



November 10, 2017

Mr. Chandler Peter
Regulatory Division (CESWF-DE-R)
Fort Worth District
U.S. Army Corps of Engineers (USACE)
819 Taylor Street, Room 3A37
Fort Worth, TX 76102-0300

Re: SWF-2009-00264, Lake Palo Pinto Storage Restoration Project at Turkey Peak, Palo Pinto County, Texas. Mitigation Plan – November 2017 Revision

Dear Mr. Peter:

The Palo Pinto County Municipal Water District No. 1 (Applicant) submits the enclosed November 2017 Revision of the Mitigation Plan in support of the Individual Permit application for the Lake Palo Pinto Storage Restoration Project at Turkey Peak. The Application for a Department of the Army Individual Permit was submitted to the Fort Worth District of the USACE on July 9, 2009. This Mitigation Plan addresses comments received to previous versions of the plan and most recently the comments received on November 1, 2017.

The Applicant believes the enclosed documents substantially address all USACE and agency comments received to date and provides the necessary information on the proposed compensatory mitigation for the Project to allow the USACE to finalize permit conditions and render a decision regarding the proposed permit.

We are requesting your expedient review of this submittal. If you have any questions or would like to discuss any clarifications before hardcopies of the Mitigation Plan are submitted, please contact me by phone at 512-912-5129 or e-mail at james.thomas@hdrinc.com. I appreciate your time and attention to this project.

Respectfully,

James Thomas, PWS, CWB
HDR Engineering, Inc.

Enclosures

cc: Kenneth Martin, PPCMWD No. 1
Ken Choffel, HDR
Richard Ritchie, Attorney

PALO PINTO COUNTY MUNICIPAL WATER DISTRICT NO. 1

MITIGATION PLAN (Volume I)

APPLICATION FOR DEPARTMENT OF THE ARMY INDIVIDUAL PERMIT

**Palo Pinto County Municipal Water District No. 1
Proposed Lake Palo Pinto Storage Restoration Project at Turkey Peak**

USACE Project No. SWF-2009-00264

REVISED November 2017

**Prepared for:
Palo Pinto County Municipal
Water District No. 1
PO Box 387
Mineral Wells, Texas 76068**

**Prepared by:
HDR Engineering, Inc.
4401 West Gate, Suite 400
Austin, TX 78757**

Mitigation Plan

Part I: Project Information

Project Name: **Lake Palo Pinto Storage Restoration Project at Turkey Peak (Proposed Turkey Peak Expansion)**

SWF Permit No.: **SWF-2009-00264**

Project Location: **Northwest of Santo, Texas**

Mitigation Site Location(s) (if different): **On-site, downstream and west of Strawn, Texas**

Watershed(s): **Palo Pinto Creek**

County or Counties: **Palo Pinto and Stephens Counties, Texas**

Note to Reader: The mitigation plan that follows is prepared in accordance with and follows the Fort Worth District recommended format posted on the District's webpage (as of March 14, 2016).

The Palo Pinto County Municipal Water District No. 1 (hereinafter referred to as the District or Applicant) operates the existing Lake Palo Pinto in Palo Pinto County, Texas. The Applicant proposes to construct the Lake Palo Pinto Storage Restoration Project at Turkey Peak (herein referred to as proposed project or reservoir). This revised mitigation plan is submitted as an update to the Application for Department of the Army Individual Permit (IP) provided to the Fort Worth District of the U.S. Army Corps of Engineers (USACE) on July 9, 2009 to initiate the process for approval to impact waters of the U.S., including wetlands (WOTUS), under Section 404 of the Clean Water Act (CWA), and also as a revision to the conceptual mitigation plan submitted in June 2011 and revised mitigation plans submitted in February 2015 and September 2016.

Additional background information is contained in the District's water right permit (as submitted to the Texas Commission on Environmental Quality (TCEQ) on January 30, 2009) and approved by TCEQ on October 12, 2015 (Certificate No. 12-4031A).

This mitigation plan is a required attachment of the larger IP application, which was paired with the water rights permit amendment application. With this in mind, the mitigation plan is designed to reflect the requirements of both Section 404 of the CWA and TCEQ regulations, including the Final Rule on Compensatory Mitigation for Losses of Aquatic Resources (Federal Register Vol. 73, No. 70; April 10, 2008) [hereafter referred to as the 2008 Mitigation Rule].

This document and the water rights permit amendment application should be reviewed together since various parts of each document rely on the information in the other. Additionally, during coordination with the USACE and resource agencies, additional analysis was conducted to address inquiries and evaluate the anticipated beneficial and adverse effects of proposed mitigation alternatives. This information was previously submitted to the USACE and is incorporated by reference where appropriate.

Part II: Avoidance and Minimization

1. Avoidance

Impacts to waters of the U.S. (WOTUS) were avoided to the maximum extent practicable through the reservoir site selection screening process and design measures utilized for the expansion of storage volume to meet the projected water supply demands. An alternatives analysis was performed for seven storage sites identified as potential locations for the expansion of current surface water storage. Additional information on comparison of alternatives is found in Attachment F of the IP document, the water rights permit amendment application, and other supporting and supplemental documentation, including the additional information submitted in November 2015 in response to the USACE's Request for Information dated August 21, 2015. These analyses show the proposed project is the least environmentally damaging practicable alternative that meets the purpose and need.

2. Minimization

The Applicant has developed appropriate and practicable on-site measures in the design and operational plans for the proposed project in order to minimize adverse impacts to waters of the U.S. that can not be reasonably avoided. These measures include, but are not limited to, water quality protection through a multi-level outlet tower, stilling basin, and energy dissipation channel located downstream of the stilling basin and upstream of the confluence with Palo Pinto Creek. Furthermore, the impacts of the proposed project will be minimized by the aquatic habitat associated with the 650 acres of open water and 11.5 miles of lacustrine shoreline and buffer habitat provided by the proposed reservoir.

Best Management Practices (BMPs) will be used to control erosion and sedimentation during construction of the proposed project and to control total suspended solids following construction. Construction will be conducted using a phased approach to reroute water to avoid flows through active construction areas to the extent practicable. Areas temporarily disturbed by construction will be re-contoured and re-vegetated as appropriate to minimize adverse impacts to water quality. The Applicant has prepared the TCEQ Tier II 401 Certification Questionnaire and Alternatives Analysis Checklist for Clean Water Act Section 401 water quality certification (included in the Individual Permit application submitted to the USACE on July 9, 2009). The section of Palo Pinto Creek between the proposed outlet works and the existing Farm-to-Market Road (FM) 4 bridge will be protected from erosion, as appropriate, to minimize the impacts from high velocity water in the spillway channel. Additionally, water quality enhancement measures are further described in the downstream mitigation portion of section 5.

By providing sustainable and reliable aquatic habitat, the proposed reservoir with its approximately 55,310 linear feet of lacustrine shoreline with natural substrate (excluding the existing and proposed dams and other infrastructure) and 650 acres of aquatic habitat, will be a highly valuable aquatic resource contributing to the minimization of impacts. In drought years when Palo Pinto Creek upstream of Lake Palo Pinto and Turkey Peak Reservoir ceases to flow, the proposed reservoir will serve as a refugium for most of the aquatic life species living along Palo Pinto Creek. This will minimize impacts through serving to allow aquatic species survival during times of drought allowing them to repopulate upstream areas, as well as continuing to provide biological input into upstream areas through migration during high flow and

downstream segments during periods of spills from the reservoir. Furthermore, the aquatic habitat established by the proposed reservoir minimizes the adverse impacts to the quality and quantity of aquatic resources within the watershed, while providing sustainable aquatic resource functions within the watershed which is subject to recurring droughts.

The shoreline will be conducive to the development of sufficient shallow areas at the various water surface elevations to result in fringe wetland habitats in the littoral zone (e.g., confluence of tributaries, upstream backwater areas, etc.) to functionally mitigate for the 0.1 ac of wetlands that will be inundated. Therefore, no additional off-site compensatory wetland mitigation areas are proposed.

Part III: Compensatory Mitigation

1. Goals and Objectives

The goals of the proposed mitigation plan include:

1. Avoid and minimize impacts to waters of the U.S. caused by the proposed project to the maximum extent practicable.
2. Provide for the replacement of the chemical, physical, and biological functions of the WOTUS that will be lost as a result of the proposed project.
3. Provide for the re-establishment, rehabilitation, and enhancement of aquatic resources within the watershed in order to sustain the ecological functions and aesthetic values of aquatic communities within the landscape of the proposed project.

The proposed mitigation plan, as illustrated in **Attachment D, Figure D-1**, includes the following objectives:

1. The re-establishment (restoration) of approximately 1,761 linear feet (LF) and rehabilitation of approximately 7,740 LF of intermittent stream, as well as the re-establishment (restoration) of approximately 1,381 LF and rehabilitation of 852 LF of ephemeral stream with associated riparian buffers in a mitigation area approximately 27 miles upstream of the proposed reservoir within the Palo Pinto Creek watershed (i.e., upstream mitigation area, **Attachment D. Figure D-2**);
2. The enhancement of approximately 10,042 LF of intermittent stream and 11,356 LF of ephemeral stream with associated riparian buffers in a mitigation area approximately 27 miles upstream of the proposed reservoir within the Palo Pinto Creek watershed (**Attachment D. Figures D-2 and D-3**);
3. The re-establishment (restoration) of approximately 3,587 LF of ephemeral stream channel with associated riparian buffers adjacent to the proposed reservoir (i.e., on-site mitigation area, **Attachment D. Figure D-4**);
4. The enhancement of approximately 510 LF of ephemeral stream channel with associated riparian buffer adjacent to the proposed reservoir (**Attachment D. Figure D-4**);
5. The rehabilitation and enhancement of approximately 27,111 LF of perennial stream channel (Palo Pinto Creek) with increased hydrology/instream flow provisions and a riparian/water quality buffer downstream of the proposed reservoir (**Attachment D. Figure D-5**).

The following definitions from the 2008 Mitigation Rule are used and described below for their applicability and use in this Mitigation Plan:

Enhancement means the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a

decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Re-establishment means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/ historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

Rehabilitation means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/ historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Restoration means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. *For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: reestablishment and rehabilitation.*

This Mitigation Plan for the Turkey Peak Reservoir defines stream mitigation types for various activities as follows:

Those streams that are proposed as mitigation where no stream currently exists, due to an impoundment / pond at the site or upstream, that will be restored and rebuilt through removal or modifications of dams and ponds to result in a gain in stream length and functions will be considered Re-establishment.

Those existing streams that will have a lift in aquatic functions as a result of proposed mitigation activities upstream to remove impoundments that restore flow and channel forming processes will be considered Rehabilitation. These streams may also have activities that enhance the riparian buffer but the stream mitigation type is considered rehabilitation based on the restoration of natural stream functions.

The proposed downstream mitigation on Palo Pinto Creek that involves flow releases, water quality improvements, and increased instream habitat is considered Rehabilitation based on the increased aquatic habitat function and availability (i.e., duration and wetted perimeter) through increased hydrology. The hydrologic measures are evaluated and quantified separately from the other mitigation activities along the downstream portion of Palo Pinto Creek defined as enhancement (see below).

Those existing streams that will have lift in aquatic functions as a result of proposed mitigation activities that primarily improve the riparian buffer as well as channel conditions through vegetation management, planting and livestock exclusion will be considered Enhancement.

2. Site Selection

Based on the scale and nature of the proposed project, the Applicant plans to provide compensatory mitigation by permittee-responsible mitigation (PRM) under a watershed approach consistent with the 2008 Mitigation Rule. The proposed compensatory mitigation measures and site selection consider the practicability and capability for offsetting impacts to aquatic resource functions in the vicinity of the project given the geologic and land use constraints. This includes likelihood for ecological success and sustainability; logistical and local stakeholder factors; location and significance in the watershed; and potential cost of the mitigation measures. The proposed measures for compensatory mitigation use the principles of a watershed approach as described in the 2008 Mitigation Rule (§230.93(b)(4) *Permittee-responsible mitigation under the watershed approach.*) to the extent practicable in order to maintain and improve the quality and quantity of aquatic resources within the watershed by strategic selection of compensatory mitigation. This watershed approach considers the aquatic resource needs of, and desired functions in, the watershed as well as the importance of landscape position and resource type of compensatory mitigation for sustainability of aquatic resource functions within the watershed. Mitigation sites were selected based on their hydrologic and ecological potential to maximize the likelihood of enhancing naturally, self-sustaining aquatic resources in the watershed. Additionally, as stated in the 2008 Mitigation Rule (§230.93(a)(2)), restoration activities are proposed where practicable as they “should generally be the first option considered because the likelihood of success is greater”.

In addition to on-site and downstream mitigation measures, a 450-acre upstream mitigation site (i.e., the Copeland Tract) along Palo Pinto Creek and several tributaries, about 19 miles southwest of the project area, was identified based on the occurrence in the Palo Pinto Creek watershed, proximity to the proposed Palo Pinto Mountains State Park (PPMSP, a protected conservation area), and property availability (see Figure 1 in **Attachment A**). Given the current condition and previous land uses, this upstream mitigation site provides an opportunity to restore stream habitat and enhance the quality of aquatic resources within the local watershed with high likelihood of success. Additionally, about 9,521 LF of Palo Pinto Creek within the western area of PPMSP known as the Nall/Ragsdale Tract is proposed for enhancement and included with the upstream mitigation site this Mitigation Plan. The watershed of the area immediately surrounding the upstream mitigation sites is rural and primarily undeveloped, with the exception of agricultural (i.e., grazing, pond and low-head dam construction) activities. Given the watershed characteristics and potential for natural hydrology and native vegetation at this mitigation site, the selection of the upstream mitigation sites is practicable for promoting successful, self-sustaining mitigation.

The proposed permittee-responsible mitigation under a watershed approach is ecologically preferable under the 2008 Mitigation Rule since it provides in-kind, functional replacement for the impacted habitats, including the use of in-channel mitigation. By providing in-channel mitigation activities by restoration as well as riparian buffer mitigation activities within the same watershed as the proposed project impacts, the proposed permittee-responsible mitigation would provide compensatory mitigation for stream habitats in a manner that benefits the aquatic environment compared to other forms of mitigation outside the watershed.

The use of private or “entrepreneurial” mitigation bank credits was considered but is not proposed in this mitigation plan. There is one mitigation bank with a service area that includes the proposed project (see table below), but use of mitigation bank credits is not practicable due to the limited ecological benefit, , considering the practicability and ecological benefit of

restoring and enhancing aquatic resources in the same watershed as the proposed action. Furthermore, the mitigation bank is not in the same watershed or HUC subregion as the proposed project, it has only legacy stream credits (generated by buffer mitigation activities), and is not as ecologically beneficial for the proposed project. In regard to watershed and ecological preference, the upstream mitigation area is only 27 stream miles upstream of the project area on Palo Pinto Creek and only one 10-digit HUC area away. In comparison, Fall Off Creek Mitigation Bank (FOCMB) is located on the Leon River 475 stream miles away from the project area (Exhibit 1 below) and is six or seven 10-digit HUC basins removed from the project (depending on which basins are followed). Additionally, the mitigation bank does not have enough available credits for the perennial or ephemeral stream types to meet the mitigation needs for functional replacement of aquatic habitat of the proposed project. Therefore, in accordance with the 2008 Mitigation Rule (Section 230.9(b)(4) which states "*(W)here permitted impacts are not in the service area of an approved mitigation bank...that has the appropriate number and resource type of credits available, permittee-responsible mitigation is the only option.*" Based on the above information, the Applicant conducted an assessment of the watershed, ecological setting, functional replacement ratios, and permittee-responsible mitigation (PRM) options.

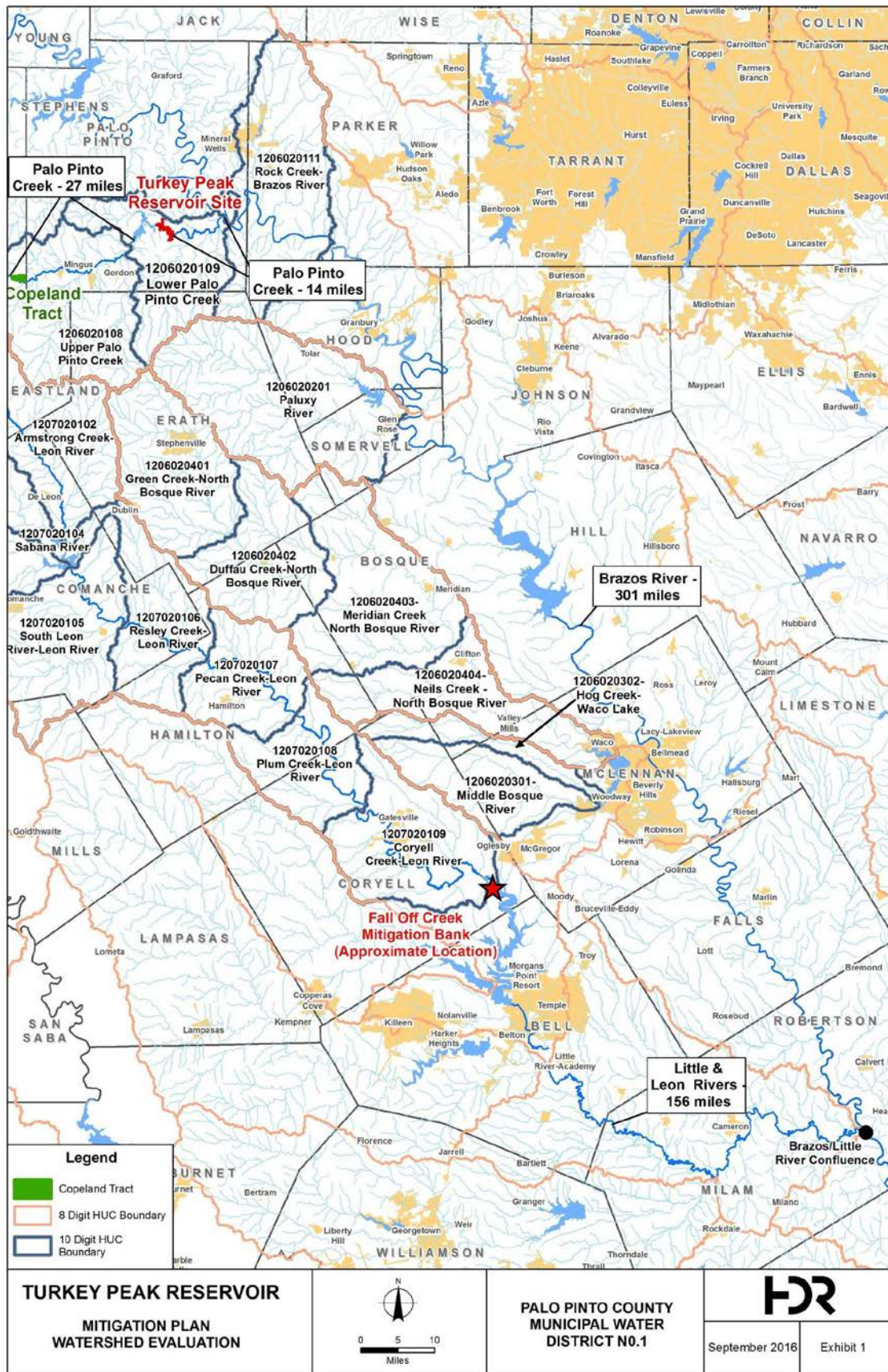
Mitigation Bank	Credit Type	Service Area	Distance (Aerial Miles)
Fall Off Creek	Legacy Stream credits only	Secondary	98

Watershed Approach Evaluation

As stated in the 2008 Mitigation Rule (Section 230.9(b) *Type and location of compensatory mitigation*) " *In general, the required mitigation should be located within the same watershed as the impact site, and should be located where it is most likely to successfully replace lost functions and services,...*". Although the project is located within the Secondary Service Area of FOCMB, when consideration is given to 10-digit HUC watersheds of similar size and flow characteristics (intermittent with perennial pools) to Palo Pinto Creek, the bank is actually six and/or seven watersheds and 475 river miles away from the project area. Conversely, the Proposed PRM sites are all within the same watershed which is a key consideration in the 2008 Mitigation Rule for mitigation alternatives. The Applicant's upstream mitigation area is approximately 27 stream miles upstream of the project area and includes work to enhance Palo Pinto Creek and is within the adjacent 10-digit HUC area as shown in Exhibit 1.

Based on the evaluations conducted by the Applicant summarized above, the use of the proposed PRM mitigation sites is environmentally preferable to the FOCMB approach for functional replacement and will provide significantly more compensatory mitigation credits. Additionally, the use of mitigation measures outlined in **Part III, Section 5** (Mitigation Work Plan) of this document, along with an Adaptive Management Plan, will maximize the likelihood of establishing ecologically self-sustaining aquatic resources.

The USACE confirmed the proposed PRM Plan is the ecologically preferred practicable option in a letter dated January 18, 2017.



3. Liens, Easements or Encumbrances

Liens, easements or encumbrances on the mitigation sites are not anticipated to impact the mitigation activities and success criteria based on the Applicants planning described below.

The Applicant is a water conservation organization as designated by the State of Texas. As a condition of the implementation of this mitigation plan, the Applicant will provide a copy of a title abstract, including a 60-year title search performed by a title company operating within the state of Texas. The submittal shall also include a legal survey of the proposed mitigation sites. The Applicant will also submit an attorney's Opinion of Title prepared in accordance with Federal Title Standards, addressing each scheduled exception to the title and either clear said exception or explain its permissible use in the project. The Title Opinion may be structured in a manner similar to that used in a standard American Land Title Association Title Commitment Form. This will be performed for all properties proposed as mitigation during the property or conservation easement acquisition process subsequent to permit authorization.

Based on the Title Commitment for the upstream mitigation site, approximately 11 pipeline and utility easements may occur in portions of the mitigation areas. Most of the easements allow access to the site, and may have ended due to lack of use. Only two pipeline easements are evident and in use based on the survey of the site, and these do not have a specified width, therefore the assumption for these easements is that maintenance would occur within 15 feet of the existing pipeline. Portions (i.e., length of stream intersected by easement) of the aquatic resources that are within existing pipeline easements and encumbrances are not included in the proposed mitigation area buffers nor the determination of credits described herein and as shown in **Attachment D, Figures D-2, D-3, D-4, and D-5**. Information on the liens, easements, and encumbrances for the on-site and downstream mitigation property acquired by the District for the proposed project will be provided to the USACE during the real-estate acquisition process. If additional easements are identified during final property easement acquisition they will be excluded from the mitigation buffers / site protection, and sufficient mitigation credits will be provided to compensate for impacts (debits).

The Applicant does not anticipate obtaining any mineral rights within the downstream mitigation area conservation easements. Since the mitigation area is primarily in designated floodplain, impacts to the downstream mitigation area from oil/gas exploration is not anticipated to be a significant issue, and the Applicant proposes to accommodate future development with appropriate best management practices. To account for potential future activities near the downstream mitigation area the Applicant has excluded an additional 280 feet from proposed mitigation buffers adjacent to the existing pipeline and utility line crossings to allow expansion of the rights of way to accommodate construction of additional pipelines or utility lines in the future. The Applicant will make efforts to identify mineral rights and lease holders prior to the establishment of the mitigation areas to provide information on the limits of the mitigation stream buffers to encourage close coordination and avoidance of mitigation areas. Finally, based on the current debit-to-credit evaluation provided in Attachment F, Table 5, the Applicant's current proposed mitigation plan has an excess of about 469 credits. This overage in credits provides sufficient contingency to offset (in advance) any potential minor stream corridor impacts due to oil and gas exploration or delivery activities that cannot currently be predicted or accounted for.

Mineral resources, including natural gas and oil, may exist under the mitigation sites. The District would not own subsurface mineral rights, and cannot control a mineral owner's access

to those minerals. However, the District will endeavor to work with mineral rights owners and lessees prior to the further development of mineral resources. The District would provide guidelines and identify areas that are away from the aquatic resources and associated buffers utilized as mitigation in order that development of mineral rights avoids and minimizes impacts to the mitigation sites to the extent practicable. Since the mitigation areas are comprised of streams and proposed riparian corridor buffers in areas prone to flooding, it is anticipated impacts, if any, will be minor in nature and limited to linear crossings. Under a 2014 agreement between the District and TPWD regarding the upstream mitigation site, the TPWD upon taking ownership of the property will *"...use its best efforts to minimize impacts associated with the exploration, drilling, or development of oil and gas and other minerals on the Property..."*.

The proposed conservation easements for the mitigation areas will include provisions that the landowners (i.e., grantors) shall use best efforts to pursue surface use agreements with mineral estate owner(s) to the effect that all mineral activities shall be conducted by directional or horizontal drilling from a surface location off of the Property and that all mineral activities do not impair or interfere with the purposes of the conservation easement. The exploration for, and production and transportation of, subsurface mineral resources beneath the mitigation sites is acceptable provided the amount of ground disturbing activities and surface alterations are minimized to the maximum extent practicable; activities are conducted in a manner that minimizes adverse environmental impacts; impacted areas are restored to pre-existing conditions (i.e., topography and native vegetation) as soon as practicable; reasonable and appropriate compensatory mitigation is achieved; and the entity conducting the activities complies with all applicable regulatory requirements, including Section 404 of the CWA. The District will work with the entity conducting the activity to restore, rehabilitate and enhance aquatic resources used as mitigation depending on the extent and location of adverse impacts associated with mineral exploration and/or extraction activities, as determined by the USACE.

The District or TPWD will maintain right-of-entry and control access as necessary for mitigation through ownership of properties in fee or by leases/easements as discussed in more detail in **Part III, Section 8**.

4. Baseline Information / Site History

Ecological Conditions for the Impact Site

A summary of ecological conditions for the proposed project impact site is provided below. The delineation of the waters of the U.S found in Attachment C of the Individual Permit application (July 2009 submittal) provides detailed descriptions of the aquatic resources, existing vegetation, surrounding land uses, known cultural resources, threatened and endangered species, geology and soils within the project area, which is the site of impacts and mitigation (i.e., on-site). Ecological condition for streams at the impact site was determined by using the Texas Rapid Assessment Method (TXRAM) and can be found in **Attachment E (Volume II)** of this mitigation plan.

The following information summarizes the existing conditions at the impact site, including the artificial and degraded quality of the impacted waters of the U.S., as it relates to the determination of mitigation requirements. Waters of the U.S. in the proposed project area include Palo Pinto Creek, a historically intermittent stream prior to the construction of Lake Palo Pinto in the late 1960s which is now artificially maintained as perennial through non-required water-supply releases, and secondarily from flow of intermittent and ephemeral tributaries. Two small non-forested wetlands and an on-channel impoundment also occur within the proposed project area. The waters of the U.S. impacted for construction of the proposed project and inundation at the conservation pool elevation include 44,234 LF of stream and 0.1 acre of wetland. A 0.78-acre on-channel impoundment within the proposed project area will not receive discharge of fill and will not have permanent impacts as a result of inundation.

Prior to the construction of Lake Palo Pinto, Palo Pinto Creek experienced no flow about 40% of the time based on flows recorded at the USGS stream gage near Santo, Texas which is located about 10 miles downstream of Lake Palo Pinto. At present, Palo Pinto Creek downstream of Lake Palo Pinto experiences no flow between about 10 and 13% of the time including periods of up to 36 days. In addition, the District's historic non-required water supply releases have resulted in high aquatic life use within Palo Pinto Creek.

Upstream Mitigation Sites

Ecological Conditions

The upstream mitigation sites include approximately 9,521 LF of Palo Pinto Creek and its riparian buffer (150 feet wide) proposed for enhancement activities in a portion of Palo Pinto Mountains State Park (PPMSP) known as the Nall/Ragsdale Tract. According to the TXGIS Mapper, the site is dominated by Central Texas Floodplain Hardwood Forest. However, as a result of previous land uses and intensive grazing portions of the buffer are dominated by Ashe juniper (*Juniperus ashei*) **Attachment B, Figure B-2 and Attachment D, Figure D-3**. Representative ecological condition for streams within PPMSP was determined by using TXRAM and can be found in **Attachment E** (see Volume II) of this mitigation plan.

The proposed upstream mitigation site referred to as the Copeland Tract is approximately 450 acres and is located approximately 19 miles west of Lake Palo Pinto in the southeast corner of Stephens County, near its border with Palo Pinto County to the east and Eastland County to the south. The PPMSP is located just to the south of the proposed Copeland Tract mitigation site. According to the TXGIS Mapper, the site is dominated by four vegetation types -- Edwards Plateau: Ashe Juniper-Live Oak Shrubland; Native Invasive: Mesquite Shrubland; Central Texas

Floodplain Hardwood Forest; and Oak-Evergreen Motte and Woodland. Of these four types, Edwards Plateau: Ashe Juniper-Live Oak Shrubland is the most common at the proposed site.

The streams and riparian buffers within the mitigation site along Palo Pinto Creek and tributaries upstream of the proposed project (i.e., impact area), are currently degraded due to past agricultural land uses, such as cattle grazing. Additionally, in Palo Pinto Creek, a channel dam structure was built presumably for historic water supply to serve rail operations which created an impoundment of the channel. Two earthen dams were also constructed on an ephemeral tributary to create an impoundment for livestock. Along the majority of Palo Pinto Creek and tributaries, the riparian corridor has been heavily invaded by Ashe juniper and subject to heavy cattle grazing that has caused erosion, sedimentation, and degradation of the native plant community through reduced grass, herbaceous, and woody species richness. A delineation of waters of the U.S. for the upstream mitigation site is in **Attachment B, Figure B-1**.

Representative ecological condition for streams within the proposed upstream mitigation site was determined by using TXRAM and can be found in **Attachment E** (see Volume II) of this mitigation plan.

A Phase I Environmental Site Assessment was performed for the District by Adams Environmental, Inc. dated May 23, 2014. Based on site reconnaissance and research and review of available historic and physical setting information, the upstream mitigation site was historically used for ranching and oil and gas exploration and production. Remnants of a reported oil refinery seen in the 1947 aerial photograph but not apparent in subsequent photographs were observed along the southern boundary of the eastern half of the site, as evidenced by dilapidated foundations and concrete footings. No evidence of stained soils, unusual odors, stressed or dead vegetation, or other indicators of media contamination was observed at these locations, and there was no definitive historical evidence that an actual refinery was located on the site. These remnant foundations do not occur within the riparian buffers of the proposed stream mitigation segments. There are records of seventeen oil/gas wells recorded on the site. Ten of these are plugged, four were recorded as dry holes, one as a permitted location, one unaccounted oil well (identified in database, but could not be verified at coordinates), and one oil/gas well (identified in database, but could not be verified at coordinates). Surface features indicating the locations of several well sites were observed at the time of the site reconnaissance; however, a majority of the wells were no longer visible or were not located at the coordinates listed within the records, and no evidence of active wells occurs within the site. Two small diameter crude oil and natural gas pipelines traverse the eastern half of the subject property. As discussed in **Part III, Section 3**, the portions of stream within pipeline easements are not included in the mitigation credits calculation. No additional investigations of potential impacts associated with the oil/gas activity and production sites and pipelines were recommended. No other regulated facilities, evidence of hazardous substances, or recognized environmental conditions were found on the site. Therefore, the upstream mitigation site is suitable and ecologically preferable for the proposed mitigation activities described herein.

Endangered Species

Ashe juniper and various oaks are the dominant tree species required for the breeding habitat of the golden-cheeked warbler (GCWA). The bark of mature Ashe junipers is essential for nest building, while deciduous trees, particularly oaks, are important for foraging. Texas red oak, plateau live oak, shin oak, cedar elm, walnut (*Juglans* spp.), and ash are common hardwoods

where the GCWA is found, especially in the central portion of its range. While many of these species are present at the proposed mitigation site, the canopy cover is very sparse over much of the area or consisting of dense canopy of a near monoculture of medium-size class (approx. 20 tall) juniper, rendering the habitat marginal to poor. The nearest recorded sighting of a GCWA based on August 2016 Natural Diversity Database (NDD) information is approximately 22 miles north-northeast of the mitigation site in Palo Pinto County. Another GCWA sighting occurred approximately 23 miles northeast of the mitigation site, also in Palo Pinto County. However, after reviewing aerial photography and site visits, agency personnel noted that potential suitable habitat for the GCWA may occur within 1 mile of the mitigation site, particularly to the southwest. Additionally, there are unconfirmed reports that GCWA were recorded during recent surveys at PPMSP but the locations of the sightings are not yet available in the NDD, and there are habitat differences (i.e., species diversity, stand age, etc.) between PPMSP sites evaluated as reference reaches and the proposed mitigation buffer locations. Thus, the Applicant undertook presence/absence surveys of the upstream mitigation site for GCWA by a USFWS-permitted biologist between March and May 2017. The results of the surveys were negative with no detections of GCWA within the mitigation area or surrounding upland habitat on the Copeland Tract. The surveys were conducted under the direction of Erin Hatchett of HDR (USFWS Permit No. TE78250B-0). Therefore, the implementation of the mitigation plan activities will have no effect on GCWA.

The black-capped vireo (BCVI) occupies heterogeneous shrub-land habitat that is characterized by a patch distribution of shrub clumps and thickets, with at least 35 percent wood cover that allows light to reach ground level. The shrub stratum is usually 4 to 10 feet in height, with abundant deciduous foliage to ground level; BCVI nests are an average of 3 feet above the ground. Typical plant species in BCVI nesting habitat include plateau live oak, shin oak, blackjack oak (*Quercus marilandica*), Texas red oak, and various sumacs (*Rhus* spp.). Less-common species include Texas mountain laurel, Texas persimmon, and algerita. The nearest recorded sighting in the NDD of a BCVI is approximately 22 miles north-northeast of the mitigation site in Palo Pinto County. Another BCVI sighting occurred approximately 23 miles northeast of the mitigation site, also in Palo Pinto County. HDR conducted a detailed habitat assessment in January 2017 and determined suitable habitat for BCVI was not present within the Copeland Tract. Additionally, observations made by a USFWS-permitted biologist during GCWA surveys further support the lack of BCVI habitat or individuals. The implementation of mitigation plan activities will have no effect on BCVI.

Cultural Resources

An intensive cultural resources survey was conducted on the 450-acre Copeland Tract. The results of this survey are detailed in a draft report *Intensive Cultural Resources Survey for the Turkey Peak Reservoir Section 404 Mitigation Project, Stephens County, Texas* (THC Permit # 7871). A copy of the report was provided to the U.S. Army Corps of Engineers (USACE) as part of project SWF # 2009-00264 on March 17, 2017. A second draft of the report (addressing comments issued by the USACE), was submitted July 14, 2017.

An intensive survey of the project area was conducted. Three archaeological sites (41SE319, 41SE320, and 41SE343) are recommended eligible for inclusion in the National Register of Historic Places (NRHP) and are recommended for State Antiquities Landmark (SAL) listing. In order to protect these three sites, HDR recommends a 50-ft (15 m) avoidance buffer be placed around each feature within sites 41SE319, 41SE320, and 41SE343 during any proposed ground

disturbing activities. USACE will require a qualified monitor on site during all construction activities at 41SE320.

The mitigation work will require impacts to a low-head concrete weir on the 450-acre tract that was recorded as an historic resource (41SE345). Based on the findings of the latest draft report, the dam is considered eligible for NRHP listing. The THC has requested additional archival research in relation to the dam. If the concrete dam is determined to be NRHP eligible it would require , agency coordination, and archival documentation (i.e., Historic American Engineering Record [HAER] report) prior to modification activities. At this time HDR is performing report revisions and a revised report for the 450-acre Copeland Tract will be submitted to USACE and THC for review. TPWD State Park staff expressed an interest in preserving sections of the dam as a potential historic interpretive resource within PPMSP to the extent possible, without affecting the restoration project benefit. Based on the hydrologic analysis conducted for the mitigation design planning it is anticipated that this can be accommodated while utilizing the existing base and wing walls of the dam for grade stabilization to avoid additional stream bed and bank instability.

An intensive cultural resources study was conducted of the upstream mitigation buffer along Palo Pinto Creek within the currently proposed Palo Pinto Mountain State Park. Portions of the Ragsdale and Nall tracts were surveyed within a 75 ft. buffer on each side of the creek. The results of the survey reported in, *Intensive Cultural Resources Survey for the Turkey Peak Reservoir Section 404 Mitigation in the Palo Pinto Mountains State Park* (THC Permit #8108) will be submitted to the USACE on August 4th, 2017. The survey of the Ragsdale and Nall tract portions of the upstream mitigation area revealed one archaeological site (41SE346) which was recommended as not eligible for NRHP eligibility. The other ground disturbing activities include modification of existing soil embankments of the small livestock ponds to re-grade the soils to pre-existing contours and are not anticipated to result in any adverse effects to potential historic or pre-historic resources. Enhancement activities will have minimal surface soil disturbance associated with above-ground vegetation removal and planting of small seedlings (i.e., dibble bar planting method or 1 gal maximum containers). Since NRHP eligibility determinations are pending and survey requirements are not finalized, a Programmatic Agreement (PA) was developed (**Attachment I**) and executed for the proposed project, and it will be amended to incorporate the final mitigation plan areas and known / unknown cultural resources identified during future survey activities to meet the Section 106 compliance and coordination requirements for the projects.

On-site Mitigation Area

Ecological Conditions

The ecological conditions for the on-site mitigation are generally similar to the existing vegetation, surrounding land uses, and local geology and soils within the project area, which is the site of impacts discussed above (and described in the delineation of the waters of the U.S found in Attachment C of the Individual Permit application). Additionally, information on the TXRAM evaluation can be found in **Attachment E** (see **Volume II**) of this mitigation plan. The on-site mitigation activities include removal of four small impoundments that capture surface flow to re-establish stream segments that lack consistent ordinary high water marks. The ponds are used for livestock watering similar to the aquatic resources in the project area.

Endangered Species

No suitable habitat for federally listed endangered species was identified in the on-site mitigation areas. There are no anticipated adverse effects.

Cultural Resources

The proposed restoration activities are located in shallow soils that have been disturbed by construction of ponds, roads, and grading for improved pasture. The area is located within the original Phase I investigation Area of Potential Effect (APE) evaluated in 2009 and no cultural resources were identified. Additionally, no ground disturbance activities are planned in previously undisturbed soils; therefore, no adverse effects to prehistoric or historic resources are anticipated.

Downstream Mitigation Sites

Ecological Conditions

The ecological conditions for the downstream mitigation are generally similar to the existing vegetation, surrounding land uses, and local geology and soils within the project area, which is the site of impacts discussed above (and described in the delineation of the waters of the U.S found in Attachment C of the Individual Permit application). Additionally, information on the TXRAM evaluation for the condition of the downstream mitigation resources can be found in **Attachment E** (see **Volume II**) of this mitigation plan. In the downstream mitigation area the streams and riparian buffers are currently degraded due to past agricultural land uses, such as cattle grazing, pecan orchard management, and clearing. Along portions of Palo Pinto Creek, the riparian corridor has been partially cleared and is subject to cattle grazing that has caused erosion, sedimentation, and degradation of the native plant community.

If enhancements of the segment of Palo Pinto Creek in PPMSF are not performed, segments of Cantrell and Big Sunday creeks, intermittent tributaries to Palo Pinto Creek, could be used as contingency intermittent stream mitigation areas through permit and mitigation plan amendment. The land use and ecological riparian communities for the tributaries are similar to the habitat along Palo Pinto Creek.

Endangered Species

No suitable habitat for federally listed endangered species was identified in the downstream mitigation areas. There are no anticipated adverse effects.

Cultural Resources

The area of proposed riffle restoration downstream of the concrete channel dam is located within the 2009 Phase I cultural resources report APE. There were no cultural resources identified within this area.

Due to the limited nature of mitigation related impacts in these areas a thorough THC Restricted Atlas Database search and historic map review were requested by the USACE in lieu of field surveys. This review document will be part of a comprehensive review memo detailing all cultural resource activities related to the proposed Turkey Peak Reservoir. The review memo will be submitted to the USACE August 4, 2017. The proposed on-site restoration activities are located in shallow soils that have been disturbed by construction of ponds, roads, and grading for improved pasture. No ground disturbance activities are planned in previously undisturbed soils; therefore, no adverse effects to prehistoric or historic resources are anticipated. Soil disturbance in the downstream enhancement areas will be limited to planting of small seedlings (i.e., bare root to 1 gal. maximum container size) and fencing will consist of driven t posts with braces on an as needed basis. No mechanized grading or ground disturbance activities are planned in previously undisturbed soils; therefore, no adverse effects to prehistoric or historic resources are anticipated.

5. Mitigation Work Plan

The Applicant proposes to undertake on-site and near-site (upstream and downstream) mitigation measures under a watershed approach to compensate for the unavoidable impacts to waters of the U.S. caused by the proposed project. The following mitigation work plan describes the proposed mitigation by location and activity type during the initial active development and management phase of the mitigation plan. These activities include stream restoration (i.e., re-establishment and rehabilitation) and enhancement. Figures and design plans illustrating the proposed mitigation plan are in **Attachment D**. It is anticipated that the proposed mitigation work plan described below will achieve the goals and objectives of this mitigation plan by providing the functional replacement value for unavoidable adverse impacts to the aquatic ecosystem.

The proposed compensatory mitigation measures consider the practicability and capability for offsetting impacts to aquatic resource functions in the vicinity of the project given the geologic and land use constraints. This includes the likelihood for ecological success and sustainability, the location and significance in the watershed, and the potential cost of the mitigation measures. The proposed measures for compensatory mitigation use the principles of a watershed approach to the extent practicable in order to maintain and improve the quality and quantity of aquatic resources within the watershed by strategic selection of compensatory mitigation. This watershed approach considers the aquatic resource needs of and desired functions in the watershed as well as the importance of landscape position and resource type of compensatory mitigation for sustainability of aquatic resource functions within the watershed.

Summary of Mitigation Plan Objectives and Approach -

Stream Restoration Engineering Design and Management Approach

A summary of stream restoration practices to be used during restoration actions at the Upstream and On-site mitigation areas is provided below. The proposed actions are based on principles of fluvial geomorphology adapted to fit the geology and hydrologic conditions of the project and mitigation areas. Implementation of all the listed examples is likely not feasible or necessary for each case of stream restoration, and each location was assessed and the appropriate practices design plans were developed based on site conditions (**Attachment D**). Details on specific mitigation design objectives, approach and preliminary design information is provided in the mitigation area (upstream, on-site, and downstream) sections below.

The proposed stream restoration measures associated with the proposed upstream and on-site mitigation actions for the Turkey Peak project include soil dam removal, concrete dam modifications, grading of sediment, rock sill installation, channel restoration and native seeding. It is important to note that the stream hydrology within the undeveloped watersheds upstream of the proposed mitigation sites is substantially unchanged. The primary impacts to the hydrology and natural plant communities are due to dam construction (earthen and concrete), overgrazing, and / or fire suppression. Therefore, the goals of the design and vegetation management plans are to reverse these impacts.

- Riparian restoration area activities will be initiated as soon as practicable following conservation easement (or similar protective covenant) through livestock exclusion and supplemental plantings of native tree, shrub, and herbaceous vegetation for erosion and

sediment control as well as the improvement of the diversity, structure, and canopy of the native riparian plant community.

- Re-grading and re-vegetation of previously constructed earthen embankments will be performed to re-establish stream channels, reduce retention, restore flow/natural stream processes, and minimize erosion and sedimentation.
- Stream re-establishment design plans will be finalized by refining the natural channel designs to connect upstream and downstream stable channel reaches with appropriate channel width to depth ratios, low floodplain benches, slopes, and grade control measures (see design plans in **Attachment D**) for the development of bid packages. Construction of stream restoration will be conducted under the oversight of an engineer and/or ecologist with fluvial geomorphology and stream restoration experience utilizing slopes appropriate to soil conditions, rock sills, grade control, and temporary erosion protection as necessary to reduce erosion and manage risk of failure. Additionally, the Applicant and their engineering consultant will evaluate prospective construction contractors to determine whether they have the qualifications and skill set to execute a details set of plans / specs equivalent to the proposed stream restoration plans. As-built plans including any changes based on field conditions as approved by the stream restoration field engineer would be provided to the USACE following construction.
- Stream banks will be terraced where appropriate based on grade and soil conditions in order to create broad floodplains appropriate for the stream type for development of streamside vegetation and riparian systems.
- Rock sills and other rock clusters will be constructed using native material and located to provide energy dissipation, grade control, increase microhabitats, and increase substrate diversity.
- During and post construction, livestock will be excluded to reduce impact to slope soil stability and vegetation to in order to avoid adverse impacts that may occur close to or adjacent to streams. Following initial stabilization, revegetation, and the verification success criteria are achieved, rotational livestock grazing may be proposed as a future vegetation management tool. If so, a detailed managed grazing plan will be prepared and submitted to the USACE for review and approval, prior to initiation of grazing activities.

Specific design plans and specifications for each restoration location are provided below and in **Attachment D**.

Native Vegetation Restoration & Management

The restoration of native herbaceous and woody plant communities will be conducted within portions of the three proposed mitigation areas (Upstream, Onsite, and Downstream). The proposed actions will vary depending on the extent of previous land use impacts, previous soil disturbance, slope, soil conditions, and proposed restoration activities (i.e., burning, grading, fill, or excavation). Therefore, the Applicant has developed the following general approaches to vegetation restoration to be adapted based on the conditions of each location. As described in the applicable section below, a specific vegetation management plan has been developed for the upstream mitigation areas titled *Copeland Tract Vegetation Management Plan* (HDR, June 2017) in **Attachment J**.

Native-Dominated Rangeland Sites:

Areas impacted by previous land uses include those dominated by Ashe juniper stands (>75% cover) and decreased herbaceous species richness. The selective removal of shrubs/brush and the exclusion of cattle will allow the restoration of the riparian buffer through the re-generation and growth of native trees which provide additional canopy cover and organic matter input to the stream. Following initial brush management activities (i.e., controlled management burn or mechanical brush clearing, volunteer and regenerative non-invasive native species recruitment will be assessed. Supplemental broadcast or drilled native grass / forb seeding and tree / shrub plantings will be performed within the buffers to meet the minimum coverage success criteria. Seedlings will be contract grown using local seed stock to improve success potential and minimize ecological risk. Irrigation may be used during the first year after initial plantings and supplemental plantings. Appropriate measures for enhancement of native vegetation community composition will be adapted from the *Copeland Tract Vegetation Management Plan* (HDR, June 2017) for the Nall/Ragsdale tract of PPMSP (see **Attachment J**) through coordination with TPWD.

Previously Disturbed & Pasture Locations:

Riparian and stream habitats that were previously cleared may require more intensive vegetation restoration activities due to the inability to use controlled burning techniques and/or lack of mature tree canopy. These activities may include herbicide applications of invasive species, selective mechanical clearing, seed drill applications, fertilizer application, and native tree/shrub planting of up to one gallon container-sized seedlings. Irrigation may be used during the first year after initial plantings and supplemental plantings.

The following species lists were developed based on existing plant communities in reference reaches and input from TPWD studies at PPMSP as well as the potential to contract grow locally sourced native species due to the extended time between the proposed initiation of construction activities in 2018 and the anticipated reservoir filling from 2020-2021. Additional information on the plant lists can be found in *Copeland Tract Vegetation Management Plan* (HDR, June 2017) in **Attachment J**.

Native Grass/Forb Seed List:

- Little bluestem (*Schizachyrium scoparium*)
- Big bluestem (*Andropogon gerardii*)
- Sideoats grama (*Bouteloua curtipendula*)
- Blue grama (*Bouteloua gracilis*)
- Buffalograss (*Buchloe dactyloides*)
- Curly mesquite (*Hilaria belangeri*)
- Texas cupgrass (*Eriochloa sericea*)
- Prairie wildrye (*Elymus canadensis*)
- Cane bluestem (*Bothriochloa barbinodis*)
- Maximillian sunflower (*Helianthus maximiliani*)
- Plains coreopsis (*Coreopsis tinctoria*)
- Prairie coneflower (*Ratibia columnifera*)

Riparian Area Native Tree / Shrub List for Downstream Mitigation Area with alluvial soils:

- Bur oak (*Quercus macrocarpa*)
- Live oak (*Q. virginiana*)
- Pecan (*Carya illinoensis*)
- Cedar elm (*Ulmus crassifolia*)

- American elm (*Ulmus americana*)
- Redbud (*Cercis canadensis*)
- Sycamore (*Liquidambar styraciflua*)
- Chickasaw plum (*Prunus angustifolia*)
- Gum bumelia (*Sideroxylon lanuginosum*)
- Buttonbush (*Cephalanthus occidentalis*)
- Roughleaf dogwood (*Cornus drummondii*)

Riparian Area Native Tree / Shrub List for Intermittent Stream in Upstream Mitigation Area:

- Pecan (*Carya illinoensis*)
- Netleaf hackberry (*Celtis reticulata*)
- Texas ash (*Fraxinus texensis*)
- Texas oak (*Q. buckleyi*)
- Live oak (*Q. virginiana*)
- Western soapberry (*Sapindus saponaria* var. *drummondii*)
- Gum bumelia (*Sideroxylon lanuginosum*)
- Cedar elm (*Ulmus crassifolia*)
- Buttonbush (*Cephalanthus occidentalis*)
- Roughleaf dogwood (*Cornus drummondii*)

Upland Buffer Native Tree / Shrub List for Ephemeral Streams (higher elevation / slope) sites in Upstream and On-site Mitigation Areas:

- Netleaf hackberry (*Celtis reticulata*)
- Texas ash (*Fraxinus texensis*)
- Texas oak (*Quercus buckleyi*)
- Plateau live oak (*Q. fusiformis*)
- White shin oak (*Q. sinuata* var. *breviloba*)
- Western soapberry (*Sapindus saponaria* var. *drummondii*)
- Gum bumelia (*Sideroxylon lanuginosum*)
- Cedar elm (*Ulmus crassifolia*)
- Prairie sumac (*Rhus lanceolata*)
- Skunkbush (*R. trilobata*)
- Rusty blackhaw (*Viburnum rufidulum*)

Although not anticipated to be a problem based on baseline surveys of the mitigation areas and reference reaches, monitoring and control of non-native/invasive species would be performed as necessary. The stream enhancement activities will promote ecological functions of the riparian buffer and in-stream habitat mitigation by replacing the chemical, physical, and biological functions of the streams impacted by the proposed project within the same watershed.

The tree/shrub planting and success criteria densities (stems per acre) proposed in this mitigation plan were developed based on the NRCS Ecological Site descriptions and state-and-transition diagrams for the mitigation areas, as described in the *Copeland Tract Vegetation Management Plan* (HDR, June 2017) in **Attachment J**. These ecological site descriptions show lower canopy cover and densities than the typical requirements for riparian buffer revegetation success criteria for final survival (e.g. 250 stems per acre) at the end of monitoring typically expected in ecoregions to the east of the mitigation sites in Stephens and Palo Pinto counties. As described in *Copeland Tract Vegetation Management Plan* (HDR, June 2017) in **Attachment J**, the Loamy Bottomland Ecological Site had a historic climax woodland and midgrass plant

community with 25% or less canopy cover averaged across the entire site, although the riparian area within 50-100 feet of the stream would be expected to be higher. Under current conditions of degradation by abusive grazing, absence of fire, and absence of brush management, the canopy cover exceeds 80% in many areas that have not been previously cleared and are dominated by Ashe juniper with little cover of native midgrass in the understory. Therefore, moving towards a more open canopy of 50-80% is ecologically desirable to be a functional and healthy riparian community and is achievable through the proposed mitigation management activities. Based on evaluation of this information, the Applicant believes the proposed 150 stems per acre at the end of monitoring is justified and appropriate to achieve a canopy of 50-80% cover based on an average tree canopy diameter width of 15 feet when accounting for both existing plants, natural recruitment (as demonstrated in reference reaches on PPMSP), and successfully planted native trees/shrubs. As described in *Copeland Tract Vegetation Management Plan* (HDR, June 2017) in **Attachment J**, the Steep Rocky and Clay Loam ecological sites had a historic climax savannah woodland plant community with no more than 20-30% canopy cover averaged across the entire site, although the riparian area within 25-50 feet of the stream would be expected to be higher. Under current conditions of degradation by abusive grazing, absence of fire, and absence of brush management, the canopy cover exceeds 75% in many areas that have not been previously cleared and are dominated by Ashe juniper. Therefore, moving towards a more open canopy of 30-60% is ecologically desirable to be a functional and healthy riparian community and is achievable through the proposed mitigation management activities. Based on evaluation of this information, the Applicant believes the proposed 120 stems per acre at the end of monitoring is justified and appropriate to achieve a canopy of 30-60% cover based on an average tree canopy diameter width of 15 feet when accounting for both existing plants, natural recruitment, and successfully planted trees/shrubs.

Site Specific Mitigation Measures

Upstream Mitigation Area Restoration Activities

At the upstream mitigation site (450 acres north of PPMSP), a portion of Palo Pinto Creek is currently degraded by the presence of a channel dam structure as well as agricultural (i.e., grazing) land uses which have altered flows, eroded banks, and caused excessive sediment deposition. The construction of concrete dams on Palo Pinto Creek for railroad and oil field development impacted the bank stability and sediment transport of the intermittent stream which is the predominant aquatic feature. The saturation associated with the dam eliminated the rooted woody vegetation on the historic low bank full benches and low stream banks. This increased the erodibility of soil in the natural banks during floods with increase velocities and which carried high amounts of gravel. The concrete dam now leaks to the extent that it doesn't hold water when the stream isn't flowing. The result is an unnatural undercut bank at the historic limits of the impoundment and excessive gravel and sediment deposition upstream and downstream of the dam. However, the water persists long enough to prevent the establishment of local, native woody vegetation and the height and width of the dam crest precludes the development of a natural channel configuration as observed upstream on PPMSP (see RS-1).

Based on a review of historic aerial photography the majority of the tract and areas upslope of the tract was predominantly cleared of woody vegetation and used for grazing lands for the past 40 years or more. An ephemeral tributary (PS-2) to Palo Pinto Creek at the mitigation site has also been degraded by an earthen dam to create an impoundment. Another ephemeral tributary (PS-10) downstream of a previously constructed pond has ceased to show signs of an

ordinary high water mark due to the excessive size of the pond dam which captures the majority of flow for the watershed and the lack of a defined outlet from the pond. Furthermore, invasion by Ashe juniper and heavy cattle grazing has caused erosion, sedimentation, and degradation of the native plant community and other ephemeral stream segments (PS-3, PS-4, PS-5, PS-6, PS-7, and PS-8).

The Applicant proposes to re-establish approximately 1,761 LF and rehabilitate approximately 7,740 LF of intermittent stream as well as re-establish approximately 1,381 LF and rehabilitate 852 LF of ephemeral stream as mitigation for the proposed project. In the currently impounded and/or currently absent stream areas, a natural channel will be re-established and restored by modifying in-channel or dam structures so they will not impound or restrict flow, and selective re-grading of the channel to replicate natural contours similar to upstream and downstream segments and based on reference reaches. Existing, degraded stream reaches downstream of the re-established stream channels will experience rehabilitation through lift in aquatic functions as a result of proposed mitigation activities to remove impoundments that restore natural stream flow and channel processes. In addition to re-vegetation by the native seed bank and natural succession from the surrounding seed source, riparian habitat along the stream restoration areas would be restored by planting tree and shrub seedlings as well as grasses and forbs from seed in select, suitable areas of previously degraded portions of the riparian corridor and adjacent uplands. The Applicant would perform select removal of shrubs/brush to enhance the riparian buffer vegetation community. Additional details of the proposed vegetation management are included in the *Copeland Tract Vegetation Management Plan* (HDR, June 2017) in **Attachment J**.

The Applicant would also exclude cattle from and protect the stream restoration areas as discussed in the enhancement section below. The upstream restoration activities will provide in-kind mitigation by replacing the chemical, physical, and biological functions of the streams impacted by the project within the same watershed.

Upstream Area Engineering Design & Construction Activities

Re-establishment on Unnamed Tributary Streams (PS-2-4 and PS-10-1)

Two soil embankments were constructed to create livestock ponds in series on stream channels PS-2-4 and PS-10-1 (see **Figure D-2 in Attachment D**). The ponds detain low flows and decrease the hydrology (quantity and duration) of bank full discharges and small events. The result of the hydrologic changes combined with increased sedimentation is a degraded sediment transport mechanisms. This has resulted in decreased abundance and benefit of seasonal pools in the channel. Additionally, the long term effects of overgrazing and fire suppression have resulted in dense juniper close to the channel. This has reduced grass cover and species diversity which results in increase sedimentation and inputs of increased amounts of juniper needles limiting diversity of detritus types in pools and eventually into Palo Pinto Creek.

The design and mitigation objectives of the proposed mitigation work plan for the upstream re-establishment of channels PS-2-4 and PS-10-1 include:

1. Pond removal and dam modification to restore hydrologic conditions associated with low-flow, bank-full events to reconnect remnant stream segments and restore stream fluvial geomorphologic processes.
2. Construction of stream segments using grading, excavation, and grade control measures where necessary to reestablish stable channel planform and cross section dimensions.

3. Short term and long term vegetation management to promote a diverse native vegetation community including grasses, shrubs and trees to reduce sedimentation, improve nutrient cycling, and enhance habitat conditions in the ephemeral and intermittent stream segments on and downstream of the mitigation area.

The pond on PS-2-4 was constructed primarily using excavation and includes a large un-vegetated spoil berm located west of the pond. The overflow is located to the east of the remnant channel resulting in sheet flow of approximately 150 to 200 feet long before flow reenters the channel causing a head cut. The proposed restoration approach is to re-grade the soil embankment into the excavated pond and re-establish a bankfull channel thereby restoring natural stream flow characteristics and function.

The upper pond on PS-10-1 is substantially oversized which has resulted in the loss of normal low flow events and spills downstream of the pond including approximately 1,381 LF of the historic stream which does not currently exhibit an ordinary high water mark (OHWM). Due to the elevation change of the profile, to re-establish a naturally stable channel, the pond will be removed by completely removing the dam and re-grading the pond to re-establish a bankfull channel thereby restoring natural stream flow characteristics and function to connect PS-10-1 to stream PS-4 downstream.

The design for the proposed re-established stream PS-2-4 and stream PS-10-1 is illustrated in **Attachment D, Sheets 1A-5 and 11-14**. The following engineering design approach was used to develop stream restoration design plans for use in construction bid procurement:

1. The streambed elevations and dimensions of the two remnant tributaries (PS-10 and PS-2) and associated ponds were collected using sub-inch accuracy GPS survey equipment to allow calculation of the elevation change and stable longitudinal slope for each segment. Additionally, topography and cross sections downstream of the ponds were collected in segment with remnant channels to determine existing depths and to aid in design of stable planform characteristics and grading plans.
2. The modeling of bankfull discharge was used to develop an appropriate design for grade control (i.e., rock sills) and / or erosion protection.
3. Horizontal and vertical layouts of channel designs were developed using stable channel dimensions and planform.
4. Planting plans were developed for all disturbed soil areas using a combination of herbaceous seed mix and native tree / shrubs from the lists provided herein.

Re-establishment on Palo Pinto Creek (PS-1-6) at Low-Head Concrete Dam

Based on field measurements collected by an HDR permitting specialist and water resource engineer, the low-head, concrete dam structure on Palo Pinto Creek (PS-1) has adversely affected the hydrology and sediment transport characteristics upstream and downstream of the dam.

The design objectives of the proposed mitigation work plan for upstream re-establishment of intermittent stream PS-1-6 include:

1. Concrete dam modification to restore hydrologic conditions associated with low flow, bank full events to reconnect stream segments and restore stream geomorphology.

2. Restoring natural stable channel dimensions through the structure to allow re-establishment of sediment transport continuity and stream habitats (riffles, runs, and pools) consistent with unmodified stream segments.
3. Modification of the structure to serve as effective grade control to minimize risk of substantial erosion upstream of the structure and associated potential negative effects associated with deposition downstream
4. Re-establishment of stream segments using grading and excavation where necessary to reestablish stable channel planform and cross section dimensions.
5. Revegetation of the newly established stream banks using native grass, shrubs (e.g., buttonbush) and trees (e.g. sycamore) adapted for alluvial establishment to improve stability.
6. Short term and long term vegetation management in overbank areas to promote a diverse native vegetation community including grasses, shrubs and trees to reduce sedimentation, improve nutrient cycling, and enhance habitat conditions in the intermittent stream segments on and downstream of the mitigation area.

The design for the proposed re-established stream PS-1-6 is illustrated in **Attachment D, Sheets 1A-5 and 15-16**. The following engineering design approach was used to develop stream restoration design plans for use in construction bid procurement:

1. The streambed elevations and dimensions upstream and downstream of the channel dam were collected to calculate elevation change and slope for design of stable planform characteristics and grading plans.
2. Horizontal and vertical layouts of a channel design were developed to construct stable channel dimensions and planform within the restoration segments floodplain.
3. A two-stage weir notch in the concrete structure was designed based on the bankfull discharge to determine notch dimensions to be constructed using demolition and shoring of existing concrete as needed (see **Attachment D, Sheet 16**).
4. Planting plans were developed for all disturbed soil areas using a combination of herbaceous seed mix and native tree / shrubs from the lists provided herein.
5. At the initiation of mitigation activities, an additional survey will be conducted to confirm location and grading quantities based on the desired slope and profile dimensions relative to stable design and the pre-construction channel elevations.

Vegetation Restoration

In the locations where soil disturbance occurs due to dam removal or modification and grading to re-establish a bankfull channel, the native grass / forb species list and temporary non-invasive cover crop will be used in the first year following ground disturbance activities. During the first late cool season following grass / forb seed application native trees / shrubs from the riparian buffer and upland buffer species lists as appropriate for soil and slope conditions will be planted. Within the alluvial areas of the bankfull benches native grass, shrubs (e.g., buttonbush) and trees (e.g. sycamore) adapted for early colonization will be planted on 15-foot center spacing to aid in stabilize soil along the newly graded channel. In the overbank areas (existing vegetated buffer) where Ashe juniper management is conducted, a pre-planting stem counts will be conducted. Supplemental plantings of seedlings of at least four species from the list in the section above will be planted to result in a total stem count of at least 250 stems per acre with no one species comprising more than 35% and no less than 5% of the total.

Upstream Mitigation Areas - Enhancement Measures

The Applicant proposes stream enhancement activities on Palo Pinto Creek and tributaries that include 521 LF of intermittent stream and 11,356 LF of ephemeral stream at the upstream mitigation site (Copeland Tract) and about 9,521 LF of intermittent stream at PPMSP (Nall/Ragsdale Tract). Palo Pinto Creek and tributaries in these areas are degraded as a result of agricultural activities, including livestock grazing, which have impacted stream functions. The stream enhancement activities would include excluding livestock, removing invasive shrubs/vegetation management, and establishing/planting native trees, shrubs, grasses and forbs.

The Applicant would provide enhancement of the aquatic habitat in approximately 21,398 LF of Palo Pinto Creek and tributaries by excluding cattle from the riparian buffers using fencing in order to reduce the impacts of livestock accessing the streams. By reducing livestock access to the streams, the Applicant would enhance aquatic functions by reducing erosion and high nutrient loads and improving water quality and riparian habitat. The Applicant would construct fencing to eliminate livestock access to the streams and associated riparian buffer areas while minimizing future maintenance requirements.

The mitigation objectives of the proposed mitigation work plan for the upstream enhancement measures include:

1. Short term active vegetation management activities and long term vegetation community maintenance to promote a diverse native vegetation community including grasses, shrubs and trees to reduce sedimentation, improve nutrient cycling, and enhance habitat conditions in the ephemeral and intermittent stream segments on and downstream of the mitigation area.
2. Incorporation of protective covenant into TPWD's facility management plan for PPMSP to designate the area as limited access for low impact and non-consumptive uses. Trails will be accommodated in crossing locations that will be excluded from the mitigation area and credit calculations.

Vegetation Management

The riparian buffers of streams at the mitigation sites have been invaded by Ashe juniper or cleared as a result of past land uses, and thus the Applicant proposes to implement a phased vegetation management plan as described in the *Copeland Tract Vegetation Management Plan* (HDR, June 2017) in **Attachment J** based on the NRCS Ecological Site descriptions and state-and-transition diagram. The phased plan consists of select removal of Ashe Juniper to promote increased fuel load development within the riparian buffer community. Within two years of permit issuance the Applicant proposes to conduct a prescribed burning within the mitigation areas. The activities will be conducted in consultation with the TPWD wildland fire team which plans to be stationed at PPMSP upon park development. The objective will be to conduct management activities within the proposed mitigation stream buffers and adjacent upslope areas to reduce the Ashe juniper densities to less than 30% coverage during the initial management phase. Supplemental plantings of native tree and shrub species started from local propagules will be conducted in the buffers.

Following the implementation of the initial vegetation management activities defined in the *Copeland Tract Vegetation Management Plan* in **Attachment J** by the District and success

criteria are achieved, the Applicant shall transfer the property to TPWD for long term stewardship. The implementation of the measures will provide in-kind mitigation by replacing the chemical, physical, and biological functions of the streams impacted by the proposed project within the same watershed. The property will then be incorporated into TPWD's long term rotational vegetation management program for PPMSP with anticipated frequency of management burns of approximately once every 10 years which will help maintain species diversity and manage juniper densities between 30% and 50%, compared to the existing densities of greater than 75%.

The stream riparian buffer areas would also be protected from unauthorized activities such as mowing, cutting, and herbicide application that are not consistent with the goals of the mitigation plan (**Attachment D, Figure D-2 and D-3**). In addition to re-vegetation by the native seed bank and natural succession from the surrounding seed source, the riparian habitat along the stream enhancement areas would be restored by planting native grasses and forbs from seed (including at least six species) from the Native Grass / Forb Seed List (see above) in select, suitable areas of previously degraded portions of the riparian corridor and adjacent uplands. Supplemental native tree / shrubs plantings will be conducted in selected, open areas as needed following the completion of a native stem count survey one year following the controlled burn or the first fall following mechanical brush clearing activities. The objective is to determine native volunteer response and develop a supplemental planting plan (species and location) to increase species richness and structural diversity.

The benefits of livestock exclusion that promote stream enhancement include reducing herbivory, trampling, and water quality impacts. Enhancement activities also allow re-generation/succession of the native plant community and restoration of natural processes by removing a source of stress and impact. The selective removal of shrubs/brush and the exclusion of cattle will allow the enhancement of the riparian buffer through the re-generation and growth of native trees/shrubs which provide additional canopy cover and organic matter input to the stream as well as herbaceous species for ground cover that stabilize soils to prevent erosion and sedimentation. The upstream stream enhancement activities will provide in-kind mitigation by replacing the chemical, physical, and biological functions of the streams impacted by the proposed project within the same watershed.

On-site Mitigation Area Restoration Activities

On-site Stream Restoration

The Applicant proposes to re-establish approximately 3,587 LF of ephemeral stream adjacent to the proposed reservoir by the modification of earthen dams to remove current impoundments that have altered stream flow (**Attachment D, Figure D-4**). In the currently impounded and/or currently absent stream areas, a natural channel will be re-established and restored by modifying dam structures so they will not impound flow, and selective re-grading of the channel to replicate natural contours similar to upstream and downstream segments and based on reference reaches. In addition to re-vegetation by the native seed bank and natural succession from the surrounding seed source, riparian habitat along the stream restoration areas would be restored by planting native tree/shrub seedlings as well as native grasses and forbs from seed in select, suitable areas of previously degraded portions of the riparian corridor and adjacent uplands. The Applicant would also restrict cattle access to and protect the stream restoration areas from unauthorized activities such as mowing, cutting, and herbicide application. The selective tree planting and the exclusion of cattle will allow the restoration of the riparian buffer

through the re-generation and growth of native trees which provide additional canopy cover and organic matter input to the stream. The on-site stream re-establishment (restoration) activities.

On-Site Mitigation Stream Engineering Design & Construction Activities:

A series of four small upland ponds were constructed before 2007 in a watershed with ephemeral tributary streams currently designated as OPSR-2-1, OPSR-5-1, OPSR-17-1, and OPSR-18-1. The ponds effectively eliminate low flow hydrologic connectivity between the stream segments and an on-channel impoundment of a tributary to Palo Pinto Creek due to the existence of at least one pond on each tributary and substantial retention volume. The proposed restoration approach includes complete removal of the ponds through re-grading soil embankment material to allow the restoration of stable ephemeral streams following the approximate historic location and planform configuration.

The design and mitigation objectives of the proposed mitigation work plan for the on-site ephemeral stream re-establishment include:

1. Pond removal and dam modification to restore hydrologic conditions associated with low-flow, bank-full events to reconnect remnant stream segments and restore stream fluvial geomorphologic processes.
2. Construction of stream segments using grading, excavation, and grade control measures (i.e., rock sills) where necessary to reestablish stable channel planform and cross section dimensions.
3. Short term vegetation re-establishment and long term vegetation community maintenance to promote a diverse native vegetation community including grasses, shrubs and trees to reduce sedimentation, improve nutrient cycling, and enhance habitat conditions in the ephemeral stream segments in the on-site mitigation area.

The designs plans for the proposed re-established streams at the on-site mitigation area (i.e., Simpson tract) are illustrated in **Attachment D, Sheets 1 and 2-10**. The following engineering design approach was used to finalize the stream restoration design plans:

1. The streambed elevations and dimensions of the remnant tributaries and the four Simpson ponds were collected using sub-inch accuracy GPS survey equipment to allow calculation of the elevation change and slope for each segment. Additionally, topography and cross sections downstream of the ponds were collected in segments with remnant channels to determine existing depths and to aid in design of stable planform characteristics and grading plans.
2. The modeling of bankfull discharge was used to develop an appropriate design for grade control (i.e., rock sills) and / or erosion protection.
3. Horizontal and vertical layouts of channel designs were developed using stable channel dimensions and planform.
4. Planting plans were developed for all disturbed soil areas using a combination of herbaceous seed mix and native tree / shrubs from the lists provided herein.

On-site Stream Enhancement

The Applicant will enhance approximately 510 LF of ephemeral stream S-17-1 adjacent to the proposed reservoir by excluding livestock to allow riparian buffer re-generation. Enhancing stream and associated riparian habitat will enhance natural processes by removing a source of stress and impact to provide benefits to the aquatic ecosystem including reducing sediment downstream, maintaining water quality, and sustaining nutrient cycles and organic matter inputs. The enhancement of stream and associated riparian habitat adjacent to the proposed project will provide in-kind mitigation by replacing the chemical, physical, and biological functions of the streams impacted by the proposed project within the same watershed.

Downstream Mitigation Area – Perennial Stream Measures

Land uses in the vicinity of the proposed project have not resulted in modifications (i.e., channelization, relocation, or flood control efforts) to perennial stream and river segments that are typical of broader floodplains in East and Southeast Texas. Considering the relative scarcity of perennial waters in this more western and drier part of Texas, potential large-scale perennial stream restoration projects are not readily available to serve as a significant source of compensatory mitigation for the proposed project. In addition, the exceptional drought conditions of the region during the past several years have provided clear evidence of the variable climatic conditions and natural cycles that can severely limit the availability of aquatic habitat in the project area. The perennial stream habitat will be supplemented and enhanced with increased availability of functional aquatic conditions through the Applicant's proposed mitigation actions in downstream segments of Palo Pinto Creek.

Downstream Perennial Stream – Riffle Rehabilitation/Restoration

The riffle located approximately 300 to 400 feet downstream of FM 4 was recently impacted by slope failure exposing construction debris (i.e., concrete, asphalt, etc.) previously dumped or buried along the bank, as well as flooding in Spring 2016. Based on field investigations and review of aerial photos for at least 20 years prior to the Spring 2016 floods (in excess of a 25-year return interval), a riffle was located at the proposed riffle restoration area that was consistently between 350-400 feet long. The Spring 2016 flood eroded the riffle and exposed previously buried construction demolition material and trash (i.e., asphalt, concrete, tires, etc.) within the bottom of the channel. Restoring the riffle at this location downstream of the low head dam will serve to provide a high quality riffle habitat at the upstream limits of the downstream mitigation segment. The riffle will aid in enhancing water quality by helping to maintain increased dissolved oxygen in the upper segment that will flow into the pool habitats upstream of the existing riffle near FM 129.

To rehabilitate riffle habitat downstream of the project and increase overall aquatic mesohabitat availability, the Applicant proposes to excavate a temporary equipment access location from the upland stream bank to allow excavation of the construction debris and uprooted trees as well as the placement of boulder rock sill structures to hold riffle cobble material to rehabilitate/restore the riffle. This action is anticipated to result in approximately 230 LF of rehabilitated/restored riffle to a width of approximately 20 feet (average ordinary high water mark for riffles) versus the approximate 6-foot wide riffle habitat currently available. The preliminary design for the proposed riffle rehabilitation is illustrated in **Attachment D, Sheet 17**. The proposed length, rock sizes, configuration was developed based on a combination of desirable stream characteristics, including anticipated flow velocities, longitudinal profile geometry and the need

to promote bed stability downstream of the existing channel dam. Size of rock in the rock sills were sized appropriately to withstand both channel forming (1 to 2 year bankfull) discharges and higher flood flows. Length of riffle and number of rock sills are based on restoration of approximate pre-flood average slope of 1% or less over the riffle length. The proposed geometry will be guided by the existing conditions prior to construction, since additional floods, erosion and sedimentation may occur. The cross sectional geometry, height and frequency of sills, and beginning and ending of the proposed riffle will be adjusted in the field by the Engineer but will not be less than 310 feet. The proposed restored riffle design includes the goal of establishing stable channel invert elevations at this degraded location and should not demonstrate significant trends towards degradation or aggradation over a significant portion of the reach. Based on calculations in the Addendum No. 2 of the Mesohabitat Analysis (**Attachment K**) the addition of the 230 feet of restored riffle at this location contributes to the average daily habitat units needed to fully compensate for impacts to aquatic habitat in Palo Pinto Creek.

The construction debris will be hauled outside of the riparian buffer for disposal in an approved landfill licensed to receive construction materials. The disturbed bank areas will be re-graded to approximately previous contours (minus the construction debris quantities) and re-vegetated using native seed mix and native trees and shrubs from the lists provided herein.

Downstream Perennial Stream Flow Rehabilitation

The Applicant proposes to compensate for perennial stream function losses as a result of the reservoir by rehabilitating a reach of Palo Pinto Creek downstream of the project area with instream benefits of increased flow (duration and quantity) including low flow and peak flow provisions and water quality enhancement. These are summarized below and in **Attachment K**. The proposed downstream mitigation on Palo Pinto Creek that involves flow releases, water quality improvements, and increased instream habitat is considered rehabilitation based on the increased aquatic habitat function and availability (i.e., duration and wetted perimeter) through increased hydrology. The hydrologic measures are evaluated and quantified separately from the other mitigation activities along the downstream portion of Palo Pinto Creek defined as enhancement (see below). By rehabilitating stream habitat downstream of the proposed project, the Applicant will provide near-site, in-kind, and functional replacement for the impacted stream habitat as a result of the proposed project.

Increased Water Flow Measures

As discussed in the November 25, 2015 response to a USACE's request for information as supplemented by the Applicant's July 18, 2016 "*Existing and Proposed Reservoir Operation and Monitoring Plan*", the proposed project will result in gradual increases in water supply releases between 2020 and 2070. These increases in flow will benefit the aquatic ecosystem within the approximately 27,111 LF reach of Palo Pinto Creek downstream of the project with flows up to 18 cubic feet per second (cfs) generally increasing in frequency and periods of no flow significantly decreasing in frequency to less than 1 percent of the time.

The Applicant's proposed *Adaptive Management Plan for Palo Pinto Creek with Turkey Peak Reservoir* (**Attachment L**) and associated operating plan includes provisions for a 1 cfs minimum flow provision when water supply releases are not occurring and the reservoir is more than 50% full. The only exception is estimated to occur less than 1% of the time during extreme droughts when the reservoir storage is below 50%, when the Applicant requests the ability to shut off the outlet structure for up to 5 consecutive days for maintenance activities

and for water conservation purposes. After 5 days the low flow releases will be restored for a period of at least 5 days, and this pattern would be alternated until water supply releases are initiated or a natural spill occurs. The analysis in **Attachment L** provides a comparison of water supply and environmental releases for Lake Palo Pinto and Turkey Peak Reservoir.

While there are no pulse flow release requirements in the District's TCEQ water rights permit, the Applicant has included a provision for a 85-cfs pulse flow in the Spring (early June) in years when a natural pulse in excess of 85 cfs has not occurred in the previous 12 months prior to the end of May and the reservoir is more than 50% full. (Note: The District will delay this release in those years when requested by TPWD.) The proposed pulse flow release will help provide a healthy aquatic ecosystem by providing flushing flows for sediment transport (fines) and nutrient movement within the aquatic habitat.

In addition to the District's water supply, 1 cfs minimum, and 85 cfs pulse flow releases, the District will also release inflows from the 7 square-mile watershed area downstream of Lake Palo Pinto in accordance the District's TCEQ water rights permit and approved "*Lake Palo Pinto Enlargement (Turkey Peak Dam) Accounting Plan*". These releases range between 1 and 4 cfs as summarized in **Attachment K** and vary by month depending on the hydrologic conditions (dry, average or wet) based on the weekly Palmer Hydrologic Drought Index (PHDI) published by the National Climatic Data Center for the North Central Zone of Texas.

All of the above flow releases are protected from diversions by others as the District's water rights permit states: "*Owner is authorized to use the bed and banks of Palo Pinto Creek, below Lake Palo Pinto to convey and deliver water to be appropriated hereunder to downstream diversion point on the perimeter of the 24 acre-foot capacity reservoir.*"

The mesohabitat on Palo Pinto Creek that would be enhanced as a result of the above flow provisions is summarized in the May 2017 addendum to the initial February 25, 2016 mesohabitat analysis for Palo Pinto Creek (see **Attachment K, Mesohabitat Analysis Technical Memorandum, Addendum No. 2**). This analysis shows that with the higher flows as outlined above, the proposed 2020 mesohabitat conditions in the Palo Pinto Creek mitigation area will exceed existing conditions even after adjustment for the 4.1 miles of Creek inundated by the project. The proposed project will significantly benefit the aquatic ecosystem on about 27,111 LF, or 5.1 miles within a 5.2 mile segment, of Palo Pinto Creek between the proposed reservoir outlet and the upstream end of the Palo Pinto Creek channel dam pool.

Water Quality Measures

The Applicant has designed measures and will utilize BMPs within the proposed project area to enhance water quality in the aquatic ecosystem of Palo Pinto Creek downstream. The design and construction of a multi-level outlet tower for water release will enhance dissolved-oxygen (DO) levels and water quality downstream of the proposed reservoir. DO concentrations of water supply and environmental releases from the conservation pool of the proposed Turkey Peak Reservoir will be augmented by three aeration features located at the new dam and one downstream feature. The three features at the new dam include: 1) the outlet works tower where water will normally cascade a distance of 39 feet when the reservoir level is within 10 feet of its conservation level; 2) the outfall to the stilling basin where water will drop 4 feet from the outlet pipe into the stilling basin; and 3) the spillway discharge channel where water will cascade through a 26 feet drop in elevation as it travels 1,400 feet from the stilling basin back to Palo Pinto Creek. An increase in DO saturation in excess of 50% above the ambient lake

DO concentration is estimated to occur as water cascades through these three structures.

The outlet works will include 4 gates with their invert elevations set 10, 20, 34 and 49 feet below the reservoir's conservation level. This measure will assure that water is released from the top 10 feet of the reservoir when its level is above 848 ft-msl and from the top 16 feet when the lake is below this level. As more fully described in the Applicant's September 15, 2016, memo to USACE and TCEQ, releases made from these levels will maintain acceptable DO and temperature levels and provide enhancement over the existing conditions associated with releasing water from the bottom portion of Lake Palo Pinto with a single outlet located 32 feet below its conservation level. The water quality benefits of the project's multi-level outlet tower are anticipated to decrease water temperatures in the critical period during summer months and increase DO levels to within TCEQ standards at all times, resulting in an improvement compared to existing releases from Lake Palo Pinto.

The Applicant proposes to provide for the continued maintenance of the existing channel dam located downstream of the FM 4 bridge. In addition to providing a shallow pool habitat, the existing channel dam will serve as a drop structure and provide additional aeration to the water released to Palo Pinto Creek. This will provide further enhancement to the existing aquatic environment downstream of the new dam. Additionally, a streamflow gauge will be installed at this location to confirm flows meet the commitments and conditions as defined in TCEQ and USACE permit authorizations.

Aquatic Life Use (ALU) ratings in Palo Pinto Creek are anticipated to be enhanced by increasing flows, available wetted perimeter, and reducing the occurrence and duration of zero flow periods as a result of the water quality and flow release provisions in the Mitigation Plan. The Applicant has developed and shall implement the *Adaptive Management Plan for Palo Pinto Creek with Turkey Peak Reservoir (Attachment L)* to collect data during pre-construction baseline, construction, filling and post-filling phases as described in the Adaptive Management Plan to allow evaluation of the effects of proposed instream flow regime on water quality and Aquatic Life Use (ALU) ratings in the mitigation reach of Palo Pinto Creek. The provisions shall result in High ALU ratings for Palo Pinto Creek for the habitat, benthic macroinvertebrate, and fish communities, or additional monitoring and flow adjustments shall be implemented.

Downstream Riparian Enhancement along Palo Pinto Creek

In addition to the in-stream habitat rehabilitation associated with the increase in flows as discussed above, the Applicant proposes to provide enhancement of associated riparian habitat buffer on Palo Pinto Creek downstream of the proposed project. Similar to the riparian habitat impacted by the proposed project, the riparian habitat along Palo Pinto Creek has been at least partially degraded by past and current land uses. This primarily includes agriculture activities such as clearing, livestock grazing, hay production, and pecan orchards. Thus the existing riparian habitat along Palo Pinto Creek downstream of the proposed project is of low quality.

To enhance and protect the riparian habitat along Palo Pinto Creek, the Applicant proposes to acquire conservation easements on property within a 300 foot wide buffer (minimum of 150-foot wide from the stream centerline on average) that is approximately 27,111 LF within an approximate 5.2 mile reach of Palo Pinto Creek as illustrated in **Attachment D, Figure D-5**. Within the easement, the applicant would enhance riparian habitat along Palo Pinto Creek through selective native tree planting using the riparian buffer tree / shrub list, clearing restrictions, and limiting livestock access using fencing to reduce the impacts of livestock

accessing the stream. By reducing livestock access to the stream, the Applicant would enhance aquatic functions by reducing erosion, sedimentation and high nutrient loads and improving water quality and riparian habitat. The Applicant would construct fencing to eliminate livestock access to the stream and associated riparian buffer areas in a way that minimizes future maintenance requirements, to the extent practicable. The stream enhancement easement would also be protected from unauthorized activities such as mowing, cutting, and herbicide application.

In addition to re-vegetation by the native seed bank and natural succession from the surrounding seed source, the riparian habitat along the stream would be restored by planting native tree seedlings as well as grasses and forbs from seed in select, suitable areas of previously degraded portions of the riparian corridor. The plantings will be conducted at an initial density of 250 woody stems per acre within approximately 63 acres of previously cleared areas to achieve a target density after 5 years of 150 stems per acre. The benefits of livestock restriction that promote stream enhancement include reducing herbivory, trampling, and water quality impacts. Enhancement activities also allow re-generation/succession of the native plant community and restoration of natural processes by removing a source of stress and impact. The easement would enhance about 150 feet from Palo Pinto Creek on each side, or the edge of the floodplain, whichever is less. The easement to enhance riparian habitat would cover approximately 27,111 LF of Palo Pinto Creek downstream of the proposed project. By providing riparian enhancement, the Applicant will improve the water quality and promote ecological functions of the riparian buffer and in-stream habitat of Palo Pinto Creek, thus providing functional replacement for the streams impacted by the proposed project.

The conservation easements on the enhanced riparian buffer habitat together with the flow releases and water quality provisions in the Mitigation Plan are anticipated to enhance aquatic habitat by increasing available wetted perimeter, and reducing the occurrence and duration of zero flow periods. The provisions will likely result in High Aquatic Life Use (ALU) ratings for Palo Pinto Creek for the habitat, benthic macroinvertebrate, and fish communities.

Implementation Schedule

The Applicant will initiate the mitigation work subsequent to permit authorization and prior to or concurrent with construction in waters of the U.S. for the proposed project, depending on the nature of the mitigation activities. Site protection will be accomplished as soon as practicable following permit approval and prior to initiation of permitted construction activities as described in Section 8. Generally, vegetation management activities on the Copeland and Ragsdale/Nall tracts are anticipated to begin soon after permit authorization and continue until success criteria are met. Other activities such as pond removals and grading for stream restoration will be initiated prior to or concurrent with construction activities in waters of the U.S. for the proposed project. Downstream riffle restoration will likely be concurrent with construction activities, while downstream riparian enhancement activities will occur as soon as practicable following acquisition of easements for the mitigation area and no later than concurrent with construction activities in waters of the U.S. Approximate start and timeframe for completion of work of various mitigation activities are summarized in the table below. At a minimum, all mitigation site components must be commenced no later than initiation of project construction and mitigation construction and components must be completed and operational (e.g., flows) when project construction is completed as determined by the Corps.

Activity	Anticipated Start*	Anticipated Completion
Site Protection	Following permit approval and initiation of land/easement acquisition, prior to construction in waters of the U.S.	Within one year of initiation of mitigation activities for each parcel and following land/easement acquisition
Upstream Vegetation Management / Enhancement	Prior to construction in waters of the U.S.	Five years following seedling planting
Upstream Pond Removal / Grading / Construction for Stream Restoration	Prior to or concurrent with construction in waters of the U.S.	Within one year of initiation for construction and two years for stabilization
On-site Pond Removal / Grading / Construction for Stream Restoration	Concurrent with construction in waters of the U.S.	Within one year of initiation for construction and two years for stabilization
Downstream Riffle Restoration	Concurrent with construction in waters of the U.S.	Within one year of initiation for construction and two years for stabilization
Downstream Riparian Enhancement	Prior to or concurrent with construction in waters of the U.S.	Five years following seedling planting
Monitoring	Following mitigation activities and concurrent with construction in waters of the U.S.	Five years following last seedling planting and three years following completion of construction in waters of the U.S. (for flow releases), until success criteria are met

* Approximate timing of start based on current understanding of project schedule.

6. Determination of Credits

The Applicant proposes to provide permittee-responsible mitigation (PRM) using a watershed approach for adverse impacts to waters of the U.S. by restoring and enhancing waters of the U.S. as described in **Part III, Section 5**. The determination of credits is described in more detail in **Attachment F**, and is based on the net increase in ecological conditions of streams as demonstrated using TXRAM Version 1.0. An explanation of how the proposed mitigation will compensate for unavoidable impacts to aquatic resources resulting from the proposed project is provided in **Attachment F** by comparing the project impact "debits" and mitigation "credits."

The rationale for the determination of credits include: (1) assessment of the quantity and quality of impacted WOTUS, (2) the types of mitigation measures described in this plan and the anticipated functional "lift", and (3) other factors such as in-kind mitigation, increased temporal availability of aquatic habitat, failure risk, and local threats to the aquatic environment.

Mitigation credits as shown in **Attachment F** are appropriate for the proposed mitigation measures based on the following:

- Temporal loss of function will be minimized by contemporaneous mitigation with the proposed project impacts. Mitigation measures will be initiated concurrently with dam construction, to the extent practicable, and inundation by the reservoir will occur over time, when several mitigation measures have already started producing functional lift and replacement.
- Mitigation credits are based on an evaluation to determine the ecological lift and functional replacement of the proposed mitigation measures when compared to the quality of the impacted resources. Additional information is provided in **Attachment F**.
- Mitigation uses a watershed approach, thus the credits do not require any decrease for location in a different watershed or ecoregion.
- Mitigation measures include in-kind stream restoration, rehabilitation, and enhancement.
- Mitigation has a high likelihood of success due to site characteristics and the mitigation work plan. The potential risk of failure for the proposed mitigation is diminished due to the presence and replication of existing, reliable hydrology, as well as the implementation of the proposed success criteria and management plan.
- The mitigation plan minimizes local threats which could affect the proposed mitigation measures. No activities will occur in the areas used as mitigation which could be detrimental or restrict the proposed mitigation from providing the anticipated ecological functions.

Mitigation Credit Summary

Based on the proposed mitigation activities described above, the impacts to 44,234 LF of stream (21,798 LF perennial, 6,036 LF intermittent, and 16,400 LF ephemeral) will be offset by re-establishment (restoration) of approximately 6,729 LF of stream (1,761 LF intermittent and 4,968 LF ephemeral), rehabilitation (restoration) of approximately 35,703 LF of stream (27,111 LF perennial, 7,740 LF intermittent, and 852 LF ephemeral), and enhancement of 21,908 LF of stream (10,042 LF intermittent, and 11,866 LF ephemeral), for a total of 64,340 LF of stream mitigation. As shown in **Table 5 of Attachment F**, total stream debits of 15,724 would be offset by total mitigation credits of 16,317, an excess of 469 credits. The mitigation credits were determined based on the process discussed above and described in more detail in **Attachment F**, as well as **Attachment K** for the increased hydrology benefits to instream habitat.

Therefore, the proposed mitigation will provide the required compensation (i.e., mitigation credit) to offset unavoidable impacts to aquatic resources resulting from the proposed project.

Texas Rapid Assessment Method

Impacts to aquatic ecosystem functions are considered in the mitigation planning process to allow (1) adequate replacement of functions and (2) restoration and enhancement of the required linear feet, in accordance with USACE requirements.

The Texas Rapid Assessment Method, Version 1.0 was published by the U.S. Army Corps of Engineers, Fort Worth District on March 24, 2011 (final draft version), as the preferred method to provide an evaluation of ecological condition of waters of the U.S. (i.e., wetlands and streams) within the Fort Worth District's jurisdiction. The TXRAM scores, in addition to linear feet units for stream impacts were used to determine debits.

TXRAM was performed for all impacted streams in the project area, and an overall score for each stream was calculated using the TXRAM scoring sheet (see **Attachment E** [Volume II] of this mitigation plan). Additionally, TXRAM was performed for the existing conditions of streams proposed for restoration/enhancement activities. TXRAM scores were also calculated for the mitigation streams following mitigation activities to determine the ecological lift demonstrated by the change in TXRAM score (see **Attachment E** [Volume II] of this mitigation plan). Furthermore, nearby reference sites for streams were evaluated with TXRAM to document the proposed achievable condition of mitigation and justification for the proposed lift (see **Attachment E** [Volume II] of this mitigation plan).

In summary, the TXRAM evaluation assesses the conditional impacts to streams at the project area as well as the projected ecological lift to streams proposed for mitigation. The results of the TXRAM evaluation were used in the determination of mitigation requirements as discussed in **Attachment F**.

7. Maintenance Plan

Maintenance practices conducted by the Applicant following initial establishment, restoration, rehabilitation, and enhancement of mitigation areas may include activities such as:

General Maintenance and Monitoring Activities:

1. Annual monitoring of ecological conditions.
2. Annual visual monitoring for any impacts from unauthorized activities (i.e., grazing, off-road vehicles, cutting, trespassing).
3. Annual maintenance or repair of necessary mitigation activities (e.g., fencing) to control predation / grazing of mitigation planting.
4. Annual monitoring for growth of non-native/invasive species with control practices as necessary.
5. When applicable, erosion control measures and re-planting approved native vegetation to meet performance criteria.
6. Replacement of trees / shrubs will be performed if needed to meet the success criteria. Different native species may be sourced based on an evaluation of site conditions in an effort to improve survivability of replacement specimen.
7. Irrigation, if required, will only be used for the first growing season following the initial plantings and one additional year for supplemental plantings.
8. Areas of excessive erosion (i.e., greater than 10% bare ground with the exception of stream beds and aggrading point bars) in the locations where dams are modified or removed, and soil grading areas will be repaired using temporary erosion control measures and native vegetation.

