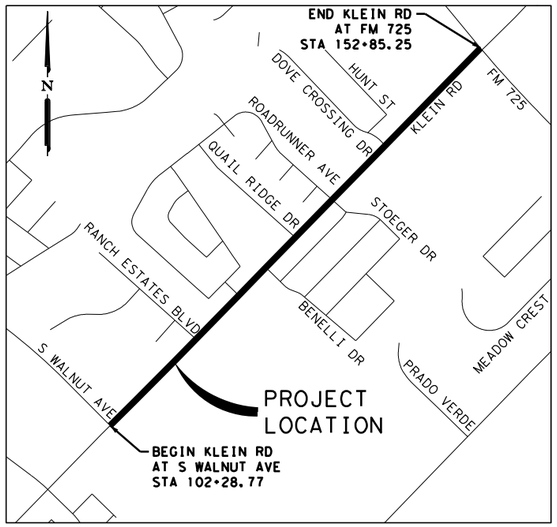
CITY OF NEW BRAUNFELS
KLEIN RD
RECONSTRUCTION PROJECT
S WALNUT AVE TO FM 725

JOB NO. NB 18-026 CITY OF NEW BRAUNFELS
KLEIN RD RECONSTRUTION PROJECT

City of NewBraunfels

NATHAN GARZA, CAPITAL PROJECTS MANAGER
550 LANDA STREET, NEW BRAUNFELS, TX 78130
830.221.4082

FINAL DESIGN SUBMITTAL
VOLUME I



LOCATION MAP
SCALE: NOT TO SCALE

CITY COUNCIL

MAYOR AT LARGE	RUSTY BROCKMAN
DISTRICT 1	SHANE HINES
DISTRICT 2/MAYOR PRO TEM	JUSTIN MEADOWS
DISTRICT 3	HARRY BOWERS
DISTRICT 4	MATTHEW E. HOYT
DISTRICT 5	JASON E. HURTA
DISTRICT 6	JAMES BLAKEY

CITY MANAGER
ROBERT CAMARENO

DESIGN SPEED - 40 MPH

BY THE ACT OF SUBMITTING A BID FOR THIS PROPOSED CONTRACT, THE BIDDER WARRANTS THAT THE BIDDER, AND ALL SUBCONTRACTORS AND MATERIAL SUPPLIERS HE INTENDS TO USE HAVE CAREFULLY AND THOROUGHLY REVIEWED THE DRAWINGS, SPECIFICATIONS AND ALL OTHER CONTRACT DOCUMENTS AND HAVE FOUND THEM COMPLETE AND FREE FROM AMBIGUITIES AND SUFFICIENT FOR THE PURPOSE INTENDED. THE BIDDER FURTHER WARRANTS THAT TO THE BEST OF HIS OR HIS SUBCONTRACTOR'S AND MATERIAL SUPPLIERS' KNOWLEDGE, ALL MATERIALS AND PRODUCTS SPECIFIED OR INDICATED HEREIN ARE ACCEPTABLE FOR ALL APPLICABLE CODES AND AUTHORITIES.

THE LOCATION OF ALL EXISTING UTILITIES SHOWN ON THESE PLANS HAS BEEN BASED UPON RECORD INFORMATION ONLY AND MAY NOT MATCH LOCATION AND/OR DEPTHS AS CONSTRUCTED. THE CONTRACTOR SHALL CONTACT EACH OF THE INDIVIDUAL UTILITIES FOR ASSISTANCE IN DETERMINING EXISTING LOCATION AND DEPTHS PRIOR TO BEGINNING AND CONSTRUCTION. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL EXISTING UTILITY CROSSING'S PRIOR TO BEGINNING CONSTRUCTION.

ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE ENGINEER OF RECORD. IN ACCEPTING THESE PLANS, THE CITY OF NEW RAINFALLS MUST RELY UPON THE ADEQUACY OF THE WORK OF THE ENGINEER OF RECORD.

IF CONSTRUCTION HAS NOT COMMENCED WITHIN ONE-YEAR OF CITY APPROVAL FOR CONSTRUCTION INSPECTION, THAT APPROVAL IS NO LONGER VALID.

GAS UTILITIES ARE NOT INCLUDED IN THE CIVIL CONSTRUCTION PLANS. NO GAS IMPROVEMENTS PROPOSED.

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY, 2012).

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/30/2021 DATE

Design Filename: H:\Projects\510\30\03\Design\Civil\General\5103003tsh.dgn

Plotted on: 4/30/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\General\5103003ind01.dgn

VOLUME I

* THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/30/2021 DATE

** THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

DRAINAGE DESIGN

STATE OF TEXAS · ANDRES MORALES · 130189 · LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 4/30/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/30/2021 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

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TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

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CHK DWG:	GUADALUPE	NEW BRAUNFELS	2

Plotted on: 4/20/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\General\510300301ind01.dgn

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DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/20/2021 DATE

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TRAFFIC SIGNAL DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 4/20/2021 DATE

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STRUCTURAL DESIGN

STATE OF TEXAS — A.M. STONE — 91049 — LICENSED PROFESSIONAL ENGINEER

A.M. STONE, P.E. — 4/29/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/29/2021 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

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Project: NB 18-026

County: Guadalupe

Highway: Klein Rd Ph 2

**********GENERAL NOTES**********
TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges (November 1, 2014)

========== **Basis of Estimate** ==========

Item	Description	Rate/Area	Quant-Unit
168-6001	Vegetative Watering	1.3 GAL/SY/WEEK (21,485 SY/12 WEEKS)	335.16-MG
310-6001	PRIME COAT (MULTI OPTION)	0.3 GAL/SY (33,714 SY)	10,114.12-GAL
340-6272	TACK COAT	0.1 GAL/SY (62,930 SY)	6,293.04-GAL
260-6002	LIME (HYDRATED LIME (SLURRY))	20 LB/SY (34,870 SY)	348.7-TON
340-6011	D-GR HMA(SQ) TY-B PG64-22	115 LB/SY-IN (678 SY)	467.5-TON
340-6014	D-GR HMA(SQ) TY-B PG70-22	115 LB/SY-IN (34,364 SY)	5,891.4-TON
340-6050	D-GR HMA(SQ) TY-C PG70-22	115 LB/SY-IN (31,465 SY)	5,428.7-TON
341-6049	D-GR HMA TY-D PG76-22	115 LB/SY-IN (32,116 SY)	3,694.4-TON
6210-6001	PVC MOISTURE BARRIER	4 SF/LF (4,334 LF)	1,926-SY

--General--
Contact the Engineer or the City of New Braunfels (City) when construction operations are within 400 feet of a signalized intersection to determine/verify the location of loop detectors, conduit, ground-boxes, etc. Repair or replace any signal equipment damaged by construction operations. The method of repair or replacement shall be pre-approved and inspected. Depending on the type and extent of the damage, the Engineer reserves the right to perform the repair or replacement work and the Contractor will be billed for this work.

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County: Guadalupe

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To better fit field conditions, the cross sections may be varied when approved.

If there are waste areas or material source areas, follow the Texas Aggregate Quarry and Pit Safety Act requirements.

Any materials removed and not reused and determined to be salvageable shall be stored within the project limits at an approved location or delivered undamaged to the storage yard as directed. Properly dispose unsalvageable materials in accordance with local, state, and federal regulations. Deface traffic signs so that they will not reappear in public as signs.

Any sign panels that are adjusted or removed and replaced, shall be done the same workday unless otherwise approved. This work shall be considered subsidiary to Item 502.

Notify the Engineer at least two weeks prior to a proposed traffic pattern change(s) that will require a revision to traffic signals.

Locate and reference all manholes and valves within the construction area with station and offset. Each manhole and valve shall be identified by its owner. No roadwork will begin until this list has been submitted. Gas valves have to be accessible at all times, therefore; temp. CTB, material stock piles, etc. cannot be placed over these valves.

Construct all manholes and valves to final pavement elevations prior to the final mat of ACP. If, between the final elevation adjustment and the final mat of ACP, the manholes and valves are going to be exposed to traffic, place temporary asphalt around the manhole and valve to provide a +/- 50:1 taper. The cost of elevation adjustment will be part of the manhole and valve work, and asphalt tapers are considered subsidiary to Item 502.

Contractor is required to access the construction site only through the Ingress & Egress Route identified in the plans. Construction traffic through adjacent neighborhood is prohibited.

Working hours are Weekdays 7:00 a.m. to 5:00 p.m. All requests to work outside the specified time periods shall be submitted in writing and approved by the City no later than three (3) working days prior to the requested work date. Emergency work may be done without prior consent of the City.
Exceptions:

(a) Concrete work shall be scheduled so that all placement and finishing shall be finished during standard daylight hours. When under emergency conditions, work that must be concluded under artificial lighting, lighting shall be erected and directed so that they shall not shine upon any residence or create a traffic visual hazard.
(b) Certain traffic congestion areas will require that modified standard work hours will be enforced where street blockage, traffic flow, channelization and/or flagmen are required. The Contractor will be notified of these areas during the pre-construction conference.

REV. NO.	DATE	DESCRIPTION	BY

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TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

GENERAL NOTES

SHEET 1 OF 11

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(c) Lane closures in school zones or on streets other than residential streets will be limited to after 9:00 a.m. and before 3:00 p.m. unless prior approval is obtained from the City. Arrow boards may be required by the City on lane closures, with all barricades, advanced warning signs and channelization devices placed according to the specifications contained in the Contract Documents.
(d) Saturday, City holidays, or City's off hours (Monday through Friday, before 7:30 a.m. or after 4:30 p.m.), work shall be considered as overtime with inspection fees being charged accordingly.
(e) Sunday work, other than emergency situations, is not allowed.

Irrigation heads and fixture relocations in conflict with the proposed improvements are not paid for separately but are subsidiary to various bid items.

Buildings and Structures must be protected from damages including concrete splash at all times. The Contractor is to install a material approved by the Engineer which will guard the buildings against concrete splash. This work is considered subsidiary to Item 531 and will not be paid separately. If concrete splash litters a building facade the Contractor, at their expense, is responsible for cleaning and remedying the concrete as approved by the Engineer.

Grade street intersections and median openings for surface drainage.

Sweep and remove all litter, construction debris and surplus material on the right-of-way within the project limits to keep the jobsite neat at all times. Keep roadways and sidewalks free of sediment. Consider subsidiary to pertinent items.

Construct all ramps, sidewalks, steps, curb ramps, handrails, pedestrian push buttons, and other pedestrian elements in accordance with Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG) issued by the United States Access Board. Maintain one copy of PROWAG at the project site at all times.

When working near aerial electrical lines and / or utility poles, provide adequate safety measures, as needed, to comply with the appropriate sections of Federal and State regulations. For electrical lines and poles shown in the plans, if the lines need to be de-energized and / or if poles require bracing, contact the electrical company to coordinate the de-energizing and bracing. Work pertaining to de-energizing lines, bracing poles and any other protective measures required will not be paid at the expense of City of New Braunfels.

Coordinate all work along FM 725 with local TxDOT Office per the permit.

Dust control is to be performed a minimum of three times per day and as needed during construction (including weekends). Dust control will be considered subsidiary to the various bid items, and will not be paid for directly. Sweeper, ground crews, water truck, or any combination of these methods, or any alternate method approved by the Engineer, shall be used as dust control.

Project: NB 18-026

County: Guadalupe

Highway: Klein Rd Ph 2

Mud/dirt inadvertently tracked off site and onto public streets shall be removed immediately by hand or mechanical broom sweeping.

Personnel will be experienced in items of work in contract. Safety vests and hard hats will be pre-approved and worn at all times when outside vehicles within the work area.

Pavement markers will be left in place until such time as they are in conflict with the work in progress.
Referencing of all existing striping and pavement markings prior to beginning paving operations shall be the Contractor's responsibility.

All pavement markings and/or striping that are in conflict with traffic operations will be removed by the Contractor. Such removal will be considered subsidiary to the various bid items, and will not be paid for directly.

Existing storm sewers and utilities are shown from the best available information. Verify the location of all underground facilities prior to starting work.

Provide temporary drain openings at all low points or other drainage structures, as required, at the Contractor's expense.

Remove any obstructions to existing drainage due to the Contractor's operations, as required, at the Contractor's expense.

If construction has not commenced within one-year of City approval for construction inspection, that approval is no longer valid.

The November 1, 2014 edition of the Texas Department of Transportation Standard Specifications for Construction of Highways, Streets and Bridges shall be followed.

All responsibility for the adequacy of these plans remains with the engineer of record. In accepting these plans, the City of New Braunfels must rely upon the adequacy of the work of the engineer of record.

Post all State and Federal labor posters at the project site.

Prior to the start of construction the Contractor shall contact the City of New Braunfels to set a preconstruction meeting. A 48-hour advanced notification is required for all inspection and meeting requests.

Plan approval, Public Infrastructure Permit and TxDOT Permits are required prior to beginning work.

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City of New Braunfels

KLEIN RD PHASE 2

GENERAL NOTES

SHEET 2 OF 11

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For Public Infrastructure Permit **(S**C):

- For inspections, you must call before 12:00 p.m., 48 hours prior to your inspection request.
- Each inspection will be allotted 1 hour unless you request for more time.
- Once your request has been accepted, you will receive a call from the City of New Braunfels Inspector.

Police Officer's subsidiary; Contractor shall have knowledge of Traffic Control.

It is the Contractor's responsibility to see that all temporary and permanent traffic control devices are properly installed and maintained in accordance with the plans and latest edition of the Texas Manual on Uniform Traffic Control Devices. If, in the opinion of the engineering representative and the construction inspector, the barricades and signs do not conform to established standards or are incorrectly placed or are insufficient in quantity to protect the general public, the construction inspector shall have the option to stop operations until such time as the conditions are corrected. If the need arises, additional temporary traffic control devices may be ordered by the Engineering representative at the Contractor's expense.

Type II B-B blue reflective raised pavement marker shall be installed in the center of the roadway in each direction of traffic adjacent to all fire hydrants. In locations where hydrants are situated on corners, blue reflective raised pavement markers shall be installed on both approaches which front the hydrant. The raised pavement marker shall meet TxDOT material, epoxy and adhesive specifications.

Groundwater

It shall be the responsibility of the developer, Contractor, subcontractors, builders, City, and project engineer to immediately notify the Office of the City Engineer and project engineer if the presence of groundwater within the site is evident. Upon notification the project engineer shall respond with plan revisions for the mitigation of the groundwater issue. The City Engineer shall respond within two (2) business days upon receipt of the mitigation plan. All construction activity, impacted by the discovery of groundwater, shall be suspended until the City Engineer grants a written approval of the groundwater mitigation plan.

Record Drawings

As per Platting Ordinance Section 118-38m.: When all of the improvements are found to be constructed and completed in accordance with the approved plans and specifications and with the City's standards, and upon receipt of one set of "Record Drawing" plans, and a digital copy of all plans (PDF) the City Engineer shall accept such improvements for the City of New Braunfels, subject to the guaranty of material and workmanship provisions in this Section.

Project: NB 18-026

County: Guadalupe

Highway: Klein Rd Ph 2

Construction Note

Contractor is responsible to ensure that erosion control measures and stormwater control sufficient to mitigate off site impacts are in place at all stages of construction. SWPPP reports are required by the Contractor per Texas Commission on Environmental Quality (TCEQ) requirements.

Drainage Note

Drainage improvements sufficient to mitigate the impact of construction shall be installed prior to adding impervious cover.

Soils Testing

Proctors shall be sampled from on site material (on site is defined as limits of construction for this plan set) and a copy of the proctor results shall be delivered to the City of New Braunfels Street Inspector prior to any density tests.

Roadway

All roadway compaction tests shall be the responsibility of the owner's Geotechnical Engineer. Flexible base or fill/embankment material shall be placed in uniform layers not to exceed eight inches (8") loose. The required density for the fill/embankment material shall meet the requirements of TxDOT's Specification Item 132. The required density for the flexible base material shall meet the requirements of TxDOT's Specification Item 247. Each layer of material, inclusive of subgrade, shall be compacted as specified and tested for density and moisture in accordance with Test Methods TEX-113-E, TEX-114-E, TEX-115-E. The number and location of required tests shall be determined by the Geotechnical Engineer and approved by the City of New Braunfels Street Inspector. At a minimum, tests shall be taken every 100 LF for each lift. Upon completion of testing, the Geotechnical Engineer will provide the City of New Braunfels Street Inspector with all testing documentation and a certification stating that the placement of flexible pavement material has been completed in accordance with the plans. The above testing requirements and certification also applies to lime treated subgrade.

Drainage Trench Compaction

All utility trench compaction tests within the street pavement/sidewalk section shall be the responsibility of the developer's Geotechnical Engineer. Fill material shall be placed in uniform layers not to exceed twelve inches (12") loose. Determine the maximum lift thickness based on the ability of the compacting operation and equipment used to meet the required density. Each layer of material shall be compacted to a minimum 95% density and tested for density and moisture in accordance with Test Methods TEX-113-E, TEX-114-E, TEX-115-E. The number and location of required tests shall be determined by the Geotechnical Engineer and approved by the City of New Braunfels Street Inspector. At a minimum, tests shall be taken every 100 LF

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City of New Braunfels

KLEIN RD PHASE 2

GENERAL NOTES

SHEET 3 OF 11

DGN:	STATE	PROJECT NO.	ROADWAY
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for each lift and every other service line. Upon completion of testing the Geotechnical Engineer shall provide the City of New Braunfels Street Inspector with all testing documentation and a certification stating that the placement of fill material has been completed in accordance with the plans. Additional density tests may be requested by the City of New Braunfels Inspector.

Curb Cut Due To Construction Of New Right-Of-Way Construction

Sawcut existing streets and match to new construction. Sawcut existing curb to tie into existing construction. Saw cutting existing pavement, concrete, and riprap is not paid for separately but is subsidiary to various bid items.

Construction Stabilized Entrance

Sawcut curb for construction entrance. Stabilized construction area shall be constructed as indicated on the plans and maintained so that construction debris does not fall within the city right-of-way. Right- of-way must be cleared from mud, rocks, etc. at all times.

Signing And Pavement Marking Plan Notes

The Contractor shall furnish and install all regulatory and warning signs, streets name signs and sign mounts in accordance with approved engineering plans. The City will inspect all signs at final inspection.

The Contractor shall install all pavement markings in accordance with approved engineering plans. The Contractor shall notify the City at least twenty-four (24) hours prior to the installation of all sealer and final markings. The City will inspect all markings at final application.

References to manufacturer's trade name or catalog numbers are for the purpose of identification only. Similar materials from other manufacturers are permitted if they are of equal quality, comply with the specifications for this project, and are approved, except for roadway illumination, electrical, and traffic signal items.

The cost for materials, labor, and incidentals to provide a minimum 14'-wide driving surface for traffic across the roadway and for ingress and egress to private property in accordance with Section 7.2.4 of the standard specifications is subsidiary to the various bid items. Restore access roadways to their original condition upon completing construction.

--Item 5--
Taper ACP placed at curb inlets, traffic inlets and slotted drains.

Prior to letting, bidders may obtain a free computer diskette or a computerized transfer of files (from the Engineer's office) that contains the earthwork information.

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Provide a non-intrusive back-up alarm system on all heavy equipment used in close proximity to residential areas. This item is subsidiary to various bid items.

--Item 6--
Show the stockpile lot and/or sub lot numbers on all tickets for all materials.

--Item 7--
The project's total disturbed area is 14.05 acres. The disturbed area in all project locations and Contractor project specific locations (PSL's), within 1/4 mile of the project limits, will further establish the authorization requirements for storm water discharges. The Contractor will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. Obtain any required authorization from the TCEQ for any PSL's on or off the ROW. When the total area disturbed on the project and PSL's within 1/4 mile of the project exceeds 5 acres, provide a copy of the Contractor NOI for PSL's to the Engineer (to the appropriate MS4 operator when the project is on an off-state system route).

Notify the Engineer of the disturbed acreage within one (1) mile of the project limits. Obtain authorization from the TCEQ for Contractor PSL's for construction support activities on or off ROW.

No significant traffic generators events identified.

--Item 8--
Working days will be computed and charged in accordance with Section 6 1.1.A.9.: Calendar Day of the City Project Manual.

Create and maintain a bar chart schedule.

--Item 9--
Show proof of certification by the Texas Commission on Law Enforcement Standards.

All law enforcement personnel used in Work Zone Traffic Control shall be trained for performing duties in work zones and are required to take "Safe and Effective Use of Law Enforcement Personnel in Work Zones" (Course #133119) which can be found online at the following site: www.nhi.fhwa.dot.gov

Certificates of completion should be available to all who finish the course. These should be kept by the officers in order to substantiate completion when reporting to the work site.

Indefinite Quantities shown in the plans are provided for job total quantity or as supplementary use on the project as needed, when authorized by the Engineer.

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City of New Braunfels

KLEIN RD PHASE 2

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--Item 100--
Begin clearing operations after trees and other areas of vegetation to be protected have been identified and approved. Install fencing around features to be protected as shown in the plans or directed. Coordinate all right of way clearing operations with the SW3P. Maintanance, mowing, cleaning of cleared ROW shall be responsibility of the Contractor throughout the entire project.

Trim and remove brush and trees as needed for construction operations. Obtain approval for proposed method of tree and brush trimming and removal. Vertical flailing equipment is not allowed. Treat damaged or cut branches, roots and/or stumps of all oak trees with a commercial tree wound dressing. Disinfect all pruning tools with a solution of 70% alcohol before moving from one tree to another. Unless otherwise approved remove all resulting vegetative debris from the ROW within 24 hours. The Engineer can stop all construction operations if the dressing, cut and removal requirements are not followed.

--Item 110--
Where excavation extends beyond an existing right of way fence, remove and replace the fence to a comparable condition. This work shall be considered subsidiary to the bid item.

--Item 132--
At no time shall the retaining wall backfill material exceed the adjacent embankment operation by more than one embankment lift. At no time will the embankment adjacent to the retaining wall backfill exceed the wall backfill by any elevation.

--Item 160--
Existing topsoil within the ROW may be windrowed or stockpiled (as approved) for later use under this Item. Place erosion control measures for the stockpile and/or windrow.

--Item 162--
Furnish and place block grass sod of the same species as the surrounding vegetation.

--Item 164--
Seeding for the purpose of establishing vegetation within constructed earthen channels, basins and disturbed areas shall be conducted in accordance with Item 164 (Seeding for Erosion Control) of TxDOT's Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges manual. Only seed types and mixes specified for the San Antonio District (District 15) in Tables 1 and 2 under Item 164 shall be utilized. During the Cool Season (Sept 1-Nov 30), Cereal Rye and seed species specified for the San Antonio District in Table 3 may be used. For Cool Season seeding applications, cool season seed mixes shall be used in conjunction with seed mixes for the San Antonio District as specified in Table 1 and 2 under Item 164.

It may be deemed necessary to incorporate topsoil and soil amendments (i.e. compost/ fertilizer) into existing soil in order to facilitate vegetation growth. Topsoil, compost and fertilizer

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additions shall be conducted according to Items 160, 161 and 166 of TxDOT's Standard Specifications manual, respectively.

Watering may also be necessary to facilitate and expedite the sprouting and growth of vegetation. Item 168 of TxDOT's Standard Specifications manual shall be adhered to for vegetative watering.

If extended drought conditions exist that hinder or prohibit the growth and establishment of vegetation, the contractor shall provide a plan to the City of New Braunfels describing the measures that will be taken to stabilize earthen drainage infrastructure until a time when growing conditions become more favorable.

--Item 168--
Apply vegetative watering as needed to supplement natural rainfall during the vegetation establishment period. Plan quantity of irrigation water is based on the application of a total of 1.3 gal of water each week for each sq. yd. of area that is sodded or seeded. Establishment time is estimated to be 12 weeks or minimum 75% establishment for both sod and permanent seed mixes. Temporary seeding will require less time for establishment. Provide a schedule and coordinate watering cycles and rates per cycle with the Engineer. Obtain approval if the quantity of water to be applied is expected to exceed the plan quantity. Adjust the amount of water applied with each cycle and the number of cycles each wk. according to actual site conditions. Drought or other conditions, as determined by the Engineer, may require the application of supplemental irrigation during hours other than normal working hours.

--Item 247--
Provide Flexible Base Type A Grade 1 material as approved by the City. Planed temporary asphalt may be used as base material in accordance with Geotechnical Engineering Study for Klein Road Reconstruction-Phase II South Walnut to FM 725 by Raba Kistner Consultants, Inc. on December 1, 2020, as approved by the City.

--Item 260--
Provide Hydrated Lime Slurry as approved by the Engineer. Compact per the owner's Geotechnical Engineer's recommendations.

--Item 275--
275-1 The Engineer will designate a target cement content and optimum moisture content necessary to produce a stabilized mixture that meets the strength requirements and moisture susceptibility requirements shown in Table 1. The Contractor shall furnish the Engineer with representative samples of the materials to be used in production of the cement treated base.

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Table 1
Requirements for Cement Treatment

Description	Minimum	Maximum
Cement Content (by dry weight of base)	2%	5%
7-Day Unconfined Compressive Strength (min.)[1]	Tex-120-E, Part I	150 psi
Retained Strength after Moisture Conditioning (min.)	Tex-120-E, Part I (10 day capillary soak)	80% of 7—Day Unconfined Compressive Strength

Microcracking will be required in accordance with Item 275.4.7.

--Item 310 & 316--
Provide Prime Coat and O.C.S.T. and as approved by the Engineer.

--Item 320—

Construct all longitudinal ACP joints adjacent to a travel lane with a joint maker device that will create a 3:1 to 6:1 taper. For placement of 2 inches or more, the device shall provide a maximum ½ inch vertical edge. Taper outside edges (next to the grass) or backfill (shoulder-up) the same day.

Provide a material transfer device capable of providing a continuous flow of material to the paver. The material transfer device will consist of a windrow elevator or better.

--Item 340, 341, 342, 344, 346, 347, & 348—

Asphaltic concrete pavement shall be the type of hot mix asphalt as defined in TxDOT's standard specifications for current TxDOT Standard Specifications for Construction of Highways, Street and Bridges.

Recycled Asphalt Pavement (RAP) should be limited to 20 percent of the total weight of the mix for Types "C" and "D" mixes and 30 percent for Type "B" mixes. Any debris inclusions within new asphalt pavements will result in asphalt removal and replacement from curb to curb for limits to be determined by the City of New Braunfels.

The asphaltic concrete pavement surface course shall be plant mixed, hot laid type "D" meeting the specification requirements of TxDOT Item 341. The asphaltic concrete pavement sub-surface courses shall be plant mixed, hot laid type "B" and hot laid type "C" meeting the specification requirements of TxDOT Item 340. The mixture shall be designed per the design requirements specified in TxDOT Item 340 and shall be compacted to between 91 and 95 percent of the

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maximum theoretical density as determined by TxDOT test method TEX-227-F. Place the mixture when the roadway surface temperature is at or above 60°F. Complete all compaction operations before the pavement temperature drops below 160°F. The asphalt cement content by percent of total mixture weight shall fall within a tolerance of +0.5 percent from a specific mix design.

Table 10, in Item 340, Table 10 in Item 341 and Table 11 in Item 344, Hamburg Wheel Test Requirements tested in accordance with Tex-242-F are changed for PG 64-22 or lower and PG 70-22. Minimum number of passes at 1/2" Rut Depth, Tested at 122 degrees F will be 5,000 and 10,000 respectively.

Design all mixture types using a target laboratory-molded density of 96.5%, when the Texas Gyrator Compactor is utilized. Increase the target laboratory-molded density to 97.0% or 97.5% at the Contractor's discretion. When utilizing SGC, design all mixture types at 50 gyrations (N-Design) and a target laboratory-molded density of 96.0%, but may be reduced to no less than 35 gyrations at the Contractor's discretion.

The asphalt plant shall have truck scales as defined in Item 520. Give three weight tickets bearing the date, the truck number, the gross, net & tare weights to the truck driver for the State inspector at the spreading and finishing operation. Trucks may be required to weigh on public scales or portable platform scales to verify the weight of the ticket.

Submit a copy of the Tex 233-F production charts on a weekly basis. At the end of the ACP work, provide all originals.

Crushing of aggregate for hot mix and immediate use for production of the mix is not allowed. Stockpile the aggregate until enough material is available for five days of production unless prior approval is provided. Hold a pre-placement meeting one month prior to the placement of the hot mix.

The main purpose of hot mix cores taken by the City are for payment calculations. If (for quality control purposes) the core information is needed sooner, take additional cores.

Do not use diesel or solvents as asphalt release agents in production, transportation, or construction.

Schedule lay-down placement where uneven travel lanes are minimized and eliminated weekly.

The use of Recycled Asphalt Pavement (RAP) and Recycled Asphalt Shingles (RAS) will not be allowed on the final riding surface.

Materials testing is to be completed by the City.

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Minimum Roadway Placement Temperature
--Item340, 341, & 344--
Place mixture when the roadway surface temperature is equal to or higher than listed in Table 1 unless otherwise approved or shown on the plans. Measure the roadway surface temperature with a hand-held thermal camera or infrared thermometer. Placement may be allowed to begin prior to the roadway surface reaching the required temperature if conditions are such that the roadway surface will reach the required temperature within 2 hrs. of beginning placement operations. Place mixtures only when weather and moisture conditions of the roadway surface are suitable in the opinion of the Engineer. The Engineer may restrict the Contractor from paving if the ambient temperature is likely to drop below 32°F within 12 hr. of paving.

Table 1
Minimum Pavement Surface Temperatures

Specification Item Number	High Temperature Binder Grade	Minimum Pavement Surface Temperatures in Degrees Fahrenheit *	
		Subsurface Layers or Night Paving Operations	Surface Layers Placed in Daylight Operations
340, 341, & 344	PG 64	45	50
	PG 70	55	60
	PG 76	60	60

* Except for PG 64, may pave at temperatures 10º F lower than the values shown in Table 1 when utilizing a Material Transfer Vehicle that is capable of providing a remixing, and continuous flow of material from the haul truck to the paver, such as a Roadtec SM-2500e/ex, that eliminates thermal segregation. In these cases, use either an infrared bar attached to the paver, or a hand held thermal camera or infrared thermometer, or a hand held infrared thermometer operated in accordance with Text Method 244-F to demonstrate that the uncompacted mat has no more than 10º F of thermal segregation.

Substitute Binder
--Item340, 341 & 344--
The Contractor may use a substitute PG binder listed below in Table 1 instead of the PG binder originally specified in Table 5 of the Standard Specification, if the substitute PG binder and mixture made with the substitute PG binder meet the following:

- The substitute binder meets the specification requirements for the substitute binder grade in accordance with Section 300.2.10., "Performance-Graded Binders;" and

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The mixture has less than 10.0 mm of rutting on the Hamburg Wheel test (Tex-242-F) after the number of passes required for the originally specified binder. Use of substitute PG binders may only be allowed at the discretion of the Engineer if the Hamburg Wheel test results are between 10.0 mm and 12.5 mm

Table 1
Allowable Substitute PG Binders and Maximum Recycled Binder Ratios

Originally Specified PG Binder	Allowable Substitute PG Binder	Maximum Ratio of Recycled Binder[1] to Total Binder (%)		
		Surface	Intermediate	Base
HMA				
76-22[2,5]	70-22	20.0	20.0	20.0
	70-28	20.0	35.0	40.0
70-22[2]	64-22	20.0	20.0	20.0
	64-28 or 58-28	20.0	35.0	40.0
64-22[2]	58-28	20.0	35.0	40.0
76-28[2,5]	70-28	20.0	20.0	20.0
70-28[2]	64-28 or 58-28	20.0	20.0	20.0
	64-34 or 58-34	20.0	35.0	40.0
64-28[2]	58-28	20.0	20.0	20.0
	58-34	20.0	35.0	40.0
WMA[3]				
76-22[2,5]	70- 22	20.0	35.0	40.0
70-22[2]	64-22 or 58-28	20.0	35.0	40.0
64-22[4]	58-28	20.0	35.0	40.0
76-28[2,5]	70-28	20.0	35.0	40.0
70-28[2]	64-28 or 58-28	20.0	35.0	40.0
64-28[4]	58-28	20.0	35.0	40.0

1. Combined recycled binder from RAP and RAS.
2. Use no more than 20.0% recycled binder when using this originally specified PG binder.
3. WMA as defined in Section 341.2.6.2., "Warm Mix Asphalt (WMA)."
4. When used with WMA, this originally specified PG binder is allowed for use at the maximum recycled binder ratios shown in this table.
5. No more than 1-PG grade lower than what is show on the plans will be permitted for Surface mixtures

--Item 403--
The Contractor and/or Contractor's Engineer who selects and designs the temporary shoring is responsible for the overall (global) stability calculations as well as internal stability and sliding calculations (including mat and soil nail pullout) as per the TxDOT Bridge Division Geotechnical Manual. If the Contractor chooses a Temporary Earth Retaining Wall for Temporary Shoring, then the Contractor and/or Contractor's Engineer is required also to provide wire struts as shown on these plans. Designs for any type of Retaining Wall used for Temporary Special Shoring shall conform to the TXDOT Geotechnical Manual Chapter 6: Retaining Walls.

--Item 421--
Use an automated ticket that contains the same information as TxDOT's ticket. Submit the ticket for approval prior to use. The concrete producer will contact the District Laboratory or the Engineer's Office (outside the San Antonio area) to inform TxDOT of scheduled structural

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KLEIN RD PHASE 2

GENERAL NOTES

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concrete batching. Structural concrete includes bridge drill shafts, columns, caps, abutments, deck or top slabs of direct traffic culverts.

Entrained air is allowed for Class P and Class HES concrete only. Air content testing is waived for all classes of concrete.

--Item 422--
For construction of approach slabs, longitudinal joints shall be placed on lane lines. Joints may be either a saw-cut crack control joint or a construction joint. Saw cut joints shall terminate 1'-0" before reaching the edge of the slab, must be saw cut as soon as possible after placement of concrete, and will be cut within 12 hours of concrete placement. Once sawing begins, it should be a continuous operation and should only be stopped if raveling occurs. Saw cut will be to a depth of 1.5" and filled with approved joint sealant.

--Item 423--
The backfill material for pre cast retaining walls shall be approved before placement. Build stockpile(s) in lifts not to exceed 2 feet and a minimum working face of not less than 10 feet, but not more than 20 feet.

Use the approved Mechanically Stabilized Earth (MSE) wall systems listed at:
http://www.dot.state.tx.us/business/contractors_consultants/bridge/retaining_wall.htm

When proprietary wall systems are used, a qualified representative of the retaining wall manufacturer must be available upon request during wall construction. As requested or required the manufacturer's representative must be on site to assist with the initial stages of wall construction, provide training to the Contractor wall crew and ensure proper interpretation of MSE wall shop drawings and details. Specific attention must be given to nonstandard wall installation details. The Contractor's wall crew foreman must be on site for the duration of wall construction. Any change to the wall crew foreman may require additional training by the wall supplier. The Contractor will ensure that the retaining walls are installed per the details presented in the construction drawings and as per the proprietary wall system requirements. The Engineer reserves the right to suspend wall construction activities due to any construction issue encountered.

Horizontal and vertical nail spacing on temp or permanent soil nail walls shall not exceed 4 ft.

Type DS material will be required on MSE walls in the area of the reinforcement mats.

--Item 432--
432-1 In all riprap slopes, provide 3 inch diameter weep holes at 10 foot maximum spacing and backed with loose graded gravel or crushed stone and galvanized hardware cloth.

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432-2 In areas where guard fence posts are to be placed in riprap, the riprap shall have an 18 inch +/-blocked out area (round or square). Blocked out areas shall be backfilled with 2 sack flowable backfill and considered subsidiary to the various bid items.

--Item 465--
Concrete Class B invert shaping is required at all inlets, manholes and junction boxes in order to insure positive flow. The material and work performed for the placement of the inverts shall be considered subsidiary to this item.

Provide for the safety and health of employees and abide by all OSHA Standards and Regulations. All costs incurred for proper management, shall be subsidiary to this Item.

--Item 496--
The Contractor will submit a demolition plan for all structures to be replaced and/or removed in accordance with Item 496.

--Item 500--
"Materials on Hand" payments will not be considered in determining percentages for mobilization payments.

--Item 502—
Prior to beginning construction, the City shall approve the routing of traffic and sequence of work.

Additional signs and barricades as directed by the Engineer shall be considered subsidiary to Item 502.

Construct the project in phases per the Traffic Control Plan in phase order. The Contractor shall not begin construction on a subsequent phase until the active phase is considered complete. A phase is considered complete when all pavement section layers except final riding surface have been constructed; substantially useable sidewalk and driveways have been constructed; and vegetation re-establishment has begun.

The Contractor shall limit impacts to individual driveways to a 3-day turnaround time from demolition to poured concrete. The Contractor shall maintain access to each driveway during construction except during this 3-day period. Construct temporary ramps to maintain access to driveways and city streets as directed by the Engineer. Temporary ramp construction is subsidiary to Item 502.

Place standard markings no later than 14 days after surface treatment operations are completed.

When advanced warning flashing arrow panels and/or changeable message sign is specified, have one standby unit in good condition at the job site. Standby time shall be considered

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subsidiary to the bid item. The use of police officers for traffic control shall be considered subsidiary to the bid item.

Treat the pavement drop-offs as shown in the TCP.

After written notification, the time frame to provide properly maintained signs and barricades before considered in non-compliance is 48 hours from receipt of the notification. Failure to make corrections as noted may result in payment for this item being withheld.
There are traffic signals at the intersection of Klein Rd and FM 725. Keep the signals in operation except when necessary for specific installation operations.

Moving an existing sign to a temporary location is subsidiary to this Item. Installations with permanent supports at permanent locations will be paid for under the applicable bid item (s).

Mount temporary mailboxes on plastic drum in accordance with Compliant Work Zone Traffic Control Devices, Section K. Temporary mailboxes shall be located for postal delivery by vehicle at all times. Mounting and moving the mailbox as needed for the various construction phases is subsidiary to this Item.

Notify the Engineer in writing 10 business days in advance of any temporary or permanent lane closures/detours, restrictions to lane widths, alterations to vertical clearances, or modifications to radii. Any other modifications to the roadway that may adversely affect the mobility of oversized/overweight trucks also require 10 business days advance written notice to the Engineer. Unless shown in the TCP, no lane closures are allowed during special events. Lane closures will not be allowed if this reporting requirement is not met.

Avoid placing stockpiles within the roadway's horizontal clear zone. If a stockpile is placed within the clear zone, address in accordance with the TMUTCD.

Do not place barricades, signs, or any other traffic control devices where they interfere with sight distance at driveways or side streets.

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee available to respond on the project for emergencies and for taking corrective measures within 2 hours or within a reasonable time frame as specified by the Engineer.

If Nighttime work is required and work is not behind positive barrier then full TY 3 reflective gear is required to be worn by all workers, hard hat halos are required to be worn by the flaggers at flagging stations, TY III barricades are required to be spaced at 500 ft, and a mandatory night work meeting is required.

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Prior to beginning construction, the Engineer shall approve the routing of traffic and sequence of work.

Additional signs and barricades as directed by the Engineer shall be considered subsidiary to Item 502.
Wash the channelizing devices and barricades following each rainfall or snowfall event and at times deemed necessary by the Engineer.

Fill any holes left by barricade or sign supports and restore the area to its original condition.
"Sidewalk Closed" (R9-9) signs are to be used while work is ongoing. See TxDOT standard WZ(BTS-2)-13 for more details.

--Item 506--
An Inspector will perform a regularly scheduled SWP3 inspection every 7 calendar days.

Failure to address items noted on the SW3P inspection report within two report cycles may result in the Department stopping all construction operations, exclusive of time charges, or withholding that month's estimate until the SW3P deficiencies are corrected unless the Engineer determines that the area is too wet to correct SW3P deficiencies.

Erosion control logs, sandbags and other BMPs will be placed and relocated as directed by the Engineer in order to comply fully with the SW3P requirements.

Water pumped off the project must have sediment and any other solids in suspension removed before discharging.

--Item 529--
Class "C" concrete is required for machine extruded curb.

--Item 530--
Use Class A Concrete for all concrete driveways.

Contractor is responsible for notifying residents at least 72 hours in advance prior to excavating driveways. Contractor should not take longer than 3 days to complete the construction of the driveways once excavation begins, weather pending.

--Item 531--
The curb ramp locations shown in the plans have taken into account the geometric features of the intersection, utilities, signage, and pavement markings. If anything changes during construction, the location of curb ramps must be adjusted to ensure they meet PROWAG requirements.

Truncated dome pavers are prohibited.

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All detectable warning surfaces are to be prefabricated panels constructed of cast iron or composite materials of contrasting color to the surrounding material, as approved by the Engineer.

Proposed curb ramps, sidewalks, curbs, and riprap are to be doweled 6-in minimum, unless otherwise shown, into existing concrete using ½-in reinforcement placed on 12-in centers.

Curb wall along ramps and landings, unless otherwise shown on the plans, is not paid for separately but is subsidiary to the ramp or landing. If the wall extends above the plane of the landing, retaining wall (unless otherwise noted on the plans) should be utilized. Retaining wall quantities are shown for Contractor information only, payment is subsidiary to Item 531 Sidewalks. See special details sheets for more information.

Each planar element along the accessible route indicates the maximum slope and cross slope for that element as defined in the plans – in many cases the element can be constructed to achieve the design intent at or below the maximum slope for that element. With the approval of the Engineer, the Contractor may extend the length of ramps or sloped sidewalks to the next planar element (level sidewalk, landing, transition, or driveway) or until the point at which the ramp or sloped sidewalk reaches the height of the adjacent curb, whichever is shorter, in order to achieve the design intent.

Construct compliant curb ramps based upon referenced design criteria, PROWAG and TxDOT Pedestrian Facilities Standards. All intersection corners are unique and it may be necessary to use various combinations of ramp elements to achieve a compliant ramp configuration.

Any approval, inspection, or checking of the Contractor's layout and the acceptance of all or any part of it shall not relieve the Contractor of his responsibility to secure the proper dimensions, grades and elevations of the various parts of the work.

The furnishing and installation of pipe underdrains, filter material, and other incidentals to ensure proper drainage of special concrete sidewalk with retaining wall per Concrete Sidewalk (Special)(Type B) will not be paid for directly but shall be considered subsidiary to this bid item and in accordance with Item 531.

Removal of existing concrete, surfaces, asphalt, base material, sign posts, miscellaneous materials, and all incidentals is included in this pay item within the footprint of the proposed work. If additional work related to the removal of existing is required beyond the quantity identified for Contractors information only, no additional payment will be made.

In areas where there is no curb fillet or concrete pavement, saw cut the existing curb and gutter and remove the curb.

For curb ramps, form tooled joints on each side of the ramp section where it meets a flare or curb wall, at each break in ramp slope or geometry, and at intervals equivalent to the width of the

Project: NB 18-026

County: Guadalupe

Highway: Klein Rd Ph 2

sidewalk for the purpose of cracking control. Place expansion joint material between proposed ramps and existing concrete; between proposed sidewalk and utility poles, guy wires, vent pipes, stand pipes and as directed.

--Item 560--
Move and replace all mailboxes within the project limits such that they may be served by the mail carrier from a vehicle at all times during and after construction. This work will be considered subsidiary to the various bid items of this contract.

If a permanent (concrete or brick) mailbox is called out to be relocated, rebuild and reset the existing mailbox in the proposed location.

MBGF posts shall be round with domed tops, and not painted. If 10 or less timber posts are needed, they may be purchased locally and will be accepted by visual inspection.

Guard fence posts placed in proposed and/or existing areas of riprap, sidewalks or other concrete shall have an 18 inch +/- (square or round) block out in the concrete. After the posts are installed, the blocked out area shall be topped off with 4 inches of low strength grout/mortar consisting of about 1 sack of cement per cubic yard of mix.

When connecting a Thrie-Beam to a concrete wingwall, bridge rail, CTB, etc., drill the holes for bolt placement using rotary or core type equipment. Use a core type drill when reinforcing steel is encountered. Do not use percussion or impact drilling. Repair damage to the concrete and spalls exceeding ½" from the edge of the hole.

--Item 666--
Use TY II material (vs. an acrylic or epoxy) as the sealer for the TY I markings, place the TY II a minimum of 14 calendar days (to provide adequate curing) before placing the TY I markings.

Median nose pavement marking materials are to be approved by the Engineer.

--Item 672--
Place all adhesive material directly from the heated dispenser to the pavement. Do not use portable or non-heated containers. Use adhesive of sufficient thickness so that when the marker is pressed into the adhesive, 1/8" or more adhesive will remain under 100% of the marker. The adhesive should extend not less than 1/2" but not more than 1 1/2" beyond the perimeter of the marker.

--Item 677--
Obtain approval before using the mechanical method for the elimination of existing thermoplastic pavement markings.

REV. NO.	DATE	DESCRIPTION	BY

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SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
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TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

GENERAL NOTES

SHEET 10 OF 11

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	13

Project: NB 18-026

County: Guadalupe

Highway: Klein Rd Ph 2

--Item 680--
Furnish and install all required materials and equipment necessary for the complete and operating traffic signal installation at the following intersections:

1. FM 725 at Klein Rd

All workers installing electrical materials, including conduit in trenches, service poles and all other system electrical apparatus, will be directly supervised by persons who have completed a TxDOT approved course in electrical underground installations. Furnish evidence of satisfactory completion of the underground electrical installation for roadway illumination and signal control course for all personnel responsible for direct supervision of electrical installation work.

The locations shown on the plans for signal pole foundations, controller foundations, conduit and other items may be adjusted to better fit field conditions as approved.

Use LED lamps from the prequalified material producer lists as shown on the Texas Department of Transportation (TxDOT) – Construction Division's (CST) material producer list. Category is "Roadway Illumination and Electrical Supplies." under item 610. No substitutions will be allowed for materials found on this list.

Demonstrate that the field wiring is properly installed, install the controller assembly, connect the wiring and turn on the controller.

All existing signal equipment with the exception of the signal controller and related equipment become the property of the Contractor. Deliver the controller and related equipment to the Signal shop, located at 4615 NW Loop 410 (corner of IH 410 and Callaghan Road) in San Antonio, Texas or to the Area Office as directed.

--Item 682--
Provide all signal heads from the same manufacturer. Pedestrian signals may be by a different manufacturer than the vehicle signal heads.

Cover all signal faces until placed in operation.

All pedestrian signal faces shall be single section LED Type. Die cast polycarbonate is acceptable in lieu of die cast aluminum. All mounting attachments shall be constructed of steel pipe and mounted as shown on the plans.

--Item 684--
Provide an extra 10' for each cable terminating in the controller cabinet. All cables shall be continuous without splices from terminal point to terminal point. All proposed traffic signal cable shall be #12 AWG stranded copper.

Project: NB 18-026

County: Guadalupe

Highway: Klein Rd Ph 2

--Item 686 & 687--
Provide all signal poles from the same manufacturer. Pedestrian poles may be from a different manufacturer.

--Item 2005--
The furnishing and installation of the sand cushion in the proposed sidewalks, sidewalk ramps and driveways will not be paid for directly but shall be considered subsidiary to this bid item. Contractor shall submit to the Engineer the material to be used for approval prior to installation.

--Item 6001--
Provide messages as directed by the Engineer.

Provide 3 solar powered changeable message signs for this project. Keep the portable changeable signs during the Phase 1 of construction only; to be removed with the removal of Phase 1 detour plan.

Subsidiary
Contractor shall control and cut any overgrown weeds, grasses, trees within the prepared ROW throughout the entire project.

All safety concrete barricades, or other, and fall protection shall be subsidiary to any bore pits, receiver pits, trenches to keep the traveling public safe.

REV. NO.	DATE	DESCRIPTION	BY

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TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

GENERAL NOTES

SHEET 11 OF 11

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	14

Plotted on: 5/6/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\General\5103003_EQ.dgn

ESTIMATE SUMMARY

NB 18-026 KLEIN ROAD PH 2		ALT	ITEM-CODE			DESCRIPTION	UNIT	TOTAL	
EST.	FINAL		ITEM NO		SP NO			EST.	FINAL
50.6			0100	6002		PREPARING ROW	STA	50.6	
29048			0110	6001		EXCAVATION (ROADWAY)	CY	29048	
206			0110	6002		EXCAVATION (CHANNEL)	CY	206	
8296			0132	6005		EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	8296	
11234			0160	6003		FURNISHING AND PLACING TOPSOIL (4")	SY	11234	
11234			0162	6002		BLOCK SODDING	SY	11234	
3450			0164	6007		BROADCAST SEED (PERM) (URBAN) (CLAY)	SY	3450	
3450			0164	6009		BROADCAST SEED (TEMP) (WARM)	SY	3450	
3450			0164	6011		BROADCAST SEED (TEMP) (COOL)	SY	3450	
336.80			0168	6001		VEGETATIVE WATERING	MG	336.80	
3450			0169	6001		SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	3450	
4.0			0216	6001		PROOF ROLLING	HR	4.0	
9544			0247	6041		FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	CY	9544	
348.7			0260	6002		LIME (HYDRATED LIME (SLURRY))	TON	348.7	
34770			0260	6027		LIME TRT (EXST MATL)(8")	SY	34770	
10114.12			0310	6001		PRIME COAT (MULTI OPTION)	GAL	10114.12	
242			0316	6251		AGGR(TY-PE GR-5 SAC-B)	CY	242	
6742.78			0316	6400		ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	6742.78	
467.5			0340	6011		D-GR HMA(SQ) TY-B PG64-22	TON	467.5	
5891.4			0340	6014		D-GR HMA(SQ) TY-B PG70-22	TON	5891.4	
5428.7			0340	6050		D-GR HMA(SQ) TY-C PG70-22	TON	5428.7	
6293.04			0340	6272		TACK COAT	GAL	6293.04	
3694.4			0341	6049		D-GR HMA TY-D PG76-22	TON	3694.4	
63			0400	6005		CEM STABIL BKFL	CY	63	
16.0			0401	6001		FLOWABLE BACKFILL	CY	16	
5289			0402	6001		TRENCH EXCAVATION PROTECTION	LF	5289	
810			0416	6004		DRILL SHAFT (36 IN)	LF	810	
2			0420	6010		CL A CONC (PLUG)	EA	2	
111			0420	6013		CL C CONC (ABUT)	CY	111	
87			0420	6025		CL C CONC (BENT)	CY	87	
61			0420	6066		CL C CONC (RAIL FOUNDATION)	CY	61	
7			0420	6074		CL C CONC (MISC)	CY	7	
18069			0422	6001		REINF CONC SLAB	SF	18069	
1470			0422	6013		BRIDGE SIDEWALK	SF	1470	
152			0422	6015		APPROACH SLAB	CY	152	
3859			0423	6001		RETAINING WALL (MSE)	SF	3859	
326			0423	6008		RETAINING WALL (CAST - IN - PLACE)	SF	326	
945			0425	6036		PRESTR CONC GIRDER (TX34)	LF	945	
1490			0425	6038		PRESTR CONC GIRDER (TX46)	LF	1490	
81			0432	6003		RIPRAP (CONC)(6 IN)	CY	81	
1			0432	6045		RIPRAP (MOW STRIP)(4 IN)	CY	1	
1835			0450	6034		RAIL (TY C402)	LF	1835	
71			0450	6048		RAIL (HANDRAIL)(TY B)	LF	71	
494			0450	6103		RAIL (TY PR11)	LF	494	
140			0454	6020		SEALED EXPANSION JOINT (4 IN) (SEJ - B)	LF	140	
100			0460	6001		CMP (GAL STL 12 IN)	LF	100	
646			0462	6006		CONC BOX CULV (5 FT X 2 FT)	LF	646	
2854			0462	6007		CONC BOX CULV (5 FT X 3 FT)	LF	2854	
162			0462	6008		CONC BOX CULV (5 FT X 4 FT)	LF	162	
120			0462	6011		CONC BOX CULV (6 FT X 4 FT)	LF	120	
1900			0464	6005		RC PIPE (CL III)(24 IN)	LF	1900	
56			0464	6007		RC PIPE (CL III)(30 IN)	LF	56	
115			0464	6025		RC PIPE (CL V)(18 IN)	LF	115	
9			0465	6013		INLET (COMPL)(PCO)(3FT)(NONE)	EA	9	
14			0465	6014		INLET (COMPL)(PCO)(3FT)(LEFT)	EA	14	
10			0465	6015		INLET (COMPL)(PCO)(3FT)(RIGHT)	EA	10	
6			0465	6030		INLET (COMPL)(PCU)(3FT)(LEFT)	EA	6	
6			0465	6031		INLET (COMPL)(PCU)(3FT)(RIGHT)	EA	6	
3			0465	6045		INLET (COMPL)(PMBD)(4FT)	EA	3	
3			0465	6070		INLET (COMPL)(PSL)(RC)(3FTX3FT)	EA	3	
1			0465	6072		INLET (COMPL)(PSL)(RC)(3FTX5FT)	EA	1	
18			0465	6077		INLET (COMPL)(PSL)(RC)(8FTX8FT)	EA	18	
1			0465	6158		INLET(COMPL)(PAZD)(FG)(3FTX3FT-3FTX3FT)	EA	1	
3			0465	6160		INLET(COMPL)(PAZD)(FG)(4FTX4FT-4FTX4FT)	EA	3	
1			0465	6269		INLET (COMPL)(TY C)	EA	1	
1			0466	6179		WINGWALL (PW - 1) (HW=4 FT)	EA	1	
1			0466	6180		WINGWALL (PW - 1) (HW=5 FT)	EA	1	
30			0471	6003		GRATE & FRAME	EA	30	
1			0479	6003		ADJUSTING MANHOLES & INLETS	EA	1	
197			0496	6007		REMOV STR (PIPE)	LF	197	
1			0500	6001		MOBILIZATION	LS	1.0	
20			0502	6001		BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	21	
250			0506	6002		ROCK FILTER DAMS (INSTALL) (TY 2)	LF	250	
335			0506	6003		ROCK FILTER DAMS (INSTALL) (TY 3)	LF	335	
585			0506	6011		ROCK FILTER DAMS (REMOVE)	LF	585	

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

ESTIMATE AND QUANTITY

SHEET 1 OF 3

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	15

Plotted on: 5/6/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\General\5103003_EQ.dgn

ESTIMATE SUMMARY

NB 18-026 KLEIN ROAD PH 2		ALT	ITEM-CODE			DESCRIPTION	UNIT	TOTAL	
EST.	FINAL		ITEM NO		SP NO			EST.	FINAL
2146			0506	6020		CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	2146	
2146			0506	6024		CONSTRUCTION EXITS (REMOVE)	SY	2146	
183			0506	6037		SANDBAGS FOR EROSION CONTROL (12")	LF	183	
2622			0506	6038		TEMP SEDMT CONT FENCE (INSTALL)	LF	2622	
2622			0506	6039		TEMP SEDMT CONT FENCE (REMOVE)	LF	2622	
1176			0506	6041		BIODEG EROSN CONT LOGS (INSTL) (12")	LF	1176	
1176			0506	6043		BIODEG EROSN CONT LOGS (REMOVE)	LF	1176	
8185			0508	6001		CONSTRUCTING DETOURS	SY	8185	
4980			0512	6009		PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	4980	
680			0512	6010		PORT CTB (FUR & INST)(LOW PROF)(TY 2)	LF	680	
360			0512	6033		PORT CTB (MOVE)(LOW PROF)(TY 1)	LF	360	
140			0512	6034		PORT CTB (MOVE)(LOW PROF)(TY 2)	LF	140	
360			0512	6045		PORT CTB (STKPL)(LOW PROF)(TY 1)	LF	360	
140			0512	6046		PORT CTB (STKPL)(LOW PROF)(TY 2)	LF	140	
4980			0512	6057		PORT CTB (REMOVE)(LOW PROF)(TY 1)	LF	4980	
680			0512	6058		PORT CTB (REMOVE)(LOW PROF)(TY 2)	LF	680	
10780			0529	6002		CONC CURB (TY II)	LF	10780	
1210			0530	6004		DRIVEWAYS (CONC)	SY	1210	
7428			0531	6001		CONC SIDEWALKS (4")	SY	7428	
161			0531	6019		CURB RAMPS (TY 2)	SY	161	
458			0531	6020		CURB RAMPS (TY 3)	SY	458	
17			0531	6030		CURB RAMPS (TY 21)	SY	17	
1320			0536	6002		CONC MEDIAN	SY	1320	
1			0540	6006		MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	1	
1			0540	6016		DOWNSTREAM ANCHOR TERMINAL SECTION	EA	1	
1			0545	6019		CRASH CUSHION ATTEN (INSTL)(S)(N)(TL3)	EA	1	
8			0560	6014		MAILBOX INSTALL-S (TWG-POST) TY 4	EA	8	
9270			0618	6033		CONDT (PVC) (SCH 40) (4")	LF	9270	
806			0618	6034		CONDT (PVC) (SCH 40) (4") (BORE)	LF	806	
150			0618	6046		CONDT (PVC) (SCH 80) (2")	LF	150	
70			0618	6053		CONDT (PVC) (SCH 80) (3")	LF	70	
190			0620	6009		ELEC CONDR (NO.6) BARE	LF	190	
70			0620	6010		ELEC CONDR (NO.6) INSULATED	LF	70	
275			0621	6005		TRAY CABLE (4 CONDR) (12 AWG)	LF	275	
2			0624	6010		GROUND BOX TY D (162922)W/APRON	EA	2	
29			0624	6012		GROUND BOX TY E (122317)W/APRON	EA	29	
589			0625	6002		ZINC-COAT STL WIRE STRAND (3/16")	LF	589	
589			0625	6004		ZINC-COAT STL WIRE STRAND (5/16")	LF	589	
4			0627	6002		TIMBER POLE (CL 2) 40 FT	EA	4	
1			0628	6164		ELC SRV TY D 120/240 070(NS)AL(E)PS(U)	EA	1	
15			0644	6001		IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	15	
1			0644	6004		IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	1	
1			0644	6007		IN SM RD SN SUP&AM TY10BWG(1)SA(U)	EA	1	
12			0644	6060		IN SM RD SN SUP&AM TYTWT(1)WS(P)	EA	12	
2			0644	6061		IN SM RD SN SUP&AM TYTWT(1)WS(T)	EA	2	
1			0644	6068		RELOCATE SM RD SN SUP&AM TY 10BWG	EA	1	
20899			0662	6004		WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	20899	
202			0662	6012		WK ZN PAV MRK NON-REMOV (W)8"(SLD)	LF	202	
21			0662	6016		WK ZN PAV MRK NON-REMOV (W)24"(SLD)	LF	21	
20956			0662	6034		WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	20956	
724			0662	6063		WK ZN PAV MRK REMOV (W)4"(SLD)	LF	724	
332			0662	6071		WK ZN PAV MRK REMOV (W)8"(SLD)	LF	332	
50			0662	6094		WK ZN PAV MRK REMOV (Y)4"(DOT)	LF	50	
1525			0662	6095		WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	1525	
1632			0666	6036		REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	1632	
834			0666	6048		REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	834	
21			0666	6054		REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	21	
13			0666	6078		REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	13	
716			0666	6147		REFL PAV MRK TY I (Y)24"(SLD)(100MIL)	LF	716	
5			0666	6156		REFL PAV MRK TY I(Y)(MED NOSE)(100MIL)	EA	5	
11031			0666	6224		PAVEMENT SEALER 4"	LF	11031	
1632			0666	6226		PAVEMENT SEALER 8"	LF	1632	
1550			0666	6230		PAVEMENT SEALER 24"	LF	1550	
21			0666	6231		PAVEMENT SEALER (ARROW)	EA	21	
13			0666	6232		PAVEMENT SEALER (WORD)	EA	13	
5			0666	6233		PAVEMENT SEALER (MED NOSE)	EA	5	
2268			0666	6300		RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	2268	
414			0666	6312		RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	LF	414	
8349			0666	6315		RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	8349	
5			0672	5009		REFL PAV MRKR TY II-B-B	EA	5	
204			0672	6007		REFL PAV MRKR TY I-C	EA	204	
313			0672	6009		REFL PAV MRKR TY II-A-A	EA	313	
67			0672	6010		REFL PAV MRKR TY II-C-R	EA	67	
4696			0677	6001		ELIM EXT PAV MRK & MRKS (4")	LF	4696	
352			0677	6003		ELIM EXT PAV MRK & MRKS (8")	LF	352	

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

ESTIMATE AND QUANTITY

SHEET 2 OF 3

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	16

Plotted on: 5/6/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\General\5103003_EQ.dgn

ESTIMATE SUMMARY

NB 18-026 KLEIN ROAD PH 2		ALT	ITEM-CODE			DESCRIPTION	UNIT	TOTAL	
EST.	FINAL		ITEM NO		SP NO			EST.	FINAL
97			0677	6007		ELIM EXT PAV MRK & MRKS (24")	LF	97	
1			0677	6008		ELIM EXT PAV MRK & MRKS (ARROW)	EA	1	
1			0677	6020		ELIM EXT PAV MRK & MRKS (MED NOSE)	EA	1	
11031			0678	6001		PAV SURF PREP FOR MRK (4")	LF	11031	
1632			0678	6004		PAV SURF PREP FOR MRK (8")	LF	1632	
1550			0678	6008		PAV SURF PREP FOR MRK (24")	LF	1550	
21			0678	6009		PAV SURF PREP FOR MRK (ARROW)	EA	21	
13			0678	6016		PAV SURF PREP FOR MRK (WORD)	EA	13	
5			0678	6024		PAV SURF PREP FOR MRK (MED NOSE)	EA	5	
1			0680	6002		INSTALL HWY TRF SIG (ISOLATED)	EA	1	
1			0680	6004		REMOVING TRAFFIC SIGNALS	EA	1	
1			0681	6001		TEMP TRAF SIGNALS	EA	1	
8			0682	6001		VEH SIG SEC (12")LED(GRN)	EA	8	
4			0682	6002		VEH SIG SEC (12")LED(GRN ARW)	EA	4	
8			0682	6003		VEH SIG SEC (12")LED(YEL)	EA	8	
6			0682	6004		VEH SIG SEC (12")LED(YEL ARW)	EA	6	
8			0682	6005		VEH SIG SEC (12")LED(RED)	EA	8	
4			0682	6006		VEH SIG SEC (12")LED(RED ARW)	EA	4	
2			0682	6018		PED SIG SEC (LED)(COUNTDOWN)	EA	2	
2			0682	6049		BACKPLATE W/REFL BRDR(4 SEC)	EA	2	
10			0682	6060		BACKPLATE W/REFL BRDR(3 SEC)	EA	10	
485			0684	6009		TRF SIG CBL (TY A)(12 AWG)(4 CONDR)	LF	485	
1960			0684	6012		TRF SIG CBL (TY A)(12 AWG)(7 CONDR)	LF	1960	
485			0684	6080		TRF SIG CBL (TY C)(14 AWG)(2 CONDR)	LF	485	
4			0687	6001		PED POLE ASSEMBLY	EA	4	
2			0688	6001		PED DETECT PUSH BUTTON (APS)	EA	2	
1			0688	6003		PED DETECTOR CONTROLLER UNIT	EA	1	
8582			2005	6002		FILTER FABRIC (TY 1)	SY	8582	
34770			5001	6002		GEOGRID BASE REINFORCEMENT (TY II)	SY	34770	
3			5009	6001		STONE MASONRY COLUMNS	EA	3	
534			5009	6002		STONE MASONRY (ROCK WALL)	SF	534	
188			5071	6001		WOOD FENCE (REMOVE)	LF	188	
188			5071	6002		WOOD FENCE (INSTALL)	LF	188	
465			6001	6001		PORTABLE CHANGEABLE MESSAGE SIGN	DAY	483	
1			6002	6001		VIVDS PROCESSOR SYSTEM	EA	1	
4			6002	6002		VIVDS CAMERA ASSEMBLY	EA	4	
1			6002	6003		VIVDS SET-UP SYSTEM	EA	1	
880			6002	6005		VIVDS COMMUNICATION CABLE (COAXIAL)	LF	880	
1926			6210	6001		PVC MOISTURE BARRIER	SY	1926	

REV. NO.	DATE	DESCRIPTION	BY

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TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

