

**PRE-CONSTRUCTION NOTIFICATION  
NATIONWIDE PERMIT 14, LINEAR  
TRANSPORTATION CROSSINGS**

**FOR THREE SINGLE AND COMPLETE  
CROSSINGS OF WATERS OF THE U.S.**

**USACE Project # 2005-00058**



**State Highway 121**

**From Farm-to-Market 1187 to  
U.S. Highway 67**

**TXDOT CSJ: 0504-04-001  
0504-05-001**

**Tarrant and Johnson  
Counties, Texas**

**December 2008**

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## 1.0 INTRODUCTION

### 1.1 Background

The Texas Department of Transportation (TxDOT), Fort Worth District (Applicant) is submitting this revised Pre-Construction Notification (PCN) for the proposed construction of a new segment of State Highway (SH) 121. The proposed project is a 14-mile long roadway segment within a new location, which would extend SH 121 from Farm-to-Market (FM) 1187 to U.S. Highway (US) 67. The project will consist of a four-lane, limited access divided highway. A PCN, including a proposed Jurisdictional Determination and Conceptual Mitigation Plan was previously submitted in December 2004, but put on hold pending further review of tollroad evaluation and funding constraints. An Environmental Assessment (EA) was submitted, and a Finding of No Significant Impact (FONSI) was received from the Federal Highway Administration (FHWA) for this project May 24, 2004 (**Appendix A**). However, an EA Re-evaluation of this project is being prepared due to a change in project approach and minor alignment modifications. A previously planned interim facility of a two-lane roadway concept as a step to the planned full toll road facility will no longer be used. The EA Re-evaluation and associated public hearing will address moving directly to the four lane toll road facility and to update any associated direct and indirect effects information. The EA Re-evaluation is expected to be approved in early 2009

A preferred alternative for the project was chosen and approved during the National Environmental Policy Act (NEPA) planning process. However, the 2004 EA provided a general evaluation of anticipated impacts to waters of the U.S. This PCN document provides a more detailed evaluation of the alternative designs considered and the refined alignment selected for detailed design. Additionally, the revised direct effects section of the EA re-valuation document will include avoidance and minimization of impacts to waters of the U.S. achieved by shifting the alignment in the vicinity of Buffalo Creek and modifying several bridge sections.

### 1.2 Purpose

This PCN is being submitted to request authorization and describe the proposed mitigation plan under Nationwide Permit (NWP) 14, Linear Transportation Crossings for unavoidable impacts at three single and complete crossings (S-2 and W-1 [crossing 1], S-6 [crossing 2], and S-10 [crossing 3]) within the proposed project area. Although other waters of the U.S. were identified and will be crossed by the project, the unavoidable impacts do not require notification under the conditions of NWP 14 (Table 1). The waters of the U.S. are distinctly separate as defined in the March 2007 re-issuance of the Nationwide Permits (CFR Volume 72, Number 47, Pages 11191–11198). Impacts to waters of the U.S. have been avoided and minimized to the extent practicable with the use of alignment shifts and design of extended bridges. In some instances, authorization of NWP 25 Structural Discharges will be utilized for construction of proposed bridges.

<b>Resource ID</b>	<b>Resource Type</b>	<b>PCN Required</b>
S-1	Ephemeral Stream	No
S-2 and W-1	Intermittent Stream with Adjacent Emergent Wetland	Yes
S-3	Intermittent Stream	No
S-4	Ephemeral Stream	No
S-5	Ephemeral Stream	No
S-6	Intermittent Stream	Yes
S-7	Ephemeral Stream	No
S-8	Intermittent Stream	No
S-9	Ephemeral Stream	No
P-1	On-Channel Impoundment	No
S-10 at CR 904	Intermittent Stream	No
S-10 at SH 121	Intermittent Stream	Yes
S-11	Intermittent Stream	No

## 2.0 PROJECT COORDINATION

The Applicant's points of contact for the proposed project are listed as follows:

### **Applicant**

Judy Anderson, P.E.  
District Engineer  
Texas Department of Transportation  
Fort Worth District  
P.O. Box 6868  
Fort Worth, Texas 76115-0868

### **Representative**

James Thomas PWS, CWB  
HDR Engineering, Inc.  
17111 Preston Road, Suite 200  
Dallas, Texas 75248-1229

## 3.0 PROJECT OVERVIEW

### 3.1 Project Description

The proposed SH 121 project from FM 1187 to US 67 is a 14-mile long tollroad within a new location that will consist of a four-lane divided typical section with grass medians (Appendix D). As a toll road facility, SH 121 will be a full controlled access facility and will have no frontage roads; however ramps will be provided at intermediate access points. The typical right-of-way (ROW) width is 220 to approximately 600 feet with additional ROW required at interchanges. The project design complies with the recommendations of the 2030 Mobility-Metropolitan Transportation Plan approved June 12, 2007. Intermediate access points will be located at FM 1187, CR 920, FM 1902, CR 913, FM 917, CR 904, Sparks Road, and CR 1125.

### 3.2 Project Purpose and Need

The purpose of the project is to provide safe and effective transportation and enhance mobility for the growing population in Johnson County. The proposed project will meet those needs in the following ways:

- Improve regional mobility with a more direct route between Cleburne in Johnson County and the transportation corridors in Tarrant County.
- Increase the carrying capacity of the area roadway network for people and goods.
- Alleviate local congestion.

### 3.3 Site Description

The project is located in north central Texas, northwest of the City of Cleburne in Tarrant and Johnson counties (**Appendix C, Sheet 1**). The project area includes the alignment and adjacent areas for the preferred alternative set forth in the EA submitted in November 2003 and approved with the publication of a FONSI on May 20, 2004 (**Appendix A**).

The project area consists of predominately rangeland and previously farmed land and has been heavily disturbed by past landowners through overgrazing and farming practices. As a result, the dominant vegetation communities throughout the project area include both native and introduced vegetative species. Common tree species include honey mesquite (*Prosopis glandulosa*), sugar hackberry (*Celtis laevigata*), Osage orange (*Maclura pomifera*), and cedar elm (*Ulmus crassifolia*). These species are common colonizers in previously grazed or farmed "old field" habitat. In addition, post oak (*Quercus stellata*) and live oak (*Q. virginiana*) occur within the project area along streams and uncleared areas. Common grass species found include bermudagrass (*Cynodon dactylon*), little bluestem (*Schizachyrium scoparium*), Texas wintergrass (*Stipa leucotricha*), and perennial rye grass (*Lolium perenne*).

There are two watersheds of intermittent streams located within the project area, Rock Creek and West Buffalo Creek. The tributaries within the northern two-thirds of the project area (streams S-1, S-2, S-3, S-4, S-5, S-6, S-7, S-8, S-9) and the adjacent water resources (W-1 and P-1) are within the Rock Creek watershed. Rock Creek flows to the north into Benbrook Reservoir which is on the Clear Fork of the Trinity River. One tributary within the West Buffalo Creek watershed (S-11) flows into West Buffalo Creek (S-10). West Buffalo Creek flows to the south into Lake George Marti and is eventually a tributary to the Nolan River which flows into the Brazos River.

### 4.0 ALTERNATIVES DISCUSSION

A No-Build Alternative and four project corridor alternatives (A-D) were evaluated in the EA. Through the NEPA process, alternatives were screened by evaluating potential impacts on the natural and human environment. Based on the analysis, a preferred build alternative was chosen (Alternative D) that minimized impacts to various environmental resources. A FONSI was issued (**Appendix A**) based on the analysis in the EA.

Further analysis of the alignment for Alternative D during the detailed design identified additional alignments with regard to the potential for avoidance and minimization of impacts to waters of the U.S. Evaluation of the northern segment indicated no opportunities for avoidance and minimization. However, evaluation of the southern portion of the alignment did allow for avoidance and minimization of waters of the U.S., more primarily at West Buffalo Creek.

Table 2 provides a summary of the evaluation of refined Alignments 1 through 4 for potential impacts to West Buffalo Creek. Sections 4.1 through 4.4 also provide discussions of the refined alignments to the original (Alternative D). Complete impact calculations for the preferred alignment are provided in Section 5.0.

#### **4.1 West Buffalo Creek Refined Alignment 1: Channel Re-alignment/One Bridge**

Refined Alignment 1 is the original Alternative D alignment defined in the EA that would relocate a reach of West Buffalo Creek along one side of the roadway and require only one bridge structure. This alignment would require that the stream be relocated to the western portion of the ROW, with the construction of one 200-foot bridge. The cost of the infrastructure would be moderate compared to the other refined alignments; however, the permitting and mitigation costs were estimated to be the highest of the potential alignments. Based on projected impacts to approximately 3,500 linear feet (LF) (0.8 acre) of waters of the U.S., in the West Buffalo Creek floodplain, this alignment does not avoid and minimize impacts to the greatest extent practicable.

#### **4.2 West Buffalo Creek Refined Alignment 2: Segment Relocations/Two Bridges**

This refined alignment would minimize the amount of channel re-alignment while allowing the roadway to remain on the original alignment. Three stream segments of West Buffalo Creek would be relocated, and two bridges would be constructed. While this would minimize channel re-alignment relative to refined Alignment 1 (original Alternative D), it does not minimize impacts to the greatest extent practicable. The cost of mitigation would be lower than refined Alignment 1 but higher than that of refined Alignments 3 or 4. In addition, construction costs are moderate. This refined alignment would impact approximately 2,150 LF (0.6 acre) of waters of the U.S. in the West Buffalo Creek floodplain.

#### **4.3 West Buffalo Creek Refined Alignment 3: Long Bridge Spans**

Refined Alignment 3 would also minimize the channel re-alignments, channel fill, and floodplain fill through the use of long bridge spans. This refined alignment uses the original Alternative D alignment presented in the EA. Approximately 1,000 LF of the northern portion of West Buffalo Creek would be relocated and the remaining crossings would be spanned with 1,500 to 1,750 feet of bridges. This refined alignment would be the most costly of the four refined alignments with regard to construction; however, the mitigation costs would be lower than refined Alignments 1 or 2. Refined Alignment 3 would impact approximately 1,100 LF (0.45 acre) of waters of the U.S. in the West Buffalo Creek floodplain. This refined alignment avoids and minimizes impacts to a greater extent than refined Alignments 1 or 2; however, refined Alignment 4 allows for additional avoidance and minimization.

#### **4.4 West Buffalo Creek Refined Alignment 4: West Alignment/One Bridge (Preferred Alternative)**

Refined Alignment 4 would result in the least amount of fill in waters of the U.S. but would require the revision of the roadway alignment to the west of West Buffalo Creek. The alignment would shift to the west of the original preferred (Alternative D) alignment, and one 300-foot bridge would be constructed where the refined alignment would cross West Buffalo Creek. For this refined alignment, channel re-alignments to segments of West Buffalo Creek would be minimized. This alternative is anticipated to have the least costly construction and mitigation expenses. This refined alignment would avoid and minimize impacts to waters of the U.S. to the

greatest extent practicable. Refined alignment 4 is currently considered to be the preferred alignment and would impact 1,058 LF (0.40 acre) of waters of the U.S along West Buffalo Creek. Although the unavoidable impacts would occur at three distinct locations, they are considered cumulatively as one single and complete crossing since the roadway crosses at a skew in the same general direction as the stream and only crosses the floodplain once. An additional 66 LF (0.01 acre) is impacted along West Buffalo Creek but is at a separate crossing at County Road (CR) 904. This crossing occurs outside the proposed ROW for SH 121, but crosses within the construction limits of proposed road modification for CR 904 adjacent to SH 121.

The alignment shift to the west allows the stream crossing to be located in a stream reach with a less densely wooded riparian corridor. Downstream of the proposed crossing, West Buffalo Creek has been substantially impaired by heavy erosion and sedimentation due to the effects of heavy livestock grazing with access directly to the stream.

<b>Refined Alignment</b>	<b>Construction Method</b>	<b>Relative Cost</b>	<b>Linear Impacts (ft)</b>	<b>Fill impacts (ac)</b>
1	Relocate stream to west; One 200' Bridge	Moderate	3,500	0.80
2	Relocate 3 stream segments; two bridges	Moderate	2,150	0.60
3	1,500' to 1,750' of bridges-south; relocation of north stream segment	Most Costly	1,100	0.45
4	Relocate road to west; One 300' bridge	Least Costly	1,058	0.40

This project will result in fill placed in the floodplain of Marti Lake. However, the selected alignment has lowered the SH 121 roadway profile which will reduce the volume of fill placed in the flood plain. It is anticipated that mitigation for fill placed in the floodplain will be necessary. The flood storage mitigation areas will be excavated with a proposed location to be between SH 121 and Lake George Marti. The top of the sloped areas will be approximately two feet above the lake spillway level [Ordinary High Water Mark (OHWM)], the limit of the waters of the U.S. The outfall structures to the tributary S-11 will be constructed above the OHWM and in a manner such that energy will be dissipated, minimizing erosion of streambanks.

The project will comply with local floodplain management requirements in accordance with NWP General Condition 10.

## 5.0 WATERS OF THE UNITED STATES

### 5.1 Delineation of Waters of the U.S.

#### 5.1.1 Methods

Waters of the U.S., including wetlands, were delineated by HDR biologists, T. Trimble and T. Ringenberg, on January 27, 2004. The delineation study area was limited to properties transected by Alternative D, as proposed in the Environmental Assessment (EA) with minor realignments at West Buffalo Creek. A delineation report including preliminary determination maps of waters of the U.S. was submitted to the USACE in December 2004 in conjunction with a PCN that was later put on hold due to project funding constraints and tolling evaluation. On November 12, 2008, HDR biologists R. Wilson and J. Wooten delineated an additional crossing of West Buffalo Creek (S-10) at County Road (CR) 904. The revised delineation report (**Appendix B**) includes data sheets and representative photographs of the project area. The delineation was conducted in accordance with the USACE Wetlands Delineation Manual (Environmental Laboratory, 1987). Jurisdictional Determination forms following the 2007 Rapanos Guidance are not being submitted since the original delineation was performed and submitted to the USACE prior to June 5, 2007.

#### 5.1.2 Summary of Delineation Findings

The delineation identified intermittent and ephemeral streams, on-channel impoundments, and emergent wetlands, as well as isolated stock ponds constructed in uplands and isolated wetlands. The project would cross five unnamed ephemeral streams and six intermittent streams, including West Buffalo Creek and tributaries to West Buffalo and Rock Creeks. The proposed ROW also includes one adjacent emergent wetland and one on-channel impoundment. Additional wetlands were delineated in the southern portion of the project area; however, potential impacts to these would be avoided by using the western relocation of the roadway alignment to minimize impacts to West Buffalo Creek and its floodplain (refined Alignment 4). Within the project area, there are approximately 6,034 LF of streams (2.07 acres) and 0.25 acre of emergent wetlands.

The streams in the project area are of low to moderate functional condition due to current and past land uses and impacts to riparian habitat. Most of the project area is currently, or was previously, used for grazing; however, residential development has resulted in impacts (e.g. erosion, downcutting, instability) to several of the stream channels more recently. Although stream channel conditions indicate soil disturbance associated with past overgrazing, several of the stream banks in the north portion of the project area exhibit signs of natural, successional revegetation and stabilization. Along the portions of West Buffalo Creek in the project area, the current landowner has allowed overgrazing of uplands and livestock access to the stream channel, which has resulted in significant erosion of the channel banks and sedimentation.

### 5.2 Unavoidable Impacts to Waters of the U.S. – Preferred Alternative

The unavoidable impacts to waters of the U.S. have been calculated using the detailed designs for the roadway facility. While **Table 2**, in Section 4.0, provides impact estimates for alternative alignments for the southern portion of the project, **Table 3**, in Section 5.2.2, and provides complete impact calculations for refined Alignment 4.

### **5.2.1 Temporary Impacts from Construction**

The construction of the roadway facility will require the installation of temporary crossings on several of the stream channels in the study area. Preliminary assessments indicate that temporary crossings will be needed on six intermittent streams (S-2, S-3, S-6, S-8, S-10, and S-11) (**Appendix C, Sheets 2-30**). Most of the delineated ephemeral channels originate within the proposed ROW and will be avoided during construction where practicable. Temporary crossings will be limited to the minimum width necessary for construction vehicles and will typically be constructed of corrugated metal pipe culverts with stabilized, clean rock and/or soil material. The culverts will be sized in order to pass anticipated normal high flows (1- to 2-year events). Following construction of the roadway facility the temporary crossing structures will be removed and the banks will be regraded to match pre-existing contours, stabilized, and revegetated using a rural mix as described in TxDOT document, Standards Specifications for Construction and Maintenance of Highways, Streets and Bridges (June 1, 2004), Section 164.2, for District 2, Fort Worth.

### **5.2.2 Permanent Impacts**

Based on the preferred Alignment (Alternative D, Alignment 4), the project would impact nine waters of the U.S within the ROW, which includes streams, an on-channel impoundment, and an adjacent wetland. The alignment would cross 11 streams. Five bridges will be constructed to span eight stream crossings and one on-channel impoundment, thereby minimizing permanent impacts. **Table 3** presents the waters of the U.S. within the project ROW. However, this PCN is required only for crossings S-2/W1, S-6 and S-10 (at SH121).

Table 3: Permanent Fill Impacts to Jurisdictional Waters SH 121 – FM 1187 to US 67									
No.	Description	Station	Ave. OHWM Width (ft)	Linear Feet in Proposed ROW	Acreage in ROW*	Structure /Impact Type	Fill Volume (cy)	Linear Impacts (LF)	Acreage Impacts*
Rock Creek Watershed									
S-1	Ephemeral	1180+35	2	282	0.01	Culvert / Fill	12.2	282	0.01
S-2	Intermittent	1208+50	5	465	0.05	Culvert / Fill	13.1	273	0.03 <sup>†</sup>
W-1	Emergent Wetland	1208+00	-	-	0.25	Fill	105.0	-	0.25 <sup>†</sup>
S-3	Intermittent	1219+60	5	518	0.06	Bridge / No Impact	0.0	0	0.00
S-4	Ephemeral	1220+75	2	238	0.01	Bridge / No Impact	0.0	0	0.00
S-5	Ephemeral	1291+00	3	412	0.01	Culvert / Fill	24.2	383	0.01
S-6	Intermittent	1310+00	8	1,001	0.40	Bridge / Re-alignment	311.0	507	0.18 <sup>†</sup>
S-7	Ephemeral	1311+00	3	116	0.01	Bridge / No Impact	0.0	0	0.00
S-8	Intermittent	1435+00	7	321	0.05	Bridge / Fill	1.2	0	0.00
S-9	Ephemeral	1434+50	3	143	0.01	Bridge / No Impact	0.0	0	0.00
P-1	Impoundmt	1437+50	-	-	0.70	Bridge / Fill	5.1	-	0.00
West Buffalo Creek Watershed									
S-10 at CR 904	Intermittent	1592+75	15	99	0.03	Culvert / Fill	190.2	66	0.01
S-10 at SH 121	Intermittent	1658+00	8	1,073	0.36	Re-alignment	279.1	332	0.09 <sup>†</sup>
		1663+00				Bridge / Re-alignment	96.7	115	0.03 <sup>†</sup>
		1670+00	14	759	0.33	Re-alignment	1,303.9	611	0.28 <sup>†</sup>
S-11	Intermittent	1733+00	4	607	0.04	Bridge / No Impact	0.0	0	0.00

\*Note: The OHWM information reported above are average stream widths. ROW acreage and acreage impact amounts were calculated using the delineated boundaries to obtain acreage amounts.

<sup>†</sup> Crossing S-2/W-1 will result in impacts to wetlands, while S-6 and S-10 exceed the 0.1 notification threshold for authorization under NWP 14.

### 5.2.3 Assessment of Impacted Areas

Approximately, 2,569 LF (0.64 acre) of streams and 0.25 acre of wetland waters of the U.S. will be unavoidably and permanently impacted by this proposed project. A Compensatory Mitigation Plan is proposed and is provided in **Appendix D** of this document. Specifically, project impacts at three crossing totaling 1,838 LF (0.61 acre) of intermittent streams and 0.25 acre of emergent wetland exceed the 0.1 acre threshold and will require notification for authorization under NWP 14. These waters of the U.S. would be affected by a combination of earthen fill and culverts. Minimization of these permanent impacts will be accomplished by the channel re-alignment of two intermittent streams carried out in conjunction with the construction of two bridges, specifically, an unnamed tributary to Rock Creek (Stream S-6) and along portions of West Buffalo Creek (Stream S-10) within the project area. The proposed channel re-alignment enhancements will improve stream channel function while reducing the total linear impacts from 1,838 LF. (**Appendix C, Sheets 11 and 23**).

#### Rock Creek Watershed

Culverts would be constructed for two ephemeral streams (S-1 and S-5), and one intermittent stream (S-2) in the Rock Creek watershed. The erosion protection would also minimize water quality impacts downstream of the proposed project (**Appendix C, Sheets 2 and 9**).

The project would impact 273 LF (0.03 acre) of the intermittent S-2 and an approximate 0.25 acre of emergent wetland (W-1) adjacent to the channel within the ROW. The sources of hydrology for W-1 include overbank flooding and seepage from the upland slope to the north of the wetland (**Appendix C, Sheet 4**). Additionally, Stream S-6 will require minor re-alignment, contouring, and stabilization to construct the proposed bridge. The impacts for S-6 would include approximately 507 LF (0.18 acre) of permanent fill (**Appendix C, Sheet 11**).

Two waters of the U.S. (S-8 and P-1) would have minor impacts (1.2 and 5.1 cubic yards, respectively) associated with bridge construction. These impacts would be associated with the placement of bridge columns in the water of the U.S. The columns will be driven piles or concrete poured in tightly sealed forms depending on geotechnical conditions (**Appendix C, Sheet 17**).

#### West Buffalo Creek Watershed

Three stream segments along West Buffalo Creek (S-10) must be relocated to construct the roadway. One of these segments (Station 1663) will require some minor realignment to accommodate the bridge columns. The impact for this point will be 115 LF (0.03 acre). The re-alignment of S-10 at Station 1658+00 will impact 332 LF (0.09 acre) while the proposed channel re-alignment at Station 1670+00 will result in 611 LF (0.28 acre) of permanent impact (**Appendix C, Sheet 22**).

One stream segment of West Buffalo Creek (S-10) will be impacted by the required widening of CR 904, a previously existing roadway. Six new culverts, measuring 7-feet by 3-feet and 66-feet in length will replace the existing 8-foot diameter by 43 feet in length. This crossing is located adjacent to SH 121 at Station 1592+75 (**Appendix C, Sheet 20**). This crossing of S-10 by CR 904 is not within the SH 121 ROW and is separate and distant from the SH 121 crossings of S-10; therefore, the impacts to S-10 by CR 904 and SH 121 are considered two single and complete crossings.

### 5.3 Impact Assessment for Other Resources

The following section provides an overview other resources of concern to be addressed during Section 404 permit coordination.

#### 5.3.1 Threatened and Endangered Species

Federally protected species listed by the U.S. Fish and Wildlife Service as Threatened, Endangered or Candidate for Tarrant and Johnson Counties are presented in Table 4.

<b>Common Name</b>	<b>Scientific Name</b>	<b>Federal Status</b>	<b>Suitable Habitat in Project Area</b>
Black-capped Vireo	<i>Vireo atricapilla</i>	Endangered	No
Golden-cheeked Warbler	<i>Dendroica chrysoparia</i>	Endangered	No
Interior Least Tern	<i>Sterna antillarum athalassos</i>	Endangered	No
Whooping Crane	<i>Grus americana</i>	Endangered	No
Sharpnose shiner	<i>Notropis oxyrhynchus</i>	Candidate	No
Smalley shiner	<i>Notropis buccula</i>	Candidate	No
Gray Wolf	<i>Canis lupus</i>	Endangered	No
Red Wolf	<i>Canis rufus</i>	Endangered	No

Source: TPWD Updated August 8, 2007

As documented in the EA, no suitable habitat for these species occurs within the general vicinity of the project. In addition, field surveys of the project area confirmed no suitable habitat for these species occurs in the project area. The project would have no effect on the gray or red wolf, its habitat, or designated habitat. The project area does not provide nesting or foraging habitat for black-capped vireo, interior least tern, or golden-cheeked warbler. There is a low potential for migratory occurrence for whooping crane at Lake George Marti; however, there are no documented occurrences or designated critical habitat along the reservoir. In addition, the project will not impact the reservoir. Therefore, it was determined the project is not likely to adversely affect these protected species. In a May 24, 2002, letter, Mr. Ray Telfair, II, of the Texas Parks and Wildlife Department, provided a “No Comment” response to the EA.

#### 5.3.2 Cultural Resources

In May 2002, Geo-Marine, Inc. conducted an archaeological impact evaluation of the preferred alternative (Alternative D in the EA). No archaeological materials and no settings with reasonable potential to contain archaeological or historic properties were determined to be present. No further archaeological work was recommended. The Texas Historical Commission (THC) concurred with this recommendation in a letter dated May 30, 2002, which was documented with the EA in November 2003.

The Area of Potential Effect (APE), as designated by the TxDOT Environmental Department (TxDOT-ENV) guidelines for historic building reconnaissance and documentation, consists of 0.25 mile on either side of a new location ROW. The THC has concurred with TxDOT’s determination that no properties within the APE for the preferred corridor area are eligible for listing in the National Register of Historic Places.

The project is not anticipated to impact cultural resources; however, if any pre-historic or historic resources are encountered during project construction, TxDOT's Cultural Resource Specialist, and the State Historic Preservation Office (Texas Historical Commission) will be notified and an impact assessment will be completed.

## **6.0 MITIGATION**

Much of the project area was previously or is currently, used for livestock grazing which has heavily impacted the area. In addition, residential development has begun to further affect the area resulting in erosion, downcutting, and instability to several of the stream channels. TxDOT and the project engineers have incorporated design measures to avoid and minimize impacts to water resources. A Proposed Compensatory Mitigation Plan (**Appendix D**) was prepared to describe unavoidable impacts, functional assessment of impacts and enhancement measures, and the proposed purchase of 8.2 mitigation credits from an approved mitigation bank. A summary of the proposed mitigation plan is provided in the sections below.

### **6.1 Avoidance**

The Applicant's alignment for the preferred alternative (Alternative D), as defined in the EA, was revised during the design phase of the project to avoid impacts to several streams in the project area. The refinement of Alternative D includes the addition of bridges and the shift as shown in Alignment 4 to avoid impacts to approximately 3,465 LF of stream channels within the proposed ROW. This number is the difference between the total stream linear footage within the ROW (6,034 LF) and the stream linear footage that will be permanently impacted (2,569 LF). A high percentage of the avoided impacts would have resulted from the West Buffalo Creek crossing. Specifically, Alignment 1 (Alternative D) would have impacted approximately 3,500 LF of West Buffalo Creek, while the Alignment 4 would impact only 1,058 LF of West Buffalo Creek.

### **6.2 Minimization**

The Applicant will use several strategies to minimize impacts along the preferred alignment. Bridges will be used for stream crossings where practical to minimize direct and indirect (e.g., changes in hydrologic characteristics) impacts to waters. Based on the final design, there will be five bridges used to minimize impacts to eight waters of the U.S. stream crossings.

#### *Protection Measures*

With regard to water quality, the Applicant will design and implement best management practices (BMPs) to control erosion during construction and post-construction activities and reduce the total suspended solids (TSS) and sedimentation in accordance with the Texas Commission on Environmental Quality (TCEQ) guidelines for 401 Water Quality Certification. Following the determination by the USACE related to the permitting process, the Applicant will coordinate with the TCEQ for authorization under Tier I certification procedures. Additionally, the Applicant will prepare a Stormwater Pollution Prevention Plan (SWPPP) and a Notice of Intent (NOI) in accordance with the Texas Pollutant Discharge Elimination System (TPDES) requirements for a General Construction Permit (GCP) (TXR150000).

Design and construction management, including hydrologic control, stormwater, erosion and sediment control will follow measures as designated by the Compensatory Mitigation Plan which provides details that address avoidance and minimization of construction impacts to water

quality (**Appendix D**) Specifics on revegetation and maintenance in impacted areas are also detailed in the Mitigation Plan.

### **6.3 Compensation**

The Applicant and their agent believe that incorporating on-site mitigation into this project area will present ongoing difficulties due to adjacent land uses and further believe that the best course of action would be to purchase mitigation credits from an approved mitigation bank. USACE supports purchase of mitigation credits from an approved Mitigation Bank for the purpose of meeting compensatory mitigation requirements as part of the 404 permitting process. This action is consistent with the 2008 USACE General Compensatory Mitigation Requirements 33CFR 332.3 and 40 CFR 230.93.

### **6.4 Criteria for Minimum Mitigation Plan Success**

The Applicant proposes to purchase 8.2 credits from the Trinity River Mitigation Bank, the approved mitigation bank within the project site's service area. The breakdown and calculations for the number of credits required and the functional assessment for the project are provided in the Compensatory Mitigation Plan, (**Appendix D**). The Applicant will provide the USACE with appropriate documentation of the purchase of credits.

### **6.5 Conclusions**

The Applicant's refined Alignment 4 is the least environmentally damaging practicable alternative that meets the purpose and need for the project. The Applicant requests verification of the proposed crossings of waters of the U.S. in the Rock Creek watershed (S-2 and W1, S-6), and West Buffalo Creek watershed (S-10 at SH 121) as three single and complete projects by the USACE for authorization under NWP 14 (Linear Transportation Crossings), as the project will result in minimal impacts to the aquatic environment that will be compensated for through the proposed conceptual mitigation plan.

## 7.0 REFERENCES

- Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1*, Department of the Army, Waterways Experiment Station. 100 p.
- U.S. Army Corps of Engineers. 2008. General Compensatory Mitigation Requirements 33CFR 332.3 and 40 CFR 230.93
- U.S. Army Corps of Engineers. 2002. Regulatory Guidance Letter 02-02. Washington, D.C.
- Texas Parks and Wildlife Department. 2007. *Annotated County Lists of Rare Species for Tarrant County and Johnson County*. Last updated August 8, 2007.
- Texas Department of Transportation, 2003. *Environmental Assessment: State Highway 121 South From FM 1187 to US 67 in Johnson County, Texas, Tarrant County, Texas*. U.S. Department of Transportation, Federal Highway Administration and Texas Department of Transportation. November 2003.



**Appendix A:**  
**Finding of No Significant Impact and Environmental Assessment**  
**Alternative Figures**  
**Agency Correspondence**



# Texas Department of Transportation

DEWITT C. GREER STATE HIGHWAY BLDG. • 125 E. 11TH STREET • AUSTIN, TEXAS 78701-2483 • (512) 463-8585

May 24, 2004

NH ( )  
Environmental Assessment  
Johnson and Tarrant Counties  
CSJ 0504-04-001; 0504-05-001

SH 121: From FM 1187 to US 67

Ms. Denise Francis  
State Single Point of Contact  
Governor's Office of Budget and Planning  
P.O. Box 12428  
Austin, Texas 78711

Post-It® Fax Note	7671	Date	6-27-04	# of pages	2
To	James Thomas	From	Robert Hall		
Co./Dept.		Co.	TxDOT		
Phone #	972-960-4400	Phone #	817-370-6755		
Fax #	972-960-4471	Fax #			

Dear Ms. Francis:

A finding of no significant impact has been issued for the subject project. It has been determined that this project will not significantly affect the quality of the human environment.

Sincerely,

Ann M. Irwin  
TRACS Coordinator

MMS: pat  
Attachment  
bcc: Fort Worth District  
FS-A ERG  
Reference: ENV 850

NOTE TO DISTRICT: Attached is one copy of the Finding of No Significant Impact (FONSI) signed by the FHWA. This completes the public hearing requirement. As indicated in the Environmental Manual, the news media should be notified by press release that approval has been received. Also, please notify the State intergovernmental review contact of the availability of the FONSI. Please note, coordination with the USACE for Individual and Nationwide Permits is required. Final environmental clearance will be granted once the permits are received. These permits must be received prior to the Letter of Authority date.

FEDERAL HIGHWAY ADMINISTRATION  
FINDING OF NO SIGNIFICANT IMPACT

FOR

NH( )  
Environmental Assessment  
Johnson and Tarrant Counties  
CSJ 0504-04-001; 0504-05-001

SH 121 South: From FM 1187 to US 67

The FHWA has determined that this project will not have any significant impact on the human environment. This finding of no significant impact is based on the attached environmental assessment which has been independently evaluated by the FHWA and determined to adequately and accurately discuss the environmental issues and impacts of the proposed project. It provides sufficient evidence and analysis for determining that an environmental impact statement is not required.

5/20/04  
DATE

Salma L. Deegan  
FEDERAL HIGHWAY ADMINISTRATION



LAKE  
BENBROOK

FM 1187

SH 121

McPHERSON (Proposed)

FM 731

FM 1187

IH 35W

BLUE  
ALTERNATIVE

BURLESON

RED  
ALTERNATIVE

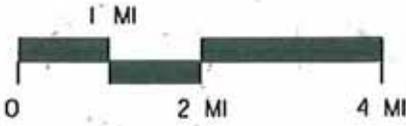
GREEN  
ALTERNATIVE

SH 174

FM 1902

FM 917

YELLOW  
ALTERNATIVE



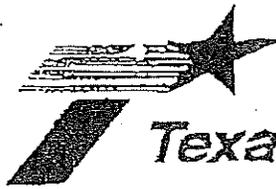
ALTERNATIVE ALIGNMENTS  
FOR "SOUTH SECTION"  
OCTOBER 1989

SH 121 SOUTH  
FROM: FM 1187 TO: US 67



EXHIBIT C





# Texas Department of Transportation

DEWITT C. GREER STATE HIGHWAY BLDG. • 125 E. 11TH STREET • AUSTIN, TEXAS 78701-2483 • (512) 462-8585

June 6, 2002

Section 106 Consultation  
Tarrant County, Fort Worth District  
C/SJ 0504-02-008 SH 121 T  
Re: Proposed Alternative Shift - Alternative "C"

RECEIVED

JUN 17 2002

Dr. James E. Bruseth  
Division of Archeology  
Texas Historical Commission  
P.O. Box 12276  
Austin, Texas 78711

CONCURRENCE

TEXAS HISTORICAL COMMISSION

by [Signature]  
for F. Lawrence  
State Historical Preservation Officer

Date 6-17-02

Dear Dr. Bruseth:

The proposed road widening project would be undertaken with federal funds. In accord with the Programmatic Agreement (PA) among the Advisory Council on Historic Preservation, the Federal Highway Administration, the Texas Historical Commission (THC), and TxDOT, and the Memorandum of Understanding (MOU) between TxDOT and THC, we hereby continue consultation under Section 106 of the National Historic Preservation Act and the Antiquities Code of Texas.

The proposed project would construct a segment of State Highway 121 between IH 20 in Fort Worth and FM 1187 and is part of a larger project that would eventually extend to US 67 in Cleburne, Johnson County. This segment of SH 121 is located entirely within Tarrant county and has been designated SH 121 T. Recently an alignment shift has been proposed at the southern end of SH 121 T near Cleburne Crowley Road, where this segment joins the next segment of SH 121, designated SH 121 South. The proposed alignment shift would utilize Alternative "C" on the attached maps. Several archeological studies have already been conducted in association with this project.

In 1994, TxDOT conducted an archeological survey of almost the entire proposed SH 121 T and SH 121 South alignments. The survey extended from 0.8 miles north of IH 820 in Fort Worth, Tarrant County to US 67 in Cleburne, Johnson County. The survey included shovel testing of a segment, designated Alternative "A" and "B" on the attached maps, that is located approximately 1,500 ft east of the proposed alignment shift, designated Alternative "C" on the attached maps. Despite shovel testing, no archeological sites were identified within the project area. One site, 41TR137, a surface lithic scatter, was observed 30m east of the project area. Please note that site 41TR137 is located over 1.5 miles northeast of the proposed alignment shift. Furthermore, the site is located east of the area surveyed in 1994 (designated as Alternative "A" and "B" on the attached maps) and Alignment "C", the proposed alignment shift, is located west of the area surveyed in 1994.

June 6, 2002

In 1999, Hicks and Company conducted an archeological survey of the northern portion of SH 121 T, where the proposed alignment crosses the West Fork of the Trinity River. One prehistoric archeological site, 41TR170, was identified during the survey. On March 28, 2000 TxDOT recommended that site 41TR170 be tested and that no further work was required within the remainder of the SH 121 T project area. On April 24, 2000, your office concurred. Right of entry to the site was denied by the property owner and currently testing is on hold pending ROW acquisition. This area is over 6 miles north of the proposed alignment shift designated Alternative "C" and is located in an entirely different environmental setting.

In May of 2002 Geo-Marine, Inc. performed an impact evaluation of the segment of SH 121, located south of SH 121 T. This segment has been designated SH 121 South (CSJ: 2118-02-008). The impact evaluation covered the entire length of the proposed SH 121 South project and extended from the southern terminus of the SH 121 T project (600 ft northeast of Cleburne Crowley Road) to US 67. No archeological sites and no settings with reasonable potential to contain archeological historic properties or SAL's were observed. The impact evaluation report dated May 22, 2002 noted that the entire project area is located in an upland setting and that because the upland setting lacks a permanent water source, archeological sites are unlikely to occur within the project area. Furthermore, the report concluded that the soils within the project area are too shallow to be conducive to retaining archeological deposits.

The proposed SH 121 T alignment shift would be located in a setting very similar to that described in the Geo-Marine impact evaluation report. Alternative "C" is located in an upland setting with no permanent source of water. The Geologic Atlas of Texas, Dallas Sheet (Bureau of Economic Geology: 1972) indicates that Alternative "C" is located in an area mapped as Lower Cretaceous Pawpaw Formation, Lower Cretaceous Weno Limestone, and Lower Cretaceous Grayson Marl and Main Street Limestone undivided. There are no alluvial settings mapped within Alignment "C". According to the Soil survey of Tarrant County [Map Sheets 54 and 61] Alternative "C" crosses shallow upland soils. Furthermore, these shallow soils have been previously disturbed by agricultural activities. These soils are considered too shallow and too disturbed to be conducive to retaining archeological deposits.

A check of the Texas Archeological Sites Atlas revealed no recorded archeological sites within or adjacent to Alternative "C". Because Alternative "C" is located in an area of ancient geologic deposits in an upland setting that is devoid of a permanent water source and consists of previously disturbed shallow soils it is concluded that the area does not include settings with reasonable potential to contain archeological historic properties or SAL's. Recent archeological work in the vicinity of the proposed alignment shift, described above, supports this conclusion.

We request your concurrence that the proposed alignment shift labeled Alternative "C" does not contain settings with reasonable potential to contain archeological Historic Properties (36 CFR 800.16.(1)) or SAL's (13 TAC §26.12) and that no further archeological work is required within the limits of Alternative "C". In the unlikely event that archeological materials are discovered during construction, work in the area of discovery will cease and accidental discovery procedures will be implemented in accordance with the provisions of the Programmatic Agreement (PA) between TxDOT and the THC.

Dr. James E. Bruseth

-3-

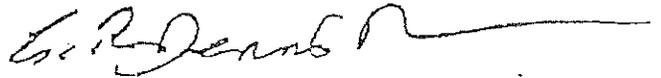
June 6, 2002

If you have any questions or need more information, please contact Mike Jordan at 512/416-2635.

Sincerely,

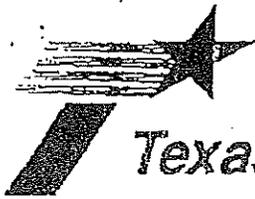


Michael Jordan, Staff Archeologist  
Archeological Studies Program  
Environmental Affairs Division



G. R. Dennis Price  
Environmental Specialist  
Environmental Affairs Division

Attachments



# Texas Department of Transportation

DEWITT C. GREER STATE HIGHWAY BLDG. • 125 E. 11TH STREET • AUSTIN, TEXAS 78701-2483 • (512) 463-3595

*cc: CRM*

RECEIVED  
JUN 04 2002

21 May 2002

SECTION 106: Determination of NRHP Eligibility  
Johnson County, FTW  
CSJ 2118-01-008

MAY 22 2002

SH 121 from FM 1187 to US 67

Bob Brinkman  
History Programs Division  
Texas Historical Commission  
Austin, Texas 78711

RECEIVED

MAY 22 2002

TEXAS HISTORICAL COMMISSION

Dear Mr. Brinkman:

In accordance with the provisions of our Statewide Programmatic Agreement for Cultural Resources, we are initiating coordination with your agency regarding National Register eligibility of one property located within the project's area of potential effect (APE). This federally funded project will widen an existing transportation facility and extend its alignment in northern Johnson County. The project would acquire additional right-of-way. A map and photos are included.

Organized in 1867, Johnson County sustained a largely agricultural economy throughout the subsequent decades. Completion of the Gulf, Colorado and Santa Fe line through the county in 1881 spurred the value of agricultural production to \$1,554,960 by 1890. Cotton production led this increase, with 18,826 bales ginned in the county in that year. Nearly half of the approximately 3,000 farms in the county were involved in sharecropping cotton by the turn of the century. The county's population remained nearly 80% rural throughout this period, reaching a peak of 37,286 in 1920. Declining agricultural revenues and the effects of the Great Depression prompted a steady decline in subsequent decades.

As detailed below, field survey efforts identified only one pre-1955 property within the APE, which ranged from 500' to 1300' based on project parameters. Severe alterations and the loss of its historically associated outbuildings preclude eligibility for this modest architectural resource, however. Despite its probable role in the region's agrarian economy, this property is therefore *not eligible* for listing in the National Register of Historic Places.

ID #	LOCATION	PROPERTY TYPE	SUBTYPE	STYLISTIC INFLUENCE	DATE	INTEGRITY ISSUES	NR ELIG.
1	FM 917, west of FM 1902	Domestic	ctr. hall plan farmhouse	NA	c.1890	porch infill, additions, fenestration changes	No

SH 121 from FM 1187 to US 67, 21 May 2002, page two

We request your written concurrence with this determination of eligibility within 30 days of receiving this letter. If you have any questions or comments concerning this project, please contact me at 416-2657.