Upstream Area Maintenance Plan:

1. Restoration and maintenance of the vegetation communities will be initiated and conducted in accordance with the Vegetation Management Plan for the Copeland Tract prepared by HDR (June 2017) in **Attachment J**. The goal in the initial 5 years of the management plan will be to increase native woody and herbaceous species richness, while reducing the Ashe juniper densities to below 30% aerial coverage.
2. Following the success of the initial restoration activities but not prior to the completion of the 5-year monitoring period, maintenance responsibilities of the 450-acre tract will be transferred to TPWD. TPWD plans to utilize a rotational controlled burn program within the entire park, of which the 450-acre tract will become part. The goal of the long term management will be to maintain vegetation species richness, while keeping the Ashe juniper densities at or below between approximately 25% to 50% aerial coverage in a mixed woodland / savannah states as described in the NRCS Steep Rocky (R080BY163TX) and the NRCS Loamy Bottomland (R080BY151TX) ecological sites.
3. Following the modification of the existing low head concrete dam on Palo Pinto Creek the applicant will monitor the sediment transport and re-vegetation of floodplain benches. After two bankfull discharges have occurred a mix of buttonbush and sycamore seedlings will be planted at 12 and 15 foot centers, respectively, within the bankfull bench areas to encourage sediment accretion and stabilization. Additional analysis of in situ data and hydraulic / hydrologic modeling may result in a recommendation for additional modifications to the structure (including temporary erosion control measures) or upstream or downstream channel.
4. Bank stability, bank height / width ratio, channel dimensions, floodplain bench condition, and lateral migration will monitored at established survey benchmark locations for the

re-established streams annually for a minimum period of 5 years following construction and until two bankfull discharges have occurred at least one year apart. Areas of excessive erosion (i.e., greater than 10% bare ground with the exception of stream beds and aggrading point bars) in the locations where dams are removed and soil grading work were conducted will be repaired using temporary erosion control measures and native vegetation.

5. The Applicant will conduct TXRAM (Version 1.0) monitoring of the proposed enhancement and restoration segments to track progress towards the target scores shown in **Attachment E (see Volume II), Appendix C** for the end of the construction and monitoring periods.

On-site Mitigation Areas:

1. Native herbaceous vegetation cover will be monitored for a period of 5 years, or until success criteria are achieved. Monitoring shall include tree stem counts within designated planting areas. Supplemental tree / shrub plantings will occur as necessary and the monitoring period for those specific portions of the mitigation areas will be extended by until tree seedlings survive for five years or until native volunteer recruitment is documented to contribute to meeting minimum stem count requirements in the management reach or buffer unit..
2. The Applicant will conduct TXRAM (Version 1.0) monitoring of the proposed enhancement and restoration segments to track progress towards the target scores shown in **Attachment E, Appendix C (see Volume II)** for the end of the construction and monitoring periods.
3. Bank stability, bank height / width ratio, channel dimensions, floodplain bench condition, and lateral migration will monitored at established survey benchmark locations annually for a minimum period of 5 years following construction and until two bankfull discharges have occurred at least one year apart. Areas of excessive erosion (i.e., greater than 10% bare ground with the exception of stream beds and aggrading point bars) in the locations where dams are removed and soil grading work were conducted will be repaired using temporary erosion control measures and native vegetation.

Downstream Mitigation Areas:

1. The restored 230 feet segment of riffle / run habitat downstream of the low-head dam below FM 4 will be monitored for a period of five years following construction (**Attachment D, Design Sheet 17**). The monitors will collect data from a permanent survey benchmark location for parameters including bank stability, constructed rock sill stability, floodplain bench vegetation conditions, and excessive erosion.
2. Native herbaceous vegetation cover will be monitored for a period of 5 years, or until success criteria are achieved. Monitoring shall include tree stem counts within designated planting areas. Supplemental tree / shrub plantings will occur as necessary and the monitoring period for those specific portions of the mitigation areas will be extended until tree seedlings survive planted in the ground for a minimum of five years or until native volunteer recruitment is documented to contribute to meeting minimum stem count requirements in the management reach or buffer unit.
3. The Applicant will conduct TXRAM (Version 1.0) monitoring of the proposed enhancement and restoration segments to track progress towards the target scores shown in **Attachment E, Appendix C (see Volume II)** and **Attachment F** for the end of the construction and monitoring periods.

8. Perpetual Site Protection Instrument

The Applicant will provide site protection for mitigation areas in accordance with regulatory requirements and the 2008 Mitigation Rule. Site protection will be accomplished as soon as practicable following permit approval and prior to initiation of permitted construction activities. However, the initiation of some mitigation activities (e.g., survey, fencing, planting, vegetation management, feral hog management, etc.) may be determined to be necessary and/or beneficial prior to the final execution of site protection legal instruments. Site protection instruments shall be complete within one year of initiation of mitigation activities described in this plan for each parcel. While the Applicant has already acquired the 450 ac tract near PPMSP, site protection cannot be fully implemented until the project is initiated since the mitigation areas are not currently in place with property acquisition, survey, and mitigation work. The only exceptions to site protection for mitigation areas shall be easements in existence prior to authorization of the Individual Permit. Areas where owners of oil and gas mineral rights exercise drilling rights in the future are not anticipated based on the linear shape of the buffers around streams and within floodplains in the mitigation areas.

The mitigation areas to be established will be within and near the project area and designated by the 2008 Mitigation Rule as permittee-responsible mitigation (PRM). The on-site upstream mitigation areas will occur on properties currently or anticipated to be owned in fee by District. As the owner in fee, the District will provide site protection in the form of conservation easements (when possible) or deed restrictions. The upstream mitigation areas on the Copeland Tract and Nall/Ragsdale tracts will be owned and managed by TPWD as a future non-consumptive, limited-use portion of the PPMSP. The District and TPWD shall execute a Memorandum of Agreement (MOA) defining responsibilities for both short and long term implementation of PRM conditions and management. TPWD will manage in accordance with the long term management agreement requiring the mitigation areas to be maintained as specified in this plan. Based on coordination with TPWD staff with the support of the Executive Director, it is anticipated that conservation easements granted to a Third Party 501(c)(3) organization will be utilized as the preferred long term protection mechanism and referenced and/or incorporated into the Park's management plan, as applicable. If the TPWD Commission does not authorize the use of conservation easements on the properties, deed restrictions shall be incorporated into the Park management plan and specified in the final MOA.. Areas to be protected as defined in this mitigation plan will be designated as limited use or conservation areas in the management plan for the PPMSP. Final drafts of the conservation easements or other protective covenant as approved by the Commission will be provided to the USACE Regulatory and legal counsel for review prior to final execution.

The use of conservation easements are proposed for the on-site restored stream corridors and the 27,111 foot long buffer along the downstream mitigation area on Palo Pinto Creek. The Applicant's legal counsel is coordinating with the USACE Fort Worth District's Office of Counsel to develop conservation easements appropriate for use in these riparian corridors given the number of landowners and the Applicant's status as a public water supply management entity. The Applicant will utilize the Fort Worth Regulatory Division Conservation Easement Template format (**Attachment G**), where applicable and not in conflict with State law. For areas protected by Conservation Easement, the easement will be granted to a third-party 501(c)(3) entity capable of conducting monitoring of conservation activities (e.g., Mitigation Futures Conservancy, Texas Land Conservancy, or Connemara Conservancy). For mitigation properties acquired through eminent domain the easements shall be held by the District and long-term monitoring program (i.e., via contractual arrangement versus a conservation easement)

consistent with State of Texas real estate law will be developed with a conservation organization, to be reviewed and approved by the USACE. It is the applicant's preference to use the same entity. The final executed documents will be provided to the USACE upon completion of land and easement coordination during the pre-construction phase (anticipated to require approximately two years).

Site protection restrictions shall not be removed or modified from any established instruments without written approval of the USACE, and conveyance of any interest in the property must be subject to the established instruments. The protective covenant restrictions shall not be removed from the real estate instruments, conservation easements or transfer agreements, or modified, without written approval of the USACE, and conveyance of any interest in the property must be subject to the protective covenant restrictions.

9. Performance Standards

Performance standards for mitigation areas restored, rehabilitated, and enhanced by the mitigation plan will ensure mitigation areas are functioning as the intended type of WOTUS and meeting the goals and objectives described in this mitigation plan. The District will be responsible for maintaining mitigation areas to comply with performance standards until such time as District provides documentation to, and receives verification from, the USACE that aquatic resources in the mitigation areas are meeting the performance standards.

Key performance standards include:

1. Completion of adequate mitigation to satisfy the Objectives (see **Part III, Section 1**).
2. Completion of mitigation work plan elements located in **Part III, Section 5**.
3. Mitigation areas will meet specific success criteria for streams as outlined below.
4. Ephemeral and intermittent mitigation streams will be monitored using TXRAM, in addition to other appropriate assessment methods (e.g., stream stability metrics, stem counts, etc.) at permanently established monitoring locations for a minimum of five years after mitigation is initiated to determine progress toward target "scores".
5. Perennial mitigation streams will be monitored using an appropriate assessment method (e.g., TXRAM, stream stability metrics, stem counts in designated planting areas, stream flow gauge data, water quality, and ALM/IBI monitoring) for a minimum of five years after mitigation is initiated to determine progress toward target "scores" as defined in the *Adaptive Management Plan for Palo Pinto Creek with Turkey Peak Reservoir* (see **Attachment L**). Mitigation scores for Palo Pinto Creek will be based on flow rates; and minimum ALM ratings of "High" for habitat, benthic macroinvertebrate, and fish communities. Flow rates and monitoring will be adjusted appropriately as defined in **Attachment L** based on Aquatic Life Monitoring (ALM) / Index of Biological Integrity (IBI) classification and water quality conditions.
6. TXRAM scores for mitigation streams shall meet the proposed scores for the end of monitoring as shown in **Attachment E** (see **Volume II**) and Attachment F to meet their success criteria. Those stream reaches that do not meet the end of monitoring scores will require additional monitoring and/or development of contingency plans to be reviewed by the USACE and implemented when approved.
7. Conservation easements or similar legal protected covenants will be negotiated for the downstream buffer area and granted along with the on-site mitigation areas to a third party as described in **Part III, Section 8**.
8. An MOA and associated conservation easements shall be executed with TPWD for the Copeland and Nall / Ragsdale tracts and incorporated into the PPMSP long term management plan.
9. Mitigation areas will meet the general success criteria below.

Success Criteria

The success criteria proposed in this document support the requirements of the 2008 Mitigation Rule.

1. Stream Dimension: General maintenance of a stable cross-section and hydrologic access to floodplain features over the course of the monitoring period will generally represent success in dimensional stability. Minor changes in dimension may be expected. Key parameters such as cross-sectional area and the channel's width-to-depth ratio may experience natural adjustment over time. Riffle sections should generally maintain a

Bank Height ratio approaching 1.0 – 1.2 and entrenchment ratio approaching 2.2 or greater, with some variation in this ratio naturally occurring. Pool sections naturally adjust based on recent flows and time between flows, therefore more leeway on pool section geometry is expected.

2. Stream Pattern and Profile: The profile should not demonstrate significant, prolonged trends toward degradation or aggradation over a significant portion of a reach. Functional standards such as channel depth, width and width-to-depth ratios will be measured and compared to each monitoring year. While some minor variability is expected, trends of instability (degradation or aggradation) over a five year monitoring period will be apparent. Pattern features (i.e. radius of curvature, belt width, wave length) should show little adjustment over the standard 5 year monitoring period and will be monitored to ensure adjustment is minor and general stable conditions are achieved.
3. Riparian buffers will be established within the protected mitigation areas as:
 - a minimum of 25 feet on either side of established ephemeral streams
 - a minimum of 50 feet on either side of established intermittent streams
 - a minimum of 100 feet on either side of established perennial streams
4. Five years after initiation of mitigation, a minimum ground cover of 75% with native grasses and forbs for areas with canopy cover less than 60%, and a minimum ground cover of 50% with native grasses and forbs for areas with canopy cover 60% and greater. Bare ground, with the exception of normal aggradation and point bar development in streams, shall not exceed 10% of the surface.
5. Riparian buffers along intermittent and perennial streams (NRCS Loamy Bottomland ecological sites) will exhibit stem counts of a minimum of 150 stems per acre (target 60% survival) of planted or volunteer native trees or shrubs that have survived in the ground for a minimum of five years. Non-native, invasive species will not be allowed to remain untreated in the canopy / mid-story, and shall not comprise more than 2% of the woody vegetation and more than 5% of the herbaceous cover. Non-native stems will not be counted towards the minimum stems per acre. Stems will consist of at least four native species with one species not comprising more than 35%.
6. Riparian buffers along ephemeral streams (NRCS Steep Rocky and Clay Loam ecological sites) will exhibit stem counts of a minimum of 120 stems per acre (target 60% survival) of planted or volunteer native trees or shrubs that have survived a minimum of five years. Non-native, invasive species will not be allowed to remain untreated in the canopy / mid-story, and shall not comprise more than 2% of the woody vegetation and more than 5% of the herbaceous cover. Non-native stems will not be counted towards the minimum stems per acre. Stems will consist of at least four native species with one species not comprising more than 35%.

Variations to the above criteria may be necessary if justified by local conditions during the five-year monitoring periods. Plantings will be monitored and deficiencies rectified by replanting, controlling competing vegetation, guarding against herbivory, or installing temporary erosion control.

General Success Criteria

1. Mitigation areas will have no excessive erosion or bare soils (i.e., greater than 10 percent bare ground).
2. Sediment aggradation in stream channels will not accumulate to levels that would impair water quality or aquatic life movements (as demonstrated with TXRAM for proposed conditions and reference reaches).
3. Vegetation will be healthy and contribute to nutrient cycling, water quality, and wildlife habitat.
4. The re-establishment (restoration) of approximately 6,729 LF of stream, rehabilitation (restoration) of 35,703 LF of stream, and enhancement of 21,908 LF of stream with associated riparian buffers within the mitigation areas.
5. Streams will be required to meet or exceed the proposed scores at release of monitoring shown in **Attachment E (see Volume II)** and **Attachment F** to demonstrate ecological lift based on TXRAM.

Note: Target scores used in success criteria reflect the results of a TXRAM evaluation of existing and proposed conditions of mitigation streams, as well as reference sites (see **Attachment E** in Volume II of this mitigation plan for additional information on the evaluations). Based on the projected overage of 469 stream mitigation credits in the Plan, as well as the potential for adjustments based on as-built conditions and minor variability in metric scores between stream assessment reaches; the cumulative totals of credits for mitigation measures (based on annual monitoring results and trajectory of projected conditions) will be tracked to confirm the overall credit totals will exceed the debits. If projected credits from monitoring results of TXRAM scores do not exceed the debits, the District will develop a plan to perform further PRM work or purchase mitigation credits, if available (see **Part III, Section 12**). This will facilitate a reasonable level of adaptive management within the mitigation areas and flexibility during implementation to successfully mitigate for unavoidable project impacts. All plans to perform additional PRM work, in addition to any adaptive management plans, will be subject to USACE review. Work to implement such plans shall not occur until such time as USACE approval is obtained.

10. Monitoring Requirements

The District will ensure sufficient financial resources are allocated to perform monitoring activities as noted in **Part III, Section 13**. The District, or their designees, will be responsible for monitoring and reporting annually following permit issuance until the success criteria are met.

Self-Monitoring and Reporting

The District will establish and implement a self-monitoring program that includes the following actions.

1. Designation, in writing, of a responsible party or position, who shall coordinate with the USACE on-site inspections and compliance with permit conditions; and
2. Implementation of a reporting program that includes submittal of written compliance reports to the USACE, due October 1 each year. These reports will outline compliance with the special conditions, summarize all activities that occurred during the reporting period, and provide notification of completion of all authorized work. These reports will document the activities that have occurred from Sept 1 of the preceding year to Aug 31 of the reporting year.

Compliance reports shall include at a minimum:

- a. the approximate acreage, location, type, and description of waters of the U.S. impacted during the reporting year;
- b. the approximate acreage, location, type, status, and completion date (actual or projected) of the ongoing mitigation that occurred during the reporting period;
- c. a description of the completed mitigation activities, including a map showing the location of waters of the U.S. re-established, rehabilitated, or enhanced and supporting documentation including vegetative species and planting rates;
- d. for restored stream segments the monitoring report shall include information on fluvial geomorphologic metrics (see Part III, Section 9) and site photographs collected at permanent survey locations and comparison to as-built drawings.
- e. representative photographs of the progress and success of mitigation work accomplished under this permit;
- f. an evaluation of progress towards meeting mitigation performance standards described above;
- g. a cumulative summary of impacted and mitigation waters of the U.S., categorized by type (including hydrologic regime); and
- h. a brief summary of annual ALM and water quality data.

The District will conduct monitoring activities and reporting including flow monitoring, two ALM surveys, and supplemental water quality monitoring between April and November 1 for three years following construction (see **Attachment L. Adaptive Management Plan for Palo Pinto Creek with Turkey Peak Reservoir**). A summary report of the water quality and ALM sampling efforts will be prepared following the 3-year, post-filling monitoring period.

Vegetation density / stem count surveys to evaluate progress of mitigation activities in restoration and enhancement areas of the upstream, on-site, and downstream mitigation areas. The District would also conduct an appropriate assessment methods (e.g., TXRAM and fluvial

geomorphology metrics) at permanent monitoring locations on stream mitigation areas annually for a period of five years after implementation (i.e., construction and vegetation management activities) of the mitigation plan and will update annually thereafter, if needed, until success criteria are achieved. Results would be included in the annual reporting discussed above.

Compliance reports are required even if no work is conducted during the reporting period. The District will submit compliance reports until the USACE has verified that all mitigation areas have met the standards of applicable special conditions.

11. Long-term Management Plan

Upstream Mitigation Area

The District has an agreement to transfer the upstream mitigation areas known as the Copeland Tract (approximately 23,611 LF of stream channels with approximately 48 acres of associated riparian buffers) and adjacent upland (approximately 402 acres of undeveloped non-mitigation areas) to TPWD following authorization of a Section 404 Permit and associated mitigation plan for inclusion in the proposed PPMSP. The two crossings of streams (PS-2 and PS-10) by an existing gravel road would include a 30-foot wide corridor that is excluded from site protection for TPWD to maintain access on the site, as well as for pipelines, and two other pipeline crossings about 30-feet wide have been excluded from proposed site protection. Furthermore, about 140 feet total at seven other stream crossings has been excluded from proposed site protection for other potential TPWD access need by trails or for gravel road access. Additionally, the District proposes to implement additional enhancement activities on approximately 9,521 LF of Palo Pinto Creek within the existing PPMSP. The construction and implementation of the mitigation measures defined in this plan (Part III, Section 5) and the initiation of the vegetation management activities as described in the *Copeland Tract Vegetation Management Plan* (June 2017) in **Attachment J** will be the responsibility of the District. Following achievement of the success criteria defined herein, the routine long-term management activities (i.e., periodic prescribed burns, exotic species management, etc.) for the mitigation areas will eventually become the responsibility of TPWD and will follow the provisions of the mitigation plan and site protection for long-term sustainability of the restored and enhanced streams. An MOA will be executed between the District and TPWD to define roles and responsibilities for monitoring and maintenance related to both of the tracts. The MOA will include a provision for site protection using a Conservation Easement or deed restriction with monitoring to be conducted by a Third Party 501(c)(3) entity as described in III.8.

On-site and Downstream Mitigation Areas

The District will own the mitigation areas around the proposed reservoir, including the stream re-establishment and enhancement, and will manage them in accordance with the protection and management plan described in **Part III, Section 5**. Additionally, the District will acquire and grant conservation easements or similar protective covenant, in cases of acquisition through eminent domain, to a 501(c)(3) third party for the on-site mitigation area ephemeral stream buffers, as well as the downstream area buffers along 5.1 miles of Palo Pinto Creek to provide riffle and flow rehabilitation and riparian buffer enhancement. Additionally, the planned flow to be released into the downstream reach of Palo Pinto Creek from FM 4 within the proposed 5.1 mile mitigation segment of Palo Pinto Creek providing in-channel flow generated habitat is protected by both the District's TCEQ permit (Special Condition 5.B. RE: Bed and Banks) and the District's flow provisions included in the May 2017 revision of the *Adaptive Management Plan for Palo Pinto Creek with Turkey Peak Reservoir* (see Attachment L).

As a contingency for the intermittent stream mitigation within PPMSP, the Applicant has assessed the potential for mitigation on Segments of Cantrell and Big Sunday creeks upstream of their confluence with Palo Pinto Creek. If this contingency plan was implemented due to the inability to finalize an agreement with TPWD, similar stream enhancement activities (i.e., cattle exclusion, vegetation management, etc.) would be conducted on adequate combined length of the streams and a conservation easement would be acquired and granted to a 501(c)(3) entity. If this option was required, a request for a permit amendment would be submitted to the USACE with sufficient details on the option to allow the USACE to review regarding the ability of

the sites to provide compensation for the mitigation requirements.

General provisions for long-term management of mitigation areas located on District-owned properties and conservation easements include:

1. The mitigation areas will be retained and maintained in perpetuity predominantly in the vegetative and hydrologic condition described in the performance standards of this mitigation plan, and any activities (other than those specified in this mitigation plan) which may affect these conditions must be approved in writing by the USACE, Fort Worth District.
2. There shall be no filling, excavation, or alteration of the mitigation site that will affect the success criteria outlined in this mitigation plan unless approved in writing in advance by the USACE, Fort Worth District.
3. There shall be no livestock grazing within the mitigation areas except with written approval from the USACE, Fort Worth District, if necessary for adaptive management and in accordance with the mitigation performance standards and success criteria. Cattle access locations for watering or crossing between parcels with the same owner shall be excluded from the mitigation area buffer and length totals, and the boundary shall be fenced to exclude cattle from the mitigation areas.
4. There shall be no mowing, shredding, clearing, or other vegetation disturbance activities within the mitigation areas except for control of non-native and invasive species as described in this plan and vegetation management plans referenced herein.
5. There shall be no motor vehicles operated within the mitigation areas except for those required to perform permitted mitigation efforts (e.g., planting and erosion control) and only when soils are not at or near saturation. (Emergency fire control vehicles and equipment, when operating to control an active fire, are included in this exception.)
6. There shall be no horseback riding, recreational ATV operation, or biking within the mitigation areas. Trails to accommodate these uses will be excluded from the mitigation area buffer and length totals, and the boundary shall be clearly marked.
7. There shall be no development within the mitigation areas which alters the natural vegetative and hydrologic conditions of the mitigation areas except as described herein.
8. Any activities related to wildlife habitat management (including hunting and feral species control) which do not jeopardize the mitigation performance standards are permitted.
9. Access is permitted to the USACE for the purpose of inspection, and to take actions including but not limited to scientific or educational observations and studies, and collection of samples.

12. Adaptive Management Plan

The Applicant shall be responsible for developing, operating and maintaining the mitigation areas in a means that meets the goals and objectives of this plan. In general, the mitigation alternatives and proposed measures were developed to minimize risk of failure and facilitate adaptive management of the streams and buffers. For example, the proposed use of locally sourced propagules, prescribed burning, and encouraging native volunteer species regeneration are examples of adaptive management that will increase the chance of success, reduce long term maintenance costs, and improve long-term self-sustainability of the activities to adapt to climate fluctuations common in the region.

Mitigation areas that result from this plan are vulnerable (but no more so than any other areas) to acts of nature such as wildfires, floods, climatic instability, wildlife activities, and disease as well as unauthorized human activities that may cause the site to become non-compliant with the success criteria in the mitigation plan. Due to the varied types of restoration and enhancement activities in the three mitigation areas combined with varying levels of human-related pressure between the future parkland, District-owned tracts, and conservation easement areas; it is a logistical challenge to develop a comprehensive adaptive plan that anticipates the range of issues and extent of adverse effects that may arise. Therefore, during the land and easement acquisition phase, the restrictions and mitigation requirements will be clearly communicated to all stakeholders as a preventative measure. Occurrence of such acts of nature during the monitoring period or following attainment of performance standards may require changes to the mitigation plan to allow for maintenance activities to offset and counteract negative impacts. Depending upon the circumstances, however, it may be appropriate to allow natural processes to continue, particularly when vegetation is expected to reestablish due to continued existence of seed sources, hydrology, and restrictions on incompatible land uses. As appropriate, the Applicant will discuss the potential causes, effects to function, options and management decisions on such issues with the USACE.

For ephemeral and intermittent stream re-establishment areas, the field construction monitoring by an experienced engineer or ecologist will improve the opportunity to implement minor changes due to field conditions (i.e., native rock layer, microhabitat, etc.) that can increase the function and minimize the risk of erosion or remobilization.

The water quality and ALM conditions in the downstream perennial segments will be closely at two permanent ALM stations (4 and 5) within the downstream mitigation area. Pre-construction baseline data collection will allow the District and agencies to better understand how variable flow and pulse flow conditions affect the stream habitat and organisms. Post-construction ALM and water quality sampling will be conducted during the preconstruction, construction / filling, and post-filling phases as described in **Attachment L** (*Adaptive Management Plan for Palo Pinto Creek with Turkey Peak Reservoir*) allowing minor adjustments to flow modifications based on the actual ALM and instream water quality conditions.

13. Short-term and Long-term Financial Assurances

To ensure mitigation can be completed successfully, the District has estimated both the short-term and long-term financial estimates (**Attachment H**) and shall develop sufficient financial assurances consistent with State of Texas and Texas Water Development Board (TWDB) guidelines for public subdivisions to meet regulatory requirements and guidance provided in the 2008 Mitigation Rule.

Upon approval of the permit for the proposed project, a plan for appropriate short-term financial assurance instruments, such as a performance bond, letter of credit, or establishment of a reserve fund based on the final bid amounts will be submitted to the USACE for review prior to impacts to WOTUS anticipated to be approved by the permit decision. As mitigation areas meet the required performance standards (**Part III, Section 9**), during the initial mitigation and active management phase they will be removed from the short-term financial assurances amount reserve funds or bond amounts based on the release schedule outlined in **Attachment H**.

The District anticipates funding the project with a TWDB loan through the State Water Implementation Fund for Texas (*SWIFT*) program or similar funding programs available at the time of project implementation. After consulting with the TWDB staff, the District shall establish a reserve or contingency fund as a financial assurance for mitigation measures in accordance with allowable TWDB rules and guidelines. Development of the financial assurance for mitigation areas will consider costs related to the following:

1. Mapping and Surveying (as needed for final field engineering activities).
2. Engineering planning and design for modification and as-built drawings.
3. Earth moving and construction.
4. Vegetative plantings/control and prescribed burn initiation
5. Monitoring of mitigation areas in accordance with performance standards called out in **Part III, Section 9** of this mitigation plan.
6. Release from short-term financial assurance requirements as performance standards are achieved.

Long-term financial assurances will be managed for mitigation maintenance after success criteria are met through the establishment of non-wasting interest bearing or dividend earning account(s). The initial long-term financial assurances will include funds for the 501(c)(3) third party who will serve as the stewards for monitoring conservation easements and protective covenants. An initial amount will be paid to the entity to allow them to establish a non-wasting endowment anticipated to provide interest or dividend earnings sufficient to conduct annual monitoring and reporting based on the long-term financial estimates provided in **Attachment H**.

Additionally, the District will establish a non-wasting endowment or similar revenue generating account consistent with TWDB project funding guidelines reserved for anticipated long-term annual maintenance costs and stewardship, including appropriate contingency to accommodate the anticipated variability in maintenance costs from year to year. A consideration in establishing the long term management funding mechanism is that maintenance activities are not anticipated during the implementation and active management phase of the mitigation activities to be covered by short term financing funds, but maintenance and stewardship utilizing the long term management funds would be expected to occur after the success criteria are met by the mitigation areas.

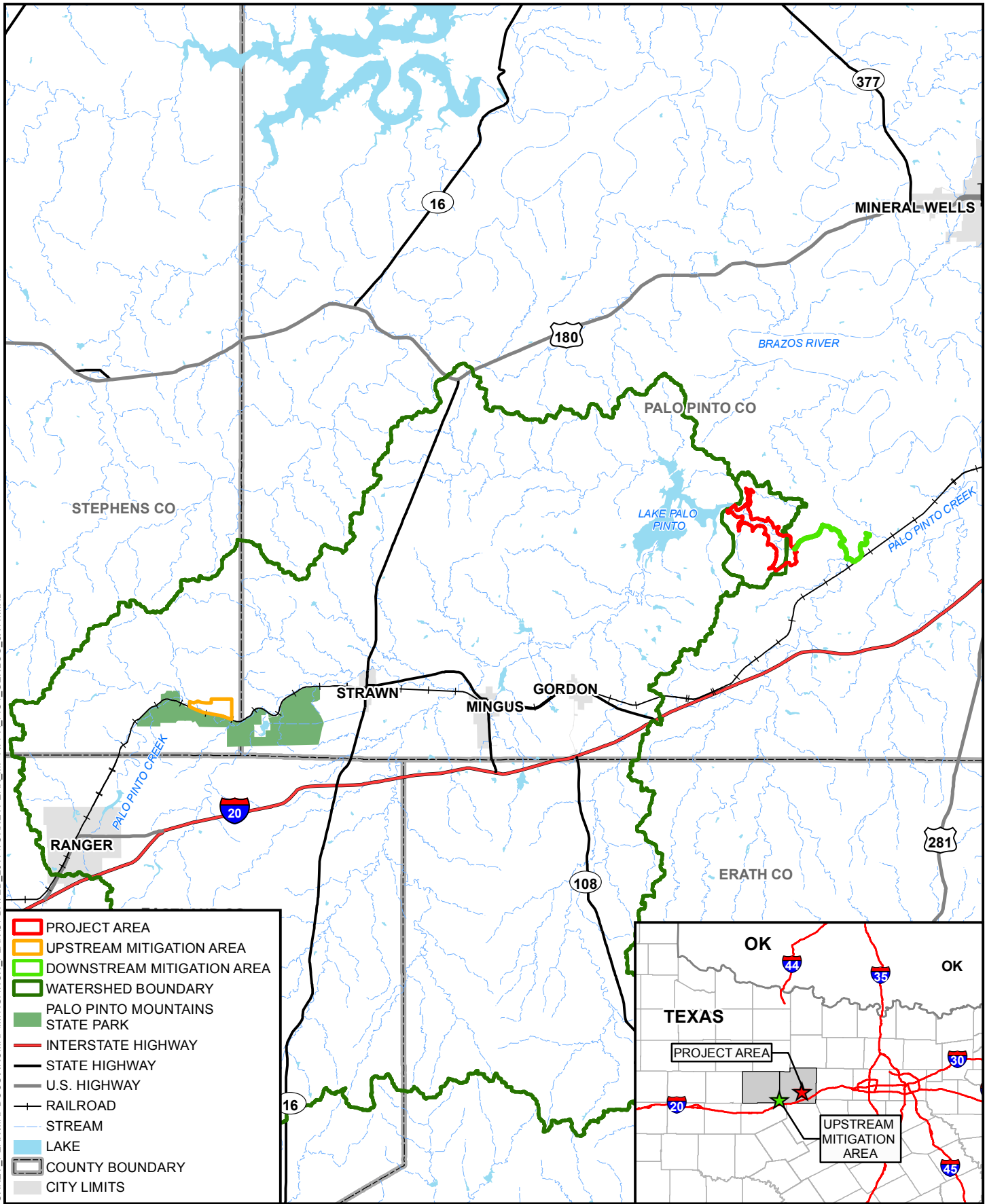
Part IV: Attachments

	Included
A. General Location Map	<input checked="" type="checkbox"/>
B. Delineation of Waters of the U.S., Including Wetlands	<input checked="" type="checkbox"/>
C. Site Photos	<input type="checkbox"/>
D. Plan Figures, Design and Specification Sheets	<input checked="" type="checkbox"/>
E. Report on the Texas Rapid Assessment Method (TXRAM) for Streams Updated June 2017 (see Volume II binder)	<input checked="" type="checkbox"/>
F. Debit / Credit Evaluation	<input checked="" type="checkbox"/>
G. Draft Site Protection Instrument	<input type="checkbox"/>
H. Short and Long-term Financial Assurances Information	<input checked="" type="checkbox"/>
I. Cultural Resource Programmatic Agreement	<input checked="" type="checkbox"/>
J. Copeland Tract Vegetation Management Plan (June 2017)	<input checked="" type="checkbox"/>
K. Mesohabitat Analyses of Palo Pinto Creek (June 2017 Addendum No. 2)	<input checked="" type="checkbox"/>
L. Adaptive Management Plan for Palo Pinto Creek with Turkey Peak Reservoir (Updated September 2017)	<input checked="" type="checkbox"/>

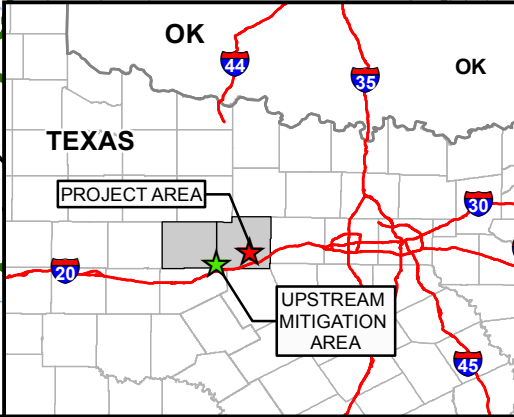
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Attachment A
General Location Map

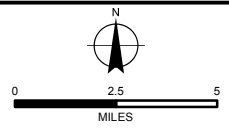
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- PROJECT AREA
- UPSTREAM MITIGATION AREA
- DOWNSTREAM MITIGATION AREA
- WATERSHED BOUNDARY
- PALO PINTO MOUNTAINS STATE PARK
- INTERSTATE HIGHWAY
- STATE HIGHWAY
- U.S. HIGHWAY
- RAILROAD
- STREAM
- LAKE
- COUNTY BOUNDARY
- CITY LIMITS



**TURKEY PEAK
MITIGATION PLAN
GENERAL LOCATION**



**PALO PINTO COUNTY
MUNICIPAL WATER
DISTRICT NO. 1**

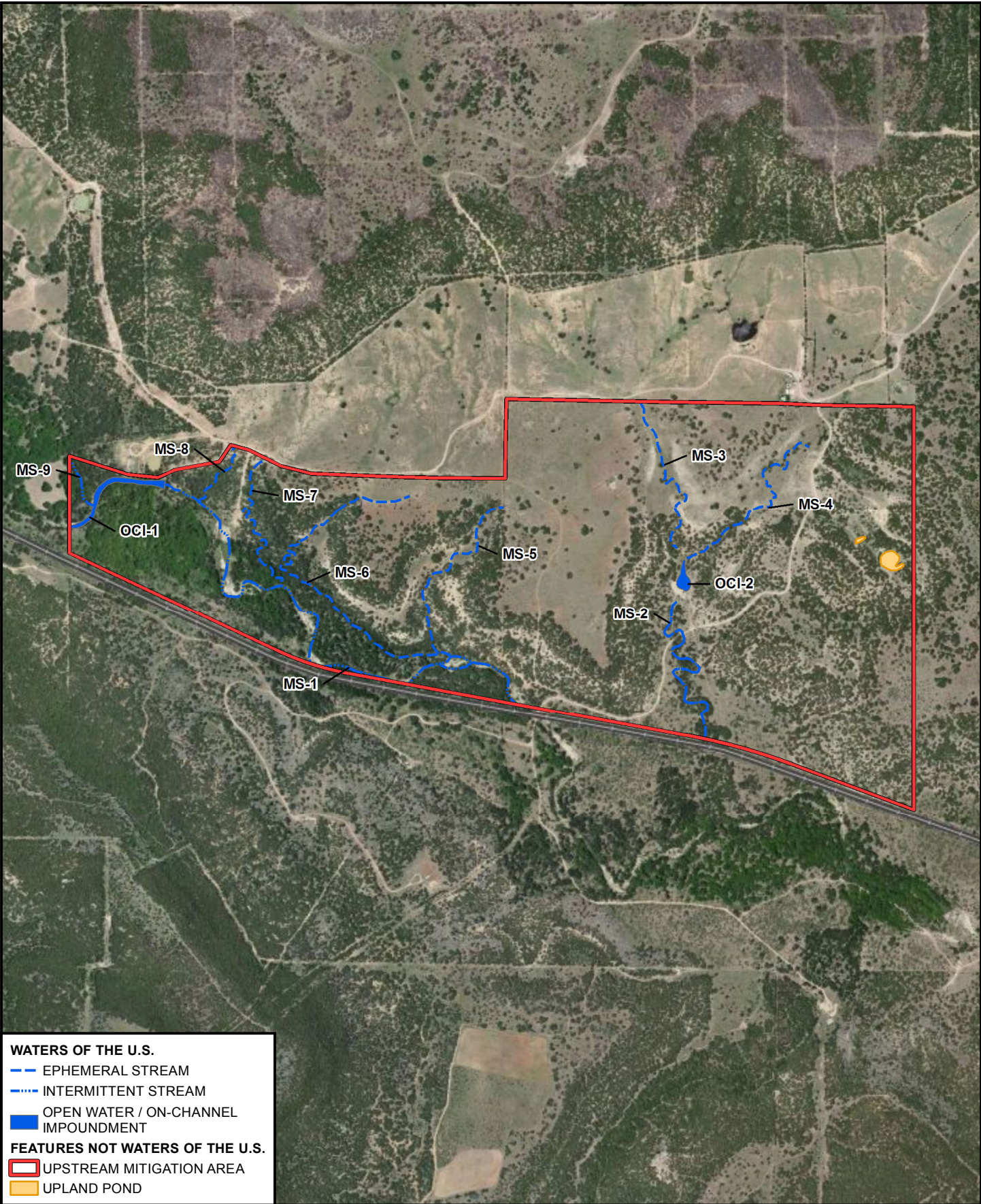


MAY 2017 FIGURE A-1

Attachment B

Delineation of Waters of the U.S., Including Wetlands

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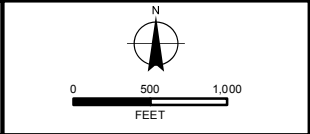
WATERS OF THE U.S.

- EPHEMERAL STREAM
- INTERMITTENT STREAM
- OPEN WATER / ON-CHANNEL IMPOUNDMENT

FEATURES NOT WATERS OF THE U.S.

- UPSTREAM MITIGATION AREA
- UPLAND POND

TURKEY PEAK
 UPSTREAM MITIGATION SITE - COPELAND TRACT
 WATERS OF THE U.S.

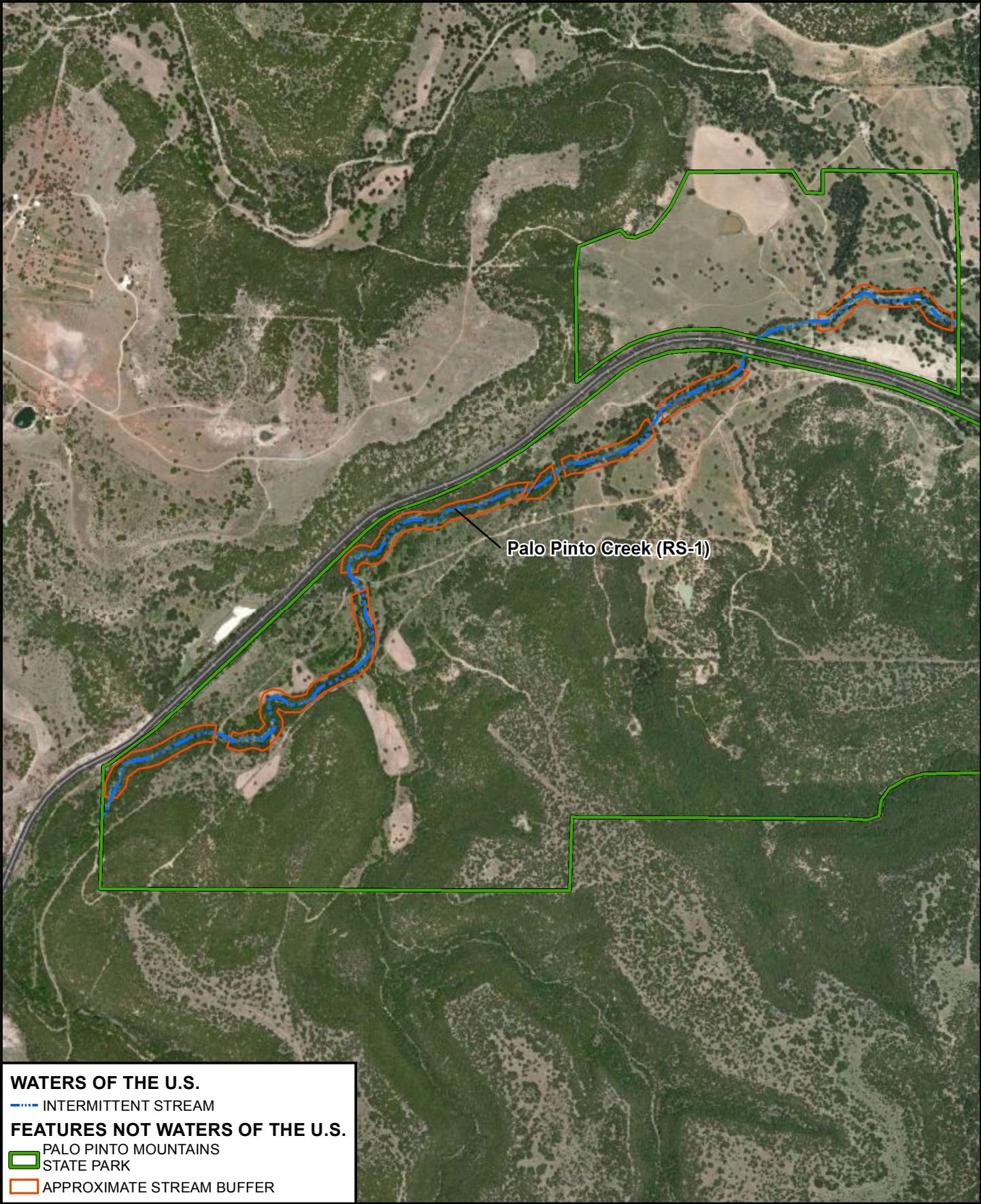


PALO PINTO COUNTY
 MUNICIPAL WATER
 DISTRICT NO. 1



MAY 2017	FIGURE B-1
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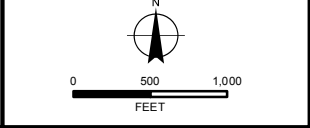
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WATERS OF THE U.S.
 - - - - - INTERMITTENT STREAM

FEATURES NOT WATERS OF THE U.S.
 [Green Outline] PALO PINTO MOUNTAINS STATE PARK
 [Orange Outline] APPROXIMATE STREAM BUFFER

TURKEY PEAK
 UPSTREAM MITIGATION SITE - RAGSDALE TRACT
 WATERS OF THE U.S.



PALO PINTO COUNTY
 MUNICIPAL WATER
 DISTRICT NO. 1



JUL 2017 FIGURE B-2

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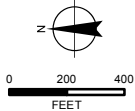
WATERS OF THE U.S.

--- EPHEMERAL STREAM

FEATURES NOT WATERS OF THE U.S.

■ UPLAND POND

**TURKEY PEAK
ON-SITE MITIGATION
WATERS OF THE U.S.**

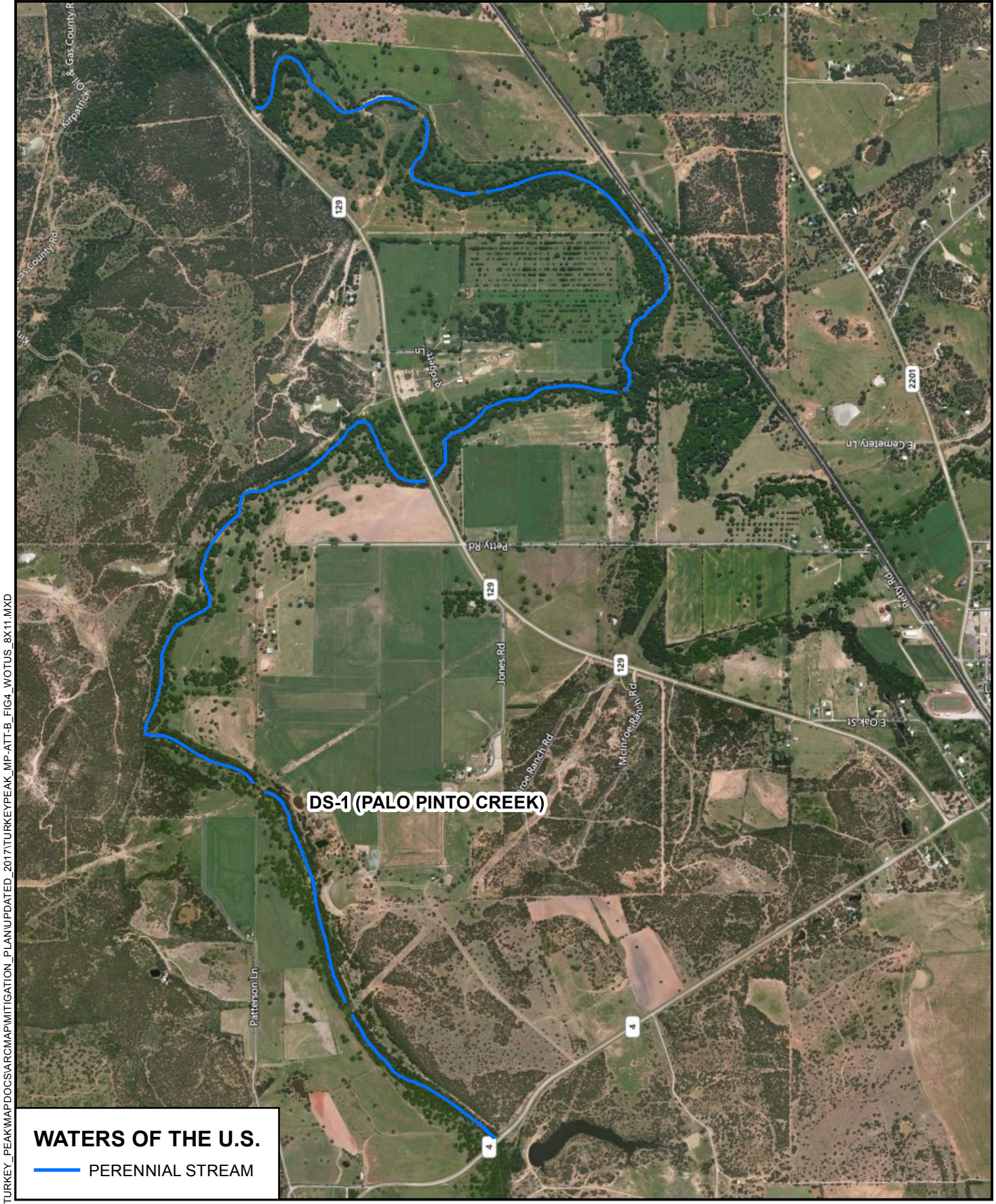


**PALO PINTO COUNTY
MUNICIPAL WATER
DISTRICT NO. 1**



AUG 2017

FIGURE B-3

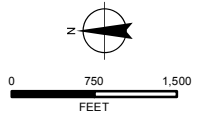


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WATERS OF THE U.S.
 — PERENNIAL STREAM

DS-1 (PALO PINTO CREEK)

TURKEY PEAK
 DOWNSTREAM MITIGATION
 WATERS OF THE U.S.



PALO PINTO COUNTY
 MUNICIPAL WATER
 DISTRICT NO. 1



MAY 2017

FIGURE B-4

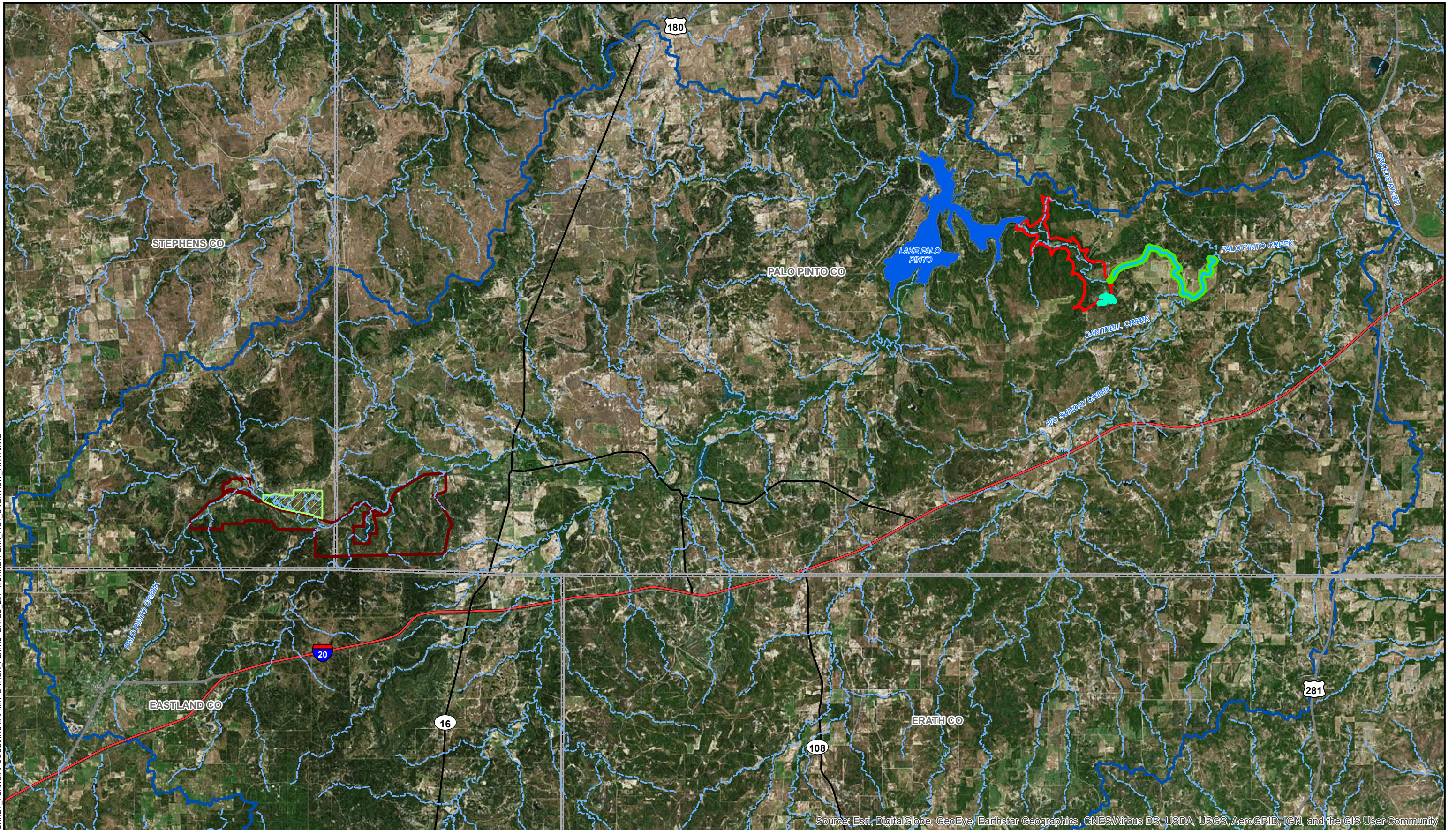
Attachment C

**Site Photos – Not Included as a Separate Attachment
(See Photos in Volume II, Attachment E–TXRAM Report)**

Attachment D

Plan Figures, Design and Specification Sheets

FILE: 0194042_037_TURKEY_PEAK\MAPDOCS\ARCMAP\MITIGATION_PLAN\UPDATED_2017\TURKEYPEAK_FIG1_OVERVIEW_11X17.MXD

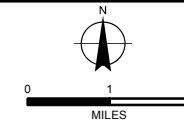


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**TURKEY PEAK
MITIGATION PLAN
GENERAL LOCATION**

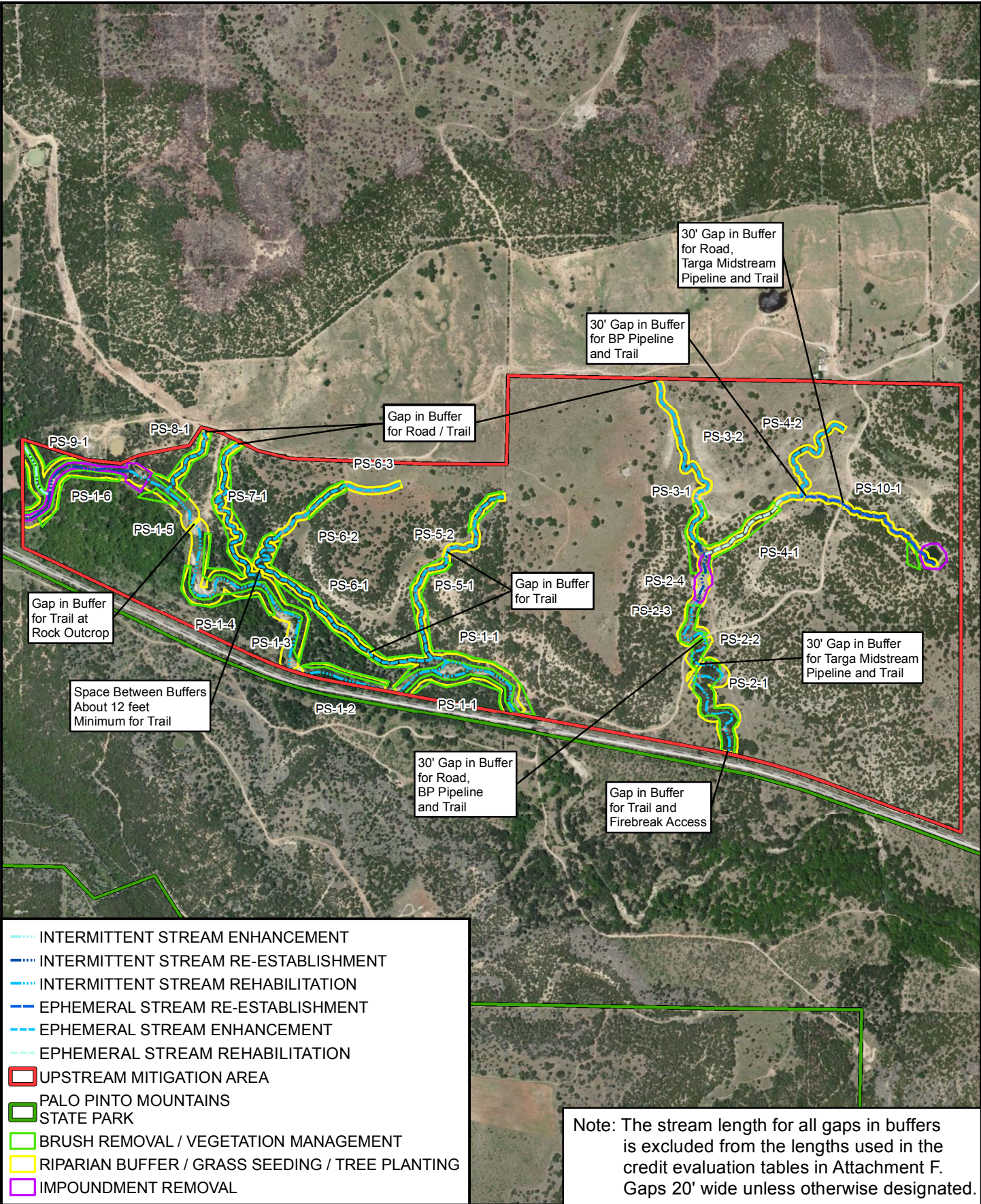
- | | | | |
|-----------------|-----------------------------------|-------------------------------------|--------------------|
| STREAM | UPSTREAM MITIGATION AREA | DOWNSTREAM MITIGATION EASEMENT AREA | INTERSTATE HIGHWAY |
| LAKE PALO PINTO | ON-SITE MITIGATION | WATERSHED BOUNDARY | STATE HIGHWAY |
| PROJECT AREA | PALO PINTO CREEK FLOW ENHANCEMENT | PALO PINTO MOUNTAINS STATE PARK | U.S. HIGHWAY |
| | | | COUNTY BOUNDARY |

**PALO PINTO COUNTY
MUNICIPAL WATER
DISTRICT NO. 1**




AUG 2017 FIGURE D-1

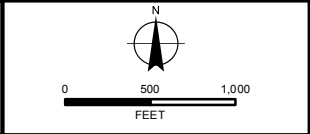
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- - - - INTERMITTENT STREAM ENHANCEMENT
- - - - INTERMITTENT STREAM RE-ESTABLISHMENT
- - - - INTERMITTENT STREAM REHABILITATION
- - - - EPHEMERAL STREAM RE-ESTABLISHMENT
- - - - EPHEMERAL STREAM ENHANCEMENT
- - - - EPHEMERAL STREAM REHABILITATION
- UPSTREAM MITIGATION AREA
- PALO PINTO MOUNTAINS STATE PARK
- BRUSH REMOVAL / VEGETATION MANAGEMENT
- RIPARIAN BUFFER / GRASS SEEDING / TREE PLANTING
- IMPOUNDMENT REMOVAL

Note: The stream length for all gaps in buffers is excluded from the lengths used in the credit evaluation tables in Attachment F. Gaps 20' wide unless otherwise designated.

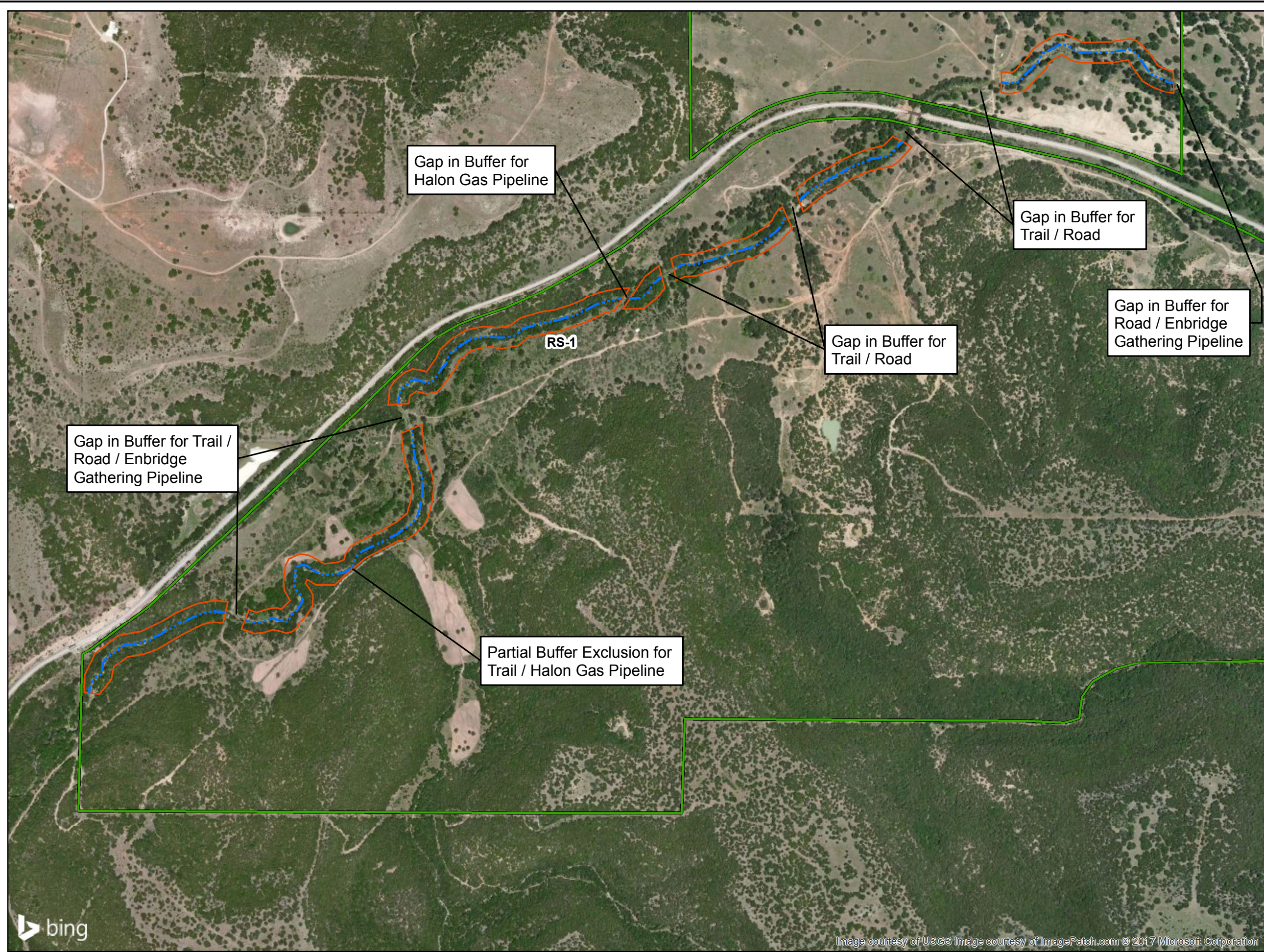
TURKEY PEAK
MITIGATION PLAN
 UPSTREAM MITIGATION



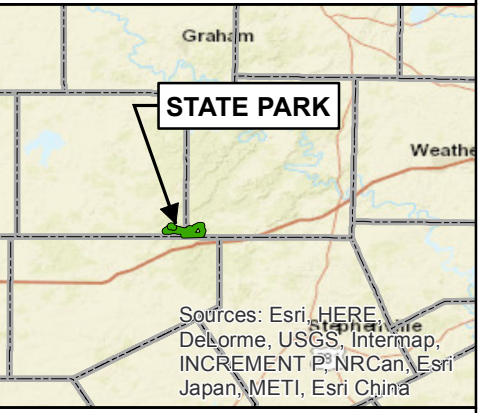
PALO PINTO COUNTY
MUNICIPAL WATER
DISTRICT NO. 1

AUG 2017	FIGURE D-2

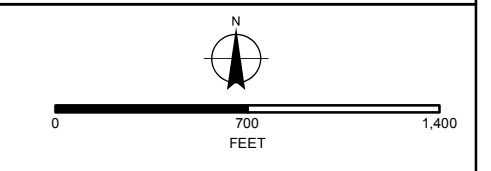
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**TURKEY PEAK RESERVOIR
MITIGATION PLAN**
PPCMWD#1 MITIGATION
ON PALO PINTO MOUNTAINS
STATE PARK
(STRAWN, STEPHENS COUNTY)



- LEGEND**
- - - INTERMITTENT STREAM ENHANCEMENT
 - APPROXIMATE STREAM BUFFER
 - PALO PINTO MOUNTAINS STATE PARK



Prepared by: HDR Engineering Inc.
PLEASE NOTE: The information provided in this document is for preliminary planning purposes. HDR Engineering Inc. does not warrant that the information is accurate or complete. Agency requirements, utility coordination, or other information may be necessary or change some of this information prior to use of this exhibit for construction / clearing purposes.

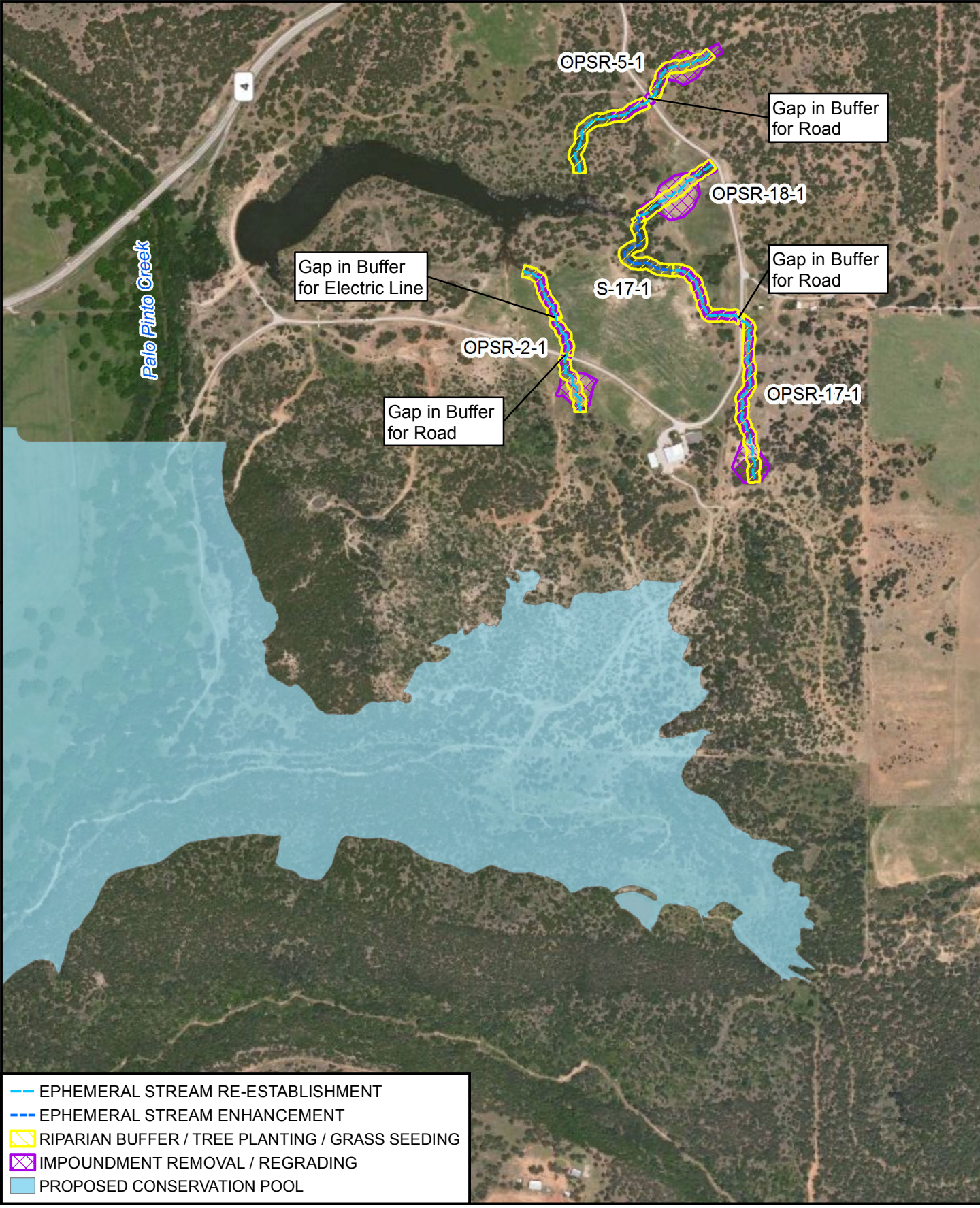
HDR HDR ENGINEERING, INC.
4401 WEST GAT BLVD., SUITE 400
AUSTIN, TEXAS 78745-1469
(512) 912-5193

AUG 2017 FIGURE D-3



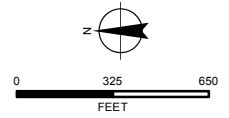
Image courtesy of USGS Image courtesy of ImagePatch.com © 2017 Microsoft Corporation

FILE:0:194042_037_TURKEY_PEAK\WPDOCS\ARCMAP\MITIGATION_PLAN\UPDATED_2017\TURKEYPEAK_FIG4_ON-SITE-MITIGATION-2017_8X11.MXD



- EPHEMERAL STREAM RE-ESTABLISHMENT
- - - EPHEMERAL STREAM ENHANCEMENT
- RIPARIAN BUFFER / TREE PLANTING / GRASS SEEDING
- IMPOUNDMENT REMOVAL / REGRADING
- PROPOSED CONSERVATION POOL

TURKEY PEAK
MITIGATION PLAN
 ON-SITE MITIGATION



PALO PINTO COUNTY
MUNICIPAL WATER
DISTRICT NO. 1



AUG 2017

FIGURE D-4

FILE: 0194042_037_TURKEY_PEAKMAPDOCSARC\MITIGATION_PLAN\UPDATED_2017\TURKEYPEAK_FIG5_DOWNSTREAMMITIGATION_11X17.MXD

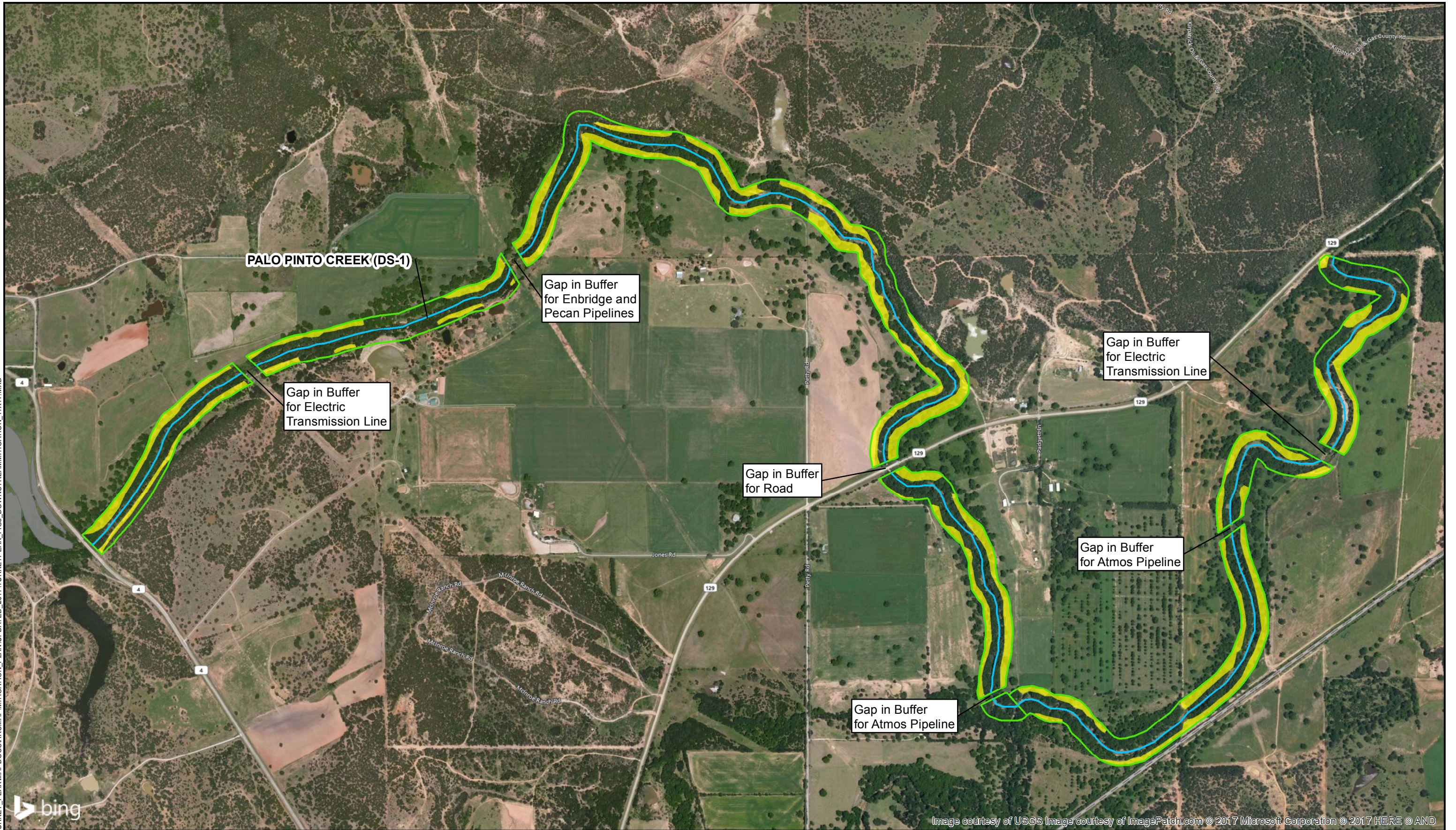
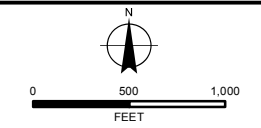


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**TURKEY PEAK
MITIGATION PLAN
DOWNSTREAM MITIGATION**

- PALO PINTO CREEK REHABILITATION
- PROPOSED TREE PLANTING AREAS
- APPROXIMATE DOWNSTREAM MITIGATION EASEMENT AREAS
- PROPOSED DAM STRUCTURE AND SPILLWAYS

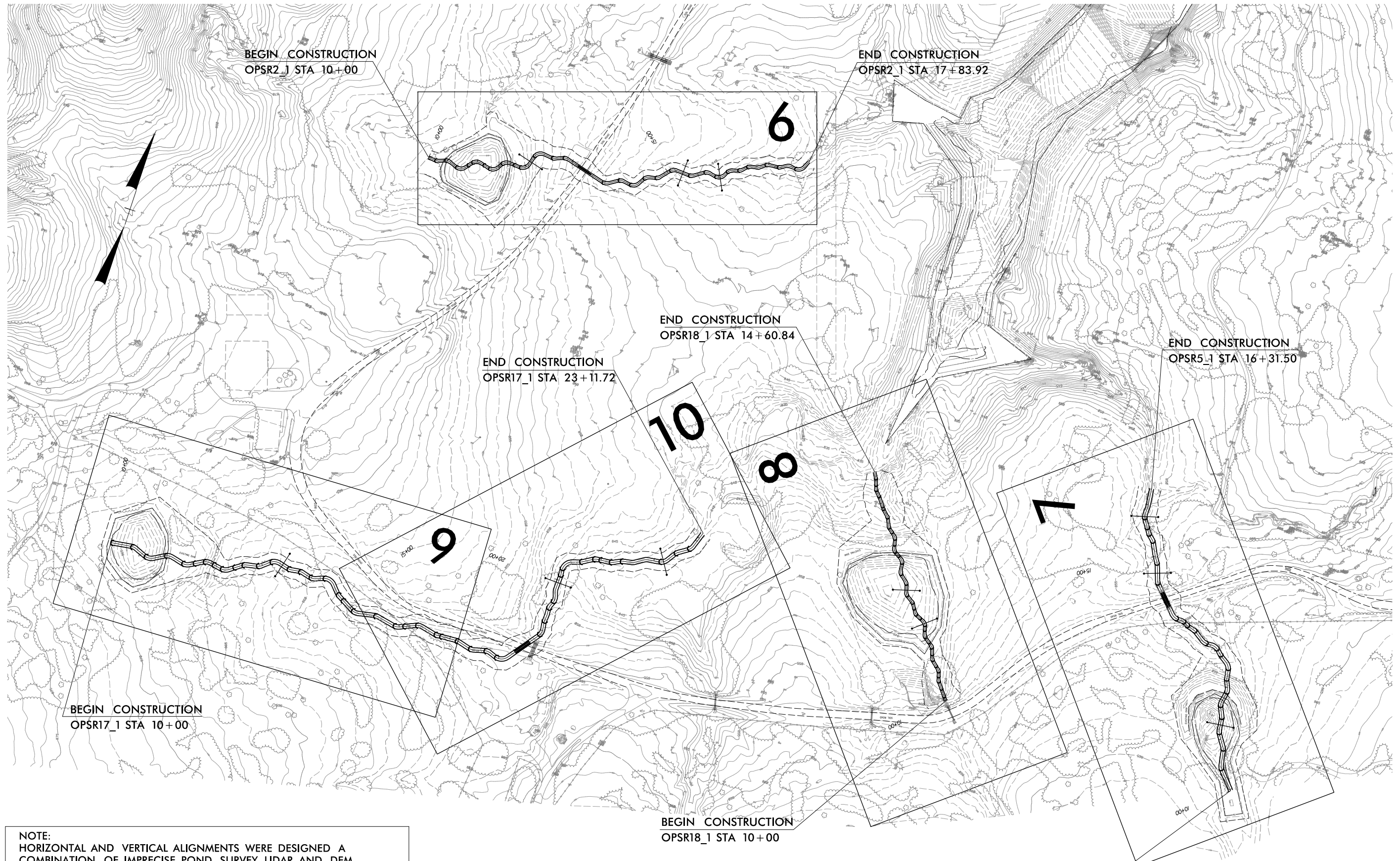
**PALO PINTO COUNTY
MUNICIPAL WATER
DISTRICT NO. 1**



AUG 2017

FIGURE D-5

OVERVIEW PLAN SHEET SIMPSON PROPERTY



NOTE:
HORIZONTAL AND VERTICAL ALIGNMENTS WERE DESIGNED A COMBINATION OF IMPRECISE POND SURVEY, LIDAR AND DEM DATA. PRIOR TO CONSTRUCTION PLAN PREPARATION, VERIFICATION OF ACTUAL GROUND ELEVATIONS SHALL TAKE PLACE TO CONFIRM THAT THE DESIGN BANKFULL CHANNEL TIES INTO EXISTING GROUND, ADJUSTMENTS TO THE HORIZONTAL AND VERTICAL ALIGNMENTS MAY BE NECESSARY AS A RESULT OF PREVAILING GROUND SURVEY DATA AND EXISTING ROCK LAYERS TO REMAIN.

FOR OVERVIEW OF STREAM PLAN SHEETS SEE SHEETS 1 THRU 1A
FOR MORPHOLOGICAL TABLE SEE SHEET 2
FOR PLANTING TABLES SEE SHEET 3
FOR STREAM DETAILS SEE SHEETS 4 THRU 5
FOR PLAN & PROFILES SEE SHEETS 6 THRU 16

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TURKEY PEAK
MITIGATION PLAN
PALO PINTO COUNTY, TEXAS

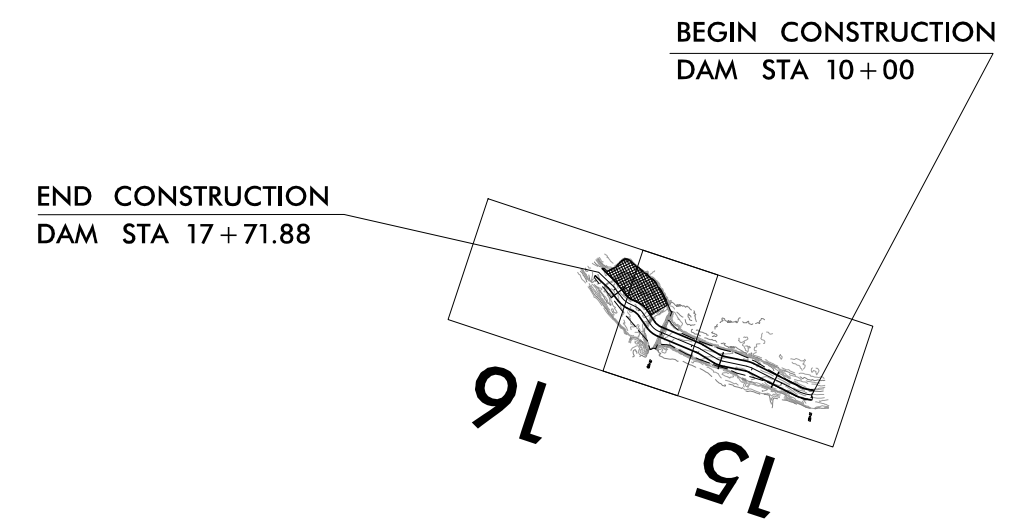
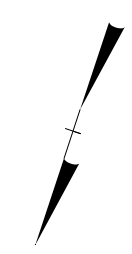
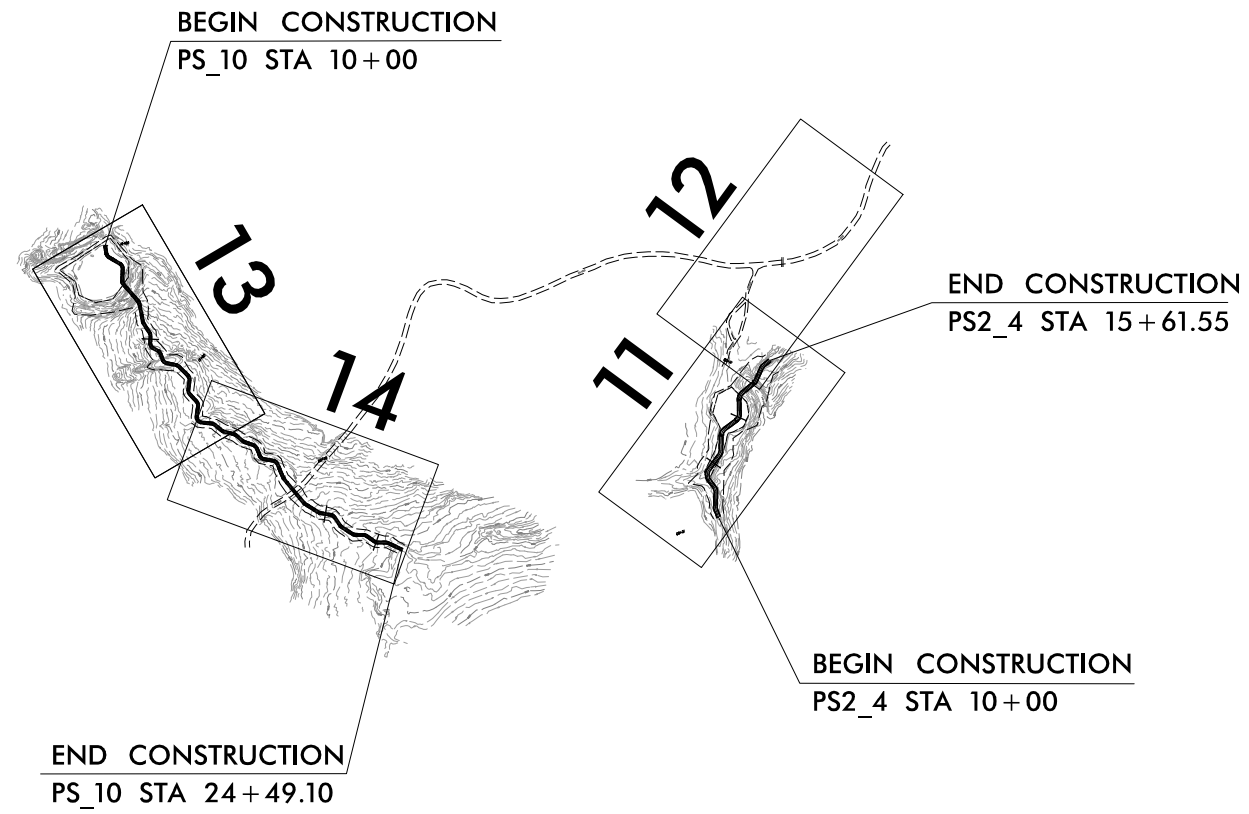
NOT TO SCALE

DATE: 02-27-2017

OVERVIEW
PLAN SHEET

SHEET
1

**OVERVIEW PLAN SHEET
COPELAND PROPERTY**



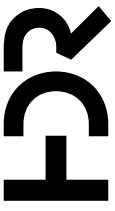
NOTE:
HORIZONTAL AND VERTICAL ALIGNMENTS WERE DESIGNED A COMBINATION OF IMPRECISE POND SURVEY, LIDAR AND DEM DATA. PRIOR TO CONSTRUCTION PLAN PREPARATION, VERIFICATION OF ACTUAL GROUND ELEVATIONS SHALL TAKE PLACE TO CONFIRM THAT THE DESIGN BANKFULL CHANNEL TIES INTO EXISTING GROUND, ADJUSTMENTS TO THE HORIZONTAL AND VERTICAL ALIGNMENTS MAY BE NECESSARY AS A RESULT OF PREVAILING GROUND SURVEY DATA AND EXISTING ROCK LAYERS TO REMAIN.

FOR OVERVIEW OF STREAM PLAN SHEETS SEE SHEETS 1 THRU 1A
FOR MORPHOLOGICAL TABLE SEE SHEET 2
FOR PLANTING TABLES SEE SHEET 3
FOR STREAM DETAILS SEE SHEETS 4 THRU 5
FOR PLAN & PROFILES SEE SHEETS 6 THRU 16

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TURKEY PEAK
MITIGATION PLAN
PALO PINTO COUNTY, TEXAS

NOT TO SCALE

DATE: 03-23-17

OVERVIEW
PLAN SHEET

SHEET
1A

Morphological Characteristics of Turkey Peak

Project:	Turkey Peak Mitigation Site			County:	Palo Pinto, TX		
ITEM	Proposed Conditions	Proposed Conditions	Proposed Conditions	Proposed Conditions	Proposed Conditions	Proposed Conditions	
LOCATION	OPSR2_1	OPSR5_1	OPSR18_1	OPSR17_1	PS2_4	PS_10	
STREAM TYPE	C/E5	C/E5	C/E5	C/E5	C/E5	C/E5	
DRAINAGE AREA, Ac - Sq Mi	19 Ac - 0.03 Sq Mi	102 Ac - 0.16 Sq Mi	11 Ac - 0.02 Sq Mi	109 Ac - 0.17 Sq Mi	442 Ac - 0.69 Sq Mi	198 Ac - 0.31 Sq Mi	
BANKFULL WIDTH (W_{bkf}), ft	5.3 ft	8.0 ft	5.3 ft	8.0 ft	10.0 ft	7.0 ft	
BANKFULL MEAN DEPTH (d_{bkf}), ft	0.58 ft	0.73 ft	0.58 ft	0.73 ft	1.00 ft	0.70 ft	
WIDTH/DEPTH RATIO (W_{bkf}/d_{bkf})	9.0	11.0	9.0	11.0	10.0	10.0	
BANKFULL X-SECTION AREA (A_{bkf}), ft ²	3.5 ft ²	5.8 ft ²	3.5 ft ²	5.8 ft ²	8.8 ft ²	5.4 ft ²	
BANKFULL MEAN VELOCITY, fps	1.2 fps	1.4 fps	0.9 fps	1.3 fps	1.9 fps	1.7 fps	
BANKFULL DISCHARGE, cfs	3.6 cfs	8.2 cfs	3.0 cfs	8.4 cfs	16.6 cfs	10.9 cfs	
BANKFULL MAX DEPTH (d_{max}), ft	0.64 ft	0.87 ft	0.64 ft	0.87 ft	1.20 ft	0.91 ft	
BANK HEIGHT RATIO	1.00	1.00	1.00	1.00	1.00	1.00	
TYPICAL BANK HEIGHT	0.64 ft	0.87 ft	0.64 ft	0.87 ft	1.20 ft	0.91 ft	
WIDTH Flood-Prone Area (W_{fpa}), ft	35.00 ft	25.00 ft	25.00 ft	65.00 ft	25.00 ft	25.00 ft	
ENTRENCHMENT RATIO (ER)*	6.7	3.1	4.8	8.1	2.5	3.6	
MEANDER LENGTH (Lm), ft*	20.7 - 26.8 ft	31.5 - 40.8 ft	20.7 - 26.8 ft	31.5 - 40.8 ft	39.4 - 51.0 ft	27.6 - 35.7 ft	
RATIO OF Lm TO W_{bkf} *	3.9 - 5.1	3.9 - 5.1	3.9 - 5.1	3.9 - 5.1	3.9 - 5.1	3.9 - 5.1	
RADIUS OF CURVATURE, ft*	7.4 - 0.0 ft	11.2 - 0.0 ft	7.4 - 0.0 ft	11.2 - 0.0 ft	14.0 - 0.0 ft	9.8 - 0.0 ft	
RATIO OF Rc TO W_{bkf} *	1.4 - 3.1	1.4 - 3.1	1.4 - 3.1	1.4 - 3.1	1.4 - 3.1	1.4 - 3.1	
BELT WIDTH, ft*	6.8 - 9.5 ft	10.4 - 14.4 ft	6.8 - 9.5 ft	10.4 - 14.4 ft	13.0 - 18.0 ft	9.1 - 12.6 ft	
MEANDER WIDTH RATIO*	1.3 - 1.8	1.3 - 1.8	1.3 - 1.8	1.3 - 1.8	1.3 - 1.8	1.3 - 1.8	
SINUOSITY (K)*	1.10	1.02	1.03	1.05	1.03	1.03	
CHANNEL LENGTH, ft	783	632	460	1312	562	325	
VALLEY LENGTH, ft	715	621	447	1250	547	315	
VALLEY SLOPE, ft/ft	0.0280 ft/ft	0.0177 ft/ft	0.0380 ft/ft	0.0216 ft/ft	0.0128 ft/ft	0.0190 ft/ft	
AVERAGE SLOPE (S), ft/ft	0.0080 ft/ft	0.0067 ft/ft	0.0043 ft/ft	0.0053 ft/ft	0.0096 ft/ft	0.0062 ft/ft	
RIFFLE SLOPE, ft/ft	0.0095 - 0.0111 ft/ft	0.0080 - 0.0093 ft/ft	0.0052 - 0.0061 ft/ft	0.0064 - 0.0075 ft/ft	0.0115 - 0.0135 ft/ft	0.0074 - 0.0086 ft/ft	
RATIO OF RIFFLE SLOPE TO AVERAGE SLOPE	1.2 - 1.4	1.2 - 1.4	1.2 - 1.4	1.2 - 1.4	1.2 - 1.4	1.2 - 1.4	
POOL SLOPE, ft/ft	0.0000 - 0.0000 ft/ft	0.0000 - 0.0000 ft/ft	0.0000 - 0.0000 ft/ft	0.0000 - 0.0000 ft/ft	0.0000 - 0.0000 ft/ft	0.0000 - 0.0000 ft/ft	
RATIO OF POOL SLOPE TO AVERAGE SLOPE	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	
MAX POOL DEPTH, ft	1.17 ft	1.45 ft	1.17 ft	1.45 ft	2.00 ft	1.40 ft	
RATIO OF POOL DEPTH TO AVERAGE BANKFULL DEPTH	2.0	2.0	2.0	2.0	2.0	2.0	
POOL WIDTH, ft	6.56 ft	10.00 ft	6.56 ft	10.00 ft	12.50 ft	8.75 ft	
RATIO OF POOL WIDTH TO BANKFULL WIDTH	1.25	1.25	1.25	1.25	1.25	1.25	
POOL TO POOL SPACING, ft	12.6 - 41.5 ft	19.2 - 63.2 ft	12.6 - 41.5 ft	19.2 - 63.2 ft	24.0 - 79.0 ft	16.8 - 55.3 ft	
RATIO OF POOL TO POOL SPACING TO BANKFULL WIDTH	2.4 - 7.9	2.4 - 7.9	2.4 - 7.9	2.4 - 7.9	2.4 - 7.9	2.4 - 7.9	

* Proposed streams utilized pattern ratios where appropriate based on the valley width

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TURKEY PEAK
STREAM RESTORATION PROJECT
PALO-PINTO COUNTY, TEXAS

NOT TO SCALE

DATE: 02-27-17

MORPHO-LOGICAL TABLE

SHEET
2

ALL AREA WITHIN THE LIMITS OF GRADING SHALL BE PLANTED WITH THE SPECIES FOUND IN THE PLANTING TABLES.

