United States Department of Agriculture

Natural Resources Conservation Service

DRAFT SUPPLEMENTAL WATERSHED PLAN NO. IV and Environmental Assessment for the Rehabilitation of Floodwater Retarding Structure No. 4 of the Escondido Creek Watershed Karnes County, Texas

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

In Cooperation With:
Karnes County Soil and Water Conservation District
Escondido Watershed District
San Antonio River Authority
City of Kenedy

April 2025

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San Antonio River Authority

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 (Public Law [PL] 566, 83d Congress; 68 Stat. 666, as amended by PL 1018, 84th Congress; 70 Stat. 1088). The rehabilitation of Floodwater Retarding Structure (FRS) No. 4 is authorized under Watershed Protection and Flood Prevention Act, as amended (16 United States [U.S.] Code [U.S.C.] Sections 1001 to 1008, 1010, and 1012).

Abstract

This FRS was originally constructed as a low hazard potential dam. Residential development and an increase in traffic has occurred downstream of FRS No. 4. These factors have caused concerns regarding the hydraulic capacity of the dam and human health and safety. As a result, FRS No. 4 has been reclassified as a high hazard potential dam. The dam does not comply with current high hazard potential dam safety and performance criteria and has been prioritized for Rehabilitation. The proposed rehabilitation of FRS No. 4 will allow the dam to comply with current performance and safety standards and maintain the present level of flood control benefits. The preferred rehabilitation of FRS No. 4 will include replacing the existing principal spillway inlet tower with a crest at elevation of 317.20 feet, replacing the existing principal spillway conduit with 42-inch-diameter pipe discharging into an impact basin, installing a 150-feet wide five-cycle labyrinth weir structural spillway over the existing embankment with crest set above the 50-year PSH elevation at 328.7 feet with a concrete chute discharging into a concrete stilling basin, regrading the inlet and outlet channel of the existing vegetated auxiliary spillway bays and raising crests to the 100-year PSH elevation of 329.2 feet, raising the top of dam to an elevation of 335.3 feet, installing upstream slope riprap, abandoning existing trench drain and installing new toe drain at downstream toe, flattening the downstream embankment slope to 3:1, and extending the cutoff trench below extended dam embankment. Total project installation cost for FRS No. 4 is estimated to be $17,924,000, of which $12,684,000 will be paid from the Small Watershed Rehabilitation funds and $5,240,000 from local funds.

Comments and Inquiries

The U.S. Department of Agriculture (USDA) and then Natural Resources Conservation Service (NRCS) has completed this Supplemental Plan-Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) and USDA-NRCS guidelines and standards. Reviewers should provide comments to NRCS during the allotted Supplemental Plan-EA review period. Submit comments and inquiries to: Mark Northcut, Natural Resources Planning Manager at the following:

Mark Northcut
NRCS Texas State Office
101 South Main Street
Temple, Texas 76501

Or email to mark.northcut@usda.gov.

Non-Discrimination Statement

In accordance with Federal civil rights law and USDA civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident. Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English. To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at https://www.usda.gov/oascr/how-to-file-a-program-discrimination-complaint and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov. USDA is an equal opportunity provider, employer, and lender.

ESCONDIDO CREEK WATERSHED
SUPPLEMENTAL WATERSHED PLAN AGREEMENT NO. IV

between the

Karnes County Soil and Water Conservation District
Sponsoring Local Organization

Escondido Watershed District
Sponsoring Local Organization

San Antonio River Authority
Sponsoring Local Organization

City of Kenedy
Sponsoring Local Organization

(Referred to herein as Sponsors)

and the

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
Formerly the Soil Conservation Service (SCS)

(Referred to herein as NRCS)

Whereas, the original Watershed Work Plan Agreement for the Escondido Creek Watershed, State of Texas, executed by the Sponsors named therein and the NRCS, became effective in June of 1954; and

Whereas, an additional Watershed Work Plan Agreement for the Escondido Creek Watershed, State of Texas, executed by the Sponsors named therein and the NRCS, became effective on October 21, 1965; and

Whereas, the Supplemental Watershed Work Plan Agreement for the Escondido Creek Watershed, State of Texas, executed by the Sponsors named therein and NRCS, became effective on the 13th day of September 1971; and

Whereas, the Supplemental Watershed Work Plan Agreement No. II for the Escondido Creek Watershed, State of Texas, executed by the Sponsors named therein and NRCS, became effective in November 1973; and

Whereas, the Supplemental Watershed Work Plan Agreement No. III for the Escondido Creek Watershed, State of Texas, executed by the Sponsors named therein and NRCS, became effective on the Xth day of Month Year; 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, application has heretofore been made to the Secretary of Agriculture by the Sponsors for assistance in preparing a plan for works of improvement for FRS No. 4 in the Escondido Creek Watershed, State of Texas, under the authority of the Watershed Protection and Flood Prevention Act, as amended (16 U.S.C. Sections 1001 to 1008, 1010, and 1012); and

Whereas, there has been developed through the cooperative efforts of the Sponsors and NRCS a Supplemental Watershed Work Plan No. IV and Environmental Assessment for works of improvement for the rehabilitation of FRS No. 4 of the Escondido Creek Watershed, State of Texas, hereinafter referred to as the Plan-EA or plan, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Secretary of Agriculture, through NRCS, and the Sponsors hereby agree on this watershed project plan and that the works of improvement for this project will be installed, operated, and maintained in accordance with the terms, conditions, and stipulations provided for in this plan and including the following:

1. **Term.** The term of this agreement is for the installation period and evaluated life of the project (103 years) and does not commit NRCS to assistance of any kind beyond the end of the evaluated life.

2. **Costs.** The costs shown in this plan are preliminary estimates. Final costs to be borne by the parties hereto will be the actual costs incurred in the installation of works of improvement.

3. **Real Property.** The sponsors will acquire such real property as will be needed in connection with the works of improvement. The amounts and percentages of the real property acquisition costs to be borne by the Sponsors and NRCS are as shown in the Cost-share table in item 5 hereof. The Sponsors and the landowners acknowledge and accept the risks associated with allowing future construction to occur at elevations lower than the elevation of the Probable Maximum Flood. The Probable Maximum Flood Elevation is 333.7 feet-NAVD88. The potential risks and liability the sponsors and landowners may be assuming for selecting landrights elevations lower than elevation of the PMF have been discussed with the sponsors and disclosed to the public.

   The sponsors agrees that all land acquired for measures, other than land treatment practices, with financial or credit assistance under this agreement will not be sold or otherwise disposed of for the evaluated life of the project except to a public agency which will continue to maintain and operate the development in accordance with the Operation and Maintenance (O&M) Agreement.

4. **Uniform Relocation Assistance and Real Property Acquisition Policies Act.** The sponsors hereby agree to comply with all of the policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. Section 4601 et seq. as further implemented through regulations in 49 Code of Federal Regulations [CFR] Part 24 and 7 CFR Part 21) when acquiring real property interests for this federally assisted project. If the sponsors are legally unable to comply with the real property acquisition requirements, 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.

5. **Cost-share for Watershed Work Plan.** The following table shows cost-share percentages and amounts for Watershed Work Plan implementation.

Cost-share Table for Rehabilitation Projects					
Works of Improvement	**NRCS**		**Sponsors**		**Total**
Cost-Shareable Items	Percent	Cost[1/]	Percent	Cost[1/]	Cost[1/]
High Hazard Potential Rehabilitation of FRS No. 4	65%	$9,519,000	35%	$4,936,000	$14,455,000
Mitigation	65%	$0	35%	$0	$0
Sponsors Project Administration	0%	NA	100%	$15,000	$15,000
Land Rights Acquisition	0%	NA	100%	$175,000	$175,000
Subtotal: Cost-Sharable Costs	65%	$9,519,000	35%	$5,126,000	$14,645,000
Non-Cost-Sharable Items [2/]					
NRCS Technical Assistance/ Engineering		$1,445,000		$0	$1,445,000
NRCS Project Administration[3/]		$1,720,000		NA	$1,720,000
Federal, State, and Local Permits		$0		$114,000	$114,000
Subtotal: Non-Cost-Share Costs		$3,165,000		$114,000	$3,279,000
Total:		$12,684,000		$5,240,000	$17,924,000

1/ All costs rounded to nearest $1000.
2/ If actual non-cost-sharable item expenditures vary from these figures, the responsible party will bear the change.
3/ The sponsors and NRCS will each bear the costs of project administration that each incurs.

6. **Land Treatment Agreements.** The sponsors will obtain agreements from owners of not less than 50 percent of the land above each multiple-purpose and floodwater-retarding structure. These agreements must provide that the owners will carry out farm or ranch conservation plans on their land. The sponsors will ensure that 50 percent of the land upstream of any retention reservoir site is adequately protected before construction of the dam. The sponsors will provide assistance to landowners and operators to ensure the installation of the land treatment measures shown in the watershed project plan. The sponsors will encourage landowners and operators to continue to operate and maintain the land treatment measures after the long-term contracts expire, for the protection and improvement of the watershed.

7. **Floodplain Management.** Before construction of any project for flood prevention, the sponsors must agree to participate in and comply with applicable Federal floodplain management and flood insurance programs. The sponsor is required to have development controls in place below low and significant hazard potential dams prior to NRCS or the sponsor entering into a construction contract.

8. **Water and Mineral Rights.** The sponsors will acquire or provide assurance that landowners or resource 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 must be borne by the sponsors and these costs are not eligible as part of the sponsor's cost-share.

9. **Permits.** The sponsors 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 are not eligible as part of the sponsors' cost-share.

10. **NRCS Assistance.** This agreement is not a fund-obligating document. Financial and other assistance to be furnished by NRCS in carrying out the plan is contingent upon the fulfillment of applicable laws and regulations and the availability of appropriations for this purpose.

11. **Additional Agreements**. A separate agreement will be entered into between NRCS and the sponsors before either party initiates work involving funds of the other party. Such agreements will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

12. **Amendments.** This plan may be amended or revised only by mutual agreement of the parties hereto, except that NRCS may deauthorize or terminate funding at any time it determines that the sponsors have failed to

comply with the conditions of this agreement or when the program funding or authority expires. In this case, NRCS must promptly notify the sponsors in writing of the determination and the reasons for the deauthorization of project funding, together with the effective date. Payments made to the sponsors or recoveries by NRCS must be in accordance with the legal rights and liabilities of the parties when project funding has been deauthorized. An amendment to incorporate changes affecting a specific measure may be made by mutual agreement between NRCS and the sponsors having specific responsibilities for the measure involved.

13. **Prohibitions.** No member of or delegate to Congress, or resident commissioner, may be admitted to any share or part of this plan, or to any benefit that may arise therefrom; but this provision may not be construed to extend to this agreement if made with a corporation for its general benefit.

14. **Operation and Maintenance (O&M).** The sponsors will be responsible for the operation, maintenance, and any needed replacement of the works of improvement by actually performing the work or arranging for such work, in accordance with an O&M Agreement. An O&M agreement will be entered into before Federal funds are obligated and will continue for the project life (100 years). Although the sponsors' responsibility to the Federal Government for O&M ends when the O&M agreement expires upon completion of the evaluated life of measures covered by the agreement, the sponsors acknowledge that continued liabilities and responsibilities associated with works of improvement may exist beyond the evaluated life.

15. **Emergency Action Plan.** Prior to construction, the sponsors must prepare an Emergency Action Plan (EAP) for each dam or similar structure where failure may cause loss of life or as required by state and local regulations. The EAP must meet the minimum content specified in the NRCS Title 180, National Operation and Maintenance Manual (NOMM), Part 500, Subpart F, Section 500.52, and meet applicable State agency dam safety requirements. The NRCS will determine that an EAP is prepared prior to the execution of fund obligating documents for construction of the structure. EAPs must be reviewed and updated by the sponsors annually.

16. **Nondiscrimination Provisions**. In accordance with Federal civil rights law and USDA civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

    Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

    To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at How to File a Program Discrimination Complaint and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

    USDA is an equal opportunity provider, employer, and lender.

By signing this agreement, the recipient assures the USDA that the program or activities provided for under this agreement will be conducted in compliance with all applicable Federal civil rights laws, rules, regulations, and policies.

17. **Certification Regarding Drug-Free Workplace Requirements** (7 CFR Part 3021). By signing this Watershed Agreement, the sponsors are providing the certification set out below. If it is later determined that the sponsors 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. Section 812) and as further defined by regulation (21 CFR Sections 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 subrecipients or subcontractors in covered workplaces).

Certification:

A. The sponsors 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 must—
(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 10 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 must include the identification numbers 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 sponsors may provide a list of the sites for the performance of work done in connection with a specific project or other agreement.

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

18. **Certification Regarding Lobbying** (7 CFR Part 3018) (for projects > $100,000)

A. The sponsors certify to the best of their knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the sponsors, to any person for influencing or attempting to influence an officer or employee of an agency, Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned must complete and submit Standard Form LLL, “Disclosure Form to Report Lobbying,” in accordance with its instructions.

(3) The sponsors must require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients must certify and disclose accordingly.

B. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by U.S. Code, Title 31, Section 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

19. **Certification Regarding Debarment, Suspension, and Other Responsibility Matters—Primary Covered Transactions (7 CFR Part 3017).**

A. The sponsors certify to the best of their knowledge and belief, that they and their principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(2) Have not within a 3-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph A (2) of this certification; and

(4) Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

B. Where the primary sponsors are unable to certify to any of the statements in this certification, such prospective participant must attach an explanation to this agreement.

20. **Clean Air and Water Certification.**

A. The project sponsoring organizations signatory to this agreement certify as follows:

(1) Any facility to be utilized in the performance of this proposed agreement is (____), is not (X) listed on the Environmental Protection Agency List of Violating Facilities.

(2) To promptly notify the NRCS-State administrative officer prior to the signing of this agreement by NRCS, of the receipt of any communication from the Director, Office of Federal Activities, U.S. Environmental Protection Agency (EPA), indicating that any facility which is proposed for use under this agreement is under consideration to be listed on the Environmental Protection Agency List of Violating Facilities.

(3) To include substantially this certification, including this subparagraph, in every nonexempt sub-agreement.

B. The project sponsoring organizations signatory to this agreement agrees as follows:

(1) To comply with all the requirements of section 114 of the Clean Air Act as amended (42 U.S.C. Section 7414) and section 308 of the Federal Water Pollution Control Act (33 U.S.C. Section 1318), respectively, relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in section 114 and section 308 of the Air Act and the Water Act, issued there under before the signing of this agreement by NRCS.

(2) That no portion of the work required by this agreement will be performed in facilities listed on the EPA List of Violating Facilities on the date when this agreement was signed by NRCS unless and until the EPA eliminates the name of such facility or facilities from such listing.

(3) To use their best efforts to comply with clean air standards and clean water standards at the facilities in which the agreement is being performed.

(4) To insert the substance of the provisions of this clause in any nonexempt subagreement.

C. The terms used in this clause have the following meanings:

(1) The term “Air Act” means the Clean Air Act, as amended (42 U.S.C. Section 7401 et seq.).

(2) The term “Water Act” means Federal Water Pollution Control Act, as amended (33 U.S.C. Section 1251 et seq.).

(3) The term “clean air standards” means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted pursuant to the Air Act or Executive Order 11738, an applicable implementation plan as described in section 110 of the Air Act (42 U.S.C. Section 7414) or an approved implementation procedure under section 112 of the Air Act (42 U.S.C. Section 7412).

(4) The term “clean water standards” means any enforceable limitation, control, condition, prohibition, standards, or other requirement which is promulgated pursuant to the Water Act or contained in a permit issued to a discharger by the EPA or by a State under an approved program, as authorized by section 402 of the Water Act (33 U.S.C. Section 1342), or by a local government to assure compliance with pretreatment regulations as required by section 307 of the Water Act (33 U.S.C. Section 1317).

(5) The term “facility” means any building, plant, installation, structure, mine, vessel, or other floating craft, location or site of operations, owned, leased, or supervised by a sponsor, to be utilized in the performance of an agreement or subagreement. Where a location or site of operations contains or includes more than one building, plant, installation, or structure, the entire location will be deemed to be a facility except where the Director, Office of Federal Activities, EPA, determines that independent facilities are collocated in one geographical area.

21. Assurances and Compliance. As a condition of the grant or cooperative agreement, the sponsors assure and certify that they are in compliance with and will comply in the course of the agreement with all applicable laws, regulations, Executive orders and other generally applicable requirements, including those set out below which are hereby incorporated in this agreement by reference, and such other statutory provisions as a specifically set forth herein.

State, Local, and Indian Tribal Governments: Office of Management and Budget (OMB) Circular Nos. A-87, A-102, A-129, and A-133; and 7 CFR Parts 3015, 3016, 3017, 3018, 3021, and 3052.

Nonprofit Organizations, Hospitals, Institutions of Higher Learning: OMB Circular Nos. A-110, A-122, A-129, and A-133; and 7 CFR Parts 3015, 3017, 3018, 3019, 3021 and 3052.

22. Examination of Records. The sponsors must give the NRCS or the Comptroller General, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to this agreement, and retain all records related to this agreement for a period of three years after completion of the terms of this agreement in accordance with the applicable OMB Circular.

23. Signatures. The signing of this PL 83-566 Watershed Agreement by an authorized representative of the Sponsors indicates that the Sponsor(s) has reviewed this Agreement and the Escondido Creek Watershed Supplemental Watershed Work Plan No. IV-Environmental Assessment and concur with the intent and contents of each.

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

Karnes County Soil and Water Conservation District
Local Organization
491 N Sunset Strip St, Ste 103
Kenedy, TX 78119-2051

By _____
Patrick Jarzombek

Title Chairman

Date _____

The signing of this agreement was authorized by a resolution of the governing body of the Karnes County Soil and Water Conservation District adopted at a meeting held on _____.

_____
Lambert Jendrzey, Secretary, Karnes County Soil and Water Conservation District

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Escondido Watershed District
Local Organization
491 N Sunset Strip St, Ste 103
Kenedy, TX 78119-2051

By _____
Joe Ed Ponish

Title Chairman

Date _____

The signing of this agreement was authorized by a resolution of the governing body of the Escondido Watershed District adopted at a meeting held on _____.

_____
Michelle Krause, Secretary, Escondido Watershed District

San Antonio River Authority
Local Organization
100 E. Guenther
San Antonio, TX 78204

By _____
Jim Campbell

Title Chairman

Date _____

The signing of this agreement was authorized by a resolution of the governing body of the San Antonio River Authority adopted at a meeting held on _____.

_____
Jerry G. Gonzales, Secretary, San Antonio River Authority

City of Kenedy
Local Organization
303 West Main Street
Kenedy, TX 78119

By _____
Brandon Briones

Title Mayor

Date _____

The signing of this agreement was authorized by a resolution of the governing body of the City of Kenedy adopted at a meeting held on _____.

_____
Maggie Gonzales, Secretary, City of Kenedy

Natural Resources Conservation Service
United States Department of Agriculture

Approved By _____
Kristy Oates, State Conservationist

Date _____

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Acronyms, Abbreviations, and Short-Forms

%	Percent
AADT	Annual Average Daily Traffic
ACB	Articulated Concrete Block
ACS	American Community Survey
AEP	Annual Exceedance Probability
APE	Area of Potential Affects
ARC	Antecedent Runoff Condition
BCC	Birds of Conservation Concern
BIA	Bureau of Indian Affairs
BMP	Best management practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CTP	Cooperating Technical Partner
CR	County Road
EA	Environmental Assessment
EAP	Emergency Action Plan
EO	Element of Occurrence
EPA	U.S. Environmental Protection Agency
FBH	Freeboard Hydrograph
FEMA	Federal Emergency Management Agency
FFE	First Floor Elevation
FIRMs	Flood Insurance Rate Map
FRS	Flood Retarding Structure
FRT	Federally Recognized Tribe
HEC	Hydrologic Engineering Center
IPaC	Information for Planning and Consultation
LiDAR	Light Detection and Ranging
LOD	Limit of Disturbance
LOMC	Letter of Map Change
LOMR	Letter of Map Revision
MBTA	Migratory Bird Treaty Act
NAAQS	National Ambient Air Quality Standards
NAVD	North American Vertical Datum

NEPA	National Environmental Policy Act
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NLCD	National Land Cover Database
NOAA	National Atmospheric and Oceanographic Administration
NOMM	National Operation and Maintenance Manual
NOT	Notice of Termination
NPS	National Parks Services
NPDES	National Pollutants Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWPM	National Watershed Program Manual
O&M	Operations and Maintenance
OMB	Office of Management and Budget
PAR	Population at Risk
PL	Public Law
Plan-EA	Plan-Environmental Assessment
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
PR&G	Principles, Requirements and Guidelines
PPA	Prototype Programmatic Agreement
PSH	Principal Spillway Hydrograph
RAS	River Analysis System
RCC	Roller Compacted Concrete
RCP	Reinforced Concrete Pipe
ROW	Right-of-Way
SCS	Soil Conservation Service
SHPO	State Historic Preservation Office
SAL	State Antiquities Landmark
SMR	Soil Mechanics Report
SWPPP	Storm Water Pollution Prevention Plan
Tc	Time of concentration
TCEQ	Texas Commission on Environmental Quality
TDAT	Tribal Directory Assessment Tool

THC	Texas Historical Commission
THPO	Tribal Historic Preservation Office
TNRIS	Texas Natural Resource Information System
TPWD	Texas Parks and Wildlife Department
TSS	Total Suspended Solids
TXNDD	Texas Natural Diversity Database
U.S.	United States
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WSE	Water Surface Elevation

SUMMARY – OFFICE OF MANAGEMENT AND BUDGET (OMB) FACT SHEET

SUPPLEMENTAL WATERSHED PLAN NO. IV – ENVIRONMENTAL ASSESSMENT
for the
Rehabilitation of Floodwater Retarding Structure No. 4
of the
Escondido Creek Watershed
Karnes County, Texas
15th Congressional District

S.1 Authorization

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 (PL 566, 83d Congress; 68 Stat. 666), as amended. The rehabilitation of FRS No. 4 is authorized under Watershed Protection and Flood Prevention Act, as amended (16 U.S.C. Sections 1001 to 1008, 1010, and 1012).

S.2 Sponsors

The project sponsors are the Karnes County Soil and Water Conservation District, Escondido Watershed District, San Antonio River Authority, and the City of Kenedy.

S.3 Proposed Action

The proposed action is the rehabilitation of FRS No. 4 to meet current NRCS performance standards for a high hazard potential dam with a service life of 100 years.

S.4 Purpose and Need for Action

The National Environmental Policy Act (NEPA) purpose and need is to remedy structural deficiency of FRS No. 4. The original authorized purpose of the Watershed Plan for FRS No. 4 was watershed protection and flood prevention. The proposed action is needed to address dam safety hazard classification concerns by implementing rehabilitation repairs or decommissioning.

FRS No. 4 was originally designed as a low hazard potential dam and is currently performing as intended. However, due to downstream development since dam construction, it has been reclassified as a high hazard potential dam and currently does not meet dam safety criteria as required by the NRCS or Texas Commission on Environmental Quality (TCEQ) to prevent embankment overtopping during a Probable Maximum Precipitation (PMP) event as required for a high hazard potential dam. The water in the reservoir would flow over the top of the embankment during the resulting Probable Maximum Flood (PMF) and could cause it to erode and collapse. Additionally, significant headcutting during the PMF will occur in both spillway bays. Breaching through the left spillway bay control section will cause dam failure. FRS No. 4 is categorized as having high potential to fail due to deficient hydrologic capacity and spillway integrity.

There is a potential for loss of life from a catastrophic dam failure of the FRS due to potential significant flooding impacts to habitable structures and infrastructure located downstream of the FRS. Based on Hydrologic Engineering Center – River Analysis System (HEC-RAS) sunny day breach modeling, there are 52 homes, eight mobile homes, eight commercial buildings, and one school outbuilding inundated above first floor elevation (FFE) within the breach extent of FRS No. 4. In addition, there are 24 roads including minor state highways and main local roads inundated by one foot or more. The Population at Risk (PAR) for FRS No. 4 is estimated to be 278 based on the number of impacted habitable structures and the overtopping of 24 roads.

The dam currently provides floodwater damage reduction for downstream habitable structures and infrastructure. Without the dam in place, floodwaters from a 1% AEP storm event would result in the inundation (above the FFE elevation) of 83 homes, 11 mobile homes, and 23 commercial buildings and would result in increased flooding on five evaluated downstream roads including FM 2102, N 5th Street, Helena Rd, County Road 331, and a private road.

The following is a general list of opportunities that will be recognized by implementation of an alternative for FRS No. 4 that address the Project purpose and need.

- Bring the dam into compliance with NRCS and TCEQ dam safety and performance standards.
- Reduce the potential for loss of life by reducing the possibility of a dam failure.
- Reduce Sponsor liability associated with operation of a noncompliant, outdated dam.
- Continue to provide flood prevention for downstream agricultural lands, houses, and infrastructure through the best fit of project measures.
- Protect downstream real estate values by continuing to provide flood prevention.

S.5 Description of Preferred Alternative

The recommended plan will rehabilitate FRS No. 4 to meet current safety and performance standards for a high hazard potential dam, will provide 100 years of submerged sediment storage after construction, and will continue downstream flood prevention.

Measures for the high hazard potential rehabilitation of FRS No. 4 include:

- Remove the existing principal spillway system;
- Install a new principal spillway system consisting of a standard inlet tower with crest at elevation 317.2 feet, two 10-inch by 10-inch low level ports at elevation 312.7 feet, and a 42-inch RCP conduit discharging into an impact basin;
- Install a 150-feet wide, five-cycle labyrinth weir structural spillway over the existing embankment with crest set above the 50-year PSH elevation at 328.7 feet and concrete chute discharging into a concrete stilling basin;
- Regrade inlet and outlet channel of the existing vegetated auxiliary spillway and raise left bay and right bay crests to the 100-year PSH elevation of 329.2 feet (1.18 feet raise from as-built);
- Flatten downstream embankment slope to 3H:1V;
- Abandon existing trench drain and install new toe drain at downstream toe;
- Install upstream dam embankment slope riprap; and
- Raise top of dam elevation to 335.3 feet (2.18 feet raise) and extend the cutoff trench below the extended dam embankment.

S.6 Resource Information

FRS No. 4 is located in southwest Karnes County, Texas on Doe Branch, a tributary of the Escondido Creek, and a tributary to the San Antonio River, located approximately 3.2 miles west of Kenedy in Karnes County, Texas.

FRS No. 4 was designed and constructed in 1956 to be a single-purpose, low hazard potential dam. The embankment is shown to be a single zone, compacted earthfill dam in the as-builts, but is noted to have an impervious core. A cutoff trench with 1:1 side slopes that has a minimum bottom width of 12 feet was

constructed at the centerline of the dam. The dam is approximately 29 feet tall and 2,285 feet long. The upstream and downstream slopes of the embankment have a slope of approximately 3:1 and 2:1 (horizontal: vertical), respectively. The top width of the structure is approximately 14 feet. The land upstream of FRS No. 4 is predominantly private ownership.

Table S-1 lists the resource information for FRS No. 4 and the land use upstream from FRS No. 4.

Table S-1. Resource Information

Resource	Description	
Latitude / Longitude	28.814771º / -97.902175º	
Hydrologic Unit Code	121003030402	
Hydrologic Unit Code Name	Doe Branch - Escondido Creek Watershed	
Watershed Size (square miles)	10.86 (includes 4.56 sq. miles above FRS No. 3)	
Land Use (acres)	Barren Land	13.0
	Cultivated Crops	126.8
	Deciduous Forest	7.3
	Developed, High Intensity	40.0
	Developed, Low Intensity	94.3
	Developed, Medium Intensity	109.8
	Developed, Open Space	69.6
	Emergent Herbaceous Wetlands	20.7
	Evergreen Forest	0.7
	Hay/Pasture	3566.5
	Herbaceous	9.1
	Mixed Forest	31.8
	Open Water	62.5
	Roads	125.5
	Shrub/Scrub	2612.7
	Woody Wetlands	59.6
	Total	**6949.9**

S.7 Population and Demographics

The demographic characteristics were reviewed for the population within the Escondido Creek Watershed FRS No. 4 breach inundation boundary for the study model extents. The estimated population of the delineated area is 138 persons according to the U.S. Census Bureau American Community Survey (ACS) 2017-2021 data. People of color make up 58 percent (%) of the population, with 42% of the total population being white. A total of 41% of households are considered low income, which is higher than both the state and national average. The share of the population with less than a high school education is 27%. The majority of households are owned, with 66% of homes being owner occupied. The unemployment rate is lower than both the state and national average.

S.8 Scoping Concerns

Relevant resource concerns identified through scoping process include:

- Prime and Unique Farmland
- Erosion and Sediment
- Floodplain Management
- Migratory Birds
- Bald and Golden Eagles
- Riparian Areas

- Waterbodies (Waters of the United States)
- Water Quality
- Wetlands
- Fish and Wildlife
- Air Quality
- Invasive Species
- Threatened and Endangered Species
- Cultural Resources/Historic Properties
- Land Use
- Public Health and Safety
- Social Issues

S.9 Alternative Plans Considered

Alternatives that were considered but eliminated from detailed study include:

- Low Hazard Potential Reclassification and Rehabilitation
- Significant Hazard Potential Reclassification and Rehabilitation
- Dam Rehabilitation with Varying Auxiliary Spillways Configurations

Alternatives that were analyzed in detail for FRS No. 4 include the No Federal Action, Decommission with Federal Assistance, and three High Hazard Potential Rehabilitation Alternatives.

Alternative 1 – No Action – Dam Remains until Failure

The No Action alternative documents baseline conditions against which all other alternatives are analyzed. It does not involve federal action or federal investment and assumes that the existing dam would remain in place without any action that would improve the dam from its original design or correct safety deficiencies beyond maintenance or replacements performed in accordance with the dam operations and maintenance plan. It is assumed that the dam will eventually fail and not be subsequently rebuilt or rehabilitated.

Catastrophic sunny day dam failure could result inundation above the FFE elevation and damages to 81 habitable structures, 24 downstream roads, and agricultural lands. Catastrophic sunny day failure would pose a significant risk of loss of life and an estimated $4,151,000 of property damages.

Following catastrophic failure of the dam, downstream flooding conditions would be similar to those that existed prior to the construction of the dam. Existing and proposed floodplains were mapped approximately 14.5 miles downstream of FRS No. 4. Since the 1% AEP floodplain downstream would be enlarged due to the absence of flood prevention, future downstream development within the expanded floodplain would be restricted by development regulations. In the existing condition, floodwaters from a 1% AEP storm event would result in the inundation (above the FFE elevation) of 53 homes, three mobile homes, and nine commercial buildings. Following catastrophic breach, floodwaters from a 1% AEP storm event would result in the inundation (above the FFE elevation) of 83 homes, 11 mobile homes, and 23 commercial buildings and would overtop Farm-to-Market (FM) 2102 by 1.51 feet (versus 0.09 feet in existing conditions), N 5th street by 2.55 feet (versus 0.53 feet in existing condition), Helena Rd by 2.22 feet (versus 0.46 feet in existing conditions), County Road (CR) 331 by 14.25 feet (versus 13.1 feet in existing conditions), and a private road by 12.7 feet (versus 12.1 feet in existing conditions).

The average annual damages associated with Alternative 1 are $189,000.

Alternative 2 – Proposed Action – Decommission

Decommissioning involves federal action and consists of removing the storage function of the dam and reconnecting, restoring, and stabilizing the upstream reservoir area/sediment pool and downstream floodplain functions. Although complete removal of the embankment is sometimes required for

decommissioning, only partial removal of the embankment was evaluated in this alternative. Partial removal of the embankment would consist of excavating a breach in the dam embankment with a 150-foot bottom width to safely pass the 1% AEP flood. A grade stabilization structure would be installed to stabilize sediment and prevent stream headcutting. To not impede flows through the breached embankment, the principal spillway components would also be removed.

The remaining portion of the embankment and the land currently covered by the sediment pool would be maintained as a greenbelt area. The excavated material (about 33,500 cubic yards) would be placed in the sediment and detention pool areas and all exposed areas would be vegetated as needed for erosion control (approximately 30 acres). Channel work would be performed to reconnect the stream channel through the sediment pool. Riparian vegetation would be established along the stream channel (approximately 2.5 acres). Construction activities will require that a SWPPP be in effect.

If non-structural mitigation measures are not implemented downstream for the decommissioning alternative, downstream flooding conditions from a 1% AEP, 24-hour storm would be similar to those described for Alternative 1 with regard to increased flooding on roadways and structures, following catastrophic breach of the dam. Existing and proposed floodplains were mapped approximately 14.5 miles downstream of FRS No. 4, ending at the confluence of the Escondido Creek with the San Antonio River. Non-structural mitigation measures include 1) property acquisition for three residential structures and one recreational structure that would be flooded above the FFE in the 10% AEP event, 2) raising of 26 residential structures above the 0.2% AEP floodplain, 3) relocation of two mobile homes, and 4) floodproofing of seven other non-residential habitable structures. The number of habitable structures inundated above the FFE during the modeled 1% AEP, 24-hour storm event would increase from 65 to 77 structures. Floodwaters from a 1% AEP, 24-hour flood would cause increased flooding on five roads.

Alternative 2 would increase the average annual damages from $189,000 to $216,000. The estimated cost to decommission the dam is $3,251,000. Additional costs for the non-structural mitigation measures are estimated to be $4,390,000 for a total alternative cost of $7,641,000.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450’ RCC Stepped Spillway
The measures for this high hazard potential rehabilitation of FRS No. 4 alternative include replacing the existing principal spillway inlet tower with a crest at elevation of 317.2 feet (0.02 foot lower), replacing the existing principal spillway conduit with 42-inch-diameter pipe discharging into an impact basin, installing a 450-feet wide RCC stepped structural spillway over the existing embankment with crest set above the 50-year PSH elevation at 328.5 feet and discharging into a concrete stilling basin, regrading the inlet and outlet channel of the existing vegetated auxiliary spillway bays and raising crests to the 100-year PSH elevation of 329.0 feet (0.98 feet raise), raising the top of dam to an elevation of 335.4 feet (2.28 feet raise), installing upstream slope riprap, abandoning existing trench drain and installing new toe drain at downstream toe, flattening the downstream embankment slope to 3:1, and extending the cutoff trench below extended dam embankment. Alternative 3 would increase the average annual damages slightly from $189,000 to $196,000. The estimated cost of this alternative is $21,207,000.

Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630’ RCC Stepped Spillway
The measures for this high hazard potential rehabilitation of FRS No. 4 alternative include replacing the existing principal spillway inlet tower with a crest at elevation of 317.2 feet (0.02 foot lower), replacing the existing principal spillway conduit with 42-inch-diameter pipe discharging into an impact basin, installing a 630-feet wide RCC stepped structural spillway over the existing embankment with crest set above the 50-year PSH elevation at 328.7 feet and discharging into a concrete stilling basin, regrading the inlet and outlet channel of the existing vegetated auxiliary spillway bays and raising crests to the 100-year PSH elevation of 329.2 feet (1.18 feet raise), raising the top of dam to an elevation of 335.4 feet (2.28 feet raise), installing upstream slope riprap, abandoning existing trench drain and installing new toe drain at

downstream toe, flattening the downstream embankment slope to 3:1, and extending the cutoff trench below extended dam embankment. Alternative 4 would increase the average annual damages slightly from $189,000 to $195,000. The estimated cost of this alternative is $26,467,000.

Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
The measures for this high hazard potential rehabilitation of FRS No. 4 alternative include replacing the existing principal spillway inlet tower with a crest at elevation of 317.2 feet (0.02 foot lower), replacing the existing principal spillway conduit with 42-inch-diameter pipe discharging into an impact basin, installing a 150-feet wide five-cycle labyrinth weir structural spillway over the existing embankment with crest set above the 50-year PSH elevation at 328.7 feet with a concrete chute discharging into a concrete stilling basin, regrading the inlet and outlet channel of the existing vegetated auxiliary spillway bays and raising crests to the 100-year PSH elevation of 329.2 feet (1.18 feet raise), raising the top of dam to an elevation of 335.3 feet (2.18 feet raise), installing upstream slope riprap, abandoning existing trench drain and installing new toe drain at downstream toe, flattening the downstream embankment slope to 3:1, and extending the cutoff trench below extended dam embankment. Alternative 5 would increase the average annual damages slightly from $189,000 to $196,000. The estimated cost of this alternative is $17,924,000.

Recommended Plan: Alternative 5, which includes the High Hazard Potential Rehabilitation of FRS No. 4, has been selected as the preferred alternative. Alternative 5 meets the Purpose and Need for the project and is the Locally, Environmentally, and Socially preferred alternative. Of the three High Hazard Potential Rehabilitation alternatives (Alternatives 3, 4, and 5), Alternative 5 has the highest (less negative) net economic benefits. The preferred alternative (Alternative 5) allows the dam to meet safety and performance standards while continuing to provide downstream flood prevention in a manner that takes into consideration economic, social, and environmental goals. The project costs for the recommended plan are provided in **Table S-2**. The most likely scenario is for the project to be implemented over 36 months, including design and construction.

Table S-2. Project Costs (Dollars)

Cost-share Table for Rehabilitation Projects					
Works of Improvement	**NRCS**	**Sponsors**	**Total**		
Cost-Shareable Items	Percent	Cost[1/]	Percent	Cost[1/]	Cost[1/]
High Hazard Potential Rehabilitation of FRS No. 4	65%	$9,519,000	35%	$4,936,000	$14,455,000
Mitigation	65%	$0	35%	$0	$0
Sponsors Project Administration	0%	NA	100%	$15,000	$15,000
Land Rights Acquisition	0%	NA	100%	$175,000	$175,000
Subtotal: Cost-Sharable Costs	65%	$9,519,000	35%	$5,126,000	$14,645,000
Non-Cost-Sharable Items [2/]					
NRCS Technical Assistance/ Engineering		$1,445,000		$0	$1,445,000
NRCS Project Administration[3/]		$1,720,000		NA	$1,720,000
Federal, State, and Local Permits		$0		$114,000	$114,000
Subtotal: Non-Cost-Share Costs		$3,165,000		$114,000	$3,279,000
Total:		$12,684,000		$5,240,000	$17,924,000

1/ All costs rounded to nearest $1,000.
2/ If actual non-cost-sharable item expenditures vary from these figures, the responsible party will bear the change.
3/ The sponsors and NRCS will each bear the costs of project administration that each incurs.

S.10 Project Benefits

Rehabilitation reduces the potential for loss of life and maintains prevention of existing infrastructure downstream of the dam. Net average annual equivalent benefits between the No Federal Action and the recommended plan is -$7,000.

Number of Direct Beneficiaries/Population at Risk FRS No. 4:

- Direct beneficiaries = 184 people protected from 1% AEP floodplain
- PAR sunny day breach = 278

Other Beneficial Effects:

- Comply with dam safety and performance standards established by NRCS and TCEQ;
- Reduces the potential for loss of life by reducing the possibility of dam failure;
- Reduces the Sponsor's liability associated with continuing to operate a noncompliant dam;
- Continues to provide flood prevention for downstream agricultural lands, houses, and infrastructure;
- Protects real estate values by continuing to provide downstream flood prevention; and
- Extends the service life of FRS No. 4 for 100 years.

Benefit-to-Cost Ratio (discount rate of 2.75%): -0.01:1.0 for FRS No. 4

Average Annual Net Economic Benefits: -$557,000 for FRS No. 4

S.11 Funding Schedule

- Federal Funds (budget year): $1,445,000
- Federal Funds (1st year after budget year): $5,619,500
- Federal Funds (2nd year after budget year): $5,619,500
- Non-Federal Funds (budget year): $0
- Non-Federal Funds (1st year after budget year): $2,620,000
- Non-Federal Funds (2nd year after budget year): $2,620,000
- Non-Federal Funds (future O&M): $5,000 annually

S.12 Period of Analysis

The standard evaluation period for dam rehabilitation under PL 83-566 is a minimum of 50 years and a maximum of 100 years. FRS No. 4 was analyzed for a benefit period of 100 years following the 36-month design and construction period. Therefore, the period of analysis is 103 years.

S.13 Project Life

FRS No. 4: 100 years

S.14 Environmental Impacts

Temporary and minor adverse impacts associated with the construction phase of the preferred alternative for FRS No. 4 are provided in **Table S-3**.

Table S-3. Summary of Environmental Effects for the Preferred Alternative

Item/Concern	FRS No. 4 - Summary of Effects of High Hazard Potential Rehabilitation Alternative
Resource Concerns	
Soil-Related Concerns	
Prime and Unique Farmland	Impacts to prime farmlands and prime farmlands if irrigated are anticipated within the FRS No. 4 LOD during construction. Would continue to provide similar level of flood prevention for downstream prime farmlands and prime farmlands if irrigated and would reduce risk of breach.
Erosion and Sediment	The increase in conduit flow will cause an initial period of streambank erosion during routine storm events until the streambanks stabilize. Would continue to allow the dam to collect and retain sediment, would provide 100 years of sediment capacity, and long term would reduce the downstream erosion potential by safely passing controlled storm flows through the new conduit.
Water-Related Concerns	
Floodplain Management	Would continue to provide downstream flood prevention benefits and would have minimal impacts on the existing downstream floodplain. The modeled 0.1% AEP floodplain downstream of FRS No. 4 would be similar to existing, increasing from 2,713 to 2,719 acres, a 0.22% increase. The upstream 1% AEP floodplain elevation would be about 0.2 feet lower than the existing condition and no upstream habitable structures would be at increased risk for flooding.
Waterbodies (Waters of the United States)	Could result in discharge of fill into potentially jurisdictional waters of U.S. during construction. Maintains stream function due to continued impoundment.
Water Quality	Minor, temporary impacts to flow characteristics including substrate, TSS/turbidity, water circulation patterns, and water fluctuations would occur during construction. Sedimentation would be managed through a SWPPP. There would be minor long-term effects to these flow characteristics following construction, resulting from the increase in downstream flows associated with larger 42-inch principal spillway conduit. No significant impact on the bacterial impairment of Escondido Creek or its tributaries.
Wetlands	No impacts. The continued presence of the dam will maintain protection of potential downstream wetlands during flood events and would not hinder the development of new or function of existing wetlands.
Air-Related Concerns	
Air Quality	Temporary negative impacts (dust and exhaust) during construction.
Plant and Animal-Related Concerns	
Fish and Wildlife	Would maintain the existing terrestrial wildlife and their habitat in the long term. Downstream aquatic and terrestrial wildlife and habitat would continue to be maintained and protected by controlling the stream flow. Minor, temporary impacts to terrestrial and aquatic habitat may occur during construction. Best management practices (BMPs) will be implemented to minimize impacts to less-mobile species during construction. It is expected that wildlife would return to the area post construction and all habitat areas would be re-established.
Invasive Species	Could result in the introduction of new invasive species by construction equipment or spreading of existing invasive species during construction. The introduction of invasive plant and animal species can degrade habitats and push native species out. All disturbed areas would be revegetated using adapted and/or non-invasive native species. All tools, equipment, and vehicles will be cleaned before transporting materials and before entering and leaving the worksites to prevent the introduction and spread of invasive species.
Migratory Birds	May temporarily affect migratory birds if construction activities occur between March 1 and August 31. Appropriate measures will be implemented in accordance with the MBTA.
Bald and Golden Eagles	No impacts.
Riparian Areas	Minor temporary negative impacts during construction. Riparian areas would reestablish following rehabilitation activities. Normal pool area will remain the same, so the amount of riparian area should not be negatively impacted.

Item/Concern	FRS No. 4 - Summary of Effects of High Hazard Potential Rehabilitation Alternative
Threatened and Endangered Species	The proposed rehabilitation could directly and indirectly affect the monarch butterfly, White-tailed Hawk, and white-nosed coati through direct removal and degradation of habitat as well as noise and vibration during construction and direct temporarily impact the sheep frog due to temporary dewatering. Though the monarch butterfly is not currently protected under federal or state laws, their listing status should be monitored for changes that may trigger coordination with the USFWS. Based on current listing status, available suitable habitat, and proposed project activities, no effects to federally listed species are anticipated and therefore, no additional studies, coordination, or documentation is required at this time. If studies and coordination are determined to be required for the project based on listing status changes, they will be performed during the design phase of the project. Additionally, BMPs will be implemented to avoid permanent impacts to the state listed species. A letter was sent to the USFWS on May 13, 2024, requesting that the agency participate in this project as a cooperating agency and is included in **Appendix A**.
Human-Related Concerns	
Cultural Resources/Historic Properties	Through consultation with the SHPO and Tribal Nations, NRCS has determined that no historic properties are present within the project APE. Therefore, the proposed rehabilitation would have no impacts to historic properties within the project APE. Furthermore, no downstream impacts to cultural resources are anticipated under this alternative.
Land Use	Minimal changes to land use adjacent to FRS No. 4 due to raise of vegetated auxiliary spillway, raise of effective top of dam, and new overtopping labyrinth weir spillway. No impacts to downstream land use.
Public Health and Safety	Would maintain the flood prevention benefits for 100 years. Upstream of the dam, the 1% AEP 24-hour flood pool will be approximately 0.2 feet lower than the existing condition and no habitable structures would be impacted. The threat to loss of life from failure of the dam would be greatly reduced. Minor induced flooding on three roadways (<0.06 feet) during the 1% AEP storm event.
Social Issues/Community Cohesion	Construction costs could necessitate an increase in taxes and fees and the taxes/fees and the project benefits may not impact individuals equally, which could result in a loss of community cohesion.
Ecosystem Services	
Provisioning Services - Tangible goods provided for direct human use (e.g., timber, food, fiber, water)	
Crop Yield (non-monetized	Minor temporary negative impacts to areas of hay/pasture land cover are anticipated within the FRS No. 4 LOD during construction. Would continue to provide similar level of flood prevention for hay/pasture land cover types that currently provide provisioning services and would reduce risk of breach.
Regulating Services - Maintains the world we live in and is regulated (e.g., flood control, erosion, water quality, crop pollination)	
Flood Control and Regulating Services Provided by Vegetation (non-monetized)	Minor temporary negative impacts during construction. Riparian areas in LOD would reestablish following rehabilitation activities. Normal pool area will remain similar to the existing condition, so the amount of riparian area around the perimeter of the normal pool should not be impacted. Regulating services currently provided by FRS No. 4 would remain.
Cultural Services – Makes the world a place people want to live (e.g., recreation, spiritual, aesthetics)	
Cultural Resources, Aesthetic Viewshed, and Tribal Values Social Issues	Would affect viewshed as a result of the addition of labyrinth weir spillway. Would continue to provide flood prevention for downstream viewshed and any cultural resources present.

S.15 Major Conclusions

The High Hazard Potential Rehabilitation Alternative will bring FRS No. 4 into compliance with both NRCS and TCEQ safety and performance standards for a high hazard potential dam. This alternative has the greatest (least negative) net economic benefit of the three high hazard rehabilitation alternatives analyzed and a benefit to-cost ratio of -0.1:1.0. This alternative is the preferred alternative and will be implemented with federal assistance. The Decommissioning alternative would provide greater (less

negative) net economic benefits than any of the high hazard rehabilitation alternatives and it would eliminate the hazard associated with a potential catastrophic breach of the dam, but it would no longer provide flood damage reduction benefits.

S.16 Areas of Controversy and Issues to be Resolved.

Controversial Issues: None identified to date.

Issues to be Resolved: The anticipated issues to be resolved for the rehabilitation of FRS No. 4 include:

- A new O&M Agreement will be developed with the Karnes County SWCD, Escondido Watershed District, San Antonio River Authority, and the City of Kenedy for the 100-year project life of FRS No. 4. The new O&M Agreement must be signed before the Project Agreement is signed.
- For projects with disturbances equal to or greater than five acres it is necessary to have a Storm Water Pollution Prevention Plan (SWPPP) in place at least 48 hours prior to and during construction of the proposed project and filing Notice of Intent with the TCEQ is required. A Notice of Termination (NOT) must be filed once the site has reached final stabilization.
- The Sponsors will be responsible for developing an EAP prior to construction and will review and update the EAP annually with local emergency response officials.
- Coordination with the U.S. Army Corps of Engineers (USACE) will be required during the design phase of this project.
- Continued coordination with the U.S. Fish and Wildlife Service (USFWS) and Texas Parks and Wildlife Department (TPWD) will be required throughout the design phase of this project.
- Confirm the existing easement extent and/or elevation during final design. The Sponsors may need to obtain additional land rights up to elevation 329.7 feet if not already within their existing easement.

S.17 Evidence of Unusual Congressional or Local Interest

No evidence of unusual Congressional or local interests was identified.

S.18 Compliance Certificate

Is this report in compliance with executive order, public laws, and other statutes governing the formulation of water resource projects? Yes _X_ No ___

0.0 CHANGES REQUIRING PREPARATION OF A SUPPLEMENT

This Supplemental Watershed Plan No. IV and Environmental Assessment formulated, evaluated, and resolved alternatives for the rehabilitation of Escondido Creek Watershed FRS No. 4, located on Doe Branch within the Escondido Creek Watershed, a subwatershed of the San Antonio River in Karnes County, Texas. (see Project Map in **Appendix B**).

FRS No. 4 was designed and constructed as a low hazard potential class structure with an original authorized purpose of flood prevention. The classification of FRS No. 4 was changed to a high hazard potential class structure due to the presence of downstream residences, businesses, and roads that would be impacted in the event of a dam failure. FRS No. 4 does not meet current NRCS and State of Texas (sometimes referred to as "State") Dam Safety Program dam design and safety criteria and performance standards for high hazard potential class dams.

1.0 PURPOSE AND NEED FOR ACTION

The National Environmental Policy Act (NEPA) purpose and need is to remedy structural deficiency of FRS No. 4. The original authorized purpose of the Watershed Plan for FRS No. 4 was watershed protection and flood prevention. The proposed action is needed to address dam safety hazard classification concerns by implementing rehabilitation repairs or decommissioning. The following sections detail the problems, opportunities, objectives, and constraints of the project which bound the formulation of alternatives.