ESTIMATE AND QUANTITY

SHEET 3 OF 3

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	17

	ITEM	0460-6001	0464-6025	0496-6007	0508-6001	0512-6009	0512-6010	0512-6033	0512-6034
SHT NO	INTERSECTION	CMP (GAL STL 12 IN)	RC PIPE (CL V)(18 IN)	REMOV STR (PIPE)	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)
		LF	LF	LF	SY	LF	LF	LF	LF
45	TRAFFIC CONTROL PLAN PHASE 1 STEP 1						40		
46	TRAFFIC CONTROL PLAN PHASE 1 STEP 1						60		
47	TRAFFIC CONTROL PLAN PHASE 1 STEP 1				208	250	20		
48	TRAFFIC CONTROL PLAN PHASE 1 STEP 1				188	110	20		
50	TRAFFIC CONTROL PLAN PHASE 1 STEP 2								
51	TRAFFIC CONTROL PLAN PHASE 1 STEP 2	100		100	630				
52	TRAFFIC CONTROL PLAN PHASE 1 STEP 2				314				
55	TRAFFIC CONTROL PLAN PHASE 2 STEP 1								
56	TRAFFIC CONTROL PLAN PHASE 2 STEP 1								
57	TRAFFIC CONTROL PLAN PHASE 2 STEP 1				203	87		360	40
58	TRAFFIC CONTROL PLAN PHASE 2 STEP 1				629	415			80
59	TRAFFIC CONTROL PLAN PHASE 2 STEP 1				762	535	20		20
60	TRAFFIC CONTROL PLAN PHASE 2 STEP 1				793	393	80		
61	TRAFFIC CONTROL PLAN PHASE 2 STEP 1				756	534	40		
62	TRAFFIC CONTROL PLAN PHASE 2 STEP 1				736	433	80		
63	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		70	52	646	464	60		
64	TRAFFIC CONTROL PLAN PHASE 2 STEP 1				731	380	40		
65	TRAFFIC CONTROL PLAN PHASE 2 STEP 1				705	553	20		
66	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		45	45	520	326	40		
67	TRAFFIC CONTROL PLAN PHASE 2 STEP 1				15				
68	TRAFFIC CONTROL PLAN PHASE 2 STEP 1								
69	TRAFFIC CONTROL PLAN PHASE 2 STEP 1								
70	TRAFFIC CONTROL PLAN PHASE 2 STEP 1				152	60	46		
71	TRAFFIC CONTROL PLAN PHASE 2 STEP 1				128	286	14		
72	TRAFFIC CONTROL PLAN PHASE 2 STEP 1				16	94	60		
73	TRAFFIC CONTROL PLAN PHASE 2 STEP 1				53	60	40		
76	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
77	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
78	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
79	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
80	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
81	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
82	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
83	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
84	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
85	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
86	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
87	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
88	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
89	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
90	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
91	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
92	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
93	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
94	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
	TOTALS	100	115	197	8185	4980	680	360	140

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
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TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

SUMMARY OF TCP QUANTITIES

SHEET 1 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	18

Plotted on: 4/22/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Summaries\5103003_Summaries_tcp.dgn

SHT NO	ITEM INTERSECTION	0512-6045 PORT CTB (STKPL) (LOW PROF) (TY 1) LF	0512-6046 PORT CTB (STKPL) (LOW PROF) (TY 2) LF	0512-6057 PORT CTB (REMOVE) (LOW PROF) (TY 1) LF	0512-6058 PORT CTB (REMOVE) (LOW PROF) (TY 2) LF	0662-6004 WK ZN PAV MRK NON-REMOV (W)4" (SLD) LF	0662-6012 WK ZN PAV MRK NON-REMOV (W)8" (SLD) LF	0662-6016 WK ZN PAV MRK NON-REMOV (W)24" (SLD) LF	0662-6034 WK ZN PAV MRK NON-REMOV (Y)4" (SLD) LF
45	TRAFFIC CONTROL PLAN PHASE 1 STEP 1		40						
46	TRAFFIC CONTROL PLAN PHASE 1 STEP 1		60						
47	TRAFFIC CONTROL PLAN PHASE 1 STEP 1	250	20			428			594
48	TRAFFIC CONTROL PLAN PHASE 1 STEP 1	110	20			472			472
50	TRAFFIC CONTROL PLAN PHASE 1 STEP 2					391			406
51	TRAFFIC CONTROL PLAN PHASE 1 STEP 2					492			494
52	TRAFFIC CONTROL PLAN PHASE 1 STEP 2					400			400
55	TRAFFIC CONTROL PLAN PHASE 2 STEP 1								
56	TRAFFIC CONTROL PLAN PHASE 2 STEP 1					130			466
57	TRAFFIC CONTROL PLAN PHASE 2 STEP 1			447	40	600			644
58	TRAFFIC CONTROL PLAN PHASE 2 STEP 1			415	80	600			600
59	TRAFFIC CONTROL PLAN PHASE 2 STEP 1			535	40	600			600
60	TRAFFIC CONTROL PLAN PHASE 2 STEP 1			393	80	524			448
61	TRAFFIC CONTROL PLAN PHASE 2 STEP 1			534	40	600			600
62	TRAFFIC CONTROL PLAN PHASE 2 STEP 1			433	80	536			470
63	TRAFFIC CONTROL PLAN PHASE 2 STEP 1			464	60	600			512
64	TRAFFIC CONTROL PLAN PHASE 2 STEP 1			380	40	572			544
65	TRAFFIC CONTROL PLAN PHASE 2 STEP 1			553	20	573			546
66	TRAFFIC CONTROL PLAN PHASE 2 STEP 1			326	40	506			514
67	TRAFFIC CONTROL PLAN PHASE 2 STEP 1					600			600
68	TRAFFIC CONTROL PLAN PHASE 2 STEP 1					602			602
69	TRAFFIC CONTROL PLAN PHASE 2 STEP 1					518			436
70	TRAFFIC CONTROL PLAN PHASE 2 STEP 1			60	46	600			600
71	TRAFFIC CONTROL PLAN PHASE 2 STEP 1			286	14	600			600
72	TRAFFIC CONTROL PLAN PHASE 2 STEP 1			94	60	600			600
73	TRAFFIC CONTROL PLAN PHASE 2 STEP 1			60	40	286		10	252
76	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
77	TRAFFIC CONTROL PLAN PHASE 2 STEP 2						90		
78	TRAFFIC CONTROL PLAN PHASE 2 STEP 2					440	112		786
79	TRAFFIC CONTROL PLAN PHASE 2 STEP 2					600			600
80	TRAFFIC CONTROL PLAN PHASE 2 STEP 2					600			600
81	TRAFFIC CONTROL PLAN PHASE 2 STEP 2					482			364
82	TRAFFIC CONTROL PLAN PHASE 2 STEP 2					600			600
83	TRAFFIC CONTROL PLAN PHASE 2 STEP 2					509			418
84	TRAFFIC CONTROL PLAN PHASE 2 STEP 2					519			438
85	TRAFFIC CONTROL PLAN PHASE 2 STEP 2					570			540
86	TRAFFIC CONTROL PLAN PHASE 2 STEP 2					570			540
87	TRAFFIC CONTROL PLAN PHASE 2 STEP 2					442			442
88	TRAFFIC CONTROL PLAN PHASE 2 STEP 2					602			602
89	TRAFFIC CONTROL PLAN PHASE 2 STEP 2					602			600
90	TRAFFIC CONTROL PLAN PHASE 2 STEP 2					493			386
91	TRAFFIC CONTROL PLAN PHASE 2 STEP 2					600			600
92	TRAFFIC CONTROL PLAN PHASE 2 STEP 2					600			600
93	TRAFFIC CONTROL PLAN PHASE 2 STEP 2					600			600
94	TRAFFIC CONTROL PLAN PHASE 2 STEP 2					240		11	240
	TOTALS	360	140	4980	680	20899	202	21	20956

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

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City of New Braunfels

KLEIN RD PHASE 2

SUMMARY OF TCP QUANTITIES

SHEET 2 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	19

Plotted on: 4/22/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Summaries\5103003_Summaries_tcp.dgn

	ITEM	0662-6063	0662-6071	0662-6094	0662-6095	0672-6009	0677-6001	0677-6003	0677-6007
SHT NO	INTERSECTION	WK ZN PAV MRK REMOV (W)4"(SLD) LF	WK ZN PAV MRK REMOV (W)8"(SLD) LF	WK ZN PAV MRK REMOV (Y)4"(DOT) LF	WK ZN PAV MRK REMOV (Y)4"(SLD) LF	REFL PAV MRKR TY II-A-A EA	ELIM EXT PAV MRK & MRKS (4") LF	ELIM EXT PAV MRK & MRKS (8") LF	ELIM EXT PAV MRK & MRKS (24") LF
45	TRAFFIC CONTROL PLAN PHASE 1 STEP 1								
46	TRAFFIC CONTROL PLAN PHASE 1 STEP 1								
47	TRAFFIC CONTROL PLAN PHASE 1 STEP 1				160		408		
48	TRAFFIC CONTROL PLAN PHASE 1 STEP 1						472		
50	TRAFFIC CONTROL PLAN PHASE 1 STEP 2						32		
51	TRAFFIC CONTROL PLAN PHASE 1 STEP 2						350		
52	TRAFFIC CONTROL PLAN PHASE 1 STEP 2						438		
55	TRAFFIC CONTROL PLAN PHASE 2 STEP 1	106			206				
56	TRAFFIC CONTROL PLAN PHASE 2 STEP 1	105			105		165	52	92
57	TRAFFIC CONTROL PLAN PHASE 2 STEP 1						90		5
58	TRAFFIC CONTROL PLAN PHASE 2 STEP 1								
59	TRAFFIC CONTROL PLAN PHASE 2 STEP 1								
60	TRAFFIC CONTROL PLAN PHASE 2 STEP 1								
61	TRAFFIC CONTROL PLAN PHASE 2 STEP 1								
62	TRAFFIC CONTROL PLAN PHASE 2 STEP 1								
63	TRAFFIC CONTROL PLAN PHASE 2 STEP 1								
64	TRAFFIC CONTROL PLAN PHASE 2 STEP 1								
65	TRAFFIC CONTROL PLAN PHASE 2 STEP 1								
66	TRAFFIC CONTROL PLAN PHASE 2 STEP 1								
67	TRAFFIC CONTROL PLAN PHASE 2 STEP 1								
68	TRAFFIC CONTROL PLAN PHASE 2 STEP 1								
69	TRAFFIC CONTROL PLAN PHASE 2 STEP 1								
70	TRAFFIC CONTROL PLAN PHASE 2 STEP 1						350		
71	TRAFFIC CONTROL PLAN PHASE 2 STEP 1						730		
72	TRAFFIC CONTROL PLAN PHASE 2 STEP 1						1306		
73	TRAFFIC CONTROL PLAN PHASE 2 STEP 1			50		50	325		
76	TRAFFIC CONTROL PLAN PHASE 2 STEP 2	212	212		424		30	212	
77	TRAFFIC CONTROL PLAN PHASE 2 STEP 2	301	120		630			88	
78	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
79	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
80	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
81	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
82	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
83	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
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85	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
86	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
87	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
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89	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
90	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
91	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
92	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
93	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
94	TRAFFIC CONTROL PLAN PHASE 2 STEP 2								
	TOTALS	724	332	50	1525	50	4696	352	97

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
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City of New Braunfels

KLEIN RD PHASE 2

SUMMARY OF TCP QUANTITIES

SHEET 3 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	20

Plotted on: 4/22/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Summaries\5103003_Summaries_tcp.dgn

	ITEM	0677-6008	0677-6020
	INTERSECTION	ELIM EXT PAV MRK & MRKS (ARROW)	ELIM EXT PAV MRK & MRKS (MED NOSE)
SHT NO		EA	EA
45	TRAFFIC CONTROL PLAN PHASE 1 STEP 1		
46	TRAFFIC CONTROL PLAN PHASE 1 STEP 1		
47	TRAFFIC CONTROL PLAN PHASE 1 STEP 1		
48	TRAFFIC CONTROL PLAN PHASE 1 STEP 1		
50	TRAFFIC CONTROL PLAN PHASE 1 STEP 2		
51	TRAFFIC CONTROL PLAN PHASE 1 STEP 2		
52	TRAFFIC CONTROL PLAN PHASE 1 STEP 2		
55	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		
56	TRAFFIC CONTROL PLAN PHASE 2 STEP 1	1	1
57	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		
58	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		
59	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		
60	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		
61	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		
62	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		
63	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		
64	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		
65	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		
66	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		
67	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		
68	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		
69	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		
70	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		
71	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		
72	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		
73	TRAFFIC CONTROL PLAN PHASE 2 STEP 1		
76	TRAFFIC CONTROL PLAN PHASE 2 STEP 2		
77	TRAFFIC CONTROL PLAN PHASE 2 STEP 2		
78	TRAFFIC CONTROL PLAN PHASE 2 STEP 2		
79	TRAFFIC CONTROL PLAN PHASE 2 STEP 2		
80	TRAFFIC CONTROL PLAN PHASE 2 STEP 2		
81	TRAFFIC CONTROL PLAN PHASE 2 STEP 2		
82	TRAFFIC CONTROL PLAN PHASE 2 STEP 2		
83	TRAFFIC CONTROL PLAN PHASE 2 STEP 2		
84	TRAFFIC CONTROL PLAN PHASE 2 STEP 2		
85	TRAFFIC CONTROL PLAN PHASE 2 STEP 2		
86	TRAFFIC CONTROL PLAN PHASE 2 STEP 2		
87	TRAFFIC CONTROL PLAN PHASE 2 STEP 2		
88	TRAFFIC CONTROL PLAN PHASE 2 STEP 2		
89	TRAFFIC CONTROL PLAN PHASE 2 STEP 2		
90	TRAFFIC CONTROL PLAN PHASE 2 STEP 2		
91	TRAFFIC CONTROL PLAN PHASE 2 STEP 2		
92	TRAFFIC CONTROL PLAN PHASE 2 STEP 2		
93	TRAFFIC CONTROL PLAN PHASE 2 STEP 2		
94	TRAFFIC CONTROL PLAN PHASE 2 STEP 2		
	TOTALS	1	1

REV. NO.	DATE	DESCRIPTION	BY

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City of New Braunfels

KLEIN RD PHASE 2

SUMMARY OF TCP QUANTITIES

SHEET 4 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	21

Plotted on: 4/22/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Summaries\5103003_Summaries_tcp.dgn

	ITEM	0110-6001	0132-6005	0160-6003	0162-6002	0164-6007	0164-6009	0164-6011
	INTERSECTION	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL)(ORD COMP)(TY C)	FURNISHING AND PLACING TOPSOIL (4")	BLOCK SODDING	BROADCAST SEED (PERM) (URBAN) (CLAY)	BROADCAST SEED (TEMP) (WARM)	BROADCAST SEED (TEMP) (COOL)
SHT NO		CY	CY	SY	SY	SY	SY	SY
138	ROADWAY PLAN & PROFILE	131	10	510	510			
139	ROADWAY PLAN & PROFILE	1757	109	1063	1063			
140	ROADWAY PLAN & PROFILE	1994	8	1125	1125			
141	ROADWAY PLAN & PROFILE	2849		765	765			
142	ROADWAY PLAN & PROFILE	2451		742	742			
143	ROADWAY PLAN & PROFILE	2293	2	786	786			
144	ROADWAY PLAN & PROFILE	2432	17	525	525			
145	ROADWAY PLAN & PROFILE	1506	34	402	402			
146	ROADWAY PLAN & PROFILE	1227	58	327	327			
147	ROADWAY PLAN & PROFILE	1438	35	365	365			
148	ROADWAY PLAN & PROFILE	1563	30	466	466			
149	ROADWAY PLAN & PROFILE	1713	2918	147	147			
150	ROADWAY PLAN & PROFILE	104	3547	1155	1155			
151	ROADWAY PLAN & PROFILE	694	1107	610	610			
152	ROADWAY PLAN & PROFILE	1834	123	550	550			
153	ROADWAY PLAN & PROFILE	2233	61	505	505			
154	ROADWAY PLAN & PROFILE	2418	30	360	360			
155	ROADWAY PLAN & PROFILE	311	107	170	170			
164	CHANNEL GRADING LAYOUT			561	561	3450	3450	3450
	TOTALS	28948	8196	11134	11134	3450	3450	3450

	ITEM	0168-6001	0169-6001	0247-6041	0260-6002	0260-6027	0310-6001	0316-6251
	INTERSECTION	VEGETATIVE WATERING	SOIL RETENTION BLANKETS (CL 1) (TY A)	FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	LIME (HYDRATED LIME (SLURRY))	LIME TRT (EXST MATL)(8")	PRIME COAT (MULTI OPTION)	AGGR(TY-PE GR-5 SAC-B)
SHT NO		MG	SY	CY	TON	SY	GAL	CY
138	ROADWAY PLAN & PROFILE	7.96		79	3.0	290	81.87	2
139	ROADWAY PLAN & PROFILE	16.59		601	22.1	2202	628.95	15
140	ROADWAY PLAN & PROFILE	17.55		595	21.8	2175	632.11	15
141	ROADWAY PLAN & PROFILE	11.94		614	22.4	2239	655.00	16
142	ROADWAY PLAN & PROFILE	11.58		687	25.0	2499	732.92	18
143	ROADWAY PLAN & PROFILE	12.27		614	22.4	2239	655.00	16
144	ROADWAY PLAN & PROFILE	8.19		668	24.4	2434	712.51	17
145	ROADWAY PLAN & PROFILE	6.28		538	19.7	1965	572.40	14
146	ROADWAY PLAN & PROFILE	5.11		479	17.6	1751	508.70	12
147	ROADWAY PLAN & PROFILE	5.70		479	17.6	1753	509.20	12
148	ROADWAY PLAN & PROFILE	7.27		503	18.4	1837	534.31	13
149	ROADWAY PLAN & PROFILE	2.30		140	5.2	511	148.46	4
150	ROADWAY PLAN & PROFILE	18.02		465	17.0	1695	495.72	12
151	ROADWAY PLAN & PROFILE	9.52		581	21.4	2135	614.88	15
152	ROADWAY PLAN & PROFILE	8.58		571	21.1	2104	601.02	14
153	ROADWAY PLAN & PROFILE	7.88		719	26.3	2623	760.21	18
154	ROADWAY PLAN & PROFILE	5.62		744	27.1	2706	795.01	19
155	ROADWAY PLAN & PROFILE	2.66		444	16.2	1613	475.85	11
164	CHANNEL GRADING LAYOUT	170.22	3450	25				
	TOTALS	335.24	3450	9544	348.7	34770	10114.12	242

REV.NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

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TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

SUMMARY OF ROADWAY QUANTITIES

SHEET 1 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	22

Plotted on: 4/29/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Summaries\5103003_Summaries_rdwy.dgn

	ITEM	0316-6400	0340-6011	0340-6014	0340-6050	0340-6272	0341-6049	0420-6066
	INTERSECTION	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	D-GR HMA(SQ) TY-B PG64-22	D-GR HMA(SQ) TY-B PG70-22	D-GR HMA(SQ) TY-C PG70-22	TACK COAT	D-GR HMA TY-D PG76-22	CL C CONC (RAIL FOUNDATION)
SHT NO		GAL	TON	TON	TON	GAL	TON	CY
138	ROADWAY PLAN & PROFILE	54.58		47.1	41.9	48.54	28.0	
139	ROADWAY PLAN & PROFILE	419.30		361.7	324.2	375.83	216.2	
140	ROADWAY PLAN & PROFILE	421.41		363.5	338.6	392.48	225.7	
141	ROADWAY PLAN & PROFILE	436.67		376.7	356.6	413.34	237.7	
142	ROADWAY PLAN & PROFILE	488.62		421.5	400.9	464.78	267.3	
143	ROADWAY PLAN & PROFILE	436.67		376.7	356.6	413.34	237.7	
144	ROADWAY PLAN & PROFILE	475.01		409.7	388.4	450.28	259.0	
145	ROADWAY PLAN & PROFILE	381.60		329.2	308.5	357.65	205.7	
146	ROADWAY PLAN & PROFILE	339.13		292.5	272.4	315.81	181.6	
147	ROADWAY PLAN & PROFILE	339.47		292.8	272.7	316.11	181.8	
148	ROADWAY PLAN & PROFILE	356.21	125.9	327.3	286.7	332.37	211.2	
149	ROADWAY PLAN & PROFILE	98.97		85.4	79.4	91.97	52.9	
150	ROADWAY PLAN & PROFILE	330.48		285.1	269.8	312.72	179.9	55
151	ROADWAY PLAN & PROFILE	409.92	341.6	408.5	322.7	374.12	270.1	6
152	ROADWAY PLAN & PROFILE	400.68		345.6	309.1	358.31	206.1	
153	ROADWAY PLAN & PROFILE	506.81		437.2	399.1	462.72	266.1	
154	ROADWAY PLAN & PROFILE	530.01		457.2	437.1	506.67	291.4	
155	ROADWAY PLAN & PROFILE	317.24		273.7	264.0	306.00	176.0	
164	CHANNEL GRADING LAYOUT							
	TOTALS	6742.78	467.5	5891.4	5428.7	6293.04	3694.4	61

	ITEM	0423-6008	0432-6003	0432-6045	0450-6034	0450-6048	0450-6103	0529-6002
	INTERSECTION	RETAINING WALL (CAST - IN - PLACE)	RIPRAP (CONC)(6 IN)	RIPRAP (MOW STRIP)(4 IN)	RAIL (TY C402)	RAIL (HANDRAIL)(TY B)	RAIL (TY PR11)	CONC CURB (TY II)
SHT NO		SF	CY	CY	LF	LF	LF	LF
138	ROADWAY PLAN & PROFILE		1.5					758
139	ROADWAY PLAN & PROFILE	310				71		1102
140	ROADWAY PLAN & PROFILE							660
141	ROADWAY PLAN & PROFILE							578
142	ROADWAY PLAN & PROFILE							494
143	ROADWAY PLAN & PROFILE							534
144	ROADWAY PLAN & PROFILE							578
145	ROADWAY PLAN & PROFILE							534
146	ROADWAY PLAN & PROFILE							431
147	ROADWAY PLAN & PROFILE							560
148	ROADWAY PLAN & PROFILE							553
149	ROADWAY PLAN & PROFILE		5.0		630			160
150	ROADWAY PLAN & PROFILE		16.1		367		247	216
151	ROADWAY PLAN & PROFILE		13.7	1	42		247	850
152	ROADWAY PLAN & PROFILE							990
153	ROADWAY PLAN & PROFILE							1068
154	ROADWAY PLAN & PROFILE							511
155	ROADWAY PLAN & PROFILE							203
164	CHANNEL GRADING LAYOUT	16						
	TOTALS	326	36.3	1	1039	71	494	10780

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS

2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000

TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

SUMMARY OF ROADWAY QUANTITIES

SHEET 2 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	23

Plotted on: 4/29/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Summaries\5103003_Summaries_rdwy.dgn

SHT NO	ITEM / INTERSECTION	0530-6004 DRIVEWAYS (CONC) SY	0531-6001 CONC SIDEWALKS (4") SY	0531-6019 CURB RAMPS (TY 2) SY	0531-6020 CURB RAMPS (TY 3) SY	0531-6030 CURB RAMPS (TY 21) SY	0536-6002 CONC MEDIAN SY	0540-6006 MTL BEAM GD FEN TRANS (THRIE-BEAM) EA
138	ROADWAY PLAN & PROFILE		294		133		114	
139	ROADWAY PLAN & PROFILE	44	512				271	
140	ROADWAY PLAN & PROFILE	137	479				92	
141	ROADWAY PLAN & PROFILE	75	500					
142	ROADWAY PLAN & PROFILE	160	458	12	16			
143	ROADWAY PLAN & PROFILE	102	496					
144	ROADWAY PLAN & PROFILE		516		30			
145	ROADWAY PLAN & PROFILE	13	377	58				
146	ROADWAY PLAN & PROFILE	127	349	11				
147	ROADWAY PLAN & PROFILE		416	11				
148	ROADWAY PLAN & PROFILE		488	50	32			
149	ROADWAY PLAN & PROFILE	110	122					
150	ROADWAY PLAN & PROFILE		433		15			
151	ROADWAY PLAN & PROFILE		461	19	62	17	254	1
152	ROADWAY PLAN & PROFILE	83	487				389	
153	ROADWAY PLAN & PROFILE	78	495				200	
154	ROADWAY PLAN & PROFILE	269	394					
155	ROADWAY PLAN & PROFILE	12	151		170			
164	CHANNEL GRADING LAYOUT							
	TOTALS	1210	7428	161	458	17	1320	1

SHT NO	ITEM / INTERSECTION	0540-6016 DOWNSTREAM ANCHOR TERMINAL SECTION EA	0545-6019 CRASH CUSH ATTEN (INSTL)(S)(N)(TL3) EA	0560-6014 MAILBOX INSTALL-S (TWG-POST) TY 4 EA	0618-6033 CONDT (PVC) (SCH 40) (4") LF	0618-6034 CONDT (PVC) (SCH 40) (4") (BORE) LF	0624-6012 GROUND BOX TY E (122317)W/APRON EA	2005-6002 FILTER FABRIC (TY 1) SY
138	ROADWAY PLAN & PROFILE				292		3	449
139	ROADWAY PLAN & PROFILE			1	600		1	544
140	ROADWAY PLAN & PROFILE			2	600		2	509
141	ROADWAY PLAN & PROFILE			1	600		1	532
142	ROADWAY PLAN & PROFILE			1	600		1	516
143	ROADWAY PLAN & PROFILE			1	600		2	528
144	ROADWAY PLAN & PROFILE				604		2	580
145	ROADWAY PLAN & PROFILE			1	598		2	469
146	ROADWAY PLAN & PROFILE			1	600		2	386
147	ROADWAY PLAN & PROFILE				600		1	461
148	ROADWAY PLAN & PROFILE				600		2	604
149	ROADWAY PLAN & PROFILE		1		240	434	2	134
150	ROADWAY PLAN & PROFILE				232	372	1	474
151	ROADWAY PLAN & PROFILE	1			602		1	591
152	ROADWAY PLAN & PROFILE				602		2	518
153	ROADWAY PLAN & PROFILE				600		2	525
154	ROADWAY PLAN & PROFILE				600		1	425
155	ROADWAY PLAN & PROFILE				100		1	337
164	CHANNEL GRADING LAYOUT							
	TOTALS	1	1	8	9270	806	29	8582

REV. NO.	DATE	DESCRIPTION	BY

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SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
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City of New Braunfels

KLEIN RD PHASE 2

SUMMARY OF ROADWAY QUANTITIES

SHEET 3 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	24

	ITEM	5001-6002	5009-6001	5009-6002	5071-6001	5071-6002	6210-6001
	INTERSECTION	GEOGRID BASE REINFORCEMENT (TY II)	STONE MASONRY COLUMNS	STONE MASONRY (ROCK WALL)	WOOD FENCE (REMOVE)	WOOD FENCE (INSTALL)	PVC MOISTURE BARRIER
SHT NO		SY	EA	SF	LF	LF	SY
138	ROADWAY PLAN & PROFILE	290					
139	ROADWAY PLAN & PROFILE	2202					134
140	ROADWAY PLAN & PROFILE	2175					120
141	ROADWAY PLAN & PROFILE	2239					120
142	ROADWAY PLAN & PROFILE	2499					107
143	ROADWAY PLAN & PROFILE	2239					119
144	ROADWAY PLAN & PROFILE	2434					134
145	ROADWAY PLAN & PROFILE	1965					108
146	ROADWAY PLAN & PROFILE	1751					133
147	ROADWAY PLAN & PROFILE	1753					133
148	ROADWAY PLAN & PROFILE	1837					114
149	ROADWAY PLAN & PROFILE	511					49
150	ROADWAY PLAN & PROFILE	1695					100
151	ROADWAY PLAN & PROFILE	2135					115
152	ROADWAY PLAN & PROFILE	2104					111
153	ROADWAY PLAN & PROFILE	2623					133
154	ROADWAY PLAN & PROFILE	2706					133
155	ROADWAY PLAN & PROFILE	1613					63
164	CHANNEL GRADING LAYOUT		3	534	188	188	
	TOTALS	34770	3	534	188	188	1926

Plotted on: 4/29/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Summaries\5103003_Summaries_rdwy.dgn

REV. NO.	DATE	DESCRIPTION	BY

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2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
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City of New Braunfels

KLEIN RD PHASE 2

SUMMARY OF ROADWAY QUANTITIES

SHEET 4 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	25

ITEM		0644-6001	0644-6004	0644-6007	0644-6060	0644-6061	0644-6068	0666-6036
	INTERSECTION	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	IN SM RD SN SUP&AM TY10BWG(1)SA(U)	IN SM RD SN SUP&AM TYTWT(1)WS(P)	IN SM RD SN SUP&AM TYTWT(1)WS(T)	RELOCATE SM RD SN SUP&AM TY 10BWG	REFL PAV MRK TY I (W)8"(SLD)(100MIL)
SHT NO		EA	EA	EA	EA	EA	EA	LF
261	SIGNING AND PAVEMENT MARKING LAYOUT	5	1		1	1	1	339
262	SIGNING AND PAVEMENT MARKING LAYOUT				4			42
263	SIGNING AND PAVEMENT MARKING LAYOUT	1						93
264	SIGNING AND PAVEMENT MARKING LAYOUT	1			1			76
265	SIGNING AND PAVEMENT MARKING LAYOUT	1						
266	SIGNING AND PAVEMENT MARKING LAYOUT	2						
267	SIGNING AND PAVEMENT MARKING LAYOUT	4			1			171
268	SIGNING AND PAVEMENT MARKING LAYOUT	1		1	5			365
269	SIGNING AND PAVEMENT MARKING LAYOUT					1		546
	TOTALS	15	1	1	12	2	1	1632

ITEM		0666-6048	0666-6054	0666-6078	0666-6147	0666-6156	0666-6224	0666-6226
	INTERSECTION	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	REFL PAV MRK TY I (W)(ARROW)(100MIL)	REFL PAV MRK TY I (W)(WORD)(100MIL)	REFL PAV MRK TY I (Y)24"(SLD)(100MIL)	REFL PAV MRK TY I(Y)(MED NOSE)(100MIL)	PAVEMENT SEALER 4"	PAVEMENT SEALER 8"
SHT NO		LF	EA	EA	LF	EA	LF	LF
261	SIGNING AND PAVEMENT MARKING LAYOUT	434	3	3	195	1	559	339
262	SIGNING AND PAVEMENT MARKING LAYOUT		4		14	1	1670	42
263	SIGNING AND PAVEMENT MARKING LAYOUT	19	4				1405	93
264	SIGNING AND PAVEMENT MARKING LAYOUT	39			113	1	1642	76
265	SIGNING AND PAVEMENT MARKING LAYOUT	14					1360	
266	SIGNING AND PAVEMENT MARKING LAYOUT	28			55		1697	
267	SIGNING AND PAVEMENT MARKING LAYOUT	114	2	2	65		1000	171
268	SIGNING AND PAVEMENT MARKING LAYOUT		4	4			300	365
269	SIGNING AND PAVEMENT MARKING LAYOUT	186	4	4	274	2	1398	546
	TOTALS	834	21	13	716	5	11031	1632

ITEM		0666-6230	0666-6231	0666-6232	0666-6233	0666-6300	0666-6312	0666-6315
	INTERSECTION	PAVEMENT SEALER 24"	PAVEMENT SEALER (ARROW)	PAVEMENT SEALER (WORD)	PAVEMENT SEALER (MED NOSE)	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)
SHT NO		LF	EA	EA	EA	LF	LF	LF
261	SIGNING AND PAVEMENT MARKING LAYOUT	629	3	3	1	300		259
262	SIGNING AND PAVEMENT MARKING LAYOUT	14	4		1	300	200	1170
263	SIGNING AND PAVEMENT MARKING LAYOUT	19	4			241	170	994
264	SIGNING AND PAVEMENT MARKING LAYOUT	152			1	212		1430
265	SIGNING AND PAVEMENT MARKING LAYOUT	14				280		1080
266	SIGNING AND PAVEMENT MARKING LAYOUT	83				265		1432
267	SIGNING AND PAVEMENT MARKING LAYOUT	179	2	2		240		760
268	SIGNING AND PAVEMENT MARKING LAYOUT		4	4		300		
269	SIGNING AND PAVEMENT MARKING LAYOUT	460	4	4	2	130	44	1224
	TOTALS	1550	21	13	5	2268	414	8349

ITEM		0672-5009	0672-6007	0672-6009	0672-6010	0678-6001	0678-6004	0678-6008
	INTERSECTION	REFL PAV MRKR TY II-B-B	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A	REFL PAV MRKR TY II-C-R	PAV SURF PREP FOR MRK (4")	PAV SURF PREP FOR MRK (8")	PAV SURF PREP FOR MRK (24")
SHT NO		EA	EA	EA	EA	LF	LF	LF
261	SIGNING AND PAVEMENT MARKING LAYOUT	2	17		26	559	339	629
262	SIGNING AND PAVEMENT MARKING LAYOUT		28	14	4	1670	42	14
263	SIGNING AND PAVEMENT MARKING LAYOUT		28	18		1405	93	19
264	SIGNING AND PAVEMENT MARKING LAYOUT		22	68		1642	76	152
265	SIGNING AND PAVEMENT MARKING LAYOUT		28	28		1360		14
266	SIGNING AND PAVEMENT MARKING LAYOUT		28	60		1697		83
267	SIGNING AND PAVEMENT MARKING LAYOUT	3	21	36	8	1000	171	179
268	SIGNING AND PAVEMENT MARKING LAYOUT		20		29	300	365	
269	SIGNING AND PAVEMENT MARKING LAYOUT		12	39		1398	546	460
	TOTALS	5	204	263	67	11031	1632	1550

ITEM		0678-6009	0678-6016	0678-6024
	INTERSECTION	PAV SURF PREP FOR MRK (ARROW)	PAV SURF PREP FOR MRK (WORD)	PAV SURF PREP FOR MRK (MED NOSE)
SHT NO		EA	EA	EA
261	SIGNING AND PAVEMENT MARKING LAYOUT	3	3	1
262	SIGNING AND PAVEMENT MARKING LAYOUT	4		1
263	SIGNING AND PAVEMENT MARKING LAYOUT	4		
264	SIGNING AND PAVEMENT MARKING LAYOUT			1
265	SIGNING AND PAVEMENT MARKING LAYOUT			
266	SIGNING AND PAVEMENT MARKING LAYOUT			
267	SIGNING AND PAVEMENT MARKING LAYOUT	2	2	
268	SIGNING AND PAVEMENT MARKING LAYOUT	4	4	
269	SIGNING AND PAVEMENT MARKING LAYOUT	4	4	2
	TOTALS	21	13	5

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

SUMMARY OF SIGNING AND PAVEMENT MARKING QUANTITIES

SHEET 1 OF 1

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	26

Plotted on: 5/6/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Summaries\5103003_Summaries_pvmt.dgn

	ITEM	0618-6046	0618-6053	0620-6009	0620-6010	0621-6005	0624-6010	0625-6002
	INTERSECTION	CONDT (PVC) (SCH 80) (2")	CONDT (PVC) (SCH 80) (3")	ELEC CONDR (NO.6) BARE	ELEC CONDR (NO.6) INSULATED	TRAY CABLE (4 CONDR) (12 AWG)	GROUND BOX TY D (162922)W/APRON	ZINC-COAT STL WIRE STRAND (3/16")
SHT NO		LF	LF	LF	LF	LF	EA	LF
74	TEMPORARY TRAFFIC SIGNAL LAYOUT PHASE 2 STEP 1							
286	EXISTING TRAFFIC SIGNAL LAYOUT							
287	PROPOSED TRAFFIC SIGNAL LAYOUT	150	70	190	70	275	2	589
	TOTALS	150	70	190	70	275	2	589

	ITEM	0625-6004	0627-6002	0628-6164	0680-6002	0680-6004	0680-XXX1*	0681-6001
	INTERSECTION	ZINC-COAT STL WIRE STRAND (5/16")	TIMBER POLE (CL 2) 40 FT	ELC SRV TY D 120/240 070(NS)AL(E)PS(U)	INSTALL HWY TRF SIG (ISOLATED)	REMOVING TRAFFIC SIGNALS	LUM MAST ARM & LED FIXTURE	TEMP TRAF SIGNALS
SHT NO		LF	EA	EA	EA	EA	EA	EA
74	TEMPORARY TRAFFIC SIGNAL LAYOUT PHASE 2 STEP 1							1
286	EXISTING TRAFFIC SIGNAL LAYOUT					1		
287	PROPOSED TRAFFIC SIGNAL LAYOUT	589	4	1	1		2	
	TOTALS	589	4	1	1	1	2	1

	ITEM	0682-6001	0682-6002	0682-6003	0682-6004	0682-6005	0682-6006	0682-6018
	INTERSECTION	VEH SIG SEC (12")LED(GRN)	VEH SIG SEC (12")LED(GRN ARW)	VEH SIG SEC (12")LED(YEL)	VEH SIG SEC (12")LED(YEL ARW)	VEH SIG SEC (12")LED(RED)	VEH SIG SEC (12")LED(RED ARW)	PED SIG SEC (LED)(COUNTDOWN)
SHT NO		EA	EA	EA	EA	EA	EA	EA
74	TEMPORARY TRAFFIC SIGNAL LAYOUT PHASE 2 STEP 1							
286	EXISTING TRAFFIC SIGNAL LAYOUT							
287	PROPOSED TRAFFIC SIGNAL LAYOUT	8	4	8	6	8	4	2
	TOTALS	8	4	8	6	8	4	2

	ITEM	0682-6049	0682-6060	0684-6009	0684-6012	0684-6080	0687-6001	0688-6001
	INTERSECTION	BACKPLATE W/REFL BRDR(4 SEC)	BACKPLATE W/REFL BRDR(3 SEC)	TRF SIG CBL (TY A)(12 AWG)(4 CONDR)	TRF SIG CBL (TY A)(12 AWG)(7 CONDR)	TRF SIG CBL (TY C)(14 AWG)(2 CONDR)	PED POLE ASSEMBLY	PED DETECT PUSH BUTTON (APS)
SHT NO		EA	EA	LF	LF	LF	EA	EA
74	TEMPORARY TRAFFIC SIGNAL LAYOUT PHASE 2 STEP 1							
286	EXISTING TRAFFIC SIGNAL LAYOUT							
287	PROPOSED TRAFFIC SIGNAL LAYOUT	2	10	485	1960	485	4	2
	TOTALS	2	10	485	1960	485	4	2

	ITEM	0688-6003	6002-6001	6002-6002	6002-6003	6002-6005
	INTERSECTION	PED DETECTOR CONTROLLER UNIT	VIVDS PROCESSOR SYSTEM	VIVDS CAMERA ASSEMBLY	VIVDS SET-UP SYSTEM	VIVDS COMMUNICATION CABLE (COAXIAL)
SHT NO		EA	EA	EA	EA	LF
74	TEMPORARY TRAFFIC SIGNAL LAYOUT PHASE 2 STEP 1					
286	EXISTING TRAFFIC SIGNAL LAYOUT					
287	PROPOSED TRAFFIC SIGNAL LAYOUT	1	1	4	1	880
	TOTALS	1	1	4	1	880

* ITEM IS SUBSIDIARY TO ITEM 0680-6002 AND IS INCLUDED FOR CONTRACTOR INFORMATION ONLY

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
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City of New Braunfels

KLEIN RD PHASE 2

SUMMARY OF TRAFFIC SIGNAL QUANTITIES

SHEET 1 OF 1

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	27

Plotted on: 2/1/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Summaries\5103003_Summaries_traf.dgn

	ITEM	0110-6002	0401-6001	0402-6001	0420-6010	0420-6074	0432-6003	0462-6006
SHT NO	INTERSECTION	EXCAVATION (CHANNEL) CY	FLOWABLE BACKFILL CY	TRENCH EXCAVATION PROTECTION LF	CL A CONC (PLUG) EA	CL C CONC (MISC) CY	RIPRAP (CONC)(6 IN) CY	CONC BOX CULV (5 FT X 2 FT) LF
216	DRAINAGE PLAN & PROFILE		16	23	2	3	27	120
217	DRAINAGE PLAN & PROFILE			474		3	7	
218	DRAINAGE PLAN & PROFILE			300				
219	DRAINAGE PLAN & PROFILE			388				
220	DRAINAGE PLAN & PROFILE			367				
221	DRAINAGE PLAN & PROFILE			367				
222	DRAINAGE PLAN & PROFILE			469			5	
223	DRAINAGE PLAN & PROFILE			347				
224	DRAINAGE PLAN & PROFILE			346				
225	DRAINAGE PLAN & PROFILE			341				
226	DRAINAGE PLAN & PROFILE			366				
227	DRAINAGE PLAN & PROFILE	20		5			5	
228	DRAINAGE PLAN & PROFILE	86						171
229	DRAINAGE PLAN & PROFILE			168			1	205
230	DRAINAGE PLAN & PROFILE			464				150
231	DRAINAGE PLAN & PROFILE			380				
232	DRAINAGE PLAN & PROFILE			484				
	TOTALS	106	16	5289	2	7	45	646

	ITEM	0462-6007	0462-6008	0462-6011	0464-6005	0464-6007	0465-6013	0465-6014
SHT NO	INTERSECTION	CONC BOX CULV (5 FT X 3 FT) LF	CONC BOX CULV (5 FT X 4 FT) LF	CONC BOX CULV (6 FT X 4 FT) LF	RC PIPE (CL III)(24 IN) LF	RC PIPE (CL III)(30 IN) LF	INLET (COMPL)(PCO)(3FT)(NONE) EA	INLET (COMPL)(PCO)(3FT)(LEFT) EA
216	DRAINAGE PLAN & PROFILE				14			
217	DRAINAGE PLAN & PROFILE	635			233		3	2
218	DRAINAGE PLAN & PROFILE							
219	DRAINAGE PLAN & PROFILE	192			74			1
220	DRAINAGE PLAN & PROFILE	342			56			1
221	DRAINAGE PLAN & PROFILE	252			56			1
222	DRAINAGE PLAN & PROFILE	353			147			1
223	DRAINAGE PLAN & PROFILE	349			36			
224	DRAINAGE PLAN & PROFILE	279			35			
225	DRAINAGE PLAN & PROFILE	247			35			
226	DRAINAGE PLAN & PROFILE		162		55			
227	DRAINAGE PLAN & PROFILE			120	35			
228	DRAINAGE PLAN & PROFILE	205			84			2
229	DRAINAGE PLAN & PROFILE				56		5	
230	DRAINAGE PLAN & PROFILE				331	56		2
231	DRAINAGE PLAN & PROFILE				322			1
232	DRAINAGE PLAN & PROFILE				331		1	3
	TOTALS	2854	162	120	1900	56	9	14

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

SUMMARY OF DRAINAGE QUANTITIES

SHEET 1 OF 2

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	28

Plotted on: 4/12/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Summaries\5103003_Summaries_drn.dgn

SHT NO	ITEM: INTERSECTION	0465-6015: INLET (COMPL) (PCO) (3FT) (RIGHT) EA	0465-6030: INLET (COMPL) (PCU) (3FT) (LEFT) EA	0465-6031: INLET (COMPL) (PCU) (3FT) (RIGHT) EA	0465-6045: INLET (COMPL) (PMBD) (4FT) EA	0465-6070: INLET (COMPL) (PSL) (RC) (3FTX3FT) EA	0465-6072: INLET (COMPL) (PSL) (RC) (3FTX5FT) EA	0465-6077: INLET (COMPL) (PSL) (RC) (8FTX8FT) EA
216	DRAINAGE PLAN & PROFILE							
217	DRAINAGE PLAN & PROFILE	1						2
218	DRAINAGE PLAN & PROFILE							
219	DRAINAGE PLAN & PROFILE	1						1
220	DRAINAGE PLAN & PROFILE	1						1
221	DRAINAGE PLAN & PROFILE	1						1
222	DRAINAGE PLAN & PROFILE	1		1				3
223	DRAINAGE PLAN & PROFILE		1	1				1
224	DRAINAGE PLAN & PROFILE		1	1				1
225	DRAINAGE PLAN & PROFILE		1	1				1
226	DRAINAGE PLAN & PROFILE		2	1				1
227	DRAINAGE PLAN & PROFILE		1	1				1
228	DRAINAGE PLAN & PROFILE				3			2
229	DRAINAGE PLAN & PROFILE							1
230	DRAINAGE PLAN & PROFILE	2					1	2
231	DRAINAGE PLAN & PROFILE	1				1		
232	DRAINAGE PLAN & PROFILE	2				2		
	TOTALS	10	6	6	3	3	1	18

SHT NO	ITEM: INTERSECTION	0465-6158: INLET(COMPL)(PAZD)(FG)(3FTX3FT-3FTX3FT) EA	0465-6160: INLET(COMPL)(PAZD)(FG)(4FTX4FT-4FTX4FT) EA	0465-6269: INLET (COMPL)(TY C) EA	0466-6179: WINGWALL (PW - 1) (HW=4 FT) EA	0466-6180: WINGWALL (PW - 1) (HW=5 FT) EA	0471-6003: GRATE & FRAME EA	0479-6003: ADJUSTING MANHOLES & INLETS EA
216	DRAINAGE PLAN & PROFILE		1				15	1
217	DRAINAGE PLAN & PROFILE		1				15	
218	DRAINAGE PLAN & PROFILE							
219	DRAINAGE PLAN & PROFILE	1						
220	DRAINAGE PLAN & PROFILE							
221	DRAINAGE PLAN & PROFILE							
222	DRAINAGE PLAN & PROFILE		1					
223	DRAINAGE PLAN & PROFILE							
224	DRAINAGE PLAN & PROFILE							
225	DRAINAGE PLAN & PROFILE							
226	DRAINAGE PLAN & PROFILE							
227	DRAINAGE PLAN & PROFILE					1		
228	DRAINAGE PLAN & PROFILE				1			
229	DRAINAGE PLAN & PROFILE			1				
230	DRAINAGE PLAN & PROFILE							
231	DRAINAGE PLAN & PROFILE							
232	DRAINAGE PLAN & PROFILE							
	TOTALS	1	3	1	1	1	30	1

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

SUMMARY OF DRAINAGE QUANTITIES

SHEET 2 OF 2

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	29

Plotted on: 5/6/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Summaries\5103003_Summaries_drn.dgn

ITEM		0506-6002	0506-6003	0506-6011	0506-6020	0506-6024	0506-6037	0506-6038
	INTERSECTION	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (INSTALL) (TY 3)	ROCK FILTER DAMS (REMOVE)	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	SANDBAGS FOR EROSION CONTROL (12")	TEMP SEDMT CONT FENCE (INSTALL)
SHT NO		LF	LF	LF	SY	SY	LF	LF
306	SW3P LAYOUT PHASE 1 STEP 1				111	111		
307	SW3P LAYOUT PHASE 1 STEP 1	15	230	245				212
308	SW3P LAYOUT PHASE 1 STEP 1	20	55	75				245
309	SW3P LAYOUT PHASE 1 STEP 1						56	300
310	SW3P LAYOUT PHASE 1 STEP 1				111	111		25
311	SW3P LAYOUT PHASE 1 STEP 2	15		15				
312	SW3P LAYOUT PHASE 1 STEP 2				111	111		
313	SW3P LAYOUT PHASE 2 STEP 1							88
314	SW3P LAYOUT PHASE 2 STEP 1				111	111		300
315	SW3P LAYOUT PHASE 2 STEP 1	10		10				224
316	SW3P LAYOUT PHASE 2 STEP 1	10		10				
317	SW3P LAYOUT PHASE 2 STEP 1	10		10	156	156		
318	SW3P LAYOUT PHASE 2 STEP 1	10		10				
319	SW3P LAYOUT PHASE 2 STEP 1	10		10	156	156		
320	SW3P LAYOUT PHASE 2 STEP 1	10		10	78	78		
321	SW3P LAYOUT PHASE 2 STEP 1	20		20	78	78		
322	SW3P LAYOUT PHASE 2 STEP 1				78	78		
323	SW3P LAYOUT PHASE 2 STEP 1	20		20	78	78	27	
327	SW3P LAYOUT PHASE 2 STEP 1							275
328	SW3P LAYOUT PHASE 2 STEP 1							300
329	SW3P LAYOUT PHASE 2 STEP 1							153
330	SW3P LAYOUT PHASE 2 STEP 1				111	111		
331	SW3P LAYOUT PHASE 2 STEP 2							
332	SW3P LAYOUT PHASE 2 STEP 2				111	111		
334	SW3P LAYOUT PHASE 2 STEP 2							
335	SW3P LAYOUT PHASE 2 STEP 2				111	111		
336	SW3P LAYOUT PHASE 2 STEP 2							
337	SW3P LAYOUT PHASE 2 STEP 2				111	111		
338	SW3P LAYOUT PHASE 2 STEP 2				156	156		
339	SW3P LAYOUT PHASE 2 STEP 2				39	39		
340	SW3P LAYOUT PHASE 2 STEP 2				39	39		
341	SW3P LAYOUT PHASE 2 STEP 2				78	78		
345	SW3P LAYOUT PHASE 2 STEP 2				111	111		
346	SW3P LAYOUT PHASE 2 STEP 2							
347	SW3P LAYOUT PHASE 2 STEP 2							
348	SW3P LAYOUT PHASE 2 STEP 2				111	111		
349	SW3P LAYOUT PHASE 3							
350	SW3P LAYOUT PHASE 3							
	TOTALS	150	285	435	2046	2046	83	2122

ITEM		0506-6039	0506-6041	0506-6043
	INTERSECTION	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)
SHT NO		LF	LF	LF
306	SW3P LAYOUT PHASE 1 STEP 1			
307	SW3P LAYOUT PHASE 1 STEP 1	212	40	40
308	SW3P LAYOUT PHASE 1 STEP 1	245	80	80
309	SW3P LAYOUT PHASE 1 STEP 1	300	20	20
310	SW3P LAYOUT PHASE 1 STEP 1	25	20	20
311	SW3P LAYOUT PHASE 1 STEP 2		20	20
312	SW3P LAYOUT PHASE 1 STEP 2		20	20
313	SW3P LAYOUT PHASE 2 STEP 1	88	93	
314	SW3P LAYOUT PHASE 2 STEP 1	300	60	20
315	SW3P LAYOUT PHASE 2 STEP 1	224		
316	SW3P LAYOUT PHASE 2 STEP 1		20	20
317	SW3P LAYOUT PHASE 2 STEP 1		20	20
318	SW3P LAYOUT PHASE 2 STEP 1		20	20
319	SW3P LAYOUT PHASE 2 STEP 1		20	20
320	SW3P LAYOUT PHASE 2 STEP 1		20	20
321	SW3P LAYOUT PHASE 2 STEP 1		20	20
322	SW3P LAYOUT PHASE 2 STEP 1		20	20
323	SW3P LAYOUT PHASE 2 STEP 1		20	20
327	SW3P LAYOUT PHASE 2 STEP 1	275	20	20
328	SW3P LAYOUT PHASE 2 STEP 1	300	20	20
329	SW3P LAYOUT PHASE 2 STEP 1	153	40	40
330	SW3P LAYOUT PHASE 2 STEP 1		20	20
331	SW3P LAYOUT PHASE 2 STEP 2		31	31
332	SW3P LAYOUT PHASE 2 STEP 2		71	20
334	SW3P LAYOUT PHASE 2 STEP 2		20	20
335	SW3P LAYOUT PHASE 2 STEP 2		20	20
336	SW3P LAYOUT PHASE 2 STEP 2		20	20
337	SW3P LAYOUT PHASE 2 STEP 2		141	141
338	SW3P LAYOUT PHASE 2 STEP 2		20	20
339	SW3P LAYOUT PHASE 2 STEP 2		20	20
340	SW3P LAYOUT PHASE 2 STEP 2		20	20
341	SW3P LAYOUT PHASE 2 STEP 2		20	20
345	SW3P LAYOUT PHASE 2 STEP 2		20	20
346	SW3P LAYOUT PHASE 2 STEP 2		20	20
347	SW3P LAYOUT PHASE 2 STEP 2		40	40
348	SW3P LAYOUT PHASE 2 STEP 2			
349	SW3P LAYOUT PHASE 3			62
350	SW3P LAYOUT PHASE 3			122
	TOTALS	2122	1076	1076

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

SUMMARY OF SW3P QUANTITIES

SHEET 1 OF 1

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	30

Plotted on: 4/22/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Summaries\5103003_Summaries_sw3p.dgn

Plotted on: 5/6/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Summaries\5103003_Summaries_misc.dgn

BRIDGE QUANTITIES

	ITEM	0400-6005	0416-6004	0420-6013	0420-6025	0422-6001	0422-6013	0422-6015
	INTERSECTION	CEM STABIL BKFL	DRILL SHAFT (36 IN)	CL C CONC (ABUT)	CL C CONC (BENT)	REINF CONC SLAB	BRIDGE SIDEWALK	APPROACH SLAB
SHT NO		CY	LF	CY	CY	SF	SF	CY
358	TOTALS	62.5	810	110.7	86.6	18069	1470	152.1
	TOTALS	62.5	810	110.7	86.6	18069	1470	152.1

	ITEM	0425-6036	0425-6038	0450-6034	0454-6020
	INTERSECTION	PRESTR CONC GIRDER (TX34)	PRESTR CONC GIRDER (TX46)	RAIL (TY C402)	SEALED EXPANSION JOINT (4 IN) (SEJ - B)
SHT NO		LF	LF	LF	LF
358	TOTALS	945	1490	735	140
	TOTALS	945	1490	735	140

DEMOLITION QUANTITIES

	ITEM	0100-6002
	INTERSECTION	PREPARING ROW
SHT NO		STA
124	DEMOLITION PLAN	4.2
125	DEMOLITION PLAN	6.0
126	DEMOLITION PLAN	6.0
127	DEMOLITION PLAN	6.0
128	DEMOLITION PLAN	6.0
129	DEMOLITION PLAN	6.0
130	DEMOLITION PLAN	6.0
131	DEMOLITION PLAN	6.0
132	DEMOLITION PLAN	4.4
	TOTALS	50.6

RETAINING WALL QUANTITIES

	ITEM	0423-6001	0450-6034
	INTERSECTION	RETAINING WALL (MSE)	RAIL (TY C402)
SHT NO		SF	LF
191	RETAINING WALL PLAN & PROFILE	337	41
192	RETAINING WALL PLAN & PROFILE	800	20
193	RETAINING WALL PLAN & PROFILE	1907	
194	RETAINING WALL PLAN & PROFILE	653	
195	RETAINING WALL PLAN & PROFILE	162	
	TOTALS	3859	61

INDEFINITE QUANTITIES

	ITEM	0110-6001	0110-6002	0132-6005	0160-6003	0162-6002	0168-6001	0216-6001	0500-6001	0502-6001	0506-6002	0506-6003	0506-6011	0506-6020	0506-6024	0506-6037	0506-6038	0506-6039	0506-6041	0506-6043	6001-6001
	INDEFINITE QUANTITIES	EXCAVATION (ROADWAY)	EXCAVATION (CHANNEL)	EMBANKMENT (FINAL) (ORD COMP) (TY C)	FURNISHING AND PLACING TOPSOIL (4")	BLOCK SODDING	VEGETATIVE WATERING	PROOF ROLLING	MOBILIZATION	BARRICADES, SIGNS AND TRAFFIC HANDLING	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (INSTALL) (TY 3)	ROCK FILTER DAMS (REMOVE)	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	SANDBAGS FOR EROSION CONTROL (12")	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)	PORTABLE CHANGEABLE MESSAGE SIGN
SHT NO		CY	CY	CY	SY	SY	MG	HR	LS	MO	LF	LF	LF	SY	SY	LF	LF	LF	LF	LF	DAY
x	FORCE ACCOUNT	100	100	100	100	100	1.56	4.0	1.0	21	100	50	150	100	100	100	500	500	100	100	483
	TOTALS	100	100	100	100	100	1.56	4.0	1.0	21	100	50	150	100	100	100	500	500	100	100	483

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

SUMMARY OF BRIDGE, DEMOLITION, RETAINING WALL, AND INDEFINITE QUANTITIES

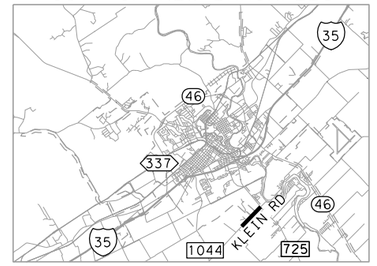
SHEET 1 OF 1

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	31

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\General\5103003_ProjectLayout.dgn

CITY OF NEW BRAUNFELS



STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED
PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

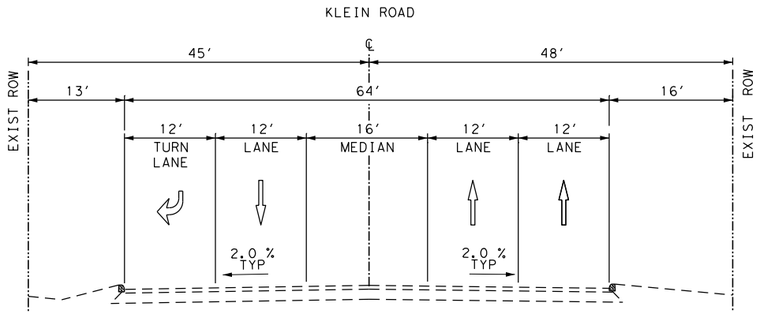
City of New Braunfels

KLEIN RD PHASE 2

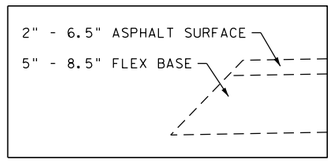
PROJECT LOCATION MAP

SHEET 1 OF 1

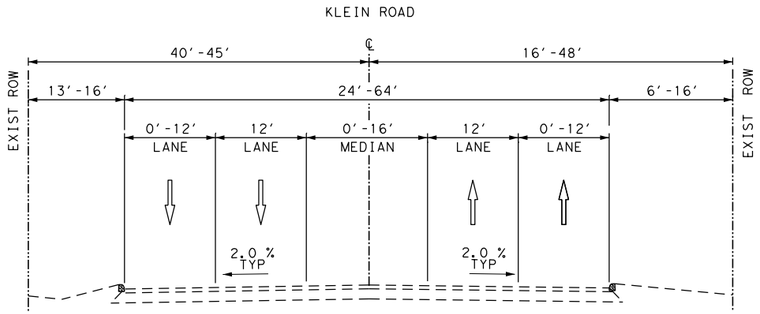
DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	32



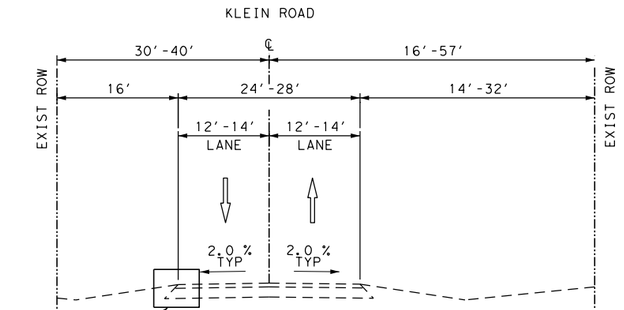
KLEIN RD
STA 102+50 - 103+54



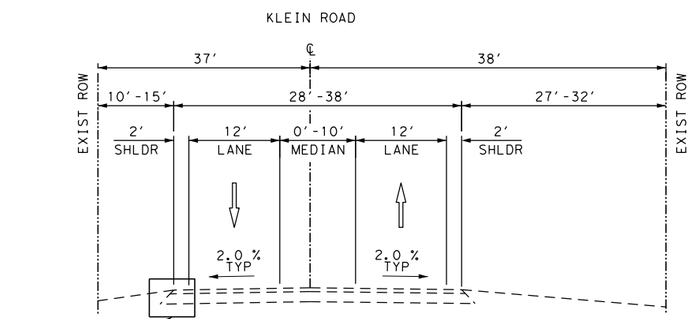
DETAIL "A"
NTS



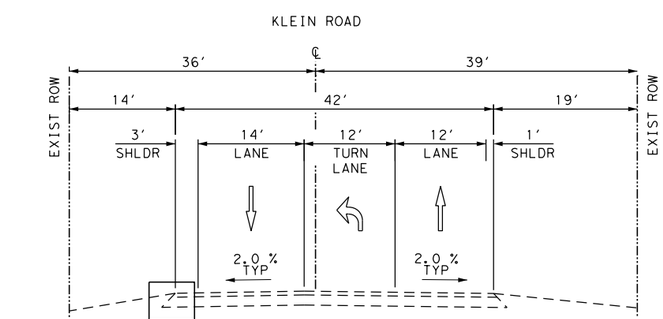
KLEIN RD
STA 103+54 - 111+16



KLEIN RD
STA 111+16 - 148+03



KLEIN RD
STA 148+03 - 151+50



KLEIN RD
STA 151+50 - 152+72

DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED
PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

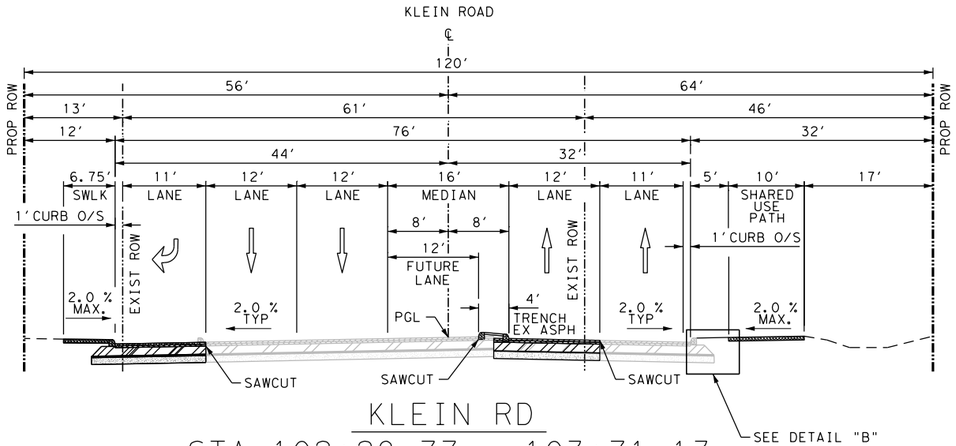
EXISTING TYPICAL SECTIONS

SHEET 1 OF 1

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	33

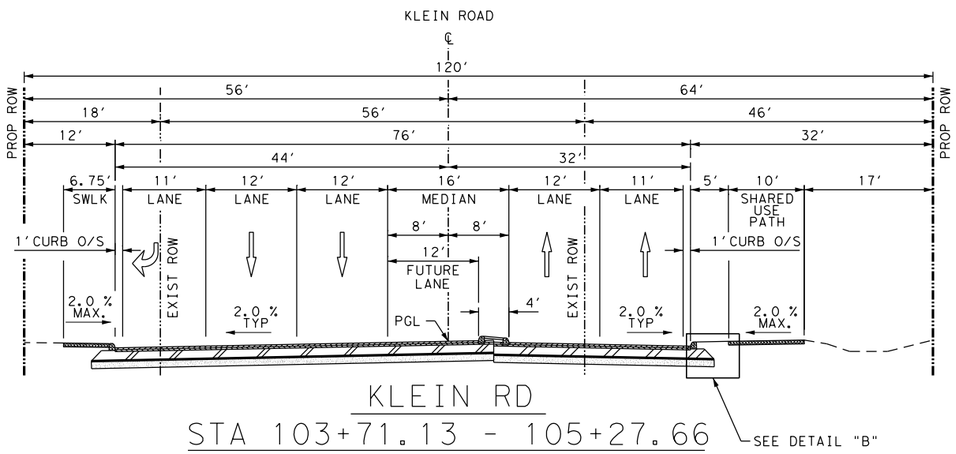
Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\General\5103003typ.dgn



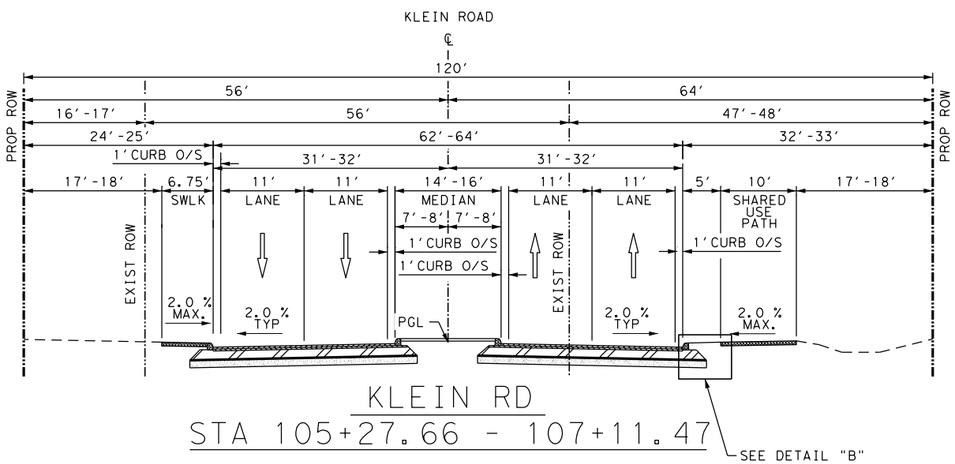
KLEIN RD

STA 102+28.77 - 103+71.13



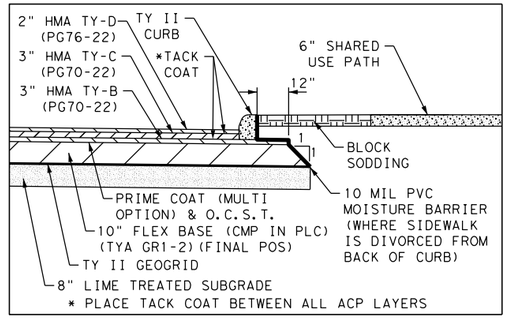
KLEIN RD

STA 103+71.13 - 105+27.66



KLEIN RD

STA 105+27.66 - 107+11.47



DETAIL "B"

NTS

NOTES:

1. PAVEMENT SECTION BASED ON ARTERIAL HYBRID OPTION (TYPE B/MSL) RECOMMENDATIONS FROM GEOTECHNICAL ENGINEERING STUDY (PAVEMENTS FOR KLEIN ROAD RECONSTRUCTION PHASE II SOUTH WALNUT TO FM 725, PREPARED BY RABA KISTNER 12/17/2020).