Sincerely,

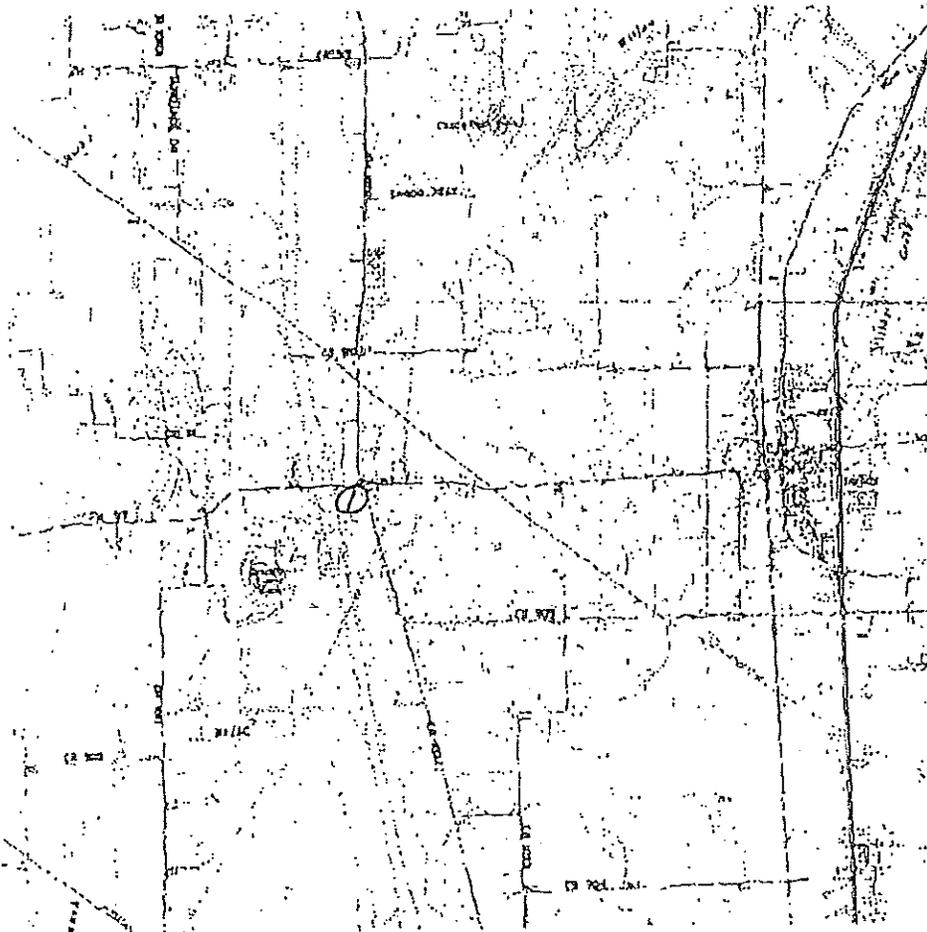


Bruce Jensen  
Architectural Historian  
Environmental Affairs Division

attachments

NOT ELIGIBLE  
for listing in the  
National Register of Historic Places  
PROJECT MAY PROCEED  
by Rth. Bl  
for F. Lawrence Oaks  
State Historic Preservation Officer  
Date 30 MAY 2002

SITE LOCATION MAP



Page: 1 of 1

ETS

**ARCHEOLOGICAL COORDINATION**  
**Impact Evaluations, No Further Work Recommended**

(Section 106 and ANTIQUITIES CODE OF TEXAS)

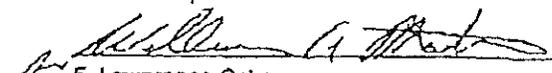
JUN 03 2002

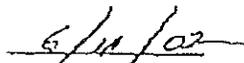
Date: 05/31/2002

TEXAS HISTORICAL COMMISSION

COUNTY	DISTRICT	PROJECT	CSJ	*F30/T20 Concur, no further work	*F10/T10 Unable to Concur
El Paso	El Paso	Loop 375	2552-01-021	✓	
Hansford	Amarillo	F.M. 520	1621-01-013	✓	
Hardeman	Childress	FM 1166	1312-01-013	✓	
Johnson	Fort Worth	SH 121	2118-01-008	✓	
Wise	Fort Worth	FM 2123	1606-02-012	✓	

Number of Projects: 5

  
F. Lawrence Oaks  
State Historic Preservation Officer and Executive Director

  
Date

07/12/2002 09:19 FAX 210 499 5167

LAN SAN ANTONIO  
TxDOT TP D

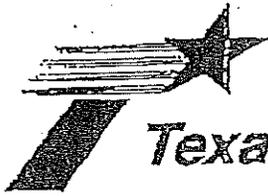
LAN DALLAS

004

004

002

07/11/02 18:21 817 370 8759  
07/11/2002 11:08 FAX



# Texas Department of Transportation

DEWITT C. GREER STATE HIGHWAY BLDG. • 125 E. 11TH STREET • AUSTIN, TEXAS 78701-2483 • (512) 463-3585

May 24, 2002

received  
May 24, 2002

NH ( )  
Environmental Assessment Coordination  
Johnson and Tarrant Counties  
CSJ 2118-01-008; 2118-02-008

PROJECT  
JUN 05 2002  
MANAGEMENT

SH 121 South: From FM 1187 to US 67

Dr. Ray C. Telfair  
Texas Parks and Wildlife Department  
Wildlife Division  
Wildlife Habitat Assessment Program  
11942 FM 848  
Tyler, Texas 75707-9657

Dear Dr. Telfair:

Consistent with the Memorandum of Understanding signed by our two agencies, attached is a copy of the environmental assessment covering the subject project for your review and comment. Any comments you may have on this document will assist the Department in ensuring that the Department's projects are sensitive to the natural resources of the state.

Please submit any comments you may have within 45 days from the date of this letter. If you do not have any comments on the document, please sign and date the bottom of this letter and return a copy to the Environmental Affairs Division. If no response is received after the 45 days have expired, we will proceed with project development. If you have any questions regarding this project, please contact Mr. William Hood at (512) 416-2623.

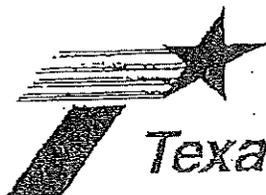
Sincerely,

Michelle Skinner  
Project Management  
Environmental Affairs Division

Attachment

NO COMMENT: Ray C. Telfair  
Wildlife Habitat Assessment Program

DATE: May 31, 2002



# Texas Department of Transportation

DEWITT C. GREER STATE HIGHWAY BLDG. • 125 E. 11TH STREET • AUSTIN, TEXAS 78701-2183 • (512) 463-8585

May 24, 2002

DIST 02 FT. WORTH  
TXDOT MAILROOM

MAY 30 2002

NH ( )

Environmental Assessment Coordination  
Johnson and Tarrant Counties  
CSJ 2118-01-008; 2118-02-008

SH 121 South: From FM 1187 to US 67

Ms. Celeste Brancel-Brown  
Texas Parks and Wildlife Department  
Endangered Resources Branch  
3000 S. L.H. 35, Suite 100  
Austin, Texas 78704

Dear Ms. Brown:

Consistent with the Memorandum of Understanding signed by our two agencies; attached is a copy of the environmental assessment covering the subject project for your review and comment. Any comments you may have on this document will assist the Department in ensuring that the Department's projects are sensitive to the natural resources of the state.

Please submit any comments you may have within 45 days from the date of this letter. If you do not have any comments on the document, please sign and date the bottom of this letter and return a copy to the Environmental Affairs Division. If no response is received after the 45 days have expired, we will proceed with project development. If you have any questions regarding this project please contact Mr. William Hood at 512-416-2623.

Sincerely,

Michelle Skinner  
Project Management  
Environmental Affairs Division

Attachment

NO COMMENT:

Texas Biological and Conservation Data System

DATE: \_\_\_\_\_

MMS:M

bcc: Fort Worth District  
ERG

Reference: ENV 850



United States  
Department of  
Agriculture

Natural  
Resources  
Conservation  
Service

101 South Main  
Temple, Texas  
78501-7802

DEPT OF TRANSPORTATION  
TXDOT MAILROOM

JUN 10 2002

Subject: LNU-Farmland Protection-  
SH 121 Highway Proposcd  
Johnson County, Texas

June 7, 2002

Texas Department of Transportation  
P.O. Box 6868  
Fort Worth, Texas  
76115-0686

Attention: Robert Hall, Environmental Coordinator

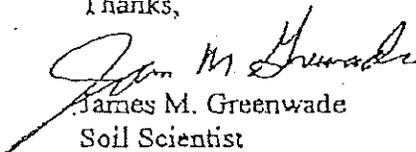
We have reviewed the information provided concerning proposed S. H. 121 in Johnson County, Texas. This is part of an Environmental Evaluation for the above-referenced highway being prepared for the TxDOT and FHWA. We have evaluated the soils for this project as required by the Farmland Protection Policy Act (FPPA).

The proposed project does contain Prime and Statewide Important Farmland soils as defined by the FPPA. Several map units identified in the Soil Survey of Johnson County are classified as Prime Farmland and Statewide Important Farmland. Approximately 431.4 acres of land will be acquired of which about 298.4 acres is classified as Important Farmland by the FPPA. These soils had a composite score of 74 and the Total Points on Part VII of the AD-1006 is 142. This site will require no additional consideration since the rating score is less then 160. The FPPA states, "Sites receiving a total score of less than 160 need not be given further consideration for protection and no additional sites need to be evaluated", 7CFR Part 658.4 (c) 2.

Attached is the completed AD-1006 (Farmland Conversion Impact Rating) form for this project indicating the exemption status of this proposed project.

Thanks for the quality resource materials you submitted to evaluate this project. If you have any questions please call James Greenwade at (254)-742-9960 or Sam Brown at (254)-742-9854, Fax (254)-742-9859.

Thanks,

  
James M. Greenwade  
Soil Scientist  
Soil Survey Section  
USDA-NRCS, Temple, Texas

**Appendix B: Revised Determination and Delineation of Waters of  
the U.S., Including Wetlands**

**REVISED DETERMINATION AND  
DELINEATION REPORT FOR  
WATERS OF THE U.S.,  
INCLUDING WETLANDS**



**State Highway 121**

**From Farm-to-Market 1187 to  
U.S. Highway 67**

**TXDOT CSJ: 0504-04-001  
0504-05-001**

**Tarrant and Johnson  
Counties, Texas**

**Original Submittal:  
December 2004**

**Revised Submittal:  
December 2008**

## 1.0 INTRODUCTION

Texas Department of Transportation, Fort Worth District (Applicant) is submitting this Revised Determination and Delineation Report for Waters of the U.S., including wetlands, for the proposed extension of State Highway (SH) 121 to amend the original submitted December 2004. The proposed project is a 14-mile roadway in a new location, which would extend SH 121 from Farm-to-Market (FM) 1187 to U.S. Highway (US) 67. The project will consist of a four-line divided highway. A preferred alternative for the project was chosen and approved during the EA process; however, the EA provided a broad-scale evaluation. This document provides a more detailed evaluation of refined alternative alignments for the selected alternative and an assessment of impacts to jurisdictional waters of the U.S. with regard to the preferred alternative. The revisions to this document provide details of an additional crossing of West Buffalo Creek (S-10) by County Road (CR) 904. This crossing occurs outside the Right-of Way (ROW) of the proposed selected alignment (Alternative D) for SH 121, but within the limits of proposed road modification for CR 904 adjacent to SH 121 (**Sheet 10 of 10, Attachment B**).

### 1.1 Applicant

Judy Anderson, P.E.  
District Engineer  
Texas Department of Transportation  
Fort Worth District  
P.O. Box 6868  
Fort Worth, Texas 76115-0868

### 1.2 Project Location

The project area is located in Johnson and southern Tarrant Counties, south of Fort Worth, Texas, within the Rock Creek and West Buffalo Creek Watersheds. The northern project terminus (LAT - 32° 33' 59.44"; LON - 97° 26' 00.01") is located approximately 4 miles west of the City of Crowley, Texas. The southern project terminus (LAT - 32° 23' 18.85"; LON - 97° 25' 03.60") is located at the proposed intersection with SH 67 approximately 0.5 mile south of the SH 171 intersection and a Burlington Northern and Santa Fe Railroad mainline, just northwest of Cleburne, Texas. (**Attachment A, Figure 1**).

### 1.3 Project Description

The proposed SH 121 project from FM 1187 to US 67 is a 14-mile roadway on new location that will consist of a four-lane divided typical section. Intermediate access points will be located at FM 1187, CR 920, FM 1902, CR 913, FM 917, CR 904, Sparks Road, and CR 1125.

A previously planned interim facility of a two-lane open roadway concept as a step to the planned full toll road facility will no longer be used. An Environmental Assessment

(EA) Re-evaluation of this project is being prepared due to a change in project approach and including minor alignment modifications. The EA Re-evaluation and associated public hearing will address moving directly to the four lane toll road facility Updates for any associated direct and indirect effects information will be included in the re-evaluation expected to be approved in early 2009.

This report provides the results of a determination and delineation of waters of the U.S., including wetlands, for the proposed project area. For this evaluation, the project area is defined by the ultimate project right-of-way (ROW). Supporting information is provided in the following attachments:

- **Attachment A:** Delineation Maps
- **Attachment B:** Stream and Wetland Data Forms
- **Attachment C:** Site Photographs

## 2.0 PROJECT AREA DESCRIPTION

### 2.1 Soils

As mapped in the Johnson County and Tarrant County soil surveys (USDA, 1985 and 1981, respectively), the project area is composed of many different soil series. Although most of the proposed roadway would intersect upland soils, additional soils located at the crossings of streams and floodplains include the following:

- Aledo-Bolar complex, 2 to 8 percent slopes
- Frio silty clay, occasionally flooded
- Gowen clay loam, frequently flooded
- Pursley clay loam, frequently flooded
- Sanger clay, 1 to 3 percent slopes
- Slidell clay, 1 to 3 percent slopes
- Wilson silty clay loam, 0 to 1 percent slopes

The Aledo-Bolar complex (*Lithic Haplustolls and Typis Calciustolls*) consists of shallow to moderately deep, well drained, moderately permeable soils. The complex is composed of 60 percent Aledo soil, 20 percent Bolar soil, and 20 percent rock outcrops. The soils in this complex are predominantly used as rangeland.

The Frio series (*Cumulic Haplustolls*) consists of deep, well drained, clayey soils on floodplains of major streams. This soil series is flooded once every three to five years for brief periods, usually between May and October. This soil series is predominantly used as cropland and rangeland.

The Gowen series (*Cumulic Haplustolls*) consists of deep, well drained, loamy soils on floodplains of small streams. This soil series is flooded once every three to five years for brief periods, usually from March to May. This soil series is well suited to pasture, both native and improved.

The Pursley series (*Fluventic Hapustolls*) consists of deep, well drained, loamy soils on floodplains. Typically, this soil series is flooded briefly each year. This soil series is well suited to pasture, both native and improved.

The Sanger series (*Udic Chromusterts*) consists of deep, well drained, gently sloping, clayey soils on uplands. In undisturbed areas, the surface is characterized by microrelief that consists of ridges and swales. This soil series is mainly used for cropland but is well suited for pasture and rangeland.

The Slidell series (*Udic Pellusterts*) consists of deep, well drained, clayey soils on uplands. Water erosion is a slight hazard, and soil blowing is a severe hazard for Slidell soils. This soil series is used equally as pastureland and cropland.

The Wilson series (*Vertic Ochraqualfs*) consists of deep, somewhat poorly drained, loamy soils on uplands or low terraces. Water erosion and soil blowing are slight hazards for Wilson soils. This soil series is used primarily as cropland.

## **2.2 Plant Community and Ecoregion of Project Area**

The project area lies within the Cross Timbers and Prairies (Area 5) Ecoregion of Texas (Hatch, et al., 1990). This area is located in the north central portion of Texas. This ecoregion includes the Cross Timbers, Grand Prairie, and North Central Prairies land resource areas.

The Cross Timbers and Prairies are primarily upland areas with riparian bottomland areas. The Cross Timbers and Prairies communities consist primarily of big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), indiagrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), Canada wildrye (*Elymus canadensis*), sideoats grama (*Bouteloua curtipendula*), blue grama (*Bouteloua gracilis*), Texas wintergrass (*Stipa leucotricha*), hairy grama (*Bouteloua hirsuta*), and buffalograss (*Buchloe dactyloides*).

Past mismanagement and cultivation have resulted in uplands being invaded by oaks (*Quercus* spp.), mesquite (*Prosopis glandulosa*), and juniper (*Juniperus* sp.) with mid- and shortgrass understories. The bottomland trees are primarily hardwoods such as pecan (*Carya illinoensis*), oaks, and elms (*Ulmus* spp.). Currently, approximately 75 percent of the Cross Timbers and Prairies vegetation area is used as range and pasture.

## **3.0 WATERS OF THE U.S. DETERMINATION AND DELINEATION**

### **3.1 Methodology**

The Soil Surveys for Johnson and Tarrant Counties (USDA, 1985 and 1981, respectively), USGS topographic maps of the project area (Joshua and Primrose

Quadrangles), 1-meter Digital Ortho Quarter Quadrangles (DOQQs) (1995), and 1-foot DOQQs (2004) were used to identify potential waters of the U.S. and areas prone to wetland development. Waters of the U.S., including wetlands were delineated by HDR biologists, T. Trimble and T. Ringenberg, on January 26-28, 2004. On November 12, 2008, HDR biologists R. Wilson and J. Wooten delineated an additional crossing of West Buffalo Creek (S-10) at County Road (CR) 904. This crossing occurs outside the ROW of the proposed selected alignment (Alternative D) for SH 121, but crosses within the construction limits of proposed road modification for CR 904 adjacent to SH 121. These delineations were conducted in accordance with the USACE Wetlands Delineation Manual (Environmental Laboratory 1987).

Based on a review of mapping for the project area, areas potentially containing creeks, streams, ponds, on-channel impoundments (waters) and wetlands were evaluated using routine on-site delineation methods. The boundaries of the jurisdictional waters of the U.S. (waters and wetlands) were mapped using a Trimble® XT handheld Global Positional System (GPS) unit with sub-meter accuracy, and flagged. No GPS points were taken with a Position Dilution of Precision (PDOP) greater than 6.0. The delineation data were overlaid onto the 1-foot DOQQ (2004) using ArcGIS® version 9.

### **3.2 Waters**

Potential jurisdictional boundaries were delineated at the ordinary high water mark (OHWM). The OHWM is the line on the shore/bank established by flowing and/or standing water. The OHWM is typically marked by characteristics including a clear, natural line impressed on the bank, erosion shelving, changes in the character of soil, destruction of terrestrial vegetation, presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area.

### **3.3 Wetlands**

Wetlands were delineated based on the presence of hydrophytic vegetation, hydrology, and hydric soils. Boundaries for the wetlands were delineated where one of the three criteria was no longer present. Routine On-Site Wetland Delineation Data Forms were completed for each wetland.

## **4.0 WATERS OF THE U.S. DETERMINATION RESULTS**

This section details the waters and wetland delineated within the project area. In total, eleven streams (six intermittent and five ephemeral), one on-channel impoundment, and one emergent wetland were delineated within the project area.

### **4.1 Waters**

The limits of the waters were delineated in the field. A total of 6,034 linear feet (LF) (1.37 acres) of stream channels, a 0.70 acre on-channel impoundment and 0.25 acre emergent wetland were delineated in the proposed ROW. Table 1 provides detailed

information for each of the waters in the project area. There are 4,843 LF (1.32 acres) of intermittent streams and 1,191 LF (0.05 acres) of ephemeral streams in the project area. The figures in Attachment A show the boundaries of the delineated areas within the proposed project ROW.

The on-channel impoundment (P-1) occurs on Stream S-7 (Attachment A, Map 5). Although recent grading activities have made identification of a stream channel difficult, the pond was delineated as an impoundment based on historic aerial photography (1942, 1958, 1973, and 1984). The historic photography shows a jurisdictional channel both upstream and downstream of the pond within the project area. The pond was originally constructed on-channel; however, due to past disturbances associated with the construction activities on the Joshua ISD site, which is adjacent to the project area, the stream has been modified through excavation to create a larger channel. The channel has been filled downstream of the pond, and currently, the identifiable OHWM of the stream channel is approximately 100 feet west of the pond. Upstream of the pond, the stream has been channelized and shows no signs of an OHWM due to the recently constructed channel.

## **4.2 Wetlands**

The limits of the one emergent wetland identified in the project area were delineated in the field. The emergent wetland was identified on a seepage slope adjacent to Stream S-2. The entire surface area (0.25 acre) of the wetland is located within the proposed ROW. A Routine Delineation Data Form was completed at this site and is included in Attachment B. The figures in Attachment A show the boundaries of the delineated wetland.

<b>Table 1: Jurisdictional Waters</b>				
<b>SH 121 – FM 1187 to US 67</b>				
<b>Stream No.</b>	<b>Description</b>	<b>Average OHWM Width (ft)</b>	<b>Linear Feet in ROW</b>	<b>Acreage</b>
<b>Rock Creek Watershed</b>				
S-1	Ephemeral	2	282	0.01
W-1	Emergent Wetland	-	-	0.25
S-2	Intermittent	5	465	0.05
S-3	Intermittent	5	518	0.06
S-4	Ephemeral	2	238	0.01
S-5	Ephemeral	3	412	0.01
S-6	Intermittent	8	1,001	0.40
S-7	Ephemeral	3	116	0.01
S-8	Intermittent	7	321	0.05
S-9	Ephemeral	3	143	0.01
P-1	Impoundment	-	-	0.70
<b>West Buffalo Creek Watershed</b>				
S-10 at CR 904	Intermittent	15	99	0.03
S-10 at SH 121	Intermittent	8	1,073	0.36
		14	759	0.33
S-11	Intermittent	4	607	0.04
<b>Totals</b>			<b>6,034</b>	<b>2.32</b>

## 5.0 SUMMARY AND RECOMMENDATIONS

A total of 2.32 acres of waters of the U.S. were delineated in the proposed ROW for the project. The streams include six intermittent channels (4,843 LF) and five ephemeral channels (1,191 LF). The impoundment (0.70 acre) identified in the project area is classified as an on-channel feature (Table 1). The emergent wetland totals 0.25 acre. Table 3 in the PCN details the proposed crossings (e.g. bridges, culverts) for the waters within the project area. The delineation of jurisdictional waters of the U.S., including wetlands, for the project area must receive a final verification by the USACE, Fort Worth Regulatory personnel prior to permit issuance.

## 6.0 REFERENCES

- Atlas Environmental Resources, Inc. 2004. *Historic Aerial Photography from 1942, 1958, 1973, and 1984*. Austin, Texas.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Fish & Wildlife Service. Washington, DC.
- Environmental Laboratory. 1987. *Corps of Engineers Wetland Delineation Manual (Technical Report Y-87-1)*. Waterways Experiment Station, Vicksburg, MI.
- Hatch, S., K. Gandhi, and L. Brown. *Checklist of the Vascular Plants of Texas*. Texas A&M University Book Press. College Station, Texas.
- Texas Natural Resource Information Service (TNRIS). 1995. *Primrose Southwest. Digital Aerial Orthophotography*. 1-m resolution. Texas Orthophotomagey Project (TOPP).
- Texas Natural Resource Information Service (TNRIS). 1995. *Joshua Northwest. Digital Aerial Orthophotography*. 1-m resolution. Texas Orthophotomagey Project (TOPP).
- United States Department of Agriculture. 1981. *Soil Survey of Tarrant County, Texas*. Natural Resources Conservation Service. Washington, D.C.
- United States Department of Agriculture. 1985. *Soil Survey of Johnson County, Texas*. Natural Resources Conservation Service. Washington, D.C.
- United States Department of Agriculture. 2004. *Official Soil Series Descriptions*. Soil Survey Staff, Natural Resources Conservation Service. <http://soils.usda.gov/soils/technical/classification/osd/index.html>. Accessed May 26, 2004.
- \_\_\_\_\_. 1995. *Hydric Soils of the United States*. Natural Resource Conservation Service. Washington, DC.



# ATTACHMENT A

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## DELINEATION MAPS

# Texas Department of Transportation SH 121 - FM 1187 to US 67 Delineation of Waters of the U.S., including Wetlands

MAP AUTHOR: ttrimble , FILE: O:\ERM Env. Sciences\08814 - RTG - SH121\map\_docs\arcmap\SH121\_DelineationSheet1of9\_8x11\_v2.mxd



**Sheet 1 of 10 - Legend**

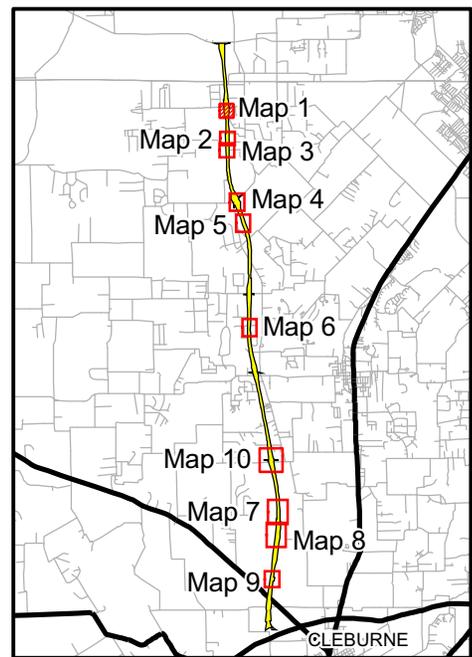
**Waters of the U.S.**

-  Intermittent Stream
-  Ephemeral Stream
-  On-Channel Pond
-  Wetland

**Features that are not Waters of the U.S.**

-  Data Point
-  Proposed SH 121 Right-Of-Way
-  Upland Drainage / Swale
-  Upland Pond

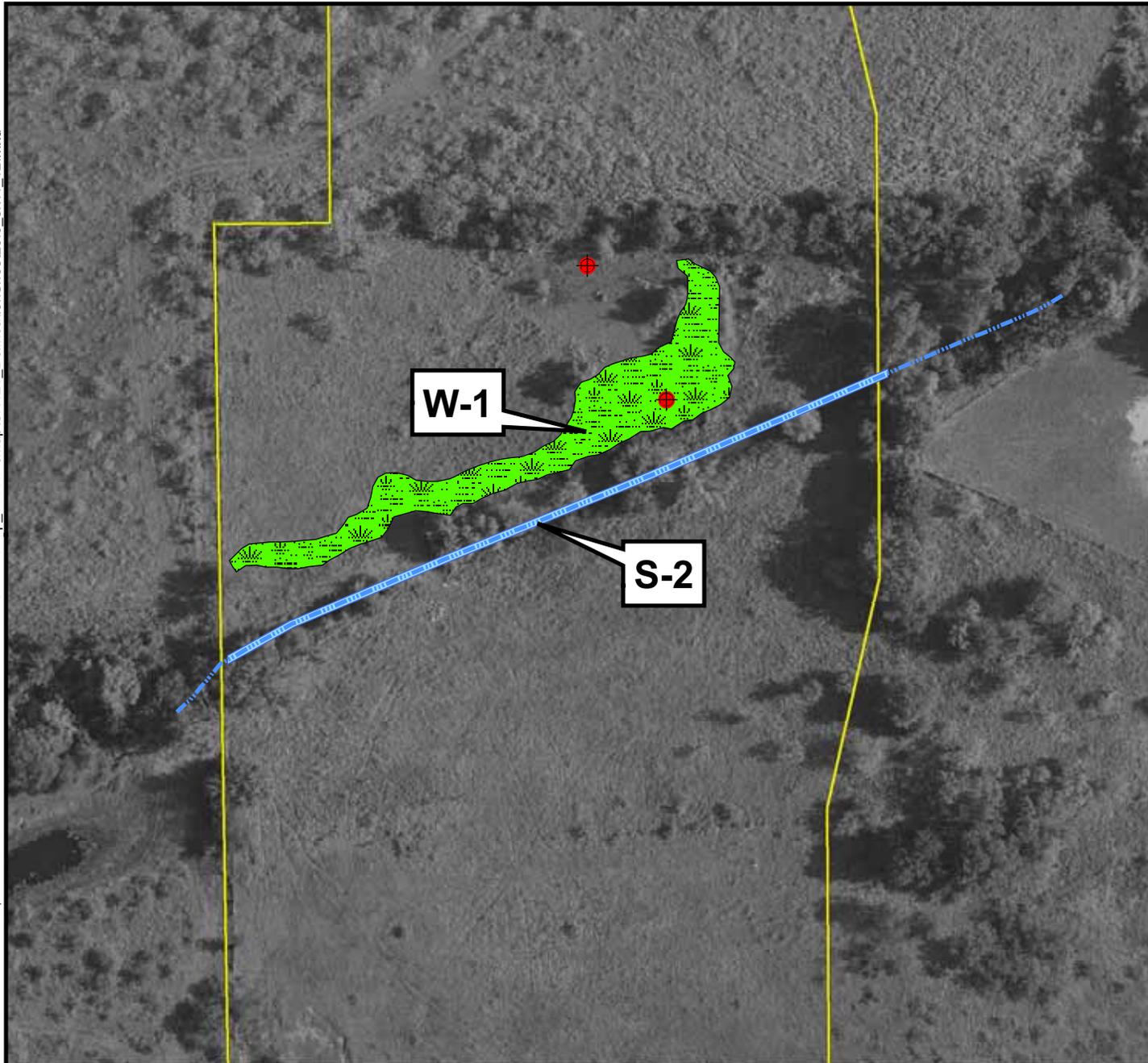
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**Fort Worth District**  
P.O. Box 6868  
Fort Worth, Texas 76115

# Texas Department of Transportation SH 121 - FM 1187 to US 67 Delineation of Waters of the U.S., including Wetlands

MAP AUTHOR: ttrimble , FILE: O:\ERM Env. Sciences\08814 - RTG - SH121\map\_docs\arcmap\SH121\_DelineationSheet\of9\_8x11\_v2.mxd



**Sheet 2 of 10 - Legend**

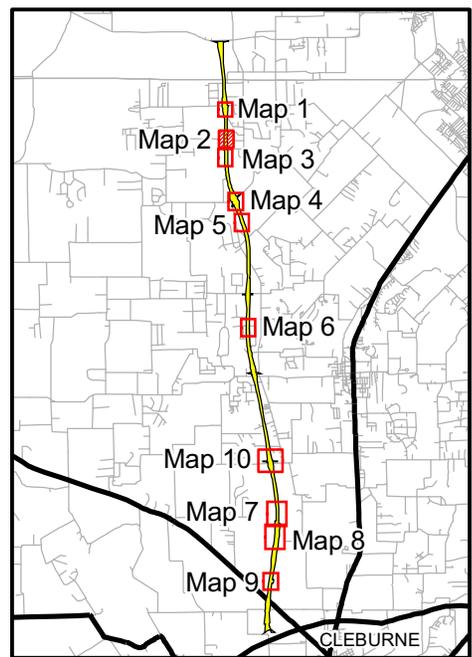
**Waters of the U.S.**

- Intermittent Stream
- Ephemeral Stream
- On-Channel Pond
- Wetland

**Features that are not Waters of the U.S.**

- Data Point
- Proposed SH 121 Right-Of-Way
- Upland Drainage / Swale
- Upland Pond

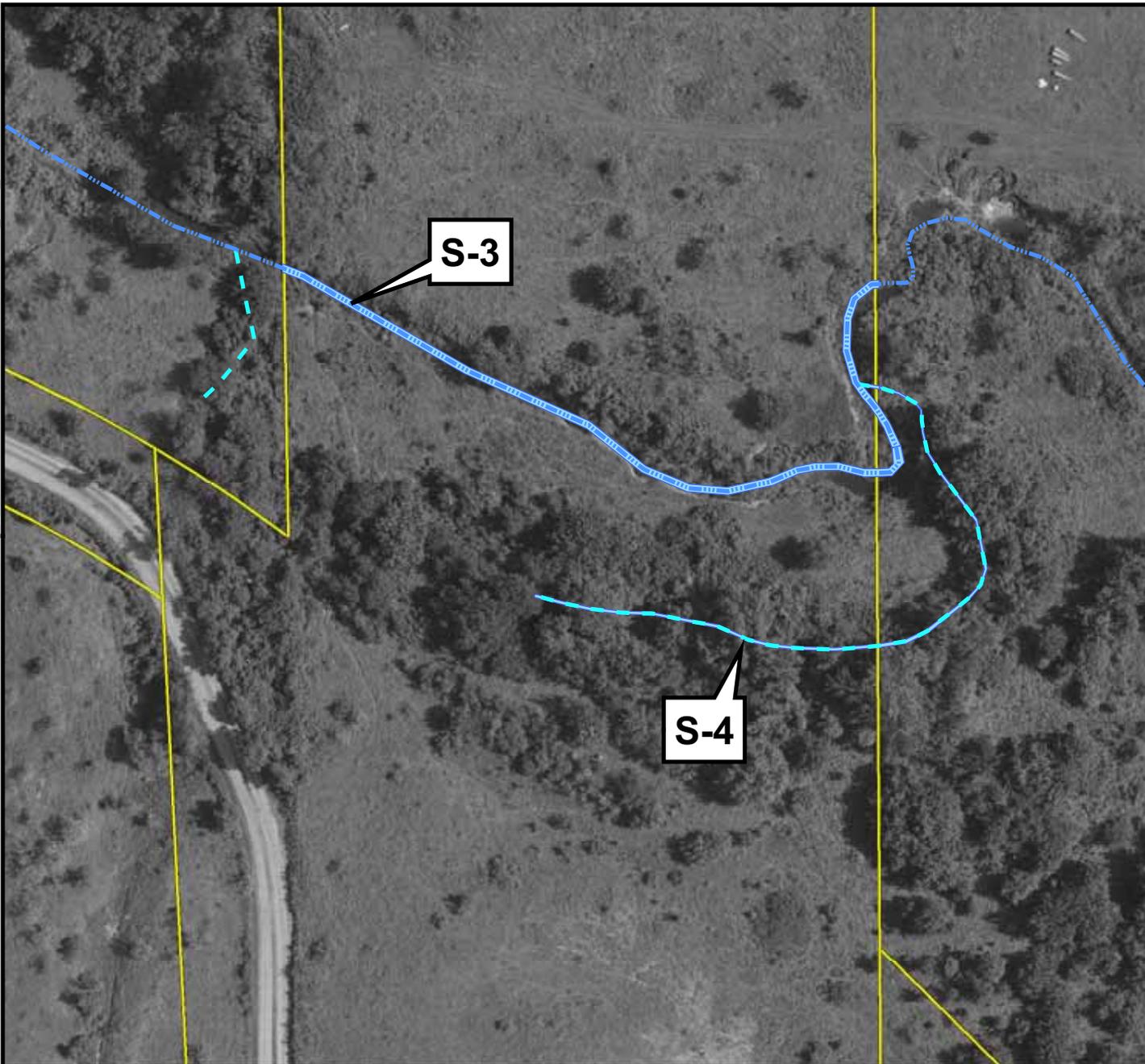
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# Texas Department of Transportation SH 121 - FM 1187 to US 67 Delineation of Waters of the U.S., including Wetlands

MAP AUTHOR: ttrimble , FILE: O:\ERM\ Env. Sciences\08814 - RTG - SH121\map\_docs\arcmap\SH121\_Delineation\Sheet8of9\_8x11\_v2.mxd



**Sheet 3 of 10 - Legend**

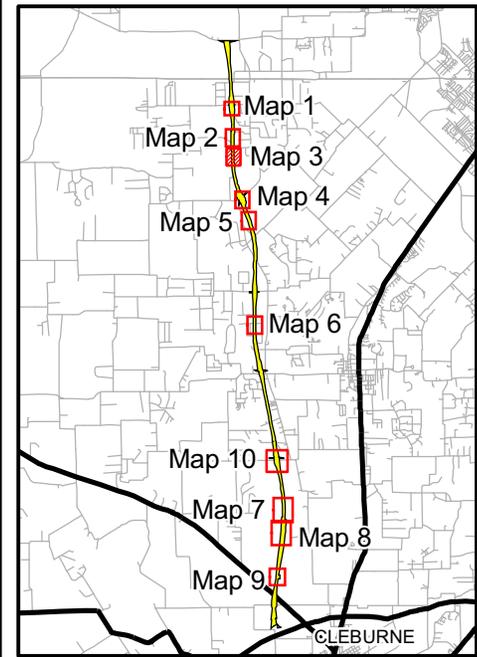
**Waters of the U.S.**

- Intermittent Stream
- Ephemeral Stream
- On-Channel Pond
- Wetland

**Features that are not Waters of the U.S.**

- Data Point
- Proposed SH 121 Right-Of-Way
- Upland Drainage / Swale
- Upland Pond

0 25 50 100 Feet



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 Fort Worth, Texas 76115

# Texas Department of Transportation SH 121 - FM 1187 to US 67 Delineation of Waters of the U.S., including Wetlands

MAP AUTHOR: ttrimble , FILE: O:\ERM Env. Sciences\08814 - RTG - SH121\map\_docs\arcmap\SH121\_Delineation\Sheet4of9\_8x11\_v2.mxd



**Sheet 4 of 10 - Legend**

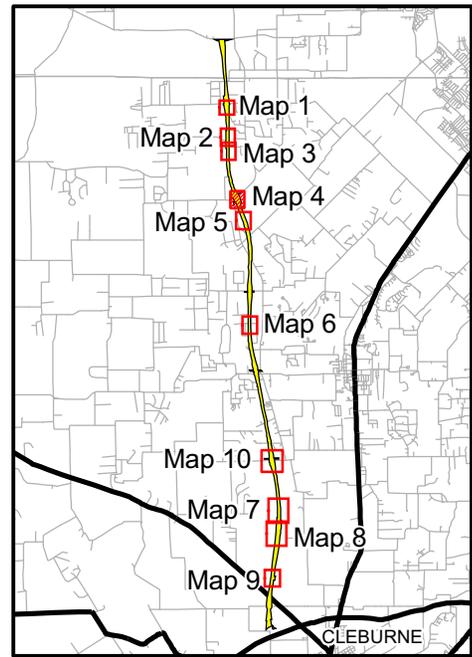
**Waters of the U.S.**

-  Intermittent Stream
-  Ephemeral Stream
-  On-Channel Pond
-  Wetland

**Features that are not Waters of the U.S.**

-  Data Point
-  Proposed SH 121 Right-Of-Way
-  Upland Drainage / Swale
-  Upland Pond

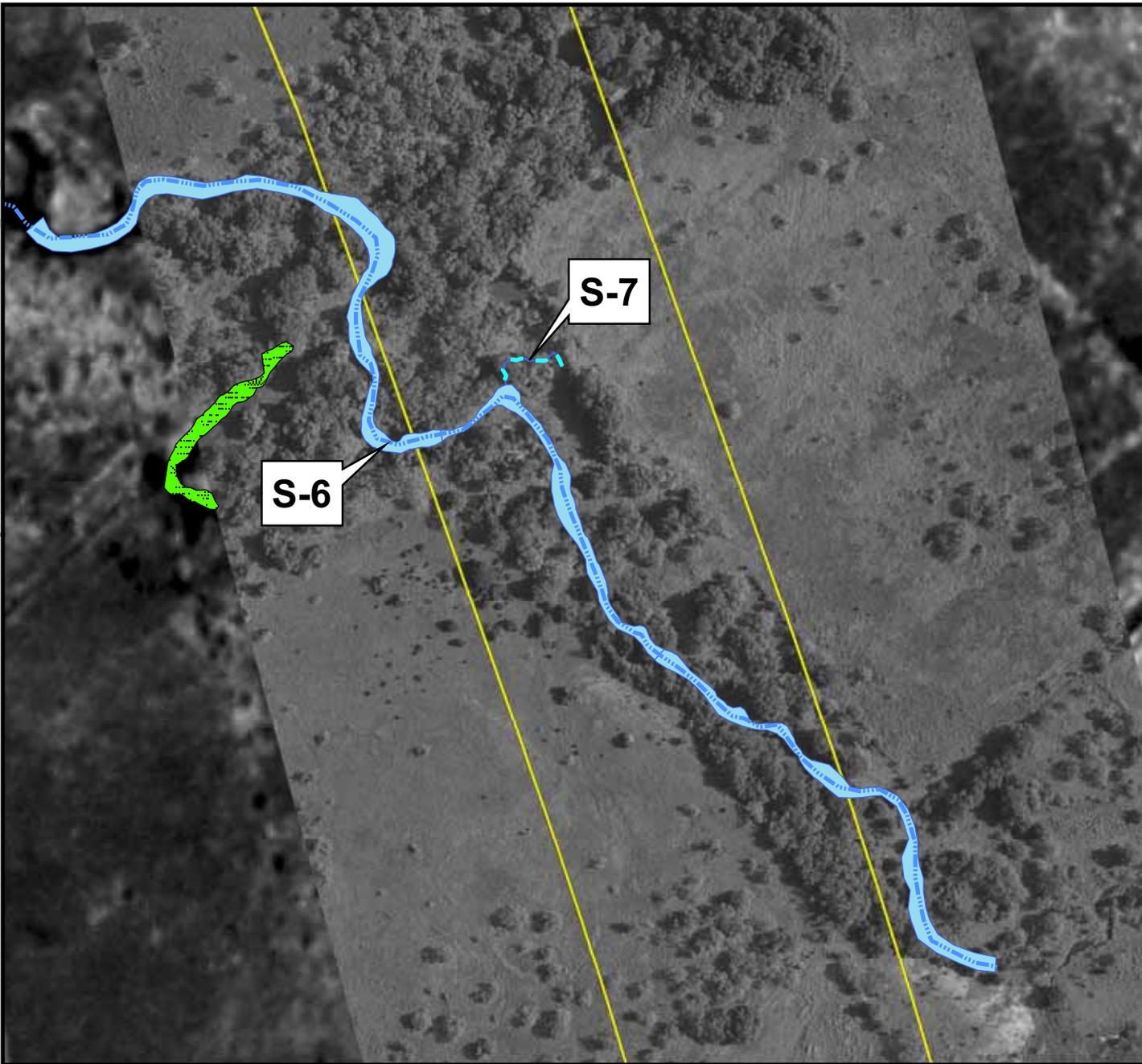
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# Texas Department of Transportation SH 121 - FM 1187 to US 67 Delineation of Waters of the U.S., including Wetlands

MAP AUTHOR: ttrimble , FILE: O:\ERM\ Env. Sciences\08814 - RTG - SH121\map\_docs\arcmap\SH121\_DelineationSheet5of9\_8x11\_v2.mxd



**Sheet 5 of 10 - Legend**

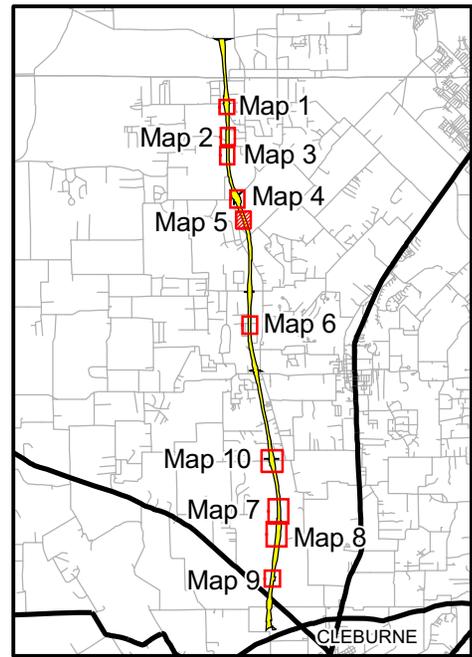
**Waters of the U.S.**

-  Intermittent Stream
-  Ephemeral Stream
-  On-Channel Pond
-  Wetland

**Features that are not Waters of the U.S.**

-  Data Point
-  Proposed SH 121 Right-Of-Way
-  Upland Drainage / Swale
-  Upland Pond