1.1 Problems and Opportunities

1.1.1 Problems

FRS No. 4 was originally designed as a low hazard potential dam and is currently performing as intended. However, due to downstream development since dam construction, it has been reclassified as a high hazard potential dam and currently does not meet dam safety criteria as required by the NRCS or TCEQ to prevent embankment overtopping during a PMP event as required for a high hazard potential dam. The water in the reservoir would flow over the top of the embankment during the resulting PMF and could cause it to erode and collapse. Additionally, significant headcutting during the PMF will occur in both spillway bays. Breaching through the left spillway bay control section will cause dam failure. FRS No. 4 is categorized as having high potential to fail due to deficient hydrologic capacity and spillway integrity.

There is a potential for loss of life from a catastrophic dam failure of the FRS due to potential significant flooding impacts to habitable structures and infrastructure located downstream of the FRS. Based on HEC-RAS sunny day breach modeling, there are 52 homes, eight mobile homes, eight commercial buildings, and one school outbuilding inundated above FFE within the breach extent of FRS No. 4. In addition, there are 24 roads including minor state highways and main local roads inundated by one foot or more. The PAR for FRS No. 4 is estimated to be 278 based on the number of impacted habitable structures and the overtopping of roads that are inundated by one foot or greater.

The dam currently provides floodwater damage reduction for downstream habitable structures and infrastructure. Without the dam in place, floodwaters from a 1% AEP storm event would result in the inundation (above the FFE elevation) of 83 homes, 11 mobile homes, and 23 commercial buildings and would result in increased flooding on five evaluated downstream roads including FM 2102, N 5th Street, Helena Rd, County Road 331, and a private road.

1.1.2 Opportunities

The following is a general list of opportunities that will be recognized by implementation of an alternative for FRS No. 4 that address the project purpose and need. Some quantification of these opportunities will be provided in other sections of this report, as appropriate.

- Bring the dam into compliance with NRCS and TCEQ dam safety and performance standards.
- Reduce the potential for loss of life by reducing the possibility of a dam failure.
- Reduce Sponsor liability associated with operation of a noncompliant, outdated dam.
- Continue to provide flood prevention for downstream agricultural lands, houses, and infrastructure through the best fit of project measures.
- Protect downstream real estate values by continuing to provide flood prevention.

1.2 Objectives and Constraints

1.2.1 Federal Objective

The Federal Objective is the fundamental goal of Federal investments in water resources and is the same for every watershed plan in accordance with Principles, Requirements, and Guidelines (PR&G). The Federal Objective specifies that Federal water resources investments shall reflect national priorities, encourage economic development, and protect the environment by:

- Seeking to maximize sustainable economic development;
- Seeking to avoid the unwise use of floodplains and flood-prone areas and minimizing adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used; and
- Protecting and restoring the functions of natural system and mitigating any unavoidable damages to natural systems.

Given the many competing demands for limited Federal resources, it is intended that Federal investments in water resources as a whole should strive to maximize public benefits, with appropriate consideration of costs. Public benefits encompass environmental, economic, and social goals, include monetary and non-monetary effects and allow for consideration of both quantified and unquantified measures.

1.2.2 Project Objectives

Project objectives were developed to address the problems and realize opportunities in the watershed. In coordination with the public and stakeholder agencies, NRCS and the sponsors established the following objectives for this project:

- Objective 1: Address dam safety compliance issues with FRS No. 4;
- Objective 2: Address risk of breach during PMP storm event; and
- Objective 3: Continue to provide flood prevention for downstream residents.

1.2.3 Constraints

Constraints represent likely insurmountable physical or administrative restrictions pertinent to the formulation of alternative plans. Considerations are other obstacles that could affect costs, societal acceptability, or legal issues which should be noted and accounted for when examining and evaluating potential alternative plans. For this Plan, the primary constraints are as follows:

- Constraint 1: Avoid impacts to the property located east of the vegetated auxiliary spillway that could result from spillway widening and/or the additional of a third spillway bay;

- Constraint 2: Avoid impacts to historic resources (farmstead along FM 2102 and a metal shed structure near intersection of FM 2102 and County Road 162) that could result from a rehabilitation project; and
- Constraint 3: Avoid impacts to FM 2102 that could result from a dam raise embankment extension.

2.0 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The scope is the range of actions, alternatives, and impacts to be considered in this Supplemental Plan-EA.

2.1 Scoping

On June 13, 2023, a Public Scoping Meeting was held at the Kenedy City Hall Auditorium to identify issues of economic, environmental, cultural, and social importance in the watershed. Input was provided by the San Antonio River Authority, Karnes County Soil and Water Conservation District, and Texas NRCS. Factors that would affect soil, water, air, plant, animals, and human resources were identified by an interdisciplinary planning team composed of the following areas: engineering, biology, economics, resource conservation, water resources, archeology, and geology. There were no additional concerns identified by local citizens at the first Public Scoping Meeting.

2.2 Resource Concerns Considered and Identified Through Scoping

The scoping process identified (1) the objectives, needs, and primary concerns for the Sponsor, (2) the relevant issues associated with FRS No. 4, and (3) the environmental concerns associated with the Project. **Table 2-1** identifies the specific concerns and their relevance to the proposed action. Resources that are determined to not be present or not relevant are eliminated from further analysis.

Resources which could potentially be impacted to a level requiring further analysis are described in Chapter 3 and impacts on these resources are analyzed in Chapter 5.

Table 2-1. Resource Concerns Considered and Identified Through Scoping

Item/Concern	Relevant to the Proposed Action?		Rationale
	YES	NO	
Soil-Related Concerns			
Prime and Unique Farmland	X		Areas designated as Prime Farmland and Prime Farmland, if irrigated are identified near the existing dam, backwater inundation area, and downstream of the dam. Agricultural flood damages to these areas must be considered.
Erosion and Sediment	X		Project activities could impact erosion and sedimentation within the analysis area.
Water-Related Concerns			
Coastal Zone Management Plans		X	The analysis area is not subject to Coastal Zone Management Act requirements.
Coral Reefs		X	Coral reefs do not occur within the analysis area.
Floodplain Management	X		Federal Emergency Management Agency (FEMA)-designated floodplains occur throughout the analysis area; floodplain management could be affected by flood control measures.
Regional Water Resource Plans		X	No regional water resource plans that are relevant to dam rehabilitation of an existing dam were identified for the analysis area.
Sole Source Aquifers		X	No designated Sole Source Aquifers were identified within the analysis area.

Item/Concern	Relevant to the Proposed Action?		Rationale
	YES	NO	
Waterbodies (Waters of the U.S. [WOTUS])	X		Potentially jurisdictional WOTUS are present within the analysis area.
Water Quality	X		Project activities could impact water quality within the analysis area.
Water Resources		X	Based on the Texas Water Rights Viewer, no water rights exist on Doe Branch or Escondido Creek downstream of FRS No. 4 and no other human uses of water from FRS No. 4 were identified.
Wetlands	X		Based on National Wetlands Inventory (NWI), wetlands may be present within the backwater area of the dam and downstream of the dam.
Wild and Scenic Rivers		X	No designated Wild and Scenic Rivers were identified in or near the analysis area. The closest Nationwide Rivers Inventory-listed segments of the Guadalupe River and the Medina River are over 80 miles away from the analysis area.
Air-Related Concerns			
Air Quality	X		Air pollutant emissions (dust and exhaust) are likely to result from construction activities.
Plant and Animal-Related Concerns			
Ecologically Critical Areas		X	Ecologically critical areas are not known to occur in the analysis area.
Essential Fish Habitat		X	The analysis area is not within the boundaries of essential fish habitat.
Fish and Wildlife	X		Fish and wildlife could be impacted by project activities.
Forest Resources		X	No forest resources were identified within the analysis area. Trees found within riparian buffers will be considered under the Riparian Areas resource concern.
Invasive Species	X		Invasive plant and animal species are known to be present within the ecoregion in which the analysis area is located.
Migratory Birds	X		Migratory birds are likely to occur within the analysis area.
Bald and Golden Eagles	X		Bald Eagles occur throughout the State and therefore have the potential to utilize the site for hunting and/or stopover.
Natural Areas		X	Natural areas occur within the analysis area but would not be impacted by dam rehabilitation outcomes.
Riparian Areas	X		Riparian areas are likely to occur within the analysis area.
Threatened and Endangered Species	X		Federal and State listed threatened and endangered species have the potential to occur within the analysis area.
Human-Related Concerns			
Cultural Resources/Historic Properties	X		There is the potential for archaeological and historic resources to be present within the analysis area and

Item/Concern	Relevant to the Proposed Action?		Rationale
	YES	NO	
			if they are present, they could be impacted by project activities.
Land Use	X		Project activities could impact land uses within the analysis area.
Parklands		X	No parklands are located within the analysis area.
Public Health and Safety	X		Public health and safety could be impacted by the project.
Public Recreation		X	There have been no public recreation opportunities identified within the analysis area.
Scenic Beauty		X	The existing dam does not have high scenic value. The FRS embankment is highly visible from FM 2102, but any modifications that may occur as a result of the project would not negatively impact the embankment aesthetics.
Significant Scientific Features		X	No significant scientific features are known to occur within or near the analysis area.
Social Issues	X		Project activities could affect community cohesion.
Scoped Ecosystem Services of Concern			
Provisioning	X		Project activities could impact agricultural lands that could be used for food, fiber, or biomass production.
Regulating	X		Project activities could impact flood damage reduction.
Supporting		X	Supporting Services are categorized as “ecosystem processes and functions” or an intermediate ecosystem service. As an intermediate ecosystem service, their service is already included in the final ecosystem service, which mainly consist of measurable benefits derived from Provisioning, Regulating, and Cultural Services. Because there is no measurable benefit associated with Supporting Services, it is not included in the ecosystem services analysis.
Cultural	X		Project activities could impact aesthetic viewshed and tribal values within the analysis area.

3.0 AFFECTED ENVIRONMENT

3.1 Introduction and Project Setting

The affected environment includes ecological, cultural, social, aesthetic, and economic resources that could potentially be affected by proposed alternatives. The purpose of describing the affected environment is to define the context in which the potential impacts could occur. Additional information regarding the affected environment of the Escondido Creek Watershed can be found in the Watershed Work Plan. Existing conditions that are specific to FRS No. 4 are described in the following sections.

FRS No. 4, also known as Hailey Lake, is located in Karnes County, Texas approximately 3.2 miles west of Kenedy, Texas. The FRS is located on Doe Branch within the Escondido Creek Watershed, a subwatershed of San Antonio River The project location is depicted in **Appendix B**, on **Figure B-1**.

3.2 Status of Existing Dam

The below record of the existing conditions of FRS No. 4 is a compilation of the *Dam Assessment Report* (NRCS, 2014), the 2022 *Dam Safety Inspection Report* (NRCS, 2022), and the FRS No. 4 as-built plans (USDA Soil Conservation Service (SCS), 1957) in addition to observations made during site visits associated with this Supplemental Watershed Plan effort.

3.2.1 Operation and Maintenance

Based on observations from a February 23, 2022, site inspection conducted by NRCS that were included in an August 17, 2022 NRCS inspection report (NRCS, 2022), the overall condition of the dam was noted as good with good operation and maintenance. No items were noted as requiring follow-up investigation. Items requiring immediate action include removal of hogs. The following items to monitor were noted in the inspection report:

- Watch for increased harvester ant and animal burrowing, rooting, and trailing on the dam embankment.
- Continue to control encroaching woody weeks, brush, and trees as they become evident on the dam embankment, the auxiliary spillway, the plunge basin, and around the principal spillway inlet and outlet.
- Watch for erosion where the grass is sparse or bare and around the principal spillway inlet.
- Monitor the low area at the downstream berm for seepage or hydrophytic plant growth.
- Monitor the trash rack steel on the inlet and the inlet filter housing for further rusting or degradation.
- Monitor the plunge basin for further degradation.

Adequate O&M for FRS No. 4 is performed by the Sponsors and the Sponsors are aware of the items noted above. These observations are not impacting the performance of the dam and are not the cause of the needed dam rehabilitation.

3.2.2 Sedimentation Rate

The 1954 Escondido Creek Watershed Work Plan (NRCS, 1954) estimated an annual sedimentation rate of 1.77 acre-feet per square mile per year. The as-builts (USDA SCS, 1957) indicate 1.71 acre-feet per square mile per year for the watershed, or 10.64 acre-feet per year at the submerged sediment storage elevation. The actual sediment rate since construction was estimated using the water surface elevation at the time of Light Detection and Ranging (LiDAR) collection in early 2019 (Texas Natural Resource

Information System [TNRIS], 2020). At the time the LiDAR was flown, the water surface elevation (WSE) was at 311.65 feet. This water surface elevation is 1.07 feet and 5.57 feet, respectively, below the as-built low-low level port elevation of 312.72 feet and the principal spillway crest elevation of 317.22 feet (NAVD88 adjusted). The assumption was made that the water level is equal to the maximum amount of accumulated sediment deposited since construction of the dam. Per the as-built elevation storage table, this equates to approximately 175 acre-feet of accumulated sediment since construction in 1957 (61 years). The sediment accumulation rate is therefore 2.87 acre-feet per year.

3.2.3 Hazard Classification

Escondido Creek FRS No. 4 is currently classified as a high hazard potential dam per both NRCS and TCEQ criteria. The results of the dam breach analysis agree with the current respective hazard classification for both agencies' criteria.

3.2.4 Potential Modes of Dam Failure

Potential modes of dam failure were evaluated for FRS No. 4. Sedimentation, seismic, and material deterioration failure modes were all considered to have a low or low to moderate potential for resulting in failure of the dam. Other potential failure modes are discussed in the following sections.

Hydrologic Capacity

Hydrologic failure of a dam occurs when the dam is overtopped and fails. FRS No. 4 was originally designed as a low hazard potential dam and is currently performing as intended. However, due to the presence of downstream residences, businesses, and roads, it has been reclassified as a high hazard potential dam and currently does not meet dam safety criteria as required by the NRCS to prevent embankment overtopping during a PMP event as required for a high hazard potential dam. The water in the reservoir would flow over the top of the embankment during the resulting PMF and could cause it to erode and collapse. FRS No. 4 is categorized as having high potential to fail due to deficient hydrologic capacity.

FRS No. 3 is upstream of FRS No. 4. The dam is currently classified as high hazard potential and is currently performing as intended. All analyses of FRS No. 4 included evaluation of FRS No. 3 in its existing condition. FRS No. 3 was found to safely pass the PMF/FBH during both TCEQ and NRCS designs storms without overtopping the embankment and was therefore categorized as having low potential to fail due to hydrologic capacity. A sunny day failure of FRS No. 3 would not contribute to the failure of FRS No. 4 since the top of dam total storage at 2726 acre-feet would be contained by the available storage in FRS No. 4. During a sunny day breach of FRS No. 3, FRS No. 4 would discharge through the auxiliary spillway but would not overtop. Conversely, a PMF/FBH storm event failure of FRS No. 3 would contribute to the overtopping and potential failure of FRS No. 4. However, given that the upstream FRS No. 3 has hydrologic capacity to safely pass the high hazard PMF/FBH storm events without overtopping, the failure of FRS No. 3 was not considered in the existing condition and concept design analyses for FRS No. 4.

Spillway Integrity

Based on the most recent inspection by NRCS and the San Antonio River Authority (NRCS, 2022), there were a number of maintenance items associated with the FRS No. 4 vegetated auxiliary spillway. These include 5.5 feet and 6.0 feet diameter harvester ant beds and a two feet deep burrow in the inside bay at the splitter dike toe; two 25-feet diameter hog rooting areas in outside bay at splitter dike, several large hog rooting areas in inside bay (right half), and hog routing around hay bales located on the auxiliary spillway floor and on the splitter dikes. SITES integrity analysis for the existing spillway using the representative soil parameters indicates that significant headcutting during the freeboard hydrograph (FBH) will occur in both spillway bays. Breaching through the left spillway bay control section will cause

dam failure. The risk of FRS No. 4 dam failure due to spillway integrity is judged to be high. FRS No. 3 upstream of FRS No. 4 was not evaluated for spillway integrity.

Embankment and Foundation Seepage

Embankment and foundation seepage can contribute to failure of an embankment by removing (piping) soil material from the embankment and/or foundation. As the soil material is removed via internal erosion, the resulting void allows more water flow through the embankment or foundation. Progressive internal erosion, if unchecked, can lead to breaching and/or collapse of the dam. Two general types of seepage can develop in earthen embankment dams: under-seepage and through-seepage. Under-seepage occurs when differential hydrostatic head causes excessive flow gradients to develop in relatively pervious dam foundation materials, producing upward vertical flow at the downstream toe of the dam which may result in the formation of seeps, sand boils, and/or piping under the dam. Through-seepage develops when differential hydrostatic head causes the phreatic surface through the embankment to daylight on the downstream slope face, which can produce seeps and/or piping through the dam embankment. An additional consequence of seepage is elevated pore pressures within the dam embankment and/or foundation, which can destabilize the embankment slopes and/or spillway structures.

Review of the historical borings from the as-built drawings indicate shallow sand layers underneath the dam embankment. The as-built core trench does not penetrate deep enough to fully penetrate these shallow sand layers, indicating the potential for under-seepage below the core trench. The pre-construction borings in the as-built drawings indicate varying near-surface soil conditions downstream of the centerline core trench. In most cases there is a thin clay blanket above the sands, but in a few cases the sands extend to ground surface. Such conditions can promote high seepage exit gradients and elevated risk of piping. Further, standing water has also been observed at the downstream toe in the remnant creek channel downstream of the dam. No further analyses or investigations have been completed to identify whether the source of the water may be under-seepage and/or surface water drainage, but this area should be further evaluated as a part of the design of the alternative.

The dam includes an existing foundation trench drain which extends from Station 10+20 to 19+60. The as-built drawings detail the drainpipe as a perforated, galvanized corrugated sheet metal pipe. Galvanized metal pipes typically have design lives of less than 50 years. Combined with the elevated soil corrosion potential as indicated by the laboratory testing for the current study (see Preliminary Soil Mechanics Report (SMR) [AECOM, 2024a]), the existing foundation drainpipe is likely beyond its useable life. Additionally, the filter material surrounding the 1956 drainpipe is detailed as single-stage aggregate filter material consisting of a relatively coarse gradation that may not meet current filter criteria given the fine-grained (clayey) soils comprising the embankment and foundation soils.

The principal spillway conduit was constructed without a filter diaphragm, and the original construction of the conduit was completed with concrete “anti-seepage” collars. Modern dam designs require a filter diaphragm to intercept the flow of materials if internal erosion develops. Similarly, anti-seepage collars are no longer allowed in the construction of new spillway conduits because compaction around the collars during construction can be difficult, allowing preferential flow paths to develop as part of the internal erosion initiation.

The supplemental geologic investigation (AECOM, 2024b) and SMR (AECOM, 2024a) performed as part of this study included soil dispersion potential testing on samples from the auxiliary spillway channel. While most samples were characterized as non-dispersive, a few samples indicated possibly dispersive to dispersive. Dispersive soils are highly erodible, and the risk of surface erosion and piping due to seepage is significantly higher in such materials. No testing is available to indicate whether dispersive soils may be present in the dam embankment or foundation and will be accounted for during the design of the selected alternative.

No existing geotechnical instrumentation (e.g., piezometers) or seepage analyses are available for review to estimate the position of the phreatic surface through the embankment or the hydraulic exit gradient at the downstream toe. Additionally, formal filter compatibility analysis are not available to evaluate whether the existing drainpipe meets current NRCS design criteria. Lastly, no recent video inspections of the existing drainpipe have been performed and its condition is unknown. Based on the foregoing,, the risk of dam failure due to through-seepage is estimated to be moderate, particularly around the principal spillway conduit.

Embankment Stability

Embankment instability generally refers to slope failures such as slides or excessive slope movement. Embankment instability can cause obstruction of inlets/outlets; recurring maintenance repairs for shallow slides; or dam failure for deeper slides which pass through the crest or upstream slope of the dam due to crest loss height and subsequent reservoir overtopping, damage to spillway conduits or other structures, shortened seepage paths and elevated seepage gradients through the embankment, and/or the development of cracking that may provide a preferential path for seepage through the embankment cross section.

Available as-built drawings indicate at least two repair projects were made at this dam to repair slope slides and erosion. Slope repairs completed in October 1961 included the repair of several shallow slides that occurred on the downstream embankment slope, which were originally constructed to 2H:1V slopes. Repair of the slides included excavating beyond the slide surface to a uniform slope angle and reconstructing the downstream slope. A 12-foot wide stability berm completed to an elevation of 321.6 feet was constructed with a flatter slope of 2.5H:1V slopes below the berm. The original 2H:1V downstream slope was restored above the berm. Erosion repairs were made on the dam embankment in 1968. Visual observations of the dam in 2023 indicate some shallow slides and sloughing may have occurred after the 1968 repairs (see Preliminary Geologic Investigation Report [AECOM, 2024b]).

Risk of deep-seated embankment instability is considered to be low based on the presence of the stability berm. However, there is a moderate risk of shallow slope failures (particularly in the steeper upper portion of the downstream slope) given the history of prior embankment slides and likelihood that the dam embankment was constructed from high-plasticity clay soils.

3.2.5 Consequences of Dam Failure

Both the PAR estimate and breach zone analyses estimate depths of inundation based upon LiDAR natural ground elevations at a structure. Based on criteria provided in the NRCS *Computation of Population at Risk During Dam Failure* spreadsheet, a home, commercial building, a school outbuilding, or road was considered to be at risk for the PAR estimate when the depth of floodwater was greater than or equal to one foot above natural ground and a mobile home was considered to be at risk for the PAR estimate when the depth of floodwater was greater than or equal to two feet above natural ground.

Loss of Life

The breach inundation study indicates that a catastrophic sunny day dam breach may result in inundation of habitable structures as well as transportation infrastructure. The estimated PAR from a sunny day, top of dam breach scenario is 278 and considers impacts to 52 homes, eight mobile homes, eight commercial buildings, one school outbuilding, and 24 roads including minor state highways and main local roads. Additionally, 23 homes, one seasonal use home, seven commercial buildings within the breach zone are inundated less than one foot and 15 mobile homes are inundated less than two feet and therefore have no PAR per the NRCS methodology.

Release of Harmful Materials
The sediment stored in the reservoir and eroded embankment material that would be released to Doe Branch and then to Escondido Creek in the event of catastrophic breach would harm water quality, degrade aquatic habitat, and reduce downstream channel capacity.

Infrastructure Destruction
Residential structures, commercial buildings, school structures, fences, roads, bridges, and public utilities may be damaged or destroyed in the event of catastrophic breach of FRS No. 4.

3.3 Resource Concerns

The resource concerns listed below were evaluated in **Section 2.2** but were not considered to be relevant to the proposed action:

- Coastal Zone Management Plans
- Coral Reefs
- Ecologically Critical Areas
- Essential Fish Habitat
- Forest Resources
- Natural Areas
- Parklands
- Public Recreation
- Regional Water Resource Plans
- Sole Source Aquifers
- Scenic Beauty
- Significant Scientific Features
- Wild and Scenic Rivers
- Water Resources

The resource concerns described in the following sections were evaluated in **Section 2.2** and were considered to be relevant to the proposed action.

3.3.1 Prime Farmland and Farmland of Statewide Importance

According to the USDA soil data access website, Prime Farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management and acceptable farming methods are applied. Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. In some areas, land that does not meet the criteria for prime or unique farmland is considered to be farmland of statewide importance for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies.

Based on the NRCS Soil Survey (USDA NRCS 2024), there is land in the immediate vicinity of the FRS No. 4 embankment, adjacent to the northwest and southeast edges of the normal pool, identified as prime farmland if irrigated and land adjacent to the southwest edge of the normal pool has been identified as prime farmland. It appears that some of these areas are actively farmed. Approximately 53 acres of prime farmland and approximately 7 acres of prime farmland if irrigated are located in the backwater area below the principal spillway crest. Similarly, within the 1% AEP floodplain downstream of FRS No. 4, there are approximately 1,709 acres designated as prime farmland, with an additional 120 acres designated as prime farmland if irrigated.

There are also areas located adjacent to Doe Branch and Escondido Creek downstream of FRS No. 4 that have been identified as prime farmland, prime farmland if irrigated, and farmland of statewide importance

if irrigated. Some of these areas appear to be actively farmed. Within the sunny day breach floodplain extending from immediately downstream of FRS No. 4 through the City of Kenedy to the breach study limit, there are approximately 799 acres of prime farmland, 102 acres of prime farmland if irrigated, and 0.2 acres of farmland of statewide importance, if irrigated. Similarly, within the 1% AEP floodplain extending from immediately downstream of FRS No. 4 to the confluence of Escondido Creek with the San Antonio River, there are 1,709 acres of prime farmland and 120 acres of prime farmland if irrigated. A map of farmland designations is provided as **Figure C-3** in **Appendix C**.

3.3.2 Erosion and Sediment

FRS No. 4 currently impounds sediment and regulates flows from Doe Branch. The existing principal spillway conduit is 28 inches in diameter and the intake structure has a crest elevation of 317.22 feet. There are two existing vegetated auxiliary spillway bays, each having a width of 250 feet and LiDAR crest elevations of 328.29 feet and 328.34 feet for the inner and outer bays, respectively. The regulation of flow by FRS No. 4 may prevent channel erosion along the portion of Doe Branch downstream of FRS No. 4 and along Escondido Creek that would have occurred from uncontrolled flows from Doe Branch. The impoundment of sediment along Doe Branch may decrease natural sediment deposition into Escondido Creek. The FRS has also changed the natural sediment regime for the watershed.

3.3.3 Floodplain Management

The NRCS policy on floodplain management reflects the requirements of Executive Order 11988 that decisions by federal agencies must recognize that floodplains have unique and significant public values (NRCS Regulation 7 CFR 650.25). In Karnes County, Escondido Creek floodplains are regulated by each respective community or Karnes County, if the floodplain is not located in an incorporated area. The responsibility of preparing flood hazard mapping to FEMA standards is managed by the San Antonio River Authority, which is a FEMA Cooperating Technical Partner (CTP). The San Antonio River Authority is also a FEMA Letter of Map Change (LOMC) review delegate, indicating their authority to review and approve FEMA flood hazard map changes submitted by the local communities under their jurisdiction. The presence of FRS No. 4 on Doe Branch regulates flood flows below FRS No. 4 through the existing 28-inch principal spillway conduit during routine storm events. At the 2% AEP and greater storm events, the existing auxiliary spillway engages and releases additional but delayed flood flows into downstream Doe Branch.

A review of the effective Federal Emergency Management Agency (FEMA) flood insurance maps for the project area (Map 48255C0375C eff. 10/19/2010) indicate the presence of a 1% flood zone (Zone A) located within the backwater area of and immediately downstream of FRS No. 4 on Doe Branch and approximately 1.25 miles along Escondido Creek. Further downstream on Escondido Creek within the City of Kenedy, the FEMA flood insurance map (Map 48255C0380C eff. 10/19/2010) designates the 1% flood zone as both Zone A and Zone AE. Downstream of the City of Kenedy and to the confluence of the San Antonio River, the FEMA flood insurance map (Map 48255C0400C eff. 10/19/2010) designates the 1% flood zone as Zone A. The flood zones for the analysis area are shown on **Figure C-4**. There are seven structures in the effective FEMA regulatory floodplain within the modeling extent.

A flood hazard remapping update was in progress via the Draft Karnes County Flood Protection Plan (Doucet 2023) at the time of this Supplemental Plan-EA preparation. These models were used for this study with permission from the San Antonio River Authority. Adjustments to model parameters for alignment with NRCS design procedures in the vicinity of the three concurrent planning studies for FRS No. 1, FRS No. 4, and FRS No. 12 were incorporated to assess the current flood risk for Doe Branch and Escondido Creek. According to the 1% AEP existing condition modeling conducted for this plan (**Appendix C, Figure C-6)**, there are 133 structures including residential and commercial structures at risk of flooding in the modeled 1% AEP, 24-hour storm event within the same upstream and downstream extents as the current effective floodplain. Only 65 of these 133 structures are flooded above the FFE.

This floodplain includes both Doe Branch and Escondido Creek, extending to the confluence of the San Antonio River. The large difference in the number of structures between the current hydraulic models and the effective FEMA floodplain is primarily due to the updated NOAA Atlas 14 rainfall (NOAA, 2018) versus the lower rainfall used in development of the regulatory floodplain and also a result of the improved definition of the LiDAR terrain used for this planning modeling compared to the older terrain data used to develop the regulatory floodplain. All frequency storm modeling results presented in the Supplemental Plan-EA were based upon this newer model with Atlas 14 rainfall.

3.3.4 Waterbodies (Waters of the United States)

Sections 401 and 404

Waterbodies and wetlands that are considered Waters of the U.S. (WOTUS) are subject to the regulatory authority of the USACE. Section 404 of the CWA prohibits the discharge of dredged or fill material into WOTUS, including streams and wetlands, unless the action is exempted or authorized by a permit issued by the USACE. If a CWA Section 404 permit is required, the State must issue a Section 401 State Water Quality Certification to certify that the activity will not violate State water quality standards.

FRS No. 4 was surveyed for waterbodies including streams, lakes, and ponds on August 1 and 2, 2023. Based on desktop review, eight National Hydrography Datasets (NHD) mapped features including Doe Branch, two unnamed streams, two lake/ponds, one artificial path, one underground pipe, and Escondido Creek FRS. No 4 Reservoir were determined to be potentially present. Based on field investigations, FRS. No 4 reservoir and Doe Branch/Stream 01 were observed within the project area of FRS No. 4. These two WOTUS features may be considered potentially jurisdictional Waters of the U.S.

3.3.5 Water Quality

Sections 303(d) and 305(b)

Section 303(d) of the Clean Water Act (CWA) requires states, territories, and tribes to identify "impaired waters" and to establish total maximum daily loads (TMDLs). By definition, an impaired water does not meet the standards associated with its assigned use classification. The State of Texas assesses its waters every two years to meet the requirements of Sections 303(d) and 305(b) of the Clean Water Act. These assessments are published in an integrated report which is titled the "2022 Texas Integrated Report of Surface Water Quality for the Clean Water Act Sections 305(b) and 303(d)" and describes the quality of all waters in the State and contains a list of waters in good condition and those that are impaired/polluted (TCEQ, 2022).

The 2022 Texas Integrated Report of Surface Water Quality for the Clean Water Act Sections 305(b) and 303(d) was released in July 2022 and summarizes the water quality conditions in Texas over a two-year period, January 1, 2020, through December 31, 2021. The Escondido Creek segment (segment 1901A), which is located downstream of FRS No. 4, is listed as impaired for bacteria in water (recreational). The segment is categorized as 5c which means additional data or information will be collected or evaluated by the State before a management strategy is selected (TCEQ, 2022). This segment is not considered impaired for aquatic life.

Section 402

Section 402 of the CWA establishes the National Pollutants Discharge Elimination System (NPDES) Program, also administered by the State. Section 402 requires any point source, including developments, construction sites, or other areas of soil disturbance, that discharges or intends to discharge to waters of the State must obtain a NPDES permit. In Texas, wastewater and stormwater state-issued permits are administered by the TCEQ through the Texas Pollutant Discharge Elimination System (TPDES) Program. The dam currently controls flow and impounds sediment from the upstream watershed. Flows are passed through a 28-inch conduit to the downstream channel until the water surface elevation reaches that of the auxiliary spillway, which helps to reduce total suspended solids and turbidity downstream.

Flow Characteristics
In addition to the above referenced authorities, water quality also considers the following characteristics:

- Substrate;
- Suspended particulates/turbidity;
- Current patterns and water circulation;
- Normal water fluctuations; and
- Salinity gradients (if applicable).

Salinity gradients considerations are not applicable to the analysis area. Although not necessarily captured by the parameters and thresholds triggering CWA classification as impaired, the FRS results in changes to water quality including substrate; suspended particulates (or total suspended solids [TSS])/ turbidity; current patterns and water circulation; and normal water fluctuations all of which can affect habitat suitability for aquatic species.

3.3.6 Wetlands

FRS No. 4 was surveyed for wetlands on August 1 and 2, 2023. Based on desktop review and field investigations, no wetlands were observed within the environmental study area (Study Area) of FRS No. 4. Additionally, based on aerial imagery and NWI mapped features, wetlands downstream of the FRS No. 4 are likely present. Information such as size, functionality, and connectivity on wetlands downstream of the project are unknown.

3.3.7 Air Quality

The EPA designates areas in the U.S. for "attainment" or "non-attainment" of National Ambient Air Quality Standards (NAAQS) which are the maximum permissible concentrations of criteria pollutants that can be present in outdoor air without harming public health or the environment. Areas in attainment are those that meet or exceed the national standard while areas in nonattainment are those that do not meet the national standards for a particular criteria pollutant. The criteria pollutants include nitrogen oxides (NO2), sulfur oxides (SO2), particulate matter (PM), ozone (O3), carbon monoxide (CO), and lead (Pb). According to the EPA's AirData Air Quality Monitors app (EPA 2023), the analysis area is not within an area designated as non-attainment for any of any NAAQSs.

3.3.8 Fish and Wildlife

FRS No. 4 and surrounding area offers both terrestrial and aquatic habitat for fish and wildlife resources. Habitat consists of open water, streams, upland grasses, upland woodlands, and riparian woodlands. Based on Ecological Mapping Systems of Texas, available terrestrial habitat within the project area predominately consists of undeveloped grassland/savannas (approximately 81 acres/29 percent), mesquite shrublands (approximately 83 acres/30 percent), riparian herbaceous (approximately 68 acres/24 percent), and riparian woodlands (approximately 40 acres/14 percent). Additionally, the majority of the FRS No. 4 normal pool (approximately 36.6 acres) provides shallow water habitat with the remaining providing deep-water habitat (approximately 4.0 acres). No terrestrial or aquatic habitats that are a focus for conservation effort or considered key habitat areas for focal species are present within the study area and therefore, these habitats would not be considered significant.

3.3.9 Invasive Species

Executive Order 13122 states that "a Federal agency shall not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction and spread of invasive species in the U.S. or elsewhere."

Invasive plant species have the potential to occur throughout Texas and can establish themselves and then spread aggressively, threatening the existing biodiversity of native plants. According to the Texas Invasives website (Texas Invasives, 2023a), the following invasive plant species have been identified as being particularly worrisome within the Southern Post Oak Savanna ecoregion, in which FRS No. 4 is located:

- Giant reed - *Arundo donax*
- Chinaberry tree - *Melia azedarach*
- Chinese tallow tree - *Triadica sebifera*
- Bermudagrass - *Cynodon dactylon*
- Johnson grass - *Sorghum halepense*
- Japanese honeysuckle - *Lonicera japonica*
- Chinese privet - *Ligustrum sinense*
- Glossy privet - *Ligustrum lucidum*
- Japanese privet - *Ligustrum japonicum*
- Giant salvinia - *Salvinia molesta*
- King Ranch bluestem - *Bothriochloa ischaemum var. songarica*
- Heavenly bamboo - *Nandina domestica*

According to the Texas Invasives website (Texas Invasives, 2023b), the following common invasive wildlife species that have the potential to occur within the project area or in the surrounding watershed include:

- Asian clam - *Corbicula fluminea*
- European Starling - *Sturnus vulgaris*
- Feral pig - *Sus scrofa*
- Nutria - *Myocastor coypus*

3.3.10 Migratory Birds

The Migratory Bird Treaty Act (MBTA) of 1918 makes it illegal to kill, possess, transport, buy, sell, or trade any migratory bird parts, nest, or eggs unless a valid Federal permit is issued. To prevent impacts to migratory birds, construction activities such as clearing and grubbing should be performed outside of the migratory bird breeding season (March 15 through September 15). Texas lies within the Central Flyway Migration Route. Many of the birds that migrate through North America rely on the Central Flyway for its diverse habitats. Migratory birds including songbirds, raptors, and waterfowl may utilize trees, shrubs, and open areas within the FRS No. 4 LOD grassland, shrubland, and woodland habitats for nesting and foraging. USFWS Information for Planning and Consultation (IPaC) resources lists three Birds of Conservation Concern (BCC) species as having the potential to occur within the project area:

- Bald Eagle *(Haliaeetus leucocephalus)*
- Lesser Yellowlegs *(Tringa flavipes)*
- Little Blue Heron *(Egretta caerulea)*

3.3.11 Bald and Golden Eagles

In addition to the MBTA, all Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act and Executive Order 13186. The Act prohibits individuals without a special permit from taking eagle parts, nests, or eggs. The Act defines “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.” In addition to those immediate impacts, the Act also covers impacts that may result from human-induced alterations around nest sites in a manner that may interfere with or interrupts normal breeding, feeding, sheltering habits, and causes injury, death, or nest

abandonment. Bald and Golden Eagles occur throughout the State and therefore have the potential to utilize the site for hunting and/or stopover. However, no Bald or Golden Eagles were observed within the project area during the site visit in August 2023. The TPWD Natural Diversity Database (TPWD, 2022b) does not list any Bald or Golden Eagle nests within two miles of FRS No. 4.

3.3.12 Riparian Areas

Riparian areas are present within the project area. NRCS policy requires integration of riparian area management into all plans and alternatives (GM 190, Park 411). Although Federal Law does not specifically regulate riparian areas, portions of riparian areas, such as wetlands and other waters of the U.S., may be subject to Federal regulation. These riparian areas are located along portions of the reservoir perimeter created by Escondido Creek FRS No. 4. Additional riparian areas are located upstream and downstream of the dam along Doe Branch. Most of the riparian areas downstream of the dam are shrubland and/or herbaceous.

3.3.13 Threatened and Endangered Species

A desktop analysis and field survey were performed to determine the presence of suitable habitat for any threatened, endangered, or candidate plant and animal species within the FRS No. 4 limit of disturbance and normal pool area. Information was obtained from TPWD's Rare, Threatened, and Endangered Species of Texas (TPWD, 2024) and USFWS's IPaC database (USFWS, 2024) concerning the occurrence of state and federally listed species in and surrounding FRS No. 4. Based on the IPaC database, there are no listed plant species with the potential to occur within the limit of disturbance and normal pool area. Additional information, including the IPaC official species list, is included in **Appendix E**, Federal and State Threatened and Endangered Species Assessment (AECOM, 2023).

According to TPWD and USFWS, there are 15 federal and/or state listed wildlife and plant species/subspecies that have potential to or have historically occurred within Karnes County. Federally listed species include the following:

- Piping Plover (*Charadrius melodus*), Federal Threatened/State Threatened;
- Red Knot (*Calidris canutus rufa*), Federal Threatened/ State Threatened;
- Whooping Crane (*Grus americana*), Federal Endangered/State Endangered; and
- Monarch butterfly (*Danaus plexippus*), Federal Candidate.

State listed threatened and endangered species include the following:

- Sheep frog (*Hypopachus variolosus*), Threatened;
- Black Rail (*Laterallus jamaicensis*), Threatened;
- Interior Least Tern (*Sternula antillarum athalassos*), Endangered;
- Swallow-tailed Kite (*Elanodies forficatus)*, Threatened;
- White-faced Ibis (*Plegadis chihi*), Threatened;
- White-tailed Hawk (*Buteo albicaudatus)*, Threatened*;*
- Wood Stork (*Mycteria americana*), Threatened;
- Ocelot (*Leopardus pardalis),* Endangered;
- Texas horned lizard (*Phrynosoma cornutum*), Threatened;
- White-nosed coati (*Nausa narica),* Threatened; and
- Texas tortoise (*Gopherus berlandieri*).

Based on Texas Natural Diversity Database (TXNDD) data received on August 9, 2023, there are no Element of Occurrence (EO) records within FRS No. 4, one EO adjacent to FRS No. 4 for the Burridge

greenthreas (*Thelesperma burridgeanum*), and nine EOs reported within five miles of the FRS No. 4 (see **Appendix E**). The nine EOs within five miles of FRS No. 4 included:

- Five EOs for the Texas horned lizard (*Phrynosoma cornutum*)
- Three EOs for the Tamaulipan spot-tailed earless lizard (*Holbrookia subcaudalis*)
- One EO for the Texas tortoise (*Gopherus berlandieri*)

Field investigations occurred on August 8 and 9, 2023 to assess the potential for suitable habitat at FRS No. 4. Based on field investigations, it was determined that suitable habitat for one federal candidate species, the monarch butterfly, is present within the Study Area. In addition, suitable habitat for three state threatened species including the sheep frog, White-tailed Hawk, and white-nosed coati may be found within the Study Area (see **Appendix E**).

Monarch Butterfly -The monarch butterfly is currently considered a candidate species for listing by USFWS and does not yet have federal protection; however, habitat was assessed as a matter of due diligence. Monarch butterflies are habitat generalists but require milkweed species as larval hosts and a nectar source for adults. The presence of milkweed indicates suitable monarch butterfly habitat. In Texas, monarch butterflies and their eggs and larvae are present from March-June and September-October (TPWD 2016). Milkweeds and nectar plants are known to occur along roadsides and in other disturbed and open areas. Milkweed species were observed within the Study Area. Therefore, suitable habitat for the monarch butterfly may be present throughout the Study Area where milkweed and nectar plants are present.

Sheep Frog - Suitable habitat for the state threatened sheep frog was identified around the aquatic features that contribute to the presence of moist microhabitats as well as within the grasslands and savannas of the Study Area. Based on field investigations, grasslands and savannas occur throughout the Study Area while moist microhabitats were present southwest of the Escondido Creek FRS. No. 4 reservoir and its surrounding areas. Therefore, suitable habitat for the sheep frog may be present within these portions of the Study Area.

White-tailed Hawk - Suitable habitat for the state threatened White-tailed Hawk was identified in the grasslands and savannas throughout the Study Area. Based on field investigations, grasslands and savannas are present surrounding the Escondido Creek FRS No. 4 reservoir as well as northeast and west to southwest of the dam structure within the Study Area. Therefore, suitable habitat for the White-tailed Hawk may be present within the Study Area.

White-nosed Coati - Suitable habitat for the state threatened white-nosed coati was identified in the woodland and riparian corridors throughout the Study Area. Based on field investigations, woodlands and riparian corridors were found in the northern areas downstream of the Escondido Creek FRS No. 4 structure, as well as on the northern and southern portions of the reservoir within the Study Area. Therefore, suitable habitat for the white-nosed coati may be present within the Study Area.

Section 7(a) of the Endangered Species Act (ESA) requires the NRCS, in consultation with and with the assistance of the Secretary of the Interior (USFWS) and/or National Oceanographic and Atmospheric Administration (NOAA), National Marine Fisheries Service, to advance the purposes of the ESA by implemented programs for the conservation of endangered and threatened species, and to ensure that NRCS actions and activities do not jeopardize the continued existence of threatened and endangered species or result in the destruction or adverse modification of the species' critical habitat.

In accordance with Section 12 of PL 566 (as amended) requires the NRCS to notify (USFWS), in effort to provide input and/or consultation, to make surveys and investigations and prepare a report, as they deem appropriate, with recommendations concerning the conservation and development of wildlife resources,

and participate, under arrangements satisfactory to the NRCS, in the preparation of a plan for works of improvement that is acceptable to the local organization and the NRCS. A letter was sent to the USFWS on May 13, 2024, requesting that the agency participate in this project as a cooperating agency. This letter is included in **Appendix A**.

3.3.14 Cultural Resources/Historic Properties

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, requires Federal Agencies to consider the potential impacts and effects of proposed actions and undertakings on historic properties. Historic properties are any prehistoric or historic district, site, building, structure, or objected included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria. Consultation with the State Historic Preservation Officer (SHPO)/Texas Historical Commission (THC), Tribal Historic Preservation Offices (THPOs), and Federally Recognized Tribes (FRTs), as appropriate, is required when an agency action may alter the characteristics that qualify a historic property for inclusion in the NRHP and has been documented in **Appendix A.**

Section 106 of the National Historic Preservation Act

NRCS determined the area of potential effect (APE) through identification studies and consultation with SHPO/THC by submission of a survey research design, which defined the APE as the geographic area or areas within which Federal agency planned actions or activities (undertakings) may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertakings. The APE includes all borrow, fill or temporary storage areas, access roads, and any other lands that would be directly or indirectly affected by the proposed undertaking. The direct APE includes the areas of potential ground disturbance (using the maximum possible extent of ground disturbance). The indirect APE is the viewshed from any identified historic resource to the proposed undertaking. The viewshed includes all the visible area in the line of sight of the project and excludes areas obstructed by terrain or other features. The direct APE for FRS No. 4 was determined by NRCS, in consultation with the SHPO/THC, as a 278-acre study area encompassing the dam embankment and proposed modification areas, and likely staging areas, haul roads, and borrow sources. The indirect APE was determined by NRCS, in consultation with the SHPO/THC, as extending 600 feet from the direct APE.

A cultural resources desktop review was performed in August 2023. The desktop review included a search of archeological records available on the Texas Archeological Sites Atlas, maintained by the THC, to determine if any previously recorded cultural resources sites, including archeological sites, historic properties, cemeteries, or State Antiquities Landmarks (SALs), were located within one kilometer of the direct APE. The desktop review revealed no previous cultural resources sites within this search area.

Following consultation between NRCS and the SHPO/THC initiated on August 11, 2023, NRCS and the SHPO/THC agreed that a cultural resources survey should be conducted in all areas of disturbance associated with potential rehabilitation measures. A cultural resources survey of the APE was completed on October 2, 2023, under Texas Antiquities Permit No. 31324. No archeological sites were identified during the survey. However, three historic-age resources, including a farmstead, a metal shed structure, and the FRS No. 4 dam and related structures, were evaluated by an architectural historian. In a letter to SHPO/THC, dated December 13, 2023, NRCS determined that no historic-age resources in the APE are eligible for listing in the NRHP, and that there will be no effect to historic properties with the proposed work. SHPO/THC concurred with NRCS's determination on January 5, 2024, that no historic properties are present or would be affected by the proposed project (**Appendix E**).

The following Tribal Nations have a stated interest in ancestral lands and might attach religious or cultural significance to historic properties or have claims to land areas within Karnes County, Texas: Alabama Coushatta Tribe of Texas; the Apache Tribe of Oklahoma; the Comanche Nation of Oklahoma; the Mescalero Apache Tribe of the Mescalero Reservation, New Mexico; and the Tonkawa Tribe of Indians of Oklahoma. NRCS initiated consultation with each of these tribes by email on December 20, 2023 (**Appendix A**). The tribes were sent invitations to participate in consultation via certified mail as well as email, but none expressed interest in participating. In an email to the Tribal Nations, dated July 9, 2024, NRCS determined that there will be no effect to historic properties with the proposed work. Coordination was officially concluded on August 10, 2024, following adequate opportunity for Tribal review of NRCS's determinations of eligibility and effect (**Appendix A**).

According to NRCS General Manual 420, Part 401 guidance, NRCS has consulted with the Texas SHPO and relevant Tribal Nations to determine what cultural resource investigations must be undertaken.

National Historic Landmarks Program

The National Parks Services (NPS) National Historic Landmarks Program identifies nationally significant historic places or properties designated by the Secretary of the Interior and listed in the NRHP. These places or properties possess a high degree of historic integrity, which can be defined as the ability of a place or property to convey its historical associations or attributes (NPS, 2021).

Per the NPS's National Historic Landmarks Program website, there are no National Historic Landmarks listed in Karnes County, Texas. Therefore, the National Historic Landmarks Program is not applicable to the project's affected environment and will not be carried forward for impact analysis in the Environmental Consequences section.

3.3.15 Land Use

The total drainage area above FRS No. 4 is 10.86 square miles, comprised of 4.56 square miles controlled above FRS No. 3 and 6.30 square miles uncontrolled above FRS No. 4. The drainage areas were derived using ArcMap 10.8 (ESRI, 2020), the Arc Hydro tool for automatic delineation, and LiDAR topography (TNRIS, 2019). Automatic ArcMap delineations were checked and edited as necessary against the LiDAR topography. The land use/land cover data were extracted from the 2019 National Land Cover Dataset (NLCD) (2021) and then major roadways/right-of-way (ROW) were overlain from Karnes County parcel data. Minor hand edits were made to better capture the different land use assignments based on the most recent imagery. There has been noticeable growth in Eagle Ford shale gas fracking seen by the presence of well pads scattered throughout the Escondido Creek watershed, including the Doe Branch subwatershed. **Table 3-1** lists the land uses in the watershed areas upstream of FRS No. 3, FRS No. 4, as well as in the project benefit area below FRS No. 4. **Figure C-2** and **Figure C-3** in **Appendix C** contain land use maps of the upstream contributing watersheds and the downstream benefit area, respectively.

