

DRAFT

**ENVIRONMENTAL ASSESSMENT
FOR**



Kyle

**Supplemental Disaster Recovery
Community Development Block Grant (CDBG)**

Contract No. B16DH480001

GLO Contract No.

Work Order No. 19-280-000-B779

Windy Hill Road

FUTURE LINK TECHNOLOGIES, INC.

PO BOX 90696

AUSTIN, TX 78709

512-443-4100

www.future-link.biz

ENVIRONMENTAL ASSESSMENT

ENVIRONMENTAL REVIEW RECORDS FOR

City of Kyle

Contract No. B16DH480001

GLO Contract No. 19-280-000-B779

TABLE OF CONTENTS

TAB 1 – EVIDENCE OF PUBLICATION

COMBINED NOTICE OF FINDING OF NO SIGNIFICANT IMPACT AND
INTENT TO REQUEST RELEASE OF FUNDS

(When Applicable:)

- EARLY NOTICE AND PUBLIC REVIEW OF A PROPOSED ACTIVITY IN A 100-YEAR FLOODPLAIN
- FLOODPLAIN NOTICE OF EXPLANATION
- US DEPARTMENT OF HOUSING & URBAN DEVELOPMENT FLOODPLAIN AND WETLAND 8-STEP PROCESS (7015.5)
- CORRESPONDENCE (e.g., HUD/EPA, FEMA, FLOODPLAIN ADMINISTRATOR, RESPONSIBLE ENTITY, GRANT ADMINISTRATOR)

TAB 2 – REQUEST FOR RELEASE OF FUNDS AND CERTIFICATION FORM

TAB 3 - ENVIRONMENTAL ASSESSMENT DETERMINATIONS AND COMPLIANCE FINDINGS FOR HUD-ASSISTED PROJECTS 24 CFR PART 58

- COMPLIANCE WITH 24 CFR 50.4, 58.5 AND 58.6 LAWS AND AUTHORITIES
- STATUTES, EXECUTIVE ORDERS, AND REGULATIONS LISTED AT 24 CFR 50.4 & 58.5
- ENVIRONMENTAL ASSESSMENT FACTORS 24 CFR 58.4; REF 40 CFR 1508.8 & 1508.27

TAB 4 - PROJECT DESCRIPTION

- FORM 314
- PROOF OF PROJECT DESCRIPTION EMAIL TO ENGINEERS

TAB 5 – GENERAL PROJECT LOCATION AND AERA OF POTENTIAL EFFECT

- GOOGLE MAP/AERIAL PROJECT BOUNDARIES
- SITE VISIT PICTURES
- SITE VISIT NOTES AND
- PROJECT ENGINEERING

TAB 6 – ATTACHMENTS

COMPLIANCE WITH 24 CFR 50.4, 58.5 AND 58.6 LAWS AND AUTHORITIES

Attachments and HUD Environmental Worksheets Included where Applicable

ATTACHMENT 1 AIRPORT CLEAR ZONES AND ACCIDENT POTENTIAL ZONES

- FAA - Maps
- NEPAassist Transportation Mapping

ATTACHMENT 2 COASTAL BARRIER RESOURCES (WHEN NEEDED)

- John H. Chafee Coastal Barrier Resource System Map

ATTACHMENT 3 FLOOD INSURANCE

- Federal Emergency Management Agency (FEMA)
Documentation of National Flood Insurance Program

STATUTES EXECUTIVE ORDERS AND REGULATIONS LISTED AT 24 CFR 50.4 & 58.5

ATTACHMENT 4 AIR QUALITY

- TCEQ or NEPA Assist Nonattainment Area Mapping
- Texas Air Quality Control Measures
- Air Pollutant Watch List

ATTACHMENT 5 COASTAL ZONE MANAGEMENT

- Texas Coastal Management Program Map
- Texas General Land Office Correspondence

ATTACHMENT 6 CONTAMINATION AND TOXIC SUBSTANCES

Federal

US Environmental Protection Agency (EPA)

- EnviroMapper for Envirofacts and NEPASSIST -
(Listing of Regulated (RCRA) Facilities)
 - EPA RCRA Corrective Action Sites – Map
 - Brownfields MAP
- National Priorities Listing (NPL)

National Response Center

- Current Spills Report

State and Local Statutes

TCEQ Central Registry Database Listings

- Underground Injection Control Permits
- Radioactive Waste Storage & Processing Permits
- Brownfield Site Assessments
- Voluntary Cleanup Program
- Superfund Program
- Innocent Owner/Operator Program
- Industrial and Hazardous Waste Disposal Registration/Permits
- Industrial and Hazardous Waste Corrective Action Sites
- Petroleum Storage Tanks Registration & Mapping of Tanks
 - Underground Storage Tanks
- Leaking Petroleum Storage Tanks & Mapping of Tanks

Closed and Abandoned Landfills

ATTACHMENT 7 ENDANGERED SPECIES

- U. S. Fish & Wildlife Endangered Species IPAC Report
- Texas Parks and Wildlife Department List of Rare, Threatened and Endangered Species
- Texas Parks and Wildlife Natural Diversity Database (TXNDD) Mapping of Rare, Threatened and Endangered Resources
- Memo to the File for Endangered Species
- Texas Parks and Wildlife Correspondence
- US Fish and Wildlife Correspondence

ATTACHMENT 8 EXPLOSIVE AND FLAMMABLE OPERATIONS [24 CFR 51C]

- Petroleum Storage Tanks Registration & Mapping of Tanks
 - Above Ground Storage Tanks and Acceptable Separation Distance

ATTACHMENT 9 FARMLANDS PROTECTION

- Farmland Protection Agency Act

ATTACHMENT 10 FLOODPLAIN MANAGEMENT

- Federal Emergency Management Agency (FEMA) Floodplain Map

ATTACHMENT 11 HISTORIC PRESERVATION

- Texas Historical Commission Approval
- Tribal Consultation For Tribes With Interests In Historic Properties Of Religious And Cultural Significance To Tribes
- Tribal Correspondence

ATTACHMENT 12 – NOISE ABATEMENT & CONTROL

- Noise Ordinance if Available

ATTACHMENT 13 SOLE SOURCE AQUIFERS - SAFE DRINKING WATER

- NEPAssist/TWDB Major Aquifers of Texas Map
- NEPAssist/TWDB Minor Aquifers of Texas Map
- NEPAssist/Texas Sole Source Aquifer Map

ATTACHMENT 14 WETLAND PROTECTION

- USFWS National Wetlands Inventory Map or NEPAssist Map
- USGS 7.5 Minute Topography Map

ATTACHMENT 15 WILD AND SCENIC RIVERS

- U.S. National Park Service Information
- NEPAssist or Google Earth Mapping of Wild & Scenic River

ATTACHMENT 16 ENVIRONMENTAL JUSTICE

- NEPAssist/EPA Environmental Justice Data

ENVIRONMENTAL ASSESSMENT FACTORS

ATTACHMENT 17 LAND DEVELOPMENT

- USDA Report for Slope and Erosion Information
- USDA Report for Soils/NEPAssist Soils

ATTACHMENT 18 SOCIOECONOMIC INFORMATION

- Regional Water Planning Area Map

ATTACHMENT 19 COMMUNITY FACILITIES AND SERVICES

- NEPAssist or Google Earth Map of Social Places in Area
 - Hospitals
 - Schools
 - Churches
- Assisted Living Federation of America (ALFA) Map of Assisted Living Facilities in Proximity of Project
- Council of Government Correspondence

19.1 Solid waste Disposal/Recycling

- Map of Solid Waste Disposal Sites and Recycling Centers within .5 miles

19.2 Water Quality

- NEPAssist or EPA Watershed & Impaired Water Map
- NEPAssist Monitor Well Map
- TCEQ Water Quality Permits in the Area
- TCEQ Storm Water Permits
- PUC Wastewater CCN

19.3 Water Supply

- TWDB Well Numbering Grid
- TWDB WIID Map of Water Well Locations
- PUC/TCEQ Safe Drinking Water Map CCN

19.4 Public Safety

- Google Earth Map of Area – Area Public Safety Locations

19.5 Parks, Open Space and Recreation

- Parks in the Surrounding County

19.6 Transportation and Accessibility (when needed)

ATTACHMENT 20 NATURAL FEATURES

Unique Natural Features, Water Resources Vegetation, Wildlife

ATTACHMENT 21 OTHER PROJECT INFORMATION

REFERENCES

Texas Commission on Environmental Quality - <http://www.tceq.state.tx.us/>
Texas Water Development Board - <http://www.twdb.state.tx.us>
Texas Parks and Wildlife – <http://www.tpwd.state.tx.us>
US Fish & Wildlife – <http://fws.com/>
National Resource Conservation Center -<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>
Google Earth - http://www.google.com/google_earth.htm
Federal Emergency Management Agency - <http://www.msc.fema.gov/>
Federal Aviation Administration -http://www.faa.gov/airports_airtraffic/airports/planning_capacity/npias/
National Response Center -<http://www.nrc.uscg.mil/pls/htmldb/f?p=109:1:139040664473>
Council of Government- <http://www.h-gac.com/>
Texas Association of Regional Councils - <http://www.txregionalcouncil.org/index.php>
Environmental Protection Agency -<http://epa.gov>
Environmental Protection Agency - [Environmental Protection Agency \(EPA\) Corrective Action Sites](#)
US Census – <http://www.census.gov>
Bureau of Economic Analysis – <http://www.bea.gov>
Texas General Land Office – www.glo.state.tx.us/coastal/cmp.html
Wild and Scenic Rivers in Texas - <http://www.nps.gov/rigr/planyourvisit/wildscenic.htm>
Home Town Locator- <http://www.hometownlocator.com/>
County of Hays- <https://hayscountytexas.com/>
City of Kyle - <https://www.cityofkyle.com/>
Texas Association of Regional Councils - <http://www.txregionalcouncil.org/index.php>
Texas Education Agency – <http://www.tea.state.tx.us/>
Assisted Living Federation of America – http://www.alfa.org/alfa/About_ALFA.asp?SnID=390678837
Texas Historical Commission - <http://www.thc.state.tx.us/>
Texas Department of Aging and Disabilities - <http://www.dads.state.tx.us/>
US Housing & Urban Development – NEPASSIST - <http://www.epa.gov/oecaerth/nepa/nepassist-mapping.html>
US Housing & Urban Development - Tribal Interest Website - <http://egis.hud.gov/tadat/countyQuery.aspx?state=Texas>
Texas Railroad Commission – <http://www.rrc.state.tx.us>

TAB 1

EVIDENCE OF PUBLICATION

**COMBINED NOTICE OF FINDING OF NO SIGNIFICANT IMPACT (FONSI)
AND INTENT TO REQUEST RELEASE OF FUNDS**

**EARLY NOTICE AND PUBLIC REVIEW OF A PROPOSED ACTIVITY
IN A 100-YEAR FLOODPLAIN**

FLOODPLAIN NOTICE OF EXPLANATION

**US DEPARTMENT OF HOUSING & URBAN DEVELOPEMNT
FLOODPLAIN AND WETLAND 8-STEP PROCESS**

**CORRESPONDENCE
(e.g., HUD/EPA, FEMA, FLOODPLAIN ADMINISTRATOR, RESPONSIBLE
ENTITY, GRANT ADMINISTRATOR)**

**COMBINED NOTICE OF FINDING OF NO SIGNIFICANT IMPACT AND INTENT TO REQUEST
RELEASE OF FUNDS – AND
FINAL NOTICE AND PUBLIC EXPLANATION OF A PROPOSED ACTIVITY IN A 100-YEAR
FLOODPLAIN AND WETLAND**

August ____, 2020

City of Kyle
100 W. Center Street
Kyle, TX, 78640
512-944-0948

These notices shall satisfy three separate but related procedural requirements for activities to be undertaken by the City of Kyle.

To: All interested Agencies, USACE, TWDB, County Flood Control,

REQUEST FOR RELEASE OF FUNDS

On or about _____ the City of Kyle will submit a request to the Texas General Land Office (TGLO) for the release of Supplemental Disaster Recovery Community Development Block Grant (CDBG) funds under program funds under Section 104(f) of Title 1 of the Housing & Community Development Act of 1974 as amended to undertake project known as Windy Hill Road and Drainage Improvements, Contract # B16DH480001 for the purpose of Windy Hill Street improvements – from 500 ft W. of Cherrywood to 500 ft East of Purple Martin Avenue. The City of Kyle shall reconstruct a portion of Windy Hill Road by removing and replacing existing culverts, the roadway, and approaches; when the roadway pavement and structure to add turn lane capacity, install railing and end treatments that meet TxDot standards; and perform associated appurtenances. Improvements total approximately two thousand one hundred (2100) linear feet.

FINDING OF NO SIGNIFICANT IMPACT

The City of Kyle has determined that the project will have no significant impact on the human environment. Therefore, an Environmental Impact Statement under the National Environmental Policy Act of 1969 (NEPA) is not required. Additional project information is contained in the Environmental Review Record (ERR) on file at The City of Kyle *100 W. Center Street, Kyle, TX 78640* and may be examined or copied weekdays __A.M to __P.M.

**FINAL NOTICE AND PUBLIC EXPLANATION OF PROPOSED ACTIVITY IN A 100-YEAR
FLOODPLAIN AND WETLANDS**

This is to give notice that the Responsible Entity under Part 58 has conducted an evaluation as required by Executive Order 11988 and 11990, in accordance with HUD regulations at 24 CFR 55.20 Subpart C Procedures for Making Determinations on Floodplain Management and Wetlands Protection. The activity is funded under the HUD Community Development Block Grant Disaster Recovery under DRS 19-280-000-B779. The proposed project(s) is located Windy Hill Road, from 500 ft West of Cherrywood to 500 ft East of Purple Martin Ave., Kyle, Hays County TX The City of Kyle shall reconstruct a portion of Windy Hill Road by removing and replacing existing culverts, the roadway, and approaches; widen the roadway pavement and structure to add turn lane capacity, install railing and end treatments that meet TxDOT

standards; and improve associated appurtenances. Improvements total approximately two thousand one hundred (2100) linear feet. The proposed project(s) limits are approximately from 500 ft W. of Cherrywood to 500 ft East of Purple Martin Ave in Kyle, TX. According to FEMA flood panel 48209C029F, the project is located within .87 acres of a 100-year floodplain. According to a wetland delineation and the National Wetlands Inventory, the project is impacting less than 0.10 acres. Wetland R4SBC – Riverine and Freshwater Emergent. Mitigation measures for floodplain and wetland construction includes: Earthwork volumes will be calculated and if it is determined fill is needed for the road infrastructure proposed, at the rate of 1 cy: 1cy material will be removed from the floodplain footprint or location determined runoff can be detained in order to maintain the waters within the floodplain. Construction activities at Richmond Branch can be covered under Nationwide Permit 14 (Linear Transportation Projects). As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, preconstruction notification to the USACE for the use of Nationwide Permit (NWP) 14 will not be required. In accordance with the guidelines of NWP 14, all limitations, criteria, and General Conditions should be followed by this project. Specifically, General Conditions 10, 12, 18, 20, 21, and 23 are addressed below. NWP 14 guidelines are included in Attachment 7 (Attachment G of Delineation Document). Sediment controls to prevent erosion that prevent impact to area wildlife. Routine monitoring of the site prior to and during construction to prevent accidental capture of any animal species. Reseed area with native plants and grasses to prevent erosion and avoid invasive plants. Limit vegetation clearing using TPWD standards and BMPs when clearing is necessary - Clearing of vegetation during general bird nesting season (between March and August) will be considered prior to construction and information regarding state listed and rare species. Conduct a bird, bat, and turtle surveys prior to and during construction to prevent impact to species. Consult checklist for future action if discovered. If wildlife enters the construction area, suspend construction until the animal leaves the area and/or contact TPWD for assistance. Environmental information investigation results will be provided to contractors for this project. This includes listings from the Federal IPAC database, the Texas Parks & Wildlife Texas Natural Diversity Database (TXNDD), the Hays County Endangered Species listing and the SGCN listing for Hays County and other information that has been incorporated into this project. These listings are provided to contractors in order to understand the possible wildlife encountered during construction. Any tree removal will be limited and be consistent with tree management requirements as identified within best management practices and TPWD standards. If buried cultural materials are encountered during construction or disturbance activities, work should cease in the immediate area; work can continue where no cultural materials are present. Industry specific best management practices will be implemented to prevent construction runoff through berming and silt fencing Please contact the THC's Archeology Division at 512-463-6096 to consult on further actions that may be necessary to protect the cultural remains and Texas General Land Office. Grant contract amount is \$3,497,686.18.

PUBLIC COMMENTS

Any individual, group, or agency may submit written comments on the ERR to the *City of Kyle*. All comments received by _____; will be considered by the City of Kyle prior to authorizing submission of a request for release of funds. Comments should specify which Notice they are addressing. Written comments regarding the Final Floodplain Notice must be received by _____ **and addressed to the Attention of Travis Mitchell, Mayor** on or before during the hours of 9:00 AM to 5:00 PM. Comments may also be submitted via email at [email address].

ENVIRONMENTAL CERTIFICATION

The City of Kyle certifies to TG:P that Travis Mitchell, in his capacity as mayor consents to accept the jurisdiction of the Federal Courts if an action is brought to enforce responsibilities in relation to the environmental review process and that these responsibilities have been satisfied. TGLO's approval of the certification satisfies its responsibilities under NEPA and related laws and authorities and allows the City of Kyle to use Program funds.

OBJECTIONS TO RELEASE OF FUNDS

TGLO will accept objections to its release of fund and the City of Kyle certification for a period of fifteen days following the anticipated submission date or its actual receipt of the request (whichever is later) only if they are on one of the following bases: (a) the certification was not executed by the Certifying Officer of the City of Kyle (b) the City of Kyle has omitted a step or failed to make a decision or finding required by HUD regulations at 24 CFR part 58; (c) the grant recipient or other participants in the development process have committed funds, incurred costs or undertaken activities not authorized by 24 CFR Part 58 before approval of a release of funds by TGLO; or (d) another Federal agency acting pursuant to 40 CFR Part 1504 has submitted a written finding that the project is unsatisfactory from the standpoint of environmental quality. Objections must be prepared and submitted in accordance with the required procedures (24 CFR Part 58, Sec. 58.76) and shall be addressed to HUD/State administration office at address of that office. Potential objectors should contact TGLO to verify the actual last day of the objection period.

Travis Mitchell, Mayor

Classifieds

20 words for \$8!

• Place your classified ad by calling 512-268-7862

• Email paper@haysfreepress.com

We accept Visa, Mastercard and Discover

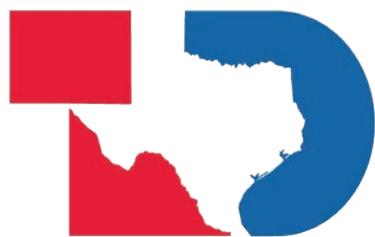
DEADLINE: NOON MONDAY FOR WEDNESDAY'S PAPER

Employment

DIRECT CARE COUNSELORS

Provide positive role modeling, structure, and supervision to adolescent boys. No exp. required, We train comprehensively. Pay starting at \$12 per hour for flexible 8 & 16 hr shift schedules.

Health/life/dental insurance after 60 days. Min. requirements: Must be 21 yrs old, HS/GED, clean TDL, clean criminal history, pre-employment TB skin test, and drug screen. Growing (20+ year old) non-profit organization. www.pegasusschool.net. Call (512)432-1678 for further information.



TEXAS DISPOSAL SYSTEMS



TDS IS NOW HIRING!
Find your career with us.

Opportunities Include:
Paralegal, Welder, CDL Drivers, Temporary Special Event Workers, Mechanics, and more.

Visit our website
www.texasdisposal.com/careers
to view and apply! For more information call **512-329-1778**

Public Notices

NOTICE TO CREDITORS

Notice is hereby given that original Letters Testamentary for the Estate of Michael Garza Silguero, Deceased, were issued on January 6, 2020 in Cause No. 19-0397-P, pending in County Court at Law Sitting in Matters Probate of Hays County, Texas, to: Jeremiah Silguero.

All persons having claims against this Estate which is currently being administered are required to present them to the undersigned within the time and in the manner prescribed by law.

c/o: Jeremiah Silguero
102 Suttles Ave.
San Marcos, Texas 78666
DATED the 15th day of April 2020.
LAW OFFICES OF MARI GARZA AND LYNN PEACH, PLLC
102 Suttles Ave.
San Marcos, Texas 78666
Tel: (512) 667-7274
Fax: (512) 727-7374
Ana Marilin "Mari" Garza Attorney for Applicant, Jeremiah Silguero
SBN: 24084385
mari@garzapeachlaw.com

REQUEST FOR PROPOSALS

Bartlett Cocke General Contractors, Construction Manager-at-Risk, for: Dripping Springs Elementary School #5, is requesting competitive proposals from subcontractors and suppliers. Subcontractor and supplier proposals will be received via email to bidaus@bartlettcocke.com or via Fax to (512) 326-3990 no later than 2:00:00 PM on 4/15/2020-BP1 and 4/23/2020-BP2. Any proposals received after this time will not be accepted. Electronic copies of the proposal documents may be obtained from Bartlett Cocke or viewed at local and online planrooms. Contact Stefan Doerr via email Sdoerr@bartlettcocke.com or phone (512) 326-4223 to make arrangements.

Small, Woman Owned, Disadvantaged, HUB, HUB-Zone, 8(a), Minority, and all similar firms are encouraged to submit proposals on this project. Bartlett Cocke General Contractors is an equal opportunity (EEO) employer.

PUBLIC NOTICE REQUEST FOR QUALIFICATIONS & PRICING PROPOSAL FOR THE PROCUREMENT OF PROFESSIONAL POLICE ASSESSMENT CENTER FOR POLICE RANKS SERGEANT AND ABOVE COK HR-2020-1

The City of Kyle ("City") and the City of Kyle Police Civil Service Commission is requesting proposals from qualified Contractors to provide comprehensive and professional testing for Police Promotional Testing. The successful Contractor will have the proven ability to develop, validate, administer, and score assessment centers for the police ranks of Sergeant and above as well as acting as a resource in the hiring of key leadership positions in the City of Kyle's Police Department.

Qualification specifications may be secured from the City's website at www.cityofkyle.com/rfps.

The City will receive proposals at the Civil Service/Human Resources Department, Monday through Friday, 8:30 a.m. - 5:00 p.m., at 100 W. Center Street, Kyle, TX 78640. Proposals will be accepted until 5:00 p.m. (local time) May 4, 2020. Contractors responding to this Request for Qualifications and Price Proposal must submit three (3) copies of their proposals in sealed envelopes and must conform to the format specified below. No fax submissions will be accepted. No late submissions will be accepted. All submissions received after the deadline will be returned unopened.

The City reserves the right to accept or reject any and all proposals or to waive technicalities. Information concerning this request for proposals is available from Kristiana Spencer, HR Manager/Civ-

il Service Director, 100 W. Center Street, Kyle, TX 78640. Ms. Spencer can be reached by telephone at the following number, (512) 262-3901, or via email at kspencer@cityofkyle.com.

Public Notice Notice of Public Hearing Board of Adjustment

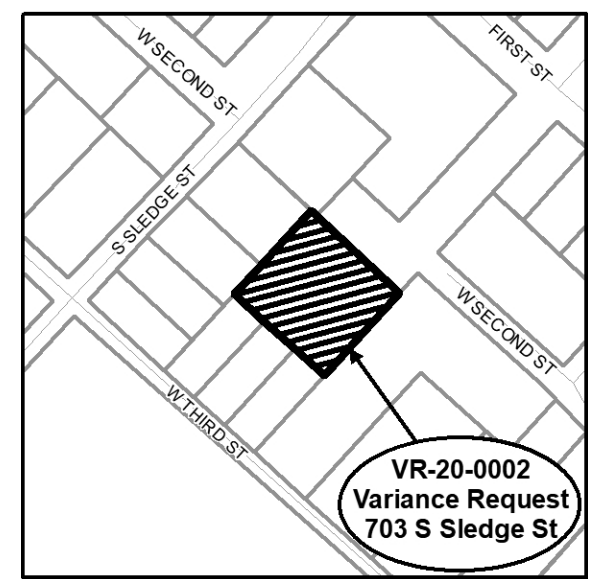
Notice is hereby Given to all interested persons, that:

The City of Kyle shall hold a public hearing on a request by Jacob Campbell (703 S. Sledge Street) for a variance to Sec. 41-136(b) Lots & Ord. No. 92, Sec. VI, *Supplementary District Regulations* (6.3.) of the City of Kyle Code of Ordinances. (VR-20-0002)

The public hearing will be held by the Board of Adjustment on Monday, May 4, 2020, at 6:30 P.M.

All interested persons are encouraged to attend the virtual public hearing and express their opinions on the variance request.

<https://www.cityofkyle.com/kyletv/kyle-10-live> OR Spectrum10 OR Call In: US:+1(800)3368975 Meeting ID: 743 645 1934



Early Notice and Public Review of a Proposed Activity in a 100-Year Floodplain and Wetland

To: All interested Agencies, Groups and Individuals

This is to give notice that the City of Kyle has determined that the following proposed action under the Community Development Block Grant Disaster Recovery Program Contract # 19-280-000-B779 is located in the 100-year floodplain wetland, and the City of Kyle will be identifying and evaluating practicable alternatives to locating the action in the floodplain/wetland and the potential impacts on the floodplain/wetland from the proposed action, as required by Executive Order 11988 and 11990, in accordance with HUD regulations at 24 CFR 55.20 Subpart C Procedures for Making Determinations on Floodplain Management and Protection of Wetlands. The City of Kyle shall reconstruct a portion of Windy Hill Road by removing and replacing existing culverts, the roadway, and approaches; widen the roadway pavement and structure to add turn lane capacity, install railing and end treatments that meet TxDOT standards; and improve associated appurtenances. Improvements total approximately two thousand one hundred (2100) linear feet. The proposed project(s) limits are approximately from 500 ft W. of Cherrywood to 500 ft East of Purple Martin Ave in Kyle, TX. According to FEMA flood panel 48209C029F, the project is located within .87 acres of a 100-year floodplain. According to the National Wetlands Inventory, the project is impacting approximately 0.20 acres. Wetland R4SBC - Riverine and Freshwater Emergent. The wetland and floodplain provide important drainage management in the area.

There are three primary purposes for this notice. First, people who may be affected by activities in floodplains/wetlands and those who have an interest in the protection of the natural environment should be given an opportunity to express their concerns and provide information about these areas. Commenters are encouraged to offer alternative sites outside of the floodplain/wetland, alternative methods to serve the same project purpose, and methods to minimize and mitigate impacts. Second, an adequate public notice program can be an important public educational tool. The dissemination of information and request for public comment about floodplains/wetlands can facilitate and enhance Federal efforts to reduce the risks and impacts associated with the occupancy and modification of these special areas. Third, as a matter of fairness, when the Federal government determines it will participate in actions taking place in floodplains/wetlands, it must inform those who may be put at greater or continued risk.

Written comments must be received by City of Kyle at the following address on or before May 1, 2020: The City of Kyle, 100 W. Center Street, Kyle TX and 512-262-3949 Attention: Jo Ann Garcia, P.E., Project Manager. A full description of the project may also be reviewed electronically or via US Mail or by visiting the City of Kyle's website address <https://www.cityofkyle.com/cityengineer/kyle-receives-18-m-federal-award-urgent-improvements-windy-hill-rd>. Please submit your request by US mail to 100 W. Center Street, 100 W. Center Street, Kyle TX. Comments may also be submitted via email at jgarcia@cityofkyle.com.

Date: April 15, 2020

TEXAS STATEWIDE CLASSIFIED ADVERTISING NETWORK TexSCAN

TexSCAN Week of April 12, 2020

ACREAGE

Hunting/investment/recreational property. We have some of the best in Texas! From the Hill Country (Edwards, Menard, Coke, Val Verde County, free ranging exotics) to South Texas (Kinney, Duval, Live Oak County, whitetail, hogs). Large or small acreage. 30-year fixed rate owner financing, only 5% down. Call toll-free or email for individual prices and terms, www.ranchenterprisesltd.com, 800-876-9720.

GENERATORS

GENERAC Standby Generators. The weather is increasingly unpredictable. Be prepared for power outages. FREE 7-year extended warranty (\$695 value!). Schedule your FREE in-home assessment today. Call 1-855-704-8579. Special financing for qualified customers.

INTERNET

AT&T Internet. Starting at \$40/month w/12-mo agmt. Includes 1 TB of data per month. Get More For Your High-Speed Internet Thing. Ask us how to bundle and SAVE! Geo & svc restrictions apply. Call us today 1-855-439-5457.

MOBILE HOMES

Lowest prices and largest selection on 9 manufactures Clayton, Southern Energy, Fleetwood, Cavco, Cavalier, New Vision and Legacy DELIVERED ANYWHERE IN TEXAS! Low rates for good credit & specialty financing for bad credit, www.ManufacturedHousingConsultants.com 210-750-6011.

Texas Press Statewide Classified Network 273 Participating Texas Newspapers • Regional Ads Start At \$250 • Email ads@texaspress.com

NOTICE: While most advertisers are reputable, we cannot guarantee products or services advertised. We urge readers to use caution and when in doubt, contact the Texas Attorney General at 800-621-0508 or the Federal Trade Commission at 877-FTC-HELP. The FTC web site is www.ftc.gov/bizop.

Store Robbery

Continued from pg. 1

sleeved shirt. The vehicle was described as an "early model black Honda Accord."

Anyone with information is urged to contact Det. A. McLeod, adam.mcleod@co.hays.tx.us.

Callers wishing to remain anonymous can

contact Crime Stoppers at 800-324-8477 (TIPS) or through Tip Line at p3tips.com.

The same store was robbed early on Christmas Day, 2019. Less than two weeks later, John Robert Garrison, 39, of Wimberley was apprehended without

incident at a North Austin hotel by Austin Police and the Lone Star Fugitive Task Force.

Garrison had been released from Hays County Jail Dec. 17 on a charge of driving with an invalid license brought by the Kyle Police Department.

For all the latest news in Buda, Kyle and surrounding communities, visit

www.HaysFreePress.com

OR

www.HaysNewsDispatch.com

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT:

8-STEP PROCESS FOR PROJECTS WITHIN A WETLAND

- Kyle (Project No. DRS B16DH480001 19-280-000-B779),
- Decision Process for E.O. 11990 as Provided by 24 CFR §55.20

Step 1: *Determine whether the action is located in a wetland*

Kyle Windy Hill Road Windy Hill Road Street improvements - 500 ft W. of Cherrywood to 500 ft East of Purple Martin Avenue The City of Kyle shall reconstruct a portion of Windy Hill Road by removing and replacing existing culverts, the roadway, and approaches; when the roadway pavement and structure to add turn lane capacity, in stall railing and end treatments that meet TxDot standards; and perform associated appurtenances. Improvements total approximately two thousand one hundred (2100) linear feet Approximately 2100 linear feet -500 ft W. of Cherrywood to 500 ft East of Purple Martin Ave.

Construction location will include temporary and permanent impacts as defined by the 100% engineering plans:

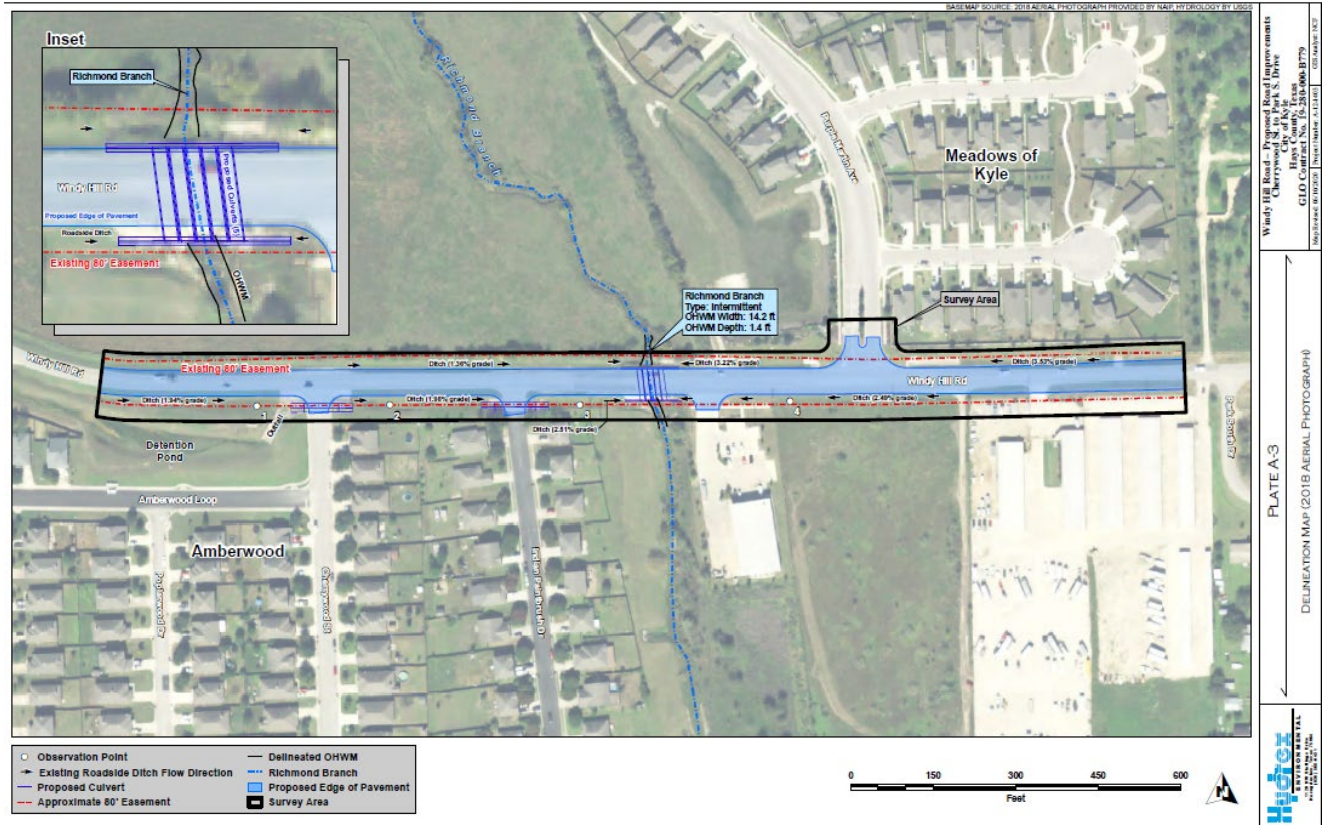
- A. Temporary pavement (beyond existing roadbed width) is needed for traffic switching/control from most western and eastern stations of (engineering plans) –sta. 55+80 to sta. 34+50 = 2130 ft.
- B. Eliminating striping that interferes with change of traffic on existing roadbed is needed from (engineering plans) sta. 58+07 - sta. 33+88 = 2418 ft
- C. The permanent road improvements will be from (engineering plans) sta. 55+67 to sta. 35+96 = 1970 on title page

A wetland delineation was conducted for this project due to the work being done at Richmond Branch. Based on the results of the delineation, the only potential WOTUS found within the survey area is Richmond Branch. Only work directly involving Richmond Branch will require a Section 404 permit for this project. Based on the proposed construction activities, this work will include replacing the existing bridge with a wider bridge containing 5 box culverts, concrete headwalls and erosion controls. The proposed construction activities at Richmond Branch can be covered under Nationwide Permit 14 (Linear Transportation Projects).

With regard to Section 404 permitting, the only area of potential WOTUS within the survey area is Richmond Branch – an intermittent stream. The delineation indicates the ordinary high water mark (OHWM) width is 14.2 ft and the OHWM depth is 1.4 ft. The length of impacted area is 125 ft., indicating a total potential impact of .04 acres. As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, preconstruction notification to the USACE for the use of Nationwide Permit (NWP) 14 will not be required.

As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, preconstruction notification to the USACE for the use of Nationwide Permit 14 will not be required. The report serves as documentation of the use and compliance with Nationwide Permit 14. In accordance with the guidelines of NWP 14, all limitations, criteria, and General Condition should be followed by this project. Specifically, General Conditions 10, 12, 18, 20, 21, and 23 are addressed below within the report.

U.S. Department of Housing and Urban Development:
8-Step Process for projects within a wetland
City of Kyle
Windy Hill Road and Drainage Improvements
DRS B16DH480001, 19-280-000-B779.



Step 2: Notify the public for early review of the proposal and involve the affected and interested public in the decision making process.

A public notice describing the project was published in the Hays Free Press, the local and regional paper, on April 20, 2020. The ad targeted local residents, including those in the floodplain. A copy of the published notification was kept in the project’s environmental review records and attached to this document. The required 15 calendar days were allowed for public comment. As required by regulation, the notice also included the name, proposed location and description of the activity, total number of floodplain acres involved, and the HUD official or responsible entity contact for information as well as the location and hours of the office at which a full description of the proposed action can be viewed. Total numbers of acres in wetland is less than .10 acres. Natural values include: preserving area wetlands and controlling stormwater runoff from surrounding areas.

Step 3: Identify and evaluate practicable alternatives.

The Kyle project site selection criteria are:

- A. Locate the Project Within the Wetland – Using an alternate form of construction within the wetland was considered, however, the type of construction selected is the most feasible and cost-effective use of funding to ensure human health and the environment.
- B. Locate the Project Outside of the Floodplain – moving the project outside the wetland was considered, however, the location where drainage occurs that impacts human health and the environment is located along Windy Hill Road at the current project location.
- C. No Action or Alternative Actions that Serve the Same Purpose - Not conducting the improvements is not a selected alternative as the wetland areas at the current location are not significant but impacts from flooding would present significant harm to human health and the environment in future heavy rain events.

Step 4: *Identify Potential Direct and Indirect Impacts of Associated with wetland Development.*

- 1. Temporary but important impact to traffic flow is possible during construction. Scheduling is suggested as a solution to ensure continued ingress and egress to area housing developments.
- 2. Improved drainage at the project site along Windy Hill road is expected. Additional drainage improvements at other locations is currently underway as well within the City to ensure all drainage improvements work together to prevent unexpected drainage issues.
- 3. Wetland impact is possible, however, due to the limited amount of impact, (less than one-tenth an acre) the activities fall under Nationwide Permit 14 for linear projects.

Step 5: *Where practicable, design or modify the proposed action to minimize the potential adverse impacts to lives, property, and natural values within the wetland and to restore, and preserve the values of the wetland.*

- (a) Preserving Lives: In order to preserve lives, Scheduling to prevent unnecessary road closures and impact to ingress and egress for surrounding communities is expected.
- (b) Preserving Property: In order to preserve property, flood controls are being improved with construction to drainage areas including Richmond Branch Creek which crosses Windy Hill Road. A wetland delineation was conducted for this project due to the work being done at Richmond Branch. Based on the results of the delineation, the only potential WOTUS found within the survey area is Richmond Branch. Only work directly involving Richmond Branch will require a Section 404 permit for this project. Based on the proposed construction activities, this work will include replacing the existing bridge with a wider bridge containing 5 box culverts, concrete headwalls and erosion controls. The proposed construction activities at

Richmond Branch can be covered under Nationwide Permit 14 (Linear Transportation Projects).

As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, preconstruction notification to the USACE for the use of Nationwide Permit 14 will not be required. The report serves as documentation of the use and compliance with Nationwide Permit 14. In accordance with the guidelines of NWP 14, all limitations, criteria, and General Condition should be followed by this project. Specifically, General Conditions 10, 12, 18, 20, 21, and 23 are addressed below within the report.

- GC-10 coordinating with the Floodplain Administrator of Hays County to ensure the construction activities associated with this project are completed in compliance with all local and FEMA floodplain development regulations;
- GC-12 Soil Erosion and Sediment Controls to prevent stormwater runoff such as berming, hay bales, or other construction matting where possible;
- GC-18 Threatened and Endangered Species primarily promote awareness that while not visible during site visit, if federal mussel species are discovered during construction activities should cease in the area and contact TPWD;
- GC-20 – Historic Properties where if cultural resources are encountered during construction, work should cease and contact be made with THC and TGLO.

Industry specific mitigation will be used to return the area to its original condition. Reseeding the area with native grasses to prevent erosion and soil stabilization will occur as possible consistent with current BMP and methodologies that prevent impact to wildlife. Interest will be paid to monitoring for potential wildlife or other animals that may wander onsite.

Construction is intended to occur during dry months in order to prevent impact to aquatic life. In the event construction occurs when water is present in Richmond Branch and dewatering activities or other harmful construction activities are involved (such as trenching and placement of temporary or permanent fills or structures), then construction will consider relocating potentially impacted native aquatic resources in conjunction with a *Permit to Introduce Fish, Shellfish or Aquatic Plants into Public Waters* and an ARRP. If this occurs, then the ARRP will be completed and approved by TPWD **30 days prior to activity within project waters and/or resource relocation** and submitted with an application for a no-cost *Permit to Introduce Fish, Shellfish, or Aquatic Plants into Public Waters*. ARRPs can be submitted to Travis Tidwell, TPWD Region 1 KAST Biologist.

Where possible, project will avoid placing riprap across stream channels and instead use alternative stabilization such as biotechnical stream bank stabilization methods including live native vegetation or a combination of vegetative and structural materials. When using riprap or other bank stabilization, placement should not impede movement of aquatic and terrestrial wildlife underneath the bridge. In some instances, riprap may be buried, back-filled with topsoil and planted with native vegetation.

Project will use spanning bridges rather than culverts when feasible otherwise stagger culverts to concentrate low flows but provide conveyance of higher flows through staggered culverts placed at higher elevations is recommended. Recommend bottomless culverts to allow for fish and other aquatic wildlife passage in the low flow channel. If bottomless culverts are not feasible, making a low flow channel for fish passage is recommended.

Use sediment control fence to exclude wildlife from the construction area. Exclusion fencing should be buried at least six inches and be at least 24 inches high and maintained for the life of the project. Construction should examine the inside of the exclusion area daily to determine if any wildlife species have been trapped inside the area of impact and provide safe egress opportunities prior to initiation of construction activities.

Step 6: *Reevaluate the Alternatives.*

The project has been reevaluated and considering the need for improvements to the roadway in the area and minimal impact to the wetlands and floodplain, proceeding with the project is in the best interest of the community to ensure preservation of human life.

Step 7: *Determination of No Practicable Alternative*

It is our determination that there is no practicable alternative for partially locating the project in the flood zone. This is due to: 1) the need to rehabbed roadways ongoing flooding; 2) an alternate location would not be financially feasible nor practicable; 3) the ability to mitigate and minimize impacts on human health, public property, and floodplain values.

A final notice was published detailing the reasons why the modified project must be located in the floodplain, a list of alternatives considered, and all mitigation measures taken to minimize adverse impacts and preserve natural and beneficial floodplain values. No concerns were expressed by the public concerning this notice.

Step 8: *Implement the Proposed Action*

The city will assure that this plan, as modified and described above, is executed and necessary language will be included in all agreements with participating parties. The City will also take an active role in monitoring the construction process to ensure no unnecessary impacts occur nor unnecessary risks are taken.

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT:

8-STEP PROCESS FOR PROJECTS WITHIN A 100 YEAR FLOODPLAIN

- Kyle (Project No. DRS B16DH480001 19-280-000-B779),
- Decision Process for E.O. 11988 as Provided by 24 CFR §55.20

Step 1: *Determine whether the action is located in a 100-year floodplain (or a 500-year floodplain for critical actions).*

Kyle Windy Hill Road Windy Hill Road Street improvements - 500 ft W. of Cherrywood to 500 ft East of Purple Martin Avenue The City of Kyle shall reconstruct a portion of Windy Hill Road by removing and replacing existing culverts, the roadway, and approaches; when the roadway pavement and structure to add turn lane capacity, in stall railing and end treatments that meet TxDot standards; and perform associated appurtenances. Improvements total approximately two thousand one hundred (2100) linear feet Approximately 2100 linear feet -500 ft W. of Cherrywood to 500 ft East of Purple Martin Ave

The structure is in the 100-year floodplain per Panel #48209C0290F effective 9/2/2005-approximately .87 acres located within the 100-year floodplain. Portion of the project is located within LOMR 6-6-B46P effective 1/25/07 and LOMR 07/06/1372X effective 4/30/07 - .57 acres located within LOMR defined area. As maps are revised flood insurance for road and drainage infrastructure is not required.

This project does occur within the floodplain. The proposal is for proposed road elevations to be similar/close to existing road elevations. Earthwork volumes will be calculated and if it is determined fill is needed for the road infrastructure proposed, at the rate of 1 cy: 1cy material will be removed from the floodplain footprint or location determined runoff can be detained in order to maintain the waters within the floodplain.

Step 2: *Notify the public for early review of the proposal and involve the affected and interested public in the decision making process.*

A public notice describing the project was published in the Hays Free Press, the local and regional paper, on April 20, 2020. The ad targeted local residents, including those in the floodplain. A copy of the published notification was kept in the project's environmental review records and attached to this document. The required 15 calendar days were allowed for public comment. As required by regulation, the notice also included the name, proposed location and description of the activity, total number of floodplain acres involved, and the HUD official or responsible entity contact for information as well as the location and hours of the office at which a full description of the proposed action can be viewed. Total numbers of acres in the 100-year flood plain include .87 acres. Natural values include: preserving area wetlands and controlling stormwater runoff from surrounding areas.

No comments received from the public to the project. FEMA and city engineers were contacted concerning mitigation requirements of the National Flood Insurance Program (NFIP) as well as local ordinances that must be implemented as part of NFIP.

Step 3: *Identify and evaluate practicable alternatives.*

The Kyle project site selection criteria are:

- A. Locate the Project Within the Floodplain – Using an alternate form of construction within the floodplain was considered, however, the type of construction selected is the most feasible and cost-effective use of funding to ensure human health and the environment.
- B. Locate the Project Outside of the Floodplain – moving the project outside the 100-year floodplain was considered, however, the location where drainage occurs that impacts human health and the environment is located along Windy Hill Road at the current project location.
- C. No Action or Alternative Actions that Serve the Same Purpose - Not conducting the improvements is not a selected alternative as the flood areas at the current location are significant and would present significant harm to human health and the environment in future heavy rain events.

Step 4: *Identify Potential Direct and Indirect Impacts of Associated with Floodplain Development.*

- A. Temporary but important impact to traffic flow is possible during construction. Scheduling is suggested as a solution to ensure continued ingress and egress to area housing developments.
- B. Improved drainage at the project site along Windy Hill road is expected. Additional drainage improvements at other locations is currently underway as well within the City to ensure all drainage improvements work together to prevent unexpected drainage issues.
- C. This project does occur within the floodplain. The proposed road elevations will be similar/close to existing road elevations. Earthwork volumes will be calculated and if it is determined fill is needed for the road infrastructure proposed, at the rate of 1 cy: 1cy material will be removed from the floodplain footprint or location determined runoff can be detained in order to maintain the waters within the floodplain.
- D. Wetland impact is possible, however, due to the limited amount of impact, the activities fall under Nationwide Permit 14 for linear projects. More specific to observe: Attachment 7 (Attachment G of Delineation Document).
 - 1. GC-10 coordinating with the Floodplain Administrator of Hays County to ensure the construction activities associated with this project are completed in compliance with all local and FEMA floodplain development regulations;
 - 2. GC-12 Soil Erosion and Sediment Controls to prevent stormwater runoff such as berming, hay bales, or other construction matting where possible;
 - 3. GC-18 Threatened and Endangered Species primarily promote awareness that while not visible during site visit, if federal mussel species are discovered during construction activities should cease in the area and contact TPWD;

4. GC-20 – Historic Properties where if cultural resources are encountered during construction, work should cease and contact be made with THC and TGLO.

Step 5: *Where practicable, design or modify the proposed action to minimize the potential adverse impacts to lives, property, and natural values within the floodplain and to restore, and preserve the values of the floodplain.*

- A. Preserving Lives: In order to preserve lives, Scheduling to prevent unnecessary road closures and impact to ingress and egress for surrounding communities is expected.
- B. This project does occur within the floodplain. The proposed road elevations will be similar/close to existing road elevations. Earthwork volumes will be calculated and if it is determined fill is needed for the road infrastructure proposed, at the rate of 1 cy: 1cy material will be removed from the floodplain footprint or location determined runoff can be detained in order to maintain the waters within the floodplain.
- C. Preserving Property: In order to preserve property, flood controls are being improved with construction to drainage areas including Richmond Branch Creek which crosses Windy Hill Road. A wetland delineation was conducted for this project due to the work being done at Richmond Branch. Based on the results of the delineation, the only potential WOTUS found within the survey area is Richmond Branch. Only work directly involving Richmond Branch will require a Section 404 permit for this project. Based on the proposed construction activities, this work will include replacing the existing bridge with a wider bridge containing 5 box culverts, concrete headwalls and erosion controls. The proposed construction activities at Richmond Branch can be covered under Nationwide Permit 14 (Linear Transportation Projects).
- D. As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, preconstruction notification to the USACE for the use of Nationwide Permit 14 will not be required. The report serves as documentation of the use and compliance with Nationwide Permit 14. In accordance with the guidelines of NWP 14, all limitations, criteria, and General Condition should be followed by this project. Specifically, General Conditions 10, 12, 18, 20, 21, and 23 are addressed within the wetland delineation report attached to the ERR.

Step 6: *Reevaluate the Alternatives.*

The project has been reevaluated and considering the need for improvements to the roadway in the area and minimal impact to the wetlands and floodplain, proceeding with the project is in the best interest of the community to ensure preservation of human life.

Step 7: *Determination of No Practicable Alternative*

It is our determination that there is no practicable alternative for partially locating the project in the flood zone. This is due to: 1) the need to rehabbed roadways ongoing flooding; 2) an alternate

location would not be financially feasible nor practicable; 3) the ability to mitigate and minimize impacts on human health, public property, and floodplain values.

A final notice was published detailing the reasons why the modified project must be located in the floodplain, a list of alternatives considered, and all mitigation measures taken to minimize adverse impacts and preserve natural and beneficial floodplain values. No concerns were expressed by the public concerning this notice.

Step 8: *Implement the Proposed Action*

The city will assure that this plan, as modified and described above, is executed and necessary language will be included in all agreements with participating parties. The City will also take an active role in monitoring the construction process to ensure no unnecessary impacts occur nor unnecessary risks are taken.

TAB 2

REQUEST FOR RELEASE OF FUNDS AND CERTIFICATION FORM

Request for Release of Funds and Certification

U.S. Department of Housing
and Urban Development
Office of Community Planning
and Development

OMB No. 2506-0087
(exp. 03/31/2020)

This form is to be used by Responsible Entities and Recipients (as defined in 24 CFR 58.2) when requesting the release of funds, and requesting the authority to use such funds, for HUD programs identified by statutes that provide for the assumption of the environmental review responsibility by units of general local government and States. Public reporting burden for this collection of information is estimated to average 36 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. This agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless that collection displays a valid OMB control number.

Part 1. Program Description and Request for Release of Funds (to be completed by Responsible Entity)

1. Program Title(s)	2. HUD/State Identification Number	3. Recipient Identification Number (optional)
4. OMB Catalog Number(s)	5. Name and address of responsible entity	
6. For information about this request, contact (name & phone number)		
8. HUD or State Agency and office unit to receive request	7. Name and address of recipient (if different than responsible entity)	

The recipient(s) of assistance under the program(s) listed above requests the release of funds and removal of environmental grant conditions governing the use of the assistance for the following

9. Program Activity(ies)/Project Name(s)	10. Location (Street address, city, county, State)
--	--

11. Program Activity/Project Description

Part 2. Environmental Certification (to be completed by responsible entity)

With reference to the above Program Activity(ies)/Project(s), I, the undersigned officer of the responsible entity, certify that:

1. The responsible entity has fully carried out its responsibilities for environmental review, decision-making and action pertaining to the project(s) named above.
2. The responsible entity has assumed responsibility for and complied with and will continue to comply with, the National Environmental Policy Act of 1969, as amended, and the environmental procedures, permit requirements and statutory obligations of the laws cited in 24 CFR 58.5; and also agrees to comply with the authorities in 24 CFR 58.6 and applicable State and local laws.
3. The responsible entity has assumed responsibility for and complied with and will continue to comply with Section 106 of the National Historic Preservation Act, and its implementing regulations 36 CFR 800, including consultation with the State Historic Preservation Officer, Indian tribes and Native Hawaiian organizations, and the public.
4. After considering the type and degree of environmental effects identified by the environmental review completed for the proposed project described in Part 1 of this request, I have found that the proposal did did not require the preparation and dissemination of an environmental impact statement.
5. The responsible entity has disseminated and/or published in the manner prescribed by 24 CFR 58.43 and 58.55 a notice to the public in accordance with 24 CFR 58.70 and as evidenced by the attached copy (copies) or evidence of posting and mailing procedure.
6. The dates for all statutory and regulatory time periods for review, comment or other action are in compliance with procedures and requirements of 24 CFR Part 58.
7. In accordance with 24 CFR 58.71(b), the responsible entity will advise the recipient (if different from the responsible entity) of any special environmental conditions that must be adhered to in carrying out the project.

As the duly designated certifying official of the responsible entity, I also certify that:

8. I am authorized to and do consent to assume the status of Federal official under the National Environmental Policy Act of 1969 and each provision of law designated in the 24 CFR 58.5 list of NEPA-related authorities insofar as the provisions of these laws apply to the HUD responsibilities for environmental review, decision-making and action that have been assumed by the responsible entity.
9. I am authorized to and do accept, on behalf of the recipient personally, the jurisdiction of the Federal courts for the enforcement of all these responsibilities, in my capacity as certifying officer of the responsible entity.

Signature of Certifying Officer of the Responsible Entity

Title of Certifying Officer

Date signed

X

Address of Certifying Officer

Part 3. To be completed when the Recipient is not the Responsible Entity

The recipient requests the release of funds for the programs and activities identified in Part 1 and agrees to abide by the special conditions, procedures and requirements of the environmental review and to advise the responsible entity of any proposed change in the scope of the project or any change in environmental conditions in accordance with 24 CFR 58.71(b).

Signature of Authorized Officer of the Recipient

Title of Authorized Officer

Date signed

X

Warning: HUD will prosecute false claims and statements. Conviction may result in criminal and/or civil penalties. (18 U.S.C. 1001, 1010, 1012; 31 U.S.C. 3729, 3802)

Request for Release of Funds
and Certification Mitigation Attachment
City of Kyle Windy Hill Road & Drainage Improvements
DRS 19-280-000-B779
B16DH480001

Law, Authority, or Factor	Mitigation Measure
<p>Endangered Species</p> <p>Endangered Species Act of 1973, particularly section 7; 50 CFR Part 402</p>	<ul style="list-style-type: none"> • Use sediment control fence to exclude wildlife from the construction area. Exclusion fencing should be buried at least six inches and be at least 24 inches high and maintained for the life of the project. Construction should examine the inside of the exclusion area daily to determine if any wildlife species have been trapped inside the area of impact and provide safe egress opportunities prior to initiation of construction activities. • TPWD recommends that any open trenches or excavation areas be covered overnight and/or inspected every morning to ensure no wildlife species have been trapped. For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees (1:1) in areas left uncovered. Also, inspect excavation areas for trapped wildlife prior to refilling. • For soil and erosion control use seed/mulch stabilization materials that avoid entanglement hazards to snakes and other wildlife species; use of no-till drilling, hydromulching and/or hydroseeding rather than erosion control blankets or mats due to a reduced risk to wildlife. • Reduce clearing of native vegetation, particularly mature native trees, riparian vegetation, and shrubs to the greatest extent practicable and in-kind replacement/restoration of the native vegetation wherever practicable. Colonization by invasive species, should be actively prevented. Vegetation management should include removing invasive species early on while allowing the existing native plants to revegetate the disturbed areas. TPWD recommends referring to the Lady Bird Johnson Wildflower Center Native Plant Database for regionally adapted native species that would be appropriate for landscaping and revegetation. As part of an international conservation effort TPWD has developed the <i>Texas Monarch and Native Pollinator Conservation Plan</i>, and one of the broad categories of action in this plan is to augment larval feeding and adult nectaring opportunities. • Use spanning bridges rather than culverts when feasible otherwise stagger culverts to concentrate low flows but provide conveyance of higher flows through staggered culverts placed at higher elevations is recommended. Recommend bottomless culverts to allow for fish and other aquatic wildlife passage in the low flow channel. If bottomless culverts are not feasible, making a low flow channel for fish passage is recommended. • Avoid placing riprap across stream channels and instead use alternative stabilization such as biotechnical stream

Request for Release of Funds
 and Certification Mitigation Attachment
 City of Kyle Windy Hill Road & Drainage Improvements
 DRS 19-280-000-B779
 B16DH480001

	<p>bank stabilization methods including live native vegetation or a combination of vegetative and structural materials. When using riprap or other bank stabilization, placement should not impede movement of aquatic and terrestrial wildlife underneath the bridge. In some instances, riprap may be buried, back-filled with topsoil and planted with native vegetation.</p> <ul style="list-style-type: none"> • Incorporate bat-friendly design into bridges and culverts where bridges are designed for adequate vertical and horizontal clearances under the roadway to allow for terrestrial wildlife to safely pass under the road. A span wide enough to cross the stream and allow for dry ground and a natural surface path under the roadway is encouraged. Incorporate artificial ledges inside culverts on one or both sides. Riparian buffer zones should remain undisturbed where possible. • Construction is intended to occur during dry months in order to prevent impact to aquatic life. In the event construction occurs when water is present in Richmond Branch and dewatering activities or other harmful construction activities are involved (such as trenching and placement of temporary or permanent fills or structures), then construction will consider relocating potentially impacted native aquatic resources in conjunction with a <i>Permit to Introduce Fish, Shellfish or Aquatic Plants into Public Waters</i> and an ARR. If this occurs, then the ARR will be completed and approved by TPWD 30 days prior to activity within project waters and/or resource relocation and submitted with an application for a no-cost <i>Permit to Introduce Fish, Shellfish, or Aquatic Plants into Public Waters</i>. ARRs can be submitted to Travis Tidwell, TPWD Region 1 KAST Biologist at (512) 389-8612 or Travis.Tidwell2@tpwd.texas.gov • If nests are observed during construction, activities will cease and TPWD will be contacted. Additionally, the site will be surveyed no more than five days prior to planned clearing or construction, preferably during daytime for nests, including under bridges and in culverts, to determine if they are active prior to construction activities and ensure Migratory Bird Treaty Act (MBTA) compliance. Should a nest be observed, a minimum 150-foot buffer of vegetation will remain around any nests prior to disturbance. Where occupied nests are located area will not be disturbed until the eggs have hatched and the young have fledged. • Project will avoid impacts to logs and rocks where turtles bask as well as gravel bars or riffle habitat in streams around where construction-related disturbance may occur. During construction, trucks and equipment should use existing bridge or culvert structures to cross creeks, and equipment staging areas should be located in previously
--	--

Request for Release of Funds
 and Certification Mitigation Attachment
 City of Kyle Windy Hill Road & Drainage Improvements
 DRS 19-280-000-B779
 B16DH480001

	<p>disturbed areas outside of riparian corridors. Since turtles nest on gently sloping sand banks within approximately 30' feet of the water's edge, disturbance of embankments will be avoided. Construction will be avoided during breeding and nesting season of this species (spring and summer). Turtles breed in spring and early summer and then the eggs incubate through the spring and summer months. If necessary, a permitted biological monitor will be on-site that is familiar with the identification of this species and that can relocate the Cagle's map turtle to a nearby area with similar habitat that would not be disturbed during construction. Any translocations of reptiles will be the minimum distance possible, no greater than one mile, preferably within 100 to 200 yards from the initial encounter location.</p> <ul style="list-style-type: none"> • A review of the project area prior to construction will occur to determine if a permitted biologist is needed to facilitate a plan of action for determining if bats are present at the project site. Project will incorporate steps provided by TPWD. Construction will consider habitat for bats in the area and take precautions to prevent impact and to determine how to mitigate for loss of roost. • The Texas Garter Snake may have suitable habitat for the within the project area. This species prefers marshy, flooded pastureland or meadows, particularly in spring when frogs are present in numbers and at other times prefers grassy or brushy terrain near hill country streams and ponds. Construction personnel and contractors will be advised to avoid injury or harm to all snakes encountered during clearing and construction. Therefore, contractors will avoid contact with snakes if encountered and allow all native snakes to safely leave the premises. • Industry specific mitigation will be used to return the area to its original condition. Reseeding the area with native grasses to prevent erosion and soil stabilization will occur as possible consistent with current BMP and methodologies that prevent impact to wildlife. Interest will be paid to monitoring for potential wildlife or other animals that may wander onsite. The activities are not intended for site cleanup.
<p>Wetlands Protection Executive Order 11990, particularly sections 2 and 5</p>	<p>The proposed construction activities at Richmond Branch can be covered under Nationwide Permit 14 (Linear Transportation Projects). As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, preconstruction notification to the USACE for the use of Nationwide Permit (NWP) 14 will not be required. In</p>

**Request for Release of Funds
and Certification Mitigation Attachment
City of Kyle Windy Hill Road & Drainage Improvements
DRS 19-280-000-B779
B16DH480001**

	<p>accordance with the guidelines of NWP 14, all limitations, criteria, and General Conditions should be followed by this project. Specifically, General Conditions (GC) 10, 12, 18, 20, 21, and 23 are addressed below. NWP 14 guidelines are included in Attachment 7 (Attachment G of Delineation Document).</p> <ul style="list-style-type: none"> • GC-10 coordinating with the Floodplain Administrator of Hays County to ensure the construction activities associated with this project are completed in compliance with all local and FEMA floodplain development regulations; • GC-12 Soil Erosion and Sediment Controls to prevent stormwater runoff such as berming, hay bales, or other construction matting where possible; • GC-18 Threatened and Endangered Species primarily promote awareness that while not visible during site visit, if federal mussel species are discovered during construction activities should cease in the area and contact TPWD; • GC-20 – Historic Properties where if cultural resources are encountered during construction, work should cease and contact be made with THC and TGLO.
<p>Floodplain Management Executive Order 11988, particularly section 2(a); 24 CFR Part 55</p>	<p>The proposal is for proposed road elevations to be similar/close to existing road elevations. Earthwork volumes will be calculated and if it is determined fill is needed for the road infrastructure proposed, at the rate of 1 cy: 1cy material will be removed from the floodplain footprint or location determined runoff can be detained in order to maintain the waters within the floodplain.</p>
<p>Historic Preservation National Historic Preservation Act of 1966, particularly sections 106 and 110; 36 CFR Part 800</p>	<p>If buried cultural materials are encountered during construction or disturbance activities, work should cease in the immediate area; work can continue where no cultural materials are present. Please contact the THC's Archeology Division at 512-463-6096 to consult on further actions that may be necessary to protect the cultural remains and Texas General Land Office.</p>

TAB 3

ENVIRONMENTAL ASSESSMENT DETERMINATIONS AND COMPLIANCE FINDINGS FOR HUD-ASSISTED PROJECTS 24 CFR PART 58

- COMPLIANCE WITH 24 CFR 50.4, 58.5 AND 58.6 LAWS AND
AUTHORITIES
 - STATUTES, EXECUTIVE ORDERS, AND REGULATIONS
LISTED AT 24 CFR 50.4 & 58.5
 - ENVIRONMENTAL ASSESSMENT FACTORS 24 CFR 58.4;
REF 40 CFR 1508.8 & 1508.27



**U.S. Department of Housing and Urban
Development**

451 Seventh Street, SW
Washington, DC 20410
www.hud.gov

espanol.hud.gov

Environmental Assessment Determinations and Compliance Findings for HUD-assisted Projects 24 CFR Part 58

Project Information

Project Name: Windy Hill at Richmond Branch Drainage Facilities

Responsible Entity: City of Kyle

Grant Recipient (if different than Responsible Entity):

State/Local Identifier: 19-280-000-B779, B16DH480001

Preparer: Jo Ann E. Garcia, P.E. City of Kyle & Latrice Hertzler, Future Link Technologies, Inc.

Certifying Officer Name and Title: Travis Mitchell, City of Kyle Mayor

Consultant (if applicable): Pending Authorization of Budget Increase by General Land Office & City of Kyle City Council – (Langford Community Management Services, LLC)

Direct Comments to:

Joshua T. Jackson, CFM
Senior Project/Grant Manager | Infrastructure
Community Development & Revitalization
Texas General Land Office, George P. Bush, Commissioner
Desk (512) 475-5038

Project Location: Windy Hill at Richmond Branch, Kyle Texas

Description of the Proposed Project [24 CFR 50.12 & 58.32; 40 CFR 1508.25]:

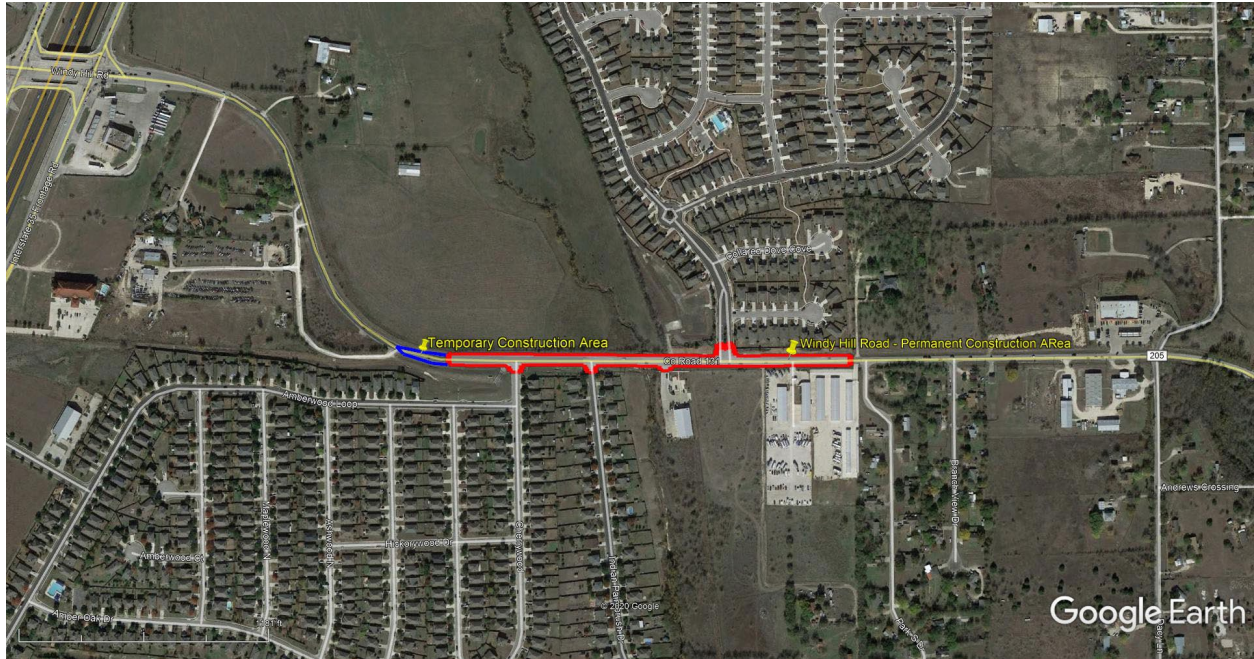
Reconstruction and widening of Windy Hill Road from approximately 500 ft west of Cherrywood to 500 ft east of Purple Martin Avenue, City of Kyle City limit boundary line will improve the street and flood drainage facilities.

Specifically, locations and associated work include both temporary and permanent construction activities at the following as described within existing engineering plans:

- A. Temporary pavement (beyond existing roadbed width) is needed for traffic switching/control from most western and eastern stations of (engineering plans) –sta. 55+80 to sta. 34+50 = 2130 ft.
- B. Eliminating striping that interferes with change of traffic on existing roadbed is needed from (engineering plans) sta. 58+07 - sta. 33+88 = 2418 ft
- C. The permanent road improvements will be from (engineering plans) sta. 55+67 to sta. 35+96 = 1970 on title page

Street Improvements: will include reconstructing and widening Windy Hill by removing and replacing existing culverts, the roadway, and structure approaches. The pavement structure will be strengthened to meet the demands of current traffic volumes and anticipated growth demand. The new facility will include a two-way left turn lane, a pedestrian pathway, safety lighting, armored erosion control elements, structure guard fence that meet current TxDOT design standards, and associated appurtenances. Street improvements total approximately two thousand one hundred linear feet (2,100). The street improvements will need to be performed under traffic as alternate routes are not available. While engineering plans indicate a total construction road improvement project as 1970 linear feet, temporary construction areas along Windy Hill road are also included in this project description and various activities such as a wetland delineation survey has occurred along the approximate 2,100 linear feet of roadway.

Flood and Drainage Facilities: the storm water collection and conveyance capacity through Windy Hill will be increased. Detention of stormwater may be necessary to prevent downstream negative effects. The existing culverts will be removed and replaced, the ditch capacities will be graded as necessary for additional runoff conveyance and storage, the ditches and Richmond Branch channel will be armored to prevent erosion of neighboring homes and infrastructure, minor channel reshaping of grades, aligning of channel may be necessary at Richmond Branch crossing. No new ROW is needed for this project.



Statement of Purpose and Need for the Proposal [40 CFR 1508.9(b)]:

Windy Hill Road and Drainage Improvements

The existing Richmond Branch cross drainage structure along Windy Hill, and parallel tributary structures leading to the main outfall, are hydraulically under designed restricting the passage of run off through the structures causing the water to have turbulence and thus eroding and causing damage to parallel ditches, the road, the roadway front slopes, and property's downstream of the culvert crossing because of the increased velocities of the runoff. Containing the water to the tributary with expanding storage capacity would minimize health and safety threatening situations which were made evident by the October 2015 event.

The October 2015 event alarmed the City that road, channel, and structure improvements were needed at Richmond Branch for the health and safety of the residents immediately to the East of the structure and Dacy Lane. Residents in this area are surrounded by low water crossings and during the event were trapped. The City of Kyle has a community development need for providing egress and ingress to residents living in this area. In addition to the immediate safety need for those residing immediately adjacent to the structure, traffic data collected at the sight in 2016 indicated more than 90% of the 14,082 volume of traffic recorded had a destination in a low to moderate income area. Windy Hill is a major collector with an overpass at IH 35 which allows commuters to access IH 35 for northern and southern destinations where places of employment, medical, educational, and other retail facilities are located.

Existing Conditions and Trends [24 CFR 58.40(a)]:

The City of Kyle continues to grow steadily. Two low to moderate income housing facilities are proposed east of Richmond Branch off of Windy Hill. It is expected that approximately 50% of the traffic that will be generated from Kyle Dacy Apartments at 3700 Dacy Lane, will utilize Windy Hill to gain access to IH 35. Three hundred twenty-four, (324) units are proposed at 3700 Dacy Lane. A second facility located further east of Richmond Branch, by DR Horton will offer homes starting at \$99,000 and an upper limit of \$125,000. DR Horton is proposing to construct 1,025 single family homes.

Because the road and street infrastructure around Windy Hill is of a lower standard than what exist on Windy Hill today the road improvements proposed need to be constructed under traffic conditions, thus requiring the road to be widened. The widening has to be constructed to a standard that could undergo another large event to minimize the entrapment and safety concerns to the Public, not proceeding with any improvements would not be in the best interest of the Public utilizing the facility for their daily needs.

Floodplain Impact

A portion of the construction activities along Windy Hill Road will occur within the 100-year floodplain. The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map indicates the 100-year floodplain (Zone A) extends along Richmond Branch as well as the majority of the western portion of the survey area. Zone A is described as areas inside the 100-year floodplain in which base flood elevations have not been determined. To this end, the City of Kyle is coordinating with the Floodplain Administrator of Hays County to ensure the construction activities associated with this project are completed in compliance with all local and FEMA floodplain development regulations.

The Federal Emergency Management Agency is in the process of updating floodplain maps and studies performed for the City have shown that the 100-year floodplain footprint is increasing, and the rain event volumes are greater. For the City of Kyle what used to be a 100-year floodplain event will now be closer to a 25-year event. The existing structures were analyzed prior to the proposed changes as being able to handle a 2-year event, therefore if no improvements are made the safety concerns will worsen for this area.

Floodplain Background

Floodplains are defined as “the low areas adjacent to rivers, lakes and oceans that are periodically flooded at intervals of varying frequency.” (Federal Interagency Stream Restoration Work Group, 1998; Interagency Floodplain Management Task Force, 1994) “The Natural & Beneficial Functions of Floodplains; Reducing Flood Losses by Protecting and Restoring the Floodplain Environment”. Floodplains are important components of area watersheds. Floodplains are hydrologically important, environmentally sensitive and ecologically productive areas within a watershed that perform many natural functions. There are various natural resources of floodplains. These include 1) water resources with natural flood and erosion control, water quality maintenance and floodwater conveyance, groundwater recharge; 2) biologic resources for biological

productivity, fish and wildlife habitats; and 3) societal resources for harvesting of wild and cultivated product, recreational opportunities and areas of scientific study/education.

Flooding is a natural occurrence of a floodplain and wetlands are important components of the floodplain environment. Wetlands are a natural buffer against flooding by storing and slowly releasing floodwaters. Wetlands are highly productive ecosystems that are often essential maintaining biodiversity within a watershed.

The National Flood Insurance Program defines the floodway as that area of watercourse and adjacent floodplain necessary to carry the base flood without increasing the water surface elevation more than a designated amount (generally one foot). The base flood is the flood that is one percent chance of being equaled or exceeded in a given year. Communities are required to prohibit development within a floodway that would cause an increase in flood heights. This requirement has the effect of limiting development in floodways that in turn help to maintain some of the floodplain's most important natural resources and functions.

Flood hazard areas identified on the Flood Insurance Rate Map are identified as a Special Flood Hazard Area (SFHA). SFHA are defined as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the base flood or 100-year flood. SFHAs are labeled as Zone A, Zone AO, Zone AH, Zones A1-A30, Zone AE, Zone A99, Zone AR, Zone AR/AE, Zone AR/AO, Zone AR/A1-A30, Zone AR/A, Zone V, Zone VE, and Zones V1-V30.

Moderate flood hazard areas, labeled Zone B or Zone X (shaded) are also shown on the FIRM, and are the areas between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood. The areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2-percent-annual-chance flood, are labeled Zone C or Zone X (unshaded).

Wetlands Impact - Section 404 Permitting

Based on the results of the delineation, the only potential WOTUS found within the survey area is Richmond Branch. Only work directly involving Richmond Branch will require a Section 404 permit for this project. Based on the proposed construction activities, this work will include replacing the existing bridge with a wider bridge containing 5 box culverts, concrete headwalls and erosion controls. The proposed construction activities at Richmond Branch can be covered under Nationwide Permit 14 (Linear Transportation Projects). As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, preconstruction notification to the USACE for the use of Nationwide Permit (NWP) 14 will not be required. In accordance with the guidelines of NWP 14, all limitations, criteria, and General Conditions should be followed by this project.

With regard to Section 404 permitting, the only area of potential WOTUS within the survey area is Richmond Branch – an intermittent stream. The delineation indicates the ordinary high water mark (OHWM) width is 14.2 ft and the OHWM depth is 1.4 ft. The length of impacted area is 125 ft., indicating a total potential impact of .04 acres. As the loss of WOTUS will be less than 0.1

acres and there will be no discharge in a special aquatic site, including wetlands, preconstruction notification to the USACE for the use of Nationwide Permit (NWP) 14 will not be required.

Wetlands Background

Wetlands are areas where water covers the soil, or is present either at or near the surface of the soil all year or for varying periods of time during the year, including during the growing season. Water saturation (hydrology) largely determines how the soil develops and the types of plant and animal communities living in and on the soil. Wetlands may support both aquatic and terrestrial species. The prolonged presence of water creates conditions that favor the growth of specially adapted plants (hydrophytes) and promote the development of characteristic wetland (hydric) soils.

Funding Information

Grant Number	HUD Program	Funding Amount
19-280-000-B779	CDBG-DR	\$3,497,686.18

Estimated Total HUD Funded Amount: \$1,847,862.05

Estimated Total Project Cost (HUD and non-HUD funds) [24 CFR 58.32(d)]: \$3,497,686.18

Compliance with 24 CFR 50.4, 58.5, and 58.6 Laws and Authorities

Record below the compliance or conformance determinations for each statute, executive order, or regulation. Provide credible, traceable, and supportive source documentation for each authority. Where applicable, complete the necessary reviews or consultations and obtain or note applicable permits of approvals. Clearly note citations, dates/names/titles of contacts, and page references. Attach additional documentation as appropriate.

Compliance Factors: Statutes, Executive Orders, and Regulations listed at 24 CFR §58.5 and §58.6	Are formal compliance steps or mitigation required?	Compliance determinations
STATUTES, EXECUTIVE ORDERS, AND REGULATIONS LISTED AT 24 CFR 50.4 and 58.6		
Airport Hazards 24 CFR Part 51 Subpart D	Yes No <input type="checkbox"/> <input checked="" type="checkbox"/>	The project is consistent with this item. The closest airport to Windy Hill at Richmond Branch is approximately 18 miles south and

		west of the project location. See Tab 6, Attachment 1, NEPA Assist Map.
Coastal Barrier Resources Coastal Barrier Resources Act, as amended by the Coastal Barrier Improvement Act of 1990 [16 USC 3501]	Yes No <input type="checkbox"/> <input checked="" type="checkbox"/>	The proposed project is consistent with this item. According to CBRA Maps and Google Earth mapping, the proposed project area is not located within a coastal barrier resource area. See Tab 6, Attachment 2. The project location is approximately 140 miles east of the Texas coast. See Tab 6, Attachment 2, Coastal Barrier Resources Map.
Flood Insurance Flood Disaster Protection Act of 1973 and National Flood Insurance Reform Act of 1994 [42 USC 4001-4128 and 42 USC 5154a]	Yes No <input type="checkbox"/> <input checked="" type="checkbox"/>	The structure is in the 100-year floodplain per Panel # 48209C0290F effective 9/2/2005-approximately .87 acres located within the 100-year floodplain. Portion of the project is located within LOMR 6-6-B46P effective 1/25/07 and LOMR 07/06/1372X effective 4/30/07 - .57 acres located within LOMR defined area. As maps are revised flood insurance for road and drainage infrastructure is not required. The City of Kyle participates in the National Flood Program per the FEMA Texas National Flood Insurance Program Community Status Book. http://fema.gov/flood-insurance/work-with-nfip-commujnity-status-book/ Therefore, the project is in compliance. See Tab 6, Attachment 3 for City's participation in the FEMA FIRM Map.
STATUTES, EXECUTIVE ORDERS, AND REGULATIONS LISTED AT 24 CFR 50.4 & 58.5		
Clean Air Clean Air Act, as amended, particularly section 176(c) & (d); 40 CFR Parts 6, 51, 93	Yes No <input type="checkbox"/> <input checked="" type="checkbox"/>	Hays County is a near ozone non attainment county. This data is available on line TxDOT copyright 2019 updated Feb. 3, 2020. The project is in compliance with the Clean Air Act. The project is considered a de minimus project as it is rehabilitating and existing roadway where drainage is problematic. Emissions will be temporary. This is further supported by the MOA between TXGLO and TCEQ. See Tab 6, Attachment 4.
Coastal Zone Management Coastal Zone Management Act, sections 307(c) & (d)	Yes No <input type="checkbox"/> <input checked="" type="checkbox"/>	The proposed project is consistent with this item. According to Coastal Zones Data mapped using Google Earth, the proposed project area is not located within a coastal barrier resource

		area. See Tab 6, Attachment 5. The project location is approximately 140 miles east of the Texas coast.
<p>Contamination and Toxic Substances</p> <p>24 CFR Part 50.3(i) & 58.5(i)(2)</p>	<p>Yes No</p> <p><input type="checkbox"/> x</p>	<p>The project is consistent with this item. Research was conducted of TCEQ Central Registry permit information. No known sites exist adjacent to the project. Prior to current developments of housing, retail, and warehouse storage the lands where agricultural in use. The project is consistent with this item. Research of TCEQ data reflects one inactive Leaking PST site Tex Best Travel Center located approximately 2400 lf from the project site. No impact is expected due to the sites cleaned up and due to the long distance to the project area. One other Medical Waste registration is location approximately 1200 lf north on Purple Martin from the project. There are no enforcement issues or concerns with the site. No impacts is expected. Other research included state and federal searches for industrial & hazardous waste sites including corrective action sites and institutional controls, Petroleum Storage Tanks Underground and Above ground (PST), NPL (listed and delisted), Brownfields, Superfunds, spill data, current and closed landfills, medical waste, underground injection control, site discovery, and voluntary cleanup/innocent owner data. No sites were found within prescribed radii. See Tab 6, Attachment 6 for mapping and listing of sites reviewed.</p>
<p>Endangered Species</p> <p>Endangered Species Act of 1973, particularly section 7; 50 CFR Part 402</p>	<p>Yes No</p> <p>X <input type="checkbox"/></p>	<p>Considering the nature of the work at the project site which includes the replacement of culverts at Richmond Branch Creek which crosses the area of roadway being improved, a wetland delineation of the area was conducted. The results of the delineation indicated Based on the results of the delineation, the only potential WOTUS (Waters of the United States – as defined by the US Army Corps of Engineers) found within the survey area is Richmond Branch. Only work directly involving Richmond</p>

Branch will require a Section 404 permit for this project. Based on the proposed construction activities, this work will include replacing the existing bridge with a wider bridge containing 5 box culverts, concrete headwalls and erosion controls. The proposed construction activities at Richmond Branch can be covered under Nationwide Permit 14 (Linear Transportation Projects). As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, preconstruction notification to the USACE for the use of Nationwide Permit (NWP) 14 will not be required. In accordance with the guidelines of NWP 14, all limitations, criteria, and General Conditions should be followed by this project. Specifically, General Conditions 10, 12, 18, 20, 21, and 23 are addressed below. NWP 14 guidelines are included in Attachment 7 (Attachment G of Delineation Document).

These results were also submitted to to TPWD on 6//20. A response was received from TPWD on 7/16/20 for their consultation. Several recommendations were provided. A response was submitted to TPWD on 8/25/20 and includes:

- Use sediment control fence to exclude wildlife from the construction area. Exclusion fencing should be buried at least six inches and be at least 24 inches high and maintained for the life of the project. Construction should examine the inside of the exclusion area daily to determine if any wildlife species have been trapped inside the area of impact and provide safe egress opportunities prior to initiation of construction activities.
- TPWD recommends that any open trenches or excavation areas be covered overnight and/or inspected every morning to ensure no wildlife species have been trapped. For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees (1:1) in areas left

		<p>uncovered. Also, inspect excavation areas for trapped wildlife prior to refilling.</p> <ul style="list-style-type: none">• For soil and erosion control use seed/mulch stabilization materials that avoid entanglement hazards to snakes and other wildlife species; use of no-till drilling, hydromulching and/or hydroseeding rather than erosion control blankets or mats due to a reduced risk to wildlife.• Reduce clearing of native vegetation, particularly mature native trees, riparian vegetation, and shrubs to the greatest extent practicable and in-kind replacement/restoration of the native vegetation wherever practicable. Colonization by invasive species, should be actively prevented. Vegetation management should include removing invasive species early on while allowing the existing native plants to revegetate the disturbed areas. TPWD recommends referring to the Lady Bird Johnson Wildflower Center Native Plant Database for regionally adapted native species that would be appropriate for landscaping and revegetation. As part of an international conservation effort TPWD has developed the <i>Texas Monarch and Native Pollinator Conservation Plan</i>, and one of the broad categories of action in this plan is to augment larval feeding and adult nectaring opportunities.• Use spanning bridges rather than culverts when feasible otherwise stagger culverts to concentrate low flows but provide conveyance of higher flows through staggered culverts placed at higher elevations is recommended. Recommend bottomless culverts to allow for fish and other aquatic wildlife passage in the low flow channel. If bottomless culverts are not feasible, making a low flow channel for fish passage is recommended.• Avoid placing riprap across stream channels and instead use alternative
--	--	--

		<p>stabilization such as biotechnical stream bank stabilization methods including live native vegetation or a combination of vegetative and structural materials. When using riprap or other bank stabilization, placement should not impede movement of aquatic and terrestrial wildlife underneath the bridge. In some instances, riprap may be buried, back-filled with topsoil and planted with native vegetation.</p> <ul style="list-style-type: none">• Incorporate bat-friendly design into bridges and culverts where bridges are designed for adequate vertical and horizontal clearances under the roadway to allow for terrestrial wildlife to safely pass under the road. A span wide enough to cross the stream and allow for dry ground and a natural surface path under the roadway is encouraged. Incorporate artificial ledges inside culverts on one or both sides. Riparian buffer zones should remain undisturbed where possible.• Construction is intended to occur during dry months in order to prevent impact to aquatic life. In the event construction occurs when water is present in Richmond Branch and dewatering activities or other harmful construction activities are involved (such as trenching and placement of temporary or permanent fills or structures), then construction will consider relocating potentially impacted native aquatic resources in conjunction with a <i>Permit to Introduce Fish, Shellfish or Aquatic Plants into Public Waters</i> and an ARRP. If this occurs, then the ARRP will be completed and approved by TPWD 30 days prior to activity within project waters and/or resource relocation and submitted with an application for a no-cost <i>Permit to Introduce Fish, Shellfish, or Aquatic Plants into Public Waters</i>. ARRPs can be submitted to Travis Tidwell, TPWD
--	--	---

Region 1 KAST Biologist at (512) 389-8612 or Travis.Tidwell2@tpwd.texas.gov

- If nests are observed during construction, activities will cease and TPWD will be contacted. Additionally, the site will be surveyed, no more than five days prior to planned clearing or construction, preferably during daytime for nests, including under bridges and in culverts, to determine if they are active prior to construction activities and ensure Migratory Bird Treaty Act (MBTA) compliance. Should a nest be observed, a minimum 150-foot buffer of vegetation will remain around any nests prior to disturbance. Where occupied nests are located area will not be disturbed until the eggs have hatched and the young have fledged.
- Project will avoid impacts to logs and rocks where turtles bask as well as gravel bars or riffle habitat in streams around where construction-related disturbance may occur. During construction, trucks and equipment should use existing bridge or culvert structures to cross creeks, and equipment staging areas should be located in previously disturbed areas outside of riparian corridors. Since turtles nest on gently sloping sand banks within approximately 30' feet of the water's edge, disturbance of embankments will be avoided. Construction will be avoided during breeding and nesting season of this species (spring and summer). Turtles breed in spring and early summer and then the eggs incubate through the spring and summer months. If necessary, a permitted biological monitor will be on-site that is familiar with the identification of this species and that can relocate the Cagle's map turtle to a nearby area with similar habitat that would not be disturbed during construction. Any translocations of reptiles will be the minimum distance possible, no greater than one mile,

		<p>preferably within 100 to 200 yards from the initial encounter location.</p> <ul style="list-style-type: none">• A screening review of the project area prior to construction will occur to determine if a permitted biologist is needed to facilitate a plan of action if bats, bird nests, mollusks, turtles or chorusing frogs prior to construction are present at the project site. Project will incorporate steps provided by TPWD. Construction will consider habitat for bats in the area and take precautions to prevent impact and to determine how to mitigate for loss of roost.• The TXNDD listing was provided to contractors with the request for consultation and it was determined that there is one study area within five miles of the project area. This includes the Texas Garter Snake. As identified by the TPWD response letter, there may be suitable habitat for the Texas garter snake within the project area. This species prefers marshy, flooded pastureland or meadows, particularly in spring when frogs are present in numbers and at other times prefers grassy or brushy terrain near hill country streams and ponds. The Texas garter snake seems to prefer vicinity of permanent sources of water or soil damp enough to support earthworm populations.• Construction personnel and contractors will be advised to avoid injury or harm to all snakes encountered during clearing and construction. Therefore, contractors will avoid contact with snakes if encountered and allow all native snakes to safely leave the premises.• Industry specific mitigation will be used to return the area to its original condition. Reseeding the area with native grasses to prevent erosion and soil stabilization will occur as possible consistent with current BMP and methodologies that prevent impact to wildlife. Interest will be paid to
--	--	--

		<p>monitoring for potential wildlife or other animals that may wander onsite. The activities are not intended for site cleanup.</p> <p>See Tab 6, Attachment 7 for further information about consultations.</p>
<p>Explosive and Flammable Hazards</p> <p>24 CFR Part 51 Subpart C</p>	<p>Yes No</p> <p><input type="checkbox"/> x</p>	<p>There are no current planned above ground storage containers of concern within 1 mile of project site. See Tab 6, Attachment 8 for worksheet regarding this item.</p>
<p>Farmlands Protection</p> <p>Farmland Protection Policy Act of 1981, particularly sections 1504(b) and 1541; 7 CFR Part 658</p>	<p>Yes No</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/></p>	<p>The project is consistent with this item. The project area and existing roadway located within the City of Kyle. No new construction is expected. See Tab 6, Attachment 9.</p>
<p>Floodplain Management</p> <p>Executive Order 11988, particularly section 2(a); 24 CFR Part 55</p>	<p>Yes No</p> <p>X <input type="checkbox"/></p>	<p>This project does occur within the floodplain. The proposal is for proposed road elevations to be similar/close to existing road elevations. Earthwork volumes will be calculated and if it is determined fill is needed for the road infrastructure proposed, at the rate of 1 cy: 1cy material will be removed from the floodplain footprint or location determined runoff can be detained in order to maintain the waters within the floodplain.</p> <p>The structure is in the 100-year floodplain per Panel #48209C0290F effective 9/2/2005-approximately .87 acres located within the 100-year floodplain. Portion of the project is located within LOMR 6-6-B46P effective 1/25/07 and LOMR 07/06/1372X effective 4/30/07 - .57 acres located within LOMR defined area. As maps are revised flood insurance for road and drainage infrastructure is not required. The City of Kyle participates in the National Flood Program per the FEMA Texas National Flood Insurance Program Community Status Book. http://fema.gov/flood-insurance/work-with-nfip-commujnity-status-book/ Therefore, the project is in compliance. See Tab 6, Attachment 3 for City's participation in the FEMA NFIP and Attachment 10 for FEMA FIRM.</p>

		<p>The 8-step process has been used for ensuring public participation regarding construction activities in the floodplain. The early notice was published in the Hays Free Press on April 15, 2020. A Final Notice and Public Explanation of A Proposed Activity In A 100-Year Floodplain is being published in the Hays Free Press on August ____, 2020.</p>
<p>Historic Preservation</p> <p>National Historic Preservation Act of 1966, particularly sections 106 and 110; 36 CFR Part 800</p>	<p>Yes No <input type="checkbox"/> <input checked="" type="checkbox"/></p>	<p>Based on the project proposed and the existing developed properties adjacent to the project area, the project has No Potential to Cause effects. The project is in compliance.</p> <p>The project activities do not represent significant disturbances. However, the Project was submitted to THC for review based upon an assessment associated with wetland delineation. This requirement provides a basis for information to be submitted to the USACE as a part of a jurisdictional determination. The project was determined to be consistent with a Nationwide Permit 14 which indicates minimal impact to waters of the US.</p> <p>A consultation request was submitted to THC on 5/15/20. The THC responded on 5/27/20 indicating no cultural resources impact is expected and specifically no historical properties were found for above ground review or cultural resource review.</p> <p>If buried cultural materials are encountered during construction or disturbance activities, work should cease in the immediate area; work can continue where no cultural materials are present. Please contact the THC's Archeology Division at 512-463-6096 to consult on further actions that may be necessary to protect the cultural remains and Texas General Land Office. See Tab6, Attachment 11.</p>
<p>Noise Abatement and Control</p> <p>Noise Control Act of 1972, as amended by the Quiet Communities Act of 1978; 24 CFR Part 51 Subpart B</p>	<p>Yes No <input type="checkbox"/> <input checked="" type="checkbox"/></p>	<p>The project is not a noise sensitive use. Noise from construction will be temporary and will be scheduled at appropriate times. See Tab 6, Attachment 12 for worksheet regarding this item.</p>

<p>Sole Source Aquifers</p> <p>Safe Drinking Water Act of 1974, as amended, particularly section 1424(e); 40 CFR Part 149</p>	<p>Yes No</p> <p><input type="checkbox"/> x</p>	<p>The project is consistent with this item. The Edwards aquifer is located in Hays County. It is a sole source aquifer. However, the project is not located over the aquifer or any of the contributing zones. No impact is expected and the project construction activities will ensure appropriate management of stormwater as a part of the project management. See Tab 6, Attachment 13, maps and worksheet.</p>
<p>Wetlands Protection</p> <p>Executive Order 11990, particularly sections 2 and 5</p>	<p>Yes No</p> <p>X <input type="checkbox"/></p>	<p>A wetland delineation was conducted for this project due to the work being done at Richmond Branch. The delineation survey area reviewed for this project is generally defined by an approximate 125-foot wide strip extending along 2100 linear feet of Windy Hill Road. The 125-foot wide strip includes the existing 80-foot easement surrounding Windy Hill Road, as well as an additional strip of land to the south, approximately 45 feet wide, which is controlled by the Homeowner's Association of Amberwood Subdivision. The primary areas of focus for this investigation are the existing roadside ditches and the crossing of Richmond Branch.</p> <p>Based on the results of the delineation, the only potential WOTUS found within the survey area is Richmond Branch. Only work directly involving Richmond Branch will require a Section 404 permit for this project. Based on the proposed construction activities, this work will include replacing the existing bridge with a wider bridge containing 5 box culverts, concrete headwalls and erosion controls. The proposed construction activities at Richmond Branch can be covered under Nationwide Permit 14 (Linear Transportation Projects).</p> <p>As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, preconstruction notification to the USACE for the use of Nationwide Permit 14 will not be required. The report serves as</p>

documentation of the use and compliance with Nationwide Permit 14. In accordance with the guidelines of NWP 14, all limitations, criteria, and General Condition should be followed by this project. Specifically, General Conditions 10, 12, 18, 20, 21, and 23 are addressed below within the report.

Specifically, A reconnaissance of the survey area was performed on June 1, 2020 to evaluate site conditions and identify potential waters of the U.S. (potentially jurisdictional wetlands, streams, and open waters). During the on-site investigation, four (4) observation points were established. These four observation points were representative of the drainage areas along Windy Hill road. None met all characteristics of wetland criteria.

The wetland delineation report indicates, "[b]ased on a desktop map review of historic USGS Topographic Maps, including the 1984 USGS Topographic Map (Plate A-2), and the National Wetlands Inventory Map (Plate A-7), it was noted that the southern roadside ditch west of Richmond Branch was historically depicted as an intermittent stream. Also, this area is shown to be located within the 100-year floodplain (Zone A) according to the FEMA Flood Insurance Rate Map (Plate A-6) for the area. However, after visiting the site, it is clear the southern roadside ditch does not exhibit an OHWM or other characteristics of a stream. Although the ditch seems to convey large stormwater runoff events at times, there is not enough frequency or duration of flow to develop an OHWM. Additionally, the grade along the ditch is great enough to promote positive drainage and does not pond water long enough to develop wetland criteria within the ditch. A few areas of erosion were observed that pond water after significant rain events, but these erosional features do not meet the definition of potential WOTUS. Therefore, in the best professional opinion of Hydrex

Environmental, the roadside ditch lacks the presence of any potential WOTUS.”

With regard to Section 404 permitting, the only area of potential WOTUS within the survey area is Richmond Branch – an intermittent stream. The delineation indicates the ordinary high water mark (OHWM) width is 14.2 ft and the OHWM depth is 1.4 ft. The length of impacted area is 125 ft., indicating a total potential impact of .04 acres. As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, preconstruction notification to the USACE for the use of Nationwide Permit (NWP) 14 will not be required.

In accordance with the guidelines of NWP 14, all limitations, criteria, and General Conditions should be followed by this project. Specifically, General Conditions (GC) 10, 12, 18, 20, 21, and 23 are addressed below. NWP 14 guidelines are included in Attachment G. See Tab 6, Attachment 14 for delineation document and supporting documentation. These include: GC-10 coordinating with the Floodplain Administrator of Hays County to ensure the construction activities associated with this project are completed in compliance with all local and FEMA floodplain development regulations; GC-12 Soil Erosion and Sediment Controls to prevent stormwater runoff; GC-18 Threatened and Endangered Species primarily promote awareness that while not visible during site visit, if federal mussel species are discovered during construction activities should cease in the area and contact TPWD; GC-20 – Historic Properties where if cultural resources are encountered during construction, work should cease and contact be made with THC and TGLO.

The 8-step process is being conducted for this project. An Early notice was published in the Hays Free Press on 4/15/2020 for 15 days.

		No comments were received. A Final Notice and Public Explanation of A Proposed Activity In A Wetland is being published in the Hays Free Press on August ____, 2020
Wild and Scenic Rivers Wild and Scenic Rivers Act of 1968, particularly section 7(b) and (c)	Yes No <input type="checkbox"/> x	This project is not located within wild and scenic rivers in Texas. It is also not located adjacent to or near any waters listed on the National Rivers Inventory. See Tab 6, Attachment 15 for worksheet and mapping.
ENVIRONMENTAL JUSTICE		
Environmental Justice Executive Order 12898	Yes No <input type="checkbox"/> x	No adverse environmental were identified in the projects total environmental review. The City of Kyle continues to grow steadily. Two low to moderate income housing facilities are proposed east of Richmond Branch off of Windy Hill. It is expected that approximately 50% of the traffic that will be generated from Kyle Dacy Apartments at 3700 Dacy Lane, will utilize Windy Hill to gain access to IH 35. Three hundred twenty-four, (324) units are proposed at 3700 Dacy Lane. A second facility located further east of Richmond Branch, by DR Horton will offer homes starting at \$99,000 and an upper limit of \$125,000. DR Horton is proposing to construct 1,025 single family homes. Population within 1 mile of the project area is estimated to be 3,944, 70% minority. See Tab 6, Attachment 16.

Environmental Assessment Factors [24 CFR 58.40; Ref. 40 CFR 1508.8 &1508.27] Recorded below is the qualitative and quantitative significance of the effects of the proposal on the character, features and resources of the project area. Each factor has been evaluated and documented, as appropriate and in proportion to its relevance to the proposed action. Verifiable source documentation has been provided and described in support of each determination, as appropriate. Credible, traceable and supportive source documentation for each authority has been provided. Where applicable, the necessary reviews or consultations have been completed and applicable permits of approvals have been obtained or noted. Citations, dates/names/titles of contacts, and page references are clear. Additional documentation is attached, as appropriate. **All conditions, attenuation or mitigation measures have been clearly identified.**

Impact Codes: Use an impact code from the following list to make the determination of impact for each factor.

(1) Minor beneficial impact

- (2) No impact anticipated
- (3) Minor Adverse Impact – May require mitigation
- (4) Significant or potentially significant impact requiring avoidance or modification which may require an Environmental Impact Statement

Environmental Assessment Factor	Impact Code	Impact Evaluation																														
LAND DEVELOPMENT																																
Conformance with Plans / Compatible Land Use and Zoning / Scale and Urban Design	1	The Windy Hill road improvements complies with the City’s 2015 Transportation Plan of providing a safe and efficient route for local and travelling through traffic. It is classified as a major collector. The plan recognizes road widenings are necessary along Windy Hill. The City’s 2018 Drainage Master Plan recognizes infrastructure capacity increases are necessary at Richmond Branch.																														
Soil Suitability/ Slope/ Erosion/ Drainage/ Storm Water Runoff	1	<p>Armoring the channel and ditches along Windy Hill will enhance soil stability minimizing erosion. Minor grading of ditches and channel will enhance water runoff from becoming stagnant. Soils in the area are Altoga Silty clay, 2 to 5 percent slopes, eroded, Heiden clay 1 to 3 percent slops, Heiden clay 3 to 5 percent slopes eroded, Houston Black clay, 1 to 3 percent slopes, and Tinn clay 0 to 1 percent slopes frequently flooded.</p> <div style="text-align: center;"> <p>Summary: Study Area 5.99 Acres 2.42 Hectares</p> <table border="1"> <thead> <tr> <th>Acres</th> <th>Hectares</th> <th>% Total</th> <th># Polys</th> <th>Descriptive Landcover</th> </tr> </thead> <tbody> <tr> <td>2.87</td> <td>1.16</td> <td>47.98</td> <td>2</td> <td>Urban Low</td> </tr> <tr> <td>1.15</td> <td>0.47</td> <td>19.22</td> <td>1</td> <td>Riparian Grassland</td> </tr> <tr> <td>0.98</td> <td>0.40</td> <td>16.40</td> <td>3</td> <td>Grassland</td> </tr> <tr> <td>0.92</td> <td>0.37</td> <td>15.42</td> <td>1</td> <td>Floodplain Grassland</td> </tr> <tr> <td>0.06</td> <td>0.02</td> <td>1.03</td> <td>1</td> <td>Deciduous Forest</td> </tr> </tbody> </table> </div>	Acres	Hectares	% Total	# Polys	Descriptive Landcover	2.87	1.16	47.98	2	Urban Low	1.15	0.47	19.22	1	Riparian Grassland	0.98	0.40	16.40	3	Grassland	0.92	0.37	15.42	1	Floodplain Grassland	0.06	0.02	1.03	1	Deciduous Forest
Acres	Hectares	% Total	# Polys	Descriptive Landcover																												
2.87	1.16	47.98	2	Urban Low																												
1.15	0.47	19.22	1	Riparian Grassland																												
0.98	0.40	16.40	3	Grassland																												
0.92	0.37	15.42	1	Floodplain Grassland																												
0.06	0.02	1.03	1	Deciduous Forest																												
Hazards and Nuisances including Site Safety and Noise	2	Temporary during the construction of the infrastructure improvements. There are a significant amount of utilities at the project site. It is recommended that all utilities be located prior to construction in order to prevent impact.																														
Energy Consumption	2	This project will not have a substantial effect on the use, extraction, or depletion of a natural resource. Minimizing the time traffic stopped due to no left turn lane availability will help eliminate air pollution.																														

Environmental Assessment Factor	Impact Code	Impact Evaluation
SOCIOECONOMIC		
Employment and Income Patterns	1	The project will directly provide temporary jobs to full time construction employees.

Demographic Character Changes, Displacement	2	The project will not result in physical barriers or reduced access that would isolate a particular neighborhood or population group.
---	---	--

Environmental Assessment Factor	Impact Code	Impact Evaluation
COMMUNITY FACILITIES AND SERVICES		
Educational and Cultural Facilities	1	The project will not displace educational or cultural facilities. A general store is adjacent to the structure improvements. Schools are located in nearby subdivisions. The pedestrian path will facilitate access to these facilities.
Commercial Facilities	2	The project is a short distance from IH 35, approximately 1 mile, where the motorist utilizing Windy Hill can travel to retail stores, banking, medical facilities, fueling stations, etc. The project will not adversely affect or displace these facilities.
Health Care and Social Services	1	Providing the proposed road infrastructure will enhance the Publics' access to health and social care services. The Public will travel more efficiently through the area with the two way left turn lane, the betterment of the road condition, and the added structure capacity. The Public will be able to access their care providers with less risk due to the road having water over it or damaged due to the water over the road.
Solid Waste Disposal / Recycling	2	Private trash services will be able to travel through to the neighborhoods and businesses in a safer more efficient manner with the proposed improvements. There are no solid waste sites located near the project area. Demolition debris or other waste generated from the project should be managed in accordance with federal, state and local disposal regulations. No closed landfills are located within close proximity to the site. See Tab 6, Attachment 19.1.
Waste Water / Sanitary Sewers	2	Utility improvements are not proposed on this project. The City of Kyle provides wastewater service though the project limits to adjacent subdivisions and business. No conflicts are anticipated. There are utilities in the area. There are existing stormwater permits located close to the project site. There are no impaired waters within close proximity to the project site. Tab 6, Attachment 19.2.
Water Supply	2	Utility improvements are not proposed on this project. The City of Kyle and two other companies provide water services to adjoining properties. Minor water line adjustment(s) may be necessary and would be undergone through the legal process in place if lines found to be in conflict with the proposed road and structure improvements. A review of the WIID groundwater database reflects no wells close to the project area.

Public Safety - Police, Fire and Emergency Medical	1	The City of Kyle and Hays County provides police protection in the City and Hays County respectively. Providing the proposed road infrastructure will enhance the Publics' safety as access to their homes or to the needed destination will be undertaken more efficiently because of two way left turn lane, the betterment of the road condition, and because of the added drainage capacity of the structure. The road will have less potential for damage and will reduce the times it has to be closed due to water over the road.
Parks, Open Space and Recreation	2	Nearby parks exist within adjacent subdivisions. This project will not affect subdivision internal access to the parks or the space allotted for the parks.
Transportation and Accessibility	1	The proposed roadway and pedestrian improvements would enhance the safe movement of traffic and people through the project. Pedestrian foot traffic has been witnessed along the proposed project limits. The existing 2 lane facility has no shoulders or pedestrian path. With the community growth in the area and present foot traffic, constructing a pedestrian path and widening the width of Windy Hill Road will improve the movement of vehicles and pedestrians through the area. The primary use of Windy Hill is to gain access to IH 35 in order to reach ultimate destinations of employment centers, medical facilities, educational, food, other communities, etc. Windy Hill will continue to function in the same manner, however in an improved accessibility manner. It is important to schedule road closures or detours preventing limited egress and ingress to surrounding housing developments.

Environmental Assessment Factor	Impact Code	Impact Evaluation
NATURAL FEATURES		
Unique Natural Features, Water Resources	2	The area's unique and natural features include the Richmond Branch which crosses under Windy Hill Road. Other unique features for Hays County are karst features. A review of the area and mapping of known karst features in the area are not located near the project area. A review of native plants and soils reflects typical central Texas conditions. See Tab 6, Attachment 17.
Vegetation, Wildlife	2	Local vegetation includes maintained native plants and landscaping at various locations along the Windy Hill Road. No wildlife was observed during the project site other than birds.
Other Factors	2	

Additional Studies Performed:

Delineation of waters of the US and non-reporting Nationwide Permit 14 for Windy Hill Road proposed road improvements cherrywood St. To Park S. Drive City of Kyle Hays County, Texas

Field Inspection (Date and completed by):

Jeff Prato, City of Kyle, February 21, 2020.

Latrice Hertzler, Future Link Technologies, Inc., March 18, 2020

List of Sources, Agencies and Persons Consulted [40 CFR 1508.9(b)]:

Texas Parks and Wildlife – Endangered and Threatened Animals of Texas
Hays County Stormwater Management Plan, January 2019
City of Kyle 2015 Transportation Plan
City of Kyle Drainage Masterplan
Texas Commission on Environmental Quality - <http://www.tceq.state.tx.us/>
Texas Water Development Board - <http://www.twdb.state.tx.us>
Texas Parks and Wildlife – <http://www.tpwd.state.tx.us>
US Fish & Wildlife – <http://fws.com/>
National Resource Conservation Center -<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>
Google Earth - <http://www.google.com/google earth.htm>
Federal Emergency Management Agency - <http://www.msc.fema.gov/>
Federal Aviation Administration -http://www.faa.gov/airports_airtraffic/airports/planning_capacity/npias/
National Response Center -<http://www.nrc.uscg.mil/pls/htmldb/f?p=109:1:139040664473>
Council of Government- <http://www.h-gac.com/>
Texas Association of Regional Councils - <http://www.txregionalcouncil.org/index.php>
Environmental Protection Agency -<http://epa.gov>
Environmental Protection Agency - Environmental Protection Agency (EPA) Corrective Action Sites
US Census – <http://www.census.gov>
Bureau of Economic Analysis – <http://www.bea.gov>
Texas General Land Office – www.glo.state.tx.us/coastal/cmp.html
Wild and Scenic Rivers in Texas - <http://www.nps.gov/rigr/planyourvisit/wildscenic.htm>
Home Town Locator- <http://www.hometownlocator.com/>
County of Hays- <https://hayscountytexas.com/>
City of Kyle - <https://www.cityofkyle.com/>
Texas Association of Regional Councils - <http://www.txregionalcouncil.org/index.php>
Texas Education Agency – <http://www.tea.state.tx.us/>
Assisted Living Federation of America – http://www.alfa.org/alfa/About_ALFA.asp?SnID=390678837
Texas Historical Commission - <http://www.thc.state.tx.us/>
Texas Department of Aging and Disabilities - <http://www.dads.state.tx.us/>
US Housing & Urban Development – NEPASSIST -
<http://www.epa.gov/oecaerth/nepa/nepassistmapping.html>
US Housing & Urban Development - Tribal Interest Website -
<http://egis.hud.gov/tadat/countyQuery.aspx?state=Texas>
Texas Railroad Commission – <http://www.rrc.state.tx.us>

List of Permits Obtained:

To be determined,

Public Outreach [24 CFR 50.23 & 58.43]:

An Early Notice and Public Review of a Proposed Activity in a 100-Year/500-year Floodplain and Wetland, for a fifteen day comment period was conducted on (April 15, 2020 – April 30, 2020) in the local newspaper, the Hays Free Press. No comments were received.

A combined notice of finding of no significant impact and intent to request release of funds and final floodplain and wetlands notice of explanation was conducted on (_____).

Cumulative Impact Analysis [24 CFR 58.32]:

No new ROW will be needed for the construction of the improvements for possible ditches, side slopes, grading, and the handling of traffic during construction. By providing improved drainage along Windy Hill Road near Richmond Branch, the frequency of road closures would be reduced.

Cumulative impacts for the area include improved drainage conditions on a heavily traveled roadway where population growth is addressed through several new housing developments along Windy Hill road. There are short and longer term impacts of the construction that will include posing potential accessibility challenges to these residential areas during construction but current engineering plans incorporate scheduling and short term use of traffic detour to prevent accessibility challenges during construction, especially during major rain events. While more area residential and commercial development is planned, these improvements will ensure improved traffic flows and safer travel for area growth. Other impacts include improving accessibility for emergency vehicles in the area during rain events or regular daily commutes.

With regard to floodplain and wetland impacts of construction in the area, mitigation is necessary during construction to ensure continued environmental stewardship of the project. Currently any rain events cause some flooding in the area of benefit. Wetland impacts will be minimal and drainage improvements will reduce the amount of flooding in the area. No longer term negative environmental impact is expected from the construction. The activities will have a positive impact to drainage for other area development facilitating better conditions along Windy Hill road during significant weather events. For example, local commuters would benefit from the improved access to IH 35 and adjacent neighborhoods and school facilities. Safety of the travelling public would be improved by providing a roadway with a dedicated turn lane, allowing turning vehicles to be out of the travel lanes. Overall, improved travel is expected as well as improved accessibility for emergency vehicles when needed during critical times such as bad weather.

Alternatives [24 CFR 58.40(e); 40 CFR 1508.9]

- A. Locate the Project Within the Floodplain – Using an alternate form of construction within the floodplain was considered, however, the type of construction selected is the most feasible and cost-effective use of funding to ensure human health and the environment.

- B. Locate the Project Outside of the Floodplain – moving the project outside the 100-year floodplain was considered, however, the location where drainage occurs that impacts human health and the environment is located along Windy Hill Road at the current project location.
- C. No Action or Alternative Actions that Serve the Same Purpose - Not conducting the improvements is not a selected alternative as the flood areas at the current location are significant and would present significant harm to human health and the environment in future heavy rain events.

No Action Alternative [24 CFR 58.40(e)]:

A No Build Alternative would result in no improvement to Windy Hill. The roadway would continue to be used as it currently is. Flooding during large rain events would continue to restrict egress of residents from two adjacent subdivisions, and prevent several others from having timely access to medical, educational, employment centers, etc. that are reached via IH 35. Maintenance of the existing road would become more common, causing traffic delays and additional costs for the City. Pavement repairs were recently required along the proposed project limits whereby it was noted motorist experienced up to two-hour delays, and traffic back-ups occurred up to the IH 35 Frontage Road.

Travel congestion and delay through the project area would continue to increase with the growth that is currently underway and expected growth in the future. The safety level of the travelling public would decline as more vehicles use the roadway. The local economy could suffer as the area becomes less desirable for businesses and consumers.

The No Build does not meet the need and purpose of this project currently described.

Summary of Findings and Conclusions:

- There are no compliance issues with comprehensive plans.
- No negative urban impact is anticipated.
- TPWD indicates several recommendations for the area where many may not apply based upon the reduced scope of the project. Recommendations include:
 - Sediment controls to prevent erosion that prevent impact to area wildlife
 - Routine monitoring of the site prior to and during construction to prevent accidental capture.
 - Reseed area with native plants and grasses to prevent erosion
 - Limit vegetation clearing using TPWD standards and BMPs when clearing is necessary - Clearing of vegetation during general bird nesting season (between March and August) will be considered prior to construction and information regarding state listed and rare species
 - Conduct a nest survey prior to and during construction to prevent impact to nesting birds.

- Check the site for signs of bat habitat and conduct investigation if bats are identified in the area. Consult checklist for future action if discovered.
 - If wildlife enters the construction area, suspend construction until the animal leaves the area and/or contact TPWD for assistance.
 - Environmental information investigation results will be provided to contractors for this project. This includes listings from the Federal IPAC database, the Texas Parks & Wildlife Texas Natural Diversity Database (TXNDD), the Hays County Endangered Species listing and the SGCN listing for Hays County and other information that has been incorporated into this project. These listings are provided to contractors in order to understand the possible wildlife encountered during construction.
 - Any tree removal will be limited and be consistent with tree management requirements as identified within best management practices and TPWD standards.
- No impact from hazardous materials is expected from this project.
 - No impact to historic properties or areas will occur from the project considering this is for street improvements to existing roadways.
 - This is not a critical action project. Impact to wetlands will be consistent with requirements associated with Nationwide permit 14 for construction of linear projects.
 - The project will not result in increased air emissions as the project for street improvements to existing roadways.
 - Precautions and scheduling should occur to prevent traffic impacts.
 - The project is located within the 100-year floodplain. The city participates in the NIFP program.
 - A wetland delineation resulted in a study finding less than .1 acres loss of WOTUS and there will be no discharge in special aquatic sites including wetlands, preconstruction notification to USACE for the Use of Nationwide Permit 14 will not be required. a total potential impact of .04 acres. As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, preconstruction notification to the USACE for the use of Nationwide Permit (NWP) 14 will not be required.
 - General Conditions (GC) 10, 12, 18, 20, 21, and 23 should be recognized. NWP 14 guidelines are included in Attachment G. See Tab 6, Attachment 14 for delineation document and supporting documentation. GC-10 coordinating with the Floodplain Administrator of Hays County to ensure the construction activities associated with this project are completed in compliance with all local and FEMA floodplain development regulations; GC-12 Soil Erosion and Sediment Controls to prevent stormwater runoff; GC-18 Threatened and Endangered Species primarily promote awareness that while not visible during site visit, if federal mussel species are discovered during construction activities should cease in the area and contact TPWD; GC-20 – Historic Properties where if cultural resources are encountered during construction, work should cease and contact be made with THC and TGLO

Mitigation Measures and Conditions [40 CFR 1505.2(c)]

Summarize below all mitigation measures adopted by the Responsible Entity to reduce, avoid, or eliminate adverse environmental impacts and to avoid non-compliance or non-conformance with the above-listed authorities and factors. These measures/conditions must be incorporated into project contracts, development agreements, and other relevant documents. The staff responsible for implementing and monitoring mitigation measures should be clearly identified in the mitigation plan.

Law, Authority, or Factor	Mitigation Measure
<p>Endangered Species</p> <p>Endangered Species Act of 1973, particularly section 7; 50 CFR Part 402</p>	<ul style="list-style-type: none">• Use sediment control fence to exclude wildlife from the construction area. Exclusion fencing should be buried at least six inches and be at least 24 inches high and maintained for the life of the project. Construction should examine the inside of the exclusion area daily to determine if any wildlife species have been trapped inside the area of impact and provide safe egress opportunities prior to initiation of construction activities.• TPWD recommends that any open trenches or excavation areas be covered overnight and/or inspected every morning to ensure no wildlife species have been trapped. For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees (1:1) in areas left uncovered. Also, inspect excavation areas for trapped wildlife prior to refilling.• For soil and erosion control use seed/mulch stabilization materials that avoid entanglement hazards to snakes and other wildlife species; use of no-till drilling, hydromulching and/or hydroseeding rather than erosion control blankets or mats due to a reduced risk to wildlife.• Reduce clearing of native vegetation, particularly mature native trees, riparian vegetation, and shrubs to the greatest extent practicable and in-kind replacement/restoration of the native vegetation wherever practicable. Colonization by invasive species, should be actively prevented. Vegetation management should include removing invasive species early on while allowing the existing native plants to revegetate the disturbed areas. TPWD recommends referring to the Lady Bird Johnson Wildflower Center Native Plant Database for regionally adapted native species that would be

appropriate for landscaping and revegetation. As part of an international conservation effort TPWD has developed the *Texas Monarch and Native Pollinator Conservation Plan*, and one of the broad categories of action in this plan is to augment larval feeding and adult nectaring opportunities.

- Use spanning bridges rather than culverts when feasible otherwise stagger culverts to concentrate low flows but provide conveyance of higher flows through staggered culverts placed at higher elevations is recommended. Recommend bottomless culverts to allow for fish and other aquatic wildlife passage in the low flow channel. If bottomless culverts are not feasible, making a low flow channel for fish passage is recommended.
- Avoid placing riprap across stream channels and instead use alternative stabilization such as biotechnical stream bank stabilization methods including live native vegetation or a combination of vegetative and structural materials. When using riprap or other bank stabilization, placement should not impede movement of aquatic and terrestrial wildlife underneath the bridge. In some instances, riprap may be buried, back-filled with topsoil and planted with native vegetation.
- Incorporate bat-friendly design into bridges and culverts where bridges are designed for adequate vertical and horizontal clearances under the roadway to allow for terrestrial wildlife to safely pass under the road. A span wide enough to cross the stream and allow for dry ground and a natural surface path under the roadway is encouraged. Incorporate artificial ledges inside culverts on one or both sides. Riparian buffer zones should remain undisturbed where possible.
- Construction is intended to occur during dry months in order to prevent impact to aquatic life. In the event construction occurs when water is present in Richmond Branch and dewatering activities or other harmful construction activities are involved (such as trenching and placement of temporary or permanent fills or structures), then construction will consider relocating potentially impacted native aquatic resources in conjunction with a *Permit to Introduce Fish, Shellfish or Aquatic Plants into Public Waters* and an ARRP. If this occurs, then the ARRP will be

completed and approved by TPWD **30 days prior to activity within project waters and/or resource relocation** and submitted with an application for a no-cost *Permit to Introduce Fish, Shellfish, or Aquatic Plants into Public Waters*. ARRP's can be submitted to Travis Tidwell, TPWD Region 1 KAST Biologist at (512) 389-8612 or Travis.Tidwell2@tpwd.texas.gov

- If nests are observed during construction, activities will cease and TPWD will be contacted. Additionally, the site will be surveyed no more than five days prior to planned clearing or construction, preferably during daytime for nests, including under bridges and in culverts, to determine if they are active prior to construction activities and ensure Migratory Bird Treaty Act (MBTA) compliance. Should a nest be observed, a minimum 150-foot buffer of vegetation will remain around any nests prior to disturbance. Where occupied nests are located area will not be disturbed until the eggs have hatched and the young have fledged.
- Project will avoid impacts to logs and rocks where turtles bask as well as gravel bars or riffle habitat in streams around where construction-related disturbance may occur. During construction, trucks and equipment should use existing bridge or culvert structures to cross creeks, and equipment staging areas should be located in previously disturbed areas outside of riparian corridors. Since turtles nest on gently sloping sand banks within approximately 30' feet of the water's edge, disturbance of embankments will be avoided. Construction will be avoided during breeding and nesting season of this species (spring and summer). Turtles breed in spring and early summer and then the eggs incubate through the spring and summer months. If necessary, a permitted biological monitor will be on-site that is familiar with the identification of this species and that can relocate the Cagle's map turtle to a nearby area with similar habitat that would not be disturbed during construction. Any translocations of reptiles will be the minimum distance possible, no greater than one mile, preferably within 100 to 200 yards from the initial encounter location.
- A review of the project area prior to construction will occur to determine if a permitted biologist is needed

	<p>to facilitate a plan of action for determining if bats are present at the project site. Project will incorporate steps provided by TPWD. Construction will consider habitat for bats in the area and take precautions to prevent impact and to determine how to mitigate for loss of roost.</p> <ul style="list-style-type: none"> • The Texas Garter Snake may have suitable habitat for the within the project area. This species prefers marshy, flooded pastureland or meadows, particularly in spring when frogs are present in numbers and at other times prefers grassy or brushy terrain near hill country streams and ponds. Construction personnel and contractors will be advised to avoid injury or harm to all snakes encountered during clearing and construction. Therefore, contractors will avoid contact with snakes if encountered and allow all native snakes to safely leave the premises. • Industry specific mitigation will be used to return the area to its original condition. Reseeding the area with native grasses to prevent erosion and soil stabilization will occur as possible consistent with current BMP and methodologies that prevent impact to wildlife. Interest will be paid to monitoring for potential wildlife or other animals that may wander onsite. The activities are not intended for site cleanup.
<p>Wetlands Protection</p> <p>Executive Order 11990, particularly sections 2 and 5</p>	<p>The proposed construction activities at Richmond Branch can be covered under Nationwide Permit 14 (Linear Transportation Projects). As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, preconstruction notification to the USACE for the use of Nationwide Permit (NWP) 14 will not be required. In accordance with the guidelines of NWP 14, all limitations, criteria, and General Conditions should be followed by this project. Specifically, General Conditions (GC) 10, 12, 18, 20, 21, and 23 are addressed below. NWP 14 guidelines are included in Attachment 7 (Attachment G of Delineation Document).</p> <ul style="list-style-type: none"> • GC-10 coordinating with the Floodplain Administrator of Hays County to ensure the construction activities associated with this project are completed in compliance with all local and FEMA floodplain development regulations;

	<ul style="list-style-type: none"> • GC-12 Soil Erosion and Sediment Controls to prevent stormwater runoff such as berming, hay bales, or other construction matting where possible; • GC-18 Threatened and Endangered Species primarily promote awareness that while not visible during site visit, if federal mussel species are discovered during construction activities should cease in the area and contact TPWD; • GC-20 – Historic Properties where if cultural resources are encountered during construction, work should cease and contact be made with THC and TGLO.
Floodplain Management Executive Order 11988, particularly section 2(a); 24 CFR Part 55	The proposal is for proposed road elevations to be similar/close to existing road elevations. Earthwork volumes will be calculated and if it is determined fill is needed for the road infrastructure proposed, at the rate of 1 cy: 1cy material will be removed from the floodplain footprint or location determined runoff can be detained in order to maintain the waters within the floodplain.
Historic Preservation National Historic Preservation Act of 1966, particularly sections 106 and 110; 36 CFR Part 800	If buried cultural materials are encountered during construction or disturbance activities, work should cease in the immediate area; work can continue where no cultural materials are present. Please contact the THC's Archeology Division at 512-463-6096 to consult on further actions that may be necessary to protect the cultural remains and Texas General Land Office.

Determination:

Finding of No Significant Impact [24 CFR 58.40(g)(1); 40 CFR 1508.27]
The project will not result in a significant impact on the quality of the human environment.

Finding of Significant Impact [24 CFR 58.40(g)(2); 40 CFR 1508.27]
The project may significantly affect the quality of the human environment.

Preparer Signature:  Date: 09/08/20

Name/Title/Organization: Latrice Hertzler,
Environmental Reviewer Future Link Technologies, Inc.

Certifying Officer Signature:  Date: 09/08/20

Name/Title: Travis Mitchell, City of Kyle Mayor

This original, signed document and related supporting material must be retained on file by the Responsible Entity in an Environmental Review Record (ERR) for the activity/project (ref: 24 CFR Part 58.38) and in accordance with recordkeeping requirements for the HUD program(s).

TAB 4

PROJECT DESCRIPTION

- FORM 314

- Project Description Email to Engineers

(A314) Project Description Sheet

CONTRACTOR LOCALITY: City of Kyle

CHIEF ELECTED OFFICIAL: Travis Mitchell, Mayor

TxCDBG CONTRACT NO.: GLO Contract No. 19-280-000-B779

PROJECT NAME: City of Kyle Windy Hill Road and Drainage Improvements

Street improvements – From, approximately 500 ft W. of Cherrywood to approximately 500 ft East of Purple Martin Avenue.

PROJECT NARRATIVE:

Street Improvements: will include reconstructing and widening Windy Hill by removing and replacing existing culverts, the roadway, and structure approaches. The pavement structure will be strengthened to meet the demands of current traffic volumes and anticipated growth demand. The new facility will include a two-way left turn lane, a pedestrian pathway, safety lighting, armored erosion control elements, structure guard fence that meet current TxDOT design standards, and associated appurtenances. Street improvements total approximately two thousand one hundred linear feet (2,100). The street improvements will need to be performed under traffic as alternate routes are not available.

Flood and Drainage Facilities: the storm water collection and conveyance capacity through Windy Hill will be increased. Detention of stormwater may be necessary to prevent downstream negative effects. The existing culverts will be removed and replaced, the ditch capacities will be graded as necessary for additional runoff conveyance and storage, the ditches and Richmond Branch channel will be armored to prevent erosion of neighboring homes and infrastructure, minor channel reshaping of grades, aligning of channel may be necessary at Richmond Branch crossing.

Street improvements total approximately disturbed area is approximately two thousand one hundred linear feet (2,100). The street improvements will need to be performed under traffic as alternate routes are not available.

Construction activities will include impacts to the following within the described project area of from approximately 500 ft W of Cherrywood to Approximately 500 ft East of Purple Martin Ave.:

- A. Temporary pavement (beyond existing roadbed width) is needed for traffic switching/control from most western and eastern stations of (engineering plans) –sta. 55+80 to sta. 34+50 = 2130 ft.
- B. Eliminating striping that interferes with change of traffic on existing roadbed is needed from (engineering plans) sta. 58+07 - sta. 33+88 = 2418 ft
- C. The permanent road improvements will be from (engineering plans) sta. 55+67 to sta. 35+96 = 1970 on title page

PROJECT DESCRIPTION:

The City of Kyle shall reconstruct a portion of Windy Hill Road by removing and replacing existing culverts, the roadway, and approaches; when the roadway pavement and structure to add turn lane capacity, in stall railing and end treatments that meet TxDot standards; and perform associated appurtenances. Improvements total approximately two thousand one hundred (2100) linear feet

PROJECT LOCATION:

Kyle, Hays County, TX

Approximately 2100 linear feet -500 ft W. of Cherrywood to 500 ft East of Purple Martin Ave

Grant Number	HUD Program	Funding Amount
19-280-000-B779	CDBG-DR	\$3,497,686.18

TOTAL AREA OF DISTURBANCE: Total area of disturbance is approximately 2.41 acres if permanent impact. Street improvements total approximately disturbed area is approximately two thousand one hundred linear feet (2,100). The street improvements will need to be performed under traffic as alternate routes are not available.

MITIGATION MEASURES:

Law, Authority, or Factor	Mitigation Measure
<p>Endangered Species</p> <p>Endangered Species Act of 1973, particularly section 7; 50 CFR Part 402</p>	<ul style="list-style-type: none"> • Use sediment control fence to exclude wildlife from the construction area. Exclusion fencing should be buried at least six inches and be at least 24 inches high and maintained for the life of the project. Construction should examine the inside of the exclusion area daily to determine if any wildlife species have been trapped inside the area of impact and provide safe egress opportunities prior to initiation of construction activities. • TPWD recommends that any open trenches or excavation areas be covered overnight and/or inspected every morning to ensure no wildlife species have been trapped. For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees (1:1) in areas left uncovered. Also, inspect excavation areas for trapped wildlife prior to refilling. • For soil and erosion control use seed/mulch stabilization materials that avoid entanglement hazards to snakes and other wildlife species; use of no-till drilling, hydromulching and/or hydroseeding rather than erosion control blankets or mats due to a reduced risk to wildlife. • Reduce clearing of native vegetation, particularly mature native trees, riparian vegetation, and shrubs to the greatest

	<p>extent practicable and in-kind replacement/restoration of the native vegetation wherever practicable. Colonization by invasive species, should be actively prevented. Vegetation management should include removing invasive species early on while allowing the existing native plants to revegetate the disturbed areas. TPWD recommends referring to the Lady Bird Johnson Wildflower Center Native Plant Database for regionally adapted native species that would be appropriate for landscaping and revegetation. As part of an international conservation effort TPWD has developed the <i>Texas Monarch and Native Pollinator Conservation Plan</i>, and one of the broad categories of action in this plan is to augment larval feeding and adult nectaring opportunities.</p> <ul style="list-style-type: none"> • Use spanning bridges rather than culverts when feasible otherwise stagger culverts to concentrate low flows but provide conveyance of higher flows through staggered culverts placed at higher elevations is recommended. Recommend bottomless culverts to allow for fish and other aquatic wildlife passage in the low flow channel. If bottomless culverts are not feasible, making a low flow channel for fish passage is recommended. • Avoid placing riprap across stream channels and instead use alternative stabilization such as biotechnical stream bank stabilization methods including live native vegetation or a combination of vegetative and structural materials. When using riprap or other bank stabilization, placement should not impede movement of aquatic and terrestrial wildlife underneath the bridge. In some instances, riprap may be buried, back-filled with topsoil and planted with native vegetation. • Incorporate bat-friendly design into bridges and culverts where bridges are designed for adequate vertical and horizontal clearances under the roadway to allow for terrestrial wildlife to safely pass under the road. A span wide enough to cross the stream and allow for dry ground and a natural surface path under the roadway is encouraged. Incorporate artificial ledges inside culverts on one or both sides. Riparian buffer zones should remain undisturbed where possible. • Construction is intended to occur during dry months in order to prevent impact to aquatic life. In the event construction occurs when water is present in Richmond Branch and dewatering activities or other harmful construction activities are involved (such as trenching and placement of temporary or permanent fills or structures), then construction will consider relocating potentially impacted native aquatic resources in conjunction with a <i>Permit to Introduce Fish, Shellfish or Aquatic Plants into Public Waters</i> and an ARRP. If this occurs, then the ARRP will be completed and approved by TPWD 30 days prior to activity within project waters and/or resource relocation and submitted with an application for a no-cost <i>Permit to Introduce Fish, Shellfish, or Aquatic Plants into Public Waters</i>. ARRPs can be submitted to Travis Tidwell, TPWD Region 1 KAST Biologist at (512) 389-8612 or Travis.Tidwell2@tpwd.texas.gov • If nests are observed during construction, activities will cease
--	--

	<p>and TPWD will be contacted. Additionally, the site will be surveyed no more than five days prior to planned clearing or construction, preferably during daytime for nests, including under bridges and in culverts, to determine if they are active prior to construction activities and ensure Migratory Bird Treaty Act (MBTA) compliance. Should a nest be observed, a minimum 150-foot buffer of vegetation will remain around any nests prior to disturbance. Where occupied nests are located area will not be disturbed until the eggs have hatched and the young have fledged.</p> <ul style="list-style-type: none">• Project will avoid impacts to logs and rocks where turtles bask as well as gravel bars or riffle habitat in streams around where construction-related disturbance may occur. During construction, trucks and equipment should use existing bridge or culvert structures to cross creeks, and equipment staging areas should be located in previously disturbed areas outside of riparian corridors. Since turtles nest on gently sloping sand banks within approximately 30' feet of the water's edge, disturbance of embankments will be avoided. Construction will be avoided during breeding and nesting season of this species (spring and summer). Turtles breed in spring and early summer and then the eggs incubate through the spring and summer months. If necessary, a permitted biological monitor will be on-site that is familiar with the identification of this species and that can relocate the Cagle's map turtle to a nearby area with similar habitat that would not be disturbed during construction. Any translocations of reptiles will be the minimum distance possible, no greater than one mile, preferably within 100 to 200 yards from the initial encounter location.• A review of the project area prior to construction will occur to determine if a permitted biologist is needed to facilitate a plan of action for determining if bats are present at the project site. Project will incorporate steps provided by TPWD. Construction will consider habitat for bats in the area and take precautions to prevent impact and to determine how to mitigate for loss of roost.• The Texas Garter Snake may have suitable habitat for the within the project area. This species prefers marshy, flooded pastureland or meadows, particularly in spring when frogs are present in numbers and at other times prefers grassy or brushy terrain near hill country streams and ponds. Construction personnel and contractors will be advised to avoid injury or harm to all snakes encountered during clearing and construction. Therefore, contractors will avoid contact with snakes if encountered and allow all native snakes to safely leave the premises.• Industry specific mitigation will be used to return the area to its original condition. Reseeding the area with native grasses to prevent erosion and soil stabilization will occur as possible consistent with current BMP and methodologies that prevent impact to wildlife. Interest will be paid to monitoring for potential wildlife or other animals that may wander onsite. The
--	---

	activities are not intended for site cleanup.
<p>Wetlands Protection</p> <p>Executive Order 11990, particularly sections 2 and 5</p>	<p>The proposed construction activities at Richmond Branch can be covered under Nationwide Permit 14 (Linear Transportation Projects). As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, preconstruction notification to the USACE for the use of Nationwide Permit (NWP) 14 will not be required. In accordance with the guidelines of NWP 14, all limitations, criteria, and General Conditions should be followed by this project. Specifically, General Conditions (GC) 10, 12, 18, 20, 21, and 23 are addressed below. NWP 14 guidelines are included in Attachment 7 (Attachment G of Delineation Document).</p> <ul style="list-style-type: none"> • GC-10 coordinating with the Floodplain Administrator of Hays County to ensure the construction activities associated with this project are completed in compliance with all local and FEMA floodplain development regulations; • GC-12 Soil Erosion and Sediment Controls to prevent stormwater runoff such as berming, hay bales, or other construction matting where possible; • GC-18 Threatened and Endangered Species primarily promote awareness that while not visible during site visit, if federal mussel species are discovered during construction activities should cease in the area and contact TPWD; • GC-20 – Historic Properties where if cultural resources are encountered during construction, work should cease and contact be made with THC and TGLO.
<p>Floodplain Management</p> <p>Executive Order 11988, particularly section 2(a); 24 CFR Part 55</p>	<p>The proposal is for proposed road elevations to be similar/close to existing road elevations. Earthwork volumes will be calculated and if it is determined fill is needed for the road infrastructure proposed, at the rate of 1 cy: 1cy material will be removed from the floodplain footprint or location determined runoff can be detained in order to maintain the waters within the floodplain.</p>
<p>Historic Preservation</p> <p>National Historic Preservation Act of 1966, particularly sections 106 and 110; 36 CFR Part 800</p>	<p>If buried cultural materials are encountered during construction or disturbance activities, work should cease in the immediate area; work can continue where no cultural materials are present. Please contact the THC's Archeology Division at 512-463-6096 to consult on further actions that may be necessary to protect the cultural remains and Texas General Land Office.</p>

ALTERNATIVES:

- A. Locate the Project Within the Floodplain – Using an alternate form of construction within the floodplain was considered, however, the type of construction selected is the most feasible and cost-effective use of funding to ensure human health and the environment.
- B. Locate the Project Outside of the Floodplain – moving the project outside the 100-year floodplain was considered, however, the location where drainage occurs that impacts human health and the environment is located along Windy Hill Road at the current project location.
- C. No Action or Alternative Actions that Serve the Same Purpose - Not conducting the improvements is not a selected alternative as the flood areas at the current location are significant and would present significant harm to human health and the environment in future heavy rain events.

DESCRIPTION OF SURROUNDING AREAS:

The City of Kyle continues to grow steadily. Two low to moderate income housing facilities are proposed east of Richmond Branch off of Windy Hill. It is expected that approximately 50% of the traffic that will be generated from Kyle Dacy Apartments at 3700 Dacy Lane, will utilize Windy Hill to gain access to IH 35. Three hundred twenty-four, (324) units are proposed at 3700 Dacy Lane. A second facility located further east of Richmond Branch, by DR Horton will offer homes starting at \$99,000 and an upper limit of \$125,000. DR Horton is proposing to construct 1,025 single family homes.

In addition, the Federal Emergency Management Agency is in the process of updating floodplain maps and studies performed for the City have shown that the 100-year floodplain footprint is increasing, and the rain event volumes are greater. For the City of Kyle what used to be a 100-year flood plain event will now be closer to a 25 year event. The existing structures were analyzed prior to the proposed changes as being able to handle a 2-year event, therefore if no improvements are made the safety concerns will worsen for this area.

PROJECT NARRATIVE:

Reconstruction and widening of Windy Hill Road from approximately 500 ft west of Cherrywood to 500 ft east of Purple Martin Avenue, City of Kyle City limit boundary line will improve the street and flood drainage facilities.

Street Improvements: will include reconstructing and widening Windy Hill by removing and replacing existing culverts, the roadway, and structure approaches. The pavement structure will be strengthened to meet the demands of current traffic volumes and anticipated growth

demand. The new facility will include a two-way left turn lane, a pedestrian pathway, safety lighting, armored erosion control elements, structure guard fence that meet current TxDOT design standards, and associated appurtenances. Street improvements total approximately two thousand one hundred linear feet (2,100). The street improvements will need to be performed under traffic as alternate routes are not available.

Flood and Drainage Facilities: the storm water collection and conveyance capacity through Windy Hill will be increased. Detention of stormwater may be necessary to prevent downstream negative effects. The existing culverts will be removed and replaced, the ditch capacities will be graded as necessary for additional runoff conveyance and storage, the ditches and Richmond Branch channel will be armored to prevent erosion of neighboring homes and infrastructure, minor channel reshaping of grades, aligning of channel may be necessary at Richmond Branch crossing. Channel improvements will not be necessary for this project. No new ROW is needed for this project.

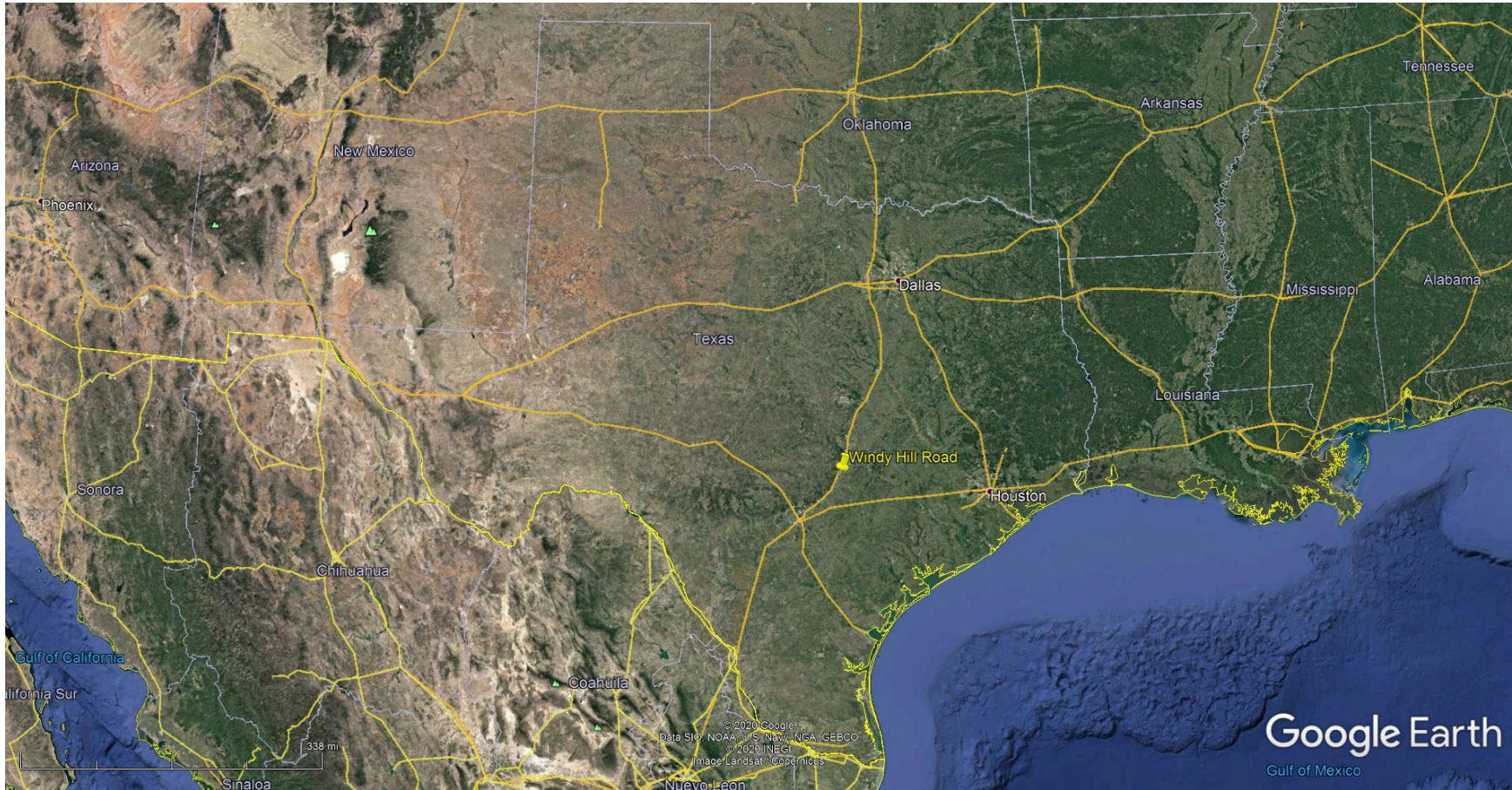
COMPARISON WITH APPLICABLE PLANS:

	Project Is In Compliance		
<u>Factor</u>	Yes	No (Explain)	N.A.
Local Comprehensive Plans Including Land Use and Growth Management Elements	x_____	_____	_____
Area and Regional Plans	x_____	_____	_____
Local Zoning Ordinances	x_____	_____	_____



TAB 5

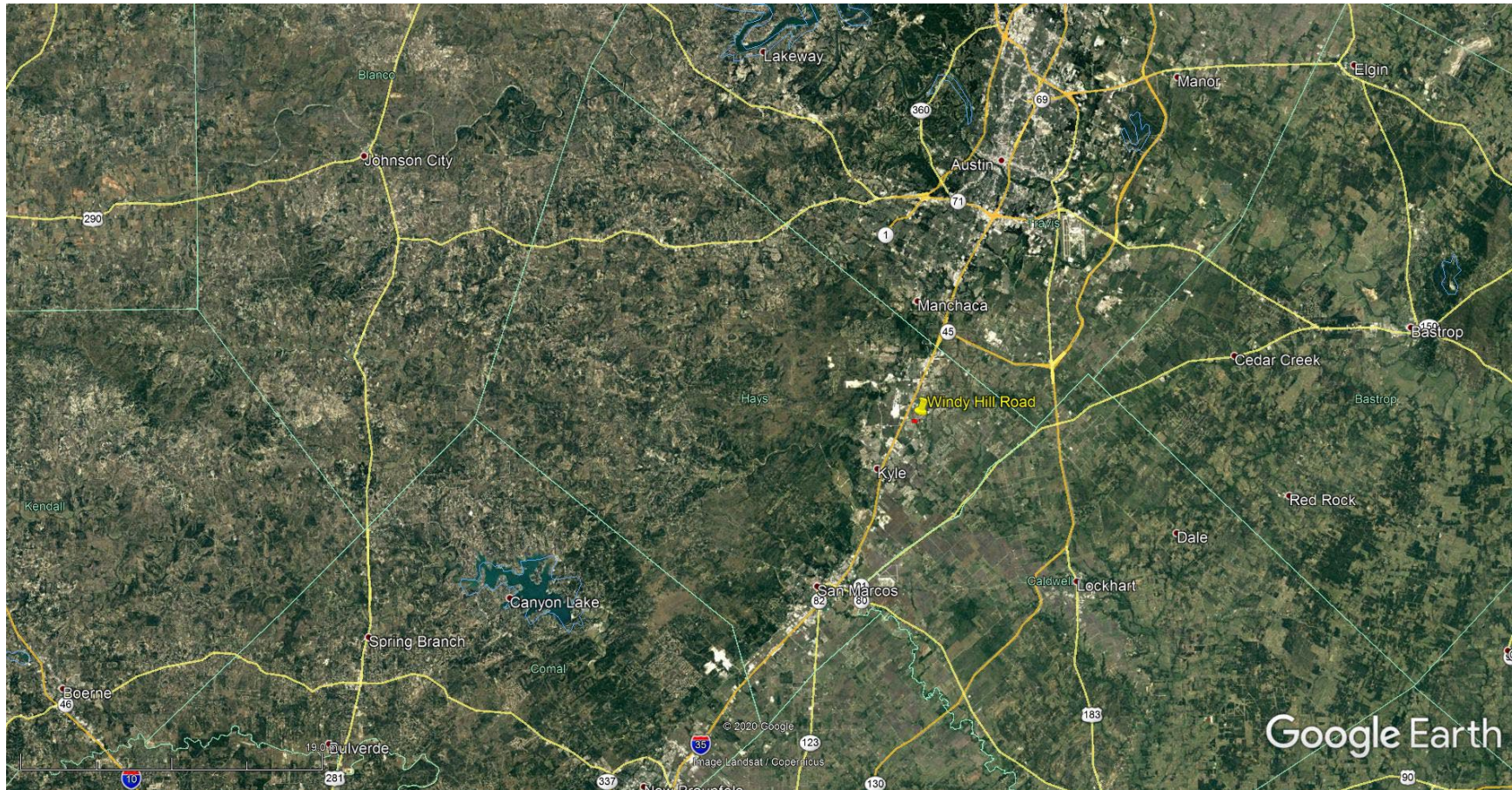
GENERAL PROJECT LOCATION AND AERA OF POTENTIAL EFFECT

- GOOGLE MAP/AERIAL PROJECT BOUNDARIES
 - SITE VISIT PICTURES
 - SITE VISIT NOTES AND
 - PROJECT ENGINEERING





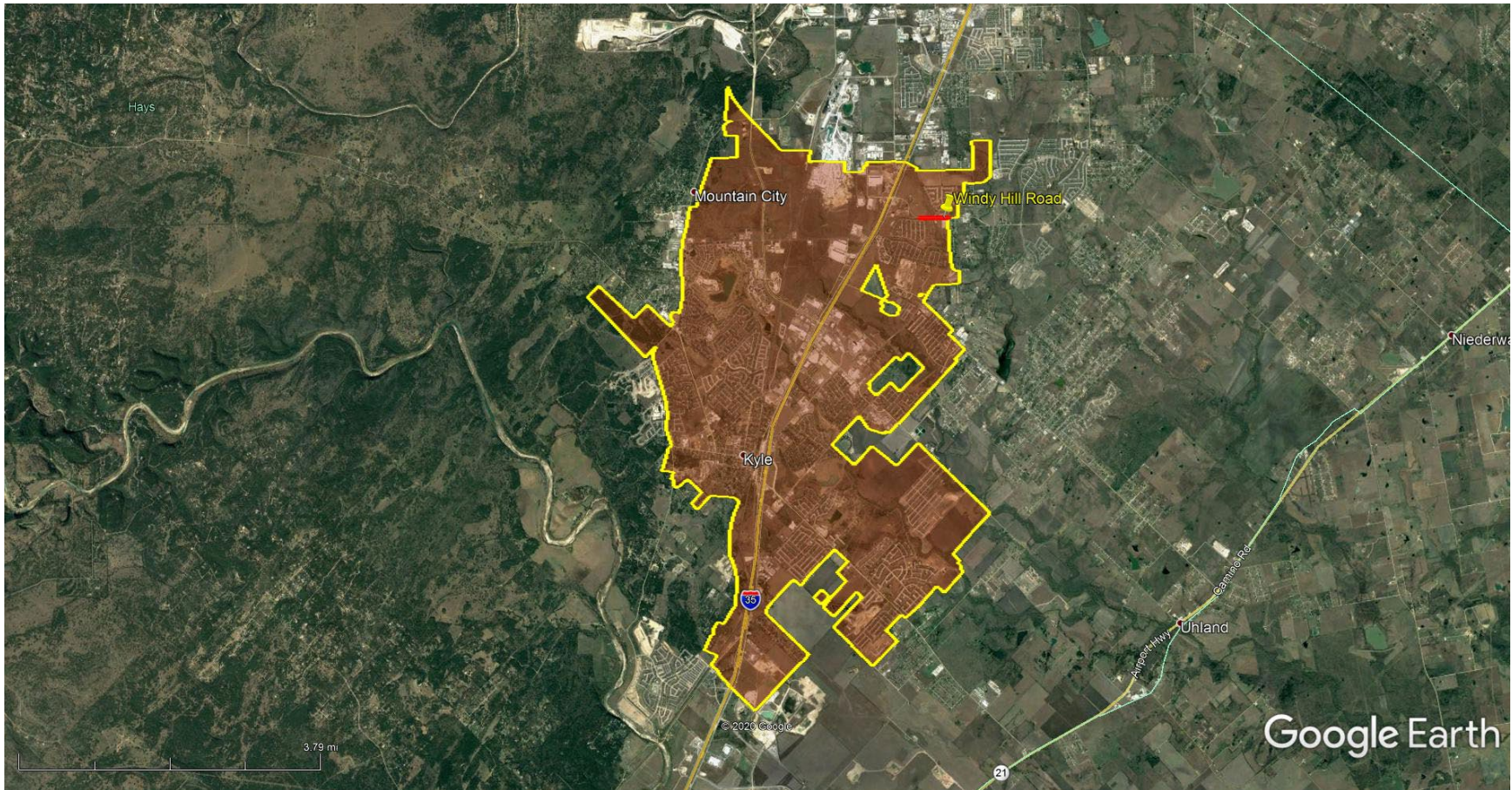
Kyle is located in Texas

Client Name	City of Kyle	Future Link Technologies 	
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709	
Map Information	General Location Maps	512-443-4100	
Date	May 20	Environmental Service Provider	





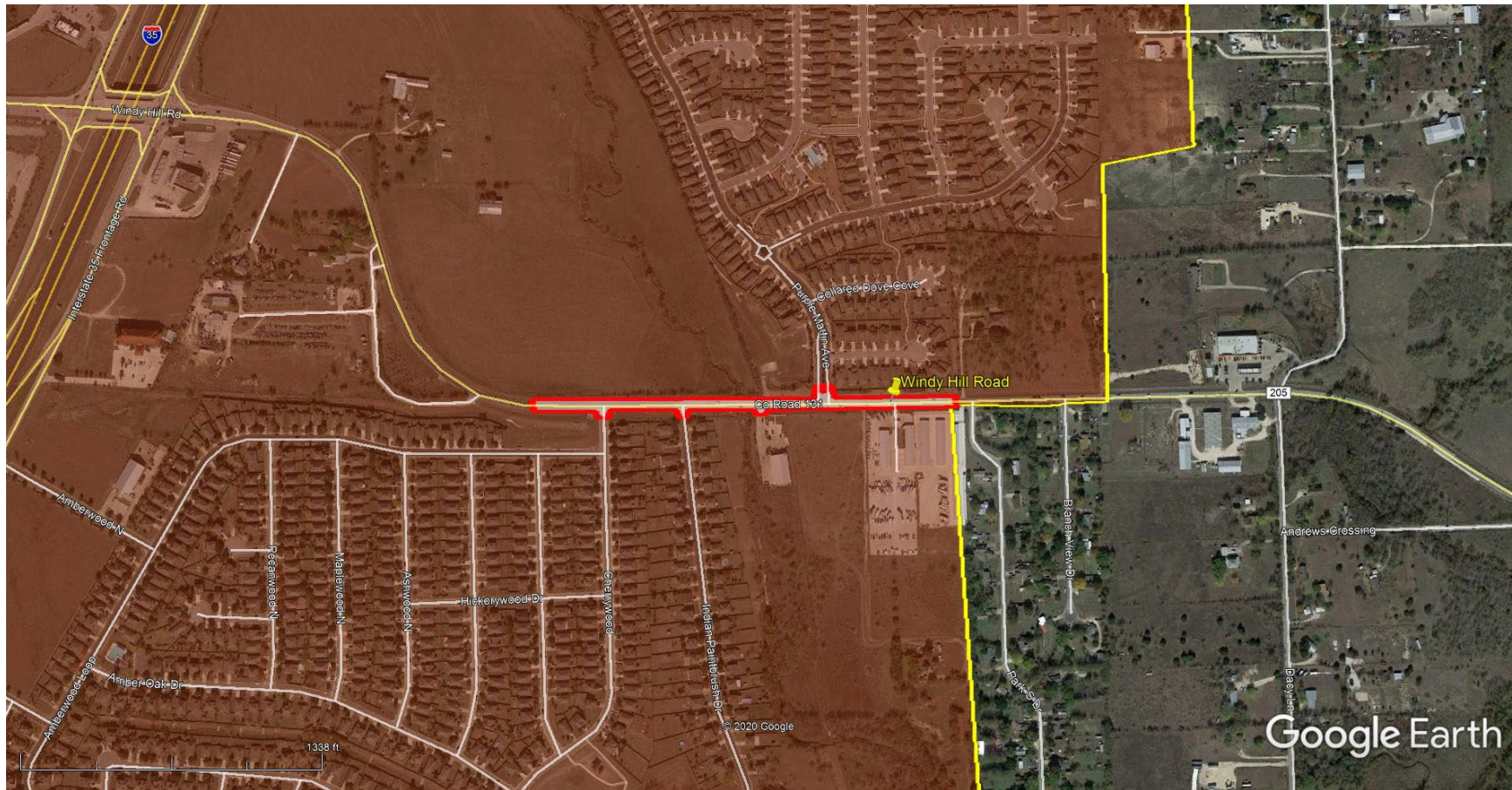
Windy Hill Road is located in Kyle, Hays County Texas

Client Name	City of Kyle	Future Link Technologies 	
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709	
Map Information	General Location Maps	512-443-4100	
Date	May 20	Environmental Service Provider	





Windy Hill Road is located in North Kyle, TX

Client Name	City of Kyle	Future Link Technologies 	
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709	
Map Information	General Location Maps	512-443-4100	
Date	May 20	Environmental Service Provider	



Project area is Windy Hill Road - Approximately 2100 linear feet -500 ft W. of Cherrywood to 500 ft East of Purple Martin Ave

Client Name	City of Kyle	Future Link Technologies 	
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709	
Map Information	General Location Maps	512-443-4100	
Date	May 20	Environmental Service Provider	

**CITY OF KYLE WINDY HILL ROAD - COMMUNITY
DEVELOPMENT BLOCK GRANT - DISASTER RECOVERY
GLO CONTRACT NO. 19-280-000-B779 – CDGB Disaster
Recovery 2015 Flood Allocation**



Cherrywood at Windy Hill Road Intersection - southwestern side of Windy Hill Road

Cherrywood at Windy Hill Road Intersection - southeastern side of Windy Hill Road



Drainage to be replaced at Cherrywood and Windy Hill Road

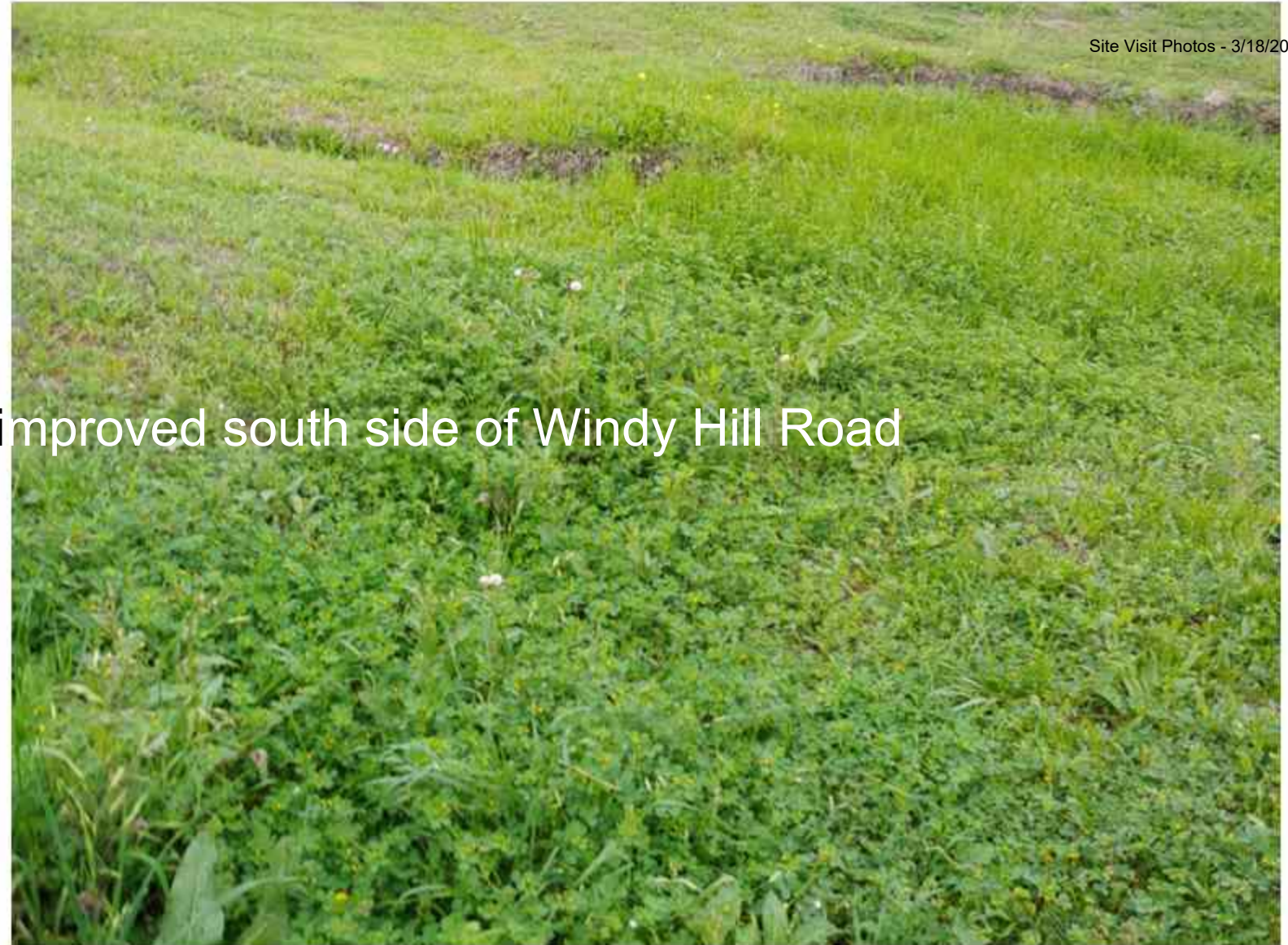


At Cherrywood looking East along South side of Windy Hill Road -





Drainage areas to be regraded and improved south side of Windy Hill Road



Area to be trenched and Graded
Possible Rip/Rap Installed





**South Side of Windy Hill Road Looking East
at Richmond Branch Stream Crossing**





**North Side of Windy Hill Road Looking East
at Richmond Branch Stream Crossing**





**North Side of Windy Hill Road Looking East
at Richmond Branch Stream Crossing**





North Side of Windy Hill

Road Looking East



**North side of Windy Hill at Indian Paintbrush
Looking West**



North Side of Windy Hill at Park South Drive



Windy Hill Road at Park S Drive, Looking East on South Side of Road



Windy Hill Road at Park S Drive, Looking West on South Side of Road



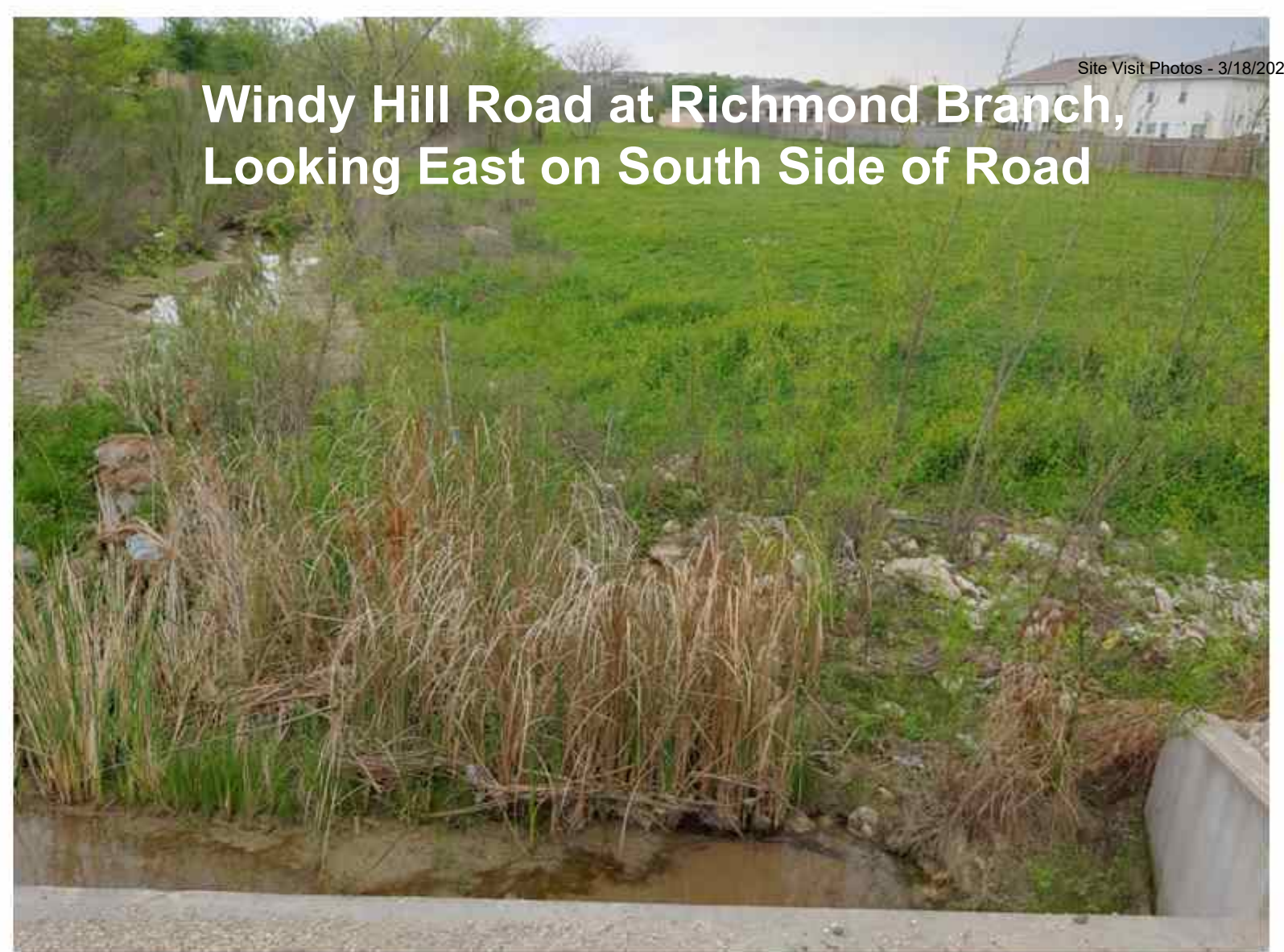
Windy Hill Road at Purple Martin Looking East on South Side of Road



Windy Hill Road at Richmond Branch, Looking East on South Side of Road



**Windy Hill Road at Richmond Branch,
Looking East on South Side of Road**



**Windy Hill Road at Richmond Branch,
Looking East on South Side of Road**



**Windy Hill Road Looking East at Indian
Paintbrush on South Side of Road**



**Windy Hill Road Looking at Indian
Paintbrush on South Side of Road**

SITE-SPECIFIC FIELD CONTAMINATION & ECOLOGICAL CHECKLIST

Completing the form requires a site visit by the preparer. The preparer should be sure to observe the property by walking through the property and the building(s) and other structures on the property to the extent possible and observing all adjoining* properties.

PREPARER MUST COMPLETE CHECKLIST IN ITS ENTIRITY

Date of Visit: 3/18/20

Time: 11:30

Conditions: Overcast and cool.

**Program Name: GLO CONTRACT NO. 19-280-000-B779 – CDGB Disaster Recovery 2015
Flood Allocation**

Project Name: City of Kyle Windy Hill Road Improvements

Does the project include any of the following activities? Include all that apply.

Structure demolition operations or structure modifications.

If yes, is there potential for the building to contain asbestos or lead-based paint? Yes **No**

Pipeline and underground utility installation or adjustments.

De-watering.

Purchase of new ROW or easement.

Trenching, drilled shafts, cuts or other excavations.

Project Location/Address: Windy Hill Road, Kyle, TX - 500 ft. W. of Cherrywood to 500 ft East of Purple Martin Avenue (approximately 2100 lf) 30.031928, -97.836717

Property Owner:

City of Kyle

Attach the following, as appropriate:

Photographs of site and surrounding areas

Maps (street, topographic, aerial, site map, etc.)

QUESTION Is there evidence of any of the following?	OBSERVATION	
	SUBJECT PROPERTY	ADJOINING PROPERTIES
Is the property or any adjoining property currently used, or has evidence of prior use, as a gasoline station, motor vehicle repair facility, printing facility, dry cleaners, photo developing laboratory, junkyard, or as a waste treatment, storage, disposal, processing or recycling facility?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Are there any damaged or discarded automobile(s), automotive or industrial batteries, pesticides, paints, or other chemicals in individual containers greater than 5 gal in volume or 50 gal in the aggregate, stored on or used at the property or adjoining properties?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Are there any industrial drums (typically 55 gal) or sacks of chemicals, herbicides or pesticides located on the property or adjoining properties?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Has fill dirt been brought onto the property or adjoining properties that originated from a suspicious site or that is of an unknown origin?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Changes in drainage patterns from possible fill areas?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Are there any pits, ponds, or lagoons located on the property or adjoining properties in connection with waste treatment or waste disposal?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>

Oil sheen or films on surface water, seeps, lagoons, ponds, or drainage basins?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Is there any stained soil, distressed vegetation and/or discolored water on the property or adjoining properties?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Are there any storage tanks , aboveground or underground (other than residential), located on the property or adjoining properties?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>

*Adjoining properties: Any real property or properties the border of which is contiguous or partially contiguous with that of the property, or that would be contiguous or partially contiguous with that of the property but for a street, road, or other public thoroughfare separating them.

QUESTION	SUBJECT PROPERTY	ADJOINING PROPERTIES
Is there evidence of any of the following?		
Are there any vent pipes, fill pipes, or underground tank access ways visible on the property or adjoining properties?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Are any flooring, drains, walls, ceilings, or grounds on the property or adjoining properties stained by substances (other than water) or emitting noxious or foul odors or odors of a chemical nature?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Is the property served by a private well or non-public water system? (If yes, a follow-up investigation is required to determine if contaminants have been identified in the well or system that exceed guidelines applicable to the water system, or if the well has been designated contaminated by any government environmental/health agency.)	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	
Has the owner or occupant of the property been informed of the existence of past or current hazardous substances or petroleum products or environmental violations with respect to the property or adjoining properties?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Do the property or adjoining properties discharge wastewater (not including sanitary waste or storm water) onto the property or adjoining properties and/or into a storm water system?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Is there a transformer, capacitor, or any hydraulic equipment on the property or adjoining properties that are not marked as "non-PCB"? If so, are there signs of leaking transformers oil on the ground?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Are there injection wells, cisterns, sumps, dry wells flooring, drains, or walls stained by substances other than water or emitting foul odors?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	
Surface dumping of trash, garbage, refuse, rubbish, debris, landfill, stockpiling, storage, etc?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Security fencing, protected areas, placards, warning signs?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Dead animals possibly due to contamination?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	

If answering "YES" or UNKNOWN" to any above items, describe the conditions:

Use photographs and maps to mark and identify conditions. Attach more information as needed.

Is further evaluation warranted? YES NO UNCERTAIN

Ecological Site Information

General Site Description (residential, commercial, forested, grassland, etc.):

The area is primarily residential with two commercial businesses located at the site. The area is along an existing roadway maintained by the City of Kyle.

Water bodies present? If yes, describe (pond, lake, creek, river, wetland, etc.):

Yes, a the Richmond Branch an intermittent stream of Porter Creek crosses under Windy Hill Road.

Special or unique vegetation features?

Possible wetland plants are located at the Richmond Branch culvert.

Special wildlife habitat?

No special wildlife habitat observed.

Observed wildlife:

None.

Observed nests or potential nesting sites?

None

National, state, or locally designated park or natural reserve at, or adjacent to, the project site?

None

Other compliance factors identified on, or adjacent to, project area:

- Historic age buildings Refineries Airports, runways Educational facilities
 Commercial facilities Healthcare facilities Social Services facilities

Preparer of this form must complete the following required information.

This inspection was completed by:

Name: Latrice Hertzler

Title: Environmental Reviewer

Phone Number: 512-443-4100

Email: lhertzler@future-link.biz

Agency:

Address: PO Box 90696, Austin, TX 78709

Preparer represents that to the best of his/her knowledge the above statements and facts are true and correct and to the best of his/her actual knowledge no material facts have been suppressed, omitted or misstated.

Signature:

Date:

STREET IMPROVEMENTS	LOCATION APPROXIMATE LAT/LONG	PROPOSED HUD PERFORMANCE MEASURE	CENSUS TRACT	BLOCK GROUP
WINDY HILL ROAD	500 FT. W. OF CHERRYWOOD TO 500 FT. EAST OF PURPLE MARTIN AVENUE 30.031928, -97.836717	2,100 LF	0109.08 0109.07	02 03

PLANS OF PROPOSED STREET AND CULVERT RECONSTRUCTION WINDY HILL RD

FULL STREET RECONSTRUCTION FROM CHERRYWOOD TO PARK S DR
TOTAL ROADWAY LENGTH = 1,970.31 FT, 0.373 MILES

STREET IMPROVEMENTS SHALL RECONSTRUCT A PORTION OF WINDY HILL ROAD BY REMOVING AND REPLACING THE ROADWAY, APPROACHES, WIDENING THE ROADWAY PAVEMENT AND STRUCTURE TO ADD TURN LANE CAPACITY, INSTALLING RAILING AND END TREATMENTS THAT MEET TXDOT STANDARDS.
FLOOD AND DRAINAGE FACILITIES SHALL INCREASE STORM WATER COLLECTION CAPACITY BY INCREASING CHANNEL CONVEYANCE CAPABILITIES, REMOVE AND REPLACE EXISTING CULVERTS WITH DRAINAGE STRUCTURES, ARMOR THE CHANNEL AND DITCHES AS SHOWN ON THE PLANS, PERFORM MINOR CHANNEL WORK UP AND DOWNSTREAM OF THE CROSSING AT WINDY HILL ROAD AND COMPLETE ASSOCIATED APPURTENANCES.

DESIGN SPEED

40 MPH

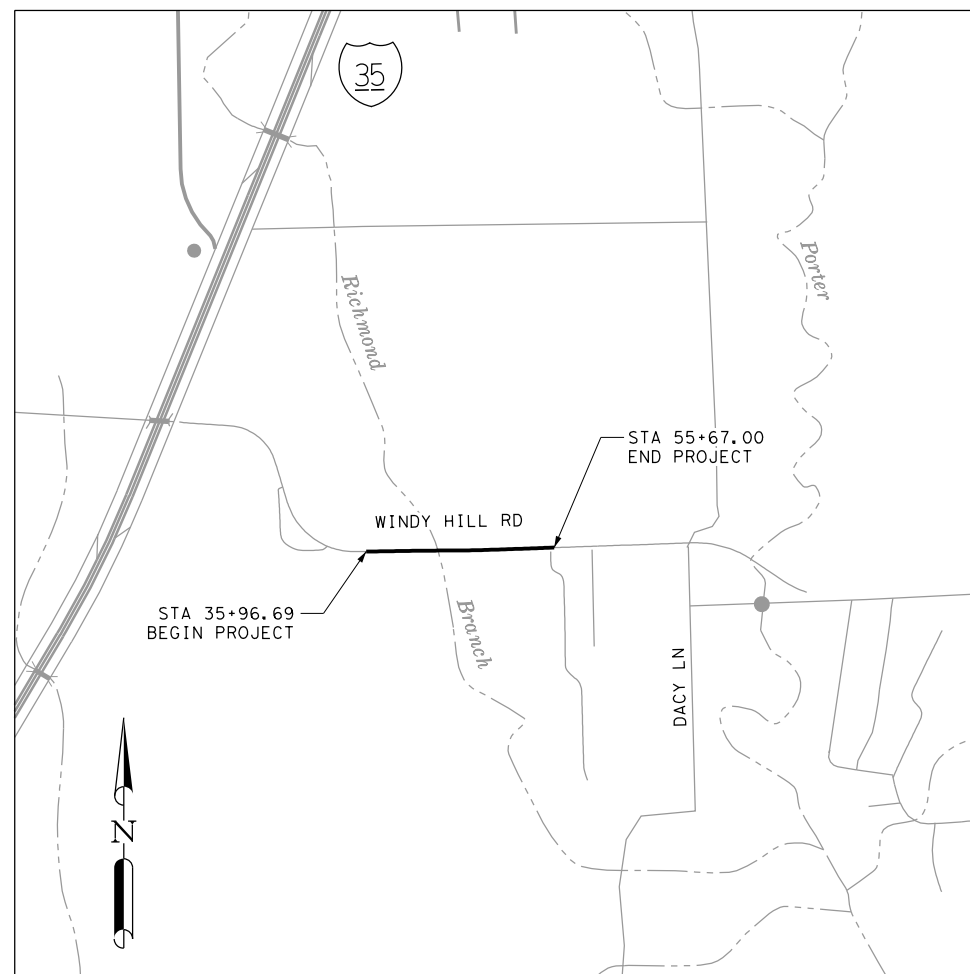
A. D. T.

2020: 13,522 VPD
2040: 21,638 VPD

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	SUPPLEMENTAL INDEX OF SHEETS

LOCATION MAP



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
ZACHARY B. RYAN
TEXAS REGISTRATION 106276
DATE: 7/10/2020
IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.

SCALE: NTS

NO EQUATIONS
NO EXCEPTIONS

GLO CONTRACT# 19-280-000-B779

CITY COUNCIL

TRAVIS MITCHELL	MAYOR
DEX ELLISON	COUNCIL MEMBER DISTRICT 1
TRACY SCHEEL	COUNCIL MEMBER DISTRICT 2
ROBERT RIZO	COUNCIL MEMBER DISTRICT 3
ALEX VILLALOBOS	COUNCIL MEMBER DISTRICT 4
RICK KOCK (MAYOR PRO-TEM)	COUNCIL MEMBER DISTRICT 5
MICHAEL TOBIAS	COUNCIL MEMBER DISTRICT 6

SUBMITTED FOR LETTING:

//****
PROJECT MANAGER _____ DATE

LJA ENGINEERING, INC.

APPROVED FOR CONSTRUCTION:

CITY OF KYLE CITY ENGINEER DATE



GENERAL

1	TITLE PAGE
2	INDEX OF SHEETS
3 - 5	PROJECT LAYOUT SHEETS
6 - 7	TYPICAL SECTIONS
8 - 80	GENERAL NOTES AND SPECIFICATION DATA
9 - 11	SUMMARY OF QUANTITIES
12	SMALL SIGN SUMMARY

TRAFFIC CONTROL DETAILS

13	TRAFFIC CONTROL NARRATIVE & TYPICAL SECTIONS
14	TRAFFIC CONTROL PLAN PHASE 1 DETOUR MAP
15 - 16	TRAFFIC CONTROL PLAN PHASE 1
17 - 19	TRAFFIC CONTROL PLAN PHASE 2
20 - 22	TRAFFIC CONTROL PLAN PHASE 3

TRAFFIC CONTROL STANDARDS

23 - 34	BC-14
35 - 36	LPCB-13
37	TCP(2-1)-18
38	TCP(2-2)-18
39	TCP(2-3)-18
40	TCP(3-1)-13
41	TCP(3-3)-13
42	WZ(BRK)-13
43	WZ(BTS-1)-13
44	WZ(BTS-2)-13
45	WZ(RCD)-13
46	WZ(STPM)-13
47	WZ(TD)-17

ROADWAY DETAILS

48 - 49	REMOVAL PLANS
50	HORIZONTAL ALIGNMENT DATA
51 - 52	SURVEY CONTROL
53 - 55	ROADWAY PLAN & PROFILE
56 - 58	INTERSECTION GRADING PLAN
59	CCCG-12

ROADWAY STANDARDS

60	GF(31)MS-19
61	GF(31)-19
62	SGT(8)31-14
63	SGT(8S)31-14
64	SGT(9S)31-14
65 - 68	MB-15(1)
69 - 72	PED-18
73 - 75	T-223
76 - 77	T-551

DRAINAGE DETAILS

78 - 79	DRAINAGE AREA MAP
80 - 84	HYDRAULIC DATA
85 - 86	HYDRAULIC DATA 10 YR
87 - 88	HYDRAULIC DATA 100 YR
89	HYDRAULIC DATA DITCHES
90 - 93	CULVERT PLAN & PROFILE
94 - 96	DRAINAGE PLAN & PROFILE

DRAINAGE STANDARDS

97	BCS
98	ECD
99	PBGC
100	PB
101	PAZD
102	PAZD-CZ
103	PW
104 - 105	RAC
106	SCP-7
107	SCP-8
108	SCP-MD
109 - 110	SETB-PD
111	SETP-PD

UTILITY LAYOUTS

112 - 114	UTILITY LAYOUTS
-----------	-----------------

SIGNING AND PAVEMENT MARKING DETAILS

115 - 117	SIGNING & PAVEMENT MARKING SHEETS
-----------	-----------------------------------

SIGNING AND PAVEMENT MARKINGS STANDARDS

118	SMD(GEN)-08
119	SMD(SLIP-1)-08
120	SMD(SLIP-2)-08
121	SMD(SLIP-3)-08
122	D & OM(1)-15
123	D & OM(2)-15
124	D & OM(3)15b
125	D & OM(4)-15
126	D & OM(5)-15
127	PM(1)-20
128	PM(2)-20
129	PM(3)-20

ILLUMINATION

130	ILLUMINATION LAYOUT
-----	---------------------

ILLUMINATION STANDARDS

131	ED(1)-14
132	ED(3)-14
133	ED(4)-14
134	ED(5)-14
135	ED(6)-14
136	ED(7)-14
137	ED(10)-14
138	ED(11)-14
139	ED(12)-14
140	RID(1)-17
141	RID(2)-17
142	RID(3)-17
143	RIP(1)-19
144	RIP(2)-19
145	RIP(3)-19
146	RIP(4)-19

EROSION CONTROL DETAILS

147 - 148	SW3P PLAN LAYOUT
-----------	------------------

EROSION CONTROL STANDARDS

149	EC(1)-16
150	EC(2)-16
151	EC(3)-16

CROSS SECTIONS

152 - 164	CROSS SECTIONS
-----------	----------------

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN-F-1386

**WINDY HILL ROAD
 INDEX
 OF SHEETS**

GLO Contract# 19-280-000-B779

DESIGN BY:	SCALE
DRAWN BY:	HORIZONTAL:
CHECKED BY:	VERTICAL:
APPROVED BY:	SHEET: 1 OF 1
PROJECT NO: 2173.2001	PAGE: 2
DATE: 7/10/2020	

LEGEND

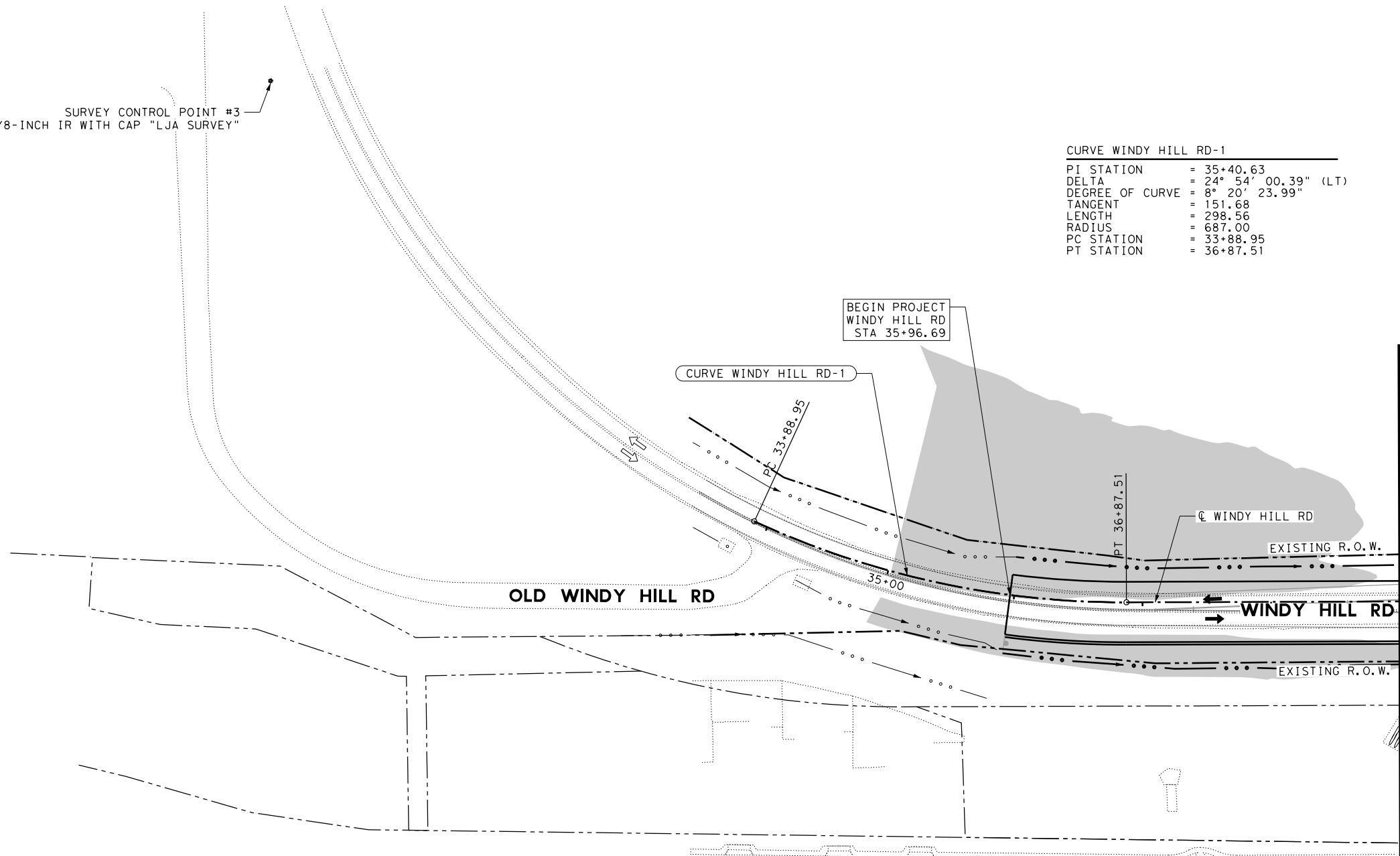
-  EXISTING R.O.W.
-  EXISTING EASEMENT
-  EXISTING 100 YR FLOODPLAIN

CURVE WINDY HILL RD-1
 PI STATION = 35+40.63
 DELTA = 24° 54' 00.39" (LT)
 DEGREE OF CURVE = 8° 20' 23.99"
 TANGENT = 151.68
 LENGTH = 298.56
 RADIUS = 687.00
 PC STATION = 33+88.95
 PT STATION = 36+87.51



0' 25' 50' 100'
 SCALE: 1"=100'

SURVEY CONTROL POINT #3
 CP SET 5/8-INCH IR WITH CAP "LJA SURVEY"



THIS DOCUMENT IS RELEASED FOR THE
 PURPOSE OF INTERIM REVIEW ONLY
 UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING,
 CONSTRUCTION, OR PERMIT PURPOSES.



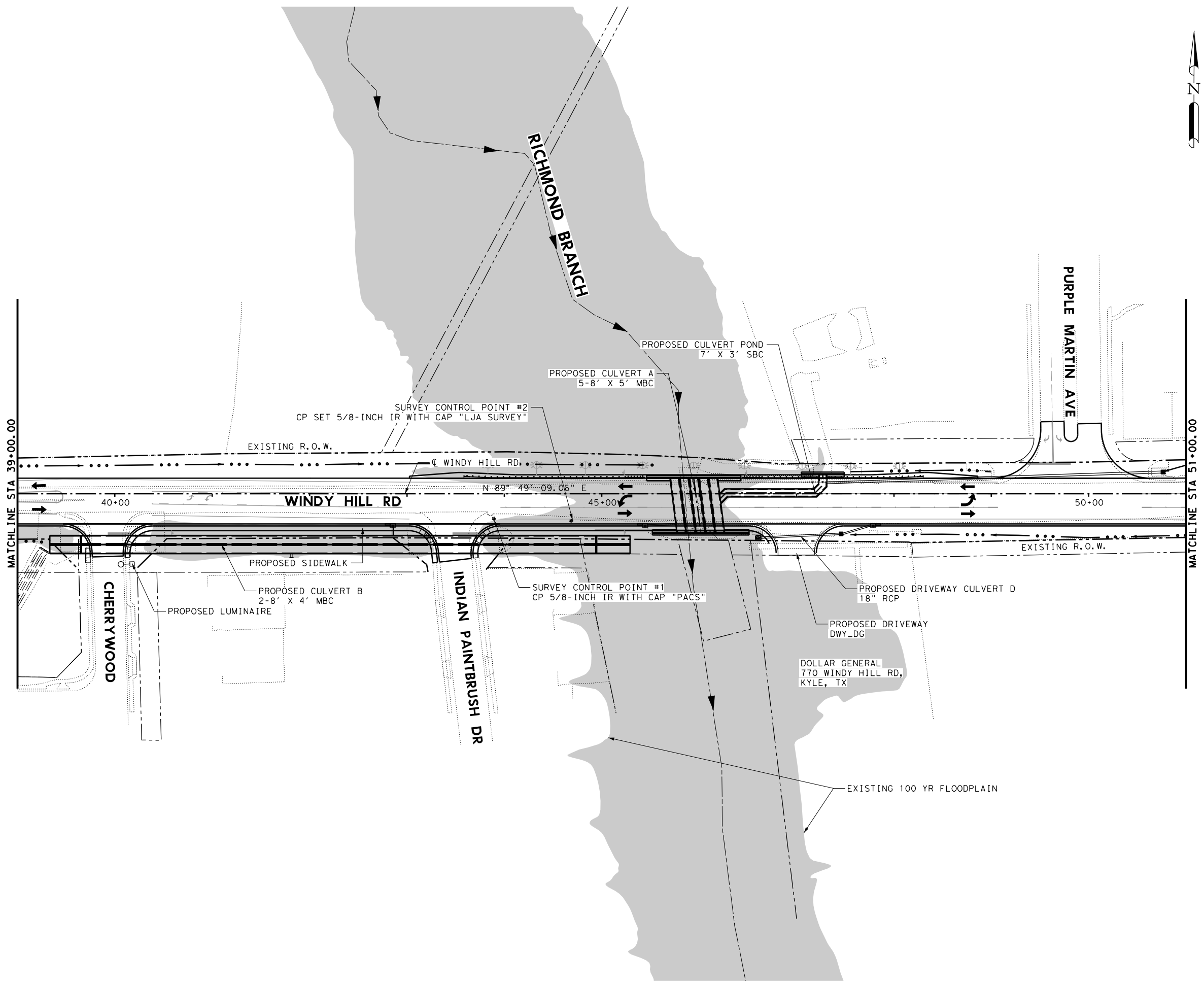
LJA Engineering, Inc.
 FRN - F-1386

**WINDY HILL ROAD
 PROJECT LAYOUT
 SHEETS**
 BEGIN TO STA 39+00

GLO Contract# 19-280-000-B779		SCALE 1"=100'
DESIGN BY: AM	HORIZONTAL:	SHEET: 1 OF 3
DRAWN BY: AM	VERTICAL:	
CHECKED BY: ZR		
APPROVED BY:		
PROJECT NO: 2173.2001		
DATE: 7/10/2020		PAGE: 3

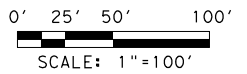
7/10/2020 4:43:22 PM I:\2173\2001\CADD\SHEETS\01 - General\WH*PROJECT*LAYOUT*01.dgn

7/10/2020
 4:43:23 PM
 I:\2173\2001\CADD\SHEETS\01 - General\WH*PROJECT*LAYOUT*02.dgn



LEGEND

	EXISTING R.O.W.
	EXISTING EASEMENT
	EXISTING 100 YR FLOODPLAIN



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



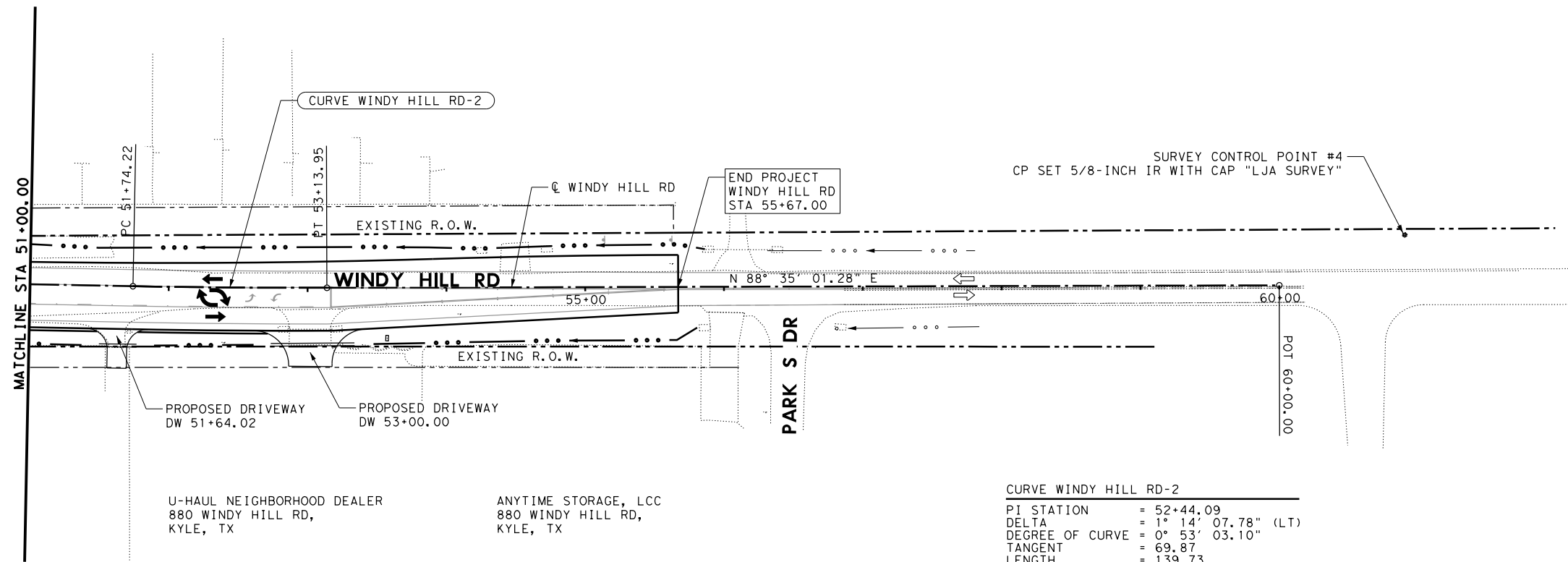
LJA Engineering, Inc.
 FRN - F-1386

**WINDY HILL ROAD
 PROJECT LAYOUT
 SHEETS**
 STA 39+00 TO STA 51+00

GLO Contract# 19-280-000-B779

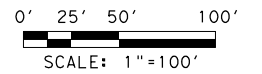
DESIGN BY:	AM	SCALE	1"=100'
DRAWN BY:	AM	HORIZONTAL:	
CHECKED BY:	ZR	VERTICAL:	
APPROVED BY:		SHEET:	2 OF 3
PROJECT NO:	2173.2001	PAGE:	4
DATE:	7/10/2020		

7/10/2020 4:43:23 PM I:\2173\2001\CADD\SHEETS\01 - General\WH*PROJECT*LAYOUT*03.dgn



LEGEND

- EXISTING R.O.W.
- EXISTING EASEMENT
- EXISTING 100 YR FLOODPLAIN



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN-F-1386

**WINDY HILL ROAD
 PROJECT LAYOUT
 SHEETS**
 STA 51+00 TO END

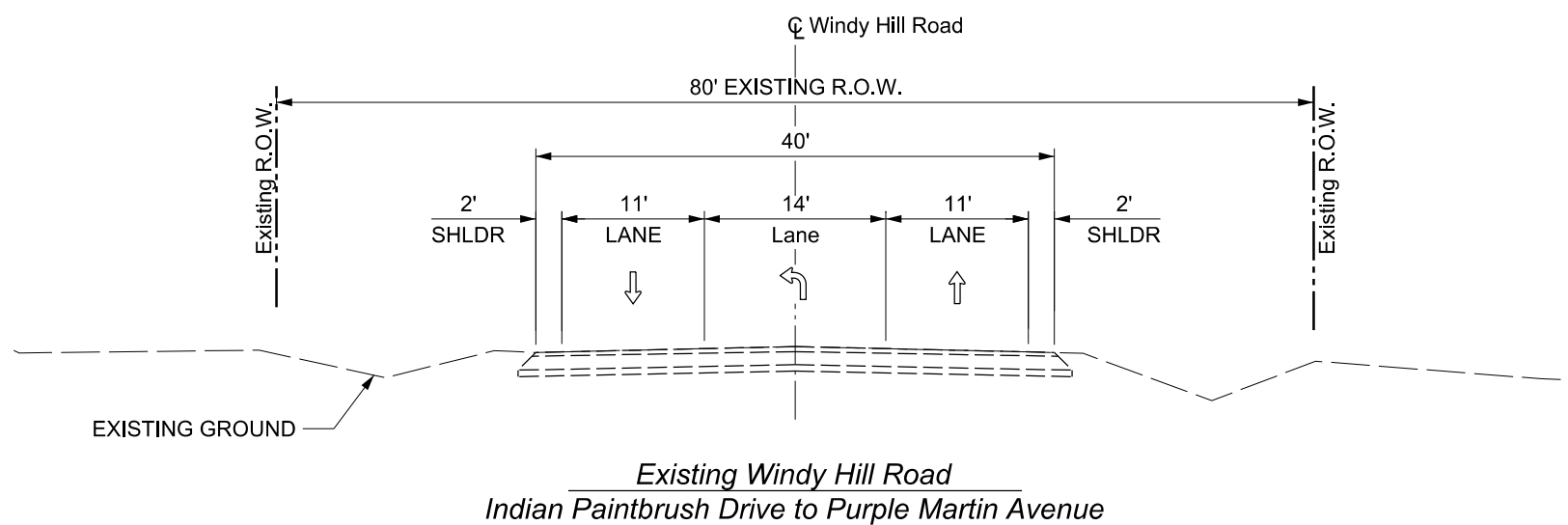
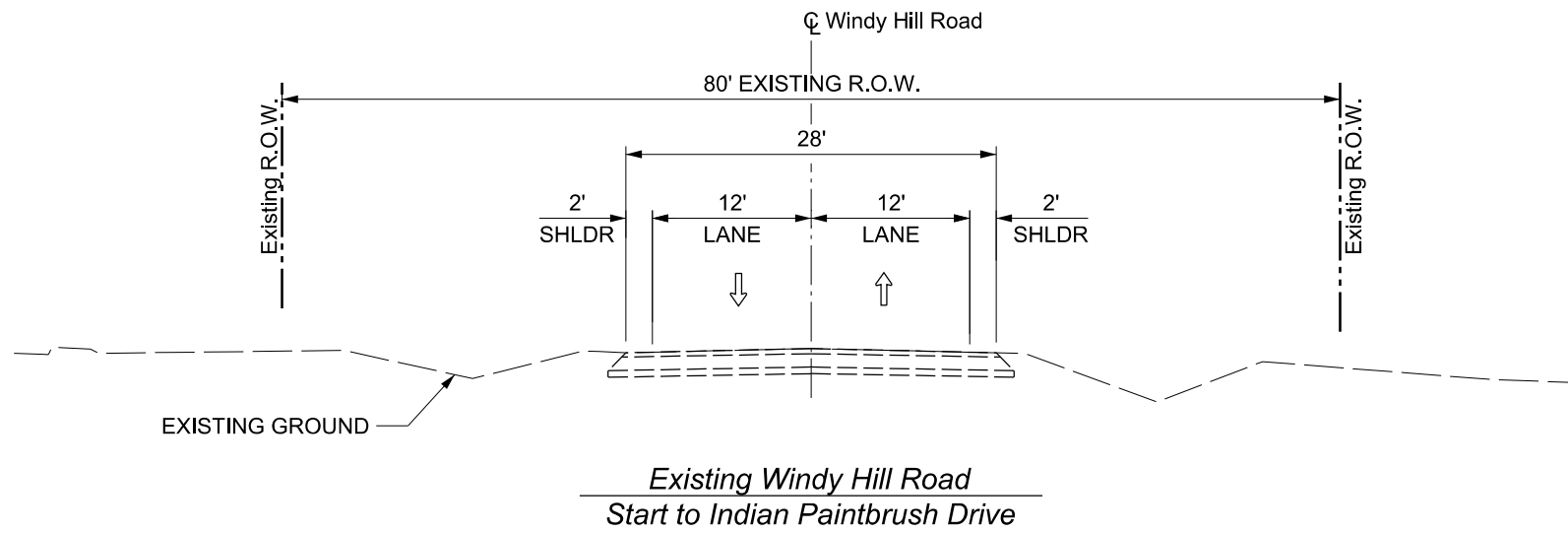
GLO Contract# 19-280-000-B779

DESIGN BY:	AM	SCALE	1"=100'
DRAWN BY:	AM	HORIZONTAL:	
CHECKED BY:	ZR	VERTICAL:	
APPROVED BY:		SHEET:	3 OF 3
PROJECT NO:	2173.2001	PAGE:	5
DATE:	7/10/2020		

CURVE WINDY HILL RD-2

PI STATION	= 52+44.09
DELTA	= 1° 14' 07.78" (LT)
DEGREE OF CURVE	= 0° 53' 03.10"
TANGENT	= 69.87
LENGTH	= 139.73
RADIUS	= 6,480.00
PC STATION	= 51+74.22
PT STATION	= 53+13.95

7/10/2020
 4:43:24 PM
 I:\2173\2001\CADD\SHEETS\01 - General\WH* TYP01.dgn



THIS DOCUMENT IS RELEASED FOR THE
 PURPOSE OF INTERIM REVIEW ONLY
 UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING,
 CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN - F-1386

WINDY HILL ROAD
TYPICAL SECTIONS
EXISTING

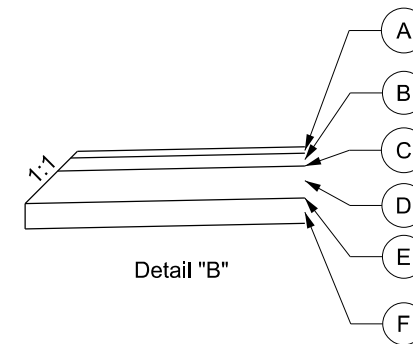
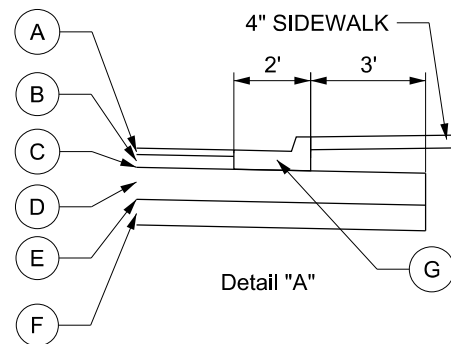
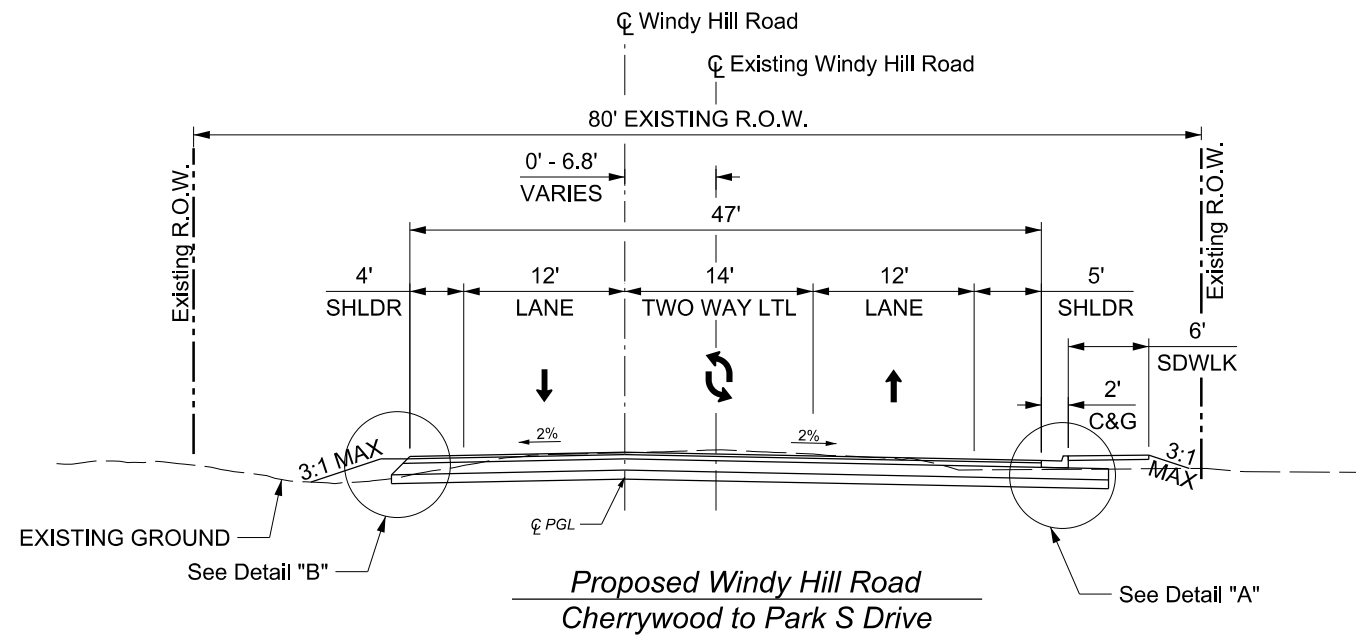
GLO Contract# 19-280-000-B779

DESIGN BY: AM
 DRAWN BY: AM
 CHECKED BY: ZR
 APPROVED BY:
 PROJECT NO: 2173.2001
 DATE: 7/10/2020

SCALE
 HORIZONTAL:
 VERTICAL:
 SHEET: 1 OF 2
 PAGE: 6

LEGEND

- (A) 1.5" DG TY-D HMAC SAC-B (PG 76-22)
(EST @ 110 LB/SY/IN)
- (B) 4.5" DG TY-B HMAC (PG 64-22)
(EST @ 110 LB/SY/IN)
- (C) PRIME COAT (MULTI-OPTION) (EST @ 0.2 GAL/SY)
- (D) 10" FLEX BASE (TY A GR 5)
(2=LIFTS) (1.823 TONS/CY)
- (E) GEOGRID BASE REINFORCEMENT TYPE II
- (F) 8" LIME TREATED SUBGRADE
(HYDRATED LIME (SLURRY) @ 7%)
- (G) TY II CURB AND GUTTER



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN - F-1386

**WINDY HILL ROAD
 TYPICAL SECTIONS
 PROPOSED**

GLO Contract# 19-280-000-B779

DESIGN BY: AM
 DRAWN BY: AM
 CHECKED BY: ZR
 APPROVED BY:
 PROJECT NO: 2173.2001
 DATE: 7/10/2020

SCALE
 HORIZONTAL:
 VERTICAL:
 SHEET: 2 OF 2
 PAGE: 7

7/10/2020 4:43:24 PM I:\2173\2001\CADD\SHEETS\01 - General\WH*QTY*01.dgn

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS												
LOCATION	502 6001	508 6001	512 6009	512 6010	512 6033	512 6034	512 6057	512 6058	662 6004	662 6034	677 6001	677 6002
	BARRICADES, SIGNS AND TRAFFIC HANDLING	CONSTRUCTING DETOURS	PORT CTB (FUR & INST) (LOW PROF) (TY 1)	PORT CTB (FUR & INST) (LOW PROF) (TY 2)	PORT CTB (MOVE) (LOW PROF) (TY 1)	PORT CTB (MOVE) (LOW PROF) (TY 2)	PORT CTB (REMOVE) (LOW PROF) (TY 1)	PORT CTB (REMOVE) (LOW PROF) (TY 2)	WK ZN PAV MRK NON-REMOV (W) 4" (SLD)	WK ZN PAV MRK NON-REMOV (Y) 4" (SLD)	ELIM EXT PAV MRK & MRKS (4")	ELIM EXT PAV MRK & MRKS (6")
	MO	SY	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF
PHASE 1	1	448	0	0	0	0	0	0	800	1336	2400	0
PHASE 2	3	31	1540	240	0	0	0	0	4582	4594	8628	279
PHASE 3	3	0	440	0	1540	80	0	160	4788	4790	0	0
PHASE 4	1	0	0	0	0	0	1980	80	0	0	0	0
PROJECT TOTALS	8	479	1980	240	1540	80	1980	240	10170	10720	11028	279

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS, CONT.				
LOCATION	677 6005	677 6008	677 6012	6001 6001
	ELIM EXT PAV MRK & MRKS (12")	ELIM EXT PAV MRK & MRKS (ARROW)	ELIM EXT PAV MRK & MRKS (WORD)	PORTABLE CHANGEABLE MESSAGE SIGN
	LF	EA	EA	DAY
PHASE 1	0	0	0	63
PHASE 2	144	2	2	0
PHASE 3	0	0	0	0
PHASE 4	0	0	0	0
PROJECT TOTALS	144	2	2	63

SUMMARY OF REMOVAL ITEMS													
LOCATION	104 6001	104 6009	104 6015	104 6017	104 6022	105 6015	496 6001	496 6004	496 6005	496 6007	496 6050	506 6012	542 6001
	REMOVING CONC (PAV)	REMOVING CONC (RIPRAP)	REMOVING CONC (SIDEWALKS)	REMOVING CONC (DRIVEWAYS)	REMOVING CONC (CURB AND GUTTER)	REMOVING STAB BASE & ASPH PAV (8"-10")	REMOV STR (BOX CULVERT)	REMOV STR (SET)	REMOV STR (WINGWALL)	REMOV STR (PIPE)	REMOV STR (DRIVEWAY CULVERT)	ROCK FILTER DAMS (REMOVE)	REMOVE METAL BEAM GUARD FENCE
	SY	SY	SY	SY	LF	SY	EA	EA	EA	LF	EA	CY	LF
BEGIN TO STA 39+00	0	0	0	0	0	898	0	0	0	0	0	0	0
STA 39+00 TO STA 51+00	207	214	73	149	131	5214	9	10	6	39	1	61	653
STA 51+00 TO END	0	0	0	94	0	1473	0	2	0	0	1	0	0
PROJECT TOTALS	207	214	73	243	131	7585	9	12	6	39	2	61	653

THIS DOCUMENT IS RELEASED FOR THE
PURPOSE OF INTERIM REVIEW ONLY
UNDER THE AUTHORITY OF:
ZACHARY B. RYAN
TEXAS REGISTRATION 106276
DATE: 7/10/2020
IT IS NOT TO BE USED FOR BIDDING,
CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
FRN-F-1386

**WINDY HILL ROAD
SUMMARY OF
QUANTITIES**

GLO Contract# 19-280-000-B779

DESIGN BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
PROJECT NO: 2173.2001
DATE: 7/10/2020

SCALE
HORIZONTAL:
VERTICAL:
SHEET: 1 OF 3
PAGE: 9

7/10/2020 4:43:25 PM I:\2173\2001\CADD\SHEETS\01 - General\WH*QTY*02.dgn

SUMMARY OF ROADWAY ITEMS													
LOCATION	110 6001	132 6005	260 6002	260 6027	247 6366	310 6001	341 6008	341 6048	432 6002	432 6045	450 6006	450 6014	529 6008
	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY C)	LIME (HYDRATED LIME (SLURRY))	LIME TRT (EXST MATL) (8")	FL BS (CMP IN PLC) (TY A GR 5) (FNAL POS)	PRIME COAT (MULTI OPTION)	D-GR HMA TY-B PG64-22	D-GR HMA TY-D SAC-B PG76-22	RIPRAP (CONC) (5 IN)	RIPRAP (MOW STRIP) (4 IN)	RAIL (TY T223)	RAIL (TY T551)	CONC CURB & GUTTER (TY I1)
	CY	CY	TON	SY	CY	GAL	TON	TON	CY	CY	LF	LF	LF
BEGIN TO STA 39+00	232	621	41	1791	498	359	414	138	0	0	0	0	355
STA 39+00 TO STA 51+00	3124	2331	187	8089	2247	1618	1759	542	6.1	72	105	159	1337
STA 51+00 TO END	549	338	64	2786	774	558	656	217	0	0	0	0	144
PROJECT TOTALS	3905	3290	292	12666	3519	2535	2829	897	6.1	72	105	159	1836

SUMMARY OF ROADWAY ITEMS CONT'D								
LOCATION	530 6014	531 6001	531 6005	540 6001	540 6006	544 6001	560 6001	5001 6002
	DRIVEWAYS AND TURNOUTS (ACP)	CONC SIDEWALKS (4")	CURB RAMPS (TY 2)	MTL W-BEAM GD FEN (TIM POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)	GUARDRAIL END TREATMENT (INSTALL)	MAILBOX INSTALL-S (TWG-POST) TY 1	GEOGRID BASE REINFORCEMENT (TY I1)
	SY	SY	EA	LF	EA	EA	EA	SY
BEGIN TO STA 39+00	0	0	0	0	0	0	0	1791
STA 39+00 TO STA 51+00	0	447	4	226	2	2	0	8088
STA 51+00 TO END	55	0	0	0	0	0	1	2786
PROJECT TOTALS	55	447	4	226	2	2	1	12665

SUMMARY OF DRAINAGE ITEMS							
CROSS CULVERT SHEET	401 6001	432 6007	432 6030	462 6019	462 6020	466 6183	467 6282
	FLOWABLE BACKFILL	RIPRAP (CONC) (CL C)	RIPRAP (STONE COMMON) (GROU T) (12 IN)	CONC BOX CULV (8 FT X 4 FT)	CONC BOX CULV (8 FT X 5 FT)	WINGWALL (PW - 1) (HW=8 FT)	SET (TY I) (S= 8 FT) (HW= 6 FT) (G:1) (P)
	CY	CY	CY	LF	LF	EA	EA
CULVERT A	5		251		290	2	
CULVERT B		4	20	1060			4
PROJECT TOTALS	5	4	271	1060	290	2	4

SUMMARY OF DRAINAGE ITEMS CONT'D							
LOCATION	462 6014	464 6003	464 6005	465 6014	465 6015	465 6158	466 6181
	CONC BOX CULV (7 FT X 3 FT)	RC PIPE (CL I11) (18 IN)	RC PIPE (CL I11) (24 IN)	INLET (COMPL) (PCO) (3FT) (LEFT)	INLET (COMPL) (PCO) (3FT) (RIGHT)	INLET (COMPL) (P AZD) (FG) (3FT X3FT-3FTX3FT)	WINGWALL (PW - 1) (HW=6 FT)
	LF	LF	LF	EA	EA	EA	EA
BEGIN TO STA 39+00							
STA 39+00 TO STA 51+00	124	160	344	2	1	3	1
STA 51+00 TO END							
PROJECT TOTALS	124	160	344	2	1	3	1

THIS DOCUMENT IS RELEASED FOR THE
PURPOSE OF INTERIM REVIEW ONLY
UNDER THE AUTHORITY OF:
ZACHARY B. RYAN
TEXAS REGISTRATION 106276
DATE: 7/10/2020
IT IS NOT TO BE USED FOR BIDDING,
CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
FRN-F-1386

**WINDY HILL ROAD
SUMMARY OF
QUANTITIES**

GLO Contract# 19-280-000-B779

DESIGN BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
PROJECT NO: 2173.2001
DATE: 7/10/2020

SCALE
HORIZONTAL:
VERTICAL:
SHEET: 2 OF 3
PAGE: 10

SUMMARY OF PAVEMENT MARKING ITEMS									
LOCATION	666 6011	666 6035	666 6047	666 6053	666 6125	672 6009	666 6205	658 6067	658
	REFL PAV MRK TY I (W) 4" (SLD) (090MIL)	REFL PAV MRK TY I (W) 8" (SLD) (090MIL)	REFL PAV MRK TY I (W) 24" (SLD) (090MIL)	REFL PAV MRK TY I (W) (ARROW) (090MIL)	REFL PAV MRK TY I (Y) 4" (SLD) (090MIL)	REFL PAV MRKR TY II-A-A	REFL PAV MRK TY II (Y) 4" (BRK)	IN STL DEL ASSM (D-DW) SZ 1 (BRF) GF2	IN STL DEL ASSM (D-DW) (SZ 1 (BRF) CTB
		LF	LF	EA		EA	LF	EA	EA
BEGIN TO STA 39+00	1126				1506	33			
STA 39+00 TO STA 51+00	2064	44	95	4	1830	46	420	3	6
STA 51+00 TO END	1509			2	2023	46	110		
PROJECT TOTALS	4699	44	95	6	5359	125	530	3	6

SUMMARY OF EROSION CONTROL ITEMS											
LOCATION	160 6003	164 6003	164 6009	164 6011	166 6002	168 6001	506 6003	506 6004	506 6011	506 6020	506 6024
	FURNISHING AND PLACING TOPSOIL (4")	BROADCAST SEED (PERM) (RURAL) (CLAY)	BROADCAST SEED (TEMP) (WARM)	BROADCAST SEED (TEMP) (COOL)	FERTILIZER	VEGETATIVE WATERING	ROCK FILTER DAMS (INSTALL) (TY 3)	ROCK FILTER DAMS (INSTALL) (TY 4)	ROCK FILTER DAMS (REMOVE)	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)
	SY	SY	SY	SY	TON	MG	LF	LF	LF	SY	SY
BEGIN TO STA 39+00	1084	1084	271	271	0.07	22	20		20		
STA 39+00 TO STA 51+00	4816	4816	1204	1204	0.31	97	100	280	100		
STA 122+00 TO END	1622	1622	406	406	0.11	33	40		40		
PROJECT TOTALS	7522	7522	1881	1881	0.49	152	160	280	160	200	200

SUMMARY OF EROSION CONTROL ITEMS (CONT'D)				
LOCATION	506 6038	506 6039	506 6041	506 6043
	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)
	LF	LF	LF	LF
BEGIN TO STA 39+00	308	308		
STA 39+00 TO STA 51+00	364	364	48	48
STA 122+00 TO END	392	392		
PROJECT TOTALS	1064	1064	48	48

SUMMARY OF ILLUMINATION ITEMS	
LOCATION	618 6023
	CONDT (PVC) (SCH 40) (2")
	LF
ILLUMINATION LAYOUT	27
PROJECT TOTALS	27

THIS DOCUMENT IS RELEASED FOR THE
PURPOSE OF INTERIM REVIEW ONLY
UNDER THE AUTHORITY OF:
ZACHARY B. RYAN
TEXAS REGISTRATION 106276
DATE: 7/10/2020
IT IS NOT TO BE USED FOR BIDDING,
CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
FRN - F-1386

**WINDY HILL ROAD
SUMMARY OF
QUANTITIES**

GLO Contract# 19-280-000-B779

DESIGN BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
PROJECT NO: 2173.2001
DATE: 7/10/2020

SCALE
HORIZONTAL:
VERTICAL:
SHEET: 3 OF 3
PAGE: 11

7/10/2020 4:43:25 PM I:\2173\2001\CADD\SHEETS\01 - General\WH*QTY*03.dgn

7/10/2020 4:43:25 PM I:\2173\2001\CADD\SHEETS\01 - General\WH*SMALL*SIGN*SUMMARY*01.dgn

SUMMARY OF SMALL SIGNS							SM RD SGN ASSM TY			XXXX (X) XX (X-XXXX)		IN SM RD SN SUP & AM TY 10BWG (1) SA (P)	RELOCATE SM RD SN SUP&AM TY 10BWG	REMOVE SM RD SN SUP&AM	INSTALL RDSB FLASH BEACON ASSEMBLY 0685 6001
PLAN SHEET NO	SIGN NO.	SIGN NOMENCLATURE	SIGN TEXT	DIM.	ALUMINUM TYPE A	ALUMINUM TYPE G	Post Type	Posts	Anchor Type	Mounting Designation					
1	1	R2-1	SPEED LIMIT 40	30X36	*		10BWG	1	SA	P	1				
2	1	W1-4R	RIGHT REVERSE CURVE	36X36			RELOCATE					1			
		W13-4P	ADVISORY SPEED 20 MPH	18X18			RELOCATE								
	2	W8-13AT	FLOOD GAUGE PLAQUE	18X12		*	10BWG	1	SA	P		1			
		W8-19	FLOOD GAUGE	12X72			RELOCATE								
	3	W8-18BT	WHEN FLOODED TURN AROUND DON'T DROWN	36X36	*		FLASHING BEACON ASSEMBLY							1	
	4	W6-1	BUMP	36X36			REMOVE						1		
	5	D3-1G	PURPLE MARTIN DR	37X8			RELOCATE					1			
		D3-1G	WINDY HILL RD	30X8			RELOCATE								
		R1-1	STOP	36X36			RELOCATE								
	6	R3-9CP	BEGIN	30X12		*	10BWG	1	SA	P		1			
		R3-9B	CENTER LANE TWLT ONLY	24X36			RELOCATE								
	7	D3-1G	INDIAN PAINTBRUSH DR	46X8			RELOCATE					1			
		D3-1G	WINDY HILL RD	30X8			RELOCATE								
		R1-1	STOP	36X36			RELOCATE								
	8	D3-1G	CHERRYWOOD	47X8			RELOCATE					1			
		D3-1G	WINDY HILL RD	41X8			RELOCATE								
		R1-1	STOP	36X36			RELOCATE								
	9	W8-13AT	FLOOD GAUGE PLAQUE	18X12		*	FLASHING BEACON ASSEMBLY							1	
W8-19		FLOOD GAUGE	12X72			FLASHING BEACON ASSEMBLY									
3	1	R2-1	SPEED LIMIT 40	30X36	*		10BWG	1	SA	P	1				
	2	1-2aT	KYLE CITY LIMIT			RELOCATE					1				
	3	TX1-1T	HAYS COUNTY MAINTENANCE ENDS			RELOCATE					1				



ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.
<http://www.txdot.gov/>

- NOTE:
- Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
 - For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS) Standard Sheet.
 - For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020

IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.

LJA Engineering, Inc. 

FRN - F-1386

WINDY HILL ROAD SMALL SIGN SUMMARY

GLO Contract# 19-280-000-B779	
DESIGN BY: DRAWN BY: CHECKED BY: APPROVED BY: PROJECT NO: 2173.2001 DATE: 7/10/2020	SCALE HORIZONTAL: VERTICAL: SHEET: 1 OF 1 PAGE: 12

WINDY HILL ROAD TRAFFIC CONTROL SUMMARY

WINDY HILL ROAD WILL BE CONSTRUCTED IN FOUR (4) PHASES.

PHASE 1: CLOSE WINDY HILL ROAD, INSTALL CULVERT A, REOPEN WINDY HILL RD.

PHASE 2: CONSTRUCT SOUTH SIDE OF ROADWAY, INSTALL CULVERT B AND STORM SEWER.

PHASE 3: CONSTRUCT NORTH SIDE OF ROADWAY.

PHASE 4: FINAL COURSE AND STRIPING.

PHASE 1

- *INSTALL DETOUR PER PLANS.
- *PLACE ADVANCED WARNING SIGNAGE.
- *CLOSE WINDY HILL ROAD AT CULVERT A CROSSING.
- *INSTALL CULVERT A.
- *CONSTRUCT TEMPORARY PAVEMENT.
- *REOPEN WINDY HILL ROAD.

PHASE 2

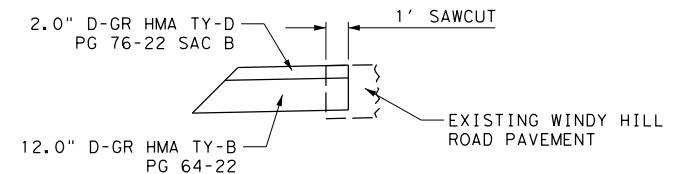
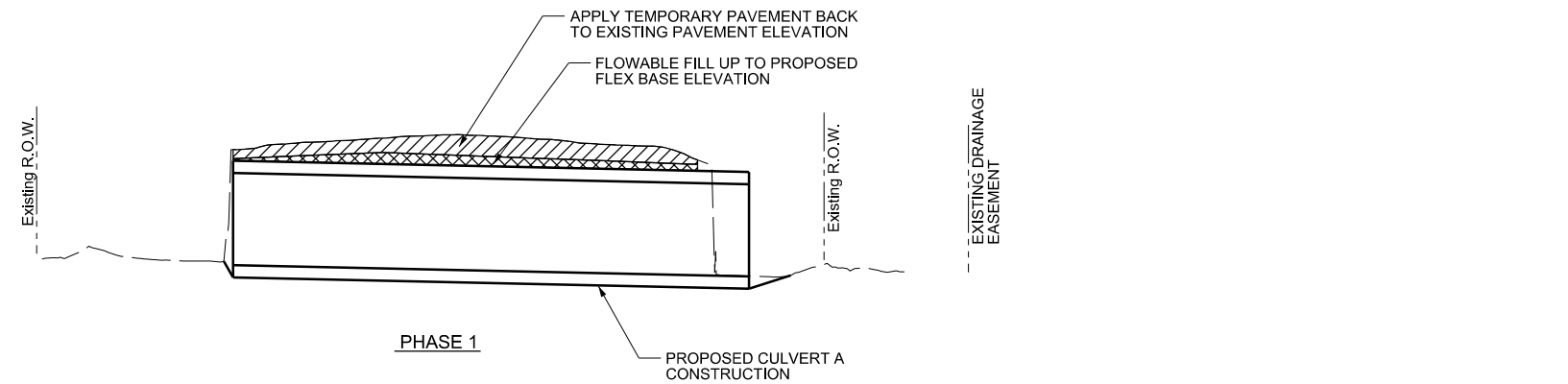
- *CONSTRUCT TEMPORARY PAVEMENT.
- *REMOVE EXISTING STRIPING AND APPLY TEMP WORK ZONE STRIPING.
- *SHIFT TRAFFIC TO NORTH SIDE OF WINDY HILL ROAD.
- *PLACE LOW PROFILE CONCRETE BARRIERS OR WATER FILLED BARRIERS.
- *CONSTRUCT PROPOSED EASTBOUND ROADWAY (EXCEPT FINAL ASPHALT COURSE).
- *INSTALL CULVERT B, INSTALL EASTBOUND STORM SEWER SYSTEM, INSTALL DOWNSTREAM HEADWALL FOR CULVERT A. (STORM SEWER INLET TOPS TO BE CONSTRUCTED IN PHASE 4. PLATE FOR PHASE 3)
- *CONSTRUCT PROPOSED CHERRYWOOD INTERSECTION.
- *CONSTRUCT PROPOSED INDIAN PAINTBRUSH DR INTERSECTION.
- *CONSTRUCT DRIVEWAY AT DOLLAR GENERAL, DRIVEWAY @ STA 51+63 & DRIVEWAY @ ANYTIME STORAGE.

PHASE 3

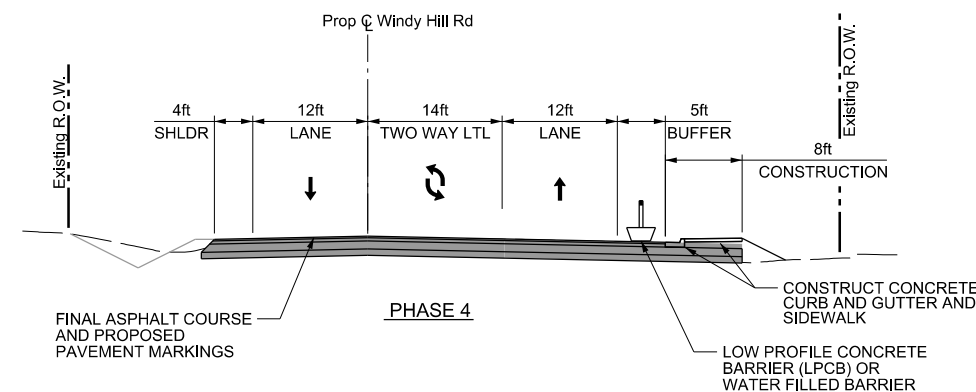
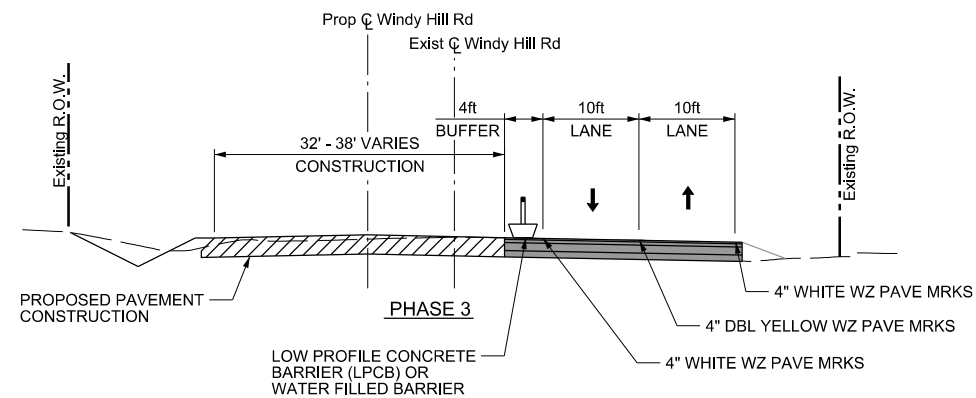
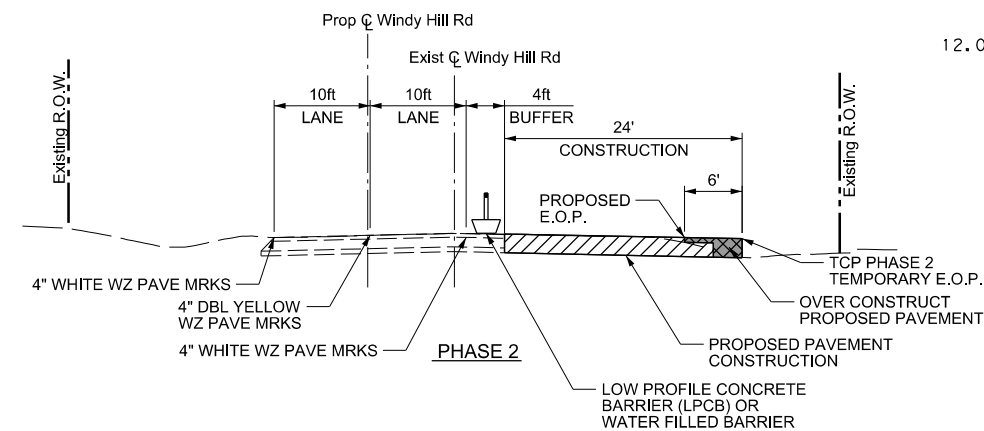
- *APPLY TEMP WORK ZONE STRIPING.
- *SHIFT TRAFFIC TO SOUTH SIDE OF WINDY HILL ROAD ON TOP OF PREVIOUSLY CONSTRUCTED PAVEMENT.
- *SHIFT LOW PROFILE CONCRETE BARRIERS OR WATER FILLED BARRIERS.
- *CONSTRUCT PROPOSED WESTBOUND ROADWAY.
- *INSTALL CULVERT POND, INSTALL WESTBOUND STORM SEWER SYSTEM, INSTALL UPSTREAM HEADWALL FOR CULVERT A.
- *CONSTRUCT PROPOSED PURPLE MARTIN AVE INTERSECTION.

PHASE 4

- *LAY FINAL ASPHALT COURSE.
- *CONSTRUCT SIDEWALK AND CURB ALONG EASTBOUND SIDE.
- *APPLY PERMANENT PAVEMENT MARKINGS.
- *FINAL CLEAN UP



Temporary Pavement Section



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN - F-1386

WINDY HILL ROAD TRAFFIC CONTROL PLAN PLAN NARRATIVE

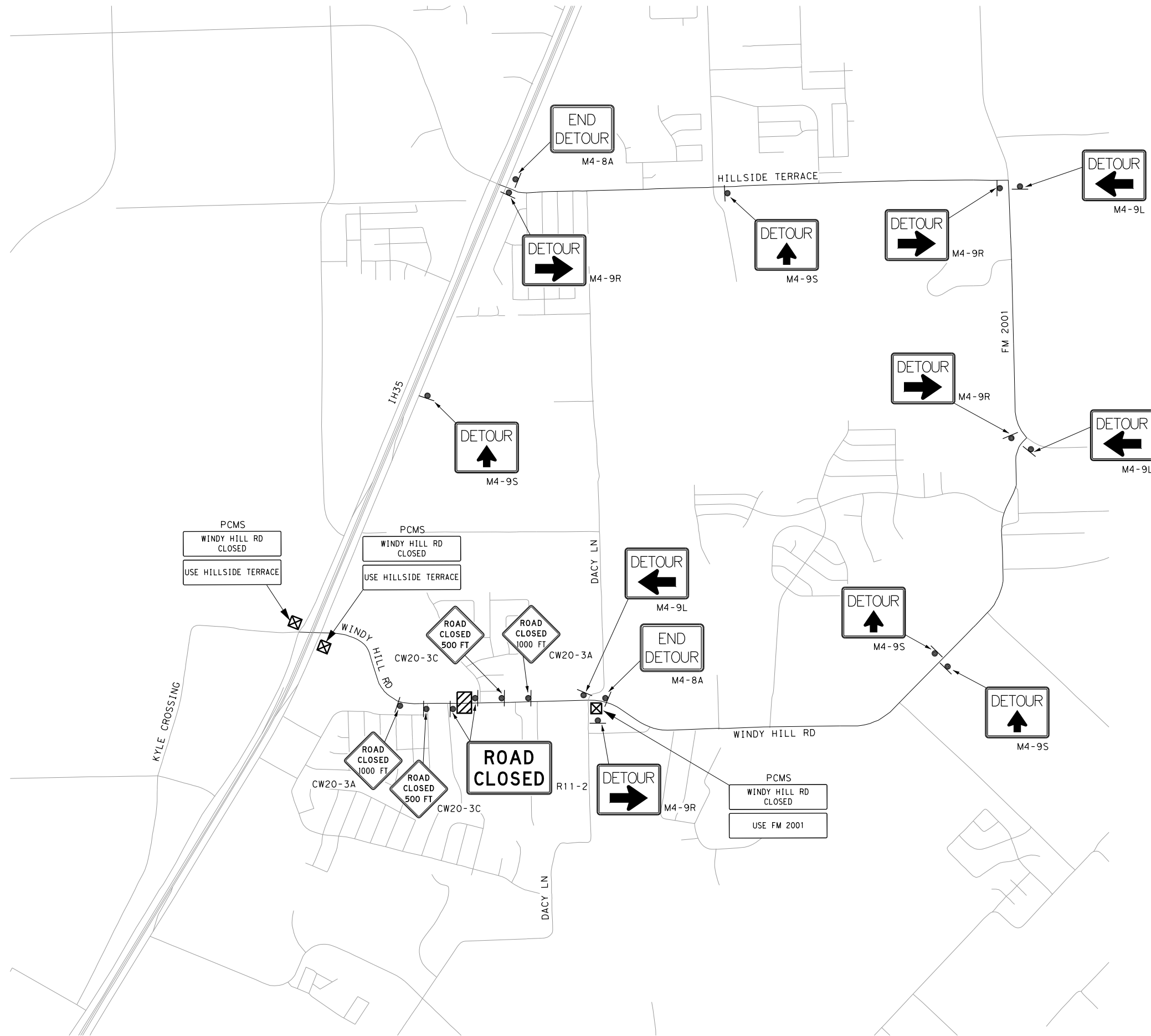
GLO Contract# 19-280-000-B779

DESIGN BY: AM
 DRAWN BY: AM
 CHECKED BY: ZR
 APPROVED BY:
 PROJECT NO: 2173.2001
 DATE: 7/10/2020




SCALE
 HORIZONTAL:
 VERTICAL:
 SHEET: 1 OF 1
 PAGE: 13

7/10/2020 4:43:26 PM I:\2173\2001\CADD\SHEETS\02-Traffic Control Plan\WH*TCP*NAR.dgn

7/10/2020 4:43:26 PM I:\2173\2001\CADD\SHEETS\02-Traffic Control Plan\WH*TCP*PHI*DETOUR*01.dgn



LEGEND

-  PROPOSED SIGN
-  PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
-  CONSTRUCTION AREA

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



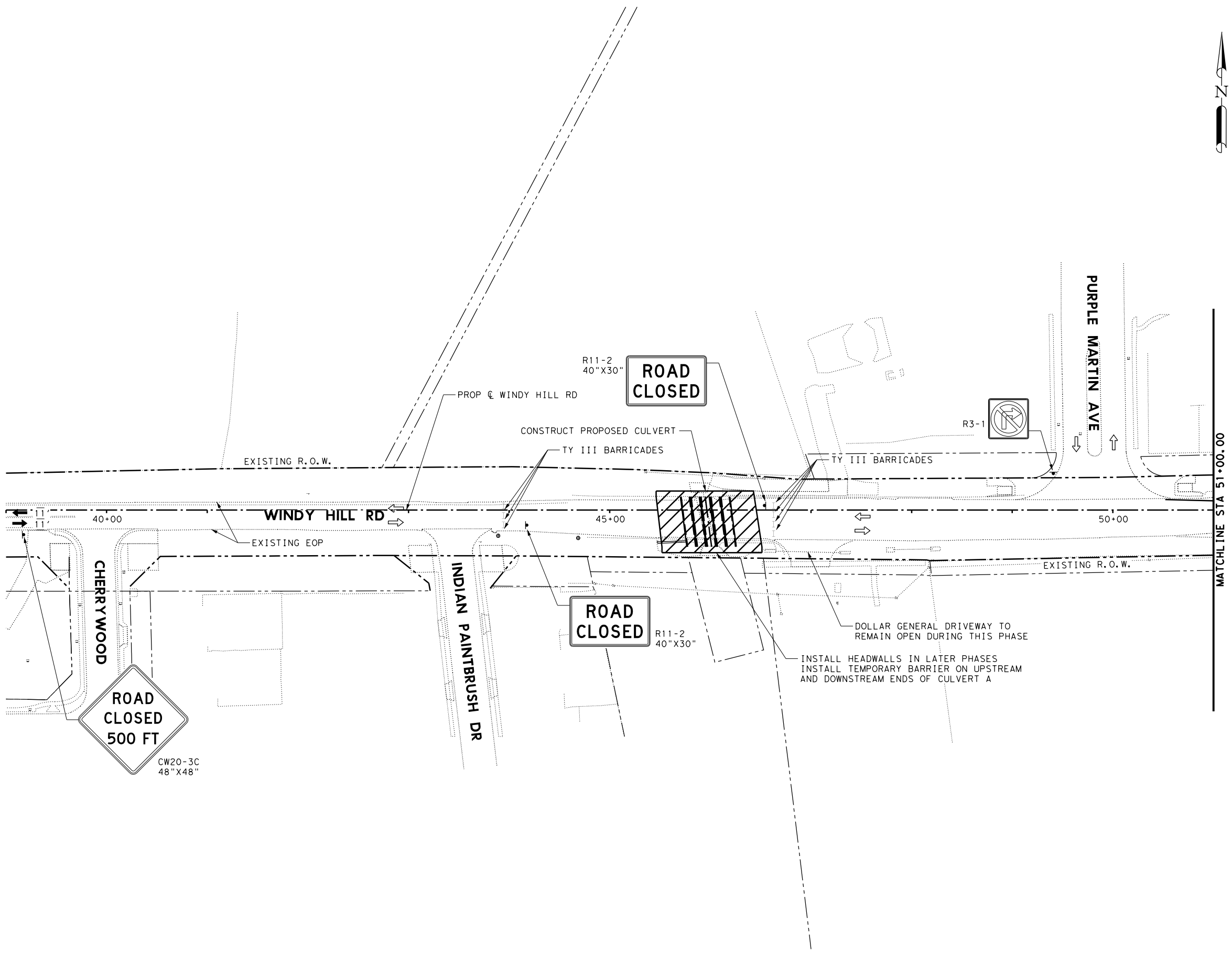
LJA Engineering, Inc.
 FRN - F-1386

**WINDY HILL ROAD
 TRAFFIC CONTROL PLAN
 PHASE 1
 DETOUR MAP**

GLO Contract# 19-280-000-B779

DESIGN BY: AM	SCALE 1"=2000'
DRAWN BY: AM	HORIZONTAL:
CHECKED BY: ZR	VERTICAL:
APPROVED BY:	SHEET: 1 OF 1
PROJECT NO: 2173.2001	PAGE: 14
DATE: 7/10/2020	

7/10/2020 4:43:27 PM I:\2173\2001\CADD\SHEETS\02-Traffic Control Plan\WH*TCP*PH1*01.dgn

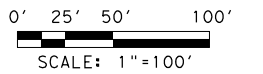


LEGEND

- EXISTING PLANIMETRICS
- EXISTING R.O.W.
- TRAFFIC FLOW
- LOW PROFILE CONCRETE BARRIER (LPCB)
- PROPOSED LANE LINE (THIS PHASE)
- PROPOSED PAVEMENT CONSTRUCTION (THIS PHASE)
- PROPOSED PAVEMENT CONSTRUCTION (PREV. PHASE)
- TEMPORARY PAVEMENT CONSTRUCTION (THIS PHASE)
- TEMPORARY PAVEMENT CONSTRUCTION (PREV PHASE)

NOTES:

1. SEE TCP DETOUR SHEET FOR DETOUR AND WARNING SIGNING INFORMATION.
2. SEE TXDOT STANDARD WZ(RCD)-13 FOR ADDITIONAL INFORMATION.



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN - F-1386









**WINDY HILL ROAD
 TRAFFIC CONTROL PLAN
 PHASE 1**

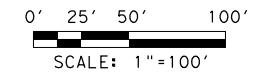
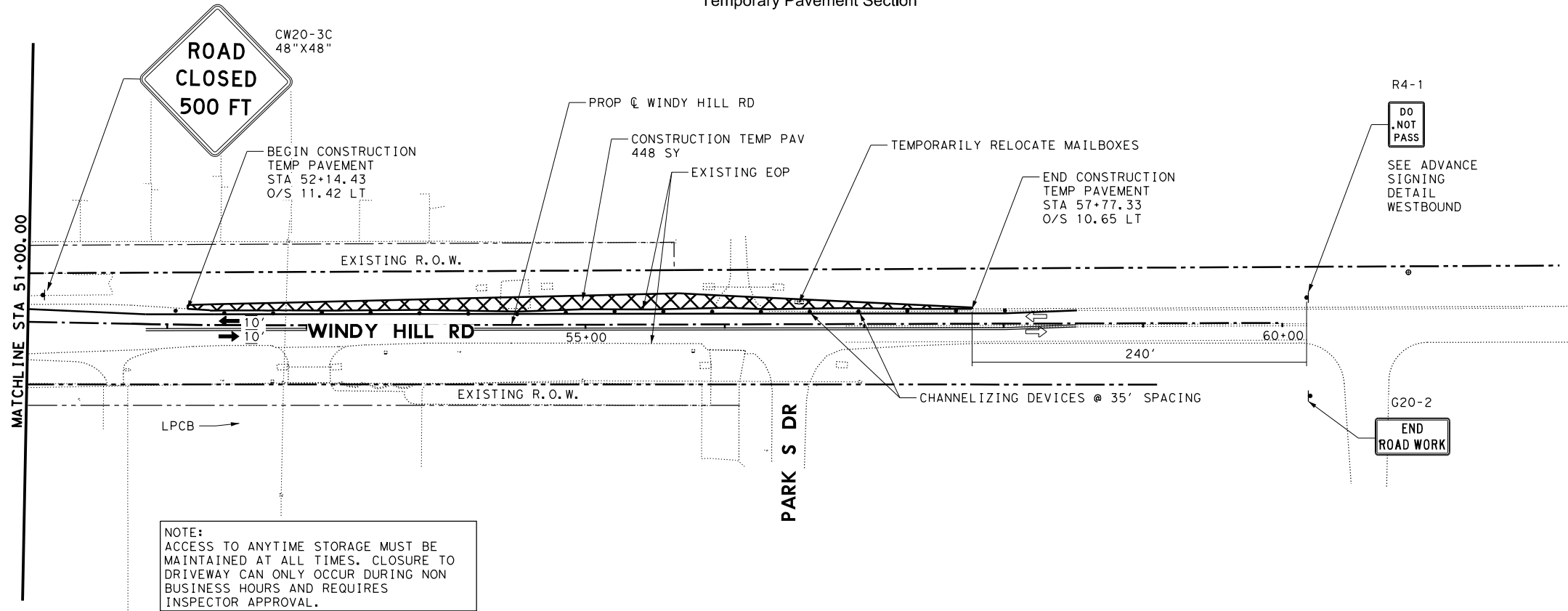
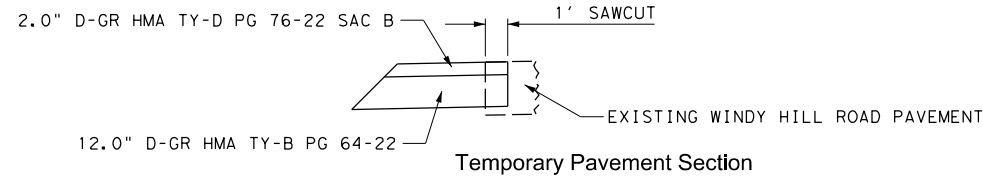
GLO Contract# 19-280-000-B779

DESIGN BY:	AM	SCALE	1"=100'
DRAWN BY:	AM	HORIZONTAL:	
CHECKED BY:	ZR	VERTICAL:	
APPROVED BY:		SHEET:	1 OF 2
PROJECT NO:	2173.2001	DATE:	7/10/2020
DATE:	7/10/2020	PAGE:	15

7/10/2020 4:43:27 PM I:\2173\2001\CADD\SHEETS\02-Traffic Control Plan\WH*TCP*PH1*02.dgn

LEGEND

-  EXISTING PLANIMETRICS
-  EXISTING R.O.W. TRAFFIC FLOW
-  LOW PROFILE CONCRETE BARRIER (LPCB)
-  PROPOSED LANE LINE (THIS PHASE)
-  PROPOSED PAVEMENT CONSTRUCTION (THIS PHASE)
-  PROPOSED PAVEMENT CONSTRUCTION (PREV. PHASE)
-  TEMPORARY PAVEMENT CONSTRUCTION (THIS PHASE)
-  TEMPORARY PAVEMENT CONSTRUCTION (PREV PHASE)



NOTE:
ACCESS TO ANYTIME STORAGE MUST BE MAINTAINED AT ALL TIMES. CLOSURE TO DRIVEWAY CAN ONLY OCCUR DURING NON BUSINESS HOURS AND REQUIRES INSPECTOR APPROVAL.

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
ZACHARY B. RYAN
TEXAS REGISTRATION 106276
DATE: 7/10/2020
IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.

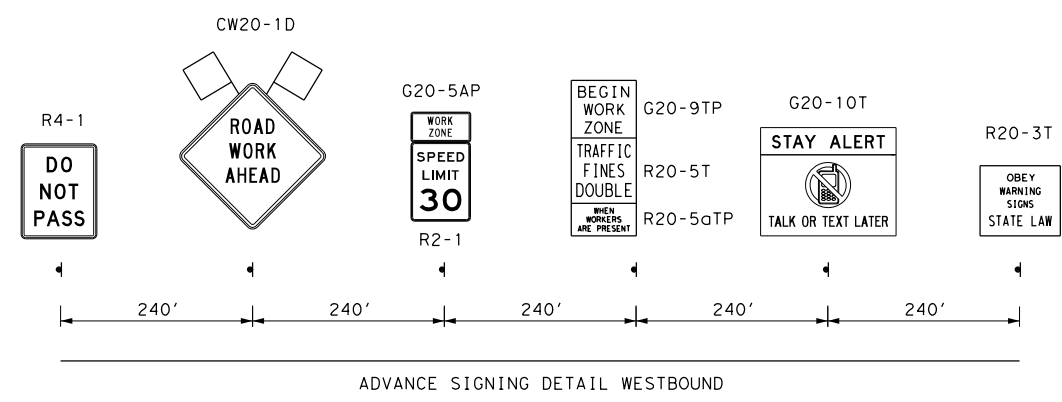


LJA Engineering, Inc.
FRN-F-1386

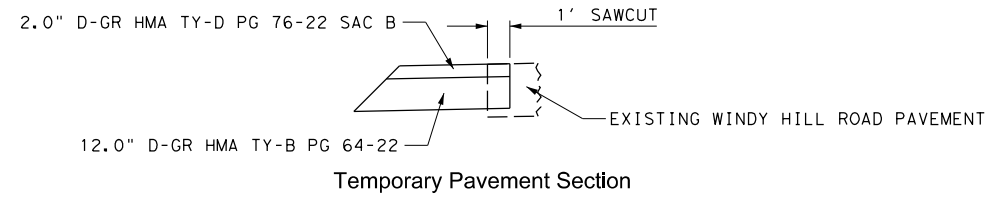
**WINDY HILL ROAD
TRAFFIC CONTROL PLAN
PHASE 1
STA 51+00 TO END**

GLO Contract# 19-280-000-B779

DESIGN BY:	AM	SCALE	1"=100'
DRAWN BY:	AM	HORIZONTAL:	
CHECKED BY:	ZR	VERTICAL:	
APPROVED BY:		SHEET:	2 OF 2
PROJECT NO:	2173.2001	PAGE:	16
DATE:	7/10/2020		

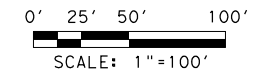
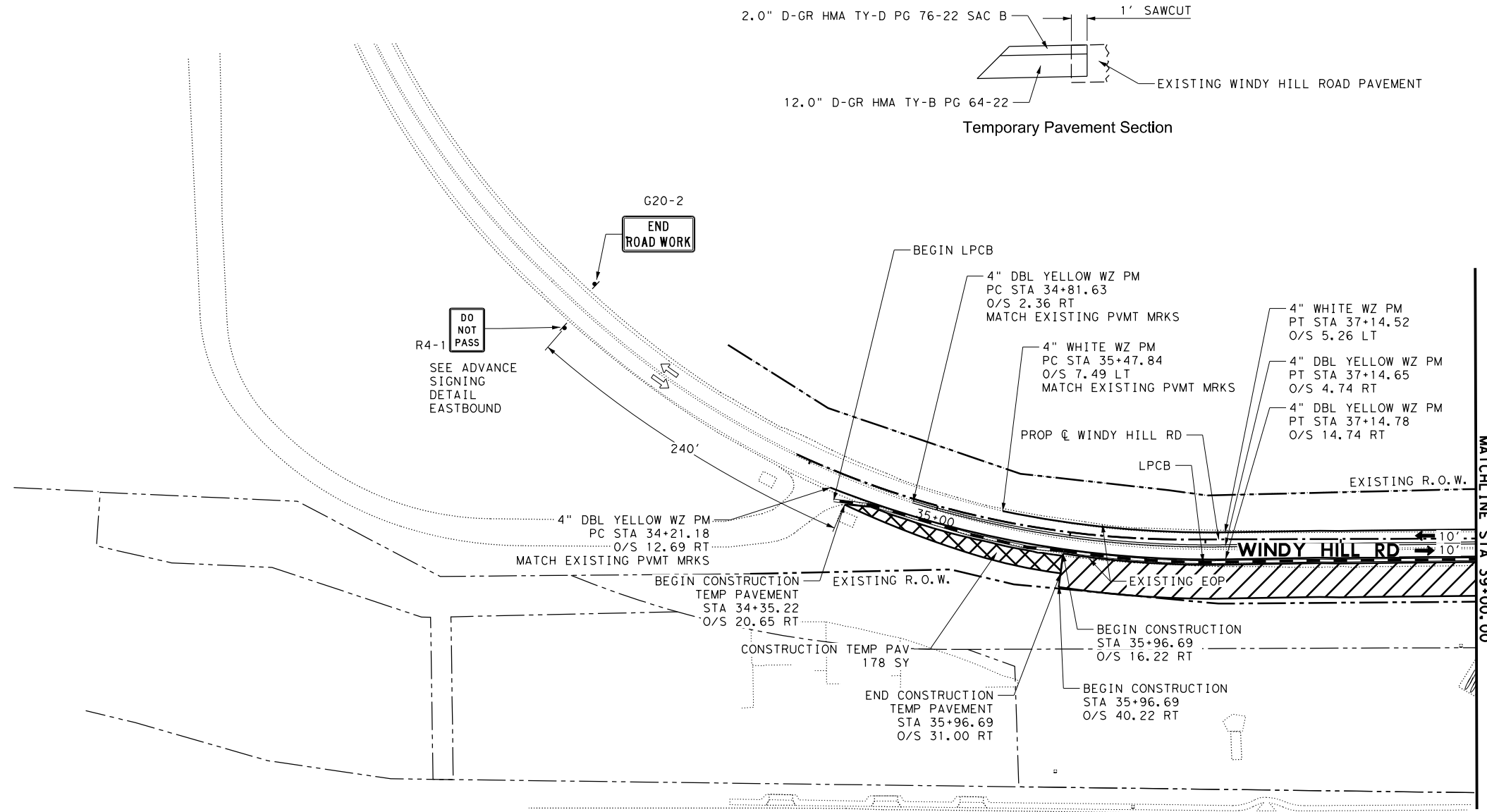


7/10/2020 4:43:28 PM I:\2173\2001\CADD\SHEETS\02-Traffic Control Plan\WH*TCP*PH2*01.dgn



LEGEND

- EXISTING PLANIMETRICS
- - - - - EXISTING R.O.W.
- TRAFFIC FLOW
- ▬ LOW PROFILE CONCRETE BARRIER (LPCB)
- ▬ PROPOSED LANE LINE (THIS PHASE)
- ▨ PROPOSED PAVEMENT CONSTRUCTION (THIS PHASE)
- ▩ PROPOSED PAVEMENT CONSTRUCTION (PREV. PHASE)
- ▧ TEMPORARY PAVEMENT CONSTRUCTION (THIS PHASE)
- ▦ TEMPORARY PAVEMENT CONSTRUCTION (PREV PHASE)



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
ZACHARY B. RYAN
TEXAS REGISTRATION 106276
DATE: 7/10/2020
IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.

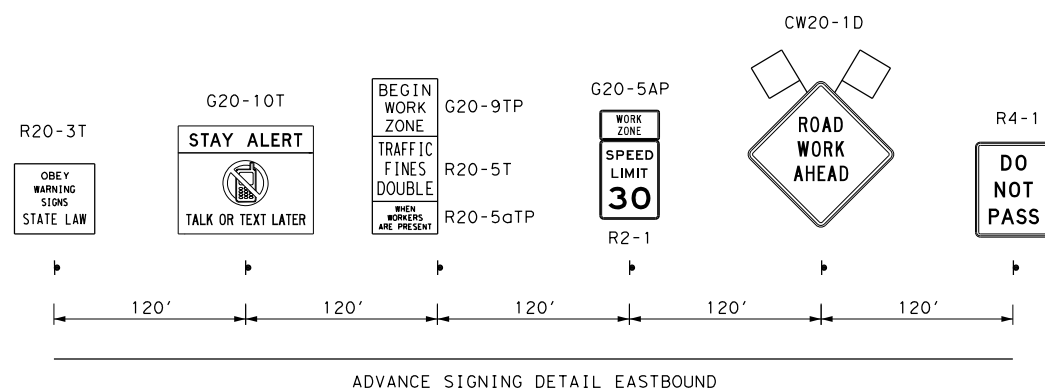


LJA Engineering, Inc.
FRN-F-1386

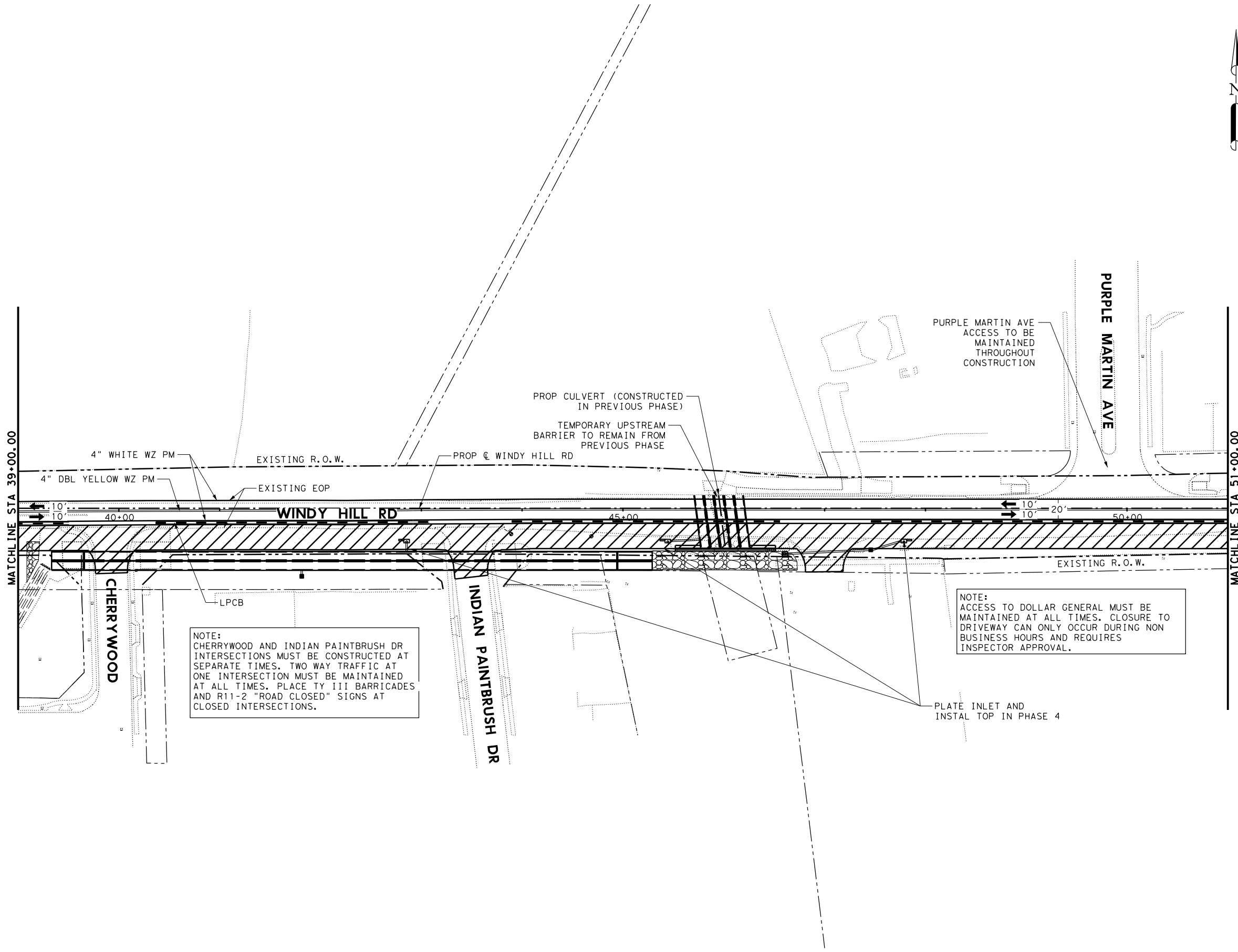
**WINDY HILL ROAD
TRAFFIC CONTROL PLAN
PHASE 2
BEGIN TO STA 39+00**

GLO Contract# 19-280-000-B779

DESIGN BY:	AM	SCALE	1"=100'
DRAWN BY:	AM	HORIZONTAL:	
CHECKED BY:	ZR	VERTICAL:	
APPROVED BY:		SHEET:	1 OF 3
PROJECT NO:	2173.2001	PAGE:	17
DATE:	7/10/2020		



7/10/2020 4:43:28 PM I:\2173\2001\CADD\SHEETS\02-Traffic Control Plan\WH*TCP*PH2*02.dgn

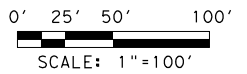


NOTE:
 CHERRYWOOD AND INDIAN PAINTBRUSH DR INTERSECTIONS MUST BE CONSTRUCTED AT SEPARATE TIMES. TWO WAY TRAFFIC AT ONE INTERSECTION MUST BE MAINTAINED AT ALL TIMES. PLACE TY III BARRICADES AND R11-2 "ROAD CLOSED" SIGNS AT CLOSED INTERSECTIONS.

NOTE:
 ACCESS TO DOLLAR GENERAL MUST BE MAINTAINED AT ALL TIMES. CLOSURE TO DRIVEWAY CAN ONLY OCCUR DURING NON BUSINESS HOURS AND REQUIRES INSPECTOR APPROVAL.

LEGEND

- EXISTING PLANIMETRICS
- EXISTING R.O.W.
- TRAFFIC FLOW
- LOW PROFILE CONCRETE BARRIER (LPCB)
- PROPOSED LANE LINE (THIS PHASE)
- PROPOSED PAVEMENT CONSTRUCTION (THIS PHASE)
- PROPOSED PAVEMENT CONSTRUCTION (PREV. PHASE)
- TEMPORARY PAVEMENT CONSTRUCTION (THIS PHASE)
- TEMPORARY PAVEMENT CONSTRUCTION (PREV PHASE)



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN-F-1386

**WINDY HILL ROAD
 TRAFFIC CONTROL PLAN
 PHASE 2
 STA 39+00 TO STA 51+00**

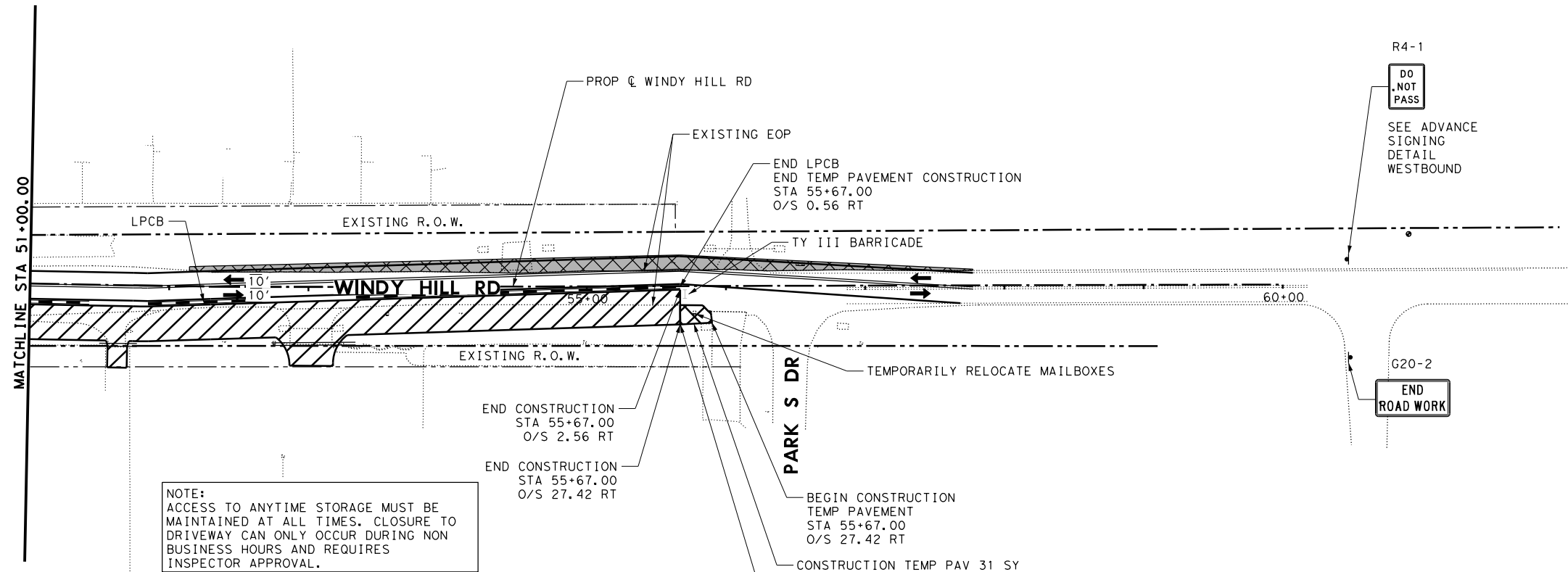
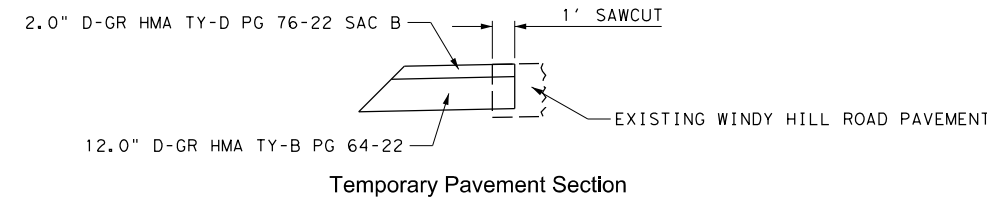
GLO Contract# 19-280-000-B779

DESIGN BY:	AM	SCALE	1"=100'
DRAWN BY:	AM	HORIZONTAL:	
CHECKED BY:	ZR	VERTICAL:	
APPROVED BY:		SHEET:	2 OF 3
PROJECT NO:	2173.2001	DATE:	7/10/2020
DATE:	7/10/2020	PAGE:	18

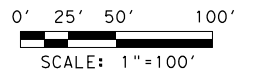
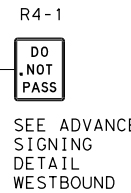
7/10/2020 4:43:29 PM I:\2173\2001\CADD\SHEETS\02-Traffic Control Plan\WH*TCP*PH2*03.dgn

LEGEND

- EXISTING PLANIMETRICS
- - - - - EXISTING R.O.W.
- TRAFFIC FLOW
- ▬▬▬ LOW PROFILE CONCRETE BARRIER (LPCB)
- ▬▬▬ PROPOSED LANE LINE (THIS PHASE)
- ▨▨▨ PROPOSED PAVEMENT CONSTRUCTION (THIS PHASE)
- ▩▩▩ PROPOSED PAVEMENT CONSTRUCTION (PREV. PHASE)
- ▧▧▧ TEMPORARY PAVEMENT CONSTRUCTION (THIS PHASE)
- ▦▦▦ TEMPORARY PAVEMENT CONSTRUCTION (PREV. PHASE)



NOTE:
ACCESS TO ANYTIME STORAGE MUST BE MAINTAINED AT ALL TIMES. CLOSURE TO DRIVEWAY CAN ONLY OCCUR DURING NON BUSINESS HOURS AND REQUIRES INSPECTOR APPROVAL.



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
ZACHARY B. RYAN
TEXAS REGISTRATION 106276
DATE: 7/10/2020
IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.

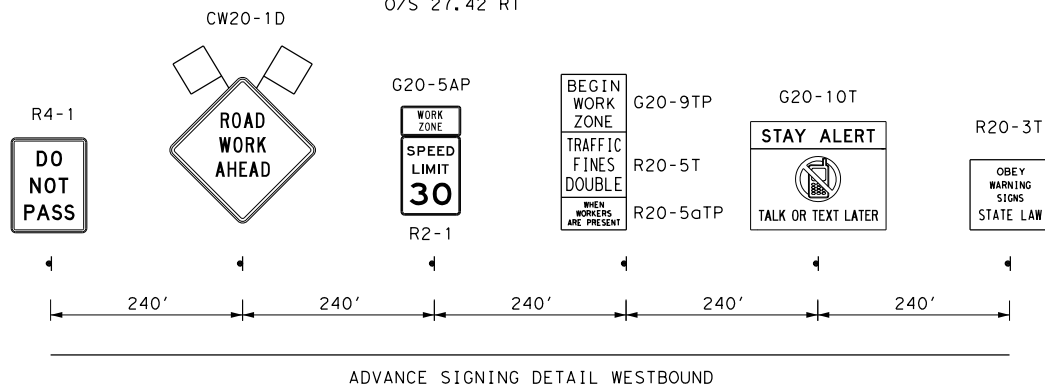


LJA Engineering, Inc.
FRN-F-1386

**WINDY HILL ROAD
TRAFFIC CONTROL PLAN
PHASE 2
STA 51+00 TO END**

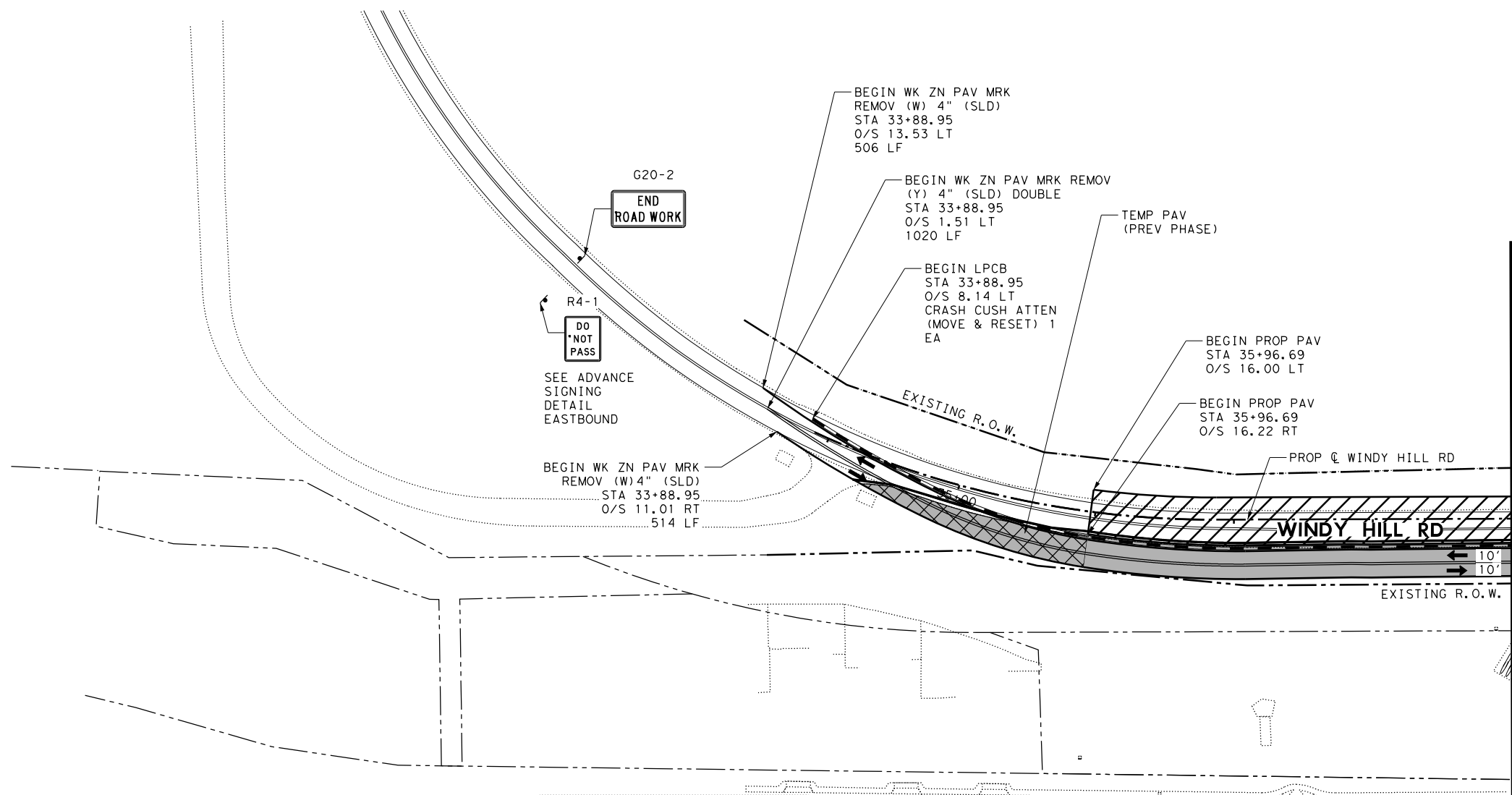
GLO Contract# 19-280-000-B779

DESIGN BY: AM	SCALE: 1"=100'
DRAWN BY: AM	HORIZONTAL:
CHECKED BY: ZR	VERTICAL:
APPROVED BY:	SHEET: 3 OF 3
PROJECT NO: 2173.2001	PAGE: 19
DATE: 7/10/2020	



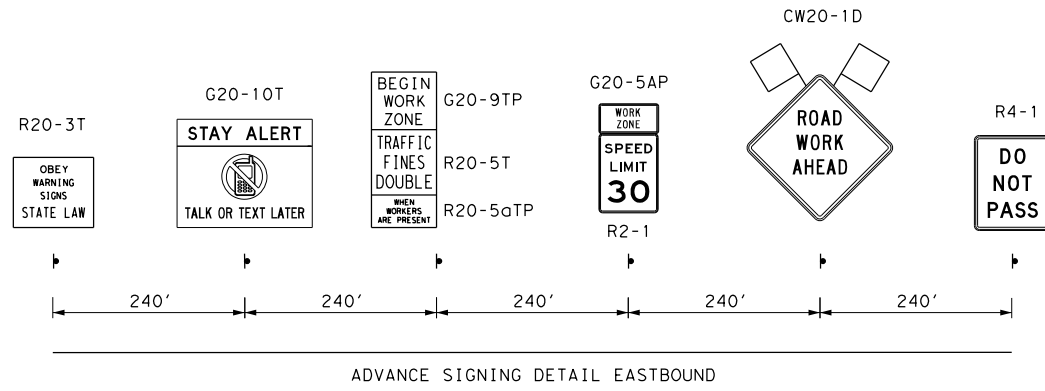
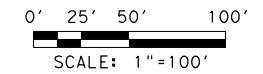
ADVANCE SIGNING DETAIL WESTBOUND

7/10/2020 4:43:29 PM I:\2173\2001\CADD\SHEETS\02-Traffic Control Plan\WH*TCP*PH3*01.dgn



LEGEND

- EXISTING PLANIMETRICS
- EXISTING R.O.W.
- TRAFFIC FLOW
- LOW PROFILE CONCRETE BARRIER (LPCB)
- PROPOSED LANE LINE (THIS PHASE)
- PROPOSED PAVEMENT CONSTRUCTION (THIS PHASE)
- PROPOSED PAVEMENT CONSTRUCTION (PREV. PHASE)
- TEMPORARY PAVEMENT CONSTRUCTION (THIS PHASE)
- TEMPORARY PAVEMENT CONSTRUCTION (PREV PHASE)



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



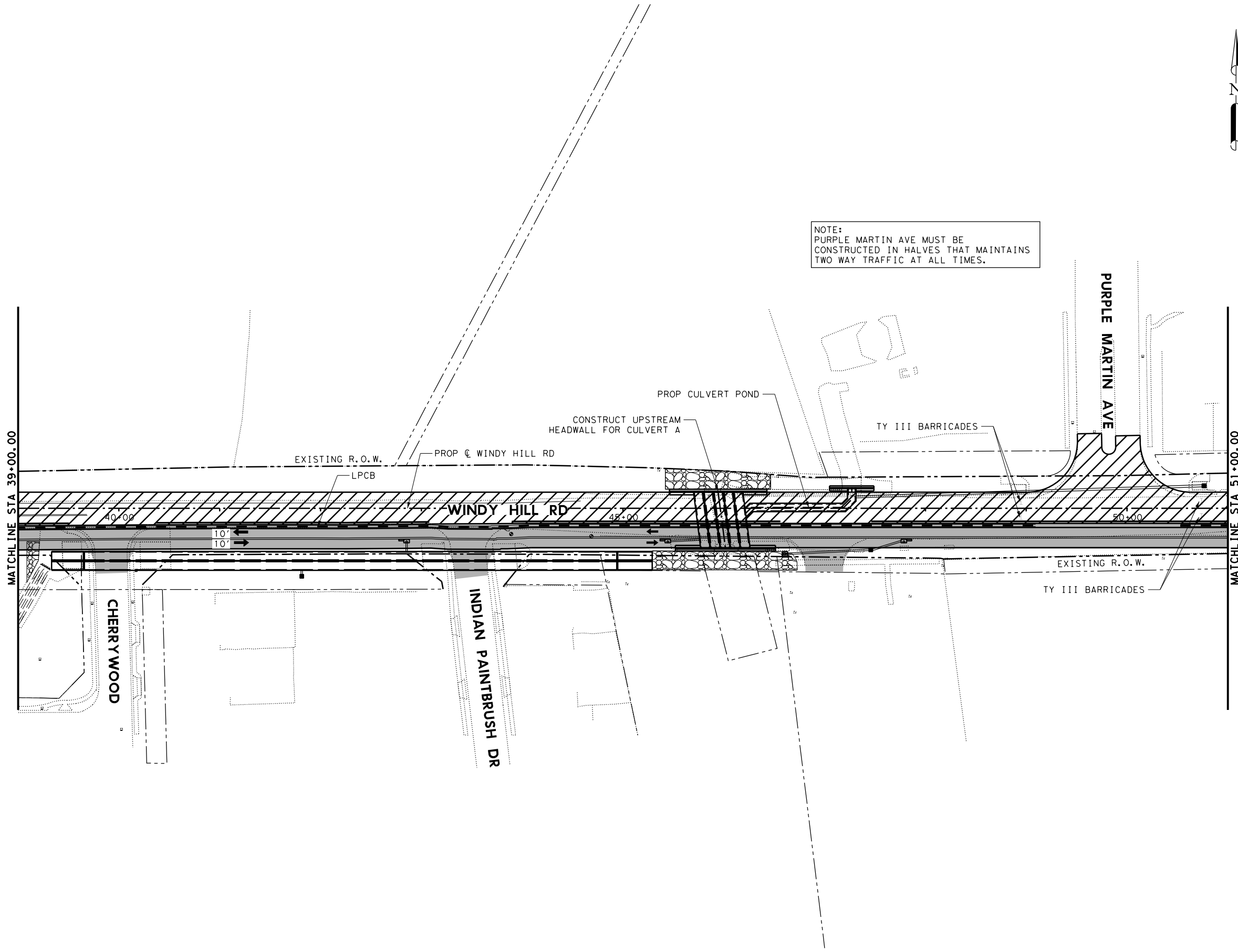
LJA Engineering, Inc.
 FRN-F-1386

**WINDY HILL ROAD
 TRAFFIC CONTROL PLAN
 PHASE 3
 BEGIN TO STA 39+00**

GLO Contract# 19-280-000-B779

DESIGN BY:	AM	SCALE	1"=100'
DRAWN BY:	AM	HORIZONTAL:	
CHECKED BY:	ZR	VERTICAL:	
APPROVED BY:		SHEET:	1 OF 3
PROJECT NO:	2173.2001	PAGE:	20
DATE:	7/10/2020		

7/10/2020
 4:43:29 PM
 I:\2173\2001\CADD\SHEETS\02-Traffic Control Plan\WH*TCP*PH3*02.dgn



NOTE:
 PURPLE MARTIN AVE MUST BE
 CONSTRUCTED IN HALVES THAT MAINTAINS
 TWO WAY TRAFFIC AT ALL TIMES.