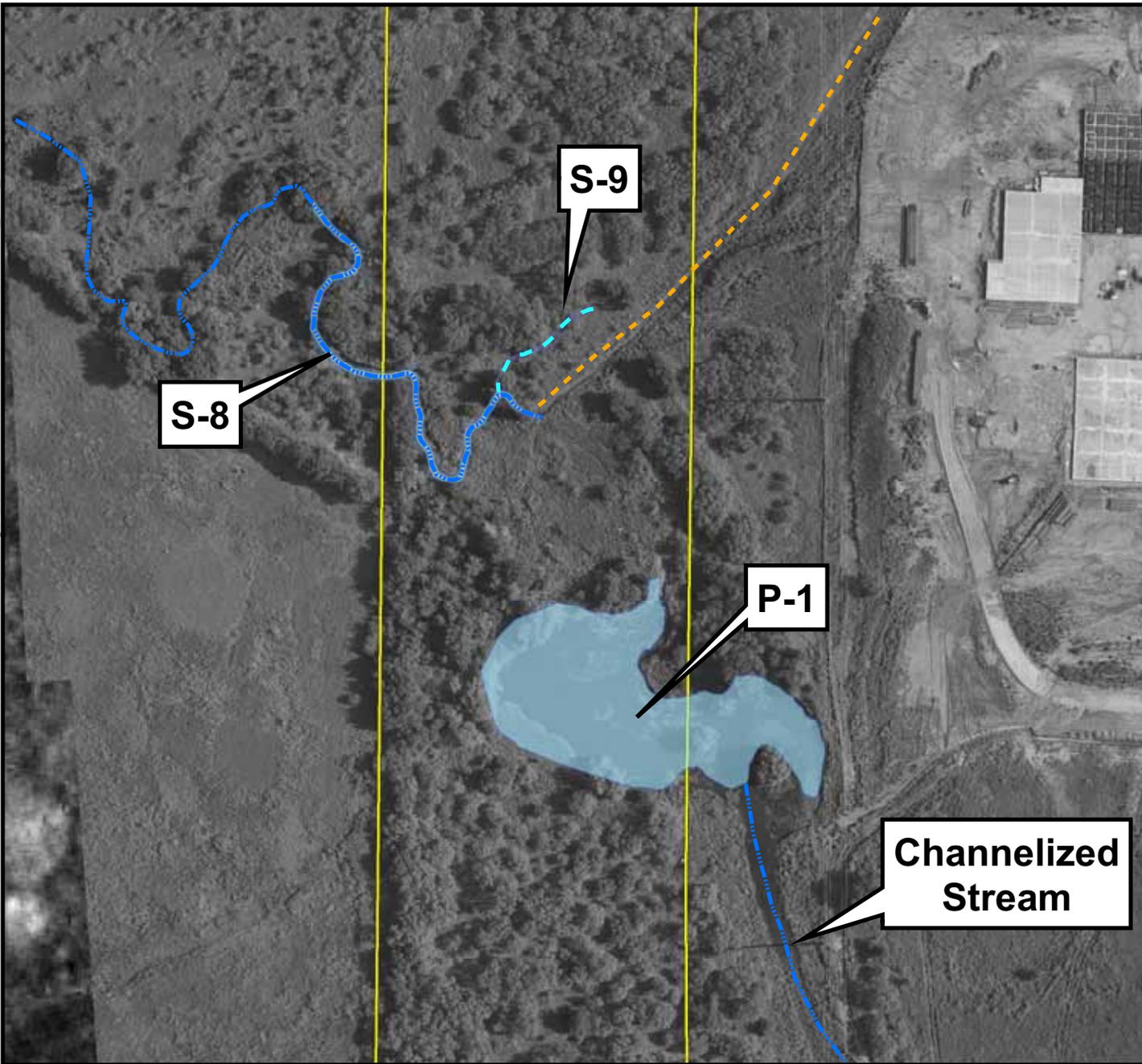
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# Texas Department of Transportation SH 121 - FM 1187 to US 67 Delineation of Waters of the U.S., including Wetlands

MAP AUTHOR: ttrimble, FILE: O:\ERM\ Env. Sciences\08814 - RTG - SH121\map\_docs\arcmap\SH121\_DelineationSheet6of9\_8x11\_v2.mxd



**Sheet 6 of 10 - Legend**

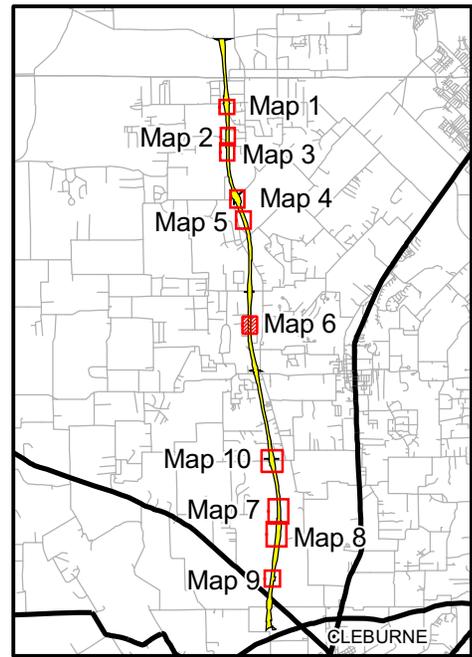
**Waters of the U.S.**

-  Intermittent Stream
-  Ephemeral Stream
-  On-Channel Pond
-  Wetland

**Features that are not Waters of the U.S.**

-  Data Point
-  Proposed SH 121 Right-Of-Way
-  Upland Drainage / Swale
-  Upland Pond

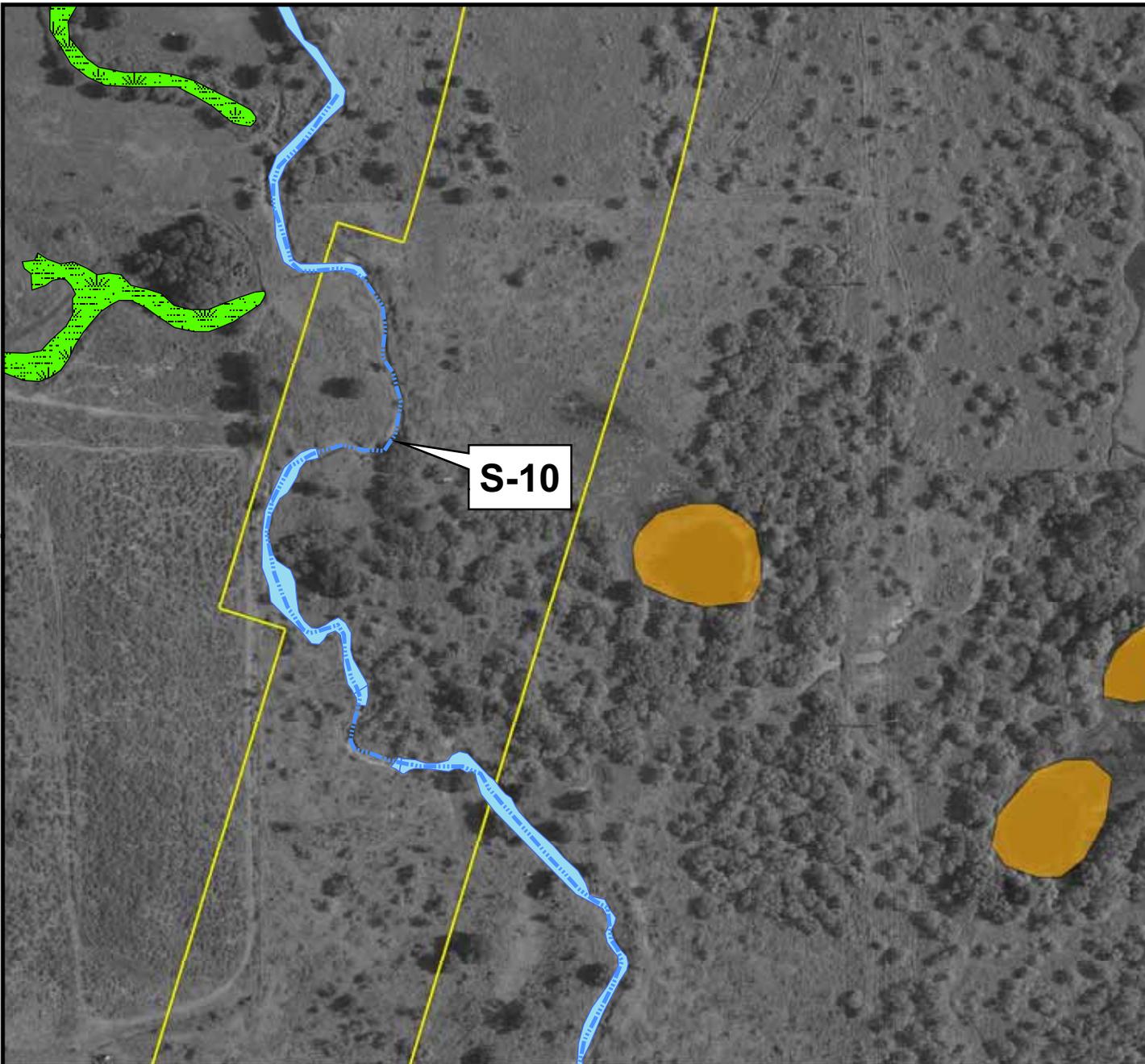
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# Texas Department of Transportation SH 121 - FM 1187 to US 67 Delineation of Waters of the U.S., including Wetlands

MAP AUTHOR: ttrimble , FILE: O:\ERM Env. Sciences\08814 - RTG - SH121\map\_docs\arcmap\SH121\_DelineationSheet7of9\_8x11\_v2.mxd



**Sheet 7 of 10 - Legend**

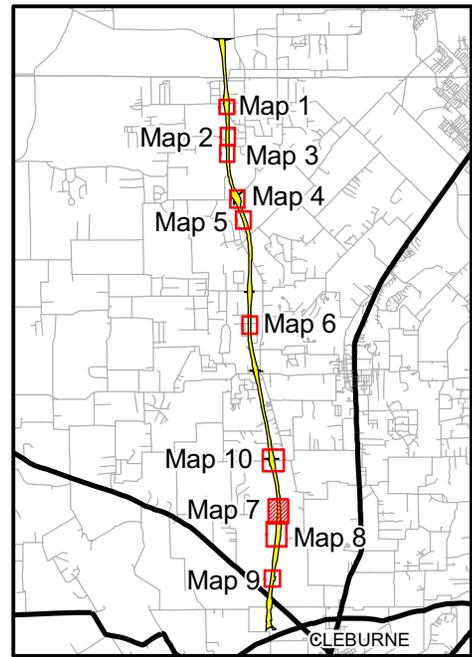
**Waters of the U.S.**

- Intermittent Stream
- Ephemeral Stream
- On-Channel Pond
- Wetland

**Features that are not Waters of the U.S.**

- Data Point
- Proposed SH 121 Right-Of-Way
- Upland Drainage / Swale
- Upland Pond

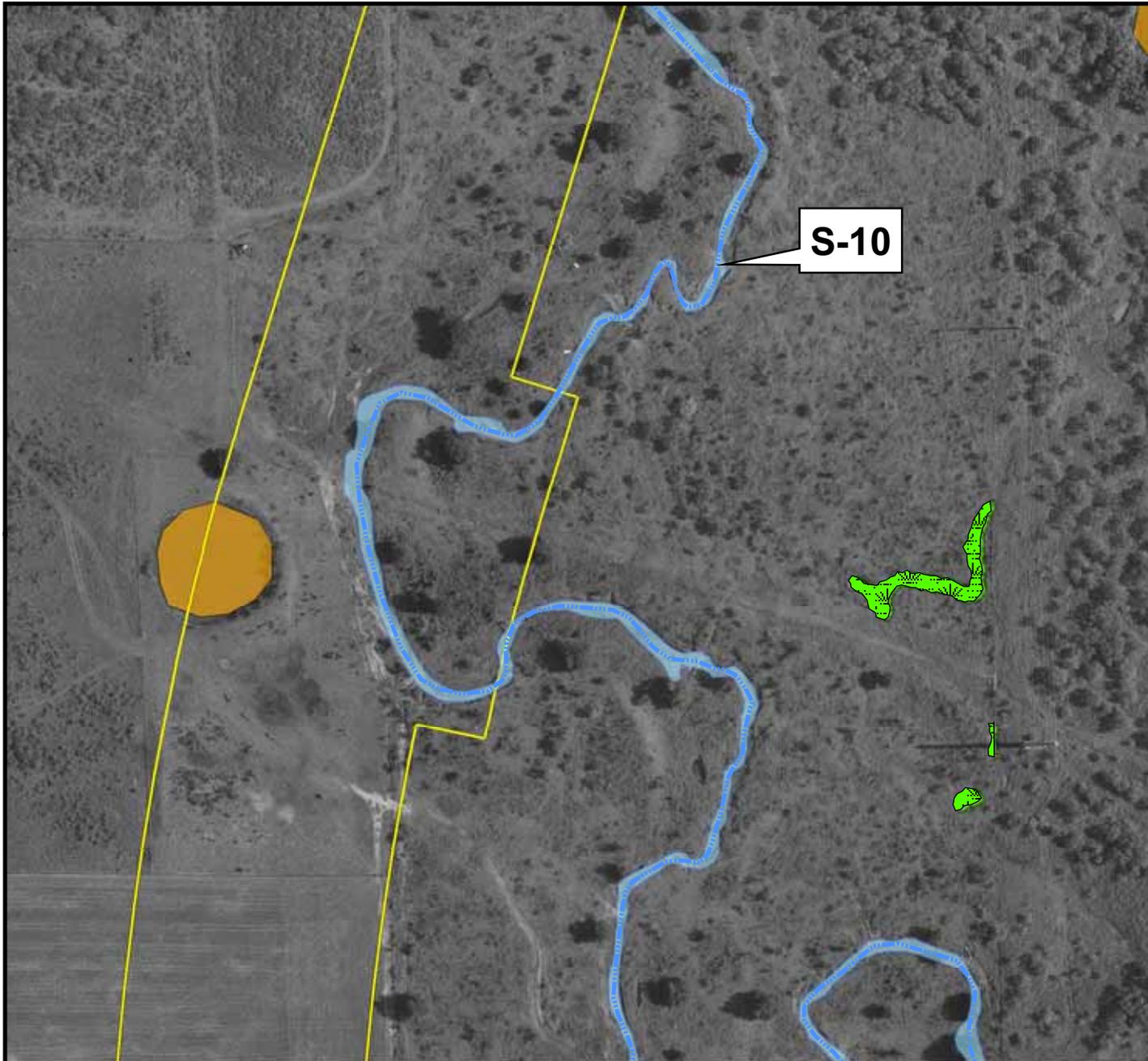
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# Texas Department of Transportation SH 121 - FM 1187 to US 67 Delineation of Waters of the U.S., including Wetlands

MAP AUTHOR: ttrimble , FILE: O:\ERM Env. Sciences\08814 - RTG - SH121\map\_docs\arcmap\SH121\_DelineationSheet8of9\_8x11\_v2.mxd



## Sheet 8 of 10 - Legend

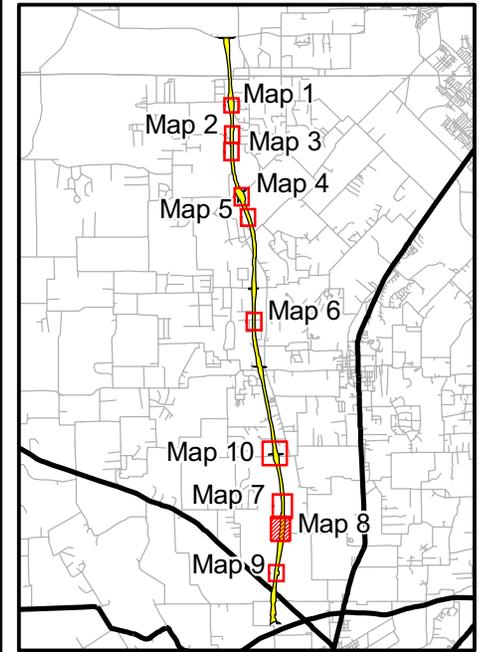
### Waters of the U.S.

-  Intermittent Stream
-  Ephemeral Stream
-  On-Channel Pond
-  Wetland

### Features that are not Waters of the U.S.

-  Data Point
-  Proposed SH 121 Right-Of-Way
-  Upland Drainage / Swale
-  Upland Pond

0 50 100 200  
Feet



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# Texas Department of Transportation SH 121 - FM 1187 to US 67 Delineation of Waters of the U.S., including Wetlands

MAP AUTHOR: ttrimble , FILE: O:\ERM Env. Sciences\08814 - RTG - SH121\map\_docs\arcmap\SH121\_Delineation\Sheet9of9\_8x11\_v3.mxd



**S-11**

**Lake George Marti**

NOTE: TOP OF SLOPES TO BE APPROXIMATELY 2 FT to 3 FT HIGHER THAN LAKE GEORGE MARTI SPILLWAY (OHWM)

**Sheet 9 of 10 - Legend**

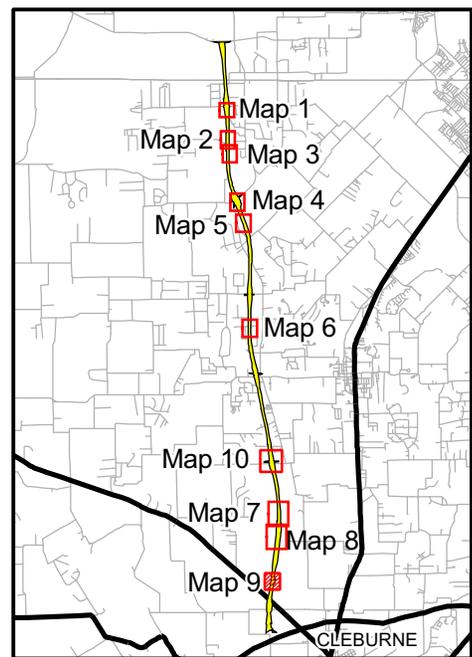
**Waters of the U.S.**

- Intermittent Stream
- Ephemeral Stream
- On-Channel Pond
- Wetland

**Features that are not Waters of the U.S.**

- Flood Storage Mitigation Areas
- Data Point
- Proposed SH 121 Right-Of-Way
- Upland Drainage / Swale
- Upland Pond

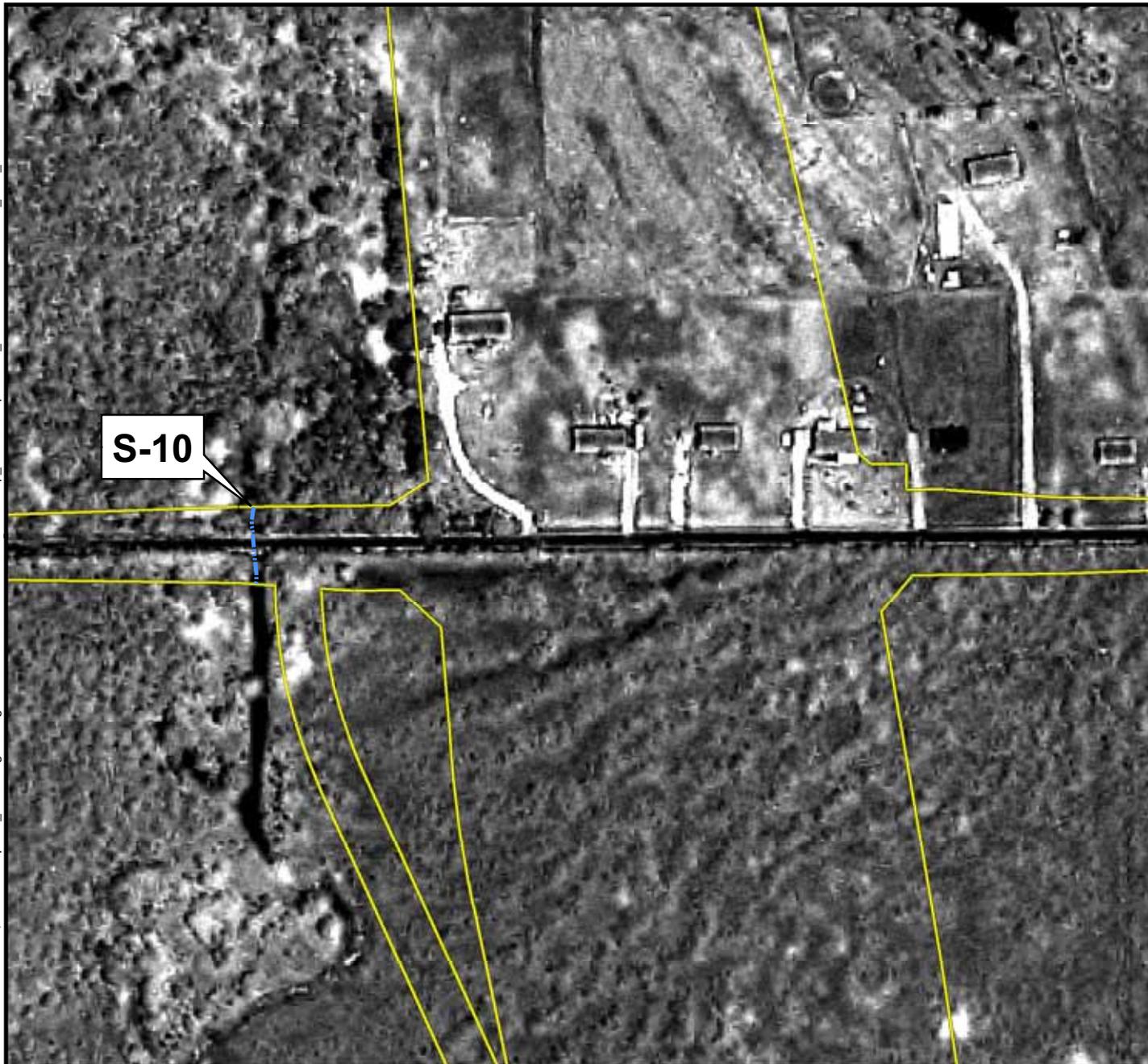
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# Texas Department of Transportation SH 121 - FM 1187 to US 67 Delineation of Waters of the U.S., including Wetlands

MAP AUTHOR: rwilson, FILE: O:\Dep037\_DallasEngineering\EnvSciences\08814 - RTG - SH121\map\_docs\arcmap\SH121\_DelineationSheet\0of10\_8x11\_v1.mxd



**Sheet 10 of 10 - Legend**

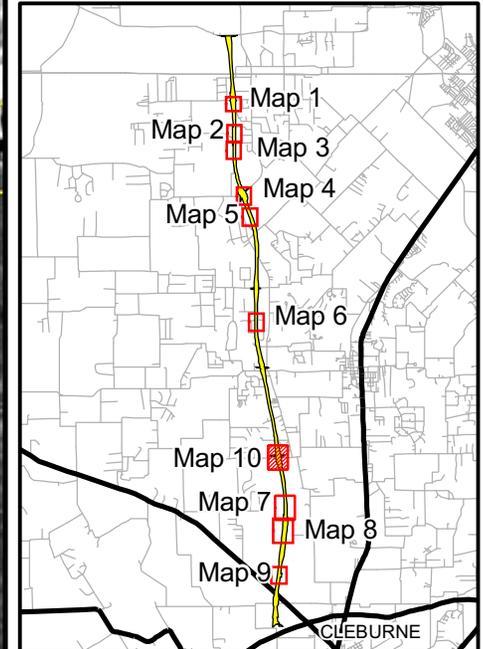
**Waters of the U.S.**

-  Intermittent Stream
-  Ephemeral Stream
-  On-Channel Pond
-  Wetland

**Features that are not Waters of the U.S.**

-  Data Point
-  Proposed SH 121 Right-Of-Way
-  Upland Drainage / Swale
-  Upland Pond

0 50 100 200 Feet


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# ATTACHMENT B

---

## STREAM AND WETLAND DATA FORMS

Stream Data

Project Name: RTG - 5H121  
 Surveyor(s): T. TRIMBLE, T. RINGENBERG

Date: JANUARY 27, 2004  
 State/County: JOHNSON COUNTY, TX

Stream Name: EPHEMERAL  
 Topo Quad Name: PRIMROSE  
 Station No.: Entrance:      Exit:       
 Photo Number(s):     

Stream No.: 5-1  
 Parcel No.:       
 GPS Data: YES X NO       
 Associated Wetland: YES      NO X

Stream Flow		Bottom Characteristics	
Perceptible Flow	Yes [ ] No [X]	Probed Stream Depth	Substrate Type
Flow Year Round	Yes [ ] No [X]	(if possible)	
Stream Flow Direction	<u>WEST</u>	<input checked="" type="checkbox"/> 0-6"	<input type="checkbox"/> Bedrock
Stream Width (ft) (water's edge to water's edge)	<u>1'</u>	<input type="checkbox"/> 7-12"	<input checked="" type="checkbox"/> Gravel
Stream Width (ft) (bank to bank)	<u>6'</u>	<input type="checkbox"/> 12-24"	<input type="checkbox"/> Sand
OHWB (ft) (height):	<u>2'</u>	<input type="checkbox"/> 25-36"	<input checked="" type="checkbox"/> Silt/Clay
		<input type="checkbox"/> 37" +	<input type="checkbox"/> Organic
		Notes:	

Bank Height and Slope		Aquatic Habitat	
Left Bank *	Right Bank *	<input type="checkbox"/> Sand bar	
		<input type="checkbox"/> Sand/Gravel beach/bar	
		<input type="checkbox"/> Mud bar	
		<input checked="" type="checkbox"/> Overhanging trees/shrubs	
		<input type="checkbox"/> Gravel riffles	
		<input type="checkbox"/> Deep pool/hole	
		<input type="checkbox"/> Aquatic vegetation	
		<input type="checkbox"/> Other: <u>    </u>	
		Water Quality	
		Clarity:	<input checked="" type="checkbox"/> Clear
			<input type="checkbox"/> Slightly Turbid
			<input type="checkbox"/> Turbid
			<input type="checkbox"/> Very Turbid
		Color: <u>    </u>	(if other than clear)
		Aquatic Organisms	
		<input checked="" type="checkbox"/> None Observed	
		<input type="checkbox"/> Waterfowl	
		<input type="checkbox"/> Fish	
		<input type="checkbox"/> Snakes <i>P</i>	
		<input type="checkbox"/> Turtles <i>P</i>	
		<input type="checkbox"/> Frogs <i>P</i>	
		<input type="checkbox"/> Invertebrates <i>P</i>	
		<input type="checkbox"/> Other: <u>    </u>	
Evidence of Erosion?	<u>SLIGHT</u>		
*Direction when facing downstream.			

Stream Data (continue)

Project Name: RTG-5H121

Date: JANUARY 27, 2004

State/County: JOHNSON COUNTY, TX

Stream Name.: S-1

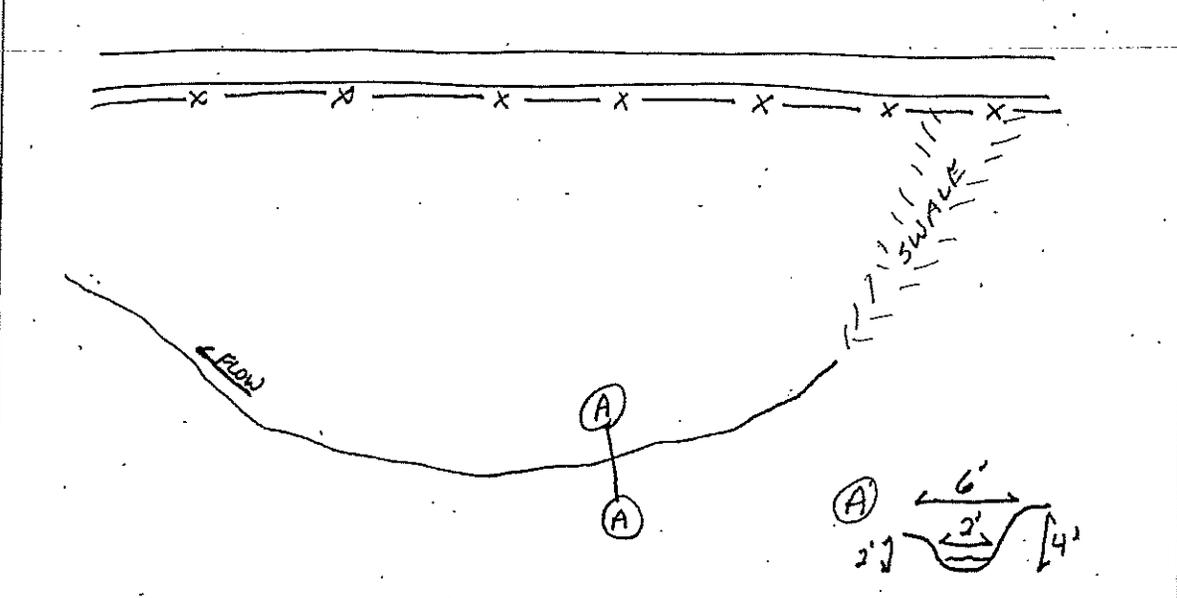
Topo Quad Name: PRIMROSE

Stream No.: \_\_\_\_\_

Photo Number(s): \_\_\_\_\_

Associated Wetland: NO

Drawing \_\_\_\_\_ Crossing Method\* (1, 2, 3, or 4): \_\_\_\_\_



Please include directional arrow.

Riparian Vegetation Description

*CELTIS LAEVIATA, ILEX VOMITORIA, SMILAX BONA-NOX, SALIX NIGRA, ULMUS CRASSIFOLIA, LYNOON DACTYLON*

T/E Species/Suitable Habitat

NONE OBSERVED

Comments (i.e., stream & wildlife functionality\*\*, angle at pipeline crossing, construction constraints, erosion potential, existing disturbances, and meanders)

\*Stream Crossing Methods

Crossing Method 1-(Wet <50') small perennial streams (10-50'), ditches, intermittent streams. Equipment will work from the banks.

Crossing Method 2-(Dry 10-50') Perennial streams with downstream users or listed species.

Crossing Method 3-(Wet >50') Streams >50' that will not be directionally drilled.

Crossing Method 4-(Directional Drill) All canoe trails.

\*\*Riparian-Function Ratings:

0-Ephemeral, low riparian quality, severe erosion; 1-Ephemeral, medium riparian quality, moderate erosion; 2-Ephemeral, medium to high riparian quality, slight erosion; 3-Ephemeral, high riparian quality, no erosion; 4-Intermittent, low riparian quality, severe erosion; 5-Intermittent, medium riparian quality, moderate erosion, no pooling; 6-Intermittent, medium to high riparian quality, slight erosion, pooling; 7-Intermittent, high riparian quality, no erosion, pooling; 8-Perennial, low riparian quality, severe erosion, flowing water; 9-Perennial, medium riparian quality, moderate to slight erosion, flowing water; 10-Perennial, high riparian quality, no erosion, flowing water.

Wildlife Habitat Quality Ratings:

0-Low Quality; 1-Medium to Low Quality; 2-Medium Quality; 3-Medium to High Quality; 4-High Quality

D. Richardson

7/14/2003

# ROUTINE WETLAND DETERMINATION DATA FORM

Project Site: SH 121 Extension Date: January 27, 2004  
 Applicant/Owner: Texas Department of Transportation County: Johnson County  
 Investigator: Tom Trimble, Tony Ringenberg State: Texas

Do Normal Circumstances exist on the site?  Yes  No Community ID: Stalcup Property  
 Is the site significantly disturbed (Atypical Situation)?  Yes  No Transect ID: \_\_\_\_\_  
 Is the area a potential Problem Area?  Yes  No Plot ID: W-1  
 (If needed, explain on reverse.)

## VEGETATION

Dominant Plant Species	Indicator	Stratum	Dominant Plant Species	Indicator	Stratum
1. <u>Salix nigra*</u>	<u>FACW+</u>	<u>T/SS</u>	9. _____	_____	_____
2. <u>Rumex crispus*</u>	<u>FACW</u>	<u>H</u>	10. _____	_____	_____
3. <u>Polygonum hydropiperoides*</u>	<u>OBL</u>	<u>H</u>	11. _____	_____	_____
4. <u>Juncus effuses*</u>	<u>OBL</u>	<u>H</u>	12. _____	_____	_____
5. <u>Eleocharis montividentis*</u>	<u>FACW+</u>	<u>H</u>	13. _____	_____	_____
6. <u>Rumex pulcher</u>	<u>FACW-</u>	<u>H</u>	14. _____	_____	_____
7. <u>Cynodon dactylon</u>	<u>FACU+</u>	<u>H</u>	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 86%  
 Remarks: \* = Dominant

## HYDROLOGY

Recorded Data Available (Describe in Remarks):  
 Aerial Photographs (Infrared DOQQs)  
 Other (GPS Data)  
 No Recorded Data Available

### Wetland Hydrology Indicators:

Primary Indicators:  
 Inundated  
 Saturated in Upper 12 inches  
 Water Marks  
 Drift Lines  
 Sediment Deposits  
 Drainage Patterns in Wetlands  
 Secondary Indicators (2 or more required):  
 Oxidized Root Channels in Upper 12 inches  
 Water-Stained Leaves  
 Local Soil Survey Data  
 FAC-Neutral Test  
 Other (Explain in Remarks)

### Field Observations:

Depth of Surface Water: 3 (in.)  
 Depth to Free Water In Pit: 0 (in.)  
 Depth to Saturated Soil: 0 (in.)

Remarks: Sulphur spring found upslope of wetland. Area supplied with water from the spring for extended periods of time after rain events. The area then drains into an intermittent stream Channel (S-1).

## SOILS

Map Unit Name (Series & Phase): Sanger clay, 1-3% slopes Drainage Class: Well drained  
 Taxonomy Subgroup: \_\_\_\_\_ Field Observations Confirm Map Type?  Yes  No

### Profile Description:

Depth (in.)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance/ Contrast	Texture, Concretions, Structure, etc.
<u>0-3</u>	_____	<u>10YR2/1</u>	<u>---</u>	<u>---</u>	<u>Clay loam</u>
<u>3-12</u>	_____	<u>10YR3/1</u>	<u>10YR4/4</u>	<u>Common/Distinct</u>	<u>Clay; 1" limestone gravel ~10% of soil</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

### Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Low-Chroma Colors
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> Concretions
<input checked="" type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Gleyed	<input type="checkbox"/> Listed on National Hydric Soils List
	<input type="checkbox"/> Other (Explain in Remarks)**

Remarks: \_\_\_\_\_

## WETLAND DETERMINATION

Hydrophytic Vegetation Present?  Yes  No  
 Wetland Hydrology Present?  Yes  No  
 Hydric Soils Present?  Yes  No  
 Is this Sampling Point within a Wetland?  Yes  No

Remarks: \_\_\_\_\_

# ROUTINE WETLAND DETERMINATION DATA FORM

Project Site: SH 121 Extension Date: January 27, 2004  
 Applicant/Owner: Texas Department of Transportation County: Johnson County  
 Investigator: Tom Trimble, Tony Ringenberg State: Texas

Do Normal Circumstances exist on the site?  Yes  No Community ID: Stalcup Property  
 Is the site significantly disturbed (Atypical Situation)?  Yes  No Transect ID: \_\_\_\_\_  
 Is the area a potential Problem Area?  Yes  No Plot ID: U-1  
 (If needed, explain on reverse.)

## VEGETATION

Dominant Plant Species	Indicator	Stratum	Dominant Plant Species	Indicator	Stratum
1. <u>Cellis laevigata</u>	<u>FAC</u>	<u>T</u>	9. _____	_____	_____
2. <u>Cynodon dactylon*</u>	<u>FACU+</u>	<u>H</u>	10. _____	_____	_____
3. _____	_____	_____	11. _____	_____	_____
4. _____	_____	_____	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 50%  
 Remarks: \*= Dominant

## HYDROLOGY

Recorded Data Available (Describe in Remarks):  
 Aerial Photographs (Infrared DOQQs)  
 Other (GPS Data)  
 No Recorded Data Available

### Wetland Hydrology Indicators:

#### Primary Indicators:

- Inundated
- Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

#### Secondary Indicators (2 or more required):

- Oxidized Root Channels in Upper 12 inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

### Field Observations:

Depth of Surface Water: \_\_\_\_\_ (in.)  
 Depth to Free Water in Pit: \_\_\_\_\_ (in.)  
 Depth to Saturated Soil: \_\_\_\_\_ (in.)

Remarks: \_\_\_\_\_

## SOILS

Map Unit Name (Series & Phase): Sanger clay, 1-3% slopes Drainage Class: Well drained  
 Taxonomy Subgroup: \_\_\_\_\_ Field Observations Confirm Map Type?  Yes  No

### Profile Description:

Depth (in.)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance/ Contrast	Texture, Concretions, Structure, etc.
0-3	_____	<u>10YR2/1</u>	<u>---</u>	<u>---</u>	<u>Clay loam</u>
3-12	_____	<u>10YR3/1</u>	<u>---</u>	<u>---</u>	<u>Clay; 1" limestone gravel ~10% of soil</u>
_____	_____	_____	_____	_____	_____

### Hydric Soil Indicators:

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li><input type="checkbox"/> Histosol</li> <li><input type="checkbox"/> Histic Epipedon</li> <li><input type="checkbox"/> Sulfidic Odor</li> <li><input type="checkbox"/> Aquic Moisture Regime</li> <li><input type="checkbox"/> Reducing Conditions</li> <li><input type="checkbox"/> Gleyed</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Low-Chroma Colors</li> <li><input type="checkbox"/> Concretions</li> <li><input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils</li> <li><input type="checkbox"/> Organic Streaking in Sandy Soils</li> <li><input type="checkbox"/> Listed on Local Hydric Soils List</li> <li><input type="checkbox"/> Listed on National Hydric Soils List</li> <li><input type="checkbox"/> Other (Explain in Remarks)**</li> </ul> |
|--|--|

Remarks: \_\_\_\_\_

## WETLAND DETERMINATION

Hydrophytic Vegetation Present?  Yes  No  
 Wetland Hydrology Present?  Yes  No  
 Hydric Soils Present?  Yes  No  
 Is this Sampling Point within a Wetland?  Yes  No

Remarks: \_\_\_\_\_

Stream Data

Project Name: RTG - SH 121 Date: JANUARY 27, 2004  
 Surveyor(s): T. TRIMBLE, T. RINGOLD State/County: JOHNSON COUNTY, TX

Stream Name.: INTERMITTENT Stream No.: 5-2  
 Topo Quad Name: PRIMROSE Parcel No.: \_\_\_\_\_  
 Station No.: Entrance: - Exit: - GPS Data: YES X NO \_\_\_\_\_  
 Photo Number(s): \_\_\_\_\_ Associated Wetland: YES X NO \_\_\_\_\_  
W-1

Stream Flow	Bottom Characteristics
Perceptible Flow Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Flow Year Round Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Probed Stream Depth Substrate Type (if possible)
Stream Flow Direction <u>WEST</u>	<input type="checkbox"/> 0-6" <input type="checkbox"/> Bedrock <input checked="" type="checkbox"/> 7-12" <input type="checkbox"/> Gravel <input type="checkbox"/> 12-24" <input type="checkbox"/> Sand <input type="checkbox"/> 25-36" <input checked="" type="checkbox"/> Silt/Clay <input type="checkbox"/> 37" + <input type="checkbox"/> Organic
Stream Width (ft) (water's edge to water's edge): <u>4'</u>	Notes: _____
Stream Width (ft) (bank to bank) <u>10'</u>	
OHWB (ft) (height): <u>5'</u>	

Bank Height and Slope	Aquatic Habitat
Left Bank * Right Bank *	<input type="checkbox"/> Sand bar <input type="checkbox"/> Sand/Gravel beach/bar <input type="checkbox"/> Mud bar <input checked="" type="checkbox"/> Overhanging trees/shrubs <input type="checkbox"/> Gravel riffles <input checked="" type="checkbox"/> Deep pool/hole <input checked="" type="checkbox"/> Aquatic vegetation <input type="checkbox"/> Other: _____
<u>0-3' High</u>	
<input type="checkbox"/> 0-20% (0-11°) <input type="checkbox"/> <input type="checkbox"/> 21-50 (12-27°) <input type="checkbox"/> <input checked="" type="checkbox"/> 51-100% (28-45°) <input checked="" type="checkbox"/> <input type="checkbox"/> 100% + (46° +) <input type="checkbox"/>	
<u>3-6' High</u>	<u>Water Quality</u>
<input type="checkbox"/> 0-20% (0-11°) <input type="checkbox"/> <input type="checkbox"/> 21-50 (12-27°) <input type="checkbox"/> <input type="checkbox"/> 51-100% (28-45°) <input type="checkbox"/> <input type="checkbox"/> 100% + (46° +) <input type="checkbox"/>	Clarity: <input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Very Turbid
<u>6' + High</u>	Color: <u>VERY CLEAR</u> (if other than clear)
<input type="checkbox"/> 0-20% (0-11°) <input type="checkbox"/> <input type="checkbox"/> 21-50 (12-27°) <input type="checkbox"/> <input type="checkbox"/> 51-100% (28-45°) <input type="checkbox"/> <input type="checkbox"/> 100% + (46° +) <input type="checkbox"/>	<u>Aquatic Organisms</u>
Evidence of Erosion? <u>SLIGHT</u>	<input checked="" type="checkbox"/> None Observed <input type="checkbox"/> Waterfowl <input type="checkbox"/> Fish <input type="checkbox"/> Snakes <input type="checkbox"/> Turtles <input type="checkbox"/> Frogs <input type="checkbox"/> Invertebrates <input type="checkbox"/> Other: _____
*Direction when facing downstream.	

Stream Data (continue)

Project Name: RTG-SH 121

Date: JANUARY 27, 2004

State/County: JOHNSON COUNTY, TX

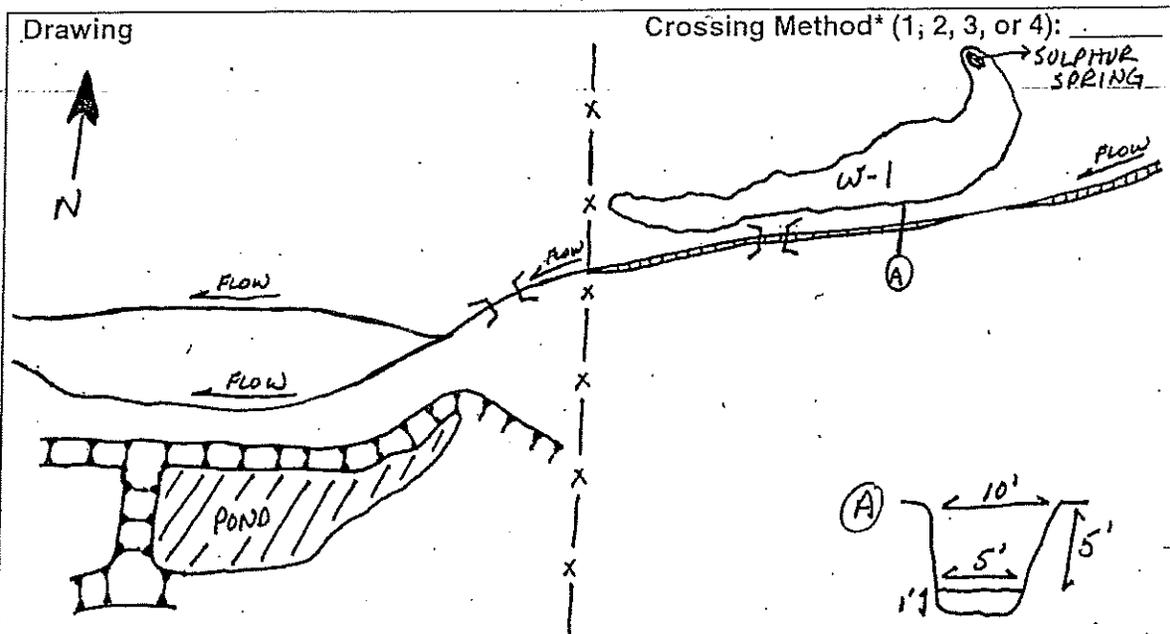
Stream Name: S-2

Topo Quad Name: PRIMROSE

Stream No.: \_\_\_\_\_

Photo Number(s): \_\_\_\_\_

Associated Wetland: W-1



Please include directional arrow.

