangered Species Lists*, Hays County, Texas, 8/8/2007. Available on line at http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species.phtml
9. U.S. Army Corps of Engineers (USACE, 2005), *River Analysis System (HECRAS)*, 2005.
10. USDA, Natural Resources Conservation Service, (NRCS, 1985), *Simplified Dam-Breach Routing Procedure, Technical Release No. 66 (TR-66)*, 1985.
11. USDA, Natural Resources Conservation Service, (NRCS, 1986), *Urban Hydrology for Small Watershed, Technical Release No.556 (TR-55)*, 1986.
12. USDA, Natural Resources Conservation Service, (NRCS, 2005), *Earth Dams and Reservoirs, Technical Release No. 60 (TR-60)*, 2005.
13. USDA, Natural Resources Conservation Service, (NRCS, 2005), *Computer Program for Project Formulation, Hydrology, Technical Release No. 20 (WIN TR-20)*, 2005.
14. USDA, Natural Resources Conservation Service, (formerly the Soil Conservation Service), (NRCS, 1992), *National Watershed Manual*, 2nd edition, 1992.
15. USDA, Natural Resources Conservation Service, (NRCS, 2005), *SITES, Water Resource Site Analysis Computer Program*, Version 2005.
16. USDA, Natural Resources Conservation Service, (NRCS, 2007), *Geologic Investigation, Plum Creek Site 5, Hays County, Texas*, 2007.

17. USDA, Natural Resources Conservation Service, (NRCS, 2007), *Soil Mechanics Report, Plum Creek Site 5, Hays County, Texas*, 2007.
18. US Bureau of Census, *2006 American Community Survey, Hays County, Texas*, 2006.

LIST OF PREPARERS

Name & Present Title	Education	Experience (Years)
Johnie Halliburton, Executive Manager, PCCD	B.S. Agriculture Production and Management	5
Isidro Y. Morales Jr., District Conservationist, NRCS	B.S. Agriculture Education	29
Steve Uselton, Soil Conservationist, NRCS	B.S. Agriculture Education	30
James Featherston, Agricultural Economist, NRCS	M.S. Agricultural Economics	31
David Petefish, Geologist, NRCS	M.S. Geology	32
Calvin Sanders, Cultural Resources Specialist, NRCS	M.A. Anthropology	26
Ronnie Skala, P. E. Hydraulic Engineer, NRCS	B.S. Agricultural Engineering	29
Russell Castro, Wildlife Biologist, NRCS	B.S. Wildlife Management	26
David Strakos, Civil Engineering Technician – NRCS	High School Diploma	30
Jim Kelly, Wildlife Biologist, NRCS	M.S. Forestry	7

The local steering committee provided invaluable information, local concerns, and reviews during the development of the environmental assessment.

STEERING COMMITTEE MEMBERS

NAME	ORGANIZATION	PHONE	EMAIL
Johnie Halliburton	PCCD, Exec. Mgr.	512-398-2383	johnie@pccd.org
Danny Green	Landowner	512-268-0299	denascampbell@yahoo.com
Reagan Simon **	Landowner	512-738-7742	rsimon4451@yahoo.com
Jeff Campbell	Landowner	512-268-0269	jeff@wteco.com
Fred Rothert	PCCD, Director	512-449-8970	fredrothert@yahoo.com
Robert Schlortt	Landowner	512-241-9424	schlortt@yahoo.com
Dan Ryan *	Landowner	512-268-3809	ryansky@aol.com
Shane A. Arabie	Landowner	512-775-9823	sarabie@austin.rr.com
Jimmy Haverda	City of Kyle	512-754-4435	jimmyh@cityofkyle.com
Jeff Barton	Hays County	512-262-2091	jeff.barton@co.hays.tx.us

* Chairman

** Co-Chairman

APPENDICES

APPENDIX A	Table 1 - Estimated Installation Cost
	Table 2 - Estimated Cost Distribution – Structural and Non – Structural Measures
	Table 3 - Structural Data – Dams with Planned Storage Capacity
	Table 4 - Estimated Average Annual NED Costs
	Table 5 - Estimated Average Annual Flood Damage Reduction Benefits
	Table 6 - Comparison of NED Benefits and Costs
APPENDIX B:	Letters and Oral Comments Received on Draft Supplemental Watershed Plan and Environmental Assessment
	Discussion and Disposition of Comments on the Draft Supplemental Watershed Plan and Environmental Assessment
APPENDIX C:	Support Maps and Site Photos
APPENDIX D:	Investigation and Analysis
APPENDIX E:	Consultation and Public Scoping Process
APPENDIX F:	Watershed Project Map

APPENDIX A

Tables 1-6

Table 1 - Estimated Installation Cost

Table 2 - Estimated Cost Distribution – Structural and Non-Structural Measures

Table 3 - Structural Data – Dams with Planned Storage Capacity

Table 4 - Estimated Average Annual NED Costs

Table 5 - Estimated Average Annual Flood Damage Reduction Benefits

Table 6 - Comparison of NED Benefits and Costs

APPENDIX A

Table 1 - Estimated Installation Cost
FRS No. 5
Plum Creek Watershed, Texas
(Dollars) ^{1/}

Installation Cost Item	Unit	Number	Estimated Costs ^{2/}		
			Public Law 83-566 Funds	Other Funds	Total
Rehabilitation of FRS No. 5	No.	1	\$1,693,800	\$689,600	\$2,383,400
Total Project			\$1,693,800	\$689,600	\$2,383,400

Mar/2008

^{1/} 2007 Prices.

^{2/} Public Law 83-566 Funds include NRCS Engineering and Project Administration (\$413,200), which are not included when calculating eligible federal cost share. Therefore, federal cost share is based on Total Eligible Project Cost of \$1,970,200.

APPENDIX A

**Table 2 - Estimated Cost Distribution - Structural and Non-structural Measures
FRS No. 5
Plum Creek Watershed, Texas
(Dollars) ^{1/}**

	Installation Cost – Public Law 83-566 ^{2/}				Installation Cost – Other Funds					
	Construction	Engineering	Project Administration	Total PL 566	Construction	Engineering	Real Property Rights	Project Administration	Total Other	Total Installation Cost
Rehabilitation of FRS No. 5	\$1,280,600	\$187,800	\$225,400	\$1,693,800	\$597,600	\$0	\$45,000	\$47,000	\$689,600	\$2,383,400
GRAND TOTAL	\$1,280,600	\$187,800	\$225,400	\$1,693,800	\$597,600	\$0	\$45,000	\$47,000	\$689,600	\$2,383,400

Mar/2008

^{1/} 2007 Prices.