2. DURING CONSTRUCTION OF PAVEMENT SECTION, ENSURE NO PUNCTURING OF PVC MOISTURE BARRIER OCCURS.

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 116612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

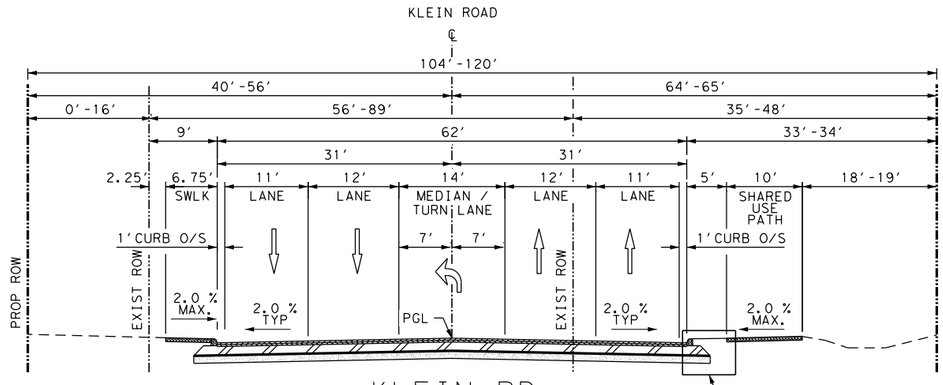
PROPOSED TYPICAL SECTIONS

SHEET 1 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	34

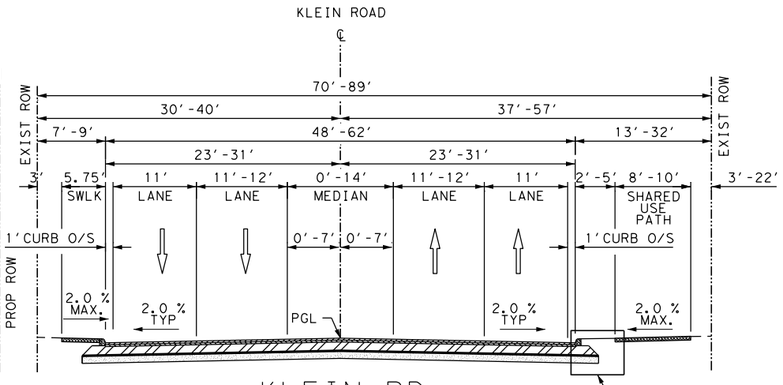
Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\General\5103003typ.dgn



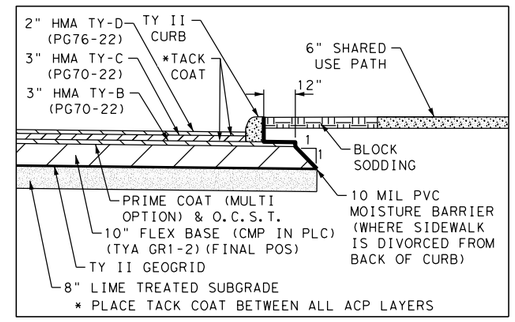
KLEIN RD

STA 107+11.47 - 119+32.17



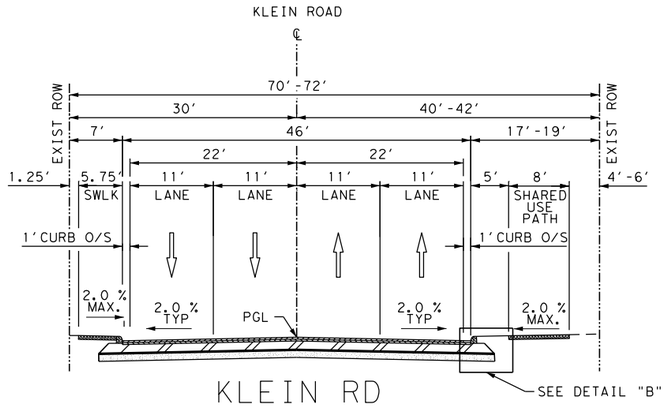
KLEIN RD

STA 119+32.17 - 123+05.47



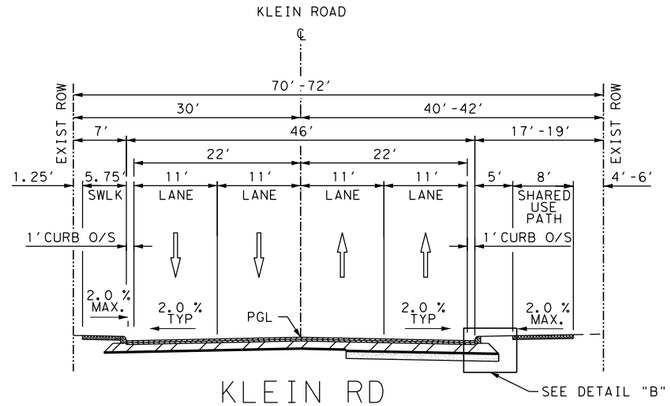
DETAIL "B"

NTS



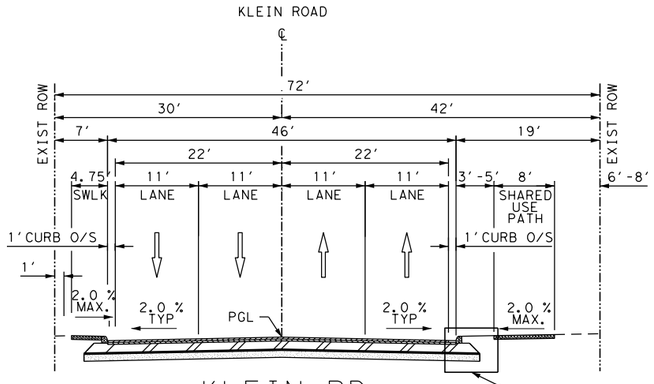
KLEIN RD

STA 123+05.47 - 132+61.67



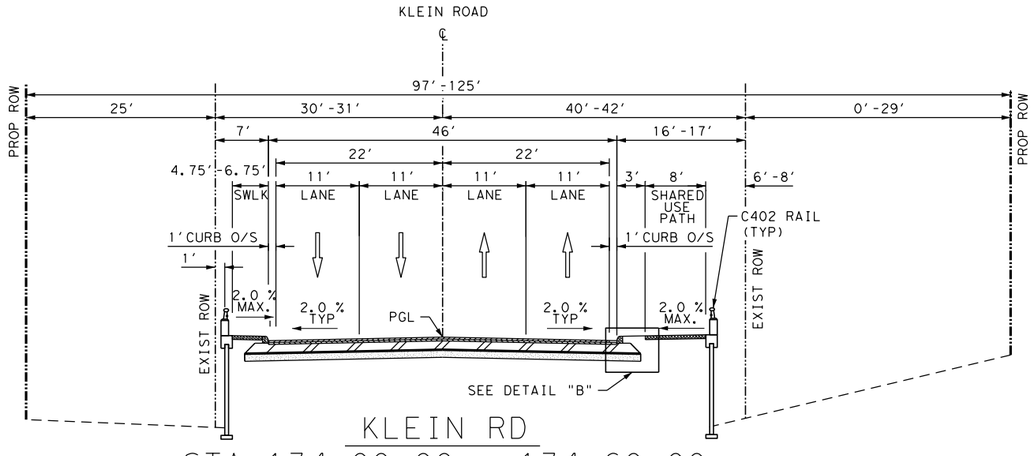
KLEIN RD

STA 132+61.67 - 132+94.74



KLEIN RD

STA 132+94.74 - 134+00.00



KLEIN RD

STA 134+00.00 - 134+60.00

NOTES:

1. PAVEMENT SECTION BASED ON ARTERIAL HYBRID OPTION (TYPE B/MSL) RECOMMENDATIONS FROM GEOTECHNICAL ENGINEERING STUDY (PAVEMENTS FOR KLEIN ROAD RECONSTRUCTION PHASE II SOUTH WALNUT TO FM 725, PREPARED BY RABA KISTNER 12/17/2020).

2. DURING CONSTRUCTION OF PAVEMENT SECTION, ENSURE NO PUNCTURING OF PVC MOISTURE BARRIER OCCURS.

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

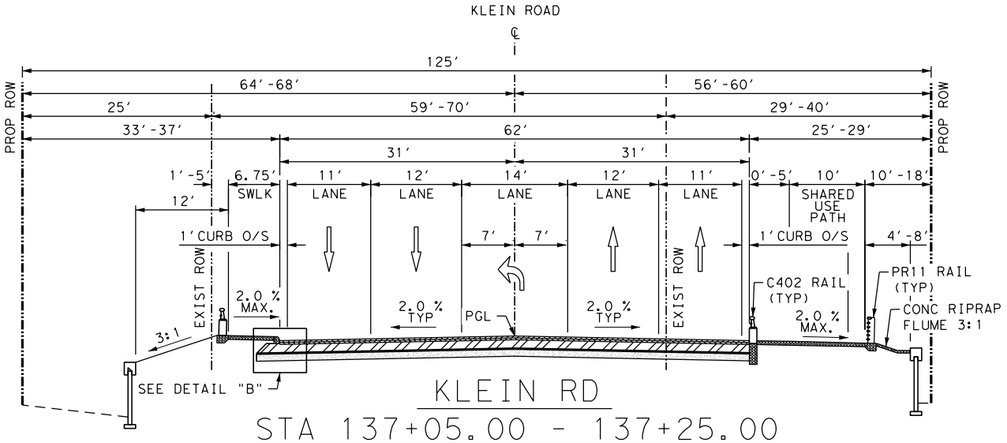
PROPOSED TYPICAL SECTIONS

SHEET 2 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	35

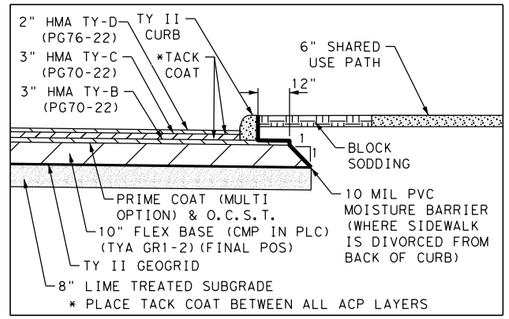
Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\General\5103003typ.dgn



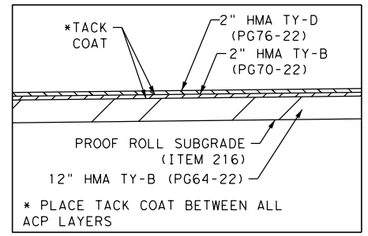
KLEIN RD

STA 137+05.00 - 137+25.00



DETAIL "B"

NTS



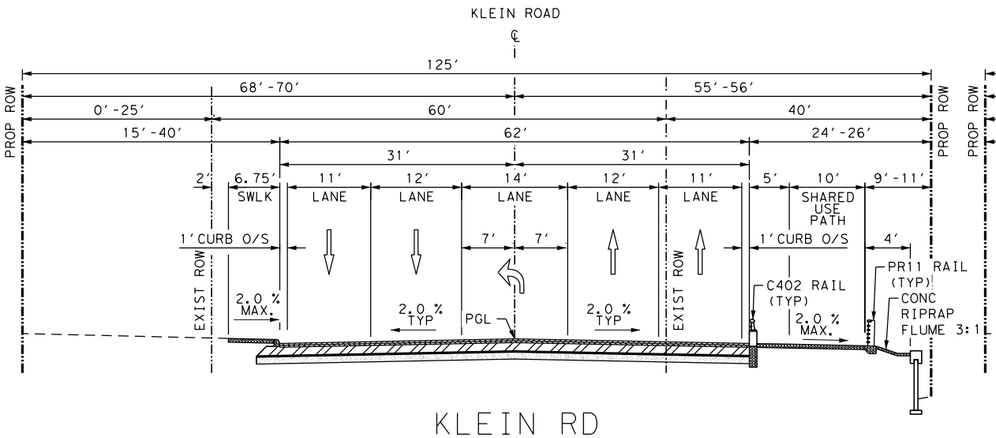
DETAIL "D"

NTS

NOTES:

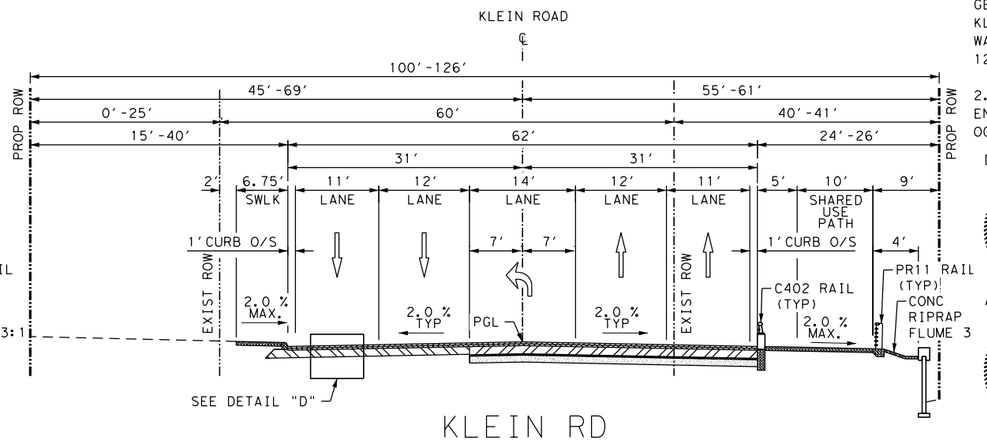
1. PAVEMENT SECTION BASED ON ARTERIAL HYBRID OPTION (TYPE B/MSL) RECOMMENDATIONS FROM GEOTECHNICAL ENGINEERING STUDY (PAVEMENTS FOR KLEIN ROAD RECONSTRUCTION PHASE II SOUTH WALNUT TO FM 725, PREPARED BY RABA KISTNER 12/17/2020).

2. DURING CONSTRUCTION OF PAVEMENT SECTION, ENSURE NO PUNCTURING OF PVC MOISTURE BARRIER OCCURS.



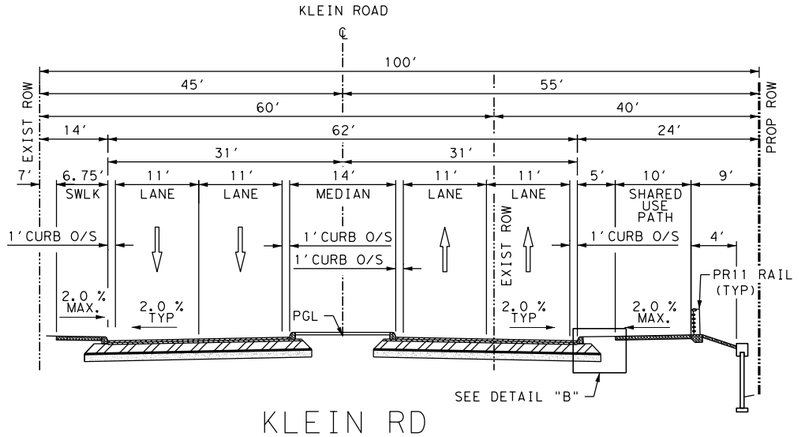
KLEIN RD

STA 137+25.00 - 139+94.25



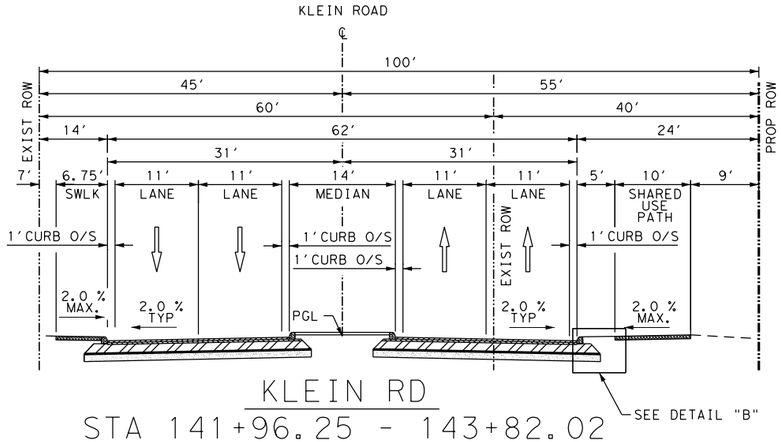
KLEIN RD

STA 139+94.25 - 140+62.28



KLEIN RD

STA 140+62.28 - 141+96.25



KLEIN RD

STA 141+96.25 - 143+82.02

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

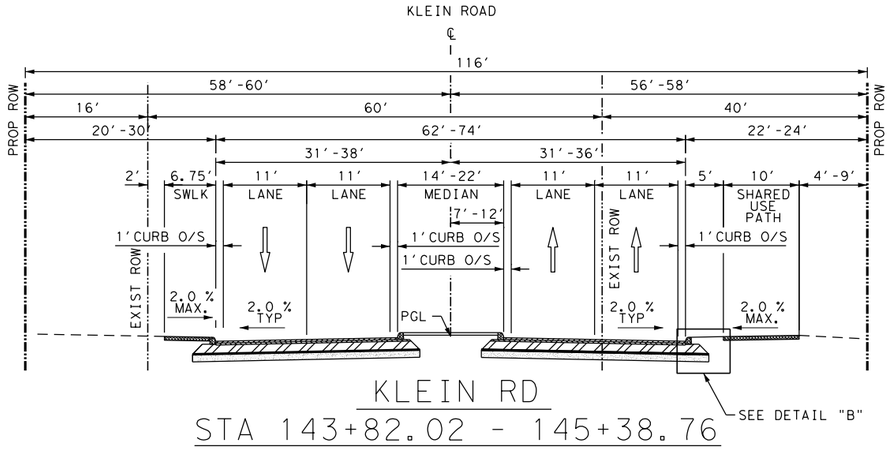
PROPOSED TYPICAL SECTIONS

SHEET 3 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	36

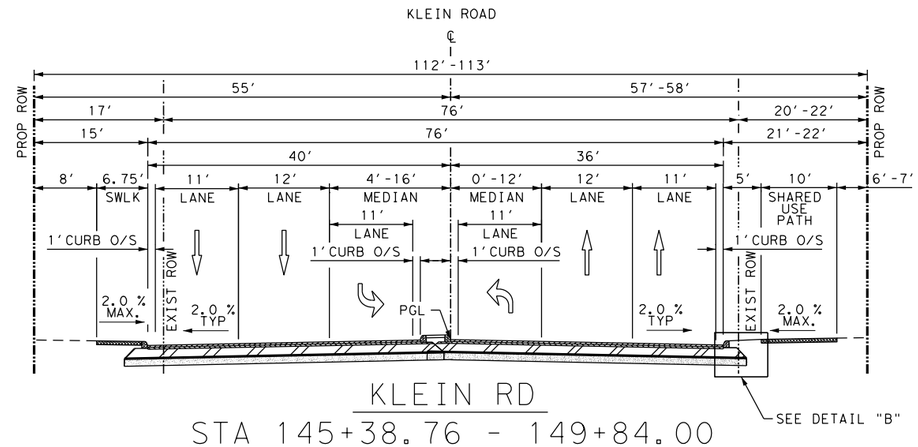
Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\General\5103003typ.dgn



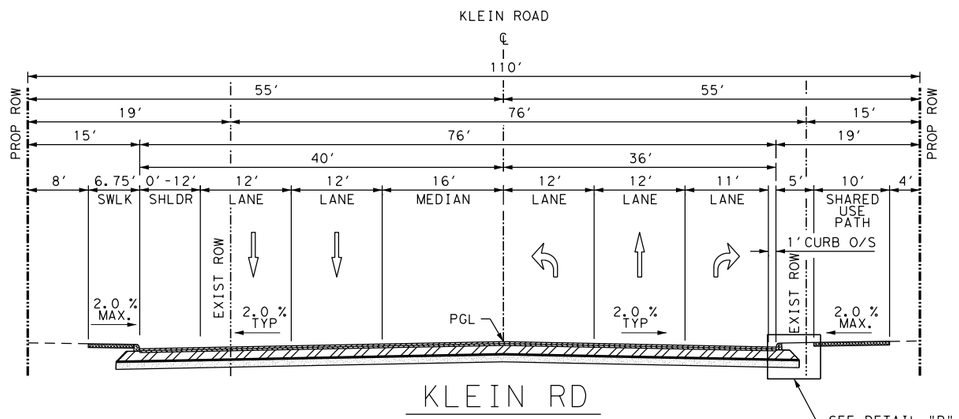
KLEIN RD

STA 143+82.02 - 145+38.76



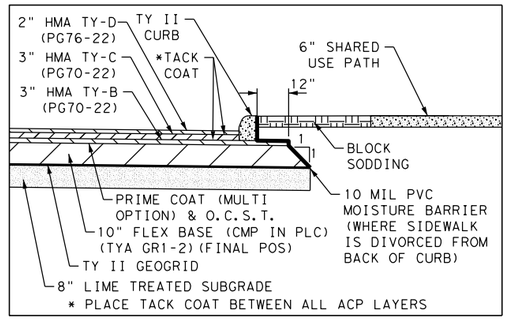
KLEIN RD

STA 145+38.76 - 149+84.00



KLEIN RD

STA 149+84.00 - 152+85.25



DETAIL "B"

NTS

NOTES:

1. PAVEMENT SECTION BASED ON ARTERIAL HYBRID OPTION (TYPE B/MSL) RECOMMENDATIONS FROM GEOTECHNICAL ENGINEERING STUDY (PAVEMENTS FOR KLEIN ROAD RECONSTRUCTION PHASE II SOUTH WALNUT TO FM 725, PREPARED BY RABA KISTNER 12/17/2020).

2. DURING CONSTRUCTION OF PAVEMENT SECTION, ENSURE NO PUNCTURING OF PVC MOISTURE BARRIER OCCURS.

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/29/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/29/2021 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

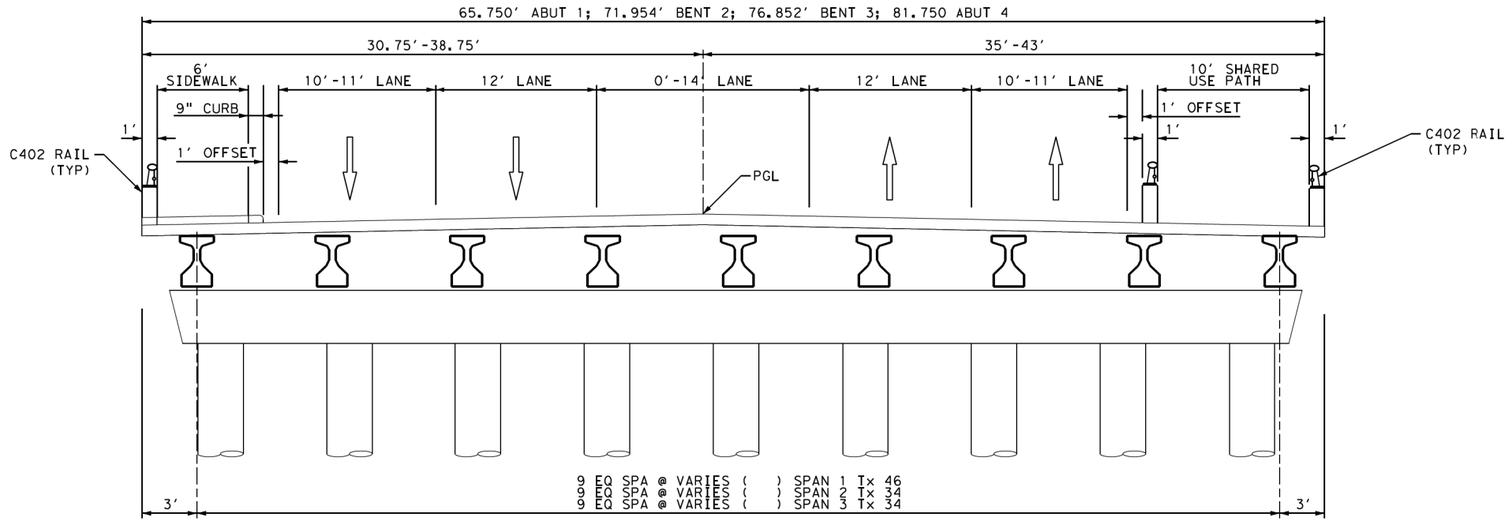
City of New Braunfels

KLEIN RD PHASE 2

PROPOSED TYPICAL SECTIONS

SHEET 4 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	37



TYPICAL SECTION
STA 134+60 - STA 137+05

REV. NO.	DATE	DESCRIPTION	BY

M&S ENGINEERING
CIVIL | ELECTRICAL | STRUCTURAL | MEP
TEXAS PROFESSIONAL ENGINEERING FIRM # F-1394
WWW.MSENGR.COM | (830) 228-5446

City of New Braunfels

KLEIN RD PH 2

BRIDGE LAYOUT

TYPICAL SECTIONS

STA 134+60 TO STA 137+05

SHEET 1 OF 1

DGN:	STATE	PROJECT NO.	HIGHWAY NO.
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	38

STATE OF TEXAS
A.M. STONE
91049
LICENSED
PROFESSIONAL ENGINEER
12/11/2018

Plotted on: $DATE$

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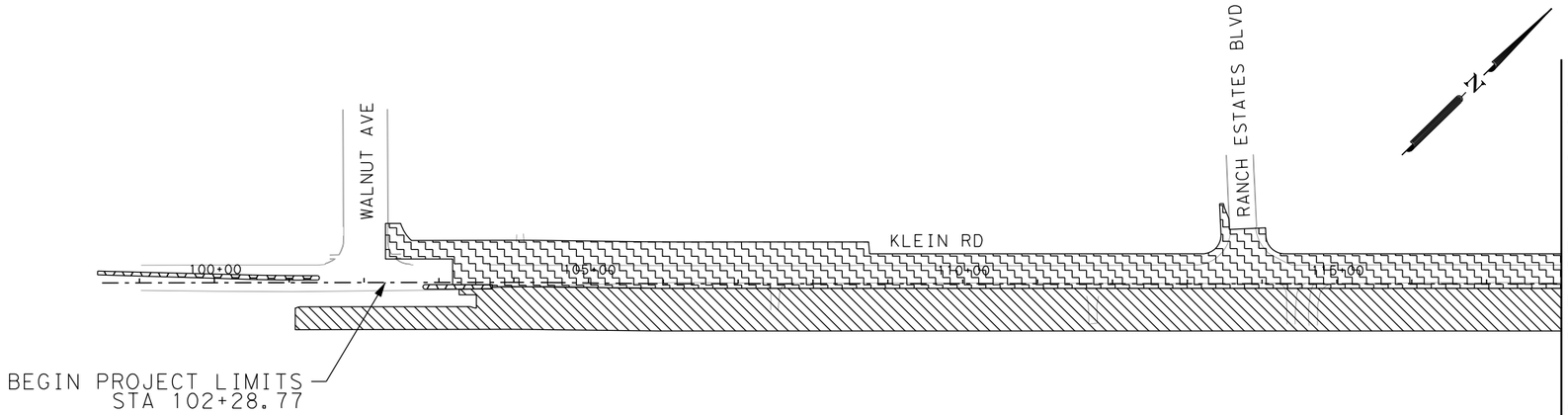

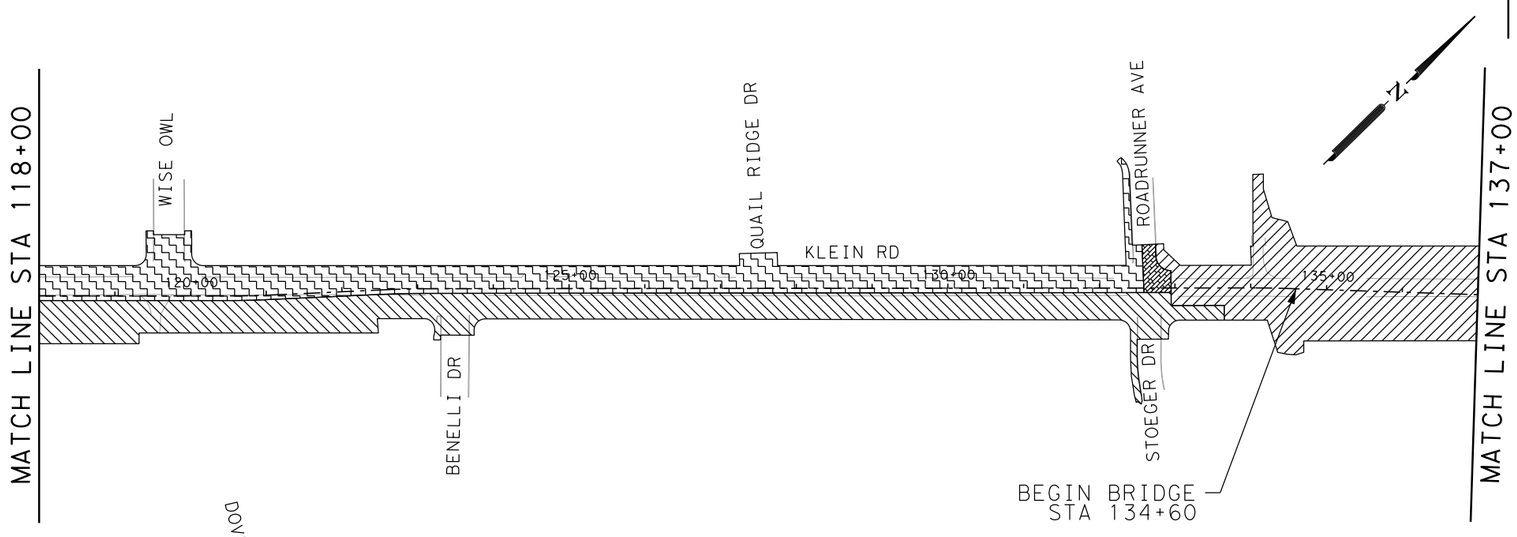

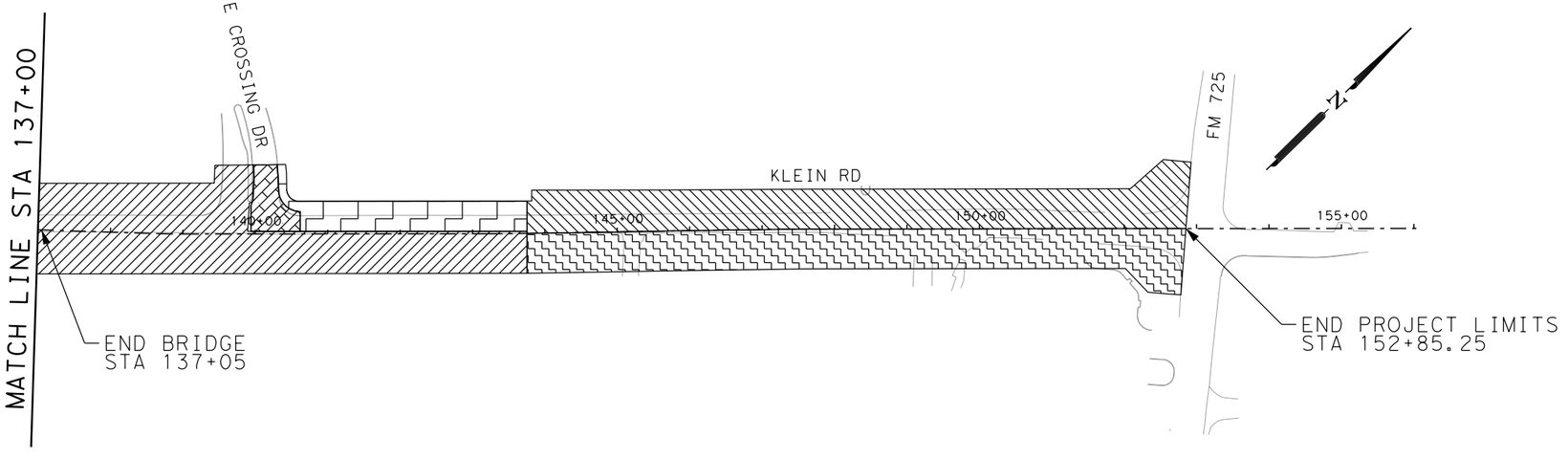

WORK ZONE PHASE 1 STEP 1
WORK ZONE PHASE 1 STEP 2
WORK ZONE PHASE 1 STEP 3
WORK ZONE PHASE 2 STEP 1
WORK ZONE PHASE 2 STEP 2
WORK ZONE PHASE 3

DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED
PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/22/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/22/2021 DATE

0 100 200 300
SCALE: 1"= 200'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN OVERALL PHASING LAYOUT

SHEET 1 OF 1

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	39

DETOURS, BARRICADES, WARNING SIGNS, SEQUENCE OF WORK, ETC.

THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC", OF THE STANDARD SPECIFICATIONS. CONTRACTOR TO FOLLOW SEQUENCE OF WORK, UNLESS OTHERWISE APPROVED. IN ADDITION TO THESE REQUIREMENTS, THE FOLLOWING PROVISIONS SHALL ALSO GOVERN ON THIS CONTRACT:

1. SEQUENCE OF WORK

SEQUENCE NOTES:

1. DROP OFF CONDITIONS GREATER THAN 2" THAT ARE UNPROTECTED BY LOW PROFILE CONCRETE BARRIER (LPCB) AND ADJACENT TO TRAVEL LANES MUST HAVE A 3:1 SLOPE AT THE END OF EACH DAY.

2. ASPHALT PLACEMENT IN PHASES 1 THROUGH PHASE 3 DOES NOT INCLUDE THE FINAL LIFT.

PHASE 1 STEP 1:

a. CONSTRUCT TEMPORARY PAVEMENT. SET UP DETOUR AS SHOWN ON DETOUR PLAN TO CLOSE THROUGH ACCESS OF KLEIN ROAD BETWEEN DOVE CROSSING DR AND ROADRUNNER AVE. INSTALL TEMPORARY TRAFFIC CONTROL DEVICES INCLUDING CHANNELIZING DEVICES AND LOW-PROFILE CONCRETE BARRIERS.

b. REMOVE THE CULVERT AT DOVE CROSSING FROM DOWNSTREAM END THROUGH THE MEDIAN.

c. CONSTRUCT DRAINAGE STRUCTURES PLUGGING THE UPSTREAM ENDS OF NEW STORM DRAINS WITH NO OUTLET AND AT PHASE LINES UNTIL THE NEXT PHASE OF CONSTRUCTION, CONSTRUCT THE ROADWAY ON THE SOUTH SIDE OF KLEIN ROAD AND DOVE CROSSING INTERSECTION, THE EAST SIDE OF KLEIN ROAD FROM THE DOVE CROSSING INTERSECTION TO STATION 143+75, THE NORTH SIDE OF ROADRUNNER AVE INTERSECTION, PROPOSED BRIDGE, AND PROPOSED RETAINING WALLS WITHIN THE WORK ZONE AS SHOWN IN THE PHASE 1 STEP 1 TCP PLANS.

PHASE 1 STEP 2:

a. MAINTAINING DETOUR ESTABLISHED IN PHASE 1 STEP 1, CONSTRUCT TEMPORARY PAVEMENT. INSTALL TEMPORARY TRAFFIC CONTROL DEVICES INCLUDING PAVEMENT MARKINGS, CHANNELIZING DEVICES, AND LOW-PROFILE CONCRETE BARRIERS.

b. REMOVE THE CULVERT ON THE NORTH SIDE OF THE DOVE CROSSING INTERSECTION WITHIN THE LIMITS OF CONSTRUCTION FROM STA 140+40 TO 140+50.

c. CONSTRUCT DRAINAGE STRUCTURES PLUGGING THE UPSTREAM ENDS OF NEW STORM DRAINS WITH NO OUTLET AND AT PHASE LINES UNTIL THE NEXT PHASE OF CONSTRUCTION. REMOVE PLUGS WHEN CONNECTING TO PREVIOUSLY CONSTRUCTED DRAINAGE STRUCTURES. CONSTRUCT THE WEST SIDE OF KLEIN ROAD FROM THE DOVE CROSSING INTERSECTION (INCLUDING THE NORTH SIDEWALK AND CURB ON DOVE CROSSING) TO STATION 143+75 WITHIN THE WORK ZONE AS SHOWN IN THE PHASE 1 STEP 2 TCP PLANS.

d. PHASE 2 STEP 2 MAY AND SHOULD BE WORKED CONCURRENTLY WITH THE BRIDGE AND RETAINING WALL CONSTRUCTION IN PHASE 1 STEP 1 ONCE CONSTRUCTION OF THE SOUTH SIDE OF KLEIN ROAD AND DOVE CROSSING INTERSECTION AND THE EAST SIDE OF KLEIN ROAD FROM THE DOVE CROSSING INTERSECTION TO STATION 143+75 IS COMPLETED.

PHASE 1 STEP 3:

a. MAINTAINING DETOUR ESTABLISHED IN PHASE 1 STEP 1, CONSTRUCT THE NORTH SIDE OF THE KLEIN ROAD AND ROADRUNNER INTERSECTION DURING OFF-PEAK DAYTIME OR NIGHT HOURS ONLY. ONE-LANE TWO-WAY OPERATION MAY BE USED ON ROADRUNNER IF NECESSARY BUT SHALL NOT EXCEED 2 WEEKS. REMOVE EXISTING PAVEMENT TO PROPOSED SUBGRADE, PROOF ROLL, AND PLACE BASE HMAC LAYER IN THE SAME DAY. EDGE CONDITIONS SHALL BE TAPERED PER EDGE CONDITION I (SEE WORKSHEET FOR EDGE CONDITION TREATMENT TYPES) AT THE END OF EACH WORK DAY.

b. REMOVE THE REMAINING CULVERT AT DOVE CROSSING INTERSECTION ON THE NORTH SIDE OF THE INTERSECTION.

c. MAINTAINING DETOUR ESTABLISHED IN PHASE 1 STEP 1, CONSTRUCT THE NORTH SIDE OF THE KLEIN ROAD AND DOVE CROSSING INTERSECTION DURING OFF-PEAK DAYTIME OR NIGHT HOURS ONLY. ONE-LANE TWO-WAY OPERATION MAY BE USED ON ROADRUNNER IF NECESSARY BUT SHALL NOT EXCEED 2 WEEKS. REMOVE EXISTING PAVEMENT TO PROPOSED SUBGRADE, PROOF ROLL, AND PLACE BASE HMAC LAYER IN THE SAME DAY. EDGE CONDITIONS SHALL BE TAPERED PER EDGE CONDITION I (SEE WORKSHEET FOR EDGE CONDITION TREATMENT TYPES) AT THE END OF EACH WORK DAY.

PHASE 2 STEP 1:

a. CONSTRUCT TEMPORARY PAVEMENT AND TEMPORARY DITCHES, MAINTAINING POSITIVE DRAINAGE AT ALL TIMES. INSTALL TEMPORARY TRAFFIC CONTROL DEVICES INCLUDING PAVEMENT MARKINGS, CHANNELIZING DEVICES, TEMPORARY TRAFFIC SIGNAL, AND LOW-PROFILE CONCRETE BARRIERS.

b. CONSTRUCT DRAINAGE STRUCTURES PLUGGING THE UPSTREAM ENDS OF NEW STORM DRAINS WITH NO OUTLET AND AT PHASE LINES UNTIL THE NEXT PHASE OF CONSTRUCTION. REMOVE PLUGS WHEN CONNECTING TO PREVIOUSLY CONSTRUCTED DRAINAGE STRUCTURES. CONSTRUCT THE WEST SIDE OF KLEIN ROAD WITHIN THE WORK ZONE AS SHOWN IN THE PHASE 2 STEP 1 TCP PLANS.

PHASE 2 STEP 2:

a. INSTALL TEMPORARY TRAFFIC CONTROL DEVICES INCLUDING PAVEMENT MARKINGS AND CHANNELIZING DEVICES.

b. CONSTRUCT REMAINING DRAINAGE STRUCTURES AND THE EAST SIDE OF KLEIN ROAD WITHIN THE WORK ZONE AS SHOWN IN THE PHASE 2 STEP 2 TCP PLANS. REMOVE PLUGS WHEN CONNECTING TO PREVIOUSLY CONSTRUCTED DRAINAGE STRUCTURES.

PHASE 3:

a. INSTALL TEMPORARY TRAFFIC CONTROL DEVICES INCLUDING CHANNELIZING DEVICES

b. CONSTRUCT RAISED MEDIANS AS SHOWN IN THE PHASE 3 TCP PLANS.

PHASE 4:

a. CONSTRUCT FINAL ASPHALT LIFT, STRIPING, AND SIGNING.

b. PERFORM FINAL CLEANUP.

2. SPECIAL NOTES

1. TEMPORARY PAVEMENT, WHERE INDICATED ON THE PLANS, IS PAID UNDER ITEM 0508-6001 CONSTRUCTING DETOURS. THE PAVEMENT SECTION FOR TEMPORARY PAVEMENTS SHALL BE CONSTRUCTED PER 225,000 ESAL RECOMMENDATIONS FROM GEOTECHNICAL ENGINEERING STUDY (PAVEMENTS FOR KLEIN ROAD RECONSTRUCTION PHASE II SOUTH WALNUT TO FM 725, PREPARED BY RABA KISTNER 12/17/2020).

2. CONTRACTOR MAY UTILIZE PULVERIZED TEMPORARY PAVEMENT MATERIALS WHEN CONSTRUCTING THE PERMANENT GRANULAR BASE COURSE, LOCATIONS ARE TO BE APPROVED BY THE ENGINEER. PULVERIZING AND PLACEMENT MUST FOLLOW THE RECOMMENDATIONS OF THE GEOTECHNICAL ENGINEERING STUDY REFERENCED IN SPECIAL NOTE 1.

3. PAYMENT FOR CONSTRUCTING THE PERMANENT GRANULAR BASE COURSE WILL BE MADE UNDER ITEM 247 FLEXIBLE BASE REGARDLESS OF WHETHER MATERIAL IS SOURCED ON SITE FROM PULVERIZED TEMPORARY PAVEMENT OR IMPORTED. IF SOURCED ON SITE, NO SEPARATE PAYMENT FOR LABOR, TOOLS, OR INCIDENTALS FOR PULVERIZING, HAULING, STOCKPILING THE PULVERIZED MATERIAL

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED
PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN NARRATIVE AND SPECIAL NOTES

SHEET 1 OF 1

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	40

NOTES:
TRUCKS SHALL ONLY USE THE PERMISSIBLE INGRESS/EGRESS ROUTES TO ACCESS THE CONSTRUCTION SITE.

DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED
PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

CONTRACTOR INGRESS & EGRESS MAP

SHEET 1 OF 1

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	41

Plotted on: 1/21/2021

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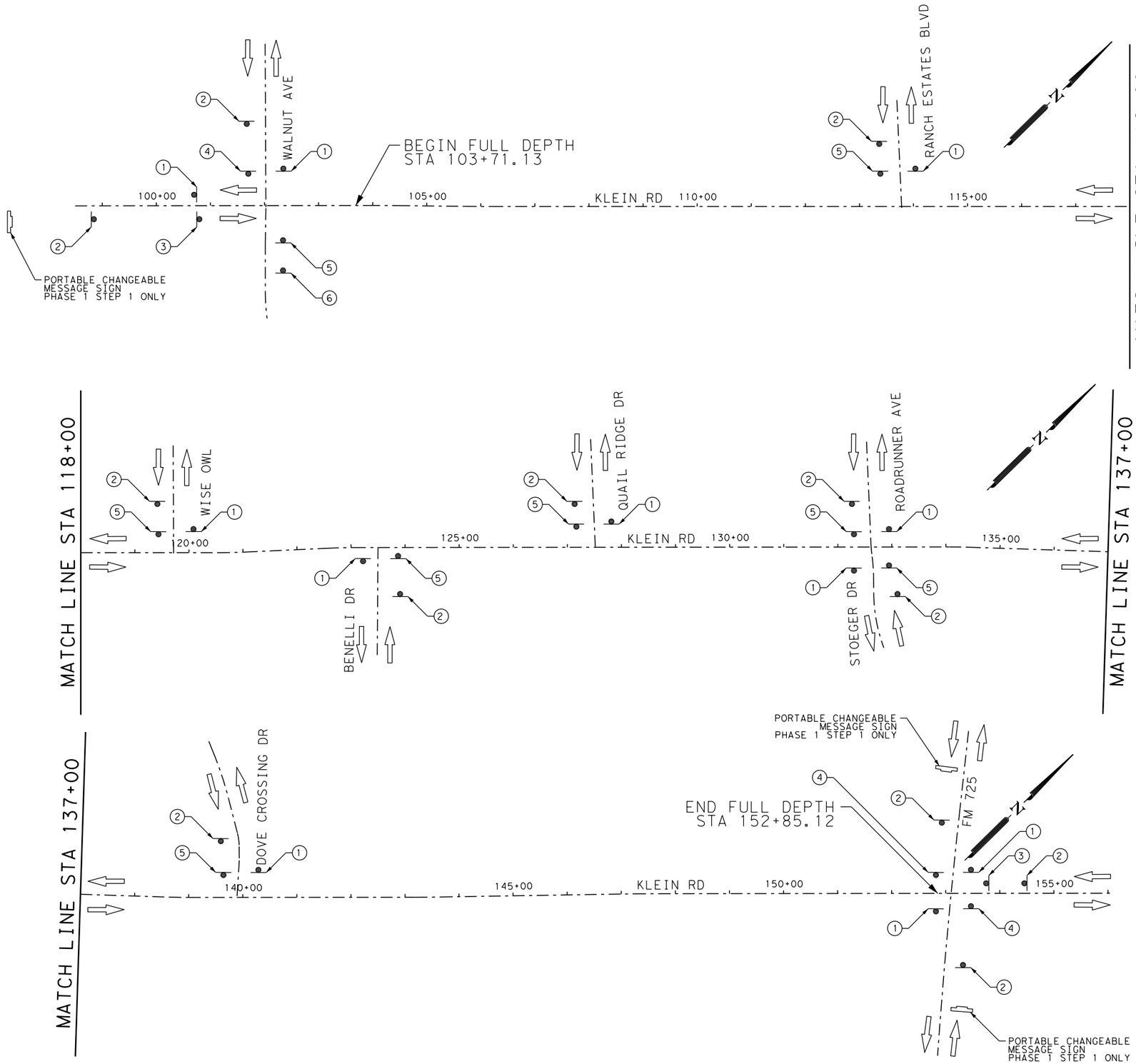

1	END ROAD WORK	G20-2a	4	ROAD CONSTRUCTION ⇦ NEXT XX MILES	G20-1b
2	ROAD WORK AHEAD, FL	CW20-1D	5	ROAD WORK ⇦ NEXT MILES, NEXT MILES ⇨	G20-1a
3	BEGIN ROAD WORK NEXT X MILES; NAME, ADDRESS, CITY, STATE, CONTRACTOR	SG20-1 w/plaque or SG20-5T; SG20-6	6	DETOUR AHEAD	CW20-2D

LEGEND

- TRAFFIC FLOW ARROW
- ADVANCE WARNING SIGNS
- PORTABLE CHANGEABLE MESSAGE SIGN

NOTES:

1. ALL ADVANCED WARNING SIGNS SHALL CONFORM WITH THE LATEST TxDOT BARRICADE AND CONSTRUCTION STANDARDS.

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PROJECT ADVANCE WARNING SIGNS

SHEET 1 OF 1

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	42

Plotted on: 1/21/2021

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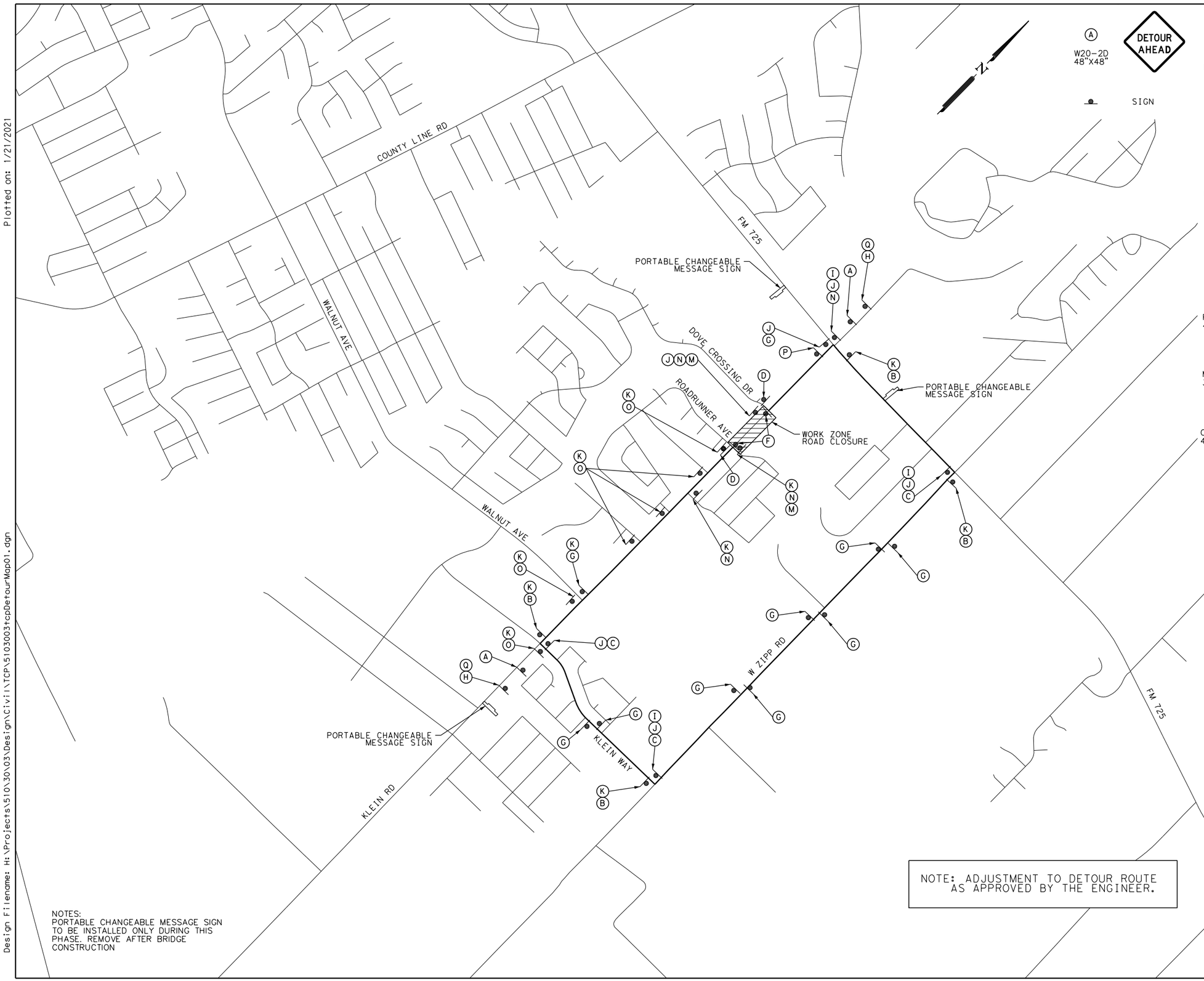

(A) W20-2D 48"X48" — DETOUR AHEAD
SIGN
(B) M4-9L 30"X24" — DETOUR
(C) M4-9R 30"X24" — DETOUR
(D) M4-8A 24"X18" — END DETOUR
(E) CW20-1D 48"X48" — ROAD WORK AHEAD
(F) R11-2 48"X30" — ROAD CLOSED
(G) M4-9S 30"X24" — DETOUR
(H) CW20-3D 48"X48" — ROAD CLOSED AHEAD
(I) KLEIN RD
(J) ROADRUNNER AVE
(K) DOVE CROSSING DR
M4-9N VARIABLE X 8"
(L) R3-1 48"X48"
(M) M4-10L 48"X18"
(N) M4-10L 48"X18" — DETOUR
(O) M4-10R 48"X18" — DETOUR
(P) R11-4 60"X30" — ROAD CLOSED TO THRU TRAFFIC
(Q) R5-2a 24"X24" — NO TRUCKS

DESIGN
STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER
TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL
STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER
JOHN A. TYLER, P.E. — 1/21/2021 DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN DETOUR MAP PHASE 1 STEPS 1, 2, 3

SHEET 1 OF 1

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	43

Plotted on: 1/21/2021
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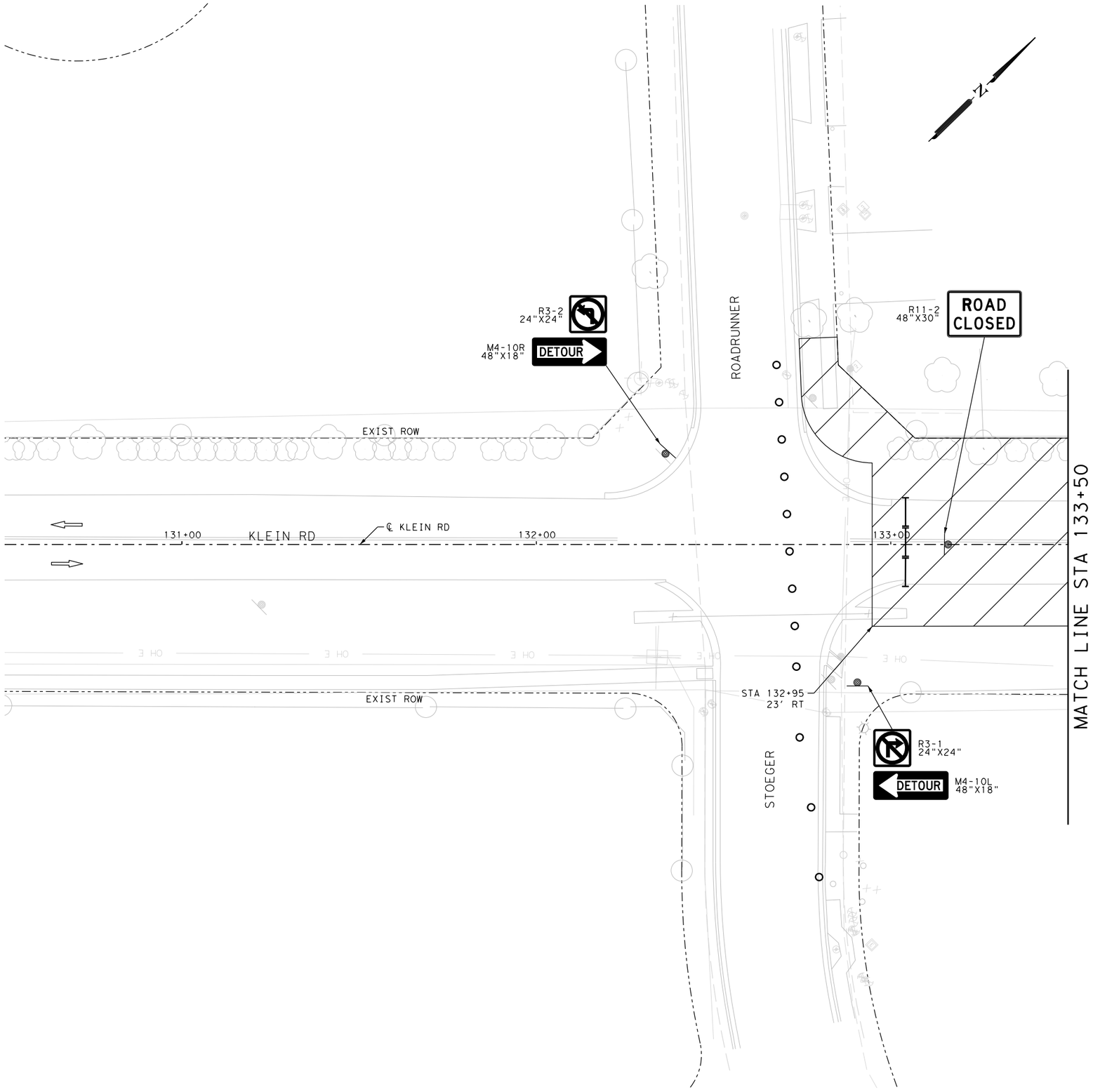


NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

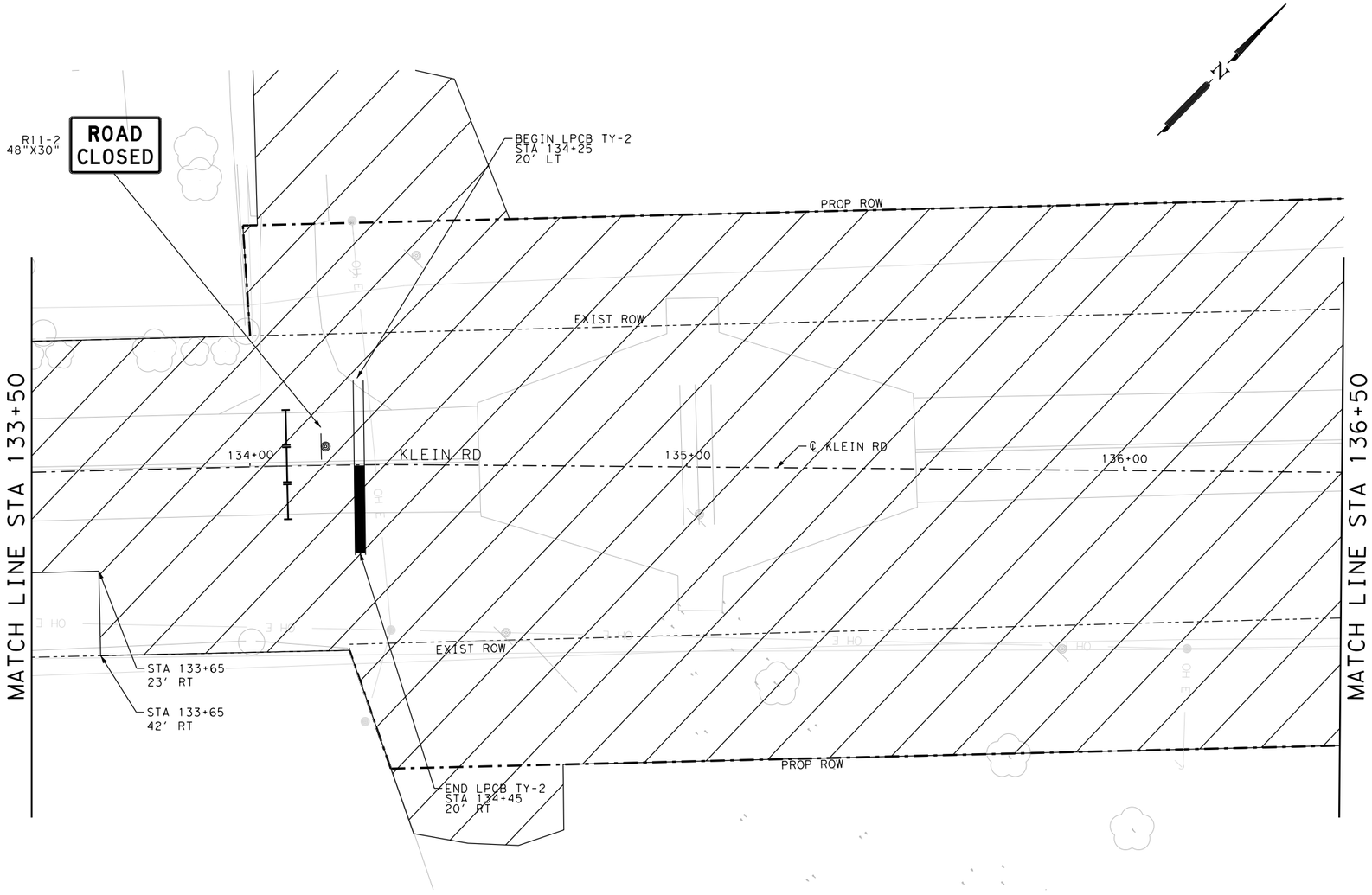
TRAFFIC CONTROL PLAN PHASE 1 STEP 1

SHEET 1 OF 6

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	44

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp101.dgn



NOTES:

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LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/22/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

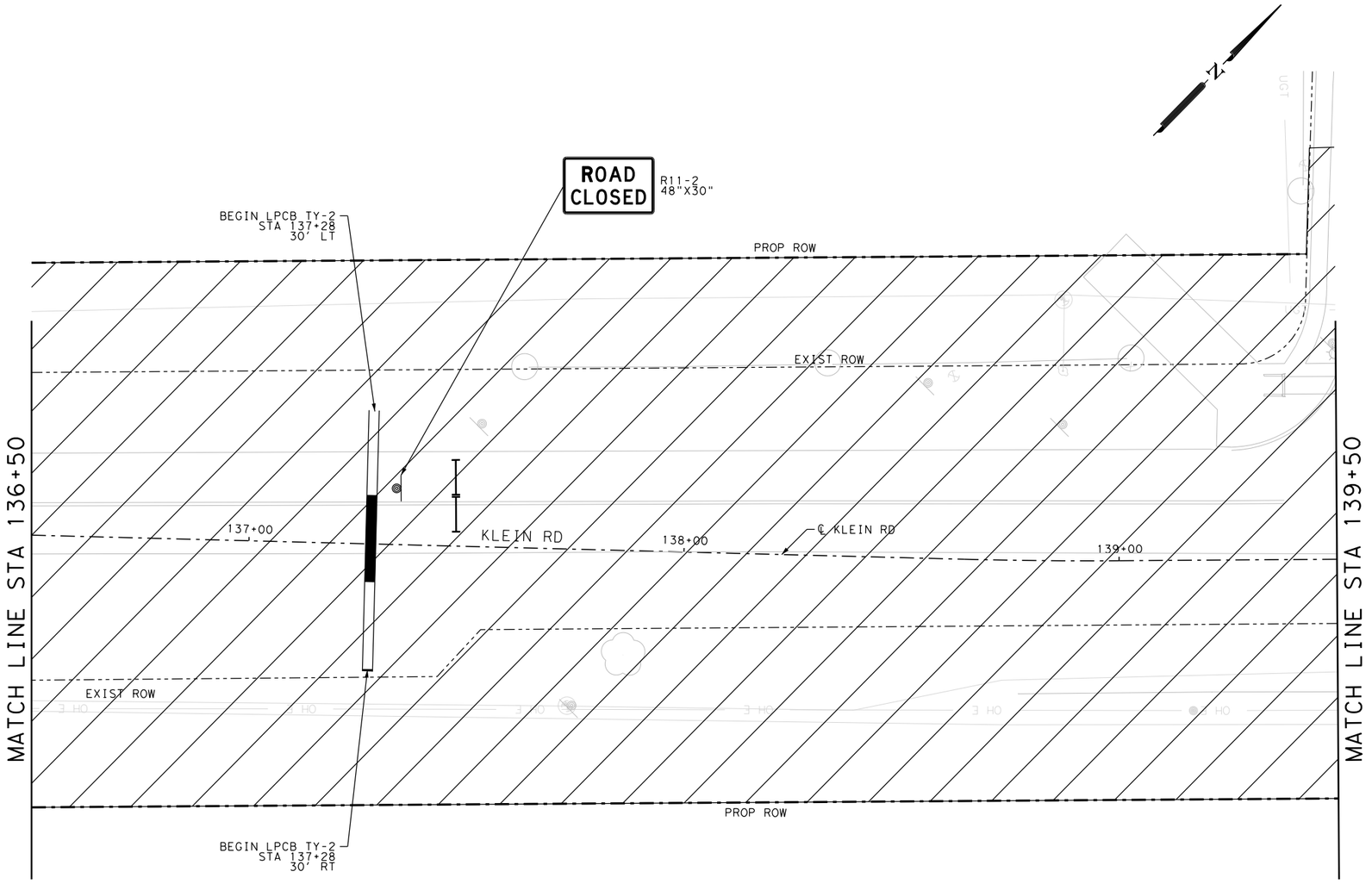
TRAFFIC CONTROL PLAN PHASE 1 STEP 1

SHEET 2 OF 6

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	45

Plotted on: 4/22/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp102.dgn



NOTES:

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2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 1 STEP 1

SHEET 3 OF 6

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	46

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp104.dgn

MATCH LINE STA 70+50
SEE SHEET 49

R11-2
48"X30"
ROAD CLOSED

℄ DOVE CROSSING RD

EXIST CULVERT TO BE REMOVED

52+00

BEGIN K
DOVE CROSSING
STA 51+27
21' LT

DOVE CROSSING
STA 51+41
21' LT

K K

R=400'

END K
BEGIN B
DOVE CROSSING
STA 52+02
17' LT

BEGIN LPCB TY-2
DOVE CROSSING
STA 52+56
5' LT

DOVE CROSSING
STA 52+36
18' LT

END LPCB TY-2
BEGIN LPCB TY-1
DOVE CROSSING
STA 52+74
12' LT

BEGIN TEMP PAVEMENT
140+33
53' LT

KLEIN RD
STA 140+33
50' LT

KLEIN RD
STA 140+17
11' LT

KLEIN RD
STA 140+52
20' LT

STA 140+65 PC
33' LT

KLEIN RD
STA 140+56
8' LT

R=35'

4'

R=33'

R=40'

℄ KLEIN RD

KLEIN RD

140+00

141+00

142+00

53+00

EXIST ROW

A

B B

A

D D

EXIST ROW

PROP ROW

KLEIN RD
STA 140+36
5' LT

SEE SECTION
THIS SHEET

MATCH LINE STA 139+50

MATCH LINE STA 142+50

NOTES:

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2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

KLEIN ROAD
℄

EXIST ROW

10'
LANE

10'
LANE

1'
SHLDR

1'
SHLDR

6'

3.5'

WORK ZONE
PHASE 1 STEP 1

PROP ROW

TEMP PAVING

WRK ZN PAV MRK
(W) (4") (SLD)

6.5'

1'
SAWCUT

3:1 MAX*

LPCB

WRK ZN PAV MRK
(W) (4") (SLD)

DBL WRK ZN PAV MRK
(Y) (4") (SLD)

* CONTRACTOR TO MAINTAIN POSITIVE DRAINAGE

PHASE 1 STEP 1

N.T.S.