Riparian Vegetation Description

*HYDROCOTYLE* sp., *CELTIS LAENIGATA*, *ULMUS CRASSIFOLIA*, *CYNODON DACTYLON*,  
*SALIX NIGRA*, *SMILAX BONA-NOX*, *ILEX VOMITORIA*

T/E Species/Suitable Habitat

NONE OBSERVED

Comments (i.e., stream & wildlife functionality\*\*, angle at pipeline crossing, construction constraints, erosion potential, existing disturbances, and meanders)

\*Stream Crossing Methods

Crossing Method 1-(Wet <50') small perennial streams (10-50'), ditches, intermittent streams. Equipment will work from the banks.

Crossing Method 2-(Dry 10-50') Perennial streams with downstream users or listed species.

Crossing Method 3-(Wet >50') Streams >50' that will not be directionally drilled.

Crossing Method 4-(Directional Drill) All canoe trails.

\*\*Riparian Function Ratings:

0-Ephemeral, low riparian quality, severe erosion; 1-Ephemeral, medium riparian quality, moderate erosion; 2-Ephemeral, medium to high riparian quality, slight erosion; 3-Ephemeral, high riparian quality, no erosion; 4-Intermittent, low riparian quality, severe erosion; 5-Intermittent, medium riparian quality, moderate erosion, no pooling; 6-Intermittent, medium to high riparian quality, slight erosion, pooling; 7-Intermittent, high riparian quality, no erosion, pooling; 8-Perennial, low riparian quality, severe erosion, flowing water; 9-Perennial, medium riparian quality, moderate to slight erosion, flowing water; 10-Perennial, high riparian quality, no erosion, flowing water.

Wildlife Habitat Quality Ratings:

0-Low Quality; 1-Medium to Low Quality; 2-Medium Quality; 3-Medium to High Quality; 4-High Quality

D. Richardson

7/14/2003

Stream Data

Project Name: RTG - SH 121 Date: JANUARY 27, 2004  
 Surveyor(s): T. TRIMBLE, T. RINGENBERG State/County: JOHNSON COUNTY, TX  
 Stream Name.: INTERMITTENT Stream No.: S-3  
 Topo Quad Name: PRIMROSE Parcel No.: \_\_\_\_\_  
 Station No.: Entrance: - Exit: - GPS Data: YES X NO \_\_\_\_\_  
 Photo Number(s): \_\_\_\_\_ Associated Wetland: YES \_\_\_\_\_ NO \_\_\_\_\_

Stream Flow		Bottom Characteristics	
Perceptible Flow	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Probed Stream Depth	Substrate Type:
Flow Year Round	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	(if possible)	
Stream Flow Direction	<u>WEST</u>	<input type="checkbox"/> 0-6"	<input type="checkbox"/> Bedrock
Stream Width (ft) (water's edge to water's edge)	<u>4'</u>	<input checked="" type="checkbox"/> 7-12"	<input type="checkbox"/> Gravel
Stream Width (ft) (bank to bank)	<u>20'</u>	<input type="checkbox"/> 12-24"	<input type="checkbox"/> Sand
OHWM (ft) (height):	<u>5'</u>	<input type="checkbox"/> 25-36"	<input checked="" type="checkbox"/> Silt/Clay
		<input type="checkbox"/> 37" +	<input type="checkbox"/> Organic
		Notes: _____	

Bank Height and Slope		Aquatic Habitat	
Left Bank *	Right Bank *	<input type="checkbox"/> Sand bar	
		<input checked="" type="checkbox"/> Sand/Gravel beach/bar	
		<input type="checkbox"/> Mud bar	
		<input checked="" type="checkbox"/> Overhanging trees/shrubs	
		<input checked="" type="checkbox"/> Gravel riffles	
		<input checked="" type="checkbox"/> Deep pool/hole	
		<input checked="" type="checkbox"/> Aquatic vegetation	
		<input type="checkbox"/> Other: _____	
		Water Quality	
		Clarity:	<input checked="" type="checkbox"/> Clear
			<input type="checkbox"/> Slightly Turbid
			<input type="checkbox"/> Turbid
			<input type="checkbox"/> Very Turbid
		Color: _____	(if other than clear)
		Aquatic Organisms	
		<input type="checkbox"/> None Observed	
		<input type="checkbox"/> Waterfowl P	
		<input checked="" type="checkbox"/> Fish	
		<input type="checkbox"/> Snakes P	
		<input checked="" type="checkbox"/> Turtles	
		<input type="checkbox"/> Frogs P	
		<input checked="" type="checkbox"/> Invertebrates	
		<input type="checkbox"/> Other: _____	
Evidence of Erosion? <u>HEAVY</u>			
*Direction when facing downstream.			

Stream Data (continue)

Project Name: RTG-SH 121

Date: JANUARY 27, 2004

State/County: JOHNSON COUNTY, TX

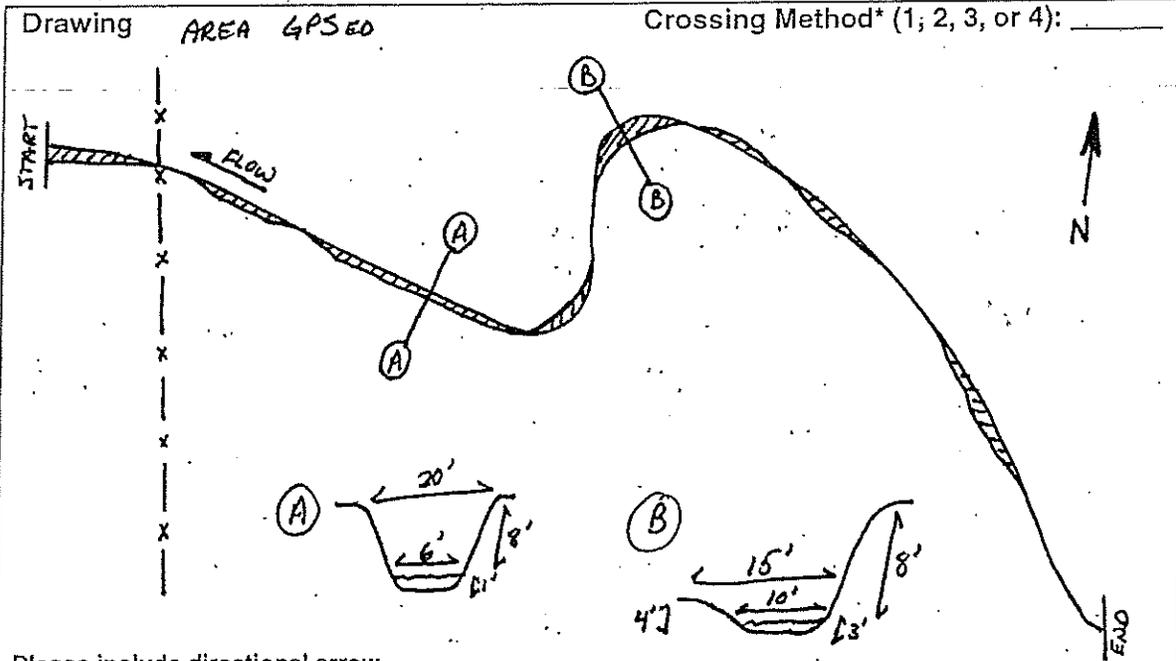
Stream Name: S-3

Topo Quad Name: PRIMROSE

Stream No.: \_\_\_\_\_

Photo Number(s): \_\_\_\_\_

Associated Wetland: \_\_\_\_\_



Please include directional arrow.

Riparian Vegetation Description

*SALIX NIGRA*, *SESBANIA DRUMMONDII*, *XANTHIUM STRUMARUM*, *CEPHALANTHUS ACCIDENTALIS*, *SAURURUS CERNUUS*, *SOLIDAGO* sp.

T/E Species/Suitable Habitat

NONE OBSERVED

Comments (i.e., stream & wildlife functionality\*\*, angle at pipeline crossing, construction constraints, erosion potential, existing disturbances, and meanders)

\*Stream Crossing Methods

Crossing Method 1-(Wet <50') small perennial streams (10-50'), ditches, intermittent streams. Equipment will work from the banks.

Crossing Method 2-(Dry 10-50') Perennial streams with downstream users or listed species.

Crossing Method 3-(Wet >50') Streams >50' that will not be directionally drilled.

Crossing Method 4-(Directional Drill) All canoe trails.

\*\*Riparian Function Ratings:

0-Ephemeral, low riparian quality, severe erosion; 1-Ephemeral, medium riparian quality, moderate erosion; ②-Ephemeral, medium to high riparian quality, slight erosion; 3-Ephemeral, high riparian quality, no erosion; 4-Intermittent, low riparian quality, severe erosion; 5-Intermittent, medium riparian quality, moderate erosion, no pooling; 6-Intermittent, medium to high riparian quality, slight erosion, pooling; 7-Intermittent, high riparian quality, no erosion, pooling; 8-Perennial, low riparian quality, severe erosion, flowing water; 9-Perennial, medium riparian quality, moderate to slight erosion, flowing water; 10-Perennial, high riparian quality, no erosion, flowing water.

Wildlife Habitat Quality Ratings:

0-Low Quality; 1-Medium to Low Quality; ②-Medium Quality; ③-Medium to High Quality; 4-High Quality

D. Richardson

7/14/2003

Stream Data

Project Name: RTG - SH 121  
 Surveyor(s): T. TRIMBLE, T. RINGENBERG

Date: JANUARY 27, 2004  
 State/County: JOHNSON / TX

Stream Name.: EPAHEMERAL  
 Topo Quad Name: PRIMROSE  
 Station No.: Entrance: — Exit: —  
 Photo Number(s):                     

Stream No.: 5-4  
 Parcel No.:                       
 GPS Data: YES  NO   
 Associated Wetland: YES  NO

Stream Flow		Bottom Characteristics	
Perceptible Flow	Yes [ ] No [X]	Probed Stream Depth	Substrate Type
Flow Year Round	Yes [ ] No [X]	(if possible)	
Stream Flow Direction	<u>E/NE</u>	<input checked="" type="checkbox"/> 0-6"	<input type="checkbox"/> Bedrock
Stream Width (ft) (water's edge to water's edge)	<u>1'</u>	<input type="checkbox"/> 7-12"	<input type="checkbox"/> Gravel
Stream Width (ft) (bank to bank)	<u>6'</u>	<input type="checkbox"/> 12-24"	<input type="checkbox"/> Sand
OHWB (ft) (height)	<u>2'</u>	<input type="checkbox"/> 25-36"	<input checked="" type="checkbox"/> Silt/Clay
		<input type="checkbox"/> 37" +	<input type="checkbox"/> Organic
		Notes:	

Bank Height and Slope		Aquatic Habitat	
Left Bank *	Right Bank *	<input type="checkbox"/> Sand bar	<input type="checkbox"/> Sand/Gravel beach/bar
<u>0-3' High</u>		<input type="checkbox"/> Mud bar	<input checked="" type="checkbox"/> Overhanging trees/shrubs
<input type="checkbox"/> 0-20% (0-11°)	<input type="checkbox"/>	<input type="checkbox"/> Gravel riffles	<input type="checkbox"/> Deep pool/hole
<input checked="" type="checkbox"/> 21-50 (12-27°)	<input checked="" type="checkbox"/>	<input type="checkbox"/> Aquatic vegetation	<input type="checkbox"/> Other: <u>                    </u>
<input type="checkbox"/> 51-100% (28-45°)	<input type="checkbox"/>	Water Quality	
<input type="checkbox"/> 100% + (46° +)	<input type="checkbox"/>	Clarity:	<input type="checkbox"/> Clear
<u>3-6' High</u>		<u>N/A</u>	<input type="checkbox"/> Slightly Turbid
<input type="checkbox"/> 0-20% (0-11°)	<input type="checkbox"/>		<input type="checkbox"/> Turbid
<input type="checkbox"/> 21-50 (12-27°)	<input type="checkbox"/>		<input type="checkbox"/> Very Turbid
<input type="checkbox"/> 51-100% (28-45°)	<input type="checkbox"/>	Color: <u>                    </u>	(if other than clear)
<input type="checkbox"/> 100% + (46° +)	<input type="checkbox"/>	Aquatic Organisms	
<u>6' + High</u>		<input type="checkbox"/> None Observed	
<input type="checkbox"/> 0-20% (0-11°)	<input type="checkbox"/>	<input type="checkbox"/> Waterfowl	
<input type="checkbox"/> 21-50 (12-27°)	<input type="checkbox"/>	<input type="checkbox"/> Fish	
<input type="checkbox"/> 51-100% (28-45°)	<input type="checkbox"/>	<input type="checkbox"/> Snakes <u>P</u>	
<input type="checkbox"/> 100% + (46° +)	<input type="checkbox"/>	<input type="checkbox"/> Turtles <u>P</u>	
Evidence of Erosion? <u>MODERATE</u>		<input type="checkbox"/> Frogs <u>P</u>	
*Direction when facing downstream.		<input type="checkbox"/> Invertebrates <u>P</u>	
		<input type="checkbox"/> Other: <u>                    </u>	

Stream Data (continue)

Project Name: RTG-SH121

Date: JANUARY 27, 2004

State/County: JOHNSON / TX

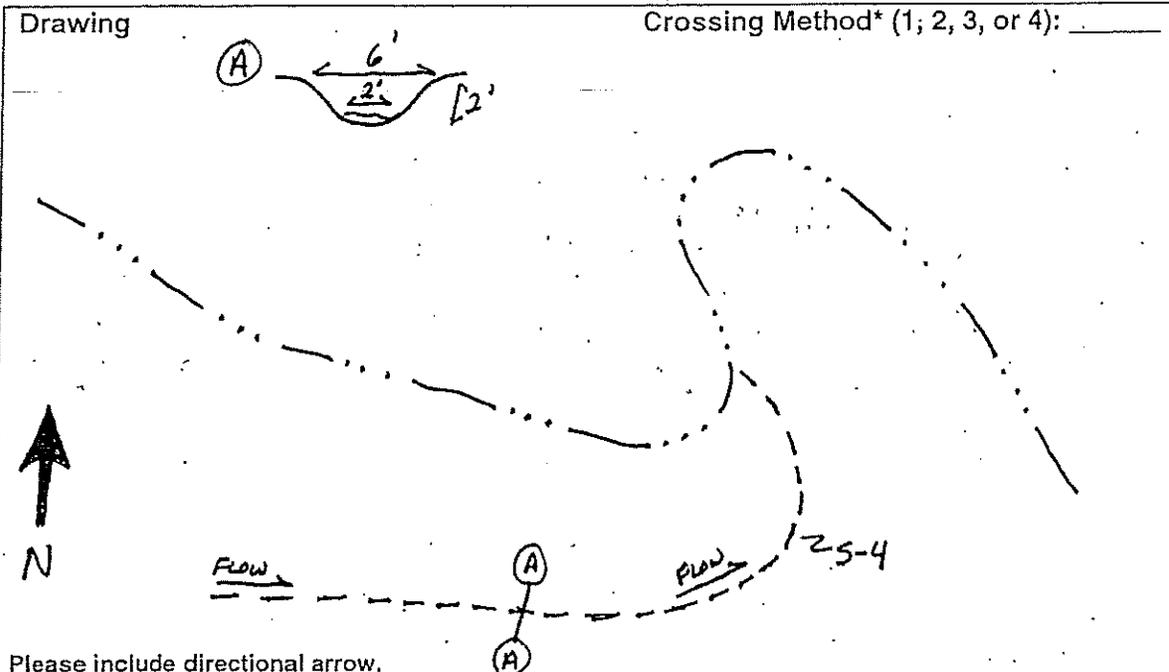
Stream Name.: S-4

Topo Quad Name: PRIMEOSE

Stream No.: \_\_\_\_\_

Photo Number(s): \_\_\_\_\_

Associated Wetland: NO



Riparian Vegetation Description  
*CELTIS LAEVIGATA, ILEX VOMITORIA, SMILAX BONA-NOX, ELYMUS VIRGINICUS, CEPHALANTHUS OCCIDENTALIS*

T/E Species/Suitable Habitat  
 NONE OBSERVED

Comments (i.e., stream & wildlife functionality\*\*, angle at pipeline crossing, construction constraints, erosion potential, existing disturbances, and meanders)

\*Stream Crossing Methods  
 Crossing Method 1-(Wet <50') small perennial streams (10-50'), ditches, intermittent streams. Equipment will work from the banks.  
 Crossing Method 2-(Dry 10-50') Perennial streams with downstream users or listed species.  
 Crossing Method 3-(Wet >50') Streams >50' that will not be directionally drilled.  
 Crossing Method 4-(Directional Drill) All canoe trails.

\*\*Riparian Function Ratings:  
 0-Ephemeral, low riparian quality, severe erosion; 1-Ephemeral, medium riparian quality, moderate erosion; 2-Ephemeral, medium to high riparian quality, slight erosion; 3-Ephemeral, high riparian quality, no erosion; 4-Intermittent, low riparian quality, severe erosion; 5-Intermittent, medium riparian quality, moderate erosion, no pooling; 6-Intermittent, medium to high riparian quality, slight erosion, pooling; 7-Intermittent, high riparian quality, no erosion, pooling; 8-Perennial, low riparian quality, severe erosion, flowing water; 9-Perennial, medium riparian quality, moderate to slight erosion, flowing water; 10-Perennial, high riparian quality, no erosion, flowing water.  
 Wildlife Habitat Quality Ratings:  
 0-Low Quality; 1-Medium to Low Quality; 2-Medium Quality; 3-Medium to High Quality; 4-High Quality

Stream Data

Project Name: RTG - SH 121  
 Surveyor(s): T. TRIMBLE, T. RINGENBERG

Date: JANUARY 27, 2004  
 State/County: JOHNSON / TX

Stream Name: EPHEMERAL  
 Topo Quad Name: PRIMROSE  
 Station No.: Entrance: — Exit: —  
 Photo Number(s):                     

Stream No.: S-5  
 Parcel No.:                       
 GPS Data: YES X NO             
 Associated Wetland: YES            NO X

Stream Flow		Bottom Characteristics	
Perceptible Flow	Yes [ ] No [X]	Probed Stream Depth	Substrate Type
Flow Year Round	Yes [ ] No [X]	(if possible)	
Stream Flow Direction	<u>SW</u>	<input checked="" type="checkbox"/> 0-6"	<input type="checkbox"/> Bedrock
Stream Width (ft) (water's edge to water's edge)	<u>0'</u>	<input type="checkbox"/> 7-12"	<input type="checkbox"/> Gravel
Stream Width (ft) (bank to bank)	<u>6'</u>	<input type="checkbox"/> 12-24"	<input type="checkbox"/> Sand
OHWM (ft) (height) :	<u>1'</u>	<input type="checkbox"/> 25-36"	<input checked="" type="checkbox"/> Silt/Clay
		<input type="checkbox"/> 37" +	<input type="checkbox"/> Organic
		Notes:	

Bank Height and Slope		Aquatic Habitat	
Left Bank *	Right Bank *	<input type="checkbox"/> Sand bar	
		<input type="checkbox"/> Sand/Gravel beach/bar	
		<input type="checkbox"/> Mud bar	
		<input checked="" type="checkbox"/> Overhanging trees/shrubs	
		<input type="checkbox"/> Gravel riffles	
		<input type="checkbox"/> Deep pool/hole	
		<input type="checkbox"/> Aquatic vegetation	
		<input type="checkbox"/> Other: <u>                    </u>	
		Water Quality	
		Clarity:	<input type="checkbox"/> Clear
			<input type="checkbox"/> Slightly Turbid
		<u>N/A</u>	<input type="checkbox"/> Turbid
			<input type="checkbox"/> Very Turbid
		Color: <u>                    </u>	(if other than clear)
		Aquatic Organisms	
		<input type="checkbox"/> None Observed	
		<input type="checkbox"/> Waterfowl	
		<input type="checkbox"/> Fish	
		<input type="checkbox"/> Snakes $\rho$	
		<input type="checkbox"/> Turtles $\rho$	
		<input type="checkbox"/> Frogs $\rho$	
		<input type="checkbox"/> Invertebrates $\rho$	
		<input type="checkbox"/> Other: <u>                    </u>	
Evidence of Erosion? <u>MODERATE</u>			
*Direction when facing downstream.			

Stream Data (continue)

Project Name: RTG - SH 121

Date: JANUARY 27, 2004

State/County: JOHNSON / TX

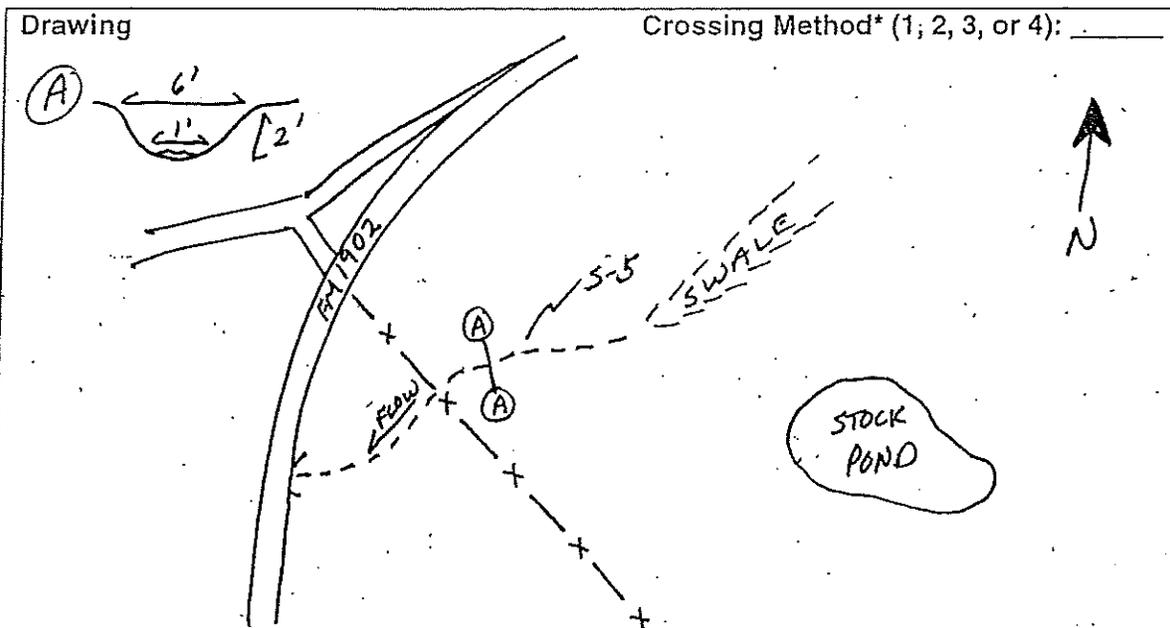
Stream Name: S-5

Topo Quad Name: \_\_\_\_\_

Stream No.: \_\_\_\_\_

Photo Number(s): \_\_\_\_\_

Associated Wetland: NO



Please include directional arrow.

Riparian Vegetation Description

*CYNODON DACTYLON, CELTIS LAEVI-GATA, AMBROSIA PSYLOSTACHYA, AMBROSIA TRIFIDA, VA ANNUA*

T/E Species/Suitable Habitat

NONE OBSERVED

Comments (i.e., stream & wildlife functionality\*\*, angle at pipeline crossing, construction constraints, erosion potential, existing disturbances, and meanders)

\*Stream Crossing Methods

Crossing Method 1-(Wet <50') small perennial streams (10-50'), ditches, intermittent streams. Equipment will work from the banks.

Crossing Method 2-(Dry 10-50') Perennial streams with downstream users or listed species.

Crossing Method 3-(Wet >50') Streams >50' that will not be directionally drilled.

Crossing Method 4-(Directional Drill) All canoe trails.

\*\*Riparian Function Ratings:

0-Ephemeral, low riparian quality, severe erosion; 1-Ephemeral, medium riparian quality, moderate erosion; 2-Ephemeral, medium to high riparian quality, slight erosion; 3-Ephemeral, high riparian quality, no erosion; 4-Intermittent, low riparian quality, severe erosion; 5-Intermittent, medium riparian quality, moderate erosion, no pooling; 6-Intermittent, medium to high riparian quality, slight erosion, pooling; 7-Intermittent, high riparian quality, no erosion, pooling; 8-Perennial, low riparian quality, severe erosion, flowing water; 9-Perennial, medium riparian quality, moderate to slight erosion, flowing water; 10-Perennial, high riparian quality, no erosion, flowing water.

Wildlife Habitat Quality Ratings:

0-Low Quality; 1-Medium to Low Quality; 2-Medium Quality; 3-Medium to High Quality; 4-High Quality

D. Richardson

7/14/2003

Stream Data

Project Name: RTG-SH121 Date: JANUARY 27, 2004  
 Surveyor(s): T. TRIMBLE, T. RINGENBERG State/County: JOHNSON / TX

Stream Name: INTERMITTENT Stream No.: S-6  
 Topo Quad Name: PRIMROSE Parcel No.: \_\_\_\_\_  
 Station No.: Entrance: — Exit: — GPS Data: YES X NO \_\_\_\_\_  
 Photo Number(s): \_\_\_\_\_ Associated Wetland: YES \_\_\_\_\_ NO X

Stream Flow		Bottom Characteristics	
Perceptible Flow	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Probed Stream Depth	Substrate Type
Flow Year Round	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	(if possible)	
Stream Flow Direction	<u>WEST</u>	<input type="checkbox"/> 0-6"	<input type="checkbox"/> Bedrock
Stream Width (ft) (water's edge to water's edge)	<u>5'</u>	<input type="checkbox"/> 7-12"	<input checked="" type="checkbox"/> Gravel
Stream Width (ft) (bank to bank)	<u>18'</u>	<input type="checkbox"/> 12-24"	<input type="checkbox"/> Sand
OHWM (ft) (height):	<u>8'</u>	<input checked="" type="checkbox"/> 25-36"	<input checked="" type="checkbox"/> Silt/Clay
		<input type="checkbox"/> 37" +	<input type="checkbox"/> Organic
		Notes:	

Bank Height and Slope		Aquatic Habitat	
Left Bank*	Right Bank*	<input type="checkbox"/> Sand bar	
<u>0-3' High</u>		<input type="checkbox"/> Sand/Gravel beach/bar	
<input type="checkbox"/> 0-20% (0-11°)	<input type="checkbox"/>	<input type="checkbox"/> Mud bar	
<input type="checkbox"/> 21-50 (12-27°)	<input type="checkbox"/>	<input type="checkbox"/> Overhanging trees/shrubs	
<input type="checkbox"/> 51-100% (28-45°)	<input type="checkbox"/>	<input type="checkbox"/> Gravel riffles	
<input type="checkbox"/> 100% + (46° +)	<input type="checkbox"/>	<input checked="" type="checkbox"/> Deep pool/hole	
		<input type="checkbox"/> Aquatic vegetation	
		<input type="checkbox"/> Other: _____	
		Water Quality	
<u>3-6' High</u>		Clarity:	<input type="checkbox"/> Clear
<input type="checkbox"/> 0-20% (0-11°)	<input type="checkbox"/>		<input checked="" type="checkbox"/> Slightly Turbid
<input type="checkbox"/> 21-50 (12-27°)	<input type="checkbox"/>		<input type="checkbox"/> Turbid
<input checked="" type="checkbox"/> 51-100% (28-45°)	<input checked="" type="checkbox"/>		<input type="checkbox"/> Very Turbid
<input type="checkbox"/> 100% + (46° +)	<input type="checkbox"/>	Color:	<u>AMBER</u> (if other than clear)
		Aquatic Organisms	
<u>6' + High</u>		<input type="checkbox"/> None Observed	
<input type="checkbox"/> 0-20% (0-11°)	<input type="checkbox"/>	<input type="checkbox"/> Waterfowl	
<input type="checkbox"/> 21-50 (12-27°)	<input type="checkbox"/>	<input checked="" type="checkbox"/> Fish	
<input type="checkbox"/> 51-100% (28-45°)	<input type="checkbox"/>	<input type="checkbox"/> Snakes	
<input type="checkbox"/> 100% + (46° +)	<input type="checkbox"/>	<input checked="" type="checkbox"/> Turtles	
Evidence of Erosion?	<u>HEAVY</u>	<input checked="" type="checkbox"/> Frogs	
*Direction when facing downstream.		<input checked="" type="checkbox"/> Invertebrates	
		<input type="checkbox"/> Other:	

Stream Data (continue)

Project Name: RTG- SH 121

Date: JANUARY 27, 2004

State/County: JOHNSON / TX

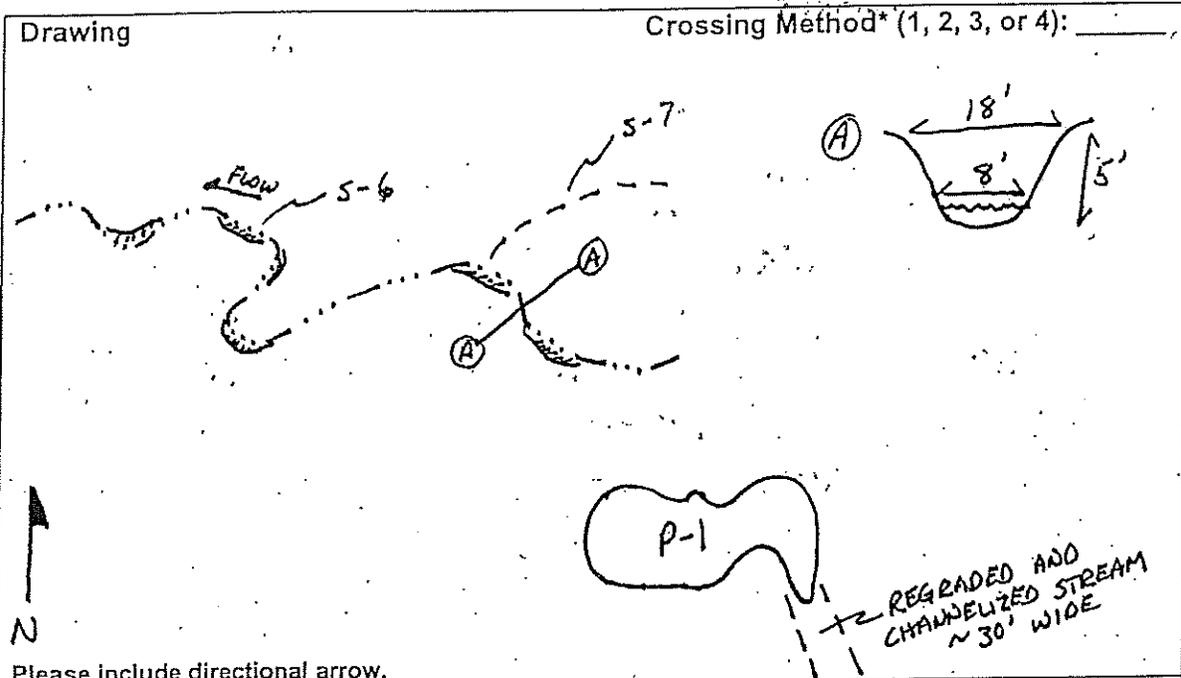
Stream Name: S-6 / P-1

Topo Quad Name: PRIMROSE

Stream No.: \_\_\_\_\_

Photo Number(s): \_\_\_\_\_

Associated Wetland: NO



Riparian Vegetation Description  
 SMILAX BONA-ROX, XANTHIUM STRUMARINUM, IVA ANNUA, MACLURA AMIFERA,  
 LYONON DACTYLON, PANICUM VIRGATUM, AMBROSIA TRIFIDA, PROSOPIS GRANDULOSA

T/E Species/Suitable Habitat  
 NONE OBSERVED

Comments (i.e., stream & wildlife functionality\*\*, angle at pipeline crossing, construction constraints, erosion potential, existing disturbances, and meanders)  
 ALTHOUGH PAST LAND DISTURBANCES HAVE FILLED OR CHANNELIZED THE CHANNEL, THE TWO PONDS WERE CONSIDERED ON-CHANNEL DUE TO HISTORICAL AERIAL PHOTOS VERIFYING THEY WERE HISTORICALLY ON-CHANNEL PONDS.

\*Stream Crossing Methods  
 Crossing Method 1-(Wet <50') small perennial streams (10-50'), ditches, intermittent streams. Equipment will work from the banks.  
 Crossing Method 2-(Dry 10-50') Perennial streams with downstream users or listed species.  
 Crossing Method 3-(Wet >50') Streams >50' that will not be directionally drilled.  
 Crossing Method 4-(Directional Drill) All canoe trails.

\*\*Riparian Function Ratings:  
 ①-Ephemeral, low riparian quality, severe erosion; 1-Ephemeral, medium riparian quality, moderate erosion; 2-Ephemeral, medium to high riparian quality, slight erosion; 3-Ephemeral, high riparian quality, no erosion; 4-Intermittent, low riparian quality, severe erosion; 5-Intermittent, medium riparian quality, moderate erosion, no pooling; 6-Intermittent, medium to high riparian quality, slight erosion, pooling; 7-Intermittent, high riparian quality, no erosion, pooling; 8-Perennial, low riparian quality, severe erosion, flowing water; 9-Perennial, medium riparian quality, moderate to slight erosion, flowing water; 10-Perennial, high riparian quality, no erosion, flowing water.  
 Wildlife Habitat Quality Ratings:  
 ①-Low Quality; 1-Medium to Low Quality; 2-Medium Quality; 3-Medium to High Quality; 4-High Quality

Stream Data

Project Name: RTG - SH 121 Date: JANUARY 27, 2004  
 Surveyor(s): T. TRIMBLE, T. RINGENBERG State/County: JOHNSON / TX

Stream Name.: EPHEMERAL Stream No.: S-7  
 Topo Quad Name: PRIMROSE Parcel No.: \_\_\_\_\_  
 Station No.: Entrance: — Exit: — GPS Data: YES X NO \_\_\_\_\_  
 Photo Number(s): \_\_\_\_\_ Associated Wetland: YES \_\_\_\_\_ NO X

Stream Flow	Bottom Characteristics
Perceptible Flow Yes [ ] No [X] Flow Year Round Yes [ ] No [X]	Probed Stream Depth Substrate Type (if possible)
Stream Flow Direction <u>SOUTH</u>	<input checked="" type="checkbox"/> 0-6" [ ] Bedrock [ ] 7-12" [ ] Gravel [ ] 12-24" [ ] Sand [ ] 25-36" <input checked="" type="checkbox"/> Silt/Clay [ ] 37" + [ ] Organic
Stream Width (ft) (water's edge to water's edge) <u>0</u>	Notes: _____
Stream Width (ft) (bank to bank) <u>4'</u>	
OHWM (ft) (height) : <u>1'</u>	

Bank Height and Slope	Aquatic Habitat
Left Bank * Right Bank *	<input type="checkbox"/> Sand bar <input type="checkbox"/> Sand/Gravel beach/bar <input type="checkbox"/> Mud bar <input checked="" type="checkbox"/> Overhanging trees/shrubs <input type="checkbox"/> Gravel riffles <input checked="" type="checkbox"/> Deep pool/hole ( <u>CATTLE HOLE</u> ) <input type="checkbox"/> Aquatic vegetation <input type="checkbox"/> Other: _____
<u>0-3' High</u>	<u>Water Quality</u>
<input checked="" type="checkbox"/> 0-20% (0-11°) <input checked="" type="checkbox"/>	Clarity: [ ] Clear <input checked="" type="checkbox"/> Slightly Turbid [ ] Turbid [ ] Very Turbid
[ ] 21-50 (12-27°) [ ]	Color: <u>BROWN</u> (if other than clear)
[ ] 51-100% (28-45°) [ ]	<u>Aquatic Organisms</u>
[ ] 100% + (46° +) [ ]	[ ] None Observed [ ] Waterfowl [ ] Fish [ ] Snakes <u>P</u> [ ] Turtles <u>P</u> [ ] Frogs <u>P</u> [ ] Invertebrates <u>P</u> [ ] Other: _____
<u>3-6' High</u>	
[ ] 0-20% (0-11°) [ ]	
[ ] 21-50 (12-27°) [ ]	
[ ] 51-100% (28-45°) [ ]	
[ ] 100% + (46° +) [ ]	
<u>6' + High</u>	
[ ] 0-20% (0-11°) [ ]	
[ ] 21-50 (12-27°) [ ]	
[ ] 51-100% (28-45°) [ ]	
[ ] 100% + (46° +) [ ]	
Evidence of Erosion? <u>MOODERATE</u>	
*Direction when facing downstream.	

Stream Data (continue)

Project Name: RTG-SH.121

Date: JANUARY 27, 2004

State/County: JOHNSON / TX

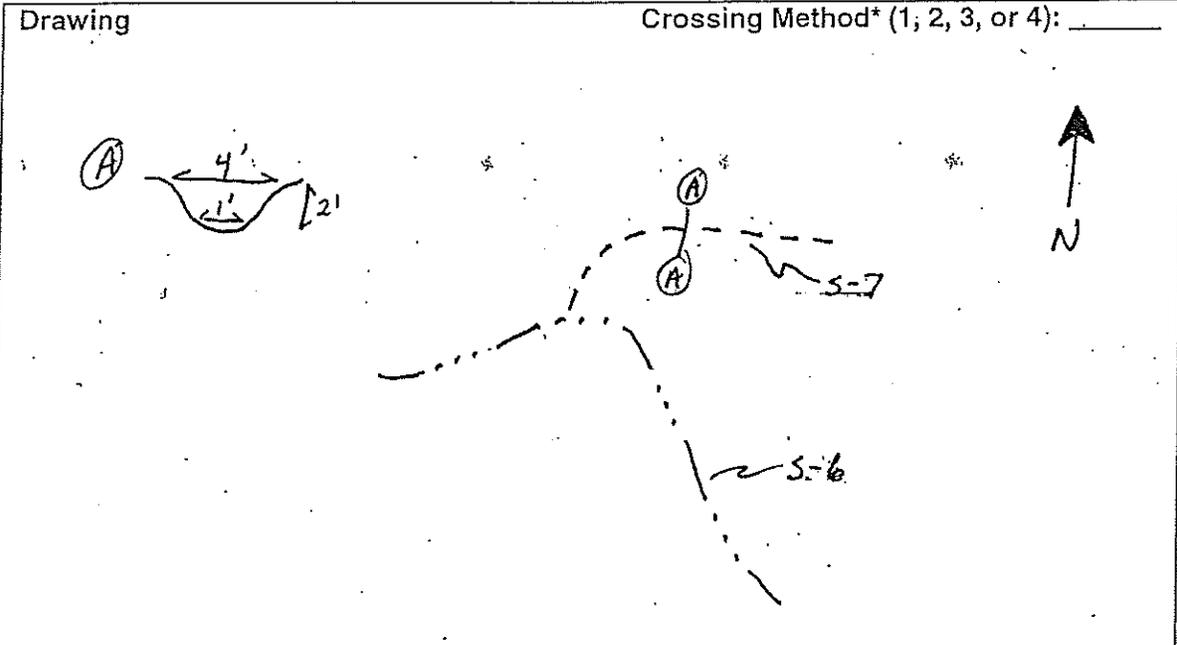
Stream Name.: S-

Topo Quad Name: PRIMROSE

Stream No.: \_\_\_\_\_

Photo Number(s): \_\_\_\_\_

Associated Wetland: NO



Please include directional arrow.

Riparian Vegetation Description  
CYNODON DACTYLON, MALVURA AMIFERA, AMBRISIA TRIFIDA, IVA ANNUA

T/E Species/Suitable Habitat  
NONE OBSERVED

Comments (i.e., stream & wildlife functionality\*\*, angle at pipeline crossing, construction constraints, erosion potential, existing disturbances, and meanders)

\*Stream Crossing Methods  
 Crossing Method 1-(Wet <50') small perennial streams (10-50'), ditches, intermittent streams. Equipment will work from the banks.  
 Crossing Method 2-(Dry 10-50') Perennial streams with downstream users or listed species.  
 Crossing Method 3-(Wet >50') Streams >50' that will not be directionally drilled.  
 Crossing Method 4-(Directional Drill) All canoe trails.

\*\*Riparian Function Ratings:  
 0-Ephemeral, low riparian quality, severe erosion; 1-Ephemeral, medium riparian quality, moderate erosion; 2-Ephemeral, medium to high riparian quality, slight erosion; 3-Ephemeral, high riparian quality, no erosion; 4-Intermittent, low riparian quality, severe erosion; 5-Intermittent, medium riparian quality, moderate erosion, no pooling; 6-Intermittent, medium to high riparian quality, slight erosion, pooling; 7-Intermittent, high riparian quality, no erosion, pooling; 8-Perennial, low riparian quality, severe erosion, flowing water; 9-Perennial, medium riparian quality, moderate to slight erosion, flowing water; 10-Perennial, high riparian quality, no erosion, flowing water.