LEGEND

- EXISTING PLANIMETRICS
- EXISTING R.O.W.
- TRAFFIC FLOW
- LOW PROFILE CONCRETE BARRIER (LPCB)
- PROPOSED LANE LINE (THIS PHASE)
- PROPOSED PAVEMENT CONSTRUCTION (THIS PHASE)
- PROPOSED PAVEMENT CONSTRUCTION (PREV. PHASE)
- TEMPORARY PAVEMENT CONSTRUCTION (THIS PHASE)
- TEMPORARY PAVEMENT CONSTRUCTION (PREV PHASE)

0' 25' 50' 100'
 SCALE: 1"=100'

THIS DOCUMENT IS RELEASED FOR THE
 PURPOSE OF INTERIM REVIEW ONLY
 UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING,
 CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN - F-1386

**WINDY HILL ROAD
 TRAFFIC CONTROL PLAN
 PHASE 3
 STA 39+00 TO STA 51+00**

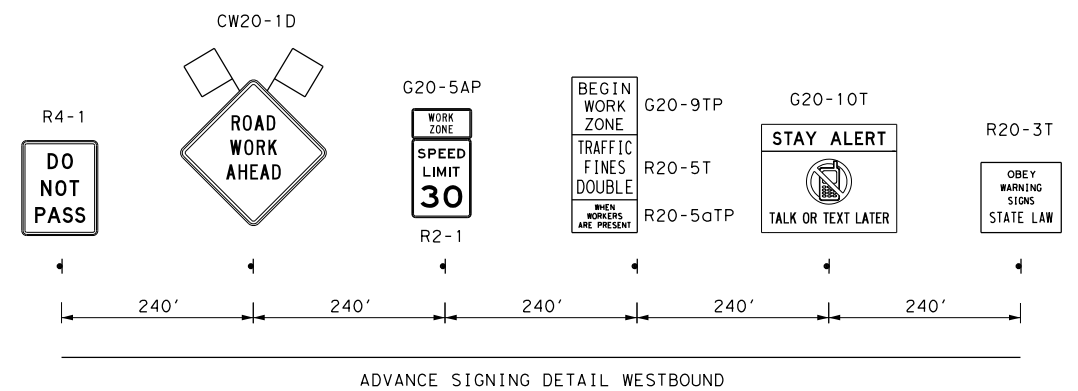
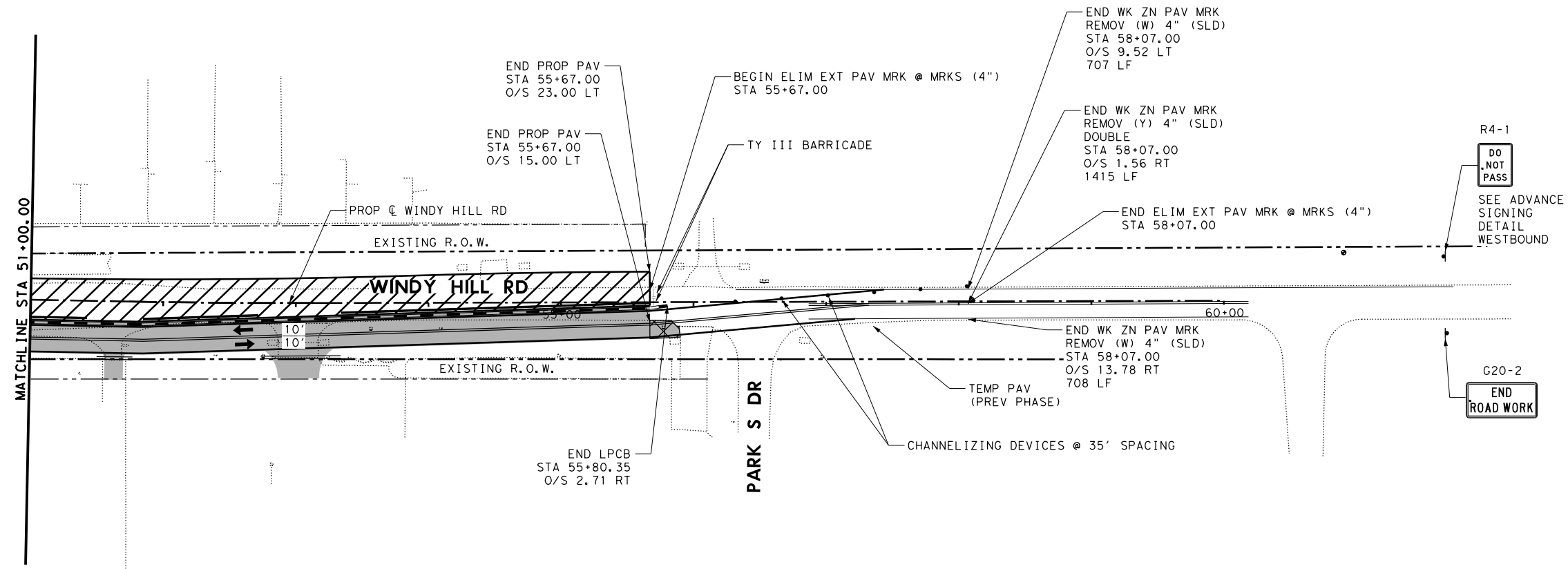
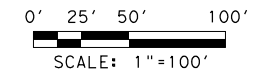
GLO Contract# 19-280-000-B779

DESIGN BY:	AM	SCALE	1"=100'
DRAWN BY:	AM	HORIZONTAL:	
CHECKED BY:	ZR	VERTICAL:	
APPROVED BY:		SHEET:	2 OF 3
PROJECT NO:	2173.2001	PAGE:	21
DATE:	7/10/2020		

7/10/2020 4:43:30 PM I:\2173\2001\CADD\SHEETS\02-Traffic Control Plan\WH*TCP*PH3*03.dgn

LEGEND

- EXISTING PLANIMETRICS
- - - - - EXISTING R.O.W.
- TRAFFIC FLOW
- ▬▬▬ LOW PROFILE CONCRETE BARRIER (LPCB)
- ▬▬▬ PROPOSED LANE LINE (THIS PHASE)
- ▬▬▬ PROPOSED PAVEMENT CONSTRUCTION (THIS PHASE)
- ▬▬▬ PROPOSED PAVEMENT CONSTRUCTION (PREV. PHASE)
- ▬▬▬ TEMPORARY PAVEMENT CONSTRUCTION (THIS PHASE)
- ▬▬▬ TEMPORARY PAVEMENT CONSTRUCTION (PREV PHASE)



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN-F-1386

**WINDY HILL ROAD
 TRAFFIC CONTROL PLAN
 PHASE 3
 STA 51+00 TO END**

GLO Contract# 19-280-000-B779

DESIGN BY:	AM	SCALE:	1"=100'
DRAWN BY:	AM	HORIZONTAL:	
CHECKED BY:	ZR	VERTICAL:	
APPROVED BY:		SHEET:	3 OF 3
PROJECT NO:	2173.2001	PAGE:	22
DATE:	7/10/2020		

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

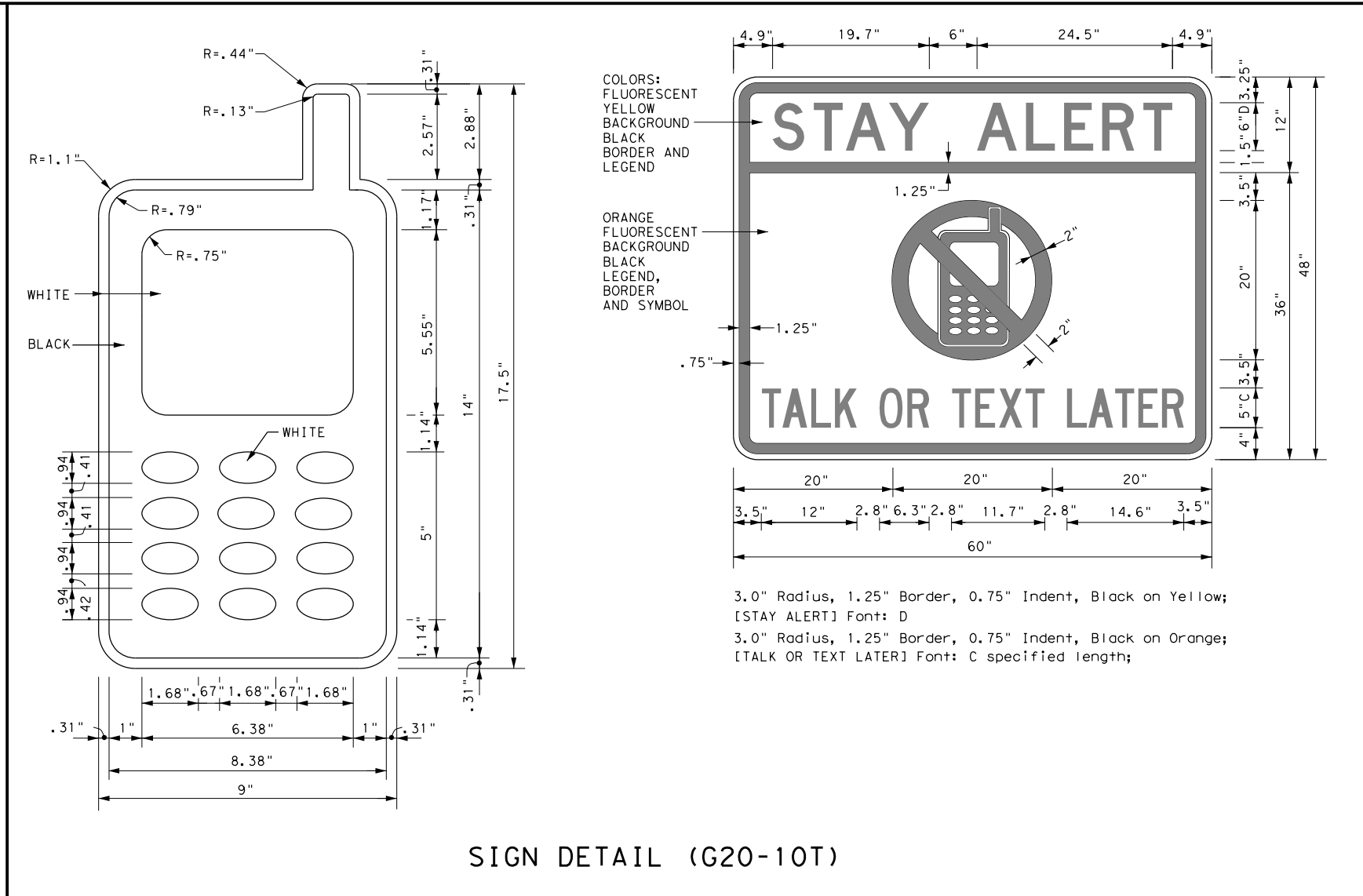
BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

- The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
- The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
- The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
- Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.
- When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
- The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
- All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
- The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
- As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.
- Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.
- The Engineer has the final decision on the location of all traffic control devices.
- Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY APPAREL NOTES:

- Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.

DATE:
 FILE:



Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation
 Traffic Operations Division - TE
 Phone (512) 416-3118

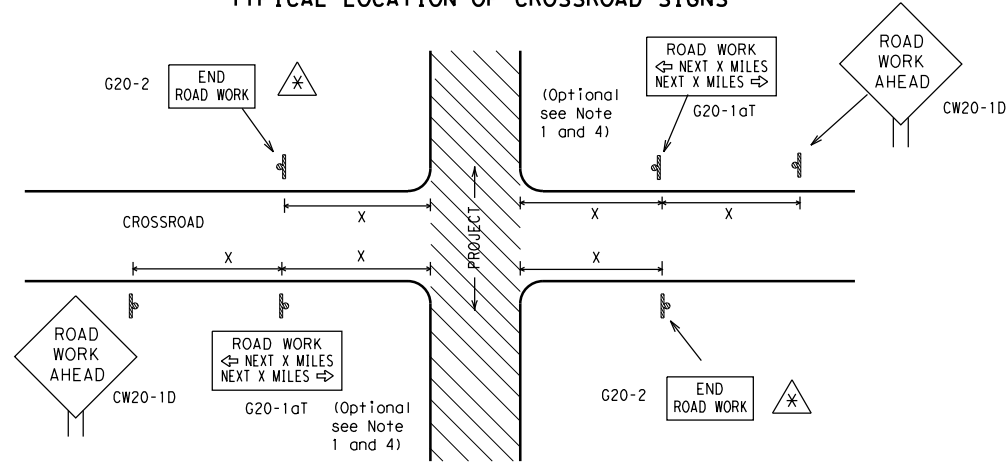
THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

SHEET 1 OF 12

		<i>Traffic Operations Division Standard</i>	
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS			
BC (1) - 14			
FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT November 2002	CONT	SECT	JOB
REVISIONS			
4-03	5-10	8-14	
9-07	7-13		
DIST		COUNTY	SHEET NO.
			23

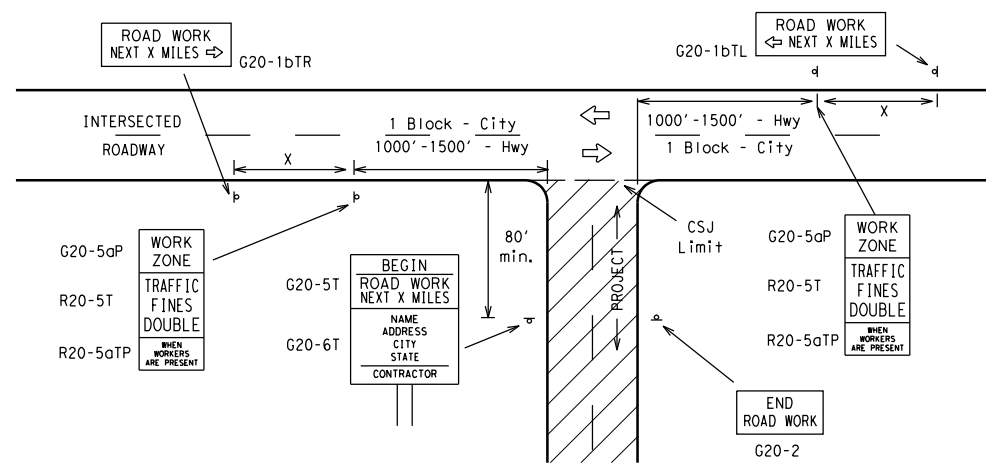
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

TYPICAL LOCATION OF CROSSROAD SIGNS



- ⚠ May be mounted on back of "ROAD WORK AHEAD" (CW20-1D) sign with approval of Engineer. (See note 2 below)
- The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D) sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
 - The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK" (G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume. This information shall be shown in the plans.
 - Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
 - The "ROAD WORK NEXT X MILES" (G20-1aT) sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
 - Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
 - When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

- The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
- If construction closes the road at a T-intersection the Contractor shall place the "CONTRACTOR NAME" (G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow (G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR) signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING^{1,5,6}

Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed MPH	Sign Spacing "X" Feet (Apprx.)
CW20 ⁴	48" x 48"	48" x 48"	30	120
CW21			35	160
CW22			40	240
CW23			45	320
CW25			50	400
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	55	500 ²
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	60	600 ²
			65	700 ²
			70	800 ²
			75	900 ²
			80	1000 ²
			*	* ³

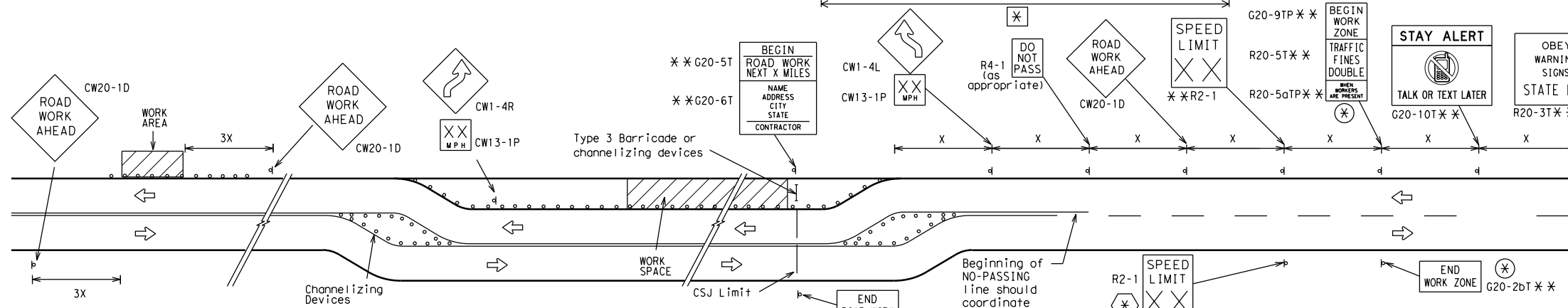
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

Δ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

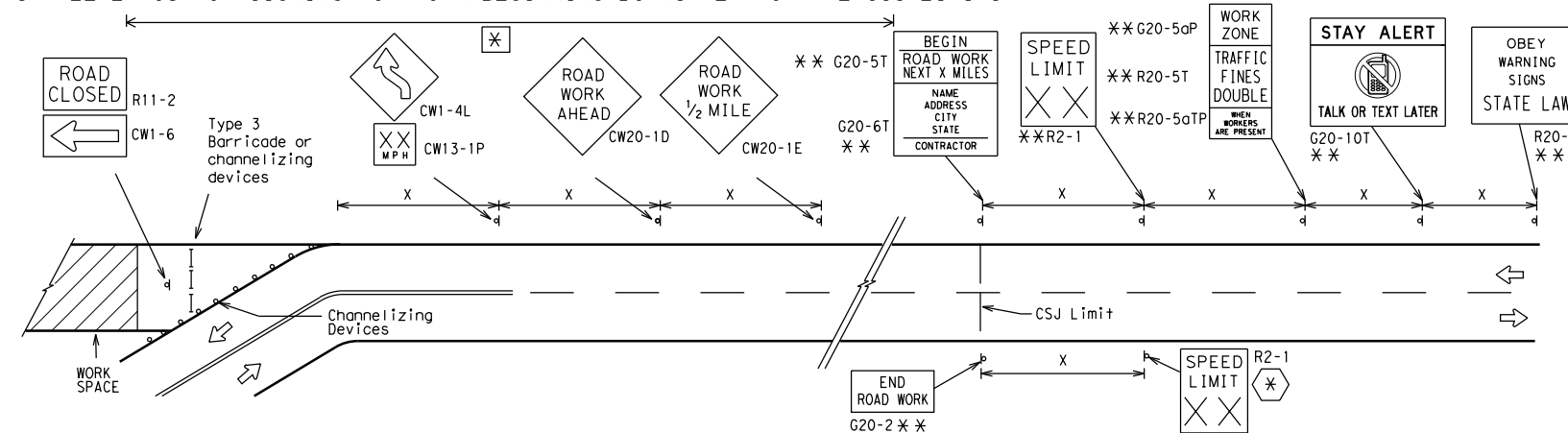
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be used on low volume crossroads at the discretion of the Engineer. See Note 2 under "Typical Location of Crossroad Signs".
- Only diamond shaped warning sign sizes are indicated.
- See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

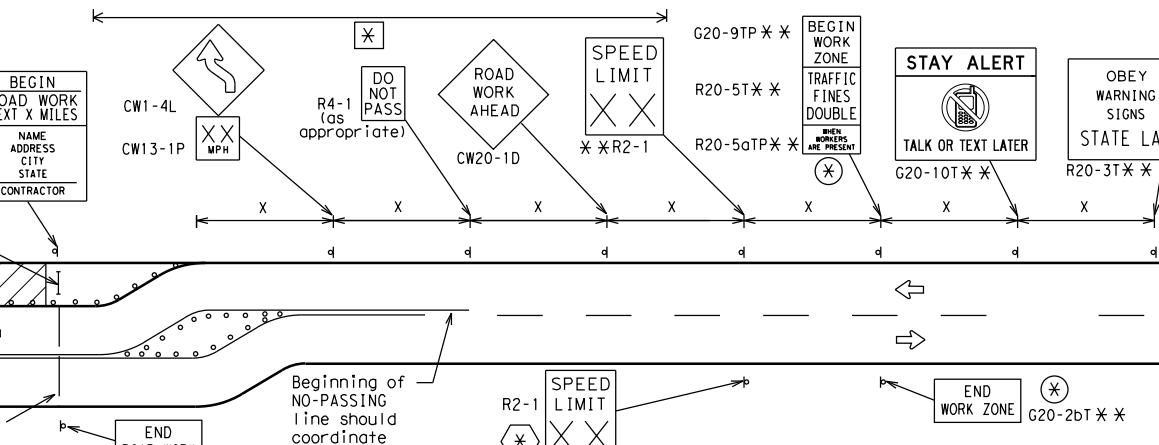


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



NOTES

- The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.
- ⊗ The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.
- ** Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.
- ⊗ Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.
- ⊗ Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND	
—	Type 3 Barricade
○ ○ ○	Channelizing Devices
⊗	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

SHEET 2 OF 12



BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

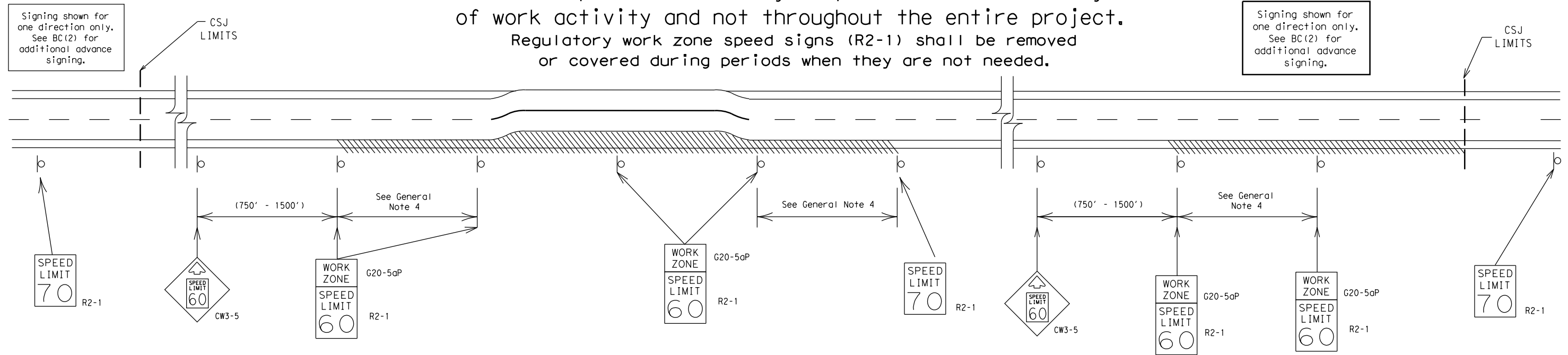
FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
9-07 8-14				
7-13				
	DIST	COUNTY		SHEET NO. 24

DATE: FILE:

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project. Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

- rough road or damaged pavement surface
- substantial alteration of roadway geometrics (diversions)
- construction detours
- grade
- width
- other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the travelled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered. (See Removing or Covering on BC(4)).

GENERAL NOTES

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- Frequency of work zone speed limit signs should be:

40 mph and greater	0.2 to 2 miles
35 mph and less	0.2 to 1 mile
- Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
- Fabrication, erection and maintenance of the "ADVANCE SPEED LIMIT" (CW3-5) sign, "WORK ZONE" (G20-5aP) plaque and the "SPEED LIMIT" (R2-1) signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
- Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
- Techniques that may help reduce traffic speeds include but are not limited to:
 - Law enforcement.
 - Flagger stationed next to sign.
 - Portable changeable message sign (PCMS).
 - Low-power (drone) radar transmitter.
 - Speed monitor trailers or signs.
- Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
- For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

SHEET 3 OF 12



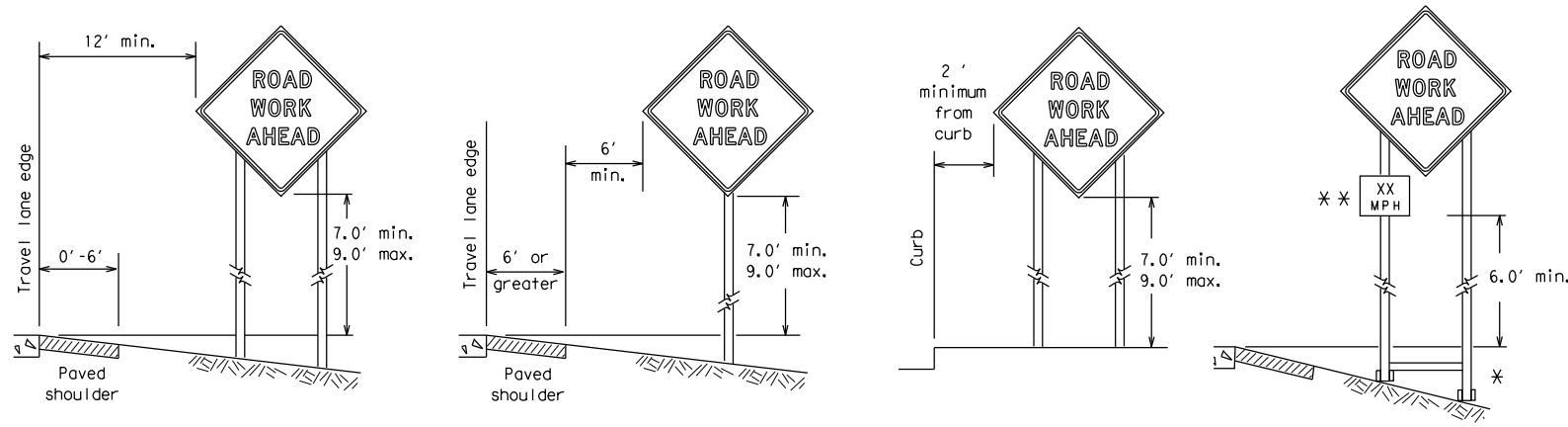
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC (3) - 14

FILE:	bc-14.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS									
9-07	8-14								
7-13		DIST	COUNTY			SHEET NO.			
						25			

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

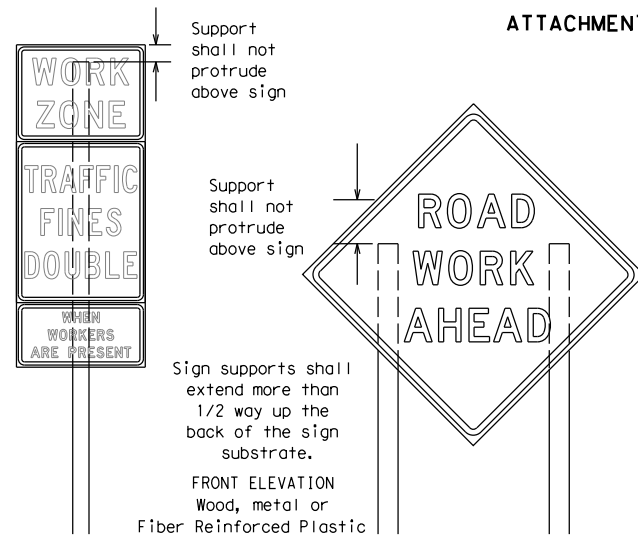
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



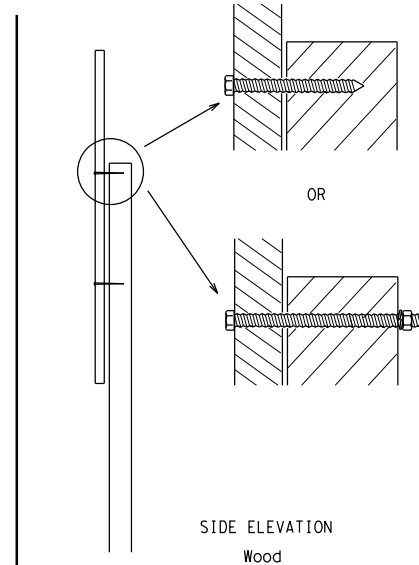
* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

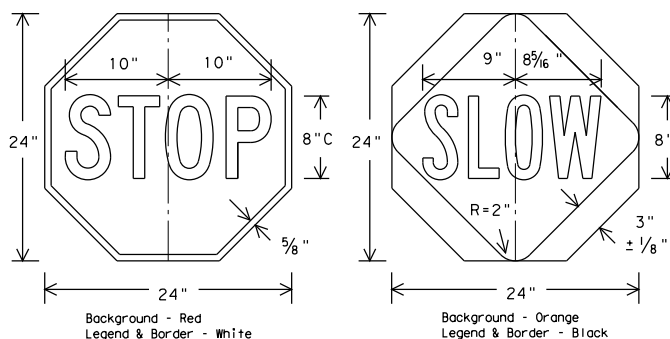


Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the splice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

- STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24" as detailed below.
- When used at night, the STOP/SLOW paddle shall be retroreflectORIZED.
- STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
- Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

- Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
- When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition.
- When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
- If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
- If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC sheets or the CWZTCD. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
- Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
 - Wooden sign posts shall be painted white.
 - Barricades shall NOT be used as sign supports.
 - All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
 - The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
 - The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD). The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
 - The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
 - Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
 - The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.
- DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)**
- The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
 - Long-term stationary - work that occupies a location more than 3 days.
 - Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
 - Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
 - Short, duration - work that occupies a location up to 1 hour.
 - Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

- The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
- The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
- Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
- Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
- Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

- The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

- The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
- "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
- All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

- All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
- White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
- Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

- All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
- Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
- Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
- When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
- Burlap shall NOT be used to cover signs.
- Duct tape or other adhesive material shall NOT be affixed to a sign face.
- Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
- Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
- Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
- Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
- Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

- Flags may be used to draw attention to warning signs. When used the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

SHEET 4 OF 12



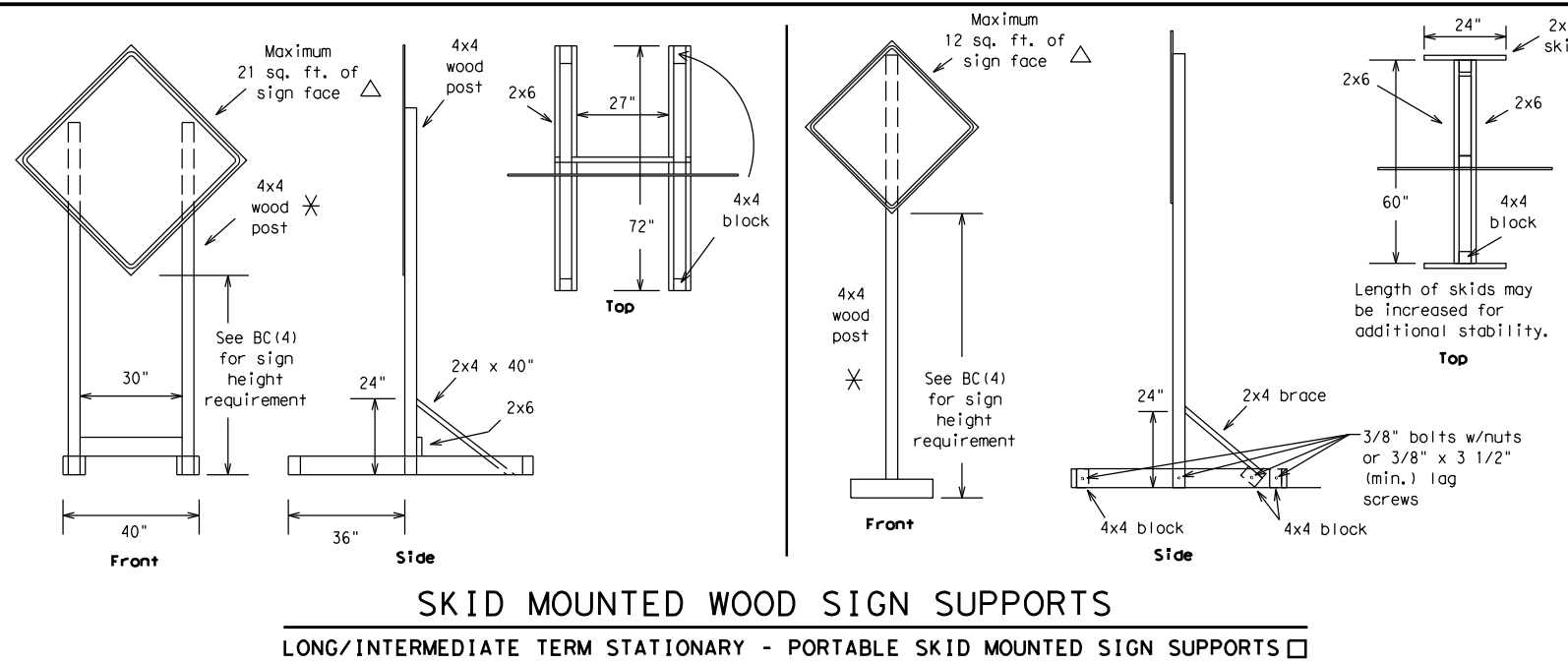
Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC (4) - 14

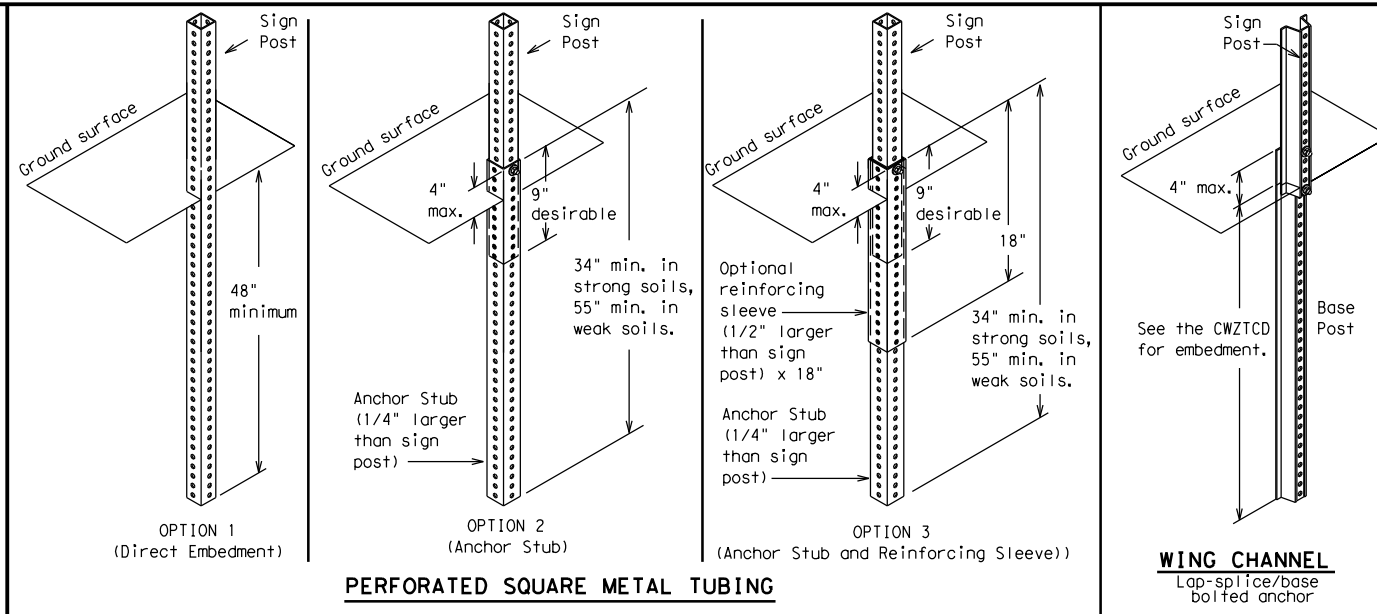
FILE:	bc-14.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS									
9-07	8-14	DIST		COUNTY	SHEET NO.				
7-13					26				

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act." No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



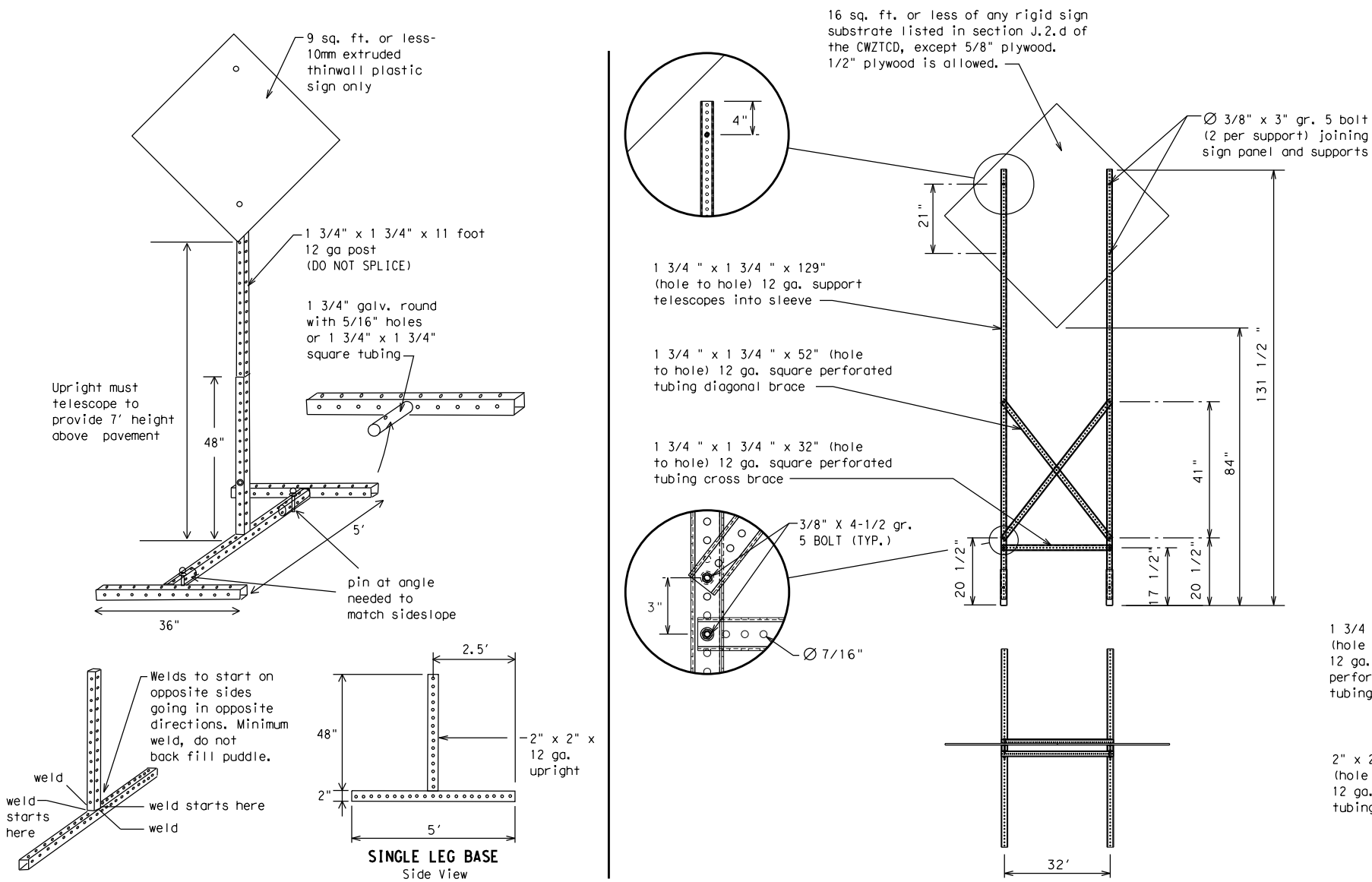
SKID MOUNTED WOOD SIGN SUPPORTS

LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □

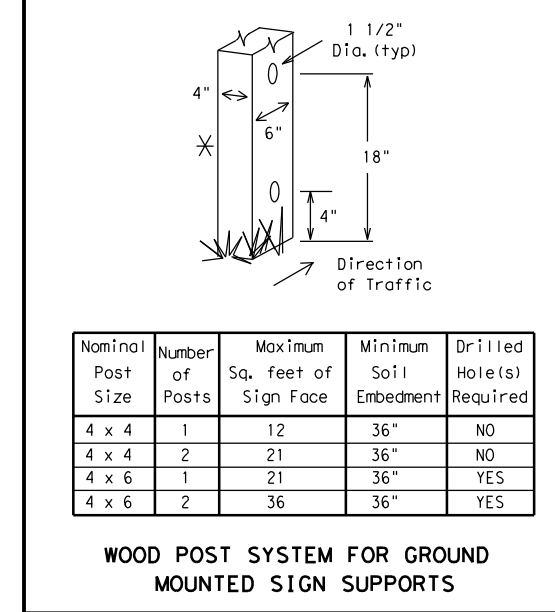


GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support. The maximum sign square footage shall adhere to the manufacturer's recommendation. Two post installations can be used for larger signs.

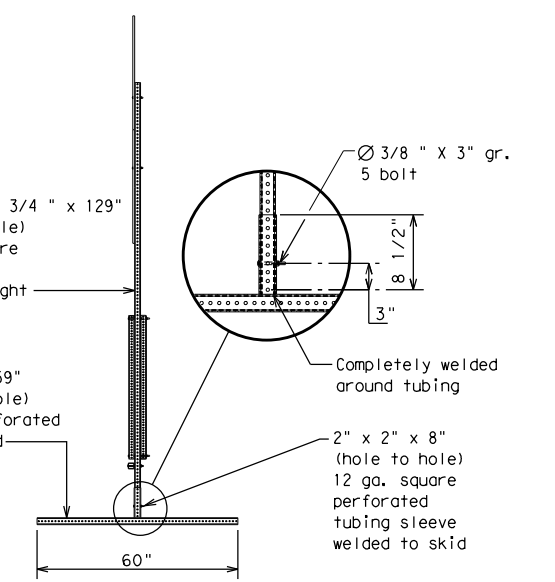


SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS



Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS



WEDGE ANCHORS

Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

- Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
- No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
- When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

- See BC(4) for definition of "Work Duration."
- ✱ Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.
- △ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12



BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5) - 14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
9-07	8-14			
7-13		DIST	COUNTY	SHEET NO.
				27

DATE: FILE:

WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

PORTABLE CHANGEABLE MESSAGE SIGNS

- The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
- Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
- Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
- Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
- The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
- Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
- Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
- Do not use the word "Danger" in message.
- Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
- Do not display messages that scroll horizontally or vertically across the face of the sign.
- The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
- PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
- Each line of text should be centered on the message board rather than left or right justified.
- If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE
ROAD CLOSED AT SH XXX
ROAD CLSD AT FM XXXX
RIGHT X LANES CLOSED
CENTER LANE CLOSED
NIGHT LANE CLOSURES
VARIOUS LANES CLOSED
EXIT CLOSED
MALL DRIVEWAY CLOSED
XXXXXXXX BLVD CLOSED

Other Condition List

FRONTAGE ROAD CLOSED
SHOULDER CLOSED XXX FT
RIGHT LN CLOSED XXX FT
RIGHT X LANES OPEN
DAYTIME LANE CLOSURES
I-XX SOUTH EXIT CLOSED
EXIT XXX CLOSED X MILE
RIGHT LN TO BE CLOSED
X LANES CLOSED TUE - FRI

ROADWORK XXX FT
FLAGGER XXXX FT
RIGHT LN NARROWS XXXX FT
MERGING TRAFFIC XXXX FT
LOOSE GRAVEL XXXX FT
DETOUR X MILE
ROADWORK PAST SH XXXX
BUMP XXXX FT
TRAFFIC SIGNAL XXXX FT

ROAD REPAIRS XXXX FT
LANE NARROWS XXXX FT
TWO-WAY TRAFFIC XX MILE
CONST TRAFFIC XXX FT
UNEVEN LANES XXXX FT
ROUGH ROAD XXXX FT
ROADWORK NEXT FRI-SUN
US XXX EXIT X MILES
LANES SHIFT *

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

MERGE RIGHT
DETOUR NEXT X EXITS
USE EXIT XXX
STAY ON US XXX SOUTH
TRUCKS USE US XXX N
WATCH FOR TRUCKS
EXPECT DELAYS
REDUCE SPEED XXX FT
USE OTHER ROUTES
STAY IN LANE *

Location List

AT FM XXXX
BEFORE RAILROAD CROSSING
NEXT X MILES
PAST US XXX EXIT
XXXXXXXX TO XXXXXXX
US XXX TO FM XXXX

Warning List

SPEED LIMIT XX MPH
MAXIMUM SPEED XX MPH
MINIMUM SPEED XX MPH
ADVISORY SPEED XX MPH
RIGHT LANE EXIT
USE CAUTION
DRIVE SAFELY
DRIVE WITH CARE

** Advance Notice List

TUE-FRI XX AM - X PM
APR XX - XX X PM - X AM
BEGINS MONDAY
BEGINS MAY XX
MAY X-X XX PM - XX AM
NEXT FRI-SUN
XX AM TO XX PM
NEXT TUE AUG XX
TONIGHT XX PM - XX AM

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

- Only 1 or 2 phases are to be used on a PCMS.
- The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
- A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
- A Location Phase is necessary only if a distance or location is not included in the first phase selected.
- If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
- For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

- The words RIGHT, LEFT and ALL can be interchanged as appropriate.
- Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
- EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
- Highway names and numbers replaced as appropriate.
- ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
- AHEAD may be used instead of distances if necessary.
- FT and MI, MILE and MILES interchanged as appropriate.
- AT, BEFORE and PAST interchanged as needed.
- Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

- When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
- When symbol signs, such as the "Flagger Symbol" (CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
- When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
- A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:

WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Canal	CANT	North	N
Center	CTR	Northbound	(route) N
Construction Ahead	CONST AHD	Parking	PKING
CROSSING	XING	Road	RD
Detour Route	DETOUR RTE	Right Lane	RT LN
Do Not	DONT	Saturday	SAT
East	E	Service Road	SERV RD
Eastbound	(route) E	Shoulder	SHLDR
Emergency	EMER	Slippery	SLIP
Emergency Vehicle	EMER VEH	South	S
Entrance, Enter	ENT	Southbound	(route) S
Express Lane	EXP LN	Speed	SPD
Expressway	EXPWY	Street	ST
XXXX Feet	XXXX FT	Sunday	SUN
Fog Ahead	FOG AHD	Telephone	PHONE
Freeway	FRWY, FWY	Temporary	TEMP
Freeway Blocked	FWY BLKD	Thursday	THURS
Friday	FRI	To Downtown	TO DWNTN
Hazardous Driving	HAZ DRIVING	Traffic	TRAF
Hazardous Material	HAZMAT	Travelers	TRVLR
High-Occupancy Vehicle	HOV	Tuesday	TUES
Highway	HWY	Time Minutes	TIME MIN
Hour(s)	HR, HRS	Upper Level	UPR LEVEL
Information	INFO	Vehicles (s)	VEH, VEHS
It Is	ITS	Warning	WARN
Junction	JCT	Wednesday	WED
Left	LFT	Weight Limit	WT LIMIT
Left Lane	LFT LN	West	W
Lane Closed	LN CLOSED	Westbound	(route) W
Lower Level	LWR LEVEL	Wet Pavement	WET PVMT
Maintenance	MAINT	Will Not	WONT

Roadway designation # IH-number, US-number, SH-number, FM-number



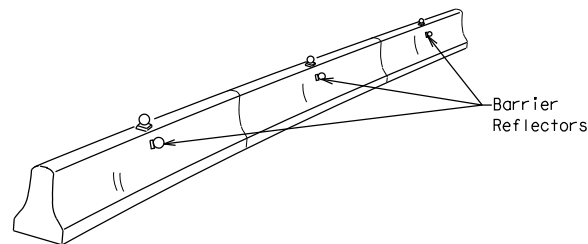
BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC (6) - 14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
9-07	8-14	DIST	COUNTY	SHEET NO.
7-13				28

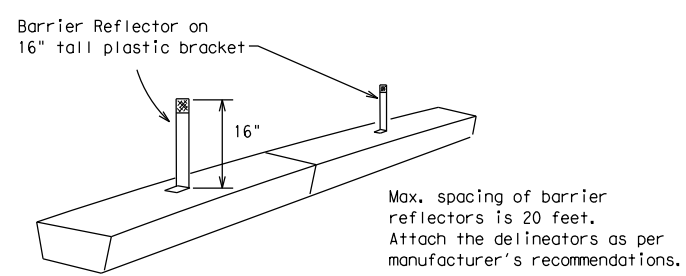
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.

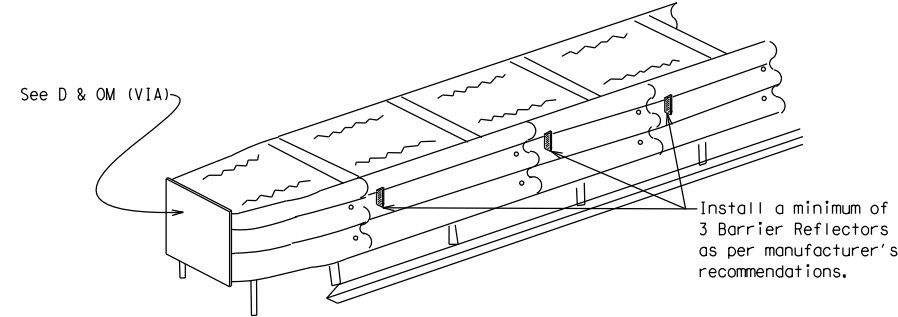


CONCRETE TRAFFIC BARRIER (CTB)

- Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
- Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional) while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
- When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
- Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
- Maximum spacing of Barrier Reflectors is forty (40) feet.
- Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
- Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
- Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
- Single slope barriers shall be delineated as shown on the above detail.



LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

END TREATMENTS FOR CTB'S USED IN WORK ZONES
 End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

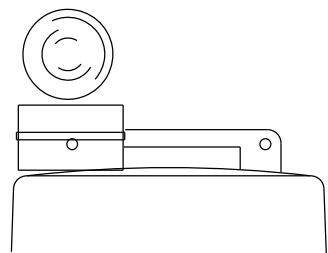
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B_{FL} or C_{FL} Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
- Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
- When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
- When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

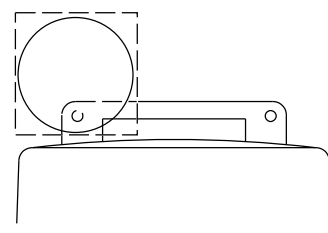
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
- Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
- Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
- Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
- The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

- A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
- The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
- The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
- The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.



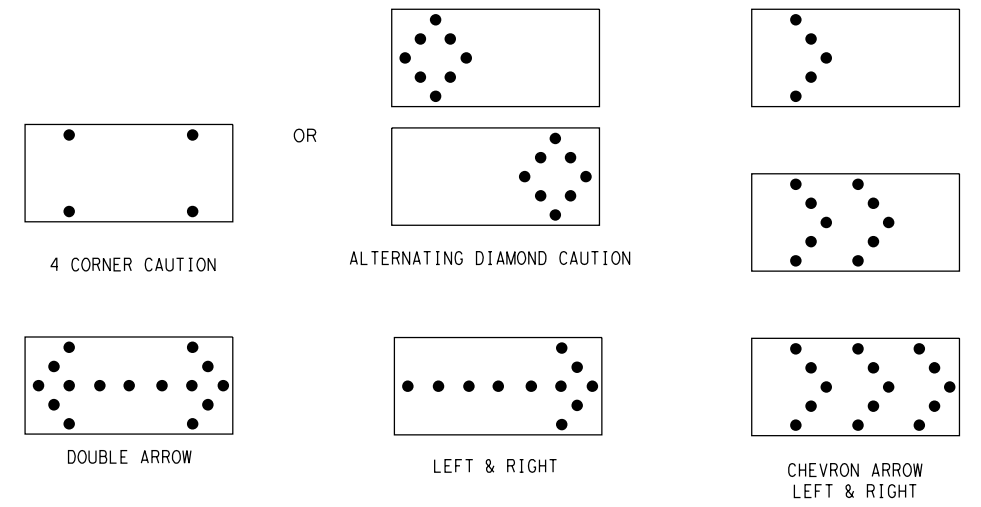
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

- The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
- Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
- The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
- The Flashing Arrow Board should be able to display the following symbols:



- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- The straight line caution display is NOT ALLOWED.
- The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
- Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
- The sequential arrow display is NOT ALLOWED.
- The flashing arrow display is the TxDOT standard; however, the sequential Chevron display may be used during daylight operations.
- The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
- A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
- Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION
 Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

SHEET 7 OF 12

TRUCK-MOUNTED ATTENUATORS

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350) or the Manual for Assessing Safety Hardware (MASH).
- Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
- Refer to the CWZTCD for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
- The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.



BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC (7) - 14

FILE:	bc-14.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
©TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS									
9-07	8-14								
7-13		DIST	COUNTY				SHEET NO.		
							29		

DATE:
FILE:

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

GENERAL NOTES

- For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
- For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
- For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
- Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
- The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

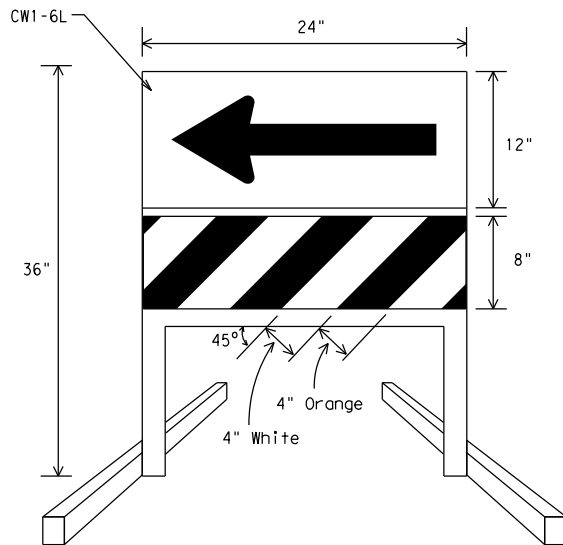
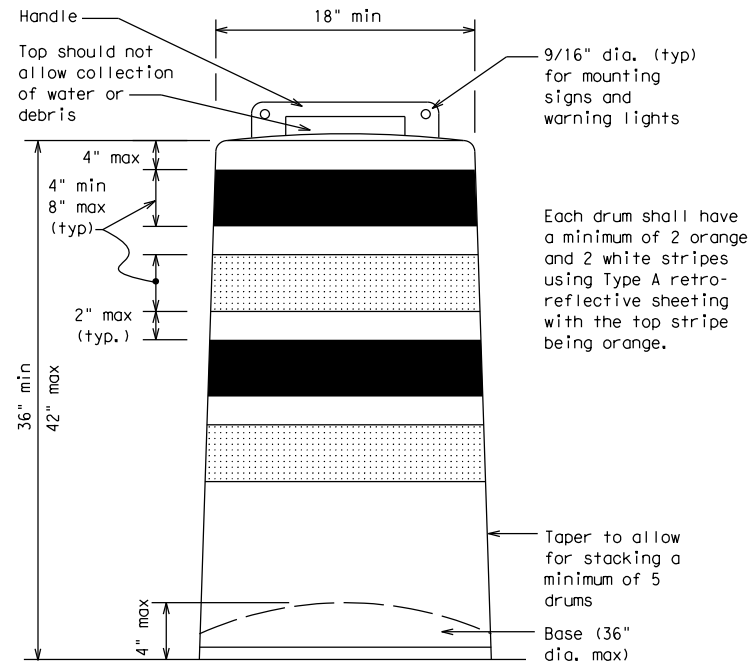
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
- Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
- Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
- The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
- The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectORIZED space between any two adjacent stripes shall not exceed 2 inches in width.
- Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
- Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
- Drum body shall have a maximum unballasted weight of 11 lbs.
- Drum and base shall be marked with manufacturer's name and model number.

RETROREFLECTIVE SHEETING

- The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A reflective sheeting shall be supplied unless otherwise specified in the plans.
- The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

- Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
- Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
- Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
- The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
- When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
- Ballast shall not be placed on top of drums.
- Adhesives may be used to secure base of drums to pavement.



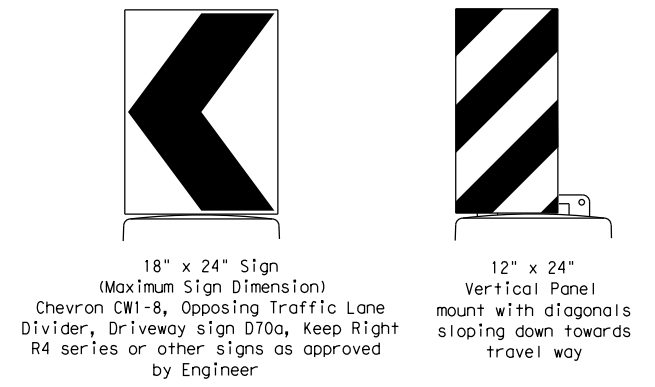
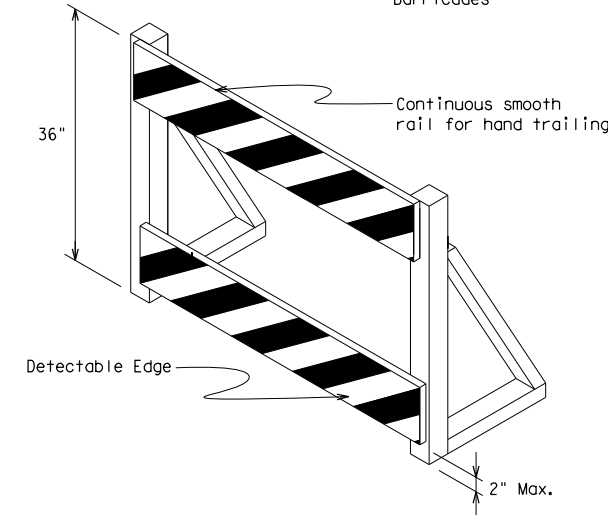
DIRECTION INDICATOR BARRICADE

- The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
- If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
- The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CWI-6) sign in the size shown with a black arrow on a background of Type B_{FL} or Type C_{FL} Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
- Double arrows on the Direction Indicator Barricade will not be allowed.
- Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.

DETECTABLE PEDESTRIAN BARRICADES

- When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility.
- Where pedestrians with visual disabilities normally use the closed sidewalk, a device that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.
- Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
- Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)" and should not be used as a control for pedestrian movements.
- Warning lights shall not be attached to detectable pedestrian barricades.
- Detectable pedestrian barricades may use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.

This detail is not intended for fabrication. See note 3 and the CWZTCD list for providers of approved Detectable Pedestrian Barricades



Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

- Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
- Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
- Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
- Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
- Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
- Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
- Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
- R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

SHEET 8 OF 12



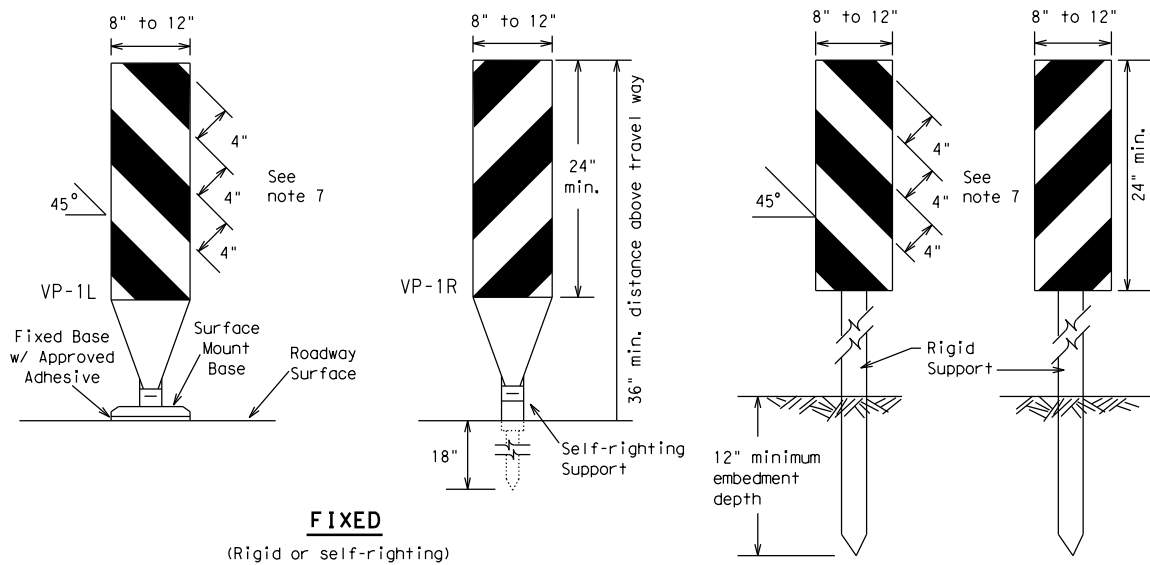
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (8) - 14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
4-03 7-13	DIST	COUNTY	SHEET NO.	
9-07 8-14			30	

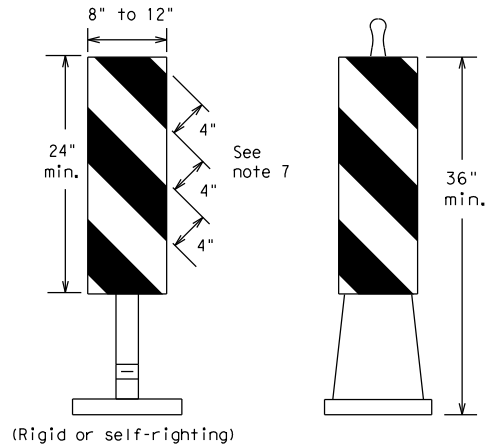
DATE: FILE:

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



FIXED
(Rigid or self-righting)

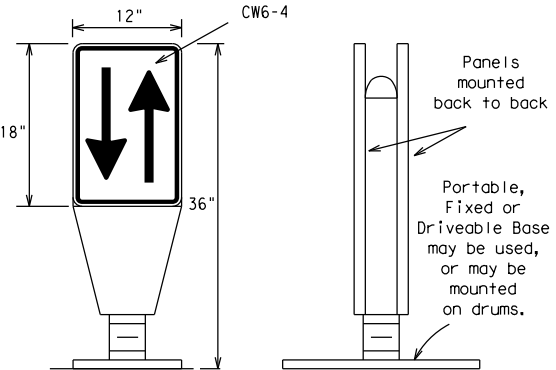
DRIVEABLE



PORTABLE

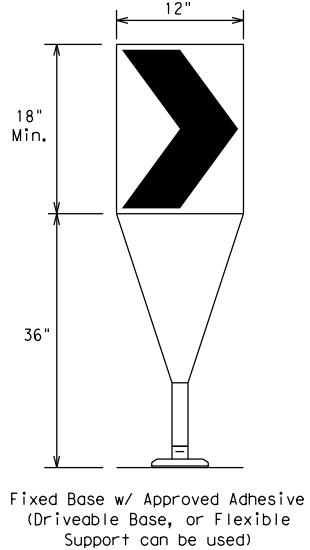
VERTICAL PANELS (VPs)

- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual Appendix B "Treatment of Pavement Drop-offs in Work Zones" for additional guidelines on the use of VP's for drop-offs.
- VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
- VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
- Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Sheeting for the VP's shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
- Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.



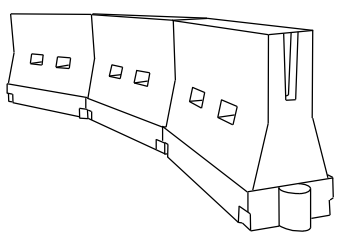
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

- Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
- The OTLD may be used in combination with 42" cones or VPs.
- Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
- The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.



- The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
- Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
- Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
- To be effective, the chevron should be visible for at least 500 feet.
- Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
- For Long Term Stationary use on tapers or transitions on freeways and divided highways self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

- LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
- LCDs may be used instead of a line of cones or drums.
- LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
- LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10) placed near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

- Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
- Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
- Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
- When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

GENERAL NOTES

- Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
- Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
- Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
- Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
- The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	L = WS ² / 60	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L = WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

**Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (9) - 14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13			31	

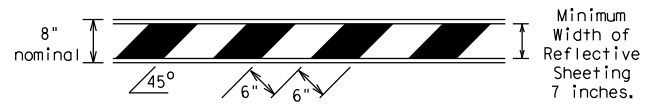
DATE: FILE:

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

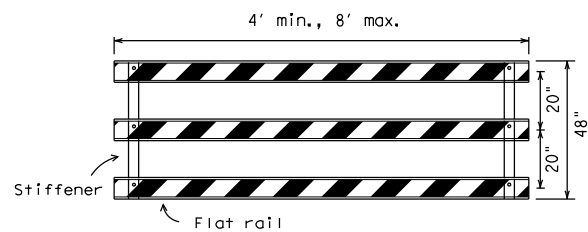
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.

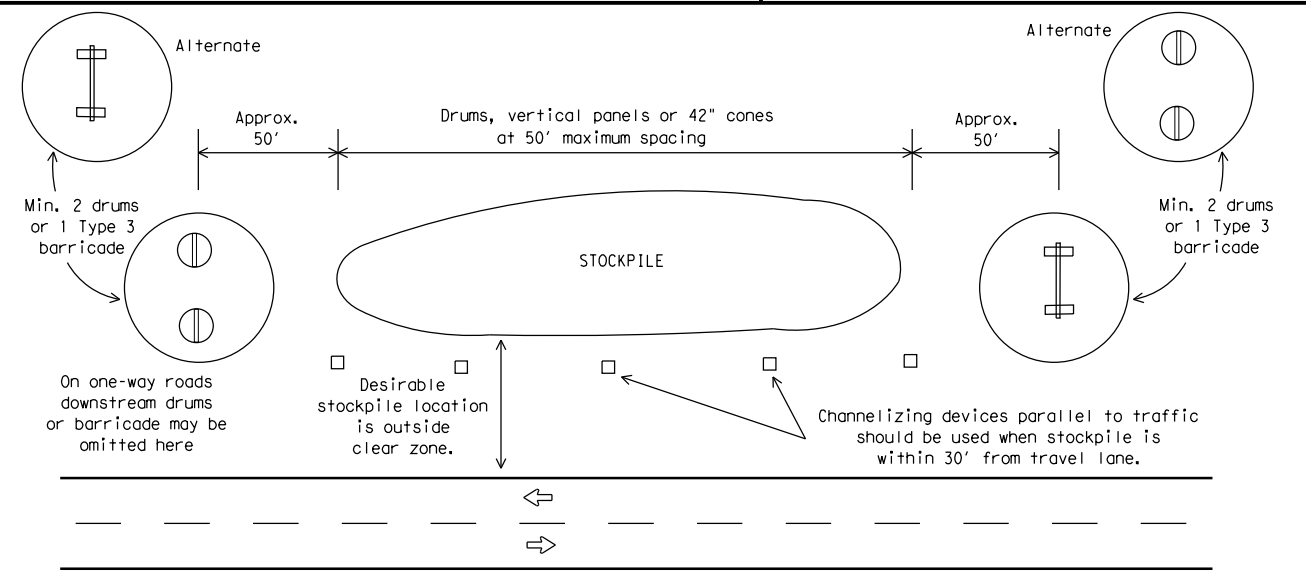


TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



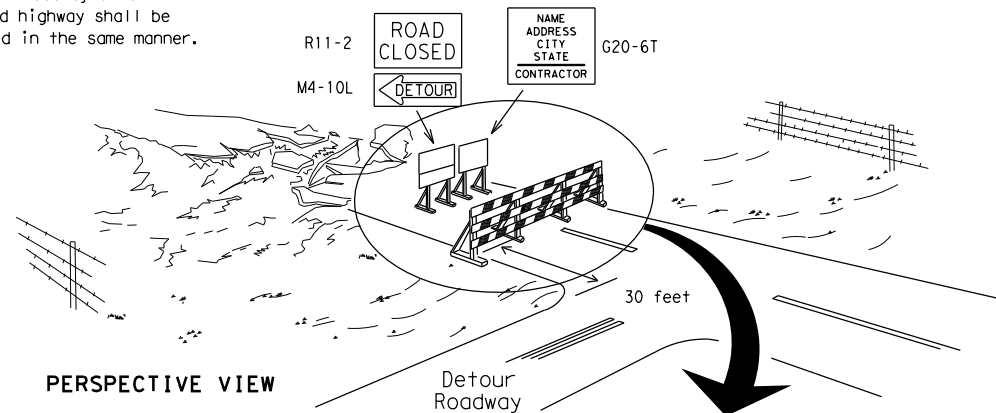
Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES



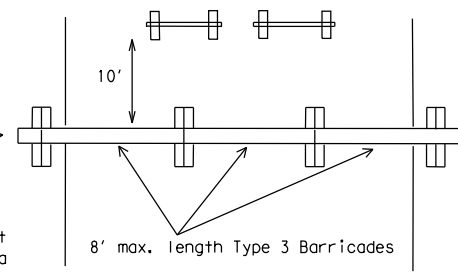
TRAFFIC CONTROL FOR MATERIAL STOCKPILES

Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

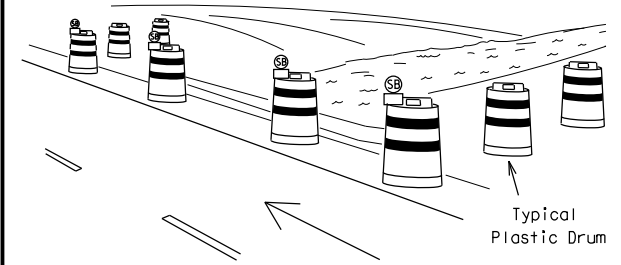
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



PLAN VIEW

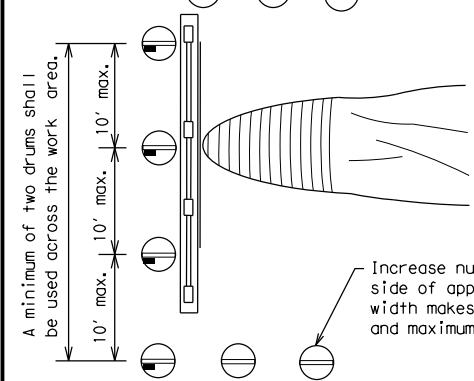
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

Typical Plastic Drum
These drums are not required on one-way roadway



PLAN VIEW

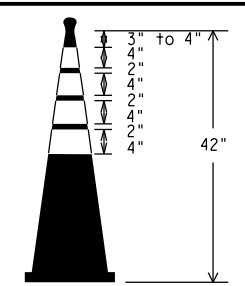
Increase number of plastic drums on the side of approaching traffic if the crown width makes it necessary. (minimum of 2 and maximum of 4 drums)

1. Where positive redirection capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.

LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
	Steady burn warning light or yellow warning reflector

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



EDGE LINE CHANNELIZER

1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

SHEET 10 OF 12



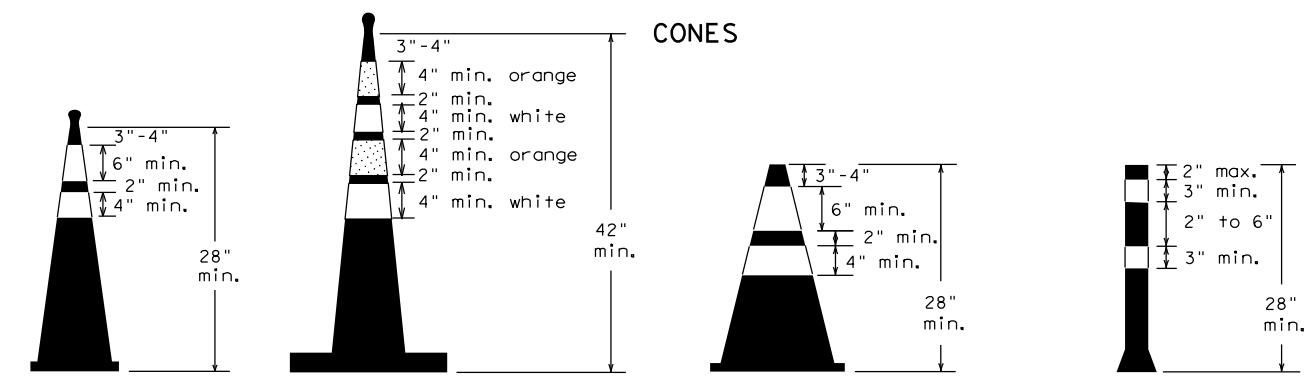
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (10) - 14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
9-07	8-14	DIST	COUNTY	SHEET NO.
7-13				32

28" Cones shall have a minimum weight of 9 1/2 lbs.
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers used at night shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



Two-Piece cones

One-Piece cones

Tubular Marker

WORK ZONE PAVEMENT MARKINGS

GENERAL

- The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
- Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Additional supplemental pavement marking details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
- When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
- When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
- All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

- Raised pavement markers are to be placed according to the patterns on BC(12).
- All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

- Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
- Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

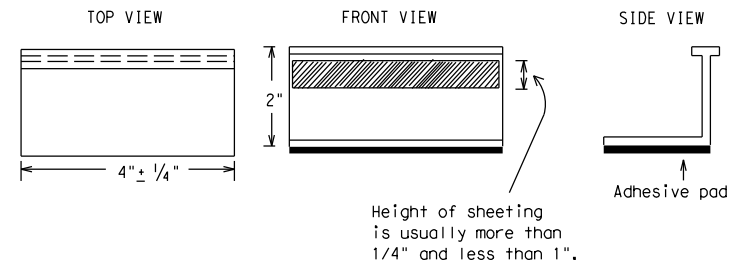
MAINTAINING WORK ZONE PAVEMENT MARKINGS

- The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
- Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
- The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
- Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

- Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
- The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
- Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
- The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
- Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
- Blast cleaning may be used but will not be required unless specifically shown in the plans.
- Over-painting of the markings SHALL NOT BE permitted.
- Removal of raised pavement markers shall be as directed by the Engineer.
- Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
- Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



**STAPLES OR NAILS SHALL NOT BE USED TO SECURE
TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER
TABS TO THE PAVEMENT SURFACE**

- Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
- Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
 - Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
 - Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
- Small design variances may be noted between tab manufacturers.
- See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

- Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
- All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
- Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
 YELLOW - (two amber reflective surfaces with yellow body).
 WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

SHEET 11 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

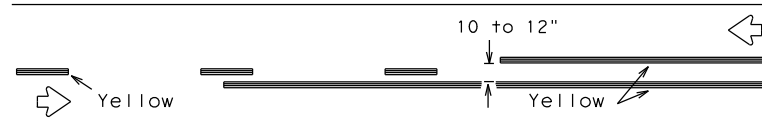
BC(11) - 14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS				
2-98 9-07	DIST	COUNTY	SHEET NO.	
1-02 7-13			33	
11-02 8-14				

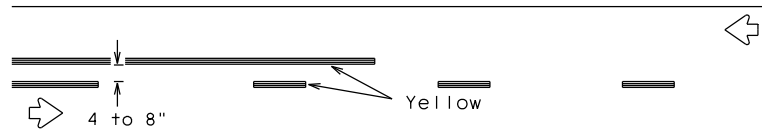
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

PAVEMENT MARKING PATTERNS

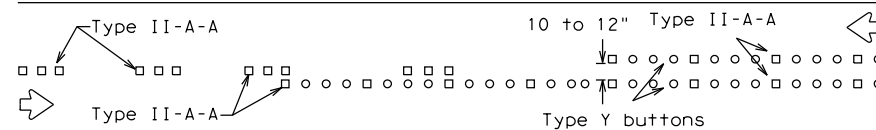


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

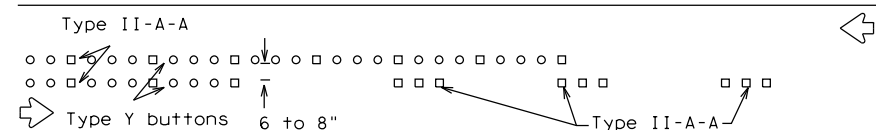


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectORIZED pavement markings.

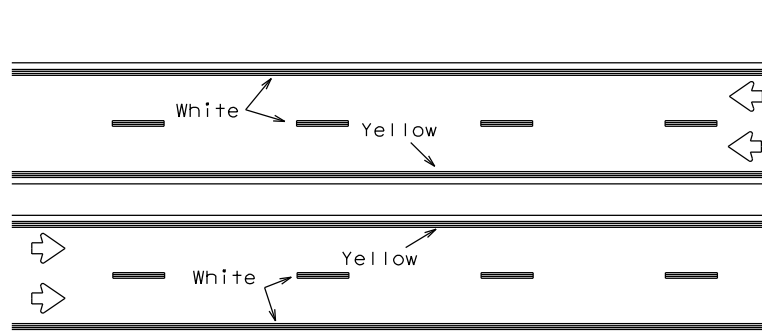


RAISED PAVEMENT MARKERS - PATTERN A



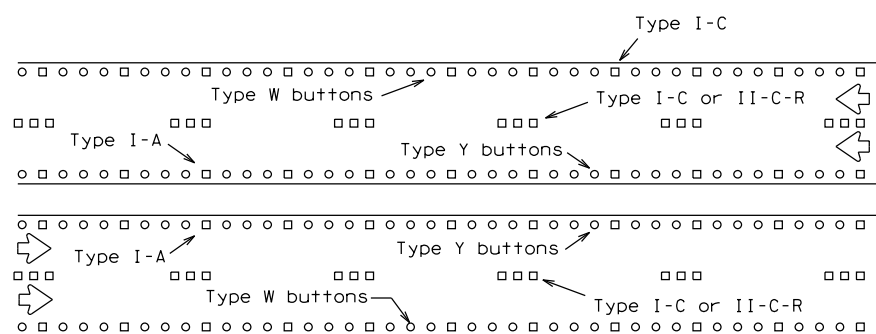
RAISED PAVEMENT MARKERS - PATTERN B

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



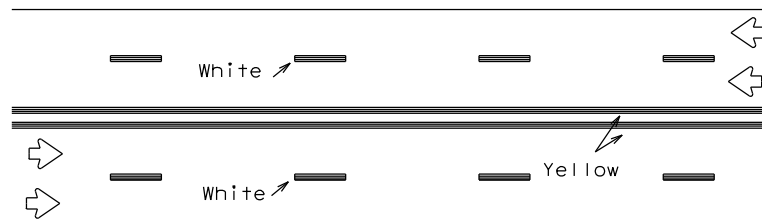
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



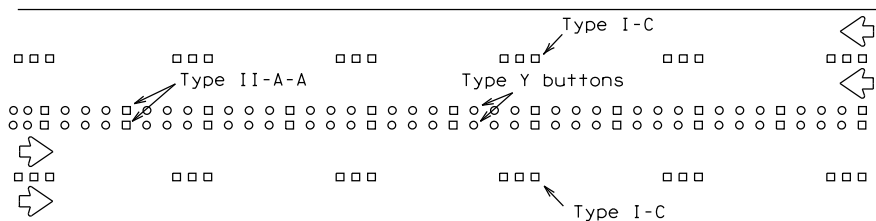
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



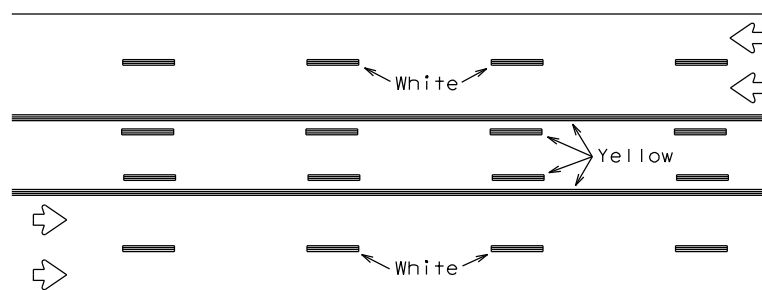
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



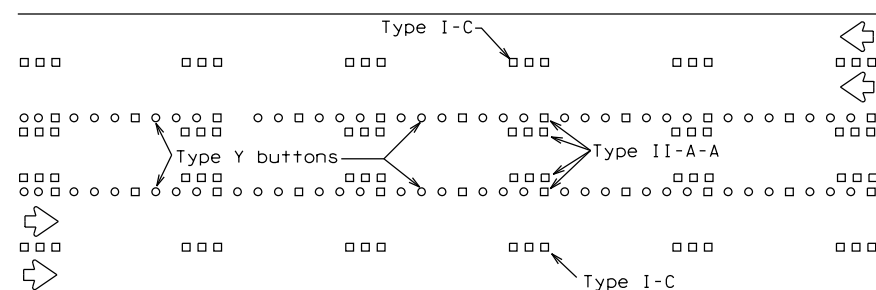
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

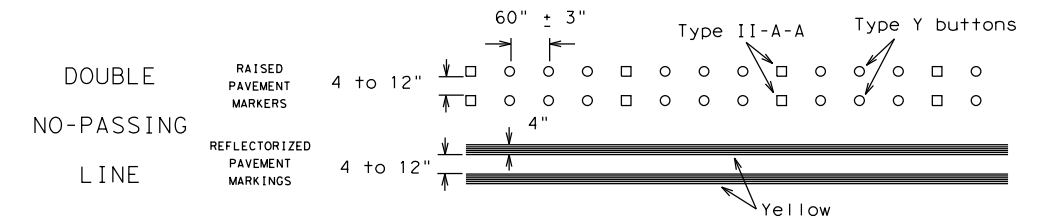
Prefabricated markings may be substituted for reflectORIZED pavement markings.



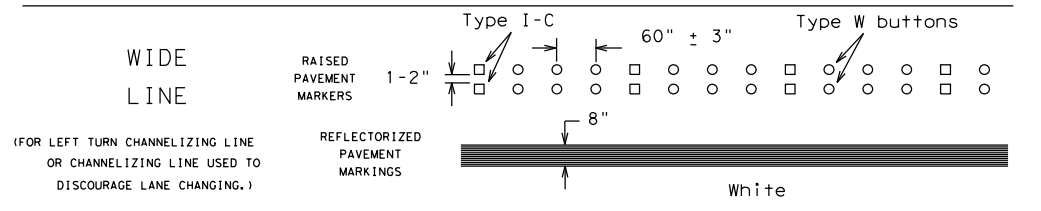
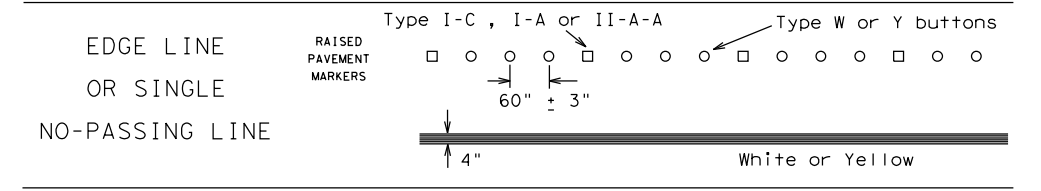
RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

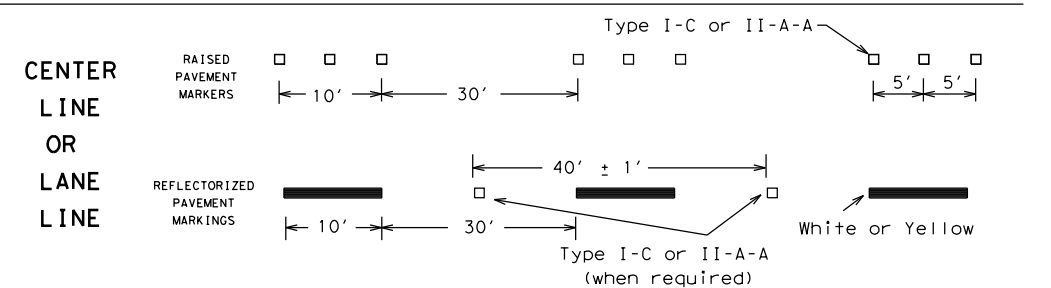


SOLID LINES

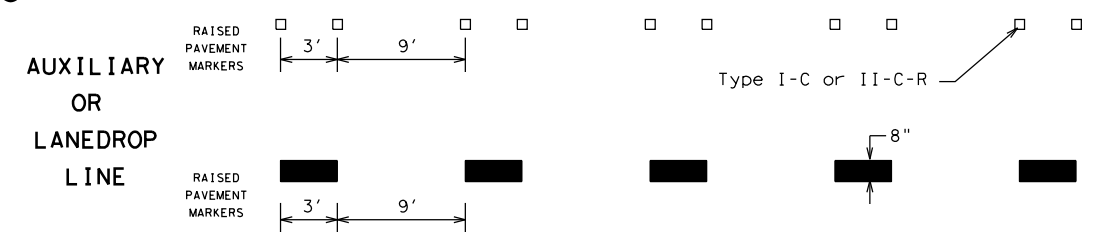


(FOR LEFT TURN CHANNELIZING LINE OR CHANNELIZING LINE USED TO DISCOURAGE LANE CHANGING.)

BROKEN LINES

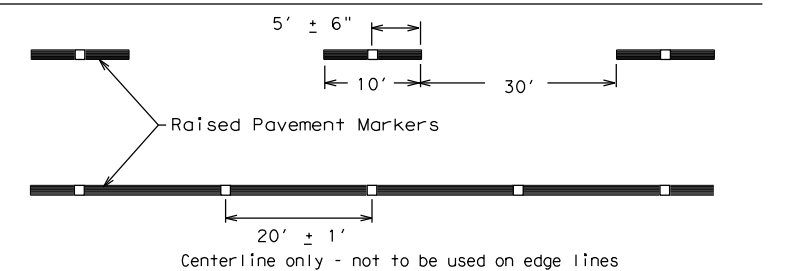


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



SHEET 12 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC (12) - 14

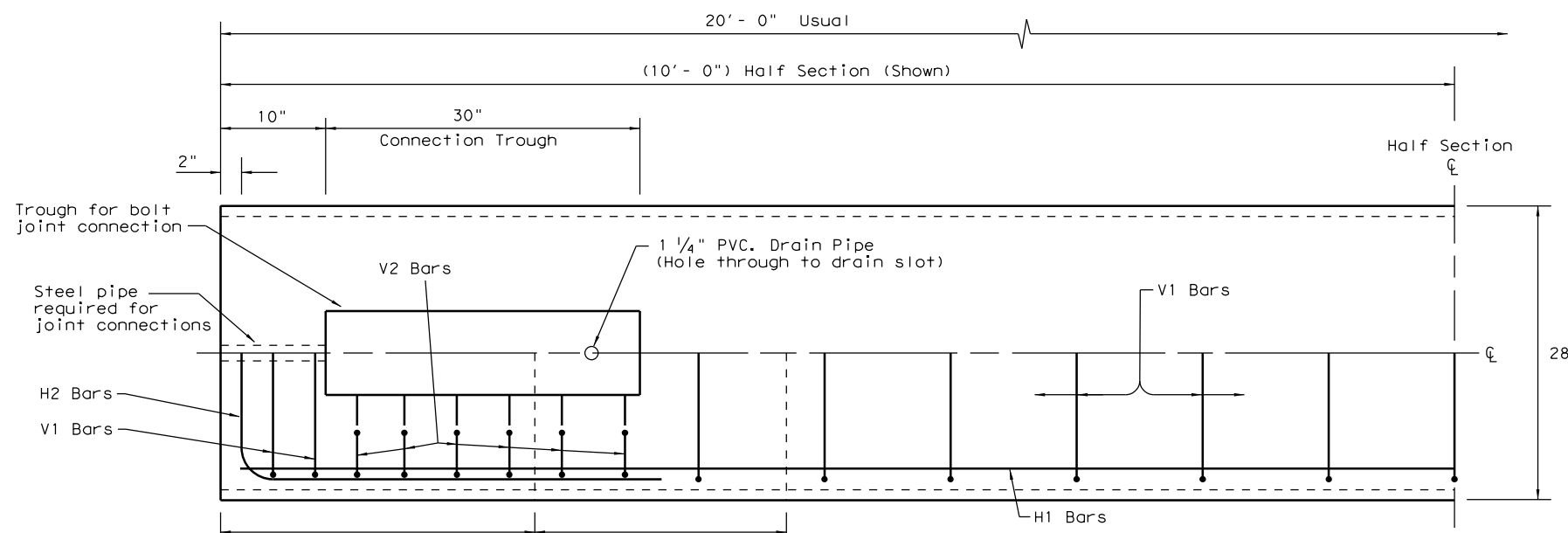
FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS				
1-97 9-07				
2-98 7-13				
11-02 8-14				
	DIST	COUNTY	SHEET NO.	
			34	

Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

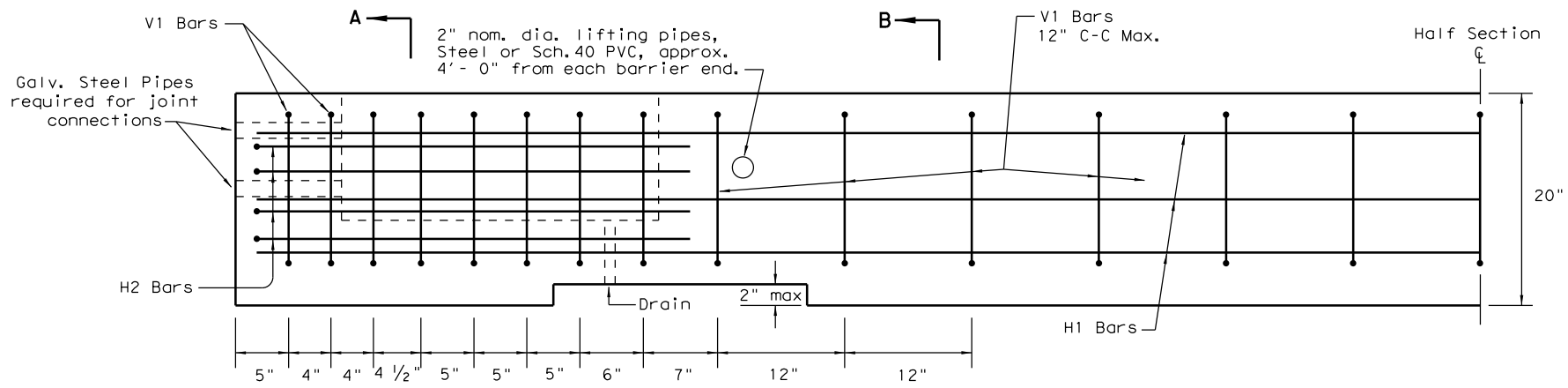
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TXDOT for any purpose whatsoever. TXDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

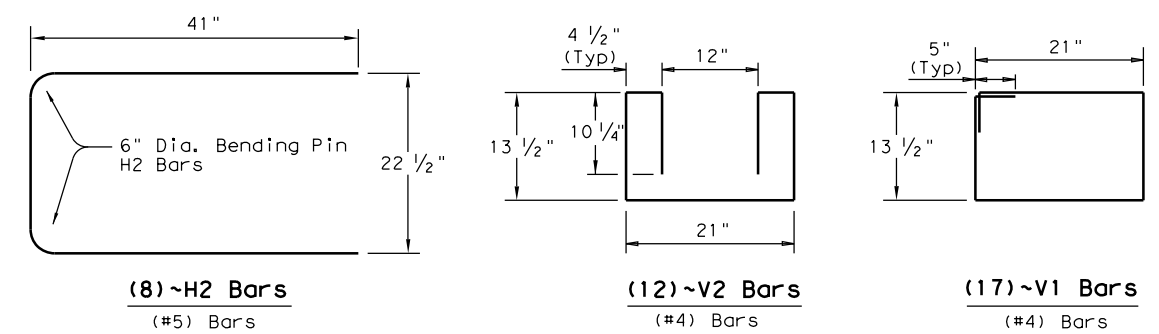
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



PLAN
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)

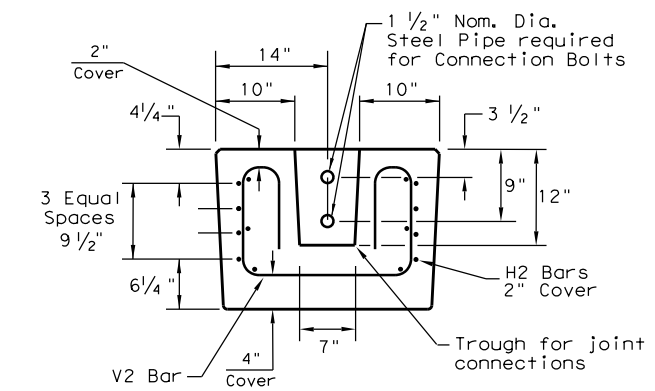


ELEVATION
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)

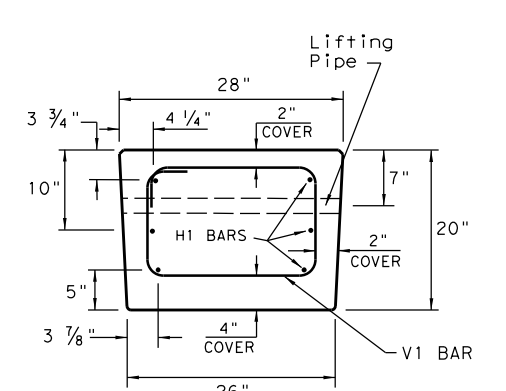


REINFORCING STEEL DETAILS
TYPE 1 - BARRIER SEGMENT

Note: Use 2" Dia. Bending Pin, unless otherwise shown



SECTION A-A



SECTION B-B

GENERAL NOTES

1. Low Profile Concrete Barrier (LPCB), is approved for use in temporary work zone locations, where the posted speed is 45 mph, or less.
2. Concrete shall be Class H for precast barrier with a minimum compressive strength of 3,600 psi.
3. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
4. Precast LPCB barrier length shall be 20 ft.
5. All barrier edges shall have 3/4" chamfer or a tooled radius.
6. Joint connection hardware shall be in accordance with Item 449, "Anchor Bolts." and is considered subsidiary.
7. Steel pipe required for joint connection bolts shall be galvanized in accordance with Item 445, "Galvanizing."
8. Welded wire reinforcement (WWR) may be used in lieu of conventional reinforcement for Type 1 barrier, and shall meet the requirements shown.

FOR CONTRACTORS INFORMATION ONLY

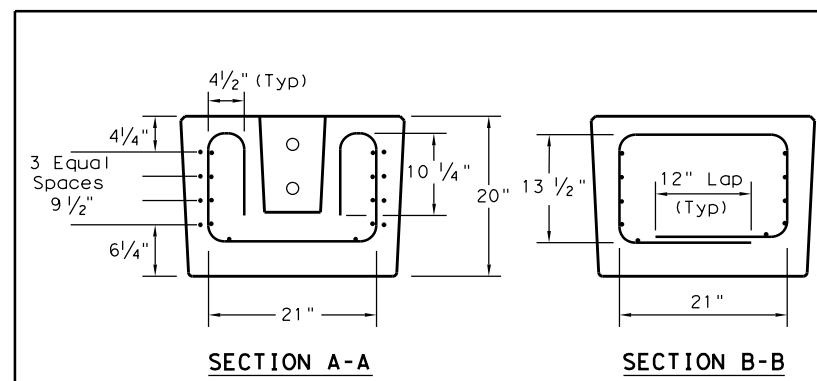
(TYPE 1) APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	2.6
REINFORCING STEEL	LBS	330
TOTAL BARRIER WT.	LBS	11000

(WWR) GENERAL NOTES

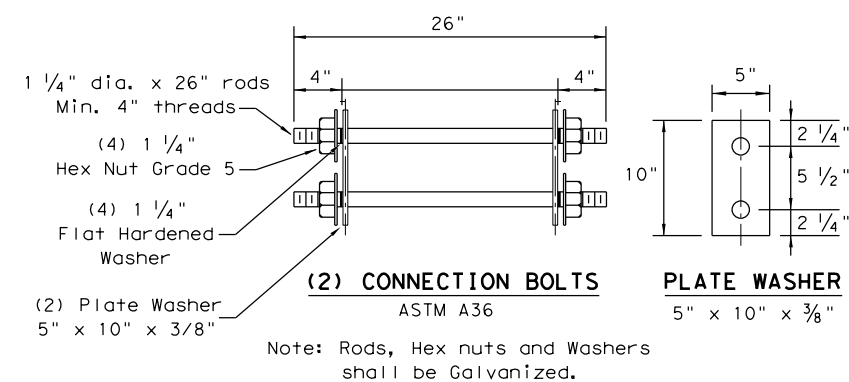
1. Deformed Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded wire cage may be cut or bent, if necessary, but must be approved by the Engineer.
3. Combinations of reinforcing steel and WWR are permitted, as directed by the Engineer. The dimensions from the end of the barrier section to the first wire shall not exceed 3".

REQUIRED (WWR) WIRE DESIGN

- 8 ~ (D31) Horizontal Wires (Equally spaced)
- 10 ~ (D20) Horizontal Wires (Equally spaced)
- 29 ~ (D20) Vertical Wires (Spaced as shown in Elevation View)



WELDED WIRE REINFORCEMENT (WWR) - OPTIONAL REINFORCING



Note: Rods, Hex nuts and Washers shall be Galvanized.



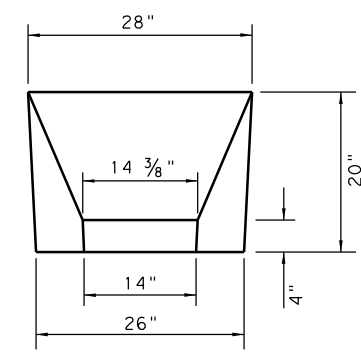
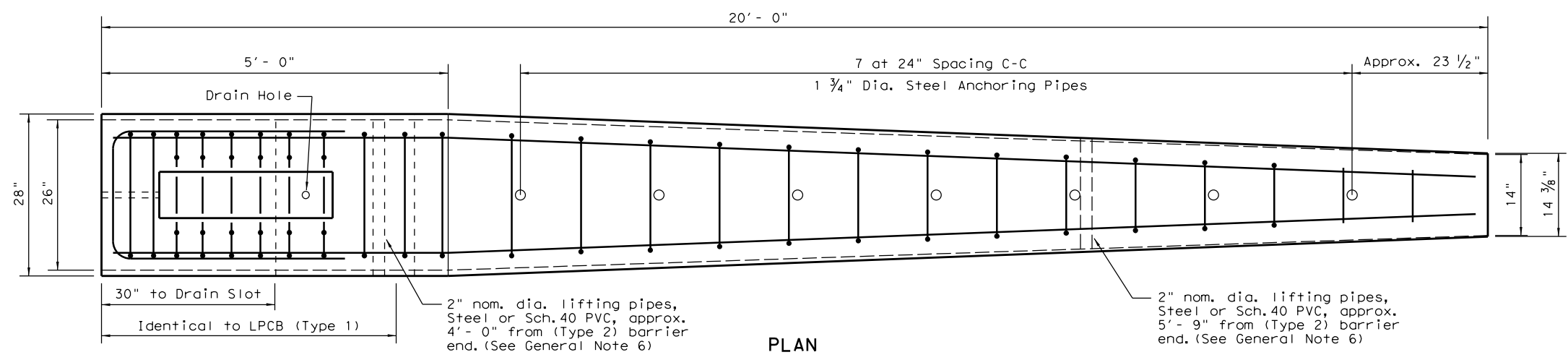
LOW PROFILE CONCRETE BARRIER PRECAST BARRIER (TYPE 1) LPCB-13

FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
© TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
DIST	COUNTY			SHEET NO.
				35

DATE:
FILE:

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

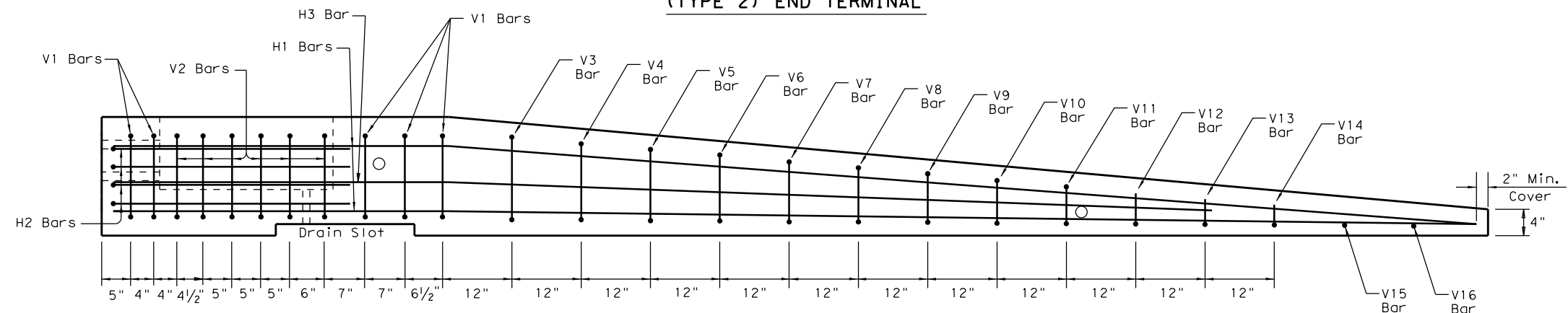
DATE: FILE:



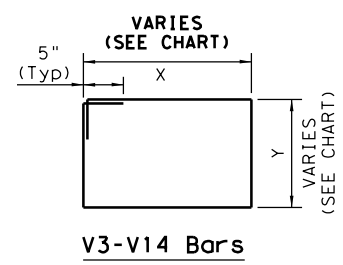
APPROACH VIEW

TYPE 2 - NOTES

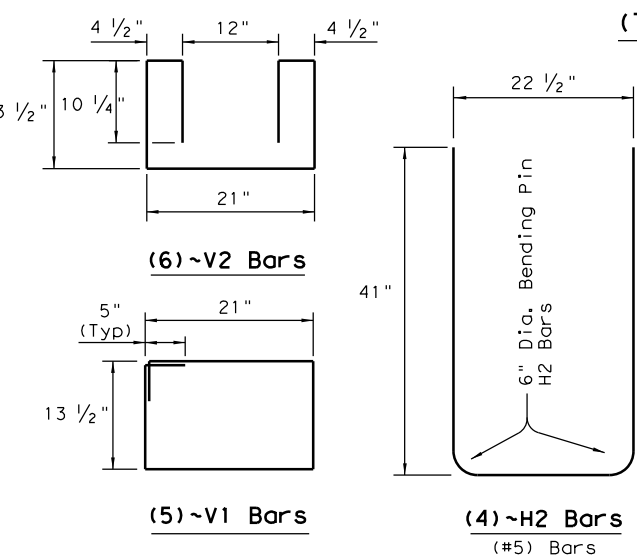
1. Welded wire reinforcement (WWR) is "not" an option for Type 2 Barrier.
2. Type 2 Barrier shall be used as an end treatment for the Type 1 barrier segments, when applicable.
3. The end treatment can be used without the anchor pins in locations that can accommodate approximately 4 ft. of lateral displacement of the end treatment. The use of non-pinned end treatment does not affect the performance or the deflection of the Low-Profile barrier system.
4. The anchor pins are all the same length and are to be driven flush with the top of the (Type 2) barrier surface.
5. The bends in the H3 and H1 bars are slight, no formal bend is necessary.
6. The Type 2 barrier segment must be lifted from the rear first, to prevent cracking of sloped section.
7. See LPCB sheet 1 for additional information.



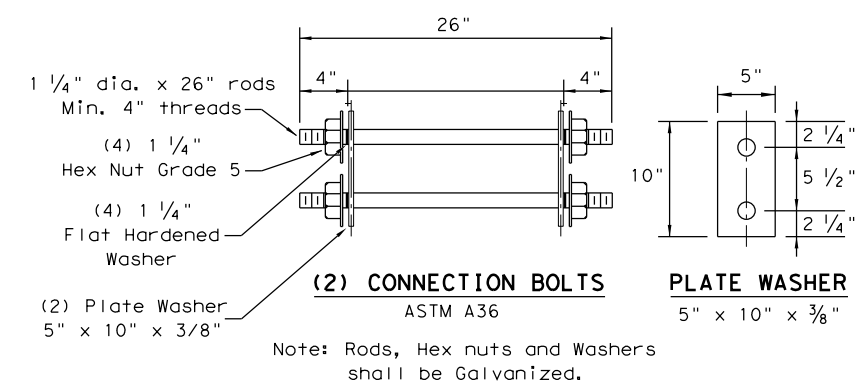
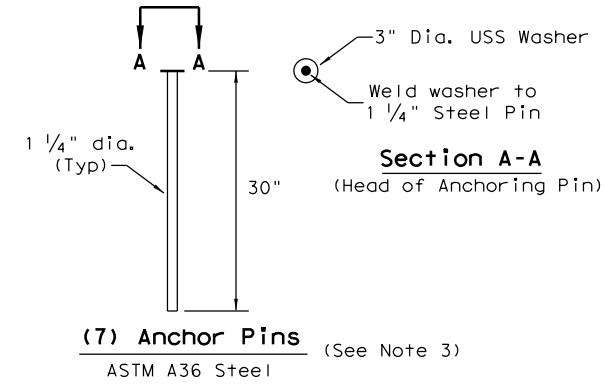
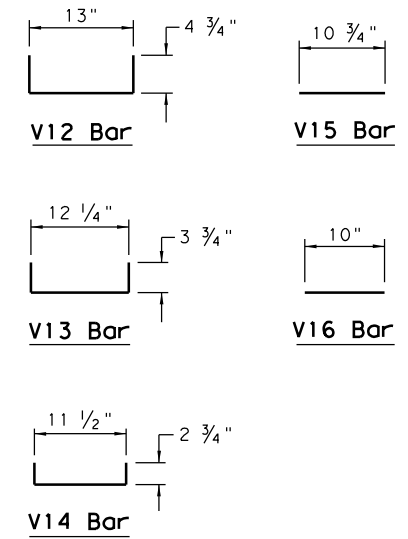
ELEVATION (TYPE 2) END TERMINAL



BAR (#4)	X (IN.)	Y (IN.)
V3 BAR	20 1/4	14 1/2
V4 BAR	19 1/2	13 1/2
V5 BAR	18 1/2	12 1/4
V6 BAR	17 1/2	11 1/4
V7 BAR	17	10 1/4
V8 BAR	16 1/4	9
V9 BAR	15 1/2	8
V10 BAR	14 1/2	7
V11 BAR	13 3/4	6



REINFORCING STEEL DETAILS
TYPE 2 - END TERMINAL



FOR CONTRACTORS INFORMATION ONLY

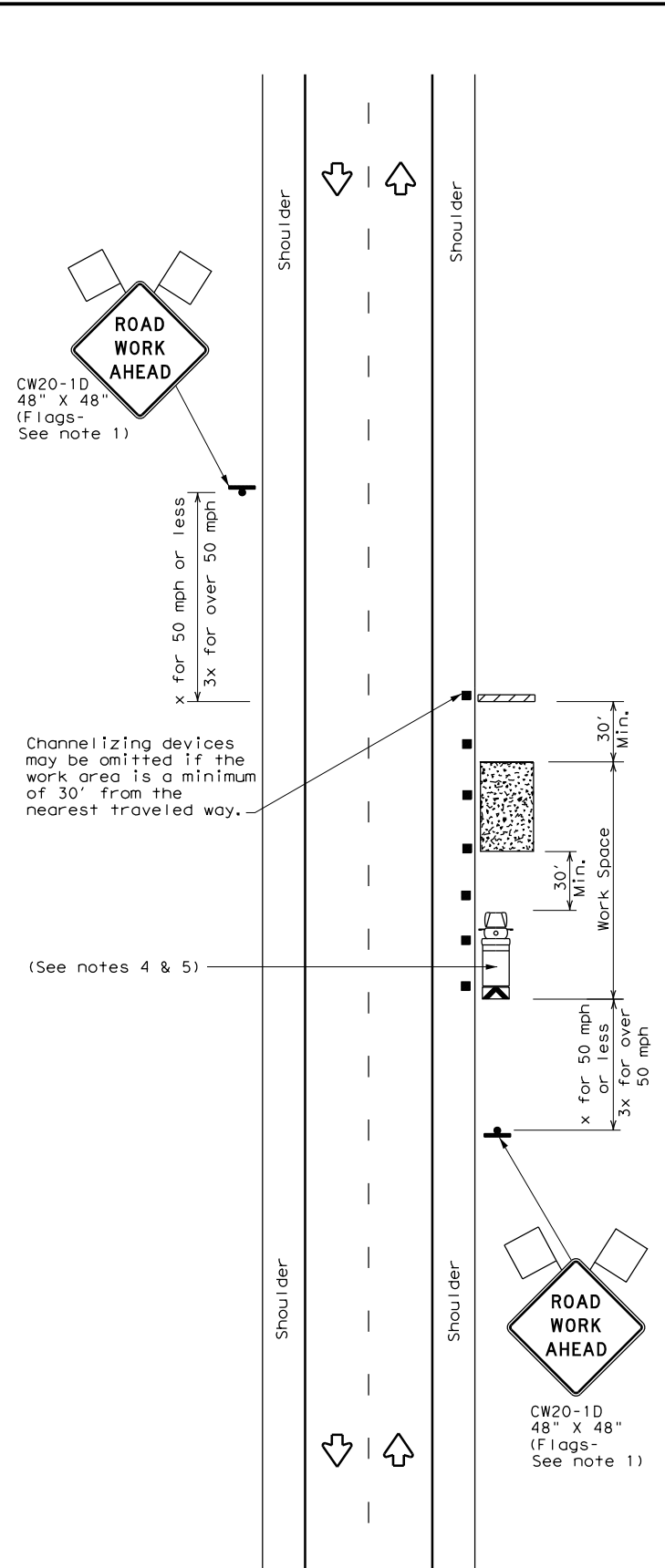
(TYPE 2)		
APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	1.65
REINFORCING STEEL	LBS	240
TOTAL BARRIER WT.	LBS	7000

SHEET 2 OF 2

		Design Division Standard	
LOW PROFILE CONCRETE BARRIER PRECAST BARRIER (TYPE 2) LPCB-13			
FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP
© TxDOT December 2010	CONT	SECT	JOB
REVISIONS		HIGHWAY	
DIST	COUNTY	SHEET NO.	
		36	

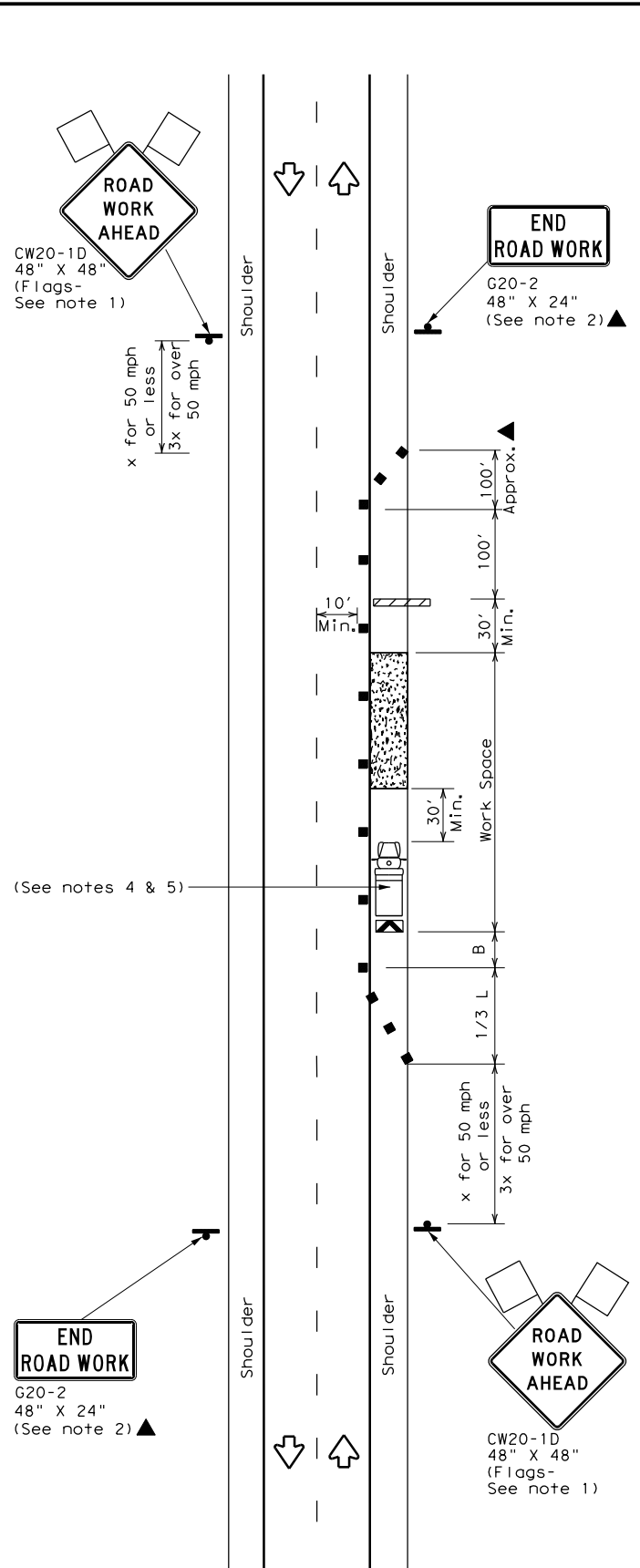
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:



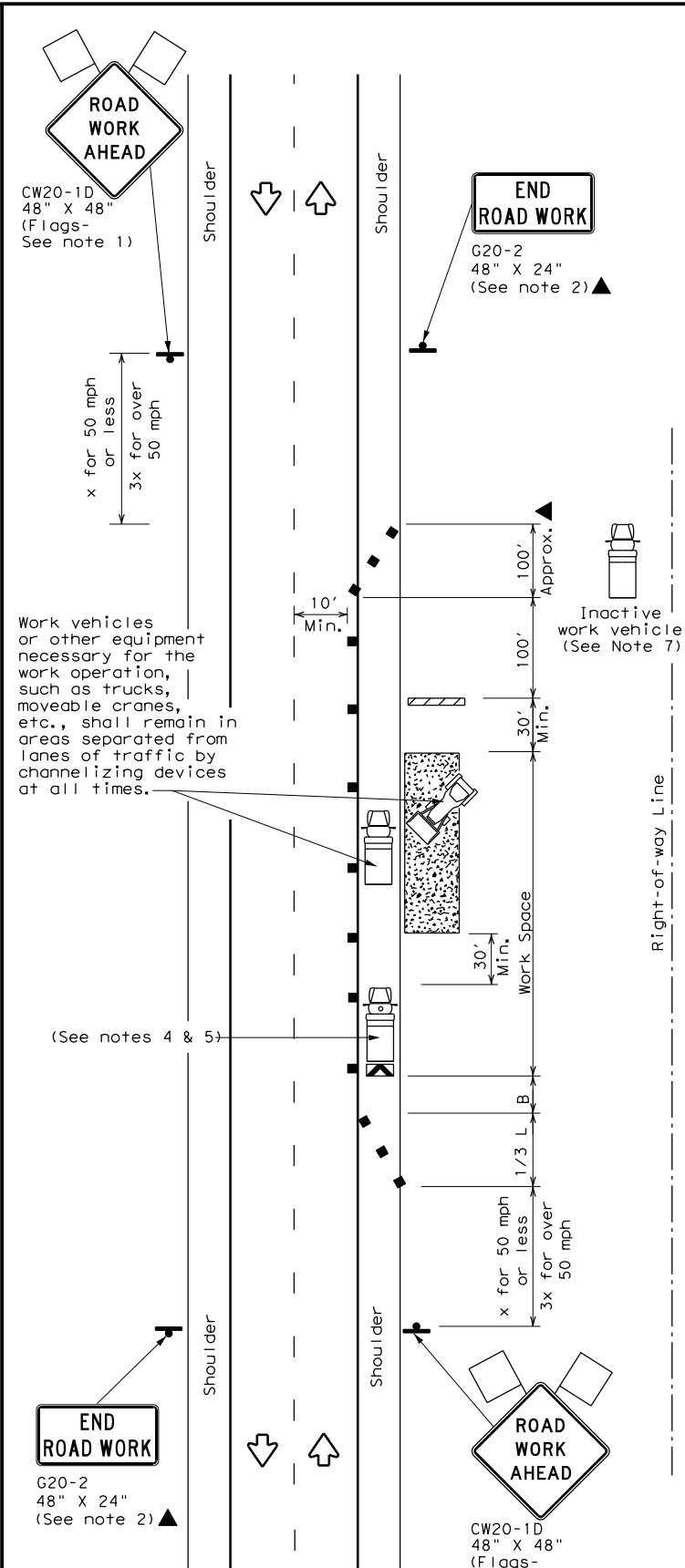
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	✓

GENERAL NOTES

- Flags attached to signs where shown, are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
- Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
- Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
- Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
- CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.



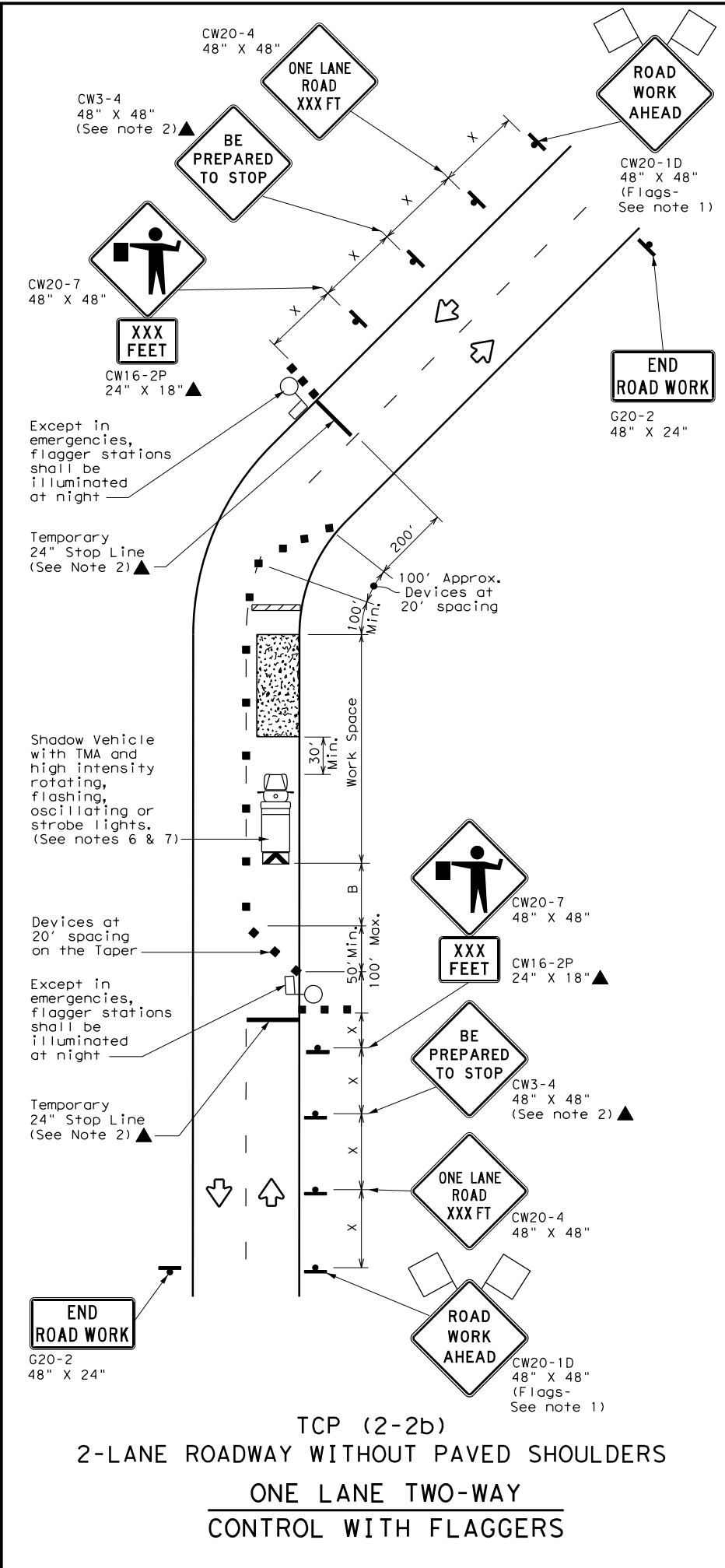
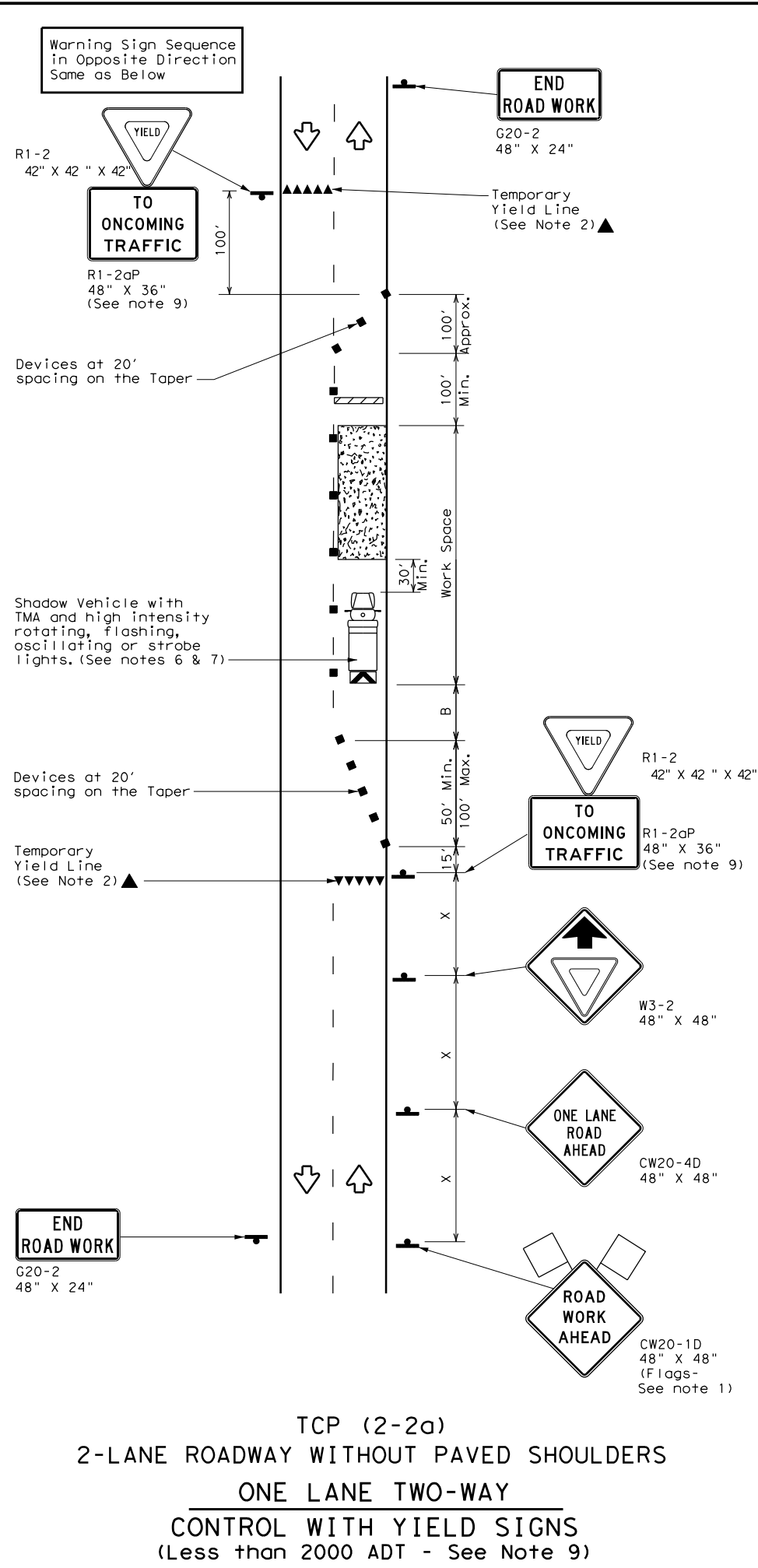
TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

TCP (2-1) - 18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS				
2-94 4-98				
8-95 2-12				
1-97 2-18				
	DIST	COUNTY	SHEET NO.	
			37	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 7/10/2020 4:43:35 PM
 FILE: ...Standards\tcp2-2-18.dgn



LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	L = WS ² / 60	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
 ** Taper lengths have been rounded off.
 L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE

	MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
		✓	✓	✓	

- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
 - Flaggers should use two-way radios or other methods of communication to control traffic.
 - Length of work space should be based on the ability of flaggers to communicate.
 - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- TCP (2-2a)**
- The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
 - The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.
- TCP (2-2b)**
- Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
 - If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
 - Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

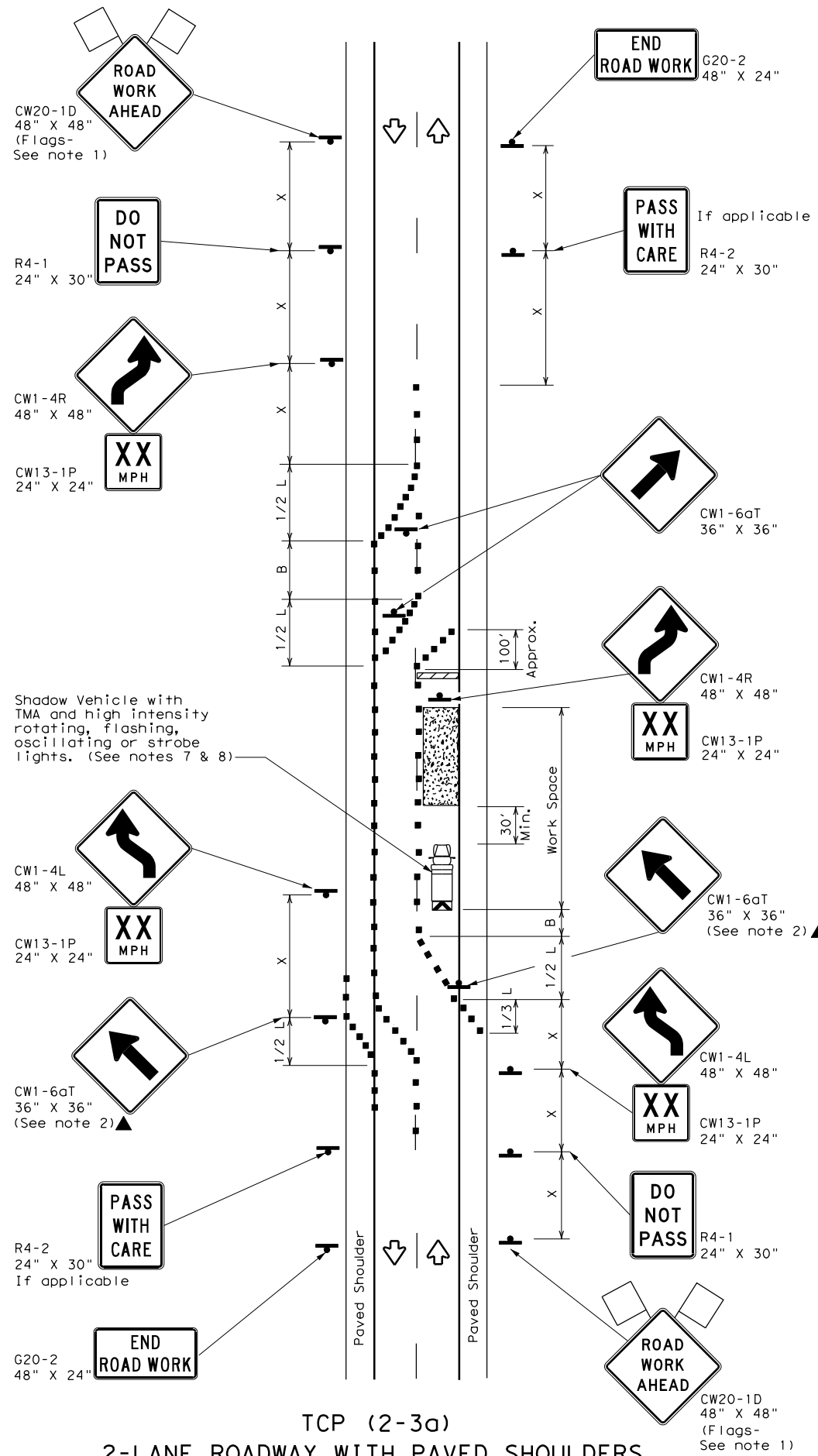
TCP (2-2) - 18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS				
8-95 3-03				
1-97 2-12				
4-98 2-18				
DIST	COUNTY	SHEET NO.		38

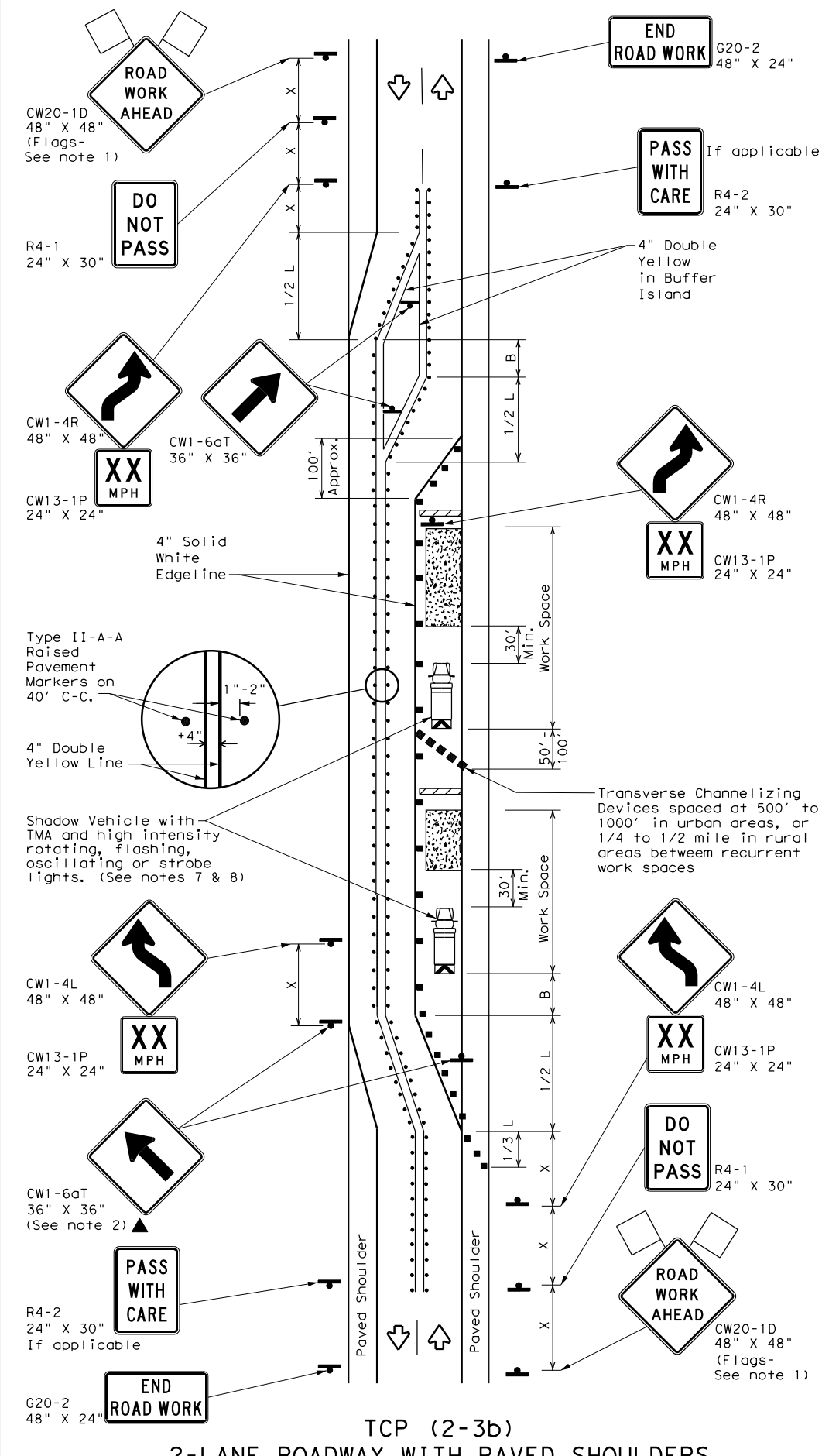
162

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 7/10/2020 4:43:35 PM
 FILE: ...Standards\Tcp2-3-18.dgn



TCP (2-3a)
 2-LANE ROADWAY WITH PAVED SHOULDERS
 ONE LANE CLOSED
 ADEQUATE FIELD OF VIEW



TCP (2-3b)
 2-LANE ROADWAY WITH PAVED SHOULDERS
 ONE LANE CLOSED
 INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Raised Pavement Markers Ty II-AA
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
 ** Taper lengths have been rounded off.
 L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
			✓	✓
				TCP (2-3b) ONLY

- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
 - Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
 - The R4-1 "DO NOT PASS," R4-2 "PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
 - Conflicting pavement marking shall be removed for long term projects.
 - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

- TCP (2-3a)**
- Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter device spacing is intended for the area of the conflicting markings, not the entire work zone.



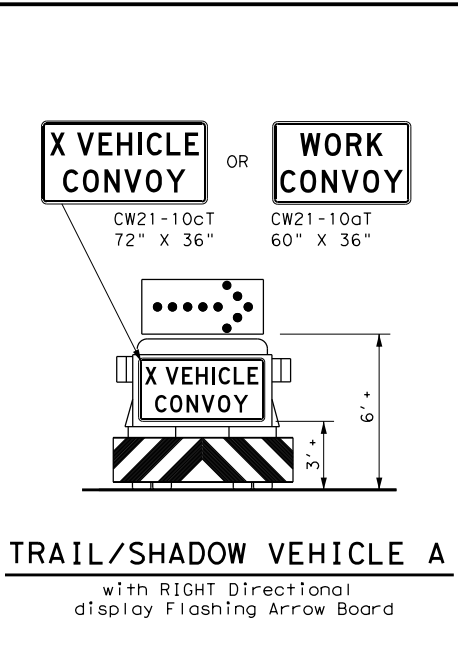
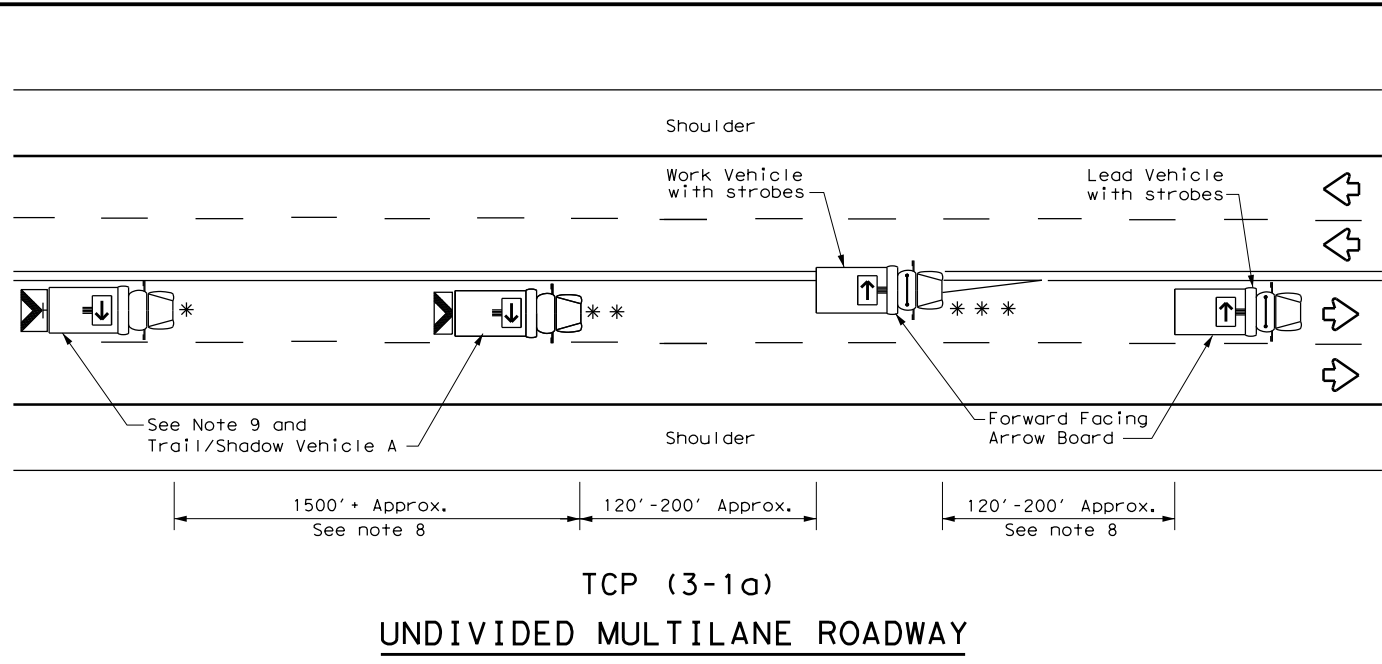
TRAFFIC CONTROL PLAN
 TRAFFIC SHIFTS ON
 TWO-LANE ROADS

TCP (2-3) - 18

FILE:	tcp(2-3)-18.dgn	DN:	CK:	DW:	CK:
© TxDOT	December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS					
8-95	3-03				
1-97	2-12				
4-98	2-18				
DIST				COUNTY	SHEET NO.
					39

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 7/10/2020 4:43:36 PM
 FILE: ...Standards\tcp3-1.dgn

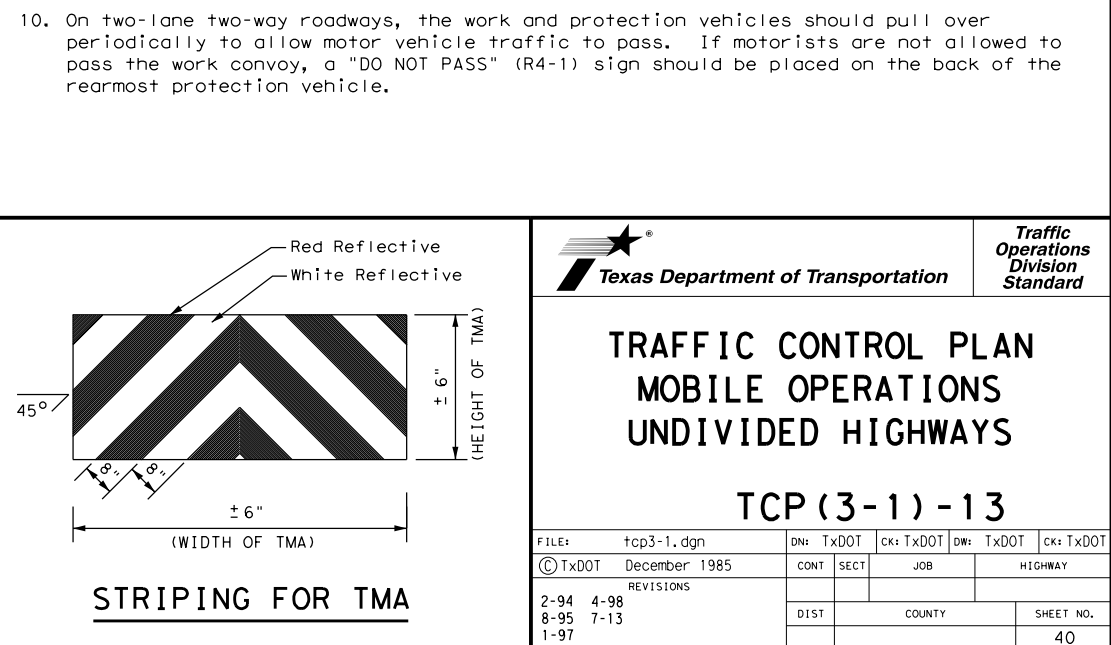
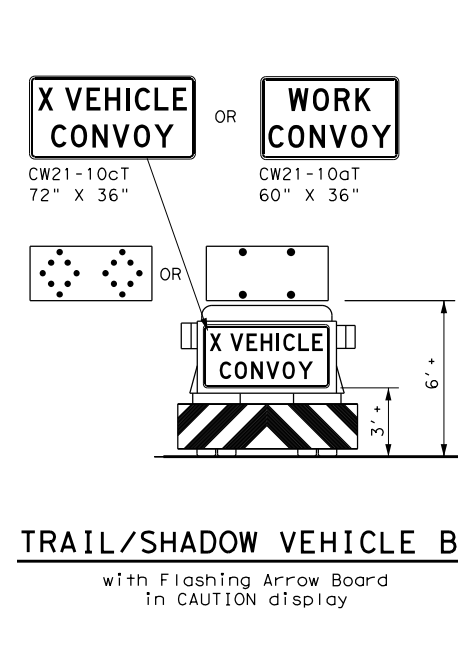
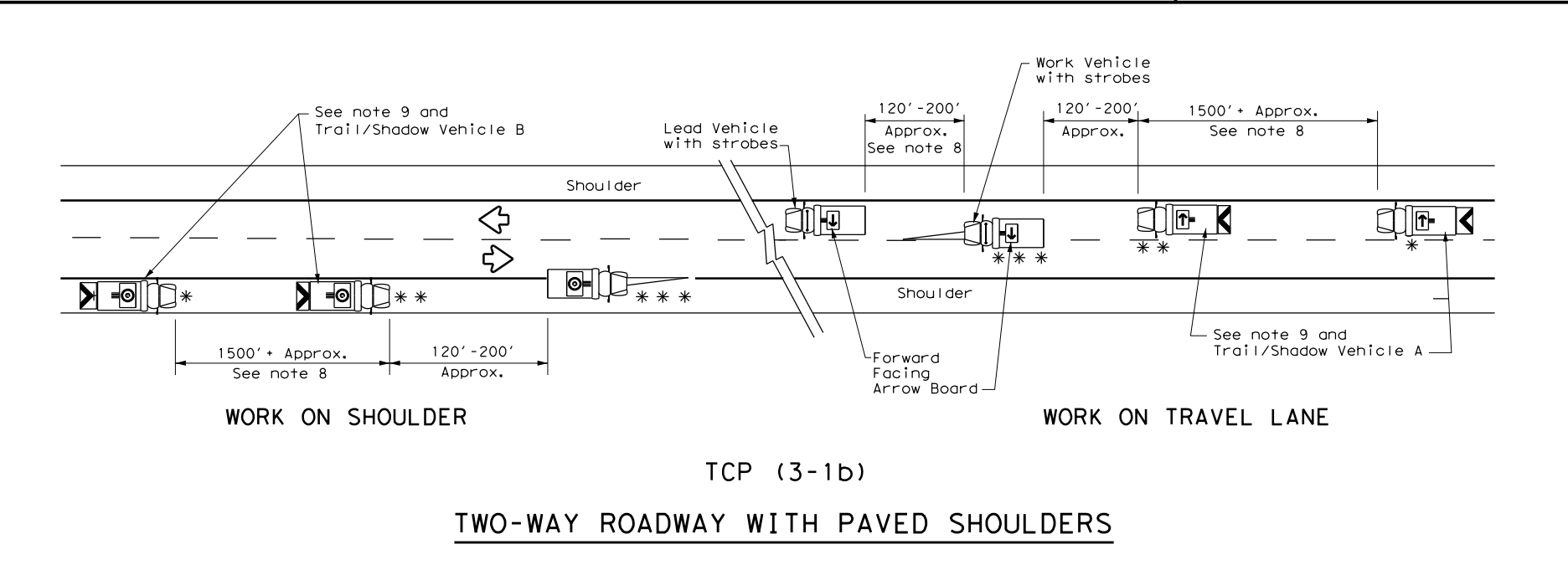


LEGEND				
*	Trail Vehicle	ARROW BOARD DISPLAY		
**	Shadow Vehicle			
***	Work Vehicle		RIGHT Directional	
	Heavy Work Vehicle		LEFT Directional	
	Truck Mounted Attenuator (TMA)		Double Arrow	
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)	

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used the WORK vehicle must be equipped with an arrow board. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. "X VEHICLE CONVOY" (CW21-10cT) or "WORK CONVOY" (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" X 48" diamond shaped "WORK CONVOY" (CW21-10T) or "X VEHICLE CONVOY" (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The "X VEHICLE CONVOY" sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a "DO NOT PASS" (R4-1) sign should be placed on the back of the rearmost protection vehicle.



Texas Department of Transportation
 Traffic Operations Division Standard

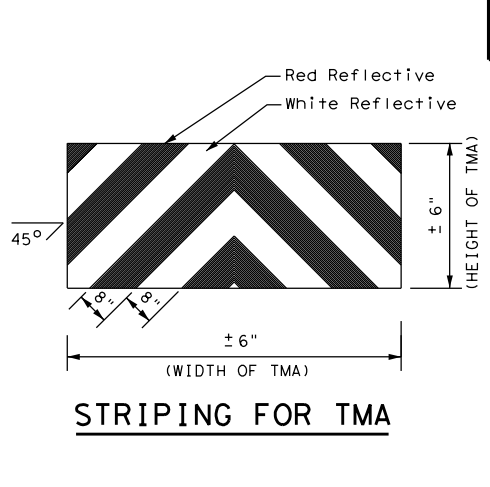
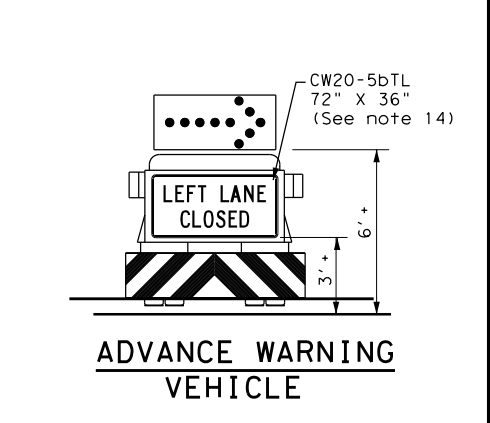
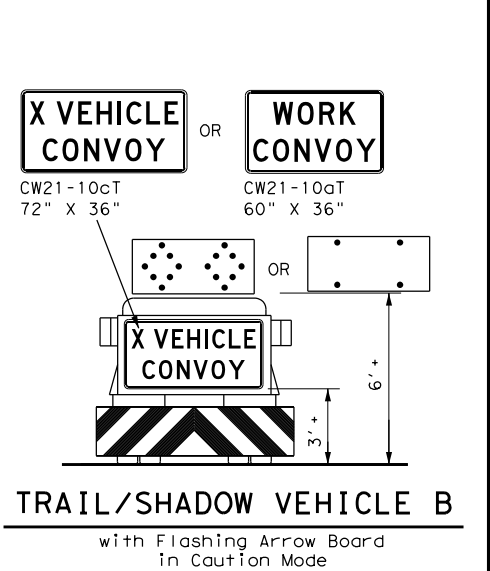
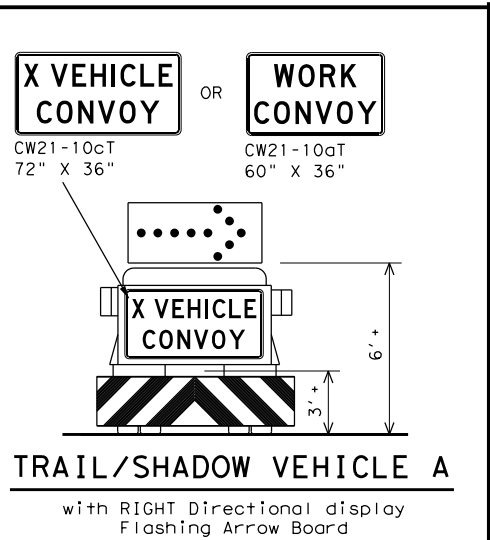
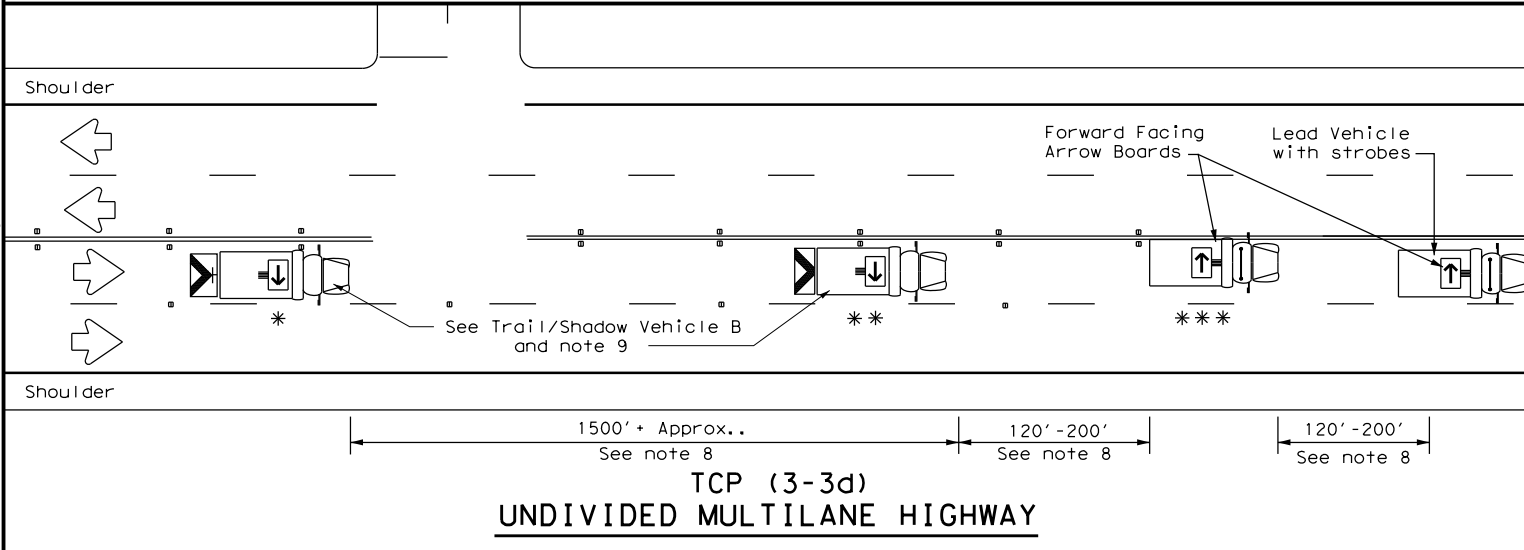
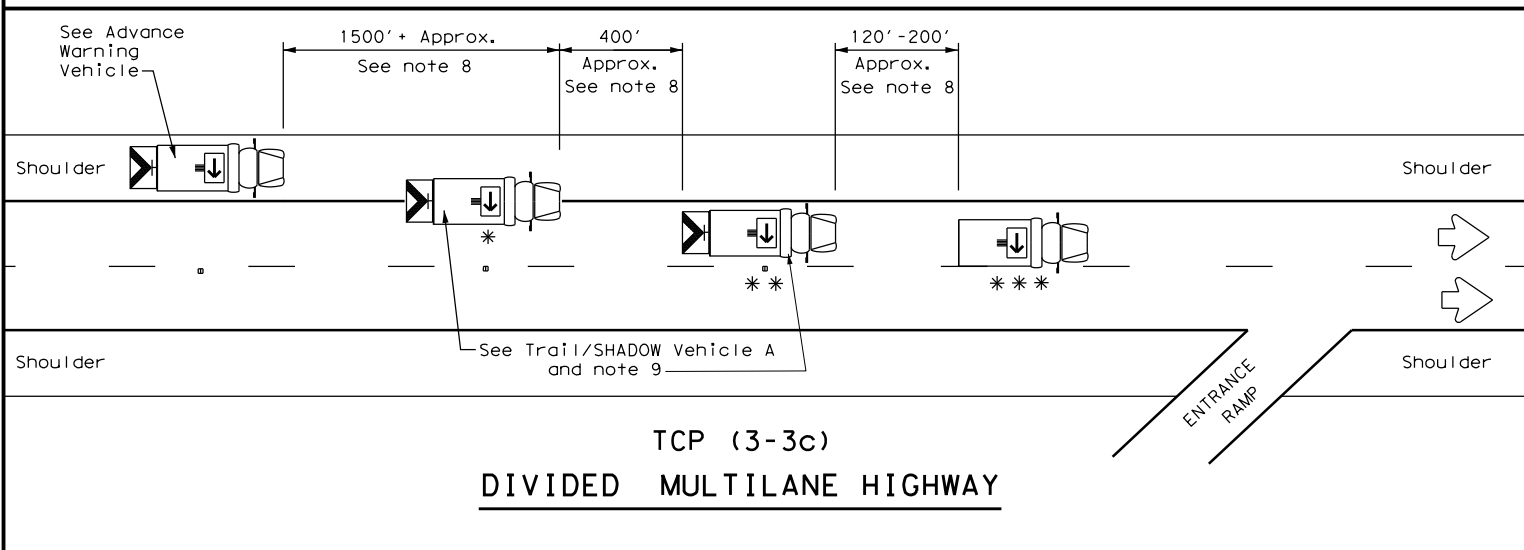
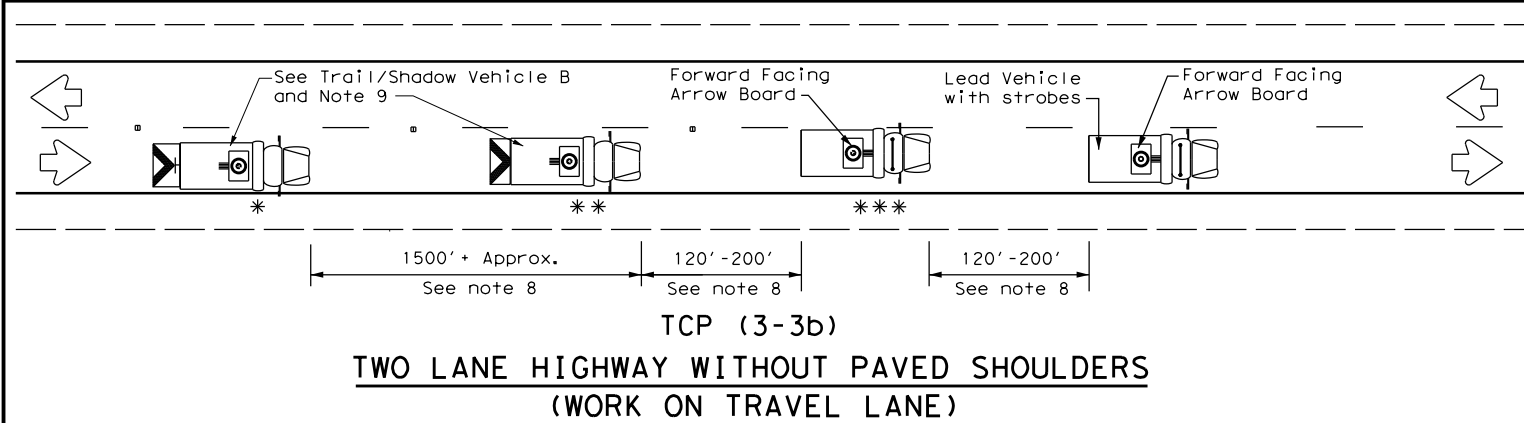
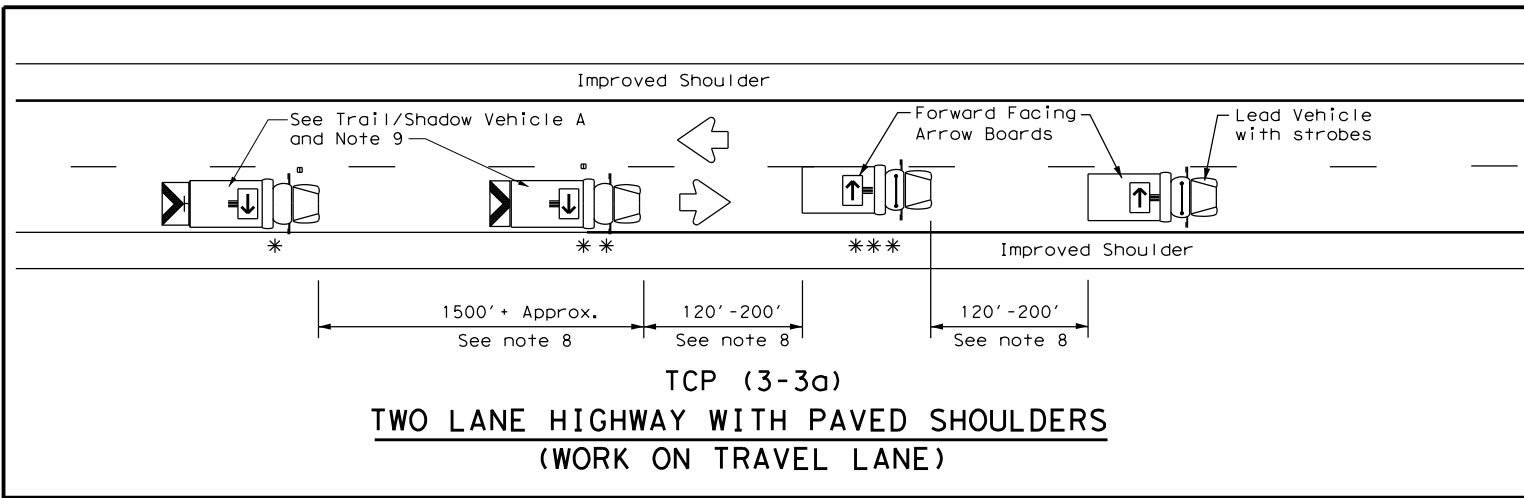
**TRAFFIC CONTROL PLAN
 MOBILE OPERATIONS
 UNDIVIDED HIGHWAYS**

TCP (3-1) - 13

FILE:	tcp3-1.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	December 1985	CONT	SECT	JOB	HIGHWAY				
REVISIONS									
2-94	4-98								
8-95	7-13								
1-97									
DIST		COUNTY			SHEET NO.				
					40				

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 7/10/2020 4:43:36 PM
 FILE: ...Standards\tcp3-3.dgn



LEGEND		
*	Trail Vehicle	ARROW BOARD DISPLAY
**	Shadow Vehicle	
** *	Work Vehicle	RIGHT Directional
☐	Heavy Work Vehicle	LEFT Directional
☐	Truck Mounted Attenuator (TMA)	Double Arrow
↔	Traffic Flow	CAUTION (Alternating Diamond or 4 Corner Flash)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
✓				

GENERAL NOTES

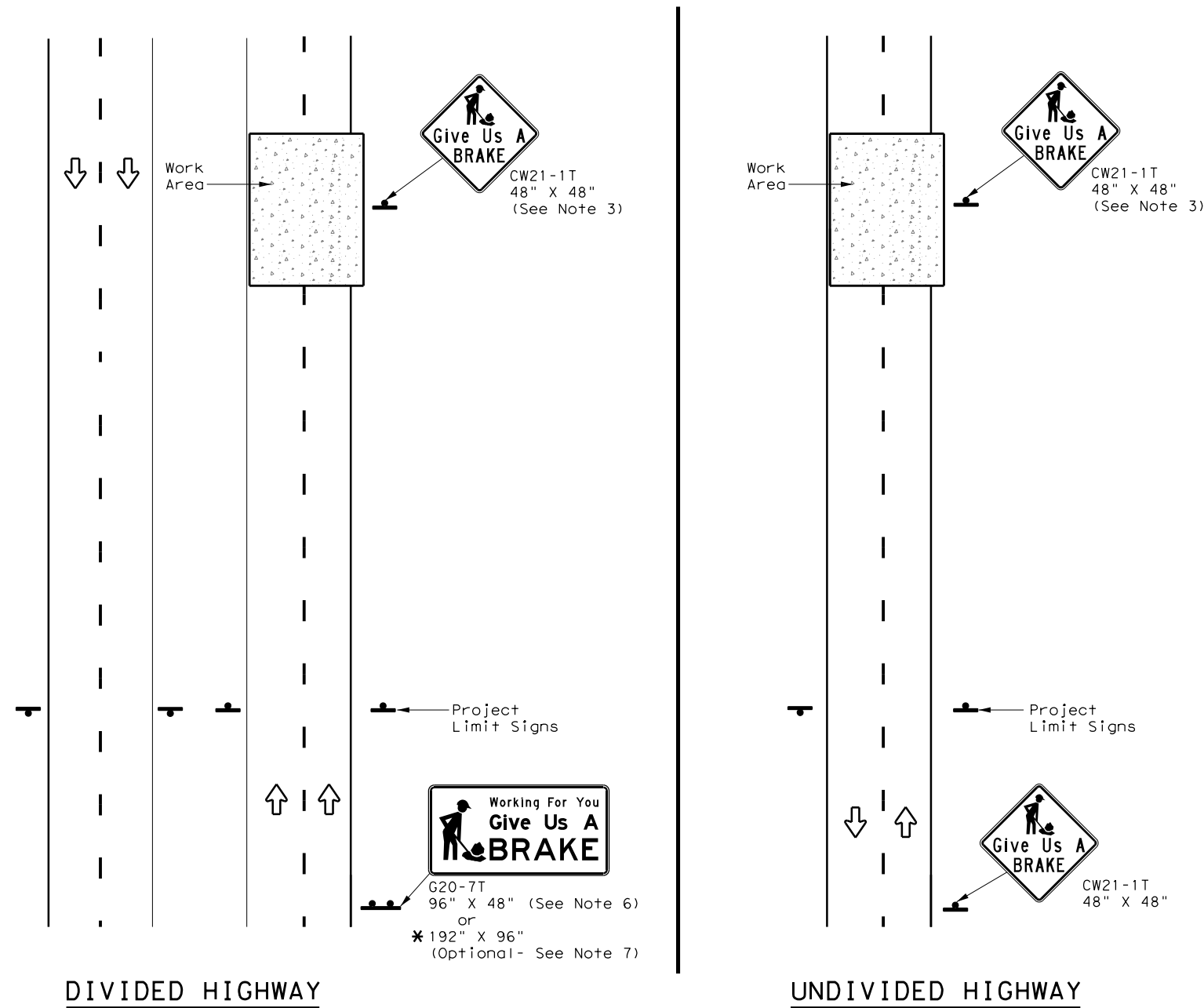
1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer will determine if the LEAD vehicle and/or TRAIL vehicle are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating, or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE, ADVANCE WARNING and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. X VEHICLE CONVOY (CW21-10cT) or WORK CONVOY (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" x 48" diamond shaped WORK CONVOY (CW21-10T) or X VEHICLE CONVOY (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The X VEHICLE CONVOY sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. For divided highways with two or three lanes in one direction, the appropriate LEFT LANE CLOSED (CW20-5bTL), RIGHT LANE CLOSED (CW20-5bTR), or CENTER LANE CLOSED (CW20-5dT) sign should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board may be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
12. For divided highways with three or four lanes in each direction, use TCP(3-2).
13. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
14. The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessary.
15. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a DO NOT PASS (R4-1) sign should be placed on the back of the rearmost protection vehicle.



TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL TCP (3-3) - 14					
FILE:	tcp3-3.dgn	DN:	TxDOT	CK:	TxDOT
© TxDOT	September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS					
2-94	4-98				
8-95	7-13				
1-97	7-14				
		DIST	COUNTY	SHEET NO.	41

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 7/10/2020 4:43:37 PM
 FILE: ...Standards\wzbrk-13.dgn



SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

* When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-7T) 192" x 96" sign is required, the locations shall be noted elsewhere in the plans.

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL		DRILLED SHAFT
						Size	(LF)	
							① ②	24" DIA. (LF)
Orange	G20-7T		96" X 48"	Type B _{FL} or C _{FL}	32	▲	▲ ▲	▲
Orange	G20-7T		192" X 96"	Type B _{FL} or C _{FL}	128	W8x18	16 17	12

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B _{FL} OR TYPE C _{FL}
BLACK	LEGEND & BORDERS	NON-REFLECTIVE ACRYLIC FILM

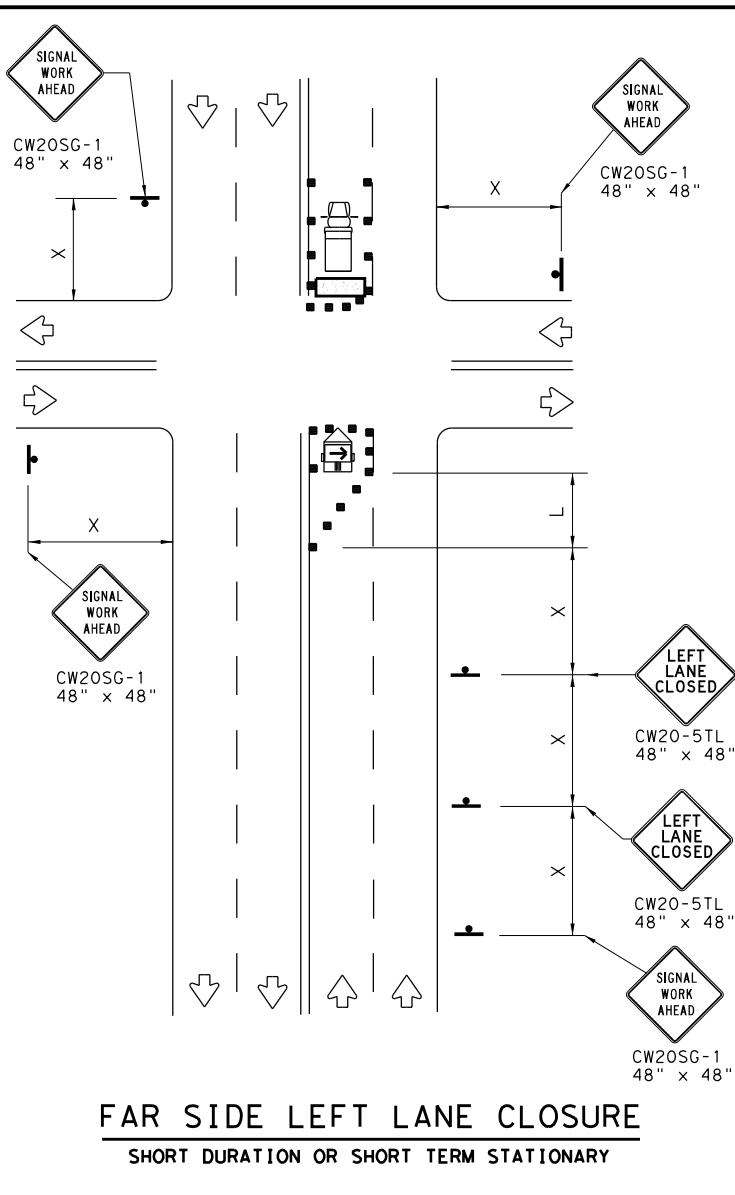
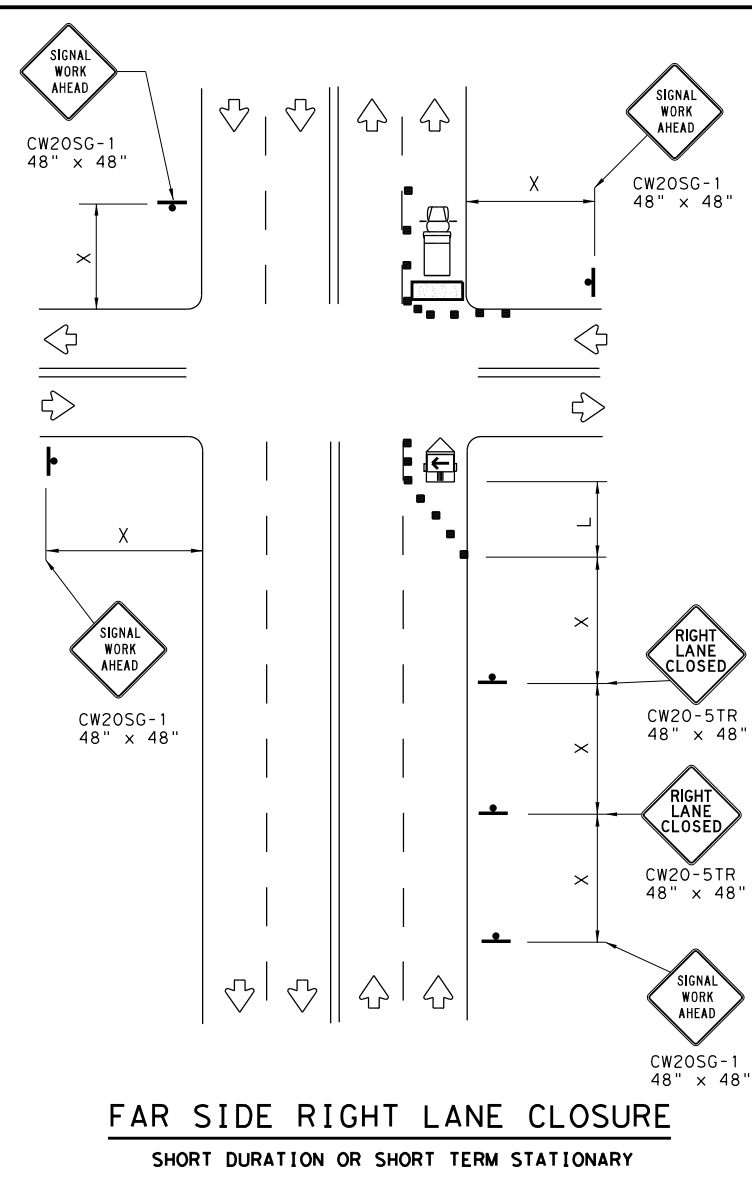
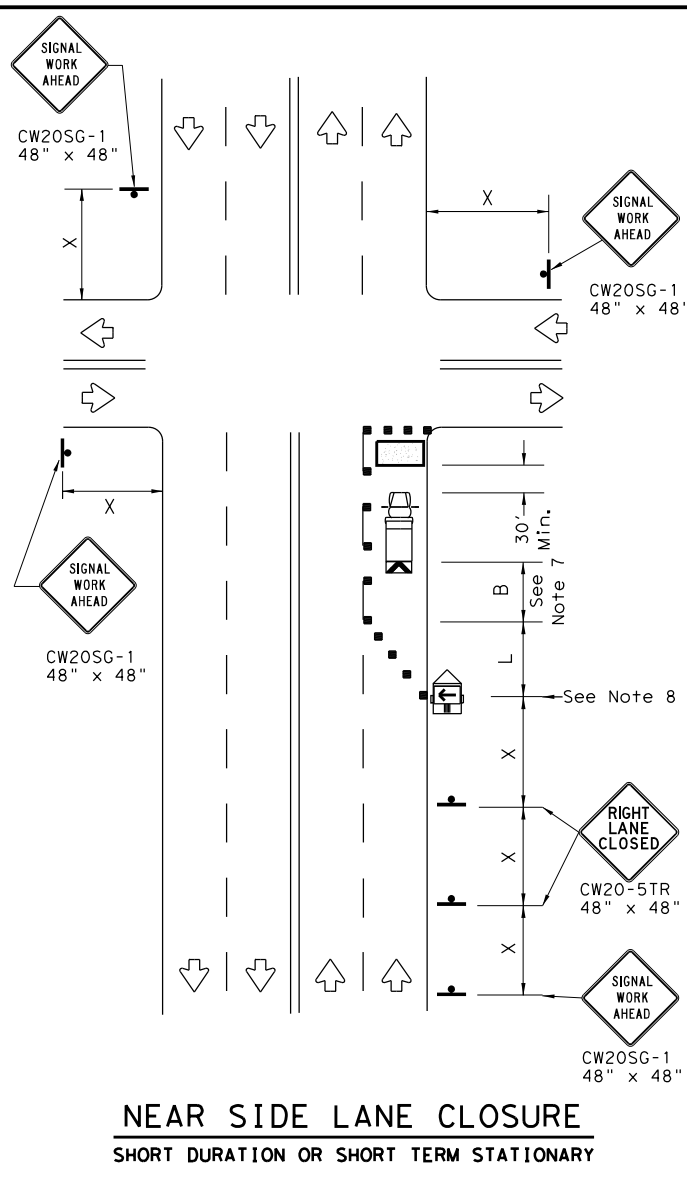
GENERAL NOTES

- See BC and SMD sheets for additional sign support details.
- Sign locations shall be approved by the Engineer.
- For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
- Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
- Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
- The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
- The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:
 Item 636 - Aluminum Signs
 Item 647 - Large Roadside Sign Supports and Assemblies.
 Item 416 - Drilled Shaft Foundations
- All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

				Traffic Operations Division Standard	
WORK ZONE "GIVE US A BRAKE" SIGNS					
WZ (BRK) - 13					
FILE:	wzbrk-13.dgn	DN:	TxDOT	CK:	TxDOT
© TxDOT	August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS					
6-96	5-98	7-13			
8-96	3-03				
		DIST	COUNTY		SHEET NO.
					42

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 7/10/2020 4:43:37 PM
 FILE: ...Standards\wzbt-s-13.dgn

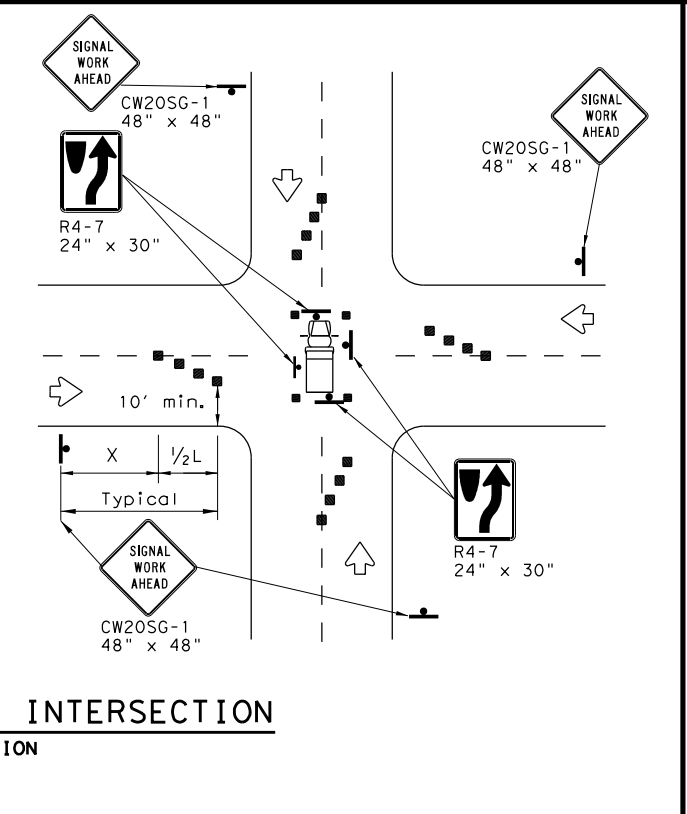
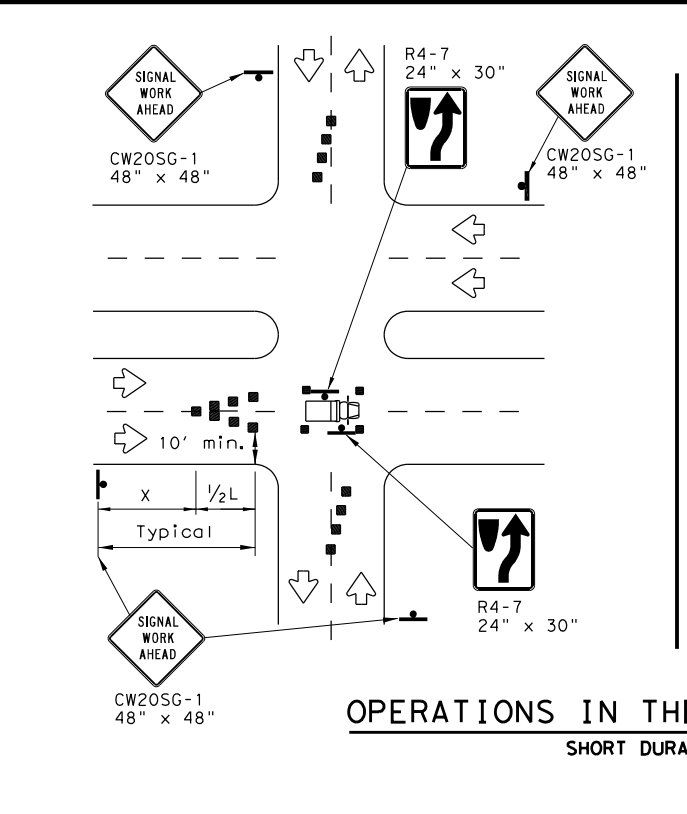


LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
 ** Taper lengths have been rounded off.
 L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

WORKERS IN BUCKET TRUCKS SHALL NOT WORK ABOVE OPEN LANES OF TRAFFIC.



GENERAL NOTES

- The minimum size channelizing device is the 28" cone. 42" Two-piece cones, drums, vertical panels or barricades will be required when the device must be left unattended at night.
- Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
- Flaggers and Flagger Symbol (CW20-7) signs may be required according to field conditions.
- Vehicles parked in roadway shall be equipped with at least two high intensity rotating, flashing, oscillating or strobe type lights.
- High level warning devices (flag trees) may be used at corners of the vehicle.
- When work operations are performed on existing signals, the signals may be placed in flashing red mode when approved by the engineer. If existing signals do not have power, All-Way Stop (R1-1 and R1-3P) signs may be implemented when approved by the engineer.
- For Short-Term Stationary work the buffer space "B" from the above table should be used if field conditions permit. For Short Duration (less than 1 hour) any buffer space provided will enhance the safety of the setup.
- The arrow board at this location may be omitted for Short Duration work if the work vehicle has an arrow board in operation. As an option, the arrow board may be placed at the end of the taper in the closed lane if space is not available at the beginning of the taper.
- Signs and devices for the NEAR SIDE LANE CLOSURE may be altered for a left lane closure by using a LEFT LANE CLOSED (CW20-5TL) and adding channelizing devices on the centerline to protect the work space from opposing traffic.



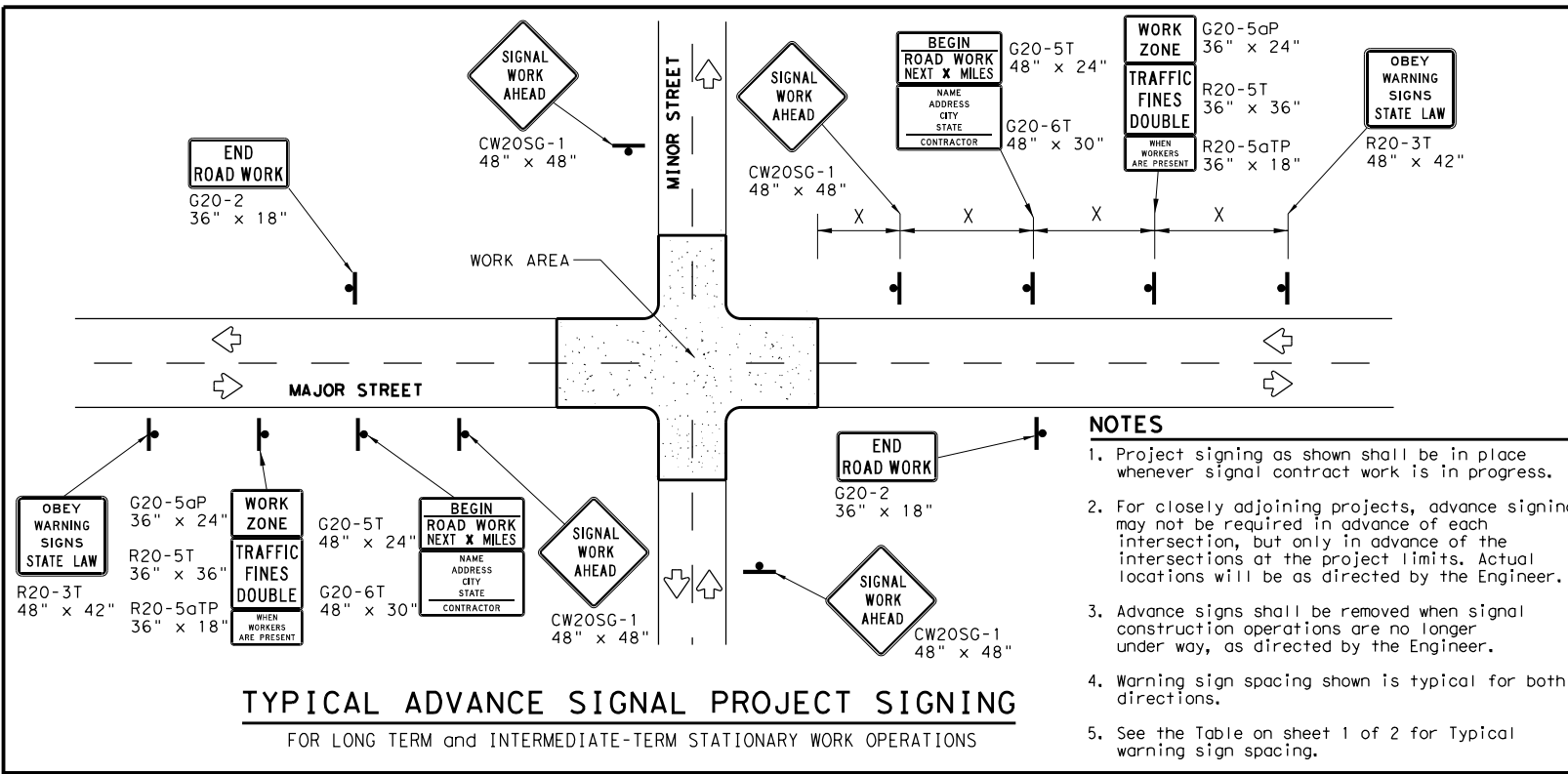
TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

FILE: wzbt-s-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS				
2-98 10-99 7-13	DIST	COUNTY	SHEET NO.	
4-98 3-03			43	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect or damages resulting from its use.

DATE: 7/10/2020 4:43:43 PM
 FILE: ...Standards\wzbt-s-13.dgn



TYPICAL ADVANCE SIGNAL PROJECT SIGNING
 FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

- NOTES**
1. Project signing as shown shall be in place whenever signal contract work is in progress.
 2. For closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits. Actual locations will be as directed by the Engineer.
 3. Advance signs shall be removed when signal construction operations are no longer under way, as directed by the Engineer.
 4. Warning sign spacing shown is typical for both directions.
 5. See the Table on sheet 1 of 2 for Typical warning sign spacing.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Signs shall be installed and maintained in a straight and plumb condition.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. Nails shall NOT be used to attach signs to any support.
5. All signs shall be installed in accordance with the plans or as directed by the Engineer.
6. The Contractor shall furnish the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD).
7. The Contractor shall furnish sign supports and substrates listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD), installed as per the manufacturer's recommendations.
8. Temporary signs that have damaged or cracked substrates and/or damaged or marred reflective sheeting shall be replaced as directed by the Engineer.
9. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1".
10. Damaged wood posts shall be replaced. Splicing wood posts will not be allowed.

DURATION OF WORK

1. Work zone durations are defined in Part 6, Section 60.02 of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

SIGN MOUNTING HEIGHT

1. Sign height of Long-term/Intermediate-term warning signs shall be as shown on Figure 6F-1 of the TMUTCD.
2. Sign height of Short-term/Short Duration warning signs shall be as shown on Figure 6F-2 of the TMUTCD.
3. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night without damaging the sign sheeting. Burlap, or heavy materials such as plywood or aluminum shall not be used to cover signs.
3. Duct tape or other adhesive material shall NOT be affixed to a sign face.
4. Signs and anchor stubs shall be removed and holes back filled upon completion of the work.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the requirements of the DMS and color usage table shown on this sheet.

SIGN SUPPORT WEIGHTS

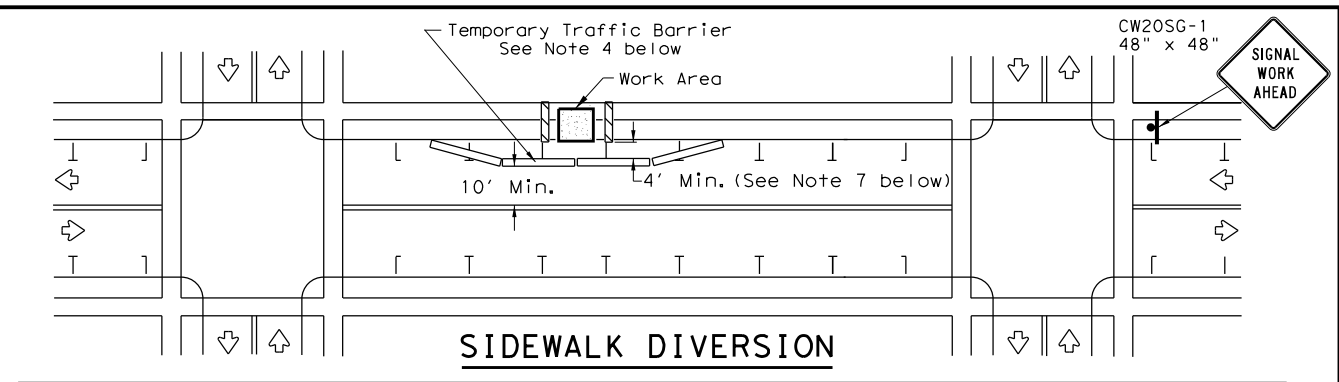
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber, such as tire inner tubes, shall not be used.
6. Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

LEGEND	
	Sign
	Channelizing Devices
	Type 3 Barricade

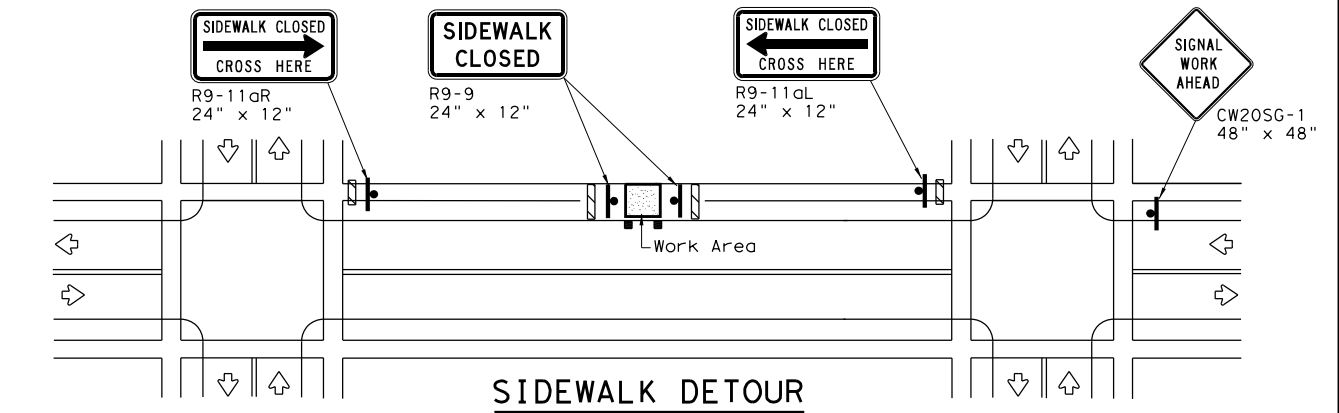
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B _{FL} OR TYPE C _{FL} SHEETING
WHITE	BACKGROUND	TYPE A SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

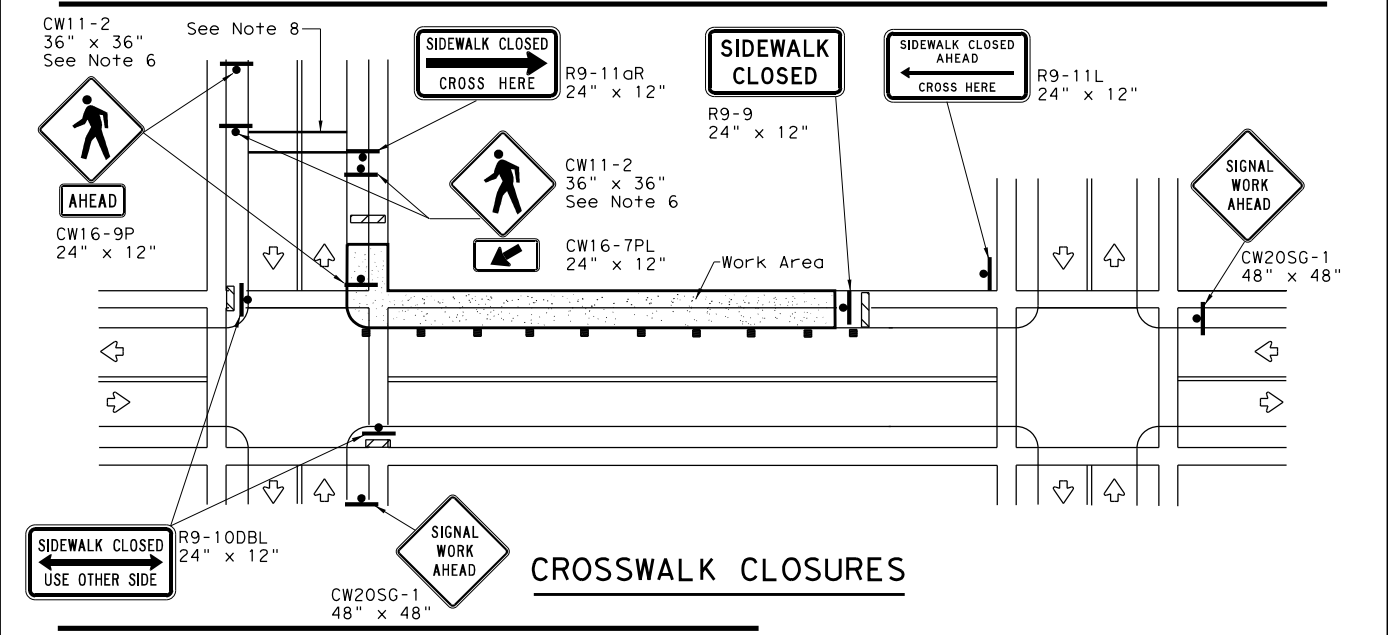
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

PEDESTRIAN CONTROL

1. Holes, trenches or other hazards shall be adequately protected by covering, delineating or surrounding the hazard with orange plastic pedestrian fencing or longitudinal channelizing devices, or as directed by the Engineer.
2. "CROSSWALK CLOSURES" as detailed above will require the Engineer's approval prior to installation.
3. R9 series signs shown may be placed on supports detailed on the BC standards or CWZTCD list, or when fabricated from approved lightweight plastic substrates, they may be mounted on top of a plastic drum at or near the location shown.
4. For speeds less than 45 mph longitudinal channelizing devices may be used instead of traffic barriers when approved by the Engineer. Attenuation of blunt ends and installation of water filled devices shall be as per BC(9) and manufacturer's recommendations.
5. Location of devices are for general guidance. Actual device spacing and location must be field adjusted to meet actual conditions.
6. Where pedestrians with visual disabilities normally use the closed sidewalk Detectable Pedestrian Barricades should be used instead of the Type 3 Barricades shown.
7. The width of existing sidewalk should be maintained if practical.
8. Pavement markings for mid-block crosswalks shall be paid for under the appropriate bid items.
9. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

SHEET 2 OF 2

Texas Department of Transportation
 Traffic Operations Division Standard

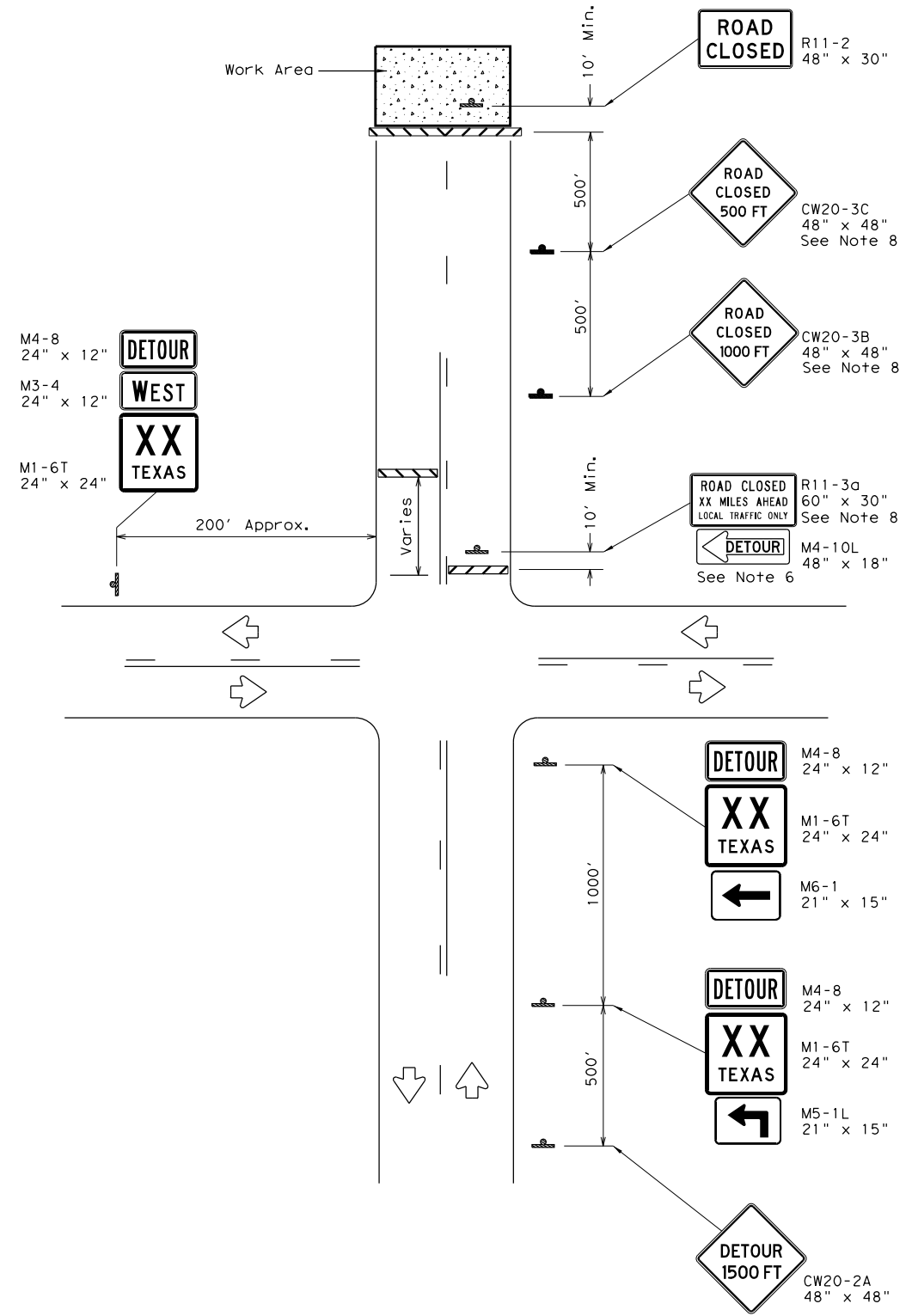
TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ (BTS-2) - 13

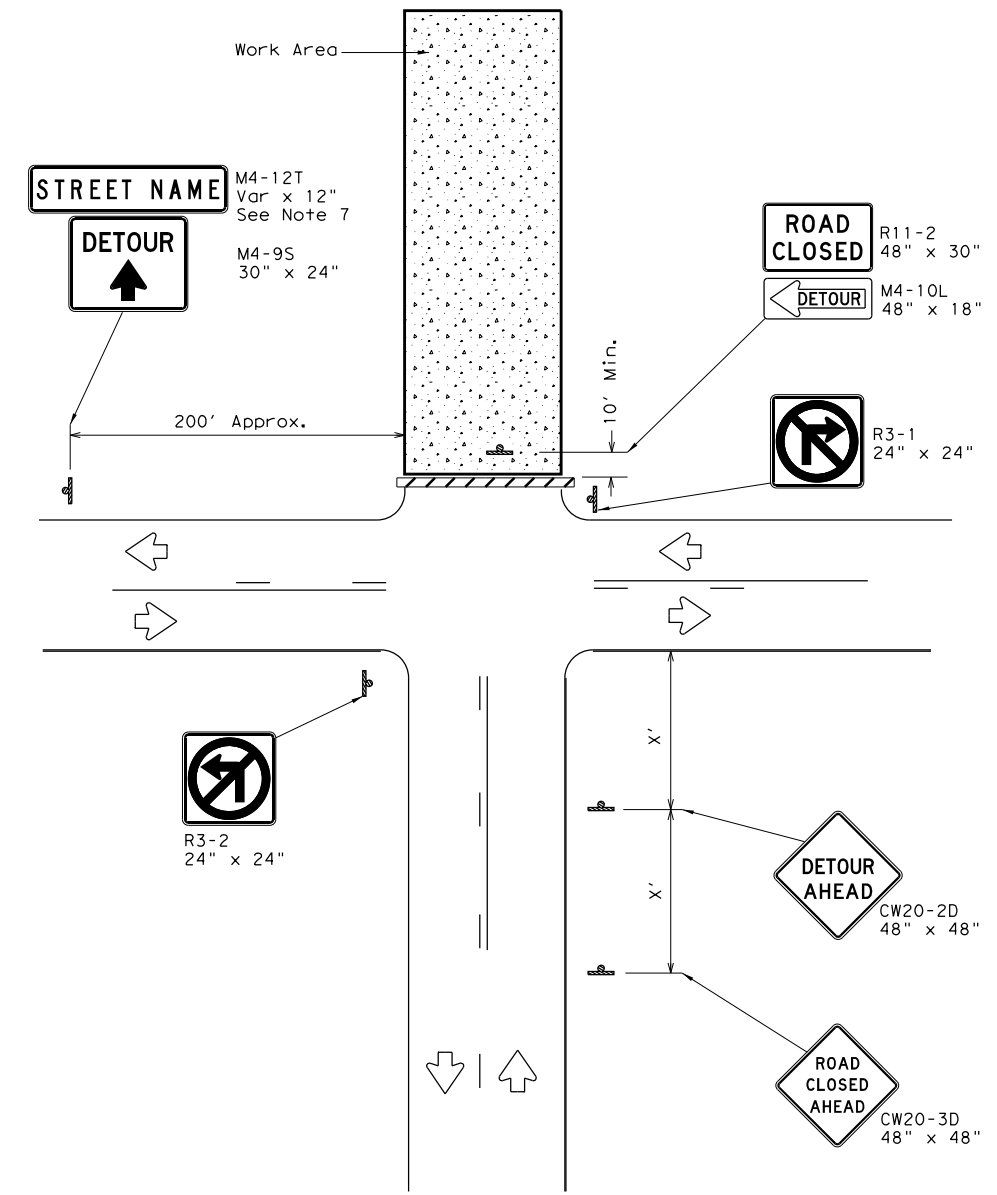
FILE:	wzbt-s-13.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY				
REVISIONS									
2-98	10-99	7-13							
4-98	3-03								
DIST								COUNTY	SHEET NO.
									44

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:



ROAD CLOSURE BEYOND THE INTERSECTION
Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION
Signing for an Un-numbered Route with an Off-Site Detour

LEGEND	
	Type 3 Barricade
	Sign

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120'
35	160'
40	240'
45	320'
50	400'
55	500'
60	600'
65	700'
70	800'
75	900'

* Conventional Roads Only

GENERAL NOTES

1. This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.
2. Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(10) and listed on the Compliant Work Zone Traffic Control Devices List (CWZTCD).
3. Stockpiled materials shall not be placed on the traffic side of barricades.
4. Barricades at the road closure should extend from pavement edge to pavement edge.
5. Detour signing shown is intended to illustrate the type of signing that is appropriate for numbered routes or un-numbered routes as labeled. It does not indicate the full extent of detour signing required. Detour routes should be signed as shown elsewhere in the plans.
6. If the road is open for a significant distance beyond the intersection or there are significant origin/destination points beyond the intersection, the signs and barricades at this location should be located at the edge of the traveled way.
7. The Street Name (M4-12T) sign is to be placed above the DETOUR (M4-9S) sign.
8. For urban areas where there is a shorter distance between the intersection and the actual closure location, the ROAD CLOSED XX MILES AHEAD (R11-3a) sign may be replaced with a ROAD CLOSED TO THRU TRAFFIC (R11-4) sign. If adequate space does not exist between the intersection and the closure a single ROAD CLOSED AHEAD (CW20-3D) sign spaced as per the table above may replace the ROAD CLOSED 1000 FT (CW20-3B) and ROAD CLOSED 500 FT (CW20-3C) signs.
9. Signs and barricades shown shall be subsidiary to Item 502. Locations where these details will be required shall be as shown elsewhere in the plans.



WORK ZONE ROAD CLOSURE DETAILS

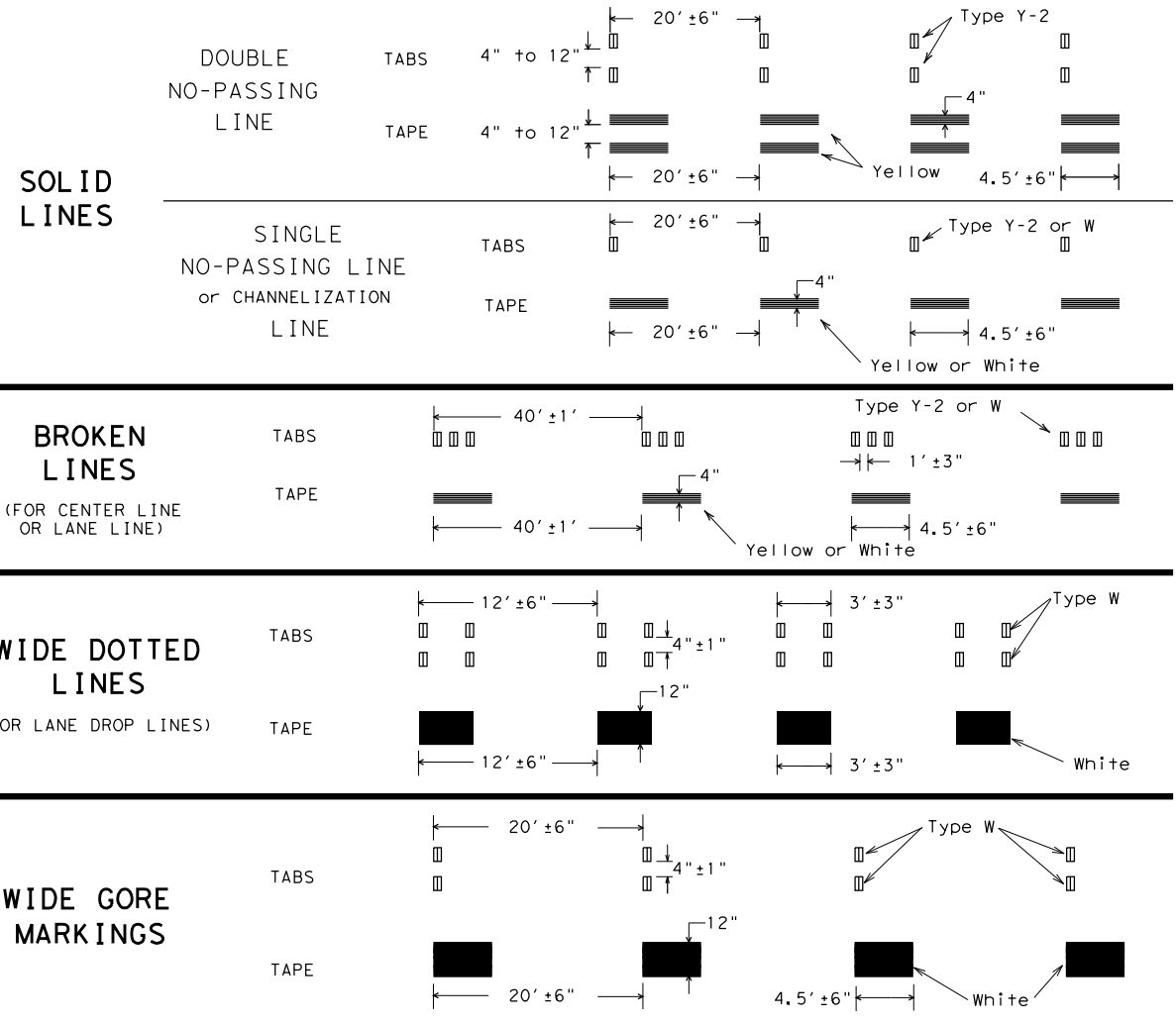
WZ (RCD) - 13

FILE: wzrcd-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS				
1-97 4-98 7-13	DIST	COUNTY	SHEET NO.	
2-98 3-03			45	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 7/10/2020 4:43:44 PM
 FILE: ...Standards\wzstpm-13.dgn

WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



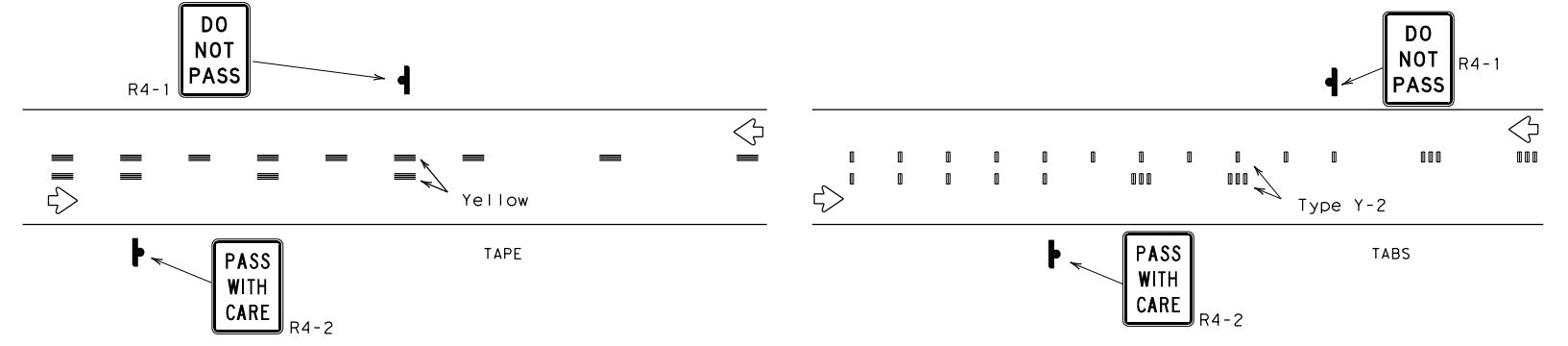
NOTES:

- Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
- Short term pavement markings shall NOT be used to simulate edge lines.
- Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
- Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
- No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
- For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
- For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
- For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

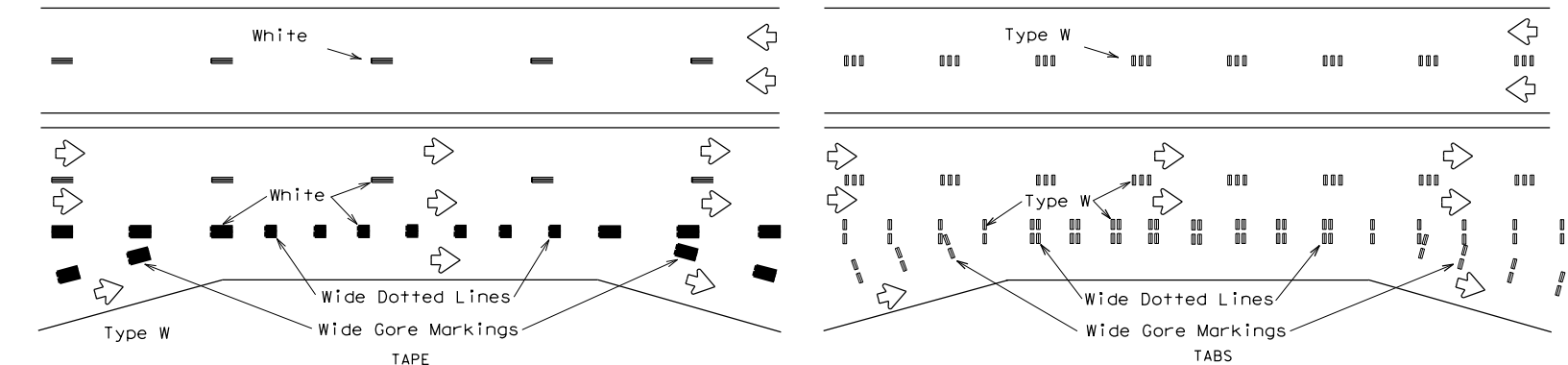
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

- Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
- Tabs shall meet requirements of Departmental Material Specification DMS-8242.
- When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
- No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

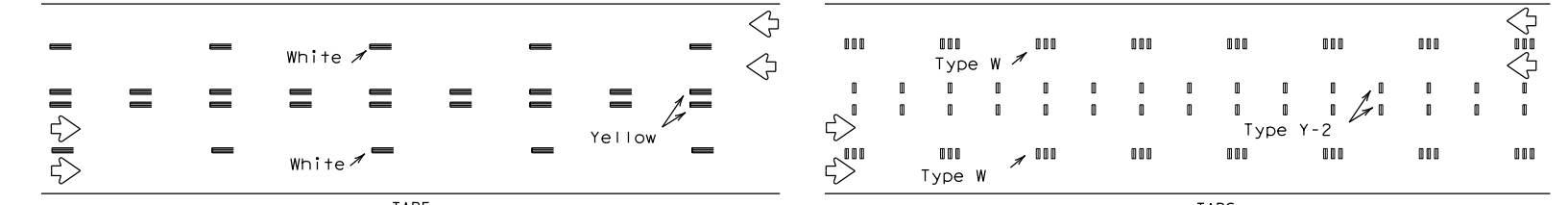
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



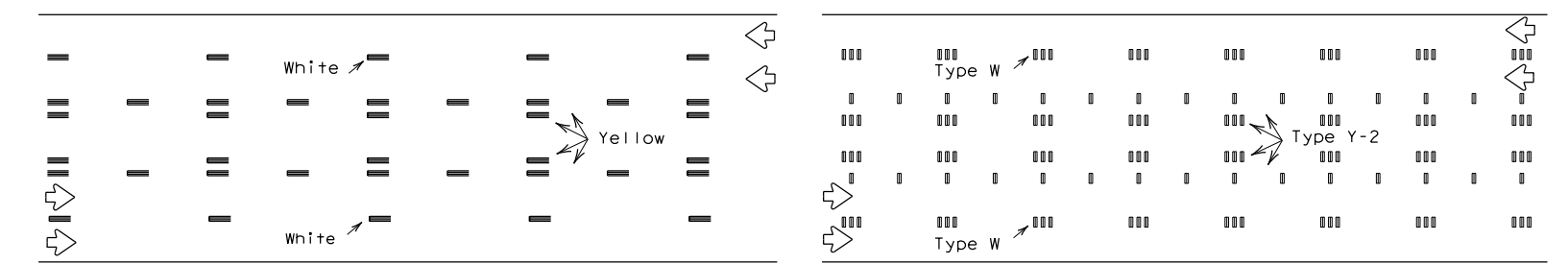
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



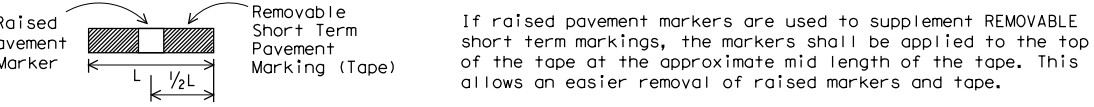
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



PREFABRICATED PAVEMENT MARKINGS

- Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
- Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Construction-Grade Prefabricated Pavement Markings."

RAISED PAVEMENT MARKERS

- All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)

- DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:
http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm



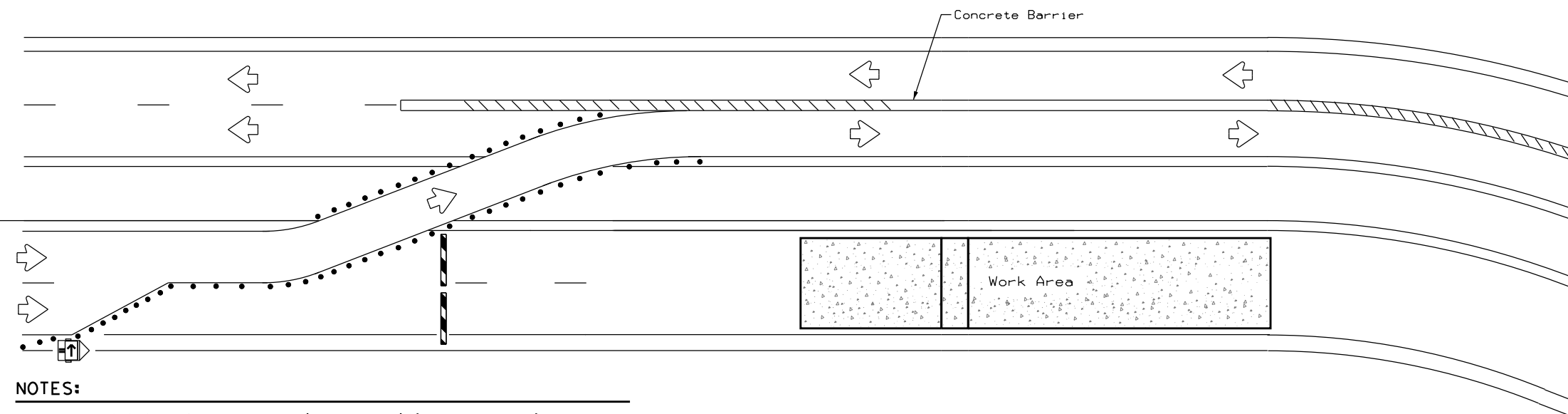
WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ (STPM) - 13

FILE:	wzstpm-13.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY				
1-97	3-03	REVISIONS		DIST	COUNTY	SHEET NO.			
7-13						46			

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:



NOTES:

1. Length of Safety Glare screen will be specified elsewhere in the plans.
2. The cumulative nominal length of the modular safety glare screen units shall equal the length of the individual sections of temporary concrete traffic barrier on which they are installed so the joint between barrier sections will not be spanned by any one safety glare screen unit.
3. Screen Panel/blades will be designed such that reflective sheeting conforming with Departmental Material Specification DMS-8300, Sign Face Materials, Type B or C Yellow, minimum size of 2 inches by 12 inches can be attached to the edge of the panel/blade. The sheeting shall be attached to one glare screen panel/blade per section of concrete barrier not to exceed a spacing of 30 feet. Barrier reflectors are not necessary when panel/blades are installed with reflective sheeting as described.
4. Payment for these devices will be under statewide Special Specification "Modular Glare Screens for Headlight Barrier."
5. This detail is only intended to show types of locations where Glare Screens would be appropriate. Required signing and other devices shall be as shown elsewhere in the plans.

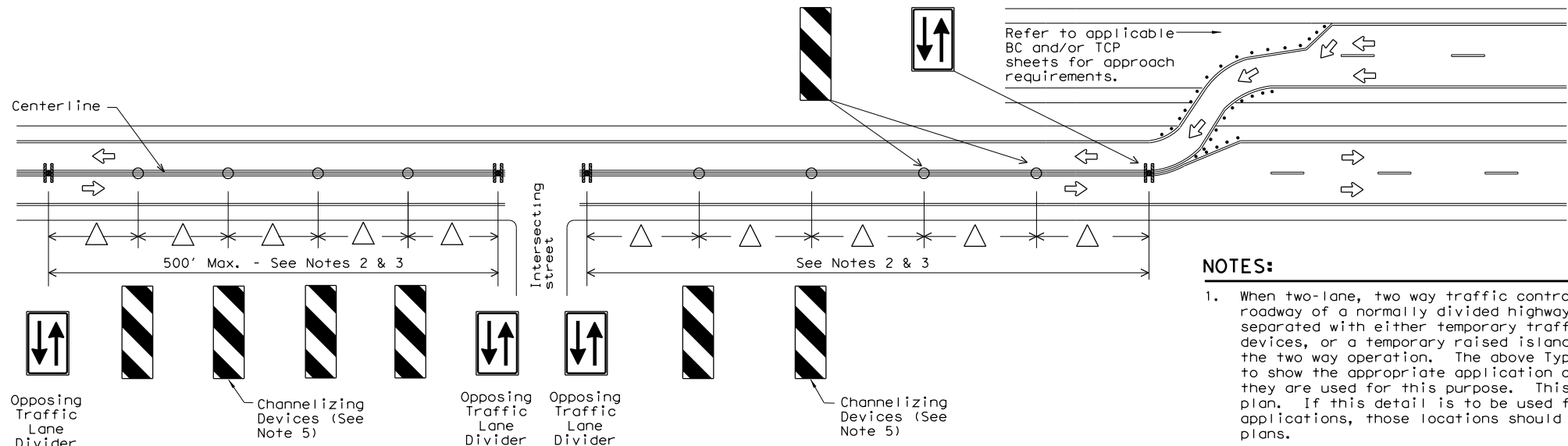
BARRIER DELINEATION WITH MODULAR GLARE SCREENS

LEGEND	
	Type 3 Barricade
	Channelizing Devices
	Trailer Mounted Flashing Arrow Board
	Sign
	Safety glare screen

DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
DELINEATORS AND OBJECT MARKERS	DMS-8600
MODULAR GLARE SCREENS FOR HEADLIGHT BARRIER	DMS-8610

Only pre-qualified products shall be used. A copy of the Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:

<http://www.txdot.gov/business/resources/producer-list.html>



NOTES:

1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application is intended to show the appropriate application of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.
2. Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100'.
3. Every fifth device should be an OTLD except when spaced closer to accommodate an intersection. An OTLD should be the first device on each side of intersecting streets or roads.
4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain them in their proper position should be noted elsewhere in the plans.
5. Channelizing devices are to be vertical panels, 42" cones or tubular markers that are at least 36" tall. Tubular markers used to separate traffic should have a rubber base weighing at least 30 pounds. Tubular markers that are 42" tall or more shall have four bands of reflective material as detailed for 42" cones on BC(10). Tubular markers less than 42" but at least 36" tall shall have three bands of 3" wide white reflective material spaced 2" apart. Reflective material shall meet DMS-8300, Type A.

VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS (OTLD) SEPARATING TWO-WAY TRAFFIC ON NORMALLY DIVIDED HIGHWAYS

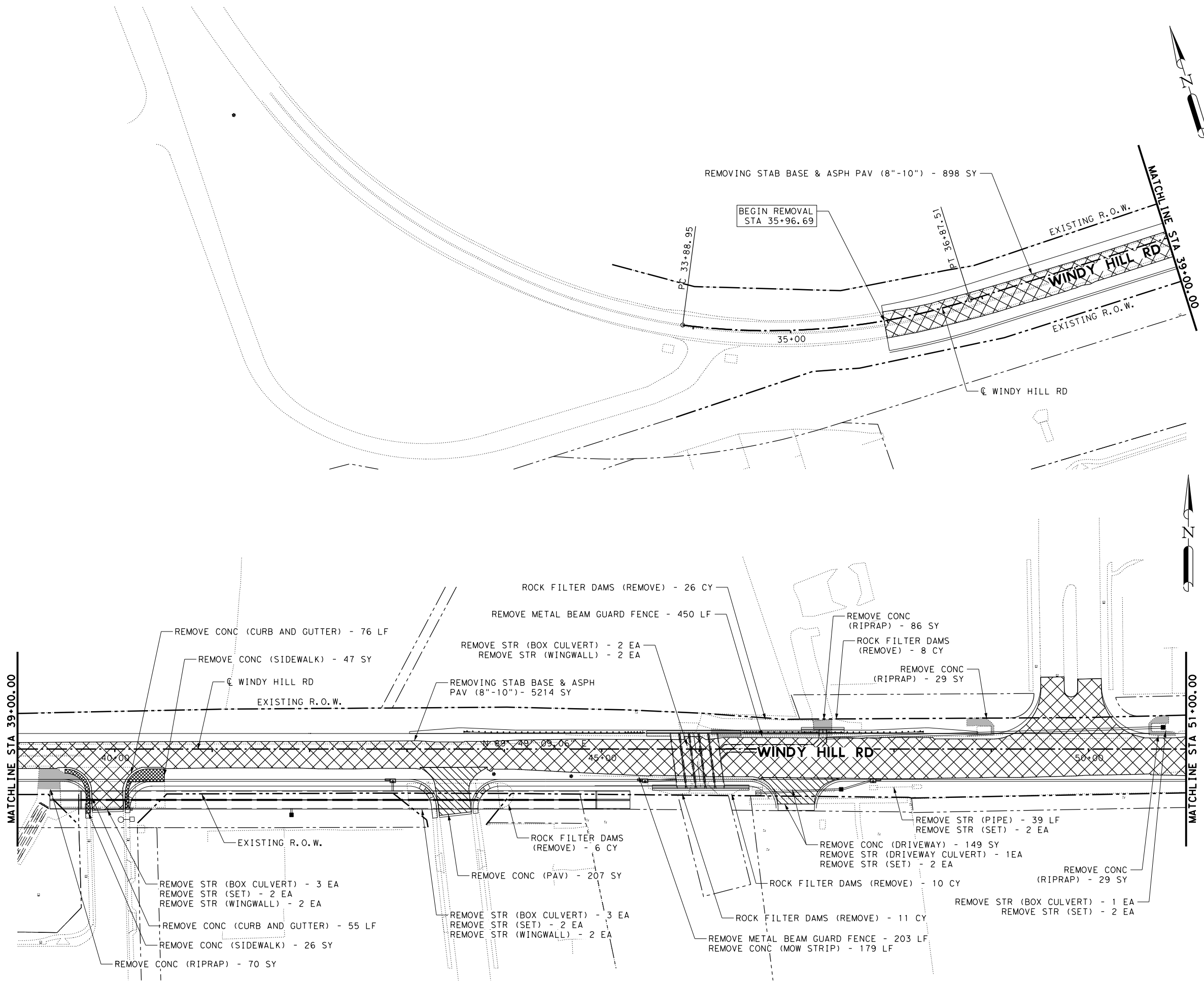


TRAFFIC CONTROL PLAN TYPICAL DETAILS

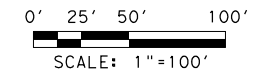
WZ(TD) - 17

FILE:	wz1d-17.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	February 1998	CONT	SECT	JOB	HIGHWAY				
REVISIONS									
4-98	2-17								
3-03									
7-13									
		DIST	COUNTY			SHEET NO.			
					47				

7/10/2020 4:43:45 PM I:\2173\2001\CADD\SHEETS\03-Roadway Details\WH*REMOVAL*01.dgn



- LEGEND**
- EXISTING R.O.W.
 - - - EXISTING DRAINAGE EASEMENT
 - - - EXISTING UTILITY
 - EXISTING PLANIMETRICS
 - [Cross-hatched box] REMOVE STAB BASE & ASPH PAV (8"-10")
 - [Diagonal lines box] REMOVE CONC (PAV)
 - [Grid pattern box] REMOVE CONC (SIDEWALK)
 - [Solid grey box] REMOVE CONC (RIPRAP)



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



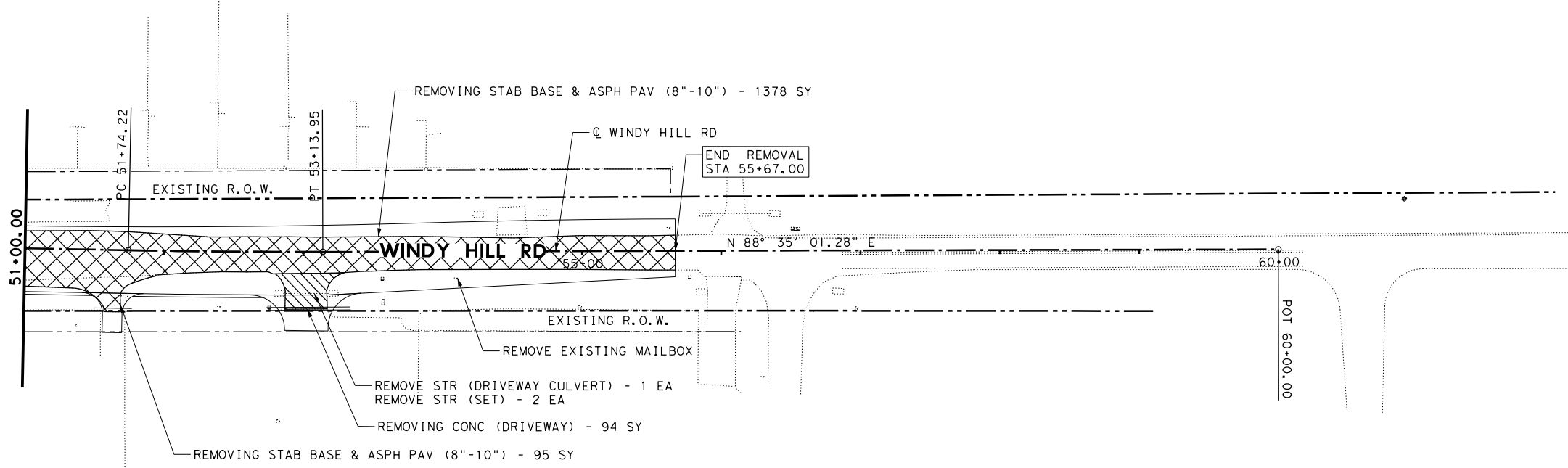
LJA Engineering, Inc.
 FRN-F-1386

**WINDY HILL ROAD
 REMOVAL
 PLANS**

GLO Contract# 19-280-000-B779

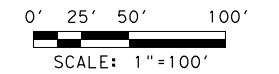
DESIGN BY:	AM	SCALE	1"=100'
DRAWN BY:	AM	HORIZONTAL:	
CHECKED BY:	ZR	VERTICAL:	
APPROVED BY:		SHEET:	1 OF 2
PROJECT NO:	2173.2001	PAGE:	48
DATE:	7/10/2020		

7/10/2020 4:43:45 PM I:\2173\2001\CADD\SHEETS\03-Roadway Details\WH*REMOVAL*02.dgn



LEGEND

- EXISTING R.O.W.
- EXISTING DRAINAGE EASEMENT
- EXISTING UTILITY
- EXISTING PLANIMETRICS
- REMOVE STAB BASE & ASPH PAV (8"-10")
- REMOVE CONC (PAV)
- REMOVE CONC (SIDEWALK)
- REMOVE CONC (RIPRAP)



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN - F-1386

**WINDY HILL ROAD
 REMOVAL
 PLANS**

GLO Contract# 19-280-000-B779

DESIGN BY:	AM	SCALE	1"=100'
DRAWN BY:	AM	HORIZONTAL:	
CHECKED BY:	ZR	VERTICAL:	
APPROVED BY:		SHEET:	2 OF 2
PROJECT NO:	2173.2001	DATE:	7/10/2020
DATE:	7/10/2020	PAGE:	49

WINDY HILL ROAD

Beginning chain WINDYHILLRD description
Feature: Geom_Centerline

Curve Data

Curve WINDYHILLRD_1
P.I. Station 35+40.63 N 13,924,599.4864 E 2,335,542.2956
Delta = 24° 54' 00.39" (LT)
Degree = 8° 20' 23.99"
Tangent = 151.6760
Length = 298.5626
Radius = 687.0000
External = 16.5443
Long Chord = 296.2186
Mid. Ord. = 16.1553
P.C. Station 33+88.95 N 13,924,662.9132 E 2,335,404.5180
P.T. Station 36+87.51 N 13,924,599.9651 E 2,335,693.9709
C.C. N 13,925,286.9617 E 2,335,691.8028
Back = S 65° 16' 50.56" E
Ahead = N 89° 49' 09.05" E
Chord Bear = S 77° 43' 50.75" E

Course from PT WINDYHILLRD_1 to PC WINDYHILLRD_4 N 89° 49' 09.06" E Dist 1,486.7065

Curve Data

Curve WINDYHILLRD_4
P.I. Station 52+44.09 N 13,924,604.8774 E 2,337,250.5378
Delta = 1° 14' 07.78" (LT)
Degree = 0° 53' 03.10"
Tangent = 69.8682
Length = 139.7310
Radius = 6,480.0000
External = 0.3767
Long Chord = 139.7283
Mid. Ord. = 0.3766
P.C. Station 51+74.22 N 13,924,604.6569 E 2,337,180.6700
P.T. Station 53+13.95 N 13,924,606.6043 E 2,337,320.3847
C.C. N 13,931,084.6247 E 2,337,160.2200
Back = N 89° 49' 09.06" E
Ahead = N 88° 35' 01.28" E
Chord Bear = N 89° 12' 05.17" E

Course from PT WINDYHILLRD_4 to WINDYHILLRD6 N 88° 35' 01.28" E Dist 686.0531

Point WINDYHILLRD6 N 13,924,623.5614 E 2,338,006.2282 Sta 60+00.00

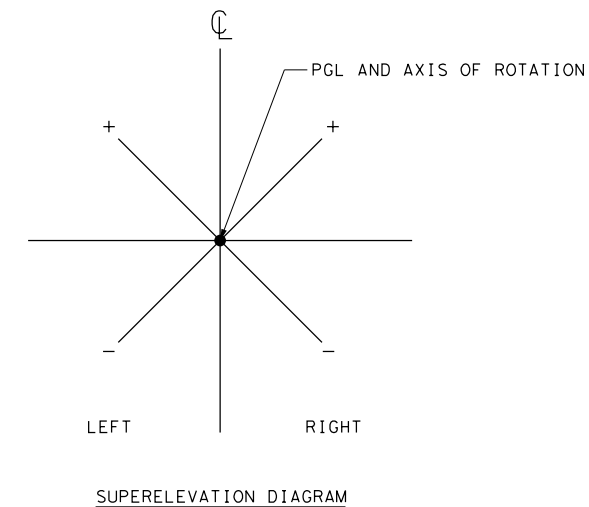
Ending chain WINDYHILLRD description

SUPERELEVATION TABLE

WINDY HILL ROAD					
STATION		SHOULDER CROSS SLOPE LEFT (%)	TRAVEL LANE CROSS SLOPE LEFT (%)	TRAVEL LANE CROSS SLOPE RIGHT (%)	SHOULDER CROSS SLOPE RIGHT (%)
35+96.69	BEGIN PROJECT				
30+64	END NC & BEGIN SUPERELEVATION TRANSITION	> -2.00	-2.00	-2.00	-2.00
34+70	END TRANSITION & BEGIN FS				
36+06	END FS & BEGIN SUPERELEVATION TRANSITION	> -5.60	-5.60	5.60	5.60
40+12	END TRANSITION & BEGIN NC	> -2.00	-2.00	-2.00	-2.00

NC = NORMAL CROWN
FS = FULL SUPERELEVATION

NOTE: ALL SUPERELEVATION TRANSITIONS ARE LINEAR



THIS DOCUMENT IS RELEASED FOR THE
PURPOSE OF INTERIM REVIEW ONLY
UNDER THE AUTHORITY OF:
ZACHARY B. RYAN
TEXAS REGISTRATION 106276
DATE: 7/10/2020
IT IS NOT TO BE USED FOR BIDDING,
CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
FRN - F-1386

WINDY HILL ROAD HORIZONTAL ALIGNMENT AND SUPERELEVATION DATA

GLO Contract# 19-280-000-B779

DESIGN BY: AM
DRAWN BY: AM
CHECKED BY: ZR
APPROVED BY:
PROJECT NO: 2173.2001
DATE: 7/10/2020

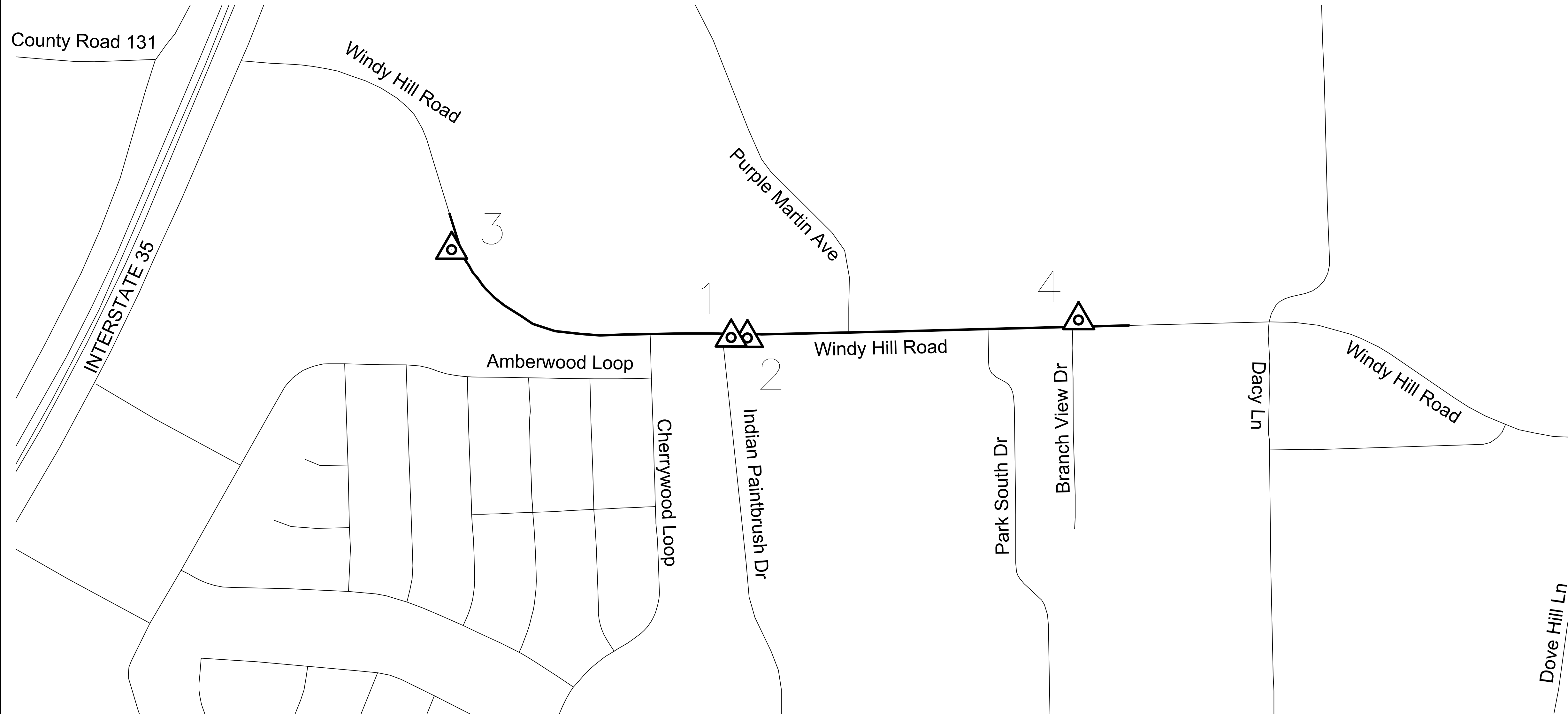
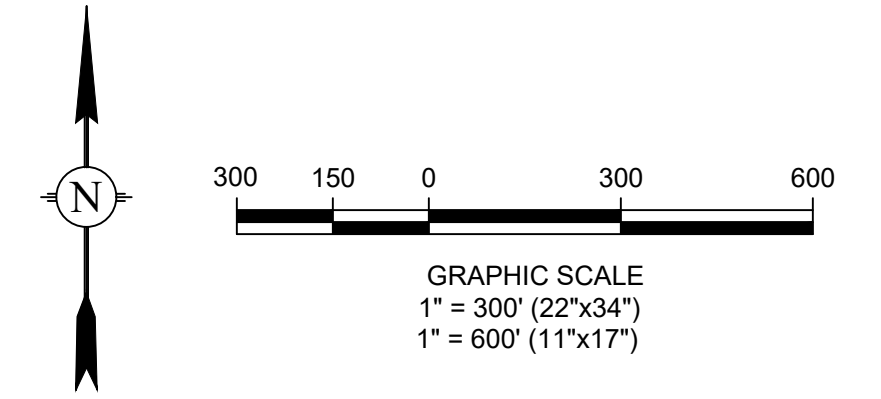
SCALE
HORIZONTAL:
VERTICAL:
SHEET: 1 OF 1
PAGE: 50

7/10/2020
 4:43:36 PM
 I:\2173\2001\CADD\SHEETS\03-ROADWAY\Btbl\SWH*HAB*01.dbr

HORIZONTAL / VERTICAL CONTROL - GRID COORDINATES

PT	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	13924576.590	2336395.706	672.93'	CP 5/8-INCH IR WITH CAP "PACS"
2	13924574.652	2336475.191	672.36'	CP SET 5/8-INCH IR WITH CAP "LJA SURVEY"
3	13925005.611	2335028.298	695.61'	CP SET 5/8-INCH IR WITH CAP "LJA SURVEY"
4	13924661.920	2338095.751	704.09'	CP SET 5/8-INCH IR WITH CAP "LJA SURVEY"

NOTES:
 1. ALL BEARINGS SHOWN ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, TEXAS SOUTH CENTRAL ZONE, NAD 83/93. ALL COORDINATES SHOWN ARE GRID.
 2. A SITE CALIBRATION SHOULD BE PERFORMED WHEN UTILIZING THE CONTROL SHOWN HEREIN.



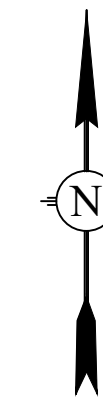
Gordon N. Anderson

SURVEY DATE: JUNE, 2020

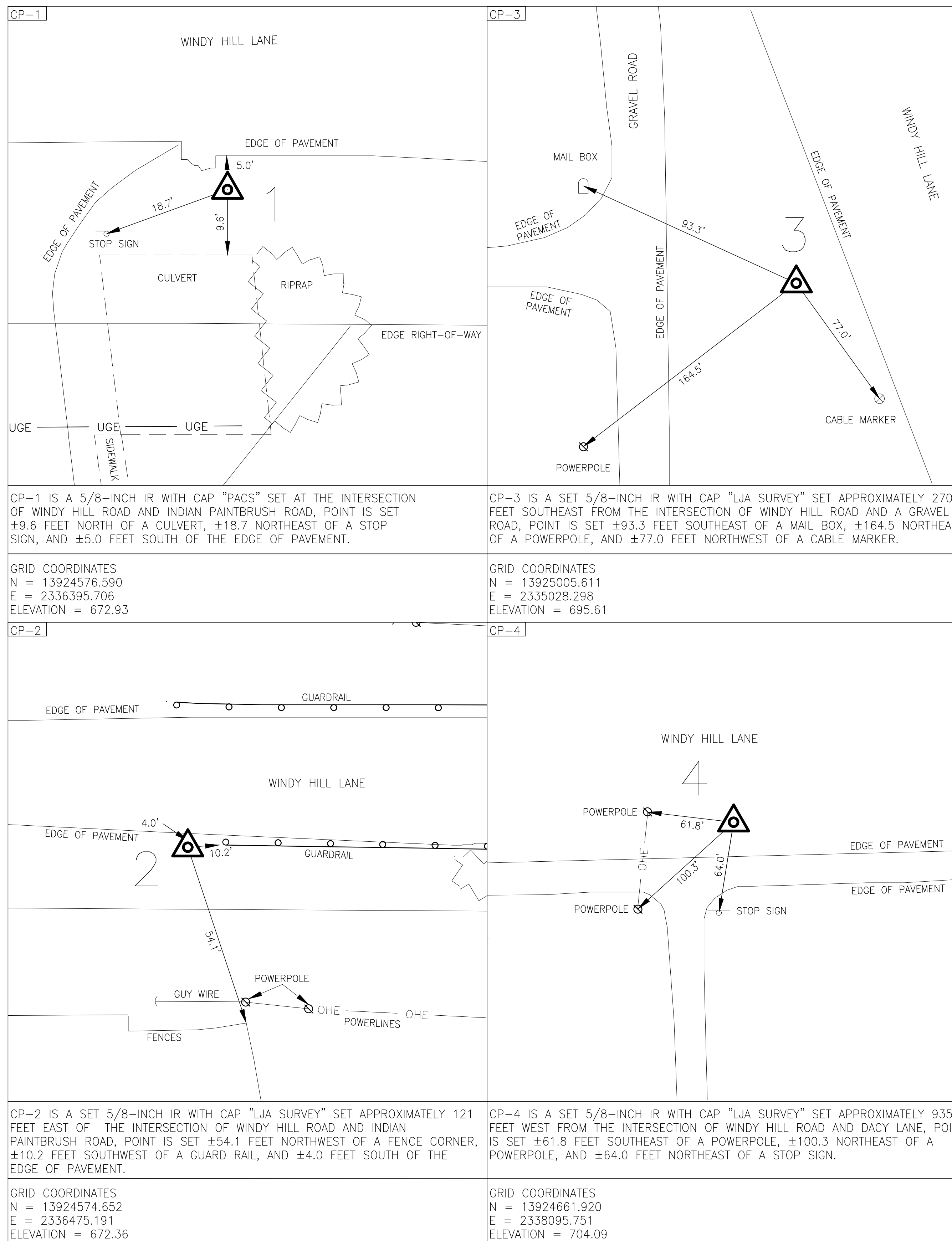


**SURVEY CONTROL
INDEX SHEET**

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.	
			51	
DRAWN	STATE	DIST. NO.	COUNTY	
CHECK	CONTROL	SECTION	JOB	HIGHWAY NO.



NOT TO SCALE



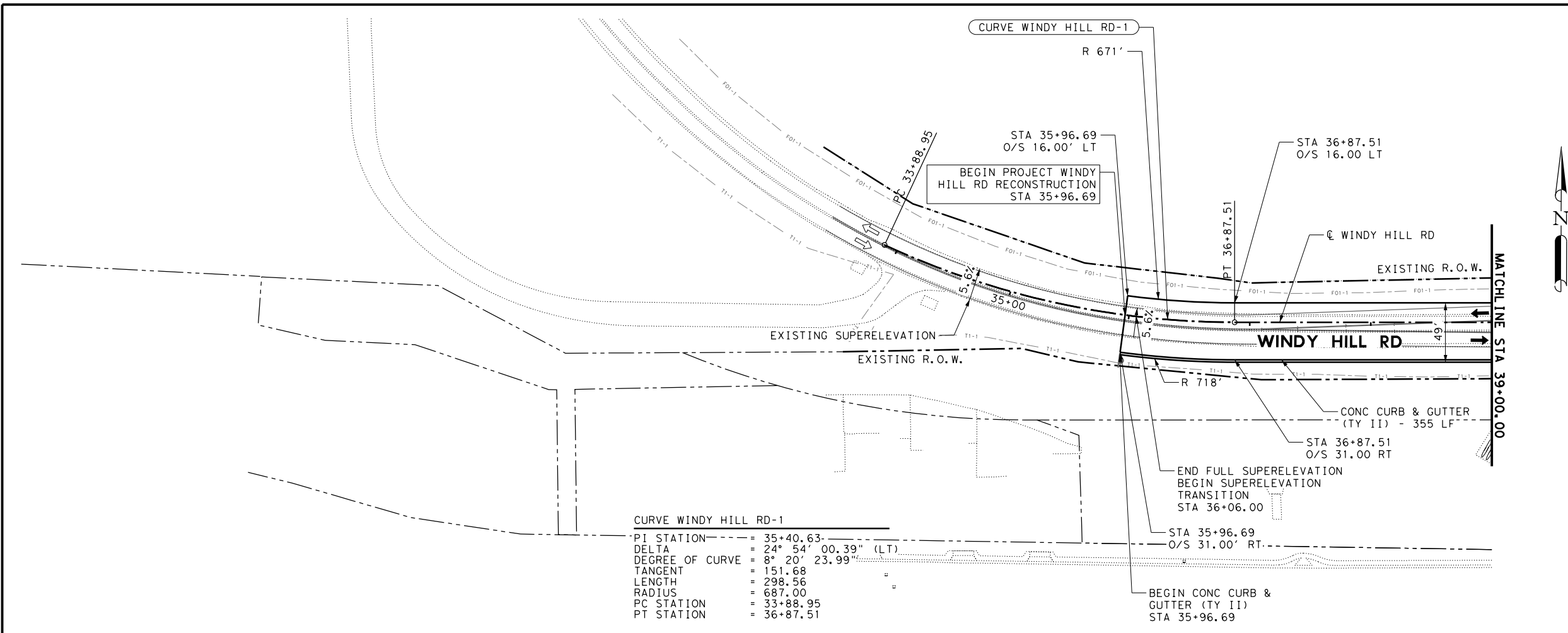
SURVEY DATE: JUNE, 2020



SURVEY CONTROL INDEX SHEET

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
			52
DRAWN	STATE	DIST. NO.	COUNTY
CHECK	CONTROL	SECTION	JOB
			HIGHWAY NO.

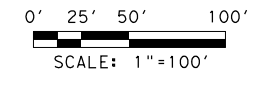
7/10/2020 4:43:47 PM I:\2173\2001\CADD\SHEETS\03-Roadway Details\WH*RDWY*PP*01.dgn



LEGEND

- EXISTING R.O.W.
- - - PROPOSED CONSTRUCTION EASEMENT
- - - EXISTING DRAINAGE EASEMENT
- EXISTING UTILITY
- EXISTING PLANIMETRICS
- CURVE DATA

- NOTES:**
- DIMENSIONS SHOWN ARE TO LIP OF GUTTER OR EDGE OF PAVEMENT UNLESS OTHERWISE NOTED.
 - SIDEWALK SHALL TYPICALLY FOLLOW THE BACK OF CURB. MINOR VARIATIONS SHALL BE FIELD LOCATED AND SHALL MEET ADA REQUIREMENTS.
 - SEE DRIVEWAY SUMMARY TABLE FOR MORE INFORMATION.
 - SEE SUPERELEVATION DATA SHEET FOR SUPERELEVATION DATA.
 - SEE INTERSECTION LAYOUTS FOR MORE INFORMATION.
 - SEE MAILBOX TURNOUT TABLE FOR MORE INFORMATION.



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.

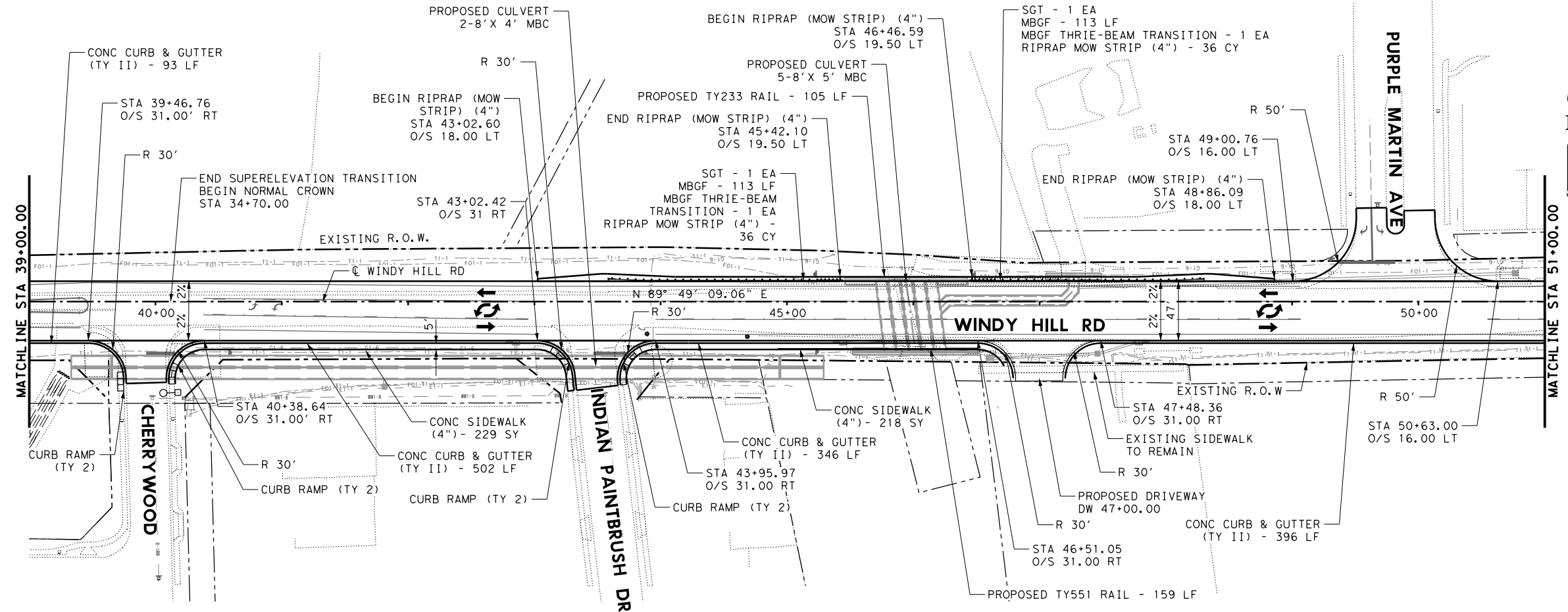


LJA Engineering, Inc.
 FRN-F-1386

WINDY HILL ROAD ROADWAY PLAN & PROFILE
 BEGIN TO STA 39+00

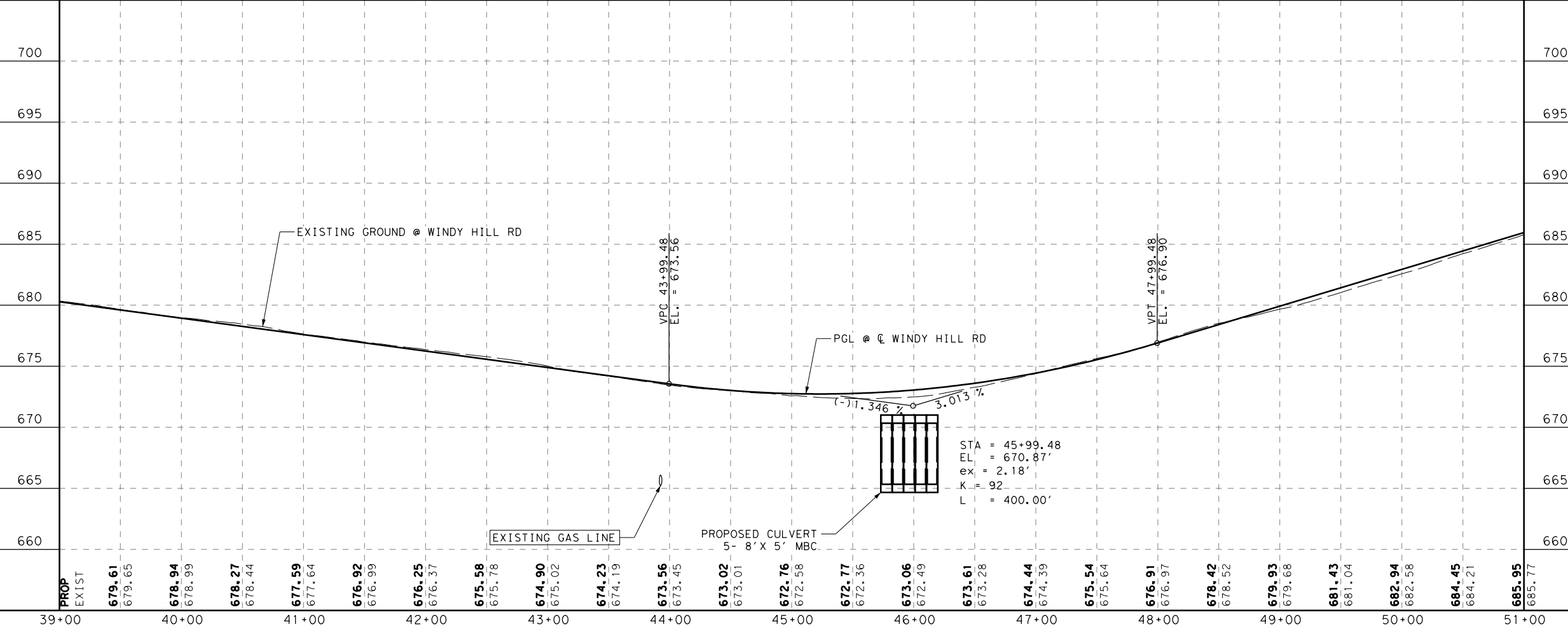
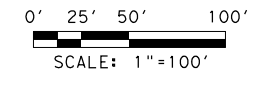
GLO Contract# 19-280-000-B779	
DESIGN BY: AM	SCALE
DRAWN BY: AM	HORIZONTAL: 1"=100'
CHECKED BY: ZR	VERTICAL: 1"=10'
APPROVED BY:	SHEET: 1 OF 3
PROJECT NO: 2173.2001	PAGE: 53
DATE: 7/10/2020	

7/10/2020 4:43:47 PM
 I:\2173\2001\CADD\SHEETS\03-Roadway Details\WH*RDWY*PP*02.dgn



- LEGEND**
- EXISTING R.O.W.
 - - - PROPOSED CONSTRUCTION EASEMENT
 - - - EXISTING DRAINAGE EASEMENT
 - EXISTING UTILITY
 - EXISTING PLANIMETRICS
 - CURVE DATA

- NOTES:**
1. DIMENSIONS SHOWN ARE TO LIP OF GUTTER OR EDGE OF PAVEMENT UNLESS OTHERWISE NOTED.
 2. SIDEWALK SHALL TYPICALLY FOLLOW THE BACK OF CURB. MINOR VARIATIONS SHALL BE FIELD LOCATED AND SHALL MEET ADA REQUIREMENTS.
 3. SEE DRIVEWAY SUMMARY TABLE FOR MORE INFORMATION.
 4. SEE SUPERELEVATION DATA SHEET FOR SUPERELEVATION DATA.
 5. SEE INTERSECTION LAYOUTS FOR MORE INFORMATION.
 6. SEE MAILBOX TURNOUT TABLE FOR MORE INFORMATION.



THIS DOCUMENT IS RELEASED FOR THE
 PURPOSE OF INTERIM REVIEW ONLY
 UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING,
 CONSTRUCTION, OR PERMIT PURPOSES.

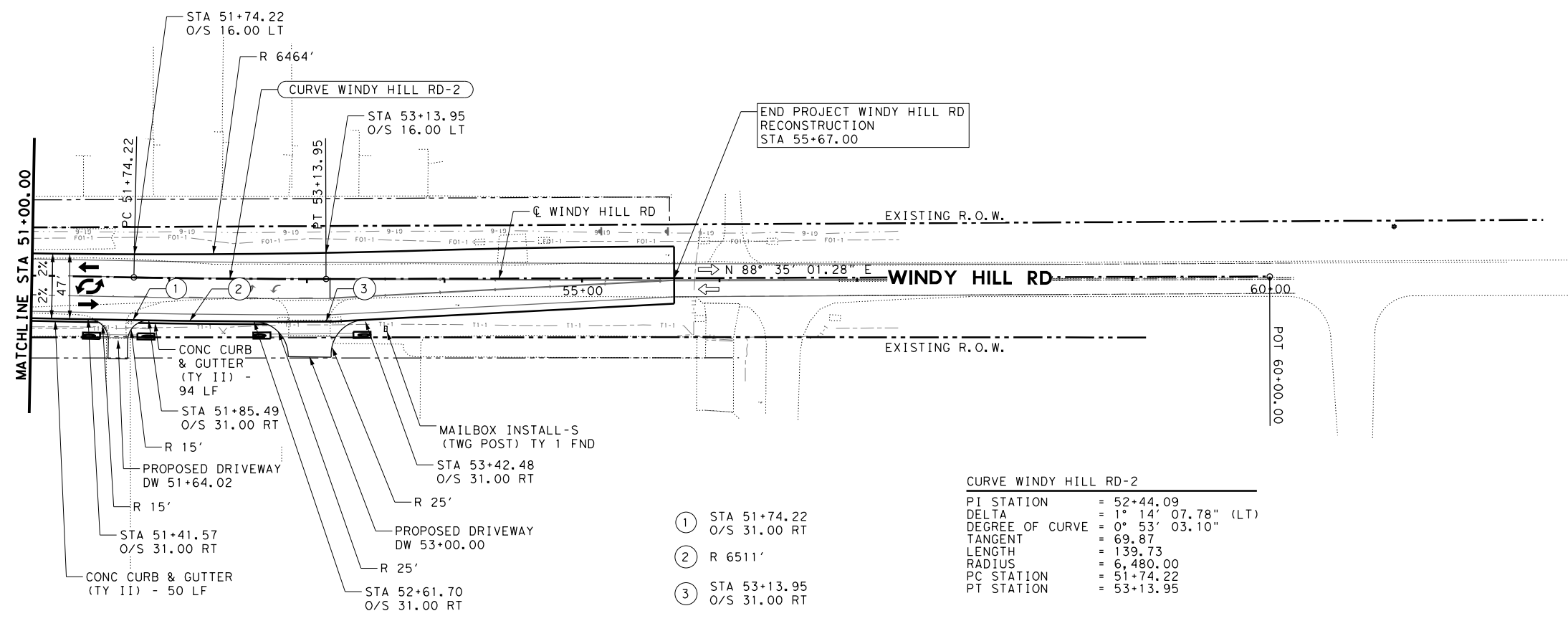


LJA Engineering, Inc.
 FRN-F-1386

**WINDY HILL ROAD
 ROADWAY
 PLAN & PROFILE**
 STA 39+00 TO STA 51+00

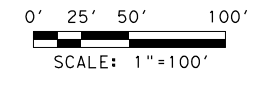
GLO Contract# 19-280-000-B779	
DESIGN BY: AM	SCALE
DRAWN BY: AM	HORIZONTAL: 1"=100'
CHECKED BY: ZR	VERTICAL: 1"=10'
APPROVED BY:	SHEET: 2 OF 3
PROJECT NO: 2173.2001	PAGE: 54
DATE: 7/10/2020	

7/10/2020 4:43:48 PM
 I:\2173\2001\CADD\SHEETS\03-Roadway Details\NH*RDWY*PP*03.dgn



- LEGEND**
- EXISTING R.O.W.
 - - - - PROPOSED CONSTRUCTION EASEMENT
 - EXISTING DRAINAGE EASEMENT
 - EXISTING UTILITY
 - EXISTING PLANIMETRICS
 - CURVE DATA

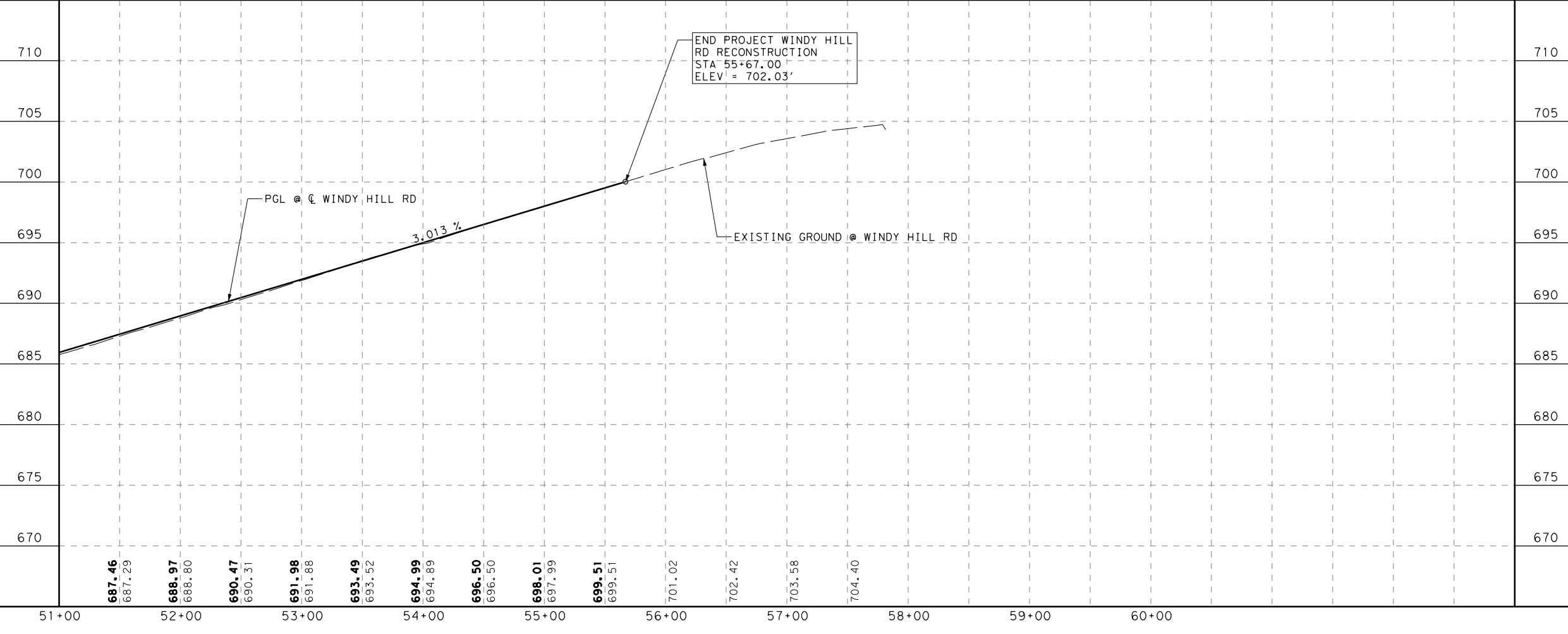
- NOTES:**
1. DIMENSIONS SHOWN ARE TO LIP OF GUTTER OR EDGE OF PAVEMENT UNLESS OTHERWISE NOTED.
 2. SIDEWALK SHALL TYPICALLY FOLLOW THE BACK OF CURB. MINOR VARIATIONS SHALL BE FIELD LOCATED AND SHALL MEET ADA REQUIREMENTS.
 3. SEE DRIVEWAY SUMMARY TABLE FOR MORE INFORMATION.
 4. SEE SUPERELEVATION DATA SHEET FOR SUPERELEVATION DATA.
 5. SEE INTERSECTION LAYOUTS FOR MORE INFORMATION.
 6. SEE MAILBOX TURNOUT TABLE FOR MORE INFORMATION.



- ① STA 51+74.22
O/S 31.00 RT
- ② R 6511'
- ③ STA 53+13.95
O/S 31.00 RT

CURVE WINDY HILL RD-2

PI STATION = 52+44.09
 DELTA = 1° 14' 07.78" (LT)
 DEGREE OF CURVE = 0° 53' 03.10"
 TANGENT = 69.87
 LENGTH = 139.73
 RADIUS = 6,480.00
 PC STATION = 51+74.22
 PT STATION = 53+13.95



THIS DOCUMENT IS RELEASED FOR THE
 PURPOSE OF INTERIM REVIEW ONLY
 UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING,
 CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.