Table 3-1. Existing Land Use

Land Cover Type	Controlled Drainage Area Above FRS No. 3		Controlled Drainage Area Above FRS No. 4		Project Benefit Area Below FRS No. 4[a]	
	(acres)	(%)	(acres)	(%)	(acres)	(%)
Barren Land	8.6	0.3%	4.4	0.1%	0.3	0.0%
Cultivated Crops	4.2	0.1%	122.5	3.0%	352.8	9.2%
Deciduous Forest	0.0	0.0%	7.3	0.2%	314.8	8.2%
Developed, High Intensity	11.7	0.4%	28.3	0.7%	27.6	0.7%
Developed, Low Intensity	30.0	1.0%	64.3	1.6%	137.8	3.6%

Land Cover Type	Controlled Drainage Area Above FRS No. 3		Controlled Drainage Area Above FRS No. 4		Project Benefit Area Below FRS No. 4[a]	
	(acres)	(%)	(acres)	(%)	(acres)	(%)
Developed, Medium Intensity	26.0	0.9%	83.8	2.1%	101.3	2.7%
Developed, Open Space	13.2	0.5%	56.4	1.4%	106.8	2.8%
Emergent Herbaceous Wetlands	9.3	0.3%	11.3	0.3%	5.3	0.1%
Evergreen Forest	0.0	0.0%	0.7	0.0%	20.0	0.5%
Hay/Pasture	1552.4	53.2%	2014.1	49.9%	837.1	21.9%
Herbaceous	6.7	0.2%	2.4	0.1%	14.5	0.4%
Mixed Forest	0.0	0.0%	31.8	0.8%	385.0	10.1%
Open Water	36.7	1.3%	25.8	0.6%	14.0	0.4%
Roads	43.5	1.5%	82.0	2.0%	124.4	3.3%
Shrub/Scrub	1161.2	39.8%	1451.5	36.0%	863.4	22.6%
Woody Wetlands	14.0	0.5%	45.6	1.1%	514.4	13.5%
Total	**2917.5**	**100.0%**	**4032.4**	**100.0%**	**3819.5**	**100.0%**

[a] Acreages were estimated within project benefit area below FRS No. 4 from the structure to the downstream limit of study as depicted on **Appendix C**, **Figure C-3**.

3.3.16 Public Health and Safety

The dam is currently classified as a high hazard potential dam by NRCS and TCEQ and does not meet NRCS or TCEQ criteria for a high hazard potential dam. A sunny day dam breach analysis indicates that numerous structures could be impacted by a catastrophic breach of FRS No. 4. A catastrophic breach would result in a PAR of 278, including individuals in eight mobile homes, 52 homes, eight commercial buildings, one school outbuilding, and 24 roads including minor state highways and main local roads.

During the FBH storm event, FRS No. 3 can safely pass the FBH storm events without overtopping; therefore, the FBH storm event breach of FRS No. 3 to FRS No. 4 was not evaluated.

The dam currently provides floodwater damage reduction for downstream habitable structures and infrastructure. Without the dam in place, floodwaters from a 1% AEP storm event would increase the number of total habitable structures flooded above the FFE from 65 to 117, including 83 homes, 11 mobile homes, and 23 commercial buildings. The 1% AEP would also result in increased flooding on five evaluated roadways, including FM 2102, North 5th Street, Helena Rd, County Road 331, and a private road as well as minor residential local roads.

3.3.17 Social Issues

FRS No. 4 was constructed in 1957 and has provided flood prevention benefits to the downstream population since construction. As such, this dam has been in place for a majority or the entirety of the lives of the downstream residents and has established the perceived existing condition for the protected or potentially affected population.

3.3.18 Scoped Ecosystem Services of Concern

Provisioning

Provisioning services are tangible goods provided for direct human use and consumption. The sole provisioning services present within the FRS No. 4 impoundment area and the downstream benefitted area result from cultivated cropland and hay/pasture areas. Land cover types classified as cultivated crops and hay/pasture comprise 9.2% and 21.9%, respectively, of the benefitted area downstream of FRS No. 4. Based on review of aerial imagery, some of these areas appear to be actively farmed and currently provide provisioning services through production of food crops, animal feed crops, and fiber crops. Hence, these areas produce direct benefits from harvested values as well as indirectly contributing to the production of meat products. Land cover types classified as forest are found within the benefitted area and these areas

could provide provisioning services if they were used for paper and fiber, although these areas do not appear to be actively used for this purpose. FRS No. 4 and the benefitted area downstream of FRS No. 4 contain freshwater reservoirs, creeks, ponds, and ditches which could be used for provisioning services, but these are not drinking water sources and therefore not considered a provisioning service.

Regulating

Regulating services maintain a world in which it is possible for people to live by providing critical benefits that buffer against environmental catastrophe. The FRS No. 4 impoundment area and stream systems present within the downstream benefitted area are the predominant drivers of regulating ecosystem service benefits. Aquatic vegetation and wetlands within these systems filter flowing water, removing harmful contaminants, and improving habitat quality for plant and animal species. The FRS No. 4 impoundment area and downstream wetlands and aquatic vegetation also serve to attenuate flood flows by slowing runoff and absorbing excess water.

Cultural

Cultural services make the world a place in which people want to live by providing for recreational use, spiritual value, aesthetic viewsheds, or tribal values. The drainage area upstream of FRS No. 4 and the benefitted area downstream of FRS No. 4 provide aesthetic viewsheds. NRCS has identified five tribal nations with ancestral land, traditional use, and/or traditional cultural property claims within Karnes County.

4.0 ALTERNATIVE FORMULATION

The alternatives were developed with the stated objectives in mind: 1) modify the dam to comply with NRCS dam safety criteria, 2) modify the dam to comply with TCEQ dam safety criteria, and 3) address flooding problems for downstream properties in a manner that takes into consideration economic, social, and environmental goals. These objectives can be achieved by installing dam rehabilitation measures, decommissioning the dam and providing mitigation, or by removing structures at risk from breach of the dam. Through implementation of a viable alternative, the risks to life and property from a potential catastrophic dam failure would be mitigated.

All cost estimates provided in this report shall be considered as preliminary "order of magnitude" cost estimates. It is assumed that a more thorough cost estimate will be completed for the selected alternative during the design phase. All cost estimates are based on 2024 dollars and should be inflated accordingly to determine the estimated cost of these improvements in future years.

4.1 Formulation Process

Formulation of the alternative rehabilitation plan for Escondido Creek Watershed FRS No. 4 followed procedures outlined in the NRCS *National Watershed Program Manual* (NWPM) (USDA-NRCS 2015) and the NRCS National Watershed Program Handbook (USDA-NRCS, 2014). Other guidance incorporated into the formulation process included the Principles and Requirements for Federal Investments in Water Resources (U.S. Council on Environmental Quality (CEQ), 2013) and Interagency Guidelines for Principles and Requirements for Federal Investments in Water Resources (U.S. CEQ, 2014) (documents collectively referred to as Principles, Requirements, and Guidelines [PR&G]), Departmental Regulation 9500-013 (USDA 2017a), Departmental Manual 9500-013 (USDA 2017b), and other NRCS watershed planning policies. Alternatives eligible for financial assistance under the Watershed Protection and Flood Prevention Act (PL 83-566), as amended (16 U.S.C. Sections 1001 to 1008, 1010, and 1012) are so identified.

The formulation process began with discussions between the Sponsors and NRCS. Alternative plans of action were developed based on NRCS planning requirements and the ability of the alternatives to bring FRS No. 4 up to date with current safety and design criteria and performance standards, resolve existing safety deficiencies, and address the Sponsors' concerns since the dam does not meet criteria for a high hazard potential dam.

The alternatives that were considered for FRS No. 4 in the development and identification of the selected alternative were:

- No Action – Dam Remains until Failure
- Proposed Action – Dam Decommissioning
- Proposed Action – Low Hazard Potential Rehabilitation: Rehabilitate dam to meet current low hazard potential criteria and perform non-structural measures to reduce risk in the breach zone, e.g., relocating structures; and
- Proposed Action – Significant Hazard Potential Rehabilitation: Rehabilitate dam to meet current significant hazard potential criteria and perform non-structural measures to reduce risk in the breach zone, e.g., relocating structures; and
- Proposed Action – High Hazard Potential Rehabilitation: Rehabilitate and upgrade dam to meet current high hazard potential criteria.

4.2 Alternatives Considered but Eliminated from Detailed Study

Some of the alternatives considered in the planning process were eliminated from detailed evaluation because these alternatives either did not meet the purpose or need for federal action, they were logistically impractical to implement, and/or the cost was higher relative to similar design alternatives. These alternatives for FRS No. 4 are described below.

4.2.1 Low Hazard Potential Reclassification and Rehabilitation

Reclassification of FRS No. 4 to a low hazard potential dam considers the purchase of deed restrictions for all areas within the breach inundation area where an easement does not already exist (433 acres of agricultural land and 873 acres of other lands), removal of 115 habitable structures downstream of FRS No. 4 within the breach inundation area, and structural modifications to the dam to meet current NRCS standards for a low hazard potential dam. These measures would remove the PAR within the breach inundation area, prevent future development within the breach inundation area that could result in a change to the hazard classification of the dam, and would bring the dam up to current NRCS standards for a low hazard potential dam.

Structural modifications to the dam that would be required to meet current NRCS standards for a low hazard potential dam would include:

- Remove the existing principal spillway system;
- Install a new principal spillway system consisting of a standard inlet tower with crest at elevation 317.2 feet, two 10-inch by 10-inch low level ports at elevation 312.72 feet, and a 36-inch RCP conduit discharging into an impact basin;
- Provide at least 50 years of future sediment storage; and
- Flatten downstream embankment slope to 3H:1V

This alternative meets the purpose and need of the Project but is not considered feasible due to 1) the disruption to community cohesion because of home buyouts and 2) the high costs associated with property acquisition and easement purchases to restrict future development. The low hazard alternative is estimated to cost $2.8 million in installation costs including design, permitting, and contingency to bring the dam up to low hazard potential design criteria. Property acquisitions and the purchase of easements that would be required for reclassification of the dam to low hazard potential and to prevent future development that could result in the future reclassification of the dam are estimated to cost an additional $22 million for a total cost of $24.8 million. This alternative was eliminated from further evaluation due to high cost relative to other high hazard rehabilitation options coupled with extensive community disruption.

4.2.2 Significant Hazard Potential Reclassification and Rehabilitation

Reclassification of FRS No. 4 to a significant hazard potential dam considers the purchase of deed restrictions for all areas within the breach inundation area where an easement does not already exist (433 acres of agricultural land and 873 acres of other lands), removal of 115 habitable structures downstream of FRS No. 4 within the breach inundation area, and structural modifications to the dam to meet current NRCS standards for a significant hazard potential dam. These measures would remove the PAR within the breach inundation area, prevent future development within the breach inundation area that could result in a change to the hazard classification of the dam, and would bring the dam up to current NRCS standards for a significant hazard potential dam. Varying combinations of structural upgrades to the dam to meet TR-210-60 significant hazard potential criteria were considered, but in general would include modifications similar to those required for a low hazard potential dam.

This alternative meets the purpose and need of the Project but is not considered feasible due to 1) the disruption to community cohesion because of home relocations and 2) the high costs associated with property acquisition and easement purchases to restrict future development. The significant hazard alternative is estimated to cost at least $2.8 million in installation costs, including design, permitting, and contingency to bring the dam up to significant hazard potential design criteria. Property acquisitions and the purchase of easements that would be required for reclassification of the dam to low hazard potential and to prevent future development that could result in the future reclassification of the dam are estimated to cost an additional $22 million for a total cost of $24.8 million. This alternative was eliminated from further evaluation due to high cost relative to other high hazard rehabilitation options coupled with extensive community disruption.

4.2.3 Dam Rehabilitation with Varying Auxiliary Spillways Configurations

The dam rehabilitation scenarios carried through to detailed analysis as presented in **Section 4.3.3** through **Section 4.3.5** were selected after initial analysis of multiple configurations of rehabilitated principal spillway conduit size; addition of a structural overtopping auxiliary spillway over the existing embankment; installation of a cutoff wall to prevent breaching and raising of the vegetated auxiliary spillway crest; installation of articulated concrete block (ACB) on auxiliary spillway; and addition of a third vegetated spillway bay and raising of the vegetated spillway crest; and corresponding top of dam raise.

A 100-year evaluated life and 103-year period of analysis were established. The principal spillway conduit size of 42 inches was selected for the evaluated alternatives based upon the need to: a) safely pass the 100-year PSH; b) achieve a drawdown period less than 10 days; and c) keep the proposed auxiliary spillway crest minimized to the extent possible (within approximately 2.0 feet of the as-built elevation) due to performance considerations of excessive fill placement within an existing vegetated channel and resulting integrity performance, and d) to minimize the sponsor's need for additional land rights above their existing easement elevation. The high hazard potential configurations presented in **Section 4.3** for FRS No. 4 best meet these objectives. The other configurations were eliminated from detailed study due to higher costs and would have similar impacts and benefits as the configurations selected for detailed analysis. **Table 4-1** shows the configurations that were considered for the Escondido Creek Watershed FRS No. 4 study but eliminated from detailed study.

Table 4-1. High Hazard Rehabilitation Design Options Eliminated from Detailed Study

Alt.	Principal Spillway		Vegetated Auxiliary Spillway							RCC Stepped Auxiliary Spillway		Top of Dam[1]	
	Pipe Size	Crest Elevation	Spillway Width			Elevation			Raised Height (From As-built)	Spillway Width	Crest Elevation	Elevation	Raised Height
			Left Bay	Right Bay	Third Bay	Crest Elevation Left Bay	Crest Elevation Right Bay	Crest Elevation Third Bay	Crest Elevation				
	[in]	[ft]	[ft]	[ft]	[ft]	[ft]	[ft]	[ft]	[ft]	[ft]	[ft]	[ft]	[ft]
As-Built	28	317.22	250	250	-	328.02	328.02	-	-	-	-	333.12	-
Existing	28	317.22	250	250	-	328.29	328.34	-	-	-	-	333.12	-
A	42	317.2	250[2,3]	250[3]	-	329.5	329.5	-	1.48	-	-	336.4	3.28
B	42	317.2	250[2,3]	250[3]	250[3]	329.5	329.5	329.5	1.48	-	-	336.3	3.18
D	42	317.2	250[3]	250	-	329	329	-	0.98	250	328.3	335.5	2.38
I	42	317.2	-	250[3]	250[3]	--	329.5	329.5	1.48	-	-	336.5	3.38
J	42	317.2	-	250	250	--	329.2	329.2	1.18	200	328.5	335.8	2.68

1. Top of dam elevation includes a preliminary estimate of wave height added to the auxiliary spillway hydrograph peak WSE.
2. Tangent Pile Drilled Shaft cutoff wall included in left bay at a depth of 39 feet.
3. ACB added to auxiliary spillway for stability.

4.3 Description of Alternatives Considered for Detailed Analysis

4.3.1 Alternative 1 – No Action – Dam Remains until Failure

The No Action alternative documents baseline conditions against which all other alternatives are analyzed. It does not involve federal action or federal investment and assumes that the existing dam would remain in place without any action that would improve the dam from its original design or correct safety deficiencies beyond maintenance or replacements performed in accordance with the dam operations and maintenance plan. It is assumed that the dam will eventually fail and not be subsequently rebuilt or rehabilitated.

The most likely failure modes for FRS No. 4 are hydrologic failure (overtopping) and spillway integrity failure (breach of the auxiliary spillway). The probability of failure of these events was estimated by reducing the FBH rainfall in inches until it reached the minimum value that would cause each type of failure. Frequency rainfall events were plotted and a power function trendline equation was used to estimate the return interval for the rainfall event that would result in each failure type. The two types of failure modes were evaluated and the most probable is hydrologic failure, which is estimated to occur during the 69.4% PMP (FBH), or a return interval of 3,572-years. Note that during the FBH storm event, FRS No. 3 can safely pass the FBH storm events without overtopping; therefore, the FBH storm event breach of FRS No. 3 to FRS No. 4 was not evaluated for Alternative 1.

Catastrophic sunny day dam failure could result inundation above the FFE elevation and damages to 81 habitable structures, 24 downstream roads, and agricultural lands. Catastrophic sunny day failure would pose a significant risk of loss of life and an estimated $4,151,000 of damages.

Following catastrophic failure of the dam, downstream flooding conditions would be similar to those that existed prior to the construction of the dam. Existing and proposed floodplains were mapped approximately 14.5 miles downstream of FRS No. 4. Since the 1% AEP floodplain downstream would be enlarged due to the absence of flood prevention, future downstream development within the expanded floodplain would be restricted by development regulations. In the existing condition, floodwaters from a 1% AEP storm event would result in the inundation (above the FFE elevation) of 53 homes, three mobile homes, and nine commercial buildings. Following catastrophic breach, floodwaters from a 1% AEP storm event would result in the inundation (above the FFE elevation) of 83 homes, 11 mobile homes, and 23 commercial buildings and would overtop FM 2102 by 1.51 feet (versus 0.09 feet in existing conditions), N 5th Street by 2.55 feet (versus 0.53 feet in existing condition), Helena Rd by 2.22 feet (versus 0.46 feet in existing conditions), County Road 331 by 14.25 feet (versus 13.1 feet in existing conditions), and a private road by 12.7 feet (versus 12.1 feet in existing conditions).

The average annual damages associated with Alternative 1 are $189,000.

4.3.2 Alternative 2 – Proposed Action – Decommission

Alternative 2 involves federal action and consists of removing the storage function of the dam and reconnecting, restoring, and stabilizing the upstream reservoir area/sediment pool and downstream floodplain functions. Although complete removal of the embankment is sometimes required for decommissioning, only partial removal of the embankment was evaluated in this alternative. Partial removal of the embankment would consist of excavating a breach in the dam embankment with a 150-foot bottom width to safely pass the 1% AEP flood. A grade stabilization structure would be installed to stabilize sediment and prevent stream headcutting. To not impede flows through the breached embankment, the principal spillway components would also be removed.

The remaining portion of the embankment and the land currently covered by the sediment pool would be maintained as a greenbelt area. The excavated material (about 33,500 cubic yards) would be placed in the

sediment and detention pool areas and all exposed areas would be vegetated as needed for erosion control (approximately 30 acres). Channel work would be performed to reconnect the stream channel through the sediment pool. Riparian vegetation would be established along the stream channel (approximately 2.5 acres). Construction activities will require that a SWPPP be in effect.

If non-structural mitigation measures are not implemented downstream for the decommissioning alternative, downstream flooding conditions from a 1% AEP, 24-hour storm would be the same as those described for Alternative 1 - FWOFI with regard to increased flooding on roadways and structures, following catastrophic breach of the dam. Existing and proposed floodplains were mapped approximately 14.5 miles downstream of FRS No. 4, ending at the confluence of the Escondido Creek with the San Antonio River. Non-structural mitigation measures include 1) property acquisition for three residential structures and one recreational structure that would be flooded above the FFE in the 10% AEP event, 2) raising of 26 residential structures above the 0.2% AEP floodplain, 3) relocation of two mobile homes, and 4) floodproofing of seven other non-residential habitable structures. The number of habitable structures (commercial buildings, homes, and mobile homes) inundated above the FFE during the modeled 1% AEP, 24-hour storm event would increase from 65 to 77 structures. Floodwaters from a 1% AEP, 24-hour flood would also cause increased flooding on five roads (**Table 4-2**).

Alternative 2 would increase the average annual damages from $189,000 to $216,000. The estimated cost to decommission the dam is $3,251,000. Additional costs for the non-structural mitigation measures are estimated to be $4,390,000 for a total alternative cost of $7,641,000. A conceptual figure is included as **Appendix C, Figure C-7**.

4.3.3 Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450’ RCC Stepped Spillway

Alternative 3 consists of the following components:

- Remove the existing principal spillway system;
- Install a new principal spillway system consisting of a standard inlet tower with crest at elevation 317.2 feet, two 10-inch by 10-inch low level ports at elevation 312.7 feet, and a 42-inch RCP conduit discharging an impact basin;
- Install a 450-feet wide RCC-step structural spillway over the existing embankment with crest set above the 50-year PSH elevation at 328.5 feet and discharging into a concrete stilling basin;
- Regrade inlet and outlet channel of the existing vegetated auxiliary spillway and raise left bay and right bay crests to the 100-year PSH elevation of 329.0 feet (0.98 feet raise from as-built);
- Flatten downstream embankment slope to 3H:1V;
- Abandon existing trench drain and install new toe drain at downstream toe;
- Install upstream dam embankment slope riprap; and
- Raise top of dam elevation to 335.4 feet (2.28 feet raise) and extend cutoff trench below extended dam embankment.

Note that during the FBH evaluation of FRS No. 4, upstream FRS No. 3 can safely pass the FBH storm events without overtopping. Therefore, FRS No. 3 was not breached during the concept design evaluation of FRS No. 4 and was evaluated as remaining in the existing condition.

The elevation of the RCC-step structural spillway was set between the 50-year and 100-year PSH peak water surface elevation (WSE) with consideration of the peak flow during the 100-year PSH event. The discharge from the dam with the RCC-step crest set at 328.5 feet will keep both the 100-year PSH and the 1% AEP, 24-hour event dam outflows less than the existing condition. Note that this alternative is

dependent upon using a vegetal retardance curve index (C_i) of 6.6 versus the standard design value of 5.6 for stability modeling in the left bay only. Use of this adjusted coefficient requires excellent maintenance of the auxiliary spillway vegetative cover. For all frequency storm events, the peak flow will slightly increase throughout the modeled downstream reach due to the increased discharge from the larger 42-inch versus the existing 28-inch conduit. No additional habitable structures will be flooded. Induced flooding impacts to roadways during the 50%, 1%, and 0.2% AEP event for Alternative 3 are provided in **Table 4-2**. The maximum increase over any roadway for the evaluated storm events is 0.13 feet.

Based on an estimated sedimentation rate of 2.87 acre-feet per year (rationale provided in **Section 3.2.2)**, 100 years of future submerged sediment storage would require 286.9 acre-feet. To account for an additional 11 years of sedimentation between the 2019 LiDAR collection utilized for the sedimentation rate estimation and the estimated rehabilitation construction completion year (2019 to 2029), the total minimum submerged sediment storage volume needed is 319.0 acre-feet. The estimated available storage between the water surface elevation and the as-built principal spillway crest indicates that 356.7 acre-feet of storage is available below the principal spillway crest, indicating there is sufficient storage for future design life of 100 years.

During construction, BMPs would be utilized to avoid and minimize any potential adverse impacts. Construction activities would require that a SWPPP be in effect. All disturbed areas would be revegetated using adapted and/or non-invasive native species. No compensatory mitigation would be required from implementation of this alternative. No change in reservoir or downstream operation would result from this alternative.

Alternative 3 would increase the average annual damages slightly from $189,000 to $196,000. The cost of this alternative is $21,207,000 and a conceptual figure is included as **Appendix C, Figure C-8**.

Table 4-2. Alternative 2 Roadway Increased Flooding and Alternative 3 Roadway Induced Flooding During 50%, 1%, and 0.2% AEP Events

Road Segment Alternative 2	Orientation to Creek	Annual Average Daily Traffic (AADT)	Depth Overtop Existing Condition (ft)			Depth Overtop Decommission Alt. 2 (ft)			Depth of Overtopping Difference (ft)		
			50%	1%	0.2%	50%	1%	0.2%	50%	1%	0.2%
Doe Branch											
FM 2102	Perpendicular	946	0	0.09	1.65	0	1.51	2.08	0	1.42	0.43
Escondido Creek											
US 181	Perpendicular	14986	0	0	2.64	0	0	2.72	0	0	0.08
N 5th St	Perpendicular	3812	0	0.53	3.67	0	2.55	3.90	0	2.02	0.23
Helena Rd	Perpendicular	2672	0	0.46	4.87	0	2.22	5.08	0	1.76	0.21
CR 331[1]	Perpendicular	NA	6.07	13.10	17.34	6.66	14.25	17.70	0.59	1.12	0.36
Private Rd[1]	Perpendicular	NA	4.86	12.10	14.09	5.64	12.70	14.26	0.78	0.58	0.17
W Main St	Parallel	6823	0	0	1.57	0	0	1.79	0	0	0.23
SH 72 at Helena Rd	Parallel	4254	0	0	0.47	0	0	0.68	0	0	0.21
SH 72 East	Parallel	4710	0	0	2.78	0	0	3.16	0	0	0.38

Road Segment Alternative 3	Orientation to Creek	Annual Average Daily Traffic (AADT)	Depth Overtop Existing Condition (ft)			Depth Overtop High Hazard Alt. 3 (ft)			Depth of Overtopping Difference (ft)		
			50%	1%	0.2%	50%	1%	0.2%	50%	1%	0.2%
Doe Branch											
FM 2102	Perpendicular	946	0	0.09	1.65	0	0	1.77	0	-0.10	0.12
Escondido Creek											
US 181	Perpendicular	14986	0	0	2.64	0	0	2.72	0	0	0.08
N 5th St	Perpendicular	3812	0	0.53	3.67	0	0.59	3.74	0	0.06	0.07
Helena Rd	Perpendicular	2672	0	0.46	4.87	0	0.49	4.93	0	0.03	0.06
CR 331[1]	Perpendicular	NA	6.07	13.1	17.34	6.18	13.20	17.41	0.11	0.02	0.07
Private Rd[1]	Perpendicular	NA	4.86	12.1	14.09	4.99	12.10	14.12	0.13	-0.04	0.03
W Main St	Parallel	6823	0	0	1.57	0	0	1.62	0	0	0.06
SH 72 at Helena Rd	Parallel	4254	0	0	0.47	0	0	0.53	0	0	0.06
SH 72 East	Parallel	4710	0	0	2.78	0	0	2.85	0	0	0.07

1. Low water crossing

4.3.4 Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway

Alternative 4 consists of the following components:

- Remove the existing principal spillway system;
- Install a new principal spillway system consisting of a standard inlet tower with crest at elevation 317.2 feet, two 10-inch by 10-inch low level ports at elevation 312.7 feet, and a 42-inch RCP conduit discharging into an impact basin;
- Install a 630-feet wide RCC stepped structural spillway over the existing embankment with crest set above the 50-year PSH elevation at 328.7 feet and discharging into a concrete stilling basin;
- Regrade inlet and outlet channel of the existing vegetated auxiliary spillway and raise left bay and right bay crests to the 100-year PSH elevation of 329.2 feet (1.18 feet raise from as-built);
- Flatten downstream embankment slope to 3H:1V;
- Abandon existing trench drain and install new toe drain at downstream toe;
- Install upstream dam embankment slope riprap; and
- Raise top of dam elevation to 335.4 feet (2.28 feet raise) and extend cutoff trench below extended dam embankment.

Note that during the FBH evaluation of FRS No. 4, upstream FRS No. 3 can safely pass the FBH storm events without overtopping. Therefore, FRS No. 3 was not breached during the concept design evaluation of FRS No. 4 and was evaluated as remaining in the existing condition.

The elevation of the RCC stepped structural spillway was set between the 50-year and 100-year PSH peak water surface elevation (WSE) with consideration of the peak flow during the 100-year PSH event. The discharge from the dam with the RCC crest set at 328.7 feet will keep both the 100-year PSH and the 1% AEP, 24-hour event dam outflows less than the existing condition. For all frequency storm events, the peak flow will slightly increase downstream throughout the modeled reach due to the increased discharge from the new, larger 42-inch versus the existing 28-inch conduit. No additional habitable structures will be flooded. Induced flooding impacts to roadways during the 50%, 1%, and 0.2% AEP event for Alternative 3 are provided in **Table 4-3**. The maximum increase over any roadway for the evaluated storm events is 0.17 feet.

Based on an estimated sedimentation rate of 2.87 acre-feet per year (rationale provided in **Section 3.2.2)**, 100 years of future submerged sediment storage would require 286.9 acre-feet. To account for an additional 11 years of sedimentation between the 2019 LiDAR collection utilized for the sedimentation rate estimation and the estimated rehabilitation construction completion year (2019 to 2029), the total minimum submerged sediment storage volume needed is 319.0 acre-feet. The estimated available storage between the water surface elevation and the as-built principal spillway crest indicates that 356.7 acre-feet of storage is available below the principal spillway crest, indicating there is sufficient storage for future design life of 100 years.

During construction, BMPs would be utilized to avoid and minimize any potential adverse impacts. Construction activities would require that a SWPPP be in effect. All disturbed areas would be revegetated using adapted and/or non-invasive native species. No compensatory mitigation would be required from implementation of this alternative. No change in reservoir or downstream operation would result from this alternative.

Alternative 4 would increase the average annual damages slightly from $189,000 to $195,000. The cost of this alternative is $26,467,000 and a conceptual figure is included as **Appendix C, Figure C-9**.

4.3.5 Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway

Alternative 5 consists of the following components:

- Remove the existing principal spillway system;
- Install a new principal spillway system consisting of a standard inlet tower with crest at elevation 317.2 feet, two 10-inch by 10-inch low level ports at elevation 312.7 feet, and a 42-inch RCP conduit discharging into an impact basin;
- Install a 150-feet wide, five-cycle labyrinth weir structural spillway over the existing embankment with crest set above the 50-year PSH elevation at 328.7 feet and concrete chute discharging into a concrete stilling basin;
- Regrade inlet and outlet channel of the existing vegetated auxiliary spillway and raise left bay and right bay crests to the 100-year PSH elevation of 329.2 feet (1.18 feet raise from as-built);
- Flatten downstream embankment slope to 3H:1V;
- Abandon existing trench drain and install new toe drain at downstream toe;
- Install upstream dam embankment slope riprap; and
- Raise top of dam elevation to 335.3 feet (2.18 feet raise) and extend cutoff trench below extended dam embankment.

Note that during the FBH evaluation of FRS No. 4, upstream FRS No. 3 can safely pass the FBH storm events without overtopping. Therefore, FRS No. 3 was not breached during the concept design evaluation of FRS No. 4 and was evaluated as remaining in the existing condition.

The elevation of the labyrinth weir structural spillway was set between the 50-year and 100-year PSH peak WSE with consideration of the peak flow during the 100-year PSH event. The dam discharge with the labyrinth weir crest at 328.7 feet will keep the 100-year PSH peak flows out of the dam less than the existing condition. The 1% AEP, 24-hour event will be nearly the same as the existing condition (2.1 cfs higher). For all frequency storm events, the peak flow will slightly increase downstream throughout the modeled reach due to the increased discharge from the new, larger 42-inch versus the existing 28-inch conduit. No additional habitable structures will be flooded. Induced flooding impacts to roadways during the 50%, 1%, and 0.2% AEP event for Alternative 4 are provided in **Table 4-3**. The maximum increase over any roadway for the evaluated storm events is 0.15 feet.

Based on an estimated sedimentation rate of 2.87 acre-feet per year (rationale provided in **Section 3.2.2)**, 100 years of future submerged sediment storage would require 286.9 acre-feet. To account for an additional 11 years of sedimentation between the 2019 LiDAR collection utilized for the sedimentation rate estimation and the estimated rehabilitation construction completion year (2019 to 2029), the total minimum submerged sediment storage volume needed is 319.0 acre-feet. The estimated available storage between the water surface elevation and the as-built principal spillway crest indicates that 356.7 acre-feet of storage is available below the principal spillway crest, indicating there is sufficient storage for future design life of 100 years.

During construction, BMPs would be utilized to avoid and minimize any potential adverse impacts. Construction activities would require that a SWPPP be in effect. All disturbed areas would be revegetated using adapted and/or non-invasive native species. No compensatory mitigation would be required from implementation of this alternative. No change in reservoir or downstream operation would result from this alternative.

Alternative 5 would increase the average annual damages slightly from $189,000 to $196,000. The cost of this alternative is $17,924,000 and a conceptual figure is included as **Appendix C, Figure C-10**.

4.4 Comparison of Alternatives

Table 4-4 provides a comparison of the social, environmental, and economic impacts and benefits of each of the considered alternatives. **Table 4-5** provides a summary of the impacts and benefits of the considered alternatives in the context of the Guiding Principles from the PR&G.

Based up on the comparisons below, Alternative 5 is the federally supported plan and the recommended plan. NRCS and the Sponsors are in agreement on the recommended plan. Further discussion is included in **Section 7.1**.

Table 4-3. Alternative 4 and Alternative 5 Roadway Induced Flooding During 50%, 1%, and 0.2% AEP Events

Road Segment Alternative 4	Orientation to Creek	Annual Average Daily Traffic (AADT)	Depth Overtop Existing Condition (ft)			Depth Overtop High Hazard Alt. 4 (ft)			Depth of Overtopping Difference (ft)		
			50%	1%	0.2%	50%	1%	0.2%	50%	1%	0.2%
Doe Branch											
FM 2102	Perpendicular	946	0	0.09	1.65	0	0.06	1.81	0	-0.03	0.16
Escondido Creek											
US 181	Perpendicular	14986	0	0	2.64	0	0	2.75	0	0	0.11
N 5th St	Perpendicular	3812	0	0.53	3.67	0	0.59	3.72	0	0.06	0.05
Helena Rd	Perpendicular	2672	0	0.46	4.87	0	0.49	4.53	0	0.03	-0.34
CR 331[1]	Perpendicular	NA	6.07	13.1	17.34	6.18	13.2	17.42	0.11	0.02	0.08
Private Rd[1]	Perpendicular	NA	4.86	12.1	14.09	4.99	12.1	14.13	0.13	-0.04	0.04
W Main St	Parallel	6823	0	0	1.567	0	0	1.63	0	0	0.066
SH 72 at Helena Rd	Parallel	4254	0	0	0.47	0	0	0.55	0	0	0.08
SH 72 East	Parallel	4710	0	0	2.78	0	0	2.86	0	0	0.08
Road Segment Alternative 5	**Orientation to Creek**	**Annual Average Daily Traffic (AADT)**	**Depth Overtop Existing Condition (ft)**			**Depth Overtop High Hazard Alt. 5 (ft)**			**Depth of Overtopping Difference (ft)**		
			50%	**1%**	**0.2%**	**50%**	**1%**	**0.2%**	**50%**	**1%**	**0.2%**
Doe Branch											
FM 2102	Perpendicular	946	0	0.09	1.65	0	0.08	1.79	0	-0.01	0.14
Escondido Creek											
US 181	Perpendicular	14986	0	0	2.64	0	0	2.73	0	0	0.09
N 5th St	Perpendicular	3812	0	0.53	3.67	0	0.59	3.74	0	0.06	0.07
Helena Rd	Perpendicular	2672	0	0.46	4.87	0	0.49	4.94	0	0.03	0.07
CR 331[1]	Perpendicular	NA	6.07	13.1	17.34	6.18	13.2	17.42	0.11	0.02	0.08
Private Rd[1]	Perpendicular	NA	4.86	12.1	14.09	4.99	12.1	14.13	0.13	-0.04	0.04
W Main St	Parallel	6823	0	0	1.567	0	0	1.64	0	0	0.076
SH 72 at Helena Rd	Parallel	4254	0	0	0.47	0	0	0.55	0	0	0.08
SH 72 East	Parallel	4710	0	0	2.78	0	0	2.86	0	0	0.08

1. Low water crossing

Table 4-4. Summary and Comparison of Alternative Plans for Escondido Creek Watershed FRS No. 4

Item	Alternative 1 No Action Dam Remains until Failure	Alternative 2 Proposed Action Decommission	Alternatives 3 and 4 Proposed Action High Hazard Rehabilitation 450' RCC Stepped Spillway 630' RCC Stepped Spillway	Alternative 5 Proposed Action High Hazard Rehabilitation Labyrinth Weir Spillway
Optimizing Criteria				
Locally Preferred				✓
Non-structural		✓		
Environmentally Preferred			✓	✓
Maximum Net Monetized Benefits Plan[1]		✓		
Socially Preferred				✓
Preferred Alternative				✓
Guiding Principles				
Healthy and Resilient Ecosystems	✓	✓	✓	✓
Sustainable Economic Development			✓	✓
Floodplains			✓	✓
Public Safety			✓	✓
Watershed Approach			✓	✓
Evaluation Framework (Resource Concerns) / Trade-Off Analysis				
Soil-Related Concerns				
Prime and Unique Farmland	No changes prior to failure. Sudden catastrophic breach would cause damage to downstream prime farmland and prime farmland if irrigated. Loss of flood storage would eliminate flood prevention for downstream prime farmland and prime farmland if irrigated currently provided by FRS No 4. Areas of prime farmland and prime farmland if irrigated upstream of the dam and in the backwater area below the principal spillway crest elevation would no longer be inundated.	Would eliminate current flood prevention for downstream prime farmlands and prime farmlands if irrigated. Areas of prime farmland and prime farmland if irrigated upstream of the dam and below the normal pool elevation would no longer be inundated.	Impacts to prime farmlands and prime farmlands if irrigated are anticipated within the FRS No. 4 LOD during construction. Would continue to provide similar level of flood prevention for downstream prime farmlands and prime farmlands if irrigated and would reduce risk of breach.	Same as Alternative 3 and Alternative 4

Item	Alternative 1 No Action Dam Remains until Failure	Alternative 2 Proposed Action Decommission	Alternatives 3 and 4 Proposed Action High Hazard Rehabilitation 450' RCC Stepped Spillway 630' RCC Stepped Spillway	Alternative 5 Proposed Action High Hazard Rehabilitation Labyrinth Weir Spillway
Erosion and Sediment	No changes prior to failure. Sudden catastrophic breach would result in excessive streambank erosion and sedimentation downstream. Loss of storage function would eliminate the ability of the dam to collect and retain sediment and would increase the potential for downstream erosion and sedimentation to properties, roads, and utilities resulting from uncontrolled flows. The natural sediment regime would be restored downstream.	Removal of storage function would eliminate the ability of the dam to collect and retain sediment and would increase the potential for downstream erosion and sedimentation to properties, roads, and utilities resulting from uncontrolled flows. Sediment regimes downstream would no longer be impacted by this dam.	The increase in conduit flow will cause an initial period of streambank erosion during routine storm events until the streambanks stabilize. Would continue to allow the dam to collect and retain sediment, would provide 100 years of sediment capacity, and long term would reduce the downstream erosion potential by safely passing controlled storm flows through the new conduit.	Same as Alternative 3 and Alternative 4
Water-Related Concerns				
Floodplain Management	No changes prior to failure. Sudden catastrophic breach would result in extensive flooding downstream and impacts to future floodplain management. Hydrologic failure is estimated to occur during the 69.4% PMP (FBH), or a return interval of 3,572-years. Loss of flood storage would result in increased floodplain area and increased flooding to roadways primarily on Escondido Creek. A FEMA LOMR may be required.	Removal of flood storage would result in increased downstream floodplain area and increased flooding to roadways primarily on Escondido Creek. A FEMA LOMR may be required.	Would continue to provide downstream flood prevention benefits and would have minimal impacts on the existing downstream floodplain. The modeled 0.1% AEP floodplain downstream of FRS No. 4 would be similar to existing, increasing from 2,713 to 2,717 acres, a 0.15% increase for Alternative 3 and from 2,713 to 2,719 acres, a 0.22% increase for Alternative 4. The upstream 1% AEP floodplain elevation would be about 0.2 feet lower than the existing condition and no upstream habitable structures would be at increased risk for flooding.	Would continue to provide downstream flood prevention benefits and would have minimal impacts on the existing downstream floodplain. The modeled 0.1% AEP floodplain downstream of FRS No. 4 would be similar to existing, increasing from 2,713 to 2,719 acres, a 0.22% increase. The upstream 1% AEP floodplain elevation would be about 0.2 feet lower than the existing condition and no upstream habitable structures would be at increased risk for flooding.

Item	Alternative 1 No Action Dam Remains until Failure	Alternative 2 Proposed Action Decommission	Alternatives 3 and 4 Proposed Action High Hazard Rehabilitation 450' RCC Stepped Spillway 630' RCC Stepped Spillway	Alternative 5 Proposed Action High Hazard Rehabilitation Labyrinth Weir Spillway
Waterbodies (Waters of the United States)	No changes prior to failure. Sudden catastrophic breach would result in discharge of fill/sediment into potentially jurisdictional waters of U.S. and result in temporary flooding of Doe Branch and Escondido Creek. The loss of flood storage would increase the potential for flooding that would likely impact streams, other waterbodies, and wetlands downstream. Long-term positive impacts resulting in a more natural, higher quality stream.	Would result in a discharge of fill material into potentially jurisdictional waters of the U.S. The controlled breach of the dam would increase the potential for flooding that would likely impact streams, other waterbodies, and wetlands downstream. Long-term positive impacts resulting in a more natural, higher quality stream.	Could result in discharge of fill into potentially jurisdictional waters of U.S. during construction. Maintains stream function due to continued impoundment.	Same as Alternative 3 and Alternative 4
Water Quality	No changes prior to failure. Sudden catastrophic breach would result in impacts to downstream water quality resulting from sudden discharge of large flows, embankment fill, and sediment. Temporary impacts to flow characteristics including substrate, TSS/turbidity, water circulation patterns, and water fluctuations would occur due to breach. Loss of storage function would eliminate the ability of the dam to collect and retain sediment and would increase the potential for downstream erosion and sedimentation from uncontrolled flows, which could decrease water quality. The flow/sediment regime would no longer be impacted	Minor, temporary impacts to flow characteristics including substrate, TSS/turbidity, water circulation patterns, and water fluctuations would occur during construction.. Removal of storage function would eliminate the ability of the dam to collect and retain sediment and would increase the potential for downstream erosion and sedimentation from uncontrolled flows, which could decrease water quality. The flow/sediment regime would no longer be impacted by the FRS which could improve water quality to pre impoundment conditions. Long-term impacts to flow characteristics including substrate, TSS/turbidity,	Minor, temporary impacts to flow characteristics including substrate, TSS/turbidity, water circulation patterns, and water fluctuations would occur during construction. Sedimentation would be managed through a SWPPP There would be minor long-term effects to these flow characteristics following construction, resulting from the increase in downstream flows associated with larger 42-inch principal spillway conduit. No significant impact on the bacterial impairment of Escondido Creek or its tributaries.	Same as Alternative 3 and Alternative 4

Item	Alternative 1 No Action Dam Remains until Failure	Alternative 2 Proposed Action Decommission	Alternatives 3 and 4 Proposed Action High Hazard Rehabilitation 450' RCC Stepped Spillway 630' RCC Stepped Spillway	Alternative 5 Proposed Action High Hazard Rehabilitation Labyrinth Weir Spillway
	by the FRS, which could improve water quality to pre impoundment conditions. Long-term impacts to flow characteristics including substrate, TSS/turbidity, water circulation patterns, and water fluctuations would occur due to absence of the FRS. No significant impacts on bacterial impairment of Escondido Creek or its tributaries.	water circulation patterns, and water fluctuations would occur due to absence of the FRS. No significant impacts on bacterial impairment of Escondido Creek or its tributaries.		
Wetlands	No changes prior to failure. Sudden catastrophic breach would result in impacts to potential downstream wetlands resulting from sudden discharge of large flows, embankment fill, and sediment. Loss of storage function would restore the downstream flow regime to pre-impoundment conditions, which could have both positive and negative impacts on potential downstream wetlands.	Removal of storage function would restore the downstream flow regime to pre-impoundment conditions, which could have both positive and negative impacts on potential downstream wetlands.	No impacts. The continued presence of the dam will maintain protection of potential downstream wetlands during flood events and would not hinder the development of new or function of existing wetlands.	Same as Alternative 3 and Alternative 4
Air-Related Concerns				
Air Quality	Temporary negative impacts (dust and exhaust) during routine O&M, prior to failure. After dam failure, routine O&M would be reduced.	Temporary negative impacts (dust and exhaust) during construction.	Same as Alternative 2	Same as Alternative 2
Plant and Animal-Related Concerns				
Fish and Wildlife	No changes prior to failure. Sudden catastrophic breach would cause impacts to downstream fish and wildlife and associated habitat due to	Removal of flood storage would eliminate shallow-water and deep-water habitat and would restore flow regime to pre impoundment	Would maintain the existing terrestrial wildlife and their habitat in the long term. Downstream aquatic and terrestrial wildlife and habitat would continue to be maintained and protected by controlling the stream flow. Minor, temporary impacts to terrestrial and aquatic habitat may occur during construction.	

Item	Alternative 1 No Action Dam Remains until Failure	Alternative 2 Proposed Action Decommission	Alternatives 3 and 4 Proposed Action High Hazard Rehabilitation 450' RCC Stepped Spillway 630' RCC Stepped Spillway	Alternative 5 Proposed Action High Hazard Rehabilitation Labyrinth Weir Spillway
	sudden release of flows and sediment. Loss of flood storage would eliminate shallow-water and deep-water habitat and would restore flow regime to pre impoundment conditions which could have positive and negative impacts on downstream aquatic and terrestrial wildlife and their habitat.	conditions which could have positive and negative impacts on downstream aquatic and terrestrial wildlife and their habitat. Minor, temporary impacts to terrestrial habitat may occur during construction. BMPs will be implemented to minimize impacts to less-mobile species during construction. It is expected that wildlife would return to the area post construction and all terrestrial habitat areas would be re-established.	BMPs will be implemented to minimize impacts to less-mobile species during construction. It is expected that wildlife would return to the area post construction and all habitat areas would be re-established.	
Invasive Species	No changes prior to failure. New invasive species could be introduced to the project site and existing invasive species could be spread within the site during routine O&M activities if care is not taken to avoid this. Sudden catastrophic breach could result in the spread of invasive species downstream.	Could result in the introduction of new invasive species by construction equipment or spreading of existing invasive species during construction. The introduction of invasive plant and animal species can degrade habitats and push native species out. All disturbed areas would be revegetated using adapted and/or non-invasive native species. All tools, equipment, and vehicles will be cleaned before transporting materials and before entering and leaving the worksites to prevent the introduction and spread of invasive species.		
Migratory Birds	No changes prior to failure. Sudden catastrophic breach could have effects on migratory birds as result of tree damage from sudden release of flows.	May temporarily affect migratory birds if construction activities occur between March 1 and August 31. Appropriate measures will be implemented in accordance with the MBTA.	Same as Alternative 2	Same as Alternative 2
Bald and Golden Eagle	No impacts.	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Riparian Areas	No changes prior to failure. Sudden catastrophic breach could have significant impacts	The elimination of flood storage would eliminate the riparian areas along the	Minor temporary negative impacts during construction. Riparian areas would	Same as Alternative 3 and Alternative 4

Item	Alternative 1 No Action Dam Remains until Failure	Alternative 2 Proposed Action Decommission	Alternatives 3 and 4 Proposed Action High Hazard Rehabilitation 450' RCC Stepped Spillway 630' RCC Stepped Spillway	Alternative 5 Proposed Action High Hazard Rehabilitation Labyrinth Weir Spillway
	to downstream riparian areas resulting from the sudden discharge of large flows, embankment fill, and sediment. Loss of flood storage would eliminate the riparian areas along the perimeter of the existing normal pool, but would restore the natural flow regime downstream, which could result in additional riparian vegetation forming.	perimeter of the existing normal pool, but would restore the natural flow regime downstream, which could result in additional riparian vegetation forming.	reestablish following rehabilitation activities. Normal pool area will remain the same, so the amount of riparian area should not be negatively impacted.	
Threatened and Endangered Species	No changes prior to failure. Sudden catastrophic breach could result in negative impacts to federal candidate monarch butterfly and the state threatened sheep frog, White-tailed Hawk, and white-nosed coati potentially located in suitable habitat identified within the Study Area and to threatened and endangered species that may be located downstream from the sudden discharge of fill/sediment and large flows.	The dam decommission could directly and indirectly affect the monarch butterfly, sheep frog, White-tailed Hawk, and white-nosed coati through direct removal and degradation of habitat as well as noise and vibration during construction. Though the monarch butterfly is not currently protected under federal or state laws, their listing status should be monitored for changes that may trigger coordination with the USFWS. Based on current listing status, available suitable habitat, and proposed project activities, no effects to federally listed species are anticipated and therefore, no additional studies or coordination is required at this time. If studies and coordination are determined to be required for the project	The proposed rehabilitation could directly and indirectly affect the monarch butterfly, White-tailed Hawk, and white-nosed coati through direct removal and degradation of habitat as well as noise and vibration during construction and direct temporarily impact the sheep frog due to temporary dewatering. Though the monarch butterfly is not currently protected under federal or state laws, their listing status should be monitored for changes that may trigger coordination with the USFWS. Based on current listing status, available suitable habitat, and proposed project activities, no effects to federally listed species are anticipated and therefore, no additional studies, coordination, or documentation is required at this time. If studies and coordination are determined to be required for the project based on listing status changes, they will be performed during the design phase of the project. Additionally, BMPs will be implemented to avoid permanent impacts to the state listed species. A letter was sent to the USFWS on May 13, 2024, requesting that the agency participate in this project as a cooperating agency and is included in **Appendix A**.	

Item	Alternative 1 No Action Dam Remains until Failure	Alternative 2 Proposed Action Decommission	Alternatives 3 and 4 Proposed Action High Hazard Rehabilitation 450' RCC Stepped Spillway 630' RCC Stepped Spillway	Alternative 5 Proposed Action High Hazard Rehabilitation Labyrinth Weir Spillway
		based on listing status changes, they will be performed during the design phase of the project. Additionally, BMPs will be implemented to minimize impacts to the state listed species. A letter was sent to the USFWS on May 13, 2024, requesting that the agency participate in this project as a cooperating agency and is included in **Appendix A**.		
Human-Related Concerns				
Cultural Resources/ Historic Properties	No changes prior to failure. Sudden catastrophic breach could result in impacts to downstream cultural resources if any resources are present. Loss of flood storage would eliminate flood prevention for downstream cultural resources, if any resources are present.	Through consultation with the SHPO and Tribal Nations, NRCS has determined that no historic properties are present within the project APE. Decommissioning would therefore have no impact to historic properties within the project APE. However, loss of flood storage from decommissioning would eliminate flood prevention for downstream cultural resources, if any such resources are present, which could be impacted..	Through consultation with the SHPO and Tribal Nations, NRCS has determined that no historic properties are present within the project APE. Therefore, the proposed rehabilitation would have no impacts to historic properties within the project APE. Furthermore, no downstream impacts to cultural resources are anticipated under this alternative.	Same as Alternative 3 and Alternative 4

Item	Alternative 1 No Action Dam Remains until Failure	Alternative 2 Proposed Action Decommission	Alternatives 3 and 4 Proposed Action High Hazard Rehabilitation 450' RCC Stepped Spillway 630' RCC Stepped Spillway	Alternative 5 Proposed Action High Hazard Rehabilitation Labyrinth Weir Spillway
Land Use	No changes prior to failure. Sudden catastrophic breach would result in significant impacts to downstream land use resulting from sudden discharge of flows and fill. Loss of flood storage would result in downstream land use changes because of more frequent flooding primarily on Escondido Creek and development regulations.	Removal of flood storage would result in downstream land use changes because of more frequent flooding primarily on Escondido Creek and development regulations. The modeled 0.1% AEP floodplain downstream of FRS No. 4 would be expanded from 2,713 acres to 3,068 acres due to decommission of dam. The most susceptible land use types to the increased flooding would primarily include hay/pasture, shrub/scrub, woody wetlands, deciduous forest, and cultivated crops areas.	Minimal changes to land use adjacent to FRS No. 4 due to raise of vegetated auxiliary spillway, raise of effective top of dam, and new overtopping RCC stepped spillway. No impacts to downstream land use.	Minimal changes to land use adjacent to FRS No. 4 due to raise of vegetated auxiliary spillway, raise of effective top of dam, and new overtopping labyrinth weir spillway. No impacts to downstream land use.
Public Health and Safety	No changes prior to failure. Sudden catastrophic breach would impact 69 habitable structures above the FFE, and 24 roads including minor state highways and main local roads. Loss of flood storage would result in an enlarged 1% AEP floodplain primarily on Escondido Creek, and increased development regulations would be necessary to protect public health and safety within the enlarged floodplain area.	Would remove the risk associated with the potential for dam failure. The 1% AEP floodplain primarily on Escondido Creek would be expanded, and increased development regulations would be implemented to protect public health and safety within the enlarged floodplain area. The number of habitable structures impacted above the FFE in the 1% AEP storm would be 77 and there would be increased flooding on five evaluated roads.	Would maintain the flood prevention benefits for 100 years. Upstream of the dam, the 1% AEP 24-hour flood pool will be approximately 0.2 feet lower than the existing condition and no habitable structures would be impacted. The threat to loss of life from failure of the dam would be greatly reduced. Minor induced flooding on three roadways (<0.06 feet) during the 1% AEP storm event.	