Wildlife Habitat Quality Ratings:  
 0-Low Quality; 1-Medium to Low Quality; 2-Medium Quality; 3-Medium to High Quality; 4-High Quality

Stream Data

Project Name: RTG - SH121 Date: JANUARY 28, 2004  
 Surveyor(s): T. TRIMBLE, T. RINGENBERG State/County: JOHNSON / TX

Stream Name.: INTERMITTENT Stream No.: 5-8  
 Topo Quad Name: JOSHUA Parcel No.: \_\_\_\_\_  
 Station No.: Entrance: — Exit: — GPS Data: YES X NO \_\_\_\_\_  
 Photo Number(s): \_\_\_\_\_ Associated Wetland: YES \_\_\_\_\_ NO X

Stream Flow	Bottom Characteristics
Perceptible Flow Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Probed Stream Depth (if possible)
Flow Year Round Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Substrate Type
Stream Flow Direction <u>NW</u>	<input type="checkbox"/> 0-6" <input type="checkbox"/> Bedrock
Stream Width (ft) (water's edge to water's edge) <u>6'</u>	<input checked="" type="checkbox"/> 7-12" <input type="checkbox"/> Gravel
Stream Width (ft) (bank to bank) <u>10'-12'</u>	<input type="checkbox"/> 12-24" <input type="checkbox"/> Sand
OHWM (ft) (height) : <u>7'</u>	<input type="checkbox"/> 25-36" <input checked="" type="checkbox"/> Silt/Clay
	<input type="checkbox"/> 37" + <input type="checkbox"/> Organic
	Notes: _____

Bank Height and Slope	Aquatic Habitat
Left Bank * Right Bank *	<input type="checkbox"/> Sand bar
<u>0-3' High</u>	<input type="checkbox"/> Sand/Gravel beach/bar
<input type="checkbox"/> 0-20% (0-11°)	<input type="checkbox"/> Mud bar
<input type="checkbox"/> 21-50 (12-27°)	<input checked="" type="checkbox"/> Overhanging trees/shrubs
<input type="checkbox"/> 51-100% (28-45°)	<input type="checkbox"/> Gravel riffles
<input type="checkbox"/> 100% + (46° +)	<input checked="" type="checkbox"/> Deep pool/hole
	<input type="checkbox"/> Aquatic vegetation
	<input type="checkbox"/> Other: _____
<u>3-6' High</u>	Water Quality
<input type="checkbox"/> 0-20% (0-11°)	Clarity: <input type="checkbox"/> Clear
<input type="checkbox"/> 21-50 (12-27°)	<input checked="" type="checkbox"/> Slightly Turbid
<input checked="" type="checkbox"/> 51-100% (28-45°)	<input type="checkbox"/> Turbid
<input type="checkbox"/> 100% + (46° +)	<input type="checkbox"/> Very Turbid
	Color: <u>AMBER</u> (if other than clear)
<u>6' + High</u>	Aquatic Organisms
<input type="checkbox"/> 0-20% (0-11°)	<input type="checkbox"/> None Observed
<input type="checkbox"/> 21-50 (12-27°)	<input type="checkbox"/> Waterfowl
<input type="checkbox"/> 51-100% (28-45°)	<input type="checkbox"/> Fish $\rho$
<input type="checkbox"/> 100% + (46° +)	<input type="checkbox"/> Snakes $\rho$
Evidence of Erosion? <u>MODERATE</u>	<input type="checkbox"/> Turtles $\rho$
*Direction when facing downstream.	<input checked="" type="checkbox"/> Frogs
	<input checked="" type="checkbox"/> Invertebrates
	<input type="checkbox"/> Other: _____

Stream Data (continue)

Project Name: RTG-SH121

Date: JANUARY 28, 2004

State/County: JOHNSON TX

Stream Name: 5-8

Topo Quad Name: JOSHUA

Stream No.: \_\_\_\_\_

Photo Number(s): \_\_\_\_\_

Associated Wetland: NO

<p>Drawing</p>	<p>Crossing Method* (1, 2, 3, or 4): _____</p>
<p>Please include directional arrow.</p> <p>Riparian Vegetation Description <u>CYNODON DACTYLON, PROSOPIS GLANDULOSA</u></p>	
<p>T/E Species/Suitable Habitat <u>NONE OBSERVED</u></p>	
<p>Comments (i.e., stream &amp; wildlife functionality**, angle at pipeline crossing, construction constraints, erosion potential, existing disturbances, and meanders)</p>	
<p>*Stream Crossing Methods                  Crossing Method 1-(Wet &lt;50') small perennial streams (10-50'), ditches, intermittent streams. Equipment will work from the banks.                  Crossing Method 2-(Dry 10-50') Perennial streams with downstream users or listed species.                  Crossing Method 3-(Wet &gt;50') Streams &gt;50' that will not be directionally drilled.                  Crossing Method 4-(Directional Drill) All canoe trails.</p>	
<p>**Riparian Function Ratings:                  0-Ephemeral, low riparian quality, severe erosion; 1-Ephemeral, medium riparian quality, moderate erosion; 2-Ephemeral, medium to high riparian quality, slight erosion; 3-Ephemeral, high riparian quality, no erosion; 4-Intermittent, low riparian quality, severe erosion; 5-Intermittent, medium riparian quality, moderate erosion, no pooling; 6-Intermittent, medium to high riparian quality, slight erosion, pooling; 7-Intermittent, high riparian quality, no erosion, pooling; 8-Perennial, low riparian quality, severe erosion, flowing water; 9-Perennial, medium riparian quality, moderate to slight erosion, flowing water; 10-Perennial, high riparian quality, no erosion, flowing water.                  Wildlife Habitat Quality Ratings:                  0-Low Quality; 1-Medium to Low Quality; 2-Medium Quality; 3-Medium to High Quality; 4-High Quality</p>	

Stream Data

Project Name: RTG - SH 121 Date: JANUARY 28, 2004  
 Surveyor(s): T. TRIMBLE, T. RINGENBERG State/County: JOHNSON / TX

Stream Name.: EPIHEMERAL Stream No.: 5-9  
 Topo Quad Name: JOSHUA Parcel No.: \_\_\_\_\_  
 Station No.: Entrance: — Exit: — GPS Data: YES X NO \_\_\_\_\_  
 Photo Number(s): \_\_\_\_\_ Associated Wetland: YES \_\_\_\_\_ NO X

Stream Flow		Bottom Characteristics	
Perceptible Flow	Yes [ ] No [X]	Probed Stream Depth (if possible)	Substrate Type
Flow Year Round	Yes [ ] No [X]		
Stream Flow Direction	<u>SW</u>	<input checked="" type="checkbox"/> 0-6"	<input type="checkbox"/> Bedrock
Stream Width (ft) (water's edge to water's edge)	<u>0'</u>	<input type="checkbox"/> 7-12"	<input type="checkbox"/> Gravel
Stream Width (ft) (bank to bank)	<u>3'</u>	<input type="checkbox"/> 12-24"	<input type="checkbox"/> Sand
OHWM (ft) (height):	<u>1'</u>	<input type="checkbox"/> 25-36"	<input checked="" type="checkbox"/> Silt/Clay
		<input type="checkbox"/> 37" +	<input type="checkbox"/> Organic
		Notes: _____	

Bank Height and Slope		Aquatic Habitat	
Left Bank *	Right Bank *	<input type="checkbox"/> Sand bar	
		<input type="checkbox"/> Sand/Gravel beach/bar	
		<input type="checkbox"/> Mud bar	
		<input checked="" type="checkbox"/> Overhanging trees/shrubs	
		<input type="checkbox"/> Gravel riffles	
		<input type="checkbox"/> Deep pool/hole	
		<input type="checkbox"/> Aquatic vegetation	
		<input type="checkbox"/> Other: _____	
		<b>Water Quality</b>	
		Clarity:	<input type="checkbox"/> Clear
			<input type="checkbox"/> Slightly Turbid
		<u>N/A</u>	<input type="checkbox"/> Turbid
			<input type="checkbox"/> Very Turbid
		Color: _____	(if other than clear)
		<b>Aquatic Organisms</b>	
		<input checked="" type="checkbox"/> None Observed	
		<input type="checkbox"/> Waterfowl	
		<input type="checkbox"/> Fish	
		<input type="checkbox"/> Snakes <i>P</i>	
		<input type="checkbox"/> Turtles <i>P</i>	
		<input type="checkbox"/> Frogs <i>P</i>	
		<input type="checkbox"/> Invertebrates <i>P</i>	
		<input type="checkbox"/> Other: _____	
Evidence of Erosion? <u>MODERATE</u>			
*Direction when facing downstream.			

Stream Data (continue)

Project Name: RTG-SH 121 Date: JANUARY 28, 2004  
 State/County: JOHNSON / TX Stream Name.: S-  
 Topo Quad Name: \_\_\_\_\_ Stream No.: \_\_\_\_\_  
 Photo Number(s): \_\_\_\_\_ Associated Wetland: NO

<p>Drawing</p>	<p>Crossing Method* (1, 2, 3, or 4): _____</p>
<p>Please include directional arrow.</p> <p>Riparian Vegetation Description  <u>CYNODON DACTYLON, PROSOPIS GRANDULOSA</u></p>	
<p>T/E Species/Suitable Habitat  <u>NONE OBSERVED</u></p>	
<p>Comments (i.e., stream &amp; wildlife functionality**, angle at pipeline crossing, construction constraints, erosion potential, existing disturbances, and meanders)</p>	
<p>*Stream Crossing Methods                  Crossing Method 1-(Wet &lt;50') small perennial streams (10-50'), ditches, intermittent streams. Equipment will work from the banks.                  Crossing Method 2-(Dry 10-50') Perennial streams with downstream users or listed species.                  Crossing Method 3-(Wet &gt;50') Streams &gt;50' that will not be directionally drilled.                  Crossing Method 4-(Directional Drill) All canoe trails.</p>	
<p>**Riparian Function Ratings:                  0-Ephemeral, low riparian quality, severe erosion; 1-Ephemeral, medium riparian quality, moderate erosion; 2-Ephemeral, medium to high riparian quality, slight erosion; 3-Ephemeral, high riparian quality, no erosion; 4-Intermittent, low riparian quality, severe erosion; 5-Intermittent, medium riparian quality, moderate erosion, no pooling; 6-Intermittent, medium to high riparian quality, slight erosion, pooling; 7-Intermittent, high riparian quality, no erosion, pooling; 8-Perennial, low riparian quality, severe erosion, flowing water; 9-Perennial, medium riparian quality, moderate to slight erosion, flowing water; 10-Perennial, high riparian quality, no erosion, flowing water.                  Wildlife Habitat Quality Ratings:                  0-Low Quality; 1-Medium to Low Quality; 2-Medium Quality; 3-Medium to High Quality; 4-High Quality</p>	

Stream Data

Project Name: RTG-SH 121  
 Surveyor(s): T. TRIMBLE

Date: JANUARY 27 2004  
 State/County: JOHNSON / TX

Stream Name: WEST BUFFALO CREEK  
 Topo Quad Name: PRIMROSE  
 Station No.: Entrance: - Exit: -  
 Photo Number(s): \_\_\_\_\_

Stream No.: 5-10  
 Parcel No.: \_\_\_\_\_  
 GPS Data: YES X NO \_\_\_\_\_  
 Associated Wetland: YES \_\_\_\_\_ NO X

Stream Flow		Bottom Characteristics	
Perceptible Flow	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Probed Stream Depth (if possible)	Substrate Type
Flow Year Round	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Stream Flow Direction	<u>SOUTH</u>	<input type="checkbox"/> 0-6"	<input type="checkbox"/> Bedrock
Stream Width (ft) (water's edge to water's edge)	<u>6'</u>	<input type="checkbox"/> 7-12"	<input checked="" type="checkbox"/> Gravel
Stream Width (ft) (bank to bank)	<u>15'</u>	<input checked="" type="checkbox"/> 12-24"	<input type="checkbox"/> Sand
OHWM (ft) (height):	<u>8'</u>	<input type="checkbox"/> 25-36"	<input checked="" type="checkbox"/> Silt/Clay
		<input type="checkbox"/> 37" +	<input type="checkbox"/> Organic
		Notes: _____	

Bank Height and Slope		Aquatic Habitat	
Left Bank *	Right Bank *	<input type="checkbox"/> Sand bar	
		<input type="checkbox"/> Sand/Gravel beach/bar	
<u>0-3' High</u>		<input type="checkbox"/> Mud bar	
<input type="checkbox"/> 0-20% (0-11°)	<input type="checkbox"/>	<input type="checkbox"/> Overhanging trees/shrubs	
<input type="checkbox"/> 21-50 (12-27°)	<input type="checkbox"/>	<input type="checkbox"/> Gravel riffles	
<input type="checkbox"/> 51-100% (28-45°)	<input type="checkbox"/>	<input checked="" type="checkbox"/> Deep pool/hole	
<input type="checkbox"/> 100% + (46° +)	<input type="checkbox"/>	<input type="checkbox"/> Aquatic vegetation	
		<input type="checkbox"/> Other: _____	
		Water Quality	
<u>3-6' High</u>		Clarity: <input type="checkbox"/> Clear	
<input type="checkbox"/> 0-20% (0-11°)	<input type="checkbox"/>	<input checked="" type="checkbox"/> Slightly Turbid	
<input type="checkbox"/> 21-50 (12-27°)	<input type="checkbox"/>	<input type="checkbox"/> Turbid	
<input checked="" type="checkbox"/> 51-100% (28-45°)	<input checked="" type="checkbox"/>	<input type="checkbox"/> Very Turbid	
<input type="checkbox"/> 100% + (46° +)	<input type="checkbox"/>	Color: <u>AMBER</u> (if other than clear)	
		Aquatic Organisms	
<u>6' + High</u>		<input type="checkbox"/> None Observed	
<input type="checkbox"/> 0-20% (0-11°)	<input type="checkbox"/>	<input type="checkbox"/> Waterfowl	
<input type="checkbox"/> 21-50 (12-27°)	<input type="checkbox"/>	<input checked="" type="checkbox"/> Fish	
<input type="checkbox"/> 51-100% (28-45°)	<input type="checkbox"/>	<input type="checkbox"/> Snakes/P	
<input type="checkbox"/> 100% + (46° +)	<input type="checkbox"/>	<input checked="" type="checkbox"/> Turtles	
Evidence of Erosion? <u>HEAVY</u>		<input checked="" type="checkbox"/> Frogs	
*Direction when facing downstream.		<input checked="" type="checkbox"/> Invertebrates	
		<input type="checkbox"/> Other: _____	

Stream Data (continue)

Project Name: RTG-SH121

Date: JANUARY 27, 2004

State/County: JOHNSON / TX

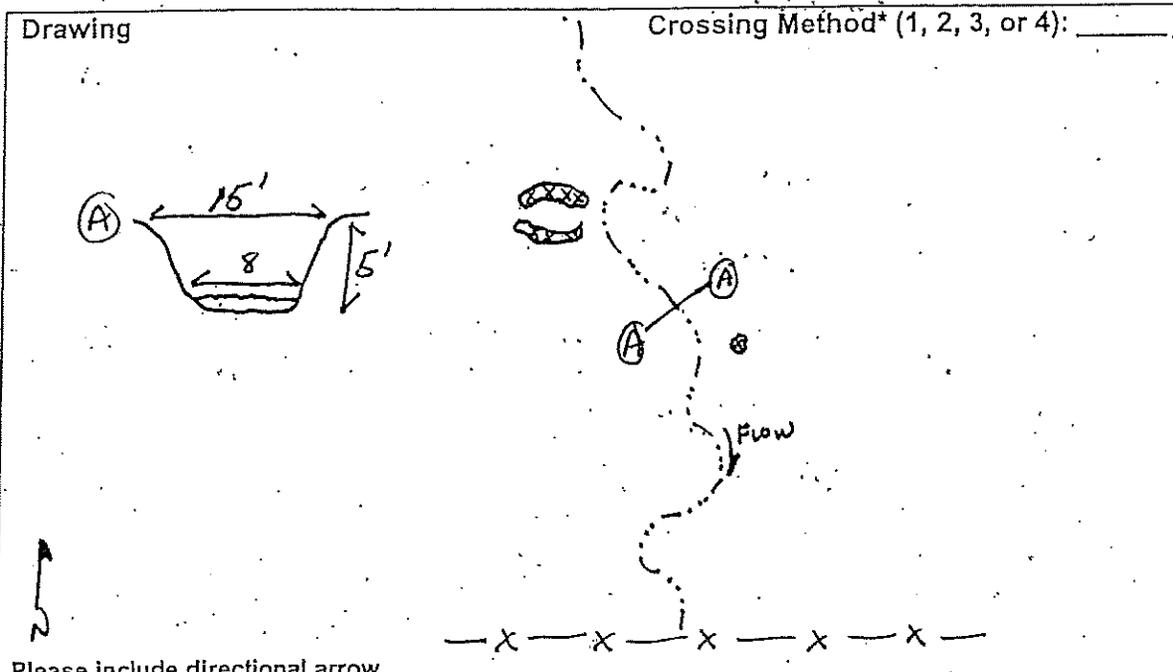
Stream Name: \_\_\_\_\_

Topo Quad Name: PRIMROSE

Stream No.: 5-10

Photo Number(s): \_\_\_\_\_

Associated Wetland: \_\_\_\_\_



Please include directional arrow.

Riparian Vegetation Description

*CYNODON DACTYLON, PROSOPIS GLANDULOSA, MALLUEA POMIFERA*

T/E Species/Suitable Habitat

NONE OBSERVED

Comments (i.e., stream & wildlife functionality\*\*, angle at pipeline crossing, construction constraints, erosion potential, existing disturbances, and meanders)

HEAVILY GRAZED AREA

\*Stream Crossing Methods

Crossing Method 1-(Wet <50') small perennial streams (10-50'), ditches, intermittent streams. Equipment will work from the banks.

Crossing Method 2-(Dry 10-50') Perennial streams with downstream users or listed species.

Crossing Method 3-(Wet >50') Streams >50' that will not be directionally drilled.

Crossing Method 4-(Directional Drill) All canoe trails.

\*\*Riparian Function Ratings:

①-Ephemeral, low riparian quality, severe erosion; 1-Ephemeral, medium riparian quality, moderate erosion; 2-Ephemeral, medium to high riparian quality, slight erosion; 3-Ephemeral, high riparian quality, no erosion; 4-Intermittent, low riparian quality, severe erosion; 5-Intermittent, medium riparian quality, moderate erosion, no pooling; 6-Intermittent, medium to high riparian quality, slight erosion, pooling; 7-Intermittent, high riparian quality, no erosion, pooling; 8-Perennial, low riparian quality, severe erosion, flowing water; 9-Perennial, medium riparian quality, moderate to slight erosion, flowing water; 10-Perennial, high riparian quality, no erosion, flowing water.

Wildlife Habitat Quality Ratings:

①-Low Quality; 1-Medium to Low Quality; 2-Medium Quality; 3-Medium to High Quality; 4-High Quality

D. Richardson

10/19/2003

Stream Data

Project Name: RTG - SH 121 Date: JANUARY 28, 2004  
 Surveyor(s): T. TRIMBLE, T. RINGENBERG State/County: JOHNSON / TX

Stream Name.: INTERMITTENT Stream No.: 5-11  
 Topo Quad Name: JOSHUA Parcel No.: \_\_\_\_\_  
 Station No.: Entrance: — Exit: — GPS Data: YES X NO \_\_\_\_\_  
 Photo Number(s): \_\_\_\_\_ Associated Wetland: YES \_\_\_\_\_ NO X

Stream Flow		Bottom Characteristics	
Perceptible Flow	Yes [ ] No [X]	Probed Stream Depth	Substrate Type
Flow Year Round	Yes [ ] No [X]	(if possible)	
Stream Flow Direction	<u>EAST</u>	<input checked="" type="checkbox"/> 0-6"	<input type="checkbox"/> Bedrock
Stream Width (ft) (water's edge to water's edge)	<u>1-3'</u>	<input type="checkbox"/> 7-12"	<input type="checkbox"/> Gravel
Stream Width (ft) (bank to bank)	<u>10'</u>	<input type="checkbox"/> 12-24"	<input type="checkbox"/> Sand
OHWM (ft) (height):	<u>3'</u>	<input type="checkbox"/> 25-36"	<input checked="" type="checkbox"/> Silt/Clay
		<input type="checkbox"/> 37" +	<input type="checkbox"/> Organic
		Notes:	

Bank Height and Slope		Aquatic Habitat	
Left Bank *	Right Bank *	<input type="checkbox"/> Sand bar	
		<input type="checkbox"/> Sand/Gravel beach/bar	
		<input type="checkbox"/> Mud bar	
		<input type="checkbox"/> Overhanging trees/shrubs	
		<input type="checkbox"/> Gravel riffles	
		<input checked="" type="checkbox"/> Deep pool/hole	
		<input type="checkbox"/> Aquatic vegetation	
		<input type="checkbox"/> Other: _____	
		Water Quality	
		Clarity:	<input type="checkbox"/> Clear
			<input type="checkbox"/> Slightly Turbid
			<input type="checkbox"/> Turbid
			<input checked="" type="checkbox"/> Very Turbid
		Color:	<u>BROWN</u> (if other than clear)
		Aquatic Organisms	
		<input checked="" type="checkbox"/> None Observed	
		<input type="checkbox"/> Waterfowl	
		<input type="checkbox"/> Fish	
		<input type="checkbox"/> Snakes <i>P</i>	
		<input type="checkbox"/> Turtles <i>P</i>	
		<input type="checkbox"/> Frogs <i>P</i>	
		<input type="checkbox"/> Invertebrates <i>P</i>	
		<input type="checkbox"/> Other: _____	
Evidence of Erosion? <u>HEAVY</u>			
*Direction when facing downstream.			

Stream Data (continue)

Project Name: RTG-SH121

Date: JANUARY 28, 2004

State/County: JOHNSON / TX

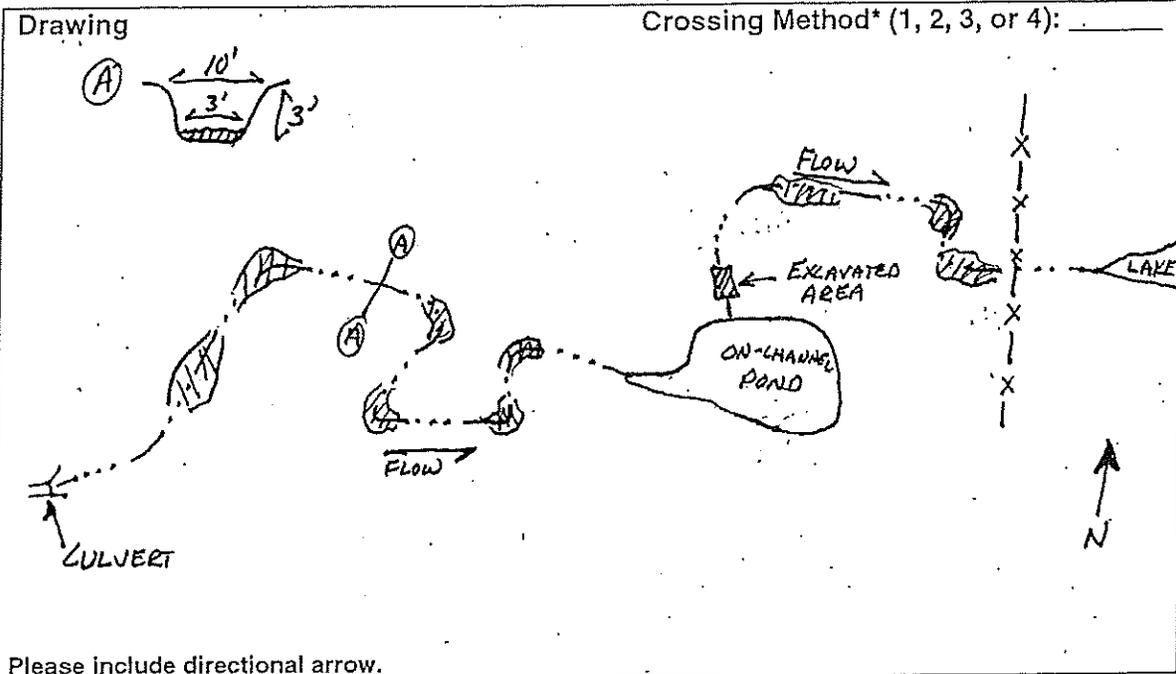
Stream Name: S-11

Topo Quad Name: JOSHUA

Stream No.: \_\_\_\_\_

Photo Number(s): \_\_\_\_\_

Associated Wetland: NO



Please include directional arrow.

Riparian Vegetation Description

*CYNODON DACTYLON, PROSOPIS GRANULOSA, IVA ANNUA*

T/E Species/Suitable Habitat

NONE OBSERVED

Comments (i.e., stream & wildlife functionality\*\*, angle at pipeline crossing, construction constraints, erosion potential, existing disturbances, and meanders)

\*Stream Crossing Methods

Crossing Method 1-(Wet <50') small perennial streams (10-50'), ditches, intermittent streams. Equipment will work from the banks.

Crossing Method 2-(Dry 10-50') Perennial streams with downstream users or listed species.

Crossing Method 3-(Wet >50') Streams >50' that will not be directionally drilled.

Crossing Method 4-(Directional Drill) All canoe trails.

\*\*Riparian Function Ratings:

①-Ephemeral, low riparian quality, severe erosion; 1-Ephemeral, medium riparian quality, moderate erosion; 2-Ephemeral, medium to high riparian quality, slight erosion; 3-Ephemeral, high riparian quality, no erosion; 4-Intermittent, low riparian quality, severe erosion; 5-Intermittent, medium riparian quality, moderate erosion, no pooling; 6-Intermittent, medium to high riparian quality, slight erosion, pooling; 7-Intermittent, high riparian quality, no erosion, pooling; 8-Perennial, low riparian quality, severe erosion, flowing water; 9-Perennial, medium riparian quality, moderate to slight erosion, flowing water; 10-Perennial, high riparian quality, no erosion, flowing water.

Wildlife Habitat Quality Ratings:

①-Low Quality; 1-Medium to Low Quality; 2-Medium Quality; 3-Medium to High Quality; 4-High Quality

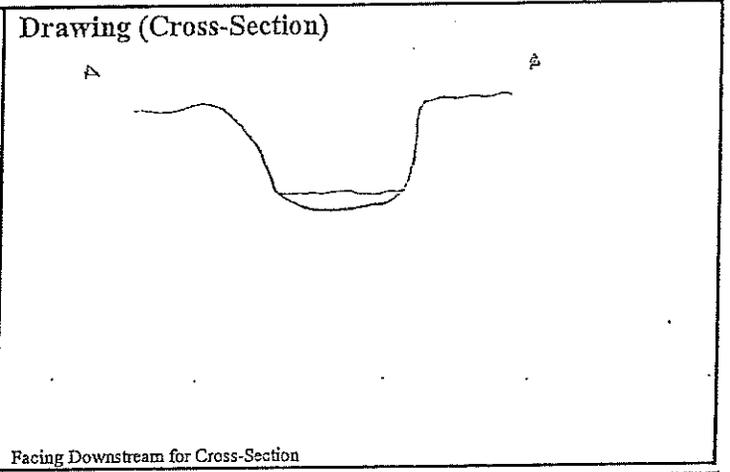
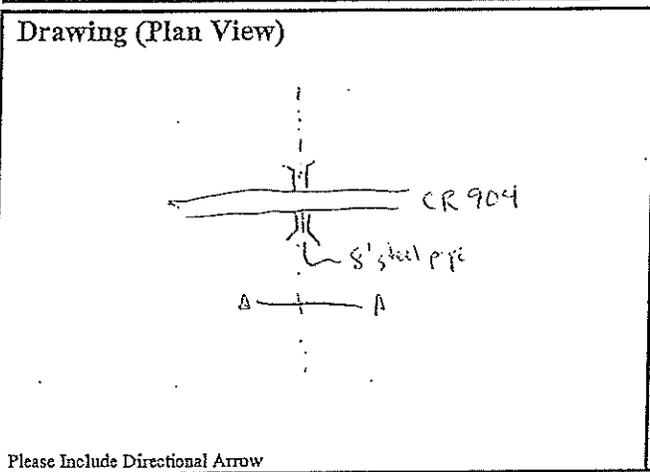
D. Richardson

7/14/2003

# STREAM DATA SHEET

Stream #: \_\_\_\_\_ Date: 11/12/08

Project Name: SHIL		Project No.:	
County/State: Johnson/TX		Surveyors: Rwa JW	
Stream Name: West Bullalo Creek		GPS Unit #:	
<b>Stream Characteristics</b>			
<i>Stream Width:</i>		<i>Stream Height/Depth:</i>	
Bank to Bank = 20'		Avg. Banks = 6'	
Waters Edge = 10'		Avg. Water = 2'	
OHWM = 15'		OHWM = 4'	
<i>Stream Flow:</i>	<input type="checkbox"/> Perennial	<input checked="" type="checkbox"/> Intermittent	<input type="checkbox"/> Ephemeral
<i>Erosion:</i>	<input type="checkbox"/> Heavy	<input type="checkbox"/> Moderate	<input type="checkbox"/> Slight
<i>Flow Regime:</i>	<input type="checkbox"/> Upstream Development	<input type="checkbox"/> Dense Regrowth	<input type="checkbox"/> Heavy Downcutting



Please Include Directional Arrow

Facing Downstream for Cross-Section

**Substrate Description**

<input type="checkbox"/> Bedrock	<input type="checkbox"/> Boulder	<input type="checkbox"/> Cobble	<input type="checkbox"/> Gravel	<input type="checkbox"/> Sand	<input checked="" type="checkbox"/> Silt/Clay	<input type="checkbox"/> Organic	<input type="checkbox"/> Concrete
<input type="checkbox"/> Other (Describe)							

**Aquatic Habitat (Instream) Description**

<input checked="" type="checkbox"/> Undercut Banks	<input checked="" type="checkbox"/> Logs/Brush	<input type="checkbox"/> Aquatic Veg.	<input type="checkbox"/> Sand Bar	<input type="checkbox"/> Mud Bar
<input checked="" type="checkbox"/> Overhanging Veg.	<input type="checkbox"/> Gravel Riffles	<input type="checkbox"/> Deep Pools	<input type="checkbox"/> Oxbows	<input type="checkbox"/> Shallows
Species (Description)				

**Riparian Zone Description**

<input type="checkbox"/> Forest	<input type="checkbox"/> Scrub/Shrub	<input type="checkbox"/> Old-Field/ROW	<input type="checkbox"/> Pasture	<input type="checkbox"/> Row Crop
<input type="checkbox"/> Wetland	<input type="checkbox"/> Paved	<input type="checkbox"/> Residential	<input type="checkbox"/> Park	<input type="checkbox"/> Other
Species (Description) Am. Elm, hackberry, willow, dewberry, greenbrier, <sup>giant</sup> ragweed, bromweed, silver bluestem, hesperis johnsonii, goldenrod				
Width:	Age Class:	Existing Species Composition Sufficient for Maintenance and Recovery:	<input type="checkbox"/> Y:	<input type="checkbox"/> N

**Notes**  
 Overgrazed pasture to south. regrowth weeds/saplings to north.  
 Pools but no flow.

# ATTACHMENT C

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## REPRESENTATIVE SITE PHOTOS

**SH 121 Extension, Cleburne, Texas  
Representative Site Photographs**



**Photo 1.** Facing west along Stream Channel 1 (S-1) south of FM917. S-1 is an ephemeral stream with a scrub overstory.



**Photo 2.** Facing northeast across W-1 which is located on the northern side of S-2. W-1 is approximately 0.25 acres.



**Photo 3.** Facing southwest along S-2 from the eastern edge of the proposed ROW location. The stream has been channelized for past land uses.



**Photo 4.** Facing southeast along S-3 from the western edge of the proposed ROW.



**Photo 5.** Facing northeast or upstream along S-6. The head of the stream is approximately 35 feet upstream of the photo location.



**Photo 6.** Facing northwest along S-6. The photo was taken looking downstream from the eastern edge of the proposed ROW.



**Photo 7.** Facing west from the head of S-7. The stream begins at the centerline of the proposed highway and flows east out of the proposed ROW.



**Photo 8.** Facing north along S-8 from the convergence of S-7 and S-8. This ephemeral stream is approximately 116 lf.



**Photo 9.** Facing south along S-10 (West Buffalo Creek).

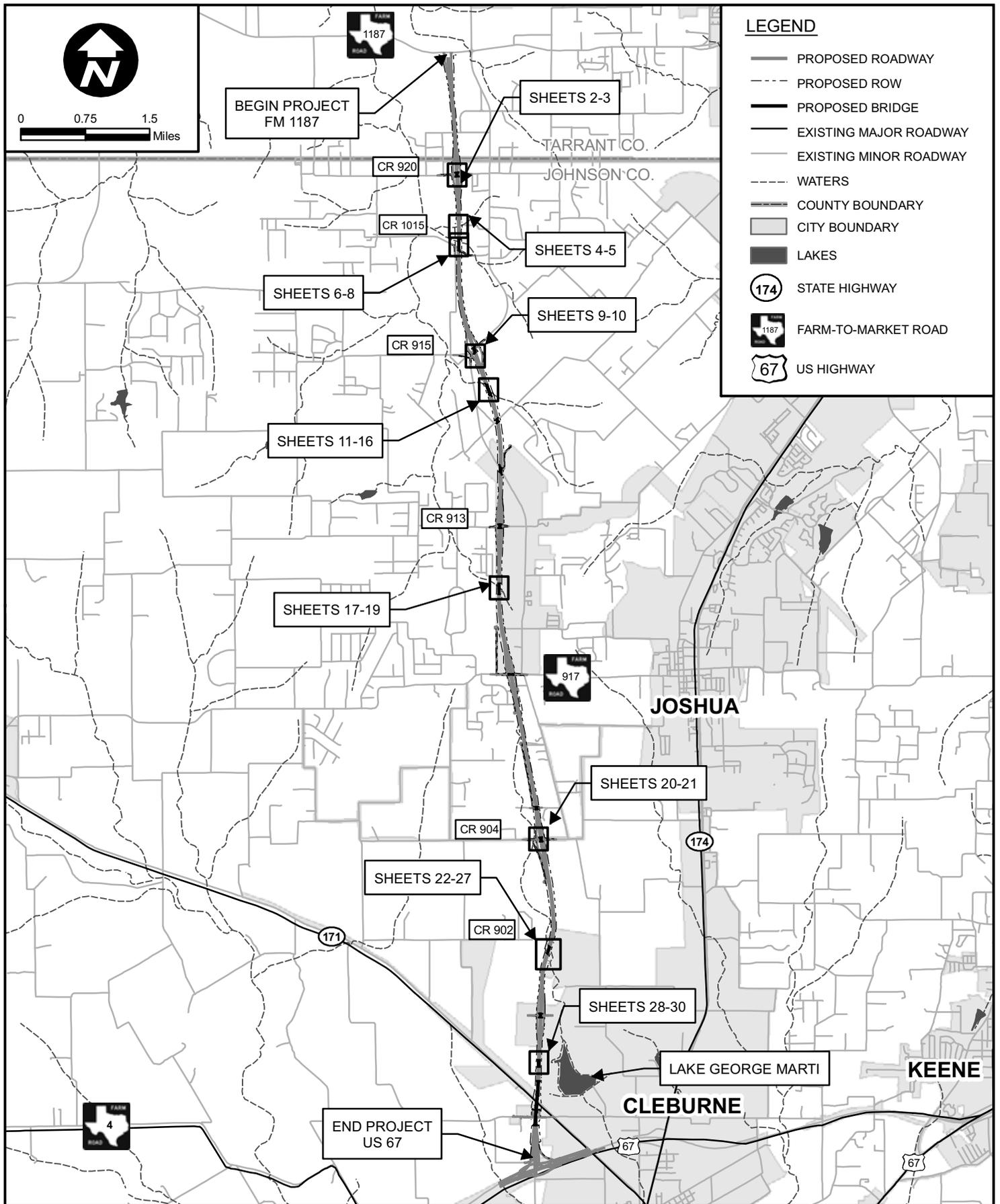


**Photo 10.** Facing northeast along S-11 back downstream towards the George Marti Reservoir northwest of the City of Cleburne.



**Photo 11.** Facing west across the On-Channel Pond located along S-7.

**Appendix C: Preliminary Design Exhibits and Impacts to Waters of  
the U.S.**

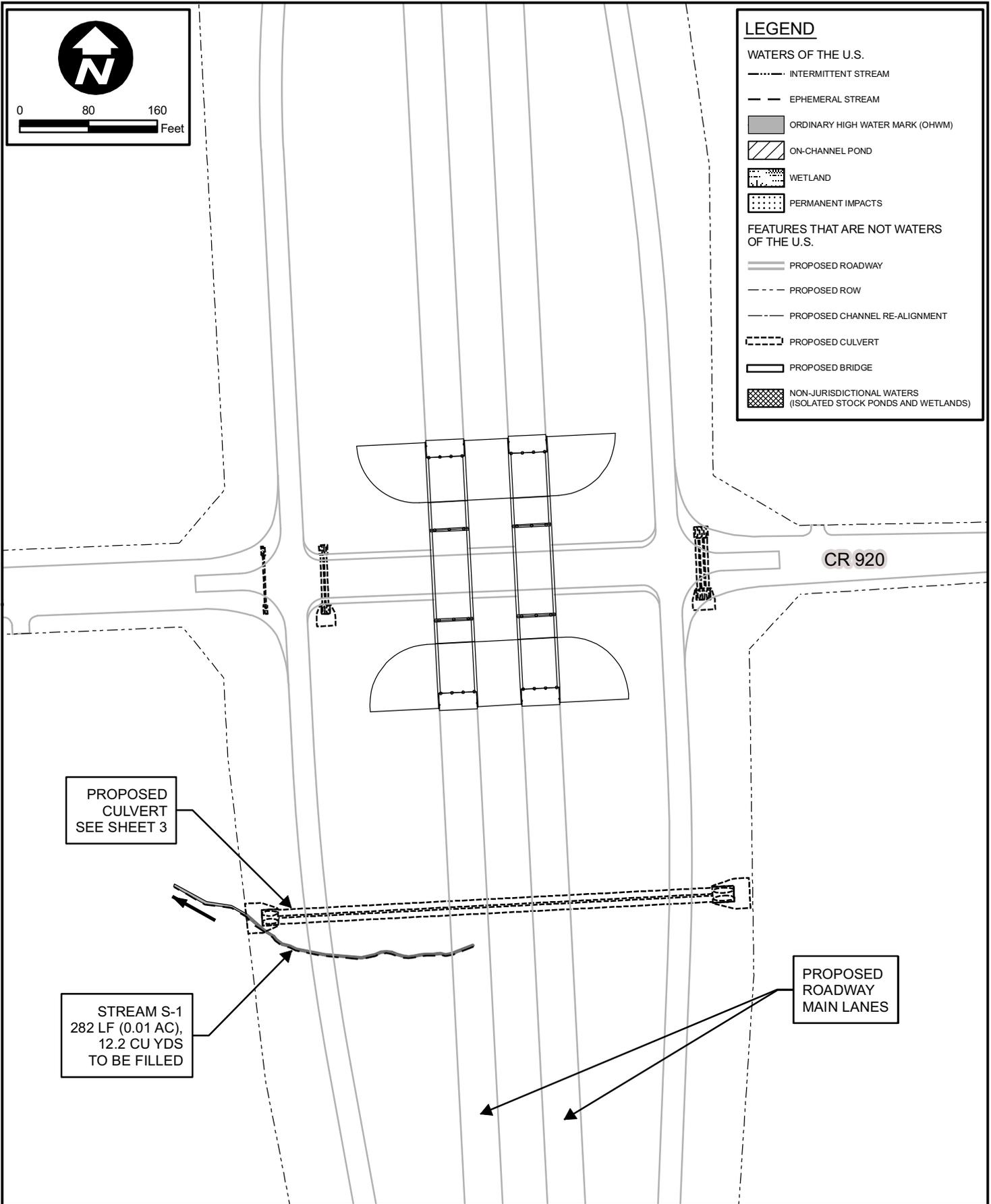


SH 121 - FM 1187 to US 67  
 PRE-CONSTRUCTION NOTIFICATION  
 DESIGN EXHIBITS - KEY MAP

DECEMBER 2008

SHEET 1 OF 30



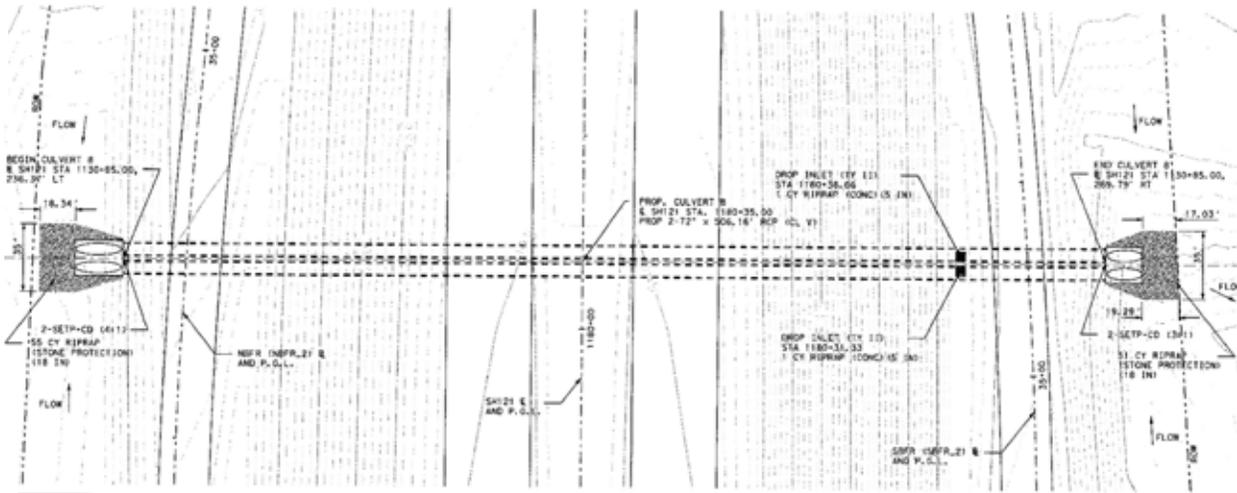


SH 121 - FM 1187 to US 67  
 PRE-CONSTRUCTION NOTIFICATION  
 DESIGN EXHIBITS

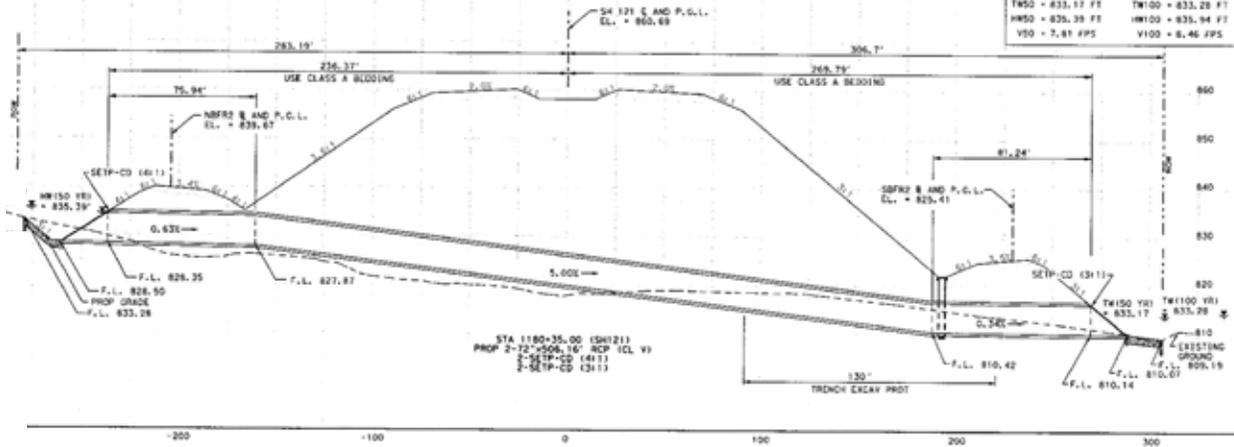
DECEMBER 2008

SHEET 2 OF 30

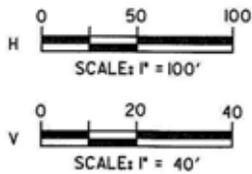




HYDRAULIC DATA	
DA = 20.97 ACRES	
Q50 = 93.15 CFS	Q100 = 108.58 CFS
TW50 = 833.17 FT	TW100 = 833.28 FT
HW50 = 825.39 FT	HW100 = 835.94 FT
V50 = 7.81 FPS	V100 = 8.46 FPS



PROPOSED CULVERT LAYOUT  
AT STREAM S-1

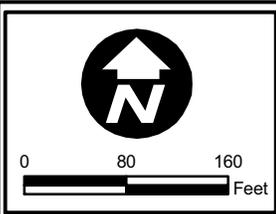


**PRELIMINARY  
NOT FOR CONSTRUCTION**

SH 121 - FM 1187 to US 67  
PRE-CONSTRUCTION NOTIFICATION  
DESIGN EXHIBITS - PROPOSED CULVERT LAYOUT

DECEMBER 2008  
SHEET 3 OF 30





**LEGEND**

**WATERS OF THE U.S.**

- INTERMITTENT STREAM
- - - EPHEMERAL STREAM
- ORDINARY HIGH WATER MARK (OHWM)
- ▨ ON-CHANNEL POND
- ▤ WETLAND
- ▥ PERMANENT IMPACTS