FRN-F-1386

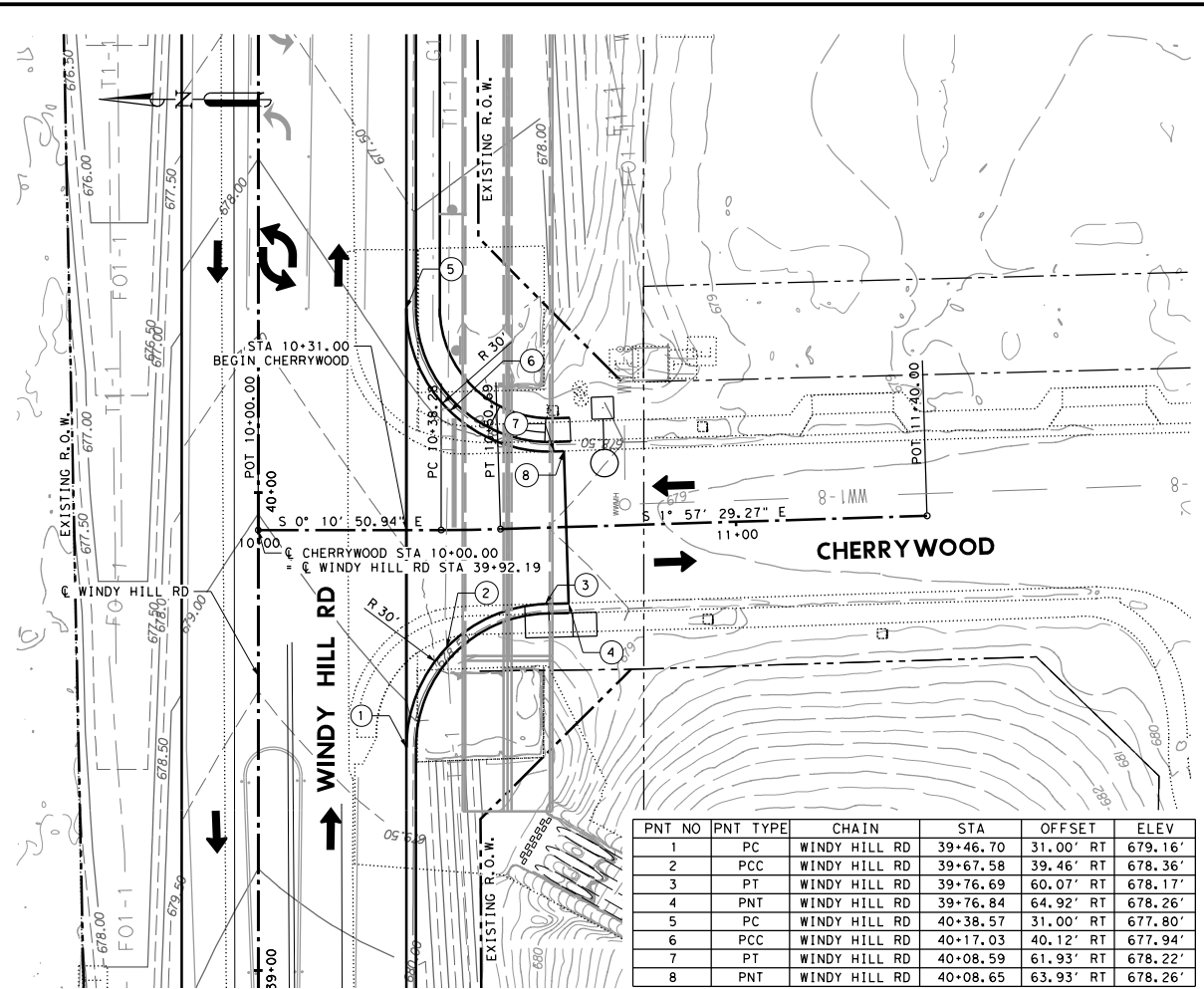
**WINDY HILL ROAD
ROADWAY
PLAN & PROFILE**

STA 51+00 TO END

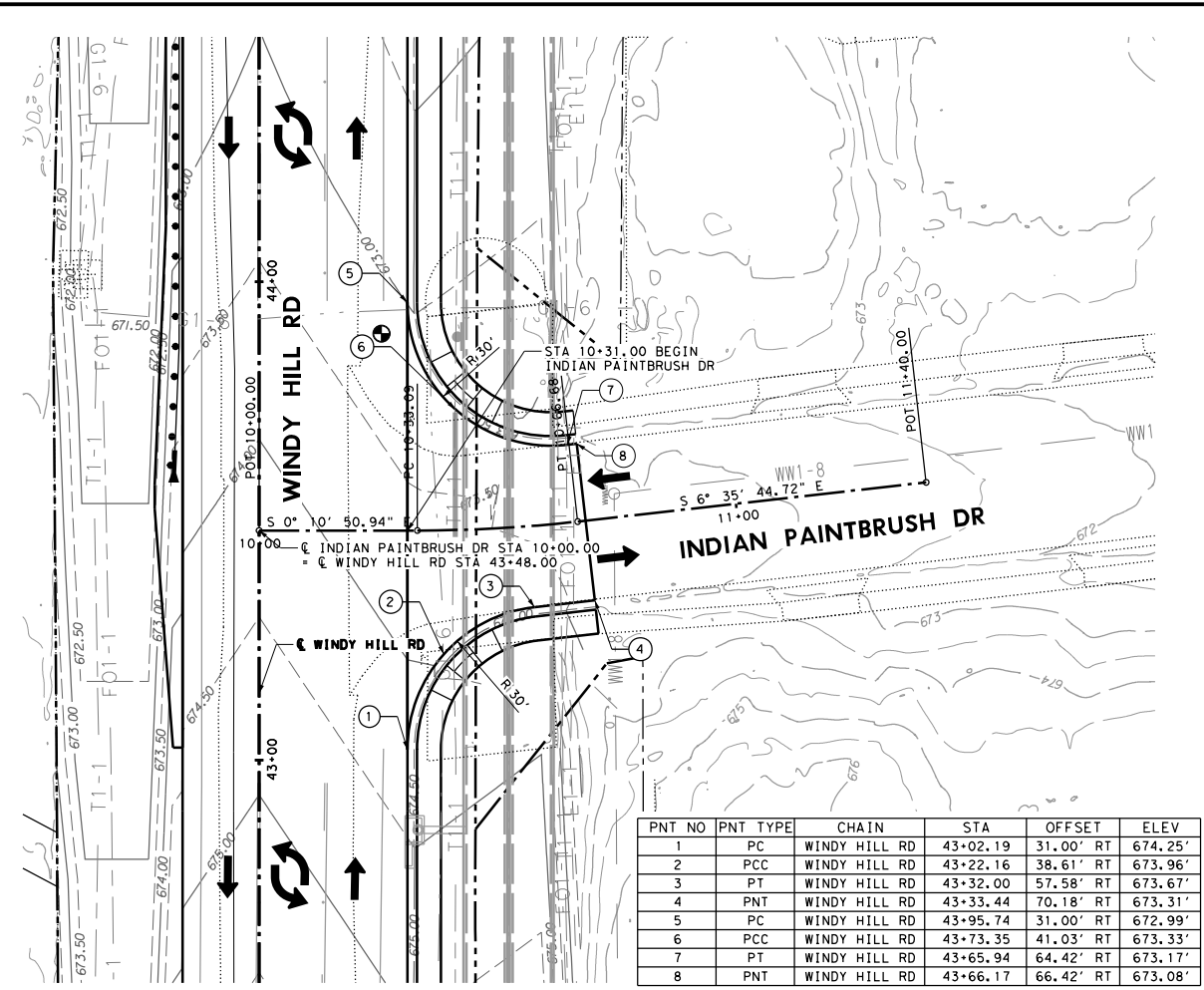
GLO Contract# 19-280-000-B779

DESIGN BY: AM	SCALE
DRAWN BY: AM	HORIZONTAL: 1"=100'
CHECKED BY: ZR	VERTICAL: 1"=10'
APPROVED BY:	SHEET: 3 OF 3
PROJECT NO: 2173.2001	PAGE: 55
DATE: 7/10/2020	

7/10/2020 4:43:58 PM I:\2173\2001\CADD\SHEETS\03-Roadway Details\WH\CROSS*ST*PP*01.dgn



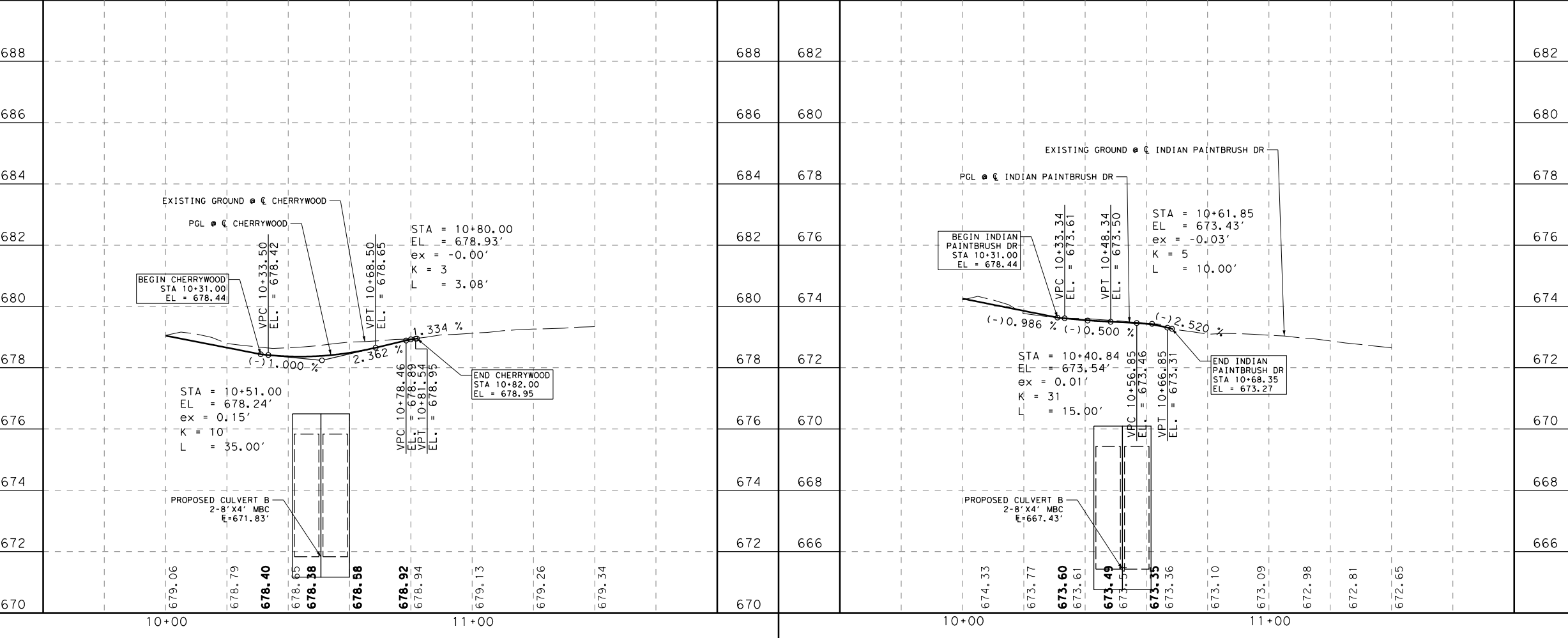
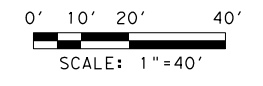
PNT NO	PNT TYPE	CHAIN	STA	OFFSET	ELEV
1	PC	WINDY HILL RD	39+46.70	31.00' RT	679.16'
2	PCC	WINDY HILL RD	39+67.58	39.46' RT	678.36'
3	PT	WINDY HILL RD	39+76.69	60.07' RT	678.17'
4	PNT	WINDY HILL RD	39+76.84	64.92' RT	678.26'
5	PC	WINDY HILL RD	40+38.57	31.00' RT	677.80'
6	PCC	WINDY HILL RD	40+17.03	40.12' RT	677.94'
7	PT	WINDY HILL RD	40+08.59	61.93' RT	678.22'
8	PNT	WINDY HILL RD	40+08.65	63.93' RT	678.26'



PNT NO	PNT TYPE	CHAIN	STA	OFFSET	ELEV
1	PC	WINDY HILL RD	43+02.19	31.00' RT	674.25'
2	PCC	WINDY HILL RD	43+22.16	38.61' RT	673.96'
3	PT	WINDY HILL RD	43+32.00	57.58' RT	673.67'
4	PNT	WINDY HILL RD	43+33.44	70.18' RT	673.31'
5	PC	WINDY HILL RD	43+95.74	31.00' RT	672.99'
6	PCC	WINDY HILL RD	43+73.35	41.03' RT	673.33'
7	PT	WINDY HILL RD	43+65.94	64.42' RT	673.17'
8	PNT	WINDY HILL RD	43+66.17	66.42' RT	673.08'

- LEGEND**
- EXISTING R.O.W.
 - - - PROPOSED CONSTRUCTION EASEMENT
 - - - EXISTING DRAINAGE EASEMENT
 - - - EXISTING UTILITY
 - - - EXISTING PLANIMETRICS
 - CURVE DATA

- NOTES:**
1. DIMENSIONS SHOWN ARE TO LIP OF GUTTER OR EDGE OF PAVEMENT UNLESS OTHERWISE NOTED.
 2. SIDEWALK SHALL TYPICALLY FOLLOW THE BACK OF CURB. MINOR VARIATIONS SHALL BE FIELD LOCATED AND SHALL MEET ADA REQUIREMENTS.
 3. SEE DRIVEWAY SUMMARY TABLE FOR MORE INFORMATION.
 4. SEE SUPERELEVATION DATA SHEET FOR SUPERELEVATION DATA.
 5. SEE INTERSECTION LAYOUTS FOR MORE INFORMATION.
 6. SEE MAILBOX TURNOUT TABLE FOR MORE INFORMATION.



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.

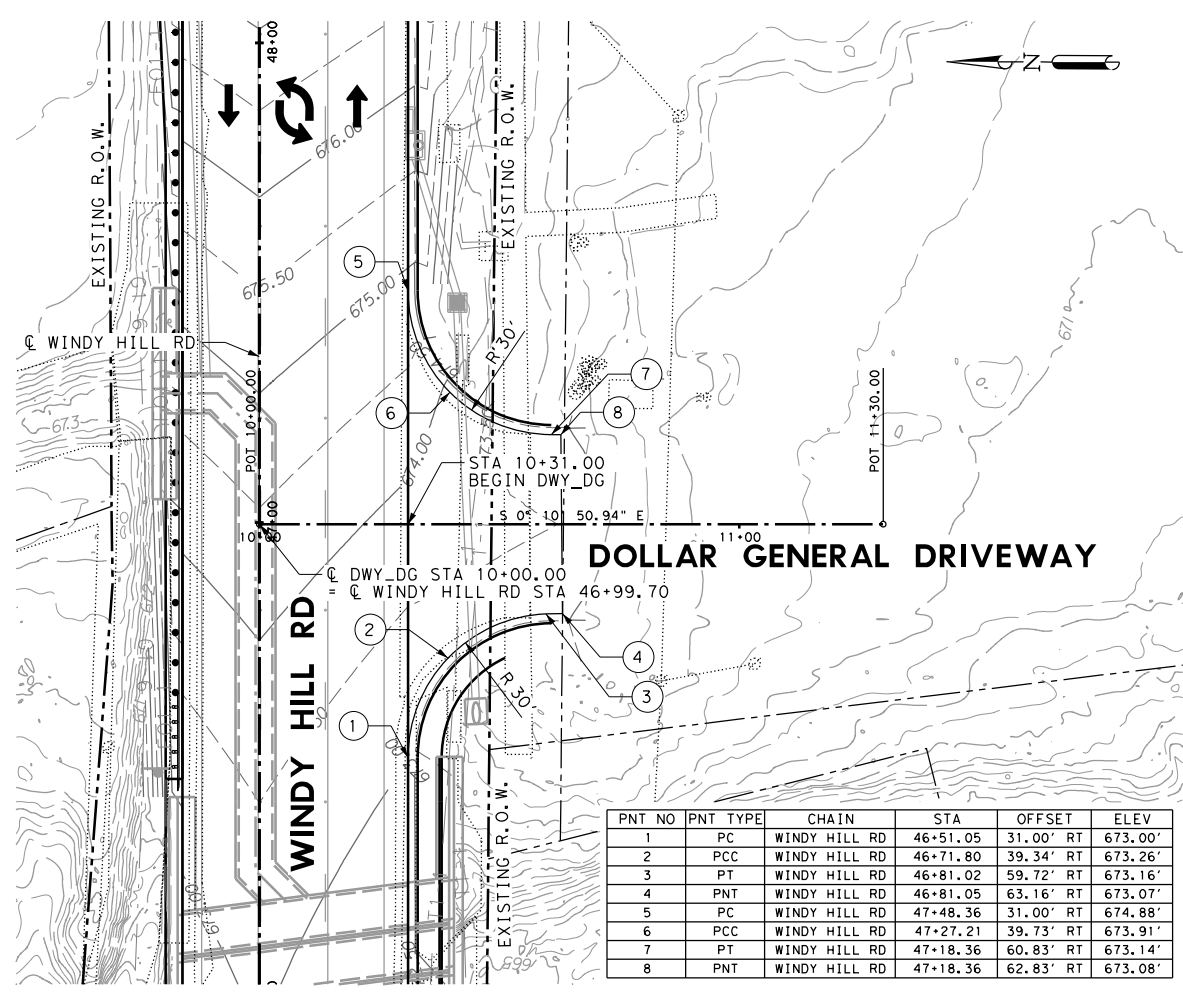


LJA Engineering, Inc.
 FRN-F-1386

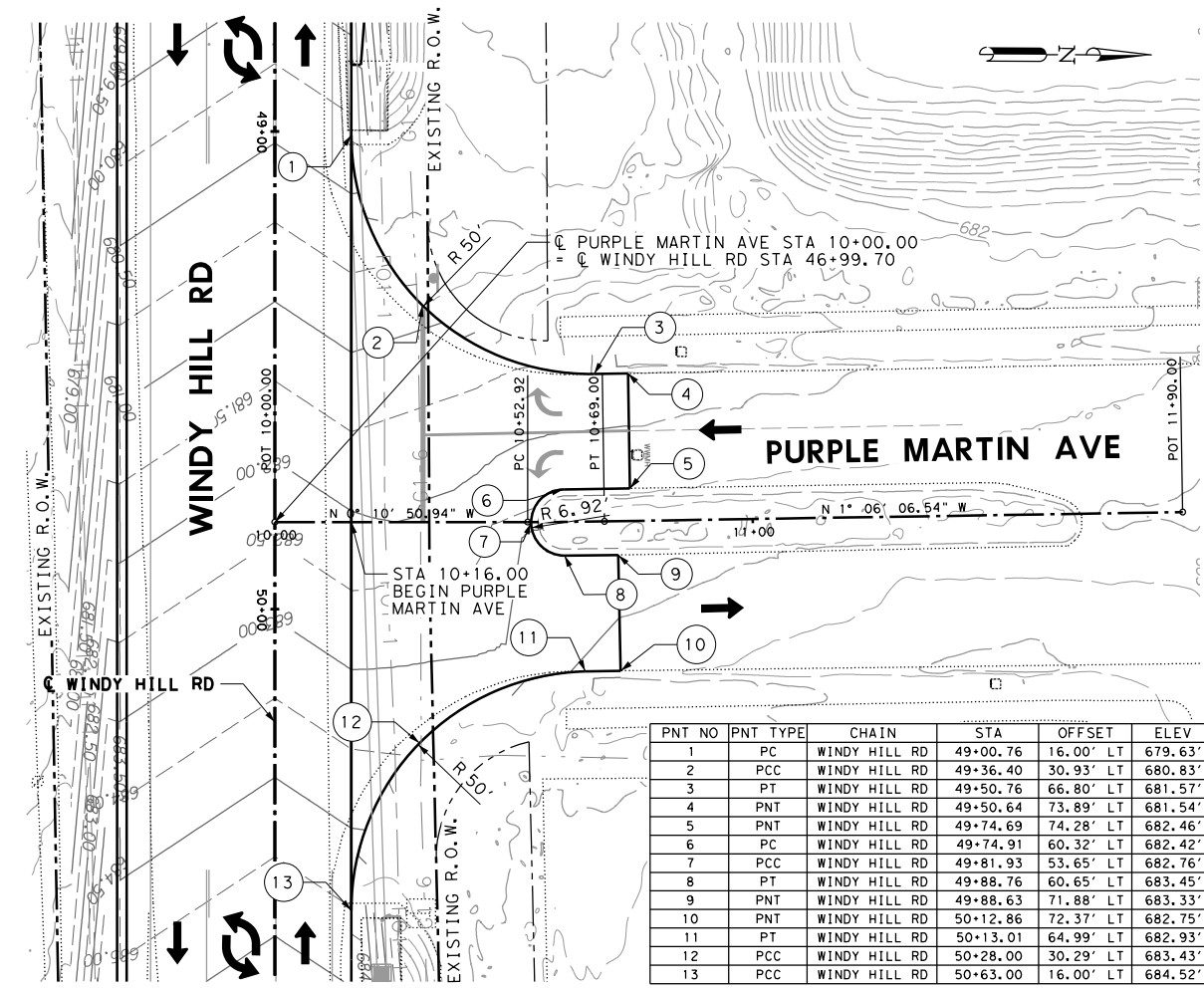
WINDY HILL ROAD INTERSECTION GRADING PLAN

GLO Contract# 19-280-000-B779	
DESIGN BY: AM	SCALE
DRAWN BY: AM	HORIZONTAL: 1"=40'
CHECKED BY: ZR	VERTICAL: 1"=4'
APPROVED BY:	SHEET: 1 OF 3
PROJECT NO: 2173.2001	PAGE: 56
DATE: 7/10/2020	

7/10/2020 4:44:00 PM
 I:\2173\2001\CADD\SHEETS\03-Roadway Details\WH\CROSS*ST*PP*02.dgn



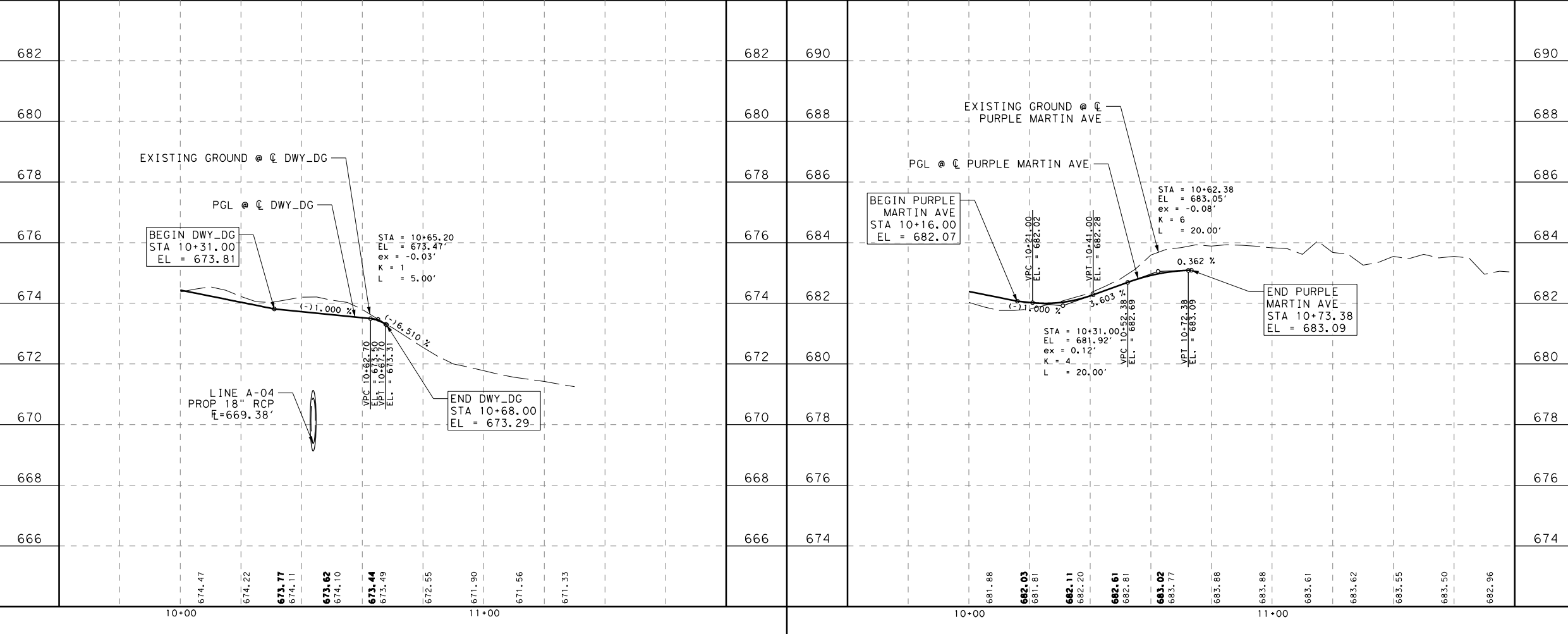
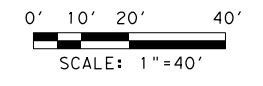
PNT NO	PNT TYPE	CHAIN	STA	OFFSET	ELEV
1	PC	WINDY HILL RD	46+51.05	31.00' RT	673.00'
2	PCC	WINDY HILL RD	46+71.80	39.34' RT	673.26'
3	PT	WINDY HILL RD	46+81.02	59.72' RT	673.16'
4	PNT	WINDY HILL RD	46+81.05	63.16' RT	673.07'
5	PC	WINDY HILL RD	47+48.36	31.00' RT	674.88'
6	PCC	WINDY HILL RD	47+27.21	39.73' RT	673.91'
7	PT	WINDY HILL RD	47+18.36	60.83' RT	673.14'
8	PNT	WINDY HILL RD	47+18.36	62.83' RT	673.08'



PNT NO	PNT TYPE	CHAIN	STA	OFFSET	ELEV
1	PC	WINDY HILL RD	49+00.76	16.00' LT	679.63'
2	PCC	WINDY HILL RD	49+36.40	30.93' LT	680.83'
3	PT	WINDY HILL RD	49+50.76	66.80' LT	681.57'
4	PNT	WINDY HILL RD	49+50.64	73.89' LT	681.54'
5	PNT	WINDY HILL RD	49+74.69	74.28' LT	682.46'
6	PC	WINDY HILL RD	49+74.91	60.32' LT	682.42'
7	PCC	WINDY HILL RD	49+81.93	53.65' LT	682.76'
8	PT	WINDY HILL RD	49+88.76	60.65' LT	683.45'
9	PNT	WINDY HILL RD	49+88.63	71.88' LT	683.33'
10	PNT	WINDY HILL RD	50+12.86	72.37' LT	682.75'
11	PT	WINDY HILL RD	50+13.01	64.99' LT	682.93'
12	PCC	WINDY HILL RD	50+28.00	30.29' LT	683.43'
13	PCC	WINDY HILL RD	50+63.00	16.00' LT	684.52'

- LEGEND**
- EXISTING R.O.W.
 - - - PROPOSED CONSTRUCTION EASEMENT
 - - - EXISTING DRAINAGE EASEMENT
 - - - EXISTING UTILITY
 - - - EXISTING PLANIMETRICS
 - CURVE DATA

- NOTES:**
- DIMENSIONS SHOWN ARE TO LIP OF GUTTER OR EDGE OF PAVEMENT UNLESS OTHERWISE NOTED.
 - SIDEWALK SHALL TYPICALLY FOLLOW THE BACK OF CURB. MINOR VARIATIONS SHALL BE FIELD LOCATED AND SHALL MEET ADA REQUIREMENTS.
 - SEE DRIVEWAY SUMMARY TABLE FOR MORE INFORMATION.
 - SEE SUPERELEVATION DATA SHEET FOR SUPERELEVATION DATA.
 - SEE INTERSECTION LAYOUTS FOR MORE INFORMATION.
 - SEE MAILBOX TURNOUT TABLE FOR MORE INFORMATION.



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



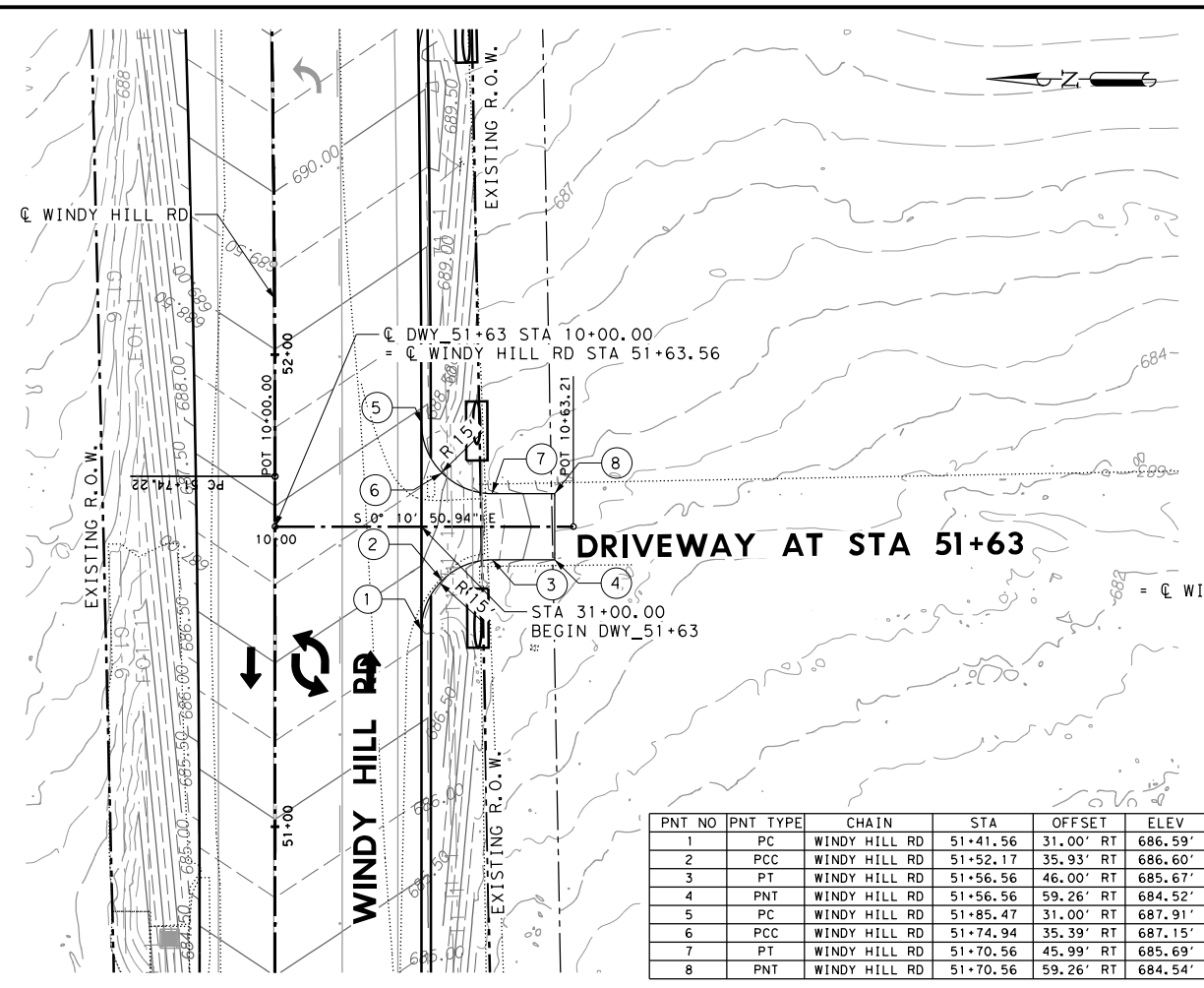
LJA Engineering, Inc.
FRN-F-1386

WINDY HILL ROAD INTERSECTION GRADING PLAN

GLO Contract# 19-280-000-B779

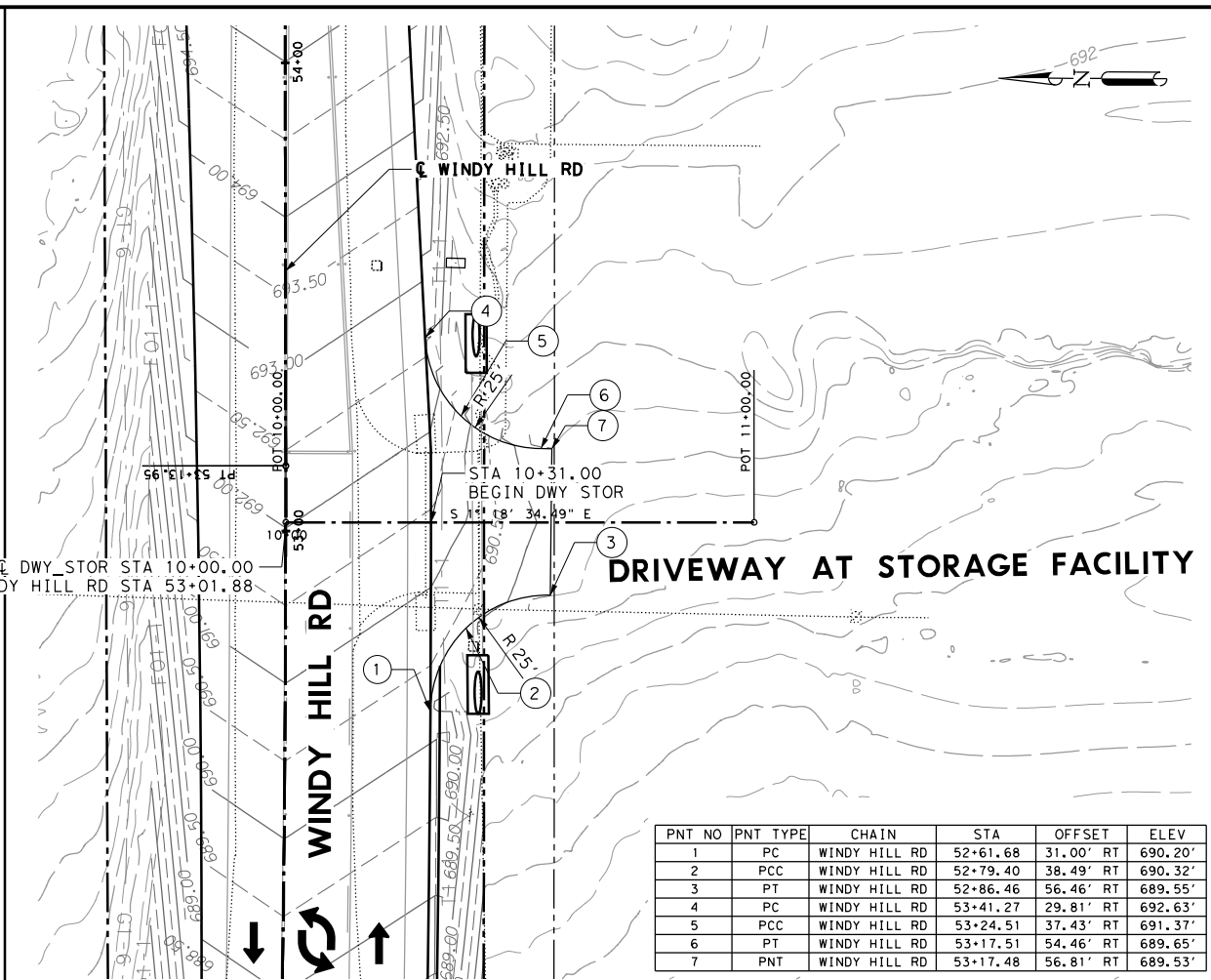
DESIGN BY:	AM	SCALE
DRAWN BY:	AM	HORIZONTAL: 1"=40'
CHECKED BY:	ZR	VERTICAL: 1"=4'
APPROVED BY:		SHEET: 2 OF 3
PROJECT NO:	2173.2001	PAGE: 57
DATE:	7/10/2020	

7/10/2020 4:44:03 PM I:\2173\2001\CADD\SHEETS\03-Roadway Details\WH\CROSS*ST*PP*03.dgn



DRIVEWAY AT STA 51+63

PNT NO	PNT TYPE	CHAIN	STA	OFFSET	ELEV
1	PC	WINDY HILL RD	51+41.56	31.00' RT	686.59'
2	PCC	WINDY HILL RD	51+52.17	35.93' RT	686.60'
3	PT	WINDY HILL RD	51+56.56	46.00' RT	685.67'
4	PNT	WINDY HILL RD	51+56.56	59.26' RT	684.52'
5	PC	WINDY HILL RD	51+85.47	31.00' RT	687.91'
6	PCC	WINDY HILL RD	51+74.94	35.39' RT	687.15'
7	PT	WINDY HILL RD	51+70.56	45.99' RT	685.69'
8	PNT	WINDY HILL RD	51+70.56	59.26' RT	684.54'

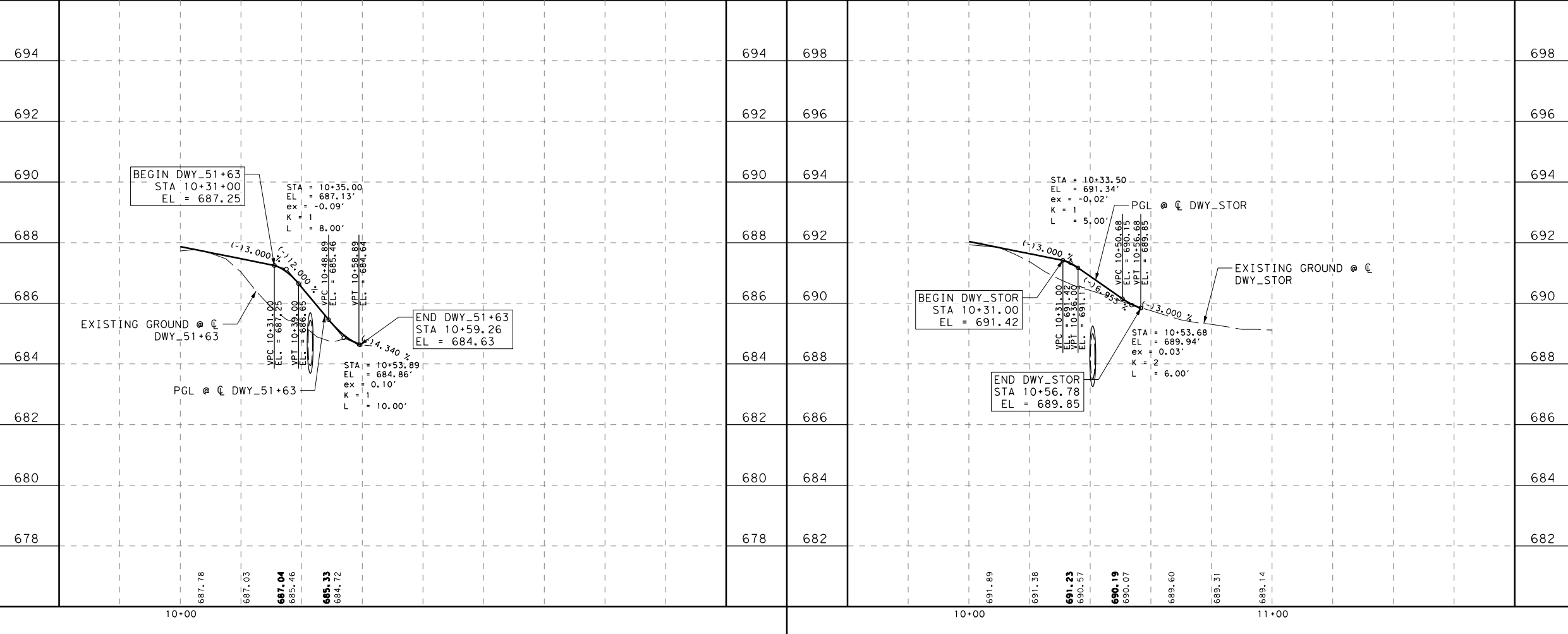
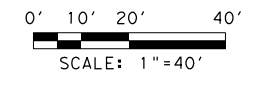


DRIVEWAY AT STORAGE FACILITY

PNT NO	PNT TYPE	CHAIN	STA	OFFSET	ELEV
1	PC	WINDY HILL RD	52+61.68	31.00' RT	690.20'
2	PCC	WINDY HILL RD	52+79.40	38.49' RT	690.32'
3	PT	WINDY HILL RD	52+86.46	56.46' RT	689.55'
4	PC	WINDY HILL RD	53+41.27	29.81' RT	692.63'
5	PCC	WINDY HILL RD	53+24.51	37.43' RT	691.37'
6	PT	WINDY HILL RD	53+17.51	54.46' RT	689.65'
7	PNT	WINDY HILL RD	53+17.48	56.81' RT	689.53'

- LEGEND**
- EXISTING R.O.W.
 - - - - PROPOSED CONSTRUCTION EASEMENT
 - - - - EXISTING DRAINAGE EASEMENT
 - - - - EXISTING UTILITY
 - - - - EXISTING PLANIMETRICS
 - CURVE DATA

- NOTES:**
- DIMENSIONS SHOWN ARE TO LIP OF GUTTER OR EDGE OF PAVEMENT UNLESS OTHERWISE NOTED.
 - SIDEWALK SHALL TYPICALLY FOLLOW THE BACK OF CURB. MINOR VARIATIONS SHALL BE FIELD LOCATED AND SHALL MEET ADA REQUIREMENTS.
 - SEE DRIVEWAY SUMMARY TABLE FOR MORE INFORMATION.
 - SEE SUPERELEVATION DATA SHEET FOR SUPERELEVATION DATA.
 - SEE INTERSECTION LAYOUTS FOR MORE INFORMATION.
 - SEE MAILBOX TURNOUT TABLE FOR MORE INFORMATION.



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



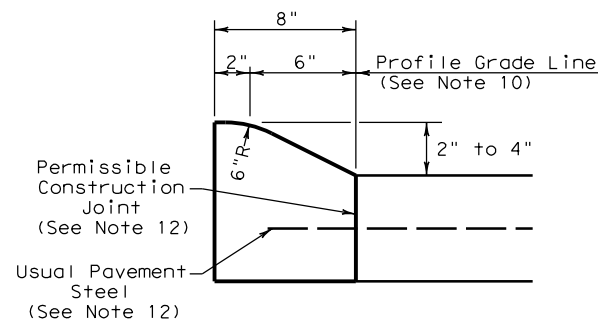
LJA Engineering, Inc.
 FRN-F-1386

WINDY HILL ROAD INTERSECTION GRADING PLAN

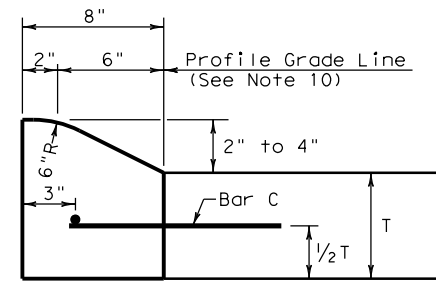
GLO Contract# 19-280-000-B779	
DESIGN BY: AM	SCALE
DRAWN BY: AM	HORIZONTAL: 1"=40'
CHECKED BY: ZR	VERTICAL: 1"=4'
APPROVED BY:	SHEET: 3 OF 3
PROJECT NO: 2173.2001	DATE: 7/10/2020
DATE: 7/10/2020	PAGE: 58

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

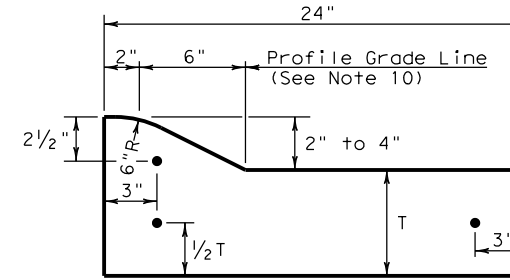
DATE:
FILE:



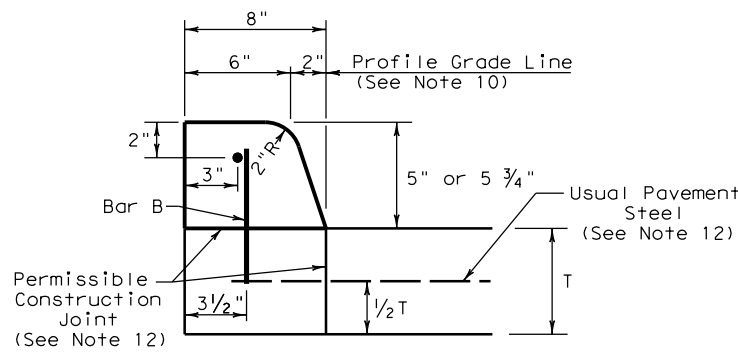
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



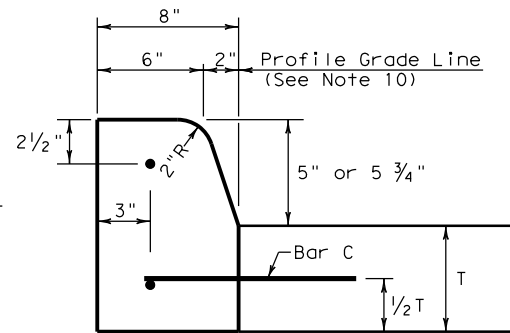
TYPE I CURB
2" - 4" HEIGHT



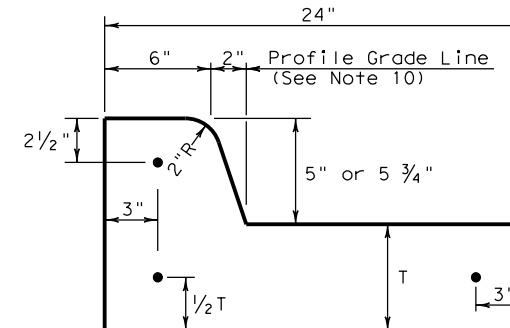
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



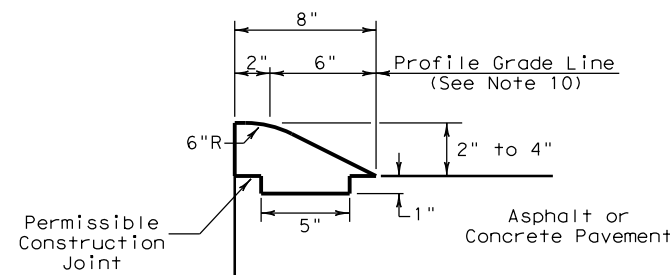
TYPE II CURB (MONOLITHIC)
5" - 5 3/4" HEIGHT



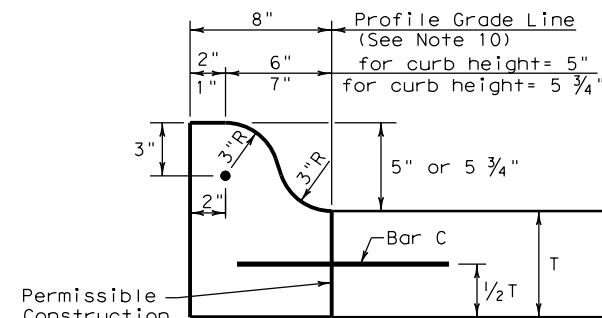
TYPE II CURB
5" - 5 3/4" HEIGHT



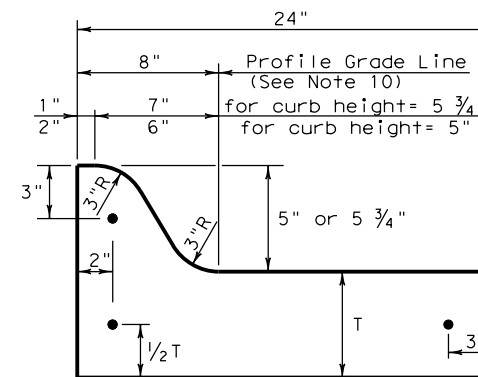
TYPE II CURB AND GUTTER
5" - 5 3/4" HEIGHT



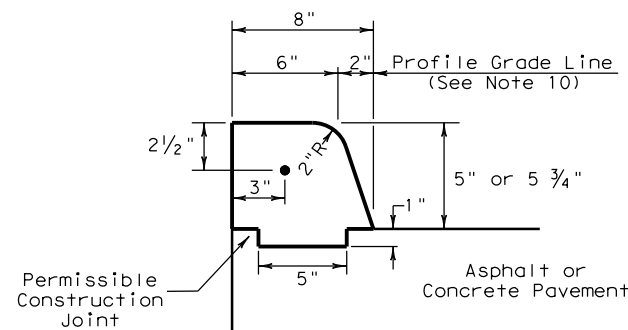
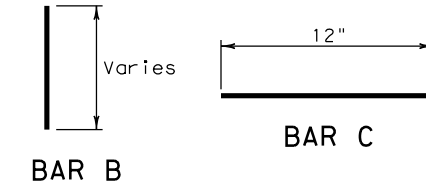
TYPE III CURB (KEYED)
2" - 4" HEIGHT



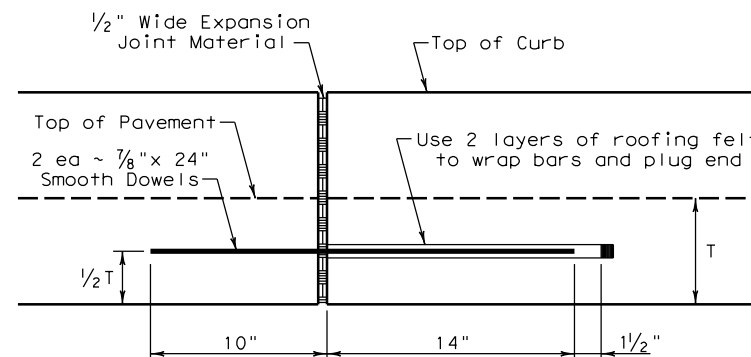
TYPE IIa CURB
5" - 5 3/4" HEIGHT



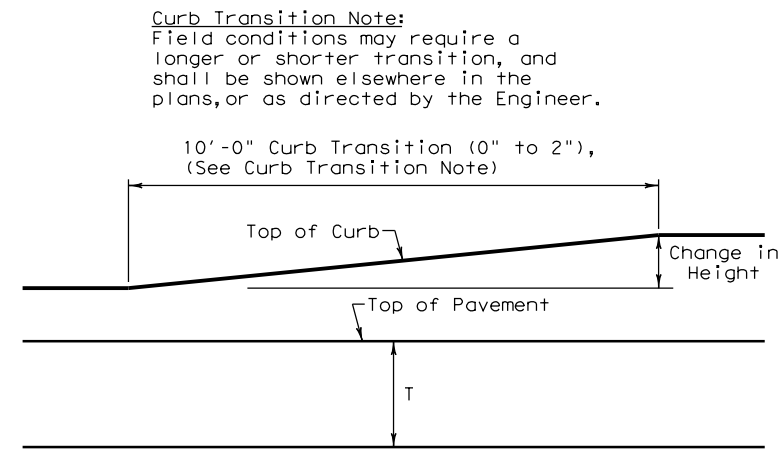
TYPE IIa CURB AND GUTTER
5" - 5 3/4" HEIGHT



TYPE IV CURB (KEYED)
5" - 5 3/4" HEIGHT



EXPANSION JOINT DETAIL



CURB TRANSITION

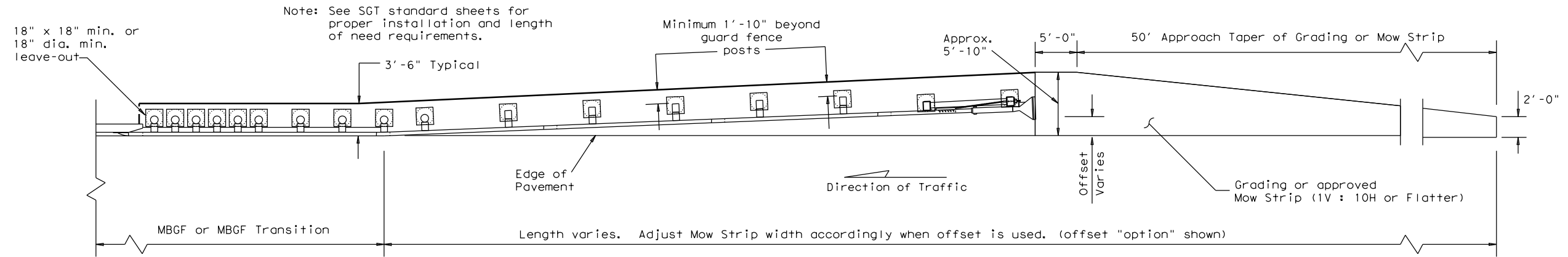
Note: To be paid for as Highest Curb

General Notes

- All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
- Concrete shall be Class A.
- When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Producer List (MPL), maintained by TxDOT, Construction Division.
- Round exposed sharp edges with a rounding tool, to a minimum radius of 1/4 inch.
- All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
- Where concrete curb is placed on existing concrete pavement, the pavement shall be drilled and the reinforcing bars grouted in place.
- Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
- Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C-C.
- Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
- Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
- One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
- When vertical permissible construction joints are used, resulting in a longitudinal construction joint in the pavement, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans for longitudinal construction joints. Reinforcing steel for curb section shall then conform to that required for concrete curb.

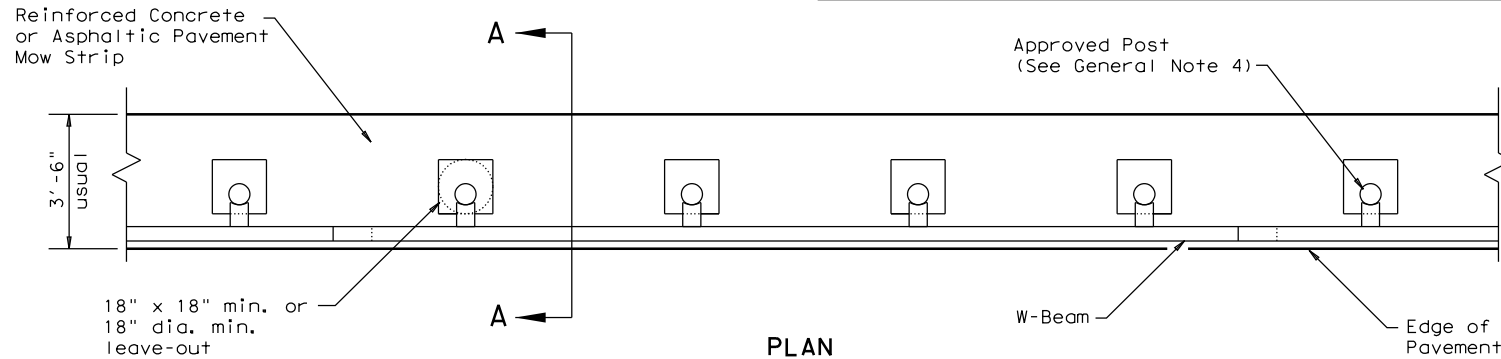
				Design Division Standard	
<h2>CURB AND GUTTER</h2> <h3>CCCG-12</h3>					
FILE: cccg12.dgn	DN: TxDOT	CK: AM	DW: VP	CK: VP	
© TxDOT: 1995	CONT	SECT	JOB	HIGHWAY	
UPDATED 2012 - VP	REVISIONS				
	DIST	COUNTY	SHEET NO.		
			59		

DISCLAIMER: THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.



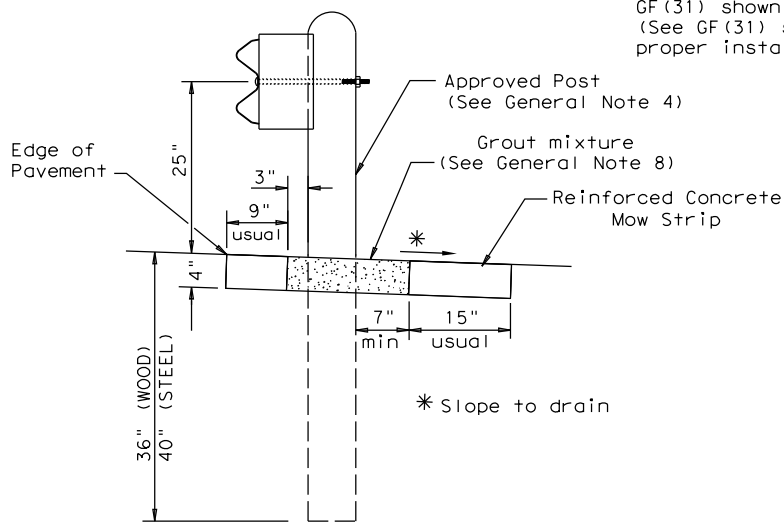
GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS

Note: Site Condition(s)
 Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.
 Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.



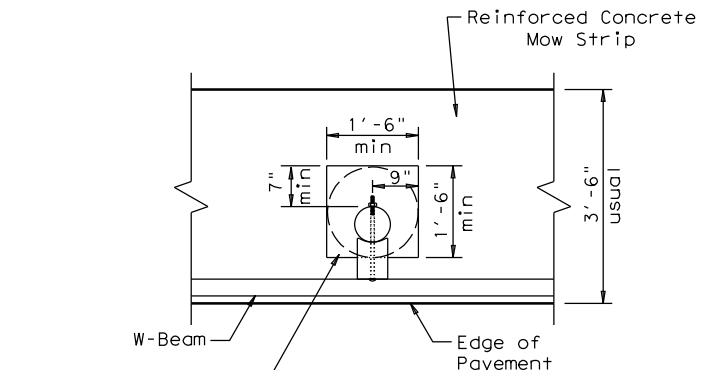
PLAN

GF(31) shown with Mow Strip
 (See GF(31) standard sheet for proper installation)



SECTION A-A

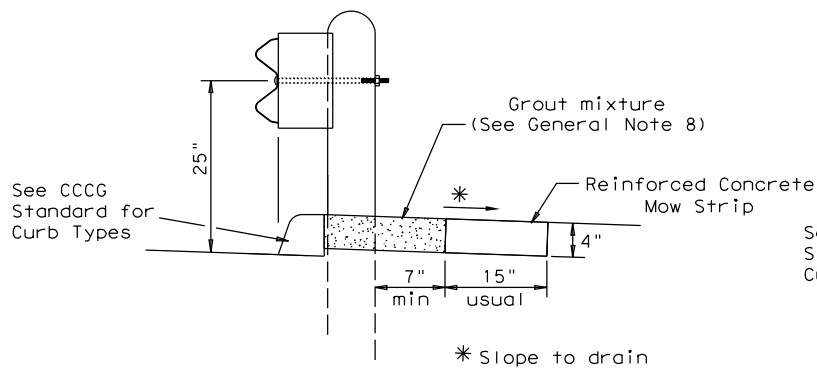
Typical



MOW STRIP DETAIL

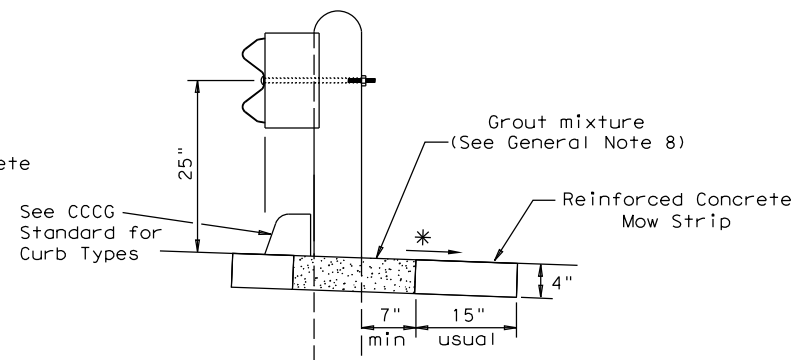
Reinforced Concrete Mow Strip with 18\"/>

- GENERAL NOTES**
1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
 2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
 3. The leave-out behind the post shall be a minimum of 7".
 4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 1/2" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
 5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
 6. Thickness of the mow strip will be 4".
 7. The limits of payment for reinforced concrete will include leave-outs for the posts.
 8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.



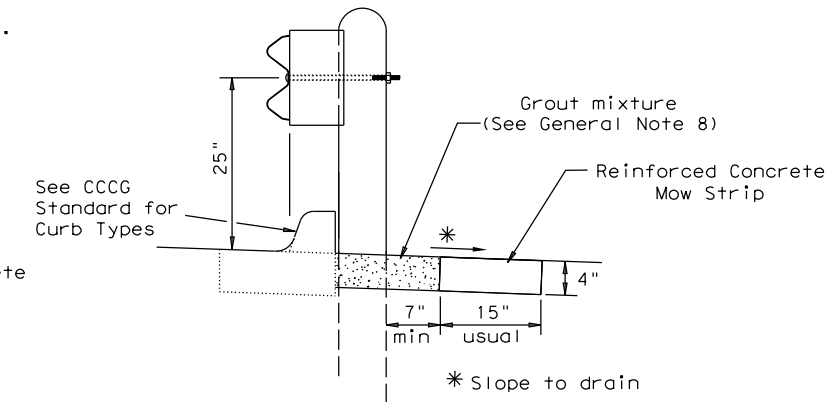
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

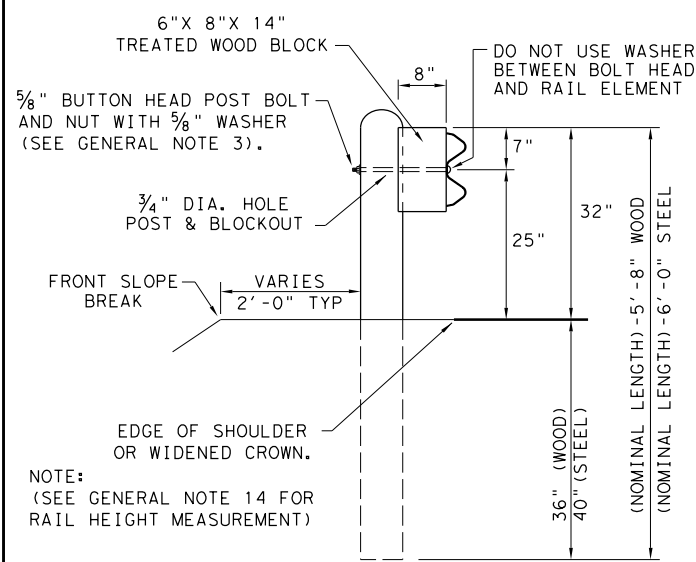


METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT GF(31)MS-19

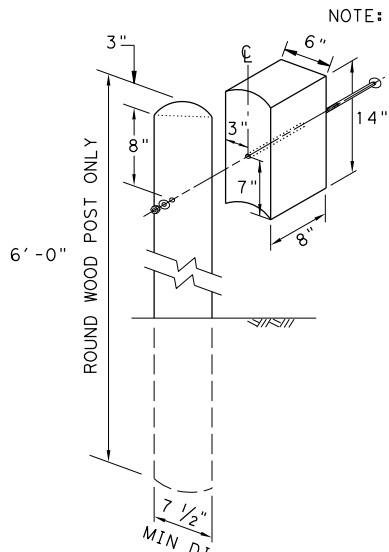
FILE: gf31ms19.dgn	DN:TxDOT	CK: KM	DW: VP	CK:CGL/AG
©TXDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				
DIST	COUNTY			SHEET NO.
				60

DATE:
FILE:

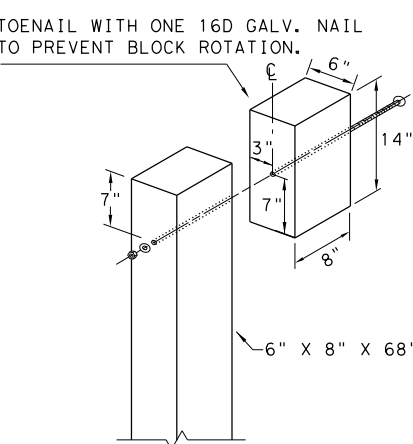
DISCLAIMER: THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.



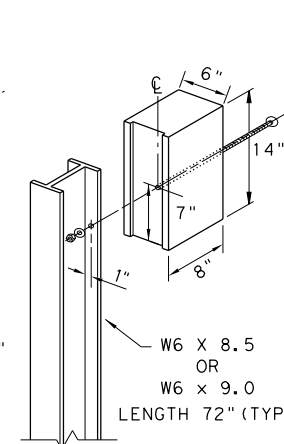
TYPICAL POST PLACEMENT



WOOD BLOCK TO ROUND WOOD POST

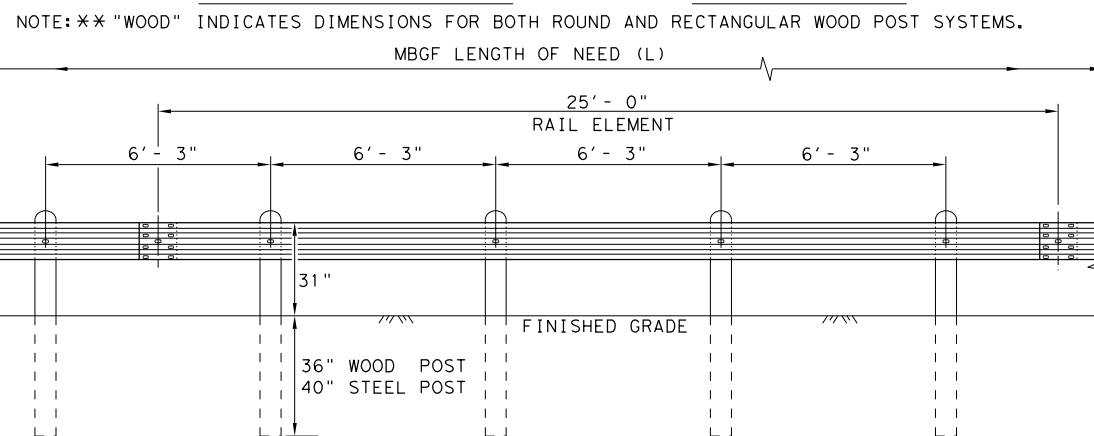


WOOD BLOCK TO RECTANGULAR WOOD POST



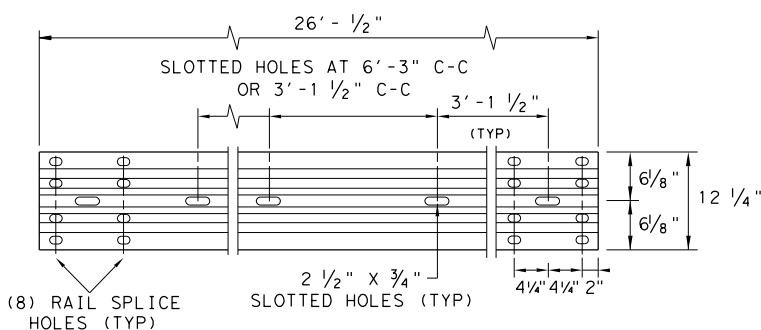
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

- GENERAL NOTES**
1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
 2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'-0", OR 12'-6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
 3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FWC16G) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
 4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
 5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
 6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
 7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
 8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
 9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
 10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
 11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
 12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
 13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
 14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.



ELEVATION MID-SPAN RAIL SPLICE

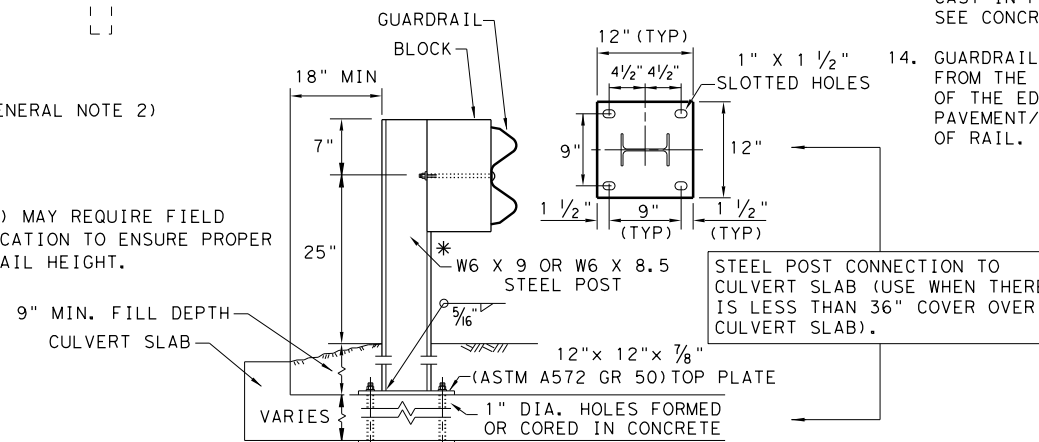
SHOWING A 25'-0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



ELEVATION 25'-0" (NOM.) W-BEAM SECTION

NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES. SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

* POST(S) MAY REQUIRE FIELD MODIFICATION TO ENSURE PROPER GUARDRAIL HEIGHT.



LOW FILL CULVERT POST

1. **BOLT-THROUGH OPTION:** REQUIRES A 6" MIN. SLAB THICKNESS. 7/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS. NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.
2. **EPOXY ANCHOR OPTION:** THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 7/8" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS 1/4" MIN. BEYOND NUT.

NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

NOTE: FOUR TYPES OF BUTTON-HEAD GUARD RAIL BOLTS COME WITH A RECESSED NUT.

SPLICE BOLT LENGTH VARIES

FBB01 = 1 1/4"

FBB02 = 2"

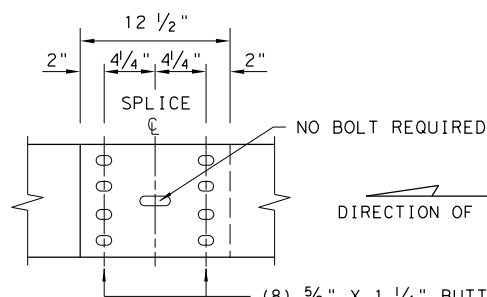
POST & BLOCK LENGTH

FBB03 = 10"

FBB04 = 18"

BUTTON HEAD BOLT

NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



MID-SPAN RAIL SPLICE DETAIL

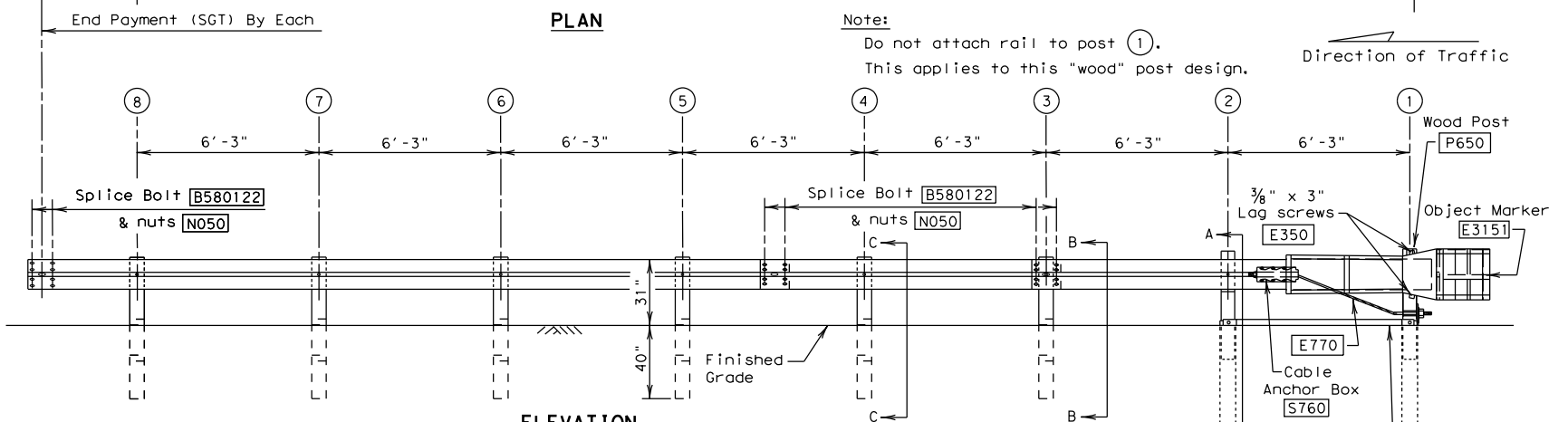
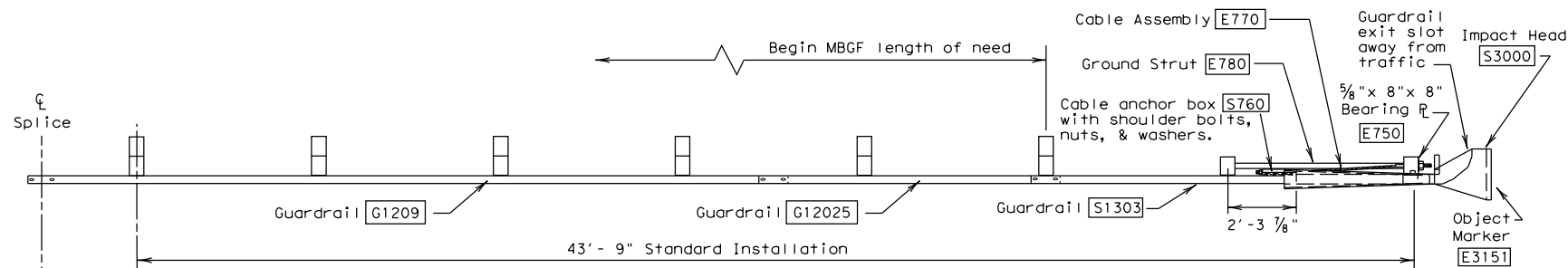
NOTE: GF(31), MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.

		Design Division Standard	
METAL BEAM GUARD FENCE TL-3 MASH COMPLIANT GF(31)-19			
FILE: gf3119.dgn	DN: TXDOT	CK: KM	DW: VP
© TXDOT: NOVEMBER 2019	CONT	SECT	JOB
REVISIONS			
DIST	COUNTY	SHEET NO.	
		61	

DATE: FILE:

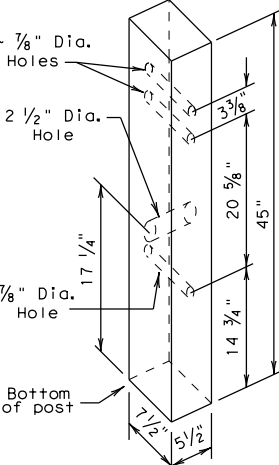
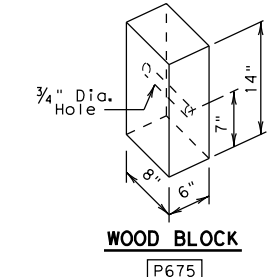
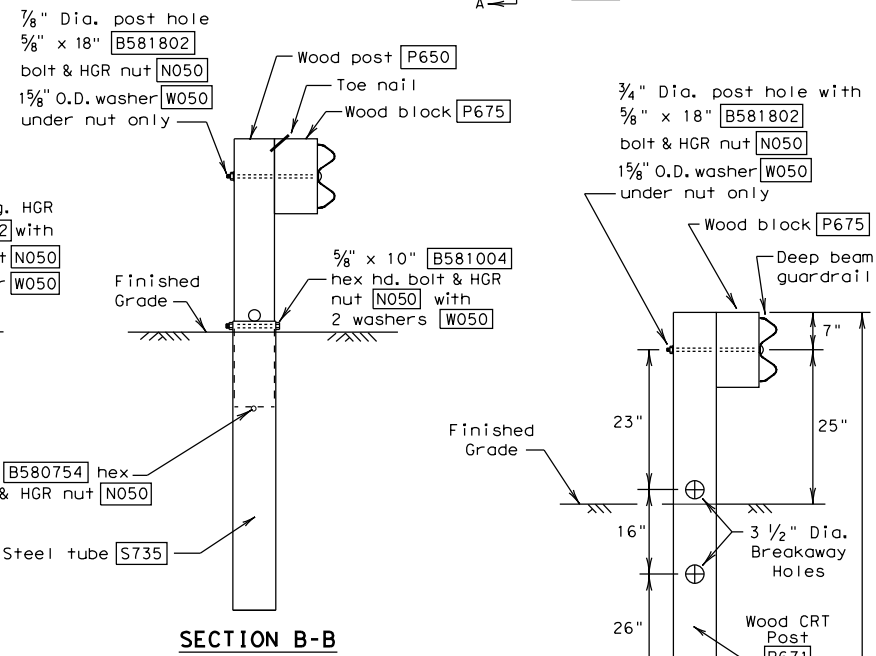
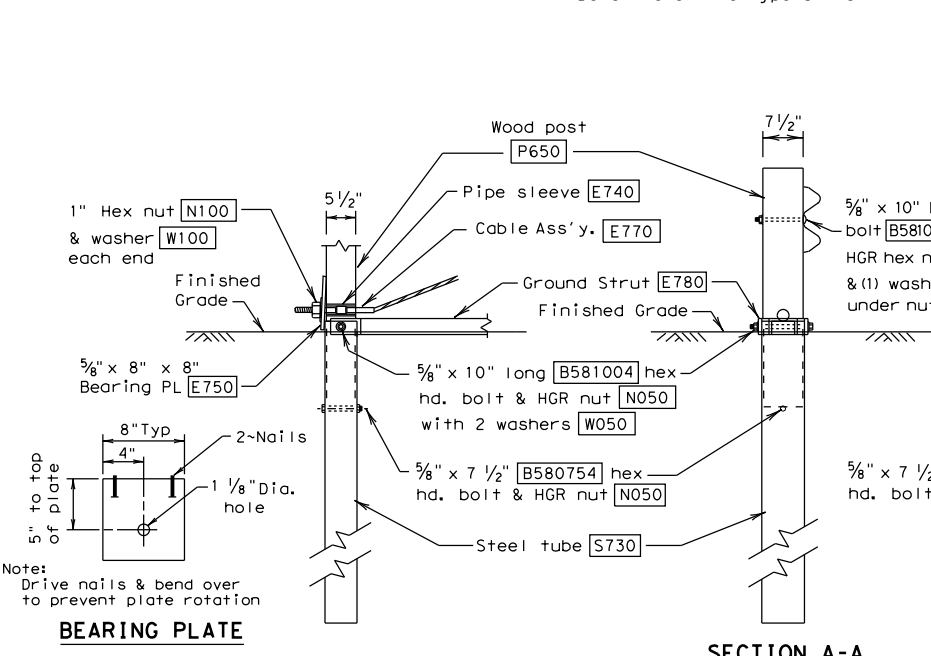
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:



- GENERAL NOTES**
- For additional information contact: Interstate Steel Inc. (432) 263-3735
 - The Type of SGT unit will be specified elsewhere in the plans. The numbers in the circles indicate post position. The type of SGT unit chosen is a maintenance consideration and does not affect the systems performance.

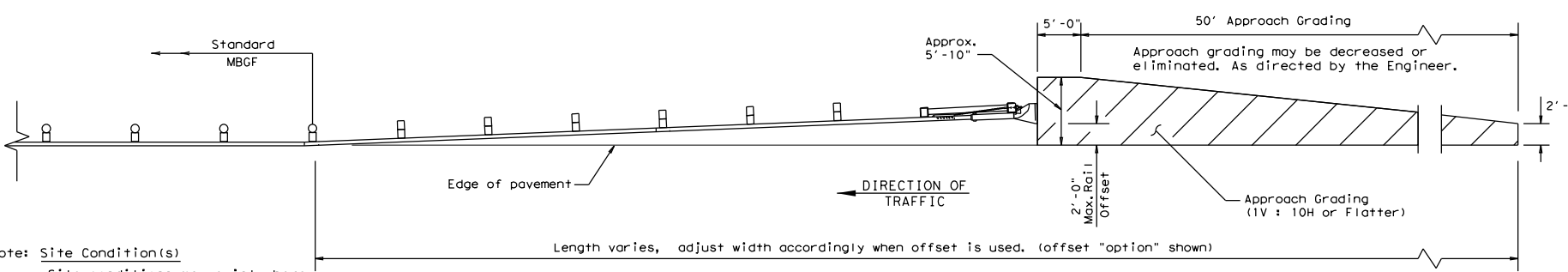
Post & Tube Options		Post Only	
Type I Posts	① thru ②	Posts ③ thru ⑧	
Type II Posts	① thru ④	Posts ⑤ thru ⑧	
Type III Posts	① thru ⑧	None	
 - SGT's placed within the "minimum" 150 ft. radius, shall be installed straight. Standard rail elements may be installed within the radius, without special fabrication.
 - All bolts, nuts cable assemblies, cable anchors, steel tubes & bearing plates shall be galvanized.
 - A flare rate of 25:1 may be used over the first 50 ft. of the system to prevent the terminal head from encroaching the shoulder. The flare may be decreased or eliminated for specific installations, if directed by the Engineer.
 - The steel tubes shall not protrude more than 4 inches above ground. Site grading may be necessary to meet this requirement.
 - The steel tubes may be driven with an approved driving head. They shall not be driven with the wood post in the tube. If the steel tubes are placed in drilled holes, the backfill material must be satisfactorily compacted to prevent tube settlement.
 - If solid rock is encountered. See the Manufacturer's installation manual for the proper installation guidance.
 - The breakaway cable assembly must be taut. A locking device, (vice grips or channel lock pliers) should be used to prevent the cable from twisting when tightening the nuts.
 - The wood blocks shall be "toe nailed" to the rectangular wood posts to prevent them from turning when the wood shrinks. The bearing plate on the front post shall also be "toe nailed" to prevent rotation.
 - For curb installations, the soil tubes and posts shall be installed at the proper ground elevation behind the curb. The posts will then require field drilling new holes to accommodate the rail to post connection bolt to maintain the proper height of the rail above the gutter pan. The excess post length above the rail will be removed if directed by the Engineer.
 - An object marker shall be installed on the front of the impact head as detailed on D&OM(VIA).



Item #	POST & TUBE OPTIONS			DESCRIPTION
	Type I	Type II	Type III	
S1303	1	1	1	Guardrail (12 Ga.) 12'- 6" SKT
G12025	1	1	1	Guardrail (12 Ga.) 9'- 4 1/2"
G1209	1	1	1	Guardrail (12 Ga.) 25'- 0"
S730	2	2	2	Steel Tube - 6" x 8" x 72" x 1/8" min. or 3/16"
S735	0	2	6	Steel Tube - 6" x 8" x 54" x 1/8" min. or 3/16"
P650	2	4	8	Wood Posts - 5 1/2" x 7 1/2" x 45"
P671	6	4	0	Wood CRT Posts - 6" x 8" x 72"
P675	6	6	6	Wood Block - 6" x 8" x 14"
E740	1	1	1	Pipe Sleeve - 2" Std. Pipe x 5 1/2"
E750	1	1	1	Bearing Plate - 5/8" x 8" x 8"
S760	1	1	1	Cable Anchor Box
E770	1	1	1	Cable Assembly
E780	1	1	1	Ground Strut
S3000	1	1	1	Impact Head
HARDWARE				
B580754	2	4	8	5/8" x 7 1/2" Hex Hd. Bolt
B581004	2	4	8	5/8" x 10" Hex Hd. Bolt (Top of Tubes)
W050	11	15	23	5/8" Washers
B581002	1	1	1	5/8" x 10" HGR Post Bolt (Post 2)
B580122	16	16	16	3/8" x 1 1/4" HGR Splice Bolt
B581802	6	6	6	5/8" x 18" HGR Post Bolt (Posts ③ thru ⑧)
N050	35	39	47	3/8" HGR Nut (24-Spl, Varies-Posts, 2-Strut)
E350	2	2	2	3/8" x 3" Lag Screw
N100	2	2	2	1" Hex Nut (Anchor Cable)
W100	2	2	2	1" Washer (Anchor Cable)
SB12A	8	8	8	Cable Anchor Box Shoulder Bolts
N012A	8	8	8	1/2" Structural Nut
W012A	8	8	8	1/2" Structural Washer
E3151	1	1	1	Object Marker - (18" x 18")

All measurements should be taken from bottom of posts.
UNIVERSAL WOOD POST
P650

POST & TUBE OPTIONS	
Type I	post ① thru ②
Type II	post ① thru ④
Type III	post ① thru ⑧



Texas Department of Transportation Design Division Standard

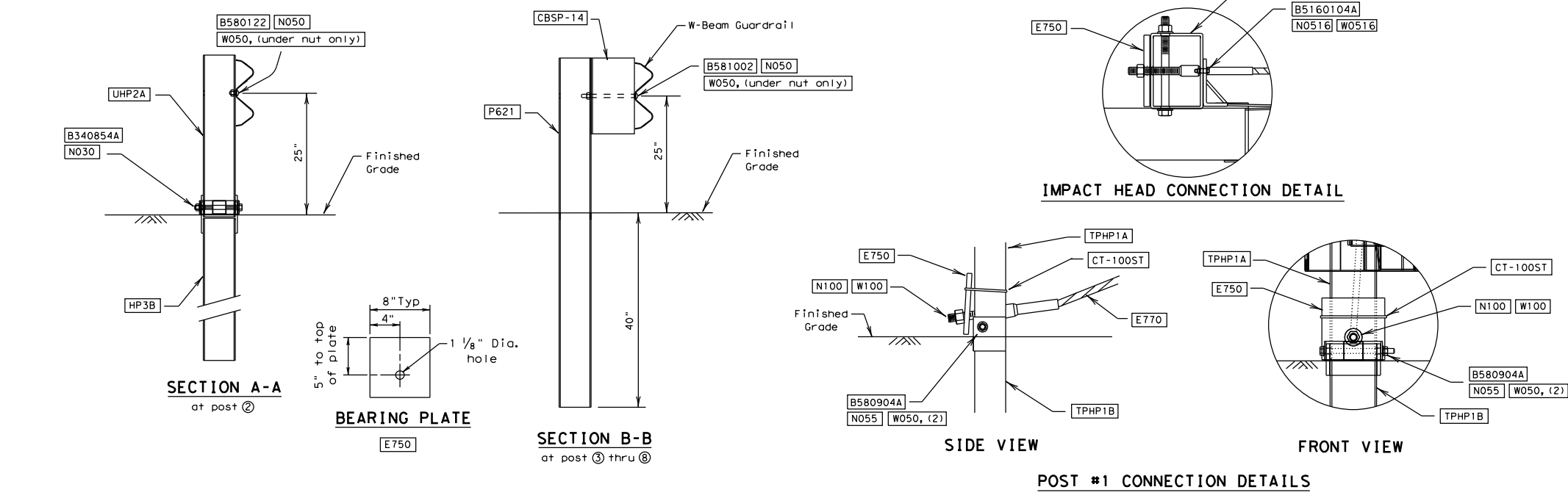
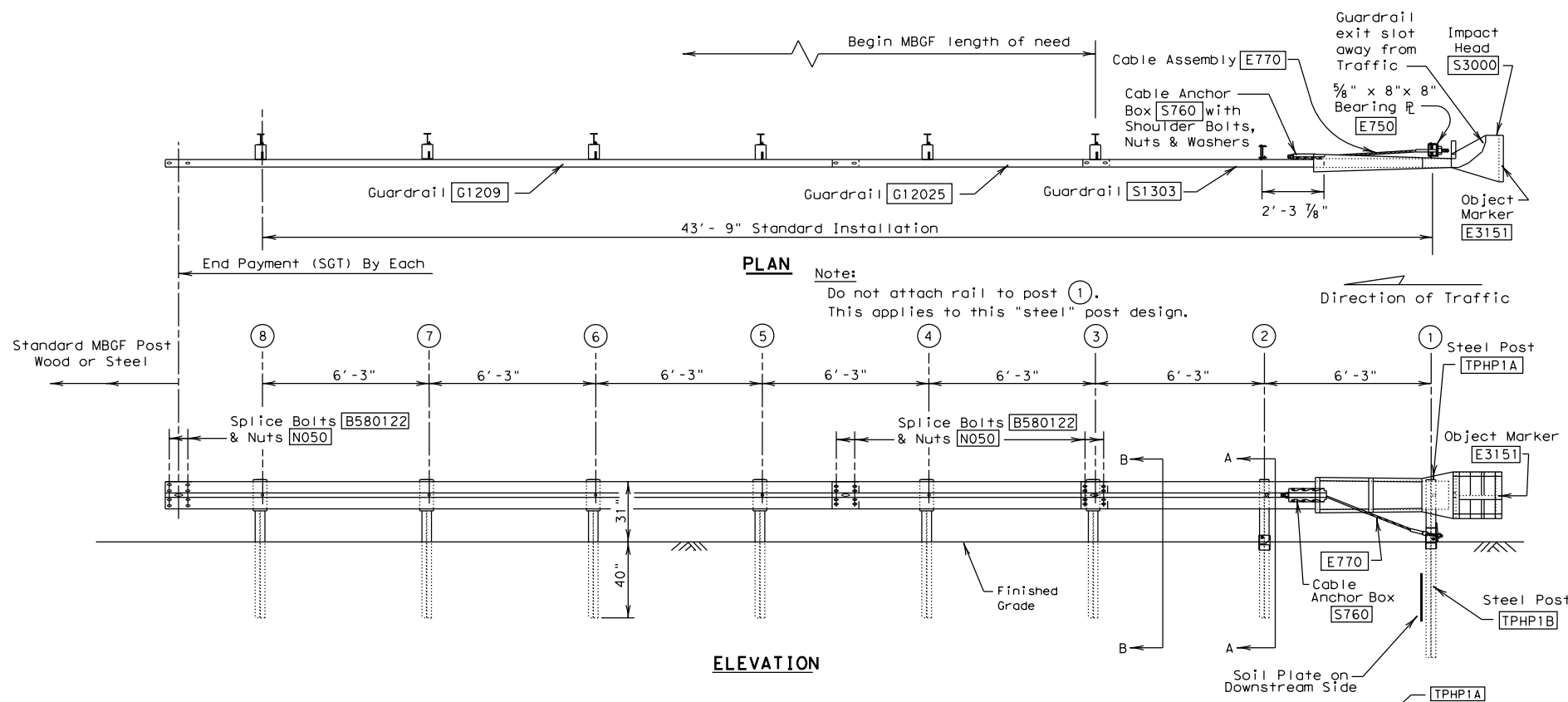
SINGLE GUARDRAIL TERMINAL (SKT-31) (WOOD POST) SGT (8) 31-14

FILE: sgt83114.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: VP
© TxDOT December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS				
DIST	COUNTY		SHEET NO.	

62

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

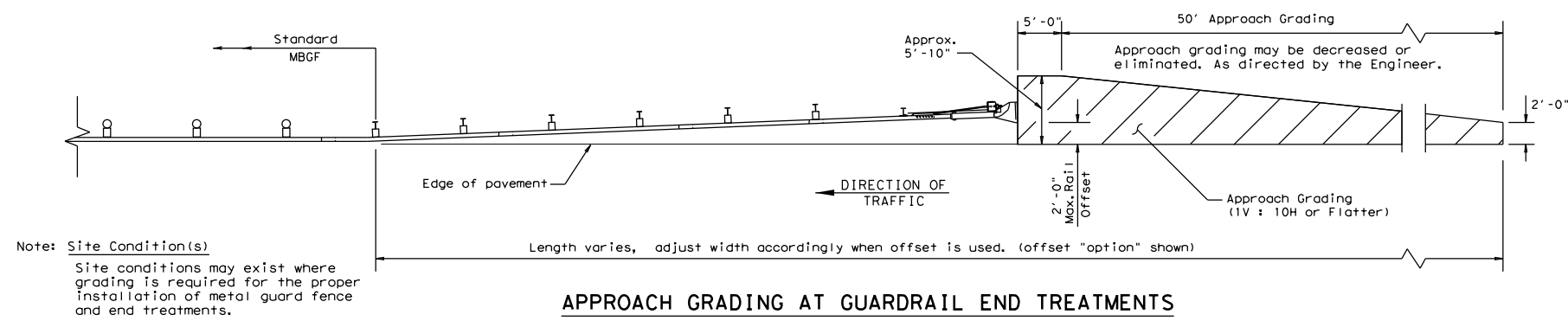
DATE: FILE:



GENERAL NOTES

- For additional information contact: Interstate Steel Inc., (432) 263-3725.
- All bolts, nuts cable assemblies, cable anchors, steel posts & bearing plates shall be galvanized.
- SGT's placed within the "minimum" 150 ft. radius, shall be installed straight. Standard rail elements may be installed within the radius without special fabrication.
- A flare rate of 25:1 may be used to prevent the terminal head from encroaching on the shoulder. The flare may be decreased or eliminated for specific installations, if directed by the Engineer.
- The lower sections of the post shall not protrude more than 4 inches above finished ground. Site grading may be necessary to meet this requirement.
- The lower section of the steel posts should not be driven with the upper post attached. If the post is placed in a drilled hole, the backfill material must be satisfactorily compacted to prevent settlement.
- If solid rock is encountered. See manufacturer's installation manual for the proper installation guidance.
- The breakaway cable assembly must be taut. A locking device, (vice grips or channel lock pliers) should be used to prevent the cable from twisting when tightening the nuts.
- Hinge bolts shall not be set below finished grade. At curb locations the posts shall be installed at the proper grade elevation behind the curb. The posts will then require field drilling new holes to accommodate the rail to post connection bolt to maintain the proper height of the rail above the gutter pan. The excess post length above the rail will be removed as directed by the Engineer.
- An object marker shall be installed on the front of the impact head as detailed on D&M(VIA).

ITEM NO.	QTY	BILL OF MATERIALS
S1303	1	GUARDRAIL (12 GA) 12' - 6" SKT Panel
G12025	1	GUARDRAIL (12 GA) 9' - 4 1/2"
G1209	1	GUARDRAIL (12 GA) 25' - 0"
TPHP1A	1	FIRST POST ASSEMBLY TOP, TUBE
TPHP1B	1	FIRST POST ASSEMBLY BOTTOM, 6' - 0"
UHP2A	1	SECOND POST ASSEMBLY TOP
HP3B	1	SECOND POST ASSEMBLY BOTTOM, 3' - 5 1/8"
P621	6	STANDARD STEEL LINE POST 6' - 0" (POST 3 THRU 8)
E750	1	BEARING PLATE
S760	1	CABLE ANCHOR BOX
E770	1	BCT CABLE ANCHOR ASSEMBLY
CT-100ST	1	CABLE TIE - STEEL
CBSP-14	6	ROUTED BLOCK
S3000	1	IMPACT HEAD
HARDWARE		
B580122	25	5/8" Dia. x 1 1/4" SPLICE BOLT
B580904A	1	5/8" Dia. x 9" HEX BOLT GR. 5
B340854A	1	3/4" Dia. x 8 1/2" HEX BOLT GR. 5
B581002	6	5/8" Dia. x 10" H.G.R. BOLT (Post 3 thru 8)
N055	1	5/8" Dia. HEX NUT (Post 1 only)
N050	31	5/8" Dia. H.G.R. NUT (at splices & at Post 2 thru 8)
W050	9	H.G.R. WASHER (At Post 1(2) & 2 thru 8)
N100	2	1" ANCHOR CABLE HEX NUT
W100	2	1" ANCHOR CABLE WASHER
B5160104A	2	5/16" x 1" HEX BOLT, GR. 5
N0516	2	5/16" HEX NUT
W0516	4	5/16" WASHER
SB12A	8	CABLE ANCHOR BOX SHOULDER BOLT
N030	1	3/4" HEX NUT
N012A	8	1/2" STR. NUT
W012A	8	1/2" STR. WASHER
E3151	1	OBJECT MARKER (18" x 18")



APPROACH GRADING AT GUARDRAIL END TREATMENTS

Texas Department of Transportation Design Division Standard

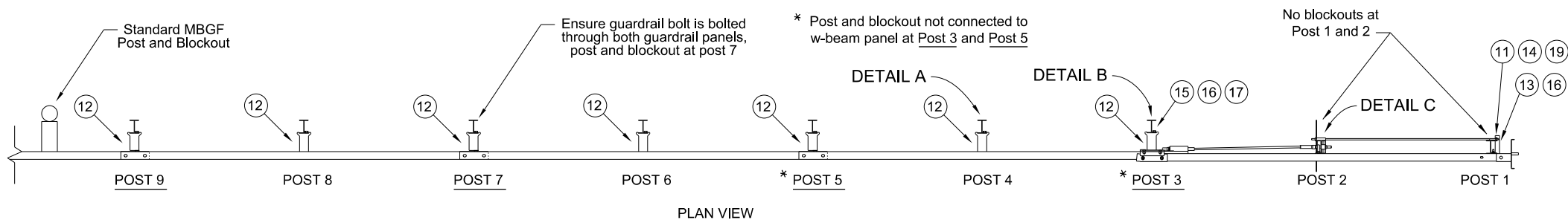
SINGLE GUARDRAIL TERMINAL (SKT-31) (STEEL POST) SGT (8S) 31-14

FILE: sgt8s314.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: VP
© TxDOT December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS				
DIST	COUNTY			SHEET NO.

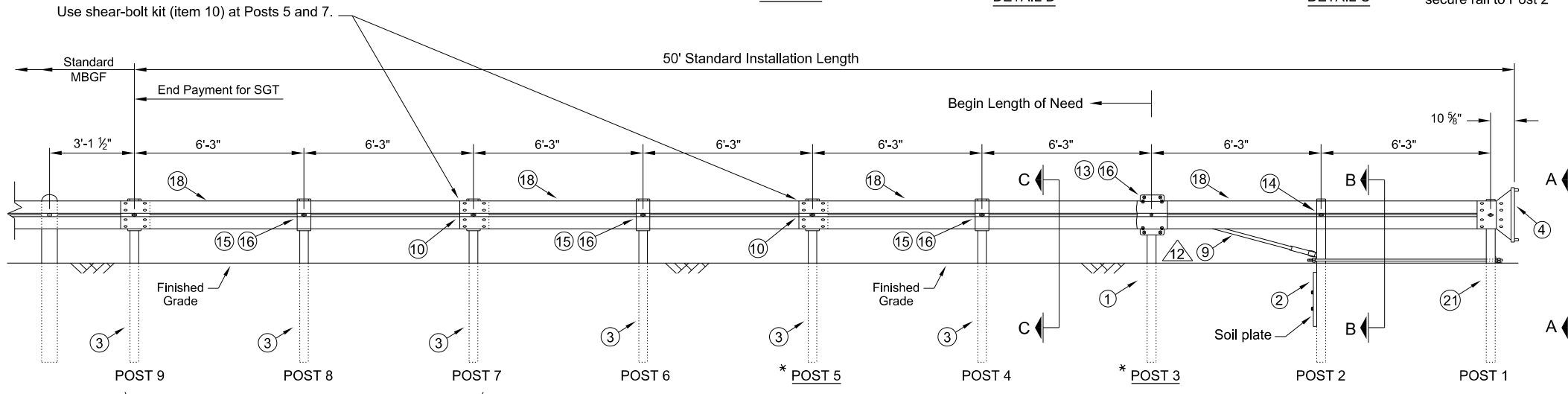
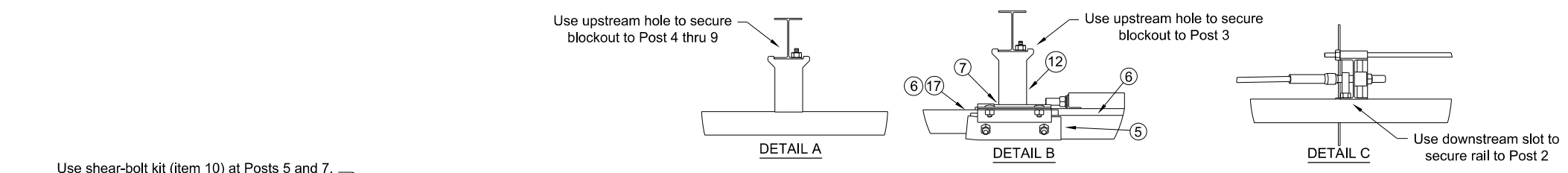
63

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:

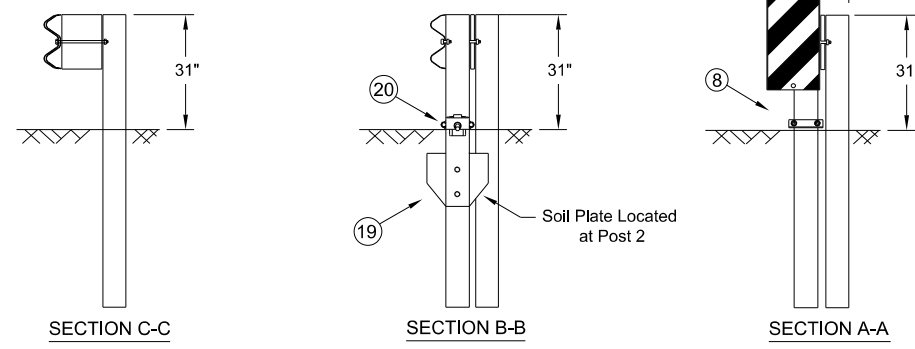


PLAN VIEW



ELEVATION VIEW

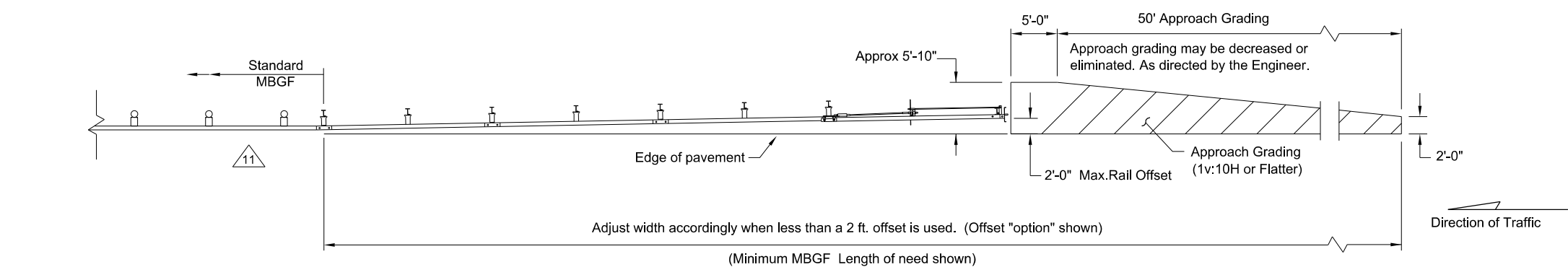
See Note 10 for alternate post option.



SECTION C-C

SECTION B-B

SECTION A-A



APPROACH GRADING AT GUARDRAIL END TREATMENTS

GENERAL NOTES

- For additional information contact: Lindsay Transportation Solutions - Barrier Systems, 180 River Road, Rio Vista, CA 94571, (707) 374-6800
- All dimensions are shown in inches except as otherwise indicated.
- All cable assemblies, cable anchor, ground struts, slider pieces, impact heads, nuts, bolts and all steel components shall be galvanized unless otherwise is noted.
- X-LITE placed within the minimum 150 ft. radius shall be installed straight. Standard rail elements may be installed within the radius without special fabrication.
- A flare rate of 37.5:1 may be used over the first 50 ft. of the system to prevent the terminal head from encroaching on the shoulder the flare may be decreased or eliminated for specific installations, or as directed by the engineer.
- At curbed locations the post shall be installed at the proper grade of elevation behind the curb. The post will then require field drilling new holes to accommodate the rail to post connection bolt to maintain the proper height of the rail above the gutter pan. The excess post length above the rail will be removed as directed by the engineer.
- If rock excavation is encountered, the soil plate maybe modified if approved by the project engineer.
- When site conditions permit, post may be driven. If posts are placed in a drilled hole, the backfill material must be satisfactorily compacted to prevent settlement.
- An object marker shall be installed on the impact head as detailed on D&OM(VIA)
- The X-LITE is a steel post SGT that is suitable for locations calling for wood post or steel post MBGF systems. When used with wood post guardrail system, post 7 thru 9 may be replaced with CRT posts.
- Minimum length of MBGF shown. See current guard fence Standards for further information.
- The breakaway cable assembly must be taut. A locking device (vice-grips or channel lock-pliers) should be used to prevent the cable from twisting when tightening the nut.

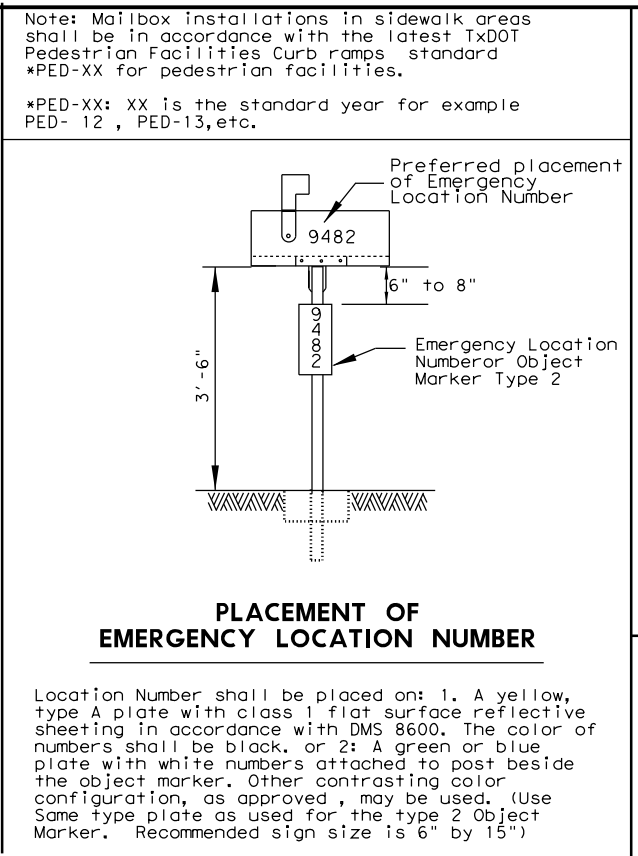
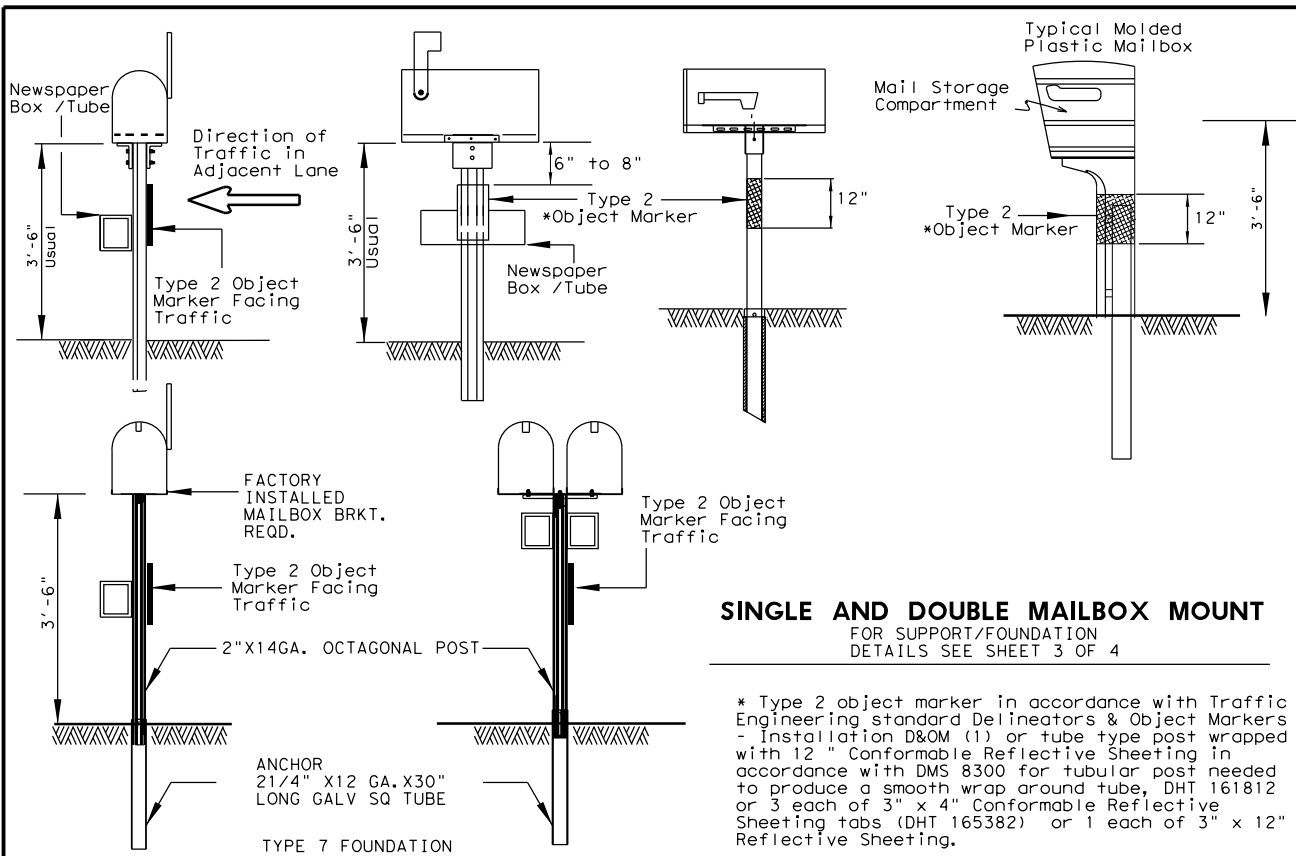
ITEM	PART NO.	DESCRIPTION	QTY
1	BSI-1310027-00	X-LITE, CRIMPED POST HOLES, GALV	1
2	BSI-1012086-00	POST II, X-LITE, GALV	1
3	BSI-1012078-00	LINE POST, X-LITE, GALV	6
4	BSI-1012103-00	IMPACT HEAD, X-LITE, GALV	1
5	BSI-1012093-00	SLIDER PANEL, FRONT, X-LITE, GALV	1
6	BSI-1012090-00	SLIDER BRACKET, X-LITE	1
7	BSI-1012096-00	BACK SLIDER PANEL, X-LITE, GALV	1
8	BSI-1102001-KT	GROUND STRUT KIT, X-LITE	1
9	BSI-1012104-00	CABLE ANCHOR ASSEMBLY, X-LITE	1
10	K080123	KIT, X-TENSION SHEAR BOLT,	2
11	BSI-1102027-00	WASHER, SQUARE, X-LITE, GALV	1
12	B090534	W-BEAM COMPOSITE BLOCKOUT 8 IN,	7
13	4001115	GUARDRAIL BOLT 5/8"-11X1 1/4"	24
14	2000302	BOLT CH 5/8"-11X2	2
15	2001635	BOLT CH 5/8"-11X10" GRADE 5 MGAL	7
16	4001116	GUARDRAIL NUT RECESSED 5/8"-11	33
17	2001580	WASHER 1 F436 FLAT RD STRUCT	1
18	4000443	W-BEAM GUARDRAIL RWM02a	4
19	BSI-1106016-KT	X-LITE, SOIL PLATE KIT	1
20	BSI-1303005-00	BRACKET, X-LITE CABLE RETENTION	1
21	BSI-1310024-00	X-LITE, CRIMPED POST SLOTS, GALV	1
22	MANXLT	X-LITE TANGENT INSTALLATION MANUAL	1

Design Division Standard

SINGLE GUARDRAIL TERMINAL (X-LITE) STEEL POST SGT(9S)31-14

FILE: sg19s3114.dgn	DN: TxDOT	CK: RM	DW: VP	CK: CGL
© TxDOT: JULY 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS				
DIST	COUNTY		SHEET NO.	
				64

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



TYPICAL MAILBOX SIZE

SIZE	INCHES			POUNDS	
	LENGTH	WIDTH	HEIGHT	MAXIMUM WEIGHT	
SMALL	19 1/2	6	7	5	5
MEDIUM	22 1/2	8	11 1/2	7	7
LARGE	23 1/2*	11 1/2*	13 1/2*	10	10

* Maximum allowed dimensions for mailbox
** Excluding Molded Plastic on 4 X 4 Post

LOCKABLE ARCHITECTURAL MAILBOX SIZE (INCHES)

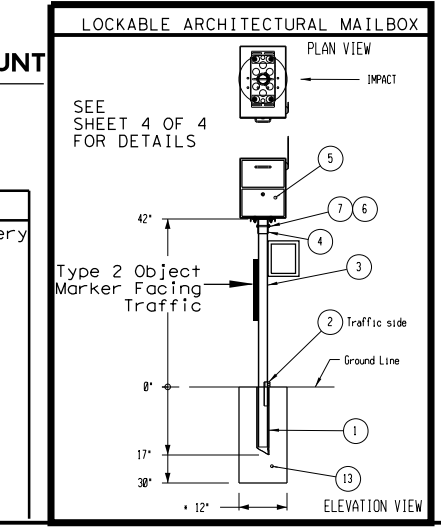
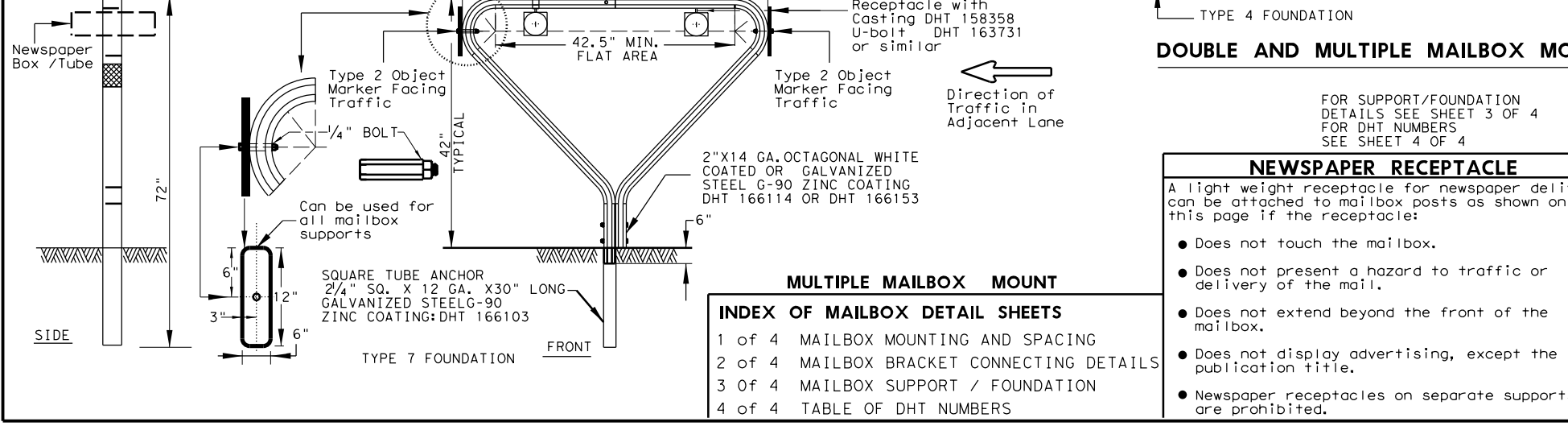
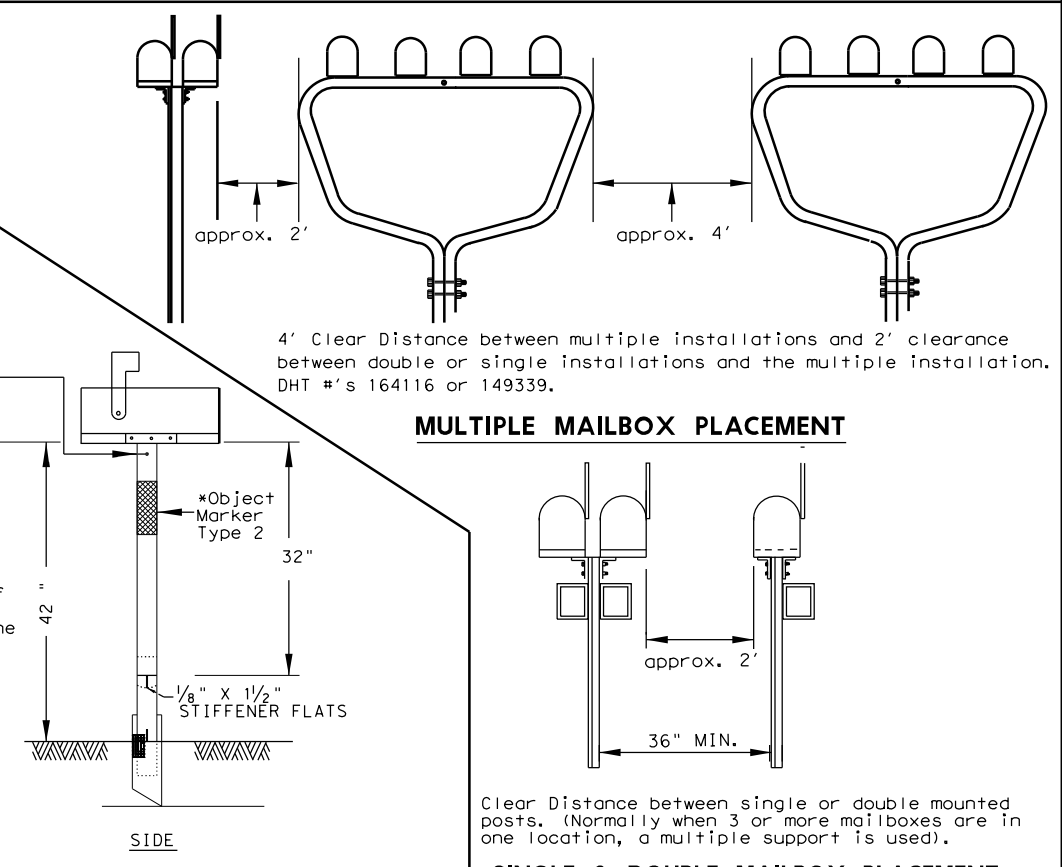
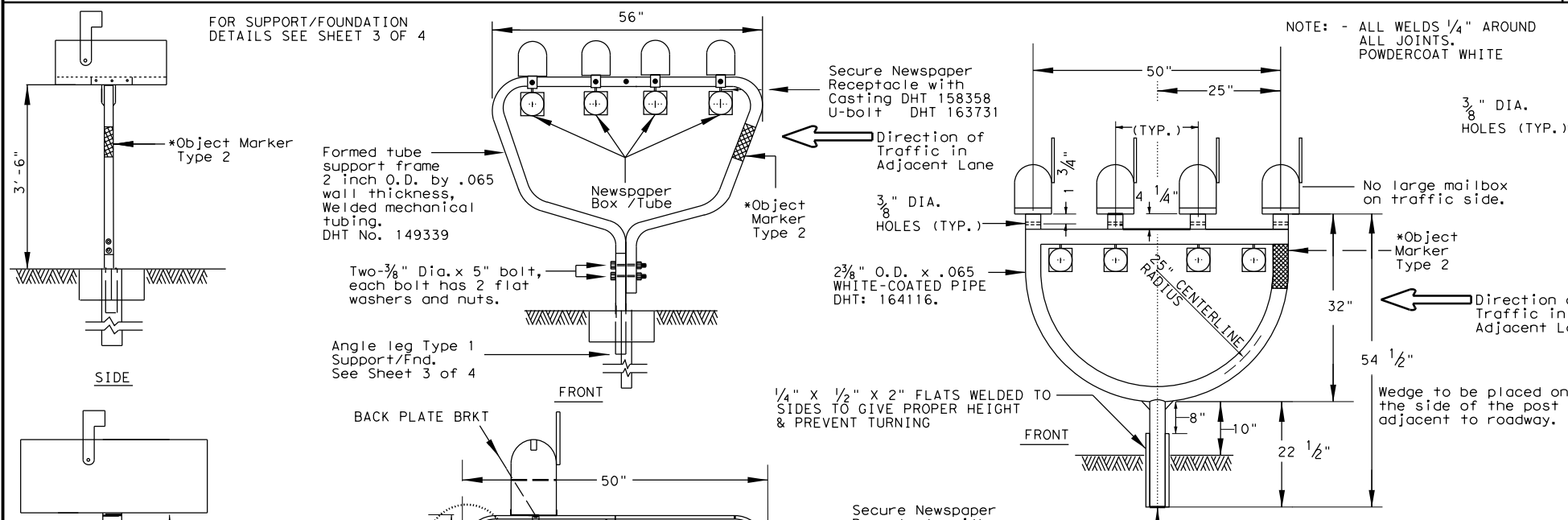
VIEW	TOP	BOTTOM	FRONT SIDE	BACK SIDE	WEIGHT (POUNDS)
SIDE	18	15	18.3	15	
BACK	11 1/2	11 1/2		15	22.4

Mailboxes shall be made of light weight sheet metal or light weight plastic. Lockable architectural mailboxes shall meet the requirements of the above table.

Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.

SEE TOP RIGHT CORNER OF SHEET 2 OF 4

MAILBOX SIZES



INDEX OF MAILBOX DETAIL SHEETS

1 of 4	MAILBOX MOUNTING AND SPACING
2 of 4	MAILBOX BRACKET CONNECTING DETAILS
3 of 4	MAILBOX SUPPORT / FOUNDATION
4 of 4	TABLE OF DHT NUMBERS

- NEWSPAPER RECEPTACLE**
- A light weight receptacle for newspaper delivery can be attached to mailbox posts as shown on this page if the receptacle:
- Does not touch the mailbox.
 - Does not present a hazard to traffic or delivery of the mail.
 - Does not extend beyond the front of the mailbox.
 - Does not display advertising, except the publication title.
 - Newspaper receptacles on separate supports are prohibited.

SHEET 1 OF 4

Texas Department of Transportation

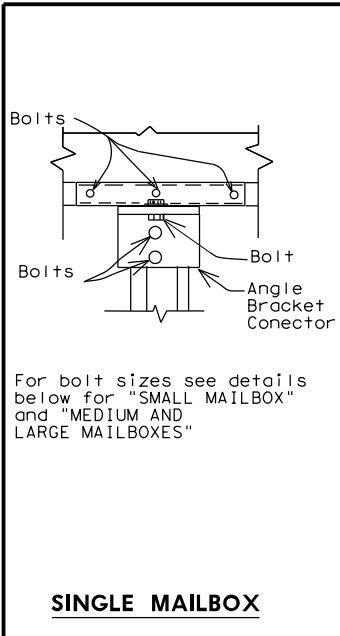
Maintenance Division Standard

MAILBOX MOUNTING AND SPACING

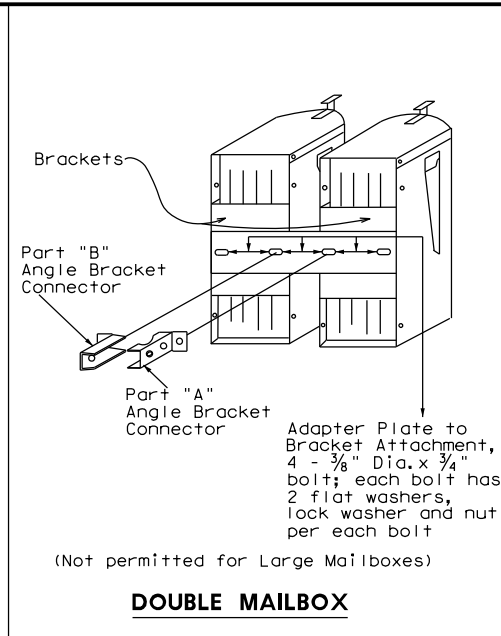
MB-15(1)

FILE: MB15(1).DGN	DWG: JEO	CHK: JEO	DWG:	CHK:
© TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS:				
Added additional newspaper receptacle for double mailbox support	DIST	COUNTY	SHEET NO.	
			65	

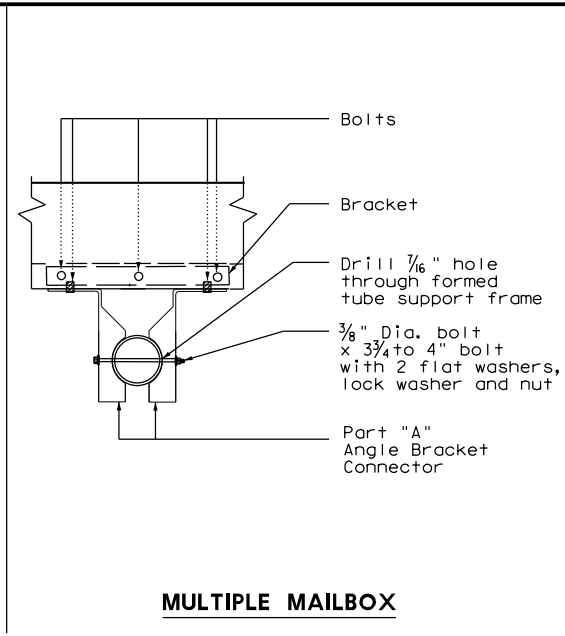
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



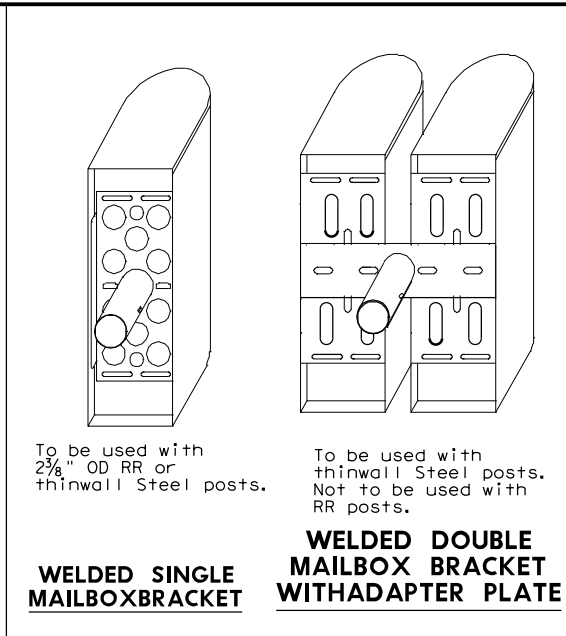
SINGLE MAILBOX



DOUBLE MAILBOX

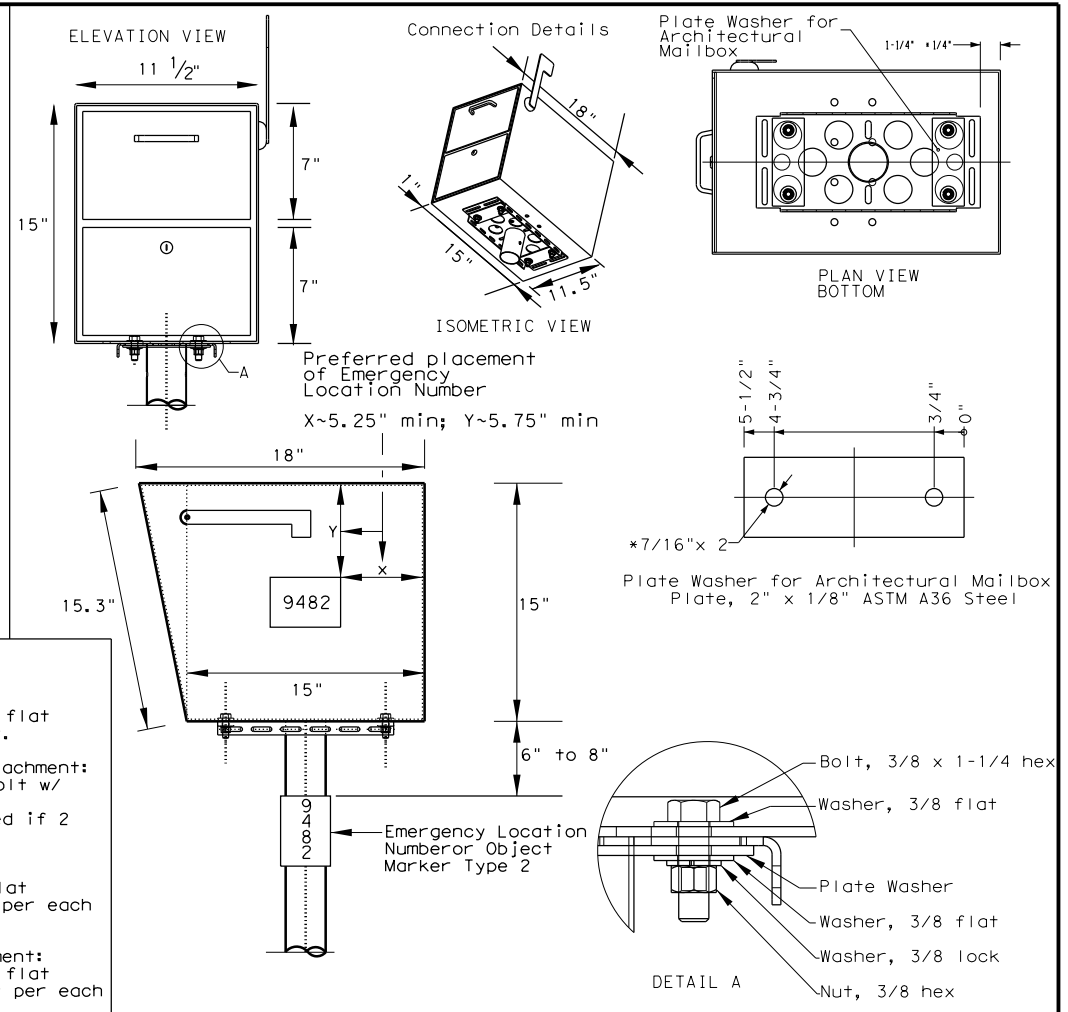


MULTIPLE MAILBOX

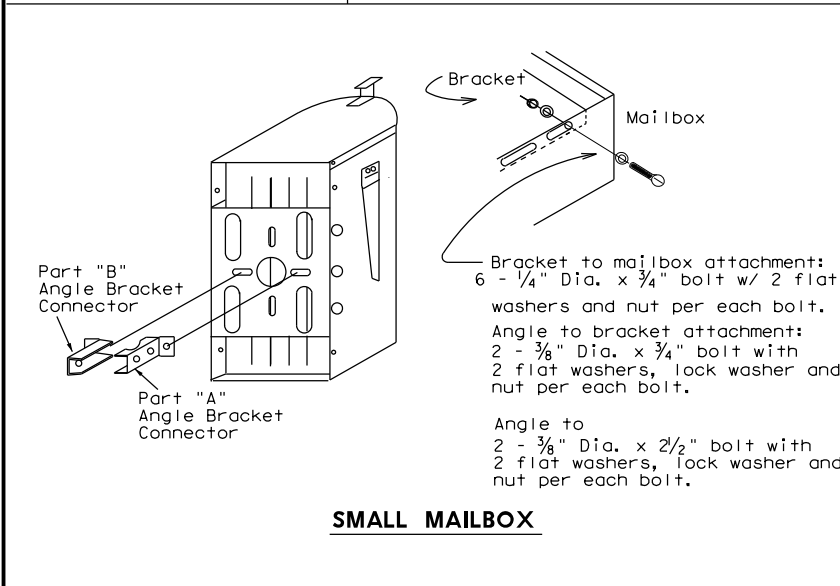


WELDED SINGLE MAILBOX BRACKET

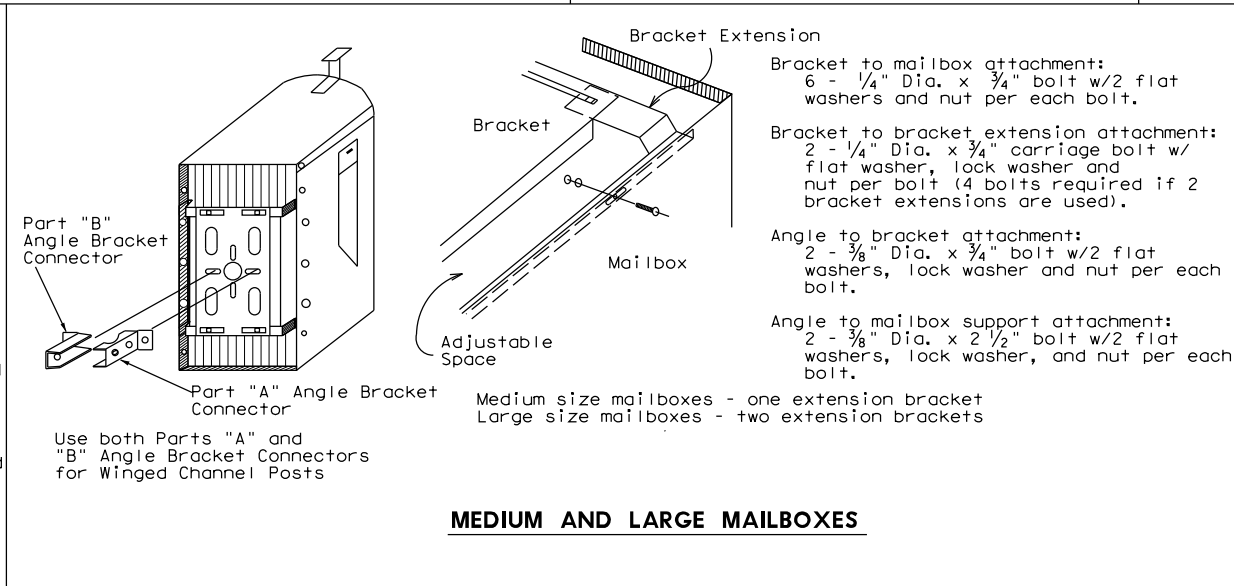
WELDED DOUBLE MAILBOX BRACKET WITH ADAPTER PLATE



LOCKABLE ARCHITECTURAL MAILBOX CONNECTION DETAILS



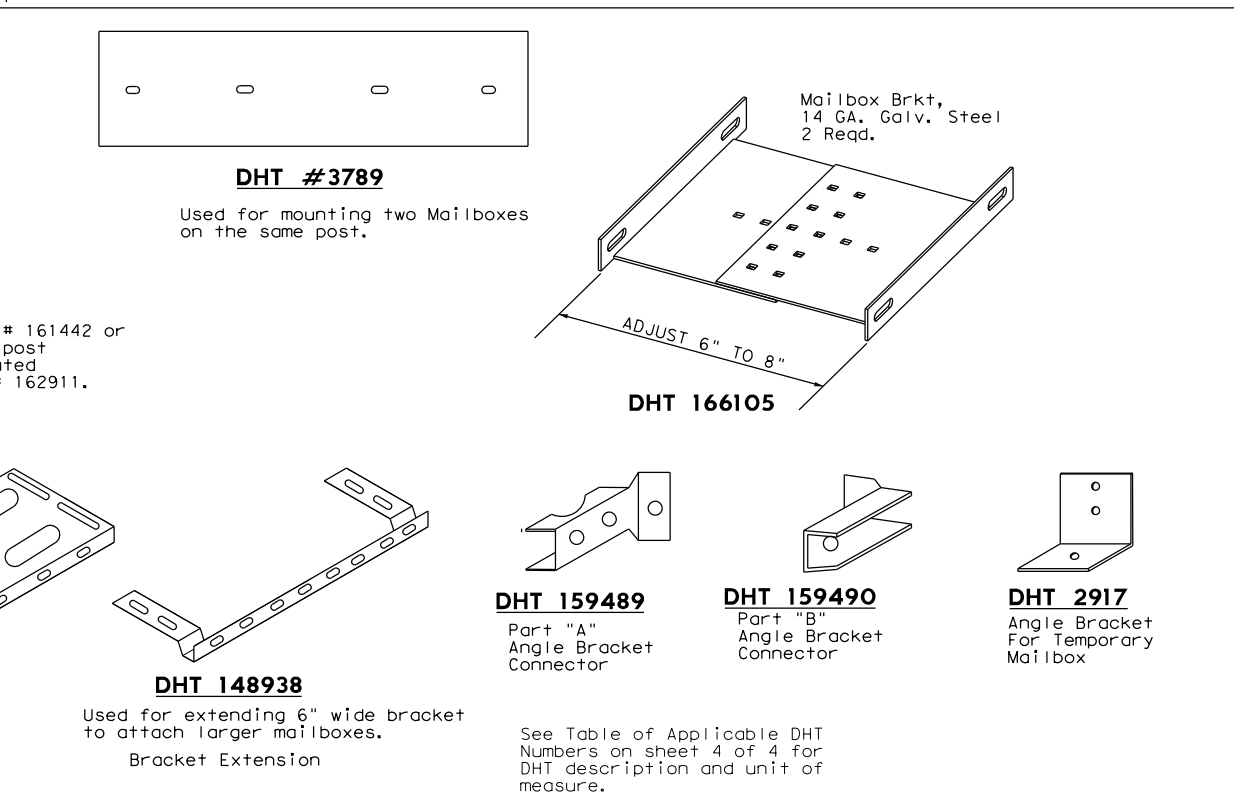
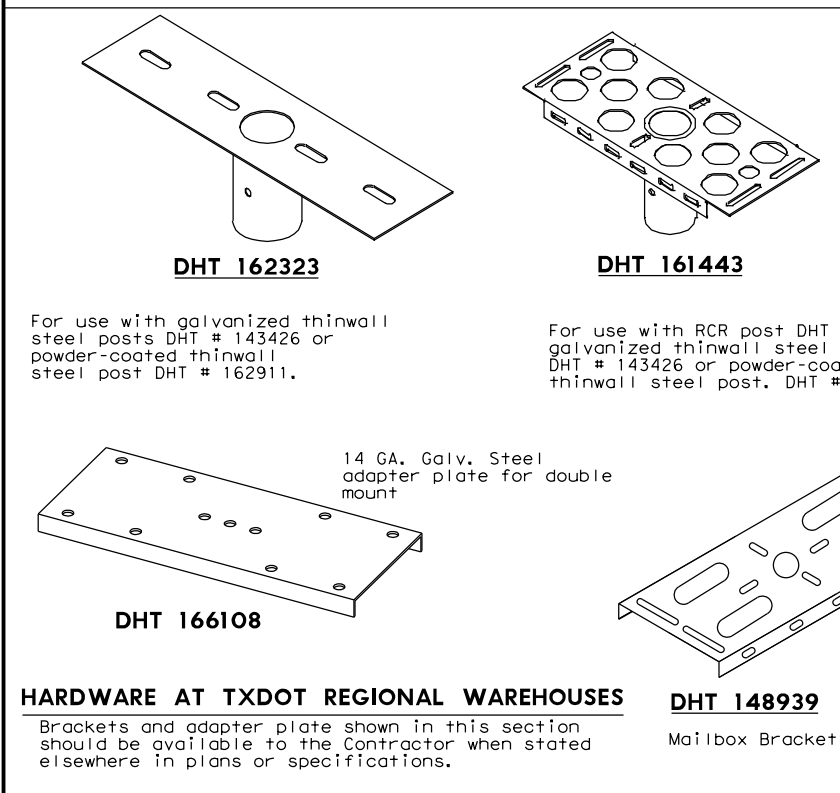
SMALL MAILBOX



MEDIUM AND LARGE MAILBOXES

GENERAL NOTES

- Connecting hardware detailed on this sheet is for the hardware that the Department stocks at the Regional Warehouses. This hardware is available to the contractor only when so stated elsewhere in the plans or specification.
- Hardware for mounting mailboxes to the support/foundation furnished by industry should be used when shown on the Maintenance Divisions "Approved Products List." Only mailbox hardware that have been crash tested in accordance with NCHRP Report 350, will be on the approved list.
- Hardware furnished by industry shall be erected in accordance with the manufacturer's recommendation.
- Bracket and bracket extension shall be constructed of 14 gauge galvanized steel sheet metal.
- The angles, brackets and adapter plates shall be constructed of 12 gauge galvanized steel sheet metal.
- Items with evidence of damage to the galvanized coating or wet storage stains (white rust) will not be accepted.

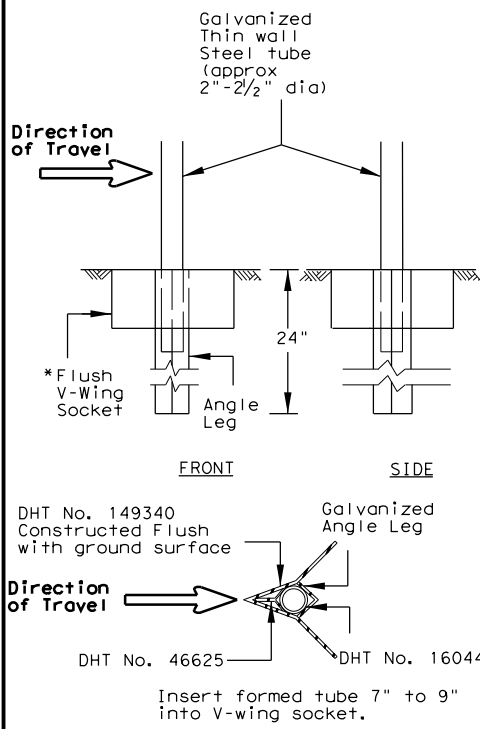


Texas Department of Transportation
Maintenance Division Standard

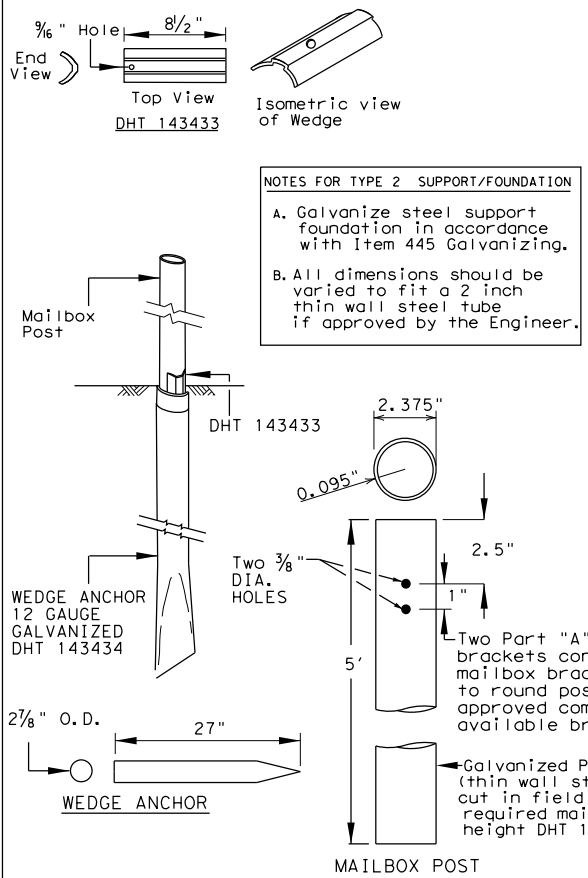
MAILBOX BRACKET CONNECTING DETAILS MB-15(1)

FILE: MB14(1).DGN	DN: JEO	CK:	DW: JEO	CK:
© TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
ADDED DHT 163730	DIST	COUNTY	SHEET NO. 66	

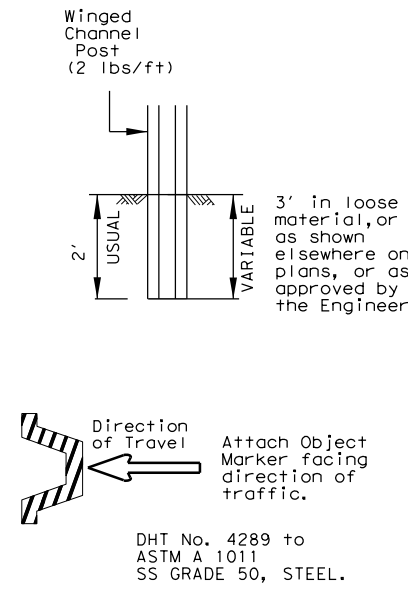
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



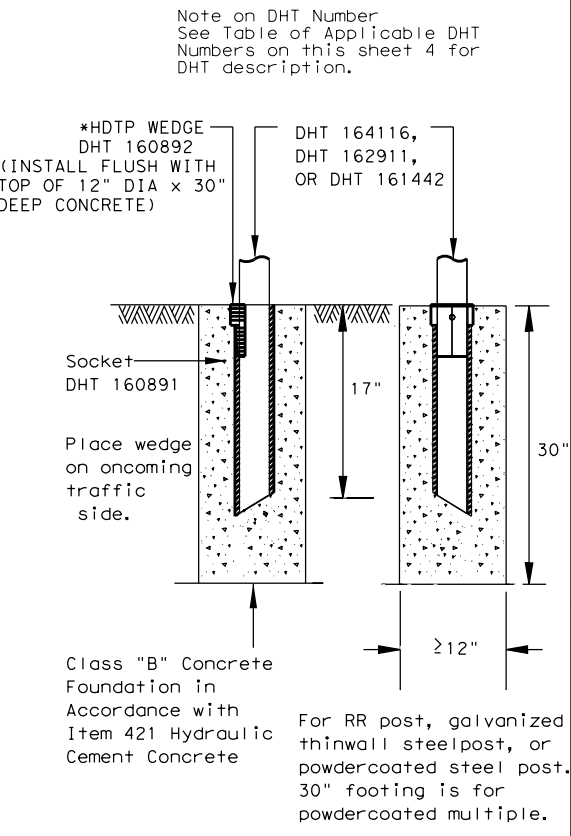
TYPE 1 SUPPORT/FOUNDATION
THIN WALL STEEL TUBE w/ V-LOC ANCHORAGE



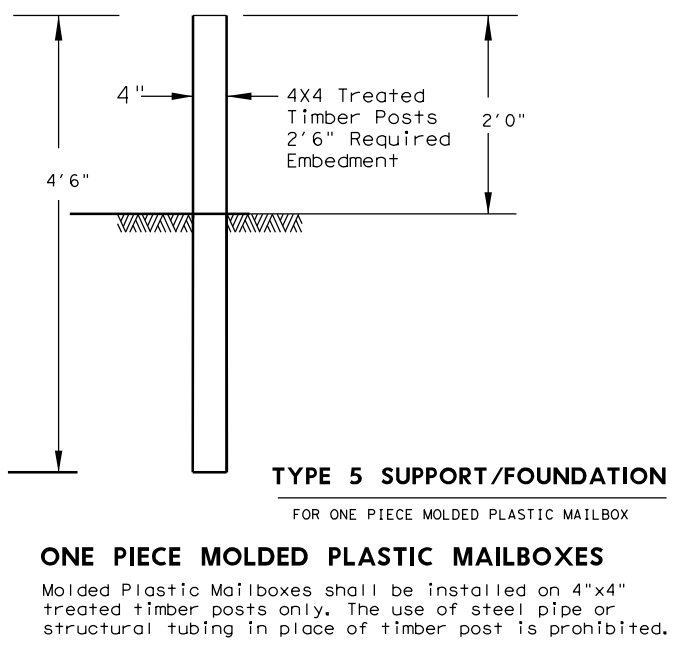
TYPE 2 SUPPORT/FOUNDATION
THIN WALL STEEL TUBE w/ WEDGE ANCHOR SYSTEM



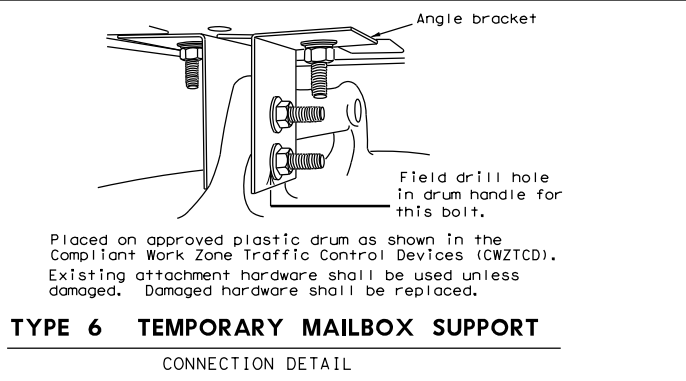
TYPE 3 SUPPORT/FOUNDATION
WINGED CHANNEL POST



TYPE 4 SUPPORT/FOUNDATION
FOR WHITECOATED STEEL POST, MULTIPLE POST, AND RECYCLED RUBBER.

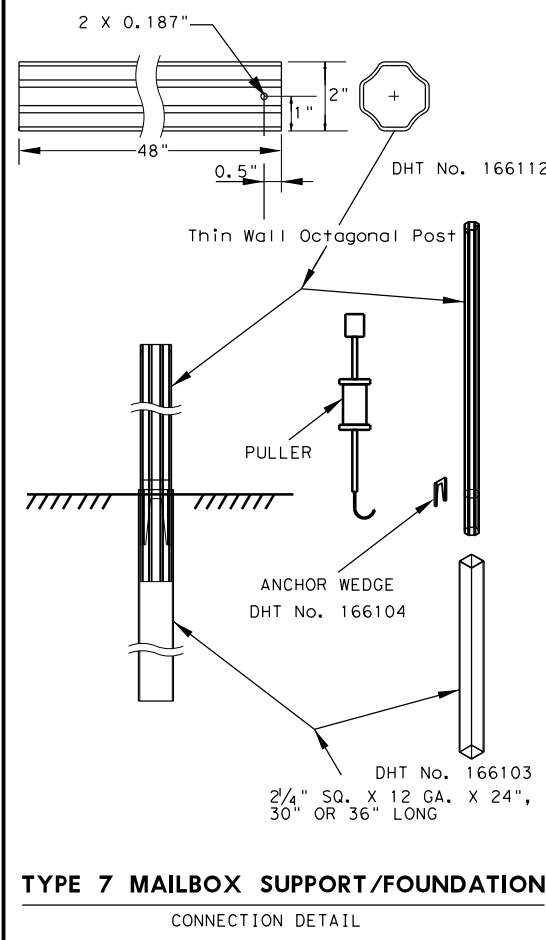


TYPE 5 SUPPORT/FOUNDATION
FOR ONE PIECE MOLDED PLASTIC MAILBOXES
ONE PIECE MOLDED PLASTIC MAILBOXES
Molded Plastic Mailboxes shall be installed on 4"x4" treated timber posts only. The use of steel pipe or structural tubing in place of timber post is prohibited.



TYPE 6 TEMPORARY MAILBOX SUPPORT
CONNECTION DETAIL

- GENERAL NOTES**
- Erect post plumb or vertical.
 - When galvanized part is required galvanize in accordance with Item 445.
 - type 1, 2, 3, 4 or 7 supports or foundation can be used for single or double mailbox installations. The RCR post should be used only for a single installation with a small mailbox. The Type 5 support/foundation is used for the single molded plastic mailbox. The Type 4 support/foundation is used for the 2.375" O.D. RR post, thin wall steel post, and white multiple mailbox post.
 - The Type 1 or type 7 support/foundation can be used for a multiple mailbox mount.
 - The Type 4 support should be used with thin wall steel pipe for the medium, large and double mailbox installations.
 - Use a concrete footing as shown or when directed. Concrete footing will be required when soils do not hold the support/foundations in a stable condition.



TYPE 7 MAILBOX SUPPORT/FOUNDATION
CONNECTION DETAIL

MB-(X) ASSM TY (XXX) (X) (XX) (OPTIONAL)

Type of Mailbox
S = Single
D = Double
M = Multiple
SP = Single Plastic

Type of Post
WC = Winged Channel Post
RR = Recycled Rubber
TWW = Thin Walled White Tubing
TWG = Thin Walled Galvanized Tubing
TIM = Timber

Type of Foundation
Ty 1 = V-Loc
Ty 2 = Wedge Anchor Steel System
Ty 3 = Winged Channel Post
Ty 4 = Wedge Anchor Plastic System
Ty 5 = 4 X 4 Post
Ty 7 = Wedge Anchor

Type of Bracket
AB = Angle Bracket.
TB = 2.375" Tube Bracket

DOUBLE AND LARGE MAILBOXES MUST BE ON STEEL POST.

*HDP: High density thermoplastic polyesters

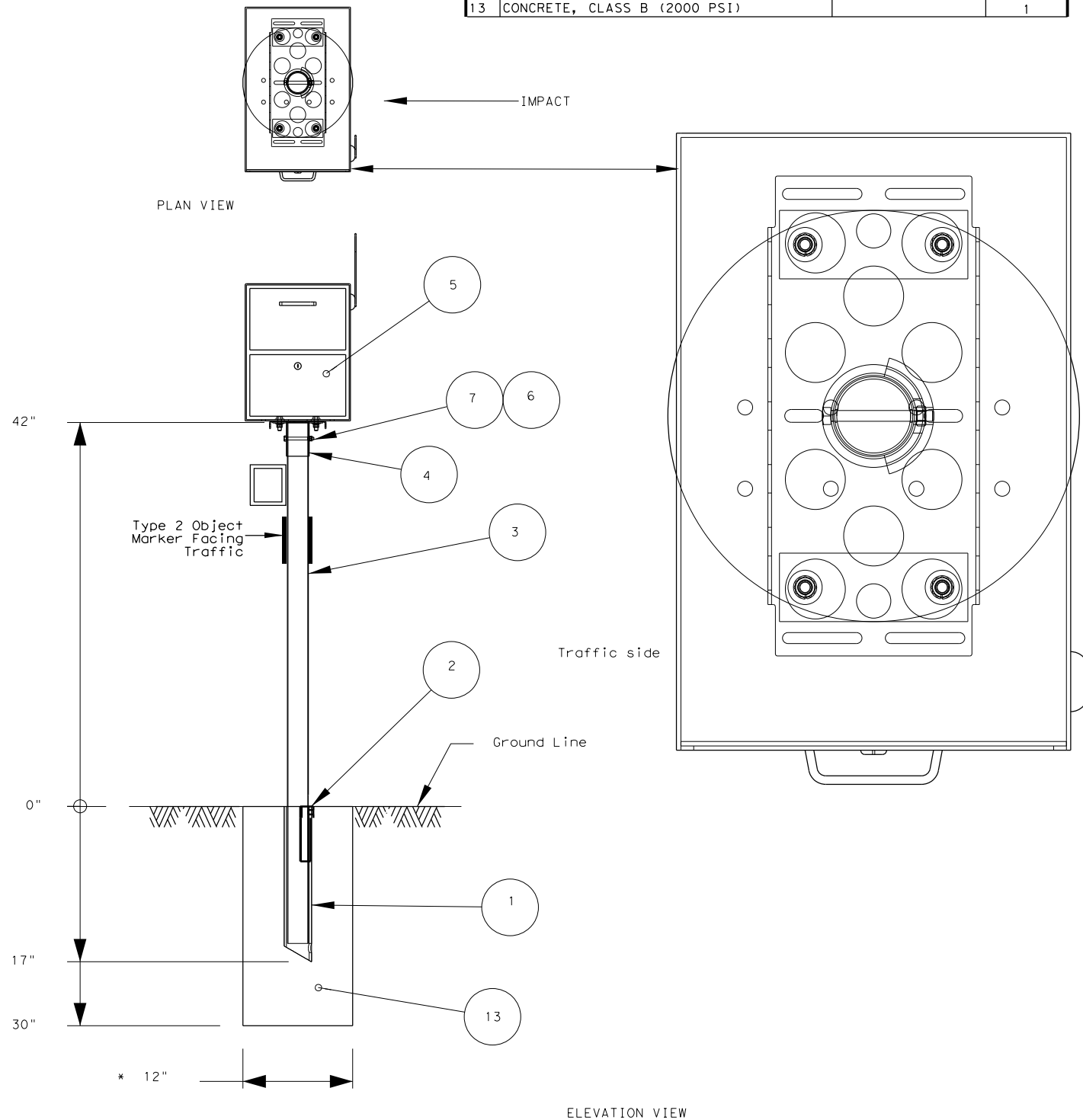
MAILBOX SUPPORT AND FOUNDATION
MB-15(1)

FILE: MB14(1).DGN	DN: JEO	CK:	DW: JEO	CK:
© TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				67

LOCKABLE ARCHITECTURAL MAILBOX

SINGLE-MOUNT INSTALLATION PARTS			
#	PART NAME	PART/DHT #	QTY
1	SOCKET, TYPE 4 FOUNDATION	160891	1
2	WEDGE FOR TYPE 4 FOUNDATION	160892	1
3	THIN-WALL WHITE STEEL TUBE 2.375 OD	162911	1
4	BRACKET FOR ATTACHING MAILBOX	161443	1
5	ARCHITECTURAL MAILBOX	SEE NOTE	1
6	NUT, 5/16" HEX	NUT, 5/16" HEX	1
7	BOLT, 5/16 X 3 HEX	GRADE 5	1
8	PLATE WASHER FOR ARCHITECTURAL MAILBOX	SEE SEE SHEET 2	2
9	WASHER, 3/8 FLAT		8
10	WASHER, 3/8 LOCK		4
11	NUT, 3/8 HEX		4
12	BOLT, 3/8 X 1-1/4 HEX	GRADE 5	4
13	CONCRETE, CLASS B (2000 PSI)		1

LOCKABLE ARCHITECTURAL MAILBOX DETAILS



DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

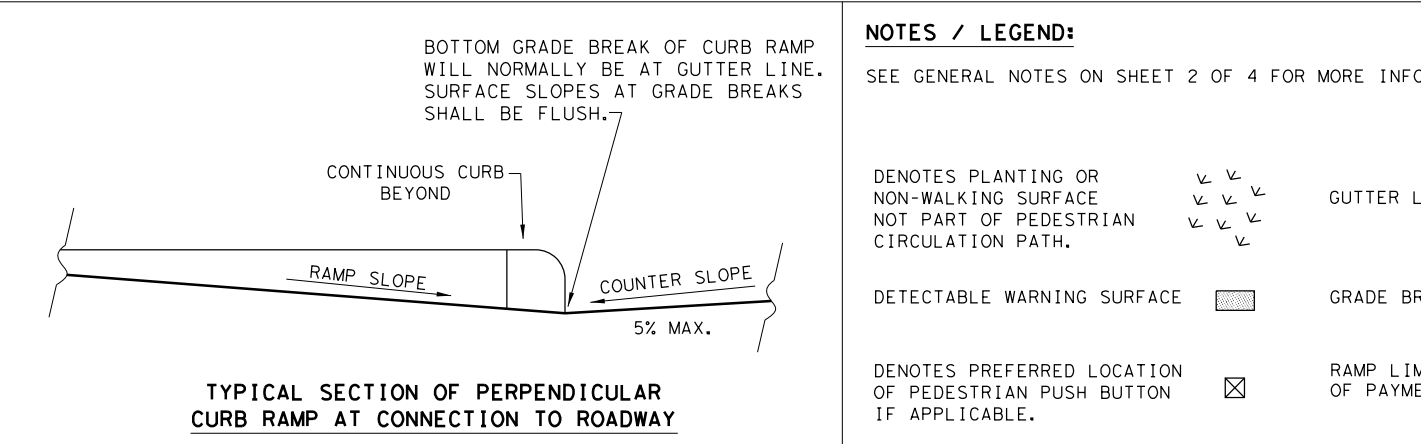
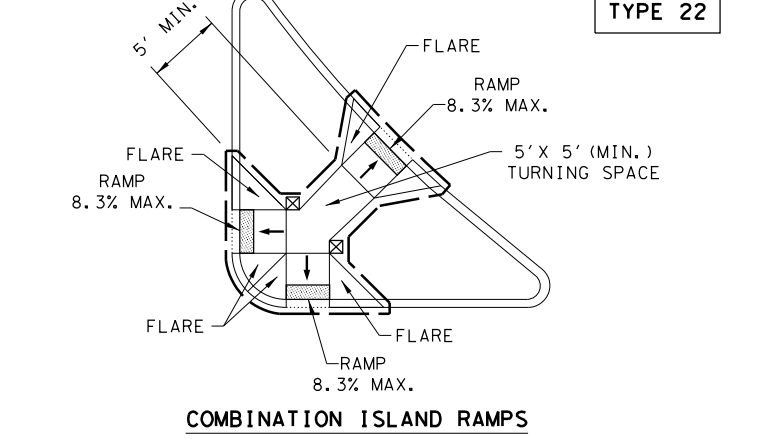
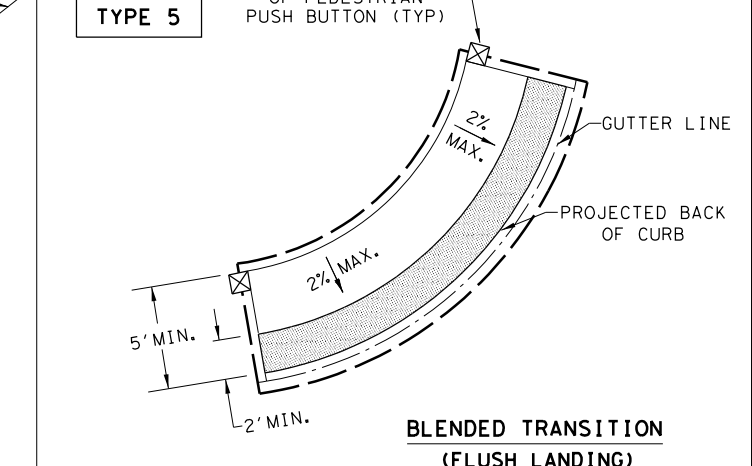
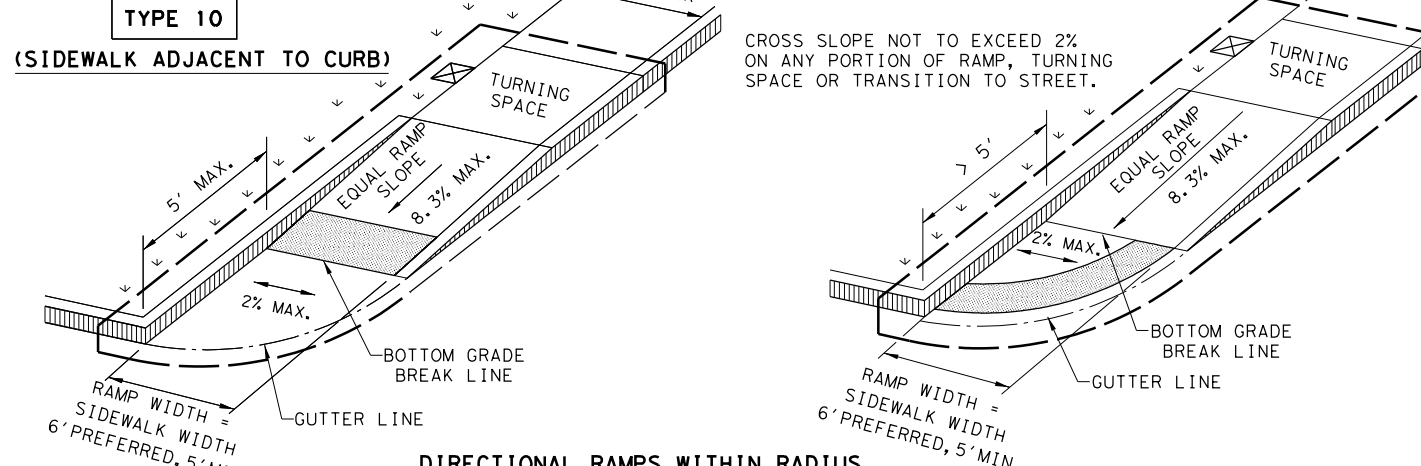
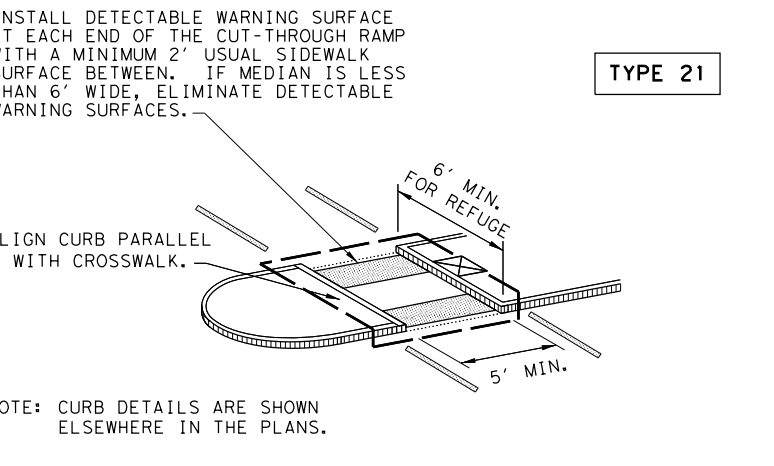
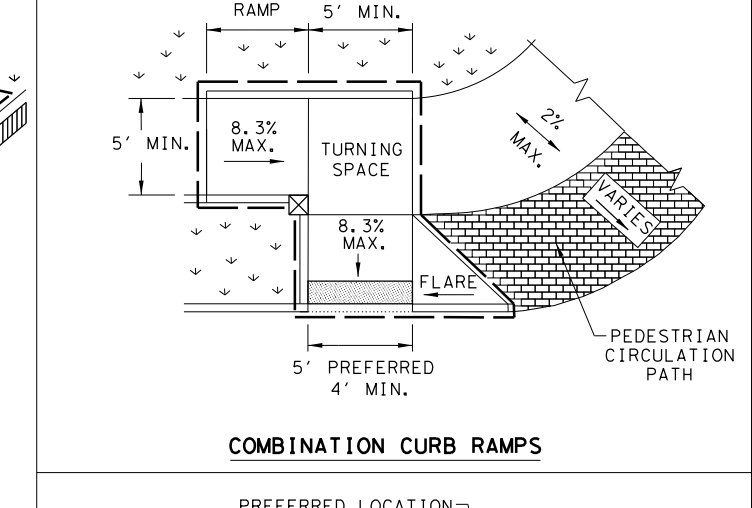
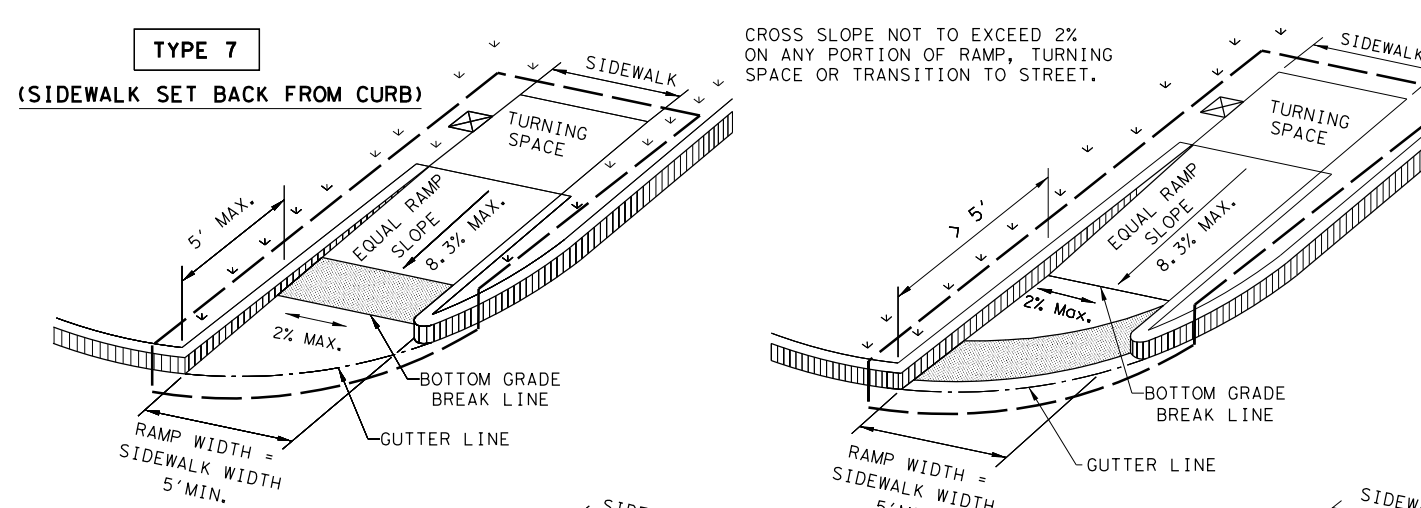
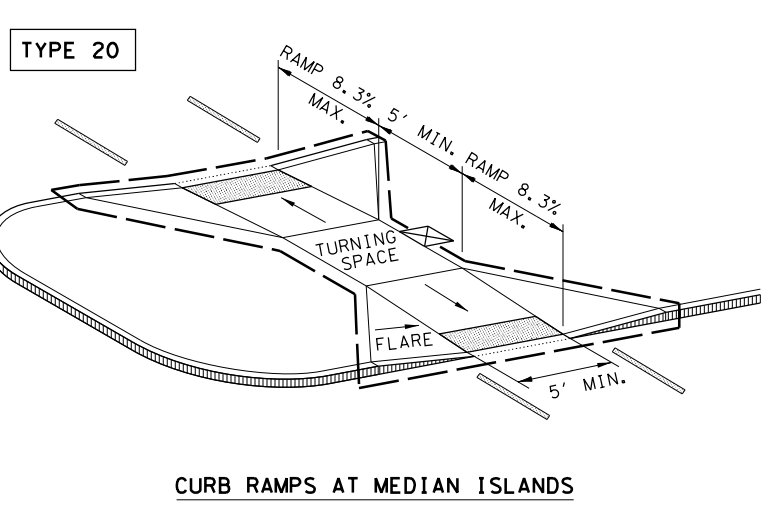
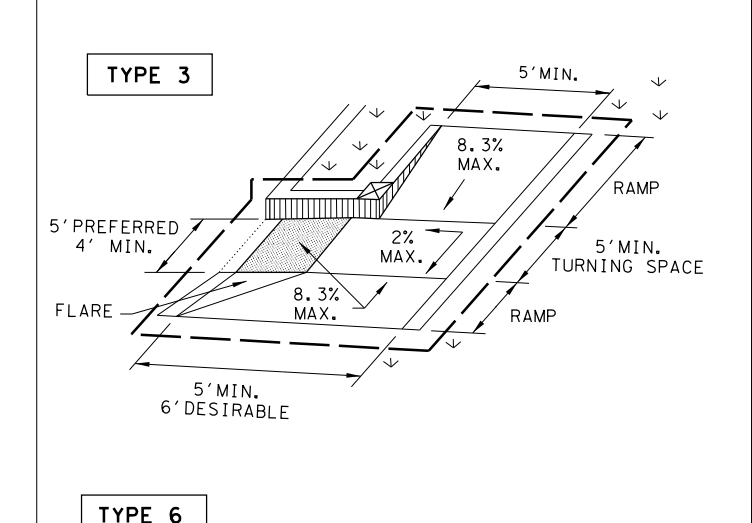
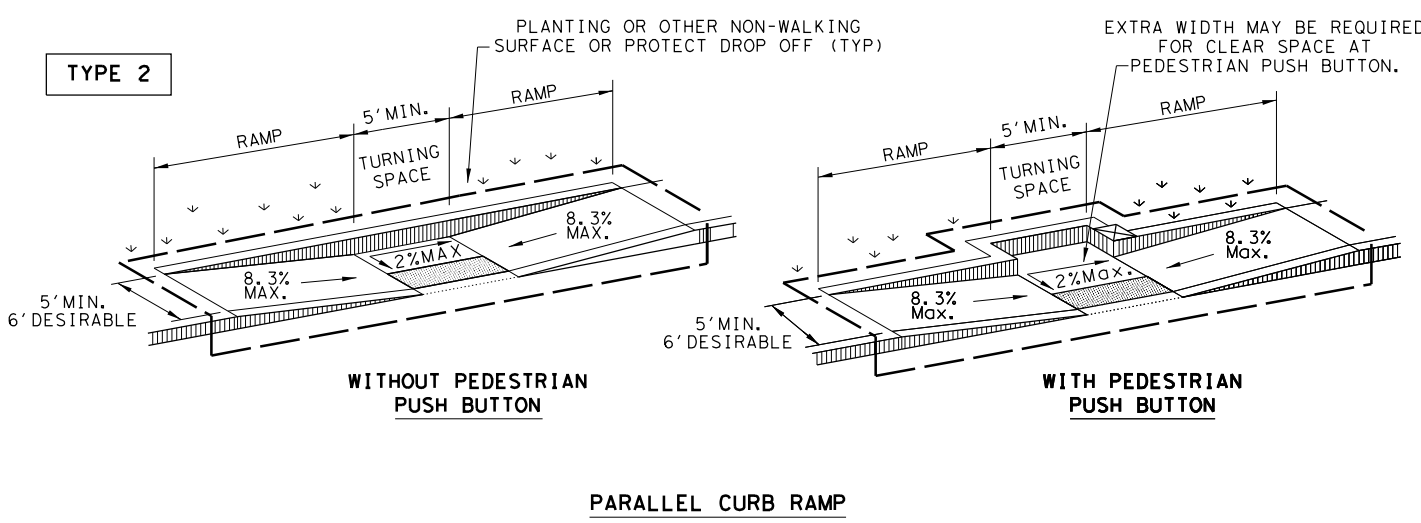
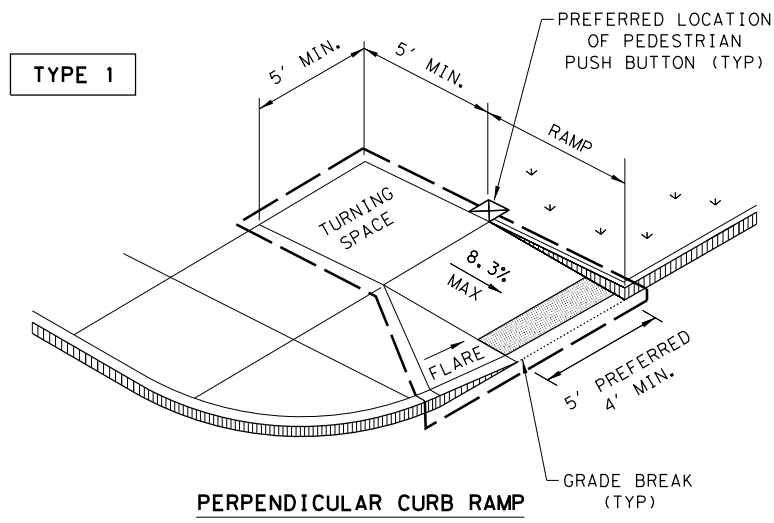
TABLE OF APPLICABLE DHT NUMBERS	
DHT NUMBER	DESCRIPTION
FOUNDATIONS	
46625	WEDGE FOR V-WING SOCKET FOR TYPE 1 FOUNDATION
149340	V-WING SOCKET FOR TYPE 1 FOUNDATION
143433	WEDGE FOR TYPE 2 FOUNDATION
143434	ANCHOR FOR TYPE 2 FOUNDATION
166103	ANCHOR FOR TYPE 7 FOUNDATION
160891	SOCKET FOR TYPE 4 FOUNDATION
160892	WEDGE FOR TYPE 4 FOUNDATION
166104	WEDGE FOR TYPE 7 FOUNDATION
POSTS	
4289	WINGED CHANNEL MAILBOX POST
149339	MULTIPLE MAILBOX POST (GALVANIZED TUBING)
164116	MULTIPLE MAILBOX POST (WHITE COATED)
166114	MULTIPLE MAILBOX POST (WHITE COATED OCTAGONAL)
166153	MULTIPLE MAILBOX POST (GALVANIZED OCTAGONAL)
161442	RECYCLED RUBBER POST. FOR SMALL MAILBOX ONLY
143426	THIN-WALL GALVANIZED STEEL TUBE 2.375" OUTER DIAMETER
162911	THINWALL WHITE STEEL TUBE 2.375" OUTER DIAMETER
	SINGLE OR DOUBLE THIN-WALL MAILBOX POST GALVANIZED
166152	2" OCTAGONAL
	SINGLE OR DOUBLE THIN-WALL MAILBOX POST WHITECOATED
166112	2" OCTAGONAL
REFLECTIVE SHEETING	
161812	REFLECTIVE SHEETING FOR EMERGENCY LOCATION NUMBER PANEL
CONNECTING HARDWARE	
2917	ANGLE BRACKET USED FOR TEMPORARY MAILBOX SUPPORT
166105	BRACKET FOR SINGLE MOUNTING OF MAILBOXES (MOUNTING KIT)
3789	PLATE FOR DOUBLE MOUNTING OF MAILBOXES
166108	BRACKET FOR DOUBLE MOUNTING OF MAILBOXES (MOUNTING KIT)
166111	BRACKET FOR MULTIPLE MOUNTING OF MAILBOXES (MOUNTING KIT)
148939	BRACKET FOR ATTACHING SMALL OR MEDIUM SIZE MAIL BOX
148938	EXTENDER TO BRACKET FOR ATTACHING LARGE MAILBOX
159489	ANGLE BRACKET PART A
159490	ANGLE BRACKET PART B
	BRACKET FOR DOUBLE MOUNTING OF MAILBOXES ON THINWALL
162323	STEEL POST, GALVANIZED OR POWDERCOATED.
	BRACKET FOR ATTACHING MAILBOX TO RECYCLED RUBBER POST
161443	AND TO MULTIPLE WHITE MAILBOX POST
158358	CASTING (NEWSPAPER RECEPTACLE BRACKET)
163731	U-BOLT (NEWSPAPER RECEPTACLE BRACKET)
160698	BOLT; HEX HEAD, GALV; 3/8"DIA X 3/4"L HD, W/2-FLAT WASHERS
163750	BOLT; HEX HEAD, GALV; 3/8" X 1-1/2, 16 NC, W/WASHERS
160701	BOLT; HEX HEAD, GALV; 3/8"DIA X 2-1/2"L, HD, W/2-FLAT WASHERS
163730	BOLT; HEX HEAD, GALV; 3/8" X 3-1/2", NC, W/NUT, 2 FLAT WASHERS
160699	BOLT; HEX HEAD, GALV; 3/8"DIA X 3-3/4"L HD, W/2-FLAT WASHERS
160700	BOLT; HEX HEAD, GALV; 3/8"DIA X 4"L HD, W/2-FLAT WASHERS

**DHT NUMBERS
TABLE
MB-15(1)**

FILE: MB14(1).DGN	DN:	CK:	DW:	CK:
© TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY	SHEET NO.	
			68	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:



SHEET 1 OF 4

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18

© TxDOT: MARCH, 2002

REVISIONS

REVISED 08, 2005

REVISED 06, 2012

REVISED 01, 2018

DN: TxDOT

CON: SECT

DIST

DW: VP

JOB

COUNTY

CK: KM

HIGHWAY

CK: PK & JG

SHEET NO. 69

NOTES / LEGEND:

SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

DETECTABLE WARNING SURFACE

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

GENERAL NOTES

CURB RAMP

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
4. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5' x 5' passing areas at intervals not to exceed 200' are required.
5. Turning Spaces shall be 5' x 5' minimum. Cross slope shall be maximum 2%.
6. Clear space at the bottom of curb ramps shall be a minimum of 4' x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5' x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.
16. Provide a smooth transition where the curb ramps connect to the street.
17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
18. Existing features that comply with applicable standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

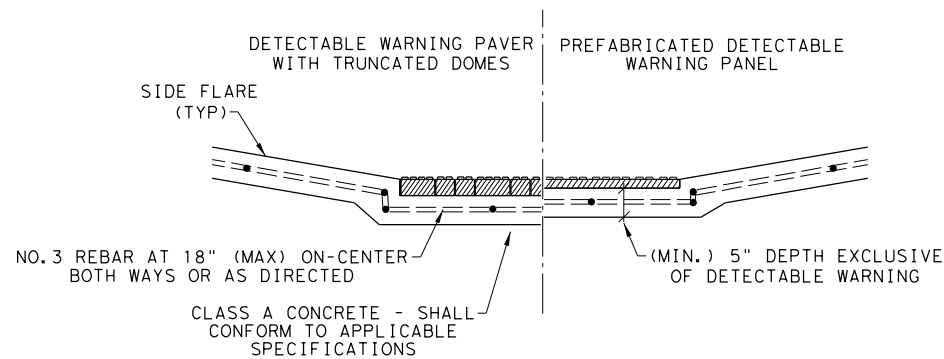
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
21. Detectable warning surfaces must be firm, stable and slip resistant.
22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

DETECTABLE WARNING PAVERS (IF USED)

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

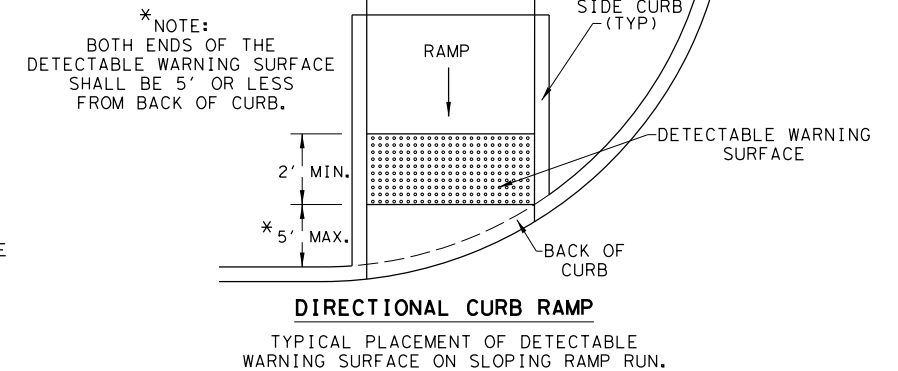
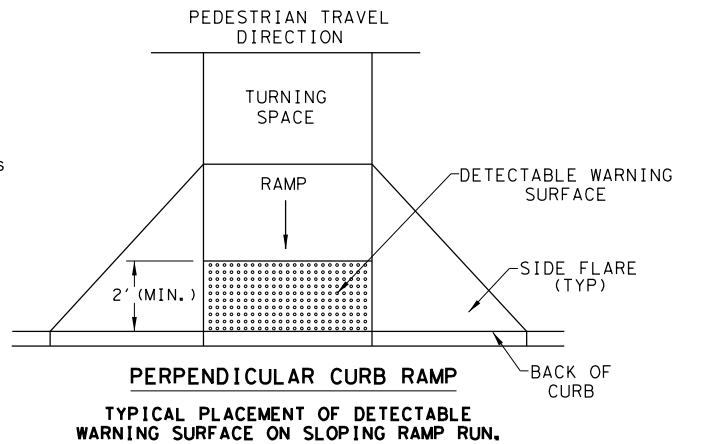
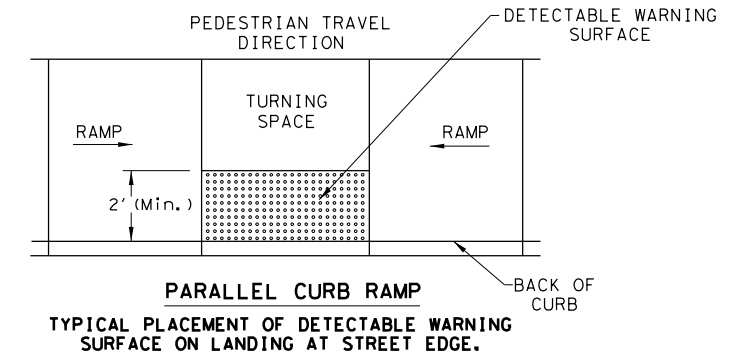
SIDEWALKS

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
29. Street grades and cross slopes shall be as shown elsewhere in the plans.
30. Changes in level greater than 1/4 inch are not permitted.
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.
32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
34. Sidewalk details are shown elsewhere in the plans.



**SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS**

DETECTABLE WARNING SURFACE DETAILS



* NOTE:
BOTH ENDS OF THE
DETECTABLE WARNING SURFACE
SHALL BE 5' OR LESS
FROM BACK OF CURB.

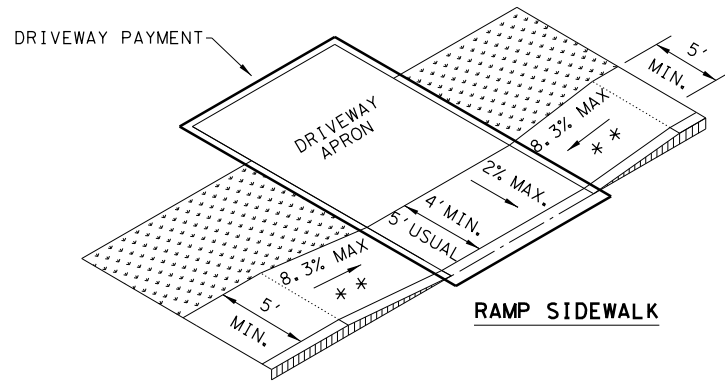
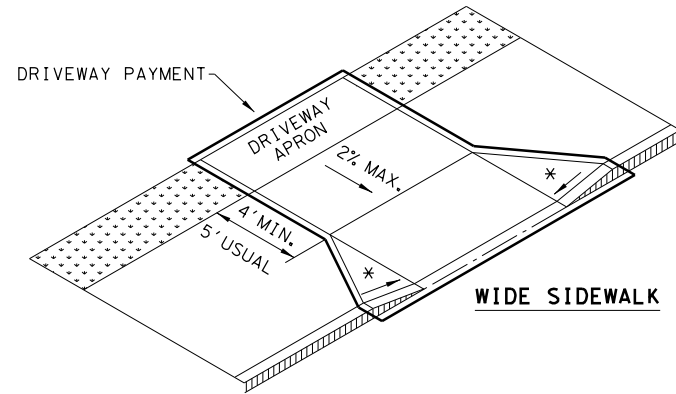
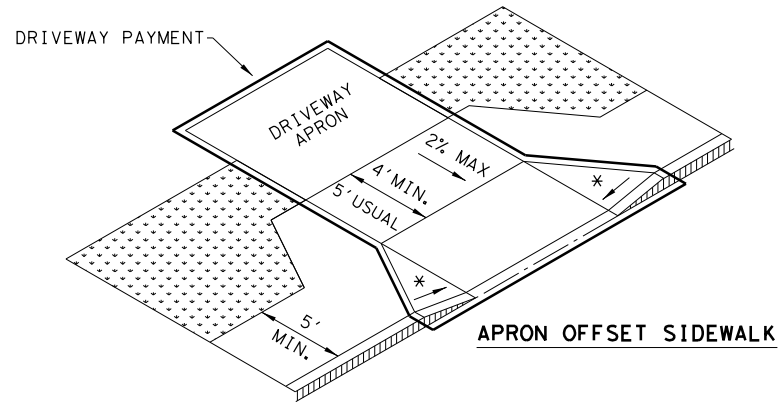
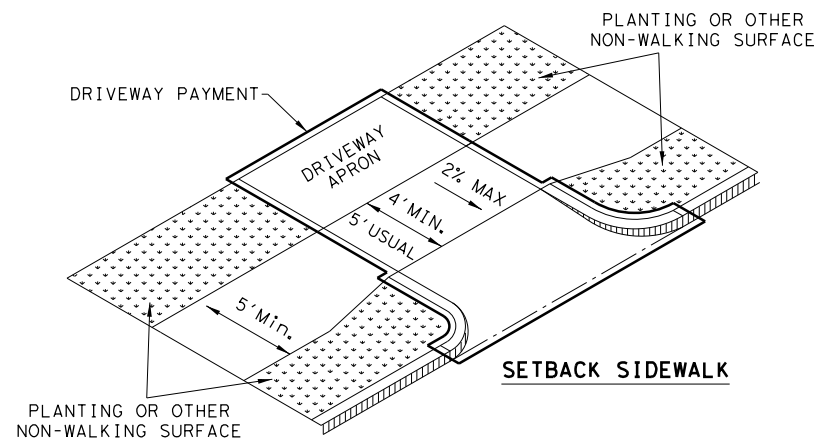
SHEET 2 OF 4

		Design Division Standard	
PEDESTRIAN FACILITIES CURB RAMPS			
PED-18			
FILE: ped18	DN: TxDOT	DW: VP	CK: KM
© TxDOT: MARCH, 2002	CONT	SECT	JOB
<small>REVISIONS</small>		<small>HIGHWAY</small>	
<small>REVISED 08, 2005</small> <small>REVISED 06, 2012</small> <small>REVISED 01, 2018</small>	DIST	COUNTY	SHEET NO.
			70

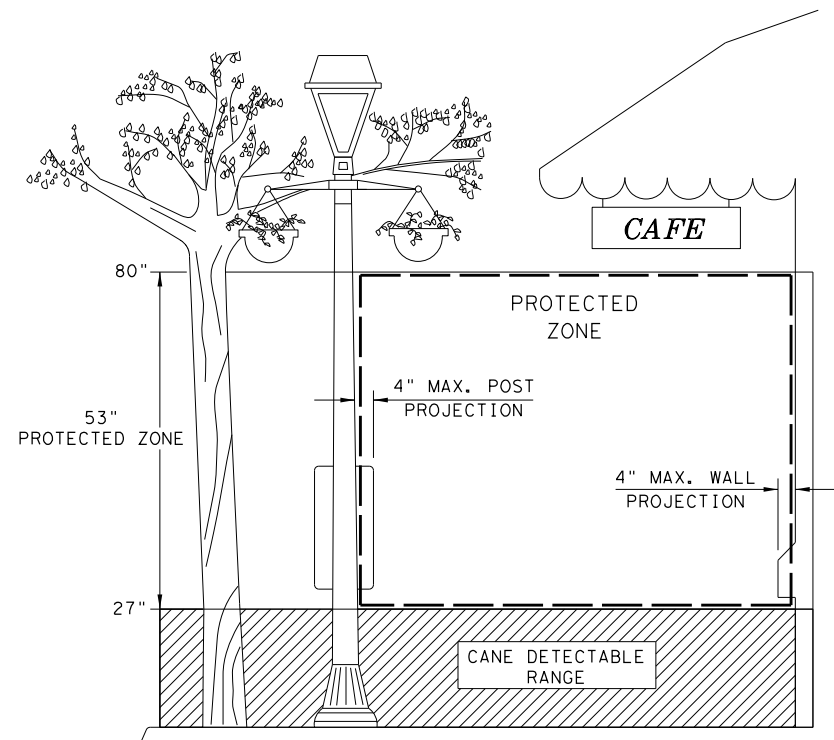
DATE:
FILE:

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

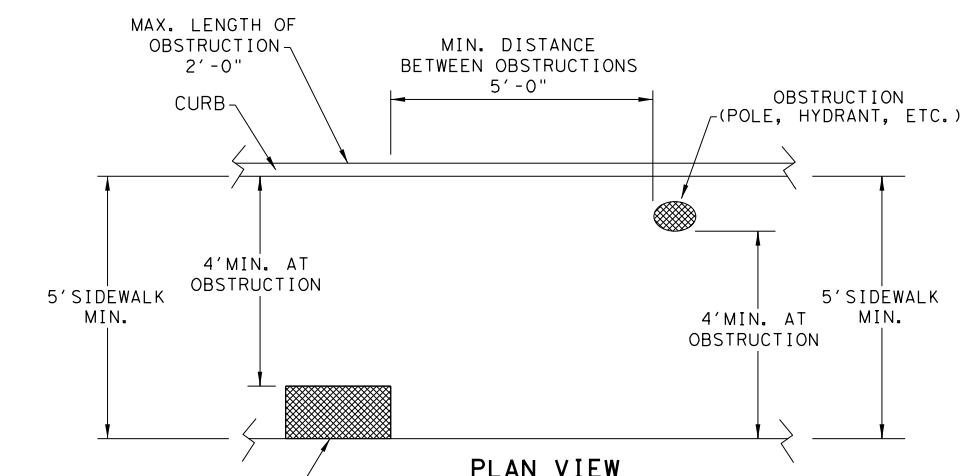
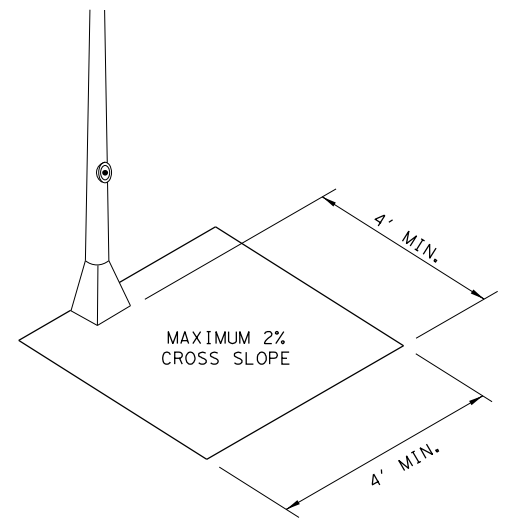
SIDEWALK TREATMENT AT DRIVEWAYS



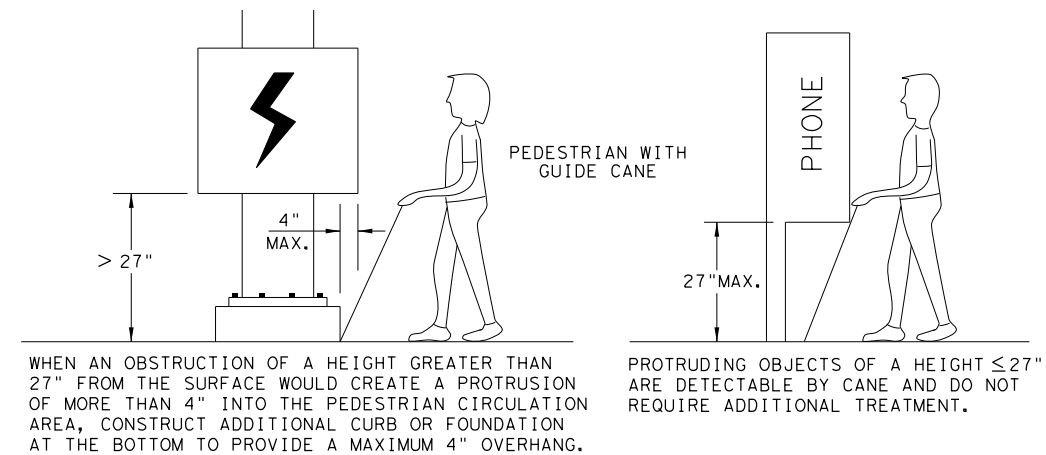
NOTES:
 * WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.
 * * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.



NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



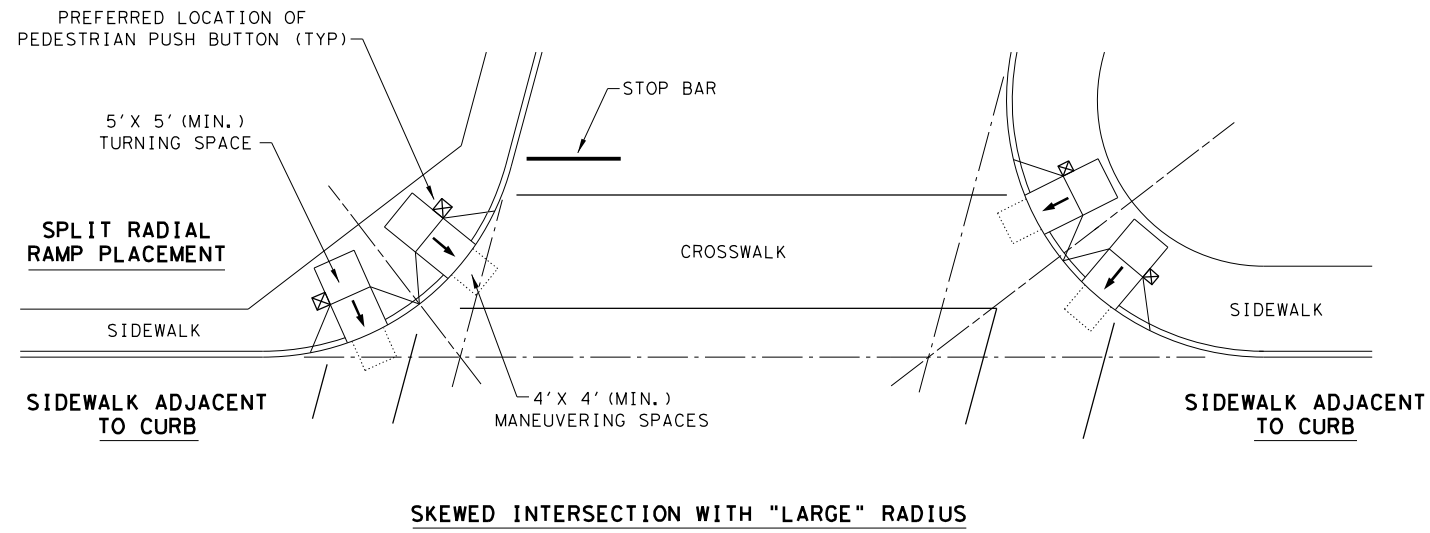
SHEET 3 OF 4

		Design Division Standard	
PEDESTRIAN FACILITIES CURB RAMPS PED-18			
FILE: ped18	DN: TxDOT	DW: VP	CK: KM
© TxDOT: MARCH, 2002	CONT	SECT	JOB
REVISIONS REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018		DIST	COUNTY
		SHEET NO.	
		71	

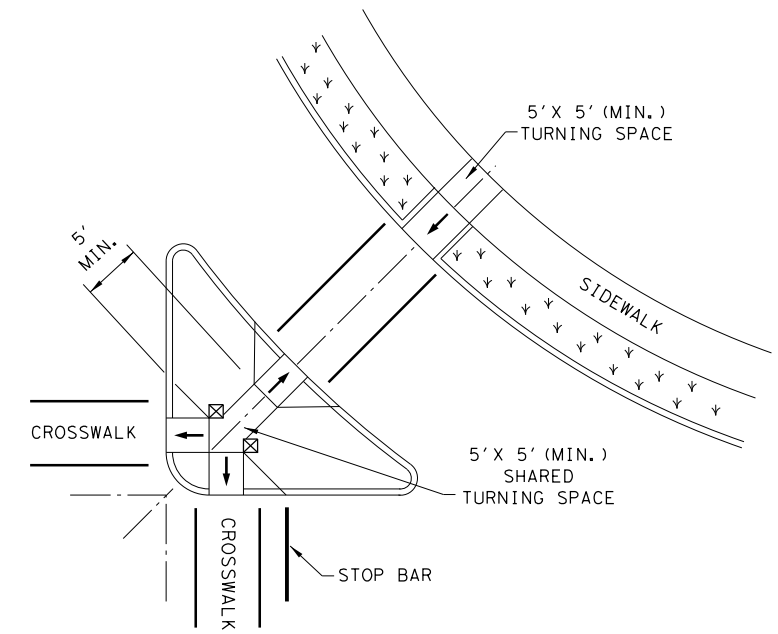
DATE:
FILE:

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

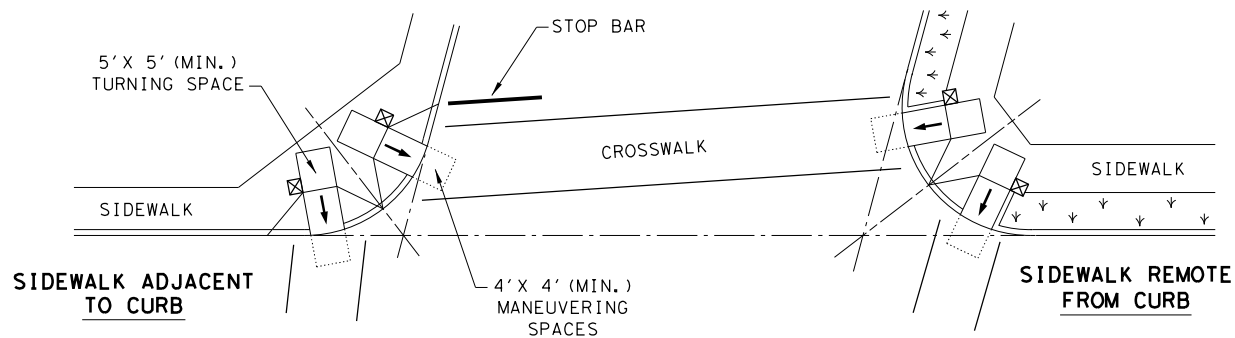
TYPICAL CROSSING LAYOUTS
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



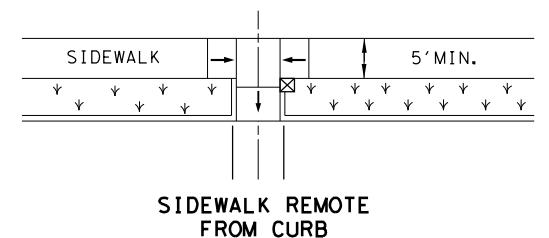
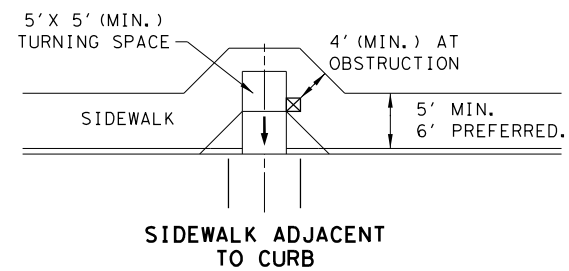
SKewed INTERSECTION WITH "LARGE" RADIUS



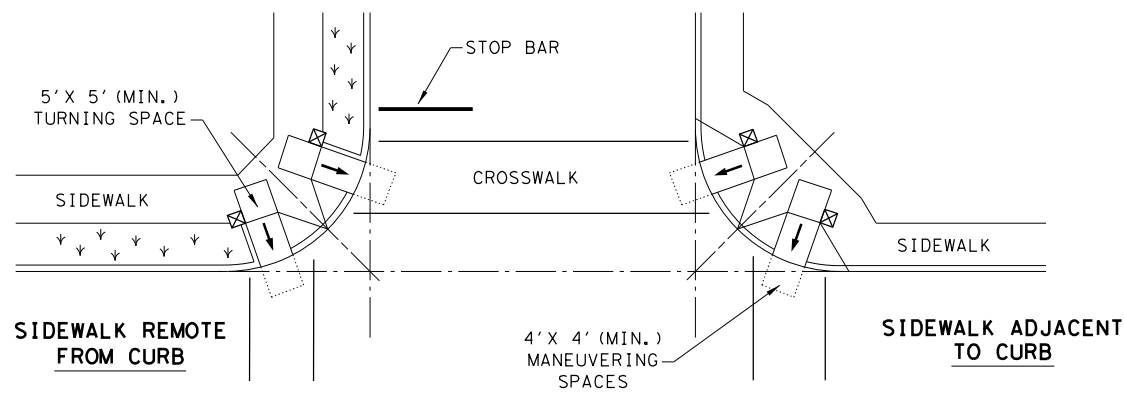
AT INTERSECTION W/FREE RIGHT TURN & ISLAND



SKewed INTERSECTION WITH "SMALL" RADIUS



MID-BLOCK PLACEMENT PERPENDICULAR RAMPS



NORMAL INTERSECTION WITH "SMALL" RADIUS

LEGEND:

- SHOWS DOWNWARD SLOPE. →
- DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ☒
- DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH. ↙ ↘ ↗ ↖

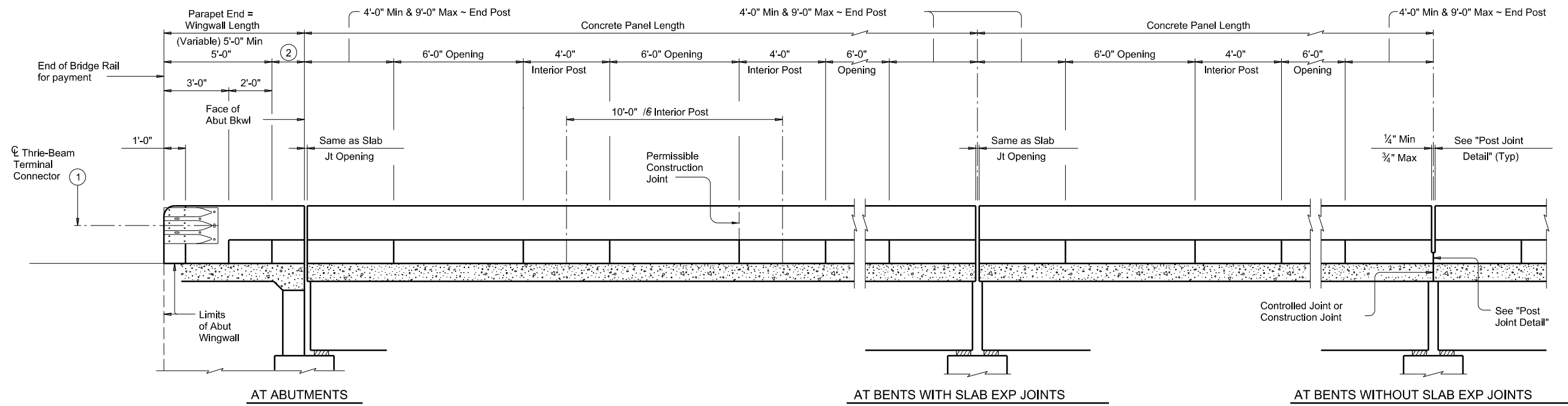
SHEET 4 OF 4

		Design Division Standard	
<h2>PEDESTRIAN FACILITIES</h2> <h3>CURB RAMPS</h3> <h1>PED-18</h1>			
FILE: ped18	DN: TxDOT	DW: VP	CK: KM
© TxDOT: MARCH, 2002	CON: SECT	JOB	HIGHWAY
REVISIONS			
REVISED 08, 2005			
REVISED 06, 2012			
REVISED 01, 2018			
DIST	COUNTY	SHEET NO.	
		72	

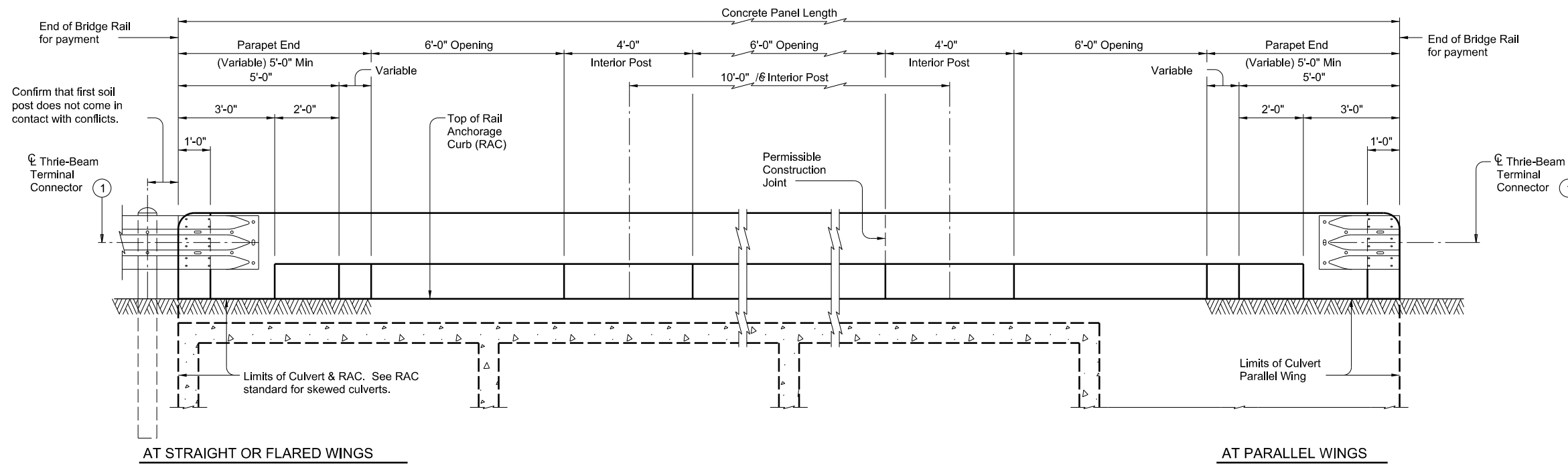
DATE:
FILE:

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:



ROADWAY ELEVATION OF RAIL ON BRIDGE



ROADWAY ELEVATION OF RAIL ON BOX CULVERTS

Showing 0° skew culvert. Skewed culverts similar. See RAC standard for details not shown. Vertical joints in concrete rail are not required, unless shown elsewhere.

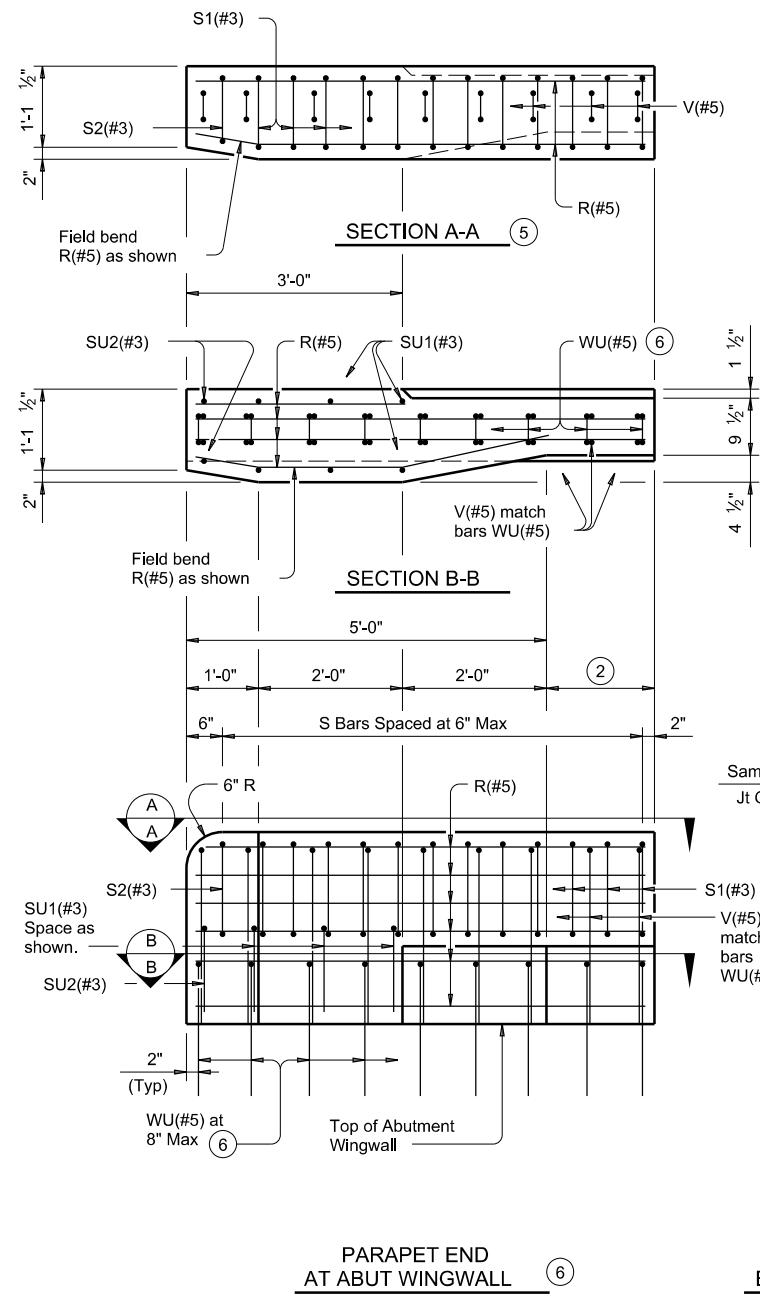
- ① Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
- ② Wingwall Length minus 5'-0" (Varies)

SHEET 1 OF 3

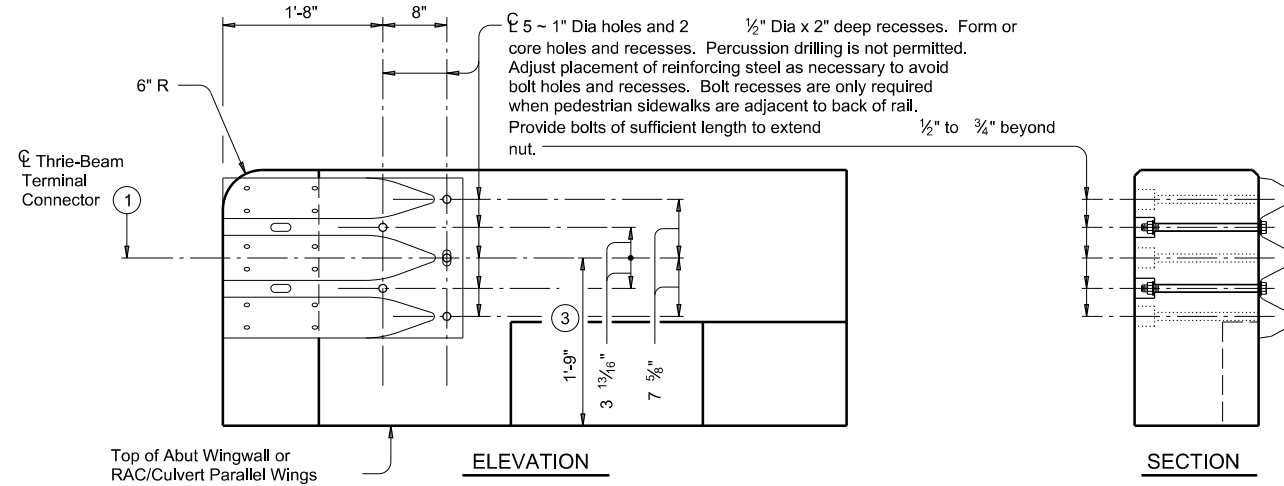
		Bridge Division Standard	
<h1>TRAFFIC RAIL</h1>			
<h2>TYPE T223</h2>			
FILE: rtsd005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT September 2019	CONT	SECT	JOB
REVISIONS		HIGHWAY	
DIST	COUNTY	SHEET NO.	
		73	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

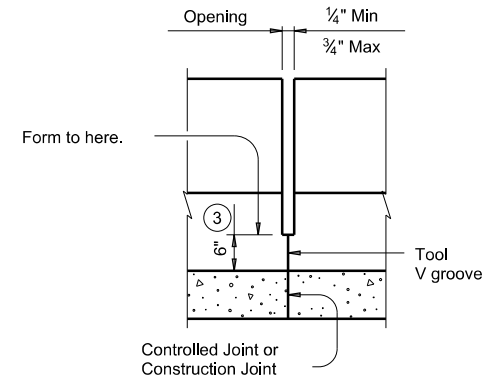
DATE:
FILE:



PARAPET END AT ABUT WINGWALL ⑥

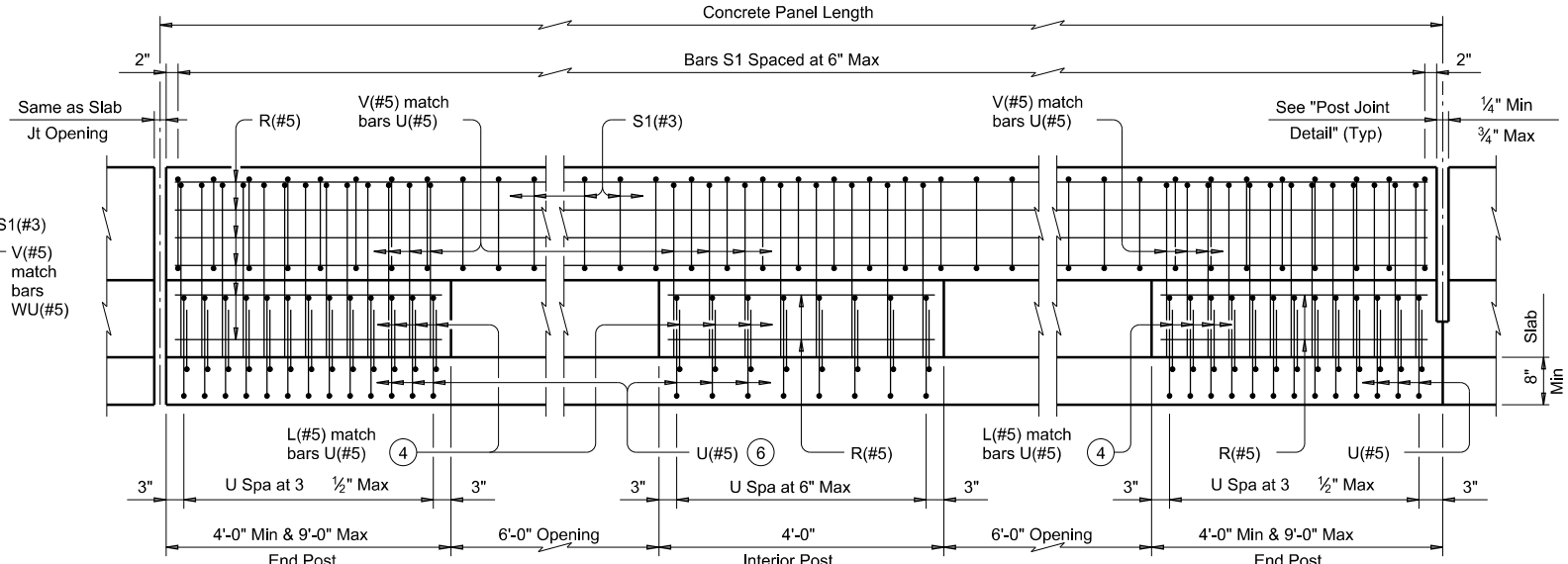


TERMINAL CONNECTION DETAILS



POST JOINT DETAIL

Provide at all interior bents without slab expansion joints.



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

Showing rail on slab. Rail on box culvert similar.

- ① Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
- ② Wingwall Length minus 5'-0" (Varies)
- ③ Increase 2" for structures with overlay.
- ④ Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.
- ⑤ Bars SU1(#3), SU2(#3) and WU(#5) not shown for clarity.
- ⑥ Substitute Bars U(#5) for Bars WU(#5) when parapet end is located on anchorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.

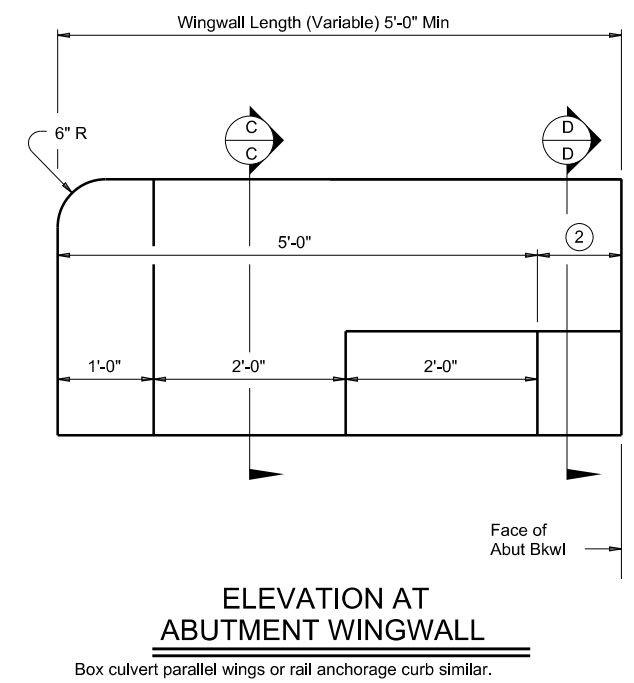
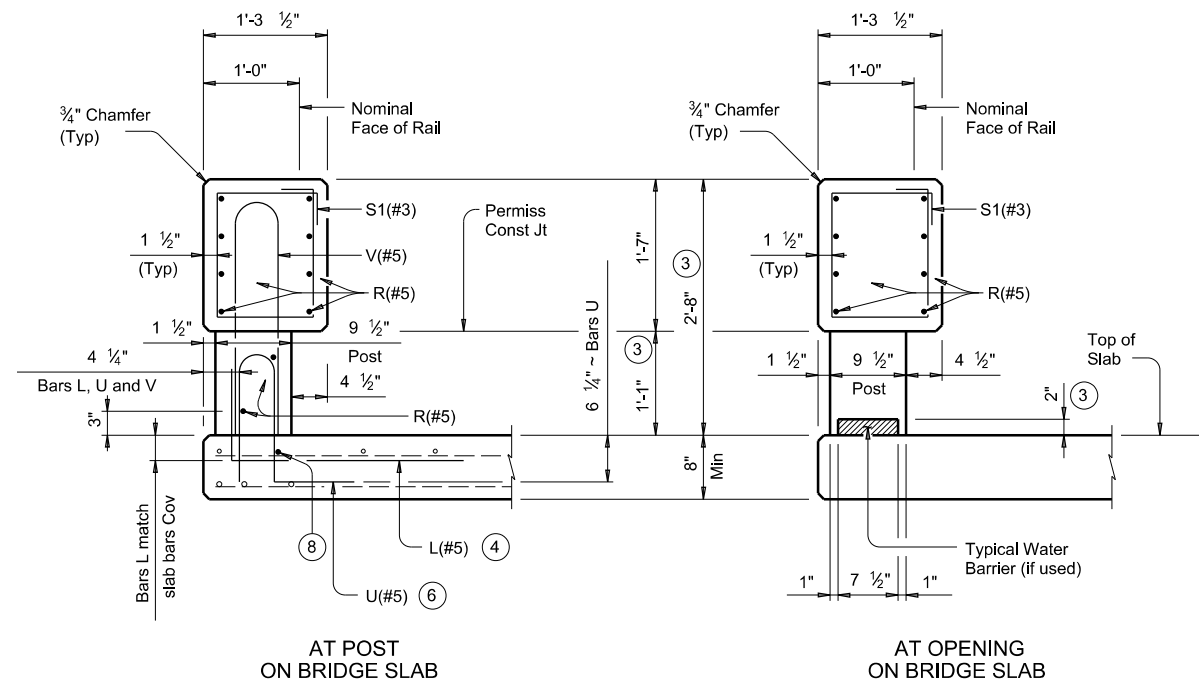
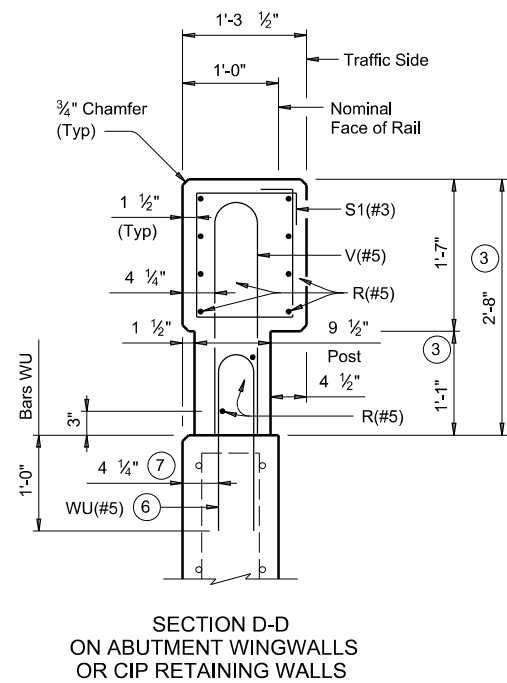
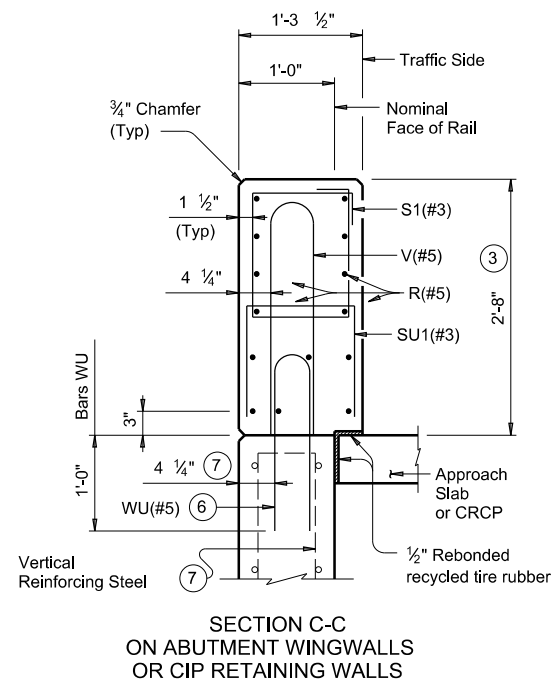
TRAFFIC RAIL

TYPE T223

FILE: rtsld005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				
DIST	COUNTY			SHEET NO.
				74

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

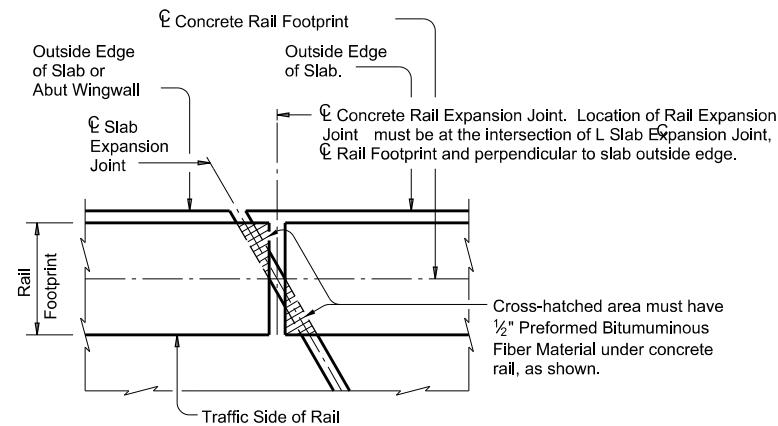
DATE: FILE:



SECTIONS THRU RAIL

Sections on box culverts similar.

- ② Wingwall Length minus 5'-0" (Varies)
- ③ Increase 2" for structures with overlay.
- ④ Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.
- ⑥ Substitute Bars U(#5) for Bars WU(#5) when parapet end is located on anchorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.
- ⑦ When vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls on traffic side of wall, move the horizontal wingwall/retaining wall reinforcing to the inside of Bars WU where bars conflict.
- ⑧ Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.
- ⑨ At the Contractor's option, Bars V may be replaced by extending Bars U to 2'-5 1/4" above the roadway surface without overlay.



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

CONSTRUCTION NOTES:

Face of rail and parapet must be vertical transversely unless otherwise shown in the plans or approved by the Engineer.
Provide water barriers at openings draining onto undercrossing roadways and sidewalks. They may be cast-in-place or precast in convenient lengths and bonded to the bridge deck with an approved epoxy cement.
Chamfer all exposed corners.

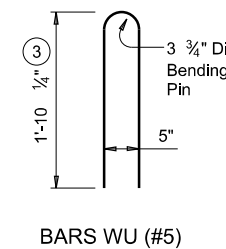
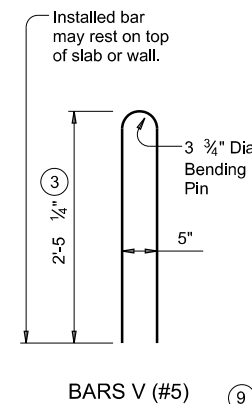
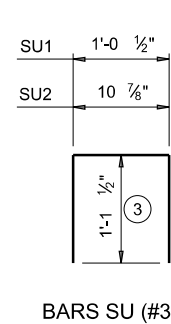
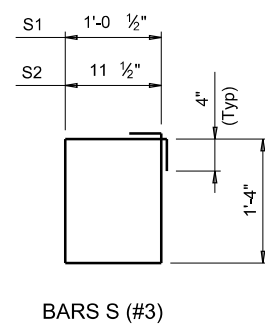
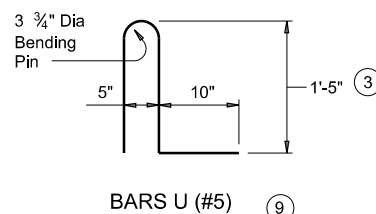
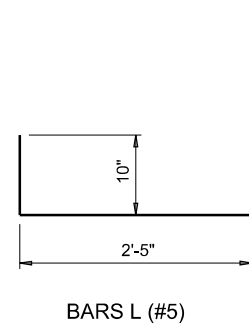
MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.
Provide Grade 60 reinforcing steel.
Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.
Deformed Welded Wire Reinforcing (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U, V, and WU unless noted otherwise. Provide the same laps as required for reinforcing bars.
Provide bar laps, where required, as follows:
Uncoated or galvanized ~ #5 = 2'-0"
Epoxy coated ~ #5 = 3'-0"

GENERAL NOTES:

This rail has been evaluated by full-scale crash test to meet MASH TL-3 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.
Do not use this railing on bridges with expansion joints providing more than 5" movement.
Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.
Shop drawings are not required for this rail.
Average weight of railing with no overlay is 358 plf.

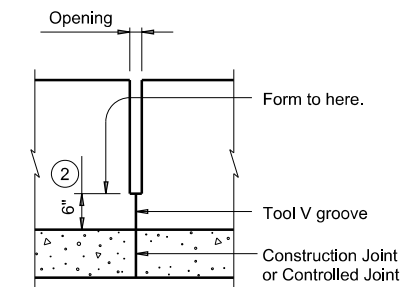
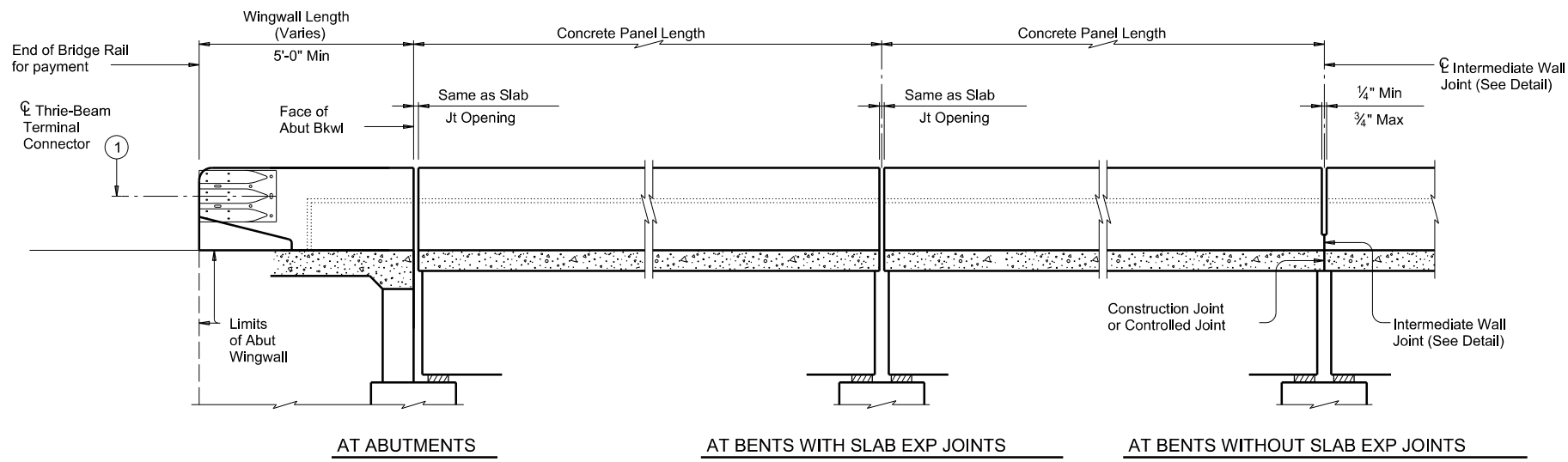
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



SHEET 3 OF 3

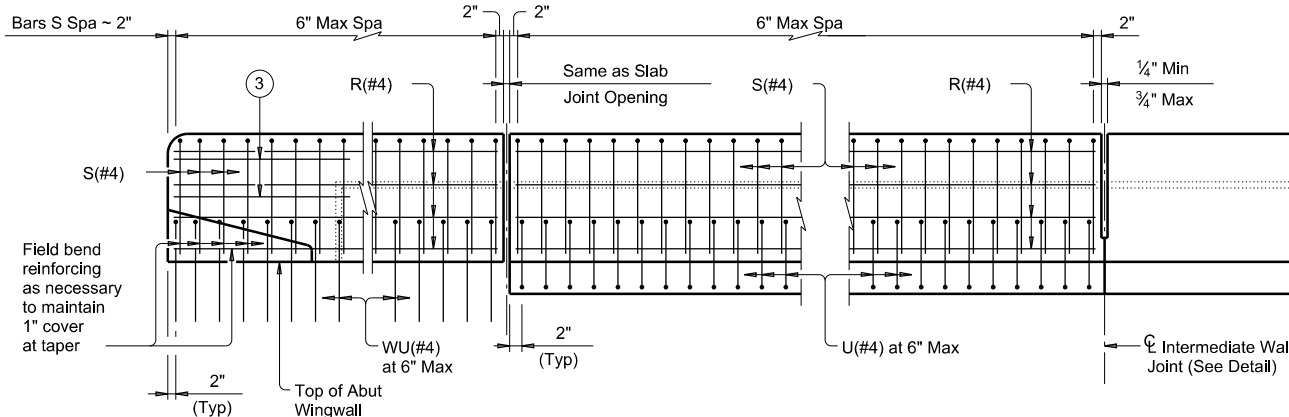
		Bridge Division Standard	
<h2>TRAFFIC RAIL</h2>			
<h3>TYPE T223</h3>			
FILE: rfsid005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT September 2019	CONT	SECT	JOB
REVISIONS		HIGHWAY	
DIST	COUNTY	SHEET NO.	
		75	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

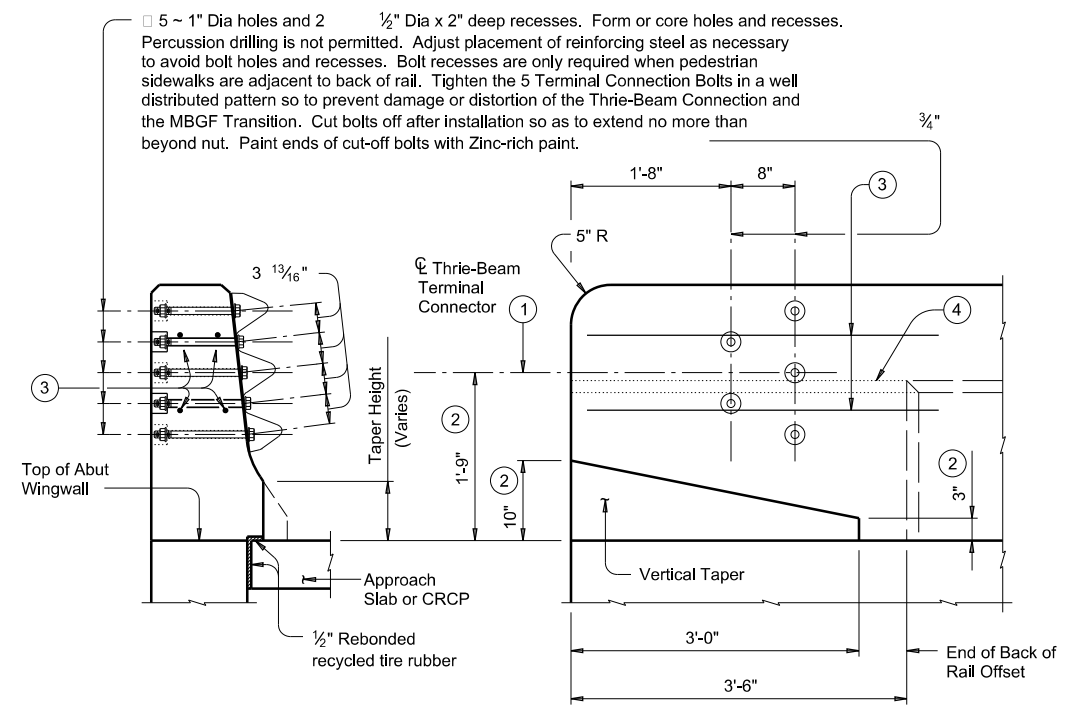


INTERMEDIATE WALL JOINT DETAIL

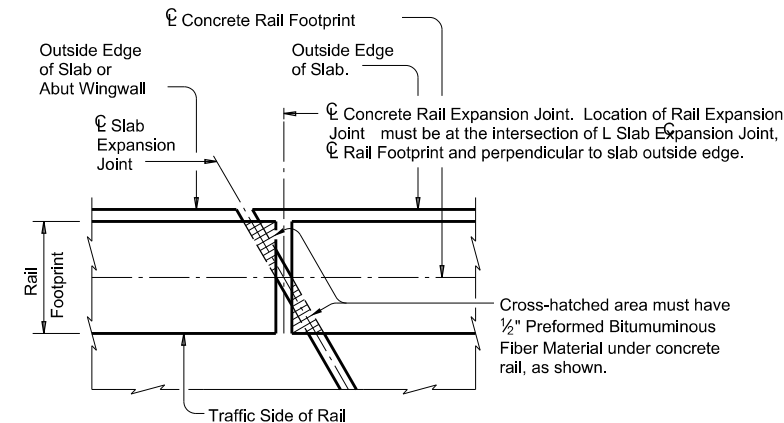
Provide at all interior bents without slab expansion joints.



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



SECTION and **ELEVATION** views of **TERMINAL CONNECTION DETAILS**



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

- 1 Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
- 2 Increase 2" for structures with overlay.
- 3 Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required.
- 4 Back of rail offset may, with Engineer's approval, be continued to the end of the railing.

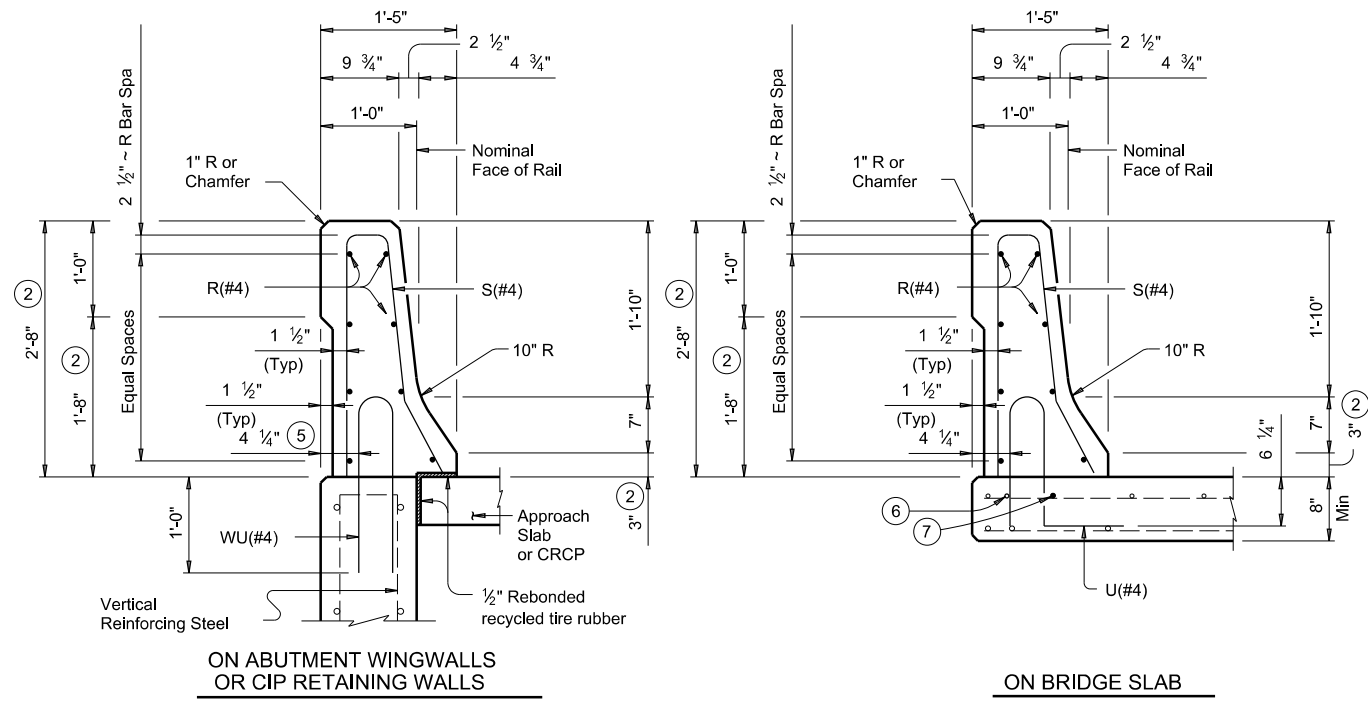
SHEET 1 OF 2

		Bridge Division Standard	
<h2>TRAFFIC RAIL</h2>			
<h3>TYPE T551</h3>			
FILE: rtsd009-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT September 2019	CONT	SECT	JOB
REVISIONS		HIGHWAY	
DIST	COUNTY	SHEET NO.	
		76	

DATE: FILE:

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:



SECTIONS THRU RAIL

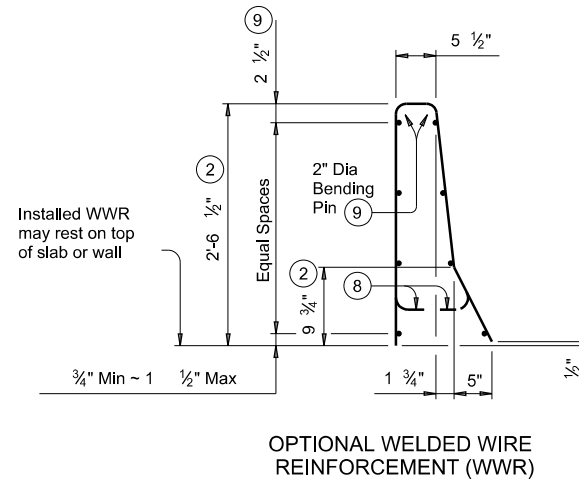
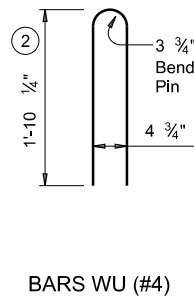
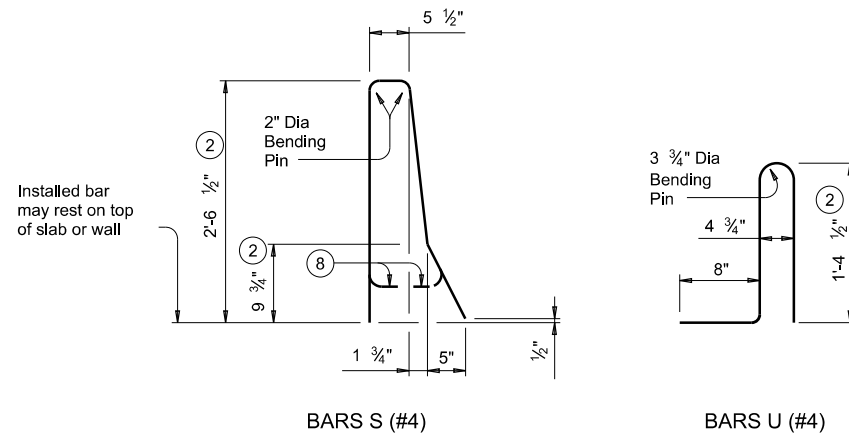
- ② Increase 2" for structures with overlay.
- ⑤ 5 1/4" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.
- ⑥ As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars will be furnished at the Contractor's expense.
- ⑦ Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.
- ⑧ Bend or cut as required to clear drain slots.
- ⑨ No longitudinal wires may be in top center of cage.
- ⑩ Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greater to side slot drain.

CONSTRUCTION NOTES:
This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer. Provide sensor control for both line and grade. Tack welding to provide bracing for slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S at any location on the cage. If increased bracing is needed, provide additional anchorage devices and weld in the upper two thirds of the cage. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing".
If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a 3/8" width x 1/4" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.
The back of railing must be vertical unless otherwise shown on the plans or approved by the Engineer.

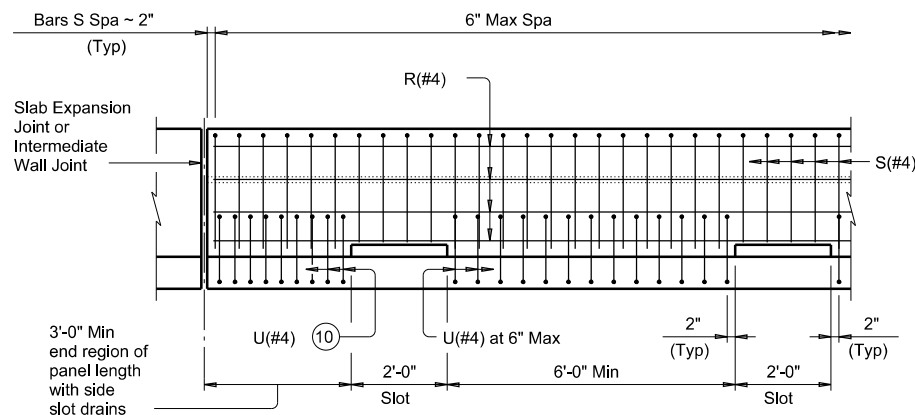
MATERIAL NOTES:
Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.
Provide Grade 60 reinforcing steel.
Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.
Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM A1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other than shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars.
Provide bar laps, where required, as follows:
Uncoated or galvanized ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:
This rail has been evaluated and accepted to be of equal strength to railings with like geometry, which have been crash tested to meet MASH TL-3 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.
Do not use this railing on bridges with expansion joints providing more than 5" movement.
Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.
Shop drawings will not be required for this rail.
Average weight of railing with no overlay is 382 plf.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

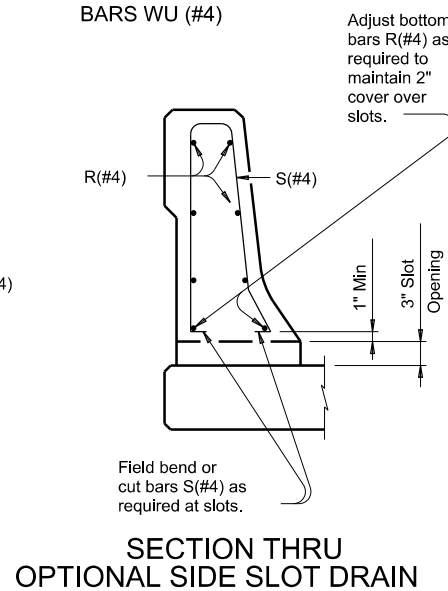


DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	1.067 Sq In.	0.267 Sq In. per Ft
Minimum	No. of Wires	Spacing
Maximum	8	4"
Maximum Wire Size Differential	10	8"
	The smaller wire must have an area of 40% or more of the larger wire.	



OPTIONAL SIDE SLOT DRAIN DETAIL

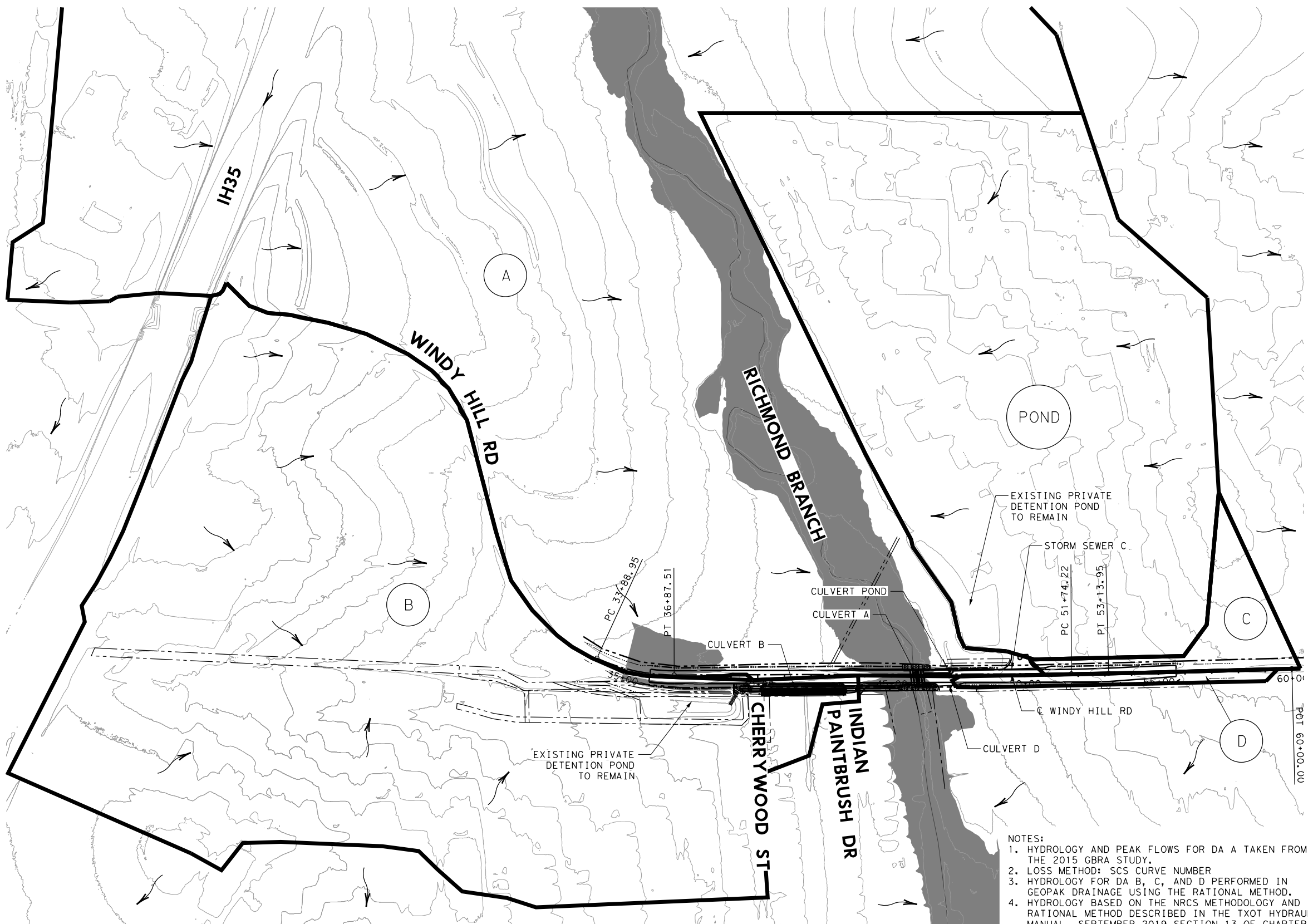
Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. If continuous slots at 8 ft c-c are required, then details as on standard Type T552 should apply. Do not place drains over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.



SECTION THRU OPTIONAL SIDE SLOT DRAIN

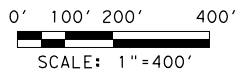
<h2>TRAFFIC RAIL</h2>			
<h3>TYPE T551</h3>			
FILE: rtsld009-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT September 2019	CONT	SECT	JOB
REVISIONS		HIGHWAY	
DIST	COUNTY	SHEET NO.	
		77	

7/10/2020 4:44:14 PM I:\2173\2001\CADD\SHEETS\05-Drainage Details\WH*DAM*EXT*01.dgn



LEGEND

- XX DRAINAGE AREA ID
- EXISTING ROW
- - - EXISTING DRAINAGE EASEMENT
- DRAINAGE AREA BOUNDARY
- FLOW DIRECTION ARROW
- 100-YR FLOODPLAIN



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
FRN-F-1386

WINDY HILL ROAD DRAINAGE AREA MAP

GLO Contract# 19-280-000-B779

DESIGN BY: CH	SCALE 1"=400'
DRAWN BY: BR	HORIZONTAL:
CHECKED BY: ZR	VERTICAL:
APPROVED BY:	SHEET: 1 OF 2
PROJECT NO: 2173.2001	PAGE: 78
DATE: 7/10/2020	

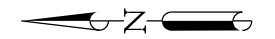
- NOTES:**
- HYDROLOGY AND PEAK FLOWS FOR DA A TAKEN FROM THE 2015 GBRA STUDY.
 - LOSS METHOD: SCS CURVE NUMBER
 - HYDROLOGY FOR DA B, C, AND D PERFORMED IN GEOPAK DRAINAGE USING THE RATIONAL METHOD.
 - HYDROLOGY BASED ON THE NRCS METHODOLOGY AND RATIONAL METHOD DESCRIBED IN THE TXOT HYDRAULIC MANUAL, SEPTEMBER 2019 SECTION 13 OF CHAPTER 4.
 - HYDROLOGY AND PEAK FLOWS FOR CULVERT POND TAKEN FROM "MEADOWS AT KYLE PHASE ONE" AS-BUILTS.
 - IMPERVIOUS COVER CALCULATIONS PERFORMED ASSUMING EXISTING ZONING CONDITIONS. LOCAL ZONING MAPS WERE USED WHEN APPLICABLE.
 - RAINFALL IDF COEFFICIENTS BASED ON NOAA ATLAS 14: PRECIPITATION-FREQUENCY ATLAS.
 - AS PER FEMA'S EFFECTIVE FIRM'S 48209C0290F, PROJECT AREA IS CROSSING ONE SPECIAL FLOOD HAZARD AREAS INCLUDING RICHMOND BRANCH TO PORTER CREEK TRIBUTARY 3 (CROSSING A).
 - CONTOURS USED FOR SIZING EXTERNAL DRAINAGE AREAS BASED OFF OF TNRIS 2012 CAPCOG 5FT CONTOURS.

WINDY HILL EXTERNAL DRAINAGE AREA DATA

STRUCTURE ID	AREA ID	AREA		TIME OF CONC (ACTUAL) MIN	TIME OF CONC (USED) MIN	LAG TIME MIN	COMPOSITE C-VALUE	CN VALUE	10-YEAR		25-YEAR		100-YEAR	
		AC	SQ MI						INTENSITY	PEAK FLOW	INTENSITY	PEAK FLOW	INTENSITY	PEAK FLOW
									IN/HR	CFS	IN/HR	CFS	IN/HR	CFS
CULVERT A	A	704	1.100	-	-	-	-	-	1560	-	1940	-	2610	
CULVERT B	B	87.2	0.136	19.59	19.59	-	0.559	-	5.675	276.507	7.063	344.115	9.374	456.71
STORM SEWER C	C	3.75	0.006	14.52	14.52	-	0.359	-	6.489	8.733	8.036	10.815	10.563	14.216
CULVERT D	D	1.15	0.002	10	10	-	0.598	-	7.479	5.123	9.208	6.308	11.963	8.196
CULVERT POND	POND	60.9	0.095	-	-	-	-	-	-	124.21	-	168.21	-	244.57

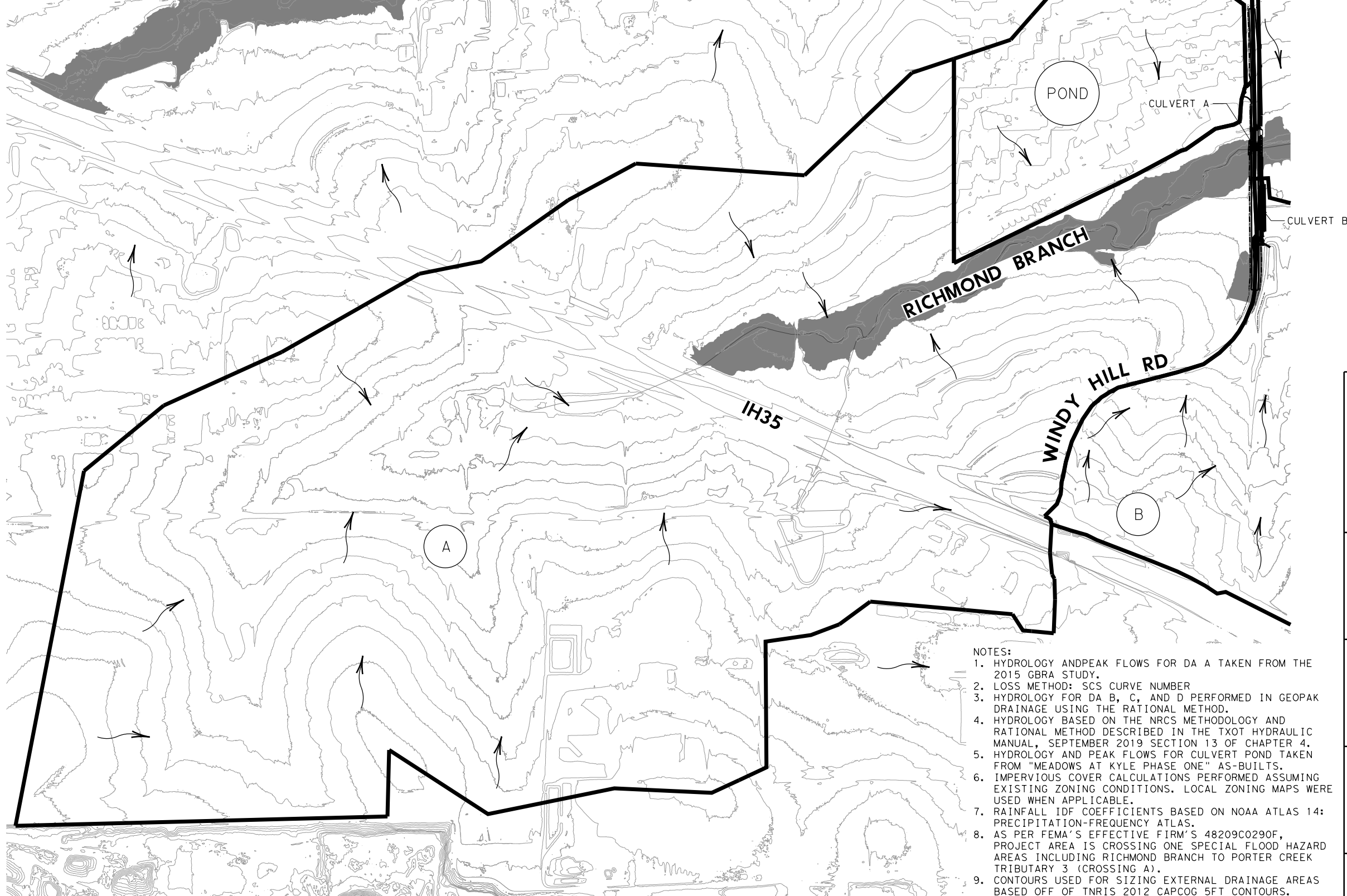
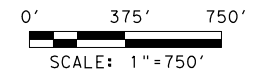
WINDY HILL EXTERNAL DRAINAGE AREA DATA

STRUCTURE ID	AREA ID	AREA		TIME OF CONC (ACTUAL) MIN	TIME OF CONC (USED) MIN	LAG TIME MIN	COMPOSITE C-VALUE	CN VALUE	10-YEAR		25-YEAR		100-YEAR	
		AC	SQ MI						INTENSITY IN/HR	PEAK FLOW CFS	INTENSITY IN/HR	PEAK FLOW CFS	INTENSITY IN/HR	PEAK FLOW CFS
CULVERT A	A	615.0	0.961	104	104	62.4	-	84	-	1560	-	1940	-	2610
CULVERT B	B	87.2	0.136	19.6	19.6	-	0.56	-	5.68	277	7.06	344	9.37	457
STORM SEWER C	C	3.8	0.006	14.5	14.5	-	0.36	-	6.49	8.7	8.04	10.8	10.56	14.2
CULVERT D	D	1.2	0.002	10.0	10.0	-	0.60	-	7.48	5.1	9.21	6.3	11.96	8.2
CULVERT POND	POND	60.9	0.095	-	-	-	-	-	-	124	-	168	-	245



LEGEND

- DRAINAGE AREA ID
- EXISTING ROW
- EXISTING DRAINAGE EASEMENT
- DRAINAGE AREA BOUNDARY
- FLOW DIRECTION ARROW
- 100-YR FLOODPLAIN



- NOTES:
1. HYDROLOGY AND PEAK FLOWS FOR DA A TAKEN FROM THE 2015 GBRA STUDY.
 2. LOSS METHOD: SCS CURVE NUMBER
 3. HYDROLOGY FOR DA B, C, AND D PERFORMED IN GEOPAK DRAINAGE USING THE RATIONAL METHOD.
 4. HYDROLOGY BASED ON THE NRCS METHODOLOGY AND RATIONAL METHOD DESCRIBED IN THE TXOT HYDRAULIC MANUAL, SEPTEMBER 2019 SECTION 13 OF CHAPTER 4.
 5. HYDROLOGY AND PEAK FLOWS FOR CULVERT POND TAKEN FROM "MEADOWS AT KYLE PHASE ONE" AS-BUILTS.
 6. IMPERVIOUS COVER CALCULATIONS PERFORMED ASSUMING EXISTING ZONING CONDITIONS. LOCAL ZONING MAPS WERE USED WHEN APPLICABLE.
 7. RAINFALL IDF COEFFICIENTS BASED ON NOAA ATLAS 14: PRECIPITATION-FREQUENCY ATLAS.
 8. AS PER FEMA'S EFFECTIVE FIRM'S 48209C0290F, PROJECT AREA IS CROSSING ONE SPECIAL FLOOD HAZARD AREAS INCLUDING RICHMOND BRANCH TO PORTER CREEK TRIBUTARY 3 (CROSSING A).
 9. CONTOURS USED FOR SIZING EXTERNAL DRAINAGE AREAS BASED OFF OF TNRIS 2012 CAPCOG 5FT CONTOURS.

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN-F-1386

WINDY HILL ROAD
 DRAINAGE AREA
 MAP

GLO Contract# 19-280-000-B779

DESIGN BY:	CH	SCALE	1"=750'
DRAWN BY:	BR	HORIZONTAL:	
CHECKED BY:	ZR	VERTICAL:	
APPROVED BY:		SHEET:	2 OF 2
PROJECT NO:	2173.2001	PAGE:	79
DATE:	7/10/2020		

7/10/2020 4:44:15 PM I:\2173\2001\CADD\SHEETS\05-Drainage Details\WH*DAM*EXT*02.dgn

7/10/2020 4:44:16 PM I:\2173\2001\CADD\SHEETS\05-Drainage Details\WH*DRN*CULV*HYD*01.dgn

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	8676	25 YR	Existing	1640	674.18	679.65		679.9	0.005274	4.73	436.8	226.88	0.43
1	8676	25 YR	Proposed	1640	674.18	679.65		679.9	0.00526	4.72	437.22	226.93	0.43
1	8676	100 YR	Existing	2210	674.18	680.04		680.34	0.005528	5.17	528.34	236.88	0.45
1	8676	100 YR	Proposed	2210	674.18	680.04		680.35	0.005524	5.17	528.48	236.89	0.45
1	8170	25 YR	Existing	1640	673.34	678.26	677.32	678.37	0.002618	3.23	648.85	355.89	0.3
1	8170	25 YR	Proposed	1640	673.34	678.26	677.32	678.37	0.002642	3.24	646.72	355.47	0.3
1	8170	100 YR	Existing	2210	673.34	678.67	677.53	678.8	0.002639	3.48	798.58	390.5	0.31
1	8170	100 YR	Proposed	2210	673.34	678.66	677.53	678.79	0.002649	3.48	797.5	390.14	0.31
1	7703	25 YR	Existing	1940	671.37	676.59		676.81	0.005001	4.5	554.05	312.18	0.42
1	7703	25 YR	Proposed	1940	671.37	676.62		676.83	0.004774	4.42	563.34	313.39	0.41
1	7703	100 YR	Existing	2610	671.37	677.06		677.3	0.004651	4.71	705.33	337.11	0.41
1	7703	100 YR	Proposed	2610	671.37	677.08		677.32	0.004496	4.65	713.97	338.42	0.4
1	7206	25 YR	Existing	1940	668.07	675.13		675.28	0.002496	3.81	695.69	337.39	0.31
1	7206	25 YR	Proposed	1940	668.07	674.92		675.1	0.003249	4.21	624.98	316.79	0.35
1	7206	100 YR	Existing	2610	668.07	675.55		675.73	0.002805	4.26	848.85	385.3	0.33
1	7206	100 YR	Proposed	2610	668.07	675.35		675.57	0.003584	4.69	770.85	367.01	0.37
1	7087	25 YR	Existing	1940	667.59	674.85		674.99	0.002315	3.74	733.1	370.41	0.29
1	7087	25 YR	Proposed	1940	667.59	674.45		674.67	0.003864	4.58	593.47	331.73	0.38
1	7087	100 YR	Existing	2610	667.59	675.24		675.4	0.002545	4.12	880.55	388.86	0.31
1	7087	100 YR	Proposed	2610	667.59	674.83		675.08	0.004321	5.1	724.87	367.98	0.4
1	6884	25 YR	Existing	1940	666.76	674.58		674.66	0.001071	2.77	954.14	416.35	0.21
1	6884	25 YR	Proposed	1940	666.76	673.94		674.09	0.002053	3.54	710.32	334.95	0.28
1	6884	100 YR	Existing	2610	666.76	674.9		675.01	0.001393	3.28	1092.85	447.29	0.24
1	6884	100 YR	Proposed	2610	666.76	674.09		674.32	0.003231	4.53	759.08	360.27	0.35
1	6874	25 YR	Existing	1940	665.98	674.58	672.85	674.65	0.000818	2.45	974.12	425.91	0.18
1	6874	25 YR	Proposed	1940	665.98	672.08	672.08	673.63	0.026884	10.03	195.86	116.69	0.94
1	6874	100 YR	Existing	2610	665.98	674.9	673.52	674.99	0.00104	2.86	1115.53	456.17	0.2
1	6874	100 YR	Proposed	2610	665.98	673.25	673.25	674.09	0.011713	8.02	388.31	259.96	0.65
1	6824.8		Culvert										
1	6764	25 YR	Existing	1940	664.65	671.16	671.16	673.86	0.025784	13.2	146.95	153.74	1
1	6764	25 YR	Proposed	1940	664.65	670.82	667.6	671.11	0.000961	4.31	450.6	135.98	0.31
1	6764	100 YR	Existing	2610	664.65	672.26	672.26	673.01	0.009477	7.53	387.35	181.95	0.6
1	6764	100 YR	Proposed	2610	664.65	671.41	668.21	671.84	0.001274	5.28	494.71	158.35	0.36
1	6731	25 YR	Existing	2190	664.45	671.38	670.78	671.91	0.00912	6.29	395.65	162.52	0.56
1	6731	25 YR	Proposed	2190	664.45	670.82	667.66	671.07	0.000993	4.03	565.2	147.75	0.31
1	6731	100 YR	Existing	2940	664.45	672	671.26	672.57	0.008815	6.55	502.62	196.49	0.56
1	6731	100 YR	Proposed	2940	664.45	671.43	668.3	671.77	0.001201	4.76	660.75	164.23	0.34
1	6561	25 YR	Existing	2190	663.89	670.44		670.74	0.004495	4.82	520.15	186.85	0.4
1	6561	25 YR	Proposed	2190	663.89	670.44		670.74	0.004495	4.82	520.15	186.85	0.4
1	6561	100 YR	Existing	2940	663.89	671.04		671.4	0.00462	5.32	635.5	207.29	0.42
1	6561	100 YR	Proposed	2940	663.89	671.04		671.4	0.00462	5.32	635.5	207.29	0.42

NOTES:

- HEC-RAS VERSION 5.0.7 WAS USED FOR THE HYDRAULIC ANALYSIS AND DESIGN OF THE CULVERT.
- DRAINAGE AREA DELINATION BASED ON SURVEY AND USGS TOPOGRAPHIC DATA.
- PEAK FLOWS FROM THE 2015 GBRA STUDY USED FOR CULVERT A HYDRAULIC ANALYSIS.
- BOUNDARY CONDITIONS SET AT NORMAL DEPTH BASED ON A DOWNSTREAM CHANNEL SLOPE OF 0.00534 FT/FT.

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
FRN-F-1386

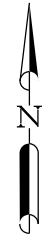
**WINDY HILL ROAD
HYDRAULIC DATA
CULVERT A**

GLO Contract# 19-280-000-B779

DESIGN BY: CH
 DRAWN BY: BR
 CHECKED BY: ZR
 APPROVED BY:
 PROJECT NO: 2173.2001
 DATE: 7/10/2020

SCALE
 HORIZONTAL:
 VERTICAL:
 SHEET: 1 OF 5
 PAGE: 80

7/10/2020 4:44:17 PM I:\2173\2001\CADD\SHEETS\05-Drainage\Detail\WH*DRN*CULV*HYD*02.dgn



NOTES:

1. HEC-RAS VERSION 5.0.7 WAS USED FOR THE HYDRAULIC ANALYSIS AND DESIGN OF THE CULVERT.
2. DRAINAGE AREA DELINATION BASED ON SURVEY AND USGS TOPOGRAPHIC DATA.
3. PEAK FLOWS FROM THE 2015 GBRA STUDY USED FOR CULVERT A HYDRAULIC ANALYSIS.
4. BOUNDARY CONDITIONS SET AT NORMAL DEPTH BASED ON A DOWNSTREAM CHANNEL SLOPE OF 0.00534 FT/FT.

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN-F-1386

**WINDY HILL ROAD
 HYDRAULIC DATA
 CULVERT A**

GLO Contract# 19-280-000-B779

DESIGN BY: CH
 DRAWN BY: BR
 CHECKED BY: ZR
 APPROVED BY:
 PROJECT NO: 2173.2001
 DATE: 7/10/2020

SCALE: NTS
 HORIZONTAL:
 VERTICAL:
 SHEET: 2 OF 5
 PAGE: 81

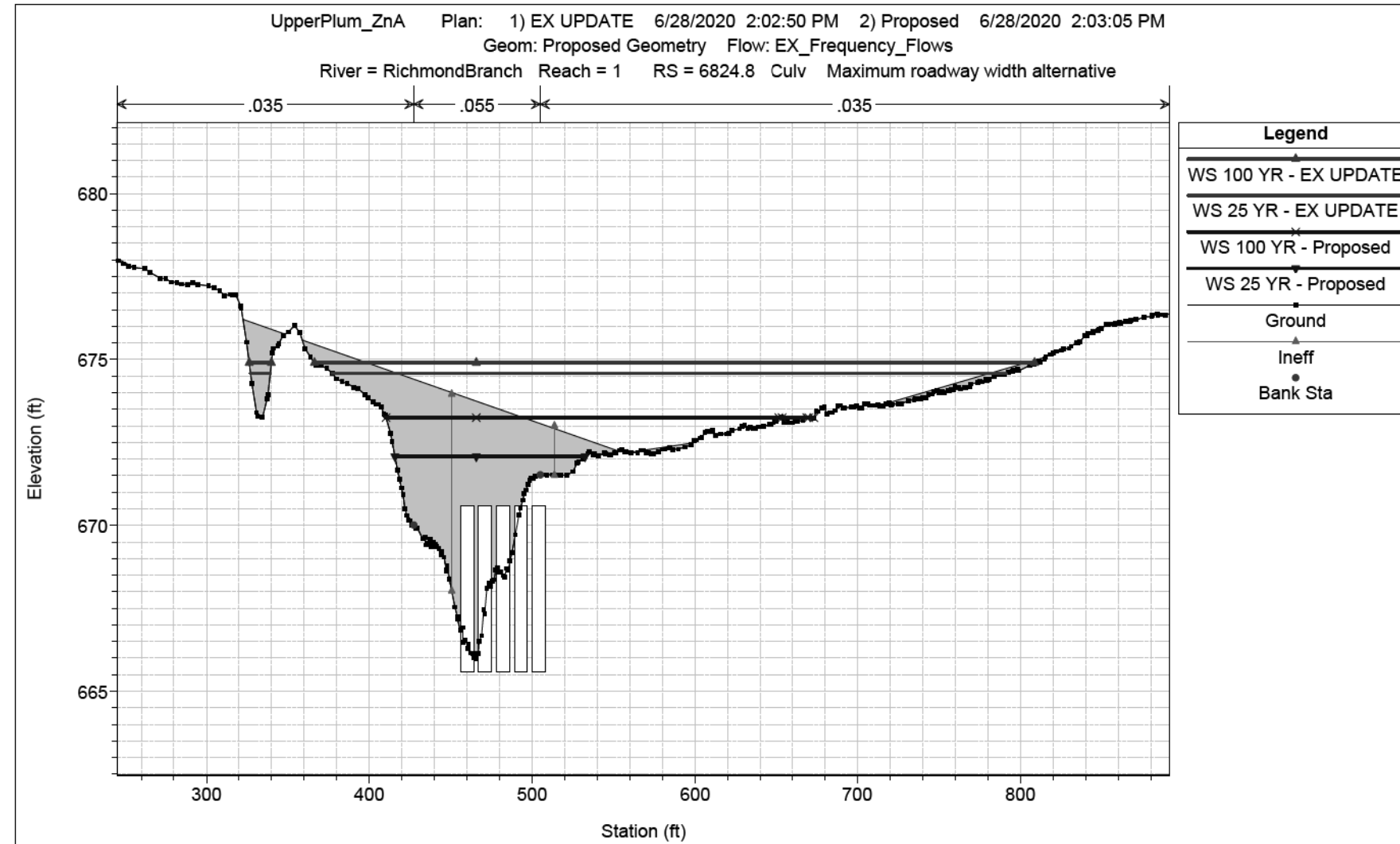
Plan: Proposed RichmondBranch 1 RS: 6824.8 Culv Group: Culvert #1 Profile: 25 YR			
Q Culv Group (cfs)	1940	Culv Full Len (ft)	49.35
# Barrels	5	Culv Vel US (ft/s)	9.7
Q Barrel (cfs)	388	Culv Vel DS (ft/s)	9.7
E.G. US. (ft)	672.45	Culv Inv El Up (ft)	665.59
W.S. US. (ft)	672.08	Culv Inv El Dn (ft)	664.96
E.G. DS (ft)	671.11	Culv Frctn Ls (ft)	0.35
W.S. DS (ft)	670.82	Culv Exit Loss (ft)	0.59
Delta EG (ft)	1.34	Culv Entr Loss (ft)	0.44
Delta WS (ft)	1.25	Q Weir (cfs)	
E.G. IC (ft)	673.13	Weir Sta Lft (ft)	
E.G. OC (ft)	672.45	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	670.59	Weir Max Depth (ft)	
Culv WS Outlet (ft)	669.96	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	2.72	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	4.18	Min El Weir Flow (ft)	672.93

Plan: Proposed RichmondBranch 1 RS: 6824.8 Culv Group: Culvert #1 Profile: 100 YR			
Q Culv Group (cfs)	2275.54	Culv Full Len (ft)	58
# Barrels	5	Culv Vel US (ft/s)	11.38
Q Barrel (cfs)	455.11	Culv Vel DS (ft/s)	11.38
E.G. US. (ft)	673.51	Culv Inv El Up (ft)	665.59
W.S. US. (ft)	673.25	Culv Inv El Dn (ft)	664.96
E.G. DS (ft)	671.84	Culv Frctn Ls (ft)	0.28
W.S. DS (ft)	671.41	Culv Exit Loss (ft)	0.79
Delta EG (ft)	1.67	Culv Entr Loss (ft)	0.6
Delta WS (ft)	1.84	Q Weir (cfs)	334.46
E.G. IC (ft)	673.75	Weir Sta Lft (ft)	479.16
E.G. OC (ft)	673.51	Weir Sta Rgt (ft)	686.89
Culvert Control	Outlet	Weir Submerg	0
Culv WS Inlet (ft)	670.59	Weir Max Depth (ft)	1.31
Culv WS Outlet (ft)	669.96	Weir Avg Depth (ft)	0.7
Culv Nml Depth (ft)	3.06	Weir Flow Area (sq ft)	143.27
Culv Crt Depth (ft)	4.65	Min El Weir Flow (ft)	672.93

HYDRAULIC DATA TABLE	
EXISTING CULVERT	PROPOSED CULVERT
Q25 = 1940 CFS	Q25 = 1940 CFS
HW25 = 674.41 FT	HW25 = 672.08 FT
V25 = 13.87 FT/S	V25 = 9.70 FT/S
Q100 = 2610 CFS	Q100 = 2610 CFS
HW100 = 674.79 FT	HW100 = 673.25 FT
V100 = 13.55 FT/S	V100 = 11.38 FT/S

NOTES:

1. HEC-RAS VERSION 5.0.7 WAS USED FOR THE HYDRAULIC ANALYSIS AND DESIGN OF THE CULVERT.
2. DRAINAGE AREA DELINATION BASED ON SURVEY AND USGS TOPOGRAPHIC DATA.
3. PEAK FLOWS FROM THE 2015 GBRA STUDY USED FOR CULVERT A HYDRAULIC ANALYSIS.
4. BOUNDARY CONDITIONS SET AT NORMAL DEPTH BASED ON A DOWNSTREAM CHANNEL SLOPE OF 0.00534 FT/FT.