Item	Alternative 1 No Action Dam Remains until Failure	Alternative 2 Proposed Action Decommission	Alternatives 3 and 4 Proposed Action High Hazard Rehabilitation 450' RCC Stepped Spillway 630' RCC Stepped Spillway	Alternative 5 Proposed Action High Hazard Rehabilitation Labyrinth Weir Spillway
Social Issues/Community Cohesion	No changes prior to failure. Sudden catastrophic breach could result in loss of community cohesion due to downstream flood damage and loss of life that will not impact individuals equally. Loss of flood storage could result in a loss of community cohesion due to potential development restrictions, increased flooding on roadways, and impacts to downstream habitable structures that will not impact individuals equally.	Construction costs could necessitate an increase in taxes and fees that may not impact individuals equally, which could result in a loss of community cohesion. The removal of flood storage could result in loss of community cohesion due to development restrictions, increased flooding on roadways, and implementation of mitigation measures or flooding impacts to downstream habitable structures that will not impact individuals equally.	Construction costs could necessitate an increase in taxes and fees and the taxes/fees and the project benefits may not impact individuals equally, which could result in a loss of community cohesion.	Same as Alternative 3 and Alternative 4
Evaluation Framework (Ecosystem Services) / Trade-Off Analysis				
Provisioning Services - Tangible goods provided for direct human use (e.g., timber, food, fiber, water)				
Crop Yield (non-monetized)	No changes prior to failure. Sudden catastrophic breach would cause damage to downstream cultivated crops and hay/pasture land cover types. Loss of flood storage would eliminate flood prevention for downstream cultivated crops and hay/pasture land cover types that currently provide provisioning services. These land cover types may no longer be used for provisioning services if subjected to routine flooding.	Minor temporary negative impacts to areas of hay/pasture land cover are anticipated within the FRS No. 4 LOD during construction. Would eliminate current flood prevention for downstream cultivated crops and hay/pasture land cover types that currently provide provisioning services. These land cover types may no longer be used for provisioning services if subjected to routine flooding.	Minor temporary negative impacts to areas of hay/pasture land cover are anticipated within the FRS No. 4 LOD during construction. Would continue to provide similar level of flood prevention for cultivated crops and hay/pasture land cover types that currently provide provisioning services and would reduce risk of breach.	Same as Alternative 3 and Alternative 4
Regulating Services - Maintains the world we live in and is regulated (e.g., flood control, erosion, water quality, crop pollination)				

Item	Alternative 1 No Action Dam Remains until Failure	Alternative 2 Proposed Action Decommission	Alternatives 3 and 4 Proposed Action High Hazard Rehabilitation 450' RCC Stepped Spillway 630' RCC Stepped Spillway	Alternative 5 Proposed Action High Hazard Rehabilitation Labyrinth Weir Spillway
Flood Control and Regulating Services Provided by Vegetation (non-monetized)	No changes prior to failure. Sudden catastrophic breach could have significant impacts to downstream vegetated areas that currently provide regulating services. Loss of flood storage would eliminate the riparian areas along the perimeter of the existing normal pool, but other vegetation would grow in this area. Loss of flood storage would restore the natural flow regime downstream, which could result in additional riparian vegetation forming. Loss of flood storage would remove regulating services provided by FRS No. 4 and would result in impacts to downstream flood control, erosion, and water quality.	Loss of flood storage would eliminate the riparian areas along the perimeter of the existing normal pool, but other vegetation would grow in this area. Loss of flood storage would restore the natural flow regime downstream, which could result in additional riparian vegetation forming. Loss of flood storage would remove regulating services provided by FRS No. 4 and would result in impacts to downstream flood control, erosion, and water quality.	Minor temporary negative impacts during construction. Riparian areas in LOD would reestablish following rehabilitation activities. Normal pool area will remain similar to the existing condition, so the amount of riparian area around the perimeter of the normal pool should not be impacted. Regulating services currently provided by FRS No. 4 would remain.	Same as Alternative 3 and Alternative 4
Cultural Services – Makes the world a place people want to live (e.g., recreation, spiritual, aesthetics)				
Cultural Resources, Aesthetic Viewshed, and Tribal Values	No changes prior to failure. Sudden catastrophic breach could result in impacts to downstream cultural resources if there are any located within inundation area and would affect viewshed as a result of the dam embankment removal and impoundment as well as downstream damage, destruction, and debris accumulation. Loss of flood storage would alter viewshed by restoring natural flow regime and could also result in	Would affect viewshed as a result of removal of a portion of the dam embankment and impoundment. Loss of flood storage would alter viewshed by restoring natural flow regime and would also result in routine flooding of cultural resources that were previously protected by FRS No. 4, if any resources are present.	Would affect viewshed as a result of the addition of RCC stepped spillway. Would continue to provide flood prevention for downstream viewshed and any cultural resources present.	Would affect viewshed as a result of the addition of labyrinth weir spillway. Would continue to provide flood prevention for downstream viewshed and any cultural resources present.

Item	Alternative 1 No Action Dam Remains until Failure	Alternative 2 Proposed Action Decommission	Alternatives 3 and 4 Proposed Action High Hazard Rehabilitation 450' RCC Stepped Spillway 630' RCC Stepped Spillway		Alternative 5 Proposed Action High Hazard Rehabilitation Labyrinth Weir Spillway
	routine flooding of cultural resources that were previously protected by FRS No. 4, if any resources are present.				
Economic Analysis[2]					
Costs					
Project Investment					
Federal PL-83-566	$0	$5,130,000	$14,991,000	$18,681,000	$12,684,000
Sponsor	$0	$2,511,000	$6,216,000	$7,786,000	$5,240,000
Total	$0	$7,641,000	$21,207,000	$26,467,000	$17,924,000
Annual O&M Costs					
Federal PL-83-566	$0	$0	$0	$0	$0
Sponsor	$5,000	$8,000	$5,000	$5,000	$5,000
Total	$5,000	$8,000	$5,000	$5,000	$5,000
Total Annual Costs	$5,000	$237,000	$651,000	$812,000	$550,000
Damages					
Total Annual Damages	$189,000	$216,000	$196,000	$195,000	$196,000
Benefits					
Structures	$0	-$3,000	-$6,000	-$5,000	-$6,000
Agricultural	$0	$0	$0	$0	$0
Infrastructure	$0	-$24,000	$0	$0	-$1,000
Cost Avoided Benefits	$0	$0	-$1,000	-$1,000	$0
Total Average Annual Benefits	$0	-$28,000	-$7,000	-$6,000	-$7,000
Evaluation					
Benefit-Cost Ratio[3]	N/A	-0.12:1.0	-0.01:1.0	-0.01:1.0	-0.01:1.0
Net Average Annual Benefit	N/A	-$265,000	-$658,000	-$818,000	-$557,000
Regional Economic Benefits (Texas)					
Job-Years of Employment Created by Construction	-	7.6	9.3	8.1	8.1
Value Added to Texas Economy During Construction (One-time benefits)	$0 (Baseline)	$7,558,000	$21,035,000	$26,209,000	$17,748,000

Item	Alternative 1 No Action Dam Remains until Failure	Alternative 2 Proposed Action Decommission	Alternatives 3 and 4 Proposed Action High Hazard Rehabilitation 450' RCC Stepped Spillway 630' RCC Stepped Spillway		Alternative 5 Proposed Action High Hazard Rehabilitation Labyrinth Weir Spillway
Total Benefits (Including annualized Value Added from construction) to Texas Economy	$0	$11,655,000	$30,347,000	$39,279,000	$26,661,000

1. For rehabilitation projects, the no-action alternative may not be identified as the NED alternative, but will continue to be included to allow a valid comparison of the reasonable alternatives
2. Price Base: 2024 price level, annualized over the 100-year evaluation period using a 2.75% discount rate. The Total Annual Costs include interest accrued during construction and the O&M costs are reflected as the net difference of Alternative 1 (No Federal Action) and the Proposed Action alternative.
3. Rationale for selection of the preferred alternative is provided in Section 7.1.

Table 4-5. Consideration of PR&G Guiding Principles for Escondido Creek Watershed FRS No. 4

PR&G GUIDING PRINCIPLES	No Federal Action/FWOFI Alternative 1	Decommission with Federal Assistance Alternative 2	Rehabilitation RCC Step Spillway (High Hazard Potential) Alternative 3 and Alternative 4	Rehabilitation Labyrinth Weir Spillway (High Hazard Potential) Alternative 5
Healthy and Resilient Ecosystems	Initially maintain current ecological function of the impoundment area and protection for downstream habitat. Sudden catastrophic breach would cause damage to downstream habitat. Loss of flood storage would return stream's ecological function to pre-impoundment conditions.	Removal of flood storage would return stream's ecological function to pre-impoundment conditions.	Maintain current ecological function of impoundment area for wildlife habitat.	Same as Alternatives 3 and 4.
Sustainable Economic Development	Initially no effect while still subjecting downstream areas to risk of breach. Sudden catastrophic breach would cause damage to downstream residences and businesses. Loss of flood storage would return to natural conditions.	Complies with sustainable use and management of water resources through return to natural conditions.	Complies with sustainable use and management of water resources through maintaining flood prevention.	Same as Alternatives 3 and 4.
Floodplains	Initially maintain current flood prevention from dam while still subjecting downstream areas to risk of breach. Following catastrophic breach, the 1% AEP floodplain downstream would be increased from 2,713 to 3,068 acres (13.1% increase).	The 1% AEP floodplain downstream would be increased from 2,713 to 3,068 acres (13.1% increase).	1% AEP floodplain downstream would remain similar to existing condition. The downstream floodplain would be slightly increase from 2,713 to 2,717 acres for Alternative 3 and from 2,713 to 2,719 acres for Alternative 4 (~0.2% increase). The upstream 1% AEP floodplain elevation would be about 0.2 feet lower than the existing condition and no upstream habitable structures would be at increased risk for flooding.	1% AEP floodplain downstream would remain similar to existing condition, The downstream floodplain would be slightly increase from 2,713 to 2,719 acres for Alternative 5 (~0.2% increase). The upstream 1% AEP floodplain elevation would be about 0.2 feet lower than the existing condition and no upstream habitable structures would be at increased risk for flooding.
Public Safety	No changes prior to failure. Sudden catastrophic breach would impact homes, mobile homes,	Would remove the risk associated with the potential for dam failure. The 1% AEP floodplain would be	Would maintain the flood prevention benefits for 100 years. The threat to loss of life from dam failure	Same as Alternatives 3 and 4.

PR&G GUIDING PRINCIPLES	No Federal Action/FWOFI Alternative 1	Decommission with Federal Assistance Alternative 2	Rehabilitation RCC Step Spillway (High Hazard Potential) Alternative 3 and Alternative 4	Rehabilitation Labyrinth Weir Spillway (High Hazard Potential) Alternative 5
	commercial structures, one school outbuilding, and downstream roads. Loss of flood storage would result in an enlarged 1% AEP floodplain primarily on Escondido Creek, and increased development regulations would be implemented to protect public health and safety within the enlarged floodplain area.	expanded primarily on Escondido Creek, and increased development regulations would be implemented to protect public health and safety within the enlarged floodplain area. The number of habitable structures impacted above the FFE in the 1% AEP storm would be 77 and there would be increased flooding on five evaluated roads.	would be greatly reduced.	
Watershed Approach	Initially, maintain ecological function of Doe Branch and contribute to ecological function of Escondido Creek Watershed. Sudden catastrophic breach would result in temporary impacts to ecologic function. Loss of flood storage could improve ecological function of system but would also subject downstream habitat area to uncontrolled flows and sediment.	Removal of flood storage could improve ecological function of Doe Branch and Escondido Creek system but would also subject downstream habitat area to uncontrolled flows and sediment.	The natural functions of Doe Branch and the Escondido Creek Watershed have been altered by construction of FRS No. 4. Rehabilitation would maintain existing ecological function of Doe Branch and contribute to existing ecological function of Escondido Creek Watershed.	Same as Alternatives 3 and 4.

5.0 ENVIRONMENTAL CONSEQUENCES

Alternative plans of action can result in a multitude of effects on resources upstream and downstream of FRS No. 4. This section describes anticipated effects on resource concerns identified by the Sponsors, the public, and agency personnel in the Scoping meeting and the public meetings.

5.1 Environmental Concerns Excluded from Environmental Consequences Evaluation

The following environmental concerns identified through the scoping process were determined to not be relevant to the proposed action:

- Coastal Zone Management Plans
- Coral Reefs
- Ecologically Critical Areas
- Essential Fish Habitat
- Forest Resources
- Natural Areas
- Parklands
- Public Recreation
- Regional Water Resource Plans
- Sole Source Aquifers
- Scenic Beauty
- Significant Scientific Features
- Wild and Scenic Rivers
- Water Resources

5.2 Comparative Environmental Effects of Alternatives – FRS No. 4

The following sections describe to the potential environmental effects to the resource concerns that were identified as relevant to the proposed action in **Section 2.2** and further described in **Section 3.3** for each of the alternatives described in **Section 4.3**.

5.2.1 Prime Farmland and Unique Farmland

Alternative 1 – No Action – Dam Remains until Failure

The No Action Alternative would have no effect on the existing conditions of prime farmland and prime farmland if irrigated while the dam remains in place, prior to failure. The risk of catastrophic dam breach would remain and if a catastrophic breach does occur, it has the potential to cause significant impacts to the downstream areas of prime farmland and prime farmland if irrigated resulting from the sudden discharge of large flows, embankment fill, and sediment. Following catastrophic breach, the elimination of the existing flood prevention would subject the downstream areas of prime farmland and prime farmlands if irrigated to more frequent and severe flooding. Due to the potential for more frequent flooding if flood prevention is removed, these areas may not be considered prime farmland and prime farmland if irrigated.

Alternative 2 – Proposed Action – Decommission

The Decommission Alternative would eliminate the existing flood prevention and subject areas downstream of the dam to more frequent and severe flooding. Due to the potential for more frequent flooding, downstream areas of prime farmland or prime farmland if irrigated may no longer be considered as such. Approximately 141 acres of prime farmland and approximately 51 acres of prime farmland if irrigated could be impacted within the FRS No. 4 LOD during construction. This land is anticipated to be returned to similar conditions after construction and therefore would not result in an irreversible conversion of protected farmlands to a non-agricultural use. Areas of prime farmland or prime farmland if irrigated that lie below the normal pool elevation, upstream of the dam would no longer be continually inundated.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450' RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
The High Hazard Potential Rehabilitation Alternatives would maintain the flood prevention for downstream prime farmland and prime farmland if irrigated. Approximately 141 acres of prime farmland and approximately 51 acres of prime farmland if irrigated could be impacted within the FRS No. 4 LOD during construction. This land is anticipated to be returned to similar conditions after construction and therefore would not result in an irreversible conversion of protected farmlands to a non-agricultural use. The high hazard rehabilitation alternatives would reduce the risk of catastrophic breach and the potential impacts to downstream prime farmlands and prime farmlands if irrigated. The normal pool elevation at the low-level ports would remain at about 312.7 feet resulting in no long term impacts to prime farmland and prime farmland if irrigated. Minor temporary impacts during construction within the LOD are anticipated.

5.2.2 Erosion and Sediment

Alternative 1 – No Action – Dam Remains until Failure
The No Action Alternative would have no effect on the existing conditions of erosion and sedimentation while the dam remains in place, prior to failure. The risk of catastrophic dam breach would remain and if a catastrophic breach does occur, it has the potential to cause temporary, but significant negative effects to erosion and sedimentation downstream resulting from the sudden discharge of large flows, embankment fill, and sediment. Following a catastrophic breach, the current function of the dam to collect and retain sediment would be eliminated and the removal of flood prevention would temporarily increase the potential for downstream erosion and sedimentation until the streambanks stabilize following a period of routine storm event flows. It is estimated that FRS No. 4 collects and retains an estimated 2.87 acre-feet/year of sediment, which would be conveyed downstream in the absence of the dam. The flows through the breached dam would increase from 66.5 cfs and 70.2 cfs to 1,673 cfs and 2,717 cfs, respectively, during the 50% and 20% AEP event which would directly increase streambank erosion. These impacts are expected to be long-term and minor. The pre-impoundment sediment regime would be restored once the dam is no longer in place and the downstream streambanks have stabilized.

Alternative 2 – Proposed Action – Decommission
The Decommission Alternative would result in temporary negative effects to streambank erosion downstream as a result of uncontrolled flows until the streambanks stabilize following a period of routine storm event flows. The pre-impoundment sediment regime would be restored once the dam is no longer in place. During construction, erosion and sedimentation would be managed through the implementation of a SWPPP and use of BMPs. Potential BMPs include a turbidity curtain, silt fence, straw bales, mulch socks, and stabilized construction entrance.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450' RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
The High Hazard Potential Rehabilitation Alternatives would provide 100 years of sediment storage following construction and would rehabilitate the dam to meet NRCS high hazard potential class dam criteria. Due to the increased conduit size from 28-inch to 42-inch in all three alternatives, the flows out of the dam would increase from 67 cfs and 70 cfs to 164 cfs and 175 cfs for Alternatives 3, 4, and 5, respectively, during the 50% and 20% AEP events. The increased conduit flow will cause an initial period of streambank erosion during routine storm events, which would have temporary negative effects on downstream erosion and sedimentation, until the streambanks stabilize. These alternatives would continue to allow the dam to collect and retain sediment as well as continue to reduce the downstream erosion potential by safely passing controlled storm flows through the new conduit. Temporary negative impacts to erosion and sedimentation may occur during construction; however, these impacts would be reduced

through the use of water quality BMPs identified in the SWPPP. Potential BMPs include a turbidity curtain, silt fence, straw bales, mulch socks, and stabilized construction entrance.

5.2.3 Floodplain Management

Alternative 1 – No Action – Dam Remains until Failure

The No Action Alternative would have no effect on the existing conditions of floodplain management while the dam remains in place, prior to catastrophic failure. 1% and 0.2% AEP floodplains were generated from the detailed hydraulic models developed for this project and are shown on **Figure C-6** in **Appendix C**. The existing impoundment provides flood damage reduction benefits by reducing the peak flow and duration of storm events within the watershed. The peak WSE elevation achieved in the reservoir during the 1% AEP, 24-hour storm event is 329.92 feet, which is 1.63 feet higher than the existing left auxiliary spillway elevation of 328.29 feet and 1.58 feet higher than the existing right auxiliary spillway elevation of 328.34 feet. The corresponding peak outflow from FRS No. 4 during the 1% AEP event is 2,277 cfs.

The modeled downstream floodplain areas for the existing conditions for the 4%, 2%, 1%, and 0.2% AEP storm events would be 1,996 acres, 2,375 acres, 2,713 acres, and 3,577 acres, respectively. The number commercial buildings, homes, and mobile homes within the modeled 1% AEP, 24-hour storm event flooded above the FFE is 9, 53, and 3, respectively, or 65 total habitable structures. Floodwaters from a 1% AEP, 24-hour storm event would cause flooding on five evaluated minor state highways or main local roads.

The risk of dam breach would remain and if a catastrophic sunny day breach does occur, it has the potential to cause significant impacts to downstream floodplain management once the dam is no longer in place. Following catastrophic failure, the current flood prevention benefits would be removed, as the structure would no longer be able to store floodwater, store sediment, and retard peak flows. This would expand the 1% AEP floodplain. The number of habitable structures (commercial structures, residential homes, and mobile homes) inundated above the FFE during the modeled 1% AEP, 24-hour storm event would increase from 65 to 117 structures. Floodwaters from a 1% AEP, 24-hour storm event would cause increased flooding on five evaluated minor state highways or main local roads (**Table 4-2**).

The modeled floodplain areas for this alternative after dam failure for the 4%, 2%, 1%, and 0.2% AEP storm events would be 2,399 acres, 2,809 acres, 3,068 acres, and 3,615 acres, respectively. The increase in 1% AEP floodplain acreage within the modeled study area is 355 acres. A FEMA Letter of Map Revision (LOMR) may be required after dam failure to revise effective Flood Insurance Rate Map (FIRMs) and show changes to the floodplains.

Alternative 2 – Proposed Action – Decommission

The Decommission Alternative would remove the flood prevention benefits, as the structure would no longer be able to store floodwater, store sediment, and retard peak flows. The downstream floodplain extent would increase. This alternative will cause additional damages to downstream private property and road crossings. Non-structural mitigation measures include 1) property acquisition for three residential structures and one recreational structure that would be flooded above the FFE in the 10% AEP event, 2) raising of 26 residential structures above the 0.2% AEP floodplain, 3) relocation of two mobile homes, and 4) floodproofing of seven other non-residential habitable structures. The number of habitable structures inundated above the FFE during the modeled 1% AEP, 24-hour storm event would increase from 65 to 77 structures. Floodwaters from a 1% AEP, 24-hour storm event would cause increased flooding on five evaluated minor state highways or main local roads (**Table 4-2**).

The modeled floodplain areas for this alternative after dam failure for the 4%, 2%, 1%, and 0.2% AEP storm events would be 2,399 acres, 2,809 acres, 3,068 acres, and 3,615 acres, respectively. The increase

in 1% AEP floodplain acreage within the modeled study area is 355 acres. A FEMA Letter of Map Revision (LOMR) may be required post-construction to revise effective Flood Insurance Rate Map (FIRMs) and show changes to the floodplains.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450' RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway

The High Hazard Potential Rehabilitation Alternatives would maintain downstream flood prevention benefits. No critical structures are impacted, and no residential structures will be added to the 1% AEP floodplain. The drawdown time in the dam backwater will be reduced to less than 10 days.

Based on the flood routing for Alternative 3 for the 1% AEP, 24-hour event, the peak WSE elevation in the dam backwater would be approximately 329.7 feet, about 0.2 feet lower than the existing condition. The peak outflow from FRS No. 4 during the 1% AEP event is approximately 2,170 cfs, including outflow from both the conduit and the RCC stepped overtopping spillway.

Based on the flood routing for Alternative 4 for the 1% AEP, 24-hour event, the peak WSE elevation in the dam backwater would be approximately 329.7 feet, or about 0.2 feet lower than the existing condition. The peak outflow from FRS No. 4 during the 1% AEP event is approximately 2,250 cfs, including outflow from both the conduit and the RCC stepped overtopping spillway.

Based on the flood routing for Alternative 5 for the 1% AEP, 24-hour event, the peak WSE elevation in the dam backwater would be approximately 329.7 feet, or about 0.2 feet lower than the existing condition. The peak outflow from FRS No. 4 during the 1% AEP event is approximately 2,279 cfs, including outflow from both the conduit and the labyrinth weir overtopping spillway.

For Alternative 3, Alternative 4, and Alternative 5, the increased conduit size will allow larger, more routine flows immediately downstream of FRS No. 4 (50% AEP = 164 cfs and 4% AEP = 199 cfs) for Alternatives 3, 4, and 5 versus the existing condition conduit (50% AEP = 67 cfs and 4% AEP = 78 cfs). The increase in discharge from the existing condition during the 50% AEP event will cause a maximum minor increase in overtopping depth (ranging from 0.11 feet to 0.13 feet) at any of the downstream roadways evaluated per **Table 4-2** and **Table 4-3**.

The modeled floodplain areas for the 4%, 2%, 1%, and 0.2% AEP storm events, respectively, are:

- Alternative 3 - 2,018 acres, 2,393 acres, 2,717 acres, and 3,589 acres
- Alternative 4 - 2,018 acres, 2,393 acres, 2,719 acres, and 3,590 acres
- Alternative 5 - 2,018 acres, 2,393 acres, 2,719 acres, and 3,590 acres

For all three alternatives, the increase in 1% AEP floodplain acreage within the modeled study area is less than seven acres. The number of habitable structures inundated above the FFE during the modeled 1% AEP, 24-hour storm event would remain the same as in the existing condition. Three evaluated roadways would experience slight induced flooding (0.06 feet or less).

5.2.4 Waterbodies (Waters of the United States)

Alternative 1 – No Action – Dam Remains until Failure

The No Action Alternative would have no effect on potentially jurisdictional waters of the U.S., including the FRS No. 4 reservoir and Doe Branch/Stream 01 in the project area. The No Action Alternative would also have no effect on the downstream streams and wetlands while the dam remains in place, prior to failure.

The risk of dam breach would remain and if a catastrophic breach does occur, it would remove the Escondido Creek FRS No. 4 reservoir area and has the potential to cause significant discharge of fill material into potentially jurisdictional features and would cause temporary flooding that would impact Doe Branch/Stream 01. The loss of flood storage resulting from the catastrophic breach of the dam would increase the potential for routine flooding that would likely negatively impact downstream streams, other waterbodies, and wetland features due to uncontrolled flows and sediment. The loss of flood storage could have a long-term positive impact resulting in a more natural, higher quality aquatic function through the conversion of still water back to free flowing that existed prior to dam construction.

Alternative 2 – Proposed Action – Decommission
The Decommission Alternative would result in a discharge of fill material into potentially jurisdictional features during and after the controlled breach. This would be managed through the implementation of a SWPPP and use of BMPs and be authorized by obtaining a Section 404 permit. The removal of flood storage resulting from the decommission of the dam would increase the potential for routine flooding that would likely negatively impact downstream streams, other waterbodies, and wetland features due to uncontrolled flows and sediment. The loss of flood storage could have a long-term positive impact resulting in a more natural, higher quality aquatic function through the conversion of still water back to free flowing that existed prior to dam construction.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450’ RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630’ RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
The High Hazard Potential Rehabilitation Alternatives could result in a discharge of fill material into potential jurisdictional features during construction. This would be managed through the implementation of a SWPPP and use of BMPs and be authorized by obtaining a Section 404 permit. These alternatives would result in maintaining the stream quality function due to continued impoundment.

5.2.5 Water Quality

Alternative 1 – No Action – Dam Remains until Failure
The No Action Alternative would have no effect on the existing conditions of water quality while the dam remains in place, prior to failure. FRS No. 4 currently controls flow and impounds sediment from the upstream watershed. Flows are passed through a 28-inch conduit to the downstream channel until the water surface elevation reaches that of the auxiliary spillway.

The risk of catastrophic dam breach would remain and if a catastrophic breach does occur, it has the potential to cause significant temporary impacts to the downstream water quality resulting from the sudden discharge of large flows, embankment fill, and sediment. A catastrophic breach would have the following effects on flow characteristics:

- Substrate – The breach of the embankment and release of impounded water would displace benthic organisms;
- TSS/Turbidity – A temporary increase in TSS and turbidity levels would result from the uncontrolled release of accumulated sediment;
- Current Patterns of Water Circulation – The uncontrolled release of flows would be a significant temporary change from existing pattern of water circulation; and
- Normal Water Fluctuations – The sudden increase in downstream flows resulting from the uncontrolled water release would result in an abnormal flow condition downstream of the FRS.

Following a catastrophic breach, the current function of the dam to collect and retain sediment would be eliminated and the removal of flood prevention would increase the potential for downstream erosion and sedimentation until the streambanks stabilize following a period of routine storm event flows. This could

temporarily decrease downstream water quality. Once the pre-impoundment sediment regime has been restored and the streambanks have stabilized, it is expected that water quality will improve to pre impoundment conditions. This alternative is not expected to have a significant impact on the current bacterial impairment in Escondido Creek, but increased flows resulting from the removal of the storage function and conversion back to free-flowing stream could dilute bacteria concentrations in Escondido Creek. Minor, temporary impacts to water quality would occur due to erosion and sedimentation during construction. Erosion and sedimentation would be managed through SWPPP implementation and use of BMPs. Following catastrophic breach, flow characteristics would be affected as follows:

- Substrate – Benthic organisms within the impoundment would be permanently displaced. Benthic organisms would reestablish in the stream channel;
- TSS/Turbidity – A temporary increase in TSS and turbidity levels would result from the increase in flows downstream of the FRS until the streambanks and sediment stabilize;
- Current Patterns of Water Circulation – The absence of the FRS would result in water circulation patterns returning to pre-impoundment conditions; and
- Normal Water Fluctuations – The absence of the FRS would result in long-term changes to water fluctuations, as water would no longer be impounded by the FRS.

Alternative 2 – Proposed Action – Decommission

The Decommission Alternative would eliminate the current function of the dam to collect and retain sediment and the removal of flood prevention would increase the potential for downstream erosion and sedimentation until the streambanks stabilize following a period of routine storm event flows. This could temporarily decrease downstream water quality. Once the pre-impoundment sediment regime has been restored and the streambanks have stabilized, it is expected that water quality will improve to pre impoundment conditions. This alternative is not expected to have a significant impact on the current bacterial impairment in Escondido Creek, but increased flows resulting from the removal of the storage function and conversion back to free-flowing stream could dilute bacteria concentrations in Escondido Creek. Minor, temporary impacts to water quality would occur due to erosion and sedimentation during construction. Erosion and sedimentation would be managed through the implementation of a SWPPP and use of BMPs. Decommission of the FRS would result in the following effects to flow characteristics:

- Substrate - Benthic organisms within the impoundment would be permanently displaced. Benthic organisms would reestablish in the stream channel;
- TSS/Turbidity - Construction would temporarily increase average TSS and turbidity levels during project construction. Increased levels are expected to be localized to the immediate area of construction and impacts would be minimized to the greatest extent practicable using appropriate construction BMPs such as soil stabilization and sediment and erosion controls (e.g., turbidity curtain, silt fence, straw bales, mulch socks, and stabilized construction entrance, etc.) and are not expected to have lasting negative effects on water quality. A temporary increase in TSS and turbidity levels would result from the increase in flows downstream of the FRS until sediments and streambanks stabilize;
- Current Patterns of Water Circulation – Patterns of water circulation at the project site would undergo minor changes during construction. Following construction, the absence of the FRS would result in water circulation patterns returning to pre-impoundment conditions; and
- Normal Water Fluctuations - The absence of the FRS will result in normal water fluctuations returning to pre-impoundment conditions.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450’ RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630’ RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway

The High Hazard Potential Rehabilitation Alternatives would reduce the risk of catastrophic breach and the potential impacts to downstream water quality that would result from a sudden catastrophic breach.

Rehabilitation would maintain the function of the dam to collect and store sediment from the upstream watershed but would not restore the natural sediment regime to pre-impoundment conditions. The replacement of the principal spillway conduit (28-inch) with a larger size (42-inch) would result in higher flows being conveyed downstream during routine storm events, but the increase in auxiliary spillway crest elevation would reduce the higher flows conveyed downstream in less frequent storm events. It is not expected that the High Hazard Potential Alternatives would have an impact on the current bacterial impairment in Escondido Creek. Minor, temporary impacts to water quality would occur due to erosion and sedimentation during construction. Erosion and sedimentation would be managed through the implementation of a SWPPP and use of BMPs, such as turbidity curtain, silt fence, straw bales, mulch socks, and stabilized construction entrance. The High Hazard Potential Rehabilitation Alternatives would have temporary and localized effects to substrates, TSS/turbidity, current patterns and circulation, and normal fluctuations during construction. There would minor long-term effects to these flow characteristics following construction, resulting from the increase in downstream flows associated with replacement of the existing 28-inch principal spillway conduit with a 42-inch principal spillway conduit.

5.2.6 Wetlands

Alternative 1 – No Action – Dam Remains until Failure

The No Action Alternative would have no effect on the existing conditions of potential downstream wetlands while dam remains in place, prior to failure. Sudden catastrophic breach has the potential to cause impacts to potential downstream wetlands resulting from the sudden discharge of fill/sediment and large flows. Following catastrophic breach, flood storage would be lost, which would restore the downstream flow regime to pre-impoundment conditions, which could have both positive and negative impacts on potential downstream wetlands. Potential positive permanent impacts could result in natural restoration and/or improving wetland function while potential negative impacts may result in elimination of wetlands due to high flow events or removal of hydrologic connection.

Alternative 2 – Proposed Action – Decommission

The Decommission Alternative would result in the removal of flood storage, restoring the downstream flow regime to pre-impoundment conditions, which could have both positive and negative impacts on potential downstream wetlands. Potential positive impacts could result in restoring and/or improving wetland function while potential negative impacts may result in elimination of wetlands due to high flow events or removal of hydrologic connection.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450’ RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630’ RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway

No impacts to potential downstream wetlands. The continued presence of the dam will maintain protection of potential downstream wetlands during flood events and would not hinder the development of new or function of existing wetlands.

5.2.7 Air Quality

Alternative 1 – No Action – Dam Remains until Failure

Temporary negative impacts (dust and exhaust) to air quality would occur during routine operation and maintenance activities due to increase in vehicle traffic. Following catastrophic failure of the dam, routine O&M would be reduced. Permanent impacts to air quality are not anticipated to occur as a result of Alternative 1.

Alternative 2 – Proposed Action – Decommission

Minor temporary negative impacts (dust and exhaust) to air quality would occur during construction activities due to the increase in equipment and vehicles as well as the earth moving activities. These

impacts are expected to resolve immediately following construction completion. Permanent impacts to air quality are not anticipated to occur as a result of Alternative 2.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450' RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
Minor temporary negative impacts (dust and exhaust) to air quality would occur during construction activities due to the increase in equipment and vehicles as well as the earth moving activities. These impacts are expected to resolve immediately following construction completion. Additionally minor temporary negative impacts (dust and exhaust) to air quality would occur during routine maintenance and would be expected to resolve immediately following completion. Permanent impacts to air quality are not anticipated to occur as a result of these Alternatives.

5.2.8 Fish and Wildlife

Alternative 1 – No Action – Dam Remains until Failure
The No Action Alternative would have no effect on the existing conditions of fish and wildlife while the dam remains in place, prior to failure. Sudden catastrophic breach has the potential to cause significant impacts to downstream fish and wildlife and associated habitat resulting from the sudden discharge of fill/sediment and large flows. Following catastrophic breach, flood storage would be lost, which would restore the downstream flow regime to pre-impoundment conditions. The loss of flood storage would eliminate shallow (approximately 36.6 acres) and deep-water (approximately 4.0 acres) habitat within the current impoundment area by converting it to unimproved riparian habitat, floodplain, or upland. Stream flow would no longer be controlled, resulting in negative impacts and degradation of downstream aquatic and terrestrial wildlife and their habitat through the lack of controlled release of flood waters.

Alternative 2 – Proposed Action – Decommission
The Decommission Alternative would result in the loss of flood storage, restoring the downstream flow regime to pre-impoundment conditions. The loss of flood storage would eliminate shallow (approximately 36.6 acres) and deep-water (approximately 4.0 acres) habitat within the current impoundment area by converting it to unimproved riparian habitat, floodplain, or upland. Stream flow would no longer be controlled, resulting in negative impacts and degradation of downstream aquatic and terrestrial wildlife and their habitat through the lack of controlled release of flood waters. Minor, temporary, localized, adverse impacts to terrestrial habitat may occur from disturbances caused by equipment during construction. Highly mobile species would be expected to leave the area; however, BMPs will be implemented to minimize impacts to less-mobile species during construction. It is expected that wildlife would return to the area post construction and all terrestrial habitat areas would be re-established. All grassland/savanna areas would reestablish quickly and only minimal tree clearing would be expected to be required. Some woodland and forest habitat would be lost due to change in available nutrients and potential destruction from high flow events. However, these impacts are expected to be negligible due to available surrounding resources for fish and wildlife that may inhabit the area.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450' RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
The High Hazard Rehabilitation Alternatives would maintain the existing wildlife and their habitat in the long term as existing conditions would not be permanently impacted. In addition, downstream aquatic and terrestrial wildlife and their habitat would continue to be maintained and protected by controlling the stream flow and providing flood prevention. Minor, temporary impacts to terrestrial and aquatic habitat may occur during construction. Highly mobile terrestrial species would be expected to leave the area; however, BMPs will be implemented to minimize impacts to less-mobile species during construction. It is expected that wildlife would return to the area post construction. All grassland/savanna areas would

reestablish quickly and only minimal tree clearing would be expected to be required. Additionally, all aquatic and riparian areas as well as eliminate shallow (approximately 36.6 acres) and deep-water (approximately 4.0 acres) habitats would be expected to reestablish. Therefore, impacts to fish and wildlife species that may inhabit these areas is anticipated to be negligible.

5.2.9 Invasive Species

Alternative 1 – No Action – Dam Remains until Failure

The No Action Alternative would have no effect on the existing conditions of invasive species while the dam remains in place. While no invasive species were observed, unobserved species may be present surrounding and upstream of the reservoir outside of the investigation area. New invasive species could be introduced to the project site and existing invasive species could be spread within the site during routine maintenance activities if care is not taken to avoid this. The risk of dam breach would remain and if a catastrophic breach does occur, it has the potential to spread invasive species downstream resulting from the sudden discharge of large flows, embankment fill, and sediment.

Alternative 2 – Proposed Action – Decommission

The Decommission Alternative could result in the introduction of new invasive species by construction equipment or spreading of existing invasive species during construction if preventative measures are not taken. Of the invasive species identified in Section 3.3.9, there is a higher risk of introducing invasive plant species which can degrade habitats and push native plants out. All disturbed areas would be revegetated using adapted and/or non-invasive native species. All tools, equipment, and vehicles will be cleaned before transporting materials and before entering and leaving the worksites to prevent the introduction and spread of invasive species.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450’ RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630’ RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway

Same as Alternative 2.

5.2.10 Migratory Birds

Alternative 1 – No Action – Dam Remains until Failure

The No Action Alternative would have no effect on the existing conditions of migratory birds while the dam remains in place, prior to catastrophic failure. The risk of dam breach would remain and if a catastrophic breach does occur, it has the potential to cause short-term significant and negative impacts to downstream migratory birds resulting from tree damage due to the sudden discharge of large flows. Damage and tree removal due to sudden discharge could remove active migratory bird nests and disrupt both ground-nesting and off ground nesting activity.

Alternative 2 – Proposed Action – Decommission

The Decommissioning Alternative may temporarily affect migratory birds during the decommission of the dam if construction activities occur between March 1 and August 31. In accordance with the MBTA the following measures will be implemented:

- Construction activities and vegetation clearing should be conducted outside peak-nesting seasons (March-August) to avoid any adverse effects to the migratory birds and their habitat.
- Should construction and vegetation clearing occur from March through August, active bird nest surveys during vegetation clearing will be conducted daily by a biologist before clearing begins. During construction active bird nest surveys will be conducted by a biologist no more than 5 days prior to planned construction.

- Ground-nesting species such as Killdeer (*Charadrius vociferus*) have the potential to be found on-site. Construction personnel should be made aware of these species, their habits, and regulatory status, and biological monitors clearing areas for construction should take these species into account.
- In the event that migratory birds or their nests are present prior to or during construction, actions should be implemented to ensure migratory birds, their nests, eggs, and young will not be harmed. This can be achieved by establishing buffer distances from the nests in which clearing and construction should not occur until the nests are no longer active. These distances will be determined on a case-by-case basis as different birds require varying buffer distances (e.g., raptor or passerine). Consultation with a qualified biologist will be necessary to determine these buffer distances.

Construction activities, particularly vegetation removal or clearing and grubbing, could remove active migratory bird nests and disrupt nesting activity by discouraging migratory birds from using refuge and cover, foraging, or nesting in the area of activities or adjacent undeveloped habitat. General disturbance due to increased noise, visual, and human activity associated with construction activities could also disrupt nesting activities. However, only minimal tree clearing would be expected to be required. Therefore, impacts to migratory bird species that may inhabit these areas is anticipated to be negligible due to available surrounding habitat.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450' RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
Same as Alternative 2.

5.2.11 Bald and Golden Eagles

Alternative 1 – No Action – Dam Remains until Failure
Bald and Golden Eagles are not anticipated to nest within or immediately downstream of the project area and would only have the potential to occur during hunting and/or stopover; therefore, nests would not be impacted in the event of a catastrophic breach. Additionally, these species are highly mobile and would be expected to flee the area in time to avoid impacts. The No Action Alternative would have no effect on the existing conditions of Bald and Golden Eagles.

Alternative 2 – Proposed Action – Decommission
Since Bald and Golden Eagles are not anticipated to nest within the project area and would only have the potential to occur during hunting and/or stopover, nests would not be impacted. Additionally, these species are highly mobile and would be expected to flee the area of construction in time to avoid impacts. In the event that a Bald or Golden Eagle is observed on or immediately surrounding the site during construction or maintenance, all work will cease and an evaluation on the nesting status of the bird will be completed. If an active nest is identified within 660 feet of active construction, a buffer will be established around the nest and remain in place until all young have fledged to avoid impacts to the nesting individuals. Alternative 2 would have no effect on the existing conditions of Bald and Golden Eagles.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450' RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
Same as Alternative 2.

5.2.12 Riparian Areas

Alternative 1 – No Action – Dam Remains until Failure

The No Action Alternative would have no effect on the existing conditions of riparian areas, which are located along portions of the FRS No. 4 reservoir perimeter and located upstream and downstream of the dam along Doe Branch/Stream 01, while the dam remains in place, prior to catastrophic failure. The risk of catastrophic dam breach would remain and if a catastrophic breach does occur, the sudden discharge of large flows, embankment fill, and sediment would likely damage or destroy downstream shrubland and/or herbaceous riparian vegetation, causing significant impacts. Following catastrophic breach, the elimination of the existing flood storage would eliminate the riparian areas along the perimeter of the existing normal pool, but would restore the pre-impoundment flow regime through the impoundment and downstream, which could result in additional riparian vegetation forming along the stream channel.

Alternative 2 – Proposed Action – Decommission

Following decommission of the dam, the elimination of the existing flood storage within the dam would eliminate the riparian areas along the perimeter of the existing normal pool, but would restore the pre-impoundment flow regime through the impoundment and downstream, which could result in additional riparian vegetation forming along the stream channel.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450’ RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630’ RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway

The High Hazard Potential Rehabilitation Alternatives would result in minor temporary negative impacts during construction. The riparian areas would reestablish surrounding the normal pool area consistent with pre-construction conditions following rehabilitation activities. The normal pool area will remain the same as the existing condition with these alternatives, so the amount of riparian area should not be impacted.

5.2.13 Threatened and Endangered Species

Alternative 1 – No Action – Dam Remains until Failure

The No Action Alternative would have no effect on the existing conditions of threatened and endangered species while the dam remains in place, prior to failure. Based on field investigations, it was determined that suitable habitat for one federal candidate species, the monarch butterfly; and three state threatened species including the sheep frog, White-tailed Hawk, and white-nosed coati may be found within the Study Area. The risk of dam breach would remain and if a catastrophic breach does occur, it could result in negative impacts to the monarch butterfly, sheep frog, White-tailed Hawk, and white-nosed coati potentially located in the Study Area, and to threatened and endangered species that may be located downstream from the sudden discharge of fill/sediment and large flows. This alternative would not be anticipated to permanently eliminate potentially suitable habitat for the monarch butterfly, White-tailed Hawk, or white-nosed coati within the study area; however, potentially suitable habitat for the sheep frog would be permanently eliminated in the event of a catastrophic breach due to the removal of aquatic habitat. Monarch butterfly, White-tailed Hawk, and white-nosed coati habitat damaged in the event of a catastrophic breach would be anticipated to be temporary and would be expected to recover within a year of the event.

Alternative 2 – Proposed Action – Decommission

The federal candidate monarch butterfly, state threatened white-nosed coati, state threatened White-tailed Hawk and state threatened sheep frog have the potential to occur in the Study Area and may be directly affected by the Decommission Alternative through removal of the species’ habitat as well as temporary indirect impacts during construction. Permanent negative impacts to the sheep frog may occur due to permanent habitat removal as well as the monarch butterfly, white-nosed coati, and White-tailed Hawk due to delayed recovery of available habitat. Additionally, temporary negative impacts may occur to these

species during construction due to noise, vibration, and dust. Though the monarch butterfly is not currently protected under federal or state laws and coordination with the USFWS is not required, their listing status should be monitored for changes that may trigger coordination with the USFWS. Based on current listing status, available suitable habitat, and proposed project activities, no effects to federally listed species are anticipated and therefore, no additional studies, coordination, or documentation is required at this time. If studies and coordination are determined to be required for the project based on listing status changes, they will be performed during the design phase of the project. A letter was sent to the USFWS on May 13, 2024, requesting that the agency participate in this project as a cooperating agency. This letter is included in **Appendix A**.

BMPs would be implemented to minimize impacts to state-listed species including performing presence/absence surveys and relocation of individuals outside of the area of impact per TPWD recommendations.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450' RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
The federal candidate monarch butterfly, state threatened white-nosed coati, state threatened White-tailed Hawk and state threatened sheep frog have the potential to occur in the Study Area and may be directly affected by the Rehabilitation Alternatives. These alternatives would not be expected to permanently eliminate suitable habitat for the sheep frog and therefore, impacts would be expected to be minor and temporary in nature occurring only during construction. BMPs would be implemented to minimize impacts to state-listed species including performing presence/absence surveys and relocation of individuals outside of the area of impact per TPWD recommendations.

Permanent negative impacts to the White-tailed Hawk and white-nosed coati may occur due to permanent habitat removal and delayed recovery of available habitat. Shrubland and woodland habitat that may be utilized by the White-tailed Hawk and white-nosed coati would be removed during construction. The cleared area is expected to be less than 10 acres. Sufficient suitable habitat is available surrounding the project and therefore impacts to the White-tailed Hawk and white-nosed coati are expected to be minor. BMPs would be implemented to minimize impacts to state-listed species including performing presence/absence surveys and relocation of individuals outside of the area of impact per TPWD recommendations.

Temporary negative impacts to the monarch butterfly may occur due to permanent habitat removal and delayed recovery of available habitat within the grassland and pasture areas due to construction. The majority of these habitats would be expected to recover within a year. Additionally, grasslands and pastures surrounding the project may support milkweeds and nectar plants for the species would not be impacted. Therefore, impacts to monarch butterfly are expected to be minor. BMPs to minimize impacts to the monarch butterfly would be implemented including:

- Protect and maintain native, herbaceous vegetation wherever possible.
- Use wildflower/native warm-season grass mix to provide wildlife habitat and benefit pollinators and minimize maintenance needs.
- Implement and maintain BMPs for erosion control prior to any land clearing or construction and for the duration of the proposed Project, including the use of natural fiber erosion mesh or matting rather than plastic monofilament that can entangle snakes and other wildlife leading to injury and/or mortality.

Additionally, temporary negative impacts may occur to the monarch butterfly, White-tailed Hawk, white-nosed coati, and sheep frog during construction due to noise, vibration, and dust. Though the monarch butterfly is not currently protected under federal or state laws and coordination with the USFWS is not required, their listing status should be monitored for changes that may trigger coordination with the USFWS. Based on current listing status, available suitable habitat, and proposed project activities, no effects to federally listed species are anticipated and therefore, no additional studies, coordination, or documentation is required at this time. If studies and coordination are determined to be required for the project based on listing status changes, they will be performed during the design phase of the project. A letter was sent to the USFWS on May 13, 2024, requesting that the agency participate in this project as a cooperating agency. This letter is included in **Appendix A.**

5.2.14 Cultural Resources/Historic Properties

Alternative 1 – No Action – Dam Remains until Failure

The No Action Alternative would have no effect on the existing conditions of cultural resources/historic properties while the dam remains in place, prior to failure. The risk of dam breach would remain and if a catastrophic breach does occur, it has the potential to cause significant impacts to any downstream cultural resources/historic properties that are within the inundation area resulting from the sudden discharge of fill/sediment and large flows.

Alternative 2 – Proposed Action – Decommission

Through consultation with the SHPO and relevant Tribal Nations, NRCS has determined that no historic properties are present within the project APE. Decommissioning would therefore have no impact to historic properties within the project APE. However, loss of flood storage from decommissioning would eliminate flood prevention for downstream cultural resources, if any such resources are present, which could be impacted. If it is determined during final design that there are areas outside of the previously surveyed APE that would be impacted, a cultural resources survey may be required for these added areas.

Alternative 3 - High Hazard Potential Rehabilitation (FWFI) – 450-ft RCC Stepped Spillway
Alternative 4 - High Hazard Potential Rehabilitation (FWFI) – 630-ft RCC Stepped Spillway
Alternative 5 - High Hazard Potential Rehabilitation (FWFI) – Labyrinth Weir Spillway

Through consultation with the SHPO and relevant Tribal Nations, NRCS has determined that no historic properties are present within the project APE. Therefore, the proposed rehabilitation for this alternative would have no impacts to historic properties within the project APE. Furthermore, no downstream impacts to cultural resources are anticipated under this alternative.