**FEATURES THAT ARE NOT WATERS OF THE U.S.**

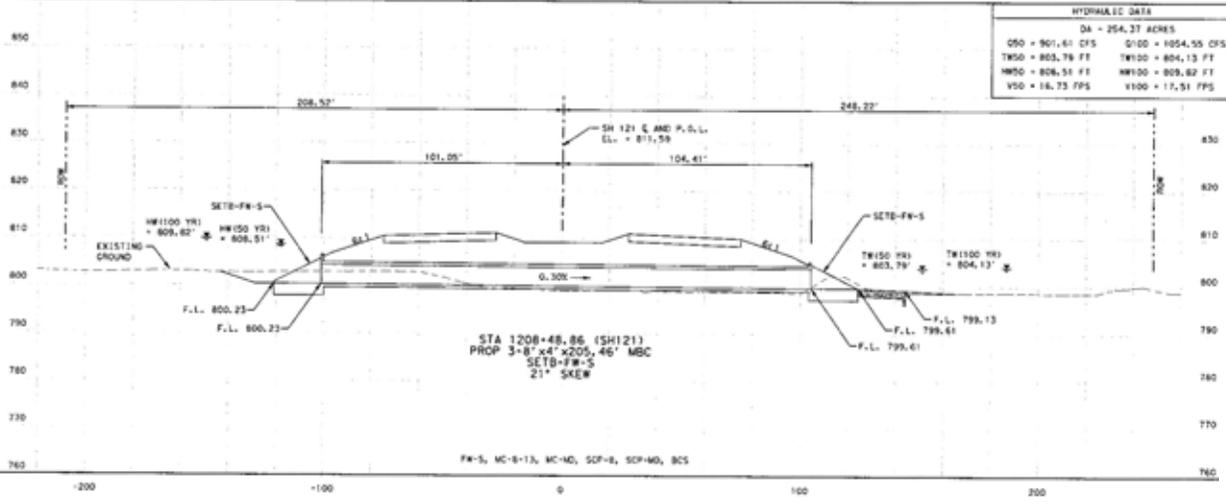
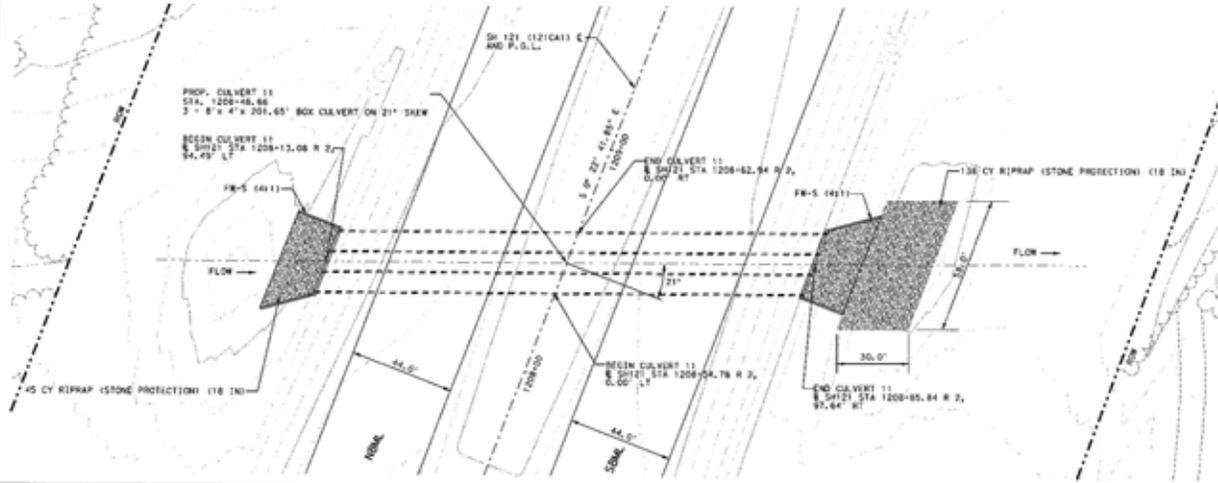
- PROPOSED ROADWAY
- - - PROPOSED ROW
- - - PROPOSED CHANNEL RE-ALIGNMENT
- - - PROPOSED CULVERT
- ▭ PROPOSED BRIDGE
- ▩ NON-JURISDICTIONAL WATERS (ISOLATED STOCK PONDS AND WETLANDS)

WETLAND W-1  
0.25 AC (105 CU YDS)  
TO BE FILLED

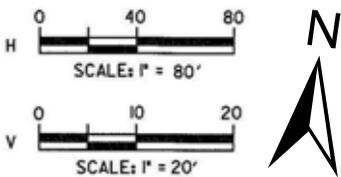
STREAM S-2  
273 LF (0.03 ac),  
13.1 cu yds  
TO BE FILLED

PROPOSED  
CULVERT  
SEE SHEET 5

PROPOSED  
ROADWAY  
MAIN LANES



PROPOSED CULVERT LAYOUT  
AT STREAM S-2



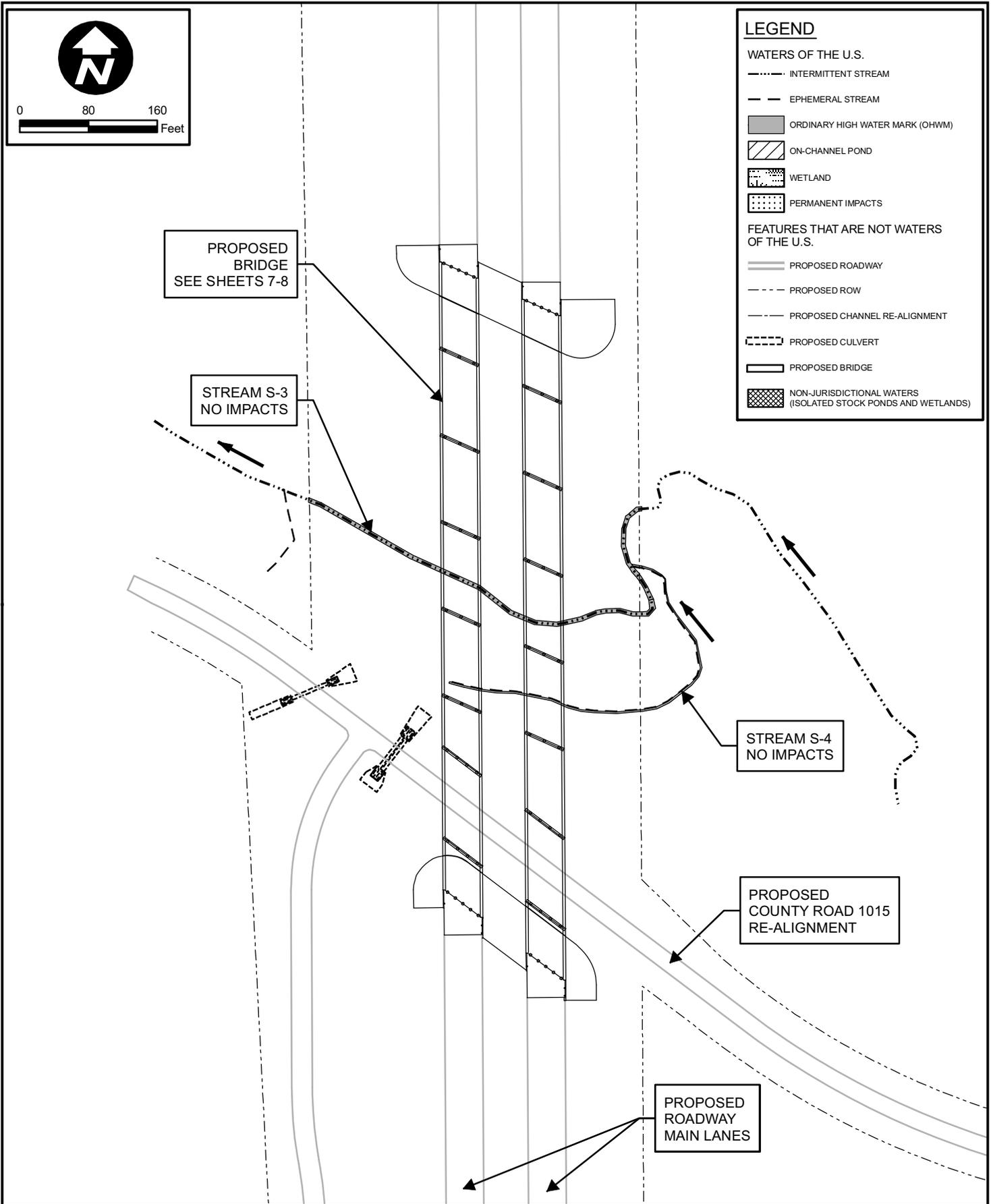
**PRELIMINARY  
NOT FOR CONSTRUCTION**

SH 121 - FM 1187 to US 67  
PRE-CONSTRUCTION NOTIFICATION  
DESIGN EXHIBITS - PROPOSED CULVERT LAYOUT

DECEMBER 2008

SHEET 5 OF 30



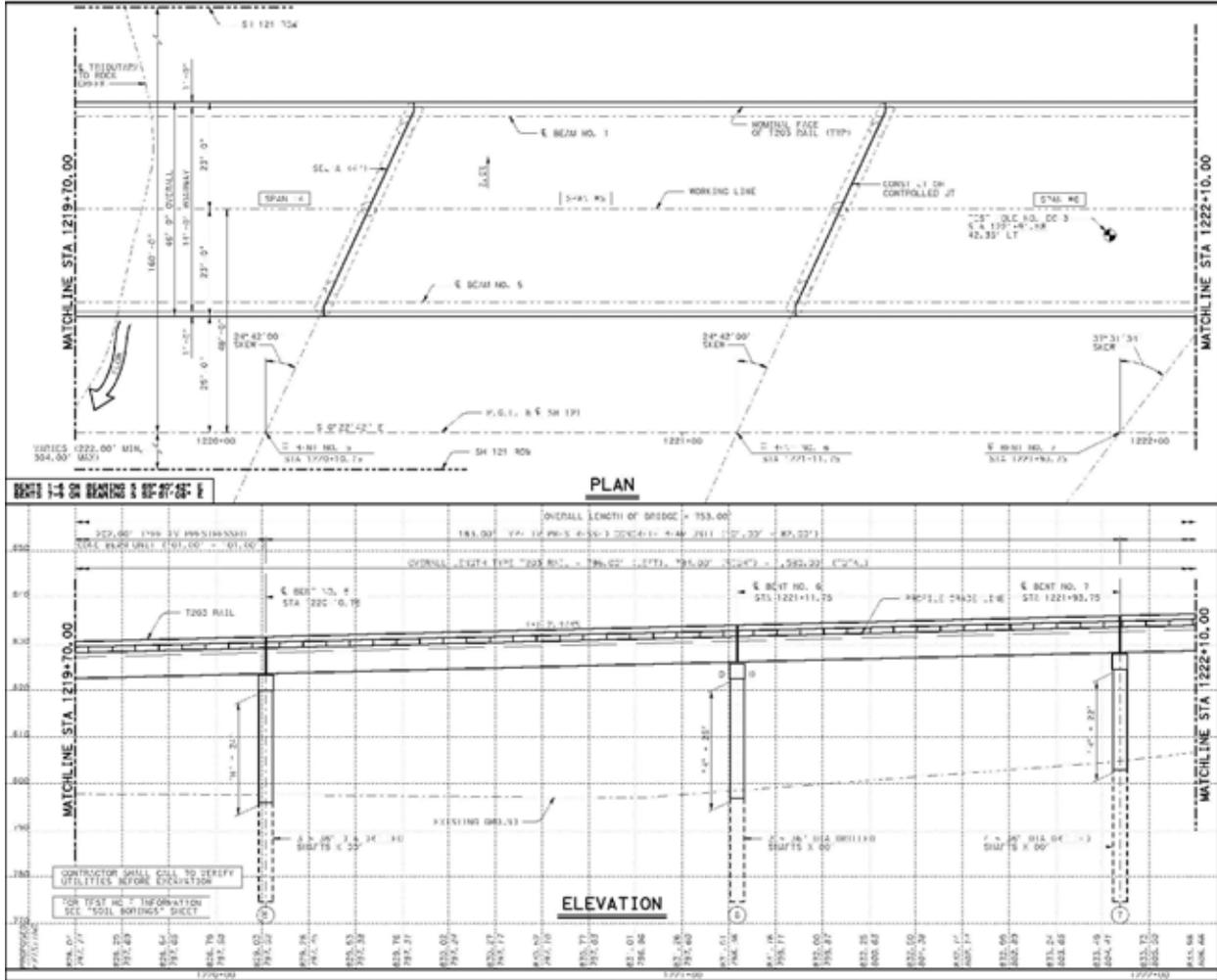


SH 121 - FM 1187 to US 67  
 PRE-CONSTRUCTION NOTIFICATION  
 DESIGN EXHIBITS

DECEMBER 2008

SHEET 6 OF 30





PROPOSED NORTH BOUND  
BRIDGE LAYOUT  
AT STREAM S-3



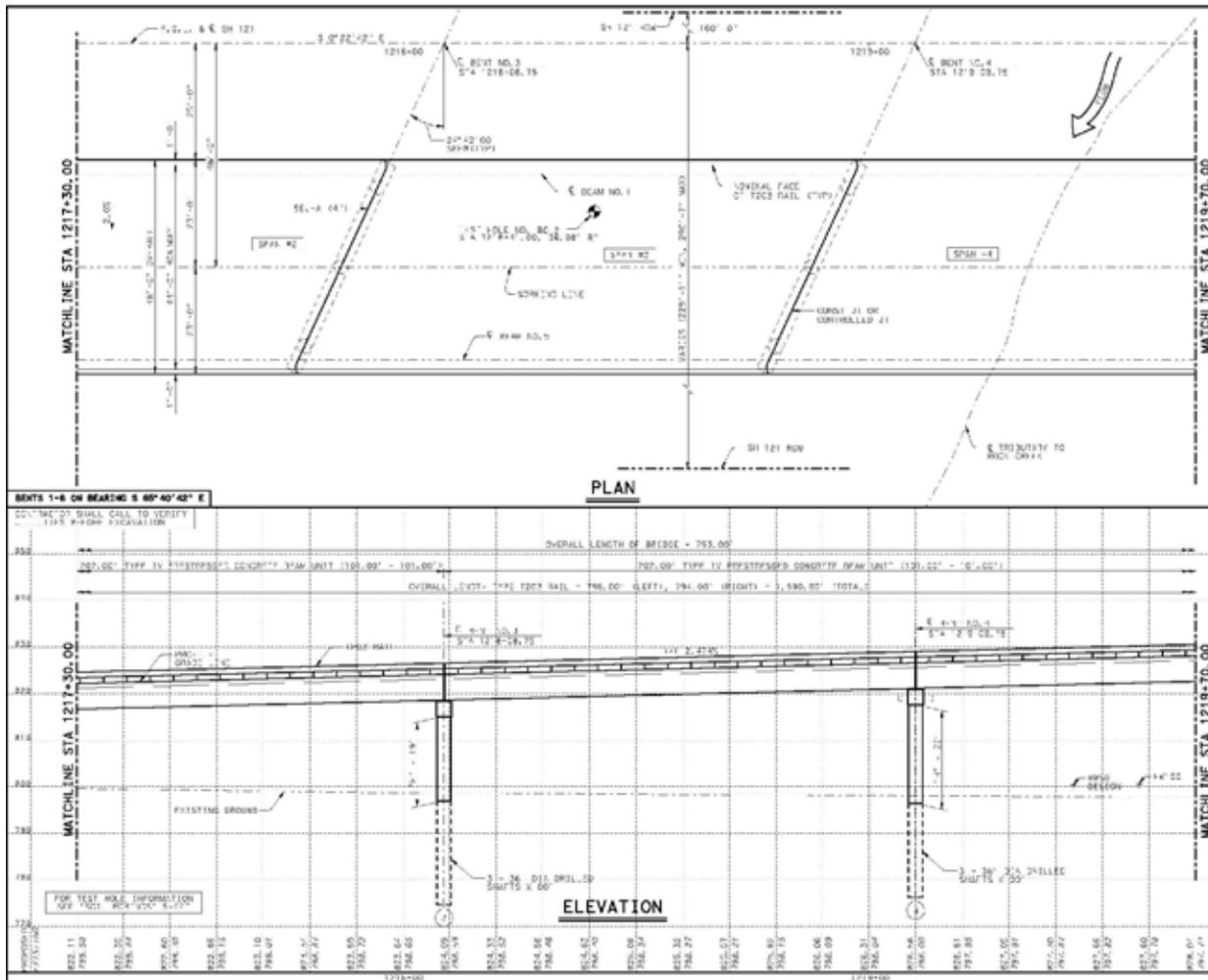
**PRELIMINARY  
NOT FOR CONSTRUCTION**

SH 121 - FM 1187 to US 67  
PRE-CONSTRUCTION NOTIFICATION  
DESIGN EXHIBITS - PROPOSED BRIDGE LAYOUT

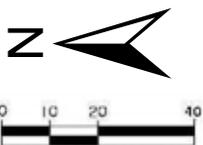
DECEMBER 2008

SHEET 7 OF 30





PROPOSED SOUTH BOUND  
BRIDGE LAYOUT  
AT STREAM S-3



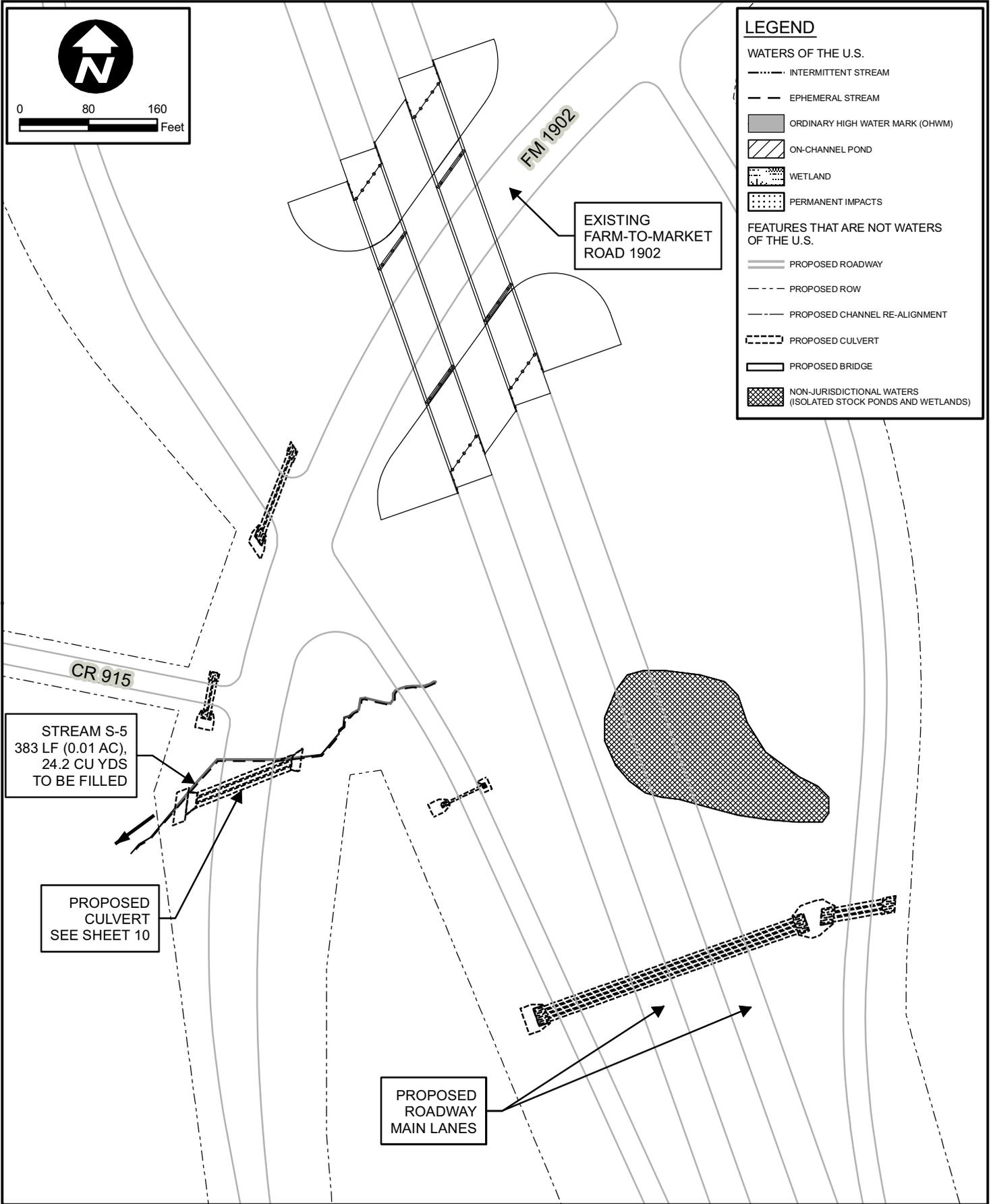
**PRELIMINARY  
NOT FOR CONSTRUCTION**

SH 121 - FM 1187 to US 67  
PRE-CONSTRUCTION NOTIFICATION  
DESIGN EXHIBITS - PROPOSED CULVERT LAYOUT

DECEMBER 2008

SHEET 8 OF 30





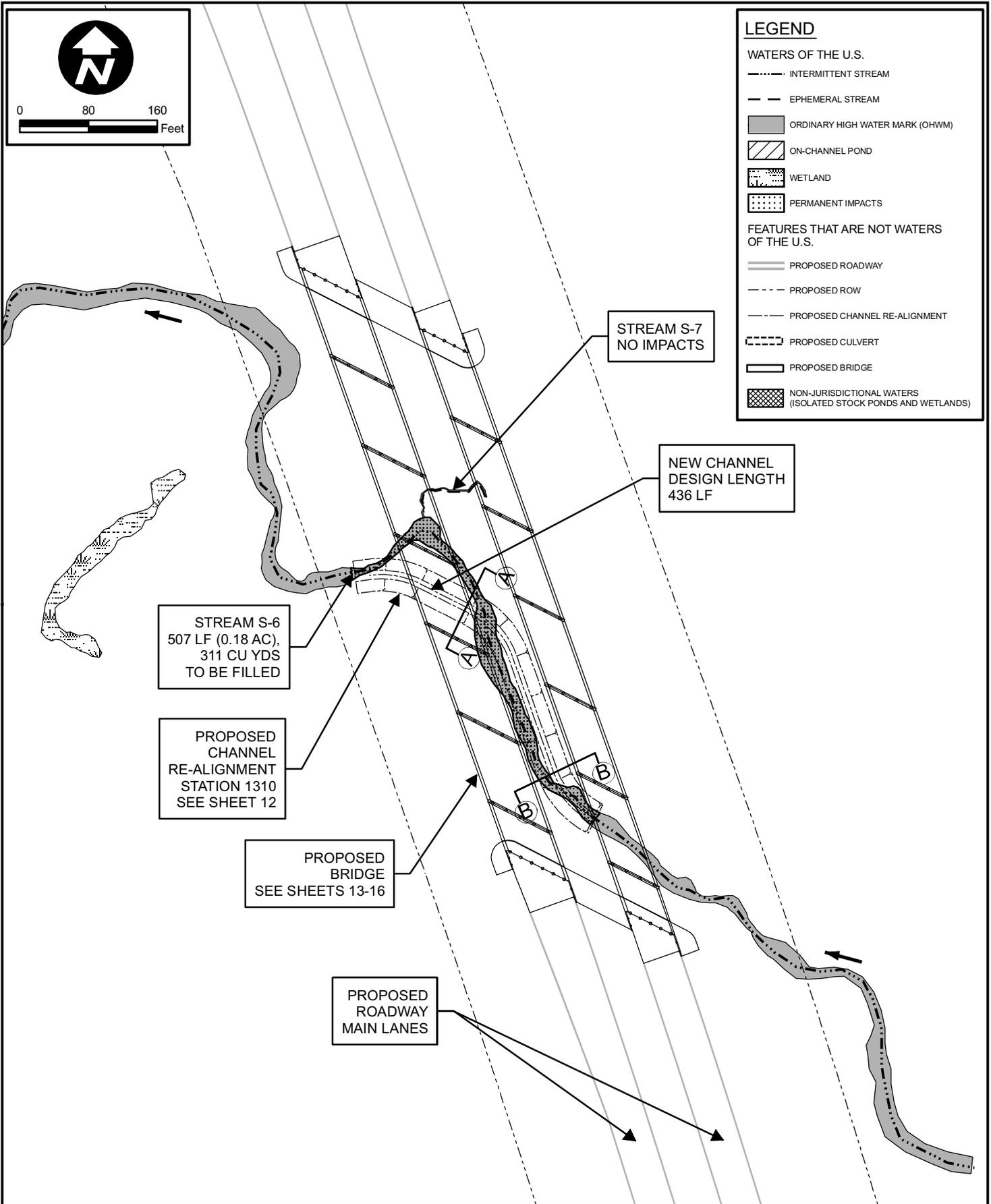
SH 121 - FM 1187 to US 67  
 PRE-CONSTRUCTION NOTIFICATION  
 DESIGN EXHIBITS

DECEMBER 2008

SHEET 9 OF 30







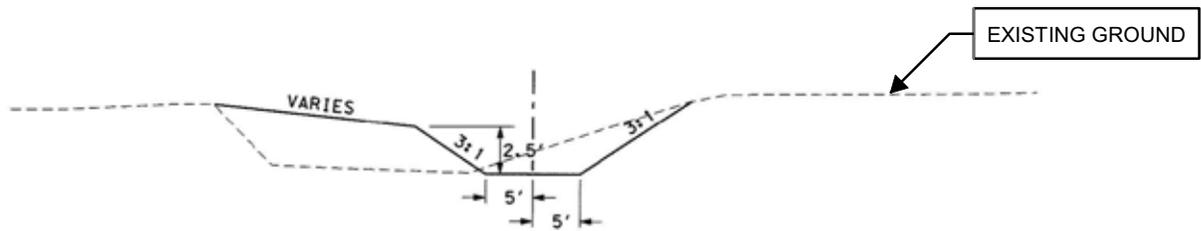
SH 121 - FM 1187 to US 67  
 PRE-CONSTRUCTION NOTIFICATION  
 DESIGN EXHIBITS

DECEMBER 2008

SHEET 11 OF 30

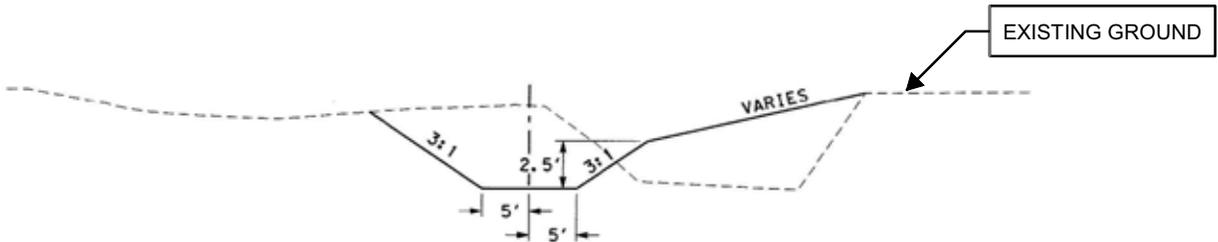


PROPOSED STREAM S-6  
CHANNEL RE-ALIGNMENT  
STATION 1310



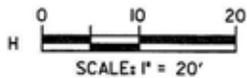
CROSS SECTION A-A

Station 1312 + 05

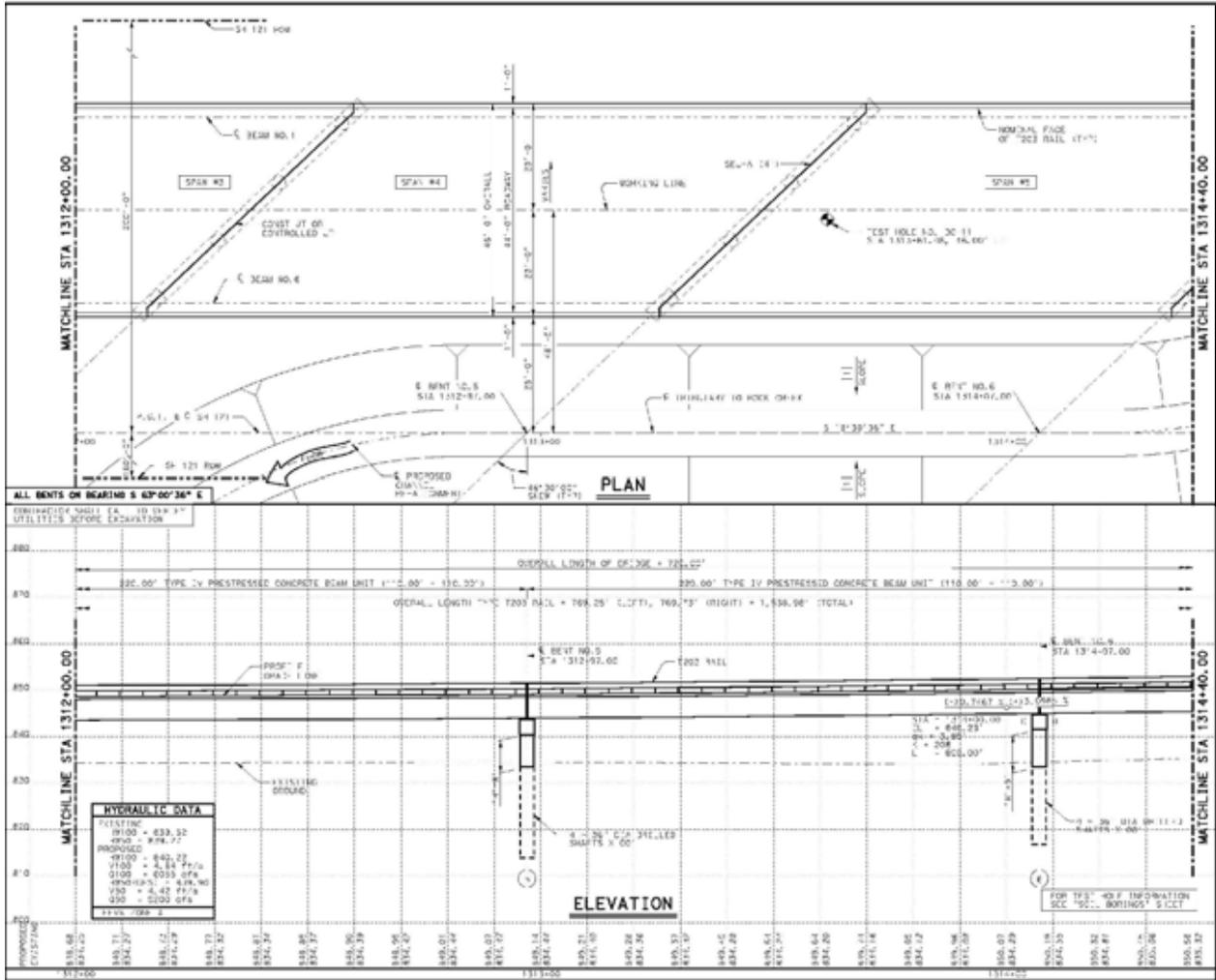


CROSS SECTION B-B

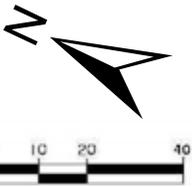
Station 1313 + 90



**PRELIMINARY  
NOT FOR CONSTRUCTION**



PROPOSED NORTH BOUND  
BRIDGE LAYOUT  
AT STREAM S-6



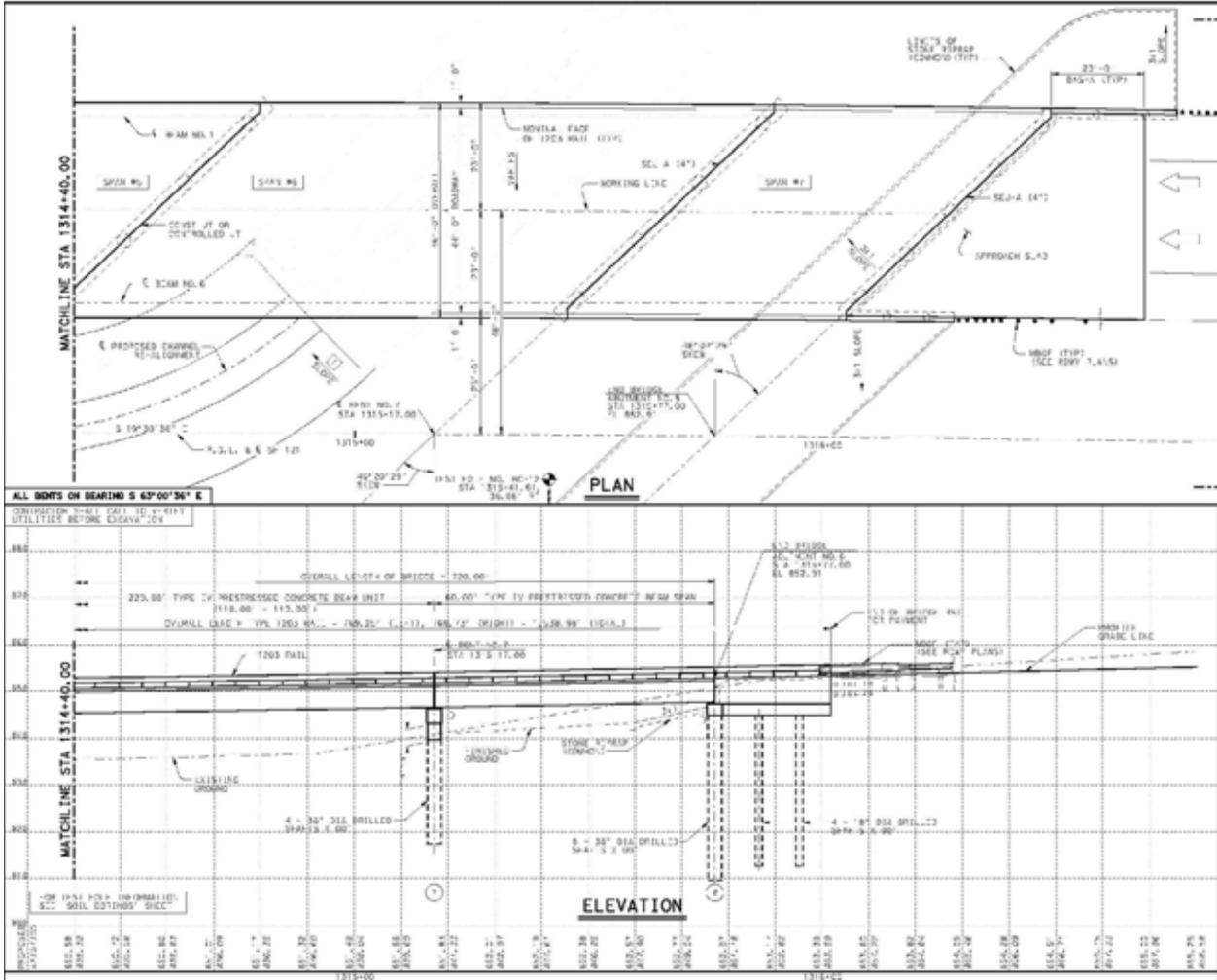
**PRELIMINARY  
NOT FOR CONSTRUCTION**

SH 121 - FM 1187 to US 67  
PRE-CONSTRUCTION NOTIFICATION  
DESIGN EXHIBITS - PROPOSED BRIDGE LAYOUT

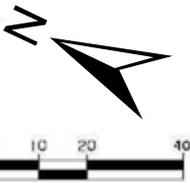
DECEMBER 2008

SHEET 13 OF 30





PROPOSED NORTH BOUND  
BRIDGE LAYOUT  
AT STREAM S-6



**PRELIMINARY  
NOT FOR CONSTRUCTION**

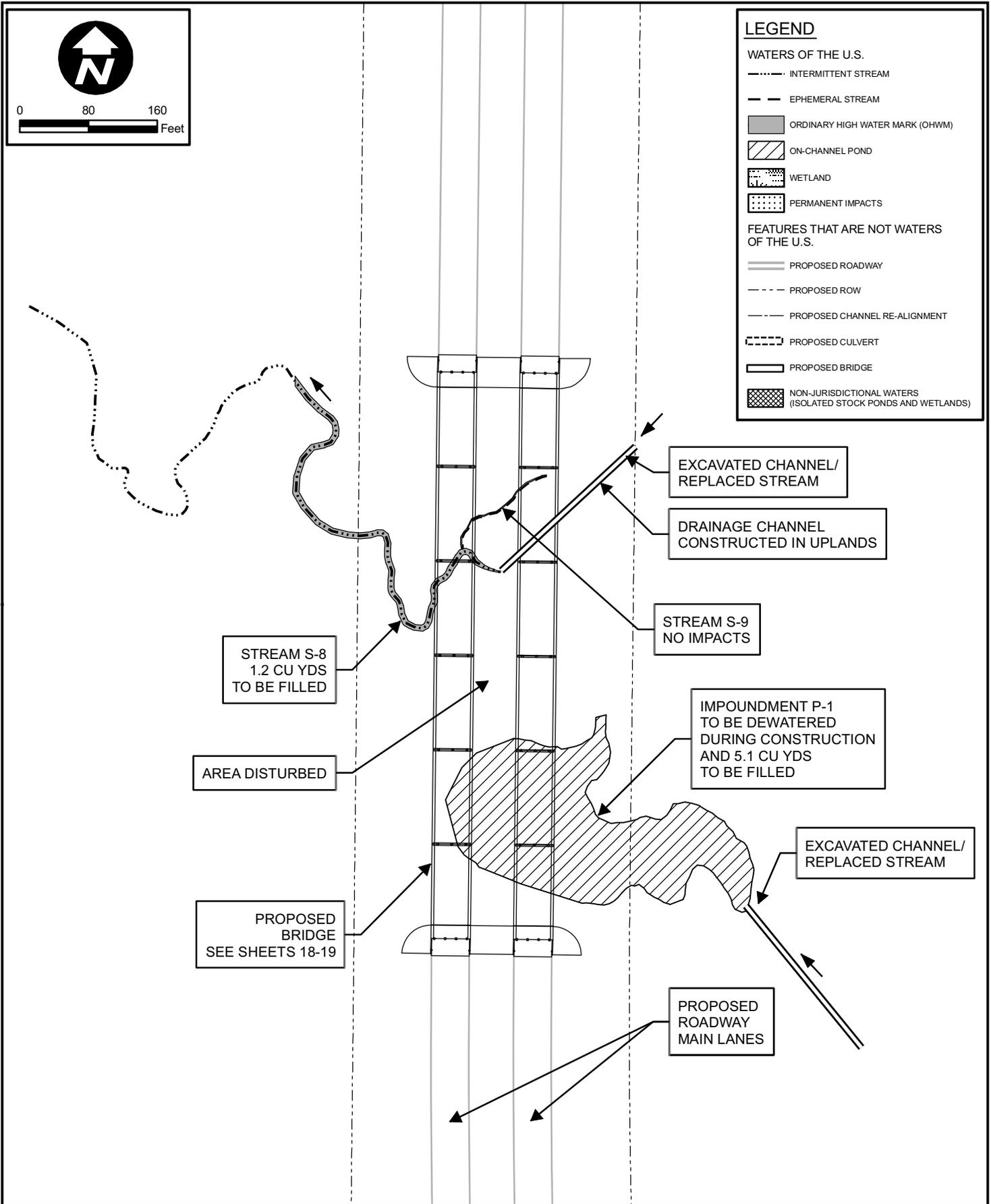
SH 121 - FM 1187 to US 67  
PRE-CONSTRUCTION NOTIFICATION  
DESIGN EXHIBITS - PROPOSED BRIDGE LAYOUT

DECEMBER 2008  
SHEET 14 OF 30









SH 121 - FM 1187 to US 67  
 PRE-CONSTRUCTION NOTIFICATION  
 DESIGN EXHIBITS

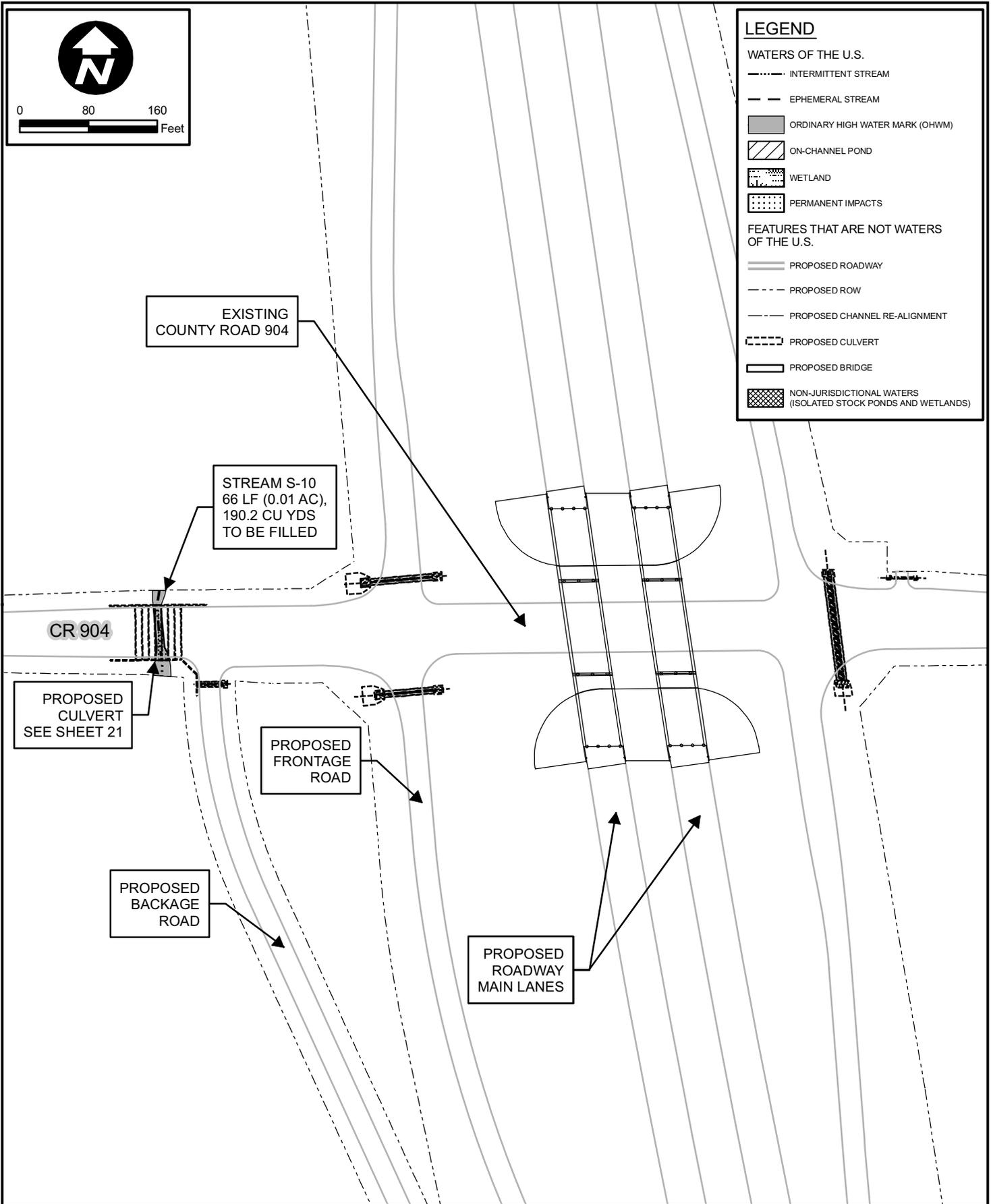
DECEMBER 2008

SHEET 17 OF 30







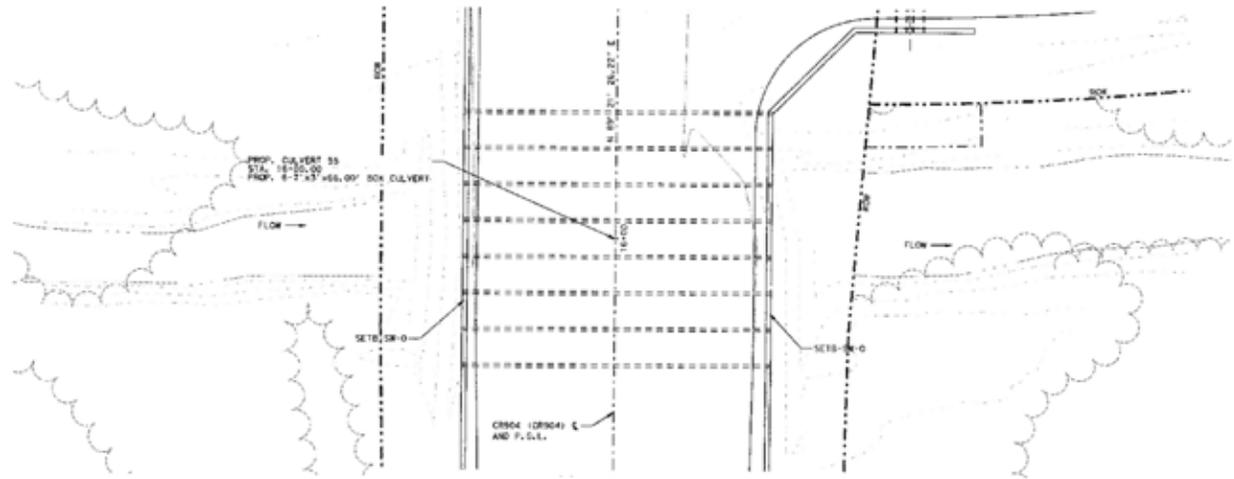


SH 121 - FM 1187 to US 67  
 PRE-CONSTRUCTION NOTIFICATION  
 DESIGN EXHIBITS

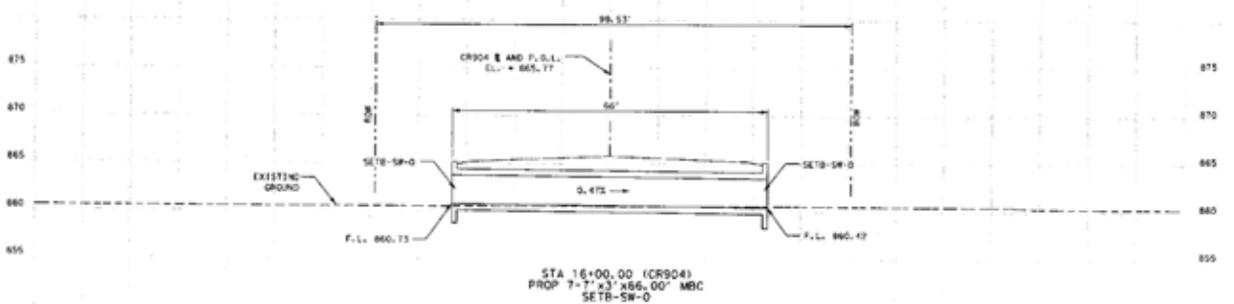
DECEMBER 2008

SHEET 20 OF 30

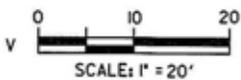




HYDRAULIC DATA	
DA = 645.24 ACRES	
Q50 = 3252.87 CFS	Q100 = 3309.49 CFS
TW50 = 889.32 FT	TW100 = 893.53 FT
HW50 = 902.69 FT	HW100 = 906.98 FT
V50 = 22.13 FPS	V100 = 24.54 FPS