ITEM	DESCRIPTION	UNIT	QTY
0508-6001	CONSTRUCTING DETOURS	SY	208
0512-6009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	250
0512-6010	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	LF	20
0512-6045	PORT CTB (STKPL)(LOW PROF)(TY 1)	LF	250
0512-6046	PORT CTB (STKPL)(LOW PROF)(TY 2)	LF	20
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	428
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	594
0662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	160
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	408

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED
PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

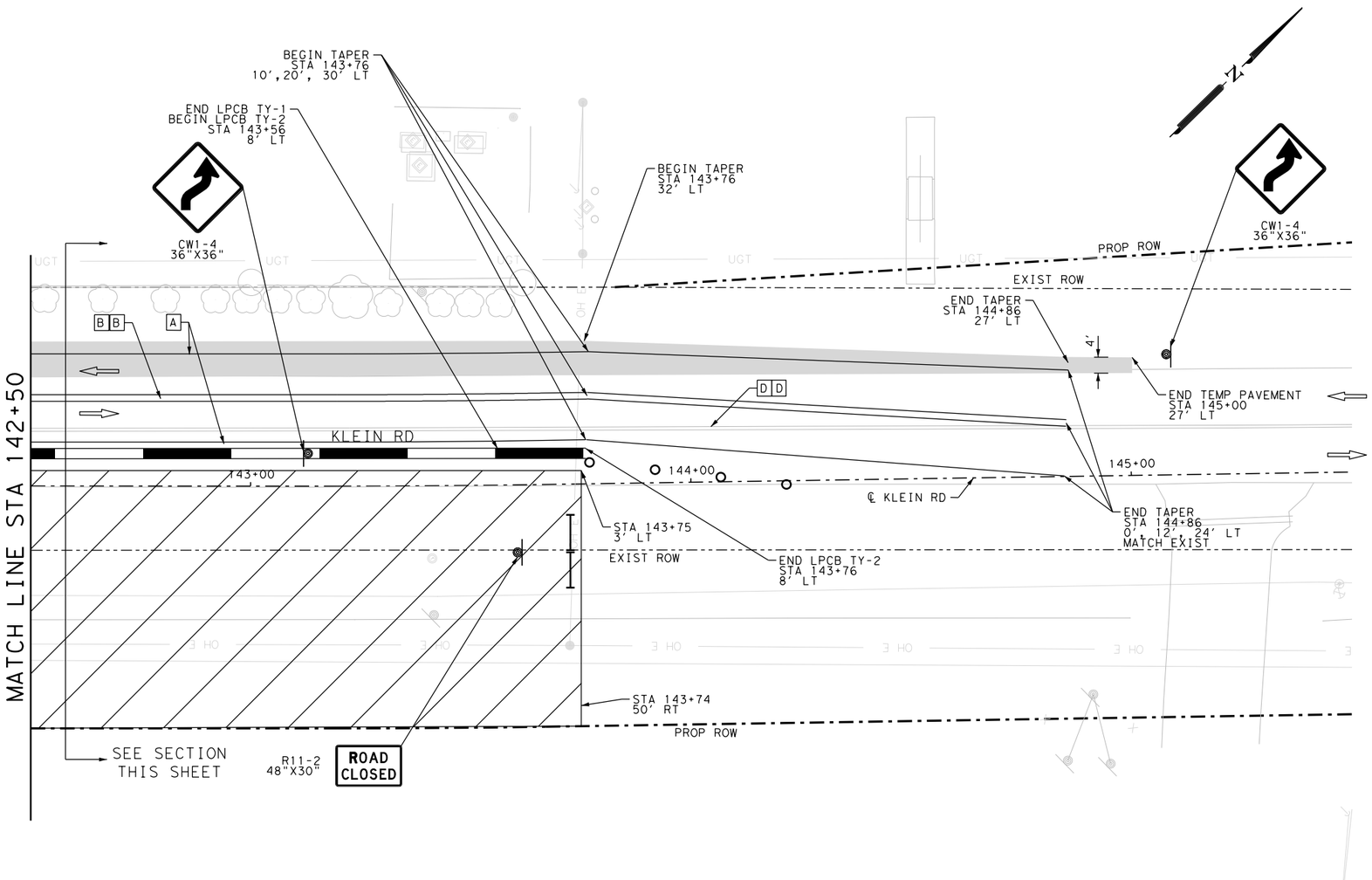
KLEIN RD PHASE 2

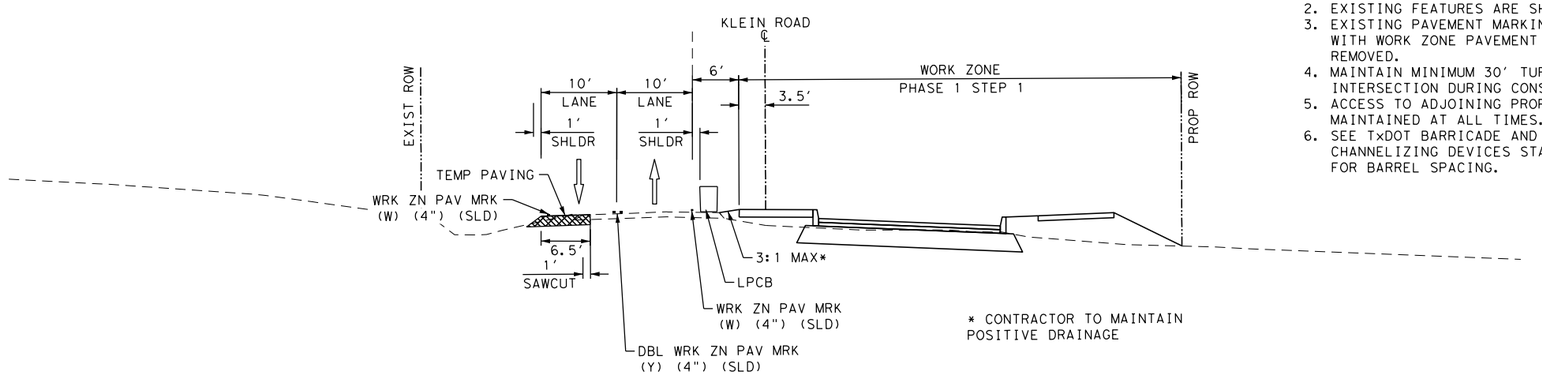
TRAFFIC CONTROL PLAN PHASE 1 STEP 1

SHEET 4 OF 6

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	47

ITEM	DESCRIPTION	UNIT	QTY
0508-6001	CONSTRUCTING DETOURS	SY	188
0512-6009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	110
0512-6010	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	LF	20
0512-6045	PORT CTB (STKPL)(LOW PROF)(TY 1)	LF	110
0512-6046	PORT CTB (STKPL)(LOW PROF)(TY 2)	LF	20
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	472
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	472
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	472





PHASE 1 STEP 1

* CONTRACTOR TO MAINTAIN POSITIVE DRAINAGE

NOTES:

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3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
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LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

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D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 1 STEP 1

SHEET 5 OF 6

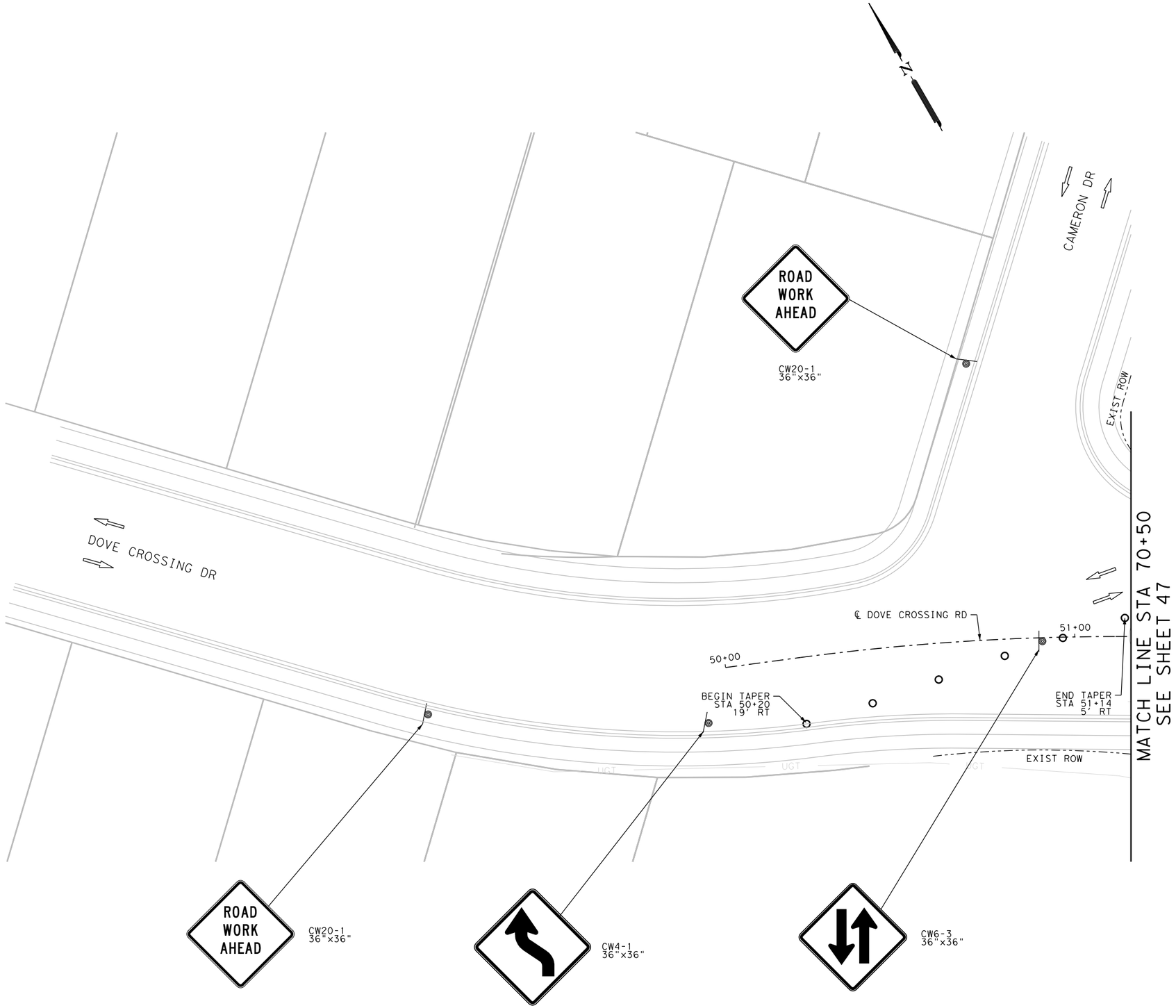
DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	48

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp105.dgn

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp106.dgn



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LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 1 STEP 1

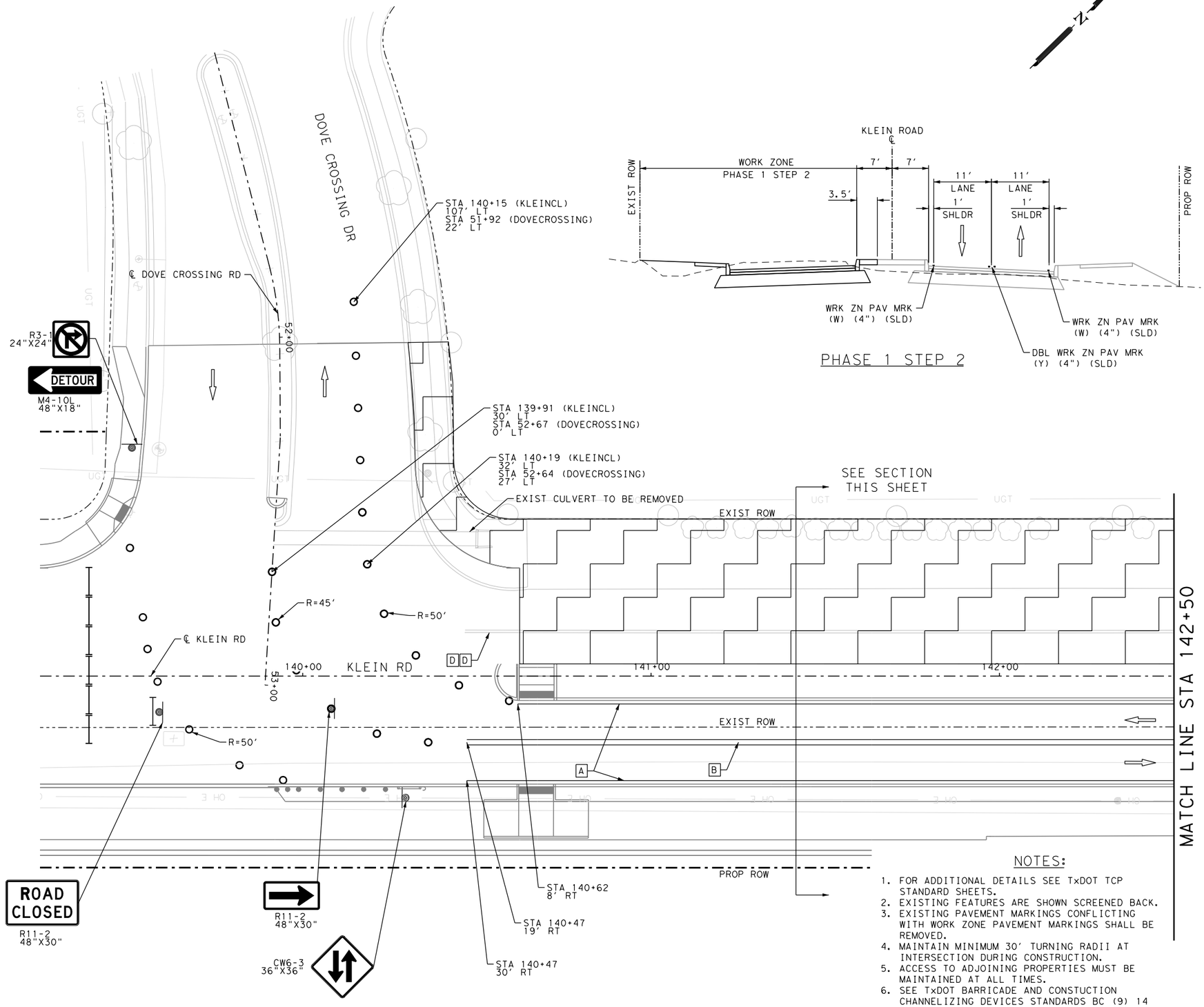
SHEET 6 OF 6

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	49

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp1A01.dgn

ITEM	DESCRIPTION	UNIT	QTY
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	391
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	406
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	32



PHASE 1 STEP 2

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

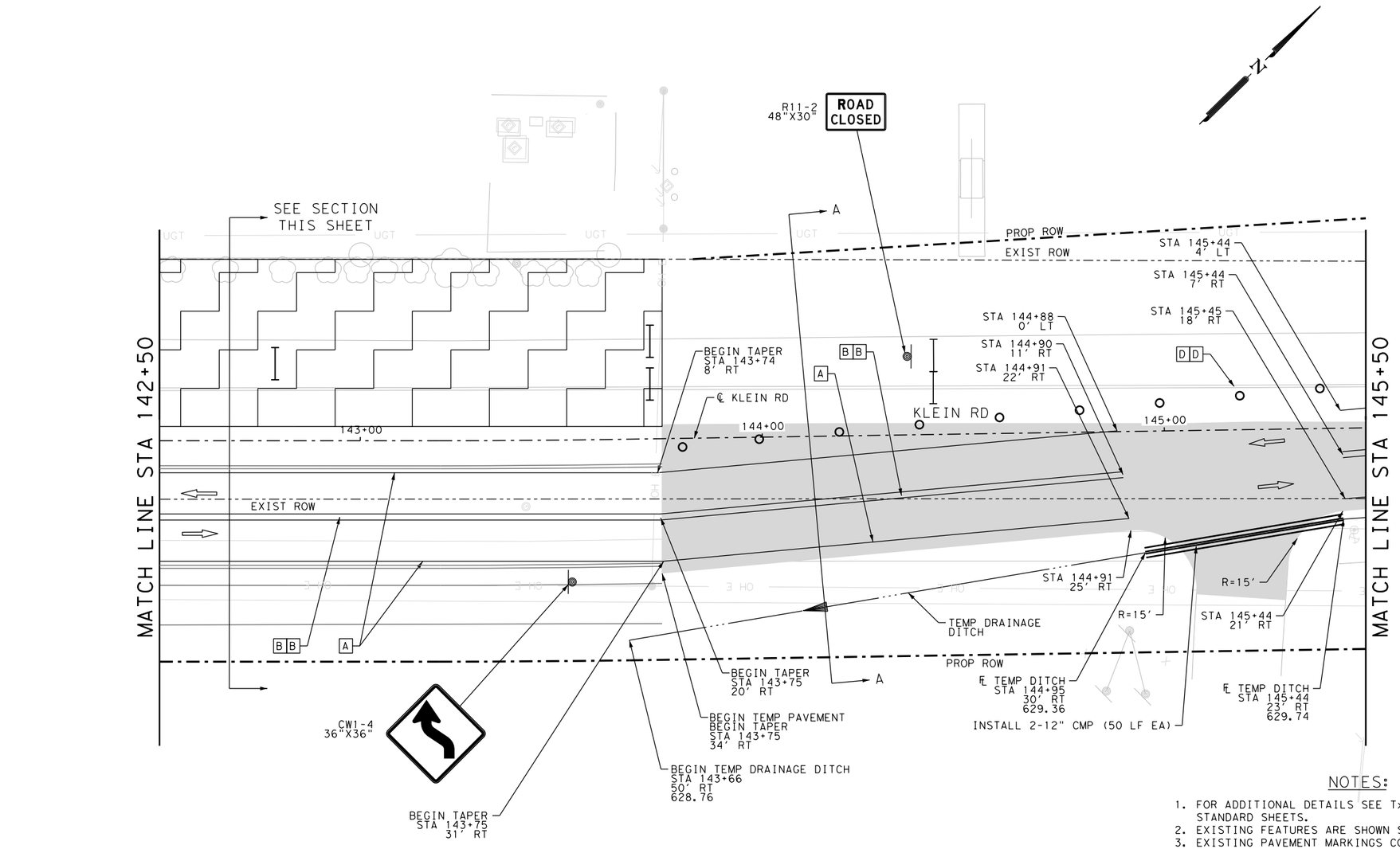
KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 1 STEP 2

SHEET 1 OF 3

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	50

ITEM	DESCRIPTION	UNIT	QTY
0460-6001	CMP (GAL STL 12 IN)	LF	100
0496-6007	REMOV STR (PIPE)	LF	100
0508-6001	CONSTRUCTING DETOURS	SY	630
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	492
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	494
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	350



LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
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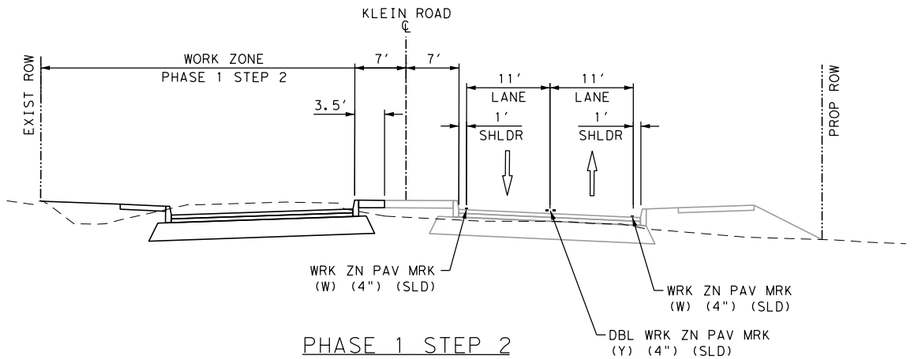
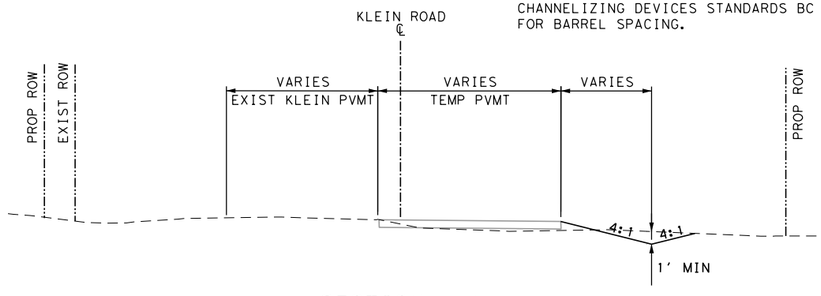
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.



PHASE 1 STEP 2

N.T.S.
140+00 TO 143+75



SECTION A-A

N.T.S.
143+75 TO 147+80

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 1 STEP 2

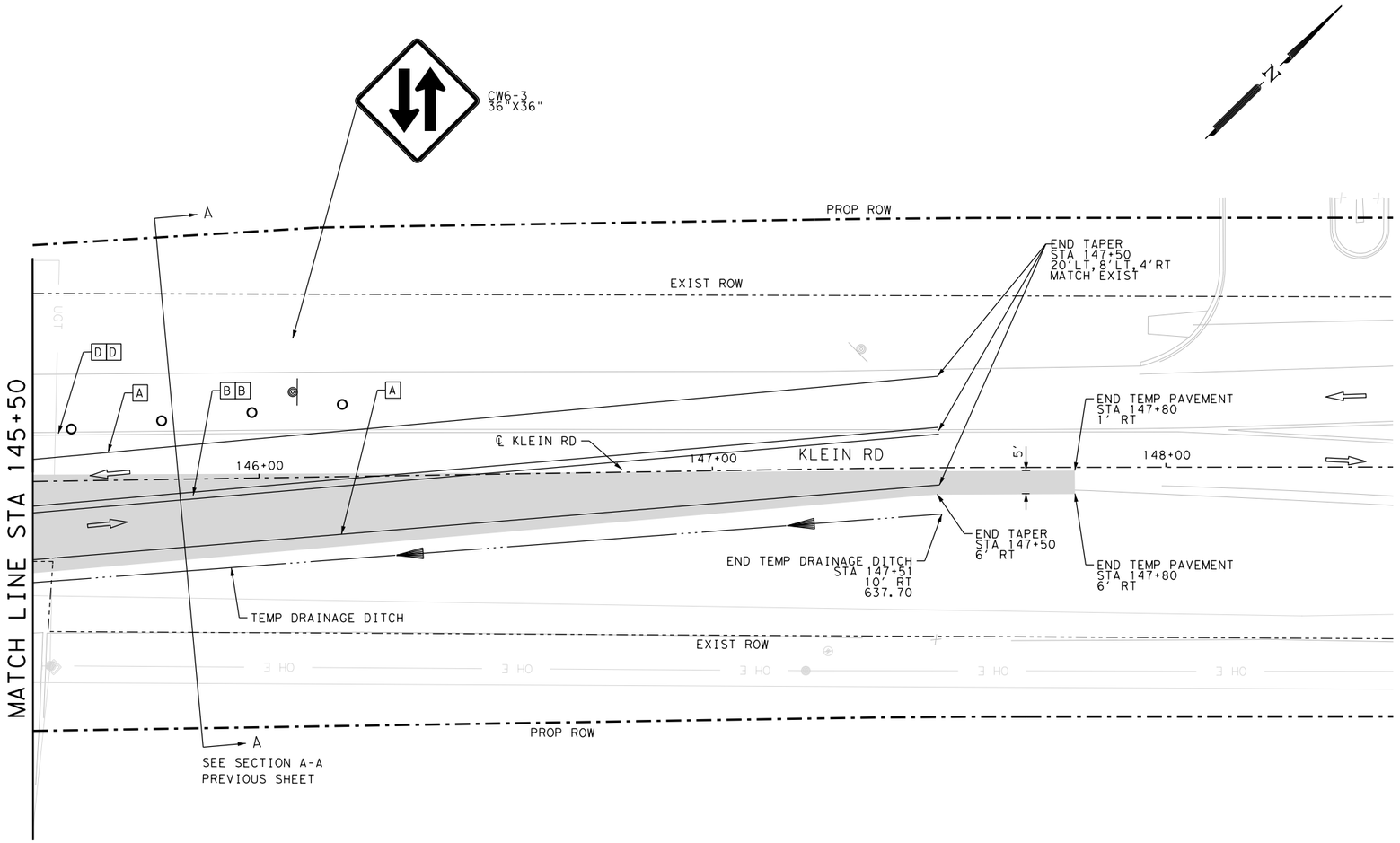
SHEET 2 OF 3

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	51

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp1A02.dgn

ITEM	DESCRIPTION	UNIT	QTY
0508-6001	CONSTRUCTING DETOURS	SY	314
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	400
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	400
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	438



LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

NOTES:

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6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 1 STEP 2

SHEET 3 OF 3

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	52

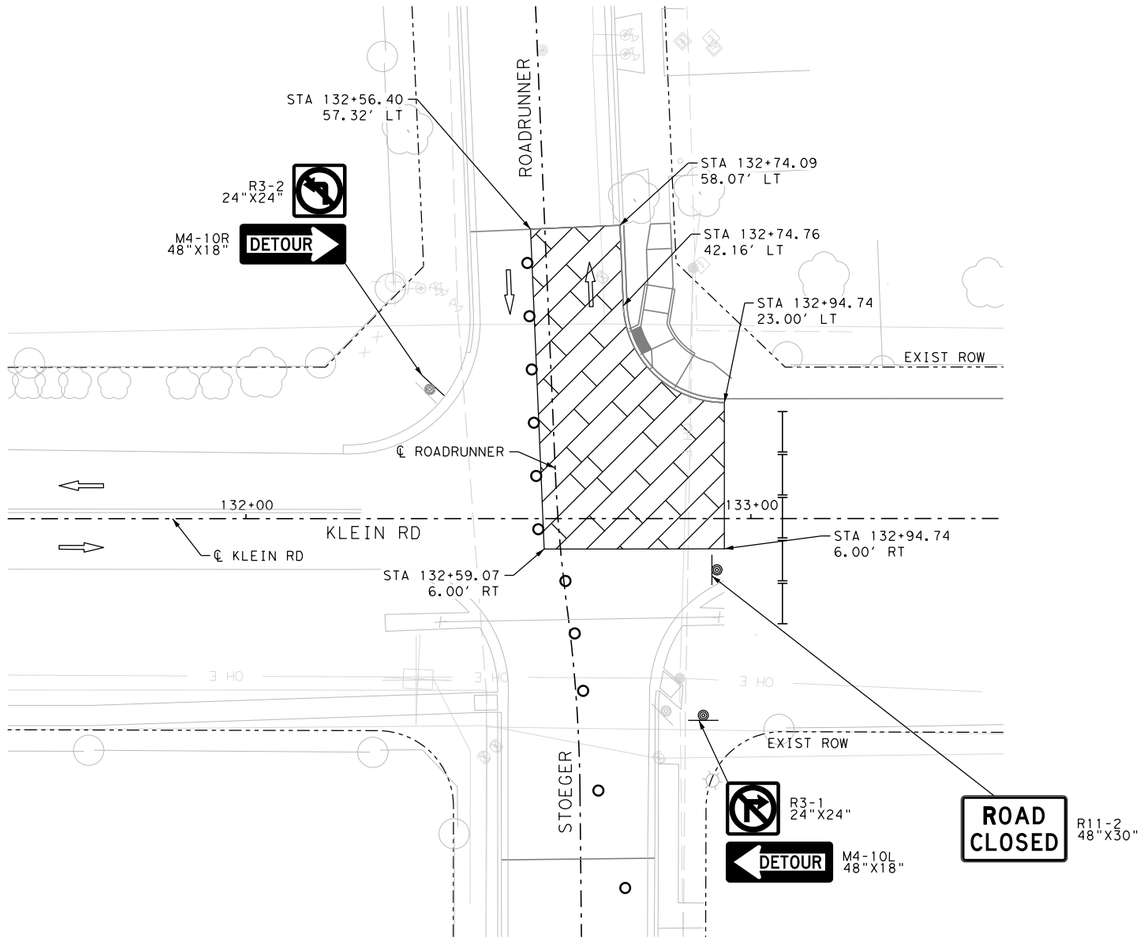
Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp1A03.dgn

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\PhaseI\5103003tcp1B01.dgn

MAINTAINING DETOUR ESTABLISHED IN PHASE 1 STEP 1, CONSTRUCT THE NORTH SIDE OF THE KLEIN ROAD AND ROADRUNNER INTERSECTION DURING OFF-PEAK DAYTIME OR NIGHT HOURS ONLY. ONE-LANE TWO-WAY OPERATION MAY BE USED ON ROADRUNNER IF NECESSARY BUT SHALL NOT EXCEED 2 WEEKS. REMOVE EXISTING PAVEMENT TO PROPOSED SUBGRADE, PROOF ROLL, AND PLACE BASE HMAC LAYER IN THE SAME DAY. EDGE CONDITIONS SHALL BE TAPERED PER EDGE CONDITION I (SEE WORKSHEET FOR EDGE CONDITION TREATMENT TYPES) AT THE END OF EACH WORK DAY.



N

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LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
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C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 1 STEP 3

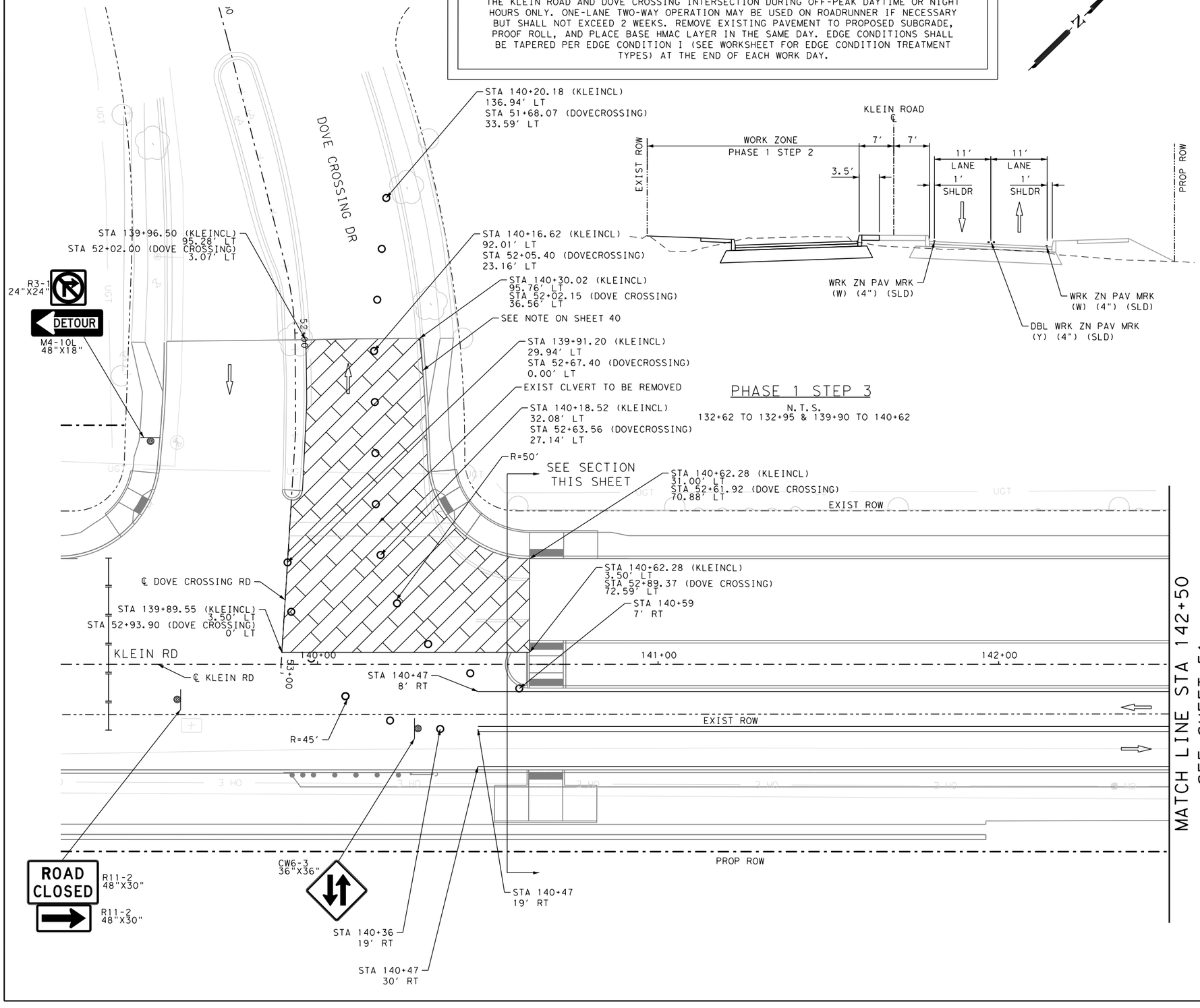
SHEET 1 OF 2

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	53

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp1B02.dgn

MAINTAINING DETOUR ESTABLISHED IN PHASE 1 STEP 1, CONSTRUCT THE NORTH SIDE OF THE KLEIN ROAD AND DOVE CROSSING INTERSECTION DURING OFF-PEAK DAYTIME OR NIGHT HOURS ONLY. ONE-LANE TWO-WAY OPERATION MAY BE USED ON ROADRUNNER IF NECESSARY BUT SHALL NOT EXCEED 2 WEEKS. REMOVE EXISTING PAVEMENT TO PROPOSED SUBGRADE, PROOF ROLL, AND PLACE BASE HMAC LAYER IN THE SAME DAY. EDGE CONDITIONS SHALL BE TAPERED PER EDGE CONDITION I (SEE WORKSHEET FOR EDGE CONDITION TREATMENT TYPES) AT THE END OF EACH WORK DAY.



PHASE 1 STEP 3

N.T.S.

132+62 TO 132+95 & 139+90 TO 140+62

NOTES:

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LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

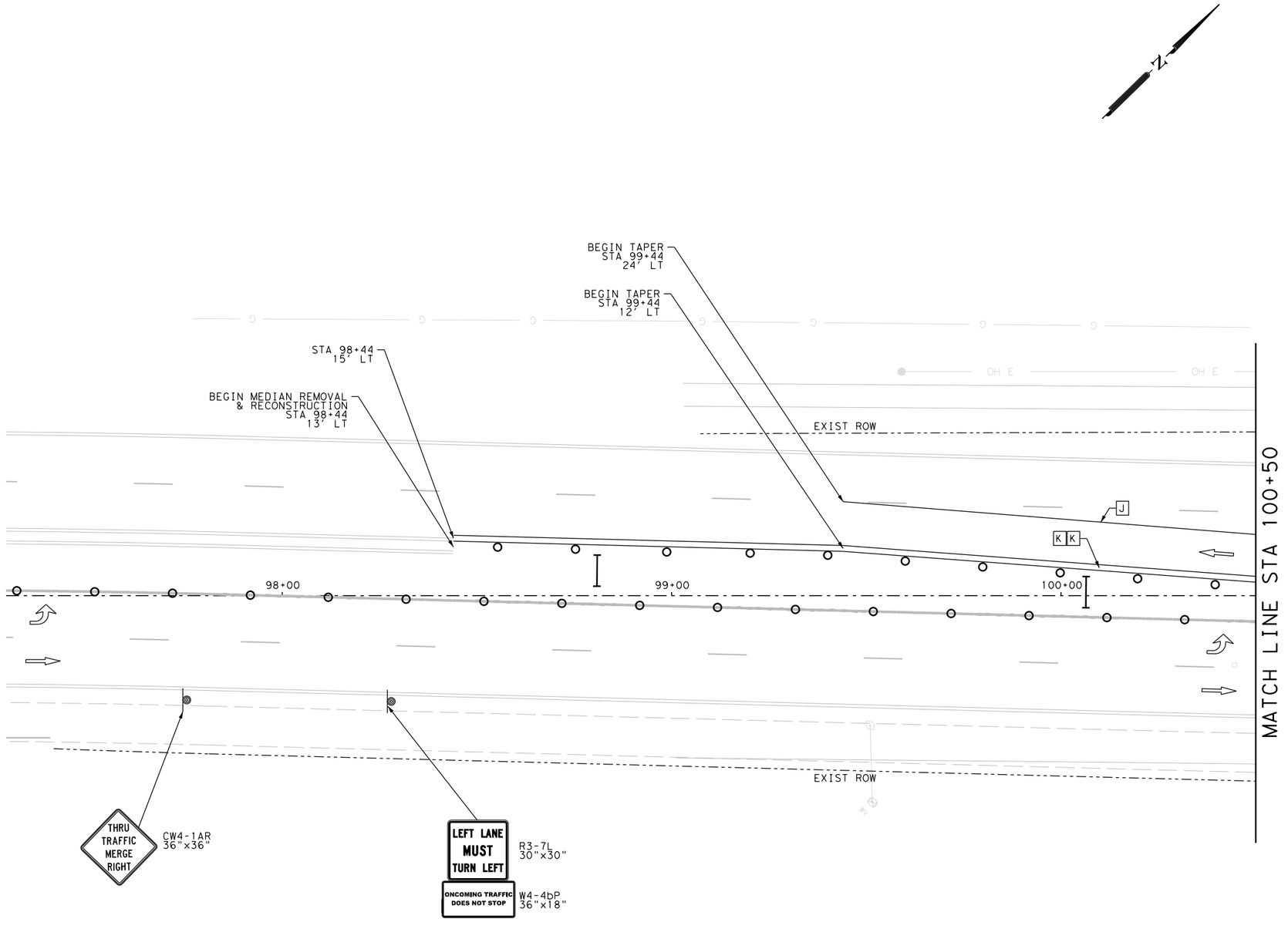
TRAFFIC CONTROL PLAN PHASE 1 STEP 3

SHEET 2 OF 2

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	54

Plotted on: 1/21/2021

ITEM	DESCRIPTION	UNIT	QTY
0662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	106
0662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	206



LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

NOTES:

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6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 1

SHEET 1 OF 19

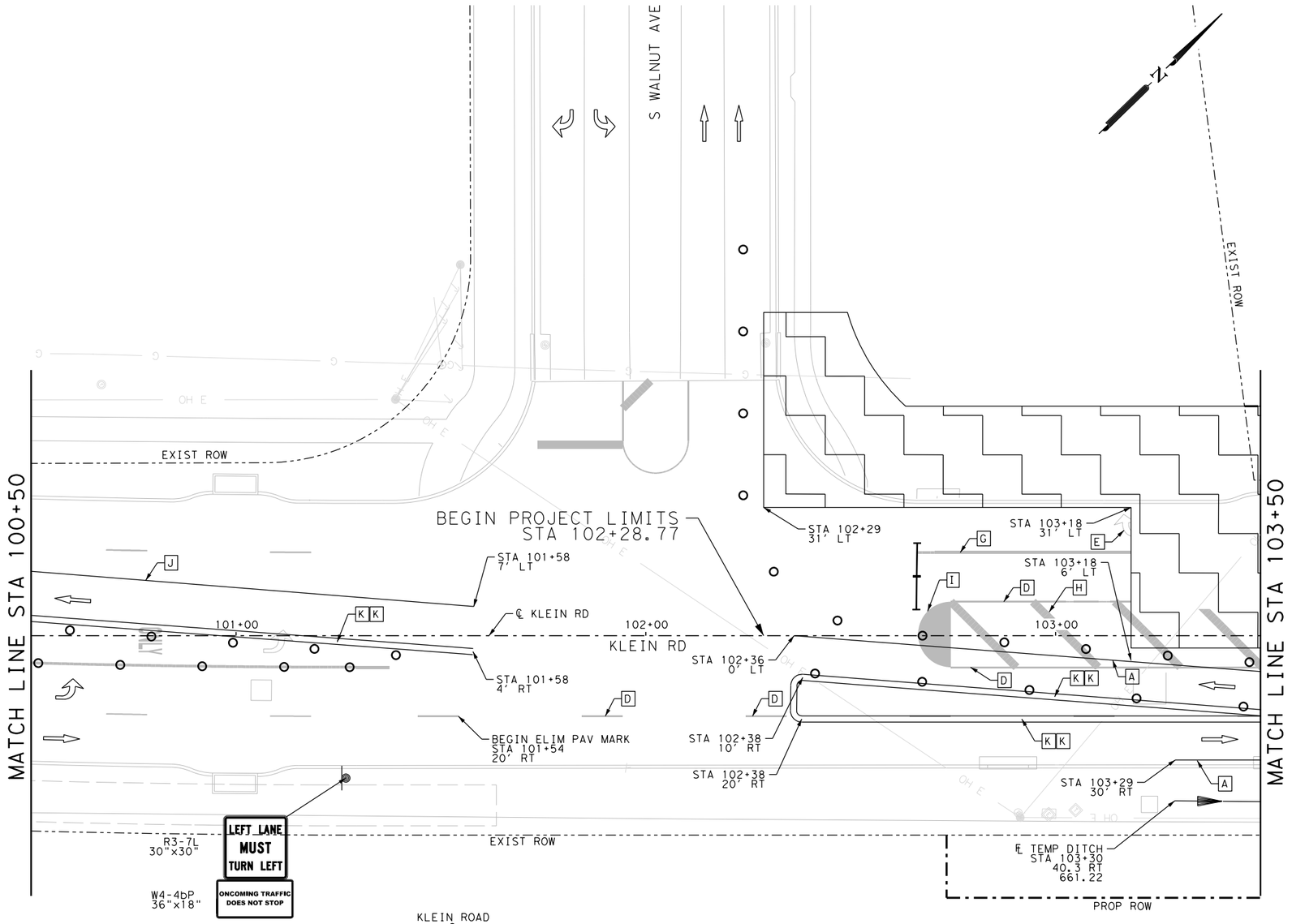
DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	55

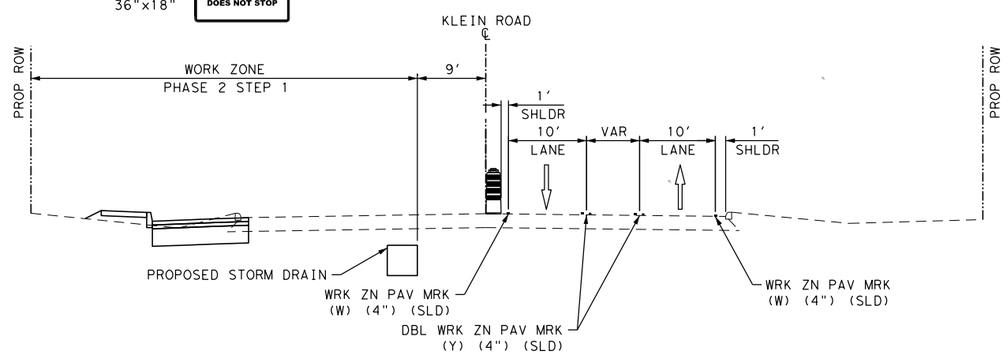
Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp201.dgn

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp202.dgn

ITEM	DESCRIPTION	UNIT	QTY
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	130
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	466
0662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	105
0662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	105
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	165
0677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	52
0677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	92
0677-6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA	1
0677-6020	ELIM EXT PAV MRK & MRKS (MED NOSE)	EA	1





PHASE 2 STEP 1

N.T.S.

102+30 TO 103+70

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
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M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

NOTES:

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PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 1

SHEET 2 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	56

NOTES:

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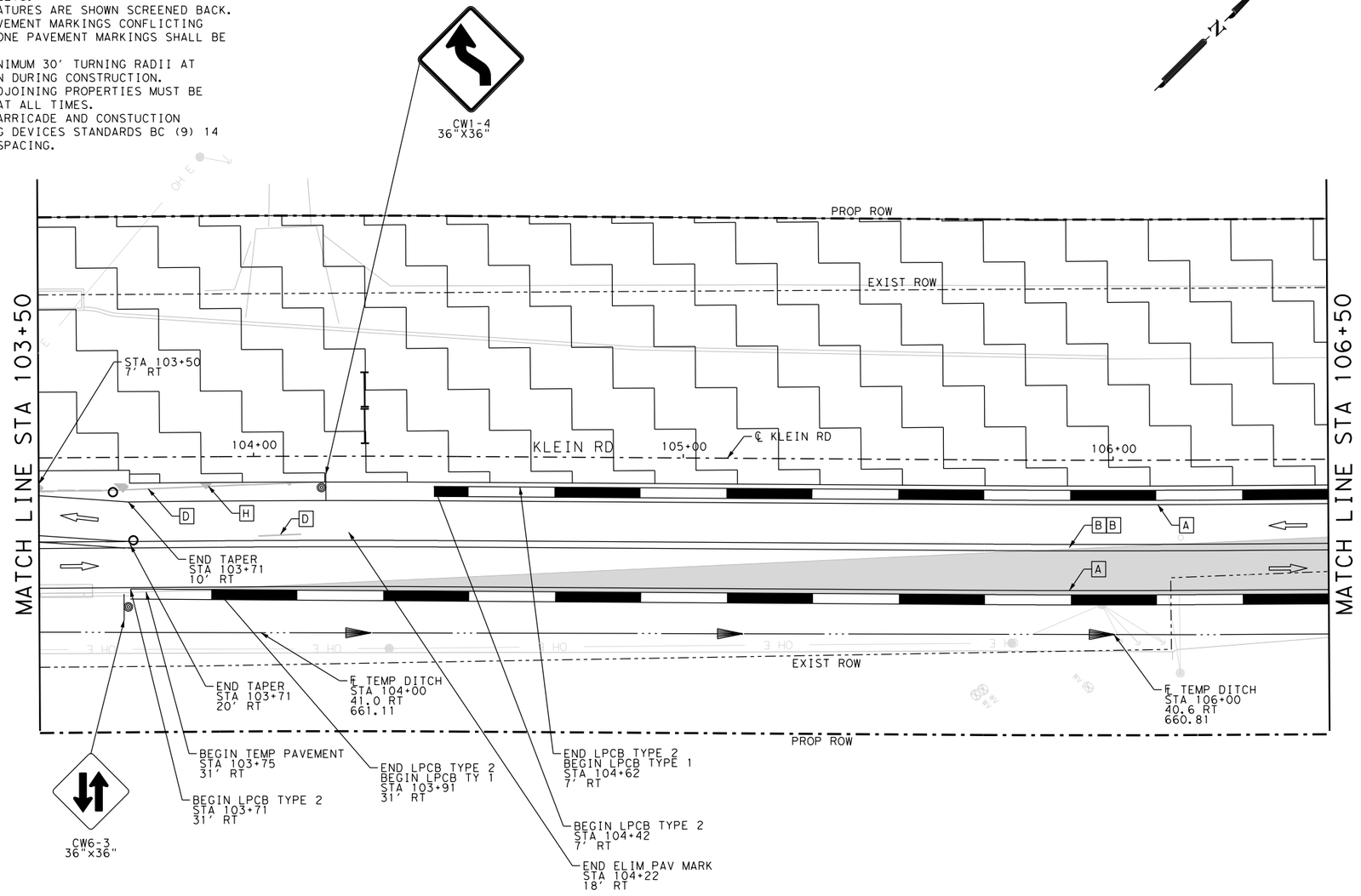
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

ITEM	DESCRIPTION	UNIT	QTY
0508-6001	CONSTRUCTING DETOURS	SY	203
0512-6009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	87
0512-6033	PORT CTB (MOVE)(LOW PROF)(TY 1)	LF	360
0512-6034	PORT CTB (MOVE)(LOW PROF)(TY 2)	LF	40
0512-6057	PORT CTB (REMOVE)(LOW PROF)(TY 1)	LF	447
0512-6058	PORT CTB (REMOVE)(LOW PROF)(TY 2)	LF	40
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	600
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	644
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	90
0677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	5



LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

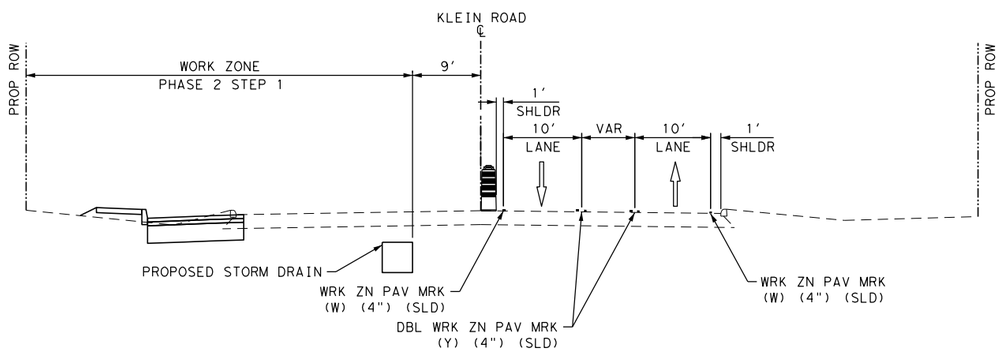
APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

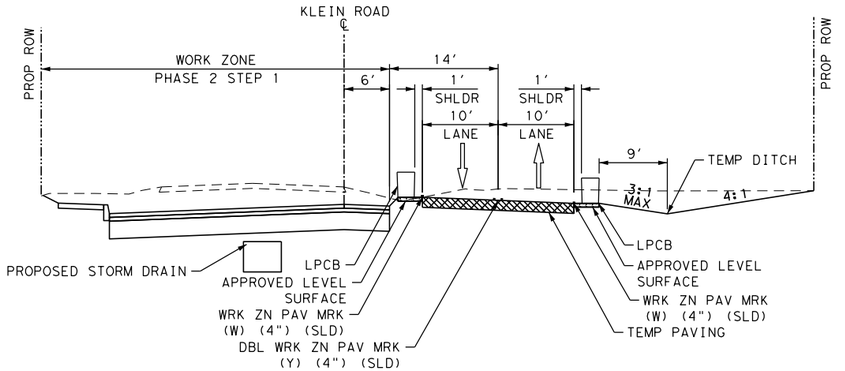
0 10 20 30 60

SCALE: PLAN 1"= 30'



PHASE 2 STEP 1

N.T.S.
102+30 TO 103+70



PHASE 2 STEP 1

N.T.S.
103+70 TO 119+32

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

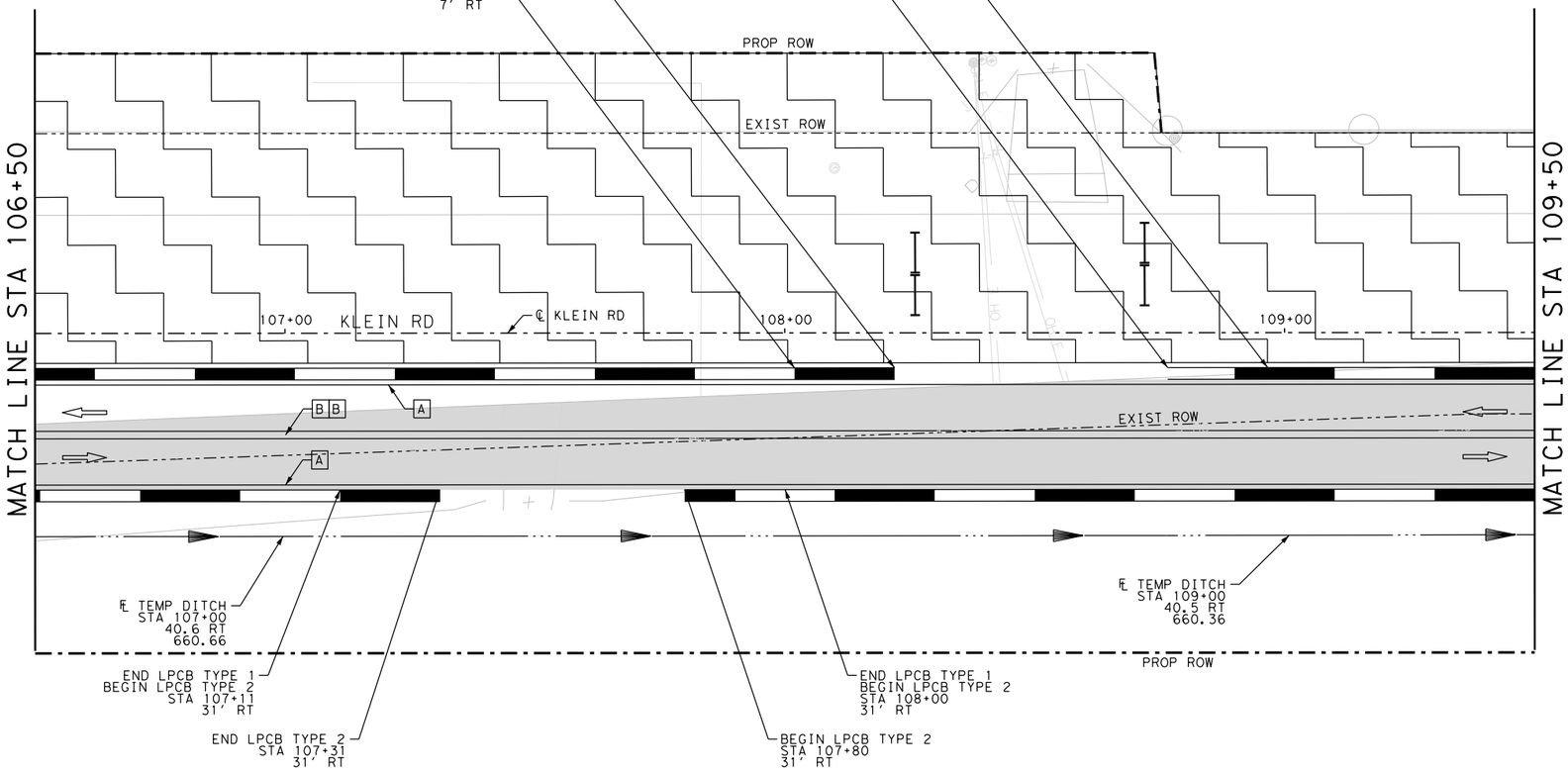
KLEIN RD PHASE 2

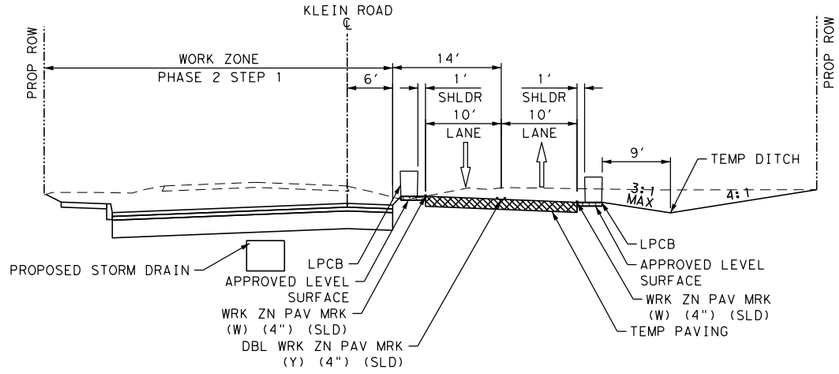
TRAFFIC CONTROL PLAN PHASE 2 STEP 1

SHEET 3 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	57

ITEM	DESCRIPTION	UNIT	QTY
0508-6001	CONSTRUCTING DETOURS	SY	629
0512-6009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	415
0512-6034	PORT CTB (MOVE)(LOW PROF)(TY 2)	LF	80
0512-6057	PORT CTB (REMOVE)(LOW PROF)(TY 1)	LF	415
0512-6058	PORT CTB (REMOVE)(LOW PROF)(TY 2)	LF	80
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	600
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	600





PHASE 2 STEP 1

N.T.S.
103+70 TO 119+32

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED
PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 1

SHEET 4 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	58

Plotted on: 1/21/2021

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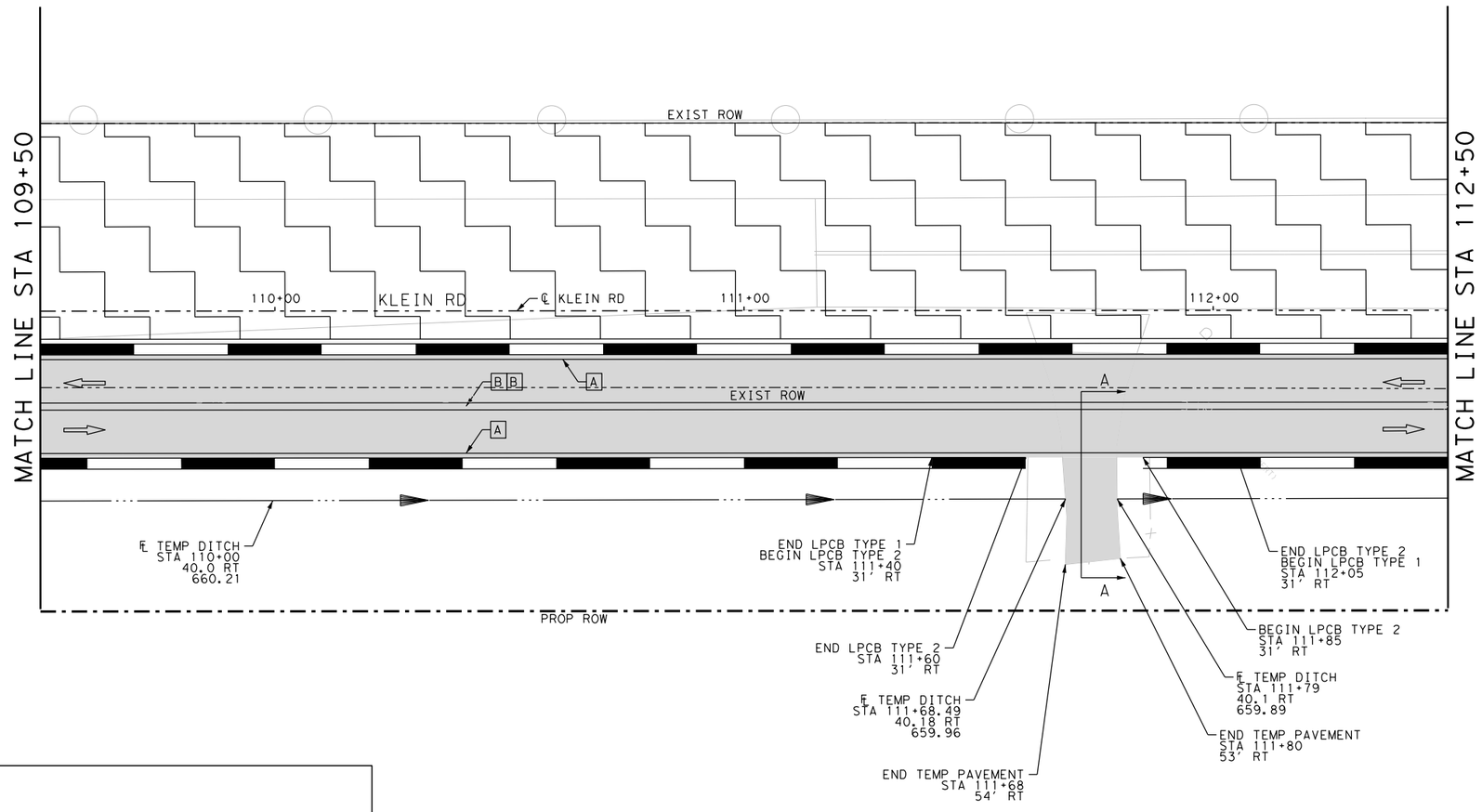
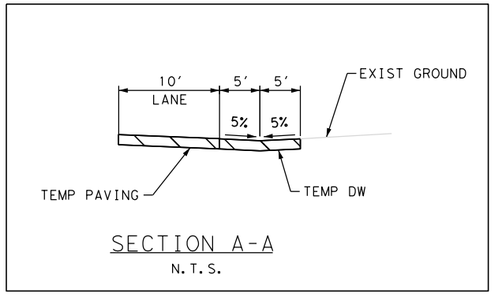
Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\PhaseII\5103003tcp205.dgn

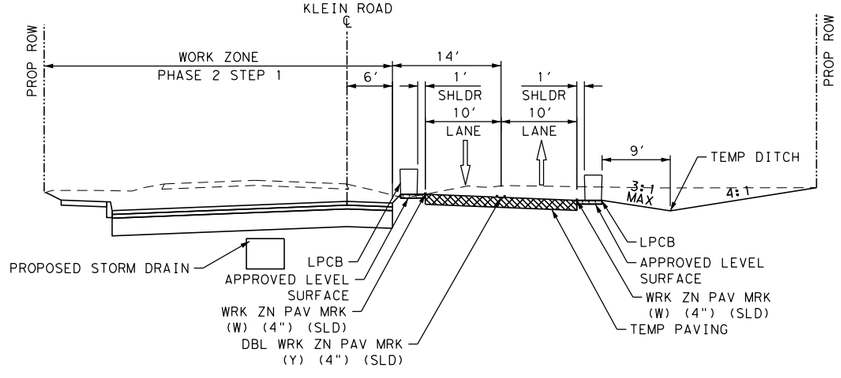
ITEM	DESCRIPTION	UNIT	QTY
0508-6001	CONSTRUCTING DETOURS	SY	762
0512-6009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	535
0512-6010	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	LF	20
0512-6034	PORT CTB (MOVE)(LOW PROF)(TY 2)	LF	20
0512-6057	PORT CTB (REMOVE)(LOW PROF)(TY 1)	LF	535
0512-6058	PORT CTB (REMOVE)(LOW PROF)(TY 2)	LF	40
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	600
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	600





SECTION A-A

N.T.S.