5.2.15 Land Use

Alternative 1 – No Action – Dam Remains until Failure

The No Action Alternative would have no effect on the existing conditions of land use while the dam remains in place, prior to catastrophic failure. The land use in the upstream watershed has remained consistent for the life of the dam and has experienced limited residential development. The existing land use at the dam is an impounded normal pool at the principal spillway low port elevation of 312.72 feet. There are two Eagle Ford shale gas fracking well pads upstream of the dam that lie below the existing top of dam elevation that would currently be flooded during the FBH event. The area downstream receiving flood damage reduction benefits has also experienced limited residential development since installation of the existing dam.

The risk of dam breach would remain and if a catastrophic sunny day breach does occur, it has the potential to inundate above FFE to 52 homes, eight mobile homes, eight commercial buildings, and one school outbuilding, 24 roads including minor state highways and main local roads, and downstream agricultural lands as a result of the sudden discharge of fill/sediment and large flows. The loss of flood

storage would result in agricultural lands, habitable structures, and road crossings downstream no longer being protected from flooding.

Alternative 2 – Proposed Action – Decommission
The Decommissioning Alternative would affect current and future land use. Impacts to land use would result in downstream agricultural land, habitable structures, and roadway crossings being no longer protected from flooding, but would also remove the risk of catastrophic breach. No major change to land use with the exception of the loss of the normal pool in FRS No. 4 would result from this alterative. The three Eagle Ford wells upstream of the dam would not be impacted by the decommissioning of the dam. The most susceptible land use types to experience increased flooding would primarily include hay/pasture, shrub/scrub, woody wetlands, deciduous forest, and cultivated crops.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450' RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
Alternative 3 and Alternative 4 will result in minimal changes to land use adjacent to FRS No. 4 due to the installation of an RCC stepped overtopping spillway, raise of the vegetated auxiliary spillway, and raise of effective top of dam. The 1% AEP flood pool elevation per the modeling performed for this study would decrease slightly from 329.9 feet (existing) to 329.7 feet with both Alternative 3 and Alternative 4.

Alternative 5 will result in minimal changes to land use adjacent to FRS No. 4 due to the installation of a labyrinth weir overtopping spillway, raise of the vegetated auxiliary spillway, and raise of effective top of dam. The 1% AEP flood pool elevation per the modeling performed for this study would decrease slightly from 329.9 feet in existing to 329.7 feet with Alternative 5.

The top of dam elevation for all three high hazard potential rehabilitation alternatives is above the elevation of the two Eagle Ford well pads upstream of the dam, which is unchanged from the existing condition. All three high hazard potential rehabilitation alternatives would provide increased prevention against breach to properties downstream of the dam. Following investigation of the existing easements for the dam, it may be determined that additional land rights are necessary for these alternatives which will prohibit the future construction of habitable dwellings below the elevation of the acquired land rights. A land rights map is provided in **Appendix C**, **Figure C-11**.

5.2.16 Public Health and Safety

Alternative 1 – No Action – Dam Remains until Failure
The No Action Alternative would have no effect on the existing conditions of public health and safety while the dam remains in place, prior to catastrophic failure. The existing auxiliary spillway does not have the capacity necessary to safely pass the FBH event and would also experience headcutting and stability issues on both vegetated spillway bays. Overtopping the dam could cause the dam to erode and collapse, resulting in a release of the water, sediment stored upstream of the dam, and eroded material from the dam embankment. Behind the dam, the FBH peak WSE would inundate two well pads. The wells would be designed to not allow backflow from surface inundation into the well. Any hazardous material concerns would be addressed by the regulating agency, including the Railroad Commission of Texas and/or the TCEQ.

The risk of dam breach would remain and if a catastrophic breach does occur, it has the potential to cause impacts to 75 homes (52 of which would be inundated by one foot or more), 23 mobile homes (eight of which would be inundated by two feet or more), 15 commercial buildings (eight of which would be inundated by one foot or more), one school outbuilding (inundated by more than one foot), one seasonal use home (inundated by less than one foot) and 24 roadways including minor state highways and main

local roads would be inundated by 1 foot or more as a result of the sudden discharge of fill/sediment and large flows. A catastrophic sunny day breach results in a PAR of 278 people.

Following catastrophic breach, the FRS would no longer provide flood prevention benefits and increased and more frequent flooding could negatively impact public health and safety. Without the dam in place, floodwaters from a 1% AEP storm event would result in the inundation (above the FFE elevation) of 83 homes, 11 mobile homes, and 23 commercial buildings on Escondido Creek and would overtop FM 2102 (Doe Branch) by 1.51 feet (versus 0.09 feet in existing conditions), N 5th Street by 2.55 feet (versus 0.53 feet in existing condition), Helena Rd by 2.22 feet (versus 0.46 feet in existing conditions), County Road 331 by 14.25 feet (versus 13.1 feet in existing conditions), and a private road by 12.7 feet (versus 12.1 feet in existing conditions).

Floodwater from 0.2% AEP storm event without the dam in place would result in the inundation (above the FFE elevation) of 99 homes, 12 mobile homes, and 39 commercial buildings along Escondido Creek. Additionally, FM 2102 on Doe Branch and eight roads along Escondido Creek would be flooded, as detailed in **Section 4.3.2**. Increased development regulations would be required downstream to prevent future public health and safety impacts associated with development within flood prone areas.

Alternative 2 – Proposed Action – Decommission

The Decommissioning Alternative would remove the risk associated with the potential for dam failure but would also remove the flood prevention benefits provided by FRS No. 4. Flows resulting from the 1% AEP storm event would safely pass the constricted breach, but the 1% AEP floodplain would be expanded. Non-structural mitigation measures include 1) property acquisition for three residential structures and one recreational structure that would be flooded above the FFE in the 10% AEP event, 2) raising of 26 residential structures above the 0.2% AEP floodplain, 3) relocation of two mobile homes, and 4) floodproofing of seven other non-residential habitable structures. The number of habitable structures (homes, mobiles homes, and commercial buildings) inundated above the FFE during the modeled 1% AEP, 24-hour storm event on Escondido Creek would increase from 65 to 77 structures. Floodwaters from a 1% AEP, 24-hour storm event would cause increased flooding on five roads (**Table 4-2**).

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450’ RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630’ RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway

The High Hazard Potential Rehabilitation Alternatives allow the dam to continue to provide flood prevention to downstream areas for 100 years following construction and would reduce the risk of catastrophic breach. Upstream of the dam, the 1% AEP flood pool will be slightly lower or identical to the existing condition for all three high hazard alternatives, and no upstream homes will be at risk. The threat to loss of life from failure of the dam would be greatly reduced for all alternatives. The number of habitable structures, comprising commercial buildings, homes, and mobile homes, inundated above the FFE on Escondido Creek during the modeled 1% AEP, 24-hour storm event would remain at 65.

For all three alternatives, the peak water surface elevation in the reservoir during the 1% AEP storm event is 0.2 feet lower than the existing condition. Immediately below the dam to the Doe Branch confluence with Escondido Creek, the water surface elevation will be reduced by a maximum of 0.16 feet for Alternative 3, 0.06 feet for Alternative 4, and no change for Alternative 5 from the existing condition for the 1% AEP event. For all three alternatives along Escondido Creek, the water surface elevation will be adjusted from the existing condition approximately -0.08 feet to 0.06 feet during the 1% AEP event, depending on location.

5.2.17 Social Issues

Alternative 1 – No Action – Dam Remains until Failure

The No Action Alternative would have no effect on the existing conditions of social issues while the dam remains in place, prior to failure. The current dam reduces average annual flood damages from a no-dam situation of $336,000 to $189,000. The risk of catastrophic dam breach would remain and if a catastrophic breach does occur, it has the potential to cause injury and death to residents that live within the dam breach inundation area and could also cause significant property damage. Following a catastrophic breach, the flood prevention benefits provided by the dam would be lost which would result in an increase in the extent and frequency of flooding and would necessitate increased development regulations downstream to reduce the flood risk to the public. Catastrophic breach of the dam could negatively impact community cohesion, as individuals within the community may experience significant injury or property damage, and may need to relocate out of the area due to loss and/or rebuilding restrictions.

Alternative 2 – Proposed Action – Decommission

The Decommission Alternative would remove the flood prevention benefits provided by the dam and would necessitate increased development regulations downstream to reduce the flood risk to the public. Non-structural mitigation measures include 1) property acquisition for three residential structures and one recreational structure that would be flooded above the FFE in the 10% AEP event, 2) raising of 26 residential structures above the 0.2% AEP floodplain, 3) relocation of two mobile homes, and 4) floodproofing of seven other non-residential habitable structures. The removal of flood prevention benefits could negatively impact community cohesion, as individuals within the community would not be impacted consistently by the loss of flood prevention, implementation of mitigation measures, or by the development restrictions. In addition, a portion of the cost of the alternative would be borne by the Sponsors, which receive funding from the community that would no longer be provided flood prevention from the dam. This could also result in a loss of community cohesion as residents may relocate due to the increased flood risk or increased flood damages. This alternative would increase average annual flood damages to $216,000.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450’ RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630’ RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway

The High Hazard Potential Rehabilitation Alternatives will allow downstream flood prevention benefits to continue for 100 years and would avoid the loss of downstream flood prevention and increased development restrictions. A portion of these alternatives’ costs would be borne by the Sponsors, which receive funding from the community. Funding these alternatives may require an increase in taxes/fees to the broader community, which could cause social issues as community members not receiving direct benefits from the rehabilitation are subjected to these increased taxes/fees.

5.2.18 Scoped Ecosystem Services of Concern

Effects of the alternatives on ecosystem services are covered in **Section 4.4** of the Supplemental Plan-EA

5.3 Cumulative Effects

The combined incremental effects of human activities are referred to as cumulative impacts (40 CFR 1508.1). Cumulative impacts are defined by the Council on Environmental Quality (CEQ) regulations in 40 CFR 1508.1 as the “effects on the environment that result from the incremental effects of the proposed action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.”

CEQ recommends that cumulative impacts analysis be narrowed as much as possible to focus on

important issues at a national, regional, or local level (CEQ, 1997). The first step in the cumulative impacts analysis is to identify those cumulative actions which comprise the cumulative impacts scenario (Section 5.3.1). The second step is to analyze how, if at all, the effects of the Proposed Action may contribute to the effects of the cumulative actions, thereby resulting in cumulative impacts (Section 5.3.2).

5.3.1 Cumulative Effects Scenario

Cumulative actions must be addressed in the cumulative impact analysis because their environmental impacts may combine with the impacts of the alternatives. **Section 3.3** provides an inventory of existing resources potentially impacted by each alternative, and **Section 5.2** analyzes the potential direct and indirect environmental impacts to those existing resources by each alternative. This section identifies specific projects and programs, both public and private sector, as well as more general demographic and environmental (e.g., climate change) trends that could contribute to those environmental impacts.

Flood Control Structure Construction in Watershed

The sponsors and NRCS have constructed 13 NRCS flood control structures in the Escondido Creek Watershed. This system of upstream impoundments provides a network of flood prevention for local residents as well as farmland adjacent to the Escondido Creek and its tributaries, including Doe Branch. While the dams provide many downstream flood control benefits, their construction has resulted in miles of free-flowing, riverine habitat being disturbed and converted into dams that moderate overall flows and affect water currents and flow regimes. Implementation of these actions has had effects on the Escondido Creek watershed, including downstream habitat loss and degradation, potential introduction of invasive species, and modification of flow and water temperature conditions.

Construction of FRS No. 4 has had long-term direct effects on the environment through the excavation of the site and development of an impoundment upstream from the dam that now provides flood control, wildlife habitat, and other incidental benefits. The dam has reduced downstream peak flows during storm events, and consequently protects property and people in otherwise flood-prone areas. The dam has also impacted the downstream natural flow and sediment regime and habitat that existed prior to construction.

FRS No. 4 was designed and constructed as a low hazard potential class structure with a primary purpose of flood prevention. The classification of FRS No. 4 was changed to a high hazard potential class structure due to the presence of downstream development and roads that would be impacted in the event of a dam failure. FRS No. 4 does not meet current NRCS and State of Texas Dam Safety Program dam design, safety criteria, and performance standards for high hazard potential class dams.

Currently, Escondido Creek FRS No. 1, FRS No. 4, and FRS No. 12 are all undergoing the NRCS rehabilitation planning process. The preferred alternatives for FRS No. 1 and FRS No. 12 are presented in Supplemental Watershed Work Plan Agreements No. III and No. V, respectively. The preferred alternative for FRS No. 1 is high hazard potential rehabilitation including a replacement principal spillway riser and conduit system, vegetated auxiliary spillway crest raise, lining the lower portion of the vegetated auxiliary spillway with ACB, and dam crest raise. The preferred alternative for FRS No. 12 is high hazard potential rehabilitation including a secondary principal spillway riser and conduit system, vegetated auxiliary spillway crest raise, secondary labyrinth weir auxiliary spillway, and dam crest raise. These projects are on a similar planning, design, and implementation schedule as FRS No. 4. The effects of these relevant projects were considered when evaluating the impacts of FRS No. 4.

All of the alternatives considered for FRS No. 4, including No Action, would have effects on the watershed that could be cumulative to effects from No Action or rehabilitation of other dams in the watershed. The degree and length of the effects would vary by alternative.

Population Growth

As shown in **Table 5-1**, Karnes County's population decreased from approximately 15,400 residents in the year 2000 to approximately 15,000 residents in 2023 with a year on year change of between -3.38% and 3.35% per year. The average year on year change for 2000-2023 is -0.11%. There is no current indication that the growth rate will change significantly in the future, but it is possible that Karnes County could experience a population increase and therefore, this scenario was considered.

Table 5-1. Annual Population Changes in Karnes County, Texas

Year	Population	Year on Year Change	Change in Percent
2000	15,416	-	-
2001	15,394	-22	-0.14%
2002	15,264	-130	-0.84%
2003	15,239	-25	-0.16%
2004	15,260	21	0.14%
2005	15,152	-108	-0.71%
2006	15,202	50	0.33%
2007	15,152	-50	-0.33%
2008	15,152	-	-
2009	15,132	-20	-0.13%
2010	14,886	-246	-1.63%
2011	14,955	69	0.46%
2012	14,857	-98	-0.66%
2013	14,729	-128	-0.86%
2014	14,907	178	1.21%
2015	15,407	500	3.35%
2016	15,513	106	0.69%
2017	15,590	77	0.50%
2018	15,715	125	0.80%
2019	15,356	-359	-2.28%
2020	14,760	-596	-3.88%
2021	14,732	-28	-0.19%
2022	14,945	213	1.45%
2023	15,018	73	0.49%

Karnes County, TX Population by Year - 2024 Update | Neilsberg

Agricultural Development

As shown in **Table 5-2**, the number of operations utilizing cropland and the total acres of cropland in Karnes County has declined between the years of 1997 and 2022. Based on these trends, it is expected that the number of operations utilizing cropland and the number of total cropland areas will continue to decline in the future.

Climate Change

Long-term changes in the climate would substantially alter physical and ecological conditions within the watershed and result in cascading changes throughout both the natural and human environment. The most notable climate-related risks consist of more intense and extreme weather events, increased drought conditions, and increased flooding events.

Table 5-2. Annual Changes in Cropland Acreage and Operations in Karnes County, Texas

Year	Cropland – Number of Operations	Cropland – Total Areas (Acres)
1997	901	163,039
2002	801	164,746
2007	768	104,454
2012	642	82,701
2017	569	75,016
2022	474	68,844

Source: USDA/NASS QuickStats Ad-hoc Query Tool

Higher future average temperatures are projected for this area. It is projected that average annual temperatures could increase by 2.2 ºF by 2035 and 4.2 ºF by 2060 under a central climate change scenario (USEPA, 2024). This increase in average annual temperature could increase drought conditions due to less frequent summer precipitation and high temperatures. It is projected that average annual precipitation would decrease by 1.4% by 2035 and decrease by 2.8% by 2060 under a central climate change scenario (USEPA, 2024). Extreme weather events and drought conditions could increase flood risk, which could affect soil formation, erosion processes, and streambank stabilization. The change in 100-year storm intensity is estimated to increase 21.0% by 2035 and 40.9% by 2060 under a "stormy" scenario (USEPA, 2024). Flooding-induced damage to infrastructure, vegetation, and land would vary based on the severity of the flooding event. Vegetation would also be increasingly stressed from water, heat, and nutrients, especially as drought and storm frequency and severity increase over time. Aquatic and terrestrial habitat would likely decline in quality and extent. Stress and disturbances reduce the fitness of some species and favor those resistant to heat and water stress and capable of exploiting physical disturbances. Among those able to take advantage of disturbances and stressful environments are invasive species; invasive species could outcompete native species under more stressful conditions, which could lead to ecological degradation and an increase in the number of listed protected species. Aquatic resources, such as rivers, lakes, and wetlands, would also face increased pressures in the foreseeable future, especially from changes in weather patterns, sedimentation, and water quality due to climate change.

Climate change would pose health, safety, and flooding risks to communities in the region. Extreme precipitation events that cause severe flooding could result in greater levels of flood damage to infrastructure and structures, along with increasing the risk to human life and livelihood. Floodplain areas would likely be expanded because of climate change, which could threaten culturally relevant historical and natural resources. Floodplain expansion and more extreme weather events would be expected to be more costly due to the increasing intensity of these events. Government entities and residents may need to invest more money to prepare and recover from damage incurred by climate change (i.e., practice climate adaptation).

5.3.2 Cumulative Impacts Analysis

As required by NEPA, the NRCS has prepared the following assessment of cumulative impacts related to the alternatives being considered.

Prime Farmland and Farmland of Statewide Importance

Alternative 1 – No Action – Dam Remains until Failure

In addition to impacts of climate change and the decrease in the number of acres of cropland, catastrophic dam failure would likely damage or destroy agricultural land in the riparian corridors, though much of this land may have already reverted from agricultural use to riparian habitat. Following failure, the loss of flood storage would subject downstream croplands to more frequent flooding. The net cumulative effects

of this alternative in consideration with the planned FRS No. 1 and FRS No. 12 rehabilitation would be direct, adverse, major, long term, and localized in extent.

Alternative 2 – Proposed Action – Decommission
In addition to impacts of climate change and the decrease in the number of acres of croplands, decommission would subject downstream croplands to more frequent flooding. The net cumulative effects of this alternative in consideration with the planned FRS No. 1 and FRS No. 12 rehabilitation would be direct, adverse, major, long term, and localized in extent.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450' RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
The FRS No. 4 rehabilitation alternatives considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would only minimally contribute to cumulative effects due to increased discharges in more frequent storm events resulting from the increased principal spillway conduit capacity on all three dams but would still be subject to adverse cumulative effects related to climate change that may make farmland in the study area less suitable for agriculture. While all three FRS No. 4 rehabilitation alternatives leave the dam in place and would continue the original dam's conversion of agricultural land to non-agricultural use at the dam and impoundment site, it is unlikely that removing FRS No. 1, FRS No. 4, or FRS No. 12 would reverse this impact as there is little demand for additional agricultural use in the catchment areas above the dams.

<u>Erosion and Sediment</u>
Alternative 1 – No Action – Dam Remains until Failure
In addition to impacts of climate change, catastrophic dam failure would likely cause an increase in downstream erosion and sedimentation due to the release of uncontrolled flows during a catastrophic breach. The loss in flood storage following the breach would result in increased discharges due to the passage of uncontrolled flows which could increase downstream erosion and sedimentation until the streambanks stabilize. The net cumulative effects of this alternative in consideration with the planned FRS No. 1 and FRS No. 12 rehabilitation would be direct, adverse, major, long term, and localized in extent.

Alternative 2 – Proposed Action – Decommission
In addition to impacts of climate change, decommission would likely cause an increase in erosion and sedimentation due to the passage of uncontrolled flows following decommission. The net cumulative effects of this alternative would be direct, adverse, major, long term, and localized in extent. These long-term effects would be incremental to other regional impacts to erosion and sedimentation resulting from future development, conversion of agricultural lands to other land uses, and the planned FRS No. 1 and FRS No. 12 rehabilitation.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450' RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
The FRS No. 4 rehabilitation alternatives considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would only minimally contribute to cumulative effects due to increased discharges in more frequent storm events resulting from the increased principal spillway conduit capacity on all three dams but would still be subject to adverse cumulative effects related to climate change that may increase downstream erosion and sedimentation.

Floodplain Management

Alternative 1 – No Action – Dam Remains until Failure

In addition to impacts of climate change, the loss of flood storage following catastrophic dam failure would cause an expansion of the regulatory floodplain as a result of uncontrolled flows being conveyed downstream. The net cumulative effects of this alternative when considered with the planned FRS No. 1 and FRS No. 12 rehabilitation would be direct, adverse, major, long term, and localized in extent.

Alternative 2 – Proposed Action – Decommission

In addition to impacts of climate change, the loss of flood storage following decommission would cause an expansion of the regulatory floodplain as a result of uncontrolled flows being conveyed downstream. The net cumulative effects of this alternative when considered with the planned FRS No. 1 and FRS No. 12 rehabilitation would be direct, adverse, major, long term, and localized in extent.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450’ RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630’ RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway

The FRS No. 4 rehabilitation alternatives considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would have minor cumulative effects as both alternatives would reduce the regulatory floodplain area on Escondido Creek (8 acre reduction) but would still be subject to adverse cumulative effects related to climate change that may expand the regulatory floodplain. The number of habitable structures inundated above the FFE during the modeled 1% AEP, 24-hour storm event would remain the same as existing at 65. The net cumulative effects of these alternative would be direct, adverse, minor to negligible, long term, and localized in extent.

Waterbodies (Waters of the United States)

Alternative 1 – No Action – Dam Remains until Failure

In addition to impacts of climate change, the catastrophic dam failure would heavily impact the quality of WOTUS downstream of the dam as a result of the sudden release of impounded water and sediment. The loss of flood storage following the failure would impact the quality of WOTUS downstream of the dam resulting from uncontrolled flows being conveyed downstream and sediment no longer impounded in the FRS. The net cumulative effects of this alternative when considered with the planned FRS No. 1 and FRS No. 12 rehabilitation would be direct, adverse, major, long term, and localized in extent.

Alternative 2 – Proposed Action – Decommission

In addition to impacts of climate change, the loss of flood storage following decommissioning would impact the quality of WOTUS downstream of the dam resulting from uncontrolled flows being conveyed downstream and sediment no longer impounded in the FRS. The net cumulative effects of this alternative in consideration with the planned FRS No. 1 and FRS No. 12 rehabilitation would be direct, minor, short term, and localized in extent.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450’ RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630’ RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway

The FRS No. 4 rehabilitation alternatives considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would continue the impacts of dam placement and reservoir inundation but would not cause additional impacts. Climate change would impact WOTUS throughout the FRS No. 4 study area and the Escondido Creek watershed.

Water Quality

Alternative 1 – No Action – Dam Remains until Failure

In addition to impacts of climate change, the catastrophic dam failure and the loss of sediment storage following the failure would heavily impact downstream water quality. Sediment that has deposited upstream of the dam over its life would not be stabilized and would therefore migrate downstream, likely with a large initial pulse of sediment to the downstream system, with additional pulses of sediment transport occurring during storm events for some time. Following the initial release, sediment transport and increased flow would occur during storm events. The net cumulative effects of this alternative in consideration with the planned FRS No. 1 and FRS No. 12 rehabilitation would be direct, adverse, major, long term, and localized in extent.

Alternative 2 – Proposed Action – Decommission

In addition to impacts of climate change, the loss of sediment storage following decommission would impact downstream water quality as sediment transport and increased flow would occur during storm events. The net cumulative effects of this alternative in consideration with the planned FRS No. 1 and FRS No. 12 rehabilitation would be direct, adverse, minor, long term, and localized in extent.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450’ RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630’ RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway

The FRS No. 4 rehabilitation alternatives considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would minimally contribute to cumulative effects due to increased discharges in more frequent storm events resulting from the increased principal spillway conduit capacity on all three dams but would still be subject to adverse cumulative effects related to climate change that may decrease downstream water quality. The rehabilitation alternatives would not contribute cumulatively to the release of additional pollutants into Doe Branch and Escondido Creek that could cause these waters to become listed on EPA’s CWA Section 303(d) list of impaired waters.

Wetlands

Alternative 1 – No Action – Dam Remains until Failure

In addition to impacts of climate change, the catastrophic dam failure and the loss of flood and sediment storage following the failure would heavily impact the quality of wetlands downstream of the dam as the deposited sediment upstream of the dam would not be stabilized and would therefore migrate downstream, likely with a large initial pulse of sediment to the downstream system, with additional pulses of sediment transport occurring during storm events. The net cumulative effects of this alternative in consideration with the planned FRS No. 1 and FRS No. 12 rehabilitation would be direct, adverse, major, long term, and localized in extent.

Alternative 2 – Proposed Action – Decommission

In addition to impacts of climate change, potential positive long-term impacts to potential downstream wetlands could occur through dam removal and the conversion back to the free-flowing streams that existed prior to the dam being constructed by creating, restoring, and/or improving wetland function while potential negative impacts may result in elimination of wetlands as a result high flow events or removal of hydrologic connection. The net cumulative effect of this alternative in consideration with the planned FRS No. 1 and FRS No. 12 rehabilitation would be direct, beneficial and adverse, major, long term, and localized in extent.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450' RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
The FRS No. 4 rehabilitation alternatives considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would continue the impacts of dam placement and reservoir inundation but would not cause additional impacts. Climate change would continue to impact wetlands throughout the analysis area.

Air Quality
Alternative 1 – No Action – Dam Remains until Failure
Temporary negative impacts (dust and exhaust) to air quality would occur during routine O&M of FRS No. 4 until failure and during routine O&M of all other active dams in the Escondido Creek Watershed. The would be no cumulative impacts of catastrophic FRS No. 4 dam failure on air quality, but the watershed would still be subject to adverse cumulative effects related to population growth that may impact air quality.

Alternative 2 – Proposed Action – Decommission
In addition to impacts from population increases on air quality resulting from increased emissions, Alternative 2 would contribute dust and exhaust emissions from equipment utilized during construction. These impacts in consideration with the planned FRS No. 1 and FRS No. 12 rehabilitation construction activities are anticipated to be minor, short term, and localized. Alternative 2 would also require ongoing O&M, which would contribute dust and exhaust emissions from equipment utilized during O&M activities. The cumulative impacts for all active dams and decommissioned areas in the Escondido Creek Watershed are anticipated to be minor, long term, and localized.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450' RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
In addition to impacts from population increases on air quality resulting from increased emissions, the rehabilitation alternatives would contribute dust and exhaust emissions from equipment utilized during construction. These impacts in consideration with the planned FRS No. 1 and FRS No. 12 rehabilitation construction activities are anticipated to be minor, short term, and localized. The rehabilitation alternatives would also require ongoing O&M, which would contribute dust and exhaust emissions from equipment utilized during O&M activities. These cumulative impacts for all active dams are anticipated to be minor, long term, and localized.

Fish and Wildlife
Alternative 1 – No Action – Dam Remains until Failure
Cumulative impacts from climate change could affect fish and wildlife in a variety of ways, such as habitat destruction from more frequent and intense storms; heat stress; invasive species, pathogens, and disease; shifts in habitat ranges due to changing climate conditions; and others. In addition to impacts of climate change, catastrophic dam failure would likely damage or destroy downstream vegetation and riparian habitat, which would adversely affect habitats for species and could displace, injure, or kill individuals unable to avoid the breach wave. Erosion of upland habitat areas from a failure event would also reduce the availability of upland habitat areas. Sedimentation and turbidity could affect water quality conditions for aquatic species, and the breach wave could entrain species downstream into waters with unfavorable water quality conditions. However, the reduction in suitable habitat overall would likely be relatively small and the potential for injury or mortality of any individual species would be very low; these effects would likely not impact the long-term population size of any aquatic or terrestrial species in the area. Following breach and the loss of flood storage, uncontrolled flows would have temporary, minor impacts on downstream habitat and aquatic species, until the downstream channel stabilizes. Therefore,

Alternative 1 in consideration with the planned FRS No. 1 and FRS No. 12 rehabilitation would contribute minor cumulative impacts to fish and wildlife.

Alternative 2 – Proposed Action – Decommission
In addition to impacts from climate change, following decommission and the loss of flood storage, uncontrolled flows would have temporary, minor impacts on downstream habitat and aquatic species, until the downstream streambanks stabilize. Potential positive long-term impacts to fish and wildlife could occur through dam removal and the conversion back to the free-flowing streams that existed prior to the dam being constructed by an increase in available habitat resources. Therefore, Alternative 2 considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would contribute minor cumulative impacts to fish and wildlife.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450' RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
The FRS No. 4 rehabilitation alternatives considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would minimally contribute to cumulative effects due to increased discharges in more frequent storm events resulting from the increased principal spillway conduit capacity on all three dams but would still be subject to adverse cumulative effects related to climate change that may impact fish and wildlife.

Invasive Species
Alternative 1 – No Action – Dam Remains until Failure
Population growth would contribute potential cumulative adverse effects, as with population increases there is a higher possibility of introduction and/or spread of invasive species. Climate change could cumulatively contribute to invasives by potentially fostering the arrival of new and exotic species in the region. Disturbances caused by dam failure could present opportunities for invasive species to colonize new areas before native species have a chance to grow back. Following breach of the dam, uncontrolled flows resulting would continue to cause disturbances until streambanks stabilize. However, the amount of disturbed space resulting from the breach and loss of flood storage considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would likely be relatively small, and the chances for invasive species to be introduced in these areas are very low. Therefore, Alternative 1 would contribute negligible cumulative impacts to invasive species.

Alternative 2 – Proposed Action – Decommission
In addition to impacts from population growth and climate change, Alternative 2 considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would contribute minor temporary negative impacts to invasive species as a result of disturbed areas and the possible introduction/spread of invasive species to the site caused by equipment used for construction. Following decommission of the dam, uncontrolled flows would cause downstream disturbances until streambanks stabilize. However, the amount of disturbed space resulting from the loss of flood storage would likely be relatively small, and the chances for invasive species to be introduced in these areas are very low. Therefore, Alternative 2 would contribute negligible cumulative impacts to invasive species.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450' RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
In addition to impacts from population growth and climate change, the FRS No. 4 rehabilitation alternatives considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would contribute minor temporary negative impacts to invasive species as a result of disturbed areas and the possible introduction/spread of invasive species to the site caused by equipment used for construction. Following

construction, increased discharges during more frequent storm events resulting from the increased principal spillway conduit capacity on all three dams would cause downstream disturbances until streambanks stabilize. However, the amount of disturbed space resulting from the increased discharges would likely be relatively small, and the chances for invasive species to be introduced in these areas are very low. Therefore, Alternatives 3, 4, and 5 would contribute negligible cumulative impacts to invasive species.

Migratory Birds

Alternative 1 – No Action – Dam Remains until Failure

Population growth would contribute potential cumulative adverse effects to migratory birds as increased development can reduce or damage habitat. Depending on the species, cumulative impacts to migratory birds are possible from climate change via a variety of potential pathways, including the northward shift of ranges of other birds; the arrival of invasive species of birds, predators, pathogens, and disease; heat stress; effects from more frequent, intense storm events; and others. In the event of catastrophic breach, temporary, but significant negative impacts to migratory birds would occur. Downstream vegetation and riparian habitat would likely be damaged and destroyed, which would adversely affect roosting, foraging, or resting habitat for migratory birds. However, migratory birds would likely use adjacent habitat until disturbed areas recovered from dam failure. Following breach of the dam considered with the planned rehabilitation of FRS No. 1 and FRS No. 12, potential negative long-term impacts to migratory birds could result from minor loss of habitat. Uncontrolled flows resulting from the loss of flood storage would continue to cause disturbances to downstream vegetation and riparian habitat until the downstream vegetation and streambanks stabilize. Therefore, Alternative 1, would contribute moderate cumulative impacts to migratory birds.

Alternative 2 – Proposed Action – Decommission

In addition to impacts from population growth and climate change, Alternative 2 considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would contribute minor negative impacts to migratory birds as a result of disturbances caused by equipment used for construction. Following decommission of the dam, potential negative long-term impacts to migratory birds could result from minor loss of habitat. Uncontrolled flows resulting from the loss of flood storage would cause disturbances to downstream vegetation and riparian habitat until vegetation and streambanks stabilize. However, the amount of disturbed space resulting from the loss of flood storage would likely be relatively small, and migratory birds would likely use adjacent habitat until disturbed areas stabilize. Therefore, Alternative 2 would contribute minor cumulative impacts to migratory birds.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450’ RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630’ RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway

In addition to impacts from population and climate change, the FRS No. 4 rehabilitation alternatives considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would contribute minor temporary negative impacts to migratory birds as a result of disturbances caused by equipment used for construction. Following construction, increased discharges during more frequent storm events resulting from the increased principal spillway conduit capacity on all three dams would cause disturbances to downstream vegetation and riparian habitat until vegetation and streambanks stabilize. However, the amount of disturbed space resulting from the increased discharges would likely be relatively small, and migratory birds would likely use adjacent habitat until disturbed areas stabilize. Therefore, Alternatives 3, 4, and 5 would contribute negligible cumulative impacts to migratory birds.

Bald and Golden Eagles

Alternative 1 – No Action – Dam Remains until Failure

Population growth would contribute potential cumulative adverse effects to bald and golden eagles as increased development can reduce or damage habitat. Cumulative impacts to bald and golden eagles are possible from climate change via a variety of potential pathways, including the northward shift of ranges of other birds; the arrival of predators, pathogens, and disease; heat stress; effects from more frequent, intense storm events; and others. In the event of catastrophic breach considered with the planned rehabilitation of FRS No. 1 and FRS No. 12, downstream hunting and foraging areas for eagles would be disrupted during the initial breach as well as during high-flow storm events. However, bald and golden eagles would likely use adjacent habitat until disturbed areas recovered from dam failure. Therefore, Alternative 1, would contribute negligible cumulative impacts to bald and golden eagles.

Alternative 2 – Proposed Action – Decommission

In addition to impacts from population growth and climate change, following decommission of the dam, uncontrolled flows resulting from the loss of flood storage would cause disturbances to downstream hunting and foraging areas for eagles. However, the amount of disturbed space resulting from the loss of flood storage considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would likely be relatively small, and bald and golden eagles would likely use adjacent habitat until high flows recede. Therefore, Alternative 2 would contribute negligible cumulative impacts to bald and golden eagles.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450’ RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630’ RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway

Cumulative impacts to bald and golden eagles are possible from climate change via a variety of potential pathways, including the northward shift of ranges of other birds; the arrival of predators, pathogens, and disease; heat stress; effects from more frequent, intense storm events; and others. The FRS No. 4 rehabilitation alternatives considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would maintain protection of downstream hunting and foraging habitat during high-flow storm events. The minor increase in routine discharges may cause minimal disturbance to downstream foraging and hunting areas for eagles. However, the amount of disturbed space resulting from the routine increased discharges on all three dams would likely be relatively small, and bald and golden eagles would likely use adjacent habitat until high flows recede. Therefore, Alternatives 3, 4, and 5 would contribute negligible cumulative impacts to bald and golden eagles.

Riparian Areas

Alternative 1 – No Action – Dam Remains until Failure

Cumulative impacts from climate change could affect riparian areas in a variety of ways, including destruction and lower quality from more frequent and intense storms and heat stress from drought conditions. Alternative 1 considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would contribute minor cumulative impacts to riparian areas.

Alternative 2 – Proposed Action – Decommission

In addition to the adverse impacts from climate change, decommissioning would reverse the impacts associated with original placement of dams and reservoirs. Alternative 2 considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would contribute minor cumulative impacts to riparian areas.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450’ RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630’ RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway

The FRS No. 4 rehabilitation alternatives considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would not contribute to cumulative effects but would still be subject to adverse cumulative

effects related to climate changes. Impacts to riparian areas from the original placement of the Escondido Creek dams would remain.

Threatened and Endangered Species

Alternative 1 – No Action – Dam Remains until Failure

Cumulative actions related to habitat loss and urban development (population growth and economic development, agricultural development) would contribute potential cumulative adverse effects. Cumulative impacts from climate change could affect threatened and endangered species in a variety of ways, such as habitat destruction from more frequent and intense storms; heat stress; invasive species, pathogens, and disease; shifts in habitat ranges due to changing climate conditions; and others. In addition, catastrophic dam failure would likely damage or destroy downstream vegetation and riparian habitat, which would adversely affect habitats for threatened and endangered species and could displace, injure, or kill individuals unable to avoid the breach wave. Erosion of upland habitat areas from a failure event would also reduce the availability of suitable habitat areas. Aquatic species, including the sheep frog, could be affected by adverse water quality conditions due to sedimentation and turbidity, or entrained downstream into waters with unfavorable water quality conditions. However, the reduction in suitable habitat overall would likely be relatively small and the potential for injury or mortality of any individual species would be very low; these effects would likely not impact the long-term population size of any aquatic or terrestrial threatened and endangered species in the area. Following breach and the loss of flood storage, uncontrolled flows would have temporary, minor impacts on downstream habitat and aquatic species. Alternative 1 considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would contribute minor cumulative impacts to threatened and endangered species.

Alternative 2 – Proposed Action – Decommission

Alternative 2 would have cumulative impacts similar to those described under Alternative 1. Alternative 2 would contribute minor cumulative impacts to special status species.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450’ RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630’ RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway

The FRS No. 4 rehabilitation alternatives considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would minimally contribute to cumulative effects due to increased discharges in more frequent storm events resulting from the increased principal spillway conduit capacity on all three dams but would still be subject to adverse cumulative effects related to climate change and urban development that may impact threatened and endangered species. The net cumulative effects of these alternative considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would be direct, adverse, minor to negligible, long term, and localized in extent.

Cultural Resources/Historic Properties

Alternative 1 – No Action – Dam Remains until Failure

Cultural resources will likely be affected by conditions associated with climate change. As resources age, more become eligible for consideration and protection under NHPA and related statutes. The effects of time and floodplain expansion/encroachment are expected to continue to degrade historic resources. This process may be accelerated by climate change. Catastrophic dam failure would adversely affect any downstream cultural resources located within the breach inundation area. Following catastrophic dam failure, the loss of flood storage would cause adverse impacts to downstream cultural resources as a result of increased flooding. The net cumulative effects of this alternative considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would be direct, adverse, minor or major depending on whether there are cultural resources located within the breach inundation area, long term, and localized in extent.

Alternative 2 – Proposed Action – Decommission
In addition to impacts of climate change, the loss of flood storage following decommission would cause adverse impacts to downstream cultural resources resulting from increased flooding. The net cumulative effects of this alternative considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would be direct, adverse, minor or major depending on whether there are cultural resources located within the area of increased flooding, long term, and localized in extent.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450' RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
The FRS No. 4 rehabilitation alternatives considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would minimally contribute to cumulative effects due to increased discharges in more frequent storms resulting from the increased principal spillway conduit capacity on all three dams but would still be subject to adverse cumulative effects related to climate change that may impact cultural resources. The net cumulative effects of these alternatives would be direct, adverse, minor to negligible, long term, and localized in extent.

Land Use
Alternative 1 – No Action – Dam Remains until Failure
In addition to adverse impacts of climate change and population growth, catastrophic dam failure of one or more Escondido Creek dams would adversely affect all land uses in the breach inundation areas, which are primarily hay/pasture, shrub/scrub, and cultivated crops. The loss of flood storage following catastrophic dam failure would cause an expansion of floodplains and would adversely affect land use. The net cumulative effects of this alternative would be direct, adverse, major, long term, and localized in extent.

Alternative 2 – Proposed Action – Decommission
In addition to impacts of climate change, the loss of flood storage following decommission considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would cause an expansion of floodplains along Doe Branch and Escondido Creek and would adversely affect land use. The net cumulative effects of this alternative would be direct, adverse, major, long term, and localized in extent.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450' RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
The FRS No. 4 rehabilitation alternatives considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 discharge more flow routinely into Doe Branch and Escondido Creek. The adjusted floodplain due to adjusted discharge from all three rehabilitated dams would minimally contribute to cumulative effects but would still be subject to adverse cumulative effects related to climate change that may expand the regulatory floodplain. The net cumulative effects of these alternative would be direct, adverse, minor to negligible, long term, and localized in extent.

Public Health and Safety
Alternative 1 – No Action – Dam Remains until Failure
In addition to adverse impacts to public health and safety from climate change, catastrophic dam failure of one or more Escondido Creek dams would adversely affect public health and safety for the breach inundation areas due to habitable structure inundation and roadway overtopping. Catastrophic sunny day failure of FRS No. 4 could result in inundation above the FFE and damages (per economic analysis) to 69 habitable structures and 24 downstream roads. Following catastrophic dam failure of FRS No. 4, floodwaters from a 1% AEP storm event would result in the inundation (above the FFE) of 83 homes, 11 mobile homes, 23 commercial buildings, and would overtop FM 2102, N 5th Street, Helena Rd, County

Road 331, and a private road. The net cumulative effects of this alternative would be direct, adverse, major, long term, and localized in extent.

Alternative 2 – Proposed Action – Decommission
In addition to impacts of climate change, the loss of flood storage following decommission would cause adverse impacts to public health and safety. The number of habitable structures (commercial buildings, homes, and mobile homes) inundated above the FFE during the modeled 1% AEP, 24-hour storm event would increase from 65 to 77 structures. Floodwaters from a 1% AEP, 24-hour flood would also cause increased flooding on five roads. The net cumulative effects of this alternative would be direct, adverse, major, long term, and localized in extent. The net cumulative effects of this alternative considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would be direct, adverse, major, long term, and localized in extent.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450' RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
The FRS No. 4 rehabilitation alternatives considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 would minimally contribute to cumulative effects due to increased discharges in routine storm events resulting from the increased principal spillway capacity on all three dams. These alternatives would still be subject to adverse cumulative effects related to climate change that may impact public health and safety.

A cumulative impacts evaluation for Alternative 5 considered with the planned rehabilitation of FRS No. 1 and FRS No. 12 was performed along Escondido Creek. Depending on the location, the water surface elevation along Escondido Creek during 1% AEP storm events is estimated to increase by 0 to 0.37 feet due to cumulative impacts. Roadway overtopping impacts for this evaluation are provided in **Table 5-3**, which shows the changes in flooding depth at the 1% AEP event range from -0.01 feet to 0.08 feet, depending on location and at the 0.2% AEP event shows a decrease in flooding at all evaluated roadways.

Potential positive long-term impacts to public safety would occur, as rehabilitation of all three dams would reduce the risk of catastrophic breach. The net cumulative effects of FRS No. 1, FRS No. 4, and FRS No. 12 rehabilitation alternatives would be direct, positive, minor, long term, and localized in extent.

<u>Social Issues</u>
Alternative 1 – No Action – Dam Remains until Failure
Climate change and population growth could result in adverse impacts to community cohesion as a result of individuals being impacted differently by the increased risk of flooding and drought. Catastrophic dam failure of one or more dams in Escondido Creek would adversely affect community cohesion as populations within the breach inundation area would be impacted differently than those located outside of the breach inundation area. Following catastrophic dam failure, the loss of flood storage would result in increased downstream flooding and expansion of the regulatory floodplain. Increased flooding and expansion of the regulatory floodplain would not affect all individuals equally. The net cumulative effects of this alternative would be direct, adverse, major, and long term in extent.

Alternative 2 – Proposed Action – Decommission
In addition to impacts of climate change and population growth, the loss of flood storage would cause adverse impacts to community cohesion. Following decommission, the risk of dam breach would be removed but the loss of flood storage would result in increased downstream flooding and expansion of the regulatory floodplain. Increased flooding and expansion of the regulatory floodplain would not affect all individuals equally. If local taxes or fees are increased as a result of the Sponsor cost share requirements for the decommission, this could impact individuals within the Sponsors' taxing jurisdiction, but not those

located outside of the taxing jurisdiction. In addition, increased development regulations and mitigation measures would be required downstream due to the expanded floodplain which could also adversely impact some individuals and not others. The net cumulative effects of this alternative would be direct, adverse, major, long term, and localized in extent.

Alternative 3 – Proposed Action – High Hazard Rehabilitation: 450' RCC Stepped Spillway
Alternative 4 – Proposed Action – High Hazard Rehabilitation: 630' RCC Stepped Spillway
Alternative 5 – Proposed Action – High Hazard Rehabilitation: Labyrinth Weir Spillway
In addition to impacts of climate change and population growth, the rehabilitation alternatives would minimally contribute to cumulative effects on community cohesion from flooding due to increased discharges in more frequent storms resulting from the increased principal spillway conduit size. If local taxes or fees are increased as a result of the Sponsor cost share requirements for the rehabilitation, this could impact individuals within the Sponsors' taxing jurisdiction, but not those located outside of the taxing jurisdiction. The net cumulative effects of these alternatives would be direct, adverse, minor to negligible, long term, and localized in extent.

Table 5-3. Cumulative Impact Analysis Preferred Alternatives Roadway Induced Flooding During 50%, 1%, and 0.2% AEP Events

Creek Name	Road Segment	Orientation to Creek	Annual Average Daily Traffic (AADT)	Depth Overtop Existing Condition (ft)			Depth Overtop Cumulative Scenario (ft)			Depth of Overtopping Difference (ft)		
				50%	1%	0.2%	50%	1%	0.2%	50%	1%	0.2%
Panther Creek	SH 72	Perpendicular	6592	0.00	0.00	2.08	0.00	0.00	0.00	0.00	0.00	-2.08
	CR 163	Perpendicular	612	7.74	9.41	9.98	7.74	9.41	9.98	0.00	0.00	0.00
	FM 2102	Perpendicular	946	0.00	0.00	2.65	0.00	0.00	2.46	0.00	0.00	-0.19
Escondido Creek	US 181	Perpendicular	14986	0.00	0.00	2.62	0.00	0.00	2.62	0.00	0.00	0.00
	N 5th St	Perpendicular	3812	0.00	0.53	3.67	0.00	0.61	3.62	0.00	0.08	-0.05
	Helena Rd	Perpendicular	2672	0.00	0.46	4.87	0.00	0.50	4.42	0.00	0.04	-0.45
	CR 331	Perpendicular	NA	6.07	13.13	17.34	6.29	13.17	17.21	0.22	0.04	-0.13
	Private Rd	Perpendicular	NA	4.86	12.09	14.09	5.12	12.08	14.03	0.26	-0.01	-0.06
	W Main St	Parallel	6823	0.00	0.00	1.57	0.00	0.00	1.53	0.00	0.00	-0.04
	SH 72 at Helena Rd	Parallel	4254	0.00	0.00	1.47	0.00	0.00	1.19	0.00	0.00	-0.28
	SH 72 East	Parallel	4710	0.00	0.00	2.77	0.00	0.00	2.64	0.00	0.00	-0.13

Note: Impacts to minor residential roads were not included in this overtopping analysis as they are generally parallel to Escondido Creek and not modeled in HEC-RAS 1-D modeling.

5.4 Risk and Uncertainty

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 hydrologic/hydraulic engineers conducted multiple field reviews and determined that best professional judgment was appropriate to make fish and wildlife habitat determinations. While technically the Nominal Group method was used, there was no reason to rank the solutions (alternatives) because all planning team members were in agreement on the alternatives, the adverse impacts, and the benefits due to the minor, temporary nature of the impacts.

Climate Change
According to the EPA Region 6 Climate Adaptation Implementation Plan (USEPA, 2022), while projected changes in annual rainfall amounts are uncertain, increases in extreme precipitation events are projected. While the increase in extreme precipitation events has not been quantified, if extreme precipitation events become more frequent, the probability of an event that could cause catastrophic failure of the dams will also increase.

Cultural Resources
As a result of field survey limitations, there is always a risk that unmarked prehistoric or historic human remains or burials may be discovered within the APE in the future. If any unmarked prehistoric or historic human remains or burials are encountered at any point during the project, the area of the remains is considered a cemetery under current Texas law and all construction activities must cease immediately to avoid impacting the remains. The THC must be notified immediately by contacting the Archeology Division at (512) 463-6096. All cemeteries are protected under State law and cannot be disturbed. Further protection is provided in Section 28.03(f) of the Texas Penal Code, which provides that intentional damage or destruction inflicted on a human burial site is a state jail felony. In the event that previously undiscovered cultural resources sites are found during construction, appropriate actions should be taken in accordance with the Prototype Programmatic Agreement between the United States Department of Agriculture, the Texas NRCS State Office, and the Texas SHPO, as well as the National Programmatic Agreement among NRCS, the National Conference of SHPOs, and the Advisory Council on Historic Preservation, and NRCS General Manual 420, Part 401 guidance.

Economics
Risk and uncertainty are inherent when conducting an economic analysis for a flood damage reduction project. For FRS 4, the uncertainty can be associated with the data for the residential and nonresidential structures (e.g., structure value, FFE), the estimated damages from flooding (e.g., depth-damage functions), and the amount of flooding anticipated to occur (e.g., water surface elevations for flood recurrence intervals). The uncertainty could be reduced for the economic analysis, but that would require more intensive primary and secondary data collection. Identification of the national economic benefit alternative was not distorted by the level of uncertainty. Thus, it was determined that increased investment in analysis was not necessary and any reduction in risk and uncertainty would not result in the selection of a different alternative.

Hydrology and Hydraulics
Areas of risk and uncertainty associated with this project lie in the accuracy of estimating flood flows and flood elevations. Flood flows and water surface elevations were derived from both new hydraulic models and recently developed hydrology and hydraulic models with project specific updates to better incorporate NRCS design criteria and inputs. The uncertainty of flood flows and water surface elevations has the potential for increased damages as new properties are converted from agricultural to residential or 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 and potential impacts from these modeling results are estimated for each alternative. These methods are in part based on professional judgment, and actual experience could be different.