PROPOSED CULVERT LAYOUT  
AT STREAM S-10 AND COUNTY ROAD 904  
(SH 121 STATION 1592 + 75)



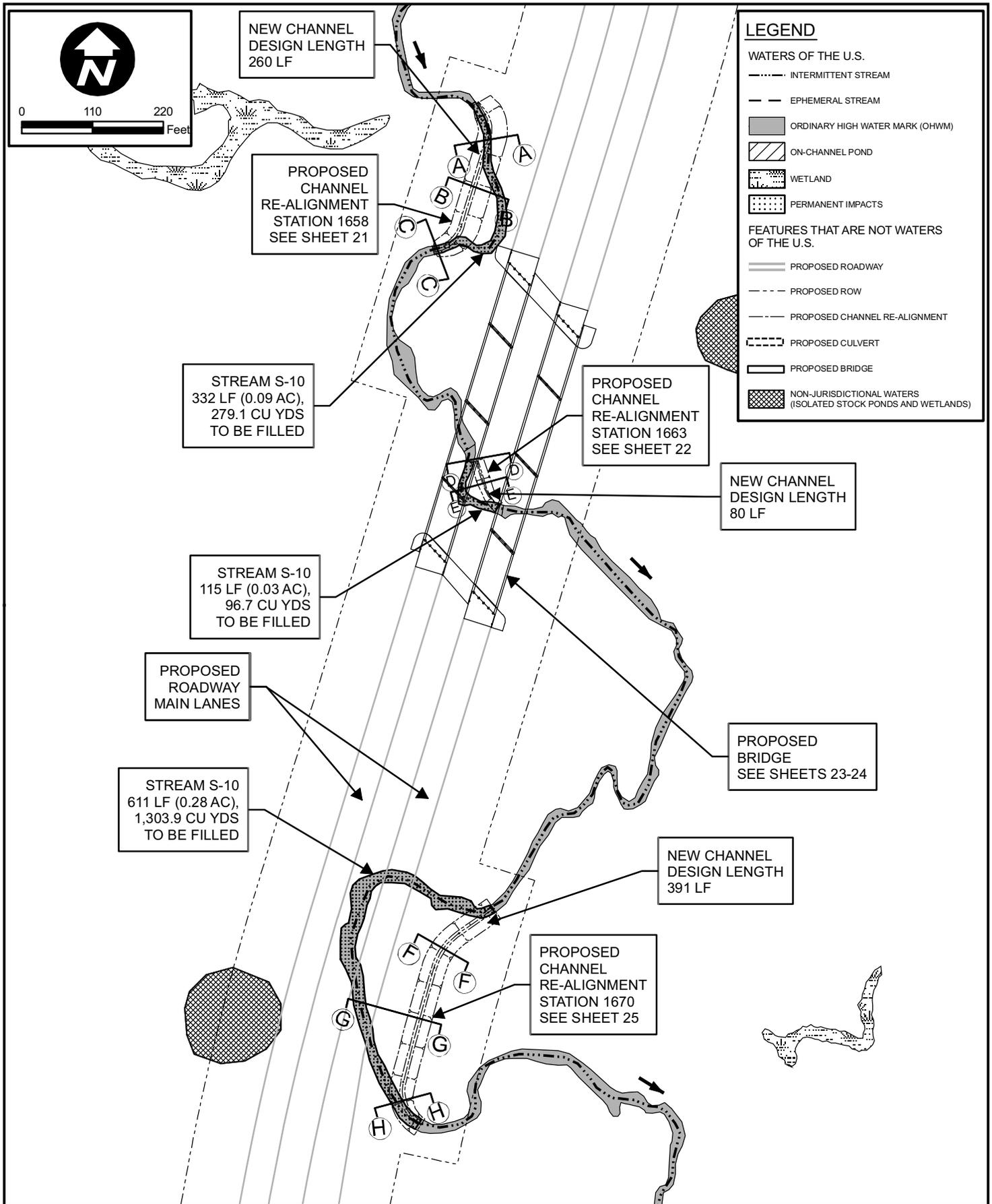
**PRELIMINARY  
NOT FOR CONSTRUCTION**

SH 121 - FM 1187 to US 67  
PRE-CONSTRUCTION NOTIFICATION  
DESIGN EXHIBITS - PROPOSED CULVERT LAYOUT

DECEMBER 2008

SHEET 21 OF 30





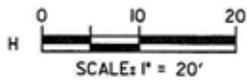
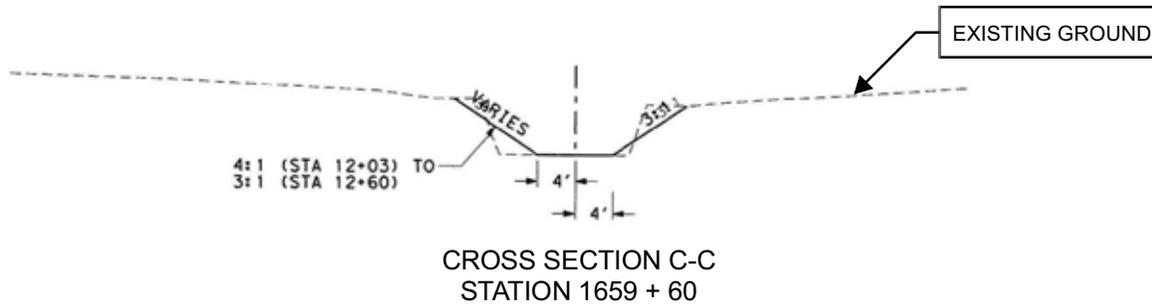
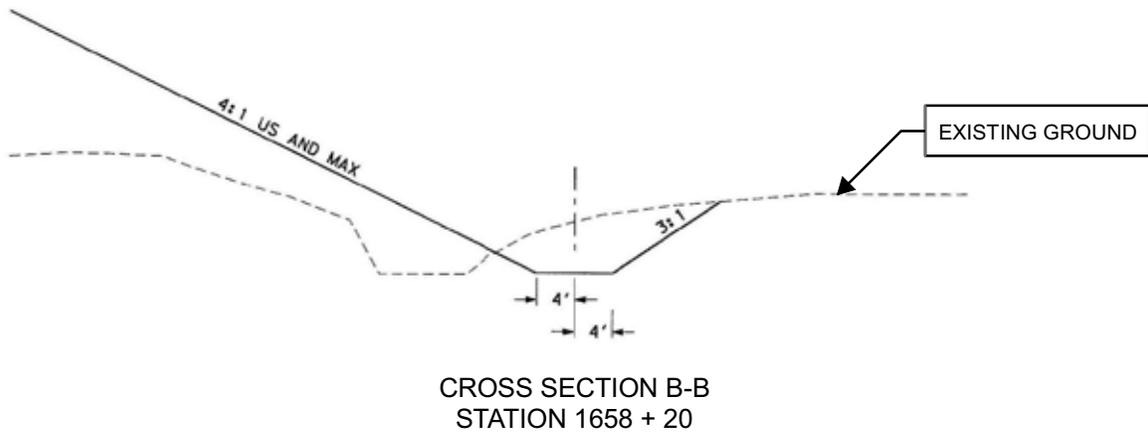
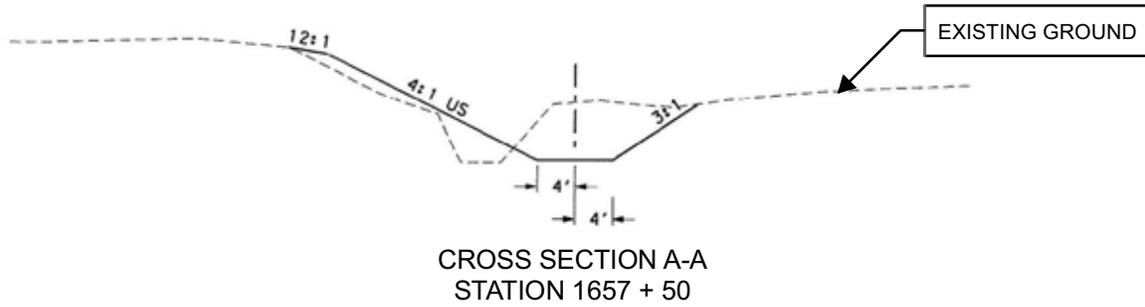
SH 121 - FM 1187 to US 67  
 PRE-CONSTRUCTION NOTIFICATION  
 DESIGN EXHIBITS

DECEMBER 2008

SHEET 22 OF 30



PROPOSED STREAM S-10  
CHANNEL RE-ALIGNMENT



**PRELIMINARY  
NOT FOR CONSTRUCTION**

SH 121 - FM 1187 to US 67  
PRE-CONSTRUCTION NOTIFICATION  
DESIGN EXHIBITS - PROPOSED CROSS SECTIONS

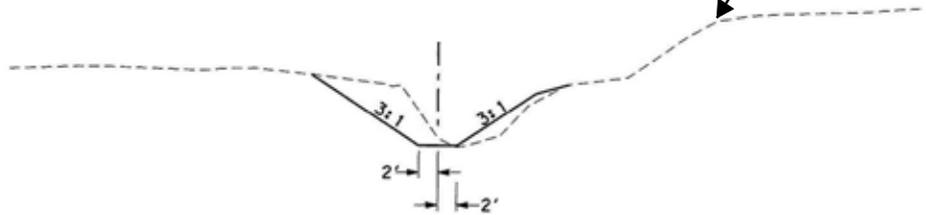
DECEMBER 2008

SHEET 23 OF 30



PROPOSED STREAM S-10  
CHANNEL RE-ALIGNMENT

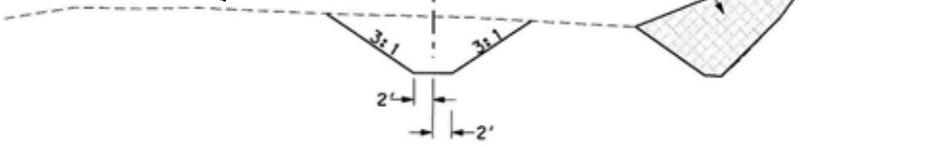
EXISTING GROUND



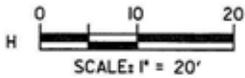
CROSS SECTION D-D  
STATION 1662 + 60

EXISTING GROUND

FILL EXISTING CHANNEL



CROSS SECTION E-E  
STATION 1663 + 00



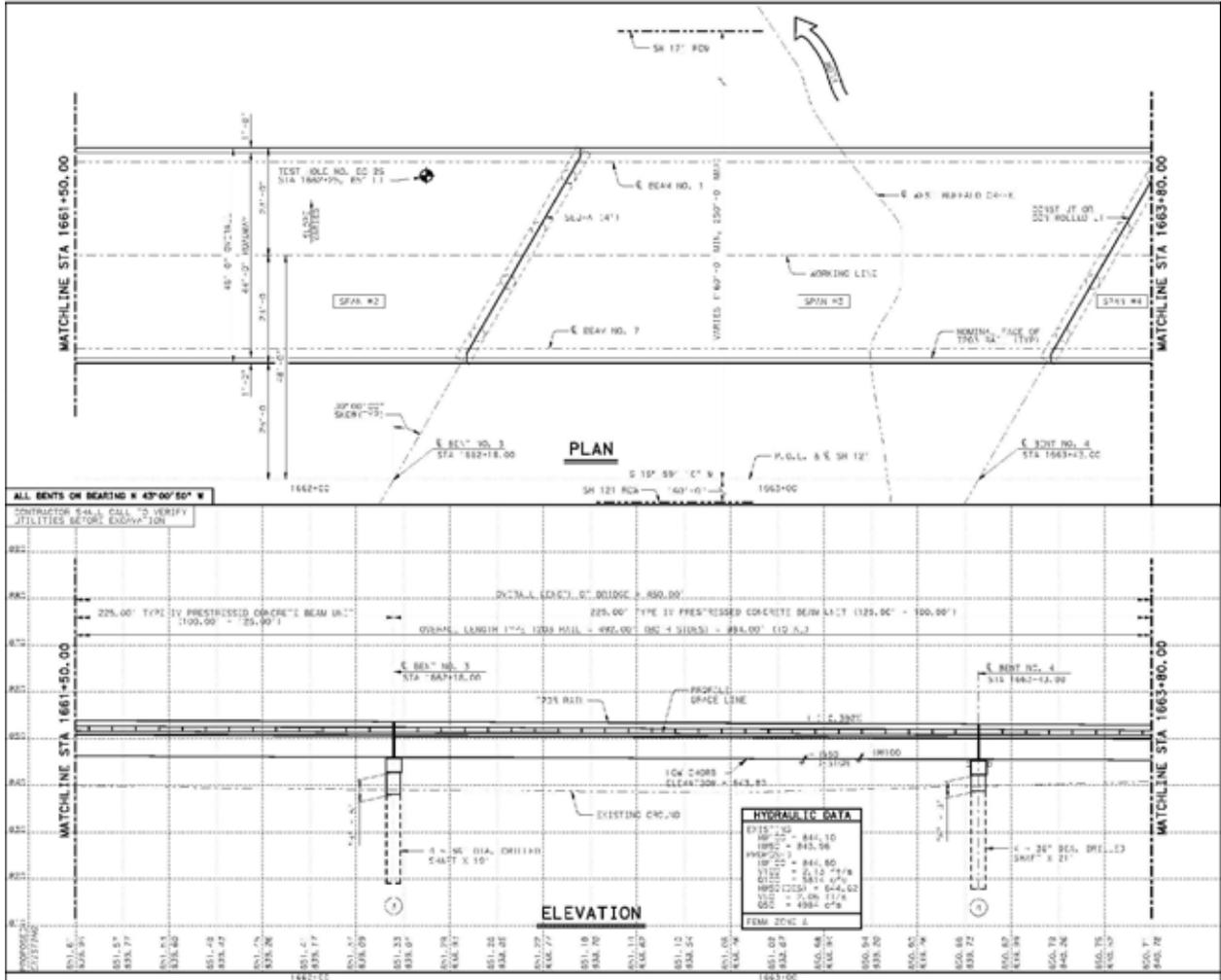
**PRELIMINARY  
NOT FOR CONSTRUCTION**

SH 121 - FM 1187 to US 67  
PRE-CONSTRUCTION NOTIFICATION  
DESIGN EXHIBITS - PROPOSED CROSS SECTIONS

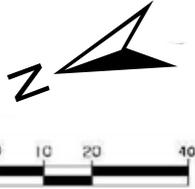
DECEMBER 2008

SHEET 24 OF 30



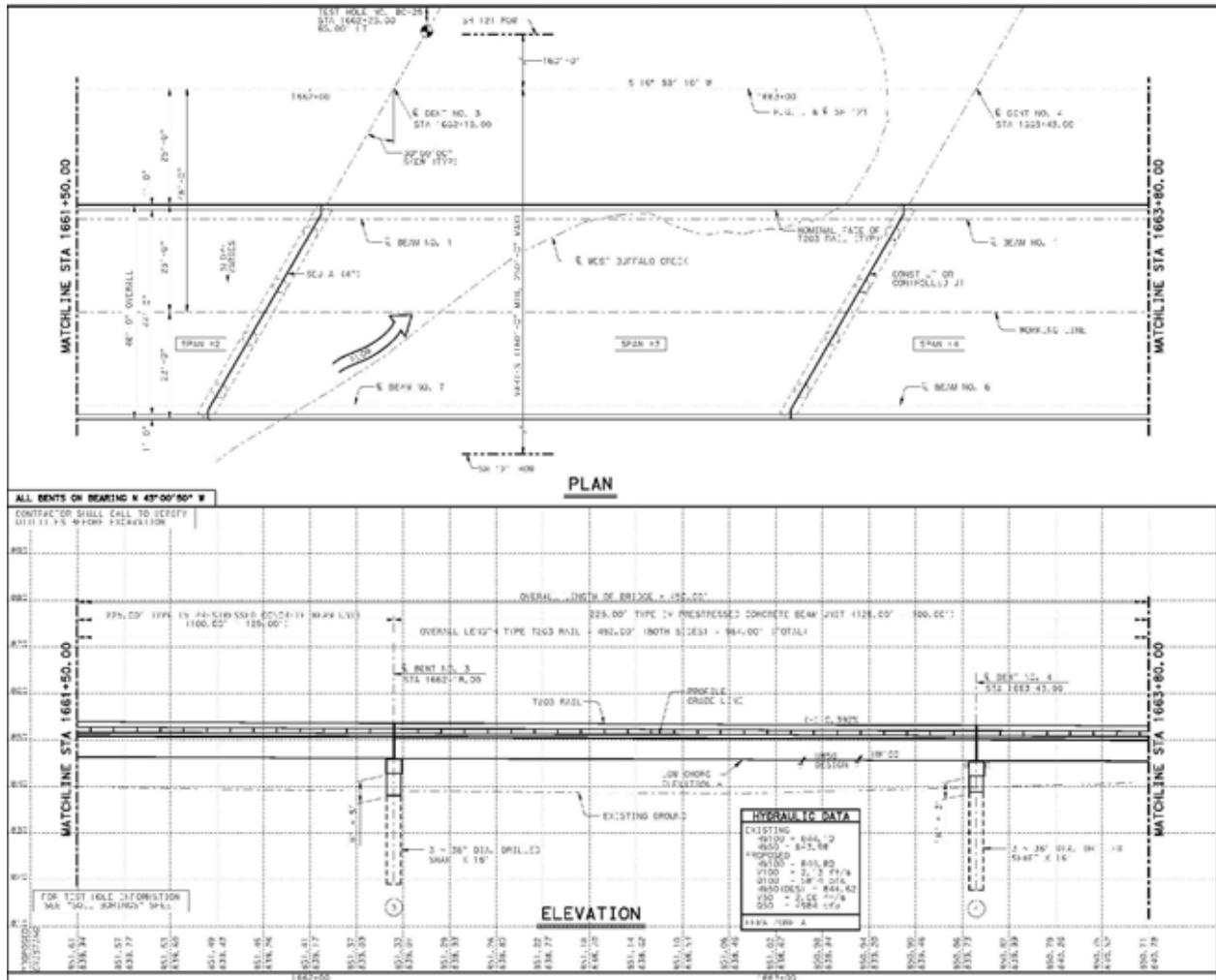


PROPOSED NORTH BOUND  
BRIDGE LAYOUT  
AT STREAM S-10



**PRELIMINARY  
NOT FOR CONSTRUCTION**

SH 121 - FM 1187 to US 67 PRE-CONSTRUCTION NOTIFICATION DESIGN EXHIBITS - PROPOSED BRIDGE LAYOUT	DECEMBER 2008	
	SHEET 25 OF 30	



PROPOSED SOUTH BOUND  
BRIDGE LAYOUT  
AT STREAM S-10



**PRELIMINARY  
NOT FOR CONSTRUCTION**

SH 121 - FM 1187 to US 67  
PRE-CONSTRUCTION NOTIFICATION  
DESIGN EXHIBITS - PROPOSED BRIDGE LAYOUT

DECEMBER 2008

SHEET 26 OF 30



PROPOSED STREAM S-10  
CHANNEL RE-ALIGNMENT

EXISTING GROUND

CROSS SECTION F-F  
STATION 1670 + 30

SH121 NB LANES

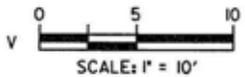
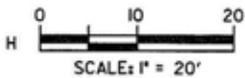
EXISTING GROUND

WEST BUFFALO CREEK

CROSS SECTION G-G  
STATION 1671 + 60

EXISTING GROUND

CROSS SECTION H-H  
STATION 1672 + 60



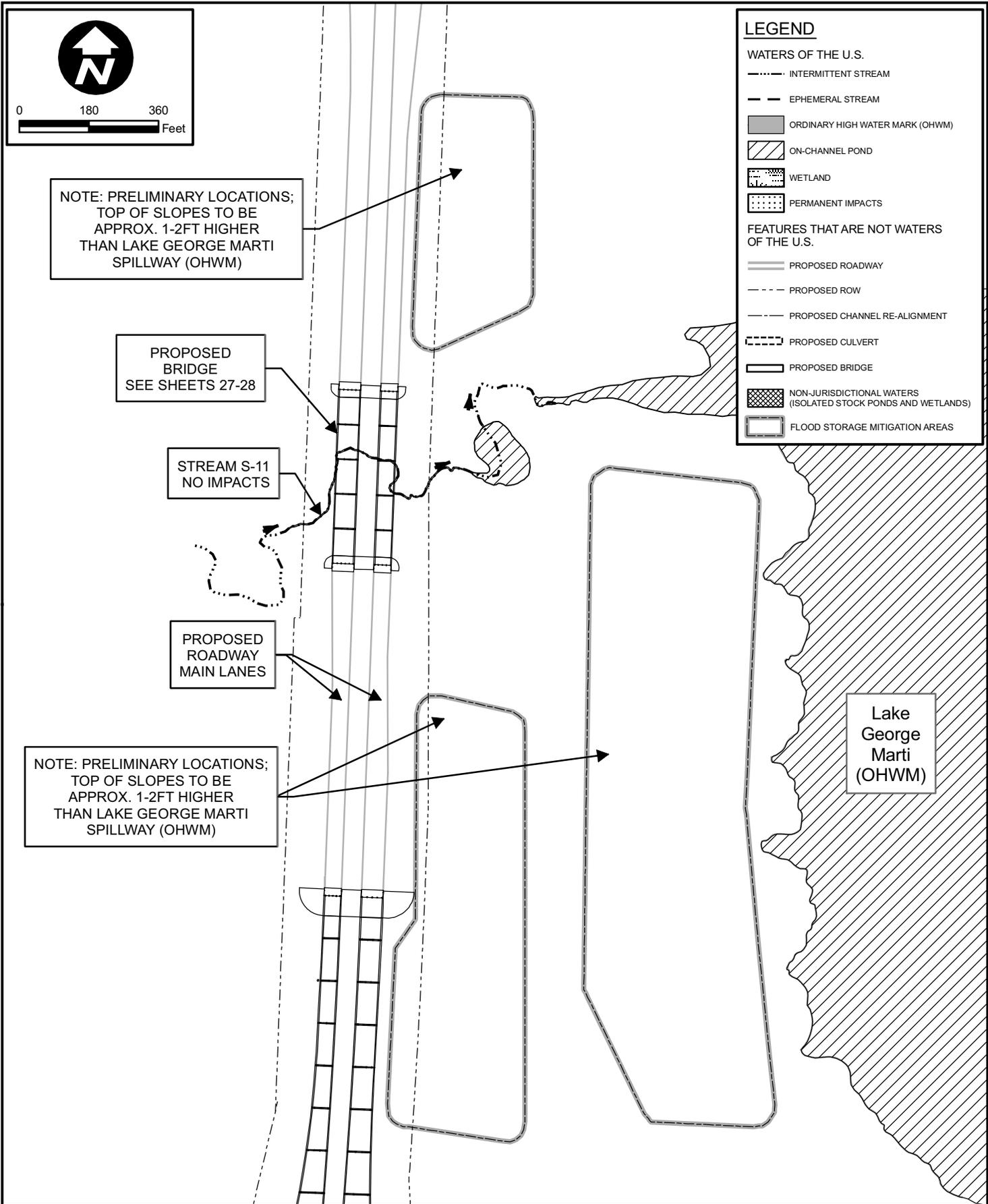
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NOT FOR CONSTRUCTION**

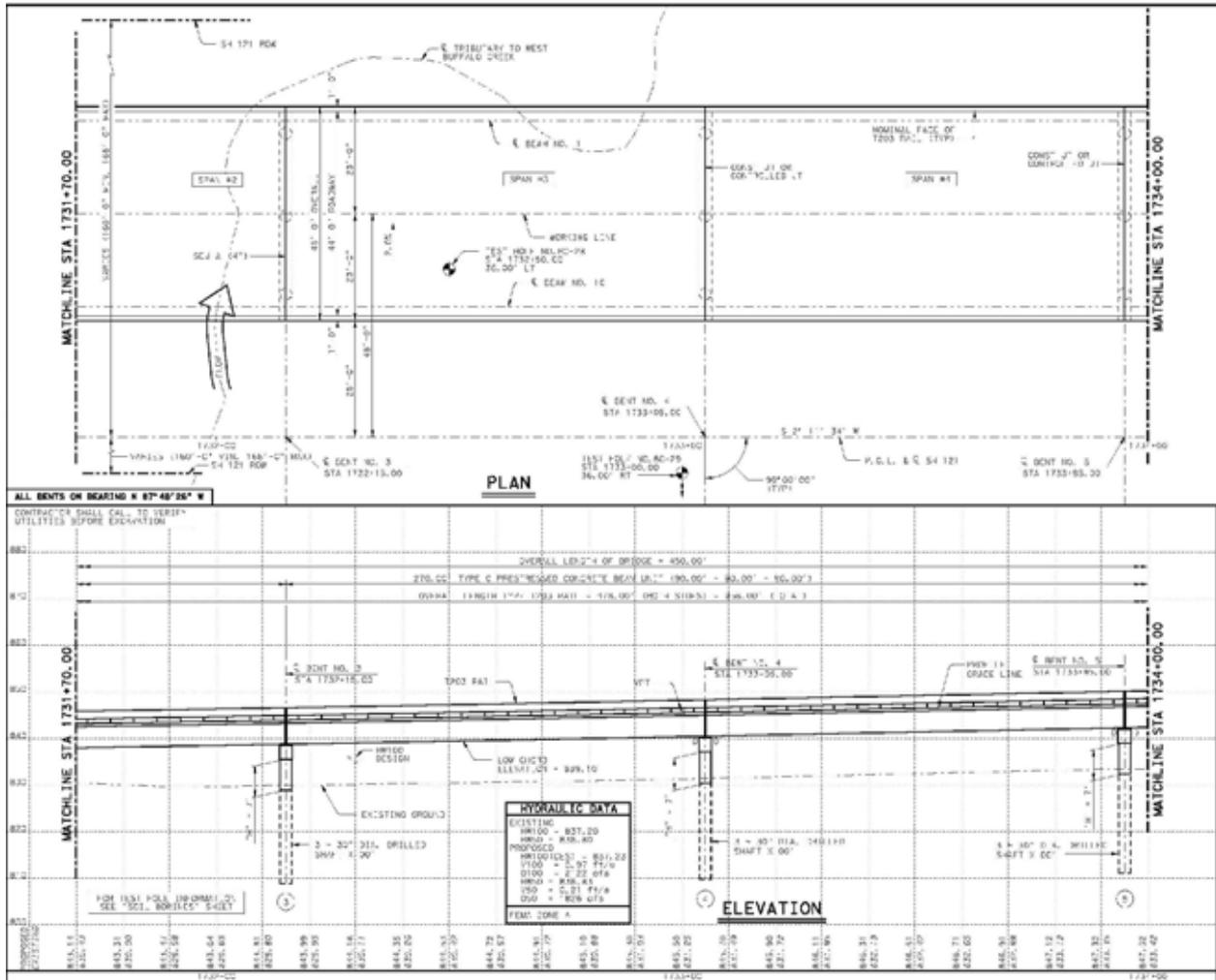
SH 121 - FM 1187 to US 67  
PRE-CONSTRUCTION NOTIFICATION  
DESIGN EXHIBITS - PROPOSED CROSS SECTIONS

DECEMBER 2008

SHEET 27 OF 30







PROPOSED NORTH BOUND  
BRIDGE LAYOUT  
AT STREAM S-11



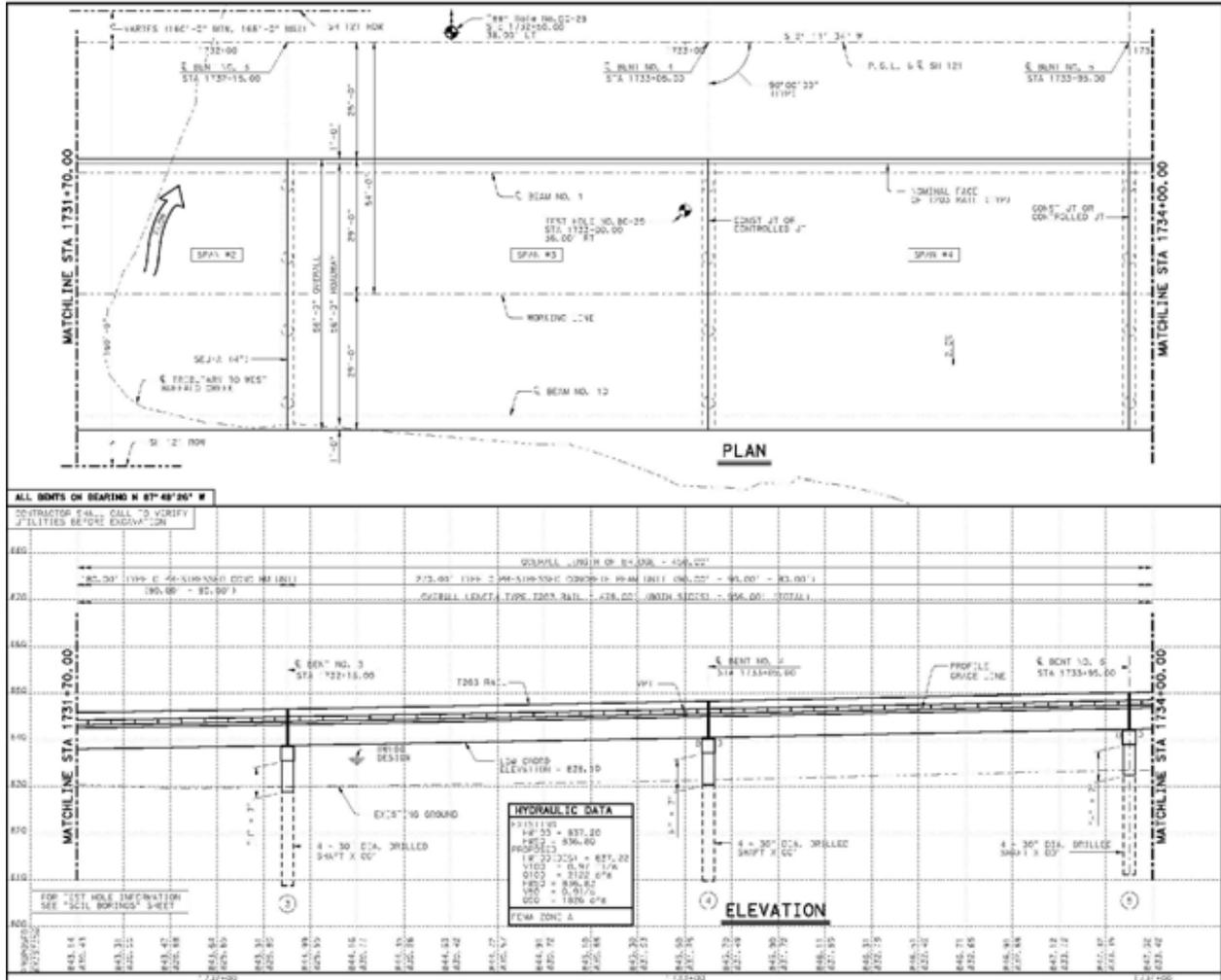
**PRELIMINARY  
NOT FOR CONSTRUCTION**

SH 121 - FM 1187 to US 67  
PRE-CONSTRUCTION NOTIFICATION  
DESIGN EXHIBITS - PROPOSED BRIDGE LAYOUT

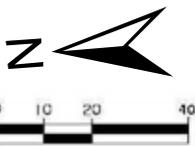
DECEMBER 2008

SHEET 29 OF 30





PROPOSED SOUTH BOUND  
BRIDGE LAYOUT  
AT STREAM S-11



**PRELIMINARY  
NOT FOR CONSTRUCTION**

SH 121 - FM 1187 to US 67  
PRE-CONSTRUCTION NOTIFICATION  
DESIGN EXHIBITS - PROPOSED BRIDGE LAYOUT

DECEMBER 2008

SHEET 30 OF 30



**Appendix D: Proposed Compensatory Mitigation Plan**

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**Proposed Compensatory Mitigation Plan  
State Highway 121 From Farm-to-Market 1187 to U.S. Highway 67**

**TXDOT CSJ: 0504-04-001  
0504-05-001**

**Tarrant and Johnson Counties, Texas**

**USACE Project 2005-00058**

**Prepared For:**



**Texas Department of Transportation  
Fort Worth District  
P.O. Box 6868  
Fort Worth, Texas 76115-0868**

**Prepared By:**

**HDR Engineering, Inc.  
17111 Preston Rd., Suite 200  
Dallas, Texas 75248**

**December 2008**

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### **Attachments**

Attachment A: Proposed Project General Location Map

Attachment B: Functional Assessment Criteria/Description and Debit/Credit Calculations

## 1.0 INTRODUCTION

This proposed Compensatory Mitigation Plan (CMP) was developed for the Texas Department of Transportation (TxDOT) (Applicant) in accordance with the U.S. Army Corps of Engineers (USACE), Fort Worth District "Draft Mitigation Guidelines" (December 24, 2003) and the Final Rule on Compensatory Mitigation for Losses of Aquatic Resources (Federal Register Vol. 73, No. 70; April 10, 2008). A Section 404 Pre-Construction Notification (PCN) (USACE 2005-00058) was submitted to the USACE December 22, 2005, but the PCN was later put on hold due to project funding constraints and a tolling evaluation. This proposed CMP was prepared to support a revised PCN submittal in December 2008.

### 1.1 Project Description

The TxDOT Fort Worth District (Applicant) is submitting this proposed CMP for the proposed construction of a segment of State Highway (SH) 121. The proposed project is a 14-mile roadway within a new location, which would extend SH 121 from Farm-to-Market (FM) 1187 to U.S. Highway (US) 67. An Environmental Assessment (EA) was previously prepared and a Finding of No Significant Impact (FONSI) was received from the Federal Highway Administration (FHWA) May 24, 2004. An EA Re-evaluation of this project is being prepared due to a change in project approach and minor alignment modifications. A previously planned interim facility of a two-lane roadway concept as a step to the planned full toll road facility will no longer be used. The EA Re-evaluation and associated public hearing will address moving directly to the four lane toll road facility and to update any associated direct and indirect effects information.

This CMP document provides a more detailed description of the conceptual mitigation plan included in the PCN. Impacts to waters of the U.S. were assessed in the PCN based on the delineation of the project area (revised December 2008). This CMP is proposed to compensate for the unavoidable impacts of the project associated with impacts in excess of 0.1 acre at three single and complete crossings (Stream S-2/Wetland W-1, Stream S-6, and Stream S-10).

### 1.2 Project Location

The project is located in north central Texas, northwest of the City of Cleburne in Tarrant and Johnson counties (**Attachment A, Sheet 1**). The project area includes approximately 660 acres of right-of-way (ROW) between FM 1187 (northern terminus) and US 67 (southern terminus).

The project area consists of predominately rangeland and previously farmed land and has been heavily disturbed by past landowners through overgrazing and farming practices. As a result, the dominant vegetation communities throughout the project area include both native and introduced vegetative species. Common tree species include honey mesquite (*Prosopis glandulosa*), sugar hackberry (*Celtis laevigata*), Osage orange (*Maclura pomifera*), and cedar elm (*Ulmus crassifolia*). These species are common colonizers in previously grazed or farmed "old field" habitat. In addition, post oak (*Quercus stellata*) and live oak (*Q. virginiana*) occur within the project area along streams and uncleared areas. Common grass species found include bermudagrass (*Cynodon dactylon*), little bluestem (*Schizachyrium scoparium*), Texas wintergrass (*Stipa leucotricha*), and perennial rye grass (*Lolium perenne*).

Within the project area, streams flow into two watersheds. Rock Creek flows to the north into Benbrook Reservoir on the Clear Fork of the Trinity River, while West Buffalo Creek flows to the

south and is a tributary to the Nolan River in the Brazos River watershed. FM 917 is the closest major roadway to the ridge separating the two watersheds. For the purpose of this report, the northern portion of the project area is that north of FM 917, and the southern portion of the project area is that south of FM 917.

### **1.3 Purpose and Need**

The purpose of the project is to provide safe and effective transportation and enhance mobility for the growing population in Johnson County. The proposed project will meet those needs in the following ways:

- Improve regional mobility with a more direct route between Cleburne in Johnson County and the transportation corridors in Tarrant County.
- Increase the carrying capacity of the area roadway network for people and goods.
- Alleviate local congestion.

### **1.4 Alternatives Discussion**

A no-build alternative and four project corridor alternatives (A-D) were evaluated in the EA. Through the NEPA process, alternatives were screened by evaluating potential impacts on the natural and human environment. Based on the analysis, a preferred build alternative was chosen (Alternative D) that minimized impacts to various environmental resources. A FONSI has been issued, based on the analysis in the EA, and the analysis of alternatives in this document focuses on detailed design alignment alternatives for the previously chosen Alternative D. Based on further analysis of the alignment for Alternative D, opportunities to avoid and minimize impacts to waters of the U.S. were identified. Therefore, during the detailed design, alternatives to the proposed alignment for Alternative D were evaluated with regard to the avoidance and minimization of impacts to waters of the U.S.

Refinements to the original preferred alignment, as detailed in the revised PCN, include: 1) channel re-alignment and one bridge, 2) three channel segment re-alignments and one bridge, 3) minimal channel re-alignment and long bridge spans, and 4) west alignment shift with minimal channel re-alignment and one bridge. The preferred refined alignment is the west alignment shift with minimal channel re-alignment and one 300-foot bridge because it would result in the least impacts to waters of the U.S. while being practicable.

### **1.5 Waters of the U.S. in the Project Area**

The delineation identified intermittent and ephemeral streams, an on-channel impoundment, and an emergent wetland, as well as isolated stock ponds constructed in uplands. The project would cross five unnamed ephemeral streams and six intermittent streams, including West Buffalo Creek and tributaries to West Buffalo and Rock creeks. The proposed ROW also includes one emergent wetland and one on-channel impoundment. Additional wetlands were delineated in the southern portion of the project vicinity; however, potential impacts to these would be avoided by using the western relocation of the roadway alignment to minimize impacts to West Buffalo Creek and its floodplain (refined alignment 4). Within the project area ROW, there are approximately 6,034 linear feet (LF) of streams (2.07 acres) and 0.25 acre of emergent wetlands.

The streams in the project area are of low to moderate functional quality due to current and past land uses and impacts to riparian habitat. Most of the project area is currently or was previously used for grazing; however, residential development has had more recent impacts (e.g., erosion,

downcutting) to several of the stream channels. Although stream channel conditions (e.g., downcut banks, headcutting) indicate soil disturbance associated with past overgrazing, several of the stream banks in the northern portion of the project area exhibit signs of natural, successional re-vegetation and stabilization. Along the portion of West Buffalo Creek in the project area, the current landowner has allowed overgrazing of uplands and livestock access to the stream channel, which has resulted in significant erosion of the channel banks and sedimentation. Representative photos of the project area are provided in Appendix B, Attachment C of the revised PCN.

## **1.6 Summary of Impacts to Waters of the U.S.**

The proposed project would result in unavoidable permanent impacts at three single and complete crossings of waters of the U.S. requiring a PCN. These impacts to waters of the U.S. total 1,838 LF (0.61 acre) of stream and 0.25 acre of wetland for which compensatory mitigation is proposed. These waters of the U.S. would be impacted by a combination of earthen fill and culverts. The three single and complete crossings exceeding 0.1 acre of fill and thus requiring compensatory mitigation include 0.28 acre at Wetland W-1 and Stream S-2, 0.18 acre at Stream S-6, and 0.40 acre at Stream S-10.

## **2.0 MITIGATION PLAN**

This proposed mitigation plan provides an overview of avoidance and minimization measures to be employed by the Applicant in this development, as well as compensatory mitigation measures proposed for unavoidable impacts to waters of the U.S.

### **2.1 Avoidance and Minimization**

#### **2.1.1 Avoidance**

Impacts to waters of the U.S. were avoided to the maximum extent practicable through route selection and design measures (i.e., the addition of bridges). The preferred alignment would avoid impacts to approximately 3,465 LF of stream channels within the proposed ROW for both the Rock Creek and West Buffalo Creek watersheds. This number is the difference between the total linear footage within the ROW (6,034 LF) and the linear footage that will be permanently impacted (2,569 LF). Only three crossings require notification and compensatory mitigation including W-1/S-2, S-6, and S-10 which total 1,838 of stream and wetland. Within the West Buffalo Creek watershed, the original alignment would have impacted approximately 3,500 LF of West Buffalo Creek, while the revised (preferred) alignment would impact only 1,058 LF of West Buffalo Creek.