PHASE 2 STEP 1

N.T.S.
103+70 TO 119+32

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

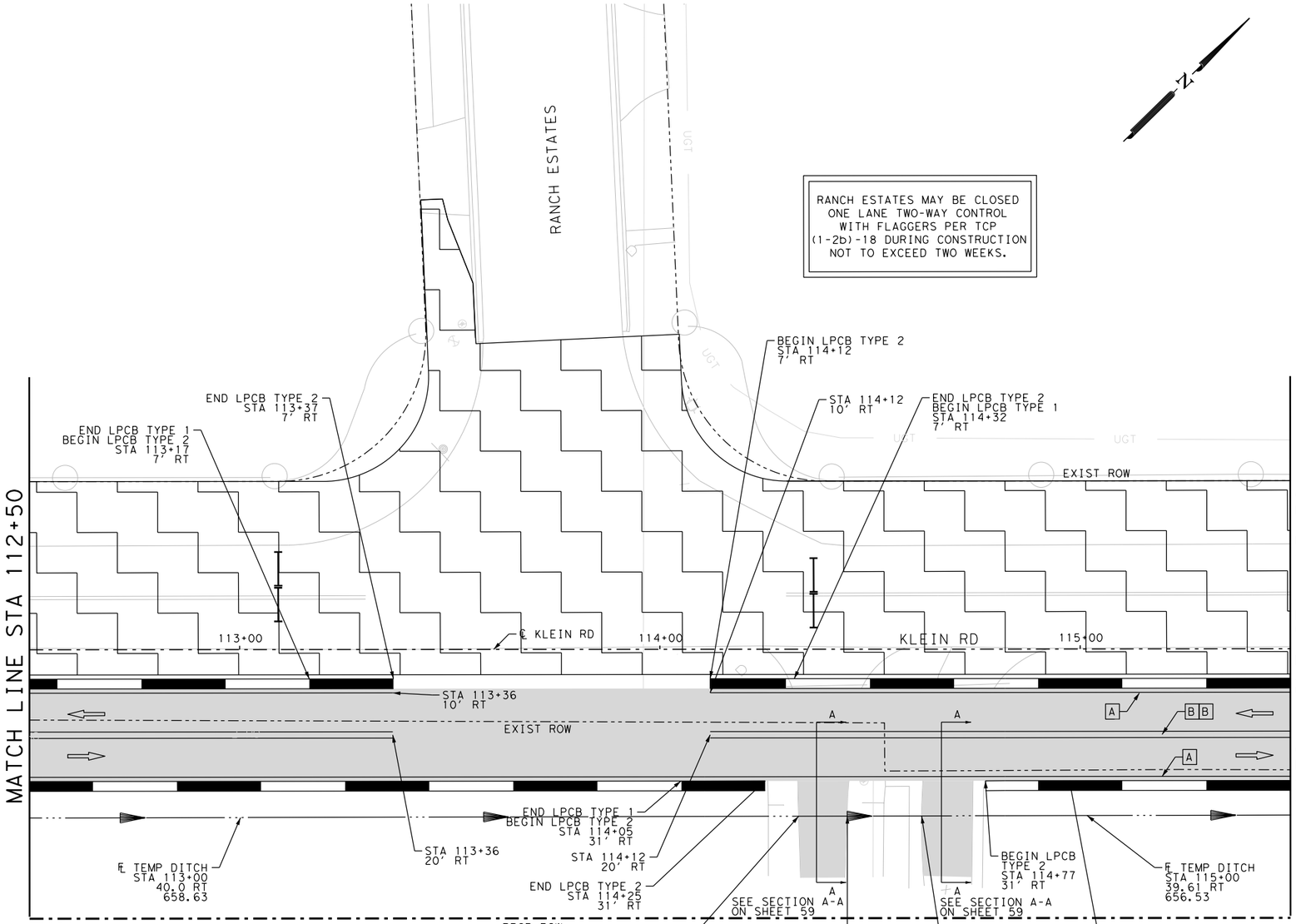
KLEIN RD PHASE 2

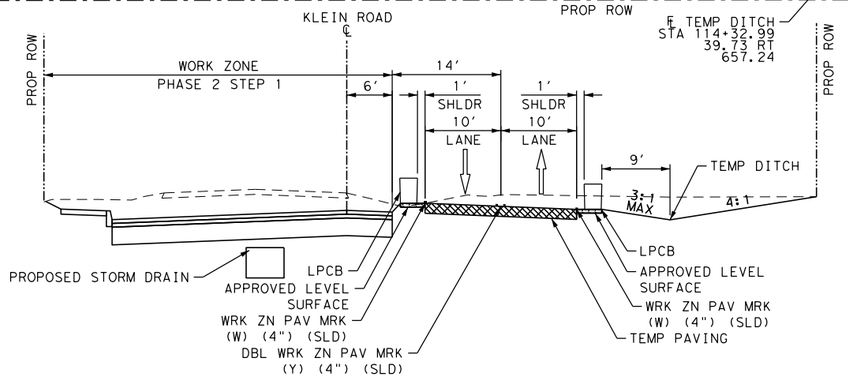
TRAFFIC CONTROL PLAN PHASE 2 STEP 1

SHEET 5 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	59

ITEM	DESCRIPTION	UNIT	QTY
0508-6001	CONSTRUCTING DETOURS	SY	793
0512-6009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	393
0512-6010	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	LF	80
0512-6057	PORT CTB (REMOVE)(LOW PROF)(TY 1)	LF	393
0512-6058	PORT CTB (REMOVE)(LOW PROF)(TY 2)	LF	80
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	524
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	448





PHASE 2 STEP 1

N.T.S.

103+70 TO 119+32

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 1

SHEET 6 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	60

Plotted on: 1/21/2021

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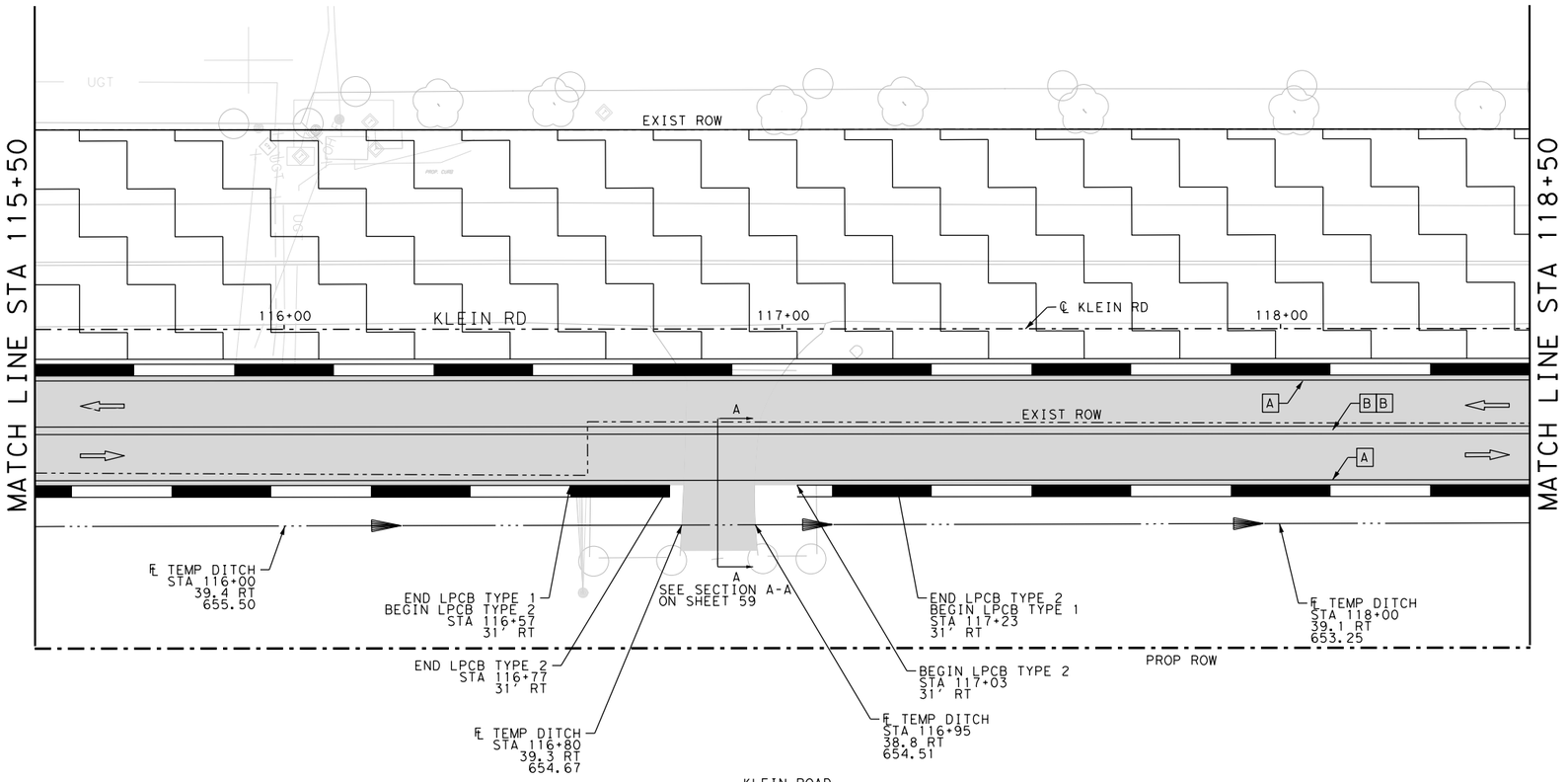
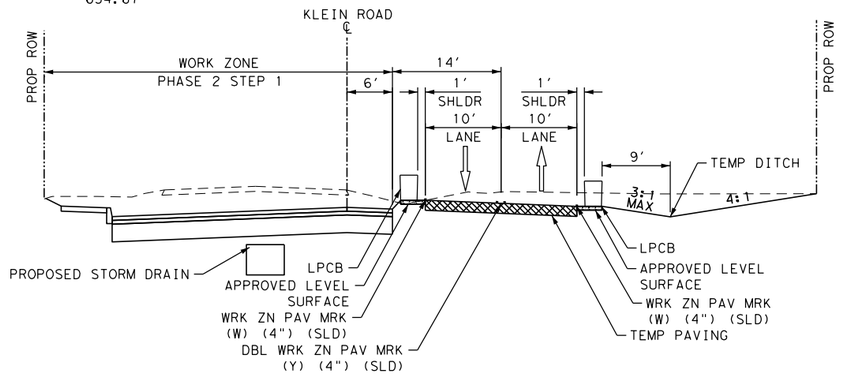
Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\PhaseII\5103003tcp207.dgn

ITEM	DESCRIPTION	UNIT	QTY
0508-6001	CONSTRUCTING DETOURS	SY	756
0512-6009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	534
0512-6010	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	LF	40
0512-6057	PORT CTB (REMOVE)(LOW PROF)(TY 1)	LF	534
0512-6058	PORT CTB (REMOVE)(LOW PROF)(TY 2)	LF	40
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	600
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	600





PHASE 2 STEP 1

N.T.S.
103+70 TO 119+32

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
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5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 1

SHEET 7 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	61

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp208.dgn

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
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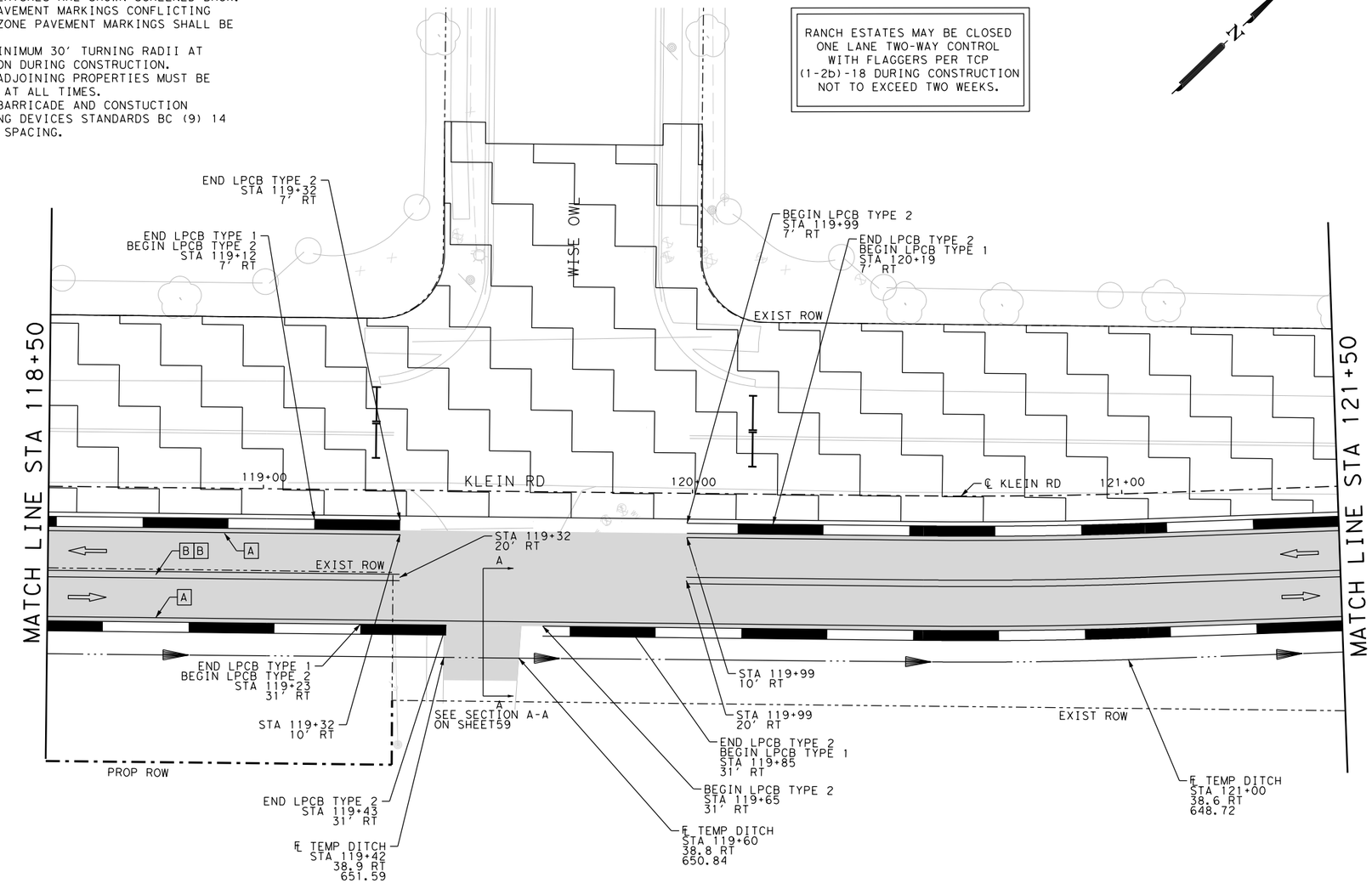
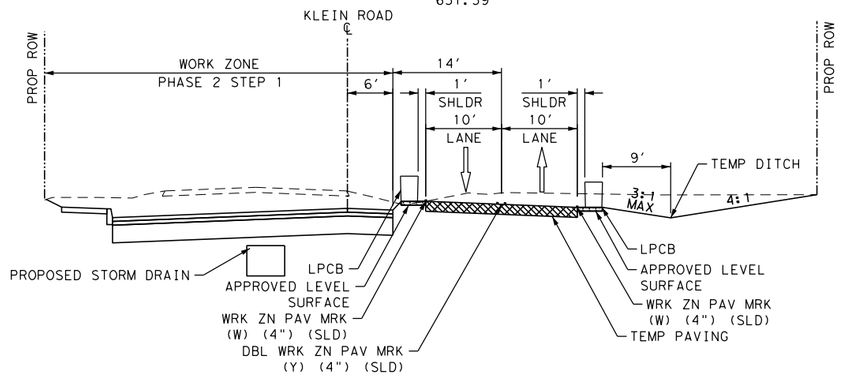
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

RANCH ESTATES MAY BE CLOSED
ONE LANE TWO-WAY CONTROL
WITH FLAGGERS PER TCP
(1-2b)-18 DURING CONSTRUCTION
NOT TO EXCEED TWO WEEKS.

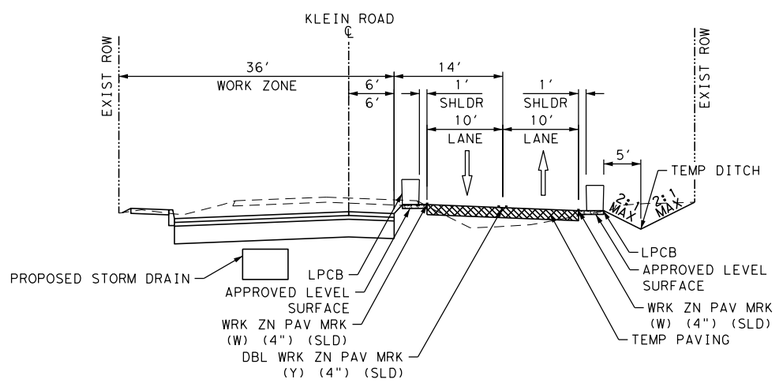




PHASE 2 STEP 1

N.T.S.

103+70 TO 119+32



PHASE 2 STEP 1

N.T.S.

119+32 TO 133+65

ITEM	DESCRIPTION	UNIT	QTY
0508-6001	CONSTRUCTING DETOURS	SY	736
0512-6009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	433
0512-6010	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	LF	80
0512-6057	PORT CTB (REMOVE)(LOW PROF)(TY 1)	LF	433
0512-6058	PORT CTB (REMOVE)(LOW PROF)(TY 2)	LF	80
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	536
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	470

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED
PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

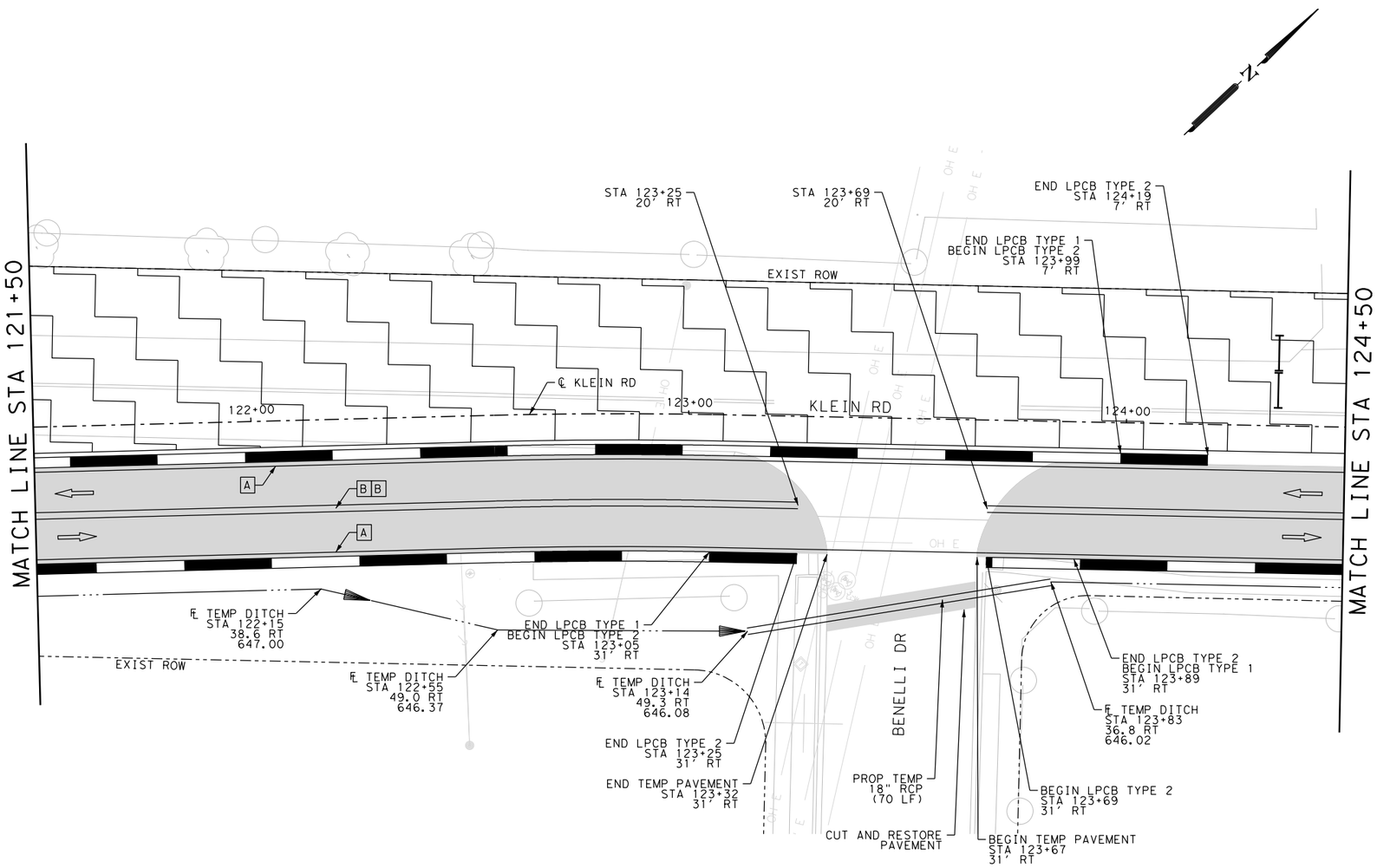
KLEIN RD PHASE 2

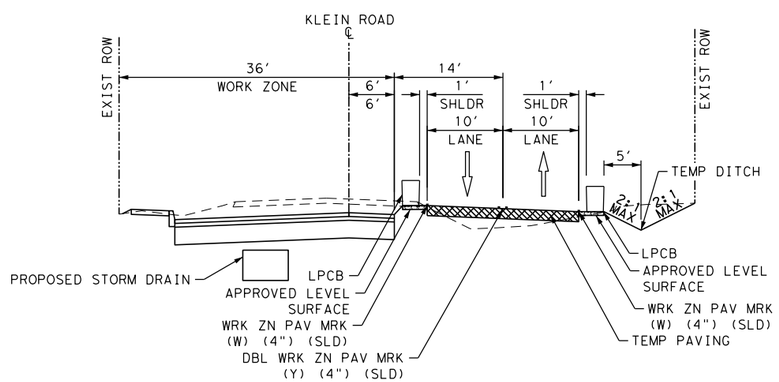
TRAFFIC CONTROL PLAN PHASE 2 STEP 1

SHEET 8 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	62

ITEM	DESCRIPTION	UNIT	QTY
0464-6025	RC PIPE (CL V)(18 IN)	LF	70
0496-6007	REMOV STR (PIPE)	LF	52
0508-6001	CONSTRUCTING DETOURS	SY	646
0512-6009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	464
0512-6010	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	LF	60
0512-6057	PORT CTB (REMOVE)(LOW PROF)(TY 1)	LF	464
0512-6058	PORT CTB (REMOVE)(LOW PROF)(TY 2)	LF	60
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	600
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	512





PHASE 2 STEP 1

N.T.S.

119+32 TO 133+65

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 1

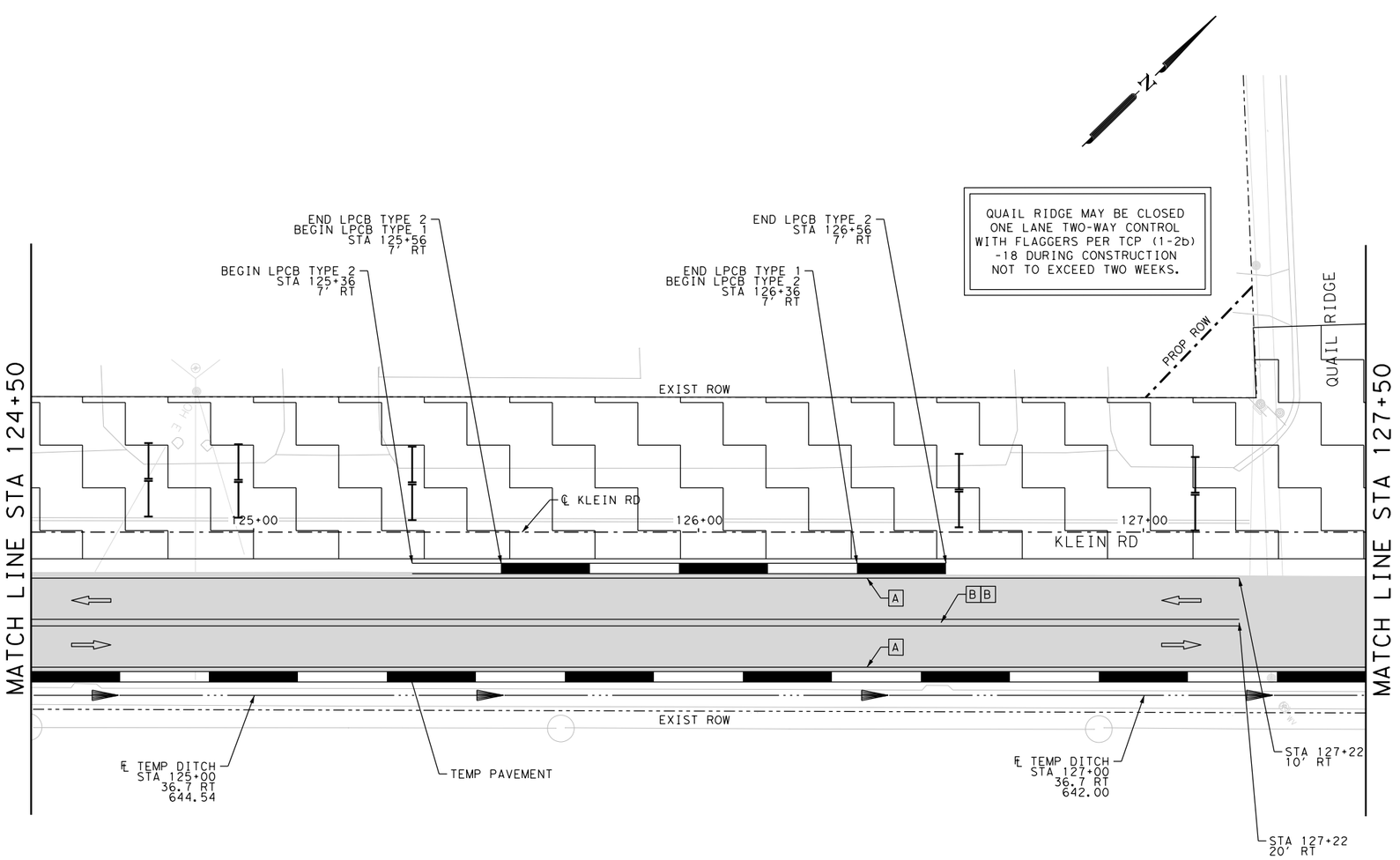
SHEET 9 OF 19

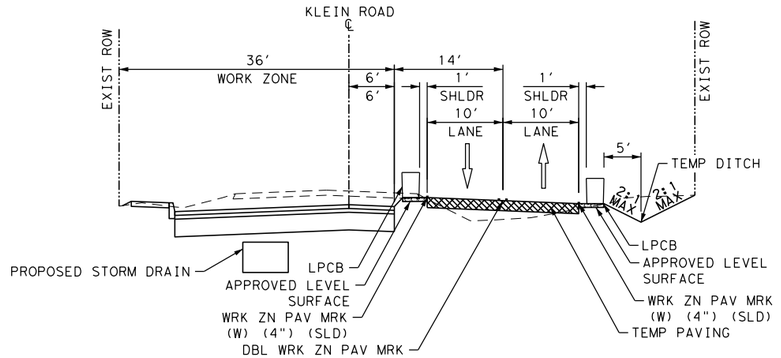
DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	63

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp209.dgn

ITEM	DESCRIPTION	UNIT	QTY
0508-6001	CONSTRUCTING DETOURS	SY	731
0512-6009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	380
0512-6010	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	LF	40
0512-6057	PORT CTB (REMOVE)(LOW PROF)(TY 1)	LF	380
0512-6058	PORT CTB (REMOVE)(LOW PROF)(TY 2)	LF	40
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	572
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	544





PHASE 2 STEP 1

N.T.S.
119+32 TO 133+65

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
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5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 1

SHEET 10 OF 19

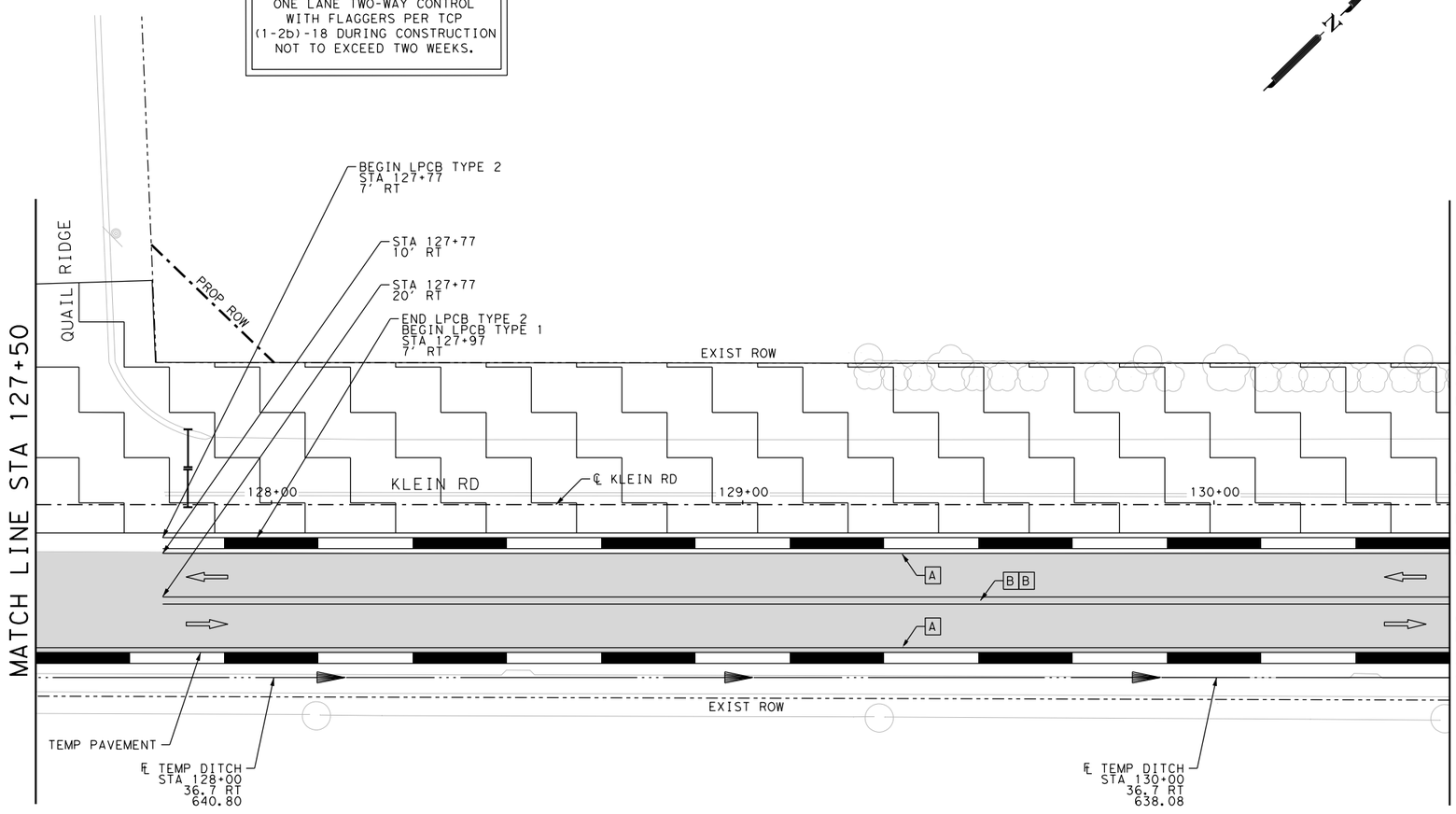
DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	64

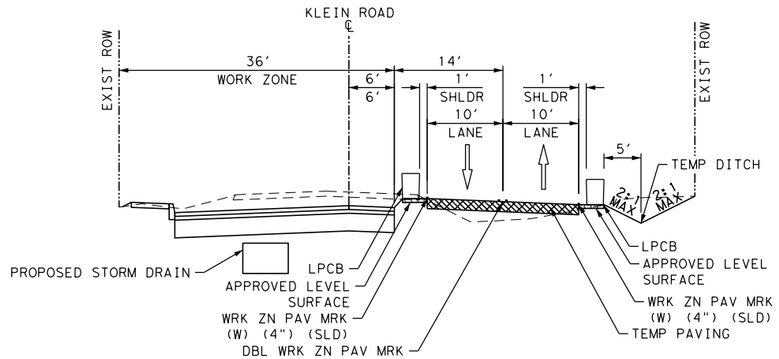
Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\PhaseII\5103003tcp210.dgn

ITEM	DESCRIPTION	UNIT	QTY
0508-6001	CONSTRUCTING DETOURS	SY	705
0512-6009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	553
0512-6010	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	LF	20
0512-6057	PORT CTB (REMOVE)(LOW PROF)(TY 1)	LF	553
0512-6058	PORT CTB (REMOVE)(LOW PROF)(TY 2)	LF	20
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	573
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	546

QUAIL RIDGE MAY BE CLOSED
ONE LANE TWO-WAY CONTROL
WITH FLAGGERS PER TCP
(1-2b)-18 DURING CONSTRUCTION
NOT TO EXCEED TWO WEEKS.





PHASE 2 STEP 1

N.T.S.
119+32 TO 133+65

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

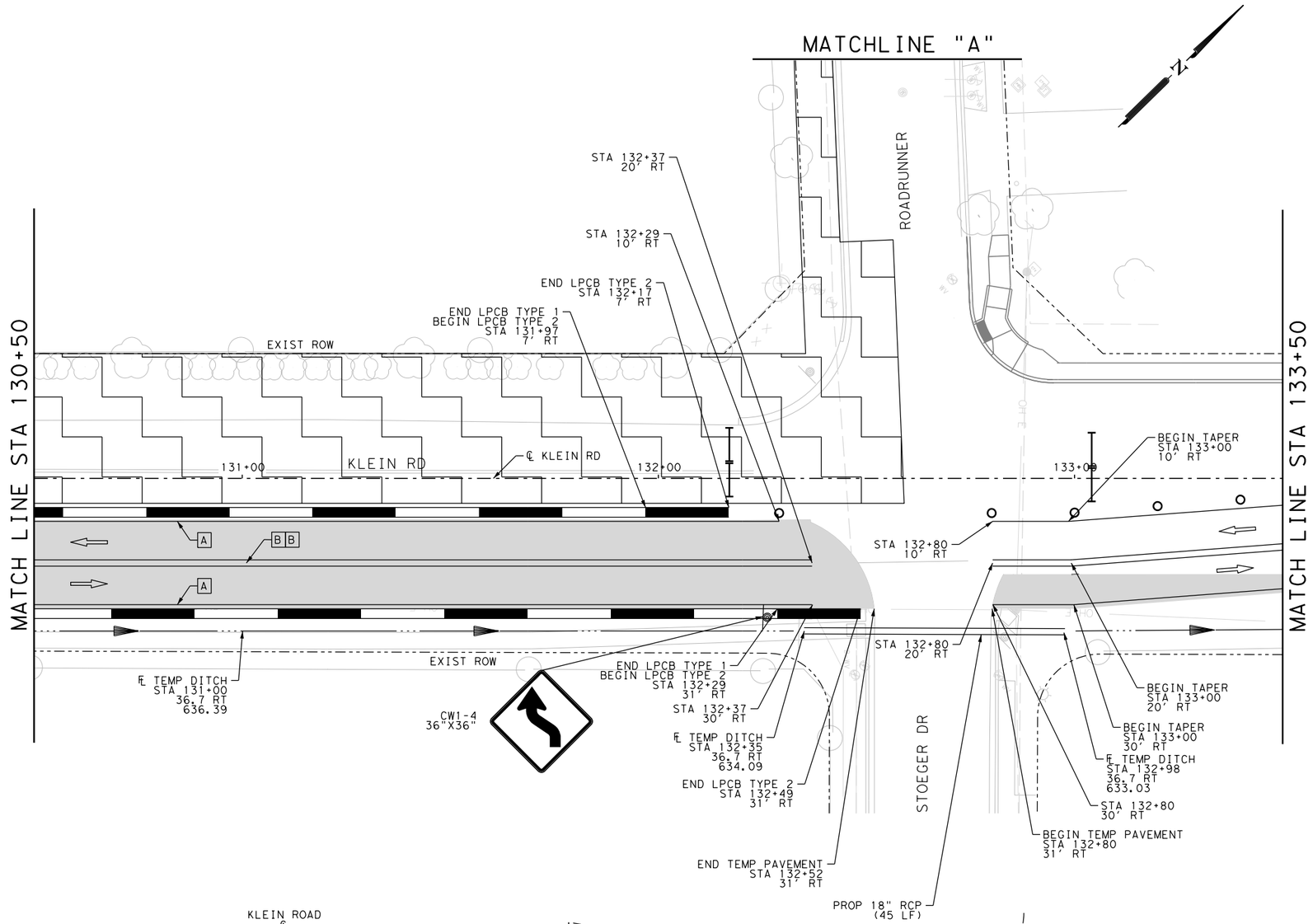
TRAFFIC CONTROL PLAN PHASE 2 STEP 1

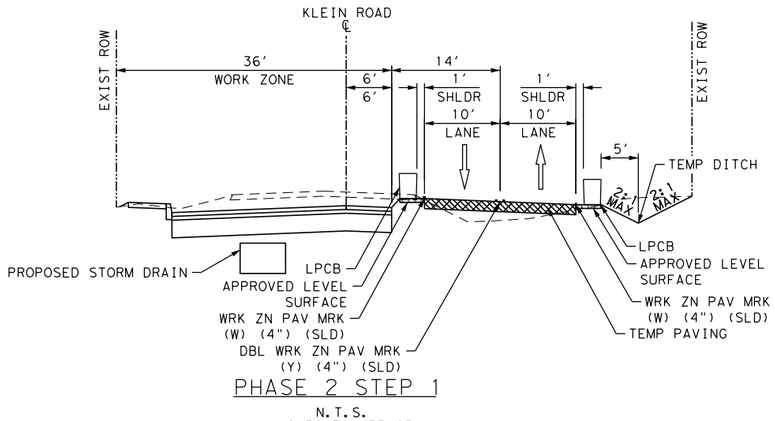
SHEET 11 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	65

Plotted on: 1/21/2021

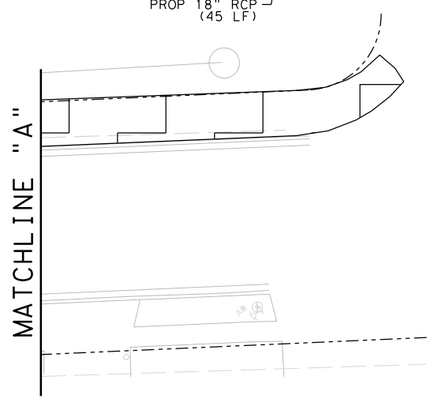
Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\PhaseII\5103003tcp211.dgn





PHASE 2 STEP 1

N.T.S.
119+32 TO 133+65



LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)	N	REMOV (Y)4"(DOT)

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
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6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/30/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/30/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

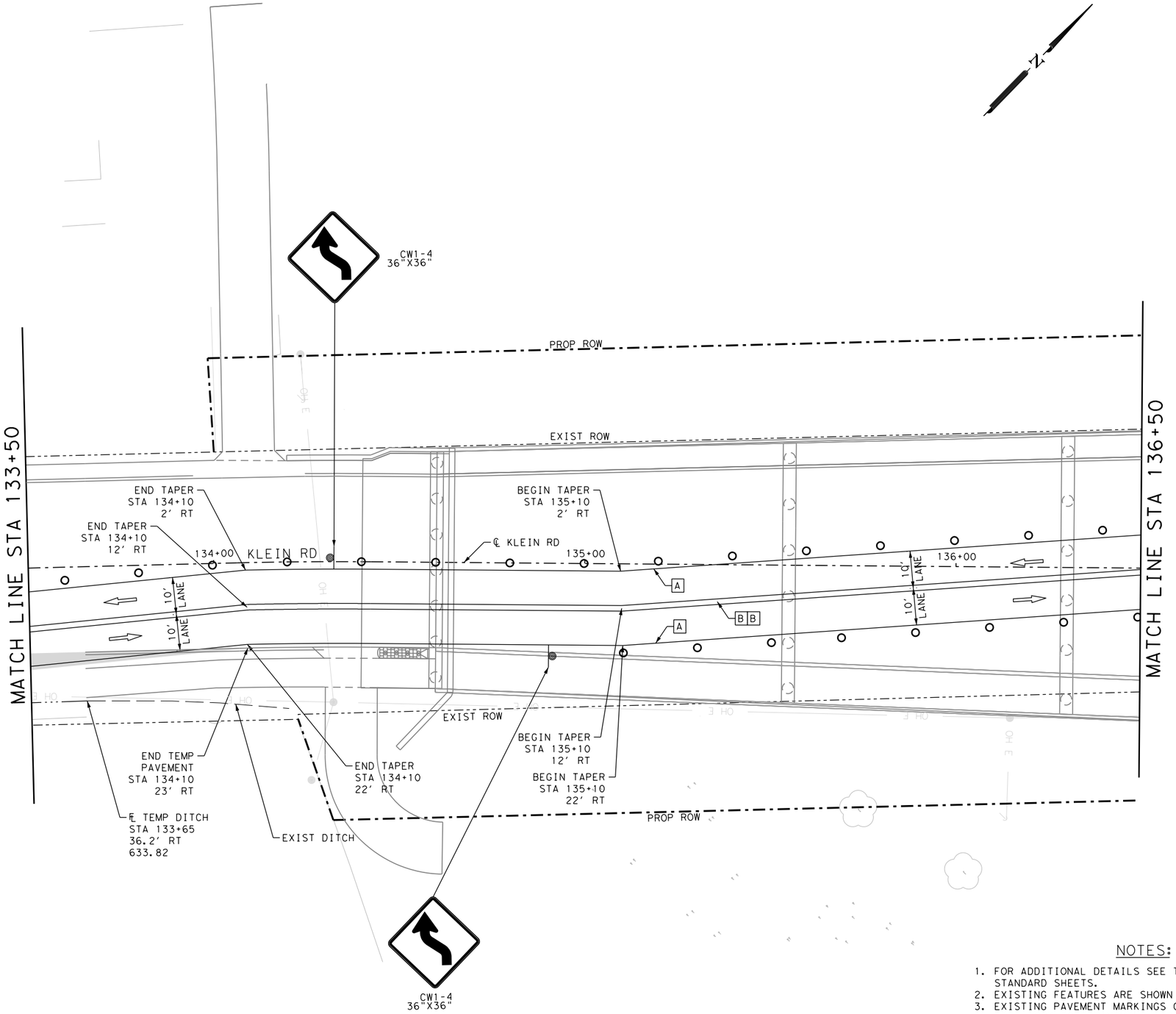
City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 1

SHEET 12 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	66



LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)	N	REMOV (Y)4"(DOT)

DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/30/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/30/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

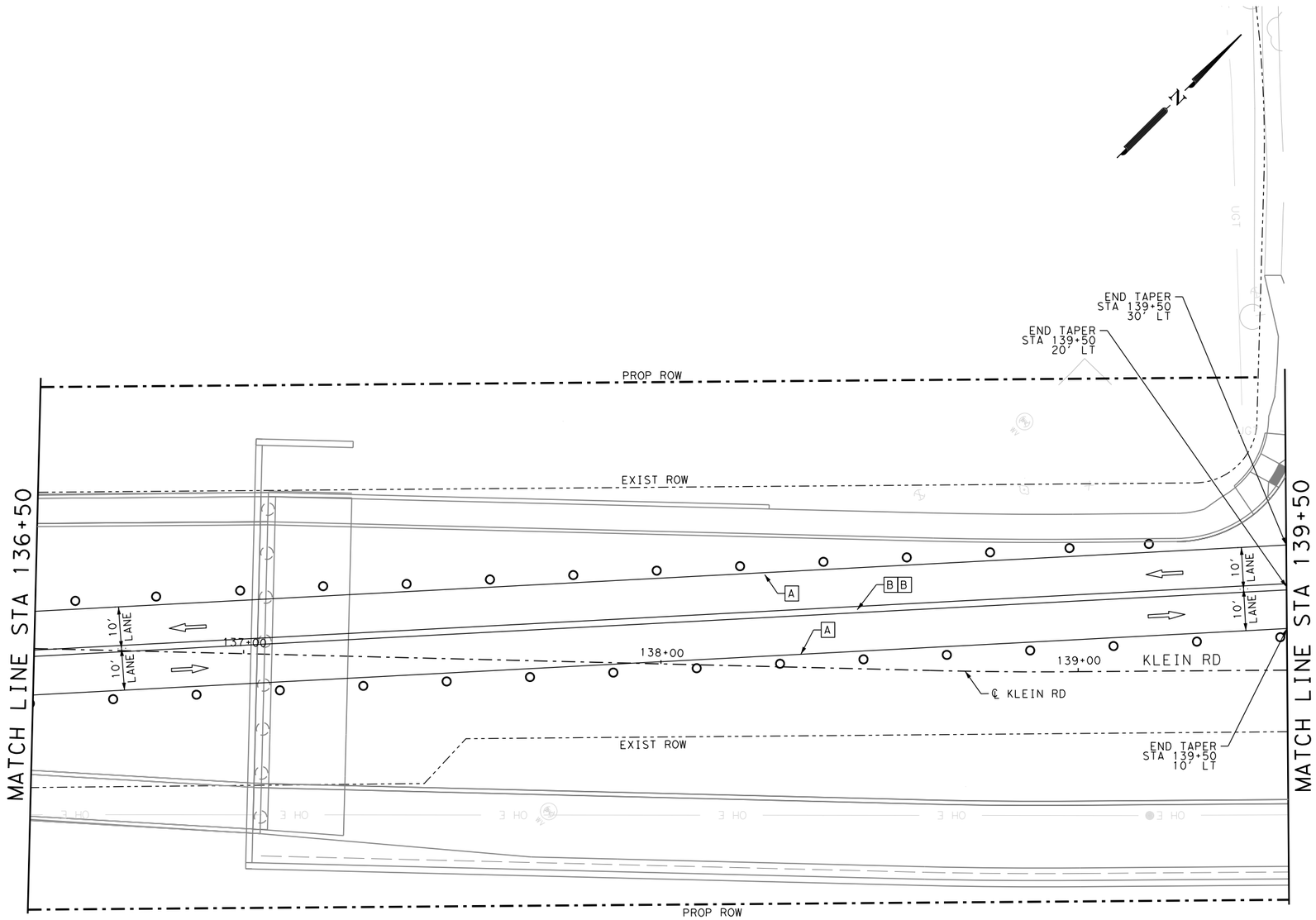
TRAFFIC CONTROL PLAN PHASE 2 STEP 1

SHEET 13 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	67

Plotted on: 4/30/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\PhaseII\5103003tcp213.dgn



LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)	N	REMOV (Y)4"(DOT)

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/30/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/30/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
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6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

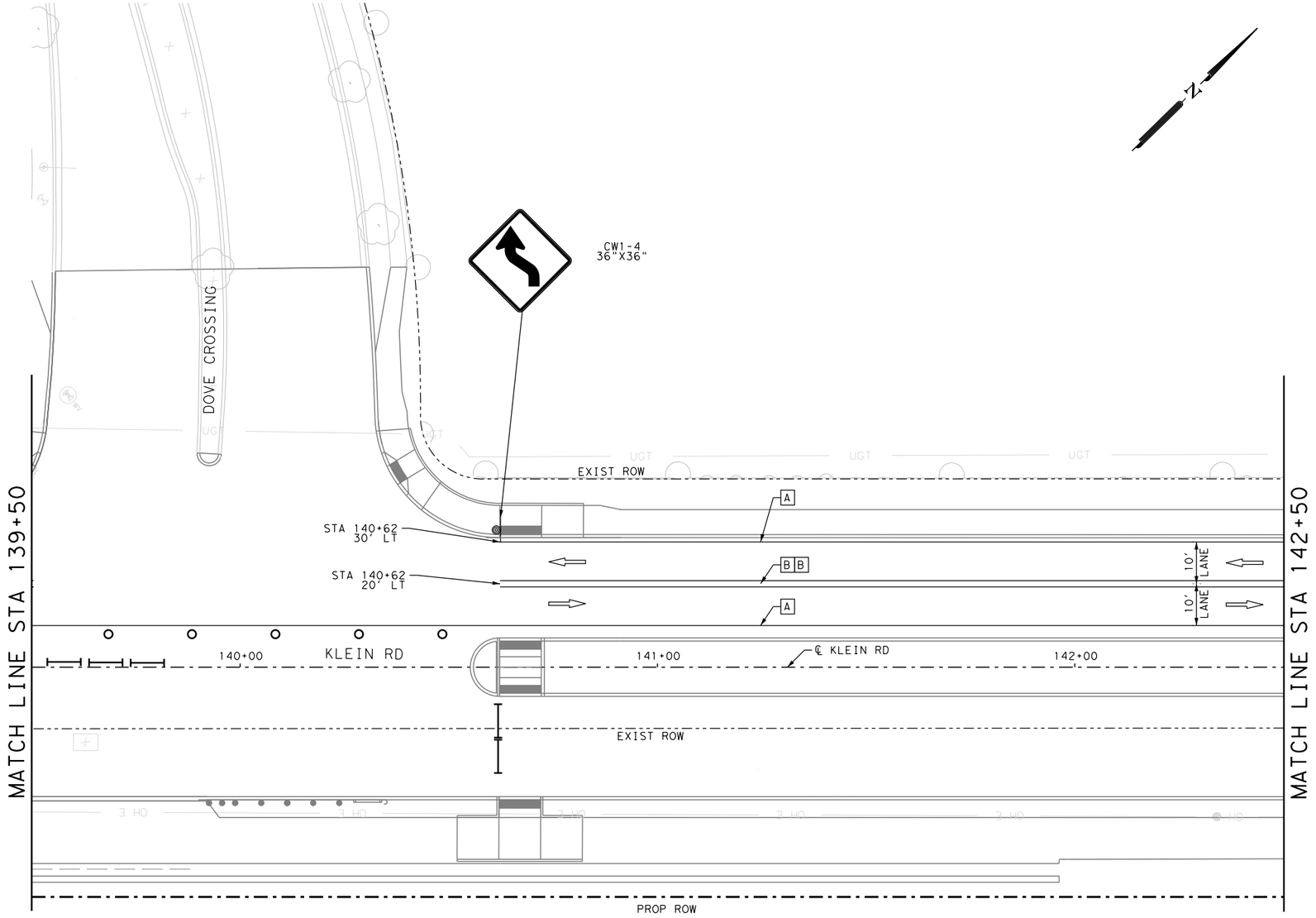
TRAFFIC CONTROL PLAN PHASE 2 STEP 1

SHEET 14 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	68

Plotted on: 4/30/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp214.dgn



LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)	N	REMOV (Y)4"(DOT)

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/30/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/30/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

NOTES:

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6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

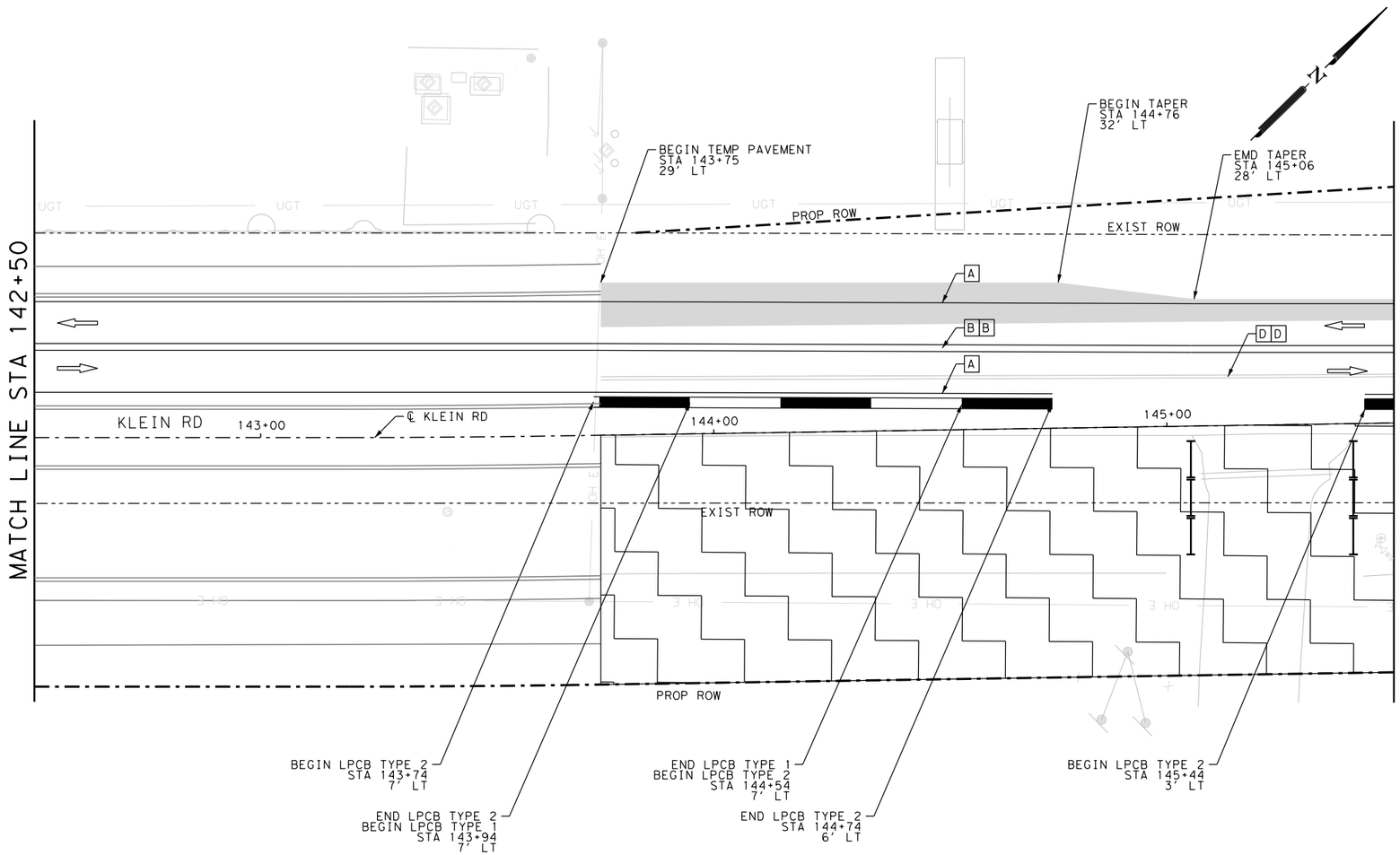
TRAFFIC CONTROL PLAN PHASE 2 STEP 1

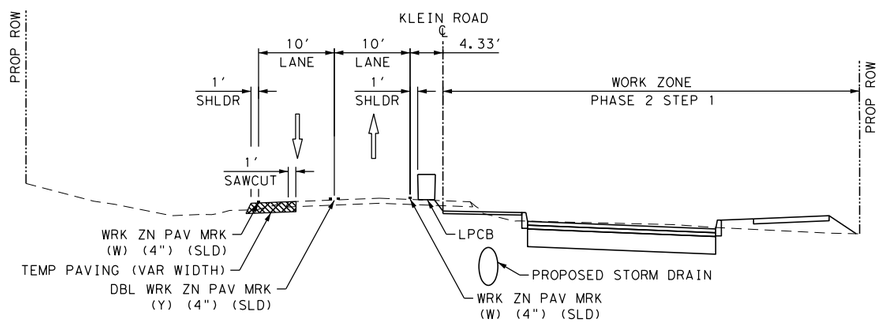
SHEET 15 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	69

Plotted on: 1/21/2021

ITEM	DESCRIPTION	UNIT	QTY
0508-6001	CONSTRUCTING DETOURS	SY	152
0512-6009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	60
0512-6010	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	LF	46
0512-6057	PORT CTB (REMOVE)(LOW PROF)(TY 1)	LF	60
0512-6058	PORT CTB (REMOVE)(LOW PROF)(TY 2)	LF	46
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	600
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	600
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	350





PHASE 2 STEP 1

N.T.S.

143+75 TO 146+00

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 1

SHEET 16 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	70

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp216.dgn

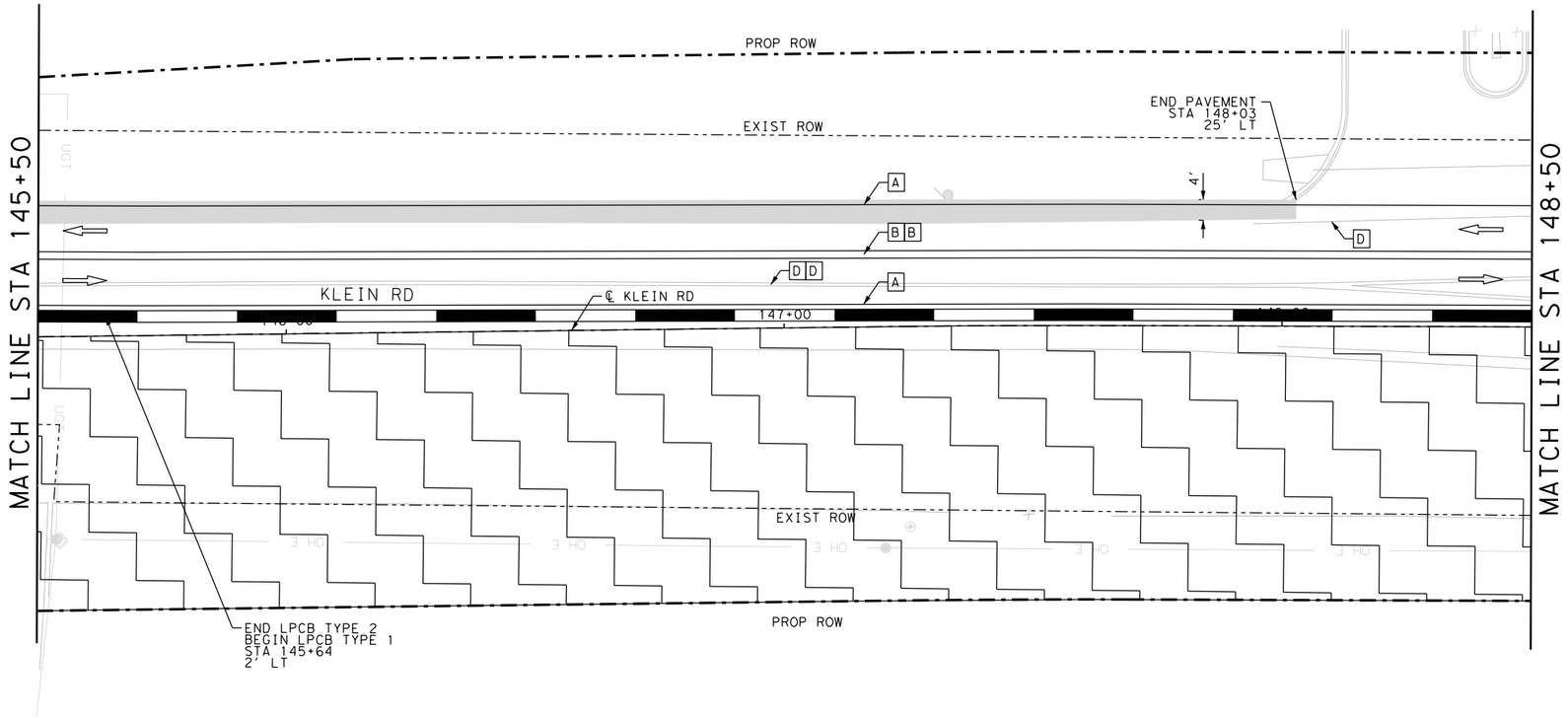
Plotted on: 1/21/2021

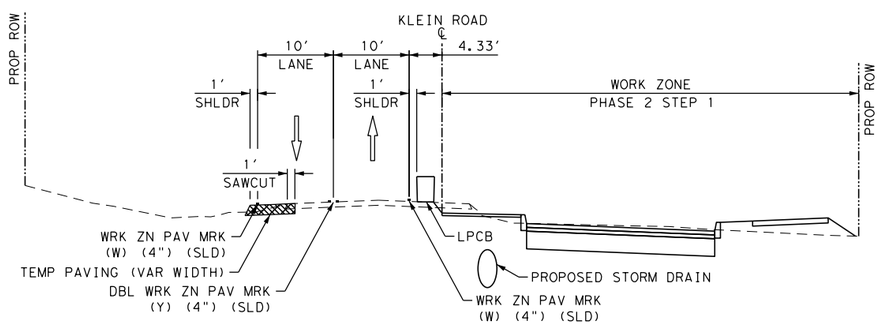
Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp217.dgn

NOTES:

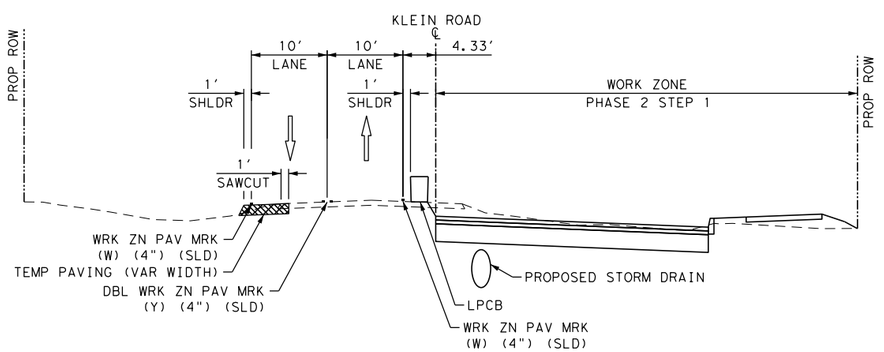
1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

ITEM	DESCRIPTION	UNIT	QTY
0508-6001	CONSTRUCTING DETOURS	SY	128
0512-6009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	286
0512-6010	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	LF	14
0512-6057	PORT CTB (REMOVE)(LOW PROF)(TY 1)	LF	286
0512-6058	PORT CTB (REMOVE)(LOW PROF)(TY 2)	LF	14
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	600
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	600
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	730





PHASE 2 STEP 1
N.T.S.
143+75 TO 146+00



PHASE 2 STEP 1
N.T.S.
146+00 TO END

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

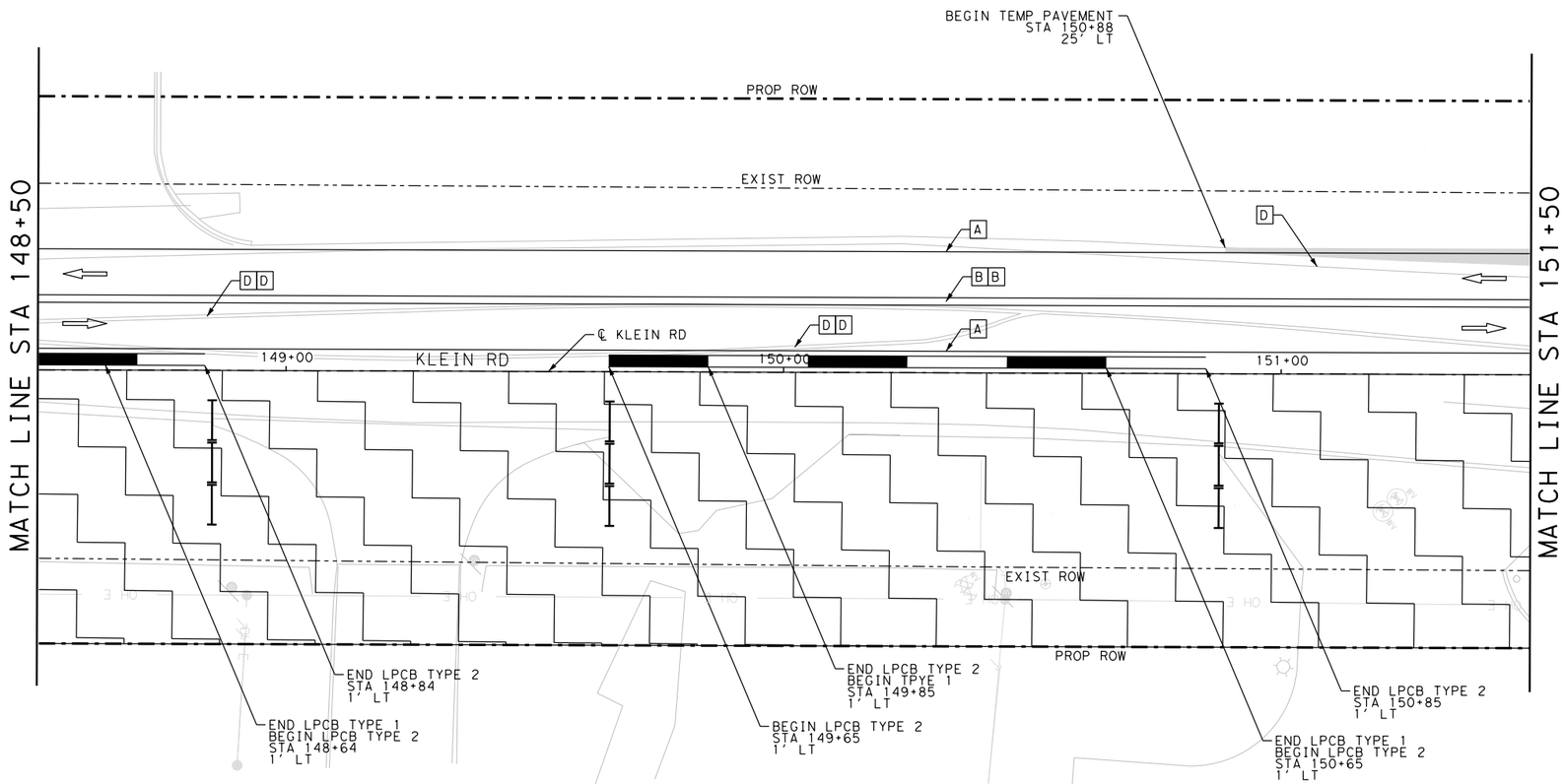
KLEIN RD PHASE 2

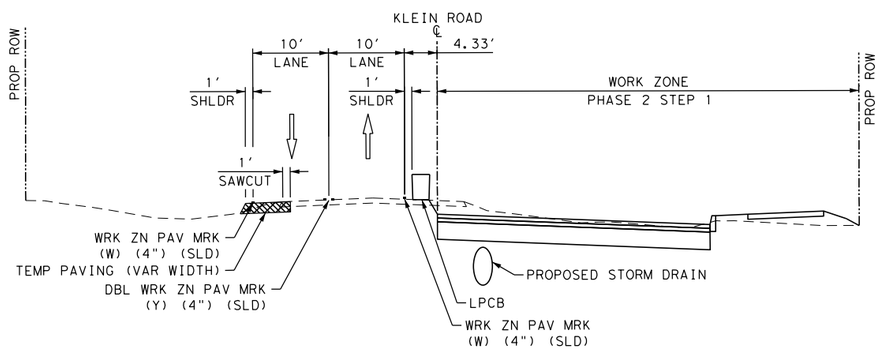
TRAFFIC CONTROL PLAN PHASE 2 STEP 1

SHEET 17 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	71

ITEM	DESCRIPTION	UNIT	QTY
0508-6001	CONSTRUCTING DETOURS	SY	16
0512-6009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	94
0512-6010	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	LF	60
0512-6057	PORT CTB (REMOVE)(LOW PROF)(TY 1)	LF	94
0512-6058	PORT CTB (REMOVE)(LOW PROF)(TY 2)	LF	60
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	600
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	600
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	1306





PHASE 2 STEP 1

N.T.S.