PLANTING TABLE				
APPLY TO PLAN SHEETS 6-13				
Native species list with seeding rates and times for grading limits of stream restoration on ephemeral streams				
Common Name	Species Name	Seeding Rate ^a	Optimum seeding dates	Maximum seeding dates
Perennial Grasses				
Big Bluestem	<i>Andropogon gerardii</i>	6	2/15-5/15	12/1-6/1
Buffalo Grass	<i>Buchloe dactyloides</i>	24	2/15-5/15	12/1-6/1
Indiangrass	<i>Sorghastrum nutans</i>	6	2/15-5/15	12/1-6/1
Little Bluestem	<i>Schizachyrium scoparium</i>	5	2/15-5/15	12/1-6/1
Sand Dropseed	<i>Sporobolus cryptandrus</i>	1	2/15-5/15	12/1-6/1
Sideoats Grama	<i>Bouteloua curtipendula</i>	5	2/15-5/15	12/1-6/1
Sw itchgrass	<i>Panicum virgatum</i>	2	2/15-5/15	12/1-6/1
Composite Dropseed	<i>Sporobolus compositus</i>	1	2/15-5/15	12/1-6/1
Texas Bluegrass	<i>Poa arachnifera</i>	1	9/1-10/15	8/15-11/1
Texas Wintergrass	<i>Nasella leucotricha</i>	12	9/1-10/15	8/15-11/1
Vine Mesquite	<i>Panicum obtusum</i>	2	2/15-5/15	12/1-6/1
Curly Mesquite	<i>Hilaria belangeri</i>	2	2/15-5/15	12/1-6/1
Purpletop	<i>Tridens flavus</i>	11	2/15-5/16	12/1-6/2
Perennial Forbs				
Verbena	<i>Glandularia bipinnatifida</i>	2	2/15-5/14	12/1-6/0
Illinois bundleflow er	<i>Desmanthus illinoensis</i>	15	2/15-5/15	12/1-6/1
Maximilian sunflow er	<i>Helianthus maximiliani</i>	3	2/15-5/15	12/1-6/1
Gayfeather	<i>Liatris punctata</i>	10	2/15-5/15	12/1-6/1
Annual Forbs				
White prickly poppy	<i>Argemone albiflora</i>	10	9/1-10/14	8/15-11/0
Partridge pea	<i>Chamaecrista fasciculata</i>	13.4	9/1-10/15	8/15-11/1
Winter Cover Crop				
cereal rye grain	<i>Secale cereale</i>	60	9/1-2/15	-
a - seeding rate in pure live seed in lbs/acre				

PLANTING TABLE				
APPLY TO PLAN SHEETS 6-13				
Woody Plant Species for use along restoration areas of Ephemeral Streams				
Seedlings of at least four species will be planted at an initial rate of at least 250 stems per acre with no one species comprising more than 35% and no less than 5% of the total.				
Scientific Name	Common Name	Plant Date	Size ^a	Spacing
Trees				
<i>Celtis reticulata</i> Torr.	netleaf hackberry	Fall	small	6'-15'
<i>Fraxinus texensis</i> (A. Gray) Sarg.	Texas ash	Fall	small	6'-15'
<i>Quercus buckleyi</i> Nixon & Dorr	Texas oak	Fall	medium	30'-40'
<i>Quercus fusiformis</i> Small	live oak	Fall	medium	30'-40'
<i>Quercus sinuata</i> Walter var. <i>breviloba</i> (Torr.) C.H. Mull.	white shin oak	Fall	small	6'-15'
<i>Sapindus saponaria</i> L. var. <i>drummondii</i> (Hook. & Arn.) L. D. Benson	western soapberry	Fall	medium	30'-40'
<i>Sideroxylon lanuginosum</i> Michx.	gum bumelia	Fall	small	6'-15'
<i>Ulmus crassifolia</i> Nutt.	cedar elm	Fall	medium	30'-40'
Shrubs				
<i>Rhus lanceolata</i> (A. Gray) Britton	prairie sumac	Fall	small	6'-15'
<i>Rhus trilobata</i> Nutt.	skunkbush	Fall	small	6'-15'
<i>Viburnum rufidulum</i> Raf.	rusty blackhaw	Fall	small	6'-15'
a small = 30' or less/ medium = 30'-70'/ large = 70' or more				

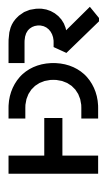
PLANTING TABLE				
APPLY TO PLAN SHEET 14 (ONLY)				
Native species list with seeding rates and times for grading limits of stream restoration for intermittent stream				
Common Name	Species Name	Seeding Rate ^a	Optimum seeding dates	Maximum seeding dates
Perennial Grasses				
Big Bluestem	<i>Andropogon gerardii</i>	6	2/15-5/15	12/1-6/1
Prairie Wildrye	<i>Elymus canadensis</i>	10	9/1-10/15	8/15-11/1
Green Sprangletop	<i>Leptochloa dubia</i>	2	2/15-5/15	12/1-6/1
Indiangrass	<i>Sorghastrum nutans</i>	6	2/15-5/15	12/1-6/1
Little Bluestem	<i>Schizachyrium scoparium</i>	5	2/15-5/15	12/1-6/1
Sand Dropseed	<i>Sporobolus cryptandrus</i>	1	2/15-5/15	12/1-6/1
Sw itchgrass	<i>Panicum virgatum</i>	2	2/15-5/15	12/1-6/1
Composite Dropseed	<i>Sporobolus compositus</i>	1	2/15-5/15	12/1-6/1
Texas Wintergrass	<i>Nasella leucotricha</i>	12	9/1-10/15	8/15-11/1
Vine Mesquite	<i>Panicum obtusum</i>	2	2/15-5/15	12/1-6/1
Virginia Wildrye	<i>Elymus virginicus</i>	3	9/1-10/15	8/15-11/1
Purpletop	<i>Tridens flavus</i>	11	2/15-5/16	12/1-6/2
Perennial Forbs				
Illinois bundleflow er	<i>Desmanthus illinoensis</i>	15	2/15-5/15	12/1-6/1
Maximilian sunflow er	<i>Helianthus maximiliani</i>	3	2/15-5/15	12/1-6/1
Gayfeather	<i>Liatris punctata</i>	10	2/15-5/15	12/1-6/1
Annual Forbs				
Partridge pea	<i>Chamaecrista fasciculata</i>	13.4	9/1-10/15	8/15-11/1
Winter Cover Crop				
cereal rye grain	<i>Secale cereale</i>	60	9/1-2/15	-
a - seeding rate in pure live seed in lbs/acre				

PLANTING TABLE				
APPLY TO PLAN SHEET 14 (ONLY)				
Woody Plant Species for use along restoration areas of Intermittent Stream				
Seedlings of at least four species will be planted at an initial rate of at least 250 stems per acre with no one species comprising more than 35% and no less than 5% of the total.				
Scientific Name	Common Name	Plant Date	Size ^a	Spacing
Trees				
<i>Carya illinoensis</i> (Wangenh.) K. Koch	pecan	Fall	large	40' - 50'
<i>Celtis reticulata</i> Torr.	netleaf hackberry	Fall	small	6'-15'
<i>Fraxinus texensis</i> (A. Gray) Sarg.	Texas ash	Fall	small	6'-15'
<i>Quercus buckleyi</i> Nixon & Dorr	Texas oak	Fall	medium	30'-40'
<i>Quercus fusiformis</i> Small	live oak	Fall	medium	30'-40'
<i>Sapindus saponaria</i> L. var. <i>drummondii</i> (Hook. & Arn.) L. D. Benson	western soapberry	Fall	medium	30'-40'
<i>Sideroxylon lanuginosum</i> Michx.	gum bumelia	Fall	small	6'-15'
<i>Ulmus crassifolia</i> Nutt.	cedar elm	Fall	medium	30'-40'
Shrubs				
<i>Cephalanthus occidentalis</i> L.	buttonbush	Fall	small	6'-15'
<i>Cornus drummondii</i> C.A. Mey.	roughleaf dogwood	Fall	small	6'-15'
a small = 30' or less/ medium = 30'-70'/ large = 70' or more				

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INCOMPLETE PLANS
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TURKEY PEAK
STREAM RESTORATION PROJECT
PALO-PINTO COUNTY, TEXAS

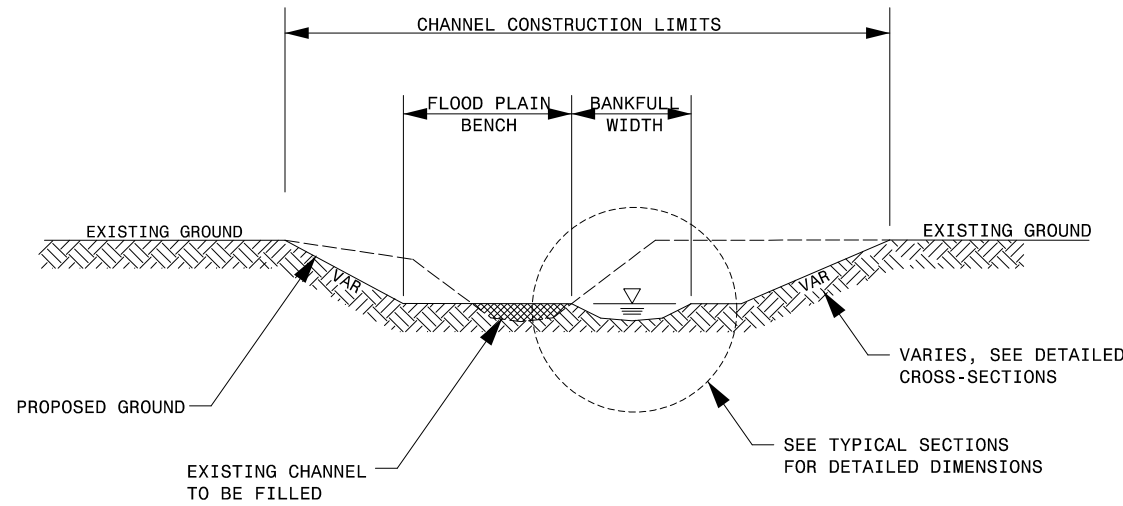
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DATE: 02-27-17

PLANTING TABLES

SHEET

3



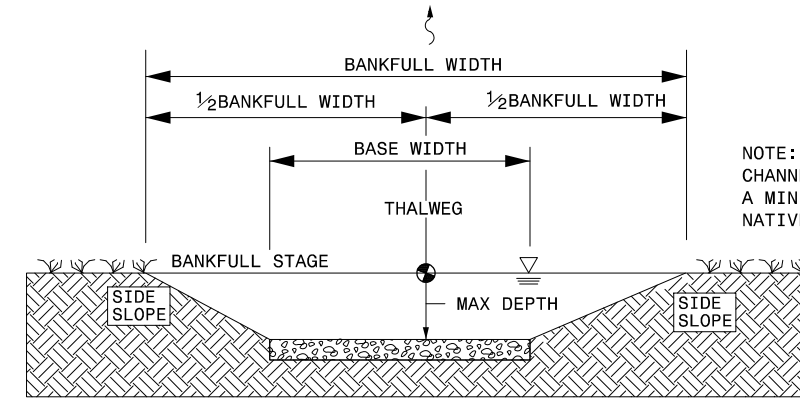
TYPICAL CHANNEL SECTION

VARIABLE	STATION - STATION
OPSR2_1	10+00.00 - 17+83.92
OPSR5_1	10+00.00 - 16+31.50
OPSR18_1	10+00.00 - 14+60.84
OPSR17_1	10+00.00 - 23+11.72
PS2_4	10+00.00 - 15+61.55
PS_10	10+00.00 - 24+49.10

TYPICAL SECTION - RIFFLE

SCALE: NTS
ALL UNITS ARE IN FEET

VARIABLE	OPSR2_1	OPSR5_1	OPSR18_1	OPSR17_1	PS2_4	PS_10
BANKFULL WIDTH	5.25	8.00	5.25	8.00	10.00	7.00
BASE WIDTH	3.50	4.86	3.50	4.86	9.00	9.00
MAXIMUM DEPTH	0.64	0.87	0.64	0.87	1.20	0.91
SIDE SLOPE	3:1	3:1	3:1	3:1	3:1	2.5:1



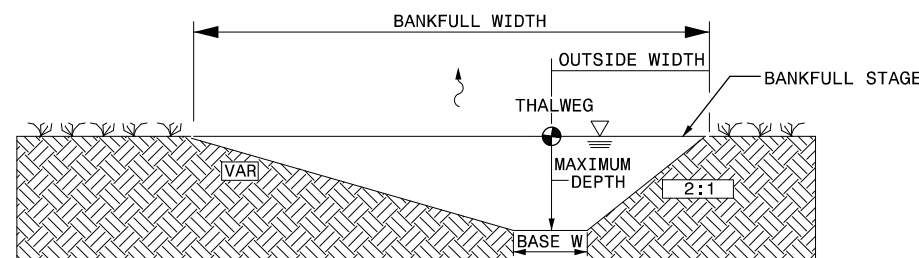
NOTE:
CHANNEL BASE TO BE OVER EXCAVATED BY A MINIMUM OF 6" AND BACKFILLED WITH NATIVE GRANULAR CHANNEL MATERIAL.

- NOTES:
- ALL CROSS SECTIONS ARE SHOWN LOOKING IN THE (DOWNSTREAM) DIRECTION.
 - GRADE POINT IS THE ELEVATION SHOWN ON PROFILE.
 - ALL SHARP CORNERS SHOULD BE ROUNDED

TYPICAL SECTION - POOL RIGHT

SCALE: NTS
ALL UNITS ARE IN FEET

VARIABLE	OPSR2_1	OPSR5_1	OPSR18_1	OPSR17_1	PS2_4	PS_10
BANKFULL WIDTH	6.56	10.00	6.56	10.00	12.5	8.75
BASE WIDTH	1.31	2.00	1.31	2.00	2.50	1.75
MAX DEPTH	1.17	1.45	1.17	1.45	2.0	1.40
OUTSIDE WIDTH	3.22	4.20	3.22	4.20	5.65	3.96
BAR SIDE SLOPE	2.30	3.30	2.30	3.30	2.80	2.80
RIGHT BANK SIDE SLOPE	2.20	2.20	2.20	2.20	2.20	2.20



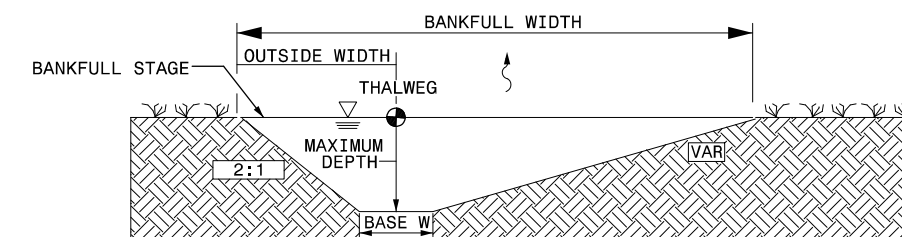
THALWEG (DEEPEST POINT IN A CROSS SECTION) IS LOCATED IN THE MIDDLE OF THE BASE WIDTH.

- NOTES:
- ALL CROSS SECTIONS ARE SHOWN LOOKING IN THE (DOWNSTREAM) DIRECTION.
 - GRADE POINT IS THE ELEVATION SHOWN ON PROFILE.
 - ALL SHARP CORNERS SHOULD BE ROUNDED

TYPICAL SECTION - POOL LEFT

SCALE: NTS
ALL UNITS ARE IN FEET

VARIABLE	OPSR2_1	OPSR5_1	OPSR18_1	OPSR17_1	PS2_4	PS_10
BANKFULL WIDTH	6.56	10.00	6.56	10.00	12.5	8.75
BASE WIDTH	1.31	2.00	1.31	2.00	2.50	1.75
MAX DEPTH	1.17	1.45	1.17	1.45	2.0	1.40
OUTSIDE WIDTH	3.22	4.20	3.22	4.20	5.65	3.96
BAR SIDE SLOPE	2.30	3.30	2.30	3.30	2.80	2.80
LEFT BANK SIDE SLOPE	2.20	2.20	2.20	2.20	2.20	2.20



THALWEG (DEEPEST POINT IN A CROSS SECTION) IS LOCATED IN THE MIDDLE OF THE BASE WIDTH.

- NOTES:
- ALL CROSS SECTIONS ARE SHOWN LOOKING IN THE (DOWNSTREAM) DIRECTION.
 - GRADE POINT IS THE ELEVATION SHOWN ON PROFILE.
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TURKEY PEAK
STREAM RESTORATION PROJECT
PALO-PINTO COUNTY, TEXAS

NOT TO SCALE

DATE: 02-27-17

TYPICAL SECTIONS

SHEET

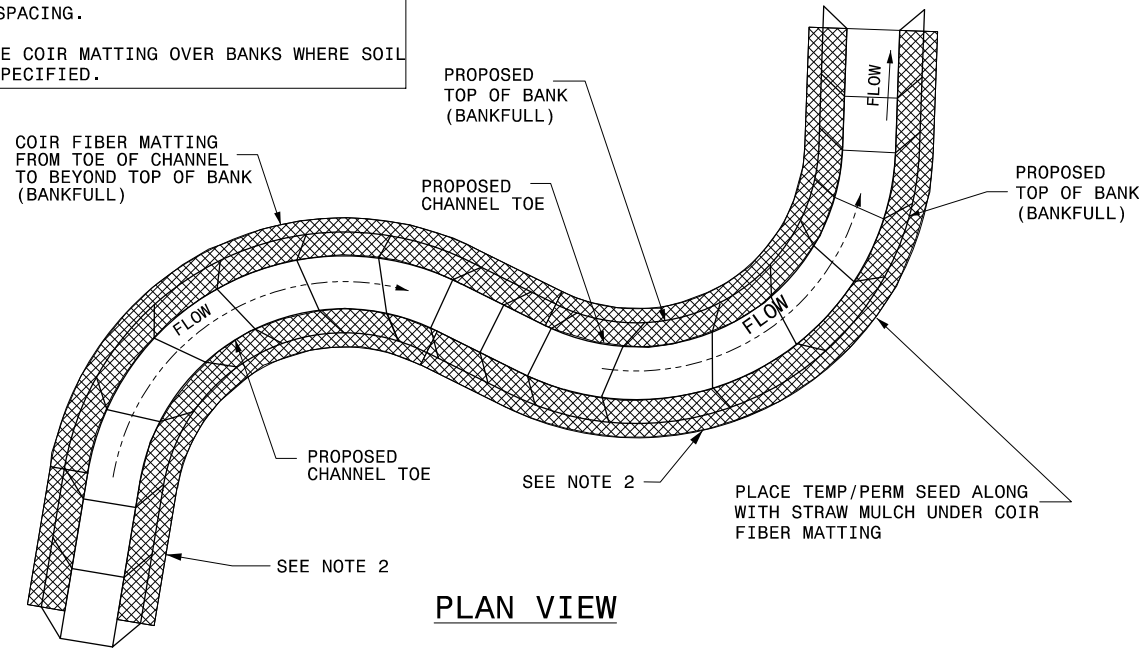
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TYPICAL MATTING LOCATION DETAIL

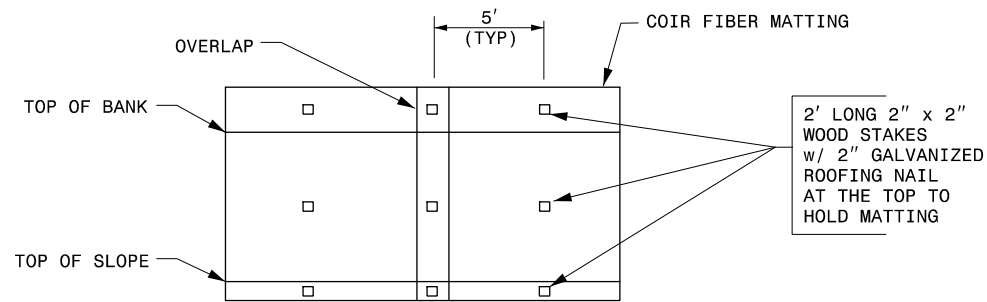
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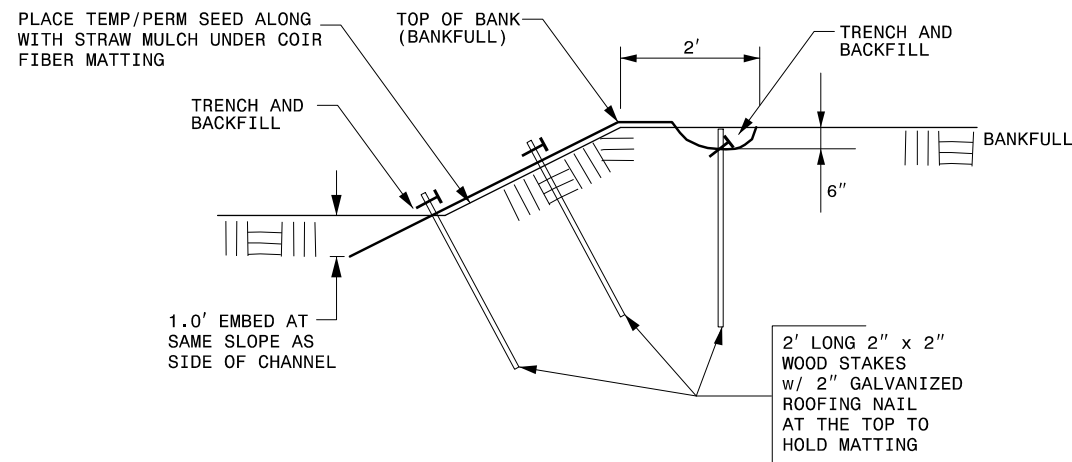
1. COIR FIBER MATTING SHALL BE PLACED ALONG BOTH BANKS THROUGHOUT THE PROJECT.
2. USE WOOD STAKES (NOT METAL) FOR MATTING.
3. INSTALL STAKES ACROSS MATTING AT ENDS, JUNCTIONS, OUTER EDGES, TOE OF SLOPES, AND DOWN THE CENTER .
4. 2' X 2" X 2" HARDWOOD STAKES SHALL BE INSTALLED ALONG THE OUTER EDGES (TOP OF BANK), TOE OF SLOPE, AND DOWN THE CENTER OF THE BANK WITH A MAXIMUM 5' SPACING.
5. DO NOT PLACE COIR MATTING OVER BANKS WHERE SOIL LIFTS ARE SPECIFIED.



PLAN VIEW



MATTING STAKING VIEW



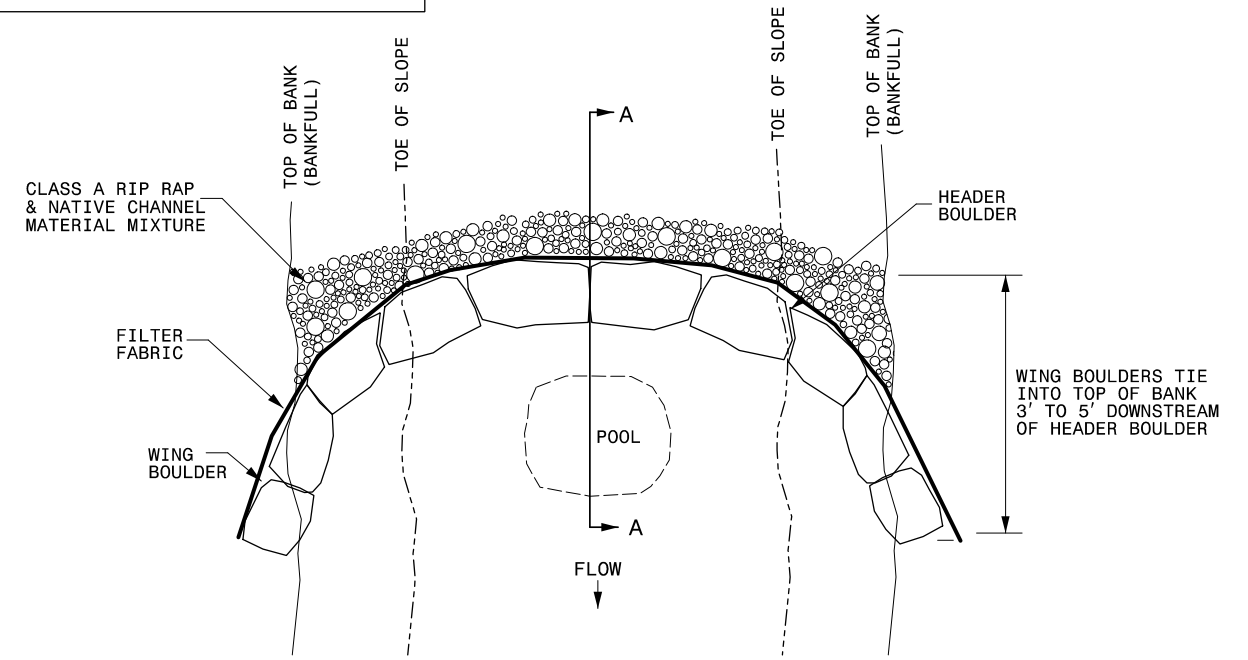
SECTION A-A

NOTES:

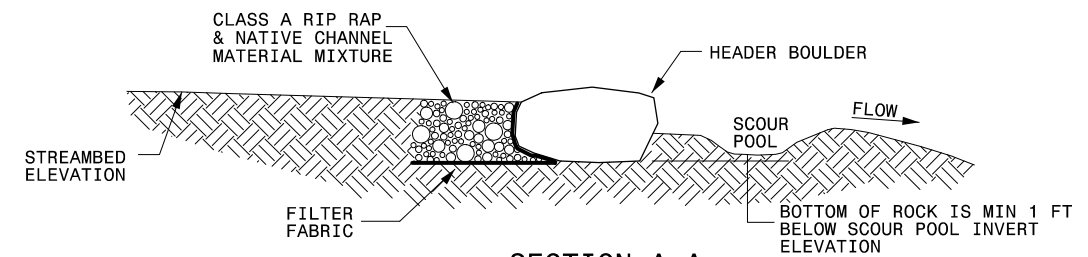
1. ALL STONES ARE TO BE STRUCTURE STONE.
2. BOULDERS SHALL BE NATIVE STONE OR SHOT ROCK, CUBICAL OR RECTANGULAR IN NATURE. WING BOULDERS MAY BE MORE RECTANGULAR THEN CUBICAL. BOULDERS SHALL BE APPROXIMATELY 30" X 30" X 30".
3. FILTER FABRIC SHALL BE PLACED AT LEAST 5' BEHIND HEADER BOULDERS AND BACKFILLED WITH CLASS A RIP RAP & NATIVE CHANNEL MATERIAL MIXTURE.
4. THE STEP STRUCTURE MAY REQUIRE FOOTER ROCKS DEPENDING ON THE SITE CONDITIONS
5. ROCK STEP STRUCTURES ARE NOT REQUIRED WHEN INTACT BEDROCK IS ENCOUNTERED AT THE PROPOSED THALWEG ELEVATION.

ROCK STEP STRUCTURE WITH BOULDERS

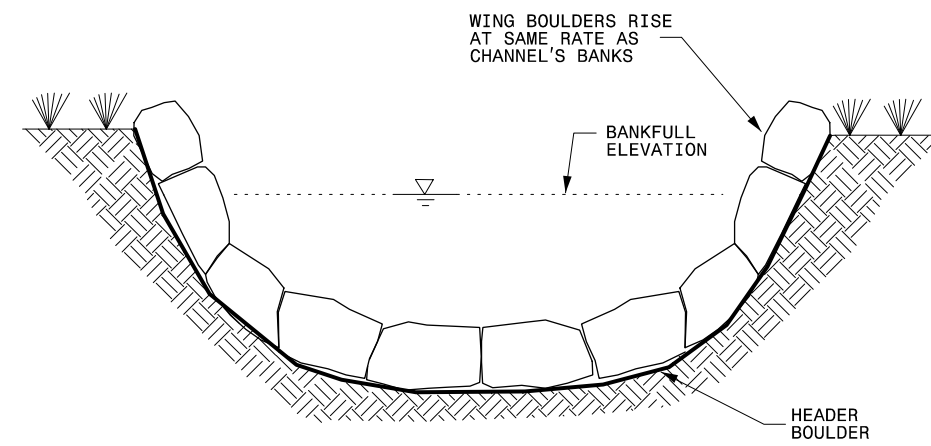
SCALE: NTS



PLAN VIEW



SECTION A-A



CROSS-SECTION

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TURKEY PEAK
STREAM RESTORATION PROJECT
PALO-PINTO COUNTY, TEXAS

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DETAILS

SHEET

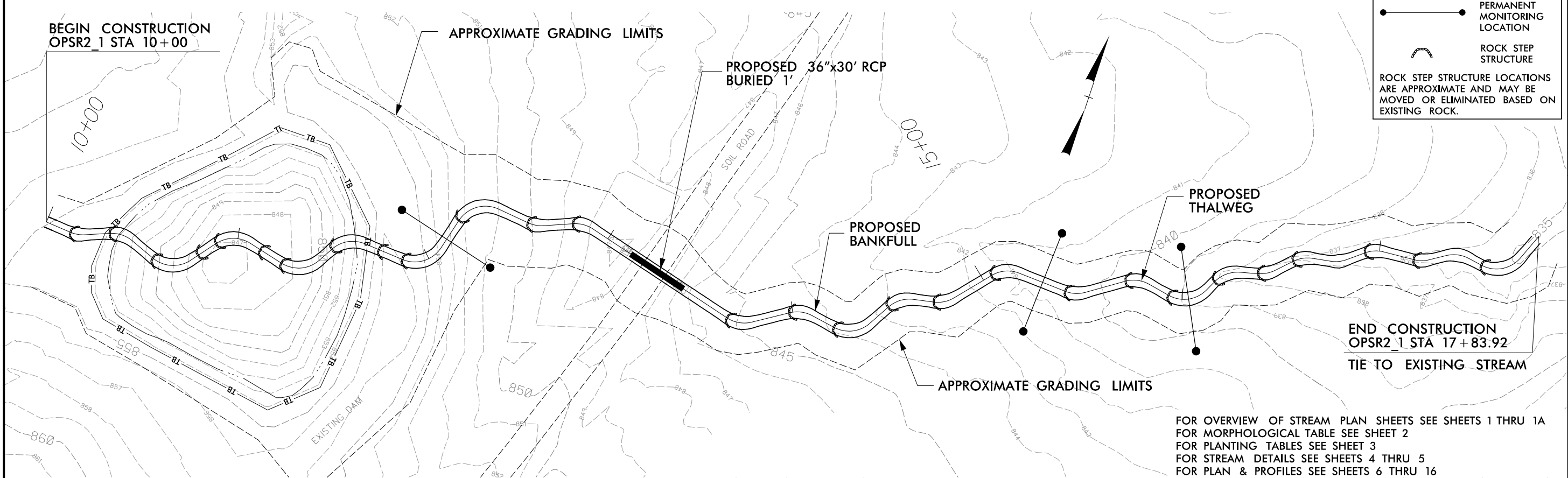
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PLAN & PROFILE SHEET

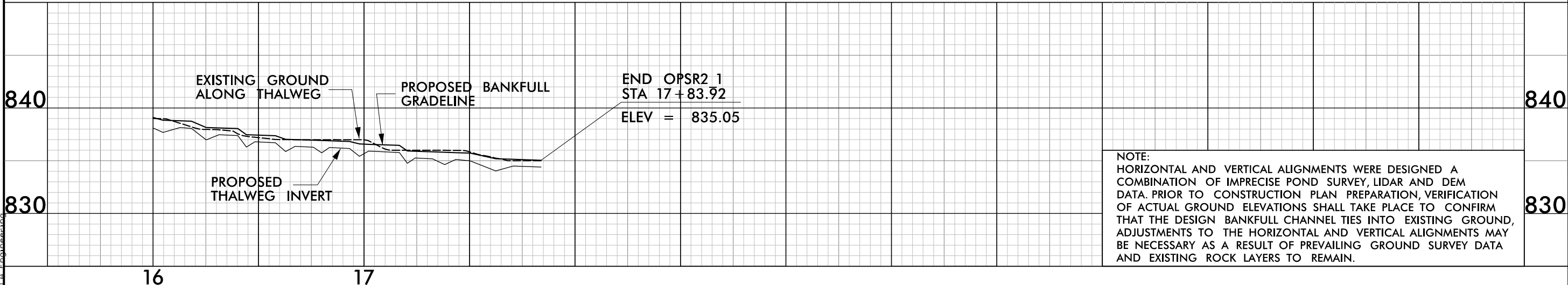
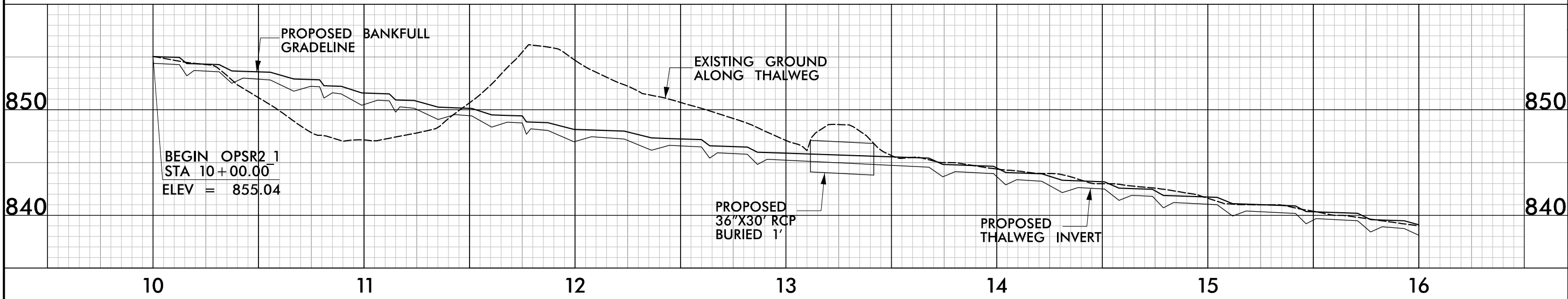
LEGEND

- ——— ● PERMANENT MONITORING LOCATION
- ⌒ ROCK STEP STRUCTURE

ROCK STEP STRUCTURE LOCATIONS ARE APPROXIMATE AND MAY BE MOVED OR ELIMINATED BASED ON EXISTING ROCK.



FOR OVERVIEW OF STREAM PLAN SHEETS SEE SHEETS 1 THRU 1A
 FOR MORPHOLOGICAL TABLE SEE SHEET 2
 FOR PLANTING TABLES SEE SHEET 3
 FOR STREAM DETAILS SEE SHEETS 4 THRU 5
 FOR PLAN & PROFILES SEE SHEETS 6 THRU 16



NOTE:
 HORIZONTAL AND VERTICAL ALIGNMENTS WERE DESIGNED A COMBINATION OF IMPRECISE POND SURVEY, LIDAR AND DEM DATA. PRIOR TO CONSTRUCTION PLAN PREPARATION, VERIFICATION OF ACTUAL GROUND ELEVATIONS SHALL TAKE PLACE TO CONFIRM THAT THE DESIGN BANKFULL CHANNEL TIES INTO EXISTING GROUND, ADJUSTMENTS TO THE HORIZONTAL AND VERTICAL ALIGNMENTS MAY BE NECESSARY AS A RESULT OF PREVAILING GROUND SURVEY DATA AND EXISTING ROCK LAYERS TO REMAIN.

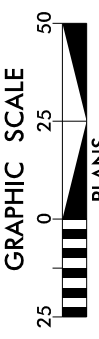
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TURKEY PEAK
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DATE: 05-30-17

OPSR2_1
 PLAN &
 PROFILE

SHEET

6

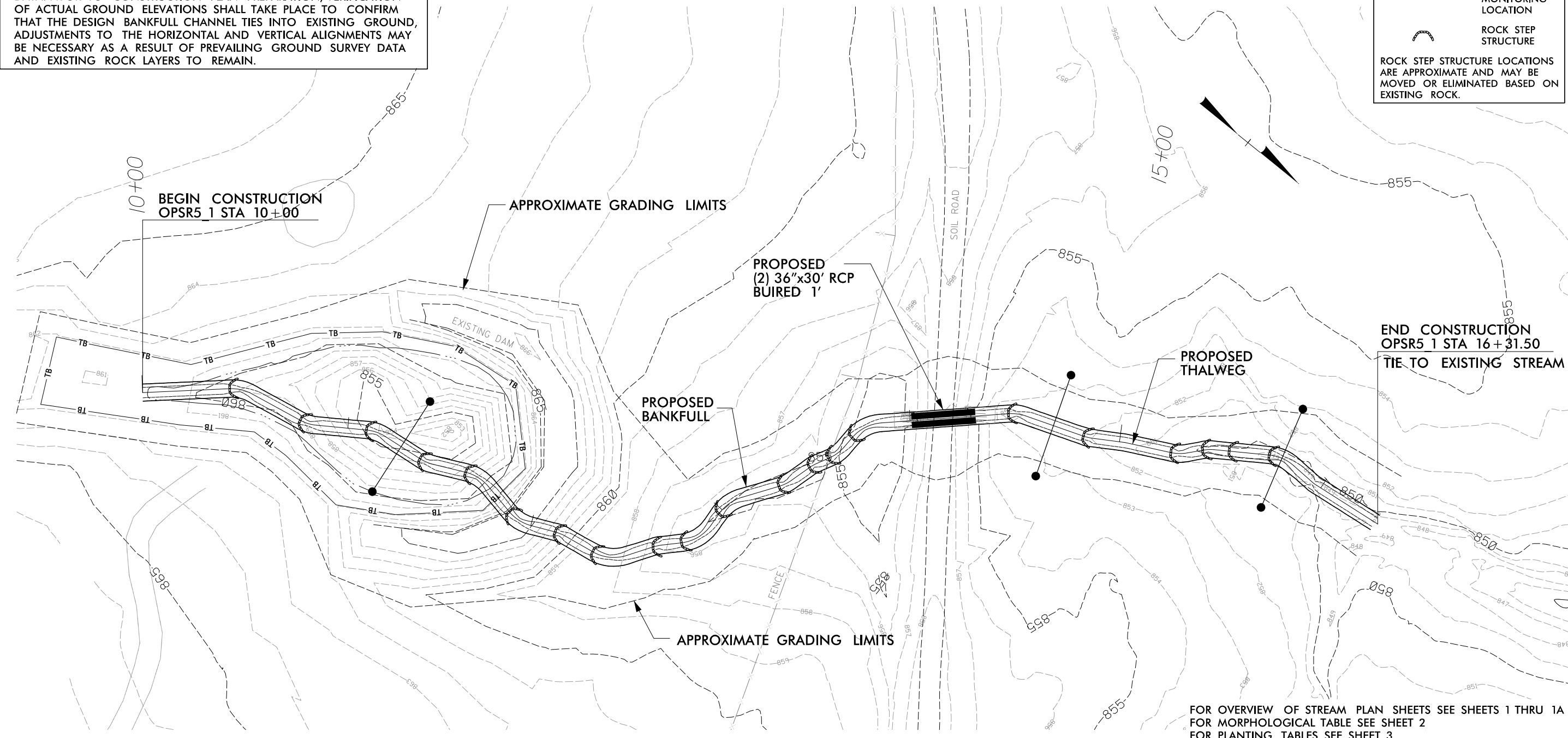
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PLAN & PROFILE SHEET

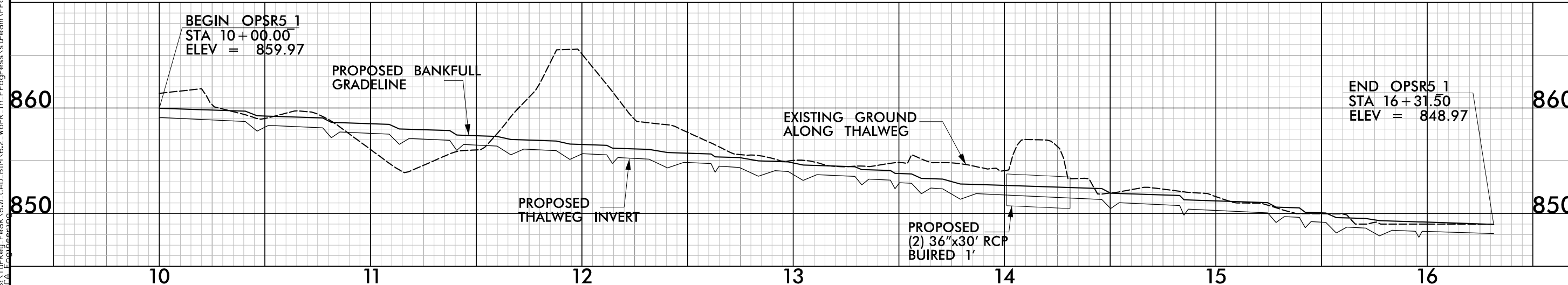
LEGEND

- PERMANENT MONITORING LOCATION
- ROCK STEP STRUCTURE

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 FOR MORPHOLOGICAL TABLE SEE SHEET 2
 FOR PLANTING TABLES SEE SHEET 3
 FOR STREAM DETAILS SEE SHEETS 4 THRU 5
 FOR PLAN & PROFILES SEE SHEETS 6 THRU 16

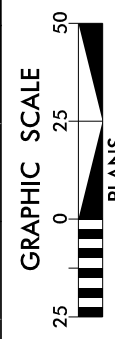


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 MITIGATION PLAN
 PALO PINTO COUNTY, TEXAS
 OPSR5_1 STA 10+00 - STA 16+31.50



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OPSR5_1
 PLAN &
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PLAN & PROFILE SHEET

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LEGEND

- ——— ● PERMANENT MONITORING LOCATION
- ⌒ ROCK STEP STRUCTURE

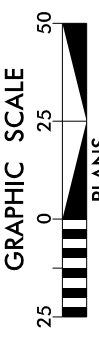
ROCK STEP STRUCTURE LOCATIONS ARE APPROXIMATE AND MAY BE MOVED OR ELIMINATED BASED ON EXISTING ROCK.

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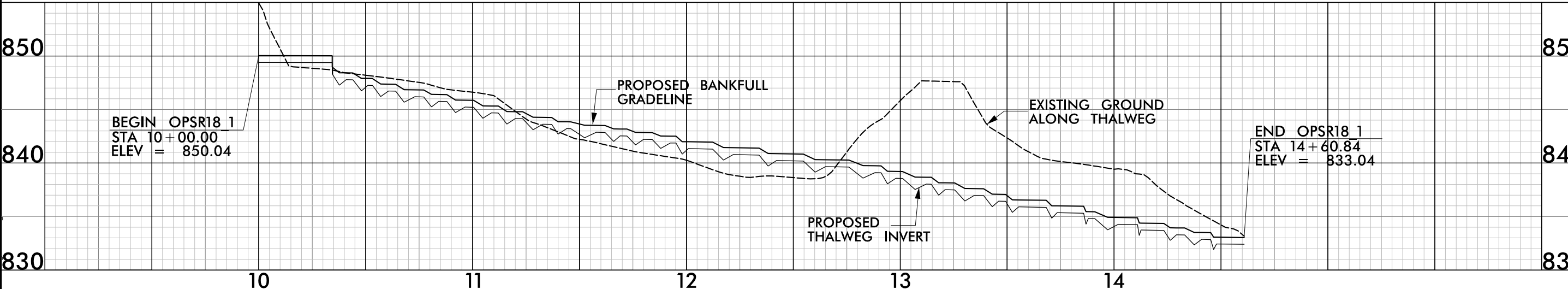
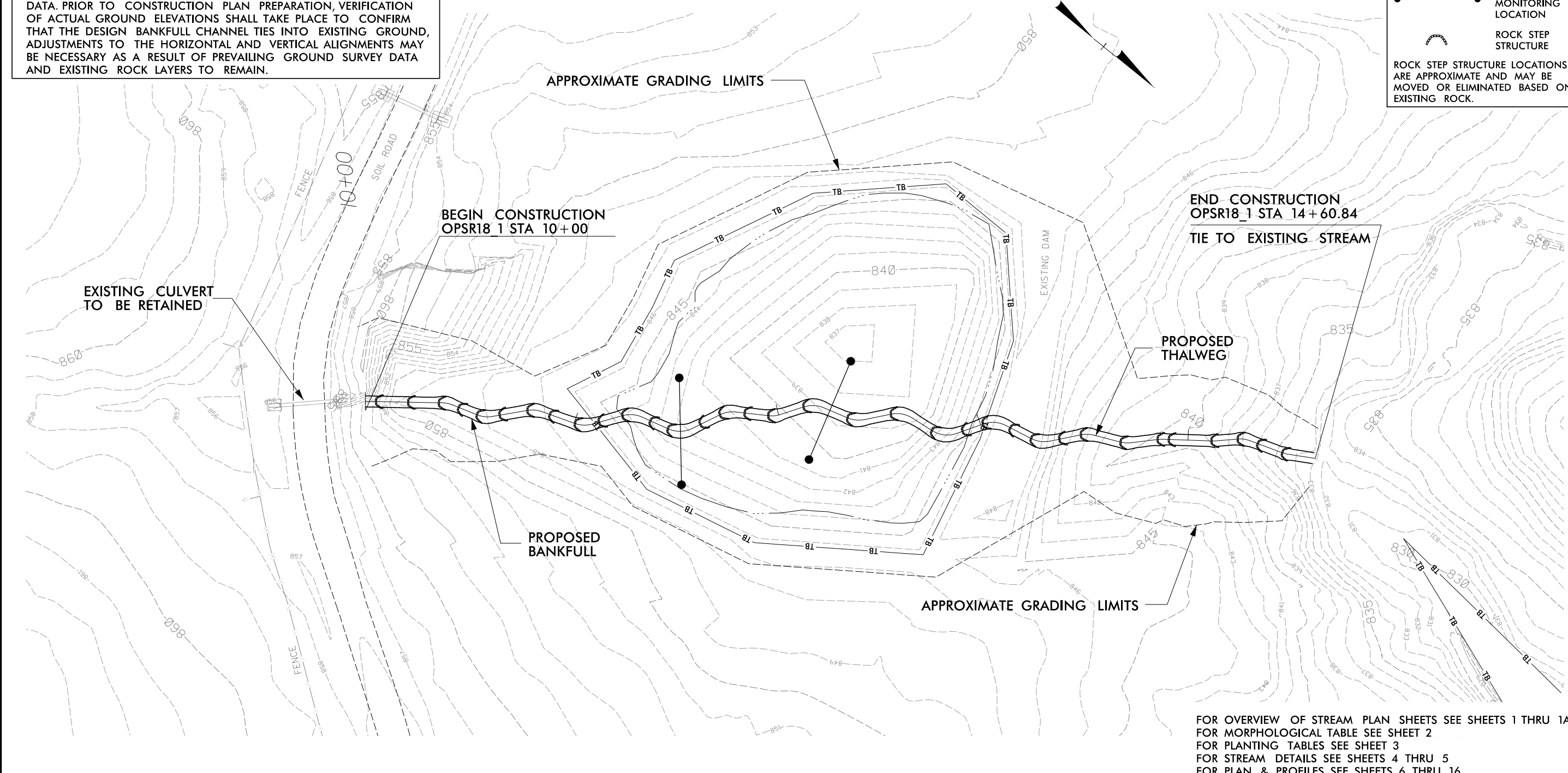
TURKEY PEAK
 MITIGATION PLAN
 PALO PINTO COUNTY, TEXAS



DATE: 05-30-17

OPSR18_1
 PLAN &
 PROFILE

SHEET
 8



FOR OVERVIEW OF STREAM PLAN SHEETS SEE SHEETS 1 THRU 1A
 FOR MORPHOLOGICAL TABLE SEE SHEET 2
 FOR PLANTING TABLES SEE SHEET 3
 FOR STREAM DETAILS SEE SHEETS 4 THRU 5
 FOR PLAN & PROFILES SEE SHEETS 6 THRU 16

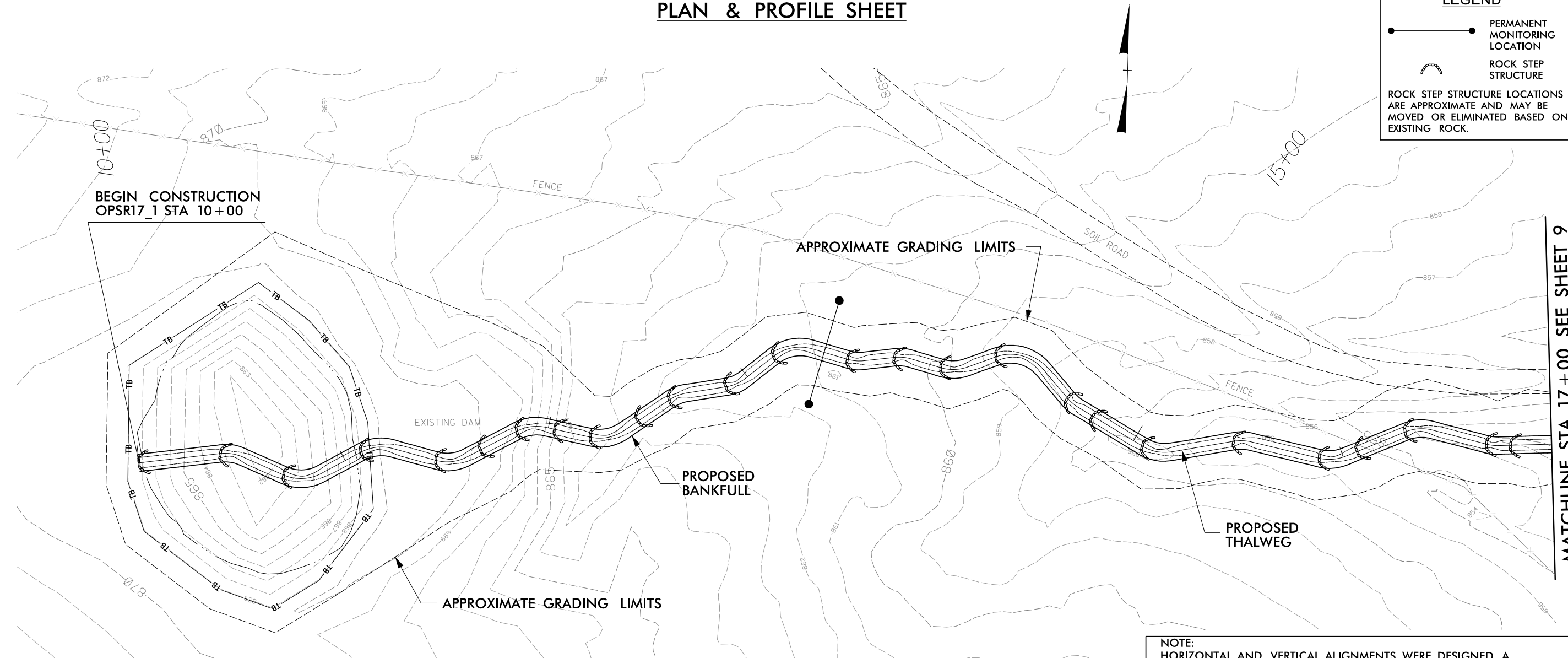
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PLAN & PROFILE SHEET

LEGEND

- PERMANENT MONITORING LOCATION
- ⤿ ROCK STEP STRUCTURE

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BEGIN CONSTRUCTION
OPSR17_1 STA 10+00

APPROXIMATE GRADING LIMITS

PROPOSED BANKFULL

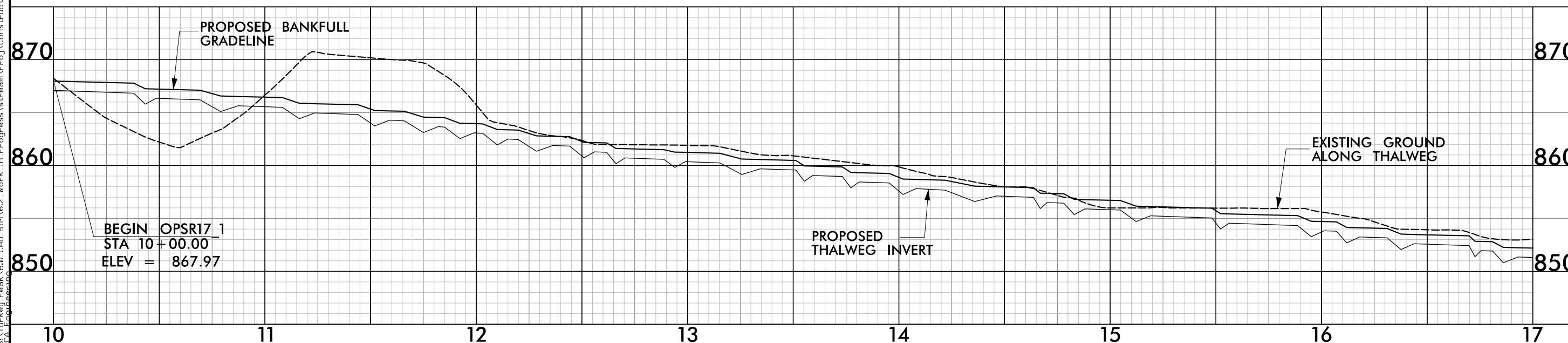
PROPOSED THALWEG

APPROXIMATE GRADING LIMITS

MATCHLINE STA. 17+00 SEE SHEET 9

FOR OVERVIEW OF STREAM PLAN SHEETS SEE SHEETS 1 THRU 1A
 FOR MORPHOLOGICAL TABLE SEE SHEET 2
 FOR PLANTING TABLES SEE SHEET 3
 FOR STREAM DETAILS SEE SHEETS 4 THRU 5
 FOR PLAN & PROFILES SEE SHEETS 6 THRU 16

NOTE:
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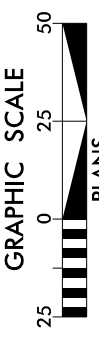


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DATE: 02-27-17

OPSR17_1
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 PROFILE

SHEET
 9

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NOTE:
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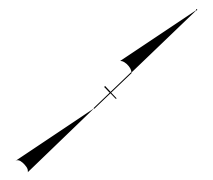
PLAN & PROFILE SHEET

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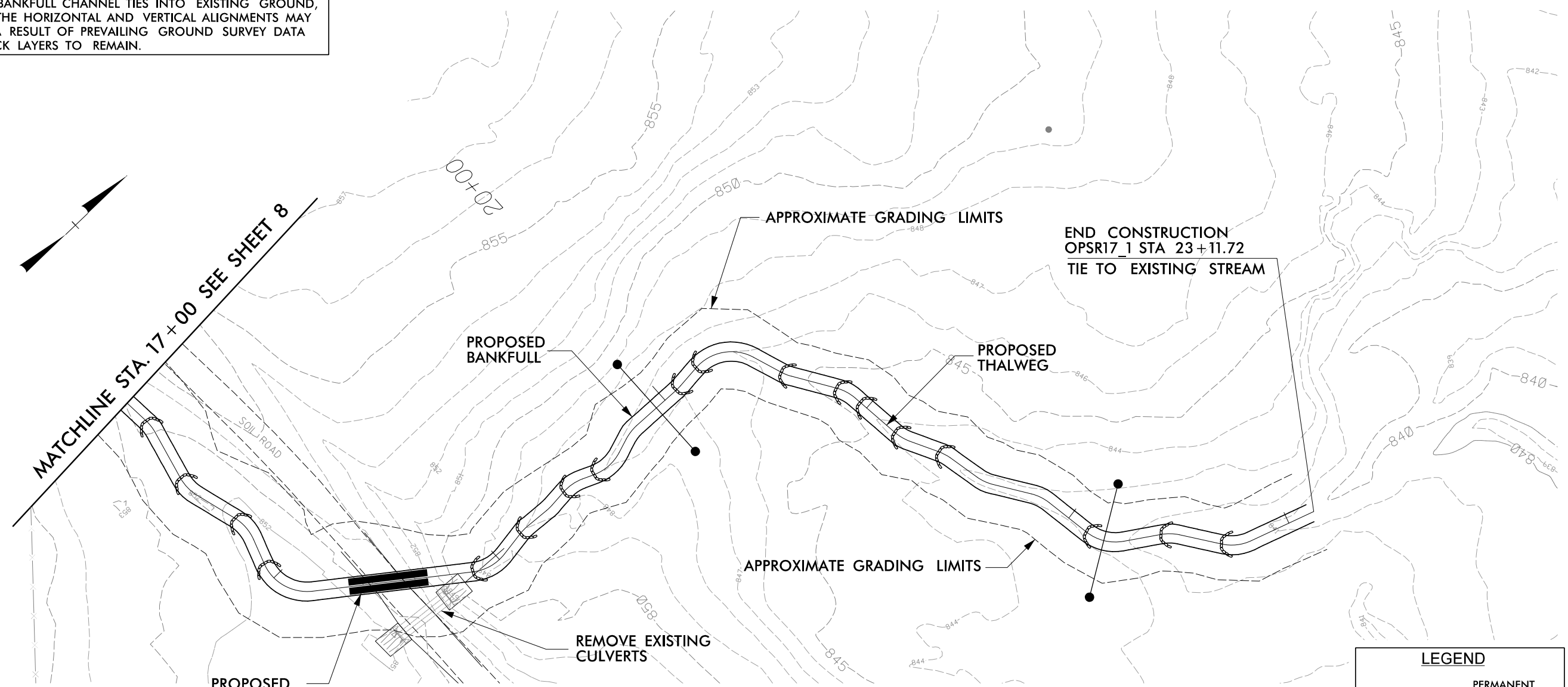
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 OPSR17_1 STA 17+00 - STA 23+11.72



MATCHLINE STA. 17+00 SEE SHEET 8



END CONSTRUCTION
 OPSR17_1 STA 23+11.72
 TIE TO EXISTING STREAM

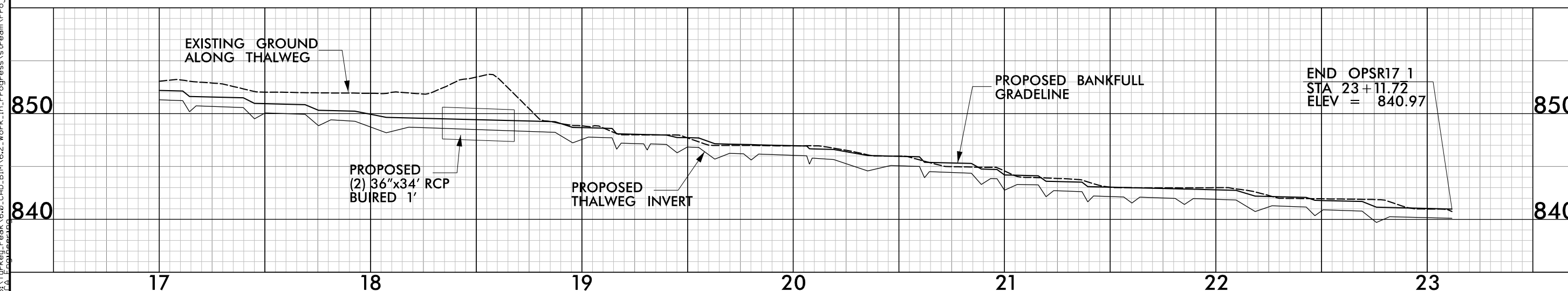
PROPOSED
 (2) 36"x34' RCP
 BUIED 1'

LEGEND

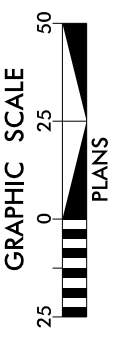
- PERMANENT MONITORING LOCATION
- ROCK STEP STRUCTURE

ROCK STEP STRUCTURE LOCATIONS ARE APPROXIMATE AND MAY BE MOVED OR ELIMINATED BASED ON EXISTING ROCK.

FOR OVERVIEW OF STREAM PLAN SHEETS SEE SHEETS 1 THRU 1A
 FOR MORPHOLOGICAL TABLE SEE SHEET 2
 FOR PLANTING TABLES SEE SHEET 3
 FOR STREAM DETAILS SEE SHEETS 4 THRU 5
 FOR PLAN & PROFILES SEE SHEETS 6 THRU 16



END OPSR17 1
 STA 23+11.72
 ELEV = 840.97



DATE: 05-30-17

OPSR17_1
 PLAN &
 PROFILE

SHEET
 10

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PLAN & PROFILE SHEET

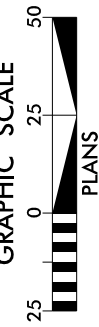
MATCHLINE SEE SHEET 12

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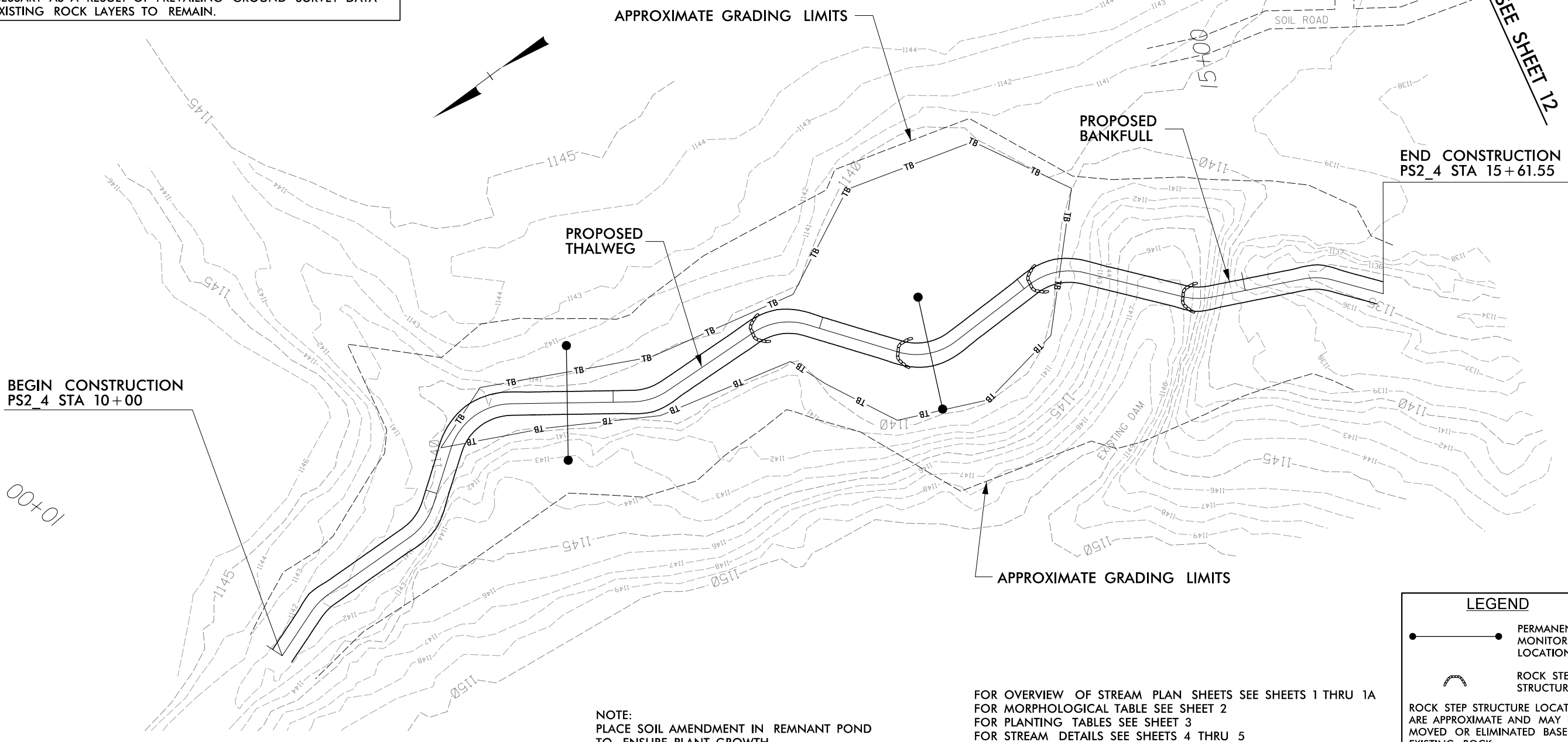
TURKEY PEAK
 MITIGATION PLAN
 PALO PINTO COUNTY, TEXAS
 PS2_4 STA 10+00 - STA 15+61.55



DATE: 05-30-17

PS2_4
 PLAN &
 PROFILE

SHEET
 11



BEGIN CONSTRUCTION
 PS2_4 STA 10+00

END CONSTRUCTION
 PS2_4 STA 15+61.55

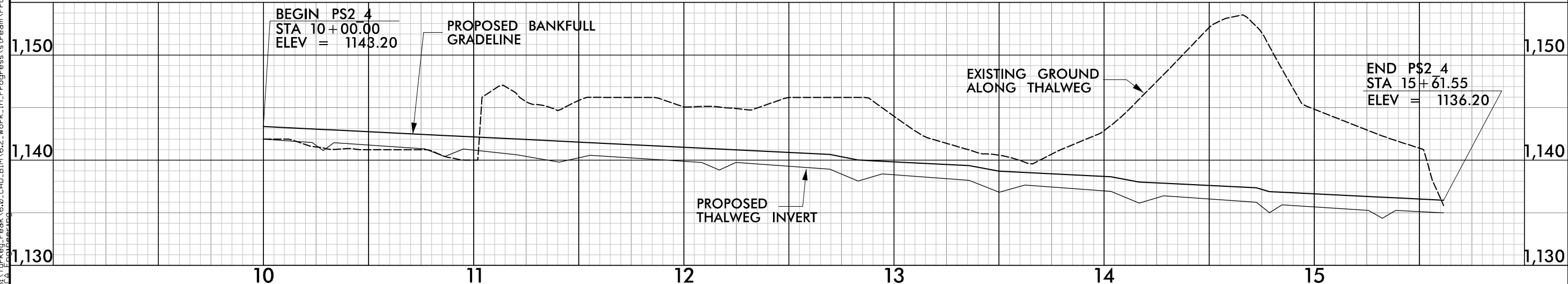
LEGEND

- — ● PERMANENT MONITORING LOCATION
- ⤿ ROCK STEP STRUCTURE

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FOR OVERVIEW OF STREAM PLAN SHEETS SEE SHEETS 1 THRU 1A
 FOR MORPHOLOGICAL TABLE SEE SHEET 2
 FOR PLANTING TABLES SEE SHEET 3
 FOR STREAM DETAILS SEE SHEETS 4 THRU 5
 FOR PLAN & PROFILES SEE SHEETS 6 THRU 16

NOTE:
 PLACE SOIL AMENDMENT IN REMNANT POND TO ENSURE PLANT GROWTH.



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PLAN SHEET

NOTE:
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MATCHLINE SEE SHEET 11

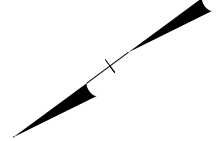
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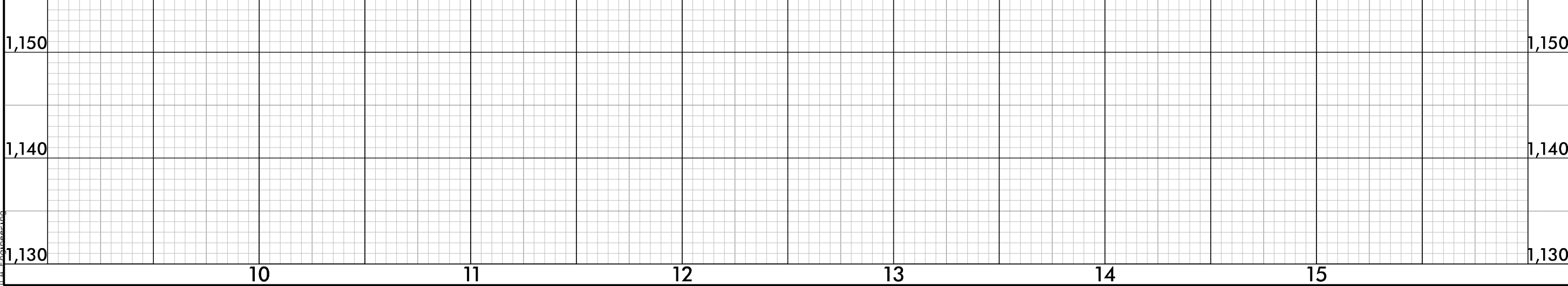
PS 2-3

SOIL ROAD

FOR OVERVIEW OF STREAM PLAN SHEETS SEE SHEETS 1 THRU 1A
 FOR MORPHOLOGICAL TABLE SEE SHEET 2
 FOR PLANTING TABLES SEE SHEET 3
 FOR STREAM DETAILS SEE SHEETS 4 THRU 5
 FOR PLAN & PROFILES SEE SHEETS 6 THRU 16



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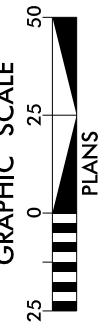


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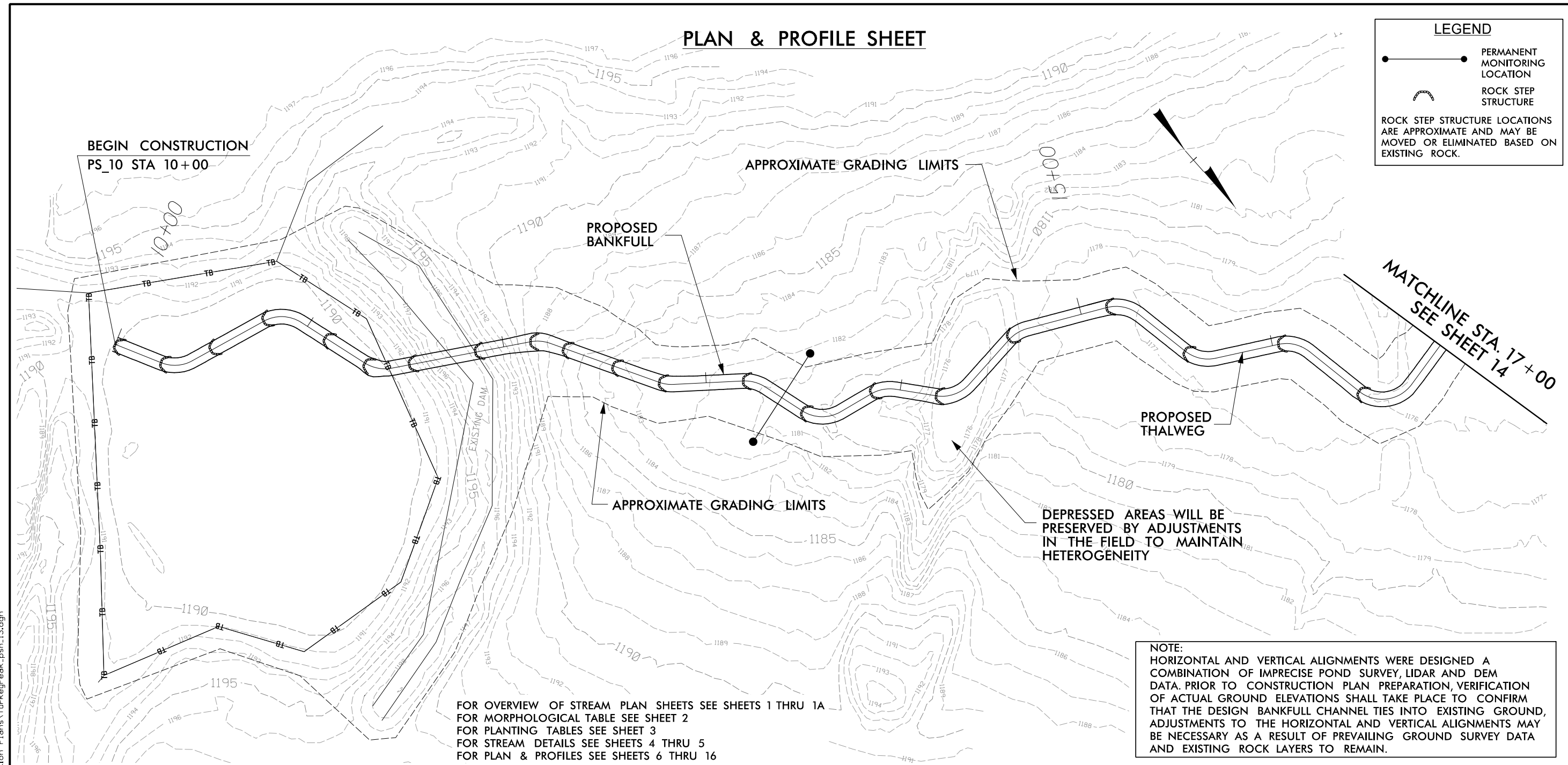
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PLAN & PROFILE SHEET

LEGEND

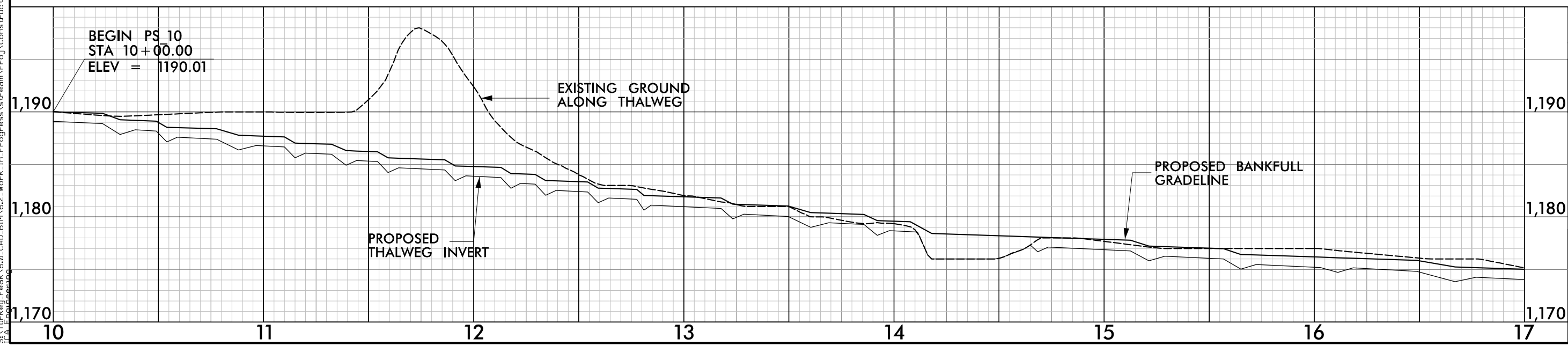
- — ● PERMANENT MONITORING LOCATION
- ⌒ ROCK STEP STRUCTURE

ROCK STEP STRUCTURE LOCATIONS ARE APPROXIMATE AND MAY BE MOVED OR ELIMINATED BASED ON EXISTING ROCK.



FOR OVERVIEW OF STREAM PLAN SHEETS SEE SHEETS 1 THRU 1A
 FOR MORPHOLOGICAL TABLE SEE SHEET 2
 FOR PLANTING TABLES SEE SHEET 3
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 FOR PLAN & PROFILES SEE SHEETS 6 THRU 16

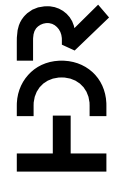
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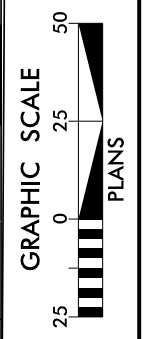
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PS 10
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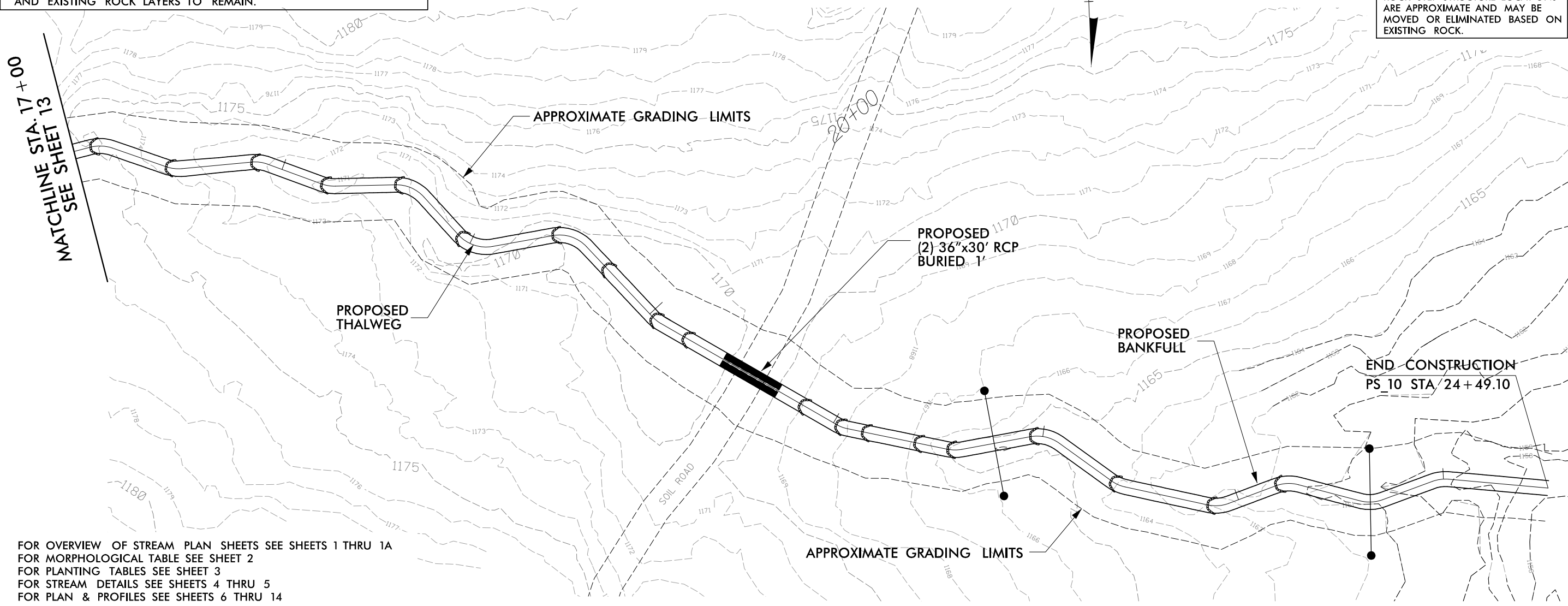
PLAN & PROFILE SHEET

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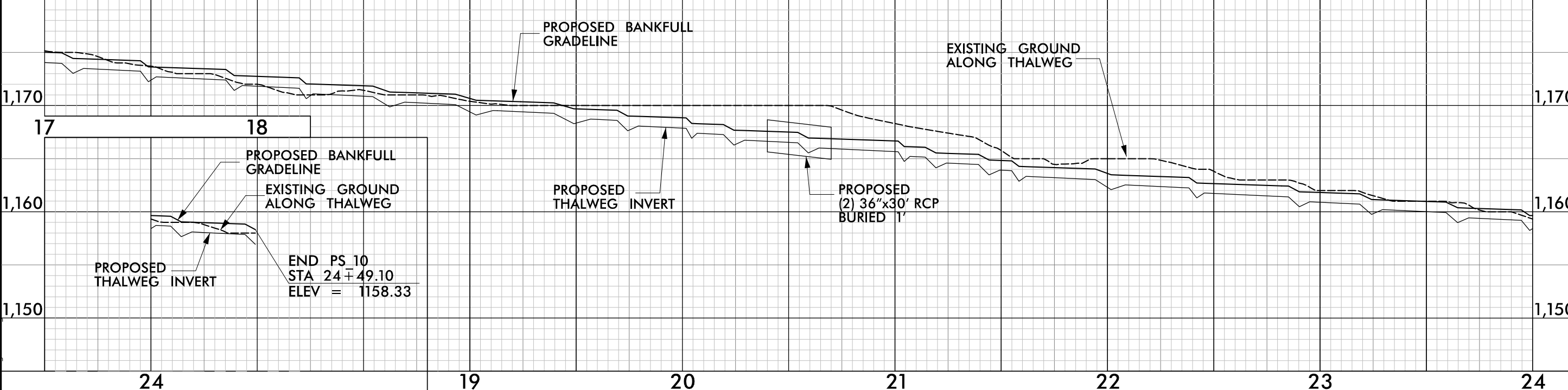
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- ——— ● PERMANENT MONITORING LOCATION
- ⌒ ROCK STEP STRUCTURE

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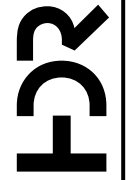


FOR OVERVIEW OF STREAM PLAN SHEETS SEE SHEETS 1 THRU 1A
 FOR MORPHOLOGICAL TABLE SEE SHEET 2
 FOR PLANTING TABLES SEE SHEET 3
 FOR STREAM DETAILS SEE SHEETS 4 THRU 5
 FOR PLAN & PROFILES SEE SHEETS 6 THRU 14

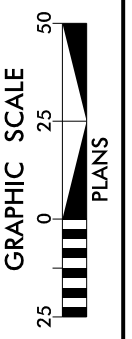


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TURKEY PEAK
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DATE: 05-30-17

PS 10
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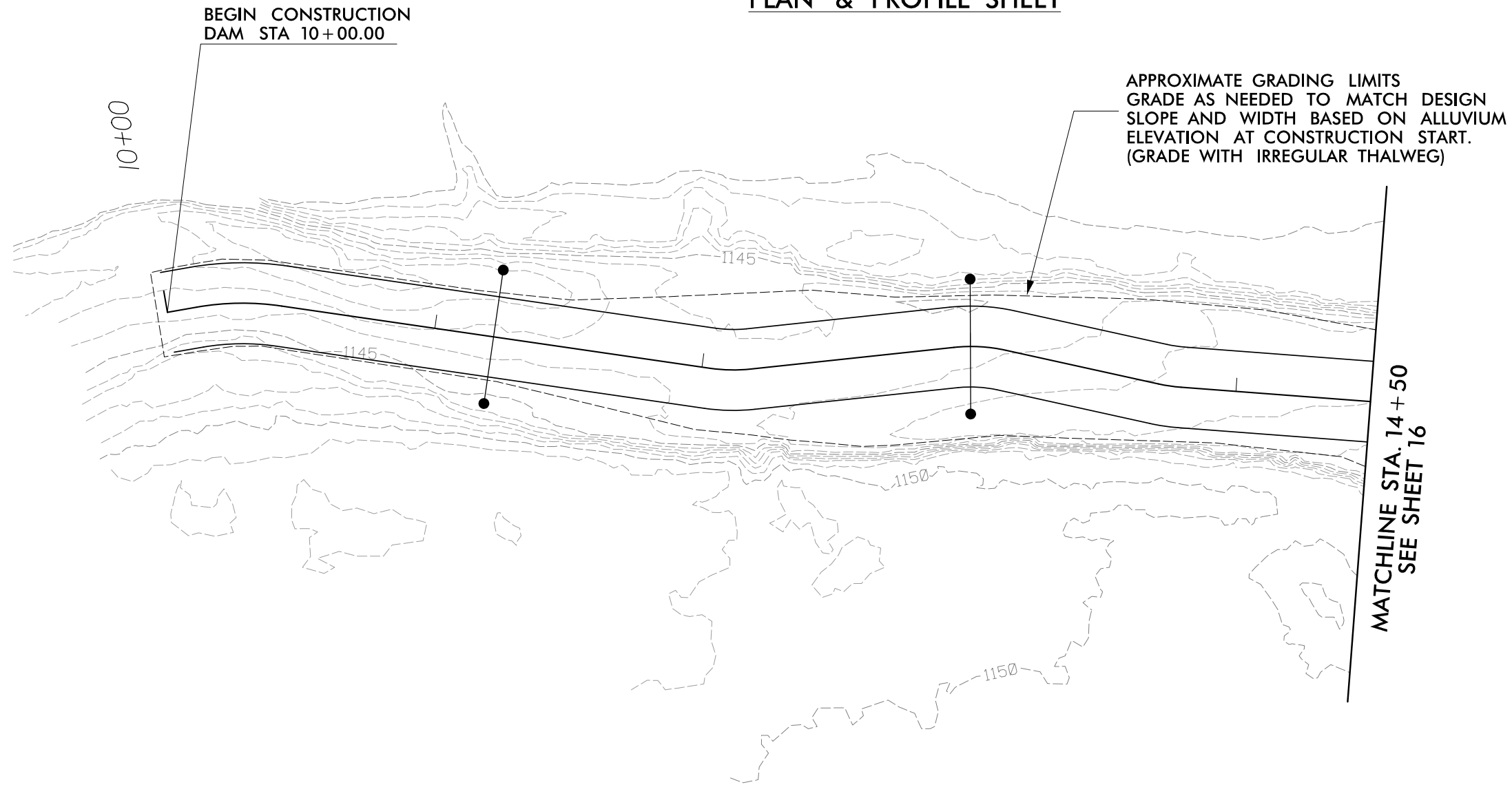
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PLAN & PROFILE SHEET

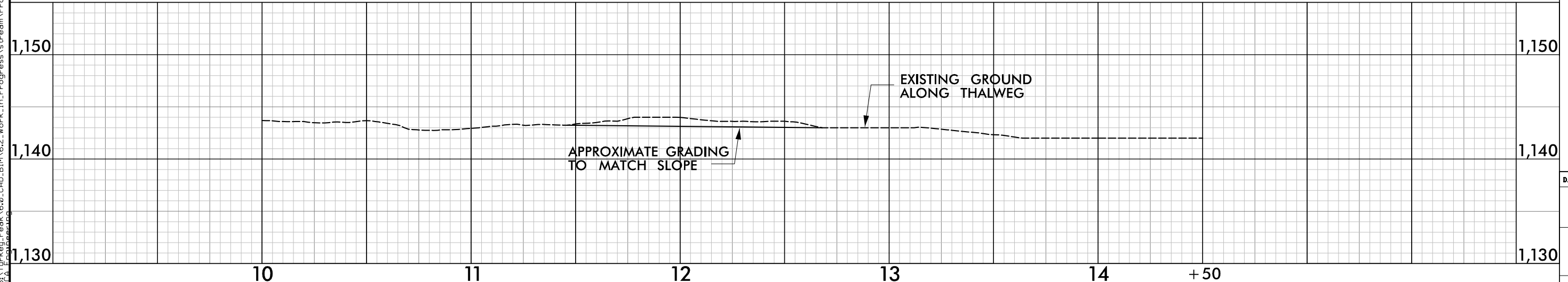
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● — ● PERMANENT MONITORING LOCATION



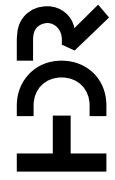
FOR OVERVIEW OF STREAM PLAN SHEETS SEE SHEETS 1 THRU 1A
 FOR PALO PINTO CREEK DAM MORPHOLOGICAL TABLE SEE SHEET 16
 FOR PLANTING TABLES SEE SHEET 3
 FOR STREAM DETAILS SEE SHEETS 4 THRU 5
 FOR PLAN & PROFILES SEE SHEETS 6 THRU 16

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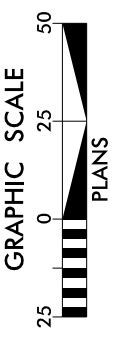


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TURKEY PEAK
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 PALO PINTO COUNTY, TEXAS
 DAM STA 10+00 - STA 14+50



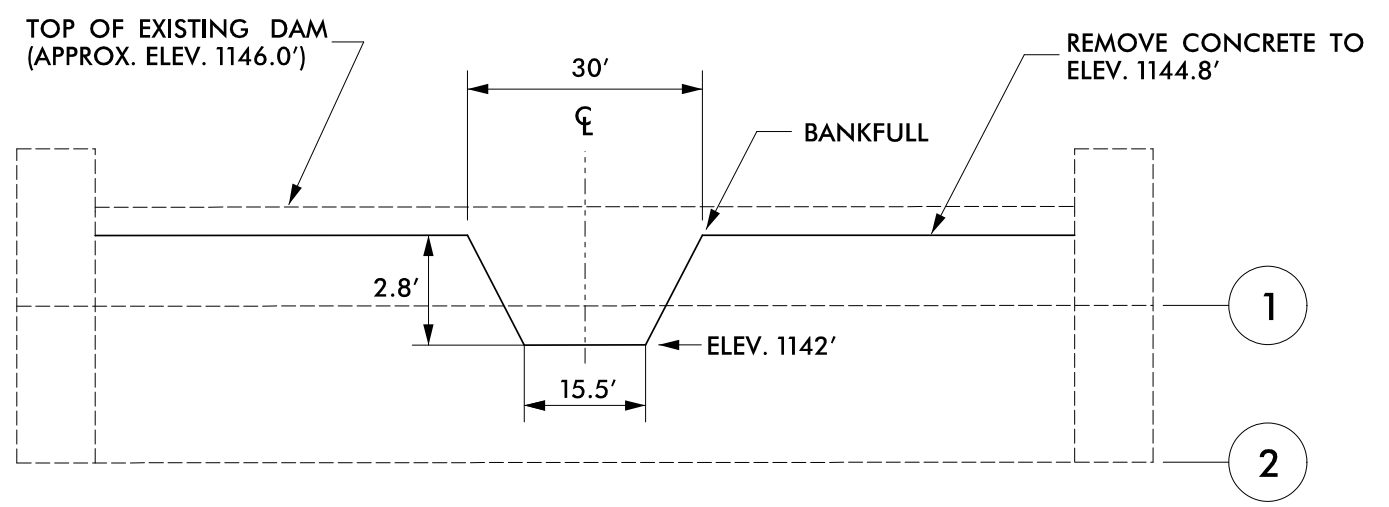
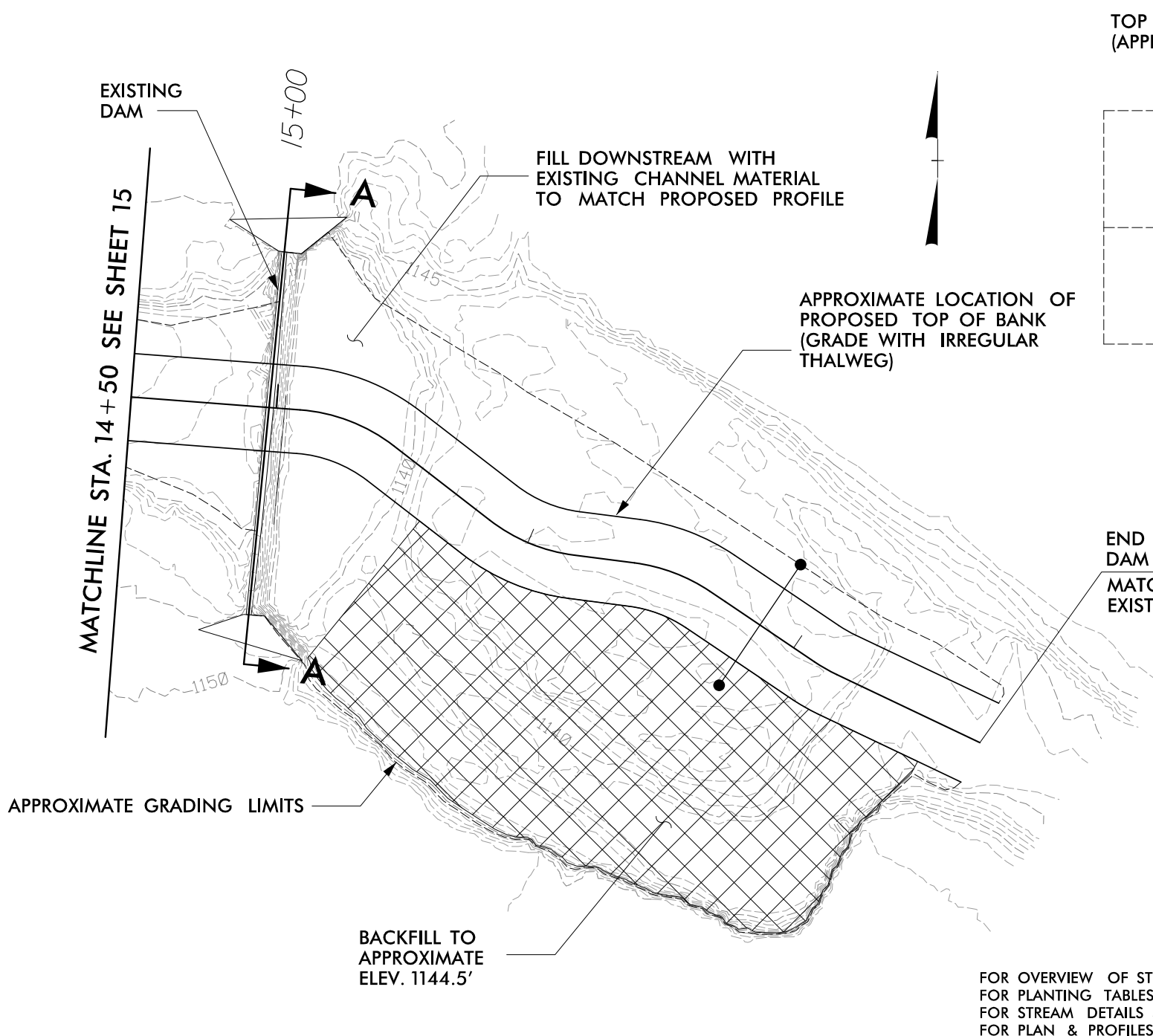
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 TCA Engineering

PLAN & PROFILE SHEET



SECTION A-A

NOTE:
NOTCH EXISTING DAM TO BANKFULL
DIMENSIONS AS SHOWN IN DETAIL ABOVE.