Engineering

Areas of risk and uncertainty associated with this project lie in the accuracy of estimating costs associated with each alternative. Cost estimates were developed from available historic and current data. Several factors that require further study during future design-level geologic investigation could significantly affect these estimates. Notable factors include the availability of suitable on-site borrow material needed for embankment construction, and resulting geotechnical analysis for slope stability, seepage, and foundation design.

6.0 CONSULTATION, COORDINATION, AND PUBLIC PARTICIPATION

6.1 Dam Assessments Reports and Assistance Request

NRCS completed a Dam Assessment Report and estimated a risk-based profile of FRS No. 4 in June 2014. The dam assessment indicated that FRS No. 4 did not meet NRCS requirements with respect to the current hazard potential classification and recommended modifications to meet current design criteria.

The Sponsor submitted formal requests for assistance to NRCS for FRS No. 4 on September 13, 2022. The requests for assistance listed concerns about compliance with current dam safety criteria.

6.2 Scoping and Public Meetings

The project sponsors are the Escondido Watershed District, San Antonio River Authority, City of Kenedy, and the Karnes County Soil and Water Conservation District. Bi-weekly meetings were held throughout the project with representatives of the San Antonio River Authority, acting on behalf of the Escondido Watershed District, and NRCS to provide updates on the planning process and gather input on the development of the Supplemental Plan-EA.

Public meetings were also held at key milestones throughout the planning process to solicitate public input related to issues and concerns associated with the project to be considered in development of the Supplemental Plan-EA.

A kickoff and scoping meeting for the project was held at the San Antonio River Authority office on April 25, 2023. The required sponsor commitment, previous studies, overall project scope, schedule, and public participation were discussed. An overview of FRS No. 4 and the contributing watershed was presented and information on potential site issues and concerns was provided by the sponsor. The meeting was attended by representatives AECOM, RESPEC, NRCS, and the San Antonio River Authority.

The first public meeting for FRS No. 4 was held in person on June 13, 2023, at the Kenedy City Hall auditorium in Kenedy, TX to discuss the Watershed Rehabilitation Program and potential alternative solutions to bring the dam into compliance with current dam safety and design criteria. In addition to providing the public information on the planning process, a primary purpose of the meeting was to discuss resource problems, issues, and concerns of local residents associated with the FRS No. 4 project area. Display boards were presented to help facilitate discussions. The public meeting notice was published in the Karnes Countywide digital newspaper on May 30, 2023 and distributed to adjacent landowners and known stakeholders.

Additional meetings were held via Microsoft Teams with the San Antonio River Authority and NRCS on January 23, 2024, February 20, 2024, and April 2, 2024 to provide updates on the planning process, alternatives considered, economic analysis results, and to gather additional input on the project. Specific input related to key analysis assumptions and potential rehabilitation alternative was gathered during these meetings.

A second public meeting for FRS No. 4 was held in person on April 9, 2025 at the Kenedy City Hall auditorium in Kenedy, TX to discuss the planning process, development of the potential alternatives, evaluation of the alternatives, and selection of the preferred alternative to bring the dam into compliance with current dam safety and design criteria. The rehabilitation alternatives included in the plan, the economic analysis, and the environmental assessment results in the context of the PR&G were presented

at the meeting. Notice for the public meeting was published in the Karnes Countywide digital newspaper on March 20, 2025 and distributed to adjacent landowners and known stakeholders.

The Draft Supplemental Plan-EA was made available for public and agency review through the San Antonio River Authority website on April 10, 2025. Comments will be solicited from the reviewing agencies and from the public during the comment period. Letters of comment received on the Draft Supplemental Plan-EA and NRCS responses to these comments will be included in **Appendix A**.

6.3 Agency and Tribal Consultation

In accordance with Section 106 of the NHPA, NRCS consultation with the Texas SHPO/THC was initiated on August 11, 2023, through the email submission of a research design and Texas Antiquities Permit application to conduct a cultural resources survey of all disturbance areas associated with potential rehabilitation measures. Texas Antiquities Permit No. 31324 was issued by the THC on August 17, 2023, and the cultural resources of the APE was completed on October 2, 2023. In a letter to SHPO/THC, dated December 13, 2023, NRCS determined that there will be no effect historic properties with the proposed work. SHPO/THC concurred with NRCS's determination on January 5, 2024, that no historic properties are present or would be affected by the proposed project (**Appendix E**).

NRCS-Texas recognizes Tribal sovereignty and importance of Tribes' interest in places of cultural or religious significance on ancestral lands, including those on private lands. On December 20, 2023, NRCS initiated tribal consultation by email (**Appendix A**). The tribes were sent invitations to participate in consultation via certified mail as well as email, but none expressed interest in participating. To date, no responses have been received. In an email to the Tribal Nations, dated July 9, 2024, NRCS determined that there will be no effect to historic properties with the proposed work. Tribal coordination was performed in accordance with Section 106 of the NHPA and other related authorities. Coordination was officially concluded on August 10, 2024, following adequate opportunity for Tribal review of NRCS's determinations of eligibility and effect (**Appendix A**).

Based on an email from the USACE on October 21, 2024, any discharges into Waters of the U.S. associated with the rehabilitation of FRS No. 4 (SWG-2024-00747) may require authorization under a Nationwide Permit No. 7, Outfall Structures and Associated Intake Structures with a Pre-Construction Notification. However, the USACE also stated that more information is needed including plans showing the specific nature and extent of the proposed work as well as the maximum area of fill impacts. Therefore, a permit package will be prepared and submitted further into design.

The federal candidate monarch butterfly, state threatened sheep frog, White-tailed Hawk, and white-nosed coati have the potential to occur in the project area. Based on current listing status, available suitable habitat, and proposed project activities, no effects to federally listed species are anticipated and therefore, no additional studies, coordination, or documentation is required at this time. If studies and coordination are determined to be required for the project based on listing status changes, they will be performed during the design phase of the project.

7.0 THE PREFERRED ALTERNATIVE

Alternative 5 has been selected as the Preferred Alternative. This alternative best meets the purpose and need for the project and is preferred by the Sponsors, local community, and their leadership. Of the four alternatives involving federal investment (2, 3, 4 and 5), Alternative 5 has the fewest environmental, social, and economic impacts.

7.1 Rationale for Preferred Alternative per PR&G

The preferred alternative is to rehabilitate FRS No. 4 to meet current NRCS and TCEQ performance standards for a high hazard potential dam. The preferred alternative meets the identified purposes and needs for the project and significantly reduces the potential risk to human life. The preferred alternative:

- Significantly reduces the threat to loss of life from catastrophic breach of FRS No. 4 to approximately 278 people.
- Ensures continued flood prevention downstream of FRS No. 4 for residents and reduces the risk of catastrophic breach by rehabilitating the dam to meet current performance standards for a high hazard potential dam.
- Eliminates the Sponsors' liability of operating a dam which does not meet state and federal requirements by rehabilitation of FRS No. 4 to meet current performance standards.
- Maintains existing stream habitat in, around, and downstream of FRS No. 4.

Formulation of the alternatives considered four criteria: completeness, effectiveness, efficiency, and acceptability. All of the alternatives considered meet the completeness criteria, as they were developed in a way to provide and account for all necessary investments or other actions to ensure the realization of the planned effects, including any necessary actions by others. Alternative 2 eliminates the risk of dam failure by overtopping or auxiliary spillway integrity failure and provides mitigation for 39 impacted structures, but floods twelve additional habitable structures and does not provide mitigation for five downstream road structures. Alternatives 3, 4, and 5 reduce the risk of dam failure by overtopping and auxiliary spillway failure and continue to provide downstream flood prevention. Therefore, the four federally assisted Alternatives (2, 3, 4, and 5) meet the criteria for effectiveness, as they alleviate the specified problems and achieve the specified opportunities. Alternative 1 is the baseline alternative against which all the other alternatives are compared. Its zero-base net economic benefits are greater than the negative net economic benefits of any of the action alternatives. Among the federally assisted alternatives, Alternative 2 has the least negative average annual net economic benefits and the lowest construction cost. Alternative 2 meets the criteria for efficiency, as it is the federally assisted alternative with the greatest net economic benefits that addresses the risk to human life in the event of a catastrophic failure of an existing dam. Alternative 3, 4, and 5 meet the criteria for acceptability as they have the fewest negative environmental and social impacts and therefore, demonstrate viability and appropriateness from the perspective of the Nation's general public and consistency with existing Federal laws, authorities, and public policies.

Pursuant to 2014 NWPM 502.2. Alternative 1 is not identified as the economically preferred alternative because human life is at risk in the event of a catastrophic failure of the existing dam which does not meet current safety and performance standards, and Alternative 1 will not meet said standards. Consequently, Alternative 2 is considered to be the economically preferred alternative. Alternative 5 is considered the environmentally and socially preferred alternative. Alternative 5 is considered the locally preferred alternative, as the sponsors preferred the high hazard potential rehabilitation alternative with the lowest construction cost. Alternatives 3, 4, and 5 have similar impacts and benefits but Alternative 5 has a lower estimated construction cost and higher (less negative) average annual net economic benefits and was therefore selected as the preferred alternative. The preferred alternative (Alternative 5) allows the dam to

meet safety and performance standards while continuing to provide downstream flood prevention in a manner that takes into consideration economic, social, and environmental goals.

7.2 FRS No. 4 Measures to Be Installed

Measures included for the high hazard potential rehabilitation of FRS No. 4 are:

- Remove the existing principal spillway system;
- Install a new principal spillway system consisting of a standard inlet tower with crest at elevation 317.2 feet, two 10-inch by 10-inch low level ports at elevation 312.7 feet, and a 42-inch RCP conduit discharging into an impact basin;
- Install a 150-feet wide, five-cycle labyrinth weir structural spillway over the existing embankment with crest set above the 50-year PSH elevation at 328.7 feet and concrete chute discharging into a concrete stilling basin;
- Regrade inlet and outlet channel of the existing vegetated auxiliary spillway and raise left bay and right bay crests to the 100-year PSH elevation of 329.2 feet (1.18 feet raise from as-built);
- Flatten downstream embankment slope to 3H:1V;
- Abandon existing trench drain and install new toe drain at downstream toe;
- Install upstream dam embankment slope riprap; and
- Raise top of dam elevation to 335.3 feet (2.18 feet raise) and extend the cutoff trench below the extended dam embankment.

After the implementation of these planned works of improvement, FRS No. 4 will meet all current NRCS criteria and performance standards and will provide 100 years of future sediment storage. Detailed structural data for the proposed rehabilitated dam can be found in **Table 7-3**.

7.3 Emergency Action Plan

The Sponsors will provide leadership in updating the current EAP for FRS No. 4 prior to the commencement of construction and will review and update the EAPs annually with local emergency response officials. As required by the National Engineering Manual, Part 520, Subpart C, Section 520.27 and the NOMM, Part 500, Subpart F, the NRCS State Conservationist is to determine that an EAP is prepared for FRS No. 4 prior to the execution of fund obligating documents for construction of the structures. NRCS will provide technical assistance in preparation and updating of the EAP. The breach inundation map of the final design 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. 4.

7.4 Real Property Rights

Acquisition of real property is a critical step in the implementation process. Real property acquisition includes obtaining needed land, water, mineral, and other subsurface rights, and required Federal, State, and local permits or clearances for installation of planned measures. Acquisition of rights may be obtained with the use of fee simple title, easements and rights of way, or by permits and clearances as required by applicable State regulations (NRCS, 2014). The following sections describe the minimum real property rights that must be acquired by the Sponsors for implementation of the project.

7.4.1 General

Real Property

The Sponsors will acquire such real property as will be needed in connection with the works of improvement. The amounts and percentages of real property acquisition costs to be borne by the Sponsors

and NRCS are as shown in the cost-share table in **Section 7** hereof. The Sponsors agree that all land acquired for measures, other than land treatment practices, with financial or credit assistance under this agreement will not be sold or otherwise disposed of for the evaluated life of the project except to a public agency that will continue to maintain and operate the development in accordance with the O&M Agreement.

Uniform Relocation Assistance and Real Property Acquisition Policies Act
The Sponsors hereby agree to comply with all of the policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. Section 4601 et seq. as further implemented through regulations in 49 CFR Part 24 and 7 CFR Part 21) when acquiring real property interests for this federally assisted project. If the sponsor is legally unable to comply with the real property acquisition requirements, 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.

7.4.2 Easements

The Sponsors are responsible for obtaining any needed land rights, title, and easements associated with the rehabilitation projects and associated works of improvement.

The Sponsors currently hold two easements related to FRS No. 4, which may cover a portion of the land required for the construction and/or related construction activities of the preferred alternatives. The easements were recorded (VOL 233 PG 72-75) on April 6 and April 22, 1955. The easements are described by metes and bounds surveys and do not provide an elevation or figure to easily convey the easement boundaries. The combined area presented in the easement documentation is 635.75 acres, The as-built surface area at the auxiliary spillway crest is 250.7 acres and at the top of dam is 333 acres (extrapolated). Based upon the information available, it is unclear what layout and corresponding elevation the FRS No. 4 easement is applicable to.

For FRS No. 4, the auxiliary spillway flood pool area associated with the preferred alternative is 265 acres at elevation 329.2 feet, set at the 100-year PSH peak WSE. The maximum water surface elevation for the modeled 1% AEP event is 329.7 feet. The r minimum allowable easement elevation for FRS No. 4 is 329.7 feet (NAVD88) with a corresponding area of 272.3 acres. This elevation is 1.68 feet higher than the as-built auxiliary spillway crest elevation of 328.02 feet. NRCS recommends acquiring landrights upstream of the dam for the entire area below the elevation of the maximum water surface during passage of the probable maximum flood (PMF) event.

Since the area noted in the easement documentation reviewed in development of this Supplemental Plan-EA is not specific as to the type of easement the Sponsors' hold, it is unknown if additional inundation easement will be required for the raising of the auxiliary spillway. The Sponsors may need to obtain additional inundation easements in the dam floodpool once the existing easement type, area, and/or elevation is confirmed during final design. Additionally, if land rights to the top of dam are not already held by the Sponsor, land rights to the top of dam will not be obtained. The potential risks and liability the Sponsor's and landowners may be assuming for selecting an inundation easement elevation lower than the top of dam has been disclosed and documented. The Sponsors and the landowners acknowledge and accept the risks associated with allowing future construction to occur at elevations lower than the elevation of the FBH. The FBH peak elevation is 333.7 feet NAVD88. If it is determined that additional land rights are required, the Sponsors will be responsible for obtaining them.

It is anticipated that some temporary land rights may be needed for the staging areas during construction. No residential or commercial relocations will be necessary as a result of the project.

7.5 Mitigation

During construction, site mitigation measures will include erosion and sediment control, seeding of disturbed areas, dust control, and other practices identified during the design process. An erosion and sediment control plan will be developed as part of the permitting process. Vegetation will be established immediately following construction on all land disturbed by construction activities. Appropriate plants for erosion control and wildlife habitat will be selected based upon the installation season, soils, surrounding vegetation, and the Sponsor's preference. All tools, equipment, and vehicles will be cleaned before transporting materials and before entering and leaving the worksites to prevent the introduction and spread of invasive plant species.

All needed measures will be taken to mitigate (avoid, minimize, and compensate) any adverse impacts during construction and may include timing of the work, sediment controls such as seeding, mulching and silt fences, and wetting construction areas to reduce dust.

7.6 Permits and Compliance.

Prior to construction, the Sponsors will be responsible for obtaining and complying with permits required by federal, state, and/or local regulatory agencies.

USACE guidelines indicate that any discharge of dredged or fill material into "Waters of the United States" require authorization under Section 404 of the Clean Water Act of 1972. Based on previous consultations with USACE, it appears that any discharges into Waters of the U.S. associated with the rehabilitation of FRS No. 4 would be authorized by a Nationwide Permit No. 43, Stormwater Management Facilities with a Pre-Construction Notification. Nationwide Permit No. 43 authorizes discharges of dredged or fill material into waters of the U.S. for the construction and maintenance of stormwater management facilities such as the proposed Project.

The federal candidate monarch butterfly and the state threatened white-nosed coati, White-tailed Hawk, and sheep frog have the potential to occur in the project area. Based on current listing status, available suitable habitat, and proposed project activities, no effects to federally listed species are anticipated and therefore, no additional studies, coordination, or documentation is required at this time. If studies and coordination are determined to be required for the project based on listing status changes, they will be performed during the design phase of the project. BMPs would be implemented to minimize impacts to state-listed species. A letter was sent to the USFWS on May 13, 2024, requesting that the agency participate in this project as a cooperating agency. This letter is included in **Appendix A**. No response has been received.

For projects with disturbances equal to or greater than five acres, it is necessary to have a SWPPP in place prior to construction of the proposed project and filing a Notice of Intent with the TCEQ is required. A NOT must be filed once the site has reached final stabilization. Construction activities associated with the rehabilitation of FRS No. 4 will require a Stormwater Pollution Prevention Plan.

In the event that previously undiscovered cultural resources sites are found during construction, appropriate actions should be taken in accordance with the Prototype Programmatic Agreement between the United States Department of Agriculture, the Texas NRCS State Office, and the Texas SHPO, as well as the National Programmatic Agreement among NRCS, the National Conference of SHPOs, and the Advisory Council on Historic Preservation, and NRCS General Manual 420, Part 401 guidance.

7.7 Costs and Cost Sharing

Table 7-1 through **Table 7-6** describe the project costs, project economic benefits, and structure data for the preferred alternative. Estimated installation costs and cost sharing allocations for the Preferred

Alternatives are shown in **Table 7-1** and **Table 7-2**. Structure data for the preferred alternatives are provided in **Table 7-3**. Total annualized costs are shown in **Table 7-4**. Costs shown in **Table 7-1**, **Table 7-2**, and **Table 7-4** and throughout the document are based on standard cost accounting practices required of federal watershed planning agencies, such as NRCS. The basis for cost sharing between NRCS and the Sponsor is based on the provisions of the dam rehabilitation amendments of the Watershed Protection and Flood Prevention program.

Table 7-5 displays the average annual economic benefits of the preferred alternative, and **Table 7-6** provides a comparison of average annual benefits and costs. A 2024 price base was used and amortized at 2.75% interest over the 100-year evaluation period following construction.

7.8 Installation and Financing

The project is planned for a phased installation totaling about 36 months including design and construction. The phasing priority is currently being considered by NRCS Texas. The actual installation period is contingent on the availability of funds for design and installation.

NRCS will provide assistance to the Sponsors with the FRS No. 4 Rehabilitation project. NRCS will be responsible for the following:

- Execute a new O&M Agreement with the Sponsors that extends the O&M responsibilities for 100 years following construction. This agreement will be based on the NRCS NOMM.
- Provide financial assistance equal to 65% of total eligible project costs, not to exceed 100% of actual construction costs.
- Verify that the current EAP is updated before construction is initiated.
- Provide engineering support, technical assistance, and approval during the design and construction of the project.
- Certify completion of all installed measures.

The Sponsors will be responsible for the following:

- Secure all needed environmental permits, easements, and rights for installation and O&M of the rehabilitated structure.
- Prepare an updated EAP for the FRS prior to the initiation of construction.
- Execute a new O&M Agreement with NRCS for the FRS. This agreement will be based on the NRCS NOMM.
- Provide engineering services for the design, construction, and certification of the project.
- Provide local administrative and contract services necessary for the installation of the project.
- Provide nonfederal funds for cost-sharing of the project at a rate equal to, or greater than, 35% of the total eligible project costs.
- Participate in and comply with applicable Federal floodplain management and flood insurance programs.
- Enforce all associated easements and rights-of-way for the safe operation of the dam.

The NRCS share of installation costs will be provided from funds appropriated under the Watershed Protection and Flood Prevention Act (PL 83-566), Watershed Rehabilitation. This is not a fund-obligating document, and federal assistance is subject to the availability of Congressional appropriations. The Sponsors have analyzed their financial requirements for carrying out the plan, including components that are not eligible for federal assistance as part of this plan. The Sponsors will arrange for funds to be available, when needed, from donations, non-federal grants, cash reserves, tax revenues and other non-

federal sources. Credit for in-kind contributions will be as specified in the Memorandum of Understanding.

The cost, if any, of all water, mineral, and other resource rights and all required permits are not eligible for federal financial assistance. These costs shall be borne, in full, by the Sponsors. The Sponsor also understands that they will be fully responsible for costs incurred for the operation, maintenance, and replacement of installed measures.

7.9 Operation, Maintenance, and Replacement

Measures installed in this plan, and previously installed measures, will be operated and maintained by the Sponsor with technical assistance from federal, state, and local agencies in accordance with their delegated authority. A new O&M agreement will be developed for FRS No. 4, utilizing the NRCS NOMM, and will be executed when the implementation agreements are executed. The term of the new O&M agreement will be for 100 years following the completion of rehabilitation. The O&M agreement will specify responsibilities of the Sponsors and include detailed provisions for retention, use, and disposal of property acquired or improved with PL 83-566 cost sharing. Provisions will be made for free access of Sponsor, state, and federal representatives to inspect all structural measures and their appurtenances at any time.

Table 7-1. Economics Table 1 – Estimated Installation Costs, Escondido Creek Watershed, TX

Cost Item	PL-83-566[1,2]			Other Funds[1]			Total
	Federal Land	Non-Federal Land	Total	Federal Land	Non-Federal Land	Total	
FRS No. 4 Rehabilitation	$0	$12,684,000	$12,684,000	$0	$5,240,000	$5,240,000	$17,924,000

[1] Price base: 2024 dollars
[2] Federal agency responsible for assisting in installation of works of improvement
Table prepared 5/2024

Table 7-2. Economics Table 2 – Estimated Cost Distribution – Structural Measures, Escondido Creek Watershed, TX

Cost Item	Installation Costs: PL-83-566[1]				Installation Costs: Other Funds[1]						Total Project Cost
	Construc-tion	Engi-neering	Project Admini-stration	Total PL-83-566	Construc-tion	Engi-neering	Real Property	Permits	Project Admini-stration	Total Other Funds	
FRS No. 4	$9,519,000	$1,445,000	$1,720,000	$12,684,000	$4,936,000	$0	$175,000	$114,000	$15,000	$5,240,000	$17,924,000

[1] Price base: 2024 dollars
Table prepared 5/2024

Table 7-3. Economics Table 3 – Structural Data – Dams with Planned Storage Capacity Escondido Creek Watershed, TX

Item	Unit	FRS No. 4 Planned Rehabilitation
Class of Structure		High
Seismicity		
Maximum Design Earthquake (MDE) PGA[(1)]	g	0.120
Operating Basis Earthquake (OBE) PGA[(1)]	g	0.013
Uncontrolled Drainage Area (above FRS No. 4)	sq-mi	6.30
Controlled Drainage Area (above FRS No. 3)	sq-mi	4.56
Total Drainage Area	sq-mi	10.86
Runoff Curve Number (1-day) (Type II)		75
Runoff Curve Number (1-day) (Avg. AMC[2])		61
Time of Concentration (T_c)	hrs	2.95
Elevation Top of Dam[3]	ft	335.3
Elevation Crest of Vegetative Auxiliary Spillway	ft	329.2
Elevation Crest of Structural Auxiliary Spillway	ft	328.7
Elevation Crest Principal Spillway	ft	317.2
Elevation Crest Low Stage Inlet	ft	312.7
Auxiliary Spillway Type		Structural, Labyrinth weir
Auxiliary Spillway Bottom Width	ft	150
Auxiliary Spillway Exit Slope	percent	N/A
Auxiliary Spillway Type		Vegetated
Auxiliary Spillway Bottom Width	ft	500 (two bays)
Auxiliary Spillway Exit Slope	percent	6.4 (left bay)/2.3 (right bay)
Maximum Height of Dam	ft	31.2
Volume of Embankment Fill[4]	yd^3	134,038
Total Capacity (Structural Auxiliary Spillway Crest)[5]	ac-ft	2,342
Sediment Submerged	ac-ft	355
Sediment Aerated	ac-ft	54
Floodwater Retarding Pool[6]	ac-ft	1,987
Between High and Low Stage	ac-ft	54
Surface Area		
Sediment Pool (Principal Spillway Crest)	acres	99.4
Floodwater Retarding Pool	acres	256.5
Principal Spillway		
Rainfall Volume (1-day)	in	11.48
Rainfall Volume (10-day)	in	16.87
Runoff Volume (10-day)	in	7.84
Capacity (at Labyrinth Weir Crest)	ft^3/s	208.1
Type of Conduit		RCP
Dimensions of Conduit	in	42
Frequency of Operation (Structural Auxiliary Spillway)	% chance	>1.0; < 2.0
Auxiliary Spillway Hydrograph		

Item	Unit	FRS No. 4 Planned Rehabilitation
Rainfall Volume	in	13.21
Runoff Volume	in	7.77
Storm Duration	hrs	6
Velocity of Flow (V_e)[7]	ft/s	2.72
Maximum Reservoir Water Surface Elevation	ft	330.2
Freeboard Hydrograph		
Rainfall Volume	in	42.5
Runoff Volume	in	35.69
Storm Duration	hrs	24
Maximum Reservoir Water Surface Elevation	ft	333.7
Storage Capacity Equivalents[8]		
Sediment Volume	in	1.22
Floodwater Retarding Volume[9]	in	5.75

1/ Site-adjusted Peak Ground Acceleration (PGA) for dam with High Consequence of Seismic Failure per TR-60. MDE uses 10,000-year return period, and OBE uses 500-year return period. Values developed from USGS Unified Hazard Tool and NRCS Part 302 National Instruction (2021) assuming Site Class D.
2/ Average Antecedent Runoff Condition (ARC) CN
3/ All elevations are recorded in North American Vertical Datum 1988 (NAVD88).
4/ Total volume of earthfill in FRS No. 4 = 134,038 CY (109,589 CY from FRS No. 4 Escondido Creek Watershed Work Plan [1954] plus an overall volume increase of 24,449 CY for proposed rehabilitation.
5/ Total capacity is provided at the crest of the labyrinth weir structural auxiliary spillway at elevation 328.7 feet..
6/ Floodwater retarding pool is at the elevation of the labyrinth weir crest.
7/ Velocity of flow is provided for the steeper left bay spillway section only.
8/ No beneficial use was identified, therefore, there is no beneficial volume.
9/ Floodwater retarding volume at the elevation of the labyrinth weir crest.
Table prepared 5/2024

Table 7-4. Economics Table 4 – Average Annual Costs Escondido Creek Watershed, TX

Cost Item	Amortization of Installation Cost[1]	Operation, Maintenance, and Replacement Cost[1,2]	Other Direct Costs	Total
FRS No. 4	$550,000	$0	$0	$550,000

[1] Price Base: 2024 dollars, annualized over the 100-year evaluation period using a 2.75% discount rate, includes interest during construction
[2] Presented as the net O&M between the baseline and the selected alternative
Table prepared 5/2024

Table 7-5. Economics Table 5 – Estimated Average Annual Flood Damage Reduction Benefits Escondido Creek Watershed, TX

Benefit Category	Average Annual Damages		Average Annual Benefits
	Without Project	With Project	
Structures	$169,000	$175,000	-$6,000
Agricultural	$2,000	$2,000	$0
Infrastructure	$18,000	$19,000	-$1,000
Total Annual Benefits			-$7,000

[1] Price Base: 2024 price level, annualized over the 100-year evaluation period using a 2.75% discount rate
Table prepared 5/2024

Table 7-6. Economics Table 6 – Comparison of Benefits and Costs Escondido Creek Watershed, TX

Dam	Average Annual Benefits[1]		Average Annual Costs[1]	Net Benefits	Benefit-Cost Ratio
	Agricultural	Non-Agricultural			
FRS No. 4		-$7,000	$550,000	-$557,000	-0.01:1.0[2]

[1] Price Base: 2024 dollars, annualized over the 100-year evaluation period using a 2.75% discount rate

[2] Rationale for selection of the preferred alternative is provided in Section 7.1

Table prepared 5/2024

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9.0 LIST OF PREPARERS

Table 9-1. List of Preparers

Name / Title	Current Position (Years)	Education	Total Experience (Years)	Applicable Certifications
NRCS				
Mark Northcut, Natural Resource Manager	5	B.S. Ag. Engineering	37	
David Sullivan, Civil Engineer	4	B.S. Civil Engineering	40	
Rocky Ingram, Soil Conservationist	8	B.S. Ag. Education	20	
Dawson Lilly, Wildlife Biologist	1	B.S. Wildlife Management M.S. Wildlife Science	11	
Angela Moody, Archeologist	5	B.A. Anthropology M.A. Museum Sciences	18	
David Buland, Economist	5	B.S. Economics, M.A. Theology, M.A. Economics	40	
Adam Bentley, Economist	1	B.A. Economics	10	
AECOM Staff				
Monica Wedo, Project Manager, Hydrology/ SITES, Alternatives Analysis	22	B.S. Civil Engineering, M.S. Environmental and Water Resources Engineering	23	P.E., ENV SP
Clifton Dorrance, Planning Lead	16	B.S. Agricultural Engineering	16	P.E.
Sabin Shrestha, H&H Modeling, SITES, WinDAM, Alternative Analysis	1	B.S. Civil Engineering, M.S. Environmental and Water Resources Engineering	9	P.E.
Guillermo Delgado Paredes, H&H Analysis	2	B.S. Civil Engineering	2	
Lance Finnefrock, Geotechnical Analysis Lead	15	B.S. Civil Engineering, M.S. Civil Engineering	16	P.E. G.E.
Charlie Krolikowski, Geotechnical Analysis	8	B.S. Civil Engineering, M.S. Civil Engineering	9	P.E
Sergio Teran Geologist	3	B.S. Geology M.S. Geology	6	P.G
Matthew Engel, CADD & Cost Estimates	7	B.S. Civil Engineering	14	P.E.
Jason Weiss, Economic Analysis Lead	24	B.I.E. Industrial Engineering, M.S. Resource Economics and Policy	28	

Name / Title	Current Position (Years)	Education	Total Experience (Years)	Applicable Certifications
Brenna Butler, Economic Analysis	2	B.A. Economics & Environmental Studies, M.S. Food Security	3	
Jennifer Oakley, Ecologist Lead	4	B.S. Biology, B.S. Environmental Science, M.S. Wildlife Ecology	14	Wetland Training
Payton Prather Ecologist	6	B.S. Wildlife Biology, M.S. Wildlife Ecology	8	Wetland Training
Steve Ahr, Cultural Resources Lead	13	B.A. Anthropology, M.A. Anthropology, PhD Geology	25	RPA

10.0 DISTRIBUTION LIST

Comments were requested on the Draft Supplemental Plan-EA from the following agencies and organizations.

10.1 Federal Agencies

NRCS National Watershed Management Center, Little Rock, Arkansas.

U.S. Fish and Wildlife Service, Austin, TX

USACE District, Fort Worth, Texas

EPA Region 6, Dallas, Texas

10.2 Texas State Agencies

Texas Parks and Wildlife Department, Austin, Texas

Texas Commission on Environmental Quality, Region 13, San Antonio, Texas

Texas Historical Commission, Austin, Texas

10.3 Other

Karnes County Soil and Water Conservation District

Escondido Watershed District

San Antonio River Authority

City of Kenedy

Appendix A Comments and Responses on Draft Supplemental Plan-EA

Ahr, Steven

From: noreply@thc.state.tx.us
Sent: Friday, January 05, 2024 8:30 AM
To: Ahr, Steven; reviews@thc.state.tx.us
Subject: Archeological Survey for the Rehabilitation of Escondido Creek FRS No. 4

TEXAS HISTORICAL COMMISSION
real places telling real stories

Re: Project Review under Section 106 of the National Historic Preservation Act and/or the Antiquities Code of Texas
THC Tracking #202404237
Date: 01/05/2024
Archeological Survey for the Rehabilitation of Escondido Creek FRS No. 4 (Permit 31324)
Karnes County
Kenedy,TX

Description: Rehabilitation of Escondido Creek Watershed Floodwater Retarding Structure No. 4

Dear Steven Ahr:
Thank you for your submittal regarding the above-referenced project. This response represents the comments of the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission (THC), pursuant to review under Section 106 of the National Historic Preservation Act and the Antiquities Code of Texas.

The review staff, led by Caitlin Brashear and Mary Galindo, has completed its review and has made the following determinations based on the information submitted for review:

Above-Ground Resources

- No historic properties are present or affected by the project as proposed. However, if historic properties are discovered or unanticipated effects on historic properties are found, work should cease in the immediate area; work can continue where no historic properties are present. Please contact the THC's History Programs Division at 512-463-5853 to consult on further actions that may be necessary to protect historic properties.

Archeology Comments

- No historic properties affected. However, if cultural materials are encountered during construction or disturbance activities, work should cease in the immediate area; work can continue where no cultural materials are present. Please contact the THC's Archeology Division at 512-463-6096 to consult on further actions that may be necessary to protect the cultural remains.
- THC/SHPO concurs with information provided.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your cooperation in this review process, and for your efforts to preserve the irreplaceable heritage of Texas. If the project changes, or if new historic properties are found, please contact the review staff. If you have any questions concerning our review or if we can be of further assistance, please email the following reviewers: caitlin.brashear@thc.texas.gov, Mary.Galindo@thc.texas.gov.

This response has been sent through the electronic THC review and compliance system (eTRAC). Submitting your project via eTRAC eliminates mailing delays and allows you to check the status of the review, receive an electronic response, and generate reports on your submissions. For more information, visit http://thc.texas.gov/etrac-system.

Sincerely,

for Mark Wolfe, State Historic Preservation Officer
Executive Director, Texas Historical Commission

Please do not respond to this email.

USDA United States Department of Agriculture
Farm Production and Conservation
Natural Resources Conservation Service
USDA NRCS
W.R. Poage Federal Building
101 South Main Street
Temple, TX 76501

December 13, 2023

Mark Wolfe
State Historic Preservation Officer
Texas Historical Commission
108 West 16th Street
Austin, Texas 78701

RE: The Texas State Soil and Water Conservation Board and Natural Resources Conservation Service – Escondido Creek Watershed Floodwater Retarding Structure No. 4 Rehabilitation, Karnes County, Texas, **THC Permit #31324**

Dear Mr. Wolfe:

In accordance with the National Historic Preservation Act of 1966, as amended and our 2015 Prototype Programmatic Agreement with State Historic Preservation Officer (SHPO), this letter is to authorize contractors for identification studies in preparation of the Escondido Creek Watershed Floodwater Retarding Structure (FRS), No. 4 Rehabilitation Supplemental Watershed Plan and Environmental Assessment, Karnes County, Texas (36 CFR Part 800.1.(3).

Escondido FRS No. 4 (National Inventory of Dams ID: TX02035) was constructed by the Soil Conservation Service in 1956 on Doe Branch, a tributary of Escondido Creek, approximately 3.2 miles west of Kenedy, Texas. The dam is an earthen embankment that is 2,900 feet (ft) long with a maximum height of 29 ft. Escondido FRS No. 4 is maintained by the Escondido Watershed District and the San Antonio River Authority and currently does not meet Federal safety standards for a High Hazard Potential dam. Therefore, the project sponsors and the United States Department of Agriculture - Natural Resources Conservation Service (NRCS) are evaluating alternatives to meet the current performance and safety criteria. AECOM has coordinated with your office on this project and performed a cultural resources survey, refer to THC Permit #31324, but with this letter our administrative record will reflect that NRCS used the contractor's identification study and recommendations to determine the eligibility and effect to archaeological and historic-age resources within the Area of Potential Effect (APE). As the responsible agency official, I concur with AECOM's proposal of determination of eligibility and effect.

In summary of the initial cultural resources review, no archaeological sites were identified during the cultural resources survey of the APE, which has been disturbed from past construction activities associated with the construction of the existing earthen dam, auxiliary spillway, and reservoir construction. Based on the previous disturbance and the ubiquitous or ordinary construction of the dam, our findings are that the Escondido FRS No. 4 dam is ineligible for inclusion in the National Register of Historic Places (NRHP) and there will be

no effect to historic properties with the proposed work. Additionally, our findings are that the historic-age farmstead site and standing structure within the indirect APE are also ineligible for inclusion in the NRHP and there will be no effect to historic properties with the proposed work.

The point of contact for reply or further information is Angela Moody, Archaeologist/Cultural Resource Specialist at angela.moody@usda.gov, at 254-742-9834, or by mail at 101 South Main Street, Temple, Texas 76501. Your prompt reply to this request is greatly appreciated and we thank you for your assistance.

Sincerely,

KRISTY OATES
Digitally signed by KRISTY OATES
Date: 2023.12.13 16:48:27 -06'00'

KRISTY OATES
State Conservationist

USDA United States Department of Agriculture
Farm Production and Conservation
Natural Resources Conservation Service
USDA NRCS
W.R. Poage Federal Building
101 South Main Street
Temple, TX 76501

May 13, 2024

U.S. Department of the Interior
U.S. Fish and Wildlife Service
Austin Ecological Services Field Office
1505 Ferguson Lane
Austin, Texas 78754

RE: Formal request for U. S. Fish and Wildlife Service (USFWS) to provide agency input and/or consultation on the Escondido Creek Watershed for the Rehabilitation Watershed Plan and Environmental Assessment (Plan-EA) of Floodwater Retarding Structure (FRS) No. 4 located in Karnes County, Texas.

In accordance with the Council on Environmental Quality regulations implementing the National Environmental Policy Act (NEPA), Endangered Species Act (ESA) Section 7 consultation related to threatened and endangered species, and regulations at 7 CFR 650 and 7 CFR 622, specifically 622.4 reference, as part of Public Law 83-566, Section 12, the U.S. Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS) is formally requesting your agency to provide input and/or consultation related to ESA Section 7, and Public Law 83-566 Section 12, as part of the planning and development of the Escondido Creek Watershed for the Plan-EA for FRS No. 4. This request is being made because your agency has been identified as having special expertise or jurisdiction related to this project. The Plan-EA is being prepared to fulfill USDA-NRCS' NEPA compliance responsibilities pertaining to our potential federal financial assistance through the Watershed Protection and Flood Prevention Program (Public Law 83-566). Under Public Law 83-566, Section 12, requires USDA-NRCS to notify USFWS to make surveys and investigations and prepare a report, as they deem appropriate, with recommendations concerning the conservation and development of wildlife resources and participate, under arrangements satisfactory to the USDA-NRCS, in the preparation of a plan for works of improvement that is acceptable to the USDA-NRCS.

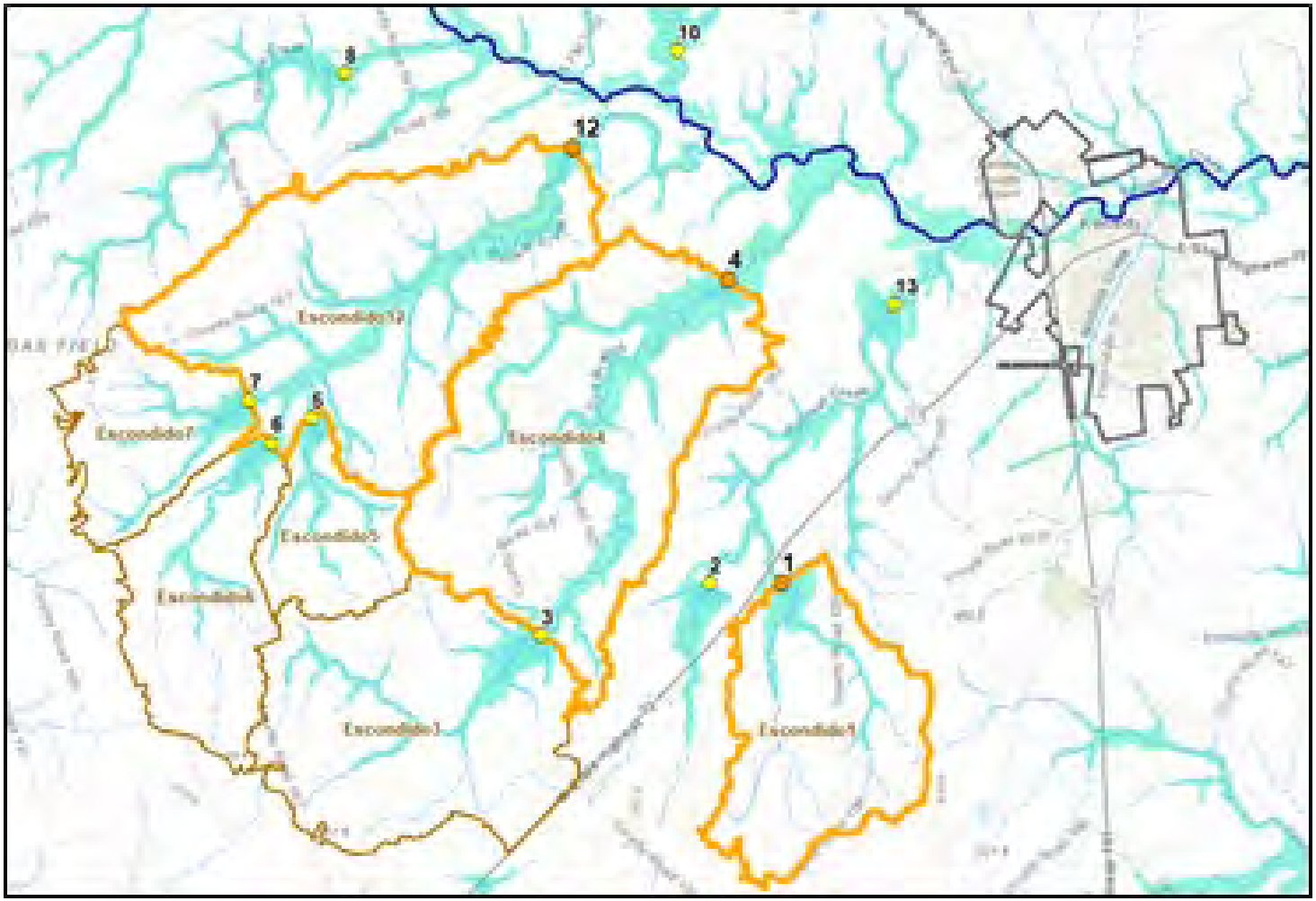
The San Antonio River Authority (SARA), Karnes County Soil and Water Conservation District (SWCD), Escondido Watershed District, have received funding to develop a Plan-EA for FRS No. 4. FRS No. 4 was constructed in 1956 by the Soil Conservation Service as a single-purpose dam (flood prevention). It was originally designed and constructed as a low hazard dam but has been re-classified as high hazard due to population at risk downstream. FRS No. 4 consists of an earthen structure 31-feet in height with a 99-acre pool. FRS No. 4 is maintained by the San Antonio River Authority (SARA). It currently does not meet Federal safety standards for a High Hazard dam. Therefore, the project sponsors and USDA-NRCS are preparing this Plan-EA to evaluate alternatives to meet the current performance and safety criteria required for high hazard classification of FRS No. 4.

Thank you for your timely response and cooperation with this project. If you have any questions or comments, please contact Mark Northcut at mark.northcut@usda.gov or at 254-742-9824.

Sincerely,

KRISTY OATES
State Conservationist

Enclosure
Project Location Map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USDA United States Department of Agriculture
Farm Production and Conservation
Natural Resources Conservation Service
USDA NRCS
W.R. Poage Federal Building
101 South Main Street
Temple, TX 76501

June 15, 2023

Colonel Rhett A. Blackmon
U.S. Army Corps of Engineers – Galveston District
2000 Fort Point Road
Galveston, Texas 77550

RE: Formal request for U.S. Army Corps of Engineers (USACE) to be a cooperating agency on the Escondido Creek Watershed for the Rehabilitation Watershed Plan and Environmental Assessment (EA) of Floodwater Retarding Structure (FRS) Sites 1, 4, and 12 located in Karnes County, Texas.

In accordance with the Council on Environmental Quality regulations implementing the National Environmental Policy Act (NEPA) at 40 CFR Part 1501.6, the U.S. Department of Agriculture Natural Resources Conservation Service (USDA-NRCS) is formally requesting that your agency become a cooperating agency in the planning and development of the Escondido Creek Watershed Rehabilitation Plan EA for Sites 1, 4, and 12 Rehabilitation Watershed Plan and Environmental Assessment (Plan-EA). This request is being made because your agency has been identified as having special expertise or jurisdiction related to this project. The Plan-EA is being prepared to fulfill USDA-NRCS' NEPA compliance responsibilities pertaining to our potential federal financial assistance through the Watershed Protection and Flood Prevention Program (Public Law 83-566) for this project. If permits are required from your agency, you also may have NEPA compliance responsibilities. Therefore, USDA-NRCS' preparation of this Plan-EA could assist in fulfilling environmental review requirements for your agency or other federal agencies and meet NEPA's intent of reducing duplication and delay between agencies.

The San Antonio River Authority (SARA), Karnes County Soil and Water Conservation District (SWCD), and Escondido Watershed District, the project sponsors, have received funding to develop a Plan-EA for Sites 1, 4, and 12. Sites 1, 4, and 12 were constructed in 1954, 1956, and 1974, respectively, by the Soil Conservation Service as a single-purpose dam (flood prevention). It was originally designed and constructed as a low hazard dam but has been re-classified as high hazard due to population at risk downstream. Dam 1, 4, and 12 consists of an earthen structure 36-feet, 29-feet, and 34-feet in height, respectively, with a 52-acre, 75-acre, and 85-acre pool, respectively. Dam 1, 4, and 12 is maintained by the San Antonio River Authority (SARA). It currently does not meet Federal safety standards for a High Hazard dam. Therefore, the project sponsors and USDA-NRCS are preparing this Plan-EA to evaluate alternatives to meet the current performance and safety criteria. The Plan-EA will consider alternatives for Dam 21 and will include: 1) No Action (future without federal funding investment), (2) Decommissioning in addition to non-structural, (3) Non-Structural (floodproofing and/or relocation of at risk properties), and 4) Structural Rehabilitation.

If your agency is unable to participate as a cooperating agency, please return a written explanation as to why your agency cannot participate. Please note that a response declining to be a cooperating agency also must be submitted to the Council on Environmental Quality per 40 CFR Part 1501.6(c). Upon acceptance of this invitation, roles can be defined in an informal agreement or formal memorandum of understanding (MOU).

A public meeting is scheduled for Tuesday, June 13 2023, from 5:30-7:00 pm at Kenedy City Hall Auditorium, 303 West Main Street, Kenedy, Texas 78119.

Thank you for your timely response and cooperation with this project. If you have any questions or comments, please contact Mark Northcut at mark.northcut@usda.gov or at 254-742-9824.

Sincerely,

KRISTY OATES Digitally signed by KRISTY OATES
Date: 2023.06.15 16:33:56 -05'00'

KRISTY OATES
State Conservationist

Enclosure
Project Location Map

USDA United States Department of Agriculture
Farm Production and Conservation
Natural Resources Conservation Service
USDA NRCS
W.R. Poage Federal Building
101 South Main Street
Temple, TX 76501

June 15, 2023

U.S. Department of the Interior
U.S. Fish and Wildlife Service
Austin Ecological Services Field Office
1505 Ferguson Lane
Austin, Texas 78754

RE: Formal request for U.S. Fish and Wildlife Service (USFWS) to be a cooperating agency on the Escondido Creek Watershed for the Rehabilitation Watershed Plan and Environmental Assessment (EA) of Floodwater Retarding Structure (FRS) Sites 1, 4, and 12 located in Karnes County, Texas.

In accordance with the Council on Environmental Quality regulations implementing the National Environmental Policy Act (NEPA) at 40 CFR Part 1501.6, the U.S. Department of Agriculture Natural Resources Conservation Service (USDA-NRCS) is formally requesting that your agency become a cooperating agency in the planning and development of the Escondido Creek Watershed Rehabilitation Plan EA for Sites 1, 4, and 12 Rehabilitation Watershed Plan and Environmental Assessment (Plan-EA). This request is being made because your agency has been identified as having special expertise or jurisdiction related to this project. The Plan-EA is being prepared to fulfill USDA-NRCS' NEPA compliance responsibilities pertaining to our potential federal financial assistance through the Watershed Protection and Flood Prevention Program (Public Law 83-566) for this project. If permits are required from your agency, you also may have NEPA compliance responsibilities. Therefore, USDA-NRCS' preparation of this Plan-EA could assist in fulfilling environmental review requirements for your agency or other federal agencies and meet NEPA's intent of reducing duplication and delay between agencies.

The San Antonio River Authority (SARA), Karnes County Soil and Water Conservation District (SWCD), and Escondido Watershed District, the project sponsors, have received funding to develop a Plan-EA for Sites 1, 4, and 12. Sites 1, 4, and 12 were constructed in 1954, 1956, and 1974, respectively, by the Soil Conservation Service as a single-purpose dam (flood prevention). It was originally designed and constructed as a low hazard dam but has been re-classified as high hazard due to population at risk downstream. Dam 1, 4, and 12 consists of an earthen structure 36-feet, 29-feet, and 34-feet in height, respectively, with a 52-acre, 75-acre, and 85-acre pool, respectively. Dam 1, 4, and 12 is maintained by the San Antonio River Authority (SARA). It currently does not meet Federal safety standards for a High Hazard dam. Therefore, the project sponsors and USDA-NRCS are preparing this Plan-EA to evaluate alternatives to meet the current performance and safety criteria. The Plan-EA will consider alternatives for Dam 21 and will include: 1) No Action (future without federal funding investment), (2) Decommissioning in addition to non-structural, (3) Non-Structural (floodproofing and/or relocation of at risk properties), and 4) Structural Rehabilitation.