7/10/2020 4:44:23 PM I:\2173\2001\CADD\SHEETS\05-Drainage Details\WH*DRN*CULV*HYD*03.dgn

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
ZACHARY B. RYAN
TEXAS REGISTRATION 106276
DATE: 7/10/2020
IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
FRN - F-1386

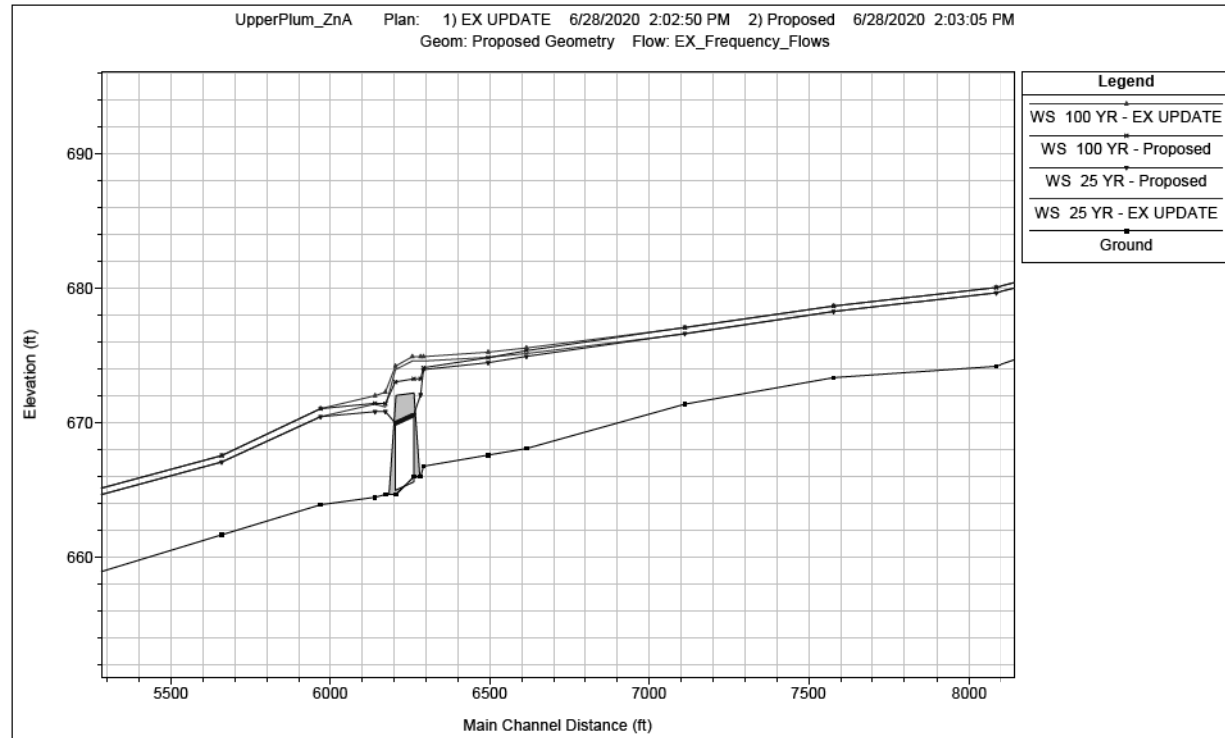
**WINDY HILL ROAD
HYDRAULIC DATA
CULVERT A**

GLO Contract# 19-280-000-B779

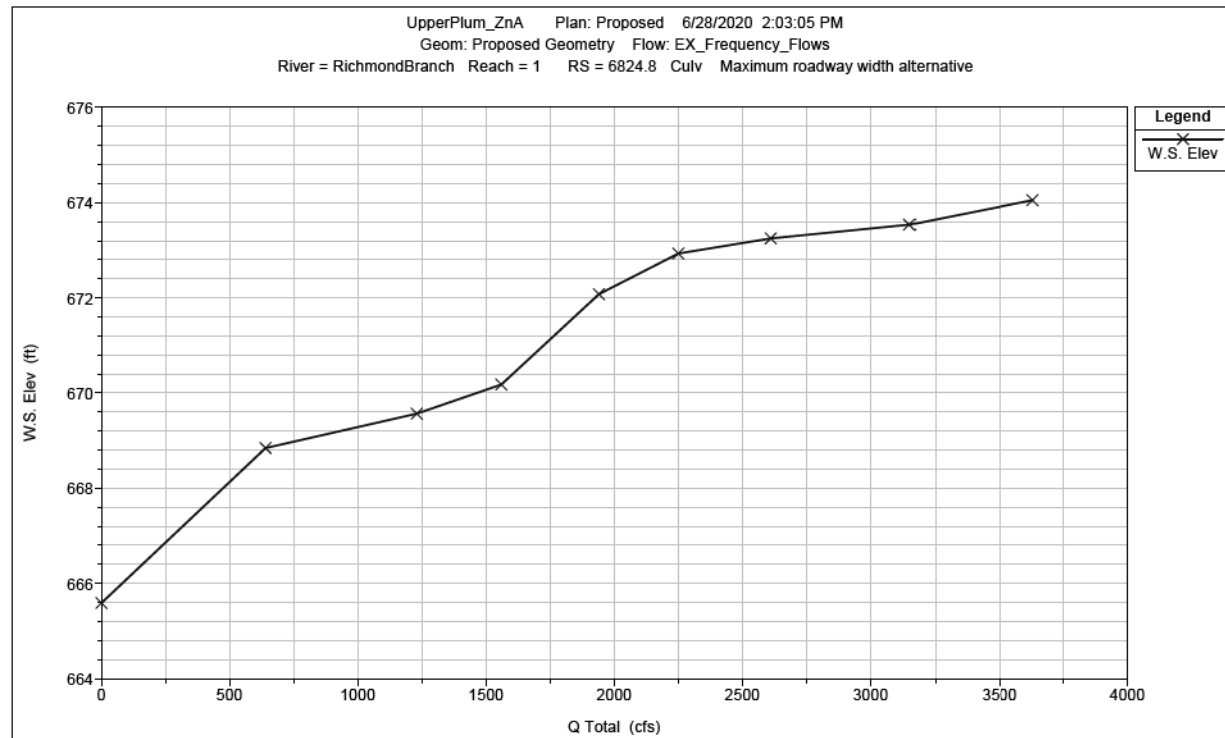
DESIGN BY: CH
DRAWN BY: BR
CHECKED BY: ZR
APPROVED BY:
PROJECT NO: 2173.2001
DATE: 7/10/2020

SCALE
HORIZONTAL:
VERTICAL:
SHEET: 3 OF 5
PAGE: 82

7/10/2020 4:44:24 PM I:\2173\2001\CADD\SHEETS\05-Drainage Details\WH*DRN*CULV*HYD*04.dgn



- NOTES:
1. HEC-RAS VERSION 5.0.7 WAS USED FOR THE HYDRAULIC ANALYSIS AND DESIGN OF THE CULVERT.
 2. DRAINAGE AREA DELINEATION BASED ON SURVEY AND USGS TOPOGRAPHIC DATA.
 3. PEAK FLOWS FROM THE 2015 GBRA STUDY USED FOR CULVERT A HYDRAULIC ANALYSIS.
 4. BOUNDARY CONDITIONS SET AT NORMAL DEPTH BASED ON A DOWNSTREAM CHANNEL SLOPE OF 0.00534 FT/FT.



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN - F-1386

**WINDY HILL ROAD
 HYDRAULIC DATA
 CULVERT A**

GLO Contract# 19-280-000-B779	
DESIGN BY: CH	SCALE
DRAWN BY: BR	HORIZONTAL:
CHECKED BY: ZR	VERTICAL:
APPROVED BY:	SHEET: 4 OF 5
PROJECT NO: 2173.2001	PAGE: 83
DATE: 7/10/2020	

7/10/2020 4:44:25 PM I:\2173\2001\CADD\SHEETS\05-Drainage Details\WH*DRN*CULV*HYD*05.dgn

EXISTING CHERRYWOOD CULVERT HYDRAULIC DATA	
MATERIAL	CONCRETE
SHAPE	BOX
ENTRANCE	STRAIGHT
PROFILE	STRAIGHT
DESIGN EVENT	10-YEAR
DESIGN DISCHARGE (CFS)	276.51
100-YEAR DISCHARGE (CFS)	456.71
n VALUE	0.013
SPAN (FT)	8
RISE (FT)	3
NUMBER OF BARRELS	3
INLET STATION	0.00
INLET ELEVATION (FT)	673.76
OUTLET STATION	60.00
OUTLET ELEVATION (FT)	673.09
TOTAL CULVERT LENGTH (FT)	60.00
CULVERT SLOPE 1 (FT/FT)	0.0112
ANALYSIS FOR DESIGN EVENT	
TAILWATER ELEVATION (FT)	674.96
Q PER BARREL (CFS)	92.17
MAX HEADWATER ELEVATION (FT)	678.77
CALC. HEADWATER ELEVATION (FT)	676.45
HEADWATER DEPTH (FT)	2.69
CONTROL	INLET
OUTLET VELOCITY (FT/S)	9.80
DISCHARGE OVER THE ROAD (CFS)	0.00
ANALYSIS FOR 100-YEAR EVENT	
TAILWATER ELEVATION (FT)	675.47
Q PER BARREL (CFS)	152.24
MAX HEADWATER ELEVATION (FT)	678.77
CALC. HEADWATER ELEVATION (FT)	677.82
HEADWATER DEPTH (FT)	2.86
CONTROL	INLET
OUTLET VELOCITY (FT/S)	11.25
DISCHARGE OVER THE ROAD (CFS)	0.00

EXISTING INDIAN PAINTBRUSH CULVERT HYDRAULIC DATA	
MATERIAL	CONCRETE
SHAPE	BOX
ENTRANCE	STRAIGHT
PROFILE	STRAIGHT
DESIGN EVENT	10-YEAR
DESIGN DISCHARGE (CFS)	276.51
100-YEAR DISCHARGE (CFS)	456.71
n VALUE	0.013
SPAN (FT)	8
RISE (FT)	3
NUMBER OF BARRELS	3
INLET STATION	0.00
INLET ELEVATION (FT)	670.00
OUTLET STATION	48.00
OUTLET ELEVATION (FT)	669.51
TOTAL CULVERT LENGTH (FT)	48.00
CULVERT SLOPE 1 (FT/FT)	0.0102
ANALYSIS FOR DESIGN EVENT	
TAILWATER ELEVATION (FT)	671.24
Q PER BARREL (CFS)	92.17
MAX HEADWATER ELEVATION (FT)	673.62
CALC. HEADWATER ELEVATION (FT)	672.69
HEADWATER DEPTH (FT)	2.69
CONTROL	INLET
OUTLET VELOCITY (FT/S)	9.43
DISCHARGE OVER THE ROAD (CFS)	0.00
ANALYSIS FOR 100-YEAR EVENT	
TAILWATER ELEVATION (FT)	671.79
Q PER BARREL (CFS)	152.24
MAX HEADWATER ELEVATION (FT)	673.62
CALC. HEADWATER ELEVATION (FT)	673.83
HEADWATER DEPTH (FT)	2.59
CONTROL	INLET
OUTLET VELOCITY (FT/S)	10.63
DISCHARGE OVER THE ROAD (CFS)	27.74

PROPOSED CULVERT B HYDRAULIC DATA	
MATERIAL	CONCRETE
SHAPE	BOX
ENTRANCE	STRAIGHT
PROFILE	STRAIGHT
DESIGN EVENT	10-YEAR
DESIGN DISCHARGE (CFS)	276.51
100-YEAR DISCHARGE (CFS)	456.71
n VALUE	0.013
SPAN (FT)	8
RISE (FT)	4
NUMBER OF BARRELS	2
INLET STATION	0.00
INLET ELEVATION (FT)	671.97
OUTLET STATION	530.00
OUTLET ELEVATION (FT)	666.62
TOTAL CULVERT LENGTH (FT)	530.00
CULVERT SLOPE 1 (FT/FT)	0.0101
ANALYSIS FOR DESIGN EVENT	
TAILWATER ELEVATION (FT)	669.08
Q PER BARREL (CFS)	138.25
MAX HEADWATER ELEVATION (FT)	678.48
CALC. HEADWATER ELEVATION (FT)	675.48
HEADWATER DEPTH (FT)	3.51
CONTROL	INLET
OUTLET VELOCITY (FT/S)	11.97
DISCHARGE OVER THE ROAD (CFS)	0.00
ANALYSIS FOR 100-YEAR EVENT	
TAILWATER ELEVATION (FT)	669.86
Q PER BARREL (CFS)	228.36
MAX HEADWATER ELEVATION (FT)	678.48
CALC. HEADWATER ELEVATION (FT)	677.25
HEADWATER DEPTH (FT)	8.17
CONTROL	INLET
OUTLET VELOCITY (FT/S)	14.00
DISCHARGE OVER THE ROAD (CFS)	0.00

PROPOSED POND OUTFALL CULVERT	
MATERIAL	CONCRETE
SHAPE	BOX
ENTRANCE	PW
PROFILE	STRAIGHT
DESIGN EVENT	25-YEAR
DESIGN DISCHARGE (CFS)	169.00
100-YEAR DISCHARGE (CFS)	245.00
n VALUE	0.013
SPAN (FT)	7
RISE (FT)	3
NUMBER OF BARRELS	1
INLET STATION	0.00
INLET ELEVATION (FT)	667.20
OUTLET STATION	123.55
OUTLET ELEVATION (FT)	666.31
TOTAL CULVERT LENGTH (FT)	123.55
CULVERT SLOPE 1 (FT/FT)	0.0072
ANALYSIS FOR DESIGN EVENT	
TAILWATER ELEVATION (FT)	669.31
Q PER BARREL (CFS)	169.00
MAX HEADWATER ELEVATION (FT)	672.50
CALC. HEADWATER ELEVATION (FT)	672.13
HEADWATER DEPTH (FT)	4.93
CONTROL	INLET
OUTLET VELOCITY (FT/S)	11.21
DISCHARGE OVER THE ROAD (CFS)	0.00
ANALYSIS FOR 100-YEAR EVENT	
TAILWATER ELEVATION (FT)	669.31
Q PER BARREL (CFS)	245.00
MAX HEADWATER ELEVATION (FT)	672.50
CALC. HEADWATER ELEVATION (FT)	672.95
HEADWATER DEPTH (FT)	3.64
CONTROL	INLET
OUTLET VELOCITY (FT/S)	11.66
DISCHARGE OVER THE ROAD (CFS)	51.19

NOTES:

- CULVERT ANALYSIS PERFORMED USING HY-8 (VERSION 7.60).
- PROPOSED CULVERT B REPLACES THE EXISTING CULVERTS AT CHERRYWOOD ST AND INDIAN PAINTBRUSH DR.
- PROPOSED CULVERT POND IS A NEW LOCATION CULVERT THAT OUTFALLS INTO CULVERT A.

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN-F-1386

**WINDY HILL ROAD
HYDRAULIC DATA
CULVERTS**

GLO Contract# 19-280-000-B779

DESIGN BY: CH
 DRAWN BY: BR
 CHECKED BY: ZR
 APPROVED BY:
 PROJECT NO: 2173.2001
 DATE: 7/10/2020

SCALE
 HORIZONTAL:
 VERTICAL:
 SHEET: 5 OF 5
 PAGE: 84

AREA DATA

AREA ID	AREA (ac)	AREA TIME OF CONC (min)	AREA TIME OF CONC USED (min)	AREA C-VALUE	AREA	AREA	AREA	AREA
					10 YR	10 YR	100 YR	100 YR
					INTENSITY (in/hr)	DISCHARGE (cfs)	INTENSITY (in/hr)	DISCHARGE (cfs)
C	3.74	14.52	14.52	0.36	6.49	8.73	10.56	14.22
A-01	0.26	1.00	10.00	0.93	7.48	1.81	11.96	2.90
A-02	0.33	1.00	10.00	0.79	7.48	1.98	11.96	3.17
A-03	0.18	1.00	10.00	0.93	7.48	1.24	11.96	1.99
A-04	0.18	1.00	10.00	0.32	7.48	0.44	11.96	0.70
B-01	0.09	1.00	10.00	0.30	7.48	0.20	11.96	0.32
POND	60.93	9.13	10.00	0.34	7.48	154.89	11.96	247.77

INLET CONFIGURATION DATA

INLET ID	INLET CHAIN	INLET STATION	INLET OFFSET	INLET TYPE	INLET PROFILE TYPE	INLET DISCHARGE (cfs)	INLET CAPACITY (cfs)	INLET BYPASS NODE	INLET BYPASS FLOW (cfs)	INLET BYPASS MAX (cfs)	INLET LONGITUDINAL SLOPE (ft/ft)
C	WINDYHILLRD	50+76.28	-22.32	Grate	Sag	8.73	8.25		0.00	n/a	n/a
A-01	WINDYHILLRD	45+44.48	31.00	Curb	Sag	1.81	12.39		0.00	n/a	n/a
A-02	WINDYHILLRD	47+78.66	31.00	Curb	On Grade	1.98	1.76	A-04	0.23	0.59	2.7863
A-03	WINDYHILLRD	42+85.42	31.00	Curb	On Grade	1.24	1.24	A-01	0.00	0.50	1.3460
A-04	WINDYHILLRD	47+45.85	41.25	Grate	Sag	0.66	8.25		0.00	n/a	n/a
B-01	WINDYHILLRD	41+81.40	67.50	Grate	Sag	0.20	8.25		0.00	n/a	n/a

INLET ID	INLET LENGTH: (ft)	GUTTER N	GUTTER DEPRESSION: (ft)	TC ELEVATION: (ft)	REQUIRED LENGTH: (ft)	GRATE AREA: (SF)	GRATE PERIMETER: (ft)	COMPUTED INLET POND DEPTH (ft)	MAX INLET POND DEPTH (ft)	COMPUTED INLET POND WIDTH (ft)	MAX INLET POND WIDTH (ft)
C	n/a	0.015	n/a	680.20	n/a	10.5300	12.0000	0.61	0.58	1.93	15.00
A-01	9.5000	0.016	0.2500	672.14	0.0000	n/a	n/a	0.16	0.58	9.66	15.00
A-02	9.5000	0.016	0.2500	675.67	13.5625	n/a	n/a	0.15	0.58	7.70	15.00
A-03	9.5000	0.016	0.2500	674.48	8.8310	n/a	n/a	0.15	0.58	7.41	15.00
A-04	n/a	0.015	n/a	673.53	n/a	10.5300	12.0000	0.11	0.58	0.00	0.00
B-01	n/a	0.015	n/a	675.00	n/a	10.5300	12.0000	0.05	0.58	0.00	0.00

- NOTES:
1. AREA HYDROLOGY CALCULATED IN GEOPAK DRAINAGE USING THE RATIONAL METHOD.
 2. INTENSITIES CALCULATED USING ATLAS 14.
 3. INLET AND LINK ANALYSIS PERFORMED USING GEOPAK DRAINAGE WHICH PERFORMS HYDRAULIC COMPUTATIONS IN ACCORDANCE WITH FHWA (HEC-22 GUIDELINES).
 4. ALL DRAINAGE FACILITIES ARE CHECKED FOR THE 1% AEP TO EXAMINE WHERE OVERFLOW (IF ANY) WOULD TRAVEL AND TO ENSURE NO SIGNIFICANT ADVERSE IMPACTS RESULT DUE TO THE PROJECT.

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN - F-1386

WINDY HILL ROAD
 HYDRAULIC DATA
 10-YEAR

GLO Contract# 19-280-000-B779

DESIGN BY: CH	SCALE
DRAWN BY: BR	HORIZONTAL:
CHECKED BY: ZR	VERTICAL:
APPROVED BY:	SHEET: 1 OF 2
PROJECT NO: 2173.2001	PAGE: 85
DATE: 7/10/2020	

CONVEYANCE CONFIGURATION DATA

PIPE ID	STRUCTURE		LOCATION			CUMUL AREA (acre)	CUMUL C	Tc USED ACTUAL Tc (min)	RAINFALL INTENSITY (in/hr)	TOTAL Q (cfs)	FLOW VEL V _{full} V _{actual} (ft/s)	FLOW DEPTH D _{actual} (ft)	FULL PIPE CAP. (cfs)	ACTUAL PIPE LENGTH (ft)	HYDRAULIC PIPE LENGTH (ft)	SLOPE (%)
	ID	TYPE	CHAIN	STATION/OFFSET												
B-01	B-01	Grate	FROM	41+81.40	67.50	0.09	0.30	10.00	7.48	0.20	0.11	0.67	7.74	6.60	6.60	0.40
	B-OUT	Outlet	TO	41+81.35	60.90			1.00			0.26					
C	C	Grate	FROM	50+76.28	-22.32	3.74	0.36	14.52	6.49	8.73	2.78	0.64	43.00	345.97	347.47	2.66
	C-OUT	Outlet	TO	47+30.44	-11.25			14.52			10.18					
A-01	A-01	Curb	FROM	45+44.48	31.00	0.26	0.93	10.00	7.48	1.81	1.02	1.41	17.31	29.59	32.14	2.00
	A-OUT-1	Outlet	TO	45+76.52	31.00			1.00			1.05					
A-02	A-02	Curb	FROM	47+78.66	31.00	0.33	0.79	10.00	7.48	1.98	1.12	0.27	31.55	30.11	34.11	6.64
	A-04	Grate	TO	47+45.85	41.25			1.00			9.13					
A-03	A-03	Curb	FROM	42+85.42	31.00	0.18	0.93	10.00	7.48	1.24	0.70	0.22	34.75	12.41	14.41	8.06
	A-OUT-	Outlet	TO	42+85.39	43.41			1.00			7.88					
A-04	A-04	Grate	FROM	47+45.85	41.25	0.51	0.63	10.00	7.48	2.42	1.37	0.40	16.52	82.37	83.87	1.82
	A-OUT-	Outlet	TO	46+63.51	45.08			1.06			6.30					

- NOTES:
1. AREA HYDROLOGY CALCULATED IN GEOPAK DRAINAGE USING THE RATIONAL METHOD.
 2. INTENSITIES CALCULATED USING ATLAS 14.
 3. INLET AND LINK ANALYSIS PERFORMED USING GEOPAK DRAINAGE WHICH PERFORMS HYDRAULIC COMPUTATIONS IN ACCORDANCE WITH FHWA (HEC-22 GUIDELINES).
 4. ALL DRAINAGE FACILITIES ARE CHECKED FOR THE 1% AEP TO EXAMINE WHERE OVERFLOW (IF ANY) WOULD TRAVEL AND TO ENSURE NO SIGNIFICANT ADVERSE IMPACTS RESULT DUE TO THE PROJECT.

PIPE ID	PIPE						N VALUE	PIPE INVERT ELEVATION		FALL (ft)	FRICTION SLOPE (%)	TOP OF GRATE/MH HGL ELEVATION	
	SHAPE	SIZE	MATL	BARRELS	SPAN (FT)	RISE (FT)		UPPER END	LOWER END			UPPER END	LOWER END
B-01	Circu	18	Concr	1.00	n/a	1.50	0.010	673.10	673.07	0.03	0.00	675.00	675.75
												673.74	673.74
C	Circu	24	Concr	1.00	n/a	2.00	0.010	676.20	667.00	9.20	3.00	680.20	669.69
												677.77	667.64
A-01	Circu	18	Concr	1	n/a	1.50	0.01	667.02	666.43	0.59	2.00	672.14	666.00
												667.86	667.84
A-02	Circu	18	Concr	1.00	n/a	1.50	0.010	672.00	670.00	2.00	7.00	675.67	673.53
												672.86	670.27
A-03	Circu	18	Concr	1	n/a	1.50	0.01	671.00	670.00	1.00	8.00	674.48	670.00
												671.64	670.22
A-04	Circu	18	Concr	1.00	n/a	1.50	0.010	670.00	668.50	1.50	2.00	673.53	670.00
												670.67	668.90

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN-F-1386

WINDY HILL ROAD
 HYDRAULIC DATA
 10-YEAR

GLO Contract# 19-280-000-B779

DESIGN BY: CH
 DRAWN BY: BR
 CHECKED BY: ZR
 APPROVED BY:
 PROJECT NO: 2173.2001
 DATE: 7/10/2020

SCALE
 HORIZONTAL:
 VERTICAL:
 SHEET: 2 OF 2
 PAGE: 86

AREA DATA

AREA ID	AREA (ac)	AREA TIME OF CONC (min)	AREA TIME OF CONC USED (min)	AREA C-VALUE	AREA	AREA	AREA	AREA
					10 YR	10 YR	100 YR	100 YR
					INTENSITY (in/hr)	DISCHARGE (cfs)	INTENSITY (in/hr)	DISCHARGE (cfs)
C	3.74	14.52	14.52	0.36	6.49	8.73	10.56	14.22
A-01	0.26	1.00	10.00	0.93	7.48	1.81	11.96	2.90
A-02	0.33	1.00	10.00	0.79	7.48	1.98	11.96	3.17
A-03	0.18	1.00	10.00	0.93	7.48	1.24	11.96	1.99
A-04	0.18	1.00	10.00	0.32	7.48	0.44	11.96	0.70
B-01	0.09	1.00	10.00	0.30	7.48	0.20	11.96	0.32
POND	60.93	9.13	10.00	0.34	7.48	154.89	11.96	247.77

INLET CONFIGURATION DATA

INLET ID	INLET CHAIN	INLET STATION	INLET OFFSET	INLET TYPE	INLET PROFILE TYPE	INLET DISCHARGE (cfs)	INLET CAPACITY (cfs)	INLET BYPASS NODE	INLET BYPASS FLOW (cfs)	INLET BYPASS MAX (cfs)	INLET LONGITUDINAL SLOPE (ft/ft)
C	WINDYHILLRD	50+76.28	-22.32	Grate	Sag	14.22	8.25		0.00	n/a	n/a
A-01	WINDYHILLRD	45+44.48	31.00	Curb	Sag	2.98	12.39		0.00	n/a	n/a
A-02	WINDYHILLRD	47+78.66	31.00	Curb	On Grade	3.17	2.38	A-04	0.79	0.95	2.7863
A-03	WINDYHILLRD	42+85.42	31.00	Curb	On Grade	1.99	1.90	A-01	0.09	0.60	1.3460
A-04	WINDYHILLRD	47+45.85	41.25	Grate	Sag	1.49	8.25		0.00	n/a	n/a
B-01	WINDYHILLRD	41+81.40	67.50	Grate	Sag	0.32	8.25		0.00	n/a	n/a

INLET ID	INLET LENGTH: (ft)	GUTTER N	GUTTER DEPRESSION: (ft)	TC ELEVATION: (ft)	REQUIRED LENGTH: (ft)	GRATE AREA: (SF)	GRATE PERIMETER: (ft)	COMPUTED INLET POND DEPTH (ft)	INLET MAX POND DEPTH (ft)	COMPUTED INLET POND WIDTH (ft)	INLET MAX POND WIDTH (ft)
C	n/a	0.015	n/a	680.20	n/a	10.5300	12.0000	0.84	0.58	2.15	15.00
A-01	9.5000	0.016	0.2500	672.14	0.0000	n/a	n/a	0.22	0.58	11.65	15.00
A-02	9.5000	0.016	0.2500	675.67	17.6924	n/a	n/a	0.18	0.58	9.19	15.00
A-03	9.5000	0.016	0.2500	674.48	11.5194	n/a	n/a	0.18	0.58	8.84	15.00
A-04	n/a	0.015	n/a	673.53	n/a	10.5300	12.0000	0.19	0.58	0.00	0.00
B-01	n/a	0.015	n/a	675.00	n/a	10.5300	12.0000	0.07	0.58	0.00	0.00

- NOTES:
1. AREA HYDROLOGY CALCULATED IN GEOPAK DRAINAGE USING THE RATIONAL METHOD.
 2. INTENSITIES CALCULATED USING ATLAS 14.
 3. INLET AND LINK ANALYSIS PERFORMED USING GEOPAK DRAINAGE WHICH PERFORMS HYDRAULIC COMPUTATIONS IN ACCORDANCE WITH FHWA (HEC-22 GUIDELINES).
 4. ALL DRAINAGE FACILITIES ARE CHECKED FOR THE 1% AEP TO EXAMINE WHERE OVERFLOW (IF ANY) WOULD TRAVEL AND TO ENSURE NO SIGNIFICANT ADVERSE IMPACTS RESULT DUE TO THE PROJECT.

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN - F-1386

WINDY HILL ROAD
 HYDRAULIC DATA
 100-YEAR

GLO Contract# 19-280-000-B779

DESIGN BY: CH	SCALE
DRAWN BY: BR	HORIZONTAL:
CHECKED BY: ZR	VERTICAL:
APPROVED BY:	SHEET: 1 OF 2
PROJECT NO: 2173.2001	PAGE: 87
DATE: 7/10/2020	

CONVEYANCE CONFIGURATION DATA

PIPE ID	STRUCTURE		LOCATION			CUM AREA (acre)	CUM C	Tc USED ACTUAL Tc (min)	RAINF ALL INTE NSITY (in/hr)	TOTAL Q (cfs)	FLOW VEL		FLOW DEPTH		FULL PIPE CAP. (cfs)	ACTUAL PIPE LENGTH (ft)	HYDRAULIC PIPE LENGTH (ft)	SLOPE (%)
	ID	TYPE	CHAIN/STATION/OFFSET	V _{full}	V _{normal}						D _{normal}	D _{actual}						
B-01	B-01 B-OUT	Grate Outlet	ON	WINDYHILL		0.09	0.30	10.00	11.96	0.32	0.18		7.74	6.60	6.60	0.40		
			FROM	41+81.40	67.50						2.04	0.22						
C	C C-OUT	Grate Outlet	ON	WINDYHILL RD		3.74	0.36	14.52	10.56	14.22	4.52		43.00	345.9	347.47	2.66		
			FROM	50+76.28	-22.32						11.66	0.82						
A-01	A-01 A-OUT-1	Curb Outlet	ON	WINDYHILL		0.26	0.93	10.00	11.96	2.90	1.64		17.31	29.59	32.14	2.00		
			FROM	45+44.48	31.00						6.91	0.43						
A-02	A-02 A-04	Curb Grate	ON	WINDYHILL		0.33	0.79	10.00	11.96	3.17	1.79		31.55	30.11	34.11	6.64		
			FROM	47+78.66	31.00						10.86	0.33						
A-03	A-03 A-OUT-	Curb Outlet	ON	WINDYHILL		0.18	0.93	10.00	11.96	1.99	1.13		34.75	12.41	14.41	8.06		
			FROM	42+85.42	31.00						10.13	0.25						
A-04	A-04 A-OUT-	Grate Outlet	ON	WINDYHILL		0.51	0.63	10.00	11.96	3.87	2.19		16.52	82.37	83.87	1.82		
			FROM	47+45.85	41.25						7.24	0.51						
			TO	46+63.51	45.08						7.18							

- NOTES:
1. AREA HYDROLOGY CALCULATED IN GEOPAK DRAINAGE USING THE RATIONAL METHOD.
 2. INTENSITIES CALCULATED USING ATLAS 14.
 3. INLET AND LINK ANALYSIS PERFORMED USING GEOPAK DRAINAGE WHICH PERFORMS HYDRAULIC COMPUTATIONS IN ACCORDANCE WITH FHWA (HEC-22 GUIDELINES).
 4. ALL DRAINAGE FACILITIES ARE CHECKED FOR THE 1% AEP TO EXAMINE WHERE OVERFLOW (IF ANY) WOULD TRAVEL AND TO ENSURE NO SIGNIFICANT ADVERSE IMPACTS RESULT DUE TO THE PROJECT.

PIPE ID	PIPE						N VALUE	PIPE INVERT ELEVATION		FALL (ft)	FRICT ION SLOPE (%)	TOP OF GRATE/MH HGL ELEVATION	
	SHAPE	SIZE	MATL	BARRELS	SPAN (FT)	RISE (FT)		UPPER	LOWER			UPPER	LOWER
								END	END			END	END
B-01	Circu	18	Concr	1.00	n/a	1.50	0.010	673.10	673.0	0.03	0.00	675.0	675.75
C	Circu	24	Concr	1.00	n/a	2.00	0.010	676.2	667.0	9.20	3.00	680.2	669.6
A-01	Circu	18	Concr	1	n/a	1.50	0.01	667.0	666.43	0.59	2.00	672.14	666.0
A-02	Circu	18	Concr	1.00	n/a	1.50	0.010	672.0	670.0	2.00	7.00	675.6	673.53
A-03	Circu	18	Concr	1	n/a	1.50	0.01	671.0	670.0	1.00	8.00	674.48	670.0
A-04	Circu	18	Concr	1.00	n/a	1.50	0.010	670.0	668.5	1.50	2.00	673.53	670.0

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN-F-1386

WINDY HILL ROAD
 HYDRAULIC DATA
 100-YEAR

GLO Contract# 19-280-000-B779
 DESIGN BY: CH
 DRAWN BY: BR
 CHECKED BY: ZR
 APPROVED BY:
 PROJECT NO: 2173.2001
 DATE: 7/10/2020
 SCALE
 HORIZONTAL:
 VERTICAL:
 SHEET: 2 OF 2
 PAGE: 88

7/10/2020 4:44:26 PM I:\2173\2001\CADD\SHEETS\05-Drainage Details\WH*DRN*HYD*DATA*04.dgn

7/10/2020 4:44:27 PM
 I:\2173\2001\CADD\SHEETS\05-Drainage Details\WH*DRN*HYD*DATA*05.dgn

DITCH RT CALCULATIONS																		
UPSTREAM				DOWNSTREAM				BOTTOM WIDTH	LEFT SIDE SLOPE	RIGHT SIDE SLOPE	CHANNEL DEPTH	MANNING'S "n"	DESIGN FLOW	SLOPE	NORMAL DEPTH	FREEBOARD	VELOCITY	SHEAR STRESS
STATION	OFFSET	LT/RT	FLOWLINE ELEVATION	STATION	OFFSET	LT/RT	FLOWLINE ELEVATION											
(ft)	(ft)		(ft)	(ft)	(ft)		(ft)	(ft)	x:1	x:1	(ft)	(cfs)	(ft/ft)	(ft)	(ft)	(f/s)	(lbs/ft ²)	
40+50	51.47	RT	671.36	41+00	50.62	RT	671.11	4.00	2.0	2.0	5.74	0.033	303.70	0.005	4.29	1.45	5.63	0.73
41+00	50.62	RT	671.11	41+50	49.77	RT	670.86	4.00	2.0	2.0	4.80	0.033	303.70	0.005	4.29	0.51	5.63	0.73
41+50	49.77	RT	670.86	42+00	48.97	RT	670.58	4.00	2.0	2.0	5.15	0.033	303.70	0.006	4.18	0.97	5.87	0.80
42+00	48.97	RT	670.58	42+50	48.24	RT	670.28	4.00	2.0	2.0	5.42	0.033	303.70	0.006	4.12	1.30	6.02	0.84
42+50	48.24	RT	670.28	43+00	47.54	RT	669.96	4.00	2.0	2.0	5.12	0.033	303.70	0.006	4.06	1.06	6.17	0.89
43+00	47.54	RT	669.96	43+50	49.71	RT	669.10	4.00	2.0	2.0	4.77	0.033	303.70	0.017	3.25	1.52	8.91	1.97
43+50	49.71	RT	669.10	44+00	49.45	RT	667.65	4.00	2.0	2.0	3.33	0.033	303.70	0.029	2.88	0.45	10.82	3.01
44+00	49.45	RT	667.65	44+50	48.88	RT	667.40	4.00	2.0	2.0	5.33	0.033	303.70	0.005	4.29	1.04	5.63	0.73
44+50	48.88	RT	667.40	45+00	48.86	RT	667.15	4.00	2.0	2.0	4.99	0.033	303.70	0.005	4.29	0.70	5.63	0.73
45+00	48.86	RT	667.15	+	0.00	RT	0.00	4.00	2.0	2.0	3.18	0.033	303.70	0.148	1.95	1.23	19.76	11.19

- NOTES:
1. AREA HYDROLOGY CALCULATED IN GEOPAK DRAINAGE USING THE RATIONAL METHOD.
 2. INTENSITIES CALCULATED USING ATLAS 14.
 3. INLET AND LINK ANALYSIS PERFORMED USING GEOPAK DRAINAGE WHICH PERFORMS HYDRAULIC COMPUTATIONS IN ACCORDANCE WITH FHWA (HEC-22 GUIDELINES).
 4. ALL DRAINAGE FACILITIES ARE CHECKED FOR THE 1% AEP TO EXAMINE WHERE OVERFLOW (IF ANY) WOULD TRAVEL AND TO ENSURE NO SIGNIFICANT ADVERSE IMPACTS RESULT DUE TO THE PROJECT.

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN - F-1386

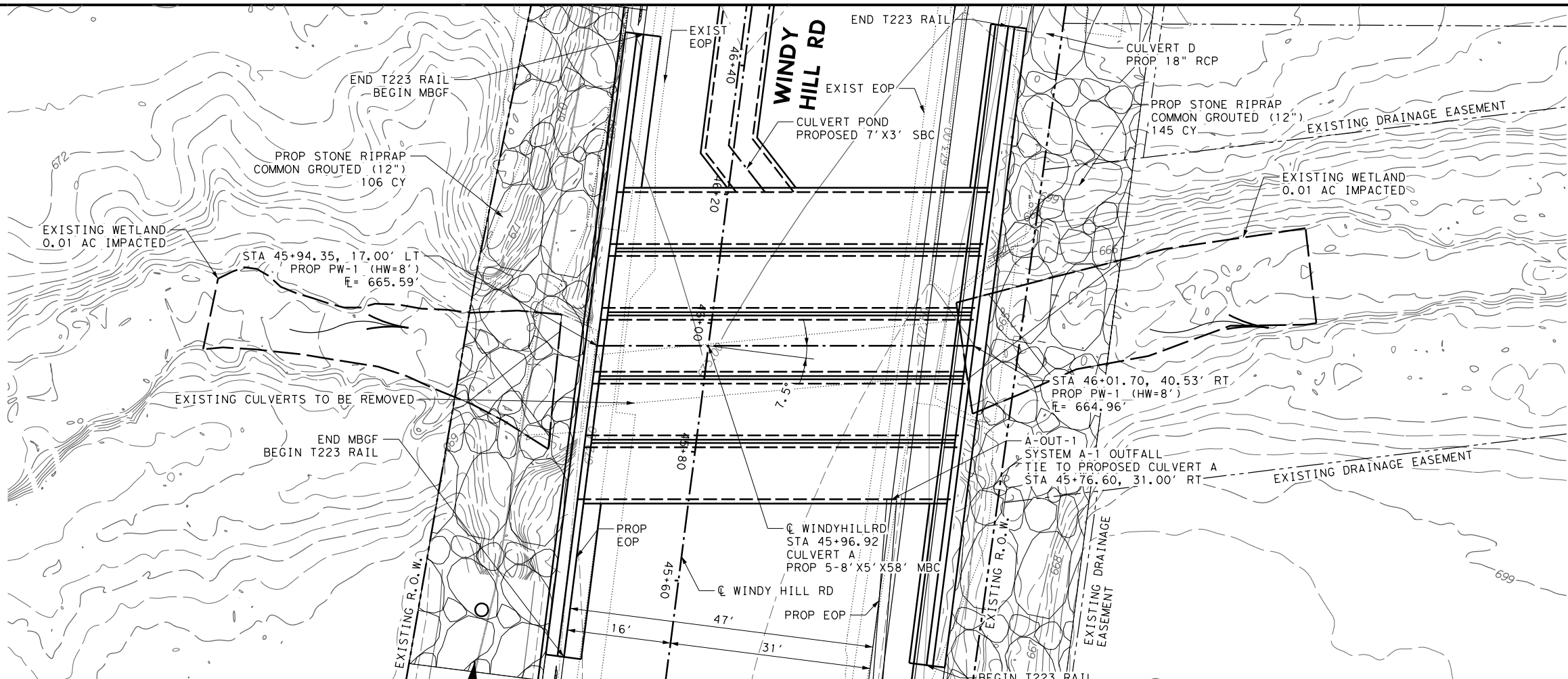
**WINDY HILL ROAD
 HYDRAULIC DATA
 DITCHES**

GLO Contract# 19-280-000-B779

DESIGN BY: CH
 DRAWN BY: BR
 CHECKED BY: ZR
 APPROVED BY:
 PROJECT NO: 2173.2001
 DATE: 7/10/2020

SCALE
 HORIZONTAL:
 VERTICAL:
 SHEET: 1 OF 1
 PAGE: 89

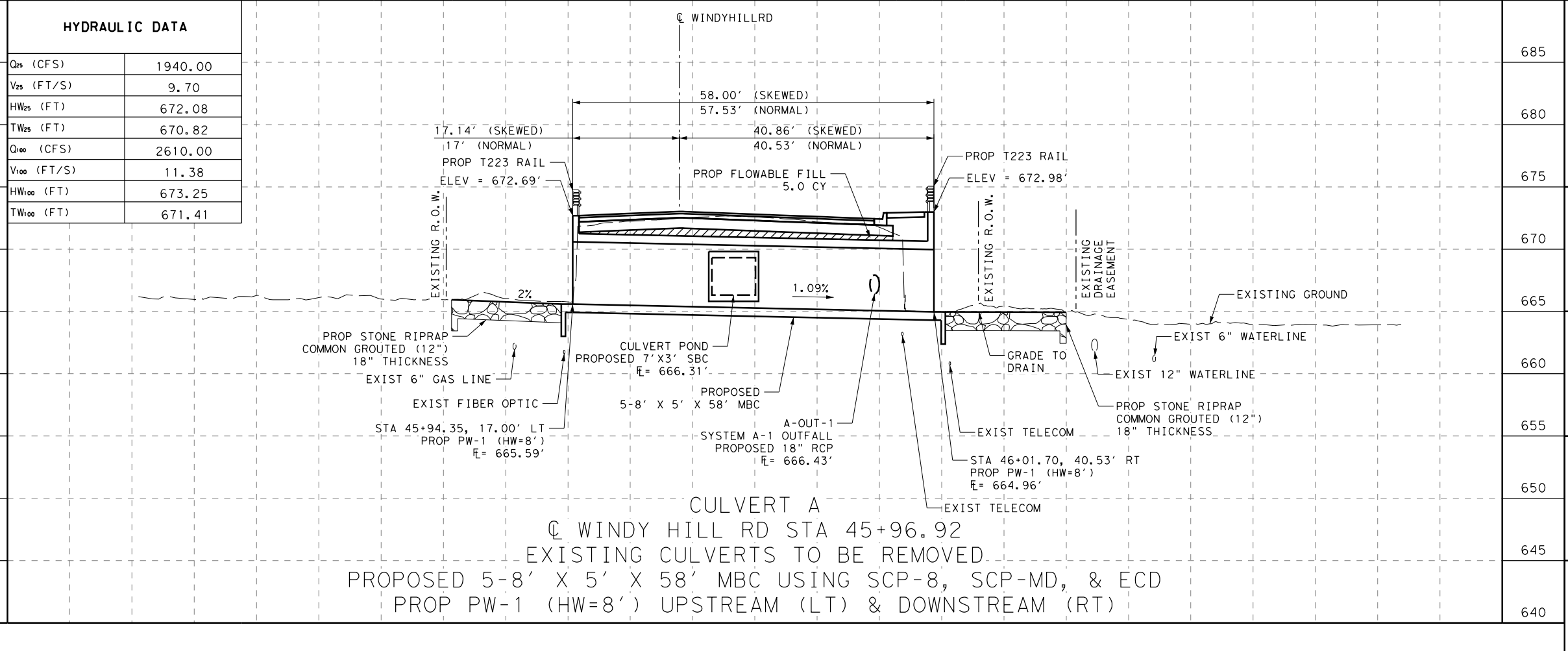
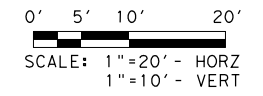
7/10/2020 4:44:36 PM I:\2173\2001\CADD\SHEETS\05-Drainage Details\WH*DRN*CULV*PP*01.dgn



LEGEND

- EXISTING R.O.W.
- - - PROPOSED R.O.W.
- - - EX DRAINAGE EASEMENT
- - - EXISTING DRAINAGE EASEMENT
- - - EXISTING UTILITY
- - - EXISTING PLANIMETRICS
- ← DITCH FLOWLINE
- PROPOSED DRAINAGE

- NOTES:**
- ANALYSIS PERFORMED USING HECRAS VERSION 5.0.7.
 - TW ELEVATIONS ESTABLISHED USING OUTFALL CHANNEL GEOMETRY.
 - THE LOCATION AND ELEVATION OF ALL UTILITIES ARE APPROXIMATE. CONTRACTOR TO VERIFY AND LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION.
 - ALL OUTFALLS WITH OUTLET VELOCITIES GREATER THAN 6 FPS ARE PROTECTED IN ACCORDANCE WITH HEC-14: HYDRAULIC DESIGN OF ENERGY DISSIPATORS FOR CULVERTS AND CHANNELS.



HYDRAULIC DATA

Q ₂₅ (CFS)	1940.00
V ₂₅ (FT/S)	9.70
HW ₂₅ (FT)	672.08
TW ₂₅ (FT)	670.82
Q ₁₀₀ (CFS)	2610.00
V ₁₀₀ (FT/S)	11.38
HW ₁₀₀ (FT)	673.25
TW ₁₀₀ (FT)	671.41

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
ZACHARY B. RYAN
TEXAS REGISTRATION 106276
DATE: 7/10/2020
IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.

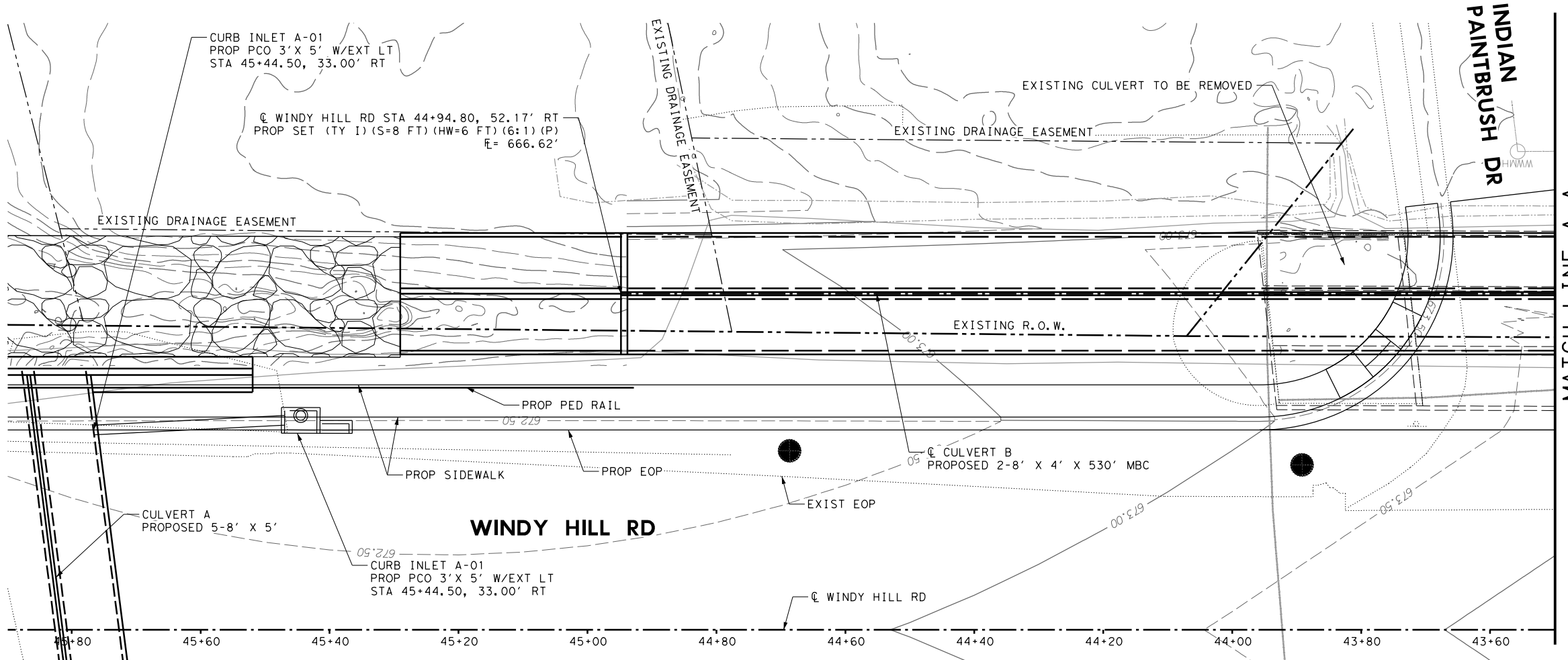


LJA Engineering, Inc.
FRN-F-1386

**WINDY HILL ROAD
CULVERT A
PLAN & PROFILE**

GLO Contract# 19-280-000-B779

DESIGN BY: CH	SCALE
DRAWN BY: BR	HORIZONTAL: 1"=20'
CHECKED BY: ZR	VERTICAL: 1"=10'
APPROVED BY:	SHEET: 1 OF 4
PROJECT NO: 2173.2001	PAGE: 90
DATE: 7/10/2020	



LEGEND

- EXISTING R.O.W.
- - - PROPOSED R.O.W.
- - - EX DRAINAGE EASEMENT
- - - EXISTING DRAINAGE EASEMENT
- EXISTING UTILITY
- EXISTING PLANIMETRICS
- DITCH FLOWLINE
- PROPOSED DRAINAGE

NOTES:

- ANALYSIS PERFORMED USING HY-8 VERSION 7.60.
- TW ELEVATIONS ESTABLISHED USING OUTFALL CHANNEL GEOMETRY.
- THE LOCATION AND ELEVATION OF ALL UTILITIES ARE APPROXIMATE. CONTRACTOR TO VERIFY AND LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION.
- ALL OUTFALLS WITH OUTLET VELOCITIES GREATER THAN 6 FPS ARE PROTECTED IN ACCORDANCE WITH HEC-14: HYDRAULIC DESIGN OF ENERGY DISSIPATORS FOR CULVERTS AND CHANNELS.

0' 5' 10' 20'
SCALE: 1"=20' - HORZ
1"=10' - VERT

HYDRAULIC DATA

Q ₁₀ (CFS)	276.51
V ₁₀ (FT/S)	11.97
HW ₁₀ (FT)	675.48
TW ₁₀ (FT)	669.08
Q ₁₀₀ (CFS)	456.71
V ₁₀₀ (FT/S)	14.00
HW ₁₀₀ (FT)	677.25
TW ₁₀₀ (FT)	669.86

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
ZACHARY B. RYAN
TEXAS REGISTRATION 106276
DATE: 7/10/2020
IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



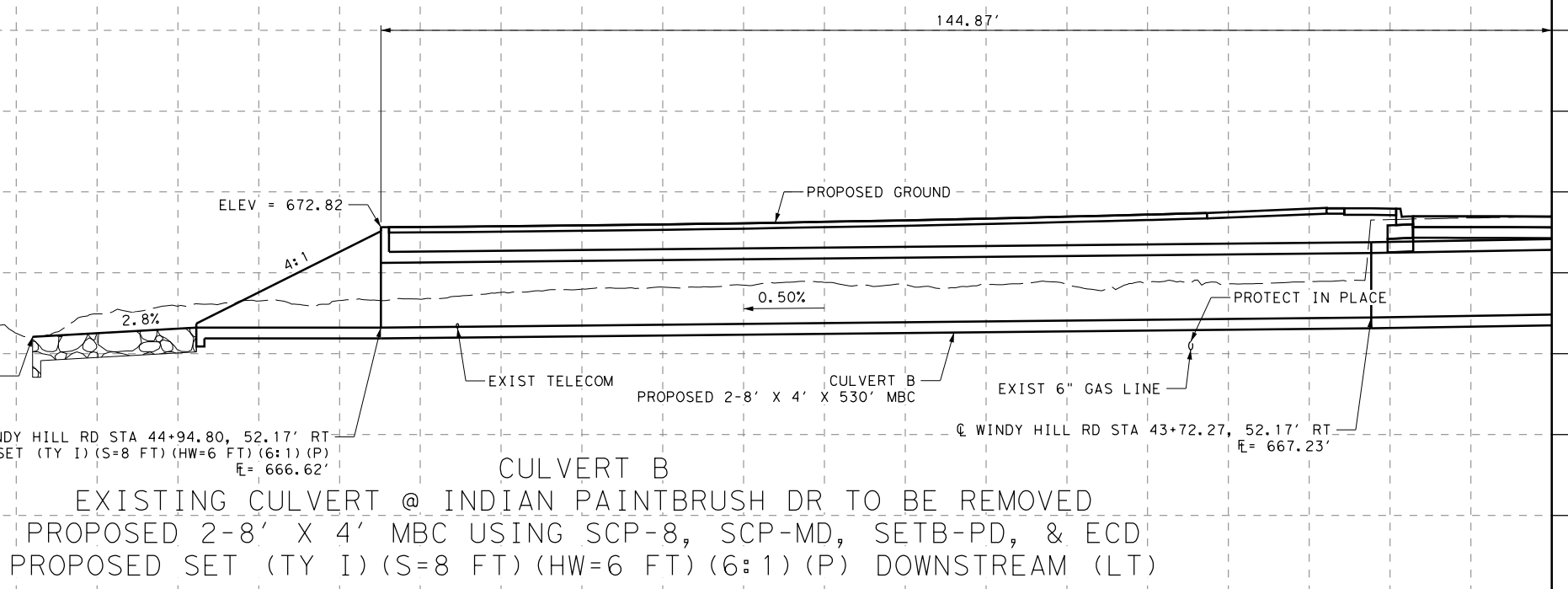
LJA Engineering, Inc.
FRN-F-1386

**WINDY HILL ROAD
CULVERT B
PLAN & PROFILE**
BEGIN TO A-A

GLO Contract# 19-280-000-B779

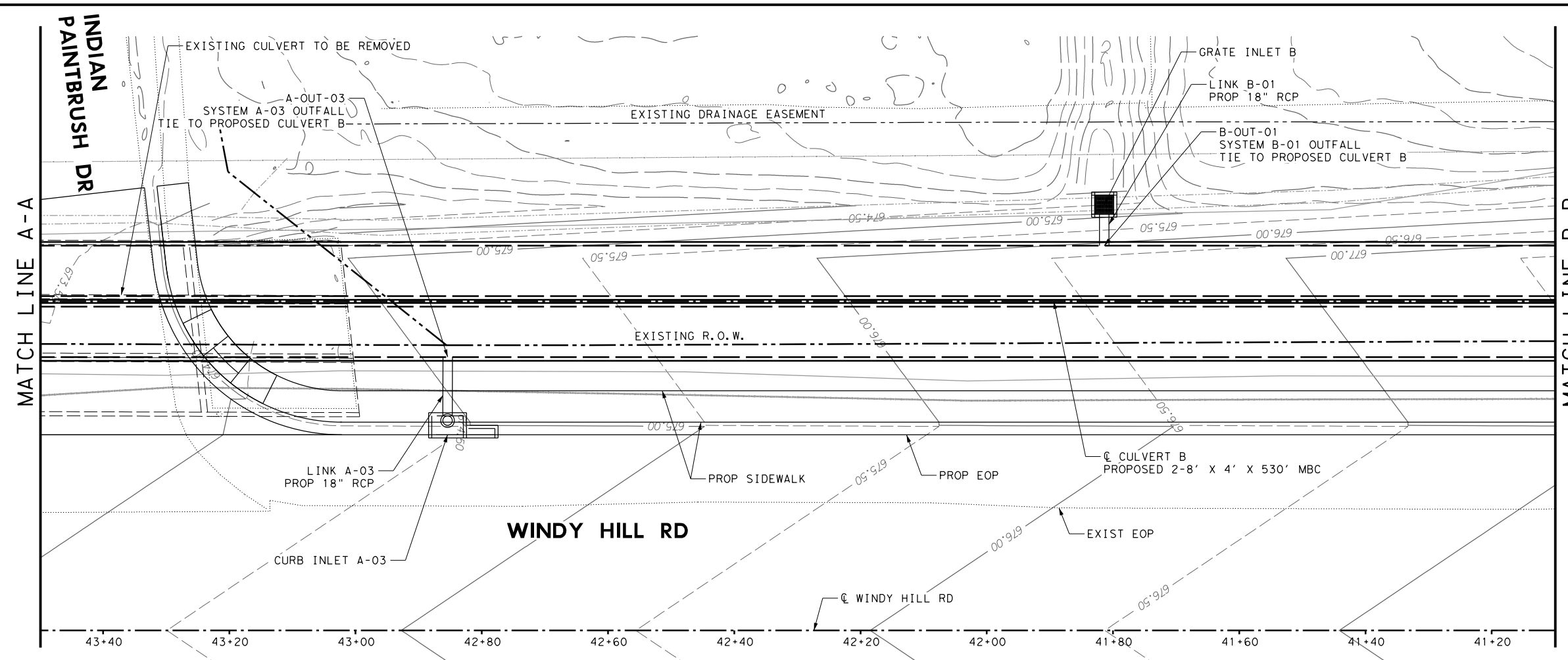
DESIGN BY: CH
DRAWN BY: BR
CHECKED BY: ZR
APPROVED BY:
PROJECT NO: 2173.2001
DATE: 7/10/2020

SCALE
HORIZONTAL: 1"=20'
VERTICAL: 1"=10'
SHEET: 2 OF 4
PAGE: 91



7/10/2020 4:44:38 PM I:\2173\2001\CADD\SHEETS\05-Drainage Details\WH*DRN*CULV*PP*02.dgn

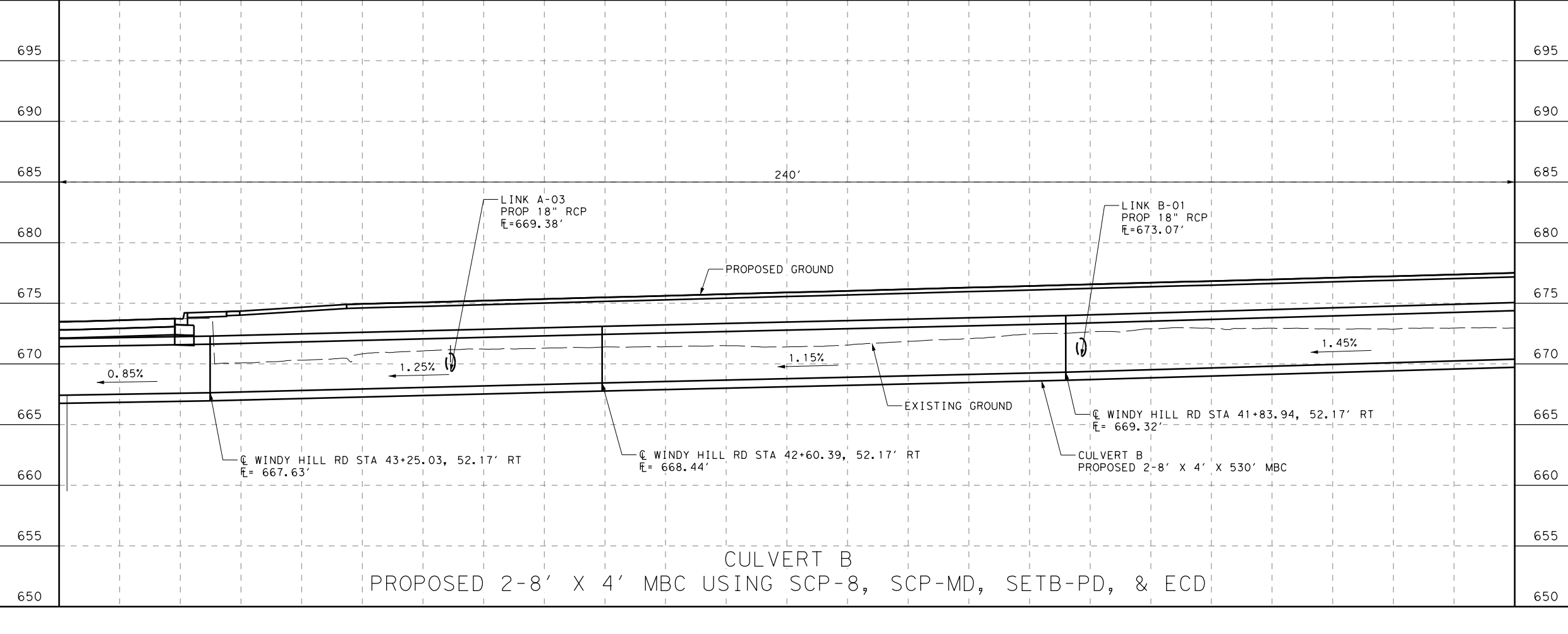
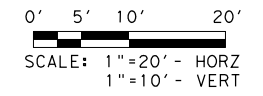
7/10/2020 4:44:39 PM I:\2173\2001\CADD\SHEETS\05-Drainage Details\WH*DRN*CULV*PP*03.dgn



LEGEND

- EXISTING R.O.W.
- - - PROPOSED R.O.W.
- - - EX DRAINAGE EASEMENT
- - - EXISTING DRAINAGE EASEMENT
- - - EXISTING UTILITY
- - - EXISTING PLANIMETRICS
- DITCH FLOWLINE
- PROPOSED DRAINAGE

- NOTES:**
- ANALYSIS PERFORMED USING HY-8 VERSION 7.60.
 - TW ELEVATIONS ESTABLISHED USING OUTFALL CHANNEL GEOMETRY.
 - THE LOCATION AND ELEVATION OF ALL UTILITIES ARE APPROXIMATE. CONTRACTOR TO VERIFY AND LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION.
 - ALL OUTFALLS WITH OUTLET VELOCITIES GREATER THAN 6 FPS ARE PROTECTED IN ACCORDANCE WITH HEC-14: HYDRAULIC DESIGN OF ENERGY DISSIPATORS FOR CULVERTS AND CHANNELS.



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
ZACHARY B. RYAN
TEXAS REGISTRATION 106276
DATE: 7/10/2020
IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



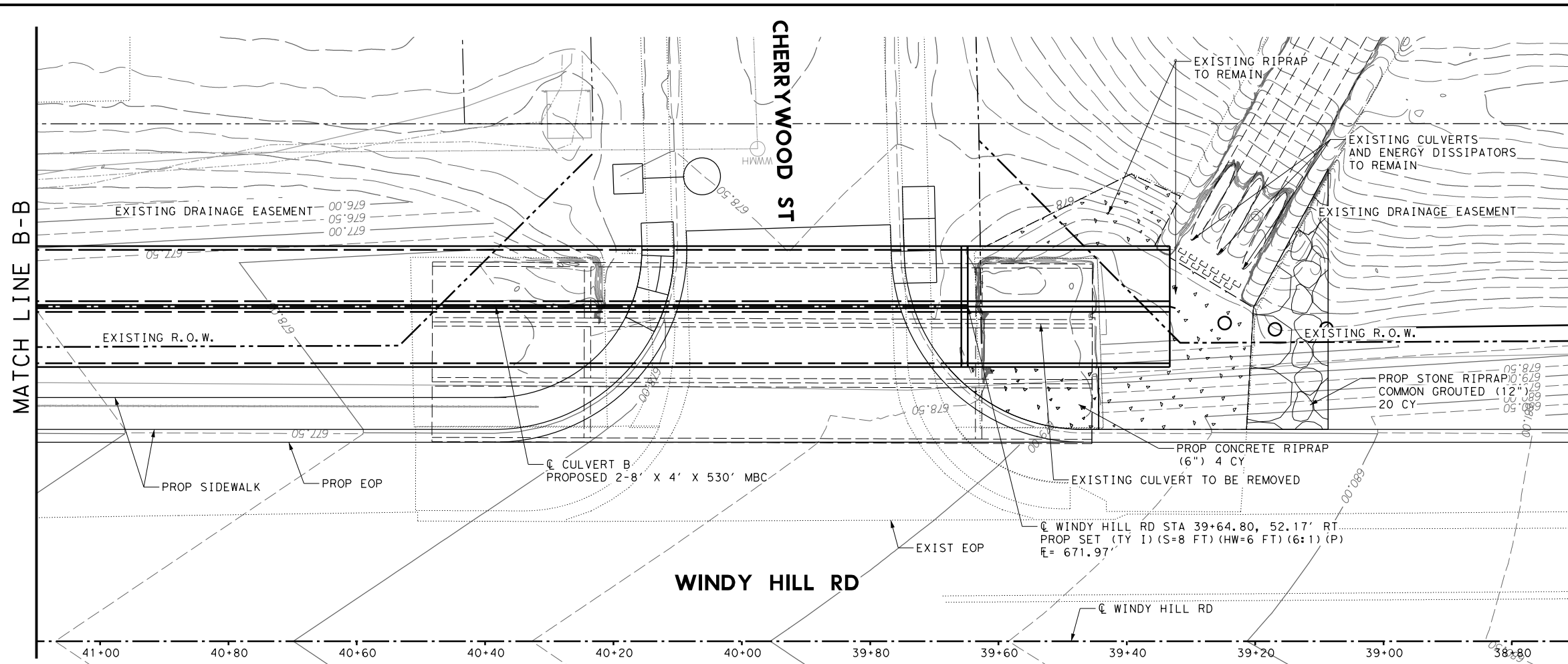
LJA Engineering, Inc.
FRN-F-1386

**WINDY HILL ROAD
CULVERT B
PLAN & PROFILE
A-A TO B-B**

GLO Contract# 19-280-000-B779

DESIGN BY: CH	SCALE
DRAWN BY: BR	HORIZONTAL: 1"=20'
CHECKED BY: ZR	VERTICAL: 1"=10'
APPROVED BY:	SHEET: 3 OF 4
PROJECT NO: 2173.2001	PAGE: 92
DATE: 7/10/2020	

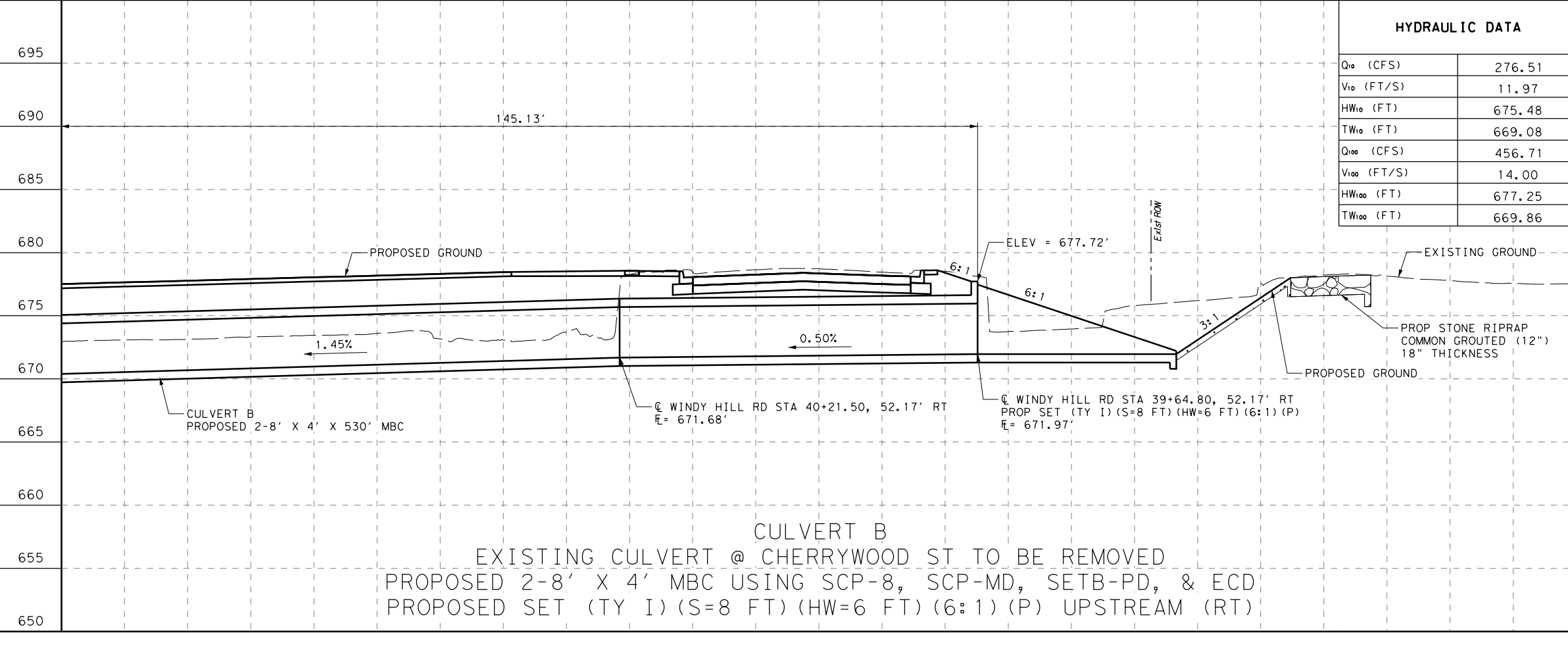
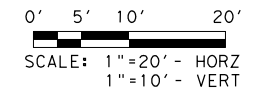
7/10/2020 4:44:40 PM I:\2173\2001\CADD\SHEETS\05-Drainage Details\WH*DRN*CULV*PP*04.dgn



LEGEND

- EXISTING R.O.W.
- PROPOSED R.O.W.
- - - EX DRAINAGE EASEMENT
- - - EXISTING DRAINAGE EASEMENT
- - - EXISTING UTILITY
- - - EXISTING PLANIMETRICS
- ← DITCH FLOWLINE
- PROPOSED DRAINAGE

- NOTES:**
- ANALYSIS PERFORMED USING HY-8 VERSION 7.60.
 - TW ELEVATIONS ESTABLISHED USING OUTFALL CHANNEL GEOMETRY.
 - THE LOCATION AND ELEVATION OF ALL UTILITIES ARE APPROXIMATE. CONTRACTOR TO VERIFY AND LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION.
 - ALL OUTFALLS WITH OUTLET VELOCITIES GREATER THAN 6 FPS ARE PROTECTED IN ACCORDANCE WITH HEC-14: HYDRAULIC DESIGN OF ENERGY DISSIPATORS FOR CULVERTS AND CHANNELS.



HYDRAULIC DATA	
Q ₁₀ (CFS)	276.51
V ₁₀ (FT/S)	11.97
HW ₁₀ (FT)	675.48
TW ₁₀ (FT)	669.08
Q ₁₀₀ (CFS)	456.71
V ₁₀₀ (FT/S)	14.00
HW ₁₀₀ (FT)	677.25
TW ₁₀₀ (FT)	669.86

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.

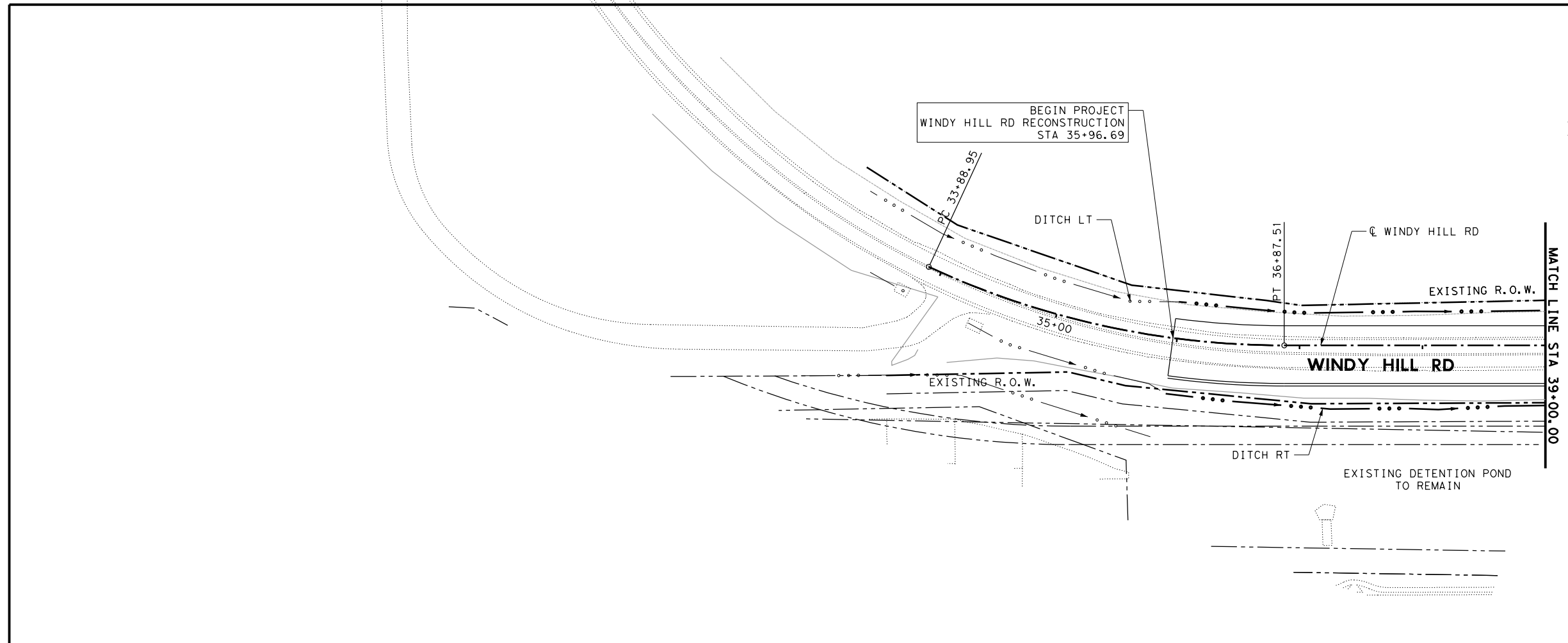


LJA Engineering, Inc.
FRN-F-1386

**WINDY HILL ROAD
CULVERT B
PLAN & PROFILE
B-B TO END**

GLO Contract# 19-280-000-B779	
DESIGN BY: CH	SCALE
DRAWN BY: BR	HORIZONTAL: 1"=20'
CHECKED BY: ZR	VERTICAL: 1"=10'
APPROVED BY:	SHEET: 4 OF 4
PROJECT NO: 2173.2001	DATE: 7/10/2020
DATE: 7/10/2020	PAGE: 93

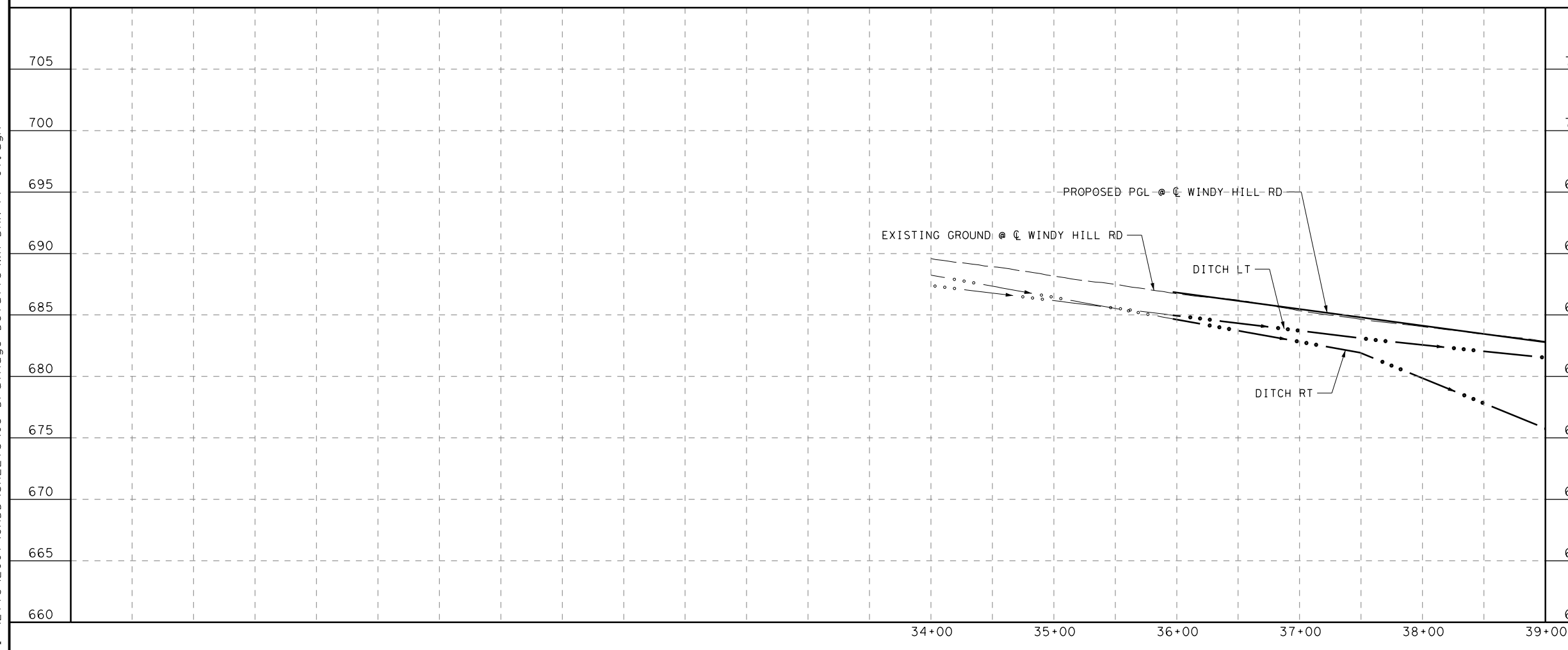
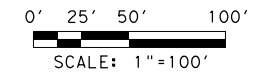
7/10/2020 4:44:40 PM
 I:\2173\2001\CADD\SHEETS\05-Drainage Details\WH*DRN*PP*01.dgn



LEGEND

- EXISTING R.O.W.
- - - PROPOSED R.O.W.
- - - EX DRAINAGE EASEMENT
- - - EXISTING DRAINAGE EASEMENT
- - - EXISTING UTILITY
- - - EXISTING PLANIMETRICS
- ← DITCH FLOWLINE
- PROPOSED DRAINAGE

- NOTES:**
1. FOR DETAILED DITCH INFORMATION, REFER TO CROSS SECTIONS.
 2. ALL REINFORCED CONCRETE PIPES ARE TO BE CLASS III UNLESS OTHERWISE NOTES.
 3. THE LOCATION AND ELEVATION OF ALL UTILITIES ARE APPROXIMATE. CONTRACTOR TO VERIFY AND LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION.
 4. GRATE INLETS MEASURED FROM TOP CENTER OF GRATE.



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



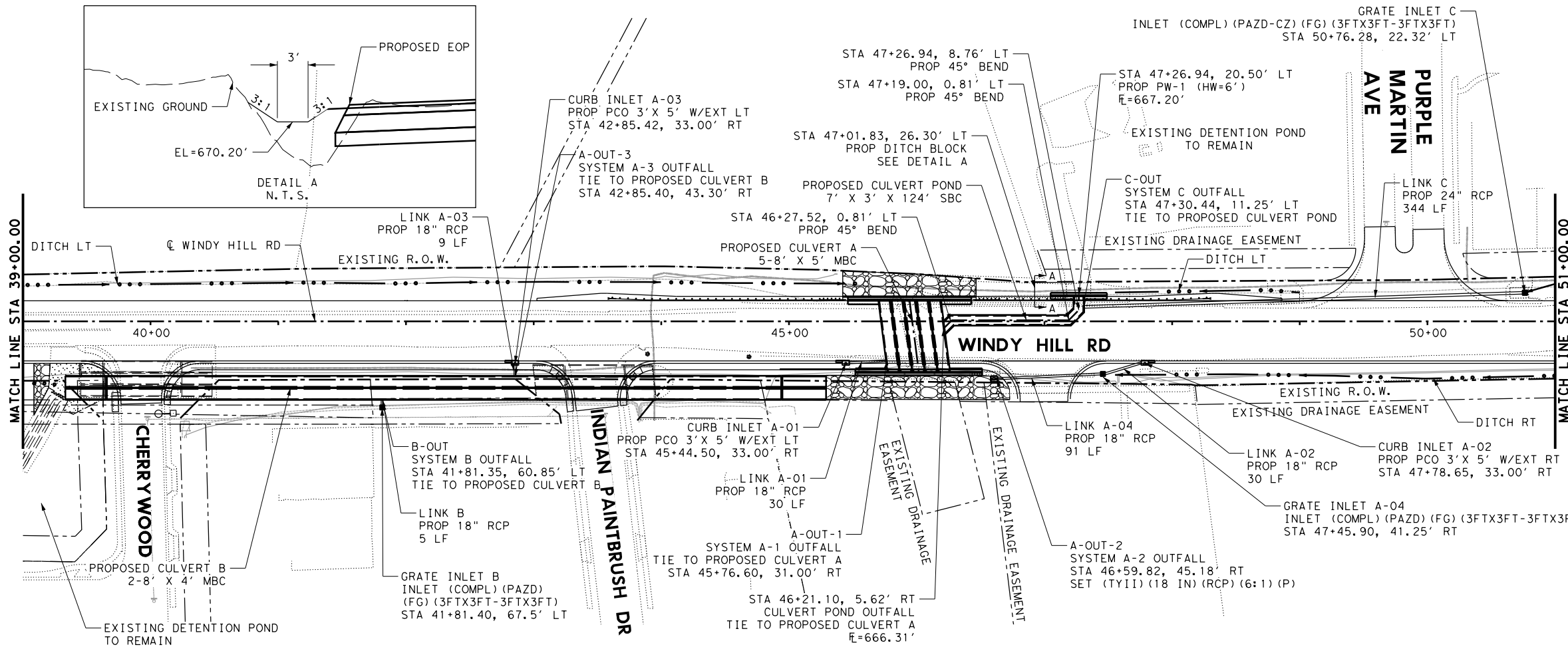
LJA Engineering, Inc.
 FRN-F-1386

**WINDY HILL ROAD
 DRAINAGE
 PLAN & PROFILE**
 BEGIN TO STA 39+00

GLO Contract# 19-280-000-B779

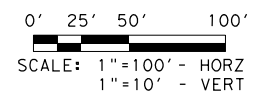
DESIGN BY: CH
 DRAWN BY: BR
 CHECKED BY: ZR
 APPROVED BY:
 PROJECT NO: 2173.2001
 DATE: 7/10/2020

SCALE
 HORIZONTAL: 1"=100'
 VERTICAL: 1"=10'
 SHEET: 1 OF 3
 PAGE: 94

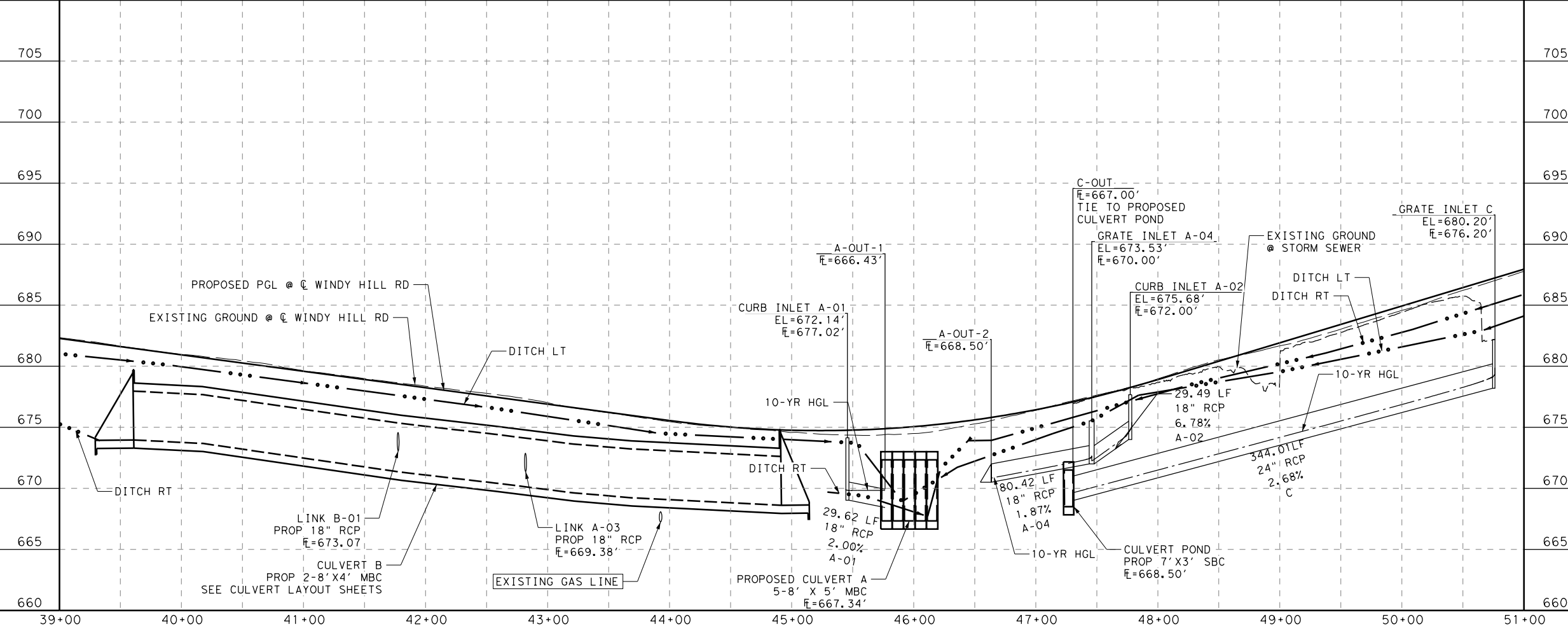


- LEGEND**
- EXISTING R.O.W.
 - - - PROPOSED R.O.W.
 - - - EX DRAINAGE EASEMENT
 - - - EXISTING DRAINAGE EASEMENT
 - - - EXISTING UTILITY
 - - - EXISTING PLANIMETRICS
 - DITCH FLOWLINE
 - PROPOSED DRAINAGE

- NOTES:**
1. FOR DETAILED DITCH INFORMATION, REFER TO CROSS SECTIONS.
 2. ALL REINFORCED CONCRETE PIPES ARE TO BE CLASS III UNLESS OTHERWISE NOTES.
 3. THE LOCATION AND ELEVATION OF ALL UTILITIES ARE APPROXIMATE. CONTRACTOR TO VERIFY AND LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION.
 4. GRATE INLETS MEASURED FROM TOP CENTER OF GRATE.



7/10/2020 4:44:41 PM I:\2173\2001\CADD\SHEETS\05-Drainage Details\WH*DRN*PP*02.dgn



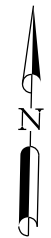
THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN-F-1386

**WINDY HILL ROAD
 DRAINAGE
 PLAN & PROFILE**
 STA 39+00 TO STA 51+00

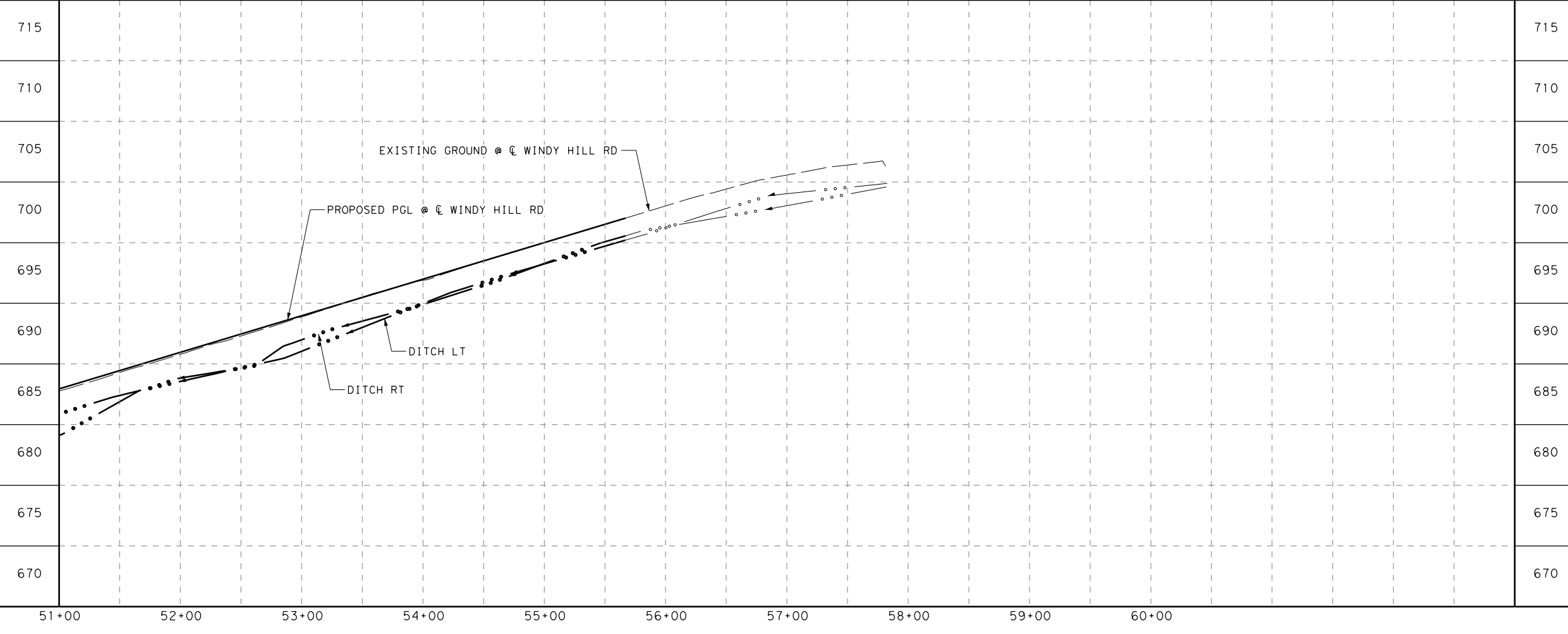
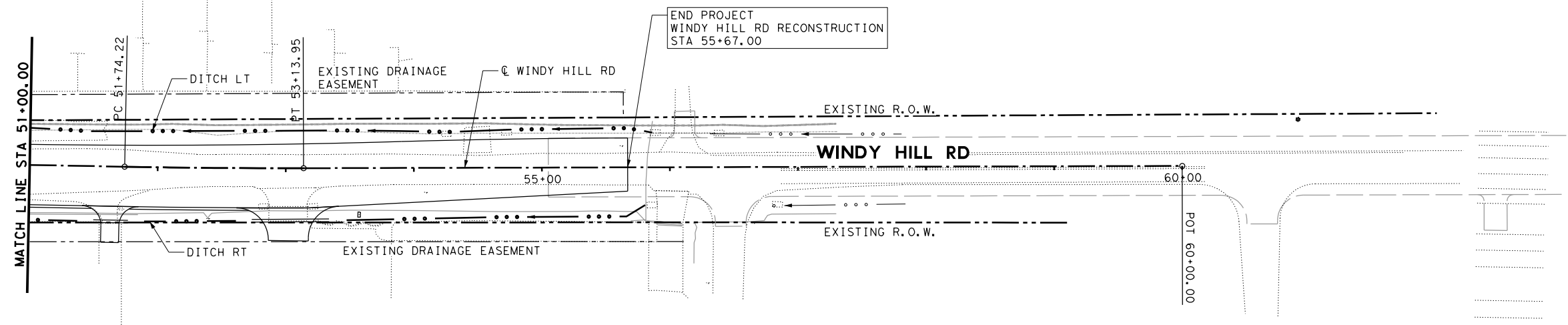
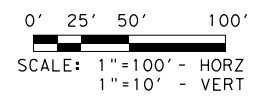
GLO Contract# 19-280-000-B779	
DESIGN BY: CH	SCALE
DRAWN BY: BR	HORIZONTAL: 1"=100'
CHECKED BY: ZR	VERTICAL: 1"=10'
APPROVED BY:	SHEET: 2 OF 3
PROJECT NO: 2173.2001	PAGE: 95
DATE: 7/10/2020	



LEGEND

- EXISTING R.O.W.
- - - PROPOSED R.O.W.
- - - EX DRAINAGE EASEMENT
- - - EXISTING DRAINAGE EASEMENT
- - - EXISTING UTILITY
- EXISTING PLANIMETRICS
- ← DITCH FLOWLINE
- PROPOSED DRAINAGE

- NOTES:**
1. FOR DETAILED DITCH INFORMATION, REFER TO CROSS SECTIONS.
 2. ALL REINFORCED CONCRETE PIPES ARE TO BE CLASS III UNLESS OTHERWISE NOTES.
 3. THE LOCATION AND ELEVATION OF ALL UTILITIES ARE APPROXIMATE. CONTRACTOR TO VERIFY AND LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION.
 4. GRATE INLETS MEASURED FROM TOP CENTER OF GRATE.



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN-F-1386

**WINDY HILL ROAD
 DRAINAGE
 PLAN & PROFILE
 STA 51+00 TO END**

GLO Contract# 19-280-000-B779

DESIGN BY: CH
 DRAWN BY: BR
 CHECKED BY: ZR
 APPROVED BY:
 PROJECT NO: 2173.2001
 DATE: 7/10/2020

SCALE
 HORIZONTAL: 1"=100'
 VERTICAL: 1"=10'
 SHEET: 3 OF 3
 PAGE: 96

7/10/2020 4:44:41 PM I:\2173\2001\CADD\SHEETS\05-Drainage Details\WH*DRN*PP*03.dgn

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 7/10/2020 4:44:42 PM
FILE: ... \Standards\bcstdt20.dgn

Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°, 15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw ^① Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" Conc (Curb) ^② (CY)	Class "C" Conc (Wingwall) ^③ (CY)	Total Wingwall Area (SF)
Culvert A (Station 45+96.52) (Lt)	5 ~ 8' x 5'	2.5'	SCP-8	PW-1	15°	3:1	8"	8"	2.005'	7.667'	N/A	N/A	23.811'	50.383'	N/A	0.0	3.7	27.7	365
Culvert A (Station 45+96.52) (Rt)	5 ~ 8' x 5'	2.5'	SCP-8	PW-1	15°	3:1	8"	8"	2.423'	8.083'	N/A	N/A	25.105'	50.383'	N/A	0.0	4.5	29.9	406
Culvert B (Lt)	2 ~ 8' x 4'	2'	SCP-8	SETB-PD	0°	6:1	8"	8"	1.533'	5.958'	N/A	N/A	34.250'	N/A	19.167'	0.0	1.1	21.5	N/A
Culvert B (Rt)	2 ~ 8' x 4'	2'	SCP-8	SETB-PD	0°	6:1	8"	8"	1.083'	5.500'	N/A	N/A	31.500'	N/A	19.167'	0.0	0.8	19.3	N/A

NOTES:
Skew = 0° on SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standard sheets;
30° maximum for safety end treatment

SL:1 = Horizontal : 1 Vertical
• Side slope at culvert for flared or straight wingwalls.
• Channel slope for parallel wingwalls.
• Slope must be 3:1 or flatter for safety end treatments.

T = Box culvert top slab thickness. Dimension can be found on the applicable box culvert standard sheet.
U = Box culvert wall thickness. Dimension can be found on the applicable box culvert standard sheet.

C = Curb height
See applicable wing or end treatment standard sheets for calculations of Hw, A, B, Lw, Ltw, Atw, and Total Wingwall Area.
Hw = Height of wingwall

A = Distance from face of curb to end of wingwall (not applicable to parallel or straight wingwalls)
B = Offset of end of wingwall (not applicable to parallel or straight wingwalls)

Lw = Length of longest wingwall.
Ltw = Length of culvert toewall (not applicable when using riprap apron)

Atw = Length of anchor toewall (applicable to safety end treatment only)
Total Wingwall Area = Wingwall area in sq. ft. for two wingwalls (one structure end) if Lt or Rt.
Area for four wingwalls (two structure ends) if Both.

- ① Round the wall heights shown to the nearest foot for bidding purposes.
- ② Concrete volume shown is for box culvert curb only. For curbs using the Box Culvert Rail Mounting Details (RAC) standard sheet quantities shown must be increased by a factor of 2.25. If Class S concrete is required for the top slab of the culvert, also provide Class S concrete for the curb. Curb concrete is considered part of the Box Culvert for payment.
- ③ Concrete volume shown is total of wings, footings, culvert toewall (if any), anchor toewalls (if any) and wingwall toewalls. Riprap aprons, culverts, and curb quantities are not included.
- ④ Regardless of the type of culvert shown on this sheet, the Contractor has the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it is the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

SPECIAL NOTE:

This sheet is a supplement to the box culvert standards. It is to be filled out by the culvert specifier and provides dimensions for the construction of the box culvert wingwalls and safety end treatments.

An Excel 2010 spreadsheet to assist in completing this table can be downloaded from the Bridge Standards (English) web page on the TxDOT web site. The completed sheet must be signed, sealed, and dated by a licensed Professional Engineer.

Bridge Division Standard

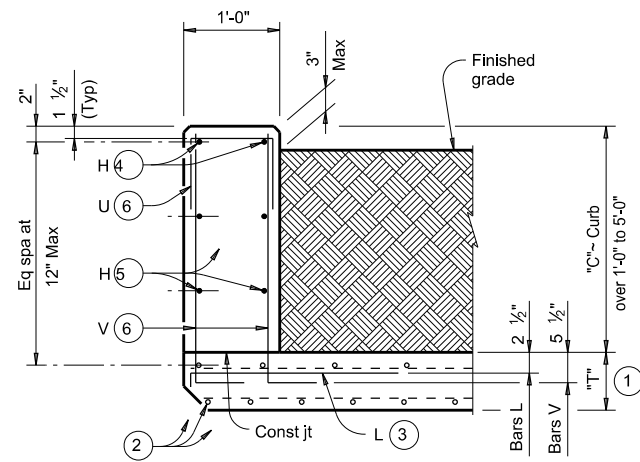
BOX CULVERT SUPPLEMENT WINGS AND END TREATMENTS

BCS

FILE: bcsstd1e1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS		DIST	COUNTY	SHEET NO.
				97

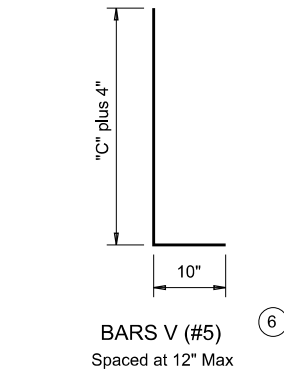
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 7/10/2020 4:44:42 PM
FILE: ... \Standards\ecdstde1-20.dgn

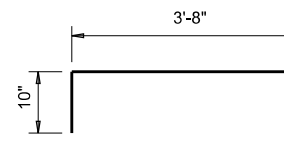


TYPICAL SECTION

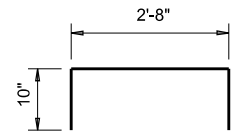
Used for curbs over 1'-0" to 5'-0"



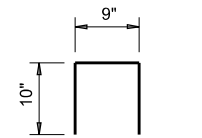
BARS V (#5)
Spaced at 12" Max



BARS L (#5)
Spaced at 12" Max



OPTIONAL BARS L (#5)
Spaced at 12" Max



BARS U (#4)
Spaced at 12" Max

- ① "C" is equal to the culvert top slab thickness. For precast boxes with slabs less than 8" thick, see SCP-MD standard for additional details.
- ② Adjust normal culvert slab bars as necessary to clear obstructions.
- ③ Place bars L as shown. Tilt hook as necessary to maintain cover.
- ④ Place normal culvert curb bars H(#4) as shown. Adjust as necessary to clear obstructions.
- ⑤ Additional bars H(#4) as required to maintain 12" Max spacing.
- ⑥ Replace normal culvert curb bars K with one bar U and two bars V as shown spaced at 12" Max. Adjust length of bars V as necessary to maintain clear cover.
- ⑦ Optional bars L are to be used only for precast box culverts with 3'-0" closure pour.
- ⑧ Quantities shown are for Contractor's information only. Quantities are per linear foot of curb length. The value in table can be interpolated for intermediate values of curb height, "C". Quantity includes bars K (when applicable).

TABLE OF ESTIMATED CURB QUANTITIES ⑧		
Curb Height "C"	Conc (CY/LF)	Reinf Steel (Lb/LF)
1'-0"	0.037	10.4
1'-6"	0.056	14.5
2'-0"	0.074	15.6
2'-6"	0.093	18.0
3'-0"	0.111	19.0
3'-6"	0.130	21.3
4'-0"	0.148	22.4
4'-6"	0.167	24.8
5'-0"	0.185	25.9

CONSTRUCTION NOTES:
Adjust reinforcing steel as necessary to provide 1/4" cover.
For vehicle safety, top of the curb must not project more than 3" above the finished grade.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class "C" concrete (f'c = 3,600 psi) minimum for curbs.
Provide bar laps, where required, as follows:
· Uncoated or galvanized ~ #4 = 1'-8" Min

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
These extended curb details have sufficient strength to allow for future retrofit of Type T631 or T631LS railing. These details are suitable for use with PR11, PR22 and PR3 type rails. These details are not suitable for the mounting of other rail types. For new construction using T631 or T631LS railing, use the T631-CM standard.
This Curb is considered as part of the Box Culvert for payment.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

Bridge Division Standard

EXTENDED CURB DETAILS

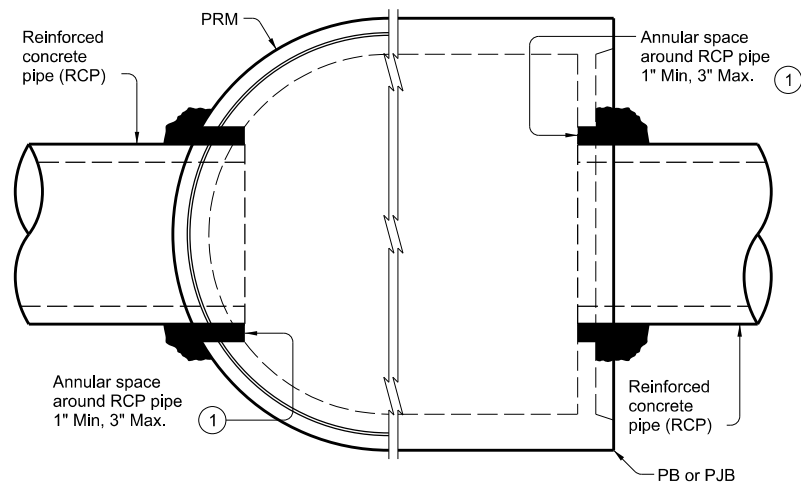
FOR BOX CULVERTS WITH CURBS OVER 1'-0" TO 5'-0" TALL

ECD

FILE: ecdstd1-20.dgn	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
DIST	COUNTY			SHEET NO.
				98

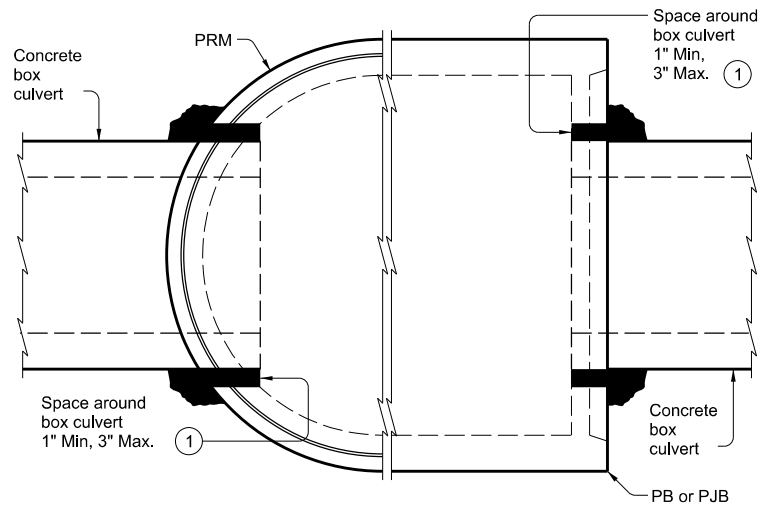
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 7/10/2020 4:44:42 PM
FILE: ... \Standards\pbgsstd1-20.dgn



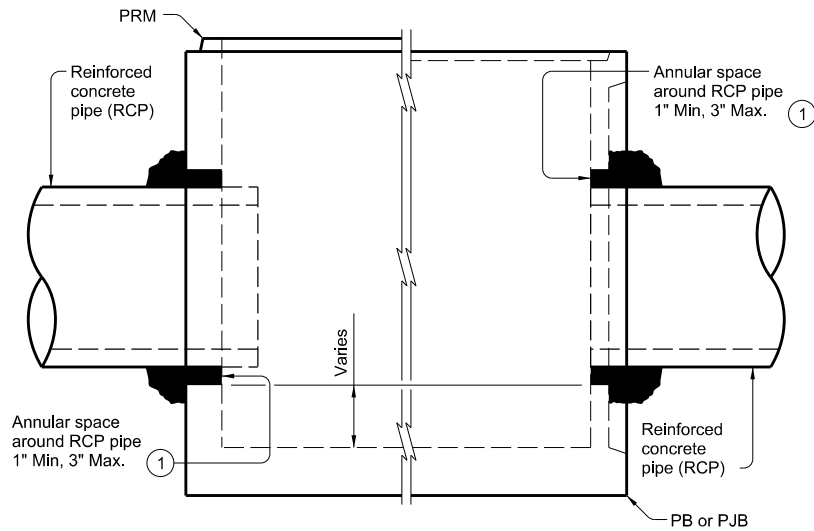
PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE
PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

TYPICAL HALF PLAN



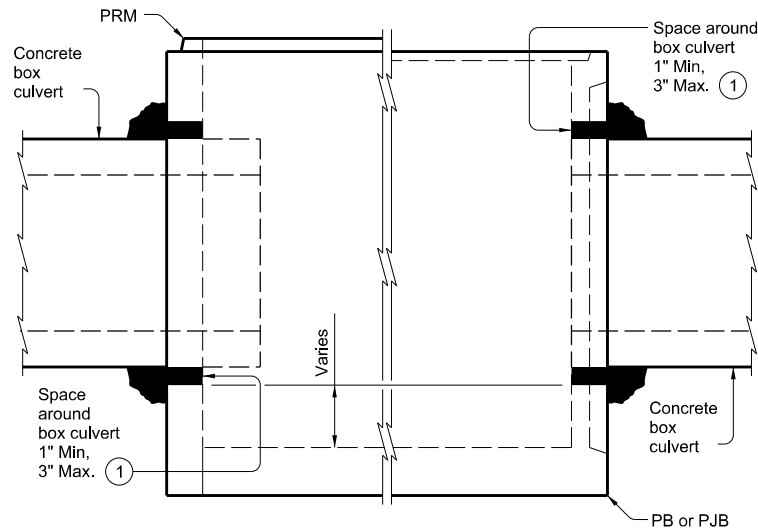
PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE
PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

TYPICAL HALF PLAN



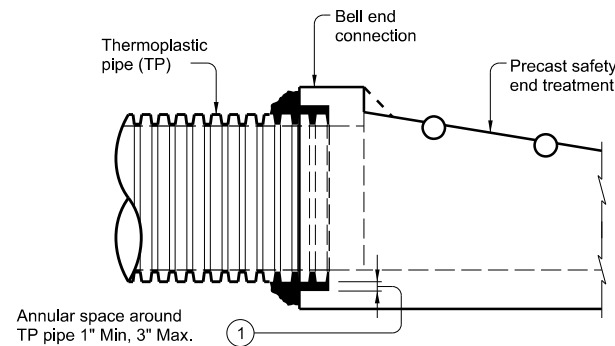
PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE
PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

TYPICAL HALF ELEVATION



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE
PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

TYPICAL HALF ELEVATION



TYPICAL PARTIAL ELEVATION OF PRECAST SAFETY END TREATMENTS

Showing square PSET for parallel drainage, cross drainage shown similar.

① Completely fill the void between the precast structure and the connecting pipe or box with cementitious grouts and mortars in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application".

CONSTRUCTION NOTES:

- Do not grout rubber gasket joints without Manufacturer's recommendations.
- Do not use bricks, masonry blocks, native stone, or similar materials in conjunction with grouted connections when filling void spaces around pipes or box culverts.

MATERIAL NOTES:

Provide grouted connections in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application".

GENERAL NOTES:

- See applicable standards for notes and details not shown:
 - Precast Base (PB)
 - Precast Junction Box (PJB)
 - Precast Round Manhole (PRM)
 - Precast Safety End Treatments C/D Square (PSET-SC)
 - Precast Safety End Treatments P/D Square (PSET-SP)
- Provide Concrete Box Culverts in accordance with Item 462 "Concrete Box Culverts and Drains".
- Provide Reinforced Concrete Pipe (RCP) in accordance with Item 464 "Reinforced Concrete Pipe".
- Provide Thermoplastic Pipe (TP) in accordance with Special Specification Thermoplastic Pipe.
- Payment for grouted connections is considered subsidiary to other bid items.



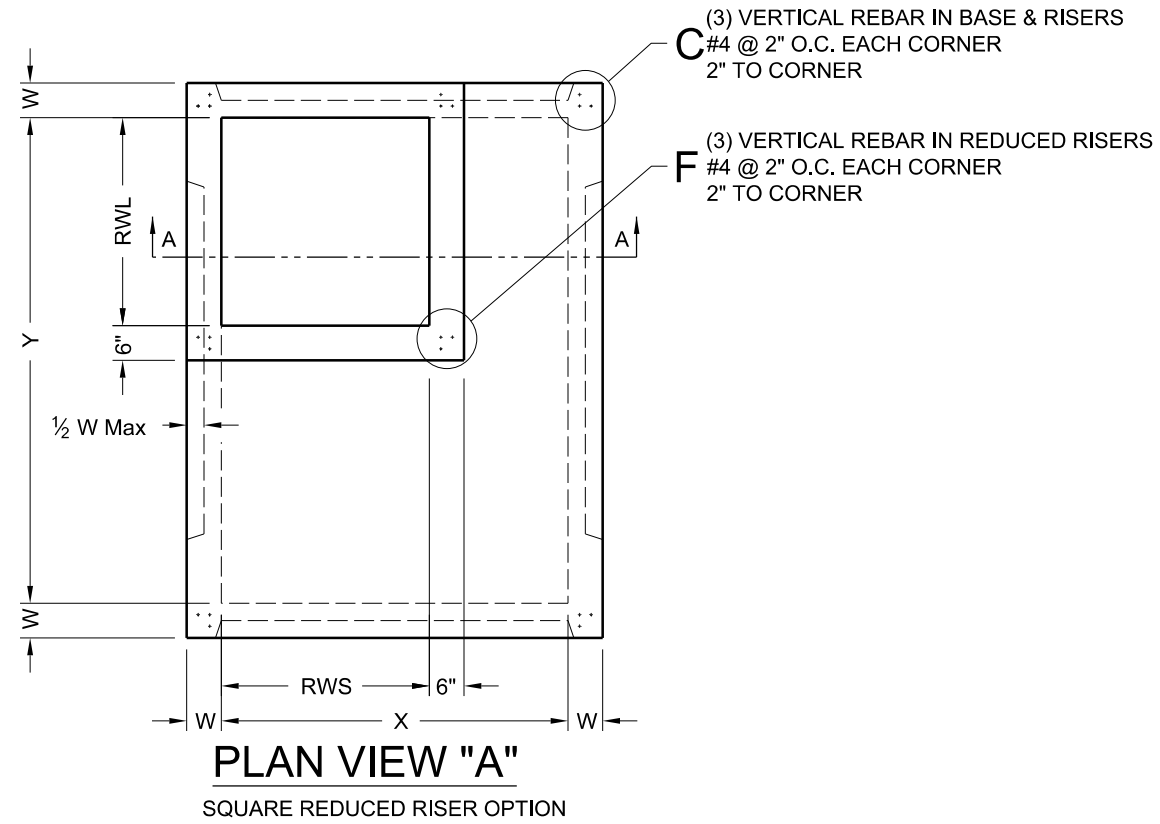
PIPE AND BOX GROUTED CONNECTIONS FOR PRECAST STRUCTURES

PBGC

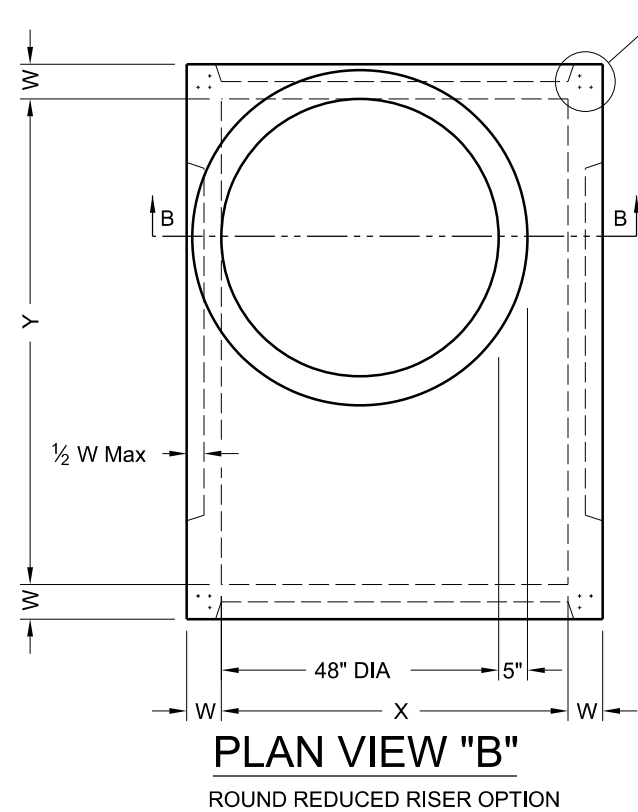
FILE: pbgsstd1-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
DIST	COUNTY			SHEET NO.
				99

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

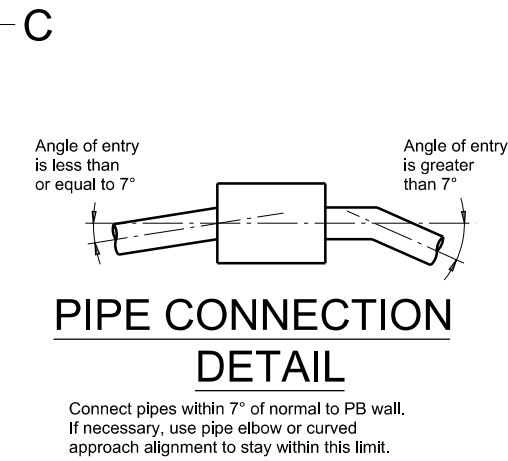
DATE: 7/10/2020 4:44:43 PM
 FILE: ...Standards\prestd01-20.dgn



PLAN VIEW "A"
 SQUARE REDUCED RISER OPTION

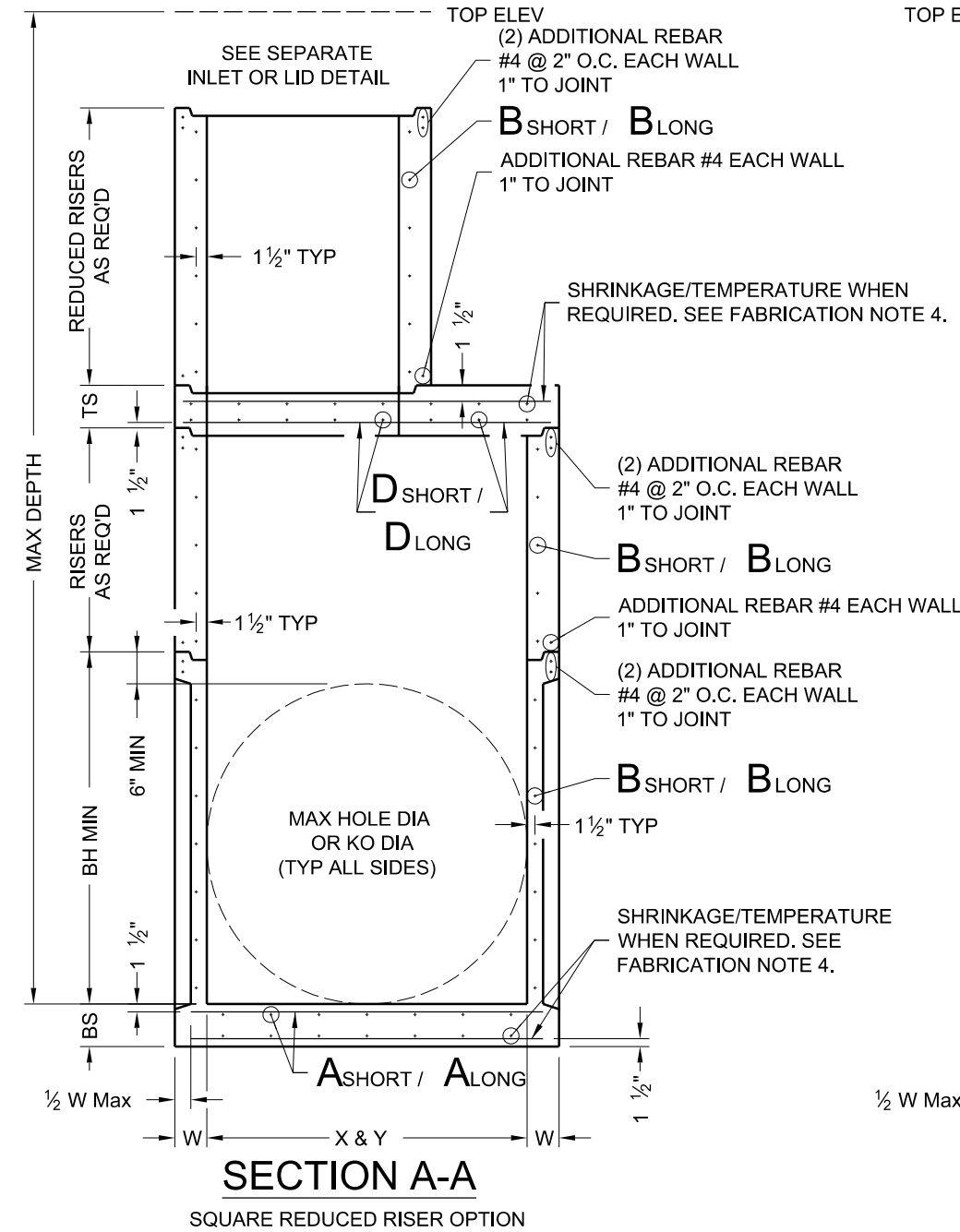


PLAN VIEW "B"
 ROUND REDUCED RISER OPTION

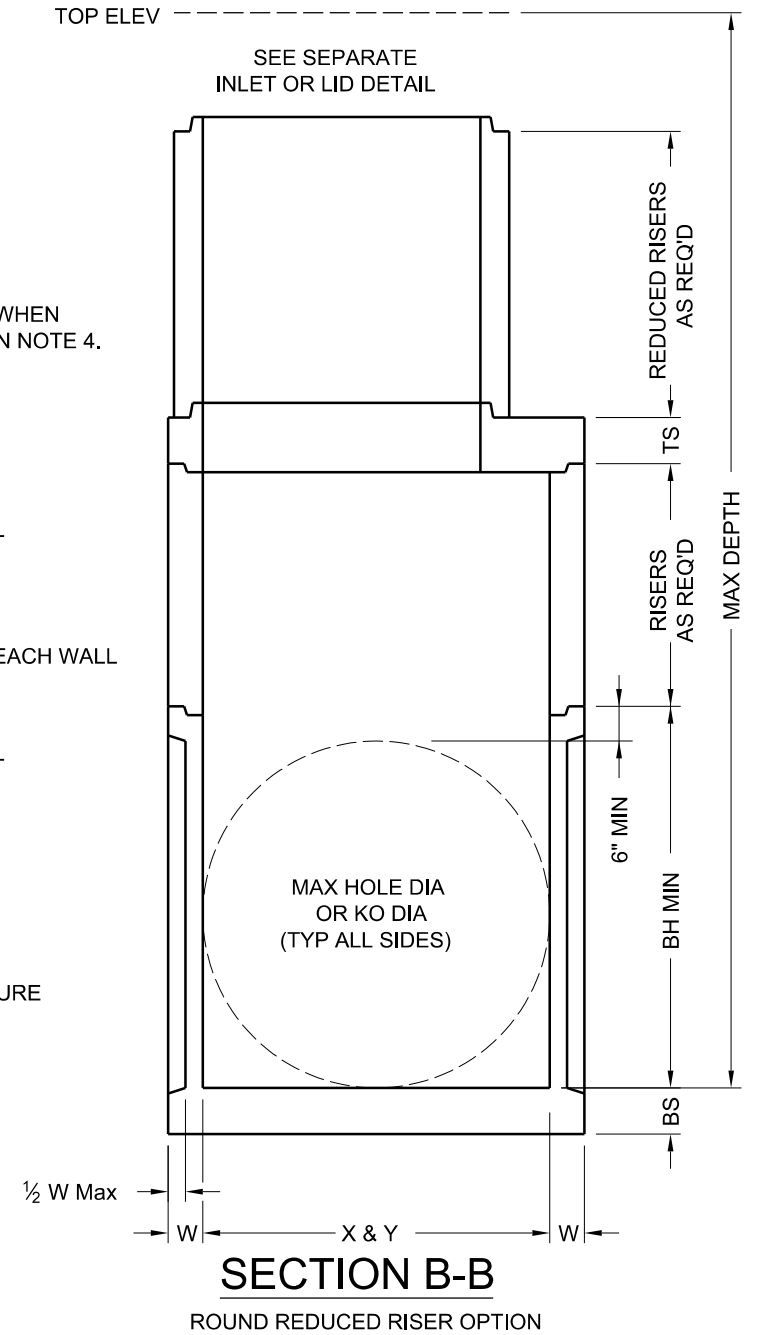


PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PB wall.
 If necessary, use pipe elbow or curved approach alignment to stay within this limit.



SECTION A-A
 SQUARE REDUCED RISER OPTION



SECTION B-B
 ROUND REDUCED RISER OPTION

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 1/2" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in²/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is 3/4".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.

INSTALLATION NOTES:

1. If required elsewhere. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to specified inlet or manhole.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or 1/2 the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. For rigid pipe, cut hole in thin wall panel (KO) 4" Max, 2" Min larger than pipe OD.
5. For flexible pipe, consult boot/seal Manufacturer's specification for placement tolerance and hole size. Center pipe in hole and install boot/seal per Manufacturer's specification.

GENERAL NOTES:

1. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for precast base is subsidiary to the specified inlet, per Item 465, "Junction Boxes, Manholes, and Inlets."

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING



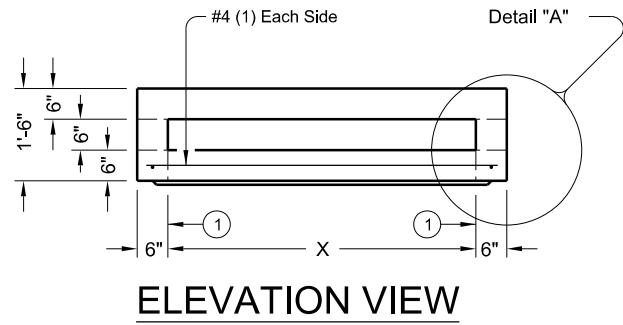
PRECAST BASE

PB

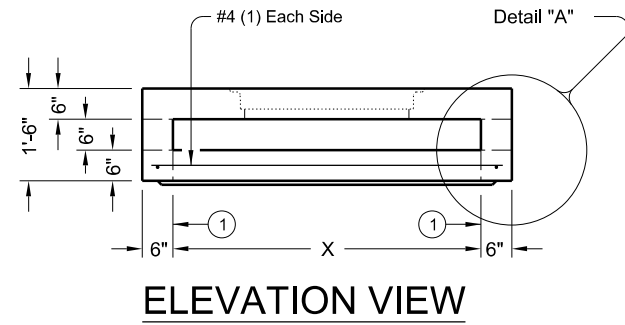
FILE: prestd01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
DIST	COUNTY			SHEET NO.
				100

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

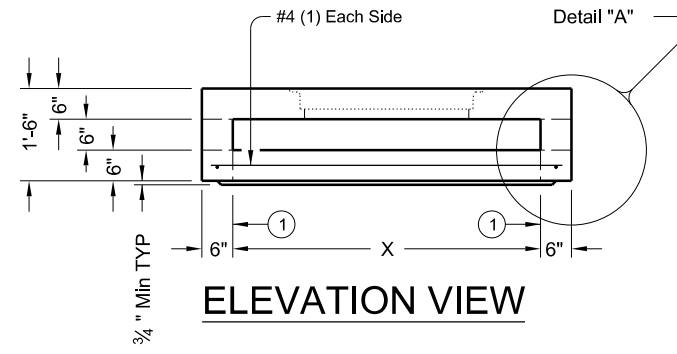
DATE: 7/10/2020 4:44:43 PM
 FILE: ... \Standards\prest08-20.dgn



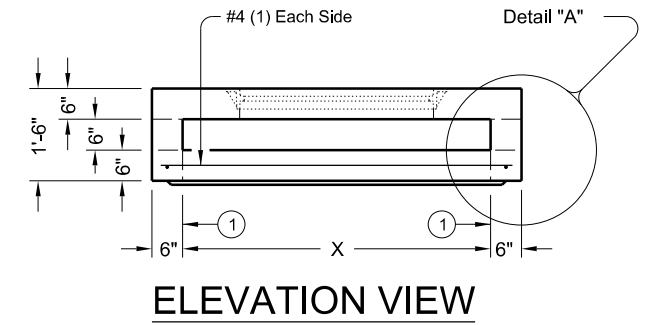
ELEVATION VIEW



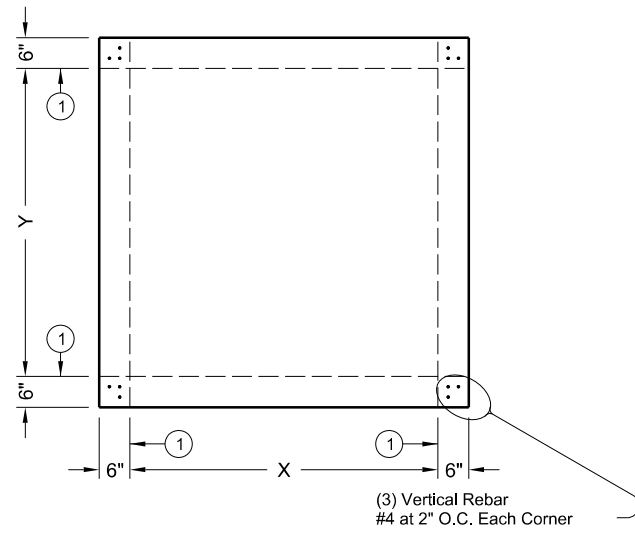
ELEVATION VIEW



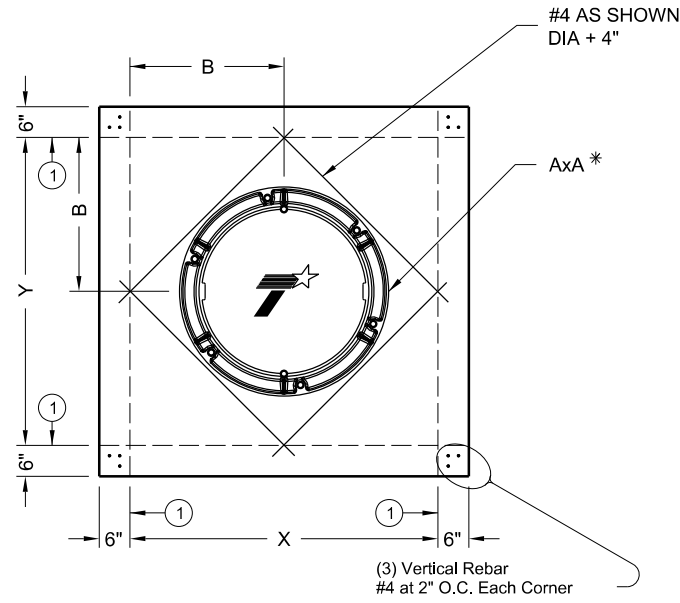
ELEVATION VIEW



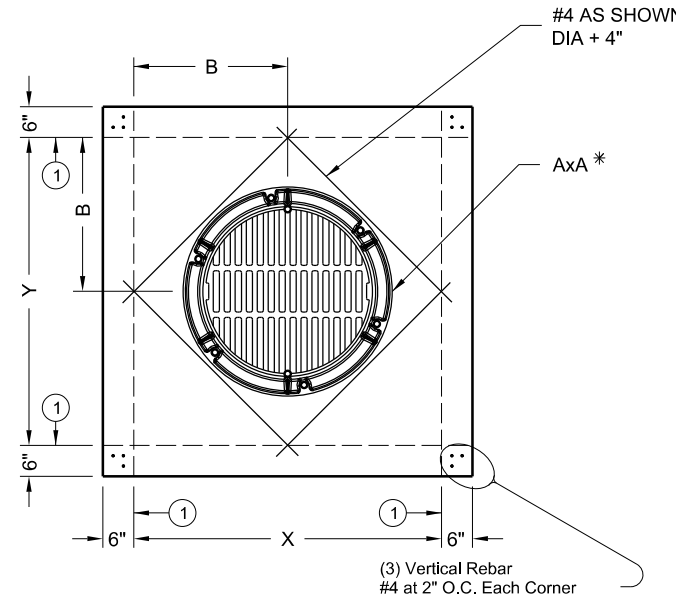
ELEVATION VIEW



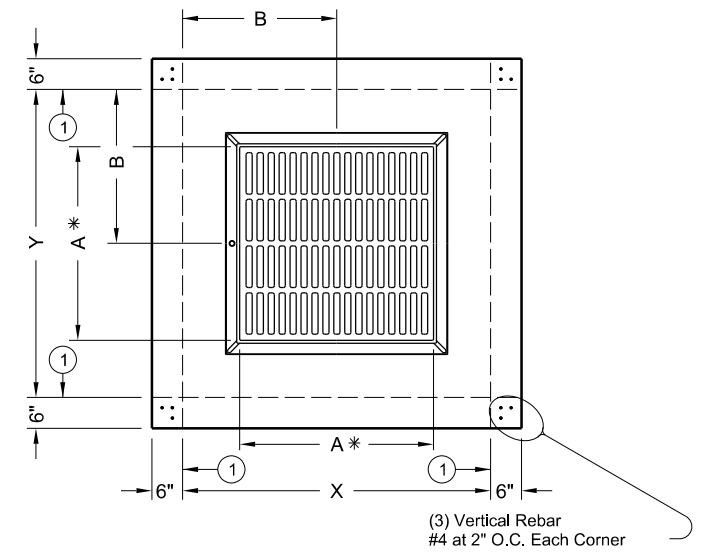
PLAN VIEW
NO OPENINGS
STYLE 'SL'



PLAN VIEW
32" DIA CAST-IN RING & COVER
STYLE 'RC'



PLAN VIEW
32" DIA CAST-IN RING & GRATE
STYLE 'RG'



PLAN VIEW
CAST-IN FRAME & GRATE
STYLE 'FG'

① Matches inside face of wall of precast base or riser below inlet.

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide clear cover of 3/4" to reinforcing from bottom of slab for structural reinforcement. Place short span reinforcing closest to surface.
4. No substitution is allowed for diagonal #4 bars around openings.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is 3/4".
6. Provide lifting devices in conformance with Manufacturer's recommendations.

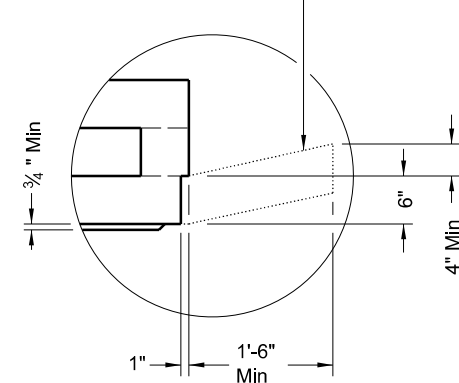
INSTALLATION NOTES:

1. PAZD is for use in ditches and medians outside of the horizontal clearance (clear zone). Precast Area Zone Drain is not intended for direct traffic and may not be placed in roadway.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or 1/2 the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, style, size, and opening size (when applicable).

Construct cast-in-place reinforced concrete apron when shown elsewhere in plans. Use Class "A" concrete. Apron is subsidiary to PAZD. Apron is 1'-6" Min width around precast zone drain.



DETAIL "A"

(Reinforcing not shown for clarity)
 When an apron is to be cast around PAZD, use detail above to create an apron ledge on all 4 sides.

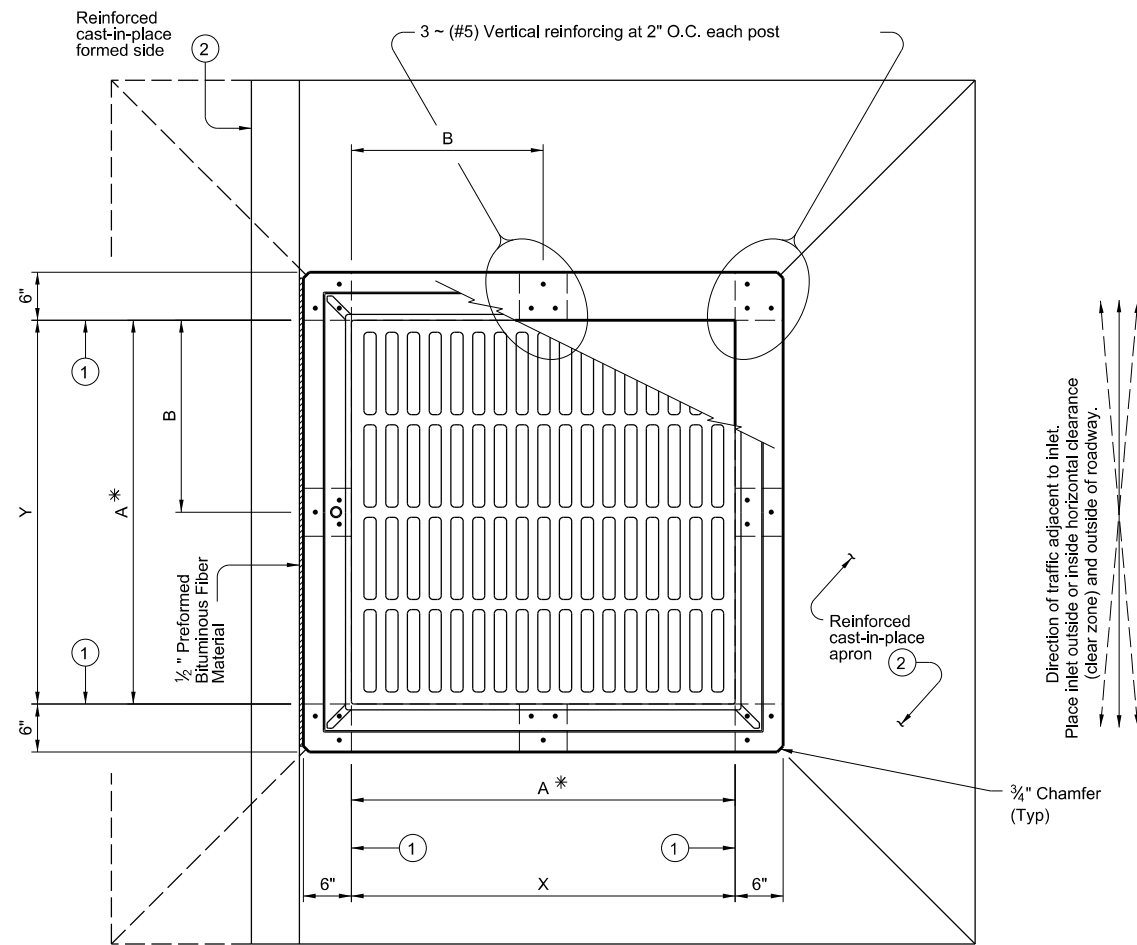
Style	Size (X x Y)	A x A *	B x B	Short Span Reinf Steel Area	Long Span Reinf Steel Area
SL	3'x3'	n/a	n/a	0.37 in ² /ft	0.37 in ² /ft
RC,RG	3'x3'	32" Dia	1.5'x1.5'	0.37 in ² /ft	0.37 in ² /ft
FG	3'x3'	3'x3'	1.5'x1.5'	0.37 in ² /ft	0.37 in ² /ft
SL	4'x4'	n/a	n/a	0.34 in ² /ft	0.34 in ² /ft
RC,RG	4'x4'	32" Dia	2'x2'	0.34 in ² /ft	0.34 in ² /ft
FG	4'x4'	3'x3'	2'x2'	0.34 in ² /ft	0.34 in ² /ft
FG	4'x4'	4'x4'	2'x2'	0.34 in ² /ft	0.34 in ² /ft
SL	5'x5'	n/a	n/a	0.43 in ² /ft	0.43 in ² /ft
RC,RG	5'x5'	32" Dia	2.5'x2.5'	0.68 in ² /ft	0.68 in ² /ft
FG	5'x5'	3'x3'	2.5'x2.5'	0.43 in ² /ft	0.43 in ² /ft
FG	5'x5'	4'x4'	2.5'x2.5'	0.43 in ² /ft	0.43 in ² /ft

* Nominal frame/grate or ring/cover size.

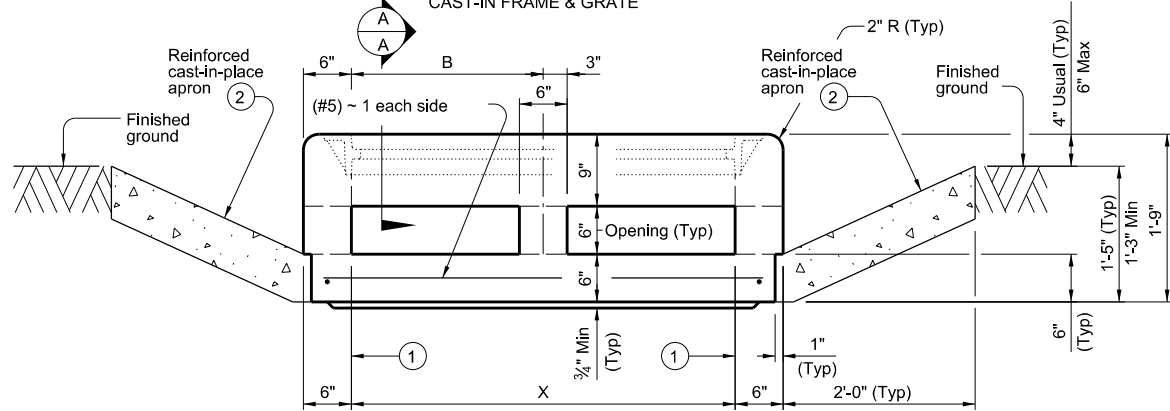
				Bridge Division Standard	
<h2>PRECAST AREA ZONE DRAIN</h2>					
<h3>PAZD</h3>					
FILE:	prest08-20.dgn	DN:	TxDOT	CK:	TxDOT
©TxDOT	February 2020	CONT:	SECT:	JOB:	HIGHWAY:
REVISIONS		DIST:	COUNTY:	SHEET NO.	
				101	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

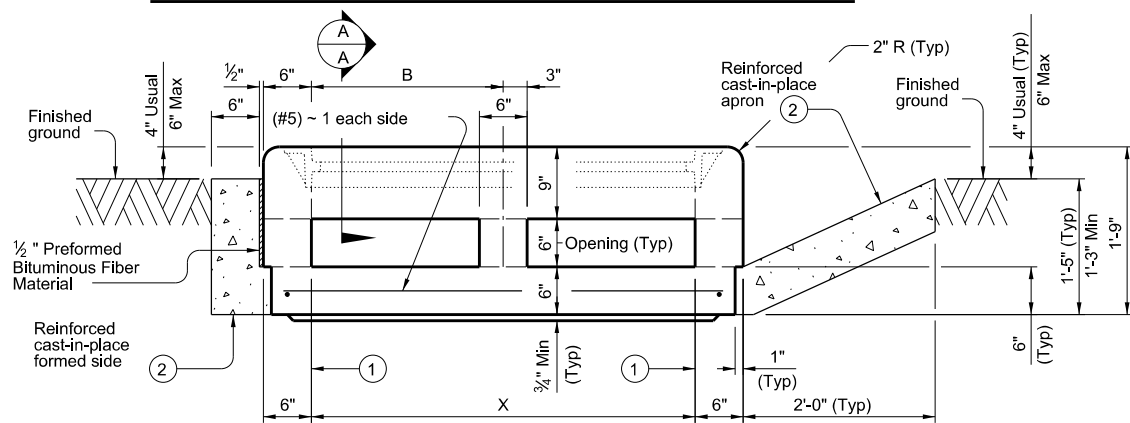
DATE: 7/10/2020 4:44:44 PM
 FILE: ...Standards\prestd15-20.dgn



PLAN VIEW ~ STYLE 'FG' ③
 CAST-IN FRAME & GRATE

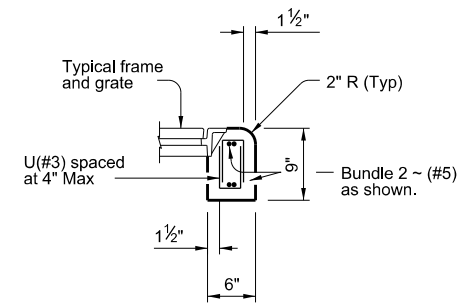


ELEVATION VIEW WITHOUT FORMED SIDE ④

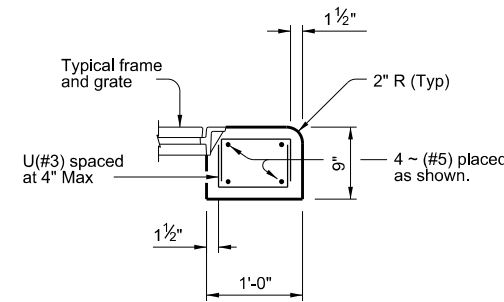


ELEVATION VIEW WITH FORMED SIDE ④

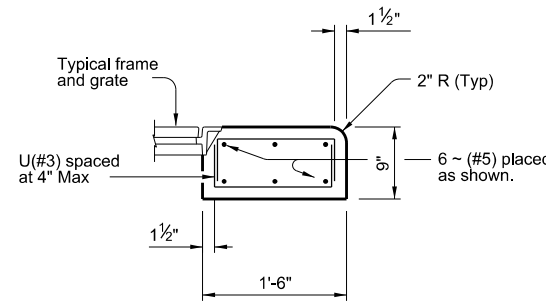
Direction of traffic adjacent to inlet.
 Place inlet outside or inside horizontal clearance (clear zone) and outside of roadway.



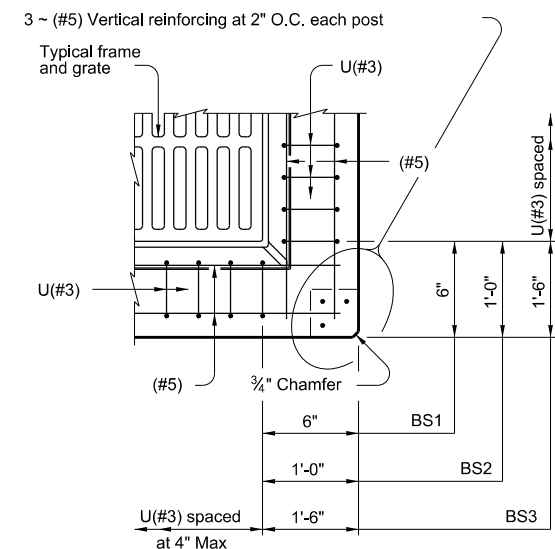
SECTION A-A ~ BS1



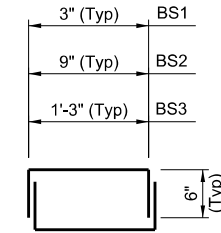
SECTION A-A ~ BS2



SECTION A-A ~ BS3



TYPICAL CORNER REINFORCING PLAN DETAIL
 Showing BS2 other beam sections similar.



BARS U (#3)
 Showing one complete bar.

- ① Matches inside face of wall of precast base or riser below inlet.
- ② Construct cast-in-place reinforced concrete with or without formed side. Place formed side/sides as directed elsewhere in the plans. Formed sides may only be used on sides parallel to traffic. Use Class "C" concrete. Apron and formed side reinforcing not shown for clarity. Apron and formed side are subsidiary to PAZD-CZ. Apron is 2'-0" width around precast zone drain, unless an optional formed side is used. For apron and formed side, provide (#4) reinforcing at 12" O.C.
- ③ Top slab reinforcing not shown for clarity.
- ④ Top slab reinforcing and post reinforcing not shown for clarity.

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide clear cover of 3/4" to reinforcing from bottom of slab and 2" to reinforcing from top of slab for structural reinforcement.
4. Provide 1 1/2" end cover on (#5) reinforcing.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is 3/4".
6. Provide lifting devices in conformance with Manufacturer's recommendations.

INSTALLATION NOTES:

1. Precast Area Zone Drain within Clear Zone (PAZD-CZ) is for use in ditches and medians outside and inside of the horizontal clearance (clear zone). PAZD-CZ is never placed in the roadway.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or 1/2 the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, style, size, and opening size (when applicable).

Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bar dimensions shown are out-to-out of bar.

Style	Size (X x Y)	A x A *	B x B	Beam Section
FG	3'x3'	3'x3'	1.5'x1.5'	BS1
FG	4'x4'	3'x3'	2'x2'	BS2
FG	4'x4'	4'x4'	2'x2'	BS1
FG	5'x5'	3'x3'	2.5'x2.5'	BS3
FG	5'x5'	4'x4'	2.5'x2.5'	BS2

* Nominal frame/grate size.

HL93 LOADING

<p>PRECAST AREA ZONE DRAIN WITHIN CLEAR ZONE</p>			
<p>PAZD-CZ</p>			
FILE: prestd15-20.dgn	DN: SDC	CK: TAR	DW: JTR
©TxDOT February 2020	CONT	SECT	JOB
REVISIONS		HIGHWAY	
DIST	COUNTY	SHEET NO.	
		102	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 7/10/2020 4:44:44 PM
 FILE: ...Standards\pws+de01-20.dgn

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

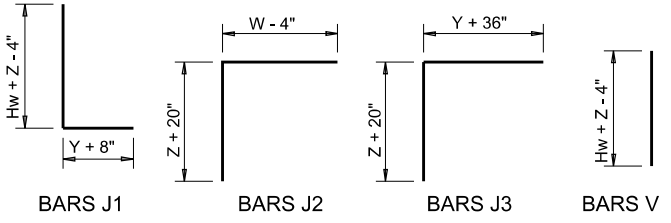
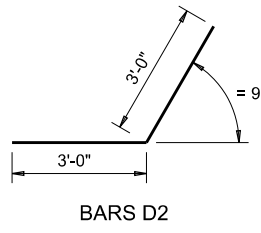
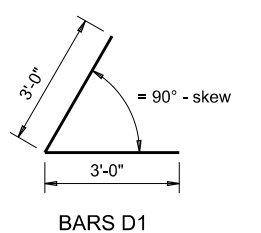
Maximum Wingwall Height Hw	Dimensions				Variable Reinforcing				Estimated Quantities per ft of wing (2-wings)		Estimated Quantities per ft of Toewall (1-toewall)	
	W	X	Y	Z	Bars J1		Bars J2		Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
					Size	Spa	Size	Spa				
2'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'-0"	2'-10"	2'-2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'-5"	3'-0"	2'-5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'-2"	3'-6"	2'-8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'-8"	3'-9"	2'-11"	1'-0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'-2"	4'-0"	3'-2"	1'-2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'-5"	3'-5"	1'-4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'-6"	4'-10"	3'-8"	1'-6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'-0"	3'-11"	1'-7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING
(2-wings)

Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



WING DIMENSION FORMULAS:
(All values are in feet.)

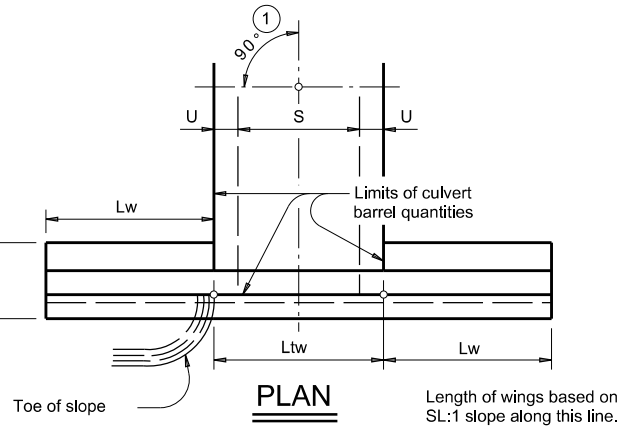
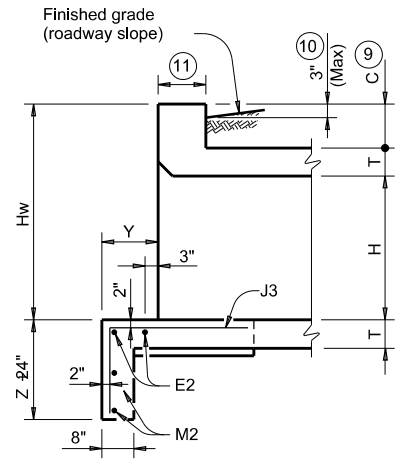
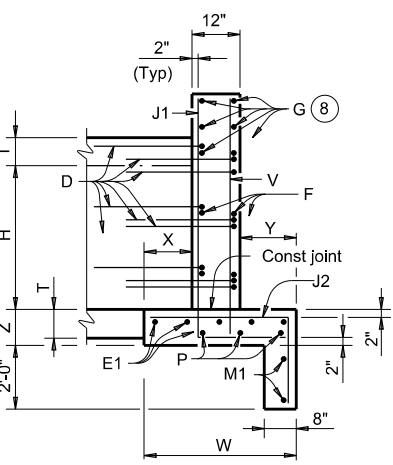
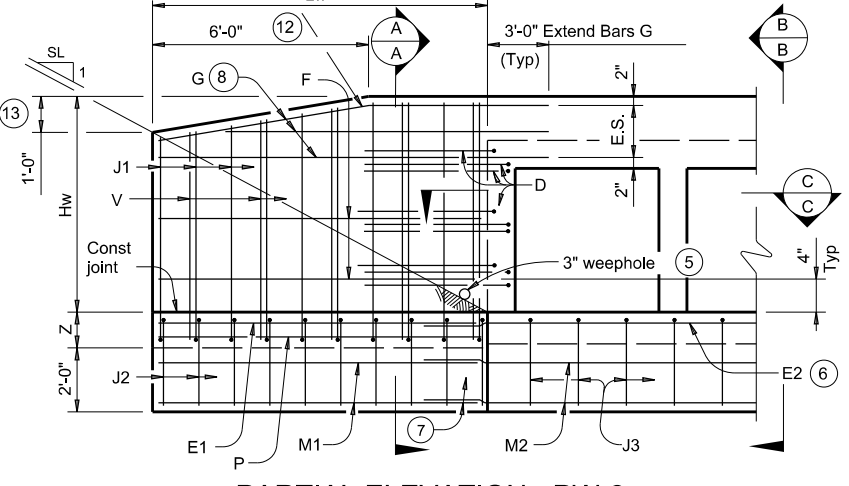
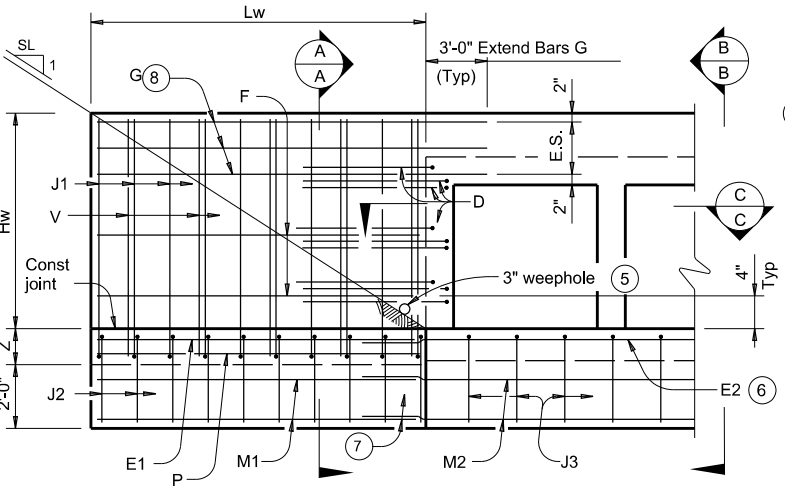
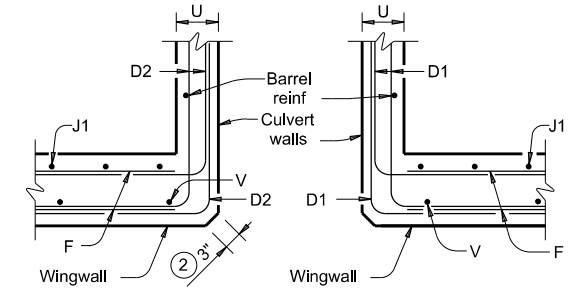
$Hw = H + T + C$
 $Lw = (Hw)(SL) + \cosine(\theta)$ for Type PW-1
 $= (Hw - 1')(SL) + \cosine(\theta)$ for Type PW-2 and Hw 4'
 $= (Hw - 0.5')(SL) + \cosine(\theta)$ for Type PW-2 and Hw 4'

For cast-in-place culverts:
 $Ltw = [(N)(S) + (N + 1)(U)] + \cosine(\theta)$

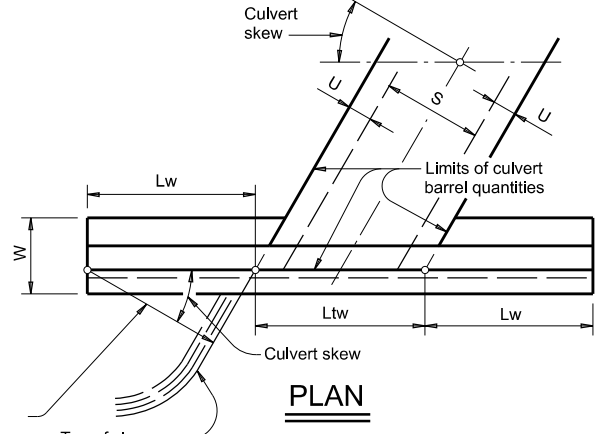
For precast culverts:
 $Ltw = [(N)(2U + S) + (N - 1)(0.5')] + \cosine(\theta)$
 Total Wingwall Area (two wings ~ SF)
 $= (2)(Hw)(Lw)$ for Type PW-1
 $= (2)(Hw)(Lw) - 6 SF$ for Type PW-2 and Hw 4'
 $= (2)(Hw)(Lw) - 1.5 SF$ for Type PW-2 and Hw 4'

Hw = Height of wingwall
 Lw = Length of wingwall
 Ltw = Culvert toewall length
 N = Number of culvert spans
 SL:1 = Channel slope ratio. (horizontal: 1 vertical, usual value is 2:1)
 θ = Culvert skew
 See applicable box culvert standard sheet for S, H, T, and U values.

- Skew = 0°
- At discharge end, chamfer may be 3/4" minimum.
- For 15° skew ~ 1"
For 30° skew ~ 2"
For 45° skew ~ 3"
- Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
- Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
- Extend Bars E2 1'-6" minimum into the wingwall footing.
- Lap Bars M1 1'-6" minimum with Bars M2.
- Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.
- 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
- For vehicle safety, the following requirements must be met:
 - For structures without bridge rail, construct curbs no more than 3" above finished grade.
 - For structures with bridge rail, construct curbs flush with finished grade.
 Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.
- 3'-0" for Hw < 4'.
- 6" for Hw < 4'.



DETAILS FOR NON-SKEWED BOX CULVERTS



DETAILS FOR SKEWED BOX CULVERTS

DESIGNER NOTES:
 Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall. Type PW-2 can only be used for applications without a railing mounted to the wingwall.

MATERIAL NOTES:
 Provide Class C concrete (f'c=3,600 psi).
 Provide Grade 60 reinforcing steel.
 Provide galvanized reinforcing steel if required elsewhere in the plans.

GENERAL NOTES:
 Designed in accordance with AASHTO LRFD Bridge Design Specifications.
 Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
 See Box Culvert Supplement (BCS) standard sheet for wingwall type and additional dimensions and information.
 Quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.

Bridge Division Standard

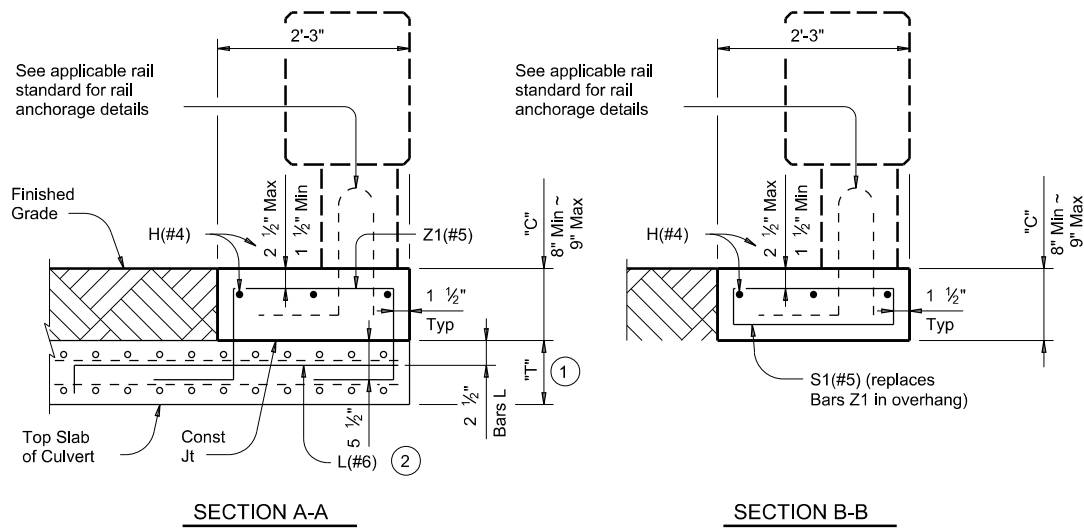
CONCRETE WINGWALLS WITH PARALLEL WINGS FOR BOX CULVERTS TYPES PW-1 AND PW-2

PW

FILE: pws+de01-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY	SHEET NO.	
			103	

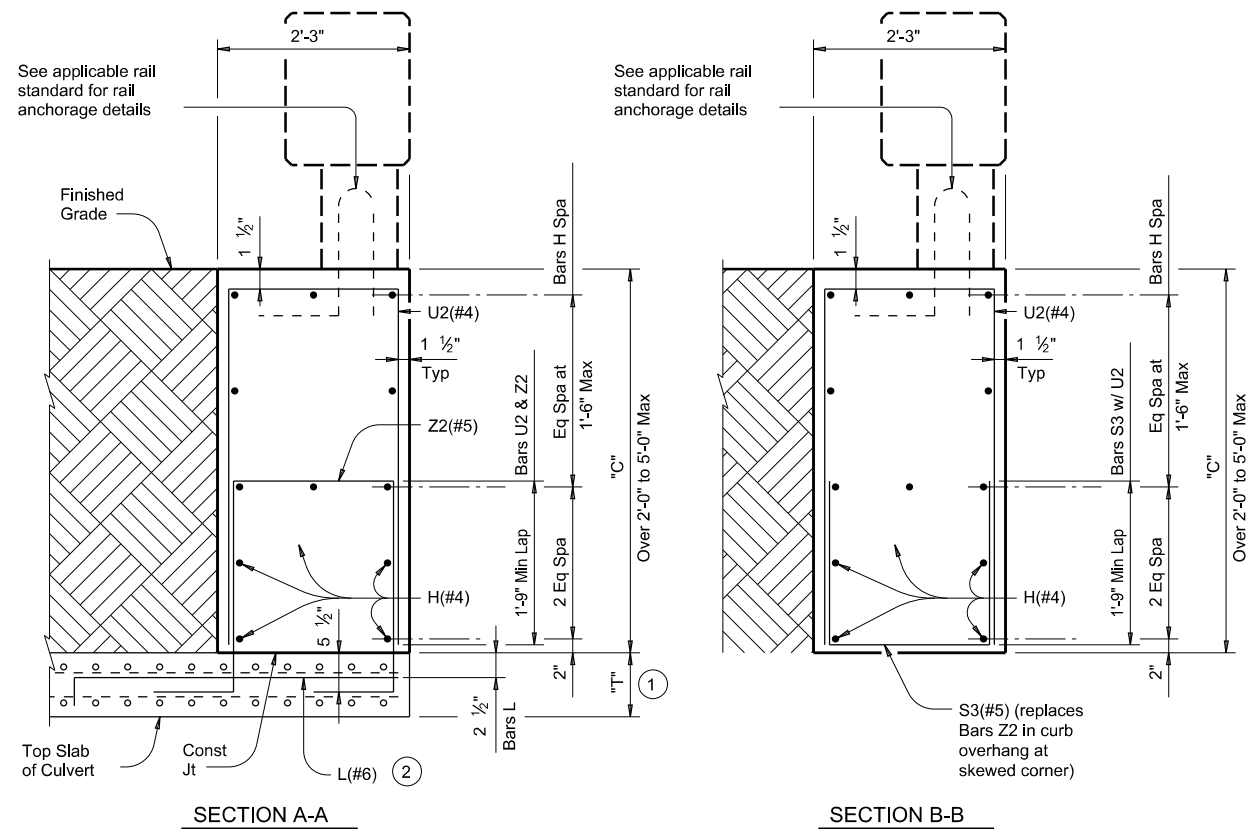
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 7/10/2020 4:44:45 PM
 FILE: ...Standards\acste01-20.dgn



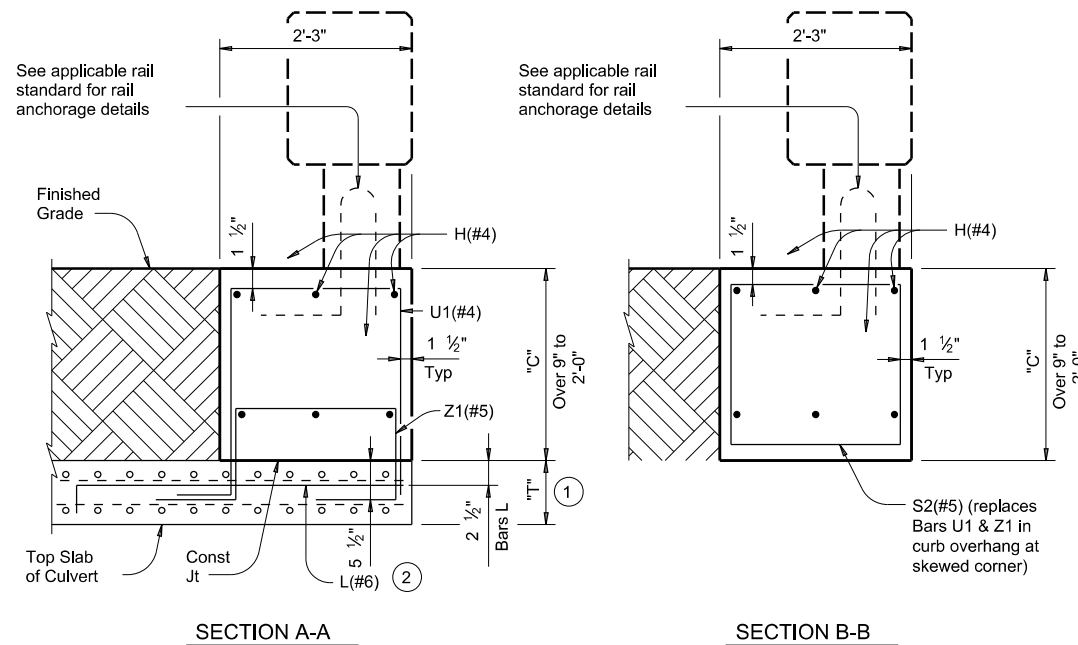
TYPE 1 CURB

Used for curbs from 8" to 9" (Showing "C" = 9"). Showing T223 Rail, other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.



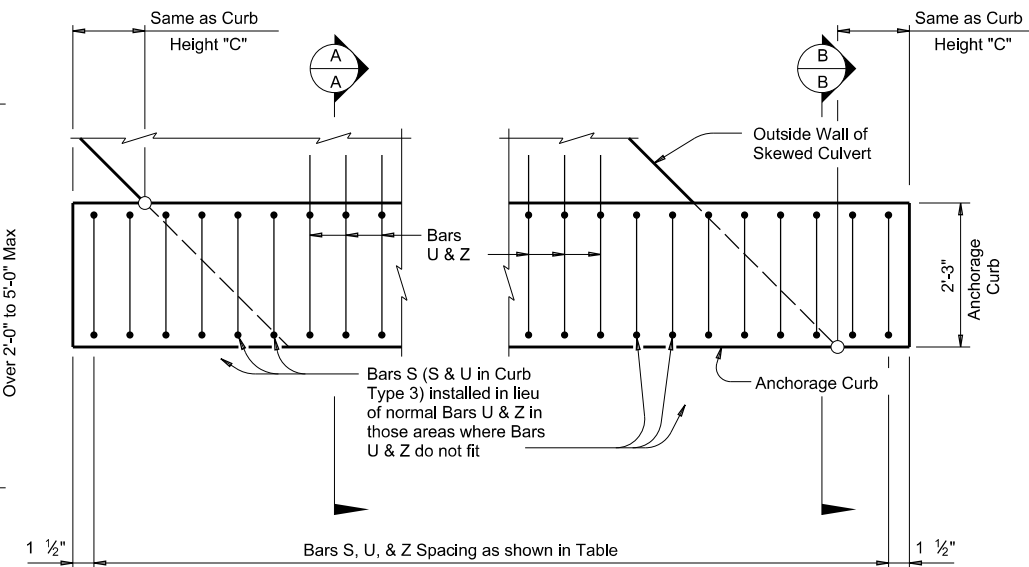
TYPE 3 CURB

Used for curbs over 2'-0" to 5'-0" (Showing "C" = 4'-0"). Showing T223 Rail, other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.



TYPE 2 CURB

Used for curbs over 9" to 2'-0" (Showing "C" = 2'-0"). Showing T223 Rail, other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.



TYPICAL CURB PLAN

Showing typical installation on skewed culvert. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.

Curb Height "C"	Section Type	Bars S, U, & Z Spa
8" to 9"	1	12"
Over 9" to 2'-0"	2	9"
Over 2'-0" to 3'-0"	3	7"
Over 3'-0" to 5'-0"	3	5"

Curb Height "C"	Section Type	Reinf Steel (Lb/LF)	Class "C" Concrete (CY/LF)
8"	1	21.5	0.056
9"	1	21.5	0.063
1'-0"	2	29.7	0.083
1'-6"	2	30.6	0.125
2'-0"	2	31.5	0.167
3'-0"	3	44.6	0.250
4'-0"	3	56.8	0.333
5'-0"	3	60.0	0.417

- "T" is equal to the culvert top slab thickness. For Precast Boxes with slabs less than 8" thick, see SCP-MD Standard for additional details.
- Tilt Bars L hook as necessary to maintain cover.
- Optional Bars L are to be used only for Precast Box Culverts with 3'-0" closure pours.
- Quantities shown are for Contractor's information only. Quantities are per Linear Foot of curb length. The values for each section type in table can be interpolated for intermediate values of Curb Height, "C".

CONSTRUCTION NOTES:

When using this anchorage curb, omit normal culvert curb reinforcing bars K and H shown on the culvert standard sheets. For vehicle safety, the top of the curb must be flush with the finished grade.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel. Galvanize all reinforcing steel if required elsewhere. Provide bar laps, where required, as follows:
 Uncoated or galvanized ~ #4 = 1'-11"
 Provide Class "C" concrete (f'c=3,600 psi). Provide Class "C" (HPC) concrete if shown elsewhere in the plans.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications. The rail anchorage curb details have sufficient strength for use with all standard rail types. See appropriate rail standard for approved design speed restrictions, notes and details not shown. This anchorage curb is considered part of the Box Culvert for payment. These details are for use with curbs that are 8" to 5'-0" tall only. Curb heights that are less than or greater than those shown will require special design.

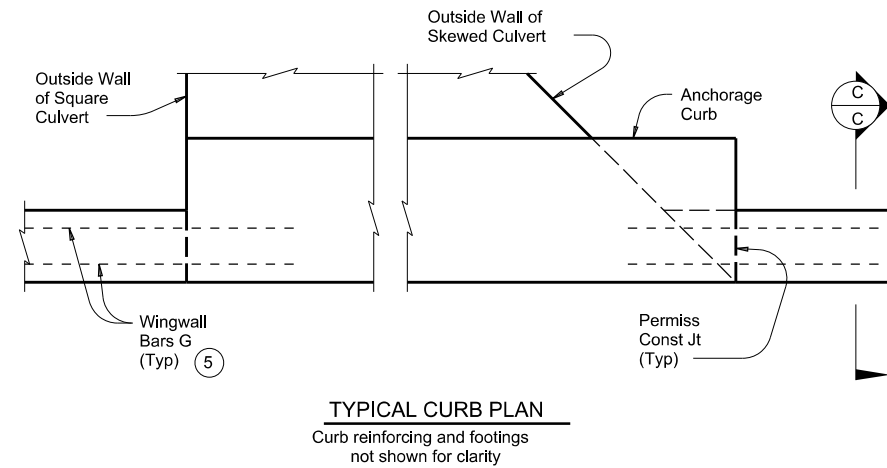
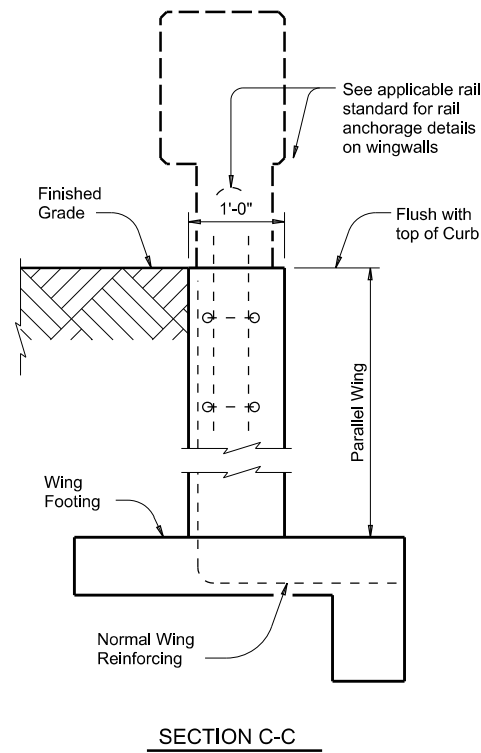
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.

SHEET 1 OF 2

		Bridge Division Standard	
RAIL ANCHORAGE CURB BOX CULVERT RAIL MOUNTING DETAILS (CURBS 8" TO 5'-0" TALL ONLY)			
RAC			
FILE: racste01-20.dgn	DN: GAF	CK: TxDOT	DW: TxDOT
REVISIONS	CONT	SECT	JOB
			HIGHWAY
	DIST	COUNTY	SHEET NO.
			104

DISCLAIMER:
 The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 7/10/2020 4:44:46 PM
 FILE: ... \Standards\racste01-20.dgn



INSTALLATION AT PARALLEL CULVERT WINGWALLS

See culvert wingwall standard for bars and details not shown.

5 Bars G (#5), as identified on the PARALLEL WINGS PW standard sheet, must extend 1'-6" into the Anchorage Curb similar to that shown for a normal culvert curb.

SHEET 2 OF 2

		Bridge Division Standard	
RAIL ANCHORAGE CURB BOX CULVERT RAIL MOUNTING DETAILS (CURBS 8" TO 5'-0" TALL ONLY)			
RAC			
FILE: racste01-20.dgn	DN: GAF	CK: TxDOT	DW: TxDOT
©TxDOT February 2020	CONT	SECT	JOB
REVISIONS		HIGHWAY	
DIST	COUNTY		SHEET NO.
			105

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

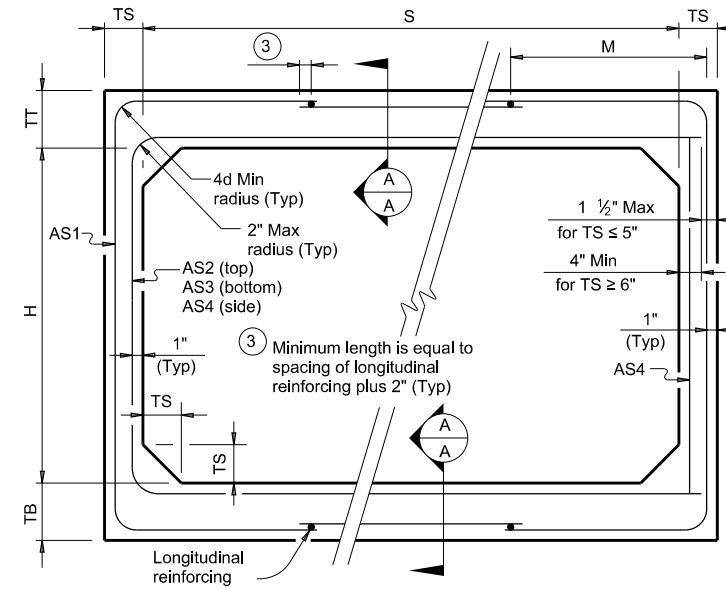
DATE: 7/10/2020 4:44:46 PM
FILE: ... \Standards\scp07sts-20.dgn

BOX DATA

SECTION DIMENSIONS					Fill Height (ft.)	M (Min) (in.)	REINFORCING (sq. in. / ft.) ^②							① Lift Weight (tons)
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)			AS1	AS2	AS3	AS4	AS5	AS7	AS8	
7	3	8	8	8	< 2	-	0.23	0.31	0.22	0.19	0.19	0.19	0.19	9.6
7	3	8	8	8	2 < 3	47	0.27	0.25	0.24	0.19	-	-	-	9.6
7	3	8	8	8	3 - 5	43	0.19	0.19	0.19	0.19	-	-	-	9.6
7	3	8	8	8	10	43	0.21	0.20	0.21	0.19	-	-	-	9.6
7	3	8	8	8	15	43	0.28	0.26	0.27	0.19	-	-	-	9.6
7	3	8	8	8	20	43	0.36	0.34	0.35	0.19	-	-	-	9.6
7	3	8	8	8	25	43	0.45	0.42	0.43	0.19	-	-	-	9.6
7	3	8	8	8	30	43	0.54	0.50	0.51	0.19	-	-	-	9.6
7	4	8	8	8	< 2	-	0.21	0.34	0.25	0.19	0.19	0.19	0.19	10.4
7	4	8	8	8	2 < 3	43	0.23	0.28	0.28	0.19	-	-	-	10.4
7	4	8	8	8	3 - 5	43	0.19	0.22	0.19	0.19	-	-	-	10.4
7	4	8	8	8	10	43	0.19	0.23	0.23	0.19	-	-	-	10.4
7	4	8	8	8	15	41	0.24	0.30	0.30	0.19	-	-	-	10.4
7	4	8	8	8	20	41	0.31	0.38	0.39	0.19	-	-	-	10.4
7	4	8	8	8	25	41	0.38	0.47	0.48	0.19	-	-	-	10.4
7	4	8	8	8	30	41	0.46	0.57	0.57	0.19	-	-	-	10.4
7	5	8	8	8	< 2	-	0.19	0.36	0.27	0.19	0.19	0.19	0.19	11.2
7	5	8	8	8	2 < 3	47	0.21	0.31	0.31	0.19	-	-	-	11.2
7	5	8	8	8	3 - 5	43	0.19	0.24	0.21	0.19	-	-	-	11.2
7	5	8	8	8	10	43	0.19	0.25	0.26	0.19	-	-	-	11.2
7	5	8	8	8	15	41	0.21	0.32	0.33	0.19	-	-	-	11.2
7	5	8	8	8	20	41	0.27	0.41	0.42	0.19	-	-	-	11.2
7	5	8	8	8	25	41	0.33	0.51	0.52	0.19	-	-	-	11.2
7	5	8	8	8	30	41	0.40	0.61	0.62	0.19	-	-	-	11.2
7	6	8	8	8	< 2	-	0.19	0.38	0.30	0.19	0.19	0.19	0.19	12.0
7	6	8	8	8	2 < 3	59	0.19	0.33	0.34	0.19	-	-	-	12.0
7	6	8	8	8	3 - 5	47	0.19	0.25	0.23	0.19	-	-	-	12.0
7	6	8	8	8	10	43	0.19	0.26	0.27	0.19	-	-	-	12.0
7	6	8	8	8	15	41	0.19	0.34	0.35	0.19	-	-	-	12.0
7	6	8	8	8	20	41	0.24	0.43	0.45	0.19	-	-	-	12.0
7	6	8	8	8	25	41	0.29	0.53	0.55	0.19	-	-	-	12.0
7	6	8	8	8	30	41	0.35	0.64	0.65	0.19	-	-	-	12.0
7	7	8	8	8	< 2	-	0.19	0.40	0.33	0.19	0.19	0.19	0.19	12.8
7	7	8	8	8	2 < 3	59	0.19	0.36	0.37	0.19	-	-	-	12.8
7	7	8	8	8	3 - 5	59	0.19	0.27	0.25	0.19	-	-	-	12.8
7	7	8	8	8	10	47	0.19	0.27	0.29	0.19	-	-	-	12.8
7	7	8	8	8	15	43	0.19	0.35	0.37	0.19	-	-	-	12.8
7	7	8	8	8	20	43	0.22	0.44	0.46	0.19	-	-	-	12.8
7	7	8	8	8	25	43	0.27	0.54	0.57	0.19	-	-	-	12.8
7	7	8	8	8	30	41	0.32	0.65	0.67	0.19	-	-	-	12.8

① For box length = 8'-0"

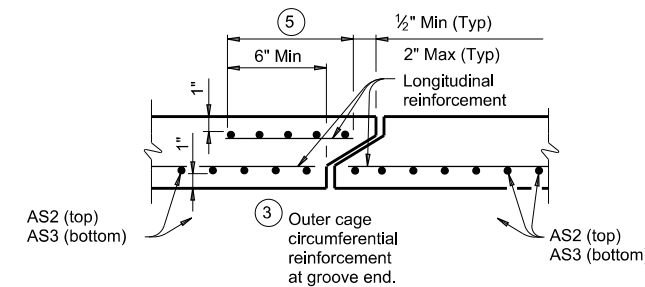
② AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A"

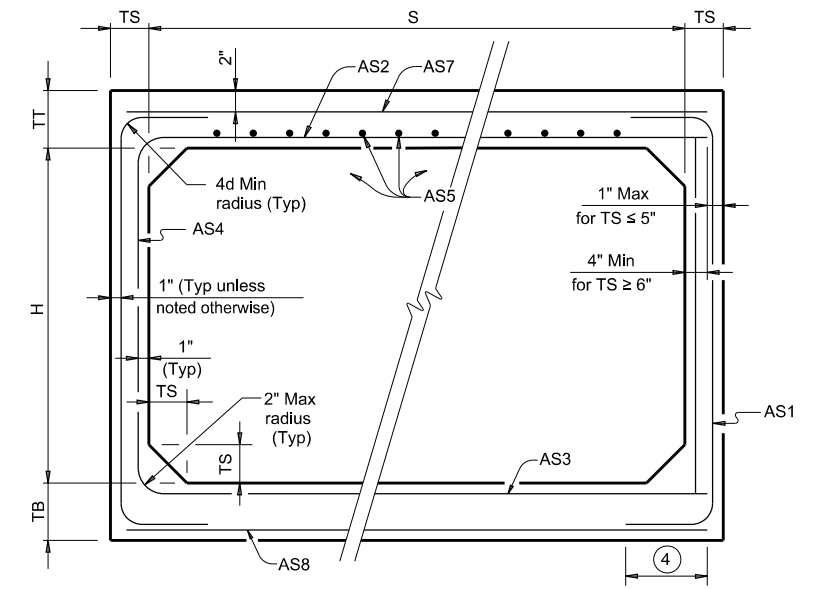
CORNER OPTION "B"

FILL HEIGHT 2 FT AND GREATER



SECTION A-A

(Showing top and bottom slab joint reinforcement.)



CORNER OPTION "A"

CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

④ Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.
Provide Class H concrete (f'c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.
See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.
In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

		Bridge Division Standard	
<h2>SINGLE BOX CULVERTS PRECAST 7'-0" SPAN</h2>			
<h3>SCP-7</h3>			
FILE:	scp07sts-20.dgn	DN:	TxDOT
CK:	TxDOT	DW:	TxDOT
CR:	TxDOT	HW:	TxDOT
REVISIONS		CONT	SECT
		JOB	HIGHWAY
		DIST	COUNTY
		SHEET NO.	
		106	

DISCLAIMER: This standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

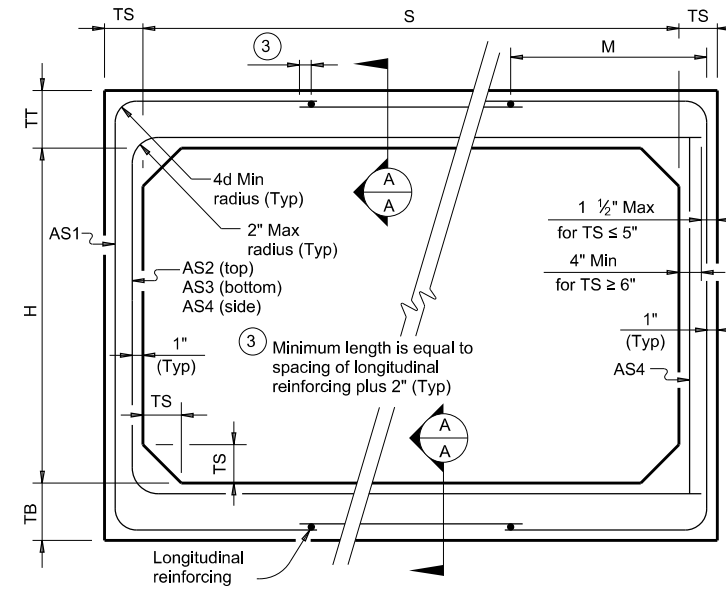
DATE: 7/10/2020 4:44:46 PM
 FILE: ... \Standards\scp08sts-20.dgn

BOX DATA

SECTION DIMENSIONS					Fill Height (ft.)	M (Min) (in.)	REINFORCING (sq. in. / ft.) ^②							① Lift Weight (tons)
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)			AS1	AS2	AS3	AS4	AS5	AS7	AS8	
8	3	8	8	8	< 2	-	0.31	0.35	0.25	0.19	0.19	0.19	0.19	10.4
8	3	8	8	8	2 < 3	55	0.35	0.29	0.28	0.19	-	-	-	10.4
8	3	8	8	8	3 - 5	50	0.28	0.23	0.24	0.19	-	-	-	10.4
8	3	8	8	8	10	45	0.29	0.25	0.26	0.19	-	-	-	10.4
8	3	8	8	8	15	45	0.39	0.33	0.34	0.19	-	-	-	10.4
8	3	8	8	8	20	45	0.51	0.43	0.44	0.19	-	-	-	10.4
8	3	8	8	8	25	45	0.63	0.53	0.54	0.19	-	-	-	10.4
8	4	8	8	8	< 2	-	0.27	0.38	0.29	0.19	0.19	0.19	0.19	11.2
8	4	8	8	8	2 < 3	50	0.31	0.34	0.32	0.19	-	-	-	11.2
8	4	8	8	8	3 - 5	50	0.25	0.27	0.27	0.19	-	-	-	11.2
8	4	8	8	8	10	45	0.26	0.28	0.29	0.19	-	-	-	11.2
8	4	8	8	8	15	41	0.34	0.37	0.38	0.19	-	-	-	11.2
8	4	8	8	8	20	41	0.44	0.48	0.49	0.19	-	-	-	11.2
8	5	8	8	8	< 2	-	0.24	0.40	0.32	0.19	0.19	0.19	0.19	12.0
8	5	8	8	8	2 < 3	50	0.28	0.37	0.35	0.19	-	-	-	12.0
8	5	8	8	8	3 - 5	45	0.23	0.29	0.30	0.19	-	-	-	12.0
8	5	8	8	8	10	45	0.23	0.31	0.32	0.19	-	-	-	12.0
8	5	8	8	8	15	41	0.30	0.41	0.42	0.19	-	-	-	12.0
8	5	8	8	8	20	41	0.39	0.52	0.54	0.19	-	-	-	12.0
8	6	8	8	8	< 2	-	0.22	0.42	0.35	0.19	0.19	0.19	0.19	12.8
8	6	8	8	8	2 < 3	50	0.25	0.40	0.38	0.19	-	-	-	12.8
8	6	8	8	8	3 - 5	50	0.21	0.32	0.33	0.19	-	-	-	12.8
8	6	8	8	8	10	45	0.22	0.33	0.34	0.19	-	-	-	12.8
8	6	8	8	8	15	41	0.28	0.43	0.45	0.19	-	-	-	12.8
8	6	8	8	8	20	41	0.36	0.55	0.57	0.19	-	-	-	12.8
8	7	8	8	8	< 2	-	0.20	0.44	0.37	0.19	0.19	0.19	0.19	13.6
8	7	8	8	8	2 < 3	55	0.23	0.43	0.41	0.19	-	-	-	13.6
8	7	8	8	8	3 - 5	55	0.19	0.34	0.35	0.19	-	-	-	13.6
8	7	8	8	8	10	50	0.20	0.34	0.36	0.19	-	-	-	13.6
8	7	8	8	8	15	41	0.26	0.45	0.47	0.19	-	-	-	13.6
8	7	8	8	8	20	41	0.33	0.57	0.60	0.19	-	-	-	13.6
8	8	8	8	8	< 2	-	0.20	0.45	0.40	0.19	0.19	0.19	0.19	14.4
8	8	8	8	8	2 < 3	65	0.21	0.45	0.44	0.19	-	-	-	14.4
8	8	8	8	8	3 - 5	65	0.19	0.36	0.38	0.19	-	-	-	14.4
8	8	8	8	8	10	55	0.19	0.35	0.38	0.19	-	-	-	14.4
8	8	8	8	8	15	45	0.24	0.46	0.49	0.19	-	-	-	14.4
8	8	8	8	8	20	45	0.31	0.59	0.62	0.19	-	-	-	14.4

① For box length = 8'-0"

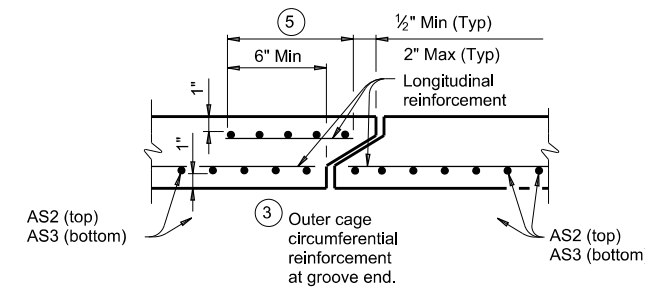
② AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A"

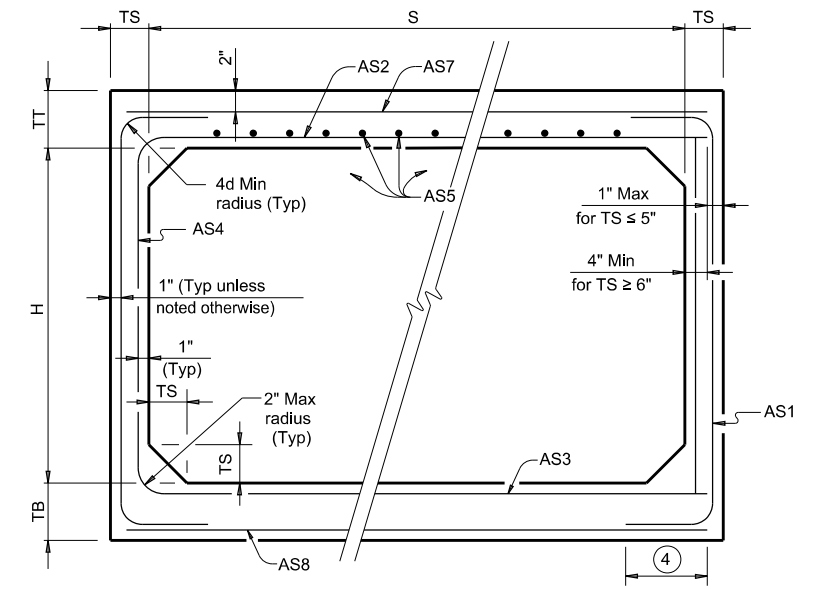
CORNER OPTION "B"

FILL HEIGHT 2 FT AND GREATER



SECTION A-A

(Showing top and bottom slab joint reinforcement.)



CORNER OPTION "A"

CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

④ Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.
 Provide Class H concrete (f'c = 5,000 psi).

GENERAL NOTES:

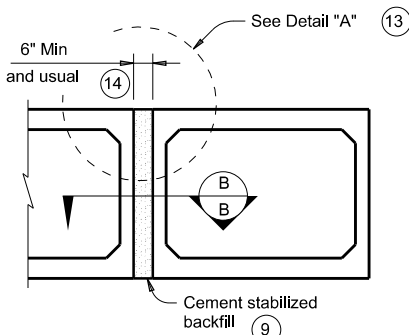
Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.
 See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.
 In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

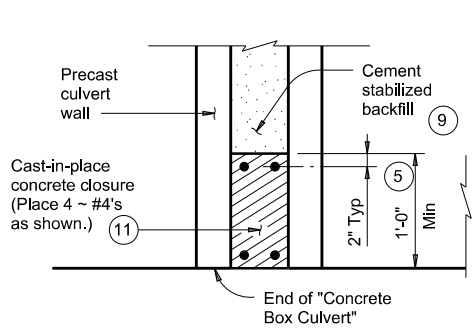
		Bridge Division Standard	
SINGLE BOX CULVERTS PRECAST 8'-0" SPAN			
SCP-8			
FILE:	scp08sts-20.dgn	DN:	TxDOT
CK:	TxDOT	DW:	TxDOT
CR:	TxDOT	HW:	TxDOT
REVISIONS		CONT:	SECT:
		JOB:	HIGHWAY:
		DIST:	COUNTY:
		SHEET NO.	
		107	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

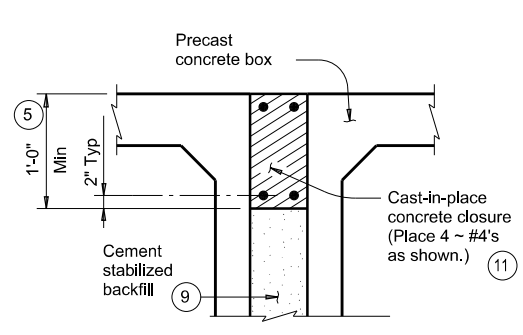
DATE: 7/10/2020 4:44:47 PM
 FILE: ... \Standards\scpmdsts-20.dgn



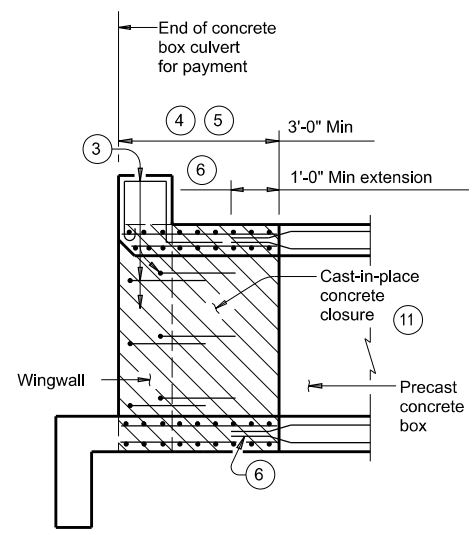
MULTIPLE UNIT PLACEMENT



SECTION B-B

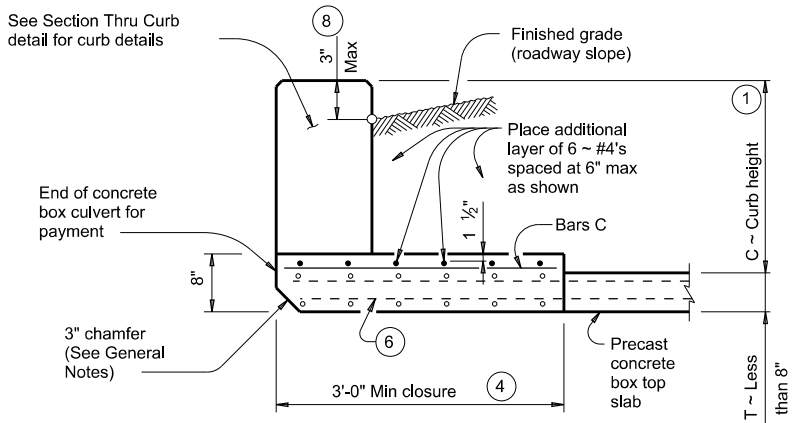


DETAIL "A"

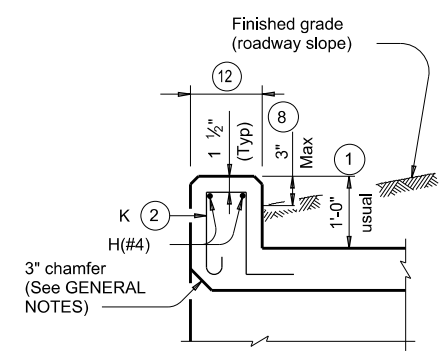


WINGWALL CONNECTION

(Also applies to safety end treatment.)

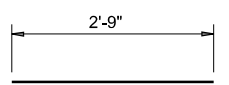


SECTION THRU TOP SLABS LESS THAN 8"

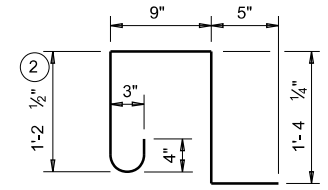


SECTION THRU CURB

QUANTITIES PER FOOT OF CURB (10)	
Reinforcing Steel	4.12 Lb
Concrete	0.037 CY



BARS C (#4)
(Spa = 1'-0" Max)



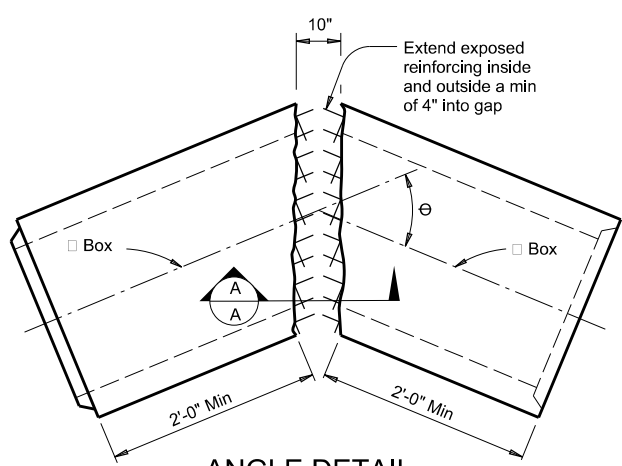
BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

- 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail, or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
- For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
- Extend curb, wingwall, or safety end treatment reinforcing into concrete closure. Bend or trim, as necessary, any reinforcing that does not fit into closure area.
- Provide a 3'-0" Min cast-in-place concrete closure. Break back boxes in the field or cast boxes short. Provide bands of reinforcing in the closure that are the same size and spacing as in the precast box section. Provide #4 longitudinal reinforcement spaced at 12 inches Max within the closure. Except where shown otherwise, construct the cast-in-place closure flush with the inside and outside faces of the precast box section.
- For multiple unit placements, adjust the length of the closure for the interior walls as necessary. Provide a 3'-0" Min cast-in-place closure in the top slab, bottom slab, and exterior wall. See Section B-B detail when interior walls are cast full length.
- Extend precast box reinforcing a minimum of 1'-0" into concrete closure (Typ).
- Place bands of reinforcing matching the inside and outside face reinforcing in the gaps of the top and bottom slabs. Place a band matching the outside face reinforcing of the wall in the gaps of the walls (placed in the outside face only). Tack weld the bands to the exposed reinforcing at each point of contact.
- For vehicle safety, the following requirements must be met:
 - For structures without bridge rail, construct curbs no more than 3" above finished grade.
 - For structures with bridge rail, construct curbs flush with finished grade. Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- Cement stabilized backfill between boxes is considered part of the box culvert for payment.
- All curb concrete and reinforcing is considered part of the box culvert for payment.
- Any additional concrete and reinforcing required for the closures will be considered subsidiary to the box culvert for payment.
- 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.
- For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in Detail "A".
- This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.

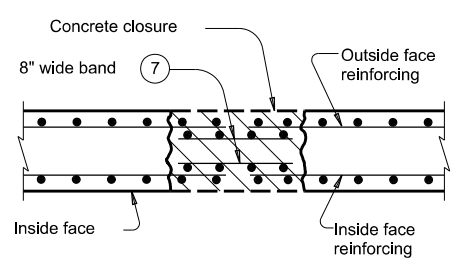
MATERIAL NOTES:
 Provide Grade 60 reinforcing steel.
 Provide ASTM A1064 welded wire reinforcement.
 Provide Class C concrete (f_c = 3,600 psi) for the closures.
 Provide cement stabilized backfill meeting the requirements of Item 400, "Excavation and Backfill for Structures."
 Any additional concrete required for the closures will be considered subsidiary to the box culvert.

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 Refer to the Single Box Culverts Precast (SCP) standard sheets for details and notes not shown.
 Chamfer the bottom edge of the top slab closure 3 inches at culvert closure ends.

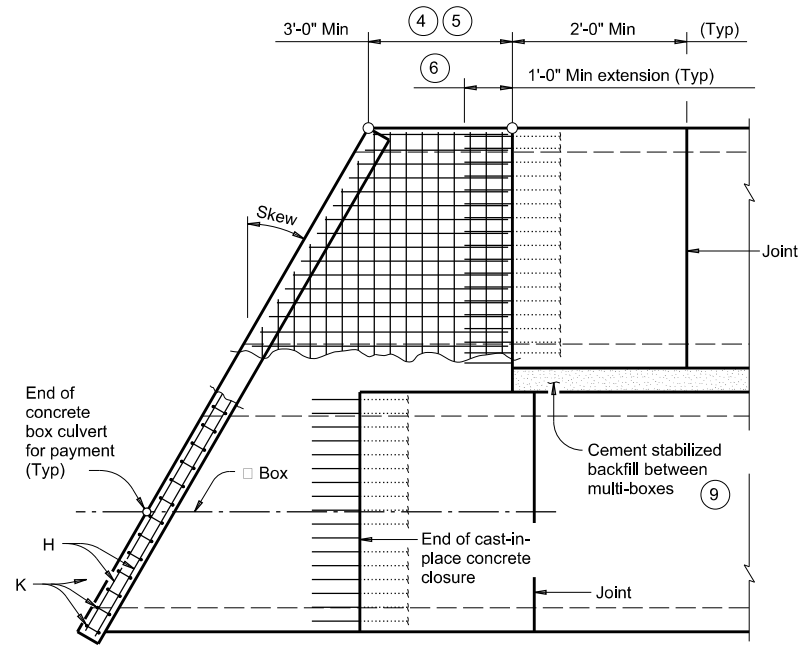
Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bars dimensions are out-to-out of bars.



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

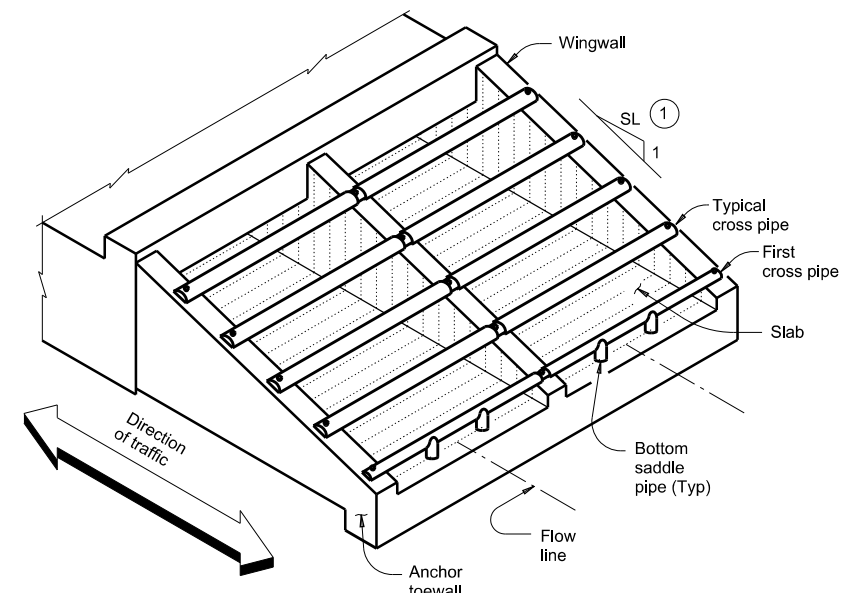
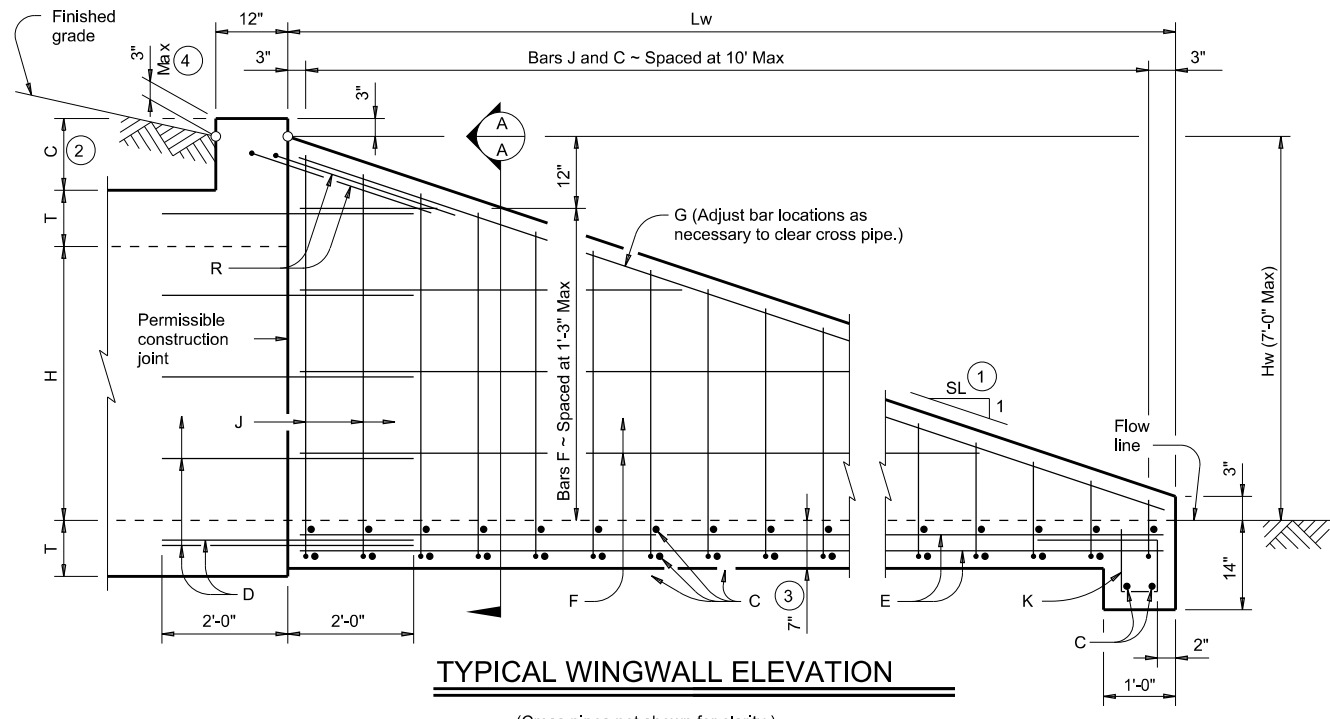
(Showing multi-box placement.)

HL93 LOADING

		Bridge Division Standard	
BOX CULVERTS PRECAST MISCELLANEOUS DETAILS			
SCP-MD			
FILE: scpmdsts-20.dgn	DN: GAF	CK: LMW	DW: BWH/TXDOT
©TxDOT February 2020	CONT	SECT	JOB
REVISIONS		HIGHWAY	
DIST	COUNTY	SHEET NO.	
		108	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 7/10/2020 4:44:48 PM
 FILE: ...Standards\set\pdse-20.dgn



WING DIMENSION CALCULATIONS:

$$Hw = H + T + C - 0.250'$$

$$Lw = (Hw - 0.333') (SL)$$

For cast-in-place culverts:
 $Atw = (N) (S) + (N + 1) (U)$

For precast culverts:
 $Atw = (N) (2U + S) + (N - 1) (0.500')$

Total Wingwall Area (SF)
 $= (0.5) (Hw + 0.333') (Lw) (N - 1)$

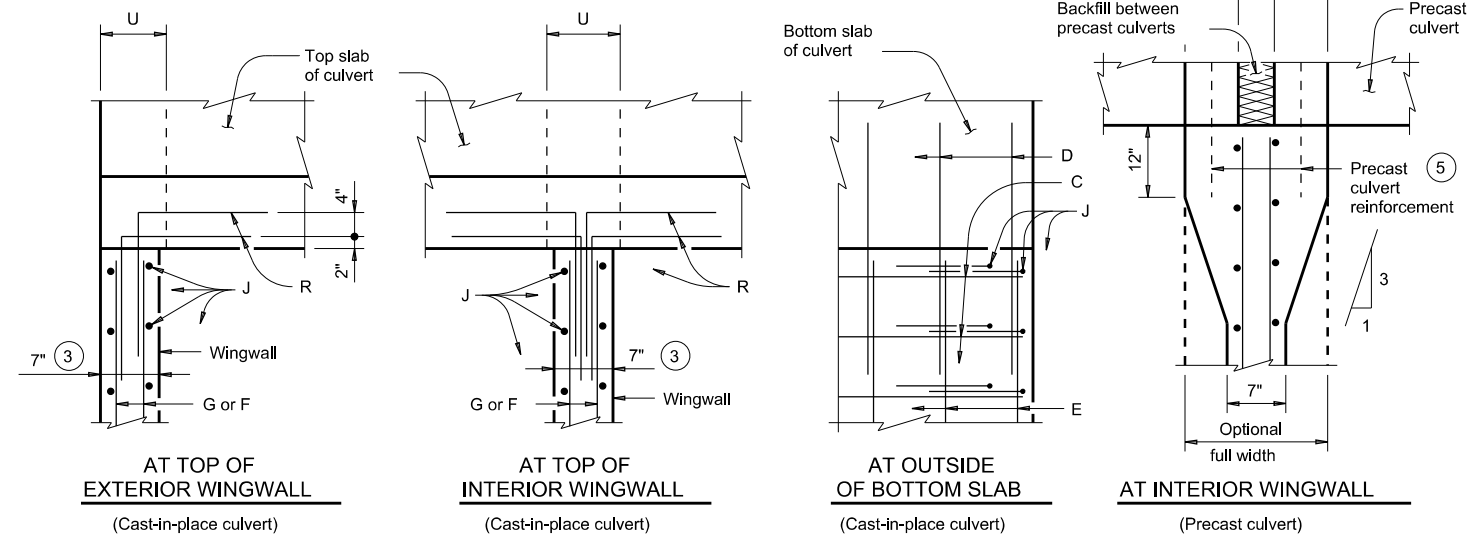
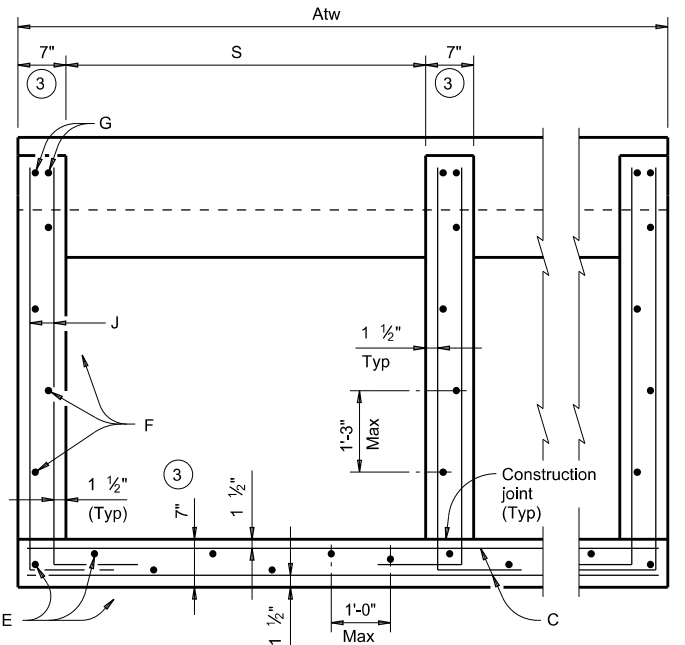
Total Concrete Volume (CY)
 $= [(Wingwall Area) (0.583') + (Lw) (Atw) (0.583') + (Atw) (1.167') (1.167' - 0.583')] + (27)$

PIPE RUNNER DIMENSION CALCULATIONS:

Pipe Runner Length (feet)
 $= (Lw) (K1) - (1.917')$

Total Reinforcing (Lb)
 $= (1.55) (Lw) (Atw) + (4.43) (Atw) + (K2) (Hw) (N + 1) (Lw)$

C = Height of curb above top of top slab (feet)
 Hw = Height of wingwall (feet)
 K = Constant value for use in formulas
 Slope SL: 1 K1 K2
 3:1 ~ 1.054 ~ 7.45
 4:1 ~ 1.031 ~ 8.49
 6:1 ~ 1.014 ~ 10.30
 Atw = Anchor toewall length (feet)
 Lw = Length of wingwall (feet)
 N = Number of culvert barrels
 SL:1 = Side slope ratio (horizontal : 1 vertical)
 See applicable box culvert standard for H, S, T, and U values.

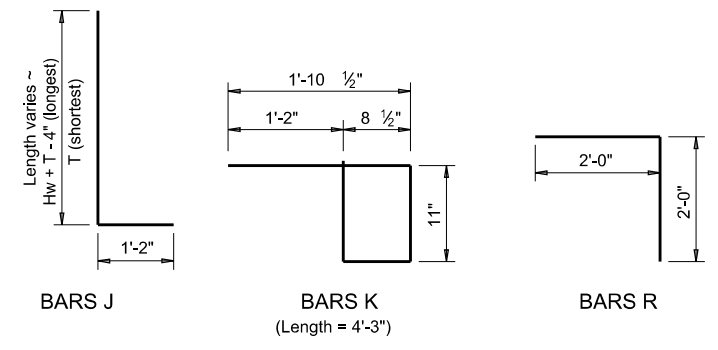


PLAN VIEWS OF CORNER DETAILS

- Provide 6:1 or flatter slope.
- 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to Extended Curb Details the Extended Curb Details (ECD) standard sheet.
- Wingwall and slab thicknesses may be the same as the adjacent culvert wall and slab thicknesses (7" Minimum). If thicknesses greater than the minimum (7") are used, no changes will be made in quantities and no additional compensation will be allowed.
- For vehicle safety, reduce height, if necessary, to provide a maximum 3" projection above finished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.
- For culverts with C = 0", the precast culvert reinforcing may extend 1'-0" minimum into wingwall. Wingwall bars D and R may be omitted. Otherwise, refer to the Wingwall Connection detail on the Box Culvert Precast Miscellaneous Details (SCP-MD) standard sheet.

TABLE OF REINFORCING BAR SIZES AND SPACING

Bar	Size	Spacing
C	#4	10' Max
D	#4	Match F and E
E	#4	1'-0" Max
F	#4	1'-3" Max
G	#6	As shown
J	#4	10' Max
K	#4	1'-0" Max
R	#4	As shown



MATERIAL NOTES:

- Provide Grade 60 reinforcing steel.
- Provide galvanized reinforcing steel if required elsewhere in the plans. Adjust reinforcing as necessary to provide a minimum clear cover of 1 1/2".
- Provide Class "C" concrete (f'c = 3,600 psi).
- Provide pipe runners, cross pipes, and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.
- Provide ASTM A307 bolts.
- Galvanize all steel components, except the concrete reinforcing, unless required elsewhere in the plans, after fabrication.
- Repair galvanizing damaged during transport or construction in accordance with Item 445, "Galvanizing."

GENERAL NOTES:

- Designed according to AASHTO LRFD Bridge Design Specifications.
- The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes.
- Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.
- The quantities for concrete, reinforcing steel, and cross pipes resulting from the formulas given herein are for Contractor's information only.
- See the Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
- Alternate design drawings bearing the seal of a professional engineer will be acceptable for precast construction of the safety end treatments.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.

Texas Department of Transportation Bridge Division Standard

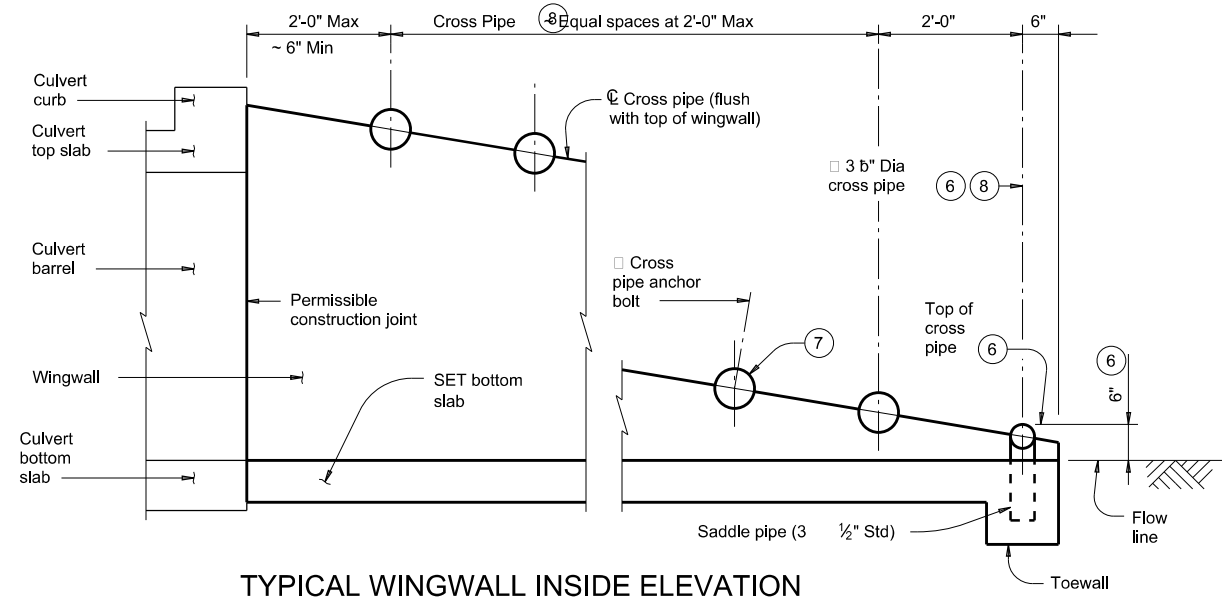
SAFETY END TREATMENT FOR BOX CULVERTS (MAXIMUM Hw = 7'-0") TYPE I ~ PARALLEL DRAINAGE

SETB-PD

FILE: setpdse-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY	SHEET NO.	
			109	

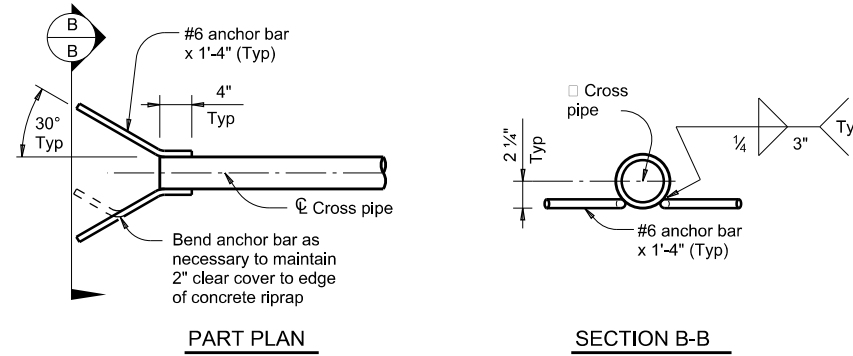
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 7/10/2020 4:44:48 PM
 FILE: ...Standards\setbdse-20.dgn

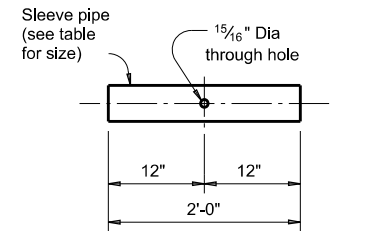


TYPICAL WINGWALL INSIDE ELEVATION

(Showing installation of cross pipes.)



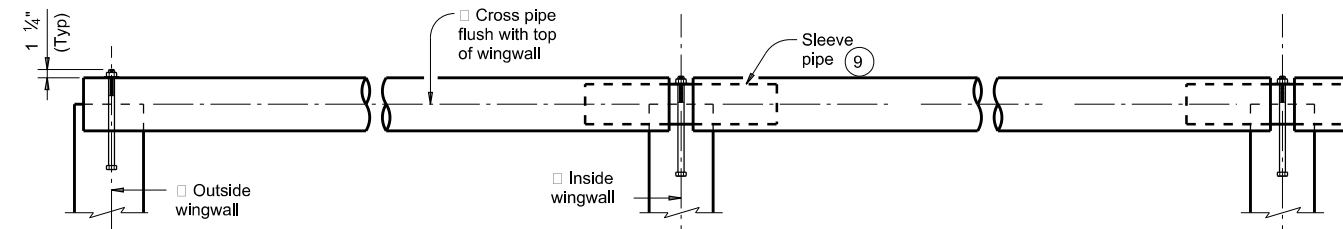
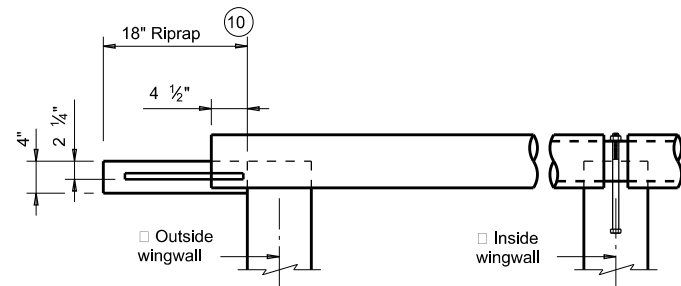
OPTIONAL ANCHOR BAR DETAILS



SLEEVE PIPE DETAILS

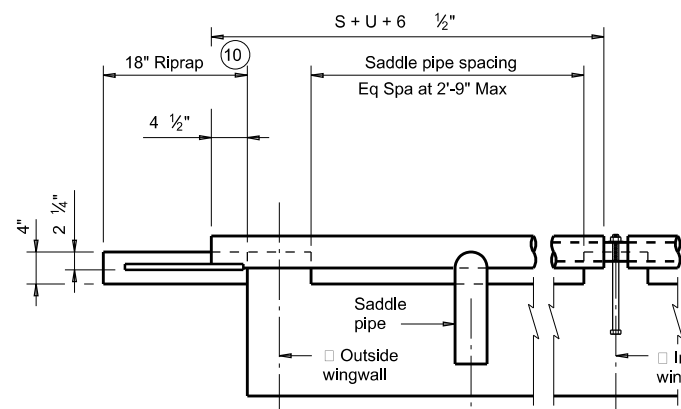
REQUIRED PIPE SIZES ⁽⁸⁾			STANDARD PIPE SIZES		
Culvert Span Sizes	Cross Pipe Size	Sleeve Pipe Size ⁽⁹⁾	Pipe Size	Pipe O.D.	Pipe I.D.
First Pipe	3 1/2" STD	2 1/2" STD	2 1/2" STD	2.875"	2.469"
30" to 42"	4" STD	3" STD	3" STD	3.500"	3.068"
48" to 72"	5" STD	4" STD	3 1/2" STD	4.000"	3.548"
78" to 120"	6" STD	5" STD	4" STD	4.500"	4.026"
			5" STD	5.563"	5.047"
			6" STD	6.625"	6.065"

- ⁽⁶⁾ The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe at no more than 6" above the flow line.
- ⁽⁷⁾ Always install the third cross pipe from the bottom of the culvert using a bolted connection. Take care to ensure that concrete does not flow into this cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.
- ⁽⁸⁾ Provide cross pipes and sleeve pipes (if required) as shown in the Required Pipe Sizes table. Provide 3 1#2" saddle pipes for the 3 1#2" first cross pipe.
- ⁽⁹⁾ At Contractor's option, make the cross pipe continuous across the inside wingwalls. If this option is selected, omit the sleeve pipe and make a 15#16" diameter through hole in the cross pipe to accept the anchor bolt at the centerline of each interior wingwall.
- ⁽¹⁰⁾ Provide riprap when using the Optional Anchor Bar details. Riprap is included in the bid price for Safety End Treatment. Provide riprap in accordance with Item 432, "Riprap".

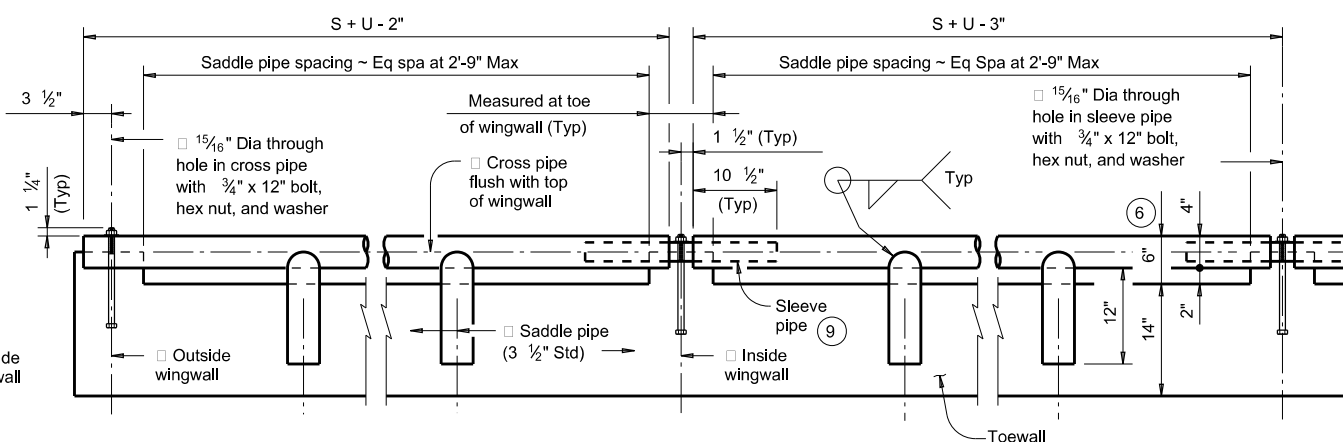


SECTION THROUGH INSTALLATION OF TYPICAL FULL CROSS PIPE

(Anchor details and dimensions are similar to those shown below in Section Through Installation of 3 b" First Cross Pipe detail.)



OUTSIDE CULVERT BARREL WITH OPTIONAL ANCHOR BARS & RIPRAP



SECTION THROUGH INSTALLATION OF 3 1/2" FIRST CROSS PIPE

OUTSIDE CULVERT BARREL WITH BOLTED ANCHOR

INSIDE CULVERT BARREL

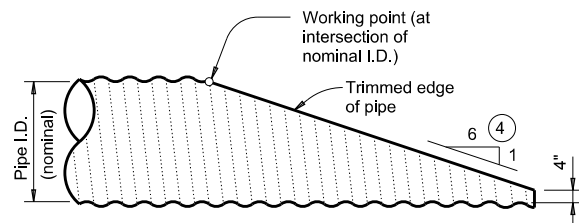
CROSS PIPE INSTALLATION DETAILS

SHEET 2 OF 2

		Bridge Division Standard	
SAFETY END TREATMENT FOR BOX CULVERTS (MAXIMUM Hw = 7'-0") TYPE I ~ PARALLEL DRAINAGE			
SETB-PD			
FILE: setbdse-20.dgn	DN: GAF	CK: CAT	DW: TxDOT
©TxDOT February 2020	CONT	SECT	JOB
REVISIONS	COUNTY		SHEET NO.
			110

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

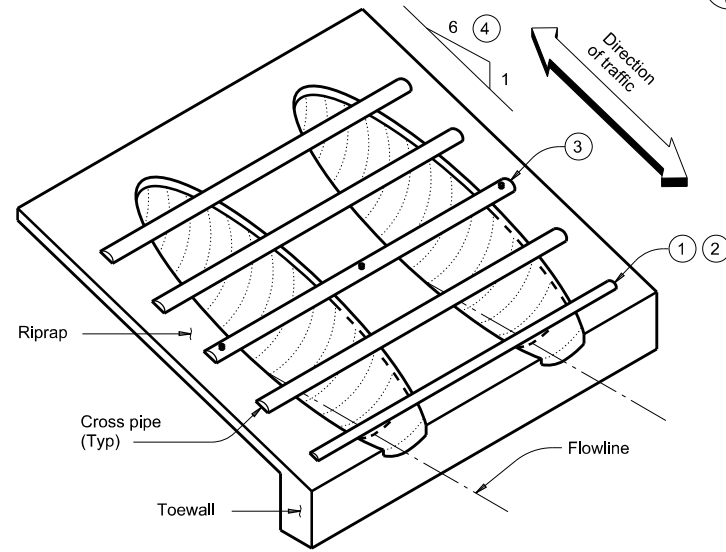
DATE: 7/10/2020 4:44:49 PM
 FILE: ...Standards\setppdse-20.dgn



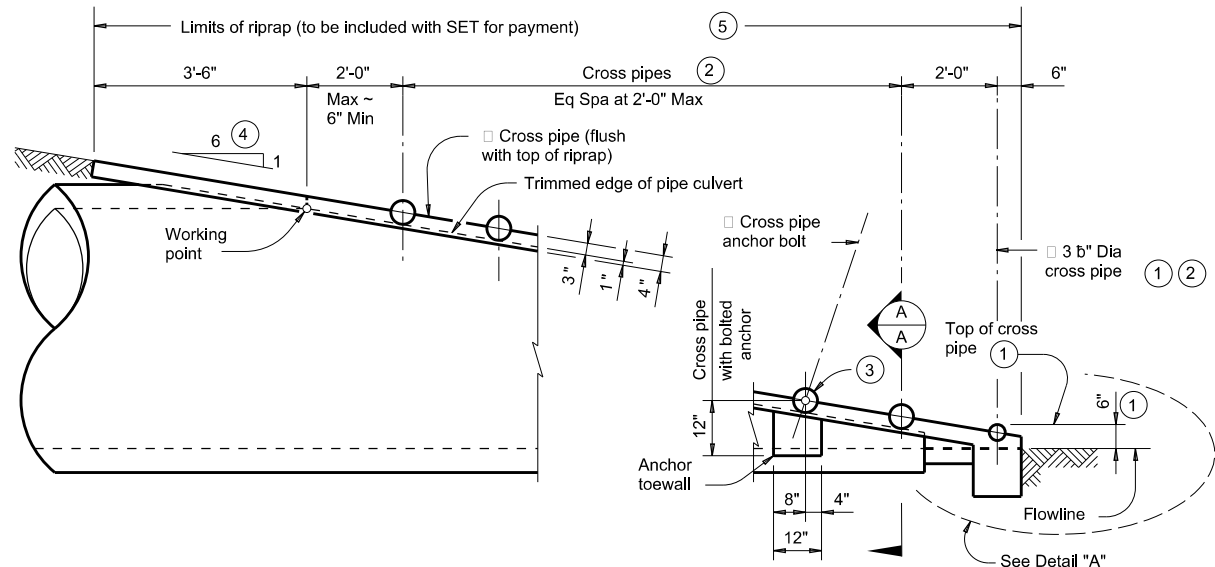
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert. Details at reinforced concrete pipe (RCP) culvert are similar.)

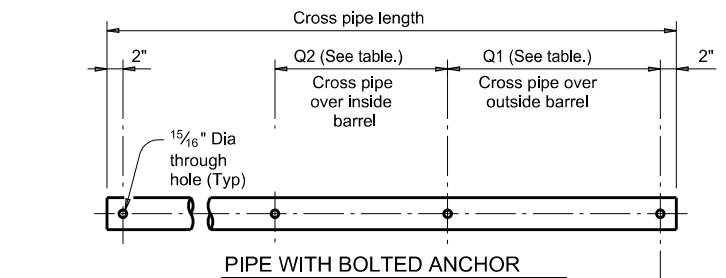


ISOMETRIC VIEW OF TYPICAL INSTALLATION

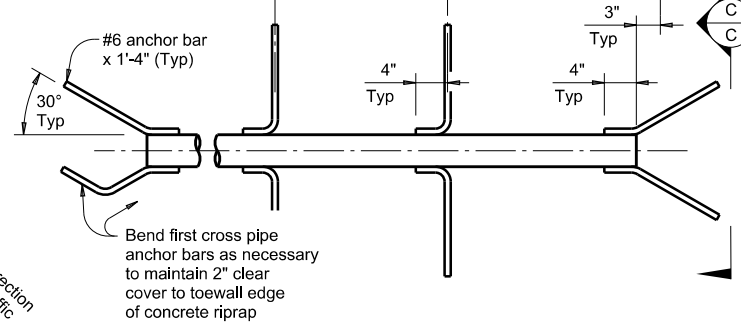


SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

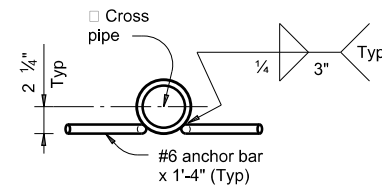
(Showing reinforced concrete pipe (RCP) culvert. Details at corrugated metal pipe (CMP) culvert are similar.)



PIPE WITH BOLTED ANCHOR



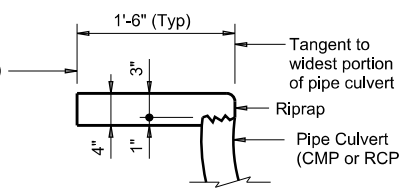
PIPE WITH ANCHOR BARS



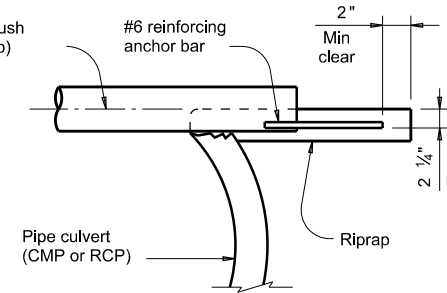
SECTION C-C

CROSS PIPE DETAILS

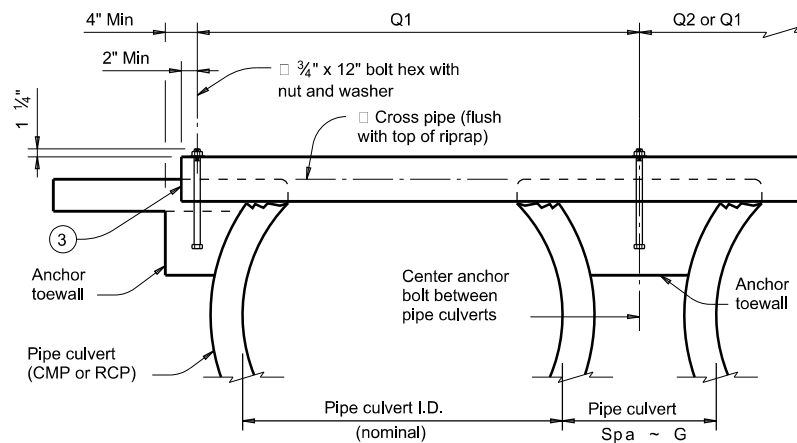
Limits of riprap (to be included with SET for payment) 5



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

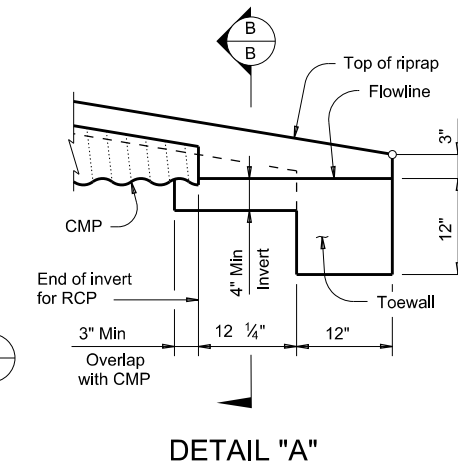


SHOWING CROSS PIPE WITH ANCHOR BAR



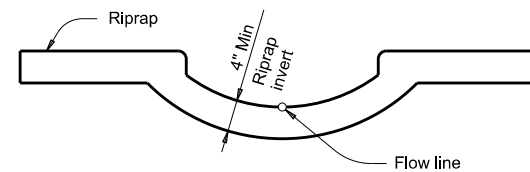
SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A



DETAIL "A"

(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



SECTION B-B

(Cross pipes not shown for clarity.)

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' - 9"	N/A	2' - 1"	1' - 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' - 11"	N/A	2' - 5"	2' - 2"		
18"	0.8	1' - 2"	N/A	2' - 10"	2' - 8"		
21"	0.9	1' - 4"	N/A	3' - 2"	3' - 1"		
24"	0.9	1' - 7"	N/A	3' - 6"	3' - 7"	3 or more pipe culverts	3 1/2" Std (4.000" O.D.)
27"	1.0	1' - 8"	N/A	3' - 10"	3' - 11"		
30"	1.1	1' - 10"	N/A	4' - 2"	4' - 4"	2 or more pipe culverts	4" Std (4.500" O.D.)
33"	1.2	1' - 11"	4' - 2"	4' - 5"	4' - 8"	All pipe culverts	
36"	1.3	2' - 1"	4' - 5"	4' - 9"	5' - 1"	All pipe culverts	4" Std (4.500" O.D.)
42"	1.5	2' - 4"	4' - 11"	5' - 5"	5' - 10"		
48"	1.7	2' - 7"	5' - 5"	6' - 0"	6' - 7"	All pipe culverts	5" Std (5.563" O.D.)
54"	2.0	3' - 0"	5' - 11"	6' - 9"	7' - 6"		
60"	2.2	3' - 3"	6' - 5"	7' - 4"	8' - 3"		
66"	2.4	3' - 3"	6' - 11"	7' - 10"	8' - 9"		
72"	2.7	3' - 4"	7' - 5"	8' - 5"	9' - 4"		

- The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.
- Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1/2" standard pipe (4" O.D.) for the first bottom pipe.
- Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.
- Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.
- Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".
- Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for contractor's information only.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise. Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 (Gr B), or API 5LX52. Provide ASTM A307 bolts and nuts. Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981. Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes. Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap". Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.

Texas Department of Transportation Bridge Division Standard

SAFETY END TREATMENT FOR 12" DIA TO 72" DIA PIPE CULVERTS TYPE II ~ PARALLEL DRAINAGE

SETP-PD

FILE: setppdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY	SHEET NO.	
			111	

SPECIAL NOTES

- ALL PIPE SIZES WERE TAKEN FROM UTILITY RECORDS WHERE POSSIBLE. THE UTILITIES DEPICTED WERE INVESTIGATED BY THE RIOS GROUP, INC.. ALL OTHER PLAN INFORMATION, NOTABLY THE BACKGROUND INFORMATION, WAS PROVIDED BY OTHERS AND THE RIOS GROUP, INC. DISCLAIMS RESPONSIBILITY FOR ITS ACCURACY.
- EXISTING SUBSURFACE UTILITY INVESTIGATIONS WERE COMPLETED ON 05/13/2020. THE RIOS GROUP, INC. EXPRESSLY DISCLAIMS ANY AND ALL RESPONSIBILITY FOR NEW UTILITY INSTALLATIONS, MODIFICATIONS, AND/OR ADJUSTMENTS TO EXISTING UTILITIES AFTER THE COMPLETION DATE.
- UTILITY LOCATIONS ON THESE DRAWINGS ARE INTENDED FOR DESIGN PURPOSES AND NOT CONSTRUCTION. THEY REFLECT SUBSURFACE UTILITIES AT THE TIME OF FIELD INVESTIGATION. CALL TEXAS ONE CALL SYSTEM (800)245-4545 FOR UTILITY LOCATIONS 48 HOURS PRIOR TO ANY WORK.
- WHERE POSSIBLE, WATER, GAS, AND COMMUNICATION SERVICE LINES WERE DESIGNATED. HOWEVER, SOME SERVICE LINES ARE CONSTRUCTED OF NON-CONDUCTIVE MATERIAL AND UTILITY COMPANY DRAWINGS MAY NOT SHOW SERVICE LINE LOCATIONS. THEREFORE ALL SERVICE LINES MAY NOT BE SHOWN.

QUALITY LEVELS

- QUALITY LEVEL "D" - INFORMATION DERIVED FROM EXISTING RECORDS AND/OR ORAL COLLECTION.
- QUALITY LEVEL "C" - INFORMATION OBTAINED BY SURVEYING AND PLOTTING VISIBLE ABOVE GROUND UTILITY FEATURES AND BY USING PROFESSIONAL JUDGMENT IN CORRELATING INFORMATION TO QUALITY LEVEL "D" INFORMATION.
- QUALITY LEVEL "B" - DESIGNATE: TWO-DIMENSIONAL HORIZONTAL MAPPING. THIS INFORMATION IS OBTAINED THROUGH THE APPLICATION AND INTERPRETATION OF APPROPRIATE NON-DESTRUCTIVE SURFACE GEOPHYSICAL METHODS. UTILITY INDICATIONS ARE REFERENCED TO ESTABLISHED SURVEY CONTROL. INCORPORATES QUALITY LEVELS "C" AND "D" INFORMATION TO PRODUCE QUALITY LEVEL "B" INFORMATION.
- QUALITY LEVEL "A" - LOCATE: PRECISE HORIZONTAL AND VERTICAL LOCATION OF UTILITIES OBTAINED BY THE ACTUAL EXPOSURE AND SUBSEQUENT MEASUREMENT OF SUBSURFACE UTILITIES AT A SPECIFIC POINT. DIAMETERS SHOWN ARE VERIFIED VISUALLY AND MAY NOT BE EXACT.

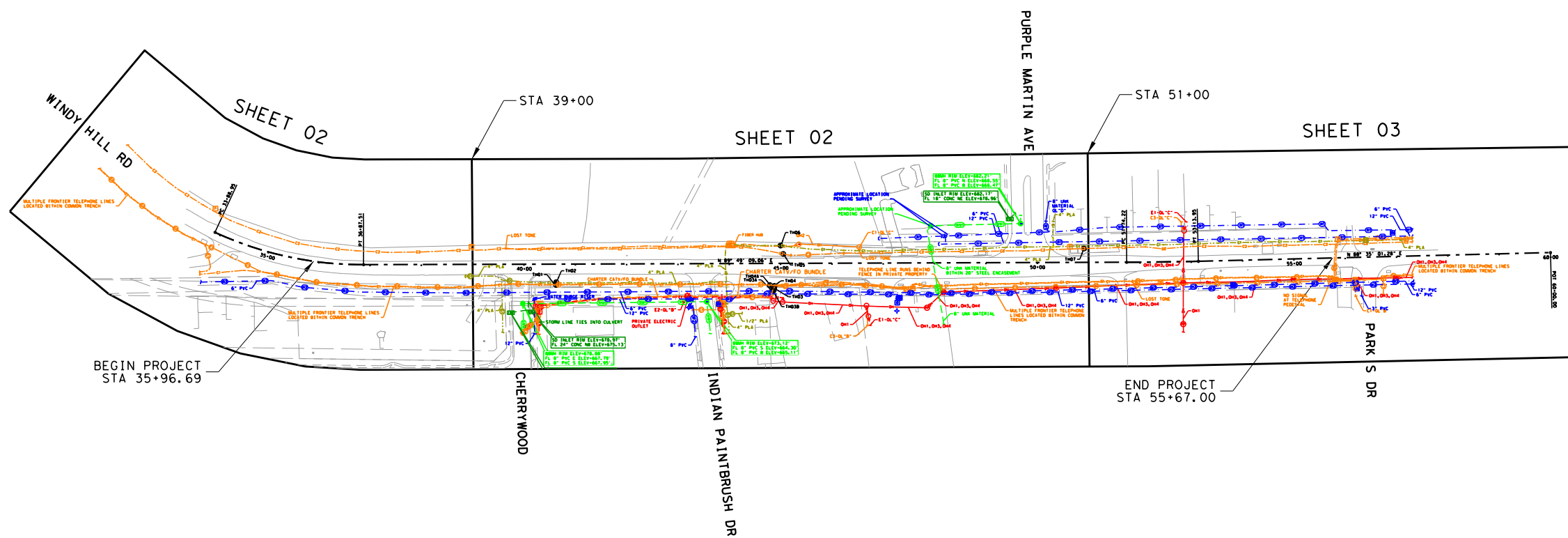
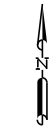
MATERIAL ABBREVIATIONS

- STL - STEEL
 PE - POLYETHYLENE
 AC - TRANSITE
 CI - CAST IRON
 PVC - POLYVINYL CHLORIDE
 RCP - REINFORCED CONCRETE PIPE
 VC - VITRIFIED CLAY
 CSC - CONCRETE/STEEL CYLINDER
 CONC - CONCRETE
 DI - DUCTILE IRON
 BS - BARE STEEL
 GALV - GALVANIZED
 WI - WROUGHT IRON
 HDPE - HIGH DENSITY POLYETHYLENE
 COP - COPPER
 FRPM - FIBER GLASS REINFORCED PLASTIC MORTAR
 UNK - UNKNOWN
 CS - CARBON STEEL

LEGEND OF UTILITY TYPES

ABANDONED UTILITY	---X---X---X---X---
PROPOSED UTILITY	---
UNKNOWN UTILITY	---
COMMUNICATIONS	
FRONTIER (TELE)	---C1---
FRONTIER (FO/DUCT)	---C2---
CHARTER (CATV)	---C3---
QL "C"/QL "D"	
FRONTIER (TELE)	---C1---
FRONTIER (FO/DUCT)	---C2---
CHARTER (CATV)	---C3---
ELECTRIC / POWER	
QL "B"	
PEDERNALES ELECTRIC COOPERATIVE (PEC)	---E1---
PRIVATE	---E2---
QL "C"/QL "D"	
PEDERNALES ELECTRIC COOPERATIVE (PEC)	---E1---
PRIVATE	---E2---
GAS / PETROLEUM	
QL "B"	
CENTERPOINT ENERGY	---G1---
QL "C"/QL "D"	
CENTERPOINT ENERGY	---G1---
SANITARY SEWER	
QL "B"	
CITY OF KYLE	---WW1---
QL "C"/QL "D"	
CITY OF KYLE	---WW1---
STORM DRAIN	
QL "B"	
CITY OF KYLE	---SD1---
QL "C"/QL "D"	
CITY OF KYLE	---SD1---
POTABLE WATER	
QL "B"	
GOFORTH SUD	---W1---
SOUTHWEST WATER COMPANY	---W2---
QL "C"/QL "D"	
GOFORTH SUD	---W1---
SOUTHWEST WATER COMPANY	---W2---
OVERHEAD UTILITY	
QL "C"/QL "D"	
OH1 (PEC - ELEC)	---OH---
OH2 (FRONTIER - TELE)	
OH3 (CHARTER - FOC)	
OH4 (CHARTER - CATV)	

NOT TO SCALE



LEGEND OF UTILITY SYMBOLS

END CAP	⊔	FIBER HANDHOLE	⊔	ELECTRIC HANDHOLE	⊔	STORM INLET	⊔
QUALITY LEVEL CHANGE	↕	FIBER CABINET	⊔	ELECTRIC JUNCTION BOX (CABINET)	⊔	WASTE WATER MANHOLE	⊔
TEST HOLE	⊕	TELEPHONE CABINET	⊔	ELECTRIC POLE (POWER)	⊔	FIRE HYDRANT	⊔
UTILITY CONTINUATION	⊔	TELEPHONE PEDESTAL	⊔	ELECTRIC POLE W/ RISER	⊔	WATER METER	⊔
GAS TEST STATION	⊔	TELEPHONE POLE W/ RISER	⊔	LIGHT POLE	⊔	WATER VALVE	⊔
						WATER VAULT	⊔

RIOS GROUP
 TBPE Firm #F-14595

R. CHAPIN
 115561
 LICENSED PROFESSIONAL ENGINEER

07-08-2020

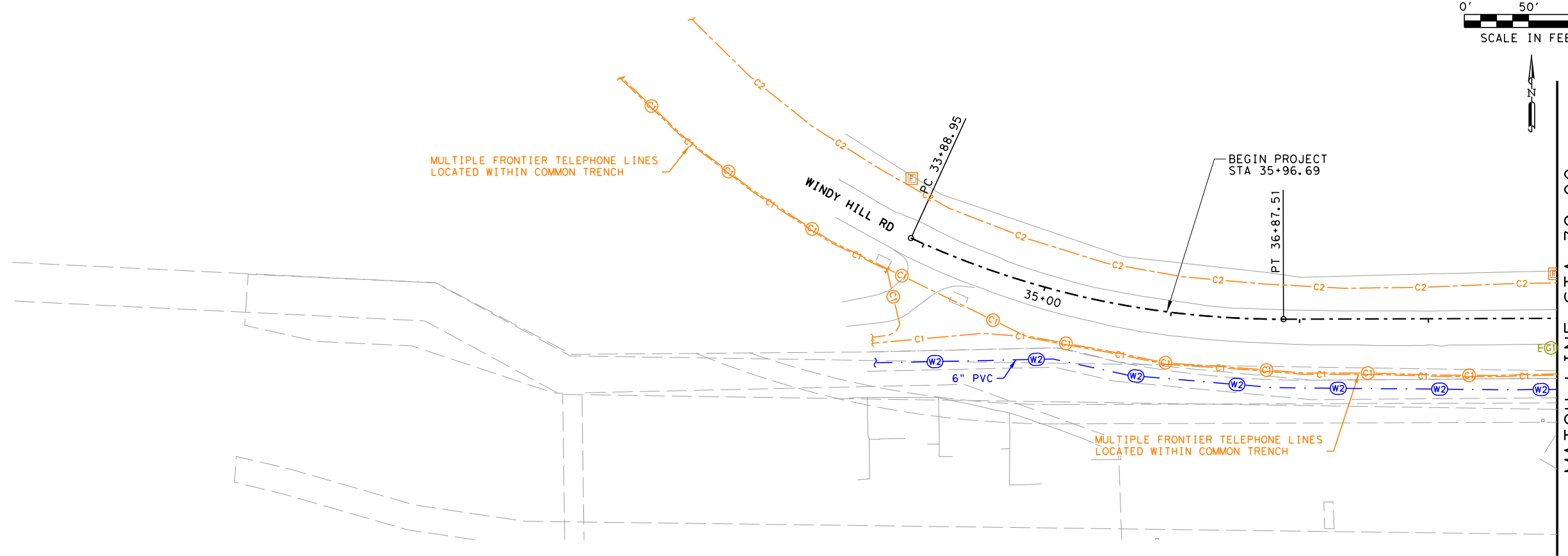
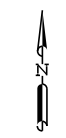
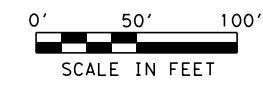
THE RIOS GROUP
 SUBSURFACE UTILITY ENGINEERING
 UTILITY COORDINATION

575 Round Rock West Drive
 Building K, Suite 400
 Round Rock, TX 78661
 512.580.8440

LJA Engineering, Inc.
 FRN - F-1386

WINDY HILL RD
 Cherrywood
 to
 Parks South Dr
S.U.E. PLAN SHEETS
 LAYOUT INDEX

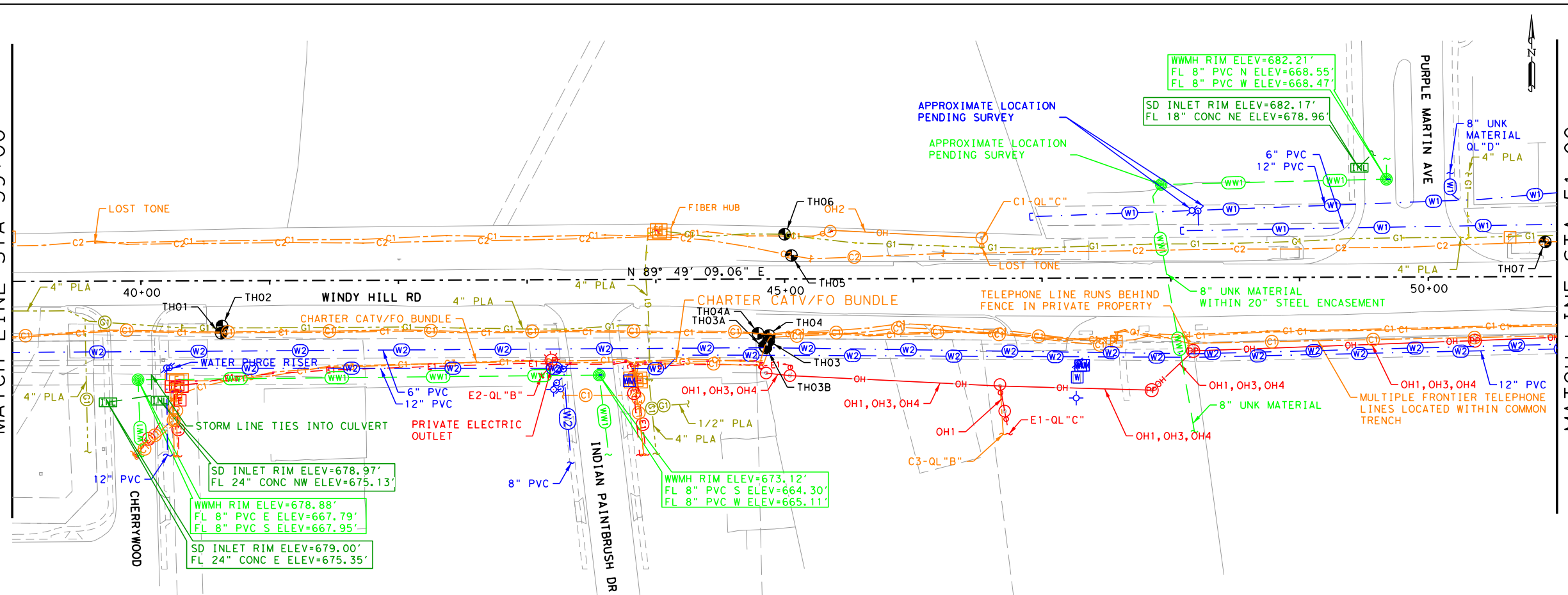
DESIGN BY:	CW	SCALE	NTS
DRAWN BY:	CW	HORIZONTAL:	
CHECKED BY:	RC	VERTICAL:	
APPROVED BY:	RC	SHEET:	01 OF 03
PROJECT NO:	LJA_2002_00	PAGE:	112
DATE:	07-08-2020		



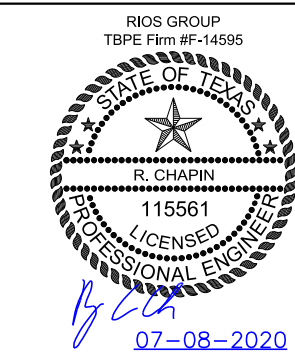
MATCH LINE STA 39+00

LEGEND OF UTILITY TYPES	
ABANDONED UTILITY	— X — X — X — X —
PROPOSED UTILITY	— — — — —
UNKNOWN UTILITY	— · — · — · — · —
COMMUNICATIONS	
FRONTIER (TELE)	QL "B" C1
FRONTIER (FO/DUCT)	C2
CHARTER (CATV)	C3
FRONTIER (TELE)	QL "C"/QL "D" C1
FRONTIER (FO/DUCT)	C2
CHARTER (CATV)	C3
ELECTRIC / POWER	
PEDERNALES ELECTRIC COOPERATIVE (PEC)	QL "B" E1
PRIVATE	E2
PEDERNALES ELECTRIC COOPERATIVE (PEC)	QL "C"/QL "D" E1
PRIVATE	E2
GAS / PETROLEUM	
CENTERPOINT ENERGY	QL "B" G1
CENTERPOINT ENERGY	QL "C"/QL "D" G1
SANITARY SEWER	
CITY OF KYLE	QL "B" WW1
CITY OF KYLE	QL "C"/QL "D" WW1
STORM DRAIN	
CITY OF KYLE	QL "B" SD1
CITY OF KYLE	QL "C"/QL "D" SD1
POTABLE WATER	
GOFORTH SUD	QL "B" W1
SOUTHWEST WATER COMPANY	W2
GOFORTH SUD	QL "C"/QL "D" W1
SOUTHWEST WATER COMPANY	W2
OVERHEAD UTILITY	
OH1 (PEC - ELEC)	QL "C"/QL "D" OH
OH2 (FRONTIER - TELE)	
OH3 (CHARTER - FOC)	
OH4 (CHARTER - CATV)	

MATCH LINE STA 39+00



MATCH LINE STA 51+00



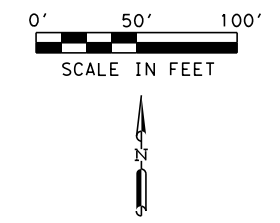
LJA Engineering, Inc.
FRN - F-1386

WINDY HILL RD
Cherrywood
to
Parks South Dr
S.U.E. PLAN SHEETS
BEGIN TO STA 51+00

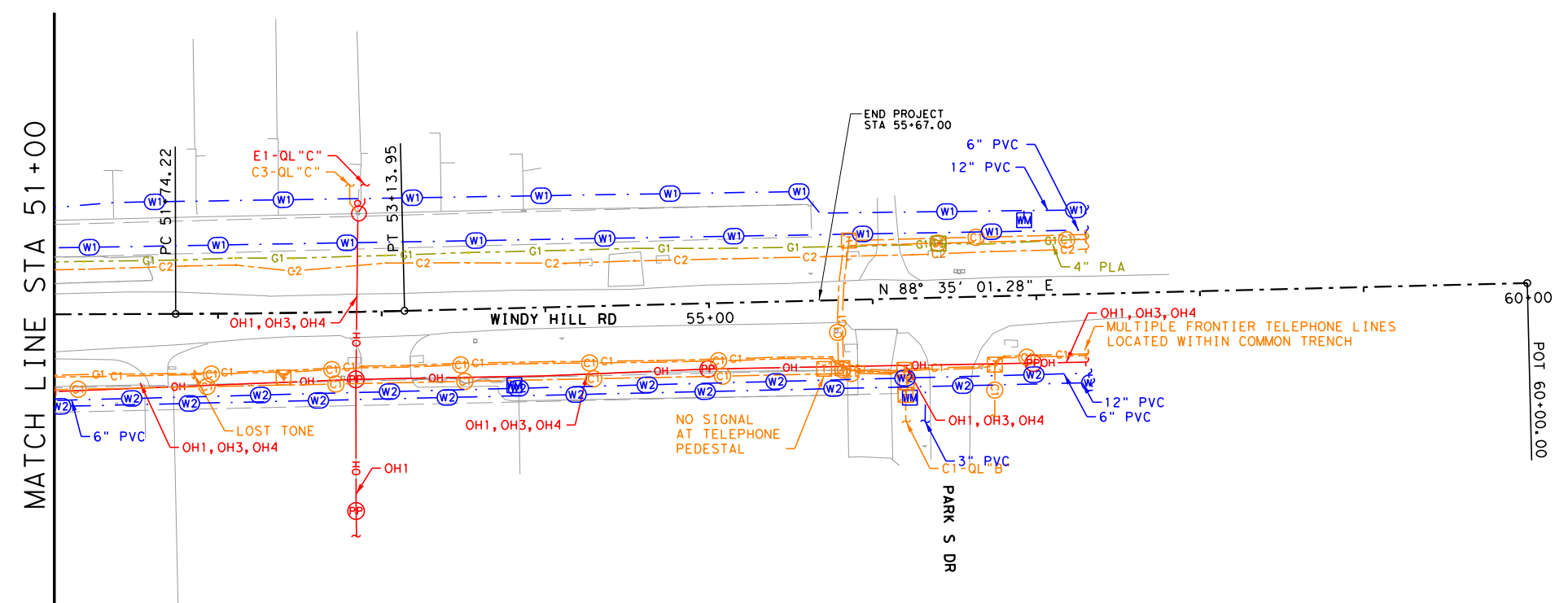
LEGEND OF UTILITY SYMBOLS

END CAP	⊔	FIBER HANDHOLE	⊔	ELECTRIC HANDHOLE	⊔	STORM INLET	⊔
QUALITY LEVEL CHANGE	↕	FIBER CABINET	⊔	ELECTRIC JUNCTION BOX (CABINET)	⊔	WASTE WATER MANHOLE	⊔
TEST HOLE	⊕	TELEPHONE CABINET	⊔	ELECTRIC POLE (POWER)	⊔	FIRE HYDRANT	⊔
UTILITY CONTINUATION	⊔	TELEPHONE PEDESTAL	⊔	ELECTRIC POLE W/RISER	⊔	WATER METER	⊔
GAS TEST STATION	⊔	TELEPHONE POLE W/RISER	⊔	LIGHT POLE	⊔	WATER VALVE	⊔
						WATER VAULT	⊔

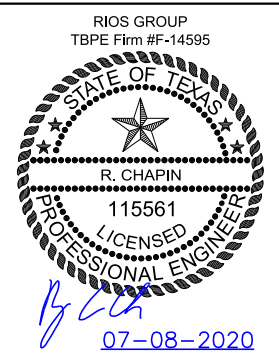
DESIGN BY:	CW	SCALE	1" = 100'
DRAWN BY:	CW	HORIZONTAL:	
CHECKED BY:	RC	VERTICAL:	
APPROVED BY:	RC	SHEET:	02 OF 03
PROJECT NO:	LJA_2002_00	DATE:	07-08-2020
DATE:	07-08-2020	PAGE:	113



LEGEND OF UTILITY TYPES	
ABANDONED UTILITY	— X — X — X — X —
PROPOSED UTILITY	— — — — —
UNKNOWN UTILITY	— · — · — · — · —
COMMUNICATIONS	
FRONTIER (TELE)	— C1 — — — —
FRONTIER (FO/DUCT)	— C2 — — — —
CHARTER (CATV)	— C3 — — — —
QL "B"	
FRONTIER (TELE)	— C1 — — — —
FRONTIER (FO/DUCT)	— C2 — — — —
CHARTER (CATV)	— C3 — — — —
QL "C"/QL "D"	
FRONTIER (TELE)	— C1 — — — —
FRONTIER (FO/DUCT)	— C2 — — — —
CHARTER (CATV)	— C3 — — — —
ELECTRIC / POWER	
QL "B"	
PEDERNALES ELECTRIC COOPERATIVE (PEC)	— E1 — — — —
PRIVATE	— E2 — — — —
QL "C"/QL "D"	
PEDERNALES ELECTRIC COOPERATIVE (PEC)	— E1 — — — —
PRIVATE	— E2 — — — —
GAS / PETROLEUM	
QL "B"	
CENTERPOINT ENERGY	— G1 — — — —
QL "C"/QL "D"	
CENTERPOINT ENERGY	— G1 — — — —
SANITARY SEWER	
QL "B"	
CITY OF KYLE	— WW1 — — — —
QL "C"/QL "D"	
CITY OF KYLE	— WW1 — — — —
STORM DRAIN	
QL "B"	
CITY OF KYLE	— SD1 — — — —
QL "C"/QL "D"	
CITY OF KYLE	— SD1 — — — —
POTABLE WATER	
QL "B"	
GOFORTH SUD	— W1 — — — —
SOUTHWEST WATER COMPANY	— W2 — — — —
QL "C"/QL "D"	
GOFORTH SUD	— W1 — — — —
SOUTHWEST WATER COMPANY	— W2 — — — —
OVERHEAD UTILITY	
QL "C"/QL "D"	
OH1 (PEC - ELEC)	— OH — — — —
OH2 (FRONTIER - TELE)	— OH — — — —
OH3 (CHARTER - FOC)	— OH — — — —
OH4 (CHARTER - CATV)	— OH — — — —



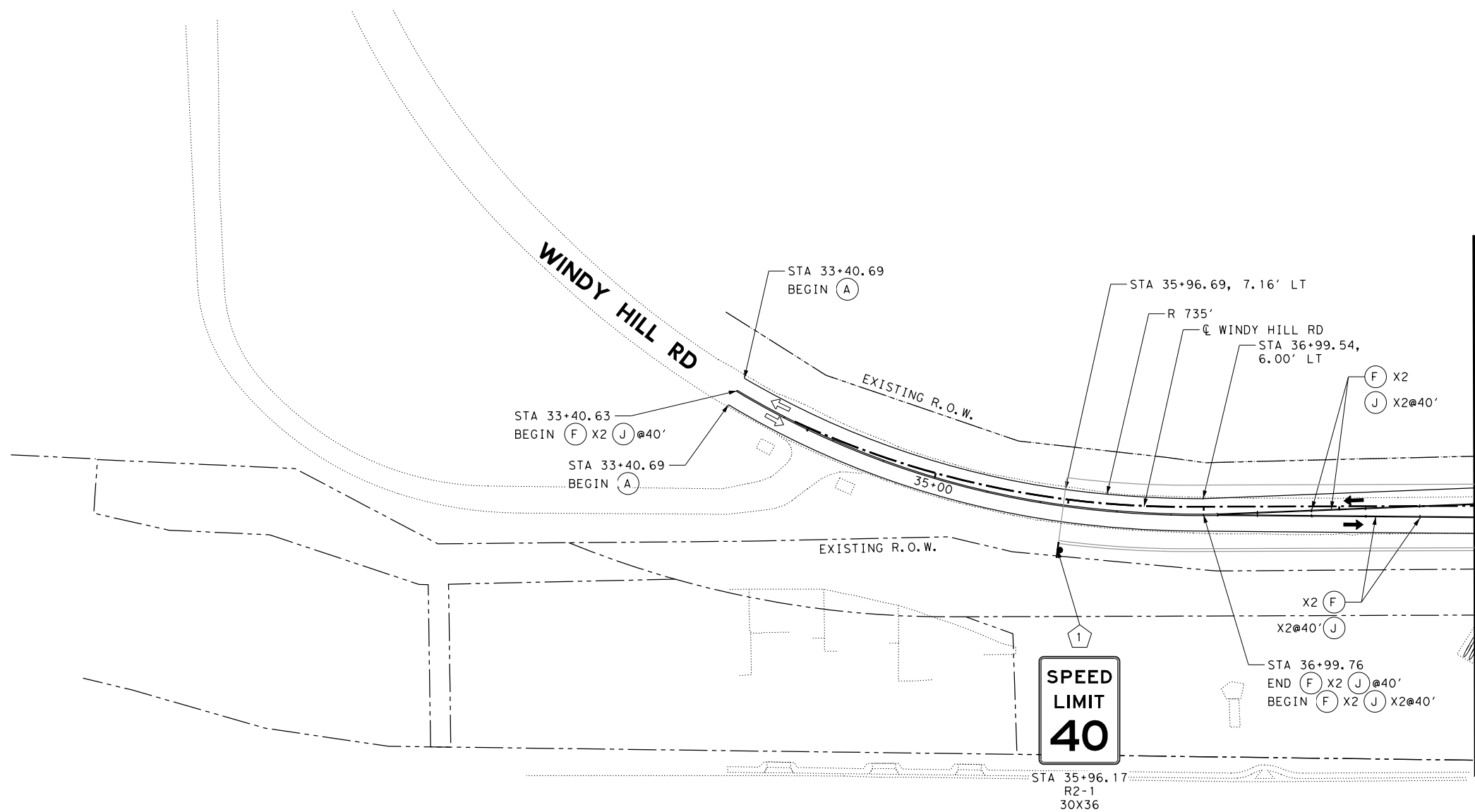
LEGEND OF UTILITY SYMBOLS			
END CAP	⊠	FIBER HANDHOLE	⊠
QUALITY LEVEL CHANGE	↕	FIBER CABINET	⊠
TEST HOLE	⊙	TELEPHONE CABINET	⊠
UTILITY CONTINUATION	⋮	TELEPHONE PEDESTAL	⊠
GAS TEST STATION	⊠	TELEPHONE POLE W/RISER	⊠
		ELECTRIC HANDHOLE	⊠
		ELECTRIC JUNCTION BOX (CABINET)	⊠
		ELECTRIC POLE (POWER)	⊠
		ELECTRIC POLE W/RISER	⊠
		LIGHT POLE	⊠
		STORM INLET	⊠
		WASTE WATER MANHOLE	⊠
		FIRE HYDRANT	⊠
		WATER METER	⊠
		WATER VALVE	⊠
		WATER VAULT	⊠



WINDY HILL RD
Cherrywood
to
Parks South Dr
S.U.E. PLAN SHEETS
STA 51+00 TO END

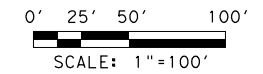
DESIGN BY:	CW	SCALE	1" = 100'
DRAWN BY:	CW	HORIZONTAL:	
CHECKED BY:	RC	VERTICAL:	
APPROVED BY:	RC	SHEET:	03 OF 03
PROJECT NO:	LJA_2002.00	PAGE:	114
DATE:	07-08-2020		

7/10/2020
 4:44:50 PM
 I:\2173\2001\CADD\SHEETS\08-Traffic Items\WH*SPM*01.dgn



LEGEND

- (A) REFL PAV MRK TY II(W)4" (SLD) (90 MIL)
- (B) REFL PAV MRK TY II(W)4" (BRK) (90 MIL)
- (C) REFL PAV MRK TY II(W)8" (SLD) (90 MIL)
- (D) REFL PAV MRK TY II(W)12" (SLD) (90 MIL)
- (E) REFL PAV MRK TY II(W)24" (SLD) (90 MIL)
- (F) REFL PAV MRK TY II(Y)4" (SLD) (90 MIL)
- (G) REFL PAV MRK TY II(Y)4" (BRK) (90 MIL)
- (H) REFL PAV MRK TY II(W) (ARROW)
- (I) REFL PAV MRK TY II(W) (WORD)
- (J) REFL PAV MRK TY II-A-A
- (K) REFL PAV MRK TY I-C
- # PROPOSED SMALL SIGN
- SMALL SIGN ASSEMBLY
- ⊗ DEL ASSM (D-DW)SZ 1(BRF)GF2
- ⊗ DEL ASSM (D-DW)SZ 1(BRF)CTB



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN - F-1386

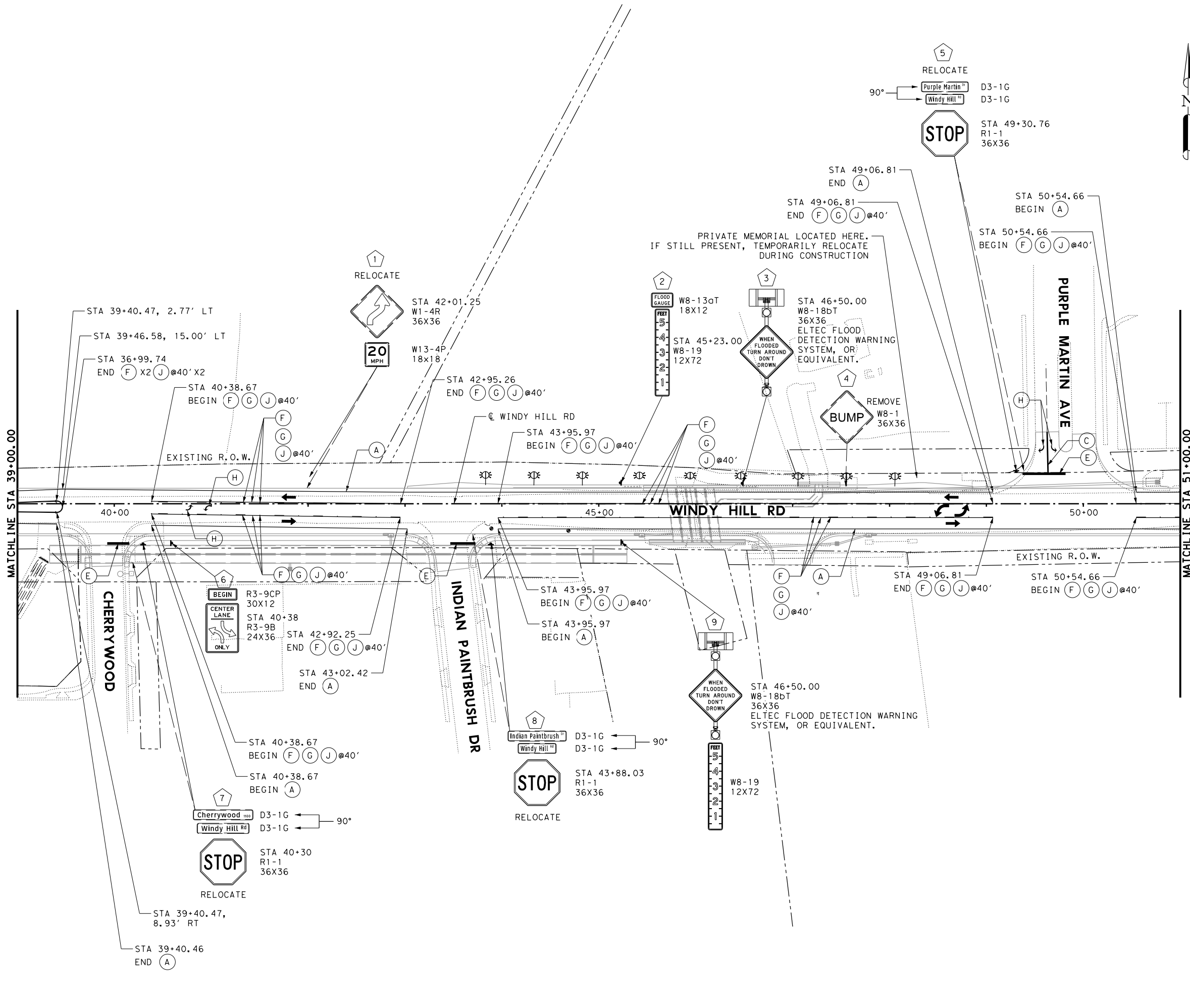
**WINDY HILL ROAD
 SIGNING & PAVEMENT
 MARKING SHEETS**
 BEGIN TO STA 39+00

GLO Contract# 19-280-000-B779

DESIGN BY:
 DRAWN BY:
 CHECKED BY:
 APPROVED BY:
 PROJECT NO: 2173.2001
 DATE: 7/10/2020

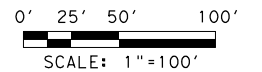
SCALE
 HORIZONTAL:
 VERTICAL:
 SHEET: 1 OF 3
 PAGE: 115

7/10/2020 4:44:51 PM I:\2173\2001\CADD\SHEETS\08-Traffic Items\WH*SPM*02.dgn



LEGEND

- (A) REFL PAV MRK TY II(W)4" (SLD) (90 MIL)
- (B) REFL PAV MRK TY II(W)4" (BRK) (90 MIL)
- (C) REFL PAV MRK TY II(W)8" (SLD) (90 MIL)
- (D) REFL PAV MRK TY II(W)12" (SLD) (90 MIL)
- (E) REFL PAV MRK TY II(W)24" (SLD) (90 MIL)
- (F) REFL PAV MRK TY II(Y)4" (SLD) (90 MIL)
- (G) REFL PAV MRK TY II(Y)4" (BRK) (90 MIL)
- (H) REFL PAV MRK TY II(W) (ARROW)
- (I) REFL PAV MRK TY II(W) (WORD)
- (J) REFL PAV MRK TY II-A-A
- (K) REFL PAV MRK TY I-C
- # PROPOSED SMALL SIGN
- SMALL SIGN ASSEMBLY
- ⊗ DEL ASSM (D-DW)SZ 1(BRF)GF2
- ⊗ DEL ASSM (D-DW)SZ 1(BRF)CTB



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN-F-1386

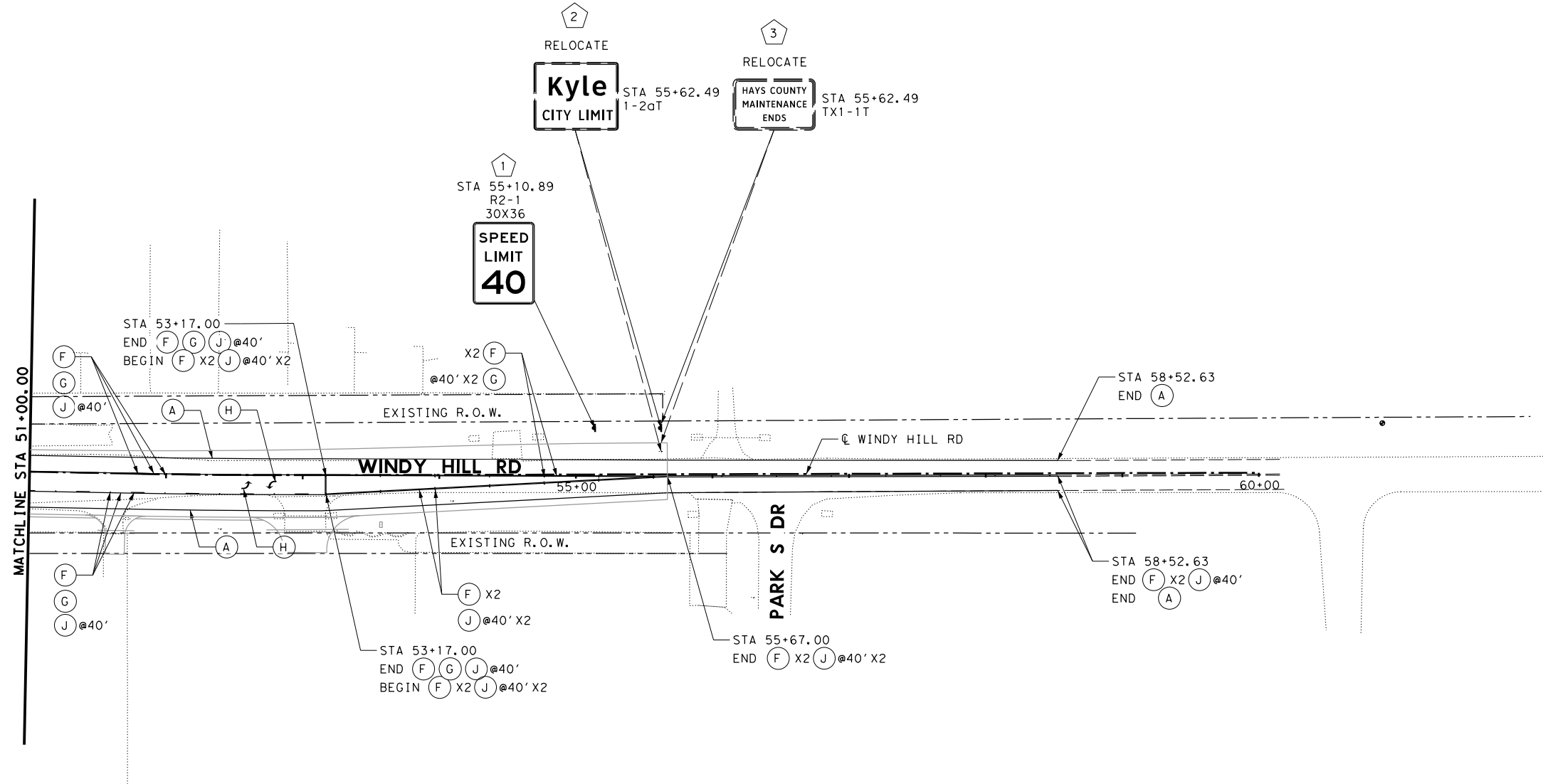
**WINDY HILL ROAD
 SIGNING & PAVEMENT
 MARKING SHEETS**
 STA 39+00 TO STA 51+00

GLO Contract# 19-280-000-B779

DESIGN BY:
 DRAWN BY:
 CHECKED BY:
 APPROVED BY:
 PROJECT NO: 2173.2001
 DATE: 7/10/2020

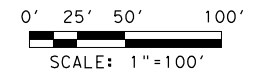
SCALE
 HORIZONTAL:
 VERTICAL:
 SHEET: 2 OF 3
 PAGE: 116

7/10/2020
 4:44:51 PM
 I:\2173\2001\CADD\SHEETS\08-Traffic Items\WH*SPM*03.dgn



LEGEND

- (A) REFL PAV MRK TY II(W)4" (SLD) (90 MIL)
- (B) REFL PAV MRK TY II(W)4" (BRK) (90 MIL)
- (C) REFL PAV MRK TY II(W)8" (SLD) (90 MIL)
- (D) REFL PAV MRK TY II(W)12" (SLD) (90 MIL)
- (E) REFL PAV MRK TY II(W)24" (SLD) (90 MIL)
- (F) REFL PAV MRK TY II(Y)4" (SLD) (90 MIL)
- (G) REFL PAV MRK TY II(Y)4" (BRK) (90 MIL)
- (H) REFL PAV MRK TY II(W) (ARROW)
- (I) REFL PAV MRK TY II(W) (WORD)
- (J) REFL PAV MRK TY II-A-A
- (K) REFL PAV MRK TY I-C
- # PROPOSED SMALL SIGN
- SMALL SIGN ASSEMBLY
- DEL ASSM (D-DW)SZ 1(BRF)GF2
- DEL ASSM (D-DW)SZ 1(BRF)CTB



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN-F-1386

**WINDY HILL ROAD
 SIGNING & PAVEMENT
 MARKING SHEETS**
 STA 51+00 TO END

GLO Contract# 19-280-000-B779

DESIGN BY:
 DRAWN BY:
 CHECKED BY:
 APPROVED BY:
 PROJECT NO: 2173.2001
 DATE: 7/10/2020

SCALE
 HORIZONTAL:
 VERTICAL:
 SHEET: 3 OF 3
 PAGE: 117

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD (FRP))
 TWT = Thin-Walled Tubing (see SMD (TWT))
 10BWG = 10 BWG Tubing (see SMD (SLIP-1) to (SLIP-3))
 S80 = Schedule 80 Pipe (see SMD (SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

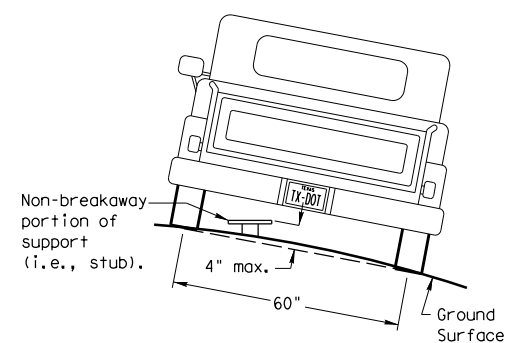
Anchor Type

UA = Universal Anchor - Concreted (see SMD (FRP) and (TWT))
 UB = Universal Anchor - Bolted down (see SMD (FRP) and (TWT))
 WS = Wedge Anchor Steel - (see SMD (TWT))
 WP = Wedge Anchor Plastic (see SMD (TWT))
 SA = Slipbase - Concreted (see SMD (SLIP-1) to (SLIP-3))
 SB = Slipbase - Bolted Down (see SMD (SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD (SLIP-1) to (SLIP-3), (TWT), (FRP))
 T = Prefab. "T" (see SMD (SLIP-1) to (SLIP-3), (TWT))
 U = Prefab. "U" (see SMD (SLIP-1) to (SLIP-3))
 IF REQUIRED
 1EXT or 2EXT = Number of Extensions (see SMD (SLIP-1) to (SLIP-3), (TWT))
 BM = Extruded Wind Beam (see SMD (SLIP-1) to (SLIP-3))
 WC = 1.12 #/ft Wing Channel (see SMD (SLIP-1) to (SLIP-3))
 EXAL = Extruded Aluminum Sign Panels (see SMD (SLIP-3))

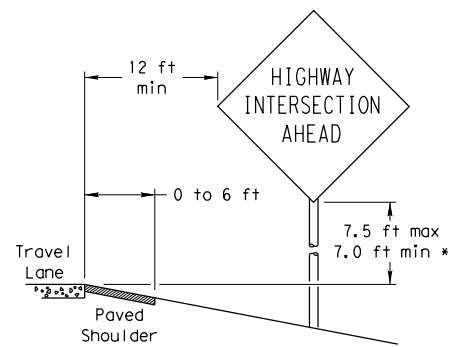
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

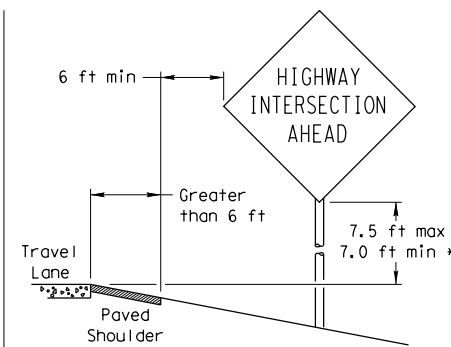
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

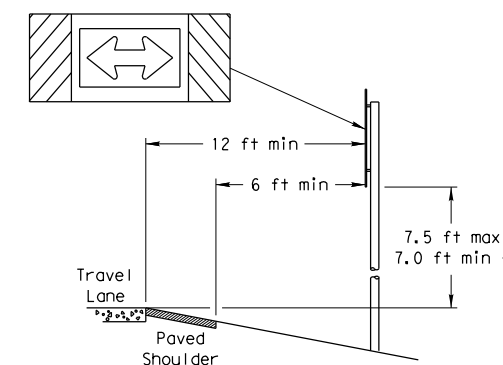
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



GREATER THAN 6 FT. WIDE

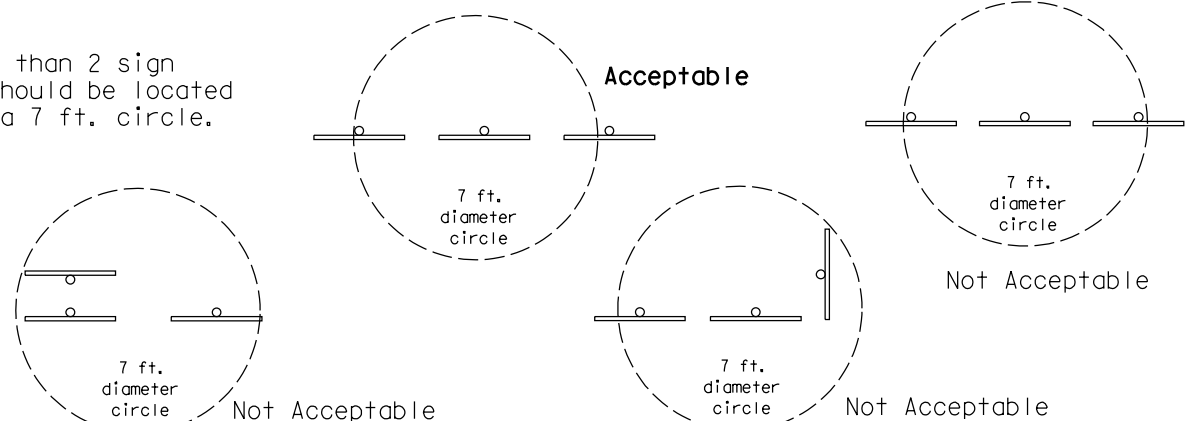
When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

T-INTERSECTION

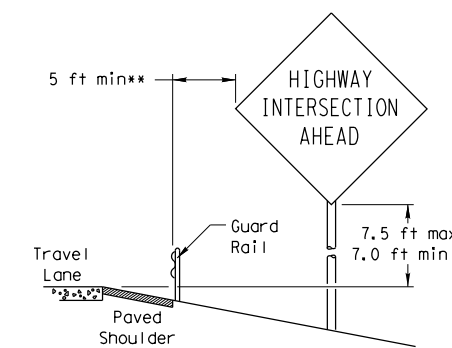


When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.