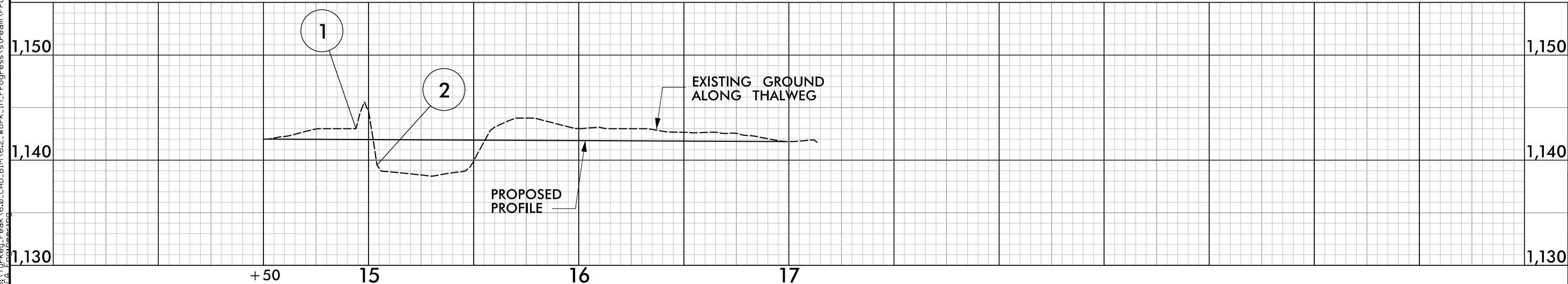
ITEM	Proposed Conditions***
LOCATION	Palo Pinto Creek Dam
STREAM TYPE	C 5
DRAINAGE AREA, Ac - Sq Mi	35200 Ac - 55.00 Sq Mi
BANKFULL WIDTH (W_{bf}), ft	30.0 ft
BANKFULL MEAN DEPTH (d_{bf}), ft	2.31 ft
WIDTH/DEPTH RATIO (W_{bf}/d_{bf})	13.0
BANKFULL X-SECTION AREA (A_{bf}), ft ²	59.3 ft ²
BANKFULL MEAN VELOCITY, fps	2.4 fps
BANKFULL DISCHARGE, cfs	140.0 cfs
BANKFULL MAX DEPTH (d_{max}), ft	2.77 ft
BANK HEIGHT RATIO	1.00
TYPICAL BANK HEIGHT	2.77 ft
WIDTH Flood-Prone Area (W_{fpa}), ft	67.00 ft
ENTRENCHMENT RATIO (ER)	2.2

LEGEND

● — ● PERMANENT MONITORING LOCATION

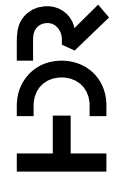
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FOR OVERVIEW OF STREAM PLAN SHEETS SEE SHEETS 1 THRU 1A
FOR PLANTING TABLES SEE SHEET 3
FOR STREAM DETAILS SEE SHEETS 4 THRU 5
FOR PLAN & PROFILES SEE SHEETS 6 THRU 16

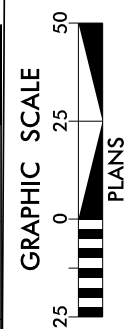


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NOTES:

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- COBBLE CHANNEL MATERIAL TO BE EXTENDED A MINIMUM 1.0' BELOW INVERT OF ROCK SILL STRUCTURES.
- ROCK SILL STRUCTURE LOCATIONS ARE APPROXIMATE AND MAY BE MOVED OR ELIMINATED BASED ON FIELD CONDITIONS.

PLAN SHEET

LEGEND

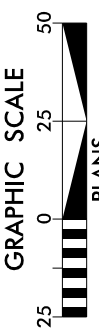
- ROCK SILL STRUCTURE
- RIFFLE COBBLE MATERIAL
- PERMANENT MONITORING LOCATION

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TURKEY PEAK
MITIGATION PLAN
PALO PINTO COUNTY, TEXAS

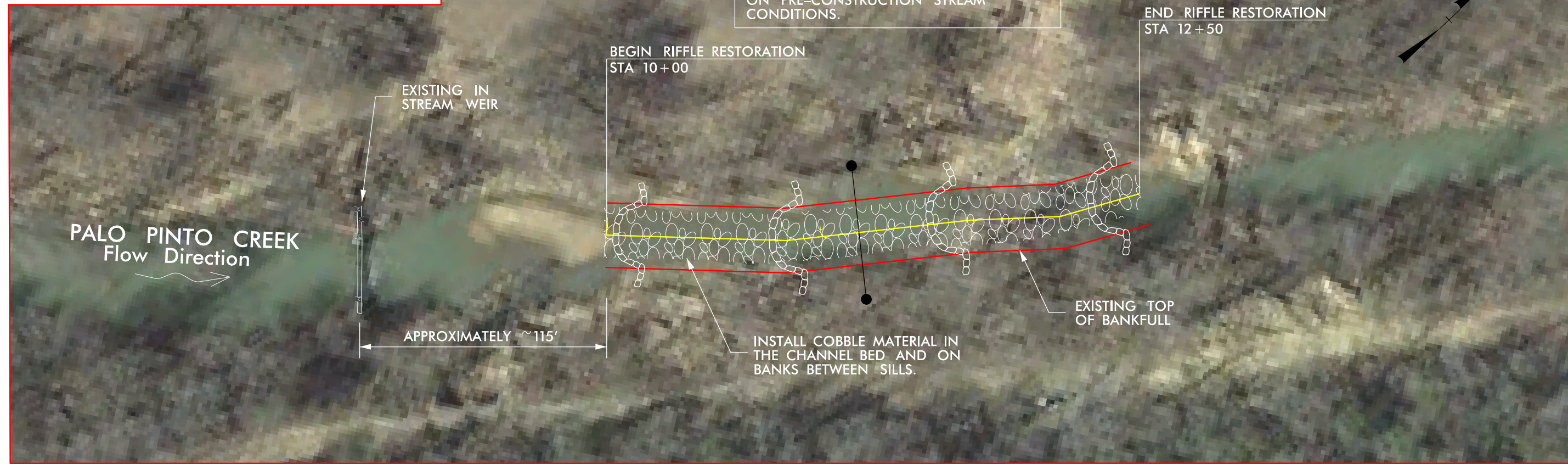


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RIFFLE PLAN

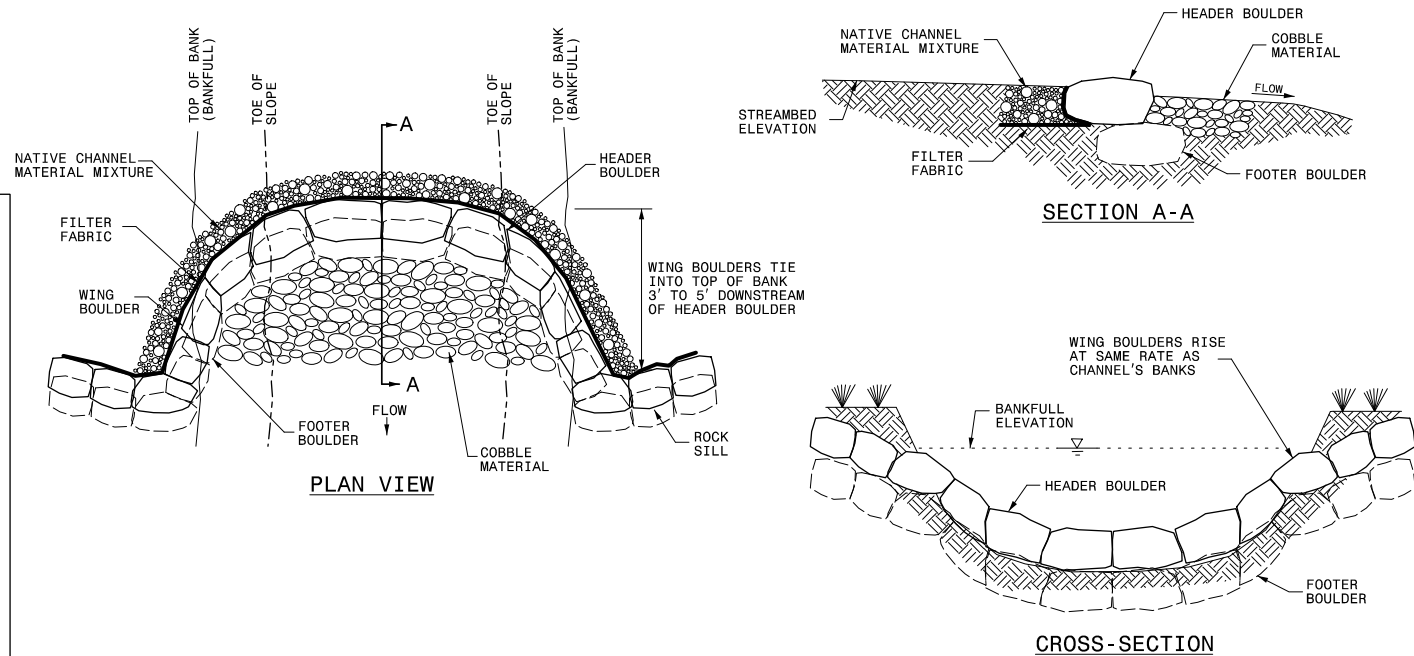
SHEET

17



ROCK SILL STRUCTURE

SCALE: NTS



NOTES:

- ALL STONES ARE TO BE STRUCTURE STONE AND NATIVE STONE OR SHOT ROCK, CUBICAL OR RECTANGULAR IN NATURE.
- BOULDERS SHALL BE NATIVE STONE OR SHOT ROCK, CUBICAL OR RECTANGULAR IN NATURE. WING BOULDERS MAY BE MORE RECTANGULAR THEN CUBICAL. BOULDERS SHALL BE APPROXIMATELY 30" x 30" x 30".
- FILTER FABRIC SHALL BE PLACED BEHIND STRUCTURE AND BACKFILLED WITH CLASS A RIP RAP & NATIVE CHANNEL MATERIAL MIXTURE.
- GAPS BETWEEN BOULDERS SHALL BE MINIMIZED BY FITTING BOULDERS TOGETHER, PLUGGING WITH STRUCTURE STONE CLASS A AND NO.57 AND LINING WITH FILTER FABRIC.
- DIMENSIONS AND SLOPES MAYBE ADJUSTED TO FIT BY THE ENGINEER.
- A DOUBLE FOOTER BOULDER SHALL BE UTILIZED IN SAND BED MATERIAL.
- CONTRACTOR WILL BE REQUIRED TO FIT BOULDERS TIGHTLY.
- THE STEP STRUCTURE MAY REQUIRE FOOTER ROCKS DEPENDING ON THE SITE CONDITIONS

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Attachment E

**Volume II: Report on TXRAM for Streams,
Updated June 2017
(see Volume II binder)**

Attachment F
Debit / Credit Evaluation

Attachment F – Debit / Credit Evaluation

Conditional Impact Unit and Credit Discussion

At the proposed Turkey Peak Reservoir, each stream that was impacted was scored using TXRAM (see TXRAM Report in Attachment E of the Mitigation Plan). The conditional impact to each stream was calculated by multiplying the linear feet of permanent impact by the TXRAM score (based on TXRAM evaluation) as shown in the formula below.

$$\text{Stream Conditional Impact Units} = \text{Linear Feet of Impact} \times \text{TXRAM Score} / 100$$

This formula is used to standardize the conditional impacts based on the TXRAM score and is not a mitigation multiplier. This formula would not over-compensate for low quality streams that should be compensated at a one-to-one ratio since a similar formula (shown below) is used to calculate the stream mitigation “credits” based on linear feet of stream and the change in TXRAM score (i.e., ecological lift) for comparison to the conditional impacts. This formula also follows the example of other assessment methodologies (e.g., the Hydro-geomorphic [HGM] approach and Habitat Evaluation Procedures [HEP]) that use an overall assessment score or index multiplied by a spatial measure to generate units (e.g., functional capacity in HGM or habitat in HEP). The use of conditional impact “units” for the debit/credit evaluation follows the requirements of 33 CFR 332.3 (f) by linking the results of the TXRAM conditional assessment with linear feet of stream when evaluating compensatory mitigation.

As noted in the conditional impact unit calculation section below, the stream conditional impact units for perennial stream, while using the same formula described above, only includes part of the total TXRAM score.

The total conditional impacts or “debits” for streams at the proposed Turkey Peak Reservoir were calculated from the sum of the conditional impacts for each stream.

TXRAM scores were calculated for the existing condition of representative streams in the upstream mitigation area on Palo Pinto Creek in Stephens County, to provide a baseline of ecological condition prior to proposed mitigation measures (see TXRAM Report in Attachment E of the Mitigation Plan). Additionally, TXRAM scores were calculated for existing condition of streams in the on-site and downstream mitigation areas to provide a baseline ecological condition. Furthermore, the TXRAM Report includes TXRAM evaluation of reference streams to provide information on the ecologically attainable condition for proposed mitigation. The proposed TXRAM scores following proposed mitigation measures were calculated using the anticipated metric scores for the representative streams in the upstream, on-site, and downstream mitigation areas (see TXRAM Report in Attachment E of the Mitigation Plan). For a description of potential mitigation measures, see the Mitigation Plan. The existing and proposed TXRAM scores were calculated for each stream, and a representative TXRAM “Lift” was calculated using the following formula.

$$\text{Representative TXRAM Score “Lift”} = \text{Proposed TXRAM Score Following Mitigation} - \text{Existing TXRAM Score}$$

The representative TXRAM Score “Lift” for each stream was then multiplied by the linear feet of proposed stream mitigation to calculate the Stream Mitigation Credits generated by the proposed stream mitigation measures as shown in the formula below.

$$\text{Stream Mitigation Credits} = (\text{Representative TXRAM Score "Lift"} / 100) \times \text{Linear Feet of Stream Mitigation}$$

The formula used to calculate stream mitigation credits is similar to the formula used to calculate the conditional impacts, and thus provides an amount of credits that allows comparison with the anticipated conditional impact units. This comparison can be used for evaluation of the compensatory mitigation for stream “debits” by the generated mitigation “credits”.

Conditional Impact Unit Calculation

The conditional impacts were calculated from the linear feet of impacts to streams and the TXRAM score for that stream using the conditional impact formula described above. Table 1 includes the linear feet of impact, TXRAM score, and conditional impact for the permanently impacted streams at the proposed Turkey Peak Reservoir.

For perennial stream, only the channel condition and riparian buffer core element portion of the total overall TXRAM score is used to calculate conditional impacts in Table 1 below. The reason for this is the method of quantification of mitigation debits and credits. For perennial stream, only the channel condition and riparian buffer condition are considered for the debit-credit evaluation using TXRAM. The instream and hydrologic condition debits and credits for perennial stream will be evaluated and quantified using a different methodology, since mitigation is proposed by increased hydrology and TXRAM is not appropriate for this analysis. The evaluation of debits and credits for perennial stream related to increased hydrology are presented in Attachment K of the Mitigation Plan.

Table 1. Stream Conditional Impacts at Turkey Peak Reservoir

Stream ID	Type	TXRAM Score*	Projected Permanent Impact (Linear Feet)	Conditional Impacts
S-1-1	Perennial	27	448	121
S-1-2	Perennial	27	948	256
S-1-3	Perennial	27	1,134	306
S-1-4	Perennial	27	1,188	321
S-1-5	Perennial	29	1,188	345
S-1-6	Perennial	29	1,143	331
S-1-7	Perennial	27	1,181	319
S-1-8	Perennial	27	1,181	319
S-1-9	Perennial	24	1,225	294
S-1-10	Perennial	26	1,097	285
S-1-11	Perennial	26	1,097	285
S-1-12	Perennial	26	1,281	333
S-1-13	Perennial	28	950	266
S-1-14	Perennial	28	1,244	348
S-1-15	Perennial	28	1,217	341
S-1-16	Perennial	29	1,116	324
S-1-17	Perennial	27	1,076	291
S-1-18	Perennial	27	1,076	291
S-1-19	Perennial	26	1,271	330
S-1-20	Perennial	31	737	228

Stream ID	Type	TXRAM Score*	Projected Permanent Impact (Linear Feet)	Conditional Impacts
S-2-1	Intermittent	45	883	397
S-2-2	Intermittent	44	926	407
S-2-3	Intermittent	52	1,270	660
S-2-4	Intermittent	52	1,289	670
S-2-5	Intermittent	52	416	216
S-3-1	Ephemeral	41	1,230	504
S-4-1	Ephemeral	32	1,177	377
S-5-1	Ephemeral	29	239	69
S-6-1	Ephemeral	44	1,394	613
S-7-1	Ephemeral	24	221	53
S-8-1	Ephemeral	43	1,021	439
S-9-1	Ephemeral	43	1,040	447
S-9-2	Ephemeral	44	1,040	458
S-9-3	Ephemeral	49	1,082	530
S-9-4	Ephemeral	49	1,082	530
S-10-1	Ephemeral	43	1,092	470
S-10-2	Ephemeral	49	1,092	535
S-10-3	Ephemeral	34	875	298
S-10-4	Ephemeral	47	891	419
S-10-5	Ephemeral	47	891	419
S-11-1	Ephemeral	35	554	194
S-12-1	Ephemeral	40	64	26
S-13-1	Intermittent	44	1,151	506
S-14-1	Ephemeral	26	345	90
S-15-1	Ephemeral	39	1,070	417
S-16-1	Intermittent	46	101	46
Subtotal	Perennial	-	21,798	5,934
Subtotal	Intermittent	-	6,036	2,902
Subtotal	Ephemeral	-	16,400	6,888
TOTAL	-	-	44,234	15,724

* For perennial stream, TXRAM score only includes the channel and riparian buffer condition core element scores, since these will be the debits offset with TXRAM, whereas instream and hydrologic condition are compensated for by increased hydrology as evaluated in a separate analysis (see Attachment K of Mitigation Plan)

** Conditional impacts calculated using formula described above

Stream Mitigation Credits

Stream mitigation credits are calculated below for each mitigation activity upstream, on-site, and downstream of the proposed project. Note that all stream lengths shown in the tables below exclude the gaps in buffers for roads, proposed trails or utility easements.

Upstream

Based on the results of the TXRAM evaluation, the change in ecologic condition and aquatic function of the proposed upstream mitigation can be evaluated to quantify ecological lift and the representative TXRAM Score "Lift" for each stream using the formula described above. Table 2

illustrates the stream mitigation credits for each SAR based on existing and proposed TXRAM scores and SAR length.

Table 2. Stream Mitigation Credits for Proposed Upstream Mitigation Area (Stephens County) Based on Change in TXRAM Scores

<i>SAR (Existing)</i>	<i>SAR (Proposed)</i>	<i>Stream Type</i>	<i>Mitigation Type</i>	<i>Existing Score</i>	<i>Proposed Score</i>	<i>Change in Score (Lift)</i>	<i>SAR Length (LF)</i>	<i>Stream Mitigation Credits</i>
MS-1-1	PS-1-1	Intermittent	Rehabilitation	64	88	24	1,753	421
MS-1-2	PS-1-2	Intermittent	Rehabilitation	58	85	27	716	193
MS-1-3	PS-1-3	Intermittent	Rehabilitation	63	84	21	1,022	215
MS-1-4	PS-1-4	Intermittent	Rehabilitation	62	82	20	984	197
MS-1-5	PS-1-5	Intermittent	Rehabilitation	63	89	26	1,003	261
MS-1-6*	PS-1-6	Intermittent	Re-establishment	0	88	88	1,199	1,055
MS-2-1	PS-2-1	Intermittent	Rehabilitation	49	76	27	840	227
MS-2-2	PS-2-2	Intermittent	Rehabilitation	33	73	40	874	350
MS-2-3	PS-2-3	Intermittent	Rehabilitation	28	71	43	548	236
MS-2-4*	PS-2-4	Intermittent	Re-establishment	0	71	71	562	399
MS-3-1**	PS-3-1**	Ephemeral	Enhancement	33	51	18	476	86
MS-3-2**	PS-3-2**	Ephemeral	Enhancement	33	51	18	1,324	238
MS-4-1	PS-4-1	Ephemeral	Rehabilitation	25	54	29	852	247
MS-4-2**	PS-4-2**	Ephemeral	Enhancement	33	51	18	1,290	232
MS-5-1**	PS-5-1**	Ephemeral	Enhancement	39	56	17	1,002	170
MS-5-2	PS-5-2	Ephemeral	Enhancement	33	51	18	947	170
MS-6-1	PS-6-1	Ephemeral	Enhancement	32	48	16	2,579	413
MS-6-2	PS-6-2	Ephemeral	Enhancement	39	56	17	735	125
MS-6-3	PS-6-3	Ephemeral	Enhancement	33	50	17	502	85
MS-7-1	PS-7-1	Ephemeral	Enhancement	33	54	21	1,792	376
MS-8-1**	PS-8-1**	Ephemeral	Enhancement	33	51	18	709	128
MS-9-1	PS-9-1	Intermittent	Enhancement	62	77	15	521	78
MS-10-1*	PS-10-1	Ephemeral	Re-establishment	0	56	56	1,381	773
RS-1-1***	RS-1-1***	Intermittent	Enhancement	69	84	15	1,136	170
RS-1-2***	RS-1-2***	Intermittent	Enhancement	70	87	17	1,226	208
RS-1-3***	RS-1-3***	Intermittent	Enhancement	70	83	13	914	119
RS-1-4***	RS-1-4***	Intermittent	Enhancement	70	87	17	928	158
RS-1-5***	RS-1-5***	Intermittent	Enhancement	72	89	17	1,278	217
RS-1-6***	RS-1-6***	Intermittent	Enhancement	70	87	17	709	121
RS-1-7***	RS-1-7***	Intermittent	Enhancement	70	87	17	907	154
RS-1-8***	RS-1-8***	Intermittent	Enhancement	70	87	17	904	154
RS-1-9***	RS-1-9***	Intermittent	Enhancement	70	87	17	1,519	258

<i>Upstream</i>	<i>Summary</i>	<i>Mitigation Type</i>	<i>Length (LF)</i>	<i>Stream Mitigation Credits</i>
<i>Intermittent</i>		<i>Re-establishment</i>	1,761	1,454
<i>Intermittent</i>		<i>Rehabilitation</i>	7,740	2,100
<i>Intermittent</i>		<i>Enhancement</i>	10,042	1,637
Intermittent	Subtotal		19,543	5,191
<i>Ephemeral</i>		<i>Re-establishment</i>	1,381	773
<i>Ephemeral</i>		<i>Rehabilitation</i>	852	247
<i>Ephemeral</i>		<i>Enhancement</i>	11,356	2,023
Ephemeral	Subtotal		13,589	3,043
TOTAL			33,132	8,234

* SAR currently impounded or not present, so existing score = 0

** Inferred resource based on similarity to representative resource of same type and condition.

*** Reference reaches of Palo Pinto Creek on Palo Pinto Mountains State Park that will be enhanced.

On-Site

Based on the current and proposed conditions of streams degraded by impoundments adjacent to the proposed reservoir, the change in ecologic condition and aquatic function of the proposed on-site stream restoration can be evaluated to quantify ecological lift using the formula described above. Additionally, stream mitigation credits are proposed for the enhancement of stream within an area adjacent to the proposed reservoir. Table 3 illustrates the stream mitigation credits for on-site stream mitigation activities.

Table 3. Stream Mitigation Credits for Proposed On-Site Mitigation Area Based on Change in TXRAM Scores

<i>Stream / SAR</i>	<i>Stream Type</i>	<i>Mitigation Type</i>	<i>Average Existing Score</i>	<i>Average Proposed Score</i>	<i>Change in Score (Lift)</i>	<i>Approximate Stream Length (LF)</i>	<i>Stream Mitigation Credits</i>
OPSR-2-1* OPSR-5-1* OPSR-17-1* OPSR-18-1*	Ephemeral	Re-establishment	0	53	53	3,587	1,901
S-17-1	Ephemeral	Enhancement	36	53	17	510	87
TOTAL						4,977	2,102

* SAR currently impounded or not present, so existing score = 0

Downstream

Based on the current and proposed conditions of streams degraded by land uses downstream of the proposed reservoir, the change in ecologic condition and aquatic function of the proposed enhancement activities can be evaluated to quantify ecological lift using the formula described above. Using the existing and proposed TXRAM scores and SAR lengths, the stream mitigation credits can be calculated. Table 4 illustrates the stream mitigation credits for downstream stream mitigation activities.

Similar to the calculation of conditional impacts for perennial stream, the calculation of stream mitigation credits for perennial stream only utilizes the lift from enhancement to the channel condition and riparian buffer condition. Credits related to increased hydrology and the lift to

instream and hydrologic condition by flow releases, water quality improvements, and increased instream habitat are evaluated in a separate analysis in Attachment K of the Mitigation Plan.

Table 4. Stream Mitigation Credits for Proposed Downstream Mitigation Area Based on Change in TXRAM Scores

<i>Stream / SAR</i>	<i>Stream Type</i>	<i>Mitigation Type</i>	<i>Existing TXRAM Score</i>	<i>Proposed TXRAM Score</i>	<i>Change in Score (Lift)</i>	<i>Stream Length</i>	<i>Stream Mitigation Credits</i>
DS-1-1	Perennial	Enhancement*	71	93	22	990	218
DS-1-2	Perennial	Enhancement*	71	93	22	775	171
DS-1-3	Perennial	Enhancement*	71	93	22	825	182
DS-1-4	Perennial	Enhancement*	72	93	21	1,022	215
DS-1-5	Perennial	Enhancement*	72	93	21	1,022	215
DS-1-6	Perennial	Enhancement*	72	93	21	1,072	225
DS-1-7	Perennial	Enhancement*	71	93	22	1,229	270
DS-1-8	Perennial	Enhancement*	70	93	23	1,229	283
DS-1-9	Perennial	Enhancement*	70	93	23	1,229	283
DS-1-10	Perennial	Enhancement*	70	93	23	1,229	283
DS-1-11	Perennial	Enhancement*	70	93	23	1,229	283
DS-1-12	Perennial	Enhancement*	70	93	23	1,229	283
DS-1-13	Perennial	Enhancement*	70	93	23	1,229	283
DS-1-14	Perennial	Enhancement*	72	93	21	1,024	215
DS-1-15	Perennial	Enhancement*	72	93	21	1,024	215
DS-1-16	Perennial	Enhancement*	72	93	21	1,024	215
DS-1-17	Perennial	Enhancement*	74	93	19	1,228	233
DS-1-18	Perennial	Enhancement*	72	93	21	1,228	258
DS-1-19	Perennial	Enhancement*	71	93	22	1,228	270
DS-1-20	Perennial	Enhancement*	71	93	22	1,228	270
DS-1-21	Perennial	Enhancement*	71	93	22	860	189
DS-1-22	Perennial	Enhancement*	71	93	22	910	200
DS-1-23	Perennial	Enhancement*	69	93	24	1,016	244
DS-1-24	Perennial	Enhancement*	69	93	24	1,016	244
DS-1-25	Perennial	Enhancement*	71	93	22	1,016	224
TOTAL						27,111	5,971

* Does not include the proposed lift for the increased hydrology that is based on the anticipated benefit of the flow releases, water quality improvements, and associated benefits to the aquatic habitat and fauna of Palo Pinto Creek downstream from the proposed project. A detailed analysis of the increased hydrology and proposed habitat benefits is included in Attachment K of the Mitigation Plan.

Debit and Credit Summary

Table 5 below is intended to provide a summary of the stream conditional impact units (debts) and mitigation credits described herein.

Table 5. Comparison of Stream Debts and Credits

Stream Type	Projected Permanent Impact (Linear Feet)	Conditional Impacts (Debts)*	Proposed Upstream Stream Credits**	Proposed On-site Stream Credits***	Proposed Downstream Stream Credits****	Total Credits	Different (Credit – Debit)
Perennial	21,798	5,934	-	-	5,971	5,971	37
Intermittent	6,036	2,902	5,191	-	-	5,315	2,289
Ephemeral	16,400	6,888	3,043	1,988	-	5,031	-1,857
TOTAL	44,234	15,724	8,234	1,988	5,971	16,193	469

* Total conditional impacts for each type from Table 1

** Total stream mitigation credits for each type from Table 2

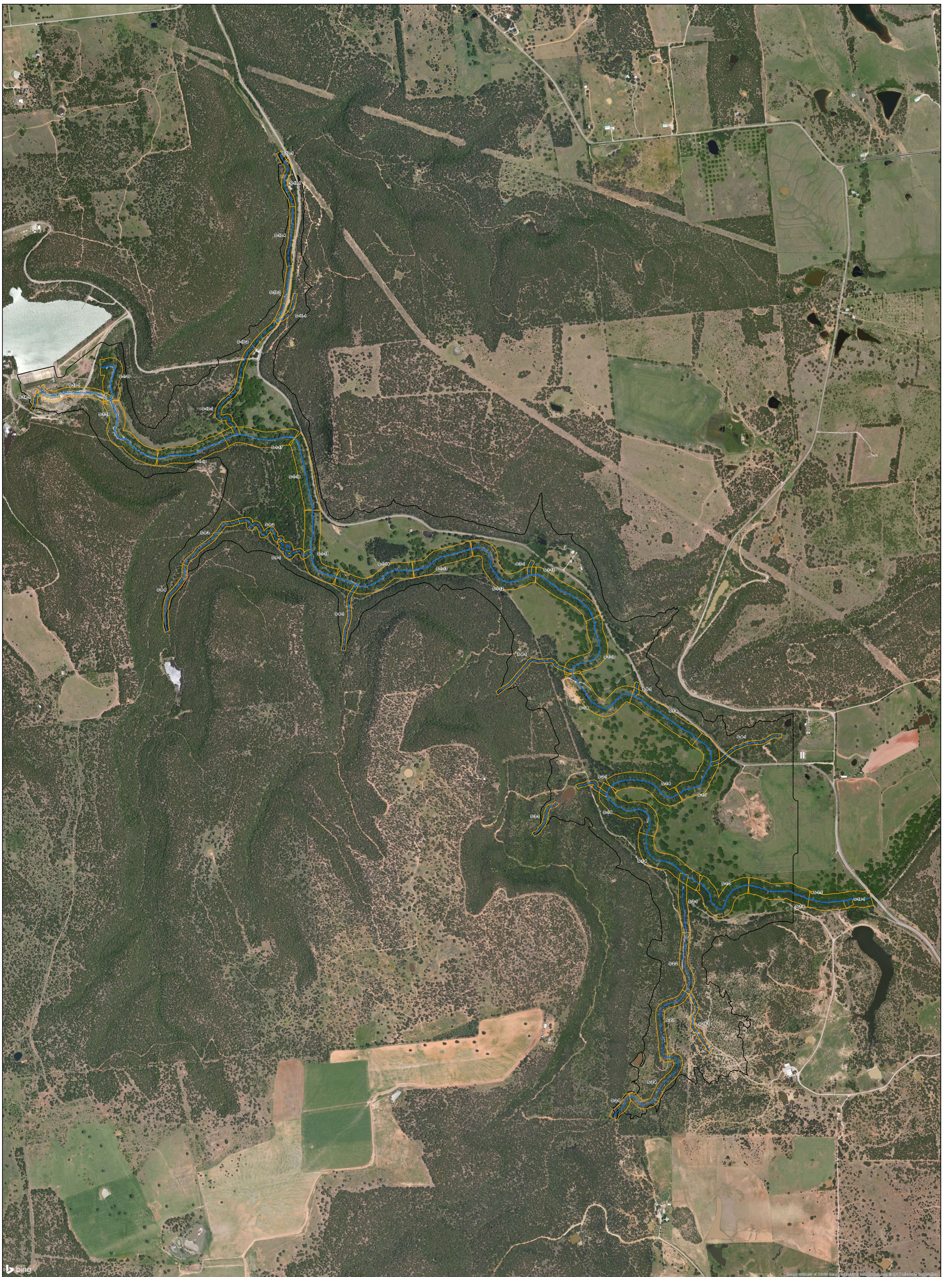
*** Total stream mitigation credits for each type from Table 3

**** Total stream mitigation credits for each type from Table 4

Based on this evaluation, as summarized in Table 5, the stream impact debts of 15,724 would be offset by total mitigation credits of 16,193.

Mitigation Summary Table

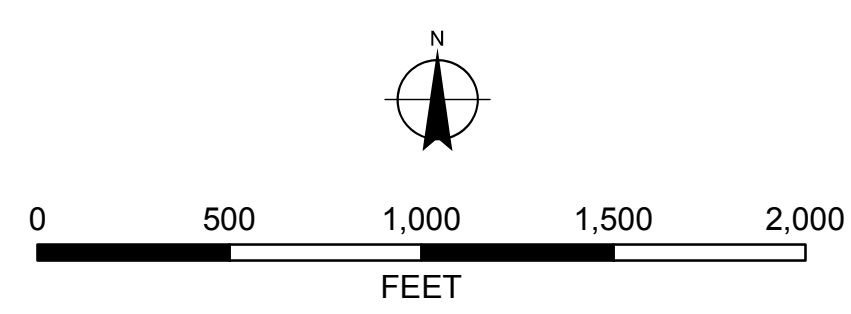
TXRAM and Debit / Credit Evaluation Maps



TURKEY PEAK

TXRAM / DEBIT EVALUATION

IMPACTED SARs MAP



WATERS OF THE U.S.

- EPHEMERAL STREAM
- .-.- INTERMITTENT STREAM
- PERENNIAL STREAM

FEATURES NOT WATERS OF THE U.S.

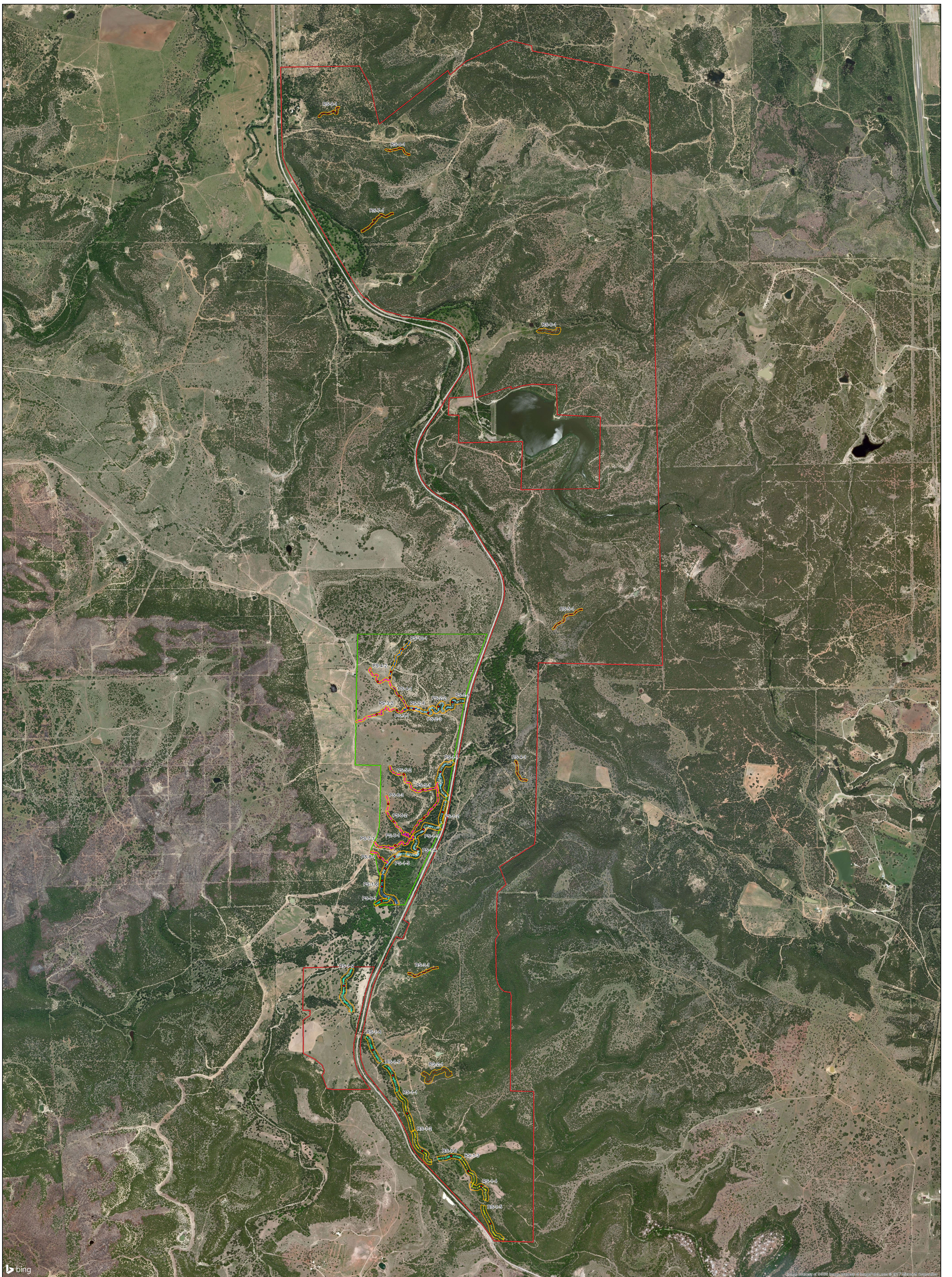
- SAR RIPARIAN BUFFER
- PROJECT AREA

PALO PINTO COUNTY
MUNICIPAL WATER
DISTRICT NO. 1



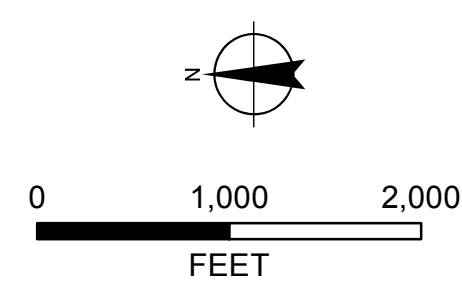
JUN 2017

FIGURE F-1



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TURKEY PEAK
 TXRAM / CREDIT EVALUATION
 UPSTREAM MITIGATION AND REFERENCE SARS MAP



- | | |
|--|---|
| <ul style="list-style-type: none"> --- INTERMITTENT STREAM REFERENCE / ENHANCEMENT --- INTERMITTENT STREAM ENHANCEMENT --- INTERMITTENT STREAM RE-ESTABLISHMENT --- INTERMITTENT STREAM RE-ESTABLISHMENT --- EPHEMERAL STREAM RE-ESTABLISHMENT --- EPHEMERAL STREAM ENHANCEMENT --- EPHEMERAL STREAM REHABILITATION | <ul style="list-style-type: none"> --- EPHEMERAL STREAM REFERENCE --- INTERMITTENT STREAM REFERENCE |
|--|---|

- | |
|---|
| <ul style="list-style-type: none"> --- SAR RIPARIAN BUFFER --- PALO PINTO MOUNTAINS --- STATE PARK --- UPSTREAM MITIGATION AREA ● MONITORING STATION |
|---|

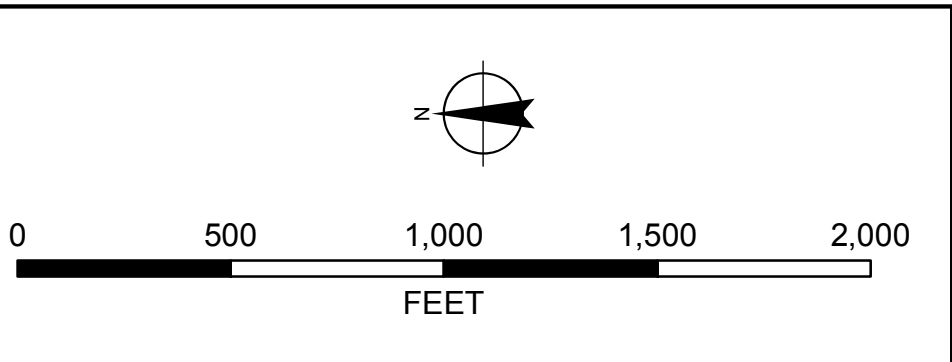
PALO PINTO COUNTY
MUNICIPAL WATER
DISTRICT NO. 1

HDR
 JUL 2017 FIGURE F-2

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TURKEY PEAK
 TXRAM / CREDIT EVALUATION
 ON-SITE AND DOWNSTREAM
 MITIGATION SARS MAP



WATERS OF THE U.S.

- EPHEMERAL STREAM ENHANCEMENT
- EPHEMERAL STREAM RE-ESTABLISHMENT
- PERENNIAL STREAM ENHANCEMENT / REHABILITATION

FEATURES NOT WATERS OF THE U.S.

- SAR RIPARIAN BUFFER
- PROJECT AREA

**PALO PINTO COUNTY
 MUNICIPAL WATER
 DISTRICT NO. 1**

HDR

AUG 2017 FIGURE F-3

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Mitigation Summary Table: TXRAM Stream Scores and Mitigation Information

Location / SAR	Stream Type / Activity	TXRAM Metric	Baseline (Existing) Site Scores	Baseline (Existing) Reference Site Scores	Release of Monitoring Mitigation Site Scores	At Maturity Mitigation Site Scores	Mitigation Activities / Work Performed	Rationale for Lift and Reference Site Achievable Scores	Photo Reference	Success Criteria / Monitoring Station
Upstream Existing: MS-1-1 Proposed: PS-1-1 Reference: RS-1-5	Intermittent Re-habilitation	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> Upstream channel dam modification to restore hydrology and sediment transport Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference and mitigation site scores will improve for bank condition after flooding affects normalize and cattle removal allows revegetation, and mitigation site scores will improve for floodplain connectivity based on upstream channel dam modification to restore channel processes and for sediment deposition with revegetation, similar to reference site. Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community Mitigation site in-stream habitat score will increase with upstream restoration and improvement of other metrics, similar to reference site. 	See scoring sheets for reference site and for mitigation site existing conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	4	4	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1	2	3.8	4.8				
		Riparian buffer (right bank)	2	2	3.8	4.8				
		Substrate composition	5	5	5	5				
		In-stream habitat	4	5	5	5				
		Flow regime	2	2	2	2				
		Channel flow status	3	3	3	3				
OVERALL	64	72	83	88						
Upstream Existing: MS-1-2 Proposed: PS-1-2 Reference: RS-1-3	Intermittent Re-habilitation	Floodplain connectivity	2	3	3	3	<ul style="list-style-type: none"> Upstream channel dam modification to restore hydrology and sediment transport Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference and mitigation site scores will improve for bank condition after flooding affects normalize and cattle removal allows revegetation, and mitigation site scores will improve for floodplain connectivity based on upstream channel dam modification to restore channel processes and for sediment deposition with revegetation, similar to reference site. Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community. Mitigation site in-stream habitat score will increase with upstream restoration and improvement of other metrics, similar to reference site. 	See scoring sheets for reference site and for mitigation site existing conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	3	4	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1	1.9	3.8	5				
		Riparian buffer (right bank)	0.8	2	2.8	4				
		Substrate composition	5	5	5	5				
		In-stream habitat	4	5	5	5				
		Flow regime	2	2	2	2				
		Channel flow status	3	3	3	3				
OVERALL	58	70	79	85						
Upstream Existing: MS-1-3 Proposed: PS-1-3 Reference: RS-1-5	Intermittent Re-habilitation	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> Upstream channel dam modification to restore hydrology and sediment transport Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference and mitigation site scores will improve for bank condition after flooding affects normalize and cattle removal allows revegetation, and mitigation site scores will improve for floodplain connectivity based on upstream channel dam modification to restore channel processes and for sediment deposition with revegetation, similar to reference site. Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community Mitigation site in-stream habitat score will increase with upstream restoration and improvement of other metrics, similar to reference site. 	See scoring sheets for reference site and for mitigation site existing conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	4	4	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	2	2	4	5				
		Riparian buffer (right bank)	1.7	2	3.1	4.1				
		Substrate composition	5	5	5	5				
		In-stream habitat	4	5	5	5				
		Flow regime	2	2	2	2				
		Channel flow status	2	3	2	2				
OVERALL	63	72	79	84						
Upstream Existing: MS-1-4 Proposed: PS-1-4 Reference: RS-1-5	Intermittent Re-habilitation	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> Upstream channel dam modification to restore hydrology and sediment transport Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference and mitigation site scores will improve for bank condition after flooding affects normalize and cattle removal allows revegetation, and mitigation site scores will improve for floodplain connectivity based on upstream channel dam modification to restore channel processes and for sediment deposition with revegetation, similar to reference site. Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community Mitigation site in-stream habitat score will increase with upstream restoration and improvement of other metrics, similar to reference site. 	See scoring sheets for reference site and for mitigation site existing conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	4	4	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1.6	2	3.8	3.8				
		Riparian buffer (right bank)	1.8	2	3.8	4.8				
		Substrate composition	5	5	5	5				
		In-stream habitat	4	5	5	5				
		Flow regime	2	2	2	2				
		Channel flow status	2	3	2	2				
OVERALL	62	72	80	82						

Location / SAR	Stream Type / Activity	TXRAM Metric	Baseline (Existing) Mitigation Site Scores	Baseline (Existing) Reference Site Scores	Release of Monitoring Mitigation Site Scores	At Maturity Mitigation Site Scores	Mitigation Activities / Work Performed	Rationale for Lift and Reference Site Achievable Scores	Photo Reference	Success Criteria / Monitoring Station
Upstream Existing: MS-1-5 Proposed: PS-1-5 Reference: RS-1-5	Intermittent Re-habilitation	Floodplain connectivity	4	4	4	4	<ul style="list-style-type: none"> Upstream channel dam modification to restore hydrology and sediment transport Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference and mitigation site scores will improve for bank condition after flooding affects normalize and cattle removal allows revegetation, and mitigation site score will improve for sediment deposition with revegetation and upstream channel dam modification to restore channel processes, similar to reference site. Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community Mitigation site in-stream habitat score will increase with upstream restoration and improvement of other metrics, similar to reference site. 	See scoring sheets for reference site and for mitigation site existing conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	4	4	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1	2	3.8	5				
		Riparian buffer (right bank)	1	2	3.8	5				
		Substrate composition	5	5	5	5				
		In-stream habitat	4	5	5	5				
		Flow regime	2	2	2	2				
		Channel flow status	3	3	3	3				
OVERALL	63	72	83	89						
Upstream Existing: N/A Proposed: PS-1-6 Reference: RS-1-5	Intermittent Re-establishment	Floodplain connectivity	0	4	4	4	<ul style="list-style-type: none"> Channel dam modification to remove impoundment and restore hydrology and sediment transport Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference site score will improve for bank condition after flooding affects normalize and cattle removal allows revegetation Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community Mitigation site channel, in-stream, and hydrologic condition will increase (be re-established) with modification of channel dam to restore channel processes, similar to reference site. 	See scoring sheets for reference site and for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	0	4	5	5				
		Sediment deposition	0	5	5	5				
		Riparian buffer (left bank)	0	2	3.6	4.5				
		Riparian buffer (right bank)	0	2	4	5				
		Substrate composition	0	5	5	5				
		In-stream habitat	0	5	4	5				
		Flow regime	0	2	2	2				
		Channel flow status	0	3	3	3				
OVERALL	0	72	80	88						
Upstream Existing: MS-9-1 Proposed: PS-9-1 Reference: RS-2-1	Intermittent Enhancement	Floodplain connectivity	3	3	3	3	<ul style="list-style-type: none"> Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	See scoring sheets for reference site and for mitigation site existing conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	5	5	5	5				
		Sediment deposition	5	5	5	5				
		Riparian buffer (left bank)	2	2	4	5				
		Riparian buffer (right bank)	2	2	3.9	4.9				
		Substrate composition	5	4	5	5				
		In-stream habitat	2	3	2	2				
		Flow regime	2	2	2	2				
		Channel flow status	2	2	2	2				
OVERALL	62	62	72	77						
Upstream RS-1-1	Intermittent Enhancement	Floodplain connectivity	4	4	4	4	<ul style="list-style-type: none"> Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference and mitigation scores will improve for bank condition after flooding affects normalize and cattle removal allows revegetation Reference and mitigation scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	See scoring sheet for reference site	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	4	4	5	5				
		Sediment deposition	5	5	5	5				
		Riparian buffer (left bank)	2	2	4.5	4.5				
		Riparian buffer (right bank)	1.8	1.8	4.3	4.5				
		Substrate composition	5	5	5	5				
		In-stream habitat	4	4	4	4				
		Flow regime	2	2	2	2				
		Channel flow status	3	3	3	3				
OVERALL	69	69	83	84						
Upstream RS-1-2	Intermittent Enhancement	Floodplain connectivity	4	4	4	4	<ul style="list-style-type: none"> Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference and mitigation scores will improve for bank condition after flooding affects normalize and cattle removal allows revegetation Reference and mitigation scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	See scoring sheet for reference site	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	3	3	4	4				
		Sediment deposition	5	5	5	5				
		Riparian buffer (left bank)	2	2	5	5				
		Riparian buffer (right bank)	1.7	1.7	4.7	5				
		Substrate composition	5	5	5	5				
		In-stream habitat	5	5	5	5				
		Flow regime	2	2	2	2				
		Channel flow status	3	3	3	3				
OVERALL	70	70	87	87						

Location / SAR	Stream Type / Activity	TXRAM Metric	Baseline (Existing) Mitigation Site Scores	Baseline (Existing) Reference Site Scores	Release of Monitoring Mitigation Site Scores	At Maturity Mitigation Site Scores	Mitigation Activities / Work Performed	Rationale for Lift and Reference Site Achievable Scores	Photo Reference	Success Criteria / Monitoring Station
Upstream RS-1-3	Intermittent Enhancement	Floodplain connectivity	3	3	3	3	<ul style="list-style-type: none"> Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference and mitigation scores will improve for bank condition after flooding affects normalize and cattle removal allows revegetation. Reference and mitigation scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	See scoring sheet for reference site	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	4	4	5	5				
		Sediment deposition	5	5	5	5				
		Riparian buffer (left bank)	1.9	1.9	4.9	5				
		Riparian buffer (right bank)	2	2	3.3	3.3				
		Substrate composition	5	5	5	5				
		In-stream habitat	5	5	5	5				
		Flow regime	2	2	2	2				
		Channel flow status	3	3	3	3				
OVERALL	70	70	83	83						
Upstream RS-1-4	Intermittent Enhancement	Floodplain connectivity	4	4	4	4	<ul style="list-style-type: none"> Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference and mitigation scores will improve for bank condition after flooding affects normalize and cattle removal allows revegetation Reference and mitigation scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	See scoring sheet for reference site	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	3	3	4	4				
		Sediment deposition	5	5	5	5				
		Riparian buffer (left bank)	1.9	1.9	4.9	5				
		Riparian buffer (right bank)	2	2	5	5				
		Substrate composition	5	5	5	5				
		In-stream habitat	5	5	5	5				
		Flow regime	2	2	2	2				
		Channel flow status	3	3	3	3				
OVERALL	70	70	87	87						
Upstream RS-1-5	Intermittent Enhancement	Floodplain connectivity	4	4	4	4	<ul style="list-style-type: none"> Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference and mitigation scores will improve for bank condition after flooding affects normalize and cattle removal allows revegetation Reference and mitigation scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	See scoring sheet for reference site	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	4	4	5	5				
		Sediment deposition	5	5	5	5				
		Riparian buffer (left bank)	2	2	4.9	4.9				
		Riparian buffer (right bank)	2	2	5	5				
		Substrate composition	5	5	5	5				
		In-stream habitat	5	5	5	5				
		Flow regime	2	2	2	2				
		Channel flow status	3	3	3	3				
OVERALL	72	72	89	89						
Upstream RS-1-6	Intermittent Enhancement	Floodplain connectivity	3	3	3	3	<ul style="list-style-type: none"> Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference and mitigation scores will improve for bank condition after flooding affects normalize and cattle removal allows revegetation. Reference and mitigation scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	N/A – Existing conditions inferred from RS-1-3	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	4	4	5	5				
		Sediment deposition	5	5	5	5				
		Riparian buffer (left bank)	1.9	1.9	4.9	4.9				
		Riparian buffer (right bank)	2	2	4.9	4.9				
		Substrate composition	5	5	5	5				
		In-stream habitat	5	5	5	5				
		Flow regime	2	2	2	2				
		Channel flow status	3	3	3	3				
OVERALL	70	70	87	87						
Upstream RS-1-7	Intermittent Enhancement	Floodplain connectivity	4	4	4	4	<ul style="list-style-type: none"> Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference and mitigation scores will improve for bank condition after flooding affects normalize and cattle removal allows revegetation Reference and mitigation scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	N/A – Existing conditions inferred from RS-1-2	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	3	3	4	4				
		Sediment deposition	5	5	5	5				
		Riparian buffer (left bank)	2	2	5	5				
		Riparian buffer (right bank)	1.7	1.7	4.7	5				
		Substrate composition	5	5	5	5				
		In-stream habitat	5	5	5	5				
		Flow regime	2	2	2	2				
		Channel flow status	3	3	3	3				
OVERALL	70	70	87	87						

Location / SAR	Stream Type / Activity	TXRAM Metric	Baseline (Existing) Mitigation Site Scores	Baseline (Existing) Reference Site Scores	Release of Monitoring Mitigation Site Scores	At Maturity Mitigation Site Scores	Mitigation Activities / Work Performed	Rationale for Lift and Reference Site Achievable Scores	Photo Reference	Success Criteria / Monitoring Station
Upstream RS-1-8	Intermittent Enhancement	Floodplain connectivity	4	4	4	4	<ul style="list-style-type: none"> Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference and mitigation scores will improve for bank condition after flooding affects normalize and cattle removal allows revegetation Reference and mitigation scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	N/A – Existing conditions inferred from RS-1-2	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	3	3	4	4				
		Sediment deposition	5	5	5	5				
		Riparian buffer (left bank)	2	2	5	5				
		Riparian buffer (right bank)	1.7	1.7	4.7	5				
		Substrate composition	5	5	5	5				
		In-stream habitat	5	5	5	5				
		Flow regime	2	2	2	2				
		Channel flow status	3	3	3	3				
OVERALL			70	70	87	87				
Upstream RS-1-9	Intermittent Enhancement	Floodplain connectivity	4	4	4	4	<ul style="list-style-type: none"> Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference and mitigation scores will improve for bank condition after flooding affects normalize and cattle removal allows revegetation Reference and mitigation scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	N/A – Existing conditions inferred from RS-1-2	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	3	3	4	4				
		Sediment deposition	5	5	5	5				
		Riparian buffer (left bank)	2	2	4	5				
		Riparian buffer (right bank)	1.7	1.7	4	5				
		Substrate composition	5	5	5	5				
		In-stream habitat	5	5	5	5				
		Flow regime	2	2	2	2				
		Channel flow status	3	3	3	3				
OVERALL			70	70	82	87				
Upstream Existing: MS-2-1 Proposed: PS-2-1 Reference: RS-2-1	Intermittent Re-habilitation	Floodplain connectivity	3	3	4	4	<ul style="list-style-type: none"> Upstream dam / pond removals to restore hydrology and sediment transport Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Mitigation site scores will improve for floodplain connectivity, bank condition, and sediment deposition after restoring channel processes with upstream dam removals and cattle removal allows revegetation, similar to reference site. Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community Mitigation site in-stream habitat score will increase with upstream restoration and improvement of hydrology metrics based on restoring natural stream flows, similar to reference site. 	See scoring sheets for reference site and for mitigation site existing conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	4	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1.9	2	3.5	4.5				
		Riparian buffer (right bank)	1.9	2	3.5	4.5				
		Substrate composition	5	4	5	5				
		In-stream habitat	1	3	2	2				
		Flow regime	1	2	2	2				
		Channel flow status	1	2	2	2				
OVERALL			49	62	71	76				
Upstream Existing: MS-2-2 Proposed: PS-2-2 Reference: RS-2-1	Intermittent Re-habilitation	Floodplain connectivity	2	3	4	4	<ul style="list-style-type: none"> Upstream dam / pond removals to restore hydrology and sediment transport Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Mitigation site scores will improve for floodplain connectivity, bank condition, and sediment deposition after restoring channel processes with upstream dam removals and cattle removal allows revegetation, similar to reference site. Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community Mitigation site substrate composition and in-stream habitat scores will increase with upstream restoration to improve sediment transport and improvement of hydrology metrics based on restoring natural stream flows, similar to reference site. 	See scoring sheets for reference site and for mitigation site existing conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	2	5	5	5				
		Sediment deposition	3	5	5	5				
		Riparian buffer (left bank)	1	2	3.5	4.5				
		Riparian buffer (right bank)	1	2	3.5	4.5				
		Substrate composition	3	4	4	4				
		In-stream habitat	1	3	2	2				
		Flow regime	1	2	2	2				
		Channel flow status	1	2	2	2				
OVERALL			33	62	68	73				
Upstream Existing: MS-2-3 Proposed: PS-2-3 Reference: RS-2-1	Intermittent Re-habilitation	Floodplain connectivity	2	3	4	4	<ul style="list-style-type: none"> Upstream dam / pond removals to restore hydrology and sediment transport Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Mitigation site scores will improve for floodplain connectivity, bank condition, and sediment deposition after restoring channel processes with upstream dam removals and cattle removal allows revegetation, similar to reference site. Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community Mitigation site substrate composition and in-stream habitat scores will increase with upstream restoration to improve sediment transport and improvement of hydrology metrics based on restoring natural stream flows, similar to reference site. 	See scoring sheets for reference site and for mitigation site existing conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	4	5	5	5				
		Sediment deposition	3	5	5	5				
		Riparian buffer (left bank)	1	2	3	4				
		Riparian buffer (right bank)	1	2	3	4				
		Substrate composition	3	4	4	4				
		In-stream habitat	0	3	2	2				
		Flow regime	0	2	2	2				
		Channel flow status	0	2	2	2				
OVERALL			28	62	66	71				

Location / SAR	Stream Type / Activity	TXRAM Metric	Baseline (Existing) Mitigation Site Scores	Baseline (Existing) Reference Site Scores	Release of Monitoring Mitigation Site Scores	At Maturity Mitigation Site Scores	Mitigation Activities / Work Performed	Rationale for Lift and Reference Site Achievable Scores	Photo Reference	Success Criteria / Monitoring Station
Upstream Existing: N/A Proposed: PS-2-4 Reference: RS-2-1	Intermittent Re-establishment	Floodplain connectivity	0	3	4	4	<ul style="list-style-type: none"> Dam / pond removal to restore hydrology and sediment transport Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community Mitigation site channel, in-stream, and hydrologic condition will increase (be re-established) with dam removal to restore natural channel processes, similar to reference site. 	See scoring sheets for reference site and for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	0	5	5	5				
		Sediment deposition	0	5	5	5				
		Riparian buffer (left bank)	0	2	3	4				
		Riparian buffer (right bank)	0	2	3	4				
		Substrate composition	0	4	4	4				
		In-stream habitat	0	3	2	2				
		Flow regime	0	2	2	2				
		Channel flow status	0	2	2	2				
OVERALL	0	62	66	71						
Upstream Existing: MS-3-1 Proposed: PS-3-1 Reference: RS-8-1	Ephemeral Enhancement	Floodplain connectivity	4	4	4	4	<ul style="list-style-type: none"> Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Mitigation site scores will improve for bank condition and sediment deposition after cattle removal allows revegetation, similar to reference site. Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	See scoring sheets for reference site and for mitigation site existing conditions	120 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	4	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1	1	3	4				
		Riparian buffer (right bank)	1	1	3	4				
		Substrate composition	3	3	3	3				
		In-stream habitat	0	0	0	0				
		Flow regime	0	0	0	0				
		Channel flow status	0	0	0	0				
OVERALL	33	36	46	51						
Upstream Existing: MS-3-2 Proposed: PS-3-2 Reference: RS-8-1	Ephemeral Enhancement	Floodplain connectivity	4	4	4	4	<ul style="list-style-type: none"> Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Mitigation site scores will improve for bank condition and sediment deposition after cattle removal allows revegetation, similar to reference site. Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community. 	See scoring sheets for reference site and for mitigation site existing conditions	120 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	4	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1	1	3	4				
		Riparian buffer (right bank)	1	1	3	4				
		Substrate composition	3	3	3	3				
		In-stream habitat	0	0	0	0				
		Flow regime	0	0	0	0				
		Channel flow status	0	0	0	0				
OVERALL	33	36	46	51						
Upstream Existing: MS-4-1 Proposed: PS-4-1 Reference: RS-5-1	Ephemeral Rehabilitation	Floodplain connectivity	4	4	4	4	<ul style="list-style-type: none"> Upstream dam / pond removal to restore hydrology and sediment transport Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Mitigation site scores will improve for bank condition and sediment deposition by restoring channel processes with upstream dam removal and cattle removal allows revegetation, similar to reference site. Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community. Mitigation site substrate composition score will increase with upstream restoration to improve sediment transport similar to reference site. Mitigation site flow regime score will increase with upstream dam removal to restore hydrology of natural stream flows and pooling. 	See scoring sheets for reference site and for mitigation site existing conditions	120 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	3	5	5	5				
		Sediment deposition	2	4	5	5				
		Riparian buffer (left bank)	1	1	3	4				
		Riparian buffer (right bank)	1	1	3	4				
		Substrate composition	2	5	3	3				
		In-stream habitat	0	0	0	0				
		Flow regime	0	0	1	1				
		Channel flow status	0	0	0	0				
OVERALL	25	39	49	54						
Upstream Existing: MS-4-2 Proposed: PS-4-2 Reference: RS-8-1	Ephemeral Enhancement	Floodplain connectivity	4	4	4	4	<ul style="list-style-type: none"> Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Mitigation site scores will improve for bank condition and sediment deposition after cattle removal allows revegetation, similar to reference site. Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	See scoring sheets for reference site and for mitigation site existing conditions	120 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	4	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1	1	3	4				
		Riparian buffer (right bank)	1	1	3	4				
		Substrate composition	3	3	3	3				
		In-stream habitat	0	0	0	0				
		Flow regime	0	0	0	0				
		Channel flow status	0	0	0	0				
OVERALL	33	36	46	51						

Location / SAR	Stream Type / Activity	TXRAM Metric	Baseline (Existing) Mitigation Site Scores	Baseline (Existing) Reference Site Scores	Release of Monitoring Mitigation Site Scores	At Maturity Mitigation Site Scores	Mitigation Activities / Work Performed	Rationale for Lift and Reference Site Achievable Scores	Photo Reference	Success Criteria / Monitoring Station
Upstream Existing: MS-5-1 Proposed: PS-5-1 Reference: RS-5-1	Ephemeral Enhancement	Floodplain connectivity	4	4	4	4	<ul style="list-style-type: none"> Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Mitigation site score will improve for bank condition after cattle removal allows revegetation, similar to reference site. Reference site score for sediment deposition will improve after flooding affects normalize and cattle removal allows revegetation. Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	See scoring sheets for reference site and for mitigation site existing conditions	120 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	4	5	5	5				
		Sediment deposition	5	4	5	5				
		Riparian buffer (left bank)	1	1	3	4				
		Riparian buffer (right bank)	1	1	3	4				
		Substrate composition	5	5	5	5				
		In-stream habitat	0	0	0	0				
		Flow regime	0	0	0	0				
		Channel flow status	0	0	0	0				
OVERALL	39	39	51	56						
Upstream Existing: MS-5-2 Proposed: PS-5-2 Reference: RS-8-1	Ephemeral Enhancement	Floodplain connectivity	4	4	4	4	<ul style="list-style-type: none"> Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Mitigation site scores will improve for bank condition and sediment deposition after cattle removal allows revegetation, similar to reference site. Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	See scoring sheets for reference site and for mitigation site existing conditions	120 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	4	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1	1	3	4				
		Riparian buffer (right bank)	1	1	3	4				
		Substrate composition	3	3	3	3				
		In-stream habitat	0	0	0	0				
		Flow regime	0	0	0	0				
		Channel flow status	0	0	0	0				
OVERALL	33	36	46	51						
Upstream Existing: MS-6-1 Proposed: PS-6-1 Reference: RS-3-1	Ephemeral Enhancement	Floodplain connectivity	3	3	3	3	<ul style="list-style-type: none"> Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Mitigation site scores will improve for bank condition and sediment deposition after cattle removal allows revegetation, similar to reference site. Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	See scoring sheets for reference site and for mitigation site existing conditions	120 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	3	5	4	4				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1.5	1	3.2	4				
		Riparian buffer (right bank)	1.5	1	3.2	4				
		Substrate composition	3	5	3	3				
		In-stream habitat	0	0	0	0				
		Flow regime	0	0	0	0				
		Channel flow status	0	0	0	0				
OVERALL	32	39	44	48						
Upstream Existing: MS-6-2 Proposed: PS-6-2 Reference: RS-5-1	Ephemeral Enhancement	Floodplain connectivity	4	4	4	4	<ul style="list-style-type: none"> Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Mitigation site score will improve for bank condition after cattle removal allows revegetation, similar to reference site. Reference site score for sediment deposition will improve after flooding affects normalize and cattle removal allows revegetation. Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	See scoring sheets for reference site and for mitigation site existing conditions	120 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	4	5	5	5				
		Sediment deposition	5	4	5	5				
		Riparian buffer (left bank)	1	1	3	4				
		Riparian buffer (right bank)	1	1	3	4				
		Substrate composition	5	5	5	5				
		In-stream habitat	0	0	0	0				
		Flow regime	0	0	0	0				
		Channel flow status	0	0	0	0				
OVERALL	39	39	51	56						
Upstream Existing: MS-6-3 Proposed: PS-6-3 Reference: RS-8-1	Ephemeral Enhancement	Floodplain connectivity	5	4	5	5	<ul style="list-style-type: none"> Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Mitigation site scores will improve for sediment deposition after cattle removal allows revegetation, similar to reference site. Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	See scoring sheets for reference site and for mitigation site existing conditions	120 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
		Bank condition	5	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1	1	3	4				
		Riparian buffer (right bank)	1	1	3	4				
		Substrate composition	2	3	2	2				
		In-stream habitat	0	0	0	0				
		Flow regime	0	0	0	0				
		Channel flow status	0	0	0	0				
OVERALL	33	36	45	50						

Location / SAR	Stream Type / Activity	TXRAM Metric	Baseline (Existing) Mitigation Site Scores	Baseline (Existing) Reference Site Scores	Release of Monitoring Mitigation Site Scores	At Maturity Mitigation Site Scores	Mitigation Activities / Work Performed	Rationale for Lift and Reference Site Achievable Scores	Photo Reference	Success Criteria / Monitoring Station
Upstream Existing: MS-7-1 Proposed: PS-7-1 Reference: RS-7-1	Ephemeral	Floodplain connectivity	3	3	3	3	<ul style="list-style-type: none"> • Cattle removal • Brush management and native tree and grass planting 	<ul style="list-style-type: none"> • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal allows revegetation, similar to reference site. • Reference site score for sediment deposition will improve after flooding affects normalize and cattle removal allows revegetation. • Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	See scoring sheets for reference site and for mitigation site existing conditions	120 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
	Enhancem ent	Bank condition	4	5	5	5				
		Sediment deposition	4	4	5	5				
		Riparian buffer (left bank)	1.4	2	4	5				
		Riparian buffer (right bank)	1.4	2	4	5				
		Substrate composition	3	4	3	3				
		In-stream habitat	0	0	0	0				
		Flow regime	0	0	0	0				
		Channel flow status	0	0	0	0				
OVERALL	33	40	49	54						
Upstream Existing: MS-8-1 Proposed: PS-8-1 Reference: RS-8-1	Ephemeral	Floodplain connectivity	4	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Brush management and native tree and grass planting 	<ul style="list-style-type: none"> • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal allows revegetation, similar to reference site. • Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	See scoring sheets for reference site and for mitigation site existing conditions	120 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
	Enhancem ent	Bank condition	4	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1	1	3	4				
		Riparian buffer (right bank)	1	1	3	4				
		Substrate composition	3	3	3	3				
		In-stream habitat	0	0	0	0				
		Flow regime	0	0	0	0				
		Channel flow status	0	0	0	0				
OVERALL	33	36	46	51						
Upstream Existing: N/A Proposed: PS-10-1 Reference: RS-5-1	Ephemeral	Floodplain connectivity	0	4	4	4	<ul style="list-style-type: none"> • Dam / pond removal to restore hydrology and sediment transport • Cattle removal • Brush management and native tree and grass planting 	<ul style="list-style-type: none"> • Reference and mitigation site scores will improve for riparian buffer and sediment deposition with cattle removal and vegetation management to reduce brush and improve native community. • Mitigation site channel and in-stream condition will increase (be re-established) with restoration, similar to reference site. • Mitigation site flow regime score will increase with dam removal to restore hydrology of natural stream flows and design for pooling. 	See scoring sheets for reference site and for mitigation site proposed conditions	120 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-2.
	Re-establi shm ent	Bank condition	0	5	5	5				
		Sediment deposition	0	4	5	5				
		Riparian buffer (left bank)	0	1	3	4				
		Riparian buffer (right bank)	0	1	3	4				
		Substrate composition	0	5	4	4				
		In-stream habitat	0	0	0	0				
		Flow regime	0	0	1	1				
		Channel flow status	0	0	0	0				
OVERALL	0	39	51	56						

Location / SAR	Stream Type / Activity	TXRAM Metric	Baseline (Existing) Mitigation Site Scores	Baseline (Existing) Reference Site Scores	Release of Monitoring Mitigation Site Scores	At Maturity Mitigation Site Scores	Mitigation Activities / Work Performed	Rationale for Lift and Reference Site Achievable Scores	Photo Reference	Success Criteria / Monitoring Station
On-site Existing and Proposed: S-17-1 Reference: RS-5-1	Ephemeral Enhancement	Floodplain connectivity	4	4	4	4	<ul style="list-style-type: none"> Upstream dam / pond removal to restore hydrology and sediment transport Cattle removal Brush management 	<ul style="list-style-type: none"> Mitigation site score will improve for bank condition after cattle removal allows revegetation, similar to reference site. Reference site score for sediment deposition will improve after flooding affects normalize and cattle removal allows revegetation. Mitigation site scores for sediment deposition and substrate composition will improve after upstream pond removal restores sediment transport. Reference and mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to reduce brush and improve native community 	See scoring sheets for reference site and for mitigation site proposed conditions	TXRAM Score and associated riparian canopy at release of monitoring See Figure F-3.
		Bank condition	4	5	5	5				
		Sediment deposition	4	4	5	5				
		Riparian buffer (left bank)	1.7	1	3.7	4				
		Riparian buffer (right bank)	1.7	1	3.7	4				
		Substrate composition	3	5	4	4				
		In-stream habitat	0	0	0	0				
		Flow regime	0	0	0	0				
		Channel flow status	0	0	0	0				
OVERALL		36	39	52	53					
On-site Existing: N/A Proposed: OPSR-2-1 Reference: RS-5-1	Ephemeral Re-establishment	Floodplain connectivity	0	4	4	4	<ul style="list-style-type: none"> Dam / pond removal to restore hydrology and sediment transport Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference site scores will improve for riparian buffer and sediment deposition with cattle removal to allow revegetation and vegetation management to reduce brush, increase native tree canopy and improve diversity of native community. Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to increase native tree canopy and improve diversity of native community. Mitigation site channel and in-stream condition will increase with restoration, similar to reference site. 	See scoring sheets for reference site and for mitigation site proposed conditions	120 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	0	5	5	5				
		Sediment deposition	0	4	5	5				
		Riparian buffer (left bank)	0	1	3	4				
		Riparian buffer (right bank)	0	1	3	4				
		Substrate composition	0	5	4	4				
		In-stream habitat	0	0	0	0				
		Flow regime	0	0	0	0				
		Channel flow status	0	0	0	0				
OVERALL		0	39	48	53					
On-site Existing: N/A Proposed: OPSR-17-1 Reference: RS-5-1	Ephemeral Re-establishment	Floodplain connectivity	0	4	4	4	<ul style="list-style-type: none"> Dam / pond removal to restore hydrology and sediment transport Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference site scores will improve for riparian buffer and sediment deposition with cattle removal to allow revegetation and vegetation management to reduce brush, increase native tree canopy and improve diversity of native community. Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to increase native tree canopy and improve diversity of native community. Mitigation site channel and in-stream condition will increase with restoration, similar to reference site. 	See scoring sheets for reference site and for mitigation site proposed conditions	120 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	0	5	5	5				
		Sediment deposition	0	4	5	5				
		Riparian buffer (left bank)	0	1	3	4				
		Riparian buffer (right bank)	0	1	3	4				
		Substrate composition	0	5	4	4				
		In-stream habitat	0	0	0	0				
		Flow regime	0	0	0	0				
		Channel flow status	0	0	0	0				
OVERALL		0	39	48	53					
On-site Existing: N/A Proposed: OPSR-18-1 Reference: RS-5-1	Ephemeral Re-establishment	Floodplain connectivity	0	4	4	4	<ul style="list-style-type: none"> Dam / pond removal to restore hydrology and sediment transport Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference site scores will improve for riparian buffer and sediment deposition with cattle removal to allow revegetation and vegetation management to reduce brush, increase native tree canopy and improve diversity of native community. Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to increase native tree canopy and improve diversity of native community. Mitigation site channel and in-stream condition will increase with restoration, similar to reference site. 	See scoring sheets for reference site and for mitigation site proposed conditions	120 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	0	5	5	5				
		Sediment deposition	0	4	5	5				
		Riparian buffer (left bank)	0	1	3	4				
		Riparian buffer (right bank)	0	1	3	4				
		Substrate composition	0	5	4	4				
		In-stream habitat	0	0	0	0				
		Flow regime	0	0	0	0				
		Channel flow status	0	0	0	0				
OVERALL		0	39	48	53					
On-site Existing: N/A Proposed: OPSR-5-1 Reference: RS-5-1	Ephemeral Re-establishment	Floodplain connectivity	0	4	4	4	<ul style="list-style-type: none"> Dam / pond removal to restore hydrology and sediment transport Cattle removal Brush management and native tree and grass planting 	<ul style="list-style-type: none"> Reference site scores will improve for riparian buffer and sediment deposition with cattle removal to allow revegetation and vegetation management to reduce brush, increase native tree canopy and improve diversity of native community. Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management to increase native tree canopy and improve diversity of native community. Mitigation site channel and in-stream condition will increase with restoration, similar to reference site. 	See scoring sheets for reference site and for mitigation site proposed conditions	120 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	0	5	5	5				
		Sediment deposition	0	4	5	5				
		Riparian buffer (left bank)	0	1	3	4				
		Riparian buffer (right bank)	0	1	3	4				
		Substrate composition	0	5	4	4				
		In-stream habitat	0	0	0	0				
		Flow regime	0	0	0	0				
		Channel flow status	0	0	0	0				
OVERALL		0	39	48	53					

Location / SAR	Stream Type / Activity	TXRAM Metric	Baseline (Existing) Mitigation Site Scores	Baseline (Existing) Reference Site Scores	Release of Monitoring Mitigation Site Scores	At Maturity Mitigation Site Scores	Mitigation Activities / Work Performed	Rationale for Lift and Reference Site Achievable Scores	Photo Reference	Success Criteria / Monitoring Station
Downstream Existing and Proposed: DS-1-1 Reference: RCR-1-1	Perennial Enhancement	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	2.0	5	4	5				
		Riparian buffer (right bank)	2.0	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	71	93	88	93						
Downstream Existing and Proposed: DS-1-2 Reference: RCR-1-1	Perennial Enhancement	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	2.0	5	4	5				
		Riparian buffer (right bank)	2.0	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	71	93	88	93						
Downstream Existing and Proposed: DS-1-3 Reference: RCR-1-1	Perennial Enhancement	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	2.0	5	4	5				
		Riparian buffer (right bank)	2.0	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	71	93	88	93						
Downstream Existing and Proposed: DS-1-4 Reference: RCR-1-1	Perennial Enhancement	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	2.1	5	4	5				
		Riparian buffer (right bank)	2.1	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	72	93	88	93						
Downstream Existing and Proposed: DS-1-5 Reference: RCR-1-1	Perennial Enhancement	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	2.1	5	4	5				
		Riparian buffer (right bank)	2.1	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	72	93	88	93						

Location / SAR	Stream Type / Activity	TXRAM Metric	Baseline (Existing) Mitigation Site Scores	Baseline (Existing) Reference Site Scores	Release of Monitoring Mitigation Site Scores	At Maturity Mitigation Site Scores	Mitigation Activities / Work Performed	Rationale for Lift and Reference Site Achievable Scores	Photo Reference	Success Criteria / Monitoring Station
Downstream Existing and Proposed: DS-1-6 Reference: RCR-1-1	Perennial	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
	Enhancement	Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	2.1	5	4	5				
		Riparian buffer (right bank)	2.1	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	72	93	88	93						
Downstream Existing and Proposed: DS-1-7 Reference: RCR-1-1	Perennial	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
	Enhancement	Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	2.0	5	4	5				
		Riparian buffer (right bank)	2.0	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	71	93	88	93						
Downstream Existing and Proposed: DS-1-8 Reference: RCR-1-1	Perennial	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
	Enhancement	Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1.9	5	4	5				
		Riparian buffer (right bank)	1.5	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	70	93	88	93						
Downstream Existing and Proposed: DS-1-9 Reference: RCR-1-1	Perennial	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
	Enhancement	Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1.9	5	4	5				
		Riparian buffer (right bank)	1.5	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	70	93	88	93						
Downstream Existing and Proposed: DS-1-10 Reference: RCR-1-1	Perennial	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
	Enhancement	Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1.9	5	4	5				
		Riparian buffer (right bank)	1.5	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	70	93	88	93						

Location / SAR	Stream Type / Activity	TXRAM Metric	Baseline (Existing) Mitigation Site Scores	Baseline (Existing) Reference Site Scores	Release of Monitoring Mitigation Site Scores	At Maturity Mitigation Site Scores	Mitigation Activities / Work Performed	Rationale for Lift and Reference Site Achievable Scores	Photo Reference	Success Criteria / Monitoring Station
Downstream Existing and Proposed: DS-1-11 Reference: RCR-1-1	Perennial Enhancement	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1.8	5	4	5				
		Riparian buffer (right bank)	1.7	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	70	93	88	93						
Downstream Existing and Proposed: DS-1-12 Reference: RCR-1-1	Perennial Enhancement	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1.8	5	4	5				
		Riparian buffer (right bank)	1.7	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	70	93	88	93						
Downstream Existing and Proposed: DS-1-13 Reference: RCR-1-1	Perennial Enhancement	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1.8	5	4	5				
		Riparian buffer (right bank)	1.7	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	70	93	88	93						
Downstream Existing and Proposed: DS-1-14 Reference: RCR-1-1	Perennial Enhancement	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1.8	5	4	5				
		Riparian buffer (right bank)	2.4	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	72	93	88	93						
Downstream Existing and Proposed: DS-1-15 Reference: RCR-1-1	Perennial Enhancement	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1.8	5	4	5				
		Riparian buffer (right bank)	2.4	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	72	93	88	93						

Location / SAR	Stream Type / Activity	TXRAM Metric	Baseline (Existing) Mitigation Site Scores	Baseline (Existing) Reference Site Scores	Release of Monitoring Mitigation Site Scores	At Maturity Mitigation Site Scores	Mitigation Activities / Work Performed	Rationale for Lift and Reference Site Achievable Scores	Photo Reference	Success Criteria / Monitoring Station
Downstream Existing and Proposed: DS-1-16 Reference: RCR-1-1	Perennial Enhancement	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1.8	5	4	5				
		Riparian buffer (right bank)	2.4	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	72	93	88	93						
Downstream Existing and Proposed: DS-1-17 Reference: RCR-1-1	Perennial Enhancement	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	2.2	5	4	5				
		Riparian buffer (right bank)	3.0	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	74	93	88	93						
Downstream Existing and Proposed: DS-1-18 Reference: RCR-1-1	Perennial Enhancement	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1.8	5	4	5				
		Riparian buffer (right bank)	2.4	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	72	93	88	93						
Downstream Existing and Proposed: DS-1-19 Reference: RCR-1-1	Perennial Enhancement	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	2.2	5	4	5				
		Riparian buffer (right bank)	1.8	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	71	93	88	93						
Downstream Existing and Proposed: DS-1-20 Reference: RCR-1-1	Perennial Enhancement	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
		Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	2.2	5	4	5				
		Riparian buffer (right bank)	1.8	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	71	93	88	93						

Location / SAR	Stream Type / Activity	TXRAM Metric	Baseline (Existing) Mitigation Site Scores	Baseline (Existing) Reference Site Scores	Release of Monitoring Mitigation Site Scores	At Maturity Mitigation Site Scores	Mitigation Activities / Work Performed	Rationale for Lift and Reference Site Achievable Scores	Photo Reference	Success Criteria / Monitoring Station
Downstream Existing and Proposed: DS-1-21 Reference: RCR-1-1	Perennial	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
	Enhancement	Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	2.2	5	4	5				
		Riparian buffer (right bank)	1.8	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	71	93	88	93						
Downstream Existing and Proposed: DS-1-22 Reference: RCR-1-1	Perennial	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
	Enhancement	Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	2.2	5	4	5				
		Riparian buffer (right bank)	1.8	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	71	93	88	93						
Downstream Existing and Proposed: DS-1-23 Reference: RCR-1-1	Perennial	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
	Enhancement	Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1.7	5	4	5				
		Riparian buffer (right bank)	1.3	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	69	93	88	93						
Downstream Existing and Proposed: DS-1-24 Reference: RCR-1-1	Perennial	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
	Enhancement	Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	1.7	5	4	5				
		Riparian buffer (right bank)	1.3	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	69	93	88	93						
Downstream Existing and Proposed: DS-1-25 Reference: RCR-1-1	Perennial	Floodplain connectivity	3	4	4	4	<ul style="list-style-type: none"> • Cattle removal • Native tree and grass planting • Flow releases 	<ul style="list-style-type: none"> • Mitigation site score will improve for floodplain connectivity with proposed operations plan of project to increase high flow events that provide regular flow access to bankfull benches. • Mitigation site scores will improve for bank condition and sediment deposition after cattle removal and planting allows revegetation to stabilize soils, similar to reference site. • Mitigation site scores will improve for riparian buffer with cattle removal and vegetation management / planting to improve native community, similar to reference site. 	See scoring sheet for mitigation site proposed conditions	150 stems per acre with diversity and invasive species standards in mitigation plan and TXRAM Score and associated riparian canopy at release of monitoring. See Figure F-3.
		Bank condition	3	5	5	5				
	Enhancement	Sediment deposition	4	5	5	5				
		Riparian buffer (left bank)	2.2	5	4	5				
		Riparian buffer (right bank)	1.8	5	4	5				
		Substrate composition	4	4	4	4				
		In-stream habitat	5	4	5	5				
		Flow regime	3	4	3	3				
		Channel flow status	4	4	4	4				
OVERALL	71	93	88	93						

Attachment G
Draft Site Protection Instrument

Final Draft versions of proposed conservation easements for use in the execution of the proposed Mitigation Plan were submitted by HDR on behalf of the Applicant to the USACE-SWF on September 1st and 7th, with the latest revisions to USACE comments being transmitted on October 26, 2017. The transmittals included versions for use in the following land ownership scenarios.

1. TPWD as Owner / Grantor for PPMSP properties (Copeland and Nall/Ragsdale tracts) with a Third Party non-profit entity as the Grantee (latest revision submitted 10-26-17).
2. Simpson Tract anticipated to be owned by applicant. PPCMWD1 as Grantor to Third Party non-profit entity as the Grantee (latest revision submitted 10-26-17).
3. Downstream buffer with willing landowners as Grantors with a Third Party as the Grantee, and PPCMWD1 named as Permittee (latest revision submitted 10-26-17).
4. Downstream easements obtained through eminent domain with landowners as Grantor to PPCMWD1 as Grantee. A Third Party to conduct monitoring through contractual agreement as "Grantee's agent" (latest revision submitted 10-26-17).

- (f) to serve as a mitigation area pursuant to the regulation and guidelines of the United States Environmental Protection Agency (“EPA”) and the USACE promulgated under authority of Section 404 of the Clean Water Act (33 USC § 1344, et seq.) and Section 10 of the Rivers and Harbors Act of 1899 (33 USC § 403, et seq.).

Any uses of the Property that may impair or interfere with these Purposes of the Conservation Easement are expressly prohibited.

E. The preservation of the Property is a condition of the Permit, required to mitigate for unavoidable adverse impacts to waters of the United States. Grantor and Grantee agree that third-party rights of enforcement shall be held by the USACE, Fort Worth District, and any successor agencies, and that such rights are in addition to, and do not limit, the rights of enforcement under the Permit.

F. The following Exhibits are attached to this Conservation Easement and incorporated by reference:

- Exhibit A** Legal Description of the Property
- Exhibit B** U.S. Army Corps of Engineers Permit
- Exhibit C** Permittee Responsible Mitigation Plan
- Exhibit D** Baseline Documentation Report

Agreement:

NOW THEREFORE, for good and valuable consideration paid by Grantee, the receipt and legal sufficiency of which are hereby acknowledged by Grantor, and in consideration of the covenants, mutual agreements and conditions herein contained, Grantor has TRANSFERRED, BARGAINED, GRANTED, SOLD, CONVEYED, ASSIGNED, SET OVER and DELIVERED, and by these presents does TRANSFER, BARGAIN, GRANT, SELL, CONVEY, ASSIGN, SET OVER and DELIVER, to Grantee a conservation easement on, over, under, across, along and through the Property on the terms set forth herein, together with all other rights reasonably necessary or desirable to accomplish the objectives of the Mitigation Plan and the Purposes of and rights granted under this Agreement (the “Conservation Easement”), subject to the following terms, reservations, covenants, limitations and exceptions:

1. **Duration of Easement.** The Conservation Easement shall be perpetual. The Conservation Easement is an easement in gross, runs with the land, and is enforceable by Grantee against Grantor, and Grantor’s successors, assigns, lessees, agents, and licensees.

2. **Property Description.** The metes and bounds legal description of the Property set forth in **Exhibit “A”** and incorporated herein by reference for all purposes are metes and bounds descriptions and surveys of the Property prepared by a Texas Registered Professional Land Surveyor.

3. **Present Condition of the Property.** Neither Grantor, its agents, assigns, successors, or personal representatives, nor any purchasers, lessees, or other users of the Property may use, disturb, or allow through intent or negligence, the use or disturbance of the Property in any manner that is inconsistent with the Purposes of the Conservation Easement. The waters of the U.S. and other aquatic

resources, scenic, resource, environmental, and other natural characteristics of the Property, and its current use and state of improvement, are described in the Baseline Documentation Report, attached hereto as **Exhibit "D"**, prepared by Permittee and acknowledged by the Grantor, Grantee, and Permittee to be complete and accurate as of the date hereof. Both Grantor and Grantee have copies of this report. It will be used by the Parties to assure that any future changes in management actions or the use of the Property will be consistent with the terms of this Conservation Easement. However, this report is not intended to preclude the use of other evidence to establish the present condition of the Property if there is a controversy over its use.

4. **Prohibited Activities.** Any activity on, or use of, the Property inconsistent with the Purposes of the Conservation Easement is prohibited. In the event of a conflict between this Section 4 and the conditions of the Permit, including, but not limited to, the PRMP, the conditions of the Permit, including, but not limited to, the PRMP, shall control. The Property shall be preserved in its natural condition and restricted from any development that would impair or interfere with the conservation values of the Property. The Permittee, Grantor, and Grantee acknowledge that any ground disturbance on the Property is subject to the Antiquities Code of Texas. Without limiting the generality of the foregoing, the following activities and uses are expressly prohibited, restricted, or reserved as indicated hereunder:

(a) **Vegetation:** Except as otherwise provided in this Agreement, there shall be no removing, destroying, cutting, trimming, mowing, shredding, burning, harming, or altering of any vegetation, or disturbing or changing in any way the natural habitat existing on the Property except as expressly allowed in the PRMP and in order to fulfill the objectives and success criteria of that plan. Grantor may remove diseased, invasive or non-native trees, shrubs, or plants; cut and mow firebreaks and existing road rights-of-way; and remove trees, shrubs, or plants to accommodate maintenance of permitted improvements or other uses expressly permitted under the terms of this Conservation Easement. With written approval of Grantee and Permittee, Grantor may remove potentially invasive plants from the Property for habitat management purposes consistent with the intent of this Conservation Easement. Except as necessary for activities expressly permitted in this Conservation Easement and with written permission from Grantee and Permittee, there shall be no farming, tilling, or destruction and removal of native vegetation on the Property. There shall be no planting of invasive or potentially invasive non-native plant species anywhere on the Property. Grantee will provide a list of potentially invasive species upon request. There shall be no use of pesticides, including but not limited to insecticides, fungicides, rodenticides, and herbicides, except as expressly allowed in the PRMP.

(b) **Predator and Nuisance Species Control:** Grantor, with written approval of Grantee and Permittee, shall have the right to control, destroy, or trap predatory, exotic, invasive, and problem animals that pose a material threat to people, livestock, other animals, or habitat conditions in accordance with applicable state and federal laws and requirements.

(c) **Uses:** No agricultural, residential or industrial activity shall be conducted upon the Property. There shall be no storing or dumping of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances, machinery, or hazardous substances, or toxic or hazardous waste, or any placement of underground or aboveground storage tanks or other materials on the Property that may negatively impact or be detrimental to the Property or to the surface or subsurface waters of the Property. Livestock animals shall not be allowed on the Property. Any right of passage for any activity or use set forth in this paragraph is also prohibited.

(d) **Subdivision.** The Property may not be further divided, subdivided, or portioned.

(e) **Topography:** There shall be no change in the topography of the Property except as expressly provided in the PRMP. There shall be no surface mining, filling, excavating, grading, dredging, mining or drilling upon the Property, and there shall be no removing of topsoil, peat, sand, gravel, rock,

minerals or other materials from the Property except (i) to restore natural topography or drainage patterns, (ii) to improve the topography from the then-current condition, as agreed to by the Grantor and Grantee and approved by USACE, as necessary, or (iii) as necessary to use the Property as otherwise authorized in this Agreement.

(f) Soil or Water Degradation: Except as otherwise provided in this Agreement or the PRMP, there shall be no use of, or the conducting of any activity on, the Property that causes or is likely to cause soil degradation, erosion, depletion or pollution of, or siltation on, any surface or subsurface waters of the Property, and there shall be no change to the surface or subsurface hydrology of the Property in any manner. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding, or related activities, or altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns. In addition, diverting or causing or permitting the diversion of surface or underground water into, within or out of the Property by any means, removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides is prohibited.

(g) Construction: Except as otherwise provided in this Agreement, there shall be no constructing or placing of any building, mobile home, asphalt or concrete pavement, billboard or other advertising display, antenna, utility pole, tower, conduit, line, pier, landing, dock, or any other temporary or permanent structure or facility or any other man-made structures on the Property except in connection with the repair, maintenance, or replacement (but not expansion) of any structures (exclusive of trails and walkways less than 10 feet in width) and other improvements located on the Property as of the Effective Date of this Agreement. Grantor shall have the right to maintain, renovate, and repair existing buildings, structures, fences, pens, wells, dams and reservoirs, utilities, soft-surface roads, and other improvements, and in the event of their destruction, to reconstruct any such existing improvement with another of similar size, function, capacity, location, and material. New non-paved pedestrian trails or walkways not exceeding 10 feet in width will be allowed on the on the Property provided that no woody vegetation is cleared to construct such trails or walkways.