^{2/} Federal Engineering and Project Administration costs (\$413,200) are not included when calculating eligible federal cost share. Therefore, federal cost share is based on Total Eligible Project Cost of \$1,970,200.

APPENDIX A
Table 3 - Structural Data – Dams with Planned Storage Capacity
FRS No. 5
Plum Creek Watershed, Texas

Item	Unit	FRS No.5
Class of structure		High
Seismic zone		0
Location	dec. deg.	Lat. 30.00, Long. -97.84
Uncontrolled drainage area	sq-mi	5.54 ^{5/}
Runoff curve number (1-day) (Avg. AMC)		76
Time of concentration (T _c)	Hrs	3.08
Elevation top of dam ^{2/}	ft	671.5
Elevation crest of auxiliary spillway ^{2/}	ft	663.4
Elevation crest existing principal spillway ^{2/} (high stage)	ft	649.4
Elevation sediment pool ^{2/} (low stage, new hooded inlet)	ft	645.1
Maximum height of dam	ft	41.5
Volume of fill	yd ³	217,580 ^{1/}
Total capacity (auxiliary spillway crest)	ac-ft	2169.1
Sediment pool	ac-ft	164.5 ^{3/}
Aerated sediment	ac-ft	40
Floodwater retarding pool	ac-ft	1964.6
Surface area		
Sediment pool – low stage	acres	33.5
Floodwater retarding pool	acres	197.3
Principal spillway		
Rainfall volume (1-day)	in	10.0
Rainfall volume (10-day)	in	16.1
Runoff volume (10-day)	in	10.17
Type - existing, standard drop inlet (high stage)		concrete
Diameter existing	in	30
Capacity existing	ft ³ /s	122
Type – added new, hooded inlet (low stage)		concrete
Diameter hooded	in	24
Capacity hooded	ft ³ /s	71
Auxiliary spillway		
Vegetated		
Bottom width	ft	250
Exit slope	%	4.8
Frequency of operation	% chance	0.7
Auxiliary spillway hydrograph		
Rainfall volume	in	13.30
Runoff volume	in	10.14
Storm duration	hrs	6
Velocity of flow (V _c)	ft/s	8.1
Maximum reservoir water surface elevation ^{2/}	ft	665.8
Freeboard hydrograph ^{4/}		
Rainfall volume	in	30.80
Runoff volume	in	27.31
Storm duration	hrs	6
Maximum reservoir water surface elevation ^{2/}	ft	671.5
Storage capacity equivalents		
Sediment volume	in	0.56
Floodwater retarding volume	in	6.65

^{1/} Original volume of fill in dam 176,580 yd³, additional volume of fill used in rehabilitation project 41,000 yd³ Mar/2008

^{2/} Planned elevations are relevant to NAVD88. As-Built elevations were relevant to NGVD29. Comparison table is provided below.

^{3/} Does not include 55.8 ac. ft. of existing sediment accumulated in reservoir.

^{4/} The 6-hour storm was the most conservative design for the FBH.

^{5/} Does not include drainage area from existing cement plant (Quarry site 407 acres/0.64 square miles)

TABLE 3 (cont.) – FOOTNOTES

FRS No.	Principal Spillway Crest				Auxiliary Spillway Crest				Effective Top of Dam			
	As-Built	Survey	Δ	Planned Rehab	As-Built	Survey	Δ	Planned Rehab	As-Built	Survey	Δ	Planned Rehab
5	649.0	649.4	0.4	645.1 ^{6/}	663.0	663.8	0.8	663.4	668.0	668.0	0.0	671.5

^{6/} 645.1 is elevation of new hooded inlet, existing drop inlet will remain unchanged at elevation 649.4.

APPENDIX A
Table 4 - Estimated Average Annual NED Costs
FRS No. 5
 Plum Creek Watershed, Texas
 (Dollars) ^{1/}

Evaluation Unit	----- Project Outlays -----		Total
	Amortization of Installation Cost ^{2/}	Operation, Maintenance and Replacement Cost	
FRS No.5	\$117,200	\$3,000	\$120,200
Grand Total	\$117,200	\$3,000	\$120,200

Mar/2008

^{1/} Price base 2007

^{2/} Amortized for 100 years at 4.875 percent

APPENDIX A

Table 5 - Estimated Average Annual Flood Damage Reduction Benefits

FRS No. 5

Plum Creek Watershed, Texas

(Dollars) ^{1/2/}

Item	Estimated Average Annual Damages Without the Project ^{3/}	Estimated Average Annual Damages With the Project ^{3/}	Estimated Average Annual Benefits
Floodwater			
Crop and Pasture	\$25,500	\$2,300	\$23,200
Other Agricultural	\$4,800	\$400	\$4,400
Road and Bridge	\$112,000	\$6,900	\$105,100
Urban	\$12,800	\$0	\$12,800
Subtotal	\$155,100	\$9,600	\$145,500
Sediment			
Overbank Deposition	\$2,400	\$200	\$2,200
Erosion			
Flood Plain Scour	\$900	\$100	\$800
Grand Total	\$158,400	\$9,900	\$148,500

Mar/2008

^{1/} Price Base: 2007 prices.

^{2/} All figures reflect agriculture-related damages and benefits, including damages and benefits to rural communities.

^{3/} Original downstream damages updated using applicable indices and updated data. Damages and benefits will accrue from floods of greater magnitude than the 500-year frequency event, but these were not evaluated.

APPENDIX A
Table 6 - Comparison of NED Benefits and Costs
FRS No. 5
 Plum Creek Watershed, Texas
 (Dollars) ^{1/}

Evaluation Unit	Average Annual Benefits			Average Annual Cost ^{3/}	Benefit/Cost Ratio	
	Agriculture -Related	Nonagricultural				
	Damage Reduction ^{2/}	Avoidance of Modifications to SWPPP	Avoidance of Cost of Sponsor's Breach			
Rehabilitation of Floodwater Retarding Structure No. 5	\$148,500	\$24,600	\$41,900	\$215,000	\$120,200	1.8:1.0

Mar/2008

^{1/} Price Base: 2007 prices

^{2/} From Table 5

^{3/} From Table 4

APPENDIX B

Letters and Oral Comments Received on Draft Supplemental Watershed Plan and Environmental Assessment