No more than 2 sign posts should be located within a 7 ft. circle.

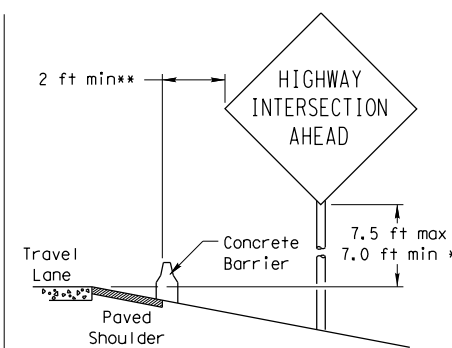


BEHIND BARRIER

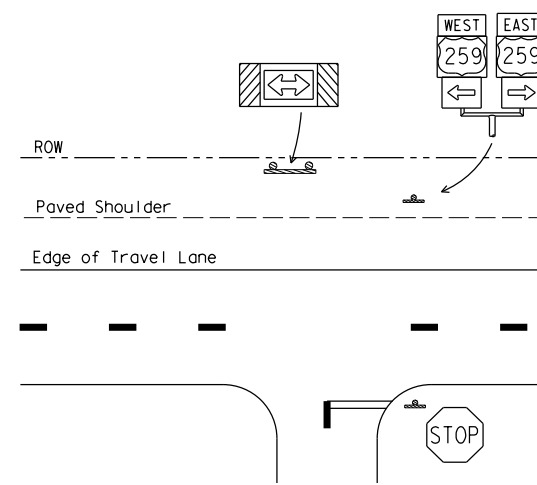


BEHIND GUARDRAIL

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.



BEHIND CONCRETE BARRIER



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

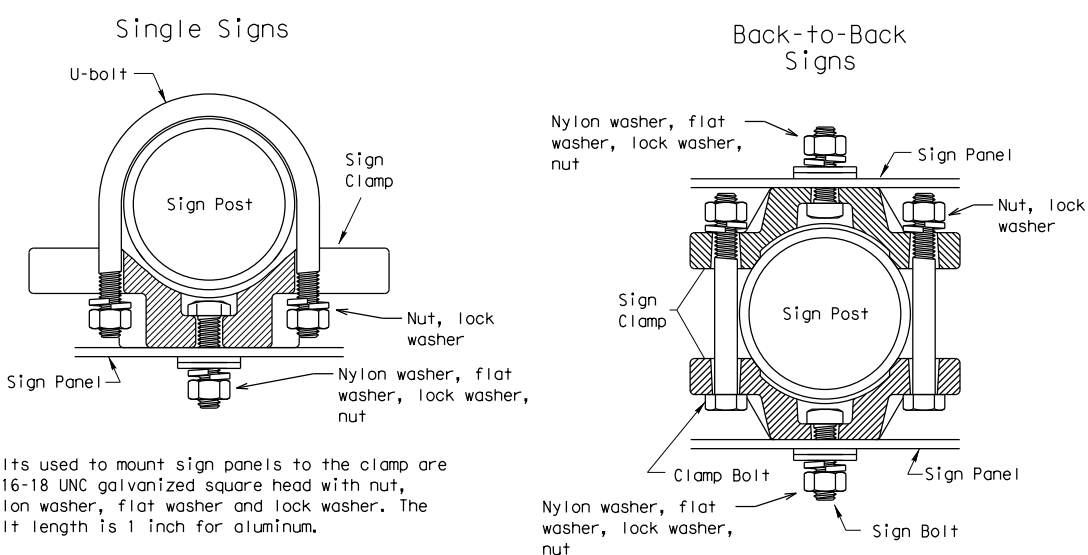
- (1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or
- (2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
<http://www.txdot.gov/publications/traffic.htm>

TYPICAL SIGN ATTACHMENT DETAIL



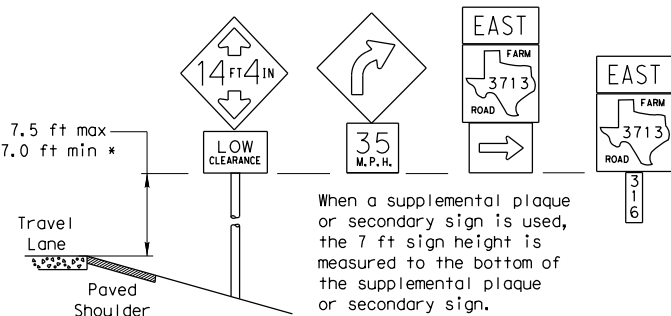
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

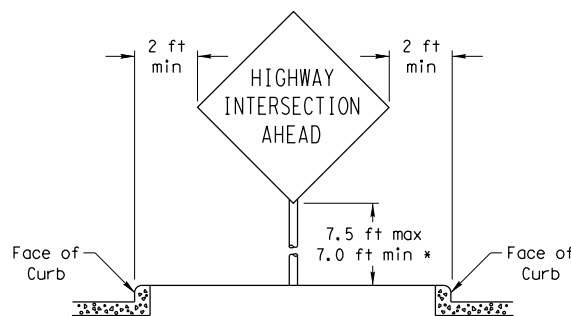
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES

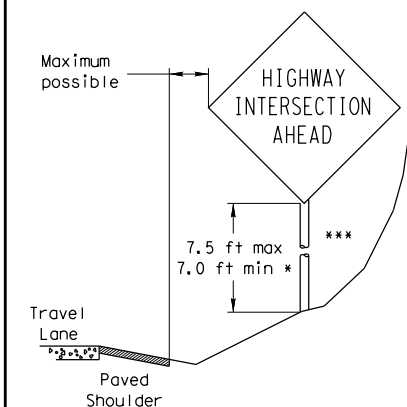


When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY (When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.



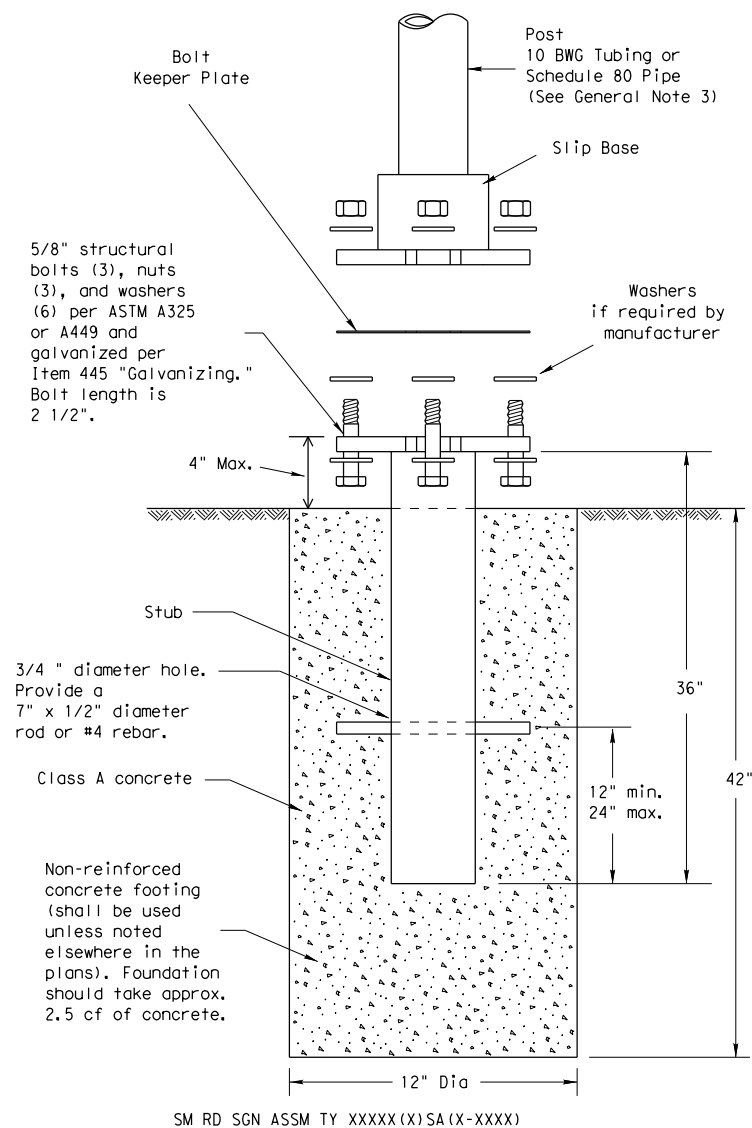
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD (GEN) -08

© TxDOT July 2002	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08	REVISIONS	CONT	SECT	JOB
				HIGHWAY
				SHEET NO.
				118

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

- Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
- Material used as post with this system shall conform to the following specifications:
 - 10 BWG Tubing (2.875" outside diameter)
 - 0.134" nominal wall thickness
 - Seamless or electric-resistance welded steel tubing or pipe
 - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
 - Other steels may be used if they meet the following:
 - 55,000 PSI minimum yield strength
 - 70,000 PSI minimum tensile strength
 - 20% minimum elongation in 2"
 - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
 - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
 - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
 - Schedule 80 Pipe (2.875" outside diameter)
 - 0.276" nominal wall thickness
 - Steel tubing per ASTM A500 Gr C
 - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
 - 46,000 PSI minimum yield strength
 - 62,000 PSI minimum tensile strength
 - 21% minimum elongation in 2"
 - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
 - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
 - Galvanization per ASTM A123
- See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: <http://www.txdot.gov/publications/traffic.htm>
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

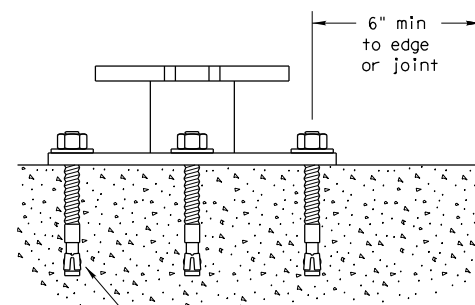
Foundation

- Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
- The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
- Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
- Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
- The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support

- Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
- Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxyes and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

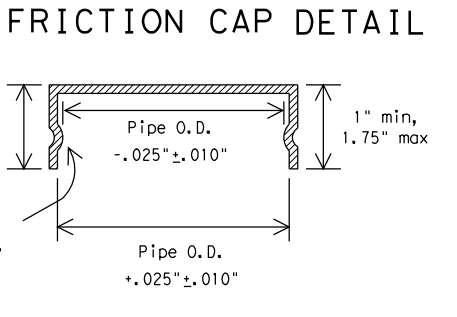
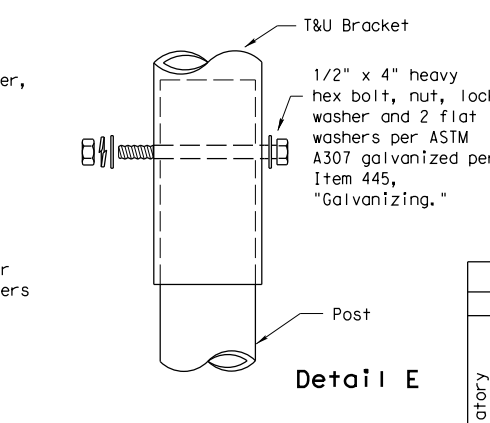
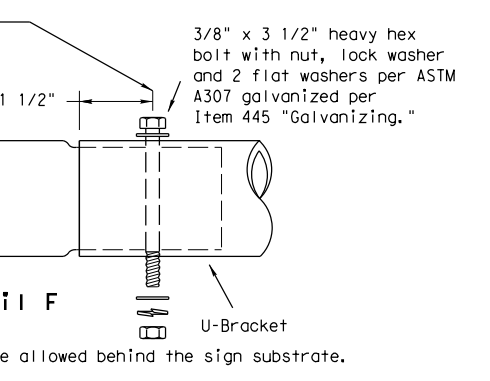
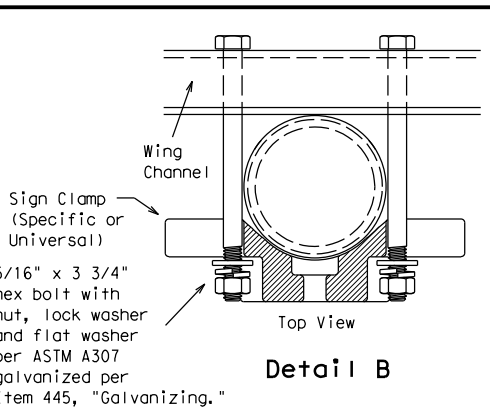
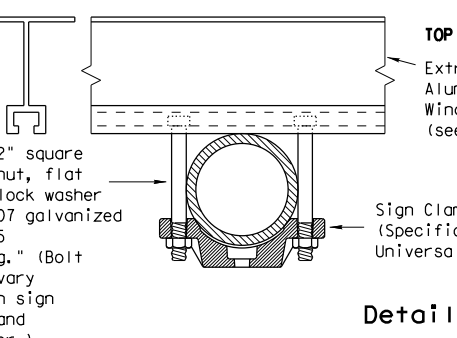
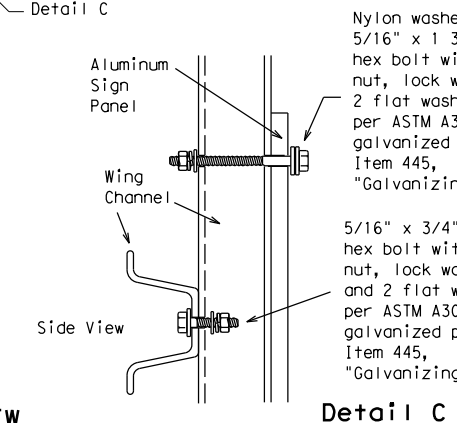
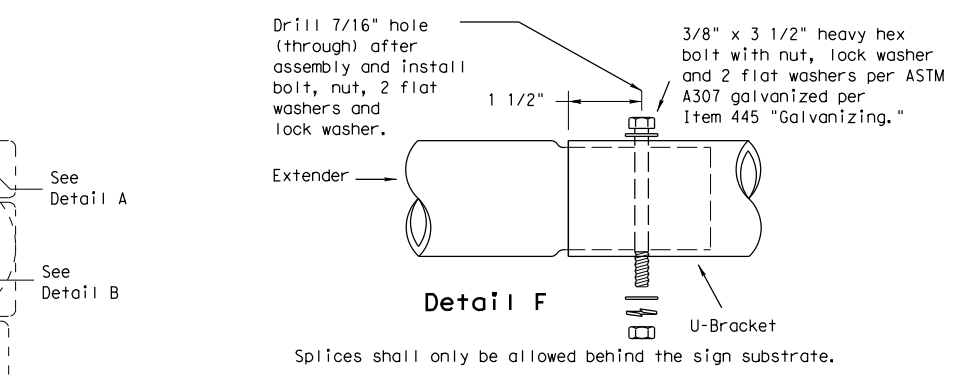
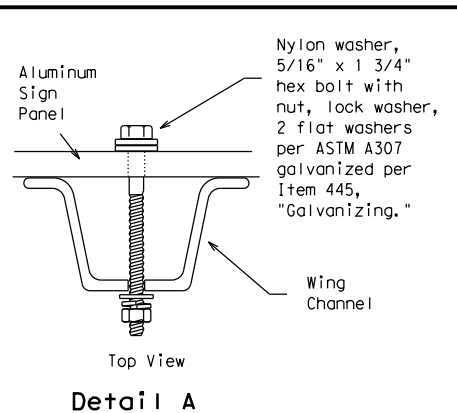
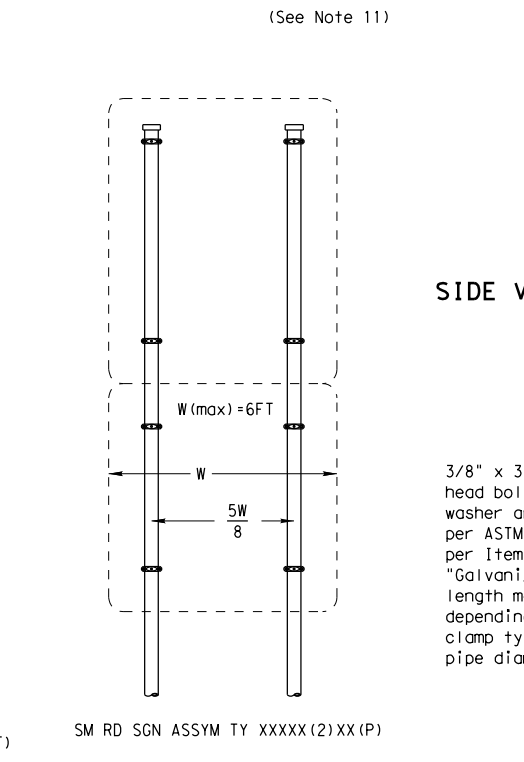
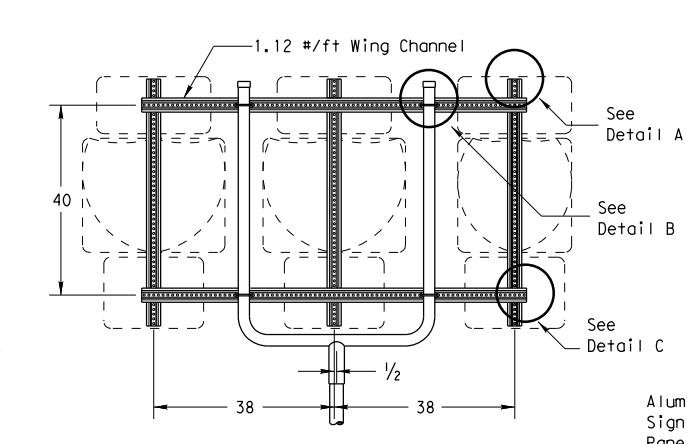
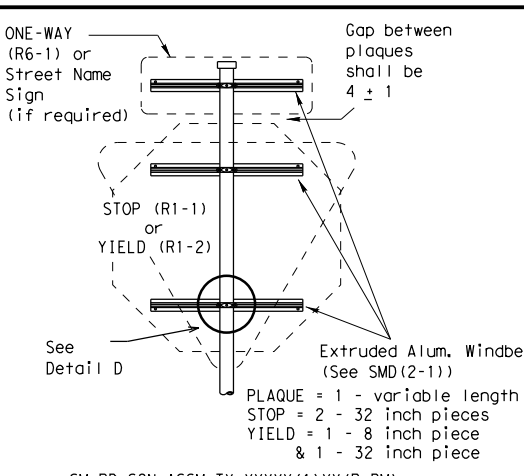
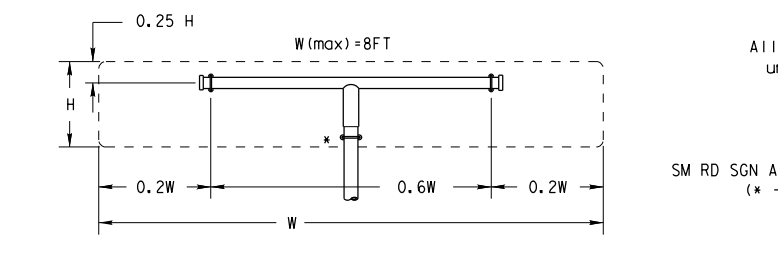
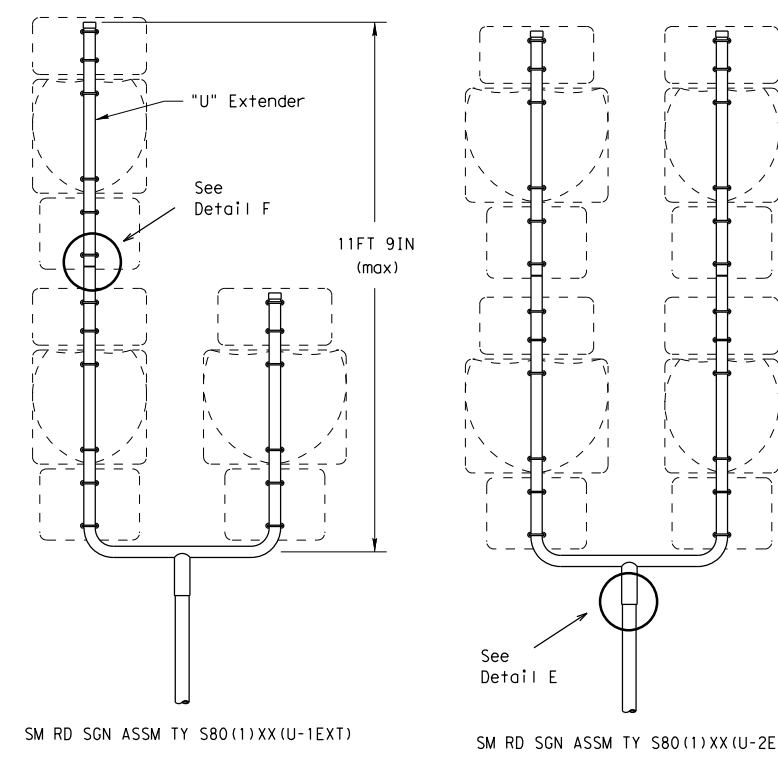
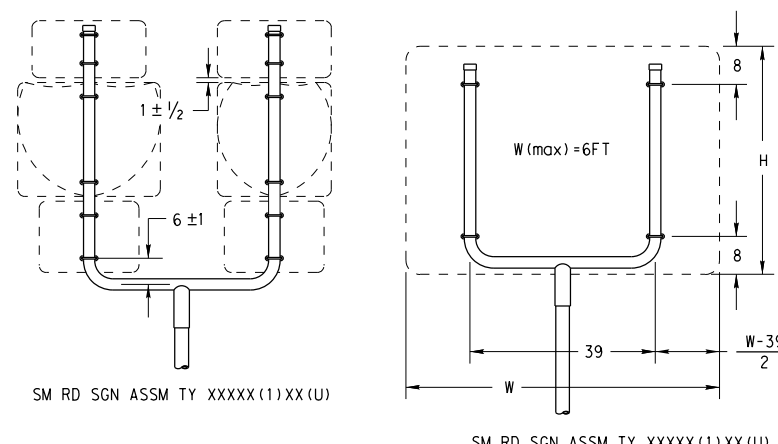
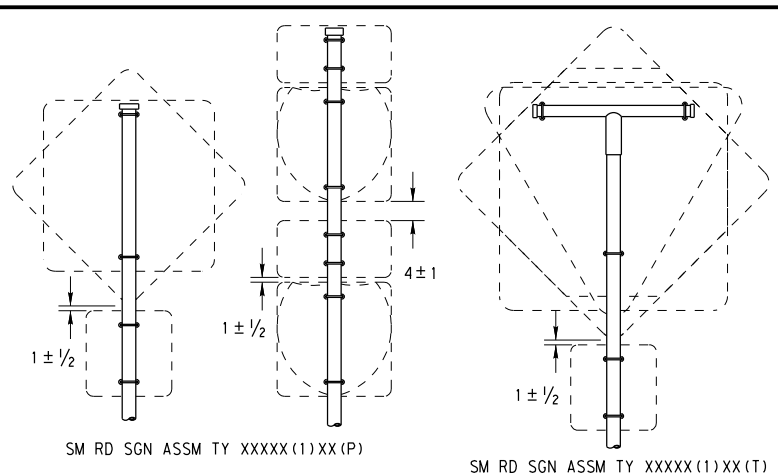


SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

© TxDOT July 2002		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08	REVISIONS	CONT	SECT	JOB	HIGHWAY
		DIST	COUNTY		SHEET NO.
					119

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



- GENERAL NOTES:**
1. SIGN SUPPORT # OF POSTS MAX. SIGN AREA

10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF
 2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
 3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
 4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
 5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
 6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
 7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
 8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
 9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
 10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
 11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
 12. Post open ends shall be fitted with Friction Caps.
 13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT		
SIGN DESCRIPTION	SUPPORT	
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
Warning	48x60-inch signs	TY S80(1)XX(T)
	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)	



**SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM
SMD(SLIP-2) -08**

© TxDOT July 2002	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08	REVISIONS	CONT	SECT	JOB
		DIST	COUNTY	SHEET NO.

Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes. The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture. Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

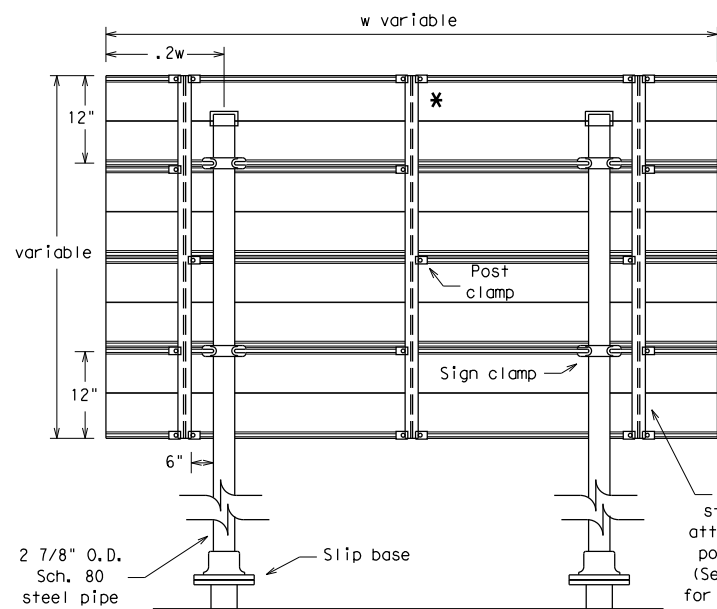
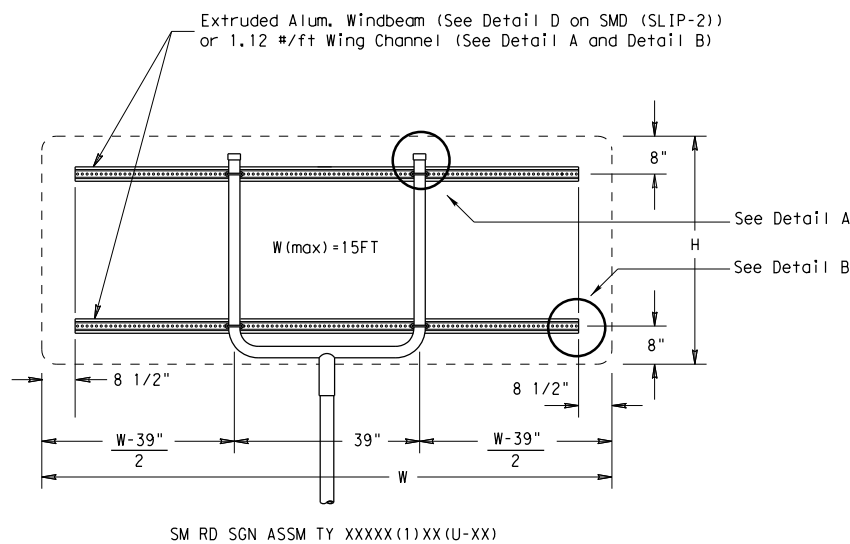
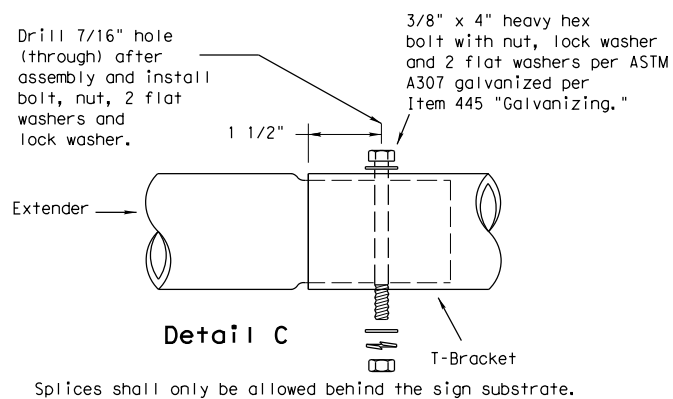
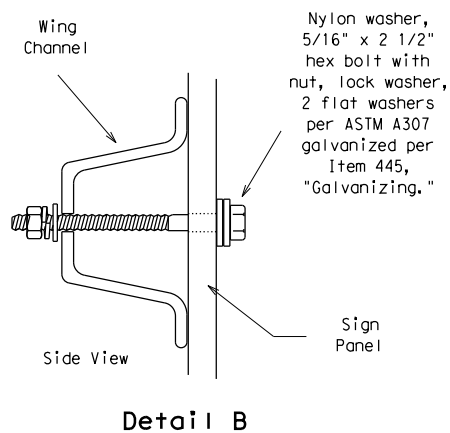
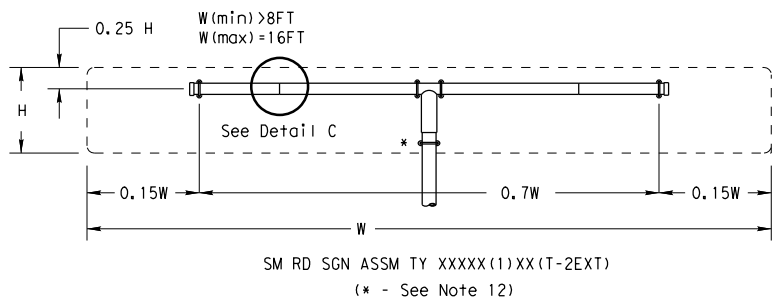
All dimensions are in english unless detailed otherwise.

SM RD SGN ASSM TY XXXX(1)XX(T) (* - See Note 12)

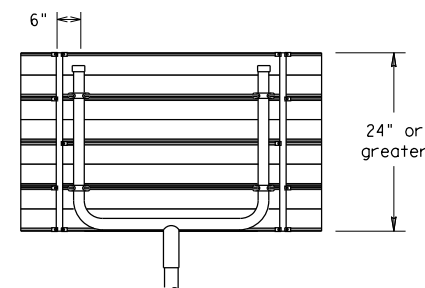
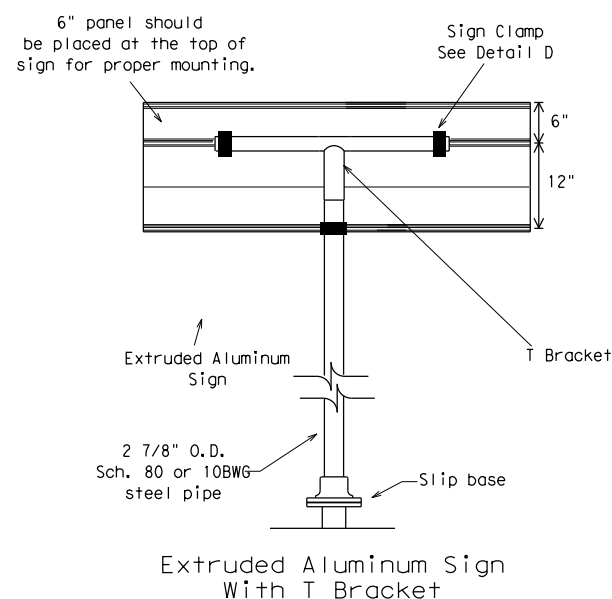
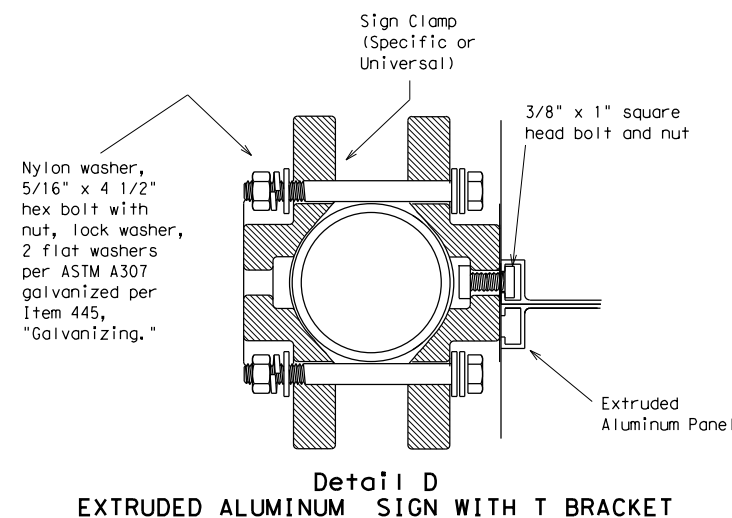
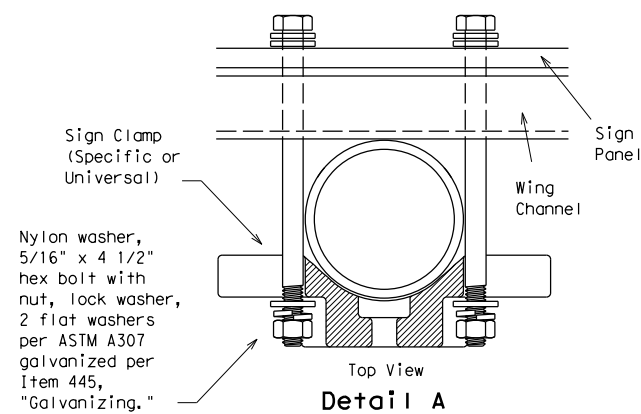
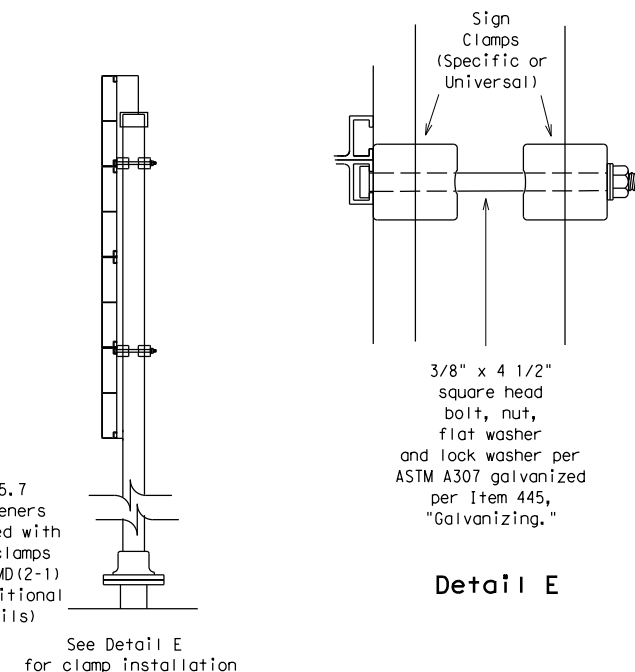
DATE:
FILE:

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:



* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.



Use Extruded Alum. Windbeam as stiffeners See SMD (2-1) for additional details
See Detail E for clamp installation

GENERAL NOTES:

- | SIGN SUPPORT | # OF POSTS | MAX. SIGN AREA |
|--------------|------------|----------------|
| 10 BWG | 1 | 16 SF |
| 10 BWG | 2 | 32 SF |
| Sch 80 | 1 | 32 SF |
| Sch 80 | 2 | 64 SF |
- The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
- Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
- Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
- For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
- When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
- Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
- Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
- Sign blanks shall be the sizes and shapes shown on the plans.
- Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
- Post open ends shall be fitted with Friction Caps.

		REQUIRED SUPPORT	
		SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)	
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)	
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)	
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)	
	48x60-inch signs	TY S80(1)XX(T)	
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)	
	48x60-inch signs	TY S80(1)XX(T)	
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)	
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)	
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)	

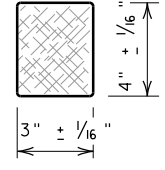
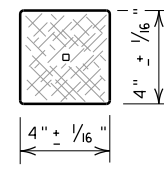
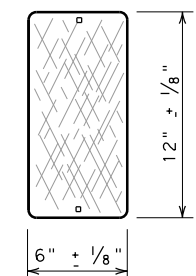
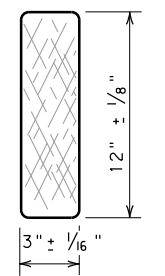
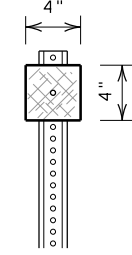
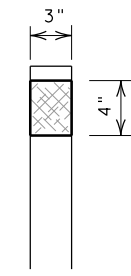
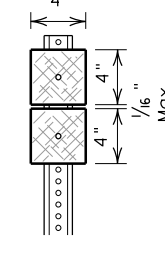
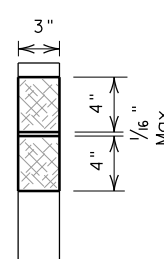
Texas Department of Transportation
Traffic Operations Division

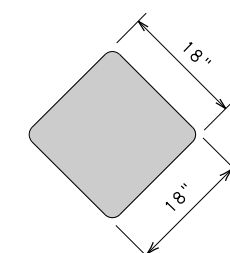
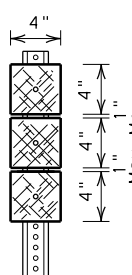
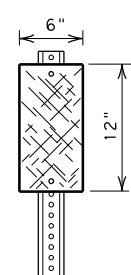
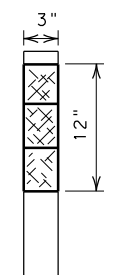
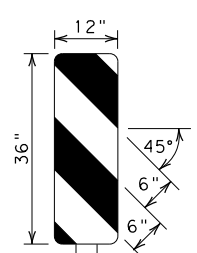
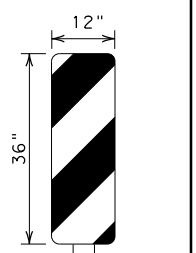
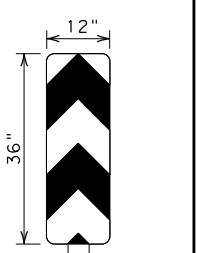
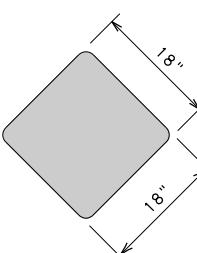
SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM
SMD(SLIP-3)-08

© TxDOT July 2002	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08	REVISIONS	CONT	SECT	JOB
		DIST	COUNTY	SHEET NO.


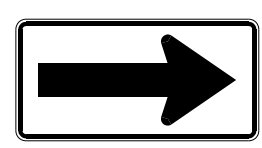
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.


DATE: FILE:

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS				DELINEATORS				D & OM DESCRIPTIVE CODES		
DEVICE	SIZE 1	SIZE 2	SIZE 3	SIZE 4	SINGLE		DOUBLE		INSTL DEL ASSM (D-XX)SZ X (XXX)XXX(XX) NUMBER OF REFLECTORS S = Single D = Double COLOR OF REFLECTORS W = White Y = Yellow R = Red REFLECTOR UNIT SIZE 1 or 2 TYPE OF POST OR DELINEATOR WC = Wing Channel Post FLX = Flexible Post BRF = Barrier Reflector TYPE OF MOUNT GND = Embedded (drivable or set in concrete) CTB = Concrete Barrier Mount GF1 or GF2 = Guard Fence Attachment SRF = Surface Mount DIRECTION If Required BI = Bi-Directional BR = Bi-Directional with red on back	
										
SHEETING	Yellow, White or Red Type B or C reflective sheeting				Yellow, White or Red Type B or C Reflective Sheeting					
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.				POST TYPE	WC	FLX	WC	FLX	INSTL OM ASSM (OM-XX) (XXX)XXX(XX) TYPE OF OBJECT MARKER 1, 2, 3, or 4 NUMBER OF REFLECTORS OR DIRECTION X = 3-Size 2 reflector units (Type 2 only) Y = 1-Size 3 reflector unit (Type 2 only) Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only) L = Left Side (Type 3 Object Marker only) R = Right Side (Type 3 Object Marker only) C = Center (Type 3 Object Marker only) TYPE OF POST WC = Wing Channel Post FLX = Flexible Post TWT = Thin Walled Tubing TYPE OF MOUNT GND = Embedded (drivable) SRF = Surface Mount WAS = Wedge Anchor Steel WAP = Wedge Anchor Plastic DIRECTION If Required BI = Bi-Directional
					MOUNT TYPE	GND	GND, SRF	GND	GND, SRF	

OBJECT MARKERS								
DEVICE	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B _{FL} or C _{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroreflective yellow - Type B _{FL} or C _{FL} Sheeting			Red -Type B _{FL} or C _{FL} Sheeting
POST TYPE	TWT	WC	WC	FLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

DEPARTMENTAL MATERIAL SPECIFICATIONS	
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)			CHEVRONS				ONE DIRECTION LARGE ARROW		NOTE: Delineator and object marker backplates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.		
DEVICE	GF1	GF2	CTB								
				1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. The Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTIONAL LARGE ARROW (W1-6).							
SHEETING	Yellow, White, Red			NOTE							
NOTE	1. Minimum 9 square inches of reflective sheeting surface area.										
				SIZE (W x L)	18" x 24" (Conventional)	24" x 30" (Conventional Oversize)	30" x 36" (Expressway)	36" x 48" (Freeway)	SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
				MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only		MOUNTING HEIGHT	7'-0"	


Traffic Operations Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-15

FILE: dom1-15.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TXDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS				
10-09 3-15	DIST	COUNTY	SHEET NO.	
4-10			122	

20A

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:

POST TYPE AND SUPPORT FOUNDATION DETAILS

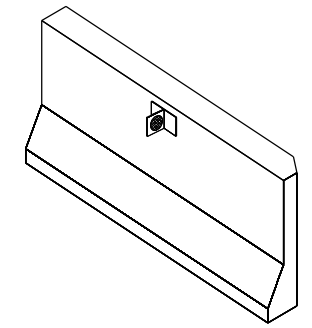
TYPE OF BARRIER MOUNTS

WING CHANNEL (WC)	FLEXIBLE POSTS (FLX)		WEDGE ANCHOR SYSTEMS	
GND	GND	SRF	WAS	WAP
	<p>Reflective material</p> <p>Post</p> <p>Stub</p>	<p>Reflective material</p> <p>Post</p> <p>Base</p>	<p>12" Dia.</p> <p>27" 30"</p>	<p>3" (Approx.)</p> <p>15" 17" 20"</p> <p>12" Dia.</p> <p>3.5" 17" 2" 1"</p> <p>30°</p>
	EMBEDDED	SURFACE MOUNT	STEEL	PLASTIC
<p>NOTES</p> <p>1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.</p> <p>2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.</p>	<p>NOTES</p> <p>1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.</p> <p>2. Install per manufacturer's recommendations.</p> <p>3. Post length may vary to meet field conditions.</p>		<p>NOTE</p> <p>1. Install per manufacturer's recommendations.</p>	

GUARD FENCE ATTACHMENT	
GF 1	GF 2

CONCRETE BARRIER / BRIDGE RAIL

CTB



TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS

CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN

DELINEATORS AND TYPE 2 OBJECT MARKERS

NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTIONAL LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

Approximately 4'-0"

2'-0" to 8'-0" or in front of object being marked

See general notes 1, 2 and 3.

- GENERAL NOTES**
- Place delineators on a section of roadway at a consistent distance from the edge of pavement.
 - Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
 - When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
 - Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
 - Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.

Texas Department of Transportation
 Traffic Operations Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION
D & OM(2) - 15

FILE: dom2-15.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
10-09 3-15	DIST		COUNTY	SHEET NO.
4-10				123

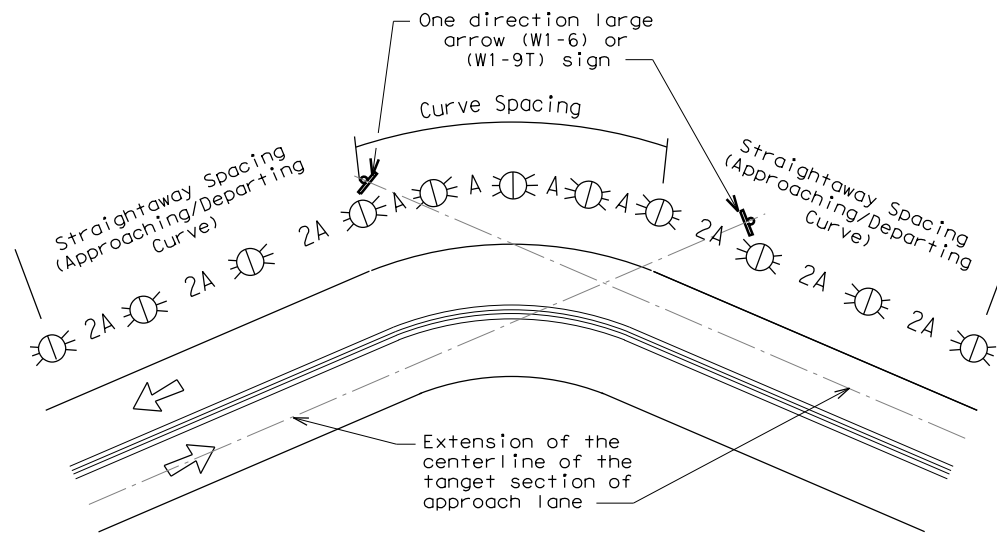
20B

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

USE OF WARNING DEVICES AT CURVES WITH ADVISORY SPEED LIMITS

Amount by which Advisory Speed Is less than Posted Speed	Warning Devices Needed
5 MPH & 10 MPH	RPMs
15 MPH & 20 MPH	RPMs, and Delineators or RPMs and ONE DIRECTION LARGE ARROW (W1-6) or (W1-9T) sign
25 MPH & Greater	RPMs and Chevrons

SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES

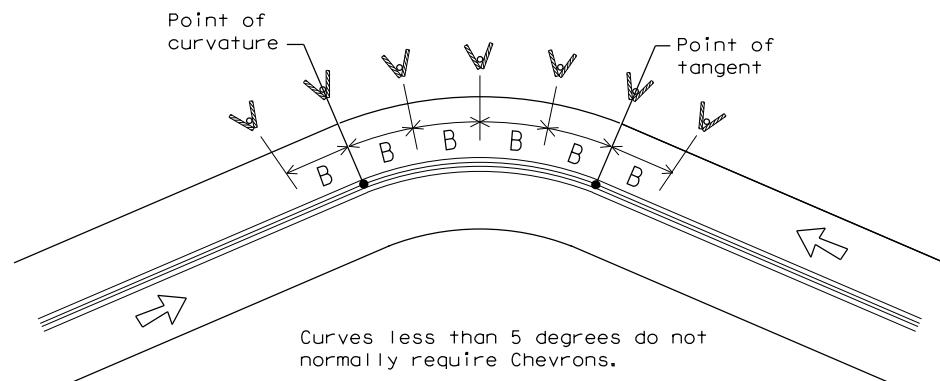


Curves less than 1 degree do not normally require delineators.

NOTE

ONE DIRECTIONAL LARGE ARROW (W1-6) or (W1-9T) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



Curves less than 5 degrees do not normally require Chevrons.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN				
Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	—
2	2865	160	320	—
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN			
Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve ¹	Single delineators on right side	See delineator spacing table
FRWY/EXP. Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 4 on D&OM(4))	100 feet on ramp tangents. Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves).
Acceleration/Deceleration Lane	Double delineators (see Detail 4 on D&OM(4))	100 feet (See Detail 4 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete) and Metal Beam Guard Fence or CTB	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100' max) but not less than 3 delineators
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end. Undivided 2-lane highways - Object marker on approach and departure end.	Requires Type 3 Object Marker or reflective sheeting provided by manufacturer per D & OM(VIA).
Bridges with no Approach Rail	Type 3 Object Marker at end of rail and 3 single delineators approaching rail.	See Detail 2 on D & OM(4)
Reduced Width Approaches to Bridge Rail	Type 2 Object Markers and 3 single delineators approaching bridge.	See Detail 1 on D & OM(4)
Culverts without MBGF	Type 2 Object Markers	See Detail 3 on D & OM(4)
Crossovers	Double yellow delineators or RPM's	See Detail 5 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Delineators not required in urban areas with continuous illumination.
2. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
3. Barrier reflectors may be used to replace required delineators.
4. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
⦿	Bi-directional Delineator
⦿	Delineator
+	Sign



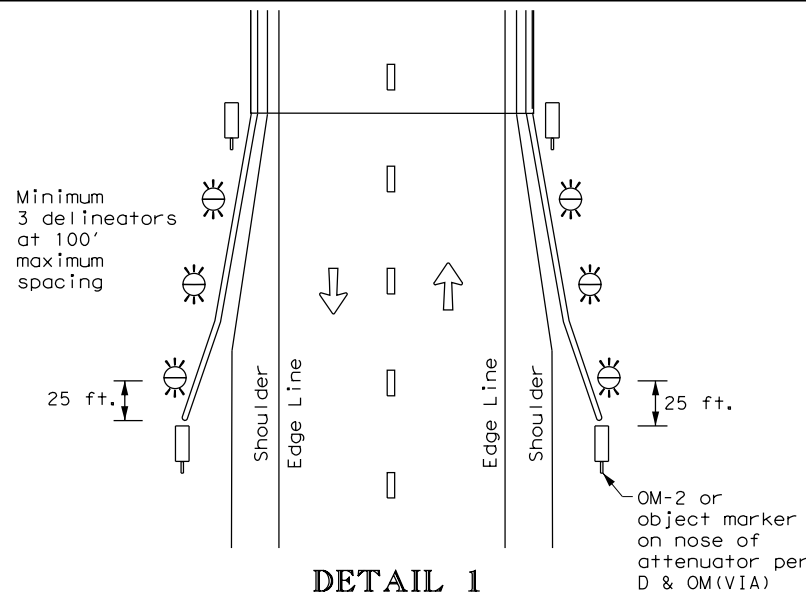
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3) - 15B

FILE: dom3-15b.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS				
3-15				
8-15				
	DIST	COUNTY	SHEET NO.	
			124	

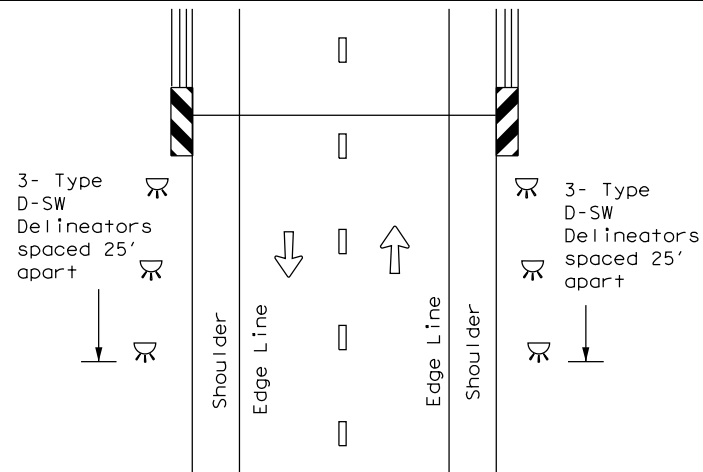
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH



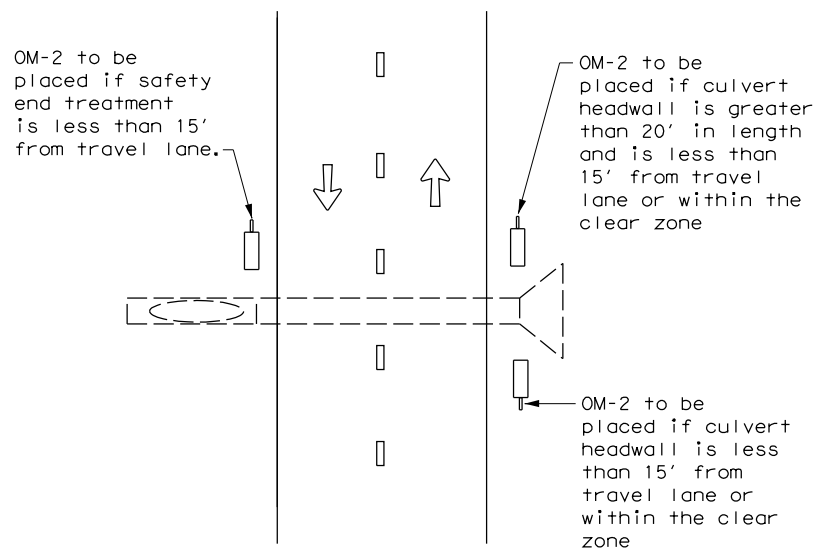
DETAIL 1

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



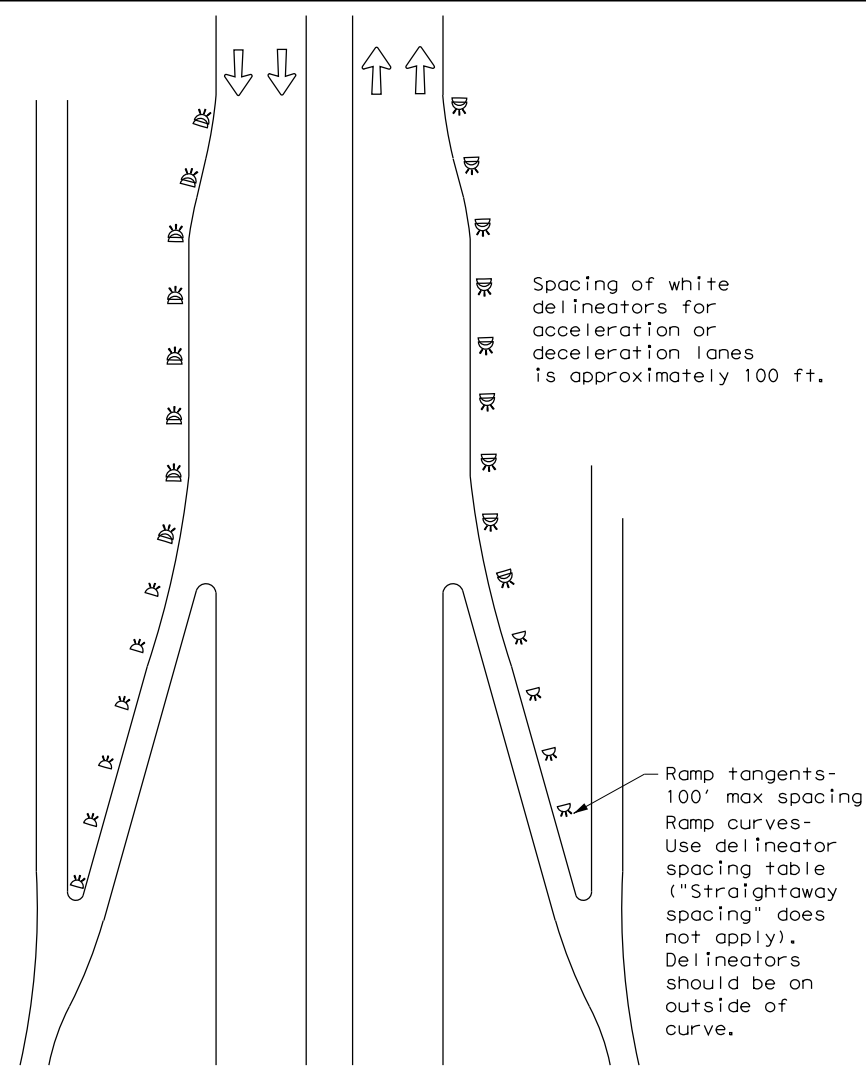
DETAIL 2

FOR CULVERTS WITHOUT MBGF



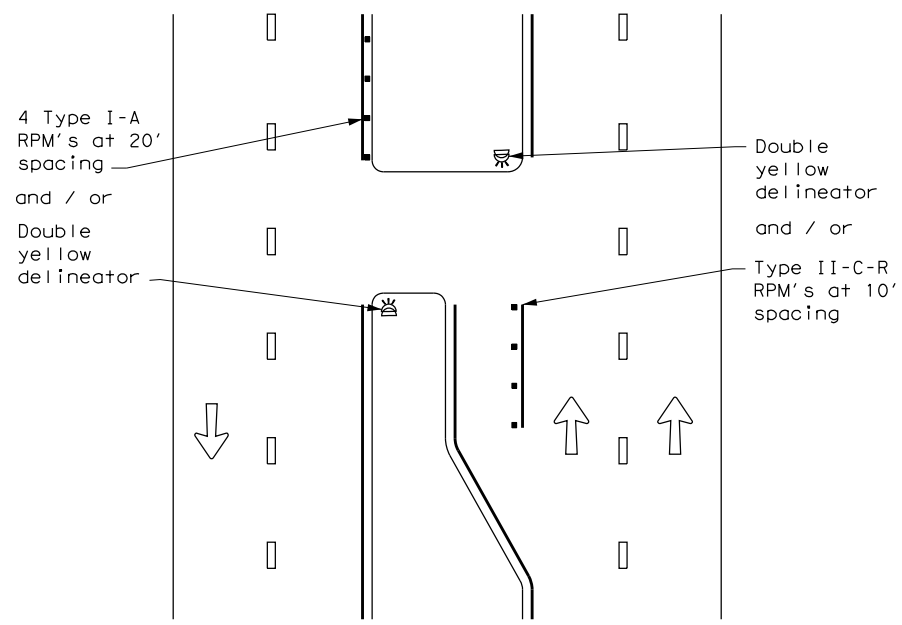
DETAIL 3

FREEWAY DELINEATION FOR RAMP AND ACCELERATION/DECELERATION LANES



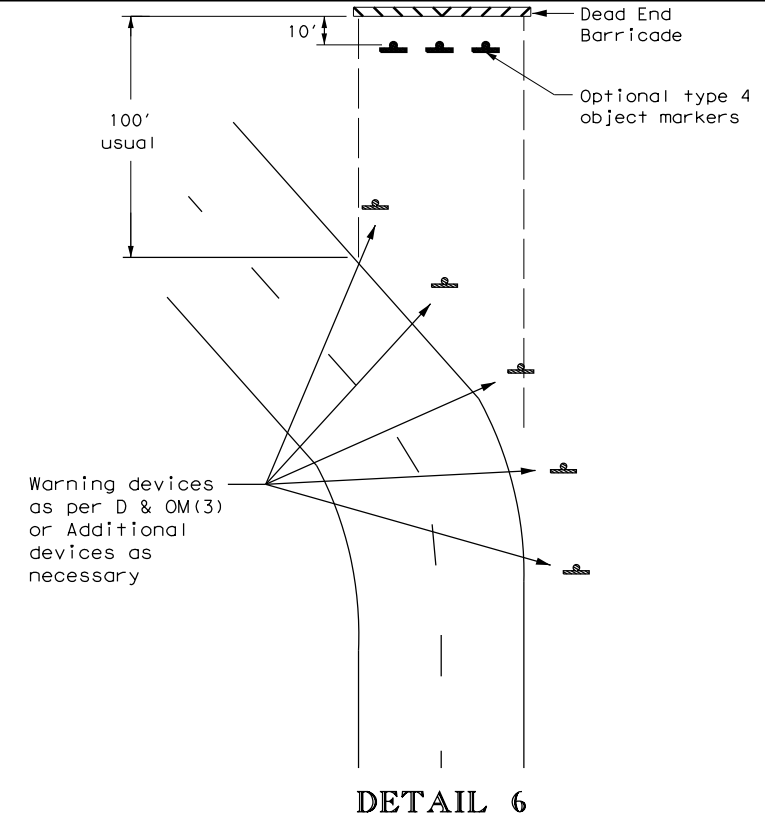
DETAIL 4

CROSSOVERS



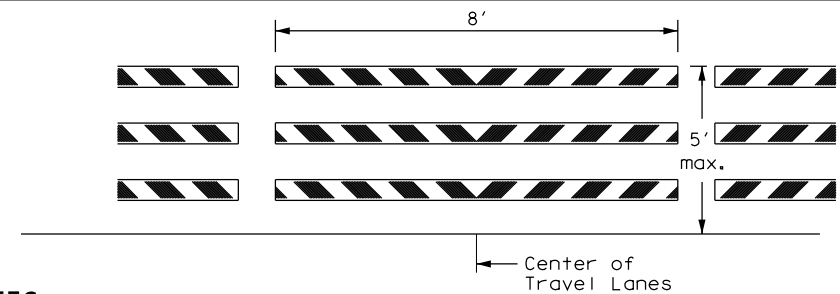
DETAIL 5

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 6

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 7

LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator



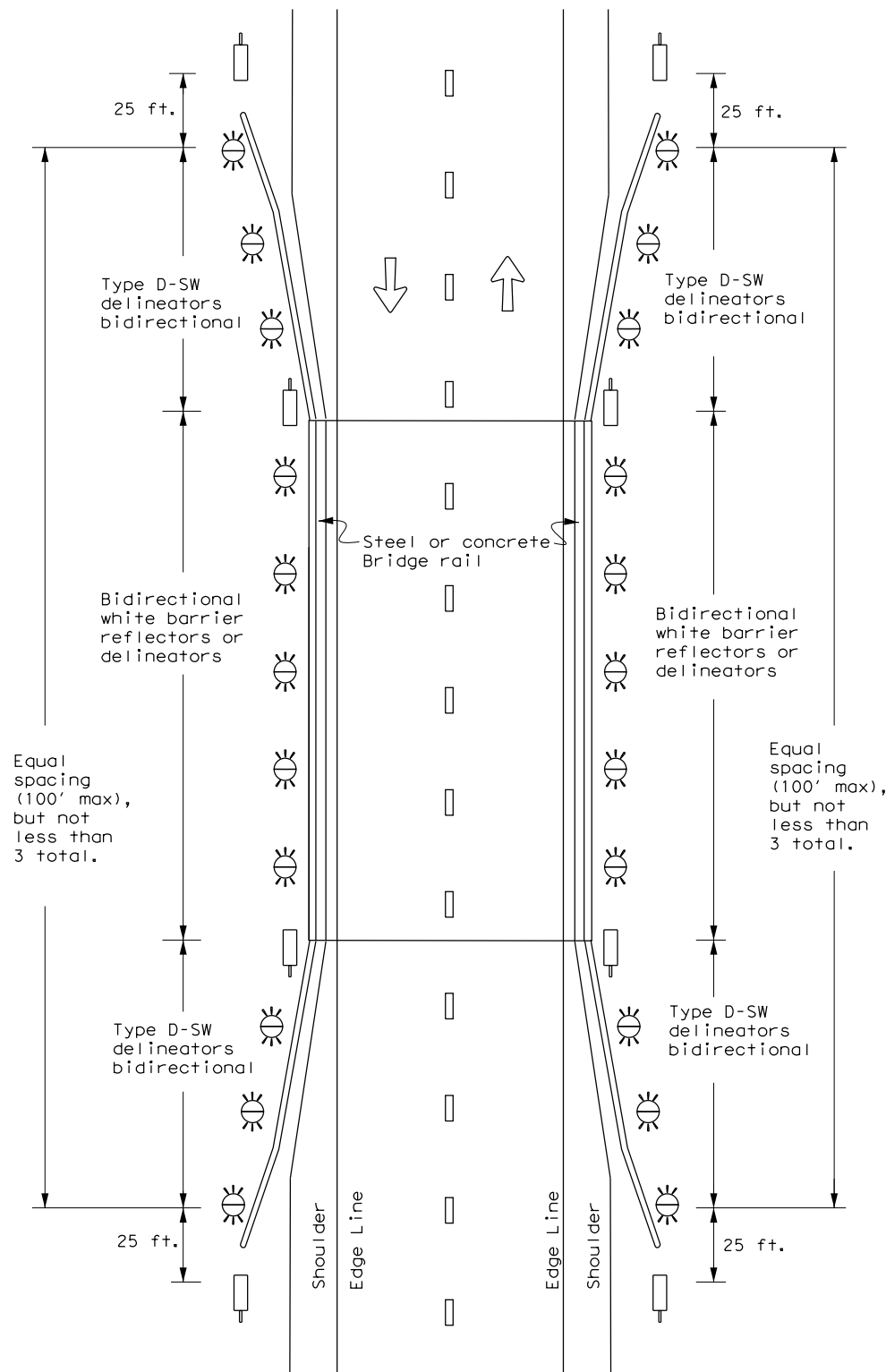
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4) - 15

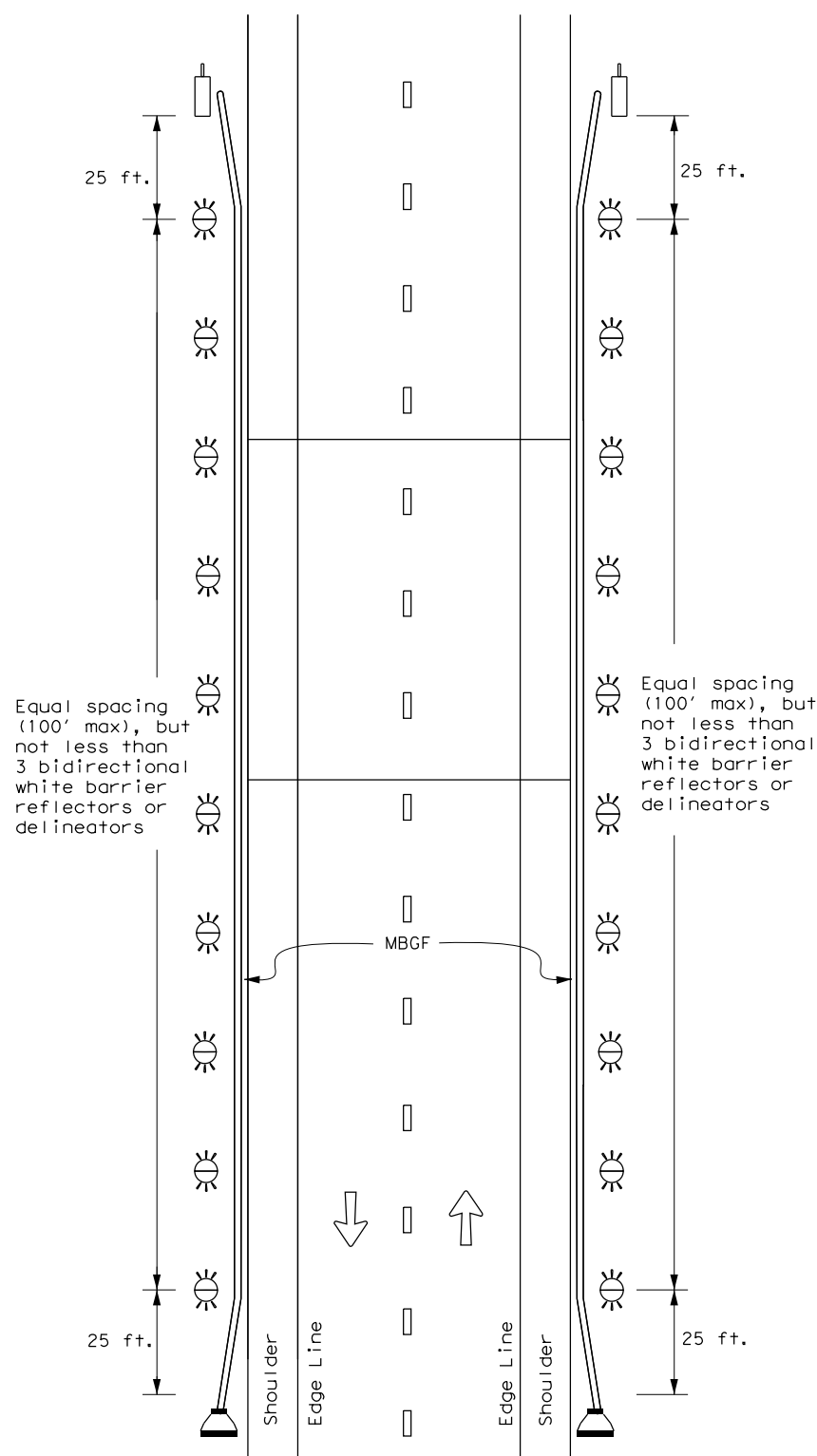
FILE: dom4-15.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TXDOT August 2004	CONT	SECT	JOB	HIGHWAY
3-15	REVISIONS		DIST	COUNTY
				SHEET NO. 125

DATE:
FILE:

**TWO-WAY, TWO LANE ROADWAY
WITH REDUCED WIDTH APPROACH RAIL**

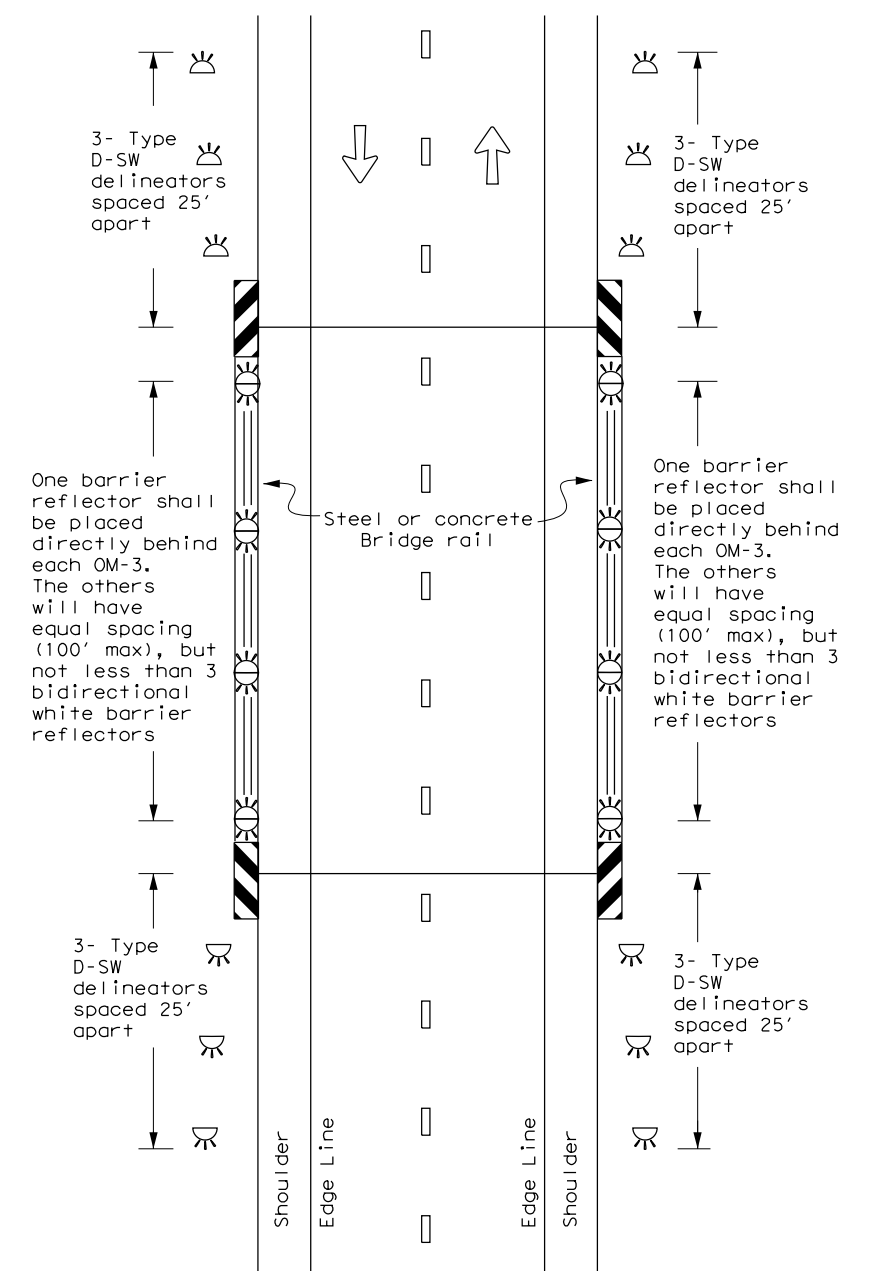


**TWO-WAY, TWO LANE ROADWAY
WITH METAL BEAM GUARD FENCE (MBGF)**



NOTE:
If terminal ends include an object marker, there is no need to install an OM-2 in front of terminal.

**TWO-WAY, TWO LANE ROADWAY
BRIDGE WITH NO APPROACH RAIL**



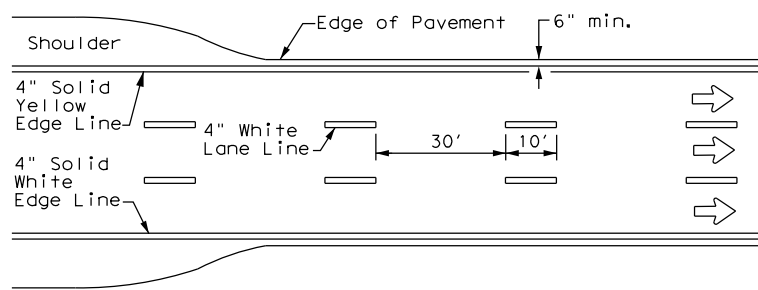
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:

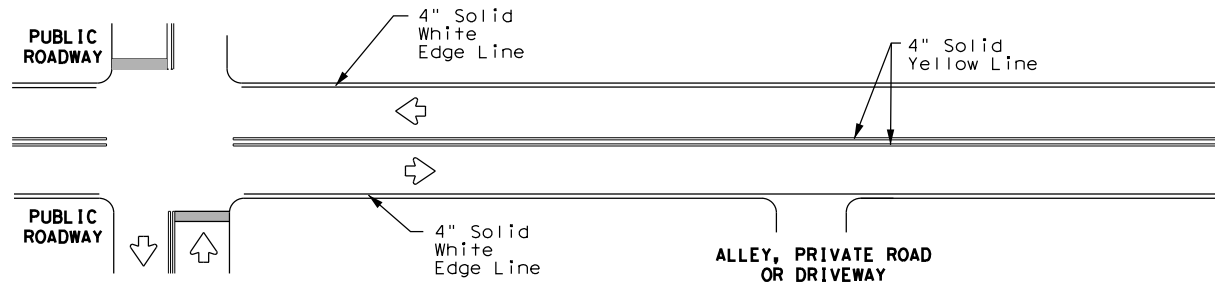
LEGEND				Traffic Operations Division Standard	
	Bidirectional Delineator	DELINEATOR & OBJECT MARKER PLACEMENT DETAILS D & OM(5) - 15			
	Delineator				
	OM-3				
	OM-2				
	Terminal End				
	TRAFFIC FLOW	FILE: dom5-15.dgn © TxDOT August 2015 REVISIONS	ON: TxDOT CONT SECT	CK: TxDOT JOB	DW: TxDOT HIGHWAY
		DIST	COUNTY	SHEET NO. 126	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

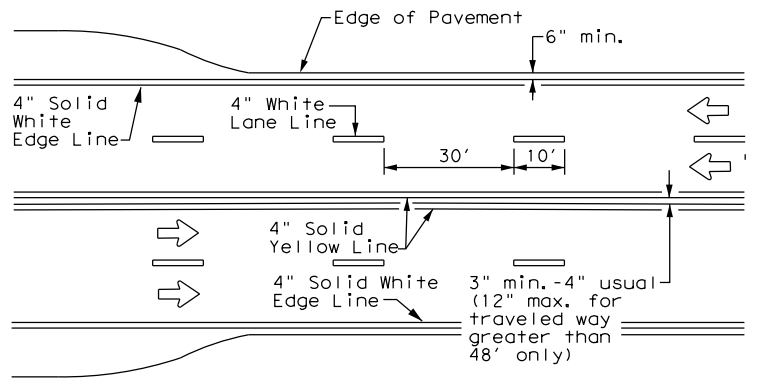
DATE: FILE:



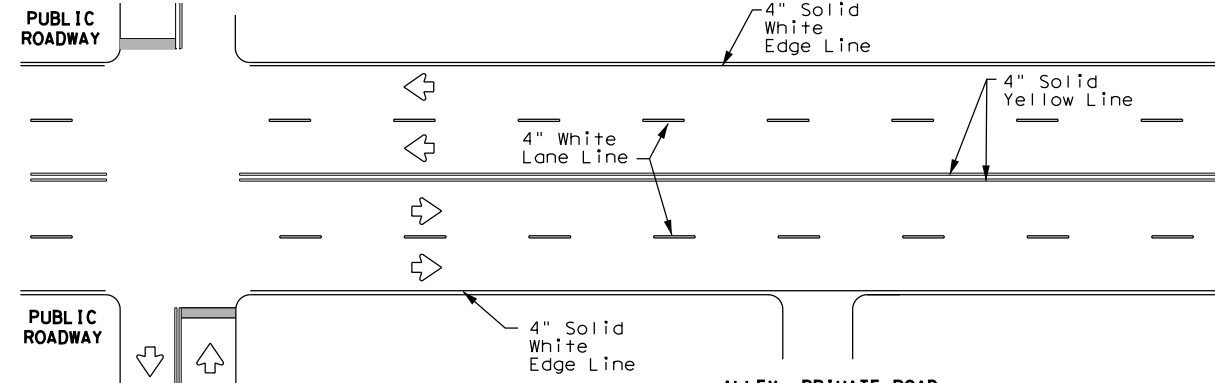
**EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



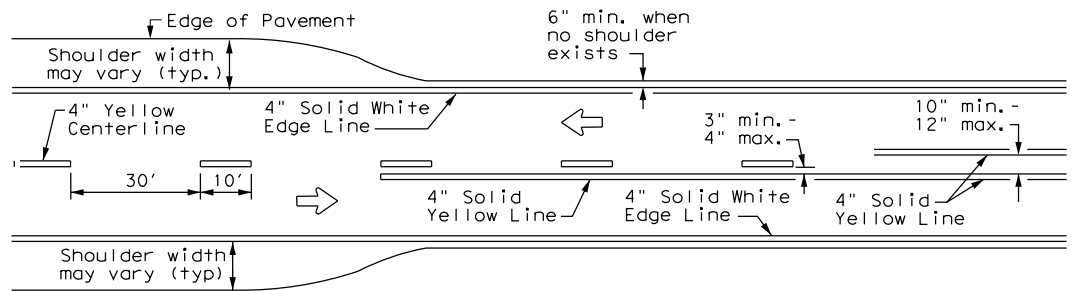
**TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**



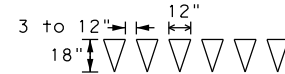
**CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



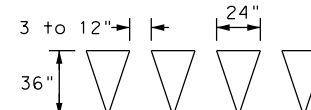
**TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**



**TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**

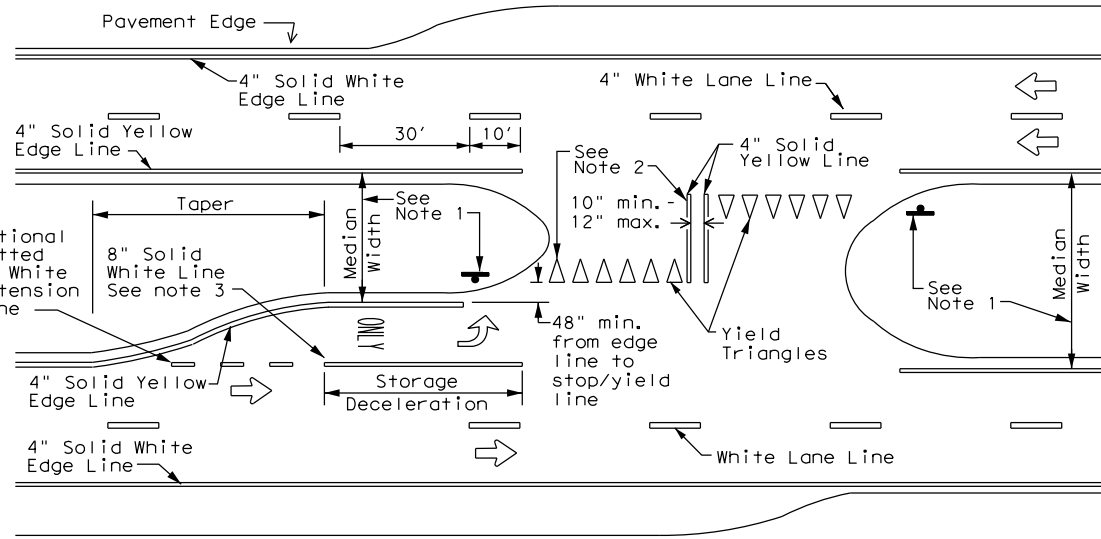


For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

- Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.
- Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield triangles shall only be used with yield signs.
- Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

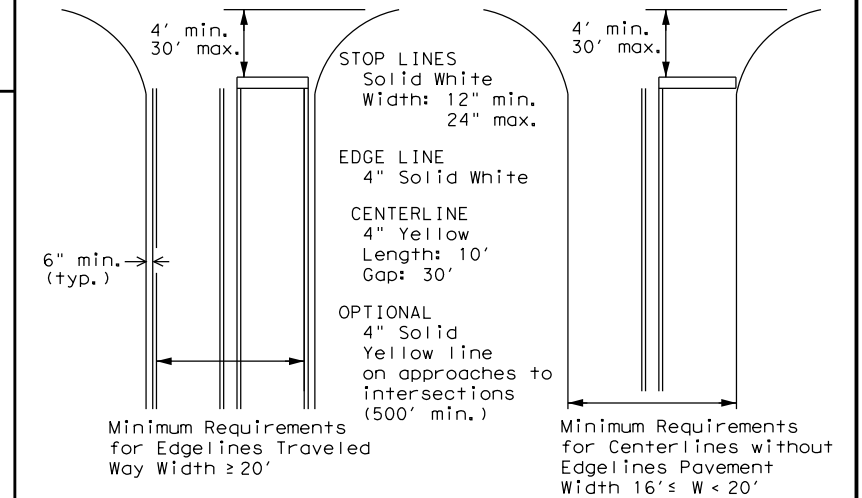
GENERAL NOTES

- Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.
- The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

MATERIAL SPECIFICATIONS

PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



**GUIDE FOR PLACEMENT OF STOP LINES,
EDGE LINE & CENTERLINE**

Based on Traveled Way and Pavement Widths for Undivided Highways



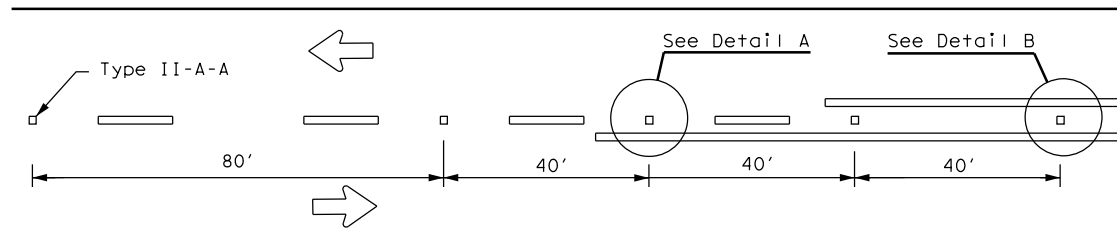
**TYPICAL STANDARD
PAVEMENT MARKINGS**

PM(1) - 20

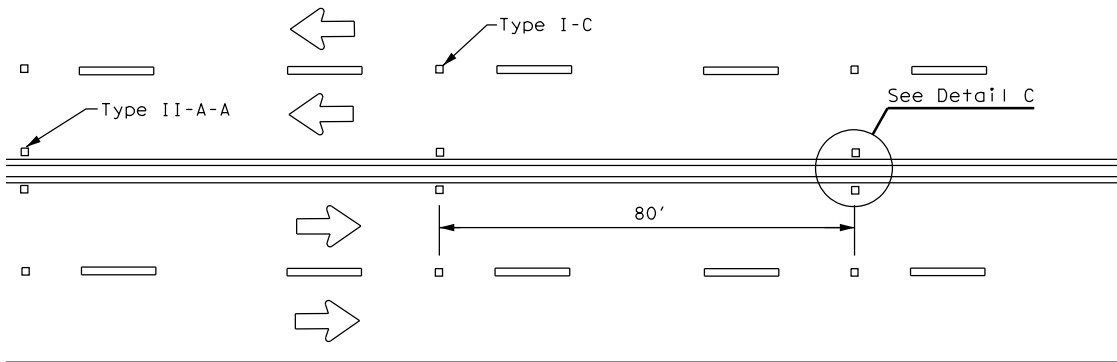
FILE: pml-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
8-95 3-03 REVISIONS				
5-00 2-12	DIST	COUNTY	SHEET NO.	
8-00 6-20			127	

REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

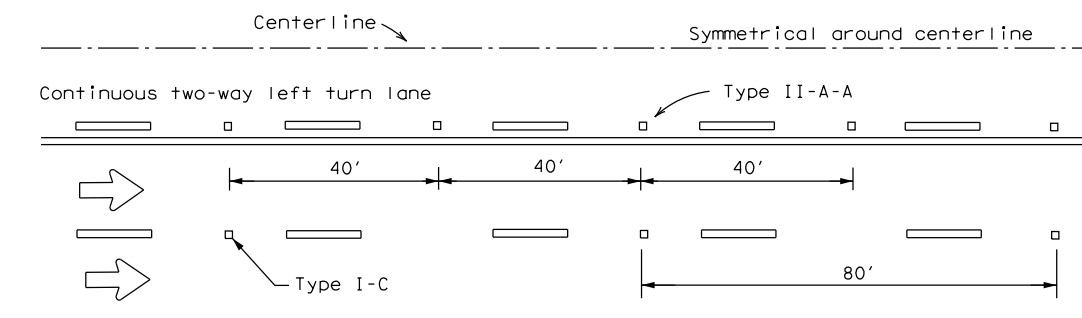
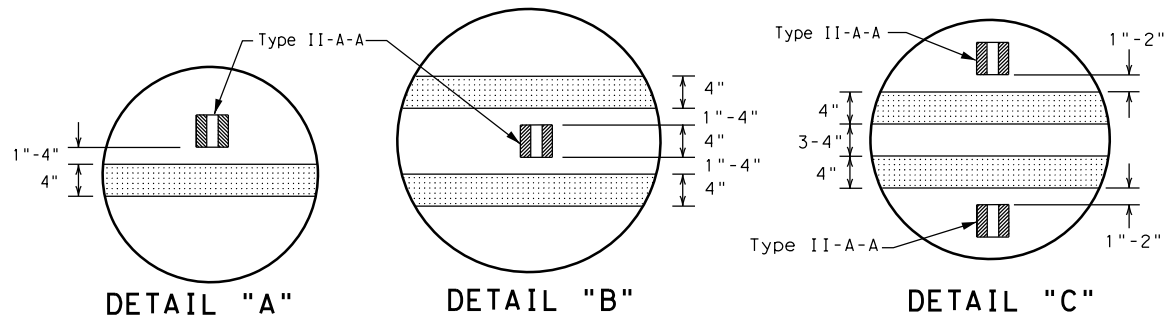
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



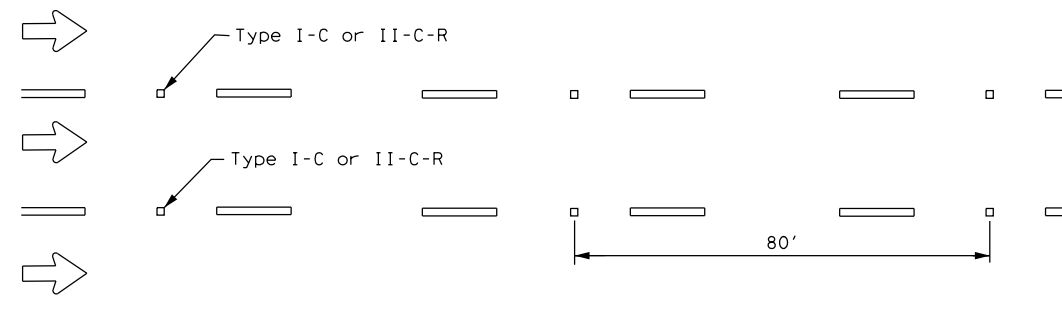
CENTERLINE FOR ALL TWO LANE ROADWAYS



**CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY HIGHWAYS**



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

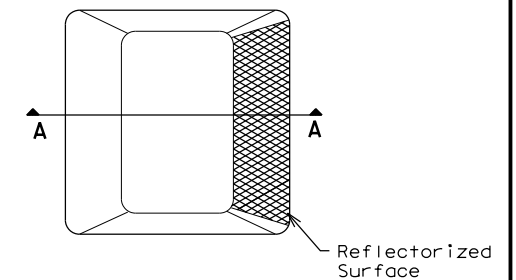


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

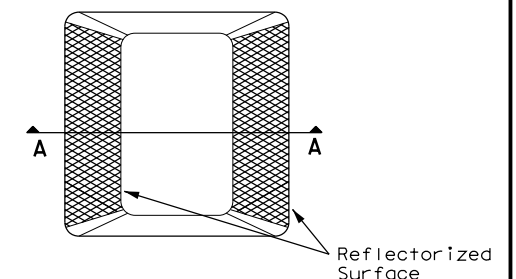
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

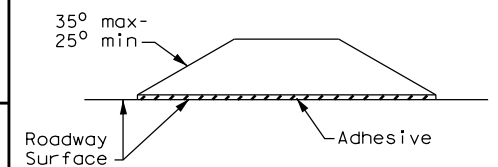
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

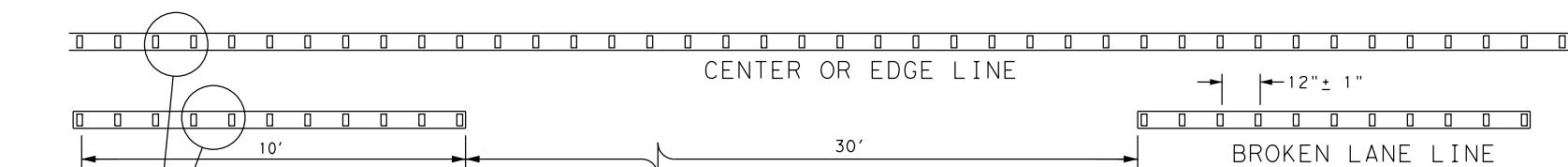


POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS PM(2) - 20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
© TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
4-92 2-10	REVISIONS			
5-00 2-12	DIST	COUNTY	SHEET NO.	
8-00 6-20			128	

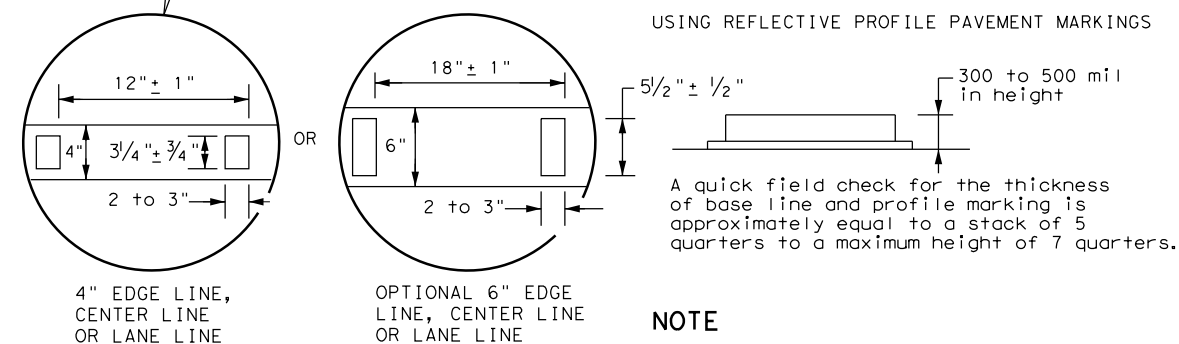
GENERAL NOTES

- All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
- On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

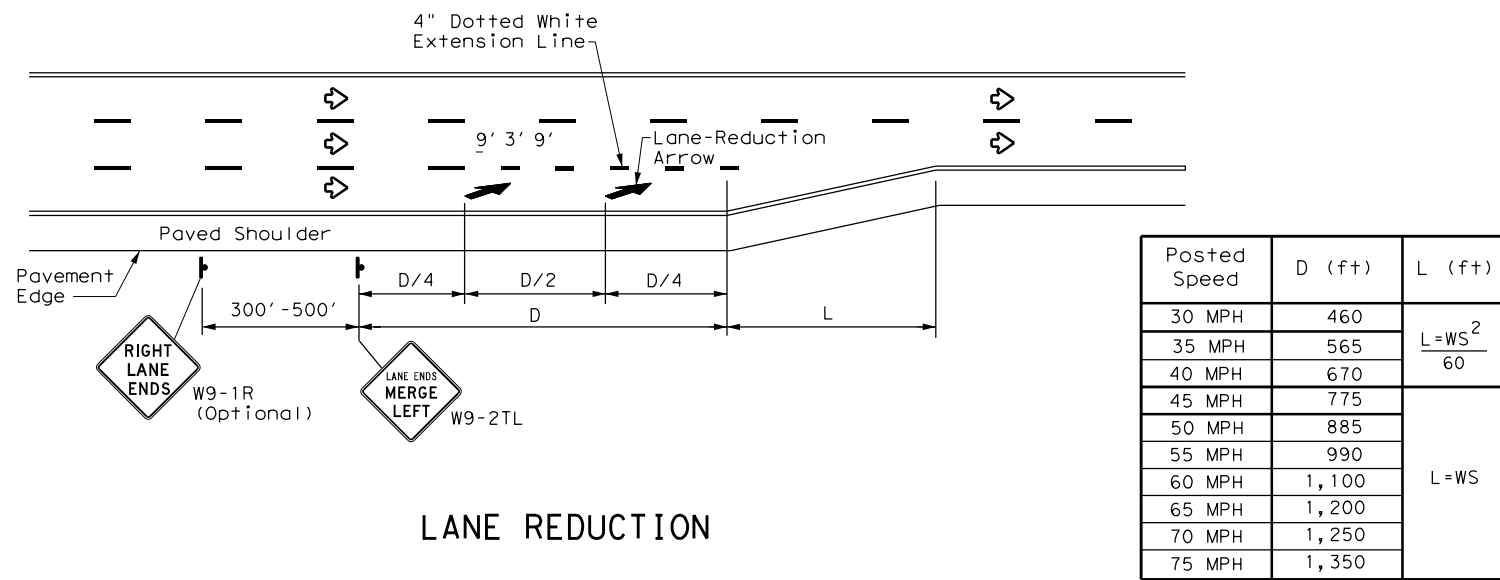


NOTE

Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

DATE:
FILE:

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



LANE REDUCTION

NOTES

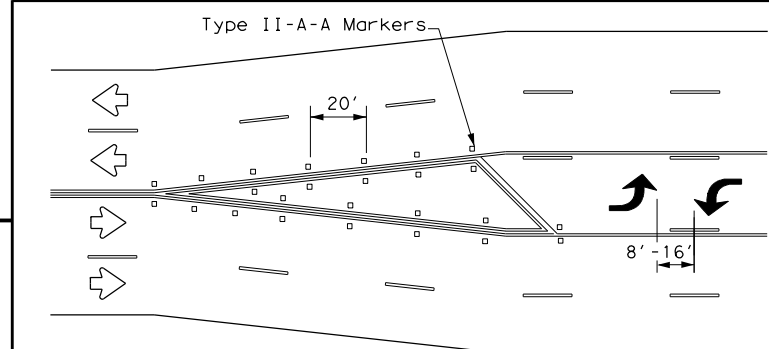
- Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
- On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
- Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
- For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

GENERAL NOTES

- Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
- When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
- Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
- Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

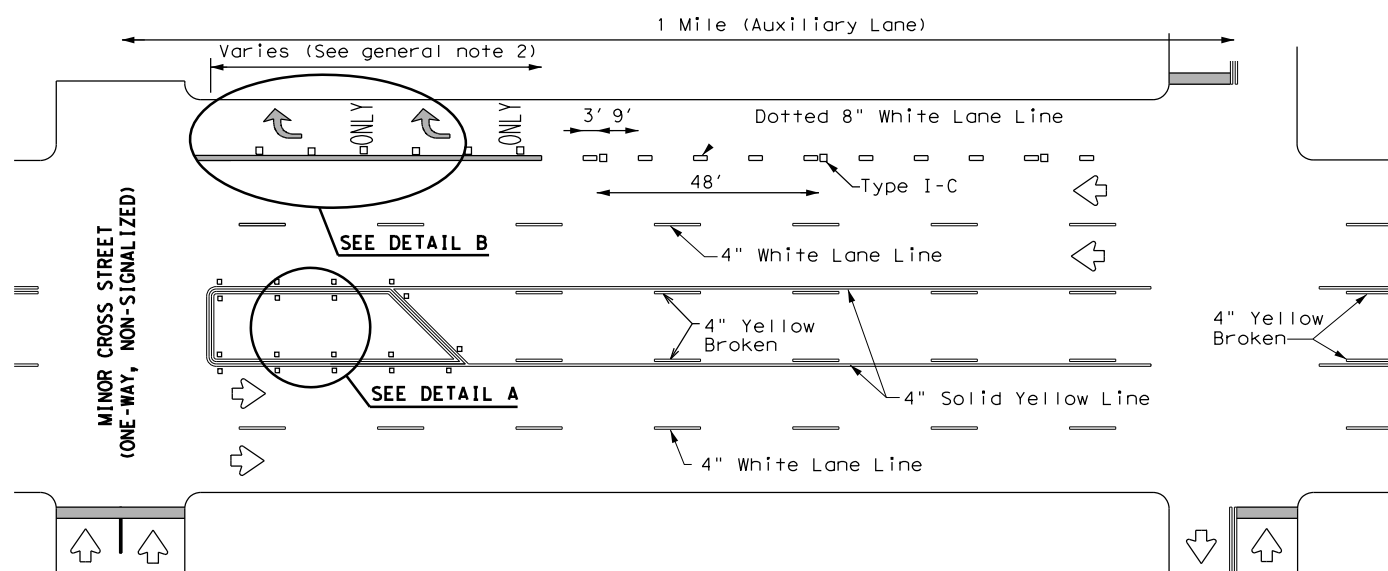
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

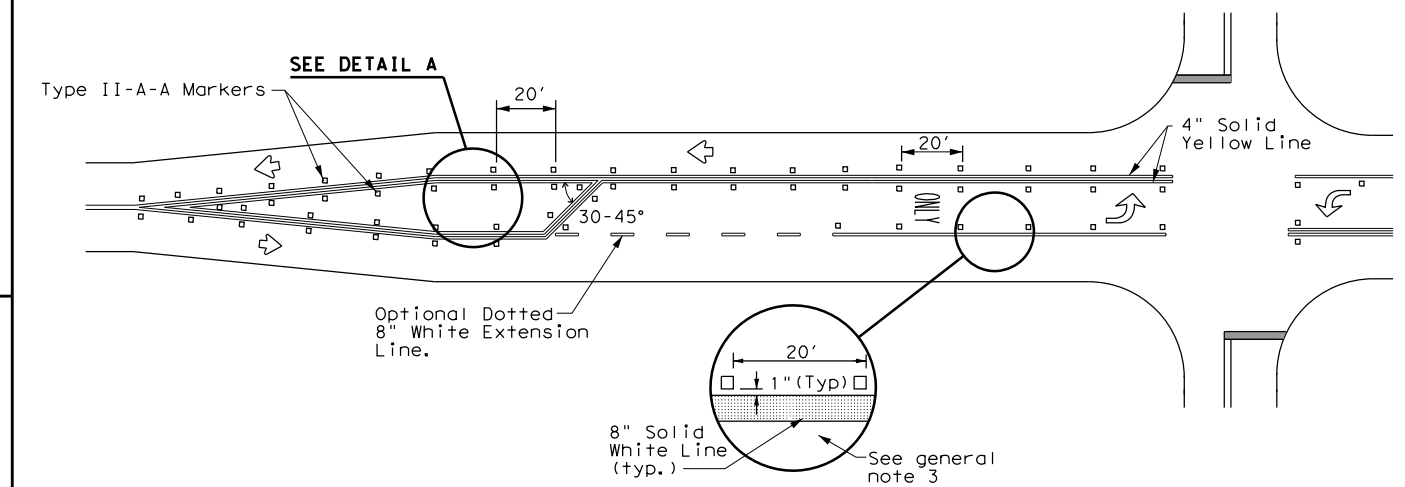


A two-way left-turn (TWLTL) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

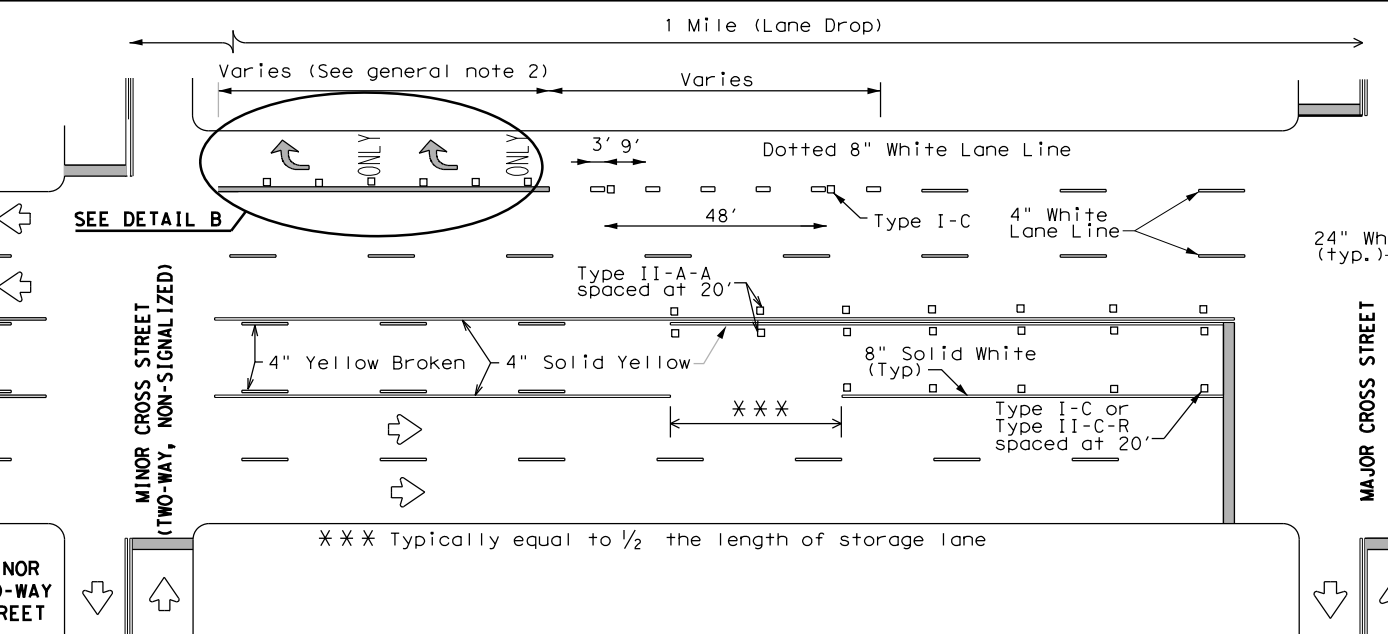
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY



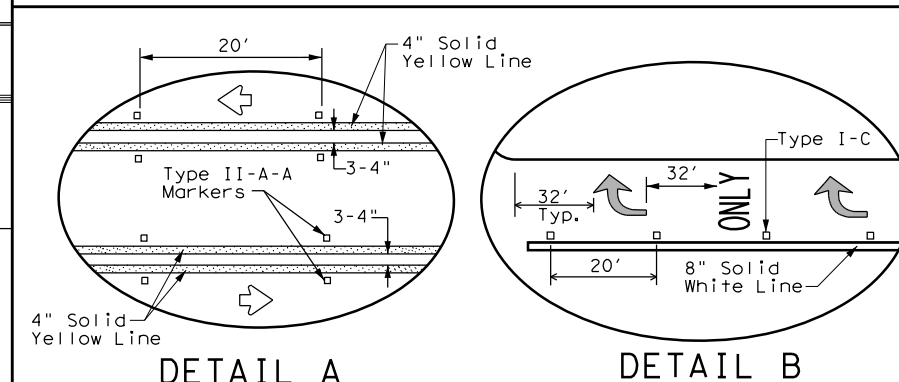
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



DETAIL A

DETAIL B

Texas Department of Transportation
Traffic Safety Division Standard










TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3) - 20

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
© TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS				
5-00 2-10				
8-00 2-12				
3-03 6-20				
DIST	COUNTY			SHEET NO.
				129

DATE:
FILE:

0' 5' 10' 20'
SCALE: 1"=20'

LEGEND

-  PROPOSED ROADWAY ILLUMINATION ASSEMBLY
-  PVC CONDUIT AND CONDUIT RUN NUMBER
-  2" PVC (SCH 80) BORED
-  PROPOSED ELECTRICAL SERVICE
-  EXISTING ELECTRICAL SERVICE
-  PROPOSED GROUND BOX
-  PROPOSED UNDERPASS LUMINAIRE
-  DISCONNECT SWITCH
-  ELECTRICAL SERVICE NUMBER
CIRCUIT NAME
ILL ASSEM NUMBER

NOTES:

1. UTILITIES SHOWN IN PLANS ARE IN APPROXIMATE LOCATIONS. CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND UTILITIES PRIOR TO BEGINNING CONSTRUCTION.
2. STATION & OFFSETS FOR RDWY ILLUMINATION ASSEMBLIES ARE TO CENTER OF DRILLED SHAFT.
3. PEC TO PROVIDE LIGHT POLES, FOUNDATIONS, CONDUCTORS, AND ELECTRIC SERVICE. CONTRACTOR TO INSTALL LIGHT POLE FOUNDATIONS, GROUND BOX, AND CONDUIT. CONTRACTOR TO OBTAIN APPROVAL OF CITY FOR LIGHT POLE LOCATION AND BEFORE COVERING CONDUIT.

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
ZACHARY B. RYAN
TEXAS REGISTRATION 106276
DATE: 7/10/2020
IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
FRN-F-1386

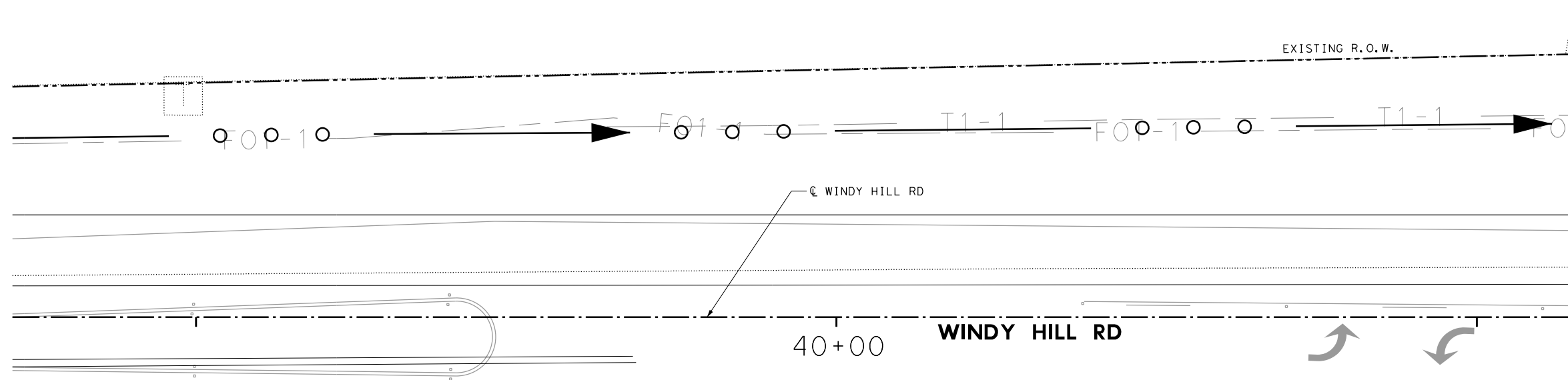
WINDY HILL ROAD ILLUMINATION LAYOUT

GLO Contract# 19-280-000-B779

DESIGN BY: AM
DRAWN BY: AM
CHECKED BY: ZR
APPROVED BY:
PROJECT NO: 2173.2001
DATE: 7/10/2020

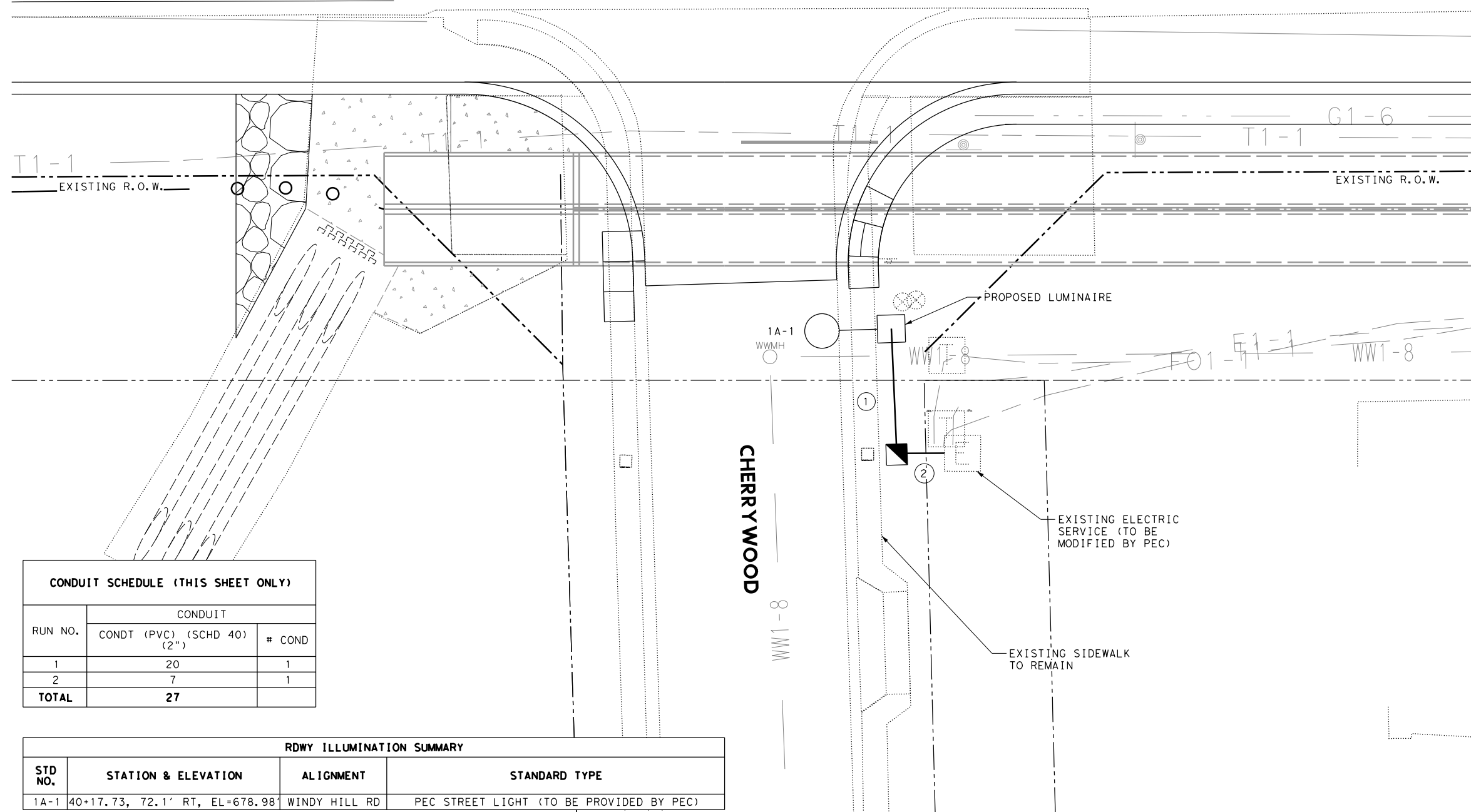
SCALE
HORIZONTAL:
VERTICAL:
SHEET: 1 OF 1
PAGE: 130

EXISTING R.O.W.



WINDY HILL RD

40+00 WINDY HILL RD



CONDUIT SCHEDULE (THIS SHEET ONLY)

RUN NO.	CONDUIT	
	CONDT (PVC) (SCHD 40) (2")	# COND
1	20	1
2	7	1
TOTAL	27	

RDWY ILLUMINATION SUMMARY

STD NO.	STATION & ELEVATION	ALIGNMENT	STANDARD TYPE
1A-1	40+17.73, 72.1' RT, EL=678.98'	WINDY HILL RD	PEC STREET LIGHT (TO BE PROVIDED BY PEC)

7/10/2020 4:45:11 PM I:\2173\2001\CADD\SHEETS\08-Traffic Items\WH*ILLUMINATION*LAYOUT.dgn

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:

GENERAL NOTES FOR ALL ELECTRICAL WORK

- The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.
- Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.
- Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is 1/2 in. or less in diameter.
- Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.
- Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.
- When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

- Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.
- Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.
- Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.



AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

- Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.
- Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.
- Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.
- Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

- Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.
- When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.
- Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

- Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.
- Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.
- Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.
- Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.
- When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."
- Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.
- During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.
- Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.
- Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.
- Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.
- At all electrical services, install a 6 AWG solid copper grounding electrode conductor.
- Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).
- Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.
- File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

					
<h1>ELECTRICAL DETAILS CONDUITS & NOTES</h1>					
<h2>ED(1) - 14</h2>					
FILE:	ed1-14.dgn	DN:	CK:	DW:	CK:
© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS		DIST	COUNTY	SHEET NO.	
				131	

ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS) 11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.
2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.
3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.
4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.
2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.
3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.
4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.
5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.
6. Support conductors in illumination poles with a J-hook at the top of the pole.
7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.
8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.
9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.
10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.
11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.
2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.
3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.
4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.
5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

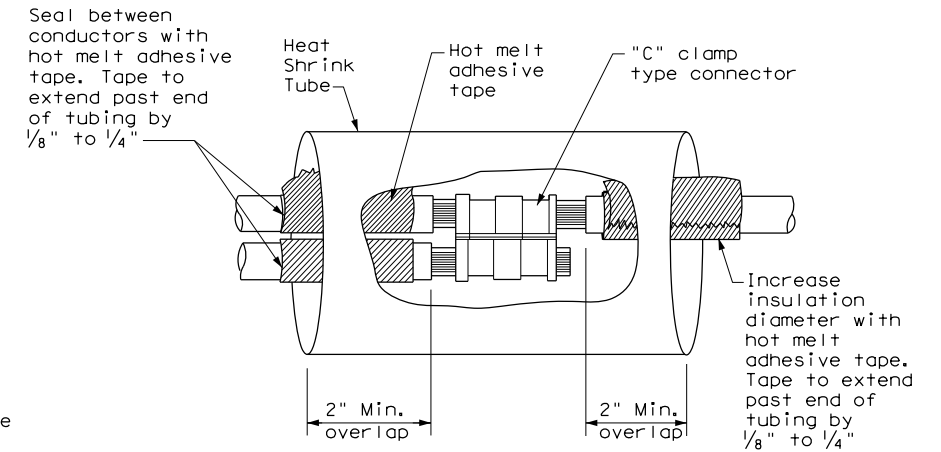
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

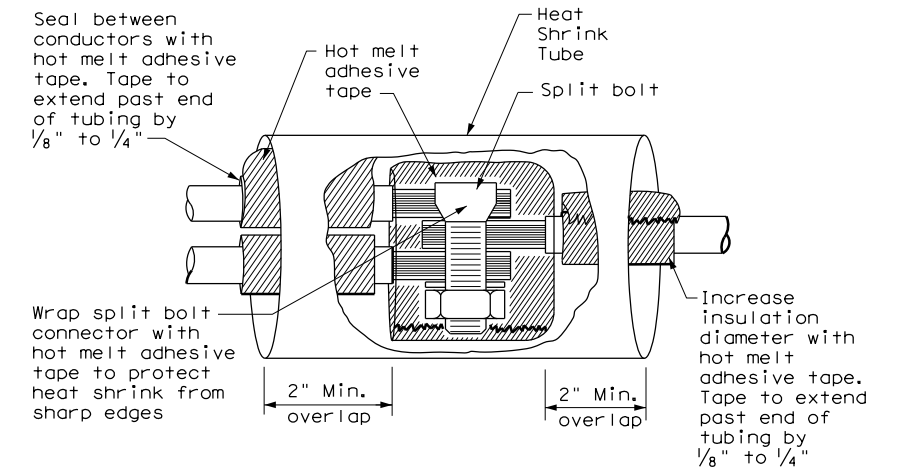
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

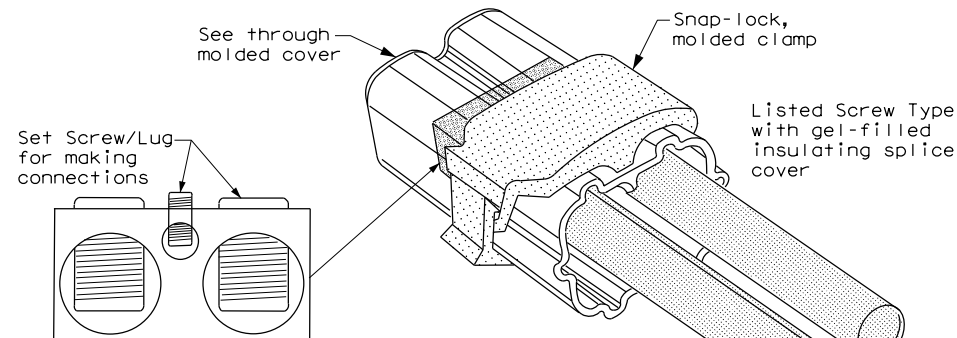
1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.
2. Do not place ground rods in the same drilled hole as a timber pole.
3. Install ground rods so the imprinted part number is at the upper end of the rod.
4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.
6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



**SPLICE OPTION 1
Compression Type**



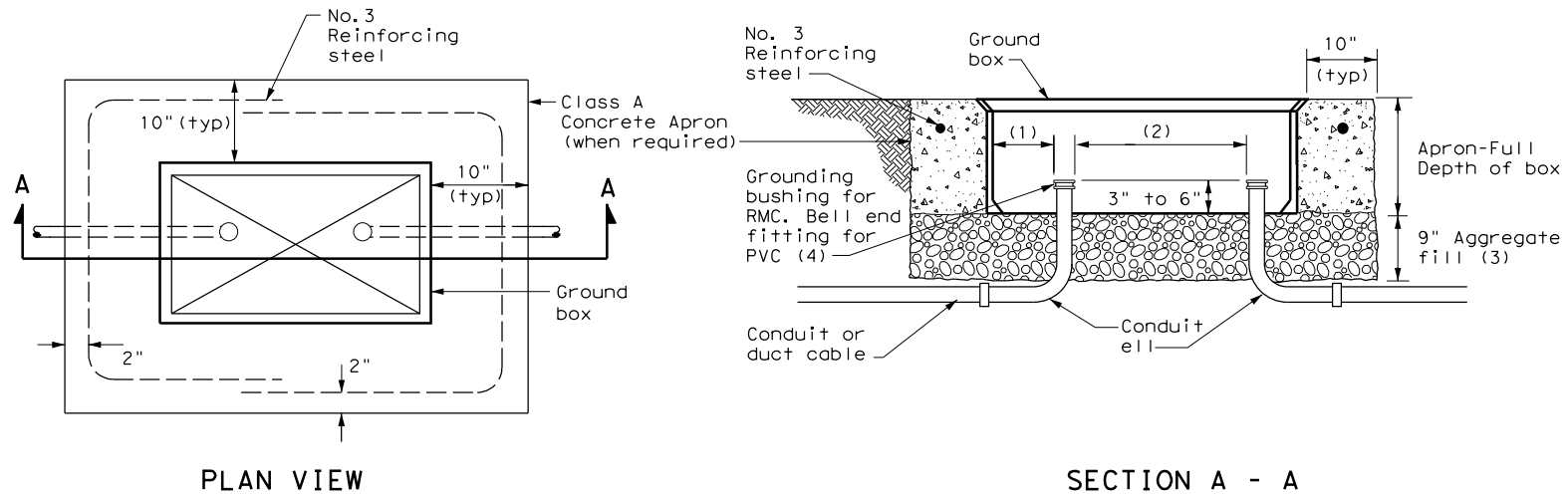
**SPLICE OPTION 2
Split Bolt Type**



**SPLICE OPTION 3
Listed Screw Type**

		Texas Department of Transportation		Traffic Operations Division Standard	
<h2>ELECTRICAL DETAILS CONDUCTORS</h2>					
<h3>ED(3) - 14</h3>					
FILE:	ed3-14.dgn	DN:	TxDOT	CK:	TxDOT
© TxDOT	October 2014	CONT:	SECT:	JOB:	HIGHWAY:
REVISIONS					
		DIST:	COUNTY:	SHEET NO.	
				132	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



APRON FOR GROUND BOX

- (1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.
- (2) Maintain sufficient space between conduits to allow for proper installation of bushing.
- (3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.
- (4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOX DIMENSIONS

TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

GROUND BOX COVER DIMENSIONS

TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."
2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.

4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.
2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.
3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.
4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.
5. Temporarily seal all conduits in the ground box until conductors are installed.
6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.
7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.
8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.
9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.
10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.
11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

DATE:
FILE:

Texas Department of Transportation					Traffic Operations Division Standard				
<h2 style="margin: 0;">ELECTRICAL DETAILS</h2> <h3 style="margin: 0;">GROUND BOXES</h3> <h4 style="margin: 0;">ED(4) - 14</h4>									
FILE:	ed4-14.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT October 2014		CONT	SECT	JOB	HIGHWAY				
REVISIONS							DIST	COUNTY	SHEET NO.
									133

ELECTRICAL SERVICES NOTES

- Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.
- Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services," DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.
- Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.
- Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.
- The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.
- Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.
- When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.
- Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.
- All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.
- Provide rigid metal conduit (RMC) for all conduits on service, except for the 1/2 in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.
- Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.
- Ensure all mounting hardware and installation details of services conform to utility company specifications.
- For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.
- When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in. before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.
- Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

- Provide threaded hub for all conduit entries into the top of enclosure.
- Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photoceII or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.
- Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.
- Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

- Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.
- When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

PHOTOELECTRIC CONTROL

- Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.

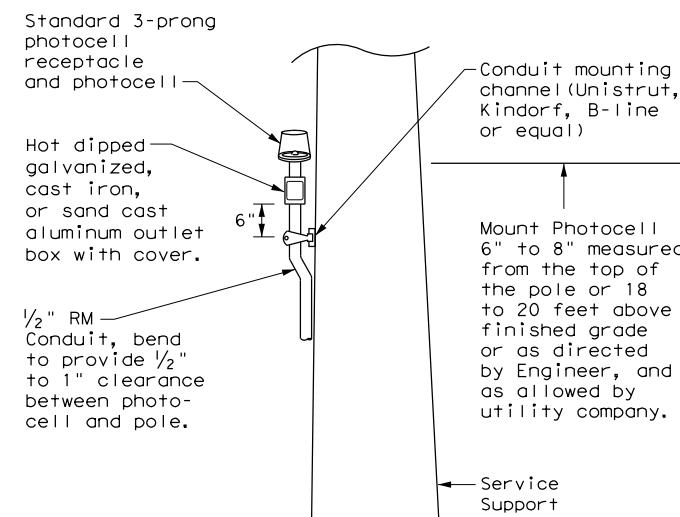
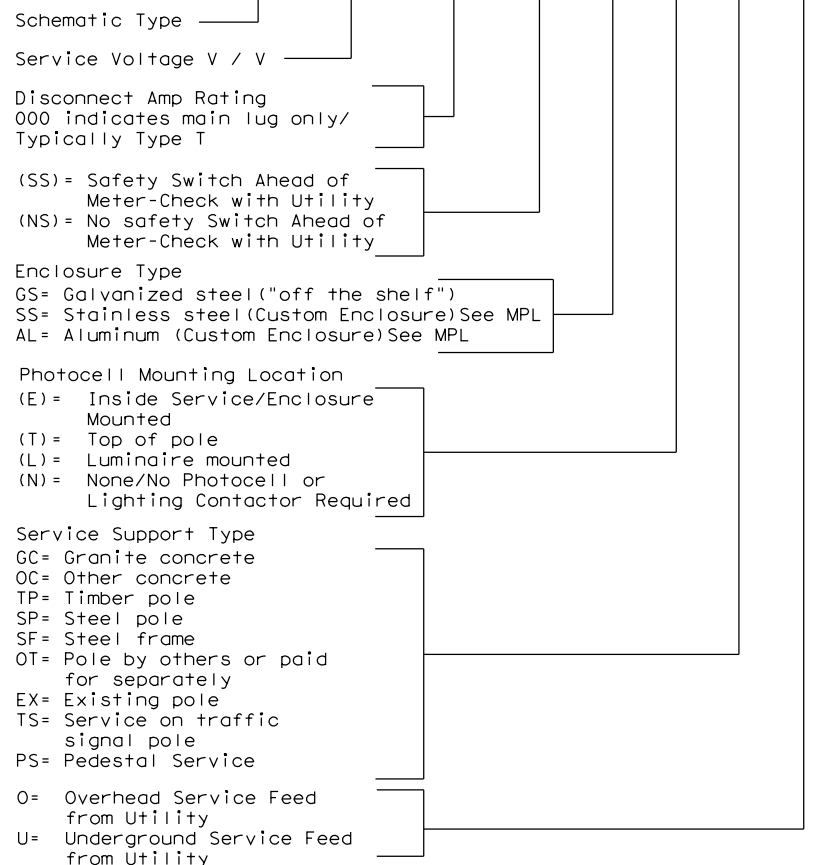
* ELECTRICAL SERVICE DATA												
Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit *xSize	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 1/4"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 1/4"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National Electrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

ELEC SERV TY X XXX/XXX XXX (XX) XX (X) XX (X)



TOP MOUNTED PHOTOCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.



ELECTRICAL DETAILS SERVICE NOTES & DATA

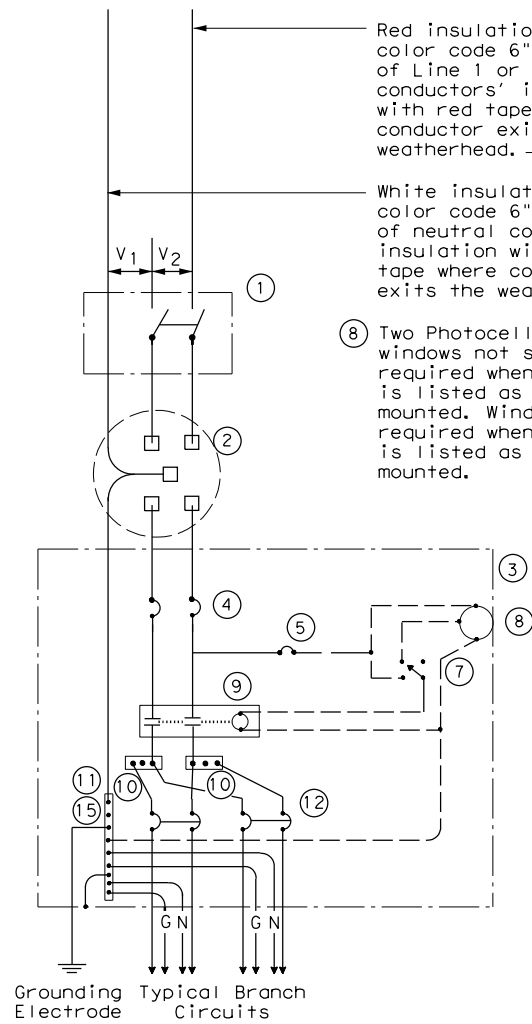
ED(5) - 14

FILE: ed5-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS				
DIST	COUNTY			SHEET NO.
				134

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

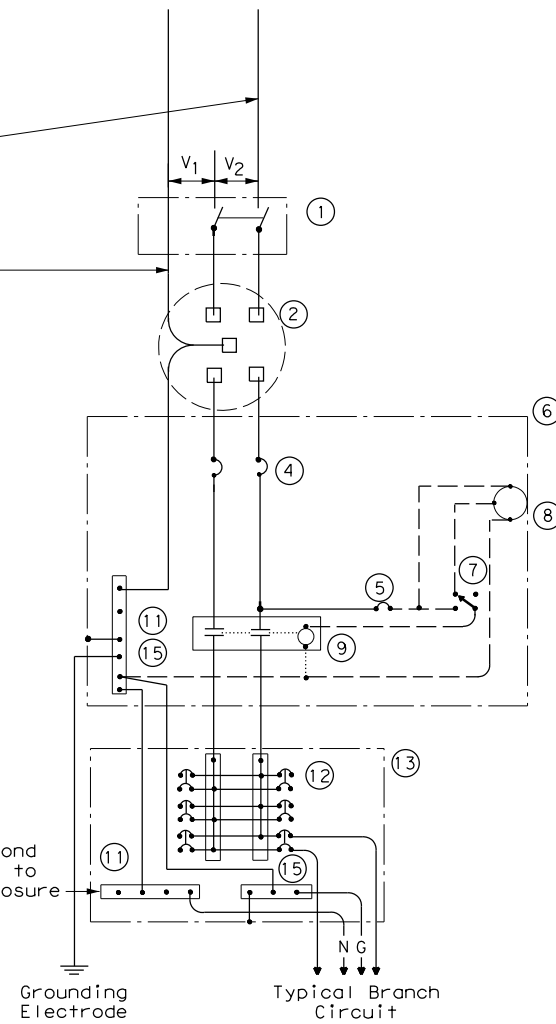


**SCHEMATIC TYPE A
THREE WIRE**

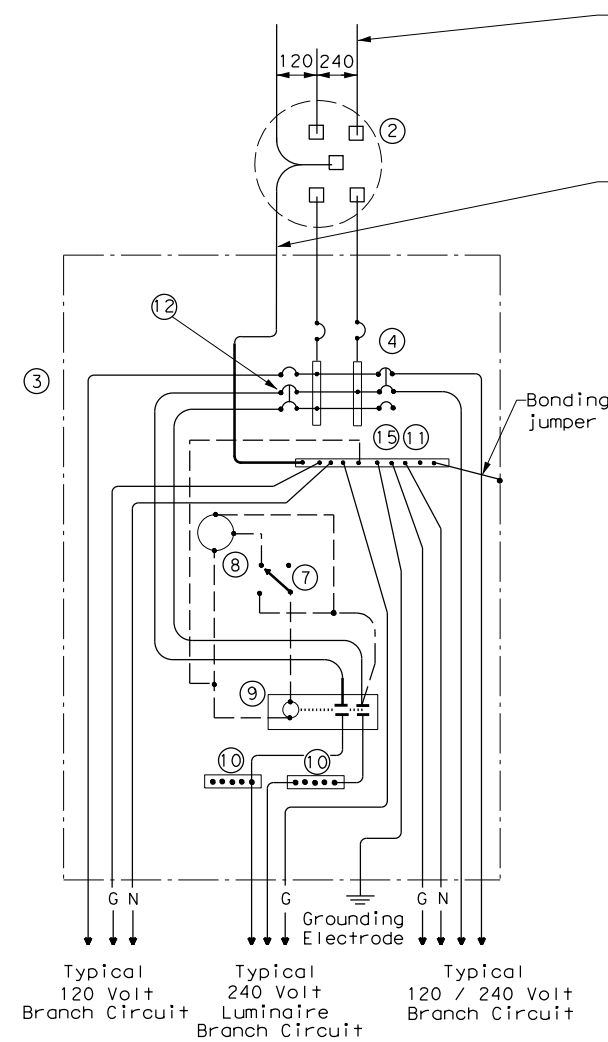
⑧ Two Photocell viewing windows not shown but required when photocell is listed as enclosure mounted. Windows not required when photocell is listed as pole top mounted.

Do not bond this bus to the enclosure

WIRING LEGEND	
—	Power Wiring
- - - -	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required



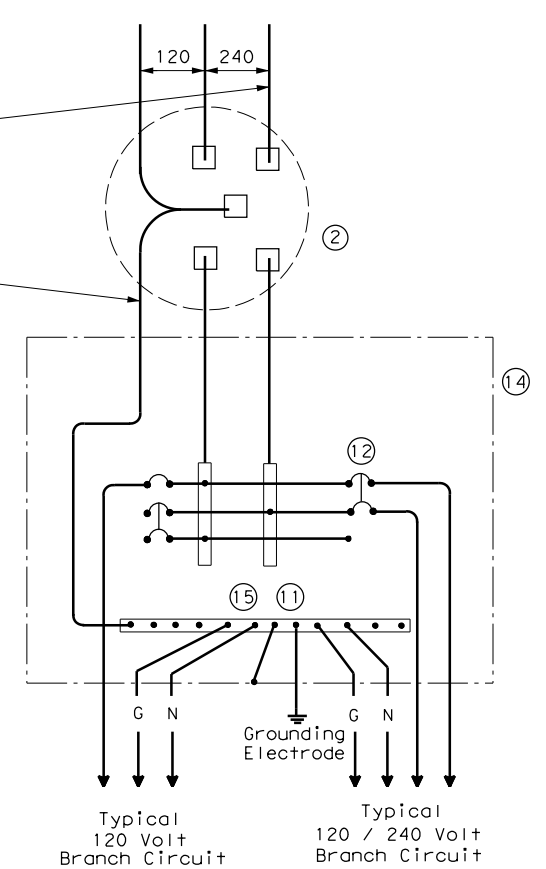
**SCHEMATIC TYPE C
THREE WIRE**



**SCHEMATIC TYPE D - CUSTOM
120/240 VOLTS - THREE WIRE**

Red insulation or color code 6" length of Line 1 or Line 2 conductors' insulation with red tape where conductor exits the weatherhead.

White insulation or color code 6" length of neutral conductors' insulation with white tape where conductor exits the weatherhead.



**SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE**
Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus

		Traffic Operations Division Standard	
ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES			
ED(6) - 14			
FILE: ed6-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT October 2014	CONT	SECT	JOB
REVISIONS		DIST	COUNTY
		SHEET NO.	
		135	

DATE:
FILE:

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

SUPPORT TYPE STEEL POLE (SP) AND STEEL FRAME (SF)

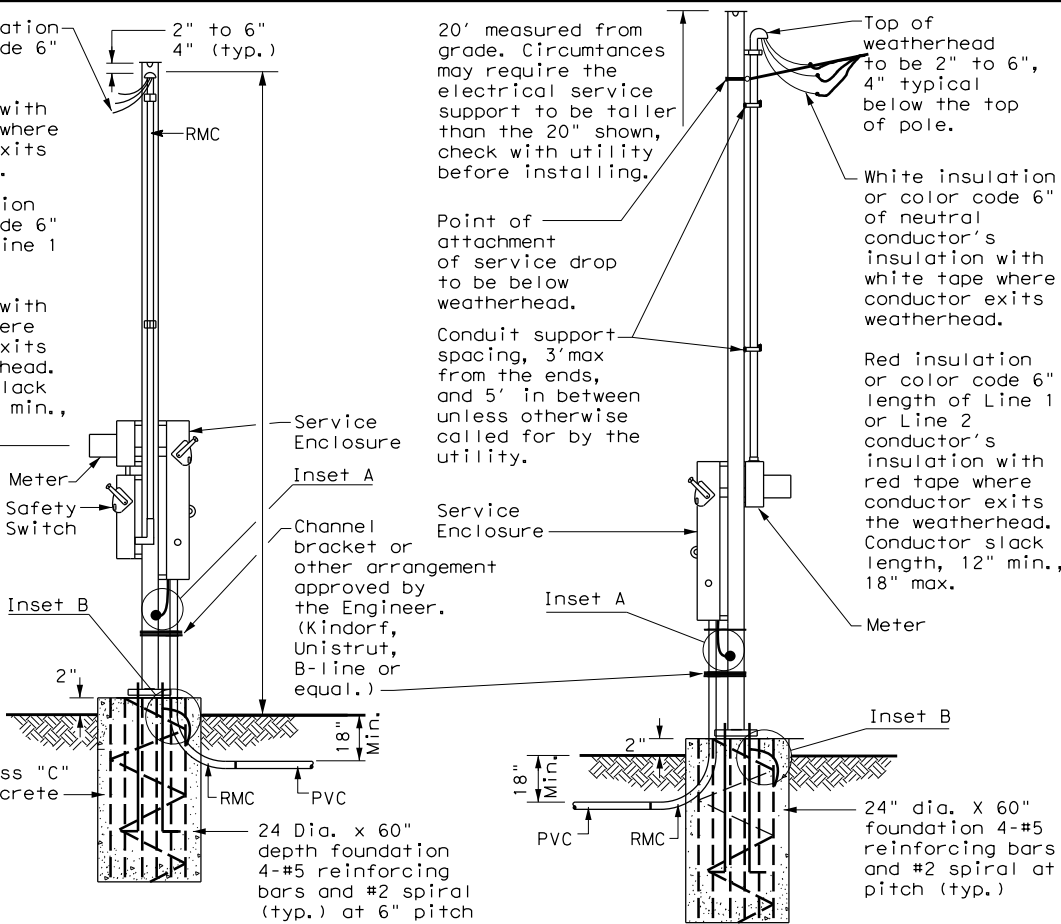
1. Provide steel pole and steel frame supports as per TxDOT Departmental Material Specification (DMS)11080 "Electrical Services." Mount all equipment and conduit on 12 gauge galvanized steel or stainless steel channel strut, 1 1/2 in. or 1 3/8 in. wide by 1 in. up to 3 3/4 in. deep Unistrut, Kindorf, B-line or equal. Bolt or weld all channel and hardware to vertical members as approved. Do not stack channel. File smooth and paint field cut ends of all channel with zinc-rich paint before installing.
2. Provide poles for overhead service with an eyebolt or similar fitting for attachment of the service drop to the pole in conformance with the electric utility provider's specifications.
3. Provide and install galvanized 3/4 in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized 3/4 in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in of thread, with 3 1/4 in. to 3 1/2 in. of the exposed anchor bolt projecting above finished foundation. Provide and install leveling nuts for all anchor bolts.
4. Bond one of the anchor bolts to the rebar cage with 6 AWG bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. See Inset B.
5. Furnish and install rigid metallic ellis in all steel pole and steel frame foundations for all conduits entering the service from underground.
6. Use class C concrete for foundations. Ensure reinforcing steel is Grade 60 with 3" of unobstructed concrete cover.
7. Drill and tap steel poles and frames for 1/2 in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. For steel frame service supports, provide and install tank ground fitting on steel frame post. Install service grounding electrode conductor in a non-metallic conduit or tubing from the enclosure to the steel frame post. Connect electrical service grounding electrode conductor to the tank ground fitting. See steel frame and steel pole details and Inset A for more information. Size service entrance conduit and branch circuit conduit as shown in the plans. For underground conduit runs from the electrical service, extend RMC from the service enclosure to an RMC elbow, and then connect the schedule type and size of conduit shown in the plans. Provide and install grounding bushings where RMC terminates in the enclosure. Grounding bushings are not required when RMC is fitted into a sealing hub or threaded boss.
8. If Steel pole or frame is painted, bond each separate painted piece with a bonding jumper attached to a tapped hole.
9. Provide 1/4" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.
10. Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.
11. Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.

White insulation or color code 6" of neutral conductor's insulation with white tape where conductor exits weatherhead.

Red insulation or color code 6" length of Line 1 or Line 2 conductor's insulation with red tape where conductor exits the weatherhead. Conductor slack length, 12" min., 18" max.

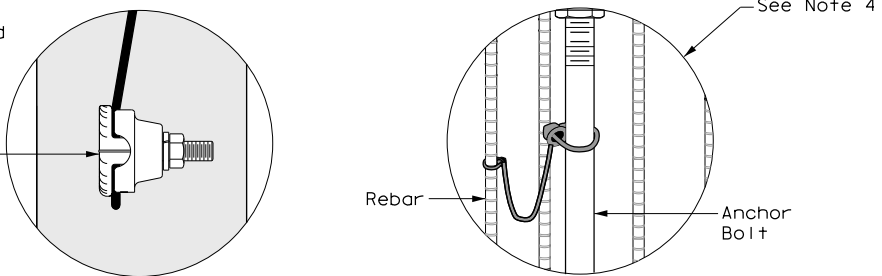
24 Dia. x 60" depth foundation 4-#5 reinforcing bars and #2 spiral (typ.) at 6" pitch

24" dia. X 60" foundation 4-#5 reinforcing bars and #2 spiral (typ.) at 6" pitch

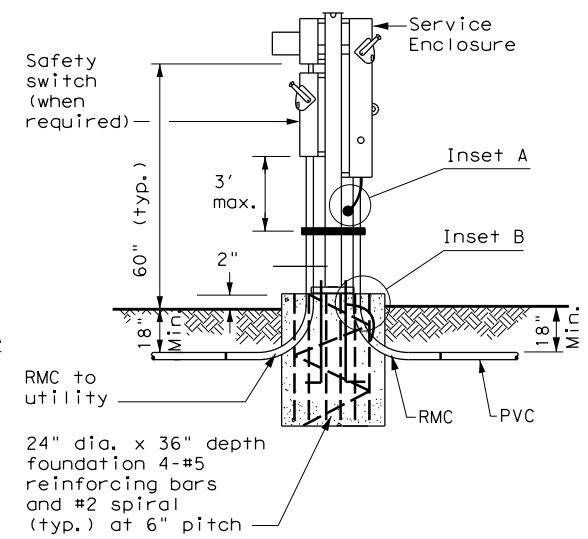


WITH SAFETY SWITCH
WITHOUT SAFETY SWITCH
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE

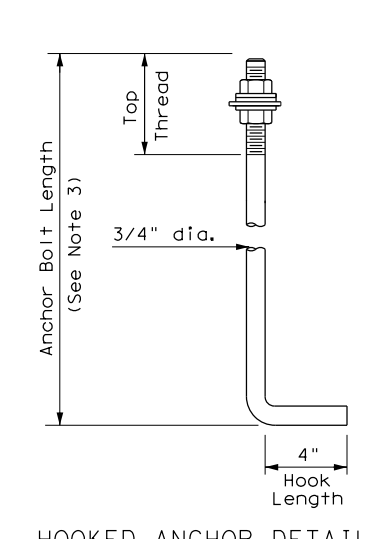
Drill, top, and thread 1/2" X 13 UNC. Install tank ground fitting, connect electrical service grounding electrode conductor. See Note 7.



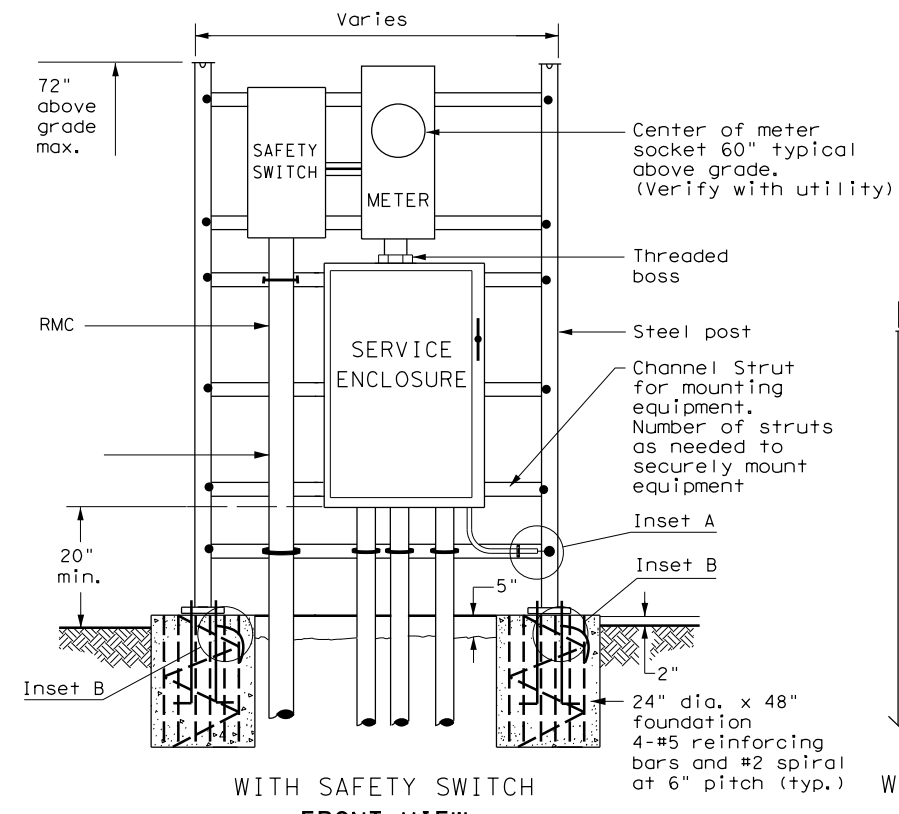
FRONT VIEW
INSET A
INSET B



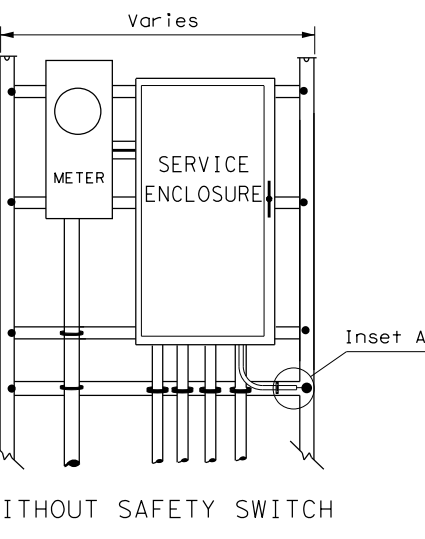
WITH SAFETY SWITCH
SERVICE SUPPORT TYPE SP (U) - UNDERGROUND SERVICE



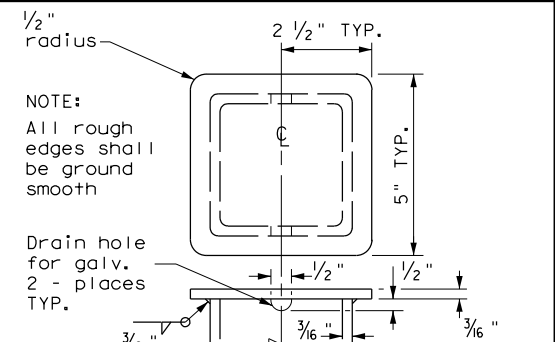
HOOKED ANCHOR DETAIL



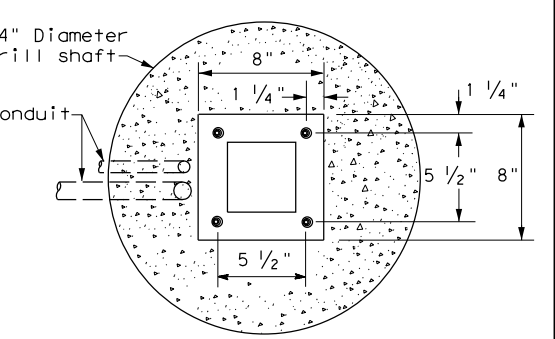
WITH SAFETY SWITCH
FRONT VIEW
SERVICE SUPPORT TYPE SF (U) - UNDERGROUND SERVICE



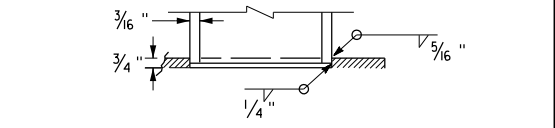
WITHOUT SAFETY SWITCH
SERVICE SUPPORT TYPE SF (U) - UNDERGROUND SERVICE



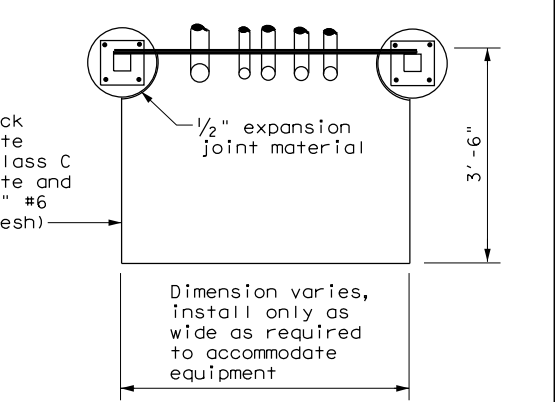
POLE TOP PLATE



BASE PLATE DETAIL



BOTTOM OF POLE



TOP VIEW
SERVICE SUPPORT TY SF (O) & SF (U)

		Traffic Operations Division Standard	
ELECTRICAL DETAILS SERVICE SUPPORT TYPES SF & SP ED(7) - 14			
FILE: ed7-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT October 2014	CONT	SECT	JOB
REVISIONS			HIGHWAY
	DIST	COUNTY	SHEET NO.
			136

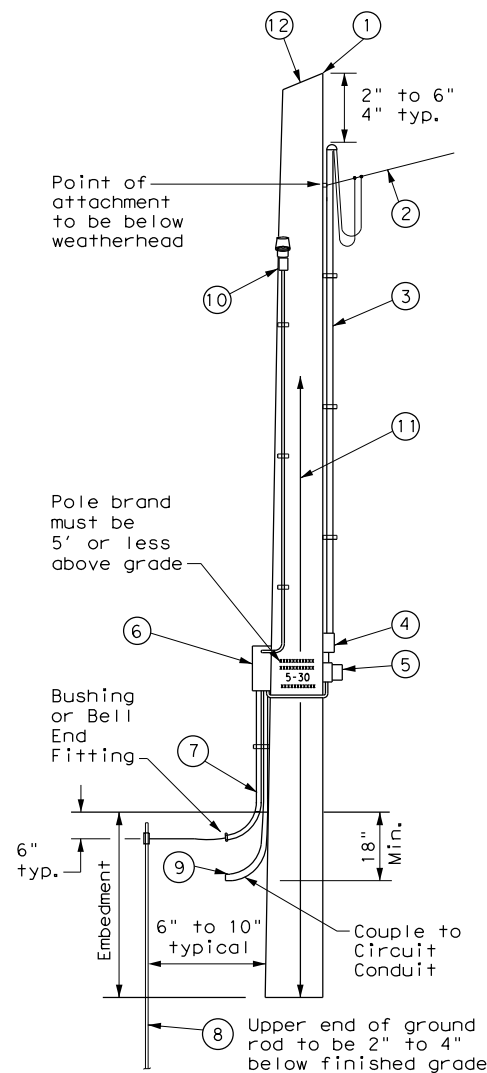
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:

TIMBER POLE (TP) SERVICE SUPPORT NOTES

1. Ensure electrical service support is a class 5 treated timber pole as per Item 627 "Treated Timber Poles." Embed timber pole to depth required in Item 627.
2. Conduit and electrical conductors attached to the electrical service pole and underground within 12 in. of service pole are not paid for directly but are subsidiary to the electrical service.
3. Install pole-top mounted photocell (T) on north side of pole, or in service enclosure (E) as required. See Electrical Service Data chart in plan set.
4. Gain pole as required to provide flat surface for each channel. Gain timber pole to $\frac{3}{8}$ in. max. depth and $1\frac{1}{8}$ in. max. height. Gain pole in a neat and workmanlike manner.
5. Mount meter and service equipment on stainless steel or galvanized channel (Unistrut, Kindorf, or equal). Provide channel sized 1 in. to $3\frac{3}{4}$ in. maximum depth, and $1\frac{1}{2}$ in. to $1\frac{5}{8}$ in. maximum width. File smooth the cut ends of galvanized channel and paint with zinc rich paint before installing on pole. Secure each channel section to timber pole with two galvanized or SS lag bolts, $\frac{1}{4}$ in. minimum diameter by $1\frac{1}{2}$ in. minimum length. Use a galvanized or SS flat washer on each lag bolt. Do not stack channel.
6. When excess length must be trimmed from poles, trim from the top end only.

- 1 Class 5 pole, height as required
- 2 Service drop from utility company (attached below weatherhead)
- 3 Service conduit (RMC) and service entrance conductors - One Red, One Black, One White (See Electrical Service Data)
- 4 Safety switch (when required)
- 5 Meter (when required)
- 6 Service enclosure
- 7 6 AWG bare grounding electrode conductor in $\frac{1}{2}$ in. PVC to ground rod - extend $\frac{1}{2}$ in. PVC 6 in. underground.
- 8 $\frac{5}{8}$ in. x 8 ft. Copper clad ground rod - drive ground rod to a depth of 2 in. to 4 in. below grade.
- 9 RMC same size as branch circuit conduit.
- 10 See pole-top mounted photocell detail on ED(5).
- 11 When required by the serving utility provide bare 6 AWG copper conductor. Run wire from pole top to butt wrap or copper butt plate. Protect conductor with non-conductive material to a height of 8 ft. above finished grade.
- 12 When required by utility, cut top of pole at an angle to enhance rain run off.

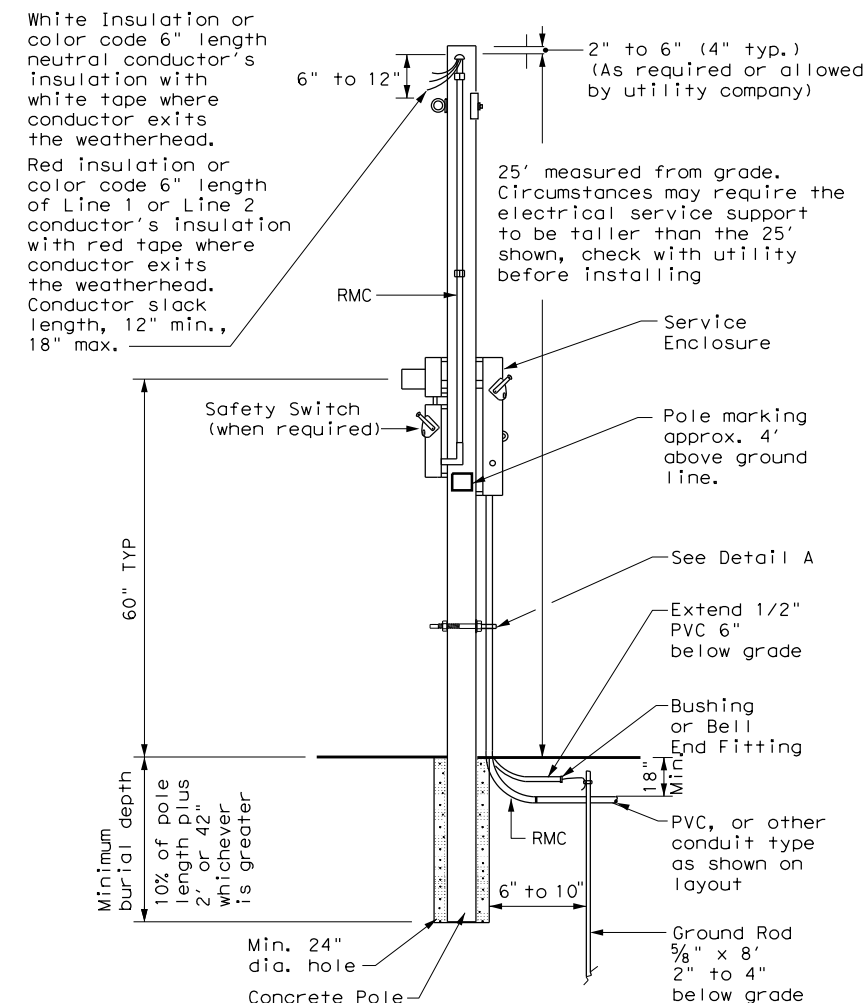


SERVICE SUPPORT TYPE TP (O)

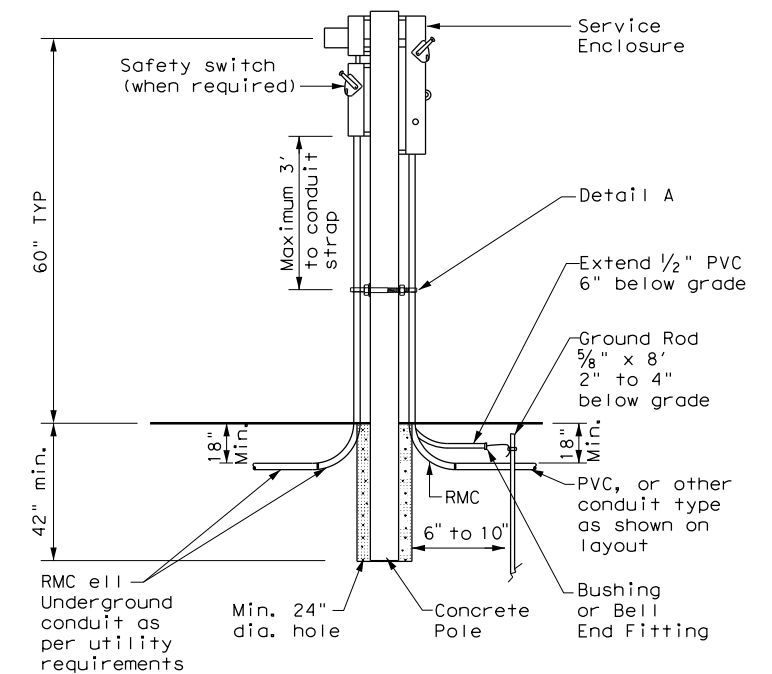
GRANITE CONCRETE (GC) & OTHER CONCRETE (OC) NOTES

Ensure electrical service support structures bid as type Granite Concrete (GC) or Other Concrete (OC) meet the following requirements.

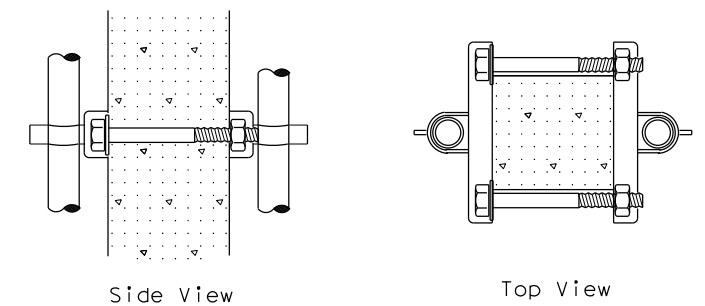
1. Provide GC and OC poles that meet the requirements of DMS 11080 "Electrical Services."
2. Provide prestressed concrete poles suitable for direct embedment into the ground without special foundations.
3. Verify poles are marked as required on DMS 11080. Location of marking should be approximately 4' above final grade. Use the two-point pickup locations when handling pole in horizontal position, and one-point pickup location for use in raising the pole to a vertical position. These marks are small but conspicuous.
4. Embed poles 42 in. or 10% of the length plus 2 ft., whichever is greater.
5. Ensure all installation details of services are in accordance with utility company specifications.
6. Install a one point rack or eye bolt bracket 6 inches to 12 inches below the weatherhead as an overhead service drop anchoring point for the electric utility.
7. Furnish and install galvanized or stainless steel channel strut $1\frac{1}{2}$ in. or $1\frac{5}{8}$ in. wide by 1 in. up to $3\frac{3}{4}$ in. deep (Unistrut, Kindorf, B-line or equal). Attach channel strut with stainless steel concrete anchors (max. 1" depth), square U-bolts or back to back channel strut with long bolts, or other secure mounting as approved by the Engineer. Ensure bolts are galvanized in accordance with ASTM A153. Do not stack channel struts.
8. Backfill the holes thoroughly by tamping in 6 in. lifts. After tamping to grade, place additional backfill material in a 6 inch high cone around the pole to allow for settling. Use material equal in composition and density to the surrounding area. Backfilling will not be paid for directly but is subsidiary to various bid items.



CONCRETE SERVICE SUPPORT Overhead (O)



CONCRETE SERVICE SUPPORT Underground (U)



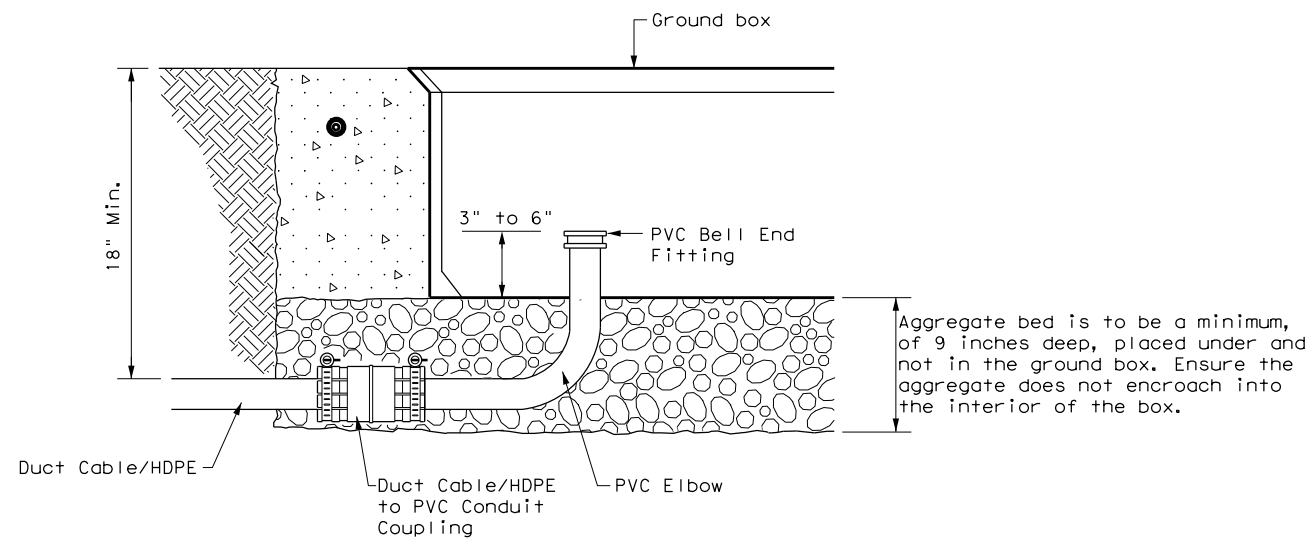
DETAIL A

See Note 7. Before installing channel that has been cut, file sharp edges and paint with zinc-rich paint. Ensure there is no paint splatter on the pole.

		Traffic Operations Division Standard	
ELECTRICAL DETAILS SERVICE SUPPORT TYPES GC, OC, & TP			
ED(10)-14			
FILE: ed10-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT October 2014	CONT	SECT	JOB
REVISIONS		HIGHWAY	
DIST	COUNTY	SHEET NO.	
		137	

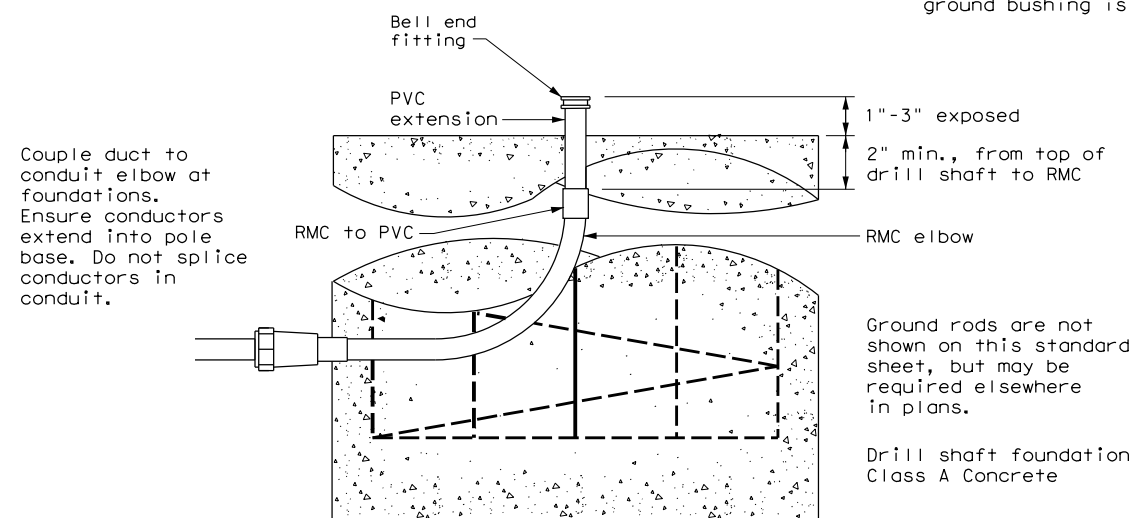
DUCT CABLE & HDPE CONDUIT NOTES

1. Provide duct cable in accordance with Departmental Material Specification (DMS) 11060 "Duct Cable" and Item 622 "Duct Cable." Provide duct cable as listed on the Material Producer List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 622.
2. Provide High-Density Polyethylene (HDPE) conduit in accordance with DMS 11060 and Item 618, "Conduit." Provide HDPE as listed on the MPL on the Department web site under "Roadway Illumination and Electrical Supplies," Item 618.
3. Supply duct cable with a minimum 2 in. diameter, unless otherwise shown in the plans. Provide duct cable and HDPE conduit as shown by descriptive code or on the plans. Bend duct cable and HDPE conduit as recommended by the manufacturer, with a minimum bending radius of 26 in. for 2 in. duct. Follow manufacturers' recommendations when handling duct cable and HDPE conduit reels and during installation of duct cable and HDPE conduit.
4. Do not splice conductors within duct cable or HDPE conduit. Couple duct cable and HDPE entering a ground box or foundation to a PVC elbow. When galvanized steel RMC elbows are called for in the plans and any portion of the RMC elbow is buried less than 18" from possible contact, ground the RMC elbow.
5. Furnish and install duct cable with factory installed conductors, sized as shown in the plans and as required by the National Electrical Code (NEC). The NEC contains specific requirements for duct cable in Article, "Nonmetallic Underground Conduit with Conductors: Type NUCC."
6. When conduit casing is called for in the plans, extend duct cable or HDPE conduit through the conduit casing in one continuous length without connection to the casing.
7. Seal the ends of duct cable or HDPE conduit with duct seal, expandable foam, or other approved method after completing the pull tests required by Item 622.
8. Provide minimum cover of 24 in. under roadways, 18 in. in other locations, or as shown on the plans.
9. Furnish and install listed fittings to couple duct cable or HDPE conduit to other types of conduit. Duct cable and HDPE conduit may be field-threaded and spliced with PVC or RMC threaded couplings; connected with listed tie-wrap fittings; connected using listed coupling made of HDPE with stainless steel external banding clamps and locking rings; connected with approved electrofusion conduit couplings; or connected using an approved chemical fusion method using an epoxy or adhesive specifically designed for HDPE couplings and connectors all installed in accordance with their manufacturer's instructions. Do not use PVC glue on HDPE. Do not use water pipe fittings, or connect conduit with heat shrink tubing.



DUCT CABLE/HDPE AT GROUND BOX

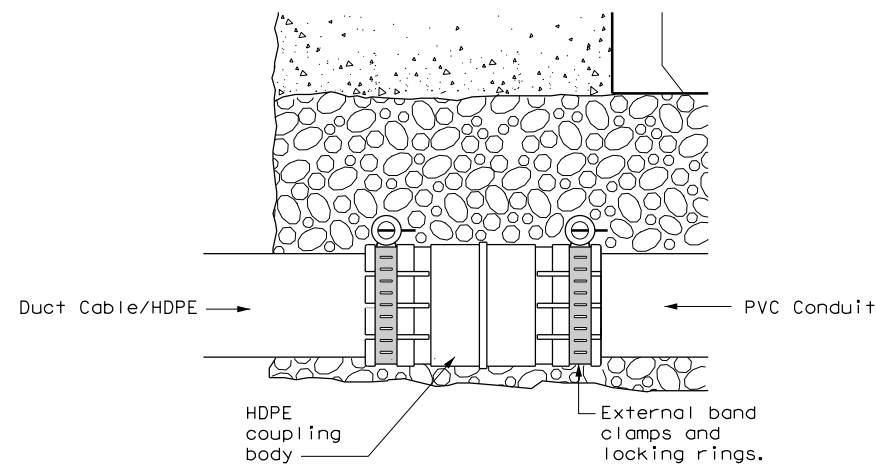
When the upper end of an RMC Ell does not enter the ground box, it may be extended with a SCH-40 PVC conduit nipple and bell end, provided there is a minimum of 18" of cover over all parts of the elbow. If not, a rigid extension and ground bushing is required.



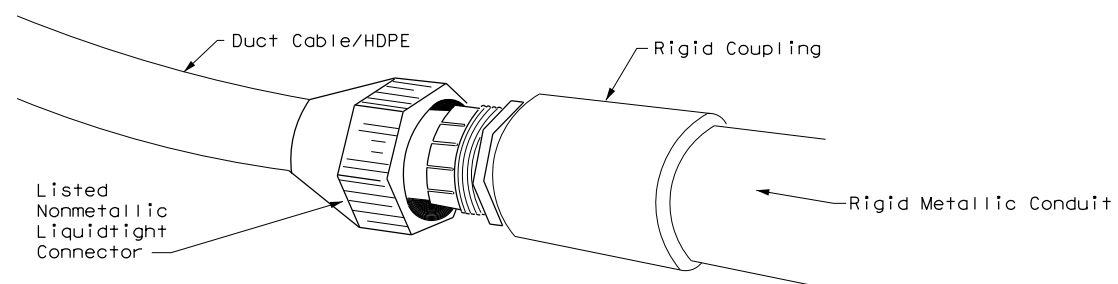
DUCT CABLE / HDPE AT FOUNDATION

Ground rods are not shown on this standard sheet, but may be required elsewhere in plans.

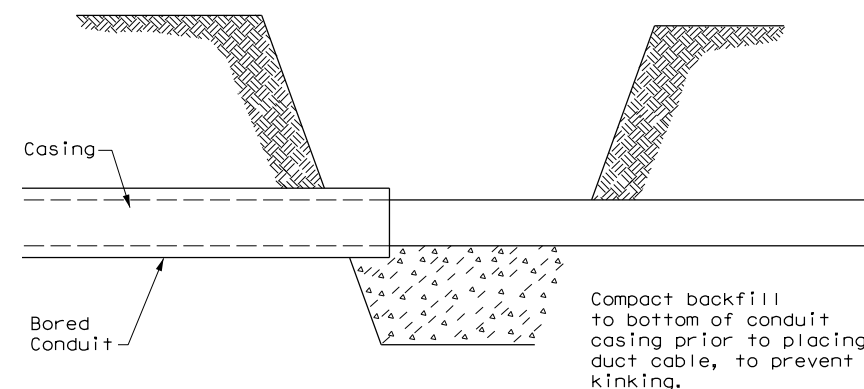
Drill shaft foundation
Class A Concrete



DUCT CABLE/HDPE TO PVC



DUCT CABLE/HDPE TO RMC



BORE PIT DETAIL

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:



ELECTRICAL DETAILS DUCT CABLE/ HDPE CONDUIT

ED(11)-14

FILE: ed11-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				138

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

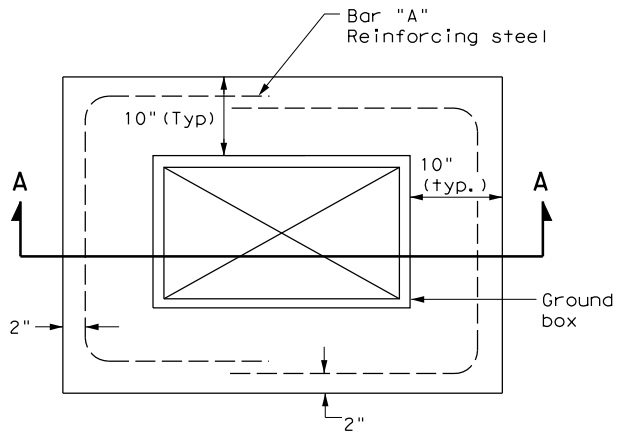
BATTERY BOX GROUND BOXES NOTES

A. MATERIALS

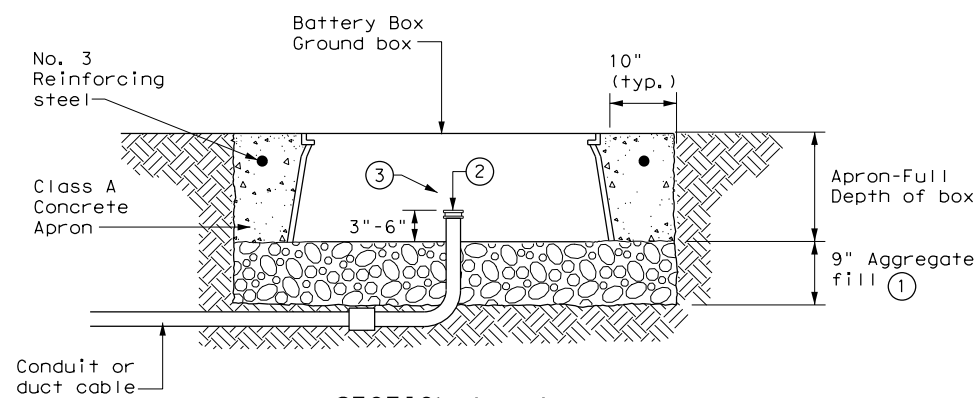
1. Provide polymer concrete or fiberglass reinforced plastic (FRP) battery box ground box and cover in accordance with Departmental Material Specification (DMS) 11071 "Battery Box Ground Boxes." Battery box will accommodate up to 4 batteries, each measuring 8 in. x 13.5 in. x 10 in. (W x L x D). Label battery box ground box cover in accordance with DMS 11071.
2. Supply a marine grade batteries with covers. Secure the marine grade batteries with covers to the stainless steel rack in the bottom of the ground box with tie down straps.

B. CONSTRUCTION METHODS

1. Ensure conduit entry will not interfere with placement of the batteries in the battery box ground box.
2. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting battery box ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure the aggregate bed is in place and is a minimum of 9 in. deep prior to setting the box. Install battery box ground box on top of aggregate.
3. Cast battery box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Battery box ground box aprons, including concrete and reinforcing steel, are subsidiary to battery box ground boxes when called for by descriptive code.
4. Bolt covers down when not working in battery box ground boxes. Keep bolt holes in the box clear of dirt.



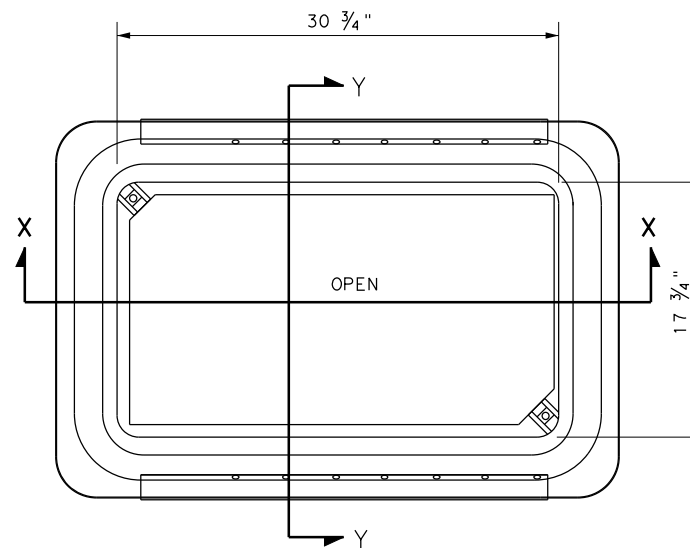
PLAN VIEW



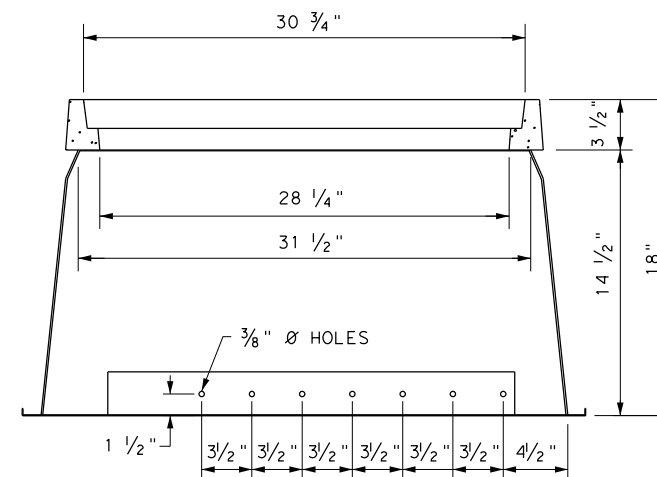
SECTION A - A

APRON FOR BATTERY BOX GROUND BOXES

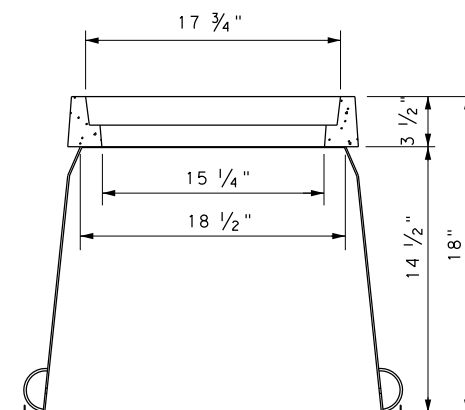
- ① Place aggregate under the box and not in the box. Aggregate should not encroach on the interior volume of the box.
- ② Install bushing or bell end fitting on the upper end of all ells.
- ③ Install all conduits in a neat and workmanlike manner.



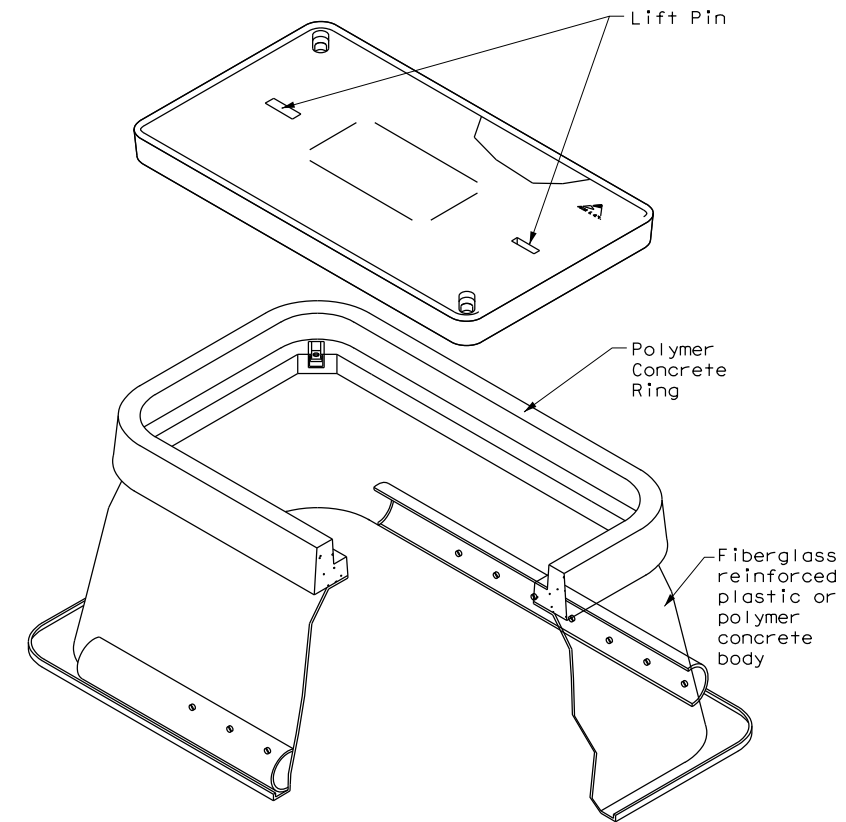
BATTERY BOX TOP VIEW



SECTION X-X



SECTION Y-Y



		Traffic Operations Division Standard	
<h2>ELECTRICAL DETAILS BATTERY BOX GROUND BOXES</h2>			
<h3>ED(12)-14</h3>			
FILE: ed12-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT October 2014	CONT	SECT	JOB
REVISIONS		DIST	COUNTY
		SHEET NO. 139	

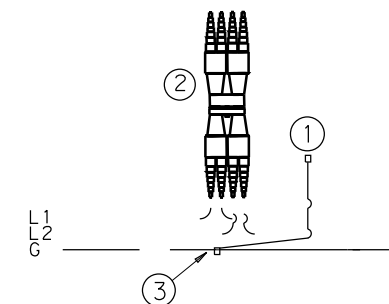
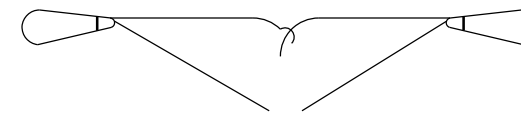
ROADWAY ILLUMINATION ASSEMBLY NOTES

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:

1. Details apply to roadway lighting installations bid or referenced under Item 610, "Roadway Illumination Assemblies." Provide, furnish, and install all other materials not shown on the plans which may be necessary for complete and proper construction. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the State such warranties or guarantees.
2. The locations of poles and fixtures may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.
3. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association, Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection.
4. Provide Roadway Illumination Light Fixtures as per TxDOT Departmental Material Specification (DMS) 11010, Item 610, and as shown on the Material Producers List (MPL) for Roadway Illumination and Electrical Supplies.
5. Fabricate steel roadway illumination poles in accordance with Roadway Illumination Poles (RIP) standards and Item 610. Poles fabricated according to RIP standards do not require shop drawing submittals.
 - a. Alternate designs to RIP standards or the use of aluminum to fabricate poles will require the submission of shop drawings electronically. For instructions on submitting shop drawings electronically see "Guide to Electronic Shop Drawing Submittal" on the TxDOT web site.
 - b. Limitations on use of the RIP standard: The RIP standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25' above the elevation of the surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 4th Edition (2001) (AASHTO Design Specifications). For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25' above the surrounding terrain, provide poles meeting the following requirements:
 - i. Submittals. Following the electronic shop drawing submittal process (see Guide to Electronic Shop Drawing Submittal on the TxDOT web site), submit to the Engineer for approval fabrication drawings and calculations for the poles, sealed by a Texas licensed professional engineer (P.E.).
 - ii. Luminaire Structural Support Requirements. Provide light poles, arms, and anchor bolt assemblies with a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the 6th edition (2013) of the AASHTO Design Specifications. For transformer base poles, include transformer base and connecting hardware in calculations and shop drawing submittals. Structurally test all transformer bases to resist the theoretical plastic moment capacity of the pole. Submit certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished with the shop drawings. Show breakaway base model number, manufacturer's name, and logo on shop drawings. Include on manufacturer's shop drawings the ASTM designations for all materials to be used.
6. For both transformer and shoe-base type illumination poles, provide and install double-pole breakaway fuse holders as specified by DMS-11040. Breakaway fuse holders are listed on the MPL for Roadway Illumination and Electrical Supplies under Items 610 & 620. Provide 10 amp time delay fuses for breakaway connectors in light poles, or inside the light fixture for underpass luminaires. In each pole, connect luminaires to the breakaway connector with continuous stranded 12 AWG copper conductors as listed on the MPL. Bond all equipment grounding conductors together and to the ground lug in the transformer base or hand hole.
7. Tighten anchor bolts for shoe base, concrete traffic barrier base, and bridge mount roadway illumination poles, in accordance with Item 449.
8. Install T-Base with following procedure:
 - a. Anchor Bolt Tightening.
 - i. Coat the threads of the anchor bolts with electrically conductive lubricant.
 - ii. Place the T-base over the anchor bolts. Foundation must be level and flat. The maximum permissible gap under any one corner of the t-base is 1/8" before nuts are tightened.
 - iii. Coat the bearing surfaces of the nuts and washers with electrically conductive lubricant. Install (1) 1/2" hold down washer, (1) lock washer, and (1) nut on each anchor bolt. Turn the nuts onto the bolts so that each is hand-tight against the washer.
 - iv. Using a torque wrench, tighten each nut to 150 ft-lb. Uniform contact is required between the foundation and the T-base in the corner regions of the T-base, and all corner gaps must be closed after applying torque. If a gap still exists after torquing to 150 ft-lbs, continue torquing each bolt incrementally until gap is closed or maximum allowable torque of 250 ft. pound is reached, whichever comes first. If 250 ft-lbs is not enough to close the gap the foundation must be leveled. Gaps along the straight sides of the T-bases and the foundation are permissible. Ensure that no high point of contact occurs between the straight sides of the T-base and the foundation.
 - v. Check top of T-base for level. If not level then foundation must be leveled.
 - b. Top Bolt Procedure
 - i. Erect pole over T-base with crane. Coat bolts, nuts, washers, and lock washers with electrically conductive lubricant.

- ii. Install bolts and 1/2" connecting washers from the inside of the T-base, thread up through the pole base. Install flat washers, lock washers and nuts snug tight according to Item 447, "Structural Bolting."
 - iii. Tighten each nut to 150 ft-lb. using a torque wrench.
- c. Level and Plumb
- i. Ensure pole is plumb and mast arm is perpendicular to the roadway according to plans to within 5 degrees.
9. Construct luminaire pole foundations in accordance with Item 416, "Drilled Shaft Foundations," and TxDOT standard sheet RID(2).
 10. Provide and install underpass luminaires in accordance with Item 610, DMS-11010, and TxDOT standard sheet RID(3). Typical luminaire size for underpass luminaires is 150W HPS or 150W EQ LED.
 11. Mount luminaires on arms level as shown by the luminaire level indicator.
 12. Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.



L1, L2 = Hot Conductors
G = Grounding Conductor

TYPICAL WIRING DIAGRAM

LUMINAIRES SERVED AT 480V ON 240/480 VOLT SERVICE OR LUMINAIRES SERVED AT 240V FOR 120/240 VOLT SERVICE.

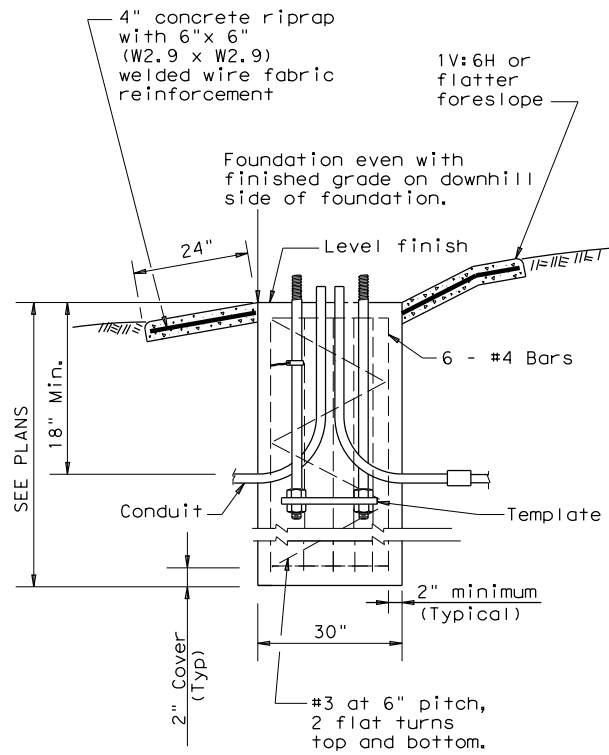
NOTES:

- ① Use 1/2 in.-13 UNC threaded, copper or tin-plated copper, pole bonding connector, sized appropriately for conductors, bonded to T-base, or use ground lug in handhole as available.
- ② Use pre-qualified two-pole breakaway connectors for all luminaire pole installations. For luminaires fed by a circuit with a neutral conductor, use double pole breakaway connectors with the neutral side unfused and marked white.
- ③ Split Bolt or other connector.

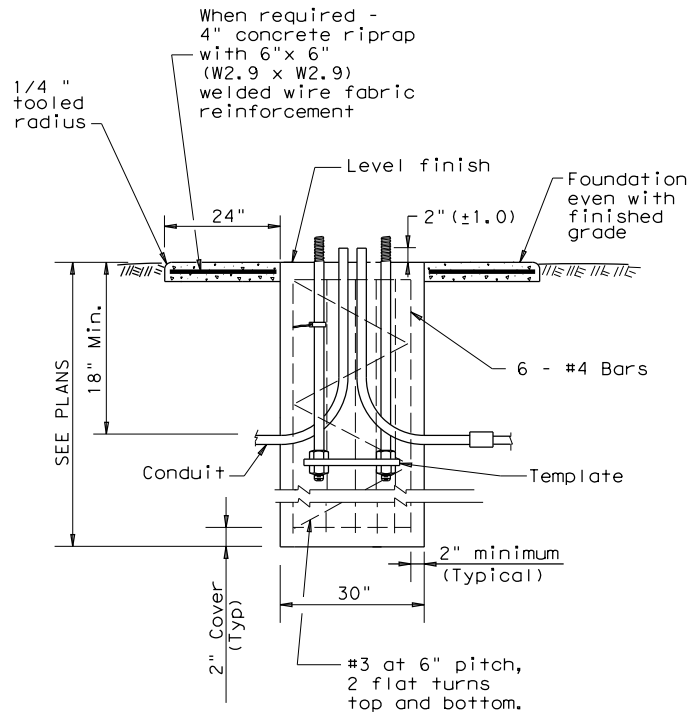
				Traffic Operations Division Standard	
<h1>ROADWAY ILLUMINATION DETAILS</h1> <h2>RID(1)-17</h2>					
FILE:	rid1-17.dgn	DN:	CK:	DW:	CK:
	© TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS					
7-17		DIST	COUNTY	SHEET NO.	
				140	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:



SECTION A-A
SHOWING SLOPED GRADE



SECTION A-A
SHOWING CONSTANT GRADE

TABLE 1			
ANCHOR BOLTS			
POLE MOUNTING HEIGHT	BOLT CIRCLE		ANCHOR BOLT SIZE
	Shoe Base	T-Base	
<40 ft.	13 in.	14 in.	1 in. x 30 in.
40-50 ft.	15 in.	17 1/4 in.	1 1/4 in. x 30 in.

TABLE 2			
RECOMMENDED FOUNDATION LENGTHS (See note 1)			
MOUNTING HEIGHT	TEXAS CONE PENETROMETER N Blows/ft		
	10	15	40
<20 ft.	6'	6'	6'
>20 ft. to 30 ft.	8'	6'	6'
>30 ft. to 40 ft.	8'	8'	6'
>40 ft. to 50 ft.	10'	8'	6'

TABLE 3		
PAY QUANTITY OF RIPRAP PER FOUNDATION (Install only when shown on the plans)		
Foundation Diameter	RIPRAP DIAMETER	RIPRAP (CONC) (CL B)
30 in.	78 in.	0.35 CY

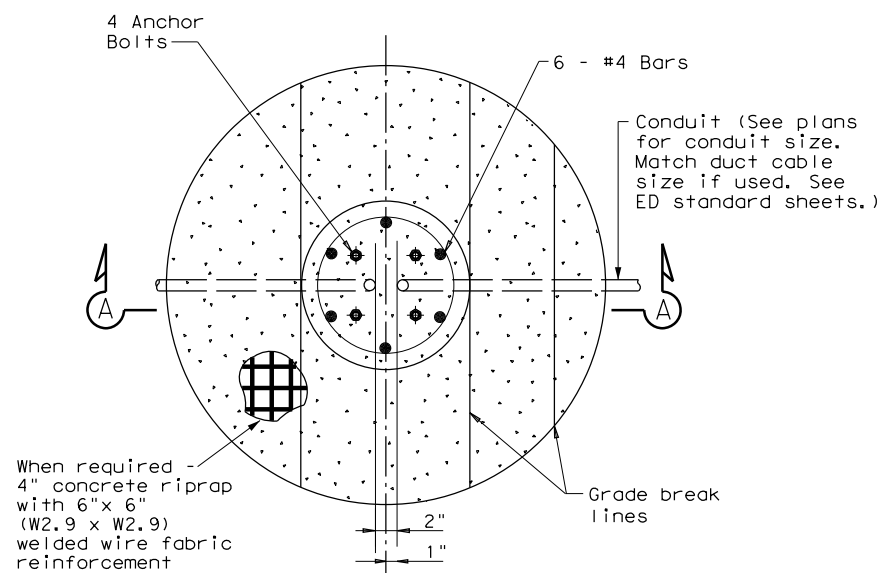
GENERAL NOTES:

1. "Recommended Foundation Lengths" table is for information purposes only. Foundation lengths shall be as shown on the plans, or as directed by the Engineer. Foundations will be paid for under Item 416, "Drilled Shaft Foundations," unless otherwise shown on the plans.
2. Erect roadway illumination assembly poles plumb and true. Form and level the top 6" of the foundation so the pole will be plumb. Use leveling nuts to plumb shoe base poles. Do not use shims or leveling nuts under transformer bases. Do not grout between baseplate and the foundation.
3. Ensure Class 2A and 2B fit for anchor bolts and nuts. Tap and chase nuts after galvanizing. Anchor bolt body with rolled threads need not be full size.
4. Use appropriate class of concrete as specified in Items 416 and 432. Concrete for riprap may be upgraded to Class C at no extra cost to the Department.
5. Place riprap around the foundation when called for elsewhere in the plans. Riprap will be paid for under Item 432.
6. Locate breakaway roadway illumination assemblies as shown in the placement table, unless otherwise dimensioned on the plans. Protect non-breakaway illumination assemblies from vehicular impact (i.e. 2.5 ft. behind guard rail or mounted on traffic barrier), or located outside the clear zone, except that 2.5 ft. from curb face is minimum desired for light poles on city streets, 45 mph or less. See Roadway Design Manual for further information.
7. Use 4 hold down and 4 connecting washers on transformer base poles as recommended by the manufacturer and supplied with base.
8. Install a minimum of 2 conduits in each foundation. See lighting layout sheets for locations of foundations with more than 2 conduits. Cap unused conduits in foundations on both ends.
9. Conduit location in foundations is critical for breakaway devices. Place conduits 2 in. apart on centerline as shown.
10. Bond anchor bolt to rebar cage with #6 bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. The bonded steel in the foundation creates a concrete encased grounding electrode which replaces the ground rod.
11. Use riprap on T-base foundations that are located on sloped grades.

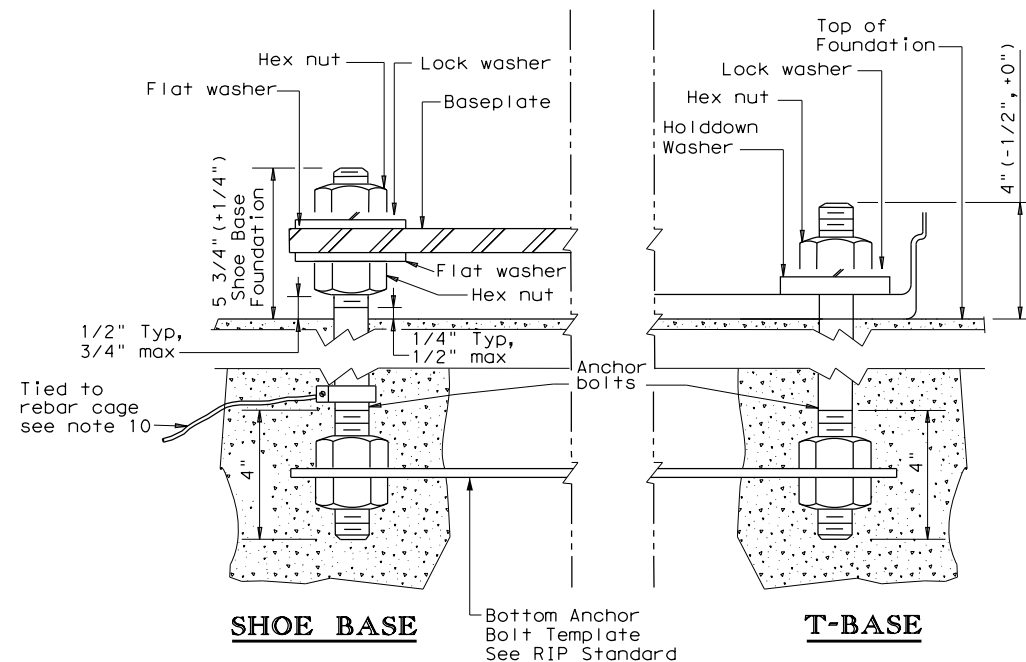
TABLE 4	
BREAKAWAY POLE PLACEMENT (See note 6)	
ROADWAY FUNCTIONAL CLASSIFICATION	** POLE OFFSET (DISTANCE TO FACE OF TRANSFORMER BASE)
Freeway Mainlanes (roadway with full control of access)	15 ft. (minimum and typical) from lane edge
All curbed, 45 mph or less design speed	2.5 ft. minimum (15 ft. desirable) from curb face
All others	10 ft. minimum*(15 ft. desirable) from lane edge

* or as close to ROW line as is practical

** provide 2/5 of the luminaire mounting height behind the pole for "falling area" to prevent encroachment on the other travel lanes. See design guidelines.



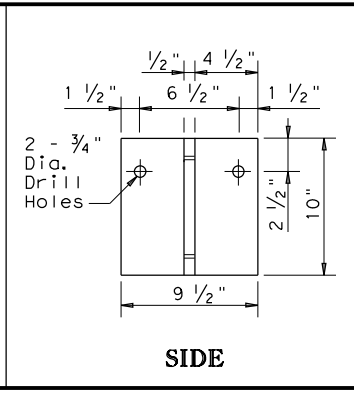
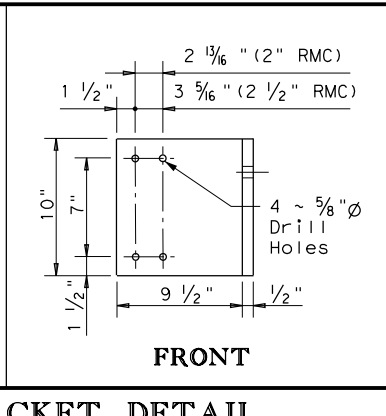
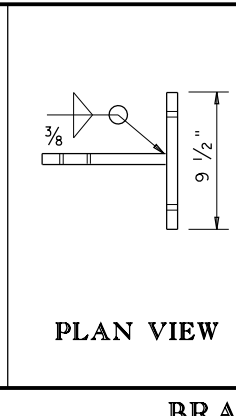
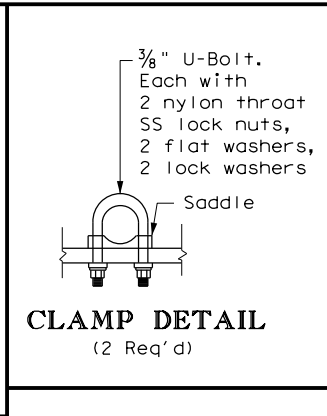
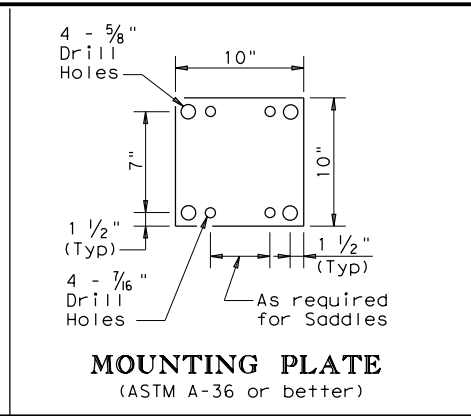
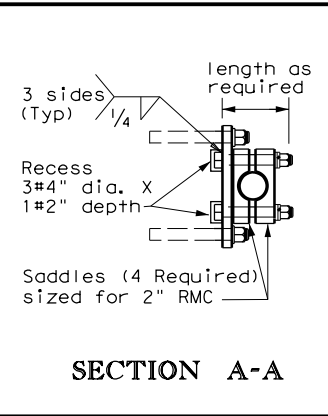
FOUNDATION DETAIL



ANCHOR BOLT DETAIL

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

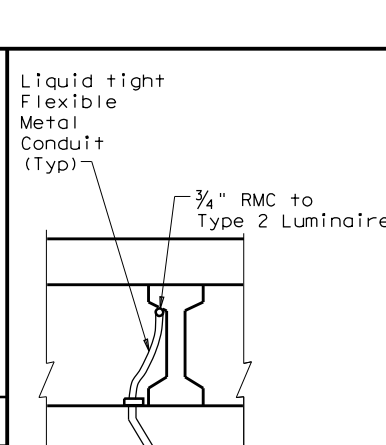
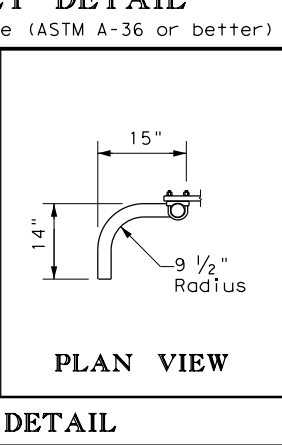
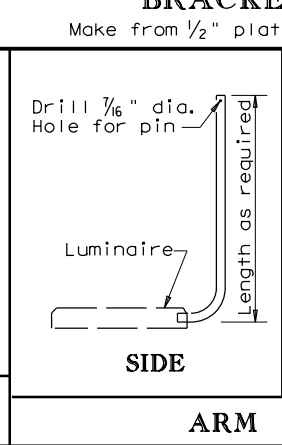
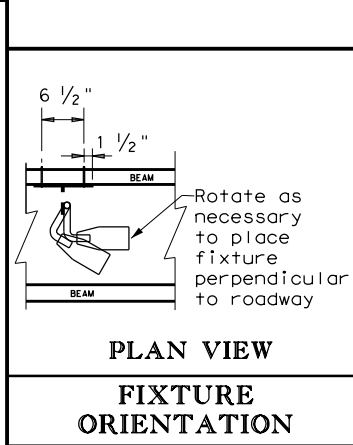
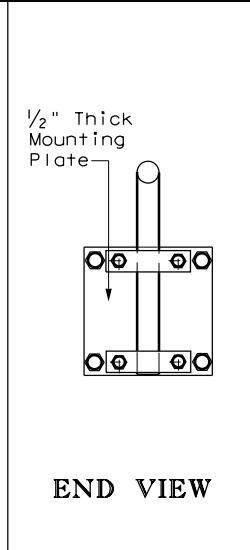
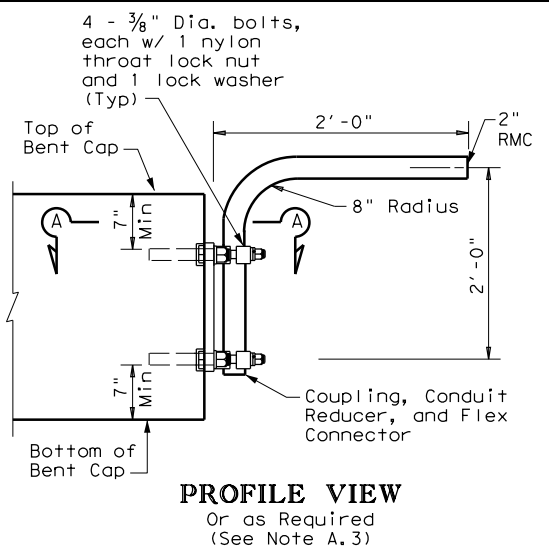
DATE: FILE:



GENERAL NOTES:

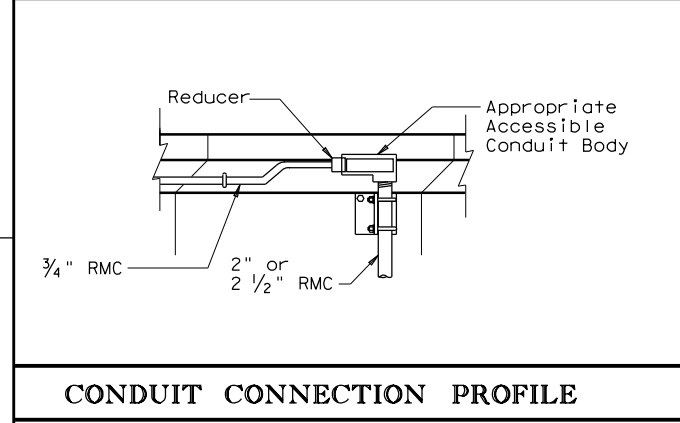
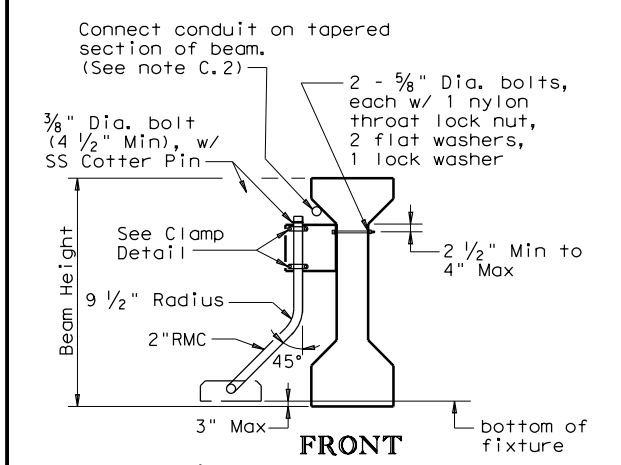
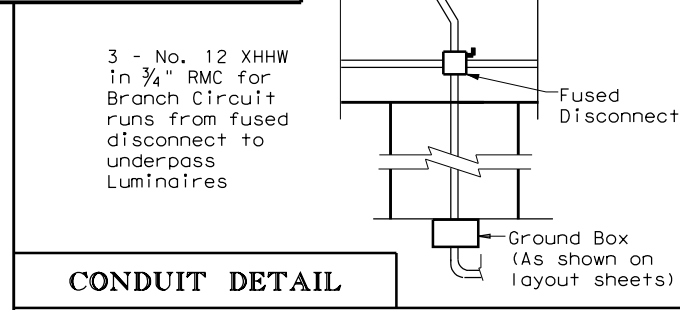
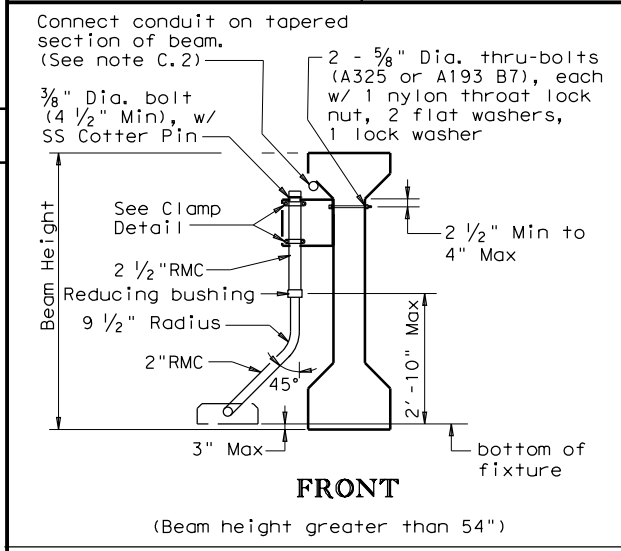
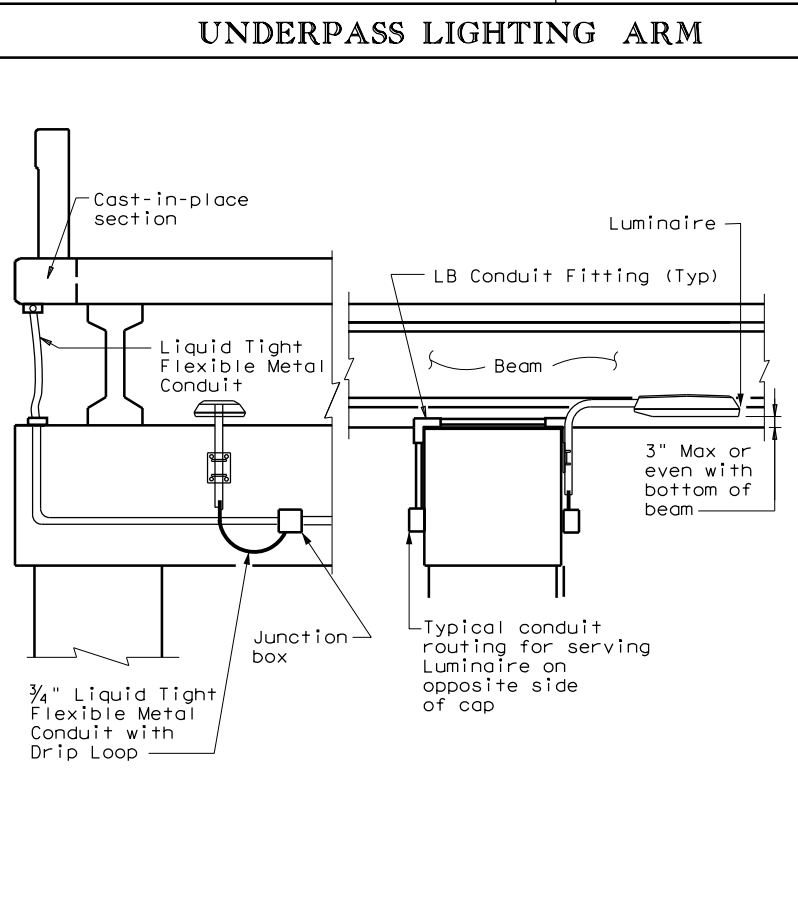
A. ALL 150 watt HPS and 150 watt equivalent LED Luminaires

- Luminaire locations, conduit and conductor sizes and routing are typical and diagrammatic only. See project layout sheets for specific details.
- Conduit will be paid for under Item 618, "Conduit" and conductors will be paid for under Item 620, "Electrical Conductors," unless otherwise shown on the plans.
- Adjust conduit in saddles to place fixture height and orientation as required. See fixture orientation detail and plans. Where practicable, place luminaires so the bottom of luminaire is above the bottom of the beam, maximum of 3 in. (See detail UNDERPASS LIGHTING ARM TYPE 2)
- Except as noted, galvanize all structural steel and exposed bolts, nuts, and washers in accordance with Item 445 "Galvanizing".
- Fabrication of brackets and support arms will not be paid for directly but is subsidiary to Item 610, "Roadway Illumination Assemblies."
- Install a heavy duty NEMA 3R fused disconnect or breaker enclosure rated at 30 amps and 480 volts to switch underpass luminaires as shown on plans, with at least one per bridge circuit. Install 20 amp time-delay fuses or inverse-time circuit breakers. Mount disconnect or breaker enclosure 10 ft. (min) above grade on columns or bent caps as approved by the Department. Modify disconnect to allow padlocking in the "ON" and "OFF" positions. Padlocks and disconnect switches or circuit breakers for underpass fixtures will not be paid for directly but are subsidiary to the various bid items of the contract.
- Conduit on columns, caps, and slab is shown surface mounted. For new columns and caps, embed PVC conduit in concrete. Bond and ground metal junction boxes and conduit.



B. TYPE 1

- Provide 2 in. rigid metal conduit (2.375" O.D., 0.146" wall) for Type 1 arm shaft.
- Use 3/8 in. stainless steel bolt or stud non-epoxy type expansion anchors for concrete for Type 1 mounting. Except as noted, provide an allowable 2650 lbs minimum pull-out force (after consideration of adjustment factors for edge distance and bolt spacing) for each anchor. Install each anchor to the embedment depth recommended by the manufacturer.
- Attach conduit to plate with 4 saddles, four - 3/8 in. diameter bolts, nylon throat lock nuts, and lock washers.



C. TYPE 2

- Provide 2 in. rigid metal conduit (2.375" O.D., 0.146" wall) or provide a combination of 2 1/2 in. (2.875" O.D., 0.193" wall) and 2 in. (2.375" O.D., 0.146" wall) rigid metal conduits with a reducing bushing as beam height stipulated for Type 2 arm shaft. Field cutting and threading will be permitted. Paint cut and threaded areas with zinc rich paint after conduit is connected to adjacent fitting.
- Connecting conduit may be strapped to tapered section only of precast beams as shown. Anchor as approved by the Engineer. Maximum anchor depth is 1 in.
- Indiscriminate drilling into precast concrete beams may result in reduced beam strength. Use drilling location and method as directed by the Engineer. See Location of Underpass Lighting Mounting Bracket detail. The locations shown in the table are such that reinforcing strands will not be damaged.

IN RD IL AM (U/P) (TY 1)
If bridge has pre-cast panels under deck, run circuit under deck edge.

UNDERPASS LIGHTING TYPE 1

IN RD IL AM (U/P) (TY 2)

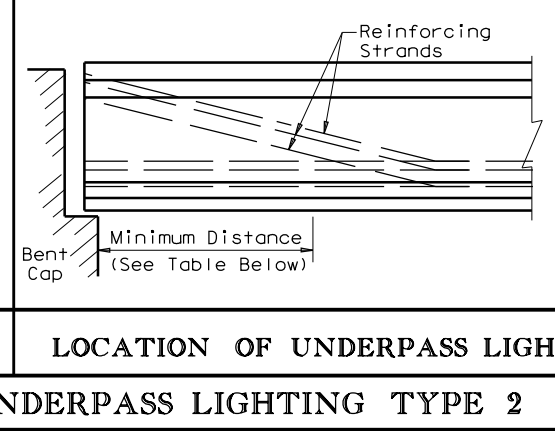


TABLE 5

LOCATION OF UNDERPASS LIGHT MOUNTING BRACKET TABLE

SPAN LENGTH	MINIMUM DISTANCE
≤ 50'	10'-0"
50' - 70'	15'-0"
70' - 90'	20'-0"
> 90'	25'-0"

Texas Department of Transportation
Traffic Operations Division Standard

ROADWAY ILLUMINATION DETAILS (UNDERPASS LIGHT FIXTURES)

RID(3)-17

FILE: rid3-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 2013	CONT	SECT	JOB	HIGHWAY
2-14 REVISIONS				
7-17	DIST	COUNTY		SHEET NO.
				142

SHIPPING PARTS LIST - POLES AND LUMINAIRE ARMS

Nominal Mounting Ht. (ft)	Shoe Base					T-Base					CSB/SSCB Mounted				
	Designation				Quantity	Designation				Quantity	Designation				Quantity
	Pole	A1	A2	Luminaire		Pole	A1	A2	Luminaire		Pole	A1	A2	Luminaire	
20	(Type SA 20 S - 4)			(150W EQ) LED		(Type SA 20 T - 4)			(150W EQ) LED						
	(Type SA 20 S - 4 - 4)			(150W EQ) LED		(Type SA 20 T - 4 - 4)			(150W EQ) LED						
30	(Type SA 30 S - 4)			(250W EQ) LED		(Type SA 30 T - 4)			(250W EQ) LED			(Type SP 28 S - 4)	(250W EQ) LED		
	(Type SA 30 S - 4 - 4)			(250W EQ) LED		(Type SA 30 T - 4 - 4)			(250W EQ) LED			(Type SP 28 S - 4 - 4)	(250W EQ) LED		
	(Type SA 30 S - 8)			(250W EQ) LED		(Type SA 30 T - 8)			(250W EQ) LED			(Type SP 28 S - 8)	(250W EQ) LED		
	(Type SA 30 S - 8 - 8)			(250W EQ) LED		(Type SA 30 T - 8 - 8)			(250W EQ) LED			(Type SP 28 S - 8 - 8)	(250W EQ) LED		
40	(Type SA 40 S - 4)			(250W EQ) LED		(Type SA 40 T - 4)			(250W EQ) LED			(Type SP 38 S - 4)	(250W EQ) LED		
	(Type SA 40 S - 4 - 4)			(250W EQ) LED		(Type SA 40 T - 4 - 4)			(250W EQ) LED			(Type SP 38 S - 4 - 4)	(250W EQ) LED		
	(Type SA 40 S - 8)			(250W EQ) LED		(Type SA 40 T - 8)			(250W EQ) LED			(Type SP 38 S - 8)	(250W EQ) LED		
	(Type SA 40 S - 8 - 8)			(250W EQ) LED		(Type SA 40 T - 8 - 8)			(250W EQ) LED			(Type SP 38 S - 8 - 8)	(250W EQ) LED		
	(Type SA 40 S - 10)			(250W EQ) LED		(Type SA 40 T - 10)			(250W EQ) LED			(Type SP 38 S - 10)	(250W EQ) LED		
	(Type SA 40 S - 10 - 10)			(250W EQ) LED		(Type SA 40 T - 10 - 10)			(250W EQ) LED			(Type SP 38 S - 10 - 10)	(250W EQ) LED		
	(Type SA 40 S - 12)			(250W EQ) LED		(Type SA 40 T - 12)			(250W EQ) LED			(Type SP 38 S - 12)	(250W EQ) LED		
	(Type SA 40 S - 12 - 12)			(250W EQ) LED		(Type SA 40 T - 12 - 12)			(250W EQ) LED			(Type SP 38 S - 12 - 12)	(250W EQ) LED		
50	(Type SA 50 S - 4)			(400W EQ) LED		(Type SA 50 T - 4)			(400W EQ) LED			(Type SP 48 S - 4)	(400W EQ) LED		
	(Type SA 50 S - 4 - 4)			(400W EQ) LED		(Type SA 50 T - 4 - 4)			(400W EQ) LED			(Type SP 48 S - 4 - 4)	(400W EQ) LED		
	(Type SA 50 S - 8)			(400W EQ) LED		(Type SA 50 T - 8)			(400W EQ) LED			(Type SP 48 S - 8)	(400W EQ) LED		
	(Type SA 50 S - 8 - 8)			(400W EQ) LED		(Type SA 50 T - 8 - 8)			(400W EQ) LED			(Type SP 48 S - 8 - 8)	(400W EQ) LED		
	(Type SA 50 S - 10)			(400W EQ) LED		(Type SA 50 T - 10)			(400W EQ) LED			(Type SP 48 S - 10)	(400W EQ) LED		
	(Type SA 50 S - 10 - 10)			(400W EQ) LED		(Type SA 50 T - 10 - 10)			(400W EQ) LED			(Type SP 48 S - 10 - 10)	(400W EQ) LED		
	(Type SA 50 S - 12)			(400W EQ) LED		(Type SA 50 T - 12)			(400W EQ) LED			(Type SP 48 S - 12)	(400W EQ) LED		
	(Type SA 50 S - 12 - 12)			(400W EQ) LED		(Type SA 50 T - 12 - 12)			(400W EQ) LED			(Type SP 48 S - 12 - 12)	(400W EQ) LED		

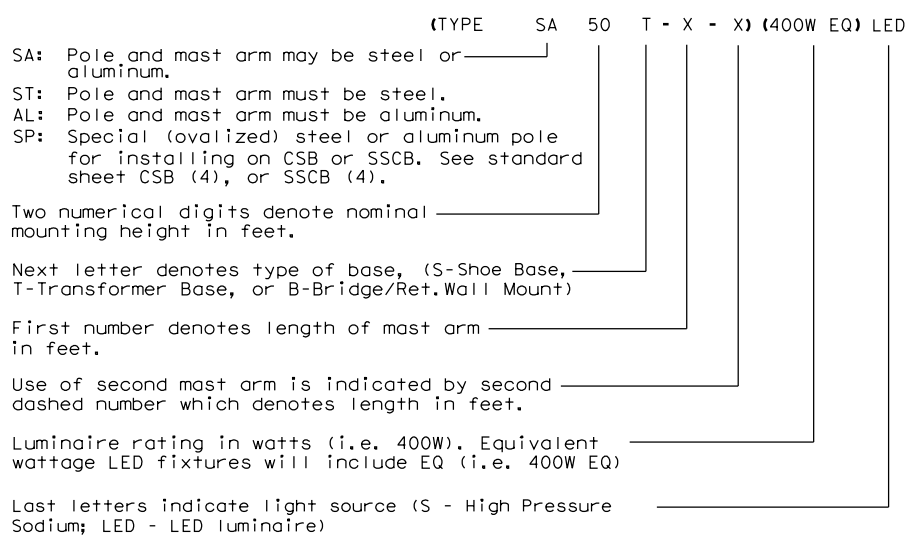
OTHER				
Designation				Quantity
Pole	A1	A2	Luminaire	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.
 DATE:
 FILE:

GENERAL NOTES:

- All work, materials and services not shown on the plans which may be necessary for complete and proper construction shall be performed, furnished and installed by the Contractor. Faulty fabrication or poor workmanship in any material, equipment or installation will be considered justification for rejection. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the Department such warranties or guarantees.
- The location of poles and fixtures are diagrammatic only and may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.
- Standard Steel Pole Designs. Steel poles fabricated in accordance with the details and dimensions shown herein, shall be considered standard designs. Submission of shop drawings and design calculations for standard designs is not required.
- Optional Steel Pole Designs. Multi-sided steel poles may be allowed as optional designs, if steel poles are permitted or required, pending approval by the Department as outlined below.
 - Shop Drawings. Optional designs require submission of shop drawings and design calculations bearing the seal of an engineer licensed in the State of Texas, in accordance with Item 441, "Steel Structures." The Department may elect to pre-approve some shop drawings for optionally designed poles. Submission of shop drawings and design calculations is not required for structures fabricated in accordance with the details of shop drawings on the pre-approved list maintained by the TxDOT Traffic Operations Division. Any deviation from the pre-approved shop drawings will require submission of shop drawings of the complete assembly and design calculations as described above.
 - Structural Support Design for Luminaires. Lighting support structures shall be designed for a 25 year design life in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto. All poles shall be designed for 110 mph 3-second gust wind speeds. The Gust Factor, G, and Wind Importance Factor, Ir, shall be applied as per the AASHTO Specifications assuming a 25-year design life. The design wind pressure for hurricane wind velocities greater than 100 mph shall not be less than the design wind pressure using 100 mph with the non-hurricane Wind Importance Factor, Ir, value. For transformer base poles, fabricator shall include transformer base and connecting hardware in design calculations and shop drawing submittals. All transformer bases shall have been structurally tested to resist the theoretical plastic moment capacity of the pole. Certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished shall be submitted with the shop drawings. Shop drawings shall show breakaway base model number, and manufacturer's name and logo. Manufacturer's shop drawings shall include the ASTM designations for all materials to be used.
 - Mast Arm Attachments. All poles and attachments shall be structurally designed to support two 12-foot mast arms and luminaires. Poles shall be supplied with mast arm combinations as shown in the plans. All mast arms shall be designed for a 60-pound luminaire having an effective projected area of 1.6 square feet.
 - Anchor Bolt Assembly. Anchor bolt assemblies for optionally designed poles shall be the same as those shown herein.
- Aluminum Pole Designs. Aluminum pole designs may be allowed, if aluminum poles are permitted or required, pending approval by the Department as outlined below.
 - Meet all of the requirements stated above for optional steel pole designs and the following:
 - Aluminum poles shall be fabricated in accordance with "Structural Welding Code-Aluminum" AWS D1.2.
 - Aluminum pole designs shall use the same anchor bolt assembly and be subject to the same geometric restraints and other requirements for steel poles specified herein.
 - Aluminum poles shall be equipped with vibration mitigation devices, as approved by the engineer.
 - Pole components shall be constructed using the following material:
 - Shaft: ASTM B221 or B241 Alloy 6063-T6, ASTM B209 Alloy 5086-H34, ASTM B221 Alloy 6005-T5.
 - Base Flange: ASTM B26 Alloy 356.0-T6 or ASTM B108 Alloy 356.0-T6 (Yield strength test required).
 - Mast Arm Fitting: ASTM B209 Alloy 6061-T6 or ASTM B221 Alloy 6005-T5.
 - Mast Arms: ASTM B241 Alloy 6061-T6 or Alloy 6063-T6.
 - Pole Cap: ASTM B209 Alloy 5086-H32 or ASTM B108 or B26 Alloy 356.0-T6.
 - Bolts: Stainless Steel AISI 300 series. Bolts threading into aluminum threads shall be treated with anti-seize compound, Never-Seez Compound, Permatex 133K or equal.
- Special Designs. Poles with architectural treatments shall meet the requirements shown elsewhere in the plans.
- Luminaire Mounting Height. Actual luminaire mounting height shall be the nominal mounting height given on RIP(2) for all pole-arm combinations except for poles with 4 ft. luminaire arms, which shall be 3'-0" lower than the nominal height, unless otherwise shown or directed.

EXPLANATION OF ROADWAY ILLUMINATION ASSEMBLY DESIGNATIONS



SHEET 1 OF 4

Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

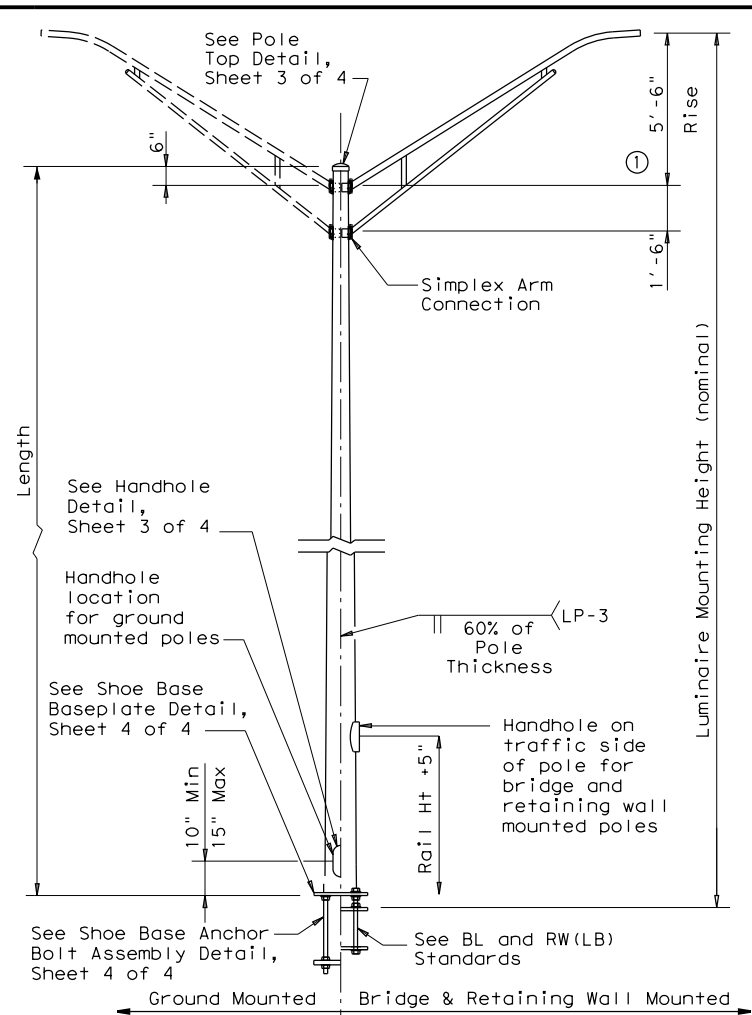
RIP(1)-19

FILE: rip-19.dgn	DN:	CK:	DW:	CK:
© TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS				
7-17				
12-19	DIST	COUNTY	SHEET NO.	
			143	

73A

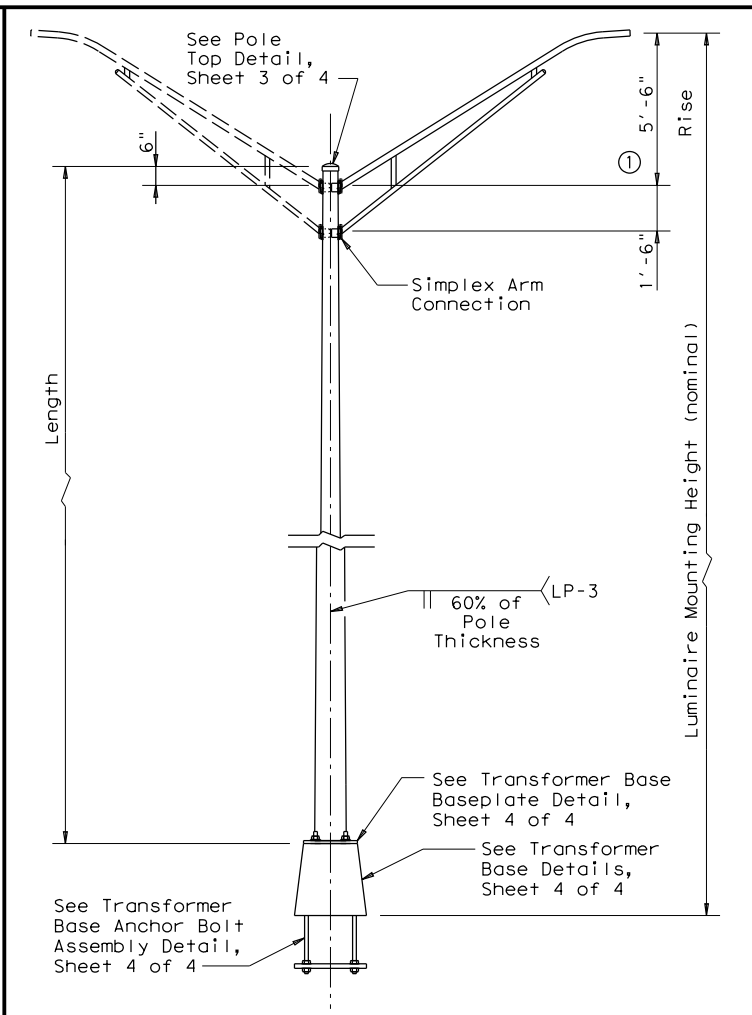
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:



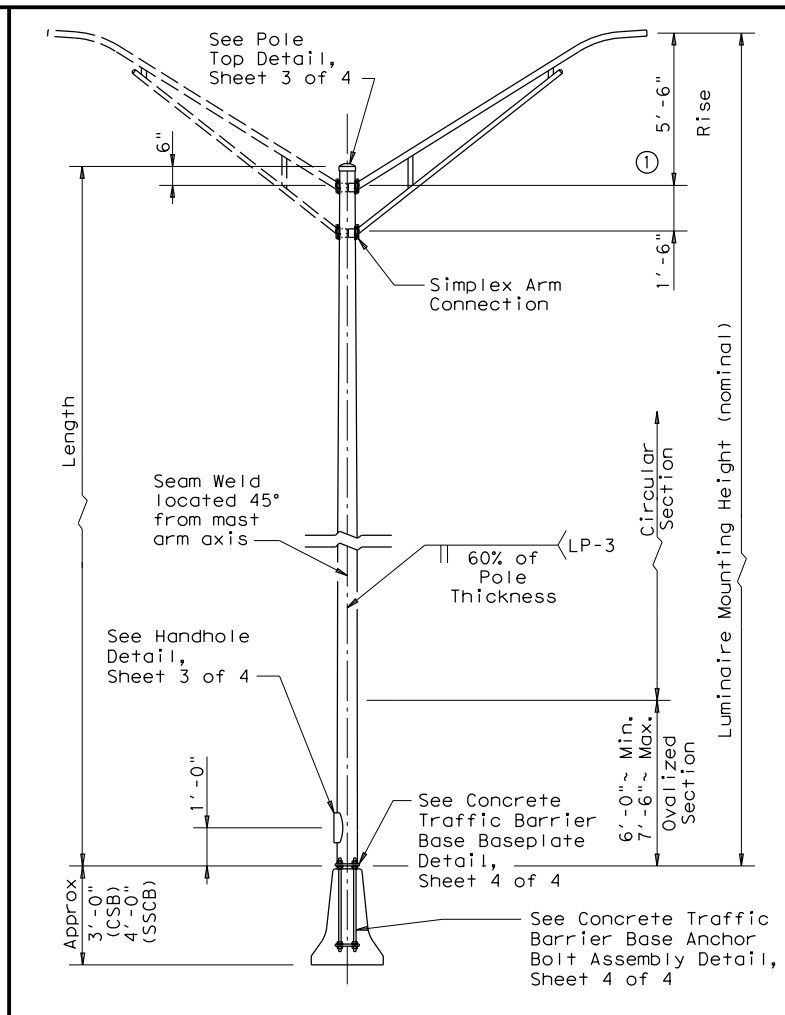
SHOE BASE POLE

SHOE BASE POLE					
Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)
20.00	7.00	4.90	15.00	0.1196	7.1
30.00	7.50	4.00	25.00	0.1196	13.2
31.00-39.00	8.00	4.36-3.24	26.00-34.00	0.1196	20.7
40.00	8.50	3.60	35.00	0.1196	20.7
50.00	10.50	4.20	45.00	0.1196	30.3



TRANSFORMER BASE POLE

TRANSFORMER BASE POLE					
Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)
20.00	7.00	5.11	13.50	0.1196	7.1
30.00	7.50	4.21	23.50	0.1196	13.2
31.00-39.00	8.00	4.57-3.45	24.50-32.50	0.1196	20.7
40.00	8.50	3.81	33.50	0.1196	20.7
50.00	10.00	3.91	43.50	0.1196	30.3



CONCRETE TRAFFIC BARRIER BASE POLE

CONCRETE TRAFFIC BARRIER BASE POLE (CSB/SSCB)						
Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)	
					About C of Rail	Perp. to Rail
28.00	9.00	5.78	23.00	0.1196	10.3	13.2
38.00	9.00	4.38	33.00	0.1196	16.6	20.8
48.00	10.50	4.48	43.00	0.1345	25.1	30.5

GENERAL NOTES:

- Designs conform to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto. Design 3-Second Gust Wind Speed equals 110 mph with a 1.14 gust factor. A wind importance factor of 0.80 is applied to adjust the wind speed to a 25 year recurrence interval. Design moments listed in tables assume base of pole is 25' above natural ground level.
- Structures are designed to support two 12' luminaire mast arms and luminaires. Mast arms are designed to support a 60-pound luminaire having an effective projected area of 1.6 square feet.
- Fabrication shall be in accordance with the Specifications and with the details, dimensions, and weld procedures shown herein. Do not submit shop drawings for roadway illumination pole assemblies fabricated in accordance with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of these sheets and the Specifications. In the absence of specified fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.
- For mounting heights between values shown in the tables, use base diameter and thickness values for the larger height.
- Unless otherwise noted, all steel parts shall be galvanized in accordance with Item 445, "Galvanizing."
- Steel poles shall be fabricated in accordance with Item 441, "Steel Structures." Longitudinal seam welds for pole sections shall have 60% minimum penetration. All welding shall be in accordance with AWS D1.1, Structural Welding Code-Steel.
- Two-section poles joined by circumferential welds will not be permitted, unless otherwise shown on the plans. Poles may be fabricated in two sections and field-assembled by the lap-joint method. The two sections shall telescope together with a lap length of not less than 1-1/2 times the shaft diameter at the lap joint.
- Alternate material equal to or better than material specified may be substituted with the approval of the Engineer.
- Lubricate and tighten anchor bolts, when erecting shoe base poles and concrete traffic barrier base poles, in accordance with Item 449, "Anchor Bolts."
- All poles, except Transformer Base Poles, shall have hand holes with reinforcing frames and covers. For ground mounted shoe base poles, hand holes shall be placed 90 degrees to mast arm unless otherwise noted on the plans. For poles mounted on a concrete traffic barrier with one luminaire arm, hand holes shall be located 180 degrees from luminaire arm. For poles mounted on a concrete traffic barrier with two luminaire arms, all hand holes shall be on the same side of the barrier. For poles mounted on a bridge lighting bracket or a retaining wall lighting bracket, hand hole shall be on traffic side of the pole, at a height that will clear the barrier.
- The finished pole shall have a smooth, uniform finish free of pits, blisters, or other defects. Scratched, chipped, and other damaged galvanized areas on poles and mast arms shall be repaired in accordance with Item 445, "Galvanizing."
- Pole length is based on a 5'-6" luminaire arm rise. 4 ft. luminaire arms have a 2'-6" rise. A pole with 4 ft. luminaire arms will have an actual mounting height 3'-0" less than the nominal mounting height. Increasing the pole length to meet the nominal mounting height is allowed, but unnecessary unless otherwise directed by the engineer.
- Erect transformer base poles in accordance with sheet RID(1).

MATERIAL DATA

COMPONENT	ASTM DESIGNATION	MIN. YIELD (ksi)
Pole Shaft (0.14"/ft. Taper)	A572 Gr 50, A595 Gr A, A1011 HSLAS Gr 50 Cl 2 ③, or A1008 HSLAS Gr 50 Cl 2	50
Base Plate and Handhole Frame	A572 Gr.50, or A36	36
T-Base Connecting Bolts	F3125 Gr A325	92
Anchor Bolts		
Anchor Bolt Templates	A36	36
Heavy Hex (H.H.) Nuts	A194 Gr 2H, or A563 Gr DH	
Flat Washers	F436	

NOTES:

- 2'-6" rise for 4 ft. luminaire arms.
- Before ovalized as shown on Concrete Traffic Barrier Base Baseplate details, Sheet 4 of 4.
- A1011 SS Gr 50 may be used instead of HSLAS, provided the material meets the elongation requirements for HSLAS.

POLE ASSEMBLY FABRICATION TOLERANCES TABLE

DIMENSION	TOLERANCE
Shaft length	+1"
I.D. of outside piece of slip fitting pieces	+1/8", -1/16"
O.D. of inside piece of slip fitting pieces	+1/32", -1/8"
Shaft diameter: other	+3/16"
Out of "round"	1/4"
Straightness of shaft	±1/4" in 10 ft
Twist in multi-sided shaft	4° in 50 ft
Perpendicular to baseplate	1/8" in 24"
Pole centered on baseplate	±1/4"
Location of Attachments	±1/4"
Bolt hole spacing	±1/16"

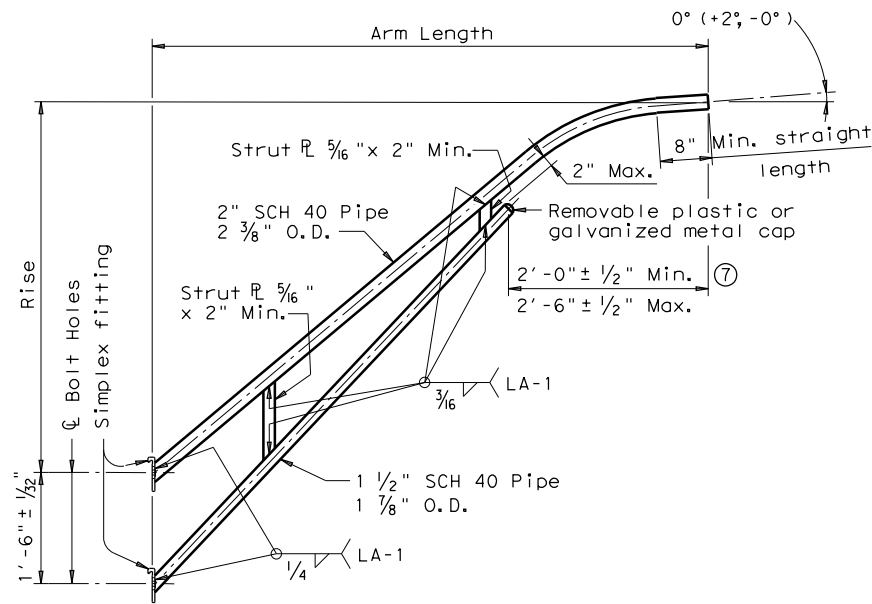


**ROADWAY ILLUMINATION POLES
RIP(2) - 19**

FILE: rip-19.dgn	DN:	CK:	DW:	CK:
© TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
7-17 12-19	DIST	COUNTY	SHEET NO. 144	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect or damages resulting from its use.

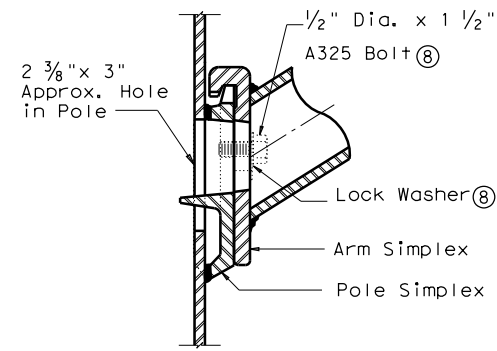
DATE: FILE:



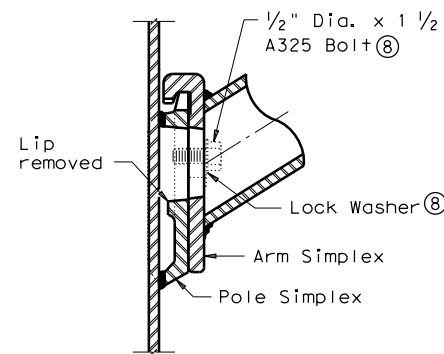
LUMINAIRE ARM

LUMINAIRE ARM DIMENSIONS		
Nominal Arm Length	Arm Length	Rise
4'-0"	3'-6"	2'-6"
6'-0"	5'-6"	5'-6"
8'-0"	7'-6"	5'-6"
10'-0"	9'-6"	5'-6"
12'-0"	11'-6"	5'-6"

ARM ASSEMBLY FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Arm Length	±1"
Arm Rise	±1"
Deviation from flat	1/8" in 12"
Spacing between holes	±1/32"

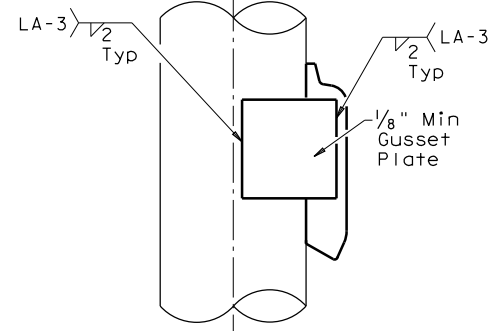


UPPER SIMPLEX FITTING
(Gusset not shown for clarity)

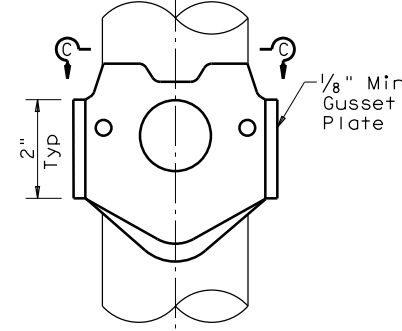


LOWER SIMPLEX FITTING
(Gusset not shown for clarity)

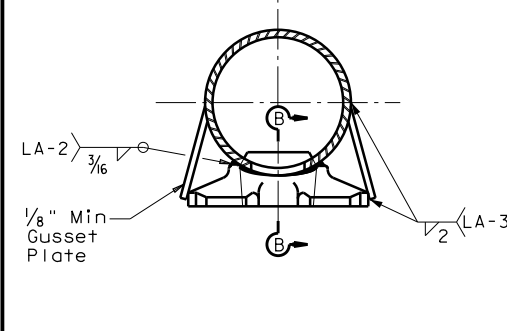
SECTION B-B



SIDE

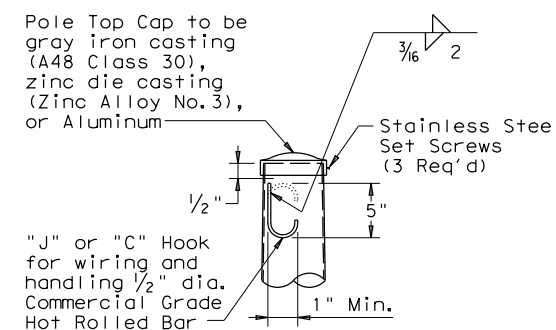


ELEVATION

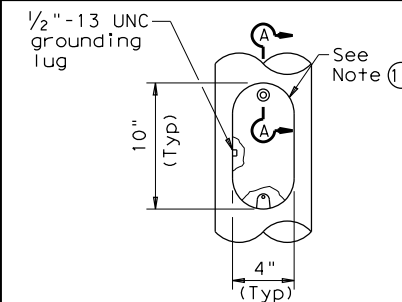


SECTION C-C

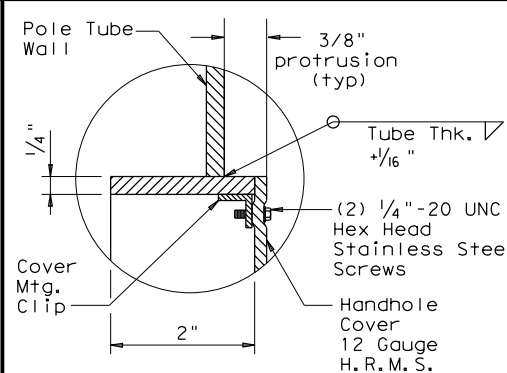
SIMPLEX ATTACHMENT DETAIL



POLE TOP

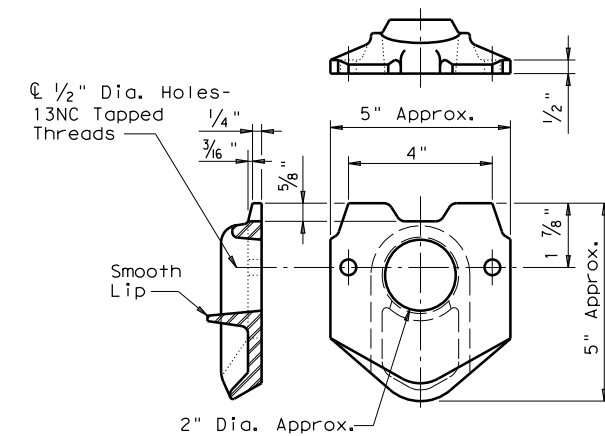


ELEVATION

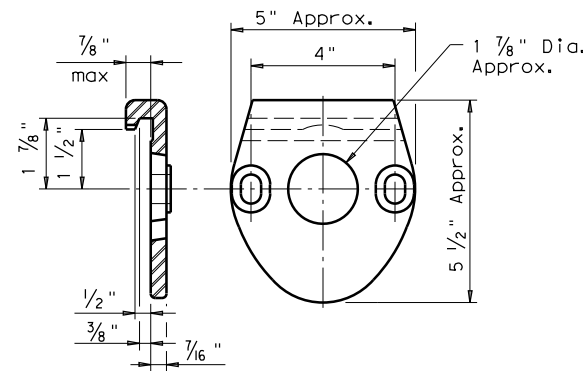


SECTION A-A

HANDHOLE



POLE SIMPLEX DETAIL ③



ARM SIMPLEX DETAIL ③

NOTES:

- ④ Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.
- ⑤ A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.
- ⑥ A572, A1008 HSLAS-F, and A1011 HSLAS-F materials may have higher yield strengths but shall not have less elongation than the grade indicated.
- ⑦ Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.
- ⑧ Each pole simplex fitting shall be supplied with 2 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans.
- ⑨ Proposed deviations in arm simplex dimensions or materials must be submitted to the Department for approval.
- ⑩ A welded handhole frame is permissible. Maximum of two (2) CJP weld splices is allowed.

MATERIALS

Pole or Arm Simplex	ASTM A27 Gr 65-35 or Gr 70-36, A148 Gr 80-50, A576 Gr 1021 ⑤, or A36 (Arm only)
Arm Pipes	ASTM A53 Gr A or B, A500 Gr B, A501, A 1008 HSLAS-F Gr 50 ⑥, or A1011 HSLAS-F Gr 50 ⑥
Arm Struts and Gusset Plates ④	ASTM A36, A572 Gr 50 ⑥, or A588
Misc.	ASTM designations as noted

SHEET 3 OF 4



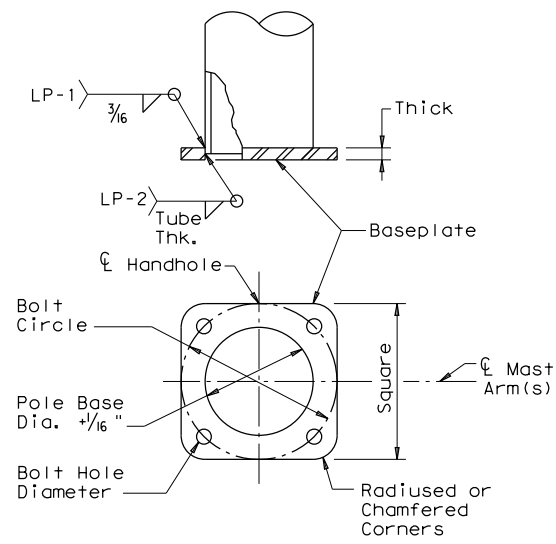
ROADWAY ILLUMINATION POLES

RIP(3) - 19

FILE: rip-19.dgn	DN:	CK:	DW:	CK:
© TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS				
7-17				
12-19				
DIST	COUNTY	SHEET NO.		
		145		

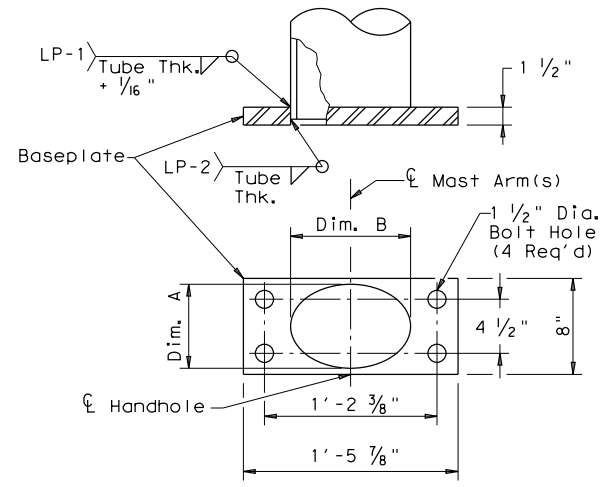
73C

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



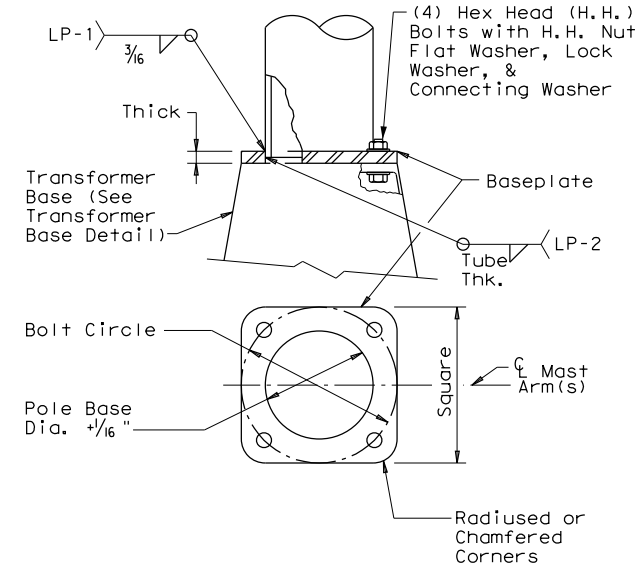
SHOE BASE BASEPLATE

SHOE BASE BASEPLATE TABLE				
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	BOLT HOLE DIAMETER
20' - 39'	13"	13"	1 1/4"	1 1/4"
40'	15"	15"	1 1/4"	1 1/2"
50'	15"	15"	1 1/2"	1 1/2"



CONCRETE TRAFFIC BARRIER BASE BASEPLATE

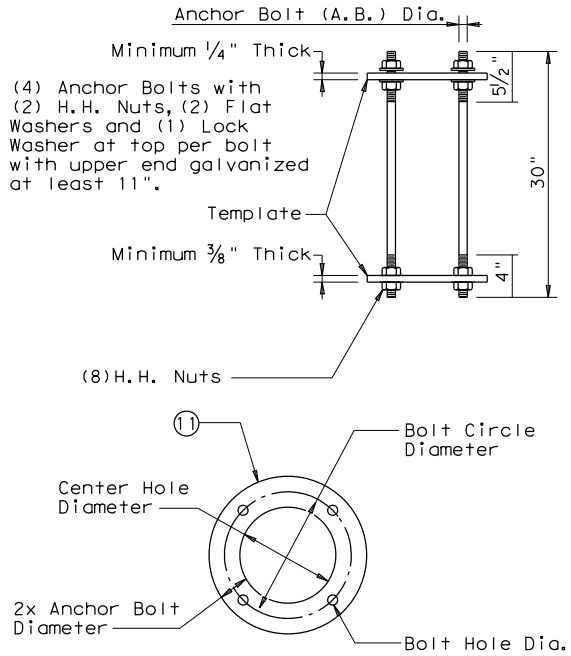
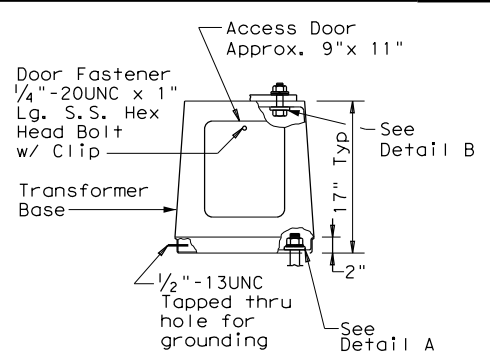
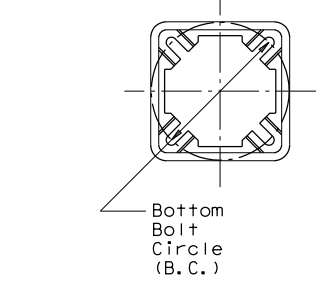
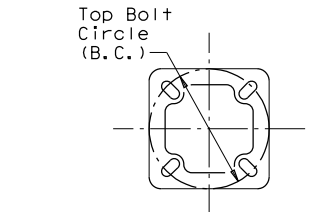
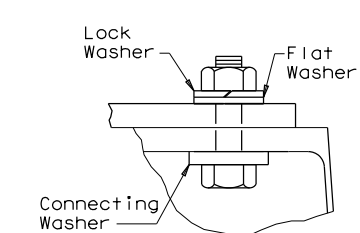
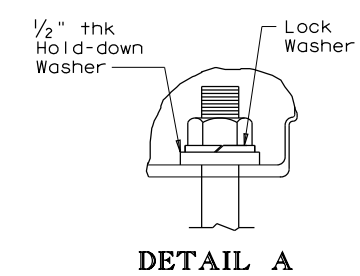
CONCRETE TRAFFIC BARRIER BASE BASEPLATE TABLE				
MOUNTING HEIGHTS (nominal)	POLE DIA. (12)	DIM. A	DIM. B	
28' - 38'	9"	7" ± 1/4"	10" ± 1/4"	
48'	10 1/2"	7" ± 1/4"	13" ± 1/4"	



TRANSFORMER BASE BASEPLATE

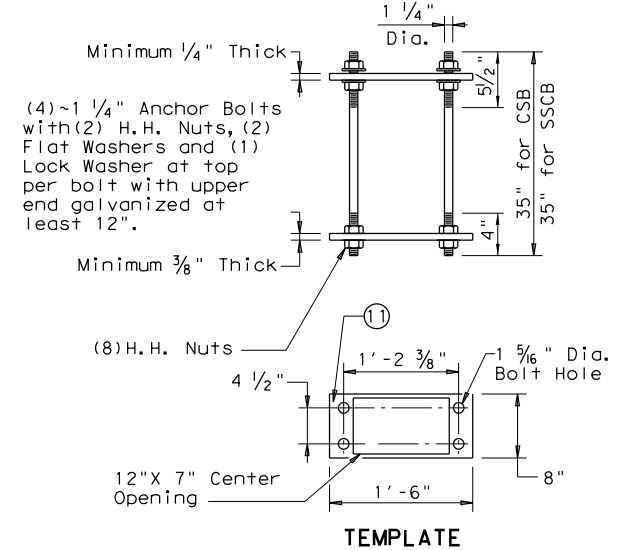
TRANSFORMER BASE BASEPLATE TABLE						
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	CONNECTING BOLT DIA.	BOLT HOLE DIAMETER	TRANSFORMER BASE TYPE
20' - 39'	13"	13"	1 1/4"	1"	1 1/4"	A
40'	15"	15"	1 1/4"	1 1/4"	1 1/2"	B
50'	15"	15"	1 1/2"	1 1/4"	1 1/2"	B

TRANSFORMER BASE TABLE		
TYPE	TOP B.C.	BTM. B.C.
A	13"	14"
B	15"	17 1/4"



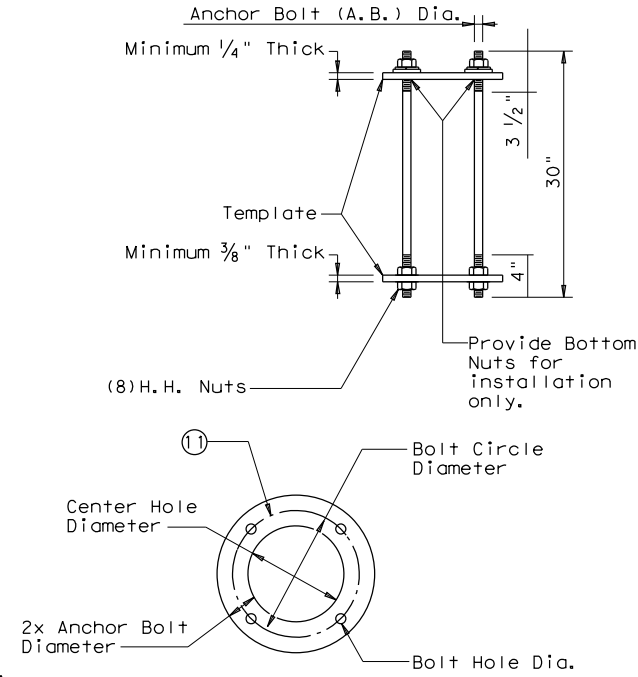
SHOE BASE ANCHOR BOLT ASSEMBLY

SHOE BASE ANCHOR BOLT ASSEMBLY TABLE				
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20' - 39'	1"	13"	11"	1 1/16"
40' - 50'	1 1/4"	15"	12 1/2"	1 5/16"



CONCRETE TRAFFIC BARRIER BASE ANCHOR BOLT ASSEMBLY

TRANSFORMER BASE ANCHOR BOLT ASSEMBLY TABLE				
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20' - 39'	1"	14"	12"	1 1/16"
40' - 50'	1 1/4"	17 1/4"	14 3/4"	1 5/16"



TRANSFORMER BASE ANCHOR BOLT ASSEMBLY

GENERAL NOTES:

- For mounting heights between those shown in the table, use the values in the table for the larger mounting height.
- All breakaway bases shall meet the breakaway requirements of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto, and shall have been tested by FHWA-approved methods. All bases shall have been structurally tested to resist 150% of the design moment.
- Transformer bases shall be cast from aluminum, ASTM B108 or B26 Alloy 356.0-T6, or other material approved by the Engineer. Four Hex Head (H.H.) bolts with four H.H. nuts, four lock washers, four flat washers, and connecting and hold-down washers as recommended by the manufacturer, galvanized to ASTM A153 Class C or D, or B695 Class 50, shall be provided with each transformer base for connecting the pole. Bolts shall be ASTM A325 or approved equal. Nuts shall be ASTM A563 grade DH galvanized.
- Bases shall be stamped, incised or by other approved permanent means, marked to show fabricator's name or logo, and model number. Such information shall be placed in a readily seen location, inside or outside the base, but shall not be placed on the door.
- Doors for transformer bases shall be made of plastic, fiberglass or other non-metallic material approved by the Engineer and shall be attached with stainless steel screws or bolts. Transformer bases shall be cleaned by grit blast cleaning after heat treatment. Certification by the manufacturer of heat treatment shall be furnished with transformer bases. The certification shall show the metal alloy and temper and that the base meets those requirements, chemical and physical. The certification shall also show the material ASTM specification. Transformer bases shall be cast with a removable tab bar for material testing. Some bars may have been removed by the manufacturer for testing.