146+00 TO END

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 1

SHEET 18 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	72

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp218.dgn

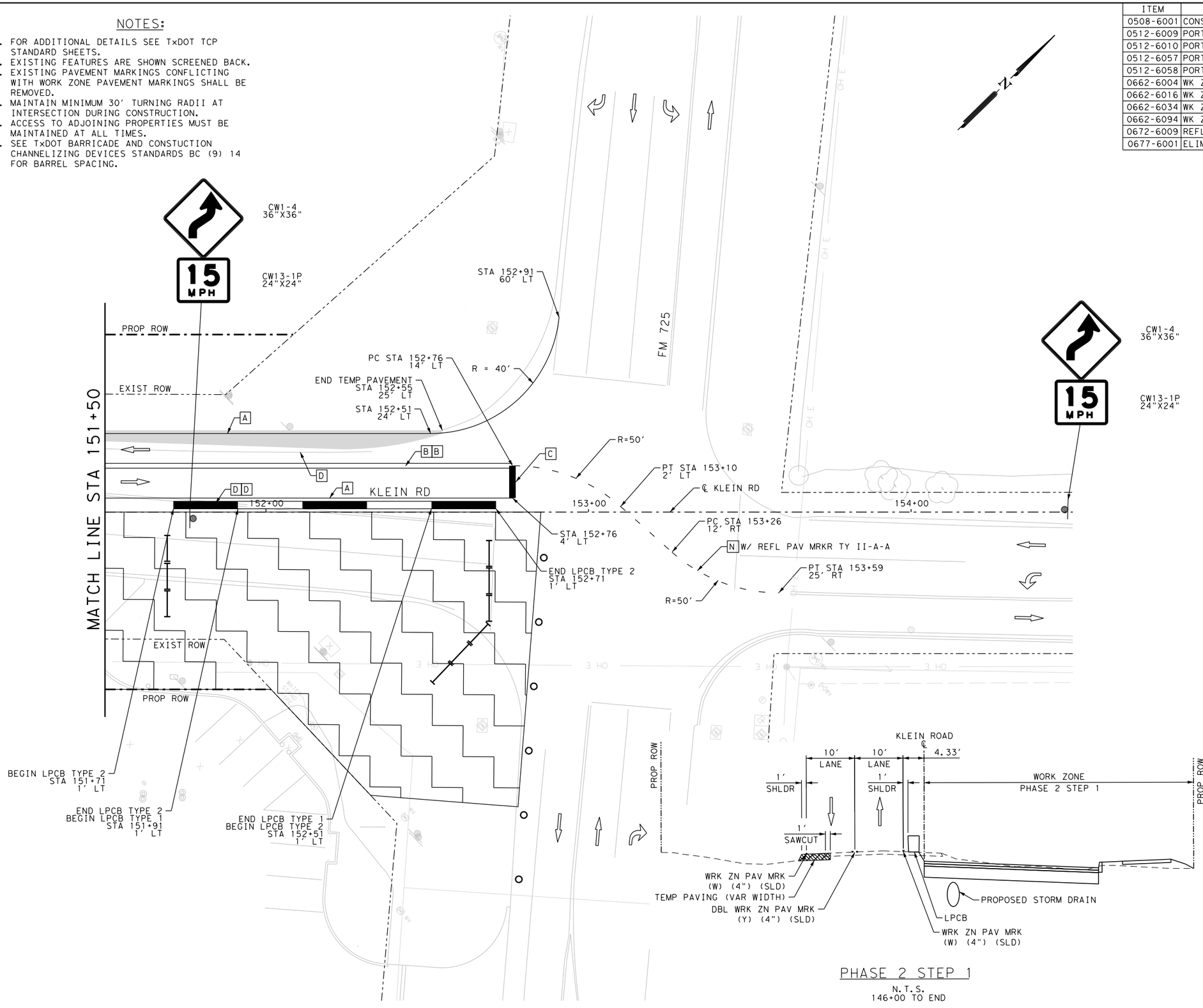
Plotted on: 4/22/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp219.dgn

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

ITEM	DESCRIPTION	UNIT	QTY
0508-6001	CONSTRUCTING DETOURS	SY	53
0512-6009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	60
0512-6010	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	LF	40
0512-6057	PORT CTB (REMOVE)(LOW PROF)(TY 1)	LF	60
0512-6058	PORT CTB (REMOVE)(LOW PROF)(TY 2)	LF	40
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	286
0662-6016	WK ZN PAV MRK NON-REMOV (W)24"(SLD)	LF	10
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	252
0662-6094	WK ZN PAV MRK REMOV (Y)4"(DOT)	LF	50
0672-6009	REFL PAV MRKR TY II-A-A	EA	50
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	325



LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)	N	REMOV (Y)4"(DOT) (2' LONG W/ 2' SPACE)

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/22/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

PHASE 2 STEP 1

N.T.S.

146+00 TO END

REV.NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

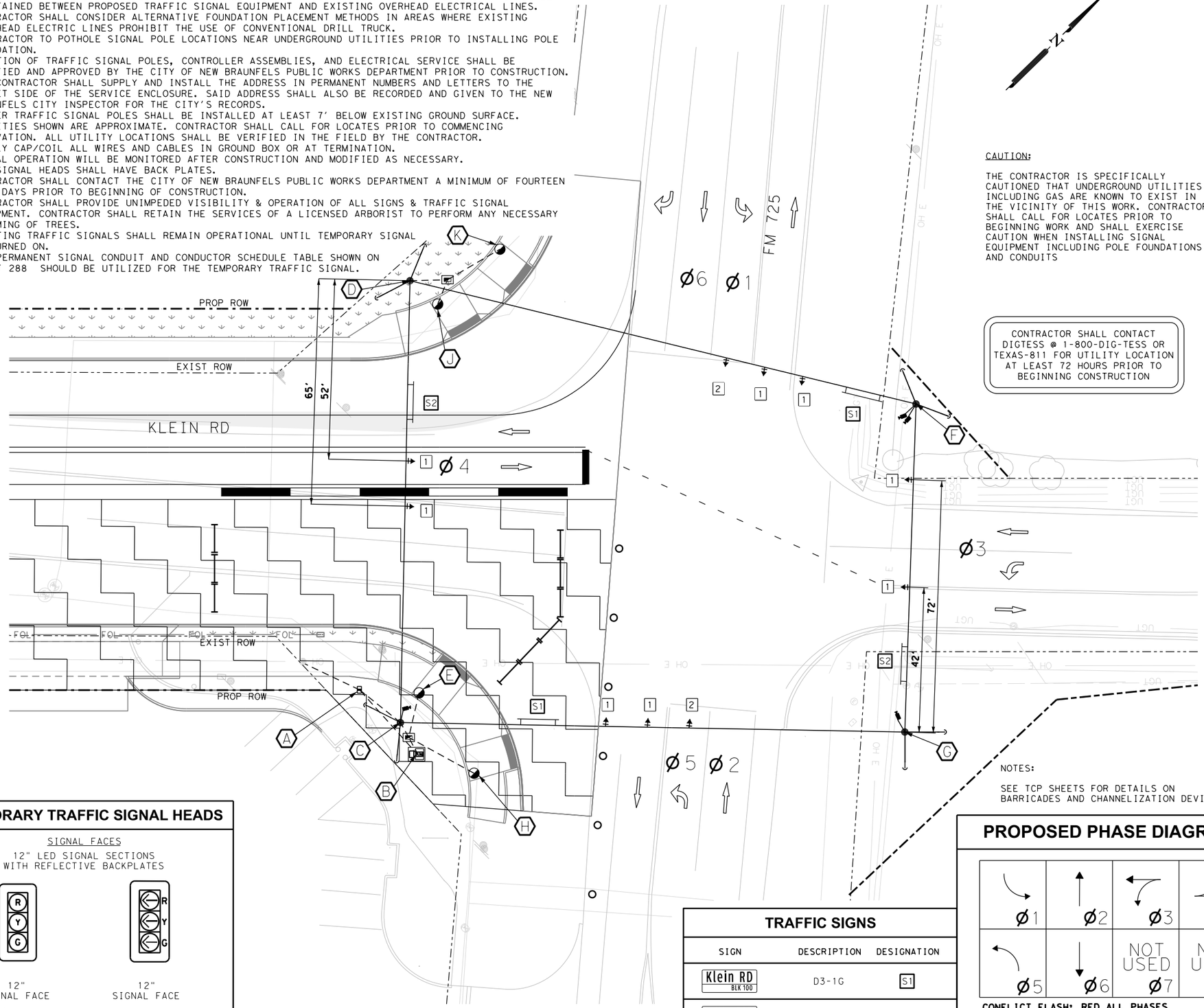
TRAFFIC CONTROL PLAN PHASE 2 STEP 1

SHEET 19 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	73

NOTES:
1. ALL DIMENSIONS SHOWN ARE IN FEET UNLESS SPECIFIED OTHERWISE. (ALL EXISTING FEATURES ARE SHOWN SCREENED BACK i.e. FADED).
2. MINIMUM CLEARANCE OF 40" RADIUS FROM NEUTRAL AND 10' RADIUS FROM PRIMARY OR SECONDARY SHALL BE MAINTAINED BETWEEN PROPOSED TRAFFIC SIGNAL EQUIPMENT AND EXISTING OVERHEAD ELECTRICAL LINES. CONTRACTOR SHALL CONSIDER ALTERNATIVE FOUNDATION PLACEMENT METHODS IN AREAS WHERE EXISTING OVERHEAD ELECTRIC LINES PROHIBIT THE USE OF CONVENTIONAL DRILL TRUCK.
3. CONTRACTOR TO POTHOLE SIGNAL POLE LOCATIONS NEAR UNDERGROUND UTILITIES PRIOR TO INSTALLING POLE FOUNDATION.
4. LOCATION OF TRAFFIC SIGNAL POLES, CONTROLLER ASSEMBLIES, AND ELECTRICAL SERVICE SHALL BE VERIFIED AND APPROVED BY THE CITY OF NEW BRAUNFELS PUBLIC WORKS DEPARTMENT PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE ADDRESS IN PERMANENT NUMBERS AND LETTERS TO THE STREET SIDE OF THE SERVICE ENCLOSURE. SAID ADDRESS SHALL ALSO BE RECORDED AND GIVEN TO THE NEW BRAUNFELS CITY INSPECTOR FOR THE CITY'S RECORDS.
5. TIMBER TRAFFIC SIGNAL POLES SHALL BE INSTALLED AT LEAST 7' BELOW EXISTING GROUND SURFACE.
6. UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO COMMENCING EXCAVATION. ALL UTILITY LOCATIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR.
7. NEATLY CAP/COIL ALL WIRES AND CABLES IN GROUND BOX OR AT TERMINATION.
8. SIGNAL OPERATION WILL BE MONITORED AFTER CONSTRUCTION AND MODIFIED AS NECESSARY.
9. ALL SIGNAL HEADS SHALL HAVE BACK PLATES.
10. CONTRACTOR SHALL CONTACT THE CITY OF NEW BRAUNFELS PUBLIC WORKS DEPARTMENT A MINIMUM OF FOURTEEN (14) DAYS PRIOR TO BEGINNING OF CONSTRUCTION.
11. CONTRACTOR SHALL PROVIDE UNIMPEDED VISIBILITY & OPERATION OF ALL SIGNS & TRAFFIC SIGNAL EQUIPMENT. CONTRACTOR SHALL RETAIN THE SERVICES OF A LICENSED ARBORIST TO PERFORM ANY NECESSARY TRIMMING OF TREES.
12. EXISTING TRAFFIC SIGNALS SHALL REMAIN OPERATIONAL UNTIL TEMPORARY SIGNAL IS TURNED ON.
13. THE PERMANENT SIGNAL CONDUIT AND CONDUCTOR SCHEDULE TABLE SHOWN ON SHEET 288 SHOULD BE UTILIZED FOR THE TEMPORARY TRAFFIC SIGNAL.

ITEM	DESCRIPTION	UNIT	QTY
0681-6001	TEMP TRAF SIGNALS	EA	1



CAUTION:

THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT UNDERGROUND UTILITIES INCLUDING GAS ARE KNOWN TO EXIST IN THE VICINITY OF THIS WORK. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO BEGINNING WORK AND SHALL EXERCISE CAUTION WHEN INSTALLING SIGNAL EQUIPMENT INCLUDING POLE FOUNDATIONS AND CONDUITS

CONTRACTOR SHALL CONTACT DIGTESS @ 1-800-DIG-TESS OR TEXAS-811 FOR UTILITY LOCATION AT LEAST 72 HOURS PRIOR TO BEGINNING CONSTRUCTION

LEGEND

- TEMPORARY PEDESTRIAN POLE
- TEMPORARY TRAFFIC SIGNAL POLE
- TRAFFIC SIGNAL SPAN WIRE
- CONDUIT (TRENCH)
- SIGNAL HEAD
- VIVDS DETECTION CAMERA ASSEMBLY
- UTILITY POLE
- TEMPORARY GUY ANCHOR
- GROUND BOX
- CONTROLLER, SLAB & FOUNDATION
- TCP PHASE

NOTE

CONTRACTOR TO COORDINATE THE STAGE OF FM 725 CONSTRUCTION WITH TXDOT AT THE TIME OF TRAFFIC SIGNAL INSTALLATION.

TEMPORARY TRAFFIC SIGNAL HEADS

SIGNAL FACES
12" LED SIGNAL SECTIONS
WITH REFLECTIVE BACKPLATES

12" SIGNAL FACE
1 QTY: 8

12" SIGNAL FACE
2 QTY: 2

TRAFFIC SIGNS

SIGN	DESCRIPTION	DESIGNATION
Klein RD BLK 100	D3-1G	S1
HWY 725 BLK 2700	D3-1G	S2

NOTES:

SEE TCP SHEETS FOR DETAILS ON BARRICADES AND CHANNELIZATION DEVICES.

PROPOSED PHASE DIAGRAM

CONFLICT FLASH: RED ALL PHASES
PHASE 1 & PHASE 5 SHALL NOT RUN CONCURRENTLY

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 2/1/2021 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 2/1/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TEMPORARY TRAFFIC SIGNAL LAYOUT PHASE 2 STEP 1

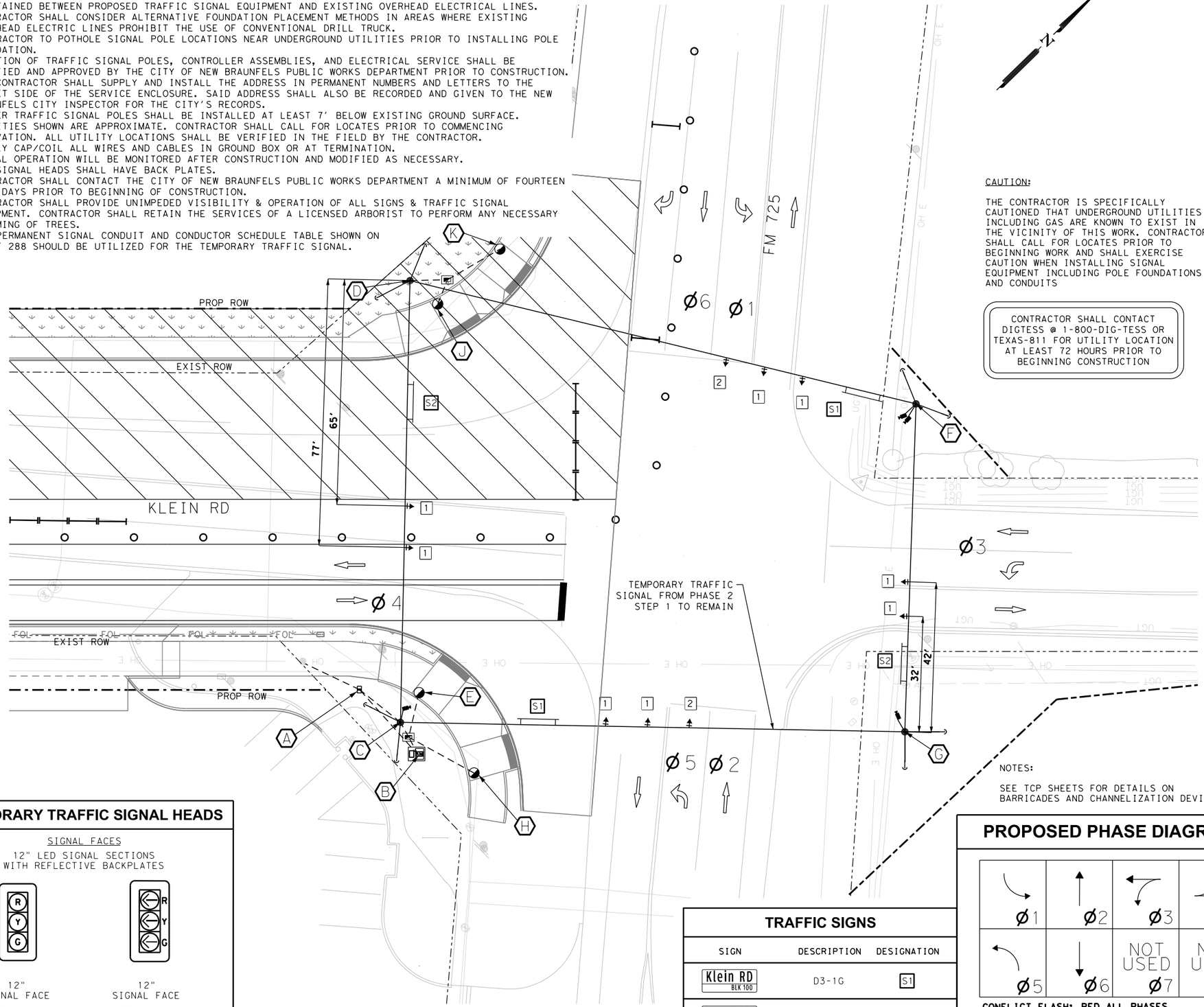
SHEET 1 OF 1

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	74

Plotted on: 2/1/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Traffic\5103003_WKleinRd_Temp Traffic Signal Sheets_Ph2.dgn

NOTES:
1. ALL DIMENSIONS SHOWN ARE IN FEET UNLESS SPECIFIED OTHERWISE. (ALL EXISTING FEATURES ARE SHOWN SCREENED BACK i.e. FADED).
2. MINIMUM CLEARANCE OF 40" RADIUS FROM NEUTRAL AND 10' RADIUS FROM PRIMARY OR SECONDARY SHALL BE MAINTAINED BETWEEN PROPOSED TRAFFIC SIGNAL EQUIPMENT AND EXISTING OVERHEAD ELECTRICAL LINES. CONTRACTOR SHALL CONSIDER ALTERNATIVE FOUNDATION PLACEMENT METHODS IN AREAS WHERE EXISTING OVERHEAD ELECTRIC LINES PROHIBIT THE USE OF CONVENTIONAL DRILL TRUCK.
3. CONTRACTOR TO POTHOLE SIGNAL POLE LOCATIONS NEAR UNDERGROUND UTILITIES PRIOR TO INSTALLING POLE FOUNDATION.
4. LOCATION OF TRAFFIC SIGNAL POLES, CONTROLLER ASSEMBLIES, AND ELECTRICAL SERVICE SHALL BE VERIFIED AND APPROVED BY THE CITY OF NEW BRAUNFELS PUBLIC WORKS DEPARTMENT PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE ADDRESS IN PERMANENT NUMBERS AND LETTERS TO THE STREET SIDE OF THE SERVICE ENCLOSURE. SAID ADDRESS SHALL ALSO BE RECORDED AND GIVEN TO THE NEW BRAUNFELS CITY INSPECTOR FOR THE CITY'S RECORDS.
5. TIMBER TRAFFIC SIGNAL POLES SHALL BE INSTALLED AT LEAST 7' BELOW EXISTING GROUND SURFACE.
6. UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO COMMENCING EXCAVATION. ALL UTILITY LOCATIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR.
7. NEATLY CAP/COIL ALL WIRES AND CABLES IN GROUND BOX OR AT TERMINATION.
8. SIGNAL OPERATION WILL BE MONITORED AFTER CONSTRUCTION AND MODIFIED AS NECESSARY.
9. ALL SIGNAL HEADS SHALL HAVE BACK PLATES.
10. CONTRACTOR SHALL CONTACT THE CITY OF NEW BRAUNFELS PUBLIC WORKS DEPARTMENT A MINIMUM OF FOURTEEN (14) DAYS PRIOR TO BEGINNING OF CONSTRUCTION.
11. CONTRACTOR SHALL PROVIDE UNIMPEDED VISIBILITY & OPERATION OF ALL SIGNS & TRAFFIC SIGNAL EQUIPMENT. CONTRACTOR SHALL RETAIN THE SERVICES OF A LICENSED ARBORIST TO PERFORM ANY NECESSARY TRIMMING OF TREES.
12. THE PERMANENT SIGNAL CONDUIT AND CONDUCTOR SCHEDULE TABLE SHOWN ON SHEET 288 SHOULD BE UTILIZED FOR THE TEMPORARY TRAFFIC SIGNAL.



CAUTION:

THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT UNDERGROUND UTILITIES INCLUDING GAS ARE KNOWN TO EXIST IN THE VICINITY OF THIS WORK. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO BEGINNING WORK AND SHALL EXERCISE CAUTION WHEN INSTALLING SIGNAL EQUIPMENT INCLUDING POLE FOUNDATIONS AND CONDUITS

CONTRACTOR SHALL CONTACT DIGTESS @ 1-800-DIG-TESS OR TEXAS-811 FOR UTILITY LOCATION AT LEAST 72 HOURS PRIOR TO BEGINNING CONSTRUCTION

LEGEND

- TEMPORARY PEDESTRIAN POLE
- TEMPORARY TRAFFIC SIGNAL POLE
- TRAFFIC SIGNAL SPAN WIRE
- CONDUIT (TRENCH)
- SIGNAL HEAD
- VIVDS DETECTION CAMERA ASSEMBLY
- UTILITY POLE
- TEMPORARY GUY ANCHOR
- GROUND BOX
- CONTROLLER, SLAB & FOUNDATION
- TCP PHASE

NOTE

CONTRACTOR TO COORDINATE THE STAGE OF FM 725 CONSTRUCTION WITH TXDOT AT THE TIME OF TRAFFIC SIGNAL INSTALLATION.

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 2/1/2021 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 2/1/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TEMPORARY TRAFFIC SIGNAL LAYOUT PHASE 2 STEP 2

SHEET 1 OF 1

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	75

TEMPORARY TRAFFIC SIGNAL HEADS

SIGNAL FACES
12" LED SIGNAL SECTIONS
WITH REFLECTIVE BACKPLATES

12" SIGNAL FACE — 1 QTY: 8

12" SIGNAL FACE — 2 QTY: 2

TRAFFIC SIGNS

SIGN	DESCRIPTION	DESIGNATION
Klein RD BLK 100	D3-1G	S1
HWY 725 BLK 2700	D3-1G	S2

NOTES:

SEE TCP SHEETS FOR DETAILS ON BARRICADES AND CHANNELIZATION DEVICES.

PROPOSED PHASE DIAGRAM

Ø1	Ø2	Ø3	Ø4
Ø5	Ø6	NOT USED Ø7	NOT USED Ø8

CONFLICT FLASH: RED ALL PHASES

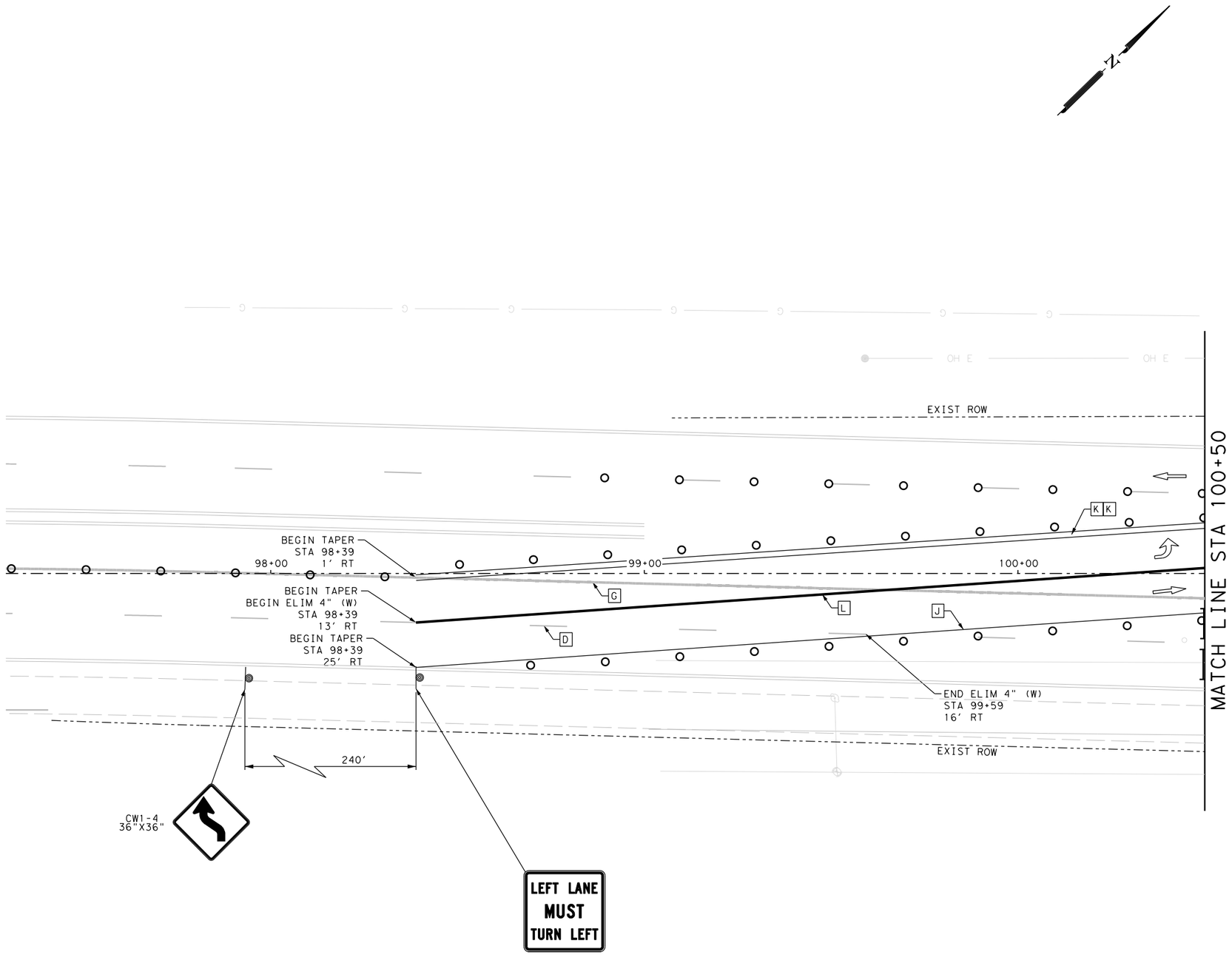
PHASE 1 & PHASE 5 SHALL NOT RUN CONCURRENTLY

Plotted on: 2/1/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Traffic\5103003_WKleinRd_Temp Traffic Signal Sheets_Ph2A.dgn

Plotted on: 1/21/2021

ITEM	DESCRIPTION	UNIT	QTY
0662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	212
0662-6071	WK ZN PAV MRK REMOV (W)8"(SLD)	LF	212
0662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	424
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	30
0677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	212



LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 2

SHEET 1 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	76

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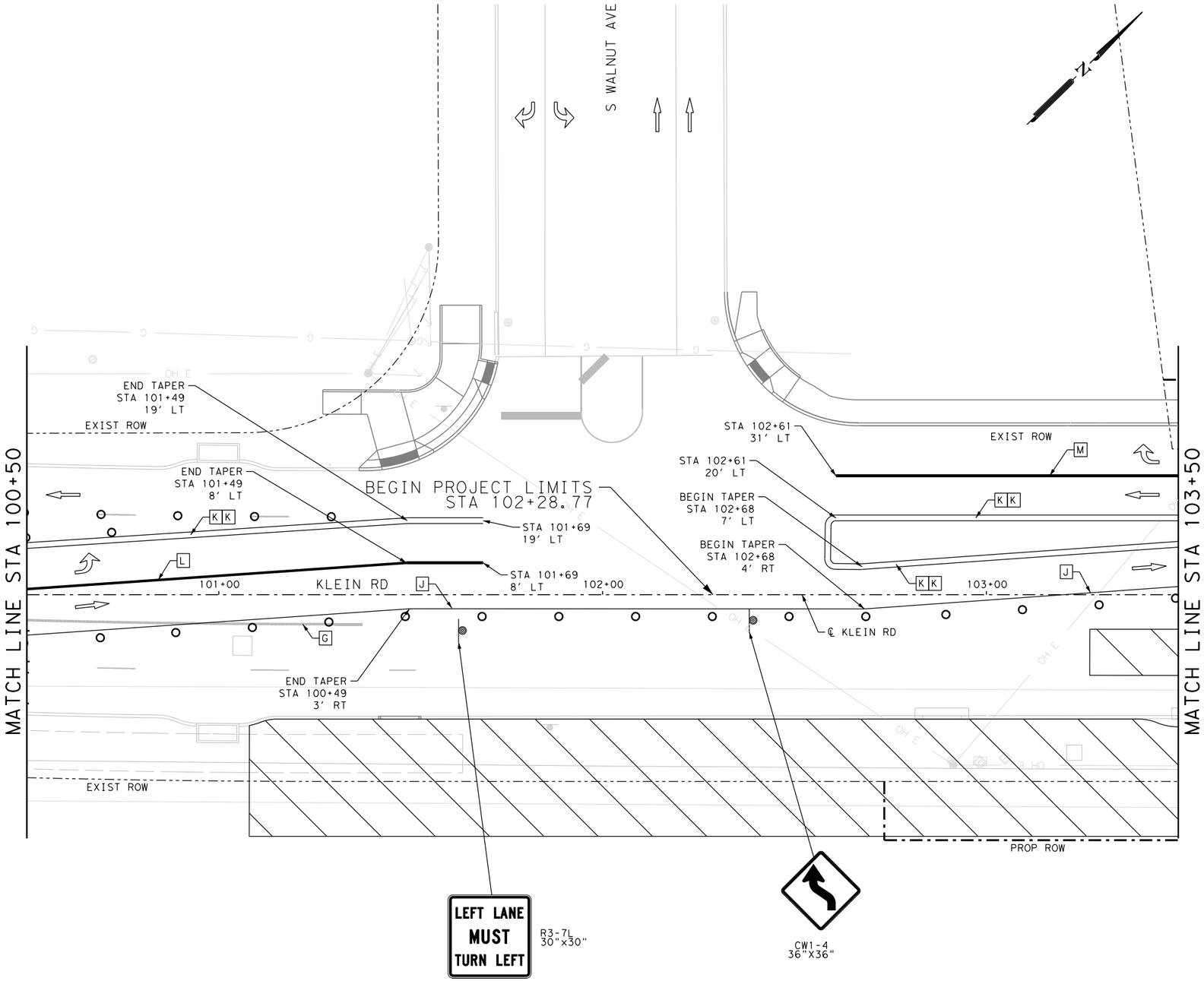
Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\PhaseII\5103003tcp2A02.dgn

ITEM	DESCRIPTION	UNIT	QTY
0662-6012	WK ZN PAV MRK NON-REMOV (W)8"(SLD)	LF	90
0662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	301
0662-6071	WK ZN PAV MRK REMOV (W)8"(SLD)	LF	120
0662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	630
0677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	88



LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

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REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

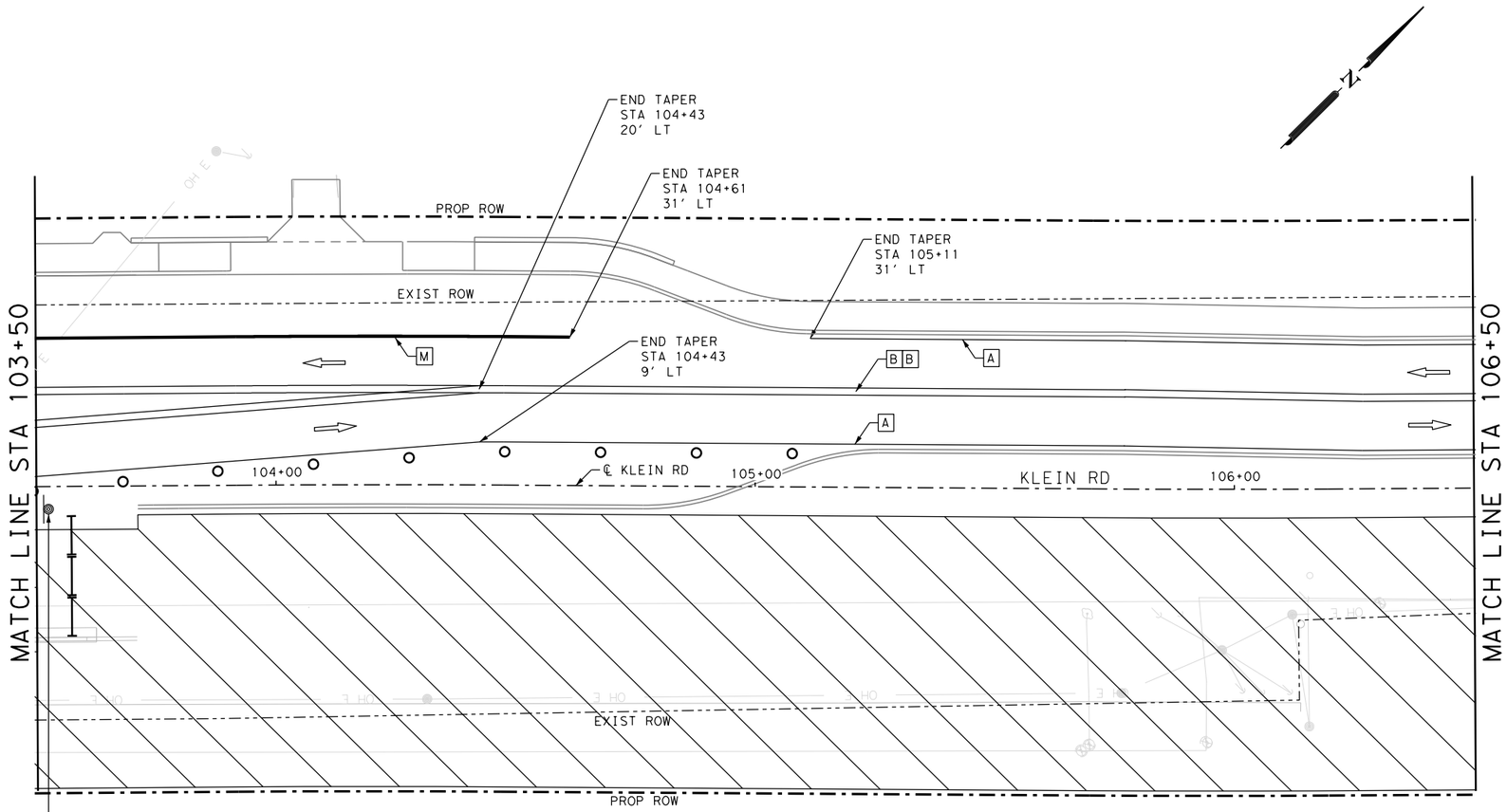
KLEIN RD PHASE 2

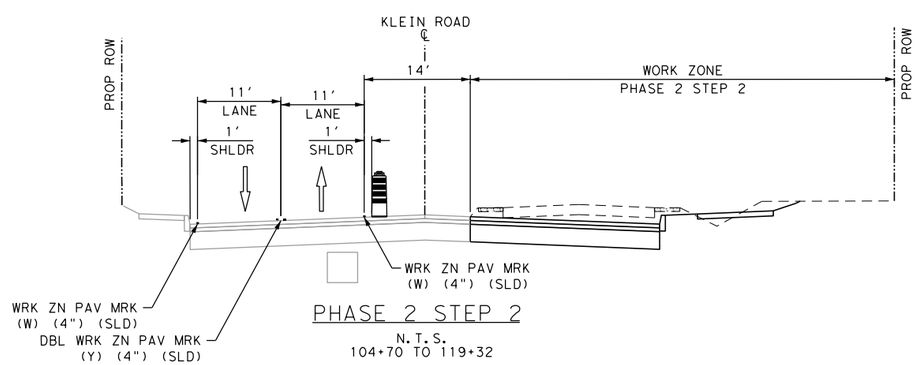
TRAFFIC CONTROL PLAN PHASE 2 STEP 2

SHEET 2 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	77

ITEM	DESCRIPTION	UNIT	QTY
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	440
0662-6012	WK ZN PAV MRK NON-REMOV (W)8"(SLD)	LF	112
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	786





PHASE 2 STEP 2

N.T.S.

104+70 TO 119+32

NOTES:

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LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 2

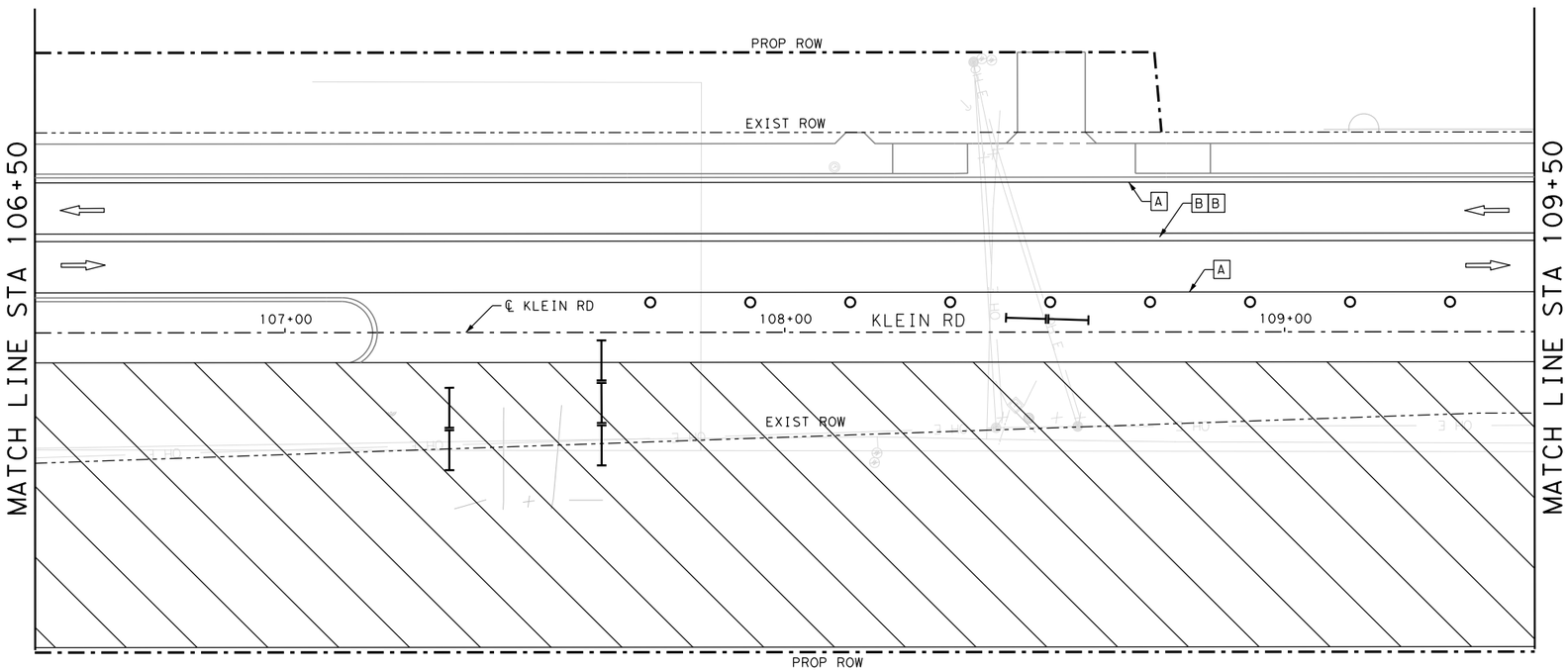
SHEET 3 OF 19

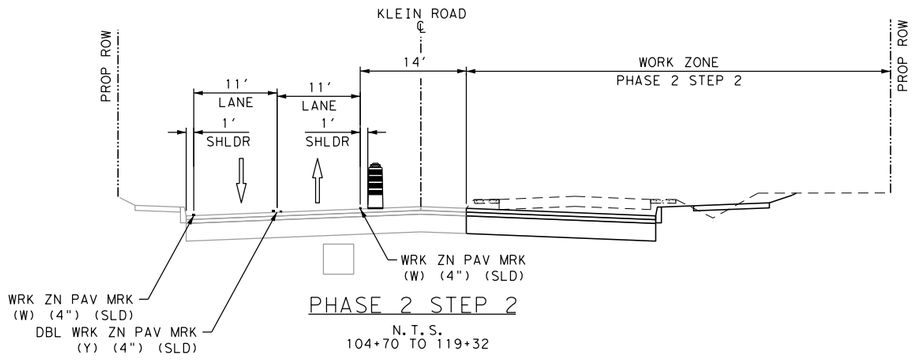
DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	78

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp2A03.dgn

ITEM	DESCRIPTION	UNIT	QTY
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	600
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	600





PHASE 2 STEP 2

N.T.S.

104+70 TO 119+32

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

NOTES:

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2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
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6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30′

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 2

SHEET 4 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	79

Plotted on: 1/21/2021

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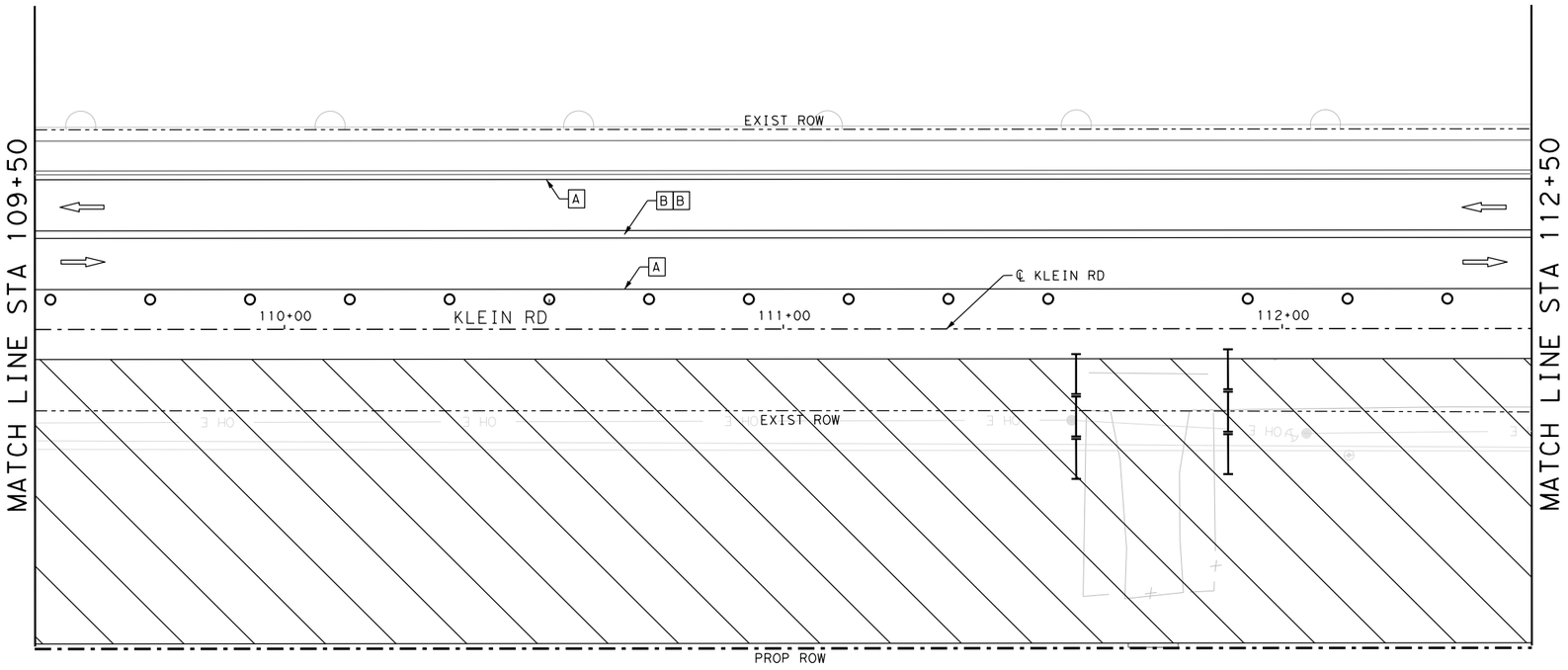
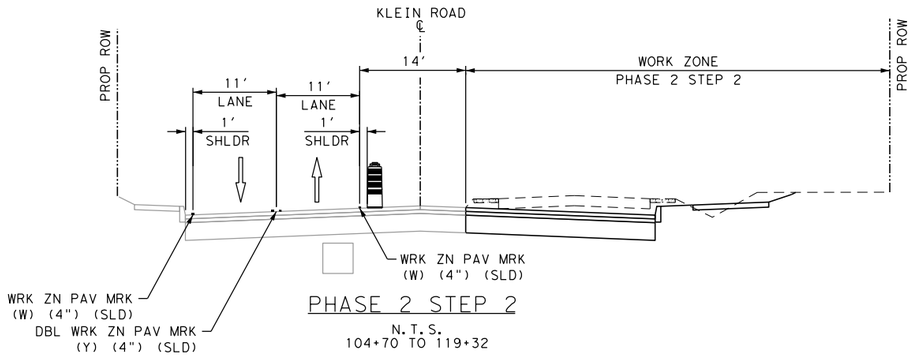
ITEM	DESCRIPTION	UNIT	QTY
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	600
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	600





PHASE 2 STEP 2

N.T.S.

104+70 TO 119+32

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LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30′

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 2

SHEET 5 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	80

Plotted on: 1/21/2021

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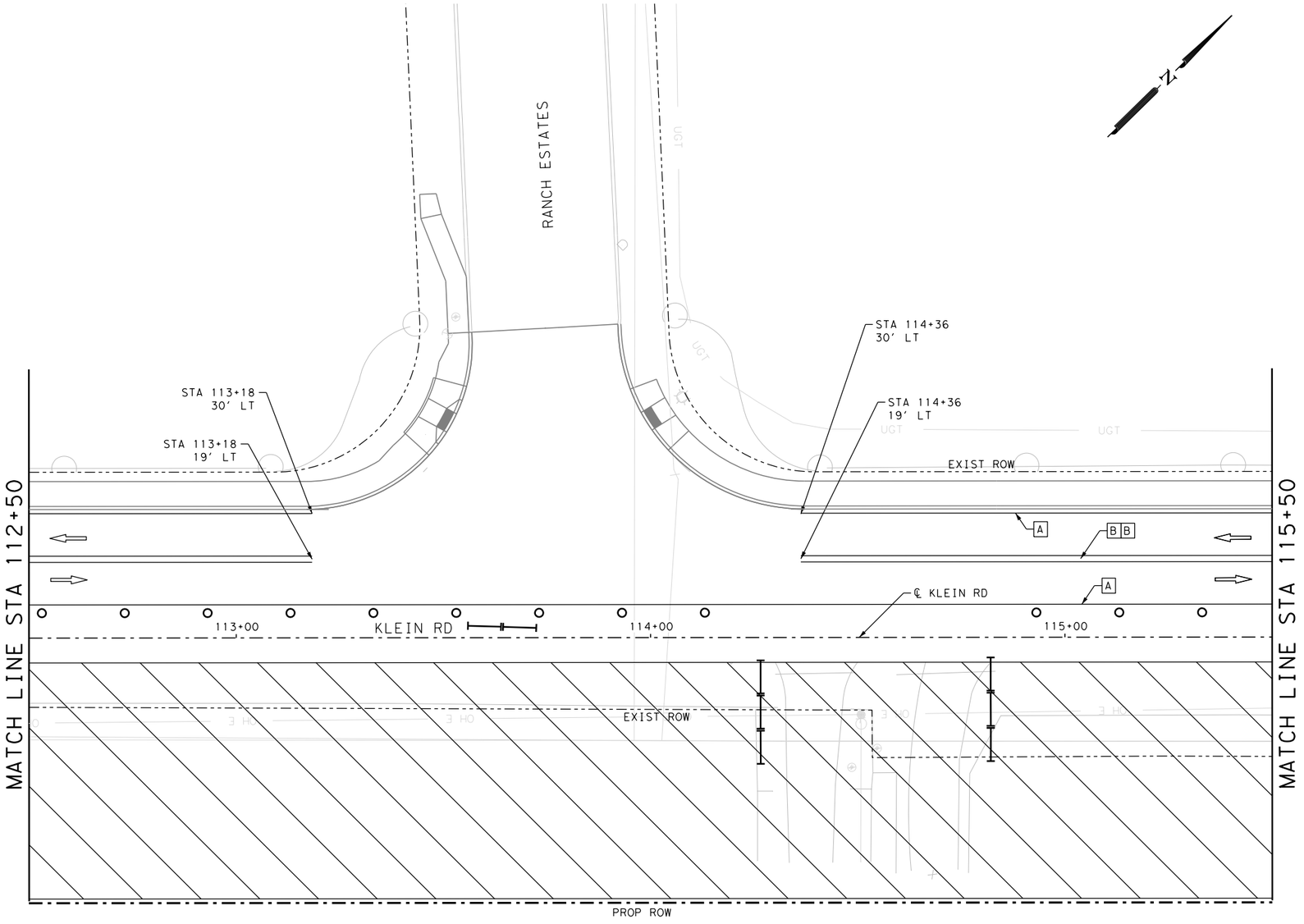
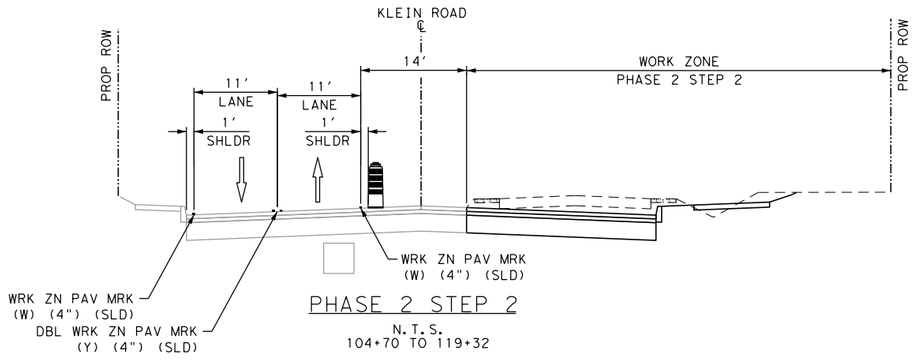
Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\PhaseII\5103003tcp2A06.dgn

ITEM	DESCRIPTION	UNIT	QTY
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	482
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	364





PHASE 2 STEP 2

N.T.S.

104+70 TO 119+32

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LEGEND

- SIGN
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F	ELIM (WORD)		

DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED
PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 2

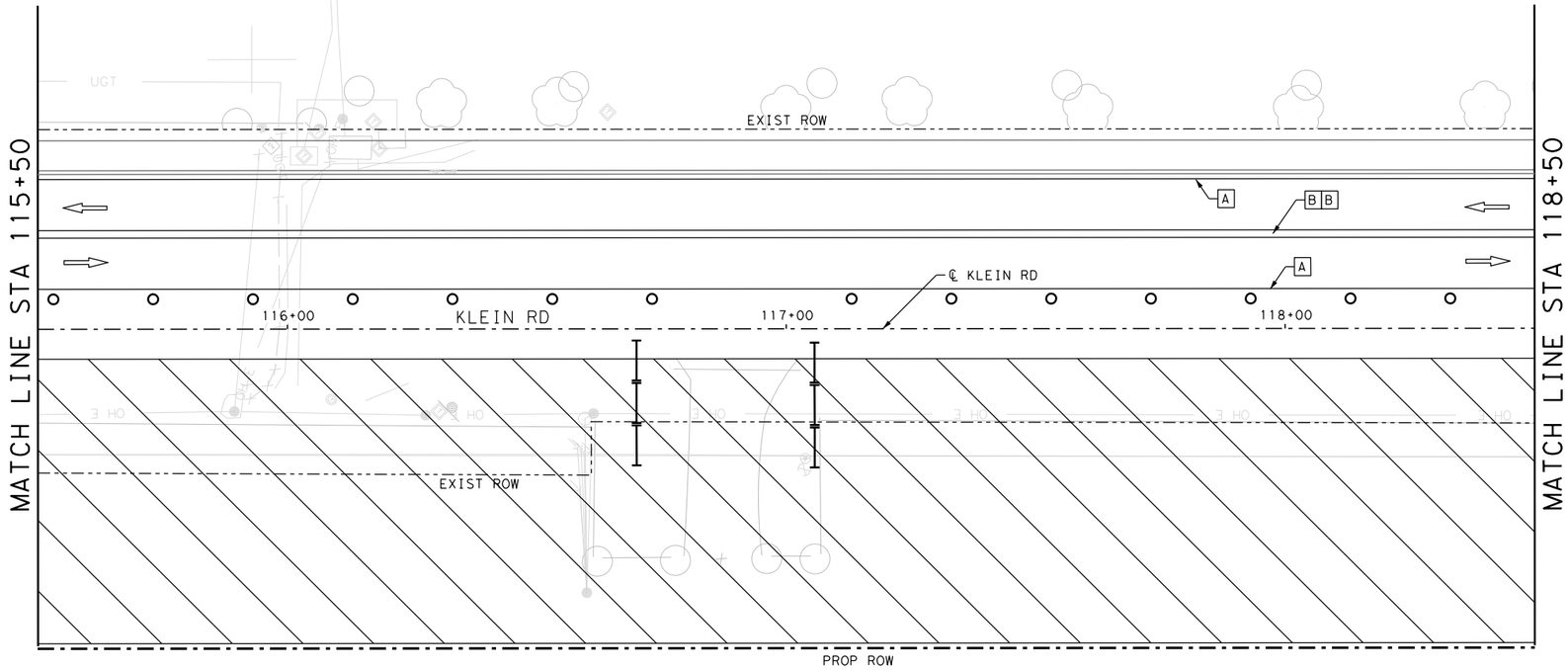
SHEET 6 OF 19

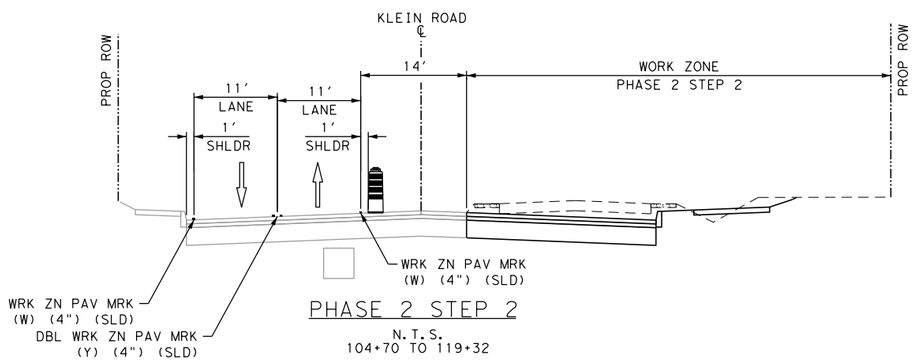
DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	81

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp2A07.dgn

ITEM	DESCRIPTION	UNIT	QTY
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	600
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	600





PHASE 2 STEP 2

N.T.S.