United States Department of Agriculture

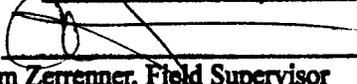


Natural Resources Conservation Service
101 South Main Street
Temple, Texas 76501

Aimee
Will

March 11, 2008

Mr. Robert Pine
Field Supervisor
U.S. Fish and Wildlife Service
Ecological Services
Austin, Texas 78758
Attention: Allison Arnold

NO ACTION	
Date:	<u>3/21/08</u>
Consultation #:	<u>21950-2009-17A-0125</u>
Approved by:	
Adam Zerrenner, Field Supervisor U.S. FISH & WILDLIFE SERVICE, AUSTIN, TEXAS	

FILE
NO.
DUE

Dear Mr. Pine:

30,00227
- 97,83926

The USDA Natural Resources Conservation Service (NRCS), with assistance from local watershed sponsors, has completed a Draft Plan Supplement and Environmental Assessment (EA) for the proposed rehabilitation of Floodwater Retarding Structure (FRS) No. 5 of the Plum Creek Watershed, Hays County, Texas. Plum Creek Watershed is within the San Marcos River Basin located within the Guadalupe River Basin. Sponsoring Local Organizations for the project are:

- Plum Creek Conservation District
- Hays County Soil and Water Conservation District
- Caldwell-Travis Soil and Water Conservation District

The project is a federally-assisted action authorized by Section 14 of the Watershed Protection and Flood Prevention Act, 16 U.S.C.1012, as amended by Section 313 of Public Law 106-472. This section authorizes NRCS to provide technical and financial assistance to local sponsors for rehabilitation of aging dams constructed under the Watershed Protection and Flood Prevention Act (Public Law 83-566), the Flood Control Act of 1944 (Public Law 78-534), the Pilot Watershed Program, and the Resource Conservation and Development (RC&D) Program. The Draft Plan Supplement and Environmental Assessment is enclosed for your review and comment.

The purpose of this project is to maintain the present level of flood control benefits and comply with current performance and safety standards. There is a need to protect downstream life, properties, and infrastructures as well as reduce the risk of potential loss of life.

We are requesting that you review this project in accordance with Section 102 (2) (c) of the National Environmental Policy Act of 1969 (Public Law 91-190). Comments must be received by this office on or before April 25, 2008. If your comments are not received by the due date, we will assume you do not wish to comment.

Helping People Help the Land

An Equal Opportunity Provider and Employer

Page 2
March 11, 2008

For more information contact Steven Bednarz, Assistant State Conservationist (Water Resources), at 254-742-9871.

Sincerely,

A handwritten signature in cursive script that reads "Donald W. Gohmert". The signature is written in black ink and is positioned above the printed name.

DONALD W. GOHMERT
State Conservationist

Enclosure

March 28, 2008

Bedmarz
SB

Dr. Donald W. Gohmert
State Conservationist
Natural Resources Conservation Service
101 South Main Street
Temple, Texas 76501-7602

Dear Dr. Gohmert:

On behalf of Texas AgriLife Research, I have reviewed the Draft Plan Supplement and Environmental Assessment (EA) for the proposed rehabilitation of Floodwater Retarding Structure (FRS) No. 5 of the Plum Creek Watershed, Hays County, Texas.

I have asked Dr. Allan Jones at the Texas A&M AgriLife, Texas Water Resources Institute to review the plans, and he has no comments or concerns regarding their analyses or recommendations.

I would, however, like to thank NRCS for the valuable service it provides to Texans in assisting with flood control through these and similar projects.

Sincerely,

Charles Allan Jones
Mark A. Hussey *for Mark Hussey*

Director,
Texas AgriLife Research

MAH/rp

APR 03 2008



DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102-0300

REPLY TO
ATTENTION OF

April 8, 2008

Planning, Environmental, and Regulatory Division
Regulatory Branch

FILE COPY
Bednary

SUBJECT: Project Number SWF-2008-00119

Mr. Donald W. Gohmert
State Conservationist
National Resource Conservation Service
101 South Main Street
Temple, Texas 76501

Dear Mr. Gohmert:

This is in reply to your letter dated March 11, 2008, addressed to Colonel Christopher W. Martin of the U.S. Army Corps of Engineers (USACE), Fort Worth District, in which you request the USACE provide comments under Section 102(2)(c) of the National Environmental Policy Act of 1969 (Public Law 91-190) on a draft Plan Supplement and Environmental Assessment (EA) for the proposed rehabilitation of Floodwater Retarding Structure (FRS) No. 5 located in Hays County, Texas. This project has been assigned Project Number SWF-2008-00119. Please include this number in all future correspondence concerning this project. Failure to reference the project number may result in a delay.

We have reviewed this project in accordance with Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. Under Section 404, the USACE regulates the discharge of dredged and fill material into waters of the United States, including wetlands. Our responsibility under Section 10 is to regulate any work in, or affecting, navigable waters of the United States. Any such discharge or work requires Department of the Army authorization in the form of a permit. For more information on the USACE Regulatory Program, please see our Internet homepage at www.swf.usace.army.mil and select "Regulatory Program."

We are unable to determine from the information you provided whether Department of the Army authorization will be required. However, we have determined that areas subject to Section 404 regulation, such as the Plum Creek, occur within the proposed project area. Mechanized land clearing, constructing spillways, or constructing earthen dams are examples of construction activities that may require Department of the Army authorization where they occur in waters of the United States.

APR 09 2008

If a Department of the Army permit is required, the project may be authorized by one or more general permits. For work to be authorized by general permit it must comply with the specifications and conditions of the permit. Projects that would not meet the specifications and conditions of a general permit may require authorization by individual permit.

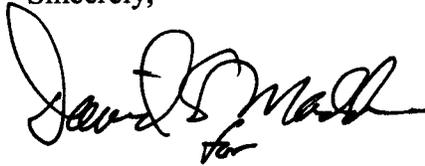
Important cultural resources are known to occur in Hays County. Several endangered and threatened species are also known to occur in Hays County. Please consider the potential effects of your proposed action on cultural resources and endangered species in your planning efforts. For additional information about endangered and threatened species, please contact the U. S. Fish and Wildlife Service.

We encourage you to avoid and minimize adverse impacts to streams, wetlands, and other waters of the United States in planning this project. When more detailed information about the project is available, please provide us with a suitable map of the proposed project area showing the location of proposed discharges, the type and amount of material (temporary or permanent), if any, to be discharged, and plan and cross-section views of the proposed project. Please refer to the enclosed guidance for Department of the Army submittals for additional details about what you should submit. Please forward your response as soon as possible so that evaluation of your request may continue. Please note that it is unlawful to start work without a Department of the Army permit if one is required.