NOTES:

- Anchor Bolt Templates do not need to be galvanized.
- Pole diameter before ovalized.

ANCHOR BOLT FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Length	± 1/2"
Threaded length	± 1/2"
Galvanized length (if required)	- 1/4"

SHEET 4 OF 4



**ROADWAY ILLUMINATION POLES
RIP(4) - 19**

FILE: rip-19.dgn	DN:	CK:	DW:	CK:
©TxDOT January 2007	CON:	SECT:	JOB:	HIGHWAY:
7-17 12-19	DIST:	COUNTY:	SHEET NO. 146	

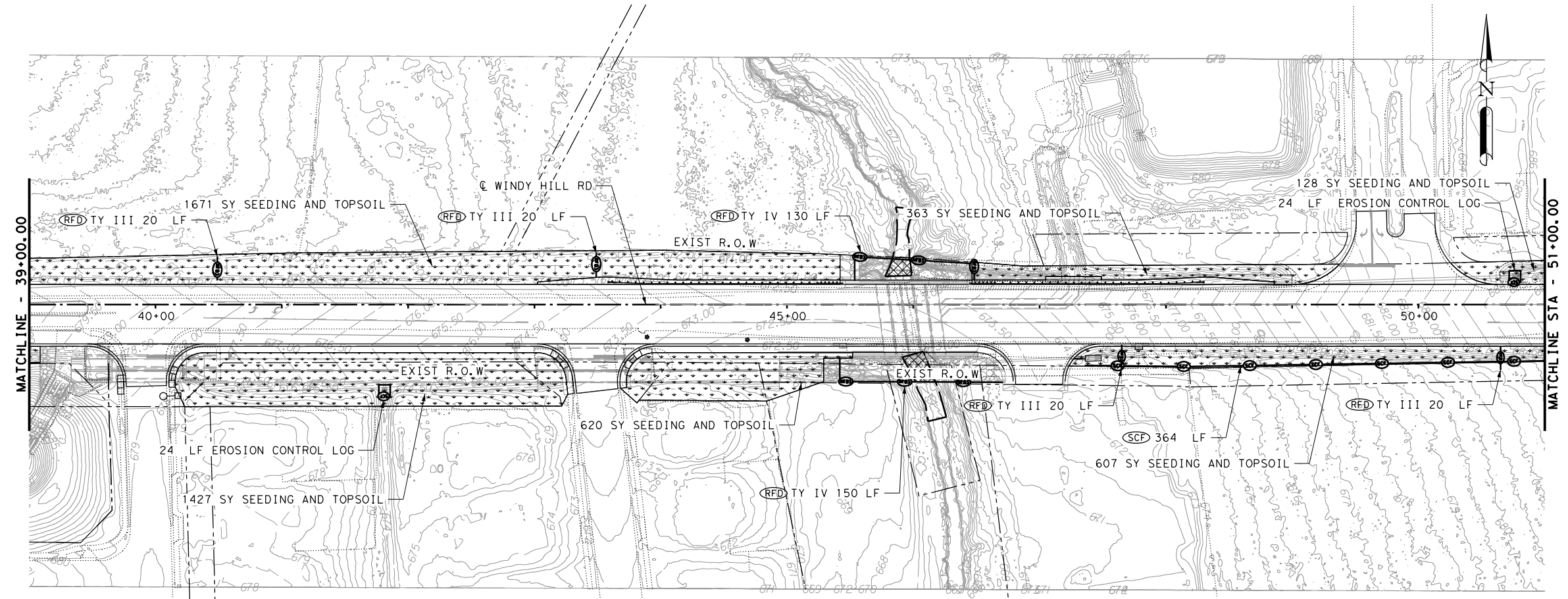
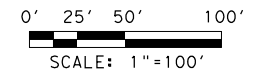
DATE:
FILE:

730

7/10/2020 4:45:33 PM I:\2173\2001\CADD\SHEETS\09-Environmental Issues\WH*SW3P*01.dgn

LEGEND

- EXISTING R.O.W.
- - - PROPOSED R.O.W.
- - - EX DRAINAGE EASEMENT
- - - EXISTING UTILITY
- EXISTING PLANIMETRICS
- ← DITCH FLOWLINE
- PROPOSED DRAINAGE
- (RFD) PROPOSED ROCK FILTER DAM
- (SCF) PROPOSED TEMP SEDMT CONT
- [Pattern Box] PROPOSED TOPSOIL & SEEDING



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.

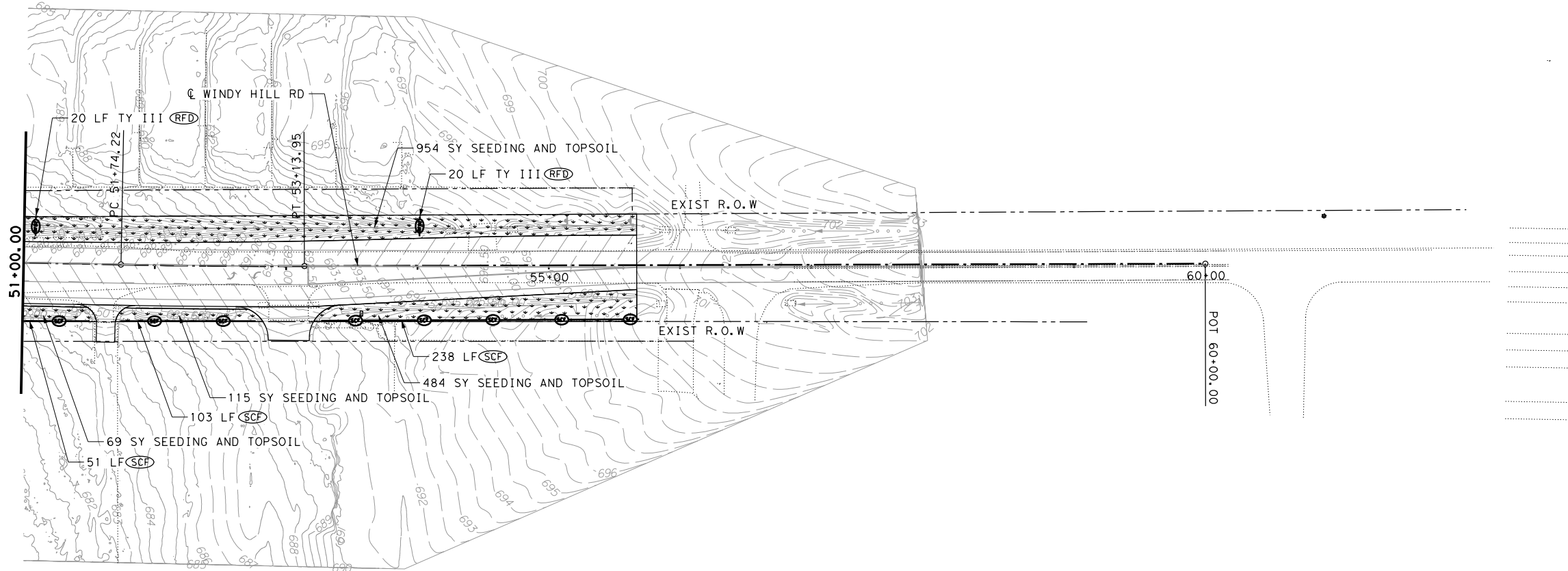


LJA Engineering, Inc.
 FRN-F-1386

**WINDY HILL ROAD
 SW3P PLAN
 LAYOUT**

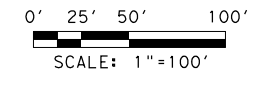
GLO Contract# 19-280-000-B779		
DESIGN BY:	AM	SCALE 1"=100'
DRAWN BY:	AM	HORIZONTAL:
CHECKED BY:	ZR	VERTICAL:
APPROVED BY:		SHEET: 1 OF 2
PROJECT NO:	2173.2001	PAGE: 147
DATE:	7/10/2020	

7/10/2020 4:45:35 PM I:\2173\2001\CADD\SHEETS\09-Environmental\Issues\WH*SW3P*02.dgn



LEGEND

- EXISTING R.O.W.
- - - PROPOSED R.O.W.
- - - EX DRAINAGE EASEMENT
- - - EXISTING UTILITY
- EXISTING PLANIMETRICS
- ← DITCH FLOWLINE
- PROPOSED DRAINAGE
- (RFD) PROPOSED ROCK FILTER DAM
- (SCF) PROPOSED TEMP SEDMT CONT
- [Pattern Box] PROPOSED TOPSOIL & SEEDING



THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 7/10/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc.
 FRN - F-1386

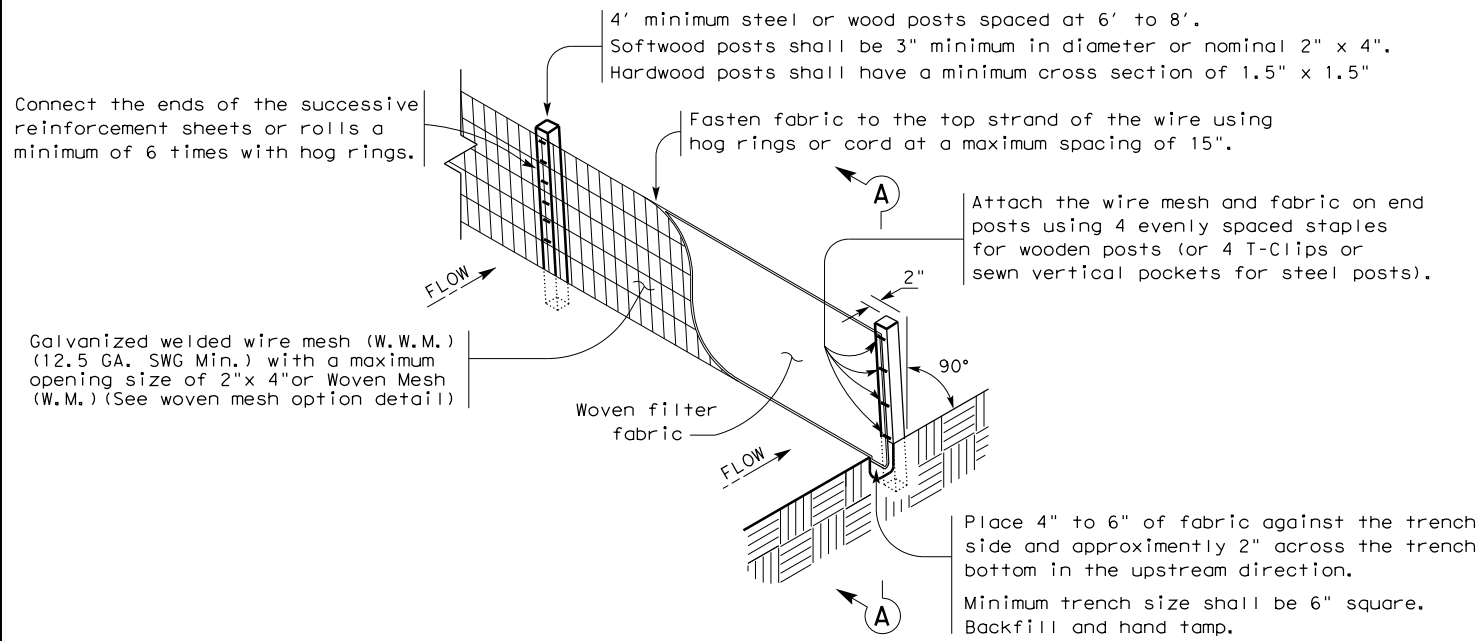
**WINDY HILL ROAD
 SW3P PLAN
 LAYOUT**

GLO Contract# 19-280-000-B779

DESIGN BY:	AM	SCALE	1"=100'
DRAWN BY:	AM	HORIZONTAL:	
CHECKED BY:	ZR	VERTICAL:	
APPROVED BY:		SHEET:	2 OF 2
PROJECT NO:	2173.2001	DATE:	7/10/2020
DATE:	7/10/2020	PAGE:	148

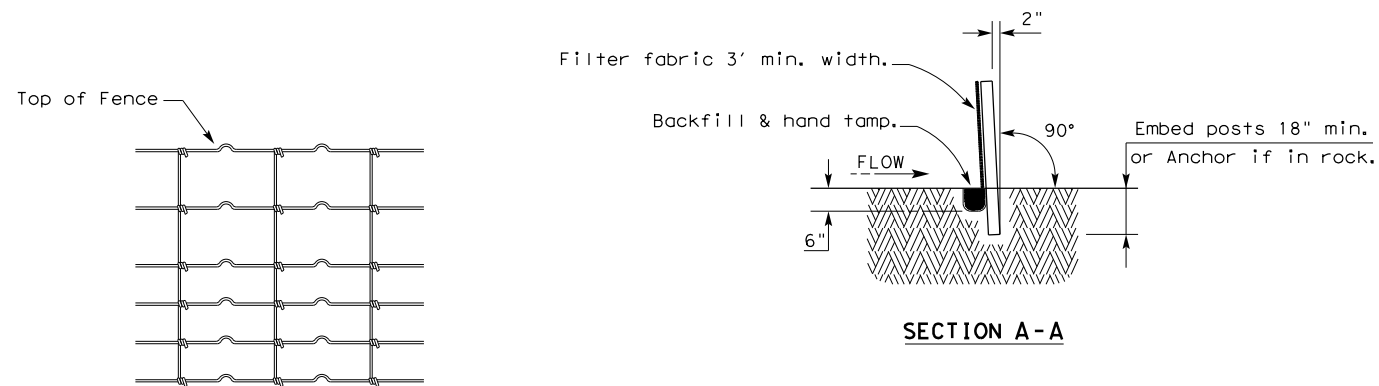
DISCLAIMER: This standard is made by TxDOT for any purpose whatsoever. No warranty of any kind is made by TxDOT for any purpose whatsoever. The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE
FILE



TEMPORARY SEDIMENT CONTROL FENCE

SCF



HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA. SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT². Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

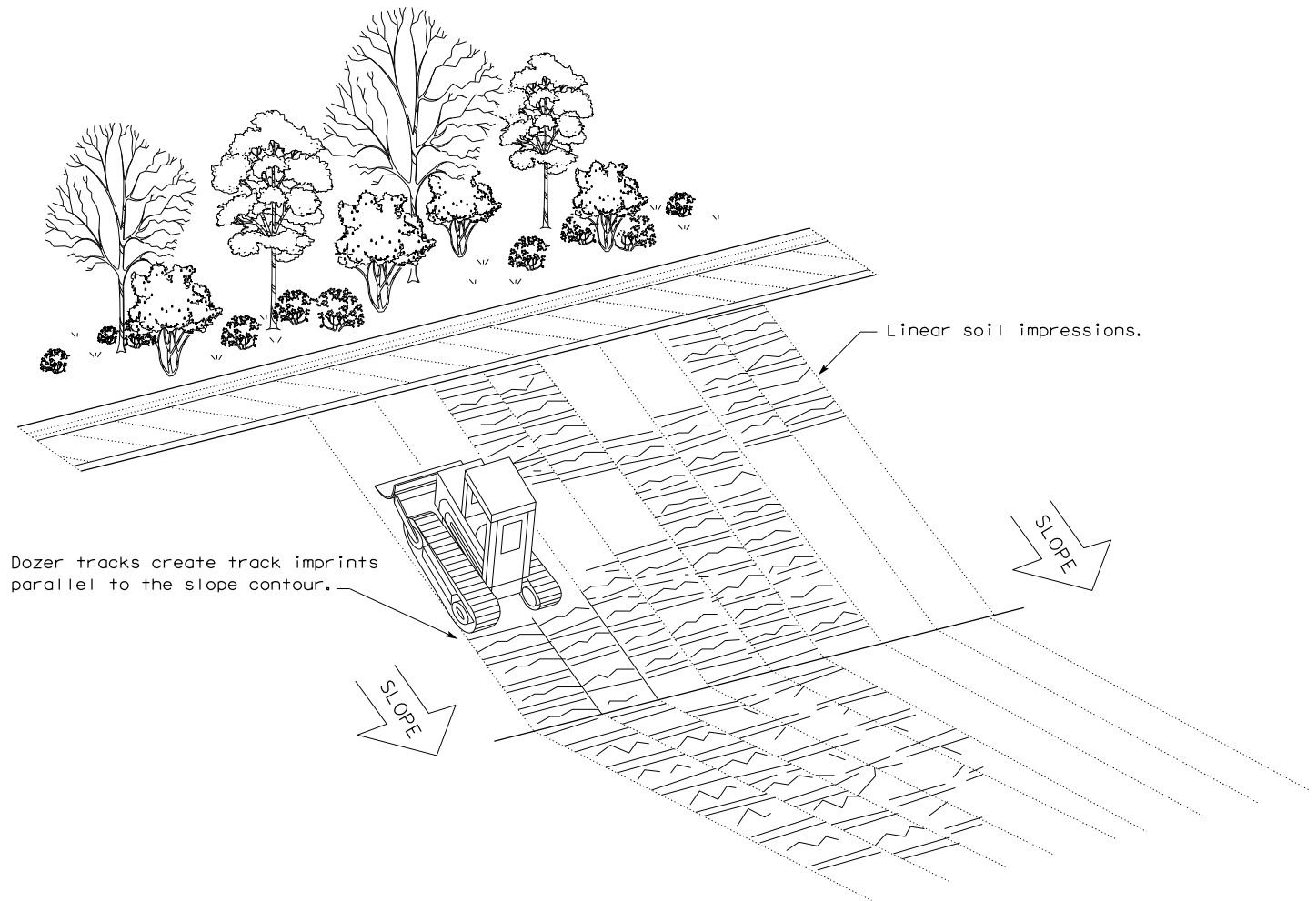
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continuous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.

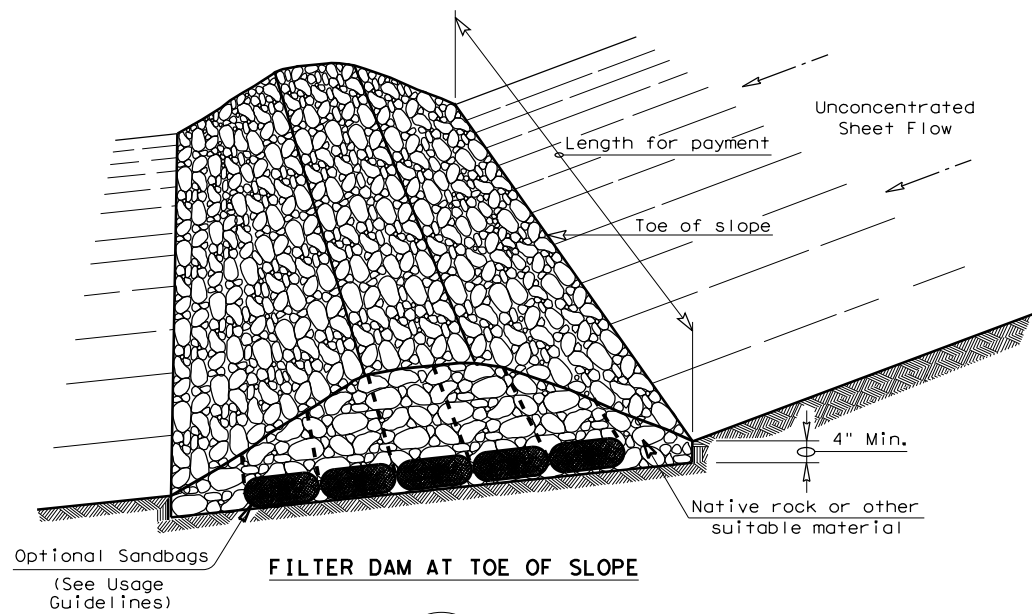


VERTICAL TRACKING

				Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES FENCE & VERTICAL TRACKING					
EC(1) - 16					
FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS	
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS					
	DIST	COUNTY		SHEET NO.	
					149

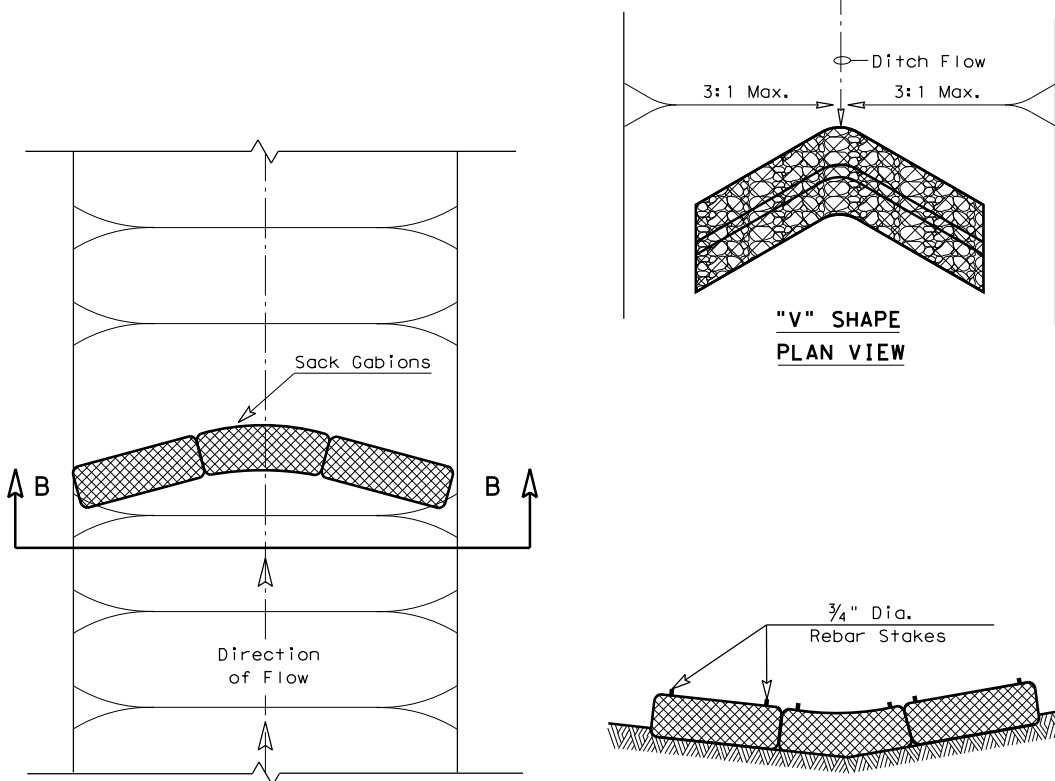
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:



FILTER DAM AT TOE OF SLOPE

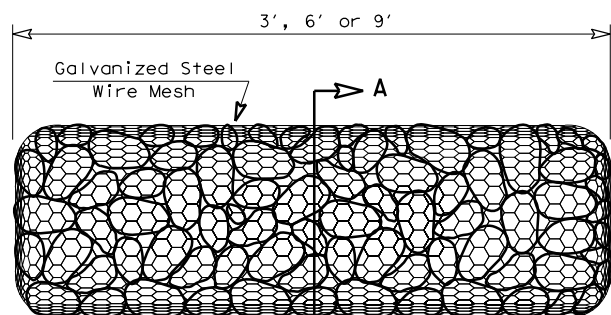
(RFD1)



"V" SHAPE PLAN VIEW

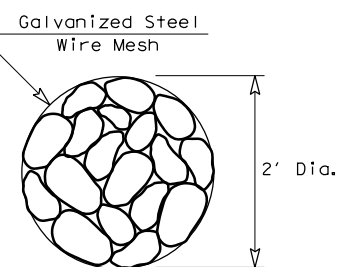
PLAN VIEW

SECTION B-B

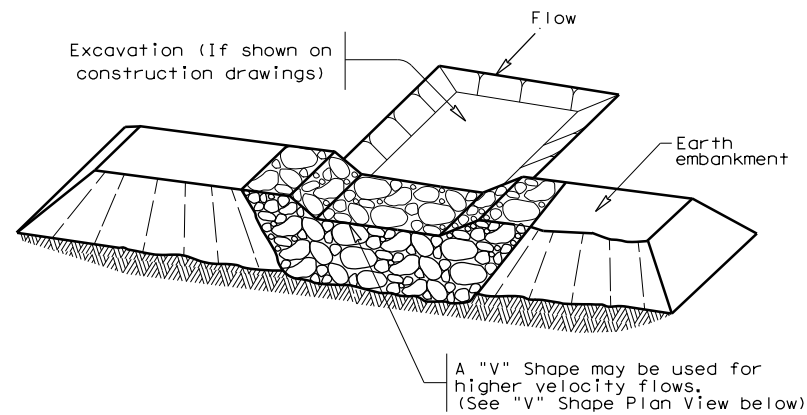


TYPE 4 (SACK GABIONS)

(RFD4)

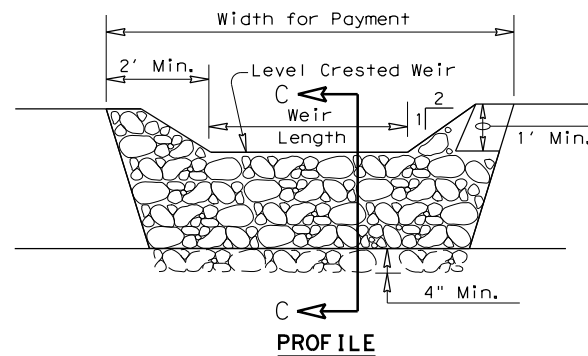


SECTION A-A

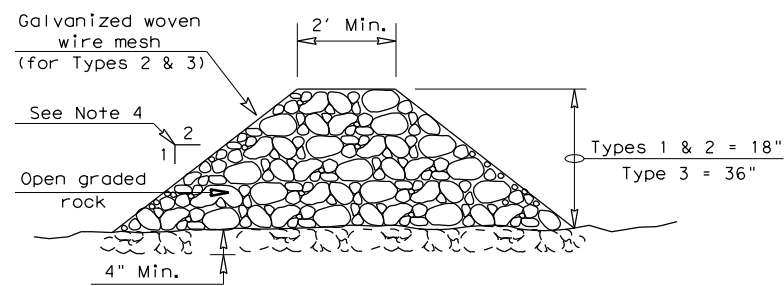


FILTER DAM AT SEDIMENT TRAP

(RFD1) OR (RFD2)



PROFILE



SECTION C-C

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT² of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

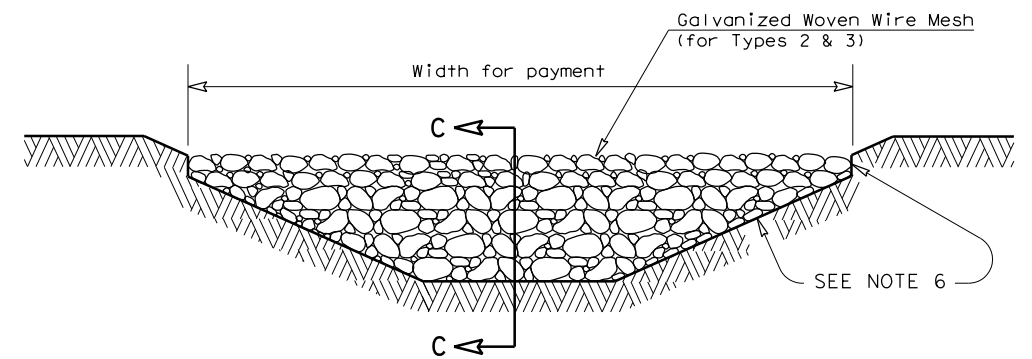
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximately 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.



FILTER DAM AT CHANNEL SECTIONS

(RFD1) OR (RFD2) OR (RFD3)

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with 3/4" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 1/2" x 3 1/4".
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

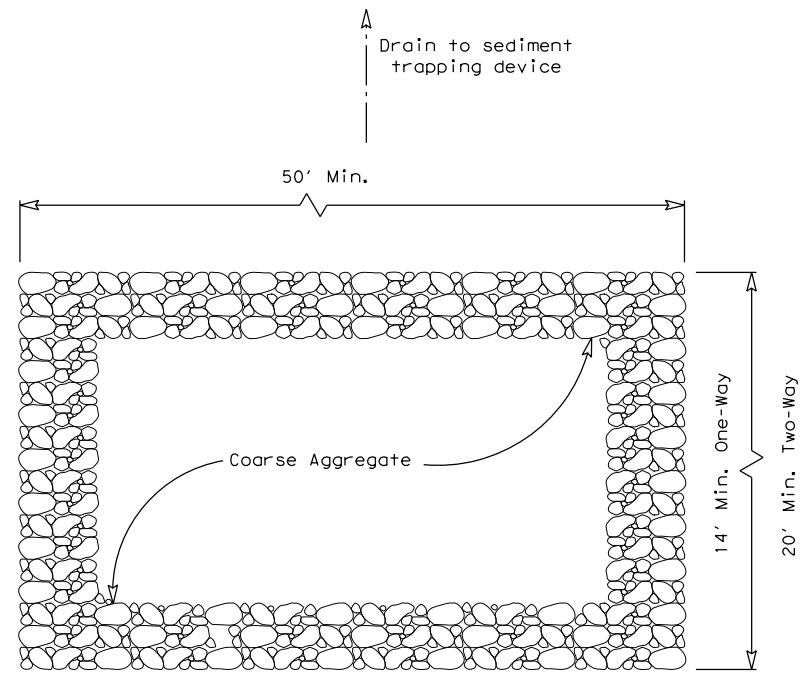
PLAN SHEET LEGEND

- Type 1 Rock Filter Dam (RFD1)
- Type 2 Rock Filter Dam (RFD2)
- Type 3 Rock Filter Dam (RFD3)
- Type 4 Rock Filter Dam (RFD4)

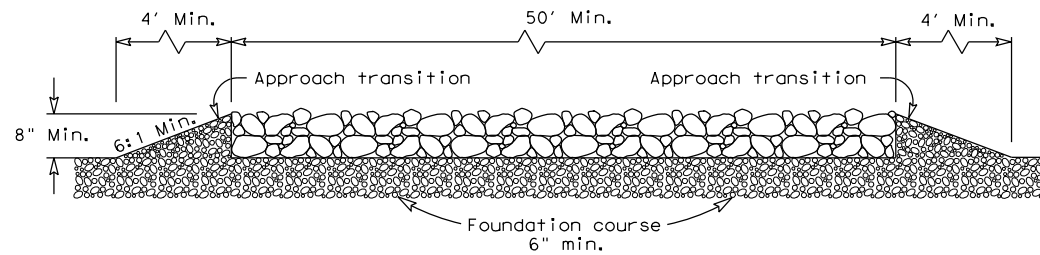
		Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES ROCK FILTER DAMS EC (2) - 16			
FILE: ec216	DN: TxDOT	CK: KM	DW: VP
© TxDOT: JULY 2016	CONT	SECT	JOB
REVISIONS		HIGHWAY	
DIST	COUNTY	SHEET NO.	
		150	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
 FILE:



PLAN VIEW

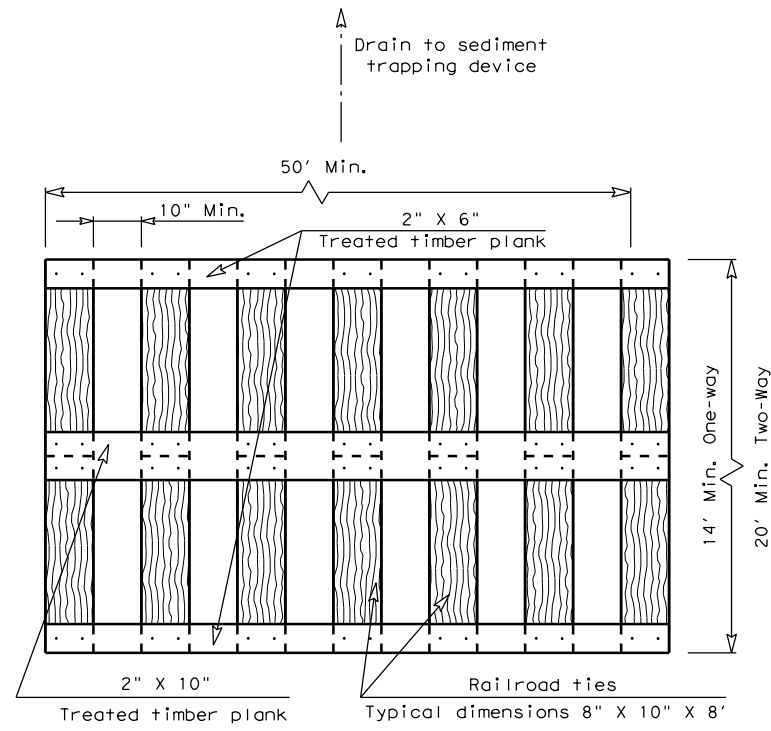


ELEVATION VIEW

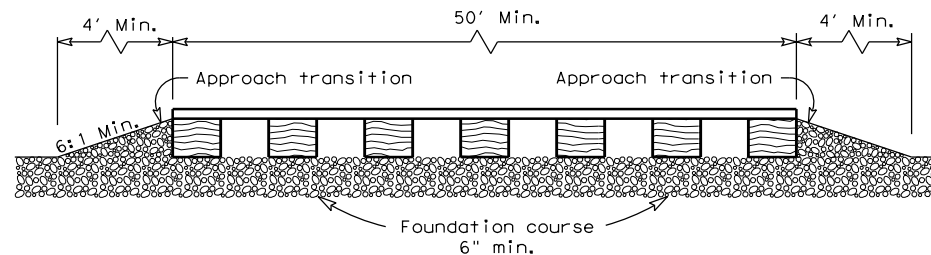
**CONSTRUCTION EXIT (TYPE 1)
 ROCK CONSTRUCTION (LONG TERM)**

GENERAL NOTES (TYPE 1)

- The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
- The coarse aggregate should be open graded with a size of 4" to 8".
- The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
- The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materials approved by the Engineer.
- The construction exit shall be graded to allow drainage to a sediment trapping device.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.
- Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



PLAN VIEW

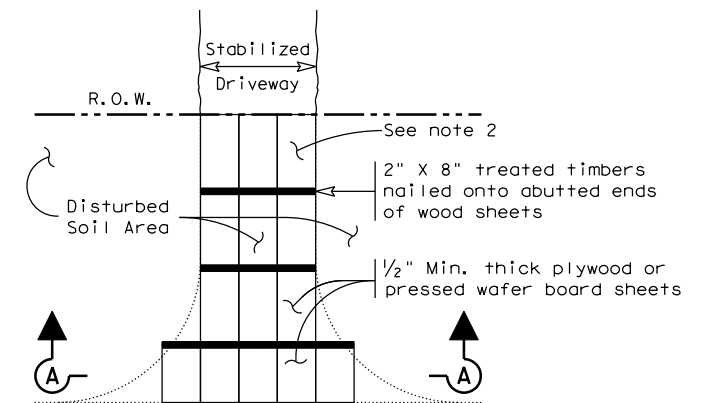


ELEVATION VIEW

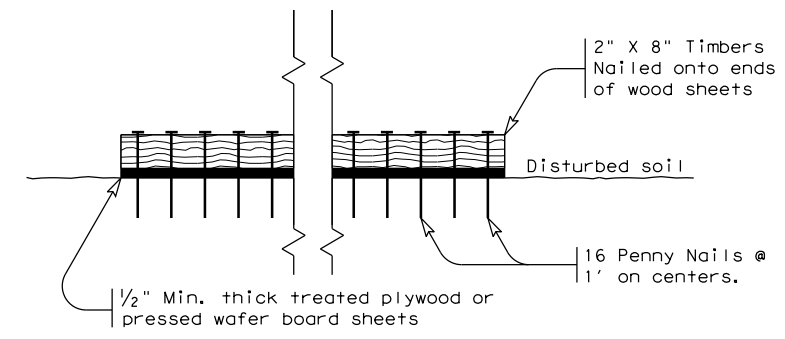
**CONSTRUCTION EXIT (TYPE 2)
 TIMBER CONSTRUCTION (LONG TERM)**

GENERAL NOTES (TYPE 2)

- The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
- The treated timber planks shall be attached to the railroad ties with 1/2" x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
- The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
- The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
- The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
- The construction exit should be graded to allow drainage to a sediment trapping device.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.
- Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



PLAN VIEW

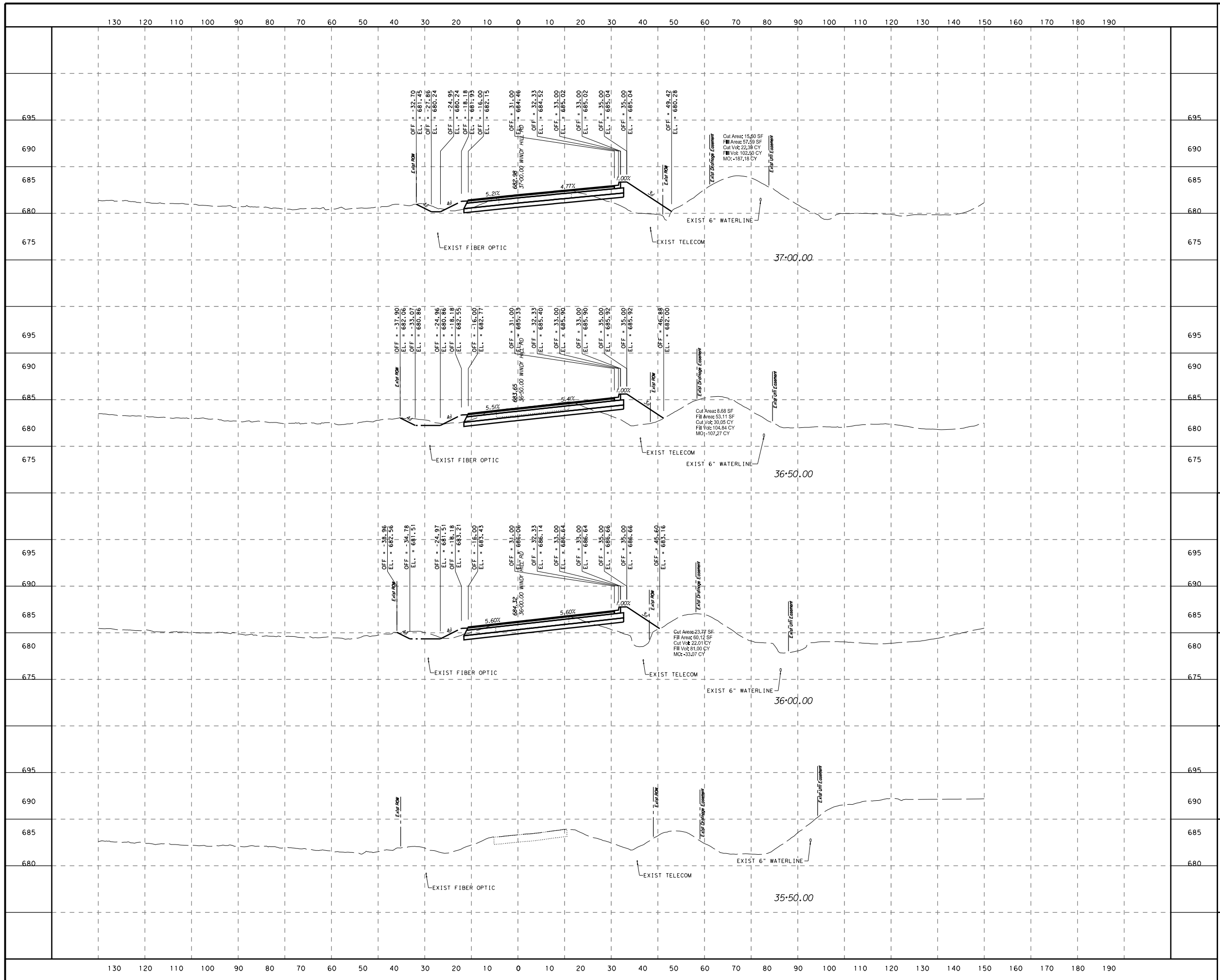


**SECTION A-A
 CONSTRUCTION EXIT (TYPE 3)
 SHORT TERM**

GENERAL NOTES (TYPE 3)

- The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
- The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
- The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.

		Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES CONSTRUCTION EXITS EC(3)-16			
FILE: ec316	DN: TxDOT	CK: KM	DW: VP
© TxDOT: JULY 2016	CONT	SECT	JOB
REVISIONS		HIGHWAY	
DIST		COUNTY	
		SHEET NO.	
		151	

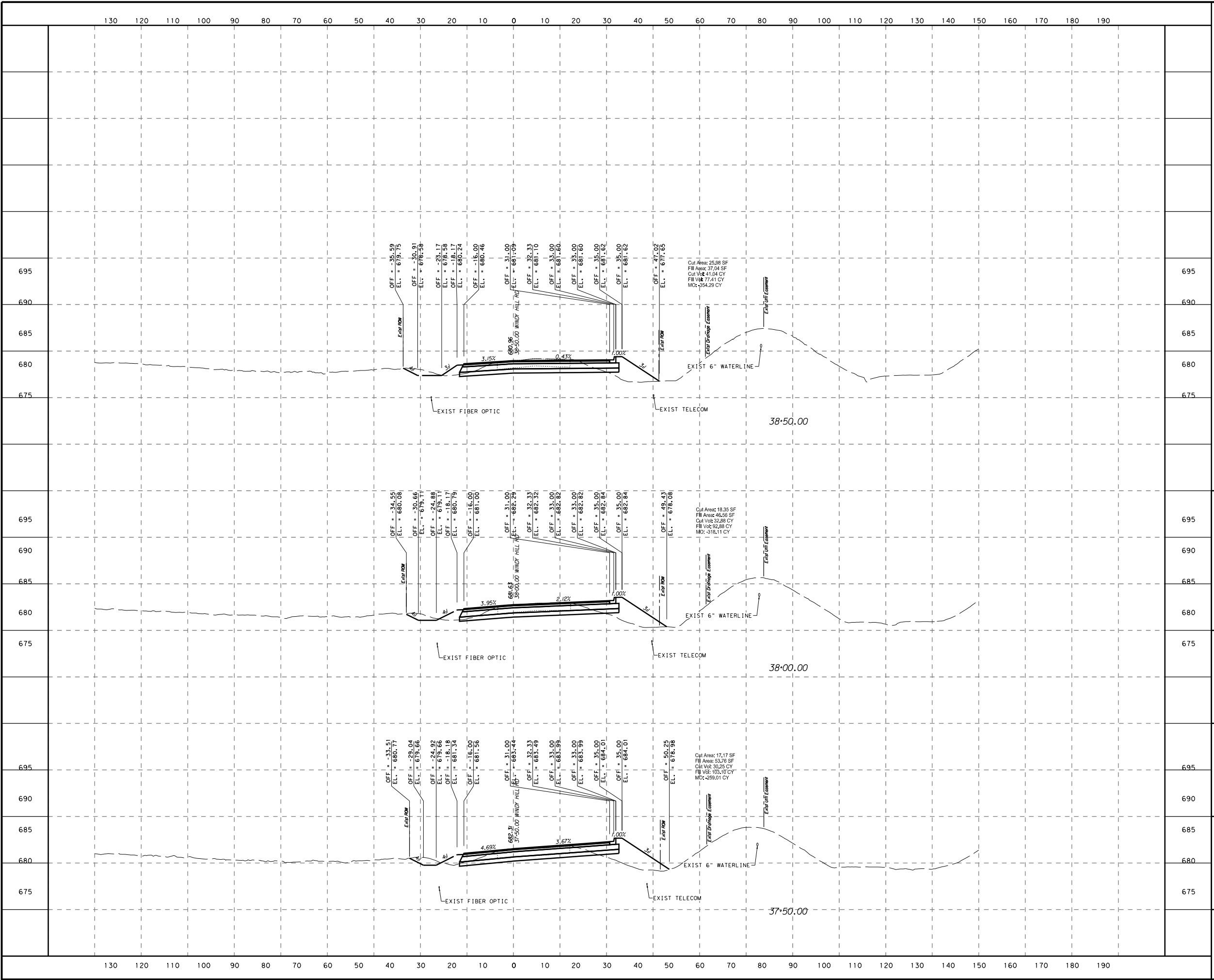


LJA Engineering, Inc.
FRN - F-1386

**WINDY HILL ROAD
CROSS SECTIONS**

GLO Contract# 19-280-000-B779

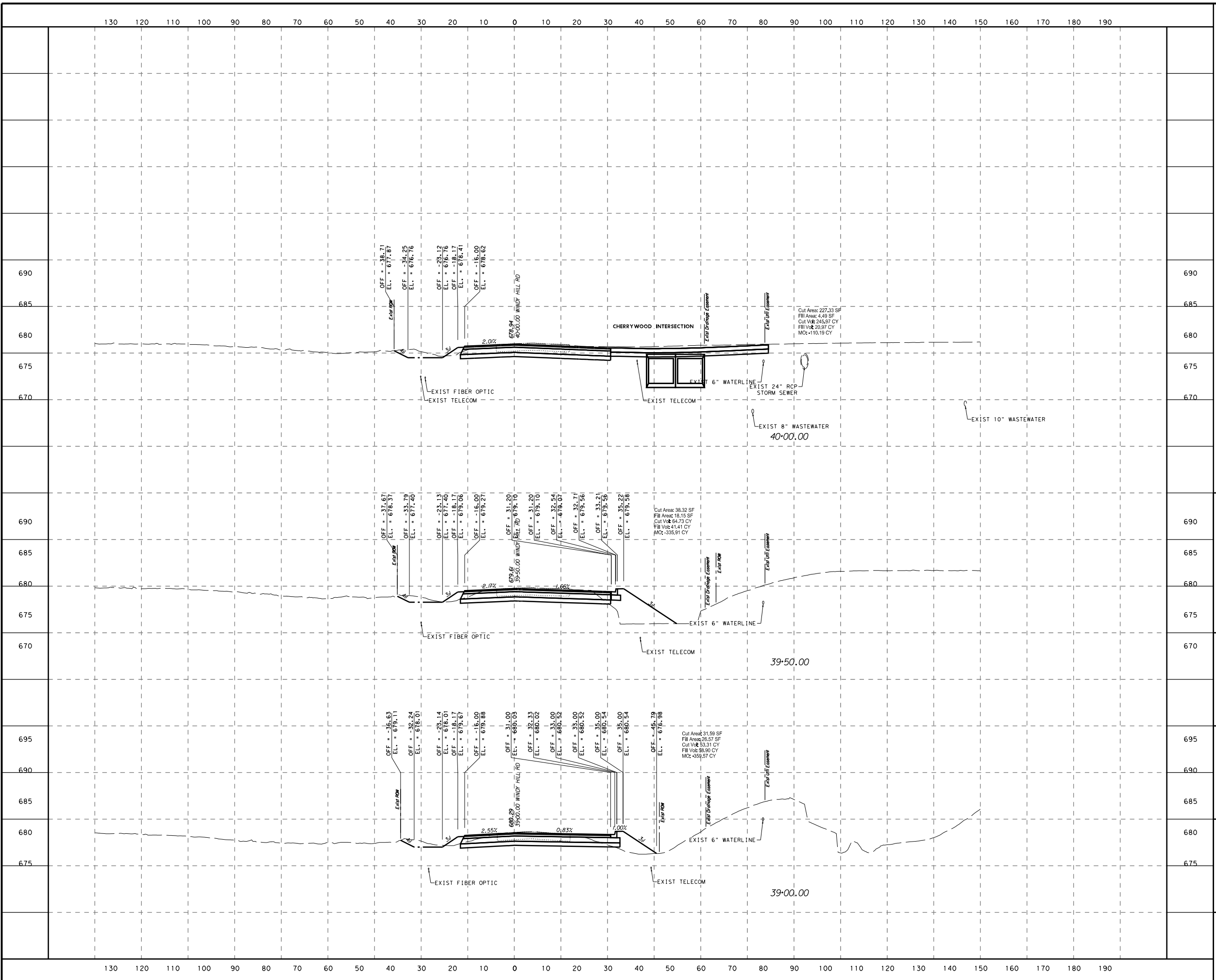
DESIGN BY: AM	SCALE
DRAWN BY: AM	HORIZONTAL: 1"=20'
CHECKED BY: ZR	VERTICAL: 1"=10'
APPROVED BY:	SHEET: 1 OF 13
PROJECT NO: 2173.2001	PAGE: 152
DATE: 7/10/2020	



LJA Engineering, Inc.
FRN - F-1386

**WINDY HILL ROAD
CROSS SECTIONS**

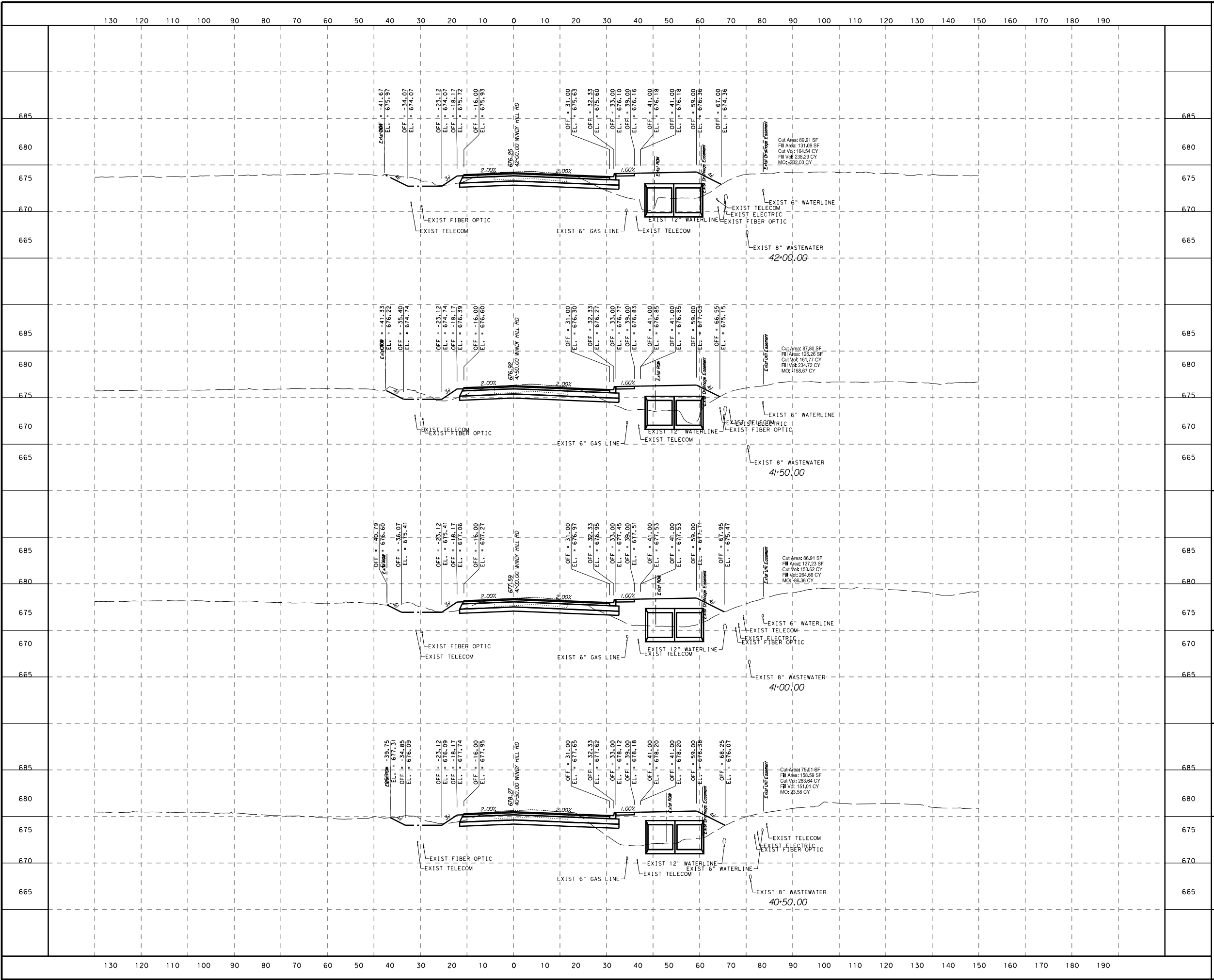
GLO Contract# 19-280-000-B779	
DESIGN BY: AM	SCALE
DRAWN BY: AM	HORIZONTAL: 1"=20'
CHECKED BY: ZR	VERTICAL: 1"=10'
APPROVED BY:	SHEET: 2 OF 13
PROJECT NO: 2173.2001	PAGE: 153
DATE: 7/10/2020	






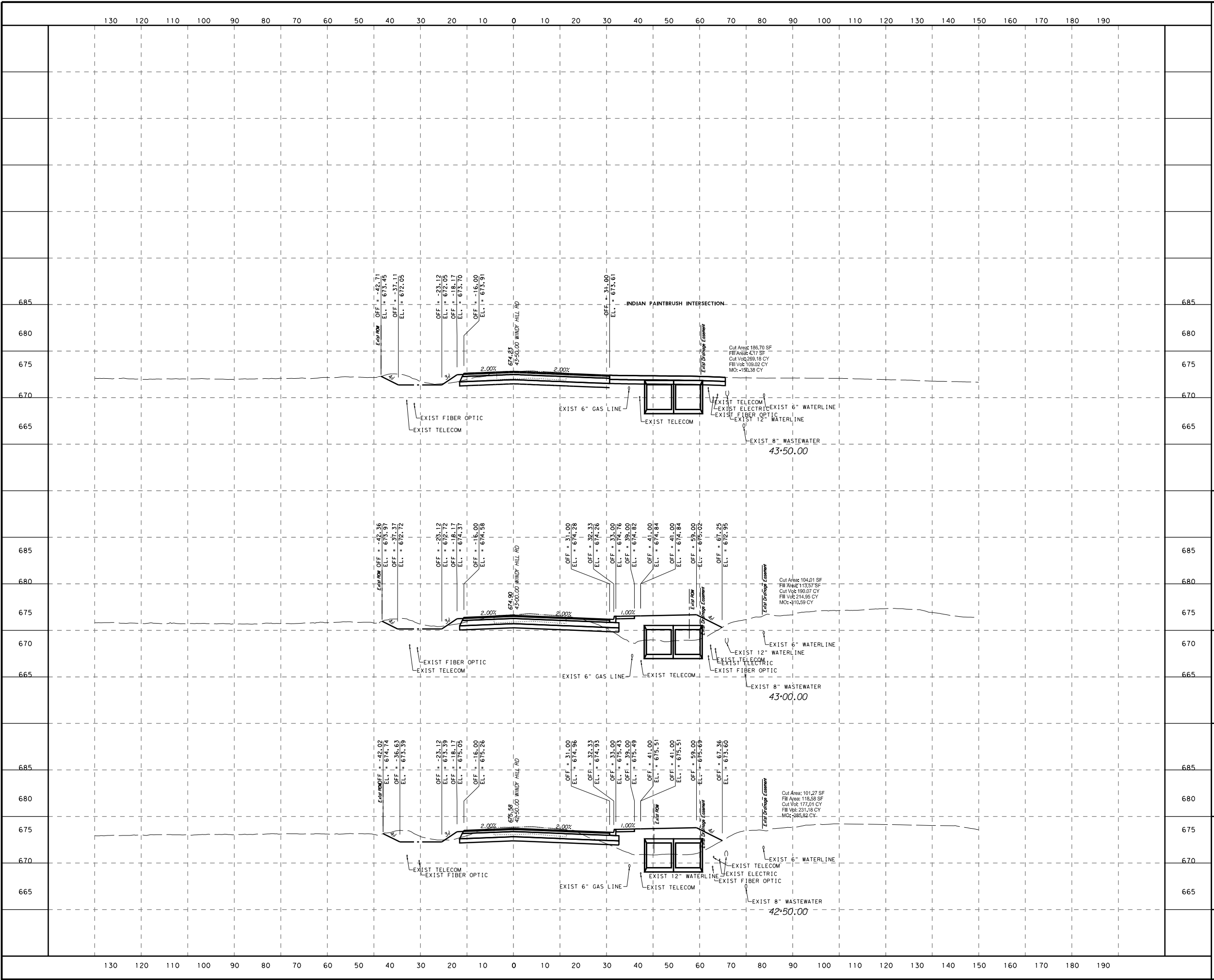
LJA Engineering, Inc.
FRN - F-1386

**WINDY HILL ROAD
CROSS SECTIONS**

GLO Contract# 19-280-000-B779	
DESIGN BY: AM	SCALE
DRAWN BY: AM	HORIZONTAL: 1"=20'
CHECKED BY: ZR	VERTICAL: 1"=10'
APPROVED BY:	SHEET: 3 OF 13
PROJECT NO: 2173.2001	PAGE: 154
DATE: 7/10/2020	



685	685
680	680
675	675
670	670
665	665
685	685
680	680
675	675
670	670
665	665
685	685
680	680
675	675
670	670
665	665
 	
LJA Engineering, Inc.  FRN-F-1386	
WINDY HILL ROAD CROSS SECTIONS	
GLO Contract# 19-280-000-B779	
DESIGN BY: AM DRAWN BY: AM CHECKED BY: ZR APPROVED BY: PROJECT NO: 2173.2001 DATE: 7/10/2020	SCALE HORIZONTAL: 1"=20' VERTICAL: 1"=10' SHEET: 4 OF 13 PAGE: 155



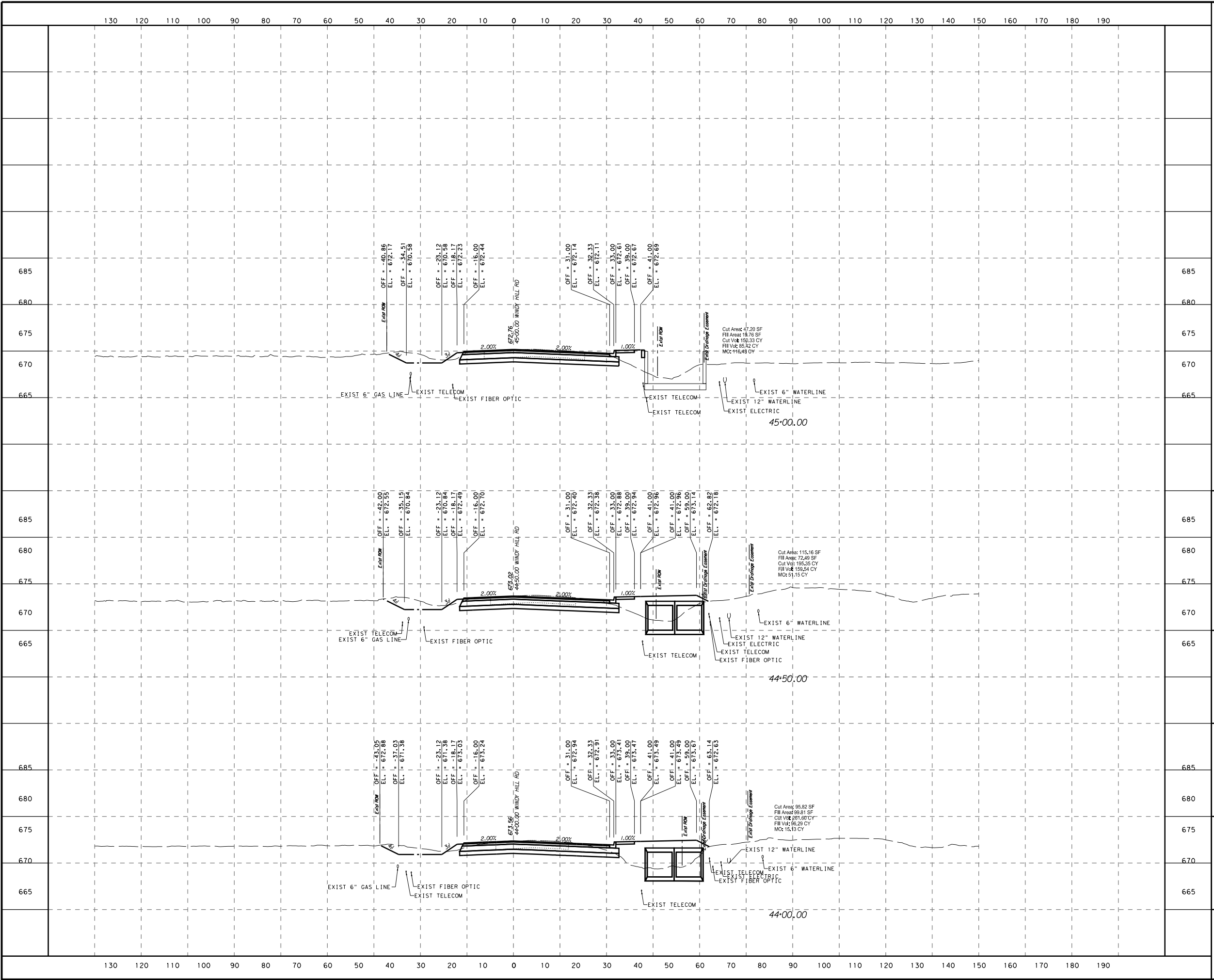
LJA Engineering, Inc.
FRN - F-1386




**WINDY HILL ROAD
CROSS SECTIONS**

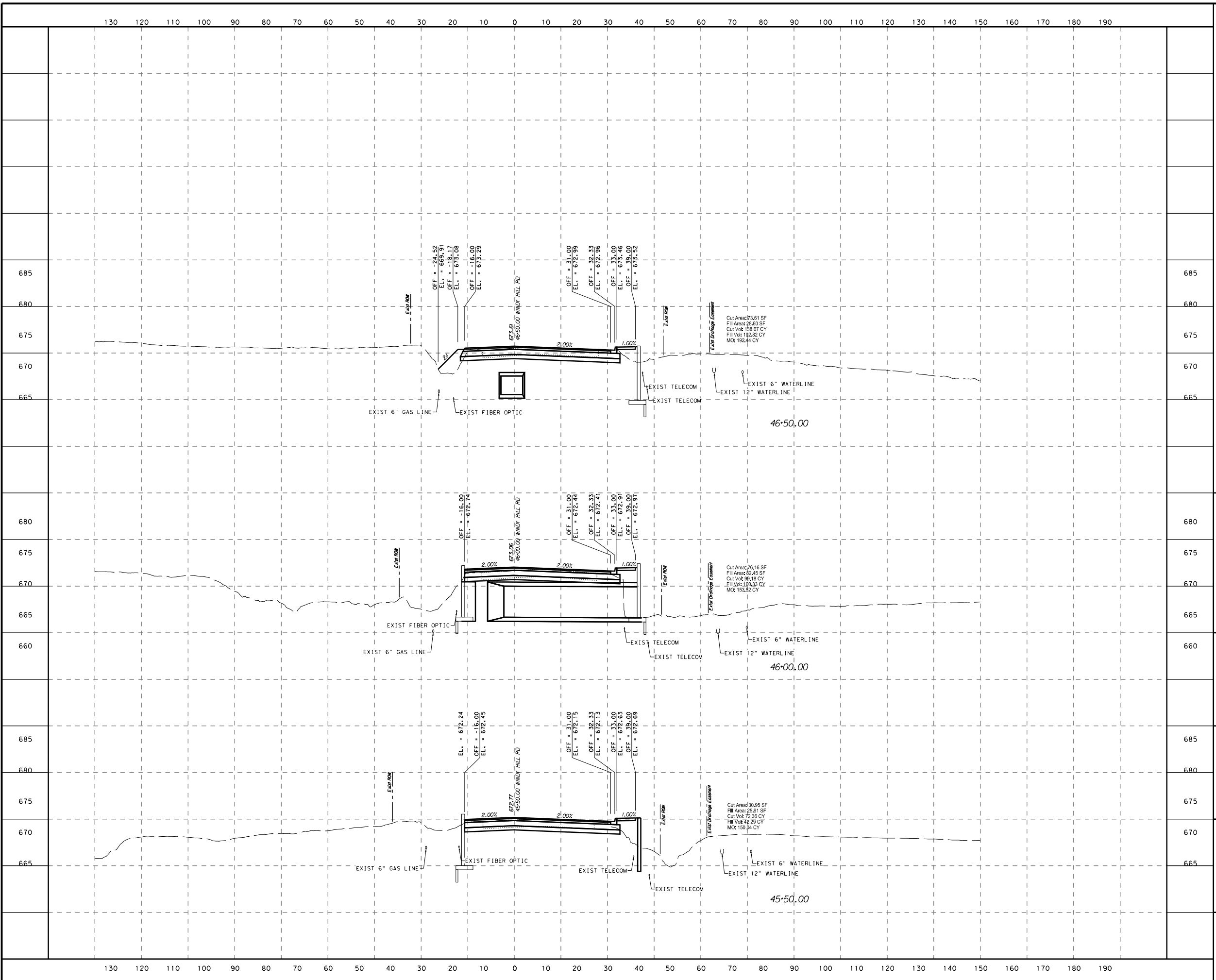
GLO Contract# 19-280-000-B779

DESIGN BY: AM
DRAWN BY: AM
CHECKED BY: ZR
APPROVED BY:
PROJECT NO: 2173.2001
DATE: 7/10/2020

SCALE
HORIZONTAL: 1"=20'
VERTICAL: 1"=10'
SHEET: 5 OF 13
PAGE: 156



685	685
680	680
675	675
670	670
665	665
685	685
680	680
675	675
670	670
665	665
685	685
680	680
675	675
670	670
665	665
 	
LJA Engineering, Inc.  <small>FRN - F-1386</small>	
WINDY HILL ROAD CROSS SECTIONS	
GLO Contract# 19-280-000-B779	
DESIGN BY: AM DRAWN BY: AM CHECKED BY: ZR APPROVED BY: PROJECT NO: 2173.2001 DATE: 7/10/2020	SCALE HORIZONTAL: 1"=20' VERTICAL: 1"=10' SHEET: 6 OF 13 PAGE: 157



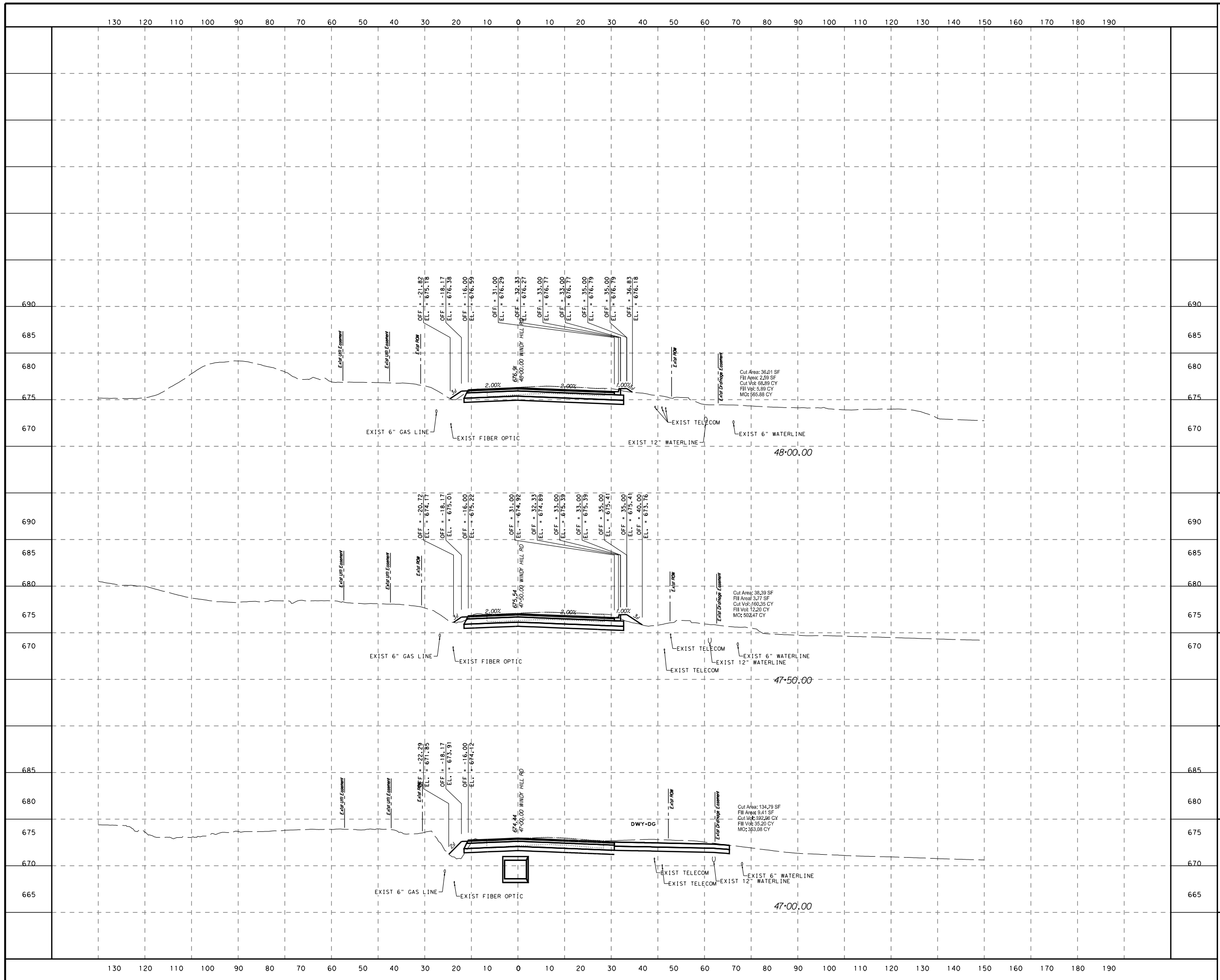
LJA Engineering, Inc.
FRN - F-1386

**WINDY HILL ROAD
CROSS SECTIONS**

GLO Contract# 19-280-000-B779

DESIGN BY: AM
DRAWN BY: AM
CHECKED BY: ZR
APPROVED BY:
PROJECT NO: 2173.2001
DATE: 7/10/2020

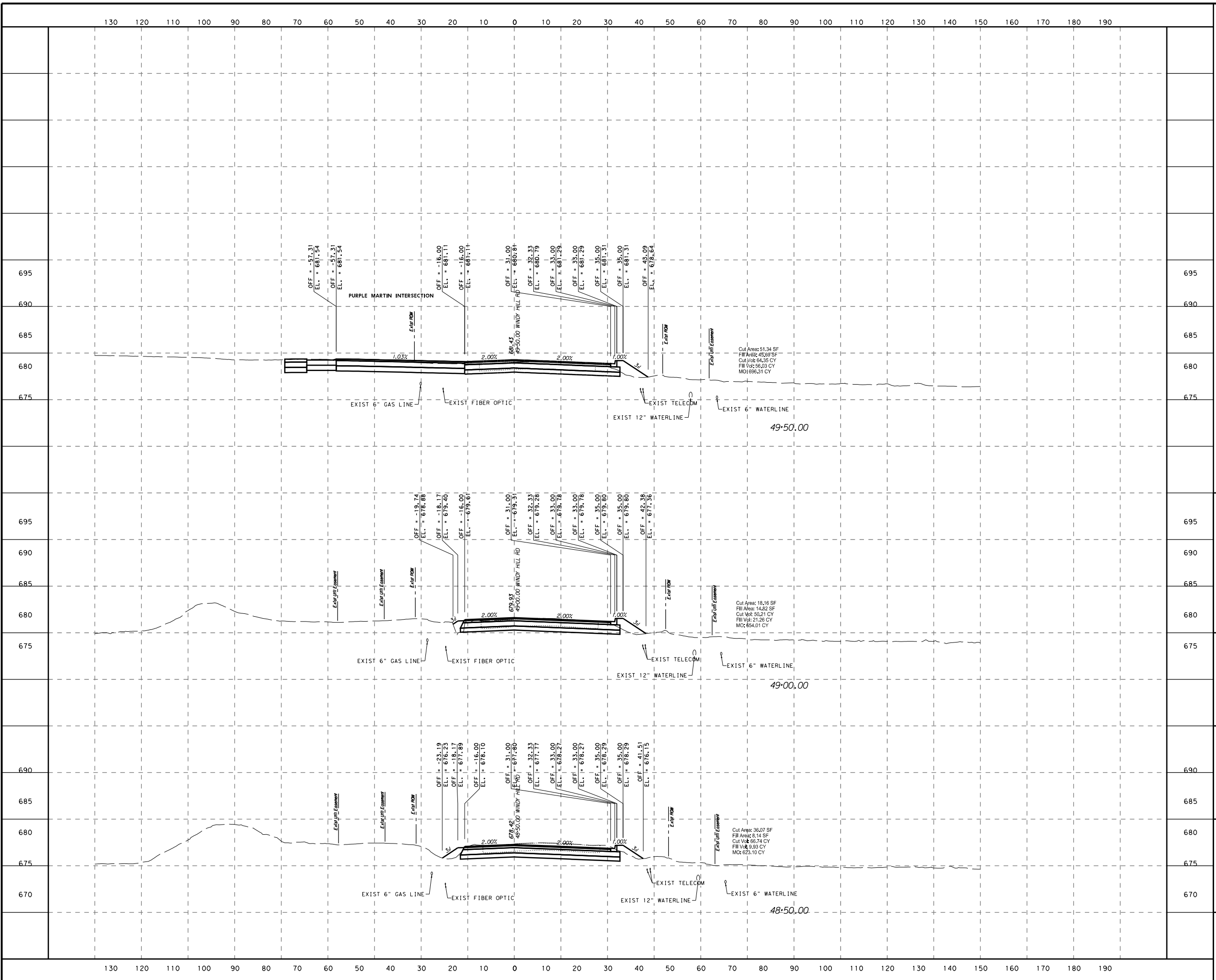
SCALE
HORIZONTAL: 1"=20'
VERTICAL: 1"=10'
SHEET: 7 OF 13
PAGE: 158



LJA Engineering, Inc.
FRN - F-1386

**WINDY HILL ROAD
CROSS SECTIONS**

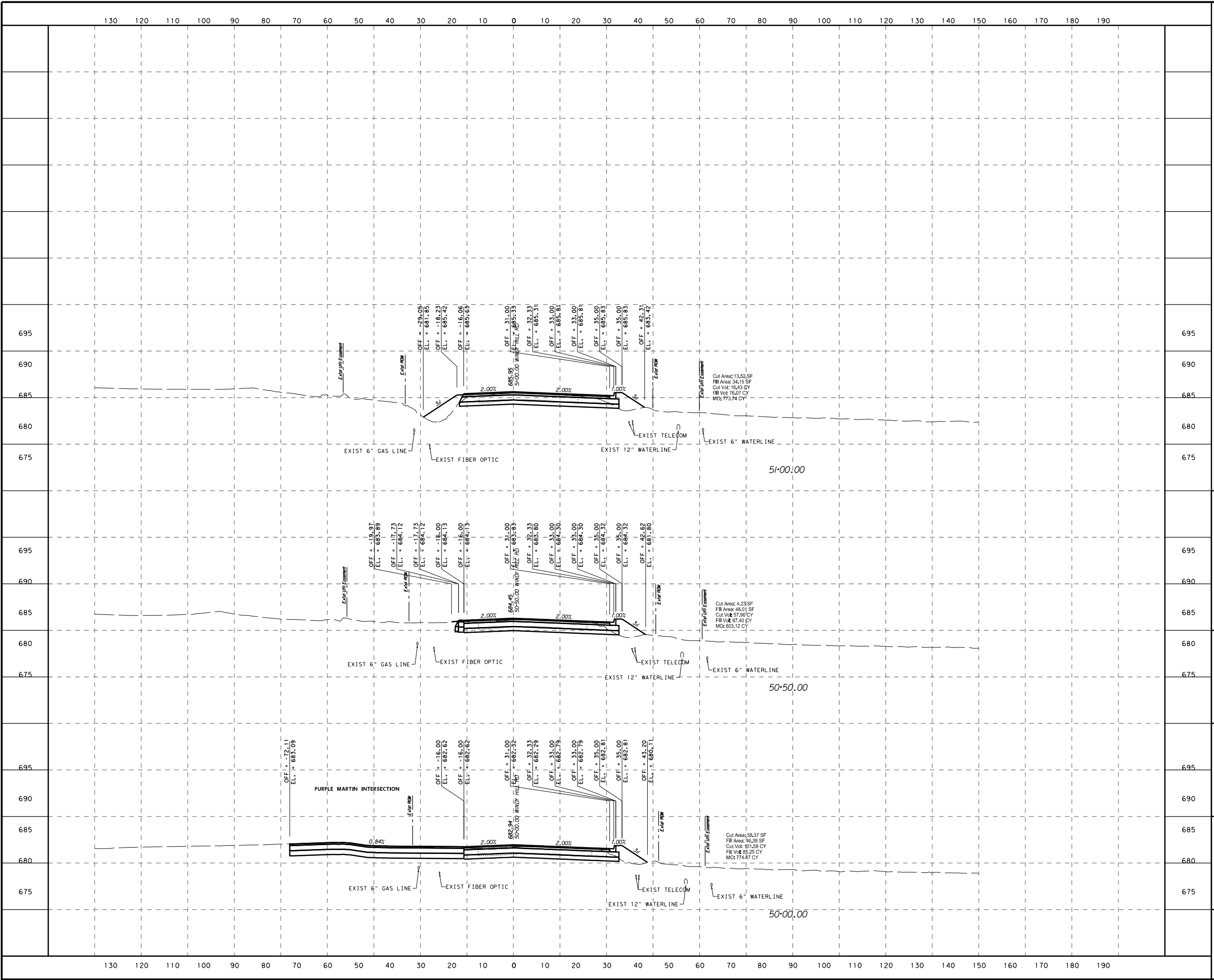
GLO Contract# 19-280-000-B779	
DESIGN BY: AM	SCALE
DRAWN BY: AM	HORIZONTAL: 1"=20'
CHECKED BY: ZR	VERTICAL: 1"=10'
APPROVED BY:	SHEET: 8 OF 13
PROJECT NO: 2173.2001	PAGE: 159
DATE: 7/10/2020	



LJA Engineering, Inc.
FRN-F-1386

**WINDY HILL ROAD
CROSS SECTIONS**

GLO Contract# 19-280-000-B779	
DESIGN BY: AM	SCALE
DRAWN BY: AM	HORIZONTAL: 1"=20'
CHECKED BY: ZR	VERTICAL: 1"=10'
APPROVED BY:	SHEET: 9 OF 13
PROJECT NO: 2173.2001	PAGE: 160
DATE: 7/10/2020	



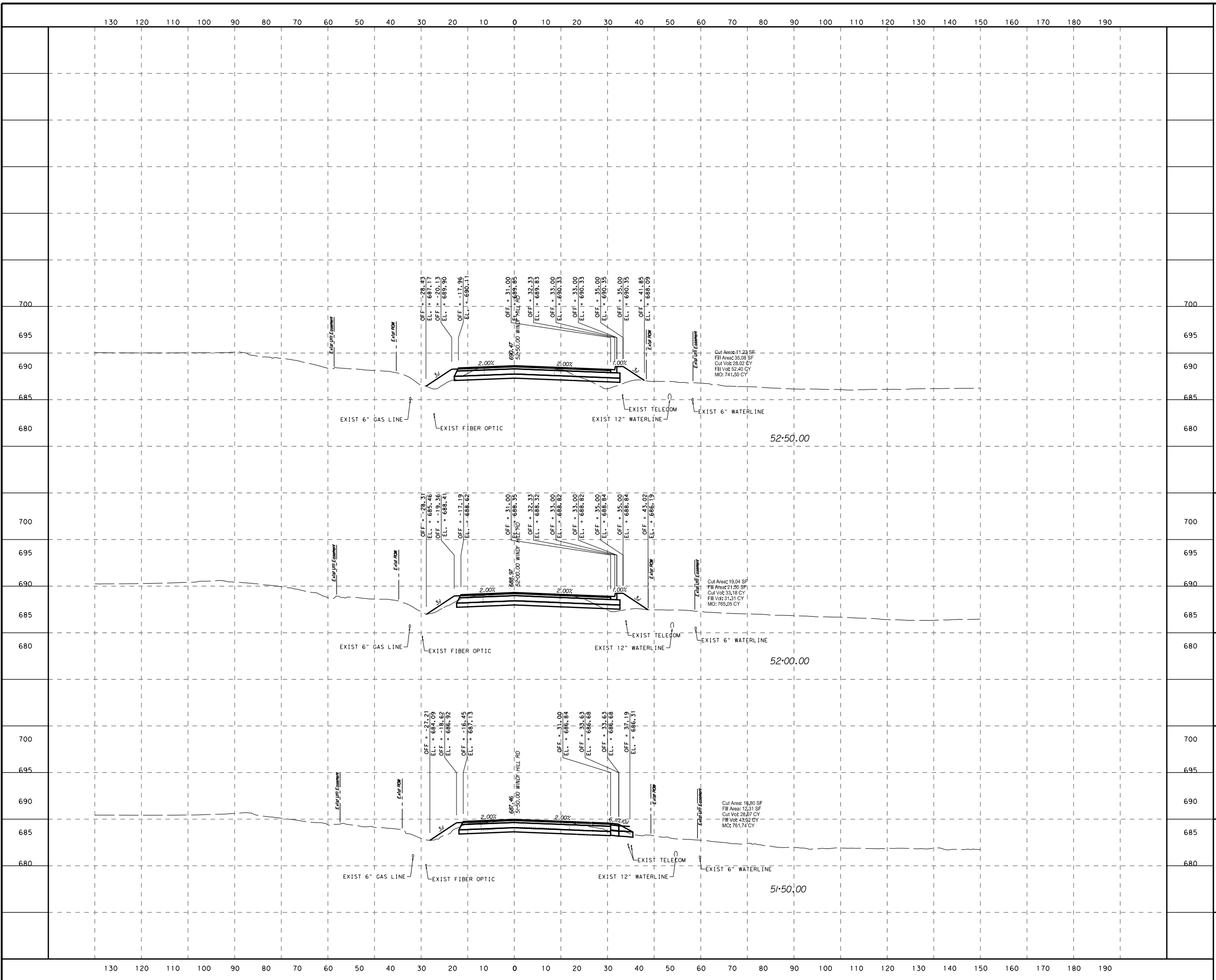
LJA Engineering, Inc.
 FRN - F-1386

**WINDY HILL ROAD
 CROSS SECTIONS**

GLO Contract# 19-280-000-B779

DESIGN BY: AM
 DRAWN BY: AM
 CHECKED BY: ZR
 APPROVED BY:
 PROJECT NO: 2173.2001
 DATE: 7/10/2020

SCALE
 HORIZONTAL: 1"=20'
 VERTICAL: 1"=10'
 SHEET: 10 OF 13
 PAGE: 161



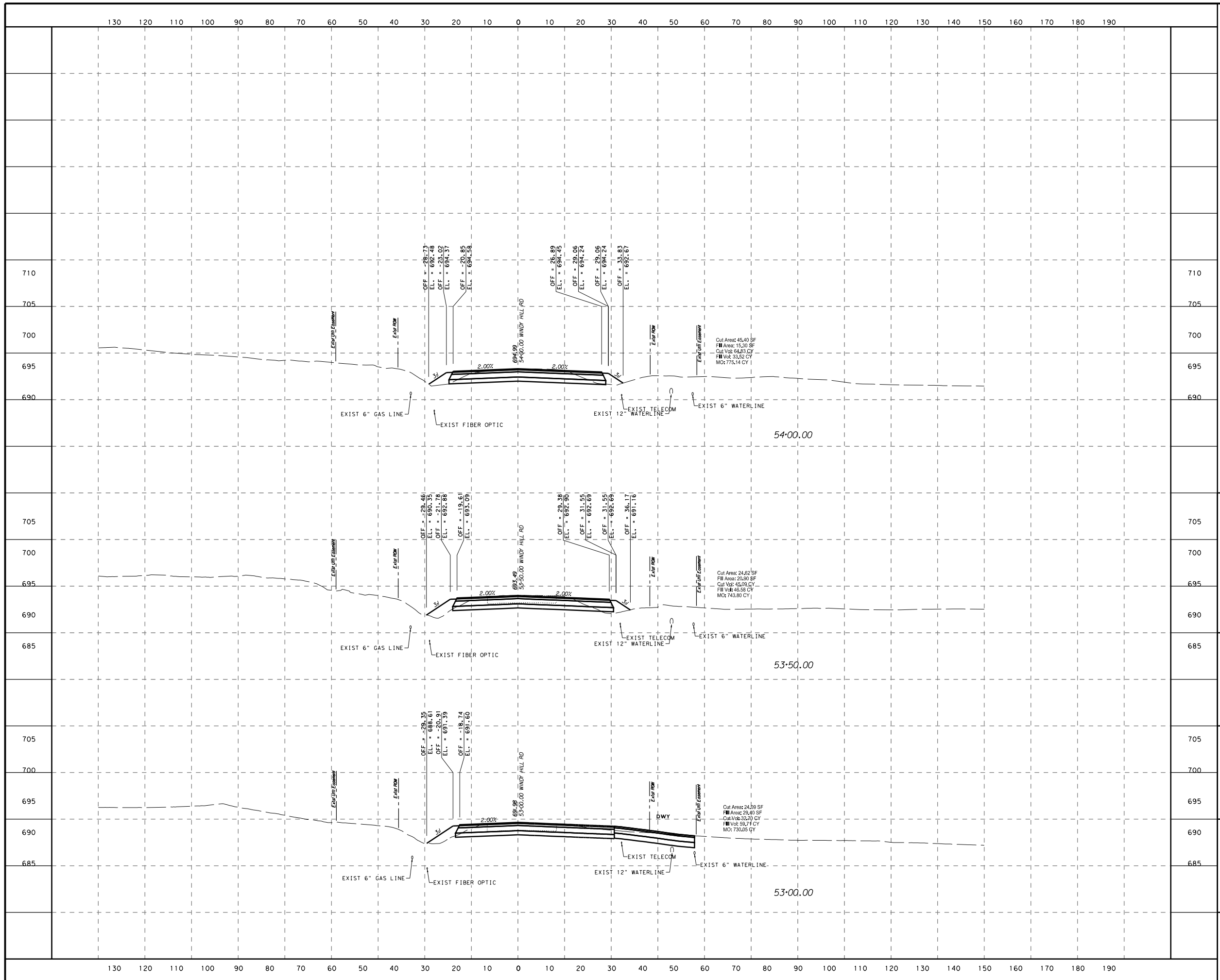
LJA Engineering, Inc.
FRN - F-1386

**WINDY HILL ROAD
CROSS SECTIONS**

GLO Contract# 19-280-000-B779

DESIGN BY: AM
DRAWN BY: AM
CHECKED BY: ZR
APPROVED BY:
PROJECT NO: 2173.2001
DATE: 7/10/2020

SCALE
HORIZONTAL: 1"=20'
VERTICAL: 1"=10'
SHEET: 11 OF 13
PAGE: 162

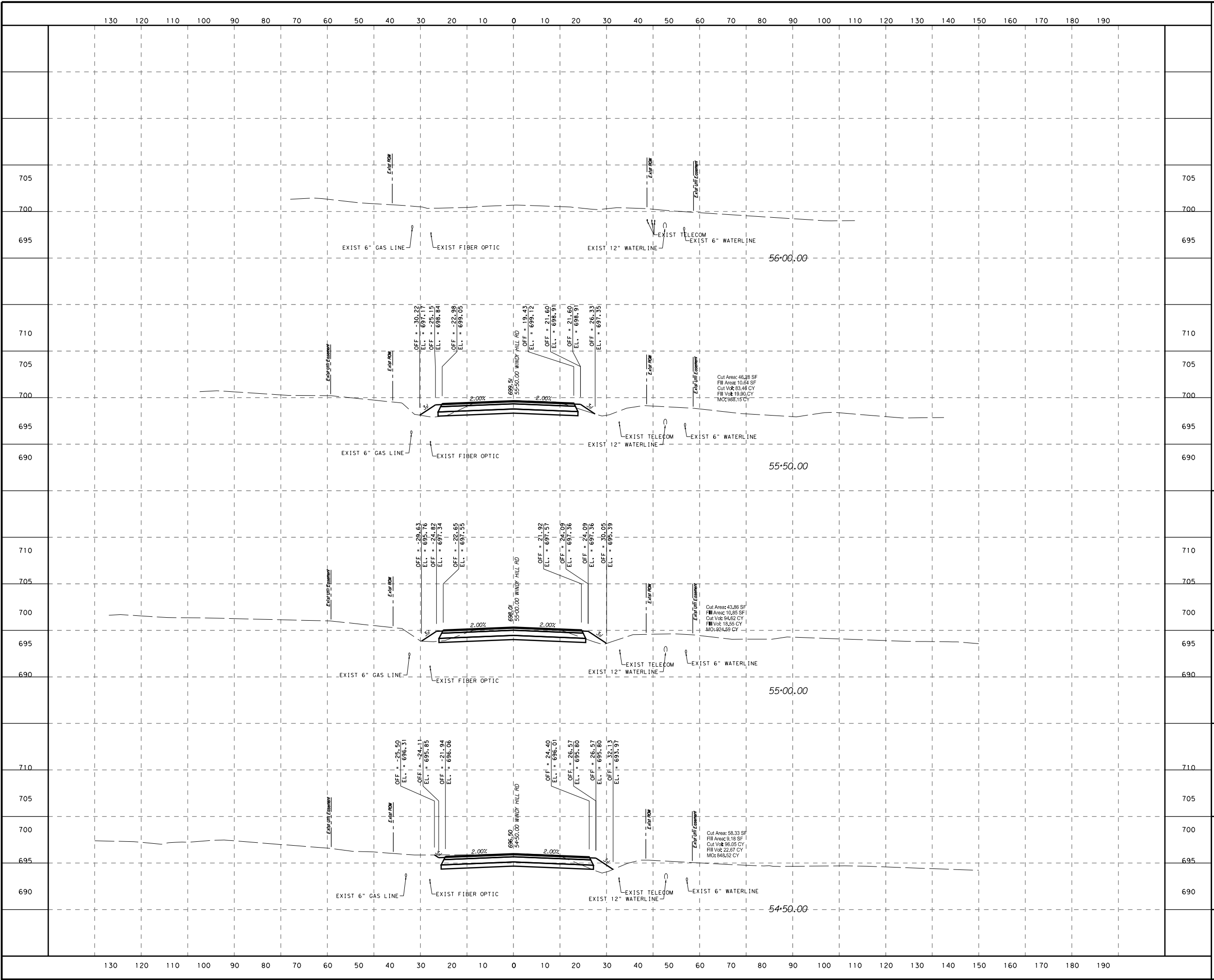


LJA Engineering, Inc.
FRN - F-1386

**WINDY HILL ROAD
CROSS SECTIONS**

GLO Contract# 19-280-000-B779

DESIGN BY:	AM	SCALE
DRAWN BY:	AM	HORIZONTAL: 1"=20'
CHECKED BY:	ZR	VERTICAL: 1"=10'
APPROVED BY:		SHEET: 12 OF 13
PROJECT NO:	2173.2001	PAGE: 163
DATE:	7/10/2020	



LJA Engineering, Inc.
FRN - F-1386

**WINDY HILL ROAD
CROSS SECTIONS**

GLO Contract# 19-280-000-B779

DESIGN BY: AM
DRAWN BY: AM
CHECKED BY: ZR
APPROVED BY:
PROJECT NO: 2173.2001
DATE: 7/10/2020

SCALE
HORIZONTAL: 1"=20'
VERTICAL: 1"=10'
SHEET: 13 OF 13
PAGE: 164

TAB 6

ATTACHMENTS

ATTACHMENT 1

Airport Clear Zones and Accident Potential Zones

- FAA - Maps
- NEPAassist Transportation Mapping

Airport Hazards (CEST and EA)

General policy	Legislation	Regulation
It is HUD's policy to apply standards to prevent incompatible development around civil airports and military airfields.		24 CFR Part 51 Subpart D
References		
https://www.hudexchange.info/environmental-review/airport-hazards		

1. To ensure compatible land use development, you must determine your site's proximity to civil and military airports. Is your project within 15,000 feet of a military airport or 2,500 feet of a civilian airport?

No → *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide a map showing that the site is not within the applicable distances to a military or civilian airport.*

Yes → *Continue to Question 2.*

2. Is your project located within a Runway Potential Zone/Clear Zone (RPZ/CZ) or Accident Potential Zone (APZ)?

Yes, project is in an APZ → *Continue to Question 3.*

Yes, project is an RPZ/CZ → *Project cannot proceed at this location.*

No, project is not within an APZ or RPZ/CZ

→ *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide a map showing that the site is not within either zone.*

3. Is the project in conformance with DOD guidelines for APZ?

Yes, project is consistent with DOD guidelines without further action.

Explain how you determined that the project is consistent:

→ *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide any documentation supporting this determination.*

No, the project cannot be brought into conformance with DOD guidelines and has not been approved. → *Project cannot proceed at this location.*

Project is not consistent with DOD guidelines, but it has been approved by Certifying Officer or HUD Approving Official.

Explain approval process:

If mitigation measures have been or will be taken, explain in detail the proposed measures that must be implemented to mitigate for the impact or effect, including the timeline for implementation.

→ *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide any documentation supporting this determination.*

Worksheet Summary

Compliance Determination

Provide a clear description of your determination and a synopsis of the information that it was based on, such as:

- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your region

No civilian airports within 2500 lf or military airports within 15,000 lf of a military airport.

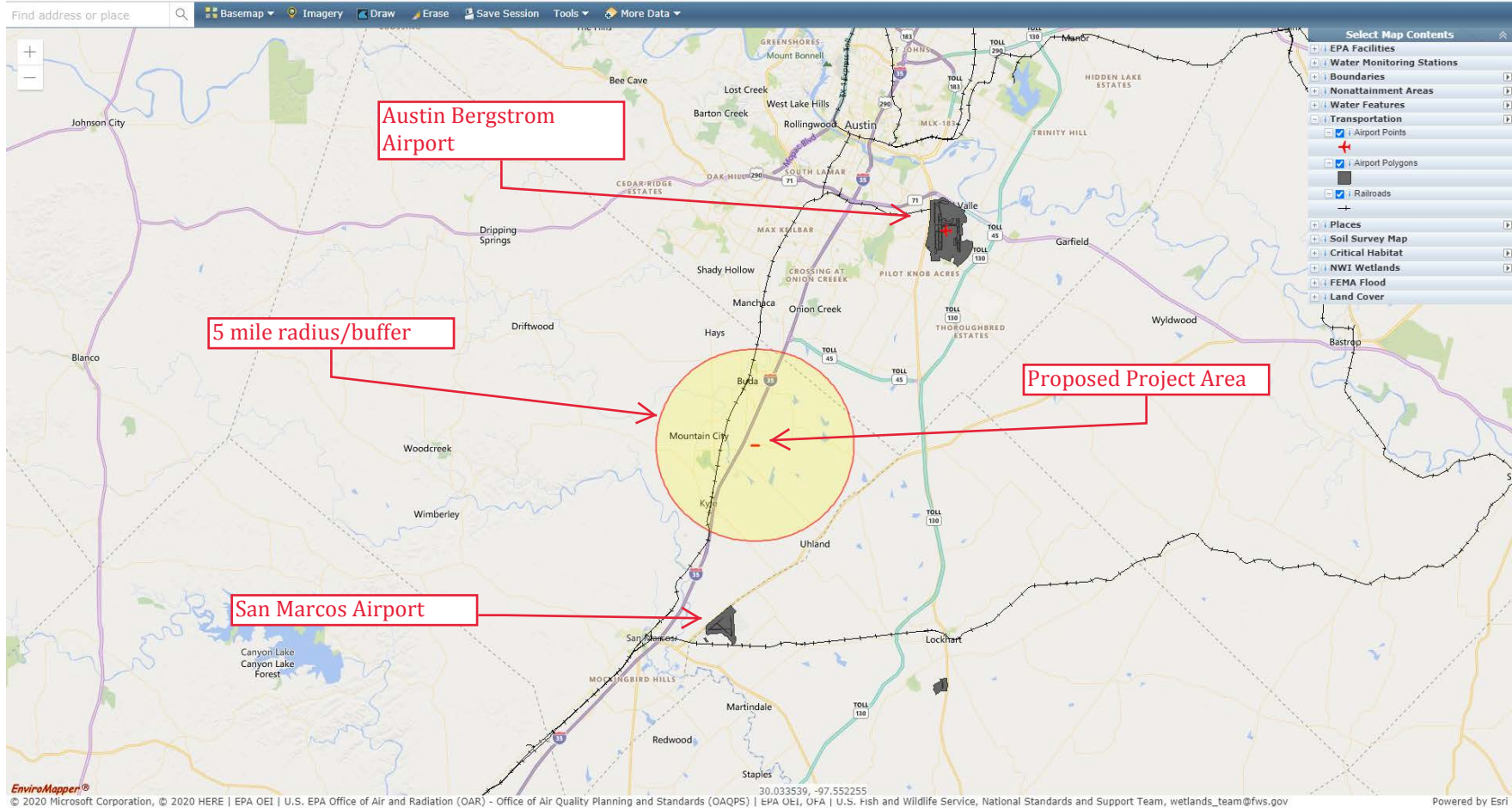
See NEPAssist mapping - Tab 6, Attachment 1

City of Kyle
GLO Contract 19-280-000-B779
B-16-DH-48-0001

Are formal compliance steps or mitigation required?



Yes

No



NEPAssist Mapping for Airports within 5 miles of the project area.

No civilian airports within 2500 lf or military airports within 15,000 lf of a military airport.

Client Name	City of Kyle	 Future Link Technologies 
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709
Map Information	General Location Maps	512-443-4100
Date	July 20	Environmental Service Provider

ATTACHMENT 2

Coastal Barrier Resources (When Needed)

- John H. Chafee Coastal Barrier Resource System Map

Coastal Barrier Resources (CEST and EA)

General requirements	Legislation	Regulation
HUD financial assistance may not be used for most activities in units of the Coastal Barrier Resources System (CBRS). See 16 USC 3504 for limitations on federal expenditures affecting the CBRS.	Coastal Barrier Resources Act (CBRA) of 1982, as amended by the Coastal Barrier Improvement Act of 1990 (16 USC 3501)	
References		
https://www.hudexchange.info/environmental-review/coastal-barrier-resources		

Projects located in the following states must complete this form.

Alabama	Georgia	Massachusetts	New Jersey	Puerto Rico	Virgin Islands
Connecticut	Louisiana	Michigan	New York	Rhode Island	Virginia
Delaware	Maine	Minnesota	North Carolina	South Carolina	Wisconsin
Florida	Maryland	Mississippi	Ohio	Texas	

1. Is the project located in a CBRS Unit?

- No → *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide a map showing that the site is not within a CBRS Unit.*
- Yes → *Continue to Question 2.*

Federal assistance for most activities may not be used at this location. You must either choose an alternate site or cancel the project. In very rare cases, federal monies can be spent within CBRS units for certain exempted activities (e.g., a nature trail), after consultation with the Fish and Wildlife Service (FWS) (see [16 USC 3505](#) for exceptions to limitations on expenditures).

2. Indicate your selected course of action.

- After consultation with the FWS the project was given approval to continue
→ *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide a map and documentation of a FWS approval.*
- Project was not given approval
Project cannot proceed at this location.

Worksheet Summary

Compliance Determination

Provide a clear description of your determination and a synopsis of the information that it was based on, such as:

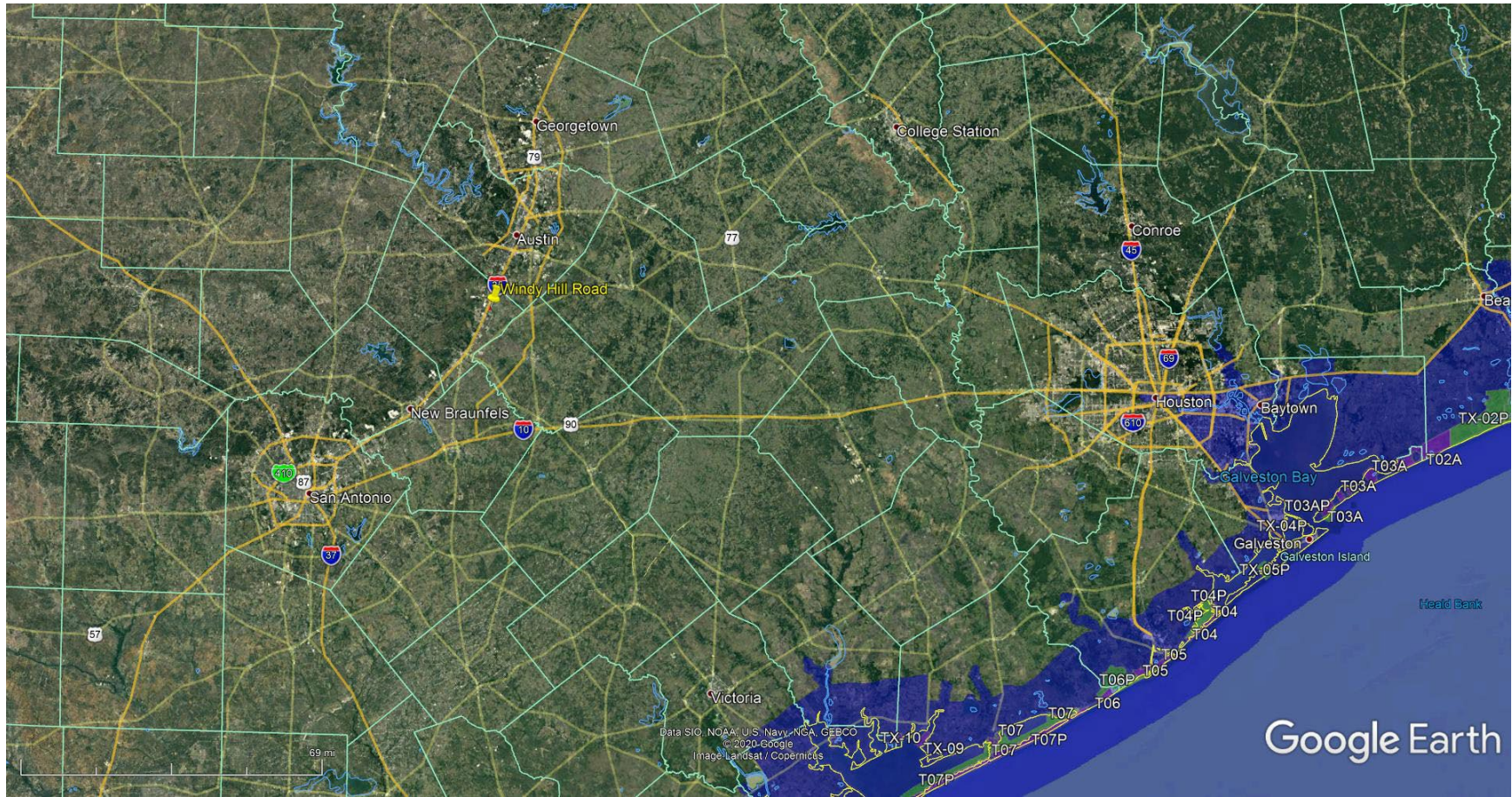
- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your region

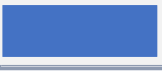


The project is located in Kyle Texas which is located in central Texas. See Tab 5 for general location maps. The project is consistent with this item.


Are formal compliance steps or mitigation required?

Yes

No



-  Coastal Management Zone (CMZ)
-  Coastal Barrier Resource Area (CBRA)
-  Project not located within the Coastal Management Zone or CBRA

Client Name	City of Kyle	Future Link Technologies 
Contract #	GLO Contract 19-280-000-B779; B-16-DH-48-0001	225 Commons Ford Rd, Suite 123 Austin, TX 78733
Map Information	Texas General Land Office Coastal Maps	512-443-4100
Date	July 20	Environmental Service Provider

ATTACHMENT 3

Flood Insurance

- Federal Emergency Management Agency (FEMA)
Documentation of National Flood Insurance Program

Flood Insurance (CEST and EA)

General requirements	Legislation	Regulation
Certain types of federal financial assistance may not be used in floodplains unless the community participates in National Flood Insurance Program and flood insurance is both obtained and maintained.	Flood Disaster Protection Act of 1973 as amended (42 USC 4001-4128)	24 CFR 50.4(b)(1) and 24 CFR 58.6(a) and (b); 24 CFR 55.1(b).
Reference		
https://www.hudexchange.info/environmental-review/flood-insurance		

1. Does this project involve financial assistance for construction, rehabilitation, or acquisition of a mobile home, building, or insurable personal property?

No. This project does not require flood insurance or is excepted from flood insurance. →
Continue to the Worksheet Summary.

Yes → *Continue to Question 2.*

2. Provide a FEMA/FIRM map showing the site.

The Federal Emergency Management Agency (FEMA) designates floodplains. The [FEMA Map Service Center](#) provides this information in the form of FEMA Flood Insurance Rate Maps (FIRMs). For projects in areas not mapped by FEMA, use the best available information to determine floodplain information. Include documentation, including a discussion of why this is the best available information for the site. Provide FEMA/FIRM floodplain zone designation, panel number, and date within your documentation.

Is the structure, part of the structure, or insurable property located in a FEMA-designated Special Flood Hazard Area?

No → *Continue to the Worksheet Summary.*

Yes → *Continue to Question 3.*

3. Is the community participating in the National Flood Insurance Program or has less than one year passed since FEMA notification of Special Flood Hazards?

Yes, the community is participating in the National Flood Insurance Program.

For loans, loan insurance or loan guarantees, flood insurance coverage must be continued for the term of the loan. For grants and other non-loan forms of financial assistance, flood insurance coverage must be continued for the life of the building irrespective of the transfer of ownership. The amount of coverage must equal the total project cost or the maximum coverage limit of the National Flood Insurance Program, whichever is less

Provide a copy of the flood insurance policy declaration or a paid receipt for the current annual flood insurance premium and a copy of the application for flood insurance.

→ *Continue to the Worksheet Summary.*

- Yes, less than one year has passed since FEMA notification of Special Flood Hazards. If less than one year has passed since notification of Special Flood Hazards, no flood Insurance is required.

→ *Continue to the Worksheet Summary.*

- No. The community is not participating, or its participation has been suspended.

Federal assistance may not be used at this location. Cancel the project at this location.

Worksheet Summary

Compliance Determination

Provide a clear description of your determination and a synopsis of the information that it was based on, such as:

- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your region

The project will not require flood insurance, but Kyle participates in the National Flood Insurance Program.
<http://fema.gov/flood-insurance/work-with-nfip-community-status-book/>

Are formal compliance steps or mitigation required?

Yes

No

STATUTES EXECUTIVE ORDERS AND REGULATIONS LISTED AT 24 CFR 50.4 & 58.5

ATTACHMENT 4

Air Quality

- TCEQ or NEPAssist Nonattainment Area Mapping
- Texas Air Quality Control Measures
- Air Pollutant Watch List

Air Quality (CEST and EA)

General Requirements	Legislation	Regulation
The Clean Air Act is administered by the U.S. Environmental Protection Agency (EPA), which sets national standards on ambient pollutants. In addition, the Clean Air Act is administered by States, which must develop State Implementation Plans (SIPs) to regulate their state air quality. Projects funded by HUD must demonstrate that they conform to the appropriate SIP.	Clean Air Act (42 USC 7401 et seq.) as amended particularly Section 176(c) and (d) (42 USC 7506(c) and (d))	40 CFR Parts 6, 51 and 93
Reference		
https://www.hudexchange.info/environmental-review/air-quality		

Scope of Work

- 1. Does your project include new construction or conversion of land use facilitating the development of public, commercial, or industrial facilities OR five or more dwelling units?**

Yes

→ Continue to Question 2.

No

Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide any documents used to make your determination.

Air Quality Attainment Status of Project's County or Air Quality Management District

- 2. Is your project's air quality management district or county in non-attainment or maintenance status for any criteria pollutants?**

Follow the link below to determine compliance status of project county or air quality management district:

<http://www.epa.gov/oaqps001/greenbk/>

No, project's county or air quality management district is in attainment status for all criteria pollutants

→ Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide any documents used to make your determination.

Yes, project's management district or county is in non-attainment or maintenance status for one or more criteria pollutants.

Describe the findings:

→ Continue to Question 3.

3. Determine the estimated emissions levels of your project for each of those criteria pollutants that are in non-attainment or maintenance status on your project area. Will your project exceed any of the *de minimis* or *threshold* emissions levels of non-attainment and maintenance level pollutants or exceed the screening levels established by the state or air quality management district?

No, the project will not exceed *de minimis* or threshold emissions levels or screening levels

→ Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Explain how you determined that the project would not exceed *de minimis* or threshold emissions.

Yes, the project exceeds *de minimis* emissions levels or screening levels.

→ Continue to Question 4. Explain how you determined that the project would not exceed *de minimis* or threshold emissions in the Worksheet Summary.

4. For the project to be brought into compliance with this section, all adverse impacts must be mitigated. Explain in detail the exact measures that must be implemented to mitigate for the impact or effect, including the timeline for implementation.

Worksheet Summary

Compliance Determination

Provide a clear description of your determination and a synopsis of the information that it was based on, such as:

- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your region

The project is consistent with this item. The project is considered a de minimus project as it is rehabilitating and existing roadway where drainage is problematic. Emissions will be temporary. This is further supported by the MOA between TXGLO and TCEQ. See Tab 6, Attachment 4.

Are formal compliance steps or mitigation required?

Yes

No



- [Home](#)
 - [Air](#)
 - [Land](#)
 - [Water](#)
 - [Licenses](#)
- [Permits](#)
 - [Reporting](#)



- [Data](#)
- [Forms](#)
- [Maps](#)
- [Public Notices](#)
- [Publications](#)
- [Records](#)
- [Webcasts](#)
- [TCEQ Online Services](#)
e-Pay,
Permits
Licenses,
Reporting
Filing,
Comments

[Home](#) / [Air Quality](#) / [SIP](#) / [Austin SIP](#)

>> [Questions or Comments:](#)
siprules@tceq.texas.gov

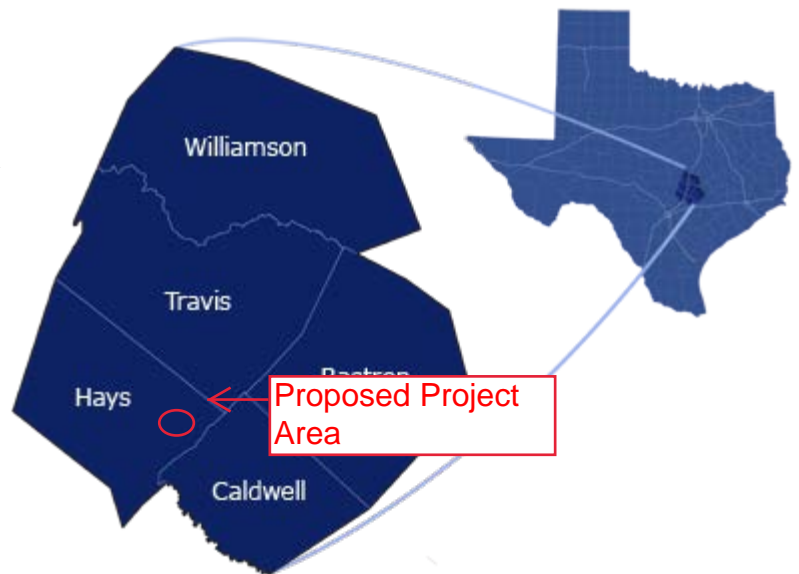
Austin-Round Rock and the State Implementation Plan

Information on the State Implementation Plan (SIP) to improve air quality in the Austin-Round Rock area and meet the requirements of the Federal Clean Air Act. The area includes Travis, Williamson, Bastrop, Hays, and Caldwell counties.

Attainment Status

Current air quality designations for the six criteria pollutants

- [Current Attainment Status](#)
- [Ozone Design Values](#)



Air Quality History

Austin air quality history from the 1990s to the present

[Ozone History](#)

Latest Activities

Information about the latest events and activities related to Austin and the SIP

- [Cleanups, Remediation](#)
- [Emergency Response](#)
- [Licensing](#)
- [Permits, Registration](#)
- [Preventing Pollution](#)
- [Recycling](#)
- [Reporting](#)
- [Rules](#)

[How are we doing? Take our customer satisfaction](#)

survey

- [Latest Ozone Planning Activities](#)

Air Quality Plans

Adopted SIP revisions and agreements from the 1970s to the present

- [Current Ozone Air Quality Plan](#)
- [Complete List of Texas SIP Revisions](#) (see *AUS* column)

Air Quality Control Measures

Information on air quality control measures implemented in Texas

- [Texas Air Quality Rules](#)
 - [Stationary Source Rules for the Austin-Round Rock Area](#)

Contact Information and Related Links

How to contact TCEQ SIP staff, local air quality planning groups, and other helpful links

[Home](#)

[About Us](#)

[Online](#)

[Services](#)

[Environmental](#)

[Emergency](#)

For TCEQ
Employees

[Connect With](#)

[Us](#)

[Contact Us](#)

[Working With](#)

[Us](#)



[Programs](#)

[Air](#)

[Land](#)

[Water](#)

[Permits](#)

[Licenses](#)

[Reporting](#)

[Documents](#)

[Data and](#)

[Records](#)

[Rules](#)

[Forms](#)

[Publications](#)

[Maps](#)

[Public Notices](#)

[Site Help](#) | [Disclaimer](#) | [Site Policies](#) | [Accessibility](#) | [Our Compact with Texans](#) | [TCEQ Homeland Security](#)

Statewide Links: [Texas.gov](#) | [Texas Homeland Security](#) | [TRAIL Statewide Archive](#) | [Texas Veterans Portal](#)

© 2002-2018 Texas Commission on Environmental Quality

Last Modified 2018-10-15



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

(<https://www.tceq.texas.gov>)

Home (<https://www.tceq.texas.gov>) / Air Quality (<https://www.tceq.texas.gov/airquality>) / SIP (<https://www.tceq.texas.gov/airquality/sip>) / Austin SIP (<https://www.tceq.texas.gov/airquality/sip/aus>) / Austin-Round Rock: Current Attainment Status

Austin-Round Rock: Current Attainment Status

Compliance of Austin-Round Rock (ARR) area counties with the National Ambient Air Quality Standards (NAAQS).

Note: This table is intended to provide a listing of designations and classifications for current, active NAAQS. While NAAQS which have been revoked by the EPA do not appear in this table, some anti-backsliding obligations may continue to apply for revoked standards. This table is to be used for informational purposes only and should not be used to determine regulatory requirements in any of the counties listed.

Austin-Round Rock Area: Attainment Status by Pollutant

Pollutant	Primary NAAQS	Averaging Period	Designation	Counties	Attainment Deadline
Ozone (O ₃)*	0.070 ppm (2015 standard)	8-hour	Attainment/ Unclassifiable (Effective Jan 16, 2018)	Travis, Williamson, Bastrop, Hays, Caldwell	
	0.075 ppm (2008 standard)	8-hour	Unclassifiable/ Attainment	Travis, Williamson, Bastrop, Hays, Caldwell	
Lead (Pb)	0.15 µg/m ³ (2008 standard)	Rolling 3- Month Average	Unclassifiable/ Attainment		
Carbon Monoxide (CO)	9 ppm	8-hour	Unclassifiable/ Attainment		
	35 ppm	1-hour	Unclassifiable/ Attainment		

Nitrogen Dioxide (NO ₂)	0.053 ppm	Annual	Unclassifiable/Attainment
	100 ppb	1-hour	Unclassifiable/Attainment
Particulate Matter (PM ₁₀)	150 µg/m ³	24-hour	Unclassifiable/Attainment
Particulate Matter (PM _{2.5})	12.0 µg/m ³ (2012 standard)	Annual (Arithmetic Mean)	Unclassifiable/Attainment
	15.0 µg/m ³ (1997 standard)	Annual (Arithmetic Mean)	Unclassifiable/Attainment
	35 µg/m ³	24-hour	Unclassifiable/Attainment
Sulfur Dioxide (SO ₂)	0.03 ppm**	Annual (Arithmetic Mean)	Unclassifiable/Attainment
	0.14 ppm**	24-hour	Unclassifiable/Attainment
	75 ppb	1-hour	Attainment/ Unclassifiable

*The United States Environmental Protection Agency (EPA) revoked the one-hour ozone standard and the 1997 eight-hour ozone standard in all areas, although some areas have continuing obligations under these standards. See **ozone history** (<https://www.tceq.texas.gov/airquality/sip/aus/aus-ozone-history>) for more information.

**The standard is scheduled to be revoked one year after the effective date of final designations for the 75 ppb standard.

For more information on attainment status, visit the EPA's **Green Book** (<https://www.epa.gov/green-book>) webpage regarding nonattainment areas for criteria pollutants.

Austin–Round Rock Attainment Areas

2015 Eight-Hour Ozone Standard Designations: Attainment/Unclassifiable, effective January 16, 2018 (**82 FR 54232** (<https://www.gpo.gov/fdsys/pkg/FR-2017-11-16/pdf/2017-24640.pdf>))

On October 1, 2015, the EPA lowered the primary and secondary eight-hour ozone NAAQS to 0.070 parts per million (**80 FR 65292** (<https://www.gpo.gov/fdsys/pkg/FR-2015-10-26/pdf/2015-26594.pdf>)). Travis, Williamson, Bastrop, Hays, and Caldwell Counties were designated attainment/unclassifiable under the 2015 eight-hour ozone NAAQS, effective January 16, 2018.

2008 Eight-Hour Ozone Standard Designations: Unclassifiable/Attainment, effective July 20, 2012 (**77 FR 30088** (<http://www.gpo.gov/fdsys/pkg/FR-2012-05-21/pdf/2012-11618.pdf>))

On March 27, 2008, the EPA lowered the primary and secondary eight-hour ozone NAAQS to 0.075 parts per million (ppm) (**73 FR 16436** (<http://edocket.access.gpo.gov/2008/pdf/E8-5645.pdf>)). Travis, Williamson, Bastrop, Hays, and Caldwell Counties were designated unclassifiable/attainment under the 2008 eight-hour ozone NAAQS, effective July 20, 2012.

1997 Eight-Hour Ozone Standard Designations: Attainment, April 30, 2004 (**69 FR 23858** (<http://www.gpo.gov/fdsys/pkg/FR-2004-04-30/pdf/04-9152.pdf>))

Counties: Travis, Williamson, Bastrop, Hays, and Caldwell

On December 18, 2002, local governments in the ARR area entered into a voluntary **Early Action Compact (EAC)** (<https://www.tceq.texas.gov/airquality/sip/eac.html>) agreement with the TCEQ and the EPA for the 1997 eight-hour ozone standard. On March 31, 2004, a final EAC plan was submitted to the TCEQ for incorporation into the State Implementation Plan. On November 17, 2004, the commission adopted the EAC attainment demonstrations for **Austin, San Antonio, and Northeast Texas** (/assets/public/implementation/air/sip/sipdocs/2004-EACs/EACs_Nov2004_archive.pdf), and, at the request of the Austin and San Antonio areas, rule changes to 30 TAC 114 and 115.

National Ambient Air Quality Standards

The EPA has set **National Ambient Air Quality Standards** (<https://www.epa.gov/criteria-air-pollutants/naaqs-table>) (NAAQS) for six principal criteria pollutants: ground-level ozone, lead, carbon monoxide, nitrogen dioxide, sulfur dioxide, and particulate matter.

No later than one year after promulgation of a new or revised NAAQS for any pollutant, the governor must submit designation recommendations to the EPA for all areas of the state. The EPA must then promulgate the designations within two years of promulgation of the revised NAAQS. Areas that do not meet (or contribute to ambient air quality in a nearby area that does not meet) the NAAQS are designated nonattainment. Areas that meet the NAAQS are designated attainment; and areas that cannot be classified based on the available information, unclassifiable.

For ozone, the Federal Clean Air Act establishes nonattainment area classifications ranked according to the severity of the area's air pollution problem. These classifications—*marginal*, *moderate*, *serious*, *severe*, and *extreme*—translate to varying requirements with which Texas and nonattainment areas must comply.

Jon Niermann, *Chairman*
Emily Lindley, *Commissioner*
Bobby Janecka, *Commissioner*
Toby Baker, *Executive Director*



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

September 23, 2019

Leslie Bradley
Acting Regional Administrator
U.S. Department of Housing and Urban Development
Fort Worth Regional Office
801 Cherry Street, Unit #45
Suite 2500
Fort Worth, TX 76102

Subject: Finding on Air Quality General Conformity Review

Dear Ms. Bradley:

The Texas Commission on Environmental Quality (TCEQ) reviewed the federal regulations at 40 Code of Federal Regulations (CFR) Part 93, Subpart B related to general conformity of federal actions with air quality state implementation plans. A federal action for which emissions are considered to be *de minimis* is exempt from general conformity requirements (40 CFR §93.153). The TCEQ also reviewed general conformity guidance documents issued by the United States Environmental Protection Agency (EPA), which provide that emissions analyses for similar, historical projects may be used to assess general conformity applicability.¹

General conformity *de minimis* thresholds, listed at 40 CFR §93.153(b)(1), are based on criteria pollutant and classification, with lower thresholds associated with higher nonattainment classifications. While general conformity applies to all of the criteria pollutants for which the EPA sets National Ambient Air Quality Standards (NAAQS), this finding applies solely to ozone. Four areas in Texas are designated nonattainment or maintenance for the 2008 and/or the 2015 eight-hour ozone NAAQS. As of September 23, 2019, the effective date of the EPA's reclassification of the Dallas-Fort Worth and Houston-Galveston-Brazoria nonattainment areas to 'serious' for the 2008 eight-hour ozone NAAQS (84 FR 44238), general conformity *de minimis* is reduced to 50 tons per year (tpy) of nitrogen oxides (NO_x) or volatile organic compounds (VOC) emissions, the lowest general conformity ozone *de minimis* threshold for any area in Texas.

Based on federal general conformity regulations and EPA guidance, a federal agency may determine that an action is exempt from general conformity requirements if it concludes the action to be *de minimis* based on comparison to a previous project that is similar in size and scope to the proposed action and for which an emissions analysis was completed. Thus, a proposed federal action that is smaller in size and scope to a similar, historical project for which an emissions analysis was completed may also be determined to be *de minimis* and, therefore, exempt from federal general conformity requirements.

The TCEQ reviewed several historical projects determined by HUD Region VI to be categorically similar to HUD-funded projects to assess the methodologies used to calculate NO_x and VOC emissions. Attachment A: *Finding on Air Quality General Conformity Review* comprises a listing

¹ See Section 3.2 *Emissions Calculations* of the EPA's "General Conformity Training Modules," <https://www.epa.gov/general-conformity/general-conformity-training-modules>, accessed August 6, 2019.
P.O. Box 13087 • Austin, Texas 78711-3087 • 512-239-1000 • tceq.texas.gov

Ms. Bradley
Page 2
September 23, 2019

of the historical projects found by the TCEQ to contain adequate emissions analysis documentation. The listing is organized according to project categories provided by HUD staff.

The TCEQ finds that proposed HUD-funded projects in Texas that are categorically similar to the historical projects listed in Attachment A and that are comparable or smaller in scope and size are not expected to exceed the 50 tpy *de minimis* threshold for serious ozone nonattainment areas; therefore, a general conformity determination would not be required. Similarly, the TCEQ finds that HUD-funded projects that fall within the project categories listed in Attachment A and that qualify as HUD categorical exclusions under 24 CFR §58.35 are not expected to, under normal circumstances, exceed the 50 tpy *de minimis* threshold for serious ozone nonattainment areas; therefore, a general conformity determination would not be required. However, it is a federal agency's responsibility to comply with the National Environmental Policy Act and federal general conformity requirements.

This finding is valid until September 23, 2021, two years from signature, unless a final EPA action changes the relevant general conformity *de minimis* thresholds in Texas in such a way as to invalidate this finding. When expired or invalidated by EPA action, the finding and project categories and historical analyses included in Attachment A will be revisited to assess whether updates are necessary.

Sincerely,



Donna F. Huff, Director
Air Quality Division
Texas Commission on Environmental Quality

Attachment

cc: Mr. Ken McQueen, U.S. Environmental Protection Agency Region 6 Administrator

Attachment A: Finding on Air Quality General Conformity Review

The following is a listing of historical projects for use by Region VI of the United States Department of Housing and Urban Development (HUD) to determine whether projects in Texas would be considered by the Texas Commission on Environmental Quality (TCEQ) to be *de minimis* for air quality general conformity purposes. The TCEQ finds that projects that are categorically similar to these historical projects and are comparable or smaller in scope and size are not expected to exceed the 50 tons per year (tpy) *de minimis* threshold for serious ozone nonattainment areas; therefore, a general conformity determination would not be required. Similarly, the TCEQ finds that HUD-funded projects that fall within these HUD project categories and that qualify as HUD categorical exclusions under 24 CFR §58.35 are not expected to, under normal circumstances, exceed the 50 tpy *de minimis* threshold for serious ozone nonattainment areas; therefore, a general conformity determination would not be required. However, it is a federal agency's responsibility to comply with the National Environmental Policy Act and federal general conformity requirements.

WATER/WASTEWATER IMPROVEMENTS

- Palos Verdes Recycled Water Pipeline Project, 2017, http://www.westbasin.org/sites/default/files/PV_Pipeline_Project.pdf, accessed August 26, 2019.
- Sacramento Regional County Sanitation District's South Sacramento County Agriculture and Habitat Lands Recycled Water Program, 2017, https://www.regionalsan.com/sites/main/files/file-attachments/feir_southcountygag_2-10-2017002_0_0.pdf, accessed August 26, 2019.
- Las Vegas Paiute Tribe Snow Mountain Reservation Public Water System Improvement Project, 2017, https://www.epa.gov/sites/production/files/2017-08/documents/environmental_assessment_for_the_las_vegas_paiute_tribe_snow_mountain_reservation_public_water_system_improvement_project.pdf, accessed August 26, 2019.
- Bay Bridge Pump Station and Force Mains Replacement Project (Project No. SP-178), 2017, <https://www.ocsd.com/Home/ShowDocument?id=19600>, accessed August 26, 2019.
- Regional Salinity Management Project - Hueneme Outfall Replacement Project (SCH No. 2007021026), 2007, <http://www.calleguas.com/images/docs-documents-reports/hofseircompdoc.pdf>, accessed August 26, 2019.

FLOOD AND DRAINAGE IMPROVEMENTS

- Termino Avenue Drain Project (SCH No. 2000111022), 2008, http://www.ladpw.org/pdd/reports/Termino_EIR08_Final.pdf, accessed August 26, 2019.
- Fagatogo Stormwater Modification, American Samoa Disaster Relief Office (FEMA-1506-DR-AS, HMGP #1506-4), 2008, https://www.fema.gov/media-library-data/20130726-1626-20490-7354/fagatogo_final_ea.pdf, accessed August 26, 2019.
- Wildwood Creek Detention Basins, City of Yucaipa (PDMC-PJ-09-CA-2005-036), 2007, https://www.fema.gov/media-library-data/20130726-1622-20490-8825/yucaipa_sea.pdf, accessed August 26, 2019.
- Alamo Creek and Ulatris Creek Detention Basins Project (SCH No. 2010022023), 2011, <https://www.ci.vacaville.ca.us/home/showdocument?id=1154>, accessed August 26, 2019.
- Lawton Interceptor Protection, City of Reno (FEMA-1629-DR-NV, HMGP 1629-4-4), 2010, https://www.fema.gov/media-library-data/20130726-1743-25045-9888/lawton_interceptor_ea.pdf, accessed August 26, 2019.

Period of Applicability: September 23, 2019 to September 23, 2021

STREET IMPROVEMENTS

Century Boulevard Extension Project Between Grape Street and Alameda Street, City of Los Angeles (CML-5006(810)), 2016,
<http://eng2.lacity.org/techdocs/emg/docs/CenturyBoulevardExtension/EnvironmentalAssessment.pdf>, accessed August 26, 2019.

PUBLIC FACILITIES

Los Angeles Department of Water and Power West Los Angeles District Headquarters Administration Building, 2005,
https://www.ladwp.com/cs/idcplg?IdcService=GET_FILE&dDocName=LADWP004459&RevisionSelectionMethod=LatestReleased, accessed August 26, 2019.

Hollywood-La Kretz Customer Service and Community Center Project, 2011,
https://www.ladwp.com/cs/idcplg?IdcService=GET_FILE&dDocName=LADWP003782&RevisionSelectionMethod=LatestReleased, accessed August 26, 2019.

HOUSING

Reseda Boulevard Mixed-Use Project, City of Los Angeles (Case No. ENV-2015-3703-MND), 2018,
<http://planning.lacity.org/StaffRpt/InitialRpts/CPC-2015-3702.PDF>, accessed August 26, 2019.

The Alexan Project, City of Los Angeles (Case No. ENV-2006-6302-MND-REC 1), 2016,
<http://planning.lacity.org/StaffRpt/MND/ENV-2006-6302-MND-REC1.pdf>, accessed August 26, 2019.

Sepulveda LLC Apartments Project, City of Los Angeles (Case No. ENV-2016-2752-MND), 2016,
https://planning.lacity.org/staffrpt/mnd/Pub_010517/ENV-2016-2752.pdf, accessed August 26, 2019.

Morgan Knolls Subdivision, Placer County, California, 2018,
<https://www.placer.ca.gov/DocumentCenter/View/32554/Morgan-Knolls-Tentative-Subdivision-Map-and-Variance---Extension-of-Time-20130316-PDF>, accessed August 26, 2019.

Quail Cove Subdivision Project, Antioch, California, 2018,
<https://www.antiochca.gov/fc/community-development/planning/QuailCove/QuailCoveISMND.pdf>, accessed August 26, 2019.

13-Lot Residential Development (APN 224-142-01) and Annexation, Escondido, California, 2014,
[https://www.escondido.org/Data/Sites/1/media/PDFs/Planning/Pickering/Initial%20Study-MNDPickering2ResidentialAnnexationProject2014-06-17\(Final\).pdf](https://www.escondido.org/Data/Sites/1/media/PDFs/Planning/Pickering/Initial%20Study-MNDPickering2ResidentialAnnexationProject2014-06-17(Final).pdf), accessed August 26, 2019.

ATTACHMENT 5

Coastal Zone Management

- Texas Coastal Management Program Map
- Texas General Land Office Correspondence

Coastal Zone Management Act (CEST and EA)

General requirements	Legislation	Regulation
Federal assistance to applicant agencies for activities affecting any coastal use or resource is granted only when such activities are consistent with federally approved State Coastal Zone Management Act Plans.	Coastal Zone Management Act (16 USC 1451-1464), particularly section 307(c) and (d) (16 USC 1456(c) and (d))	15 CFR Part 930
References		
https://www.onecpd.info/environmental-review/coastal-zone-management		

Projects located in the following states must complete this form.

Alabama	Florida	Louisiana	Mississippi	Ohio	Texas
Alaska	Georgia	Maine	New Hampshire	Oregon	Virgin Islands
American Samona	Guam	Maryland	New Jersey	Pennsylvania	Virginia
California	Hawaii	Massachusetts	New York	Puerto Rico	Washington
Connecticut	Illinois	Michigan	North Carolina	Rhode Island	Wisconsin
Delaware	Indiana	Minnesota	Northern Mariana Islands	South Carolina	

1. Is the project located in, or does it affect, a Coastal Zone as defined in your state Coastal Management Plan?

Yes → Continue to Question 2.

No → Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide a map showing that the site is not within a Coastal Zone.

2. Does this project include activities that are subject to state review?

Yes → Continue to Question 3.

No → Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide documentation used to make your determination.

3. Has this project been determined to be consistent with the State Coastal Management Program?

Yes, with mitigation. → Continue to Question 4.

Yes, without mitigation. → Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide documentation used to make your determination.

No, project must be canceled.

Project cannot proceed at this location.

4. Explain in detail the proposed measures that must be implemented to mitigate for the impact or effect, including the timeline for implementation.

→ *Continue to the Worksheet Summary below. Provide documentation of the consultation (including the State Coastal Management Program letter of consistency) and any other documentation used to make your determination.*

Worksheet Summary

Compliance Determination

Provide a clear description of your determination and a synopsis of the information that it was based on, such as:

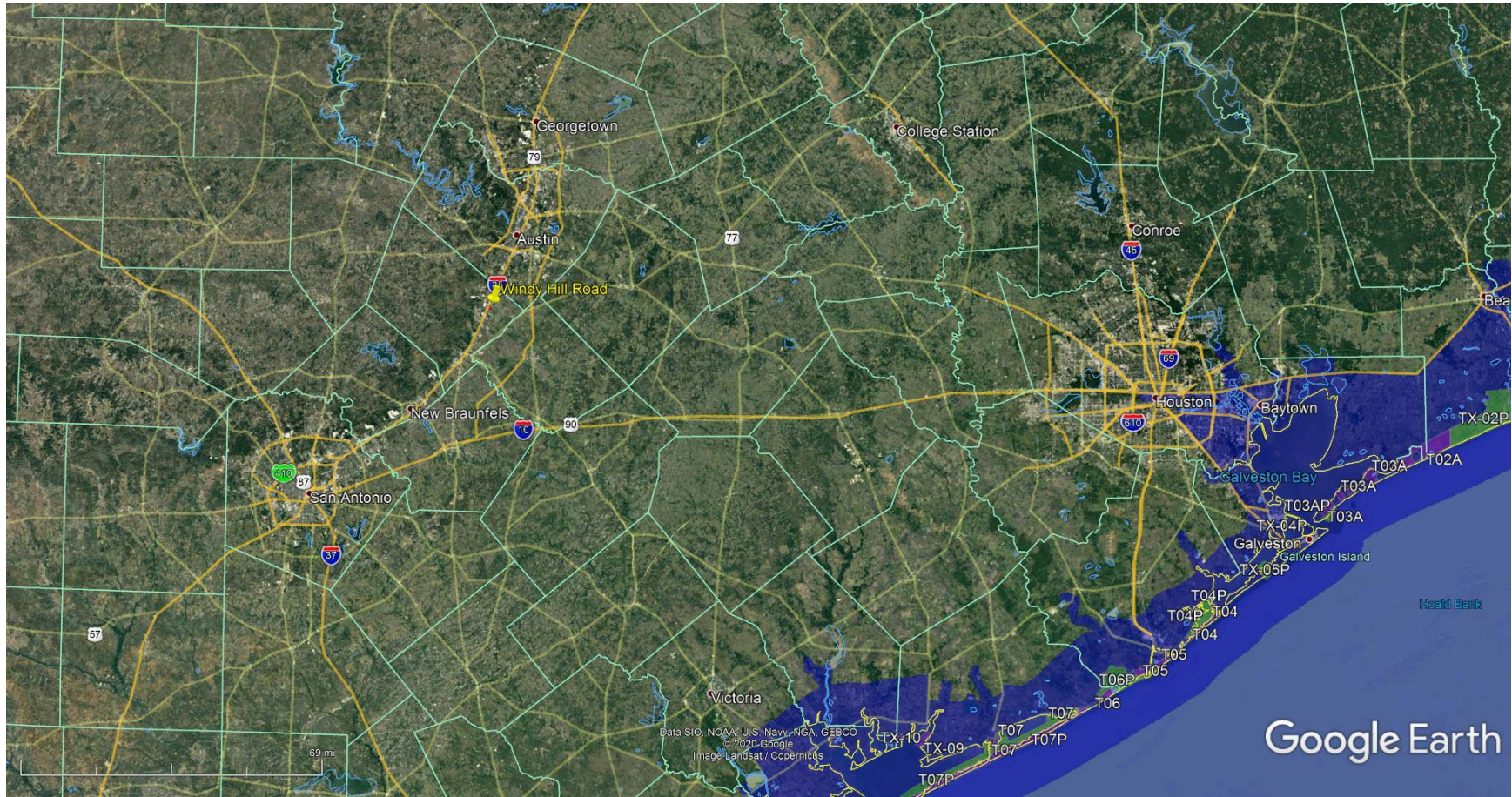
- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your region




The project area is located in central Texas approximately 140 miles east of the Texas Coast. See Tab6, Attachment 5.


Are formal compliance steps or mitigation required?

Yes

No



-  Coastal Management Zone (CMZ)
-  Coastal Barrier Resource Area (CBRA)
-  Project not located within the Coastal Management Zone or CBRA

Client Name	City of Kyle	Future Link Technologies 
Contract #	GLO Contract 19-280-000-B779; B-16-DH-48-0001	225 Commons Ford Rd, Suite 123 Austin, TX 78733
Map Information	Texas General Land Office Coastal Maps	512-443-4100
Date	July 20	Environmental Service Provider

ATTACHMENT 6

Contamination and Toxic Substances

Federal

US Environmental Protection Agency (EPA)

- EnviroMapper for Envirofacts and NEPASSIST -
(Listing of Regulated (RCRA) Facilities)
 - EPA RCRA Corrective Action Sites – Map
 - Brownfields MAP
- National Priorities Listing (NPL)

National Response Center

- Current Spills Report

State and Local Statutes

TCEQ Central Registry Database Listings

- Underground Injection Control Permits
- Radioactive Waste Storage & Processing Permits
- Brownfield Site Assessments
- Voluntary Cleanup Program
- Superfund Program
- Innocent Owner/Operator Program
- Industrial and Hazardous Waste Disposal Registration/Permits
- Industrial and Hazardous Waste Corrective Action Sites
- Petroleum Storage Tanks Registration & Mapping of Tanks
 - Underground Storage Tanks
- Leaking Petroleum Storage Tanks & Mapping of Tanks

Closed and Abandoned Landfills

Contamination and Toxic Substances (Multifamily and Non-Residential Properties)

General requirements	Legislation	Regulations
It is HUD policy that all properties that are being proposed for use in HUD programs be free of hazardous materials, contamination, toxic chemicals and gases, and radioactive substances, where a hazard could affect the health and safety of the occupants or conflict with the intended utilization of the property.		24 CFR 58.5(i)(2) 24 CFR 50.3(i)
Reference		
https://www.hudexchange.info/programs/environmental-review/site-contamination		

1. How was site contamination evaluated? ¹ Select all that apply.

- ASTM Phase I ESA
- ASTM Phase II ESA
- Remediation or clean-up plan
- ASTM Vapor Encroachment Screening
- None of the above

→ Provide documentation and reports and include an explanation of how site contamination was evaluated in the Worksheet Summary.

Continue to Question 2.

2. Were any on-site or nearby toxic, hazardous, or radioactive substances found that could affect the health and safety of project occupants or conflict with the intended use of the property? (Were any recognized environmental conditions or RECs identified in a Phase I ESA and confirmed in a Phase II ESA?)

- No

Explain:

Research was conducted of TCEQ Central Registry permit information as well as the NEPAssist (EPA Envirofacts data), Cleanups in My Community, and Capital Area Council of Government data. The information is mapped in Tab 6, Attachment 6. A site visit was conducted on 03/18/20. No known sites exist adjacent to the project. Prior to current developments of housing, retail, and warehouse storage the lands were agricultural in use.

¹ HUD regulations at 24 CFR § 58.5(i)(2)(ii) require that the environmental review for multifamily housing with five or more dwelling units or non-residential property include the evaluation of previous uses of the site or other evidence of contamination on or near the site. For acquisition and new construction of multifamily and nonresidential properties HUD strongly advises the review include an ASTM Phase I Environmental Site Assessment (ESA) to meet real estate transaction standards of due diligence and to help ensure compliance with HUD's toxic policy at 24 CFR §58.5(i) and 24 CFR §50.3(i). Also note that some HUD programs require an ASTM Phase I ESA.

→ *Based on the response, the review is in compliance with this section.
Continue to the Worksheet Summary below.*

Yes.

→ *Describe the findings, including any recognized environmental conditions (RECs), in Worksheet Summary below. Continue to Question 3.*

3. Mitigation

Document the mitigation needed according to the requirements of the appropriate federal, state, tribal, or local oversight agency. If the adverse environmental effects cannot be mitigated, then HUD assistance may not be used for the project at this site.

Can adverse environmental impacts be mitigated?

Adverse environmental impacts cannot feasibly be mitigated

→ Project cannot proceed at this location.

Yes, adverse environmental impacts can be eliminated through mitigation.

→ *Provide all mitigation requirements² and documents. Continue to Question 4.*

4. Describe how compliance was achieved. Include any of the following that apply: State Voluntary Clean-up Program, a No Further Action letter, use of engineering controls³, or use of institutional controls⁴.

² Mitigation requirements include all clean-up actions required by applicable federal, state, tribal, or local law. Additionally, provide, as applicable, the long-term operations and maintenance plan, Remedial Action Work Plan, and other equivalent documents.

³ Engineering controls are any physical mechanism used to contain or stabilize contamination or ensure the effectiveness of a remedial action. Engineering controls may include, without limitation, caps, covers, dikes, trenches, leachate collection systems, signs, fences, physical access controls, ground water monitoring systems and ground water containment systems including, without limitation, slurry walls and ground water pumping systems.

⁴ Institutional controls are mechanisms used to limit human activities at or near a contaminated site, or to ensure the effectiveness of the remedial action over time, when contaminants remain at a site at levels above the applicable remediation standard which would allow for unrestricted use of the property. Institutional controls may include structure, land, and natural resource use restrictions, well restriction areas, classification exception areas, deed notices, and declarations of environmental restrictions.

If a remediation plan or clean-up program was necessary, which standard does it follow?

- Complete removal
→ *Continue to the Worksheet Summary.*
- Risk-based corrective action (RBCA)
→ *Continue to the Worksheet Summary.*

Worksheet Summary

Compliance Determination

Provide a clear description of your determination and a synopsis of the information that it was based on, such as:

- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your region

The project is consistent with this item. Research of TCEQ data reflects one inactive Leaking PST site Tex Best Travel Center located approximately 2400 lf from the project site. No impact is expected due to the site is cleaned up and due to the long distance to the project area. One other Medical Waste registration is location approximately 1200 lf north on Purple Martin from the project. There are no enforcement issues or concerns with the site. No impacts is expected. Other research included state and federal searches for industrial & hazardous waste sites including corrective action sites and institutional controls, Petroleum Storage Tanks Underground and Above ground (PST), NPL (listed and delisted), Brownfields, Superfunds, spill data, current and closed landfills, medical waste, underground injection control, site discovery, and voluntary cleanup/innocent owner data. No sites were found within prescribed radii.

Are formal compliance steps or mitigation required?

- Yes
- No



Environmental and Technology Consulting

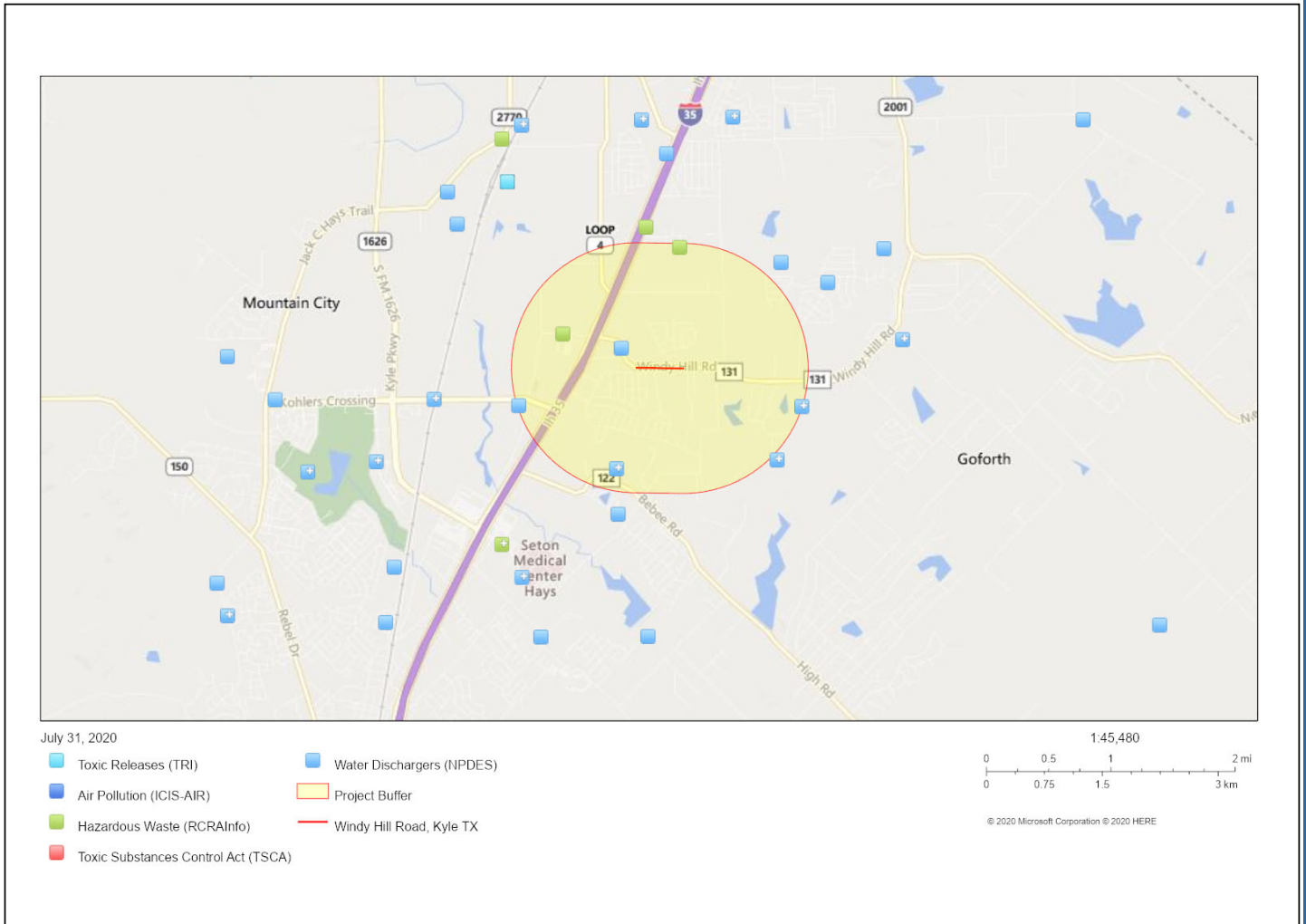
RE: Kyle - Windy Hill Road
Contract # B16DH480001
GLO # 19-280-000-B779

Research

Hazardous Materials Search Results – TCEQ Central Registry and EPA NEPAAssist and Cleanups in My Community

Database searched	Search Distance (in miles)	Number of Sites found
<i>Federal Databases</i>		
NPL site list	1.0	0
Delisted NPL site list	0.5	0
CERCLIS list	0.5	0
CERCLIS NFRAP site list	0.5	0
RCRA CORRACTS facilities list	1.0	0
RCRA non-CORRACTS TSD facilities list	0.5	0
RCRA generators list	property and adjoining properties	0
Institutional control/engineering control registries	property only	0
ERNS list	property only	0
<i>State/Tribal Databases</i>		
NPL	1.0	0
CERCLIS	0.5	0
Landfill and/or solid waste disposal site lists	0.5	1 – Medical Waste Site- No impact due to proximity
Leaking storage tank list	0.5	1 – Tex-Best Travel Center - .4 miles from project area (inactive)
Registered storage tank list	property and adjoining properties	0
Institutional control/engineering control registries	property only	0
Voluntary cleanup sites Owner/Operator	0.5	0
Brownfield sites	0.5	0
Current Spills Report www.nrc.uscg .	At Project location or within close proximity to Site	0

Windy Hill Road, Kyle TX

 Map


Geographic coordinates:

LINE (30.032006,-97.839982,30.031932,-97.833502)

with buffer 1 mile

Note: The information in the following reports is based on publicly available databases and web services. The National Report uses nationally available datasets and the State Reports use datasets available through the EPA Regions. Click on the hyperlinked question to view the data source and associated metadata.

 National Report 

Length of digitized line	0.39 mi
Within 1 mile of an Ozone 8-hr (1997 standard) Non-Attainment/Maintenance Area?	no
Within 1 mile of an Ozone 8-hr (2008 standard) Non-Attainment/Maintenance Area?	no
Within 1 mile of a Lead (2008 standard) Non-Attainment/Maintenance Area?	no
Within 1 mile of a SO ₂ 1-hr (2010 standard) Non-Attainment/Maintenance Area?	no
Within 1 mile of a PM _{2.5} 24-hr (2006 standard) Non-Attainment/Maintenance Area?	no
Within 1 mile of a PM _{2.5} Annual (1997 standard) Non-Attainment/Maintenance Area?	no
Within 1 mile of a PM _{2.5} Annual (2012 standard) Non-Attainment/Maintenance Area?	no
	no

Within 1 mile of a PM10 (1987 standard) Non-Attainment/Maintenance Area?	
Within 1 mile of a Federal Land?	no
Within 1 mile of an impaired stream?	no
Within 1 mile of an impaired waterbody?	no
Within 1 mile of a waterbody?	yes
Within 1 mile of a stream?	yes
Within 1 mile of an NWI wetland?	click here May take several minutes
Within 1 mile of a Brownfields site?	no
Within 1 mile of a Superfund site?	no
Within 1 mile of a Toxic Release Inventory (TRI) site?	no
Within 1 mile of a water discharger (NPDES)?	yes
Within 1 mile of a hazardous waste (RCRA) facility?	yes
Within 1 mile of an air emission facility?	no
Within 1 mile of a school?	no
Within 1 mile of an airport?	no
Within 1 mile of a hospital?	no
Within 1 mile of a designated sole source aquifer?	yes
Within 1 mile of a historic property on the National Register of Historic Places?	yes
Within 1 mile of a Toxic Substances Control Act (TSCA) site?	no
Within 1 mile of a Land Cession Boundary?	no
Within 1 mile of a tribal area (lower 48 states)?	no

☐ Texas Report

Data at the root level is invalid. Line 1, position 1.

No data retrieved from EPA Region 6

☐ Demographic Reports

Note: The demographic reports are provided by EJSCREEN. The reports are generated based on your project area and buffer. For more information, visit the [EJSCREEN](#) website.

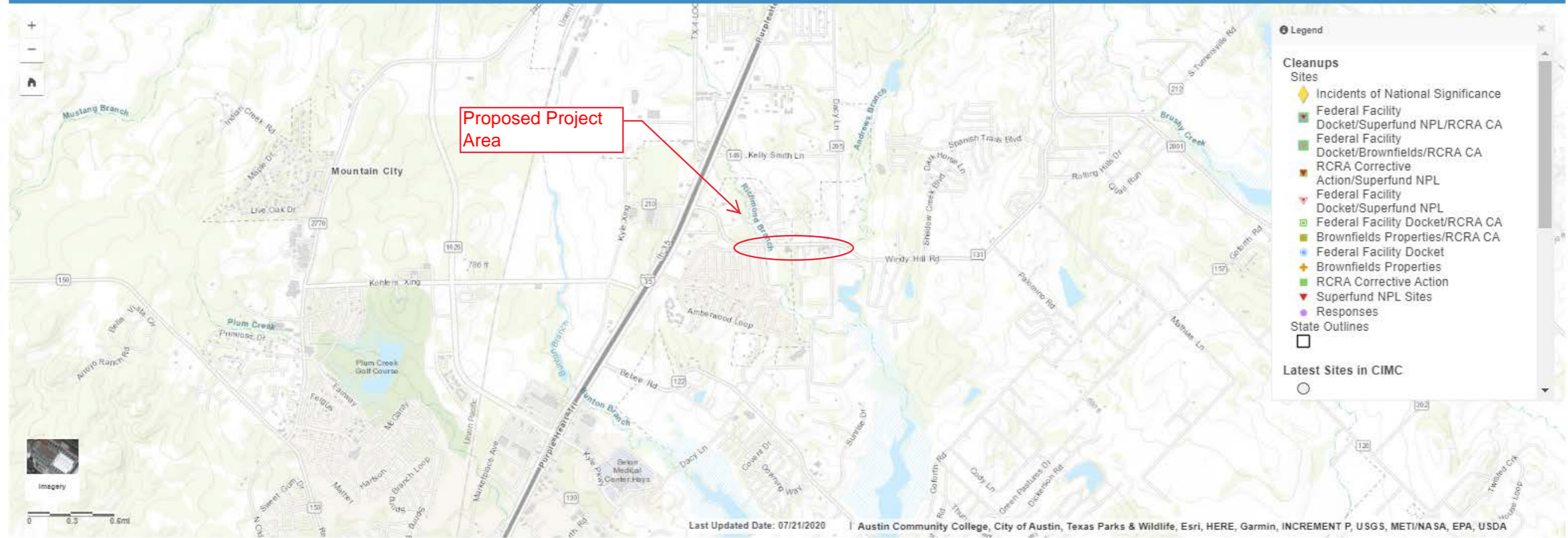
☐ USFWS IPaC Report

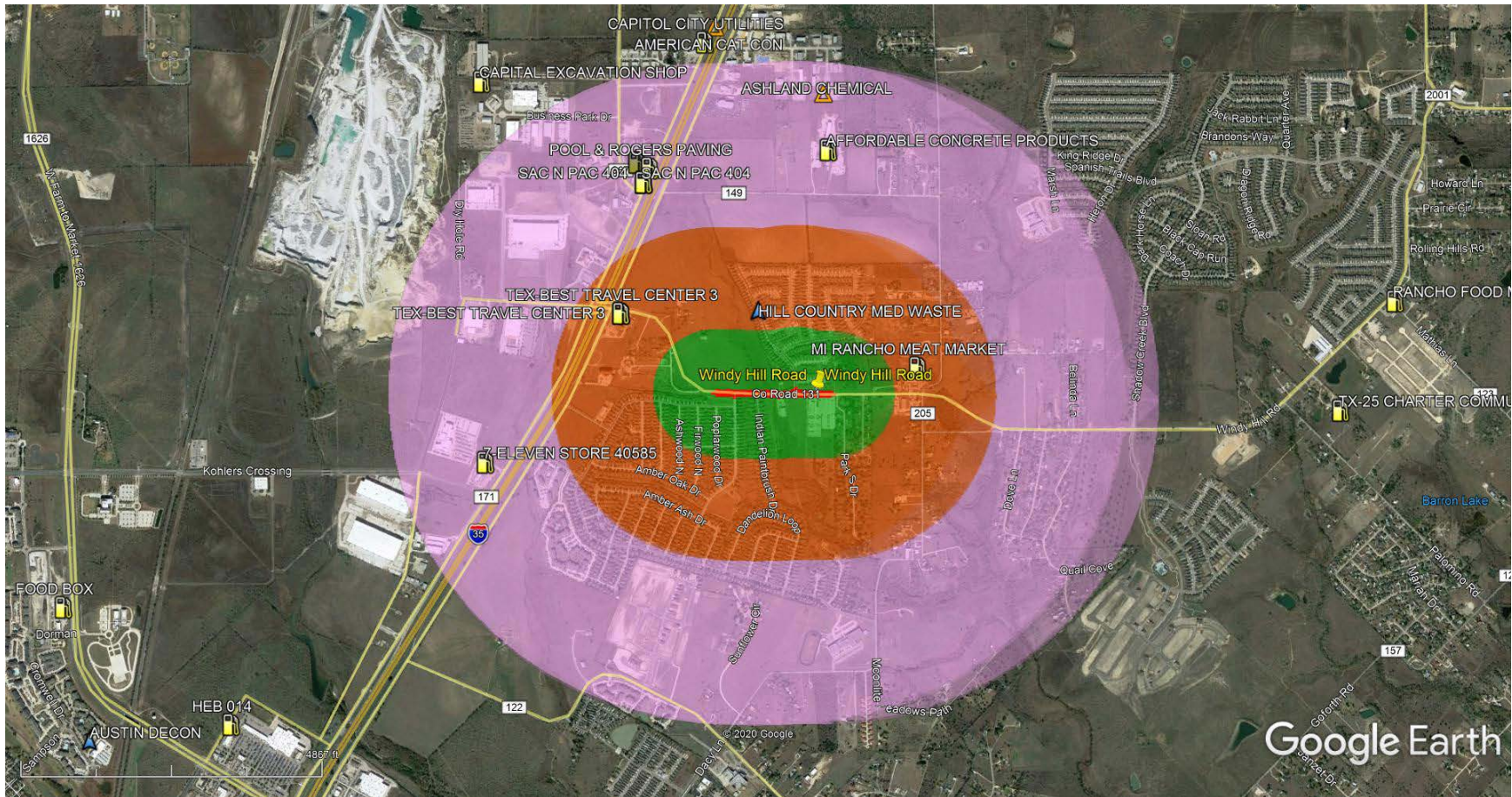
This report is from the U.S. Fish and Wildlife Service's Information, Planning and Conservation System (IPaC) tool and provides information about the natural resources for which the U.S. Fish and Wildlife Service has trust or regulatory responsibility. For more information, visit the [IPaC](#) website.










Cleanups In My Community Map

Cleanups Brownfields Grants Latest Sites in CIMC


Layers, Legend, & Print

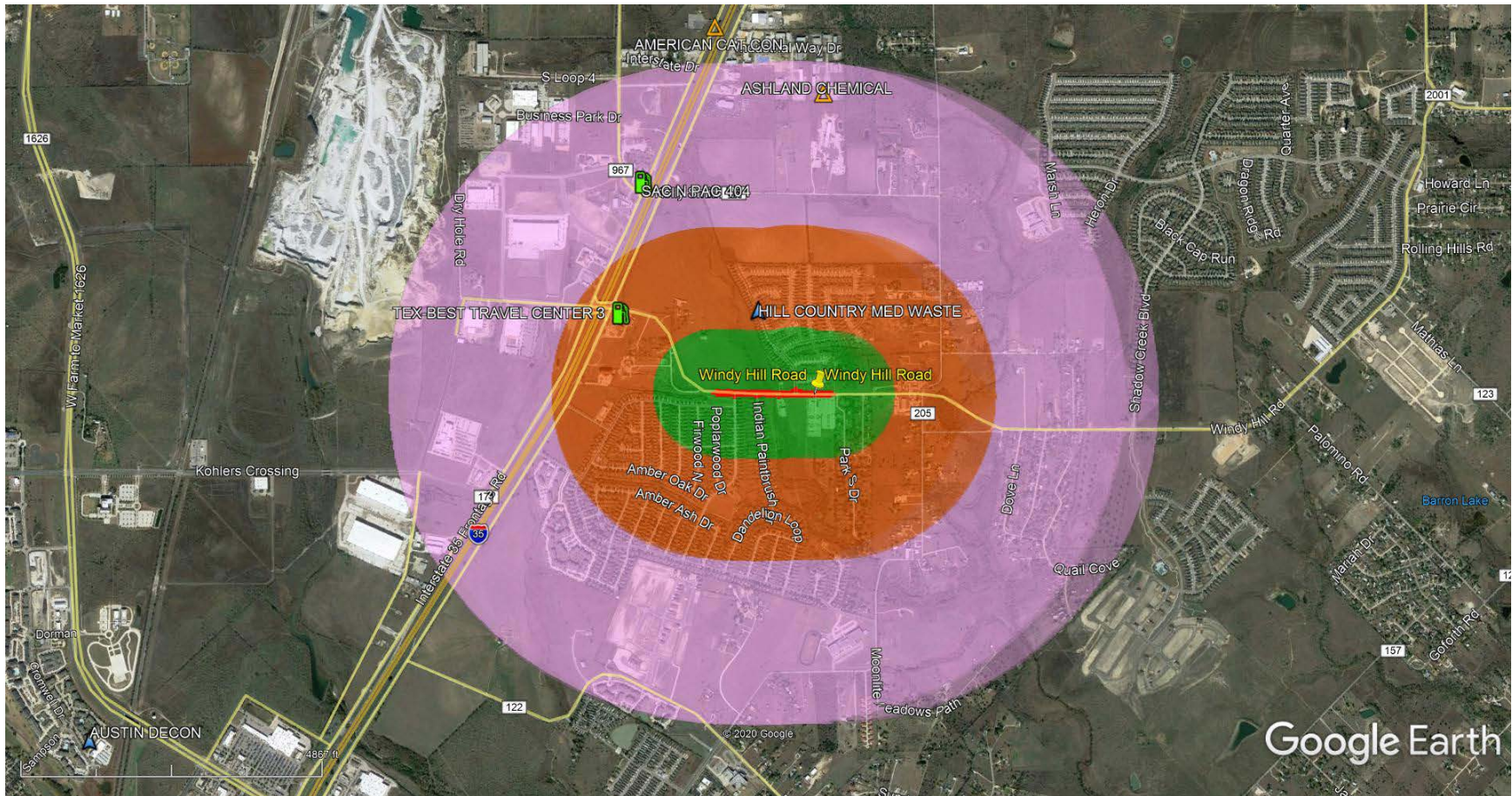













	1,000' ft. Buffer		Industrial Hazardous Waste (IHW)		IHW Corrective Action
	0.5 Mile Buffer		Petroleum Storage Tanks (PST)		Medical Waste Site
	1.0 Mile Buffer		Leaking PST		
	5.0 Mile Buffer				


No TCEQ registered facilities located at or adjacent to the project site.

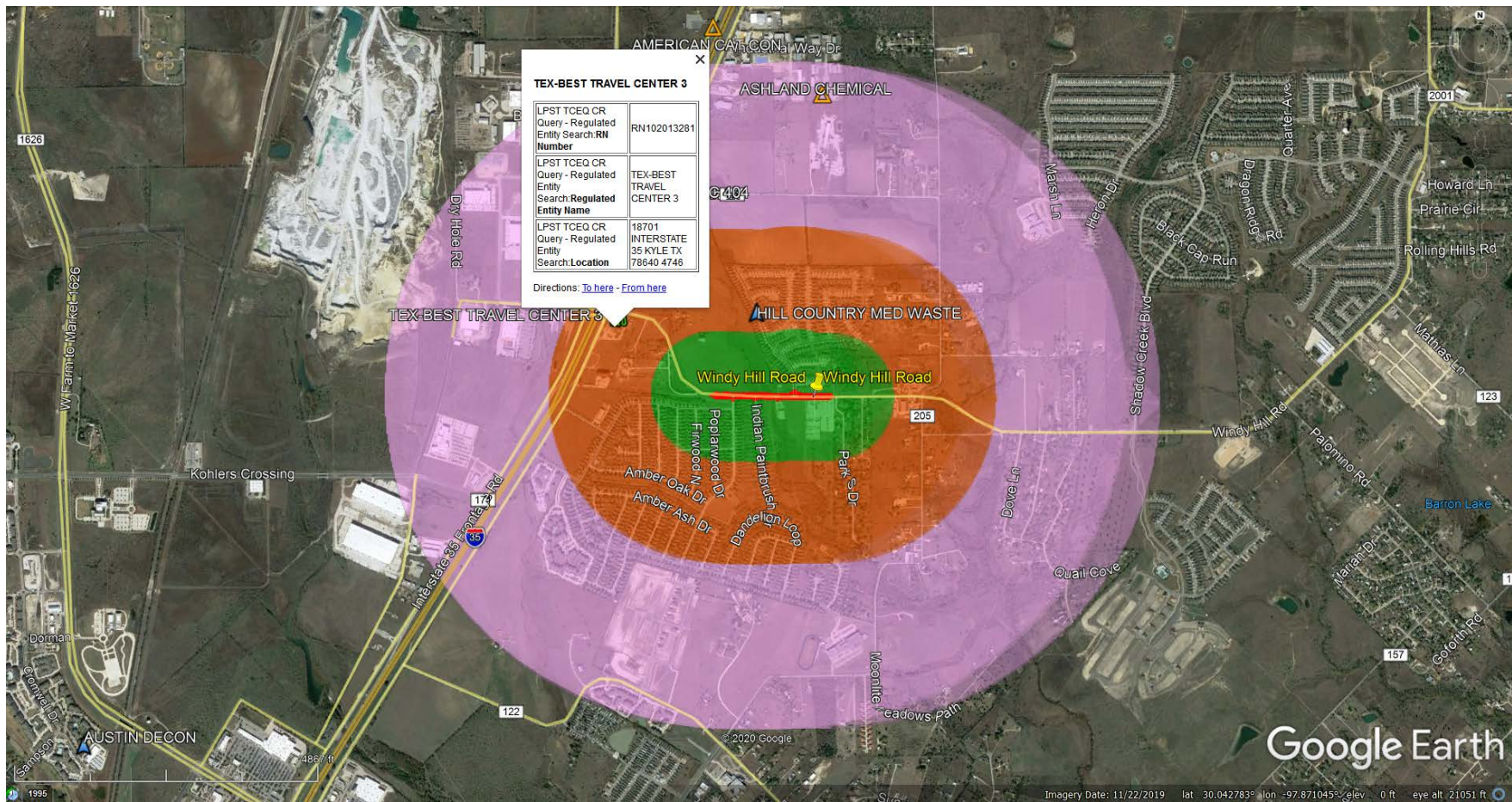
Client Name	City of Kyle – Windy Hill Road	Future Link Technologies 
Contract #	GLO Contract 19-280-000-B779; B-16-DH-48-0001	225 Commons Ford Rd., Suite 123 Austin, TX 78733
Map Information	TCEQ Central Registry Data Mapped With Google Earth	512-443-4100
Date	July 20	Environmental Service Provider













	1,000' ft. Buffer		Industrial Hazardous Waste (IHW)		IHW Corrective Action
	0.5 Mile Buffer		Petroleum Storage Tanks (PST)		Medical Waste Site
	1.0 Mile Buffer		Leaking PST		
	5.0 Mile Buffer				

One Inactive LPST located within .5 miles of the project area.

Client Name	City of Kyle – Windy Hill Road	Future Link Technologies 
Contract #	GLO Contract 19-280-000-B779; B-16-DH-48-0001	225 Commons Ford Rd., Suite 123 Austin, TX 78733
Map Information	TCEQ Central Registry Data Mapped With Google Earth	512-443-4100
Date	July 20	Environmental Service Provider



 1,000' ft. Buffer	 Industrial Hazardous Waste (IHW)	 IHW Corrective Action
 0.5 Mile Buffer	 Petroleum Storage Tanks (PST)	 Medical Waste Site
 1.0 Mile Buffer	 Leaking PST	
 5.0 Mile Buffer		

Client Name	City of Kyle – Windy Hill Road	Future Link Technologies 
Contract #	GLO Contract 19-280-000-B779; B-16-DH-48-0001	225 Commons Ford Rd., Suite 123 Austin, TX 78733
Map Information	TCEQ Central Registry Data Mapped With Google Earth	512-443-4100
Date	July 20	Environmental Service Provider



Central Registry Query - Regulated Entity Information

Regulated Entity Information

RN Number: RN110508462

Name: HILL COUNTRY MED WASTE

Primary Business: No primary business description on file.

Street Address: 361 PURPLE MARTIN AVE, KYLE TX 78640 2126

County: HAYS

Nearest City: No near city on file.

State: TX

Near ZIP Code: No near zip code on file.

Physical Location: No physical location description ON file.

Affiliated Customers - Current

Your Search Returned **1** Current Affiliation Records ([View Affiliation History](#))

The Customer Name displayed may be different than the Customer Name associated to the Additional IDs related to the customer. This name may be different due to ownership changes, legal name changes, or other administrative changes.

1-1 of 1 Records

CN Number	Customer Name	Customer Role(s)	Details
CN605576644	HILL COUNTRY MED WASTE LLC	OWNER OPERATOR	

Industry Type Codes

Code	Classification	Name
No NAICS or SIC Codes on file.		

Permits, Registrations, or Other Authorizations

There is **1** program and ID for this regulated entity.

1-1 of 1 Records

Program	ID Type	ID Number	ID Status
MEDICAL WASTE	REGISTRATION	50215	ACTIVE

Central Registry

The Customer Name displayed may be different than the Customer Name associated to the Additional IDs related to the customer. This name may be different due to ownership changes, legal name changes, or other administrative changes.

Detail of: **Leaking Petroleum Storage Tanks Remediation ID Number 101433**

For: **TEXAS STAR (RN102013281)**

18701 INTERSTATE 35, KYLE

ID Number Status: **INACTIVE**

Responsible Parties: **Texas Star Oil Company (CN601311996)** [View Compliance History](#)

Mailing Address: Not on file

Legal	Description	Start Date	End Date	Type	Status	Status Date
101433	LEAKING PETROLEUM STORAGE TANK	01/23/1992	07/13/1995	CLEANUP	INACTIVE	07/13/1995

Site Help | Disclaimer | Web Policies | Accessibility | Our Compact with Texans | TCEQ Homeland Security | Contact Us |
 Central Registry | Search Hints | Report Data Errors
 Statewide Links: Texas.gov | Texas Homeland Security | TRAIL Statewide Archive | Texas Veterans Portal

© 2002 - 2020 Texas Commission on Environmental Quality

Central Registry

The Customer Name displayed may be different than the Customer Name associated to the Additional IDs related to the customer. This name may be different due to ownership changes, legal name changes, or other administrative changes.

Detail of: **Leaking Petroleum Storage Tanks Remediation ID Number 108746**

For: **TEX BEST TRAVEL CENTER 3 (RN102013281)**

18701 IH 35, KYLE

ID Number Status: **INACTIVE**

Responsible Parties: **Southmost Terminal, Inc. (CN601101496)** Since 09/01/1989 [View Compliance History](#)

Mailing Address: PO BOX 1810 MCALLEN, TX 78505 -1810

Legal	Description	Start Date	End Date	Type	Status	Status Date
108746	LEAKING PETROLEUM STORAGE TANK	05/29/1996	06/25/1999	CLEANUP	INACTIVE	06/25/1999

[Site Help](#) | [Disclaimer](#) | [Web Policies](#) | [Accessibility](#) | [Our Compact with Texans](#) | [TCEQ Homeland Security](#) | [Contact Us](#) | [Central Registry](#) | [Search Hints](#) | [Report Data Errors](#)
[Statewide Links](#): [Texas.gov](#) | [Texas Homeland Security](#) | [TRAIL Statewide Archive](#) | [Texas Veterans Portal](#)

© 2002 - 2020 Texas Commission on Environmental Quality

Central Registry

The Customer Name displayed may be different than the Customer Name associated to the Additional IDs related to the customer. This name may be different due to ownership changes, legal name changes, or other administrative changes.

Detail of: **Leaking Petroleum Storage Tanks Remediation ID Number 119776**

For: **TEX-BEST TRAVEL CENTER 3 (RN102013281)**

18701 INTERSTATE 35, KYLE

ID Number Status: **INACTIVE**

Responsible Parties: **Travel Center Properties LLC (CN603635103)** Since 01/01/2010
[View Compliance History](#)

Now Known As: **Travel Center Properties, LLC**

Mailing Address: Not on file

Legal	Description	Start Date	End Date	Type	Status	Status Date
119776	LEAKING PETROLEUM STORAGE TANK	11/12/2015	11/08/2019	CLEANUP	INACTIVE	11/08/2019

Site Help | Disclaimer | Web Policies | Accessibility | Our Compact with Texans | TCEQ Homeland Security | Contact Us | Central Registry | Search Hints | Report Data Errors
 Statewide Links: Texas.gov | Texas Homeland Security | TRAIL Statewide Archive | Texas Veterans Portal

© 2002 - 2020 Texas Commission on Environmental Quality

ATTACHMENT 7

Endangered Species

- U. S. Fish & Wildlife Endangered Species IPAC Report
- Texas Parks and Wildlife Department List of Rare, Threatened and Endangered Species
- Texas Parks and Wildlife Natural Diversity Database (TXNDD) Mapping of Rare, Threatened and Endangered Resources
- Memo to the File for Endangered Species
- Texas Parks and Wildlife Correspondence
- US Fish and Wildlife Correspondence

Endangered Species Act (CEST and EA)

General requirements	ESA Legislation	Regulations
Section 7 of the Endangered Species Act (ESA) mandates that federal agencies ensure that actions that they authorize, fund, or carry out shall not jeopardize the continued existence of federally listed plants and animals or result in the adverse modification or destruction of designated critical habitat. Where their actions may affect resources protected by the ESA, agencies must consult with the Fish and Wildlife Service and/or the National Marine Fisheries Service (“FWS” and “NMFS” or “the Services”).	The Endangered Species Act of 1973 (16 U.S.C. 1531 <i>et seq.</i>); particularly section 7 (16 USC 1536).	50 CFR Part 402
References		
https://www.hudexchange.info/environmental-review/endangered-species		

1. Does the project involve any activities that have the potential to affect species or habitats?

No, the project will have No Effect due to the nature of the activities involved in the project.
 → *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide any documents used to make your determination.*

No, the project will have No Effect based on a letter of understanding, memorandum of agreement, programmatic agreement, or checklist provided by local HUD office.
 Explain your determination:

→ *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide any documents used to make your determination.*

Yes, the activities involved in the project have the potential to affect species and/or habitats. → *Continue to Question 2.*

2. Are federally listed species or designated critical habitats present in the action area?

Obtain a list of protected species from the Services. This information is available on the [FWS Website](#) or you may contact your [local FWS](#) and/or [NMFS](#) offices directly.

No, the project will have No Effect due to the absence of federally listed species and designated critical habitat.

→ *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide any documents used to make your determination. Documentation*

may include letters from the Services, species lists from the Services' websites, surveys or other documents and analysis showing that there are no species in the action area.

- Yes, there are federally listed species or designated critical habitats present in the action area. → *Continue to Question 3.*

3. What effects, if any, will your project have on federally listed species or designated critical habitat?

- No Effect: Based on the specifics of both the project and any federally listed species in the action area, you have determined that the project will have absolutely no effect on listed species or critical habitat.

→ *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide any documents used to make your determination. Documentation should include a species list and explanation of your conclusion, and may require maps, photographs, and surveys as appropriate.*

- May Affect, Not Likely to Adversely Affect: Any effects that the project may have on federally listed species or critical habitats would be beneficial, discountable, or insignificant.

→ *Continue to Question 4, Informal Consultation.*

- Likely to Adversely Affect: The project may have negative effects on one or more listed species or critical habitat.

→ *Continue to Question 5, Formal Consultation.*

4. Informal Consultation is required

Section 7 of ESA (16 USC. 1536) mandates consultation to resolve potential impacts to endangered and threatened species and critical habitats. If a HUD-assisted project may affect any federally listed endangered or threatened species or critical habitat, then compliance is required with Section 7. See 50 CFR Part 402 Subpart B Consultation Procedures.

Did the Service(s) concur with the finding that the project is Not Likely to Adversely Affect?

- Yes, the Service(s) concurred with the finding.

→ *Based on the response, the review is in compliance with this section. Continue to Question 6 and provide the following:*

- (1) A biological evaluation or equivalent document*
- (2) Concurrence(s) from FWS and/or NMFS*
- (3) Any other documentation of informal consultation*

Exception: If finding was made based on procedures provided by a letter of understanding, memorandum of agreement, programmatic agreement, or checklist provided by local HUD office, provide whatever documentation is mandated by that agreement.

No, the Service(s) did not concur with the finding. → Continue to Question 5.

5. Formal consultation is required

Section 7 of ESA (16 USC 1536) mandates consultation to resolve potential impacts to federally listed endangered and threatened species and critical habitats. If a HUD assisted project may affect any endangered or threatened species or critical habitat, then compliance is required with Section 7. See 50 CFR Part 402 Subpart B Consultation Procedures.

→ Once consultation is complete, the review is in compliance with this section. Continue to Question 6 and provide the following:

- (1) A biological assessment, evaluation, or equivalent document
- (2) Biological opinion(s) issued by FWS and/or NMFS
- (3) Any other documentation of formal consultation

6. For the project to be brought into compliance with this section, all adverse impacts must be mitigated. Explain in detail the proposed measures that will be implemented to mitigate for the impact or effect, including the timeline for implementation.

Mitigation as follows will be implemented:

No mitigation is necessary.

Explain why mitigation will not be made here:

Worksheet Summary

Compliance Determination

Provide a clear description of your determination and a synopsis of the information that it was based on, such as:

- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your region

Considering the nature of the work at the project site which includes the replacement of culverts at Richmond Branch Creek which crosses the area of roadway being improved, a wetland delineation of the area was conducted. The results of the delineation indicated Based on the results of the delineation, the only potential WOTUS (Waters of the United States – as defined by the US Army Corps of Engineers) found within the survey area is Richmond Branch. Only work directly involving Richmond Branch will require a Section 404 permit for this project. Based on the proposed construction activities, this work will include replacing the existing bridge with a wider bridge containing 5 box culverts, concrete headwalls and erosion controls. The proposed construction activities at Richmond Branch can be covered under Nationwide Permit 14 (Linear Transportation Projects). As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, preconstruction notification to the USACE for the use of Nationwide Permit (NWP) 14 will not be required. In accordance with the guidelines of NWP 14, all limitations, criteria, and General Conditions should be followed by this project. Specifically, General Conditions 10, 12, 18, 20, 21, and 23 are addressed below. NWP 14 guidelines are included in Attachment 7 (Attachment G of Delineation Document).

These results were also submitted to to TPWD on 6//20. A response was received from TPWD on 7/16/20 for their consultation

Are formal compliance steps or mitigation required?

Yes

No

- Use sediment control fence to exclude wildlife from the construction area. Exclusion fencing should be buried at least six inches and be at least 24 inches high and maintained for the life of the project. Construction should examine the inside of the exclusion area daily to determine if any wildlife species have been trapped inside the area of impact and provide safe egress opportunities prior to initiation of construction activities.
 - TPWD recommends that any open trenches or excavation areas be covered overnight and/or inspected every morning to ensure no wildlife species have been trapped. For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees (1:1) in areas left uncovered. Also, inspect excavation areas for trapped wildlife prior to refilling.
 - For soil and erosion control use seed/mulch stabilization materials that avoid entanglement hazards to snakes and other wildlife species; use of no-till drilling, hydromulching and/or hydroseeding rather than erosion control blankets or mats due to a reduced risk to wildlife.
 - Reduce clearing of native vegetation, particularly mature native trees, riparian vegetation, and shrubs to the greatest extent practicable and in-kind replacement/restoration of the native vegetation wherever practicable. Colonization by invasive species, should be actively prevented. Vegetation management should include removing invasive species early on while allowing the existing native plants to revegetate the disturbed areas. TPWD recommends referring to the Lady Bird Johnson Wildflower Center Native Plant Database for regionally adapted native species that would be appropriate for landscaping and revegetation. As part of an international conservation effort TPWD has developed the Texas Monarch and Native Pollinator Conservation Plan, and one of the broad categories of action in this plan is to augment larval feeding and adult nectaring opportunities.
 - Use spanning bridges rather than culverts when feasible otherwise stagger culverts to concentrate low flows but provide conveyance of higher flows through staggered culverts placed at higher elevations is recommended. Recommend bottomless culverts to allow for fish and other aquatic wildlife passage in the low flow channel. If bottomless culverts are not feasible, making a low flow channel for fish passage is recommended.
 - Avoid placing riprap across stream channels and instead use alternative stabilization such as biotechnical stream bank stabilization methods including live native vegetation or a combination of vegetative and structural materials. When using riprap or other bank stabilization, placement should not impede movement of aquatic and terrestrial wildlife underneath the bridge. In some instances, riprap may be buried, back-filled with topsoil and planted with native vegetation.
 - Incorporate bat-friendly design into bridges and culverts where bridges are designed for adequate vertical and horizontal clearances under the roadway to allow for terrestrial wildlife to safely pass under the road. A span wide enough to cross the stream and allow for dry ground and a natural surface path under the roadway is encouraged. Incorporate artificial ledges inside culverts on one or both sides. Riparian buffer zones should remain undisturbed where possible.
- The area will be screened prior to construction and during construction to ensure consistency with bulleted items above.

- Construction is intended to occur during dry months in order to prevent impact to aquatic life. In the event construction occurs when water is present in Richmond Branch and dewatering activities or other harmful construction activities are involved (such as trenching and placement of temporary or permanent fills or structures), then construction will consider relocating potentially impacted native aquatic resources in conjunction with a Permit to Introduce Fish, Shellfish or Aquatic Plants into Public Waters and an ARRP. If this occurs, then the ARRP will be completed and approved by TPWD 30 days prior to activity within project waters and/or resource relocation and submitted with an application for a no-cost Permit to Introduce Fish, Shellfish, or Aquatic Plants into Public Waters. ARRPs can be submitted to Travis Tidwell, TPWD Region 1 KAST Biologist at (512) 389-8612 or Travis.Tidwell2@tpwd.texas.gov
- If nests are observed during construction, activities will cease and TPWD will be contacted. Additionally, the site will be surveyed, no more than five days prior to planned clearing or construction, preferably during daytime for nests, including under bridges and in culverts, to determine if they are active prior to construction activities and ensure Migratory Bird Treaty Act (MBTA) compliance. Should a nest be observed, a minimum 150-foot buffer of vegetation will remain around any nests prior to disturbance. Where occupied nests are located area will not be disturbed until the eggs have hatched and the young have fledged.
- Project will avoid impacts to logs and rocks where turtles bask as well as gravel bars or riffle habitat in streams around where construction-related disturbance may occur. During construction, trucks and equipment should use existing bridge or culvert structures to cross creeks, and equipment staging areas should be located in previously disturbed areas outside of riparian corridors. Since turtles nest on gently sloping sand banks within approximately 30' feet of the water's edge, disturbance of embankments will be avoided. Construction will be avoided during breeding and nesting season of this species (spring and summer). Turtles breed in spring and early summer and then the eggs incubate through the spring and summer months. If necessary, a permitted biological monitor will be on-site that is familiar with the identification of this species and that can relocate the Cagle's map turtle to a nearby area with similar habitat that would not be disturbed during construction. Any translocations of reptiles will be the minimum distance possible, no greater than one mile, preferably within 100 to 200 yards from the initial encounter location.
- A review of the project area prior to construction will occur to determine if a permitted biologist is needed to facilitate a plan of action for determining if bats are present at the project site. Project will incorporate steps provided by TPWD. Construction will consider habitat for bats in the area and take precautions to prevent impact and to determine how to mitigate for loss of roost.
- The TXNDD listing was provided to contractors with the request for consultation and it was determined that there is one study area within five miles of the project area. This includes the Texas Garter Snake. As identified by the TPWD response letter, there may be suitable habitat for the Texas garter snake within the project area. This species prefers marshy, flooded pastureland or meadows, particularly in spring when frogs are present in numbers and at other times prefers grassy or brushy terrain near hill country streams and ponds. The Texas garter snake seems to prefer vicinity of permanent sources of water or soil damp enough to support earthworm populations.
- Construction personnel and contractors will be advised to avoid injury or harm to all snakes encountered during clearing and construction. Therefore, contractors will avoid contact with snakes if encountered and allow all native snakes to safely leave the premises.
- Industry specific mitigation will be used to return the area to its original condition. Reseeding the area with native grasses to prevent erosion and soil stabilization will occur as possible consistent with current BMP and methodologies that prevent impact to wildlife. Interest will be paid to monitoring for potential wildlife or other animals that may wander onsite. The activities are not intended for site cleanup.

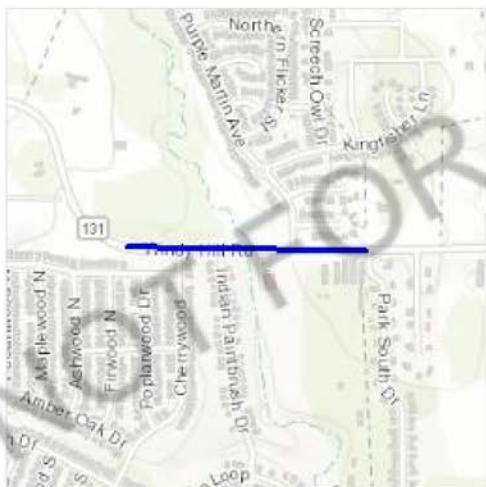
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Hays County, Texas



Local office

Austin Ecological Services Field Office

☎ (512) 490-0057

📅 (512) 490-0974

10711 Burnet Road, Suite 200

Austin, TX 78758-4460

<http://www.fws.gov/southwest/es/AustinTexas/>

<http://www.fws.gov/southwest/es/EndangeredSpecies/lists/>

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species¹ and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information.
2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME

STATUS

Golden-cheeked Warbler (=wood) <i>Dendroica chrysoparia</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/33	Endangered
Least Tern <i>Sterna antillarum</i> This species only needs to be considered if the following condition applies: <ul style="list-style-type: none"> • Wind Energy Projects No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8505	Endangered
Piping Plover <i>Charadrius melodus</i> This species only needs to be considered if the following condition applies: <ul style="list-style-type: none"> • Wind Energy Projects There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/6039	Threatened
Red Knot <i>Calidris canutus rufa</i> This species only needs to be considered if the following condition applies: <ul style="list-style-type: none"> • Wind Energy Projects No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1864	Threatened
Whooping Crane <i>Grus americana</i> There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/758	Endangered

Amphibians

NAME	STATUS
Austin Blind Salamander <i>Eurycea waterlooensis</i> There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/5737	Endangered
Barton Springs Salamander <i>Eurycea sosorum</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1113	Endangered

San Marcos Salamander *Eurycea nana* Threatened
 There is **final** critical habitat for this species. Your location is outside the critical habitat.
<https://ecos.fws.gov/ecp/species/6374>

Texas Blind Salamander *Typhlomolge rathbuni* Endangered
 No critical habitat has been designated for this species.
<https://ecos.fws.gov/ecp/species/5130>

Fishes

NAME	STATUS
Fountain Darter <i>Etheostoma fonticola</i> There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/5858	Endangered
San Marcos Gambusia <i>Gambusia georgei</i> There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/7519	Endangered

Clams

NAME	STATUS
Texas Fatmucket <i>Lampsilis bracteata</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9041	Candidate
Texas Fawnsfoot <i>Truncilla macrodon</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8965	Candidate
Texas Pimpleback <i>Quadrula petrina</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8966	Candidate

Insects

NAME	STATUS
Comal Springs Dryopid Beetle <i>Stygoparnus comalensis</i> There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/7175	Endangered

Comal Springs Riffle Beetle <i>Heterelmis comalensis</i>	Endangered
There is final critical habitat for this species. Your location is outside the critical habitat.	
https://ecos.fws.gov/ecp/species/3403	

Crustaceans

NAME	STATUS
Peck's Cave Amphipod <i>Stygobromus (=Stygonectes) pecki</i>	Endangered
There is final critical habitat for this species. Your location is outside the critical habitat.	
https://ecos.fws.gov/ecp/species/8575	

Flowering Plants

NAME	STATUS
Bracted Twistflower <i>Streptanthus bracteatus</i>	Candidate
No critical habitat has been designated for this species.	
https://ecos.fws.gov/ecp/species/2856	
Texas Wild-rice <i>Zizania texana</i>	Endangered
There is final critical habitat for this species. Your location is outside the critical habitat.	
https://ecos.fws.gov/ecp/species/805	

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME

BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)

American Golden-plover *Pluvialis dominica*

Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<p>Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626</p>	Breeds Sep 1 to Jul 31
<p>Buff-breasted Sandpiper <i>Calidris subruficollis</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9488</p>	Breeds elsewhere
<p>Harris's Sparrow <i>Zonotrichia querula</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.</p>	Breeds elsewhere
<p>Lesser Yellowlegs <i>Tringa flavipes</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679</p>	Breeds elsewhere
<p>Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.</p>	Breeds May 10 to Sep 10
<p>Willet <i>Tringa semipalmata</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.</p>	Breeds elsewhere

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that

- week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
- To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
 - The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

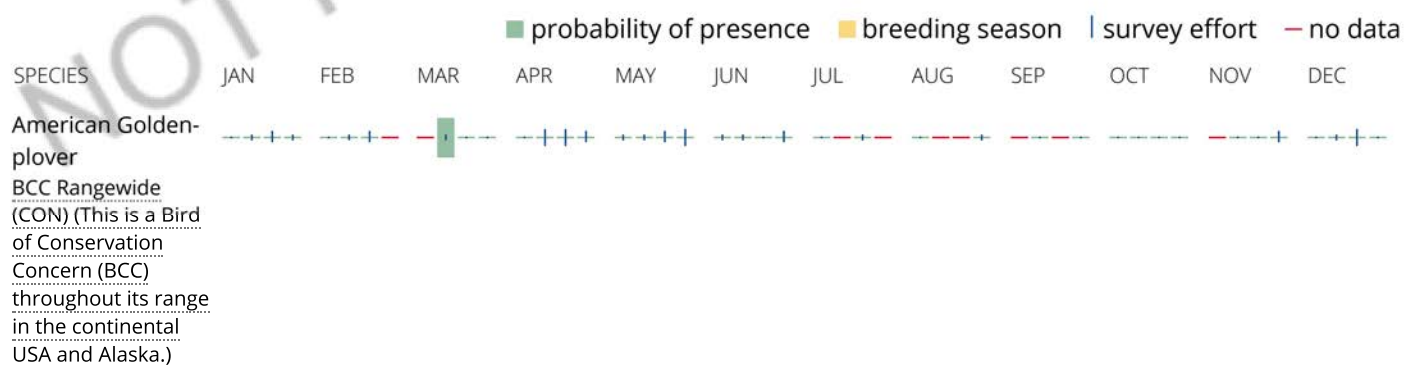
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

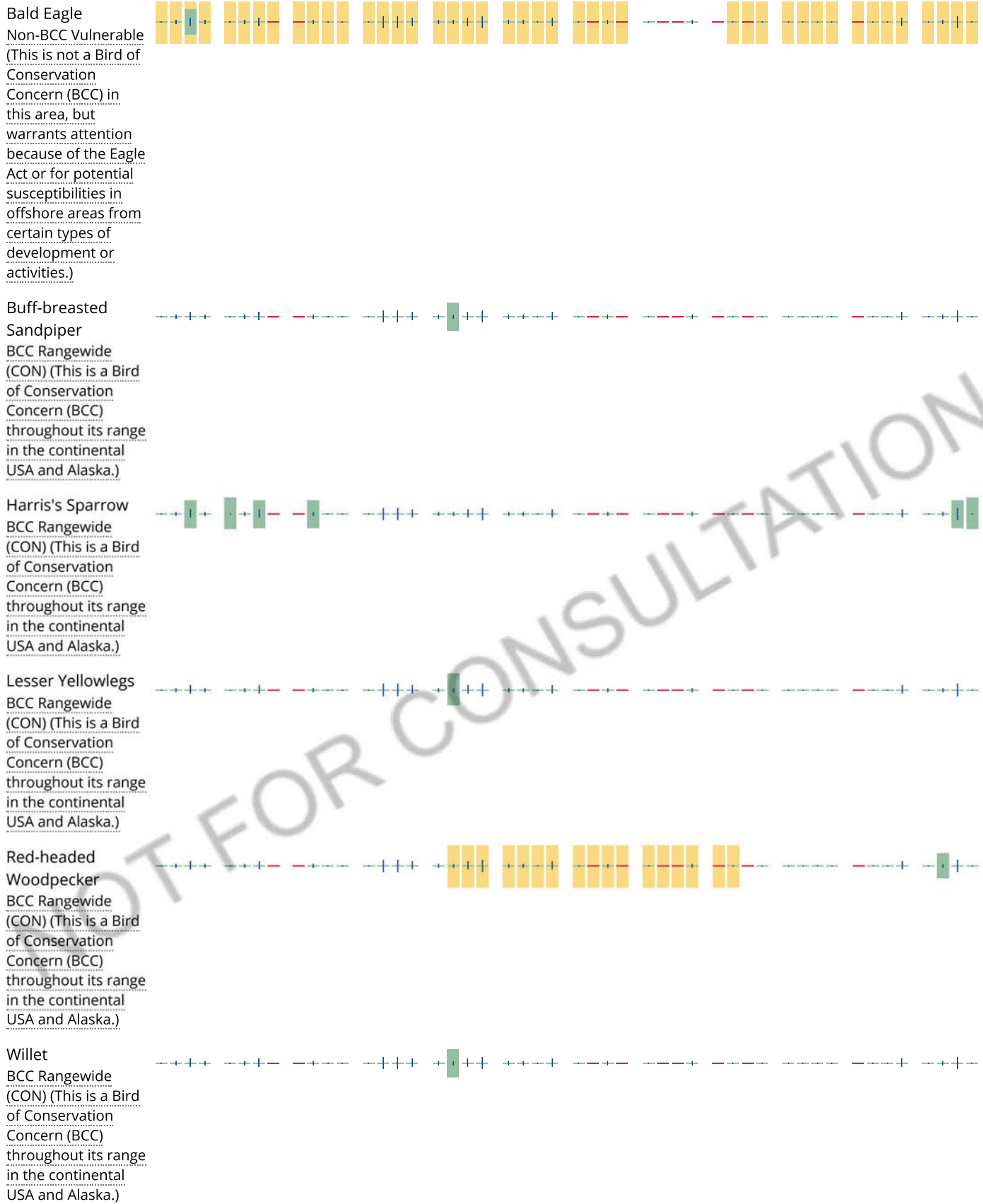
No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to

occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) and/or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [AKN Phenology Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

[PEM1C](#)

A full description for each wetland code can be found at the [National Wetlands Inventory website](#)

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION

From: [Latrice Hertzler](#)
To: "[Jessica Schmerler](#)"
Subject: RE: Kyle Confirmation of ReceiptTPWD has received your project review request.pdf
Date: Thursday, July 16, 2020 9:53:00 AM

Hi Jessica,

I asked the engineer and he said no dredging is expected nor is dewatering expected due to the creek typically being dry.

Please let me know if there is anything else I can provide.

Thanks,

Latrice

From: Jessica Schmerler <Jessica.Schmerler@tpwd.texas.gov>
Sent: Wednesday, July 15, 2020 11:55 AM
To: Latrice Hertzler <lhertzler@future-link.biz>
Subject: RE: Kyle Confirmation of ReceiptTPWD has received your project review request.pdf

Hi Latrice,

I have question for you regarding the proposed project. The information provided states that the proposed project will include replacing the existing bridge over Richmond Branch with a wider bridge containing 5 box culverts. Is dredging and/or dewatering proposed for this portion of the project?

Thanks

Jessica

From: Latrice Hertzler <lhertzler@future-link.biz>
Sent: Wednesday, July 15, 2020 11:12 AM
To: Jessica Schmerler <Jessica.Schmerler@tpwd.texas.gov>
Subject: RE: Kyle Confirmation of ReceiptTPWD has received your project review request.pdf

ALERT: This email came from an external source. Do not open attachments or click on links in unknown or unexpected emails.

Thank you Jessica. I appreciate the update.

This is very helpful.

Latrice

From: Jessica Schmerler <Jessica.Schmerler@tpwd.texas.gov>
Sent: Wednesday, July 15, 2020 11:10 AM
To: Latrice Hertzler <lhertzler@future-link.biz>
Subject: RE: Kyle Confirmation of ReceiptTPWD has received your project review request.pdf

Hi Latrice,

I am actually working on this letter right now. I should hopefully get you something later this afternoon.

Thanks!
Jessica

From: Rachel Lange <Rachel.Lange@tpwd.texas.gov>
Sent: Wednesday, July 15, 2020 11:06 AM
To: Jessica Schmerler <Jessica.Schmerler@tpwd.texas.gov>
Subject: FW: Kyle Confirmation of ReceiptTPWD has received your project review request.pdf

I got a status check on this, but it looks like it is in your review area. Not due until 7/26.

Please note my new phone number.

Rachel Lange, CWB
Habitat Assessment Biologist
Texas Parks & Wildlife Department
316 Spring Street, Suite 106
Columbus, TX 78934
(979)732-4213

From: Latrice Hertzler <lhertzler@future-link.biz>
Sent: Wednesday, July 15, 2020 10:39 AM
To: Rachel Lange <Rachel.Lange@tpwd.texas.gov>
Cc: mharmon@future-link.biz
Subject: Kyle Confirmation of ReceiptTPWD has received your project review request.pdf

ALERT: This email came from an external source. Do not open attachments or click on links in unknown or unexpected emails.

Hi Rachel,

I am writing to check on the status of this request. Do you have any updates for me?

Thanks for checking.

Latrice Hertzler

Latrice Hertzler, BAIS, MPA
Environmental Consultant
Certified Environmental Reviewers

Future Link Technologies, Inc.
Environmental & Technology Services & Consulting
P.O. Box 90696
Austin, TX 78709
512-443-4100 (Ofc)
512-791-6685 (Cell)



Future Link Technologies

Environmental and Technology Consulting

August 25, 2020

Jessica E. Schmerler
Texas Parks and Wildlife Department
Wildlife Habitat Assessment Program - Wildlife Division
4200 Smith School Road
Austin, Texas 78744

RE: TPWD – City of Kyle Windy Hill Road Improvements
Reply to Consultation letter dated 7/16/20, TPWD project number 44183

Dear Ms. Schmerler,

Thank you so much for the response to the request for consultation in your letter dated, July 16, 2020. We sincerely appreciate all input in order to support ongoing environmental and ecological stewardship during and following construction project.

As acknowledgement of the TPWD additional recommendations, responses are provided below:

General Construction Recommendations

Recommendation: TPWD recommends the judicious use and placement of sediment control fence to exclude wildlife from the construction area. In many cases, sediment control fence placement for the purposes of controlling erosion and protecting water quality can be modified minimally to also provide the benefit of excluding wildlife access to construction areas. The exclusion fence should be buried at least six inches and be at least 24 inches high. The exclusion fence should be maintained for the life of the project and only removed after the construction is completed and the disturbed site has been revegetated with site-specific native species. Construction personnel should be encouraged to examine the inside of the exclusion area daily to determine if any wildlife species have been trapped inside the area of impact and provide safe egress opportunities prior to initiation of construction activities. TPWD recommends that any open trenches or excavation areas be covered overnight and/or inspected every morning to ensure no wildlife species have been trapped. For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees (1:1) in areas left uncovered. Also, inspect excavation areas for trapped wildlife prior to refilling.

Response: The City of Kyle (the City) will ensure sediment control fencing placement to prevent erosion and to ensure wildlife access to construction areas is minimized. Fencing will be installed for temporary controls during construction but will be removed after construction is complete. Review of any exclusion areas will occur daily to determine if any wildlife species have been trapped inside the area of impact and provide safe egress opportunities prior to initiation of construction activities. Where possible, open trenches will be covered nightly and where no covers can occur, where possible, sloped areas will be incorporated into the trench for easy escape by any potentially

trapped species. Trench areas will be examined prior to refilling to ensure no trapped species are impacted.

Recommendation: For soil stabilization and/or revegetation of disturbed areas within the proposed project area, TPWD recommends erosion and seed/mulch stabilization materials that avoid entanglement hazards to snakes and other wildlife species. Because the mesh found in many erosion control blankets or mats pose an entanglement hazard to wildlife TPWD recommends the use of no-till drilling, hydromulching and/or hydroseeding rather than erosion control blankets or mats due to a reduced risk to wildlife. If erosion control blankets or mats will be used, the product should contain no netting or contain loosely woven, natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic mesh matting should be avoided.

Response: Sediment control technologies that incorporate best management practices wherein human, domestic animal and wildlife impact are protected will be utilized where necessary; this includes silt fencing and riprap. If erosion control blankets are used, no plastic mesh matting will be used. Routine monitoring of the site will occur for safety.

Impacts to Vegetation/Wildlife Habitat

Recommendation: TPWD recommends reducing the amount of vegetation proposed for clearing if possible and minimizing clearing of native vegetation, particularly mature native trees, riparian vegetation, and shrubs to the greatest extent practicable. TPWD recommends in-kind on-site replacement/restoration of the native vegetation wherever practicable. Colonization by invasive species, particularly invasive grasses and weeds, should be actively prevented. Vegetation management should include removing invasive species early on while allowing the existing native plants to revegetate the disturbed areas. TPWD recommends referring to the Lady Bird Johnson Wildflower Center Native Plant Database for regionally adapted native species that would be appropriate for landscaping and revegetation.

Landscaping for Monarch Butterflies

Significant declines in the population of migrating monarch butterflies (*Danaus plexippus*) have led to widespread concern about this species and the long-term persistence of the North American monarch migration. As part of an international conservation effort TPWD has developed the *Texas Monarch and Native Pollinator Conservation Plan*, and one of the broad categories of action in this plan is to augment larval feeding and adult nectaring opportunities.

Recommendation: TPWD recommends incorporating pollinator conservation and management into the revegetation and maintenance plan for this project, such as promoting growth of native flowering species throughout the growing season. TPWD recommends revegetation efforts include planting or seeding native milkweed (*Asclepias* spp.) and nectar plants as funding and seed availability allow. Information about monarch biology, migration, and butterfly gardening can be found on the Monarch Watch website.

Recommendation: TPWD advises against planting the non-native milkweed species black swallow-wort (*Cynanchum louiseae*) and pale swallow-wort (*C. rossicum*). Monarch butterflies will lay eggs on these plant species, but the larvae are unable to feed and complete their life cycle. Additionally, these plant species can be highly invasive. Additionally, TPWD advises against planting the non-native tropical milkweed (*Asclepias curassavica*), a popular commercial nursery milkweed that can persist year-round in southern states. The year-round persistence of tropical milkweed fosters greater transmission of the protozoan *Ophryocystis elektroscirrha* (OE), increasing the likelihood that monarchs become infected with the debilitating parasite.

Response: Where possible in-kind on-site replacement/restoration of the native vegetation will occur wherever practicable. Where necessary, the project will use available resources such as the Lady Bird Johnson Wildflower Center Native Plant Database which provide native plant references to revegetate and landscape the area. Where possible, the City will select vegetation consistent with Monarch butterfly habitat.

Water Resources

As previously mentioned, the project proposes to remove and replace existing culverts and will replace the existing bridge over Richmond Branch with a wider bridge containing 5 box culverts, concrete headwalls and erosion controls.

Recommendation: TPWD would like to include the following stream crossing recommendations to assist in project planning:

- Use spanning bridges rather than culverts when feasible.
- If using a culvert, staggered culverts that concentrate low flows but provide conveyance of higher flows through staggered culverts placed at higher elevations is recommended.
- Bottomless culverts are recommended to allow for fish and other aquatic wildlife passage in the low flow channel. If bottomless culverts are not feasible, making a low flow channel for fish passage is recommended.
- Avoid placing riprap across stream channels and instead use alternative stabilization such as biotechnical stream bank stabilization methods including live native vegetation or a combination of vegetative and structural materials. When riprap or other bank stabilization devices are necessary, their placement should not impede the movement of aquatic and terrestrial wildlife underneath the bridge. In some instances, riprap may be buried, back-filled with topsoil and planted with native vegetation.
- Incorporate bat-friendly design into bridges and culverts.
- Design bridges for adequate vertical and horizontal clearances under the roadway to allow for terrestrial wildlife to safely pass under the road.
- A span wide enough to cross the stream and allow for dry ground and a natural surface path under the roadway is encouraged. For culverts, incorporation of an artificial ledge inside the culvert on one or both sides for use by terrestrial wildlife is recommended.
- Riparian buffer zones should remain undisturbed where possible.

Recommendation: All waterways and associated floodplains, riparian corridors, springs, and wetlands, regardless of their jurisdictional status, provide valuable wildlife habitat and should be protected to the maximum extent possible. Natural buffers contiguous to any wetlands or aquatic systems should remain undisturbed to preserve wildlife cover, food sources, and travel corridors.

During construction, trucks and equipment should use existing bridge or culvert structures to cross creeks, and equipment staging areas should be located in previously disturbed areas outside of riparian corridors. Destruction of inert microhabitats in waterways such as snags, brush piles, fallen logs, creek banks, pools, and gravel stream bottoms should be avoided, as these provide habitat for a variety of fish and wildlife species and their food sources. Erosion controls and sediment runoff control measures should be installed prior to construction and maintained until disturbed areas are permanently revegetated using site-specific native vegetation. Measures should be properly installed in order to effectively minimize the amount of sediment and other debris entering the waterway.

Response: Where possible, construction will prevent impact to riparian buffer zones and will not impede water flow, but planned to facilitate improved water flow in a controlled environment. In

addition, a primary focus of the project is to prevent erosion and reduce the amount of runoff as much as possible. Water velocities are also a major focus of construction as these increased velocities cause additional erosion. Improved conditions at the site along mow strips will include cleanout of existing ditches and riprap that serves to slow water intensity.

The project does not include placing riprap across stream channels but does include placing riprap along embankments for erosion controls. Native vegetation will be added to the project site where possible. Measures to support wildlife in the area may occur where possible.

State Regulations - Aquatic Resources

As indicated in the project description, the proposed project has the potential to impact aquatic resources within Richmond Branch. TPW Code Section 1.011 grants TPWD authority to regulate and conserve aquatic animal life of public waters. Title 31, Chapter 57, Subchapter B, Section 57.157 of Texas Administrative Code (TAC) regulates take of mussels, including mussels that are not state-listed threatened or endangered.

TPW Code Sections 12.015, 12.019, 66.015 and TAC 52.101-52.105, 52.202, and 57.251-57.259 regulate the introduction and stocking of fish, shellfish, and aquatic plants into public waters of the state. Dewatering activities can impact aquatic resources through stranding fish and mussels. Other harmful construction activities can trample, dredge or fill areas exhibiting stationary aquatic resources such as plants and mussels. Relocating aquatic life to an area of suitable habitat outside the project footprint avoids or reduces impacts to aquatic life. Relocation activities are done under the authority of a TPWD *Permit to Introduce Fish, Shellfish or Aquatic Plants into Public Waters* to ensure that natural resource risks associated with relocation area alleviated. Aquatic Resource Relocation Plans (ARRPs) dictate resource handling activities, assist in the permitting process, and are coordinated through the TPWD Kills and Spills Team (KAST). If dewatering activities or other project-related activities cause mortality to fish and wildlife species, then the responsible party would be subject to investigation by the TPWD KAST and will be liable for the value of the lost resources under the authority of TPW Code Sections 12.0011 (b) (1) and 12.301.

Since a portion of this project will take place within Richmond Branch, the project may be subject to coordination with TPWD KAST. For additional information please see the TPWD KAST website and *TPWD Guidelines for Aquatic Resource Relocation Plans for Fish and Shellfish, Including Freshwater Mussels*. Impact avoidance measures for aquatic organisms, including **all** native freshwater mussel and fish species, regardless of state-listing status, should be considered during project planning and construction activities.

Recommendation: TPWD recommends constructing the new bridge when the stream is dry. If construction occurs during times when water is present in Richmond Branch and dewatering activities or other harmful construction activities are involved (such as trenching and placement of temporary or permanent fills or structures), then TPWD recommends relocating potentially impacted native aquatic resources in conjunction with a *Permit to Introduce Fish, Shellfish or Aquatic Plants into Public Waters* and an ARRP. The ARRP should be completed and approved by TPWD **30 days prior to activity within project waters and/or resource relocation** and submitted with an application for a no-cost *Permit to Introduce Fish, Shellfish, or Aquatic Plants into Public Waters*. ARRPs can be submitted to Travis Tidwell, TPWD Region 1 KAST Biologist at (512) 389-8612 or Travis.Tidwell2@tpwd.texas.gov.

Response: Construction is intended to occur during dry months in order to prevent impact to aquatic life. In the event construction occurs when water is present in Richmond Branch and dewatering activities or other harmful construction activities are involved (such as trenching and placement of temporary or permanent fills or structures), then construction will consider relocating potentially impacted native aquatic resources in conjunction with a *Permit to Introduce Fish, Shellfish or Aquatic Plants into Public Waters* and an ARRP. If this occurs, then the ARRP will be

completed and approved by TPWD **30 days prior to activity within project waters and/or resource relocation** and submitted with an application for a no-cost *Permit to Introduce Fish, Shellfish, or Aquatic Plants into Public Waters*. ARRs can be submitted to Travis Tidwell, TPWD Region 1 KAST Biologist at (512) 389-8612 or Travis.Tidwell2@tpwd.texas.gov.

Federal Regulations - Migratory Bird Treaty Act (MBTA)

The U.S. Fish and Wildlife Service (USFWS) Migratory Bird Office can be contacted at (505) 248-7882 for more information on potential impacts to migratory birds.

Recommendation: TPWD recommends excluding vegetation clearing activities during the general bird nesting season, March 15 through September 15, to avoid adverse impacts to breeding birds. If clearing vegetation during the migratory bird nesting season is unavoidable, TPWD recommends surveying the area proposed for disturbance to ensure that no nests with eggs or young will be disturbed by operations. TPWD recommends performing active bird nest surveys no more than five days prior to planned clearing or construction.

TPWD recommends that a minimum 150-foot buffer of vegetation remain around any nests that are observed prior to disturbance. Any vegetation (such as trees, shrubs, and grasses) or other open areas where occupied nests are located should not be disturbed until the eggs have hatched and the young have fledged.

As previously mentioned, prior to construction, TPWD recommends performing daytime surveys for nests, including under bridges and in culverts, to determine if they are active before removal. Nests that are active should not be disturbed. TPWD recommends avoiding the removal of unoccupied, inactive nests, as practicable. TPWD also recommends the project proponent prevent the establishment of active nests during the nesting season on any bridges, culverts, or other structures proposed for disturbance during construction activities. Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.

State Regulations - State-Listed Species

TPW Code Section 64.002, regarding protection of nongame birds, provides that no person may catch, kill, injure, pursue, or possess a bird that is not a game bird. TPW Code Section 64.003, regarding destroying nests or eggs, provides that, no person may destroy or take the nests, eggs, or young and any wild game bird, wild bird, or wild fowl. TPW Code Chapter 64 does not allow for incidental take and therefore is more restrictive than the MBTA.

Recommendation: Please review the *Migratory Bird Treaty Act* section above for recommendations as they are also applicable for Chapter 64 of the TPW Code compliance.

Response: No nest or signs of nest were observed during the site visit. If nests are observed during construction, activities will cease and TPWD will be contacted. Additionally, the site will be surveyed, no more than five days prior to planned clearing or construction, preferably during daytime for nests, including under bridges and in culverts, to determine if they are active prior to construction activities and ensure Migratory Bird Treaty Act (MBTA) compliance. Should a nest be observed, a minimum 150-foot buffer of vegetation will remain around any nests prior to disturbance. Any vegetation (such as trees, shrubs, and grasses) or other open areas where occupied nests are located should not be disturbed until the eggs have hatched and the young have fledged.

Parks and Wildlife Code, Section 68.015 – State-listed Species

TPW Code regulates state-listed threatened and endangered animal species. The capture, trap, take, or killing of state-listed threatened and endangered animal species is unlawful unless expressly authorized under a permit issued by USFWS or TPWD. The *TPWD Guidelines for Protection of State-Listed Species*, which includes a list of penalties for take of species, can be found on the Wildlife Habitat Assessment Program website. State-listed species may only be handled by persons with authorization obtained through TPWD. For more information on this permit, please contact the Wildlife Permits Office at (512) 389-4647.

Cagle's map turtle (*Graptemys caglei*)

There may be suitable habitat for the state-listed Cagle's map turtle within the project area. This species is endemic and found within the Guadalupe River System. This species inhabits shallow water with swift to moderate flow and gravel or cobble bottom as well as areas connected by deeper pools with a slower flow rate and a silt or mud bottom. Gravel bar riffles and transition areas between riffles and pools are especially important in providing insect prey items. Cagle's map turtles nest on gently sloping sand banks within approximately 30' feet of the water's edge.

Recommendation: TPWD recommends implementing the following beneficial management practices (BMPs) to avoid and/or minimize potential impacts to the Cagle's map turtle that could occur as a result of the construction of the proposed project:

- Avoid impacts to logs and rocks as Cagle's map turtles like to use these for basking.
- TPWD recommends paying particular attention to gravel bars or riffle habitat in streams around where construction-related disturbance may occur. This type of habitat is thought to be critical for the Cagle's map turtle. TPWD recommends avoiding impacts to gravel bars and riffle habitat in the project area.
- During construction, trucks and equipment should use existing bridge or culvert structures to cross creeks, and equipment staging areas should be located in previously disturbed areas outside of riparian corridors.
- Cagle's map turtles nest on gently sloping sand banks within approximately 30' feet of the water's edge. TPWD recommends avoiding disturbance of banks to avoid disturbing nesting turtles or their nests.
- TPWD recommends avoiding construction during the breeding and nesting season of this species (spring and summer). Cagle's map turtles breed in spring and early summer and then the eggs incubate through the spring and summer months.
- TPWD recommends having a permitted biological monitor on-site that is familiar with the identification of this species and that can relocate the Cagle's map turtle to a nearby area with similar habitat that would not be disturbed during construction. TPWD recommends that any translocations of reptiles be the minimum distance possible, no greater than one mile, preferably within 100 to 200 yards from the initial encounter location.

Response: A review of the project area prior to construction will occur to determine if a permitted biologist is needed to facilitate a plan of action for translocating reptiles or other species living in the project area at Richmond Branch. Construction will consider habitat for reptiles in the area and take precautions to prevent impact.

Species of Greatest Conservation Need

In addition to state and federally-protected species, TPWD tracks Species of Greatest Conservation Need (SGCN) and other special features and natural communities that are not listed as threatened or endangered. These species and communities are tracked in the TXNDD, and TPWD actively promotes their conservation. TPWD considers it important to evaluate and, if necessary, minimize

impacts to SGCN and their habitat to reduce the likelihood of endangerment and preclude the need to list as threatened or endangered in the future. There may be suitable habitat for the following bat SGCN within the project area:

- Eastern red bat (*Lasiurus borealis*)
- Big brown bat (*Eptesicus fuscus*)
- Hoary bat (*Lasiurus cinereus*)
- Cave myotis bat (*Myotis velifer*)
- Mexican free-tailed bat (*Tadarida brasiliensis*)
- Tricolored bat (*Perimyotis subflavus*)
- Big free-tailed bat (*Nyctinomops macrotis*)
- Mexican long-tongued bat (*Choeronycteris mexicana*)

Adverse impacts to bats, such as habitat loss, are being compounded due to a deadly disease known as white-nose syndrome (WNS). This disease is associated with the fungus, *Pseudogymnoascus destructans*, which appears to impact certain species of hibernating bats and frequently results in death of the infected bats. This fungus has wiped out entire colonies of hibernating bats in states east of Texas. As of May 2019, the fungus that causes WNS has been detected in 22 Texas Counties and as of March 5, 2020 TPWD biologists have confirmed the WNS disease in a Texas bat. The infected bat was a cave myotis found dead in Central Texas (Gillespie County). Bats appear to spread WNS among colonies and roosts; however, there is evidence that humans can transport the fungus on their shoes, gear, and clothing after entering infected bat caves and roosts. TPWD is concerned that WNS could be spread by personnel or consultants working on development projects in states where WNS has been detected, and then inadvertently bring the fungus to Texas on gear or clothing that has not been properly decontaminated.

To determine the appropriate BMP to avoid or minimize impacts to bats, review the habitat descriptions for the above-listed species on the TPWD county list or other trusted resources. All bat surveys and other activities that include direct contact with bats shall comply with TPWD-recommended WNS protocols located on the TPWD Wildlife Habitat Assessment Program website under “Project Design and Construction”.

The following survey and exclusion protocols should be followed prior to commencement of construction activities. For the purposes of this letter, structures are defined as bridges, culverts (concrete or metal), wells, and buildings. For activities that have the potential to impact structures, cliffs or caves, or trees; a qualified biologist should perform a habitat assessment and occupancy survey of the feature(s) with roost potential as early in the planning process as possible or within one year before construction is scheduled to begin.

Recommendation: TPWD recommends surveying the project limits for potential bat habitat. Surveys should be conducted by a qualified biologist to determine roost site potential and occupancy. Bat surveys of structures or features should include visual inspections for the presence of bats. If bats are present or recent signs of occupation (i.e., piles of guano, distinct musky odor, or staining and rub marks at potential entry points) are observed, take appropriate measures to ensure that bats are not harmed, such as implementing non-lethal exclusion activities or timing or phasing of construction. For roosts where occupancy is strongly suspected but unconfirmed during the initial survey, revisit feature(s) at most four weeks prior to scheduled disturbance to confirm absence of bats.

Recommendation: For exclusion of bats, TPWD recommends locating and sealing the entrances through which bats make ingress or egress. Before excluding bats from any occupied structure/feature, bat species, weather, temperature, season, and geographic location must be incorporated into any exclusion plans to avoid unnecessary harm or death to bats. Winter exclusion must entail a survey to confirm either, 1) bats are absent or 2) present but active (i.e. continuously active – not intermittently active due to arousals from hibernation). Prior to exclusion, ensure that

alternate roosting habitat is available in the immediate area. If no suitable roosting habitat is available, install alternate roosts to mitigate for the loss of an occupied roost. If alternate roost sites are not provided, bats may seek shelter in other inappropriate sites, such as buildings, in the surrounding area.

Exclusion devices can be installed by a qualified individual between September 1 and March 31. Exclusion devices should be used for a minimum of seven days when minimum nighttime temperatures are above 50°F and minimum daytime temperatures are above 70°F. TPWD offers the following beneficial practices regarding bat exclusion devices and activities:

- Avoid using materials that degrade quickly, like paper, steel wool or rags, to close holes.
- Avoid using products or making structural modifications that may block natural ventilation, like hanging plastic sheeting over an active roost entrance, thereby altering roost microclimate.
- Avoid using chemical and ultrasonic repellents.
- Avoid use of silicone, polyurethane or similar non-water-based caulk products.
- Avoid use of expandable foam products at occupied sites.
- Avoid the use of flexible netting attached with duct tape.
- In order to avoid entombing bats, exclusion activities should be only implemented by a qualified individual. A qualified individual or company should possess at least the following minimum qualifications:
 - Experience in bat exclusion (the individual, not just the company).
 - Proof of rabies pre-exposure vaccinations.
 - Demonstrated knowledge of the relevant bat species, including maternity season date range and habitat requirements.
 - Demonstrated knowledge of rabies and histoplasmosis in relation to bat roosts.
 - Contact TPWD for additional resources and information to assist in executing successful bat exclusions that will avoid unnecessary harm or death in bats.

Response: A review of the project area prior to construction will occur to determine if a permitted biologist is needed to facilitate a plan of action for determining if bats are present at the project site. Project will incorporate steps provided by TPWD. Construction will consider habitat for bats in the area and take precautions to prevent impact and to determine how to mitigate for loss of roost.

Texas map turtle (*Graptemys versa*)

There may be suitable habitat for the Texas map turtle within the project area. TPWD notes that there is a research-grade iNaturalist (www.inaturalist.org) observation for this species located approximately 8 miles from the project area within Hays County. The Texas map turtle is found only within the Edwards Plateau region of Central Texas and these turtles stay within close proximity of the Colorado River drainage area. They prefer shallow waterways with riffle systems and abundant vegetation. When not in the water, they are often found basking on snags or logs.

Recommendation: TPWD recommends referring to the recommendations listed above for the Cagle's map turtle as those recommendations are applicable to the Texas map turtle as well.

Response: A review of the project area prior to construction will occur to determine if a permitted biologist is needed to facilitate a plan of action for translocating reptiles or other species living in the project area at Richmond Branch. Construction will consider habitat for reptiles in the area and take precautions to prevent impact.

Western box turtle (*Terrapene ornata*)

TPWD notes that there are several research-grade iNaturalist observations for the western box turtle located within Hays County. The western box turtle occurs throughout Texas, typically in open habitats such as prairie grasslands, pastures, fields, sandhills, and open woodlands. Adults have a home-range size of approximately 6 to 14 acres. This species is active spring through fall with courtship and mating occurring primarily in the spring. For shelter, they burrow into soil (e.g., under plants such as yucca) or enter burrows made by other species.

Eggs are laid in nests dug in soft well-drained soil in open areas. Western box turtles are threatened by habitat loss and fragmentation, vehicle strikes on roads, and collection for the pet trade and food markets. The project area may provide suitable habitat for this species.

Eastern box turtle (*Terrapene carolina*)

TPWD notes that there are research-grade iNaturalist observations for the eastern box turtle located within Hays County. The eastern box turtle occurs typically in woodlands, forest edges, and brushy areas. Adults have a home-range size of approximately 2 to 5 acres. Eastern box turtles are active spring through fall with nesting occurring in late spring-early summer. Eastern box turtles are threatened by habitat loss and fragmentation, vehicle strikes on roads, and collection for the pet trade and food markets. The project area may provide suitable habitat for this species.

Recommendation: TPWD recommends identifying locations of burrows on the project site and avoiding impacts to burrows if feasible. TPWD also recommends reducing speed limits in the project area to at least 15 mph to help prevent vehicle-induced mortality of the eastern and western box turtle, as well as any other wildlife species that may be crossing the road within the project area. TPWD recommends that any translocations of reptiles be the minimum distance possible no greater than one mile, preferably within 100 to 200 yards from the initial encounter location.

Response: A review of the project area prior to construction will occur to determine if a permitted biologist is needed to facilitate a plan of action for translocating reptiles or other species living in the project area at Richmond Branch. Construction will consider habitat for reptiles in the area and take precautions to prevent impact.

Strecker's chorus frog (*Pseudacris streckeri*)

There may be suitable habitat for Strecker's chorus frog within the project area. Strecker's chorus frog inhabits moist terrestrial habitats including moist woods, sand prairies, ravines, cultivated areas, and habitats surrounding streams, swamps, and ponds. Flooded fields, ditches, sloughs, small ponds, and wetlands are used for breeding. Breeding season is generally late winter through early spring. When inactive, the Strecker's chorus frog burrows into the soil.

Rare, Threatened, and Endangered Species of Texas by County online application (RTEST or TPWD county list), not just state and federally-listed species, and to determine if those species have habitat within the project area and if those species have the potential to be impacted by the construction of the proposed project.

Recommendation: Please review the TPWD county list for Hays County because species in addition to those discussed in this letter could be present within the project area depending upon habitat availability. TPWD recommends including a discussion and evaluation of potential impacts to SGCN (in addition to state-listed and federally-listed species) for all projects coordinated with this office. The USFWS should be contacted for species occurrence data, guidance, permitting, survey protocols, and mitigation for federally-listed species.

Determining the actual presence of a species in a given area depends on many variables including daily and seasonal activity cycles, environmental activity cues, preferred habitat, transiency and population density (both wildlife and human). The absence of a species can be demonstrated only

with great difficulty and then only with repeated negative observations, considering all the variable factors contributing to the lack of detectable presence. If encountered during construction, measures should be taken to avoid impacting all wildlife, regardless of listing status.

Response:

The Rare, Threatened, and Endangered Species of Texas for Hays County has been researched along with the USFWS IPaC listing. There are no critical habitats located within the project area. The RTEST list reflects there are six species (three endangered and three threatened).

As pointed out in the request, the TPWD RTEST online listing was referenced for the request. It pointed out that the list provided to TPWD for consultation included those species with possible habitats consistent with the project area. Species that did not have consistent habitats as identified by NRCS soils data review, TPWD Teams Database review, the RTEST listing, as well as site visit photos provided with the submittal were not included in the list.

Texas Natural Diversity Database

The TXNDD is intended to assist users in avoiding harm to rare species or significant ecological features. Given the small proportion of public versus private land in Texas, the TXNDD does not include a representative inventory of rare resources in the state. Absence of information in the database does not imply that a species is absent from that area. Although it is based on the best data available to TPWD regarding rare species, the data from the TXNDD do not provide a definitive statement as to the presence, absence or condition of special species, natural communities, or other significant features within your project area. These data are not inclusive and **cannot be used as presence/absence data**. They represent species that could potentially be in your project area. This information cannot be substituted for field surveys.

Recommendation: The TXNDD is updated continuously based on new, updated and undigitized records; therefore, TPWD recommends requesting the most recent TXNDD data on a regular basis. For questions regarding a record or to request the most recent data, please contact TexasNatural.DiversityDatabase@tpwd.texas.gov.

Recommendation: To aid in the scientific knowledge of a species' status and current range, TPWD encourages project proponents and their contractors report all encounters of SGCN, state-listed, and federally-listed species to the TXNDD according to the data submittal instructions found on the TXNDD website.

Response: The TXNDD listing was provided with the request for consultation and it was determined that there is one study area within five miles of the project area. This includes the Texas Garter Snake. As identified by the TPWD response letter, there may be suitable habitat for the Texas garter snake within the project area. This species prefers marshy, flooded pastureland or meadows, particularly in spring when frogs are present in numbers and at other times prefers grassy or brushy terrain near hill country streams and ponds. The Texas garter snake seems to prefer vicinity of permanent sources of water or soil damp enough to support earthworm populations.

Recommendation: TPWD recommends avoiding disturbance of the Texas garter snake if found during clearing and construction. Because snakes are generally perceived as a threat and killed when encountered, and since the project area contains suitable habitat for the Texas garter snake, TPWD recommends construction personnel and contractors be advised to avoid injury or harm to all snakes encountered during clearing and construction. Injury to humans usually occurs when the snake becomes agitated following harassment or when someone attempts to handle a recently dead venomous snake that still contains its bite reflex. Therefore, contractors should avoid contact with snakes if encountered and allow all native snakes to safely leave the premises.

Response: Construction personnel and contractors will be advised to avoid injury or harm to all snakes encountered during clearing and construction. Injury to humans usually occurs when the snake becomes agitated following harassment or when someone attempts to handle a recently dead venomous snake that still contains its bite reflex. Therefore, contractors will avoid contact with snakes if encountered and allow all native snakes to safely leave the premises.

The project includes replacement of culverts to increase capacity. However, there are no bridges involved so no riprap will be installed under bridges. However, where riprap is installed it will prevent negative impact to aquatic and terrestrial wildlife where possible.

Response: No native aquatic resources will be relocated as the work is limited to culvert replacement and erosion control at that location. The City does not intend to introduce fish, shellfish or aquatic plants to the area. If needed however, TPWD will be contacted and/or ARRP will be submitted to TPWD in accordance with requirements.

Response: Industry specific mitigation will be used to return the area to its original condition. Reseeding the area with native grasses to prevent erosion and soil stabilization will occur as possible consistent with current BMP and methodologies that prevent impact to wildlife. Interest will be paid to monitoring for potential wildlife or other animals that may wander onsite. The activities are not intended for site cleanup.

Sincerely,

Latrice Hertzler

Future Link Technologies, Inc



Future Link Technologies

Environmental and Technology Consulting

July 28, 2020

Jessica E. Schmerler
Texas Parks and Wildlife Department
Wildlife Habitat Assessment Program - Wildlife Division
4200 Smith School Road
Austin, Texas 78744

RE: TPWD – City of Kyle Windy Hill Road Improvements
Reply to Consultation letter dated 7/16/20, TPWD project number 44183

Dear Ms. Schmerler,

Thank you so much for the response to the request for consultation in your letter dated, July 16, 2020. We sincerely appreciate all input in order to support ongoing environmental and ecological stewardship during and following construction project.

As acknowledgement of the TPWD additional recommendations, responses are provided below:

General Construction Recommendations

Recommendation: TPWD recommends the judicious use and placement of sediment control fence to exclude wildlife from the construction area. In many cases, sediment control fence placement for the purposes of controlling erosion and protecting water quality can be modified minimally to also provide the benefit of excluding wildlife access to construction areas. The exclusion fence should be buried at least six inches and be at least 24 inches high. The exclusion fence should be maintained for the life of the project and only removed after the construction is completed and the disturbed site has been revegetated with site-specific native species. Construction personnel should be encouraged to examine the inside of the exclusion area daily to determine if any wildlife species have been trapped inside the area of impact and provide safe egress opportunities prior to initiation of construction activities. TPWD recommends that any open trenches or excavation areas be covered overnight and/or inspected every morning to ensure no wildlife species have been trapped. For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees (1:1) in areas left uncovered. Also, inspect excavation areas for trapped wildlife prior to refilling.

Response: The City of Kyle (the City) will ensure sediment control fencing placement to prevent erosion and to ensure wildlife access to construction areas is minimized. Fencing will be installed for temporary controls during construction but will be removed after construction is complete. Review of any exclusion areas will occur daily to determine if any wildlife species have been trapped inside the area of impact and provide safe egress opportunities prior to initiation of construction activities. Where possible, open trenches will be covered nightly and where no covers can occur, where possible, sloped areas will be incorporated into the trench for easy escape by any potentially

trapped species. Trench areas will be examined prior to refilling to ensure no trapped species are impacted.

Recommendation: For soil stabilization and/or revegetation of disturbed areas within the proposed project area, TPWD recommends erosion and seed/mulch stabilization materials that avoid entanglement hazards to snakes and other wildlife species. Because the mesh found in many erosion control blankets or mats pose an entanglement hazard to wildlife TPWD recommends the use of no-till drilling, hydromulching and/or hydroseeding rather than erosion control blankets or mats due to a reduced risk to wildlife. If erosion control blankets or mats will be used, the product should contain no netting or contain loosely woven, natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic mesh matting should be avoided.

Response: Sediment control technologies that incorporate best management practices wherein human, domestic animal and wildlife impact are protected will be utilized where necessary; this includes silt fencing and riprap. If erosion control blankets are used, no plastic mesh matting will be used. Routine monitoring of the site will occur for safety.

Impacts to Vegetation/Wildlife Habitat

Recommendation: TPWD recommends reducing the amount of vegetation proposed for clearing if possible and minimizing clearing of native vegetation, particularly mature native trees, riparian vegetation, and shrubs to the greatest extent practicable. TPWD recommends in-kind on-site replacement/restoration of the native vegetation wherever practicable. Colonization by invasive species, particularly invasive grasses and weeds, should be actively prevented. Vegetation management should include removing invasive species early on while allowing the existing native plants to revegetate the disturbed areas. TPWD recommends referring to the Lady Bird Johnson Wildflower Center Native Plant Database for regionally adapted native species that would be appropriate for landscaping and revegetation.

Landscaping for Monarch Butterflies

Significant declines in the population of migrating monarch butterflies (*Danaus plexippus*) have led to widespread concern about this species and the long-term persistence of the North American monarch migration. As part of an international conservation effort TPWD has developed the *Texas Monarch and Native Pollinator Conservation Plan*, and one of the broad categories of action in this plan is to augment larval feeding and adult nectaring opportunities.

Recommendation: TPWD recommends incorporating pollinator conservation and management into the revegetation and maintenance plan for this project, such as promoting growth of native flowering species throughout the growing season. TPWD recommends revegetation efforts include planting or seeding native milkweed (*Asclepias* spp.) and nectar plants as funding and seed availability allow. Information about monarch biology, migration, and butterfly gardening can be found on the Monarch Watch website.

Recommendation: TPWD advises against planting the non-native milkweed species black swallow-wort (*Cynanchum louiseae*) and pale swallow-wort (*C. rossicum*). Monarch butterflies will lay eggs on these plant species, but the larvae are unable to feed and complete their life cycle. Additionally, these plant species can be highly invasive. Additionally, TPWD advises against planting the non-native tropical milkweed (*Asclepias curassavica*), a popular commercial nursery milkweed that can persist year-round in southern states. The year-round persistence of tropical milkweed fosters greater transmission of the protozoan *Ophryocystis elektroscirrha* (OE), increasing the likelihood that monarchs become infected with the debilitating parasite.

Response: Where possible in-kind on-site replacement/restoration of the native vegetation will occur wherever practicable. Where necessary, the project will use available resources such as the Lady Bird Johnson Wildflower Center Native Plant Database which provide native plant references to revegetate and landscape the area. Where possible, the City will select vegetation consistent with Monarch butterfly habitat.

Water Resources

As previously mentioned, the project proposes to remove and replace existing culverts and will replace the existing bridge over Richmond Branch with a wider bridge containing 5 box culverts, concrete headwalls and erosion controls.

Recommendation: TPWD would like to include the following stream crossing recommendations to assist in project planning:

- Use spanning bridges rather than culverts when feasible.
- If using a culvert, staggered culverts that concentrate low flows but provide conveyance of higher flows through staggered culverts placed at higher elevations is recommended.
- Bottomless culverts are recommended to allow for fish and other aquatic wildlife passage in the low flow channel. If bottomless culverts are not feasible, making a low flow channel for fish passage is recommended.
- Avoid placing riprap across stream channels and instead use alternative stabilization such as biotechnical stream bank stabilization methods including live native vegetation or a combination of vegetative and structural materials. When riprap or other bank stabilization devices are necessary, their placement should not impede the movement of aquatic and terrestrial wildlife underneath the bridge. In some instances, riprap may be buried, back-filled with topsoil and planted with native vegetation.
- Incorporate bat-friendly design into bridges and culverts.
- Design bridges for adequate vertical and horizontal clearances under the roadway to allow for terrestrial wildlife to safely pass under the road.
- A span wide enough to cross the stream and allow for dry ground and a natural surface path under the roadway is encouraged. For culverts, incorporation of an artificial ledge inside the culvert on one or both sides for use by terrestrial wildlife is recommended.
- Riparian buffer zones should remain undisturbed where possible.

Recommendation: All waterways and associated floodplains, riparian corridors, springs, and wetlands, regardless of their jurisdictional status, provide valuable wildlife habitat and should be protected to the maximum extent possible. Natural buffers contiguous to any wetlands or aquatic systems should remain undisturbed to preserve wildlife cover, food sources, and travel corridors.

During construction, trucks and equipment should use existing bridge or culvert structures to cross creeks, and equipment staging areas should be located in previously disturbed areas outside of riparian corridors. Destruction of inert microhabitats in waterways such as snags, brush piles, fallen logs, creek banks, pools, and gravel stream bottoms should be avoided, as these provide habitat for a variety of fish and wildlife species and their food sources. Erosion controls and sediment runoff control measures should be installed prior to construction and maintained until disturbed areas are permanently revegetated using site-specific native vegetation. Measures should be properly installed in order to effectively minimize the amount of sediment and other debris entering the waterway.

Response: Where possible, construction will prevent impact to riparian buffer zones and will not impede water flow, but planned to facilitate improved water flow in a controlled environment. In

addition, a primary focus of the project is to prevent erosion and reduce the amount of runoff as much as possible. Water velocities are also a major focus of construction as these increased velocities cause additional erosion. Improved conditions at the site along mow strips will include cleanout of existing ditches and riprap that serves to slow water intensity.

The project does not include placing riprap across stream channels but does include placing riprap along embankments for erosion controls. Native vegetation will be added to the project site where possible. Measures to support wildlife in the area may occur where possible.

State Regulations - Aquatic Resources

As indicated in the project description, the proposed project has the potential to impact aquatic resources within Richmond Branch. TPW Code Section 1.011 grants TPWD authority to regulate and conserve aquatic animal life of public waters. Title 31, Chapter 57, Subchapter B, Section 57.157 of Texas Administrative Code (TAC) regulates take of mussels, including mussels that are not state-listed threatened or endangered.

TPW Code Sections 12.015, 12.019, 66.015 and TAC 52.101-52.105, 52.202, and 57.251-57.259 regulate the introduction and stocking of fish, shellfish, and aquatic plants into public waters of the state. Dewatering activities can impact aquatic resources through stranding fish and mussels. Other harmful construction activities can trample, dredge or fill areas exhibiting stationary aquatic resources such as plants and mussels. Relocating aquatic life to an area of suitable habitat outside the project footprint avoids or reduces impacts to aquatic life. Relocation activities are done under the authority of a TPWD *Permit to Introduce Fish, Shellfish or Aquatic Plants into Public Waters* to ensure that natural resource risks associated with relocation area alleviated. Aquatic Resource Relocation Plans (ARRPs) dictate resource handling activities, assist in the permitting process, and are coordinated through the TPWD Kills and Spills Team (KAST). If dewatering activities or other project-related activities cause mortality to fish and wildlife species, then the responsible party would be subject to investigation by the TPWD KAST and will be liable for the value of the lost resources under the authority of TPW Code Sections 12.0011 (b) (1) and 12.301.

Since a portion of this project will take place within Richmond Branch, the project may be subject to coordination with TPWD KAST. For additional information please see the TPWD KAST website and *TPWD Guidelines for Aquatic Resource Relocation Plans for Fish and Shellfish, Including Freshwater Mussels*. Impact avoidance measures for aquatic organisms, including **all** native freshwater mussel and fish species, regardless of state-listing status, should be considered during project planning and construction activities.

Recommendation: TPWD recommends constructing the new bridge when the stream is dry. If construction occurs during times when water is present in Richmond Branch and dewatering activities or other harmful construction activities are involved (such as trenching and placement of temporary or permanent fills or structures), then TPWD recommends relocating potentially impacted native aquatic resources in conjunction with a *Permit to Introduce Fish, Shellfish or Aquatic Plants into Public Waters* and an ARRP. The ARRP should be completed and approved by TPWD **30 days prior to activity within project waters and/or resource relocation** and submitted with an application for a no-cost *Permit to Introduce Fish, Shellfish, or Aquatic Plants into Public Waters*. ARRPs can be submitted to Travis Tidwell, TPWD Region 1 KAST Biologist at (512) 389-8612 or Travis.Tidwell2@tpwd.texas.gov.

Response: Construction is intended to occur during dry months in order to prevent impact to aquatic life. In the event construction occurs when water is present in Richmond Branch and dewatering activities or other harmful construction activities are involved (such as trenching and placement of temporary or permanent fills or structures), then construction will consider relocating potentially impacted native aquatic resources in conjunction with a *Permit to Introduce Fish, Shellfish or Aquatic Plants into Public Waters* and an ARRP. If this occurs, then the ARRP will be

completed and approved by TPWD **30 days prior to activity within project waters and/or resource relocation** and submitted with an application for a no-cost *Permit to Introduce Fish, Shellfish, or Aquatic Plants into Public Waters*. ARRs can be submitted to Travis Tidwell, TPWD Region 1 KAST Biologist at (512) 389-8612 or Travis.Tidwell2@tpwd.texas.gov.

Federal Regulations - Migratory Bird Treaty Act (MBTA)

The U.S. Fish and Wildlife Service (USFWS) Migratory Bird Office can be contacted at (505) 248-7882 for more information on potential impacts to migratory birds.

Recommendation: TPWD recommends excluding vegetation clearing activities during the general bird nesting season, March 15 through September 15, to avoid adverse impacts to breeding birds. If clearing vegetation during the migratory bird nesting season is unavoidable, TPWD recommends surveying the area proposed for disturbance to ensure that no nests with eggs or young will be disturbed by operations. TPWD recommends performing active bird nest surveys no more than five days prior to planned clearing or construction.

TPWD recommends that a minimum 150-foot buffer of vegetation remain around any nests that are observed prior to disturbance. Any vegetation (such as trees, shrubs, and grasses) or other open areas where occupied nests are located should not be disturbed until the eggs have hatched and the young have fledged.

As previously mentioned, prior to construction, TPWD recommends performing daytime surveys for nests, including under bridges and in culverts, to determine if they are active before removal. Nests that are active should not be disturbed. TPWD recommends avoiding the removal of unoccupied, inactive nests, as practicable. TPWD also recommends the project proponent prevent the establishment of active nests during the nesting season on any bridges, culverts, or other structures proposed for disturbance during construction activities. Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.

State Regulations - State-Listed Species

TPW Code Section 64.002, regarding protection of nongame birds, provides that no person may catch, kill, injure, pursue, or possess a bird that is not a game bird. TPW Code Section 64.003, regarding destroying nests or eggs, provides that, no person may destroy or take the nests, eggs, or young and any wild game bird, wild bird, or wild fowl. TPW Code Chapter 64 does not allow for incidental take and therefore is more restrictive than the MBTA.

Recommendation: Please review the *Migratory Bird Treaty Act* section above for recommendations as they are also applicable for Chapter 64 of the TPW Code compliance.

Response: No nest or signs of nest were observed during the site visit. If nests are observed during construction, activities will cease and TPWD will be contacted. Additionally, the site will be surveyed, no more than five days prior to planned clearing or construction, preferably during daytime for nests, including under bridges and in culverts, to determine if they are active prior to construction activities and ensure Migratory Bird Treaty Act (MBTA) compliance. Should a nest be observed, a minimum 150-foot buffer of vegetation will remain around any nests prior to disturbance. Any vegetation (such as trees, shrubs, and grasses) or other open areas where occupied nests are located should not be disturbed until the eggs have hatched and the young have fledged.

Parks and Wildlife Code, Section 68.015 – State-listed Species

TPW Code regulates state-listed threatened and endangered animal species. The capture, trap, take, or killing of state-listed threatened and endangered animal species is unlawful unless expressly authorized under a permit issued by USFWS or TPWD. The *TPWD Guidelines for Protection of State-Listed Species*, which includes a list of penalties for take of species, can be found on the Wildlife Habitat Assessment Program website. State-listed species may only be handled by persons with authorization obtained through TPWD. For more information on this permit, please contact the Wildlife Permits Office at (512) 389-4647.

Cagle's map turtle (*Graptemys caglei*)

There may be suitable habitat for the state-listed Cagle's map turtle within the project area. This species is endemic and found within the Guadalupe River System. This species inhabits shallow water with swift to moderate flow and gravel or cobble bottom as well as areas connected by deeper pools with a slower flow rate and a silt or mud bottom. Gravel bar riffles and transition areas between riffles and pools are especially important in providing insect prey items. Cagle's map turtles nest on gently sloping sand banks within approximately 30' feet of the water's edge.

Recommendation: TPWD recommends implementing the following beneficial management practices (BMPs) to avoid and/or minimize potential impacts to the Cagle's map turtle that could occur as a result of the construction of the proposed project:

- Avoid impacts to logs and rocks as Cagle's map turtles like to use these for basking.
- TPWD recommends paying particular attention to gravel bars or riffle habitat in streams around where construction-related disturbance may occur. This type of habitat is thought to be critical for the Cagle's map turtle. TPWD recommends avoiding impacts to gravel bars and riffle habitat in the project area.
- During construction, trucks and equipment should use existing bridge or culvert structures to cross creeks, and equipment staging areas should be located in previously disturbed areas outside of riparian corridors.
- Cagle's map turtles nest on gently sloping sand banks within approximately 30' feet of the water's edge. TPWD recommends avoiding disturbance of banks to avoid disturbing nesting turtles or their nests.
- TPWD recommends avoiding construction during the breeding and nesting season of this species (spring and summer). Cagle's map turtles breed in spring and early summer and then the eggs incubate through the spring and summer months.
- TPWD recommends having a permitted biological monitor on-site that is familiar with the identification of this species and that can relocate the Cagle's map turtle to a nearby area with similar habitat that would not be disturbed during construction. TPWD recommends that any translocations of reptiles be the minimum distance possible, no greater than one mile, preferably within 100 to 200 yards from the initial encounter location.

Response: A review of the project area prior to construction will occur to determine if a permitted biologist is needed to facilitate a plan of action for translocating reptiles or other species living in the project area at Richmond Branch. Construction will consider habitat for reptiles in the area and take precautions to prevent impact.

Species of Greatest Conservation Need

In addition to state and federally-protected species, TPWD tracks Species of Greatest Conservation Need (SGCN) and other special features and natural communities that are not listed as threatened or endangered. These species and communities are tracked in the TXNDD, and TPWD actively promotes their conservation. TPWD considers it important to evaluate and, if necessary, minimize

impacts to SGCN and their habitat to reduce the likelihood of endangerment and preclude the need to list as threatened or endangered in the future. There may be suitable habitat for the following bat SGCN within the project area:

- Eastern red bat (*Lasiurus borealis*)
- Big brown bat (*Eptesicus fuscus*)
- Hoary bat (*Lasiurus cinereus*)
- Cave myotis bat (*Myotis velifer*)
- Mexican free-tailed bat (*Tadarida brasiliensis*)
- Tricolored bat (*Perimyotis subflavus*)
- Big free-tailed bat (*Nyctinomops macrotis*)
- Mexican long-tongued bat (*Choeronycteris mexicana*)

Adverse impacts to bats, such as habitat loss, are being compounded due to a deadly disease known as white-nose syndrome (WNS). This disease is associated with the fungus, *Pseudogymnoascus destructans*, which appears to impact certain species of hibernating bats and frequently results in death of the infected bats. This fungus has wiped out entire colonies of hibernating bats in states east of Texas. As of May 2019, the fungus that causes WNS has been detected in 22 Texas Counties and as of March 5, 2020 TPWD biologists have confirmed the WNS disease in a Texas bat. The infected bat was a cave myotis found dead in Central Texas (Gillespie County). Bats appear to spread WNS among colonies and roosts; however, there is evidence that humans can transport the fungus on their shoes, gear, and clothing after entering infected bat caves and roosts. TPWD is concerned that WNS could be spread by personnel or consultants working on development projects in states where WNS has been detected, and then inadvertently bring the fungus to Texas on gear or clothing that has not been properly decontaminated.

To determine the appropriate BMP to avoid or minimize impacts to bats, review the habitat descriptions for the above-listed species on the TPWD county list or other trusted resources. All bat surveys and other activities that include direct contact with bats shall comply with TPWD-recommended WNS protocols located on the TPWD Wildlife Habitat Assessment Program website under “Project Design and Construction”.

The following survey and exclusion protocols should be followed prior to commencement of construction activities. For the purposes of this letter, structures are defined as bridges, culverts (concrete or metal), wells, and buildings. For activities that have the potential to impact structures, cliffs or caves, or trees; a qualified biologist should perform a habitat assessment and occupancy survey of the feature(s) with roost potential as early in the planning process as possible or within one year before construction is scheduled to begin.

Recommendation: TPWD recommends surveying the project limits for potential bat habitat. Surveys should be conducted by a qualified biologist to determine roost site potential and occupancy. Bat surveys of structures or features should include visual inspections for the presence of bats. If bats are present or recent signs of occupation (i.e., piles of guano, distinct musky odor, or staining and rub marks at potential entry points) are observed, take appropriate measures to ensure that bats are not harmed, such as implementing non-lethal exclusion activities or timing or phasing of construction. For roosts where occupancy is strongly suspected but unconfirmed during the initial survey, revisit feature(s) at most four weeks prior to scheduled disturbance to confirm absence of bats.

Recommendation: For exclusion of bats, TPWD recommends locating and sealing the entrances through which bats make ingress or egress. Before excluding bats from any occupied structure/feature, bat species, weather, temperature, season, and geographic location must be incorporated into any exclusion plans to avoid unnecessary harm or death to bats. Winter exclusion must entail a survey to confirm either, 1) bats are absent or 2) present but active (i.e. continuously active – not intermittently active due to arousals from hibernation). Prior to exclusion, ensure that

alternate roosting habitat is available in the immediate area. If no suitable roosting habitat is available, install alternate roosts to mitigate for the loss of an occupied roost. If alternate roost sites are not provided, bats may seek shelter in other inappropriate sites, such as buildings, in the surrounding area.

Exclusion devices can be installed by a qualified individual between September 1 and March 31. Exclusion devices should be used for a minimum of seven days when minimum nighttime temperatures are above 50°F and minimum daytime temperatures are above 70°F. TPWD offers the following beneficial practices regarding bat exclusion devices and activities:

- Avoid using materials that degrade quickly, like paper, steel wool or rags, to close holes.
- Avoid using products or making structural modifications that may block natural ventilation, like hanging plastic sheeting over an active roost entrance, thereby altering roost microclimate.
- Avoid using chemical and ultrasonic repellents.
- Avoid use of silicone, polyurethane or similar non-water-based caulk products.
- Avoid use of expandable foam products at occupied sites.
- Avoid the use of flexible netting attached with duct tape.
- In order to avoid entombing bats, exclusion activities should be only implemented by a qualified individual. A qualified individual or company should possess at least the following minimum qualifications:
 - Experience in bat exclusion (the individual, not just the company).
 - Proof of rabies pre-exposure vaccinations.
 - Demonstrated knowledge of the relevant bat species, including maternity season date range and habitat requirements.
 - Demonstrated knowledge of rabies and histoplasmosis in relation to bat roosts.
 - Contact TPWD for additional resources and information to assist in executing successful bat exclusions that will avoid unnecessary harm or death in bats.

Response: A review of the project area prior to construction will occur to determine if a permitted biologist is needed to facilitate a plan of action for determining if bats are present at the project site. Project will incorporate steps provided by TPWD. Construction will consider habitat for bats in the area and take precautions to prevent impact and to determine how to mitigate for loss of roost.

Texas map turtle (*Graptemys versa*)

There may be suitable habitat for the Texas map turtle within the project area. TPWD notes that there is a research-grade iNaturalist (www.inaturalist.org) observation for this species located approximately 8 miles from the project area within Hays County. The Texas map turtle is found only within the Edwards Plateau region of Central Texas and these turtles stay within close proximity of the Colorado River drainage area. They prefer shallow waterways with riffle systems and abundant vegetation. When not in the water, they are often found basking on snags or logs.

Recommendation: TPWD recommends referring to the recommendations listed above for the Cagle's map turtle as those recommendations are applicable to the Texas map turtle as well.

Response: A review of the project area prior to construction will occur to determine if a permitted biologist is needed to facilitate a plan of action for translocating reptiles or other species living in the project area at Richmond Branch. Construction will consider habitat for reptiles in the area and take precautions to prevent impact.

Western box turtle (*Terrapene ornata*)

TPWD notes that there are several research-grade iNaturalist observations for the western box turtle located within Hays County. The western box turtle occurs throughout Texas, typically in open habitats such as prairie grasslands, pastures, fields, sandhills, and open woodlands. Adults have a home-range size of approximately 6 to 14 acres. This species is active spring through fall with courtship and mating occurring primarily in the spring. For shelter, they burrow into soil (e.g., under plants such as yucca) or enter burrows made by other species.

Eggs are laid in nests dug in soft well-drained soil in open areas. Western box turtles are threatened by habitat loss and fragmentation, vehicle strikes on roads, and collection for the pet trade and food markets. The project area may provide suitable habitat for this species.

Eastern box turtle (*Terrapene carolina*)

TPWD notes that there are research-grade iNaturalist observations for the eastern box turtle located within Hays County. The eastern box turtle occurs typically in woodlands, forest edges, and brushy areas. Adults have a home-range size of approximately 2 to 5 acres. Eastern box turtles are active spring through fall with nesting occurring in late spring-early summer. Eastern box turtles are threatened by habitat loss and fragmentation, vehicle strikes on roads, and collection for the pet trade and food markets. The project area may provide suitable habitat for this species.

Recommendation: TPWD recommends identifying locations of burrows on the project site and avoiding impacts to burrows if feasible. TPWD also recommends reducing speed limits in the project area to at least 15 mph to help prevent vehicle-induced mortality of the eastern and western box turtle, as well as any other wildlife species that may be crossing the road within the project area. TPWD recommends that any translocations of reptiles be the minimum distance possible no greater than one mile, preferably within 100 to 200 yards from the initial encounter location.

Response: A review of the project area prior to construction will occur to determine if a permitted biologist is needed to facilitate a plan of action for translocating reptiles or other species living in the project area at Richmond Branch. Construction will consider habitat for reptiles in the area and take precautions to prevent impact.

Strecker's chorus frog (*Pseudacris streckeri*)

There may be suitable habitat for Strecker's chorus frog within the project area. Strecker's chorus frog inhabits moist terrestrial habitats including moist woods, sand prairies, ravines, cultivated areas, and habitats surrounding streams, swamps, and ponds. Flooded fields, ditches, sloughs, small ponds, and wetlands are used for breeding. Breeding season is generally late winter through early spring. When inactive, the Strecker's chorus frog burrows into the soil.

Rare, Threatened, and Endangered Species of Texas by County online application (RTEST or TPWD county list), not just state and federally-listed species, and to determine if those species have habitat within the project area and if those species have the potential to be impacted by the construction of the proposed project.

Recommendation: Please review the TPWD county list for Hays County because species in addition to those discussed in this letter could be present within the project area depending upon habitat availability. TPWD recommends including a discussion and evaluation of potential impacts to SGCN (in addition to state-listed and federally-listed species) for all projects coordinated with this office. The USFWS should be contacted for species occurrence data, guidance, permitting, survey protocols, and mitigation for federally-listed species.

Determining the actual presence of a species in a given area depends on many variables including daily and seasonal activity cycles, environmental activity cues, preferred habitat, transiency and population density (both wildlife and human). The absence of a species can be demonstrated only

with great difficulty and then only with repeated negative observations, considering all the variable factors contributing to the lack of detectable presence. If encountered during construction, measures should be taken to avoid impacting all wildlife, regardless of listing status.

Response:

The Rare, Threatened, and Endangered Species of Texas for Hays County has been researched along with the USFWS IPaC listing. There are no critical habitats located within the project area. The RTEST list reflects there are six species (three endangered and three threatened).

As pointed out in the request, the TPWD RTEST online listing was referenced for the request. It pointed out that the list provided to TPWD for consultation included those species with possible habitats consistent with the project area. Species that did not have consistent habitats as identified by NRCS soils data review, TPWD Teams Database review, the RTEST listing, as well as site visit photos provided with the submittal were not included in the list.

Texas Natural Diversity Database

The TXNDD is intended to assist users in avoiding harm to rare species or significant ecological features. Given the small proportion of public versus private land in Texas, the TXNDD does not include a representative inventory of rare resources in the state. Absence of information in the database does not imply that a species is absent from that area. Although it is based on the best data available to TPWD regarding rare species, the data from the TXNDD do not provide a definitive statement as to the presence, absence or condition of special species, natural communities, or other significant features within your project area. These data are not inclusive and **cannot be used as presence/absence data**. They represent species that could potentially be in your project area. This information cannot be substituted for field surveys.

Recommendation: The TXNDD is updated continuously based on new, updated and undigitized records; therefore, TPWD recommends requesting the most recent TXNDD data on a regular basis. For questions regarding a record or to request the most recent data, please contact TexasNatural.DiversityDatabase@tpwd.texas.gov.

Recommendation: To aid in the scientific knowledge of a species' status and current range, TPWD encourages project proponents and their contractors report all encounters of SGCN, state-listed, and federally-listed species to the TXNDD according to the data submittal instructions found on the TXNDD website.

Response: The TXNDD listing was provided with the request for consultation and it was determined that there is one study area within five miles of the project area. This includes the Texas Garter Snake. As identified by the TPWD response letter, there may be suitable habitat for the Texas garter snake within the project area. This species prefers marshy, flooded pastureland or meadows, particularly in spring when frogs are present in numbers and at other times prefers grassy or brushy terrain near hill country streams and ponds. The Texas garter snake seems to prefer vicinity of permanent sources of water or soil damp enough to support earthworm populations.

Recommendation: TPWD recommends avoiding disturbance of the Texas garter snake if found during clearing and construction. Because snakes are generally perceived as a threat and killed when encountered, and since the project area contains suitable habitat for the Texas garter snake, TPWD recommends construction personnel and contractors be advised to avoid injury or harm to all snakes encountered during clearing and construction. Injury to humans usually occurs when the snake becomes agitated following harassment or when someone attempts to handle a recently dead venomous snake that still contains its bite reflex. Therefore, contractors should avoid contact with snakes if encountered and allow all native snakes to safely leave the premises.

Response: Construction personnel and contractors will be advised to avoid injury or harm to all snakes encountered during clearing and construction. Injury to humans usually occurs when the snake becomes agitated following harassment or when someone attempts to handle a recently dead venomous snake that still contains its bite reflex. Therefore, contractors will avoid contact with snakes if encountered and allow all native snakes to safely leave the premises.

The project includes replacement of culverts to increase capacity. However, there are no bridges involved so no riprap will be installed under bridges. However, where riprap is installed it will prevent negative impact to aquatic and terrestrial wildlife where possible.

Response: No native aquatic resources will be relocated as the work is limited to culvert replacement and erosion control at that location. The City does not intend to introduce fish, shellfish or aquatic plants to the area. If needed however, TPWD will be contacted and/or ARRP will be submitted to TPWD in accordance with requirements.

Response: Industry specific mitigation will be used to return the area to its original condition. Reseeding the area with native grasses to prevent erosion and soil stabilization will occur as possible consistent with current BMP and methodologies that prevent impact to wildlife. Interest will be paid to monitoring for potential wildlife or other animals that may wander onsite. The activities are not intended for site cleanup.

Sincerely,

Latrice Hertzler

Future Link Technologies, Inc



Life's better outside.®

Commissioners

S. Reed Morian
Chairman
Houston

Arch "Beaver" Aplin, III
Vice-Chairman
Lake Jackson

James E. Abell
Kilgore

Oliver J. Bell
Cleveland

Anna B. Galo
Laredo

Jeffery D. Hildebrand
Houston

Jeanne W. Latimer
San Antonio

Robert L. "Bobby" Patton, Jr.
Fort Worth

Dick Scott
Wimberley

Lee M. Bass
Chairman-Emeritus
Fort Worth

T. Dan Friedkin
Chairman-Emeritus
Houston

Carter P. Smith
Executive Director

July 16, 2020

Ms. Latrice Hertzler, BAIS, MPA
Environmental Consultant
Future Link Technologies, Inc.
P.O. Box 90696
Austin, TX 78709

RE: City of Kyle – Windy Hill Road Improvements, Hays County, Texas
(DRSB16DH480001 - 19-280-000-B779)

Dear Ms. Hertzler:

Texas Parks and Wildlife Department (TPWD) has received the request for coordination regarding the proposed project referenced above located in Hays County. TPWD staff has reviewed the information provided and offers the following information, comments, and recommendations concerning this project.

Please be aware that a written response to a TPWD recommendation or informational comment received by a state governmental agency may be required by state law. For further guidance, see the Texas Parks and Wildlife (TPW) Code, Section 12.0011. For tracking purposes, please refer to TPWD project number 44183 in any return correspondence regarding this project.

Project Description

The information provided included the following project description:

“The City of Kyle shall reconstruct a portion of Windy Hill Road by removing and replacing existing culverts, the roadway, and approaches; when the roadway pavement and structure to add turn lane capacity, in stall railing and end treatments that meet TxDot standards; sidewalks; and perform associated appurtenances. Improvements total approximately two thousand one hundred (2100) linear feet.”

“Based on the proposed construction activities, this work will include replacing the existing bridge [over Richmond Branch] with a wider bridge containing 5 box culverts, concrete headwalls and erosion controls.”

General Construction Recommendations

TPWD would like to provide the following general construction recommendations to assist in project planning.

Recommendation: TPWD recommends the judicious use and placement of sediment control fence to exclude wildlife from the construction area. In many cases, sediment control fence placement for the purposes of controlling erosion

and protecting water quality can be modified minimally to also provide the benefit of excluding wildlife access to construction areas. The exclusion fence should be buried at least six inches and be at least 24 inches high. The exclusion fence should be maintained for the life of the project and only removed after the construction is completed and the disturbed site has been revegetated with site-specific native species. Construction personnel should be encouraged to examine the inside of the exclusion area daily to determine if any wildlife species have been trapped inside the area of impact and provide safe egress opportunities prior to initiation of construction activities. TPWD recommends that any open trenches or excavation areas be covered overnight and/or inspected every morning to ensure no wildlife species have been trapped. For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees (1:1) in areas left uncovered. Also, inspect excavation areas for trapped wildlife prior to refilling.

Recommendation: For soil stabilization and/or revegetation of disturbed areas within the proposed project area, TPWD recommends erosion and seed/mulch stabilization materials that avoid entanglement hazards to snakes and other wildlife species. Because the mesh found in many erosion control blankets or mats pose an entanglement hazard to wildlife, TPWD recommends the use of no-till drilling, hydromulching and/or hydroseeding due to a reduced risk to wildlife. If erosion control blankets or mats will be used, the product should not contain netting, but if it must contain netting it should contain loosely woven, natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. TPWD recommends avoiding the use of plastic mesh matting.

Impacts to Vegetation/Wildlife Habitat

TPWD would like to provide the following vegetation removal, revegetation, and landscaping recommendations to assist in project planning.

Recommendation: TPWD recommends reducing the amount of vegetation proposed for clearing if possible and minimizing clearing of native vegetation, particularly mature native trees, riparian vegetation, and shrubs to the greatest extent practicable. TPWD recommends in-kind on-site replacement/restoration of the native vegetation wherever practicable. Colonization by invasive species, particularly invasive grasses and weeds, should be actively prevented. Vegetation management should include removing invasive species early on while allowing the existing native plants to revegetate the disturbed areas. TPWD recommends referring to the Lady Bird Johnson Wildflower Center Native Plant Database for regionally adapted native species that would be appropriate for landscaping and revegetation.

Landscaping for Monarch Butterflies

Significant declines in the population of migrating monarch butterflies (*Danaus plexippus*) have led to widespread concern about this species and the long-term persistence of the North American monarch migration. As part of an international conservation effort TPWD has developed the *Texas Monarch and Native Pollinator Conservation Plan*, and one of the broad categories of action in this plan is to augment larval feeding and adult nectaring opportunities.

Recommendation: TPWD recommends incorporating pollinator conservation and management into the revegetation and maintenance plan for this project, such as promoting growth of native flowering species throughout the growing season. TPWD recommends revegetation efforts include planting or seeding native milkweed (*Asclepias* spp.) and nectar plants as funding and seed availability allow. Information about monarch biology, migration, and butterfly gardening can be found on the Monarch Watch website.

Recommendation: TPWD advises against planting the non-native milkweed species black swallow-wort (*Cynanchum louiseae*) and pale swallow-wort (*C. rossicum*). Monarch butterflies will lay eggs on these plant species, but the larvae are unable to feed and complete their life cycle. Additionally, these plant species can be highly invasive. Additionally, TPWD advises against planting the non-native tropical milkweed (*Asclepias curassavica*), a popular commercial nursery milkweed that can persist year-round in southern states. The year-round persistence of tropical milkweed fosters greater transmission of the protozoan *Ophryocystis elektroscirrha* (OE), increasing the likelihood that monarchs become infected with the debilitating parasite.

Water Resources

As previously mentioned, the project proposes to remove and replace existing culverts and will replace the existing bridge over Richmond Branch with a wider bridge containing 5 box culverts, concrete headwalls and erosion controls.

Recommendation: TPWD would like to include the following stream crossing recommendations to assist in project planning:

- Use spanning bridges rather than culverts when feasible.
- If using a culvert, staggered culverts that concentrate low flows but provide conveyance of higher flows through staggered culverts placed at higher elevations is recommended.
- Bottomless culverts are recommended to allow for fish and other aquatic wildlife passage in the low flow channel. If bottomless culverts are not feasible, making a low flow channel for fish passage is recommended.
- Avoid placing riprap across stream channels and instead use alternative stabilization such as biotechnical stream bank stabilization methods

including live native vegetation or a combination of vegetative and structural materials. When riprap or other bank stabilization devices are necessary, their placement should not impede the movement of aquatic and terrestrial wildlife underneath the bridge. In some instances, riprap may be buried, back-filled with topsoil and planted with native vegetation.

- Incorporate bat-friendly design into bridges and culverts.
- Design bridges for adequate vertical and horizontal clearances under the roadway to allow for terrestrial wildlife to safely pass under the road.
- A span wide enough to cross the stream and allow for dry ground and a natural surface path under the roadway is encouraged. For culverts, incorporation of an artificial ledge inside the culvert on one or both sides for use by terrestrial wildlife is recommended.
- Riparian buffer zones should remain undisturbed where possible.

Recommendation: All waterways and associated floodplains, riparian corridors, springs, and wetlands, regardless of their jurisdictional status, provide valuable wildlife habitat and should be protected to the maximum extent possible. Natural buffers contiguous to any wetlands or aquatic systems should remain undisturbed to preserve wildlife cover, food sources, and travel corridors. During construction, trucks and equipment should use existing bridge or culvert structures to cross creeks, and equipment staging areas should be located in previously disturbed areas outside of riparian corridors.

Destruction of inert microhabitats in waterways such as snags, brush piles, fallen logs, creek banks, pools, and gravel stream bottoms should be avoided, as these provide habitat for a variety of fish and wildlife species and their food sources. Erosion controls and sediment runoff control measures should be installed prior to construction and maintained until disturbed areas are permanently revegetated using site-specific native vegetation. Measures should be properly installed in order to effectively minimize the amount of sediment and other debris entering the waterway.

State Regulations - Aquatic Resources

As indicated in the project description, the proposed project has the potential to impact aquatic resources within Richmond Branch. TPW Code Section 1.011 grants TPWD authority to regulate and conserve aquatic animal life of public waters. Title 31, Chapter 57, Subchapter B, Section 57.157 of Texas Administrative Code (TAC) regulates take of mussels, including mussels that are not state-listed threatened or endangered.

TPW Code Sections 12.015, 12.019, 66.015 and TAC 52.101-52.105, 52.202, and 57.251-57.259 regulate the introduction and stocking of fish, shellfish, and aquatic plants into public waters of the state. Dewatering activities can impact aquatic resources through stranding fish and mussels. Other harmful construction activities can trample, dredge or fill areas exhibiting stationary aquatic resources such as

plants and mussels. Relocating aquatic life to an area of suitable habitat outside the project footprint avoids or reduces impacts to aquatic life. Relocation activities are done under the authority of a TPWD *Permit to Introduce Fish, Shellfish or Aquatic Plants into Public Waters* to ensure that natural resource risks associated with relocation area alleviated. Aquatic Resource Relocation Plans (ARRPs) dictate resource handling activities, assist in the permitting process, and are coordinated through the TPWD Kills and Spills Team (KAST). If dewatering activities or other project-related activities cause mortality to fish and wildlife species, then the responsible party would be subject to investigation by the TPWD KAST and will be liable for the value of the lost resources under the authority of TPW Code Sections 12.0011 (b) (1) and 12.301.

Since a portion of this project will take place within Richmond Branch, the project may be subject to coordination with TPWD KAST. For additional information please see the TPWD KAST website and *TPWD Guidelines for Aquatic Resource Relocation Plans for Fish and Shellfish, Including Freshwater Mussels*. Impact avoidance measures for aquatic organisms, including **all** native freshwater mussel and fish species, regardless of state-listing status, should be considered during project planning and construction activities.

Recommendation: TPWD recommends constructing the new bridge when the stream is dry. If construction occurs during times when water is present in Richmond Branch and dewatering activities or other harmful construction activities are involved (such as trenching and placement of temporary or permanent fills or structures), then TPWD recommends relocating potentially-impacted native aquatic resources in conjunction with a *Permit to Introduce Fish, Shellfish or Aquatic Plants into Public Waters* and an ARRP. The ARRP should be completed and approved by TPWD **30 days prior to activity within project waters and/or resource relocation** and submitted with an application for a no-cost *Permit to Introduce Fish, Shellfish, or Aquatic Plants into Public Waters*. ARRPs can be submitted to Travis Tidwell, TPWD Region 1 KAST Biologist at (512) 389-8612 or Travis.Tidwell2@tpwd.texas.gov.

Federal Laws

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) prohibits direct and affirmative purposeful actions that reduce migratory birds, their eggs, or their nests, by killing or capturing, to human control, except when specifically authorized by the Department of the Interior. This protection applies to most native bird species, including ground nesting species. The U.S. Fish and Wildlife Service (USFWS) Migratory Bird Office can be contacted at (505) 248-7882 for more information on potential impacts to migratory birds.

Recommendation: TPWD recommends excluding vegetation clearing activities during the general bird nesting season, March 15 through September 15, to avoid adverse impacts to breeding birds. If clearing vegetation during the migratory bird nesting season is unavoidable, TPWD recommends surveying the area proposed for disturbance to ensure that no nests with eggs or young will be disturbed by operations. TPWD recommends performing active bird nest surveys no more than five days prior to planned clearing or construction. TPWD recommends that a minimum 150-foot buffer of vegetation remain around any nests that are observed prior to disturbance. Any vegetation (such as trees, shrubs, and grasses) or other open areas where occupied nests are located should not be disturbed until the eggs have hatched and the young have fledged.

As previously mentioned, prior to construction, TPWD recommends performing daytime surveys for nests, including under bridges and in culverts, to determine if they are active before removal. Nests that are active should not be disturbed. TPWD recommends avoiding the removal of unoccupied, inactive nests, as practicable. TPWD also recommends the project proponent prevent the establishment of active nests during the nesting season on any bridges, culverts, or other structures proposed for disturbance during construction activities. Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.

State Laws

Parks and Wildlife Code – Chapter 64, Birds

TPW Code Section 64.002, regarding protection of nongame birds, provides that no person may catch, kill, injure, pursue, or possess a bird that is not a game bird. TPW Code Section 64.003, regarding destroying nests or eggs, provides that, no person may destroy or take the nests, eggs, or young and any wild game bird, wild bird, or wild fowl. TPW Code Chapter 64 does not allow for incidental take and therefore is more restrictive than the MBTA.

Recommendation: Please review the *Migratory Bird Treaty Act* section above for recommendations as they are also applicable for Chapter 64 of the TPW Code compliance.

Parks and Wildlife Code, Section 68.015 – State-listed Species

TPW Code regulates state-listed threatened and endangered animal species. The capture, trap, take, or killing of state-listed threatened and endangered animal species is unlawful unless expressly authorized under a permit issued by USFWS or TPWD. The *TPWD Guidelines for Protection of State-Listed Species*, which includes a list of penalties for take of species, can be found on the Wildlife Habitat Assessment Program website. State-listed species may only be handled by persons

with authorization obtained through TPWD. For more information on this permit, please contact the Wildlife Permits Office at (512) 389-4647.

Cagle's map turtle (*Graptemys caglei*)

There may be suitable habitat for the state-listed Cagle's map turtle within the project area. This species is endemic and found within the Guadalupe River System. This species inhabits shallow water with swift to moderate flow and gravel or cobble bottom as well as areas connected by deeper pools with a slower flow rate and a silt or mud bottom. Gravel bar riffles and transition areas between riffles and pools are especially important in providing insect prey items. Cagle's map turtles nest on gently sloping sand banks within approximately 30 feet of the water's edge.

Recommendation: TPWD recommends implementing the following beneficial management practices (BMPs) to avoid and/or minimize potential impacts to the Cagle's map turtle that could occur as a result of the construction of the proposed project:

- Avoid impacts to logs and rocks as Cagle's map turtles like to use these for basking.
- TPWD recommends paying particular attention to gravel bars or riffle habitat in streams around where construction-related disturbance may occur. This type of habitat is thought to be critical for the Cagle's map turtle. TPWD recommends avoiding impacts to gravel bars and riffle habitat in the project area.
- During construction, trucks and equipment should use existing bridge or culvert structures to cross creeks, and equipment staging areas should be located in previously disturbed areas outside of riparian corridors.
- Cagle's map turtles nest on gently sloping sand banks within approximately 30 feet of the water's edge. TPWD recommends avoiding disturbance of banks to avoid disturbing nesting turtles or their nests.
- TPWD recommends avoiding construction during the breeding and nesting season of this species (spring and summer). Cagle's map turtles breed in spring and early summer and then the eggs incubate through the spring and summer months.
- TPWD recommends having a permitted biological monitor on-site that is familiar with the identification of this species and that can relocate the Cagle's map turtle to a nearby area with similar habitat that would not be disturbed during construction. TPWD recommends that any translocations of reptiles be the minimum distance possible, no greater than one mile, preferably within 100 to 200 yards from the initial encounter location.