(h) Roads: Excluding any and all right-of-ways and easements granted prior to the Effective Date of this Agreement, there shall be no construction of roads on the Property; nor any enlargement, widening, improvement or modification to any existing roads or any other rights of way on the Property, exclusive of non-paved pedestrian trails and walkways less than 10 feet in width. Maintenance of existing roads shall be limited to removal of dead vegetation, necessary pruning or removal of obstructing trees and plants, and/or application of permeable materials (e.g., sand, gravel, and crushed stone) as necessary to correct or prevent erosion and maintain all-weather serviceability.

(i) Waters: There shall be no polluting, altering, manipulating, depleting or extracting of surface or subsurface water (including, but not limited to, ponds, creeks or other water courses) or any other water bodies on the Property, and there shall be no conducting or (to the extent in Grantor's control) allowing any entity or person to conduct activities on the Property that would be detrimental to water purity or that alter the natural water level or flow in or over the Property (including, but not limited to, damming, dredging or construction in any free flowing water body, nor any manipulation or alteration of natural water courses, fresh water lake and pond shores, marshes or other water bodies). It is understood that with respect to the prohibited activities set forth in this Section 4(i), Grantor may not and will not engage in any such prohibited activities on the Property.

(j) Vehicles: Use of vehicles off of designated roadways and pathways on the Property shall be limited to access on the site for monitoring, maintenance, fire protection/emergency action, or other approved activities, as specified in the PRMP. Off road vehicular access on the Property for recreational use is expressly prohibited.

(k) Easements: Except as otherwise provided in this Agreement, including, but not limited to, the easement contemplated, granted and conveyed in Section 6, herein, there shall be no granting or conveying of any easements on, over, under, across, or through the Property, including, but not limited to, access easements and utility easements.

(l) Signage: Construction or placement of any signs, billboards, or other advertising displays on the Property is not permitted, except that signs whose placement, number, and design do not significantly diminish the scenic character of the Property may be placed to state the name and address of the Property and the names of persons living on the Property, to advertise or regulate permitted on-site activities, to advertise the Property for sale or rent, to post the Property to control unauthorized entry or use, or to identify the property as being protected by this Conservation Easement.

(m) Development Rights: No development rights that have been encumbered or extinguished by this Agreement or the Conservation Easement granted herein shall be transferred pursuant to a transferable development rights scheme or cluster development arrangement or otherwise.

(n) Hunting: Grantor and Grantor's lessees and guests may conduct hunting, fishing or trapping activities in accordance with appropriate federal, state and local laws and restrictions that conform to terms of this Conservation Easement and the Permit and Mitigation Plan. Grantor may expressly construct hunting blinds, the size, design, location, and number of which shall be subject to Grantee's prior written approval. No non-native animal species may be introduced to the Property.

(o) Dumping: There shall be no dumping or storing of any material, such as trash, wastes, ashes, sewage, garbage, scrap material, sediment discharges, oil and petroleum by-products, leached compounds, toxic materials or fumes, or any "hazardous substances" (as hereinafter defined). For the purposes of this paragraph, the phrase "hazardous substances" shall be defined as in the federal Comprehensive Environmental Response, Compensation and Liability Act (42 U.S.C. 9601 et seq.) and/or a substance whose manufacture, processing, distribution in commerce, use, possession, or disposal is banned, prohibited, or limited pursuant to the federal Toxic Substances Control Act (15 U.S.C. 2601 et seq.).

(p) Other Prohibitions: Any other use of, or activity on, the Property which is or may become inconsistent with the Purposes of the Conservation Easement granted herein, the preservation of the Property in its natural condition, or the protection of its environmental systems, is prohibited.

5. **Rights Reserved to Grantor.** The Grantor expressly reserves for itself, its successors and assigns, the right of access to and the right of continued use of the Property for all purposes not inconsistent with the Permit or this Agreement and the Conservation Easement granted herein, including, but not limited to, the right to quiet enjoyment of the Property, the rights of ingress and egress with respect to the Property, the right to fence the Property and to prohibit public access thereto, and the right to sell, transfer, gift or otherwise convey the Property, in whole or in part, provided such sale, transfer, or gift conveyance is subject to the terms of, and shall specifically reference, the Conservation Easement. Except as may be expressly provided otherwise in this Agreement, neither this Agreement nor the Conservation Easement granted herein in any way limits, restricts or in any way affects any property of Grantor other than the Property, including without limitation, any property adjacent to, surrounding or near the Property. The rights conveyed by this Agreement and the Conservation Easement granted herein do not constitute a conveyance of a fee interest in the Property, nor of any of the mineral rights therein and thereunder. The rights retained by Grantor as set forth in this Section 5 are referred to hereinafter as the "Reserved Rights".

6. **Rights of Grantee.** Grantor also grants and conveys to Grantee or its authorized representatives, successors, and assigns, the Permittee, and the USACE, the right to enter the Property at all reasonable times for the purposes of (i) inspecting the Property to determine if the Grantor or any of its successors and assigns is complying with the terms, conditions, restrictions, and Purposes of the Conservation Easement, and (ii) taking such actions which are consistent with the Conservation Easement and the Permit. Such right to enter the Property includes the right of pedestrian and vehicular ingress and egress to and from the Property. Access to the Property through Grantor's Palo Pinto Mountains State Park property shall be via routes authorized by Grantor as shown in **Exhibit "E"** and shall be coordinated with Grantor no less than twenty four (24) hours prior to the proposed access time, except in the case of emergency. The easement rights granted herein do not include any public access rights. Grantee shall indemnify, defend and hold harmless Grantor and its affiliates, partners, members, directors, officers, employees, agents and contractors and the heirs, personal representatives, successors and assigns of each of them from and against any and all liability, loss, cost or damage arising out of or in connection with Grantee's exercise of its rights under the Conservation Easement. Nothing construed herein shall constitute an agreement by USACE or Permittee to indemnify, defend or hold harmless either Grantor or any of the above-listed parties, from and against any liability, loss, cost or damage.

7. **Mineral Interests and Other Encumbrances.** This Agreement is subject and subordinate to the existing rights of mineral estate owner(s), ground leases and other encumbrances to the title of the Property. Grantor is the surface owner of the Property. Since the mineral interests in the Property have been severed in the past, it is the intent of the Grantor to: (a) protect the surface estate of the Property; and (b) work to ensure the perpetuation of fish, wildlife, and plant resources and their habitats contained within the Property. In recognition of the legal doctrine whereby landowners in the State of Texas who have severed mineral interests under their land cannot control a mineral owner's access to those minerals, Grantor and Permittee shall use their best efforts to minimize impacts associated with the exploration, drilling, or development of oil and gas and other minerals on the Property from the owner of the mineral estate of the Property and his/her heirs, successors, and assigns, to the extent such activities impact the surface estate of the Property or impact the Permittee's ability to comply with the requirements of the Permit. Grantor shall use its best efforts to pursue a surface use agreement with mineral estate owner(s) to the effect that any and all mineral activities shall be conducted by directional or horizontal drilling from a surface location off of the Property and that all mineral activities do not impair or interfere with the Purposes of the Conservation Easement. Grantor shall notify Grantee and Permittee of any requests by the mineral estate owner(s) to explore or extract minerals from the Property. Prior to entering into any surface use agreement with mineral estate owner(s), Grantor shall consult with Grantee and Permittee and make reasonable efforts to incorporate conditions or restrictions into the surface use agreement as Grantor, Grantee, and Permittee may reasonably determine are required in order to prevent an impairment or interference with the Purposes of the Conservation Easement.

8. **Liens and Taxes.** Grantor shall keep the Property free of any and all liens, including, without limitation, liens arising out of any work performed for, materials furnished to, or obligations incurred by Grantor. Grantor shall pay before delinquency all taxes, assessments, fees, and charges of whatever description levied on or assessed against the Property by competent authority, and shall upon written request by Grantee furnish Grantee with satisfactory evidence of payment.

9. **Enforcement.** In the event of a breach of this Agreement by Grantor, the Grantee, Permittee, or any third party working for or under the direction of Grantor, Grantee, or Permittee, the Parties and the USACE shall be notified immediately. If USACE becomes aware of a breach of this Agreement, then USACE will notify the Permittee, Grantee and Grantor of the breach.

In the event of a breach by Grantor, Grantor shall have thirty (30) days after receipt of such notice to undertake actions that are reasonably calculated to correct the conditions constituting the breach. If the

conditions constituting the breach are corrected in a timely and reasonable manner, no further action shall be warranted or authorized. If the conditions constituting the breach are such that more than thirty (30) days are required to cure the breach, Grantor shall not be in default hereunder if Grantor undertakes the cure of such breach during the thirty (30) day period following notice of the breach and diligently pursues the cure of the breach to completion. If Grantor fails to initiate such corrective action within thirty (30) days or fails to complete the necessary corrective action, the Grantee may enforce the Conservation Easement by appropriate legal proceedings to the extent authorized under Texas law, including an action for damages, injunctive and other relief. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive relief or other appropriate relief to the extent authorized under Texas law if the breach of any provision of the Conservation Easement is materially impairing or would irreversibly or otherwise materially impair the benefits to be derived from the Conservation Easement. Grantor and the Grantee acknowledge that under such circumstances, damage to the Grantee would be irreparable and remedies at law will be inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with the Conservation Easement. To the extent authorized under Texas law, the costs of a breach of this Agreement and the costs of any correction or restoration, including the Grantee's expenses, court costs and attorney's fees, shall be paid by Grantor. The USACE shall have the same right to enforce the terms and conditions of the Conservation Easement as the Grantee.

Any forbearance or failure on the part of the Grantee or the USACE to exercise its rights in the event of a violation shall not be deemed or construed to be a waiver of either Grantee's or the USACE's rights hereunder. Nor shall forbearance or failure to enforce any covenant or provision hereof discharge or invalidate such covenant or provision or any other covenant, condition, or provision hereof or affect the right of the Grantee and the USACE to enforce the same in the event of a subsequent breach or default.

Nothing contained in this Agreement or the Conservation Easement granted herein shall be construed to entitle the Grantee to bring any action against Grantor for any injury to or change in the Property, or for any violation of any covenant or provision of this Agreement, resulting from any prudent action taken in good faith by Grantor under emergency or force majeure conditions to prevent, abate, or mitigate significant injury to life, damage to property or harm to the Property resulting from any of such causes.

USACE shall have the same right to enforce the terms and conditions of the Conservation Easement as the Grantee, and notwithstanding the above, USACE as a federal agency, will follow Texas law to the extent it does not conflict with Federal law, or interfere with USACE's 404 Permit enforcement and the performance of Permittee's obligations under the Permit. Further, any legal proceeding involving USACE as a party will be subject to the jurisdiction of federal court.

10. **Duration.** The burdens of this Agreement and the Conservation Easement shall run with the Property and shall be enforceable against Grantor and all future interests in and to the Property in perpetuity. Grantor agrees that the future transfer or conveyance of any interest in or to the Property shall at all times be subject and subordinate to the terms, conditions, restrictions and Purposes of the Conservation Easement and a reference to this Agreement shall be included in each instrument of transfer or conveyance of any interest in or to the Property from and after the Effective Date; provided, however, that nothing in this Agreement shall be construed to in any way limit Grantee's ability to freely sell, convey, assign, or otherwise transfer the property interest and rights, or any portions thereof, granted by this Agreement to any other person or entity, except as otherwise provided in this Agreement.

11. **General Provisions.**

(a) Notices. Any notice, request for approval, or other communication required under this Conservation Easement shall be sent by registered or certified mail, postage prepaid, to the following addresses (or such address as may be hereafter specified by notice pursuant to this paragraph):

To Grantor: Land Conservation Program
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, TX 78744
(512) 389-4961

To Grantee:

To Permittee: Palo Pinto County Municipal Water District No. 1
Attn: President
P.O. Box 387
Mineral Wells, TX 76068

To the USACE: Regulatory Branch
Fort Worth District
U.S. Army Corps of Engineers
P. O. Box 17300
Fort Worth, Texas 76102

(b) Severability. In the event any provision of this Agreement is determined by the appropriate court to be void and unenforceable, all remaining terms shall remain valid and binding, and in full force and effect.

(c) Agreement Binding. The terms, covenants, and conditions of this Agreement shall be binding upon and shall inure to the benefit of Grantor, Grantee, Permittee, and their respective executors, administrators, heirs, legal representatives, successors and assigns. Notwithstanding the foregoing, Grantee not may assign (i) this Agreement, or (ii) any rights or interests in this Agreement, without the prior written approval of Grantor and the USACE.

(d) Warranty. Grantor warrants, covenants, and represents that it owns the surface estate to the Property in fee simple, and that Grantor either owns all interests in the surface estate to the Property which may be impaired by the granting of the Conservation Easement or that there are no outstanding mortgages, tax liens, encumbrances, or other interests in the surface estate of the Property which have not been expressly subordinated to the Conservation Easement. Grantor further warrants that Grantee shall have the use of and shall enjoy all the benefits derived from and arising out of the Conservation Easement, and that Grantor will warrant and defend title to the Property against all persons claiming by, through or under Grantor, but not otherwise.

(e) Subsequent Transfers. Grantor agrees to incorporate the terms of this Agreement and the Conservation Easement in any deed or other legal instrument that transfers any interest in all or any portion of the Property. Grantor agrees to provide written notice of such transfer at least thirty (30) days prior to the date of the transfer. Grantor and Grantee agree that the terms of the Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof and shall not be amended, modified or terminated without the prior written consent and approval of the USACE.

(f) Assignment or Transfer. The Parties recognize and agree that the benefits of the Conservation Easement are in gross and assignable by the Grantee; provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns the Conservation Easement, the organization receiving the interest will be a qualified holder under applicable state and federal law. The Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this Agreement and that the balance of any management and conservation funds or other funds allocated by the Permittee to implementation of the Conservation Easement be transferred to the new Conservation Easement holder. Grantee shall select a transferee agreeable to Grantor and Permittee. Grantee shall give written notice by certified mail to Grantor and Permittee of an assignment at least ninety (90) days prior to the date of such assignment. Within 45 days after receiving the written notice, Grantor and Permittee will by written letter advise the Grantee if the proposed replacement Grantee is acceptable, and, if not, will provide the Grantee with a list of at least three acceptable replacement Grantees; and Grantee agrees to select a replacement Grantee from the list.

(g) Obligations of Ownership. Grantee shall not be responsible for any costs or liability of any kind related to the ownership, operation, insurance, upkeep, or maintenance of the Property, except as expressly provided herein. Nothing herein shall relieve the Grantor of the obligation to comply with any federal, state, or local laws, regulations and permits that may apply to the Property in connection with the exercise by Grantor of the Reserved Rights.

(h) Extinguishment. In the event that changed conditions render impossible the continued use of the Property for the conservation purposes as contemplated by this Agreement, the Conservation Easement may only be extinguished, in whole or in part, by judicial proceeding in any court of competent jurisdiction.

(i) Eminent Domain. Whenever all or any part of the Property is taken in the exercise of eminent domain so as to substantially abrogate the restrictions imposed by this Agreement and the Conservation Easement, Grantor and Grantee shall join in appropriate actions at the time of such taking to recover the full value of the taking, and all incidental and direct damages due to the taking.

(j) Proceeds. The Conservation Easement constitutes a real property interest immediately vested in Grantee. In the event that all or a portion of the Property is sold, exchanged, or involuntarily converted following an extinguishment of all or any portion of the Conservation Easement, or following the exercise of eminent domain, Grantee shall be entitled to the fair market value of the Conservation Easement. The parties stipulate that the fair market value of the Conservation Easement shall be determined by multiplying the fair market value of the Property unencumbered by the Conservation Easement (minus any increase in value after the Effective attributable to improvements) by the ratio of the value of the Conservation Easement as of the Effective Date to the value of the Property (without deduction for the value of the Conservation Easement) at the time of this grant. The values as of the Effective Date and as referenced in this Section 11(j) shall be the values used, or which would have been used, to calculate a deduction for federal income tax purposes, pursuant to Section 170(h) of the Internal Revenue Code of 1986, as amended (whether eligible or ineligible for such a deduction). Grantee shall use its share of any proceeds in a manner consistent with the Purposes of the Conservation Easement.

Nothing herein shall constitute a grant of real property or proceeds to the USACE.

(k) Failure of Grantee. If at any time Grantee is unable or fails to enforce the Conservation Easement, or if Grantee ceases to be a qualified grantee, and if within a reasonable period of time after the occurrence of any of such events, Grantee fails to make an assignment of its interest pursuant to the Conservation Easement, then Grantee's interest shall become vested in another qualified grantee in

accordance with and as provided by an appropriate and final, non-appealable proceeding in a court of competent jurisdiction.

(1) Amendment. This Agreement and the Conservation Easement granted herein may be amended, but only in a writing signed by the Parties hereto; provided, however, that such amendment does not affect the qualification of the Conservation Easement or the status of the Grantee under any applicable laws, is consistent with the conservation purposes of this Agreement and the Conservation Easement granted herein, and does not conflict with the Permit No. _____ or its related PRMP. Notice of such amendment shall be provided to the USACE.

TO HAVE AND TO HOLD the Conservation Easement for the Purposes herein described, subject, however, to the matters herein set forth and to all matters of record with respect to the Property, unto Grantee, its successors and assigns, forever; and Grantor does hereby bind itself, its successors and assigns to warrant and defend the Conservation Easement and the rights granted herein, unto Grantee, its successors and assigns, against every person whomsoever lawfully claiming or to claim the same or any part thereof by, through or under Grantor, but not otherwise.

[SIGNATURE PAGE FOLLOWS]

EXECUTED and DELIVERED to be effective as of the Effective Date.

GRANTOR:

GRANTEE:

PERMITTEE:

[ACKNOWLEDGMENTS FOLLOW]

STATE OF TEXAS §
 §
COUNTY OF _____ §

This instrument was acknowledged before me on _____, 20__ by
_____, on behalf of _____.

Name:
Notary Public, State of Texas
My commission expires: _____

STATE OF TEXAS §
 §
COUNTY OF _____ §

This instrument was acknowledged before me on _____, 20__ by
_____, on behalf of _____.

Name:
Notary Public, State of Texas
My commission expires: _____

STATE OF TEXAS §
 §
COUNTY OF _____ §

This instrument was acknowledged before me on _____, 20__ by
_____, on behalf of Palo Pinto County Municipal Water District No. 1.

Name:
Notary Public, State of Texas
My commission expires: _____

After recording return to:

Exhibit A
to
Conservation Easement Agreement

Metes and Bounds Legal Description of the Property

[TO BE PROVIDED]

Exhibit B
to
Conservation Easement Agreement

The Permit

[TO BE ATTACHED]

Exhibit C
to
Conservation Easement Agreement

Permittee Responsible Mitigation Plan
or
Mitigation Banking Instrument

[TO BE PROVIDED]

Exhibit D
to
Conservation Easement Agreement

Baseline Documentation Report

[TO BE PROVIDED]

Exhibit E
to
Conservation Easement Agreement

Access Route/Road to Property

[TO BE PROVIDED]

- (f) to serve as a mitigation area pursuant to the regulation and guidelines of the United States Environmental Protection Agency (EPA) and the USACE promulgated under authority of Section 404 of the Clean Water Act (33 USC § 1344, et seq.) and Section 10 of the Rivers and Harbors Act of 1899 (33 USC § 403, et seq.).

Any uses of the Property that may impair or interfere with these Purposes of the Conservation Easement are expressly prohibited.

E. The preservation of the Property is a condition of the Permit, required to mitigate for unavoidable adverse impacts to waters of the United States. Grantor and Grantee agree that third-party rights of enforcement shall be held by the USACE, Fort Worth District, and any successor agencies, and that such rights are in addition to, and do not limit, the rights of enforcement under the Permit.

F. The following Exhibits are attached to this Conservation Easement and incorporated by reference:

- Exhibit A** Legal Description of the Property
- Exhibit B** U.S. Army Corps of Engineers Permit
- Exhibit C** Permittee Responsible Mitigation Plan
- Exhibit D** Baseline Documentation Report

Agreement:

NOW THEREFORE, for good and valuable consideration paid by Grantee, the receipt and legal sufficiency of which are hereby acknowledged by Grantor, and in consideration of the covenants, mutual agreements and conditions herein contained, Grantor has TRANSFERRED, BARGAINED, GRANTED, SOLD, CONVEYED, ASSIGNED, SET OVER and DELIVERED, and by these presents does TRANSFER, BARGAIN, GRANT, SELL, CONVEY, ASSIGN, SET OVER and DELIVER, to Grantee a conservation easement on, over, under, across, along and through the Property on the terms set forth herein, together with all other rights reasonably necessary or desirable to accomplish the objectives of the Mitigation Plan and the Purposes of and rights granted under this Agreement (the "Conservation Easement"), subject to the following terms, reservations, covenants, limitations and exceptions:

1. **Duration of Easement.** The Conservation Easement shall be perpetual. The Conservation Easement is an easement in gross, runs with the land, and is enforceable by Grantee against Grantor, and Grantor's successors, assigns, lessees, agents, and licensees.

2. **Property Description.** The metes and bounds legal description of the Property set forth in **Exhibit "A"** and incorporated herein by reference for all purposes are metes and bounds descriptions and surveys of the Property prepared by a Texas Registered Professional Land Surveyor.

3. **Present Condition of the Property.** Neither Grantor, its agents, assigns, successors, or personal representatives, nor any purchasers, lessees, or other users of the Property may use, disturb, or allow through intent or negligence, the use or disturbance of the Property in any manner that is inconsistent with the Purposes of the Conservation Easement. The waters of the U.S. and other aquatic

resources, scenic, resource, environmental, and other natural characteristics of the Property, and its current use and state of improvement, are described in the Baseline Documentation Report, attached hereto as **Exhibit "D"**, prepared by Permittee and acknowledged by the Grantee and Permittee to be complete and accurate as of the date hereof. Both Grantor and Grantee have copies of this report. It will be used by the Parties to assure that any future changes in management actions or use of the Property will be consistent with the terms of this Conservation Easement. However, this report is not intended to preclude the use of other evidence to establish the present condition of the Property if there is a controversy over its use.

4. **Prohibited Activities.** Any activity on, or use of, the Property inconsistent with the Purposes of the Conservation Easement is prohibited. In the event of a conflict between this Section 4 and the conditions of the Permit, including, but not limited to, the PRMP, the conditions of the Permit, including, but not limited to, the PRMP, shall control. The Property shall be preserved in its natural condition and restricted from any development that would impair or interfere with the conservation values of the Property. Without limiting the generality of the foregoing, the following activities and uses are expressly prohibited, restricted, or reserved as indicated hereunder:

(a) **Vegetation:** Except as otherwise provided in this Agreement or the PRMP, there shall be no removing, destroying, cutting, trimming, mowing, shredding, burning, harming, or altering of any vegetation, or disturbing or changing in any way the natural habitat existing on the Property except as expressly allowed in the PRMP and in order to fulfill the objectives and success criteria of that plan. Grantor may remove diseased, invasive or non-native trees, shrubs, or plants; cut and mow firebreaks and existing road rights-of-way; and remove trees, shrubs, or plants to accommodate maintenance of permitted improvements or other uses expressly permitted under the terms of this Conservation Easement. With written approval of Grantee, Grantor may remove potentially invasive plants from the Property for habitat management purposes consistent with the intent of this Conservation Easement. Except as necessary for activities expressly permitted in this Conservation Easement and with written permission from Grantee, there shall be no farming, tilling, or destruction and removal of native vegetation on the Property. There shall be no planting of invasive or potentially invasive non-native plant species anywhere on the Property. Grantee will provide a list of potentially invasive species upon request. There shall be no use of pesticides, including but not limited to insecticides, fungicides, rodenticides, and herbicides, except as expressly allowed in the PRMP.

(b) **Predator and Nuisance Species Control:** Grantor, with written approval of Grantee, shall have the right to control, destroy, or trap predatory, exotic, invasive, and problem animals that pose a material threat to people, livestock, other animals, or habitat conditions in accordance with applicable state and federal laws and requirements.

(c) **Uses:** No agricultural, residential or industrial activity shall be conducted upon the Property. There shall be no storing or dumping of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances, machinery, or hazardous substances, or toxic or hazardous waste, or any placement of underground or aboveground storage tanks or other materials on the Property that may negatively impact or be detrimental to the Property or to the surface or subsurface waters of the Property. Livestock animals shall not be allowed on the Property. Any right of passage for any activity or use set forth in this paragraph is also prohibited.

(d) **Subdivision:** The Property may not be further divided, subdivided, or partitioned.

(e) **Topography:** There shall be no change in the topography of the Property except as expressly provided in the PRMP. There shall be no filling, excavating, grading, dredging, or drilling upon the Property, and there shall be no removing of topsoil, peat, sand, gravel, rock, or other materials from the Property except (i) to restore natural topography or drainage patterns, (ii) to improve the topography

from the then-current condition, as agreed to by the Grantor and Grantee and approved by the USACE, as necessary, or (iii) as necessary to use the Property as otherwise authorized in this Agreement.

(f) Soil or Water Degradation: Except as otherwise provided in this Agreement or the PRMP, there shall be no use of, or the conducting of any activity on, the Property that causes or is likely to cause soil degradation, erosion, depletion or pollution of, or siltation on, any surface or subsurface waters of the Property, and there shall be no change to the surface or subsurface hydrology of the Property in any manner. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding, or related activities, or altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns. In addition, diverting or causing or permitting the diversion of surface or underground water into, within or out of the Property by any means, removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides is prohibited except as allowed under Section 4(i).

(g) Construction: Except as otherwise provided in this Agreement or the PRMP, there shall be no constructing or placing of any building, mobile home, asphalt or concrete pavement, billboard or other advertising display, antenna, utility pole, tower, conduit, line, pier, landing, dock, or any other temporary or permanent structure or facility or any other man-made structures on the Property except in connection with the repair, maintenance, or replacement (but not expansion) of any structures and other improvements located on the Property as of the Effective Date of this Agreement. Grantor shall have the right to maintain, renovate, and repair existing buildings, structures, fences, pens, wells, dams and reservoirs, utilities, soft-surface roads, and other improvements, and in the event of their destruction, to reconstruct any such existing improvement with another of similar size, function, capacity, location, and material.

(h) Roads: Excluding any and all right-of-ways and easements granted prior to the Effective Date of this Agreement, there shall be no construction of roads, trails, or walkways on the Property; nor any enlargement, widening, improvement or modification to any existing roads, trails, or walkways or any other rights of way on the Property. Maintenance of existing roads shall be limited to removal of dead vegetation, necessary pruning or removal of obstructing trees and plants, and/or application of permeable materials (e.g., sand, gravel, and crushed stone) as necessary to correct or prevent erosion and maintain all-weather serviceability.

(i) Waters: Except as otherwise allowed in this Section 4(i), there shall be no polluting, altering, manipulating, depleting or extracting of surface or subsurface water (including, but not limited to, ponds, creeks or other water courses) or any other water bodies on the Property, and there shall be no conducting or (to the extent in Grantor's control) allowing any entity or person to conduct activities on the Property that would be detrimental to water purity or that alter the natural water level or flow in or over the Property (including, but not limited to, damming, dredging or construction in any free flowing water body, nor any manipulation or alteration of natural water courses, fresh water lake and pond shores, marshes or other water bodies). It is understood that Grantor is allowed to use the Property to periodically drain water from the Turkey Peak emergency spillway and that this is not a prohibited activity on the Property. It is understood that the Grantor will be responsible to maintain the Property in accordance with the terms of the PRMP and this includes making restorative repairs to the Property, if needed, following those times when the Turkey Peak emergency spillway is engaged.

(j) Vehicles: Use of vehicles off of designated roadways and pathways on the Property shall be limited to access on the site for monitoring, maintenance, fire protection/emergency action, or other

approved activities, as specified in the PRMP. Off road vehicular access on the Property for recreational use is expressly prohibited.

(k) Easements: Except as otherwise provided in this Agreement, including, but not limited to, the easement contemplated, granted, and conveyed in Section 6, herein, there shall be no granting or conveying of any easements by Grantee on, over, under, across, or through the Property, including, but not limited to, access easements and utility easements.

(l) Signage: Construction or placement of any signs, billboards, or other advertising displays on the Property is not permitted, except that signs whose placement, number, and design do not significantly diminish the scenic character of the Property may be placed to state the name and address of the Property and the names of persons living on the Property, to advertise or regulate permitted on-site activities, to advertise the Property for sale or rent, to post the Property to control unauthorized entry or use, or to identify the property as being protected by this Conservation Easement.

(m) Development Rights: No development rights that have been encumbered or extinguished by this Agreement or the Conservation Easement granted herein shall be transferred pursuant to a transferable development rights scheme or cluster development arrangement or otherwise.

(n) Hunting: Grantor and Grantor's lessees and guests may conduct hunting, fishing or trapping activities in accordance with appropriate federal, state and local laws and restrictions that conform to terms of this Conservation Easement and the Permit and Mitigation Plan. Grantor may expressly construct hunting blinds, the size, design, location, and number of which shall be subject to Grantee's prior written approval. No non-native animal species may be introduced to the Property.

(o) Dumping: There shall be no dumping or storing of any material, such as trash, wastes, ashes, sewage, garbage, scrap material, sediment discharges, oil and petroleum by-products, leached compounds, toxic materials or fumes, or any "hazardous substances" (as hereinafter defined). For the purposes of this paragraph, the phrase "hazardous substances" shall be defined as in the federal Comprehensive Environmental Response, Compensation and Liability Act (42 U.S.C. 9601 et seq.) and/or a substance whose manufacture, processing, distribution in commerce, use, possession, or disposal is banned, prohibited, or limited pursuant to the federal Toxic Substances Control Act (15 U.S.C. 2601 et seq.).

(p) Other Prohibitions: Any other use of, or activity on, the Property which is or may become inconsistent with the Purposes of the Conservation Easement granted herein, the preservation of the Property in its natural condition, or the protection of its environmental systems, is prohibited.

5. Rights Reserved to Grantor. The Grantor expressly reserves for itself, its successors and assigns, the right of access to and the right of continued use of the Property for all purposes not inconsistent with the Permit or this Agreement and the Conservation Easement granted herein, including, but not limited to, the right to quiet enjoyment of the Property, the rights of ingress and egress with respect to the Property, the right to fence the Property and to prohibit public access thereto, the Access Purposes (defined herein), and the right to sell, transfer, gift or otherwise convey the Property, in whole or in part, provided such sale, transfer, or gift conveyance is subject to the terms of, and shall specifically reference, the Conservation Easement. Except as may be expressly provided otherwise in this Agreement, including the Access Route/Road shown in **Exhibit "E"**, neither this Agreement nor the Conservation Easement granted herein in any way limits, restricts or in any way affects any property of Grantor other than the Property, including without limitation, any property adjacent to, surrounding or near the Property. The rights conveyed by this Agreement and the Conservation Easement granted herein do not constitute a conveyance of a fee interest in the Property, nor of any of the mineral rights therein and

thereunder. The rights retained by Grantor as set forth in this Section 5 are referred to hereinafter as the "Reserved Rights".

6. **Rights of Grantee.** Grantor also grants and conveys to Grantee or its authorized representatives, successors, and assigns, and the USACE, the right to enter the Property at all reasonable times for the purposes of (i) inspecting the Property to determine if the Grantor or any of its successors and assigns is complying with the terms, conditions, restrictions, and Purposes of the Conservation Easement, and (ii) taking such actions which are consistent with the Conservation Easement and the Permit. Such right to enter the Property includes the right of pedestrian and vehicular ingress and egress to and from the Property (collectively, the "***Access Purposes***"). Access to the Property through the Grantor's remaining property not included in this Conservation Easement shall be via routes authorized by the Grantor as shown in **Exhibit "E"** and shall be coordinated with the Grantor no less than forty eight (48) hours prior to the proposed access time, except in the case of emergency. The easement rights granted herein do not include any public access rights. Grantee shall indemnify, defend and hold harmless Grantor and its affiliates, partners, members, directors, officers, employees, agents and contractors and the heirs, personal representatives, successors and assigns of each of them from and against any and all liability, loss, cost or damage arising out of or in connection with Grantee's exercise of its rights under the Conservation Easement. Nothing construed herein shall constitute an agreement by USACE to indemnify, defend or hold harmless Grantor, or any of the above-listed parties, from and against any liability, loss, cost or damage.

7. **Mineral Extraction.** There shall be no exploration, development, production, extraction, or transportation of oil, gas or other mineral substances (whether such other mineral substances be part of the mineral estate or part of the surface estate) by Grantor on, from, or across the Property ("**Mineral Activities**") except in accordance with this Section; provided, however, that this Section does not apply to water, which is addressed elsewhere in this Conservation Easement.

- (a) **No Surface Mining.** Grantor shall not conduct surface mining on the Property by any surface mining methods, including, without limitation, the mining of gravel, sand or caliche.
- (b) **No Surface Use.** It is understood and agreed by Grantor, Grantee, and any third party beneficiaries that Grantor may conduct Mineral Activities on the Property; provided however, that in the event that Grantor conducts any Mineral Activities on the Property, (i) Grantor shall not use or occupy any portion of the surface estate of the Property and shall not place any facilities, fixtures, equipment, building, structures, pipelines, rights of way or personal property of any kind or nature whatsoever on the surface of the Property or in the subsurface within the depth interval of 1000 feet below the surface of the Property or on or in any portion thereof, and (ii) any and all Mineral Activities by Grantor shall be conducted by directional or horizontal drilling below said subsurface interval from a surface location off the Property. Grantor hereby waives any rights whatsoever to the use of the surface and said subsurface interval of the Property in connection with any Mineral Activities Grantor conducts on the Property. Notwithstanding anything to the contrary in the foregoing provisions of this Subsection (b), Grantor shall not be prohibited from conducting exploratory activities on the Property that are non-invasive, do not otherwise damage or negatively impact the watersheds thereon or any underlying aquifer, and do not significantly impair or interfere with the Conservation Values. To the extent Grantor elects to explore for, extract, or exploit any oil, gas or other minerals in or under the Property from a surface location off the Property, Grantor shall use reasonable efforts to minimize any damage or other negative impact to the watersheds on or any aquifer underlying the Property by such activity.

Grantee and any third party beneficiaries known to Grantor must be given written notice from Grantor of any actual or proposed Mineral Activities that Grantor intends to conduct or authorize in and under the Property at least forty-five (45) days prior to Grantor entering into any contract with or lease to any third party for mineral exploration; and, if no such contract or lease, prior to Grantor beginning any work. In addition to the above surface waiver requirements in the foregoing provisions of this Subsection (b), Grantor shall, prior to entering into any contract or lease (or prior to beginning any work if there is no contract or lease), consult with Grantee and any third party beneficiaries and make reasonable efforts to incorporate conditions or restrictions as Grantee and any third party beneficiaries may reasonably determine are required in order to prevent a significant impairment or interference with the Conservation Values of the Property. Grantee and any third party beneficiaries reserve the right to attend and participate in all meetings, negotiations or discussions regarding any actual or proposed Mineral Activities or otherwise associated with the exploration for, extraction of, or translocation of any minerals in and under the Property in order to protect their interest in the Conservation Easement.

Any and all mineral contracts, mineral conveyances, and mineral leases authorizing Mineral Activities in and under the Property that are executed subsequent to the date of this Agreement to which Grantor is a party shall be subject to the provisions hereof.

- (c) Third-Party Minerals. To the extent that all or part of the oil, gas or other mineral substances (whether such other mineral substances be part of the mineral estate or part of the surface estate) in and under the Property are owned by third party mineral interest owners as of the date of the grant of this Conservation Easement, the following provisions shall apply to such third party owned oil, gas and other mineral substances to the extent this Conservation Easement is deemed subordinated (by law or otherwise) to such third parties' ownership rights in the oil, gas and other mineral substances in and under the Property, and in such event, only to the extent that Grantor has the legal right to comply with these provisions:
- i) Grantee and any third party beneficiaries recognize that Grantor may not receive notice from third party mineral interest owners of Mineral Activities proposed to occur on the Property. Grantor shall promptly notify Grantee and any third party beneficiaries upon receiving written notice or such other notice from third party mineral interest owners that Grantor reasonably believes to be objectively credible of any Mineral Activities proposed to occur in and under the Property by any such third party mineral interest owners (or their lessees).
 - ii) Whenever such third party mineral interest owners are required by applicable law or pursuant to any existing or future contract, conveyance or lease to obtain any consent from Grantor with respect to any access to, operation on, physical alteration of, or improvement to the Property, Grantor shall, prior to giving any such consent, notify and consult with Grantee and any third party beneficiaries and shall incorporate the conditions or restrictions set forth in Subsection 7(b) above into such consent to the extent allowed by law. In instances where Grantor does not have the unilateral right to impose the conditions and restrictions set forth in Subsection 7(b) above, Grantor will use reasonable efforts to negotiate protection of the Conservation Values by third-party mineral interest owners.

In the event Grantor at any time becomes the owner of any of such third party mineral interests in and under the Property, then such rights shall be deemed immediately subject to this Conservation Easement (including without limitation, paragraphs (a) and (b) of this Section), and any and all subsequent Mineral Activities, contracts, conveyances and leases of or relating to such ownership rights shall be bound by the provisions of this Conservation Easement.

8. **Liens and Taxes.** Grantor shall keep the Property free of any and all liens, including, without limitation, liens arising out of any work performed for, materials furnished to, or obligations incurred by Grantor. Grantor shall pay before delinquency all taxes, assessments, fees, and charges of whatever description levied on or assessed against the Property by competent authority, and shall upon written request by Grantee furnish Grantee with satisfactory evidence of payment.

9. **Enforcement.** In the event of a breach of this Agreement by Grantor, the Grantee, or any third party or any third party working for or under the direction of Grantor or the Grantee, the Parties and the USACE shall be notified immediately. If USACE becomes aware of a breach of this Agreement, then USACE will notify the Grantee and Grantor of the breach.

In the event of a breach by Grantor, Grantor shall have thirty (30) days after receipt of such notice to undertake actions that are reasonably calculated to correct the conditions constituting the breach. If the conditions constituting the breach are corrected in a timely and reasonable manner, no further action shall be warranted or authorized. If the conditions constituting the breach are such that more than thirty (30) days are required to cure the breach, Grantor shall not be in default hereunder if Grantor undertakes the cure of such breach during the thirty (30) day period following notice of the breach and diligently pursues the cure of the breach to completion. If Grantor fails to initiate such corrective action within thirty (30) days or fails to complete the necessary corrective action, the Grantee may enforce the Conservation Easement by appropriate legal proceedings to the extent authorized under Texas law, including an action for damages, injunctive and other relief. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive relief or other appropriate relief to the extent authorized under Texas law if the breach of any provision of the Conservation Easement is materially impairing or would irreversibly or otherwise materially impair the benefits to be derived from the Conservation Easement. Grantor and the Grantee acknowledge that under such circumstances, damage to the Grantee would be irreparable and remedies at law will be inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with the Conservation Easement. To the extent authorized under Texas law, the costs of a breach of this Agreement and the costs of any correction or restoration, including the Grantee's expenses, court costs and attorney's fees, shall be paid by Grantor. The USACE shall have the same right to enforce the terms and conditions of the Conservation Easement as the Grantee.

Any forbearance or failure on the part of the Grantee or the USACE to exercise its rights in the event of a violation shall not be deemed or construed to be a waiver of either Grantee's or the USACE's rights hereunder. Nor shall forbearance or failure to enforce any covenant or provision hereof discharge or invalidate such covenant or provision or any other covenant, condition, or provision hereof or affect the right of the Grantee and the USACE to enforce the same in the event of a subsequent breach or default.

Nothing contained in this Agreement or the Conservation Easement granted herein shall be construed to entitle the Grantee to bring any action against Grantor for any injury to or change in the Property, or for any violation of any covenant or provision of this Agreement, resulting from any prudent action taken in good faith by Grantor under emergency or force majeure conditions to prevent, abate, or mitigate significant injury to life, damage to property or harm to the Property resulting from any of such causes.

USACE shall have the same right to enforce the terms and conditions of the Conservation Easement as the Grantee, and notwithstanding the above, USACE as a federal agency, will follow Texas law to the extent it does not conflict with Federal law, or interfere with USACE's 404 Permit enforcement and the performance of Permittee's obligations under the Permit. Further, any legal proceeding involving USACE as a party will be subject to the jurisdiction of federal court.

10. **Duration.** The burdens of this Agreement and the Conservation Easement shall run with the Property and shall be enforceable against Grantor and all future interests in and to the Property in perpetuity. Grantor agrees that the future transfer or conveyance of any interest in or to the Property shall at all times be subject and subordinate to the terms, conditions, restrictions and Purposes of the Conservation Easement and a reference to this Agreement shall be included in each instrument of transfer or conveyance of any interest in or to the Property from and after the Effective Date; provided, however, that nothing in this Agreement shall be construed to in any way limit Grantee's ability to freely sell, convey, assign, or otherwise transfer the property interest and rights, or any portions thereof, granted by this Agreement to any other person or entity, except as otherwise provided in this Agreement.

11. **General Provisions.**

(a) **Notices.** Any notice, request for approval, or other communication required under this Conservation Easement shall be sent by registered or certified mail, postage prepaid, to the following addresses (or such address as may be hereafter specified by notice pursuant to this paragraph):

To Grantor: Palo Pinto County Municipal Water District No. 1
 Attn: President
 P.O. Box 387
 Mineral Wells, TX 76068

To Grantee:

To the USACE:

Regulatory Branch
Fort Worth District
U.S. Army Corps of Engineers
P. O. Box 17300
Fort Worth, Texas 76102

(b) **Severability.** In the event any provision of this Agreement is determined by the appropriate court to be void and unenforceable, all remaining terms shall remain valid and binding, and in full force and effect.

(c) **Agreement Binding.** The terms, covenants, and conditions of this Agreement shall be binding upon and shall inure to the benefit of Grantor, Grantee, and their respective executors, administrators, heirs, legal representatives, successors and assigns. Notwithstanding the foregoing, Grantee not may assign (i) this Agreement, or (ii) any rights or interests in this Agreement, without the prior written approval of Grantor and the USACE.

(d) Warranty. Grantor warrants, covenants, and represents that it owns the surface estate to the Property in fee simple, and that Grantor either owns all interests in the surface estate to the Property which may be impaired by the granting of the Conservation Easement or that there are no outstanding mortgages, tax liens, encumbrances, or other interests in the surface estate of the Property which have not been expressly subordinated to the Conservation Easement. Grantor further warrants that Grantee shall have the use of and shall enjoy all the benefits derived from and arising out of the Conservation Easement, and that Grantor will warrant and defend title to the Property against all persons claiming by, through or under Grantor, but not otherwise.

(e) Subsequent Transfers. Grantor agrees to incorporate the terms of this Agreement and the Conservation Easement in any deed or other legal instrument that transfers any interest in all or any portion of the Property. Grantor agrees to provide written notice of such transfer at least thirty (30) days prior to the date of the transfer. Grantor and Grantee agree that the terms of the Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof and shall not be amended, modified or terminated without the prior written consent and approval of the USACE.

(f) Assignment or Transfer. The Parties recognize and agree that the benefits of the Conservation Easement are in gross and assignable by the Grantee; provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns the Conservation Easement, the organization receiving the interest will be a qualified holder under applicable state and federal law. The Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this Agreement and that the balance of any management and conservation funds or other funds allocated by the Permittee for implementation of the Conservation Easement be transferred to the new Conservation Easement holder. Grantee shall select a transferee agreeable to the Permittee. Grantee shall give written notice by certified mail to Permittee of any proposed assignment at least 90 days prior to the date of such assignment. Within 45 days after receiving the written notice, Permittee will by written letter advise the Grantee if the proposed replacement Grantee is acceptable, and, if not, will provide the Grantee with the name of at least one acceptable replacement Grantee; and Grantee agrees to select the replacement Grantee.

(g) Obligations of Ownership. Grantee shall not be responsible for any costs or liability of any kind related to the ownership, operation, insurance, upkeep, or maintenance of the Property, except as expressly provided herein. Nothing herein shall relieve the Grantor of the obligation to comply with any federal, state, or local laws, regulations and permits that may apply to the Property in connection with the exercise by Grantor of the Reserved Rights.

(h) Extinguishment. In the event that changed conditions render impossible the continued use of the Property for the conservation purposes as contemplated by this Agreement, the Conservation Easement may only be extinguished, in whole or in part, by judicial proceeding in any court of competent jurisdiction.

(i) Eminent Domain. Whenever all or any part of the Property is taken in the exercise of eminent domain so as to substantially abrogate the restrictions imposed by this Agreement and the Conservation Easement, Grantor and Grantee shall join in appropriate actions at the time of such taking to recover the full value of the taking, and all incidental and direct damages due to the taking.

(j) Proceeds. The Conservation Easement constitutes a real property interest immediately vested in Grantee. In the event that all or a portion of the Property is sold, exchanged, or involuntarily converted following an extinguishment of all or any portion of the Conservation Easement, or following the exercise of eminent domain, Grantee shall be entitled to the fair market value of the Conservation

Easement. The parties stipulate that the fair market value of the Conservation Easement shall be determined by multiplying the fair market value of the Property unencumbered by the Conservation Easement (minus any increase in value after the Effective attributable to improvements) by the ratio of the value of the Conservation Easement as of the Effective Date to the value of the Property (without deduction for the value of the Conservation Easement) at the time of this grant. The values as of the Effective Date and as referenced in this Section 11(j) shall be the values used, or which would have been used, to calculate a deduction for federal income tax purposes, pursuant to Section 170(h) of the Internal Revenue Code of 1986, as amended (whether eligible or ineligible for such a deduction). Grantee shall use its share of any proceeds in a manner consistent with the Purposes of the Conservation Easement.

Nothing herein shall constitute a grant of real property or proceeds to the USACE.

(k) Failure of Grantee. If at any time Grantee is unable or fails to enforce the Conservation Easement, or if Grantee ceases to be a qualified grantee, and if within a reasonable period of time after the occurrence of any of such events, Grantee fails to make an assignment of its interest pursuant to the

Conservation Easement, then Grantee's interest shall become vested in another qualified grantee in accordance with and as provided by an appropriate and final, non-appealable proceeding in a court of competent jurisdiction.

(l) Amendment. This Agreement and the Conservation Easement granted herein may be amended, but only in a writing signed by the Parties hereto; provided, however, that such amendment does not affect the qualification of the Conservation Easement or the status of the Grantee under any applicable laws, is consistent with the conservation purposes of this Agreement and the Conservation Easement granted herein, and does not conflict with the Permit No. _____ or its related PRMP. Notice of such amendment shall be provided to the USACE.

TO HAVE AND TO HOLD the Conservation Easement for the Purposes herein described, subject, however, to the matters herein set forth and to all matters of record with respect to the Property, unto Grantee, its successors and assigns, forever; and Grantor does hereby bind itself, its successors and assigns to warrant and defend the Conservation Easement and the rights granted herein, unto Grantee, its successors and assigns, against every person whomsoever lawfully claiming or to claim the same or any part thereof by, through or under Grantor, but not otherwise.

[SIGNATURE PAGE FOLLOWS]

EXECUTED and DELIVERED to be effective as of the Effective Date.

GRANTOR:

GRANTEE:

[ACKNOWLEDGMENTS FOLLOW]

Exhibit A
to
Conservation Easement Agreement

Metes and Bounds Legal Description of the Property

[TO BE PROVIDED]

Exhibit B
to
Conservation Easement Agreement

The Permit

[TO BE ATTACHED]

Exhibit C
to
Conservation Easement Agreement

Permittee Responsible Mitigation Plan

[TO BE PROVIDED]

Exhibit D

to
Conservation Easement Agreement

Baseline Documentation Report

[TO BE PROVIDED]

- (f) to serve as a mitigation area pursuant to the regulation and guidelines of the United States Environmental Protection Agency (EPA) and the USACE promulgated under authority of Section 404 of the Clean Water Act (33 USC § 1344, et seq.) and Section 10 of the Rivers and Harbors Act of 1899 (33 USC § 403, et seq.).

Any uses of the Property that may impair or interfere with these Purposes of the Conservation Easement are expressly prohibited.

E. The preservation of the Property is a condition of the Permit, required to mitigate for unavoidable adverse impacts to waters of the United States. Grantor and Grantee agree that third-party rights of enforcement shall be held by the USACE, Fort Worth District, and any successor agencies, and that such rights are in addition to, and do not limit, the rights of enforcement under the Permit.

F. The following Exhibits are attached to this Conservation Easement and incorporated by reference:

- Exhibit A** Legal Description of the Property
- Exhibit B** U.S. Army Corps of Engineers Permit
- Exhibit C** Permittee Responsible Mitigation Plan
- Exhibit D** Baseline Documentation Report
- Exhibit E** Access Route/Road to Property

Agreement:

NOW THEREFORE, for good and valuable consideration paid by Grantee, the receipt and legal sufficiency of which are hereby acknowledged by Grantor, and in consideration of the covenants, mutual agreements and conditions herein contained, Grantor has TRANSFERRED, BARGAINED, GRANTED, SOLD, CONVEYED, ASSIGNED, SET OVER and DELIVERED, and by these presents does TRANSFER, BARGAIN, GRANT, SELL, CONVEY, ASSIGN, SET OVER and DELIVER, to Grantee a conservation easement on, over, under, across, along and through the Property on the terms set forth herein, together with all other rights reasonably necessary or desirable to accomplish the objectives of the Mitigation Plan and the Purposes of and rights granted under this Agreement (the "Conservation Easement"), subject to the following terms, reservations, covenants, limitations and exceptions:

1. **Duration of Easement.** The Conservation Easement shall be perpetual. The Conservation Easement is an easement in gross, runs with the land, and is enforceable by Grantee against Grantor, and Grantor's successors, assigns, lessees, agents, and licensees.

2. **Property Description.** The metes and bounds legal description of the Property set forth in **Exhibit "A"** and incorporated herein by reference for all purposes are metes and bounds descriptions and surveys of the Property prepared by a Texas Registered Professional Land Surveyor.

3. **Present Condition of the Property.** Neither Grantor, its agents, assigns, successors, or personal representatives, nor any purchasers, lessees, or other users of the Property may use, disturb, or

allow through intent or negligence, the use or disturbance of the Property in any manner that is inconsistent with the Purposes of the Conservation Easement. The waters of the U.S. and other aquatic resources, scenic, resource, environmental, and other natural characteristics of the Property, and its current use and state of improvement, are described in the Baseline Documentation Report, attached hereto as **Exhibit "D"**, prepared by Permittee and acknowledged by the Grantor and Grantee to be complete and accurate as of the date hereof. Both Grantor and Grantee have copies of this report. It will be used by the Parties to assure that any future changes in management actions or use of the Property will be consistent with the terms of this Conservation Easement. However, this report is not intended to preclude the use of other evidence to establish the present condition of the Property if there is a controversy over its use.

4. **Prohibited Activities.** Any activity on, or use of, the Property inconsistent with the Purposes of the Conservation Easement is prohibited. In the event of a conflict between this Section 4 and the conditions of the Permit, including, but not limited to, the PRMP, the conditions of the Permit, including, but not limited to, the PRMP, shall control. The Property shall be preserved in its natural condition and restricted from any development that would impair or interfere with the conservation values of the Property. Without limiting the generality of the foregoing, the following activities and uses are expressly prohibited, restricted, or reserved as indicated hereunder:

(a) **Vegetation:** Except as otherwise provided in this Agreement or the PRMP, there shall be no removing, destroying, cutting, trimming, mowing, shredding, burning, harming, or altering of any vegetation, or disturbing or changing in any way the natural habitat existing on the Property except as expressly allowed in the PRMP and in order to fulfill the objectives and success criteria of that plan. Grantor may remove diseased, invasive or non-native trees, shrubs, or plants; cut and mow firebreaks and existing road rights-of-way; and remove trees, shrubs, or plants to accommodate maintenance of permitted improvements or other uses expressly permitted under the terms of this Conservation Easement. With written approval of Grantee, Grantor may remove potentially invasive plants from the Property for habitat management purposes consistent with the intent of this Conservation Easement. Except as necessary for activities expressly permitted in this Conservation Easement and with written permission from Grantee, there shall be no farming, tilling, or destruction and removal of native vegetation on the Property. There shall be no planting of invasive or potentially invasive non-native plant species anywhere on the Property. Grantee will provide a list of potentially invasive species upon request. There shall be no use of pesticides, including but not limited to insecticides, fungicides, rodenticides, and herbicides, except as expressly allowed in the PRMP.

(b) **Predator and Nuisance Species Control:** Grantor, with written approval of Grantee, shall have the right to control, destroy, or trap predatory, exotic, invasive, and problem animals that pose a material threat to people, livestock, other animals, or habitat conditions in accordance with applicable state and federal laws and requirements.

(c) **Uses:** No agricultural, residential or industrial activity shall be conducted upon the Property. There shall be no storing or dumping of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances, machinery, or hazardous substances, or toxic or hazardous waste, or any placement of underground or aboveground storage tanks or other materials on the Property that may negatively impact or be detrimental to the Property or to the surface or subsurface waters of the Property. Livestock animals shall not be allowed on the Property. Any right of passage for any activity or use set forth in this paragraph is also prohibited.

(d) **Topography:** There shall be no change in the topography of the Property except as expressly provided in the PRMP. There shall be no surface mining, filling, excavating, grading, dredging,

mining or drilling upon the Property, and there shall be no removing of topsoil, peat, sand, gravel, rock, minerals or other materials from the Property except (i) to restore natural topography or drainage patterns, (ii) to improve the topography from the then-current condition, as agreed to by the Grantor and Grantee and approved by the USACE, as necessary, or (iii) as necessary to use the Property as otherwise authorized in this Agreement.

(e) Soil or Water Degradation: Except as otherwise provided in this Agreement or the PRMP, there shall be no use of, or the conducting of any activity on, the Property that causes or is likely to cause soil degradation, erosion, depletion or pollution of, or siltation on, any surface or subsurface waters of the Property, and there shall be no change to the surface or subsurface hydrology of the Property in any manner. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding, or related activities, or altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns. In addition, diverting or causing or permitting the diversion of surface or underground water into, within or out of the Property by any means, removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides is prohibited.

(f) Construction: Except as otherwise provided in this Agreement or the PRMP, there shall be no constructing or placing of any building, mobile home, asphalt or concrete pavement, billboard or other advertising display, antenna, utility pole, tower, conduit, line, pier, landing, dock, or any other temporary or permanent structure or facility or any other man-made structures on the Property except in connection with the repair, maintenance, or replacement (but not expansion) of any structures and other improvements located on the Property as of the Effective Date of this Agreement. Grantor shall have the right to maintain, renovate, and repair existing buildings, structures, fences, pens, wells, dams and reservoirs, utilities, soft-surface roads, and other improvements, and in the event of their destruction, to reconstruct any such existing improvement with another of similar size, function, capacity, location, and material.

(g) Roads: Excluding any and all right-of-ways and easements granted prior to the Effective Date of this Agreement, there shall be no construction of roads, trails, or walkways on the Property; nor any enlargement, widening, improvement or modification to any existing roads, trails, or walkways or any other rights of way on the Property. Maintenance of existing roads shall be limited to removal of dead vegetation, necessary pruning or removal of obstructing trees and plants, and/or application of permeable materials (e.g., sand, gravel, and crushed stone) as necessary to correct or prevent erosion and maintain all-weather serviceability.

(h) Waters: There shall be no polluting, altering, manipulating, depleting or extracting of surface or subsurface water (including, but not limited to, ponds, creeks or other water courses) or any other water bodies on the Property, and there shall be no conducting or (to the extent in Grantor's control) allowing any entity or person to conduct activities on the Property that would be detrimental to water purity or that alter the natural water level or flow in or over the Property (including, but not limited to, damming, dredging or construction in any free flowing water body, nor any manipulation or alteration of natural water courses, fresh water lake and pond shores, marshes or other water bodies). It is understood that with respect to the prohibited activities set forth in this Section 4(h), Grantor may not and will not engage in any such prohibited activities on the Property.

(i) Vehicles: Use of vehicles off of designated roadways and pathways on the Property shall be limited to access on the site for monitoring, maintenance, fire protection/emergency action, or other

approved activities, as specified in the PRMP. Off road vehicular access on the Property for recreational use is expressly prohibited.

(j) Easements: Except as otherwise provided in this Agreement, including, but not limited to, the easement contemplated, granted, and conveyed in Section 6, herein, there shall be no granting or conveying of any easements on, over, under, across, or through the Property, including, but not limited to, access easements and utility easements.

(k) Signage: Construction or placement of any signs, billboards, or other advertising displays on the Property is not permitted, except that signs whose placement, number, and design do not significantly diminish the scenic character of the Property may be placed to state the name and address of the Property and the names of persons living on the Property, to advertise or regulate permitted on-site activities, to advertise the Property for sale or rent, to post the Property to control unauthorized entry or use, or to identify the property as being protected by this Conservation Easement.

(l) Development Rights: No development rights that have been encumbered or extinguished by this Agreement or the Conservation Easement granted herein shall be transferred pursuant to a transferable development rights scheme or cluster development arrangement or otherwise.

(m) Hunting: Grantor and Grantor's lessees and guests may conduct hunting, fishing or trapping activities in accordance with appropriate federal, state and local laws and restrictions that conform to terms of this Conservation Easement and the Permit and Mitigation Plan. Grantor may expressly construct hunting blinds, the size, design, location, and number of which shall be subject to Grantee's prior written approval. No non-native animal species may be introduced to the Property.

(n) Dumping: There shall be no dumping or storing of any material, such as trash, wastes, ashes, sewage, garbage, scrap material, sediment discharges, oil and petroleum by-products, leached compounds, toxic materials or fumes, or any "hazardous substances" (as hereinafter defined). For the purposes of this paragraph, the phrase "hazardous substances" shall be defined as in the federal Comprehensive Environmental Response, Compensation and Liability Act (42 U.S.C. 9601 et seq.) and/or a substance whose manufacture, processing, distribution in commerce, use, possession, or disposal is banned, prohibited, or limited pursuant to the federal Toxic Substances Control Act (15 U.S.C. 2601 et seq.).

(o) Other Prohibitions: Any other use of, or activity on, the Property which is or may become inconsistent with the Purposes of the Conservation Easement granted herein, the preservation of the Property in its natural condition, or the protection of its environmental systems, is prohibited.

5. **Rights Reserved to Grantor**. The Grantor expressly reserves for itself, its successors and assigns, the right of access to and the right of continued use of the Property for all purposes not inconsistent with the Permit or this Agreement and the Conservation Easement granted herein, including, but not limited to, the right to quiet enjoyment of the Property, the rights of ingress and egress with respect to the Property, the right to fence the Property and to prohibit public access thereto, the Access Purposes (defined herein), and the right to sell, transfer, gift or otherwise convey the Property, in whole or in part, provided such sale, transfer, or gift conveyance is subject to the terms of, and shall specifically reference, the Conservation Easement. Except as may be expressly provided otherwise in this Agreement, including the Access Route/Road shown in **Exhibit "E"**, neither this Agreement nor the Conservation Easement granted herein in any way limits, restricts or in any way affects any property of Grantor other than the Property, including without limitation, any property adjacent to, surrounding or near the Property. The rights conveyed by this Agreement and the Conservation Easement granted herein do not constitute a conveyance of a fee interest in the Property, nor of any of the mineral rights therein and

thereunder. The rights retained by Grantor as set forth in this Section 5 are referred to hereinafter as the "Reserved Rights".

6. **Rights of Grantee.** Grantor also grants and conveys to Grantee or its authorized representatives, agents, successors, and assigns, and the USACE, the right to enter the Property at all reasonable times for the purposes of (i) inspecting the Property to determine if the Grantor or any of its successors and assigns is complying with the terms, conditions, restrictions, and Purposes of the Conservation Easement, and (ii) taking such actions which are consistent with the Conservation Easement and the Permit. Such right to enter the Property includes the right of pedestrian and vehicular ingress and egress to and from the Property (collectively, the "***Access Purposes***"). Access to the Property through the Grantor's remaining property not included in this Conservation Easement shall be via routes authorized by the Grantor as shown in **Exhibit "E"** and shall be coordinated with the Grantor no less than forty eight (48) hours prior to the proposed access time, except in the case of emergency. The easement rights granted herein do not include any public access rights. Grantee shall indemnify, defend and hold harmless Grantor and its affiliates, partners, members, directors, officers, employees, agents and contractors and the heirs, personal representatives, successors and assigns of each of them from and against any and all liability, loss, cost or damage arising out of or in connection with Grantee's exercise of its rights under the Conservation Easement. Nothing construed herein shall constitute an agreement by USACE or Grantee to indemnify, defend or hold harmless Grantor, or any of the above-listed parties, from and against any liability, loss, cost or damage.

7. **Mineral Extraction.** There shall be no exploration, development, production, extraction, or transportation of oil, gas or other mineral substances (whether such other mineral substances be part of the mineral estate or part of the surface estate) by Grantor on, from, or across the Property ("**Mineral Activities**") except in accordance with this Section; provided, however, that this Section does not apply to water, which is addressed elsewhere in this Conservation Easement.

- (a) **No Surface Mining.** Grantor shall not conduct surface mining on the Property by any surface mining methods, including, without limitation, the mining of gravel, sand or caliche.
- (b) **No Surface Use.** It is understood and agreed by Grantor, Grantee, and any third party beneficiaries that Grantor may conduct Mineral Activities on the Property; provided however, that in the event that Grantor conducts any Mineral Activities on the Property, (i) Grantor shall not use or occupy any portion of the surface estate of the Property and shall not place any facilities, fixtures, equipment, building, structures, pipelines, rights of way or personal property of any kind or nature whatsoever on the surface of the Property or in the subsurface within the depth interval of 1000 feet below the surface of the Property or on or in any portion thereof, and (ii) any and all Mineral Activities by Grantor shall be conducted by directional or horizontal drilling below said subsurface interval from a surface location off the Property. Grantor hereby waives any rights whatsoever to the use of the surface and said subsurface interval of the Property in connection with any Mineral Activities Grantor conducts on the Property. Notwithstanding anything to the contrary in the foregoing provisions of this Subsection (b), Grantor shall not be prohibited from conducting exploratory activities on the Property that are non-invasive, do not otherwise damage or negatively impact the watersheds thereon or any underlying aquifer, and do not significantly impair or interfere with the Conservation Values. To the extent Grantor elects to explore for, extract, or exploit any oil, gas or other minerals in or under the Property from a surface location off the Property, Grantor shall use reasonable efforts to minimize any damage or other negative impact to the watersheds on or any aquifer underlying the Property by such activity.

Grantee and any third party beneficiaries known to Grantor must be given written notice from Grantor of any actual or proposed Mineral Activities that Grantor intends to conduct or authorize in and under the Property at least forty-five (45) days prior to Grantor entering into any contract with or lease to any third party for mineral exploration; and, if no such contract or lease, prior to Grantor beginning any work. In addition to the above surface waiver requirements in the foregoing provisions of this Subsection (b), Grantor shall, prior to entering into any contract or lease (or prior to beginning any work if there is no contract or lease), consult with Grantee and any third party beneficiaries and make reasonable efforts to incorporate conditions or restrictions as Grantee and any third party beneficiaries may reasonably determine are required in order to prevent a significant impairment or interference with the Conservation Values of the Property. Grantee and any third party beneficiaries reserve the right to attend and participate in all meetings, negotiations or discussions regarding any actual or proposed Mineral Activities or otherwise associated with the exploration for, extraction of, or translocation of any minerals in and under the Property in order to protect their interest in the Conservation Easement.

Any and all mineral contracts, mineral conveyances, and mineral leases authorizing Mineral Activities in and under the Property that are executed subsequent to the date of this Agreement to which Grantor is a party shall be subject to the provisions hereof.

- (c) Third-Party Minerals. To the extent that all or part of the oil, gas or other mineral substances (whether such other mineral substances be part of the mineral estate or part of the surface estate) in and under the Property are owned by third party mineral interest owners as of the date of the grant of this Conservation Easement, the following provisions shall apply to such third party owned oil, gas and other mineral substances to the extent this Conservation Easement is deemed subordinated (by law or otherwise) to such third parties' ownership rights in the oil, gas and other mineral substances in and under the Property, and in such event, only to the extent that Grantor has the legal right to comply with these provisions:
- i) Grantee and any third party beneficiaries recognize that Grantor may not receive notice from third party mineral interest owners of Mineral Activities proposed to occur on the Property. Grantor shall promptly notify Grantee and any third party beneficiaries upon receiving written notice or such other notice from third party mineral interest owners that Grantor reasonably believes to be objectively credible of any Mineral Activities proposed to occur in and under the Property by any such third party mineral interest owners (or their lessees).
 - ii) Whenever such third party mineral interest owners are required by applicable law or pursuant to any existing or future contract, conveyance or lease to obtain any consent from Grantor with respect to any access to, operation on, physical alteration of, or improvement to the Property, Grantor shall, prior to giving any such consent, notify and consult with Grantor and any third party beneficiaries and shall incorporate the conditions or restrictions set forth in Subsection 7(b) above into such consent to the extent allowed by law. In instances where Grantee does not have the unilateral right to impose the conditions and restrictions set forth in Subsection 7(b) above, Grantee will use reasonable efforts to negotiate protection of the Conservation Values by third-party mineral interest owners.

In the event Grantor at any time becomes the owner of any of such third party mineral interests in and under the Property, then such rights shall be deemed immediately subject to this Conservation Easement (including without limitation, paragraphs (a) and (b) of this Section), and any and all subsequent Mineral Activities, contracts, conveyances and leases of or relating to such ownership rights shall be bound by the provisions of this Conservation Easement.

8. **Liens and Taxes.** Grantor shall keep the Property free of any and all liens, including, without limitation, liens arising out of any work performed for, materials furnished to, or obligations incurred by Grantor. Grantor shall pay before delinquency all taxes, assessments, fees, and charges of whatever description levied on or assessed against the Property by competent authority, and shall upon written request by Grantee furnish Grantee with satisfactory evidence of payment.

9. **Enforcement.** In the event of a breach of this Agreement by Grantor, the Grantee, or any third party or any third party working for or under the direction of Grantor, or Grantee, or the Parties, the USACE shall be notified immediately. If USACE becomes aware of a breach of this Agreement, then USACE will notify the Grantee and Grantor of the breach.

In the event of a breach by Grantor, Grantor shall have thirty (30) days after receipt of such notice to undertake actions that are reasonably calculated to correct the conditions constituting the breach. If the conditions constituting the breach are corrected in a timely and reasonable manner, no further action shall be warranted or authorized. If the conditions constituting the breach are such that more than thirty (30) days are required to cure the breach, Grantor shall not be in default hereunder if Grantor undertakes the cure of such breach during the thirty (30) day period following notice of the breach and diligently pursues the cure of the breach to completion. If Grantor fails to initiate such corrective action within thirty (30) days or fails to complete the necessary corrective action, the Grantee may enforce the Conservation Easement by appropriate legal proceedings to the extent authorized under Texas law, including an action for damages, injunctive and other relief. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive relief or other appropriate relief to the extent authorized under Texas law if the breach of any provision of the Conservation Easement is materially impairing or would irreversibly or otherwise materially impair the benefits to be derived from the Conservation Easement. Grantor and the Grantee acknowledge that under such circumstances, damage to the Grantee would be irreparable and remedies at law will be inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with the Conservation Easement. To the extent authorized under Texas law, the costs of a breach of this Agreement and the costs of any correction or restoration, including the Grantee's expenses, court costs and attorney's fees, shall be paid by Grantor. The USACE shall have the same right to enforce the terms and conditions of the Conservation Easement as the Grantee.

Any forbearance or failure on the part of the Grantee or the USACE to exercise its rights in the event of a violation shall not be deemed or construed to be a waiver of either Grantee's or the USACE's rights hereunder. Nor shall forbearance or failure to enforce any covenant or provision hereof discharge or invalidate such covenant or provision or any other covenant, condition, or provision hereof or affect the right of the Grantee and the USACE to enforce the same in the event of a subsequent breach or default.

Nothing contained in this Agreement or the Conservation Easement granted herein shall be construed to entitle the Grantee to bring any action against Grantor for any injury to or change in the Property, or for any violation of any covenant or provision of this Agreement, resulting from any prudent action taken in

good faith by Grantor under emergency or force majeure conditions to prevent, abate, or mitigate significant injury to life, damage to property or harm to the Property resulting from any of such causes.

USACE shall have the same right to enforce the terms and conditions of the Conservation Easement as the Grantee, and notwithstanding the above, USACE as a federal agency, will follow Texas law to the extent it does not conflict with Federal law, or interfere with USACE's 404 Permit enforcement and the performance of Permittee's obligations under the Permit. Further, any legal proceeding involving USACE as a party will be subject to the jurisdiction of federal court.

10. **Duration.** The burdens of this Agreement and the Conservation Easement shall run with the Property and shall be enforceable against Grantor and all future interests in and to the Property in perpetuity. Grantor agrees that the future transfer or conveyance of any interest in or to the Property shall at all times be subject and subordinate to the terms, conditions, restrictions and Purposes of the Conservation Easement and a reference to this Agreement shall be included in each instrument of transfer or conveyance of any interest in or to the Property from and after the Effective Date; provided, however, that nothing in this Agreement shall be construed to in any way limit Grantee's ability to freely sell, convey, assign, or otherwise transfer the property interest and rights, or any portions thereof, granted by this Agreement to any other person or entity, except as otherwise provided in this Agreement.

11. **General Provisions.**

(a) **Notices.** Any notice, request for approval, or other communication required under this Conservation Easement shall be sent by registered or certified mail, postage prepaid, to the following addresses (or such address as may be hereafter specified by notice pursuant to this paragraph):

To Grantor:

To Grantee:

To Permittee: Palo Pinto County Municipal Water District No. 1

 Attn: President

 P.O. Box 387

 Mineral Wells, TX 76068

To the USACE:

Regulatory Branch
Fort Worth District
U.S. Army Corps of Engineers
P. O. Box 17300
Fort Worth, Texas 76102

(b) Severability. In the event any provision of this Agreement is determined by the appropriate court to be void and unenforceable, all remaining terms shall remain valid and binding, and in full force and effect.

(c) Agreement Binding. The terms, covenants, and conditions of this Agreement shall be binding upon and shall inure to the benefit of Grantor, Grantee and their respective executors, administrators, heirs, legal representatives, successors and assigns. Notwithstanding the foregoing, Grantee not may assign (i) this Agreement, or (ii) any rights or interests in this Agreement, without the prior written approval of Grantor and the USACE.

(d) Warranty. Grantor warrants, covenants, and represents that it owns the surface estate to the Property in fee simple, and that Grantor either owns all interests in the surface estate to the Property which may be impaired by the granting of the Conservation Easement or that there are no outstanding mortgages, tax liens, encumbrances, or other interests in the surface estate of the Property which have not been expressly subordinated to the Conservation Easement. Grantor further warrants that Grantee shall have the use of and shall enjoy all the benefits derived from and arising out of the Conservation Easement, and that Grantor will warrant and defend title to the Property against all persons claiming by, through or under Grantor, but not otherwise.

(e) Subsequent Transfers. Grantor agrees to incorporate the terms of this Agreement and the Conservation Easement in any deed or other legal instrument that transfers any interest in all or any portion of the Property. Grantor agrees to provide written notice of such transfer at least thirty (30) days prior to the date of the transfer. Grantor and Grantee agree that the terms of the Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof and shall not be amended, modified or terminated without the prior written consent and approval of the USACE.

(f) Assignment or Transfer. The Parties recognize and agree that the benefits of the Conservation Easement are in gross and may be assignable by the Grantee to the extent authorized under Texas law; provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns the Conservation Easement, the organization receiving the interest will be a qualified holder under applicable state and federal law. The Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this Agreement.

(g) Obligations of Ownership. Grantee shall not be responsible for any costs or liability of any kind related to the ownership, operation, insurance, upkeep, or maintenance of the Property, except as expressly provided herein. Nothing herein shall relieve the Grantor of the obligation to comply with any federal, state, or local laws, regulations and permits that may apply to the Property in connection with the exercise by Grantor of the Reserved Rights.

(h) Extinguishment. In the event that changed conditions render impossible the continued use of the Property for the conservation purposes as contemplated by this Agreement, the Conservation Easement may only be extinguished, in whole or in part, by judicial proceeding in any court of competent jurisdiction.

(i) Eminent Domain. Whenever all or any part of the Property is taken in the exercise of eminent domain so as to substantially abrogate the restrictions imposed by this Agreement and the Conservation Easement, Grantor and Grantee shall join in appropriate actions at the time of such taking to recover the full value of the taking, and all incidental and direct damages due to the taking.

(j) Proceeds. The Conservation Easement constitutes a real property interest immediately vested in Grantee. In the event that all or a portion of the Property is sold, exchanged, or involuntarily converted following an extinguishment of all or any portion of the Conservation Easement, or following the exercise of eminent domain, Grantee shall be entitled to the fair market value of the Conservation Easement. The parties stipulate that the fair market value of the Conservation Easement shall be determined by multiplying the fair market value of the Property unencumbered by the Conservation Easement (minus any increase in value after the Effective attributable to improvements) by the ratio of the value of the Conservation Easement as of the Effective Date to the value of the Property (without deduction for the value of the Conservation Easement) at the time of this grant. The values as of the Effective Date and as referenced in this Section 11(j) shall be the values used, or which would have been used, to calculate a deduction for federal income tax purposes, pursuant to Section 170(h) of the Internal Revenue Code of 1986, as amended (whether eligible or ineligible for such a deduction). Grantee shall use its share of any proceeds in a manner consistent with the Purposes of the Conservation Easement.

Nothing herein shall constitute a grant of real property or proceeds to the USACE.

(k) Failure of Grantee. If at any time Grantee is unable or fails to enforce the Conservation Easement, or if Grantee ceases to be a qualified grantee, and if within a reasonable period of time after the occurrence of any of such events, Grantee fails to make an assignment of its interest pursuant to the

Conservation Easement, then Grantee's interest shall become vested in another qualified grantee in accordance with and as provided by an appropriate and final, non-appealable proceeding in a court of competent jurisdiction.

(l) Amendment. This Agreement and the Conservation Easement granted herein may be amended, but only in a writing signed by the Parties hereto; provided, however, that such amendment does not affect the qualification of the Conservation Easement or the status of the Grantee under any applicable laws, is consistent with the conservation purposes of this Agreement and the Conservation Easement granted herein, and does not conflict with the Permit No. _____ or its related PRMP. Notice of such amendment shall be provided to the USACE.

TO HAVE AND TO HOLD the Conservation Easement for the Purposes herein described, subject, however, to the matters herein set forth and to all matters of record with respect to the Property, unto Grantee, its successors and assigns, forever; and Grantor does hereby bind itself, its successors and assigns to warrant and defend the Conservation Easement and the rights granted herein, unto Grantee, its successors and assigns, against every person whomsoever lawfully claiming or to claim the same or any part thereof by, through or under Grantor, but not otherwise.

[SIGNATURE PAGE FOLLOWS]

EXECUTED and DELIVERED to be effective as of the Effective Date.

GRANTOR:

GRANTEE/PERMITTEE:

[ACKNOWLEDGMENTS FOLLOW]

STATE OF TEXAS §
 §
COUNTY OF _____ §

This instrument was acknowledged before me on _____, 20__ by
_____, on behalf of _____.

Name:
Notary Public, State of Texas
My commission expires: _____

STATE OF TEXAS §
 §
COUNTY OF _____ §

This instrument was acknowledged before me on _____, 20__ by
_____, on behalf of Palo Pinto County Municipal Water District No. 1.

Name:
Notary Public, State of Texas
My commission expires: _____

After recording return to:

Exhibit A
to
Conservation Easement Agreement

Metes and Bounds Legal Description of the Property

[TO BE PROVIDED]

Exhibit B
to
Conservation Easement Agreement

The Permit

[TO BE ATTACHED]

Exhibit C
to
Conservation Easement Agreement

Permittee Responsible Mitigation Plan

[TO BE PROVIDED]

Exhibit D

to
Conservation Easement Agreement

Baseline Documentation Report

[TO BE PROVIDED]

Exhibit E
to

Conservation Easement Agreement

Access Route/Road to Property

[TO BE PROVIDED]

- (f) to serve as a mitigation area pursuant to the regulation and guidelines of the United States Environmental Protection Agency (EPA) and the USACE promulgated under authority of Section 404 of the Clean Water Act (33 USC § 1344, et seq.) and Section 10 of the Rivers and Harbors Act of 1899 (33 USC § 403, et seq.).

Any uses of the Property that may impair or interfere with these Purposes of the Conservation Easement are expressly prohibited.

E. The preservation of the Property is a condition of the Permit, required to mitigate for unavoidable adverse impacts to waters of the United States. Grantor and Grantee agree that third-party rights of enforcement shall be held by the USACE, Fort Worth District, and any successor agencies, and that such rights are in addition to, and do not limit, the rights of enforcement under the Permit.

F. The following Exhibits are attached to this Conservation Easement and incorporated by reference:

- Exhibit A** Legal Description of the Property
- Exhibit B** U.S. Army Corps of Engineers Permit
- Exhibit C** Permittee Responsible Mitigation Plan
- Exhibit D** Baseline Documentation Report
- Exhibit E** Access Route/Road to Property

Agreement:

NOW THEREFORE, for good and valuable consideration paid by Grantee, the receipt and legal sufficiency of which are hereby acknowledged by Grantor, and in consideration of the covenants, mutual agreements and conditions herein contained, Grantor has TRANSFERRED, BARGAINED, GRANTED, SOLD, CONVEYED, ASSIGNED, SET OVER and DELIVERED, and by these presents does TRANSFER, BARGAIN, GRANT, SELL, CONVEY, ASSIGN, SET OVER and DELIVER, to Grantee a conservation easement on, over, under, across, along and through the Property on the terms set forth herein, together with all other rights reasonably necessary or desirable to accomplish the objectives of the Mitigation Plan and the Purposes of and rights granted under this Agreement (the "Conservation Easement"), subject to the following terms, reservations, covenants, limitations and exceptions:

1. **Duration of Easement.** The Conservation Easement shall be perpetual. The Conservation Easement is an easement in gross, runs with the land, and is enforceable by Grantee against Grantor, and Grantor's successors, assigns, lessees, agents, and licensees.

2. **Property Description.** The metes and bounds legal description of the Property set forth in **Exhibit "A"** and incorporated herein by reference for all purposes are metes and bounds descriptions and surveys of the Property prepared by a Texas Registered Professional Land Surveyor.

3. **Present Condition of the Property.** Neither Grantor, its agents, assigns, successors, or personal representatives, nor any purchasers, lessees, or other users of the Property may use, disturb, or

allow through intent or negligence, the use or disturbance of the Property in any manner that is inconsistent with the Purposes of the Conservation Easement. The waters of the U.S. and other aquatic resources, scenic, resource, environmental, and other natural characteristics of the Property, and its current use and state of improvement, are described in the Baseline Documentation Report, attached hereto as **Exhibit "D"**, prepared by Permittee and acknowledged by the Grantor, Grantee and Permittee to be complete and accurate as of the date hereof. Both Grantor and Grantee have copies of this report. It will be used by the Parties to assure that any future changes in management actions or use of the Property will be consistent with the terms of this Conservation Easement. However, this report is not intended to preclude the use of other evidence to establish the present condition of the Property if there is a controversy over its use.

4. **Prohibited Activities.** Any activity on, or use of, the Property inconsistent with the Purposes of the Conservation Easement is prohibited. In the event of a conflict between this Section 4 and the conditions of the Permit, including, but not limited to, the PRMP, the conditions of the Permit, including, but not limited to, the PRMP, shall control. The Property shall be preserved in its natural condition and restricted from any development that would impair or interfere with the conservation values of the Property. Without limiting the generality of the foregoing, the following activities and uses are expressly prohibited, restricted, or reserved as indicated hereunder:

(a) **Vegetation:** Except as otherwise provided in this Agreement or the PRMP, there shall be no removing, destroying, cutting, trimming, mowing, shredding, burning, harming, or altering of any vegetation, or disturbing or changing in any way the natural habitat existing on the Property except as expressly allowed in the PRMP and in order to fulfill the objectives and success criteria of that plan. Grantor may remove diseased, invasive or non-native trees, shrubs, or plants; cut and mow firebreaks and existing road rights-of-way; and remove trees, shrubs, or plants to accommodate maintenance of permitted improvements or other uses expressly permitted under the terms of this Conservation Easement. With written approval of Grantee and Permittee, Grantor may remove potentially invasive plants from the Property for habitat management purposes consistent with the intent of this Conservation Easement. Except as necessary for activities expressly permitted in this Conservation Easement and with written permission from Grantee and Permittee, there shall be no farming, tilling, or destruction and removal of native vegetation on the Property. There shall be no planting of invasive or potentially invasive non-native plant species anywhere on the Property. Grantee will provide a list of potentially invasive species upon request. There shall be no use of pesticides, including but not limited to insecticides, fungicides, rodenticides, and herbicides, except as expressly allowed in the PRMP.

(b) **Predator and Nuisance Species Control:** Grantor, with written approval of Grantee and Permittee, shall have the right to control, destroy, or trap predatory, exotic, invasive, and problem animals that pose a material threat to people, livestock, other animals, or habitat conditions in accordance with applicable state and federal laws and requirements.

(c) **Uses:** No agricultural, residential or industrial activity shall be conducted upon the Property. There shall be no storing or dumping of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances, machinery, or hazardous substances, or toxic or hazardous waste, or any placement of underground or aboveground storage tanks or other materials on the Property that may negatively impact or be detrimental to the Property or to the surface or subsurface waters of the Property. Livestock animals shall not be allowed on the Property. Any right of passage for any activity or use set forth in this paragraph is also prohibited.

(d) **Topography:** There shall be no change in the topography of the Property except as expressly provided in the PRMP. There shall be no surface mining, filling, excavating, grading, dredging, mining or drilling upon the Property, and there shall be no removing of topsoil, peat, sand, gravel, rock,

minerals or other materials from the Property except (i) to restore natural topography or drainage patterns, (ii) to improve the topography from the then-current condition, as agreed to by the Grantor and Grantee and approved by the USACE, as necessary, or (iii) as necessary to use the Property as otherwise authorized in this Agreement.

(e) Soil or Water Degradation: Except as otherwise provided in this Agreement or the PRMP, there shall be no use of, or the conducting of any activity on, the Property that causes or is likely to cause soil degradation, erosion, depletion or pollution of, or siltation on, any surface or subsurface waters of the Property, and there shall be no change to the surface or subsurface hydrology of the Property in any manner. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding, or related activities, or altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns. In addition, diverting or causing or permitting the diversion of surface or underground water into, within or out of the Property by any means, removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides is prohibited.

(f) Construction: Except as otherwise provided in this Agreement or the PRMP, there shall be no constructing or placing of any building, mobile home, asphalt or concrete pavement, billboard or other advertising display, antenna, utility pole, tower, conduit, line, pier, landing, dock, or any other temporary or permanent structure or facility or any other man-made structures on the Property except in connection with the repair, maintenance, or replacement (but not expansion) of any structures and other improvements located on the Property as of the Effective Date of this Agreement. Grantor shall have the right to maintain, renovate, and repair existing buildings, structures, fences, pens, wells, dams and reservoirs, utilities, soft-surface roads, and other improvements, and in the event of their destruction, to reconstruct any such existing improvement with another of similar size, function, capacity, location, and material.

(g) Roads: Excluding any and all right-of-ways and easements granted prior to the Effective Date of this Agreement, there shall be no construction of roads, trails, or walkways on the Property; nor any enlargement, widening, improvement or modification to any existing roads, trails, or walkways or any other rights of way on the Property. Maintenance of existing roads shall be limited to removal of dead vegetation, necessary pruning or removal of obstructing trees and plants, and/or application of permeable materials (e.g., sand, gravel, and crushed stone) as necessary to correct or prevent erosion and maintain all-weather serviceability.

(h) Waters: There shall be no polluting, altering, manipulating, depleting or extracting of surface or subsurface water (including, but not limited to, ponds, creeks or other water courses) or any other water bodies on the Property, and there shall be no conducting or (to the extent in Grantor's control) allowing any entity or person to conduct activities on the Property that would be detrimental to water purity or that alter the natural water level or flow in or over the Property (including, but not limited to, damming, dredging or construction in any free flowing water body, nor any manipulation or alteration of natural water courses, fresh water lake and pond shores, marshes or other water bodies). It is understood that with respect to the prohibited activities set forth in this Section 4(i), Grantor may not and will not engage in any such prohibited activities on the Property.

(i) Vehicles: Use of vehicles off of designated roadways and pathways on the Property shall be limited to access on the site for monitoring, maintenance, fire protection/emergency action, or other approved activities, as specified in the PRMP. Off road vehicular access on the Property for recreational use is expressly prohibited.

(j) Easements: Except as otherwise provided in this Agreement, including, but not limited to, the easement contemplated, granted, and conveyed in Section 6, herein, there shall be no granting or conveying of any easements on, over, under, across, or through the Property, including, but not limited to, access easements and utility easements.

(k) Signage: Construction or placement of any signs, billboards, or other advertising displays on the Property is not permitted, except that signs whose placement, number, and design do not significantly diminish the scenic character of the Property may be placed to state the name and address of the Property and the names of persons living on the Property, to advertise or regulate permitted on-site activities, to advertise the Property for sale or rent, to post the Property to control unauthorized entry or use, or to identify the property as being protected by this Conservation Easement.

(l) Development Rights: No development rights that have been encumbered or extinguished by this Agreement or the Conservation Easement granted herein shall be transferred pursuant to a transferable development rights scheme or cluster development arrangement or otherwise.

(m) Hunting: Grantor and Grantor's lessees and guests may conduct hunting, fishing or trapping activities in accordance with appropriate federal, state and local laws and restrictions that conform to terms of this Conservation Easement and the Permit and Mitigation Plan. Grantor may expressly construct hunting blinds, the size, design, location, and number of which shall be subject to Grantee's prior written approval. No non-native animal species may be introduced to the Property.

(n) Dumping: There shall be no dumping or storing of any material, such as trash, wastes, ashes, sewage, garbage, scrap material, sediment discharges, oil and petroleum by-products, leached compounds, toxic materials or fumes, or any "hazardous substances" (as hereinafter defined). For the purposes of this paragraph, the phrase "hazardous substances" shall be defined as in the federal Comprehensive Environmental Response, Compensation and Liability Act (42 U.S.C. 9601 *et seq.*) and/or a substance whose manufacture, processing, distribution in commerce, use, possession, or disposal is banned, prohibited, or limited pursuant to the federal Toxic Substances Control Act (15 U.S.C. 2601 *et seq.*).

(o) Other Prohibitions: Any other use of, or activity on, the Property which is or may become inconsistent with the Purposes of the Conservation Easement granted herein, the preservation of the Property in its natural condition, or the protection of its environmental systems, is prohibited.

5. **Rights Reserved to Grantor.** The Grantor expressly reserves for itself, its successors and assigns, the right of access to and the right of continued use of the Property for all purposes not inconsistent with the Permit or this Agreement and the Conservation Easement granted herein, including, but not limited to, the right to quiet enjoyment of the Property, the rights of ingress and egress with respect to the Property, the right to fence the Property and to prohibit public access thereto, the Access Purposes (defined herein), and the right to sell, transfer, gift or otherwise convey the Property, in whole or in part, provided such sale, transfer, or gift conveyance is subject to the terms of, and shall specifically reference, the Conservation Easement. Except as may be expressly provided otherwise in this Agreement including the Access Route/Road shown in **Exhibit "E"**, neither this Agreement nor the Conservation Easement granted herein in any way limits, restricts or in any way affects any property of Grantor other than the Property, including without limitation, any property adjacent to, surrounding or near the Property. The rights conveyed by this Agreement and the Conservation Easement granted herein do not constitute a conveyance of a fee interest in the Property, nor of any of the mineral rights therein and thereunder. The rights retained by Grantor as set forth in this Section 5 are referred to hereinafter as the "Reserved Rights".

6. **Rights of Grantee.** Grantor also grants and conveys to Grantee or its authorized representatives, successors, and assigns, the Permittee, and the USACE, the right to enter the Property at all reasonable times for the purposes of (i) inspecting the Property to determine if the Grantor or any of its successors and assigns is complying with the terms, conditions, restrictions, and Purposes of the Conservation Easement, and (ii) taking such actions which are consistent with the Conservation Easement and the Permit. Such right to enter the Property includes the right of pedestrian and vehicular ingress and egress to and from the Property (collectively, the “*Access Purposes*”). Access to the Property through the Grantor’s remaining property not included in this Conservation Easement shall be via routes authorized by the Grantor as shown in **Exhibit “E”** and shall be coordinated with the Grantor no less than forty eight (48) hours prior to the proposed access time, except in the case of emergency. The easement rights granted herein do not include any public access rights. Grantee shall indemnify, defend and hold harmless Grantor and its affiliates, partners, members, directors, officers, employees, agents and contractors and the heirs, personal representatives, successors and assigns of each of them from and against any and all liability, loss, cost or damage arising out of or in connection with Grantee's exercise of its rights under the Conservation Easement. Nothing construed herein shall constitute an agreement by USACE or Permittee to indemnify, defend or hold harmless Grantor, or any of the above-listed parties, from and against any liability, loss, cost or damage.

7. **Mineral Extraction.** There shall be no exploration, development, production, extraction, or transportation of oil, gas or other mineral substances (whether such other mineral substances be part of the mineral estate or part of the surface estate) by Grantor on, from, or across the Property (“Mineral Activities”) except in accordance with this Section; provided, however, that this Section does not apply to water, which is addressed elsewhere in this Conservation Easement.

- (a) **No Surface Mining.** Grantor shall not conduct surface mining on the Property by any surface mining methods, including, without limitation, the mining of gravel, sand or caliche.
- (b) **No Surface Use.** It is understood and agreed by Grantor, Grantee, Permittee, and any third party beneficiaries that Grantor may conduct Mineral Activities on the Property; provided however, that in the event that Grantor conducts any Mineral Activities on the Property, (i) Grantor shall not use or occupy any portion of the surface estate of the Property and shall not place any facilities, fixtures, equipment, building, structures, pipelines, rights of way or personal property of any kind or nature whatsoever on the surface of the Property or in the subsurface within the depth interval of 1000 feet below the surface of the Property or on or in any portion thereof, and (ii) any and all Mineral Activities by Grantor shall be conducted by directional or horizontal drilling below said subsurface interval from a surface location off the Property. Grantor hereby waives any rights whatsoever to the use of the surface and said subsurface interval of the Property in connection with any Mineral Activities Grantor conducts on the Property. Notwithstanding anything to the contrary in the foregoing provisions of this Subsection (b), Grantor shall not be prohibited from conducting exploratory activities on the Property that are non-invasive, do not otherwise damage or negatively impact the watersheds thereon or any underlying aquifer, and do not significantly impair or interfere with the Conservation Values. To the extent Grantor elects to explore for, extract, or exploit any oil, gas or other minerals in or under the Property from a surface location off the Property, Grantor shall use reasonable efforts to minimize any damage or other negative impact to the watersheds on or any aquifer underlying the Property by such activity.

Permittee, Grantee, and any third party beneficiaries known to Grantor must be given written notice from Grantor of any actual or proposed Mineral Activities that Grantor

intends to conduct or authorize in and under the Property at least forty-five (45) days prior to Grantor entering into any contract with or lease to any third party for mineral exploration; and, if no such contract or lease, prior to Grantor beginning any work. In addition to the above surface waiver requirements in the foregoing provisions of this Subsection (b), Grantor shall, prior to entering into any contract or lease (or prior to beginning any work if there is no contract or lease), consult with Permittee, Grantee, and any third party beneficiaries and make reasonable efforts to incorporate conditions or restrictions as Permittee, Grantee, and any third party beneficiaries may reasonably determine are required in order to prevent a significant impairment or interference with the Conservation Values of the Property. Permittee, Grantee, and any third party beneficiaries reserve the right to attend and participate in all meetings, negotiations or discussions regarding any actual or proposed Mineral Activities or otherwise associated with the exploration for, extraction of, or translocation of any minerals in and under the Property in order to protect their interest in the Conservation Easement.