104+70 TO 119+32

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LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
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D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30′

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

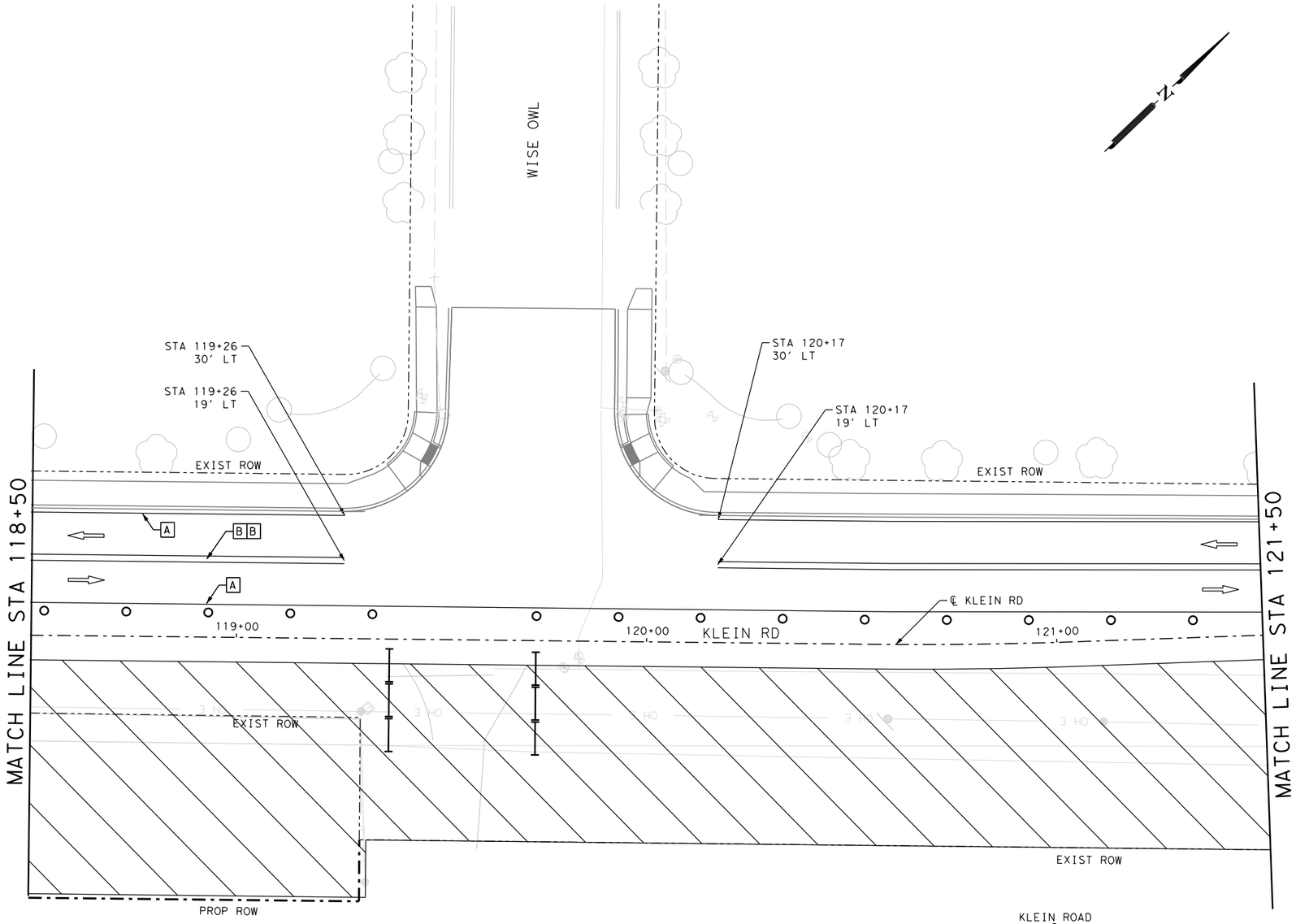
KLEIN RD PHASE 2

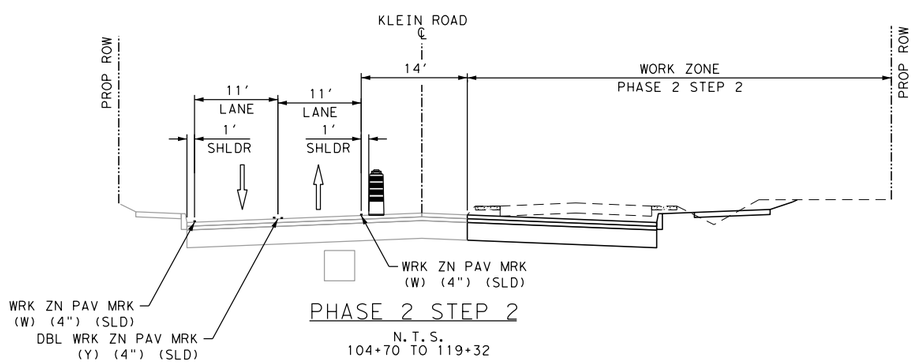
TRAFFIC CONTROL PLAN PHASE 2 STEP 2

SHEET 7 OF 19

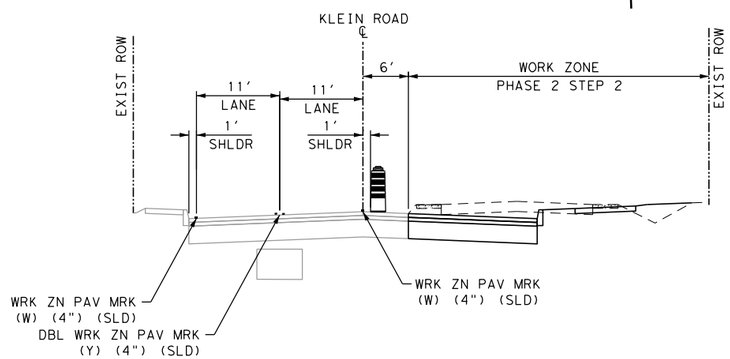
DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	82

Plotted on: 1/21/2021





PHASE 2 STEP 2
N.T.S.
104+70 TO 119+32



PHASE 2 STEP 2
N.T.S.
119+32 TO 133+65

ITEM	DESCRIPTION	UNIT	QTY
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	509
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	418

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

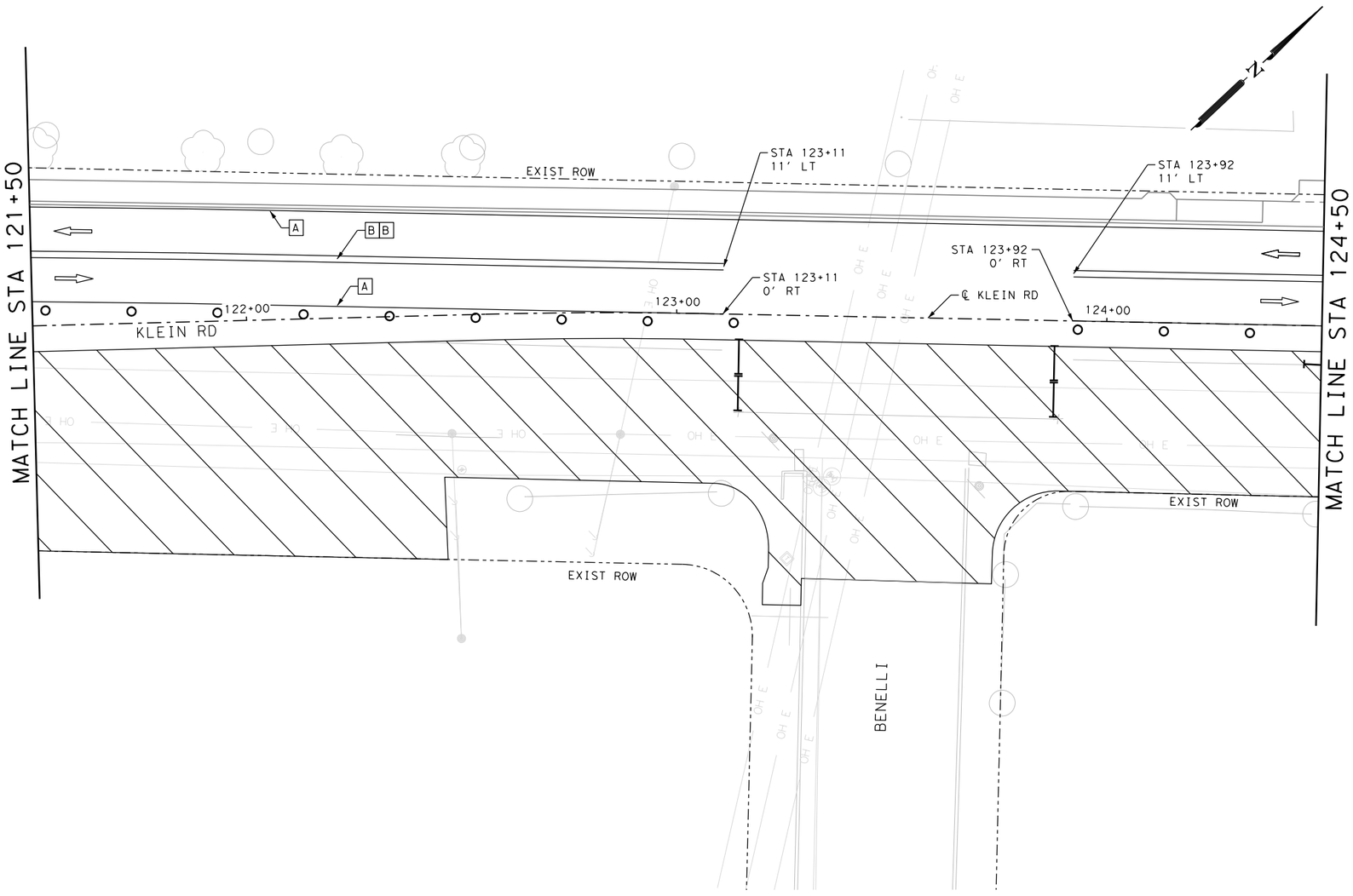
TRAFFIC CONTROL PLAN PHASE 2 STEP 2

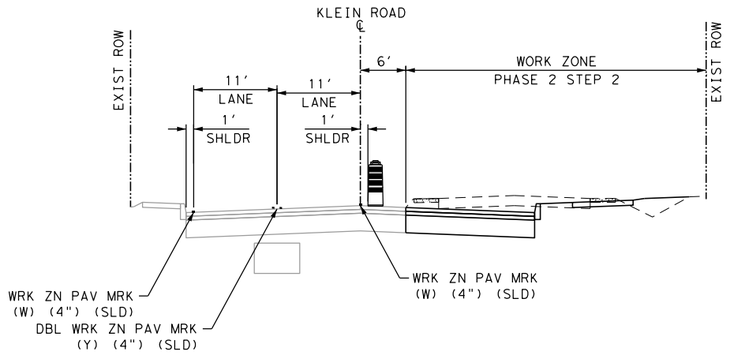
SHEET 8 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	83

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp2a08.dgn

ITEM	DESCRIPTION	UNIT	QTY
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	519
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	438





PHASE 2 STEP 2

N.T.S.

119+32 TO 133+65

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 2

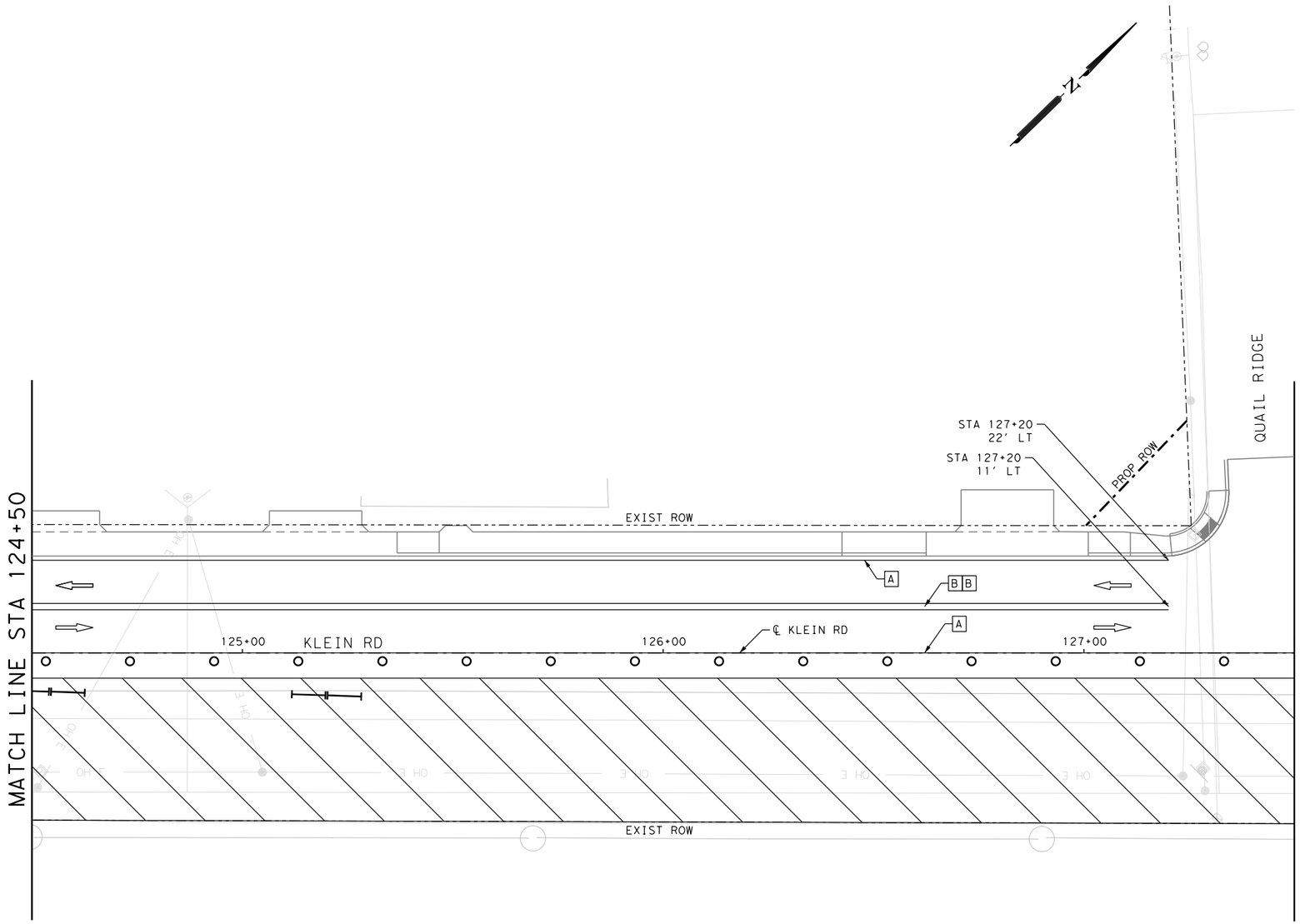
SHEET 9 OF 19

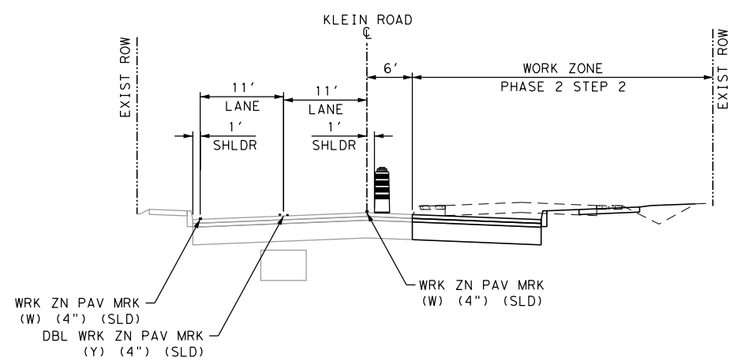
DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	84

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\PhaseII\5103003tcp2a10.dgn

ITEM	DESCRIPTION	UNIT	QTY
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	570
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	540





PHASE 2 STEP 2

N.T.S.
119+32 TO 133+65

NOTES:

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LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

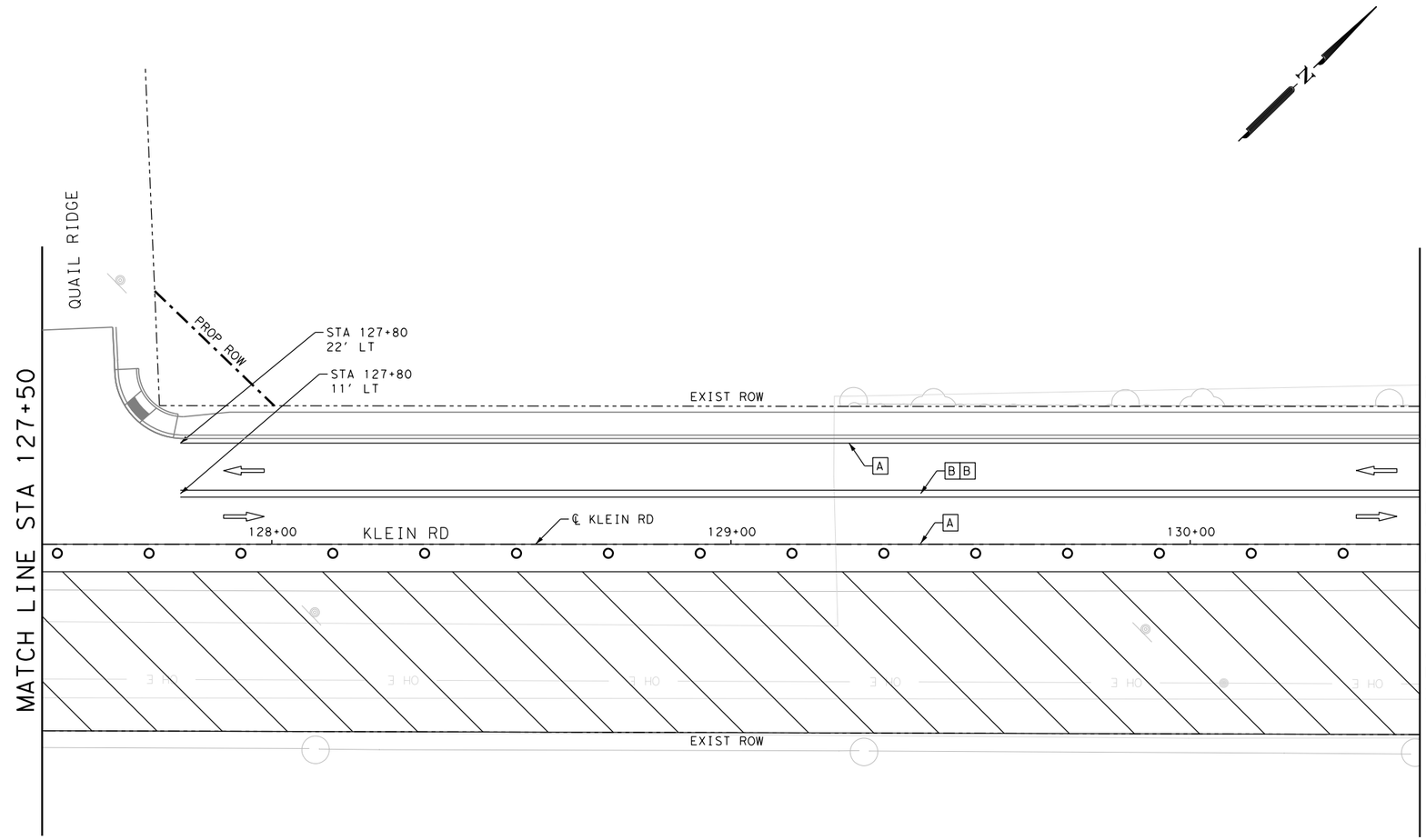
KLEIN RD PHASE 2

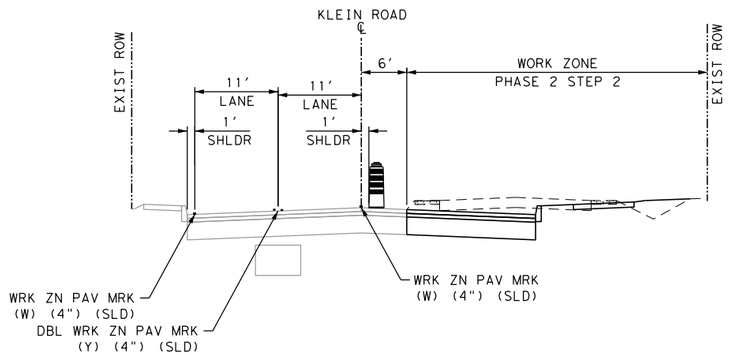
TRAFFIC CONTROL PLAN PHASE 2 STEP 2

SHEET 10 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	85

ITEM	DESCRIPTION	UNIT	QTY
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	570
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	540





PHASE 2 STEP 2

N.T.S.

119+32 TO 133+65

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
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C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

NOTES:

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6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 2

SHEET 11 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	86

Plotted on: 1/21/2021

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Plotted on: 1/21/2021

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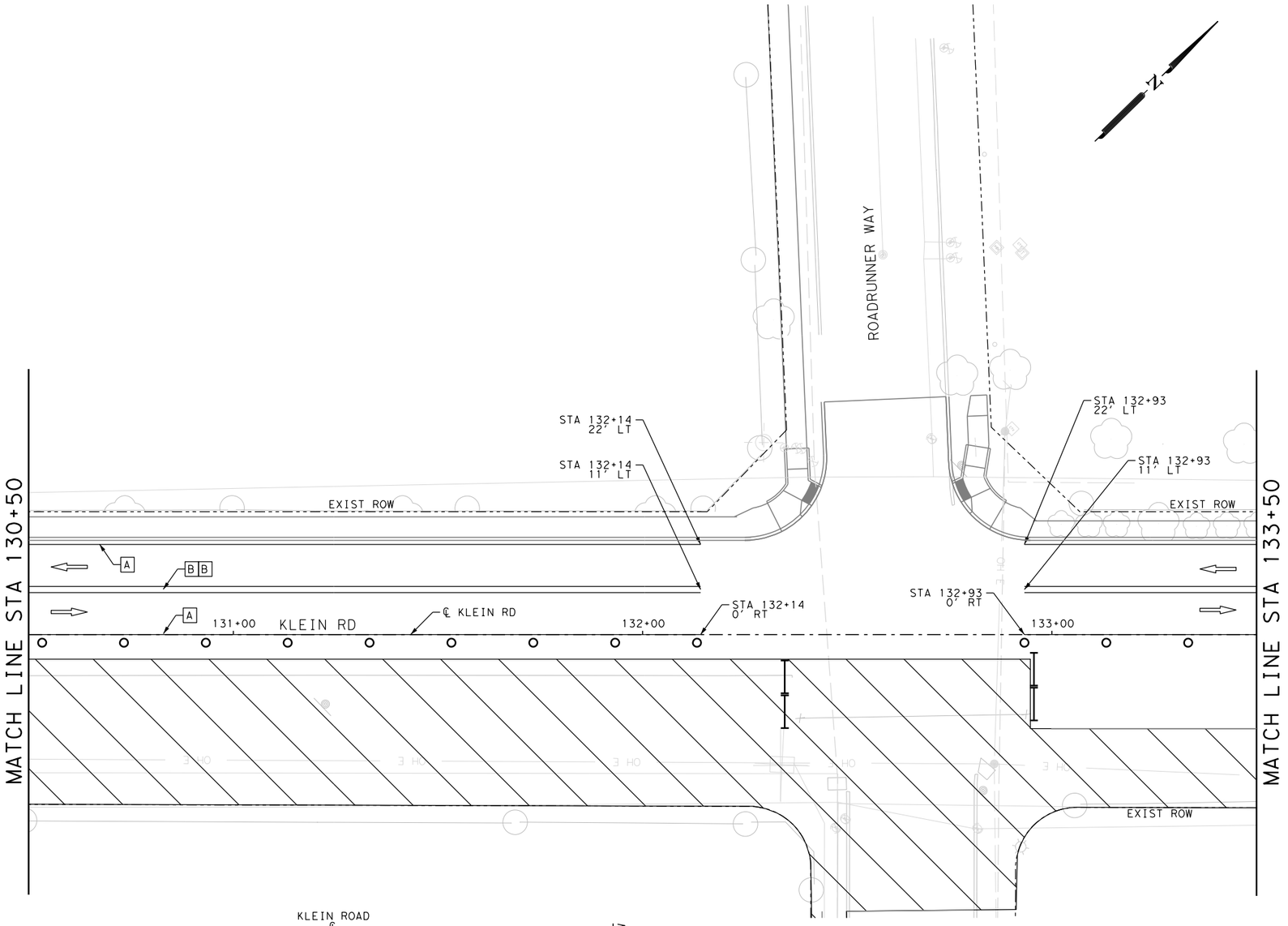
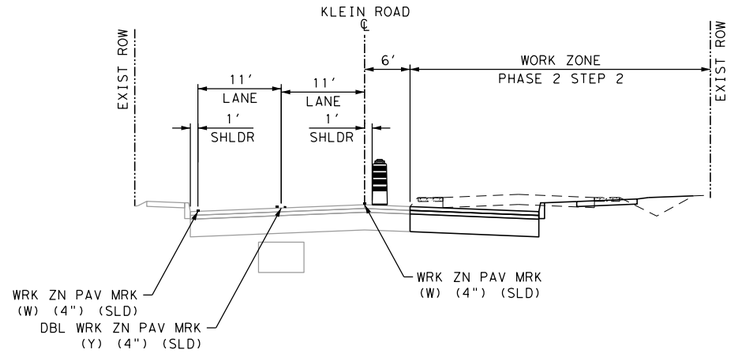
ITEM	DESCRIPTION	UNIT	QTY
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	442
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	442





PHASE 2 STEP 2

N.T.S.

119+32 TO 133+65

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

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D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 2

SHEET 12 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	87

NOTES:

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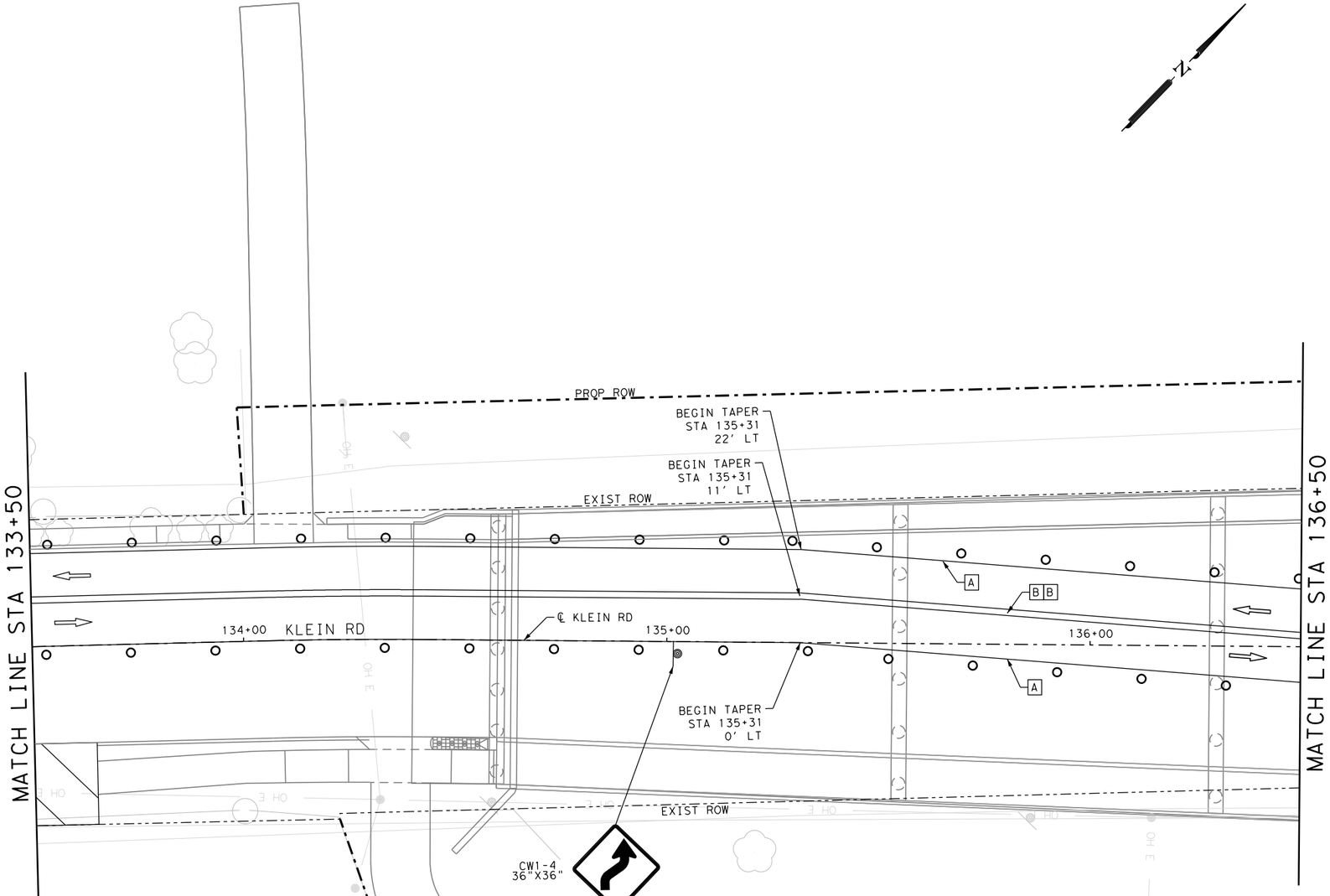

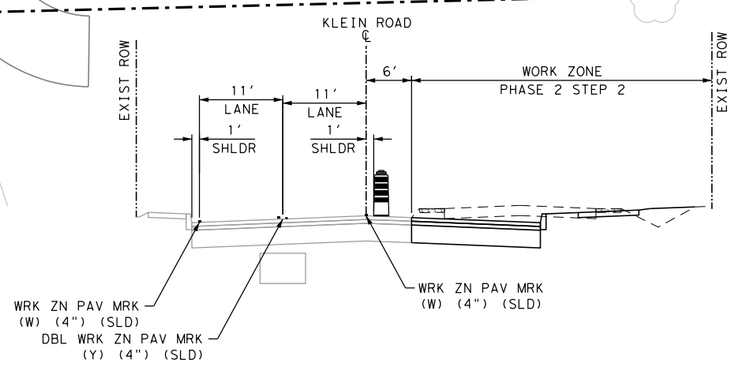

PHASE 2 STEP 2

N.T.S.

119+32 TO 133+65

NOTES:

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LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
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- PLASTIC DRUM
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F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/30/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/30/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 2

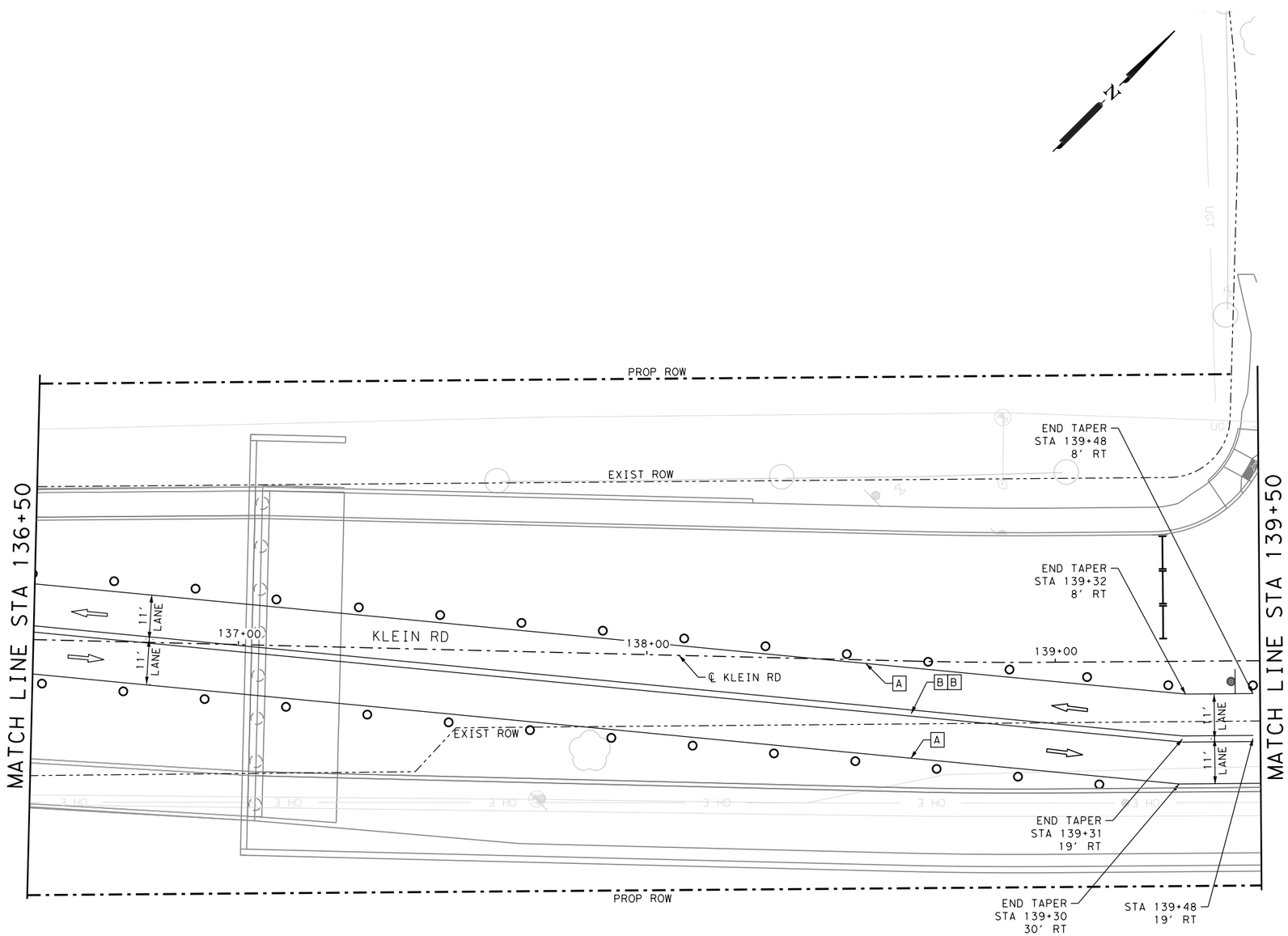
SHEET 13 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	88

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp2a14.dgn

ITEM	DESCRIPTION	UNIT	QTY
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	602
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	600



LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
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- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

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E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

NOTES:

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REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

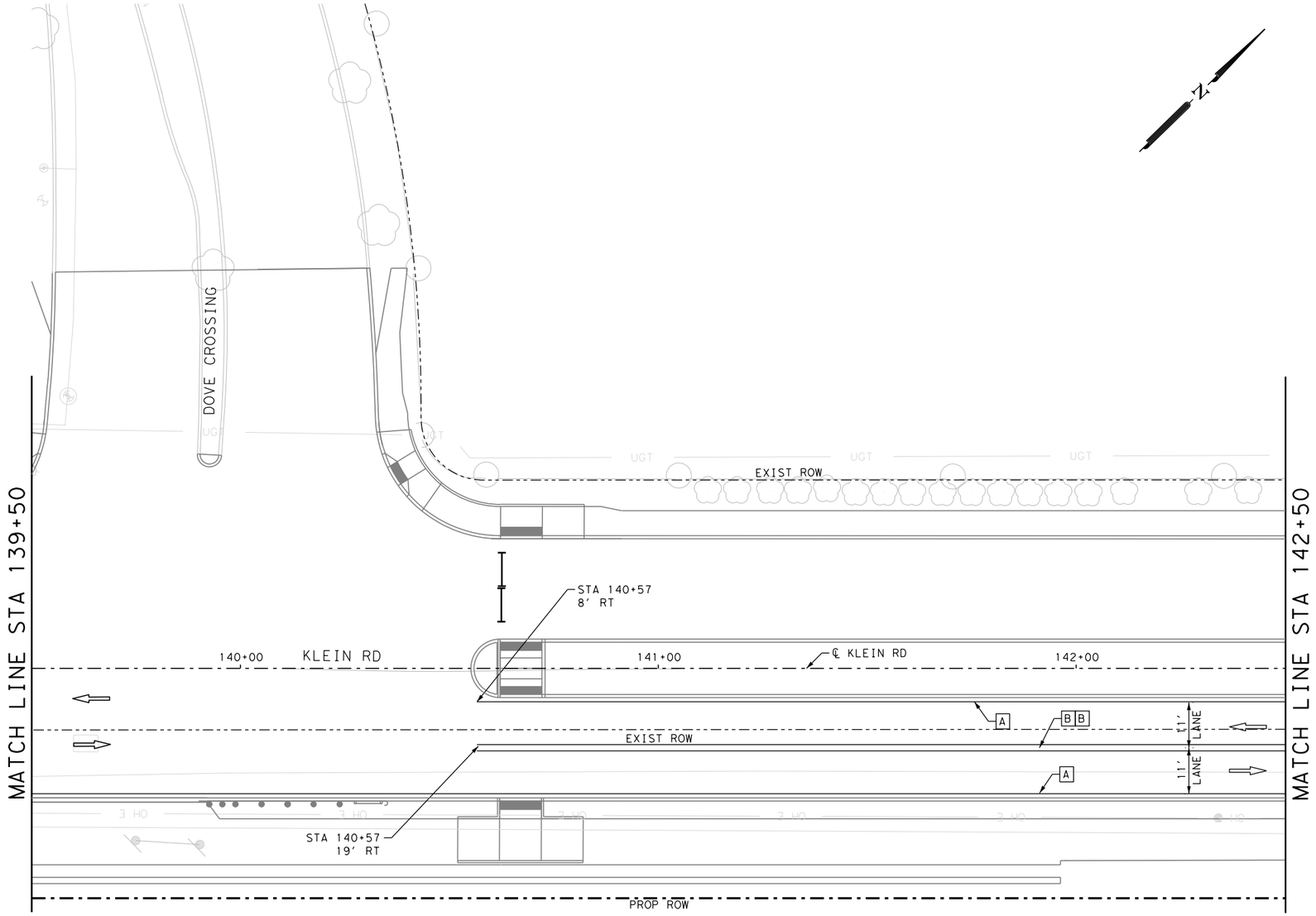
TRAFFIC CONTROL PLAN PHASE 2 STEP 2

SHEET 14 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	89

Plotted on: 1/21/2021

ITEM	DESCRIPTION	UNIT	QTY
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	493
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	386



LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

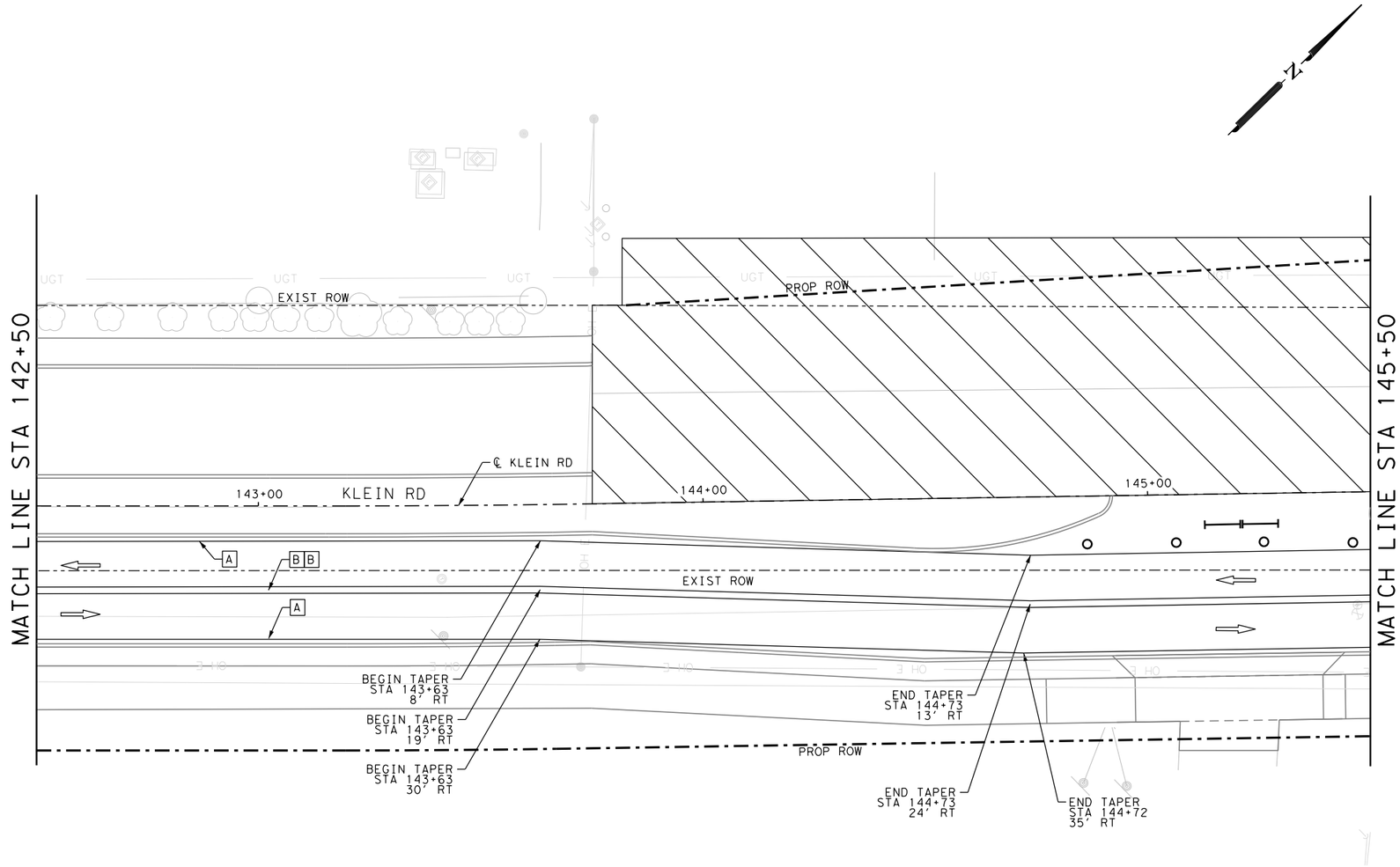
TRAFFIC CONTROL PLAN PHASE 2 STEP 2

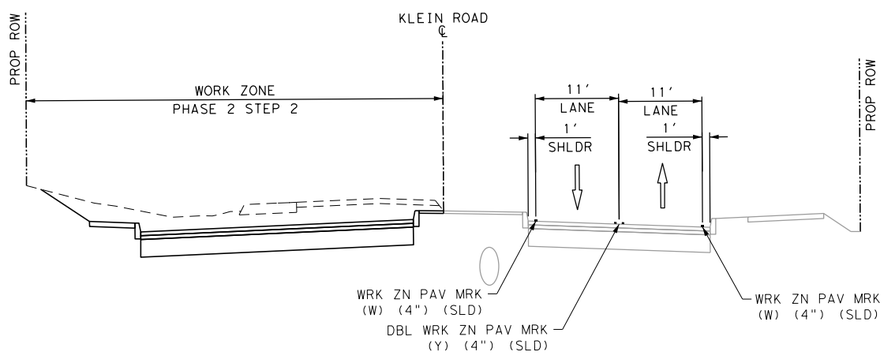
SHEET 15 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	90

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase II\5103003tcp2a15.dgn

ITEM	DESCRIPTION	UNIT	QTY
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	600
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	600





PHASE 2 STEP 2

N.T.S.

142+75 TO 147+23

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

NOTES:

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DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 2

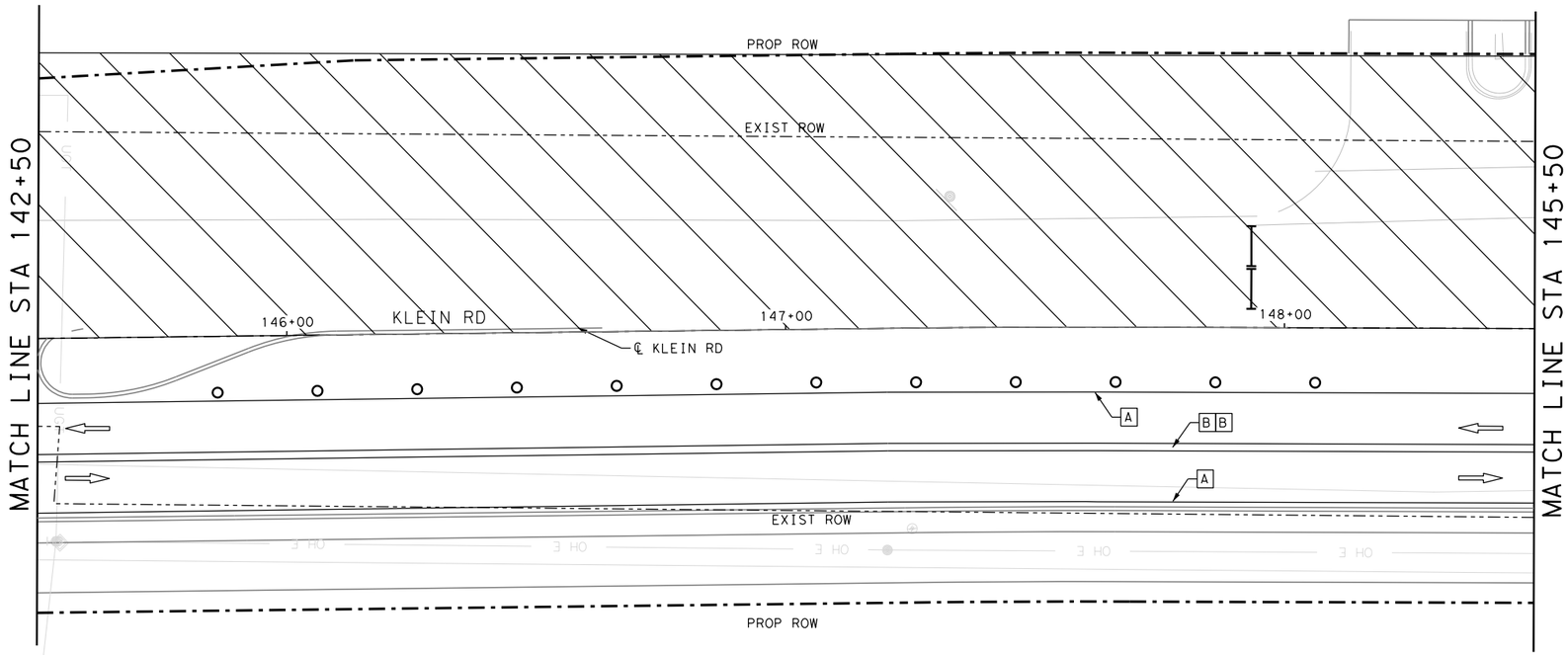
SHEET 16 OF 19

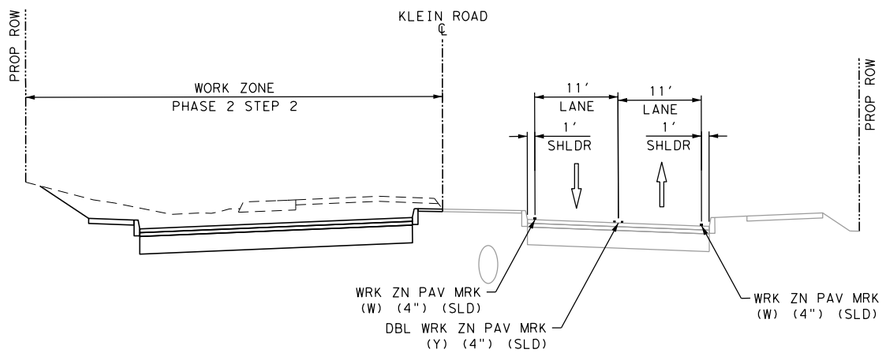
DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	91

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp2a16.dgn

ITEM	DESCRIPTION	UNIT	QTY
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	600
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	600





PHASE 2 STEP 2

N.T.S.

142+75 TO 147+23

NOTES:

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LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
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E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30′

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS

2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000

TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 2

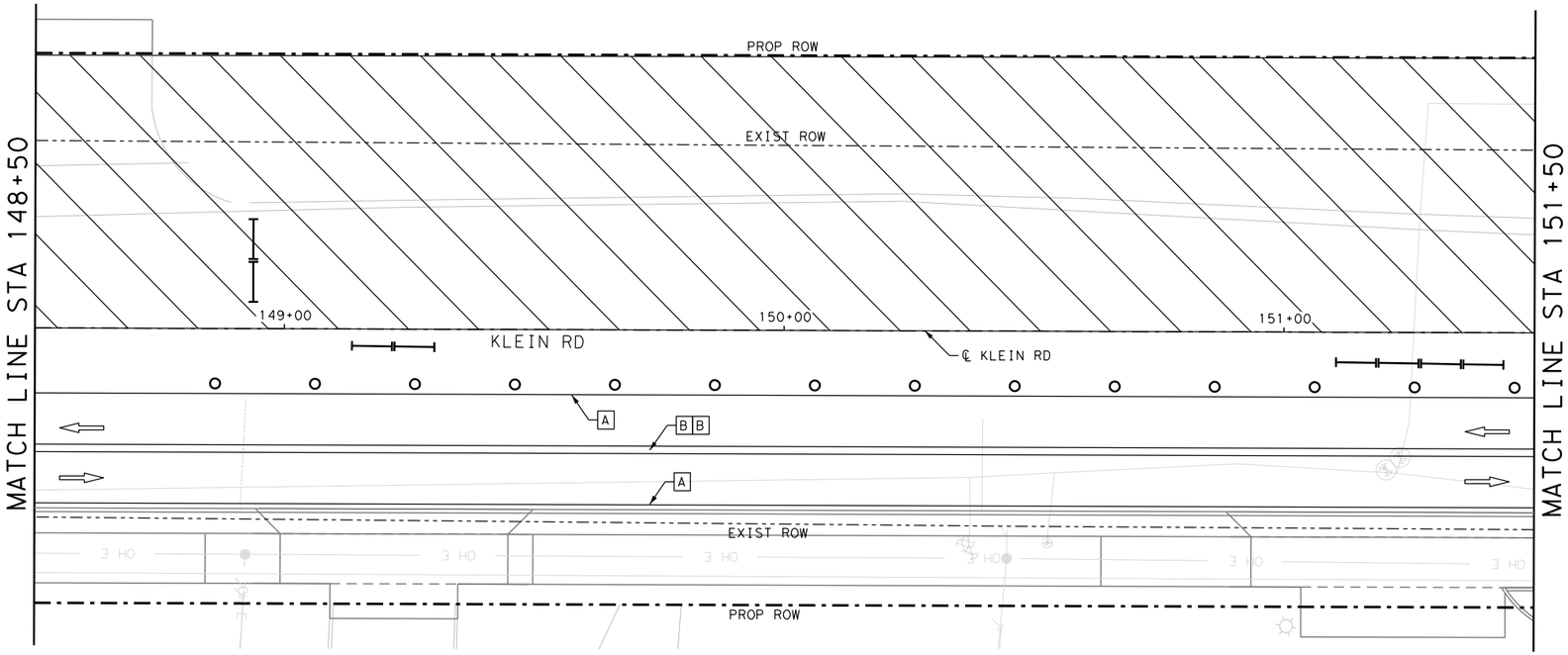
SHEET 17 OF 19

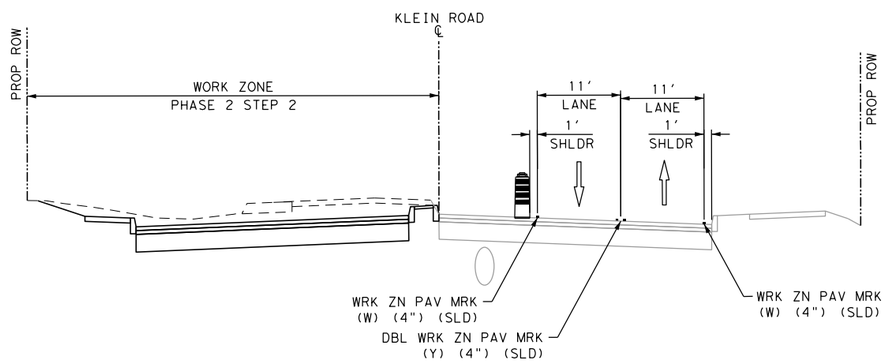
DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	92

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\PhaseII\5103003tcp2A17.dgn

ITEM	DESCRIPTION	UNIT	QTY
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	600
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	600





PHASE 2 STEP 2

N.T.S.

146+00 TO END

NOTES:

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LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
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D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 2

SHEET 18 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	93

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\Phase1\5103003tcp2a18.dgn

NOTES:

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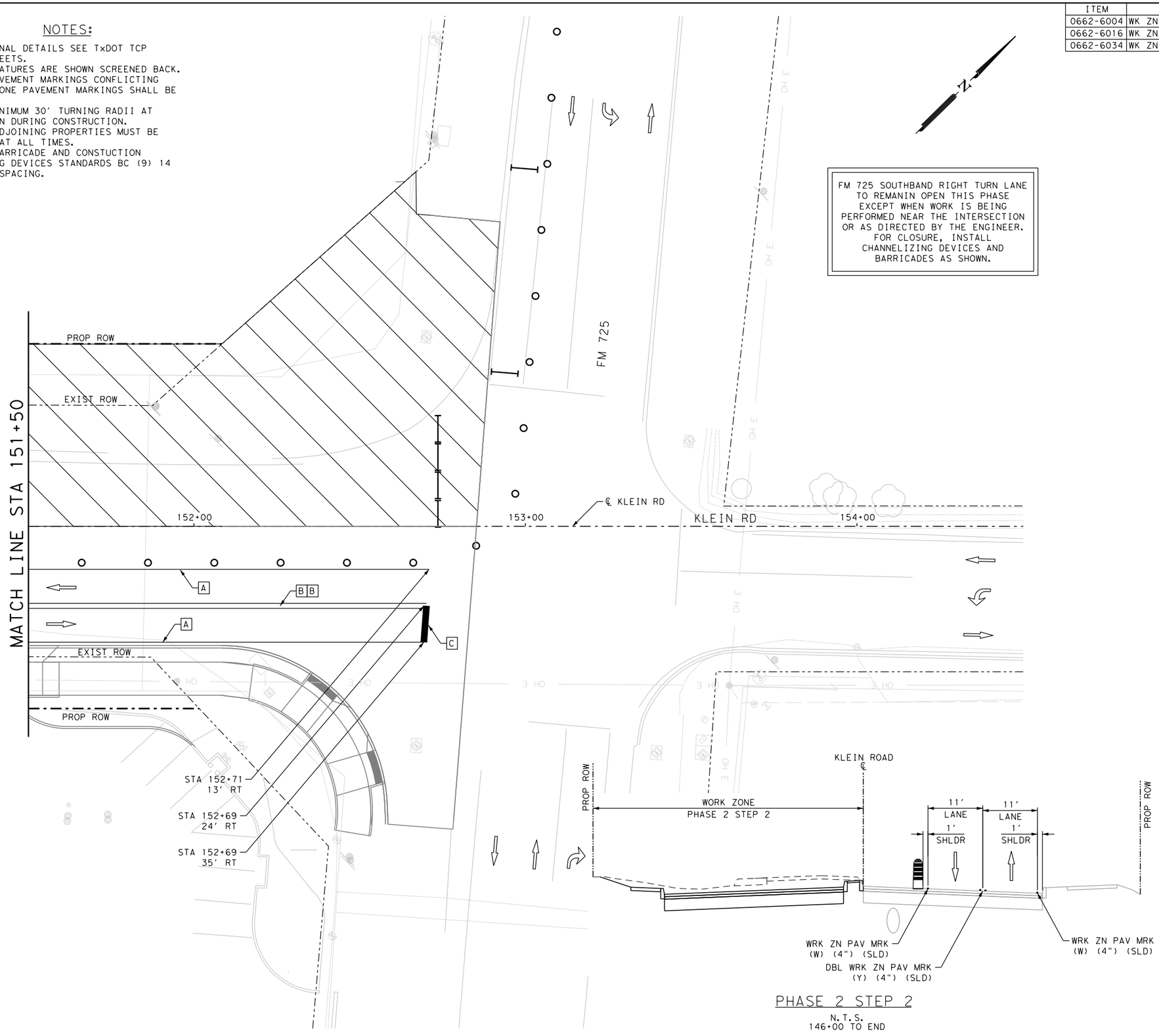
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

ITEM	DESCRIPTION	UNIT	QTY
0662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	240
0662-6016	WK ZN PAV MRK NON-REMOV (W)24"(SLD)	LF	11
0662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	240



FM 725 SOUTHBAND RIGHT TURN LANE TO REMANIN OPEN THIS PHASE EXCEPT WHEN WORK IS BEING PERFORMED NEAR THE INTERSECTION OR AS DIRECTED BY THE ENGINEER. FOR CLOSURE, INSTALL CHANNELIZING DEVICES AND BARRICADES AS SHOWN.

PHASE 2 STEP 2
N.T.S.
146+00 TO END

LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED
PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

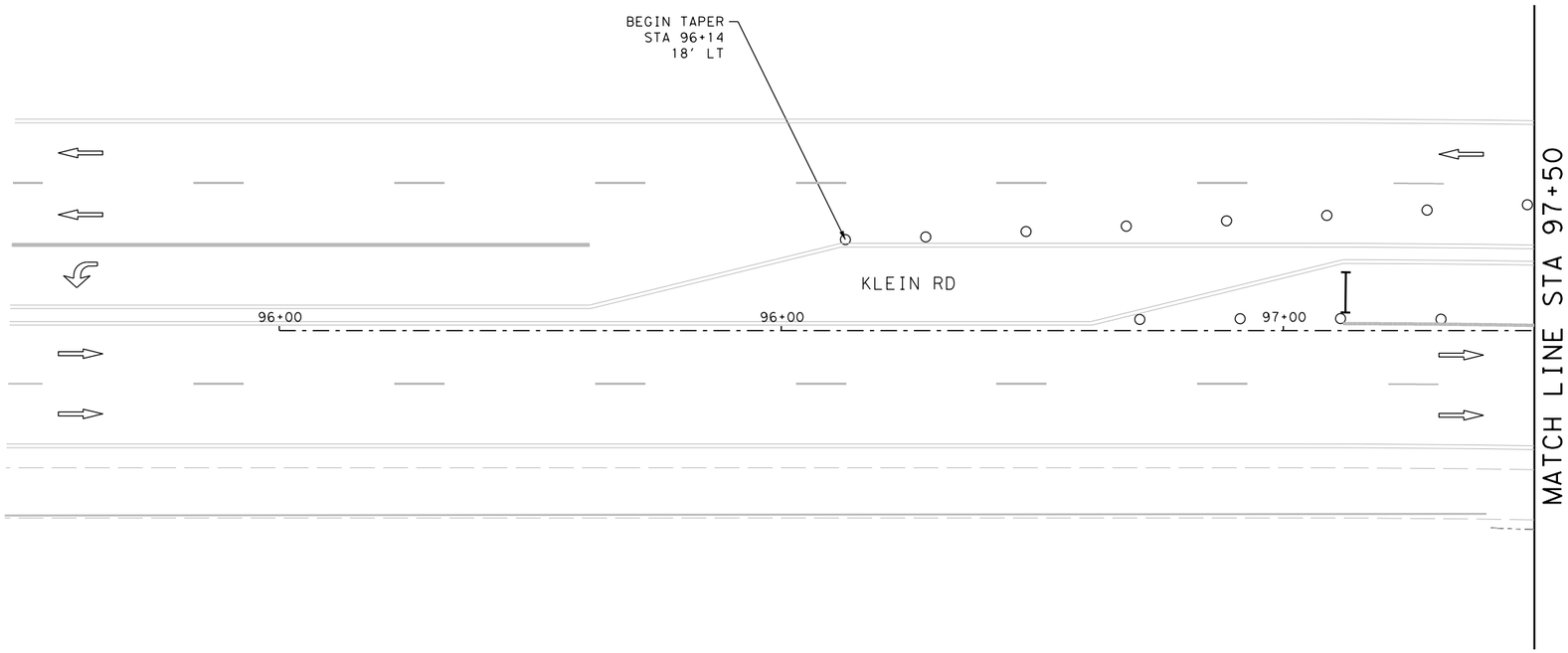
KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 2 STEP 2

SHEET 19 OF 19

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	94

Plotted on: 1/21/2021



LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
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- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
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E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

NOTES:

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3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
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6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 3

SHEET 1 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	95

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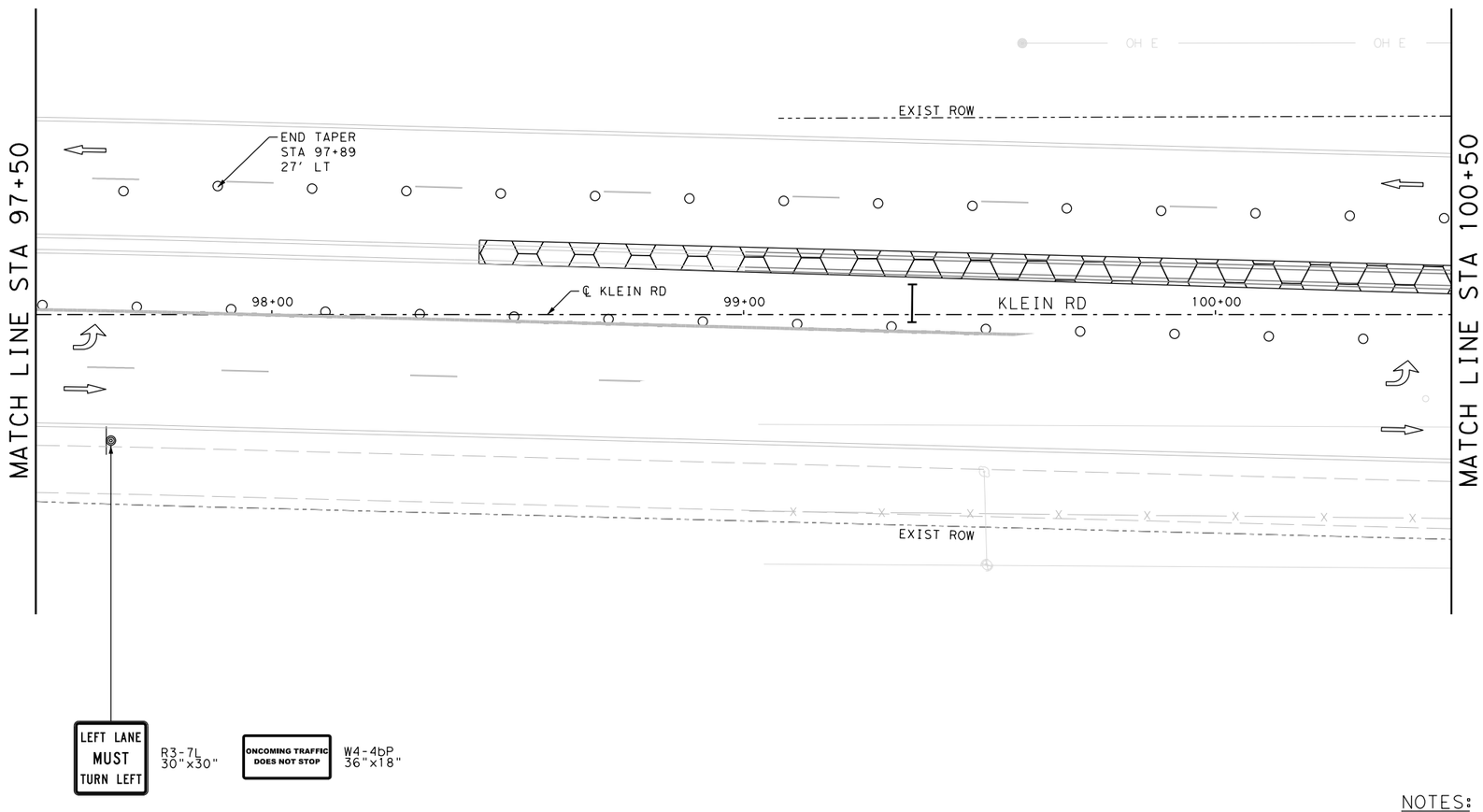

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LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
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- PLASTIC DRUM
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D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

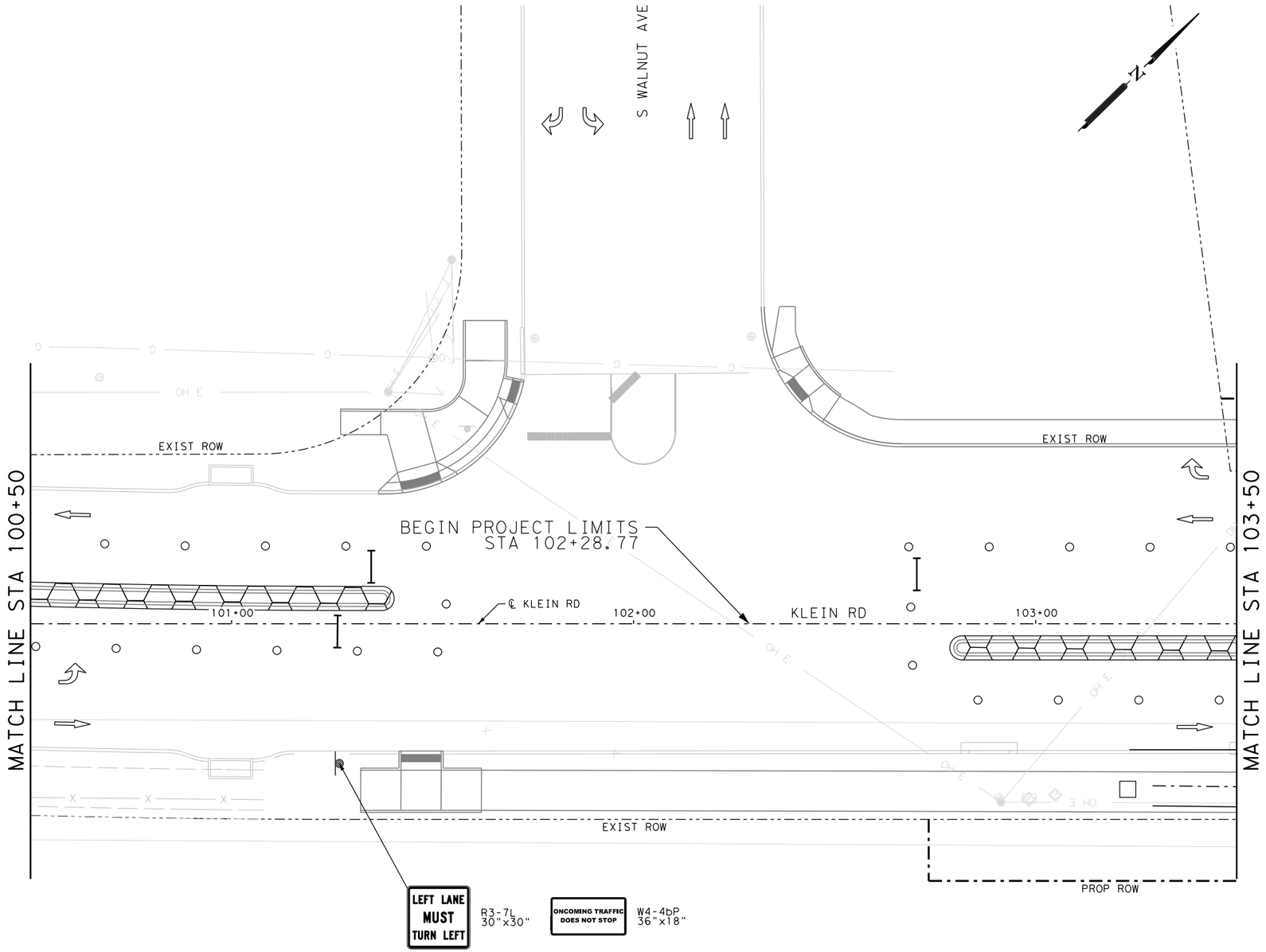
City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 3

SHEET 2 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	96



LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

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B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

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REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

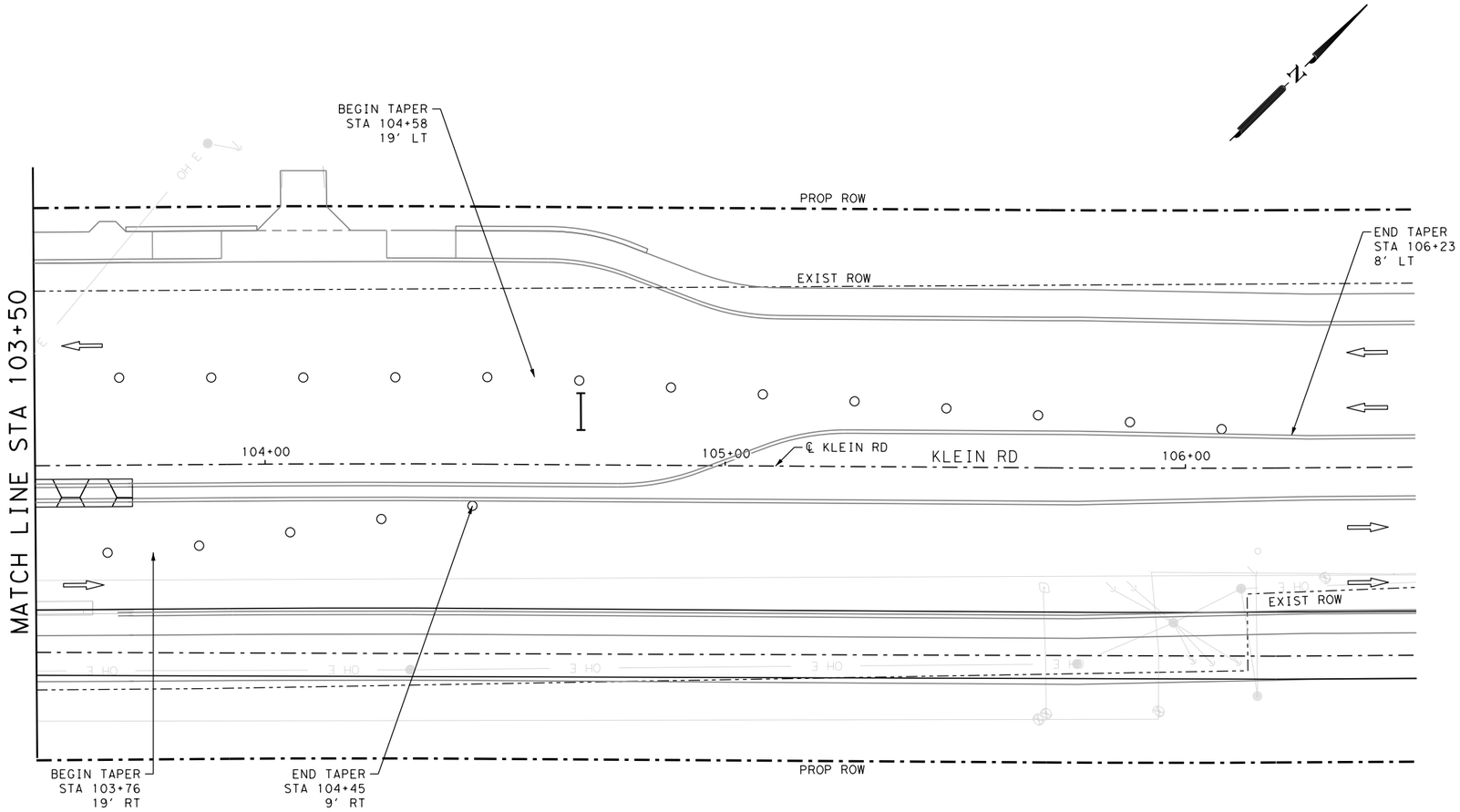
City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 3

SHEET 3 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	97



LEGEND

- SIGN
- TYPE III BARRICADE
- TRAFFIC FLOW ARROWS
- TEMPORARY PAVEMENT
- CONSTRUCTION PHASE
- PLASTIC DRUM
- LOW PROFILE CONCRETE BARRIER TYPE 1 AND TYPE 2

A	NON-REMOV (W)4"(SLD)	G	ELIM (8")
B	NON-REMOV (Y)4"(SLD)	H	ELIM (24")
M	NON-REMOV (W)8"(SLD)	I	ELIM (MED NOSE)
C	NON-REMOV (W)24"(SLD)	J	REMOV (W)4"(SLD)
D	ELIM (4")	K	REMOV (Y)4"(SLD)
E	ELIM (ARROW)	L	REMOV (W)8"(SLD)
F	ELIM (WORD)		

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/30/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/30/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. EXISTING PAVEMENT MARKINGS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS SHALL BE REMOVED.
4. MAINTAIN MINIMUM 30' TURNING RADII AT INTERSECTION DURING CONSTRUCTION.
5. ACCESS TO ADJOINING PROPERTIES MUST BE MAINTAINED AT ALL TIMES.
6. SEE TxDOT BARRICADE AND CONSTUCTION CHANNELIZING DEVICES STANDARDS BC (9) 14 FOR BARREL SPACING.