Species of Greatest Conservation Need

In addition to state and federally-protected species, TPWD tracks Species of Greatest Conservation Need (SGCN) and other special features and natural communities that are not listed as threatened or endangered. These species and communities are tracked in the TXNDD, and TPWD actively promotes their conservation. TPWD considers it important to evaluate and, if necessary, minimize impacts to SGCN and their habitat to reduce the likelihood of endangerment and preclude the need to list as threatened or endangered in the future.

There may be suitable habitat for the following bat SGCN within the project area:

- Eastern red bat (*Lasiurus borealis*)
- Big brown bat (*Eptesicus fuscus*)
- Hoary bat (*Lasiurus cinereus*)
- Cave myotis bat (*Myotis velifer*)
- Mexican free-tailed bat (*Tadarida brasiliensis*)
- Tricolored bat (*Perimyotis subflavus*)
- Big free-tailed bat (*Nyctinomops macrotis*)
- Mexican long-tongued bat (*Choeronycteris mexicana*)

Adverse impacts to bats, such as habitat loss, are being compounded due to a deadly disease known as white-nose syndrome (WNS). This disease is associated with the fungus, *Pseudogymnoascus destructans*, which appears to impact certain species of hibernating bats and frequently results in death of the infected bats. This fungus has wiped out entire colonies of hibernating bats in states east of Texas. As of May 2019, the fungus that causes WNS has been detected in 22 Texas Counties and as of March 5, 2020 TPWD biologists have confirmed the WNS disease in a Texas bat. The infected bat was a cave myotis found dead in Central Texas (Gillespie County). Bats appear to spread WNS among colonies and roosts; however, there is evidence that humans can transport the fungus on their shoes, gear, and clothing after entering infected bat caves and roosts. TPWD is concerned that WNS could be spread by personnel or consultants working on development projects in states where WNS has been detected, and then inadvertently bring the fungus to Texas on gear or clothing that has not been properly decontaminated.

To determine the appropriate BMP to avoid or minimize impacts to bats, review the habitat descriptions for the above-listed species on the TPWD county list or other trusted resources. All bat surveys and other activities that include direct contact with bats shall comply with TPWD-recommended WNS protocols located on the TPWD Wildlife Habitat Assessment Program website under “Project Design and Construction”.

The following survey and exclusion protocols should be followed prior to commencement of construction activities. For the purposes of this letter, structures are defined as bridges, culverts (concrete or metal), wells, and buildings. For

activities that have the potential to impact structures, cliffs or caves, or trees; a qualified biologist should perform a habitat assessment and occupancy survey of the feature(s) with roost potential as early in the planning process as possible or within one year before construction is scheduled to begin.

Recommendation: TPWD recommends surveying the project limits for potential bat habitat. Surveys should be conducted by a qualified biologist to determine roost site potential and occupancy. Bat surveys of structures or features should include visual inspections for the presence of bats. If bats are present or recent signs of occupation (i.e., piles of guano, distinct musky odor, or staining and rub marks at potential entry points) are observed, take appropriate measures to ensure that bats are not harmed, such as implementing non-lethal exclusion activities or timing or phasing of construction. For roosts where occupancy is strongly suspected but unconfirmed during the initial survey, revisit feature(s) at most four weeks prior to scheduled disturbance to confirm absence of bats.

Recommendation: For exclusion of bats, TPWD recommends locating and sealing the entrances through which bats make ingress or egress. Before excluding bats from any occupied structure/feature, bat species, weather, temperature, season, and geographic location must be incorporated into any exclusion plans to avoid unnecessary harm or death to bats. Winter exclusion must entail a survey to confirm either, 1) bats are absent or 2) present but active (i.e. continuously active – not intermittently active due to arousals from hibernation). Prior to exclusion, ensure that alternate roosting habitat is available in the immediate area. If no suitable roosting habitat is available, install alternate roosts to mitigate for the loss of an occupied roost. If alternate roost sites are not provided, bats may seek shelter in other inappropriate sites, such as buildings, in the surrounding area.

Exclusion devices can be installed by a qualified individual between September 1 and March 31. Exclusion devices should be used for a minimum of seven days when minimum nighttime temperatures are above 50°F and minimum daytime temperatures are above 70°F. TPWD offers the following beneficial practices regarding bat exclusion devices and activities:

- Avoid using materials that degrade quickly, like paper, steel wool or rags, to close holes.
- Avoid using products or making structural modifications that may block natural ventilation, like hanging plastic sheeting over an active roost entrance, thereby altering roost microclimate.
- Avoid using chemical and ultrasonic repellents.
- Avoid use of silicone, polyurethane or similar non-water-based caulk products.
- Avoid use of expandable foam products at occupied sites.
- Avoid the use of flexible netting attached with duct tape.

- In order to avoid entombing bats, exclusion activities should be only implemented by a qualified individual. A qualified individual or company should possess at least the following minimum qualifications:
 - Experience in bat exclusion (the individual, not just the company).
 - Proof of rabies pre-exposure vaccinations.
 - Demonstrated knowledge of the relevant bat species, including maternity season date range and habitat requirements.
 - Demonstrated knowledge of rabies and histoplasmosis in relation to bat roosts.
- Contact TPWD for additional resources and information to assist in executing successful bat exclusions that will avoid unnecessary harm or death in bats.

Texas garter snake (*Thamnophis sirtalis annectens*)

There may be suitable habitat for the Texas garter snake within the project area. This species prefers marshy, flooded pastureland or meadows, particularly in spring when frogs are present in numbers and at other times prefers grassy or brushy terrain near hill country streams and ponds. The Texas garter snake seems to prefer vicinity of permanent sources of water or soil damp enough to support earthworm populations.

Recommendation: TPWD recommends avoiding disturbance of the Texas garter snake if found during clearing and construction. Because snakes are generally perceived as a threat and killed when encountered, and since the project area contains suitable habitat for the Texas garter snake, TPWD recommends construction personnel and contractors be advised to avoid injury or harm to all snakes encountered during clearing and construction. Injury to humans usually occurs when the snake becomes agitated following harassment or when someone attempts to handle a recently dead venomous snake that still contains its bite reflex. Therefore, contractors should avoid contact with snakes if encountered and allow all native snakes to safely leave the premises.

Texas map turtle (*Graptemys versa*)

There may be suitable habitat for the Texas map turtle within the project area. TPWD notes that there is a research-grade iNaturalist (www.inaturalist.org) observation for this species located approximately 8 miles from the project area within Hays County. The Texas map turtle is found only within the Edwards Plateau region of Central Texas and these turtles stay within close proximity of the Colorado River drainage area. They prefer shallow waterways with riffle systems and abundant vegetation. When not in the water, they are often found basking on snags or logs.

Recommendation: TPWD recommends referring to the recommendations listed above for the Cagle's map turtle as those recommendations are applicable to the Texas map turtle as well.

Western box turtle (*Terrapene ornata*)

TPWD notes that there are several research-grade iNaturalist observations for the the western box turtle located within Hays County. The western box turtle occurs throughout Texas, typically in open habitats such as prairie grasslands, pastures, fields, sandhills, and open woodlands. Adults have a home-range size of approximately 6 to 14 acres. This species is active spring through fall with courtship and mating occurring primarily in the spring. For shelter, they burrow into soil (e.g., under plants such as yucca) or enter burrows made by other species. Eggs are laid in nests dug in soft well-drained soil in open areas. Western box turtles are threatened by habitat loss and fragmentation, vehicle strikes on roads, and collection for the pet trade and food markets. The project area may provide suitable habitat for this species.

Eastern box turtle (*Terrapene carolina*)

TPWD notes that there are research-grade iNaturalist observations for the eastern box turtle located within Hays County. The eastern box turtle occurs typically in woodlands, forest edges, and brushy areas. Adults have a home-range size of approximately 2 to 5 acres. Eastern box turtles are active spring through fall with nesting occurring in late spring-early summer. Eastern box turtles are threatened by habitat loss and fragmentation, vehicle strikes on roads, and collection for the pet trade and food markets. The project area may provide suitable habitat for this species.

Recommendation: TPWD recommends identifying locations of burrows on the project site and avoiding impacts to burrows if feasible. TPWD also recommends reducing speed limits in the project area to at least 15 mph to help prevent vehicle-induced mortality of the eastern and western box turtle, as well as any other wildlife species that may be crossing the road within the project area. TPWD recommends that any translocations of reptiles be the minimum distance possible no greater than one mile, preferably within 100 to 200 yards from the initial encounter location.

Strecker's chorus frog (*Pseudacris streckeri*)

There may be suitable habitat for Strecker's chorus frog within the project area. Strecker's chorus frog inhabits moist terrestrial habitats including moist woods, sand prairies, ravines, cultivated areas, and habitats surrounding streams, swamps, and ponds. Flooded fields, ditches, sloughs, small ponds, and wetlands are used for breeding. Breeding season is generally late winter through early spring. When inactive, the Strecker's chorus frog burrows into the soil.

Woodhouse's toad (*Anaxyrus woodhousii*)

There may be suitable habitat for Woodhouse's toad within the project area. Woodhouse's toad has a wide geographic range, occurring from the eastern coast of North America to Nevada and northern Mexico; populations in central Texas have undergone apparent declines. This species is a year-round resident where found, although its presence can most easily be detected during the breeding season, when males may be heard calling. Woodhouse's toad is associated with sandy substrates in lowlands such as river bottoms and desert streams, as well as irrigated fields and lawns.

Recommendation: TPWD recommends the project proponent inform employees and contractors of the potential for Strecker's chorus frog and Woodhouse's toad to occur in the project area. TPWD recommends avoiding disturbance to wetlands and temporary and permanent open water features, including depressions.

Evaluation of SGCN

TPWD notes that it is the responsibility of the project proponent to evaluate all of the species listed on the TPWD Rare, Threatened, and Endangered Species of Texas by County online application (RTEST or TPWD county list), not just state- and federally-listed species, and to determine if those species have habitat within the project area and if those species have the potential to be impacted by the construction of the proposed project.

Recommendation: Please review the TPWD county list for Hays County because species in addition to those discussed in this letter could be present within the project area depending upon habitat availability. TPWD recommends including a discussion and evaluation of potential impacts to SGCN (in addition to state-listed and federally-listed species) for all projects coordinated with this office. The USFWS should be contacted for species occurrence data, guidance, permitting, survey protocols, and mitigation for federally-listed species.

Determining the actual presence of a species in a given area depends on many variables including daily and seasonal activity cycles, environmental activity cues, preferred habitat, transiency and population density (both wildlife and human). The absence of a species can be demonstrated only with great difficulty and then only with repeated negative observations, considering all the variable factors contributing to the lack of detectable presence. If encountered during construction, measures should be taken to avoid impacting all wildlife, regardless of listing status.

Texas Natural Diversity Database

The TXNDD is intended to assist users in avoiding harm to rare species or significant ecological features. Given the small proportion of public versus private land in Texas, the TXNDD does not include a representative inventory of rare resources in the state. Absence of information in the database does not imply that a species is absent from that area. Although it is based on the best data available to TPWD regarding rare species, the data from the TXNDD do not provide a definitive statement as to the presence, absence or condition of special species, natural communities, or other significant features within your project area. These data are not inclusive and **cannot be used as presence/absence data**. They represent species that could potentially be in your project area. This information cannot be substituted for field surveys.

Recommendation: The TXNDD is updated continuously based on new, updated and undigitized records; therefore, TPWD recommends requesting the most recent TXNDD data on a regular basis. For questions regarding a record or to request the most recent data, please contact TexasNatural.DiversityDatabase@tpwd.texas.gov.

Recommendation: To aid in the scientific knowledge of a species' status and current range, TPWD encourages project proponents and their contractors report all encounters of SGCN, state-listed, and federally-listed species to the TXNDD according to the data submittal instructions found on the TXNDD website.

TPWD strives to respond to requests for project review within a 45-day comment period. Responses may be delayed due to workload and lack of staff. Failure to meet the 45-day review timeframe does not constitute a concurrence from TPWD that the proposed project will not adversely impact fish and wildlife resources.

TPWD appreciates the opportunity to provide comments and recommendations for this project. If you have any questions, please contact me at (512) 389-8054 or Jessica.Schmerler@tpwd.texas.gov.

Sincerely,



Jessica E. Schmerler
Wildlife Habitat Assessment Program
Wildlife Division

JES:44183

From: [Jessica Schmerler](#)
To: [Latrice Hertzler](#)
Subject: RE: Kyle Confirmation of ReceiptTPWD has received your project review request.pdf
Date: Wednesday, July 15, 2020 11:54:50 AM

Hi Latrice,

I have question for you regarding the proposed project. The information provided states that the proposed project will include replacing the existing bridge over Richmond Branch with a wider bridge containing 5 box culverts. Is dredging and/or dewatering proposed for this portion of the project?

Thanks
Jessica

From: Latrice Hertzler <lhertzler@future-link.biz>
Sent: Wednesday, July 15, 2020 11:12 AM
To: Jessica Schmerler <Jessica.Schmerler@tpwd.texas.gov>
Subject: RE: Kyle Confirmation of ReceiptTPWD has received your project review request.pdf

ALERT: This email came from an external source. Do not open attachments or click on links in unknown or unexpected emails.

Thank you Jessica. I appreciate the update.

This is very helpful.

Latrice

From: Jessica Schmerler <Jessica.Schmerler@tpwd.texas.gov>
Sent: Wednesday, July 15, 2020 11:10 AM
To: Latrice Hertzler <lhertzler@future-link.biz>
Subject: RE: Kyle Confirmation of ReceiptTPWD has received your project review request.pdf

Hi Latrice,

I am actually working on this letter right now. I should hopefully get you something later this afternoon.

Thanks!
Jessica

From: Rachel Lange <Rachel.Lange@tpwd.texas.gov>

Sent: Wednesday, July 15, 2020 11:06 AM

To: Jessica Schmerler <Jessica.Schmerler@tpwd.texas.gov>

Subject: FW: Kyle Confirmation of ReceiptTPWD has received your project review request.pdf

I got a status check on this, but it looks like it is in your review area. Not due until 7/26.

Please note my new phone number.

Rachel Lange, CWB
Habitat Assessment Biologist
Texas Parks & Wildlife Department
316 Spring Street, Suite 106
Columbus, TX 78934
(979)732-4213

From: Latrice Hertzler <lhertzler@future-link.biz>

Sent: Wednesday, July 15, 2020 10:39 AM

To: Rachel Lange <Rachel.Lange@tpwd.texas.gov>

Cc: mharmon@future-link.biz

Subject: Kyle Confirmation of ReceiptTPWD has received your project review request.pdf

ALERT: This email came from an external source. Do not open attachments or click on links in unknown or unexpected emails.

Hi Rachel,

I am writing to check on the status of this request. Do you have any updates for me?

Thanks for checking.

Latrice Hertzler

Latrice Hertzler, BAIS, MPA
Environmental Consultant
Certified Environmental Reviewers

Future Link Technologies, Inc.
Environmental & Technology Services & Consulting
P.O. Box 90696
Austin, TX 78709
512-443-4100 (Ofc)
512-791-6685 (Cell)



Future Link Technologies

Environmental and Technology Consulting

June 11, 2020

Email: WHAB@tpwd.texas.gov

Texas Parks and Wildlife Department
4200 Smith School Road
Austin, Texas 78744

RE: Request for Consultation:
City of Kyle – Windy Hill Road Improvements
DRSB16DH480001 - 19-280-000-B779

Dear Sirs:

The City of Kyle has received approval for a US Housing & Urban Development Community Development Block Disaster Recovery Grant in the amount of \$1,847,862.05 from the Texas General Land Office for a project known as known as Street Improvements located at: Windy Hill Road, Kyle, Hays County, TX.

This letter is to request your consultation regarding activities proposed for this project. The proposed construction is described as:

The City of Kyle shall reconstruct a portion of Windy Hill Road by removing and replacing existing culverts, the roadway, and approaches; when the roadway pavement and structure to add turn lane capacity, in stall railing and end treatments that meet TxDot standards; sidewalks; and perform associated appurtenances. Improvements total approximately two thousand one hundred (2100) linear feet

The Environmental Review has been designed to cover all construction activities that are funded by this grant and there will be some short-term impacts during the construction period of the project and the contractor will utilize accepted methods of dust and noise abatement during this time. At this time, there will be no land acquired as a result of this project and no land will be converted from farmland use.

The Texas Parks & Wildlife Texas Natural Diversity Database (TXNDD) was consulted which shows one study area is located within five miles of the proposed project area. The Texas Garter Snake (*Thamnophis sirtalis annectens*) is listed as G5/T4 and S1 on the SGCN (Species of Greatest Conservation Need). According

to common habitat on the County Threatened & Endangered species listing, the soils along Windy Hill Road are not consistent with habitat for this species.

A review of the area soils in concert with the Hays County Threatened & Endangered Species listing was conducted. See Attachment 1. There is no indication threatened and endangered species would be impacted by the construction. However, the project will include a review of the area prior to construction to examine for any species and monitoring during construction to ensure no impact.

An National Wetland delineation report reflects potential wetland existence along Windy Hill Rod and consistent with NWP 14 for linear transportation improvements. Precautions will be taken to prevent impact to natural features. See Attachment 2.

The review of federal listed species was conducted using the EPA IPAC system. See Attachment 1. The site is not consistent with listed species and no critical habits exist at the proposed project site.

Industry specific mitigation measures will be applied to return the area to its original condition and precautions taken to maintain minimal disturbance within the construction area including best management practices to prevent construction runoff through berming and silt fencing. According to engineering plans, soil stabilization and/or revegetation of disturbed areas will be handled through seed stabilization materials consistent with area recommended native plants and grasses but that avoid invasive plants.

Clearing vegetated areas for construction between March to August will include an examination prior to construction to ensure that no nests with eggs or young will be disturbed by construction. If any nests are discovered in vegetation or bare ground within at least 25 feet of occupied nests avoid disturbance until the eggs have hatched and the young have fledged.

Any tree removal will be limited and be consistent with tree management requirements as identified within best management practices and TPWD standards. There are no known karst features located in the area.

Attachment 1 contains project area maps to facilitate an understanding of project locations. Attachment 2 contains a FEMA flood maps regarding the area flood levels and wetland. Attachment 3 includes the site visit pictures. Attachment 4 provides general engineering plans for your review.

If you disagree with our findings and have additional information we should consider or have any questions, please do not hesitate to call. If we do not hear

from you within 30-45 calendar days, we will assume that you agree with our determination and we will proceed with the project.

Sincerely,

Latrice Hertzler
Environmental Service Provider

Enclosures:

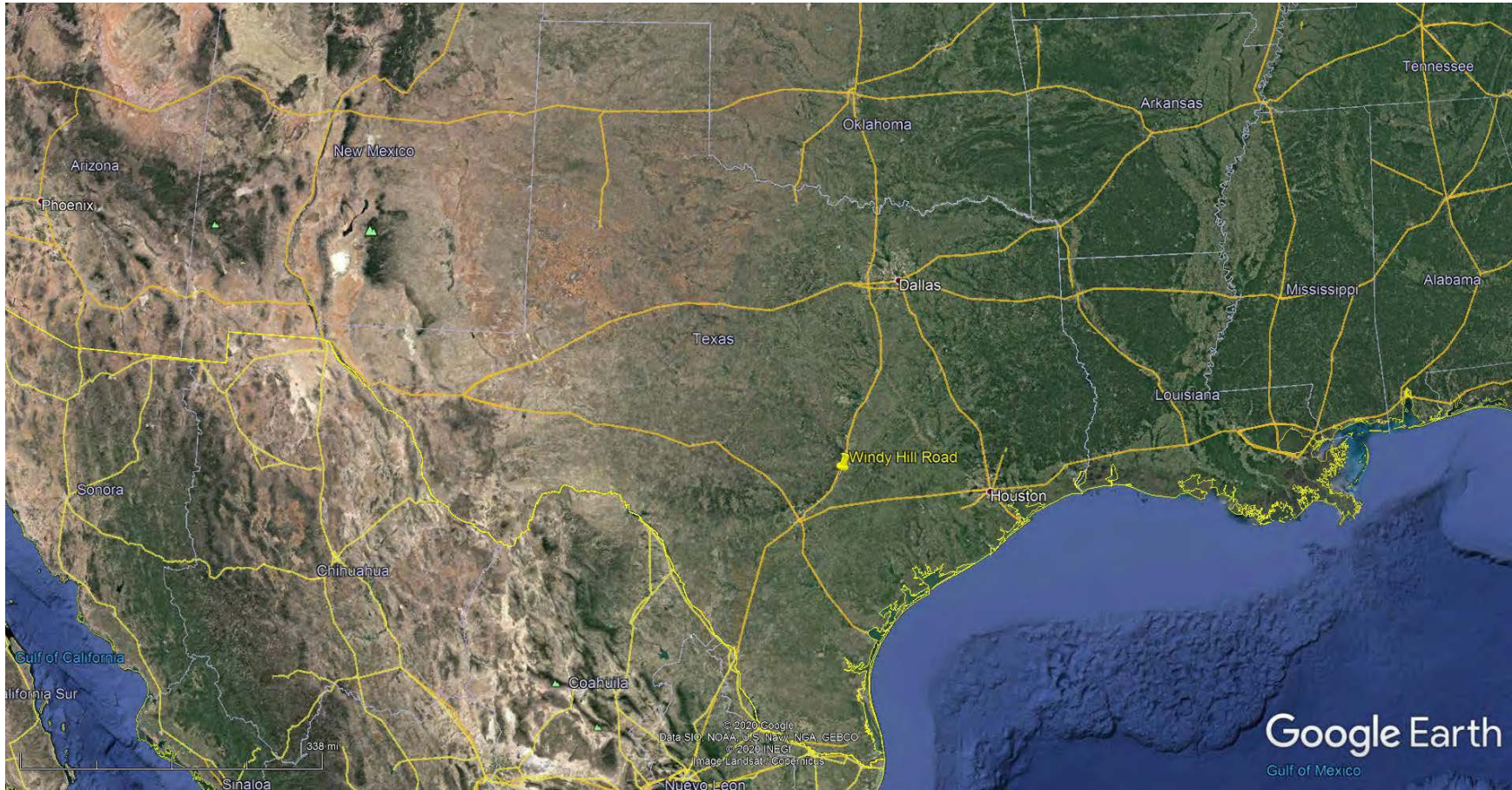
Att 1: Target Area Maps, and Karst Map

Att 2: Flood Plain Information and Wetland Delineation Info



Att 3: Site Visit Pictures (Attachment 2)

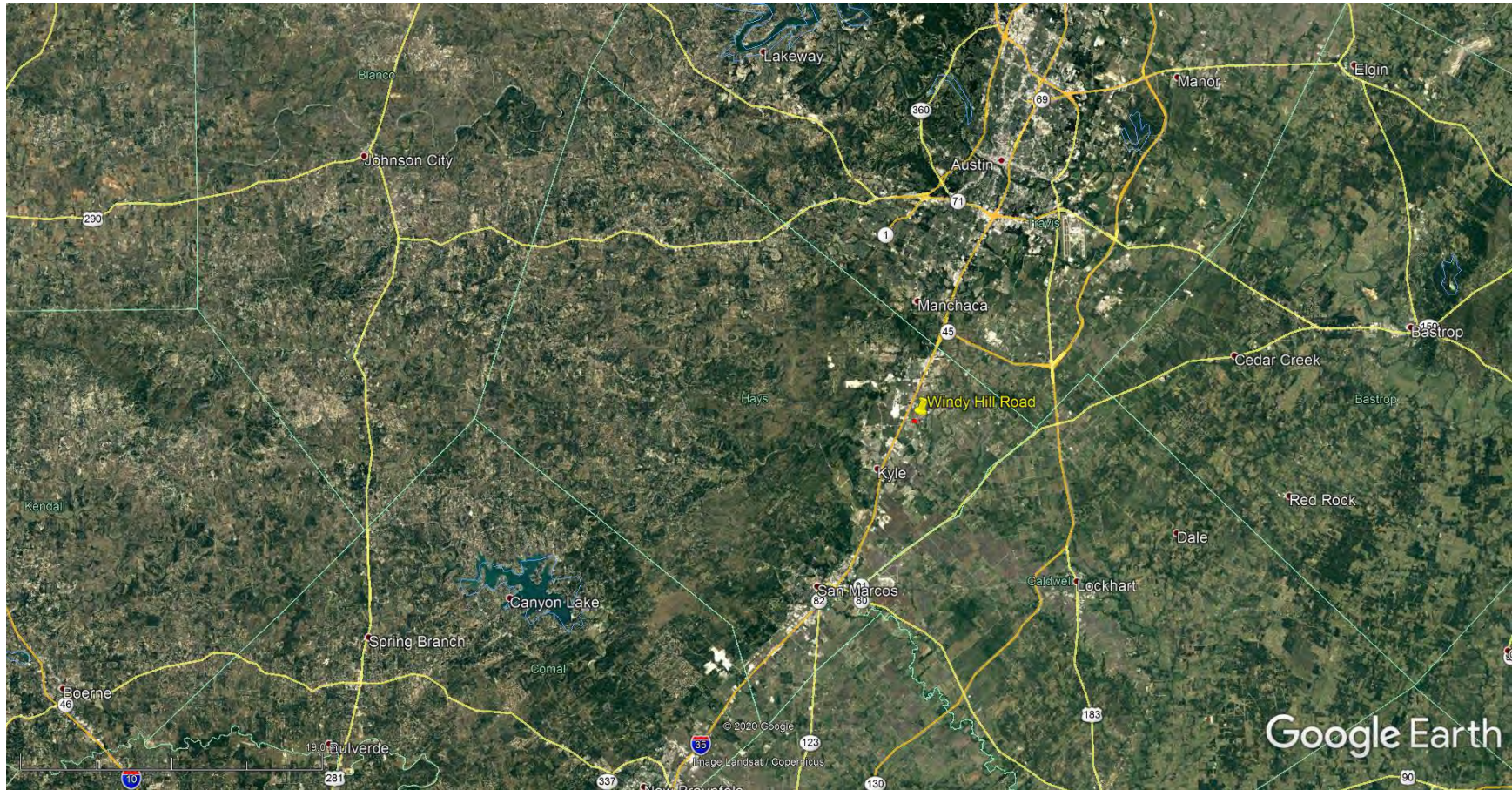
Att 4: Engineering

Attachment 1
Target Area Maps & Karst Map





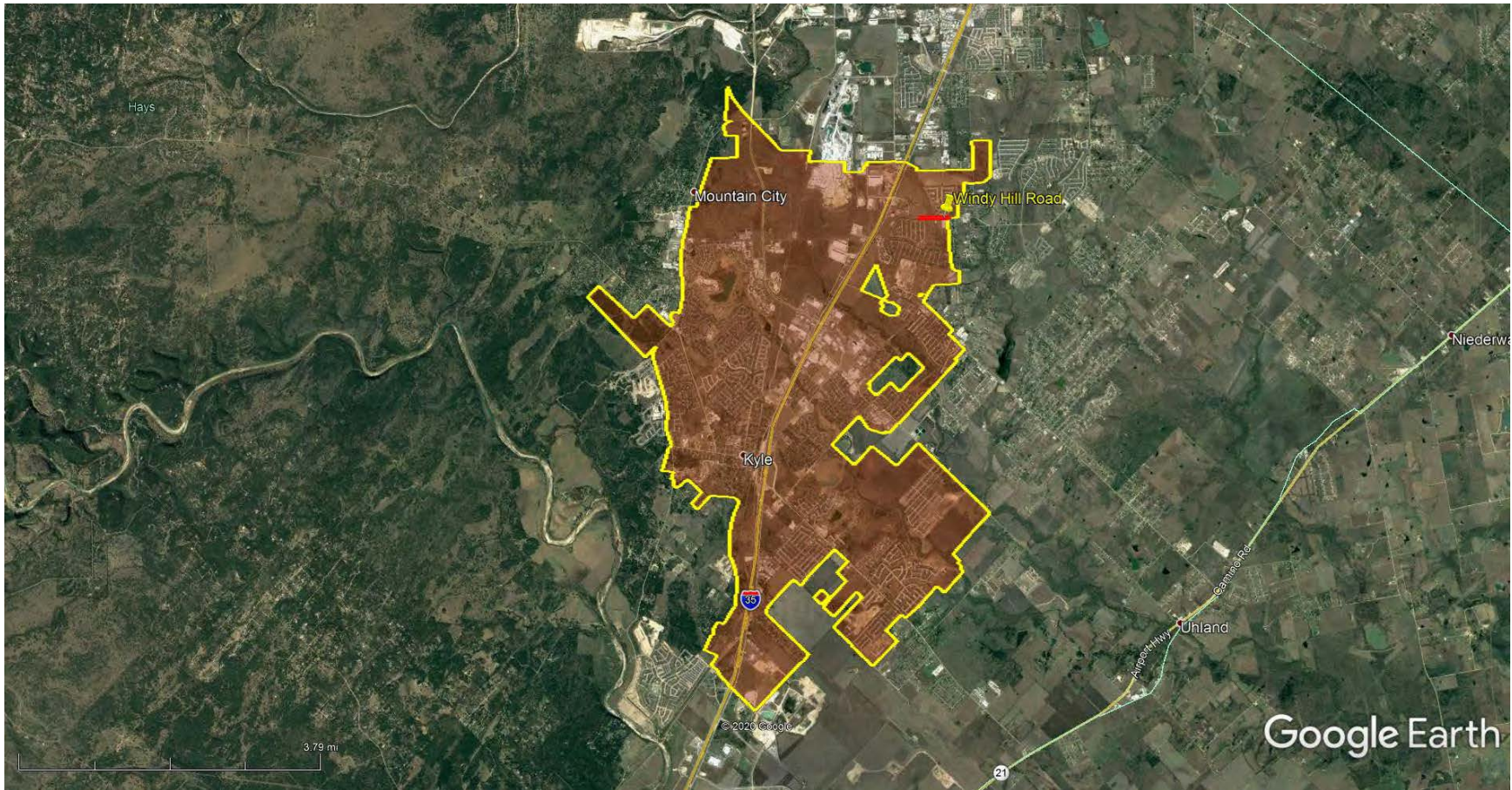
Kyle is located in Texas

Client Name	City of Kyle	Future Link Technologies 	
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709	
Map Information	General Location Maps	512-443-4100	
Date	May 20	Environmental Service Provider	





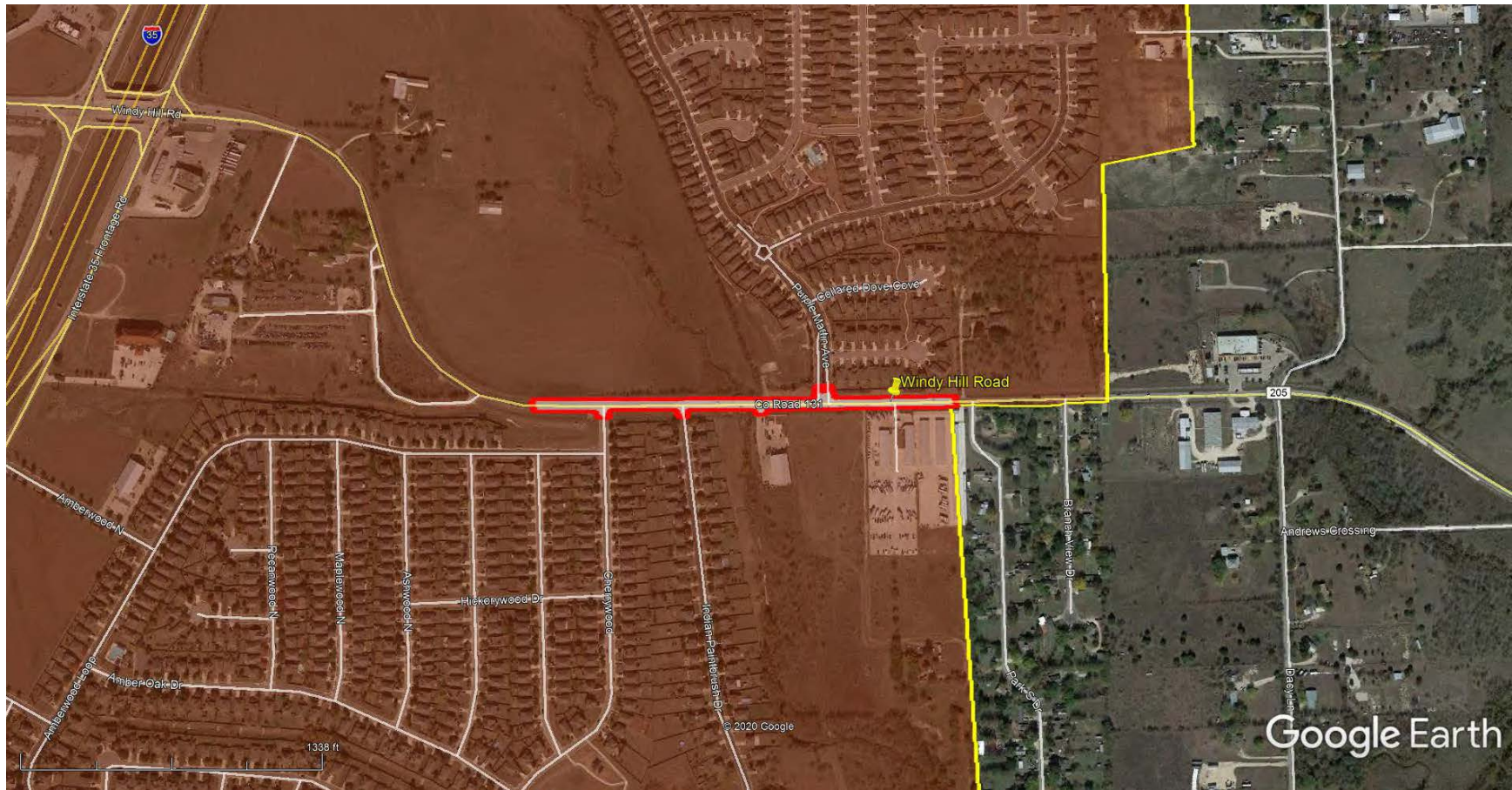
Windy Hill Road is located in Kyle, Hays County Texas

Client Name	City of Kyle	Future Link Technologies 	
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709	
Map Information	General Location Maps	512-443-4100	
Date	May 20	Environmental Service Provider	





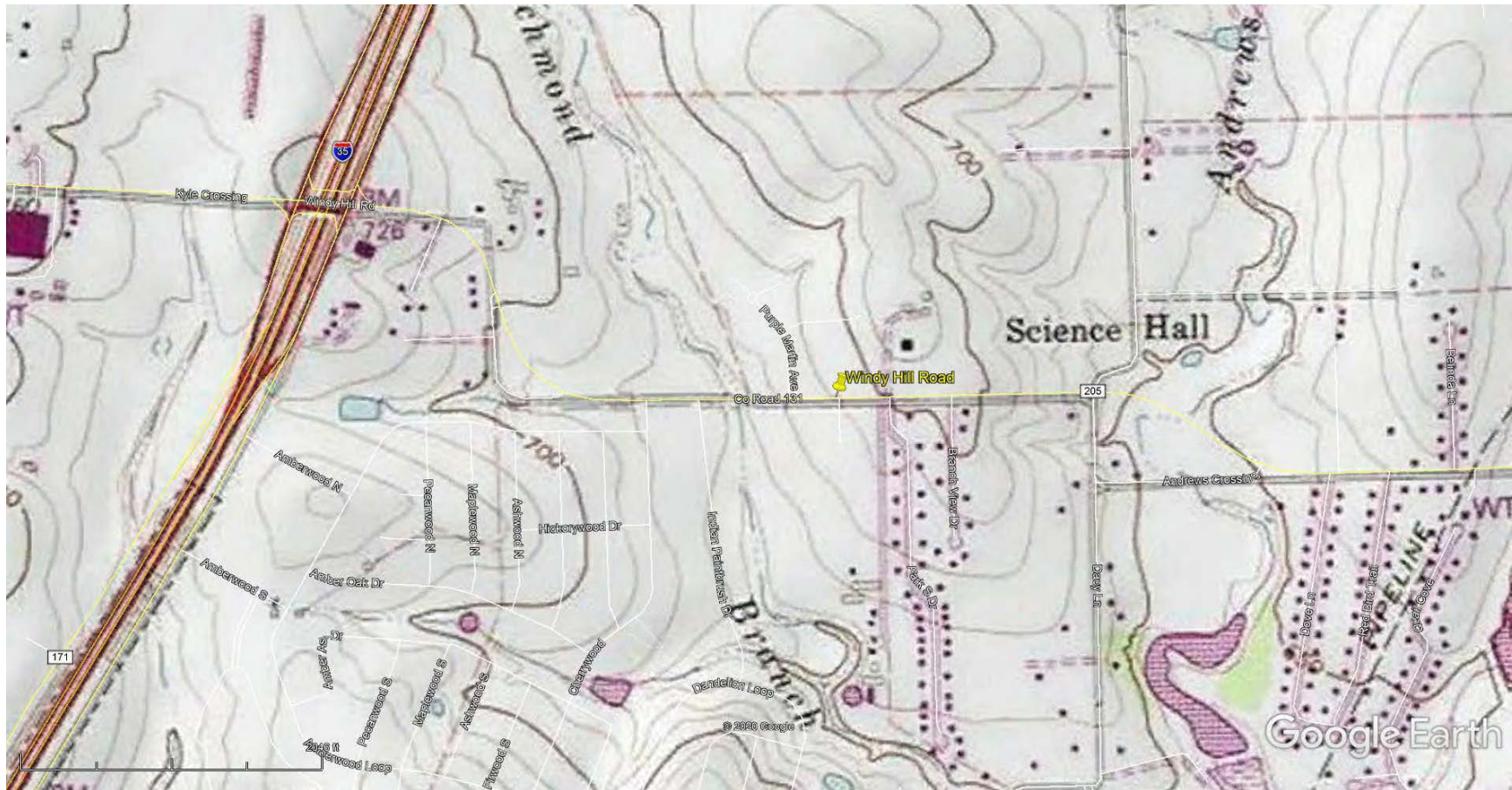
Windy Hill Road is located in North Kyle, TX

Client Name	City of Kyle	Future Link Technologies 	
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709	
Map Information	General Location Maps	512-443-4100	
Date	May 20	Environmental Service Provider	




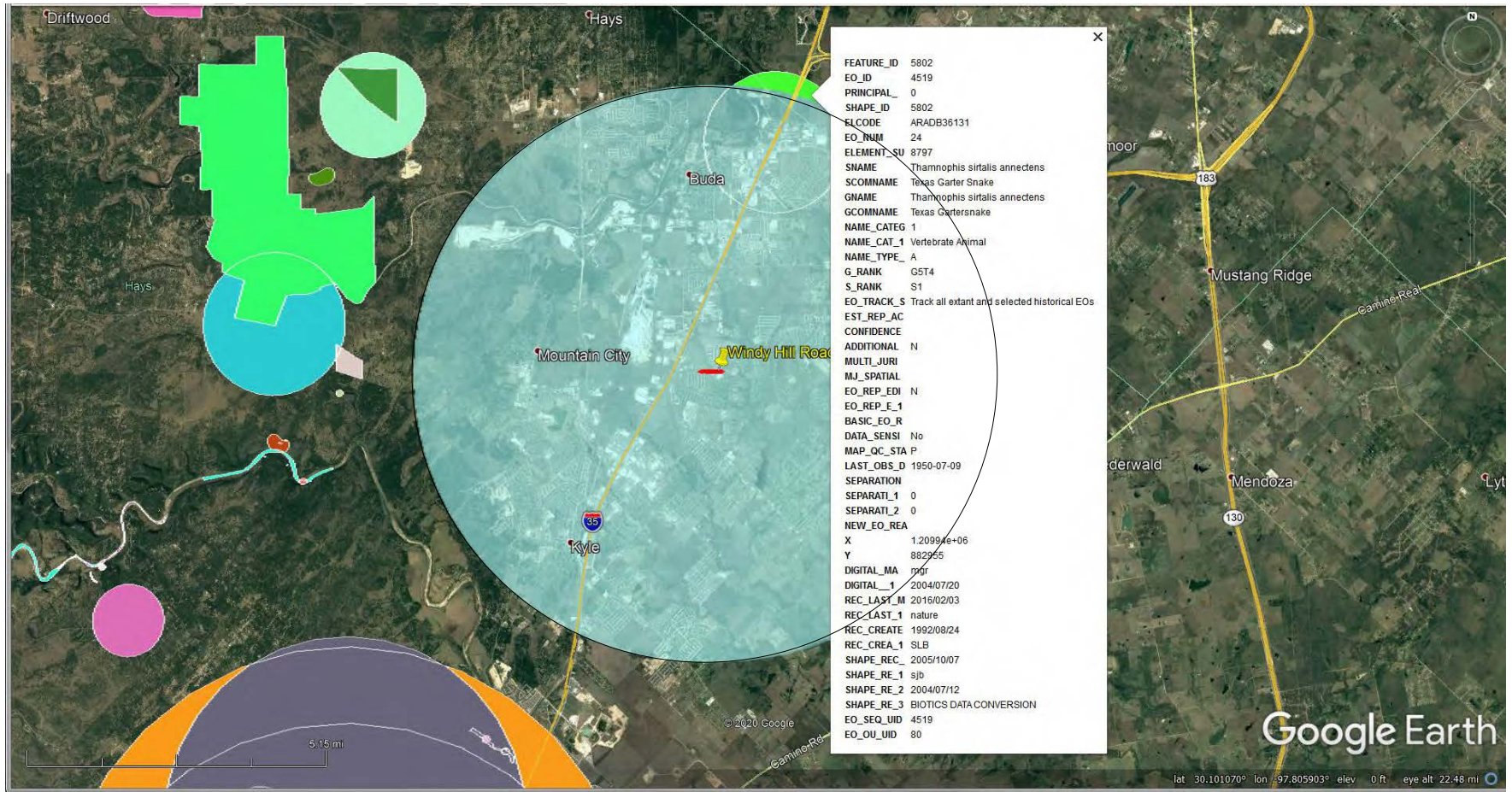
Project area is Windy Hill Road - Approximately 2100 linear feet -500 ft W. of Cherrywood to 500 ft East of Purple Martin Ave

Client Name	City of Kyle	Future Link Technologies 	
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709	
Map Information	General Location Maps	512-443-4100	
Date	May 20	Environmental Service Provider	



USGS 7.5 Min Topographic Map

Client Name	City of Kyle	Future Link Technologies 
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709
Map Information	General Location Maps	512-443-4100
Date	May 20	Environmental Service Provider




TPWD -Texas Natural Diversity Data Mapping

One Study area located within five miles of the project area.

 Five Mile Buffer

SNAME	Thamnophis sirtalis annectens
SCOMNAME	Texas Garter Snake

Client Name	City of Kyle	Future Link Technologies 
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709
Map Information	General Location Maps	512-443-4100
Date	May 20	Environmental Service Provider


Attachment 2
Floodplain Information and USFWS NWI wetland Map
& Wetland Delineation Report



FEMA National Flood Hazard Flood Layer –

Panel # 48209C0290F effective 9/2/2005- approximately .80 acres located within the 100-year floodplain

Portion of the project is located within LOMR 6-6-B46P effective 1/25/07 and LOMR 07/06/1372X effective 4/30/07 - .57 acres located within LOMR defined area.

Client Name	City of Kyle	Future Link Technologies	
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709	
Map Information	General Location Maps	512-443-4100	
Date	May 20	Environmental Service Provider	

**DELINEATION OF WATERS OF THE U.S.
AND NON-REPORTING NATIONWIDE PERMIT 14**

WINDY HILL ROAD

**PROPOSED ROAD IMPROVEMENTS
CHERRYWOOD ST. TO PARK S. DRIVE**

**CITY OF KYLE
HAYS COUNTY, TEXAS**

GLO CONTRACT NO. 19-280-000-B779

**Report Date:
June 10, 2020**

**Prepared for:
Ms. Judy Langford
Langford Community Management Services, Inc.
2901 CR 175
Leander, Texas 78641**

**Prepared by:
Hydrex Environmental
1120 NW Stallings Drive
Nacogdoches, Texas 75964-3428
(936) 568-9451 FAX (936) 568-9527**



June 10, 2020

Ms. Judy Langford
Langford Community Management Services, Inc.
2901 CR 175
Leander, Texas 78641

RE: DELINEATION OF WATERS OF THE U.S. AND NON-REPORTING NATIONWIDE PERMIT 14
Windy Hill Road – Proposed Road Improvements
Cherrywood St. to Park S. Drive
City of Kyle
Hays County, Texas
GLO Contract No. 19-280-000-B779

Dear Ms. Langford:

Hydrex Environmental (Hydrex) has been contracted by Langford Community Management Services, Inc. to complete a delineation of waters of the U.S. and document the use of Nationwide Permit 14 at the above-referenced project site. This report presents a summary of our findings and conclusions.

EXECUTIVE SUMMARY

The City of Kyle proposes to improve street conditions along 2100 linear feet of Windy Hill Road approximately between Cherrywood St. and Park S. Drive. This segment of road will be reconstructed by removing and replacing culverts, the roadway, and approaches. The roadway pavement and structure will be widened to add turn lane capacity. Railings and end treatments will be installed and will meet TXDOT standards. The survey area reviewed by Hydrex for this project is generally defined by an approximate 125-foot wide strip extending along 2100 linear feet of Windy Hill Road.

Based on the results of the delineation, the only potential WOTUS found within the survey area is Richmond Branch. Only work directly involving Richmond Branch will require a Section 404 permit for this project. Based on the proposed construction activities, this work will include replacing the existing bridge with a wider bridge containing 5 box culverts, concrete headwalls and erosion controls. The proposed construction activities at Richmond Branch can be covered under Nationwide Permit 14 (Linear Transportation Projects). As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, pre-construction notification to the USACE for the use of Nationwide Permit 14 will not be required. This report serves as documentation of the use and compliance with Nationwide Permit 14.

Additionally, a review of U.S. Fish and Wildlife records has been completed to address threatened and endangered species for this project. In the best professional opinion of Hydrex, construction activities associated with the proposed project will have “no effect” on the fifteen (15) federally-listed threatened or endangered species for Hays County, Texas. However, there are three (3) candidate species for listing which have habitat similar to Richmond Branch. These species are mussels and include Texas fatmucket (*Lampsilis bracteata*), Texas fawnsfoot (*Truncilla macrodon*), and Texas pimpleback (*Quadrula petrina*). Therefore, it is recommended to promote awareness of the potential for these species to contractors and avoid impacts to any mussels encountered during construction.

INTRODUCTION

The City of Kyle proposes to improve street conditions along 2100 linear feet of Windy Hill Road approximately between Cherrywood St. and Park S. Drive. This segment of road will be reconstructed by removing and replacing culverts, the roadway, and approaches. The roadway pavement and structure will be widened to add turn lane capacity. Railings and end treatments will be installed and will meet TXDOT standards. Hydrex Environmental has been contracted to complete a delineation of waters of the U.S. for this project and determine if authorization from the U.S. Army Corps of Engineers (USACE) will be required.

The survey area reviewed for this project is generally defined by an approximate 125-foot wide strip extending along 2100 linear feet of Windy Hill Road. The 125-foot wide strip includes the existing 80-foot easement surrounding Windy Hill Road, as well as an additional strip of land to the south, approximately 45 feet wide, which is controlled by the Homeowner's Association of Amberwood Subdivision. The primary areas of focus for this investigation are the existing roadside ditches and the crossing of Richmond Branch.

This project is located within the city limits of Kyle (Hays County), Texas. The approximate NAD83 geographic coordinates for the center of the project at the crossing of Richmond Branch are N 30.031912°, W 97.836695°. The project location is depicted on Plate A-1 of Attachment A.

METHODS AND PROCEDURES

Methods used in this study were consistent with those set forth in the *1987 Corps of Engineers Wetlands Delineation Manual* and the *2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0)*. Flagging was used to mark the boundaries between any wetlands and non-wetlands as well as the ordinary high water mark (OHWM) of any streams and open waters. Based on the OHWM, the average widths and depths of any identified streams were measured using a hand-held measuring tape.

In addition, a review of readily available maps and aerial photographs was performed as part of this investigation. The following sources were utilized:

- USGS 7.5 Minute Topographic Quadrangle Map: Buda, TX sheet (1984).
- Soil Survey of Hay County, Texas (USDA-NRCS, Web Soil Survey, Accessed 5/2020).
- FEMA Flood Rate Insurance Maps (Panel Nos. 48209C0290F, 09/02/2005).
- Color infrared aerial photographs (TOP, 1996; NAIP, 2004; TOP, 2009; NAIP, 2015).
- Natural color aerial photographs (TOP, 2009; NAIP, 2010, 2012, 2014, 2015, 2016, 2018).
- National Wetlands Inventory Map (USFWS, Central Texas Database, Accessed 5/2020).
- Light Detection and Ranging (LiDAR) Digital Elevation Model (DEM): Stratmap, 2017.

FINDINGS

On-Site Reconnaissance

A reconnaissance of the survey area was performed on June 1, 2020 to evaluate site conditions and identify potential waters of the U.S. (potentially jurisdictional wetlands, streams, and open waters). During the on-site investigation, four (4) observation points were established. The findings at each observation point, representing conditions found throughout the survey area, are summarized in the following table (Table 1). Field data sheets detailing the findings at each observation point are included in Attachment B. Site photographs are included in Attachment C along with a map showing photograph locations (Plate C-1, Attachment C).

Table 1. Wetland Determination Data Form Summary Table.

Observation Point	Dominance of Hydrophytic Vegetation	Wetland Hydrology Indicators Present	Hydric Soil Indicator Present	Wetland Determination*	Location / Representation
1	100%	B10, C8, D2	None	Non-Wetland	Observation Point 1 is representative of non-wetland conditions found within the southern roadside ditch west of Cherrywood St.
2	100%	B10, D2	None	Non-Wetland	Observation Point 2 is representative of non-wetland conditions found within the southern roadside ditch between Cherrywood St. and Indian Paint Brush Dr.
3	66.7%	B10, D2	None	Non-Wetland	Observation Point 3 is representative of non-wetland conditions found within the southern roadside ditch between Indian Paint Brush Dr. and Richmond Branch.
4	50%	D2	None	Non-Wetland	Observation Point 4 was established along the southern roadside ditch near Purple Martin Ave. OP 4 is representative of site conditions found within all remaining roadside ditches within the project along both the north and south roadside ditches of Windy Hill Road.

* A positive wetland determination at an observation point, as defined by the U.S. Corps of Engineers Wetlands Delineation Manual, must demonstrate 1) a dominance of hydrophytic vegetation (>50% dominant hydrophytic vegetation), 2) a minimum of one primary or two secondary wetland hydrology indicators, and 3) the presence of a hydric soil indicator.

Although a limited number of official observation points were established throughout the survey area, the field reconnaissance covered the entire project site. Site conditions were determined to be wetter than normal during the delineation. According to the nearest weather station located in Buda, Texas (BUDA 1.9 WNW, TX US US1TXHYS205), the area received 3.82 inches of rain in the week leading up to the delineation (May 25-31, 2020). Precipitation records have been included in Attachment D for reference. During the delineation, stormwater flow was evident and coming from the outfall of the Amberwood detention pond located near the western portion of the project. Soils throughout the survey area were saturated in the upper few inches from stormwater runoff, but soil profiles were not saturated from the bottom of the profile up as would normally be seen with a high water table.

Windy Hill Road – Proposed Road Improvements
 Cherrywood St. to Park S. Drive
 City of Kyle
 Hays County, Texas
 GLO Contract No. 19-280-000-B779

Based on a desktop map review of historic USGS Topographic Maps, including the 1984 USGS Topographic Map (Plate A-2), and the National Wetlands Inventory Map (Plate A-7), it was noted that the southern roadside ditch west of Richmond Branch was historically depicted as an intermittent stream. Also, this area is shown to be located within the 100-year floodplain (Zone A) according to the FEMA Flood Insurance Rate Map (Plate A-6) for the area. However, after visiting the site, it is clear the southern roadside ditch does not exhibit an OHWM or other characteristics of a stream. Although the ditch seems to convey large stormwater runoff events at times, there is not enough frequency or duration of flow to develop an OHWM. Additionally, the grade along the ditch is great enough to promote positive drainage and does not pond water long enough to develop wetland criteria within the ditch. A few areas of erosion were observed that pond water after significant rain events, but these erosional features do not meet the definition of potential WOTUS. Therefore, in the best professional opinion of Hydrex Environmental, the roadside ditch lacks the presence of any potential WOTUS.

The results of the delineation are summarized in the following table (Table 2). The boundaries of Richmond Branch are depicted on Plates A-3 and A-4 in Attachment A.

Table 2. Delineated Aquatic Resources

Feature ID	Type	OHWM Width (ft)	OHWM Depth (ft)	Length (LF)	Area (ac)	Latitude, Longitude (NAD 83)
Richmond Branch	Intermittent Stream	14.2	1.4	125	0.04	30.031912, -97.836695

Section 404 Permitting

Based on the results of the delineation, the only potential WOTUS found within the survey area is Richmond Branch. Only work directly involving Richmond Branch will require a Section 404 permit for this project. Based on the proposed construction activities, this work will include replacing the existing bridge with a wider bridge containing 5 box culverts, concrete headwalls and erosion controls. The proposed construction activities at Richmond Branch can be covered under Nationwide Permit 14 (Linear Transportation Projects). As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, pre-construction notification to the USACE for the use of Nationwide Permit (NWP) 14 will not be required.

In accordance with the guidelines of NWP 14, all limitations, criteria, and General Conditions should be followed by this project. Specifically, General Conditions 10, 12, 18, 20, 21, and 23 are addressed below. NWP 14 guidelines are included in Attachment G.

General Condition 10: Fills Within 100-Year Floodplain

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (Plate A-6) indicates the 100-year floodplain (Zone A) extends along Richmond Branch as well as the majority of the western portion of the survey area. Zone A is described as areas inside the 100-year floodplain in which base flood elevations have not been determined. To this end, the City of Kyle is coordinating with the Floodplain Administrator of Hays County to ensure the construction activities associated with this project are completed in compliance with all local and FEMA floodplain development regulations.

Windy Hill Road – Proposed Road Improvements
Cherrywood St. to Park S. Drive
City of Kyle
Hays County, Texas
GLO Contract No. 19-280-000-B779
.....

General Condition 12: Soil Erosion and Sediment Controls

Appropriate soil erosion and sediment controls (sediment fence, hay bales, rock riprap, vegetation mats, etc.) must be used and maintained in effective operating conditions during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within WOTUS during periods of low-flow or no-flow.

General Condition 18: Threatened and Endangered Species

A review of U.S. Fish and Wildlife records has been completed to address threatened and endangered species for this project. In the best professional opinion of Hydrex, construction activities associated with the proposed project will have “no effect” on the fifteen (15) federally-listed threatened or endangered species for Hays County, Texas. However, there are three (3) candidate species for listing which have habitat similar to Richmond Branch. These species are mussels and include Texas fatmucket (*Lampsilis bracteata*), Texas fawnsfoot (*Truncilla macrodon*), and Texas pimpleback (*Quadrula petrina*). Therefore, it is recommended to promote awareness of the potential for these species to contractors and avoid impacts to any mussels encountered during construction. Supporting documentation for the threatened and endangered species habitat survey is included in Attachment E.

General Condition 20: Historic Properties

A review has been completed by the Texas Historical Commission (THC) to address cultural resources for this project. The THC has determined that no historic properties are present or will be affected by the proposed project. However, if historic properties or buried cultural resources are discovered, work should cease, and the THC should be contacted for further instructions. Documentation from the THC is included in Attachment F.

CONCLUSIONS

The City of Kyle proposes to improve street conditions along 2100 linear feet of Windy Hill Road approximately between Cherrywood St. and Park S. Drive. This segment of road will be reconstructed by removing and replacing culverts, the roadway, and approaches. The roadway pavement and structure will be widened to add turn lane capacity. Railings and end treatments will be installed and will meet TXDOT standards. The survey area reviewed by Hydrex for this project is generally defined by an approximate 125-foot wide strip extending along 2100 linear feet of Windy Hill Road.

Based on the results of the delineation, the only potential WOTUS found within the survey area is Richmond Branch. Only work directly involving Richmond Branch will require a Section 404 permit for this project. Based on the proposed construction activities, this work will include replacing the existing bridge with a wider bridge containing 5 box culverts, concrete headwalls and erosion controls. The proposed construction activities at Richmond Branch can be covered under Nationwide Permit 14 (Linear Transportation Projects). As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, pre-construction notification to the USACE for the use of Nationwide Permit 14 will not be required. This report serves as documentation of the use and compliance with Nationwide Permit 14.

Additionally, a review of U.S. Fish and Wildlife records has been completed to address threatened and endangered species for this project. In the best professional opinion of Hydrex, construction activities associated with the proposed project will have “no effect” on the fifteen (15) federally-listed threatened or endangered species for Hays County, Texas. However, there are three (3) candidate species for listing which have habitat similar to Richmond Branch. These species are mussels and include Texas fatmucket (*Lampsilis bracteata*), Texas fawnsfoot (*Truncilla macrodon*), and Texas pimpleback (*Quadrula petrina*). Therefore, it is recommended to promote awareness of the potential for these species to contractors and avoid impacts to any mussels encountered during construction.

I appreciate the opportunity to present this information. If you have any questions regarding these findings or conclusions, or if further clarification is necessary, please feel free to contact me at ccollier@hydrex-inc.com or (936) 568-9451. I look forward to working with you in the future.

Sincerely,
Hydrex Environmental



Clayton A. Collier, REM, PWS
Senior Environmental Scientist



ATTACHMENTS

Attachment A	PLATES
Plate A-1	Vicinity Map
Plate A-2	USGS Topographic Map
Plate A-3	Delineation Map (2018 Aerial Photograph)
Plate A-4	Delineation Map (2017 LiDAR Digital Elevation Model)
Plate A-5	NRCS Soil Survey Map
Plate A-6	FEMA Flood Insurance Rate Map
Plate A-7	National Wetlands Inventory Map
Attachment B	WETLAND DETERMINATION DATA FORMS
Attachment C	PHOTOGRAPHIC DOCUMENTATION
Plate C-1	Map Showing Photograph Locations Site Photographs
Attachment D	PRECIPITATION RECORDS
Attachment E	THREATENED & ENDANGERED SPECIES
Attachment F	CULTURAL RESOURCES
Attachment G	NATIONWIDE PERMIT 14 GUIDELINES
Attachment H	LIMITATIONS

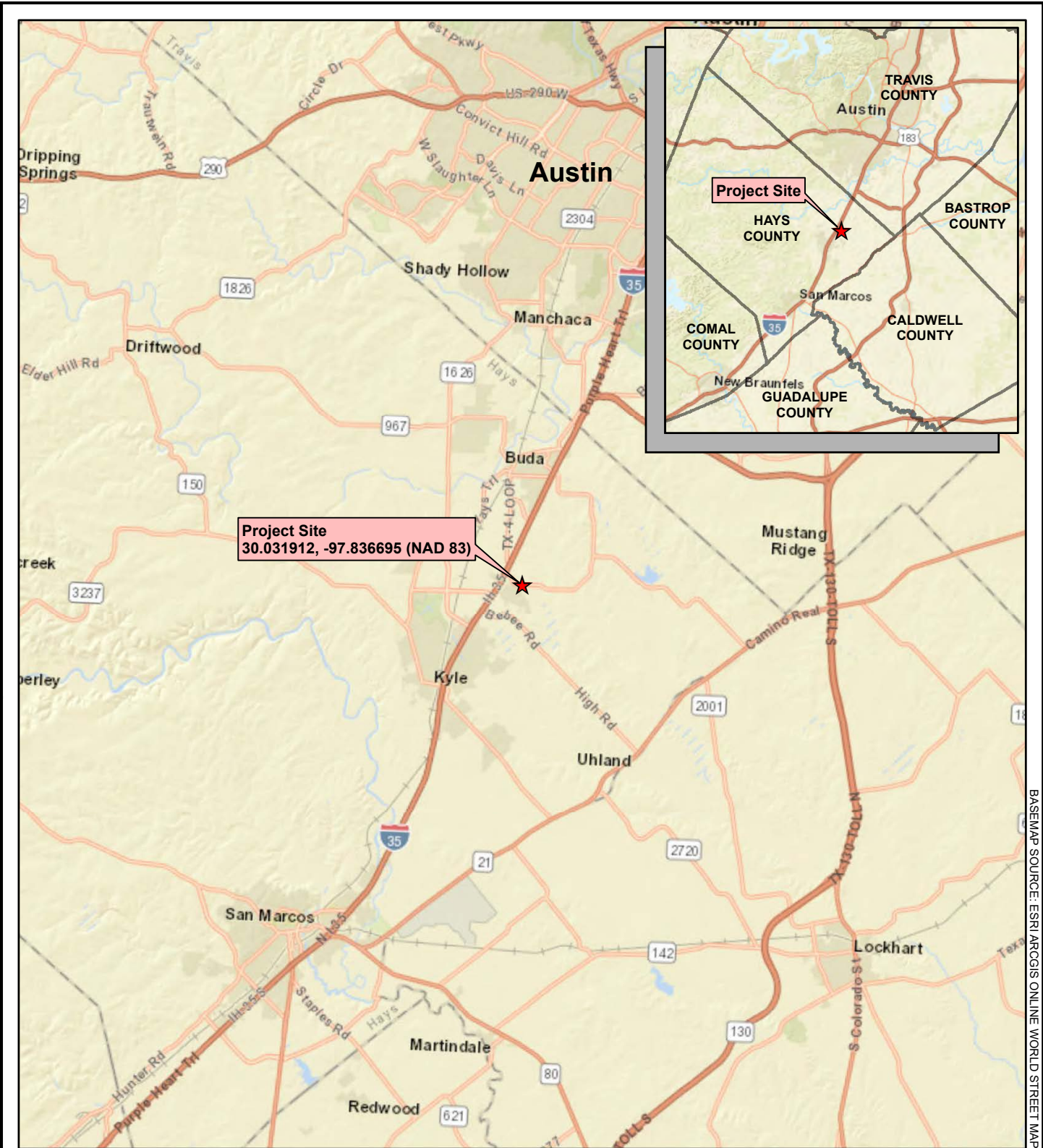
DISTRIBUTION

Ms. Judy Langford
Langford Community Management Services, Inc.
2901 CR 175
Leander, Texas 78641

Mrs. Latrice Hertzler
Future Link Technologies
PO Box 90696
Austin, Texas 78709-0696

Mr. Clayton A. Collier, REM, PWS
Hydrex Environmental
1120 NW Stallings Drive
Nacogdoches, Texas 75964-3428

ATTACHMENT A
PLATES



BASEMAP SOURCE: ESRI ARCGIS ONLINE WORLD STREET MAP

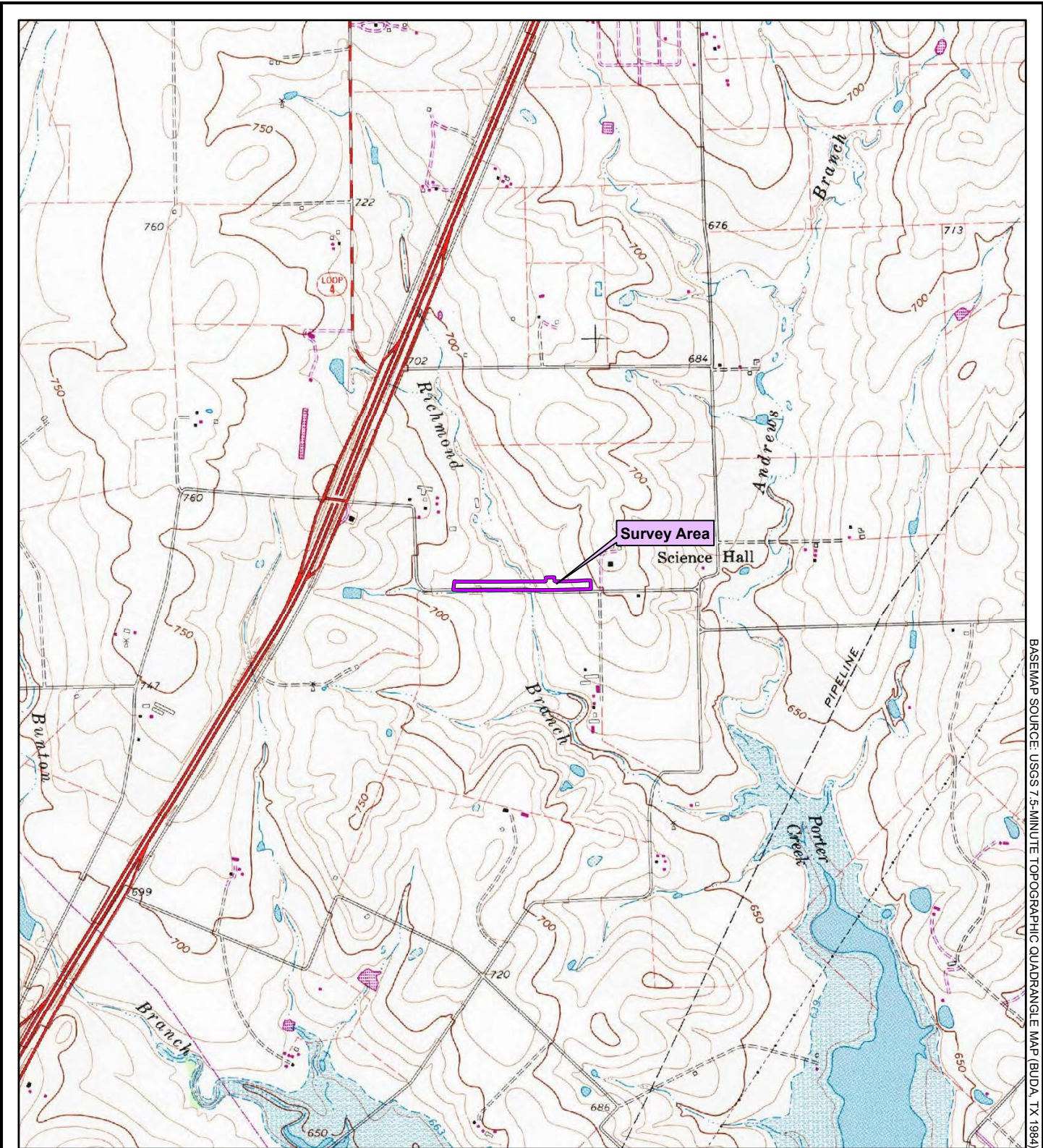
★ Project Site



← PLATE A-1 →
VICINITY MAP

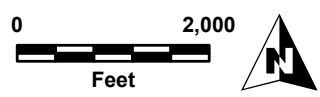
Windy Hill Road – Proposed Road Improvements
Cherrywood St. to Park S. Drive
City of Kyle
Hays County, Texas
GLO Contract No. 19-280-000-B779

Map Revised: 06/10/2020	Project Number: A-12-1403	GIS Analyst: NCF
-------------------------	---------------------------	------------------



BASEMAP SOURCE: USGS 7.5-MINUTE TOPOGRAPHIC QUADRANGLE MAP (BUDA, TX 1984)

 Survey Area



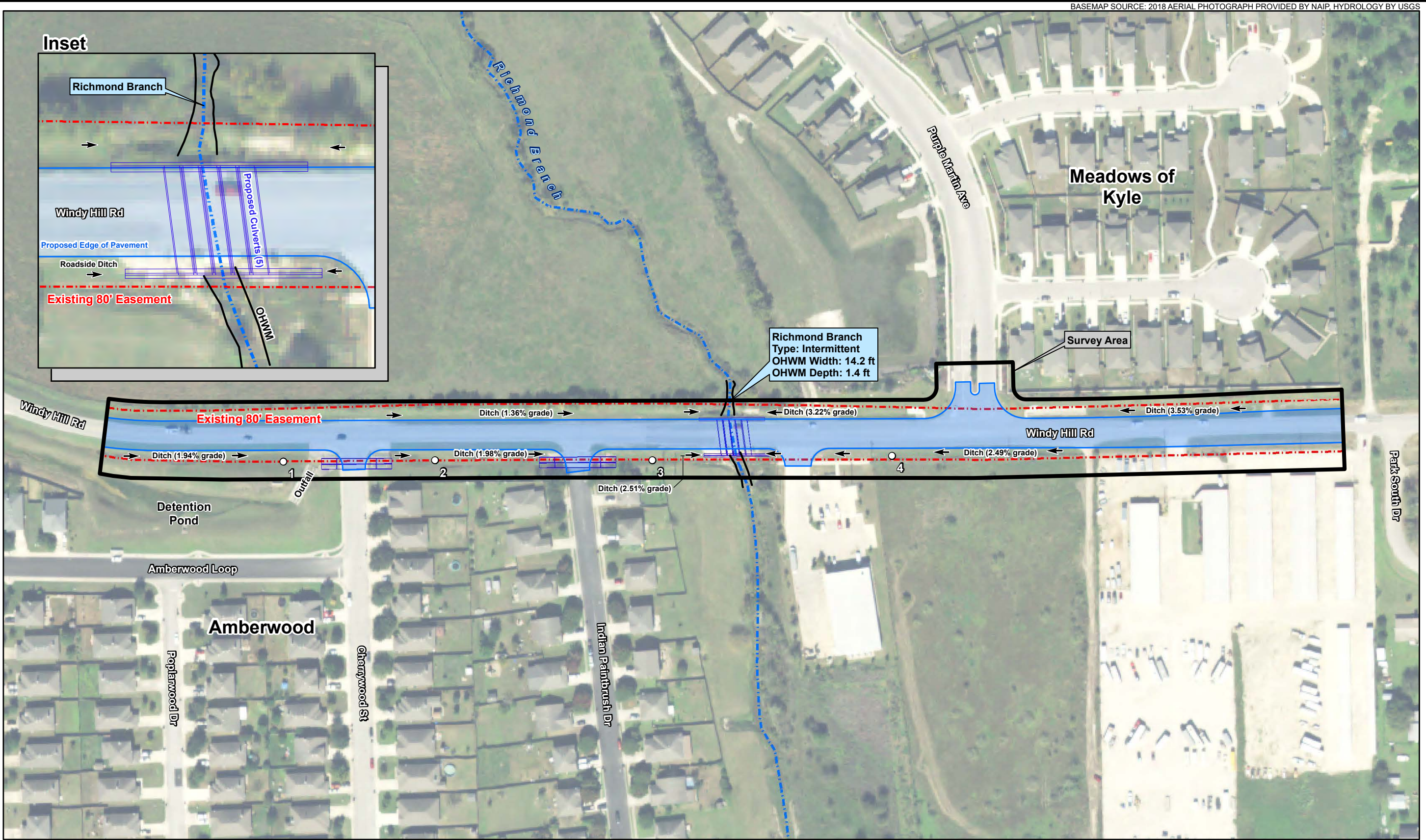

Hydrex
ENVIRONMENTAL
1120 NW Stallings Drive
Nacogdoches, Texas 75964
(936) 568-9451

← PLATE A-2 →

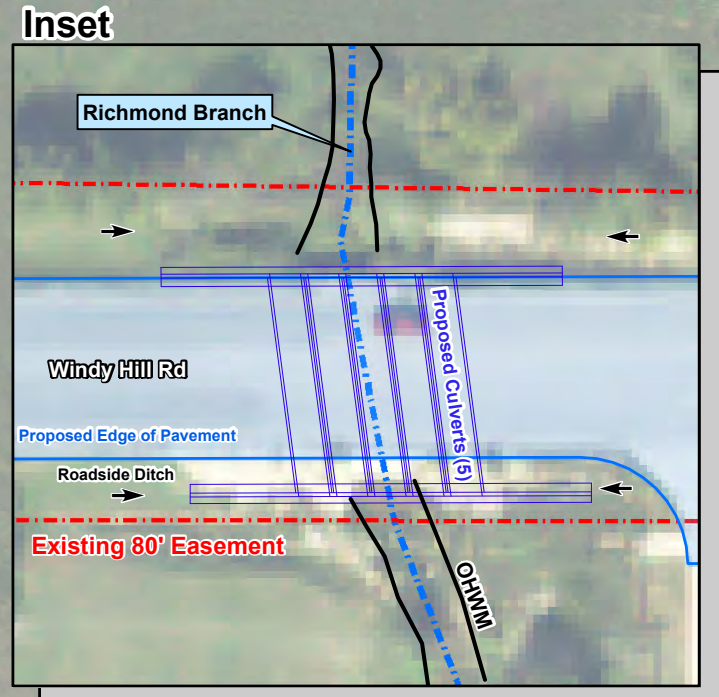
USGS TOPOGRAPHIC MAP

Windy Hill Road – Proposed Road Improvements
Cherrywood St. to Park S. Drive
City of Kyle
Hays County, Texas
GLO Contract No. 19-280-000-B779

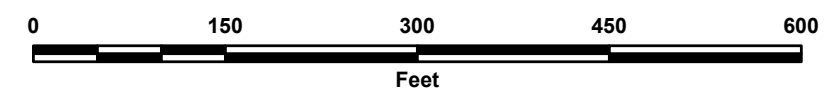
Map Revised: 06/10/2020	Project Number: A-12-1403	GIS Analyst: NCF
-------------------------	---------------------------	------------------



Richmond Branch
Type: Intermittent
OHWM Width: 14.2 ft
OHWM Depth: 1.4 ft



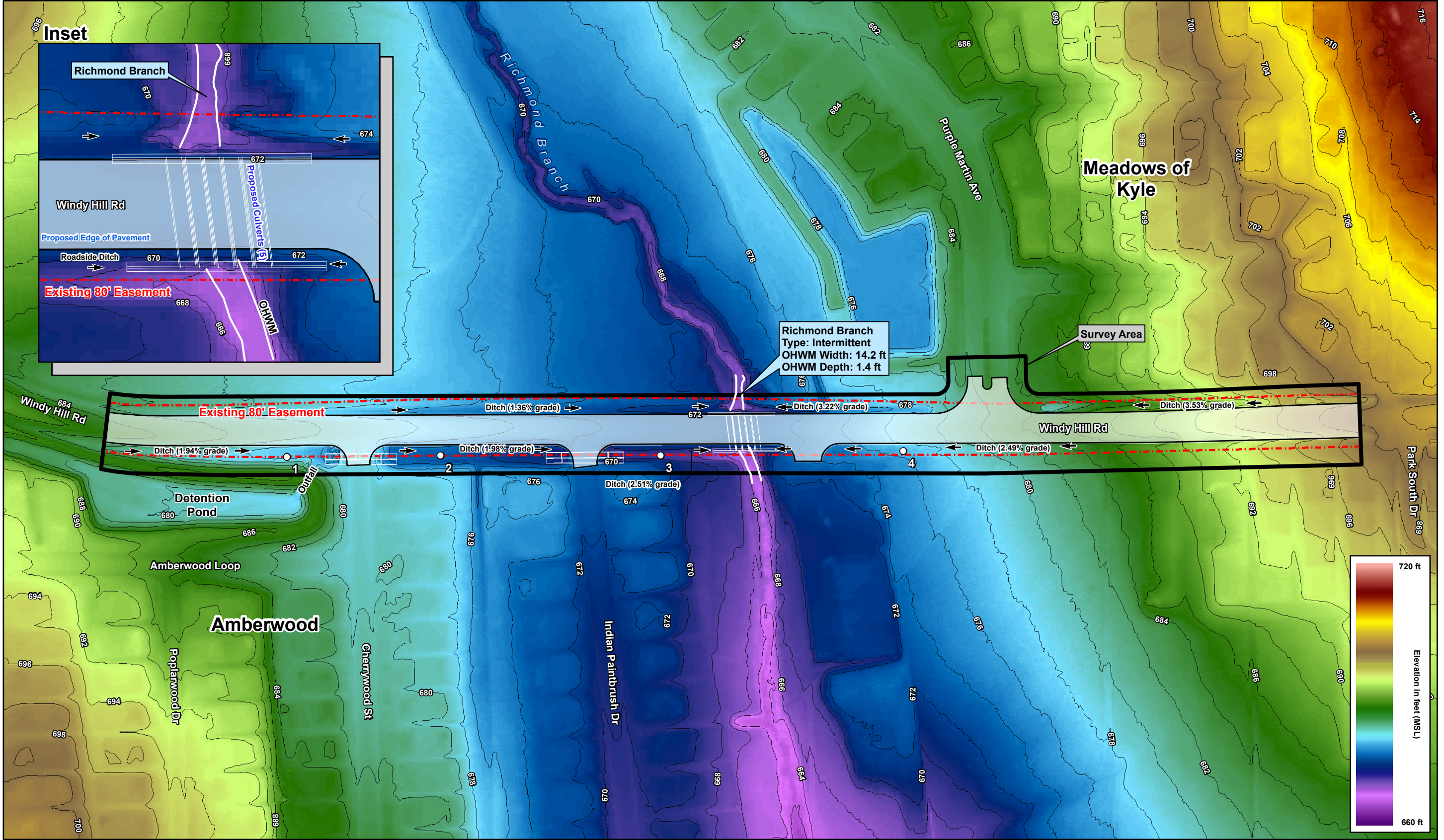
- Observation Point
- ➔ Existing Roadside Ditch Flow Direction
- Proposed Culvert
- - - Approximate 80' Easement
- Delineated OHWM
- - - Richmond Branch
- ▭ Proposed Edge of Pavement
- ▭ Survey Area



Windy Hill Road – Proposed Road Improvements
Cherrywood St. to Park S. Drive
City of Kyle
Hays County, Texas
GLO Contract No. 19-280-000-B779
Map Revised: 06/10/2020 Project Number: A-12-1403 GIS Analyst: NCF

PLATE A-3
DELINEATION MAP (2018 AERIAL PHOTOGRAPH)

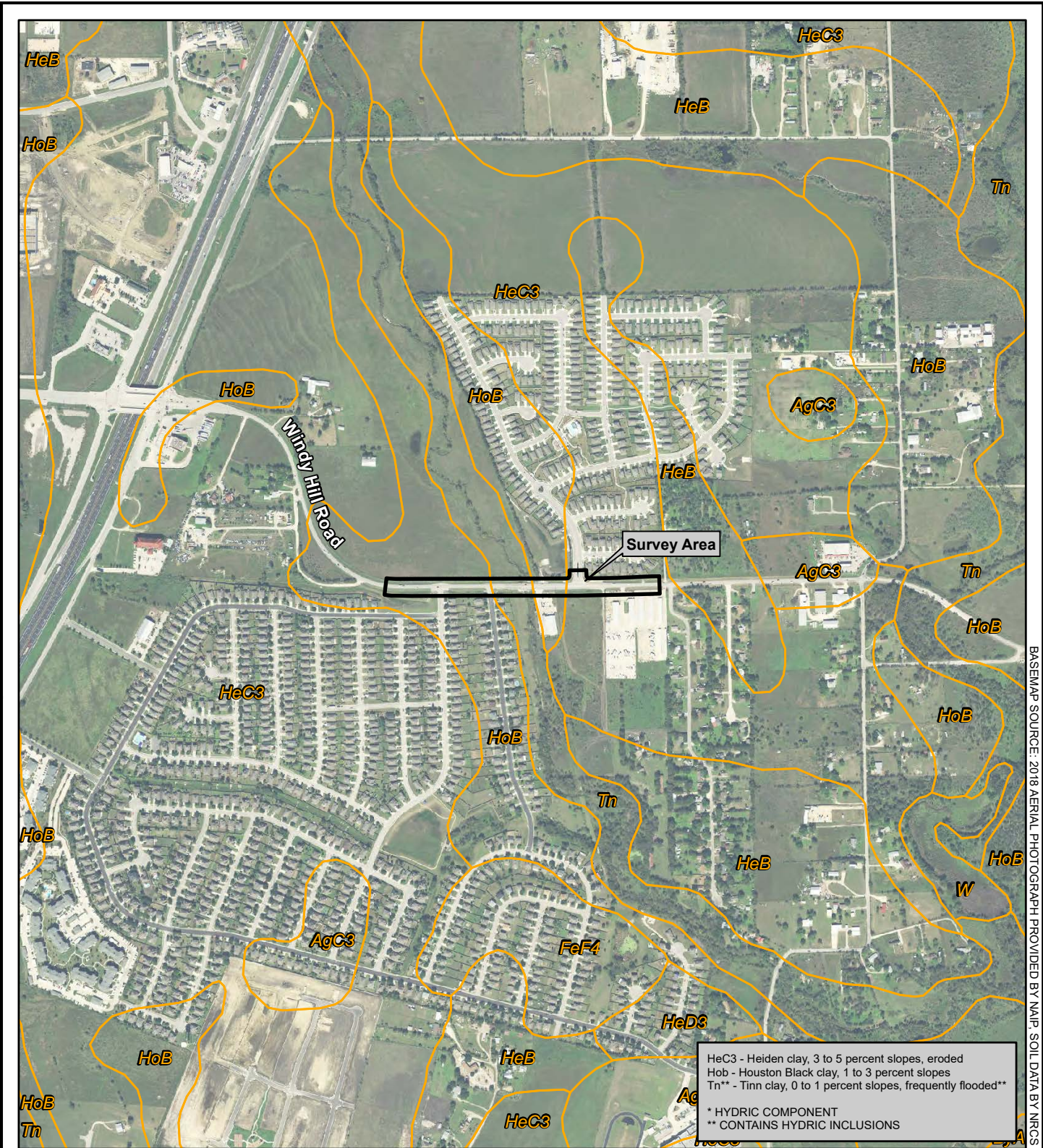




Windy Hill Road – Proposed Road Improvements
 Cherrywood St. to Park S. Drive
 City of Kyle
 Hays County, Texas
GLO Contract No. 19-280-000-B779
 Map Revised: 06/10/2020 Project Number: A-12-1403 GIS Analyst: NCF

PLATE A-4
 DELINEATION MAP (2017 LIDAR DIGITAL ELEVATION MODEL)

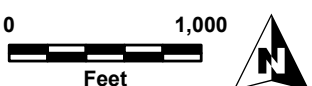




BASEMAP SOURCE: 2018 AERIAL PHOTOGRAPH PROVIDED BY NAPP. SOIL DATA BY NRCS

Survey Area
 NRCS Soil Map Unit

HeC3 - Heiden clay, 3 to 5 percent slopes, eroded
 HoB - Houston Black clay, 1 to 3 percent slopes
 Tn** - Tinn clay, 0 to 1 percent slopes, frequently flooded**
 * HYDRIC COMPONENT
 ** CONTAINS HYDRIC INCLUSIONS

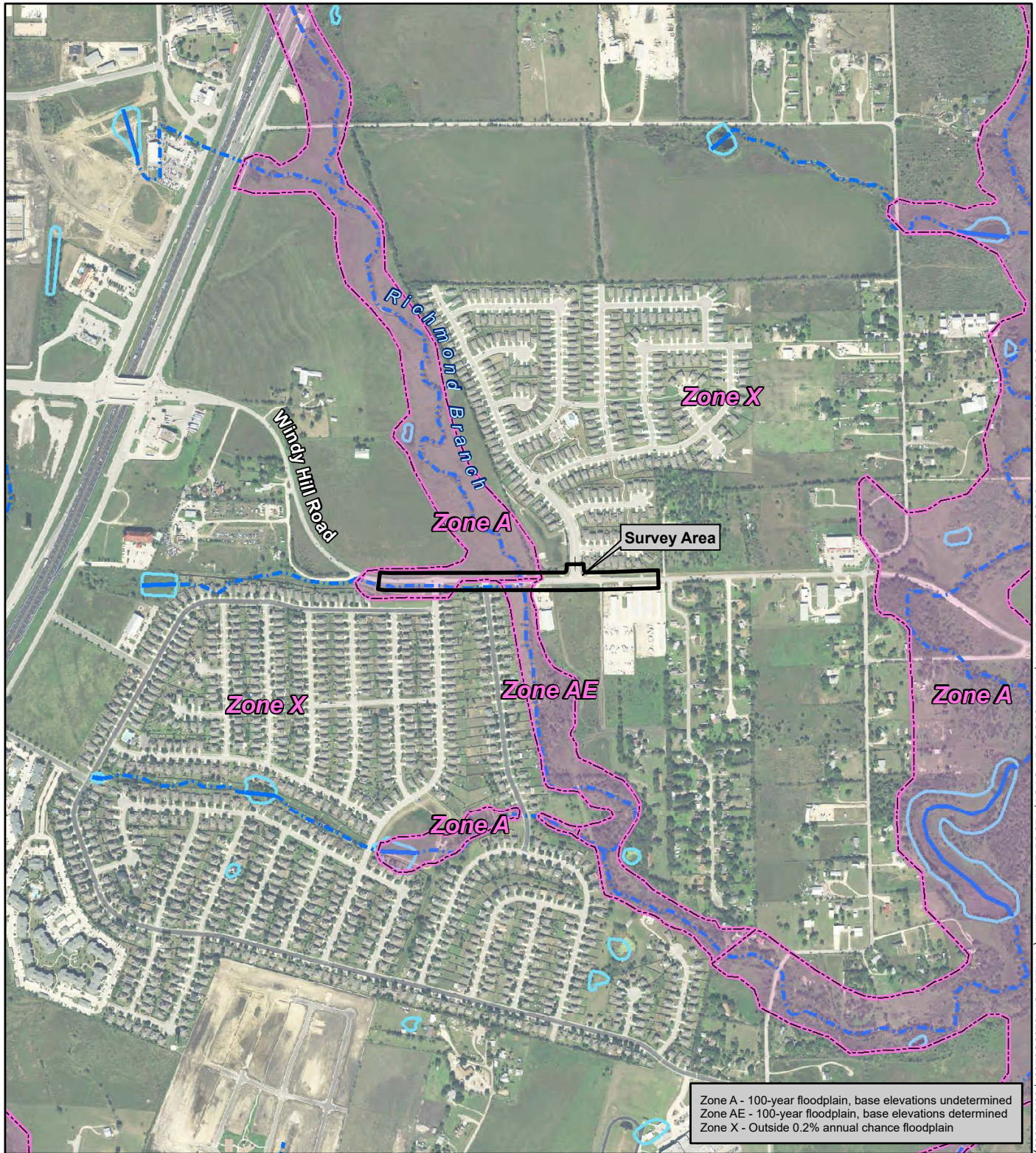


← PLATE A-5 →
 NRCS SOIL SURVEY MAP

Windy Hill Road – Proposed Road Improvements
Cherrywood St. to Park S. Drive
City of Kyle
Hays County, Texas
GLO Contract No. 19-280-000-B779

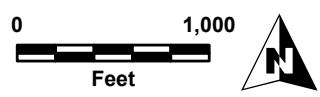
Map Revised: 06/10/2020 Project Number: A-12-1403 GIS Analyst: NCF

BASEMAP SOURCE: 2018 AERIAL PHOTOGRAPH PROVIDED BY NHP. HYDROLOGY BY USGS. FLOOD DATA BY FEMA (PANEL NO. 48209C0290F - 09/02/2005)



Zone A - 100-year floodplain, base elevations undetermined
 Zone AE - 100-year floodplain, base elevations determined
 Zone X - Outside 0.2% annual chance floodplain

Survey Area	USGS River / Perennial Stream
FEMA Flood Zone	USGS Ephemeral / Intermittent Stream
	USGS Waterbody

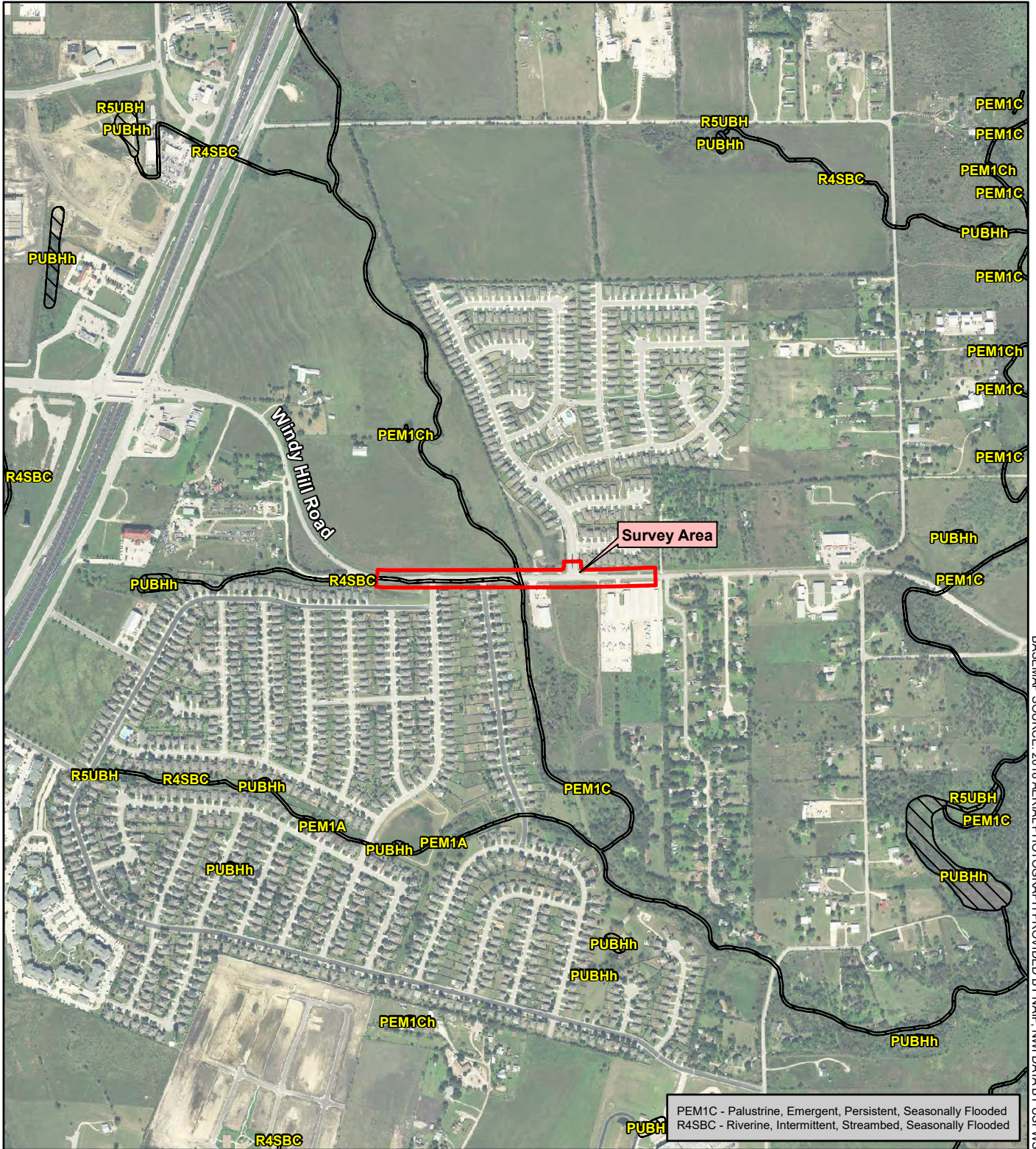


Hydrex
 ENVIRONMENTAL
 1120 NW Stallings Drive
 Nacogdoches, Texas 75964
 (936) 568-9451

PLATE A-6
 FEMA FLOOD INSURANCE RATE MAP

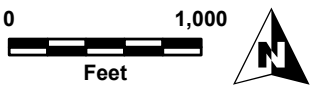
Windy Hill Road – Proposed Road Improvements
 Cherrywood St. to Park S. Drive
 City of Kyle
 Hays County, Texas
 GLO Contract No. 19-280-000-B779

Map Revised: 06/10/2020 Project Number: A-12-1403 GIS Analyst: NCF



BASEMAP SOURCE: 2018 AERIAL PHOTOGRAPH PROVIDED BY NAPI. NWI DATA BY USFWS

Survey Area
 NWI Wetlands



PEM1C - Palustrine, Emergent, Persistent, Seasonally Flooded
 R4SBC - Riverine, Intermittent, Streambed, Seasonally Flooded

1120 NW Stallings Drive
 Nacogdoches, Texas 75964
 (936) 568-9451

PLATE A-7
 NATIONAL WETLANDS INVENTORY MAP

Windy Hill Road – Proposed Road Improvements
Cherrywood St. to Park S. Drive
City of Kyle
Hays County, Texas
GLO Contract No. 19-280-000-B779

Map Revised: 06/10/2020 Project Number: A-12-1403 GIS Analyst: NCF

ATTACHMENT B
WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Windy Hill Road (A-12-1403) City/County: Hays County Sampling Date: 6/1/2020
 Applicant/Owner: City of Kyle State: TX Sampling Point: 1
 Investigator(s): C. Collier Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): Concave Slope (%): 1.94
 Subregion (LRR or MLRA): LRR J Lat: 30.031819 Long: -97.83896 Datum: NAD 83
 Soil Map Unit Name: HoB - Houston Black clay, 1 to 3 percent slopes NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Remarks:	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Site conditions were wetter than normal due to recent rainfall.	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Marl Deposits (B15) (LRR U)	<input checked="" type="checkbox"/> Drainage Patterns (B10)	<input checked="" type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input checked="" type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input checked="" type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Thin Muck Surface (C7)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Shallow Aquifer (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)		<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)

Field Observations:

Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): _____
 Saturation Present? Yes No Depth (inches): 4 in.
 (includes capillary fringe)

Wetland Hydrology Present? Yes No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

FAC-Neutral Test: 0 FACW/OBL Species, 0 FACU/UPL Species

Saturation in upper 4 inches due to rainfall during previous night.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 1

Tree Stratum (Plot size: 15' x 30')	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A) Total Number of Dominant Species Across All Strata: 1 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)
1.				
2.				
3.				
4.				
5.				
6.				
8.				
0 = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species x 1 = _____ FACW species x 2 = _____ FAC species x 3 = _____ FACU species x 4 = _____ UPL species x 5 = _____ Column Totals: (A) _____ (B) _____ Prevalence Index = B/A = _____
50% of total cover: _____ 20% of total cover: _____				
Sapling/Shrub Stratum (Plot size: 15' x 30')				
1.				
2.				
3.				
4.				
5.				
8.				
0 = Total Cover				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: 15' x 30')				
1. Paspalum dilatatum	75	Yes	FAC	
2. Mimosa strigillosa	15		FAC	
3. Oenothera speciosa (Status Unknown)	8		UPL	
4. Lolium perenne	2		FACU	
5.				
6.				
7.				
8.				
100 = Total Cover				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
50% of total cover: 50 20% of total cover: 20				
Woody Vine Stratum (Plot size: 15' x 30')				
1.				
2.				
3.				
4.				
5.				
0 = Total Cover				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
50% of total cover: _____ 20% of total cover: _____				
Remarks: (If observed, list morphological adaptations below.)				

SOIL Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features		Texture	Remarks
	Color (moist)	%	Color (moist)	%		
0-11	10YR 3/2	100			CL	
11-14	10YR 3/2	95	10YR 3/3	5	CL	(No redox features, only mottles.)

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U)	<input type="checkbox"/> 1 cm Muck (A9) (LRR O)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U)	<input type="checkbox"/> 2 cm Muck (A10) (LRR S)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O)	<input type="checkbox"/> Reduced Vertic (F18) (outside MLRA 150A,B)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (LRR P, S, T)
<input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 153B)
<input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Muck Presence (A8) (LRR U)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> 1 cm Muck (A9) (LRR P, T)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Marl (F10) (LRR U)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Ochric (F11) (MLRA 151)	
<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR O, S)	<input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Delta Ochric (F17) (MLRA 151)	
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B)	
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A)	
<input type="checkbox"/> Dark Surface (S7) (LRR P, S, T, U)	<input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)	

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

Soils significantly disturbed from construction of adjacent road. Sedimentation and erosion from upgradient subdivision.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Windy Hill Road (A-12-1403) City/County: Hays County Sampling Date: 6/1/2020
 Applicant/Owner: City of Kyle State: TX Sampling Point: 2
 Investigator(s): C. Collier Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): Concave Slope (%): 1.98
 Subregion (LRR or MLRA): LRR J Lat: 30.031818 Long: -97.838197 Datum: NAD 83
 Soil Map Unit Name: HoB - Houston Black clay, 1 to 3 percent slopes NWI classification: R4SBC
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation, Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation, Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		

Remarks:
 Site conditions were wetter than normal due to recent rainfall.
 Hydrology significantly disturbed due to areas of erosion ponding water after rain events.

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquifer (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
---	---

Field Observations:
 Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): _____
 Saturation Present? Yes No Depth (inches): _____
 (includes capillary fringe)
 Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
 FAC-Neutral Test: 0 FACW/OBL Species, 0 FACU/UPL Species
 Ponded water from recent rain in areas of severe erosion.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 2

Tree Stratum (Plot size: 15'x30') 1. _____ Absolute % Cover: _____ Dominant Species? _____ Indicator Status _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 0 = Total Cover 50% of total cover: _____ 20% of total cover: _____ Sapling/Shrub Stratum (Plot size: 15'x30') 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 0 = Total Cover 50% of total cover: _____ 20% of total cover: _____ Herb Stratum (Plot size: 15'x30') 1. Paspalum dilatatum 65 Yes FAC 2. Cynodon dactylon 15 FACU 3. Pynnpappus carolinianus (Status Unknown) 5 UPL 4. Mimosa strigillosa 5 FAC 5. Oenothera speciosa (Status Unknown) 2 UPL 6. _____ 7. _____ 8. _____ 9. _____ 10. _____ 11. _____ 12. _____ 92 = Total Cover 50% of total cover: 46 20% of total cover: 18.4 Woody Vine Stratum (Plot size: 15'x30') 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 0 = Total Cover 50% of total cover: _____ 20% of total cover: _____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A) Total Number of Dominant Species Across All Strata: 1 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B) Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____ Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
---	---

Remarks: (If observed, list morphological adaptations below.)

SOIL Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-5	10YR 3/2	100					CL	
5-14	10YR 3/2	80	2.5 Y 6/4	20			CL	20% rock from adjacent road

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U) <input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U) <input type="checkbox"/> Muck Presence (A8) (LRR U) <input type="checkbox"/> 1 cm Muck (A9) (LRR P, T) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A) <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR O, S) <input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Dark Surface (S7) (LRR P, S, T, U)	<input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U) <input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U) <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Marl (F10) (LRR U) <input type="checkbox"/> Depleted Ochric (F11) (MLRA 151) <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T) <input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U) <input type="checkbox"/> Delta Ochric (F17) (MLRA 151) <input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B) <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A) <input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)	<input type="checkbox"/> 1 cm Muck (A9) (LRR O) <input type="checkbox"/> 2 cm Muck (A10) (LRR S) <input type="checkbox"/> Reduced Vertic (F18) (outside MLRA 150A,B) <input type="checkbox"/> Piedmont Floodplain Soils (F19) (LRR P, S, T) <input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 153B) <input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> Other (Explain in Remarks)
--	--	---

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
 Type: _____
 Depth (inches): _____
 Hydric Soil Present? Yes No
 Remarks:
 Soils significantly disturbed from construction of adjacent road. Sedimentation and erosion from upgradient subdivision.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Windy Hill Road (A-12-1403) City/County: Hays County Sampling Date: 6/1/2020
 Applicant/Owner: City of Kyle State: TX Sampling Point: 3
 Investigator(s): C. Collier Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): Concave Slope (%): 2.51
 Subregion (LRR or MLRA): LRR J Lat: 30.031809 Long: -97.837104 Datum: NAD 83
 Soil Map Unit Name: Tn - Tinn clay, 0 to 1 percent slopes, frequently flooded NWI classification: R4SBC
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Remarks: Site conditions were wetter than normal due to recent rainfall.			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquifer (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
---	---

Field Observations:
 Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): _____
 Saturation Present? (includes capillary fringe) Yes No Depth (inches): _____
 Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
 Remarks:
 FAC-Neutral Test: 0 FACW/OBL Species, 1 FACU/UPL Species

Wetland Hydrology Present? Yes No

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 3

Tree Stratum (Plot size: 15'x30') 1. _____ Absolute % Cover: _____ Dominant Species? _____ Indicator Status _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 0 = Total Cover 50% of total cover: _____ 20% of total cover: _____ Sapling/Shrub Stratum (Plot size: 15'x30') 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 0 = Total Cover 50% of total cover: _____ 20% of total cover: _____ Herb Stratum (Plot size: 15'x30') 1. Paspalum dilatatum 39 Yes FAC 2. Cynodon dactylon 25 Yes FACU 3. Mimosa strigillosa 25 Yes FACU 4. Lolium perenne 5 FACU 5. Pyrrhappus carolinianus (Status Unknown) 5 UPL 6. Oenothera speciosa (Status Unknown) 1 UPL 7. _____ 8. _____ 9. _____ 10. _____ 11. _____ 12. _____ 100 = Total Cover 50% of total cover: 50 20% of total cover: 20 Woody Vine Stratum (Plot size: 15'x30') 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 0 = Total Cover 50% of total cover: _____ 20% of total cover: _____ Remarks: (If observed, list morphological adaptations below.)	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A) Total Number of Dominant Species Across All Strata: 3 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B) Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species x 1 = _____ FACW species x 2 = _____ FAC species x 3 = _____ FACU species x 4 = _____ UPL species x 5 = _____ Column Totals: (A) _____ (B) _____ Prevalence Index = B/A = _____ Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height. Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
---	--

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features		Texture	Remarks
	Color (moist)	%	Color (moist)	%		
0-12	10YR 4/2	60	2.5Y 6/4	40	CL	Sedimentation on top. Rock fragments throughout. Large rock (riprap) encountered at 4 inches.

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)
 Histic Epipedon (A2) Polyvalue Below Surface (S8) (LRR S, T, U)
 Black Histic (A3) Thin Dark Surface (S9) (LRR S, T, U)
 Hydrogen Sulfide (A4) Loamy Mucky Mineral (F1) (LRR O)
 Stratified Layers (A5) Loamy Gleyed Matrix (F2)
 Organic Bodies (A6) (LRR P, T, U) Depleted Matrix (F3)
 5 cm Mucky Mineral (A7) (LRR P, T, U) Redox Dark Surface (F6)
 Muck Presence (A8) (LRR U) Depleted Dark Surface (F7)
 1 cm Muck (A9) (LRR P, T) Redox Depressions (F8)
 Depleted Below Dark Surface (A11) Marl (F10) (LRR U)
 Thick Dark Surface (A12) Depleted Ochric (F11) (MLRA 151)
 Coast Prairie Redox (A16) (MLRA 150A) Iron-Manganese Masses (F12) (LRR O, P, T)
 Sandy Mucky Mineral (S1) (LRR O, S) Umbric Surface (F13) (LRR P, T, U)
 Sandy Gleyed Matrix (S4) Delta Ochric (F17) (MLRA 151)
 Sandy Redox (S5) Reduced Vertic (F18) (MLRA 150A, 150B)
 Stripped Matrix (S6) Piedmont Floodplain Soils (F19) (MLRA 149A)
 Dark Surface (S7) (LRR P, S, T, U) Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Restrictive Layer (if observed):
 Type: _____
 Depth (inches): _____
 Hydric Soil Present? Yes No

Remarks:
 Soils significantly disturbed from construction of adjacent road. Sedimentation and erosion from upgradient subdivision.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Windy Hill Road (A-12-1403) City/County: Hays County Sampling Date: 6/1/2020
 Applicant/Owner: City of Kyle State: TX Sampling Point: 4
 Investigator(s): C. Collier Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): Concave Slope (%): 2.49
 Subregion (LRR or MLRA): LRR J Lat: 30.031818 Long: -97.835898 Datum: NAD 83
 Soil Map Unit Name: HoB - Houston Black clay, 1 to 3 percent slopes NWI classification: Upland
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation, Soil, or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Remarks:	
Wetland Hydrology Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Site conditions were wetter than normal due to recent rainfall.	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Marl Deposits (B15) (LRR U)	<input type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input checked="" type="checkbox"/> Shallow Aquifer (D3)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Thin Muck Surface (C7)		
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Other (Explain in Remarks)		
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)			
<input type="checkbox"/> Water-Stained Leaves (B9)			

Field Observations:

Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): _____
 Saturation Present? (includes capillary fringe) Yes No Depth (inches): _____
 Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
 FAC-Neutral Test: 0 FACW/OBL Species, 1 FACU/UPL Species

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 4

Tree Stratum (Plot size: 15'x30')	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A) Total Number of Dominant Species Across All Strata: 2 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
8. _____	_____	_____	_____	
0 = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species x 1 = _____ FACW species x 2 = _____ FAC species x 3 = _____ FACU species x 4 = _____ UPL species x 5 = _____ Column Totals: (A) _____ (B) _____ Prevalence Index = B/A = _____
50% of total cover: _____ 20% of total cover: _____				
Sapling/Shrub Stratum (Plot size: 15'x30')				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
8. _____	_____	_____	_____	
0 = Total Cover				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: 15'x30')				
1. <i>Cynodon dactylon</i>	30	Yes	FACU	
2. <i>Paspalum dilatatum</i>	25	Yes	FAC	
3. <i>Mimosa strigillosa</i>	20		FAC	
4. <i>Phyrrhopappus carolinianus</i> (Status Unknown)	15		UPL	
5. <i>Lolium perenne</i>	15		FACU	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
105 = Total Cover				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
50% of total cover: 52.5 20% of total cover: 21				
Woody Vine Stratum (Plot size: 15'x30')				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
0 = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Remarks: (If observed, list morphological adaptations below.)				

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features		Texture	Remarks
	Color (moist)	%	Color (moist)	%		
0-12	10YR 3/2	100			CL	Few rock fragments throughout

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U)	<input type="checkbox"/> 1 cm Muck (A9) (LRR O)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U)	<input type="checkbox"/> 2 cm Muck (A10) (LRR S)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O)	<input type="checkbox"/> Reduced Vertic (F18) (outside MLRA 150A,B)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (LRR P, S, T)
<input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 153B)
<input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Muck Presence (A8) (LRR U)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> 1 cm Muck (A9) (LRR P, T)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Marl (F10) (LRR U)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Ochric (F11) (MLRA 151)	
<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR O, S)	<input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Delta Ochric (F17) (MLRA 151)	
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B)	
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A)	
<input type="checkbox"/> Dark Layer (S7) (LRR P, S, T, U)	<input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)	

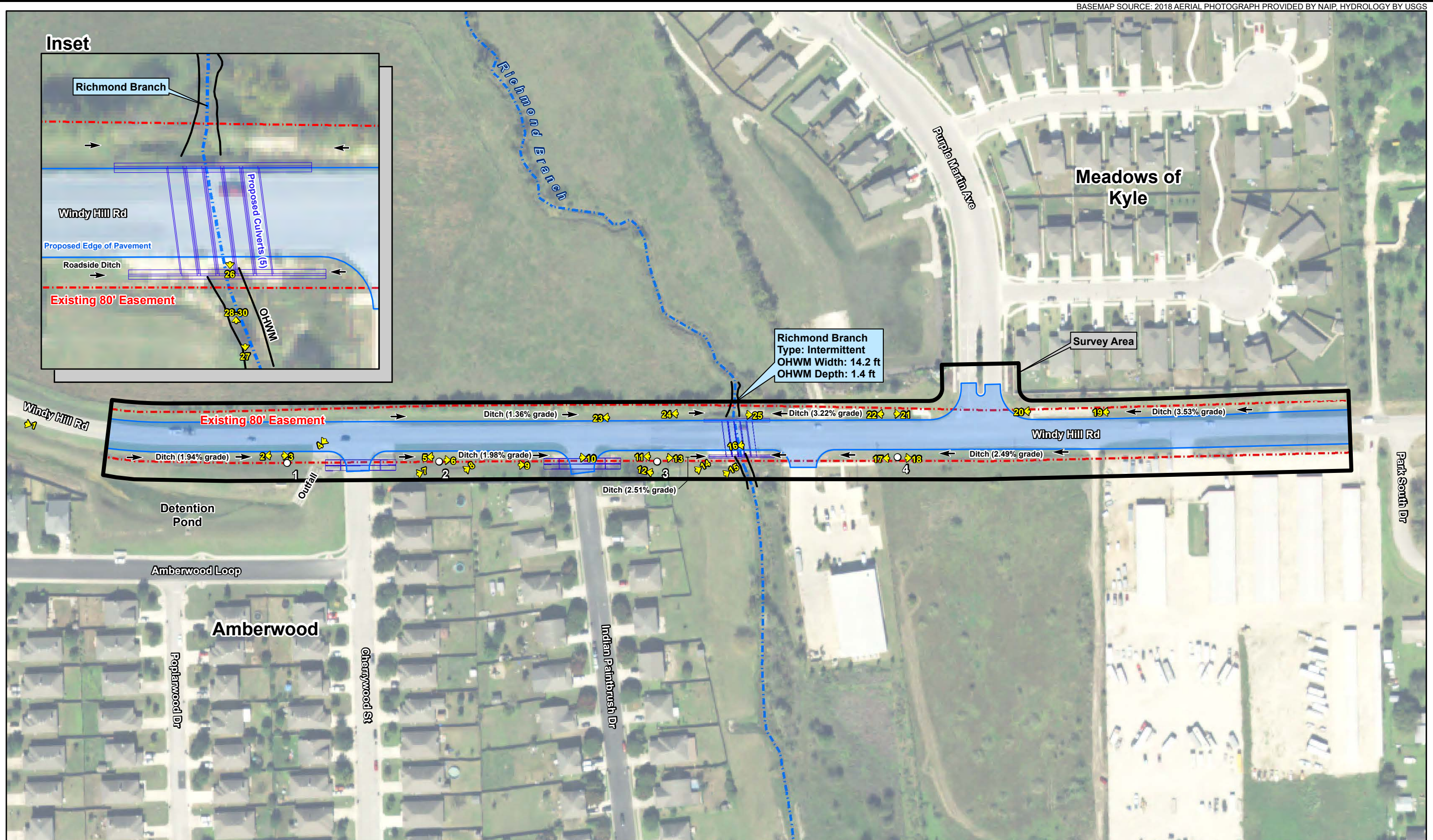
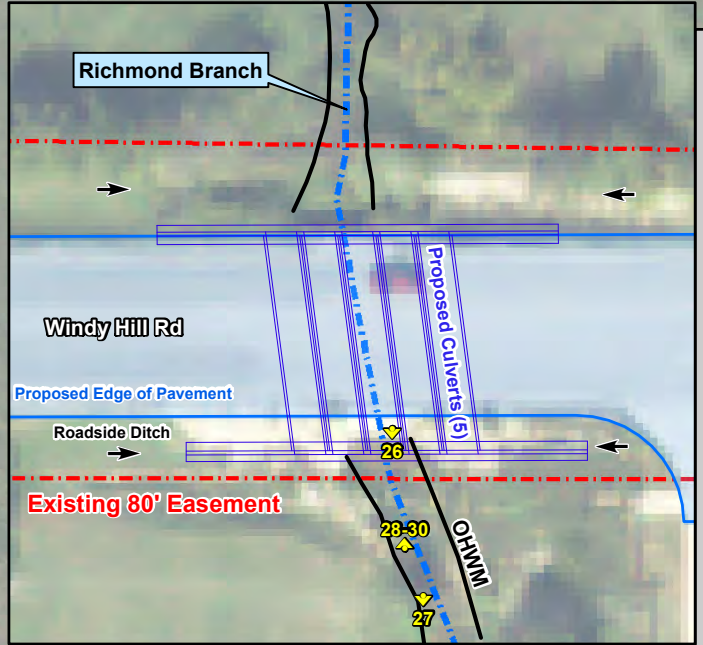
Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____
 Hydric Soil Present? Yes No

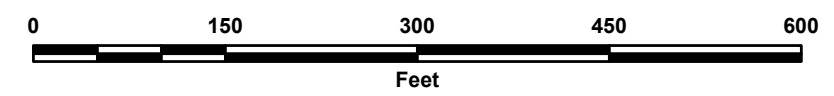
Remarks:

ATTACHMENT C
PHOTOGRAPHIC DOCUMENTATION

Inset



- | | |
|--|-----------------------------|
| ○ Observation Point | — Delineated OHWM |
| △ Photograph Location | --- Richmond Branch |
| → Existing Roadside Ditch Flow Direction | ▭ Proposed Edge of Pavement |
| ▭ Proposed Culvert | ▭ Survey Area |
| --- Approximate 80' Easement | |



Windy Hill Road – Proposed Road Improvements
 Cherrywood St. to Park S. Drive
 City of Kyle
 Hays County, Texas
 GLO Contract No. 19-280-000-B779
 Map Revised: 06/10/2020 Project Number: A-12-1-403 GIS Analyst: NCF

PLATE C-1
 MAP SHOWING PHOTOGRAPH LOCATIONS



Site Photographs



1. Looking east along Windy Hill Road and the south roadside ditch during the June 2020 delineation.



2. Looking west along the south roadside ditch of Windy Hill Road from near Cherrywood St.



3. Looking west at culvert under Cherrywood St.



4. Looking south at Amberwood detention pond outfall at the roadside ditch.



5. Looking west along roadside ditch. Conditions were wetter than normal during delineation due to recent rainfall.



6. Looking east along roadside ditch. Erosional features pond water after significant runoff events.

Site Photographs



7. For comparison: Photograph taken by FLT in March 2020 showing typical, dry site conditions of the roadside ditch.



8. For comparison: Another photograph taken by FLT in March 2020. Erosional features typically remain dry except after significant runoff events.



9. Looking east at culvert under Indian Paint Brush Dr.



10. Looking east from Indian Paint Brush Dr. Site conditions were wetter than normal during the delineation.



11. Looking west along the roadside ditch towards Indian Paint Brush Dr.



12. For comparison: Photograph taken by FLT in March 2020 showing typical, dry conditions of the roadside ditch.

Site Photographs



13. Looking east along roadside ditch towards Richmond Branch.



14. For comparison: Photograph taken by FLT in March 2020 showing typical, dry conditions of the roadside ditch between Indian Paint Brush Rd. and Richmond Branch.



15. Looking east along roadside ditch near Richmond Branch bridge. Significant erosion is present, along with erosion control devices put in place over the years.



16. Looking west from the Richmond Branch bridge along Windy Hill Road.



17. Looking west along the south roadside ditch.



18. Looking east along the south roadside ditch.

Site Photographs



19. Looking west along the north roadside ditch near Purple Martin Ave. Riprap has been installed to minimize erosion.



20. Looking west along the roadside ditch from near Purple Martin Ave.



21. Looking east along roadside ditch towards Purple Martin Ave.



22. Looking west along roadside ditch towards Richmond Branch. Riprap has been installed to minimize erosion.



23. Looking west along roadside ditch across from Indian Paint Brush Dr.



24. Looking west along roadside ditch from near Richmond Branch.

Site Photographs



25. Looking east along roadside ditch near the discharge point into Richmond Branch. Significant riprap has been installed to minimize erosion.



26. Looking south along intermittent Richmond Branch. Blue flagging denotes the extent of OHWM.



27. Looking south along Richmond Branch near the edge of the project area.



28. Looking north along Richmond Branch. Cattails and black willows are abundant within the OHWM of Richmond Branch.



29. Looking north along Richmond Branch. Blue flagging denotes OHWM.



30. Looking north at Richmond Branch bridge.

Site Photographs



Soil Profile of Observation Point 1.



Soil Profile of Observation Point 2.



Soil Profile of Observation Point 3.



Soil Profile of Observation Point 4.

ATTACHMENT D
PRECIPITATION RECORDS

Record of Climatological Observations

These data are quality controlled and may not be identical to the original observations.

Generated on 06/08/2020

Observation Time Temperature: Unknown Observation Time Precipitation: Unknown

Year	Month	Day	Temperature (F)		At Observation	Precipitation					Evaporation		Soil Temperature (F)						
			24 Hrs. Ending at Observation Time			24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth			
			Max.	Min.		Rain, Melted Snow, Etc. (in)	F l a g	Snow, Ice Pellets, Hail (in)	F l a g	Snow, Ice Pellets, Hail, Ice on Ground (in)			Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.	
2020	05	01				0.00													
2020	05	02				0.00													
2020	05	03				0.00													
2020	05	04				0.00													
2020	05	05				0.00													
2020	05	06				0.00													
2020	05	07				0.00													
2020	05	08				0.00													
2020	05	09				0.00													
2020	05	10				0.00													
2020	05	11				0.00													
2020	05	12				5.08													
2020	05	13				0.19													
2020	05	14				0.00													
2020	05	15				T													
2020	05	16				1.05													
2020	05	17				0.00													
2020	05	18				0.00													
2020	05	19				0.00													
2020	05	20				0.00													
2020	05	21				0.00													
2020	05	22				0.00													
2020	05	23				0.00													
2020	05	24				0.09													
2020	05	25				2.26													
2020	05	26				0.50													
2020	05	27																	
2020	05	28				0.74													
2020	05	29				0.00													
2020	05	30				0.00													
2020	05	31				0.32													
Summary						10.23		0.0											

Empty, or blank, cells indicate that a data observation was not reported.

*Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 0=Unknown

"s" This data value failed one of NCDC's quality control tests.

"T" values in the Precipitation or Snow category above indicate a "trace" value was recorded.

"A" values in the Precipitation Flag or the Snow Flag column indicate a multiday total, accumulated since last measurement, is being used.
Data value inconsistency may be present due to rounding calculations during the conversion process from SI metric units to standard imperial units.

ATTACHMENT E
THREATENED & ENDANGERED SPECIES



United States Department of the Interior



FISH AND WILDLIFE SERVICE

Austin Ecological Services Field Office

10711 Burnet Road, Suite 200

Austin, TX 78758-4460

Phone: (512) 490-0057 Fax: (512) 490-0974

<http://www.fws.gov/southwest/es/AustinTexas/>

<http://www.fws.gov/southwest/es/EndangeredSpecies/lists/>

In Reply Refer To:

June 08, 2020

Consultation Code: 02ETAU00-2020-SLI-1584

Event Code: 02ETAU00-2020-E-03280

Project Name: City of Kyle, Windy Hill Road

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that *may* occur within the county of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

Please note that new information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Also note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of federally listed as threatened

or endangered species and to determine whether projects may affect these species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

While a Federal agency may designate a non-Federal representative to conduct informal consultation or prepare a biological assessment, the Federal Agency must notify the Service in writing of any such designation. The Federal agency shall also independently review and evaluate the scope and content of a biological assessment prepared by their designated non-Federal representative before that document is submitted to the Service.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by a federally funded, permitted or authorized activity, the agency is required to consult with the Service pursuant to 50 CFR 402. The following definitions are provided to assist you in reaching a determination:

- *No effect* - the proposed action will not affect federally listed species or critical habitat. A “no effect” determination does not require section 7 consultation and no coordination or contact with the Service is necessary. However, if the project changes or additional information on the distribution of listed or proposed species becomes available, the project should be reanalyzed for effects not previously considered.
 - *May affect, but is not likely to adversely affect* - the project may affect listed species and/or critical habitat; however, the effects are expected to be discountable, insignificant, or completely beneficial. Certain avoidance and minimization measures may need to be implemented in order to reach this level of effect. The Federal agency or the designated non-Federal representative should consult with the Service to seek written concurrence that adverse effects are not likely. Be sure to include all of the information and documentation used to reach your decision with your request for concurrence. The Service must have this documentation before issuing a concurrence.
 - *Is likely to adversely affect* - adverse effects to listed species may occur as a direct or indirect result of the proposed action. For this determination, the effect of the action is neither discountable nor insignificant. If the overall effect of the proposed action is beneficial to the listed species but the action is also likely to cause some adverse effects to individuals of that species, then the proposed action “is likely to adversely affect” the listed species. The analysis should consider all interrelated and interdependent actions. An “is likely to adversely affect” determination requires the Federal action agency to initiate formal section 7 consultation with our office.
-

Regardless of the determination, the Service recommends that the Federal agency maintain a complete record of the evaluation, including steps leading to the determination of effect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related information. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at: <http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>.

Migratory Birds

For projects that may affect migratory birds, the Migratory Bird Treaty Act (MBTA) implements various treaties and conventions for the protection of these species. Under the MBTA, taking, killing, or possessing migratory birds is unlawful. Migratory birds may nest in trees, brushy areas, or other areas of suitable habitat. The Service recommends activities requiring vegetation removal or disturbance avoid the peak nesting period of March through August to avoid destruction of individuals, nests, or eggs. If project activities must be conducted during this time, we recommend surveying for nests prior to conducting work. If a nest is found, and if possible, the Service recommends a buffer of vegetation remain around the nest until the young have fledged or the nest is abandoned.

For additional information concerning the MBTA and recommendations to reduce impacts to migratory birds please contact the U.S. Fish and Wildlife Service Migratory Birds Office, 500 Gold Ave. SW, Albuquerque, NM 87102. A list of migratory birds may be viewed at <https://www.fws.gov/birds/management/managed-species/migratory-bird-treaty-act-protected-species.php>. Guidance for minimizing impacts to migratory birds for projects including communications towers can be found at: <https://www.fws.gov/birds/management/project-assessment-tools-and-guidance/guidance-documents/communication-towers.php>. Additionally, wind energy projects should follow the wind energy guidelines

<https://www.fws.gov/birds/management/project-assessment-tools-and-guidance/guidance-documents/wind-energy.php>) for minimizing impacts to migratory birds and bats.

Finally, please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan <https://www.fws.gov/birds/management/project-assessment-tools-and-guidance/guidance-documents/eagles.php>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
-

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Austin Ecological Services Field Office

10711 Burnet Road, Suite 200

Austin, TX 78758-4460

(512) 490-0057

Project Summary

Consultation Code: 02ETAU00-2020-SLI-1584

Event Code: 02ETAU00-2020-E-03280

Project Name: City of Kyle, Windy Hill Road

Project Type: TRANSPORTATION

Project Description: Wetlands delineation for permitting requirements.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/30.03190822392377N97.83674551765803W>



Counties: Hays, TX

Endangered Species Act Species

There is a total of 19 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 3 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.
-

Birds

NAME	STATUS
<p>Golden-cheeked Warbler (=wood) <i>Dendroica chrysoparia</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/33</p>	Endangered
<p>Least Tern <i>Sterna antillarum</i> Population: interior pop. No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: <ul style="list-style-type: none"> ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/8505</p>	Endangered
<p>Piping Plover <i>Charadrius melodus</i> Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is final critical habitat for this species. Your location is outside the critical habitat. This species only needs to be considered under the following conditions: <ul style="list-style-type: none"> ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/6039</p>	Threatened
<p>Red Knot <i>Calidris canutus rufa</i> No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: <ul style="list-style-type: none"> ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/1864</p>	Threatened
<p>Whooping Crane <i>Grus americana</i> Population: Wherever found, except where listed as an experimental population There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/758</p>	Endangered

Amphibians

NAME	STATUS
Austin Blind Salamander <i>Eurycea waterlooensis</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5737	Endangered
Barton Springs Salamander <i>Eurycea sosorum</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1113	Endangered
San Marcos Salamander <i>Eurycea nana</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6374	Threatened
Texas Blind Salamander <i>Typhlomolge rathbuni</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5130	Endangered

Fishes

NAME	STATUS
Fountain Darter <i>Etheostoma fonticola</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5858	Endangered
San Marcos Gambusia <i>Gambusia georgei</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7519	Endangered

Clams

NAME	STATUS
Texas Fatmucket <i>Lampsilis bracteata</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9041	Candidate
Texas Fawnsfoot <i>Truncilla macrodon</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8965	Candidate
Texas Pimpleback <i>Quadrula petrina</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8966	Candidate

Insects

NAME	STATUS
Comal Springs Dryopid Beetle <i>Stygoparnus comalensis</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7175	Endangered
Comal Springs Riffle Beetle <i>Heterelmis comalensis</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3403	Endangered

Crustaceans

NAME	STATUS
Peck's Cave Amphipod <i>Stygobromus (=Stygonectes) pecki</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8575	Endangered

Flowering Plants

NAME	STATUS
Bracted Twistflower <i>Streptanthus bracteatus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2856	Candidate
Texas Wild-rice <i>Zizania texana</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/805	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

ATTACHMENT F
CULTURAL RESOURCES

From: noreply@thc.state.tx.us
To: lhertzler@future-link.biz; reviews@thc.state.tx.us
Subject: Section 106 Submission
Date: Wednesday, May 27, 2020 5:18:06 PM



Re: Project Review under Section 106 of the National Historic Preservation Act and/or the Antiquities Code of Texas

THC Tracking #202013097

Kyle Wndy Hill Road Improvements
Windy Hill Road
Kyle, TX

Dear Latrice Hertzler:

Thank you for your submittal regarding the above-referenced project.

The review staff, led by Bill Martin and Sarah Medwig, has completed its review and has made the following determinations based on the information submitted for review:

Above-Ground Resources

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

Archeology Comments

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

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

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

Sincerely,



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

Please do not respond to this email.

ATTACHMENT G
NATIONWIDE PERMIT 14 GUIDELINES

NATIONWIDE PERMIT 14
Effective Date: March 19, 2017

Linear Transportation Projects. Activities required for crossings of waters of the United States associated with the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxiways) in waters of the United States. For linear transportation projects in non-tidal waters, the discharge cannot cause the loss of greater than 1/2-acre of waters of the United States. For linear transportation projects in tidal waters, the discharge cannot cause the loss of greater than 1/3-acre of waters of the United States. Any stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project.

This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to construct the linear transportation project. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

This NWP cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) the loss of waters of the United States exceeds 1/10-acre; or (2) there is a discharge in a special aquatic site, including wetlands. (See general condition 32.) (Authorities: Sections 10 and 404)

Note 1: For linear transportation projects crossing a single waterbody more than one time at separate and distant locations, or multiple waterbodies at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. Linear transportation projects must comply with 33 CFR 330.6(d).

Note 2: Some discharges for the construction of farm roads or forest roads, or temporary roads for moving mining equipment, may qualify for an exemption under section 404(f) of the Clean Water Act (see 33 CFR 323.4).

Note 3: For NWP 14 activities that require pre-construction notification, the PCN must include any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings that require Department of the Army authorization but do not require pre-construction notification (see paragraph (b) of general condition 32). The district engineer will evaluate the PCN in accordance with Section D, "District Engineer's Decision." The district engineer may require mitigation to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see general condition 23).

NATIONWIDE PERMIT GENERAL CONDITIONS

Effective Date: January 6, 2017

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation. (b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States. (c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the preconstruction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the preconstruction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than

once for the same single and complete project.

16. Wild and Scenic Rivers. (a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status.

(b) If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. The permittee shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status.

(c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: <http://www.rivers.gov/>.

17. Tribal Rights. No NWP activity may cause more than minimal adverse effects on tribal rights (including treaty rights), protected tribal resources, or tribal lands.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless ESA section 7 consultation addressing the effects of the proposed activity has been completed. Direct effects are the immediate effects on listed species and critical habitat caused by the NWP activity. Indirect effects are those effects on listed species and critical habitat that are caused by the NWP activity and are later in time, but still are reasonably certain to occur.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. If preconstruction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the proposed activity or that utilize the designated critical habitat that might be affected by the proposed activity. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the activity, and has so notified the Corps, VerDate Sep-11 the applicant shall not begin work until the Corps has provided notification that the proposed activity will have "no effect" on listed species or critical habitat, or until ESA section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs.

(e) Authorization of an activity by an NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required.

(g) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their world wide Web pages at <http://www.fws.gov/> or <http://www.fws.gov/ipac> and <http://www.nmfs.noaa.gov/pr/species/esa/> respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring their action complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting appropriate local office of the U.S. Fish and Wildlife Service to determine applicable measures to reduce impacts to migratory birds or eagles, including whether "incidental

take” permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. Historic Properties. (a) In cases where the district engineer determines that the activity may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act. If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106.

(c) Non-Federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the preconstruction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect. Where the non-Federal applicant has identified historic properties on which the activity might have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed.

(d) For non-Federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/ THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require preconstruction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require preconstruction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation to ensure that the activity results in no more than minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult to replace resources (see 33 CFR 332.3(e)(3)).

(e) Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. Restored riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(f) Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332. (1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the VerDate Sep-district engineer may approve the use of permittee-responsible mitigation. (2) The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f)). (3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation. (4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)). (5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided. (6) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(e)(1)(ii)).

(g) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs.

(h) Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of

concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWP does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature: When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(Transferee)

(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(i)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the activity and mitigation. The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. Activities Affecting Structures or Works Built by the United States. If an NWP activity also requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a "USACE project"), the prospective permittee must submit a preconstruction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission is not authorized by NWP until the appropriate Corps office issues the section 408 permission to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. Pre-Construction Notification. (a) **Timing.** Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either: (1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or (2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the

permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) **Contents of Pre-Construction Notification:** The PCN must be in writing and include the following information: (1) Name, address and telephone numbers of the prospective permittee; (2) Location of the proposed activity; (3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity; (4) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures. For single and complete linear projects, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans); (5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate; (6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan. (7) For non-Federal permittees, if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed activity or utilize the designated critical habitat that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act; (8) For non-Federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act; (9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the "study river" (see general condition 16); and (10) For an activity that requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from the Corps office having jurisdiction over that USACE project.

(c) **Form of Pre-Construction Notification:** The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is an NWP PCN and must include all of the applicable information required in paragraphs (b)(1) through (10) of this general condition. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and supporting materials if the district engineer has established tools and procedures for electronic submittals.

(d) **Agency Coordination:** (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity's adverse environmental effects so that they are no more than minimal. (2) Agency coordination is required for: (i) All NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of stream bed; (iii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iv) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes. (3) When agency coordination is required, the district engineer will immediately provide (e.g., via email, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or email that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the preconstruction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5. (4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act. (5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of preconstruction notifications to expedite agency coordination.

ATTACHMENT H
LIMITATIONS

LIMITATIONS

The work conducted by **Hydrex Environmental** and described in this report was performed in accordance with generally accepted scientific principles and practices, observing the same degree of care and skill generally exercised by the profession under similar circumstances and conditions. The opinions expressed in the report, together with the observations and findings are based on our professional judgment of the data developed and gathered during the course of this investigation and upon conditions that existed at the time of the specified field activities. Some of the information provided in this report may have been derived from a variety of published sources. It is not the intent or purpose of **Hydrex Environmental** to validate the precision of data generated by other parties.

The investigation is considered sufficient in detail and scope to form a reasonable basis for the conclusions presented in this report. Due to the nature of such investigations, interpretations and conclusions must be based on limited site data.

Hydrex Environmental is not responsible for the conclusions, opinions, or recommendations made by others based on the contents of this report. No other warranty, expressed or implied, is made in regard to the work performed by **Hydrex Environmental** during the course of this investigation.

Attachment 3
Site Visit Pictures
SEE ATTACHMENT 2

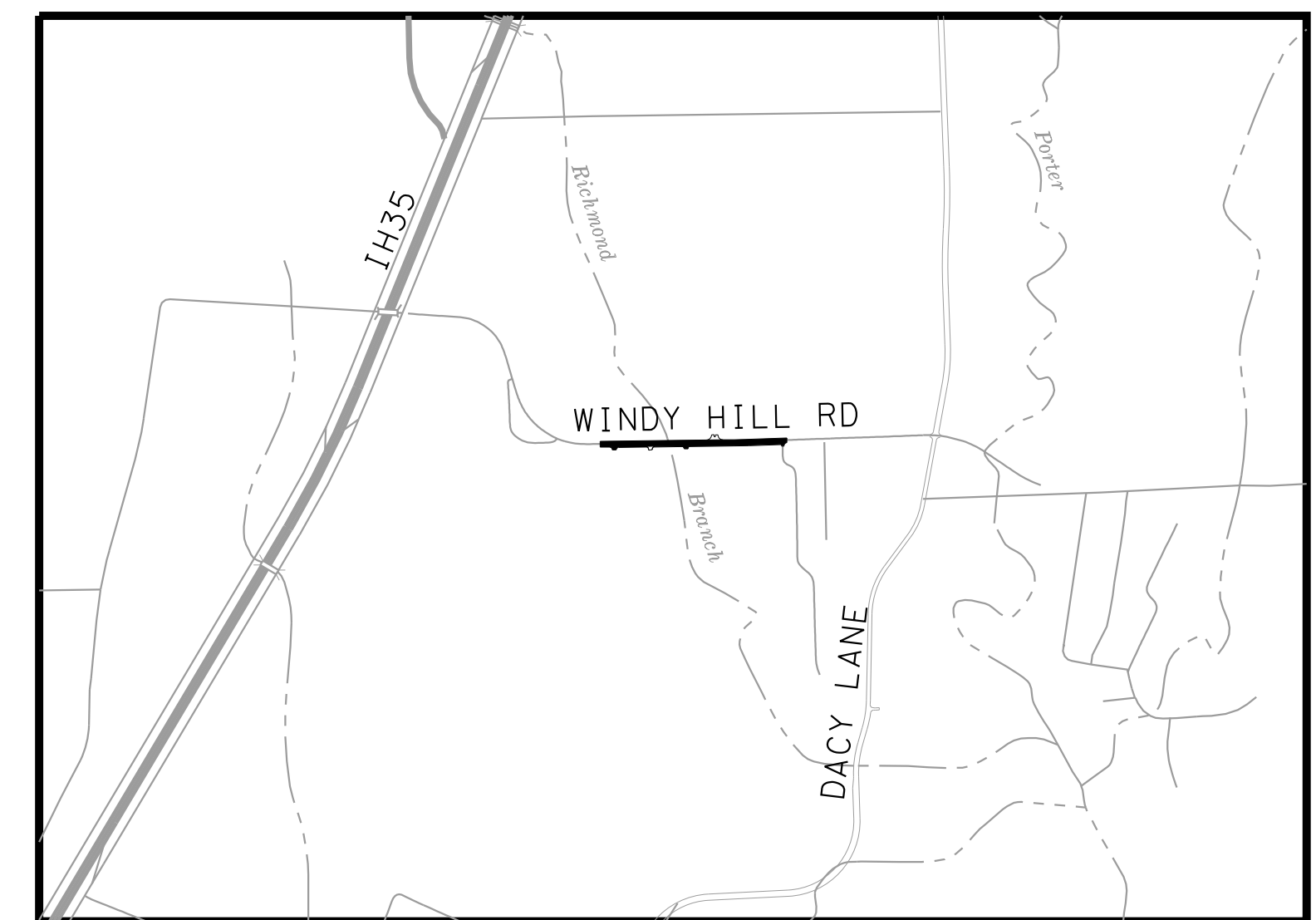
Attachment 4
Project Engineering

STATE OF TEXAS
CITY OF KYLE
**PRELIMINARY DESIGN SCHEMATIC FOR:
WINDY HILL ROAD
CHERRYWOOD TO PARK S DRIVE**

DATE	3/30/2020	DISTRICT	AUS	COUNTY	HAYS	LJA PROJECT NUMBER	2173-2001
REVISED DATE							

DESIGN DATA
PROJECT LENGTH: 1,833 FT = 0.374 MILES
FUNCTIONAL CLASSIFICATION: ARTERIAL
DESIGN SPEED: 40 mph

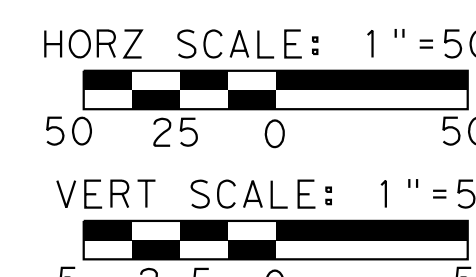
CURRENT AND PROJECTED TRAFFIC DATA
HIGHWAY: WINDY HILL ROAD COUNTY: HAYS
LIMITS: CHERRYWOOD TO PARK S ROAD
TRAFFIC VOLUMES: EXISTING ADT - 10,000



VICINITY MAP
SCALE: NTS

THIS PROJECT IS BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM (SPCS), SOUTH CENTRAL ZONE, NAD83(96) CORS ADJUSTMENT 2002 EPOCH. ALL COORDINATES SHOWN HEREON ARE GRID VALUES EXPRESSED IN UNITS OF U.S. SURVEY FEET.

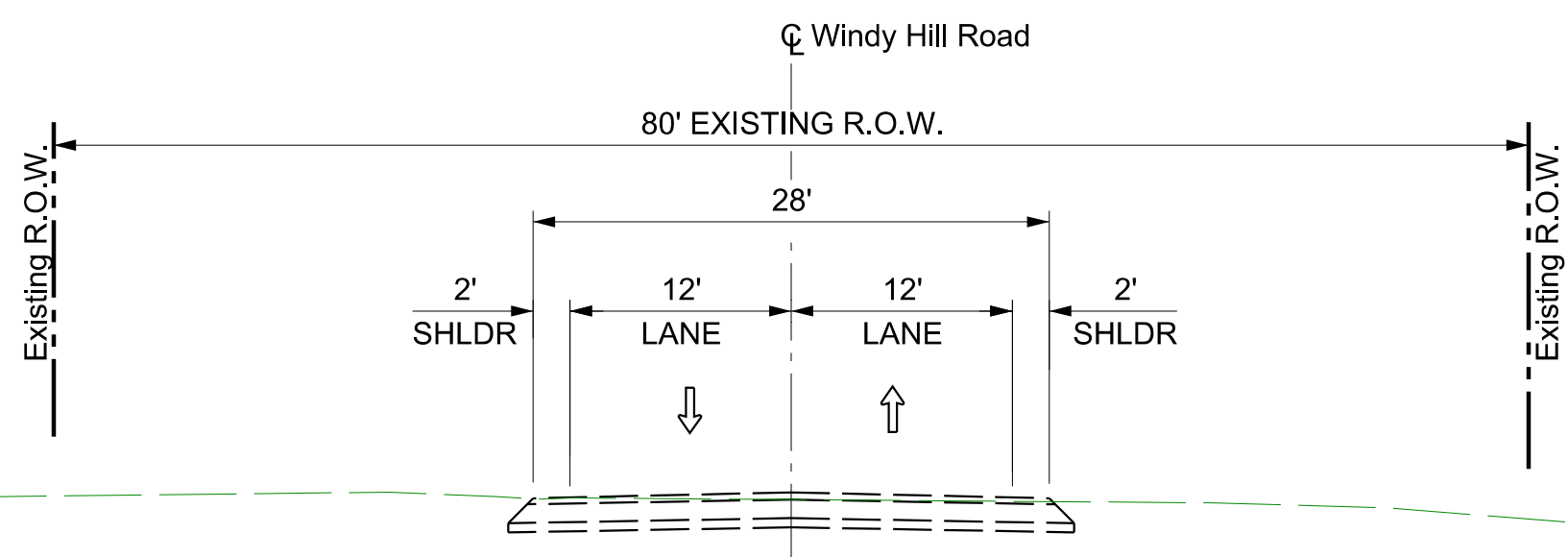
ALL ELEVATIONS SHOWN HEREON ARE NAVD 88 AND WERE BASED ON GPS OBSERVATIONS.



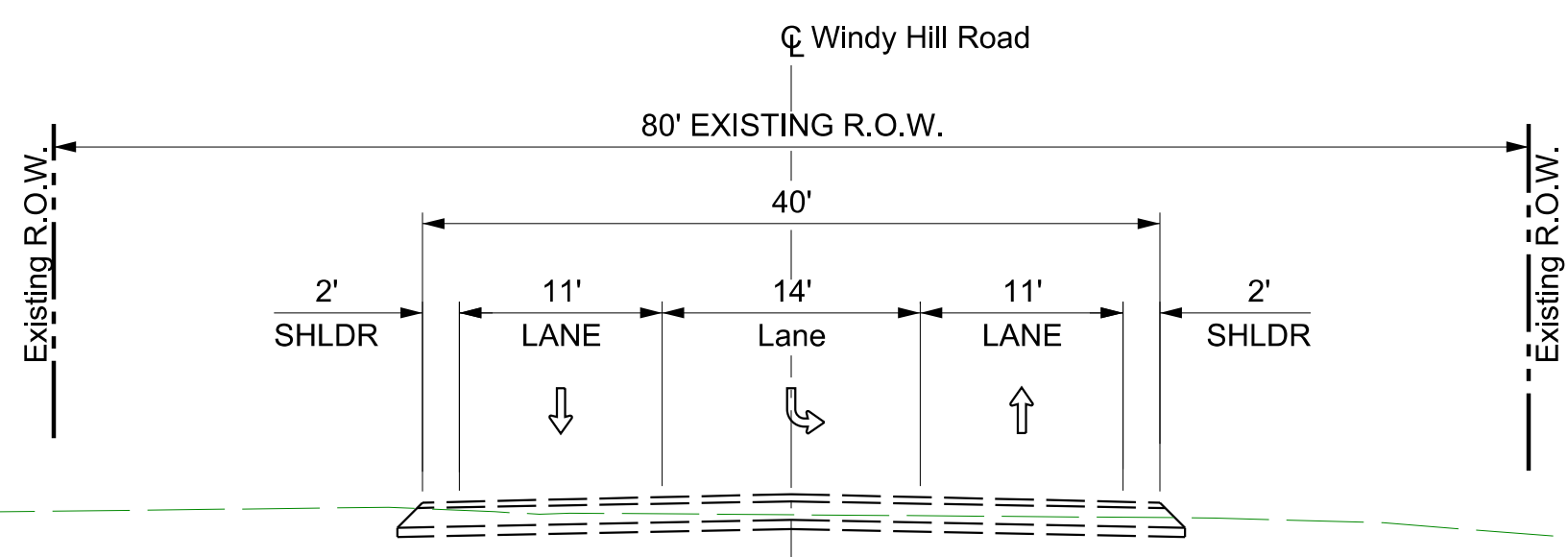
PRELIMINARY
SUBMITTED FOR REVIEW
BY ZACHARY B. RYAN P.E. # 106276
DATE 3/30/2020
NOT FOR CONSTRUCTION, BIDDING OR PERMITTING

LJA Engineering, Inc.
7500 Rigoiro Blvd, Building 11
Suite 100
Austin, Texas 78735
Phone 512.439.4700
Fax 512.439.4716
FRN-F-1386

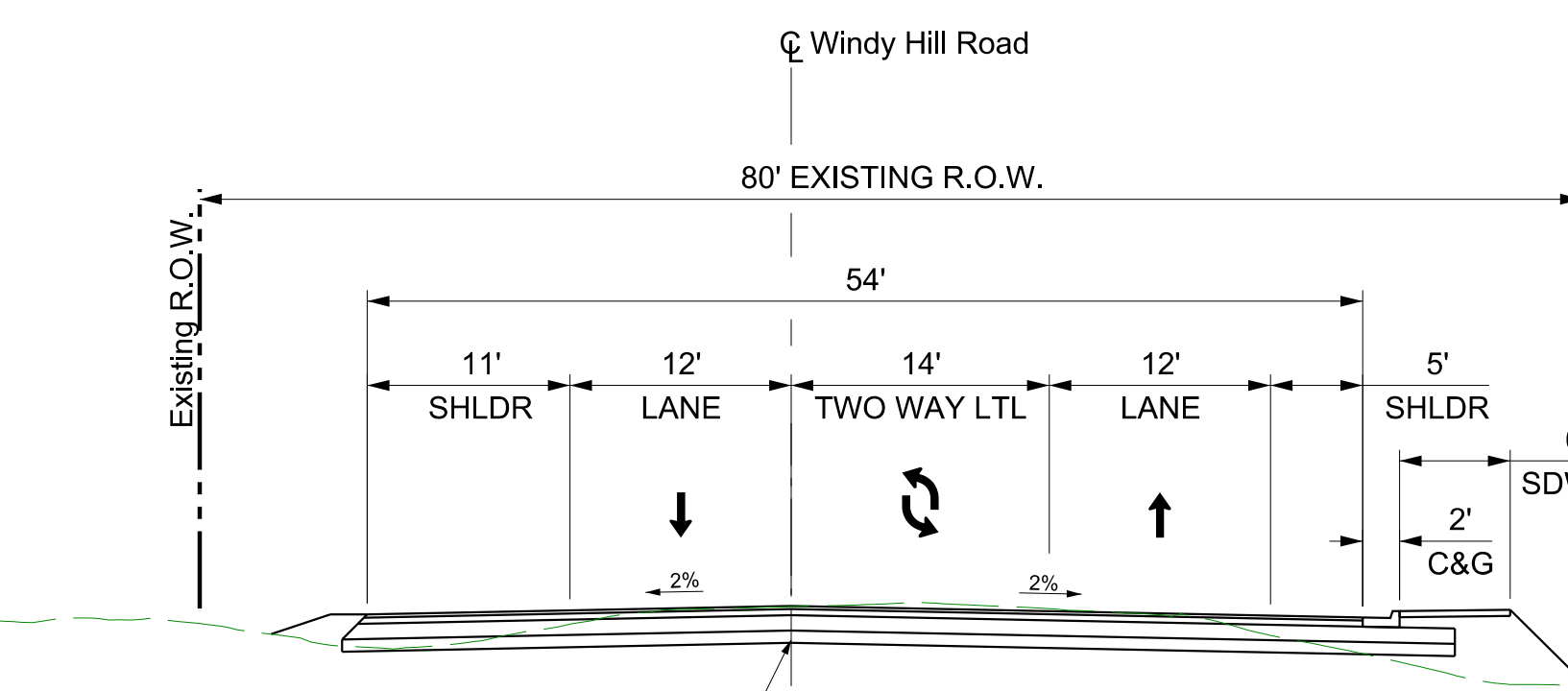
TYPICAL SECTIONS



Existing Windy Hill Road
Start to Indian Paintbrush Drive



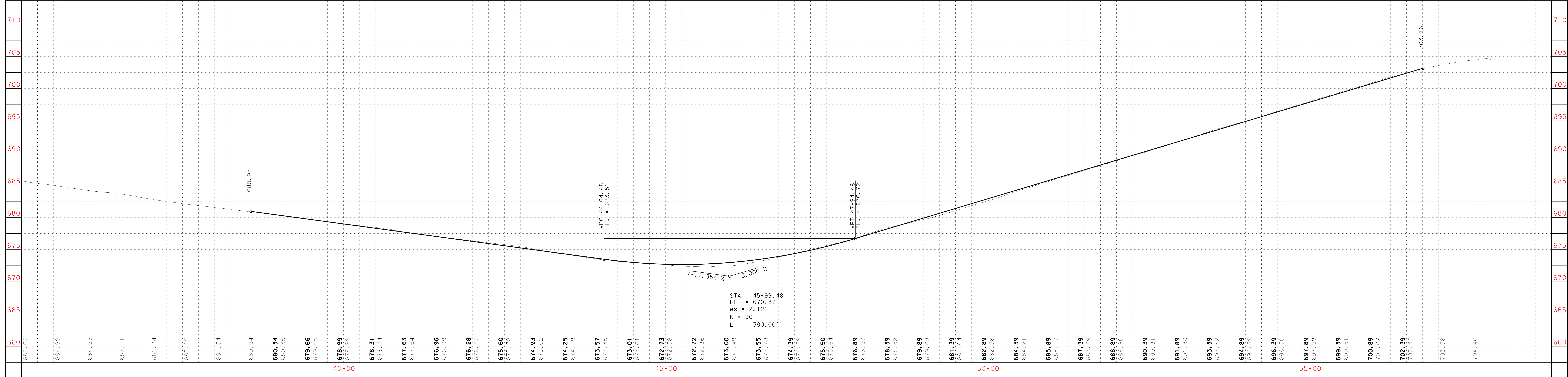
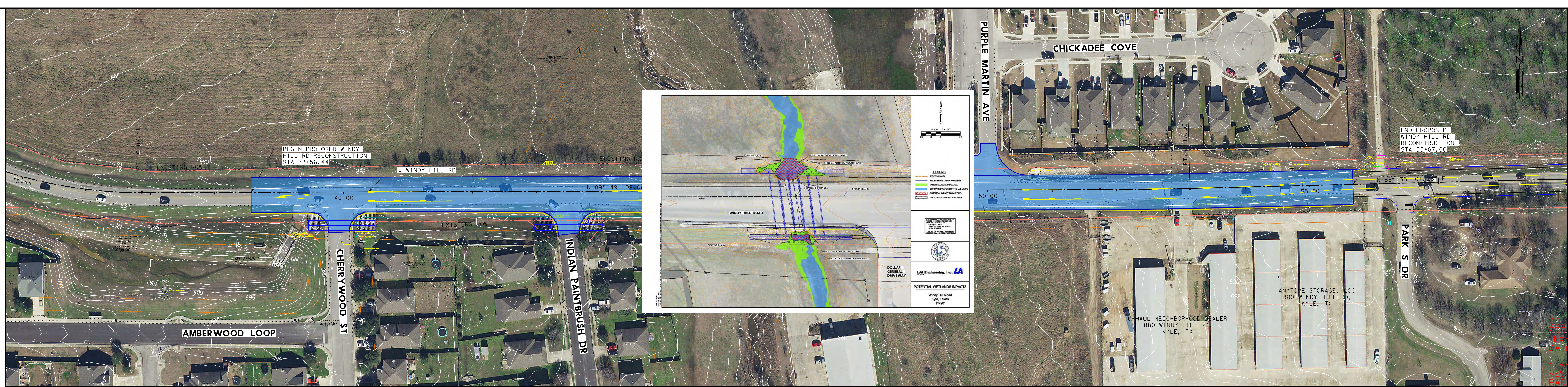
Existing Windy Hill Road
Indian Paintbrush Drive to Purple Martin Avenue



Proposed Windy Hill Road
Cherrywood to Park S Drive

LEGEND

- PROPOSED PAVEMENT
- EXISTING R.O.W.
- EXISTING EASEMENT

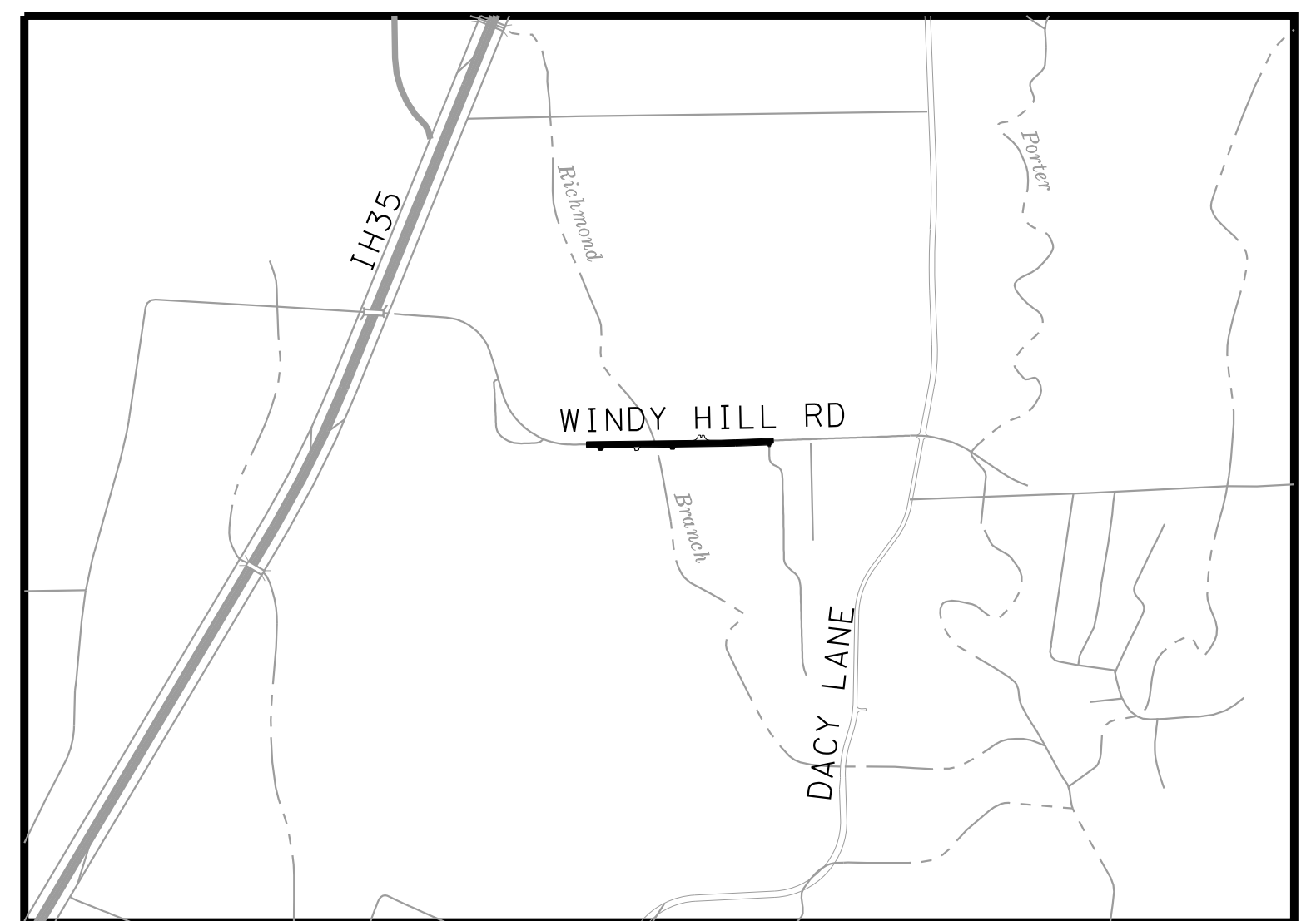


STATE OF TEXAS
CITY OF KYLE
**PRELIMINARY DESIGN SCHEMATIC FOR:
WINDY HILL ROAD
CHERRYWOOD TO PARK S DRIVE**

DATE	3/30/2020	DISTRICT	AUS	COUNTY	HAYS	LJA PROJECT NUMBER	2173-2001
REVISED DATE							

DESIGN DATA
PROJECT LENGTH: 1,833 FT = 0.374 MILES
FUNCTIONAL CLASSIFICATION: ARTERIAL
DESIGN SPEED: 40 mph

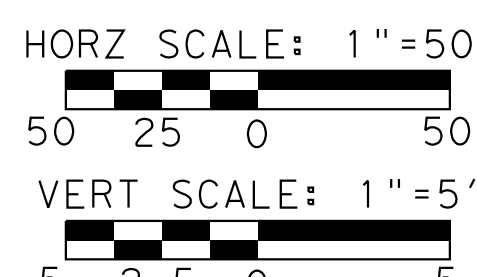
CURRENT AND PROJECTED TRAFFIC DATA
HIGHWAY: WINDY HILL ROAD COUNTY: HAYS
LIMITS: CHERRYWOOD TO PARK S ROAD
TRAFFIC VOLUMES: EXISTING ADT - 10,000



VICINITY MAP
SCALE: NTS

THIS PROJECT IS BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM (SPCS), SOUTH CENTRAL ZONE, NAD83(96) CORS ADJUSTMENT 2002 EPOCH. ALL COORDINATES SHOWN HEREON ARE GRID VALUES EXPRESSED IN UNITS OF U.S. SURVEY FEET.

ALL ELEVATIONS SHOWN HEREON ARE NAVD 88 AND WERE BASED ON GPS OBSERVATIONS.



PRELIMINARY
SUBMITTED FOR REVIEW
BY ZACHARY B. RYAN P.E. # 106276
DATE 3/30/2020
NOT FOR CONSTRUCTION, BIDDING OR PERMITTING

LJA Engineering, Inc.
7500 Rigoiro Blvd, Building 11
Suite 100
Austin, Texas 78735
Phone 512.439.4700
Fax 512.439.4716
FRN-F-1386

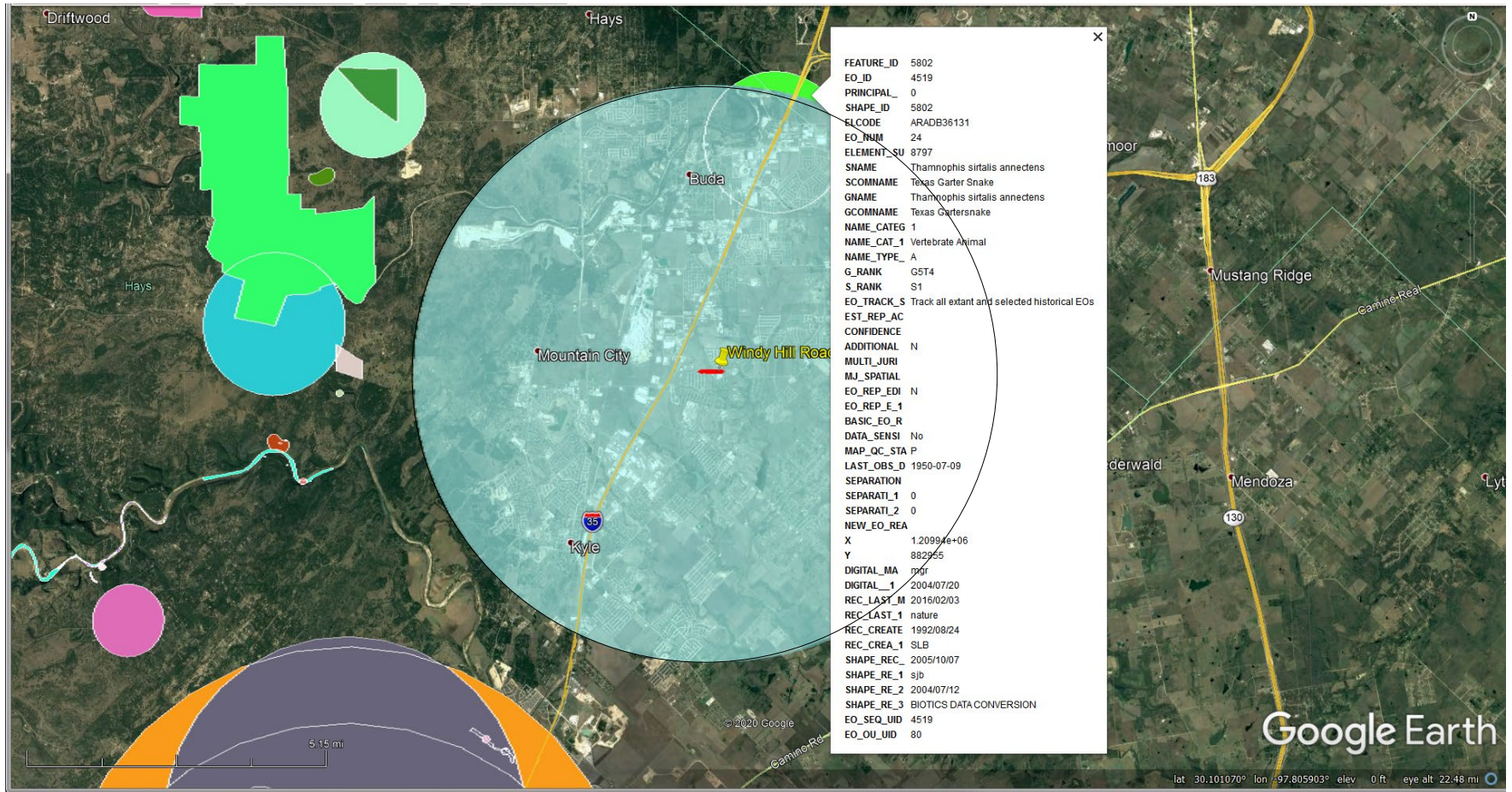
DATE: 3/30/2020 TIME: 3:38:15 PM
FILE: I:\2173\2001\CADD\SHETS\00-Schematic - E\01018\WindyHill11-Schematic1.dgn
PLOT TABLE: LJA\color\lpr1.tbl

NOT A BIDDING DOCUMENT

PRELIMINARY SUBJECT TO CHANGE

NOT A BIDDING DOCUMENT

PRELIMINARY SUBJECT TO CHANGE




TPWD -Texas Natural Diversity Data Mapping

One Study area located within five miles of the project area.

 Five Mile Buffer

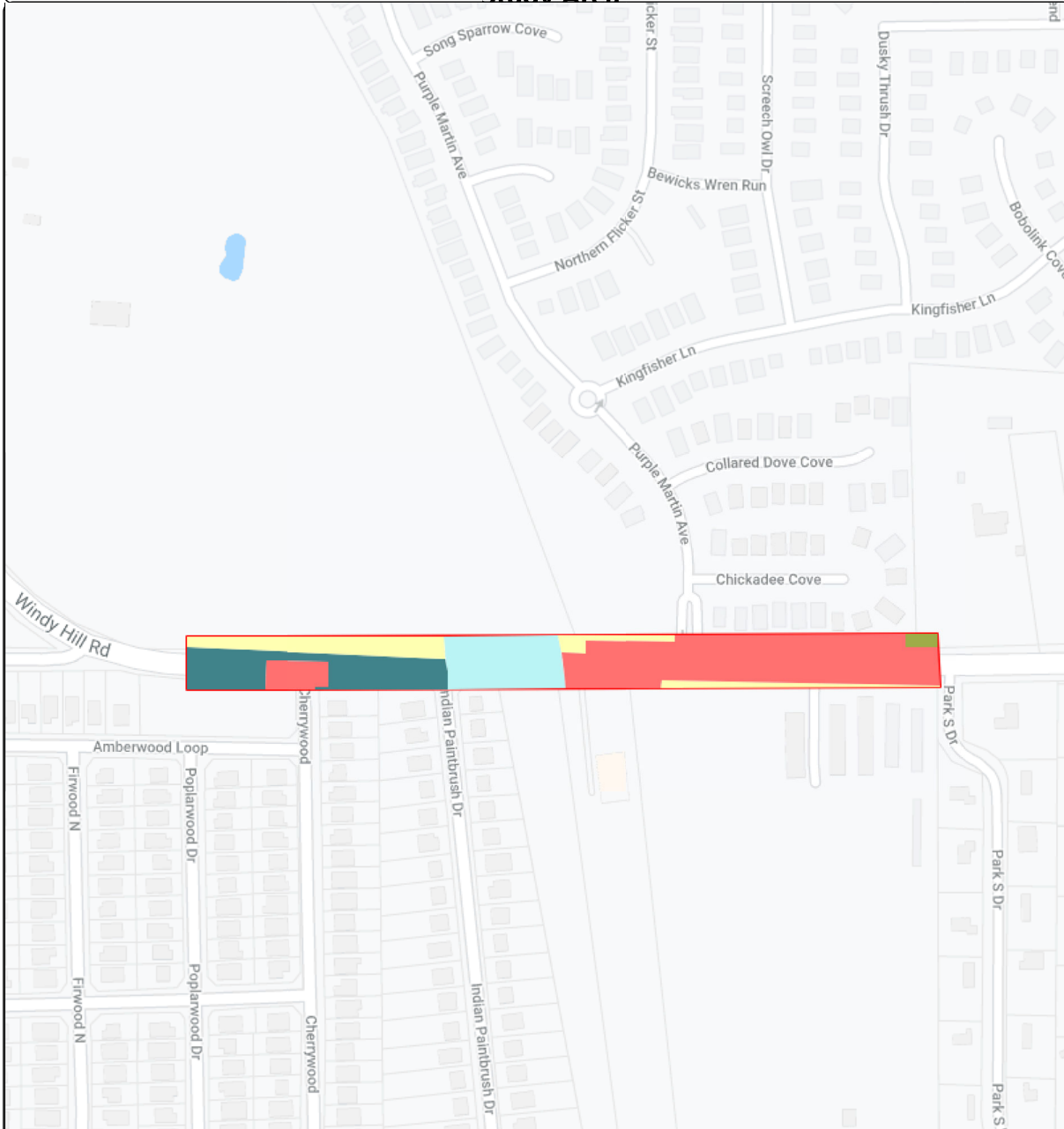
SNAME	Thamnophis sirtalis annectens
SCOMNAME	Texas Garter Snake

Client Name	City of Kyle	Future Link Technologies 
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709
Map Information	General Location Maps	512-443-4100
Date	May 20	Environmental Service Provider



T.E.A.M. Study Area Report

Study Area



50 m

Map Report a map error

Report Created Fri May 15 2020








T.E.A.M. Study Area Report



Legend

Summary: Study Area
5.99 Acres || 2.42 Hectares

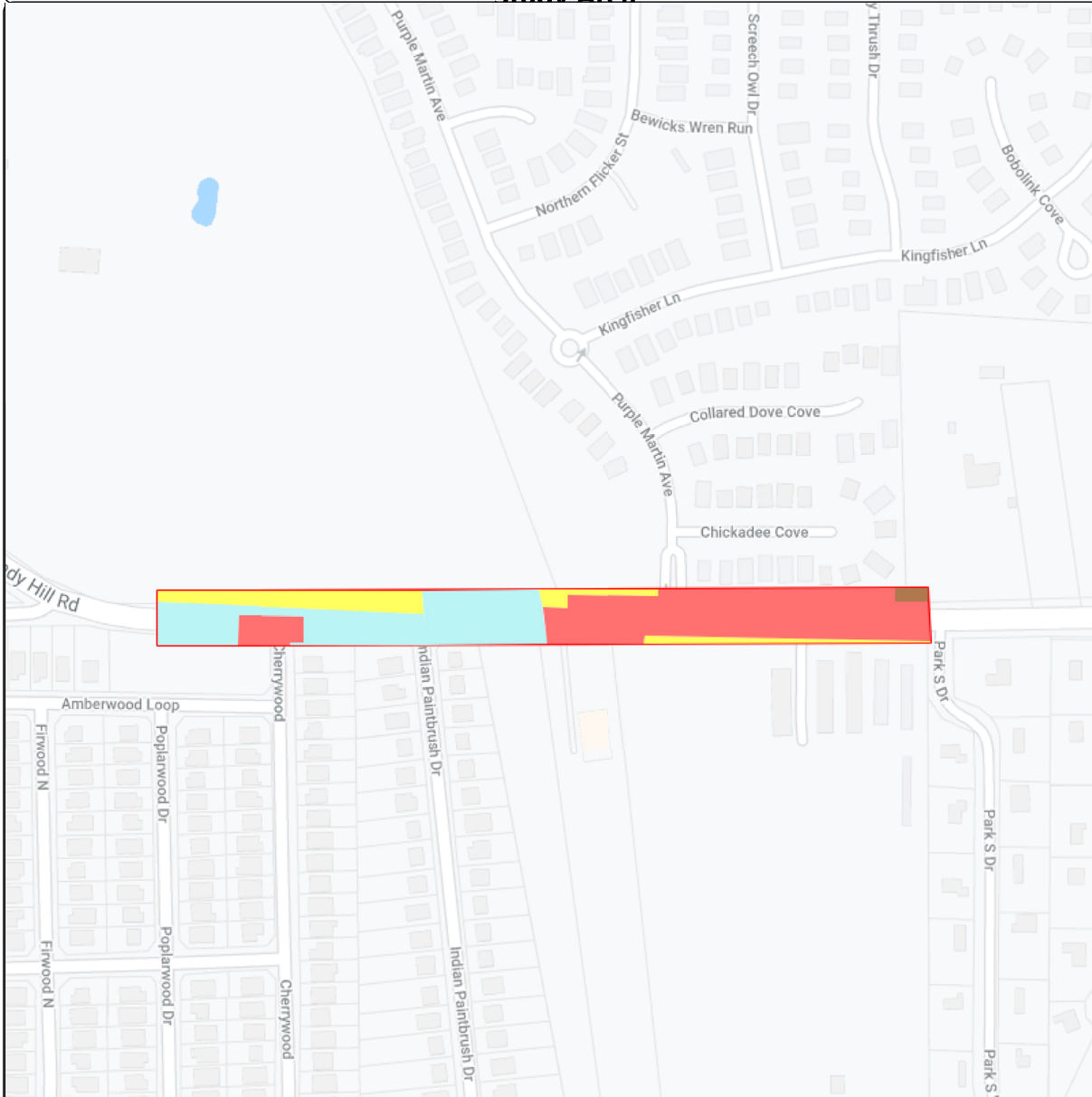
Acres	Hectares	% Total	# Polys	Descriptive Landcover
2.87	1.16	47.98	2	 Urban Low
1.15	0.47	19.22	1	 Riparian Grassland
0.98	0.40	16.40	3	 Grassland
0.92	0.37	15.42	1	 Floodplain Grassland
0.06	0.02	1.03	1	 Deciduous Forest

Report Created Fri May 15 2020



T.E.A.M. Study Area Report

Study Area



50 m

Map Report a map.error

Report Created Fri May 15 2020








T.E.A.M. Study Area Report



Legend

Summary: Study Area
5.99 Acres || 2.42 Hectares

Acres	Hectares	% Total	# Polys	Tx Ecological System
2.87	1.16	47.98	2	 Urban Low Intensity
1.15	0.47	19.22	1	 Central Texas: Riparian Herbaceous Vegetation
0.98	0.40	16.40	3	 Blackland Prairie: Disturbance or Tame Grassland
0.92	0.37	15.42	1	 Central Texas: Floodplain Herbaceous Vegetation
0.06	0.02	1.03	1	 Native Invasive: Deciduous Woodland

Report Created Fri May 15 2020

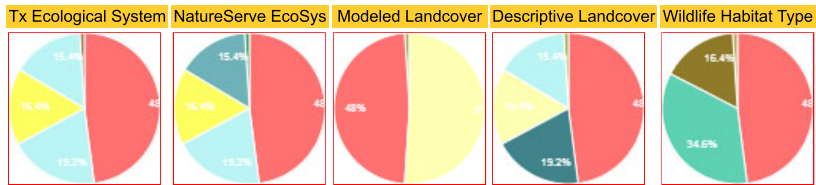
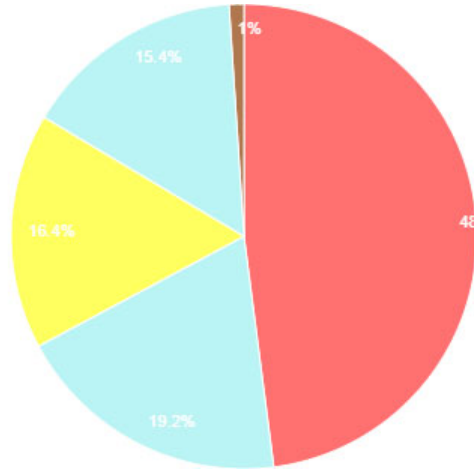


T.E.A.M. Study Area Report

Study Area Charts



Tx Ecological System



Report Created Fri May 15 2020



T.E.A.M. Study Area Report Study Area Endangered Species Table



Counties: Hays		Species Count: 132						
Taxon	Com Name	Sci Name	USESA	SPROT	GRank	SRank	End	SGCN
Amphibians	Barton Springs salamander	<i>Eurycea sosorum</i>		LE	E	G1	S1	Y Y
	Counties: (3) Hays , Travis , Williamson							
Amphibians	Blanco blind salamander	<i>Eurycea robusta</i>			T	G1	S1	Y Y
	Counties: (1) Hays							
Amphibians	Blanco River Springs salamander	<i>Eurycea pterophila</i>				G3	S3	Y Y
	Counties: (4) Blanco , Comal , Hays , Kendall							
Amphibians	Pedernales River Springs salamander	<i>Eurycea sp. 6</i>				G1	S1S2	Y N
	Counties: (4) Blanco , Burnet , Hays , Travis							
Amphibians	San Marcos salamander	<i>Eurycea nana</i>		LT	T	G1	S1	Y Y
	Counties: (3) Caldwell , Comal , Hays							
Amphibians	Strecker's chorus frog	<i>Pseudacris streckeri</i>				G5	S3	N Y
	Counties: (141) Anderson , Angelina , Aransas , Atascosa , Austin , Bastrop , Bee , Bell , Bexar , Blanco , Bosque , Bowie , Brazoria , Brazos , Brooks , Brown , Burlinson , Burnet , Caldwell , Calhoun , Callahan , Cameron , Camp , Cass , Chambers , Cherokee , Clay , Coleman , Collin , Colorado , Comal , Comanche , Cooke , Coryell , Dallas , Delta , Denton , DeWitt , Eastland , Ellis , Erath , Falls , Fannin , Fayette , Fort Bend , Franklin , Freestone , Frio , Gillespie , Goliad , Gonzales , Grayson , Gregg , Grimes , Guadalupe , Hamilton , Hardin , Harris , Harrison , Hays , Henderson , Hill , Hood , Hopkins , Houston , Hunt , Jack , Jackson , Jasper , Jefferson , Jim Wells , Johnson , Karnes , Kaufman , Kendall , Kenedy , Kerr , Kimble , Kleberg , Lamar , Lampasas , Lavaca , Lee , Leon , Liberty , Limestone , Live Oak , Llano , Madison , Mason , Matagorda , McCulloch , McLennan , Medina , Milam , Mills , Montague , Montgomery , Morris , Nacogdoches , Navarro , Newton , Nueces , Orange , Palo Pinto , Panola , Parker , Polk , Rains , Red River , Refugio , Robertson , Rockwall , Rusk , Sabine , San Augustine , San Jacinto , San Patricio , San Saba , Shelby , Smith , Somervell , Stephens , Tarrant , Titus , Travis , Trinity , Tyler , Upshur , Uvalde , Van Zandt , Victoria , Walker , Waller , Washington , Wharton , Willacy , Williamson , Wilson , Wise , Wood							
Amphibians	Texas blind salamander	<i>Eurycea rathbuni</i>		LE	E	G1	S1	Y Y
	Counties: (5) Blanco , Caldwell , Comal , Guadalupe , Hays							
Amphibians	Texas salamander	<i>Eurycea neotenes</i>			T	G1G2	S1S2	Y Y
	Counties: (7) Bandera , Bexar , Blanco , Comal , Gillespie , Hays , Kendall							
Amphibians	Woodhouse's toad	<i>Anaxyrus woodhousii</i>				G5	SU	N Y
	Counties: (215) Anderson , Andrews , Angelina , Aransas , Archer , Armstrong , Atascosa , Austin , Bandera , Bastrop , Baylor , Bell , Bexar , Borden , Bosque , Brazoria , Brazos , Brewster , Briscoe , Brooks , Brown , Burlinson , Burnet , Caldwell , Calhoun , Callahan , Cameron , Carson , Cass , Castro , Childress , Clay , Cochran , Coke , Coleman , Collin , Collingsworth , Colorado , Comal , Comanche , Concho , Cooke , Coryell , Cottle , Crane , Crockett , Crosby , Culberson , Dallas , Dawson , Deaf Smith , Delta , Denton , DeWitt , Dickens , Donley , Eastland , Ector , Edwards , El Paso , Ellis , Erath , Falls , Fannin , Fayette , Fisher , Foard , Fort Bend , Freestone , Gaines , Galveston , Gillespie , Glasscock , Goliad , Gonzales , Gray , Grayson , Gregg , Grimes , Guadalupe , Hale , Hall , Hamilton , Hansford , Hardeman , Hardin , Harris , Hartley , Haskell , Hays , Hemphill , Hidalgo , Hill , Hood , Hopkins , Houston , Howard , Hudspeth , Hunt , Hutchinson , Irion , Jack , Jackson , Jasper , Jeff Davis , Johnson , Jones , Karnes , Kaufman , Kendall , Kenedy , Kent , Kerr , Kimble , King , Kleberg , Knox , Lamar , Lamb , Lampasas , Lavaca , Lee , Leon , Liberty , Limestone , Lipscomb , Live Oak , Llano , Loving , Lubbock , Madison , Marion , Martin , Mason , Matagorda , McCulloch , McLennan , Medina , Menard , Midland , Milam , Mills , Mitchell , Montague , Montgomery , Moore , Morris , Motley , Nacogdoches , Navarro , Newton , Ochiltree , Oldham , Orange , Palo Pinto , Panola , Parker , Parmer , Pecos , Polk , Potter , Presidio , Randall , Reagan , Real , Red River , Reeves , Refugio , Roberts , Robertson , Rockwall , Runnels , Rusk , Sabine , San Jacinto , San Saba , Schleicher , Scurry , Shackelford , Sherman , Smith , Somervell , Stephens , Sterling , Stonewall , Sutton , Swisher , Tarrant , Taylor , Terrell , Terry , Throckmorton , Tom Green , Travis , Trinity , Upton , Van Zandt , Victoria , Walker , Waller , Ward , Washington , Wharton , Wheeler , Wichita , Wilbarger , Willacy , Williamson , Wilson , Winkler , Wise , Wood , Yoakum , Young							
Arachnids	No accepted common name	<i>Cicurina russelli</i>				G1G2	S1	Y Y
	Counties: (1) Hays							
Arachnids	No accepted common name	<i>Cicurina ubicki</i>				G1G2	S1	Y Y
	Counties: (1) Hays							
Arachnids	No accepted common name	<i>Texella diplospina</i>				G1G2	S1	Y Y
	Counties: (1) Hays							
Arachnids	No accepted common name	<i>Texella grubbsi</i>				G1G2	S1	Y Y
	Counties: (2) Hays , Travis							
Arachnids	No accepted common name	<i>Texella mulaiki</i>				G2G3	S2	Y Y
	Counties: (2) Hays , Travis							
Arachnids	No accepted common name	<i>Texella renkesae</i>				G1G2	S1	Y Y
	Counties: (1) Hays							
Arachnids	No accepted common name	<i>Tartarocreagris grubbsi</i>				G1G2	S1	Y Y
	Counties: (1) Hays							
Arachnids	No accepted common name	<i>Cicurina ezelli</i>				G1G2	S1	Y Y
	Counties: (1) Hays							

Report Created Fri May 15 2020



T.E.A.M. Study Area Report Study Area Endangered Species Table



Counties: Hays		Species Count: 132						
Taxon	Com Name	Sci Name	USESA	SPROT	GRank	SRank	End	SGCN
Birds	bald eagle	Haliaeetus leucocephalus			G5	S3B,S3N	N	Y
<p>Counties: (238) <u>Anderson, Andrews, Angelina, Aransas, Archer, Armstrong, Atascosa, Austin, Bailey, Bandera, Bastrop, Baylor, Bee, Bell, Bexar, Blanco, Borden, Bosque, Bowie, Brazoria, Brazos, Briscoe, Brown, Burleson, Burnet, Caldwell, Calhoun, Callahan, Camp, Carson, Cass, Castro, Chambers, Cherokee, Childress, Clay, Cochran, Coke, Coleman, Collin, Collingsworth, Colorado, Comal, Comanche, Concho, Cooke, Coryell, Cottle, Crane, Crockett, Crosby, Dallam, Dallas, Dawson, Deaf Smith, Delta, Denton, DeWitt, Dickens, Dimmit, Donley, Duval, Eastland, Ector, Edwards, Ellis, Erath, Falls, Fannin, Fayette, Fisher, Floyd, Foard, Fort Bend, Franklin, Freestone, Frio, Gaines, Galveston, Garza, Gillespie, Glasscock, Goliad, Gonzales, Gray, Grayson, Gregg, Grimes, Guadalupe, Hale, Hall, Hamilton, Hansford, Hardeman, Hardin, Harris, Harrison, Hartley, Haskell, Hays, Hemphill, Henderson, Hill, Hockley, Hood, Hopkins, Houston, Howard, Hunt, Hutchinson, Irion, Jack, Jackson, Jasper, Jefferson, Jim Wells, Johnson, Jones, Karnes, Kaufman, Kendall, Kenedy, Kent, Kerr, Kimble, King, Kinney, Kleberg, Knox, La Salle, Lamar, Lamb, Lampasas, Lavaca, Lee, Leon, Liberty, Limestone, Lipscomb, Live Oak, Llano, Lubbock, Lynn, Madison, Marion, Martin, Mason, Matagorda, Maverick, McCulloch, McLennan, McMullen, Medina, Menard, Midland, Milam, Mills, Mitchell, Montague, Montgomery, Moore, Morris, Motley, Nacogdoches, Navarro, Newton, Nolan, Nueces, Ochiltree, Oldham, Orange, Palo Pinto, Panola, Parker, Parmer, Pecos, Polk, Potter, Rains, Randall, Reagan, Real, Red River, Refugio, Roberts, Robertson, Rockwall, Runnels, Rusk, Sabine, San Augustine, San Jacinto, San Patricio, San Saba, Schleicher, Scurry, Shackelford, Shelby, Sherman, Smith, Somervell, Starr, Stephens, Sterling, Stonewall, Sutton, Swisher, Tarrant, Taylor, Terrell, Terry, Throckmorton, Titus, Tom Green, Travis, Upton, Uvalde, Val Verde, Van Zandt, Victoria, Walker, Waller, Ward, Washington, Wharton, Wheeler, Wichita, Wilbarger, Williamson, Wilson, Winkler, Wise, Wood, Yoakum, Young, Zapata</u></p>								
Birds	black-capped vireo	Vireo atricapilla			G3	S3B	N	Y
<p>Counties: (63) <u>Bandera, Bell, Bexar, Blanco, Bosque, Brewster, Brown, Burnet, Callahan, Coke, Coleman, Comal, Comanche, Concho, Coryell, Crockett, Dallas, Eastland, Edwards, Erath, Gillespie, Hamilton, Hays, Hill, Hood, Irion, Jack, Johnson, Kendall, Kerr, Kimble, Kinney, Lampasas, Llano, Mason, McCulloch, McLennan, Medina, Menard, Mills, Montague, Nolan, Palo Pinto, Parker, Pecos, Reagan, Real, Runnels, San Saba, Schleicher, Shackelford, Somervell, Stephens, Sterling, Sutton, Taylor, Terrell, Tom Green, Travis, Uvalde, Val Verde, Williamson, Young</u></p>								
Birds	Franklin's gull	Leucophaeus pipixcan			G5	S2N	N	Y
<p>Counties: (254) <u>Anderson, Andrews, Angelina, Aransas, Archer, Armstrong, Atascosa, Austin, Bailey, Bandera, Bastrop, Baylor, Bee, Bell, Bexar, Blanco, Borden, Bosque, Bowie, Brazoria, Brazos, Brewster, Briscoe, Brooks, Brown, Burleson, Burnet, Caldwell, Calhoun, Callahan, Cameron, Camp, Carson, Cass, Castro, Chambers, Cherokee, Childress, Clay, Cochran, Coke, Coleman, Collin, Collingsworth, Colorado, Comal, Comanche, Concho, Cooke, Coryell, Cottle, Crane, Crockett, Crosby, Culberson, Dallam, Dallas, Dawson, Deaf Smith, Delta, Denton, DeWitt, Dickens, Dimmit, Donley, Duval, Eastland, Ector, Edwards, El Paso, Ellis, Erath, Falls, Fannin, Fayette, Fisher, Floyd, Foard, Fort Bend, Franklin, Freestone, Frio, Gaines, Galveston, Garza, Gillespie, Glasscock, Goliad, Gonzales, Gray, Grayson, Gregg, Grimes, Guadalupe, Hale, Hall, Hamilton, Hansford, Hardeman, Hardin, Harris, Harrison, Hartley, Haskell, Hays, Hemphill, Henderson, Hidalgo, Hill, Hockley, Hood, Hopkins, Houston, Howard, Hudspeth, Hunt, Hutchinson, Irion, Jack, Jackson, Jasper, Jeff Davis, Jefferson, Jim Hogg, Jim Wells, Johnson, Jones, Karnes, Kaufman, Kendall, Kenedy, Kent, Kerr, Kimble, King, Kinney, Kleberg, Knox, La Salle, Lamar, Lamb, Lampasas, Lavaca, Lee, Leon, Liberty, Limestone, Lipscomb, Live Oak, Llano, Loving, Lubbock, Lynn, Madison, Marion, Martin, Mason, Matagorda, Maverick, McCulloch, McLennan, McMullen, Medina, Menard, Midland, Mills, Mitchell, Montague, Montgomery, Moore, Morris, Motley, Nacogdoches, Navarro, Newton, Nolan, Nueces, Ochiltree, Oldham, Orange, Palo Pinto, Panola, Parker, Parmer, Pecos, Polk, Potter, Presidio, Rains, Randall, Reagan, Real, Red River, Reeves, Refugio, Roberts, Robertson, Rockwall, Runnels, Rusk, Sabine, San Augustine, San Jacinto, San Patricio, San Saba, Schleicher, Scurry, Shackelford, Shelby, Sherman, Smith, Somervell, Starr, Stephens, Sterling, Stonewall, Sutton, Swisher, Tarrant, Taylor, Terrell, Terry, Throckmorton, Titus, Tom Green, Travis, Trinity, Tyler, Upshur, Upton, Uvalde, Val Verde, Van Zandt, Victoria, Walker, Waller, Ward, Washington, Webb, Wharton, Wheeler, Wichita, Wilbarger, Willacy, Williamson, Wilson, Winkler, Wise, Wood, Yoakum, Young, Zapata, Zavala</u></p>								
Birds	golden-cheeked warbler	Setophaga chrysoparia	LE	E	G2	S2?B	N	Y
<p>Counties: (37) <u>Bandera, Bell, Bexar, Blanco, Bosque, Burnet, Comal, Coryell, Dallas, Eastland, Edwards, Erath, Gillespie, Hamilton, Hays, Hill, Hood, Johnson, Kendall, Kerr, Kimble, Kinney, Lampasas, Llano, Mason, McLennan, Medina, Palo Pinto, Parker, Real, San Saba, Somervell, Stephens, Travis, Uvalde, Williamson, Young</u></p>								
Birds	interior least tern	Sterna antillarum athalassos	LE	E	G4T3Q	S1B	N	Y
<p>Counties: (136) <u>Anderson, Angelina, Archer, Atascosa, Austin, Bastrop, Baylor, Bee, Bell, Bexar, Blanco, Bosque, Bowie, Brazos, Brooks, Burleson, Burnet, Caldwell, Camp, Cass, Cherokee, Childress, Clay, Coke, Collin, Colorado, Comal, Comanche, Cooke, Coryell, Dallas, Delta, Denton, DeWitt, Duval, Eastland, Ellis, Erath, Falls, Fannin, Fayette, Fort Bend, Franklin, Freestone, Goliad, Gonzales, Grayson, Gregg, Grimes, Guadalupe, Hall, Hamilton, Hardeman, Hardin, Harrison, Hays, Hemphill, Henderson, Hidalgo, Hill, Hood, Hopkins, Houston, Hunt, Jack, Jackson, Jasper, Jim Hogg, Jim Wells, Johnson, Jones, Karnes, Kaufman, Lamar, Lampasas, Lavaca, Lee, Leon, Liberty, Limestone, Live Oak, Madison, Marion, McLennan, McMullen, Milam, Mills, Montague, Montgomery, Morris, Nacogdoches, Navarro, Newton, Orange, Palo Pinto, Panola, Parker, Polk, Rains, Red River, Roberts, Robertson, Rockwall, Rusk, Sabine, San Augustine, San Jacinto, Shackelford, Shelby, Smith, Somervell, Starr, Stephens, Tarrant, Throckmorton, Titus, Tom Green, Travis, Trinity, Tyler, Upshur, Val Verde, Van Zandt, Victoria, Walker, Waller, Washington, Webb, Wharton, Wichita, Wilbarger, Williamson, Wilson, Wise, Wood, Young, Zapata</u></p>								
Birds	mountain plover	Charadrius montanus			G3	S2	N	Y
<p>Counties: (183) <u>Anderson, Aransas, Archer, Armstrong, Atascosa, Bailey, Bandera, Bastrop, Baylor, Bee, Bell, Bexar, Blanco, Borden, Bosque, Brewster, Briscoe, Brooks, Brown, Burnet, Caldwell, Callahan, Carson, Castro, Childress, Clay, Cochran, Coke, Coleman, Collingsworth, Comal, Comanche, Concho, Cooke, Coryell, Cottle, Crane, Crockett, Crosby, Culberson, Dallam, Dawson, Deaf Smith, Denton, DeWitt, Dickens, Dimmit, Donley, Duval, Eastland, Ector, Edwards, Erath, Falls, Fayette, Fisher, Floyd, Foard, Frio, Gaines, Garza, Gillespie, Glasscock, Goliad, Gonzales, Gray, Guadalupe, Hale, Hall, Hamilton, Hansford, Hardeman, Harris, Hartley, Haskell, Hays, Hemphill, Hidalgo, Hill, Hockley, Hood, Howard, Hudspeth, Hutchinson, Irion, Jack, Jeff Davis, Jim Hogg, Jim Wells, Johnson, Jones, Karnes, Kendall, Kenedy, Kent, Kerr, Kimble, King, Kinney, Kleberg, Knox, La Salle, Lamb, Lampasas, Lavaca, Lee, Lipscomb, Live Oak, Llano, Loving, Lubbock, Lynn, Martin, Mason, Maverick, McCulloch, McLennan, McMullen, Medina, Menard, Midland, Milam, Mills, Mitchell, Montague, Moore, Motley, Nolan, Nueces, Ochiltree, Oldham, Palo Pinto, Parker, Parmer, Pecos, Potter, Presidio, Randall, Reagan, Real, Reeves, Refugio, Roberts, Runnels, San Patricio, San Saba, Schleicher, Scurry, Shackelford, Sherman, Somervell, Starr, Stephens, Sterling, Stonewall, Sutton, Swisher, Tarrant, Taylor, Terrell, Terry, Throckmorton, Tom Green, Travis, Upton, Uvalde, Val Verde, Victoria, Walker, Waller, Ward, Webb, Wheeler, Wichita, Wilbarger, Willacy, Williamson, Wilson, Winkler, Wise, Yoakum, Young, Zapata, Zavala</u></p>								



T.E.A.M. Study Area Report Study Area Endangered Species Table



Counties: Hays Species Count: 132

Taxon	Com Name	Sci Name	USESA	SPROT	GRank	SRank	End	SGCN
Birds piping plover	Charadrius melodus		LT	T	G3	S2N	N	Y
<p>Counties: (123) Anderson, Angelina, Aransas, Archer, Atascosa, Austin, Bastrop, Bee, Bell, Bexar, Bosque, Bowie, Brazoria, Brazos, Brooks, Burleson, Caldwell, Calhoun, Cameron, Camp, Cass, Chambers, Cherokee, Clay, Collin, Colorado, Comal, Cooke, Dallas, Delta, Denton, DeWitt, Duval, Ellis, Falls, Fannin, Fayette, Fort Bend, Franklin, Freestone, Galveston, Goliad, Gonzales, Grayson, Gregg, Grimes, Guadalupe, Hardin, Harris, Harrison, Hays, Henderson, Hidalgo, Hill, Hood, Hopkins, Houston, Hunt, Jack, Jackson, Jasper, Jefferson, Jim Wells, Johnson, Karnes, Kaufman, Kenedy, Kleberg, Lamar, Lavaca, Lee, Leon, Liberty, Limestone, Live Oak, Madison, Marion, Matagorda, McLennan, McMullen, Milam, Montague, Montgomery, Morris, Nacogdoches, Navarro, Newton, Nueces, Orange, Panola, Parker, Polk, Rains, Red River, Refugio, Robertson, Rockwall, Rusk, Sabine, San Augustine, San Jacinto, San Patricio, Shelby, Smith, Somervell, Tarrant, Titus, Travis, Trinity, Tyler, Upshur, Van Zandt, Victoria, Walker, Waller, Washington, Wharton, Wichita, Willacy, Williamson, Wilson, Wise, Wood</p>								
Birds tropical parula	Setophaga pitiayumi			T	G5	S3B	N	Y
<p>Counties: (30) Aransas, Bandera, Bee, Bexar, Blanco, Brooks, Calhoun, Cameron, Comal, Edwards, Gillespie, Goliad, Hays, Hidalgo, Jeff Davis, Kendall, Kenedy, Kerr, Kinney, Kleberg, Medina, Nueces, Real, Refugio, San Patricio, Starr, Uvalde, Val Verde, Victoria, Willacy</p>								
Birds western burrowing owl	Athene cunicularia hypugaea				G4T4	S2	N	Y
<p>Counties: (221) Anderson, Andrews, Aransas, Archer, Armstrong, Atascosa, Austin, Bailey, Bandera, Bastrop, Baylor, Bee, Bell, Bexar, Blanco, Borden, Bosque, Brazoria, Brazos, Brewster, Briscoe, Brooks, Brown, Burleson, Burnet, Caldwell, Calhoun, Callahan, Cameron, Carson, Castro, Childress, Clay, Cochran, Coke, Coleman, Collin, Collingsworth, Colorado, Comal, Comanche, Concho, Cooke, Coryell, Cottle, Crane, Crockett, Crosby, Culberson, Dallam, Dallas, Dawson, Deaf Smith, Delta, Denton, DeWitt, Dickens, Dimmit, Donley, Duval, Eastland, Ector, Edwards, El Paso, Ellis, Erath, Falls, Fannin, Fayette, Fisher, Floyd, Foard, Fort Bend, Freestone, Frio, Gaines, Galveston, Garza, Gillespie, Glasscock, Goliad, Gonzales, Gray, Grayson, Grimes, Guadalupe, Hale, Hall, Hamilton, Hansford, Hardeman, Harris, Hartley, Haskell, Hays, Hemphill, Henderson, Hidalgo, Hill, Hockley, Hood, Hopkins, Howard, Hudspeth, Hunt, Hutchinson, Irion, Jack, Jackson, Jeff Davis, Jim Hogg, Jim Wells, Johnson, Jones, Karnes, Kaufman, Kendall, Kenedy, Kent, Kerr, Kimble, King, Kinney, Kleberg, Knox, La Salle, Lamar, Lamb, Lampasas, Lavaca, Lee, Leon, Limestone, Lipscomb, Live Oak, Llano, Loving, Lubbock, Lynn, Madison, Martin, Mason, Matagorda, Maverick, McCulloch, McLennan, McMullen, Medina, Menard, Midland, Milam, Mills, Mitchell, Montague, Montgomery, Moore, Motley, Navarro, Nolan, Nueces, Ochiltree, Oldham, Palo Pinto, Parker, Parmer, Pecos, Potter, Presidio, Rains, Randall, Reagan, Real, Reeves, Refugio, Roberts, Robertson, Rockwall, Runnels, San Patricio, San Saba, Schleicher, Scurry, Shackelford, Sherman, Somervell, Starr, Stephens, Sterling, Sutton, Swisher, Tarrant, Taylor, Terrell, Terry, Throckmorton, Tom Green, Travis, Upton, Uvalde, Val Verde, Van Zandt, Victoria, Walker, Waller, Ward, Washington, Webb, Wharton, Wheeler, Wichita, Wilbarger, Willacy, Williamson, Wilson, Winkler, Wise, Yoakum, Young, Zapata, Zavala</p>								
Birds white-faced ibis	Plegadis chihii			T	G5	S4B	N	Y
<p>Counties: (254) Anderson, Andrews, Angelina, Aransas, Archer, Armstrong, Atascosa, Austin, Bailey, Bandera, Bastrop, Baylor, Bee, Bell, Bexar, Blanco, Borden, Bosque, Bowie, Brazoria, Brazos, Brewster, Briscoe, Brooks, Brown, Burleson, Burnet, Caldwell, Calhoun, Callahan, Cameron, Camp, Carson, Cass, Castro, Chambers, Cherokee, Childress, Clay, Cochran, Coke, Coleman, Collin, Collingsworth, Colorado, Comal, Comanche, Concho, Cooke, Coryell, Cottle, Crane, Crockett, Crosby, Culberson, Dallam, Dallas, Dawson, Deaf Smith, Delta, Denton, DeWitt, Dickens, Dimmit, Donley, Duval, Eastland, Ector, Edwards, El Paso, Ellis, Erath, Falls, Fannin, Fayette, Fisher, Floyd, Foard, Fort Bend, Franklin, Freestone, Frio, Gaines, Galveston, Garza, Gillespie, Glasscock, Goliad, Gonzales, Gray, Grayson, Gregg, Grimes, Guadalupe, Hale, Hall, Hamilton, Hansford, Hardeman, Hardin, Harris, Harrison, Hartley, Haskell, Hays, Hemphill, Henderson, Hidalgo, Hill, Hockley, Hood, Hopkins, Houston, Howard, Hudspeth, Hunt, Hutchinson, Irion, Jack, Jackson, Jasper, Jeff Davis, Jefferson, Jim Hogg, Jim Wells, Johnson, Jones, Karnes, Kaufman, Kendall, Kenedy, Kent, Kerr, Kimble, King, Kinney, Kleberg, Knox, La Salle, Lamar, Lamb, Lampasas, Lavaca, Lee, Leon, Liberty, Limestone, Lipscomb, Live Oak, Llano, Loving, Lubbock, Lynn, Madison, Marion, Martin, Mason, Matagorda, Maverick, McCulloch, McLennan, McMullen, Medina, Menard, Midland, Milam, Mills, Mitchell, Montague, Montgomery, Moore, Morris, Motley, Nacogdoches, Navarro, Newton, Nolan, Nueces, Ochiltree, Oldham, Orange, Palo Pinto, Panola, Parker, Parmer, Pecos, Polk, Potter, Presidio, Rains, Randall, Reagan, Real, Red River, Reeves, Refugio, Roberts, Robertson, Rockwall, Runnels, Rusk, Sabine, San Augustine, San Jacinto, San Patricio, San Saba, Schleicher, Scurry, Shackelford, Shelby, Sherman, Smith, Somervell, Starr, Stephens, Sterling, Stonewall, Sutton, Swisher, Tarrant, Taylor, Terrell, Terry, Throckmorton, Travis, Victoria, Walker, Waller, Washington, Wharton, Wheeler, Wichita, Wilbarger, Williamson, Wilson, Winkler, Wise, Wood, Yoakum, Young, Zapata, Zavala</p>								
Birds whooping crane	Grus americana		LE	E	G1	S1N	N	Y
<p>Counties: (118) Aransas, Archer, Atascosa, Austin, Bastrop, Baylor, Bee, Bell, Bexar, Blanco, Bosque, Brazoria, Brazos, Brown, Burleson, Burnet, Caldwell, Calhoun, Callahan, Carson, Childress, Clay, Coleman, Collin, Collingsworth, Colorado, Comal, Comanche, Cooke, Coryell, Cottle, Dallas, Denton, DeWitt, Donley, Eastland, Ellis, Erath, Falls, Fayette, Foard, Fort Bend, Freestone, Gillespie, Goliad, Gonzales, Gray, Grayson, Grimes, Guadalupe, Hall, Hamilton, Hansford, Hardeman, Harris, Haskell, Hays, Hemphill, Henderson, Hill, Hood, Hutchinson, Jack, Jackson, Jim Wells, Johnson, Jones, Karnes, Kaufman, Kendall, Kenedy, King, Kleberg, Knox, Lampasas, Lavaca, Lee, Leon, Limestone, Lipscomb, Live Oak, Llano, Madison, Matagorda, McLennan, Milam, Mills, Montague, Montgomery, Navarro, Nueces, Ochiltree, Palo Pinto, Parker, Refugio, Roberts, Robertson, Rockwall, San Patricio, San Saba, Shackelford, Somervell, Stephens, Tarrant, Taylor, Terrell, Terry, Throckmorton, Travis, Victoria, Walker, Waller, Washington, Wharton, Wheeler, Wichita, Wilbarger, Williamson, Wilson, Wise, Young</p>								
Birds wood stork	Mycteria americana			T	G4	SHB,S2N	N	Y
<p>Counties: (118) Anderson, Angelina, Aransas, Atascosa, Austin, Bastrop, Bee, Bell, Bexar, Bowie, Brazoria, Brazos, Brooks, Burleson, Caldwell, Calhoun, Cameron, Camp, Cass, Chambers, Cherokee, Collin, Colorado, Comal, Dallas, Delta, DeWitt, Dimmit, Duval, Ellis, Falls, Fannin, Fayette, Fort Bend, Franklin, Freestone, Frio, Galveston, Goliad, Gonzales, Grayson, Gregg, Grimes, Guadalupe, Hardin, Harris, Harrison, Hays, Henderson, Hidalgo, Hopkins, Houston, Hunt, Jackson, Jasper, Jefferson, Jim Hogg, Jim Wells, Karnes, Kaufman, Kenedy, Kleberg, La Salle, Lamar, Lavaca, Lee, Leon, Liberty, Limestone, Live Oak, Madison, Marion, Matagorda, Maverick, McLennan, McMullen, Medina, Milam, Montgomery, Morris, Nacogdoches, Navarro, Newton, Nueces, Orange, Panola, Polk, Rains, Red River, Refugio, Robertson, Rockwall, Rusk, Sabine, San Augustine, San Jacinto, San Patricio, Shelby, Smith, Starr, Titus, Travis, Trinity, Tyler, Upshur, Van Zandt, Victoria, Walker, Waller, Washington, Webb, Wharton, Willacy, Williamson, Wilson, Wood, Zapata, Zavala</p>								
Birds zone-tailed hawk	Buteo albonotatus			T	G4	S3B	N	Y
<p>Counties: (73) Bandera, Bastrop, Bell, Bexar, Blanco, Brewster, Brooks, Brown, Burnet, Caldwell, Callahan, Cameron, Coke, Colorado, Comal, Comanche, Concho, Coryell, Crockett, Culberson, DeWitt, Eastland, Edwards, Fayette, Gillespie, Glasscock, Gonzales, Guadalupe, Hamilton, Hays, Hidalgo, Hudspeth, Irion, Jeff Davis, Karnes, Kendall, Kenedy, Kerr, Kimble, Kinney, Lampasas, Lavaca, Llano, Mason, McCulloch, Medina, Menard, Midland, Mills, Pecos, Presidio, Rains, Reagan, Real, Reeves, San Saba, Schleicher, Starr, Sterling, Sutton, Terrell, Terry, Tom Green, Travis, Upton, Uvalde, Val Verde, Victoria, Walker, Willacy, Williamson, Wilson, Zapata</p>								



T.E.A.M. Study Area Report Study Area Endangered Species Table



Counties: Hays		Species Count: 132						
Taxon	Com Name	Sci Name	USESA	SPROT	GRank	SRank	End	SGCN
Crustaceans	Balcones Cave amphipod	Stygobromus balconis			G2G3	S2	Y	Y
	Counties: (3) <u>Hays, Kendall, Travis</u>							
Crustaceans	Ezell's Cave amphipod	Stygobromus flagellatus			G2G3	S3	Y	Y
	Counties: (4) <u>Bexar, Comal, Hays, Travis</u>							
Crustaceans	No accepted common name	Cyclops cavernarum			GNR	SU	Y	N
	Counties: (1) <u>Hays</u>							
Crustaceans	No accepted common name	Palaemonetes texanus			G1G2	S1?	Y	Y
	Counties: (2) <u>Comal, Hays</u>							
Crustaceans	No accepted common name	Artesia subterranea			G1G2	S2	Y	Y
	Counties: (5) <u>Comal, Hays, Menard, Terrell, Val Verde</u>							
Crustaceans	No accepted common name	Texiweckelia texensis			G2G3	S2	Y	Y
	Counties: (1) <u>Hays</u>							
Crustaceans	Purgatory Cave shrimp	Calathaemon holthuisi			G1G2	S1	Y	Y
	Counties: (1) <u>Hays</u>							
Crustaceans	Texas troglitic water slater	Lirceolus smithii		T	G1G2	S1	Y	Y
	Counties: (1) <u>Hays</u>							
Fish	american eel	Anguilla rostrata			G4	S4	N	Y
	Counties: (29) <u>Bastrop, Brazos, Brewster, Cameron, Chambers, Colorado, Comal, Dallas, DeWitt, Duval, Grayson, Guadalupe, Hardin, Hays, Hill, Jackson, Jasper, Jefferson, Jim Wells, Kinney, Matagorda, McLennan, Newton, Nueces, Orange, Refugio, Travis, Tyler, Washington</u>							
Fish	fountain darter	Etheostoma fonticola		LE E	G1	S1	Y	Y
	Counties: (5) <u>Caldwell, Comal, Gonzales, Guadalupe, Hays</u>							
Fish	Guadalupe bass	Micropterus treculii			G3	S3	Y	Y
	Counties: (47) <u>Bandera, Bastrop, Bell, Bexar, Blanco, Bosque, Burnet, Caldwell, Coke, Coleman, Colorado, Comal, Concho, Coryell, DeWitt, Edwards, Fayette, Gillespie, Gonzales, Guadalupe, Hamilton, Hays, Hill, Irion, Kendall, Kerr, Kimble, Lampasas, Llano, Mason, McCulloch, McLennan, Medina, Menard, Milam, Mills, Real, Runnels, San Saba, Schleicher, Somervell, Tom Green, Travis, Uvalde, Victoria, Williamson, Zavala</u>							
Fish	Guadalupe darter	Percina apristis		T	G4	S2	Y	Y
	Counties: (9) <u>Caldwell, Comal, DeWitt, Gonzales, Guadalupe, Hays, Kendall, Kerr, Victoria</u>							
Fish	headwater catfish	Ictalurus lupus		T	G3	S1S2	N	Y
	Counties: (18) <u>Brewster, Caldwell, Crockett, Culberson, Hays, Jeff Davis, Kendall, Kerr, Kinney, Maverick, Menard, Pecos, Presidio, Real, Reeves, Terrell, Uvalde, Val Verde</u>							
Fish	ironcolor shiner	Notropis chalybaeus			G4	S3	N	Y
	Counties: (11) <u>Anderson, Bowie, Cass, Hardin, Harrison, Hays, Henderson, Marion, Tyler, Upshur, Wood</u>							
Fish	Texas shiner	Notropis amabilis			G4	S4	N	Y
	Counties: (37) <u>Bandera, Bastrop, Bexar, Blanco, Borden, Burnet, Caldwell, Comal, Crockett, Crosby, Edwards, Gillespie, Guadalupe, Hays, Irion, Kendall, Kerr, Kimble, Kinney, Live Oak, Llano, Maverick, McMullen, Medina, Menard, Pecos, Real, Runnels, San Saba, Terrell, Tom Green, Travis, Uvalde, Val Verde, Victoria, Williamson, Zavala</u>							
Insects	a caddisfly	Ochrotrichia capitana			G1G3	S2?	Y	Y
	Counties: (14) <u>Bandera, Blanco, Brewster, Comal, Culberson, Hays, Hudspeth, Kerr, Kimble, Medina, Menard, Real, Uvalde, Val Verde</u>							
Insects	a caddisfly	Neotrichia juani			G1	S1		Y
	Counties: (5) <u>Bandera, Comal, Hays, Johnson, Travis</u>							
Insects	a caddisfly	Xiphocentron messapus			G1G3	S2?	Y	Y
	Counties: (4) <u>Comal, Gillespie, Hays, Travis</u>							
Insects	a cave obligate beetle	Rhadine austinica			G1G2	S1S2	Y	Y
	Counties: (2) <u>Hays, Travis</u>							
Insects	a mayfly	Proclleon distinctum			G1G3Q	S2?	Y	Y
	Counties: (2) <u>Hays, Williamson</u>							

Report Created Fri May 15 2020



T.E.A.M. Study Area Report Study Area Endangered Species Table



Counties: Hays		Species Count: 132						
Taxon	Com Name	Sci Name	USESA	SPROT	GRank	SRank	End	SGCN
Insects	American bumblebee	Bombus pensylvanicus			G3G4	SNR		Y
Counties: (161) Anderson, Angelina, Aransas, Atascosa, Austin, Bandera, Bastrop, Bell, Bexar, Blanco, Bosque, Bowie, Brazoria, Brazos, Brewster, Brooks, Brown, Burleson, Burnet, Caldwell, Calhoun, Cameron, Camp, Chambers, Cherokee, Childress, Cochran, Collin, Colorado, Comal, Cooke, Coryell, Crockett, Crosby, Dallas, Dawson, Delta, Denton, DeWitt, Dickens, Dimmit, Eastland, El Paso, Ellis, Erath, Falls, Fannin, Fayette, Foard, Fort Bend, Franklin, Frio, Galveston, Garza, Gillespie, Goliad, Gonzales, Grayson, Gregg, Grimes, Guadalupe, Hale, Hardin, Harris, Harrison, Hartley, Hays, Hemphill, Hidalgo, Hockley, Hood, Hopkins, Houston, Hunt, Jack, Jackson, Jasper, Jeff Davis, Jefferson, Jim Wells, Johnson, Kaufman, Kendall, Kenedy, Kerr, Kimble, Kinney, Kleberg, La Salle, Lamar, Lavaca, Lee, Liberty, Limestone, Live Oak, Llano, Lubbock, Lynn, Madison, Marion, Mason, Matagorda, Maverick, McLennan, Medina, Midland, Milam, Mills, Montague, Montgomery, Nacogdoches, Navarro, Nueces, Orange, Palo Pinto, Panola, Parker, Pecos, Polk, Potter, Presidio, Rains, Randall, Red River, Reeves, Refugio, Robertson, Rockwall, Runnels, Sabine, San Jacinto, San Patricio, Schleicher, Shelby, Smith, Somervell, Starr, Sutton, Tarrant, Taylor, Throckmorton, Titus, Tom Green, Travis, Tyler, Upshur, Uvalde, Val Verde, Van Zandt, Victoria, Walker, Washington, Webb, Wharton, Wichita, Wilbarger, Williamson, Wilson, Wise, Wood, Zavala								
Insects	Comal Springs diving beetle	Comaldessus stygius			G1	S1		Y Y
Counties: (2) Comal, Hays								
Insects	Comal Springs dryopid beetle	Stygoparnus comalensis		LE E	G1G2	S1		Y Y
Counties: (2) Comal, Hays								
Insects	Comal Springs riffle beetle	Heterelmis comalensis		LE E	G1	S1		Y
Counties: (2) Comal, Hays								
Insects	Edwards Aquifer diving beetle	Haideoporus texanus			G1G2	S1		Y Y
Counties: (2) Comal, Hays								
Insects	No accepted common name	Oxyelophila callista			GNR	SNR		Y
Counties: (6) Comal, Edwards, Hays, Kerr, Real, Val Verde								
Insects	No accepted common name	Plauditus texanus			G2G3	S1?	N	Y
Counties: (3) Austin, Blanco, Hays								
Insects	No accepted common name	Rhadine insolita			G1G2	S1		Y Y
Counties: (2) Comal, Hays								
Insects	No accepted common name	Batrissodes grubbsi			G1G2	S1		Y Y
Counties: (1) Hays								
Insects	San Marcos saddle-case caddisfly	Protoptila arca			G1	S1		Y Y
Counties: (1) Hays								
Insects	Texas austrotinodes caddisfly	Austrotinodes texensis			G2	S2		Y Y
Counties: (4) Bandera, Hays, Real, Val Verde								
Mammals	American badger	Taxidea taxus			G5	S5	N	Y
Counties: (225) Anderson, Andrews, Aransas, Archer, Armstrong, Atascosa, Austin, Bailey, Bandera, Bastrop, Baylor, Bee, Bell, Bexar, Blanco, Borden, Bosque, Brazoria, Brazos, Brewster, Briscoe, Brooks, Brown, Burleson, Burnet, Caldwell, Calhoun, Callahan, Cameron, Carson, Castro, Cherokee, Childress, Clay, Cochran, Coke, Coleman, Collin, Collingsworth, Colorado, Comal, Comanche, Concho, Cooke, Coryell, Cottle, Crane, Crockett, Crosby, Culberson, Dallam, Dallas, Dawson, Deaf Smith, Delta, Denton, DeWitt, Dickens, Dimmit, Donley, Duval, Eastland, Ector, Edwards, El Paso, Ellis, Erath, Falls, Fannin, Fayette, Fisher, Floyd, Foard, Fort Bend, Freestone, Frio, Gaines, Garza, Gillespie, Glasscock, Goliad, Gonzales, Gray, Grayson, Grimes, Guadalupe, Hale, Hall, Hamilton, Hansford, Hardeman, Harris, Hartley, Haskell, Hays, Hemphill, Henderson, Hidalgo, Hill, Hockley, Hood, Hopkins, Houston, Howard, Hudspeth, Hunt, Hutchinson, Irion, Jack, Jackson, Jeff Davis, Jim Hogg, Jim Wells, Johnson, Jones, Karnes, Kaufman, Kendall, Kenedy, Kent, Kerr, Kimble, King, Kinney, Kleberg, Knox, La Salle, Lamar, Lamb, Lampasas, Lavaca, Lee, Leon, Limestone, Lipscomb, Live Oak, Llano, Loving, Lubbock, Lynn, Madison, Martin, Mason, Matagorda, Maverick, McCulloch, McLennan, McMullen, Medina, Menard, Midland, Milam, Mills, Mitchell, Montague, Montgomery, Moore, Motley, Navarro, Nolan, Nueces, Ochiltree, Oldham, Palo Pinto, Parker, Parmer, Pecos, Potter, Presidio, Rains, Randall, Reagan, Real, Reeves, Refugio, Roberts, Robertson, Rockwall, Runnels, San Patricio, San Saba, Schleicher, Scurry, Shackelford, Sherman, Smith, Somervell, Starr, Stephens, Sterling, Stonewall, Sutton, Swisher, Tarrant, Taylor, Terrell, Terry, Throckmorton, Tom Green, Travis, Trinity, Upton, Uvalde, Val Verde, Van Zandt, Victoria, Walker, Waller, Ward, Washington, Webb, Wharton, Wheeler, Wichita, Wilbarger, Willacy, Williamson, Wilson, Winkler, Wise, Wood, Yoakum, Young, Zapata, Zavala								
Mammals	big brown bat	Eptesicus fuscus			G5	S5	N	Y
Counties: (178) Anderson, Angelina, Archer, Armstrong, Atascosa, Austin, Bailey, Bandera, Bastrop, Baylor, Bell, Bexar, Blanco, Borden, Bosque, Bowie, Brazoria, Brazos, Brewster, Briscoe, Burnet, Caldwell, Camp, Carson, Cass, Castro, Chambers, Cherokee, Childress, Clay, Collin, Collingsworth, Colorado, Comal, Comanche, Cooke, Coryell, Cottle, Crosby, Culberson, Dallas, Dawson, Deaf Smith, Delta, Denton, Dickens, Donley, Eastland, El Paso, Ellis, Erath, Falls, Fannin, Fayette, Fisher, Floyd, Foard, Fort Bend, Franklin, Freestone, Frio, Galveston, Garza, Gonzales, Gray, Grayson, Gregg, Grimes, Guadalupe, Hale, Hall, Hamilton, Hansford, Hardeman, Hardin, Harris, Harrison, Hartley, Haskell, Hays, Hemphill, Henderson, Hill, Hockley, Hood, Hopkins, Houston, Hudspeth, Hunt, Hutchinson, Jack, Jasper, Jeff Davis, Jefferson, Johnson, Jones, Kaufman, Kendall, Kent, King, Knox, Lamar, Lamb, Lampasas, Lavaca, Lee, Leon, Liberty, Limestone, Lipscomb, Llano, Lubbock, Lynn, Madison, Marion, McLennan, Medina, Milam, Montague, Montgomery, Moore, Motley, Nacogdoches, Navarro, Newton, Ochiltree, Oldham, Orange, Palo Pinto, Panola, Parker, Parmer, Pecos, Polk, Potter, Presidio, Rains, Randall, Red River, Reeves, Roberts, Robertson, Rockwall, Rusk, Sabine, San Augustine, San Jacinto, Scurry, Shackelford, Shelby, Sherman, Smith, Somervell, Stephens, Stonewall, Swisher, Tarrant, Terrell, Terry, Throckmorton, Titus, Travis, Trinity, Tyler, Upshur, Van Zandt, Walker, Waller, Washington, Wharton, Wheeler, Wichita, Wilbarger, Williamson, Wilson, Wise, Wood, Young								

Report Created Fri May 15 2020



T.E.A.M. Study Area Report Study Area Endangered Species Table



Counties: Hays

Species Count: 132

Taxon	Com Name	Sci Name	USESA	SPROT	GRank	SRank	End	SGCN
Mammals	big free-tailed bat	Nyctinomops macrotis			G5	S3		Y
<p>Counties: (113) <u>Andrews, Aransas, Armstrong, Atascosa, Austin, Bailey, Bastrop, Bee, Bell, Bexar, Blanco, Borden, Brazoria, Brazos, Brewster, Briscoe, Burleson, Burnet, Caldwell, Calhoun, Cameron, Carson, Castro, Cochran, Colorado, Comal, Crane, Crockett, Crosby, Culberson, Dallam, Dawson, Deaf Smith, Denton, DeWitt, Donley, Duval, Ector, El Paso, Falls, Fayette, Floyd, Fort Bend, Gaines, Garza, Glasscock, Goliad, Gonzales, Gray, Grimes, Guadalupe, Hale, Hansford, Harris, Hartley, Hays, Hockley, Howard, Hudspeth, Hutchinson, Jack, Jackson, Jeff Davis, Jim Wells, Karnes, Kendall, Lamb, Lavaca, Lee, Live Oak, Loving, Lubbock, Lynn, Madison, Martin, Matagorda, McMullen, Midland, Milam, Montague, Montgomery, Moore, Nueces, Ochiltree, Oldham, Parker, Parmer, Pecos, Potter, Presidio, Randall, Reagan, Reeves, Refugio, Roberts, Robertson, San Patricio, Sherman, Sterling, Swisher, Tarrant, Terry, Travis, Upton, Victoria, Waller, Ward, Washington, Wharton, Williamson, Wilson, Winkler, Wise, Yoakum</u></p>								
Mammals	cave myotis bat	Myotis velifer			G4G5	S4	N	Y
<p>Counties: (155) <u>Archer, Armstrong, Atascosa, Bandera, Bastrop, Baylor, Bell, Bexar, Blanco, Borden, Bosque, Brewster, Briscoe, Brooks, Brown, Burleson, Burnet, Caldwell, Calhoun, Cameron, Carson, Castro, Childress, Coke, Coleman, Collin, Collingsworth, Comal, Comanche, Concho, Coryell, Cottle, Crane, Crockett, Crosby, Culberson, Dallas, Dawson, Deaf Smith, Dickens, Dimmit, Donley, Duval, Eastland, Edwards, El Paso, Ellis, Falls, Fayette, Fisher, Floyd, Foard, Frio, Garza, Gillespie, Glasscock, Gonzales, Gray, Guadalupe, Hale, Hall, Hamilton, Hardeman, Haskell, Hays, Hemphill, Hidalgo, Hill, Hockley, Howard, Hudspeth, Hutchinson, Irion, Jeff Davis, Jim Hogg, Jim Wells, Johnson, Jones, Karnes, Kendall, Kenedy, Kerr, Kimble, King, Kinney, Kleberg, Knox, La Salle, Lamb, Lampasas, Lee, Limestone, Live Oak, Llano, Loving, Lubbock, Lynn, Martin, Mason, Maverick, McCulloch, McLennan, McMullen, Medina, Menard, Midland, Milam, Mills, Mitchell, Moore, Motley, Navarro, Nolan, Nueces, Oldham, Pecos, Potter, Presidio, Randall, Reagan, Real, Reeves, Roberts, Robertson, Runnels, San Patricio, San Saba, Schleicher, Scurry, Shackelford, Starr, Sterling, Stonewall, Sutton, Swisher, Tarrant, Taylor, Terrell, Terry, Throckmorton, Tom Green, Travis, Upton, Uvalde, Val Verde, Walker, Waller, Ward, Washington, Webb, Wheeler, Wichita, Wilbarger, Willacy, Williamson, Wilson, Zapata, Zavala</u></p>								
Mammals	eastern red bat	Lasiurus borealis			G3G4	S4	N	Y
<p>Counties: (254) <u>Anderson, Andrews, Angelina, Aransas, Archer, Armstrong, Atascosa, Austin, Bailey, Bandera, Bastrop, Baylor, Bee, Bell, Bexar, Blanco, Borden, Bosque, Bowie, Brazoria, Brazos, Briscoe, Brooks, Brown, Burleson, Burnet, Caldwell, Calhoun, Callahan, Cameron, Camp, Carson, Cass, Castro, Chambers, Cherokee, Childress, Clay, Cochran, Coke, Coleman, Collin, Collingsworth, Colorado, Comal, Comanche, Concho, Cooke, Coryell, Cottle, Crane, Crockett, Crosby, Culberson, Dallam, Dallas, Dawson, Deaf Smith, Delta, Denton, DeWitt, Dickens, Dimmit, Donley, Duval, Eastland, Ector, Edwards, El Paso, Ellis, Erath, Falls, Fannin, Fayette, Fisher, Floyd, Foard, Fort Bend, Franklin, Freestone, Frio, Gaines, Galveston, Garza, Gillespie, Glasscock, Goliad, Gonzales, Gray, Grayson, Gregg, Grimes, Guadalupe, Hale, Hall, Hamilton, Hansford, Hardeman, Hardin, Harris, Harrison, Hartley, Haskell, Hays, Hemphill, Henderson, Hidalgo, Hill, Hockley, Hood, Hopkins, Houston, Howard, Hudspeth, Hunt, Hutchinson, Irion, Jack, Jackson, Jasper, Jeff Davis, Jefferson, Jim Hogg, Jim Wells, Johnson, Jones, Karnes, Kaufman, Kendall, Kenedy, Kerr, Kimble, King, Kinney, Kleberg, Knox, La Salle, Lamar, Lamb, Lampasas, Lavaca, Lee, Leon, Liberty, Limestone, Lipscomb, Live Oak, Llano, Loving, Lubbock, Lynn, Madison, Marion, Mason, Matagorda, Maverick, McCulloch, McLennan, McMullen, Medina, Menard, Midland, Milam, Mills, Mitchell, Montague, Montgomery, Moore, Morris, Motley, Nacogdoches, Navarro, Newton, Nolan, Nueces, Ochiltree, Oldham, Orange, Palo Pinto, Panola, Parker, Parmer, Pecos, Polk, Potter, Presidio, Rains, Randall, Reagan, Real, Red River, Reeves, Refugio, Roberts, Robertson, Rockwall, Runnels, Rusk, Sabine, San Augustine, San Jacinto, San Patricio, San Saba, Schleicher, Scurry, Shackelford, Shelby, Sherman, Smith, Somervell, Starr, Stephens, Sterling, Stonewall, Sutton, Swisher, Tarrant, Taylor, Terrell, Terry, Throckmorton, Titus, Tom Green, Travis, Trinity, Tyler, Upshur, Upton, Uvalde, Val Verde, Van Zandt, Victoria, Walker, Waller, Ward, Washington, Webb, Wharton, Wheeler, Wichita, Wilbarger, Willacy, Williamson, Wilson, Winkler, Wise, Wood, Yoakum, Young, Zapata, Zavala</u></p>								
Mammals	eastern spotted skunk	Spilogale putorius			G4	S1S3	N	Y
<p>Counties: (218) <u>Anderson, Angelina, Aransas, Archer, Armstrong, Atascosa, Austin, Bailey, Bandera, Bastrop, Baylor, Bee, Bell, Bexar, Blanco, Borden, Bosque, Bowie, Brazoria, Brazos, Briscoe, Brooks, Brown, Burleson, Burnet, Caldwell, Calhoun, Callahan, Cameron, Camp, Carson, Cass, Castro, Chambers, Cherokee, Childress, Clay, Cochran, Coke, Coleman, Collin, Collingsworth, Colorado, Comal, Comanche, Concho, Cooke, Coryell, Cottle, Crane, Crockett, Crosby, Culberson, Dallam, Dallas, Dawson, Deaf Smith, Delta, Denton, DeWitt, Dickens, Dimmit, Donley, Duval, Eastland, Ector, Edwards, El Paso, Ellis, Erath, Falls, Fannin, Fayette, Fisher, Floyd, Foard, Fort Bend, Franklin, Freestone, Frio, Gaines, Galveston, Garza, Gillespie, Glasscock, Goliad, Gonzales, Gray, Grayson, Gregg, Grimes, Guadalupe, Hale, Hall, Hamilton, Hansford, Hardeman, Hardin, Harris, Harrison, Hartley, Haskell, Hays, Hemphill, Henderson, Hidalgo, Hill, Hockley, Hood, Hopkins, Houston, Hunt, Hutchinson, Jack, Jackson, Jasper, Jefferson, Jim Hogg, Jim Wells, Johnson, Jones, Karnes, Kaufman, Kendall, Kenedy, Kerr, Kimble, King, Kinney, Kleberg, Knox, La Salle, Lamar, Lamb, Lampasas, Lavaca, Lee, Leon, Liberty, Limestone, Lipscomb, Live Oak, Llano, Loving, Lubbock, Lynn, Madison, Marion, Mason, Matagorda, McCulloch, McLennan, McMullen, Medina, Menard, Midland, Milam, Mills, Mitchell, Montague, Montgomery, Moore, Morris, Motley, Nacogdoches, Navarro, Newton, Nolan, Nueces, Ochiltree, Oldham, Orange, Palo Pinto, Panola, Parker, Parmer, Pecos, Polk, Potter, Presidio, Rains, Randall, Reagan, Real, Red River, Reeves, Refugio, Roberts, Robertson, Rockwall, Runnels, Rusk, Sabine, San Augustine, San Jacinto, San Patricio, San Saba, Schleicher, Scurry, Shackelford, Shelby, Sherman, Smith, Somervell, Starr, Stephens, Stonewall, Swisher, Tarrant, Taylor, Terrell, Terry, Throckmorton, Titus, Tom Green, Travis, Trinity, Tyler, Upshur, Upton, Uvalde, Van Zandt, Victoria, Walker, Waller, Washington, Webb, Wharton, Wheeler, Wichita, Wilbarger, Willacy, Williamson, Wilson, Wise, Wood, Yoakum, Young, Zapata, Zavala</u></p>								
Mammals	hoary bat	Lasiurus cinereus			G3G4	S4	N	Y
<p>Counties: (254) <u>Anderson, Andrews, Angelina, Aransas, Archer, Armstrong, Atascosa, Austin, Bailey, Bandera, Bastrop, Baylor, Bee, Bell, Bexar, Blanco, Borden, Bosque, Bowie, Brazoria, Brazos, Brewster, Briscoe, Brooks, Brown, Burleson, Burnet, Caldwell, Calhoun, Callahan, Cameron, Camp, Carson, Cass, Castro, Chambers, Cherokee, Childress, Clay, Cochran, Coke, Coleman, Collin, Collingsworth, Colorado, Comal, Comanche, Concho, Cooke, Coryell, Cottle, Crane, Crockett, Crosby, Culberson, Dallam, Dallas, Dawson, Deaf Smith, Delta, Denton, DeWitt, Dickens, Dimmit, Donley, Duval, Eastland, Ector, Edwards, El Paso, Ellis, Erath, Falls, Fannin, Fayette, Fisher, Floyd, Foard, Fort Bend, Franklin, Freestone, Frio, Gaines, Galveston, Garza, Gillespie, Glasscock, Goliad, Gonzales, Gray, Grayson, Gregg, Grimes, Guadalupe, Hale, Hall, Hamilton, Hansford, Hardeman, Hardin, Harris, Harrison, Hartley, Haskell, Hays, Hemphill, Henderson, Hidalgo, Hill, Hockley, Hood, Hopkins, Houston, Howard, Hudspeth, Hunt, Hutchinson, Irion, Jack, Jackson, Jasper, Jeff Davis, Jefferson, Jim Hogg, Jim Wells, Johnson, Jones, Karnes, Kaufman, Kendall, Kenedy, Kerr, Kimble, King, Kinney, Kleberg, Knox, La Salle, Lamar, Lamb, Lampasas, Lavaca, Lee, Leon, Liberty, Limestone, Lipscomb, Live Oak, Llano, Loving, Lubbock, Lynn, Madison, Marion, Martin, Mason, Matagorda, Maverick, McCulloch, McLennan, McMullen, Medina, Menard, Midland, Milam, Mills, Mitchell, Montague, Montgomery, Moore, Morris, Motley, Nacogdoches, Navarro, Newton, Nolan, Nueces, Ochiltree, Oldham, Orange, Palo Pinto, Panola, Parker, Parmer, Pecos, Polk, Potter, Presidio, Rains, Randall, Reagan, Real, Red River, Reeves, Refugio, Roberts, Robertson, Rockwall, Runnels, Rusk, Sabine, San Augustine, San Jacinto, San Patricio, San Saba, Schleicher, Scurry, Shackelford, Shelby, Sherman, Smith, Somervell, Starr, Stephens, Sterling, Stonewall, Sutton, Swisher, Tarrant, Taylor, Terrell, Terry, Throckmorton, Titus, Tom Green, Travis, Trinity, Tyler, Upshur, Upton, Uvalde, Val Verde, Van Zandt, Victoria, Walker, Waller, Ward, Washington, Webb, Wharton, Wheeler, Wichita, Wilbarger, Willacy, Williamson, Wilson, Winkler, Wise, Wood, Yoakum, Young, Zapata, Zavala</u></p>								

Report Created Fri May 15 2020



T.E.A.M. Study Area Report Study Area Endangered Species Table



Counties: Hays		Species Count: 132						
Taxon	Com Name	Sci Name	USESA	SPROT	GRank	SRank	End	SGCN
Mammals	long-tailed weasel	<i>Mustela frenata</i>			G5	S5	N	Y
<p>Counties: (234) Anderson, Andrews, Angelina, Aransas, Archer, Atascosa, Austin, Bailey, Bandera, Bastrop, Baylor, Bee, Bell, Bexar, Blanco, Borden, Bosque, Bowie, Brazoria, Brazos, Brewster, Briscoe, Brooks, Brown, Burleson, Burnet, Caldwell, Calhoun, Callahan, Cameron, Camp, Cass, Castro, Chambers, Cherokee, Clay, Cochran, Coke, Coleman, Collin, Colorado, Comal, Comanche, Concho, Cooke, Coryell, Cottle, Crane, Crockett, Crosby, Culberson, Dallas, Dawson, Deaf Smith, Delta, Denton, DeWitt, Dickens, Dimmit, Duval, Eastland, Ector, Edwards, El Paso, Ellis, Erath, Falls, Fannin, Fayette, Fisher, Floyd, Foard, Fort Bend, Franklin, Freestone, Frio, Gaines, Galveston, Garza, Gillespie, Glasscock, Goliad, Gonzales, Grayson, Gregg, Grimes, Guadalupe, Hale, Hall, Hamilton, Hardeman, Hardin, Harris, Harrison, Haskell, Hays, Henderson, Hidalgo, Hill, Hockley, Hood, Hopkins, Houston, Howard, Hudspeth, Hunt, Irion, Jack, Jackson, Jasper, Jeff Davis, Jefferson, Jim Hogg, Jim Wells, Johnson, Jones, Karnes, Kaufman, Kendall, Kenedy, Kent, Kerr, Kimble, King, Kinney, Kleberg, Knox, La Salle, Lamar, Lamb, Lampasas, Lavaca, Lee, Leon, Liberty, Limestone, Live Oak, Llano, Loving, Lubbock, Lynn, Madison, Marion, Martin, Mason, Matagorda, Maverick, McCulloch, McLennan, McMullen, Medina, Menard, Midland, Milam, Mills, Mitchell, Montague, Montgomery, Morris, Motley, Nacogdoches, Navarro, Newton, Nolan, Nueces, Orange, Palo Pinto, Panola, Parker, Parmer, Pecos, Polk, Presidio, Rains, Reagan, Real, Red River, Reeves, Refugio, Robertson, Rockwall, Runnels, Rusk, Sabine, San Augustine, San Jacinto, San Patricio, San Saba, Schleicher, Scurry, Shackelford, Shelby, Smith, Somervell, Starr, Stephens, Sterling, Stonewall, Sutton, Swisher, Tarrant, Taylor, Terrell, Terry, Throckmorton, Titus, Tom Green, Travis, Trinity, Tyler, Upshur, Upton, Uvalde, Val Verde, Van Zandt, Victoria, Walker, Waller, Ward, Washington, Webb, Wharton, Wichita, Wilbarger, Willacy, Williamson, Wilson, Winkler, Wise, Wood, Yoakum, Young, Zapata, Zavala</p>								
Mammals	Mexican free-tailed bat	<i>Tadarida brasiliensis</i>			G5	S5	N	Y
<p>Counties: (254) Anderson, Andrews, Angelina, Aransas, Archer, Armstrong, Atascosa, Austin, Bailey, Bandera, Bastrop, Baylor, Bee, Bell, Bexar, Blanco, Borden, Bosque, Bowie, Brazoria, Brazos, Brewster, Briscoe, Brooks, Brown, Burleson, Burnet, Caldwell, Calhoun, Callahan, Cameron, Camp, Carson, Cass, Castro, Chambers, Cherokee, Childress, Clay, Cochran, Coke, Coleman, Collin, Collingsworth, Colorado, Comal, Comanche, Concho, Cooke, Coryell, Cottle, Crane, Crockett, Crosby, Culberson, Dallam, Dallas, Dawson, Deaf Smith, Delta, Denton, DeWitt, Dickens, Dimmit, Donley, Duval, Eastland, Ector, Edwards, El Paso, Ellis, Erath, Falls, Fannin, Fayette, Fisher, Floyd, Foard, Fort Bend, Franklin, Freestone, Frio, Gaines, Galveston, Garza, Gillespie, Glasscock, Goliad, Gonzales, Gray, Grayson, Gregg, Grimes, Guadalupe, Hale, Hall, Hamilton, Hansford, Hardeman, Hardin, Harris, Harrison, Hartley, Haskell, Hays, Hemphill, Henderson, Hidalgo, Hill, Hockley, Hood, Hopkins, Houston, Howard, Hudspeth, Hunt, Hutchinson, Irion, Jack, Jackson, Jasper, Jeff Davis, Jefferson, Jim Hogg, Jim Wells, Johnson, Jones, Karnes, Kaufman, Kendall, Kenedy, Kent, Kerr, Kimble, King, Kinney, Kleberg, Knox, La Salle, Lamar, Lamb, Lampasas, Lavaca, Lee, Leon, Liberty, Limestone, Lipscomb, Live Oak, Llano, Loving, Lubbock, Lynn, Madison, Marion, Martin, Mason, Matagorda, Maverick, McCulloch, McLennan, McMullen, Medina, Menard, Midland, Milam, Mills, Mitchell, Montague, Montgomery, Moore, Morris, Motley, Nacogdoches, Navarro, Newton, Nolan, Nueces, Ochiltree, Oldham, Orange, Palo Pinto, Panola, Parker, Parmer, Pecos, Polk, Potter, Presidio, Rains, Randall, Reagan, Real, Red River, Reeves, Refugio, Roberts, Robertson, Rockwall, Runnels, Rusk, Sabine, San Augustine, San Jacinto, San Patricio, San Saba, Schleicher, Scurry, Shackelford, Shelby, Sherman, Smith, Somervell, Starr, Stephens, Sterling, Stonewall, Sutton, Swisher, Tarrant, Taylor, Terrell, Terry, Throckmorton, Titus, Tom Green, Travis, Trinity, Tyler, Upshur, Upton, Uvalde, Val Verde, Van Zandt, Victoria, Walker, Waller, Ward, Washington, Webb, Wharton, Wheeler, Wichita, Wilbarger, Willacy, Williamson, Wilson, Winkler, Wise, Wood, Yoakum, Young, Zapata, Zavala</p>								
Mammals	Mexican long-tongued bat	<i>Choeronycteris mexicana</i>			G3G4	S1	N	Y
<p>Counties: (20) Blanco, Caldwell, Cameron, Comal, Crane, Ector, El Paso, Glasscock, Guadalupe, Hays, Hidalgo, Hudspeth, Kenedy, Martin, Midland, Reagan, Starr, Travis, Upton, Willacy</p>								
Mammals	mink	<i>Neovison vison</i>			G5	S4	N	Y
<p>Counties: (155) Anderson, Angelina, Aransas, Archer, Atascosa, Austin, Bandera, Bastrop, Baylor, Bee, Bell, Bexar, Blanco, Bosque, Bowie, Brazoria, Brazos, Brown, Burleson, Burnet, Caldwell, Calhoun, Callahan, Camp, Cass, Chambers, Cherokee, Clay, Coleman, Collin, Colorado, Comal, Comanche, Concho, Cooke, Coryell, Dallas, Delta, Denton, DeWitt, Eastland, Edwards, Ellis, Erath, Falls, Fannin, Fayette, Foard, Fort Bend, Franklin, Freestone, Galveston, Gillespie, Goliad, Gonzales, Grayson, Gregg, Grimes, Guadalupe, Hamilton, Hansford, Hardeman, Hardin, Harris, Harrison, Haskell, Hays, Henderson, Hill, Hood, Hopkins, Houston, Hunt, Jack, Jackson, Jasper, Jefferson, Johnson, Jones, Karnes, Kaufman, Kendall, Kerr, Kimble, Knox, Lamar, Lampasas, Lavaca, Lee, Leon, Liberty, Limestone, Llano, Madison, Marion, Mason, Matagorda, McCulloch, McLennan, Medina, Menard, Milam, Mills, Montague, Montgomery, Morris, Nacogdoches, Navarro, Newton, Orange, Palo Pinto, Panola, Parker, Polk, Rains, Real, Red River, Refugio, Robertson, Rockwall, Runnels, Rusk, Sabine, San Augustine, San Jacinto, San Saba, Schleicher, Shackelford, Shelby, Smith, Somervell, Stephens, Sutton, Tarrant, Taylor, Throckmorton, Titus, Tom Green, Travis, Trinity, Tyler, Upshur, Van Zandt, Victoria, Walker, Waller, Washington, Wharton, Wichita, Wilbarger, Williamson, Wilson, Wise, Wood, Young</p>								
Mammals	mountain lion	<i>Puma concolor</i>			G5	S2S3	N	Y
<p>Counties: (253) Anderson, Andrews, Angelina, Aransas, Archer, Armstrong, Atascosa, Austin, Bailey, Bandera, Bastrop, Baylor, Bee, Bell, Bexar, Blanco, Borden, Bosque, Bowie, Brazoria, Brazos, Brewster, Briscoe, Brooks, Brown, Burleson, Burnet, Caldwell, Calhoun, Callahan, Cameron, Camp, Carson, Cass, Castro, Chambers, Cherokee, Childress, Clay, Cochran, Coke, Coleman, Collin, Collingsworth, Colorado, Comanche, Concho, Cooke, Coryell, Cottle, Crane, Crockett, Crosby, Culberson, Dallam, Dallas, Dawson, Deaf Smith, Delta, Denton, DeWitt, Dickens, Dimmit, Donley, Duval, Eastland, Ector, Edwards, El Paso, Ellis, Erath, Falls, Fannin, Fayette, Fisher, Floyd, Foard, Fort Bend, Franklin, Freestone, Frio, Gaines, Galveston, Garza, Gillespie, Glasscock, Goliad, Gonzales, Gray, Grayson, Gregg, Grimes, Guadalupe, Hale, Hall, Hamilton, Hansford, Hardeman, Hardin, Harris, Harrison, Hartley, Haskell, Hays, Hemphill, Henderson, Hidalgo, Hill, Hockley, Hood, Hopkins, Houston, Howard, Hudspeth, Hunt, Hutchinson, Irion, Jack, Jackson, Jasper, Jeff Davis, Jefferson, Jim Hogg, Jim Wells, Johnson, Jones, Karnes, Kaufman, Kendall, Kenedy, Kent, Kerr, Kimble, King, Kinney, Kleberg, Knox, La Salle, Lamar, Lamb, Lampasas, Lavaca, Lee, Leon, Liberty, Limestone, Lipscomb, Live Oak, Llano, Loving, Lubbock, Lynn, Madison, Marion, Martin, Mason, Matagorda, Maverick, McCulloch, McLennan, McMullen, Medina, Menard, Midland, Milam, Mills, Mitchell, Montague, Montgomery, Moore, Morris, Motley, Nacogdoches, Navarro, Newton, Nolan, Nueces, Ochiltree, Oldham, Orange, Palo Pinto, Panola, Parker, Parmer, Pecos, Polk, Potter, Presidio, Rains, Randall, Reagan, Real, Red River, Reeves, Refugio, Roberts, Robertson, Rockwall, Runnels, Rusk, Sabine, San Augustine, San Jacinto, San Patricio, San Saba, Schleicher, Scurry, Shackelford, Shelby, Sherman, Smith, Somervell, Starr, Stephens, Sterling, Stonewall, Sutton, Swisher, Tarrant, Taylor, Terrell, Terry, Throckmorton, Titus, Tom Green, Travis, Trinity, Tyler, Upshur, Upton, Uvalde, Val Verde, Van Zandt, Victoria, Walker, Waller, Ward, Washington, Webb, Wharton, Wheeler, Wichita, Wilbarger, Willacy, Williamson, Wilson, Winkler, Wise, Wood, Yoakum, Young, Zapata, Zavala</p>								

ATTACHMENT 8

Explosive and Flammable Operations [24 CFR 51C]

- Petroleum Storage Tanks Registration & Mapping of Tanks
 - Above Ground Storage Tanks and Acceptable Separation Distance

Explosive and Flammable Hazards (CEST and EA)

General requirements	Legislation	Regulation
HUD-assisted projects must meet Acceptable Separation Distance (ASD) requirements to protect them from explosive and flammable hazards.	N/A	24 CFR Part 51 Subpart C
Reference		
https://www.hudexchange.info/environmental-review/explosive-and-flammable-facilities		

1. Does the proposed HUD-assisted project include a hazardous facility (a facility that mainly stores, handles or processes flammable or combustible chemicals such as bulk fuel storage facilities and refineries)?

No

→ Continue to Question 2.

Yes

Explain:

→ Continue to Question 5.

2. Does this project include any of the following activities: development, construction, rehabilitation that will increase residential densities, or conversion?

No

→ Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below.

Yes

→ Continue to Question 3.

3. Within 1 mile of the project site, are there any current *or planned* stationary aboveground storage containers:

- Of more than 100 gallon capacity, containing common liquid industrial fuels OR
- Of any capacity, containing hazardous liquids or gases that are not common liquid industrial fuels?

No

→ Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide all documents used to make your determination.

Yes

→ Continue to Question 4.

4. Is the Separation Distance from the project acceptable based on standards in the Regulation?

Please visit HUD's website for information on calculating Acceptable Separation Distance.

Yes

→ Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide map(s) showing the location of the project site relative to any tanks and your separation distance calculations. If the map identifies more than one tank, please identify the tank you have chosen as the "assessed tank."

No

→ Provide map(s) showing the location of the project site relative to any tanks and your separation distance calculations. If the map identifies more than one tank, please identify the tank you have chosen as the "assessed tank." Continue to Question 6.

5. Is the hazardous facility located at an acceptable separation distance from residences and any other facility or area where people may congregate or be present?

Please visit HUD's website for information on calculating Acceptable Separation Distance.

Yes

→ Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide map(s) showing the location of the project site relative to residences and any other facility or area where people congregate or are present and your separation distance calculations.

No

→ Provide map(s) showing the location of the project site relative to residences and any other facility or area where people congregate or are present and your separation distance calculations. Continue to Question 6.

6. For the project to be brought into compliance with this section, all adverse impacts must be mitigated. Explain in detail the exact measures that must be implemented to make the Separation Distance acceptable, including the timeline for implementation. If negative effects cannot be mitigated, cancel the project at this location.

Note that only licensed professional engineers should design and implement blast barriers. If a barrier will be used or the project will be modified to compensate for an

unacceptable separation distance, provide approval from a licensed professional engineer.

Worksheet Summary

Compliance Determination

Provide a clear description of your determination and a synopsis of the information that it was based on, such as:

- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your region

A review of area above ground storage tanks was not conducted as the project does not meet the requirements that support the review. No impact is expected.

Are formal compliance steps or mitigation required?

Yes

No

ATTACHMENT 9

FARMLANDS PROTECTION

- Farmland Protection Agency Act

Farmlands Protection (CEST and EA)

General requirements	Legislation	Regulation
The Farmland Protection Policy Act (FPPA) discourages federal activities that would convert farmland to nonagricultural purposes.	Farmland Protection Policy Act of 1981 (7 U.S.C. 4201 et seq.)	7 CFR Part 658
Reference		
https://www.hudexchange.info/environmental-review/farmlands-protection		

1. Does your project include any activities, including new construction, acquisition of undeveloped land or conversion, that could convert agricultural land to a non-agricultural use?

Yes → *Continue to Question 2.*

No

Explain how you determined that agricultural land would not be converted:

The project area is an existing roadway within the city limits of Kyle TX.

→ *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide any documentation supporting your determination.*

2. Does “important farmland,” including prime farmland, unique farmland, or farmland of statewide or local importance regulated under the Farmland Protection Policy Act, occur on the project site?

You may use the links below to determine important farmland occurs on the project site:

- Utilize USDA Natural Resources Conservation Service’s (NRCS) Web Soil Survey <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>
- Check with your city or county’s planning department and ask them to document if the project is on land regulated by the FPPA (zoning important farmland as non-agricultural does not exempt it from FPPA requirements)
- Contact NRCS at the local USDA service center <http://offices.sc.egov.usda.gov/locator/app?agency=nrsc> or your NRCS state soil scientist http://soils.usda.gov/contact/state_offices/ for assistance

No → *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide any documents used to make your determination.*

Yes → *Continue to Question 3.*

3. Consider alternatives to completing the project on important farmland and means of avoiding impacts to important farmland.

- Complete form **AD-1006**, "Farmland Conversion Impact Rating" http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1045394.pdf and contact the state soil scientist before sending it to the local NRCS District Conservationist.
(NOTE: for corridor type projects, use instead form **NRCS-CPA-106**, "Farmland Conversion Impact Rating for Corridor Type Projects: http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1045395.pdf.)
- Work with NRCS to minimize the impact of the project on the protected farmland. When you have finished with your analysis, return a copy of form AD-1006 (or form NRCS-CPA-106 if applicable) to the USDA-NRCS State Soil Scientist or his/her designee informing them of your determination.

Document your conclusion:

- Project will proceed with mitigation.

Explain in detail the proposed measures that must be implemented to mitigate for the impact or effect, including the timeline for implementation.

→ *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide form AD-1006 and all other documents used to make your determination.*

- Project will proceed without mitigation.

Explain why mitigation will not be made here:

→ *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide form AD-1006 and all other documents used to make your determination.*

Worksheet Summary

Compliance Determination

Provide a clear description of your determination and a synopsis of the information that it was based on, such as:

- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your region

Project is existing roadway and ROW. No new disturbance of soils. See Tab 5, General Location Maps.

Are formal compliance steps or mitigation required?

Yes

No

Land Use

- Cropland
- Farmland Protection Policy Act**
- Forestry
- Range & Pasture

Annual Reports

Farmland Protection Policy Act 2012 Annual Report [PDF]

Farmland Protection Policy Act

Latest Feature

To know more about the Farmland Protection Policy Act, you can play the webinar below or download the webinar's PowerPoint file .

Webinar - Farmland Protection Policy Act (9/2013)

Web Soil Survey Farmland Classification Report

Soil Name	Rating	Acres to 2012	Percent of 2012
0112 Alluvial silt loam, frequently flooded	Prime farmland	4.1	0.2%
0118 Silt loam, frequently flooded	Prime farmland of marginal	0.9	0.0%
1102 Alluvial silt loam, 1 to 2 percent slopes	Not prime farmland	248.2	12.9%
1106 Alluvial silt loam, 2 to 3 percent slopes	Not prime farmland	17.4	0.9%
1124 Silt loam, 1 to 2 percent slopes	Not prime farmland	412.2	21.0%
1128 Silt loam, 2 to 3 percent slopes, eroded	Not prime farmland	361.3	18.9%
1134 Silt loam, 2 to 3 percent slopes, eroded	Farmland of marginal	209.1	10.7%
1176 Silt loam, frequently flooded	Prime farmland of marginal	21.4	1.1%
1178 Silt loam, frequently flooded	Prime farmland	429.8	22.4%
1182 Alluvial silt loam, frequently flooded	Not prime farmland	8.8	0.4%
Total for State of Indiana		3,199.1	100.0%

Background



The National Agricultural Land Study of 1980-81 found that millions of acres of farmland were being converted in the United States each year. The 1981 Congressional report, Compact Cities: Energy-Saving Strategies for the Eighties, identified the need for Congress to implement programs and policies to protect farmland and combat urban sprawl and the waste of energy and resources that accompanies sprawling development.

The Compact Cities report indicated that much of the sprawl was the result of programs funded by the Federal Government. With this in mind, Congress passed the Agriculture and Food Act of 1981 (Public Law 97-98)

containing the Farmland Protection Policy Act (FPPA) subtitle I of Title XV, Section 1539-1549. The final rules and regulations were published in the Federal Register on June 17, 1994.

Purpose

The FPPA is intended to minimize the impact Federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. It assures that to the extent possible federal programs are administered to be compatible with state, local units of government, and private programs and policies to protect farmland. Federal agencies are required to develop and review their policies and procedures to implement the FPPA every two years.

The FPPA does not authorize the Federal Government to regulate the use of private or nonfederal land or, in any way, affect the property rights of owners.

For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land.

Projects and Activities

Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a Federal agency or with assistance from a Federal agency.

Assistance from a Federal agency includes:

- Acquiring or disposing of land.
- Providing financing or loans.
- Managing property.
- Providing technical assistance

Activities that may be subject to FPPA include:

- State highway construction projects, (through the Federal Highway Administration)
- Airport expansions
- Electric cooperative construction projects
- Railroad construction projects
- Telephone company construction projects
- Reservoir and hydroelectric projects
- Federal agency projects that convert farmland
- Other projects completed with Federal assistance.

Activities not subject to FPPA include:

- Federal permitting and licensing
- Projects planned and completed without the assistance of a Federal agency
- Projects on land already in urban development or used for water storage**
- Construction within an existing right-of-way purchased on or before August 4, 1984
- Construction for national defense purposes
- Construction of on-farm structures needed for farm operations
- Surface mining, where restoration to agricultural use is planned
- Construction of new minor secondary structures such as a garage or storage shed.

Farmland Conversion Impact Rating Form

If you represent a Federal agency in a project that has the potential to convert important farmland to non-farm use, please contact your local office of the Natural Resources Conservation Service (NRCS) or USDA Service Center. NRCS uses a land evaluation and site assessment (LESA) system to establish a farmland conversion impact rating score on proposed sites of Federally funded and assisted projects. This score is used as an indicator for the project sponsor to consider alternative sites if the potential adverse impacts on the farmland exceed the recommended allowable level.

The assessment is completed on form [AD-1006, Farmland Conversion Impact Rating](#). The sponsoring agency completes the site assessment portion of the AD-1006, which assesses non-soil related criteria such as the potential for impact on the local agricultural economy if the land is converted to non-farm use and compatibility with existing agricultural use.

Program Contacts

[Michael Robotham](#), National Leader -Soil Interpretations, 402-437-4098

[Mabel Kenyon](#), Program Analyst-Soil Science Division, 202-692-0099

[State FPPA Contacts](#)

[NRCS Home](#) | [USDA.gov](#) | [Site Map](#) | [Civil Rights](#) | [FOIA](#) | [Accessibility Statement](#)

[Privacy Policy](#) | [Non-Discrimination Statement](#) | [Information Quality](#) | [USA.gov](#) | [Whitehouse.gov](#) |

ATTACHMENT 10

Floodplain Management

- Federal Emergency Management Agency (FEMA) Floodplain Map

Floodplain Management (CEST and EA)

General Requirements	Legislation	Regulation
Executive Order 11988, Floodplain Management, requires Federal activities to avoid impacts to floodplains and to avoid direct and indirect support of floodplain development to the extent practicable.	Executive Order 11988	24 CFR 55
Reference		
https://www.hudexchange.info/environmental-review/floodplain-management		

1. Does [24 CFR 55.12\(c\)](#) exempt this project from compliance with HUD's floodplain management regulations in Part 55?

Yes

Provide the applicable citation at 24 CFR 55.12(c) here. If project is exempt under 55.12(c)(7) or (8), provide supporting documentation.

→ Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below.

No → Continue to Question 2.

2. Provide a FEMA/FIRM or ABFE map showing the site.

The Federal Emergency Management Agency (FEMA) designates floodplains. The FEMA Map Service Center provides this information in the form of FEMA Flood Insurance Rate Maps (FIRMs) or Advisory Base Flood Elevations (ABFEs). For projects in areas not mapped by FEMA, use the best available information to determine floodplain information. Include documentation, including a discussion of why this is the best available information for the site.

Does your project occur in a floodplain?

No → Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below.

Yes

Select the applicable floodplain using the FEMA map or the best available information:

Floodway → Continue to Question 3, Floodways

- Coastal High Hazard Area (V Zone) → *Continue to Question 4, Coastal High Hazard Areas*
- 500-year floodplain (B Zone or shaded X Zone) → *Continue to Question 5, 500-year Floodplains*
- 100-year floodplain (A Zone) → *The 8-Step Process is required. Continue to Question 6, 8-Step Process*

3. **Floodways**

Is this a functionally dependent use?

- Yes

The 8-Step Process is required. Work with your HUD FEO to determine a way to satisfactorily continue with this project. Provide a completed 8-Step Process, including the early public notice and the final notice.

→ *Continue to Question 6, 8-Step Process*

- No

Federal assistance may not be used at this location unless a 55.12(c) exception applies. You must either choose an alternate site or cancel the project at this location.

4. **Coastal High Hazard Area**

Is this a critical action?

- Yes

Critical actions are prohibited in coastal high hazard areas. Federal assistance may not be used at this location. Unless the action is excepted at 24 CFR 55.12(c), you must either choose an alternate site or cancel the project.

- No

Does this action include construction that is not a functionally dependent use, existing construction (including improvements), or reconstruction following destruction caused by a disaster?

- Yes, there is new construction.

New construction is prohibited in V Zones ((24 CFR 55.1(c)(3)).

- No, this action concerns only a functionally dependent use, existing construction(including improvements), or reconstruction following destruction caused by a disaster.

This construction must have met FEMA elevation and construction standards for a coastal high hazard area or other standards applicable at the time of construction.

→ Continue to Question 6, 8-Step Process

5. 500-year Floodplain

Is this a critical action?

No → Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below.

Yes → Continue to Question 6, 8-Step Process

6. 8-Step Process.

Does the 8-Step Process apply? Select one of the following options:

8-Step Process applies.

Provide a completed 8-Step Process, including the early public notice and the final notice.

→ Continue to Question 7, Mitigation

5-Step Process is applicable per 55.12(a)(1-3).

Provide documentation of 5-Step Process.

Select the applicable citation:

55.12(a)(1) HUD actions involving the disposition of HUD-acquired multifamily housing projects or “bulk sales” of HUD-acquired one- to four-family properties in communities that are in the Regular Program of the National Flood Insurance Program (NFIP) and in good standing (i.e., not suspended from program eligibility or placed on probation under 44 CFR 59.24).

55.12(a)(2) HUD's actions under the National Housing Act (12 U.S.C. 1701) for the purchase or refinancing of existing multifamily housing projects, hospitals, nursing homes, assisted living facilities, board and care facilities, and intermediate care facilities, in communities that are in good standing under the NFIP.

55.12(a)(3) HUD's or the recipient's actions under any HUD program involving the repair, rehabilitation, modernization, weatherization, or improvement of existing multifamily housing projects, hospitals, nursing homes, assisted living facilities, board and care facilities, intermediate care facilities, and one- to four-family properties, in communities that are in the Regular Program of the National Flood Insurance Program (NFIP) and are in good standing, provided that the number of units is not increased more than 20 percent, the action does not involve a conversion from nonresidential to residential land use, the action does not meet the thresholds for “substantial improvement” under § 55.2(b)(10), and the footprint of the structure and paved areas is not significantly increased.

55.12(a)(4) HUD's (or the recipient's) actions under any HUD program involving the repair, rehabilitation, modernization, weatherization, or improvement of existing nonresidential buildings and structures, in communities that are in the

Regular Program of the NFIP and are in good standing, provided that the action does not meet the thresholds for “substantial improvement” under § 55.2(b)(10) and that the footprint of the structure and paved areas is not significantly increased.

→ *Continue to Question 7, Mitigation*

- 8-Step Process is inapplicable per 55.12(b)(1-4).

Select the applicable citation:

- 55.12(b)(1) HUD's mortgage insurance actions and other financial assistance for the purchasing, mortgaging or refinancing of existing one- to four-family properties in communities that are in the Regular Program of the National Flood Insurance Program (NFIP) and in good standing (i.e., not suspended from program eligibility or placed on probation under 44 CFR 59.24), where the action is not a critical action and the property is not located in a floodway or coastal high hazard area.
- 55.12(b)(2) Financial assistance for minor repairs or improvements on one- to four-family properties that do not meet the thresholds for “substantial improvement” under § 55.2(b)(10)
- 55.12(b)(3) HUD actions involving the disposition of individual HUD-acquired, one- to four-family properties.
- 55.12(b)(4) HUD guarantees under the Loan Guarantee Recovery Fund Program (24 CFR part 573) of loans that refinance existing loans and mortgages, where any new construction or rehabilitation financed by the existing loan or mortgage has been completed prior to the filing of an application under the program, and the refinancing will not allow further construction or rehabilitation, nor result in any physical impacts or changes except for routine maintenance.
- 55.12(b)(5) The approval of financial assistance to lease an existing structure located within the floodplain, but only if—
- (i) The structure is located outside the floodway or Coastal High Hazard Area, and is in a community that is in the Regular Program of the NFIP and in good standing (i.e., not suspended from program eligibility or placed on probation under 44 CFR 59.24);
 - (ii) The project is not a critical action; and
 - (iii) The entire structure is or will be fully insured or insured to the maximum under the NFIP for at least the term of the lease.

→ *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below.*

7. Mitigation

For the project to be brought into compliance with this section, all adverse impacts must be mitigated. Explain in detail the exact measures that must be implemented to mitigate for the impact or effect, including the timeline for implementation.

The project is for proposed road elevations to be similar/close to existing road elevations. Earthwork volumes will be calculated and if it is determined fill is needed for the road infrastructure proposed, at the rate of 1 cy: 1cy material will be removed from the floodplain footprint or location determined runoff can be detained in order to maintain the waters within the floodplain.

Which of the following mitigation/minimization measures have been identified for this project in the 8-Step or 5-Step Process? Select all that apply.

- Permeable surfaces
- Natural landscape enhancements that maintain or restore natural hydrology
- Planting or restoring native plant species
- Bioswales
- Evapotranspiration
- Stormwater capture and reuse
- Green or vegetative roofs with drainage provisions
- Natural Resources Conservation Service conservation easements or similar easements
- Floodproofing of structures
- Elevating structures including freeboarding above the required base flood elevations
- Other

→ *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below.*

Worksheet Summary

Compliance Determination

Provide a clear description of your determination and a synopsis of the information that it was based on, such as:

- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your region

The structure is in the 100-year floodplain per Panel # 48209C0290F effective 9/2/2005- approximately .87 acres located within the 100-year floodplain. Portion of the project is located within LOMR 6-6-B46P effective 1/25/07 and LOMR 07/06/1372X effective 4/30/07 - .57 acres located within LOMR defined area.

As maps are revised flood insurance for road and drainage infrastructure is not required.

Are formal compliance steps or mitigation required?

Yes


No



FEMA National Flood Hazard Flood Layer –

Panel # 48209C0290F effective 9/2/2005- approximately .87 acres located within the 100-year floodplain

Portion of the project is located within LOMR 6-6-B46P effective 1/25/07 and LOMR 07/06/1372X effective 4/30/07 - .57 acres located within LOMR defined area.

Client Name	City of Kyle	Future Link Technologies 
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709
Map Information	General Location Maps	512-443-4100
Date	May 20	Environmental Service Provider

ATTACHMENT 11

HISTORIC PRESERVATION

- Texas Historical Commission Approval
- Tribal Consultation For Tribes With Interests In Historic Properties Of Religious And Cultural Significance To Tribes
- Tribal Correspondence

Historic Preservation (CEST and EA)

General requirements	Legislation	Regulation
Regulations under Section 106 of the National Historic Preservation Act (NHPA) require a consultative process to identify historic properties, assess project impacts on them, and avoid, minimize, or mitigate adverse effects	Section 106 of the National Historic Preservation Act (16 U.S.C. 470f)	36 CFR 800 "Protection of Historic Properties"
References		
https://www.hudexchange.info/environmental-review/historic-preservation		

Threshold

Is Section 106 review required for your project?

- No, because the project consists solely of activities listed as exempt in a Programmatic Agreement (PA). (See the [PA Database](#) to find applicable PAs.)

Either provide the PA itself or a link to it here. Mark the applicable exemptions or include the text here:

→ *Continue to the Worksheet Summary.*

- No, because the project consists solely of activities included in a No Potential to Cause Effects memo or other determination [36 CFR 800.3(a)(1)].

Either provide the memo itself or a link to it here. Explain and justify the other determination here:

The project activities do not represent significant disturbances. However, the project was submitted to THC for review based upon an assessment associated with wetland delineation. This requirement provides a basis for information to be submitted to the USACE as a part of a jurisdictional determination. The project was determined to be consistent with a Nationwide Permit 14 which indicates minimal impact to waters of the US.

→ *Continue to the Worksheet Summary.*

- Yes, because the project includes activities with potential to cause effects (direct or indirect). → *Continue to Step 1.*

The Section 106 Process

After determining the need to do a Section 106 review, initiate consultation with regulatory and other interested parties, identify and evaluate historic properties, assess effects of the project on properties listed on or eligible for the National Register of Historic Places, and resolve any adverse effects through project design modifications or mitigation.

Note that consultation continues through all phases of the review.

Step 1: Initiate consultation

Step 2: Identify and evaluate historic properties

Step 3: Assess effects of the project on historic properties

Step 4: Resolve any adverse effects

Step 1 - Initiate Consultation

The following parties are entitled to participate in Section 106 reviews: Advisory Council on Historic Preservation; State Historic Preservation Officers (SHPOs); federally recognized Indian tribes/Tribal Historic Preservation Officers (THPOs); Native Hawaiian Organizations (NHOs); local governments; and project grantees. The general public and individuals and organizations with a demonstrated interest in a project may participate as consulting parties at the discretion of the RE or HUD official. Participation varies with the nature and scope of a project. Refer to HUD's website for guidance on consultation, including the required timeframes for response. Consultation should begin early to enable full consideration of preservation options.

Use the [When To Consult With Tribes checklist](#) within [Notice CPD-12-006: Process for Tribal Consultation](#) to determine if you should invite tribes to consult on a particular project. Use the [Tribal Directory Assessment Tool \(TDAT\)](#) to identify tribes that may have an interest in the area where the project is located. Note that consultants may not initiate consultation with Tribes.

Select all consulting parties below (check all that apply):

- State Historic Preservation Officer (SHPO)
- Advisory Council on Historic Preservation
- Indian Tribes, including Tribal Historic Preservation Officers (THPOs) or Native
- Hawaiian Organizations (NHOs)

List all tribes that were consulted here and their status of consultation:

The form When to consult with Tribes under Section 106 was completed and considering work is being completed in previously disturbed areas and is not significant, as the project falls under Nationwide permit 14, tribal letters were not submitted for consultation.

- Other Consulting Parties

List all consulting parties that were consulted here and their status of consultation:

Describe the process of selecting consulting parties and initiating consultation here:

The THC was consulted because a wetland delineation was conducted. This information includes an assessment of cultural resources impact which based upon the amount of growth and previous disturbance in the area was determined to have no historical properties were found for above ground review or cultural resource review.

Provide all correspondence, notices, and notes (including comments and objections received) and continue to Step 2.

Step 2 - Identify and Evaluate Historic Properties

Define the Area of Potential Effect (APE), either by entering the address(es) or providing a map depicting the APE. Attach an additional page if necessary.

The area reviewed is 2100 linear feet along Windy Hill Road..

Gather information about known historic properties in the APE. Historic buildings, districts and archeological sites may have been identified in local, state, and national surveys and registers, local historic districts, municipal plans, town and county histories, and local history websites. If not already listed on the National Register of Historic Places, identified properties are then evaluated to see if they are eligible for the National Register. Refer to HUD’s website for guidance on identifying and evaluating historic properties.

In the space below, list historic properties identified and evaluated in the APE.

Every historic property that may be affected by the project should be listed. For each historic property or district, include the National Register status, whether the SHPO has concurred with the finding, and whether information on the site is sensitive. Attach an additional page if necessary.

None

Provide the documentation (survey forms, Register nominations, concurrence(s) and/or objection(s), notes, and photos) that justify your National Register Status determination.

Was a survey of historic buildings and/or archeological sites done as part of the project?

If the APE contains previously unsurveyed buildings or structures over 50 years old, or there is a likely presence of previously unsurveyed archeological sites, a survey may be necessary. For Archeological surveys, refer to HP Fact Sheet #6, [Guidance on Archeological Investigations in HUD Projects](#).

- Yes → *Provide survey(s) and report(s) and continue to Step 3.*

Additional notes:

- No → *Continue to Step 3.*

Step 3 - Assess Effects of the Project on Historic Properties

Only properties that are listed on or eligible for the National Register of Historic Places receive further consideration under Section 106. Assess the effect(s) of the project by applying the Criteria of Adverse Effect. ([36 CFR 800.5](#)) Consider direct and indirect effects as applicable as per HUD guidance.

Choose one of the findings below - No Historic Properties Affected, No Adverse Effect, or Adverse Effect; and seek concurrence from consulting parties.

- No Historic Properties Affected

Document reason for finding:

- No historic properties present. → *Provide concurrence(s) or objection(s) and continue to the Worksheet Summary.*
- Historic properties present, but project will have no effect upon them. → *Provide concurrence(s) or objection(s) and continue to the Worksheet Summary.*

If consulting parties concur or fail to respond to user's request for concurrence, project is in compliance with this section. No further review is required. If consulting parties object, refer to ([36 CFR 800.4\(d\)\(1\)](#)) and consult further to try to resolve objection(s).

No Adverse Effect

Document reason for finding:

Does the No Adverse Effect finding contain conditions?

Yes

Check all that apply: (check all that apply)

- Avoidance
- Modification of project
- Other

Describe conditions here:

→ *Monitor satisfactory implementation of conditions. Provide concurrence(s) or objection(s) and continue to the Worksheet Summary.*

No → *Provide concurrence(s) or objection(s) and continue to the Worksheet Summary.*

If consulting parties concur or fail to respond to user's request for concurrence, project is in compliance with this section. No further review is required. If consulting parties object, refer to ([36 CFR 800.5\(c\)\(2\)](#)) and consult further to try to resolve objection(s).

Adverse Effect

Document reason for finding:

Copy and paste applicable Criteria into text box with summary and justification.

Criteria of Adverse Effect: [36 CFR 800.5](#)

Notify the Advisory Council on Historic Preservation of the Adverse Effect and provide the documentation outlined in [36 CFR 800.11\(e\)](#). The Council has 15 days to decide whether to enter the consultation (Not required for projects covered by a Programmatic Agreement).

→ *Continue to Step 4.*

Step 4 - Resolve Adverse Effects

Work with consulting parties to try to avoid, minimize or mitigate adverse effects. Refer to HUD guidance and [36 CFR 800.6 and 800.7](#).

Were the Adverse Effects resolved?

Yes

Describe the resolution of Adverse Effects, including consultation efforts and participation by the Advisory Council on Historic Preservation:

For the project to be brought into compliance with this section, all adverse impacts must be mitigated. Explain in detail the exact measures that must be implemented to mitigate for the impact or effect, including the timeline for implementation.

→ *Provide signed Memorandum of Agreement (MOA) or Standard Mitigation Measures Agreement (SMMA). Continue to the Worksheet Summary.*

No

The project must be cancelled unless the “Head of Agency” approves it. Either provide approval from the “Head of Agency” or cancel the project at this location.

Describe the failure to resolve Adverse Effects, including consultation efforts and participation by the Advisory Council on Historic Preservation and “Head of the Agency”:

Explain in detail the exact conditions or measures that must be implemented to mitigate for the impact or effect, including the timeline for implementation.

→ *Provide correspondence, comments, documentation of decision, and “Head of Agency” approval. Continue to the Worksheet Summary.*

Worksheet Summary

Compliance Determination

Provide a clear description of your determination and a synopsis of the information that it was based on, such as:

- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your region

A consultation request was submitted to THC on 5/15/20. The THC responded on 5/27/20 indicating no cultural resources impact is expected and specifically no historical properties were found for above ground review or cultural resource review. If buried cultural materials are encountered during construction or disturbance activities, work should cease in the immediate area; work can continue where no cultural materials are present. Please contact the THC's Archeology Division at 512-463-6096 to consult on further actions that may be necessary to protect the cultural remains and Texas General Land Office. See Tab6, Attachment 11.

Are formal compliance steps or mitigation required?

Yes

No

From: noreply@thc.state.tx.us
To: lhertzler@future-link.biz; reviews@thc.state.tx.us
Subject: Section 106 Submission
Date: Wednesday, May 27, 2020 5:18:06 PM



Re: Project Review under Section 106 of the National Historic Preservation Act and/or the Antiquities Code of Texas

THC Tracking #202013097

Kyle Windy Hill Road Improvements
Windy Hill Road
Kyle, TX

Dear Latrice Hertzler:

Thank you for your submittal regarding the above-referenced project.

The review staff, led by Bill Martin and Sarah Medwig, has completed its review and has made the following determinations based on the information submitted for review:

Above-Ground Resources

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

Archeology Comments

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

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

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

Sincerely,



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

Please do not respond to this email.



REVIEW REQUEST CONFIRMATION

Your request for consultation has been successfully submitted to the Texas Historical Commission.

Project Name

Kyle Wndy Hill Road Improvements

Track Number

202013097

Date Received

5/15/2020 2:45:35 PM

Thank you!

© 2020 - Texas Historical Commission

TEXAS HISTORICAL COMMISSION

REQUEST FOR SHPO CONSULTATION:

Section 106 of the National Historic Preservation Act and/or the Antiquities Code of Texas

Please see instructions for completing this form and additional information on Section 106 and Antiquities Code consultation on the Texas Historical Commission website at http://www.thc.state.tx.us/crm/crmsend.shtml.

- This is a new submission.
This is additional information relating to THC tracking number(s):

Project Information

PROJECT NAME: Kyle Windy Road Improvements
PROJECT ADDRESS: Windy Hill Road
PROJECT CITY: Kyle
PROJECT ZIP CODE(S):
PROJECT COUNTY OR COUNTIES: Hays
PROJECT TYPE (Check all that apply):
Road/Highway Construction or Improvement, Site Excavation, Utilities and Infrastructure, New Construction, Repair, Rehabilitation, or Renovation of Structure(s), Addition to Existing Structure(s), Demolition or Relocation of Existing Structure(s), None of these
BRIEF PROJECT DESCRIPTION: Please explain the project in one or two sentences. More details should be included as an attachment to this form. The project will improve traffic congestion, roadway flooding and erosion controls by

Project Contact Information

PROJECT CONTACT NAME: Latrice Hertzler
TITLE: Environmental Reviewer
ORGANIZATION: Future Link Technologies, Inc
ADDRESS: 225 Commons Ford Rd Suite 123
CITY: Austin, STATE: TX ZIP CODE: 78733
PHONE: 512-443-4100
EMAIL: lhertzler@future-link.biz

Federal Involvement (Section 106 of the National Historic Preservation Act)

Does this project involve approval, funding, permit, or license from a federal agency?
Yes (Please complete this section) No (Skip to next section)
FEDERAL AGENCY: FEDERAL PROGRAM, FUNDING, OR PERMIT TYPE:
CONTACT PERSON: PHONE:
ADDRESS: EMAIL:

State Involvement (Antiquities Code of Texas)

Does this project occur on land or property owned by the State of Texas or a political subdivision of the state?
Yes (Please complete this section) No (Skip to next section)
CURRENT OR FUTURE OWNER OF THE PUBLIC LAND: City of Kyle
CONTACT PERSON: JoAnn Garcia
PHONE: 512-262-3949
ADDRESS: City of Kyle, Kyle, TX
EMAIL: jgarcia@cityofkyle.com

Identification of Historic Properties: Archeology

Does this project involve ground-disturbing activity?
 Yes (Please complete this section) No (Skip to next section)

Describe the nature of the ground-disturbing activity, including but not limited to depth, width, and length. Subrecipient shall will reconstruct a portion of Windy Hill Road by removing and replacing existing culverts, the roadway, and approaches; widen the roadway pavement and structure to add turn lane capacity; install railing and end treatments that meet TxDOT standards; and perform associated appurtenances. Improvements total approximately two thousand one hundred (2,100) linear feet.