Any and all mineral contracts, mineral conveyances, and mineral leases authorizing Mineral Activities in and under the Property that are executed subsequent to the date of this Agreement to which Grantor is a party shall be subject to the provisions hereof.

- (c) Third-Party Minerals. To the extent that all or part of the oil, gas or other mineral substances (whether such other mineral substances be part of the mineral estate or part of the surface estate) in and under the Property are owned by third party mineral interest owners as of the date of the grant of this Conservation Easement, the following provisions shall apply to such third party owned oil, gas and other mineral substances to the extent this Conservation Easement is deemed subordinated (by law or otherwise) to such third parties' ownership rights in the oil, gas and other mineral substances in and under the Property, and in such event, only to the extent that Grantor has the legal right to comply with these provisions:
- i) Permittee, Grantee, and any third party beneficiaries recognize that Grantor may not receive notice from third party mineral interest owners of Mineral Activities proposed to occur on the Property. Grantor shall promptly notify Permittee, Grantee, and any third party beneficiaries upon receiving written notice or such other notice from third party mineral interest owners that Grantor reasonably believes to be objectively credible of any Mineral Activities proposed to occur in and under the Property by any such third party mineral interest owners (or their lessees).
 - ii) Whenever such third party mineral interest owners are required by applicable law or pursuant to any existing or future contract, conveyance or lease to obtain any consent from Grantor with respect to any access to, operation on, physical alteration of, or improvement to the Property, Grantor shall, prior to giving any such consent, notify and consult with Permittee, Grantee, and any third party beneficiaries and shall incorporate the conditions or restrictions set forth in Subsection 7(b) above into such consent to the extent allowed by law. In instances where Grantor does not have the unilateral right to impose the conditions and restrictions set forth in Subsection 7(b) above, Grantor will use reasonable efforts to negotiate protection of the Conservation Values by third-party mineral interest owners.

In the event Grantor at any time becomes the owner of any of such third party mineral interests in and under the Property, then such rights shall be deemed immediately subject to this Conservation Easement (including without limitation, paragraphs (a) and (b) of this Section), and any and all subsequent Mineral Activities, contracts, conveyances and leases of or relating to such ownership rights shall be bound by the provisions of this Conservation Easement.

8. **Liens and Taxes.** Grantor shall keep the Property free of any and all liens, including, without limitation, liens arising out of any work performed for, materials furnished to, or obligations incurred by Grantor. Grantor shall pay before delinquency all taxes, assessments, fees, and charges of whatever description levied on or assessed against the Property by competent authority, and shall upon written request by Grantee furnish Grantee with satisfactory evidence of payment.

9. **Enforcement.** In the event of a breach of this Agreement by Grantor, the Grantee, Permittee, or any third party or any third party working for or under the direction of Grantor, or Grantee, or Permittee, or the Parties, the USACE shall be notified immediately. If USACE becomes aware of a breach of this Agreement, then USACE will notify the Permittee, Grantee and Grantor of the breach.

In the event of a breach by Grantor, Grantor shall have thirty (30) days after receipt of such notice to undertake actions that are reasonably calculated to correct the conditions constituting the breach. If the conditions constituting the breach are corrected in a timely and reasonable manner, no further action shall be warranted or authorized. If the conditions constituting the breach are such that more than thirty (30) days are required to cure the breach, Grantor shall not be in default hereunder if Grantor undertakes the cure of such breach during the thirty (30) day period following notice of the breach and diligently pursues the cure of the breach to completion. If Grantor fails to initiate such corrective action within thirty (30) days or fails to complete the necessary corrective action, the Grantee may enforce the Conservation Easement by appropriate legal proceedings to the extent authorized under Texas law, including an action for damages, injunctive and other relief. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive relief or other appropriate relief to the extent authorized under Texas law if the breach of any provision of the Conservation Easement is materially impairing or would irreversibly or otherwise materially impair the benefits to be derived from the Conservation Easement. Grantor and the Grantee acknowledge that under such circumstances, damage to the Grantee would be irreparable and remedies at law will be inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with the Conservation Easement. To the extent authorized under Texas law, the costs of a breach of this Agreement and the costs of any correction or restoration, including the Grantee's expenses, court costs and attorney's fees, shall be paid by Grantor. The USACE shall have the same right to enforce the terms and conditions of the Conservation Easement as the Grantee.

Any forbearance or failure on the part of the Grantee or the USACE to exercise its rights in the event of a violation shall not be deemed or construed to be a waiver of either Grantee's or the USACE's rights hereunder. Nor shall forbearance or failure to enforce any covenant or provision hereof discharge or invalidate such covenant or provision or any other covenant, condition, or provision hereof or affect the right of the Grantee and the USACE to enforce the same in the event of a subsequent breach or default.

Nothing contained in this Agreement or the Conservation Easement granted herein shall be construed to entitle the Grantee to bring any action against Grantor for any injury to or change in the Property, or for any violation of any covenant or provision of this Agreement, resulting from any prudent action taken in good faith by Grantor under emergency or force majeure conditions to prevent, abate, or mitigate significant injury to life, damage to property or harm to the Property resulting from any of such causes.

USACE shall have the same right to enforce the terms and conditions of the Conservation Easement as the Grantee, and notwithstanding the above, USACE as a federal agency, will follow Texas law to the extent it does not conflict with Federal law, or interfere with USACE's 404 Permit enforcement and the performance of Permittee's obligations under the Permit. Further, any legal proceeding involving USACE as a party will be subject to the jurisdiction of federal court.

10. **Duration.** The burdens of this Agreement and the Conservation Easement shall run with the Property and shall be enforceable against Grantor and all future interests in and to the Property in perpetuity. Grantor agrees that the future transfer or conveyance of any interest in or to the Property shall at all times be subject and subordinate to the terms, conditions, restrictions and Purposes of the Conservation Easement and a reference to this Agreement shall be included in each instrument of transfer or conveyance of any interest in or to the Property from and after the Effective Date; provided, however, that nothing in this Agreement shall be construed to in any way limit Grantee's ability to freely sell, convey, assign, or otherwise transfer the property interest and rights, or any portions thereof, granted by this Agreement to any other person or entity, except as otherwise provided in this Agreement.

11. **General Provisions.**

(a) **Notices.** Any notice, request for approval, or other communication required under this Conservation Easement shall be sent by registered or certified mail, postage prepaid, to the following addresses (or such address as may be hereafter specified by notice pursuant to this paragraph):

To Grantor:

To Grantee:

To Permittee: Palo Pinto County Municipal Water District No. 1

 Attn: President

 P.O. Box 387

 Mineral Wells, TX 76068

To the USACE:

Regulatory Branch
Fort Worth District
U.S. Army Corps of Engineers
P. O. Box 17300
Fort Worth, Texas 76102

(b) **Severability.** In the event any provision of this Agreement is determined by the appropriate court to be void and unenforceable, all remaining terms shall remain valid and binding, and in full force and effect.

(c) Agreement Binding. The terms, covenants, and conditions of this Agreement shall be binding upon and shall inure to the benefit of Grantor, Grantee, Permittee, and their respective executors, administrators, heirs, legal representatives, successors and assigns. Notwithstanding the foregoing, Grantee not may assign (i) this Agreement, or (ii) any rights or interests in this Agreement, without the prior written approval of Grantor and the USACE.

(d) Warranty. Grantor warrants, covenants, and represents that it owns the surface estate to the Property in fee simple, and that Grantor either owns all interests in the surface estate to the Property which may be impaired by the granting of the Conservation Easement or that there are no outstanding mortgages, tax liens, encumbrances, or other interests in the surface estate of the Property which have not been expressly subordinated to the Conservation Easement. Grantor further warrants that Grantee shall have the use of and shall enjoy all the benefits derived from and arising out of the Conservation Easement, and that Grantor will warrant and defend title to the Property against all persons claiming by, through or under Grantor, but not otherwise.

(e) Subsequent Transfers. Grantor agrees to incorporate the terms of this Agreement and the Conservation Easement in any deed or other legal instrument that transfers any interest in all or any portion of the Property. Grantor agrees to provide written notice of such transfer at least thirty (30) days prior to the date of the transfer. Grantor and Grantee agree that the terms of the Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof and shall not be amended, modified or terminated without the prior written consent and approval of the USACE.

(f) Assignment or Transfer. The Parties recognize and agree that the benefits of the Conservation Easement are in gross and assignable by the Grantee; provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns the Conservation Easement, the organization receiving the interest will be a qualified holder under applicable state and federal law. The Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this Agreement and that the balance of any management and conservation funds or other funds allocated by the Permittee to implementation of the Conservation Easement be transferred to the new Conservation Easement holder. Grantee shall select a transferee agreeable to the Permittee. Grantee shall give written notice by certified mail to Permittee of an assignment at least 90 days prior to the date of such assignment. Within 45 days after receiving the written notice, Permittee will by written letter advise the Grantee if the proposed replacement Grantee is acceptable, and, if not, will provide the Grantee with a list of at least three acceptable replacement Grantees; and Grantee agrees to select a replacement Grantee from the list. Permittee will provide written notice to the Grantor of the replacement Grantee.

(g) Obligations of Ownership. Grantee shall not be responsible for any costs or liability of any kind related to the ownership, operation, insurance, upkeep, or maintenance of the Property, except as expressly provided herein. Nothing herein shall relieve the Grantor of the obligation to comply with any federal, state, or local laws, regulations and permits that may apply to the Property in connection with the exercise by Grantor of the Reserved Rights.

(h) Extinguishment. In the event that changed conditions render impossible the continued use of the Property for the conservation purposes as contemplated by this Agreement, the Conservation Easement may only be extinguished, in whole or in part, by judicial proceeding in any court of competent jurisdiction.

(i) Eminent Domain. Whenever all or any part of the Property is taken in the exercise of eminent domain so as to substantially abrogate the restrictions imposed by this Agreement and the

Conservation Easement, Grantor and Grantee shall join in appropriate actions at the time of such taking to recover the full value of the taking, and all incidental and direct damages due to the taking.

(j) Proceeds. The Conservation Easement constitutes a real property interest immediately vested in Grantee. In the event that all or a portion of the Property is sold, exchanged, or involuntarily converted following an extinguishment of all or any portion of the Conservation Easement, or following the exercise of eminent domain, Grantee shall be entitled to the fair market value of the Conservation Easement. The parties stipulate that the fair market value of the Conservation Easement shall be determined by multiplying the fair market value of the Property unencumbered by the Conservation Easement (minus any increase in value after the Effective attributable to improvements) by the ratio of the value of the Conservation Easement as of the Effective Date to the value of the Property (without deduction for the value of the Conservation Easement) at the time of this grant. The values as of the Effective Date and as referenced in this Section 11(j) shall be the values used, or which would have been used, to calculate a deduction for federal income tax purposes, pursuant to Section 170(h) of the Internal Revenue Code of 1986, as amended (whether eligible or ineligible for such a deduction). Grantee shall use its share of any proceeds in a manner consistent with the Purposes of the Conservation Easement.

Nothing herein shall constitute a grant of real property or proceeds to the USACE.

(k) Failure of Grantee. If at any time Grantee is unable or fails to enforce the Conservation Easement, or if Grantee ceases to be a qualified grantee, and if within a reasonable period of time after the occurrence of any of such events, Grantee fails to make an assignment of its interest pursuant to the

Conservation Easement, then Grantee's interest shall become vested in another qualified grantee in accordance with and as provided by an appropriate and final, non-appealable proceeding in a court of competent jurisdiction.

(l) Amendment. This Agreement and the Conservation Easement granted herein may be amended, but only in a writing signed by the Parties hereto; provided, however, that such amendment does not affect the qualification of the Conservation Easement or the status of the Grantee under any applicable laws, is consistent with the conservation purposes of this Agreement and the Conservation Easement granted herein, and does not conflict with the Permit No. _____ or its related PRMP. Notice of such amendment shall be provided to the USACE.

TO HAVE AND TO HOLD the Conservation Easement for the Purposes herein described, subject, however, to the matters herein set forth and to all matters of record with respect to the Property, unto Grantee, its successors and assigns, forever; and Grantor does hereby bind itself, its successors and assigns to warrant and defend the Conservation Easement and the rights granted herein, unto Grantee, its successors and assigns, against every person whomsoever lawfully claiming or to claim the same or any part thereof by, through or under Grantor, but not otherwise.

[SIGNATURE PAGE FOLLOWS]

EXECUTED and DELIVERED to be effective as of the Effective Date.

GRANTOR:

GRANTEE:

PERMITTEE:

[ACKNOWLEDGMENTS FOLLOW]

After recording return to:

Exhibit A
to
Conservation Easement Agreement

Metes and Bounds Legal Description of the Property

[TO BE PROVIDED]

Exhibit B
to
Conservation Easement Agreement

The Permit

[TO BE ATTACHED]

Exhibit C
to
Conservation Easement Agreement

Permittee Responsible Mitigation Plan

[TO BE PROVIDED]

Exhibit D
to
Conservation Easement Agreement

Baseline Documentation Report

[TO BE PROVIDED]

Exhibit E
to
Conservation Easement Agreement

Access Route/Road to Property

[TO BE PROVIDED]

Attachment H

Short-Term and Long-Term Financial Assurance Estimates

Also: See Part III, Section 11.

Turkey Peak Reservoir Expansion - SWF 2009-00264
Short Term Financial Assurance Calculations (August 2017 Revision)

Restoration Activities																									
Location		OPSR2_1 - Simpson			OPSR5_1 - Simpson			OPSR18_1 - Simpson			OPSR17_1 Simpson			PS2_4 Copeland middle pond			PS_10 Copeland Upper Pond			PS-1-6 (Concrete Dam & PPC)			Palo Pinto Riffle Restoration		
Line Item	Unit	Quantity	Unit Price	Total	Quantity	Unit Price	Total	Quantity	Unit Price	Total	Quantity	Unit Price	Total	Quantity	Unit Price	Total	Quantity	Unit Price	Total	Quantity	Unit Price	Total	Quantity	Unit Price	Total
Grading - Stream	Cubic Yard	101	\$30	\$3,030	135	\$30	\$4,050	59	\$30	\$1,770	281	\$30	\$8,430	182	\$30	\$5,460	292	\$30	\$8,760	500	\$20	\$10,000	278	\$100.00	\$28,000
Grading / Demo - Dams	Cubic Yard	1200	\$30	\$36,000	1710	\$30	\$51,300	1440	\$30	\$43,200	1040	\$30	\$31,200	2900	\$30	\$87,000	1950	\$30	\$58,500	25	\$500	\$12,500	0	\$500	\$0
Rock Steps	Each	28	\$500	\$14,000	21	\$500	\$10,500	34	\$500	\$17,000	44	\$500	\$22,000	4	\$500	\$2,000	40	\$500	\$20,000	0	\$0	\$0	4	\$5,000	\$20,000
Erosion Control Matting	Square Yard	1132	\$5	\$5,660	913	\$5	\$4,565	666	\$5	\$3,330	1895	\$5	\$9,475	812	\$5	\$4,060	2093	\$5	\$10,465	0	\$5	\$0	0	\$5	\$0
Seeding (Perm and Temp)	Acre	1	\$2,200	\$2,200	1	\$2,200	\$2,200	1.2	\$2,200	\$2,640	1.6	\$2,200	\$3,520	1.2	\$2,200	\$2,640	2.3	\$2,200	\$5,060	0.5	\$2,200	\$1,100	0	\$2,200	\$0
Tree Seedlings (1 gal max)	Each	250	\$6	\$1,500	250	\$6	\$1,500	300	\$6	\$1,800	400	\$6	\$2,400	300	\$6	\$1,800	575	\$6	\$3,450	400	\$6	\$2,400	0	\$6	\$0
Culvert (Remove/Replace) - 36" RCP	Linear Feet	30	\$150	\$4,500	60	\$150	\$9,000			\$0	68	\$150	\$10,200	60	\$150	\$9,000	60	\$150	\$9,000	0	\$150	\$0	0	\$150	\$0
Mobilization	Each	1	\$3,344	\$3,344	1	\$4,156	\$4,156	1	\$3,487	\$3,487	1	\$4,362	\$4,362	1	\$5,599	\$5,599	1	\$5,762	\$5,762	0	\$5,599	\$0	1	\$12,000	\$12,000
Total				\$70,234			\$87,271			\$73,227			\$91,587			\$117,559			\$120,997			\$26,000			\$60,000

Combined Total - Restoration	\$646,875
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Enhancement Activities													
Location		Upstream - Copeland			Upstream - PPMSPPC**			On-site			Downstream PPC		
Line Item	Unit	Quantity	Unit Price	Total	Quantity	Unit Price	Total	Quantity	Unit Price	Total	Quantity	Unit Price	Total
Fire Management Plan and Burn Plan Drafts per Unit	Each	3	\$ 5,000	\$ 15,000	2	\$ 5,000	\$ 10,000						
Final Prescribed Burn Plans & Implementation*	Acre	78	\$ 300	\$ 23,400	50	\$ 300	\$ 14,850	0		\$ -	0		\$ -
Juniper thinning (skid steer / hand)	Acre	50	\$ 1,200	\$ 60,000	25	\$ 1,200	\$ 30,000	1	\$ 1,200	\$ 1,200	20	\$ 1,200	\$ 24,000
Seeding (Perm and Temp)	Acre	52	\$ 600	\$ 31,200	25	\$ 600	\$ 15,000	5	\$ 600	\$ 3,000	36	\$ 600	\$ 21,600
Tree Seedlings (1 gal max)	Each	5175	\$ 6.50	\$ 33,638	3000	\$ 6.50	\$ 19,500		\$ 6	\$ -	15625	\$ 6	\$ 93,750
Fencing (5 strand or hog)	Linear Feet	22,260	\$ 6	\$ 133,560	0	\$ 5	\$ -	1500	\$ 5	\$ 7,500	52500	\$ 5	\$ 262,500
Mobilization	Each	3	\$ 1,500	\$ 4,500	2	\$ 1,500	\$ 3,000	2	\$ 500	\$ 1,000	3	\$ 1,500	\$ 4,500
				\$ 301,298			\$ 92,350			\$ 12,700			\$ 406,350

Combined Total - Enhancement	\$812,698
Mitigation Construction / Implementation Total	\$1,459,573
Estimated Short Term Financial Assurance Amount (110%)	\$1,605,530

* Estimated based on acreage x 1.5 for burn unit planning
** to be finalized through coordination with TPWD
Note: Does not include Third Party Endowment for Conservation Easement grantee

Stream Mitigation - Schedule for Release from Financial Assurances

Stream Restoration Activities

Release Rate

- 10% Initial release - Compliance with initial success criteria:
 - A. Final civil engineering and construction of grading/contouring and grade control for stream channel restoration.

- 10% Post Planting and demonstration of hydrology, having met the following criteria:
 - A. Stream channel flow/hydrology meets the definition for the appropriate stream types (i.e., perennial, intermittent, ephemeral) being re-established.
 - B. No excessive erosion.

- 10% Two full bank events at least one year apart (Bank full events may occur anytime after construction complete.):
 - A. Stream channels do not exhibit adverse impacts from erosion, head cutting, and excessive silt accumulation following a runoff event.
 - B. Planted riparian zones exhibit a minimum measurement of 25 feet on either side of ephemeral streams, 50 feet on either side of intermittent streams, and 100 feet on either side of perennial streams.
 - C. No excessive erosion.

- 10% Interim release based on function/conditional assessment, having met the following criteria:
 - A. Has attained 25% of the predicted TXRAM scores (scores at release of monitoring) as proposed for each stream restoration SAR.

- 35% Interim release based on function/conditional assessment, having met the following criteria:
 - A. Has attained 70% of the predicted TXRAM scores (scores at release of monitoring) as proposed for each stream restoration SAR.

- 25% Final release based on function/conditional assessment, having met the following criteria:
 - A. Meets the definition of a water of the U.S. under the Regulatory Program regulations applicable at the time the project is authorized.
 - B. Has attained 100% of the predicted TXRAM score (i.e., score at release of monitoring) as proposed for each stream restoration SAR.
 - C. Provision of site protection and long-term management as appropriate.
 - D. Applicable success criteria have been met for stream restoration areas.

Stream Enhancement Activities

Release Rate

- 10% Initial release - Compliance with initial success criteria:
 - A. Completion of fencing to exclude livestock.

- 20% Post Planting, having met the following criteria:
 - A. Stream channels do not exhibit adverse impacts from erosion, head cutting, and excessive silt accumulation following a runoff event.
 - B. Planted riparian zones exhibit a minimum measurement of 25 feet on either side of ephemeral streams, 50 feet on either side of intermittent streams, and 100 feet on either side of perennial streams.
 - C. No excessive erosion.

- 10% Interim release based on function/conditional assessment, having met the following criteria:
 - A. Has attained 25% of the predicted TXRAM scores (scores at release of monitoring) as proposed for each stream enhancement SAR.

- 35% Interim release based on function/conditional assessment, having met the following criteria:
 - A. Has attained 70% of the predicted TXRAM scores (scores at release of monitoring) as proposed for each stream enhancement SAR.

- 25% Final release based on function/conditional assessment, having met the following criteria:
 - A. Meets the definition of a water of the U.S. under the Regulatory Program regulations applicable at the time the project is authorized.
 - B. Has attained 100% of the predicted TXRAM score (i.e., score at release of monitoring) as proposed for each stream enhancement SAR.
 - C. Provision of site protection and long-term management as appropriate.
 - D. Applicable success criteria have been met for stream enhancement areas.

Turkey Peak Reservoir Expansion - SWF 2009-00264
Long Term Management Funding Calculations (August 2017 Revision)

Mitigation Areas - Estimated Annual Costs														
Location		Upstream - TPWD PPMSP** (approx. 33 ac)			Upstream - Copeland (TPWD) (approx. 52 ac)			On-site (District Mgmt) (approx. 6 ac)			Downstream (District Mgmt) (approx. 185 ac)			
Line Item	Unit	Quantity	Unit Price	Total	Quantity	Unit Price	Total	Quantity	Unit Price	Total	Quantity	Unit Price	Total	Subtotals
Annual Costs														
Property Inspection for Access Control	Hours	2	\$20	\$40	4	\$20	\$80	2	\$20	\$40	16	\$20	\$320	
Habitat Assessment	Hours	2	\$40	\$80	2	\$40	\$80	2	\$40	\$80	16	\$40	\$640	
Reporting	Hours	2	\$40	\$80	2	\$40	\$80	1	\$40	\$40	2	\$40	\$80	
Mobilization	Each	1	\$500	\$500	1	\$500	\$500	1	\$500	\$500	2	\$500	\$1,000	
Subtotal				\$700			\$740			\$660			\$2,040	\$4,140
Annualized Recurring Mgmt Costs (recurring cost per year estimated over 3-5 year period)														
Fence Repair Labor	Hours	0	\$20	\$0	10	\$20	\$200	5	\$20	\$100	40	\$20	\$800	
Fence Repair Materials	Linear Feet	0	\$3	\$0	200	\$3	\$600	200	\$3	\$600	800	\$3	\$2,400	
Vegetation Management (thinning, invasive control, etc. on 10%-20% of acreage once every 5 yrs)	Acre	3.3	\$250	\$825	10.4	\$250	\$2,600	1.2	\$250	\$300	18.5	\$250	\$4,625	
Prescribed Burn Management (w/ TPWD Coord)	Acre	10	\$50	\$500	25	\$50	\$1,250	0	\$0	\$0	0	\$0	\$0	
Vegetation Monitoring for Prescribed Burns	Plot	1	\$333	\$333	2	\$333	\$667	0	\$0	\$0	0	\$0	\$0	
Erosion Repair	Acre	2	\$25	\$50	2	\$25	\$50	1	\$25	\$25	5	\$25	\$125	
Subtotal				\$1,708			\$5,367			\$1,025			\$7,950	\$16,050
Total				\$2,408			\$6,107			\$1,685			\$9,990	

Combined Total - TPWD properties (Nall/Ragsdale & Copeland Tracts)
Combined Total - District held property
Annualized Long Term Management Total
Longterm endowment (estimated total needed at 4% growth, 1.5% inflation rate)

\$8,515
\$11,675
\$20,190
\$475,000

* To be adjusted based on final agreements.
 ** to be confirmed through coordination with TPWD (ongoing)
 ***Annualized average of costs based on estimates of annual percentage of activities expected to reoccur every 3-5 years
 Note: Prescribed burn and associated vegetation monitoring based on TPWD estimates of \$40/acre, planning, permitting, and \$1000/monitoring plot

Long Term Financial Assurance - Endowment Calculations

Years Following Funding Start	Principal in Endowment (P)	*Rate of Return (Interest Rate (i))	Endowment Fund Management and Fees	Investment Periods (n)	Annual Costs (Annual Inflation Adjusted 1.5%)	Endowment Total	Annual Capitalization Rate	Growth Until Short Term Release
1	\$475,000	5.0%	-1.0%	1.0 years		\$494,000	0.0%	\$20,190
2	\$494,000	5.0%	-1.0%	1.0 years		\$513,760	0.0%	\$20,493
3	\$513,760	5.0%	-1.0%	1.0 years		\$534,310	0.0%	\$20,800
4	\$534,310	5.0%	-1.0%	1.0 years		\$555,683	0.0%	\$21,112
5	\$555,683	5.0%	-1.0%	1.0 years		\$577,910	0.0%	\$21,429
6	\$577,910	5.0%	-1.0%	1.0 years		\$601,027	0.0%	\$21,750
7	\$601,027	5.0%	-1.0%	1.0 years		\$625,068	0.0%	\$22,077
8	\$625,068	5.0%	-1.0%	1.0 years		\$650,070	0.0%	\$22,408
9	\$650,070	5.0%	-1.0%	1.0 years		\$676,073	0.0%	\$22,744
10	\$676,073	5.0%	-1.0%	1.0 years		\$703,116	0.0%	\$23,085
11	\$703,116	5.0%	-1.0%	1.0 years	\$23,431	\$707,809	3.3%	\$23,431
12	\$707,809	5.0%	-1.0%	1.0 years	\$23,783	\$712,339	3.3%	
13	\$712,339	5.0%	-1.0%	1.0 years	\$24,140	\$716,693	3.4%	
14	\$716,693	5.0%	-1.0%	1.0 years	\$24,502	\$720,859	3.4%	
15	\$720,859	5.0%	-1.0%	1.0 years	\$24,869	\$724,824	3.4%	
16	\$724,824	5.0%	-1.0%	1.0 years	\$25,242	\$728,575	3.5%	
17	\$728,575	5.0%	-1.0%	1.0 years	\$25,621	\$732,097	3.5%	
18	\$732,097	5.0%	-1.0%	1.0 years	\$26,005	\$735,376	3.5%	
19	\$735,376	5.0%	-1.0%	1.0 years	\$26,395	\$738,396	3.6%	
20	\$738,396	5.0%	-1.0%	1.0 years	\$26,791	\$741,141	3.6%	
21	\$741,141	5.0%	-1.0%	1.0 years	\$27,193	\$743,593	3.7%	
22	\$743,593	5.0%	-1.0%	1.0 years	\$27,601	\$745,736	3.7%	
23	\$745,736	5.0%	-1.0%	1.0 years	\$28,015	\$747,551	3.7%	
24	\$747,551	5.0%	-1.0%	1.0 years	\$28,435	\$749,017	3.8%	
25	\$749,017	5.0%	-1.0%	1.0 years	\$28,862	\$750,116	3.8%	
26	\$750,116	5.0%	-1.0%	1.0 years	\$29,295	\$750,827	3.9%	
27	\$750,827	5.0%	-1.0%	1.0 years	\$29,734	\$751,126	4.0%	
28	\$751,126	5.0%	-1.0%	1.0 years	\$30,180	\$750,991	4.0%	
29	\$750,991	5.0%	-1.0%	1.0 years	\$30,633	\$750,397	4.1%	
30	\$750,397	5.0%	-1.0%	1.0 years	\$31,092	\$749,321	4.1%	
31	\$749,321	5.0%	-1.0%	1.0 years	\$31,559	\$747,735	4.2%	
32	\$747,735	5.0%	-1.0%	1.0 years	\$32,032	\$745,613	4.3%	
33	\$745,613	5.0%	-1.0%	1.0 years	\$32,512	\$742,925	4.4%	
34	\$742,925	5.0%	-1.0%	1.0 years	\$33,000	\$739,642	4.5%	
35	\$739,642	5.0%	-1.0%	1.0 years	\$33,495	\$735,732	4.6%	
36	\$735,732	5.0%	-1.0%	1.0 years	\$33,998	\$731,164	4.6%	
37	\$731,164	5.0%	-1.0%	1.0 years	\$34,508	\$725,903	4.8%	
38	\$725,903	5.0%	-1.0%	1.0 years	\$35,025	\$719,914	4.9%	
39	\$719,914	5.0%	-1.0%	1.0 years	\$35,551	\$713,160	5.0%	
40	\$713,160	5.0%	-1.0%	1.0 years	\$36,084	\$705,603	5.1%	
41	\$705,603	5.0%	-1.0%	1.0 years	\$36,625	\$697,202	5.3%	
42	\$697,202	5.0%	-1.0%	1.0 years	\$37,174	\$687,916	5.4%	
43	\$687,916	5.0%	-1.0%	1.0 years	\$37,732	\$677,700	5.6%	
44	\$677,700	5.0%	-1.0%	1.0 years	\$38,298	\$666,510	5.7%	
45	\$666,510	5.0%	-1.0%	1.0 years	\$38,872	\$654,298	5.9%	
46	\$654,298	5.0%	-1.0%	1.0 years	\$39,456	\$641,014	6.2%	
47	\$641,014	5.0%	-1.0%	1.0 years	\$40,047	\$626,608	6.4%	
48	\$626,608	5.0%	-1.0%	1.0 years	\$40,648	\$611,024	6.7%	
49	\$611,024	5.0%	-1.0%	1.0 years	\$41,258	\$594,207	6.9%	
50	\$594,207	5.0%	-1.0%	1.0 years	\$41,877	\$576,098	7.3%	

Attachment I

Cultural Resource Programmatic Agreement and Section 106 Agency Coordination Information

AMENDMENT TO:

PROGRAMMATIC AGREEMENT

AMONG

**THE UNITED STATES ARMY, CORPS OF ENGINEERS, FORT WORTH DISTRICT,
THE TEXAS STATE HISTORIC PRESERVATION OFFICER,
AND THE PALO PINTO COUNTY MUNICIPAL WATER DISTRICT NO. 1,**

**FOR THE PROPOSED TURKEY PEAK RESERVOIR, PALO PINTO AND STEPHENS
COUNTIES, TEXAS**

Permit Number: SWF-2009-00264

WHEREAS, the United States Army Corps of Engineers (USACE), the Texas Historical Commission, and the Palo Pinto County Municipal Water District No. 1 (PPCMWD) executed a Programmatic Agreement (PA) in October 2016 to address issues related to PPCMWD's application for a USACE Individual Permit and the impacts of the proposed Turkey Peak Reservoir on historical properties; and

WHEREAS, the Stipulation XI, Duration, Amendment, and Termination, of the PA stated that the PA may be amended when such an amendment is agreed to in writing by all signatories; and

WHEREAS, the PPCMWD has proposed to construct a mitigation area, a new road, and improve an existing road for the Turkey Peak Reservoir, which will be located on Palo Pinto Creek and associated tributaries in both Palo Pinto and Stephens Counties, Texas; and

WHEREAS, the signatories have determined that it is appropriate to include the proposed mitigation area, new road, and road improvements for the Turkey Peak Reservoir under the terms of the PA due to the ongoing USACE permit application evaluation and the potential for direct or indirect adverse effects on historical properties as a result of road construction, bank stabilization, stream modification, vegetation clearing, vegetation planting, and associated workspace; and

NOW, THEREFORE; the USACE, the THC, and the PPCMWD agree to amend the PA to include the mitigation area for the proposed Turkey Peak Reservoir, as shown on the attached map. All other terms of the PA shall remain as stated.

SIGNATORIES:

United States Army, Corps of Engineers, Fort Worth District

Stephen L Brooks, Chief, Regulatory Division

Date _____

Texas State Historic Preservation Officer

Mark Wolfe, State Historic Preservation Officer

Date _____

Palo Pinto County Municipal Water District No. 1

Scott Blasor, Secretary/Treasurer

Date _____

CONSULTING PARTIES CONCURRING IN PA:

Comanche Nation

Theodore E. Villicana, Comanche Nation Historic Preservation Office

Date _____

Palo Pinto County Historical Commission

Mike Lewis, Archeological Chairman, Board of Directors

Date _____



Cultural Resources Review for Turkey Peak 404 Mitigation

Date: Friday, August 4, 2017

Project: Turkey Peak 404 Mitigation Project

To: James Barrera, Regulatory Archaeologist, USACE – Fort Worth District

From: Clayton Tinsley, Southern US Archaeology Program Manager

Palo Pinto County Municipal Water District No. 1 has contracted with HDR Engineering, Inc. (HDR) to conduct an intensive archaeological survey in advance of the proposed habitat restoration of portions of Palo Pinto Creek in Stephens County, Texas. HDR has also been contracted to conduct the intensive archaeological survey of the areas selected in support of the Texas Water Rights and Section 404 permitting processes for the proposed Turkey Peak Reservoir.

This work was also conducted in support of a United States Army Corps of Engineers (USACE) Section 404 permit and associated Mitigation Plan (last revised September 2017) for the impacts to the affected tributaries, which triggers Section 106 consultation. The purpose of the cultural resources investigations was to determine the presence/absence of archaeological resources (36 Code of Federal Regulations [CFR] 800.4) and to evaluate identified resources for their eligibility for inclusion in the National Register of Historic Places (NRHP), as per Section 106 (36 CFR 800) of the National Historic Preservation Act of 1966, as amended, or as a designated State Antiquities Landmark (SAL) under the Antiquities Code of Texas (13 Texas Administrative Code [TAC] 26.12).

This document serves as a review and summary of the results of the archaeological surveys conducted by HDR in the Section 404 mitigation project areas. The areas selected for mitigation include the following locations:

- 1) Copeland Tract
- 2) Ragsdale and Nall Tracts
- 3) Simpson Tract
- 4) Downstream Corridor Location

Copeland Tract

An intensive cultural resources survey was conducted on the 450-acre Copeland Tract in January 2017. The results of this survey are detailed in a draft report *Intensive Cultural Resources Survey for the Turkey Peak Reservoir Section 404 Mitigation Project, Stephens County, Texas* (THC Permit # 7871). A copy of the report was provided to the U.S. Army Corps of Engineers (USACE) as part of project SWF # 2009-00264 on March 17, 2017. A second draft of the report (addressing comments issued by the USACE), was submitted July 14, 2017.

Three archaeological sites (41SE319, 41SE320, and 41SE343) are recommended eligible for inclusion in the National Register of Historic Places (NRHP) and are recommended for State



Antiquities Landmark (SAL) listing. In order to protect these three sites, HDR recommends a 50-ft (15 m) avoidance buffer be placed around each feature within sites 41SE319, 41SE320, and 41SE343 during any proposed ground disturbing activities.

The mitigation work will require impacts to a low-head concrete weir on the 450-acre tract that was recorded as an historic resource (41PP345). The THC and USACE have determined the weir to be NRHP eligible and it will require, agency coordination, and archival documentation (i.e., Historic American Engineering Record [HAER] report) prior to modification activities. TPWD State Park staff expressed an interest in preserving sections of the dam as a potential historic interpretive resource within PPMSP to the extent possible, without affecting the restoration project benefit. Based on the hydrologic analysis conducted for the mitigation design planning it is anticipated that this can be accommodated while utilizing the existing base and wing walls of the dam for grade stabilization to avoid additional stream bed and bank instability.

Ragsdale and Nall Tracts

An intensive cultural resources study was conducted of the upstream mitigation buffer along Palo Pinto Creek within the currently proposed Palo Pinto Mountain State Park in July 2017. Portions of the Ragsdale and Nall tracts were surveyed within a 75 ft buffer on each side of the creek. The results of the survey reported in, *Intensive Cultural Resources Survey for the Turkey Peak Reservoir Section 404 Mitigation in the Palo Pinto Mountains State Park* (THC Permit #8108) has been submitted to the USACE on August 4th, 2017. The survey of the Ragsdale and Nall tract portions of the upstream mitigation area revealed one archaeological site (41SE346), a livestock dipping vat, which was recommended as not eligible for NRHP eligibility.

Simpson Tract and Downstream Location

Due to the limited nature of mitigation related impacts in these areas a thorough THC Restricted Atlas Database search and historic map review were requested by the USACE in lieu of field surveys.

The mitigation areas on the Simpson Tract begin at Farm-to-Market (FM) 4 and extend approximately 27,111 linear feet (ft; 8,263 meter [m]) downstream and for several “on-site” streams west of FM 4 in Palo Pinto County, Texas (Figure 1). The on-site APE involves removing ponds and re-grading several stream channels adjacent to the proposed reservoir on the Simpson Tract. These areas exhibit eroded and/or truncated soils and have little probability for containing intact cultural resources. Approximately 3,587 linear ft (1,093 m) of ephemeral streams that have been modified by earthen dams will be re-established and restored by modifying the dam structures and selective re-grading to replicate the natural contours of similar upstream and downstream segments. Suitable areas will be re-seeded with native seed bank and natural native grasses and forb, cattle access will be restricted to protect the restoration areas from unauthorized activities (e.g., mowing cutting, herbicide application, etc.), and selective tree planting will occur. In addition, the on-site improvements will enhance approximately 880 linear ft (268 m) of an intermittent stream and 510 linear ft (155 m) of an ephemeral stream on the Simpson Tract. The streams will be protected by the exclusion of livestock from the area to allow riparian buffer regeneration.

The downstream Area of Potential Effects (APE) is broken into eight segments within a 5.2 mile (8.4 kilometer [km]) segment of Palo Pinto Creek. The proposed APE measures approximately 300 ft (91 m) in width along the 27,111 ft (8,263 m) mitigation corridor. The improvements to the creek include supplemental native plantings (herbs and tree/shrub seedlings up to one gallon in size), limited removal of non-native plant species (primarily through cutting and/or herbicide), fencing to restrict unauthorized use (e.g., clearing and grazing), and riffle rehabilitation where the riffle has recently been impacted by slope failure during a flooding event.

Environmental Setting

The majority of the APE is underlain by Alluvium of Holocene age (USGS 2007). This unit comprises floodplain deposits, including low terrace deposits near floodplain level and bedrock locally in stream channels (USGS 2007). One other geologic unit is mapped within the APE: the Mingus Formation of Des Moines age (USGS 2007). Only a small portion of the APE falls on this unit, which consists of shale, sandstone, and limestone (USGS 2007). According to data from the Web Soil Survey, maintained by the National Resources Conservation Service (NRCS), the APE consists of ten soil units: Santo and Bunyan soils, 0 to 1 percent slopes, frequently flooded; Shatruce-Bonti complex, 8 to 40 percent slopes, rubbly; Bosque clay loam, 0 to 1 percent slopes, occasionally flooded; Minwells fine sandy loam, 2 to 5 percent slopes, eroded; Owens-Harpersville complex, 8 to 45 percent slopes, extremely bouldery; Yahola and Gaddy soils, 0 to 2 percent slopes, occasionally flooded; Truce fine sandy loam, 1 to 5 percent slopes, eroded; Truce fine sandy loam, 3 to 5 percent slopes; Bonti-Exray complex, 1 to 8 percent slopes, extremely stony; and Shatruce gravelly sandy loam, 12 to 50 percent slopes, very rubbly (NRCS 2017). Of these, the most common soils in the APE are the Santo and Bunyan soils. Santo soils are deep, well drained, moderately rapidly permeable soils that formed in stratified calcareous alluvium on floodplains (NRCS 2017). Santo soils form on narrow, nearly level to gently undulating floodplains (NRCS 2017). Bunyan soils consist of very deep, well drained, moderately permeable soils that formed in stratified loamy alluvium on nearly level bottomlands (NRCS 2017).

Database Review

A review of the Texas Historical Commission's (THC's) Archeological Sites Atlas (Atlas) indicates that, within a one-mile buffer zone around the APE, there have been two cultural resources surveys conducted, nine archaeological sites recorded, and two cemeteries identified (Figure 2 and Figure 3). None of the archaeological sites or cemeteries fall directly within the proposed APE. No Official Texas Historical Markers (OTHMs), Recorded Texas Historic Landmarks (RTHLs), or National Register of Historic Places (NRHP) listed Properties or Districts are located within this one-mile buffer.

The Atlas search listed two cultural resources surveys (IDs 8500018340 and 8400006711) within a one-mile buffer zone around the APE. The first survey (ID 8500018340) was conducted by GeoMarine, Inc. in 2009 under TAC permit number 5497. This survey was conducted for the proposed Turkey Peak Reservoir. This survey encompassed the westernmost 0.2 mile (0.3 km) portion of the Turkey Peak Downstream 404 Mitigation project APE (including the entire riffle

restoration area). The second survey (ID 8400006711) was conducted by TxDOT in 1972 along FM 4, but no additional information is available via the Atlas.

During the review of the Atlas, nine previously recorded archaeological sites were identified within one mile of the APE (Table 1; see Figure 2 and Figure 3). All of these sites were originally recorded by Geo-Marine during the 2009 survey of the proposed Turkey Peak Reservoir. Of these sites, five (41PP382, 41PP385, 41PP386, 41PP387, and 41PP388) have potential to be eligible for inclusion in the NRHP. The Phase II testing of these five sites is currently in progress. The remaining four archaeological sites within the search radius are recommended not eligible for inclusion in the NRHP.

Table 1. Previously Recorded Archaeological Sites Located within One Mile of the Area of Potential Effects.

Identifier	Affiliation	Features/Function	NRHP Eligibility	Comments/Recommendations
41PP382	Historic	Late 19th–early 20th c. occupation	Has potential	Phase II testing recommended (in progress)
41PP383	Prehistoric	Lithic scatter	Not eligible	No further work
41PP385	Prehistoric	Occupation	Has potential	Phase II testing and trenching recommended (in progress)
41PP387	Prehistoric	Occupation	Has potential	Phase II testing and trenching recommended (in progress)
41PP388	Prehistoric	Occupation	Has potential	Phase II testing and trenching recommended (in progress)
41PP386	Prehistoric	Occupation	Has potential	Phase II testing and trenching recommended (in progress)
41PP380	Prehistoric	Low-density lithic scatter	Not eligible	No further work
41PP381	Prehistoric	Low-density lithic scatter	Not eligible	No further work
41PP379	Prehistoric	Low-density lithic scatter	Not eligible	No further work

Site 41PP382 was located via shovel testing during the Phase I survey of the proposed Turkey Peak Reservoir. The site consists of a late-nineteenth to early-twentieth century occupation observed within the plow-zone of a hay field west of FM 4. The artifacts encountered within the site included historic domestic and architectural artifacts (e.g., a glass bottle, ceramics, a spoon, nails, etc.) from 0 centimeters (cm; 2 inches [in]) to 35 cm (14 in) below surface. While the site has been severely affected by plowing, it retains the potential to provide information concerning the early settlement of Palo Pinto County. As such, the site was recommended for further Phase II NRHP-eligibility testing. The testing of site 41PP382 is in progress.

Sites 41PP385, 41PP386, 41PP387, and 41PP388 all represent deeply buried prehistoric occupations with multiple discrete components. These sites were originally documented during the deep trenching for the original Phase I survey for the proposed Turkey Peak Reservoir. These sites contained prehistoric artifacts (e.g., lithics, fire-cracked rock, mussel shell, bone,



etc.) from depths between 24 cm (9 in) and 370 cm (146 in) below surface. Due to the nature of the deeply buried deposits, the integrity of the archaeological deposits at sites 41PP385, 41PP386, 41PP387, and 41PP388 appears excellent, and the sites have the potential to aid in our understanding of the prehistory of the region. As a result, further Phase II NRHP-eligibility testing was recommended for these four sites. This Phase II testing is currently in progress.

Aside from the archaeological sites discussed above, the only other cultural resources within one mile of the APE are two cemeteries (Table 2).

Table 2. Cemeteries within One Mile of the Area of Potential Effects.

Identifier	Cemetery Name	Location	Comments/Recommendations
PP-C003	Santo East Cemetery	Off of East Cemetery Lane, north of the Texas and Pacific Railroad, approximately 0.9 mile (1.4 km) northeast of Santo, Texas	No further information available
PP-C004	Brannon Cemetery	On the west side of FM 4, 0.2 mile north of the intersection of N FM 129, Santo, Texas	No further information available

Conclusions and Recommendations

A review of the Atlas indicated that the proposed Turkey Peak Downstream Mitigation Project APE has cultural resources within a one mile search radius. However, none of these resources are located within 300 m (984 ft) of the proposed mitigation project areas. Furthermore, the portion of the project where the ground disturbing activities will be concentrated (the riffle location) was previously surveyed in 2009, and no cultural resources were observed. Previous surveys near the APE indicate that the area is comprised of deep Holocene alluvial deposits. As such, the shallow nature of the proposed impacts within the APE have a low probability for negatively impacting cultural resources. Due to these findings, no further archaeological investigations are recommended for the proposed Turkey Peak Downstream 404 Mitigation Project.



References

National Resources Conservation Service (NRCS)

2017 *Web Soil Survey*, <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>, accessed July 21, 2017.

Texas Historical Commission (THC)

2017 “The Texas Archeological Sites Atlas.” <https://atlas.thc.state.tx.us>, accessed July 21, 2017.

United States Geological Survey (USGS)

2007 “The Texas Geology Map Viewer.” United States Geological Survey (USGS), in cooperation with the Texas Natural Resources Information System (TNRIS). Available at <http://txpub.usgs.gov/dss/texasgeology/>). Accessed July 21, 2017.

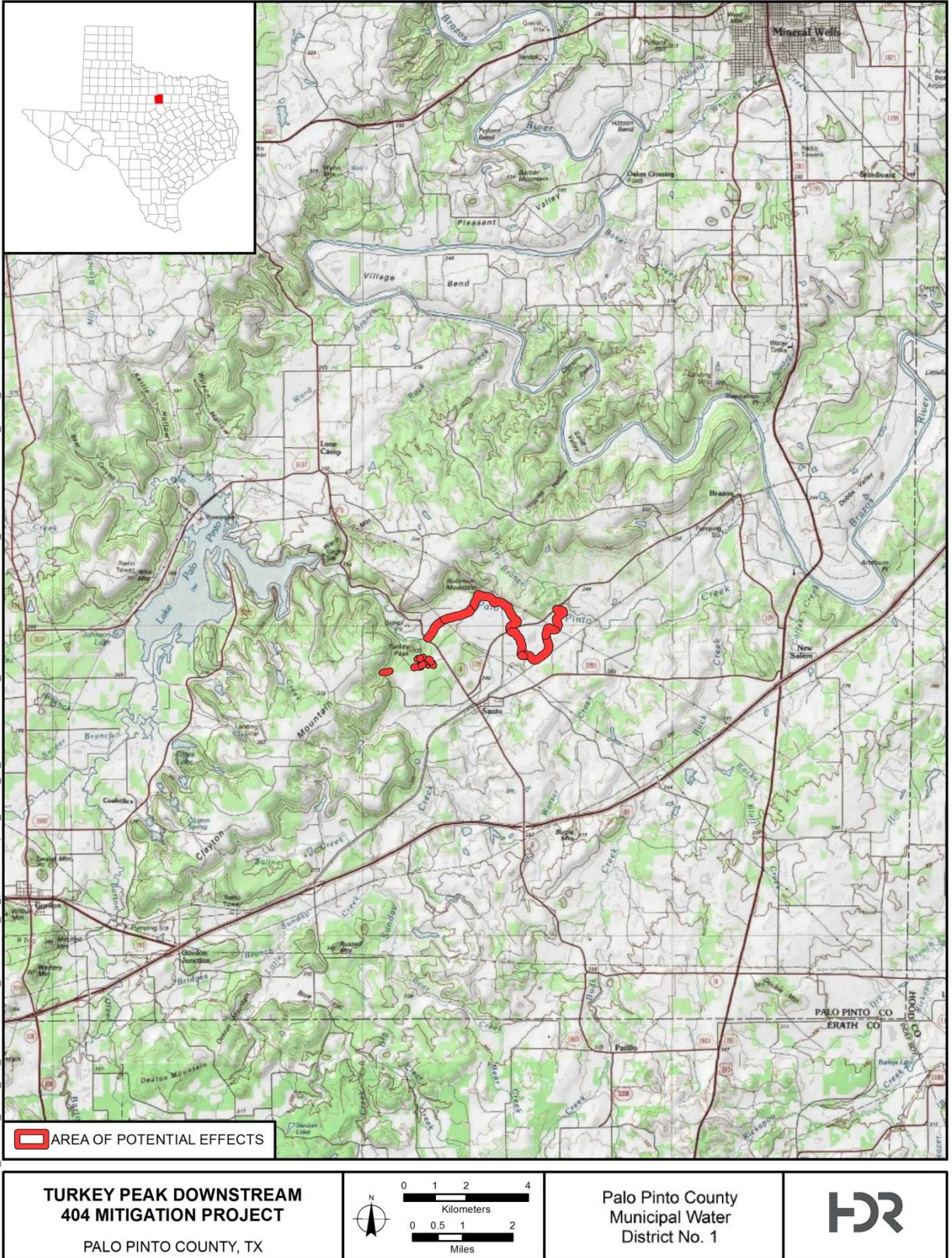


Figure 1. Map Showing the General Location of the APE.

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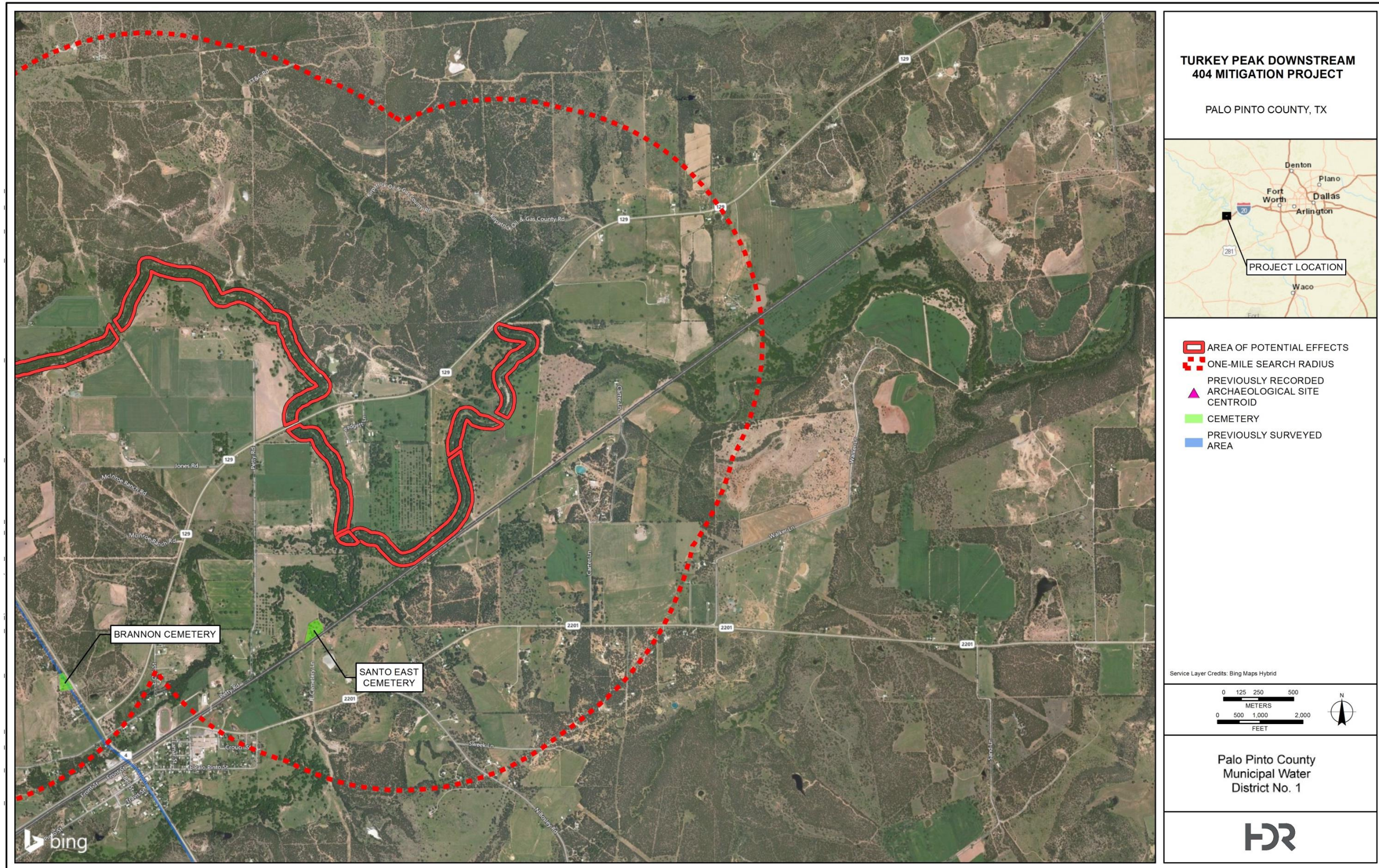


Figure 2. Aerial Photographic Map Showing Cultural Resources and Previous Surveys within One Mile of the APE, Page 1 of 2.

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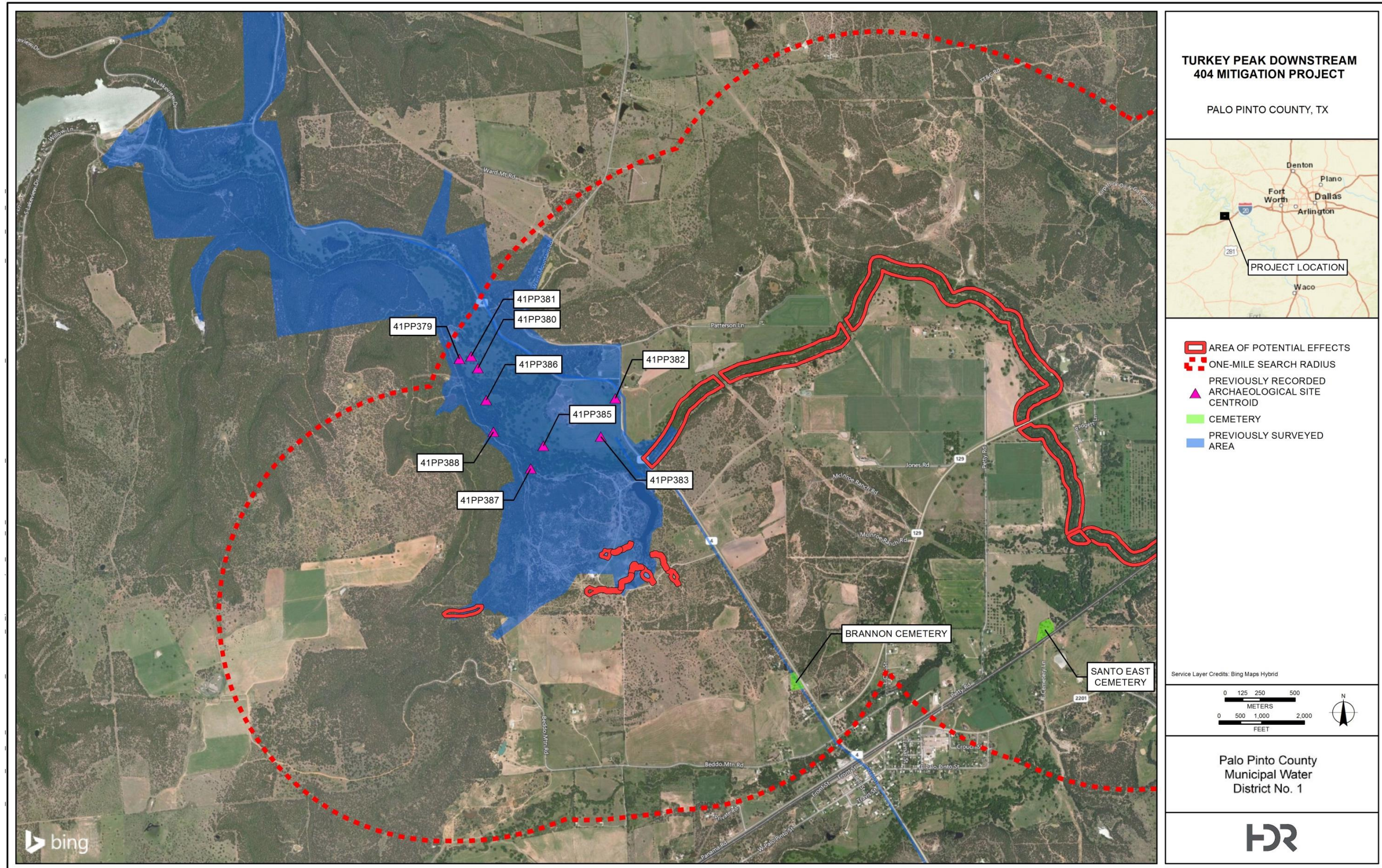


Figure 3. Aerial Photographic Map Showing Cultural Resources and Previous Surveys within One Mile of the APE, Page 2 of 2.

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8 August 2017

RECEIVED

AUG 09 2017

Ms. Rebecca Shelton
Archeology Division
Texas Historical Commission
108 West 16th St.
Austin, TX 78701

Re: Submittal of the draft report, - *Intensive Cultural Resources Survey for the Turkey Peak Reservoir Section 404 Mitigation in Palo Pinto Mountains State Park, Stephens County, Texas* (SWF # 2009-00264; THC Permit #8108)

Dear Ms. Shelton:

Please find enclosed one (1) copy of the revised draft report *Intensive Cultural Resources Survey for the Turkey Peak Reservoir Section 404 Mitigation in Palo Pinto Mountains State Park, Stephens County, Texas* (THC Permit # 8108). A review copy of the report is also being provided to the U.S. Army Corps of Engineers (USACE) as part of project SWF # 2009-00264 and to the Texas Parks and Wildlife Department.

An intensive survey was conducted within the project area. One archaeological site (41SE346) was located but is not recommended eligible for inclusion in the National Register of Historic Places (NRHP) or as a for State Antiquities Landmark (SAL) listing. The report recommends that the proposed project should be allowed to proceed.

Please contact me if you have any questions or concerns.

Sincerely,

Megan Koszarek
Principal Investigator

Cc: Jimmy Barrera, Archeologist, USACE Fort Worth District
Chandler Peter, Regulatory Technical Specialist, USACE Fort Worth District
Tony Lyle, Regional Archaeologist, TPWD

NO HISTORIC
PROPERTIES AFFECTED
PROJECT MAY PROCEED
by [Signature]
or Mark Wolfe
State Historic Preservation Officer
Date 9/5/17
Track# 201709952

**DRAFT REPORT
ACCEPTABLE**

Palo Pinto County Municipal Water District No. 1 has initiated National Historic Preservation Act, Section 106 coordination for the proposed project and mitigation sites with U.S. Army Corps of Engineers – Fort Worth District, Texas Historical Commission (THC, Texas State Historic Preservation Officer), The Comanche Nation, Texas Parks and Wildlife Department, and Interested Parties. Phase I intensive cultural resource surveys were completed for the mitigation areas with proposed construction activities as part of the mitigation plan (Upstream - Nall/Ragsdale tract on Palo Pinto Mountain State Park, Upstream – Copeland tract, On-site Simpson tract and riffle restoration areas. Additionally, a Texas Site Atlas database search was conducted for the downstream mitigation stream buffer areas to which access to the privately owned tracts have not been granted to date.

A Programmatic Agreement was executed in October 2016 and an amendment to address the mitigation sites is being circulated for signatures as of November 8, 2017. An unsigned copy of the proposed PA amendment is provided herein for reference. The cultural resource investigations, testing, agency coordination, and curation as defined in the Programmatic Agreement will be completed prior to construction impacts at each site. Best management practices will be employed as defined by PA, associated reports, or as agreed upon through coordination based on the terms of the PA, as amended.

Enclosed is a summary memo prepared by HDR, Inc. which provides an overview of the findings of surveys conducted to date, as well as recommended investigations to be completed prior to the implementation of mitigation efforts in each of the four mitigation areas.

PROGRAMMATIC AGREEMENT

AMONG

THE UNITED STATES ARMY, CORPS OF ENGINEERS, FORT WORTH DISTRICT,

THE TEXAS STATE HISTORIC PRESERVATION OFFICER,

THE PALO PINTO COUNTY MUNICIPAL WATER DISTRICT NO. 1,

REGARDING COMPLIANCE WITH SECTION 106 OF THE NATIONAL HISTORIC

PRESERVATION ACT OF 1966 (AS AMMENDED)

FOR THE PROPOSED TURKEY PEAK RESERVOIR

TO BE LOCATED SOUTH OF THE CITY OF PALO PINTO, PALO PINTO COUNTY,

TEXAS

AND REQUIRING AN INDIVIDUAL PERMIT ISSUED UNDER SECTION 404 UNDER

THE CLEAN WATER ACT

Permit Number: 2009-00264

WHEREAS, the United States Army Corps of Engineers (USACE) is assessing a permit application under Section 404 of the Clean Water Act for the construction of the Turkey Peak Reservoir by the Palo Pinto County Municipal Water District No. 1 (PPCMWD); and

WHEREAS, construction of the Turkey Peak Reservoir will require a permit in order to comply with Section 404 of the Clean Water Act; and

WHEREAS, the PPCMWD has proposed to construct the Turkey Peak Reservoir, which will be located on Palo Pinto Creek near the town of Santo, Texas and adjacent to Lake Palo Pinto; and

WHEREAS, PPCMWD is a political subdivision of the State of Texas, and as such, is subject to compliance with the Antiquities Code of Texas (Title 9, Chapter 191 of the Texas Natural Resources Code); and

WHEREAS, issuing a permit pursuant to Section 404 of the Clean Water Act requires review of the Project under Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended); and

WHEREAS, the USACE has determined that the proposed Project has the potential to adversely effect properties that are eligible for listing in the National Register of Historic Places (National Register), and has consulted with the Texas State Historic Preservation Officer (SHPO), pursuant to the Advisory Council on Historic Preservation (ACHP) regulations, *Protection of Historic Properties* (36 CFR Part 800), implementing Section 106 of the National Historic Preservation Act (54 USC 300101); 33CFR 325 (Appendix C) *Procedures for the Protection of Historic Properties*; Revised Interim

Guidance for Implementing Appendix C of 33 CFR 325 with the ACHP regulations at 36 CFR 800 (2005); and

WHEREAS, the purpose of this Programmatic Agreement (PA) is to streamline compliance with the regulations by developing procedures to satisfactorily take into account the effects of this Project on historic properties, and to increase flexibility in applying the regulations and reduce redundant documentation in a manner that will allow the PPCMWD to proceed with construction in an expeditious manner; and

WHEREAS, the USACE, in consultation with the Texas SHPO, considered the potential effects of the Project as provided in 36 CFR 800 and 33 CFR 325 and establish an Area of Potential Effects (APE) that encompasses the entire area covered by the terms of the Environmental Assessment (EA), which includes the 704-acre area comprising the flood pool (elevation 874.9 amsl), all recreational areas and pipeline rights-of-way; and

WHEREAS, the USACE has consulted with the Comanche Nation of Oklahoma, Kiowa Tribe of Oklahoma, Lipan Apache Tribe of Texas, Tonkawa Tribe of Oklahoma, and Wichita and Affiliated Tribes, and invited them to sign this agreement; and

WHEREAS, The PPCMWD and other consulting parties have been notified and provided an opportunity to comment on and participate in consultation on this Project; and

WHEREAS, the USACE has invited the Advisory Council on Historic Preservation (ACHP) to participate in consultation for this Project, and the ACHP has chosen not to participate in development of this PA; and

NOW, THEREFORE; the USACE and the SHPO agree that the Project shall be implemented in accordance with the following stipulations in order to take into account the effect of the Project on historic properties to satisfy the USACE's Section 106 responsibilities for this Project.

STIPULATIONS

The USACE will ensure that the following stipulations are carried out by the applicant to identify historic properties and address adverse effects to such properties that will result from construction of Turkey Peak Reservoir.

I. FRAMEWORK

- A. All work conducted under the PA will be performed in a manner that is consistent with the Secretary of Interior's "Standards and Guidelines for Archeology and Historic Preservation" (48 FR 44716-44740; September 23, 1983) as amended, or the Secretary of the Interior's "Standards for the Treatment of Historic Properties" (36 CFR 68) as appropriate.

- B. The Texas Historical Commission (THC) is the agency that administers the Antiquities Code of Texas (Title 9, Chapter 191 of the Texas Natural Resources Code) and must issue an Antiquities permit prior to the initiation of archeological work, and also has responsibilities under Chapter 711 of the Texas Health and Safety Code regarding the discovery and disposition of abandoned or unknown cemeteries.
- C. Critical steps in the identification process include a literature review, tribal consultation (as appropriate), historical and archival research, consultation with other knowledgeable parties, and field investigations.

II. LITERATURE REVIEW AND RESEARCH DESIGN

- A. The applicant prepared a report summarizing and synthesizing all previous archeological and architectural studies conducted at the proposed reservoir. This background research is necessary to plan the research design (RD) that will guide the survey strategy and will assist in the preparation of the scope-of-work required for the Antiquities permit. The report shall contain:
 - 1. Full references to all previous investigations.
 - 2. Complete list of sites identified in prior work, including National Register of Historic Places and State Antiquities Landmark status.
 - 3. Separate tabular listings for archeological sites and above-ground architecture.
 - 4. Summary of any identified Traditional Cultural Properties (TCPs) or Traditional Cultural Landscapes.
 - 5. Maps of areas where historic properties have been identified.
 - 6. Maps of areas where historic properties have not been fully inventoried.
 - 7. Maps of any proposed recreation facilities and pipelines associated with the Project.
- B. A draft RD shall be submitted to the SHPO, Tribes, consulting parties and USACE. The RD may be revised based on the comments received within 30 days. The USACE shall be responsible for final comments and acceptance before implementation of the final RD. A copy of the final RD shall be made available to all signatories and concurring parties.
- C. The RD will identify research questions of importance to the region that can be reasonably addressed by resources that are likely to be encountered within the proposed reservoir and will set forth procedures for the identification and evaluation of these resources. These will include methods for finding and documenting archeological sites and architectural resources, analysis of data, and the curation of artifacts.

III. IDENTIFICATION OF HISTORIC PROPERTIES

Identification efforts should follow the ACHP's Section 106 Archaeology Guidance, the Secretary of the Interior's (SOI) Standards and Guidelines for Archaeology and Historic Preservation, the SOI's Standards and Guidelines for Federal Agency Historic Preservation Programs Pursuant to the National Historic Preservation Act. This includes standards defined by the Council of Texas Archeologists. For all archaeological activities and architectural assessments resulting in a written report, the SHPO, Tribes, and consulting parties will be afforded 30 calendar days after receipt of any document to comment on the documentation submitted by the USACE. Documents may then be revised considering the comments received. The USACE shall be responsible for final comments.

A. Phase I (Survey)

1. If necessary, for additional recreation facilities or pipelines defined in the final RD, the applicant will complete a pedestrian survey, including shovel-testing, augering, and backhoe trenches (as necessary) to identify archeological sites.
 - a. All archeological sites and above ground architecture recorded will be assessed, if possible, for eligibility to the NRHP. This will consist of the categorization of all sites as NRHP eligible, listed, not eligible, or unevaluated. Archival research will be necessary to assess standing architecture. Sites that cannot be determined ineligible for the NRHP will be assessed by more detailed work in Phase II.
 - b. A draft report shall follow reporting standards developed by the Council of Texas Archeologists, as per the Antiquities Code of Texas.
 - c. The draft report shall be distributed to all signatory parties for a 30 day period of review and comment. The USACE shall ensure that comments are addressed in a final report and distributed to all signatories.

B. Phase II (Testing)

1. A testing plan that complies with the Antiquities Code of Texas shall be developed in consultation with the Tribes and consulting parties. It must include at the minimum:
 - a. Criteria for assessing NRHP eligibility that can be applied to every site tested.

- b. A draft report shall follow reporting standards developed by the Council of Texas Archeologists as per the Antiquities Code of Texas. This will consist of the categorization of all sites as NRHP eligible, or not eligible. For all sites determined eligible, the report should also document the effect of the Project on the resource, noting whether it will be adverse or not. For all eligible sites that will suffer adverse effects, an avoidance plan (if possible) or a data recovery plan shall be included that will mitigate the adverse effects.
- c. The draft report shall be distributed to all signatory parties for a 30 day period of review and comment. The USACE shall ensure that comments are incorporated into a final report and distributed to all signatories.

The USACE will determine the NRHP eligibility of all archeological and historical resources identified within the APE of the Project in consultation with the SHPO and the Tribes. If the USACE and the SHPO concur on eligibility, the USACE will proceed to a determination of effect. If the USACE and the SHPO disagree on NRHP eligibility, the matter will be referred to the Keeper of the Register in the Department of the Interior, as per 36 CFR 63. The resource will be treated as if it is eligible for inclusion in the NRHP until a decision is rendered by the Keeper. If the Keeper determines that the resource is eligible, the USACE will proceed to a determination of effect.

IV. DETERMINATION OF EFFECT

- A. For all resources determined eligible for inclusion in the NRHP, the USACE will apply the Criteria of Effect to assess whether or not adverse effects will occur to historic properties as a result of the reservoir construction Project. In consultation with the SHPO and Tribes, the USACE shall make a determination of effect. For all historic properties that will be adversely effected, an avoidance plan or mitigation plan will be developed in consultation with all consulting parties.
- B. *Finding of no Adverse Effect (NAE)*. USACE, in consultation with, the SHPO, and consulting parties, shall apply the criteria of adverse effect to historic properties within the APE in accordance with 36 CFR 800.5. Project Properties determined to have NAE shall be avoided and or protected from all potential current and future impacts by the PPCMWD. Properties with NAE designation may be adversely effected by use or design changes in the Project and require re-assessment of effects.
 - 1. The signatories to this agreement concur that all eligible historic properties identified within the APE that do not have a final determination of NAE are presumed to be adversely effected by the Project. PPCMWD, in consultation with the USACE, the SHPO and

other consulting parties, shall apply the criteria within the APE on a case-by-case basis in accordance with 36 CFR 800.5.

V. TREATMENT OF ADVERSE EFFECT

- A. Once a data recovery plan has been approved by the USACE, SHPO, Tribes and consulting parties, it may be implemented to resolve adverse effects in accordance with 36 CFR 800.6. For archeological sites, the mitigation plan will specify the areas to be excavated, the methods to be used, special samples to be collected, the specialists who will conduct specialized analyses, the problems set forth in the RD that can be addressed by data from the site being excavated, and include reporting methods and curation of artifacts and records. For architectural resources, adaptive reuse shall be considered whenever possible. For buildings and structures that will be destroyed by the Project, the mitigation plan will specify the level of HABS-HAER drawings and photographs that will be necessary to document the resources.
- B. All work conducted to treat adverse effects will be described in a draft report that shall follow reporting standards developed by the Council of Texas Archeologists as per the Antiquities Code of Texas.
- C. The draft report shall be distributed to all signatory parties for a 30 day period of review and comment.
- D. If PPCMWD and the USACE, and the SHPO fail to agree on how adverse effects will be resolved, the USACE shall request that the ACHP join the consultation and provide the ACHP and all consulting parties with documentation pursuant to 36 CFR 800.11 (g).

VI. CURATION AND DISPOSITION OF RECOVERED MATERIALS, RECORDS AND REPORTS

- A. *Curation.* PPCMWD materials and associated records owned by the State of Texas or PPCMWD are governed by the THC Rules (Chapter 29, Rules of Management and Care of Artifacts and Collections). Therefore, PPCMWD shall ensure that all such materials and records that result from identification, evaluation, and treatment efforts conducted under this PA are accessioned into a curatorial facility that has been certified, or granted provisional status, by the THC in accordance with Chapter 29.6, except as specified for human remains in Stipulation VI.

VII. TREATMENT OF HUMAN REMAINS

- A. PPCMWD shall develop a treatment plan for human remains in consultation with the USCAE, the SHPO and other consulting parties. USACE shall ensure that

consulting parties are afforded a reasonable opportunity to identify concerns, advise on identification and evaluation, and disposition of human remains.

- B. **INADVERTENT DISCOVERY.** Immediately upon the inadvertent discovery of human remains during historic properties investigations or construction activities conducted pursuant to this PA, PPCMWD shall ensure that all ground disturbing activities cease in the vicinity of the human remains and any associated grave goods, and that the site is secured from further disturbance or vandalism. PPCMWD will be responsible for immediately notifying local law enforcement officials and a medical examiner or coroner, and if the archeologist is reasonably certain that the human remains are archeological in nature, he will discuss the matter with the medical examiner or coroner and be on site when they or their designees (e.g., police officers) are examining the remains to prevent disturbance to the remains resulting from unscientific excavation methods. Within 48 hours of the discovery, USACE shall initiate consultation with the SHPO, and consulting parties to develop a plan for resolving the adverse effects. The course of action shall comport with Title 13, Part II, Chapter 22, Cemeteries, which are the rules regarding abandoned cemeteries and the disinterment of graves, as well as any other requirements under Chapter 711 of the Texas Health and Safety Code.

Any human remains or grave goods found during the course of this Project must be curated at a state-certified repository (under the Antiquities Code of Texas), Any human remains and associated grave goods sent to the curation repository, will incur expenses that shall be covered by PPCMWD.

VIII. INADVERTENT DISCOVERIES OF HISTORIC PROPERTIES

The PPCMWD recognizes the possibility that inadvertent effects may occur to a recorded or previously unidentified historic property or unevaluated cultural resource. Upon such a discovery, the PPCMWD will use the following procedures:

- A. The SHPO, USACE, and Tribes will be notified by the PPCMWD immediately upon discovery that a protected or previously unidentified cultural resource has been, or could be, inadvertently effected by the Project.
- B. If the Project has not been completed at the time the effect is discovered, all activities in the vicinity (minimum of 50 meters) of the discovery shall cease, and reasonable efforts shall be taken to avoid or minimize harm to the cultural resource.
- C. The Principal Investigator will evaluate the discovery, assess the effects, develop possible treatment recommendations and implement additional protection measures as necessary to prevent further harm to the cultural resource.

- D. Within seven (7) days of this evaluation, the PPCMWD will initiate consultation with the SHPO, USACE, and Tribes to determine if the resource is a historic property and, if so, to develop a treatment plan to mitigate any adverse effects.
- E. If the Project has already been concluded when an effect to a property has been discovered, the PPCMWD, SHPO, and Tribes shall develop a treatment plan to mitigate adverse effects which the PPCMWD must implement within a mutually agreed upon specified time period.
- F. Within six months (or an alternate agreed upon schedule), of the discovery of the inadvertent effect, the PPCMWD shall provide the SHPO, USACE, Tribes and other interested parties with a report describing the Project, the circumstances surrounding the effects, and the results of treatment plan implementation.

IX. PROFESSIONAL QUALIFICATIONS

All historic preservation-related investigations specified in this Agreement shall be carried out by Principal Investigators meeting the pertinent professional qualifications of the Secretary of Interior's (SOI) *Professional Qualification Standards* (36 CFR Part 61) in a discipline appropriate for the task and the nature of the historic properties. Since this project will be conducted on land controlled by the PPCMWD, principal investigators must also meet the professional qualification standards found in Title 13, Part II, Chapter 26, Rules of Practice and Procedure, and must be eligible to receive an Antiquities Permit.

X. DISPUTE RESOLUTION

Should any signatory or concurring party to this Agreement object at any time to any actions proposed or the manner in which the terms of this Agreement are implemented, the USACE shall consult with such party to resolve the objection. If the USACE determines that such objection cannot be resolved, the USACE will:

- A. **CONSULT ACHP.** Forward all documentation relevant to the dispute, including the USACE's proposed resolution, to the ACHP. The ACHP shall provide the USACE with its advice on the resolution of the objection within 30 calendar days of receiving adequate documentation. Prior to reaching a final decision on the dispute, the USACE shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP, signatories and concurring parties, and provide them with a copy of this written response. The USACE will then proceed according to its final decision.
- B. **FINAL DECISION.** If the ACHP does not provide its advice regarding the dispute within the 30 calendar day time period, the USACE may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, the USACE shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories and concurring parties to

the Agreement, and provide them and the ACHP with a copy of such written response.

- C. Carry out all other actions subject to the terms of this PA that are not the subject of the dispute.

XI. DURATION, AMENDMENT, AND TERMINATION:

- A. **DURATION.** This Agreement shall be null and void if its terms are not carried out within 10 years from the date of its execution. Prior to such time, the USACE may consult with the other signatories to reconsider the terms of the Agreement and amend in accordance with this stipulation.
- B. **AMENDMENT.** This Agreement may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP.
- C. **TERMINATION.** If any signatory to this Agreement determines that its terms will not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Stipulation VII, above. If within 30 calendar days (or another time period agreed to by all signatories) an amendment cannot be reached, any signatory may terminate the Agreement upon written notification to the other signatories.

Once the Agreement is terminated, and prior to work continuing on any historic property work defined by the EA, the USACE must either (a) execute a Memorandum of Agreement pursuant to 36 CFR 800.6, or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR 800.7. The USACE shall notify the signatories as to the course of action it will pursue.

XII. REPORTING AND MONITORING:

Upon execution of this PA, the USACE shall submit, via email, a bi-annual update on the status of all activities covered by this PA to consulting parties other than the ACHP and other interested parties. Updates will be submitted until all activities covered by this PA have been completed.

XIII. EXECUTION:

Signature of this Agreement by the USACE, and the SHPO, and implementation of its terms evidence that the USACE has taken into account the effects of this Project on historic properties and afforded the ACHP an opportunity to comment.

SIGNATORIES:

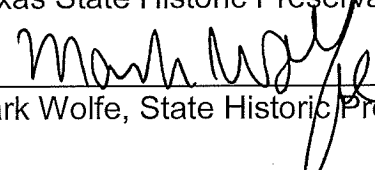
United States Army, Corps of Engineers, Fort Worth District



Stephen L. Brooks, Chief, Regulatory Division

Date 10-7-16

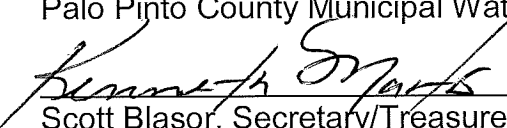
Texas State Historic Preservation Officer



Mark Wolfe, State Historic Preservation Officer

Date 9/29/16

Palo Pinto County Municipal Water District No. 1



Scott Blasor, Secretary/Treasurer

Date 6-21-2016

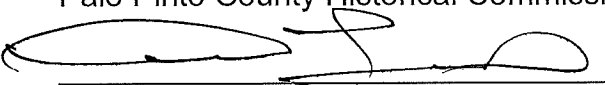
CONSULTING PARTIES CONCURRING IN PA:

Comanche Nation

Theodore E. Villicana, Comanche Nation Historic Preservation Office

Date _____

Palo Pinto County Historical Commission



Mike Lewis, Archeological Chairman, Board of Directors

Date 6/21/16

Attachment J

Copeland Tract Vegetation Management Plan (June 2017)

June
2017



Final

Copeland Tract Vegetation Management Plan

Palo Pinto County Municipal Water
Utility District, No. 1

Turkey Peak Reservoir – Mitigation
Plan (SWF 2009-00264)
Supplemental Document

Stephens County, Texas



Acronyms and Abbreviations

BCC	Bird of Conservation Concern
BMP	Best Management Practice
CWA	Clean Water Act
ESA	Endangered Species Act
MBTA	Migratory Bird Treaty Act
MLRA	Major Land Resource Area
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PPMSP	Palo Pinto Mountains State Park
PPCMWD	Palo Pinto County Municipal Water District
TCEQ	Texas Commission on Environmental Quality
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks and Wildlife
TWDB	Texas Water Development Board
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service

Table of Contents

Acronyms and Abbreviations	Inside Front Cover
1. Introduction	1-1
1.1 Purpose	1-1
1.2 Environmental Compliance Requirements	1-1
1.3 Implementation and Responsibilities	1-2
1.4 Integration with Other Plans and Documents	1-2
1.5 Management Strategy	1-2
2. Location and Setting	2-1
2.1 Surrounding Properties	2-1
2.2 Land Use History	2-1
3. Existing Conditions	3-1
3.1 Land Use Impacts	3-1
3.2 Climate	3-2
3.3 Water Resources	3-3
3.4 Topography and Geology	3-3
3.5 Soils	3-3
3.6 Vegetation	3-8
3.6.1 Loamy Bottomland Ecological Site	3-9
3.6.2 Steep Rocky and Clay Loam Ecological Sites	3-12
3.6.3 Low Stony Hill Ecological Site	3-14
3.6.4 Clay Slopes Ecological Site	3-14
3.7 Wildland Fire Fuels	3-15
3.8 Wildlife	3-16
3.8.1 Federally Listed Species	3-16
3.8.2 Migratory Birds	3-17
3.9 Invasive, Nonnative Flora and Fauna	3-18
3.9.1 Invasive Flora	3-18
3.9.2 Invasive Fauna	3-18
4. Management	4-1
4.1 Ecosystem Management	4-3
4.1.1 Ecosystem Management Goal 1	4-3
4.1.2 Ecosystem Management Goal 2	4-3
4.1.3 Ecosystem Management Goal 3	4-4
4.2 Special Status Species Habitat Management	4-4
4.2.1 Sensitive Habitat Management Goal 1	4-4
4.3 Riparian Buffer Vegetation Management	4-6
4.3.1 Riparian Buffer Goal 1	4-6
4.3.2 Riparian Buffer Goal 2	4-6

4.4	Watershed Management.....	4-15
4.4.1	Watershed Vegetation Goal 1.....	4-17
4.5	Non-native and Invasive Species Management	4-19
4.5.1	Non-Native Invasive Species Goal 1	4-19
4.5.2	Non-Native Invasive Species Goal 2	4-20
5.	Monitoring Plan	5-1
6.	Plan Implementation Process.....	6-1
6.1	Plan Implementation	6-1
6.1.1	Quarterly Work Plan	6-1
6.1.2	Funding	6-1
7.	References.....	7-1

Appendices

- Appendix A. Burn Prescription Form
- Appendix B. Draft Seed and Live Plants Lists
- Appendix C. NRCS State and Transition Diagrams

Figures

Figure 2-1.	Regional Location of Copeland Tract	2-2
Figure 2-2.	Location of Copeland Tract	2-3
Figure 3-1.	Pasture Land Use	3-1
Figure 3-2.	Palo Pinto Creek within the Copeland Tract.....	3-4
Figure 3-3.	Livestock Impoundment (Pond 2) on Ephemeral Stream within Copeland Tract	3-4
Figure 3-4.	Water Resources in the Copeland Tract	3-5
Figure 3-5.	Topography of Copeland Tract.....	3-6
Figure 3-6.	Soils of Copeland Tract.....	3-7
Figure 3-7.	Ecological Sites on the Copeland Tract.....	3-10
Figure 3-8.	Adapted from NRCS Loamy Bottomland (R080BY151TX) State-and-Transition Diagram (see Appendix C, Diagram C-1)	3-11
Figure 3-9.	Adapted from NRCS Steep Rocky (R080BY163TX) State-and-Transition Diagram (see Appendix C, Diagram C-2)	3-13
Figure 4-1.	Riparian Brush Management Units	4-9
Figure 4-2.	Fire Management Units.....	4-12
Figure 4-3.	Watershed Vegetation Management Units.....	4-16

Tables

Table 3-1.	Weather Averages by Month.....	3-2
Table 3-2.	Summary of Ecological Sites on the Copeland Tract.....	3-9
Table 3-3.	USFWS Birds of Conservation Concern with the Potential to Occur on Copeland Tract	3-17
Table 3-4.	Invasive and Nonnative Plants Observed on Copeland Tract*	3-18
Table 4-1.	Summary of Plan Goals	4-1
Table 4-2.	Riparian Vegetation Management Summary*	4-10
Table 4-3.	Watershed Vegetation Management Units Summary	4-18

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1. Introduction

1.1 Purpose

The purpose of this Copeland Tract Vegetation Management Plan (Plan) is to outline the process by which the Palo Pinto County Municipal Water District No. 1 (hereinafter referred to as the District) will undertake actions to meet the standards of mitigation outlined in the Mitigation Plan (PPCMWD 2016). The Copeland Tract is the Upstream Mitigation Site referred to in the Mitigation Plan. This document is intended to serve as a supplemental technical report to the Mitigation Plan which is a required attachment of the Clean Water Act (CWA), Section 404 Individual Permit application (SWF 2009-00264), for the Lake Palo Pinto Storage Restoration Project at Turkey Peak (hereinafter referred to as Turkey Peak Reservoir). This Plan may be incorporated as an attachment or by reference to a Final Mitigation Plan or as a special permit condition.

The intent of the Mitigation Plan as it pertains to the Copeland Tract is to restore intermittent and ephemeral stream channels with associated riparian buffers. Restoration and enhancement of stream hydrology will be conducted as outlined in the Mitigation Plan. The intent of this Vegetation Management Plan is to detail the approach of restoring and enhance the riparian vegetation associated with the streams on the Copeland Tract. This Vegetation Plan presents practicable recommendations that allow for the protection and enhancement of natural resources and conservation of existing ecosystems, while achieving the mitigation requirements at the Copeland Tract defined in the Mitigation Plan (PPCMWD 2016).

1.2 Environmental Compliance Requirements

The following laws were considered when developing the Plan for the Copeland Tract:

Endangered Species Act. In order to minimize adverse effects to federally listed species protected under the Endangered Species Act, the U.S. Fish and Wildlife Service (USFWS) could identify changes or additional minimization measures that could result in delays and additional costs. Because of this, the District has initiated early environmental/natural resources review of proposed actions, in order to assess risks, develop alternatives, and correctly identify minimization measures.

Migratory Bird Treaty Act. The Migratory Bird Treaty Act (MBTA) of 1918, made it illegal for people to “take” migratory birds, their eggs, feathers, or nests. Take is defined in the MBTA to include by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing or transporting any migratory bird, nest, egg, or part thereof.

Clean Water Act. The CWA establishes the basic structure for regulating discharges of pollutants or fill into waters of the United States and regulating quality standards for surface waters. The CWA made it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained. The U.S. Environmental Protection Agency National Pollutant Discharge Elimination System (NPDES) permit program controls wastewater and stormwater discharges in accordance with CWA – Section 402. In Texas, authority of the Section 402 is delegated to the Texas Commission on Environmental Quality (TCEQ) which

reviews and issues general permits for construction stormwater discharge activities under the Texas Pollutant Discharge Elimination System (TPDES).

1.3 Implementation and Responsibilities

Performance standards for restoration and enhancement will ensure the Copeland Tract is functioning as intended and meeting the goals and objectives described in the Mitigation Plan (PPCMWD 2016) or a future Final Mitigation Plan. The District will be responsible for maintaining the Copeland Tract to comply with performance standards until such time as the District provides documentation to, and receives verification from, the U.S. Army Corps of Engineers (USACE) that aquatic resources in the Copeland Tract meet the performance standards.

1.4 Integration with Other Plans and Documents

The planning process for this Plan included analysis of the objectives and requirements of the Mitigation Plan (PPCMWD 2016), stream restoration engineering and design report(s), initial cultural resources reviews, and the Phase I Environmental Site Assessment (PPCMWD 2014 in PPCMWD 2016) . Any additional surveys or findings specific to the Copeland Tract that are undertaken will be incorporated into this Plan and will be considered during the adaptive management phases of the Plan's implementation. Reports for Palo Pinto Mountain State Park (PPMSP) property were also considered during the development of this Plan and will continue to be considered during its implementation (Keith 2013; Keith and Carr 2014).

1.5 Management Strategy

The District will be responsible for developing, operating and maintaining the Copeland Tract in a means that meets the goals and objectives of this Plan and the Mitigation Plan. In general, the mitigation alternatives and proposed measures were developed to minimize risk of failure and facilitate adaptive management of the streams and buffers. For example, the anticipated use of locally sourced propagules, controlled burn, and encouraging native volunteer species regeneration are examples of adaptive management that will increase the chance of success, reduce long-term maintenance costs, and improve long-term self-sustainability of the activities to adapt to climate fluctuations common in the region.

The Copeland Tract is vulnerable (but no more so than any other areas) to acts of nature such as wildfires, floods, climatic instability, wildlife activities, and disease as well as unauthorized human activities that may cause the site to become non-compliant with this Plan. Due to the varied types of restoration and enhancement activities in the Copeland Tract, it is a logistical challenge to develop a comprehensive adaptive plan that anticipates the range of issues and extent of adverse effects that may arise. Occurrence of such acts of nature during implementation of the Plan, during the monitoring period or following attainment of performance standards may require changes to the Plan to allow for maintenance activities to offset and counteract negative impacts. Depending upon the circumstances, however, it may be appropriate to allow natural processes to continue, particularly when vegetation is expected to re-establish due to the continued existence of seed sources, hydrology, and restrictions on incompatible land uses. As appropriate, the District will discuss the potential causes, effects to function, options and management decisions on such issues with USACE.

2. Location and Setting

This section describes the location of the Copeland Tract and the surrounding properties and describes the general land use associated with each area. Current and historical information pertaining to land use at the Copeland Tract and in surrounding properties is necessary to manage natural resources and assess future management activities properly.

Located approximately 5 miles west of Strawn, Texas, the Copeland Tract is an approximately 450-acre parcel of undeveloped land in southeastern Stephens County. This property is approximately 19 miles southwest (upstream) of the proposed Turkey Peak Reservoir (**Figure 2-1**).

2.1 Surrounding Properties

The Union Pacific railroad, which forms the southern boundary of the Copeland Tract, divides the Copeland Tract from PPMSP, which is a 4,000-plus acre state park administered by the Texas Parks and Wildlife Department (TPWD). TPWD purchased the former ranch land that makes up PPMSP in 2011. Currently PPMSP is in the public use planning process and has not been developed with infrastructure to support public access. Vegetation management and prescribed burn program planning is on-going for PPMSP, and information collected by TPWD and their contractors was utilized in the development of this Plan (Keith 2013; Keith and Carr 2014). The adjacent properties to the north, east, and west of the Copeland Tract are privately owned and are undeveloped except for an isolated homestead on the northeast boundary (**Figure 2-2**). On April 16, 2011, the Jackson Ranch Fire (part of the Possum Kingdom Wildfire Complex) burned to the edge of the plateau that is immediately north of the Copeland Tract. Signs of that wildfire are still evident on the ridge north of the Copeland Tract.

2.2 Land Use History

Based on site reconnaissance, research, and review of available historical and physical setting information, the Copeland Tract was historically used for ranching and oil and gas exploration and production. Remnants of a reported oil refinery seen in the 1947 aerial photograph, but not apparent in subsequent photographs, were observed along the southern boundary of the eastern half of the property, as evidenced by dilapidated foundations and concrete footings (PPCMWD 2014). There are records of seventeen oil/gas wells recorded on the site. Ten of these are plugged, four were recorded as dry holes, one as a permitted location, one unaccounted oil well, and one oil/gas well. Surface features indicating the locations of several well sites were observed at the time of the site reconnaissance; however, a majority of the wells were no longer visible or were not located at the coordinates listed within the records, and no evidence of active wells occurs within the site (PPCMWD 2014).