If your agency is unable to participate as a cooperating agency, please return a written explanation as to why your agency cannot participate. Please note that a response declining to be a cooperating agency also must be submitted to the Council on Environmental Quality per 40 CFR Part 1501.6(c). Upon acceptance of this invitation, roles can be defined in an informal agreement or formal memorandum of understanding (MOU).

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Thank you for your timely response and cooperation with this project. If you have any questions or comments, please contact Mark Northcut at mark.northcut@usda.gov or at 254-742-9824.

Sincerely,

KRISTY OATES

Digitally signed by KRISTY OATES
Date: 2023.06.15 16:22:35 -05'00'

KRISTY OATES
State Conservationist

Enclosure
Project Location Map

USDA United States Department of Agriculture
Farm Production and Conservation
Natural Resources Conservation Service
USDA NRCS
W.R. Poage Federal Building
101 South Main Street
Temple, TX 76501

June 15, 2023

Trina Lancaster
Texas Commission on Environmental Quality
Mail Code 177
Post Office Box 13087
Austin, Texas 78711-3087

RE: Formal request for Texas Commission on Environmental Quality (TCEQ) to be a cooperating agency on the Escondido Creek Watershed for the Rehabilitation Watershed Plan and Environmental Assessment (EA) of Floodwater Retarding Structure (FRS) Sites 1, 4, and 12 located in Karnes County, Texas.

In accordance with the Council on Environmental Quality regulations implementing the National Environmental Policy Act (NEPA) at 40 CFR Part 1501.6, the U.S. Department of Agriculture Natural Resources Conservation Service (USDA-NRCS) is formally requesting that your agency become a cooperating agency in the planning and development of the Escondido Creek Watershed Rehabilitation Plan EA for Sites 1, 4, and 12 Rehabilitation Watershed Plan and Environmental Assessment (Plan-EA). This request is being made because your agency has been identified as having special expertise or jurisdiction related to this project. The Plan-EA is being prepared to fulfill USDA-NRCS' NEPA compliance responsibilities pertaining to our potential federal financial assistance through the Watershed Protection and Flood Prevention Program (Public Law 83-566) for this project. If permits are required from your agency, you also may have NEPA compliance responsibilities. Therefore, USDA-NRCS' preparation of this Plan-EA could assist in fulfilling environmental review requirements for your agency or other federal agencies and meet NEPA's intent of reducing duplication and delay between agencies.

The San Antonio River Authority (SARA), Karnes County Soil and Water Conservation District (SWCD), and Escondido Watershed District, the project sponsors, have received funding to develop a Plan-EA for Sites 1, 4, and 12. Sites 1, 4, and 12 were constructed in 1954, 1956, and 1974, respectively, by the Soil Conservation Service as a single-purpose dam (flood prevention). It was originally designed and constructed as a low hazard dam but has been re-classified as high hazard due to population at risk downstream. Dam 1, 4, and 12 consists of an earthen structure 36-feet, 29-feet, and 34-feet in height, respectively, with a 52-acre, 75-acre, and 85-acre pool, respectively. Dam 1, 4, and 12 is maintained by the San Antonio River Authority (SARA). It currently does not meet Federal safety standards for a High Hazard dam. Therefore, the project sponsors and USDA-NRCS are preparing this Plan-EA to evaluate alternatives to meet the current performance and safety criteria. The Plan-EA will consider alternatives for Dam 21 and will include: 1) No Action (future without federal funding investment), (2) Decommissioning in addition to non-structural, (3) Non-Structural (floodproofing and/or relocation of at risk properties), and 4) Structural Rehabilitation.

If your agency is unable to participate as a cooperating agency, please return a written explanation as to why your agency cannot participate. Please note that a response declining to be a cooperating agency also must be submitted to the Council on Environmental Quality per 40 CFR Part 1501.6(c). Upon acceptance of this invitation, roles can be defined in an informal agreement or formal memorandum of understanding (MOU).

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Thank you for your timely response and cooperation with this project. If you have any questions or comments, please contact Mark Northcut at mark.northcut@usda.gov or at 254-742-9824.

Sincerely,

KRISTY OATES

Digitally signed by KRISTY OATES
Date: 2023.06.15 16:15:15 -05'00'

KRISTY OATES
State Conservationist

Enclosure
Project Location Map

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

July 31, 2023

Ms. Kristy Oates
State Conservationist
US Department of Agriculture
Natural Resources Conservation Service
101 South Main Street
Temple, TX 76501-7602

RE: Formal Request for TCEQ to be a cooperating agency on the Escondido Creek Watershed Rehabilitation for Sites 1 (TX02032), 4 (TX02035) and 12 (TX04315).

Dear Ms. Oates,

The Texas Commission on Environmental Quality (TCEQ) Dam Safety Program will participate as a cooperating agency on the Escondido Creek Watershed for the Rehabilitation Watershed Plan and Environmental Assessment (EA) of Floodwater Retarding Structure Sites 1, 4, and 12 located in Karnes County.

Thank you for including us in this project, I apologize for the delayed response.

Sincerely,

Trina Lancaster

Trina Lancaster
Manager, Dam Safety Section
Critical Infrastructure Division, MC-177

USDA United States Department of Agriculture
Farm Production and Conservation
Natural Resources Conservation Service
USDA NRCS
W.R. Poage Federal Building
101 South Main Street
Temple, TX 76501

June 15, 2023

Mr. Tom Heger
Texas Parks and Wildlife Department
Wildlife Habitat Assessment Program
4200 Smith School Road
Austin, Texas 78744

RE: Formal request for Texas Parks and Wildlife Department (TPWD) to be a cooperating agency the Escondido Creek Watershed for the Rehabilitation Watershed Plan and Environmental Assessment (EA) of Floodwater Retarding Structure (FRS) Sites 1, 4, and 12 located in Karnes County, Texas.

In accordance with the Council on Environmental Quality regulations implementing the National Environmental Policy Act (NEPA) at 40 CFR Part 1501.6, the U.S. Department of Agriculture Natural Resources Conservation Service (USDA-NRCS) is formally requesting that your agency become a cooperating agency in the planning and development of the Escondido Creek Watershed Rehabilitation Plan EA for Sites 1, 4, and 12 Rehabilitation Watershed Plan and Environmental Assessment (Plan-EA). This request is being made because your agency has been identified as having special expertise or jurisdiction related to this project. The Plan-EA is being prepared to fulfill USDA-NRCS' NEPA compliance responsibilities pertaining to our potential federal financial assistance through the Watershed Protection and Flood Prevention Program (Public Law 83-566) for this project. If permits are required from your agency, you also may have NEPA compliance responsibilities. Therefore, USDA-NRCS' preparation of this Plan-EA could assist in fulfilling environmental review requirements for your agency or other federal agencies and meet NEPA's intent of reducing duplication and delay between agencies.

The San Antonio River Authority (SARA), Karnes County Soil and Water Conservation District (SWCD), and Escondido Watershed District, the project sponsors, have received funding to develop a Plan-EA for Sites 1, 4, and 12. Sites 1, 4, and 12 were constructed in 1954, 1956, and 1974, respectively, by the Soil Conservation Service as a single-purpose dam (flood prevention). It was originally designed and constructed as a low hazard dam but has been re-classified as high hazard due to population at risk downstream. Dam 1, 4, and 12 consists of an earthen structure 36-feet, 29-feet, and 34-feet in height, respectively, with a 52-acre, 75-acre, and 85-acre pool, respectively. Dam 1, 4, and 12 is maintained by the San Antonio River Authority (SARA). It currently does not meet Federal safety standards for a High Hazard dam. Therefore, the project sponsors and USDA-NRCS are preparing this Plan-EA to evaluate alternatives to meet the current performance and safety criteria. The Plan-EA will consider alternatives for Dam 21 and will include: 1) No Action (future without federal funding investment), (2) Decommissioning in addition to non-structural, (3) Non-Structural (floodproofing and/or relocation of at risk properties), and 4) Structural Rehabilitation.

If your agency is unable to participate as a cooperating agency, please return a written explanation as to why your agency cannot participate. Please note that a response declining to be a cooperating agency also must be submitted to the Council on Environmental Quality Texas Parks and Wildlife Department per 40 CFR Part 1501.6(c). Upon acceptance of this invitation, roles can be defined in an informal agreement or formal memorandum of understanding (MOU).

A public meeting is scheduled for Tuesday, June 13, 2023, from 5:30-7:00 pm at Kenedy City Hall Auditorium, 303 West Main Street, Kenedy, Texas 78119.

Thank you for your timely response and cooperation with this project. If you have any questions or comments, please contact Mark Northcut at mark.northcut@usda.gov or at 254-742-9824.

Sincerely,

KRISTY OATES Digitally signed by KRISTY OATES
Date: 2023.06.15 16:30:13 -05'00'

KRISTY OATES
State Conservationist

Enclosure
Project Location Map

Appendix A Comments and Responses on Draft Plan-EA

NRCS RECORD OF NHPA CONSULTATIONS									
PROJECT/REASON FOR INITIATING CONSULTATION: Escondido Creek FRS 1, 4, and 12									
PROGRAM: Watershed Rehabilitation Program (REHAB)									
SHPO/FEDERALLY RECOGNIZED TRIBE	**MAIL CONTACT(S) NAME AND ADDRESS(S)**	**DATE CONSULT-ATION INVITATION PACKAGE MAILED (1)**	**DATE CONSULT-ATION INVITATION PACKAGE RECEIVED**	**RESPONSE TO CONSULT-ATION INVITATION PACKAGE (INCLUDE FORM [LETTER, PHONE CALL, E-MAIL, ETC.], DATE, RESPONDENT NAME, AND RESPONSE)**	**FOLLOW-UP CONTACT NAME, E-MAIL ADDRESS, PHONE NUMBER**	**DATE FOLLOW-UP ATTEMPTED OR MADE**	**PHONE CALL NOTES**	**RESPONSE TO FOLLOW-UP CONTACT (INCLUDE FORM [LETTER, PHONE CALL, E-MAIL, ETC.], DATE, RESPONDENT NAME, AND RESPONSE)**	**DATE NHPA CONSULTATION COMPLETE**
State Historic Preservation Officer/Texas Historical Commission	Mark Wolfe or Acting SHPO, THC P.O. Box 12276 Austin, TX 78711-2276	Determination letters dated 12/13/2023	Submitted via online portal		Main: 512-463-6100 Main: thc@thc.texas.gov	8/17/2023 THC issued Antiquities Permit No. 31326 for FRS 1; Permit No. 31324 for FRS 4; and 8/17/2023 Permit No. 31326 for FRS 12	NA	Concurrence on NRCS determinations of eligibility and effect	FRS 1, 4, and 12 4/1/2024, 1/5/2024, and 1/4/2024 respectively
Alabama Coushatta Tribe of Texas	Mr. Rick Sylestine, Chairman and Mr. Delvin Johnson, THPO c/o Historic Preservation Office 571 State Park Road 56 Livingston, TX 77351	12/19/2023	Certified Tracking Card received by NRCS 12/21/2023	Certified mail tracking card returned with signature of receipt	Delvin Johnson (Historic Preservation Officer) johnson.delvin@actribe.org	12/20/2023 -Emailed signed invitation letters 7/9/2024 - Emailed determination letters	11/28/2023 Contact info up-to date	No response yet to invitation nor determinations update email.	8/10/2024
Apache Tribe of Oklahoma	Chairman Durell Cooper and Cultural Coordinator Darren Cisco P.O. Box 1330 Anadarko, OK 73005	12/19/2023	Certified Tracking Card received by NRCS 12/28/2023	Certified mail tracking card returned with signature of receipt	Darrin Cisco (Cultural Coordinator) darrin.cisco@apachetribe.org 405-933-7701	12/20/2023 -Emailed signed invitation letters 7/9/2024 - Emailed determination letters	9/13/2023 Contact info up-to date	No response yet to invitation nor determinations update email.	8/10/2024
Comanche Nation of Oklahoma	Chairman Mr. Mark Woommavovah PO Box 908 Lawton, OK 73502 and THPO Ms. Martina Minthorn c/o Historic Preservation Office, Comanche Nation of Oklahoma 6 SW D Avenue Suite C Lawton, OK 73501	12/19/2023	Certified Tracking Card received by NRCS 12/26/2023	Certified mail tracking card returned with signature of receipt	Ms. Martina Minthorn (THPO) martina.minthorn@comanchenation.com 580-492-1153	12/20/2023 -Emailed signed invitation letters 7/9/2024 - Emailed determination letters	11/30/2023 Contact info up-to date	No response yet to invitation nor determinations update email.	8/10/2024
Mescalero Apache Tribe of the Mescalero Reservation, New Mexico	President Gina Via and Ms. Holly Houghten, THPO P.O. Box 227 Mescalero, NM 88340	12/19/2023	Certified Tracking Card received by NRCS 12/27/2023	Certified mail tracking card returned with signature of receipt	Ms. Holly Houghten (THPO) holly@mathpo.org 575-464-3005	12/20/2023 -Emailed signed invitation letters 7/9/2024 - Emailed determination letters	11/30/2023 Contact info up-to date	No response yet to invitation nor determinations update email.	8/10/2024
Tonkawa Tribe of Indians of Oklahoma	President Russell Martin and THPO Lauren Norman-Brown c/o Historic Preservation Office 1 Rush Buffalo Road Tonkawa, OK 74653-4449	12/19/2023	Certified Tracking Card received by NRCS 12/2024	Certified mail tracking card returned with signature of receipt	Lauren Norman-Brown (THPO) lbrown@tonkawatribe.com 580-628-2561 ext 214	12/20/2023 -Emailed signed invitation letters 7/9/2024 - Emailed determination letters	9/13/2023 Contact info up-to date, spoke with admin	No response yet to invitation nor determinations update email.	8/10/2024

(1) Initial consultation invitation packages should be sent by certified mail, return receipt requested unless a Tribal Government official specifies otherwise. Title 190, 315.8.F(1) provides specific guidance on this issue. Return receipt requested, although not specified in 315.8.F(1), allows us to get a receipt with a date and signature. 315.8.F(1)(ii) instructs to send a pdf version of the consultation invitation package by email after the certified mail package has been sent. Although not specified, attaching a read receipt request to all official consultation emails allows us to get confirmation of receipt. Boyer update January 23, 2023.

USDA United States Department of Agriculture
Farm Production and Conservation
Natural Resources Conservation Service
USDA NRCS
W.R. Poage Federal Building
101 South Main Street
Temple, TX 76501

December 19, 2023

CERTIFIED - RETURN RECEIPT REQUESTED

Mr. Rick Sylestine
Chairman
Alabama-Coushatta Tribe of Texas
571 State Park Road 56
Livingston, Texas 77351

Dear Mr. Sylestine:

While the Natural Resource Conservation Service (NRCS) Texas works to build a relationship with your Tribe through establishing Tribal consultation protocols, I would like to invite your Tribe to consult over whether a proposed project on private lands might impact any of your Tribe's places of cultural or religious significance, National Historic Preservation Act historic properties, and other Tribal interests. We recognize your Tribal sovereignty and importance of your Tribe's interests on ancestral lands, including those on private lands.

This letter is regarding Consultation under Section 106 of the National Historic Preservation Act of 1966, Amended for the Escondido Creek Watershed - Flood Retarding Structure (FRS) No. 1, 4, and 12, Rehabilitation Watershed Plan and Environmental Assessment (Plan-EA), Karnes County, Texas.

The San Antonio River Authority (SARA), Karnes County Soil and Water Conservation District (SWCD), and Escondido Watershed District, the project sponsors, have received funding to develop a Plan-EA for Sites 1, 4, and 12. Sites 1, 4, and 12 were constructed in 1954, 1956, and 1974, respectively, by the Soil Conservation Service as a single-purpose dam (flood prevention). It was originally designed and constructed as a low hazard dam but has been re-classified as high hazard due to population at risk downstream. Dam 1, 4, and 12 consists of an earthen structure 36-feet, 29-feet, and 34-feet in height, respectively, with a 52-acre, 75-acre, and 85-acre pool, respectively. Dam 1, 4, and 12 is maintained by the San Antonio River Authority (SARA). It currently does not meet Federal safety standards for a High Hazard dam. Therefore, the project sponsors and USDA-NRCS are preparing this Plan-EA to evaluate alternatives to meet the current performance and safety criteria. The Plan-EA will consider alternatives for Dam 12 and will include: (1) No Action (future without federal funding investment), (2) Decommissioning in addition to non-structural, (3) Non-Structural (floodproofing and/or relocation of at-risk properties), and (4) Structural Rehabilitation.

Please reply with whether you are interested in participating in consultation regarding this project and assist us in identifying whether there are any culturally or religiously significant places, or other Tribal interests, we should be aware of that might be affected by this project. Enclosed is the NRCS initial background review for each dam and check out this BoxDrive link for document(s) potentially relevant to your review. As project planning progresses, expect email updates as they come available.

In responding, please refer to the **Escondido Creek FRS No. 1, 4 and 12** project. The point of contact for reply or further information is Angela Moody, Archaeologist/Cultural Resource Specialist at angela.moody@usda.gov, at 254-742-9834, or by mail at 101 South Main Street, Temple, Texas 76501, within our planned review period of 30 days of receiving this letter. Your prompt reply to this request is greatly appreciated and we thank you for your assistance.

Sincerely,

Kristy Oates

KRISTY OATES
State Conservationist

Enclosure

cc:
Mr. Delvin Johnson, Tribal Historic Preservation Officer, Historic Preservation Office, Alabama-Coushatta Tribe of Texas, Livingston, Texas

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Natural Resources Conservation Service
USDA NRCS
W.R. Poage Federal Building
101 South Main Street
Temple, TX 76501

December 19, 2023

CERTIFIED - RETURN RECEIPT REQUESTED

Mr. Durell Cooper, III
Chairman
Apache Tribe of Oklahoma
Post Office Box 1330
Anadarko, Oklahoma 73005

Dear Mr. Cooper:

While the Natural Resource Conservation Service (NRCS) Texas works to build a relationship with your Tribe through establishing Tribal consultation protocols, I would like to invite your Tribe to consult over whether a proposed project on private lands might impact any of your Tribe's places of cultural or religious significance, National Historic Preservation Act historic properties, and other Tribal interests. We recognize your Tribal sovereignty and importance of your Tribe's interests on ancestral lands, including those on private lands.

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Sincerely,

Kristy Oates

KRISTY OATES
State Conservationist

Enclosure

cc:
Mr. Darren Cisco, Cultural Coordinator, Apache Tribe of Oklahoma, Anadarko, Oklahoma

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Farm Production and Conservation
Natural Resources Conservation Service
USDA NRCS
W.R. Poage Federal Building
101 South Main Street
Temple, TX 76501

December 19, 2023

CERTIFIED - RETURN RECEIPT REQUESTED

Mr. Mark Woommavovah
Chairman
Comanche Nation of Oklahoma
Post Office Box 908
Lawton, Oklahoma 73502

Dear Mr. Woommavovah:

While the Natural Resource Conservation Service (NRCS) Texas works to build a relationship with your Tribe through establishing Tribal consultation protocols, I would like to invite your Tribe to consult over whether a proposed project on private lands might impact any of your Tribe's places of cultural or religious significance, National Historic Preservation Act historic properties, and other Tribal interests. We recognize your Tribal sovereignty and importance of your Tribe's interests on ancestral lands, including those on private lands.

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Sincerely,

Kristy Oates

KRISTY OATES
State Conservationist

Enclosure

cc:
Ms. Martina Minthorn, Tribal Historic Preservation Officer, c/o Historic Preservation Office, Comanche Nation of Oklahoma, Lawton, Oklahoma

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Farm Production and Conservation
Natural Resources Conservation Service
USDA NRCS
W.R. Poage Federal Building
101 South Main Street
Temple, TX 76501

December 19, 2023

CERTIFIED - RETURN RECEIPT REQUESTED

Ms. Gina Via
President
Mescalero Apache Tribe of the Mescalero Reservation
Post Office Box 227
Mescalero, New Mexico 88340

Dear Ms. Via:

While the Natural Resource Conservation Service (NRCS) Texas works to build a relationship with your Tribe through establishing Tribal consultation protocols, I would like to invite your Tribe to consult over whether a proposed project on private lands might impact any of your Tribe's places of cultural or religious significance, National Historic Preservation Act historic properties, and other Tribal interests. We recognize your Tribal sovereignty and importance of your Tribe's interests on ancestral lands, including those on private lands.

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Sincerely,

Kristy Oates

KRISTY OATES
State Conservationist

Enclosure

cc:
Ms. Holly Houghten, Tribal Historic Preservation Officer, Mescalero Apache Tribe of the Mescalero Reservation, Mescalero, New Mexico

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Farm Production and Conservation
Natural Resources Conservation Service
USDA NRCS
W.R. Poage Federal Building
101 South Main Street
Temple, TX 76501

December 19, 2023

CERTIFIED - RETURN RECEIPT REQUESTED

Mr. Russell Martin
President
Tonkawa Tribe of Indians of Oklahoma
1 Rush Buffalo Road
Tonkawa, Oklahoma 74653-4449

Dear Mr. Martin:

While the Natural Resource Conservation Service (NRCS) Texas works to build a relationship with your Tribe through establishing Tribal consultation protocols, I would like to invite your Tribe to consult over whether a proposed project on private lands might impact any of your Tribe's places of cultural or religious significance, National Historic Preservation Act historic properties, and other Tribal interests. We recognize your Tribal sovereignty and importance of your Tribe's interests on ancestral lands, including those on private lands.

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Sincerely,

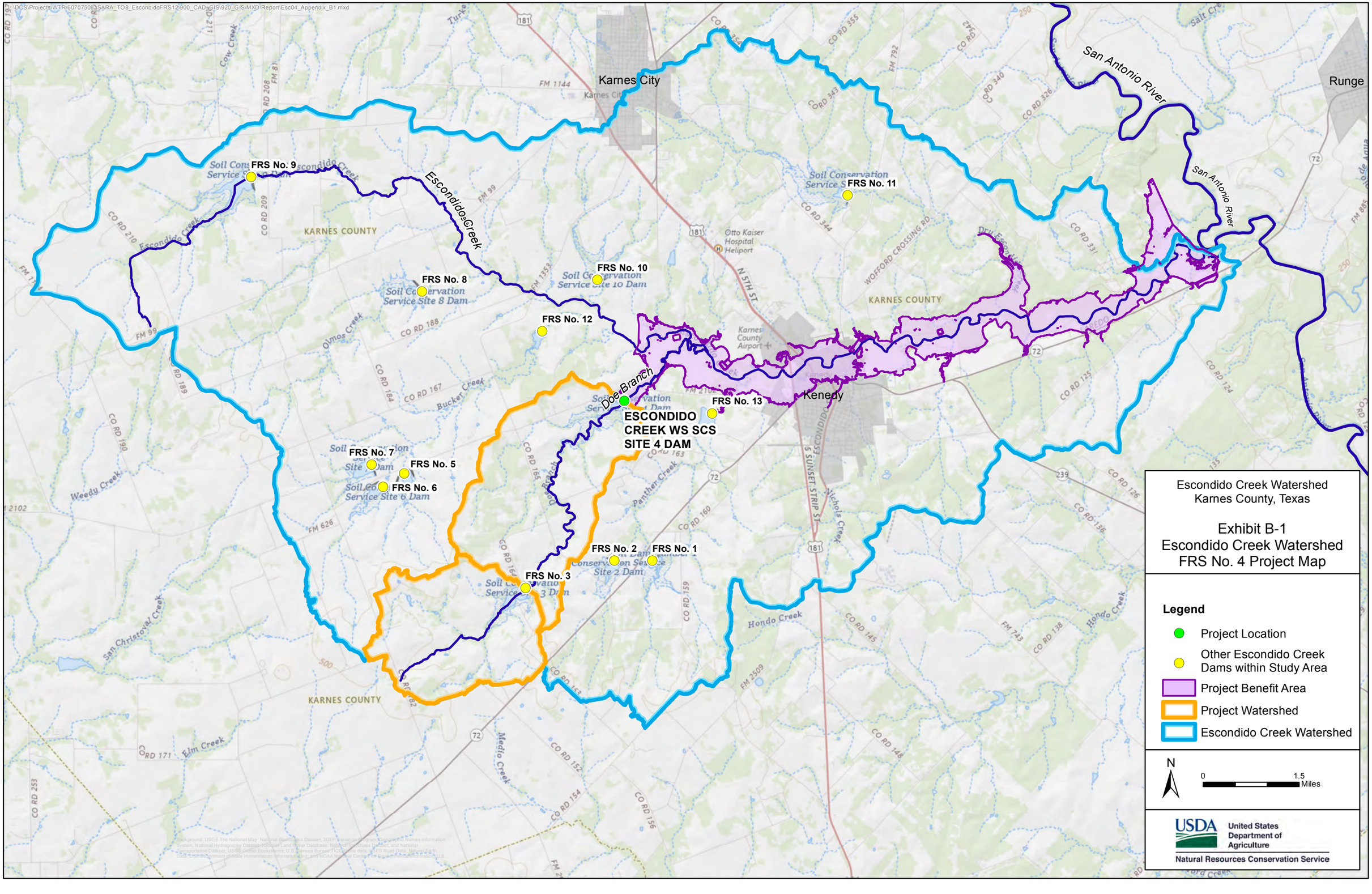
Kristy Oates

KRISTY OATES
State Conservationist

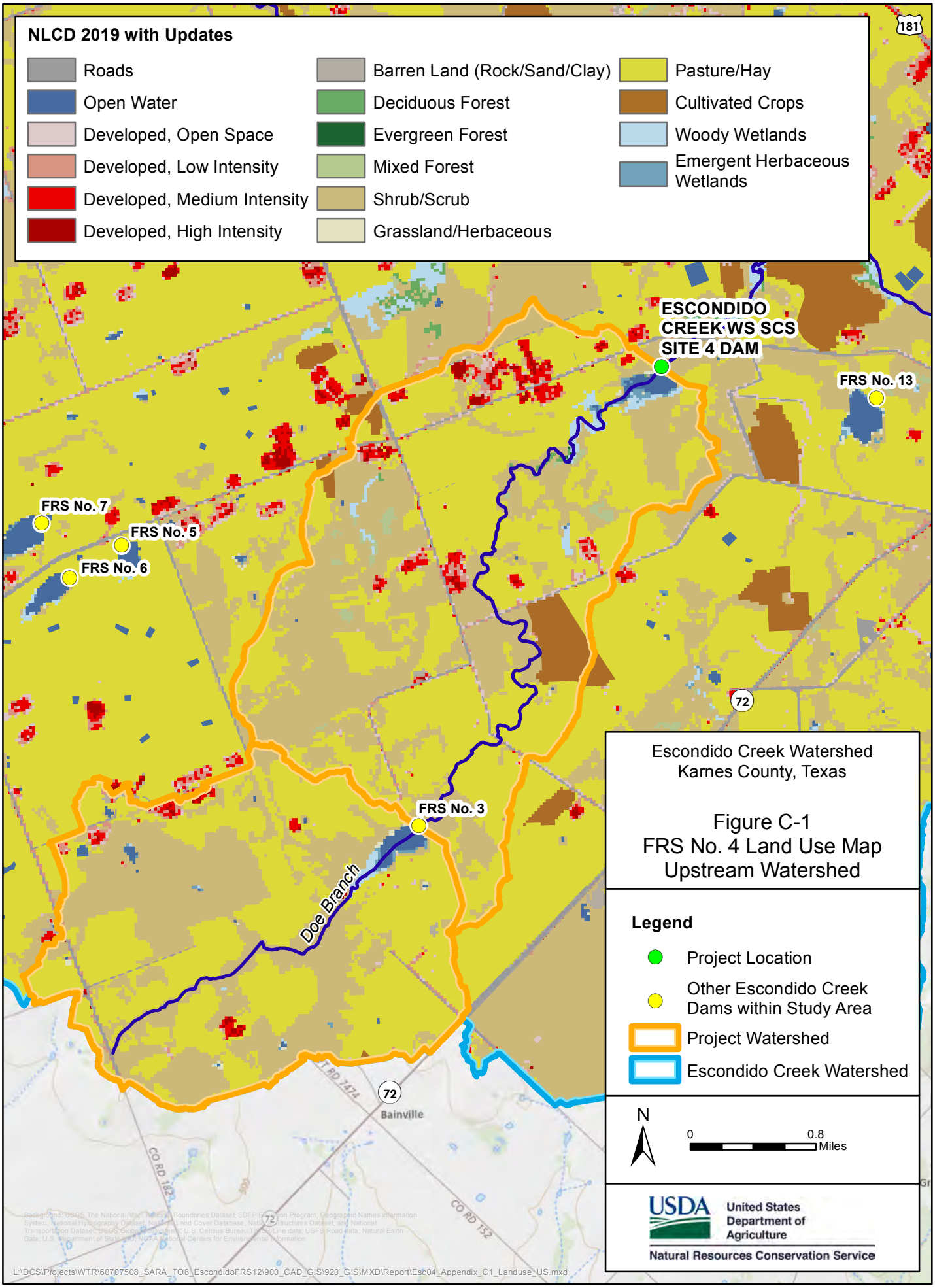
Enclosure

cc:
Ms. Lauren Norman-Brown, Tribal Historic Preservation Officer, c/o Historic Preservation Office, Tonkawa Tribe of Indians of Oklahoma, Tonkawa, Oklahoma

Appendix B Project Map


Karnes City
Runge
San Antonio River
Escondido Creek
Doe Branch
Kenedy
FRS No. 9
FRS No. 8
FRS No. 10
FRS No. 11
FRS No. 12
FRS No. 13
ESCONDIDO CREEK WS SCS SITE 4 DAM
FRS No. 7
FRS No. 5
FRS No. 6
FRS No. 2
FRS No. 1
FRS No. 3
KARNES COUNTY
Soil Conservation Service Site 8 Dam
Soil Conservation Service Site 10 Dam
Soil Conservation Service Site 6 Dam
Soil Conservation Service Site 2 Dam
Otto Kaiser Hospital Heliport
Karnes County Airport
Escondido Creek Watershed
Karnes County, Texas
Exhibit B-1
Escondido Creek Watershed
FRS No. 4 Project Map
Legend
Project Location
Other Escondido Creek Dams within Study Area
Project Benefit Area
Project Watershed
Escondido Creek Watershed
N
0
1.5
Miles
USDA United States Department of Agriculture
Natural Resources Conservation Service

Appendix C Support Maps


NLCD 2019 with Updates
Roads
Open Water
Developed, Open Space
Developed, Low Intensity
Developed, Medium Intensity
Developed, High Intensity
Barren Land (Rock/Sand/Clay)
Deciduous Forest
Evergreen Forest
Mixed Forest
Shrub/Scrub
Grassland/Herbaceous
Pasture/Hay
Cultivated Crops
Woody Wetlands
Emergent Herbaceous Wetlands
ESCONDIDO CREEK WS SCS SITE 4 DAM
FRS No. 13
FRS No. 7
FRS No. 5
FRS No. 6
FRS No. 3
Doe Branch
181
72
Bainville
CO RD 7474
CO RD 182
CO RD 752
Escondido Creek Watershed
Karnes County, Texas
Figure C-1
FRS No. 4 Land Use Map
Upstream Watershed
Legend
Project Location
Other Escondido Creek Dams within Study Area
Project Watershed
Escondido Creek Watershed
N
0
0.8
Miles
USDA
United States Department of Agriculture
Natural Resources Conservation Service
L:\DCS\Projects\WTR\60707508_SARA_TO8_EscondidoFRS12\900_CAD_GIS\920_GIS\MXD\Report\Esc04_Appendix_C1_Landuse_US.mxd

NLCD 2019 with Updates

Roads	Developed, Medium Intensity	Evergreen Forest	Pasture/Hay
Open Water	Developed, High Intensity	Mixed Forest	Cultivated Crops
Developed, Open Space	Barren Land (Rock/Sand/Clay)	Shrub/Scrub	Woody Wetlands
Developed, Low Intensity	Deciduous Forest	Grassland/Herbaceous	Emergent Herbaceous Wetlands

FRS No. 10
FRS No. 12
FRS No. 13
FRS No. 2
FRS No. 1
ESCONDIDO CREEK WS SCS SITE 4 DAM
Escondido Creek
Doe Branch
Kenedy
San Antonio River
181
BUS 181
72
239
CO RD 339
CO RD 331
CO RD 124
CO RD 126
CO RD 137
CO RD 136
CO RD 139
CO RD 138
Card Airfield
Hondo Creek
Carr Hollow
Possum Hollow
Rock Hollow

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Escondido Creek Watershed
Karnes County, Texas

Figure C-2
FRS No. 4 Land Use Map
Downstream Study Area

Legend

- Project Location
- Other Escondido Creek Dams within Study Area
- Project Benefit Area
- Project Watershed
- Escondido Creek Watershed

N

0 0.75 Miles

USDA United States Department of Agriculture
Natural Resources Conservation Service

L:\DGS\Projects\WTR\60707508_SARA_TO8_Escondido\FRS\2300_CAD_GIS\920_GIS\MXD\Report\Esch4_Appendix_C3_Farmland.mxd

FRS No. 11
FRS No. 10
FRS No. 8
FRS No. 12
ESCONDIDO CREEK WS SCS SITE 4 DAM
FRS No. 13
FRS No. 7
FRS No. 5
FRS No. 6
FRS No. 2
FRS No. 1
FRS No. 3
Escondido Creek
Doe Branch
Kenedy
San Antonio River
Hondo Creek
Card Airfield
Otto Kaiser Hospital Helipert
Karnes County Airport
Soil Conservation Service Site 10 Dam
Soil Conservation Service Site 8 Dam
Soil Conservation Service Site 6 Dam
Soil Conservation Service Site 2 Dam
KARNES COUNTY
FM 99
FM 2102
FM 2509
FM 743
CO RD 188
CO RD 167
CO RD 164
CO RD 163
CO RD 159
CO RD 145
CO RD 148
CO RD 138
CO RD 136
CO RD 135
CO RD 126
CO RD 124
Omos Creek
Bucket Creek
Panther Creek
Nichols Creek
Hondo Creek
LAREDO
S SUNSET STRIP ST
S ESCONDIDO ST
72
181
239

NRCS Farmland

- Prime farmland
- Prime farmland if irrigated
- Farmland of statewide importance
- Farmland of statewide importance, if irrigated
- Not prime farmland

Escondido Creek Watershed
Karnes County, Texas

Figure C-3
FRS No. 4
Farmland Map

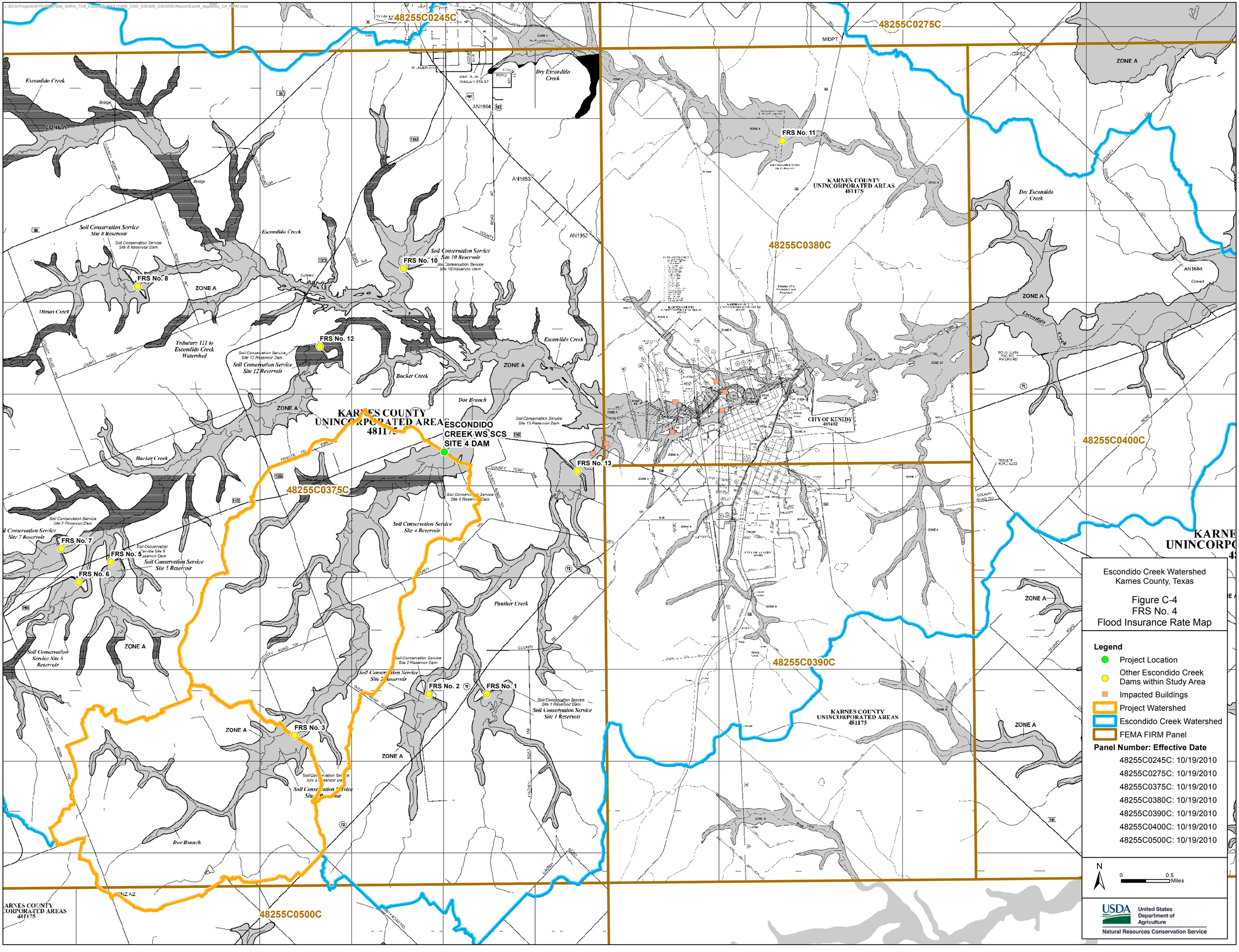
Legend

- Project Location
- Other Escondido Creek Dams within Study Area
- Project Watershed
- Escondido Creek Watershed

N

0 1 Miles

USDA United States Department of Agriculture
Natural Resources Conservation Service



Escondido Creek Watershed
Karnes County, Texas

Figure C-4
FRS No. 4
Flood Insurance Rate Map

Doe Branch Private Culvert

Doe Branch

Dam 4 Breach

FM 2102

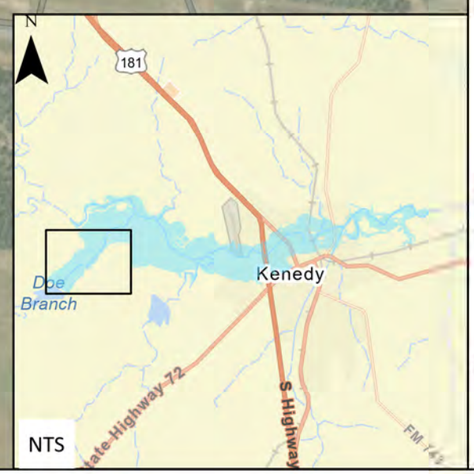
FM 2102

FM 2102

FM 2102

Doe Branch

Doe Branch



Legend

- Road Crossings
- Impacted Buildings
- FEMA Effective Floodplain
- Dam 4 Breach Inundation Boundary

ESCONDIDO CREEK WATERSHED
FRS NO. 4
KARNES COUNTY, TEXAS

FIGURE C-5
BREACH INUNDATION MAP
1 OF 6

N

0 200 400 Feet
1 inch = 400 ft

USDA United States Department of Agriculture
Natural Resources Conservation Service

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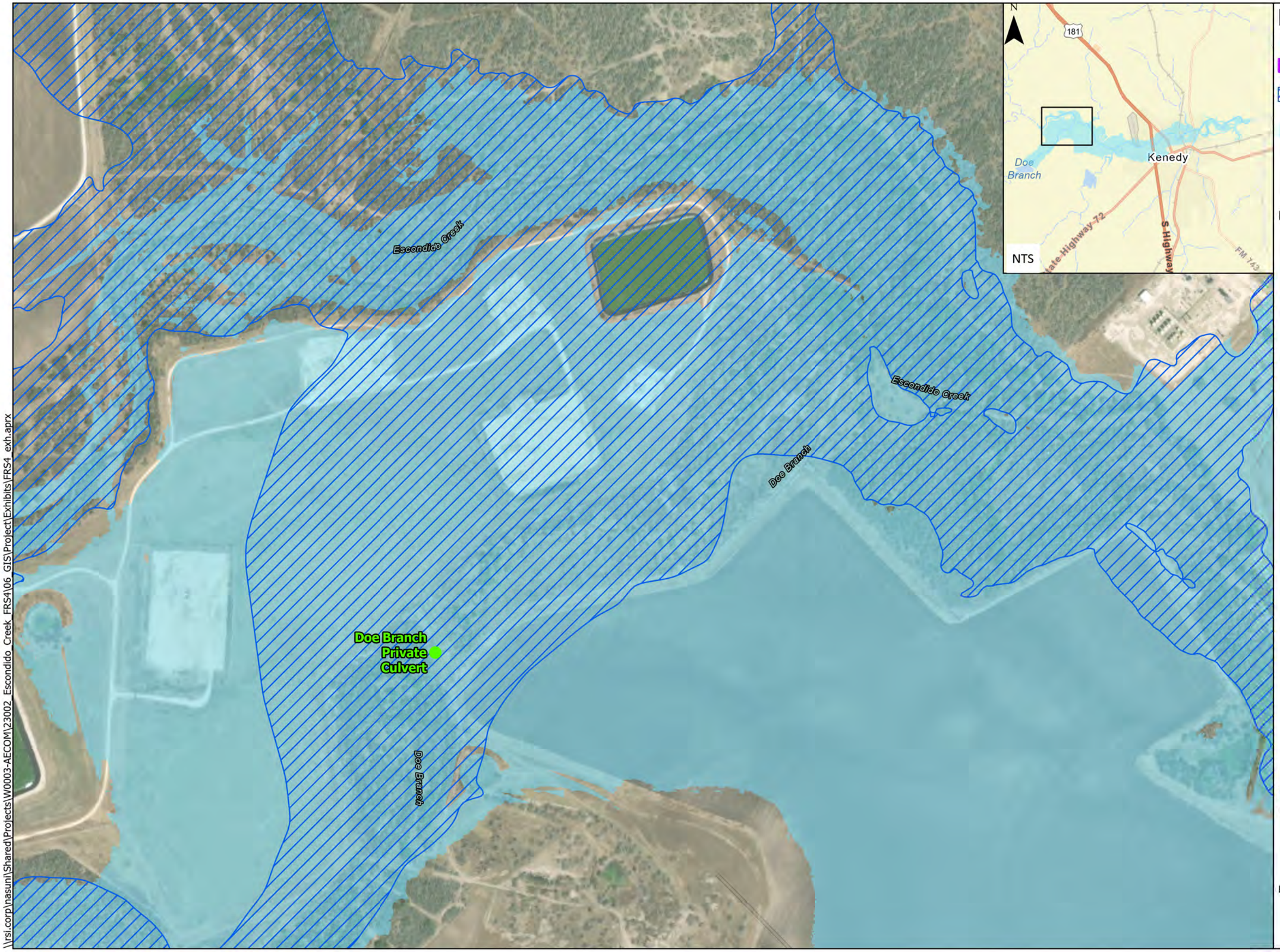

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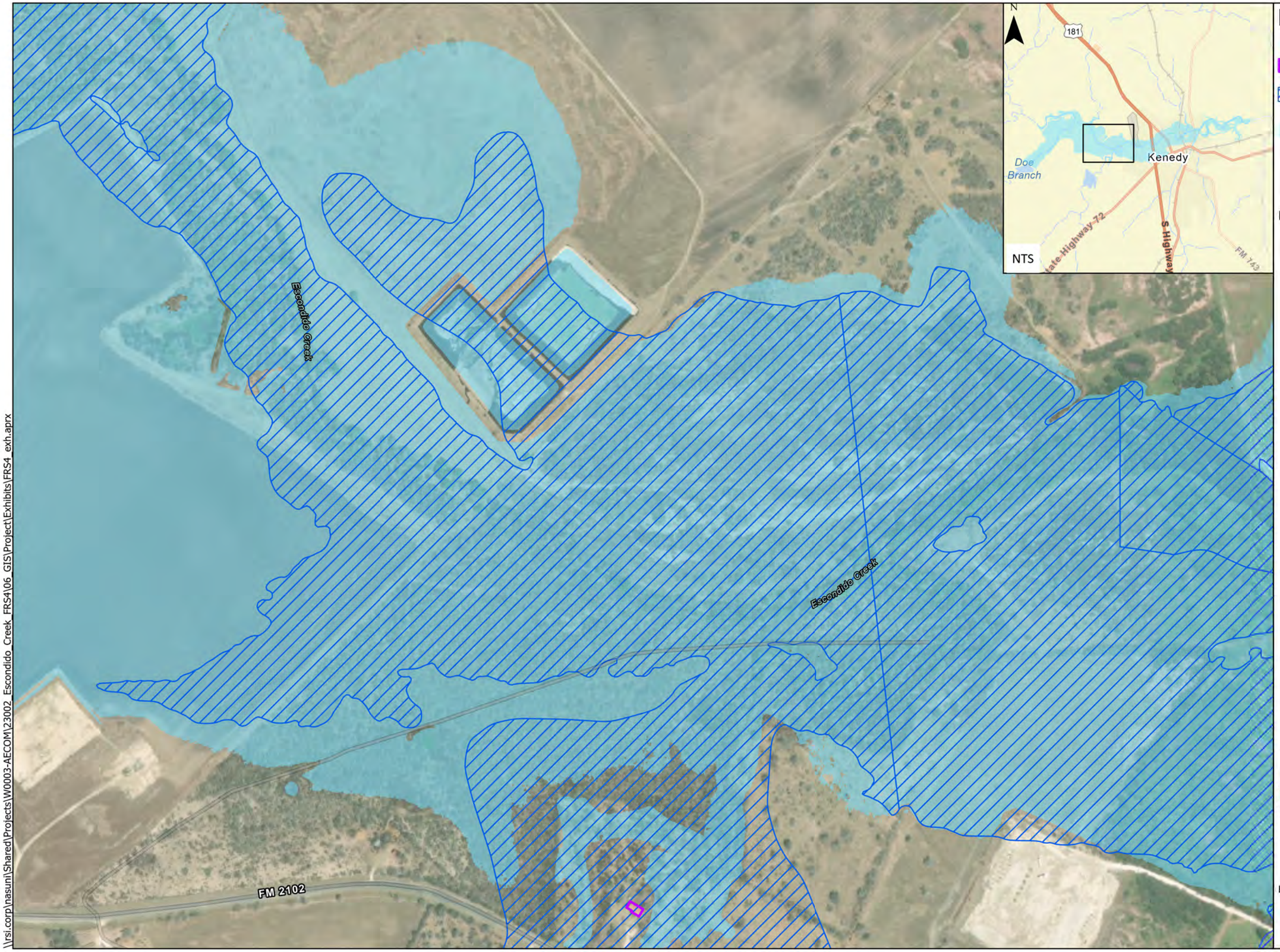

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Legend

- Road Crossings
- Impacted Buildings
- FEMA Effective Floodplain
- Dam 4 Breach Inundation Boundary

ESCONDIDO CREEK WATERSHED
FRS NO. 4
KARNES COUNTY, TEXAS

FIGURE C-5
BREACH INUNDATION MAP
3 OF 6

N

0 200 400 Feet
1 inch = 400 ft

USDA United States Department of Agriculture
Natural Resources Conservation Service

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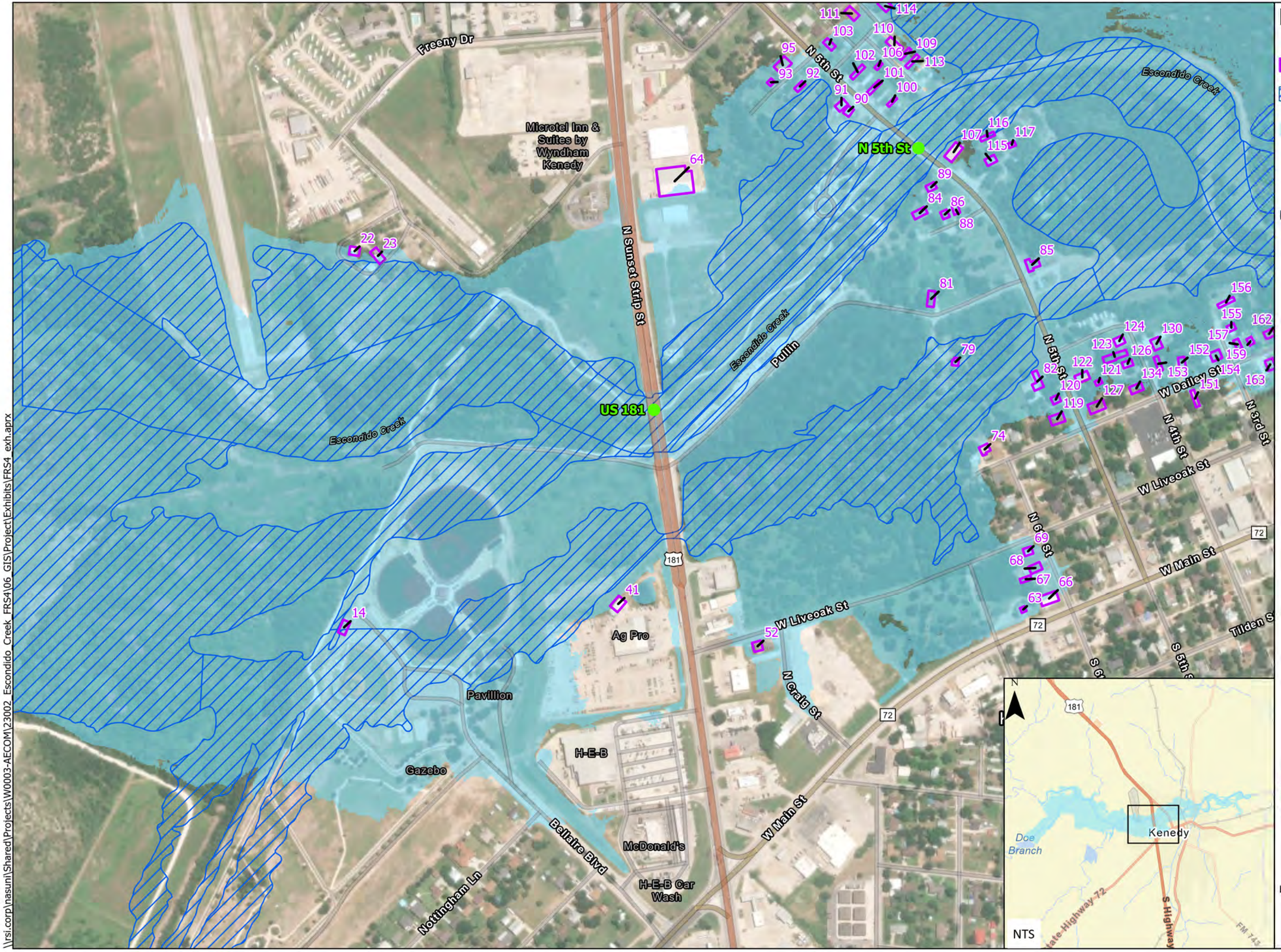