We recommend that any EA or environmental impact statement (EIS) include information and analysis of the proposed project's effect, relative to specific project evaluation, on the following issues: conservation, economics, aesthetics, general environmental concerns, wetlands, cultural resources, fish and wildlife values including threatened and endangered species and essential fish habitat, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, cumulative impacts, air quality, and security. The EA or EIS should include evaluations of alternatives including geographic alternatives, changes in location and other site-specific variables, and functional alternatives, e.g. project substitutes and design modifications. The EA or EIS should include analysis of proposed mitigation for impacts to aquatic resources, including wetlands and insure that the sequencing of avoidance, minimization, and compensation has been fully integrated into the selection of the preferred alternative. Any evaluation should include a functional assessment of impacted aquatic resources, including wetlands and demonstrate that mitigation appropriately addresses lost functions of the aquatic environment.

Thank you for your interest in our nation's water resources. If you have any questions concerning our regulatory program, please contact Mr. Elliott Carman at the address above or telephone (817)886-1662.

Sincerely,

A handwritten signature in black ink, appearing to read "Wayne A. Lea". The signature is fluid and cursive, with a large initial "W" and "A".

Wayne A. Lea
Chief, Regulatory Branch



**US Army Corps
of Engineers**
Fort Worth District

General Recommendations for Department of the Army Permit Submittals

June 11, 2001



The following recommendations from the U.S. Army Corps of Engineers (USACE), Fort Worth District, specify information that should be submitted with project proposals for review of permitting requirements under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899:

1. The purpose of, and need for, the project.
2. A delineation and description of wetlands and other waters of the United States in the area that would be affected by the proposed work, and a description of the project's likely impact on the aquatic environment. Delineations of wetlands must be conducted using the "Corps of Engineers Wetland Delineation Manual", USACE Waterways Experiment Station Wetlands Research Program Technical Report Y-87-1, dated January 1987 (on-line edition available at <http://www.wes.army.mil/el/wetlands/wlpubs.html>), including all supplemental guidance (currently includes guidance dated October 7, 1991, and March 6, 1992). The supplemental guidance is included in the on-line version and may also be obtained from your USACE district office. In addition, include the width and depth of the water body and the waterward distance of any structures from the existing shoreline.
3. A vicinity map (e.g., county map, USGS topographic map, etc.) showing the location of all temporary and permanent elements of the project, including the route of the entire highway or road, borrow pit(s), disposal site(s), staging area(s), etc. This map, or an additional map, should show the project area in relation to nearby highways and other roads, and other pertinent features. A ground survey is not required to obtain this information. (All maps and drawings must be submitted on 8½ by 11 inch sheets.)
4. Plan, profile, and cross-section views of all work (fills, excavations, structures, etc.), both permanent and temporary, in, or adjacent to, waters of the United States, including wetlands, and a description of the proposed activities and structures, such as the dimensions and/or locations of highways and roads (both temporary and permanent), coffer dams, equipment ramps, borrow pits, disposal areas, staging areas, haul roads, and other project related areas within the USACE permit area(s). The permit area(s) includes all waters of the United States affected by activities associated with the project, as well as any additional area of non-waters of the United States in the immediate vicinity of, directly associated with, and/or affected by, activities in waters of the United States. The USACE permit area(s) includes borrow pits, disposal areas, staging areas, etc. in many cases. A description of the proposed work should include such information as the height, width, and length of structures and fills, widths of cleared rights-of-way, location of all affected areas of waters of the United States, and the size and spacing of culverts, bridges and other crossings of waters of the United States. (All maps and drawings must be submitted on 8½ by 11 inch sheets.)
5. The volume of material proposed to be discharged into and/or excavated from waters of the United States and the proposed type and source of the material.
6. A written discussion of the alternatives considered and the rationale for selecting the proposed alternative as the least environmentally damaging practicable alternative. Practicable alternatives that do not involve a discharge into a special aquatic site, such as wetlands, are presumed to have less adverse impact on the aquatic ecosystem, unless clearly demonstrated otherwise. The package should also include documentation that the amount of area impacted is the minimum necessary to accomplish the project.

7. An assessment of the adverse and beneficial effects, both permanent and temporary, of the proposed work and documentation that the work would result in no more than a minimal adverse impact on the aquatic environment.
8. A compensatory mitigation plan for unavoidable adverse impacts to the aquatic environment. This plan should include a description of proposed appropriate and practicable actions that would restore, enhance, protect, and/or replace the functions and values of the aquatic ecosystem unavoidably lost in the project area because of the proposed work.
9. A discussion documenting whether any species listed as endangered or threatened under the Endangered Species Act might be affected by, or found in the vicinity of, the USACE permit area for the proposed project. Direct coordination with the FWS concerning the potential impact of the entire project on endangered and threatened species is strongly encouraged.
10. A discussion documenting whether any cultural resources, particularly those historic properties listed, or eligible for listing, in the National Register of Historic Places (NRHP), would be affected by, or are in the vicinity of, the USACE permit area for the proposed project.
11. Documentation that any permanent above-grade fills in waters of the United States within the 100-year floodplain comply with FEMA, or FEMA-approved local, floodplain development requirements.
12. The applicant should include any other relevant information, including information on hydrology and hydraulics.

Jerry D. Nichols, *Chairman*
Reed Stewart, *Vice Chairman*
José Dodier, Jr., *Member*
Barry Mahler, *Member*



Aubrey Russell, *Member*
Joe Ward, *Member*
Larry Jacobs, *Member*
Rex Isom, *Executive Director*

TEXAS STATE SOIL & WATER CONSERVATION BOARD
Protecting and Enhancing Natural Resources for Tomorrow

April 25, 2008

Donald W. Gohmert, *State Conservationist*
USDA Natural Resources Conservation Service
101 South Main
Temple, Texas 76501-7602

Re: Rehabilitation of FRS Site 5 Plum Creek Watershed

Dear Don:

We have reviewed the Draft Plan Supplement and Environmental Assessment on the proposed rehabilitation of Floodwater Retarding Structure No. 5 of the Plum Creek Watershed, Hays County, Texas.

This project is essential to maintain the flood control benefits the structure currently provides and to comply with current performance and safety standards. We strongly support this project and commend the project sponsors and NRCS for implementing this rehabilitation effort.