Based on the Title Commitment for the upstream mitigation site, approximately 11 pipeline and utility easements may occur in portions of the site. Most of the easements allow access to the site and may have ended due to lack of use. Only two pipeline easements are evident and in use based on the survey of the site, and these do not have a specified width; therefore, the assumption for these easements is that maintenance would occur within 15 feet of the existing

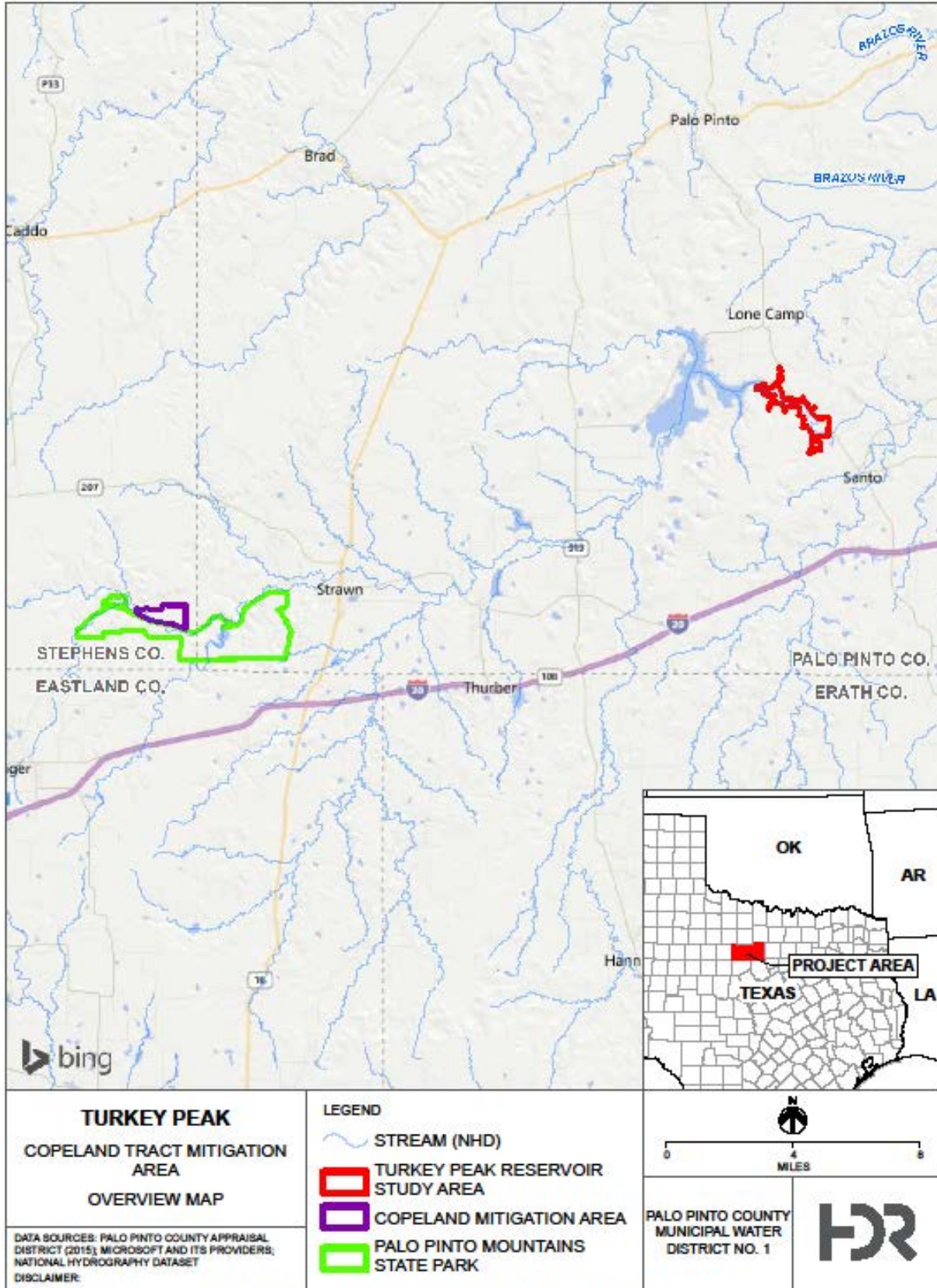


Figure 2-1. Regional Location of Copeland Tract

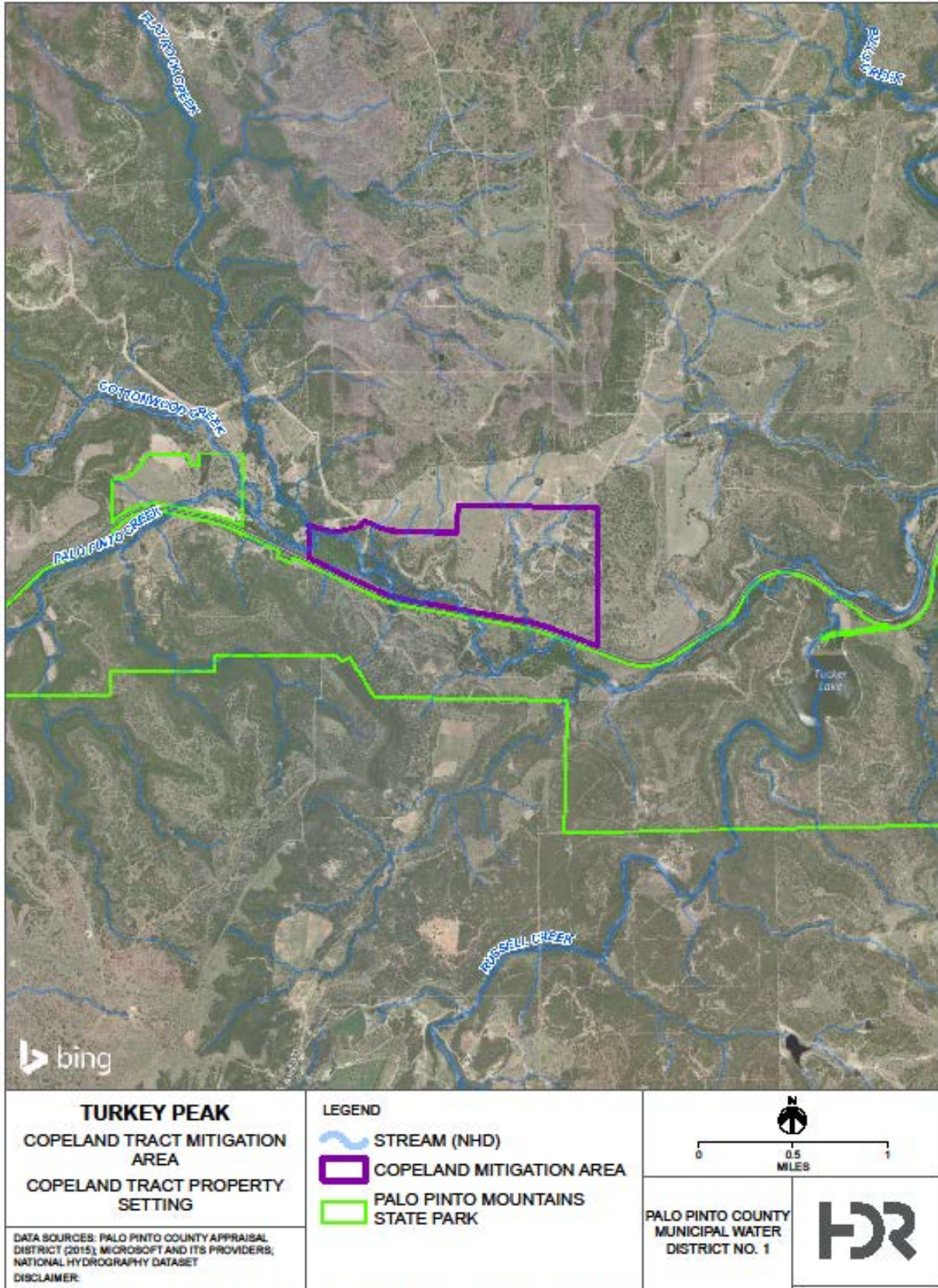


Figure 2-2. Location of Copeland Tract

pipeline. These two small diameter crude oil and natural gas pipelines traverse the eastern half of the subject property (PPCMWD 2014).

Mechanical clearing to increase grazing capacity occurred on the Copeland Tract in the 1940s and 1950s. The effects of the current and historical land use on natural resources within the Copeland Tract are discussed in **Section 3**.

3. Existing Conditions

Establishing vegetation management goals and priorities depends on the existing conditions during implementation of a vegetation management plan. The following sections describe the existing land use, climatic, topographic, soil, water resource, and vegetation conditions on the Copeland Tract.

3.1 Land Use Impacts

Farms and ranches with rangeland and pasture characterize the region almost entirely as the dominant land uses. Most of the rangeland is grazed by beef cattle with a small percentage of pasture set aside for sheep and goats (**Figure 3-1**). An even smaller area characterized by deep soils is farmed for wheat, oats, cotton or grain sorghum. Intense grazing of domestic livestock has impacted the Copeland Tract. Grazing intensity has altered the vegetation communities and significantly reduced native vegetation cover, structure, and diversity, resulting in loss to wildlife habitat as well as terrestrial and aquatic ecosystem functions. In addition, physical trampling of native vegetation around water resources and stream banks has resulted in the loss of vegetation and a healthy riparian vegetation zone. Furthermore, selective grazing and movement of seeds by cattle over the years has allowed invasive plants to compete more successfully.



Figure 3-1. Pasture Land Use

The effects of this intense grazing on the Copeland Tract vegetation communities has led to wind and water erosion of topsoils. Overland flow and resulting loss of topsoil has resulted in erosion that has led to sedimentation into waterways. As further discussed in **Section 3.3**, two livestock impoundments and one in-channel dam occur on the Copeland Tract. These stream impoundments were constructed to provide water for livestock and have removed the natural hydrologic regime and function. In addition to current grazing activities, as many as eleven easements, at least two of which are maintained gas pipelines, also occur on the Copeland Tract.

3.2 Climate

The nearest station with historical weather data (1971–present) is located in Eastland, Texas, approximately 16 miles southwest of the Copeland Tract. The Eastland station reports an average annual rainfall of approximately 29 inches with the wettest periods occurring in late spring (May and June) and early October; rainfall tends to occur as high-intensity, convective thunderstorms during these time periods. Drought conditions are common during most summers. The driest period occurring in late fall and winter (November through January). Temperatures range from average highs of approximately 95 degrees Fahrenheit in the summer months to average lows of approximately 29 degrees Fahrenheit in January (**Table 3-1**) with an average annual temperature of 63 to 66 degrees Fahrenheit. The average first frost occurs around November 5, and the last freeze of the season usually occurs around March 19. The prevailing wind direction is from the southwest with the highest wind speeds occurring during spring.

Table 3-1. Weather Averages by Month

Month	Temperature (° Fahrenheit)		Precipitation (inches)
	Daily Max	Daily Min	Average
January	57.2	28.8	1.17
February	60.7	32.9	2.05
March	68.4	40.4	2.57
April	76.8	48.4	1.98
May	83.7	58.3	3.45
June	90.2	65.4	4.21
July	94.6	68.5	1.77
August	94.9	67.9	2.43
September	87.9	60.7	2.56
October	78.2	50.1	3.44
November	67.1	39.3	1.74
December	57.7	30.3	1.65
Annual	76.5	49.3	29.02

Source: National Oceanic and Atmospheric Administration Station: GHCND:USC00412715; TX2715

3.3 Water Resources

The Copeland Tract is located in the major hydrologic unit area of Middle Brazos-Palo Pinto and in the Upper Palo Pinto Creek (HUC 1206020108). The major hydrologic features surrounding the Copeland Tract drain in a south to southeastern direction and occurs in the Palo Pinto Creek above Lake Palo Pinto segment of the Brazos River Basin. Approximately 1.2 river miles of Palo Pinto Creek (**Figure 3-2**) flows through the Copeland Tract, starting on the far western boundary and generally flowing in a southeasterly direction, exiting the property near its south-central boundary. Landforms surrounding Palo Pinto Creek include floodplain, draw, and flood-plain step, all of which are frequently flooded for brief periods.

In addition to Palo Pinto Creek, the Copeland Tract contains all or portions of one intermittent stream (Flat Rock Creek) and seven ephemeral streams that contribute to Palo Pinto Creek from the north. These tributaries are currently degraded due to intensive overgrazing practices and in-stream impoundments. For example, on Palo Pinto Creek a channel dam structure, which creates a channel impoundment, occurs in the southwest corner of the property. Additionally, two earthen dams, which have created livestock impoundments (**Figure 3-3**), occur on two previously ephemeral tributaries in the eastern portion of the Copeland Tract. The water resources in the Copeland Tract and the setting of the Copeland Tract within the watershed are depicted in **Figure 3-4**.

3.4 Topography and Geology

The region is characterized by dissected drainage divides that are gently rolling to steep with steep-sided, narrow valleys. Prominent scarps with relief to more than 100 feet are common. This area is primarily underlain by limestones and shales of the Pennsylvanian age and by Cretaceous sandstone. The Copeland Tract consists of level plateaus with gentle to moderate slopes down to the riparian corridor of Palo Pinto Creek. It is surrounded by high plateaus with steep slopes and canyons that are associated with Palo Pinto Creek and its tributaries. Elevations within the Copeland Tract range from approximately 1,125 feet (ft, 343 meters [m]) above mean sea level in the south-central portion of the Copeland Tract, at Palo Pinto Creek, to approximately 1,240 ft (378 m) above mean sea level along the southeastern boundary (**Figure 3-5**).

3.5 Soils

Alfisols, Mollisols, and Vertisols soil orders dominate the soils in the region. Natural Resources Conservation Service (NRCS) Soil Survey data for Stephens County depicts four soil series underlying the Copeland Tract (**Figure 3-6**). Understanding the characteristics of soils can assist in determining feasible vegetation management objectives, inherent limitations, and approaches relevant to the Copeland Tract.



Figure 3-2. Palo Pinto Creek within the Copeland Tract



Figure 3-3. Livestock Impoundment (Pond 2) on Ephemeral Stream within Copeland Tract

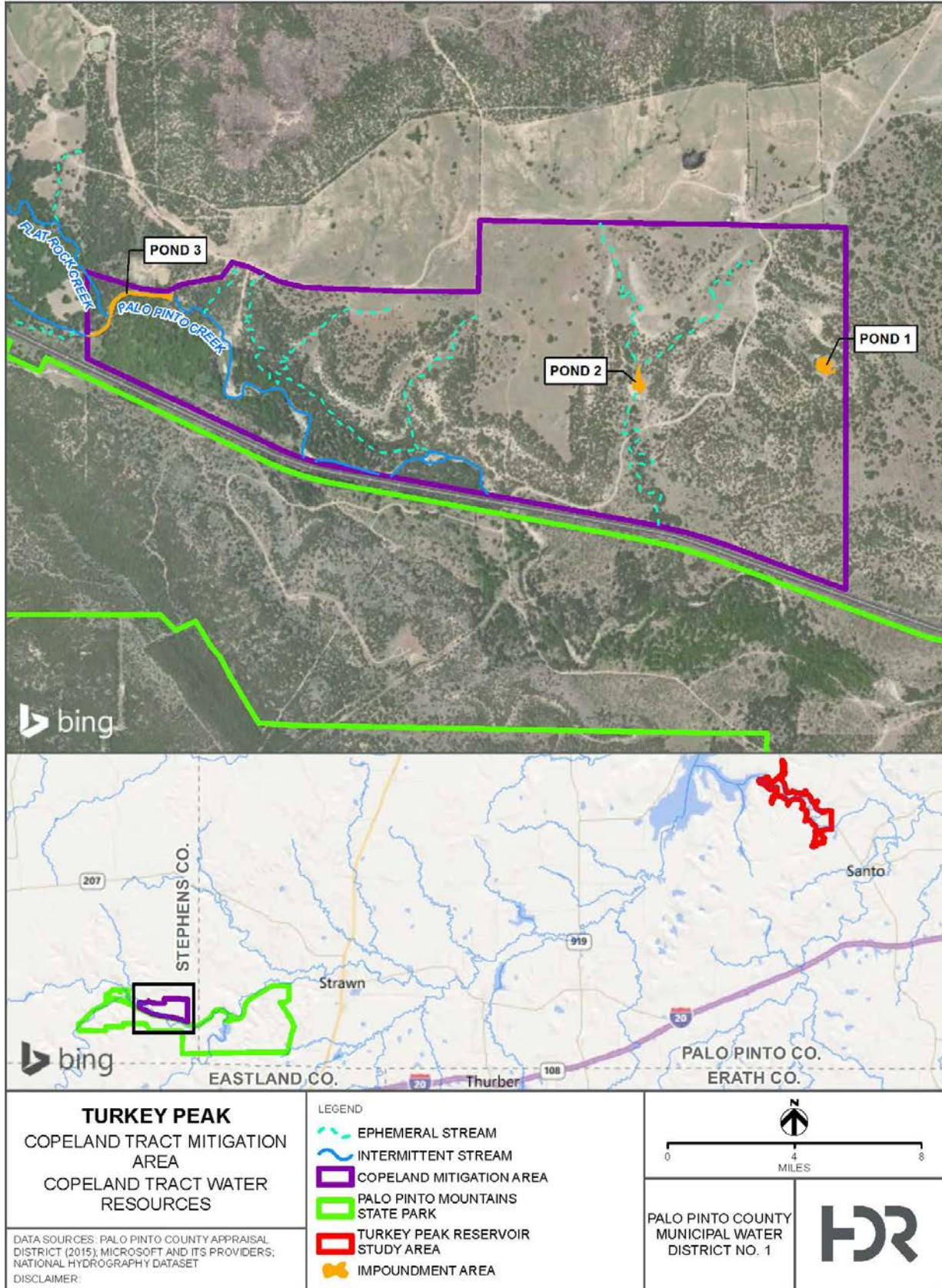


Figure 3-4. Water Resources in the Copeland Tract

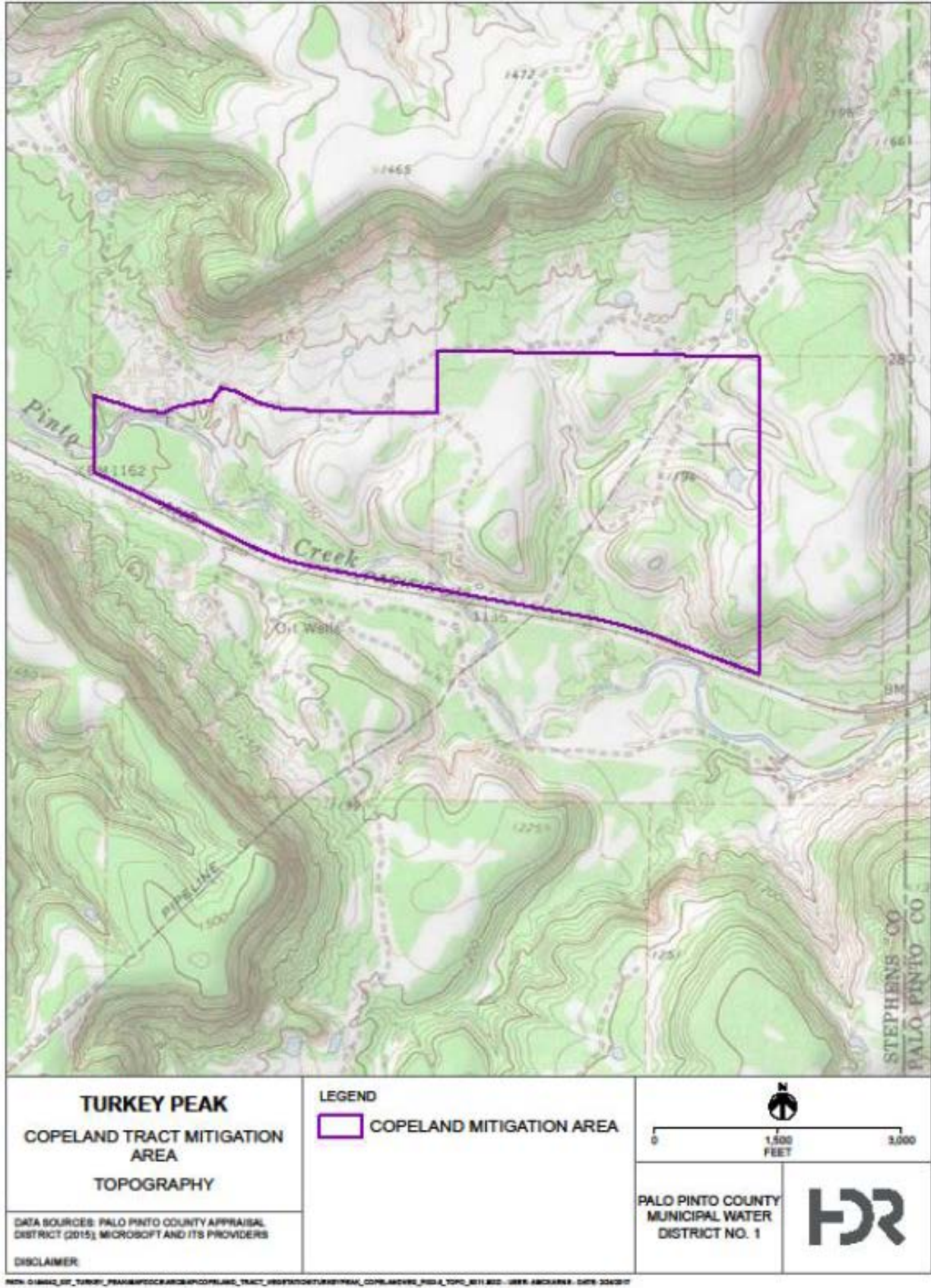


Figure 3-5. Topography of Copeland Tract

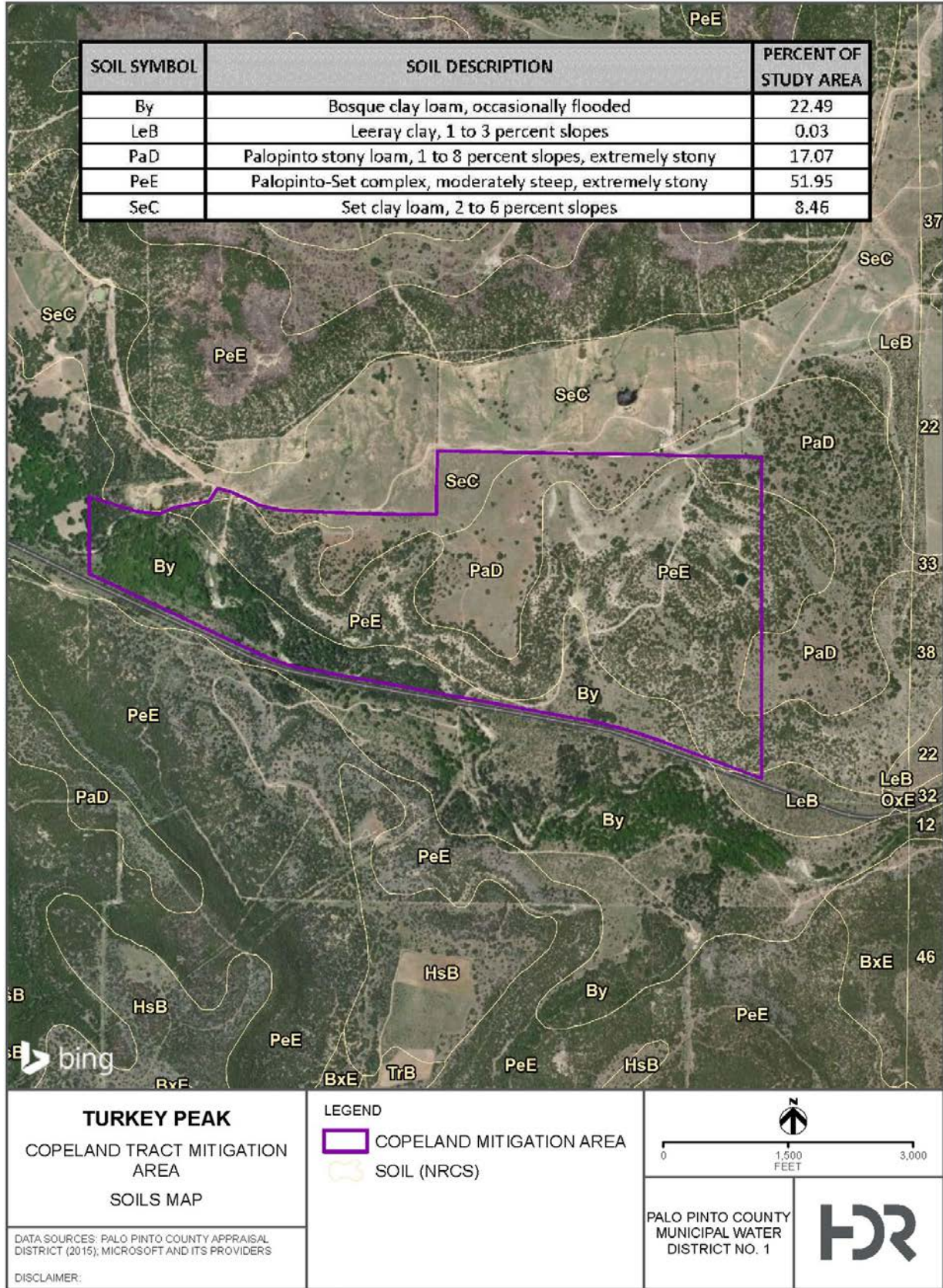


Figure 3-6. Soils of Copeland Tract

The predominant naturally occurring soils underlying the Copeland Tract are as follows:

Set-Palopinto complex (PeE). Extremely stony and well drained with 8 to 40 percent slopes on upland hillsides and along escarpments. Runoff is rapid and permeability is slow to moderate. The available water capacity is very low in the Palopinto soil and high in the Set soil. The hazard of water and wind erosion is slight for both soils. This complex occurs in the hills, ridges, and higher elevations in the central and eastern portions of the Copeland Tract.

Bosque clay loam (By). Very deep, well drained, and occasionally flooded soil on narrow flood plains along local streams. Runoff is slow, permeability is moderate, and available water capacity is high, the root zone is relatively deep and the soil can be easily penetrated by plant roots. This soil is flooded approximately once every 3 to 7 years with short flood durations that recede quickly and result in little damage to permanent vegetation. The hazard of water and wind erosion is slight. The Bosque clay loam soil occurs in the floodplain along Palo Pinto Creek, within the western and southern portions of the Copeland Tract.

Palopinto very stony clay loam (PaD). Well drained and very stony clay loam and rubble on uplands with 1 to 8 percent slopes. Runoff is rapid, permeability is moderate and the available water capacity is very low. The root zone is very shallow to shallow and the hazard of water and wind erosion is slight. This soil occurs on the backslopes and side slopes in the eastern portion of the Copeland Tract.

Set clay loam (SeC). Very deep, well drained, gently sloping (2 to 6 percent slopes) soil occurring on uplands and knolls. Runoff is rapid, permeability is slow, and the available water capacity is high. The root zone is deep; however, clayey layers may restrict some root penetration. The hazard of water erosion is severe and the hazard of wind erosion is slight. This soil occurs in the footslope of ridges along the north-central portion of the Copeland Tract.

3.6 Vegetation

As has been documented in previous vegetation studies conducted for TPWD at the PPMSP (Keith 2013), this area is located in a unique ecotone that is described variously by more than one author: Rolling Plains and Oak Woods and Prairies in the Mesquite Plains Subregion (Diamond et al. 1987), the ecotone between the Carbonate Cross Timbers and Western Cross Timbers Subregion in the Cross Timbers Ecoregion (Griffith et al. 2007), and the Palo Pinto Physiographic Region (Diggs et al. 1999). An ecotone is a transitional phase between two or more different types of ecological communities. The fact that this site is in an ecotone increases the diversity and relative rarity of the setting because it displays characteristics of both regions that converge at one location.

This ecotone, however one chooses to define it, falls within the NRCS Texas North – Central Prairies (80B) Major Land Resource Area (MLRA). This MLRA is described as having the potential to support oak savanna vegetation with an understory of tall grasses such as little bluestem, big bluestem, Indiangrass, and switchgrass in deep soils and Texas wintergrass, little bluestem, silver bluestem, buffalograss, and gramas in more shallow soils. Oak, sumac, bumelias, mesquite, and elm are expected to be the dominant woody species (USDA 2006). Within this MLRA, the Copeland Tract is further characterized by five Ecological Sites

(**Table 3-2** and **Figure 3-7**). Ecological Sites, as developed by the NRCS, provide a framework for describing rangeland vegetation which then facilitates understanding the site’s capabilities to respond to management activities or disturbance. All but one of these Site’s historic climax communities are savanna communities with warm-season perennial tall and midgrasses, several tree species, and shrub species. Each of the Sites are described in additional detail below in order to compare existing vegetation to the potential vegetation as defined by the descriptions of each Site.

Table 3-2. Summary of Ecological Sites on the Copeland Tract

Soil Map Unit Symbol	Ecological Site	Historic Climax Community	Percent of Tract
PeE	Steep Rocky and Clay Loam Slopes*	Tall/Midgrass Prairie and Bluestem – Oak/Juniper Savanna	52
By	Loamy Bottomland	Tallgrass/Hardwood Savanna	22
PaD	Low Stony Hill	Tall/Midgrass Oak Savanna	17
SeC	Clay Slopes	Mixed-grass Prairie	8

Citation: USDA 1994 and USDA 2006

* A description of Clay Loam Slopes has not been developed by USDA NRCS; therefore, Clay Loam was referenced in its place.

As was described in **Sections 2.2** and **3.1**, the Copeland Tract and its neighboring properties have experienced land use that has significantly shifted the plant community away from its presumed historic climax plant community that one might expect to see based on the Ecological Site Descriptions. Continuous heavy grazing and the lack of fire in these systems has resulted in a decrease in warm-season tall grasses and increase of cool-season midgrasses. The Copeland Tract has, therefore, experienced a significant increase in overstory and midstory canopy cover of woody species, particularly Ashe juniper. The tallgrass plant community that would have occupied this Tract is all but eliminated, most significantly in the bottomlands of Palo Pinto Creek. This section describes each of the Ecological Sites on the tract in comparison to the current state of the vegetation communities and then discusses what level of effort would be required to move their current states towards the state that is relevant to the goals in the Mitigation Plan.

3.6.1 Loamy Bottomland Ecological Site

The Loamy Bottomland comprises 22 percent of the Copeland Tract and is the floodplain of the Palo Pinto Creek which runs along the southern portion of the Tract from west to southeast (**Figure 3-7**). The Loamy Bottomland receives runoff from adjacent sites and serves as a tributary to major watercourses. This Ecological Site, at its historic climax plant community, should be a tallgrass/hardwood savanna community with no more than 25 percent canopy cover of scattered oak, elm, and pecan (USDA 2014). This area should be dominated by warm-season tall and midgrass species such as bushy bluestem, Indiangrass, eastern gamagrass, switchgrass, sideoats grama, tall dropseed, and vine mesquite along with a diverse set of cool-season grasses such as Texas wintergrass, wildryes, Scribner’s rosettegrass, and Texas bluegrass. Despite its potential to support that type of vegetation community, this area instead

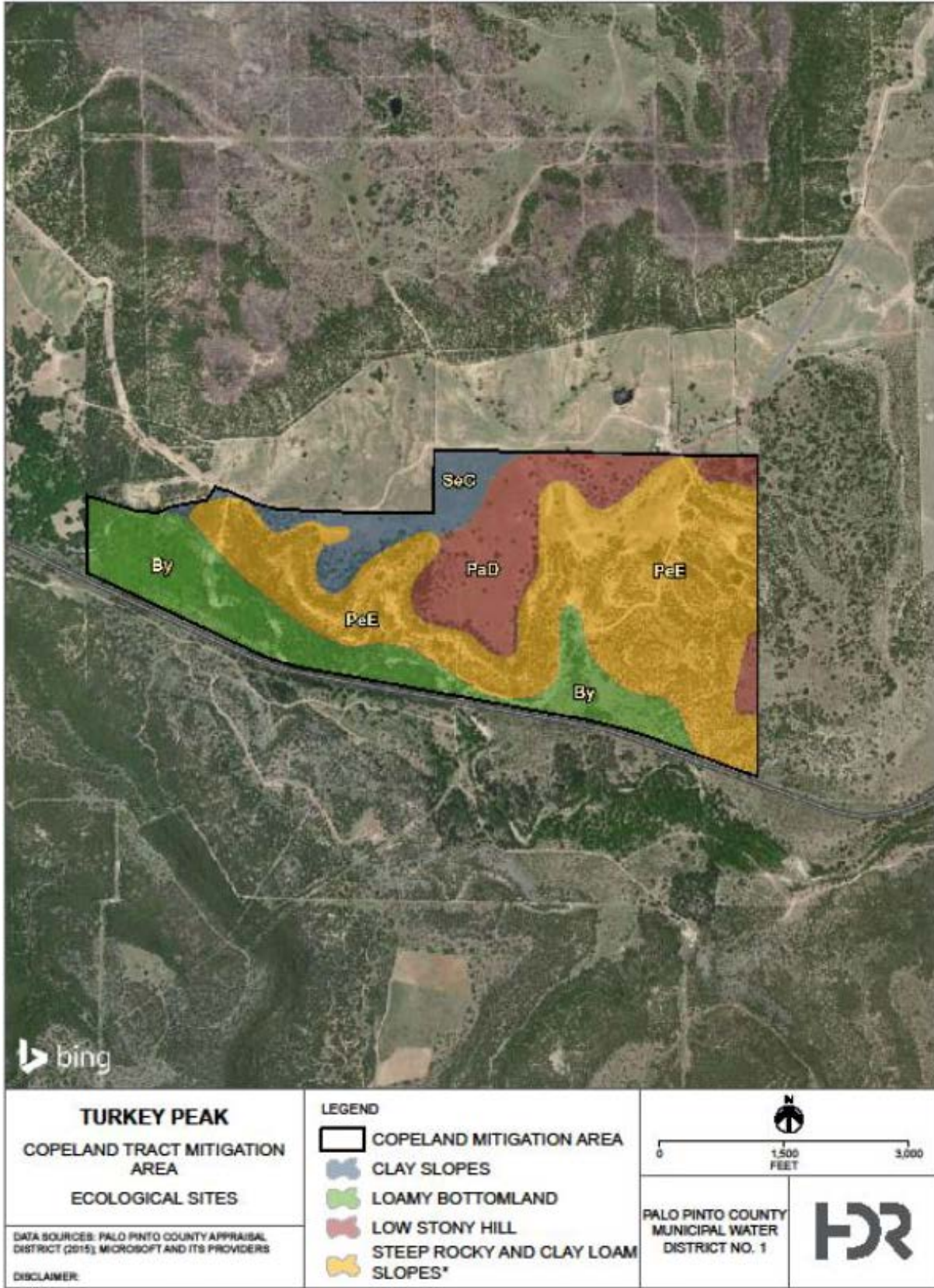
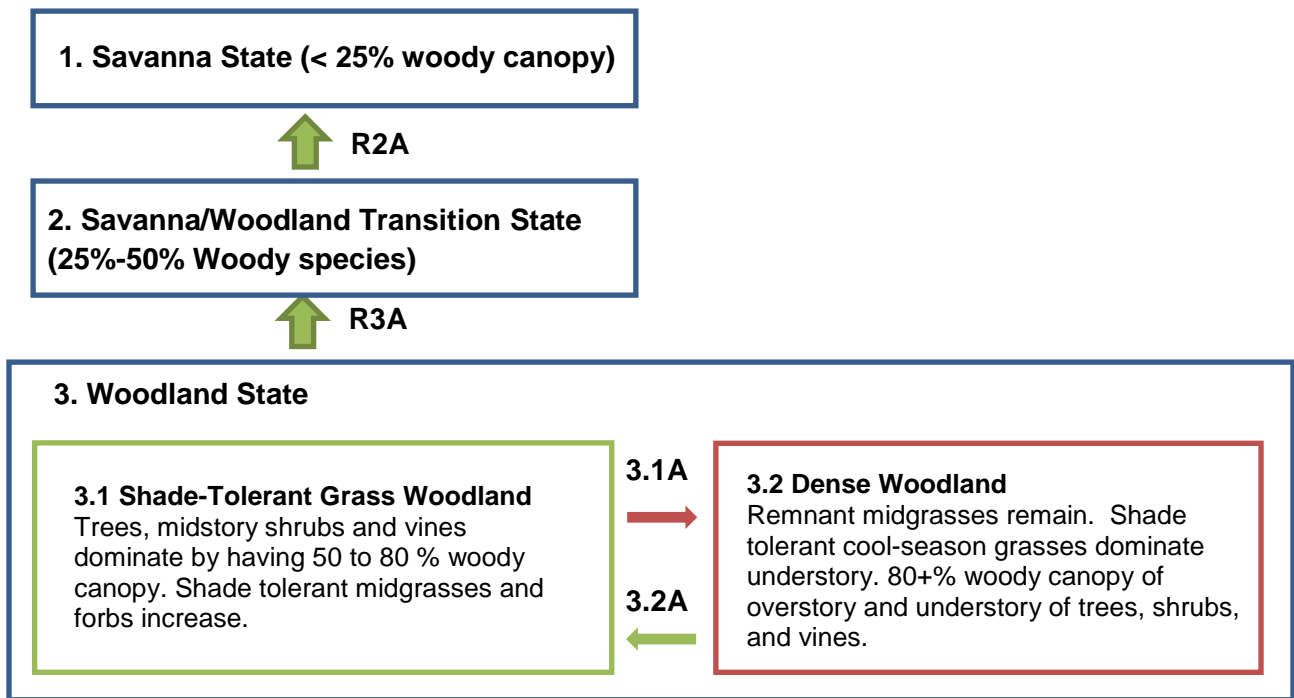


Figure 3-7. Ecological Sites on the Copeland Tract

exhibits a canopy cover of 80 to 100 percent and is comprised of Ashe juniper, elm, and isolated stands of pecan. The understory shrub component is generally absent except along the margins of this community. The herbaceous cover, where present, is almost entirely comprised of Texas wintergrass, a cool season midgrass species.

Instead of a savanna, Loamy Bottomland on the Copeland Tract is currently a Dense Woodland. As depicted in the State-and-Transition diagram developed by NRCS, this site likely passed through several other states prior to reaching the Dense Woodland. Also depicted in the diagram (**Figure 3-8** and **Appendix C, Diagram C-1**), these typical pathways from tallgrass/hardwood savanna to dense woodland are results of poor management inputs such as the application of heavy continuous grazing along with the lack of brush management and prescribed burns. Movement between one state to the next, in either direction, requires more input and time than movement within each state. For instance, according to the diagram below, less energy would be required to move the landscape from the mid/tallgrass hardwood savanna (1.2) back to a tallgrass/hardwood savanna (1.1) than it would to transition the landscape from a Savanna/Woodland Transition State (2) back to a Savanna State (1) (see **Appendix C, Diagram C-1**).



Legend

- 3.1A – abusive grazing, absence of fire, absence of brush management
- 3.2A – absence of domestic cattle, prescribed burning, brush management, native seeding/planting
- R2A – absence of domestic cattle, prescribed burning, brush management, native seeding/planting
- R3A – absence of domestic cattle, prescribed burning, brush management, native seeding/planting

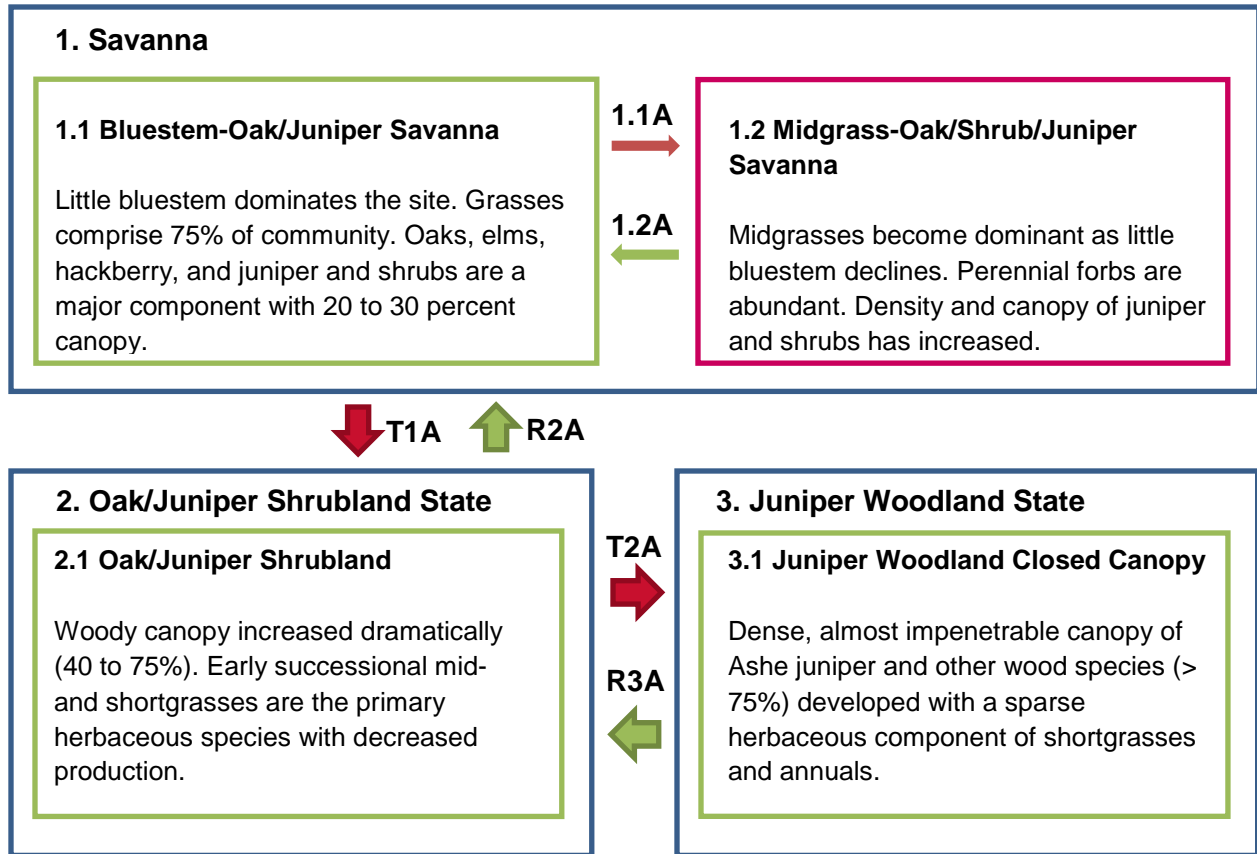
Figure 3-8. Adapted from NRCS Loamy Bottomland (R080BY151TX) State-and-Transition Diagram (see Appendix C, Diagram C-1)

The state-and-transition conceptual framework illustrates in a simplified format how much the Palo Pinto Creek floodplain has departed from its historic climax plant community and the relative amount of energy it would take to transition the landscape back to that community. The first step towards restoring this landscape back to a more functional and healthy setting would be to move it away from the closed canopy Dense Woodland (**Figure 3-8, 3.2**) towards a more open canopy of 50 to 80 percent cover Shade-Tolerant Grass Woodland (**Figure 3-8, 3.1**). According to this diagram, there is potential for this landscape to be moved in that direction with the removal of heavy continuous grazing, brush management, and prescribed burns (**Figure 3-8, 3.2A**). However, more long-term management efforts (e.g., prescribed burning, brush management) would be needed to then move the landscape towards the Savanna/Woodland Community (**Figure 3-8, R3A**), which would result in a shift in grasses and an additional reduction in canopy cover to 25 to 50 percent cover.

3.6.2 Steep Rocky and Clay Loam Ecological Sites

The Steep Rocky and Clay Loam Ecological Sites form a complex that covers 52 percent of the Copeland Tract and is generally upland with small ephemeral tributaries of Palo Pinto Creek (**Figure 3-7**). These areas both directly and indirectly relate to the health and restoration of riparian corridors on the Copeland Tract. The Steep Rocky Ecological Site Description is more descriptive of the Copeland Tract's potential; therefore, that site description is the focus of this discussion. This Ecological Site, at its historic climax plant community, should be a bluestem-oak/juniper savanna with no more than 20 to 30 percent canopy cover of scattered oak, elm, and Ashe juniper (USDA 2014). This area should be dominated by warm-season tall and midgrass species such as little bluestem, big bluestem, Indiangrass, and midgrasses. Despite its potential to support that type of vegetation community, this area instead exhibits a canopy cover of 40 to 75 percent that is comprised of Ashe juniper, live oak, elm, and mesquite. In this setting, the grasses are generally cool-season midgrass species as opposed to warm-season tallgrasses. In the more steep areas, the canopy cover is greater than 75 percent and comprised almost entirely of Ashe juniper. Under this canopy, the herbaceous cover, where present, is almost entirely comprised of Texas wintergrass, a cool season midgrass species.

Instead of a savanna, the Steep Rocky sites on the Copeland Tract are currently either Oak/Juniper Shrubland (**Figure 3-9, 2.1**) or Juniper Woodland (**Figure 3-9, 3.1**). As depicted in the State-and-Transition diagram developed by NRCS, this site likely passed through other states. Also depicted in the diagram (**Figure 3-9 and Diagram C-2**), these typical pathways from tallgrass/hardwood savanna to dense woodland are results of poor management inputs such as the application of heavy continuous grazing along with the lack of brush management and prescribed burns. Movement between one state to the next, in either direction, requires more input and time than movement within each state. For instance, according to the diagram below, less energy would be required to move the landscape from the midgrass-oak/shrub/juniper savanna (1.2) back to a bluestem-oak/juniper savanna (1.1) than it would to transition the landscape from a Juniper Woodland State (2) back to a Savanna State (1) (see **Appendix C, Diagram C-2**).



Legend

- 1.1A – abusive grazing, absence of fire, absence of brush management
- 1.2A – absence of domestic cattle, prescribed burning, brush management, native seeding/planting
- T1A – abusive grazing, absence of fire, absence of brush management
- R2A – absence of domestic cattle, prescribed burning, brush management, native seeding/planting
- T2A – abusive grazing, absence of fire, absence of brush management
- R3A – absence of domestic cattle, prescribed burning, brush management

Figure 3-9. Adapted from NRCS Steep Rocky (R080BY163TX) State-and-Transition Diagram (see Appendix C, Diagram C-2)

The state-and-transition conceptual framework illustrates in a simplified format the degree to which these areas have departed from their historic climax plant communities and the relative amount of energy it would take to transition the landscape back. The first step towards restoring this landscape back to a more functional and healthy setting would be to move it away from the closed canopy Shrubland and Woodland States towards a more open canopy. According to this diagram, a significant effort would be needed to move the landscape from the Juniper Woodland State to the Oak/Juniper Shrubland State and the same would be the case to try to move the Oak/Juniper Shrubland to the Midgrass-Oak/Shrub/Juniper Savanna (see **Appendix C, Diagram C-2**). However, those areas that are currently Midgrass-Oak/Shrub/Juniper Savanna could be moved toward the Bluestem-Oak/Juniper Savanna historic climax community with less effort (**Figure 3-9, 1.2A**).

3.6.3 Low Stony Hill Ecological Site

The Low Stony Hill Ecological Site comprises 17 percent of the Copeland Tract and is located in the uplands of the north-central portion of the Tract (**Figure 3-7**). While this Ecological Site is primarily located upslope of the proposed riparian and stream buffer mitigation areas, it is important to understand the vegetation community stages in the context of how they may influence future conditions downslope in the mitigation areas, and since prescribed burns may also influence vegetation in these Sites. The historic climax plant community of Low Stony Hill Ecological Sites should be a tallgrass/midgrass/oak savanna community with a few scattered oak mottes, hackberry, and elm. The shrub component includes a small amount of Ashe juniper, bumelia, sumac, catclaw acacia, agarito and shinoak. This area should be dominated by warm-season tall and midgrass and a variety of forbs (USDA 2014). However, despite its potential to support that type of vegetation community, this areas on the Copeland Tract currently exhibit a canopy cover of approximately 20 percent which is mainly comprised of Ashe juniper and mesquite with a shrub component comprised of approximately 40 percent cover of pricklypear along with scattered agarito, catclaw acacia, and lotebush. The herbaceous cover is comprised of short and midgrass species and weedy annuals such as broom snakeweed.

Instead of a savanna, the Low Stony Hill on the Copeland Tract is currently in a state of Converted Land. As depicted in the State-and-Transition diagram developed by the NRCS, this site was mechanically cleared and potentially seeded at some point. Also depicted in the diagram (**Appendix C, Diagram C-3**), the typical pathways to Converted Land results from intense, direct management inputs such as chaining or blading along with the application of heavy continuous grazing. Movement out of the Converted Land State does not normally occur without intensive management effort because the sites have been altered so drastically.

The state-and-transition conceptual framework illustrates in a simplified format how much this portion of the Copeland Tract has departed from its historic climax plant community. The first step towards restoring this landscape back to a more functional and healthy setting would be to remove grazing from the site. According to this diagram, the potential for this landscape to be moved out of the Converted Land State is limited. However, both brush management and prescribed burns could increase herbaceous cover and reduce the amount of sedimentation this site contributes to adjacent ephemeral drainages.

3.6.4 Clay Slopes Ecological Site

The Clay Slopes Ecological Site comprises 8 percent of the Copeland Tract and is located in the uplands of the north-central portion of the Tract (**Figure 3-7**). While the areas fitting this Ecological Site are primarily located outside (upslope) of the proposed stream buffer mitigation areas, it is important to understand the vegetation community stages in the context of how they may influence future conditions downslope in mitigation areas, and since prescribed burns may also influence vegetation in these Sites. This Ecological Site, at its historic climax plant community, should be a prairie community with less than 5 percent of scattered woody plants. This area should be dominated by warm-season tallgrasses such as big and little bluestem along with a variety of forbs (USDA 2014). However, despite its potential to support that type of vegetation community, this area instead exhibits a canopy cover of approximately 20 percent that is mainly comprised of Ashe juniper and mesquite with a shrub component comprised of

pricklypear, agarito, catclaw acacia, and lotebush. The herbaceous cover is almost entirely comprised of midgrass species and weedy annuals such as broom snakeweed.

Instead of a Prairie, the Clay Slopes site on the Copeland Tract is currently in a Converted State. As depicted in the State-and-Transition diagram developed by NRCS, this site was mechanically cleared and potentially seeded at some point. Over time, it has been allowed to revert back to mostly native, yet weedy annual species. Also depicted in the diagram (**Appendix C, Diagram C-4**), the typical pathways to Converted Land results from intense, direct management inputs such as chaining or blading along with the application of heavy continuous grazing. Movement out of the Converted Land State does not normally occur because the site has been changed so drastically.

The state-and-transition conceptual framework illustrates in a simplified format how much this portion of the Copeland Tract has departed from its historic climax plant community. The first step towards restoring this landscape back to a more functional and healthy setting would be to remove grazing from the site. According to this diagram, the potential for this landscape to transition away from the Converted Land State is very low. However, both brush management and prescribed burns could increase herbaceous cover and reduce the amount of sedimentation this site contributes to the watershed.

3.7 Wildland Fire Fuels

All vegetation either is already a fuel source or is a potential fuel source under specific conditions. The dry dead foliage, or litter, produced by all vegetation creates fuel for fire. Living vegetation becomes a viable fuel source when ambient conditions dry the living plants sufficiently or when, during a wildfire, they are dried by the convective or radiant heat of the fire itself.

Fuel conditions are directly related to moisture patterns and seasonal rainfall. During periods of no or low moisture, the burning potential of vegetation can persist throughout the year. Fluctuations in precipitation can also result in short periods of vegetation green-up followed by periods of drying. Dry conditions contribute to an increase in dead foliage and litter in plant communities. Additionally, the setting in which the fuel is arranged can also significantly affect how fuels respond to environmental conditions. For instance, wildfires can become increasingly intense and hard to control in steep topography due to preheating of fuels upslope.

Fuel types are generally correlated with vegetation community types; however, factors such as plant density and fuel load can vary greatly within a community which sometimes requires the assignment of more than one type of fuel within a community. Predicting the behavior of wildland fire is an essential part of managing fire in any given area. Multiple factors are considered when predicting wildland fire like fuel load, fuel moisture, wind speed, and fuel class, all of which can change on different time scales. In order to develop a rapid assessment of predicting fire behavior, fuel models that simulate the fuel complexes for which various fuel properties have been developed.

Components of the fuels on a site include litter layer, duff layer, dead-down woody material, grasses, forbs, shrub, timber, regeneration, and slash. For each component, selected characteristics are quantified to select a fuel model for evaluating fire behavior. Designating a

vegetation community into a fuel model is dependent on the fuel or fuel type, not the vegetation community itself. Fuel models are therefore selected based on the general/dominant fire-carrying fuel type: grass, grass-shrub, shrub, timber litter, timber with understory (grass or shrub), or slash or blowdown fuels (Scott and Burgan 2005).

3.8 Wildlife

The common native wildlife species in this region are white-tailed deer, coyote, cottontail rabbit, bobwhite quail, mourning dove, fox squirrel, songbirds, ducks, and geese. The Copeland Tract provides habitat for a variety of wildlife species including birds, mammals, reptiles, and amphibians. Baseline wildlife surveys have not been conducted; however, white-tailed deer and feral hogs seem to be the two species with the most significant influence on the landscape. All wildlife have free movement into neighboring properties. The east and west boundaries are not fenced at this time and only a portion of the north boundary is fenced. Fence installation is anticipated if a permit is granted and the mitigation plan is implemented.

Special status species that are federally listed by USFWS as endangered, threatened, or candidates and have the potential to occur in the Copeland Tract are discussed below in **Section 3.8.1**. Migratory birds that are protected species under the MBTA and have the potential to occur in the Copeland Tract are discussed in **Section 3.8.2**.

3.8.1 Federally Listed Species

A habitat assessment for the potential presence of threatened and endangered species, in particular the endangered golden-cheeked warbler (*Dendroica chrysoparia*) and black-capped vireo (*Vireo atricapilla*), was conducted on January 5, 2017 (HDR 2017).

The golden-cheeked warbler's primary habitat is considered woodlands with mature Ashe juniper in a natural mix with oaks, elms, and other hardwoods, in relatively moist (mesic) areas such as steep canyons and slopes, and adjacent uplands. Mature Ashe junipers are trees that are at least 15 feet in height with a trunk diameter of about five inches at four feet above the ground. These areas generally will have a nearly continuous canopy cover of trees with 50 to 100 percent canopy closure and an overall woodland canopy height of 20 feet or more (Campbell 2003). Vegetation types that may be used by the golden-cheeked warblers include a variety of other oak, other hardwood or juniper woodland types when located adjacent or near primary habitat.

This habitat assessment concluded that no primary golden-cheeked warbler habitat was identified within the Copeland Tract; however, the Copeland Tract is located adjacent to the new Palo Pinto State Park where primary habitat occurs and golden-cheeked warblers have been reported. Therefore, since vegetation associations that may be used by golden-cheeked warblers have been identified (juniper-live oak woodland and riparian woodland) within the Copeland Tract, these areas are classified as potential habitat due to the presence of nearby primary habitat (HDR 2017)

Shrub vegetation (less than 15 feet) on the Copeland Tract is dominated by immature juniper, mesquite and immature cedar elm. Less than 5 percent of shrub vegetation consisted of young live oak or other broad-leaved shrubs. Due the dominance of juniper and very low availability of

broad-leaved shrubs, no suitable breeding habitat for the black-capped vireo was identified on the Copeland Tract.

3.8.2 Migratory Birds

The MBTA protects migratory birds and implements the United States’ commitment to international conventions for the protection of migratory birds. The MBTA is the domestic law that governs the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests.

Birds of Conservation Concern are a subset of protected birds under the MBTA and include all species, subspecies, and populations of migratory nongame birds that are likely to become candidates for listing under the Endangered Species Act (ESA) without additional conservation actions (USFWS 2008). Birds of Conservation Concern that have the potential to occur on Copeland Tract are shown in **Table 3-3**.

Table 3-3. USFWS Birds of Conservation Concern with the Potential to Occur on Copeland Tract

Common Name	Scientific Name	Habitat
Bald eagle	<i>Haliaeetus leucocephalus</i>	wintering
Bell’s vireo	<i>Vireo bellii</i>	breeding ¹
Burrowing owl	<i>Athene cunicularia</i>	year-round
Chestnut-collared longspur	<i>Calcarius ornatus</i>	wintering
Dickcissel	<i>Spiza Americana</i>	breeding ¹
Fox sparrow	<i>Passerella iliaca</i>	wintering ²
Golden eagle	<i>Aquila chrysaetos</i>	wintering
Harris’s sparrow	<i>Zonotrichia querula</i>	wintering ²
Hudsonian godwit	<i>Limosa haemastica</i>	migrating
Lark bunting	<i>Calamospiza melanocorys</i>	wintering ²
Le Conte’s sparrow	<i>Ammadramus leconteii</i>	wintering
Little blue heron	<i>Egretta caerulea</i>	breeding
Loggerhead shrike	<i>Lanius ludovicianus</i>	year-round ²
Mccown’s longspur	<i>Calcarius mccownii</i>	wintering
Mississippi kite	<i>Ictinia mississippiensis</i>	breeding
Orchard oriole	<i>Icterus spurius</i>	breeding ¹
Painted bunting	<i>Passerina ciris</i>	breeding ¹
Prothonotary warbler	<i>Protonotaria citrea</i>	breeding
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	year-round ¹
Rufous-crowned sparrow	<i>Aimophila ruficeps</i>	year-round ²
Scissor-tailed flycatcher	<i>Tyrannus forficatus</i>	breeding ¹
Short-eared owl	<i>Asio flammeus</i>	wintering
Sprague’s pipit	<i>Anthus spragueii</i>	wintering
Swainson’s hawk	<i>Buteo swainsoni</i>	breeding ¹

Source: IPaC 2017

¹ Breeding habitat confirmed during field surveys in Copeland Tract (HDR 2017)

² Winter habitat confirmed during field surveys in Copeland Tract (HDR 2017)

3.9 Invasive, Nonnative Flora and Fauna

3.9.1 Invasive Flora

Invasive species can threaten the health of an ecosystem through competition with native species. It is important to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. Invasive plants incidentally documented during a January 2017 site visit are listed in **Table 3-4**.

Table 3-4. Invasive and Nonnative Plants Observed on Copeland Tract*

Common Name	Scientific Name
Canada thistle	<i>Cirsium arvense</i>
Bull thistle	<i>Cirsium vulgare</i>
Bermudagrass	<i>Cynodon dactylon</i>
King Ranch bluestem	<i>Bothriochloa ischaemum</i>
Japanese brome	<i>Bromus japonicus</i>
Tall fescue	<i>Festuca arundinacea</i>
Johnsongrass	<i>Sorghum halepense</i>

* An invasive flora survey was not conducted; therefore, this is not a complete list of invasive plants present.

3.9.2 Invasive Fauna

Feral hogs are present on the Copeland Tract with the most damage being obvious along Palo Pinto Creek. The hogs have created damage along and on the stream banks and reduced vegetation cover significantly. Feral hogs compete with native wildlife species for available habitat and resources. Population management of feral hogs would greatly benefit the successful implementation of this Plan and would contribute to watershed health both upstream and downstream from the Copeland Tract. Management of feral hogs should be coordinated with adjacent landowners in order to have a lasting impact to the population. TPWD is anticipated to implement a feral hog management program in conjunction with the development and public use of the property. Restoration activities and vegetation plantings in the Palo Pinto Creek riparian zone will be implemented with protection from damage to feral hogs in mind; however, eliminating feral hog damage to restoration sites is not possible.

4. Management

The desired future condition of the Copeland Tract is to meet the requirements set forth in the Mitigation Plan using the most sustainable and cost effective means practical within the constraints of the habitats and ecosystems present. As has been made evident from each of the state-and-transition diagrams for the Ecological Sites present on the Copeland Tract, the most significant change to the landscape that has taken place over time is the increase in woody species resulting from clearing, overgrazing, and fire suppression. Secondary effects include increased erosion and decreased plant species richness. Actions identified for all of the Ecological Sites that would begin moving their current States towards a more resilient and functional ecosystem includes brush management and prescribed burn management aimed at reducing the woody vegetation, particularly Ashe juniper. The removal of woody vegetation within these Ecological Sites should be undertaken in a manner that does not negatively impact the watershed. In addition to brush and prescribed burn management, the seeding and planting of live plugs of warm-season perennial grasses and forbs would also begin shifting these systems towards their historic climax plant communities and would help to stabilize the soils as woody vegetation is removed. In order to move the Copeland Tract towards a more resilient and functional landscape, an ecosystem management approach is prescribed in this Plan and is driven by explicit goals (**Table 4-1**), objectives and actions that are adaptable based on feedback from the monitoring program described in **Section 5**.

Table 4-1. Summary of Plan Goals

Ecosystem Management Goals
<ul style="list-style-type: none"> ▪ Identify current land conditions and implement a management program based on adaptive management. ▪ Identify land use actions that compromise the function and composition of ecosystems and develop remedies through adaptive management. ▪ Apply ecosystem-based management through implementation of the Plan and other regional plans and programs.
Special Status Species Habitat Goal
<ul style="list-style-type: none"> ▪ Ensure the activities implemented remain in compliance with the ESA, MBTA and appropriate state regulations.
Riparian Buffer Vegetation Management Goals
<ul style="list-style-type: none"> ▪ Remain in compliance with USACE regulations and permit special conditions (pending). ▪ Achieve the mitigation objectives as defined in the Turkey Peak Mitigation Plan (September 2016 or Final Mitigation Plan).
Watershed Management Goals
<ul style="list-style-type: none"> ▪ Reduce/control nutrient and sediment inputs into the watershed that degrade water quality.
Non-Native and Invasive Species Management Goals
<ul style="list-style-type: none"> ▪ Ensure compliance with environmental legislation, regulations, and guidelines. ▪ Control non-native animals and invasive plant species that have the potential to impact restoration success.

To accomplish the goals in **Table 4-1**, a multidisciplinary ecosystem approach that integrates a suite of vegetation management methods has been developed. This integrated vegetation management is guided by goals, objectives, and actions driven by the requirements set forth in the Mitigation Plan as informed by the NRCS state-and-transition diagrams discussion in **Section 3.6 and Appendix C**. Management objectives established in this Plan were developed through a thorough evaluation of the natural resources present on the Copeland Tract and the potential for the vegetation communities to be restored to appropriate states within the context of applicable Ecological Site Descriptions. The purpose of this section is to identify vegetation management goals and objectives necessary to meet the requirements of the Mitigation Plan. Each objective is followed by a set of actions comprised of an integrated approach to vegetation management. Implementation of each action will achieve the related objectives, which will in turn accomplish the program’s overarching goals as outlined above.

In systems that require fire to maintain natural vegetation communities, an integrated approach to vegetation management is important, especially for those areas where the departure from the natural fire interval is significant. Due to the Copeland Tract’s departure from the natural fire regime and the heavy grazing regime applied over the years, woody vegetation, particularly Ashe juniper, has established in levels of both cover and density that has reduced the quality of wildlife habitat and watershed health.

The methods selected for each vegetation management action has taken the following into consideration (Hanselka et al. 1999):

- the degree of control of vegetation prescribed
- expected life of the action applied and need for maintenance activity
- possible secondary effects of the vegetation management action (e.g. sensitive species habitat, soil compaction, soil loss, invasive plants)
- requirements of the vegetation management method (e.g. equipment, certifications, permits), and
- timing of the actions (e.g., seasonality, order of actions).

Prescribed fire will be applied after cattle are removed and once sufficient re-growth of fine fuel reaches a fuel load sufficient for achieving the objectives of the prescriptions. This recovery period could take up to three years depending on environmental conditions such as rainfall amount and timing. All prescribed fire operations will comply with rules, laws, and regulations set forth in the Texas Natural Resources Code (Section 153), the Texas Administrative Code Prescribed Burn Board Rules (Title 4, Part 13, Chapters 225–229), Texas Commission on Environmental Quality, and Stephens County outdoor burning rules. A prescription will be developed for each prescribed burn using the TPWD Prescribed Burn Plan Form (**Appendix A**). Coordination with TPWD will take place during both planning and implementation phases for the prescribed burns. Only qualified personnel will take part in prescribed fire operations.

Mechanical methods will be used to accomplish pre-fire thinning or in areas where prescribed fires are not feasible. Mechanical methods of removal will typically involve the use of a tree shear or roller chopper mounted on a tracked skid steer. In some cases, woody vegetation

removal will be undertaken with chainsaws. Best management practices for all mechanized equipment will be developed and implemented in order to minimize impacts to sensitive environmental resources.

Herbicide application may be necessary to control non-native vegetation and will only be used when other methods are not viable. No broadcast or aerial application of herbicides will be undertaken. Handling, mixing, and disposal of herbicides will comply with the Texas Department of Agriculture regulations.

4.1 Ecosystem Management

4.1.1 Ecosystem Management Goal 1

Identify current land conditions and implement a management program based on adaptive management.

Objective A: Complete analysis of Ecological Sites and States

Actions:

1. Map vegetation communities to association.
2. Map and define fuel types.

4.1.2 Ecosystem Management Goal 2

Identify land use actions that compromise the function and composition of ecosystems, and develop remedies through adaptive management.

Objective A: Manage domestic livestock and related infrastructure in a manner that benefits the watershed.

Actions:

1. Remove domestic livestock from the Copeland Tract as soon as practicable.
2. Install new fencing with steel posts and repair existing fencing to preclude access from domestic livestock.
3. Coordinate during the planning phases of fence clearing and installation to ensure fuels are not disposed of in a manner that would increase fire risk by specifying that fuels should either be removed from the site, chipped into a box and deposited at pre-determined locations, or windrowed in approved areas for future broadcast or brush pile burn disposal.
4. Coordinate to determine whether it would be cost effective to create shaded fuel breaks along identified portions of the boundary fence at the same time fence clearing activities are undertaken.
5. Monitor, maintain and repair fencing as necessary to ensure cattle do not re-enter the tract during restoration.

6. Assess locations where cattle gathered consistently due to mineral block placement, etc. and determine whether invasive species management, soil remediation from compaction, or seeding should be undertaken.

4.1.3 Ecosystem Management Goal 3

Apply ecosystem-based management through implementation of the Plan and other regional plans and programs.

Objective A: Using adaptive management, continuously assess the success of management actions and adjust based on results from the monitoring program.

1. Develop a Quarterly Work Plan to present a road map for the implementation and funding of the Vegetation Management Plan (see **Section 6**).
2. Implement a monitoring plan that will allow determination of USACE mitigation success criteria status and is consistent, to the extent practicable, to the methods to be used on State Park properties to track the success of management activities.
3. Develop best management practices to ensure management actions are undertaken in a manner that reduces potential impacts to the environment.

Objective B: Access external specialized skills, personnel, and resources to support implementation of the Plan in a cost effective manner.

1. Coordinate with TPWD and PPMSP to manage for resources across property boundaries (e.g., feral hog control, prescribed fire, weather station) and plan for transition of management activities from District to TPWD Park operations.
2. Identify regional conservation plans and programs that apply to the Copeland Tract and coordinate with those organizations.
3. Coordinate with Tarleton State University (Stephenville) to apply lessons learned from their ecological restoration research at PPMSP and collaborate whenever possible during restoration on the Copeland Tract.
4. Coordinate with the Texas Forest Service or private entities to collect native vegetation on PPMSP in order to manage and/or propagate the plants for restoration sites on the Copeland Tract.
5. Coordinate with pipeline and utility easement holders prior to implementation of the Plan.
6. Communicate with adjacent land owners prior to the implementation of prescribed fire operations.

4.2 Special Status Species Habitat Management

4.2.1 Sensitive Habitat Management Goal 1

Ensure the activities implemented remain in compliance with the ESA, MBTA and appropriate state regulations.

Objective A: Identify current habitat of sensitive species with the potential to occur on the Copeland Tract.

Actions:

1. When planning vegetation management activities, reference the golden-cheeked warbler habitat assessment to ensure activities enhance current habitat conditions.
2. Conduct presence/absence survey for golden-cheeked warblers prior to implementation of vegetation management activities outlined in this Plan.
3. Determine appropriate changes to this Plan if golden-cheeked warblers are present on the Copeland Tract and coordinate with USACE and USFWS to determine reasonable and prudent measures through continuation of Section 7 consultation efforts previously conducted for CWA permit coordination for the reservoir.
4. Minimize impacts on golden-cheeked warblers by conducting vegetation removal activities outside of the breeding season whenever practicable. The ideal time to conduct vegetation management is October through January.
5. Minimize impacts on golden-cheeked warblers by not reducing woody vegetation canopy cover to less than 35 percent on steep, rocky slopes that are currently > 80 percent canopy cover.
6. Minimize habitat fragmentation by clearing evenly throughout dense stands.
7. Periodically review the vegetation management plan to ensure actions do not adversely impact sensitive species habitat.

Objective B: Comply with the MBTA and minimize incidental loss of migratory and non-migratory birds.

Actions:

1. Conduct restoration activities that benefit migratory bird habitat, breeding sites, and foraging areas.
2. Minimize impacts on migratory birds by conducting vegetation removal activities outside of the breeding season whenever practicable.¹
3. To reduce habitat fragmentation, co-locate roads, fences, laydown areas, staging areas, and other infrastructure in or immediately adjacent to already disturbed areas (e.g., existing roads, fencelines).

¹ Without undertaking specific analysis of breeding species and their respective nesting seasons on the Copeland Tract, implementation of this seasonal restriction will avoid take of most breeding birds, their nests, and their young (i.e., eggs, hatchlings, fledglings).

4.3 Riparian Buffer Vegetation Management

Mitigation requirements set for in the Turkey Peak Mitigation Plan are specifically focused on restoration of the riparian corridors of Palo Pinto Creek and its minor tributaries.

4.3.1 Riparian Buffer Goal 1

Ensure that the activities implemented remain in compliance with USACE regulations, permit special conditions, and are consistent with the intent of the Turkey Peak Mitigation Plan (September 2016 or Final Mitigation Plan).

Objective A: Continue to coordinate with USACE.

Actions:

1. Ensure the Plan is consistent with the Final Mitigation Plan and permit special conditions as approved by USACE prior to implementation.
2. Significant changes to this Plan will be coordinated with USACE prior to their implementation. For reference, significant changes in the context of the 404 Permit or Mitigation would be changes related to the mitigation success criteria (e.g., canopy coverage goals, planting densities, or schedule). Changes related to potential fill in waters of the United States will be coordinated separately through a permit amendment or new permit by the project sponsor if a single and complete project not directly related to the mitigation efforts.

4.3.2 Riparian Buffer Goal 2

Achieve the mitigation objectives as defined in the Turkey Peak Mitigation Plan (September 2016).

Objective A: Restore riparian and ephemeral stream buffer vegetation adjacent to intermittent stream channel (**Figure 3-6**) associated with impounded portion of Palo Pinto Creek (i.e., Pond 3).

Actions:

1. Incorporate into engineering plans site-specific seeding and planting specifications for construction footprint of Pond 3 (PS-1, Palo Pinto Creek low-head concrete dam) (**Figure 3-6**) based on engineering site designs and in accordance with **Appendix B, Seed and Live Plant Lists**. Specifications should include restoration actions for all areas disturbed during construction activities (e.g. graded areas, access routes, material storage areas). Note: due to existing active movement of alluvium in this segment, it is anticipated that initial channel grading activities may be required after low head dam modification is conducted. However, this will be dependent on elevation and position of alluvium at the time of construction relative to designed stream stable grade and planform geometry. It is anticipated stable planform channel may develop following 2 to 3 bankfull flow events after dam modification, therefore, the addition of native vegetation

within the current active channel and impoundment areas is anticipated to occur following these flow events or 1 to 2 years following channel forming discharge.

2. Incorporate into engineering plans site-specific brush management disposal plans for brush removal associated with Pond 3 dam modification.
3. Prior to initiation of construction, identify native vegetation within the construction footprint of Pond 3 (i.e. volunteer seedlings on gravel point bars) that may respond well to transplanting or collection for installation after construction is completed.
4. Attempt to stabilize the portion of the property boundary immediately north of the Pond 3 site to reduce impacts from a poorly managed and constructed holding tank on the adjacent property (e.g., install hay bale erosion control at base of dam on District property and apply seed).
5. Prior to initiation of construction, flag a boundary around approved construction footprint in order to confine activities in approved areas.
6. Pre- and post-construction, maintain water quality to protect surface waters and ponds from excessive sediment-laden runoff by installing erosion control features as appropriate (e.g., weed-free hay bales, erosion control fencing, brush piles).
7. During the first late cool season following activities planned for Pond 3, install vegetation (seeds, live plants, and erosion control) in the area of Pond 3 per site-specific specifications developed for Action 1, above.
8. Monitor sites for non-native invasive plants. Identify corrective actions (**Section 5**).
9. Conduct mechanical brush management for Ashe juniper in portions of Riparian Brush Management Units 1 through 5 (**Figure 4-1**), as specified in **Table 4-2** over a period of at least 2 years. Define percent canopy cover reduction targets prior to implementation of each stage of clearing with the overall target of reducing canopy cover to approximately 30 percent.
10. Conduct a winter prescribed fire in Fire Management Unit 2 (**Figure 4-2**).
11. Survey recently burned area for erosion features (e.g., rills, gullies, headcuts). Prescribed corrective actions as appropriate.
12. Broadcast seed in the recently burned area with mix appropriate for location along the riparian buffer (**Appendix B, Seed and Live Plant Lists**).
13. Following brush management stem counts of native trees and shrubs, conduct sampling using randomized sample plots to determine existing and volunteer stem densities in the loamy bottomland and steep rocky and clay loam ecological sites. These surveys will aid in refining the woody planting requirements (number 14 below).
14. Install woody vegetation (live plugs) within the buffers in isolated locations where soils and protection from minor flood events are sufficient (**Appendix B, Seed and Live Plant Lists**). Efforts will be taken to protect live plugs from feral hog damage by planting within downed Ashe juniper or similar. Install at a minimum, four woody plant species to reach a rate of 250 stems per acre with no one species comprising more than 35 percent and no less than 5 percent of that stem count. Note: Existing and volunteer native species

following management activities are expected to be included in the stem count and the number of stems to be manually planted will be adjusted downward as appropriate.

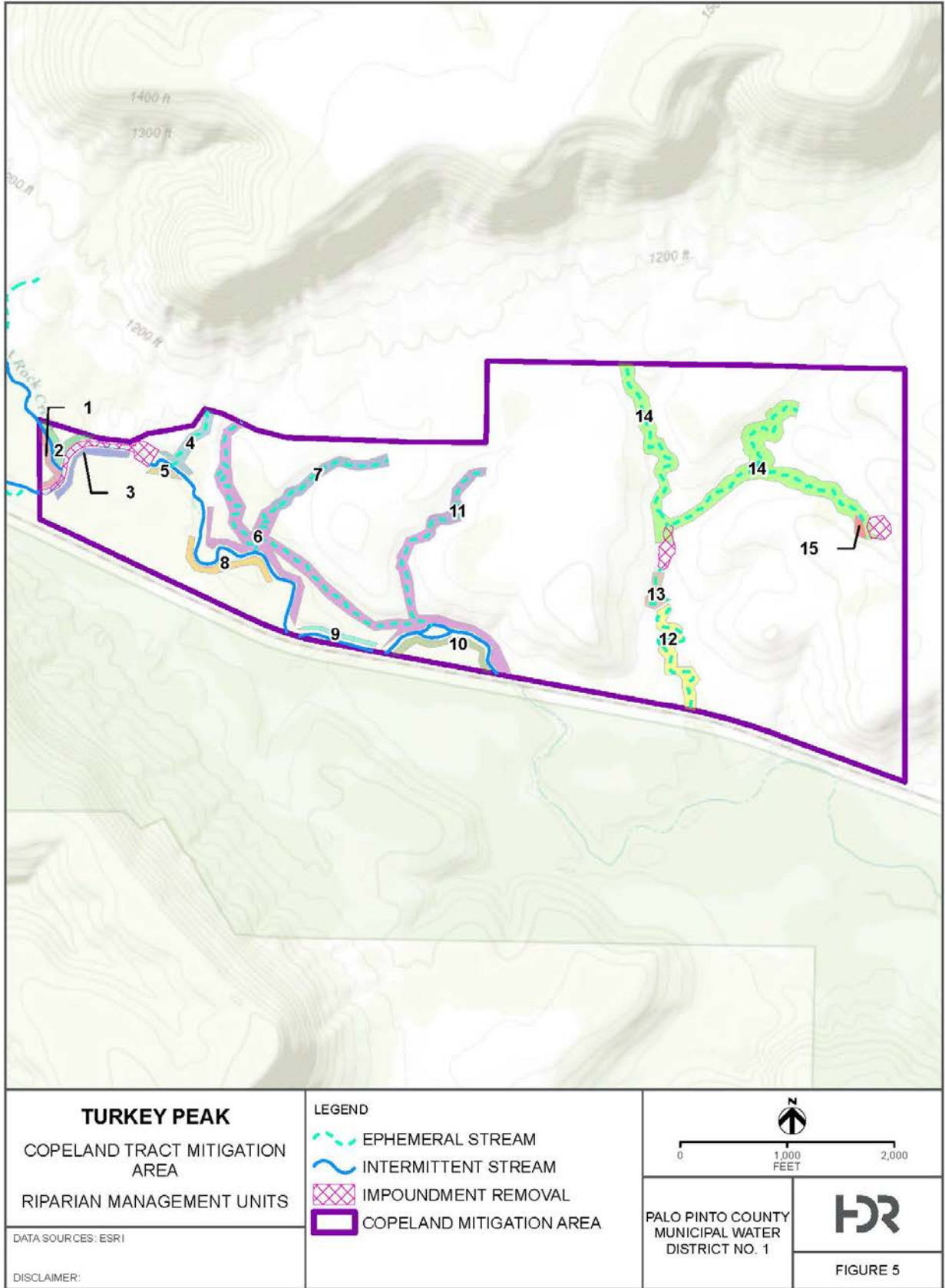


Figure 4-1. Riparian Brush Management Units

Table 4-2. Riparian Vegetation Management Summary*

Riparian Brush Unit	Action	Method	Comments
1	Selective thinning of Ashe juniper (height of thinned trees will vary based on spacing of adjacent trees); leave in place*; coordinate with construction at Pond 1	Tree shear Chainsaws Prescribed burn	Prior to conducting a prescribed burn and prior to seeding and planting
2	Selective thinning of Ashe juniper (height will depend on spacing of adjacent trees); leave in place*; coordinate with construction at Pond 1	Tree shear Chainsaws Prescribed burn	Prior to conducting a prescribed burn and prior to seeding and planting
3	Selective thinning of Ashe juniper (height will depend on spacing of adjacent trees); leave in place*; coordinate with construction at Pond 1	Tree shear Chainsaws Prescribed burn	Prior to conducting a prescribed burn and prior to seeding and planting
4	Selective thinning of Ashe juniper (height will depend on spacing of adjacent trees); leave in place*	Tree shear Chainsaws Prescribed burn	Prior to conducting a prescribed burn and prior to seeding and planting; erosion is a concern and should be addressed before and during clearing
5	Selective thinning of Ashe juniper (height will depend on spacing of adjacent trees); leave in place*	Tree shear Chainsaws Prescribed burn	Prior to conducting a prescribed burn and prior to seeding and planting
6	Selective thinning in the lower reaches similar to that of 1-5; upper reaches may be undertaken post prescribed burn; do not reduce Ashe juniper canopy below 35 percent on slopes	Tree shear Chainsaws Prescribed burn	Prior to conducting a prescribed burn; erosion is a concern and should be addressed before and during clearing
7	Remove Ashe juniper < 5 ft tall from live oak canopies and leave in place; cut down 20 percent Ashe juniper between 10-15 ft tall and position along contours on slopes; do not reduce Ashe juniper canopy below 35 percent	Tree shear Prescribed burn	Prior to conducting a prescribed burn; erosion is a concern and should be addressed before and during clearing
8	Conduct a winter prescribed burn in understory; selective thinning of Ashe juniper (height will depend on spacing of adjacent trees); leave in place*	Prescribed burn Tree shear Chainsaws	After a prescribed burn and prior to seeding and planting

Riparian Brush Unit	Action	Method	Comments
9	Conduct a winter prescribed burn in understory; selective thinning of Ashe juniper (height will depend on spacing of adjacent trees); leave in place*	Prescribed burn Tree shear Chainsaws	After a prescribed burn and prior to seeding and planting
10	Conduct a winter prescribed burn in understory; selective thinning of Ashe juniper (height will depend on spacing of adjacent trees); leave in place*	Prescribed burn Tree shear Chainsaws	After a prescribed burn and prior to seeding and planting
11	Remove Ashe juniper < 5 ft tall from live oak canopies and leave in place; cut down 20 percent Ashe juniper between 10-15 ft tall and position along contours on slopes; do not reduce Ashe juniper canopy below 35 percent	Tree shear Prescribed burn	Prior to conducting a prescribed burn; erosion is a concern and should be addressed before and during clearing
12	Cut and leave 60 percent of Ashe juniper > 5 ft in place unless creates ladder fuel into elm or live oak	Tree shear Prescribed burn	Prior to conducting a prescribed burn
13	Cut and leave Ashe juniper > 5 ft in place unless creates ladder fuel into elm or live oak	Tree shear Prescribed burn	Prior to conducting a prescribed burn
14	Cut and leave 40 percent of Ashe juniper > 5 ft in place unless creates ladder fuel into elm or live oak; do not reduce Ashe juniper canopy below 35 percent	Tree shear Prescribed burn	Prior to conducting a prescribed burn; coordinate with Pond 2 construction
15	Cut and leave Ashe juniper > 5 ft in place unless creates ladder fuel into elm or live oak	Tree shear Prescribed burn	Prior to conducting a prescribed burn; coordinate with Pond 3 construction

* Tracked equipment will not operate within 25 feet of the streambank unless specified otherwise. Fuel loading and structure will be assessed as trees are thinned; chipping or removal may be required if prescribed burning is not feasible. Access to sites by vehicles will be limited.

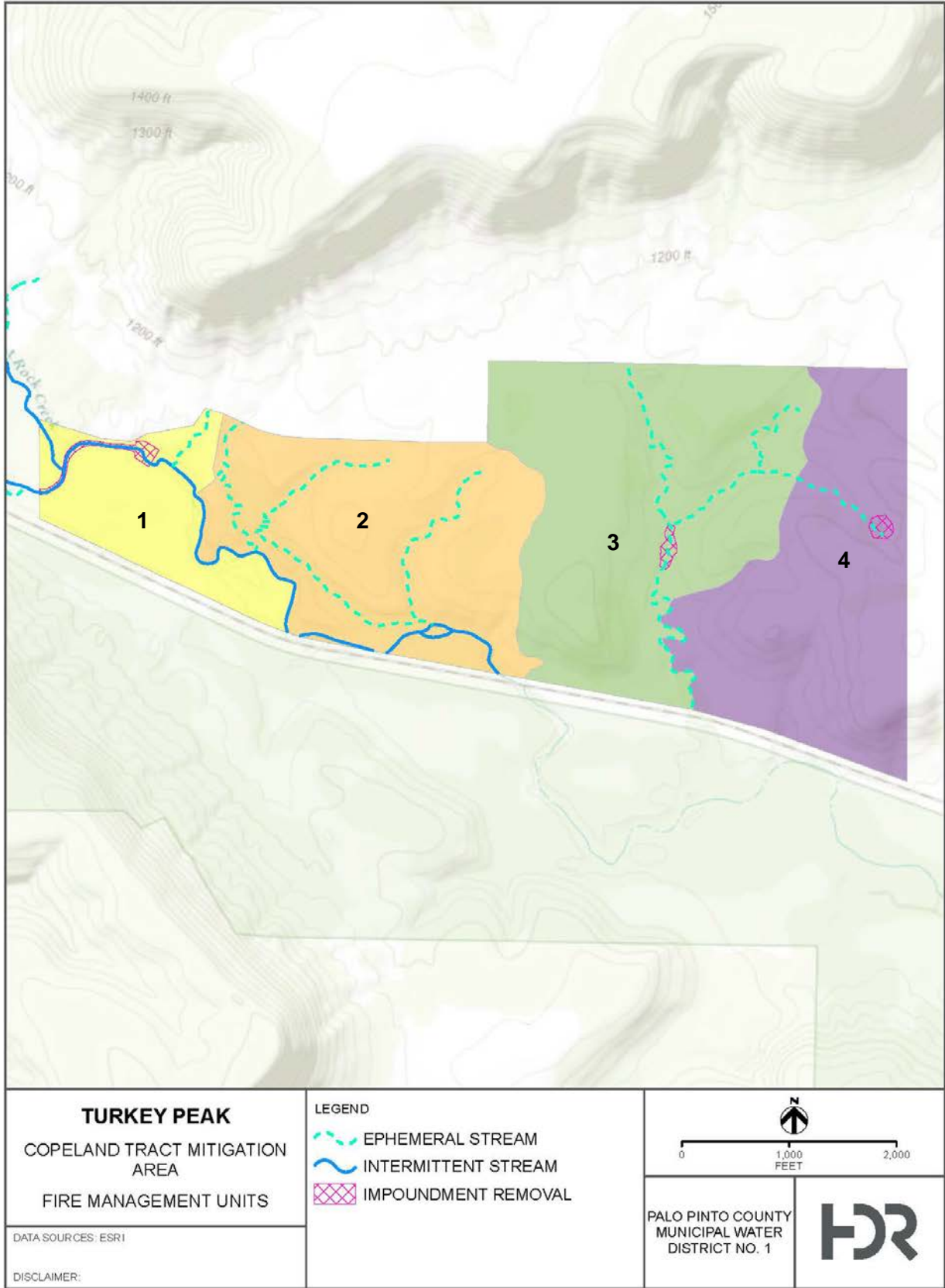


Figure 4-2. Fire Management Units

15. Conduct monitoring within planted areas to determine the frequency of survival among the installed woody vegetation, percent cover of grass and forb vegetation, and assessment of erosion monitoring (**Section 5**). The final surviving stem densities will be established in the Final Mitigation Plan or permit special conditions, but as of March 2017 is proposed to be 60 percent or 150 stems per acre at the completion of monitoring.
16. Install supplemental woody vegetation plantings based on the results of the monitoring and Final Mitigation Plan requirements.

Objective B: Restore stream buffer habitat adjacent to ephemeral stream channel associated with removal or dam modification of Ponds 1 and 2 (PS-2 and PS-10 soil embankments).

Actions:

1. Incorporate into engineering plans site-specific seeding and planting specifications for construction footprints of Ponds 1 and 2 (PS-2 and PS-10 soil embankments) (**Figure 3-6**) based on engineering site designs and in accordance with **Appendix B, Seed and Live Plant Lists**. Construction footprint should include all areas that will be disturbed during construction activities (e.g., graded areas, access routes, material storage areas).
2. Incorporate into engineering plans site-specific brush management disposal plans for brush removal associated with Ponds 1 and 2 construction activities.
3. Prior to initiation of construction at Ponds 1 and 2, identify native vegetation within the construction footprints that may respond well to transplanting or collection for installation after construction is completed.
4. Pre- and post-construction, maintain water quality to protect surface waters and ponds from excessive sediment-laden runoff using erosion control features as appropriate (e.g., erosion control blankets, weed-free hay bales, silt fence, brush piles).
5. Prior to construction, flag a boundary around approved construction footprint in order to confine activities to approved areas.
6. During the first late cool season following activities planned at Ponds 1 and 2, install vegetation (seeds, live plants, and erosion control) in areas of Ponds 1 and 2 per site-specific specifications developed for Action 1, above.
7. Monitor the sites for non-native invasive plants. Identify corrective actions (**Section 5**).
8. Monitor installed vegetation and seeded areas for success. Identify corrective actions (**Section 5**).
9. Conduct mechanical brush management for Ashe juniper in Riparian Brush Management Units 1 through 15 (**Table 4-2**), depicted in **Figure 4-1**. Define the percentage of canopy cover reduction targets prior to implementation of each stage of clearing with the overall target of reducing canopy cover to approximately 30 percent.
10. Conduct a winter prescribed fire in Fire Management Unit 4 (**Figure 4-2**).
11. Survey recently burned area for erosion features (e.g., rills, gullies, headcuts).

12. Broadcast seed in the recently burned area with seed species mix appropriate for location along the riparian buffer (**Appendix B, Seed and Live Plant Lists**).
13. Following brush management, stem counts of native trees and shrubs will be conducted within randomized sample plots to determine existing and volunteer stem densities in the steep rocky and clay loam ecological sites adjacent to ephemeral streams. These surveys will aid in refining the woody planting requirements (see number 14).
14. During the first late cool season following brush management and prescribed burns, install woody vegetation within the riparian buffer in isolated locations where soils and protection from minor flood events are sufficient (**Appendix B, Seed and Live Plant Lists**). Install four or more woody plant species to reach a rate of 200 stems per acre with no one species comprising more than 35 percent and no less than 5 percent of that stem count. Note: Existing and volunteer native species following management activities are expected to be included in the stem count and the number of stems to be manually planted will be adjusted downward as appropriate.
15. Conduct monitoring within planted areas to determine the frequency of survival among the installed woody vegetation, percent cover of grass and forb vegetation, and assessment of installed erosion monitoring stakes. The final surviving stem densities will be established in the Final Mitigation Plan or permit special conditions, but as of March 2017 is proposed to be 60 percent or 120 stems per acre at the completion of monitoring.
16. Map and define areas with existing dominant midgrass community proposed to be managed as savannah and request exception from woody planting from USACE, if appropriate, to achieve suitable ecological state condition monitoring.
17. Install supplemental woody vegetation plantings based on the results of the monitoring and Final Mitigation Plan criteria.

Objective C: Enhance intermittent stream riparian habitat buffer adjacent to Palo Pinto Creek.

Actions:

1. Conduct mechanical brush management for Ashe juniper in Riparian Brush Management Units 6 and 8 through 10 (**Table 4-2**) (**Figure 4-1**). Define the percentage of canopy cover reduction targets prior to implementation of each stage of clearing with the overall target of reducing canopy cover to approximately 35 percent.
2. One year following initial brush management, conduct a winter prescribed fire in Fire Management Unit 2 (**Figure 4-2**).
3. Broadcast seed in the recently burned area with mix appropriate for location along the riparian buffer (**Appendix B, Seed and Live Plant Lists**).
4. During the first late cool season following Action 2, install woody vegetation within the riparian buffer in isolated locations where soils and protection from minor flood events are sufficient (**Appendix B, Seed and Live Plant Lists**). Provide protection to installed plants from feral hogs using cut, unburned juniper trees.

5. Conduct monitoring within planted areas to determine the frequency of survival among the installed woody vegetation, percent cover of grass and forb vegetation, and assessment of installed erosion monitoring stakes.
6. Install supplemental woody vegetation plantings based on the results of the monitoring.

Objective D: Enhance ephemeral stream buffer area adjacent to tributaries, not including restoration areas described in Objective B.

Actions:

1. Conduct mechanical brush management for Ashe juniper in Riparian Brush Management Units 4, 6, 7, 11, 12 and 14 as specified in **Table 4-2** over a period of at least 2 years in coordination with Objective B Actions. Define percent canopy cover reduction targets prior to implementation of each stage of clearing with the overall target of reducing canopy cover to approximately 30 percent.
2. One year following initial brush management, conduct a winter prescribed fire in Fire Management Units 1 and 4 (**Figure 4-2**).
3. Survey recently burned area for erosion features (e.g., rills, gullies, headcuts).
4. Broadcast seed in the recently burned area with mix appropriate for location along the riparian buffer (**Appendix B, Seed and Live Plant Lists**).
5. Conduct monitoring within seeded areas to determine successful germination and assess erosion sites. Identify corrective actions.
6. Apply supplemental seeding/plantings based on the results of the monitoring.

4.4 Watershed Management

Watershed management is important to riparian area management because it has the potential to both indirectly and directly affect both surface water and groundwater quality. Management activities in these areas can increase water infiltration into the soil profile, increasing deep percolation into the groundwater, resulting in less runoff. These areas serve as important filters to reduce sediments and pollutants. Additionally, in order to shift the narrow, riparian corridors towards more appropriate states as defined by the Ecological Site Descriptions, management outside the riparian corridors would be necessary. Activities would be focused near the riparian management units and radiate outwards from those areas as determined necessary. It is important to note that although the watershed management goals may be beneficial, they are not proposed or anticipated to be a required part of the Mitigation Plan due to the indirect association with the streams. Therefore, the goals and objectives outlined below should be considered supplemental and efforts the District will pursue in conjunction with TPWD as the initial phases of the long-term management plan for the non-riparian portions anticipated to be future PPMSP property.