Describe the previous and current land use, conditions, and disturbances.
 According to aerial photos from 1965, the previous land use for the area was farming. See attachments.

Identification of Historic Properties: Structures

Does the project area or area of potential effects include buildings, structures, or designed landscape features (such as parks or cemeteries) that are 45 years of age or older?
 Yes (Please complete this section) No (Skip to next section)

Is the project area or area of potential effects within or adjacent to a property or district that is listed in or eligible for listing in the National Register of Historic Places?
 Yes, name of property or district: No Unknown

In the space below or as an attachment, describe each building, structure, or landscape feature within the project area or area of potential effect that is 45 years of age or older.

ADDRESS	DATE OF CONSTRUCTION	SOURCE FOR CONSTRUCTION DATE

Attachments
[Please see detailed instructions regarding attachments.](#)
 Include the following with each submission:

- Project Work Description
- Maps
- Identification of Historic Properties
- Photographs

For Section 106 reviews only, also include:

- Consulting Parties/Public Notification
- Area of Potential Effects
- Determination of Eligibility
- Determination of Effect

Submit completed form and attachments to the address below. Faxes and email are not acceptable.

Mark Wolfe
 State Historic Preservation Officer
 Texas Historical Commission
 P.O. Box 12276, Austin, TX 78711-2276 (mail service)
 108 W. 16th Street, Austin, TX 78701 (courier service)

For SHPO Use Only

**ADDENDUM TO
REQUEST FOR SHPO CONSULTATION:
Projects Subject to Section 106 of the National Historic Preservation Act
and/or the Antiquities Code of Texas
City of Kyle – Windy Hill Road Improvements**

Potential for direct and indirect effects that might result from the project?

The project will improve traffic congestion and reduce flooding which occurs in the area during significant rain events. Better ingress and egress to area residential developments and commercial businesses is expected and reduced impact of increased traffic volumes in the area. Drainage structures will be improved and the Richmond Branch stream crossing at Windy Hill Road be improved in order that backup of existing flows occurs.

Justification for the boundaries chosen for the APE?

The project is located along Windy Hill Road where significant flooding occurs during rain events. The area will be improved on both sides of the roadway within the existing ROW. Existing underground utilities will be moved where necessary. Increasing the size and condition of existing drainage structures will improve flow. Adding rip/rap where necessary will facilitate to control flow volume and reduce erosion. The

Identification of Historic Properties within the APE

- **There are no historic properties within the APE**

Photographs

Site visit photos of Project Site Area - See Attachment 4.

Consulting Parties/Public Notification (Section 106 only)

A standard public notice for the TCPD Grant Program will be conducted, The public comment period will include a 15-day period to notify City residences of expected work. Notification to Texas Parks and Wildlife will also be included with this review.

ATTACHMENTS

Attachment 1: General Location Mapping, Project Site Area Location Maps,
USGS 7.5 Minute Quadrangle Map

Attachment 2: Engineering Drawings and Specifications

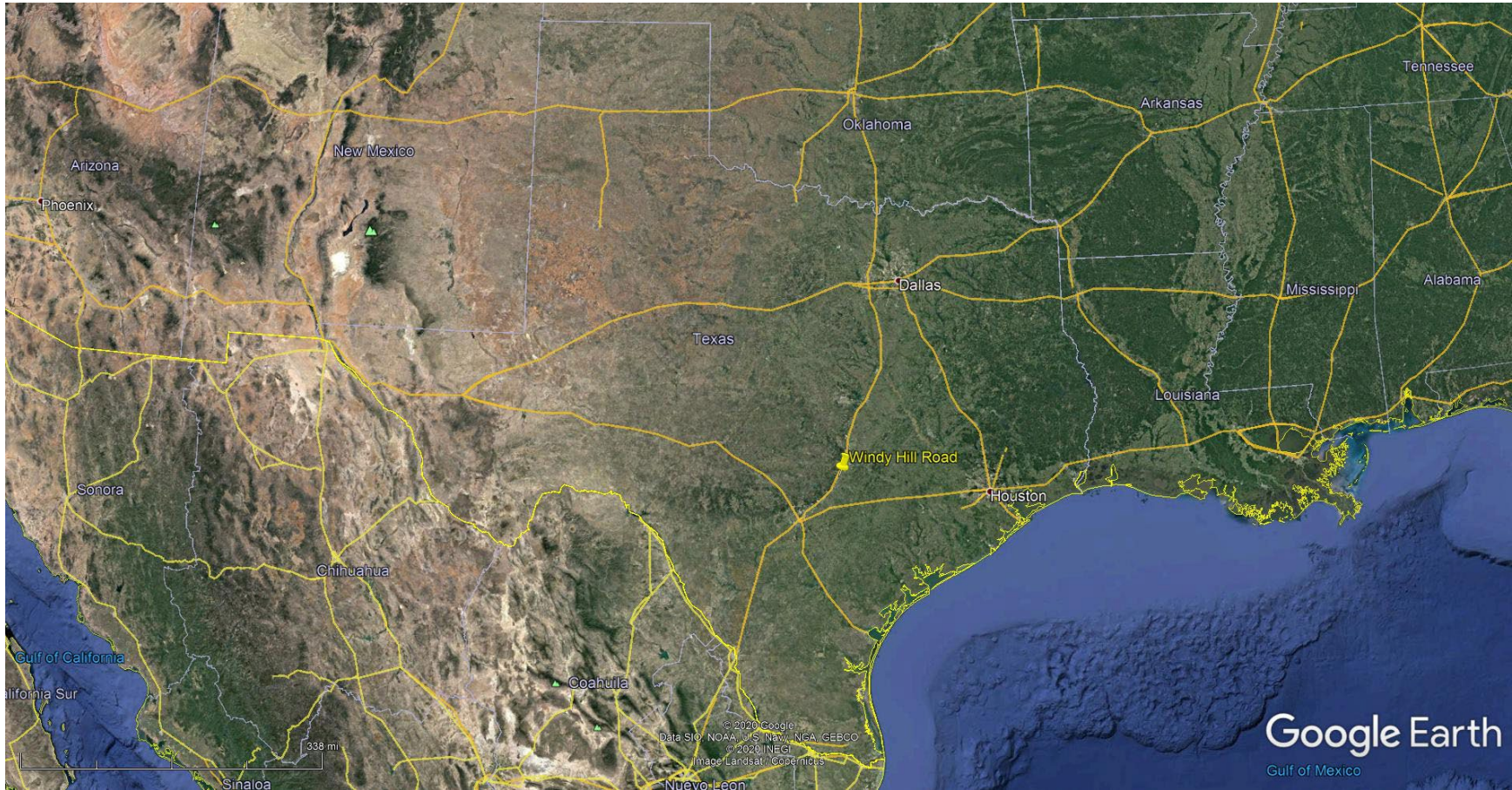
Attachment 3: Historical Commission Database Results/Mapping

Attachment 4: Site Visit Pictures



Attachment 5: Flood Plain Mapping

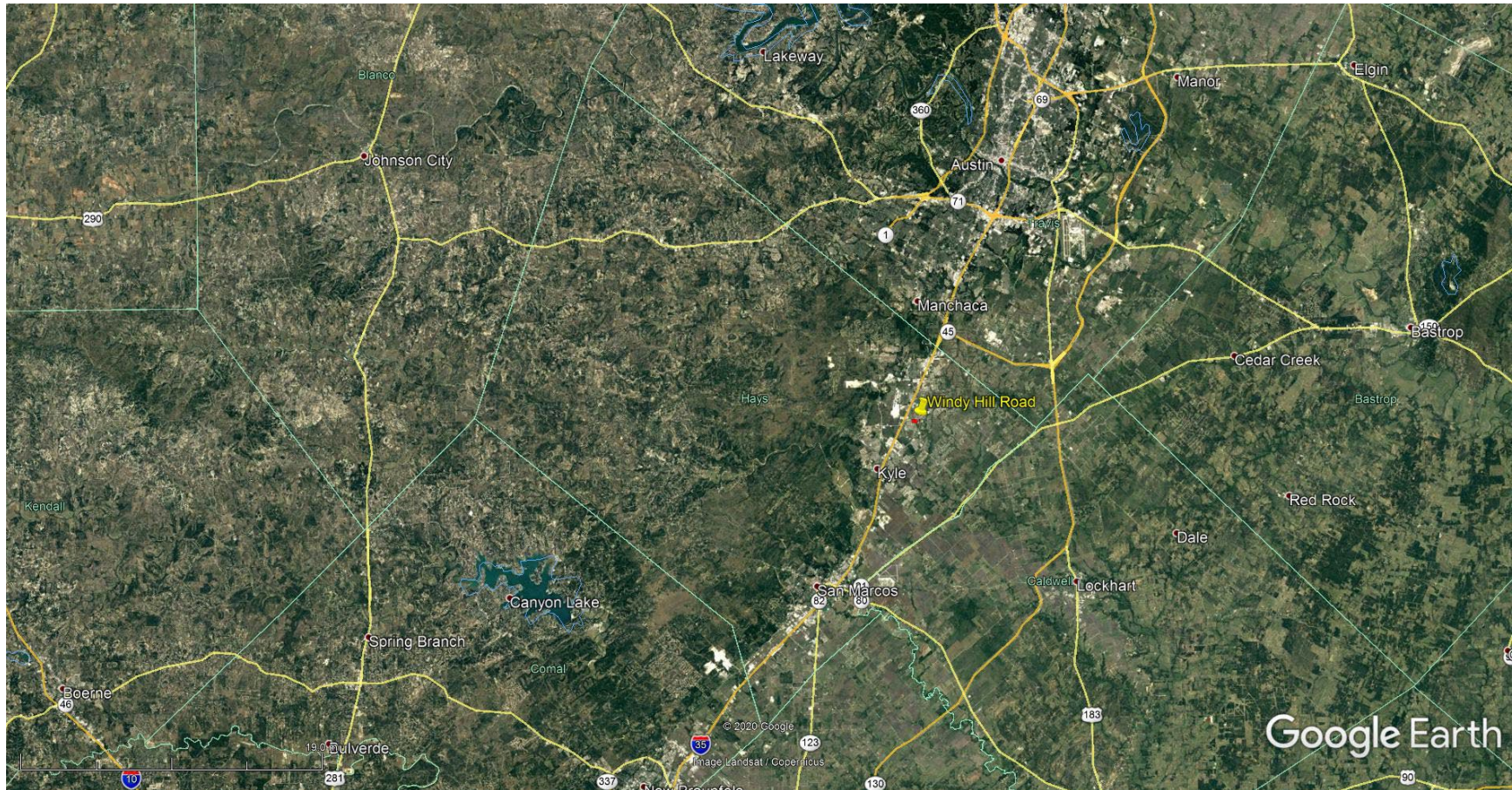
Attachment 1

General Location Mapping
Project Site Area Location Maps
USGS 7.5 Minute Quadrangle Map





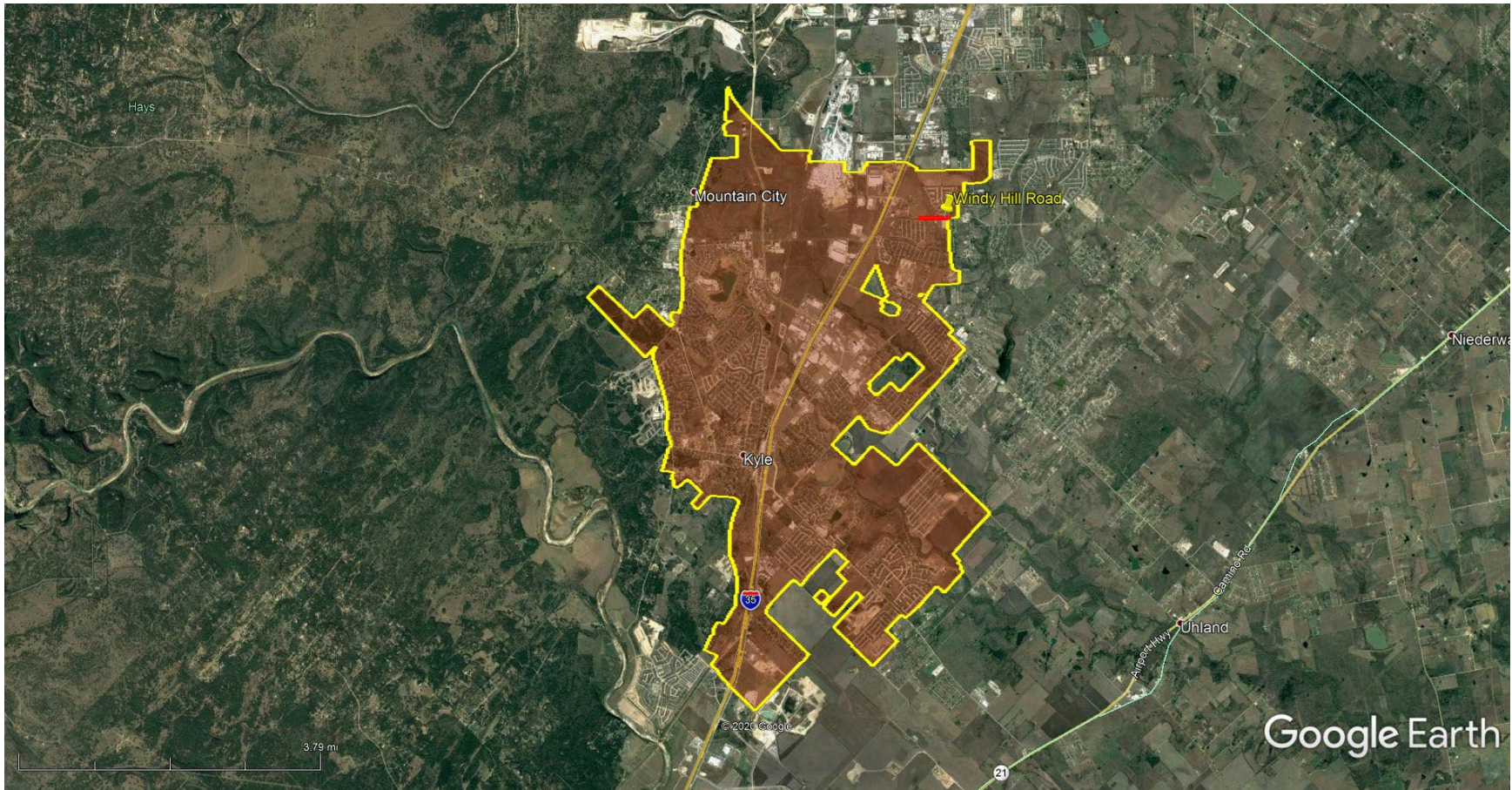
Kyle is located in Texas

Client Name	City of Kyle	Future Link Technologies 	
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709	
Map Information	General Location Maps	512-443-4100	
Date	May 20	Environmental Service Provider	





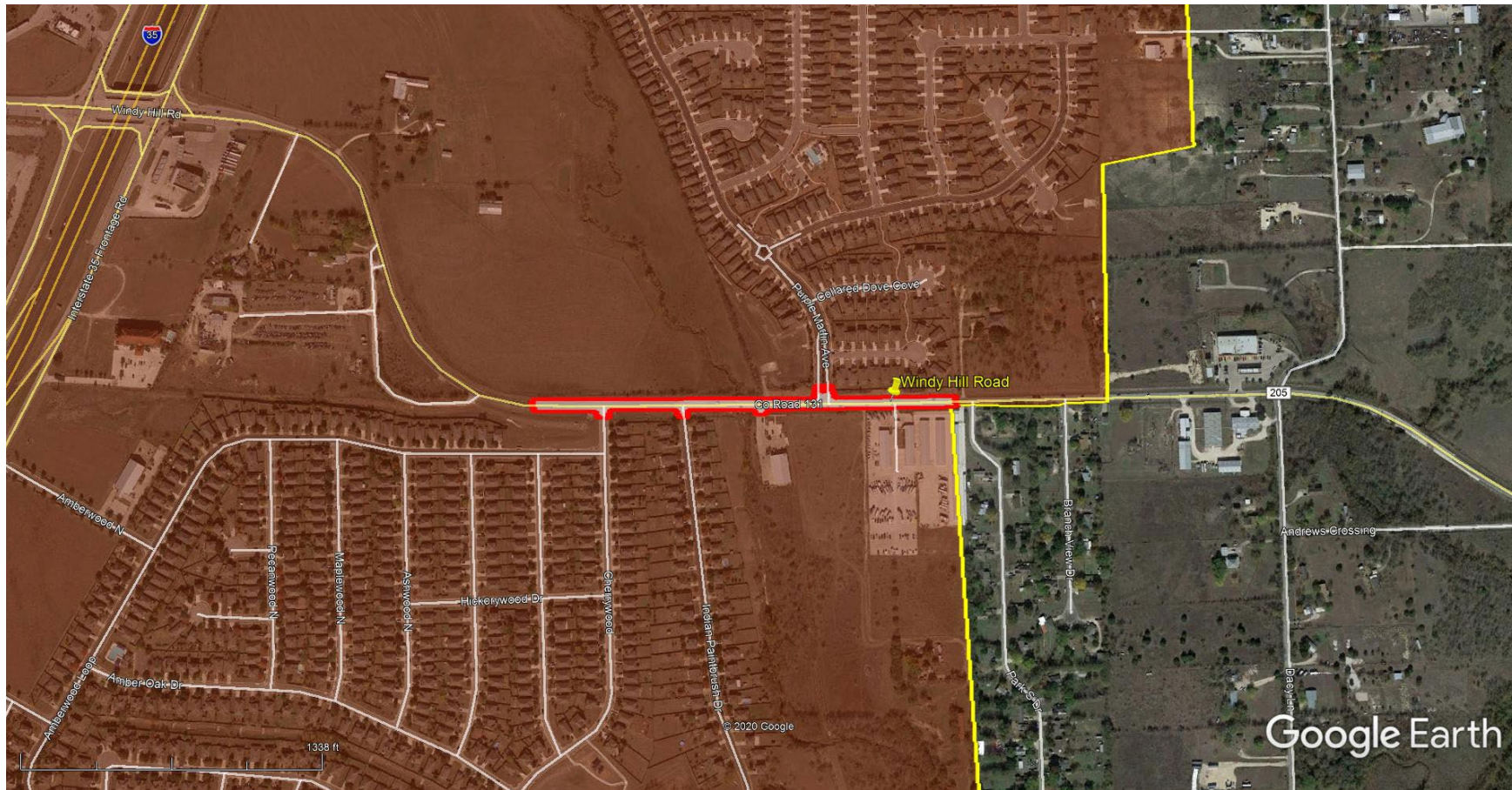
Windy Hill Road is located in Kyle, Hays County Texas

Client Name	City of Kyle	Future Link Technologies 	
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709	
Map Information	General Location Maps	512-443-4100	
Date	May 20	Environmental Service Provider	





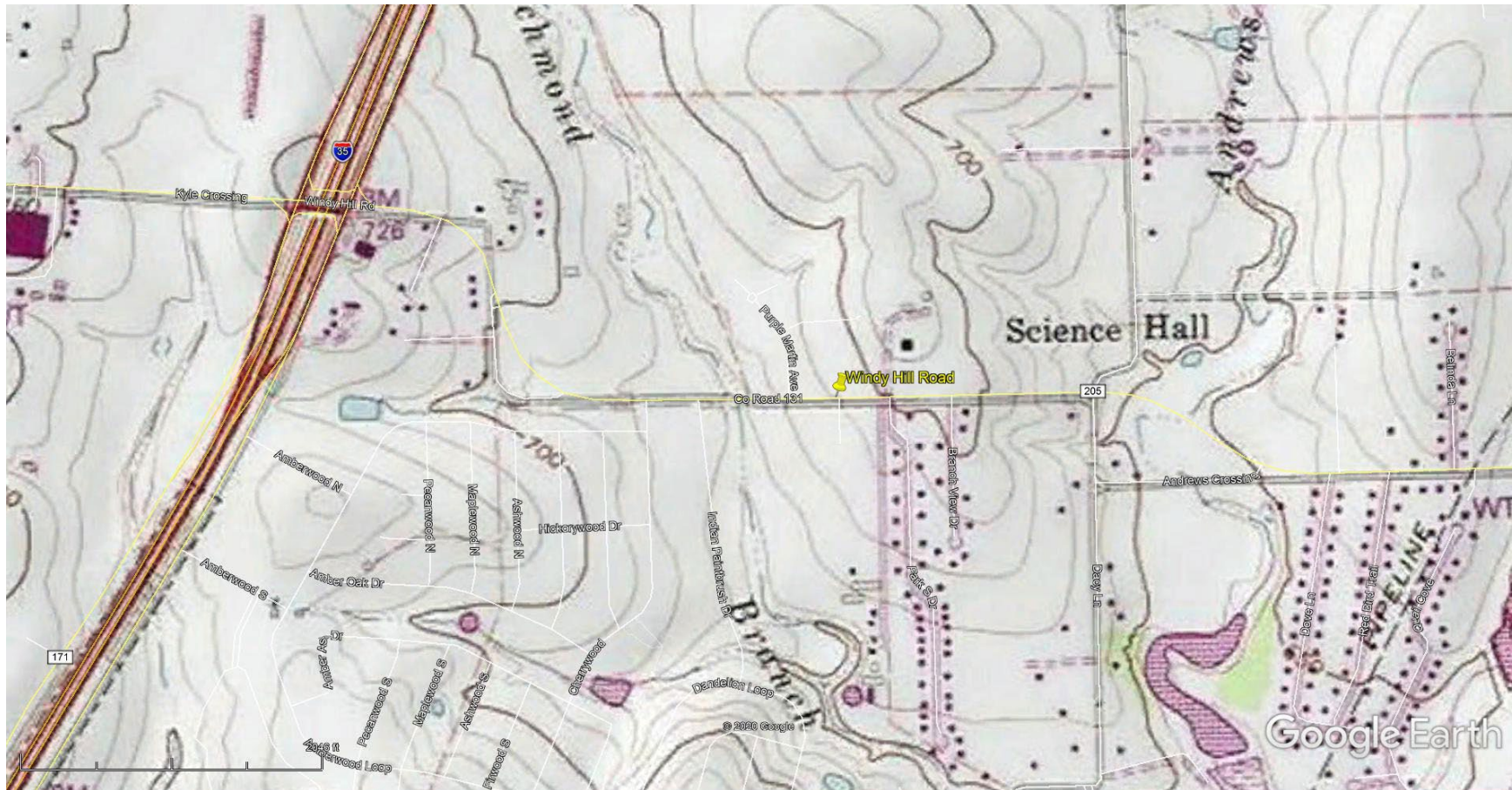
Windy Hill Road is located in North Kyle, TX

Client Name	City of Kyle	Future Link Technologies 	
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709	
Map Information	General Location Maps	512-443-4100	
Date	May 20	Environmental Service Provider	




Project area is Windy Hill Road - Approximately 2100 linear feet -500 ft W. of Cherrywood to 500 ft East of Purple Martin Ave

Client Name	City of Kyle	Future Link Technologies 	
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709	
Map Information	General Location Maps	512-443-4100	
Date	May 20	Environmental Service Provider	



USGS 7.5 Min Topographic Map

Client Name	City of Kyle	Future Link Technologies 
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709
Map Information	General Location Maps	512-443-4100
Date	May 20	Environmental Service Provider

Attachment 2

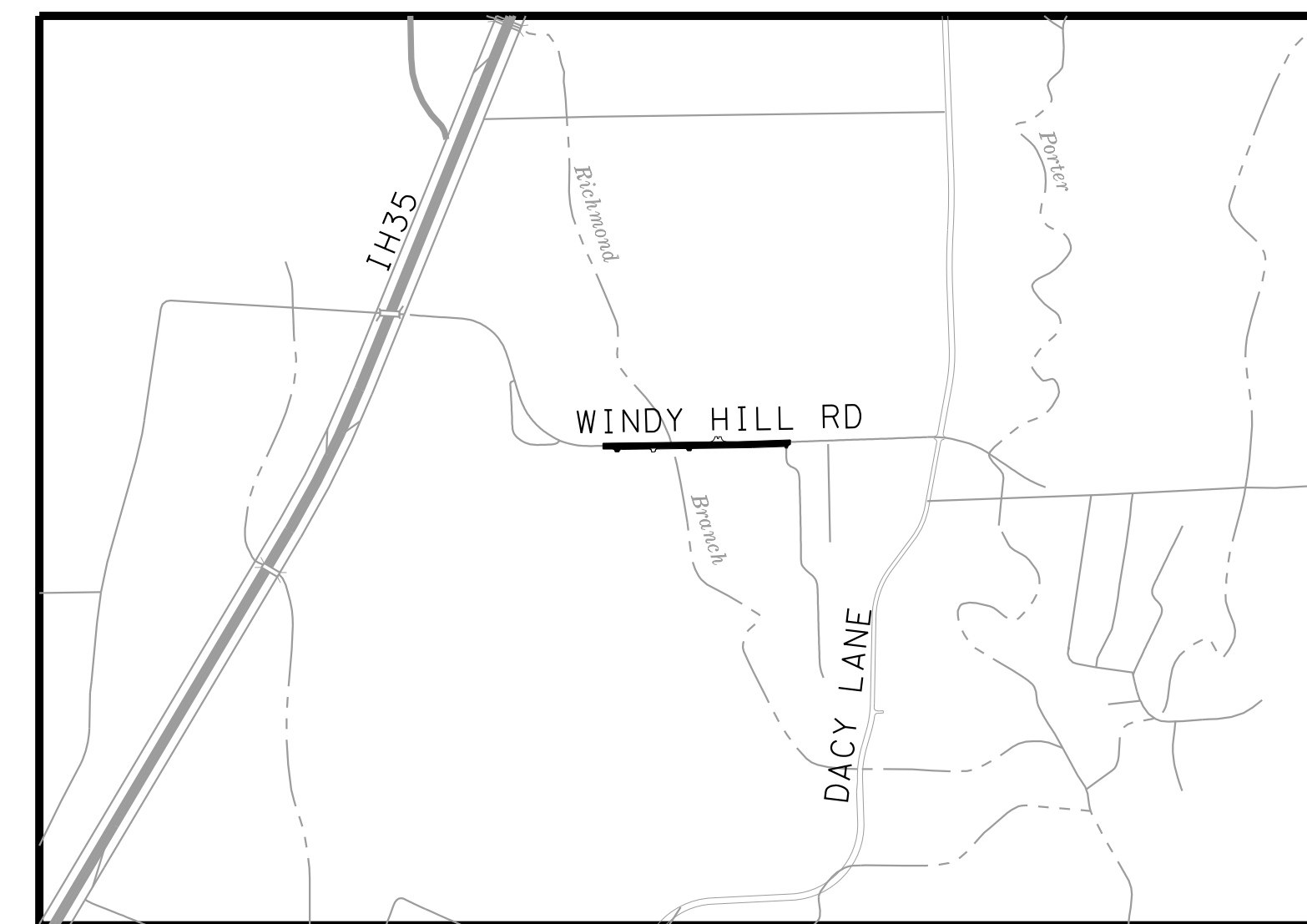
Engineering Drawings and Specifications

STATE OF TEXAS
CITY OF KYLE
**PRELIMINARY DESIGN SCHEMATIC FOR:
WINDY HILL ROAD
CHERRYWOOD TO PARK S DRIVE**

DATE	3/30/2020	DISTRICT	AUS	COUNTY	HAYS	LJA PROJECT NUMBER	2173-2001
REVISED DATE							

DESIGN DATA
PROJECT LENGTH: 1,833 FT = 0.374 MILES
FUNCTIONAL CLASSIFICATION: ARTERIAL
DESIGN SPEED: 40 mph

CURRENT AND PROJECTED TRAFFIC DATA
HIGHWAY: WINDY HILL ROAD
LIMITS: CHERRYWOOD TO PARK S ROAD
TRAFFIC VOLUMES: EXISTING ADT - 10,000



VICINITY MAP
SCALE: NTS

THIS PROJECT IS BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM (SPCS), SOUTH CENTRAL ZONE, NAD83(96) CORS ADJUSTMENT 2002 EPOCH. ALL COORDINATES SHOWN HEREON ARE GRID VALUES EXPRESSED IN UNITS OF U.S. SURVEY FEET.

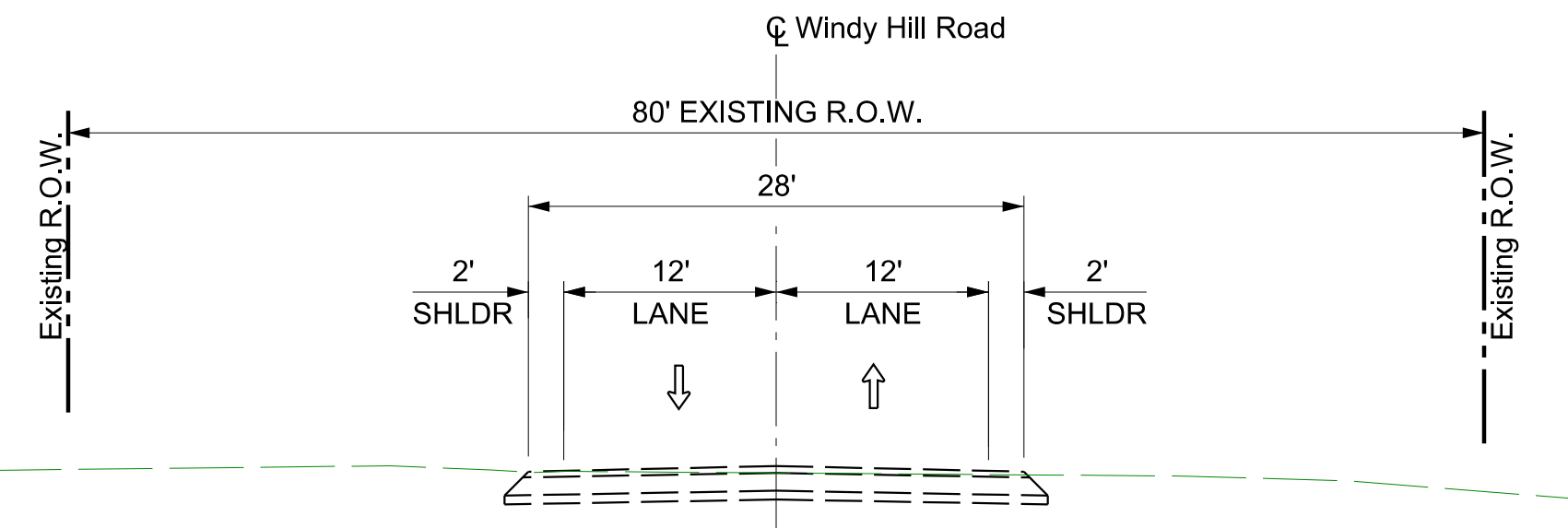
ALL ELEVATIONS SHOWN HEREON ARE NAVD 88 AND WERE BASED ON GPS OBSERVATIONS.

HORZ SCALE: 1"=50'
VERT SCALE: 1"=5'

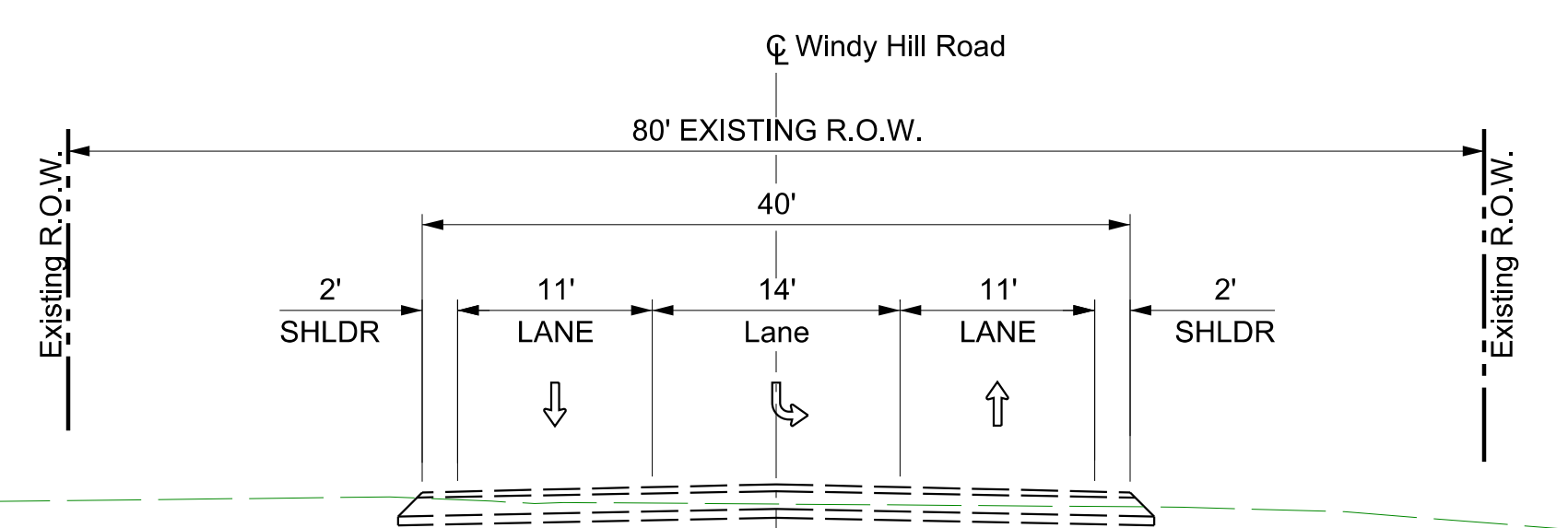
PRELIMINARY
SUBMITTED FOR REVIEW
BY ZACHARY B. RYAN P.E. # 106276
DATE 3/30/2020
NOT FOR CONSTRUCTION, BIDDING OR PERMITTING

LJA Engineering, Inc.
7500 Rigoiro Blvd, Building 11
Suite 100
Austin, Texas 78735
Phone 512.439.4700
Fax 512.439.4716
FRN-F-1386

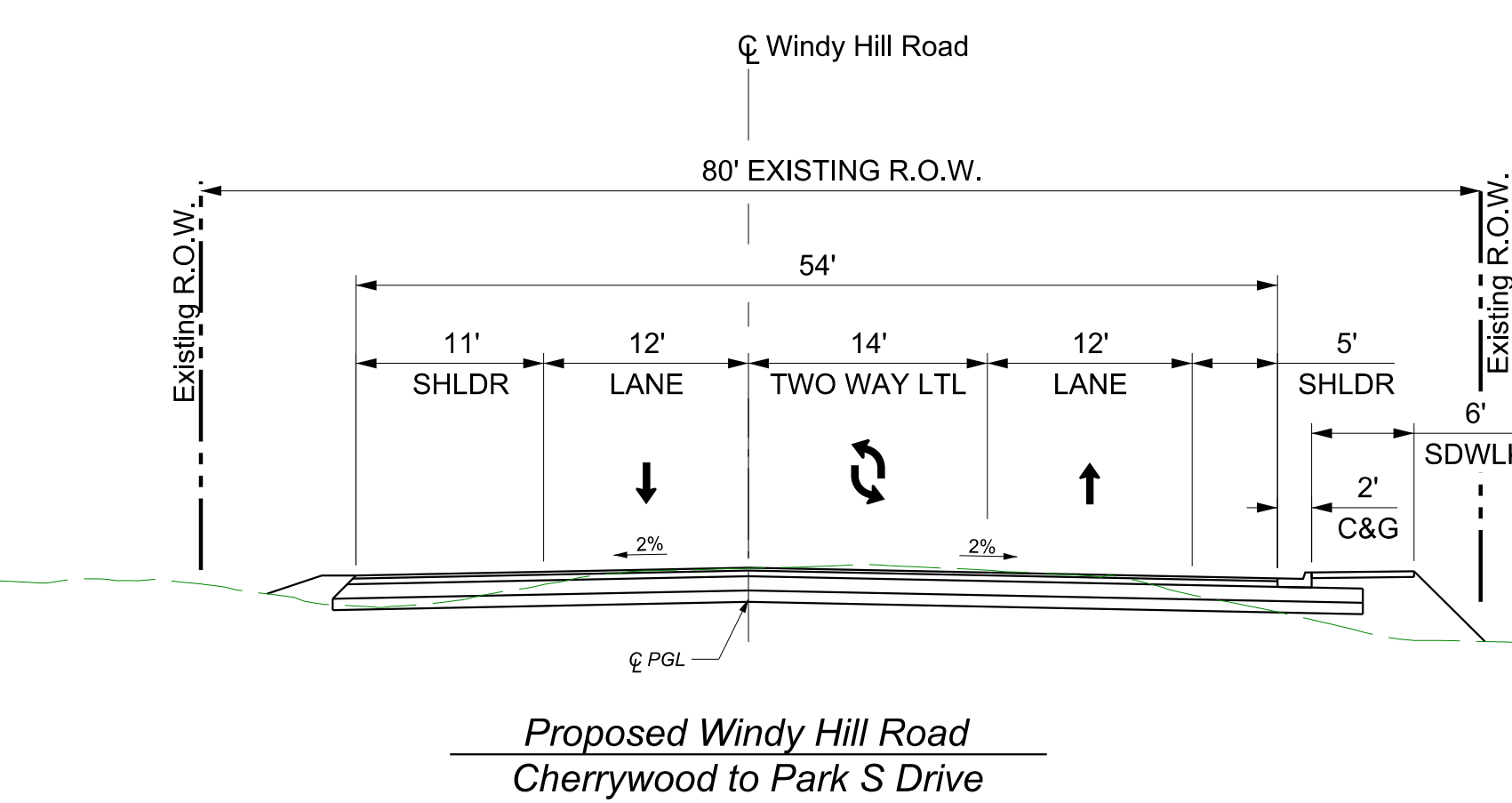
TYPICAL SECTIONS



Existing Windy Hill Road
Start to Indian Paintbrush Drive



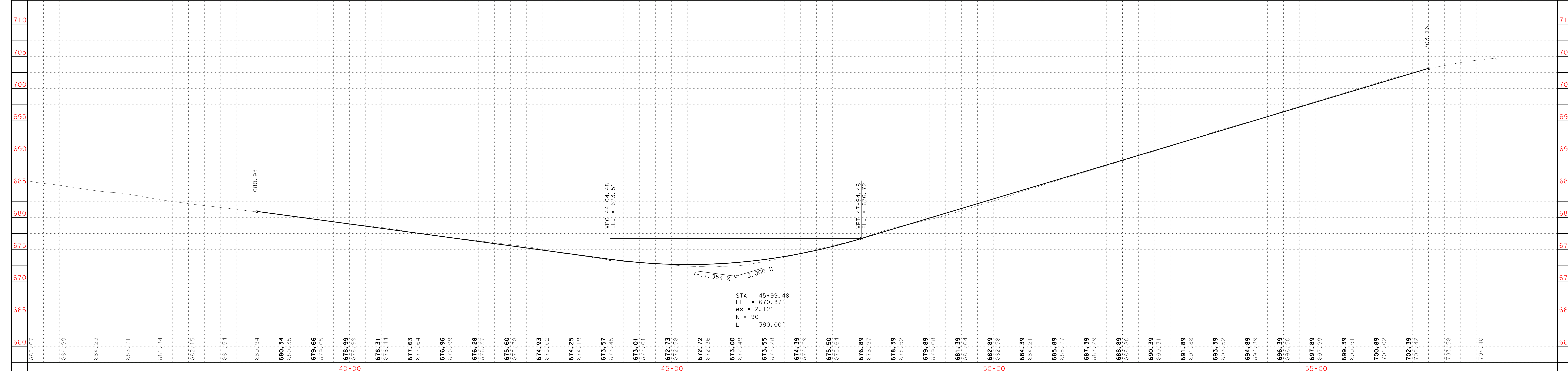
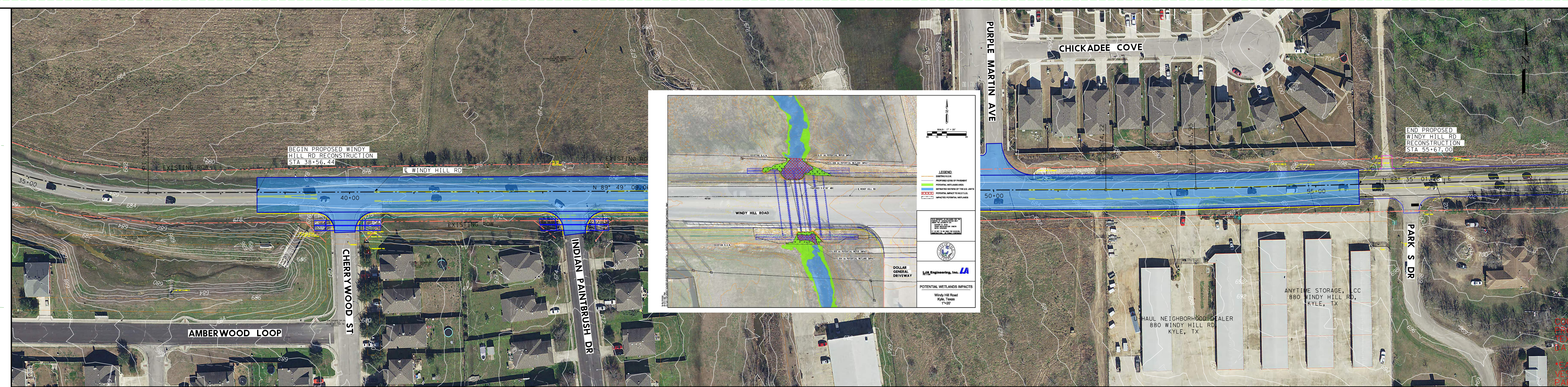
Existing Windy Hill Road
Indian Paintbrush Drive to Purple Martin Avenue



Proposed Windy Hill Road
Cherrywood to Park S Drive

LEGEND

- PROPOSED PAVEMENT
- EXISTING R.O.W.
- EXISTING EASEMENT

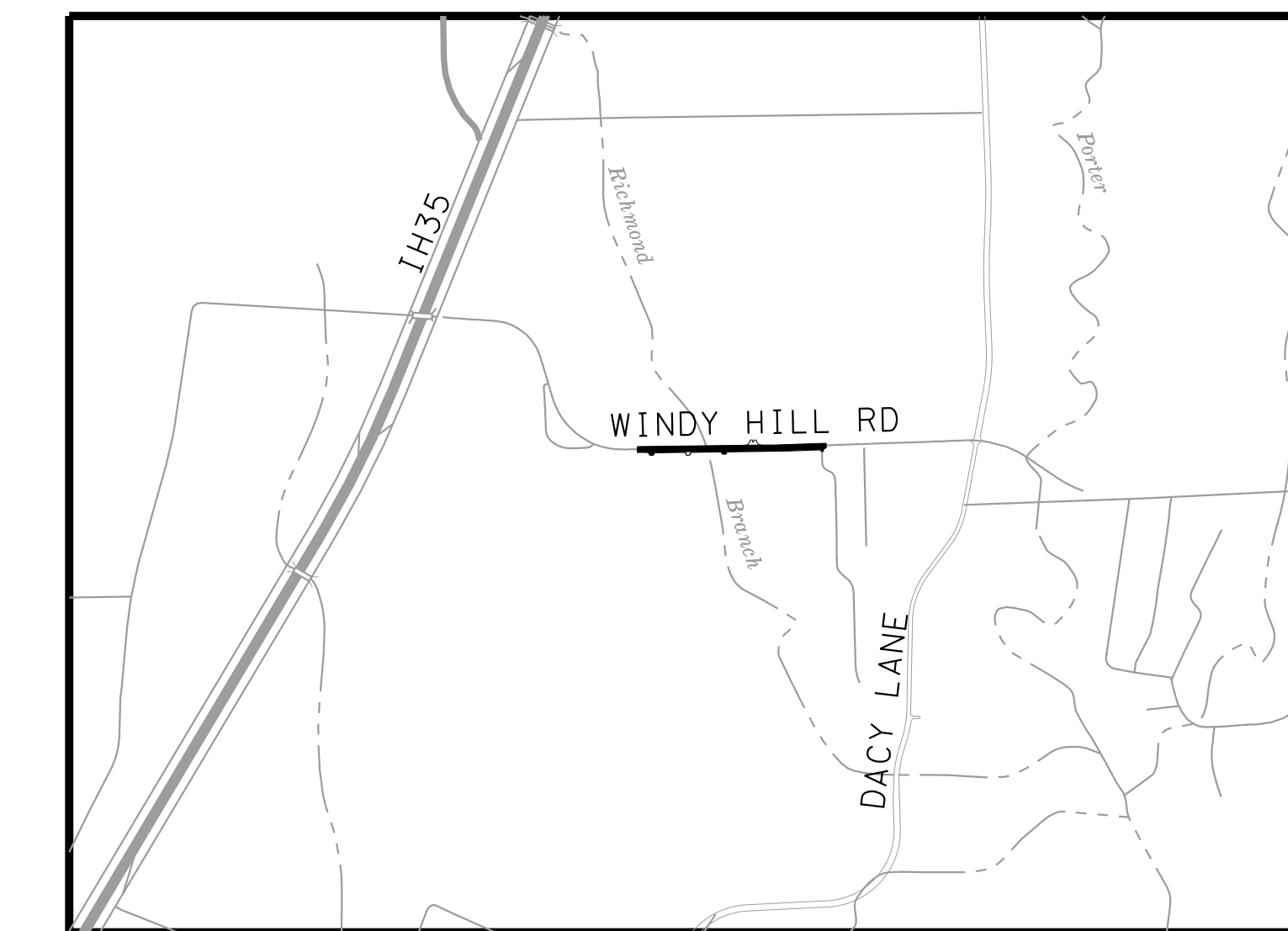


STATE OF TEXAS
CITY OF KYLE
**PRELIMINARY DESIGN SCHEMATIC FOR:
WINDY HILL ROAD
CHERRYWOOD TO PARK S DRIVE**

DATE	3/30/2020	DISTRICT	AUS	COUNTY	HAYS	LJA PROJECT NUMBER	2173-2001
REVISED DATE							

DESIGN DATA
PROJECT LENGTH: 1,833 FT = 0.374 MILES
FUNCTIONAL CLASSIFICATION: ARTERIAL
DESIGN SPEED: 40 mph

CURRENT AND PROJECTED TRAFFIC DATA
HIGHWAY: WINDY HILL ROAD
LIMITS: CHERRYWOOD TO PARK S ROAD
TRAFFIC VOLUMES: EXISTING ADT - 10,000



VICINITY MAP
SCALE: NTS

THIS PROJECT IS BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM (SPCS), SOUTH CENTRAL ZONE, NAD83(96) CORS ADJUSTMENT 2002 EPOCH. ALL COORDINATES SHOWN HEREON ARE GRID VALUES EXPRESSED IN UNITS OF U.S. SURVEY FEET.

ALL ELEVATIONS SHOWN HEREON ARE NAVD 88 AND WERE BASED ON GPS OBSERVATIONS.

HORZ SCALE: 1"=50'
VERT SCALE: 1"=5'

PRELIMINARY
SUBMITTED FOR REVIEW
BY ZACHARY B. RYAN P.E. # 106276
DATE 3/30/2020
NOT FOR CONSTRUCTION, BIDDING OR PERMITTING

LJA Engineering, Inc.
7500 Rigoiro Blvd, Building 11
Suite 100
Austin, Texas 78735
Phone 512.439.4700
Fax 512.439.4716
FRN-F-1386

NOT A BIDDING DOCUMENT

PRELIMINARY SUBJECT TO CHANGE

NOT A BIDDING DOCUMENT


PRELIMINARY SUBJECT TO CHANGE

Attachment 3

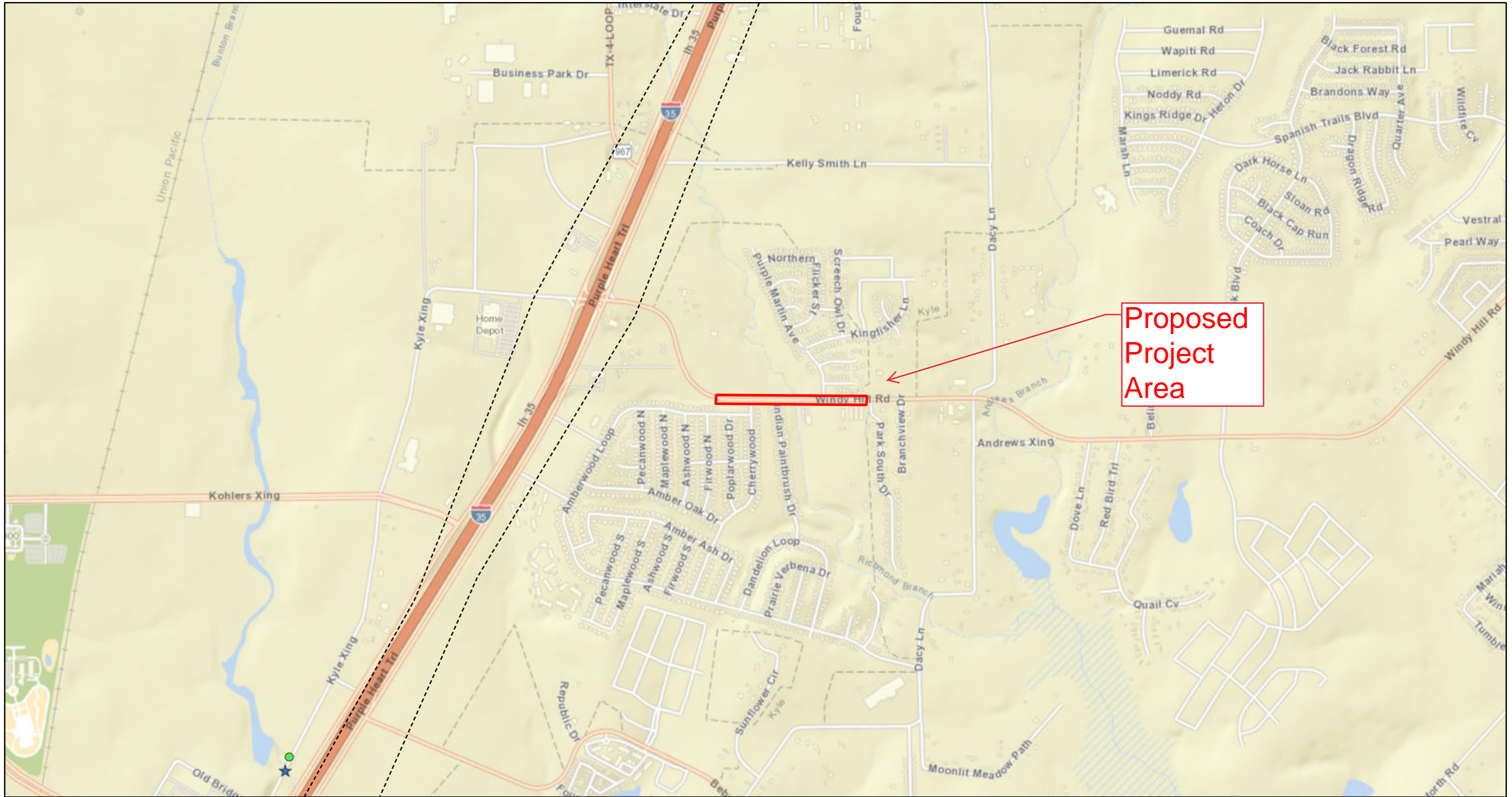
Historical Commission Database Results/Mapping



No Historic sites from the National Registry located at the project site.

Client Name	City of Kyle	Future Link Technologies	
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709	
Map Information	National Park Service-National Registry of Historic Places	512-443-4100	
Date	May 20	Environmental Service Provider	

THC Atlas Kyle - Windy Hill Road Improvements



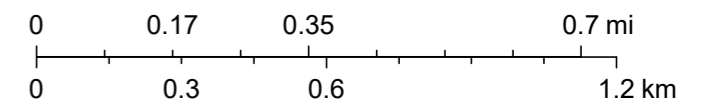
May 13, 2020

- Historical Marker
- ★ National Register Properties

Historic Trails

----- El Camino Real De Los Tejas National Historic Trail

1:18,056



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Attachment 4

Site Visit Pictures for Project Site Areas

















SITE-SPECIFIC FIELD CONTAMINATION & ECOLOGICAL CHECKLIST

Completing the form requires a site visit by the preparer. The preparer should be sure to observe the property by walking through the property and the building(s) and other structures on the property to the extent possible and observing all adjoining* properties.

PREPARER MUST COMPLETE CHECKLIST IN ITS ENTIRITY

Date of Visit: 3/18/20

Time: 11:30

Conditions: Overcast and cool.

**Program Name: GLO CONTRACT NO. 19-280-000-B779 – CDGB Disaster Recovery 2015
Flood Allocation**

Project Name: City of Kyle Windy Hill Road Improvements

Does the project include any of the following activities? Include all that apply.

Structure demolition operations or structure modifications.

If yes, is there potential for the building to contain asbestos or lead-based paint? Yes **No**

Pipeline and underground utility installation or adjustments.

De-watering.

Purchase of new ROW or easement.

Trenching, drilled shafts, cuts or other excavations.

Project Location/Address: Windy Hill Road, Kyle, TX - 500 ft. W. of Cherrywood to 500 ft East of Purple Martin Avenue (approximately 2100 lf) 30.031928, -97.836717

Property Owner:

City of Kyle

Attach the following, as appropriate:

Photographs of site and surrounding areas

Maps (street, topographic, aerial, site map, etc.)

QUESTION Is there evidence of any of the following?	OBSERVATION	
	SUBJECT PROPERTY	ADJOINING PROPERTIES
Is the property or any adjoining property currently used, or has evidence of prior use, as a gasoline station, motor vehicle repair facility, printing facility, dry cleaners, photo developing laboratory, junkyard, or as a waste treatment, storage, disposal, processing or recycling facility?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Are there any damaged or discarded automobile(s), automotive or industrial batteries, pesticides, paints, or other chemicals in individual containers greater than 5 gal in volume or 50 gal in the aggregate, stored on or used at the property or adjoining properties?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Are there any industrial drums (typically 55 gal) or sacks of chemicals, herbicides or pesticides located on the property or adjoining properties?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Has fill dirt been brought onto the property or adjoining properties that originated from a suspicious site or that is of an unknown origin?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Changes in drainage patterns from possible fill areas?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Are there any pits, ponds, or lagoons located on the property or adjoining properties in connection with waste treatment or waste disposal?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>

Oil sheen or films on surface water, seeps, lagoons, ponds, or drainage basins?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Is there any stained soil, distressed vegetation and/or discolored water on the property or adjoining properties?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Are there any storage tanks , aboveground or underground (other than residential), located on the property or adjoining properties?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>

*Adjoining properties: Any real property or properties the border of which is contiguous or partially contiguous with that of the property, or that would be contiguous or partially contiguous with that of the property but for a street, road, or other public thoroughfare separating them.

QUESTION	SUBJECT PROPERTY	ADJOINING PROPERTIES
Is there evidence of any of the following?		
Are there any vent pipes, fill pipes, or underground tank access ways visible on the property or adjoining properties?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Are any flooring, drains, walls, ceilings, or grounds on the property or adjoining properties stained by substances (other than water) or emitting noxious or foul odors or odors of a chemical nature?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Is the property served by a private well or non-public water system? (If yes, a follow-up investigation is required to determine if contaminants have been identified in the well or system that exceed guidelines applicable to the water system, or if the well has been designated contaminated by any government environmental/health agency.)	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	
Has the owner or occupant of the property been informed of the existence of past or current hazardous substances or petroleum products or environmental violations with respect to the property or adjoining properties?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Do the property or adjoining properties discharge wastewater (not including sanitary waste or storm water) onto the property or adjoining properties and/or into a storm water system?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Is there a transformer, capacitor, or any hydraulic equipment on the property or adjoining properties that are not marked as "non-PCB"? If so, are there signs of leaking transformers oil on the ground?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Are there injection wells, cisterns, sumps, dry wells flooring, drains, or walls stained by substances other than water or emitting foul odors?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	
Surface dumping of trash, garbage, refuse, rubbish, debris, landfill, stockpiling, storage, etc?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Security fencing, protected areas, placards, warning signs?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>
Dead animals possibly due to contamination?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UNKNOWN <input type="checkbox"/>	

If answering "YES" or UNKNOWN" to any above items, describe the conditions:

Use photographs and maps to mark and identify conditions. Attach more information as needed.

Is further evaluation warranted? YES NO UNCERTAIN

Ecological Site Information

General Site Description (residential, commercial, forested, grassland, etc.):

The area is primarily residential with two commercial businesses located at the site. The area is along an existing roadway maintained by the City of Kyle.

Water bodies present? If yes, describe (pond, lake, creek, river, wetland, etc.):

Yes, a the Richmond Branch an intermittent stream of Porter Creek crosses under Windy Hill Road.

Special or unique vegetation features?

Possible wetland plants are located at the Richmond Branch culvert.

Special wildlife habitat?

No special wildlife habitat observed.

Observed wildlife:

None.

Observed nests or potential nesting sites?

None

National, state, or locally designated park or natural reserve at, or adjacent to, the project site?

None

Other compliance factors identified on, or adjacent to, project area:

- Historic age buildings Refineries Airports, runways Educational facilities
 Commercial facilities Healthcare facilities Social Services facilities

Preparer of this form must complete the following required information.

This inspection was completed by:

Name: Latrice Hertzler

Title: Environmental Reviewer

Phone Number: 512-443-4100

Email: lhertzler@future-link.biz

Agency:

Address: PO Box 90696, Austin, TX 78709

Preparer represents that to the best of his/her knowledge the above statements and facts are true and correct and to the best of his/her actual knowledge no material facts have been suppressed, omitted or misstated.

Signature:

Date:

Attachment 5

FEMA Flood Insurance Rate Map



FEMA National Flood Hazard Flood Layer –

Panel # 48209C0290F effective 9/2/2005- approximately .80 acres located within the 100-year floodplain

Portion of the project is located within LOMR 6-6-B46P effective 1/25/07 and LOMR 07/06/1372X effective 4/30/07 - .57 acres located within LOMR defined area.

Client Name	City of Kyle	Future Link Technologies	
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709	
Map Information	General Location Maps	512-443-4100	
Date	May 20	Environmental Service Provider	

When To Consult With Tribes Under Section 106

Section 106 requires consultation with federally-recognized Indian tribes when a project may affect a historic property of religious and cultural significance to the tribe. Historic properties of religious and cultural significance include: archeological sites, burial grounds, sacred landscapes or features, ceremonial areas, traditional cultural places, traditional cultural landscapes, plant and animal communities, and buildings and structures with significant tribal association. The types of activities that may affect historic properties of religious and cultural significance include: ground disturbance (digging), new construction in undeveloped natural areas, introduction of incongruent visual, audible, or atmospheric changes, work on a building with significant tribal association, and transfer, lease or sale of properties of the types listed above.

If a project includes any of the types of activities below, invite tribes to consult:

- significant ground disturbance (digging)**
Examples: new sewer lines, utility lines (above and below ground), foundations, footings, grading, access roads
- new construction in undeveloped natural areas**
Examples: industrial-scale energy facilities, transmission lines, pipelines, or new recreational facilities, in undeveloped natural areas like mountaintops, canyons, islands, forests, native grasslands, etc., and housing, commercial, and industrial facilities in such areas
- incongruent visual changes**
Examples: construction of a focal point that is out of character with the surrounding natural area, impairment of the vista or viewshed from an observation point in the natural landscape, or impairment of the recognized historic scenic qualities of an area
- incongruent audible changes**
Examples: increase in noise levels above an acceptable standard in areas known for their quiet, contemplative experience
- incongruent atmospheric changes**
Examples: introduction of lights that create skyglow in an area with a dark night sky
- work on a building with significant tribal association**
Examples: rehabilitation, demolition or removal of a surviving ancient tribal structure or village, or a building or structure that there is reason to believe was the location of a significant tribal event, home of an important person, or that served as a tribal school or community hall
- transfer, lease or sale of a historic property of religious and cultural significance**
Example: transfer, lease or sale of properties that contain archeological sites, burial grounds, sacred landscapes or features, ceremonial areas, plant and animal communities, or buildings and structures with significant tribal association
- None of the above apply**

Disaster Recovery Project at Windy Hill Road

Project

Latrice Hertzler

Reviewed By

07/30/20

Date

ATTACHMENT 12

NOISE ABATEMENT & CONTROL

- Noise Ordinance if Available

Noise (EA Level Reviews)

General requirements	Legislation	Regulation
HUD's noise regulations protect residential properties from excessive noise exposure. HUD encourages mitigation as appropriate.	Noise Control Act of 1972 General Services Administration Federal Management Circular 75-2: "Compatible Land Uses at Federal Airfields"	Title 24 CFR 51 Subpart B
References		
https://www.hudexchange.info/programs/environmental-review/noise-abatement-and-control		

1. What activities does your project involve? Check all that apply:

- New construction for residential use

NOTE: HUD assistance to new construction projects is generally prohibited if they are located in an Unacceptable zone, and HUD discourages assistance for new construction projects in Normally Unacceptable zones. See 24 CFR 51.101(a)(3) for further details.

→ *Continue to Question 2.*

- Rehabilitation of an existing residential property

NOTE: For major or substantial rehabilitation in Normally Unacceptable zones, HUD encourages mitigation to reduce levels to acceptable compliance standards. For major rehabilitation in Unacceptable zones, HUD strongly encourages mitigation to reduce levels to acceptable compliance standards. See 24 CFR 51 Subpart B for further details.

→ *Continue to Question 2.*

- A research demonstration project which does not result in new construction or reconstruction, interstate, land sales registration, or any timely emergency assistance under disaster assistance provisions or appropriations which are provided to save lives, protect property, protect public health and safety, remove debris and wreckage, or assistance that has the effect of restoring facilities substantially as they existed prior to the disaster

→ *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below.*

- None of the above

→ *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below.*

2. Complete the Preliminary Screening to identify potential noise generators in the vicinity (1000' from a major road, 3000' from a railroad, or 15 miles from an airport).

Indicate the findings of the Preliminary Screening below:

There are no noise generators found within the threshold distances above.

→ *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide a map showing the location of the project relative to any noise generators.*

Noise generators were found within the threshold distances.

→ *Continue to Question 3.*

3. Complete the Noise Assessment Guidelines to quantify the noise exposure. Indicate the findings of the Noise Assessment below:

Acceptable: (65 decibels or less; the ceiling may be shifted to 70 decibels in circumstances described in §24 CFR 51.105(a))

Indicate noise level here:

→ *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide noise analysis, including noise level and data used to complete the analysis.*

Normally Unacceptable: (Above 65 decibels but not exceeding 75 decibels; the floor may be shifted to 70 decibels in circumstances described in 24 CFR 51.105(a))

Indicate noise level here:

If project is rehabilitation:

→ *Continue to Question 4. Provide noise analysis, including noise level and data used to complete the analysis.*

If project is new construction:

Is the project in a largely undeveloped area¹?

No

→ *Continue to Question 4. Provide noise analysis, including noise level and data used to complete the analysis, and any other relevant information.*

¹ A largely undeveloped area means the area within 2 miles of the project site is less than 50 percent developed with urban uses and does not have water and sewer capacity to serve the project.

Yes

→ Your project requires completion of an Environmental Impact Statement (EIS) pursuant to 51.104(b)(1)(i). Elevate this review to an EIS-level review.

Unacceptable: (Above 75 decibels)

Indicate noise level here:

If project is rehabilitation:

HUD strongly encourages conversion of noise-exposed sites to land uses compatible with high noise levels. Consider converting this property to a non-residential use compatible with high noise levels.

→ Continue to Question 4. Provide noise analysis, including noise level and data used to complete the analysis, and any other relevant information.

If project is new construction:

Your project requires completion of an Environmental Impact Statement (EIS) pursuant to 51.104(b)(1)(i). You may either complete an EIS or provide a waiver signed by the appropriate authority. Indicate your choice:

Convert to an EIS

→ Provide noise analysis, including noise level and data used to complete the analysis.

Continue to Question 4.

Provide waiver

→ Provide an Environmental Impact Statement waiver from the Certifying Officer or the Assistant Secretary for Community Planning and Development per 24 CFR 51.104(b)(2) and noise analysis, including noise level and data used to complete the analysis.

Continue to Question 4.

- 4. HUD strongly encourages mitigation be used to eliminate adverse noise impacts. Explain in detail the exact measures that must be implemented to mitigate for the impact or effect, including the timeline for implementation. This information will be automatically included in the Mitigation summary for the environmental review.**

Mitigation as follows will be implemented:

→ Provide drawings, specifications, and other materials as needed to describe the project's noise mitigation measures. Continue to the Worksheet Summary.

No mitigation is necessary.

Explain why mitigation will not be made here:

→ Continue to the Worksheet Summary.

Worksheet Summary

Compliance Determination

Provide a clear description of your determination and a synopsis of the information that it was based on, such as:

- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your region

The project is not a noise sensitive issue. Construction noises will be temporary and minimal.

Are formal compliance steps or mitigation required?

Yes

No

ATTACHMENT 13

SOLE SOURCE AQUIFERS – SAFE DRINKING WATER

- NEPAAssist/TWDB Major Aquifers of Texas Map
- NEPAAssist/TWDB Minor Aquifers of Texas Map
- NEPAAssist/Texas Sole Source Aquifer Map

Sole Source Aquifers (CEST and EA)

General requirements	Legislation	Regulation
The Safe Drinking Water Act of 1974 protects drinking water systems which are the sole or principal drinking water source for an area and which, if contaminated, would create a significant hazard to public health.	Safe Drinking Water Act of 1974 (42 U.S.C. 201, 300f et seq., and 21 U.S.C. 349)	40 CFR Part 149
Reference		
https://www.hudexchange.info/environmental-review/sole-source-aquifers		

1. Is the project located on a sole source aquifer (SSA)¹?

- No → *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide documentation used to make your determination, such as a map of your project (or jurisdiction, if appropriate) in relation to the nearest SSA and its source area.*
- Yes → *Continue to Question 2.*

2. Does your project consist solely of acquisition, leasing, or rehabilitation of an existing building(s)?

- Yes → *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below.*
- No → *Continue to Question 3.*

3. Does your region have a memorandum of understanding (MOU) or other working agreement with EPA for HUD projects impacting a sole source aquifer?

Contact your Field or Regional Environmental Officer or visit the HUD webpage at the link above to determine if an MOU or agreement exists in your area.

- Yes → *Provide the MOU or agreement as part of your supporting documentation. Continue to Question 4.*
- No → *Continue to Question 5.*

4. Does your MOU or working agreement exclude your project from further review?

- Yes → *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide documentation used to make your determination and document where your project fits within the MOU or agreement.*

¹ A sole source aquifer is defined as an aquifer that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. This includes streamflow source areas, which are upstream areas of losing streams that flow into the recharge area.

No → Continue to Question 5.

5. Will the proposed project contaminate the aquifer and create a significant hazard to public health?

Consult with your Regional EPA Office. Your consultation request should include detailed information about your proposed project and its relationship to the aquifer and associated streamflow source area. EPA will also want to know about water, storm water and waste water at the proposed project. Follow your MOU or working agreement or contact your Regional EPA office for specific information you may need to provide. EPA may request additional information if impacts to the aquifer are questionable after this information is submitted for review.

No → Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide your correspondence with the EPA and all documents used to make your determination.

Yes → Work with EPA to develop mitigation measures. If mitigation measures are approved, attach correspondence with EPA and include the mitigation measures in your environmental review documents and project contracts. If EPA determines that the project continues to pose a significant risk to the aquifer, federal financial assistance must be denied. Continue to Question 6.

6. In order to continue with the project, any threat must be mitigated, and all mitigation must be approved by the EPA. Explain in detail the proposed measures that can be implemented to mitigate for the impact or effect, including the timeline for implementation.

→ Continue to the Worksheet Summary below. Provide documentation of the consultation (including the Managing Agency's concurrence) and any other documentation used to make your determination.

Worksheet Summary

Compliance Determination

Provide a clear description of your determination and a synopsis of the information that it was based on, such as:

- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your region

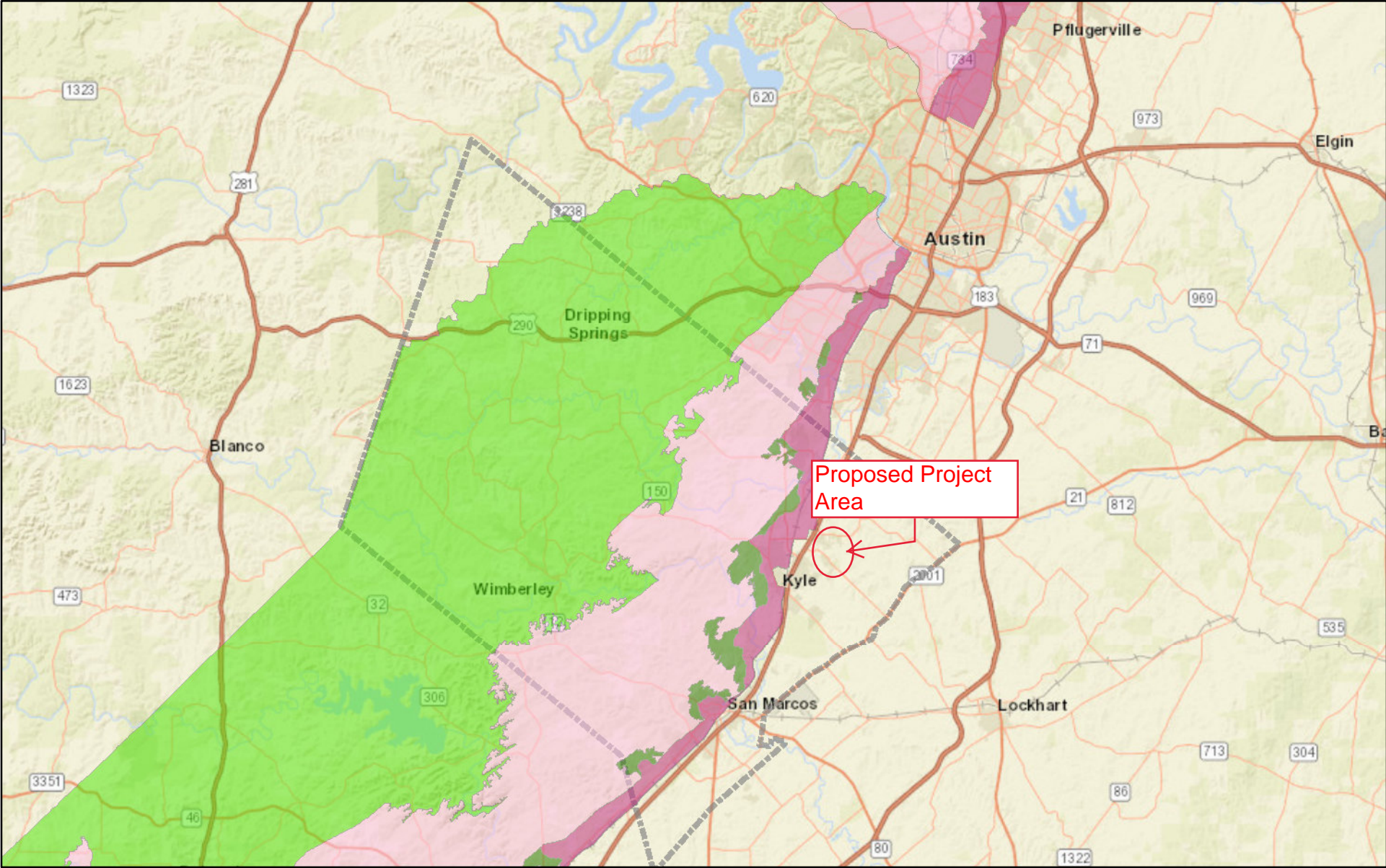
The Edwards aquifer is located in Hays County. It is a sole source aquifer. However, the project is not located over the aquifer or any of the contributing zones. No impact is expected and the project construction activities will ensure appropriate management of stormwater as a part of the project management.

Are formal compliance steps or mitigation required?

Yes

No

Hays County Edwards Aquifer Zones

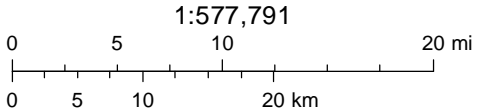


May 13, 2019

EdwardsAquiferZones

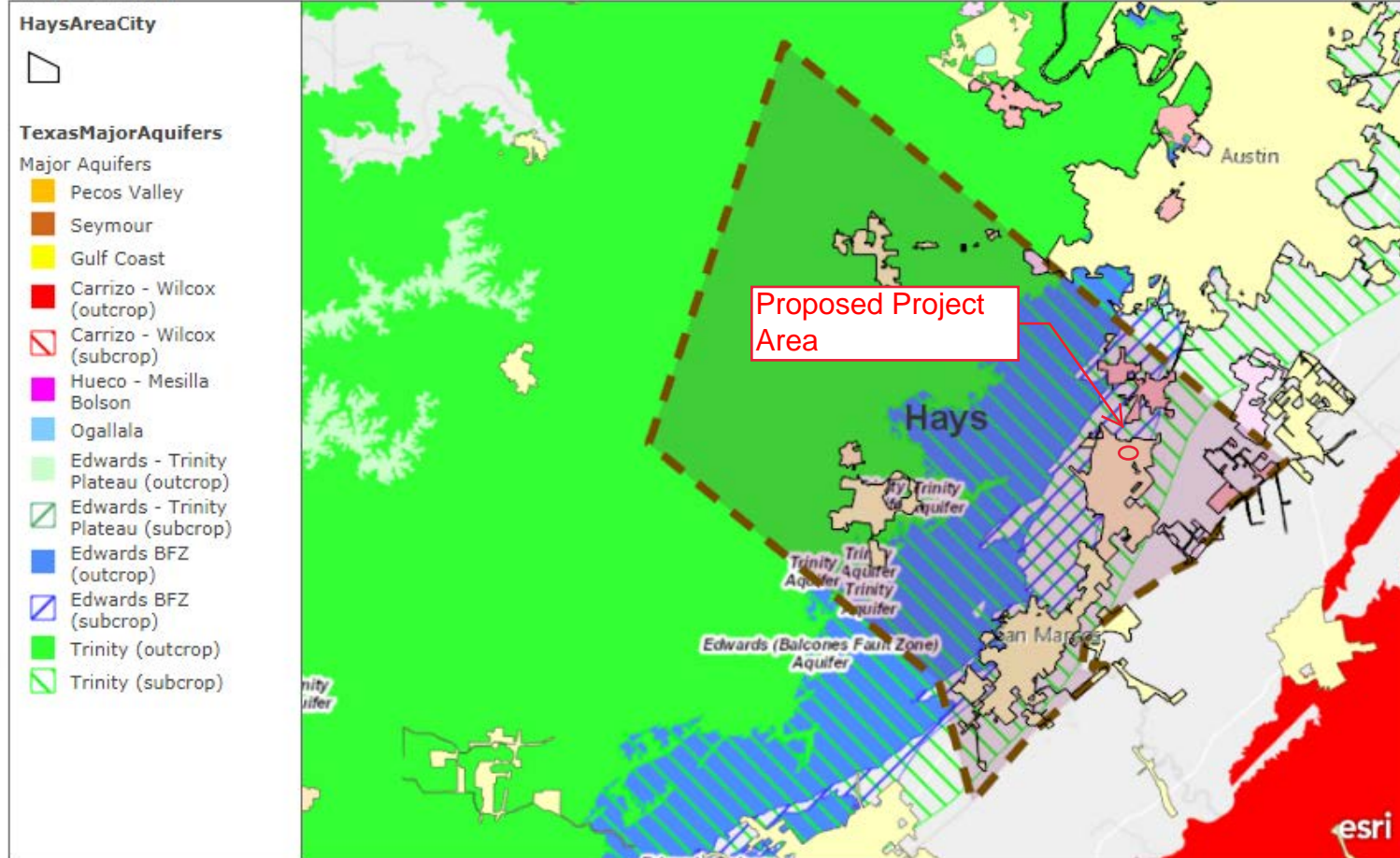
- Contributing Zone
- Contributing Zone within Transition Zone

- Recharge Zone
- Transition Zone
- County Border





Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand),

Hays County

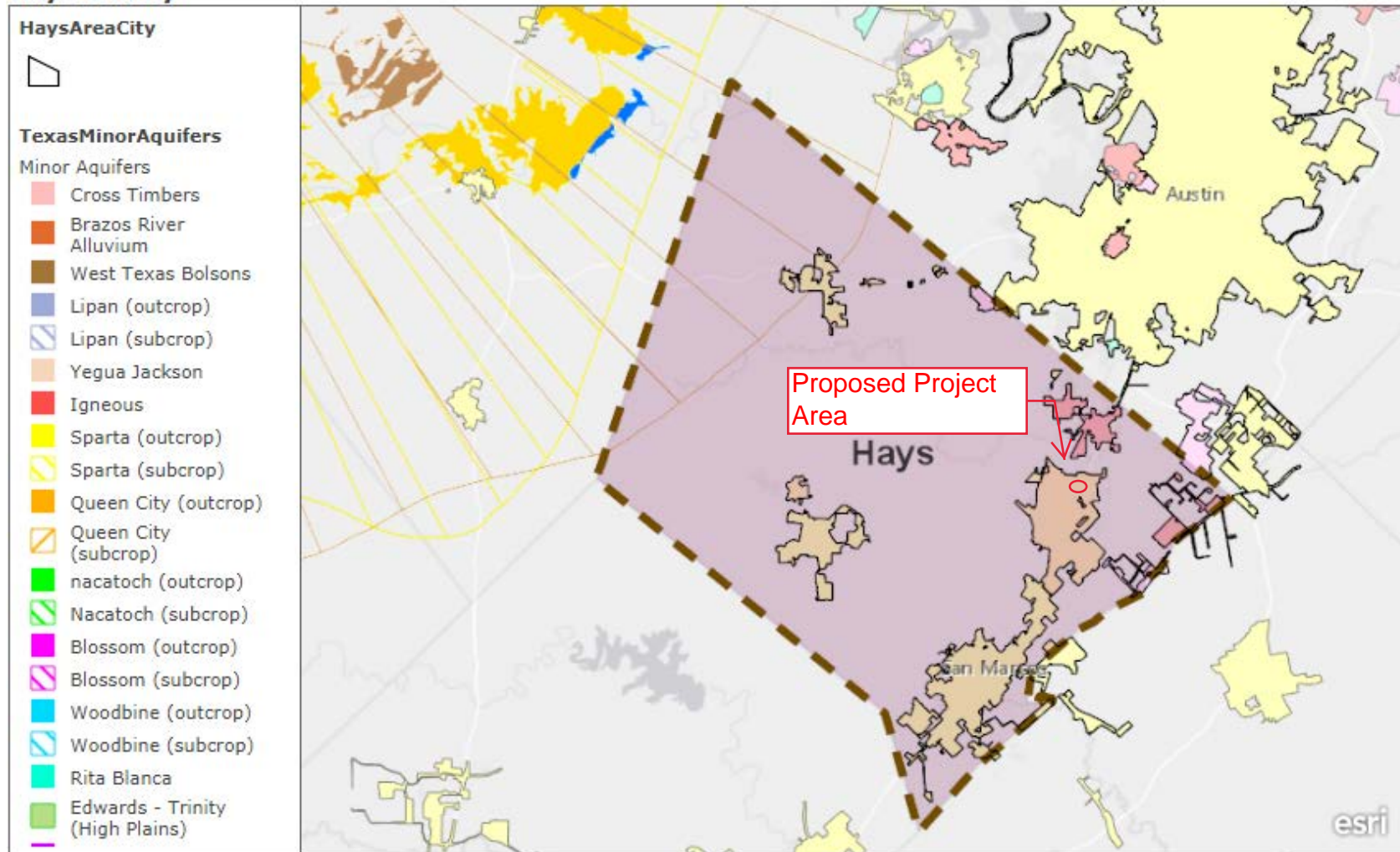


Esri, HERE, Garmin, NGA, USGS, NPS | Texas Water Development Board | Transportation Planning and Programming Division - Data Management Section 512-486-5052 TPP-GIS@txdot.gov | U.S. Fish and Wildlife Service, National Standards and Support Team, wetlands_team@fws.gov | Esri, HERE, NPS


Hays County Major Aquifer Map

Client Name	Hays County Kyle Windy Hill Road	Future Link Technologies 	
Contract #	GLO Contract 19-280-000-B779: Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709	
Map Information	General Site Maps	512-443-4100	
Date	May 19	Environmental Service Provider	

Hays County



Esri, HERE, Garmin, NGA, USGS, NPS | Texas Water Development Board | Transportation Planning and Programming Division - Data Management
 Section 512-486-5052 TPP-GIS@txdot.gov | U.S. Fish and Wildlife Service, National Standards and Support Team, wetlands_team@fws.gov | Esri,
 HERE, NPS

Client Name	Hays County Kyle Windy Hill Road	Future Link Technologies 
Contract #	GLO Contract 19-280-000-B779: Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709
Map Information	General Site Maps	512-443-4100
Date	May 19	Environmental Service Provider

ATTACHMENT 14

WETLAND PROTECTION

- USFWS National Wetlands Inventory Map or NEPAAssist Map
- USGS 7.5 Minute Topography Map

Wetlands (CEST and EA)

General requirements	Legislation	Regulation
Executive Order 11990 discourages that direct or indirect support of new construction impacting wetlands wherever there is a practicable alternative. The Fish and Wildlife Service's National Wetlands Inventory can be used as a primary screening tool, but observed or known wetlands not indicated on NWI maps must also be processed. Off-site impacts that result in draining, impounding, or destroying wetlands must also be processed.	Executive Order 11990	24 CFR 55.20 can be used for general guidance regarding the 8 Step Process.
References		
https://www.hudexchange.info/environmental-review/wetlands-protection		

1. Does this project involve new construction as defined in Executive Order 11990, expansion of a building's footprint, or ground disturbance?

The term "new construction" shall include draining, dredging, channelizing, filling, diking, impounding, and related activities and any structures or facilities begun or authorized after the effective date of the Order.

No → *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below.*

Yes → *Continue to Question 2.*

2. Will the new construction or other ground disturbance impact an on- or off-site wetland?

The term "wetlands" means those areas that are inundated by surface or ground water with a frequency sufficient to support, and under normal circumstances does or would support, a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds. Wetlands under E.O. 11990 include isolated and non-jurisdictional wetlands.

No, a wetland will not be impacted in terms of E.O. 11990's definition of new construction.
→ *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide a map or any other relevant documentation to explain your determination.*

Yes, there is a wetland that be impacted in terms of E.O. 11990's definition of new construction.

→ You must determine that there are no practicable alternatives to wetlands development by completing the 8-Step Process.

Provide a completed 8-Step Process as well as all documents used to make your determination, including a map. Be sure to include the early public notice and the final notice with your documentation.

Continue to Question 3.

- 3. For the project to be brought into compliance with this section, all adverse impacts must be mitigated. Explain in detail the exact measures that must be implemented to mitigate for the impact or effect, including the timeline for implementation.**

Based on the results of the delineation, the only potential WOTUS found within the survey area is Richmond Branch.

Only work directly involving Richmond Branch will require a Section 404 permit for this project.

Based on the proposed construction activities, this work will include

replacing the existing bridge with a wider bridge containing 5 box culverts, concrete headwalls and erosion controls.

The proposed construction activities at Richmond Branch can be covered under Nationwide Permit 14 (Linear Transportation Projects).

Which of the following mitigation actions have been or will be taken? Select all that apply:

- Permeable surfaces
- Natural landscape enhancements that maintain or restore natural hydrology through infiltration
- Native plant species
- Bioswales
- Evapotranspiration
- Stormwater capture and reuse
- Green or vegetative roofs with drainage provisions
- Natural Resources Conservation Service conservation easements
- Compensatory mitigation

Worksheet Summary

Compliance Determination

Provide a clear description of your determination and a synopsis of the information that it was based on, such as:

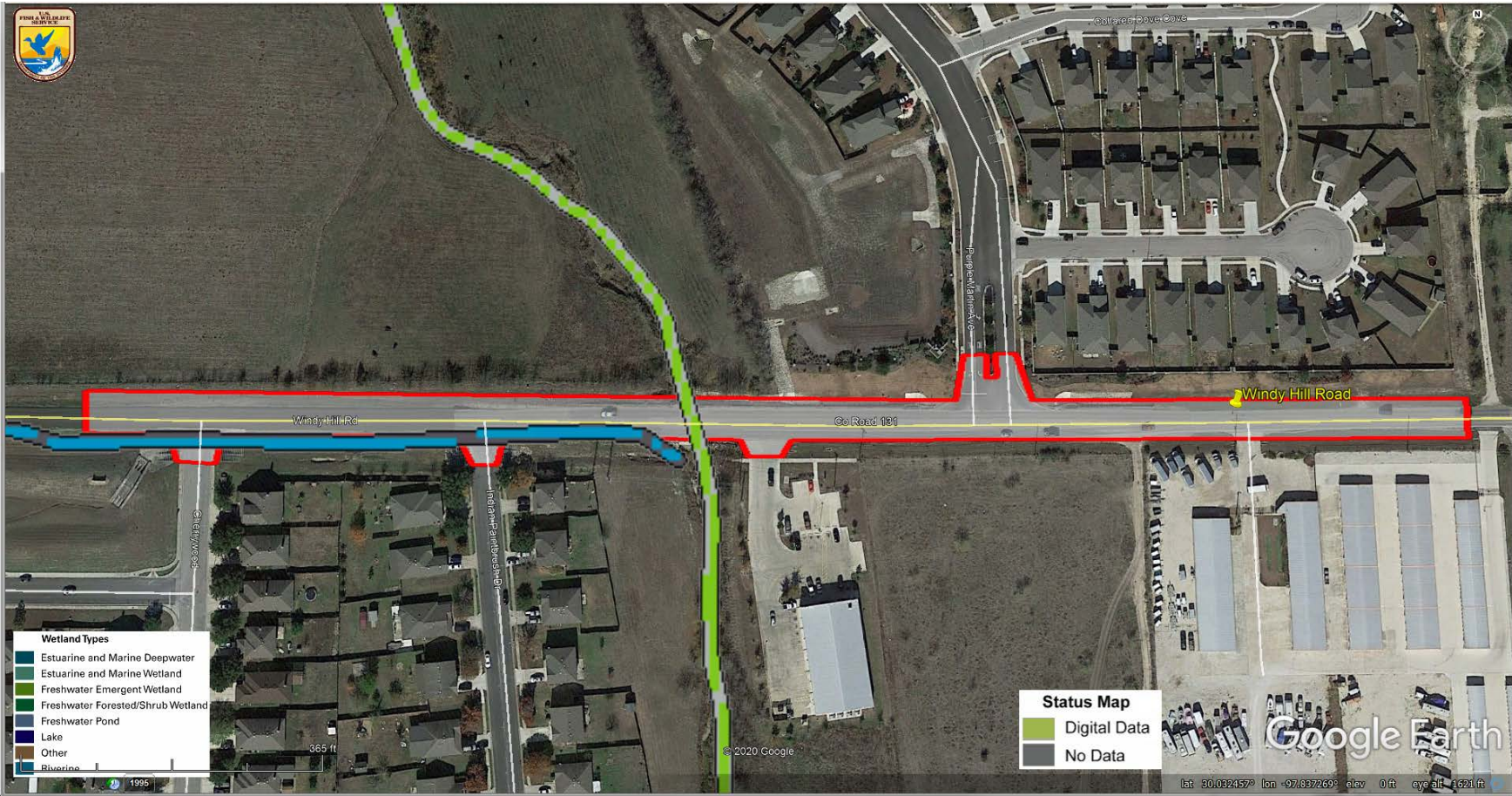
- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your region

As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, preconstruction notification to the USACE for the use of Nationwide Permit 14 will not be required. The report serves as documentation of the use and compliance with Nationwide Permit 14. In accordance with the guidelines of NWP 14, all limitations, criteria, and General Conditions should be followed by this project. Specifically, General Conditions 10, 12, 18, 20, 21, and 23 are addressed below within the report.

Are formal compliance steps or mitigation required?


Yes

No



Project Area

According to the National Wetlands Inventory, the project is impacting approximately 0.20 acres.

Client Name	City of Kyle	Future Link Technologies 
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709
Map Information	USFWS National Wetlands Inventory	512-443-4100
Date	April 20	Environmental Service Provider



National Wetlands Inventory Data

Approximate .04 acres impact at Cherrywood Crossing

Wetland R4SBC – Riverine


 Project Area

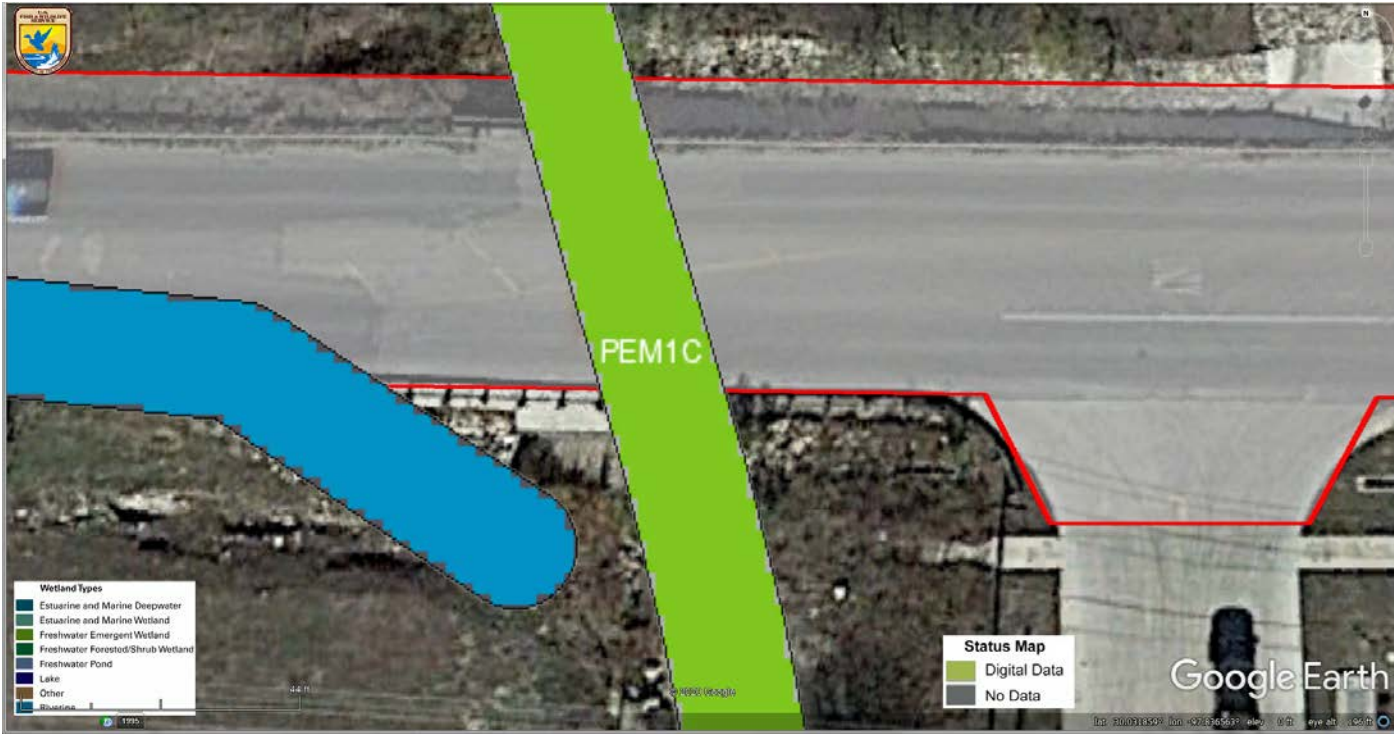
Approximate .04 acre impact at Indian Paintbrush Drive

Approximate .08 acre impact at Windy Hill Road

Wetland R4SBC




Client Name	City of Kyle	Future Link Technologies 
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709
Map Information	USFWS National Wetlands Inventory	512-443-4100
Date	April 20	Environmental Service Provider




Approximate .04 Acre impact at Windy Hill Road Drainage

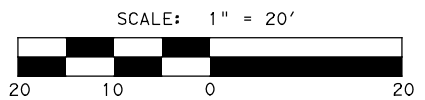
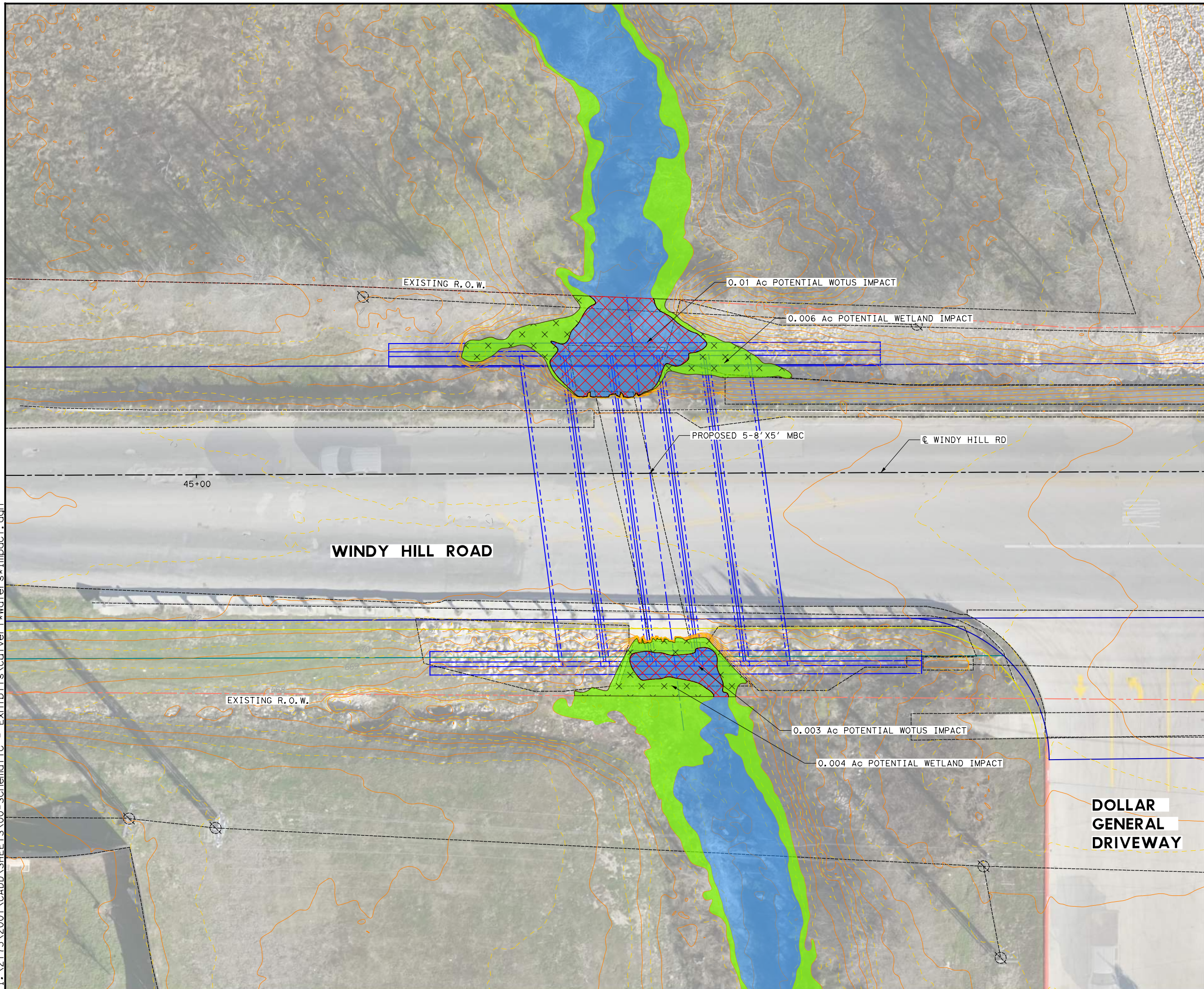
PEM1C Freshwater Emergent Wetland

 Proposed Project Area







As identified by National Wetland Inventory total acreage impact is approximately .20 acres.

Client Name	City of Kyle	Future Link Technologies 
Contract #	GLO Contract 19-280-000-B779; Aware B-16-DH-48-0001	PO Box 90696, Austin, TX 78709
Map Information	USFWS National Wetlands Inventory	512-443-4100
Date	April 20	Environmental Service Provider

3/6/2020 4:07:42 PM I:\2173\2001\CADD\SHEETS\00-Schematic - Exhibits\Culvert+Waters*Impact.dgn



LEGEND

-  EXISTING R.O.W.
-  PROPOSED EDGE OF PAVEMENT
-  POTENTIAL WETLANDS AREA
-  ESTIMATED WATERS OF THE U.S. LIMITS
-  POTENTIAL IMPACT TO W.O.T.U.S.
-  IMPACTED POTENTIAL WETLANDS

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW ONLY UNDER THE AUTHORITY OF:
 ZACHARY B. RYAN
 TEXAS REGISTRATION 106276
 DATE: 3/6/2020
 IT IS NOT TO BE USED FOR BIDDING, CONSTRUCTION, OR PERMIT PURPOSES.



LJA Engineering, Inc. 
 FRN - F-1386

POTENTIAL WETLANDS IMPACTS

Windy Hill Road
 Kyle, Texas
 1"=20'

**DELINEATION OF WATERS OF THE U.S.
AND NON-REPORTING NATIONWIDE PERMIT 14**

WINDY HILL ROAD

**PROPOSED ROAD IMPROVEMENTS
CHERRYWOOD ST. TO PARK S. DRIVE**

**CITY OF KYLE
HAYS COUNTY, TEXAS**

GLO CONTRACT NO. 19-280-000-B779

**Report Date:
June 10, 2020**

**Prepared for:
Ms. Judy Langford
Langford Community Management Services, Inc.
2901 CR 175
Leander, Texas 78641**

**Prepared by:
Hydrex Environmental
1120 NW Stallings Drive
Nacogdoches, Texas 75964-3428
(936) 568-9451 FAX (936) 568-9527**



Ms. Judy Langford
Langford Community Management Services, Inc.
2901 CR 175
Leander, Texas 78641

**RE: DELINEATION OF WATERS OF THE U.S. AND NON-REPORTING NATIONWIDE PERMIT 14
Windy Hill Road – Proposed Road Improvements
Cherrywood St. to Park S. Drive
City of Kyle
Hays County, Texas
GLO Contract No. 19-280-000-B779**

Dear Ms. Langford:

Hydrex Environmental (Hydrex) has been contracted by Langford Community Management Services, Inc. to complete a delineation of waters of the U.S. and document the use of Nationwide Permit 14 at the above-referenced project site. This report presents a summary of our findings and conclusions.

EXECUTIVE SUMMARY

The City of Kyle proposes to improve street conditions along 2100 linear feet of Windy Hill Road approximately between Cherrywood St. and Park S. Drive. This segment of road will be reconstructed by removing and replacing culverts, the roadway, and approaches. The roadway pavement and structure will be widened to add turn lane capacity. Railings and end treatments will be installed and will meet TXDOT standards. The survey area reviewed by Hydrex for this project is generally defined by an approximate 125-foot wide strip extending along 2100 linear feet of Windy Hill Road.

Based on the results of the delineation, the only potential WOTUS found within the survey area is Richmond Branch. Only work directly involving Richmond Branch will require a Section 404 permit for this project. Based on the proposed construction activities, this work will include replacing the existing bridge with a wider bridge containing 5 box culverts, concrete headwalls and erosion controls. The proposed construction activities at Richmond Branch can be covered under Nationwide Permit 14 (Linear Transportation Projects). As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, pre-construction notification to the USACE for the use of Nationwide Permit 14 will not be required. This report serves as documentation of the use and compliance with Nationwide Permit 14.

Additionally, a review of U.S. Fish and Wildlife records has been completed to address threatened and endangered species for this project. In the best professional opinion of Hydrex, construction activities associated with the proposed project will have “no effect” on the fifteen (15) federally-listed threatened or endangered species for Hays County, Texas. However, there are three (3) candidate species for listing which have habitat similar to Richmond Branch. These species are mussels and include Texas fatmucket (*Lampsilis bracteata*), Texas fawnsfoot (*Truncilla macrodon*), and Texas pimpleback (*Quadrula petrina*). Therefore, it is recommended to promote awareness of the potential for these species to contractors and avoid impacts to any mussels encountered during construction.

Windy Hill Road – Proposed Road Improvements

Cherrywood St. to Park S. Drive

City of Kyle

Hays County, Texas

GLO Contract No. 19-280-000-B779

.....

INTRODUCTION

The City of Kyle proposes to improve street conditions along 2100 linear feet of Windy Hill Road approximately between Cherrywood St. and Park S. Drive. This segment of road will be reconstructed by removing and replacing culverts, the roadway, and approaches. The roadway pavement and structure will be widened to add turn lane capacity. Railings and end treatments will be installed and will meet TXDOT standards. Hydrex Environmental has been contracted to complete a delineation of waters of the U.S. for this project and determine if authorization from the U.S. Army Corps of Engineers (USACE) will be required.

The survey area reviewed for this project is generally defined by an approximate 125-foot wide strip extending along 2100 linear feet of Windy Hill Road. The 125-foot wide strip includes the existing 80-foot easement surrounding Windy Hill Road, as well as an additional strip of land to the south, approximately 45 feet wide, which is controlled by the Homeowner’s Association of Amberwood Subdivision. The primary areas of focus for this investigation are the existing roadside ditches and the crossing of Richmond Branch.

This project is located within the city limits of Kyle (Hays County), Texas. The approximate NAD83 geographic coordinates for the center of the project at the crossing of Richmond Branch are N 30.031912°, W 97.836695°. The project location is depicted on Plate A-1 of Attachment A.

METHODS AND PROCEDURES

Methods used in this study were consistent with those set forth in the *1987 Corps of Engineers Wetlands Delineation Manual* and the *2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0)*. Flagging was used to mark the boundaries between any wetlands and non-wetlands as well as the ordinary high water mark (OHWM) of any streams and open waters. Based on the OHWM, the average widths and depths of any identified streams were measured using a hand-held measuring tape.

In addition, a review of readily available maps and aerial photographs was performed as part of this investigation. The following sources were utilized:

- USGS 7.5 Minute Topographic Quadrangle Map: Buda, TX sheet (1984).
- Soil Survey of Hay County, Texas (USDA-NRCS, Web Soil Survey, Accessed 5/2020).
- FEMA Flood Rate Insurance Maps (Panel Nos. 48209C0290F, 09/02/2005).
- Color infrared aerial photographs (TOP, 1996; NAIP, 2004; TOP, 2009; NAIP, 2015).
- Natural color aerial photographs (TOP, 2009; NAIP, 2010, 2012, 2014, 2015, 2016, 2018).
- National Wetlands Inventory Map (USFWS, Central Texas Database, Accessed 5/2020).
- Light Detection and Ranging (LiDAR) Digital Elevation Model (DEM): Stratmap, 2017.

FINDINGS

On-Site Reconnaissance

A reconnaissance of the survey area was performed on June 1, 2020 to evaluate site conditions and identify potential waters of the U.S. (potentially jurisdictional wetlands, streams, and open waters). During the on-site investigation, four (4) observation points were established. The findings at each observation point, representing conditions found throughout the survey area, are summarized in the following table (Table 1). Field data sheets detailing the findings at each observation point are included in Attachment B. Site photographs are included in Attachment C along with a map showing photograph locations (Plate C-1, Attachment C).

Table 1. Wetland Determination Data Form Summary Table.

Observation Point	Dominance of Hydrophytic Vegetation	Wetland Hydrology Indicators Present	Hydric Soil Indicator Present	Wetland Determination*	Location / Representation
1	100%	B10, C8, D2	None	Non-Wetland	Observation Point 1 is representative of non-wetland conditions found within the southern roadside ditch west of Cherrywood St.
2	100%	B10, D2	None	Non-Wetland	Observation Point 2 is representative of non-wetland conditions found within the southern roadside ditch between Cherrywood St. and Indian Paint Brush Dr.
3	66.7%	B10, D2	None	Non-Wetland	Observation Point 3 is representative of non-wetland conditions found within the southern roadside ditch between Indian Paint Brush Dr. and Richmond Branch.
4	50%	D2	None	Non-Wetland	Observation Point 4 was established along the southern roadside ditch near Purple Martin Ave. OP 4 is representative of site conditions found within all remaining roadside ditches within the project along both the north and south roadside ditches of Windy Hill Road.

* A positive wetland determination at an observation point, as defined by the U.S. Corps of Engineers Wetlands Delineation Manual, must demonstrate 1) a dominance of hydrophytic vegetation (>50% dominant hydrophytic vegetation), 2) a minimum of one primary or two secondary wetland hydrology indicators, and 3) the presence of a hydric soil indicator.

Although a limited number of official observation points were established throughout the survey area, the field reconnaissance covered the entire project site. Site conditions were determined to be wetter than normal during the delineation. According to the nearest weather station located in Buda, Texas (BUDA 1.9 WNW, TX US US1TXHYS205), the area received 3.82 inches of rain in the week leading up to the delineation (May 25-31, 2020). Precipitation records have been included in Attachment D for reference. During the delineation, stormwater flow was evident and coming from the outfall of the Amberwood detention pond located near the western portion of the project. Soils throughout the survey area were saturated in the upper few inches from stormwater runoff, but soil profiles were not saturated from the bottom of the profile up as would normally be seen with a high water table.

Windy Hill Road – Proposed Road Improvements
 Cherrywood St. to Park S. Drive
 City of Kyle
 Hays County, Texas
 GLO Contract No. 19-280-000-B779

Based on a desktop map review of historic USGS Topographic Maps, including the 1984 USGS Topographic Map (Plate A-2), and the National Wetlands Inventory Map (Plate A-7), it was noted that the southern roadside ditch west of Richmond Branch was historically depicted as an intermittent stream. Also, this area is shown to be located within the 100-year floodplain (Zone A) according to the FEMA Flood Insurance Rate Map (Plate A-6) for the area. However, after visiting the site, it is clear the southern roadside ditch does not exhibit an OHWM or other characteristics of a stream. Although the ditch seems to convey large stormwater runoff events at times, there is not enough frequency or duration of flow to develop an OHWM. Additionally, the grade along the ditch is great enough to promote positive drainage and does not pond water long enough to develop wetland criteria within the ditch. A few areas of erosion were observed that pond water after significant rain events, but these erosional features do not meet the definition of potential WOTUS. Therefore, in the best professional opinion of Hydrex Environmental, the roadside ditch lacks the presence of any potential WOTUS.

The results of the delineation are summarized in the following table (Table 2). The boundaries of Richmond Branch are depicted on Plates A-3 and A-4 in Attachment A.

Table 2. Delineated Aquatic Resources

Feature ID	Type	OHWM Width (ft)	OHWM Depth (ft)	Length (LF)	Area (ac)	Latitude, Longitude (NAD 83)
Richmond Branch	Intermittent Stream	14.2	1.4	125	0.04	30.031912, -97.836695

Section 404 Permitting

Based on the results of the delineation, the only potential WOTUS found within the survey area is Richmond Branch. Only work directly involving Richmond Branch will require a Section 404 permit for this project. Based on the proposed construction activities, this work will include replacing the existing bridge with a wider bridge containing 5 box culverts, concrete headwalls and erosion controls. The proposed construction activities at Richmond Branch can be covered under Nationwide Permit 14 (Linear Transportation Projects). As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, pre-construction notification to the USACE for the use of Nationwide Permit (NWP) 14 will not be required.

In accordance with the guidelines of NWP 14, all limitations, criteria, and General Conditions should be followed by this project. Specifically, General Conditions 10, 12, 18, 20, 21, and 23 are addressed below. NWP 14 guidelines are included in Attachment G.

General Condition 10: Fills Within 100-Year Floodplain

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (Plate A-6) indicates the 100-year floodplain (Zone A) extends along Richmond Branch as well as the majority of the western portion of the survey area. Zone A is described as areas inside the 100-year floodplain in which base flood elevations have not been determined. To this end, the City of Kyle is coordinating with the Floodplain Administrator of Hays County to ensure the construction activities associated with this project are completed in compliance with all local and FEMA floodplain development regulations.

General Condition 12: Soil Erosion and Sediment Controls

Appropriate soil erosion and sediment controls (sediment fence, hay bales, rock riprap, vegetation mats, etc.) must be used and maintained in effective operating conditions during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within WOTUS during periods of low-flow or no-flow.

General Condition 18: Threatened and Endangered Species

A review of U.S. Fish and Wildlife records has been completed to address threatened and endangered species for this project. In the best professional opinion of Hydrex, construction activities associated with the proposed project will have “no effect” on the fifteen (15) federally-listed threatened or endangered species for Hays County, Texas. However, there are three (3) candidate species for listing which have habitat similar to Richmond Branch. These species are mussels and include Texas fatmucket (*Lampsilis bracteata*), Texas fawnsfoot (*Truncilla macrodon*), and Texas pimpleback (*Quadrula petrina*). Therefore, it is recommended to promote awareness of the potential for these species to contractors and avoid impacts to any mussels encountered during construction. Supporting documentation for the threatened and endangered species habitat survey is included in Attachment E.

General Condition 20: Historic Properties

A review has been completed by the Texas Historical Commission (THC) to address cultural resources for this project. The THC has determined that no historic properties are present or will be affected by the proposed project. However, if historic properties or buried cultural resources are discovered, work should cease, and the THC should be contacted for further instructions. Documentation from the THC is included in Attachment F.

CONCLUSIONS

The City of Kyle proposes to improve street conditions along 2100 linear feet of Windy Hill Road approximately between Cherrywood St. and Park S. Drive. This segment of road will be reconstructed by removing and replacing culverts, the roadway, and approaches. The roadway pavement and structure will be widened to add turn lane capacity. Railings and end treatments will be installed and will meet TXDOT standards. The survey area reviewed by Hydrex for this project is generally defined by an approximate 125-foot wide strip extending along 2100 linear feet of Windy Hill Road.

Based on the results of the delineation, the only potential WOTUS found within the survey area is Richmond Branch. Only work directly involving Richmond Branch will require a Section 404 permit for this project. Based on the proposed construction activities, this work will include replacing the existing bridge with a wider bridge containing 5 box culverts, concrete headwalls and erosion controls. The proposed construction activities at Richmond Branch can be covered under Nationwide Permit 14 (Linear Transportation Projects). As the loss of WOTUS will be less than 0.1 acres and there will be no discharge in a special aquatic site, including wetlands, pre-construction notification to the USACE for the use of Nationwide Permit 14 will not be required. This report serves as documentation of the use and compliance with Nationwide Permit 14.

Additionally, a review of U.S. Fish and Wildlife records has been completed to address threatened and endangered species for this project. In the best professional opinion of Hydrex, construction activities associated with the proposed project will have “no effect” on the fifteen (15) federally-listed threatened or endangered species for Hays County, Texas. However, there are three (3) candidate species for listing which have habitat similar to Richmond Branch. These species are mussels and include Texas fatmucket (*Lampsilis bracteata*), Texas fawnsfoot (*Truncilla macrodon*), and Texas pimpleback (*Quadrula petrina*). Therefore, it is recommended to promote awareness of the potential for these species to contractors and avoid impacts to any mussels encountered during construction.

I appreciate the opportunity to present this information. If you have any questions regarding these findings or conclusions, or if further clarification is necessary, please feel free to contact me at ccollier@hydrex-inc.com or (936) 568-9451. I look forward to working with you in the future.

Sincerely,
Hydrex Environmental



Clayton A. Collier, REM, PWS
Senior Environmental Scientist



ATTACHMENTS

Attachment A	PLATES
Plate A-1	Vicinity Map
Plate A-2	USGS Topographic Map
Plate A-3	Delineation Map (2018 Aerial Photograph)
Plate A-4	Delineation Map (2017 LiDAR Digital Elevation Model)
Plate A-5	NRCS Soil Survey Map
Plate A-6	FEMA Flood Insurance Rate Map
Plate A-7	National Wetlands Inventory Map
Attachment B	WETLAND DETERMINATION DATA FORMS
Attachment C	PHOTOGRAPHIC DOCUMENTATION
Plate C-1	Map Showing Photograph Locations Site Photographs
Attachment D	PRECIPITATION RECORDS
Attachment E	THREATENED & ENDANGERED SPECIES
Attachment F	CULTURAL RESOURCES
Attachment G	NATIONWIDE PERMIT 14 GUIDELINES
Attachment H	LIMITATIONS

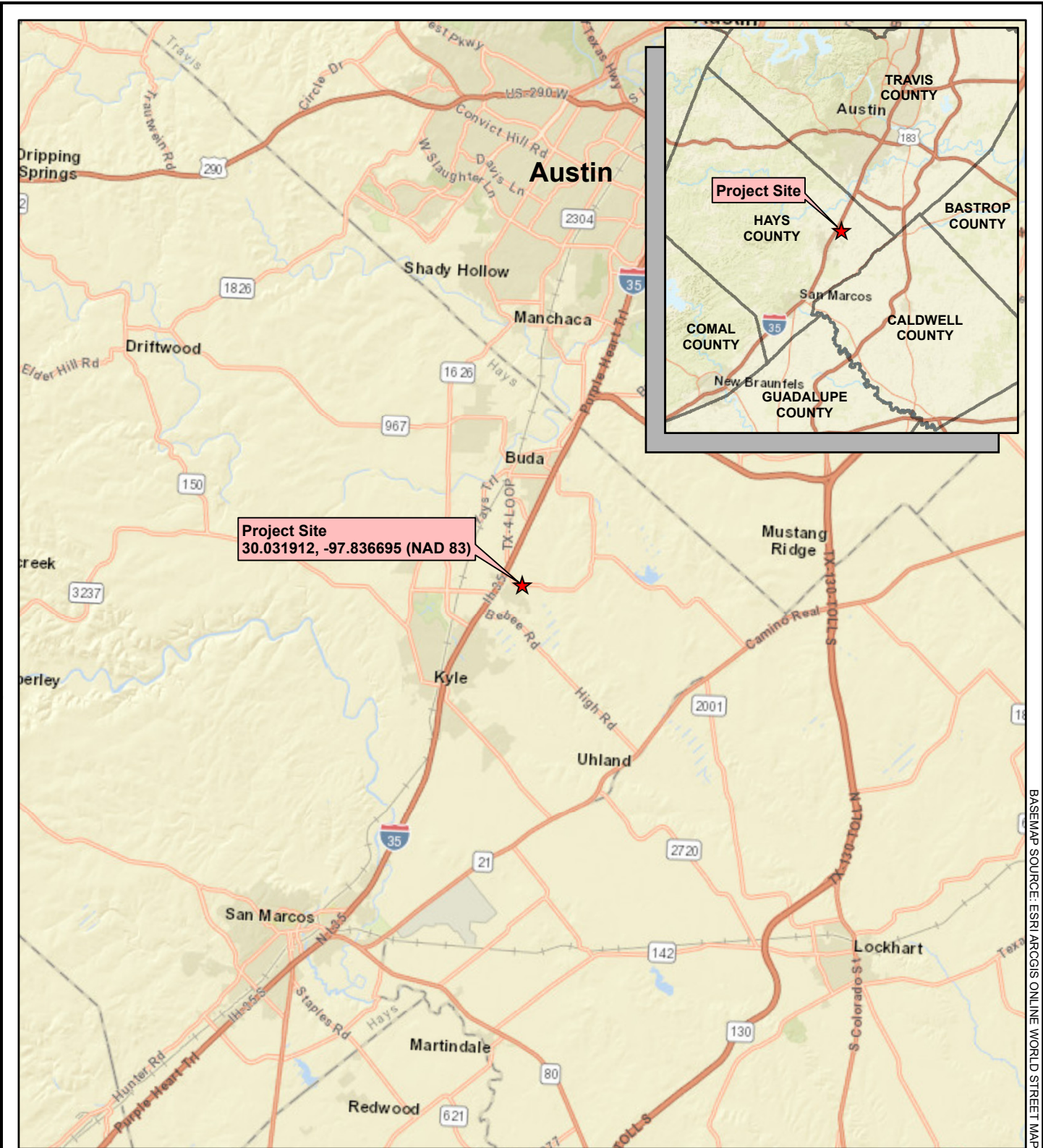
DISTRIBUTION

Ms. Judy Langford
Langford Community Management Services, Inc.
2901 CR 175
Leander, Texas 78641

Mrs. Latrice Hertzler
Future Link Technologies
PO Box 90696
Austin, Texas 78709-0696

Mr. Clayton A. Collier, REM, PWS
Hydrex Environmental
1120 NW Stallings Drive
Nacogdoches, Texas 75964-3428

ATTACHMENT A
PLATES



BASEMAP SOURCE: ESRI ARCGIS ONLINE WORLD STREET MAP

 **Project Site**

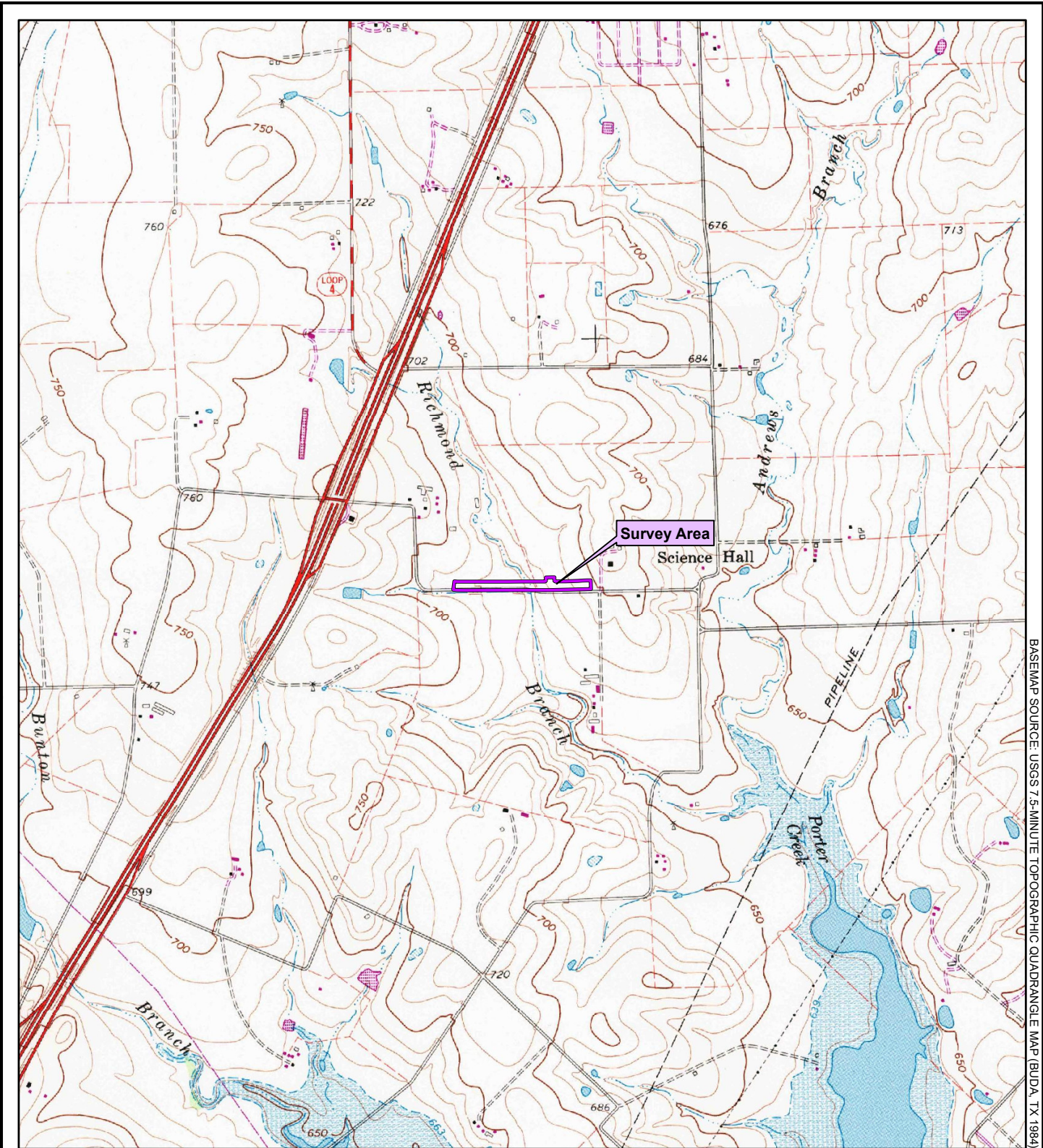



Hydrex
ENVIRONMENTAL
1120 NW Stallings Drive
Nacogdoches, Texas 75964
(936) 568-9451

← PLATE A-1 →
VICINITY MAP

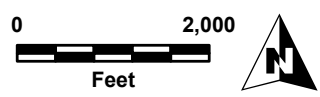
Windy Hill Road – Proposed Road Improvements
Cherrywood St. to Park S. Drive
City of Kyle
Hays County, Texas
GLO Contract No. 19-280-000-B779

Map Revised: 06/10/2020	Project Number: A-12-1403	GIS Analyst: NCF
-------------------------	---------------------------	------------------



BASEMAP SOURCE: USGS 7.5-MINUTE TOPOGRAPHIC QUADRANGLE MAP (BUDA, TX 1984)

 Survey Area



Hydrex
 ENVIRONMENTAL
 1120 NW Stallings Drive
 Nacogdoches, Texas 75964
 (936) 568-9451

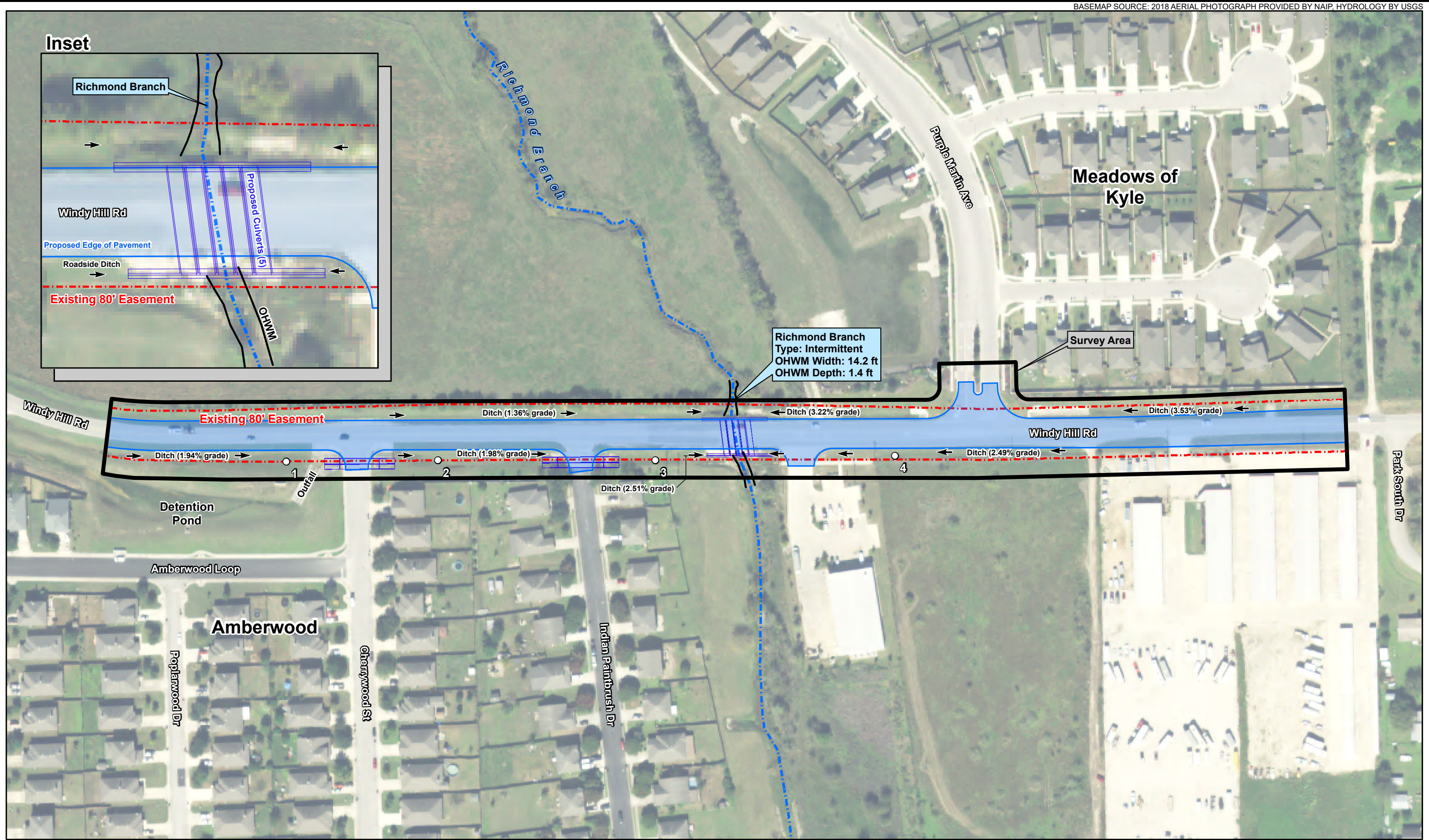
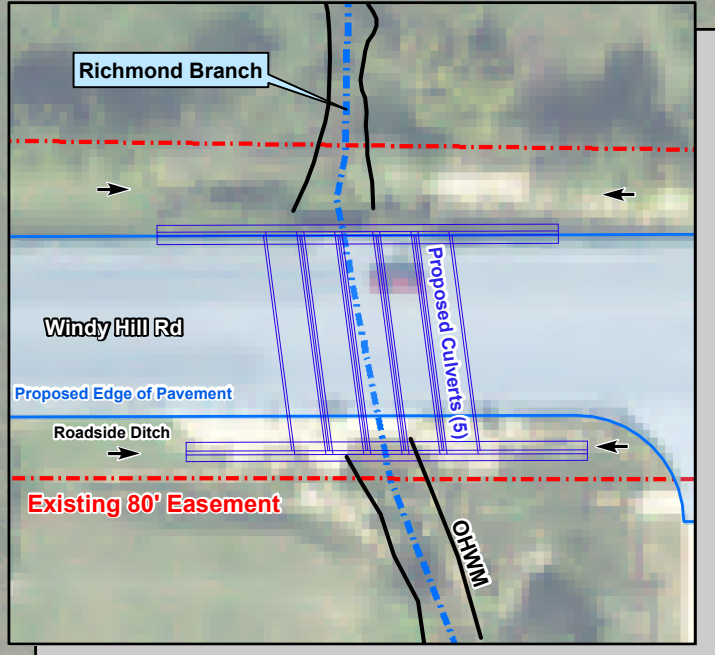
← PLATE A-2 →

USGS TOPOGRAPHIC MAP

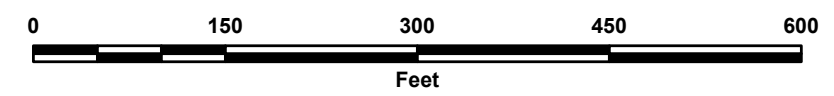
Windy Hill Road – Proposed Road Improvements
 Cherrywood St. to Park S. Drive
 City of Kyle
 Hays County, Texas
 GLO Contract No. 19-280-000-B779

Map Revised: 06/10/2020	Project Number: A-12-1403	GIS Analyst: NCF
-------------------------	---------------------------	------------------

Inset



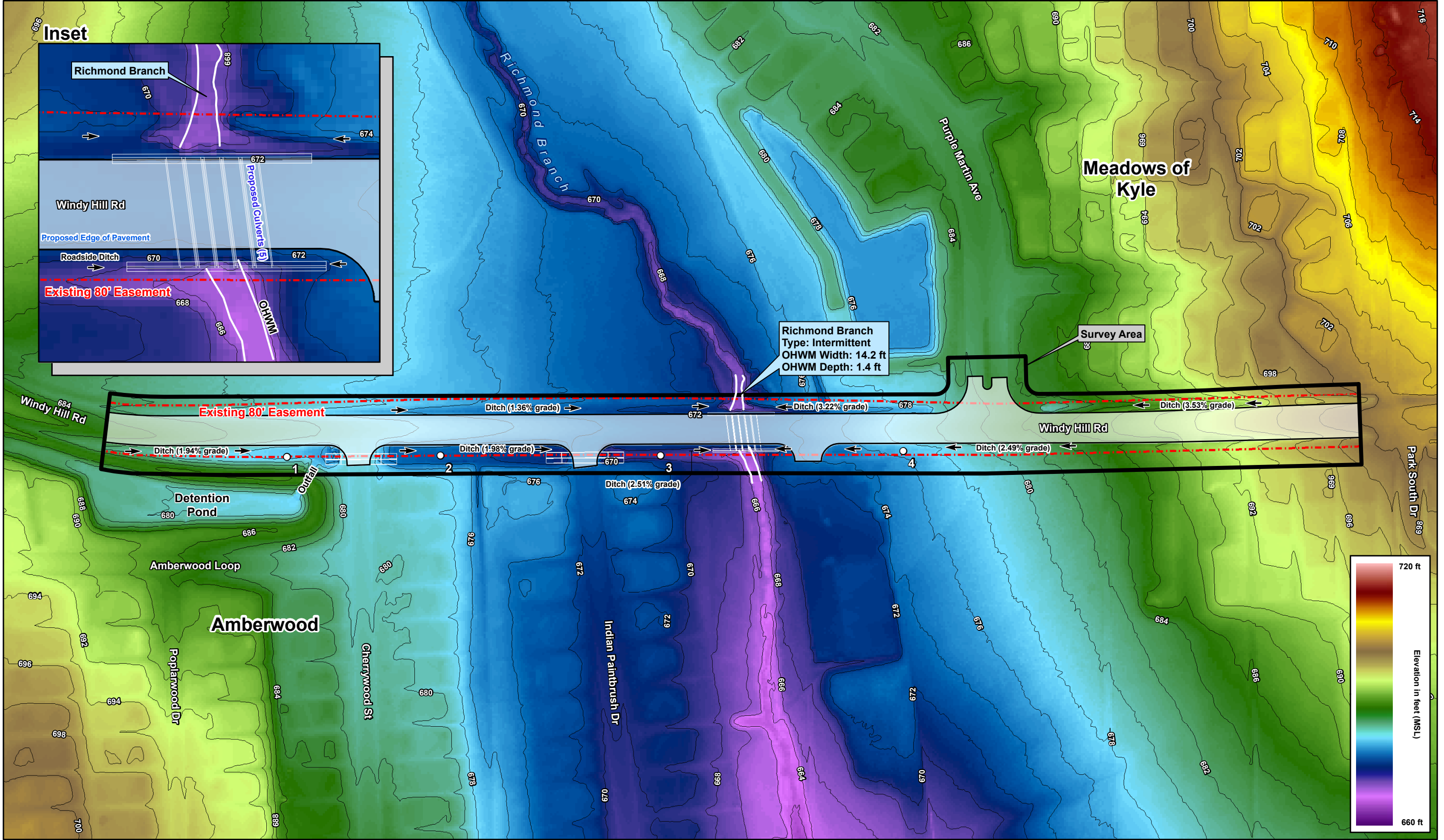
- Observation Point
- ➔ Existing Roadside Ditch Flow Direction
- Proposed Culvert
- - - Approximate 80' Easement
- Delineated OHWM
- - - Richmond Branch
- ▭ Proposed Edge of Pavement
- ▭ Survey Area



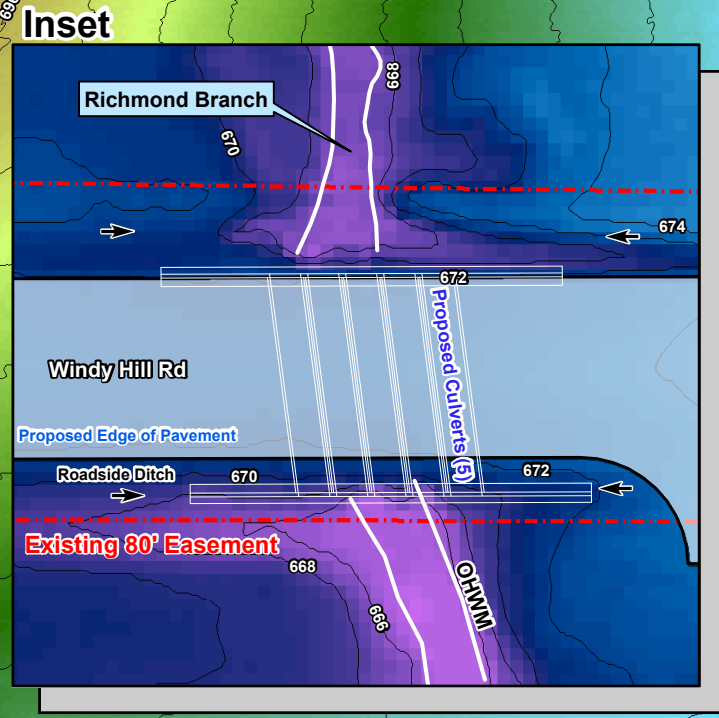
Windy Hill Road – Proposed Road Improvements
Cherrywood St. to Park S. Drive
City of Kyle
Hays County, Texas
GLO Contract No. 19-280-000-B779
Map Revised: 06/10/2020 Project Number: A-12-1403 GIS Analyst: NCF

PLATE A-3
DELINEATION MAP (2018 AERIAL PHOTOGRAPH)

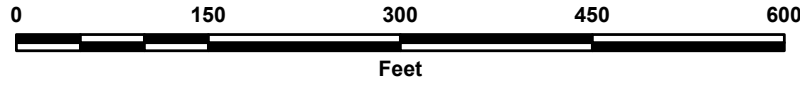




Richmond Branch
Type: Intermittent
OHWM Width: 14.2 ft
OHWM Depth: 1.4 ft

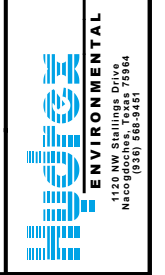


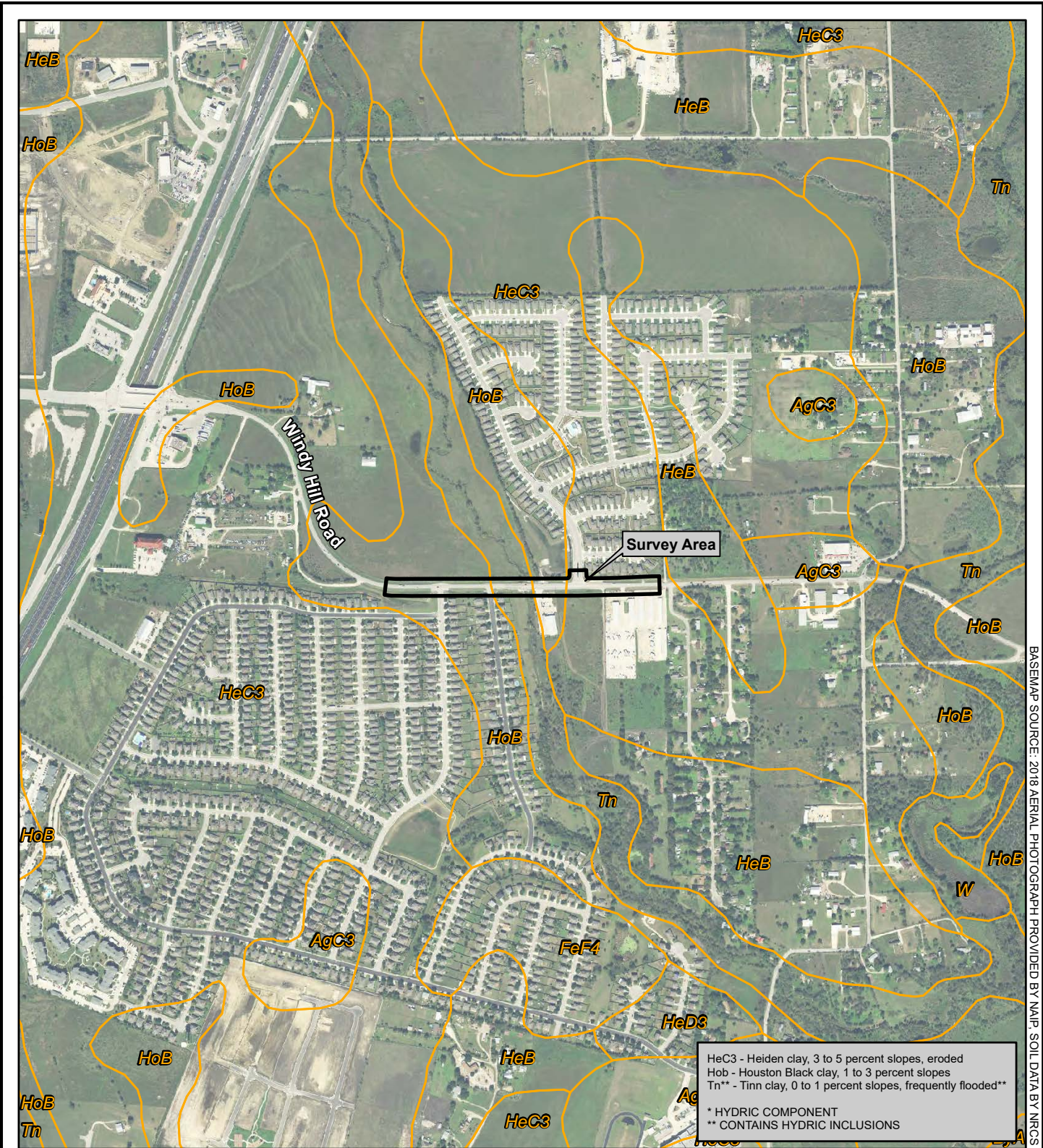
- Observation Point
- ➔ Existing Roadside Ditch Flow Direction
- Proposed Culvert
- Approximate 80' Easement
- Delineated OHWM
- LiDAR 2-ft Contour
- Proposed Edge of Pavement
- ▭ Survey Area



Windy Hill Road – Proposed Road Improvements
Cherrywood St. to Park S. Drive
City of Kyle
Hays County, Texas
GLO Contract No. 19-280-000-B779
Map Revised: 06/10/2020 Project Number: A-12-1403 GIS Analyst: NCF

PLATE A-4
DELINEATION MAP (2017 LIDAR DIGITAL ELEVATION MODEL)





BASEMAP SOURCE: 2018 AERIAL PHOTOGRAPH PROVIDED BY NAPP. SOIL DATA BY NRCS

Survey Area
 NRCS Soil Map Unit

HeC3 - Heiden clay, 3 to 5 percent slopes, eroded
 HoB - Houston Black clay, 1 to 3 percent slopes
 Tn** - Tinn clay, 0 to 1 percent slopes, frequently flooded**
 * HYDRIC COMPONENT
 ** CONTAINS HYDRIC INCLUSIONS

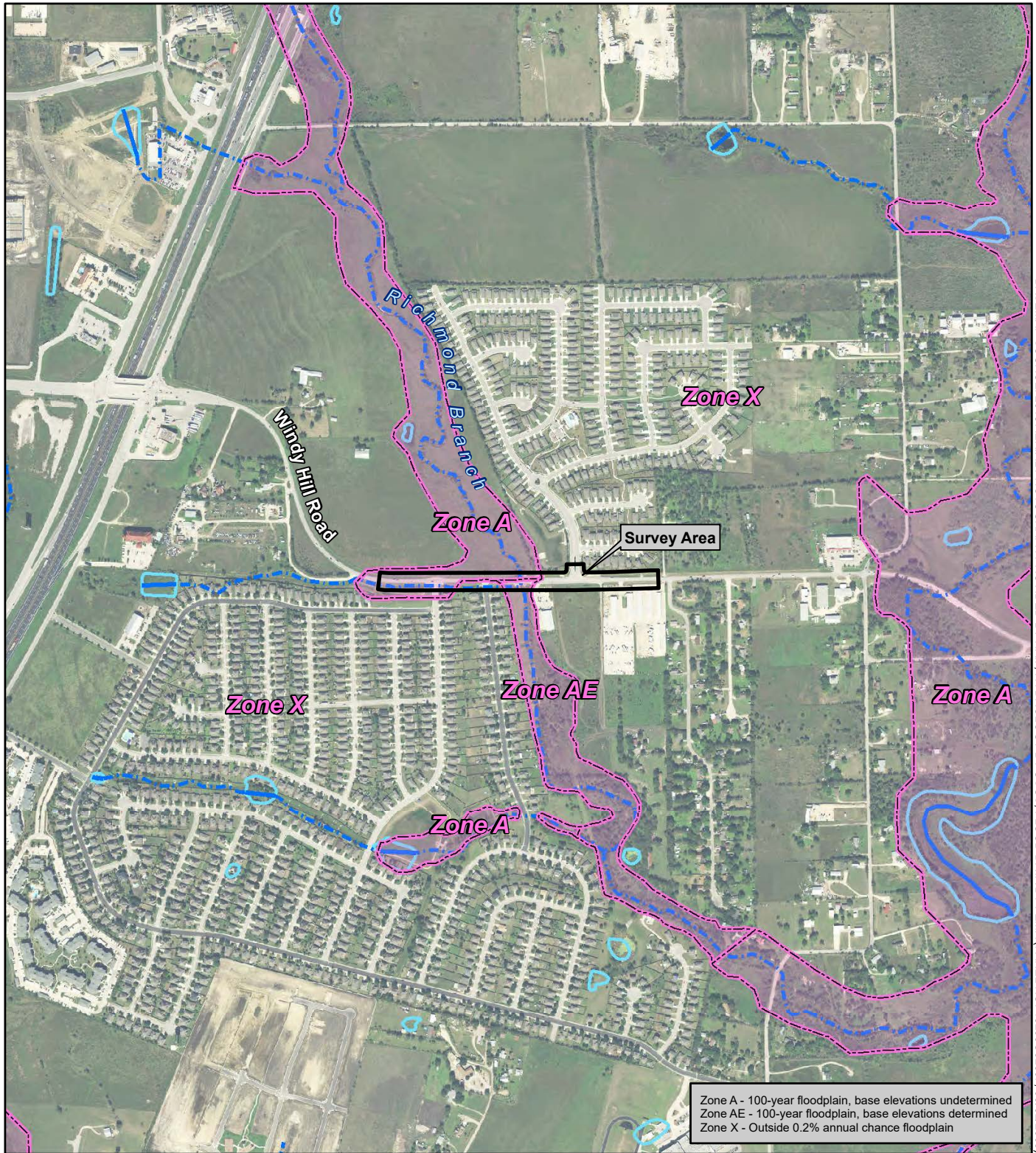


← PLATE A-5 →
 NRCS SOIL SURVEY MAP

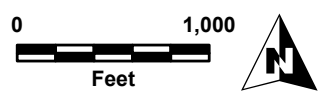
Windy Hill Road – Proposed Road Improvements
Cherrywood St. to Park S. Drive
City of Kyle
Hays County, Texas
GLO Contract No. 19-280-000-B779

Map Revised: 06/10/2020 Project Number: A-12-1403 GIS Analyst: NCF

BASEMAP SOURCE: 2018 AERIAL PHOTOGRAPH PROVIDED BY NHP. HYDROLOGY BY USGS. FLOOD DATA BY FEMA (PANEL NO. 48209C0290F - 09/02/2005)



Survey Area	USGS River / Perennial Stream
FEMA Flood Zone	USGS Ephemeral / Intermittent Stream
	USGS Waterbody



Zone A - 100-year floodplain, base elevations undetermined
 Zone AE - 100-year floodplain, base elevations determined
 Zone X - Outside 0.2% annual chance floodplain

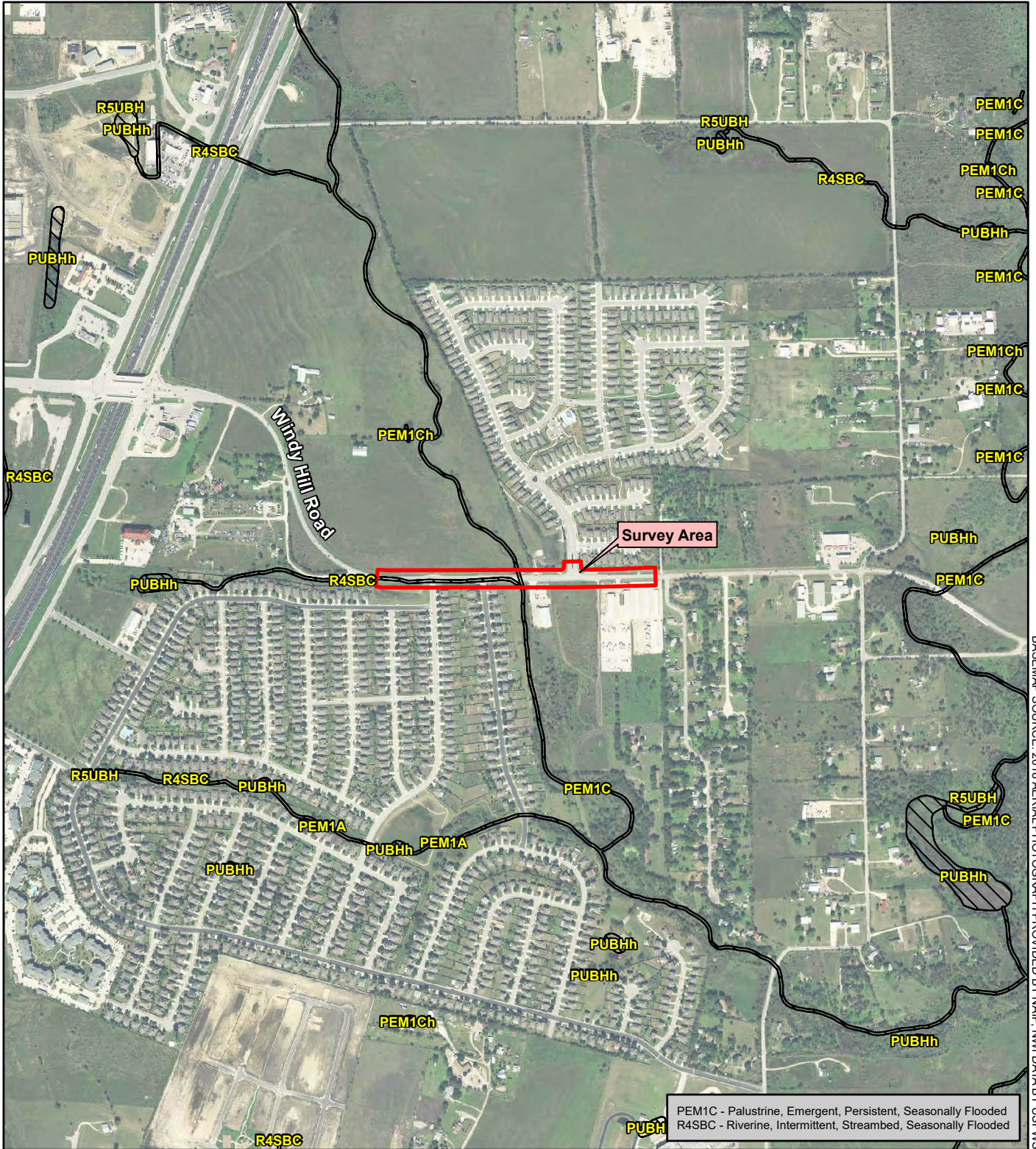


PLATE A-6

FEMA FLOOD INSURANCE RATE MAP

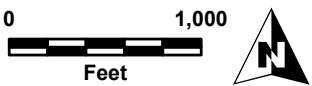
Windy Hill Road – Proposed Road Improvements
 Cherrywood St. to Park S. Drive
 City of Kyle
 Hays County, Texas
 GLO Contract No. 19-280-000-B779

Map Revised: 06/10/2020 Project Number: A-12-1403 GIS Analyst: NCF



BASEMAP SOURCE: 2018 AERIAL PHOTOGRAPH PROVIDED BY NAPI. NWI DATA BY USFWS

Survey Area
 NWI Wetlands



PEM1C - Palustrine, Emergent, Persistent, Seasonally Flooded
 R4SBC - Riverine, Intermittent, Streambed, Seasonally Flooded


 1120 NW Stallings Drive
 Nacogdoches, Texas 75964
 (936) 568-9451

PLATE A-7
 NATIONAL WETLANDS INVENTORY MAP

Windy Hill Road – Proposed Road Improvements
Cherrywood St. to Park S. Drive
City of Kyle
Hays County, Texas
GLO Contract No. 19-280-000-B779

Map Revised: 06/10/2020 Project Number: A-12-1403 GIS Analyst: NCF

ATTACHMENT B
WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Windy Hill Road (A-12-1403) City/County: Hays County Sampling Date: 6/1/2020
 Applicant/Owner: City of Kyle State: TX Sampling Point: 1
 Investigator(s): C. Collier Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): Concave Slope (%): 1.94
 Subregion (LRR or MLRA): LRR J Lat: 30.031819 Long: -97.83896 Datum: NAD 83
 Soil Map Unit Name: HoB - Houston Black clay, 1 to 3 percent slopes NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation, Soil , or Hydrology significantly disturbed? Yes No
 Are Vegetation, Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Remarks: Site conditions were wetter than normal due to recent rainfall.			

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Marl Deposits (B15) (LRR U)	<input checked="" type="checkbox"/> Drainage Patterns (B10)	<input checked="" type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input checked="" type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Thin Muck Surface (C7)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Shallow Aquifer (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)		<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)

Field Observations:

Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): _____
 Saturation Present? Yes No Depth (inches): 4 in.
 (includes capillary fringe)

Wetland Hydrology Present? Yes No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
 FAC-Neutral Test: 0 FACW/OBL Species, 0 FACU/UPL Species
 Saturation in upper 4 inches due to rainfall during previous night.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 1

Tree Stratum (Plot size: 15' x 30')	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A) Total Number of Dominant Species Across All Strata: 1 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)
1.				
2.				
3.				
4.				
5.				
6.				
8.				
0 = Total Cover 50% of total cover: _____ 20% of total cover: _____				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species x 1 = _____ FACW species x 2 = _____ FAC species x 3 = _____ FACU species x 4 = _____ UPL species x 5 = _____ Column Totals: (A) _____ (B) _____ Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: 15' x 30')				
1.				
2.				
3.				
4.				
5.				
8.				
0 = Total Cover 50% of total cover: _____ 20% of total cover: _____				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
Herb Stratum (Plot size: 15' x 30')				
1. Paspalum dilatatum	75	Yes	FAC	
2. Mimosa strigillosa	15		FAC	
3. Oenothera speciosa (Status Unknown)	8		UPL	
4. Lolium perenne	2		FACU	
5.				
8.				
0 = Total Cover 50% of total cover: 50 20% of total cover: 20				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
Woody Vine Stratum (Plot size: 15' x 30')				
1.				
2.				
3.				
4.				
5.				
8.				
0 = Total Cover 50% of total cover: _____ 20% of total cover: _____				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: (If observed, list morphological adaptations below.)				

SOIL Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features		Texture	Remarks
	Color (moist)	%	Color (moist)	%		
0-11	10YR 3/2	100			CL	
11-14	10YR 3/2	95	10YR 3/3	5	CL	(No redox features, only mottles.)

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U)	<input type="checkbox"/> 1 cm Muck (A9) (LRR O)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U)	<input type="checkbox"/> 2 cm Muck (A10) (LRR S)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O)	<input type="checkbox"/> Reduced Vertic (F18) (outside MLRA 150A,B)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (LRR P, S, T)
<input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 153B)
<input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Muck Presence (A8) (LRR U)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> 1 cm Muck (A9) (LRR P, T)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Marl (F10) (LRR U)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Ochric (F11) (MLRA 151)	
<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR O, S)	<input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Delta Ochric (F17) (MLRA 151)	
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B)	
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A)	
<input type="checkbox"/> Dark Surface (S7) (LRR P, S, T, U)	<input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)	

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:
 Soils significantly disturbed from construction of adjacent road. Sedimentation and erosion from upgradient subdivision.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Windy Hill Road (A-12-1403) City/County: Hays County Sampling Date: 6/1/2020
 Applicant/Owner: City of Kyle State: TX Sampling Point: 2
 Investigator(s): C. Collier Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): Concave Slope (%): 1.98
 Subregion (LRR or MLRA): LRR J Lat: 30.031818 Long: -97.838197 Datum: NAD 83
 Soil Map Unit Name: HoB - Houston Black clay, 1 to 3 percent slopes NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		

Remarks:
 Site conditions were wetter than normal due to recent rainfall.
 Hydrology significantly disturbed due to areas of erosion ponding water after rain events.

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquifer (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
---	---

Field Observations:
 Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): _____
 Saturation Present? Yes No Depth (inches): _____
 (includes capillary fringe)
 Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
 FAC-Neutral Test: 0 FACW/OBL Species, 0 FACU/UPL Species
 Ponded water from recent rain in areas of severe erosion.

Wetland Hydrology Present? Yes No

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 2

Tree Stratum (Plot size: 15'x30') 1. _____ Absolute % Cover: _____ Dominant Species? _____ Indicator Status _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 0 = Total Cover 50% of total cover: _____ 20% of total cover: _____ Sapling/Shrub Stratum (Plot size: 15'x30') 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 0 = Total Cover 50% of total cover: _____ 20% of total cover: _____ Herb Stratum (Plot size: 15'x30') 1. Paspalum dilatatum 65 Yes FAC 2. Cynodon dactylon 15 FACU 3. Pynnopappus carolinianus (Status Unknown) 5 UPL 4. Mimosa strigillosa 5 FAC 5. Oenothera speciosa (Status Unknown) 2 UPL 6. _____ 7. _____ 8. _____ 9. _____ 10. _____ 11. _____ 12. _____ 92 = Total Cover 50% of total cover: 46 20% of total cover: 18.4 Woody Vine Stratum (Plot size: 15'x30') 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 0 = Total Cover 50% of total cover: _____ 20% of total cover: _____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A) Total Number of Dominant Species Across All Strata: 1 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B) Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species x 1 = _____ FACW species x 2 = _____ FAC species x 3 = _____ FACU species x 4 = _____ UPL species x 5 = _____ Column Totals: (A) _____ (B) _____ Prevalence Index = B/A = _____ Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
--	---

Remarks: (If observed, list morphological adaptations below.)

SOIL Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features		Texture	Remarks
	Color (moist)	%	Color (moist)	%		
0-5	10YR 3/2	100			CL	
5-14	10YR 3/2	80	2.5 Y 6/4	20	CL	20% rock from adjacent road

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U)	<input type="checkbox"/> 1 cm Muck (A9) (LRR O)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U)	<input type="checkbox"/> 2 cm Muck (A10) (LRR S)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O)	<input type="checkbox"/> Reduced Vertic (F18) (outside MLRA 150A,B)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (LRR P, S, T)
<input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 153B)
<input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Muck Presence (A8) (LRR U)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> 1 cm Muck (A9) (LRR P, T)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Marl (F10) (LRR U)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Ochric (F11) (MLRA 151)	
<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T)	
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR O, S)	<input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Delta Ochric (F17) (MLRA 151)	
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B)	
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A)	
<input type="checkbox"/> Dark Surface (S7) (LRR P, S, T, U)	<input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
 Type: _____
 Depth (inches): _____
 Hydric Soil Present? Yes No

Remarks:
 Soils significantly disturbed from construction of adjacent road. Sedimentation and erosion from upgradient subdivision.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Windy Hill Road (A-12-1403) City/County: Hays County Sampling Date: 6/1/2020
 Applicant/Owner: City of Kyle State: TX Sampling Point: 3
 Investigator(s): C. Collier Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): Concave Slope (%): 2.51
 Subregion (LRR or MLRA): LRR J Lat: 30.031809 Long: -97.837104 Datum: NAD 83
 Soil Map Unit Name: Tn - Tinn clay, 0 to 1 percent slopes, frequently flooded NWI classification: R4SBC
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Remarks:	Site conditions were wetter than normal due to recent rainfall.		

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquifer (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
---	---

Field Observations:
 Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): _____
 Saturation Present? (includes capillary fringe) Yes No Depth (inches): _____
 Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
 Remarks:
 FAC-Neutral Test: 0 FACW/OBL Species, 1 FACU/UPL Species

Wetland Hydrology Present? Yes No

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 3

Tree Stratum (Plot size: 15'x30') 1. _____ Absolute % Cover: _____ Dominant Species? _____ Indicator Status _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 0 = Total Cover 50% of total cover: _____ 20% of total cover: _____ Sapling/Shrub Stratum (Plot size: 15'x30') 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 0 = Total Cover 50% of total cover: _____ 20% of total cover: _____ Herb Stratum (Plot size: 15'x30') 1. Paspalum dilatatum 39 Yes FAC 2. Cynodon dactylon 25 Yes FACU 3. Mimosa strigillosa 25 Yes FACU 4. Lolium perenne 5 FACU 5. Pyrrhappus carolinianus (Status Unknown) 5 UPL 6. Oenothera speciosa (Status Unknown) 1 UPL 7. _____ 8. _____ 9. _____ 10. _____ 11. _____ 12. _____ 100 = Total Cover 50% of total cover: 50 20% of total cover: 20 Woody Vine Stratum (Plot size: 15'x30') 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 0 = Total Cover 50% of total cover: _____ 20% of total cover: _____ Remarks: (If observed, list morphological adaptations below.)	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A) Total Number of Dominant Species Across All Strata: 3 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B) Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species x 1 = _____ FACW species x 2 = _____ FAC species x 3 = _____ FACU species x 4 = _____ UPL species x 5 = _____ Column Totals: (A) _____ (B) _____ Prevalence Index = B/A = _____ Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0' <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height. Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
---	--

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features		Texture	Remarks
	Color (moist)	%	Color (moist)	%		
0-12	10YR 4/2	60	2.5Y 6/4	40	CL	Sedimentation on top. Rock fragments throughout. Large rock (riprap) encountered at 4 inches.

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)
 Histic Epipedon (A2) Polyvalue Below Surface (S8) (LRR S, T, U)
 Black Histic (A3) Thin Dark Surface (S9) (LRR S, T, U)
 Hydrogen Sulfide (A4) Loamy Mucky Mineral (F1) (LRR O)
 Stratified Layers (A5) Loamy Gleyed Matrix (F2) Reduced Vertic (F18) (outside MLRA 150A,B)
 Organic Bodies (A6) (LRR P, T, U) Depleted Matrix (F3) Anomalous Bright Loamy Soils (F20) (MLRA 153B)
 5 cm Mucky Mineral (A7) (LRR P, T, U) Redox Dark Surface (F6) Red Parent Material (TF2)
 Muck Presence (A8) (LRR U) Depleted Dark Surface (F7) Very Shallow Dark Surface (TF12)
 1 cm Muck (A9) (LRR P, T) Redox Depressions (F8) Other (Explain in Remarks)
 Depleted Below Dark Surface (A11) Marl (F10) (LRR U)
 Thick Dark Surface (A12) Depleted Ochric (F11) (MLRA 151)
 Coast Prairie Redox (A16) (MLRA 150A) Iron-Manganese Masses (F12) (LRR O, P, T) ³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
 Sandy Mucky Mineral (S1) (LRR O, S) Umbric Surface (F13) (LRR P, T, U)
 Sandy Gleyed Matrix (S4) Delta Ochric (F17) (MLRA 151)
 Sandy Redox (S5) Reduced Vertic (F18) (MLRA 150A, 150B)
 Stripped Matrix (S6) Piedmont Floodplain Soils (F19) (MLRA 149A)
 Dark Surface (S7) (LRR P, S, T, U) Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Restrictive Layer (if observed):
 Type: _____
 Depth (inches): _____
 Hydric Soil Present? Yes No

Remarks:
 Soils significantly disturbed from construction of adjacent road. Sedimentation and erosion from upgradient subdivision.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Windy Hill Road (A-12-1403) City/County: Hays County Sampling Date: 6/1/2020
 Applicant/Owner: City of Kyle State: TX Sampling Point: 4
 Investigator(s): C. Collier Section, Township, Range: N/A
 Landform (hilllope, terrace, etc.): Swale Local relief (concave, convex, none): Concave Slope (%): 2.49
 Subregion (LRR or MLRA): LRR J Lat: 30.031818 Long: -97.835898 Datum: NAD 83
 Soil Map Unit Name: HoB - Houston Black clay, 1 to 3 percent slopes NWI classification: Upland
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation, Soil, or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Remarks: Site conditions were wetter than normal due to recent rainfall.	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquifer (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
---	---

Field Observations:
 Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): _____
 Saturation Present? (includes capillary fringe) Yes No Depth (inches): _____
 Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
 Remarks:
 FAC-Neutral Test: 0 FACW/OBL Species, 1 FACU/UPL Species

Wetland Hydrology Present? Yes No

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 4

Tree Stratum (Plot size: 15'x30') 1. _____ Absolute % Cover _____ Dominant Species? _____ Indicator Status _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 0 = Total Cover 50% of total cover: _____ 20% of total cover: _____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A) Total Number of Dominant Species Across All Strata: 2 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)
Sapling/Shrub Stratum (Plot size: 15'x30') 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 0 = Total Cover 50% of total cover: _____ 20% of total cover: _____	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species x 1 = _____ FACW species x 2 = _____ FAC species x 3 = _____ FACU species x 4 = _____ UPL species x 5 = _____ Column Totals: (A) _____ (B) _____ Prevalence Index = B/A = _____
Herb Stratum (Plot size: 15'x30') 1. <i>Cynodon dactylon</i> 30 Yes FACU 2. <i>Paspalum dilatatum</i> 25 Yes FAC 3. <i>Mimosa strigillosa</i> 20 UPL 4. <i>Phyrrhopappus carolinianus</i> (Status Unknown) 15 FACU 5. <i>Lolium perenne</i> 15 FACU 6. _____ 7. _____ 8. _____ 9. _____ 10. _____ 11. _____ 12. _____ 105 = Total Cover 50% of total cover: 52.5 20% of total cover: 21	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size: 15'x30') 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 0 = Total Cover 50% of total cover: _____ 20% of total cover: _____	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
Remarks: (If observed, list morphological adaptations below.)	Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features		Texture	Remarks
	Color (moist)	%	Color (moist)	%		
0-12	10YR 3/2	100			CL	Few rock fragments throughout

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

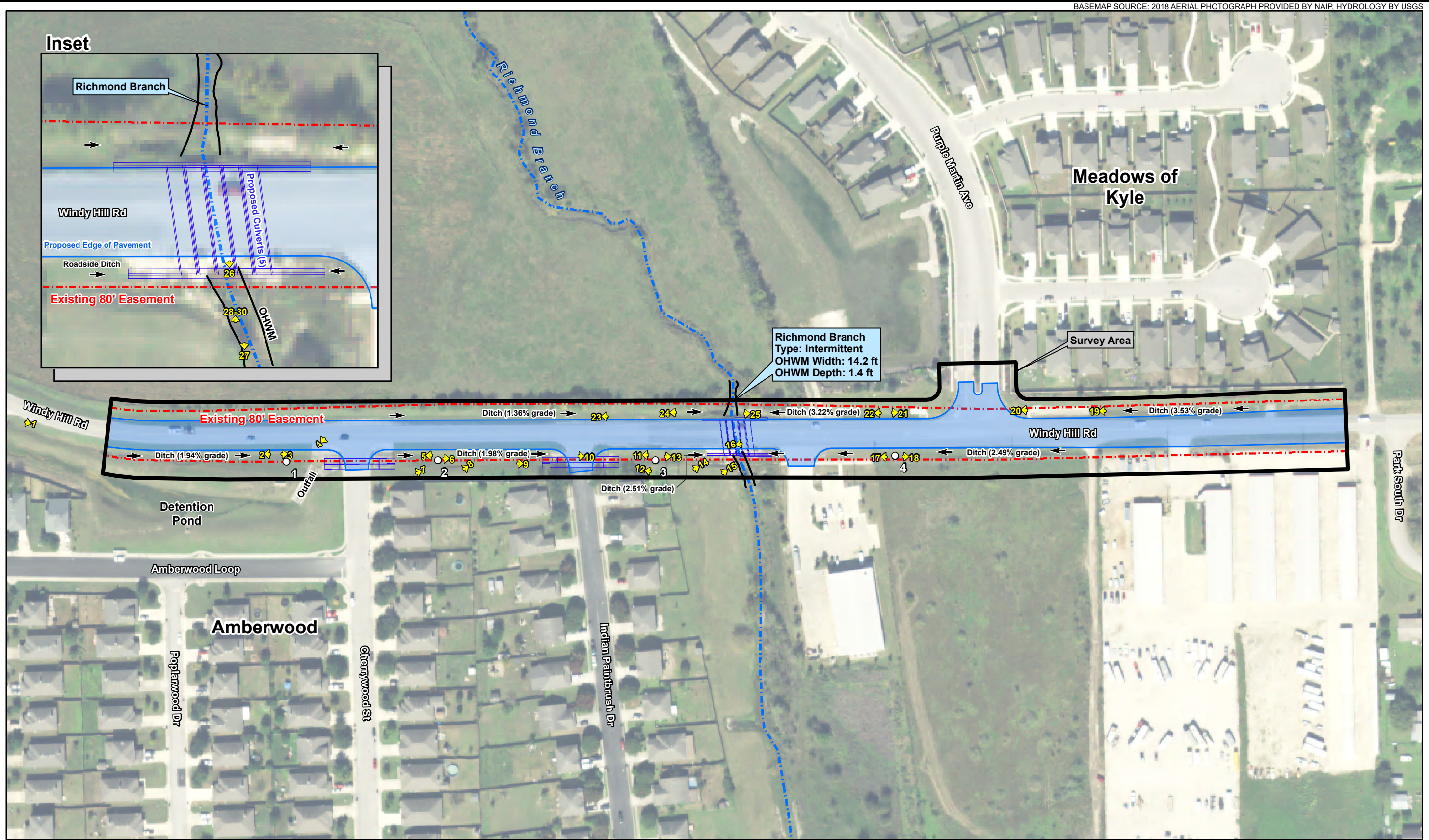
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)
 Histic Epipedon (A2) Polyvalue Below Surface (S8) (LRR S, T, U)
 Black Histic (A3) Thin Dark Surface (S9) (LRR S, T, U)
 Hydrogen Sulfide (A4) Loamy Mucky Mineral (F1) (LRR O)
 Stratified Layers (A5) Loamy Gleyed Matrix (F2)
 Organic Bodies (A6) (LRR P, T, U) Depleted Matrix (F3)
 5 cm Mucky Mineral (A7) (LRR P, T, U) Redox Dark Surface (F6)
 Muck Presence (A8) (LRR U) Depleted Dark Surface (F7)
 1 cm Muck (A9) (LRR P, T) Redox Depressions (F8)
 Depleted Below Dark Surface (A11) Marl (F10) (LRR U)
 Thick Dark Surface (A12) Depleted Ochric (F11) (MLRA 151)
 Coast Prairie Redox (A16) (MLRA 150A) Iron-Manganese Masses (F12) (LRR O, P, T)
 Sandy Mucky Mineral (S1) (LRR O, S) Umbric Surface (F13) (LRR P, T, U)
 Sandy Gleyed Matrix (S4) Delta Ochric (F17) (MLRA 151)
 Sandy Redox (S5) Reduced Vertic (F18) (MLRA 150A, 150B)
 Stripped Matrix (S6) Piedmont Floodplain Soils (F19) (MLRA 149A)
 Dark Surface (S7) (LRR P, S, T, U) Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

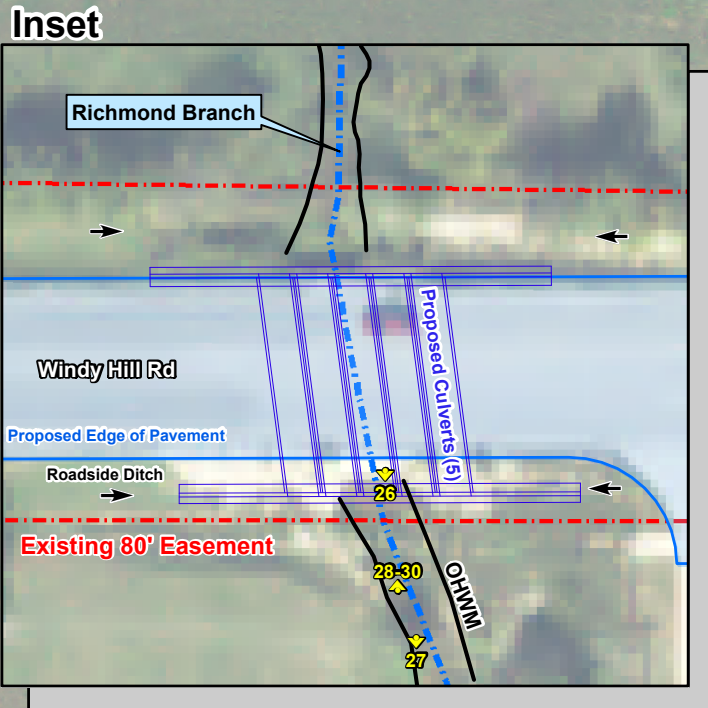
Restrictive Layer (if observed):
 Type: _____
 Depth (inches): _____
 Hydric Soil Present? Yes No

Remarks:

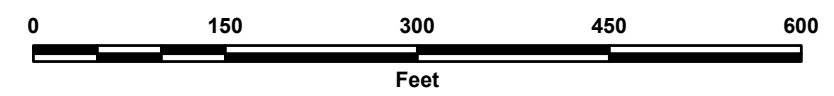
ATTACHMENT C
PHOTOGRAPHIC DOCUMENTATION



Richmond Branch
Type: Intermittent
OHWM Width: 14.2 ft
OHWM Depth: 1.4 ft



- Observation Point
- Photograph Location
- ➔ Existing Roadside Ditch Flow Direction
- Proposed Culvert
- Approximate 80' Easement
- Delineated OHWM
- Richmond Branch
- Proposed Edge of Pavement
- ▭ Survey Area



Windy Hill Road – Proposed Road Improvements
Cherrywood St. to Park S. Drive
City of Kyle
Hays County, Texas
GLO Contract No. 19-280-000-B779
Map Revised: 06/10/2020 Project Number: A-12-1-403 GIS Analyst: NCF

PLATE C-1
MAP SHOWING PHOTOGRAPH LOCATIONS



Site Photographs



1. Looking east along Windy Hill Road and the south roadside ditch during the June 2020 delineation.



2. Looking west along the south roadside ditch of Windy Hill Road from near Cherrywood St.



3. Looking west at culvert under Cherrywood St.



4. Looking south at Amberwood detention pond outfall at the roadside ditch.



5. Looking west along roadside ditch. Conditions were wetter than normal during delineation due to recent rainfall.



6. Looking east along roadside ditch. Erosional features pond water after significant runoff events.

Site Photographs



7. For comparison: Photograph taken by FLT in March 2020 showing typical, dry site conditions of the roadside ditch.



8. For comparison: Another photograph taken by FLT in March 2020. Erosional features typically remain dry except after significant runoff events.



9. Looking east at culvert under Indian Paint Brush Dr.



10. Looking east from Indian Paint Brush Dr. Site conditions were wetter than normal during the delineation.



11. Looking west along the roadside ditch towards Indian Paint Brush Dr.



12. For comparison: Photograph taken by FLT in March 2020 showing typical, dry conditions of the roadside ditch.

Site Photographs



13. Looking east along roadside ditch towards Richmond Branch.



14. For comparison: Photograph taken by FLT in March 2020 showing typical, dry conditions of the roadside ditch between Indian Paint Brush Rd. and Richmond Branch.



15. Looking east along roadside ditch near Richmond Branch bridge. Significant erosion is present, along with erosion control devices put in place over the years.



16. Looking west from the Richmond Branch bridge along Windy Hill Road.



17. Looking west along the south roadside ditch.



18. Looking east along the south roadside ditch.

Site Photographs



19. Looking west along the north roadside ditch near Purple Martin Ave. Riprap has been installed to minimize erosion.



20. Looking west along the roadside ditch from near Purple Martin Ave.



21. Looking east along roadside ditch towards Purple Martin Ave.



22. Looking west along roadside ditch towards Richmond Branch. Riprap has been installed to minimize erosion.



23. Looking west along roadside ditch across from Indian Paint Brush Dr.



24. Looking west along roadside ditch from near Richmond Branch.

Site Photographs



25. Looking east along roadside ditch near the discharge point into Richmond Branch. Significant riprap has been installed to minimize erosion.



26. Looking south along intermittent Richmond Branch. Blue flagging denotes the extent of OHWM.



27. Looking south along Richmond Branch near the edge of the project area.



28. Looking north along Richmond Branch. Cattails and black willows are abundant within the OHWM of Richmond Branch.



29. Looking north along Richmond Branch. Blue flagging denotes OHWM.



30. Looking north at Richmond Branch bridge.

Site Photographs



Soil Profile of Observation Point 1.



Soil Profile of Observation Point 2.



Soil Profile of Observation Point 3.



Soil Profile of Observation Point 4.

ATTACHMENT D
PRECIPITATION RECORDS

Record of Climatological Observations

These data are quality controlled and may not be identical to the original observations.

Generated on 06/08/2020

Observation Time Temperature: Unknown Observation Time Precipitation: Unknown

Year	Month	Day	Temperature (F)		At Observation	Precipitation					Evaporation		Soil Temperature (F)						
			24 Hrs. Ending at Observation Time			24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth			
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag	Snow, Ice Pellets, Hail, Ice on Ground (in)			Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.	
2020	05	01				0.00													
2020	05	02				0.00													
2020	05	03				0.00													
2020	05	04				0.00													
2020	05	05				0.00													
2020	05	06				0.00													
2020	05	07				0.00													
2020	05	08				0.00													
2020	05	09				0.00													
2020	05	10				0.00													
2020	05	11				0.00													
2020	05	12				5.08													
2020	05	13				0.19													
2020	05	14				0.00													
2020	05	15				T													
2020	05	16				1.05													
2020	05	17				0.00													
2020	05	18				0.00													
2020	05	19				0.00													
2020	05	20				0.00													
2020	05	21				0.00													
2020	05	22				0.00													
2020	05	23				0.00													
2020	05	24				0.09													
2020	05	25				2.26													
2020	05	26				0.50													
2020	05	27																	
2020	05	28				0.74													
2020	05	29				0.00													
2020	05	30				0.00													
2020	05	31				0.32													
Summary						10.23		0.0											

Empty, or blank, cells indicate that a data observation was not reported.

*Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 0=Unknown

"s" This data value failed one of NCDC's quality control tests.

"T" values in the Precipitation or Snow category above indicate a "trace" value was recorded.

"A" values in the Precipitation Flag or the Snow Flag column indicate a multiday total, accumulated since last measurement, is being used.
Data value inconsistency may be present due to rounding calculations during the conversion process from SI metric units to standard imperial units.

ATTACHMENT E
THREATENED & ENDANGERED SPECIES



United States Department of the Interior



FISH AND WILDLIFE SERVICE

Austin Ecological Services Field Office

10711 Burnet Road, Suite 200

Austin, TX 78758-4460

Phone: (512) 490-0057 Fax: (512) 490-0974

<http://www.fws.gov/southwest/es/AustinTexas/>

<http://www.fws.gov/southwest/es/EndangeredSpecies/lists/>

In Reply Refer To:

June 08, 2020

Consultation Code: 02ETAU00-2020-SLI-1584

Event Code: 02ETAU00-2020-E-03280

Project Name: City of Kyle, Windy Hill Road

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that *may* occur within the county of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

Please note that new information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Also note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of federally listed as threatened

or endangered species and to determine whether projects may affect these species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

While a Federal agency may designate a non-Federal representative to conduct informal consultation or prepare a biological assessment, the Federal Agency must notify the Service in writing of any such designation. The Federal agency shall also independently review and evaluate the scope and content of a biological assessment prepared by their designated non-Federal representative before that document is submitted to the Service.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by a federally funded, permitted or authorized activity, the agency is required to consult with the Service pursuant to 50 CFR 402. The following definitions are provided to assist you in reaching a determination:

- *No effect* - the proposed action will not affect federally listed species or critical habitat. A “no effect” determination does not require section 7 consultation and no coordination or contact with the Service is necessary. However, if the project changes or additional information on the distribution of listed or proposed species becomes available, the project should be reanalyzed for effects not previously considered.
 - *May affect, but is not likely to adversely affect* - the project may affect listed species and/or critical habitat; however, the effects are expected to be discountable, insignificant, or completely beneficial. Certain avoidance and minimization measures may need to be implemented in order to reach this level of effect. The Federal agency or the designated non-Federal representative should consult with the Service to seek written concurrence that adverse effects are not likely. Be sure to include all of the information and documentation used to reach your decision with your request for concurrence. The Service must have this documentation before issuing a concurrence.
 - *Is likely to adversely affect* - adverse effects to listed species may occur as a direct or indirect result of the proposed action. For this determination, the effect of the action is neither discountable nor insignificant. If the overall effect of the proposed action is beneficial to the listed species but the action is also likely to cause some adverse effects to individuals of that species, then the proposed action “is likely to adversely affect” the listed species. The analysis should consider all interrelated and interdependent actions. An “is likely to adversely affect” determination requires the Federal action agency to initiate formal section 7 consultation with our office.
-

Regardless of the determination, the Service recommends that the Federal agency maintain a complete record of the evaluation, including steps leading to the determination of effect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related information. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at: <http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>.

Migratory Birds

For projects that may affect migratory birds, the Migratory Bird Treaty Act (MBTA) implements various treaties and conventions for the protection of these species. Under the MBTA, taking, killing, or possessing migratory birds is unlawful. Migratory birds may nest in trees, brushy areas, or other areas of suitable habitat. The Service recommends activities requiring vegetation removal or disturbance avoid the peak nesting period of March through August to avoid destruction of individuals, nests, or eggs. If project activities must be conducted during this time, we recommend surveying for nests prior to conducting work. If a nest is found, and if possible, the Service recommends a buffer of vegetation remain around the nest until the young have fledged or the nest is abandoned.

For additional information concerning the MBTA and recommendations to reduce impacts to migratory birds please contact the U.S. Fish and Wildlife Service Migratory Birds Office, 500 Gold Ave. SW, Albuquerque, NM 87102. A list of migratory birds may be viewed at <https://www.fws.gov/birds/management/managed-species/migratory-bird-treaty-act-protected-species.php>. Guidance for minimizing impacts to migratory birds for projects including communications towers can be found at: <https://www.fws.gov/birds/management/project-assessment-tools-and-guidance/guidance-documents/communication-towers.php>. Additionally, wind energy projects should follow the wind energy guidelines

<https://www.fws.gov/birds/management/project-assessment-tools-and-guidance/guidance-documents/wind-energy.php>) for minimizing impacts to migratory birds and bats.

Finally, please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan <https://www.fws.gov/birds/management/project-assessment-tools-and-guidance/guidance-documents/eagles.php>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
-

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Austin Ecological Services Field Office

10711 Burnet Road, Suite 200

Austin, TX 78758-4460

(512) 490-0057

Project Summary

Consultation Code: 02ETAU00-2020-SLI-1584

Event Code: 02ETAU00-2020-E-03280

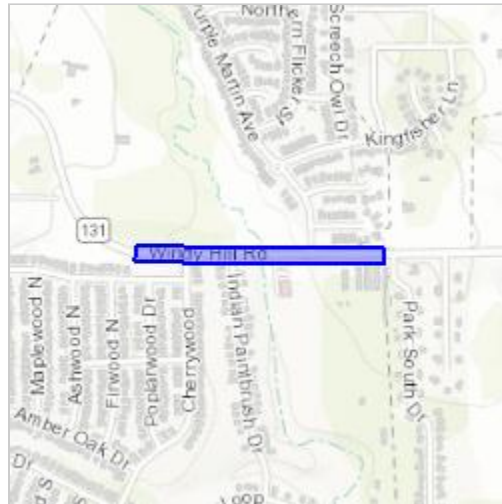
Project Name: City of Kyle, Windy Hill Road

Project Type: TRANSPORTATION

Project Description: Wetlands delineation for permitting requirements.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/30.03190822392377N97.83674551765803W>



Counties: Hays, TX

Endangered Species Act Species

There is a total of 19 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 3 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.
-

Birds

NAME	STATUS
<p>Golden-cheeked Warbler (=wood) <i>Dendroica chrysoparia</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/33</p>	Endangered
<p>Least Tern <i>Sterna antillarum</i> Population: interior pop. No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: <ul style="list-style-type: none"> ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/8505</p>	Endangered
<p>Piping Plover <i>Charadrius melodus</i> Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is final critical habitat for this species. Your location is outside the critical habitat. This species only needs to be considered under the following conditions: <ul style="list-style-type: none"> ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/6039</p>	Threatened
<p>Red Knot <i>Calidris canutus rufa</i> No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: <ul style="list-style-type: none"> ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/1864</p>	Threatened
<p>Whooping Crane <i>Grus americana</i> Population: Wherever found, except where listed as an experimental population There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/758</p>	Endangered

Amphibians

NAME	STATUS
Austin Blind Salamander <i>Eurycea waterlooensis</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5737	Endangered
Barton Springs Salamander <i>Eurycea sosorum</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1113	Endangered
San Marcos Salamander <i>Eurycea nana</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6374	Threatened
Texas Blind Salamander <i>Typhlomolge rathbuni</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5130	Endangered

Fishes

NAME	STATUS
Fountain Darter <i>Etheostoma fonticola</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5858	Endangered
San Marcos Gambusia <i>Gambusia georgei</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7519	Endangered

Clams

NAME	STATUS
Texas Fatmucket <i>Lampsilis bracteata</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9041	Candidate
Texas Fawnsfoot <i>Truncilla macrodon</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8965	Candidate
Texas Pimpleback <i>Quadrula petrina</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8966	Candidate

Insects

NAME	STATUS
Comal Springs Dryopid Beetle <i>Stygoparnus comalensis</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7175	Endangered
Comal Springs Riffle Beetle <i>Heterelmis comalensis</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3403	Endangered

Crustaceans

NAME	STATUS
Peck's Cave Amphipod <i>Stygobromus (=Stygonectes) pecki</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8575	Endangered

Flowering Plants

NAME	STATUS
Bracted Twistflower <i>Streptanthus bracteatus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2856	Candidate
Texas Wild-rice <i>Zizania texana</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/805	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

ATTACHMENT F
CULTURAL RESOURCES

From: noreply@thc.state.tx.us
To: lhertzler@future-link.biz; reviews@thc.state.tx.us
Subject: Section 106 Submission
Date: Wednesday, May 27, 2020 5:18:06 PM



Re: Project Review under Section 106 of the National Historic Preservation Act and/or the Antiquities Code of Texas

THC Tracking #202013097

Kyle Windy Hill Road Improvements
Windy Hill Road
Kyle, TX

Dear Latrice Hertzler:

Thank you for your submittal regarding the above-referenced project.

The review staff, led by Bill Martin and Sarah Medwig, has completed its review and has made the following determinations based on the information submitted for review:

Above-Ground Resources

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

Archeology Comments

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

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

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

Sincerely,



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

Please do not respond to this email.

ATTACHMENT G
NATIONWIDE PERMIT 14 GUIDELINES

NATIONWIDE PERMIT 14
Effective Date: March 19, 2017

Linear Transportation Projects. Activities required for crossings of waters of the United States associated with the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxiways) in waters of the United States. For linear transportation projects in non-tidal waters, the discharge cannot cause the loss of greater than 1/2-acre of waters of the United States. For linear transportation projects in tidal waters, the discharge cannot cause the loss of greater than 1/3-acre of waters of the United States. Any stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project.

This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to construct the linear transportation project. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

This NWP cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) the loss of waters of the United States exceeds 1/10-acre; or (2) there is a discharge in a special aquatic site, including wetlands. (See general condition 32.) (Authorities: Sections 10 and 404)

Note 1: For linear transportation projects crossing a single waterbody more than one time at separate and distant locations, or multiple waterbodies at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. Linear transportation projects must comply with 33 CFR 330.6(d).

Note 2: Some discharges for the construction of farm roads or forest roads, or temporary roads for moving mining equipment, may qualify for an exemption under section 404(f) of the Clean Water Act (see 33 CFR 323.4).

Note 3: For NWP 14 activities that require pre-construction notification, the PCN must include any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings that require Department of the Army authorization but do not require pre-construction notification (see paragraph (b) of general condition 32). The district engineer will evaluate the PCN in accordance with Section D, "District Engineer's Decision." The district engineer may require mitigation to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see general condition 23).

NATIONWIDE PERMIT GENERAL CONDITIONS

Effective Date: January 6, 2017

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation. (b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States. (c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the preconstruction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the preconstruction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than

once for the same single and complete project.

16. Wild and Scenic Rivers. (a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status.

(b) If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. The permittee shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status.

(c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: <http://www.rivers.gov/>.

17. Tribal Rights. No NWP activity may cause more than minimal adverse effects on tribal rights (including treaty rights), protected tribal resources, or tribal lands.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless ESA section 7 consultation addressing the effects of the proposed activity has been completed. Direct effects are the immediate effects on listed species and critical habitat caused by the NWP activity. Indirect effects are those effects on listed species and critical habitat that are caused by the NWP activity and are later in time, but still are reasonably certain to occur.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. If preconstruction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the proposed activity or that utilize the designated critical habitat that might be affected by the proposed activity. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the activity, and has so notified the Corps, VerDate Sep-11 the applicant shall not begin work until the Corps has provided notification that the proposed activity will have "no effect" on listed species or critical habitat, or until ESA section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs.

(e) Authorization of an activity by an NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required.

(g) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their world wide Web pages at <http://www.fws.gov/> or <http://www.fws.gov/ipac> and <http://www.nmfs.noaa.gov/pr/species/esa/> respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring their action complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting appropriate local office of the U.S. Fish and Wildlife Service to determine applicable measures to reduce impacts to migratory birds or eagles, including whether "incidental

take” permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. Historic Properties. (a) In cases where the district engineer determines that the activity may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act. If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the preconstruction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect. Where the non-Federal applicant has identified historic properties on which the activity might have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed.

(d) For non-federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/ THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require preconstruction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require preconstruction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation to ensure that the activity results in no more than minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult to replace resources (see 33 CFR 332.3(e)(3)).

(e) Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. Restored riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(f) Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332. (1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the VerDate Sep-district engineer may approve the use of permittee-responsible mitigation. (2) The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f)). (3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation. (4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)). (5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided. (6) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(e)(1)(ii)).

(g) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs.

(h) Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of

concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWP does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature: When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(Transferee)

(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(i)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the activity and mitigation. The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. Activities Affecting Structures or Works Built by the United States. If an NWP activity also requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a "USACE project"), the prospective permittee must submit a preconstruction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission is not authorized by NWP until the appropriate Corps office issues the section 408 permission to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. Pre-Construction Notification. (a) **Timing.** Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either: (1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or (2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the

permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) **Contents of Pre-Construction Notification:** The PCN must be in writing and include the following information: (1) Name, address and telephone numbers of the prospective permittee; (2) Location of the proposed activity; (3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity; (4) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures. For single and complete linear projects, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans); (5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate; (6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan. (7) For non-Federal permittees, if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed activity or utilize the designated critical habitat that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act; (8) For non-Federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act; (9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the "study river" (see general condition 16); and (10) For an activity that requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from the Corps office having jurisdiction over that USACE project.

(c) **Form of Pre-Construction Notification:** The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is an NWP PCN and must include all of the applicable information required in paragraphs (b)(1) through (10) of this general condition. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and supporting materials if the district engineer has established tools and procedures for electronic submittals.

(d) **Agency Coordination:** (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity's adverse environmental effects so that they are no more than minimal. (2) Agency coordination is required for: (i) All NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of stream bed; (iii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iv) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes. (3) When agency coordination is required, the district engineer will immediately provide (e.g., via email, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or email that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the preconstruction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5. (4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act. (5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of preconstruction notifications to expedite agency coordination.

ATTACHMENT H
LIMITATIONS

LIMITATIONS

The work conducted by **Hydrex Environmental** and described in this report was performed in accordance with generally accepted scientific principles and practices, observing the same degree of care and skill generally exercised by the profession under similar circumstances and conditions. The opinions expressed in the report, together with the observations and findings are based on our professional judgment of the data developed and gathered during the course of this investigation and upon conditions that existed at the time of the specified field activities. Some of the information provided in this report may have been derived from a variety of published sources. It is not the intent or purpose of **Hydrex Environmental** to validate the precision of data generated by other parties.

The investigation is considered sufficient in detail and scope to form a reasonable basis for the conclusions presented in this report. Due to the nature of such investigations, interpretations and conclusions must be based on limited site data.

Hydrex Environmental is not responsible for the conclusions, opinions, or recommendations made by others based on the contents of this report. No other warranty, expressed or implied, is made in regard to the work performed by **Hydrex Environmental** during the course of this investigation.

ATTACHMENT 15

WILD AND SCENIC RIVERS

- U.S. National Park Service Information
- NEPAssist or Google Earth Mapping of Wild & Scenic River

Wild and Scenic Rivers (CEST and EA)

General requirements	Legislation	Regulation
The Wild and Scenic Rivers Act provides federal protection for certain free-flowing, wild, scenic and recreational rivers designated as components or potential components of the National Wild and Scenic Rivers System (NWSRS) from the effects of construction or development.	The Wild and Scenic Rivers Act (16 U.S.C. 1271-1287), particularly section 7(b) and (c) (16 U.S.C. 1278(b) and (c))	36 CFR Part 297
References		
https://www.hudexchange.info/environmental-review/wild-and-scenic-rivers		

1. Is your project within proximity of a NWSRS river as defined below?

Wild & Scenic Rivers: These rivers or river segments have been designated by Congress or by states (with the concurrence of the Secretary of the Interior) as wild, scenic, or recreational

Study Rivers: These rivers or river segments are being studied as a potential component of the Wild & Scenic River system.

Nationwide Rivers Inventory (NRI): The National Park Service has compiled and maintains the NRI, a register of river segments that potentially qualify as national wild, scenic, or recreational river areas

No

→ Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide documentation used to make your determination, such as a map identifying the project site and its surrounding area or a list of rivers in your region in the Screen Summary at the conclusion of this screen.

Yes, the project is in proximity of a Nationwide Rivers Inventory (NRI) River.

→ Continue to Question 2.

2. Could the project do *any* of the following?

- Have a direct and adverse effect within Wild and Scenic River Boundaries,
- Invade the area or unreasonably diminish the river outside Wild and Scenic River Boundaries, or
- Have an adverse effect on the natural, cultural, and/or recreational values of a NRI segment.

Consultation with the appropriate federal/state/local/tribal Managing Agency(s) is required, pursuant to Section 7 of the Act, to determine if the proposed project may have an adverse effect on a Wild & Scenic River or a Study River and, if so, to determine the appropriate avoidance or mitigation measures.

Note: Concurrence may be assumed if the Managing Agency does not respond within 30 days; however, you are still obligated to avoid or mitigate adverse effects on the rivers identified in the NWSRS

No, the Managing Agency has concurred that the proposed project will not alter, directly, or indirectly, any of the characteristics that qualifies or potentially qualifies the river for inclusion in the NWSRS.

→ *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide documentation of the consultation (including the Managing Agency's concurrence) and any other documentation used to make your determination.*

Yes, the Managing Agency was consulted and the proposed project may alter, directly, or indirectly, any of the characteristics that qualifies or potentially qualifies the river for inclusion in the NWSRS.

→ *Continue to Question 3.*

3. For the project to be brought into compliance with this section, all adverse impacts must be mitigated. Explain in detail the proposed measures that must be implemented to mitigate for the impact or effect, including the timeline for implementation.

→ *Continue to the Worksheet Summary below. Provide documentation of the consultation (including the Managing Agency's concurrence) and any other documentation used to make your determination.*

Worksheet Summary

Compliance Determination

Provide a clear description of your determination and a synopsis of the information that it was based on, such as:

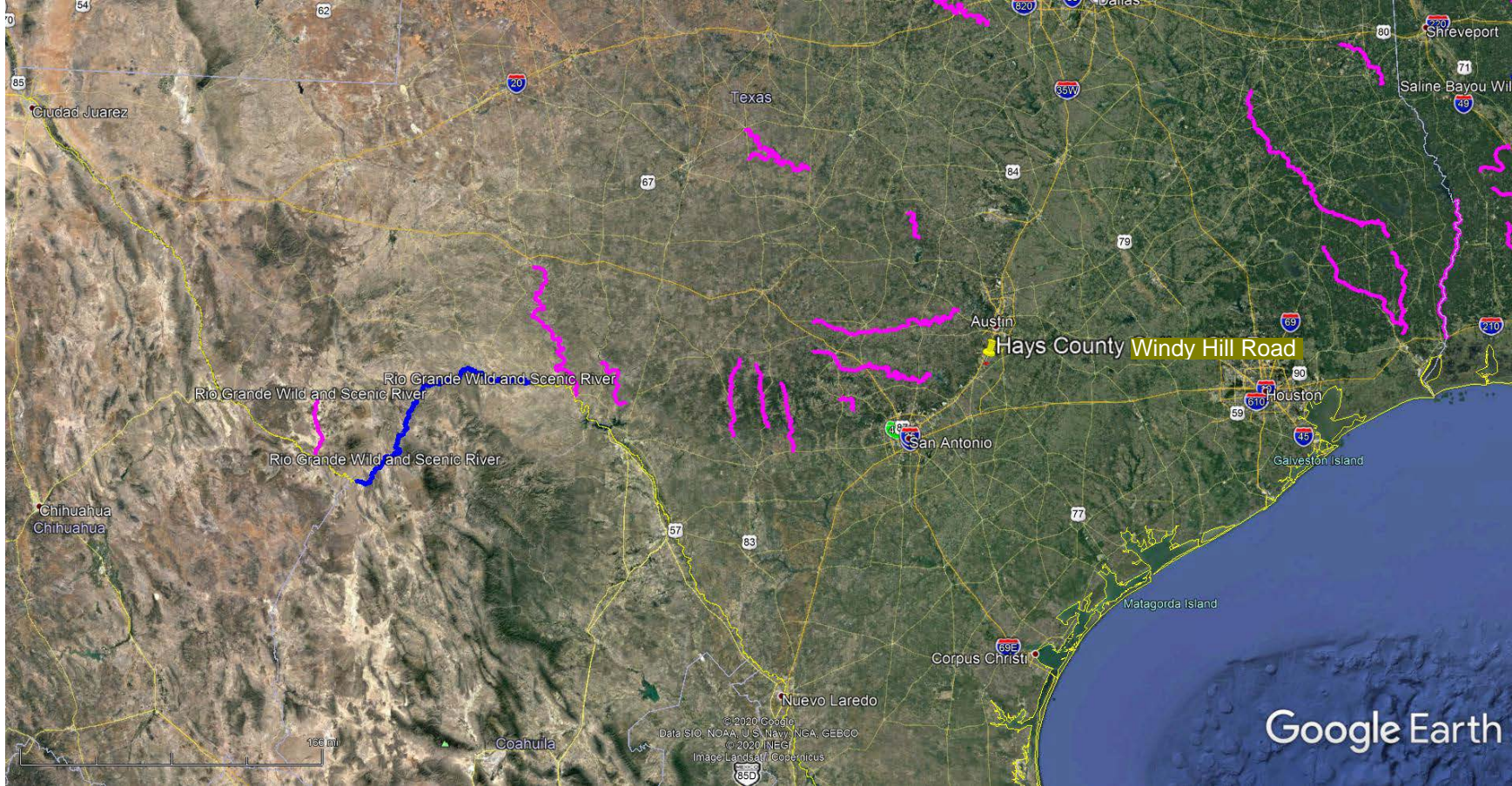
- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your region



See map of project area in proximity to nearest wild & scenic river as well as National Rivers Inventory.


Are formal compliance steps or mitigation required?

Yes

No



-  Wild & Scenic River
-  Significant Rivers (US National Park Service)

Client Name	Hays County	Future Link Technologies 
Contract #	CDBG – DR – May 2015 Floods	PO Box 90696, Austin, TX 78709
Map Information	Wild & Scenic Rivers	512-443-4100
Date	March 20	Environmental Service Provider

ATTACHMENT 16

ENVIRONMENTAL JUSTICE

- NEPAssist/EPA Environmental Justice Data

Environmental Justice (CEST and EA)

General requirements	Legislation	Regulation
Determine if the project creates adverse environmental impacts upon a low-income or minority community. If it does, engage the community in meaningful participation about mitigating the impacts or move the project.	Executive Order 12898	
References		
https://www.hudexchange.info/environmental-review/environmental-justice		

HUD strongly encourages starting the Environmental Justice analysis only after all other laws and authorities, including Environmental Assessment factors if necessary, have been completed.

1. Were any adverse environmental impacts identified in any other compliance review portion of this project's total environmental review?

Yes → *Continue to Question 2.*

No → *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below.*

2. Were these adverse environmental impacts disproportionately high for low-income and/or minority communities?

Yes

Explain:

→ *Continue to Question 3. Provide any supporting documentation.*

No

Explain:

→ *Continue to the Worksheet Summary and provide any supporting documentation.*

3. All adverse impacts should be mitigated. Explain in detail the proposed measures that must be implemented to mitigate for the impact or effect, including the timeline for implementation.

Mitigation as follows will be implemented:

→ Continue to Question 4.

No mitigation is necessary.

Explain why mitigation will not be made here:

→ Continue to Question 4.

4. Describe how the affected low-income or minority community was engaged or meaningfully involved in the decision on what mitigation actions, if any, will be taken.

→ Continue to the Worksheet Summary and provide any supporting documentation.

Worksheet Summary

Compliance Determination

Provide a clear description of your determination and a synopsis of the information that it was based on, such as:

- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your region

Are formal compliance steps or mitigation required?

Yes

No

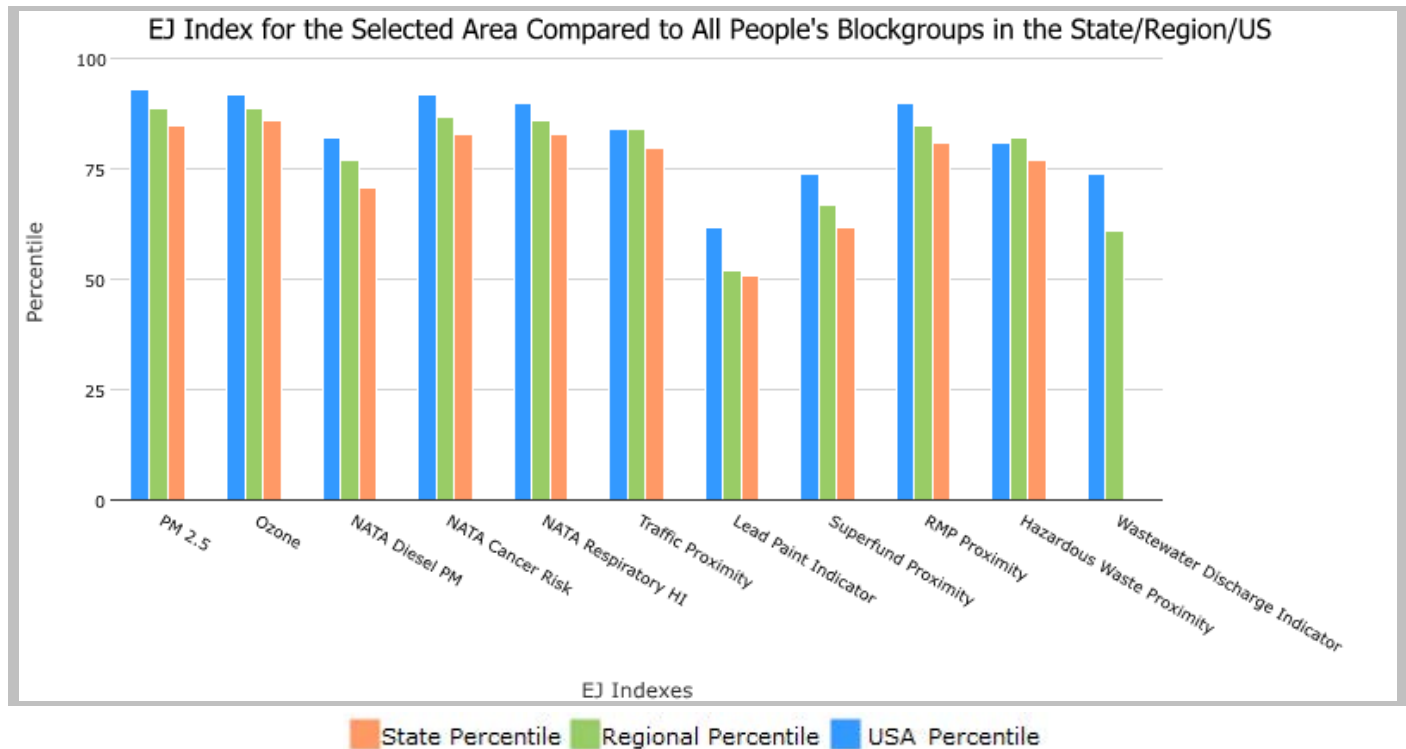
1 miles Ring around the Area, TEXAS, EPA Region 6

Approximate Population: 4,546

Input Area (sq. miles): 4.46

Kyle Windy Hill Road

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	85	89	93
EJ Index for Ozone	86	89	92
EJ Index for NATA* Diesel PM	71	77	82
EJ Index for NATA* Air Toxics Cancer Risk	83	87	92
EJ Index for NATA* Respiratory Hazard Index	83	86	90
EJ Index for Traffic Proximity and Volume	80	84	84
EJ Index for Lead Paint Indicator	51	52	62
EJ Index for Superfund Proximity	62	67	74
EJ Index for RMP Proximity	81	85	90
EJ Index for Hazardous Waste Proximity	77	82	81
EJ Index for Wastewater Discharge Indicator	N/A	61	74



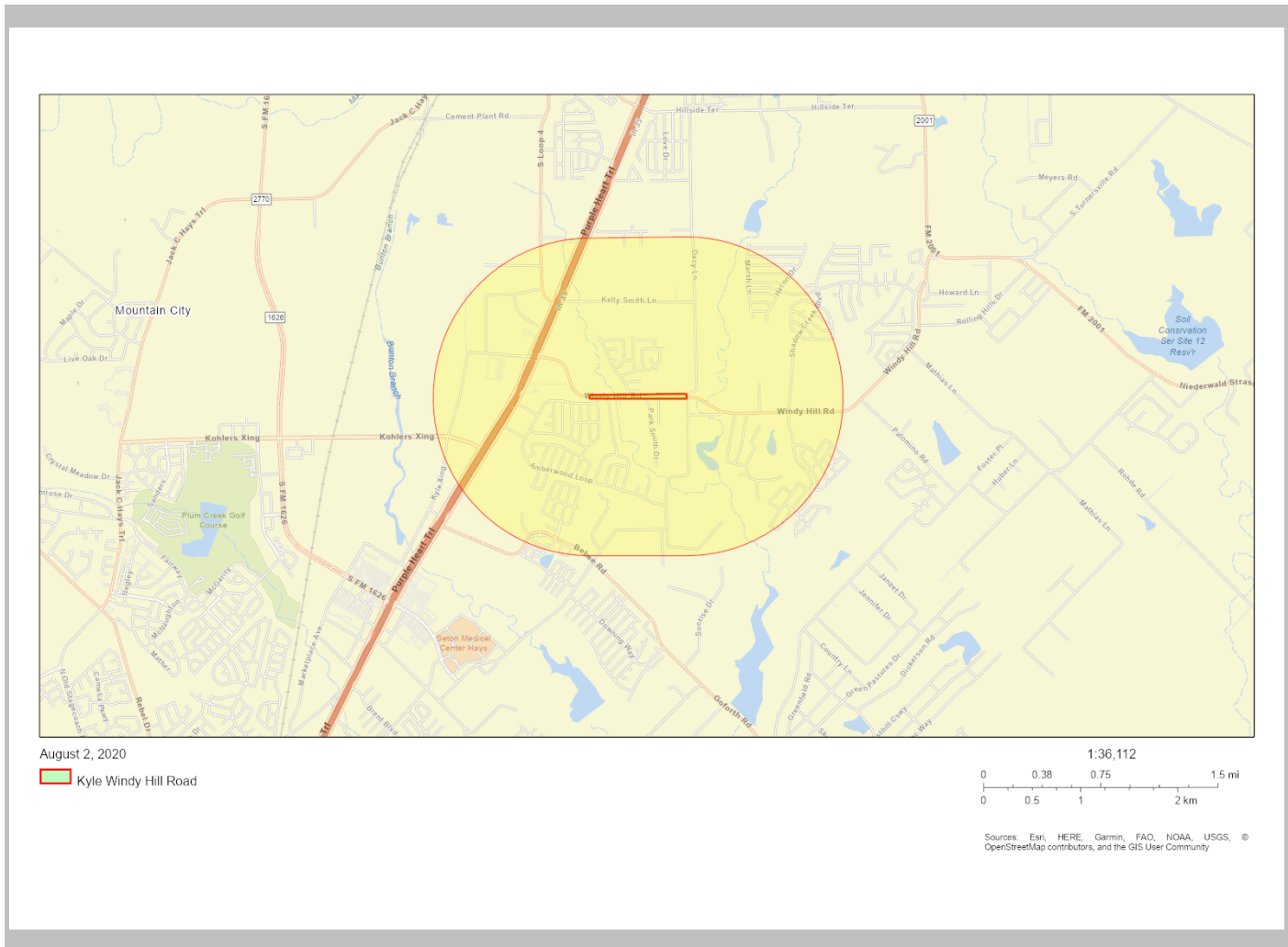
This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

1 miles Ring around the Area, TEXAS, EPA Region 6

Approximate Population: 4,546

Input Area (sq. miles): 4.46

Kyle Windy Hill Road



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJSCREEN Report (Version 2019)

1 miles Ring around the Area, TEXAS, EPA Region 6

Approximate Population: 4,546

Input Area (sq. miles): 4.46

Kyle Windy Hill Road

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in $\mu\text{g}/\text{m}^3$)	7.98	8.43	24	8.37	25	8.3	38
Ozone (ppb)	36.1	38.4	28	39.4	22	43	14
NATA* Diesel PM ($\mu\text{g}/\text{m}^3$)	0.231	0.429	23	0.401	<50th	0.479	<50th
NATA* Cancer Risk (lifetime risk per million)	30	35	23	36	<50th	32	<50th
NATA* Respiratory Hazard Index	0.37	0.43	23	0.45	<50th	0.44	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	260	470	60	400	65	750	54
Lead Paint Indicator (% Pre-1960 Housing)	6.9E-05	0.15	25	0.17	20	0.28	10
Superfund Proximity (site count/km distance)	0.014	0.085	12	0.081	14	0.13	9
RMP Proximity (facility count/km distance)	0.73	0.91	61	0.82	65	0.74	69
Hazardous Waste Proximity (facility count/km distance)	0.43	0.83	55	0.75	59	4	49
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	0	0.19	N/A	9.8	32	14	37
Demographic Indicators							
Demographic Index	50%	47%	56	44%	61	36%	74
Minority Population	69%	57%	59	51%	67	39%	78
Low Income Population	32%	36%	46	37%	43	33%	53
Linguistically Isolated Population	5%	8%	56	6%	65	4%	73
Population With Less Than High School Education	20%	17%	64	16%	67	13%	78
Population Under 5 years of age	7%	7%	51	7%	54	6%	64
Population over 64 years of age	6%	12%	27	13%	22	15%	14

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: <https://www.epa.gov/national-air-toxics-assessment>.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

Location: User-specified linear location
 Ring (buffer): 1-miles radius
 Description: Windy Hill Road, Kyle TX

Summary of ACS Estimates		2013 - 2017
Population		3,944
Population Density (per sq. mile)		1,635
Minority Population		2,744
% Minority		70%
Households		1,219
Housing Units		1,331
Housing Units Built Before 1950		0
Per Capita Income		26,852
Land Area (sq. miles) (Source: SF1)		2.41
% Land Area		97%
Water Area (sq. miles) (Source: SF1)		0.09
% Water Area		3%

	2013 - 2017 ACS Estimates	Percent	MOE (±)
Population by Race			
Total	3,944	100%	1,043
Population Reporting One Race	3,809	97%	2,198
White	3,183	81%	952
Black	124	3%	430
American Indian	0	0%	19
Asian	1	0%	115
Pacific Islander	0	0%	19
Some Other Race	501	13%	663
Population Reporting Two or More Races	135	3%	432
Total Hispanic Population	2,618	66%	1,030
Total Non-Hispanic Population	1,326		
White Alone	1,200	30%	444
Black Alone	124	3%	430
American Indian Alone	0	0%	19
Non-Hispanic Asian Alone	1	0%	115
Pacific Islander Alone	0	0%	19
Other Race Alone	0	0%	19
Two or More Races Alone	1	0%	173
Population by Sex			
Male	1,927	49%	604
Female	2,017	51%	651
Population by Age			
Age 0-4	279	7%	238
Age 0-17	1,246	32%	445
Age 18+	2,698	68%	563
Age 65+	265	7%	147

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race.

N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2013 - 2017



Location: User-specified linear location
 Ring (buffer): 1-miles radius
 Description: Windy Hill Road, Kyle TX

	2013 - 2017 ACS Estimates	Percent	MOE (±)
Population 25+ by Educational Attainment			
Total	2,314	100%	502
Less than 9th Grade	385	17%	248
9th - 12th Grade, No Diploma	123	5%	171
High School Graduate	548	24%	316
Some College, No Degree	625	27%	343
Associate Degree	158	7%	159
Bachelor's Degree or more	633	27%	274
Population Age 5+ Years by Ability to Speak English			
Total	3,665	100%	959
Speak only English	1,662	45%	623
Non-English at Home ¹⁺²⁺³⁺⁴	2,003	55%	745
¹ Speak English "very well"	1,238	34%	598
² Speak English "well"	374	10%	269
³ Speak English "not well"	273	7%	207
⁴ Speak English "not at all"	118	3%	150
³⁺⁴ Speak English "less than well"	391	11%	254
²⁺³⁺⁴ Speak English "less than very well"	764	21%	370
Linguistically Isolated Households*			
Total	70	100%	87
Speak Spanish	70	100%	85
Speak Other Indo-European Languages	0	0%	19
Speak Asian-Pacific Island Languages	0	0%	43
Speak Other Languages	0	0%	19
Households by Household Income			
Household Income Base	1,219	100%	252
< \$15,000	88	7%	104
\$15,000 - \$25,000	85	7%	108
\$25,000 - \$50,000	268	22%	195
\$50,000 - \$75,000	217	18%	198
\$75,000 +	561	46%	258
Occupied Housing Units by Tenure			
Total	1,219	100%	252
Owner Occupied	830	68%	228
Renter Occupied	388	32%	169
Employed Population Age 16+ Years			
Total	2,876	100%	691
In Labor Force	1,938	67%	565
Civilian Unemployed in Labor Force	66	2%	140
Not In Labor Force	938	33%	315

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of anyrace.

N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS)

*Households in which no one 14 and over speaks English "very well" or speaks English only.

Location: User-specified linear location

Ring (buffer): 1-miles radius

Description: Windy Hill Road, Kyle TX

	2013 - 2017 ACS Estimates	Percent	MOE (±)
Population by Language Spoken at Home*			
Total (persons age 5 and above)	5,798	100%	978
English	2,295	40%	654
Spanish	3,417	59%	1,020
French	24	0%	21
French Creole	N/A	N/A	N/A
Italian	N/A	N/A	N/A
Portuguese	N/A	N/A	N/A
German	50	1%	140
Yiddish	N/A	N/A	N/A
Other West Germanic	N/A	N/A	N/A
Scandinavian	N/A	N/A	N/A
Greek	N/A	N/A	N/A
Russian	N/A	N/A	N/A
Polish	N/A	N/A	N/A
Serbo-Croatian	N/A	N/A	N/A
Other Slavic	N/A	N/A	N/A
Armenian	N/A	N/A	N/A
Persian	N/A	N/A	N/A
Gujarathi	N/A	N/A	N/A
Hindi	N/A	N/A	N/A
Urdu	N/A	N/A	N/A
Other Indic	N/A	N/A	N/A
Other Indo-European	6	0%	21
Chinese	0	0%	21
Japanese	N/A	N/A	N/A
Korean	5	0%	17
Mon-Khmer, Cambodian	N/A	N/A	N/A
Hmong	N/A	N/A	N/A
Thai	N/A	N/A	N/A
Laotian	N/A	N/A	N/A
Vietnamese	0	0%	21
Other Asian	0	0%	21
Tagalog	0	0%	21
Other Pacific Island	N/A	N/A	N/A
Navajo	N/A	N/A	N/A
Other Native American	N/A	N/A	N/A
Hungarian	N/A	N/A	N/A
Arabic	0	0%	21
Hebrew	N/A	N/A	N/A
African	N/A	N/A	N/A
Other and non-specified	0	0%	21
Total Non-English	3,503	60%	1,177

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race.

N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2013 - 2017.

*Population by Language Spoken at Home is available at the census tract summary level and up.



Location: User-specified linear location
 Ring (buffer): 1-miles radius
 Description: Windy Hill Road, Kyle TX

Summary	Census 2010
Population	3,146
Population Density (per sq. mile)	1,303
Minority Population	2,119
% Minority	67%
Households	966
Housing Units	1,004
Land Area (sq. miles)	2.41
% Land Area	97%
Water Area (sq. miles)	0.09
% Water Area	3%

Population by Race	Number	Percent
Total	3,146	-----
Population Reporting One Race	3,033	96%
White	2,058	65%
Black	149	5%
American Indian	28	1%
Asian	32	1%
Pacific Islander	1	0%
Some Other Race	766	24%
Population Reporting Two or More Races	113	4%
Total Hispanic Population	1,929	61%
Total Non-Hispanic Population	1,217	39%
White Alone	1,027	33%
Black Alone	114	4%
American Indian Alone	8	0%
Non-Hispanic Asian Alone	31	1%
Pacific Islander Alone	1	0%
Other Race Alone	0	0%
Two or More Races Alone	37	1%

Population by Sex	Number	Percent
Male	1,593	51%
Female	1,553	49%

Population by Age	Number	Percent
Age 0-4	328	10%
Age 0-17	1,086	35%
Age 18+	2,060	65%
Age 65+	126	4%

Households by Tenure	Number	Percent
Total	966	
Owner Occupied	785	81%
Renter Occupied	181	19%

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race.
Source: U.S. Census Bureau, Census 2010 Summary File 1.

ENVIRONMENTAL ASSESSMENT FACTORS

ATTACHMENT 17

LAND DEVELOPMENT

- USDA Report for Slope and Erosion Information
- USDA Report for Soils/NEPAssist Soils



United States
Department of
Agriculture

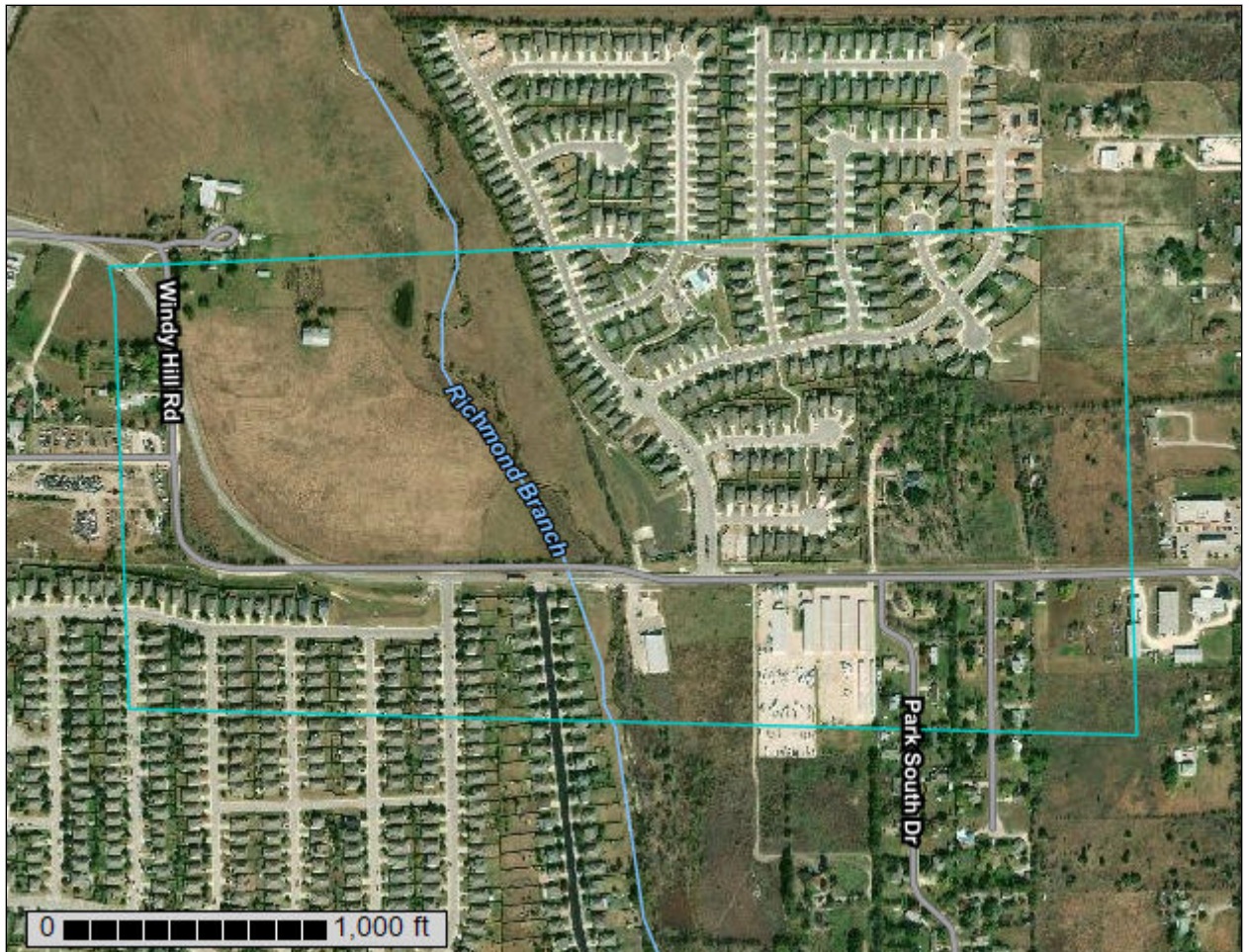
NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Comal and Hays Counties, Texas

Windy Hill Soil Analysis



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface	2
How Soil Surveys Are Made	5
Soil Map	8
Soil Map (Windy Hill Soil map).....	9
Legend.....	10
Map Unit Legend (Windy Hill Soil map).....	11
Map Unit Descriptions (Windy Hill Soil map).....	11
Comal and Hays Counties, Texas.....	13
AgC3—Altoga silty clay, 2 to 5 percent slopes, eroded.....	13
HeB—Heiden clay, 1 to 3 percent slopes.....	14
HeC3—Heiden clay, 3 to 5 percent slopes, eroded.....	15
HoB—Houston Black clay, 1 to 3 percent slopes.....	17
Tn—Tinn clay, 0 to 1 percent slopes, frequently flooded.....	18
Soil Information for All Uses	21
Soil Reports.....	21
Soil Physical Properties.....	21
Engineering Properties (Windy Hill Soil map).....	21
References	26

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map (Windy Hill Soil map)



Map Scale: 1:6,530 if printed on A landscape (11" x 8.5") sheet.

0 50 100 200 300 Meters

0 300 600 1200 1800 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)




















Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Comal and Hays Counties, Texas
 Survey Area Data: Version 16, Sep 12, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 21, 2016—Nov 30, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Windy Hill Soil map)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AgC3	Altoga silty clay, 2 to 5 percent slopes, eroded	4.5	2.8%
HeB	Heiden clay, 1 to 3 percent slopes	18.8	11.8%
HeC3	Heiden clay, 3 to 5 percent slopes, eroded	78.5	49.5%
HoB	Houston Black clay, 1 to 3 percent slopes	44.6	28.1%
Tn	Tinn clay, 0 to 1 percent slopes, frequently flooded	12.2	7.7%
Totals for Area of Interest		158.5	100.0%

Map Unit Descriptions (Windy Hill Soil map)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it

Custom Soil Resource Report

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Comal and Hays Counties, Texas

AgC3—Altoga silty clay, 2 to 5 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2ssgr
Elevation: 450 to 830 feet
Mean annual precipitation: 36 to 37 inches
Mean annual air temperature: 66 to 68 degrees F
Frost-free period: 221 to 278 days
Farmland classification: Not prime farmland

Map Unit Composition

Altoga, eroded, and similar soils: 92 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Altoga, Eroded

Setting

Landform: Stream terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Calcareous clayey alluvium derived from mudstone

Typical profile

Ap - 0 to 7 inches: silty clay
Bk - 7 to 36 inches: silty clay
Bck - 36 to 60 inches: silty clay

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 75 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Southern Clay Loam (R086AY007TX)
Hydric soil rating: No

Minor Components

Heiden, eroded

Percent of map unit: 8 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Northern Eroded Blackland (R086AY008TX)
Hydric soil rating: No

HeB—Heiden clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2v1v9
Elevation: 290 to 1,020 feet
Mean annual precipitation: 33 to 45 inches
Mean annual air temperature: 63 to 68 degrees F
Frost-free period: 224 to 278 days
Farmland classification: Not prime farmland

Map Unit Composition

Heiden and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Heiden

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from mudstone

Typical profile

Ap - 0 to 6 inches: clay
A - 6 to 18 inches: clay
Bkss - 18 to 58 inches: clay
CBdk - 58 to 70 inches: clay

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 40 to 65 inches to densic material
Natural drainage class: Well drained
Runoff class: Very high

Custom Soil Resource Report

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 40 percent

Gypsum, maximum in profile: 5 percent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 12.0

Available water storage in profile: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: D

Ecological site: Southern Blackland (R086AY011TX)

Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent

Landform: Ridges

Landform position (two-dimensional): Shoulder, summit

Landform position (three-dimensional): Interfluvium

Microfeatures of landform position: Circular gilgai

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Southern Blackland (R086AY011TX)

Hydric soil rating: No

Ferris

Percent of map unit: 5 percent

Landform: Ridges

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Microfeatures of landform position: Linear gilgai

Down-slope shape: Linear

Across-slope shape: Convex

Ecological site: Southern Eroded Blackland (R086AY009TX)

Hydric soil rating: No

HeC3—Heiden clay, 3 to 5 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2v1vb

Elevation: 300 to 1,390 feet

Mean annual precipitation: 33 to 48 inches

Mean annual air temperature: 64 to 68 degrees F

Custom Soil Resource Report

Frost-free period: 233 to 278 days

Farmland classification: Not prime farmland

Map Unit Composition

Heiden, moderately eroded, and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Heiden, Moderately Eroded

Setting

Landform: Ridges

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Microfeatures of landform position: Linear gilgai

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Clayey residuum weathered from mudstone

Typical profile

A - 0 to 13 inches: clay

Bss - 13 to 22 inches: clay

Bkss - 22 to 58 inches: clay

CBdk - 58 to 80 inches: clay

Properties and qualities

Slope: 3 to 5 percent

Depth to restrictive feature: 40 to 65 inches to densic material

Natural drainage class: Well drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 40 percent

Gypsum, maximum in profile: 5 percent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 12.0

Available water storage in profile: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: D

Ecological site: Southern Eroded Blackland (R086AY009TX)

Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent

Landform: Ridges

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Microfeatures of landform position: Circular gilgai

Custom Soil Resource Report

Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Southern Blackland (R086AY011TX)
Hydric soil rating: No

Ferris, severely eroded

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Microfeatures of landform position: Linear gilgai
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: Southern Eroded Blackland (R086AY009TX)
Hydric soil rating: No

HoB—Houston Black clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2ssh0
Elevation: 270 to 1,040 feet
Mean annual precipitation: 33 to 43 inches
Mean annual air temperature: 62 to 63 degrees F
Frost-free period: 217 to 244 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Houston black and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Houston Black

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Clayey residuum weathered from calcareous mudstone of upper cretaceous age

Typical profile

Ap - 0 to 6 inches: clay
Bkss - 6 to 70 inches: clay
BCkss - 70 to 80 inches: clay

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches

Custom Soil Resource Report

Natural drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 35 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: Southern Blackland (R086AY011TX)
Hydric soil rating: No

Minor Components

Heiden

Percent of map unit: 15 percent
Landform: Plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: Southern Blackland (R086AY011TX)
Hydric soil rating: No

Fairlie

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: Southern Blackland (R086AY011TX)
Hydric soil rating: No

Tn—Tinn clay, 0 to 1 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2vtgr
Elevation: 330 to 750 feet
Mean annual precipitation: 35 to 47 inches

Custom Soil Resource Report

Mean annual air temperature: 63 to 68 degrees F
Frost-free period: 226 to 263 days
Farmland classification: Not prime farmland

Map Unit Composition

Tinn and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tinn

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Microfeatures of landform position: Circular gilgai
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Calcareous clayey alluvium

Typical profile

A - 0 to 17 inches: clay
Bss - 17 to 57 inches: clay
Bkssy - 57 to 80 inches: clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: D
Ecological site: Clayey Bottomland (R086AY013TX)
Hydric soil rating: No

Minor Components

Whitesboro

Percent of map unit: 10 percent
Landform: Flood plains
Microfeatures of landform position: Circular gilgai
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Bottomland (R086AY012TX)

Custom Soil Resource Report

Hydric soil rating: No

Gladewater

Percent of map unit: 5 percent

Landform: Flood plains

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: Clayey Bottomland (R086AY013TX)

Hydric soil rating: Yes

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Engineering Properties (Windy Hill Soil map)

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission

Custom Soil Resource Report

rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group

Custom Soil Resource Report

index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Percentage of rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Custom Soil Resource Report

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties—Comal and Hays Counties, Texas														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
AgC3—Altoga silty clay, 2 to 5 percent slopes, eroded														
Altoga, eroded	92	B	0-7	Silty clay	CH	A-7-6	0- 0- 0	0- 0- 0	96-100-100	90-100-100	85-99-100	79-95-100	45-53-60	22-29-36
			7-36	Silty clay, silty clay loam	CH, CL	A-6, A-7-6	0- 0- 0	0- 0- 0	94-100-100	89-100-100	82-99-100	74-94-100	36-46-55	18-26-33
			36-60	Silty clay, silty clay loam	CH, CL	A-6, A-7-6	0- 0- 0	0- 0- 0	96-100-100	91-100-100	83-99-100	74-94-100	32-44-55	15-24-33
HeB—Heiden clay, 1 to 3 percent slopes														
Heiden	85	D	0-6	Clay	CH	A-7-6	0- 0- 0	0- 0- 0	96-98-100	90-96-100	81-94-100	65-81-94	50-60-80	30-40-55
			6-18	Silty clay, clay	CH	A-7-6	0- 0- 0	0- 0- 0	96-98-100	90-96-100	80-94-100	65-81-98	50-60-80	30-40-55
			18-58	Clay, silty clay	CH	A-7-6	0- 0- 0	0- 0- 0	96-98-100	90-96-100	80-94-100	65-81-98	50-60-80	30-40-55
			58-70	Clay	CH	A-7-6	0- 0- 0	0- 0- 0	98-100-100	97-100-100	86-98-100	71-86-95	50-70-80	30-45-55

Custom Soil Resource Report

Engineering Properties—Comal and Hays Counties, Texas														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
HeC3—Heiden clay, 3 to 5 percent slopes, eroded														
Heiden, moderately eroded	85	D	0-13	Clay	CH	A-7-6	0- 0- 0	0- 0- 0	96-98-100	90-96-100	80-94-100	65-81-94	50-60-80	30-40-55
			13-22	Clay, silty clay	CH	A-7-6	0- 0- 0	0- 0- 0	96-98-100	90-96-100	80-94-100	65-81-98	50-60-80	30-40-55
			22-58	Clay, silty clay	CH	A-7-6	0- 0- 0	0- 0- 0	96-98-100	90-96-100	80-94-100	65-81-98	50-60-80	30-40-55
			58-80	Clay	CH	A-7-6	0- 0- 0	0- 0- 0	98-100-100	97-100-100	86-98-100	71-86-95	50-70-80	30-45-55
HoB—Houston Black clay, 1 to 3 percent slopes														
Houston black	80	D	0-6	Clay	CH	A-7-6	0- 0- 0	0- 0- 0	96-98-100	92-96-100	81-92-100	71-81-90	63-70-76	34-44-49
			6-70	Clay, silty clay	CH	A-7-6	0- 0- 0	0- 0- 0	98-98-100	96-96-100	85-92-100	74-81-90	58-70-76	38-44-49
			70-80	Clay, silty clay	CH	A-7-6	0- 0- 0	0- 0- 0	94-96-100	86-92-100	74-88-100	65-78-95	61-71-75	37-45-50
Tn—Tinn clay, 0 to 1 percent slopes, frequently flooded														
Tinn	85	D	0-17	Clay	CH	A-7, A-7-6	0- 0- 0	0- 0- 0	100-100-100	96-98-100	84-91-100	73-79-91	61-66-76	37-41-49
			17-57	Silty clay, clay	CH	A-7, A-7-6	0- 0- 0	0- 0- 0	100-100-100	96-98-100	81-91-100	70-79-91	58-66-76	35-41-49
			57-80	Silty clay, clay	CH	A-7, A-7-6	0- 0- 0	0- 0- 0	100-100-100	92-96-100	78-89-100	67-78-91	58-66-76	35-41-49

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

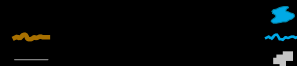
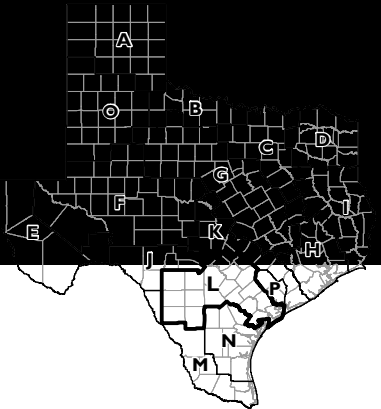
United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

ATTACHMENT 18

SOCIOECONOMIC INFORMATION

- Regional Water Planning Area Map



ATTACHMENT 19

COMMUNITY FACILITIES AND SERVICES

- NEPAssist or Google Earth Map of Social Places in Area
 - Hospitals
 - Schools
 - Churches
- Assisted Living Federation of America (ALFA) Map of Assisted Living Facilities in Proximity of Project
- Council of Government Correspondence

← Rating ▾ Hours ▾ Your past visits ▾

Kyle Police Department

4.5 ★★★★★ (25) · Police dep...

111 N Front St

Closed · Opens 9AM Mon

· (512) 268-0859



WEBSITE



DIRECTIONS

Hays County Justice of Peace

3.0 ★★★★★ (4) · County government office

500 Jack C Hays Trail

Closed · Opens 8AM Mon · (512) 295-2700



DIRECTIONS

Hays County Tax Office Substation

3.6 ★★★★★ (35) · Tax collect...

5458 FM2770

Closed · Opens 8AM Mon

· (512) 268-8024



WEBSITE



DIRECTIONS

Hays Central Appraisal District

3.3 ★★★★★ (10) · County gov...

21001 I-35

Closed · Opens 8AM Mon

· (512) 268-2522



WEBSITE



DIRECTIONS

Constable Office Precinct

4.0 ★★★★★ (1) · County government office



19.1 Solid waste Disposal/Recycling

- Map of Solid Waste Disposal Sites and Recycling Centers within .5 miles

HAYS COUNTY CLOSED & ABANDONED LANDFILL SITES

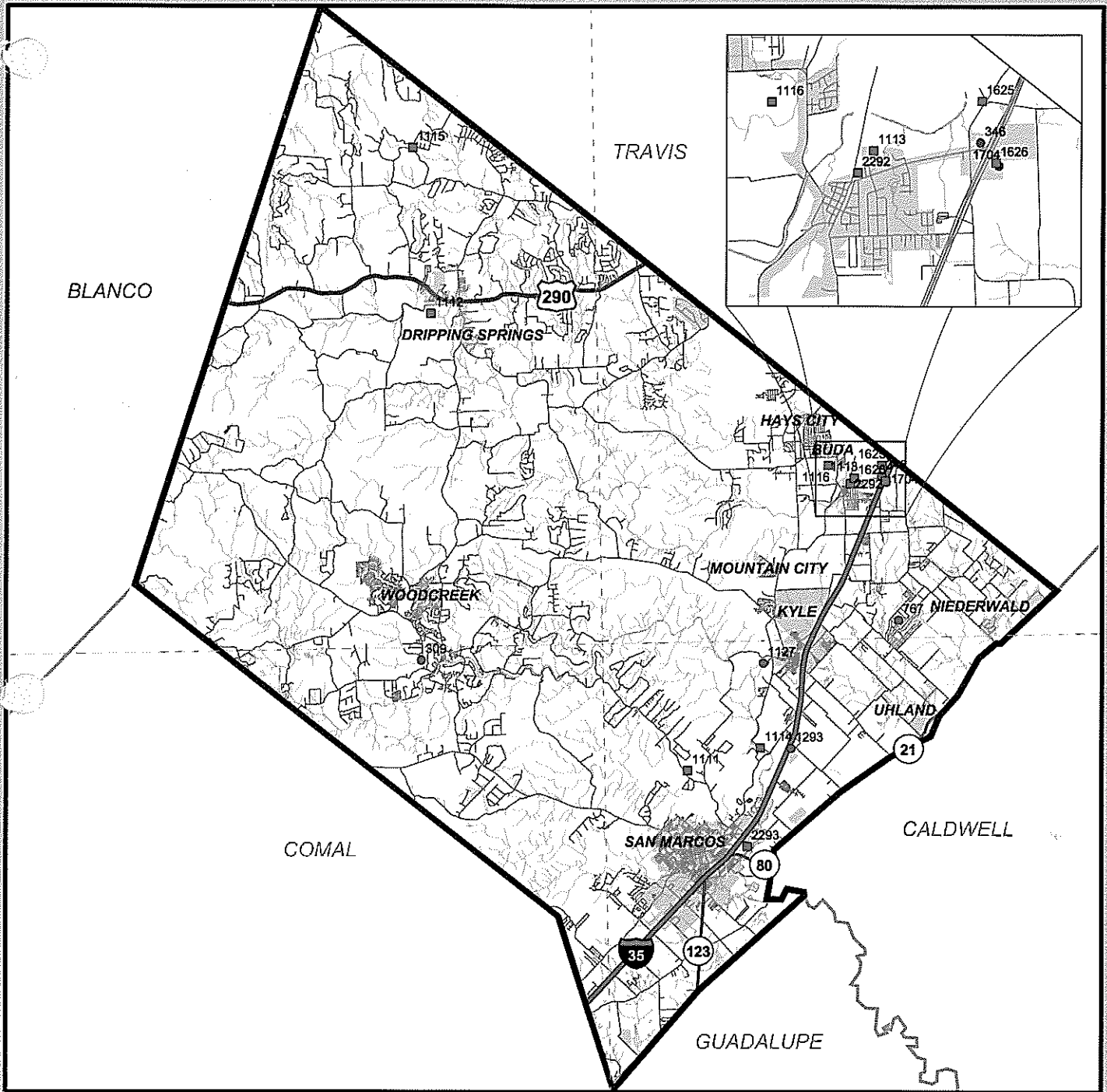
PERMITTED LANDFILL SITES		
Number	Location	Confidence Level
309	West of Wimberly, end of CR 278	4
346	IH 35 and Loop 4	4
767	Goforth Rd.	3
1127	West of Kyle, Pump House Rd.	4
1293	IH 35, South of Yarrington Rd.	5
1704	IH 35 and Loop 4	5

UNPERMITTED LANDFILL SITES		
Number	Location	Confidence Level
1111	Hilliard Rd.	1
1112	Dripping Springs, Creek Rd.	1
1113	Garrison Rd. and Loop 4	1
1115	Bell Springs Rd.	1
1116	West of Buda, FM 967	1
1625	Manchaca Springs Rd. and Old San Antonio Rd.	2
1626	IH 35, South of Loop 4	3
2292	Loop 4 and Garrison Rd.	2
2293	San Marcos, IH 35 and railroad	1

Closed Landfill Units

Hays County, Texas

98°0'0"W



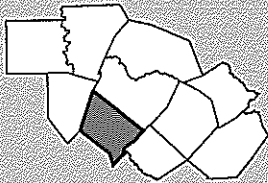
30°0'0"N

30°0'0"N

98°0'0"W

Current Suspected Locations

- Permitted Closed Landfills
- Unpermitted Closed Landfills
- Roads
- Streams & Ponds
- City Limits



Disclaimer: This map was prepared by the Capital Area Planning Council in direct response to provisions of senate Bill 1447, enacted by the 76th Legislature of the State of Texas. The closed landfill boundaries indicated on this map are an approximation only, based on the best available information. This map should be accompanied by additional information on the subject, closed landfill land tracts, as developed during the inventory process.

Source of Data: Landfill Site - Texas Natural Resource Conservation Commission & Southwest Texas State University - Department of Geography (1997), Aerial Photography - CAPCO (1997), Parcels - Hays County Appraisal District (1999)

19.2 Water Quality

- NEPAssist or EPA Watershed & Impaired Water Map
- NEPAssist Monitor Well Map
- TCEQ Water Quality Permits in the Area
- TCEQ Storm Water Permits
- PUC Wastewater CCN

Central Registry Query - Regulated Entity Search Results List

The regulated entity name search looks for current and prior customer names. Therefore, the result list could return a name that doesn't exactly match the search criteria.

Your Search Returned **7** Records. Click on a column name to change the sort or a RN to view the regulated entity information.

1-7 of 7 Records

RN Number	Regulated Entity Name ▲	County	Location
RN109867838	CROSSWINDS	HAYS	SOUTH SIDE OF WINDY HILL ROAD AT SHADOW CREEK BLVD.
RN109152033	CROSSWINDS PHASE 1 SECTION 1	HAYS	SOUTH OF THE INTERSECTION OF SHADOW CREEK BLVD AND WINDY HILL ROAD
RN110397726	CROSSWINDS PHASE 2	HAYS	SITE IS LOCATED APPROXIMATELY 0.5 MILES SOUTH OF THE INTERSECTION OF CROSSWINDS PARKWAY AND WINDY HILL ROAD.
RN109220467	MEADOWS AT KYLE	HAYS	EAST SIDE OF PURPLE MARTIN AVENUE, 0.4 MILE NORTH OF WINDY HILL ROAD
RN110784808	SOUTHGROVE	HAYS	SOUTHWEST OF INTERSECTION AT WINDY HILL ROAD AND MATHIAS LN
RN110737558	SOUTHGROVE PHASE 1 2 3	HAYS	SOUTHWEST OF INTERSECTION AT WINDY HILL ROAD AND MATHIAS LN IN KYLE TEXAS
RN106510597	THE MEADOWS AT KYLE	HAYS	NORTH SIDE OF WINDY HILL ROAD (COUNTY ROAD 131) BETWEEN I-35 AND DACY LANE (COUNTY ROAD 205)

1-7 of 7 Records

The following search criteria was entered:

Program Area: STORM
Address: WINDY HILL ROAD
City: KYLE

.....
[Site Help](#) | [Disclaimer](#) | [Web Policies](#) | [Accessibility](#) | [Our Compact with Texans](#) | [TCEQ Homeland Security](#) | [Contact Us](#) | [Central Registry](#) | [Search Hints](#) | [Report Data Errors](#)
[Statewide Links](#): [Texas.gov](#) | [Texas Homeland Security](#) | [TRAIL Statewide Archive](#) | [Texas Veterans Portal](#)

© 2002 - 2020 Texas Commission on Environmental Quality

Central Registry Query - Regulated Entity Information

Regulated Entity Information

RN Number: RN109152033

Name: CROSSWINDS PHASE 1 SECTION 1

Primary Business: GENERAL CONTRACTOR

Street Address: No street address on file.

County: HAYS

Nearest City: KYLE

State: TX

Near ZIP Code: 78640

Physical Location: SOUTH OF THE INTERSECTION OF SHADOW CREEK BLVD AND WINDY HILL ROAD

Affiliated Customers - Current

Your Search Returned **2** Current Affiliation Records ([View Affiliation History](#))

The Customer Name displayed may be different than the Customer Name associated to the Additional IDs related to the customer. This name may be different due to ownership changes, legal name changes, or other administrative changes.

1-2 of 2 Records

CN Number ▲	Customer Name	Customer Role(s)	Details
CN603613092	DNT CONSTRUCTION LLC	OPERATOR	➔
CN604701466	DEVELOPMENT SOLUTIONS CW LLC	OPERATOR	➔

Industry Type Codes

Code	Classification	Name
1542	SIC	General Contractors-Nonresidential Buildings
6552	SIC	Land Subdividers and Developers

Permits, Registrations, or Other Authorizations

There are a total of **2** programs and IDs for this regulated entity. Click on a column name to change the sort order.

1-2 of 2 Records

Program ▲	ID Type	ID Number	ID Status
STORMWATER	PERMIT	TXR150024810	CANCELLED
STORMWATER	PERMIT	TXR15475H	EXPIRED

Central Registry Query - Regulated Entity Information

Regulated Entity Information

RN Number: RN110397726

Name: CROSSWINDS PHASE 2

Primary Business: No primary business description on file.

Street Address: No street address on file.

County: HAYS

Nearest City: KYLE

State: TX

Near ZIP Code: 78640


Physical Location: SITE IS LOCATED APPROXIMATELY 0.5 MILES SOUTH OF THE INTERSECTION OF CROSSWINDS PARKWAY AND WINDY HILL ROAD.

Affiliated Customers - Current

Your Search Returned **1** Current Affiliation Records ([View Affiliation History](#))

The Customer Name displayed may be different than the Customer Name associated to the Additional IDs related to the customer. This name may be different due to ownership changes, legal name changes, or other administrative changes.

1-1 of 1 Records

CN Number	Customer Name	Customer Role(s)	Details
CN603653213	CHASCO CONSTRUCTORS LTD LLP	OPERATOR	

Industry Type Codes

Code	Classification	Name
No NAICS or SIC Codes on file.		

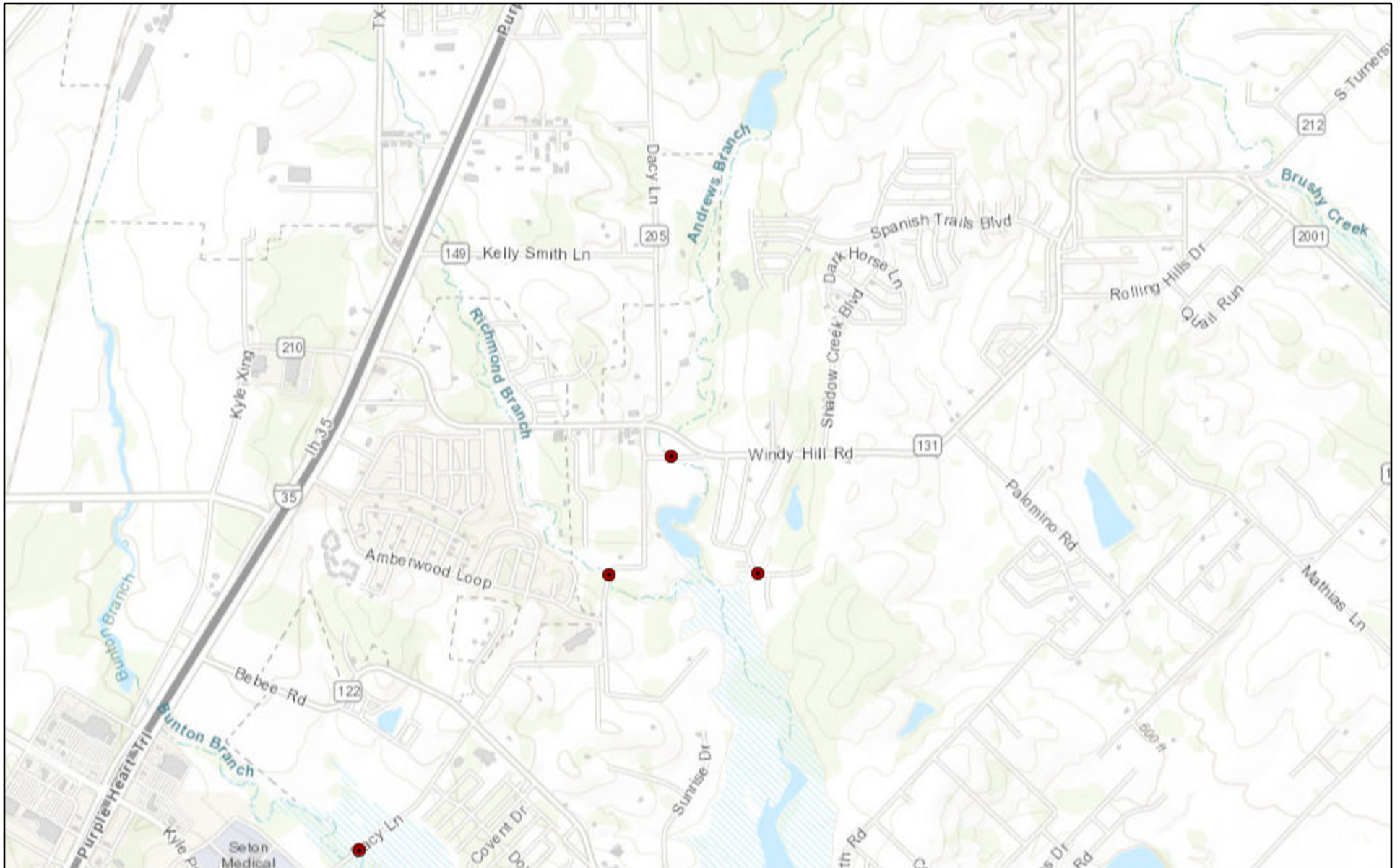
Permits, Registrations, or Other Authorizations

There is **1** program and ID for this regulated entity.

1-1 of 1 Records

Program	ID Type	ID Number	ID Status
STORMWATER	PERMIT	TXR15211N	CANCELLED

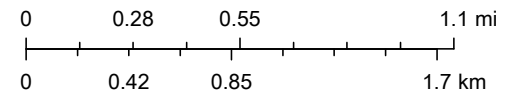
Kyle Surface Water Quality in Texas Custom Map



8/1/2020, 9:53:53 AM

- Impaired Streams
- Stream Segments
- SWQM Stations (Active)
- Impaired Reservoirs
- Reservoir Segments

1:36,112



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,

Web AppBuilder for ArcGIS

Austin Community College, City of Austin, Texas Parks & Wildlife, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA | TCEQ |

Central Registry Query - Regulated Entity Information

Regulated Entity Information

RN Number: RN109220467

Name: MEADOWS AT KYLE

Primary Business: RESIDENTIAL DEVELOPMENT

Street Address: No street address on file.

County: HAYS

Nearest City: KYLE

State: TX

Near ZIP Code: 78640


Physical Location: EAST SIDE OF PURPLE MARTIN AVENUE, 0.4 MILE NORTH OF WINDY HILL ROAD

Affiliated Customers - Current

Your Search Returned **1** Current Affiliation Records ([View Affiliation History](#))

The Customer Name displayed may be different than the Customer Name associated to the Additional IDs related to the customer. This name may be different due to ownership changes, legal name changes, or other administrative changes.

1-1 of 1 Records

CN Number	Customer Name	Customer Role(s)	Details
CN603613092	DNT CONSTRUCTION LLC	OPERATOR	

Industry Type Codes

Code	Classification	Name
6552	SIC	Land Subdividers and Developers

Permits, Registrations, or Other Authorizations

There is **1** program and ID for this regulated entity.

1-1 of 1 Records

Program	ID Type	ID Number	ID Status
STORMWATER	PERMIT	TXR150025892	CANCELLED

Public Utility Commission of Texas



Back



New Search (/WaterSearch/)

Water Utility Details for CITY OF KYLE

Site Details

Properties

Name	CITY OF KYLE
CCN/Regnum	20410
Utility Type	SEWER UTILITY
Ownership Type	MUNICIPALITY
Primary County	HAYS

AIS Number

Official Address

PO BOX 40

KYLE TX 78640 - 40

Responsible Party

Organization Name

CITY OF KYLE

Address

PO BOX 40

KYLE TX 78640 - 40

BUSINESS PHONE 1 (512) 262-3085

Public Utility Commission of Texas

Activity

Activity Status	Start Date
ACTIVE	3/1/1986

Affiliates

Organization Name	Individual Name	Role
CITY OF KYLE		RESPONSIBLE PARTY

Counties

Name	Primary
HAYS	✓

Central Registry Query - Regulated Entity Information

Regulated Entity Information

RN Number: RN106510597

Name: THE MEADOWS AT KYLE

Primary Business: SINGLE FAMILY RESIDENTIAL CONSTRUCTION

Street Address: No street address on file.

County: HAYS

Nearest City: KYLE

State: TX

Near ZIP Code: 78640

Physical Location: NORTH SIDE OF WINDY HILL ROAD (COUNTY ROAD 131) BETWEEN I-35 AND DACY LANE (COUNTY ROAD 205)

Affiliated Customers - Current

Your Search Returned **2** Current Affiliation Records ([View Affiliation History](#))

The Customer Name displayed may be different than the Customer Name associated to the Additional IDs related to the customer. This name may be different due to ownership changes, legal name changes, or other administrative changes.

1-2 of 2 Records

CN Number ▲	Customer Name	Customer Role(s)	Details
CN601213523	CONTINENTAL HOMES OF TEXAS LP	OPERATOR	➡
CN603980715	JKB CONSTRUCTION COMPANY LLC	OPERATOR	➡

Industry Type Codes

Code	Classification	Name
1521	SIC	General Contractors-Single-Family Houses
1623	SIC	Water
6552	SIC	Land Subdividers and Developers

Permits, Registrations, or Other Authorizations

There are a total of **2** programs and IDs for this regulated entity. Click on a column name to change the sort order.

1-2 of 2 Records

Program ▲	ID Type	ID Number	ID Status
STORMWATER	PERMIT	TXR15VB01	EXPIRED
STORMWATER	PERMIT	TXR15VQ36	CANCELLED

[Site Help](#) | [Disclaimer](#) | [Web Policies](#) | [Accessibility](#) | [Our Compact with Texans](#) | [TCEQ Homeland Security](#) | [Contact Us](#) | [Central Registry](#) | [Search Hints](#) | [Report Data Errors](#)

Statewide Links: [Texas.gov](#) | [Texas Homeland Security](#) | [TRAIL Statewide Archive](#) | [Texas Veterans Portal](#)

© 2002 - 2020 Texas Commission on Environmental Quality

Water Quality General Permits and Registration Search

Summary of Authorization TXR15308E

Permit/Registration Number: TXR15308E
Authorization Status: ACTIVE
Date Coverage Began: 07/24/2017
Date Coverage Ended:
Replaced Permit Number:

Authorization Details

Site Name on Permit/Registration: CROSSWINDS
Authorization Type: CONSTRUCTION
Primary SIC Code: 1521
Area Disturbed (In Acres) : 31.63
Common Plan Of Development : Y
Estimated Project End Date : 07/31/2022
Estimated Project Start Date : 07/24/2017
Impaired Water Body : PLUM CREEK SEGMENT 1810
MS4 Operator : HAYS COUNTY
Receiving Water Body : BUNTON & BRUSHY CREEK TO PLUM CREEK SEGMENT 1810
Receiving Water Body : PORTER
Receiving Water Body : ANDREWS BRANCH
Segment Number : 1810

Permittee or Registrant Information

Operator: CN603331174 - Pacesetter Homes, LLC
Address: 14400 THE LAKES BLVD STE 200 PFLUGERVILLE TX 78660 4642
Annual Fee Billing Address: NOT FOUND OR NOT APPLICABLE

Permitted Site Information

RN: RN109867838
RE Name: CROSSWINDS
Site Location: SOUTH SIDE OF WINDY HILL ROAD AT SHADOW CREEK BLVD. KYLE 78640
County: HAYS
TCEQ Region: REGION 11 - AUSTIN
Latitude: 30.026
Longitude: -97.8164

Regulated Entity Site Information

RE Name: CROSSWINDS
Site Location: SOUTH SIDE OF WINDY HILL ROAD AT SHADOW CREEK BLVD. KYLE 78640
County: HAYS
TCEQ Region: REGION 11 - AUSTIN
Latitude: 30.026
Longitude: -97.8164

Application History for this Authorization

Application Type	Status	Received Date	Final Action Date
NOTICE OF INTENT	APPROVED	07/24/2017	07/24/2017
NOI-RENEWAL	APPROVED	05/29/2018	05/29/2018
NOTICE OF CHANGE	APPROVED	09/20/2019	09/20/2019

Central Registry Query - Regulated Entity Search Results List

The regulated entity name search looks for current and prior customer names. Therefore, the result list could return a name that doesn't exactly match the search criteria.

Your Search Returned **8** Records. Click on a column name to change the sort or a RN to view the regulated entity information.

1-8 of 8 Records

RN Number	Regulated Entity Name ▲	County	Location
RN102182680	CITY OF KYLE WWTP	HAYS	941 NEW BRIDGE DR KYLE TX 78640 5544
RN106196918	CROSSWINDS WWTP	HAYS	S OF THE END OF MOCKINGBIRD LN AND APPROX 2 MI E OF THE INTERX OF IH 35 AND CR 122 BEBEE RD
RN101513729	GOFORTH WWTP	HAYS	5271 GOFORTH RD KYLE TX 78640 4576
RN102545464	LAUREN CONCRETE KYLE PLANT 5	HAYS	SW CORNER OF FM 150 AND CR 134
RN100721570	LONGHORN MACHINE WORKS	HAYS	1119 N OLD HIGHWAY 81 KYLE TX 78640 9496
RN109467035	PLUM CREEK COMMUNITY	HAYS	LOCATED ON THE W SIDE OF FM 150 1 MI N FROM THE INTEREX OF FM 150 AND HWY 21
RN102314218	RAILYARD PLANT	HAYS	APPROX 2.6 MI NW OF INTX OF STATE HWY 21 & CNTY RD 127 IN HAYS CNTY
RN109208553	WINDY HILL WWTP	HAYS	LOCATED 1110 FT WEST OF INTERX OF FM 2001 & WINDY HILL RD FM 131 IN THE CITY OF KYLE

1-8 of 8 Records

The following search criteria was entered:

Program Area: WWPERMIT

City: KYLE

.....
[Site Help](#) | [Disclaimer](#) | [Web Policies](#) | [Accessibility](#) | [Our Compact with Texans](#) | [TCEQ Homeland Security](#) | [Contact Us](#) | [Central Registry](#) | [Search Hints](#) | [Report Data Errors](#)
 Statewide Links: [Texas.gov](#) | [Texas Homeland Security](#) | [TRAIL Statewide Archive](#) | [Texas Veterans Portal](#)

© 2002 - 2020 Texas Commission on Environmental Quality

19.3 Water Supply

- TWDB Well Numbering Grid
- TWDB WIID Map of Water Well Locations
- PUC/TCEQ Safe Drinking Water Map CCN
-

Texas Commission on Environmental Quality	Office of Water	Public Drinking Water Section
County Map of TX	Water System Search	Office of Compliance and Enforcement

Water System Detail			
Water System Facilities Source Water Assessment Results	Violations Enforcement Actions	TCR Sample Results	TTHM HAA5 Summaries
Sample Points	Assistance Actions	Recent Positive TCR Results	PBCU Summaries
Sample Schedules / FANLs / Plans	Compliance Schedules	Other Chemical Results	Chlorine Summaries
Site Visits Milestones	TOC/Alkalinity Results	Chemical Results: Sort by: Name Code	Turbidity Summaries
Operators All POC	LRAA (TTHM/HAA5)	Recent Non-TCR Sample Results	TCR Sample Summaries
Glossary		DWW Instructions	

Water System Detail Information			
Water System No.:	TX1050002	System Type:	C
Water System Name:	CITY OF KYLE	Primary Source Type:	SWP
Principal County Served:	HAYS	System Status:	A
Principal City Served:		Activity Date:	01-01-1913
Population:	29118	System Recognition:	NO DATA

Water System Contacts			
Type	Contact	Communication	
AC - Administrative Contact	MITCHELL, TRAVIS 100 W CENTER ST KYLE, TX 78640-9450	Electronic Type	Value
		Phone Type	Value
		BUS - Business	512-787-4464
		BUS - Business	512-944-0948
		BUS - Business	512-262-1010
		FAX - Facsimile	512-262-3987

Sources of Water			
Name	Type	Activity	Availability
SW FROM GBRA	CC	A	S
4 - 751 KOHLERS CROSSING	WL	A	P
3 - 260 OLD STAGECOACH	WL	A	P
5 - 225 REBEL RD	WL	A	P
2 - W ALLEN ST / W MOORE ST	WL	A	P
1 - 225 REBEL RD	WL	A	P
SW FROM CITY OF SAN MARCOS	CC	A	E

Source Water Percentages			
Surface Water	0	Surface Water Purchased	0
Ground Water	0	Ground Water Purchased	0
Ground Water UDI	0	Ground Water UDI Purchased	0

Water Purchases	
Water System \ Treatment Status	
TX1050002 buys from GBRA IH-35 TRANSMISSION MAIN - TX1050149 / who is providing Treated and Filtered Water	
	TX1050149 buys from CITY OF SAN MARCOS - TX1050001 / who is providing Treated and Filtered Water

Buyers of Water	
Water System / Population / Availability (blank, (S)easonal, (E)mergency, (I)nterim, (P)ermanent, (O)ther	
No Buyers	
Total Population Served = 29118	
Total Population Served included ALL active connections, including emergency.	

Annual Operating Period(s)					
Effective Begin Date	Effective End Date	Start Month/Day	End Month/Day	Type	Population
03-15-2019	No End Date	1/1	12/31	R	29118

Service Connections			
Type	Count	Meter Type	Meter Size
RS	9706	MU	0

Service Area	
Code	Name
R	RESIDENTIAL AREA
O	WHOLESALE (SELLS WATER)

Regulating Agencies	
Name	Alias/Inspector
TX COMMISSION ON ENVIRONMENTAL QUALITY	TCEQ

Water System Historical Names
Historical Name(s)

System Certification Requirements		
Certification Name	Code	Begin Date

WS Flow Rates		
Type	Quantity	UOM
MDD - Maximum Daily Demand	5.397	MGD
PPRC - Provided Production Capacity	9.23	MGD
PSPC - Provided Service Pump Capacity	16.034	MGD
ADU - Average Daily Usage	2.89	MGD

WS Measures		
Type	Quantity	UOM
TESC - Total Elevated Storage Capacity	2.2	MG
TSTC - Total Storage Capacity	4.791	MG

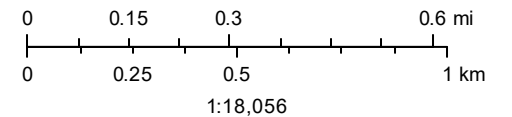
WS Indicators		
Type	Value	Date
DBP2 - Stage2 DBPR Schedule Category	2 - 2	10-01-2012
MDDD - Maximum Daily Demand Date	MDDD - Maximum Daily Demand Date	07-23-2018
POWN - Previous Ownership Type Code. This is the WUD ownership code.	MUN - Municipality	
PRFT - Status as a For or Non Profit Entitiy	NON - Non Profit	
SSWP - State Source Water Program	YES - Yes	08-31-1993
UCM3 - UCMR3 EPA Monitoring Required	YES - Yes	01-01-2013
XCON - Cross Connection control Program Ranking	ADQTE - Adequate	07-02-2014

City of Kyle Windy Hill Road Improvements



August 1, 2020

-  Plugging Reports
-  TWDB Groundwater
-  Well Reports



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

The data in Water Data Interactive represents the best available information provided by the TWDB and third-party cooperators of the TWDB. The TWDB provides information via this web site as a public service. Neither the State of Texas nor the TWDB assumes any legal liability or responsibility or makes any guarantees or warranties as to the accuracy, completeness or suitability of the information for any particular purpose. The TWDB systematically revises or removes data discovered to be incorrect. If you find inaccurate information or have questions, please contact WDI-Support@twdb.texas.gov.

Public Utility Commission of Texas



Back



New Search (/WaterSearch/)

Water Utility Details for CITY OF KYLE

Site Details

Properties

Name	CITY OF KYLE
CCN/Regnum	11024
Utility Type	WATER UTILITY
Ownership Type	MUNICIPALITY
Primary County	HAYS

AIS Number

Official Address

PO BOX 40

KYLE TX 78640 - 40

Responsible Party

Organization Name

CITY OF KYLE

Address

PO BOX 40

KYLE TX 78640 - 40

BUSINESS PHONE 1 (512) 262-3085

Public Utility Commission of Texas

Activity

Activity Status	Start Date
ACTIVE	10/2/2009

Affiliates

Organization Name	Individual Name	Role
CITY OF KYLE	JOHN A BARTLE PE	RESPONSIBLE PARTY UTILITY CONTACT

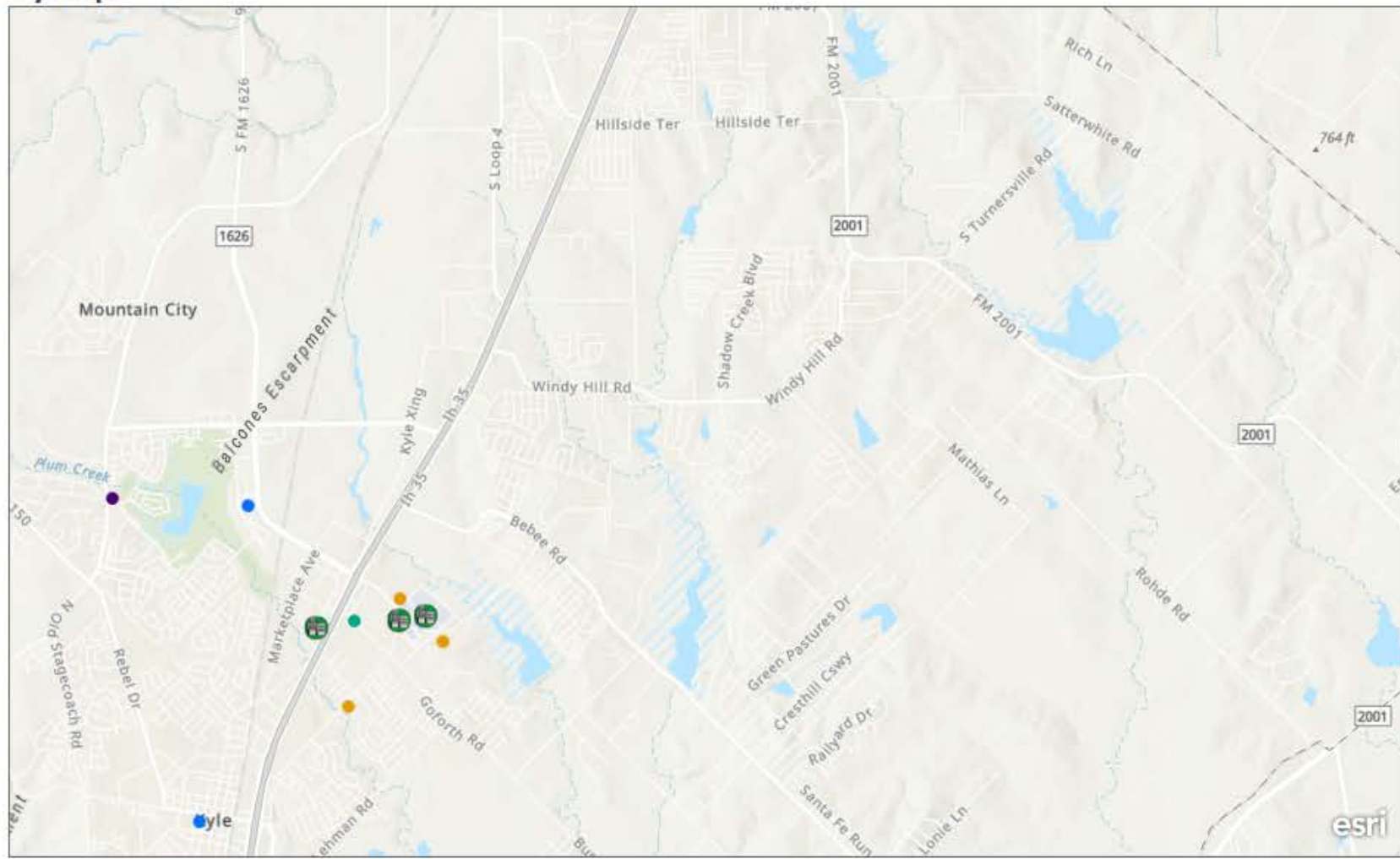
Counties

Name	Primary
HAYS	✓

19.4 Public Safety

- Google Earth Map of Area – Area Public Safety Locations

My Map



Esri, NASA, NGA, USGS, FEMA | Austin Community College, Texas Parks & Wildlife, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA | Texas Department of Health and Human Services (DSHS), Harris County Public Health | Texas Department of Health and Human Services, DSHS, Harris County Public Health

← Rating Hours Your past visits

Kyle Police Department

4.5 ★★★★★ (25) · Police dep...

111 N Front St

Closed · Opens 9AM Mon

· (512) 268-0859



WEBSITE



DIRECTIONS

Hays County Justice of Peace

3.0 ★★★★★ (4) · County government office

500 Jack C Hays Trail

Closed · Opens 8AM Mon · (512) 295-2700



DIRECTIONS

Hays County Tax Office Substation

3.6 ★★★★★ (35) · Tax collect...

5458 FM2770

Closed · Opens 8AM Mon

· (512) 268-8024



WEBSITE



DIRECTIONS

Hays Central Appraisal District

3.3 ★★★★★ (10) · County gov...

21001 I-35

Closed · Opens 8AM Mon

· (512) 268-2522



WEBSITE



DIRECTIONS

Constable Office Precinct

4.0 ★★★★★ (1) · County government office



19.5 Recreational Open Spaces

- Parks in the Surrounding County

Parkland in Kyle

Primary Column	Column2	Column3	Column4	Column5	Column6	
1	Public Parkland	Name of Park	Address	Year Dedicated	Developed Acres	Undeveloped Acres
2		Mary Kyle Hartson City Square Park	111 S. Burleson	1880	1.5	0
3		Kyle Train Depot	101 N. Front St		0.5	0
4		Gregg-Clarke Park	1100 S. Center St	1994	32	0
5		Steeplechase Park	295 Hallie Dr	2002	31	0
6		Waterleaf Park	570 Abundance Ln	2004	20	72
7		Kyle Vista Park	Sunflower Circle	2006	0	42
8		Post Oak Open Space	201 Goddard	2003	0	4
9		Four Seasons Farm			0	5
10		Bunton Creek Village			0	26
11		Lake Kyle Preserve	700 Lehman Road	2011	20	99
12		Kensington Trails Open Space			0	14
13		Seton/SCC Open Space	1975 Dacy Lane	2009	0	45
14		Linebarger Lake		2008	0	52
15		Oso Oro Open Space		2008	0	4
16		Bunton Creek Phase 1B		2014	0	6
17		Cool Springs (Proposed)		2016	22	0
18		Bunton Creek Reserve		2018	0.5	
19		Brookside Village Phase 2		2015	0.5	12
20		Other Undeveloped Open Spaces			0	103
21						
22		Public Parkland Totals			128	484
23						
24	Private/HOA Parkland and Open Space	Name of Park	Address	Year Dedicated	Park Land	Open Spaces
25		Amberwood			5.25	0
26		6 Creeks (Blanco River Ranch) Phase 1			132.67	269.78
27		Bluebonnet Estates			4.5	0
28		Brooks Crossing		2015	8.82	0.44
29		Brookside Phase 2		2015	0.5	0
30		Bunton Creek Village			19.14	
31		Casetta Ranch		2019	0	9.15
32		Cool Springs (Proposed)			0.75	2.25
33		Bunton Creek Reserve (Creekside at Bunton Creek)			0	16.32
34		Creekside Village Phase 1 & 2 & 3			0	16.01
35		Crosswinds (Proposed)			12.78	117.28
36		Cypress Forest Phases 1 & 2			1.62	21.94
37		Paramont	Section 1			
38		Goforth Kyle			1.57	21.18
39		Hays Commerce Center			0	12.98
40		Hometown Kyle			15.58	0
41		Indian Paintbrush			8.59	0
42		Kensington Trails			5.2	0
43		Meadows at Kyle			0	1.54
44		Opal Ranch			2.43	0.51
45		Park at Steeplechase			3.58	0
46		Plum Creek			139.2	289.788
47		Post Oak			10.73	0
48		Prairie on the Creek			4.3	0
49		Saddle Creek Apts			0.5	0
50		Sawyer Subdivision			0	5.59
51		Silverado			15.89	0
52		Southlake Ranch			37.89	0

Primary Column	Column2	Column3	Column4	Column5	Column6	
53	Spring Branch			6.03	0	
54	Stagecoach		2017	1.52	12.77	
55	Steeplechase			9.74	0	
56	Sunset Hills		2017	1.92	4.47	
57	Sunset Ridge			1.04	0	
58	The Trails			11.45	0	
59	Trails at Windy Hill		2018	2.57	28.4	
60	Vantage Apts			0.5	0	
61	Waterleaf			14.3	0	
62	Windy Hill Subdivision		2018		11.48	
63	Woodlands Park			2.67	8.097	
64						
65	Private & HOA Parkland & Open Space Totals			483.23	849.975	
66						
67	Total Developed Parkland in Kyle			611.23		
68	Total Undeveloped Parkland & Open Space in Kyle			1333.975		
69						
70	Grand Total Parkland & Open Space			1945.205		
71						
72	Developed Parkland Goal	9 acres per 1,000 population	Estimated current population = 35,000	35,000/1,000x9 = 315 acre goal	194%	Exceeds goal
73	Open Space Goal	15 acres per 1,000 population	Estimated current population = 35,000	35,000/1,000x15 = 525 acre goal	254%	Exceeds goal

Collaboration powered by Smartsheet | Report Abuse

19.6 Transportation and Accessibility (When Needed)

ATTACHMENT 20

NATURAL FEATURES

Unique Natural Features/Water Resources

Vegetation, Wildlife

ATTACHMENT 21

OTHER PROJECT INFORMATION