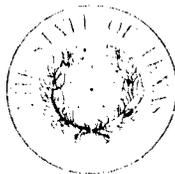
Sincerely,

Richard Egg, P.E.

cc. Rex Isom

APR 28 2008

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*



FILE COPY

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

May 14, 2008

STB
Bednarz
copy for usetten

Mr. Donald W. Gohmert
State Conservationist
Natural Resources Conservation Service
101 South Main Street
Temple, TX 76501

Re: TCEQ Grant and Texas Review and Comment System (TRACS) #8926, Plum Creek Conservation District, Hays County Soil and Water Conservation District, Caldwell-Travis Soil and Water Conservation District

Dear Mr. Gohmert:

The Texas Commission on Environmental Quality (TCEQ) has reviewed the above-referenced project and offers following comments:

A review of the project for General Conformity impact in accordance with 40 CFR Part 93 and Title 30, Texas Administrative Code § 101.30 indicates that the proposed action is located in Hays County, which is currently unclassified or in attainment of the National Ambient Air Quality Standards for all six criteria air pollutants. Therefore, general conformity does not apply.

Although any demolition, construction, rehabilitation or repair project will produce dust and particulate emissions, these actions should pose no significant impact upon air quality standards. Any minimal dust and particulate emissions should be easily controlled by the construction contractors using standard dust mitigation techniques.

We do not anticipate significant long term environmental impacts from this project as long as construction and waste disposal activities associated with it are completed in accordance with applicable local, state, and federal environmental permits and regulations. We recommend that the applicant take necessary steps to insure that best management practices are utilized to control runoff from construction sites to prevent detrimental impact to surface and ground water.

Thank you for the opportunity to review this project. If you have any questions, please call Ms. Betty Thompson at (512) 239-1627.

Sincerely,

A handwritten signature in black ink that reads "Thomas W. Weber".

Thomas W. Weber, Manager
Water Programs, Chief Engineer's Office

MAY 23 2008

Discussion and Disposition of Comments from letters received on the Draft Supplemental Watershed Plan and Environmental Assessment

Not all agencies and groups requested to comment on the Draft Supplemental Watershed Plan and Environmental Assessment submitted comments. The responding agencies and groups comments and the disposition of each are as follows:

United States Fish and Wildlife Service

Comment: The agency submitted a “No Action” comment as a result of their review of the Draft Supplemental Watershed Plan and Environmental Assessment, meaning that no additional documentation or contact with their agency is necessary.

Response: Noted

Texas AgriLife Research and Texas Water Resources Institute

Comment: The agencies had no comment or concerns but wanted to thank NRCS for the valuable service it provides to Texans in assisting with flood control through these and similar projects.

Response: Noted

United States Army Corps of Engineers

Comment: The USACE utilized a standardized form letter for their comment that also included a list of specific information that should be submitted with project proposals for review.

Response: All of the items mentioned in the USACE letter and those noted on the general recommendations list that was attached to the letter were adequately addressed in the Draft Supplemental Watershed Plan and Environmental Assessment that was sent out for review.

Texas State Soil and Water Conservation Board

Comment: This project is essential to maintain the flood control benefits the structure currently provides and to comply with current performance and safety standards. We strongly support this project and commend the project sponsors and NRCS for implementing this rehabilitation effort.

Response: Noted

Texas Commission on Environmental Quality

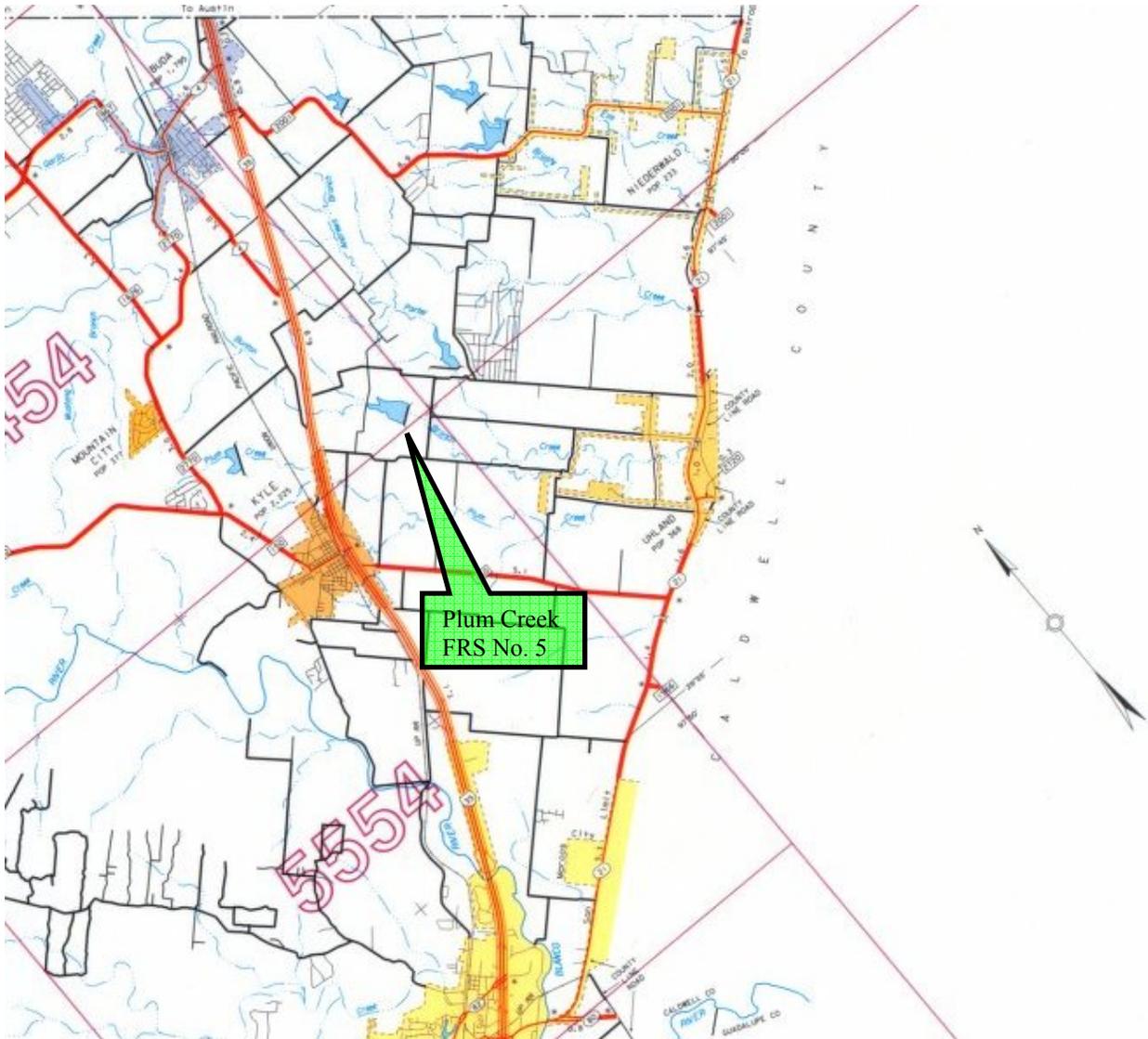
Comment: A review of the project for General Conformity impact in accordance with 40 CFR Part 93 and Title 30, Texas Administrative Code section 101.30 indicates that the proposed action is located in Hays County, which is currently unclassified or in attainment of the National Ambient Air Quality Standards for all six criteria air pollutants. Therefore, general conformity does not apply.