#### **2.1.2 Minimization**

In addition to the avoidance measures described above, five bridges will be constructed to span eight stream crossings and one on-channel impoundment, thereby minimizing permanent impacts. Where culverts will be installed to cross streams, energy dissipation features, such as rock filter dams, will be used downstream of the culverts to reduce peak flow velocities. This will reduce scouring at culvert crossings and minimize water quality impacts downstream of the project area. Staging and equipment storage sites will be located in non-active portions of the construction area to minimize impacts to riparian habitats. During construction activities, excavated soils will not be placed in waters of the U.S. or floodplain areas unless required for construction of crossings. In addition, disturbed soils will be stabilized to control erosion in

accordance with the project Stormwater Pollution Prevention Plan (SWPPP). Floodplain impacts at Marti Lake will be mitigated and minimized by incorporation of the selected alignment which has lowered the SH 121 roadway profile and will reduce the volume of fill placed in the flood plain. The project will comply with local floodplain management requirements in accordance with NWP General Condition 10.

#### *2.1.2.1 Re-aligned Channel Enhancement*

Minimization of permanent impacts will also be provided by the channel re-alignment of two intermittent streams that will be carried out in conjunction with the construction of two bridges. Specifically, channel re-alignments will occur on an unnamed tributary to Rock Creek (Stream S-6) and along portions of West Buffalo Creek (Stream S-10) within the project area. The bridges were designed in an attempt to avoid impacts to the extent practicable; however in some instances the stream skew requires some re-grading and re-alignment. These stream channels are impaired due to previous and current land uses including overgrazing by livestock and encroachment of residential development resulting in erosion and downcutting in stream channels. The proposed channel re-alignments will reduce the overall linear functional impacts from approximately 1,898 LF to 968 LF by partially replacing stream channel function of the reaches within the ROW. The channel re-alignments would be constructed with soil bed and banks (as opposed to concrete-lined) and re-vegetated as directed in TxDOT document, Standards Specifications for Construction and Maintenance of Highways, Streets and Bridges (June 1, 2004), Section 164.2, for District 2, Fort Worth. Construction of the channel re-alignments will be designed to maintain upstream and downstream hydrology and promote stream stability (See Appendix C, Sheets 12 and 27, in the revised PCN).

#### *2.1.2.2 Water Quality Protection Measures*

The Applicant will design and implement water quality best management practices (BMPs) to control erosion during construction, post-construction total suspended solids (TSS), and sedimentation in accordance with the Texas Commission on Environmental Quality (TCEQ) Guidelines for 401 Water Quality Certification for Tier I projects. Additionally, the Applicant will prepare a SWPPP and a Notice of Intent (NOI) in accordance with the Texas Pollutant Discharge Elimination System (TPDES) requirements for a General Construction Permit (GCP) (TXR150000).

### Project Design and Construction Management

The following mitigation measures are proposed to address avoidance and minimization of construction impacts to water quality.

- BMPs will be implemented in accordance with TCEQ Guidelines for 401 Water Quality Certification for Tier I projects.
- During construction, the Applicant will prohibit project-related construction vehicles from driving in or crossing streams at other than established temporary or permanent crossing points.

### Hydrologic Control and Storm Water Retention Measures

Mitigation measures for project-related, temporary impacts to the hydrology of waters of the U.S. have been incorporated into the project.

- The Applicant will maintain existing surface drainage patterns, to the extent practicable, through the design of the project so as not to impede or increase drainage conditions outside of the ROW.
- The Applicant will maintain downstream water flow conditions, in accordance with NWP 14, General Condition 9, by following stream bed elevations to reduce downcutting and headcutting upstream of the culverts. Additionally, rip rap and temporary rock filter dams will be used downstream of the culverts to dissipate energy and minimize scour and sedimentation.

### Erosion and Sedimentation Control

The following mitigation measures are proposed to minimize erosion and sedimentation impacts on the water quality of waters of the U.S. as a result of project construction.

- When project-related construction activities, such as culverts and bridgework, require work in streambeds, the Applicant will conduct these activities, to the extent practicable, during low-flow conditions.
- Following construction activities in or adjacent to streams, disturbed areas will be returned to pre-construction contours as soon as practicable and stabilized using appropriate BMPs (e.g., seeding, erosion control blankets).
- To minimize sedimentation into streams and wetlands during construction, the Applicant will use BMPs, such as silt fences and straw bale dikes, to minimize soil erosion, sedimentation, runoff, and surface instability during project-related construction activities. The Applicant will disturb the smallest area practicable near streams or wetlands and will conduct reseeding efforts to ensure proper re-vegetation of disturbed areas, as soon as practicable, following project-related construction activities.
- The Applicant will, to the extent practicable, ensure that any fill placed below the ordinary high water mark (OHWM) of wetlands and streams is appropriate material (i.e., clean soil and/or rock) selected to minimize impacts to the wetlands and streams.

### Re-vegetation and Maintenance Measures

Mitigation measures for ROW soil stabilization, re-vegetation, and maintenance with regards to water quality will be included as part of the project SWPPP and are proposed as follows:

- All stream crossing points will be returned to their pre-construction contours to the extent practicable and the crossing banks will be stabilized and reseeded following project-related construction.
- Drainage ditches will be stabilized and vegetated following project-related construction.
- If seasonal conditions are determined to be non-conducive to prescribed plant establishment, temporary cover as directed in TxDOT document, Standards

Specifications for Construction and Maintenance of Highways, Streets and Bridges (June 1, 2004), Section 164.2 (Table 3), for District 2, Fort Worth may be used including mulch, or erosion-control blankets until conditions improve for seeding.

## **2.2 Unavoidable Impacts**

### **2.2.1 Direct Unavoidable Impacts**

Permanent impacts to waters of the U.S. have been avoided and minimized to the extent practicable. For example, bridge spans have been lengthened and added where practicable to avoid impacts to waters of the U.S.

Based on the refined alignment, the project would impact three single and complete crossings of waters of the U.S. which require a PCN (i.e. exceed 0.1 acre of fill impact). These impacts total 0.86 acre of waters of the U.S and include three intermittent streams and one emergent wetland. Permanent impacts due to fill for culvert construction and/or stream re-alignments associated with roadway embankments will be 1,838 LF (0.61 acre) of intermittent stream and 0.25 acre of emergent wetland for which compensatory mitigation is proposed.

The channel re-alignment effort on two intermittent streams, an unnamed tributary to Rock Creek (Stream S-6) and along portions of West Buffalo Creek (Stream S-10), will result in permanent adverse impacts to the waters of the U.S. Although these re-alignments would be constructed to connect and maintain the hydrologic conditions of the current stream channels, a change in stream functionality will result from reduction in linear footage; however, re-vegetation as directed in TxDOT document, Standards Specifications for Construction and Maintenance of Highways, Streets and Bridges and stabilization efforts will minimize overall functional impacts. Construction of the channel re-alignments will be designed to allow stable transitions to the existing stream reaches in both upstream and downstream channel locations. **Table 1** provides detail of the stream functional replacement for the channel re-alignments. This information is reflected in **Table 2** showing the total functional impacts to waters of the U.S. for which compensatory mitigation is proposed.

Table 1 Stream Functional Replacement Calculation - Re-Aligned Channels								
No.	Description	Approximate Station	Ave Width (ft)	Length of Re-Alignment (LF)	Proposed Riparian Functional Category	Proposed Stream Functional Index	Riparian Width Index	Proposed Functional Replacement (LF)
<b>Rock Creek Watershed</b>								
S-6a	Channel Re-alignment Not Under Bridge	1310 00	8	352.00	2.00	1.00	1.00	352.00
S-6b	Channel Re-alignment Under Bridge	1310 00	8	84.00	1.00	0.50	1.00	42.00
<b>West Buffalo Creek Watershed</b>								
S-10a1	Channel Re-alignment West of Roadway	1658 00	8	260.00	2.00	1.00	1.00	260.00
S-10a2	Channel Re-alignment Between Bridges	1663 00	8	80.00	2.00	1.00	1.00	80.00
S-10b	Channel Re-alignment East of Roadway	1670 00	14	391.00	1.00	0.50	1.00	195.50
<b>Total Waters of the U.S.</b>								
								<b>2 .50</b>

<b>Table 2</b> <b>Permanent Fill Impacts and Functional Assessment - Streams and Wetland</b> <b>SH 121, FM 1187 to US 67</b>														
No.	Description	Station	Ave Width (ft)	Linear Feet in ROW	Acreage in ROW	Structure Type	Linear Impacts (LF)	Acreage Impacts	Existing Functional Category	Existing Stream Functional Index	Riparian Width Index	Functional Impacts (LF unless labeled)	Proposed Functional Replacement (See Table 1) (LF)	Total Functional Impacts (LF unless labeled)
<b>Rock Creek Watershed</b>														
W-1	Emergent Wetland	1208 00	-	-	0.25	Fill	-	0.25	2.00	-	-	0.50 acre	-	0.50 acre
S-2	Intermittent Stream	1208 50	5	465	0.05	Culvert/Fill	273	0.03	2.00	1.00	1.00	273.00	-	273.00
S-6	Intermittent Stream	1310 00	8	1,001	0.40	Bridge/Re-align	507	0.18	2.00	1.00	1.50	760.50	394.00	366.50
<b>Subtotal – Rock Crk Watershed</b>				<b>1,466</b>	<b>1.56</b>		<b>780</b>	<b>0.46</b>				<b>1,033.50</b>	<b>3 4.00</b>	<b>63 .50</b>
<b>West Buffalo Creek Watershed</b>														
S-10	Intermittent Stream	1658 00	8	1,073	0.36	Re-align	332	0.09	2.00	1.00	1.25	415.00	260.00	155.00
		1663 00				Bridge/Re-align	115	0.03	2.00	1.00	1.25	143.75	80.00	63.75
		1670 00	14	759	0.33	Re-align	611	0.28	1.00	0.50	1.00	305.50	195.50	110.00
<b>Subtotal – West Buffalo Crk Watershed</b>				<b>1,832</b>	<b>0.6</b>		<b>1,058</b>	<b>0.40</b>				<b>864.25</b>	<b>535.50</b>	<b>328.75</b>
<b>Total</b>				<b>3,2 8</b>	<b>2.25</b>		<b>1,838</b>	<b>0.86</b>				<b>1,8 7.75</b>	<b>2 .50</b>	<b>68.25</b>
<b>Total Functional Impacts</b>														
<b>Stream (LF)</b>														<b>68.25</b>
<b>Wetland (acre)</b>														<b>0.50</b>

Total Functional Impacts = Functional Impacts – Functional Replacement (see Table 1)

### **2.2.2 Indirect/Temporary Impacts**

The project has been designed to allow construction from the embankment to the extent practicable to minimize temporary construction impacts. The construction of the roadway will require the installation of temporary crossings on several of the stream channels in the project area. Temporary crossings will be limited to the minimum width necessary for construction vehicles and will typically be constructed of corrugated metal pipe culverts with stabilized, clean rock and/or soil material. The culverts will be sized in order to pass anticipated normal high flows (one- to two-year events). Following construction of the facility the temporary crossing structures will be removed and the banks will be re-graded to match pre-existing contours, stabilized, and re-vegetated. Temporary impacts will be minimized using the water quality protection measures outlined in section 2.1.2.2.

### **2.3 Mitigation Plan Goals and Objectives**

The goals of the proposed mitigation plan include:

1. Avoid and minimize impacts to waters of the U.S. within the project area.
2. Provide compensation to replace the chemical, physical, and biological functions of the waters of the U.S. that will be adversely affected by the project.

The objectives of the mitigation plan include:

1. Avoid impacts to waters of the U.S. through the selection of a practicable alternative alignment with the least impacts to waters of the U.S.
2. Avoid and minimize impacts to waters of the U.S. through the use of bridges and other design measures where practicable.
3. Compensate for unavoidable adverse impacts to waters of the U.S. through purchase of 8.2 credits from the Trinity River Mitigation Bank. This will compensate for aquatic functions which will not be replaced through design and construction measures.

### **2.4 Proposed Compensatory Mitigation**

The Applicant and HDR believe that incorporating on-site mitigation into this project area will present challenges with long-term maintenance and success of areas outside TxDOT's management, thereby resulting in unacceptable risks for the state. Therefore, the Applicant proposes to compensate for unavoidable impacts to the streams and wetlands through purchase of mitigation credits from an approved mitigation bank. Recent guidance from the USACE published in the Federal Register Vol. 73, No. 70; on April 10, 2008 supports purchase of mitigation credits from an approved mitigation bank for the purpose of meeting compensatory mitigation requirements as part of the 404 permitting process. This action is substantiated by USACE General Compensatory Mitigation Requirements 33 CFR 332.3 and 40 CFR 230.93.

To determine the amount of credits necessary to compensate for unavoidable impacts as a result of the project, a functional assessment was performed on the impacted streams and wetland requiring a PCN. The criteria and methods for conducting the functional assessment and a functional description of the impacted waters of the U.S. can be found in **Attachment B**. The total functional impacts as a result of the proposed project are 968 LF of intermittent stream

and 0.5 acre of wetland (**Table 2**). Based on these functional impacts, the evaluation determined 8.2 functional debits will require compensatory mitigation (**Table 3**).

Table 3 Compensatory Mitigation - Debit Calculation Evaluation SH 121, FM 1187 to US 67						
No.	Description	Station	Stream Total Functional Impacts (LF)	Wetland Functional Impacts (acre)	Linear Conversion Factor	Debits
<b>Rock Creek Watershed</b>						
W-1	Emergent Wetland	1208 00	-	0.50	-	0.5
S-2	Intermittent Stream	1208 50	273.00	-	0.008	2.2
S-6	Intermittent Stream	1310 00	366.50	-	0.008	2.9
<b>Subtotal – Rock Crk Watershed</b>			<b>63 .50</b>	<b>0.50</b>	<b>-</b>	<b>5.6</b>
<b>West Buffalo Creek Watershed</b>						
S-10	Intermittent Stream	1658 00	155.00	-	0.008	1.2
		1663 00	63.75	-	0.008	0.5
		1670 00	110.00	-	0.008	0.9
<b>Subtotal – West Buffalo Crk Watershed</b>			<b>328.75</b>	<b>-</b>	<b>-</b>	<b>2.6</b>
<b>Total</b>			<b>68.25</b>	<b>0.50</b>	<b>-</b>	<b>8.2</b>

Debit Calculations for Stream Impacts based on USACE-accepted linear conversion factor:  
Intermittent - 0.008/LF

The Applicant proposes to purchase 8.2 credits from the Trinity River Mitigation Bank, the approved mitigation bank within the project site's service area. The Applicant will provide the USACE with appropriate documentation of the purchase of credits following the transaction.

## 2.5 Project Contact Information

The point of contact for the Applicant is:

Judy Anderson, P.E.  
Project Engineer  
Texas Department of Transportation  
Fort Worth District  
P.O. Box 6868  
Fort Worth, Texas 76115-0868

The mitigation specialist retained to oversee mitigation plan implementation is:

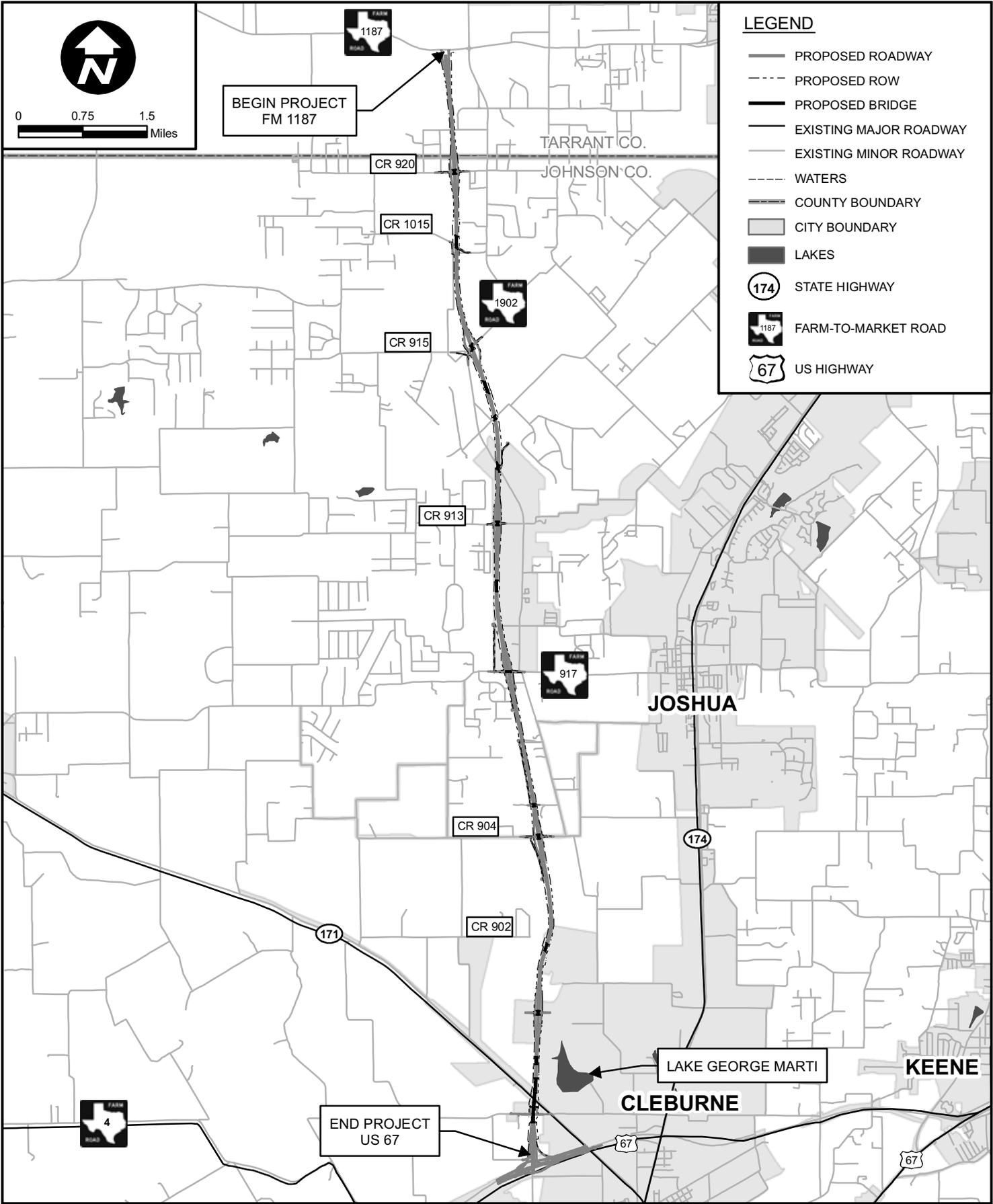
James A. Thomas, PWS, CWB  
Environmental Scientist  
HDR Engineering, Inc.  
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Dallas, Texas 75248  
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Mr. Thomas is a Professional Wetland Scientist (PWS) and a Certified Wetland Biologist (CWB) with 14 years of experience in wetland delineation, vegetation and wildlife management, and riparian restoration and monitoring. He has been consulting as an environmental scientist with

HDR Engineering, Inc. for eight years. If mitigation responsibilities are transferred to a qualified specialist employed by TxDOT or a different agent, written notice will be provided to the USACE, Fort Worth District, Regulatory Branch.



## **Attachment A: Proposed Project General Location Map**



SH 121 - FM 1187 to US 67  
 COMPENSATORY MITIGATION PLAN  
 GENERAL LOCATION MAP

DECEMBER 2008

SHEET 1 OF 1



**Attachment B: Functional Assessment Criteria Description and  
Debit Credit Calculations**

## Functional Assessment of Waters of the U.S., including Wetlands

### Introduction

An earlier version of the following functional assessment was originally developed for the Texas Department of Transportation (TxDOT), Fort Worth District, by HDR Engineering, Inc., in accordance with guidance for mitigation plan development for the U.S. Army Corps of Engineers (USACE). Guidance documents include Regulatory Guidance Letter (RGL) 02-02 and Fort Worth District Draft Mitigation Guidelines (December 24, 2003). Additionally, this functional assessment was used in association with Section 404 Permit No. 1996-00228, for the SH 130 project in Williamson, Travis, Caldwell, and Guadalupe Counties and Project Number 2001-00239 for the Brazos Valley Solid Waste Management Agency for the SH 30 Twin Oaks Landfill in Grimes County.

### Functional Assessment of Waters of the U.S.

To evaluate the potential functions associated with waters of the U.S., the characteristics of each water of the U.S. were recorded during the field delineation surveys. The physical and biological characteristics of stream channels and associated riparian habitat were evaluated to determine a functional category for each stream. The two primary stream components used to assess the function of stream channels were 1) channel functioning condition (e.g., channel stability, aquatic resources/habitat, floodplain characteristics), and 2) native riparian habitat condition. Similarly, delineated wetlands and on-channel impoundments were evaluated to determine a functional category based on several factors, including position in the landscape, water quality maintenance, storm-water detention capacity, vegetation richness/diversity, potential value as wildlife habitat, estimated hydro-period, and size.

### Functional Category Criteria

Functional Categories assigned to each stream were derived by evaluation of:

- Stream Data Sheets
- Routine Wetland Determination Data Forms (completed on-site)
- Aerial 2004 Color Infrared Photography
- Functional Category Criteria

The functional category was based on the following criteria:

Functional Category 1: Aquatic resources with relatively low functional contributions to the aquatic system were given a functional category of "1". These streams are typically ephemeral or intermittent streams, and rarely exhibit prolonged pooling or water flow. They also contribute heavily to sediment loads within the stream system due to unstable bank soils, poor sediment trapping and limited flood storage capacity. The channels are often the result of erosion due to past land uses and support little riparian/emergent hydrophytic vegetation. The associated riparian community generally exhibits early successional and/or non-native species, with low diversity and richness. The streams in this category have little fish/wildlife habitat function and exhibit degradation (i.e., downcutting, erosion, sedimentation, etc.).

Wetlands with the functional category of "1" exhibit little diversity in the plant community and are often dominated by invasive species of low value to wildlife (e.g. *Typha* spp., *va* spp., *Aster* spp.). Their position in the landscape, or ephemeral nature, often limits the positive effects these sites can provide in groundwater recharge, nutrient cycling, and wildlife habitat.

On-channel impoundments with the functional category of 1" have little diversity in the plant community bordering the impoundment and may be dominated by invasive species of low value to wildlife. The position of these impoundments along the channels and the tendency of the impoundments to dry up during the dry portions of the year limit the positive effects of the impoundments for the watershed. Open access for livestock often results in high turbidity, impacts to marginal wetland habitat, and soil erosion of the banks; thus minimizing the benefits to water quality. High nutrient inputs from livestock or surrounding land uses (e.g. residential, agricultural, etc.) can result in algal concentrations and low dissolved oxygen levels. They generally lack overhanging vegetation that helps moderate water temperatures resulting in significant variation and limiting aquatic organisms.

Functional Category 2: Aquatic resources which provide functional benefits to the aquatic system and surrounding uplands, but are limited by physical characteristics or degradation were assigned a functional category of 2". Stream channels in this category can include perennial or intermittent waters, but rarely ephemeral streams, as prolonged hydrology is a key component of the function as aquatic and wildlife habitat and a diverse wetland plant community with species adapted to a variety of hydrologic regimes. The physical characteristics (i.e., channel stability/morphology, riparian corridor, soil/substrate stability, water quality, etc.) have the potential to provide fish and wildlife habitat. These streams may show signs of degradation, but the streams generally have wooded and emergent riparian buffers which function to stabilize banks. Streams and their associated riparian corridor with this category have moderate value in reducing flood velocities (i.e., peak flows), balancing sediment transfer (e.g., erosion and accretion processes), and maintaining healthy food-webs and nutrient cycles. The associated riparian habitat typically exhibits moderate levels of species diversity and richness, often dominated by early colonizing species (e.g., willow, sugar hackberry, green ash). The plant communities of functional category 2" areas generally do not include well-developed strata of mast-producing native species (e.g., oaks, hickories, vines, etc).

Wetlands with the functional category of 2" generally exhibit relatively medium to high diversity in the plant community and are not dominated by invasive species of low value to wildlife. They contribute to the enhancement of water quality and provide floodwater storage. The plant community is not generally dominated by valuable food sources, such as mast-producing woody species or seed/tuber producing emergent vegetation. These wetlands have moderate value in storing floodwaters, trapping and filtering pollutants, maintaining water quality, and promoting nutrient cycling.

On-channel impoundments with the functional category of 2" have medium to high diversity in the plant community bordering the impoundment and are not dominated by invasive species of low value to wildlife. The position of these impoundments along the channels and the tendency of the impoundments to stay inundated during the dry portions of the year allow the impoundments to have a positive effect on the watershed. Controlled access for livestock has resulted in low to medium turbidity, few impacts to marginal wetland habitat, and slight soil erosion of the banks. These impoundments generally have overhanging or floating-leaf vegetation that helps moderate water temperatures resulting in less variation and a more diverse community of aquatic organisms. Impoundments with this category also have moderate value in trapping and filtering pollutants, reducing peak flows, and transferring nutrients to support downstream food-webs.

Functional Category 3: Aquatic resources which provide a range of functional benefits to the aquatic system and surrounding uplands, with only minor degradation due to surrounding land

use(s) and upstream influences were assigned a functional category of 3". Streams in this category generally include perennial and intermittent streams. These streams have large amounts of flood storage capacity which in turn increases the amount of sediment trapping in the stream system. Therefore, the channels may show minor signs of degradation but generally exhibit good water quality characteristics and often include habitat features which serve as fish and aquatic species habitat (e.g., riffle/pool complexes, shaded areas from overhanging canopy, emergent and submergent vegetation, and natural cover materials). Streams and their associated riparian corridor with this category are highly functional in helping to reduce flood velocities (i.e., peak flows), balance sediment transfer (e.g., erosion and accretion processes), and maintain healthy food-webs and nutrient cycles. These streams typically have well-developed wooded or emergent riparian corridors. The associated riparian habitats generally exhibit high diversity and richness in the plant community and are generally dominated by native species. The plant communities of functional category 3" areas generally include well-developed strata of mast-producing native species (e.g., oaks, hickories, vines, etc). The streams and associated riparian corridor provide habitat to a variety of fish and wildlife species in their current state.

Wetlands with the functional category of 3" generally exhibit a high diversity of native plant species with few invasive species. The plant community is generally dominated by valuable food sources, such as mast-producing woody species or seed/tuber producing emergent vegetation (e.g., *Cyperus* spp., *Polygonum* spp.). These wetlands are highly functional to help store floodwaters, trap and filter pollutants, maintain water quality, and promote nutrient cycling. Wetlands in this functional category will generally have variable micro-topography which provides diversity of vegetation and aquatic regimes as hydrology fluctuates.

On-channel impoundments with the functional category of 3" have high diversity in the plant community bordering the impoundment with few invasive species. The position of these impoundments along the channels allows the impoundments to retain water levels sufficient to serve as refugia for aquatic species during the dry portions of the year and have a highly beneficial effect on the surrounding area as well as downstream aquatic systems. Little access for livestock results in low turbidity, no impacts to marginal wetland habitat, and stable banks. These impoundments generally have a diverse community of overhanging or floating-leaf vegetation that helps moderate water temperatures resulting in consistent temperatures and a highly diverse community of aquatic organisms. Impoundments with this category also have high functional value for trapping and filtering pollutants, reducing peak flows, and transferring nutrients to support downstream food-webs.

### **Stream Functional Indices Calculations**

The Stream Functional Index (SFI) for each stream is determined by evaluating the stream type (i.e., ephemeral, intermittent, or perennial) and functional category (i.e., 1, 2, or 3) to develop an index which reflects the beneficial functions of each stream. The SFI evaluation used for determining the linear functional impacts were based on discussions with Mr. Ken Laterza (formerly of the USACE, Fort Worth Regulatory Branch) on March 14, 2002. The indices are weighted to provide a higher functional value to waters that have longer hydro-periods, maintain water quality, provide aquatic habitat, and have native wooded riparian buffers (Table 1). A description of the SFI for each stream type is presented in this table.

<b>Stream Type</b>	<b>Functional Category</b>	<b>SFI</b>
Ephemeral	No riparian habitat	0.25
	1	0.50
	2	0.75
	3	1.00
Intermittent	1	0.50
	2	1.00
	3	1.50
Perennial	1	1.00
	2	1.50
	3	2.00

### **Riparian Width Indices Calculations**

In addition to the SFI, it is appropriate to use an evaluation factor for the riparian buffer, or Riparian Width Index (RWI), in determining the linear functional impact amount necessary to determine the debit for each stream impact, as well as credit for mitigation efforts. The RWI for each stream impacted by the proposed project is based on the width of native riparian habitat adjacent and within the floodplain of the channel (Table 2). The evaluation is based on using FEMA 100-year floodplain overlays, where designated, on aerial digital orthophotography and on-site evaluations using professional judgment when FEMA floodplains have not been developed. For intermittent and ephemeral streams without broad floodplains the RWI is generally based on the habitat immediately adjacent to the channel (approximately 25-foot buffer) plus additional buffer which contributes to the ecological and physical functions of the stream. In most cases, the RWI for intermittent and ephemeral streams would not exceed 1.25 (i.e., 51 to 100 feet). However, in some geologic and soil formations with high variation in water tables the riparian buffer for intermittent streams would be greater. The RWIs were developed using the following weighted values.

<b>Native Riparian Corridor Width (ft)</b>	<b>Riparian Width Index (RWI)</b>
0-50	1.00
51-100	1.25
101-200	1.50
201-300	2.00
300	3.00

## Stream Linear Functional Impacts Calculations

The total linear functional impact (debit) for each stream crossing is calculated using the following formula:

$$\text{Linear Functional Impacts} = \text{Linear Feet} \times \text{SFI} \times \text{RWI}$$

The SFI values are weighted to allow low-functioning ephemeral and intermittent streams with little or no riparian habitat to fall under a value of 1.0. This is based on the presumption that a standard functional unit is based on an intermittent stream with moderate function or an ephemeral stream exhibiting high functional condition. However, no stream is to be given a RWI value of less than 1.0. This prevents impact values for low-functioning streams to be decreased by both measurements due to a lack of riparian habitat. Similarly, the values are weighted to allow moderate-functioning intermittent streams with narrow floodplains and riparian corridors to be calculated at their actual linear impact length (value of 1.0) for compensatory mitigation, while perennial streams with expansive, diverse riparian buffers can score greater than 1.0 value, or up to 6.0 (SFI x RWI). This value can be used in the debit and credit evaluation to compare impacts and proposed mitigation using the same measuring criteria. Therefore, additional ratios can be used after the application of these formulas for both impacts (debits) and mitigation (credits) as described below to account for functional lift and temporal loss of habitat value in multi-component mitigation plans in accordance with the goal of "no net loss".

**Debits and Area Functional Impacts Calculations –  
SH 121, FM 1187 to US 67 and Trinity River Mitigation Bank**

The debits for streams and the area of functional impacts for other waters of the U.S. (which is equal to the amount of debits calculated for mitigation) are calculated using the following formulas:

$$\text{Debits of Stream Functional Impacts} = \text{Linear Conversion Factor} \times \text{Stream Functional Impacts}$$

Where the Linear Conversion Factors are based on USACE-accepted mitigation multipliers for Trinity River Mitigation Bank:

Intermittent Stream Ratio = 0.008

$$\text{Wetland Functional Impacts} = \text{Acres of Wetland} \times \text{Wetland Functional Impacts Debits}$$

**Functional Replacement Calculations – Minimization Enhancement Efforts**

The potential functional replacement credits for mitigative minimization or enhancement efforts, such as re-aligned and re-vegetated (native vegetation only) channel segments, can be calculated using the following formula:

$$\text{Functional Replacement} = \text{Re-aligned Stream} \times \text{Functional Replacement}$$

The Functional Replacement value is then used to offset a portion of the functional impacts prior to the calculation of stream functional impact debits using the following formula:

$$\text{Total Functional Impacts for All Streams} = \text{Stream Functional Impacts} - \text{Functional Replacement}$$

The Total Functional Impacts value for each stream is then used as the Linear Functional Impacts variable in the formula for calculating debits of Stream Functional Impacts listed above.

## **Functional Description of Impacted Waters of the U.S. – SH 121, FM 1187 to US 67**

### **Rock Creek Watershed**

#### **Stream S-2**

Functional Category 2, SFI 1.00, RWI 1.00. This intermittent stream flows west across the ROW. Stream S-2 has a riparian corridor of less than 50 feet and an OHWM of five feet. Although Stream S-2 appears to have been excavated and straightened, the riparian habitat is regenerating due to propagation from upstream areas. The riparian habitat consists of native species such as cedar elm, sugar hackberry, black willow, yaupon, greenbrier, and water-pennywort; but also has some introduced species such as bermudagrass. Stream S-2 was assigned a functional category of 2” because the vegetation community exhibits medium riparian quality and a wildlife habitat quality rating of medium quality. Stream S-2 has an associated wetland (W-1) and was channelized by previous landowners which has resulted in some slight erosion.

#### **Wetland W-1**

Functional Category 2. W-1 is located in the northern portion of the project area and is associated with stream S-2. This wetland lies north and adjacent to S-2 and has a habitat that consists of native species such as black willow, curly dock, smartweed, rush, and spikerush; but also has some introduced species such as bermudagrass. Wetland W-1 has been impacted by livestock movement through the area seeking water from stream S-2. Also, W-1 has moderate value for trapping and filtering pollutants and maintaining water quality and has medium species diversity.

#### **Stream S-6**

Functional Category 2, SFI 1.00, RWI 1.50. This intermittent stream is located in the north central portion of the project area and flows in a westward direction. Stream S-6 has a riparian corridor of 101 to 200 feet wide and has an average OHWM of eight feet. The riparian habitat consists of native species such as mesquite, cocklebur, seacoast sumpweed, Osage orange, giant ragweed, and switchgrass; but also has some introduced species such as bermudagrass. Evidence of pooling occurs in the stream and the water quality is slightly turbid. Stream S-6 was assigned a functional category of 2” because it has low riparian quality and low quality habitat. Stream S-6 also shows indications of channel downcutting resulting from increased flows due to land use patterns upslope.

### **West Buffalo Creek Watershed**

#### **Stream S-10a** (Stations 1658 and 1663)

Functional Category 2, SFI 1.00, RWI 1.25. This reach of intermittent stream (S-10a) is located in the southern portion of the project area and flows south. Stream S-10a has a narrow riparian corridor (51 to 100 feet) and has an OHWM of eight feet. This stream is associated with a number of wetlands occurring in remnant or cut off (i.e. fill activities) channel reaches, all of which are located outside the ROW. The riparian habitat consists of native species such as mesquite and Osage orange; but also has some introduced species such as bermudagrass. Evidence of pooling occurs in the stream and the area has been heavily impacted as a result of livestock grazing. Stream S-10a was assigned a functional category of 2” because the riparian community exhibits low diversity and species richness. The associated wildlife habitat is of moderate quality, and S-10a shows signs of moderate erosion.

**Stream S-10b** (Station 1670)

Functional Category 1, SFI 0.50, RWI 1.00. This reach of intermittent stream S-10b is located downstream (south) of S-10a in the southern portion of the project area. Stream S-10b has a very narrow riparian corridor (less than 50 feet) and has an OHWM of eight feet. The riparian habitat consists of native species such as mesquite and Osage orange; but also has some introduced species such as bermudagrass. Evidence of pooling occurs in the stream, and the area has been heavily impacted as a result of livestock grazing. This reach of Stream S-10b was assigned a functional category of "1" because the riparian community exhibits low diversity and species richness due to past land use. The associated wildlife habitat is of low quality and this reach of S-10b shows signs of moderate to high erosion due to overgrazing.

## Debit Calculations – SH 121, FM 1187 to US 67 and Trinity River Mitigation Bank

### Definitions

LF is linear feet

SFI is Stream Functional Index

RWI is Riparian Width Index

+ is addition

– is subtraction

x is multiplication

/ is division

= is equals

### Assumptions:

Linear conversion factors to convert stream debit values of LF to surface area functional unit equivalents:

**Intermittent Stream** debit = LF of stream functional impact x **0.008**

This linear conversion factor is based on USACE-accepted multipliers for the Trinity River Mitigation Bank.

**Debits** - See **Table 1** for individual stream linear functional impact calculations

LF of functional impacts for streams = (LF of fill) x (SFI) x (RWI)

Debits of functional impacts for streams = (LF of functional impacts) x (linear conversion factor)

Debits of functional impacts for wetland = (acres of fill) x (Functional Category)

### Intermittent stream 2

Debits = 273 LF x 0.008 = **2.2**

### Wetland 1

Debits = 0.25 acre x 2 = **0.5**

**Intermittent streams and 1** (See Table 2 for Functional Replacement Values)

The functional replacement calculated for Streams S-6 and S-10 are as a result of necessary re-alignments along stream channels that will provide improved channel design and stabilization along channel slopes, minimizing impacts of erosion and reducing downcutting within the immediate area of construction and bridge supports. For Stream S-6 there is an additional functional change due to a bridge span over an 84-LF reach of the stream which will affect the re-vegetation of the riparian habitat in this area.

$$\text{Functional impacts} = (\text{LF of impacted stream}) \times (\text{SF}) \times (\text{RW})$$

$$\text{Functional Replacement} = (\text{LF of re-aligned stream}) \times (\text{proposed replacement SF}) \times (\text{proposed replacement RW})$$

$$\text{Total Functional impacts for All Streams with Replacement Values} = \text{Stream Functional impacts} - \text{Functional Replacement from Stream Re-alignment}$$

**FOR:**

Stream S-6:

$$\begin{aligned} \text{Station 1310: Total Functional Impacts} &= 760.50 - (352.00 - 42.00) = 366.50 \\ \text{Debits} &= 366.50 \text{ LF} \times 0.008 = \mathbf{2.9} \end{aligned}$$

Stream S-10:

$$\begin{aligned} \text{Station 1658: Functional Impacts} &= 415.00 - (260.00) = 155.00 \\ \text{Debits} &= 155.00 \text{ LF} \times 0.008 = \mathbf{1.2} \end{aligned}$$

$$\begin{aligned} \text{Station 1663: Functional Impacts} &= 143.75 - (80.00) = 63.75 \\ \text{Debits} &= 63.75 \text{ LF} \times 0.008 = \mathbf{0.5} \end{aligned}$$

$$\begin{aligned} \text{Station 1670: Functional Impacts} &= 305.50 - (196.50) = 110.00 \\ \text{Debits} &= 110.00 \text{ LF} \times 0.008 = \mathbf{0.9} \end{aligned}$$

$$\text{Total Debits for Streams with Functional Replacement} = 2.9 + 1.2 + 0.5 + 0.9 = \mathbf{5.5}$$

**T TA D IT Intermittent stream 2 Debits etland 1 Debits**  
**Total Debits or Intermittent streams it nctional eplacement**

**T TA D IT 2.2 . . .2**  
**(See Table 3)**

<b>Table 1</b> <b>Permanent Fill Impacts and Functional Assessment - Streams and Wetland</b> <b>SH 121, FM 1187 to US 67</b>														
No.	Description	Station	Ave Width (ft)	Linear Feet in ROW	Acreage in ROW	Structure Type	Linear Impacts (LF)	Acreage Impacts	Existing Functional Category	Existing Stream Functional Index	Riparian Width Index	Functional Impacts (LF unless labeled)	Proposed Functional Replacement (See Table 2) (LF)	Total Functional Impacts (LF unless labeled)
<b>Rock Creek Watershed</b>														
W-1	Emergent Wetland	1208 00	-	-	0.25	Fill	-	0.25	2.00	-	-	0.50 acre	-	0.50 acre
S-2	Intermittent Stream	1208 50	5	465	0.05	Culvert/Fill	273	0.03	2.00	1.00	1.00	273.00	-	273.00
S-6	Intermittent Stream	1310 00	8	1,001	0.40	Bridge/Re-align	507	0.18	2.00	1.00	1.50	760.50	394.00	366.50
<b>Subtotal – Rock Crk Watershed</b>				<b>1,466</b>	<b>1.56</b>		<b>780</b>	<b>0.46</b>				<b>1,033.50</b>	<b>3 4.00</b>	<b>63 .50</b>
<b>West Buffalo Creek Watershed</b>														
S-10	Intermittent Stream	1658 00	8	1,073	0.36	Re-align	332	0.09	2.00	1.00	1.25	415.00	260.00	155.00
		1663 00				Bridge/Re-align	115	0.03	2.00	1.00	1.25	143.75	80.00	63.75
		1670 00	14	759	0.33	Re-align	611	0.28	1.00	0.50	1.00	305.50	195.50	110.00
<b>Subtotal – West Buffalo Crk Watershed</b>				<b>1,832</b>	<b>0.6</b>		<b>1,058</b>	<b>0.40</b>				<b>864.25</b>	<b>535.50</b>	<b>328.75</b>
<b>Total</b>				<b>3,2 8</b>	<b>2.25</b>		<b>1,838</b>	<b>0.86</b>				<b>1,8 7.75</b>	<b>2 .50</b>	<b>68.25</b>
<b>Total Functional Impacts</b>														
<b>Stream (LF)</b>														<b>68.25</b>
<b>Wetland (acre)</b>														<b>0.50</b>

Total Functional Impacts = Functional Impacts – Functional Replacement (see Table 2)

Table 2 Stream Functional Replacement Calculation - Re-Aligned Channels								
No.	Description	Approximate Station	Ave Width (ft)	Length of Re-Alignment (LF)	Proposed Riparian Functional Category	Proposed Stream Functional Index	Riparian Width Index	Proposed Functional Replacement (LF)
<b>Rock Creek Watershed</b>								
S-6a	Channel Re-alignment Not Under Bridge	1310 00	8	352.00	2.00	1.00	1.00	352.00
S-6b	Channel Re-alignment Under Bridge	1310 00	8	84.00	1.00	0.50	1.00	42.00
<b>West Buffalo Creek Watershed</b>								
S-10a1	Channel Re-alignment West of Roadway	1658 00	8	260.00	2.00	1.00	1.00	260.00
S-10a2	Channel Re-alignment Between Bridges	1663 00	8	80.00	2.00	1.00	1.00	80.00
S-10b	Channel Re-alignment East of Roadway	1670 00	14	391.00	1.00	0.50	1.00	195.50
<b>Total Waters of the U.S.</b>								<b>2 .50</b>

Table 3 Compensatory Mitigation - Debit Calculation Evaluation SH 121, FM 1187 to US 67						
No.	Description	Station	Stream Total Functional Impacts (LF)	Wetland Functional Impacts (acre)	Linear Conversion Factor	Debits
<b>Rock Creek Watershed</b>						
W-1	Emergent Wetland	1208 00	-	0.50	-	0.5
S-2	Intermittent Stream	1208 50	273.00	-	0.008	2.2
S-6	Intermittent Stream	1310 00	366.50	-	0.008	2.9
<b>Subtotal – Rock Crk Watershed</b>			<b>63 .50</b>	<b>0.50</b>	<b>-</b>	<b>5.6</b>
<b>West Buffalo Creek Watershed</b>						
S-10	Intermittent Stream	1658 00	155.00	-	0.008	1.2
		1663 00	63.75	-	0.008	0.5
		1670 00	110.00	-	0.008	0.9
<b>Subtotal – West Buffalo Crk Watershed</b>			<b>328.75</b>	<b>-</b>	<b>-</b>	<b>2.6</b>
<b>Total</b>			<b>68.25</b>	<b>0.50</b>	<b>-</b>	<b>8.2</b>

Debit Calculations for Stream Impacts based on USACE-accepted linear conversion factor:  
Intermittent - 0.008/LF