Watershed Brush Management Units, defined by vegetation cover types, tract boundaries, and both planned and existing firebreaks have been delineated. These units were used to prioritize brush management methods based on existing conditions (**Figures 4-2** and **4-3**). In order to reduce impacts to the watershed, manage smoke production, and ultimately provide for a more

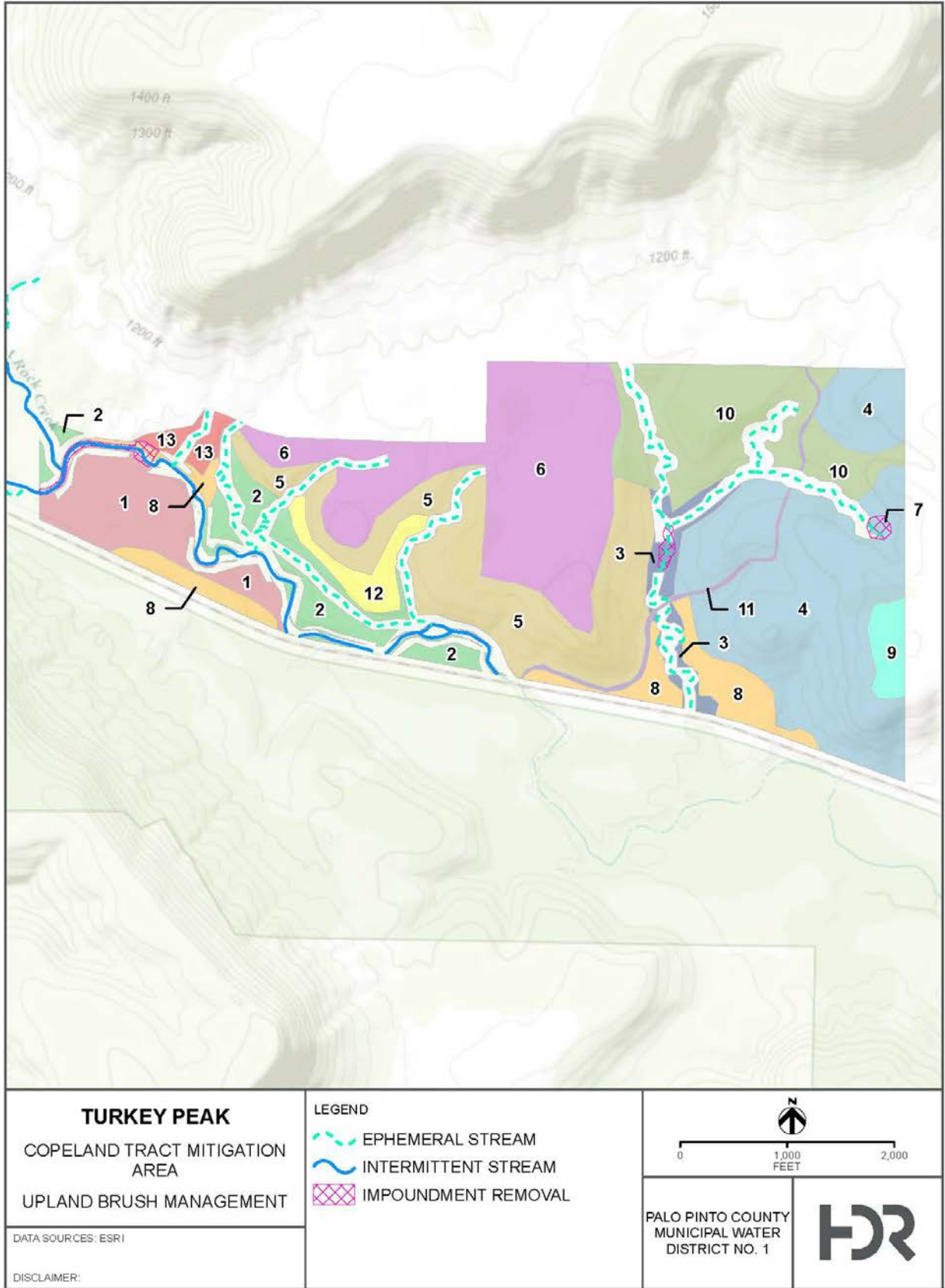


Figure 4-3. Watershed Vegetation Management Units

diverse landscape, no more than approximately 35 percent of the tract will be burned during any one burn event.

In addition to Ecosystem Management Goal 2, Objective A which specifies the exclusion of livestock which will benefit the watershed, the watershed management goals and objectives are as follows.

4.4.1 Watershed Vegetation Goal 1

Reduce/control nutrient and sediment inputs into the watershed that degrade water quality.

Objective A: Repair areas of active erosion such as rills or gullies that lead into the defined riparian buffer.

Actions:

1. Identify areas of active erosion such as headcuts, rills or gullies that lead into the defined riparian buffers. The most efficient time to find these features is after a prescribed burn.
2. Prescribe an erosion control method (e.g., checkdam, brush, revegetation) to stabilize the site and initiate a monitoring technique appropriate for the site condition (e.g., live stakes, photopoint).
3. Install control methods and monitoring according to priorities.

Objective B: Conduct mechanical brush management to prepare fuels for a prescribed burn and to reduce impacts on sensitive resources.

Actions:

1. Prior to conducting a prescribed burn, cut understory Ashe juniper that is growing directly beneath mature live oak and elm trees in order to reduce ladder fuel into canopies in Watershed Management Units 4, 6, and 8.
2. Prior to conducting prescribed burns, create shaded fuel breaks as prescribed in **Table 4-3** and in coordination with the installation of the boundary fence.
3. Ensure brush management equipment is washed and free of weedy propagules prior to accessing the site. Monitor the sites for non-native invasive plants. Identify corrective actions when new infestations are documented (**Section 5**).
4. Monitor installed vegetation and seeded areas for success. Identify corrective actions (**Section 5**).

Objective C: Conduct prescribed burn operations in Fire Management Units 1 through 4.

Actions:

1. Conduct mechanical brush management prior to conducting prescribed burns.
2. In Fire Management Units with sufficient fine fuel to carry a fire, conduct prescribed burns in the winter with the objective of reducing juniper \leq 5 feet tall with occasional torching (consumption of larger Ashe juniper).

Table 4-3. Watershed Vegetation Management Units Summary

Watershed Brush Unit	Action	Method	Comments*
1-13	Remove cattle and install boundary fence	NA	Initial action required
1	Create 200-ft-wide shaded fuel break on west boundary	Tree shear Chainsaws	In coordination with fenceline clearing
	Create shaded 200-ft-wide fuel break on south boundary along boundary	Tree shear Chainsaws	In coordination with fenceline clearing
	Hand cut juniper < 5 ft and leave in place	Tree shear Chainsaws	
	Selective thinning of Ashe juniper (height will depend on spacing of adjacent trees); leave in place	Tree shear	
	Conduct a prescribed burn	Prescribed burn	Winter
2	Create a 200-ft-wide shaded fuel break on west and south boundaries	Tree shear Chainsaws	In coordination with fenceline clearing
	Conduct a prescribed burn in the understory	Prescribed burn	Prior to installing woody plantings
3	Cut and leave 60 percent of Ashe juniper > 5 ft in place	Tree shear	Prior to prescribed burn
	Conduct a prescribed burn	Prescribed burn	After brush management in winter
4	Create a 200-ft-wide shaded fuel break on north, east, and south boundaries	Tree shear Chainsaws	In coordination with fenceline clearing
	Cut and leave Ashe juniper under mature live oak and elm trees to reduce ladder fuel	Tree shear Chainsaw	Prior to conducting prescribed burn
	Conduct a winter prescribed burn with objective to consume Ashe juniper < 5 ft tall with occasional torching	Prescribed burn	After brush management; after installation of fence and shaded fuel break; coordinate with easement holders
5	Use as a winter prescribed burn firebreak	Prescribed burn	Prescribed burn would not carry through this unit during winter prescribed burns
6	Along the northeast boundary, create a 200-ft-wide shaded fuel break or remove Ashe juniper entirely in the 200-ft-wide area	Tree shear Chainsaws	Prior to prescribed burn
	Conduct a prescribed burn	Prescribed burn	May take 4+ years to develop enough fine fuel after livestock are removed
7	Not applicable (waterbody)		

Watershed Brush Unit	Action	Method	Comments*
8	Create a 200-ft-wide shaded fuel break on south boundary	Tree shear Chainsaws	In coordination with fenceline clearing
	Cut Ashe juniper; leave in place	Tree shear	Prior to prescribed burn
	Conduct a prescribed burn	Prescribed burn	Winter
9	Create a shaded fuel break on east boundary (along with Units 4 and 10)	Tree shear Chainsaws	In coordination with fenceline clearing
	Conduct a prescribed burn	Prescribed burn	Winter
10	Create a 200-ft-wide shaded fuel break on east boundary		In coordination with fenceline clearing
	Conduct a prescribed burn	Prescribed burn	Winter; coordinate with home directly to north
11	Create 50-ft wide shaded fuel break on either side of the road	Tree shear	After prescribed burn
12	Cut and leave 60 percent of Ashe juniper > 5 ft in place	Tree shear	Prior to prescribed burn
	Conduct a prescribed burn after brush management treatment if enough fine fuel exists to carry the fire	Prescribed burn	Winter
13	Create a 200-ft-wide shaded fuel break on west boundary	Tree shear Chainsaws	In coordination with fenceline clearing
	Conduct a prescribed burn in the understory	Prescribed burn	Prior to installing vegetation

*Fuels will be assessed as trees are thinned; chipping or removal may be required if prescribed burning is not feasible. Specific objectives for each prescribed burn will be developed for each prescription and documented in the prescribed burn plan.

3. No more than approximately 35 percent of the Copeland Tract is expected to be burned during any one burn period.
4. Post-burn, survey for erosion features and prescribe corrective actions when necessary.
5. Monitor burned areas for non-native species, effects to restored (planted) areas, and to determine whether prescribed burn objectives were met (**Section 5**).

4.5 Non-native and Invasive Species Management

It is important to prevent the introduction of invasive species, detect and control populations of invasive species, and restore native species and habitat conditions in ecosystems that have been invaded. Objectives and management actions for invasive species management are presented below.

4.5.1 Non-Native Invasive Species Goal 1

Ensure compliance with environmental legislation, regulations, and guidelines.

Objective A: Plan ahead to ensure compliance with requirements.

Actions:

1. Confirm seed provider's methods for ensuring seed mix is free of non-native and invasive species.
2. Ensure applicators are certified as appropriate.
3. Herbicide applications will follow label requirements.
4. Coordinate with the TPWD and Texas Department of Agriculture.

4.5.2 Non-Native Invasive Species Goal 2

Control nonnative animals and invasive plant species that have the potential to impact restoration success.

Objective A: Identify infestations early and respond rapidly with management.

Actions:

1. Ensure that the monitoring program is designed in a manner to detect invasive species that have the potential to impact the success of the restoration activities.
2. Be prepared to apply herbicides upon the discovery of an infestation of non-native species in a restoration area.

Objective B: Use integrated pest management practices to manage invasive species.

Actions:

1. Assess the feasibility for feral hog management in coordination with adjacent landowners, TPWD, and the Texas Department of Agriculture.
2. Plant native species appropriate for site landscape position and site conditions in order to compete effectively with invasive plants.
3. Apply the least-toxic options when herbicide is deemed the only alternative for management.
4. Consider additional physical protection from feral hogs such as planting seedlings within downed Ashe juniper trees which have the potential to protect vegetation from hog damage.

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5. Monitoring Plan

The monitoring plan for the Copeland Tract will determine whether the management goals, objectives, and actions listed in **Section 4** are successful. This monitoring will complement the annual monitoring for USACE-approved mitigation plan success criteria. This supplemental monitoring will document whether thresholds set as success criteria are achieved. Photopoints and permanent monitoring plots will be established within representative communities to define baseline vegetation community characteristics in order to track trends in changes to the communities over time. This protocol will be adapted from the TPWD Natural Resources, Wildland Fire Management Program’s Standards and Protocols for Baseline Vegetation Studies on Texas State Parks (TPWD 2010 in Keith 2013).

Sample sites would be selected to sample representative plant communities. Repeatable digital photographs would be established in each site. Vegetation would be sampled and quantitatively described following the TPWD protocol as follows:

1. Data for belt transects in forest plots would be collected on a single 1-m-wide transect per plot and collected in brush plots on a single 5-m-wide transect per plot.
2. Point-line intercepts would be tallied for all species, including tree species that normally exceed 2 m tall; however, trees over 2 m in height would not be counted in forest plots. Trees over 2 m in height would be counted in brush transects because they would not be adequately sampled by other methods as they are in forest plots. However, woody species over 2 m in height and in the canopy above the 2 m sampling rod, but not coming into contact with the rod, would not be counted. Substrate would not be recorded under living plants.
3. Herbaceous data would be collected using a 1-m-square quadrat at five locations along two 50 m transects in forest plots and at three locations along one 30 m transect in brush plots.
4. Canopy cover data would be collected in forest plots at each plot corner and at the plot origin.

The vegetation data would be analyzed and summarized in a manner that is compatible with existing TPWD protocols. Absolute cover would be determined from data collected on point-line intercept transects. Basal area values, mid-story stems per acre, and tree seedling data would also be reported. These data would describe whether mitigation activities are successful over the long-term as these methods would integrate efficiently with TPWD standard monitoring methods and protocols.

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6. Plan Implementation Process

6.1 Plan Implementation

The vegetation management plan describes the implementation of year-round, cost-effective management activities and projects that meet the intent of the mitigation requirements. A Quarterly Work Plan will guide the Plan activities and the funds required for its implementation.

6.1.1 Quarterly Work Plan

The purpose of the Quarterly Work Plan is to present a road map for implementation of the Vegetation Management Plan. As stipulated in **Section 4.1.3**, a brief summary of the estimated oversight required from each fiscal year to accomplish the initial actions identified in **Section 4** will be developed. The tasks proposed for this Plan are aggressive and might not be accomplished within initially established timelines due to a number of factors. Therefore, the management actions should be modified as part of the quarterly review of this Plan to ensure that these tasks are continually emphasized and accomplished when practicable.

6.1.2 Funding

To ensure mitigation can be completed successfully, the District will develop sufficient financial assurances to meet regulatory requirements and guidance provided in the 2008 Mitigation Rule. Upon approval of the permit for the proposed project, an appropriate financial assurance instrument, such as a performance bond, letter of credit, or establishment of a reserve fund will be submitted to and approved as adequate by USACE prior to impacts to Waters of the United States approved by the permit decision. As mitigation areas meet the required performance standards, they will be removed from the financial assurances amount calculation.

The District funds the project with a Texas Water Development Board (TWDB) loan through the State Water Implementation Fund for Texas (SWIFT) program. After consulting with TWDB staff, the District will establish a reserve or contingency fund as a financial assurance for mitigation measures in accordance with allowable TWDB rules and guidelines.

Areas outside of the stream mitigation buffer may also be enhanced in a cost-effective manner through cooperation with TPWD (e.g., evaluation of cost share or work-in-kind options).

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7. References

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A

Burn Prescription Form



TEXAS PARKS AND WILDLIFE DEPARTMENT

Prescribed Burn Plan

10-28-02

Note: This form is a general form to be used for prescribed fires on all TPWD lands . For brush/debris piles see TPWD form_ 859.

Park / WMA Name: _____ Burn Unit : _____

County: _____ Acres to be burned: _____ Longitude/Latitude _____

Record of Previous Burning - Date: _____ Results: _____

Burn Justification (goals, objectives, rationale, purpose): _____

Burn Plan Prepared by : _____ Signature: _____ Date _____

Plan Approved by (Burn Boss): _____ Signature: _____ Date _____

State Park Plans Must be approved by the Natural Resources Program:

Approved by: _____ Signature: _____ Date _____

Notifications (contact names and phone numbers)

TCEQ _____

County Sheriff _____

TX Forest Service _____

Fire Department _____

County Fire Marshal _____

Neighboring Landowners _____

Other _____

Description of Area/Burn Unit

Unit Name, Size & Location (Attach map): _____

Live Fuels: Type, Density, Size: _____

Dead Fuels: Description, moisture, time-lag, load: _____

Topography/elevation: _____

Previous treatments: _____

Pre-Burn Factors

Fire guards: specify width (attach map).

Plow or blade _____ mow _____ wet line _____ blackline _____

Natural Features (please describe) _____

other _____

Crew size: Minimum number required: _____

Pumpers (number/names) _____

Ignition crew: _____

Hand Tools: _____

Weather Monitor: _____

Equipment Needs (describe): _____

Special Fire Protection Considerations: (buildings, powerlines, utility poles, oil/gas facilities, hunting blinds, fences, protected areas, livestock, wildlife, endangered/threatened species or habitats etc.; (see map): _____

Ignition Procedures (see map): _____

Smoke sensitive areas: (see map) No Yes _____

Special Precautions: (see map) No Yes _____

Prescription

Will blacklines be created for a intense headfire situation: No Yes
If no, proceed to the prescription for headfires and other ignition strategies.

Blacklines

	<u>Desired Prescription Range</u>
Temperature (⁰ F):	_____
Relative Humidity:	_____
Wind Direction:	_____
Wind Speed:	_____
Fuel Load:	_____
(lbs/acre):	_____
(tons/acre):	_____
Dead fuel Moisture:	_____
(1-hr):	_____
(10-hr):	_____
(100-hr):	_____
Live fuel Moisture:	_____

Headfires, and other ignition strategies

	<u>Desired Prescription Range</u>
Temperature (⁰ F):	_____
Relative Humidity:	_____
Wind Direction:	_____
Wind Speed:	_____
Fuel Load:	_____
(lbs/acre):	_____
(tons/acre):	_____
Dead fuel Moisture:	_____
(1-hr):	_____
(10-hr):	_____
(100-hr):	_____
Live fuel Moisture:	_____

Smoke Management

Mixing height:	_____
Transport windspeed:	_____
Transport wind direction:	_____

Fire Behavior

Flame Length:	_____
Rate of Spread:	_____
Fireline Intensity:	_____

Required Checklist and Evaluations

The following table should be filled out after every burn and attached to the burn plan. It is also recommended a copy of the fire weather forecast for the day of the burn be attached to the plan as well.

Park/WMA:		Burn Unit:		
Date of Burn:		Time of Burn:		
Fire Boss:		Acres of Burned:		
Number of Crew On Site:		Number and Size of Spot Fires:		
Forecasted Environmental Variables:				
	Minimum	Maximum	Forecast Location:	
Temperature (°F):				
Relative Humidity:				
Wind Speed:				
Wind Direction:				
Forecasted Smoke Management Variables				
Forecast Location:		Transport Wind Direction:		
Transport Winds Speed:		Mixing Height:		
Observed Environmental Variables:				
	Minimum	Maximum	Average	Observer
Temperature (°F):				
Relative Humidity:				
Wind Speed and Direction:				
Estimated Fuel Conditions				
	Percent (%)	Method of Calculation		
1-hour fuels:				
10 hour fuels:				
Live Moisture:				
Crew Assignments				
Activity		Personnel Assigned (note certified burners)		
Ignition Crew:				
Suppression and Mop Up Crew:				
Weather Observer:				
Media / Information:				
Road Flagmen:				
Maintain close observation of the burned area until the fire is completely extinguished:				
Final Evaluation				
Identify any equipment failures, injuries, or other problems:				
Public complaints, explain:				
Were objectives achieved, what should have been done different:				

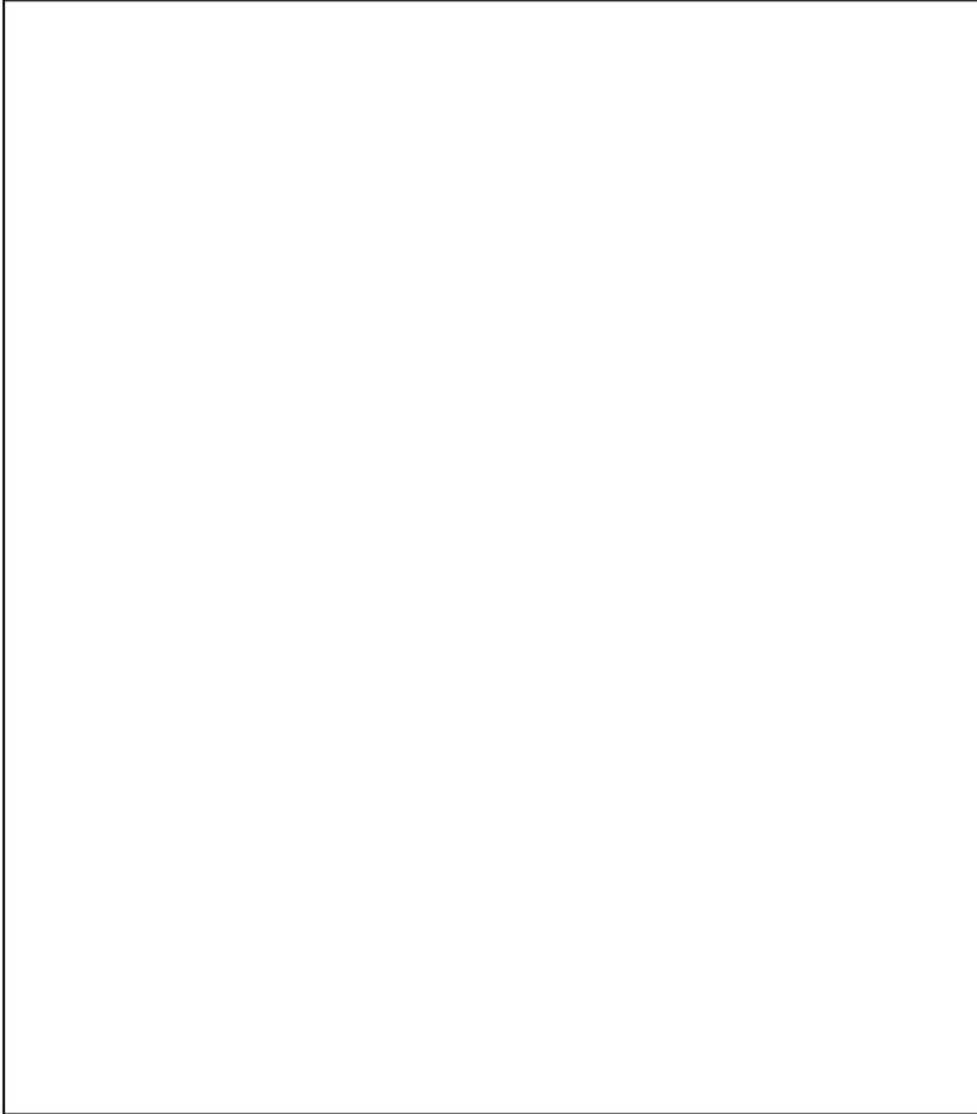
Notifications (contact names and phone numbers)

TCEQ _____
County Sheriff _____
TX Forest Service _____
Fire Department _____
County Fire Marshal _____
Neighboring Landowners _____
Other _____

Notes and Comments: _____

Map(s) of Area to be Burned

Include items such as legend, magnetic north, water sources, roads, gates, safety zones, escape routes, fire guards, areas to be protected, ignition area, smoke sensitive areas, special precautions etc.



Other Considerations:

Continuously monitor weather factors affecting fire behavior.

Consider not burning log-littered areas if the weather forecast is for strong winds within 3 days following a burn.

Consider not burning within 12 hours of a predicted wind shift.

When graded or bladed strips are used as fireguards, rolls of soil should be left on the side of the area next to the fence or away from area to be burned.

Prescribed Burning Sequence

1. Continually monitor weather conditions.
2. Have direct communication with crew members and account for all crew members.
3. Review lighting sequence and escape routes with crew members
4. Identify trouble areas in burn unit and firebreaks
5. Make a final check of the burn area to be sure that no unauthorized people are present.
6. Test burn a small area to check fire behavior and smoke drift
7. Ignite backfire to reinforce firebreak and then ignite side fires into wind
8. Once side fires and backfires have provided adequate blacklines, ignite headfire
9. Continually monitor all borders of burn unit plus snags, stumps or burning brush until extinguished.

Plan of Action if Fire Escapes

1. Immediately notify fire boss and all crew members and account for all members of the burn crew.
2. Stop any further ignition.
3. Assess fuel loads, structures, and safety precautions in area fire has escaped into.
4. Identify all roads, trails, streams or changes in vegetation where fire could be stopped.
5. If possible, attack escaped fire on flanks first then work toward headfire
6. If deemed necessary, move torches and equipment downwind from escaped fire to establish backfires where appropriate
7. Call fire department (and neighbors) as soon as possible if escaped fire is determined to be uncontrollable

Burn Plan Maps:

Attach burn maps indicating burn site location, safety zones, escape routes, fire guards, areas to be protected, ignition area, smoke sensitive areas, special precautions etc.. Maps should be drawn to scale, include a legend and provide as much detail as possible.

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B

Seed and Live Plants Lists



Table B-1. Seed list with seeding rates, timing of application, soil type and habitat information for Copeland Tract

Common Name	Scientific Name	Cool/Warm Season	Seeding Rate ^a	Optimum seeding dates	Maximum seeding dates	Soil Type ^b	Plant Size	Habitat
Perennial Grasses								
Big bluestem	<i>Andropogon gerardii</i>	warm	6	2/15-5/15	12/1-6/1	S,L,C	tallgrass	prairies, dry upland and open forest
Buffalograss	<i>Buchloe dactyloides</i>	warm	24	2/15-5/15	12/1-6/1	C,L	shortgrass	prairies, sod-forming
Prairie wildrye	<i>Elymus canadensis</i>	cool	10	9/1-10/15	8/15-11/1	-	midgrass	moist prairies and shade ⁵
Green sprangletop	<i>Leptochloa dubia</i>	warm	2	2/15-5/15	12/1-6/1	S,L,C	midgrass	rocky hills and canyons in sandy soils ^{1, 5}
Indiangrass	<i>Sorghastrum nutans</i>	warm	6	2/15-5/15	12/1-6/1	S,L,C	tallgrass	bottomlands/low slopes ²
Little bluestem	<i>Schizachyrium scoparium</i>	warm	5	2/15-5/15	12/1-6/1	S,L,C	midgrass	prairies and savannas
Sand dropseed	<i>Sporobolus cryptandrus</i>	warm	1	2/15-5/15	12/1-6/1	S,L,C	midgrass	one of the most abundant grass species
Sideoats grama	<i>Bouteloua curtipendula</i>	warm	5	2/15-5/15	12/1-6/1	S,L,C	midgrass	uplands, ridges and rocky areas
Silver bluestem	<i>Bothriochloa laguroides</i>	warm	2	2/15-5/15	12/1-6/1	-	midgrass	open areas
Switchgrass	<i>Panicum virgatum</i>	warm	2	2/15-5/15	12/1-6/1	S,L,C	tallgrass	moist areas, good erosion control ⁵
Composite dropseed	<i>Sporobolus compositus</i>	warm	1	2/15-5/15	12/1-6/1	S,L	midgrass	rhizomatous
Texas bluegrass	<i>Poa arachnifera</i>	cool	1	9/1-10/15	8/15-11/1	-	shortgrass	undisturbed prairies
Texas wintergrass	<i>Nasella leucotricha</i>	cool	12	9/1-10/15	8/15-11/1	S,L,C	midgrass	prairies, brush areas and roadsides
Vine mesquite	<i>Panicum obtusum</i>	warm	2	2/15-5/15	12/1-6/1	S,L,C	midgrass	wet areas ⁵
Virginia wildrye	<i>Elymus virginicus</i>	cool	3	9/1-10/15	8/15-11/1	-	midgrass	moist prairies and shaded areas ⁵
Curly mesquite	<i>Hilaria belangeri</i>	warm	2	2/15-5/15	12/1-6/1	L,C	shortgrass	prairies, full sun ²

Common Name	Scientific Name	Cool/Warm Season	Seeding Rate ^a	Optimum seeding dates	Maximum seeding dates	Soil Type ^b	Plant Size	Habitat
Perennial Grasses (continued)								
Purpletop	<i>Tridens flavus</i>	warm	11	2/15-5/16	12/1-6/2	S,L,C	tallgrass	shallow rocky soils
Perennial Forbs								
Verbena	<i>Glandularia bipinnatifida</i>	warm	2	2/15-5/14	12/1-6/0	S,L,C		prairies
Illinois bundleflower	<i>Desmanthus illinoensis</i>	warm	15	2/15-5/15	12/1-6/1	S,L,C		prairies, prefers moist soils ³
Maximilian sunflower	<i>Helianthus maximiliani</i>	warm	3	2/15-5/15	12/1-6/1	S,L,C		mesic site and prairies
Gayfeather	<i>Liatris punctata</i>	warm	10	2/15-5/15	12/1-6/1	-		open slopes
Western ragweed	<i>Ambrosia psilostachya</i>	warm	7	2/15-5/15	12/1-6/1	S,L,C		prairies
Annual Forbs								
Lemon mint	<i>Monarda citriodora</i>	warm	3	9/1-10/12	8/15-11/2	S,L		prairies, full sun
Indian blanket	<i>Gaillardia pulchella</i>	warm	10	9/1-10/13	8/15-11/1	S,L,C		prairies, full sun
White prickly poppy	<i>Argemone albiflora</i>	warm	10	9/1-10/14	8/15-11/0	S,L,C		prairies, full sun
Longpod sesbania	<i>Sesbania macrocarpa</i>	warm	10	2/15-5/15	12/1-6/1	S,L,C		full sun, riparian areas
Partridge pea	<i>Chamaecrista fasciculata</i>	cool	13.4	9/1-10/15	8/15-11/1	S,L,C		prairie ³
Winter Cover Crop								
cereal rye grain	<i>Secale cereale</i>	cool	20-100 ⁴	9/1-2/15	-	S, L, C		winter cover crop

a-seeding rate in pure live seed in lbs/acre

b-soil type: sand (S), loam (L), and caliche (C)

1-nurse grass, establishes quickly and fades in 2-3 years

2-reliable during drought

3-nitrogen fixing, good for erosion control

4-rate depends on setting, timing, and mix

5-riparian and wetlands

Table B-2. Woody plant list with size, spacing, timing of installation, soil type and habitat information for Copeland Tract

Common Name	Scientific Name	Plant Date	Size ^a	Spacing	Habitat
Trees					
Pecan	<i>Carya illinoensis</i>	Fall	large	40' - 50'	Common in bottomland woodlands ^b
Netleaf hackberry	<i>Celtis reticulata</i>	Fall	small	6'-15'	Frequent in woodlands and shrublands
Texas ash	<i>Fraxinus texensis</i>	Fall	small	6'-15'	Common in woodlands throughout
Texas oak	<i>Quercus buckleyi</i>	Fall	medium	30'-40'	Occasional in woodlands on lower slopes and valley flats
Live oak	<i>Quercus fusiformis</i>	Fall	medium	30'-40'	Occasional throughout ^b
Blackjack oak	<i>Quercus marilandica</i>	Fall	small	6'-15'	Occasional in woodlands on sandstone ridgetops
White shin oak	<i>Quercus sinuata</i>	Fall	small	6'-15'	Common component of shrublands and low woodlands on slopes and ridgetops
Post oak	<i>Quercus stellata</i>	Fall	medium	30'-40'	Common component of woodlands on ridgetops; scattered elsewhere
Black willow	<i>Salix nigra</i>	Fall	medium	30'-40'	Occasional along streambanks ^b
Western soapberry	<i>Sapindus saponaria var. drummondii</i>	Fall	medium	30'-40'	Occasional in woodlands on lower slopes and valley flats ^b
Gum bumelia	<i>Sideroxylon lanuginosum</i>	Fall	small	6'-15'	Occasional throughout ^b
Cedar elm	<i>Ulmus crassifolia</i>	Fall	medium	30'-40'	Common throughout, especially on valley flats ^b
Shrubs					
Buttonbush	<i>Cephalanthus occidentalis</i>	Fall	small	6'-15'	Common in and along creekbeds ^b
Roughleaf dogwood	<i>Cornus drummondii</i>	Fall	small	6'-15'	Occasional in riparian woodlands and along brushy creekbanks ^b
Elbowbush	<i>Forestiera pubescens</i>	Fall	small	6'-15'	Occasional in woodlands and shrublands throughout
Catclaw mimosa	<i>Mimosa aculeaticarpa</i>	Fall	small	6'-15'	Occasional throughout, nowhere abundant
Prairie sumac	<i>Rhus lanceolata</i>	Fall	small	6'-15'	Common in burned sites; occasional elsewhere

Common Name	Scientific Name	Plant Date	Size ^a	Spacing	Habitat
Shrubs (continued)					
skunkbush	<i>Rhus trilobata</i>	Fall	small	6'-15'	Occasional throughout
rusty blackhaw	<i>Viburnum rufidulum</i>	Fall	small	6'-15'	Occasional in woodlands on slopes and terraces
toothache tree	<i>Zanthoxylum clava-herculis</i>	Fall	small	6'-15'	Occasional in shrublands on slopes and ridgetops
lotebush	<i>Ziziphus obtusifolia</i>	Fall	small	6'-15'	Occasional in shrublands and grasslands

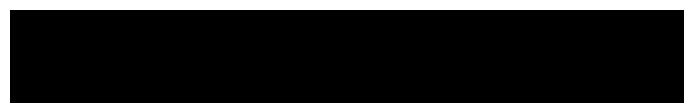
^a small = 30 inch or less; medium = 30-70 inch; large = 70 inch or more

^b stream enhancement species

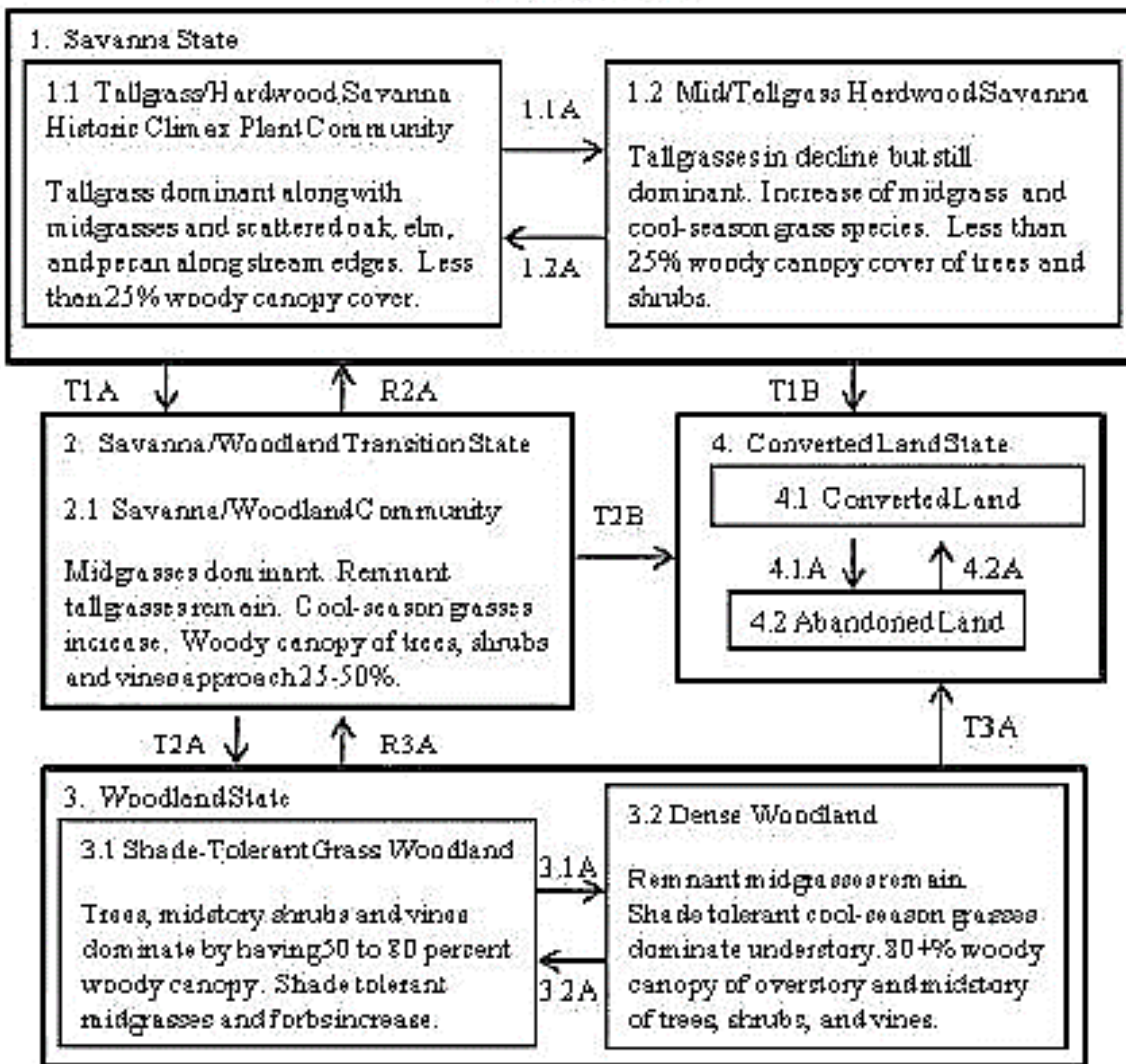


C

NRCS State and Transition
Diagrams



AExhibit C-1. NRCS Loamy Bottomland (R080BY151TX) State-and-Transition Diagram

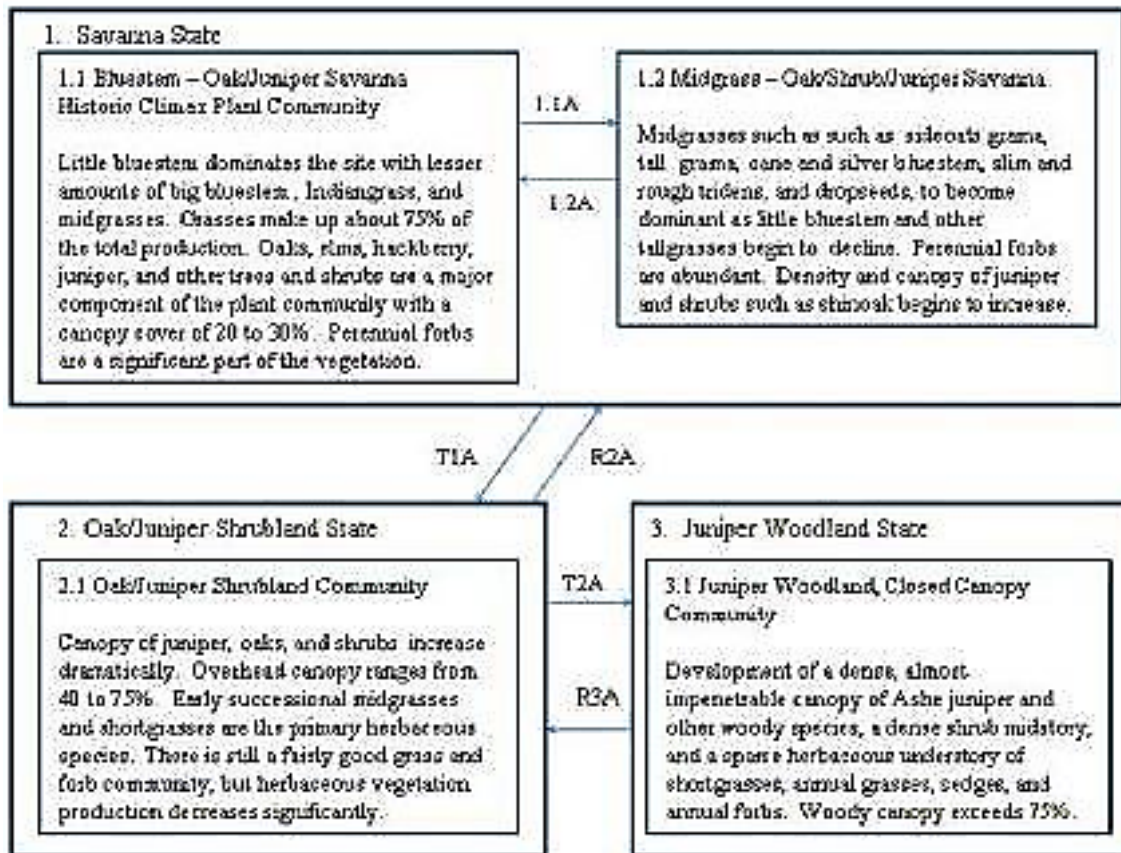


Legend

- 1.1A - Uncontrolled Grazing, Flooding, No Fire
- 1.2A - Prescribed Grazing, Prescribed Burning
- T1A - Abusive Grazing, Flooding, No Fire, No Brush Management
- R2A - Prescribed Grazing, Prescribed Burning, Brush Management
- T2A - Abusive Grazing, No Fire, No Brush Management
- R3A - Prescribed Grazing, Prescribed Burning, Brush Management
- 3.1A - Abusive Grazing, No Fire, No Brush Management
- 3.2A - Prescribed Grazing, Prescribed Burning, Brush Management
- T1B - Crop Cultivation, Pasture Planting, Range Planting, Tree Planting
- T2B - Brush Management, Crop Cultivation, Pasture Planting, Range Planting, Tree Planting
- T3A - Land Clearing, Crop Cultivation, Pasture Planting, Range Planting, Tree Planting
- 4.1A - Abusive Grazing, No Brush Management, Idle Land
- 4.2A - Prescribed Grazing, Pasture/Range/Cropland Management, Crop Cultivation, Pasture Planting, Range Planting

Source: USDA 2014

Exhibit C-2. NRCS Steep Rocky (R080BY163TX) State-and-Transition Diagram

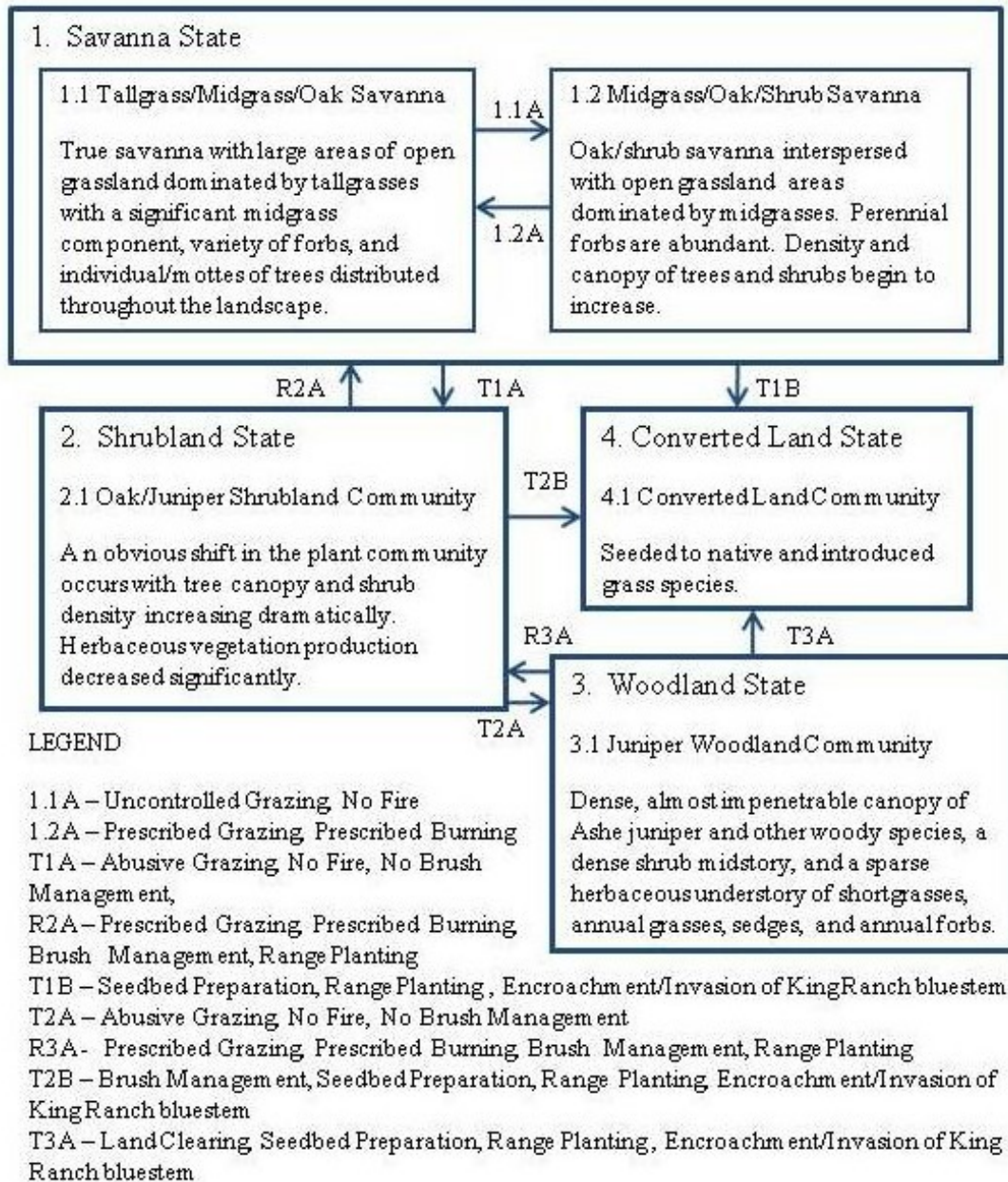


LEGEND

- 1.1A – Uncontrolled Grazing, No Fire
- 1.2A – Prescribed Grazing, Prescribed Burning
- T1A – Abusive Grazing, No Fire, No Brush Management
- R2A – Prescribed Grazing, Prescribed Burning, Brush Management, Range Planting
- T2A – Abusive Grazing, No Fire, No Brush Management
- R3A – Prescribed Grazing, Prescribed Burning, Brush Management, Range Planting

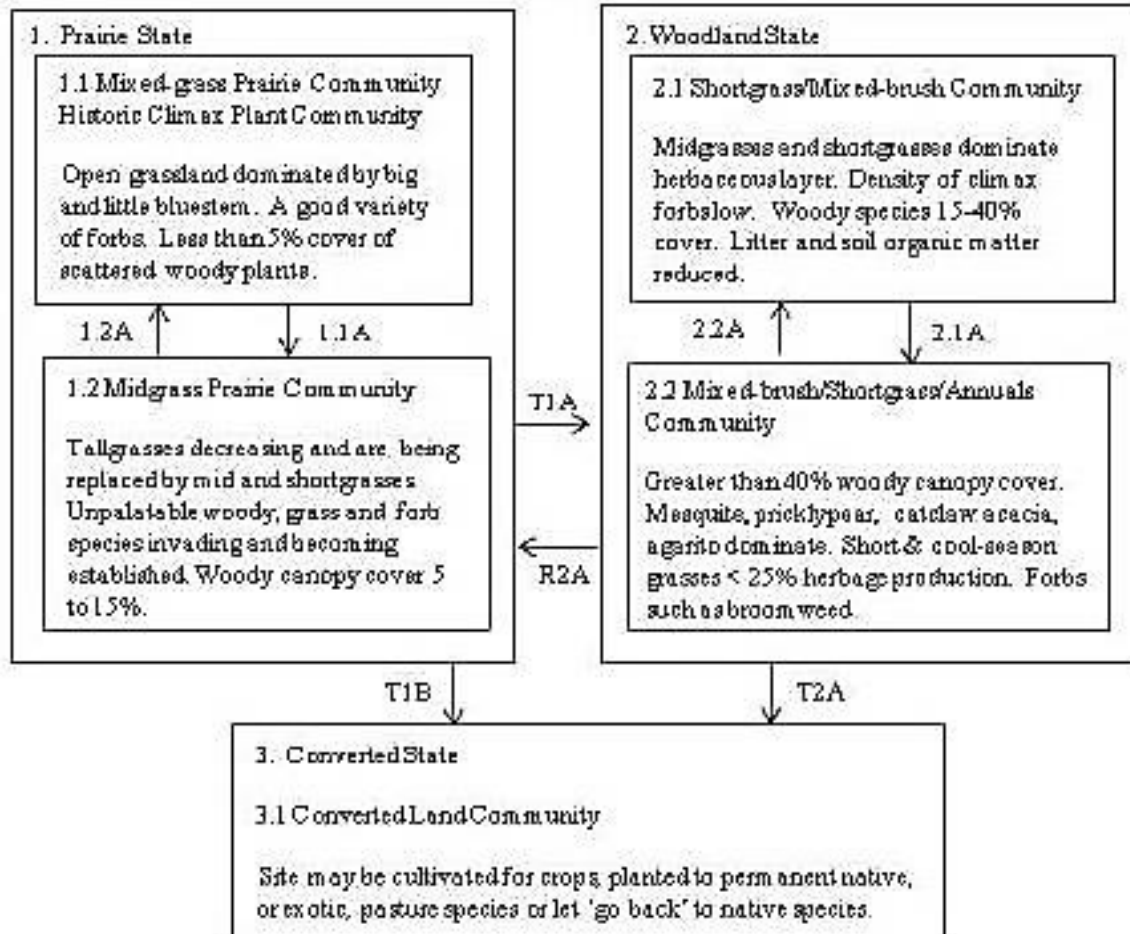
Source: USDA 2014

Exhibit C-3. NRCS Low Stony Hill (R080BY154TX) State-and-Transition Diagram



Source: USDA 2014

Exhibit C-4. NRCS Clay Slopes (R080BY604TX) State-and-Transition Diagram



Legend

- 1.1A Heavy Continuous Grazing, No Fire, Brush Invasion, No Brush Management
- 1.2A Prescribed Grazing, Prescribed Burning
- T1A Heavy Continuous Grazing, No Brush Management, No Fire
- R2A Brush Management, Range Planting, Prescribed Grazing, IPT, Prescribed Burning
- 2.1A Heavy Continuous Grazing, No Fire, No Brush Management
- 2.2A Brush Management, Prescribed Grazing
- T1B Crop Cultivation, Plowing, Range Planting, Pasture Planting, Pest/Nutrient Mgmt.
- T2A Crop Cultivation, Plowing, Range Planting, Pasture Planting, Pest/Nutrient Mgmt.

Source: USDA 2014

Attachment K

Mesohabitat Analysis of Palo Pinto Creek (June 2017 Addendum No. 2)

Memo - Addendum No. 2

Date: June 1, 2017

Project: Turkey Peak Project – Mitigation Plan

To: Chandler Peter

From: Cory Shockley; James Thomas; Ken Choffel; Ricky Wilson; Zach Stein

Subject: **Evaluation of Expanded Mesohabitat Areas in Palo Pinto Creek associated with Increased Water Supply Releases downstream of the Turkey Peak Expansion Project – Addendum No. 2., Updated for Revised Mitigation Reach**

Background:

In response to ongoing discussions with USACE staff and in response to reviewing agency comments, the Applicant is proposing a revised mitigation plan for the downstream reach (Figure 1) of Palo Pinto Creek for perennial credits required to mitigate for the Turkey Peak Enlargement Project (TPE). This memorandum is the second addendum to the February 25, 2016 memorandum describing the methodology and findings associated with an analysis to determine the potential lift (i.e. enhancement) to stream habitats from increases in water supply and environmental flow releases to Palo Pinto Creek (PPC) downstream of the TPE for purposes of the required mitigation plan. The first addendum dated August 22, 2016 describes the results of analyzing the Applicant’s July 2016 proposed reservoir operating plan and the associated benefits to stream habitats from increased frequency and duration of flows in PPC. This second addendum is focused on the final determination of the development of the mitigation plan, specifically as it addresses perennial stream credits.

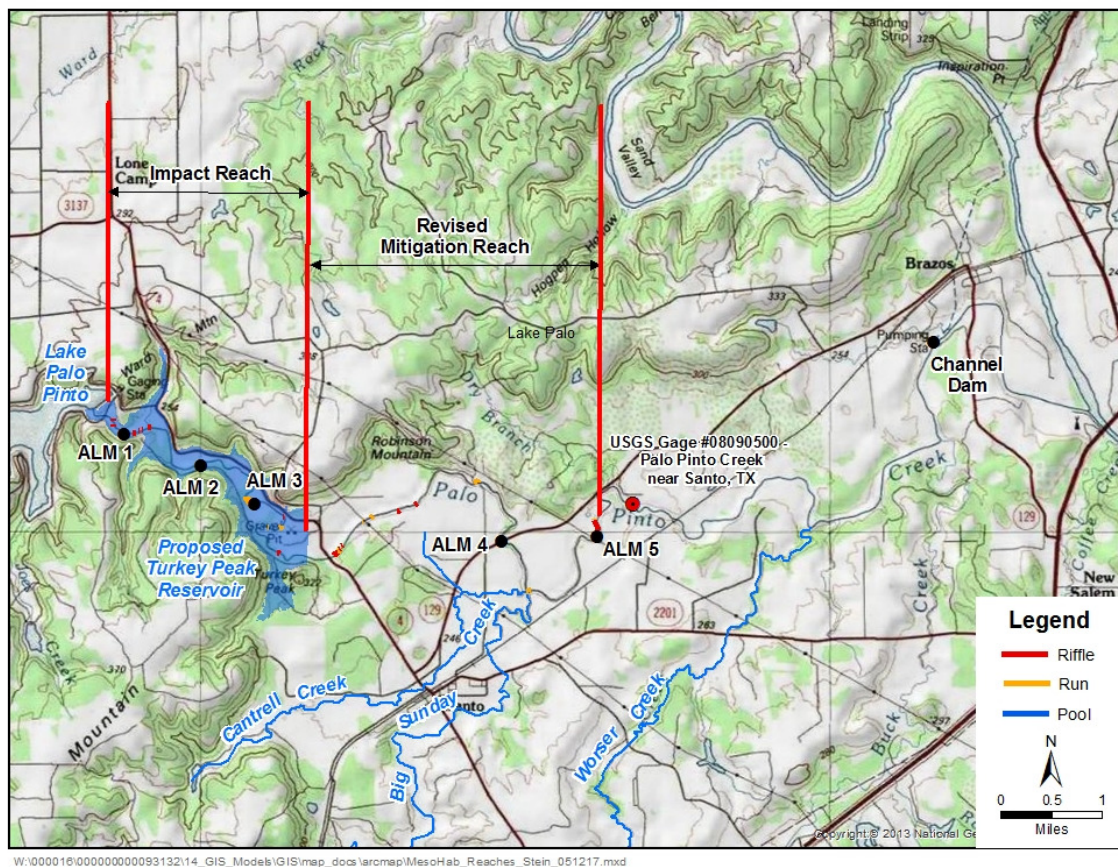


Figure 1. Palo Pinto Creek Mesohabitat Types and Reach Designations

Analysis Methodology:

The most significant change related to the mitigation plan is the defining of the mitigation reach on Palo Pinto Creek along with riffle improvements. The previous analysis had segmented Palo Pinto Creek into three reaches (refer to original memorandum dated February 25, 2016). This Addendum No. 2 defines Palo Pinto Creek in two reaches: an impact reach (formerly described as Reach 1) and a mitigation reach, comprised of all of Reach 2 and a short segment of Reach 3. The mitigation reach contains sufficient length to contain more than a 1:1 linear foot length compared to the impact reach (5.1 miles versus 4.1) and sufficient credits to overcome the impacted reach.

The methodology used to analyze the revised mitigation reach is identical to that of the original analysis and was developed through coordination between HDR staff and Ed Oborny, Sr. Aquatic Ecologist (BIO-WEST, Inc.). The approach considers how flows downstream of the project will increase in frequency and duration as water supply releases increase to meet demands in addition to minimum continuous flow releases (except during extreme drought conditions) to satisfy environmental flow targets. The increase in releases will in turn increase the wetted area of vital riffle and run mesohabitats in the mitigation reach, thus providing enhancement to the reach. Table 1 provides the lengths of riffle, run and pool mesohabitats in the impact reach and revised mitigation reach. Further details regarding the analysis approach can be found in the February 25, 2016 memorandum. Note that part of the final mitigation plan includes rehabilitation of existing riffle and re-creation of a riffle segment that was degraded into a pool during the flood events of 2016. The length of this new riffle, 230 feet, is included in the table.

Table 1: Mesohabitat Length by Reach

Reach	Riffle Length (ft)	Run Length (ft)	Pool Length (ft)	Total Reach Length (ft)
Impact Reach (LPP to TPE)	1,119	1,132	19,426	21,677
Revised Mitigation Reach	1,506	795	24,581	26,882

The two stream reaches were simulated using daily streamflows from the RiverWare model for two scenarios, baseline and with the project under 2020 conditions. The baseline scenario (2020 LPP) assumes water supply releases from Lake Palo Pinto (LPP) under LPP's 2020 supply capabilities or safe yield. The updated scenario including the TPE (2020 TPE) assumes releases are made in accordance with the Applicant's July 2016 proposed reservoir operating plan to meet projected 2020 demands and satisfy environmental flow criteria. The scenario assumptions for the 2020 LPP and 2020 TPE scenarios are the same as those presented in the first addendum.

Analysis Results:

Table 2 provides the cumulative and average daily wetted area habitat units for the two scenarios and Figure 2 illustrates the average daily wetted area habitat for the two scenarios. The mitigation reach includes an improved riffle section. This improved riffle section is located just downstream of the FM4 bridge below the small check dam on Palo Pinto Creek. During a site visit with the USACE and resource agencies it was noted that this riffle was severely degraded from the storms in 2015 and 2016 and was constricted and filled with construction debris. The District has proposed to clean out this riffle and lengthen it by 230 feet for a total riffle length of 310 feet, which is included in the calculations. Design schematics for the riffle improvement have been included as part of the mitigation plan. Results of the analysis with the improved riffle complex included indicate that the enhancement to the revised mitigation reach with the TPE in place is sufficient to compensate for loss of habitat in the impact reach.

Table 2: Summary of Daily Riffle and Run Habitat Units by Reach for Two Water Supply Scenarios

Scenario	Impact Reach Habitat Units (cumulative sqft)	Revised Mitigation Reach Habitat Units (cumulative sqft)	Total Habitat Units (cumulative sqft)	Average Daily Habitat Units (sqft)	Percent Increase Compared to Baseline
2020 LPP (Baseline)	385,516,675	780,928,608	1,166,445,828	48,179	-
2020 TPE	-	1,166,918,775	1,166,918,775	48,199	0.04%

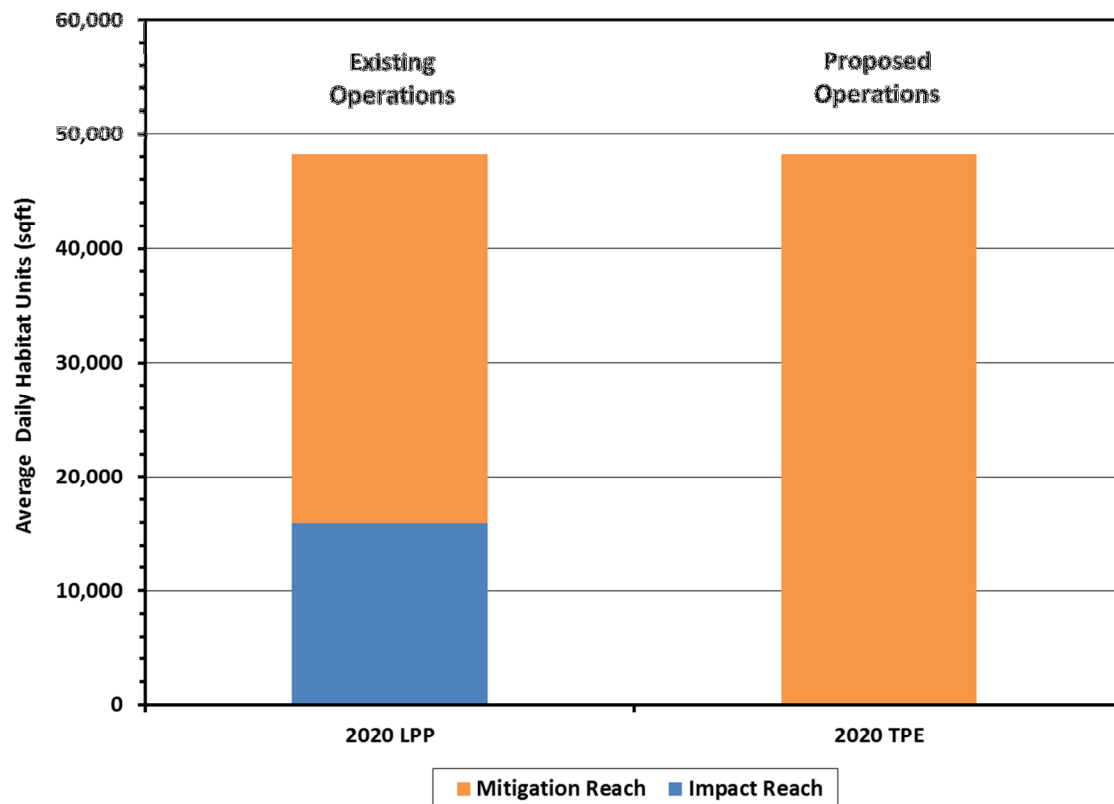


Figure 2. Average Daily Riffle and Run Habitat Units by Reach for Two Water Supply Scenarios

Conclusions

The updated analysis performed as a result of the proposed final mitigation plan for TPE indicates the 5.1 mile mitigation reach with the addition of 230 feet of new riffle habitat will provide sufficient habitat units to provide enough ecological lift to fully compensate for mesohabitat losses in the 4.1 mile reach of Palo Pinto Creek inundated by the project. The Applicant proposes to create the additional riffle habitat through channel modifications and increases in minimum flows and believes this is a practicable approach to address the concerns identified in the agency reviews of the Applicant's Mitigation Plan.

Attachment L

Adaptive Management Plan for Palo Pinto Creek with Turkey Peak Reservoir

Adaptive Management Plan for Palo Pinto Creek with Turkey Peak Reservoir (SWF 2009-00264)

Includes: Environmental Flows; New Streamflow Gage; Aquatic Life Monitoring (ALM); Agency Cooperation; Water Quality Monitoring; and Success Criteria

(November 10, 2017)

1.0 Overview

This document summarizes an Adaptive Management Plan for environmental flow releases to a segment of Palo Pinto Creek from the Turkey Peak reservoir project as part of the Mitigation Plan associated with the U.S. Army Corps of Engineers, Fort Worth District Regulatory Division proposed permit SWF 2009-00264. The objective of this plan is to improve conditions contributing to the currently High aquatic life use (ALU) conditions of Palo Pinto Creek. This plan includes descriptions of the District's initially required environmental flows (both TCEQ and USACE); an Aquatic Life Monitoring (ALM) plan; a Water Quality Monitoring plan; and an integrated approach for potentially modifying environmental flows in the event that the success criteria for Palo Pinto Creek are either achieved, exceeded, or initially not achieved, with proposed adjustments to the environmental flow releases in the event success criteria are initially not achieved. This Adaptive Management Plan will aid in achieving enhanced habitat conditions compared to existing conditions during the most stressful times by assuring minimum flow releases and by significantly reducing the occurrence of zero flow days downstream of the reservoir, as detailed in the Mesohabitat Analysis of Palo Pinto Creek with the Turkey Expansion in the February 2016 Technical Memo and August 2016 Addendum. Additional benefits are expected as a result of the Applicant's inclusion of a pulse flow release that will assure Palo Pinto Creek will experience a flow of at least 85 cfs annually except during the most extreme critical drought conditions.

2.0 Commitment of Environmental Flows and New Streamflow Gage for Compliance

Minimum Environmental Flows for USACE Permit and New Streamflow Gage

Minimum environmental flow releases are not required from Lake Palo Pinto under its water right permit. Flow records indicate days with 0 cfs flow occur more than 10 percent of the time with periods of no flow lasting up to 36 consecutive days. As shown in Table 1, after Turkey Peak Reservoir fills, the minimum environmental flow release will initially be set at 1 cfs. During critical drought conditions (i.e. when reservoir storage is less than 50%, elevation 856.3 ft-msl), then the minimum environmental flow will be 0 cfs for a maximum of 5 consecutive days and then a minimum flow of 1 cfs would be provided for a minimum of 5 continuous days prior to a new 5 day period of no flow (and so on). To monitor compliance, the District will install a new streamflow gage at the small channel dam near FM 4.

Pulse Flows for USACE Permit (To be coordinated with TPWD)

Pulse flow releases are not required from Lake Palo Pinto. As shown in Table 1, after Turkey Peak Reservoir fills, the District will make a 9-hour, 85 cfs pulse flow release during the first week of June in those years when a peak flow of 85 cfs or more has not occurred during the previous 12 months at the new streamflow gage. The District will coordinate the timing of this

release with TPWD’s Watershed Conservation Team and River Studies Program staff and will notify TPWD staff (by email) on or about May15th in years a release is required. By May 25th TPWD will notify the District to either proceed with the pulse flow release the first week of June or delay the release until no later than October 31st of that year. If during the TPWD requested delay period a natural flow event occurs that exceeds 85 cfs at the new streamflow gage or if the reservoir level drops to less than 50%, then the District will not be required to make the pulse flow release that year. During critical drought conditions, when reservoir storage is less than 50%, pulse flow releases are not required.

Table 1. Summary of Environmental Flow Releases, Projected DO Concentrations, Projected Water Release Temperature and Aquatic Life Use Target for Palo Pinto Creek

	With Turkey Peak Reservoir
Minimum Environmental Flow Releases – USACE During Critical Drought Conditions	1 cfs 0 cfs for 5 days max. (When TP <50% full)
Environmental Pulse Flow Release (years gage flow has not exceeded 85 cfs) - USACE (Not required during Critical Drought Conditions when TP <50% full.)	85 cfs for 9 hours
Environmental Pass-throughs (7 sq. mile area) – TCEQ Permit	1 to 4 cfs (see Table 2)
Maximum Outlet Depth (see Figure 1)	10 feet or less (~98%) 13 feet or less (~2%)
Projected percentage of Instantaneous / 24-hour Mean Dissolved Oxygen readings below TCEQ standards of: 3.0 / 5.0 mg/L (Non-Spring Months including July-March) 4.5 / 5.5 mg/L (Spring Months including April-June) Projected percentage of water release temperature readings above 90°F:	~0% below new dam
Aquatic Life Use in Palo Pinto Creek downstream of Reservoir - Success Criteria	Existing = High Future Target = High

Additional Environmental Pass-throughs for TCEQ Permit

In addition to the minimum environmental and pulse flow releases under the USACE Permit, the District will release inflows from the 7 square-mile watershed area downstream of Lake Palo Pinto in accordance with the District’s TCEQ water rights permit. These releases are summarized in Table 2 and vary by month depending on the hydrologic conditions (dry, average, or wet) based on the weekly Palmer Hydrologic Drought Index (PHDI) values¹ published by the National Climatic Data Center for the North Central Zone of Texas.

Multi-Level Outlet Included at Turkey Peak Reservoir

Lake Palo Pinto has a single, fixed outlet located 32 feet below its conservation level. Aquatic life monitoring (ALM) sampling on Palo Pinto Creek below the existing dam indicates all dissolved oxygen (DO) samples are in compliance with TCEQ standards and this segment has a High Aquatic life use rating. Turkey Peak Reservoir will have a multi-level outlet with releases

¹ <http://www1.ncdc.noaa.gov/pub/data/cmb/drought/weekly-palmers/>

occurring from a maximum depth of 10 feet about 98% of the time as shown in Figure 1 further enhancing current DO concentrations. DO concentrations below TCEQ's seasonal standards are not expected to occur downstream of the new dam considering the significant aeration provided by the outlet tower, stilling basin, spillway discharge channel, and small dam on Palo Pinto Creek. The District's Mitigation Plan is based on maintaining a High aquatic life use rating for Palo Pinto Creek.

Figure 1. Turkey Peak Reservoir Operating Levels and Outlet Gate Elevations

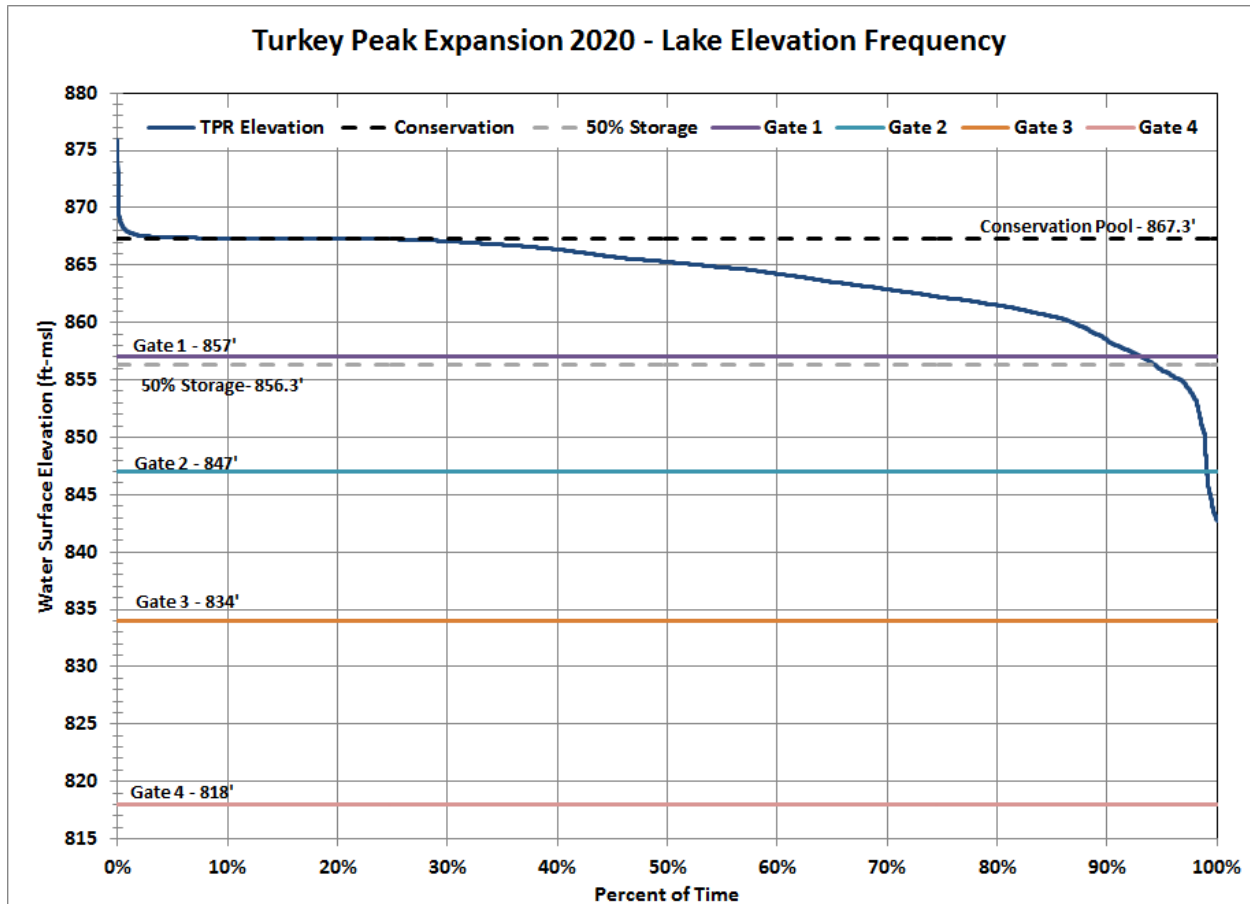


Table 2. TCEQ Required Environmental Pass-Throughs for Turkey Peak Reservoir*

Season	Month	Subsistence Flows (cfs)	Base Flows (cfs)		
			Dry	Average	Wet
Winter	Jan	1	1	2	3
	Feb	1	1	2	3
Spring	Mar	1	1	2	4
	Apr	1	1	2	4
	May	1	1	2	4
	Jun	1	1	2	4
Summer	Jul	1	1	2	4
	Aug	1	1	2	4
	Sep	1	1	2	4
	Oct	1	1	2	4
Winter	Nov	1	1	2	3
	Dec	1	1	2	3

* Pass-throughs are only required from the inflows originating from the additional 7 sq. mi. drainage controlled by Turkey Peak Dam below Palo Pinto Dam.

3.0 Aquatic Life Monitoring (ALM) and Water Quality Monitoring Plan

Baseline (Pre-Construction) ALM and Water Quality Monitoring for Palo Pinto Creek (including Mussel Survey)

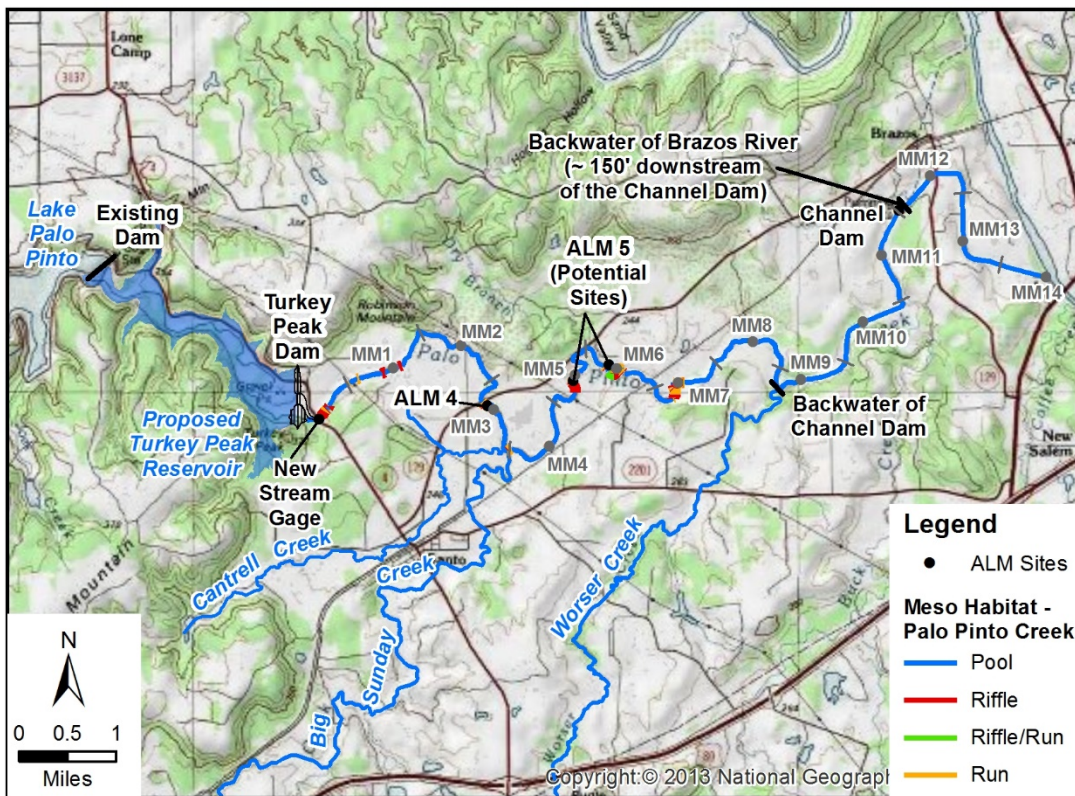
The District has performed three baseline Aquatic Life Monitoring (ALM) sampling events at four locations on Palo Pinto Creek between the existing Lake Palo Pinto dam and FM 129 in accordance with the TCEQ’s guidelines and protocols.² Baseline sampling has consistently indicated that Palo Pinto Creek supports a diversity and abundance of aquatic benthic macroinvertebrate and fish assemblages typical of a High quality Aquatic Life Use (ALU) stream. The existing habitat conditions are due in large part to the District’s water supply releases occurring from Lake Palo Pinto since the 1960s.

The District will conduct additional baseline ALM monitoring in accordance with the most recent TCEQ protocols twice during the year prior to construction of the new dam. These ALM monitoring events will include mussel surveys in accordance with the most recent TCEQ Surface Water Quality Monitoring (SWQM) protocols (i.e. Draft SWQM Mussel Monitoring Protocol) currently being developed cooperatively by TPWD and TCEQ. (Note: The final version is anticipated to be added to the SWQM Procedures Volume 2 in the near future.) ALM sampling will occur at the FM 129 bridge near Santo, Texas (sampling station 4) and at an additional site

²Texas Commission on Environmental Quality (TCEQ). 2014. *Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Community and Habitat Data*. Document No. RG-416. Monitoring Operations Division, Texas Commission on Environmental Quality, Austin, Texas.

(station 5). As shown in Figure 2, station 5 will be located downstream of the confluence of Big Sunday Creek and upstream of the backwater from the District's channel dam with its final location based on site access and stream channel suitability. The District will coordinate the selection of this site with TCEQ staff and TPWD Watershed Conservation Team and River Studies Program staff. ALM sampling at these sites will occur during the index period (March 15 - October 15) and during the critical period (July 1 - September 30; with July or August being the preferred timeframe to sample during the hottest period of the year). About 3 weeks prior to the ALM sampling events, District will notify TCEQ and TPWD staff so they can plan their participation.

Figure 2. Location of New Streamflow Gage and ALM Sites



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During either the index or critical period baseline ALM monitoring, the District will perform a mussel survey in areas of Palo Pinto Creek that will be directly affected by the project, to include the dam footprint, reservoir, and riffle restoration site, in accordance with the TPWD mussel survey protocol (as of November 2017). The District will coordinate an Aquatic Resource Relocation Plan (ARRP) with TPWD's Kills and Spills Team (KAST) and apply for a 60-day permit to *Introduce Fish, Shellfish or Aquatic Plants into Public*. The District will use the mussel survey data (along with data from previous surveys) to develop the ARRP to include a mussel relocation plan for the construction area in accordance with TPWD requirements. Contingent upon approval by KAST and due to the size of the project area, the District's team may propose to relocate mussels to suitable downstream habitat or the Lake Palo Pinto shoreline concurrently with the mussel survey in order to minimize impact to the recovered mussels and mobilization

costs. About 3 weeks prior to this survey, the District will notify TCEQ staff and TPWD Watershed Conservation Team and River Studies Program staff so they can plan their participation in the survey in available.

Concurrent with each baseline ALM sampling event, *in situ* determinations of water temperature, dissolved oxygen, conductivity (used to calculate TDS), and pH readings will be recorded using multiprobe dataloggers in Lake Palo Pinto (LPP) near the outlet, in Palo Pinto Creek just downstream of the outlet channel, downstream of the existing channel dam near FM 4, and at ALM stations 4 and 5. Sampling at all sites will be within 1 foot of the water surface or at 1 meter depth intervals when the site has sufficient depth.

During the index period ALM sampling event, the District will record water quality parameters at 15 minute intervals for a minimum period of 42 hours. During the critical period ALM sampling event, the District will record water quality parameters at 15 minute intervals for a period of about 11 to 12 days. During the first two days of the critical period monitoring, ALM sampling will be performed and, afterwards, flow from the reservoir will be reduced to 0 cfs for the next 5 days and then set to 1 cfs for the next 5 days. Water quality monitoring will continue during this time to determine how stream water quality responds to the variations in flow. During this period, daily stream flow measurements will be made at the outlet of Lake Palo Pinto, in Palo Pinto Creek just downstream of the LPP outlet channel, the new gage site near FM 4, and at ALM stations 4 and 5.

The District will invite TCEQ staff and TPWD Watershed Conservation Team and River Studies Program staff to participate and assist with the ALM and mussel surveys and will notify agency staff (by email) about 3 weeks prior to the proposed sampling events.

ALM and Water Quality Monitoring during Construction and Filling Phase

The District will annually conduct one water quality sampling effort at ALM site 4 during the in-stream construction and filling phase. The water quality sampling will include *in situ* determinations of water temperature, dissolved oxygen, conductivity (used to calculate TDS), and pH readings. Additionally, the District will conduct one ALM sampling effort at ALM site 4 in the second year following initiation of the dam construction activities within Palo Pinto Creek channel if the reservoir has not filled. To maintain existing conditions and minimize adverse effects during the construction and filling phase, the District will limit the maximum duration of no flow (via water supply releases or reservoir spills) during construction to 30 days. After the reservoir has filled and flow has normalized, the post-filling sampling efforts (see below) will be initiated.

ALM and Water Quality Monitoring for Palo Pinto Creek after Initial Filling of Turkey Peak

The District will conduct ALM monitoring (twice each year) for a period of three years following the initial filling of Turkey Peak Reservoir at ALM Stations 4 and 5 during the index period (March 15 - October 15) and during the critical period (July 1 - September 30; with July or August being preferred). Water quality sampling will also be conducted to evaluate whether or not the quality of water released from the new reservoir meets TCEQ standards immediately

below the new reservoir, and in the downstream reaches. The water quality measurements will consist of DO, temperature, conductivity (used to calculate TDS), and pH. Water quality sampling will typically be conducted on a quarterly basis. Consistent with TCEQ definitions, the applicant defines quarterly to mean January through March, April through June, July through September, and October through December. Two of the quarterly sampling efforts will be conducted concurrently within the index and critical period ALM sampling. In years when a scheduled 85-cfs pulse flow is required, water quality sampling will be conducted concurrently with the pulse flow event and in lieu of the next winter quarterly sampling period (January through March) resulting in a maximum of four sampling periods per 12 month period.

The additional water quality sampling will be conducted for a period of 3 years following reservoir filling. During the sampling efforts, daily stream flow measurements will be made at the outlet of the Turkey Peak Dam, the new gage site near FM 4, and at ALM stations 4 and 5. Water quality data shall be recorded for 24-hour monitoring periods at 15 minute intervals during the twice-annual ALM sampling events and the supplemental water quality sampling events in accordance with TCEQ SWQM standards.

If the majority of data confirm the water quality parameters are consistent with high aquatic life use standards (5.0mg/L mean and 3.0mg/L minimum and during spring months 5.5mg/L mean and 4.5mg/L minimum) after three years, the sampling will be reduced to only during the ALM sampling. In years when a pulse flow release occurs during the 3-year period, one of the supplemental sampling events will be conducted at that time (between June 1st and October 31st). During these events a portable, multi-parameter water quality datalogger will be set up at the locations described in Table 3 (i.e. at the reservoir tower outlet gate; at the outlet, at the new streamflow gage site just below the channel dam; and at both ALM stations).

During the index period ALM sampling event, the District will record water quality parameters for a minimum period of 42 hours. During the critical period ALM sampling event, the District will record water quality for a period of about 11 to 12 days. Additionally, during the critical period sampling the District shall record water temperatures at 5-foot increments at the tower to a depth of -49 feet (lowest gate) below conservation pool depth (867.4 ft msl) to develop a temperature profile for the reservoir expansion area. During the first two days of the critical-period monitoring, ALM sampling will be performed and then flow from the reservoir will be reduced to 0 cfs for the next 5 days and then set to 1 cfs for the next 5 days. Water quality monitoring will continue during this time to determine how stream water quality responds to the variations in flow. During this period, daily stream flow measurements will be made at the reservoir tower outlet gate; at the outlet, at the new streamflow gage site just below the channel dam; and at ALM stations 4 and 5. During the critical period sampling at each of the two ALM sites, the following data will be collected at a minimum of 5 cross-sections for a range of flow rates between approximately 0.5 and 8 cfs: depth; velocity; substrate material; and instream cover. During the 11 to 12 day critical period monitoring, water surface elevation data will be collected at each ALM site at 15 minute intervals using a water pressure transducer or stream

gage data. The District will also install a staff gage at each ALM site so that a reference water surface elevation can be obtained for all sampling events.

The District will invite TCEQ staff and TPWD Watershed Conservation Team and River Studies Program staff to participate and assist with the ALM surveys and will notify agency staff (by email) about 3 weeks prior to the proposed sampling events.

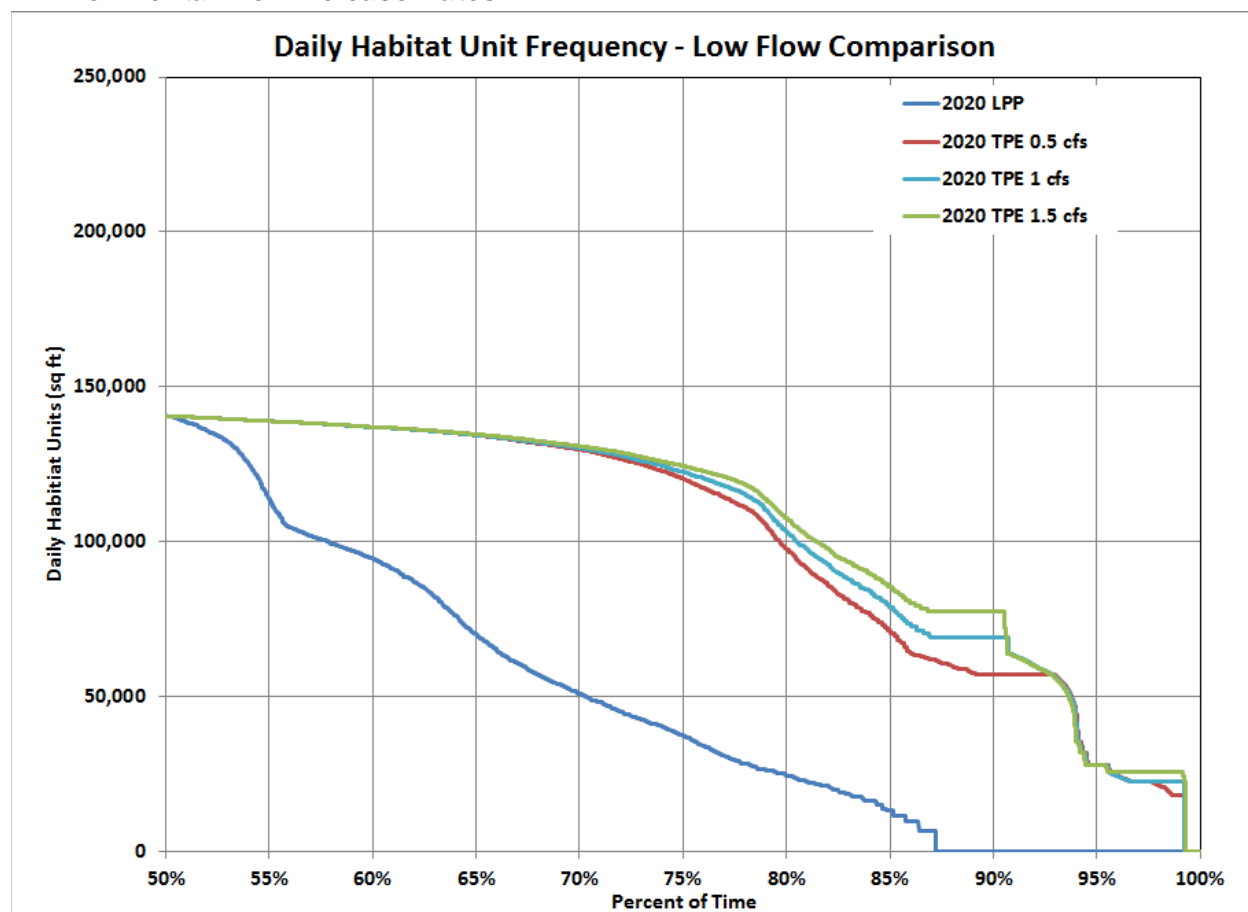
4.0 Proposed Adaptive Management Plan and Success Criteria

Adaptive Management Plan and Success Criteria including Potential Adjustments to Minimum Environmental Flow Release

During each of the first two years after the new reservoir fills, the District will prepare an annual data report summarizing all the sampling/monitoring data collected. After the initial 3 years of sampling/monitoring is completed, the District will prepare a report summarizing the sampling results and water quality data collected. At this point in time, there will be 6 Aquatic Life Use (ALU) ratings determined for both Stations 4 and 5 and trends (if any) should become apparent. If the 3-year report indicates a High ALU rating for Palo Pinto Creek has been achieved, then there would be no changes in the District's minimum flow release requirements and the monitoring program would continue with once a year ALM sampling during the critical period for two more years. If the report indicates an ALU rating less than High at either station, then the District will increase their minimum environmental flow release from 1.0 cfs to 1.5 cfs and the monitoring program will continue with twice a year ALM sampling for 3 more years. If the report indicates an Exceptional ALU rating has been achieved, then the District will either: 1) reduce their minimum environmental flow release from 1.0 cfs to 0.5 cfs and continue the monitoring program with twice a year sampling for 2 more years; or 2) will leave the minimum environmental flow release at 1.0 cfs and cease monitoring and reporting (as an incentive for District to not reduce the minimum 1 cfs release). Figure 3 shows a comparison of the frequency of daily habitat units for Palo Pinto creek associated with the three minimum flow scenarios using minimum releases of 0.5, 1.0 and 1.5 cfs.

Following the 5 or 6 years of monitoring (if required), the District will prepare a final report and include in the report recommendations for: 1) a minimum environmental flow amount between 0.5 and 1.5 cfs; and 2) potential revisions to the maximum 5 consecutive days of 0 flow not to exceed a 2 day adjustment in either direction. The District will present the report in a meeting with USACE, TPWD, USFWS, and TCEQ staff invited to attend. The USACE will make the final determination as to the minimum environmental flow amount to be set between 0.5 and 1.5 cfs and if the maximum 5 days of 0 flow should be adjusted (by not more than 2 days).

Figure 3. Enhancement to Wetted-Perimeter Area of Palo Pinto Creek for Three Minimum Environmental Flow Release Rates



5.0 Summary of USACE and TCEQ Required Palo Pinto Creek Monitoring Plan

The District’s TCEQ water right permit requirements for its Palo Pinto Creek monitoring plan are summarized in Table 3 along with the District’s additional monitoring proposed for the USACE permit.

Table 3. Summary of ALM and Water Quality Monitoring Requirements

<u>Item</u>	<u>TCEQ Monitoring Requirements</u>	<u>Combined USACE & TCEQ Monitoring Requirements</u>
Number of ALM Monitoring Sites	1 – Station 4 (Station 4 is upstream of confluence with Big Sunday Creek)	2 – Stations 4 & 5 (Station 5 to be established downstream of Big Sunday Creek in cooperation w. TPWD & TCEQ)

Table 3. Continued

Number and Location of Water Quality Monitoring Sites	4 - Water Quality sites: 1 at TP outlet tower gate 1 at TP outlet 1 at new gage site 1 at ALM Station 4	5 - Water Quality sites: 1 at TP outlet tower gate 1 at TP outlet 1 at new gage site 1 at ALM Station 4 1 at ALM Station 5
Baseline ALM and Water Quality Sampling Frequency (Prior to Construction)	Twice during year before construction	Twice during year before construction (new mussel survey to be completed in cooperation w. TPWD & TCEQ)
Construction & Filling Periods - ALM and Water Quality Sampling	Not applicable	Annual water quality sampling & one ALM sampling event in second year following start of in-stream construction activities. 30-day maximum of continuous no flow conditions
Phase 1 - Initial 3-year ALM and Water Quality Sampling (After Reservoir Fills)	ALM and Water Quality – Twice a year for 3 years	ALM - Twice a year for 3 years Water Quality – Four times a year for 3 years.
		Critical Period temperature data at 5-foot depth increments to -49 feet
Phase 2 - ALM and Water Quality Sampling <u>If Phase 1 ALU Results are:</u> High Less than High Exceptional	Not Required after 3 years Not Required after 3 years Not Required after 3 years	Once a year for 2 more years (Keep minimum flow of 1.0 cfs), Critical Period temperature data at 5-foot depth increments to -49 feet Twice a year for 3 more years (Increase min. flow to 1.5 cfs) A. Twice a year for 2 more years; if minimum flow reduced to 0.5 cfs B. No additional monitoring/reports; if minimum flow kept at 1.0 cfs