Although any demolition, construction, rehabilitation or repair project will produce dust particulate emissions, these actions should pose no significant impact upon air quality standards. Any minimal dust and particulate emissions should be easily controlled by the construction contractors using standard dust mitigation techniques.

Response: Dust and particulate emissions during construction will be controlled.

APPENDIX C

VICINITY MAP





Plum Creek
Site 5



End of Study Area

Plum Creek
Site 5
Breach and 100-YR Floodplain

Not to Scale

Legend

-  Breach Area
-  100-YR Floodplain

APPENDIX D

Investigation and Analysis

Table H displays the effects of the recommended plan on particular types of resources that are recognized by certain Federal policies.

Table H - Effects of the Recommended Plan on Resources of National Recognition		
Types of Resources	Principal Sources of National Recognition	Measurement of Effects
Air Quality	Clean Air Act, as amended (42 U.S.C. 7401 et seq.)	Minor temporary effect during construction
Areas of Particular Concern within the Coastal Zone	Coastal Zone Management Act of 1972, as amended (16 U.S.C. 1451 et seq.)	Not present in planning area
Endangered & Threatened Species Critical Habitat	Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)	Not present in planning area
Fish & Wildlife Habitat	Fish and Wildlife Coordination Act (16 U.S.C. Sec. 661 et seq.)	Minor temporary effect during construction
Flood Plains	Executive Order 11988, Flood Plain Management	No Effect
Historical & Cultural Properties	National Historic Preservation Act of 1966, as amended (16 U.S.C. Sec. 470 et seq.)	Not present in planning area
Prime & Unique Farmland	CEQ Memorandum of August 1, 1980: Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act, Farmland Protection Policy Act of 1981.	Minimal Effect
Water Quality	Clean Water Act of 1977 (33 U.S.C. 1251 et seq.)	Minor temporary effect during construction
Wetlands	Executive Order 11990, Protection of Wetlands; Clean Water Act of 1977 (33 U.S.C. 1251 et seq.) Food Security Act of 1985	Minor temporary effect during construction
Wild & Scenic Rivers	Wild and Scenic Rivers Act, as amended (16 U.S.C. 1271 et seq.)	Not present in planning area

Economics:

In general, the NED benefits presented in this supplemental plan were developed based on Principles and Guidelines utilizing methods of (1) updating agricultural downstream benefits and sediment and erosion benefits; (2) updating rural community (urban area, road and bridge) flood reduction benefits; (3) avoiding modifications to the City of Kyle's Stormwater Pollution Prevention Plan; and (4) saving the sponsors the cost of a controlled breach.

For flood damage reduction agricultural benefits (including erosion and sediment), original damages with and without project were obtained from the 1960 work plan. Origins for these damages were compared with field notes of current land uses downstream of FRS No. 5. Extent of damages was adjusted due to changes in land use. Adjusted damages were updated using appropriate indices (prices paid by producers, prices received by producers, consumer price index, and construction cost index). The difference in damages with and without project results in benefits. Based on this analysis, updated flood damage reduction agricultural benefits were estimated to be \$30,600 annually.

There are 5 road crossings below FRS No. 5. According to the Texas Department of Transportation, the 2005 average daily traffic count for one of these roads (Goforth Road) was about 2,100 (traffic counts were not available for the other 2 roads – Bunton Lane and Heidenreich Lane). In the absence of the dam, floodwaters would wreck havoc at each crossing. Using current construction costs, floodwater damages were calculated with and without project. The damage reduction benefits were estimated to be \$105,100 annually. Other benefits of the project were floodwater damage reduction benefits to the urban area located downstream of the dam. This area included 72 properties (68 residential, 1 public, and 3 commercial). The local tax appraisal district records were utilized in order to obtain values of properties (structures and land) that would possibly be affected by project activities. It was discovered that a majority of downstream properties were either owned or occupied by people with Hispanic surnames. Therefore, efforts were made to ensure that USDA policies regarding Environmental Justice were met. By utilizing the Urban Floodwater Damage Economic Evaluation (URB1) program, damages with and without project were calculated. Thirty-five residential properties and one public property would incur floodwater damages under the FWOP Alternative. Alternative numbers three and four would reduce all flood damages within the urban area from the 100-year storm event. Therefore, average annual benefits would equal flood damages incurred, which amounted to \$12,800. However, Alternative number 4 would result in relocating the families of 35 residences. The consequential disruption (and possibly destruction) of the cohesion of a minority community played a factor in alternative preference.

Due to the past and projected urban growth area, officials at the local tax appraisal district office were contacted regarding the impact of the sediment pool of FRS No. 5 on adjacent subdivisions. According to the officials, current formulas used to estimate values of properties adjacent to FRS No. 5 do not include an amenity value factor due to the presence of the site. This was surprising, but officials explained that growth was more dependent on the booming IH-35 Austin-San Antonio corridor more than any other factor. In other words, development near IH-35 would occur regardless of amenity values. Also, the officials stated that future development downstream of the dam would probably be limited to the existing development along Bunton Lane. Therefore, no adjustments were made for land values as the result of project activity.

Although there would be some incidental recreational opportunities associated with FRS No. 5, these were not accounted for due to ownership issues of land adjacent to the sediment pool. Also, potential administrative costs savings associated with the National Flood Insurance Program for at least 35 downstream properties was not included in the benefits estimates.

The cost of breaching the dam under the FWOP Alternative was considered a cost avoided benefit for the Decommissioning, Rehabilitation, and Relocation Alternatives. A breach by the sponsors of FRS No. 5 was estimated to cost \$852,400. Amortized over 100 years at 4.875% results in an annual cost of \$41,900, which equates to a cost savings (benefit).