Legend

- Road Crossings
- Impacted Buildings
- FEMA Effective Floodplain
- Dam 4 Breach Inundation Boundary

ESCONDIDO CREEK WATERSHED
FRS NO. 4
KARNES COUNTY, TEXAS

FIGURE C-5
BREACH INUNDATION MAP
4 OF 6

N

0 200 400 Feet
1 inch = 400 ft

United States Department of Agriculture
Natural Resources Conservation Service

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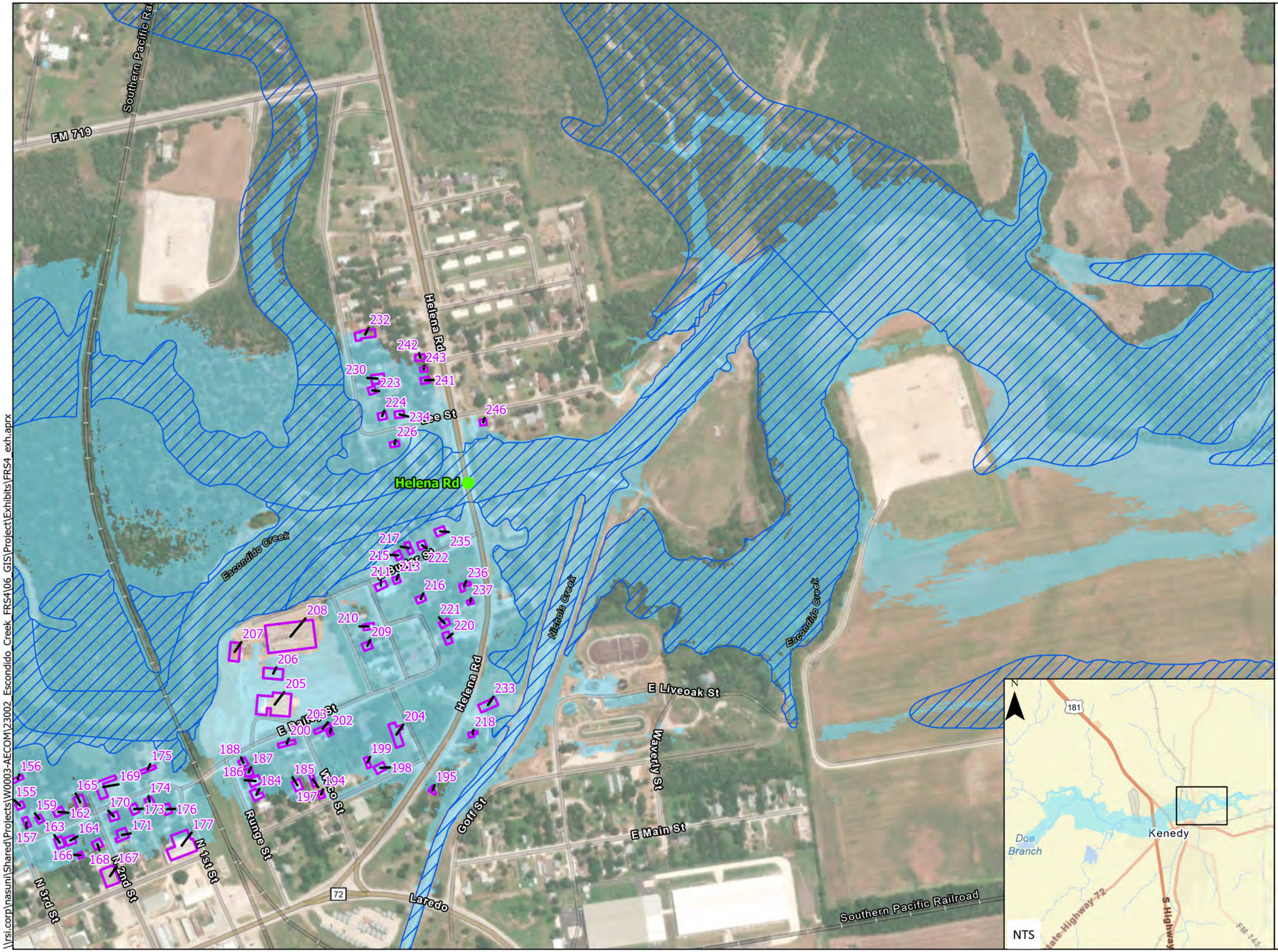

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Legend

- Road Crossings
- Impacted Buildings
- FEMA Effective Floodplain
- Dam 4 Breach Inundation Boundary

ESCONDIDO CREEK WATERSHED
FRS NO. 4
KARNES COUNTY, TEXAS

FIGURE C-5
BREACH INUNDATION MAP
5 OF 6

N

0 200 400 Feet
1 inch = 400 ft

USDA United States Department of Agriculture
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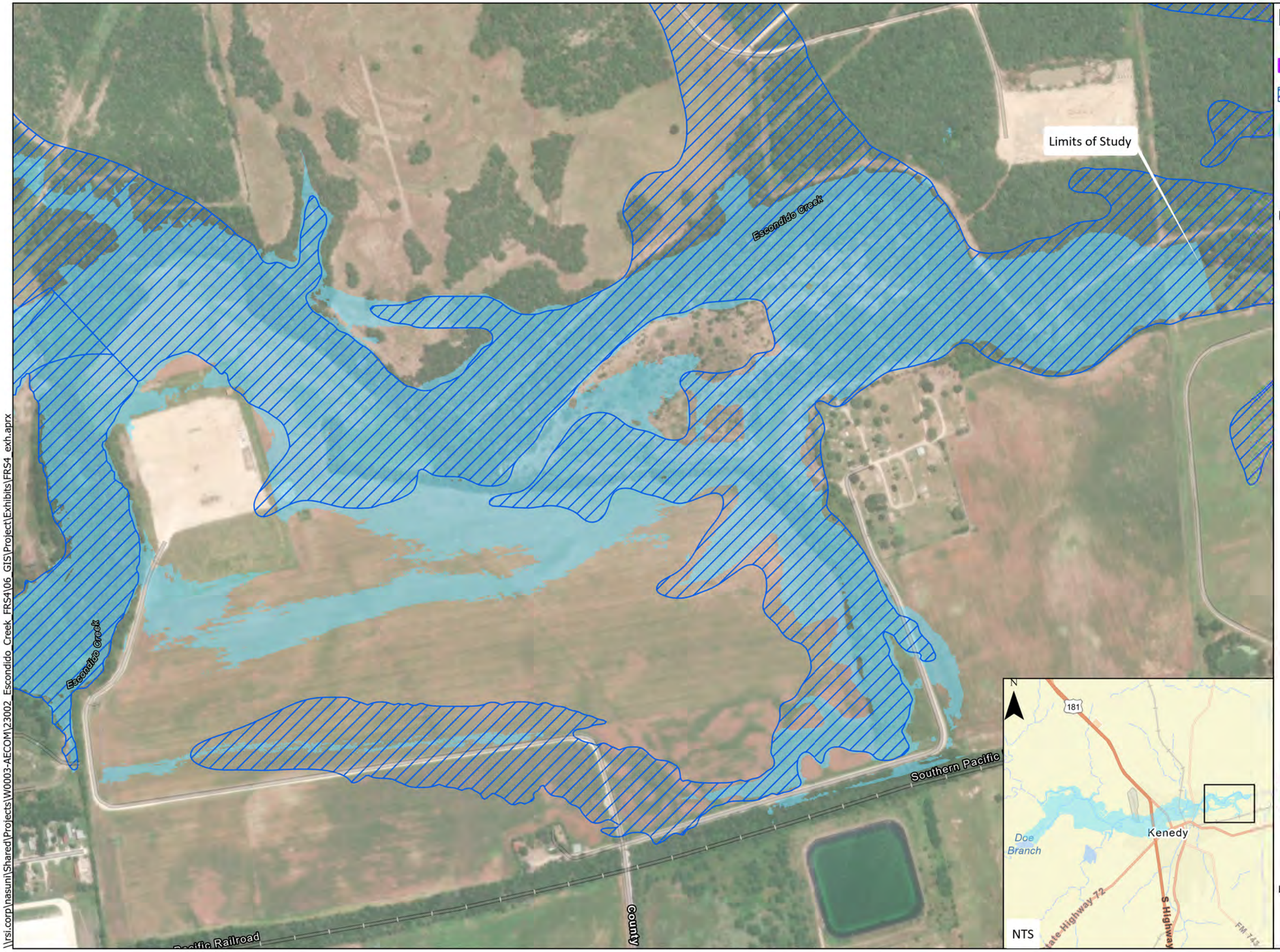

Legend

- Road Crossings
- Impacted Buildings
- FEMA Effective Floodplain
- Dam 4 Breach Inundation Boundary

ESCONDIDO CREEK WATERSHED
FRS NO. 4
KARNES COUNTY, TEXAS

FIGURE C-5
BREACH INUNDATION MAP
6 OF 6

N

0 200 400 Feet
1 inch = 400 ft

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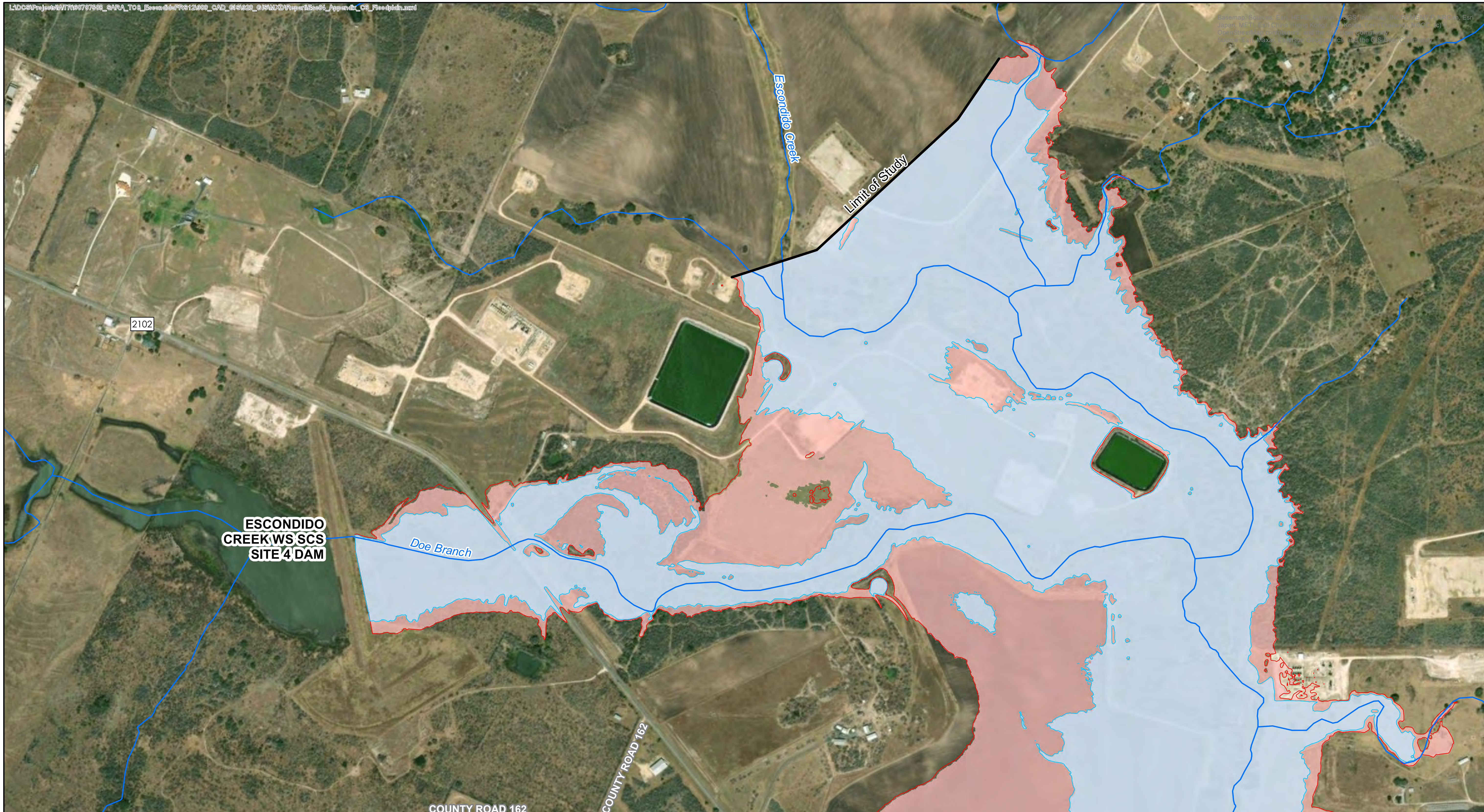
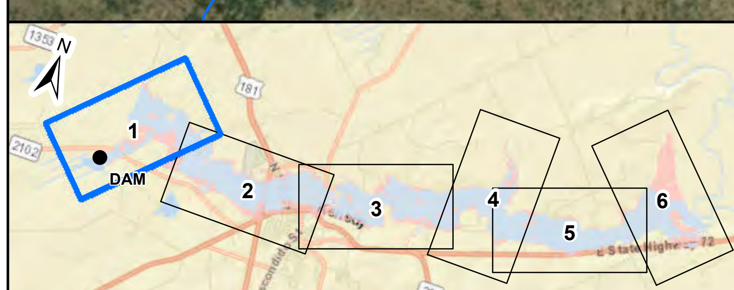




0 800
Feet

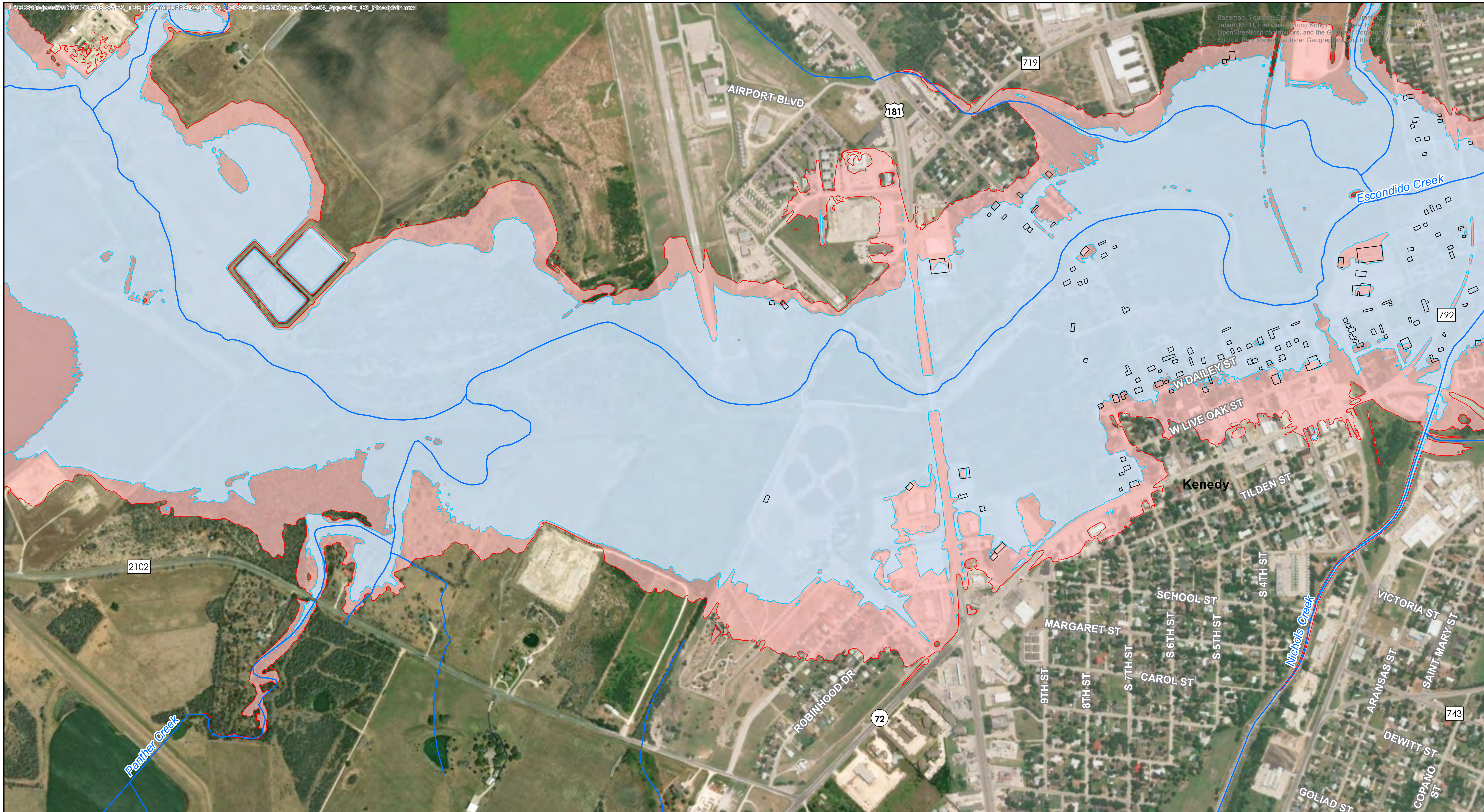
United States
Department of
Agriculture
Natural Resources Conservation Service

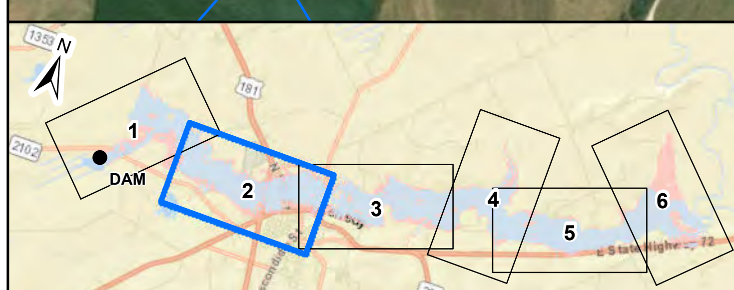
Legend

Modeled Preferred Alternative 1% AEP Floodplain	Modeled Existing Condition 1% AEP Floodplain
Modeled Preferred Alternative 0.2% AEP Floodplain	Modeled Existing Condition 0.2% AEP Floodplain
	Impacted Buildings

Escondido Creek Watershed
Karnes County, Texas

Figure C-6
FRS No. 4 Floodplain Map
1 of 6





N

0 800 Feet

United States Department of Agriculture

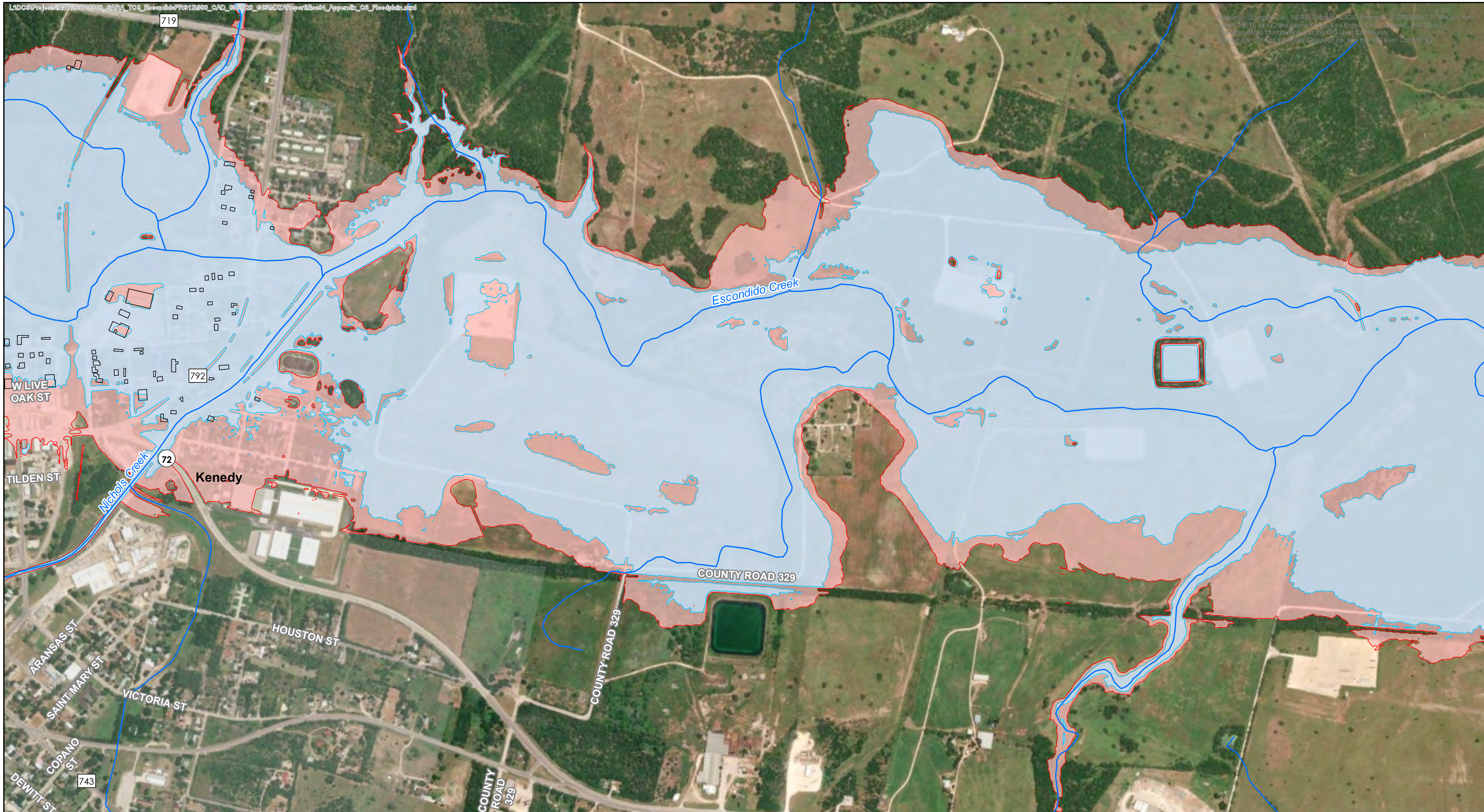
Natural Resources Conservation Service

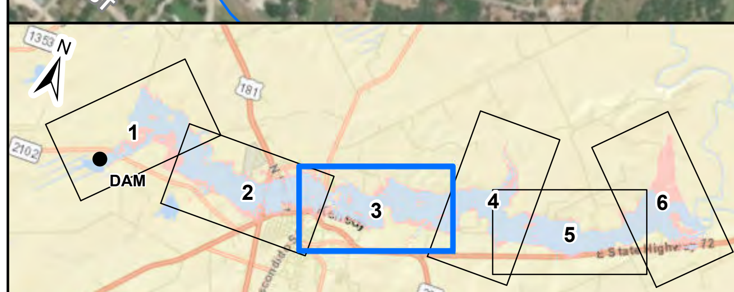
Legend

Modeled Preferred Alternative 1% AEP Floodplain	Modeled Existing Condition 1% AEP Floodplain
Modeled Preferred Alternative 0.2% AEP Floodplain	Modeled Existing Condition 0.2% AEP Floodplain
	Impacted Buildings

Escondido Creek Watershed
Karnes County, Texas

Figure C-6
FRS No. 4 Floodplain Map
2 of 6





N

0 800 Feet

USDA United States Department of Agriculture

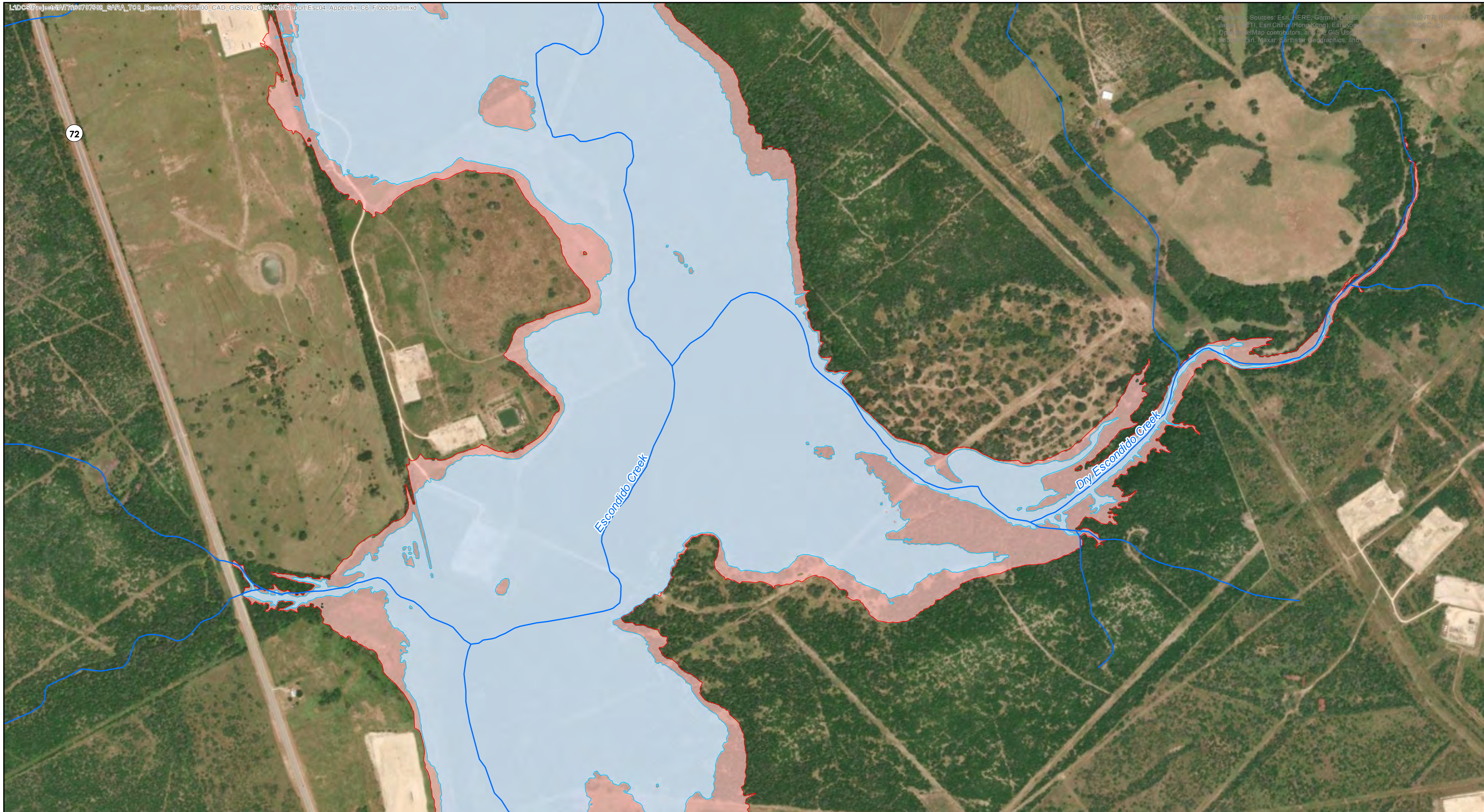
Natural Resources Conservation Service

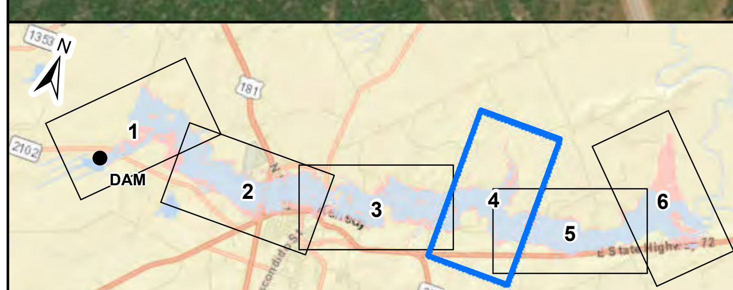
Legend

- Modeled Preferred Alternative 1% AEP Floodplain
- Modeled Preferred Alternative 0.2% AEP Floodplain
- Modeled Existing Condition 1% AEP Floodplain
- Modeled Existing Condition 0.2% AEP Floodplain
- Impacted Buildings

Escondido Creek Watershed
Karnes County, Texas

Figure C-6
FRS No. 4 Floodplain Map
3 of 6





Z

0 800
Feet

USDA United States Department of Agriculture
Natural Resources Conservation Service

Legend

Modeled Preferred Alternative 1% AEP Floodplain

Modeled Preferred Alternative 0.2% AEP Floodplain

Modeled Existing Condition 1% AEP Floodplain

Modeled Existing Condition 0.2% AEP Floodplain

Impacted Buildings

Escondido Creek Watershed
Karnes County, Texas

Figure C-6
FRS No. 4 Floodplain Map
4 of 6

L:\DCS\Projects\WTR\60707508_SARA_TO8_EscondidoFRS12900_CAD_GIS\920_GIS\MXD\Report\Esc04_Appendix_C6_Floodplain.mxd

Basemap Sources: Esri, DeLorme, HERE, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, Maxar, GeoEye, Earthstar Geographics, and the GIS User Community

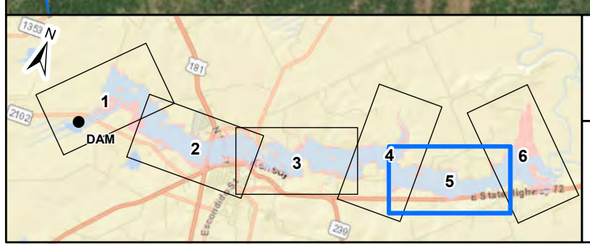
Escondido Creek

COUNTY ROAD 331

72

COUNTY ROAD 125

COUNTY ROAD 124



N

0 800 Feet

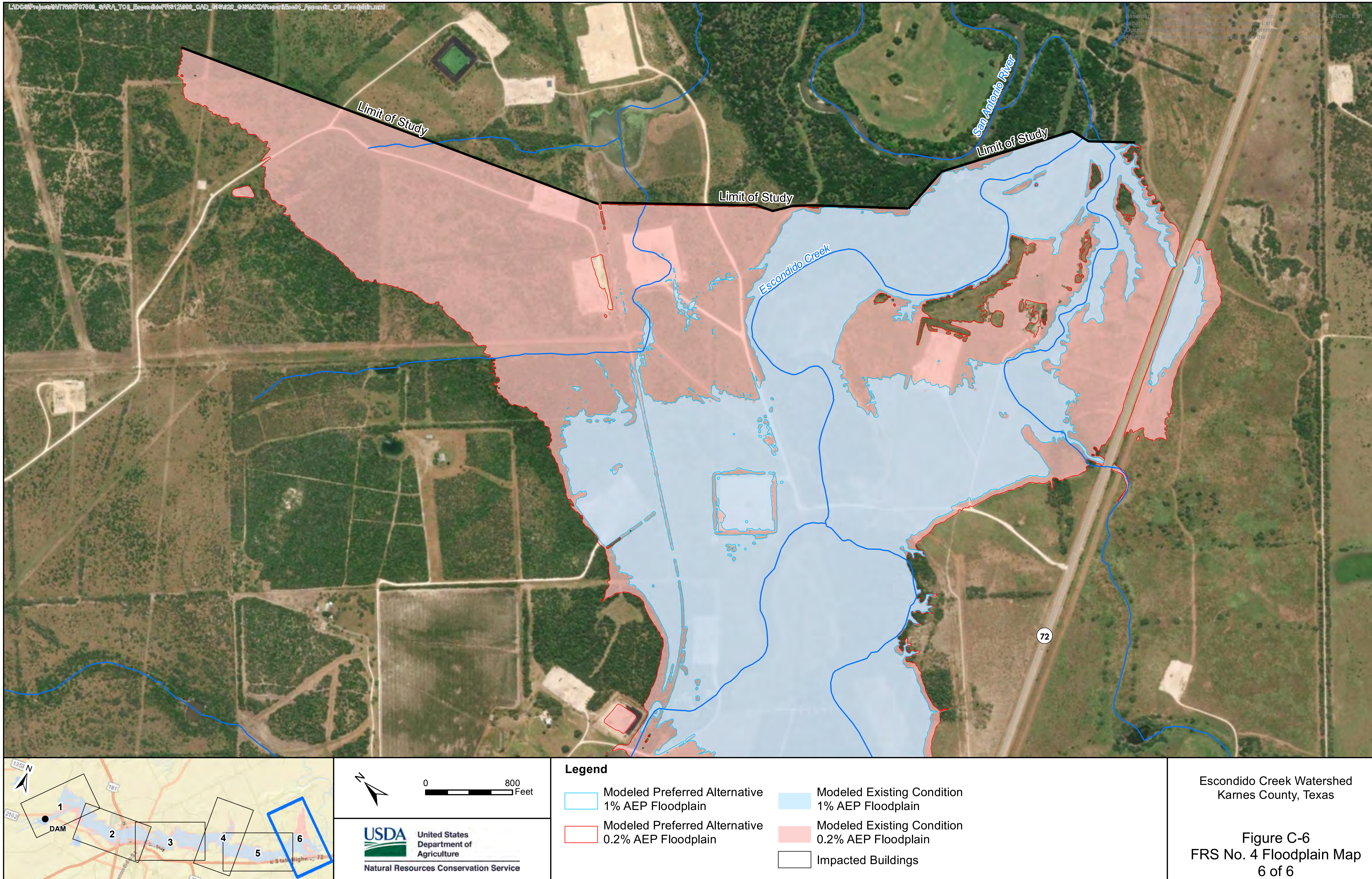
USDA United States Department of Agriculture
Natural Resources Conservation Service

Legend

- Modeled Preferred Alternative 1% AEP Floodplain
- Modeled Preferred Alternative 0.2% AEP Floodplain
- Modeled Existing Condition 1% AEP Floodplain
- Modeled Existing Condition 0.2% AEP Floodplain
- Impacted Buildings

Escondido Creek Watershed
Karnes County, Texas

Figure C-6
FRS No. 4 Floodplain Map
5 of 6



N

0 800 Feet

USDA United States Department of Agriculture
Natural Resources Conservation Service

Legend

Modeled Preferred Alternative 1% AEP Floodplain

Modeled Preferred Alternative 0.2% AEP Floodplain

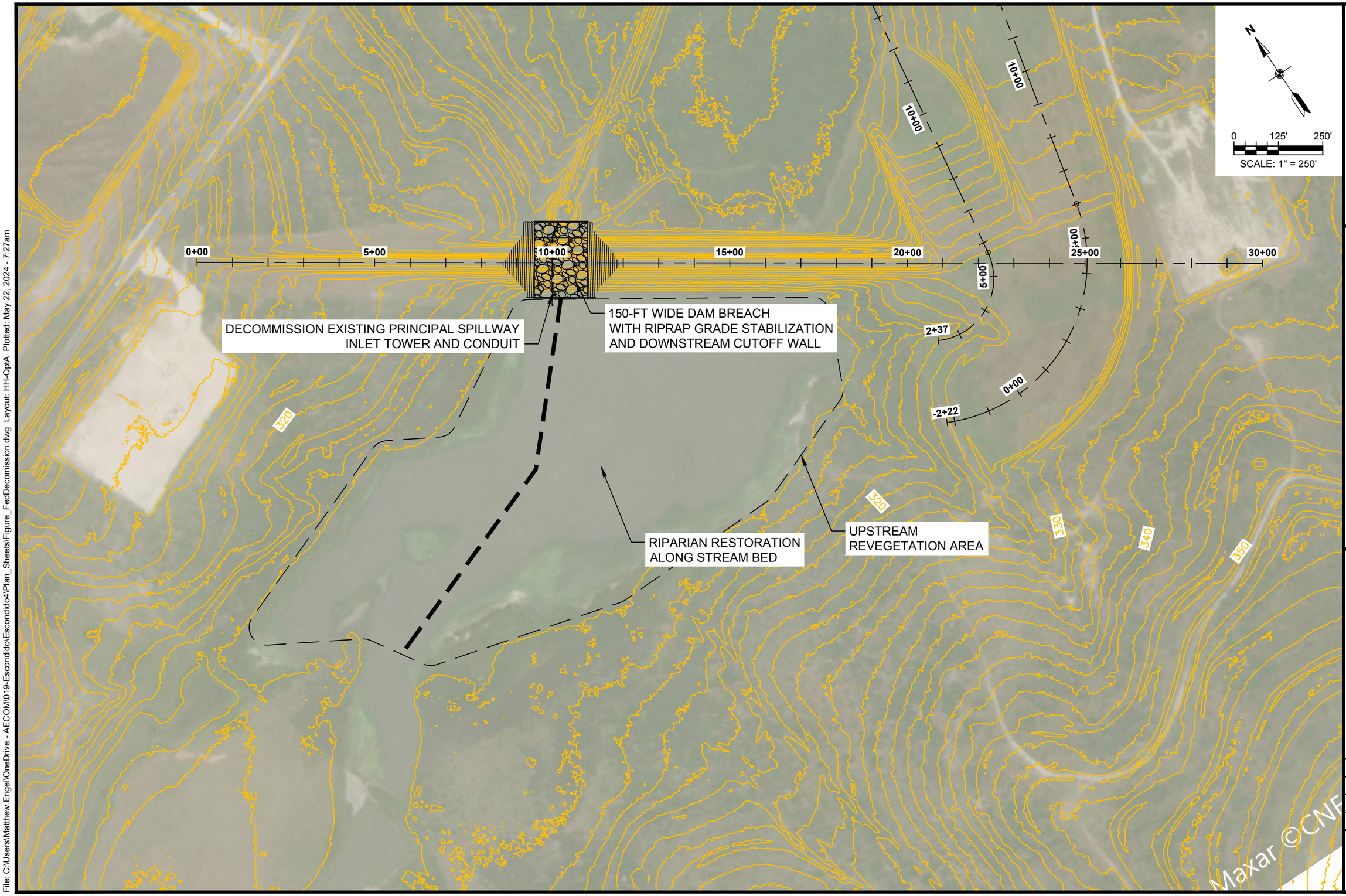
Modeled Existing Condition 1% AEP Floodplain

Modeled Existing Condition 0.2% AEP Floodplain

Impacted Buildings

Escondido Creek Watershed
Karnes County, Texas

Figure C-6
FRS No. 4 Floodplain Map
6 of 6



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Texas Firm No. F-3162

AECOM

NRCS

Escondido Creek FRS No. 4
Supplemental Watershed Plan
and Environmental Assessment

FRS No. 4 Alternative 2
Federal Decommission

DATE: 4/23/2024
SCALE: 1" = 200"
DESIGNED BY: MDE
DRAWN BY: MDE

FIGURE NO.:
C-7

File: C:\Users\Matthew.Engel\OneDrive - AECOM\019-Escondido\Escondido4\Plan_Sheets\Figure_FedDecomission.dwg Layout: HH-OptA Plotted: May 22, 2024 - 7:27am

RAISE TOP OF DAM
2.28 FT TO EL. 335.4 FT
(3H:1V DOWNSTREAM SLOPE)

NEW 450-FT WIDE RCC STEP SPILLWAY
At EL. 328.5 FT AND STILLING BASIN

NEW TOE DRAIN

EXTEND CUTOFF
TRENCH

DECOMMISSION EXISTING PRINCIPAL SPILLWAY
INLET TOWER AND CONDUIT

NEW PRINCIPAL SPILLWAY WITHIN INLET TOWER,
42" CONDUIT, AND IMPACT BASIN

WAVE PROTECTION RIPRAP

EXISTING AUXILIARY SPILLWAY
CREST RAISE EL. 329.0 FT

0 125' 250'
SCALE: 1" = 250'

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Austin, Texas 78729
Texas Firm No. F-3162

Escondido Creek FRS No. 4
Supplemental Watershed Plan and Environmental Assessment

NRCS

FRS No. 4 Alternative 3
High Hazard Rehabilitation
450-ft RCC Stepped Spillway

DATE: 5/6/2024
SCALE: 1" = 250"
DESIGNED BY: MDE
DRAWN BY: MDE

FIGURE NO.:
C-8

NEW 630-FT WIDE RCC STEP SPILLWAY
AT EL. 328.7 FT AND STILLING BASIN

RAISE TOP OF DAM
2.28 FT TO EL. 335.4 FT
(3H:1V DOWNSTREAM SLOPE)

NEW TOE DRAIN

EXTEND CUTOFF
TRENCH

DECOMMISSION EXISTING PRINCIPAL SPILLWAY
INLET TOWER AND CONDUIT

NEW PRINCIPAL SPILLWAY WITHIN INLET TOWER,
42" CONDUIT, AND IMPACT BASIN

WAVE PROTECTION RIPRAP

EXISTING AUXILIARY SPILLWAY
CREST RAISE EL. 329.2 FT

0331.681

0 125' 250'
SCALE: 1" = 250'

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Austin, Texas 78729
Texas Firm No. F-3162

Escondido Creek FRS No. 4
Supplemental Watershed Plan
and Environmental Assessment

FRS No. 4 Alternative 4
High Hazard Rehabilitation
630-ft RCC Stepped Spillway

DATE: 5/6/2024
SCALE: 1" = 250"
DESIGNED BY: MDE
DRAWN BY: MDE

FIGURE NO.:
C-9

RAISE TOP OF DAM
2.18 FT TO EL. 335.3 FT
(3H:1V DOWNSTREAM SLOPE)

NEW 150-FT WIDE REINFORCED CONCRETE
LABYRINTH SPILLWAY CHUTE
AT EL. 328.7 FT AND STILLING BASIN

NEW TOE DRAIN

EXTEND CUTOFF
TRENCH

DECOMMISSION EXISTING PRINCIPAL SPILLWAY
INLET TOWER AND CONDUIT

NEW PRINCIPAL SPILLWAY WITHIN INLET TOWER,
42" CONDUIT, AND IMPACT BASIN

WAVE PROTECTION RIPRAP

EXISTING AUXILIARY SPILLWAY
CREST RAISE EL. 329.2 FT

0 125' 250'
SCALE: 1" = 250'

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Escondido Creek FRS No. 4
Supplemental Watershed Plan
and Environmental Assessment

FRS No. 4 Alternative 5
High Hazard Rehabilitation
Labyrinth Weir Spillway

DATE: 5/6/2024
SCALE: 1" = 250"
DESIGNED BY: MDE
DRAWN BY: MDE

FIGURE NO.:
C-10

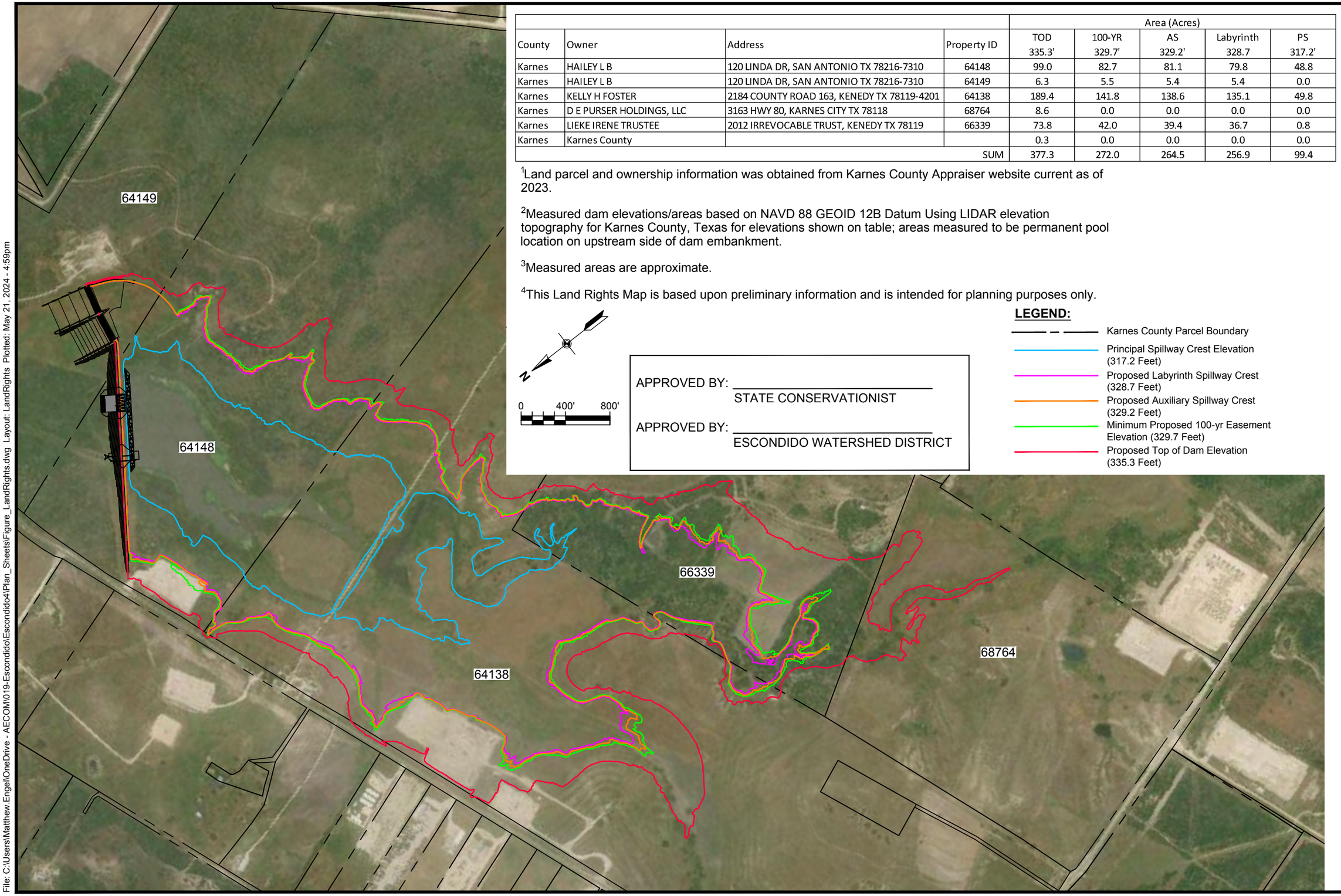
				Area (Acres)				
County	Owner	Address	Property ID	TOD 335.3'	100-YR 329.7'	AS 329.2'	Labyrinth 328.7	PS 317.2'
Karnes	HAILEY L B	120 LINDA DR, SAN ANTONIO TX 78216-7310	64148	99.0	82.7	81.1	79.8	48.8
Karnes	HAILEY L B	120 LINDA DR, SAN ANTONIO TX 78216-7310	64149	6.3	5.5	5.4	5.4	0.0
Karnes	KELLY H FOSTER	2184 COUNTY ROAD 163, KENEDY TX 78119-4201	64138	189.4	141.8	138.6	135.1	49.8
Karnes	D E PURSER HOLDINGS, LLC	3163 HWY 80, KARNES CITY TX 78118	68764	8.6	0.0	0.0	0.0	0.0
Karnes	LIEKE IRENE TRUSTEE	2012 IRREVOCABLE TRUST, KENEDY TX 78119	66339	73.8	42.0	39.4	36.7	0.8
Karnes	Karnes County			0.3	0.0	0.0	0.0	0.0
			SUM	377.3	272.0	264.5	256.9	99.4

[1]Land parcel and ownership information was obtained from Karnes County Appraiser website current as of 2023.

[2]Measured dam elevations/areas based on NAVD 88 GEOID 12B Datum Using LIDAR elevation topography for Karnes County, Texas for elevations shown on table; areas measured to be permanent pool location on upstream side of dam embankment.

[3]Measured areas are approximate.

[4]This Land Rights Map is based upon preliminary information and is intended for planning purposes only.



APPROVED BY: _____
STATE CONSERVATIONIST

APPROVED BY: _____
ESCONDIDO WATERSHED DISTRICT

LEGEND:

- Karnes County Parcel Boundary
- Principal Spillway Crest Elevation (317.2 Feet)
- Proposed Labyrinth Spillway Crest (328.7 Feet)
- Proposed Auxiliary Spillway Crest (329.2 Feet)
- Minimum Proposed 100-yr Easement Elevation (329.7 Feet)
- Proposed Top of Dam Elevation (335.3 Feet)

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Austin, Texas 78729
Texas Firm No. F-3162

Escondido Creek FRS No. 4
Supplemental Watershed Plan and Environmental Assessment

NRCS

FRS No. 4
Land Rights Map

DATE: 5/20/24
SCALE: 1" = 800"
DESIGNED BY: MDE
DRAWN BY: MDE

FIGURE NO.:
C-11

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