FRS No. 5 currently is a part of the City of Kyle's Stormwater Pollution Prevention Plan. Had the PCCD decided to breach the dam under the FWOP Alternative, the SWPPP would have to be modified in order to include implementation of some other means of detention. This additional cost (including construction and landrights) was estimated to be \$500,000, which converts to an average annual cost of \$24,600. This also equates to a cost savings or benefit.

Hydrology:

Dam breach modeling performed for this project demonstrated that loss of life could occur as a result of dam failure and, as a result, the hazard classification for the dam is high hazard class (c). This classification requires that the dam meet two basic criteria:

- The 100-year, 10-day Principal Spillway Hydrograph (PSH) storm event can not overtop the auxiliary spillway; and
- The PMP does not overtop the dam.

The design to meet these criteria required determining event flow rates for the watersheds above and immediately below the structure. This was accomplished by the use of a TR-20 model. The dam hydraulic and hydrologic site computer analysis program SITES was used to develop storage-discharge relationships, set the top of dam, auxiliary and principal spillway crests, and conduit dimensions for the FRS No. 5 rehabilitation alternatives. The two alternatives studied were the 6-hour PMP with a rainfall of 30.6 inches and the 24-hour rainfall, 5 point distribution of 43.70 inches. The 6-hour storm proved to be the most conservative design of the stability and integrity of the dam and auxiliary spillway. Simplified Dam Breach Routing Procedures (TR-66) were used to develop a breach hydrograph of FRS No. 5. Fair weather conditions were assumed to develop the breach hydrograph. The reservoir pool elevation was static at top of dam with non-storm conditions downstream. Event flow rates from the TR-20 model and the breach hydrograph were used in a previously developed HEC-RAS model of Plum Creek to define impacts and benefits associated with project alternatives. These models are available as part of the supporting documentation developed for this planning study.

The subtasks performed are summarized as follows:

- Assembly of existing relevant geographic information system (GIS) data into a project database;
- Delineation of the Plum Creek Dams and Plum Creek Watershed
- Estimation of rainfall depths for event and design storms
- Estimation of watershed time of concentration, T_c
- Estimation and calibration of watershed curve numbers
- Estimation of channel loss factors
- Use SITES program to evaluate FRS No. 5 rehabilitation alternatives
- Estimation of flow rates using the computer model TR-20
- Development of FRS No. 5 breach hydrograph
- Estimation of downstream water surface elevations using the computer model HEC-RAS

Engineering:

Engineering planning efforts were completed to meet the following rehabilitation project purposes:

- Maintain present level of flood control benefits.
- Comply with the current performance and safety standards.

The preferred alternative which best meets the purposes and need for the project is rehabilitation of the dam by construction of dam safety modifications developed to address dam safety deficiencies consistent with the dam's high hazard classification. Designed dam safety modifications include raising the dam 3.5 feet with earth fill, extending the back slope in order to maintain a 3:1 slope, installing a toe drain system, adding an additional principal spillway

hooded inlet with 24" conduit and connecting both principal spillways to outlet into a new impact basin. The entrance section of the auxiliary spillway will be modified for better alignment, a splitter dike added and the crest elevation will be lowered by 0.4 foot.

Engineering work items completed as part of the development of this planning study include:

- Gathering and reviewing existing site data.
- Identifying problems, opportunities, and concerns.
- Conducting planning studies, including:
 - Analyzing existing data
 - Conducting field investigations to evaluate the condition of existing structures and obtain additional data (e.g., survey and geotechnical data)
 - Developing topographic mapping for the watershed
 - Conducting bathymetric surveys for sediment yield analyses
 - Conducting and assisting engineering, environmental, geologic, hydrologic, hydraulic, social, and economic analyses in accordance with the requirements of NRCS design criteria (e.g., national engineering handbook, technical releases, technical notes, design notes, SITES software, TR20 software)
- Developing design layouts and cost estimates for evaluation of design alternatives including:
 - No Action or Future Without Project
 - Decommission of dam
 - Rehabilitation of dam:
 - Raising top of dam
 - Increasing principal spillway capacity
 - Upgrading auxiliary spillway
- Developing inundation maps for impact comparisons associated with the proposed design modifications.
- Providing public involvement support services, including coordinating with local NRCS offices, site landowners, sponsors, and the public; preparing presentations to the public; and attending public meetings.
- Preparing a Supplemental Watershed Plan and Environmental Assessment for the project sponsors.

Environmental – Wetlands and Fish/Wildlife Habitat:

During the planning process, an evaluation was undertaken to determine what effects or consequences the selected alternatives would have on the environment. NRCS biologists, environmental coordinators and hydraulic engineers conducted multiple field reviews and determined that best professional judgment was appropriate to make fish and wildlife habitat determinations.

The existing on-site wetland system is composed of shallow and deep water habitats. A small seep has formed along the lower left section of the auxiliary spillway and migrates into the outlet channel below the dam. NRCS biologists determined that the soils on the auxiliary spillway are not hydric soils and the vegetation occurring along the seep and in the outlet channel would be classified as in-stream vegetation. The wet area caused by the seep would not meet the definition of a wetland under the Clean Water Act and is not a jurisdictional wetland.

NRCS hydraulic engineers determined that the downstream low water crossing on Goforth Road is currently overtopped by flows from storm events classified as 25 year events or greater.

Additionally, two of the three existing crossings on Bunton Lane overtop with storm events of 1-2 year events or greater. The City of Kyle Transportation Master Plan shows future major improvements to Bunton Lane. If Plum Creek FRS No. 5 were removed, flows from the one-year event and greater would overtop Goforth Road and all three crossings on Bunton Lane. For these reasons, NRCS biologists determined that:

- Increased flows from Alternatives 1 and 2 would overtop Goforth Road and all three crossings on Bunton Lane and would flow out of banks during minor storm events causing erosion in the area downstream of the existing structure, creating a braided stream system in this area, and adding to downstream aggradation due to the increased erosion,
- Alternatives 1 and 2 would convert all open water habitat to ephemeral riverine habitat,
- While Alternative 3 increases flows over existing conditions, flows would not overtop Goforth Road and flows would remain in the current channel,
- Alternative 3 would have only minor temporary adverse impacts to existing fish and wildlife habitats,
- Alternative 4 would not change flow rates downstream of the existing structure, and
- Alternative 4 would have only minor impacts to current fish and wildlife habitat but would provide long term protection of habitats in the downstream greenbelt, and
- Through conducting field investigations, no threatened or endangered species or suitable habitat for threatened or endangered species is present on the project site.

APPENDIX E

Consultation and Public Scoping Process

Summary of Consultation and Public Scoping Process

Integral to the planning process is the solicitation of public comments to identify, understand, and address the issues and concerns of the relevant agencies and the public. The sponsors' intent during the scoping process was to inform agencies and the public about the planning process and solicit their comments in order to identify issues and questions to consider when developing the Supplemental Watershed Plan and Environmental Assessment. During the scoping period, the sponsors announced the commencement of the planning process through various means, invited written comments, and held a public scoping meeting. Opportunities for the public to participate in the planning process occurred at key milestones throughout the process. This appendix describes the planning for and results of the scoping process.

Sponsors include PCCD, the Hays County SWCD, and the Caldwell-Travis SWCD. At the initiation of the planning process, meetings were held with representatives of the sponsors to ascertain their interest and concerns regarding the rehabilitation of FRS No. 5 of the Plum Creek Watershed. The initial steering committee meeting was held on September 20, 2007, with sponsors, NRCS, and the invited public and steering committee present to discuss purposes and requirements of the rehabilitation program. Issues and concerns of the sponsors and an initial outline of the public scoping process were also reviewed. PCCD agreed to serve as the "lead sponsor," being responsible for leading the planning process with assistance from NRCS. Informal discussions amongst the sponsors, NRCS, and landowners were conducted throughout the entire planning period.

The scoping process was continuous and comments were solicited and received for consideration throughout the entire planning procedure.

A second steering committee meeting was held in January, 2008 to review the results of the scoping process to date and to present potential alternative solutions to bring FRS No. 5 into compliance with current dam safety criteria. Through verbal and written comments, meeting participants provided input on issues and concerns to be considered in the planning process. Federal, State, and local agencies all participated in the scoping planning process.

A review of National Environmental Policy Act (NEPA) concerns was initiated at the first steering committee meeting and was a major topic of discussion and concern throughout the entire planning process. NEPA concerns were reviewed and documented. Coordination with the State Historic Preservation Office (SHPO) was performed through written and verbal communications and a survey of the area of potential effects (APE) was prepared by the NRCS.

The United States Fish and Wildlife Service and the Texas Parks and Wildlife Department websites were visited to obtain an official list of the federally and state-listed threatened and endangered species known to exist in Hays County, Texas. The findings are shown in Table C found on page 13 of this document.

APPENDIX F

Project Map

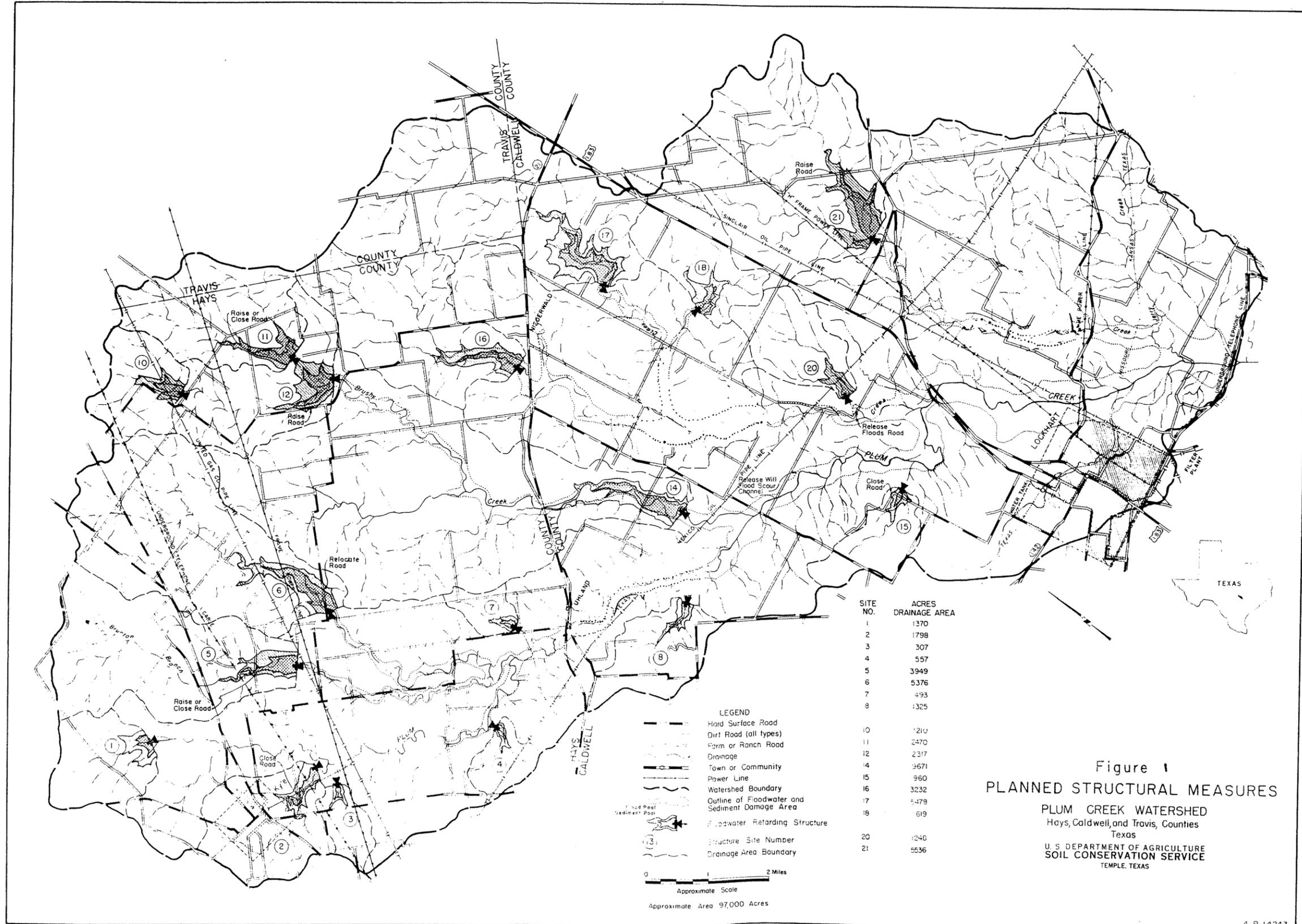


Figure 1
PLANNED STRUCTURAL MEASURES
 PLUM CREEK WATERSHED
 Hays, Caldwell, and Travis, Counties
 Texas
 U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE
 TEMPLE, TEXAS