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

TRAFFIC CONTROL PLAN PHASE 3

SHEET 4 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	98

Plotted on: 4/30/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\TCP\PhaseIII\5103003tcp304.dgn

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. 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).

2. The development and design of the Traffic Control Plan (TCP)is the responsibility of the Engineer.

3. 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.

4. 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.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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.

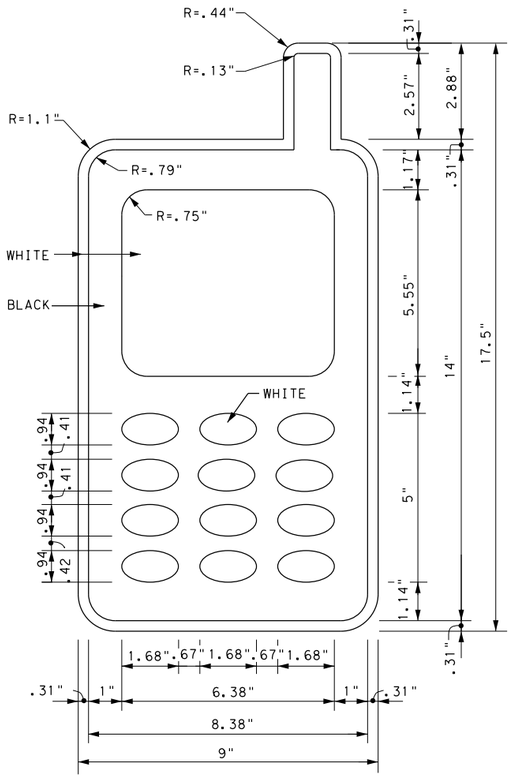
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. 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:

1. 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.



3.0" Radius, 1.25" Border, 0.75" Indent, Black on Yellow;
[STAY ALERT] Font: D
3.0" Radius, 1.25" Border, 0.75" Indent, Black on Orange;
[TALK OR TEXT LATER] Font: C specified length;

SIGN DETAIL (G20-10T)

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

Texas Department of Transportation | Traffic Operations Division Standard

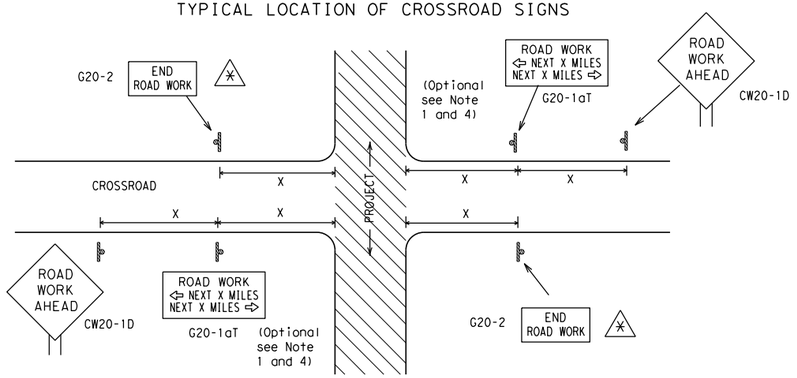
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
4-03 5-10 8-14	DIST	COUNTY		SHEET NO.
9-07 7-13	SAT	GUADALUPE		99

DATE: 1/21/2021 1:23:28 PM
FILE: H:\Projects\510\30\03\Design\Civil\Standards\TCP\bc-14.dgn

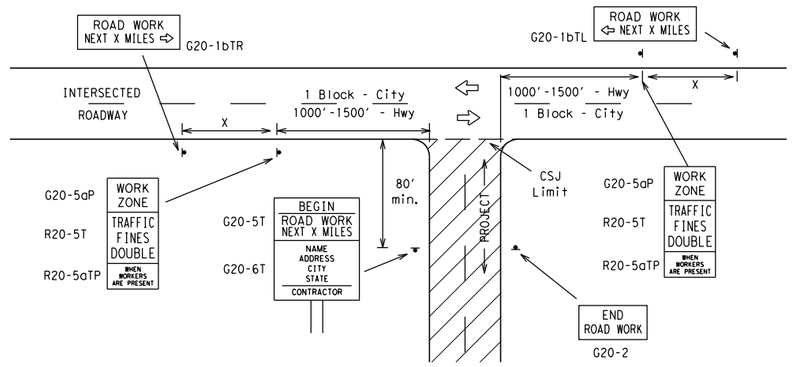
TYPICAL LOCATION OF CROSSROAD SIGNS



⚹ May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of Engineer. (See note 2 below)

1. 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.
2. 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.
3. 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.
4. 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.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. 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

1. 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.
2. 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]

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

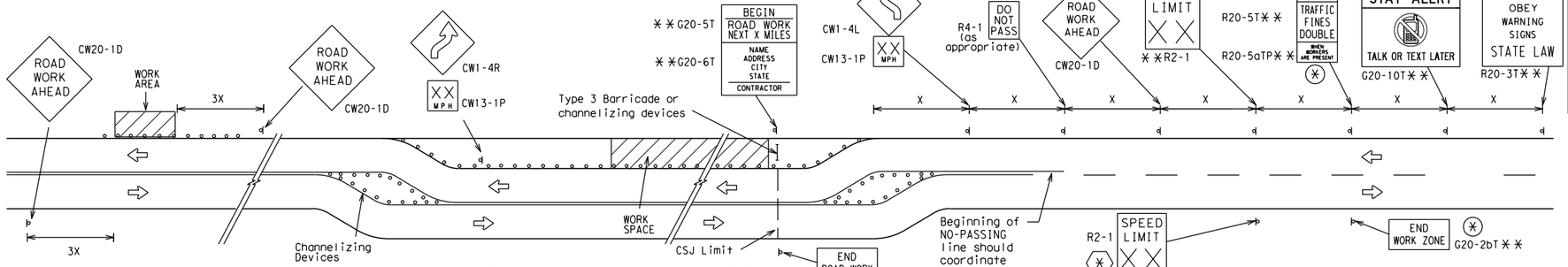
⚹ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 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".
5. Only diamond shaped warning sign sizes are indicated.
6. 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.

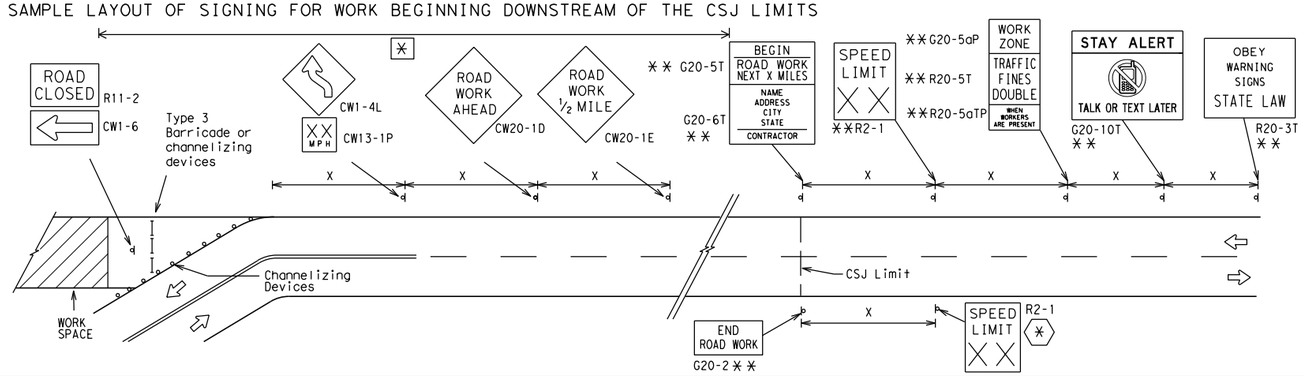
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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 AT THE CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF 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.

Texas Department of Transportation

Traffic Operations Division Standard

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				KLEIN RD
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	SAT	GUADALUPE		100

DATE: 1/21/2021 1:23:29 PM
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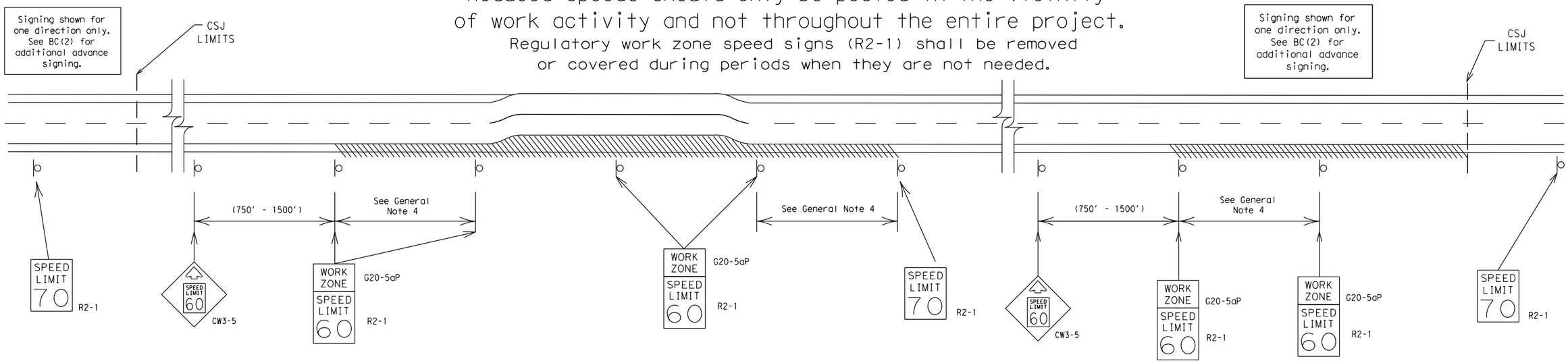
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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:

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) 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

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. 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
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. 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.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. 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.

Texas Department of Transportation

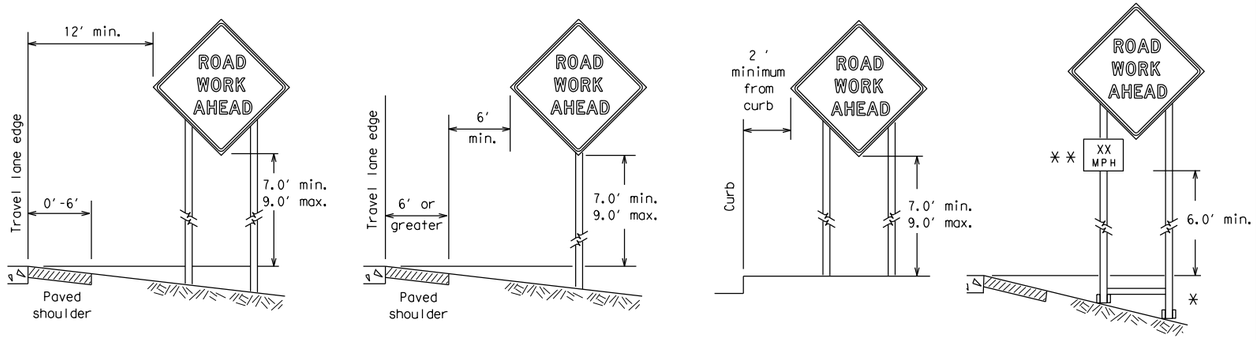
Traffic Operations Division Standard

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				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		101

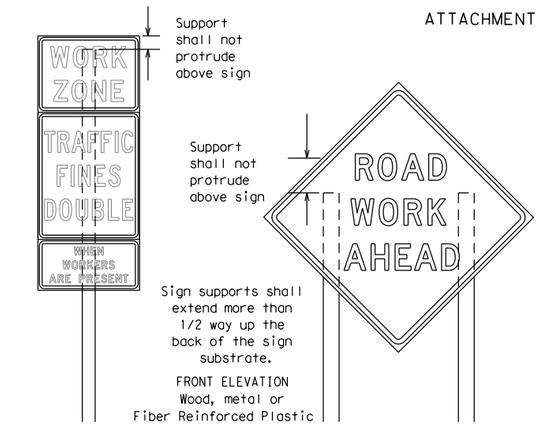
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



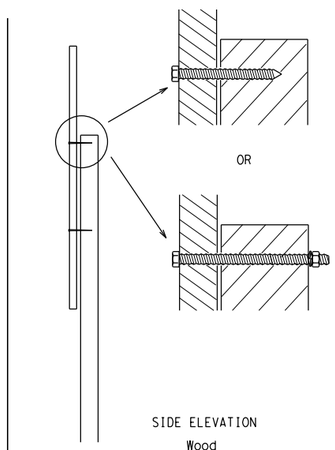
⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⁎⁎ 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



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 spice 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.

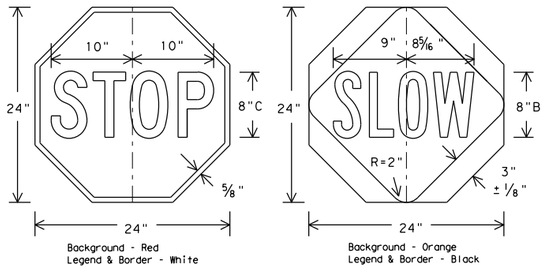


Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.

STOP/SLOW PADDLES

1. 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.
2. When used at night, the STOP/SLOW paddle shall be retroreflectorized.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6′ to the bottom of the sign.
4. 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

1. 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.
2. 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.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. 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.
5. 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.
6. 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

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. 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)

1. 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.
   a. Long-term stationary - work that occupies a location more than 3 days.
   b. 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.
   c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration - work that occupies a location up to 1 hour.
   e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

1. 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.
2. 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.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. 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.
5. 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

1. 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

1. 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.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. 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

1. 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).
2. White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
3. 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

1. 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

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. 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.
3. 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.
4. 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.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
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 shall 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.

FLAGS ON SIGNS

1. 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.

Texas Department of Transportation

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 7-13				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		102

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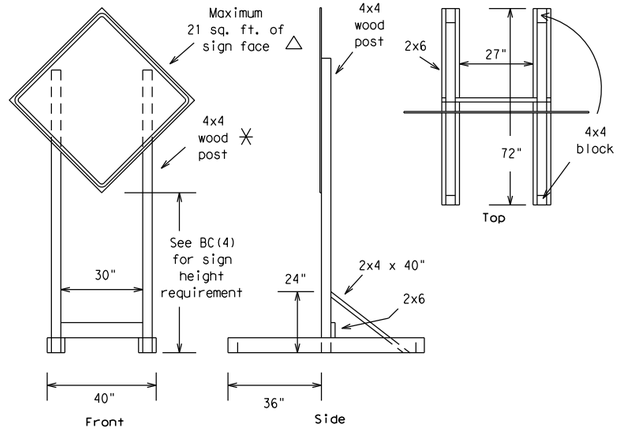
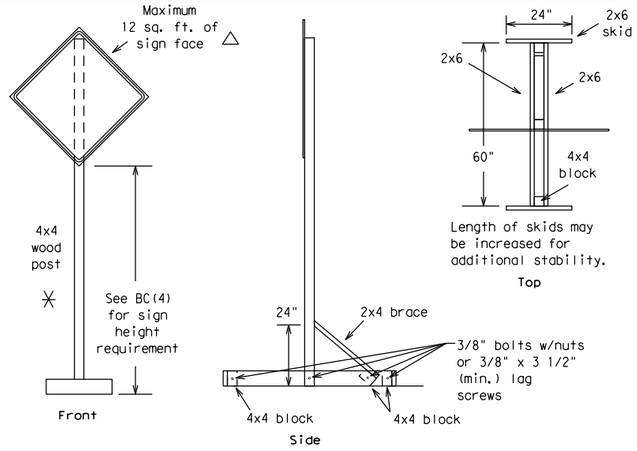
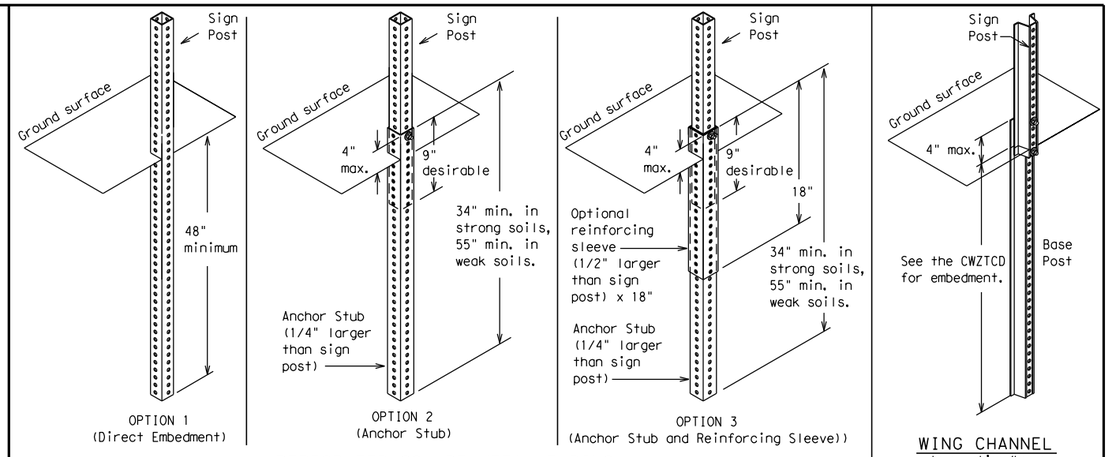




SKID MOUNTED WOOD SIGN SUPPORTS

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

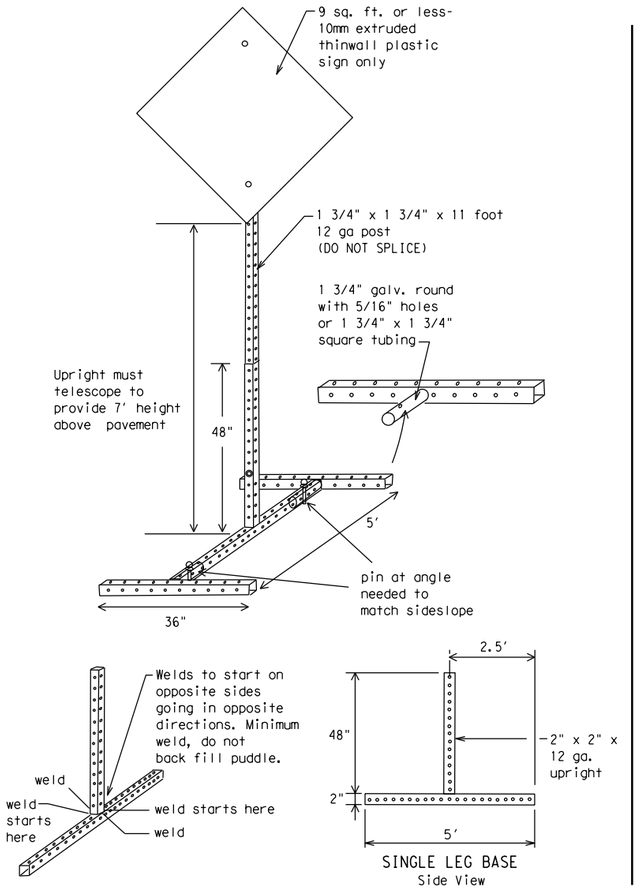


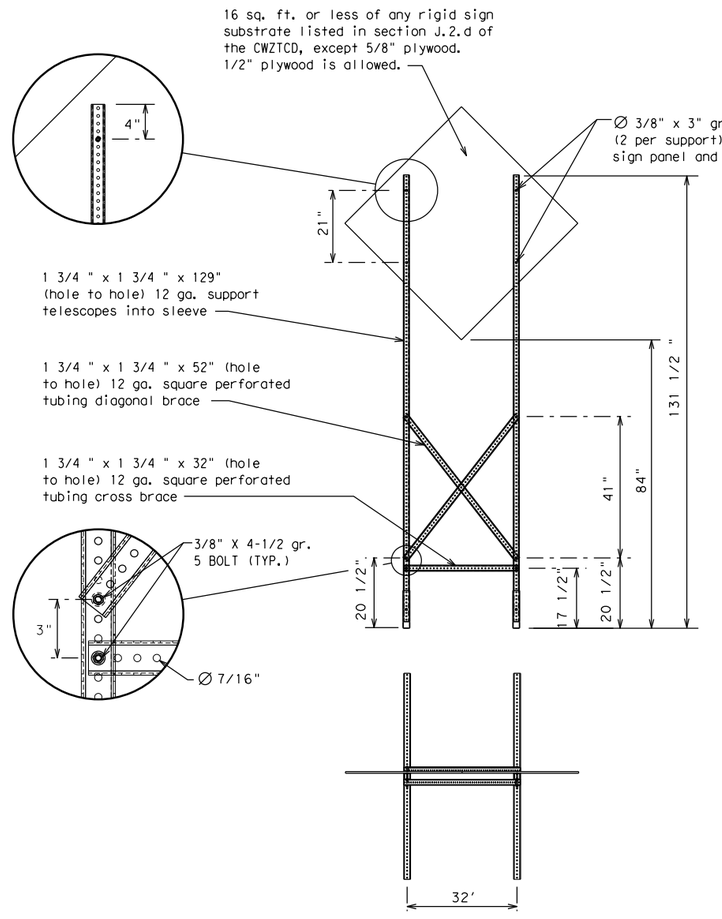
PERFORATED SQUARE METAL TUBING

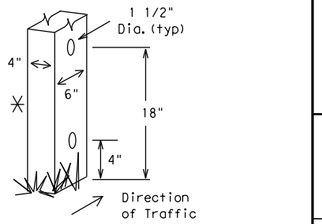
WING CHANNEL
Lap-splice/base bolted anchor

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.

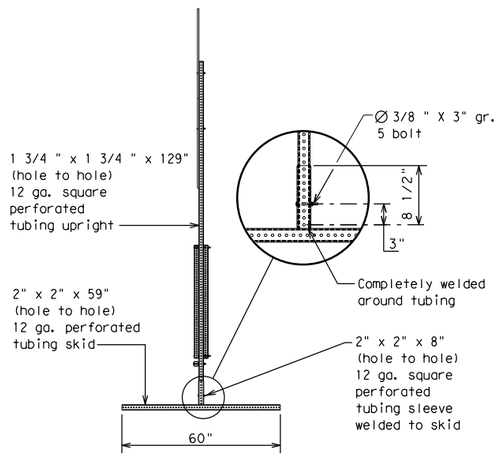






Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS



SKID MOUNTED PERFORATED SQUARE STEEL TUBING 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

1. 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.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. 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.

Texas Department of Transportation

Traffic Operations Division Standard

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				KLEIN RD
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	SAT	GUADALUPE		103

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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

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. 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.
3. 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.
4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. 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.
8. 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.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. 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.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. 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.
15. 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.
16. Each line of text should be centered on the message board rather than left or right justified.
17. 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.

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

WORD OR PHRASE	ABBREVIATION
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
Will Not	WONT

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

- FREEWAY CLOSED X MILE
- FRONTAGE ROAD CLOSED
- ROAD CLOSED AT SH XXX
- SHOULDER CLOSED XXX FT
- ROAD CLSD AT FM XXXX
- RIGHT LN CLOSED XXX FT
- RIGHT X LANES CLOSED
- RIGHT X LANES OPEN
- CENTER LANE CLOSED
- DAYTIME LANE CLOSURES
- NIGHT LANE CLOSURES
- I-XX SOUTH EXIT CLOSED
- VARIOUS LANES CLOSED
- EXIT XXX CLOSED X MILE
- EXIT CLOSED
- RIGHT LN TO BE CLOSED
- MALL DRIVEWAY CLOSED
- X LANES CLOSED TUE - FRI
- XXXXXXXX BLVD CLOSED

Other Condition List

- ROADWORK XXX FT
- ROAD REPAIRS XXXX FT
- FLAGGER XXXX FT
- LANE NARROWS XXXX FT
- RIGHT LN NARROWS XXXX FT
- TWO-WAY TRAFFIC XX MILE
- MERGING TRAFFIC XXXX FT
- CONST TRAFFIC XXX FT
- LOOSE GRAVEL XXXX FT
- UNEVEN LANES XXXX FT
- DETOUR X MILE
- ROUGH ROAD XXXX FT
- ROADWORK PAST SH XXXX
- ROADWORK NEXT FRI-SUN
- BUMP XXXX FT
- US XXX EXIT X MILES
- TRAFFIC SIGNAL XXXX FT
- 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
- FORM X LINES RIGHT
- DETOUR NEXT X EXITS
- USE XXXXX RD EXIT
- USE EXIT XXX
- USE EXIT I-XX NORTH
- STAY ON US XXX SOUTH
- USE I-XX E TO I-XX N
- TRUCKS USE US XXX N
- WATCH FOR TRUCKS
- WATCH FOR TRUCKS
- EXPECT DELAYS
- EXPECT DELAYS
- PREPARE TO STOP
- REDUCE SPEED XXX FT
- END SHOULDER USE
- USE OTHER ROUTES
- WATCH FOR WORKERS
- STAY IN LANE *

Location List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. 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.
6. 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

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. 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

1. 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.
2. 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.
3. 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.
4. 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.

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	SAT	GUADALUPE		104

100

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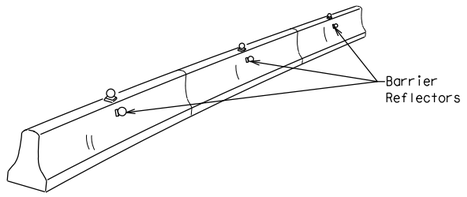
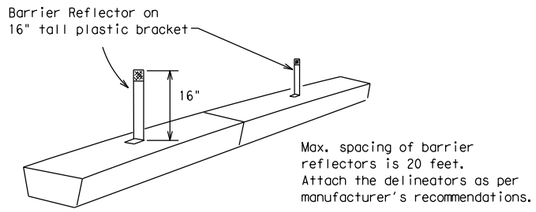
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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

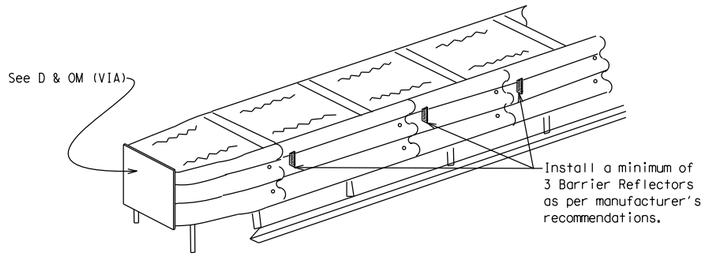


CONCRETE TRAFFIC BARRIER (CTB)

3. 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.
4. 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.
5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
7. Maximum spacing of Barrier Reflectors is forty (40) feet.
8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
11. Single slope barriers shall be delineated as shown on the above detail.



LOW PROFILE CONCRETE BARRIER (LPCB)

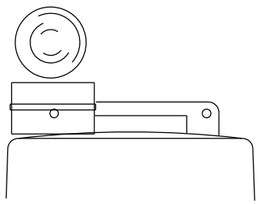


DELINEATION OF END TREATMENTS

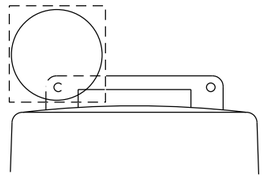
END TREATMENTS FOR
CTB'S USED
IN WORK ZONES

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



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

WARNING LIGHTS

1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. 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.
4. 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".
5. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
6. 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.
7. 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.
8. The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

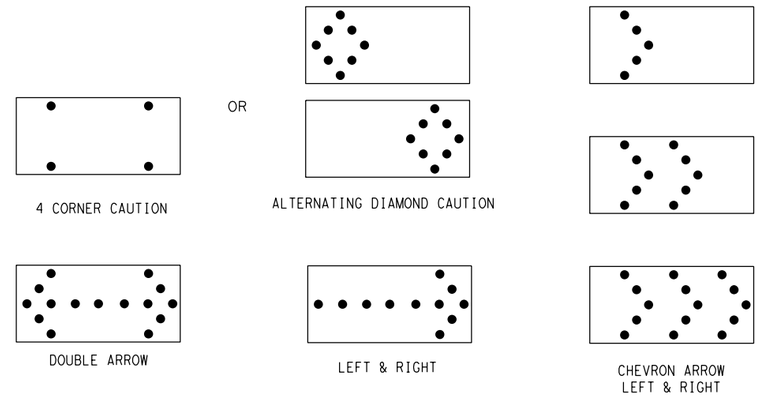
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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.
4. 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.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. 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

1. 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.
2. 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.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. 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.
6. 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.
7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

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.

1. 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.
2. 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.
3. 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.
4. The Flashing Arrow Board should be able to display the following symbols:



5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
6. The straight line caution display is NOT ALLOWED.
7. 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.
8. 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.
9. The sequential arrow display is NOT ALLOWED.
10. The flashing arrow display is the TxDOT standard; however, the sequential Chevron display may be used during daylight operations.
11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
13. 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.
14. 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

TRUCK-MOUNTED ATTENUATORS

1. 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).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. 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.
6. 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.

Texas Department of Transportation

Traffic Operations Division Standard

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				KLEIN RD
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	SAT	GUADALUPE		105

101

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GENERAL NOTES

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. 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.
3. 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.
4. 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).
5. 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.
6. 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:

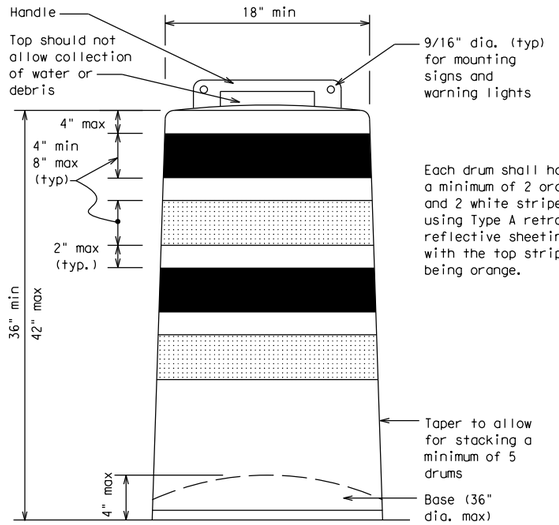
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

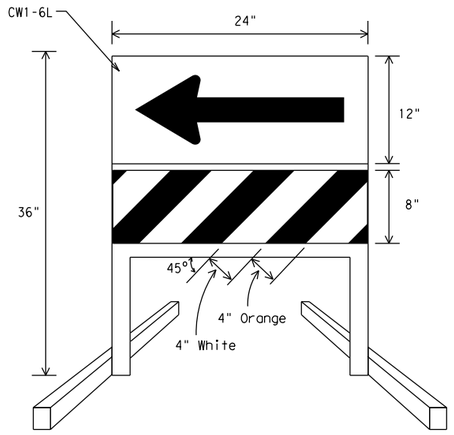
RETROREFLECTIVE SHEETING

1. 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.
2. 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

1. 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.
2. 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.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. 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.
5. 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.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.

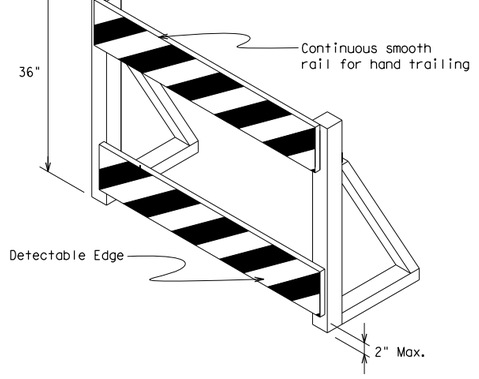




DIRECTION INDICATOR BARRICADE

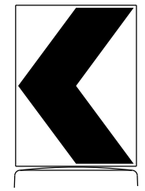
1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) 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.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.

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

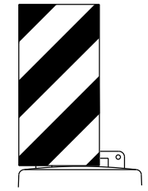


DETECTABLE PEDESTRIAN BARRICADES

1. 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.
2. 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.
3. 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.
4. 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.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. 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.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer



12" x 24"
Vertical Panel
mount with diagonals sloping down towards travel way

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. 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.
3. 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.
4. 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.
5. Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. 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.
8. 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.

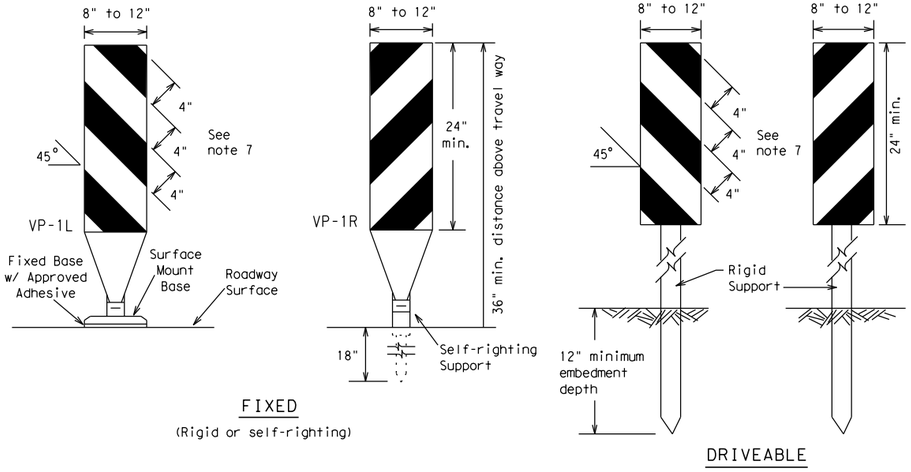
Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

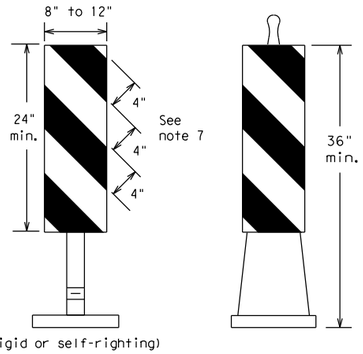
FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	SAT	GUADALUPE		106



FIXED

(Rigid or self-righting)

DRIVEABLE

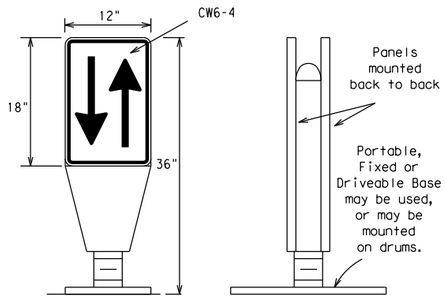


(Rigid or self-righting)

PORTABLE

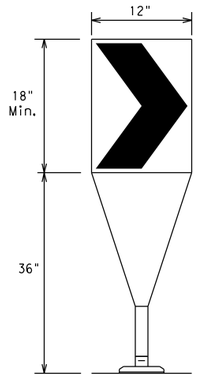
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is 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.
3. 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.
4. VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VPs)



1. 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.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. 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.

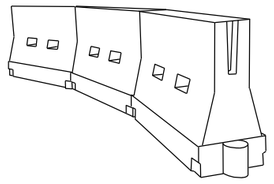
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. 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.
3. 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.
4. To be effective, the chevron should be visible for at least 500 feet.
5. 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.
6. 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)

1. 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.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. 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

1. 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.
2. 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.
3. 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.
4. 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.
5. 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

1. 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).
2. 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.
3. 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).
4. 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.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. 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.
7. 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 ** 10′ Offset	11′ Offset	12′ Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent
30	$L = \frac{WS^2}{60}$	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

Texas Department of Transportation

Traffic Operations Division Standard

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				KLEIN RD
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	SAT	GUADALUPE		107

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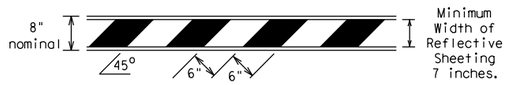
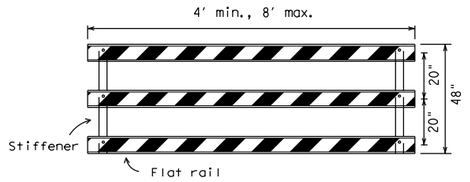
TYPE 3 BARRICADES

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.



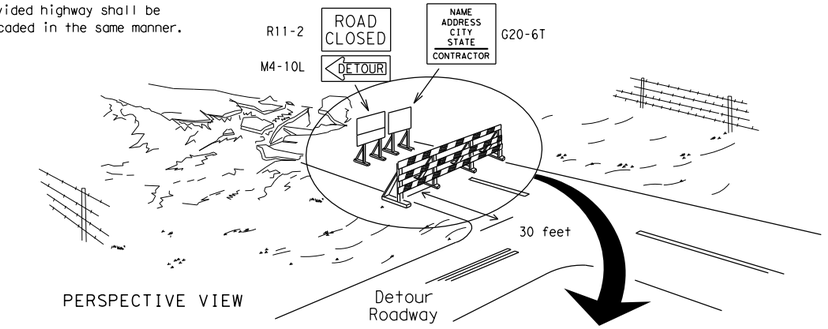
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

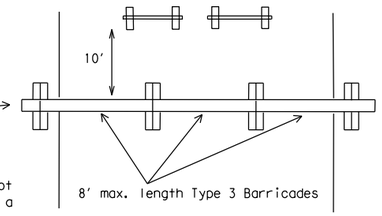
Each roadway of a divided highway shall be barricaded in the same manner.



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.

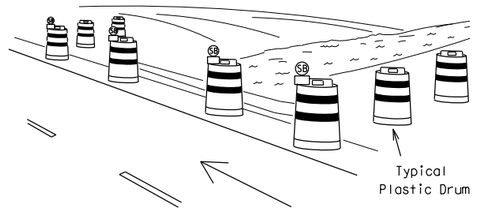
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

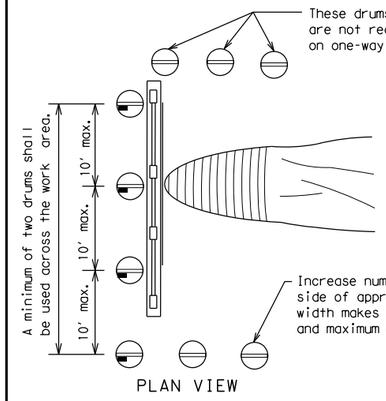
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

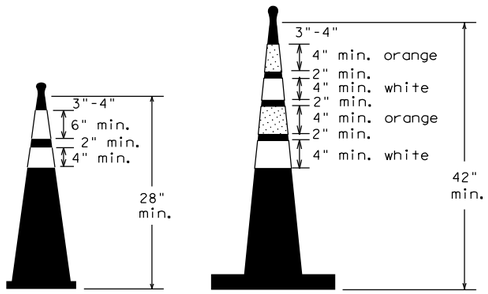
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder 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.



PLAN VIEW

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

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones

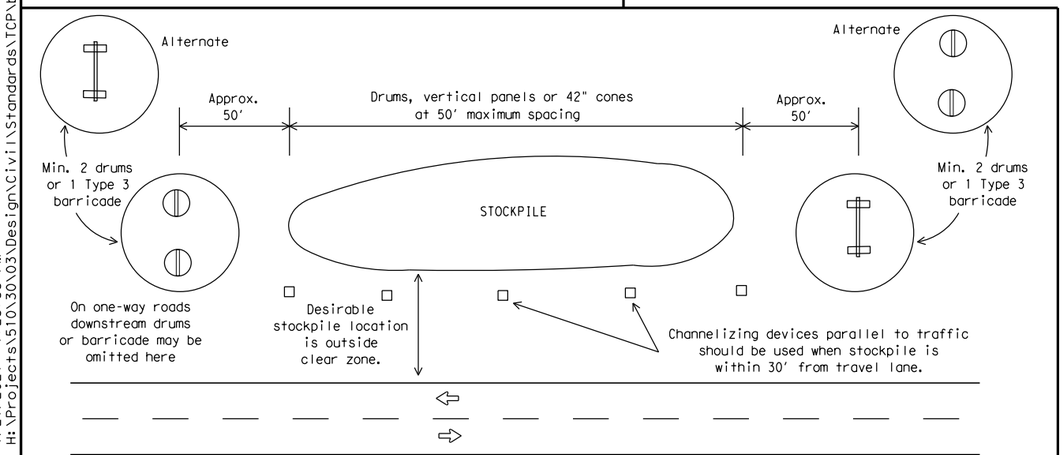
One-Piece cones

Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.

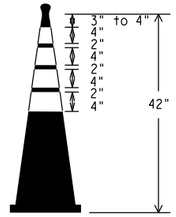
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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



EDGELINE 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.

Texas Department of Transportation

Traffic Operations Division Standard

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				KLEIN RD
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	SAT	GUADALUPE		108

DATE: 1/21/2021 1:23:33 PM
FILE: H:\Projects\510\30\03\Design\Civil\Standards\TCP\bc-14.dgn

WORK ZONE PAVEMENT MARKINGS

GENERAL

1. 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.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. 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).
6. 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.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. 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

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

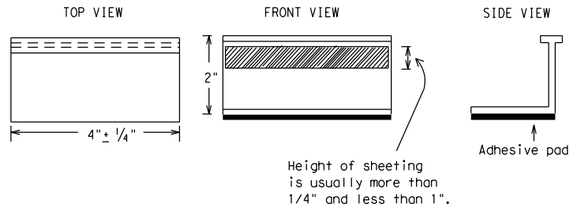
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. 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.
3. 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.
4. 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

1. 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.
2. 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.
3. 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".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. 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.
10. 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

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. 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.
   A. 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.
   B. 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.
3. Small design variances may be noted between tab manufacturers.
4. 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

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. 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).

Texas Department of Transportation

Traffic Operations Division Standard

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				KLEIN RD
2-98 9-07	DIST	COUNTY		SHEET NO.
1-02 7-13	SAT	GUADALUPE		109
11-02 8-14				

105

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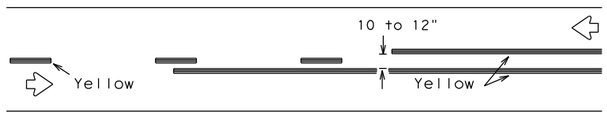
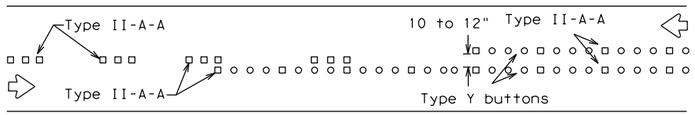
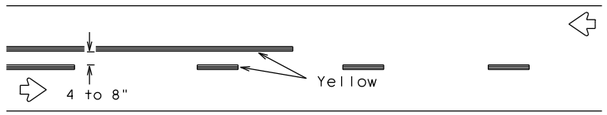
PAVEMENT MARKING PATTERNS



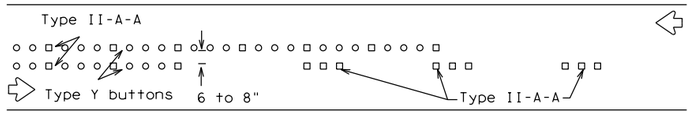
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



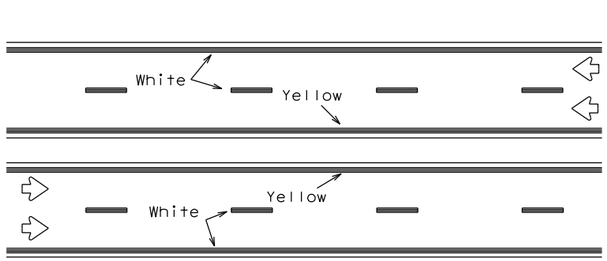
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



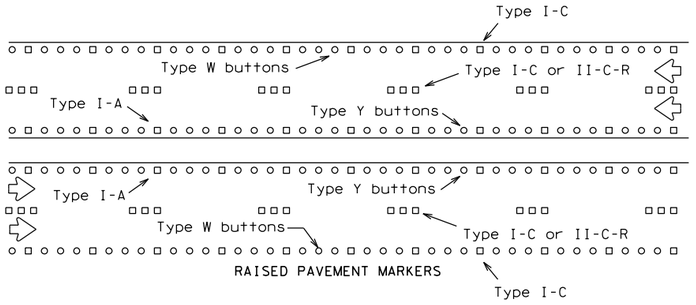
RAISED PAVEMENT MARKERS - PATTERN B

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.

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



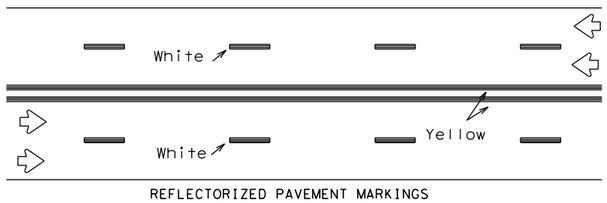
REFLECTORIZED PAVEMENT MARKINGS



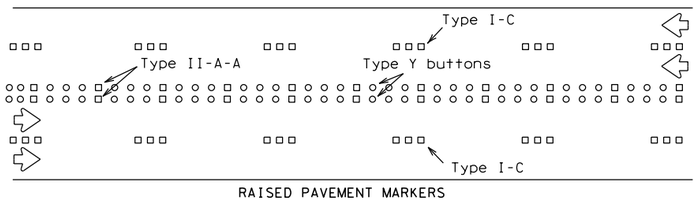
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



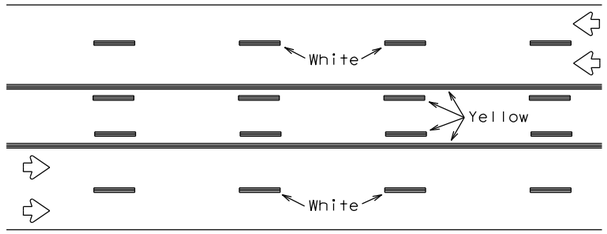
REFLECTORIZED PAVEMENT MARKINGS



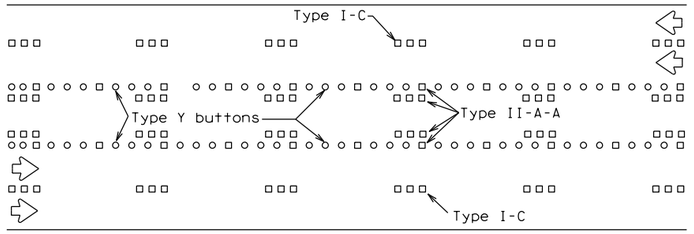
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

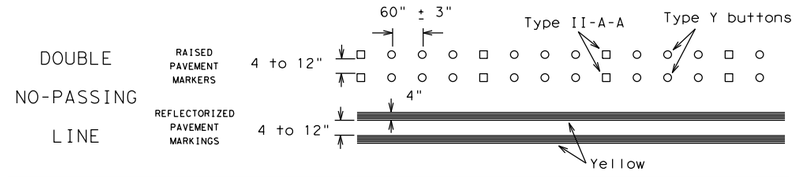
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

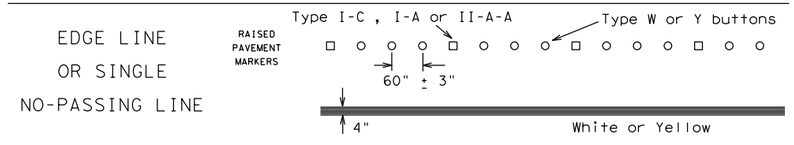
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

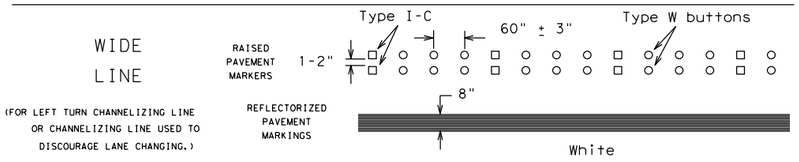


EDGE LINE OR SINGLE NO-PASSING LINE



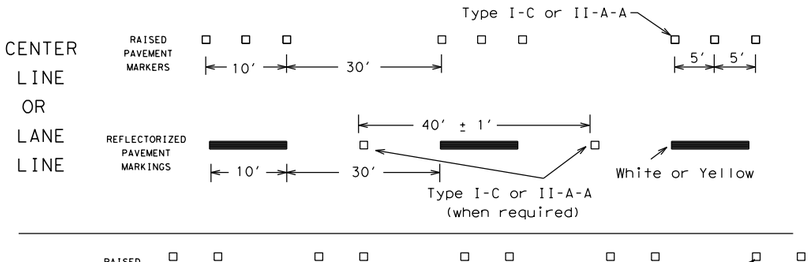
WIDE LINE

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

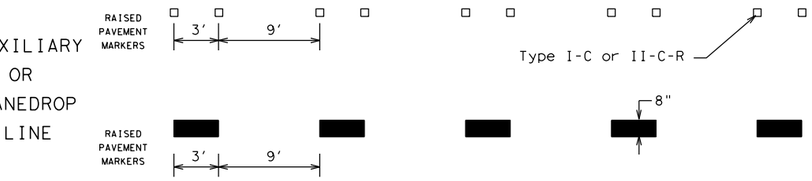


BROKEN LINES

CENTER LINE OR LANE LINE

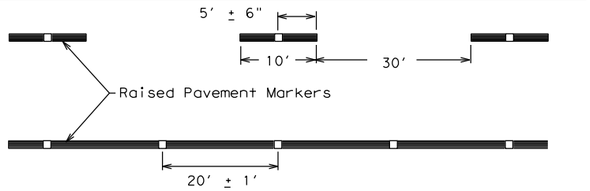


AUXILIARY OR LANEDROP LINE



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.



Centerline only - not to be used on edge lines

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."

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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1-97 9-07	DIST	COUNTY		SHEET NO.
2-98 7-13	SAT	GUADALUPE		110
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106

DATE: 1/21/2021
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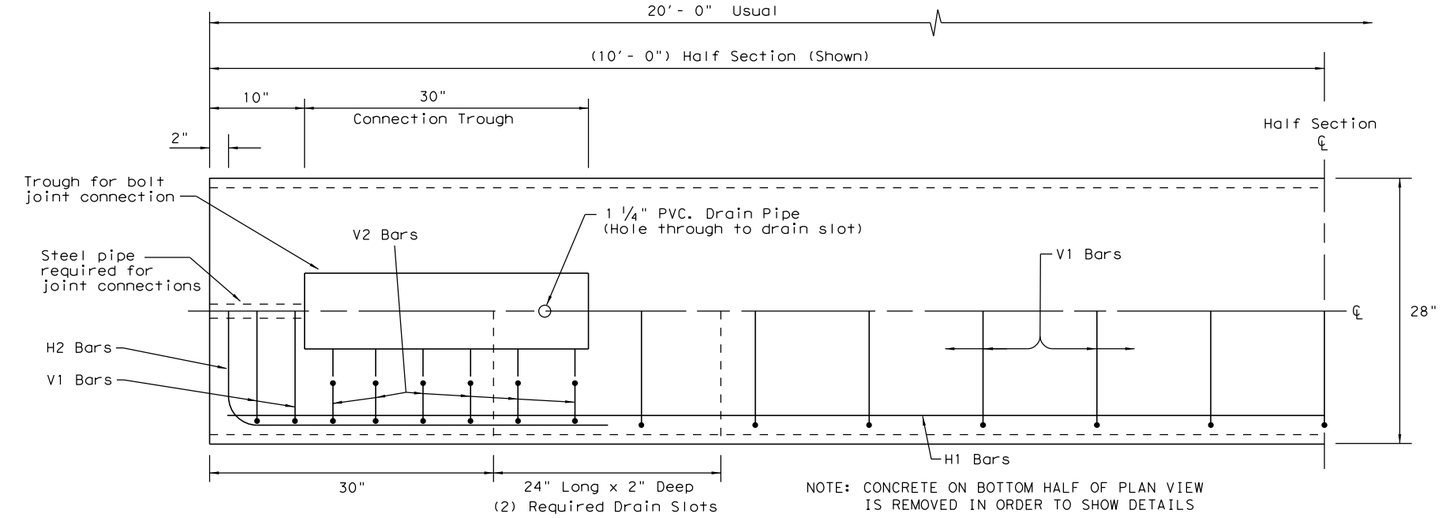
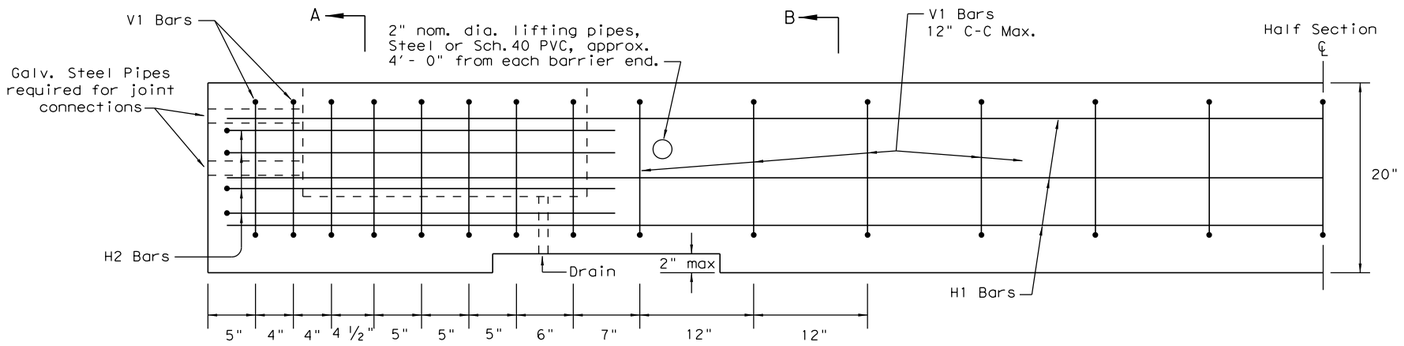
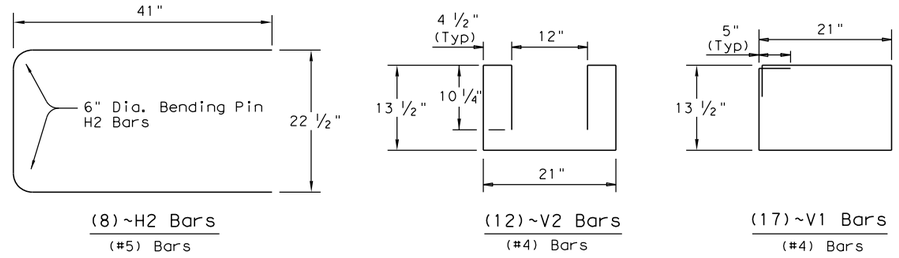


PLAN
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



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



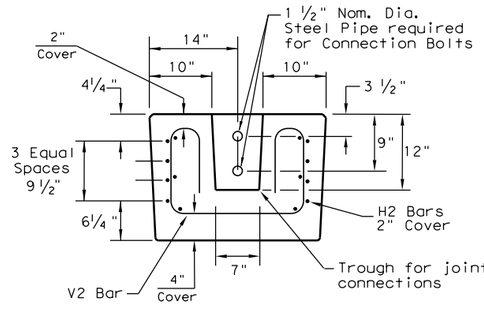
(8)~H2 Bars
(#5) Bars

(12)~V2 Bars
(#4) Bars

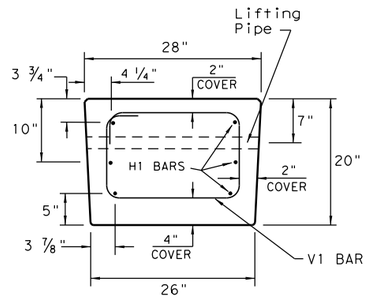
(17)~V1 Bars
(#4) Bars

REINFORCING STEEL DETAILS
TYPE 1 - BARRIER SEGMENT

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



SECTION A-A



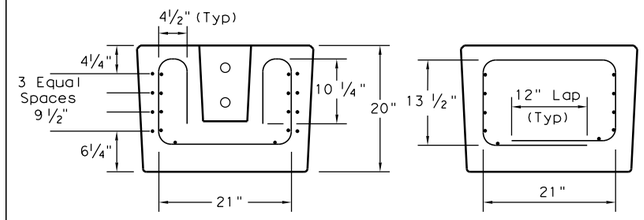
SECTION B-B

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 ¾" 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



SECTION A-A SECTION B-B

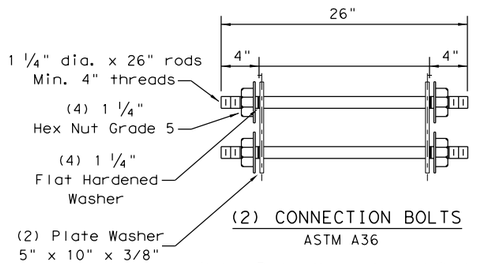
(WWR) GENERAL NOTES

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



(2) CONNECTION BOLTS
ASTM A36

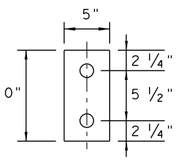


PLATE WASHER
5" x 10" x ⅜"

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

SHEET 1 OF 2

Texas Department of Transportation
Design Division Standard

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				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		111

DATE: 1/21/2021
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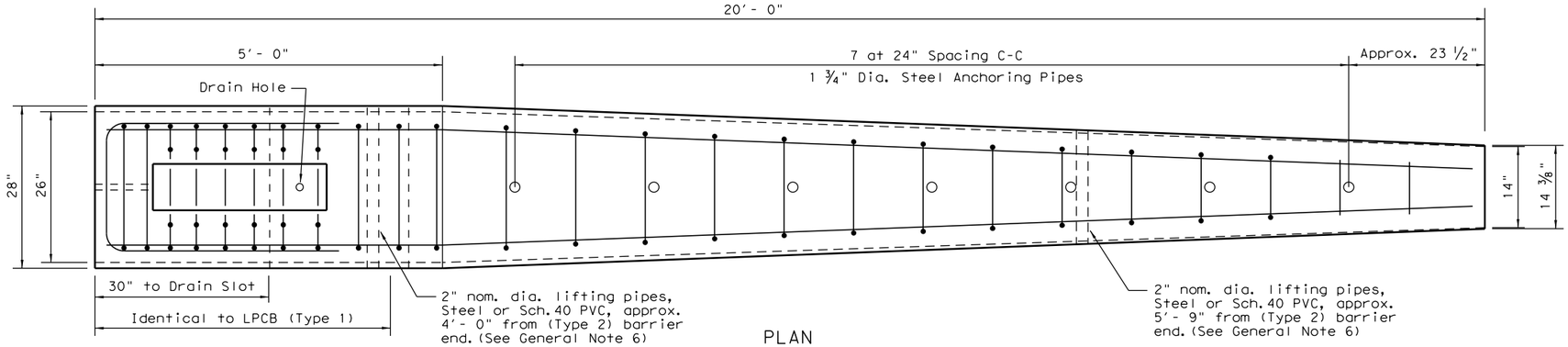
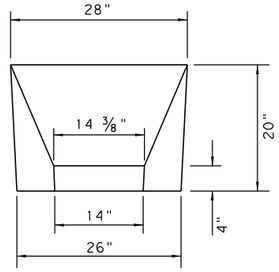
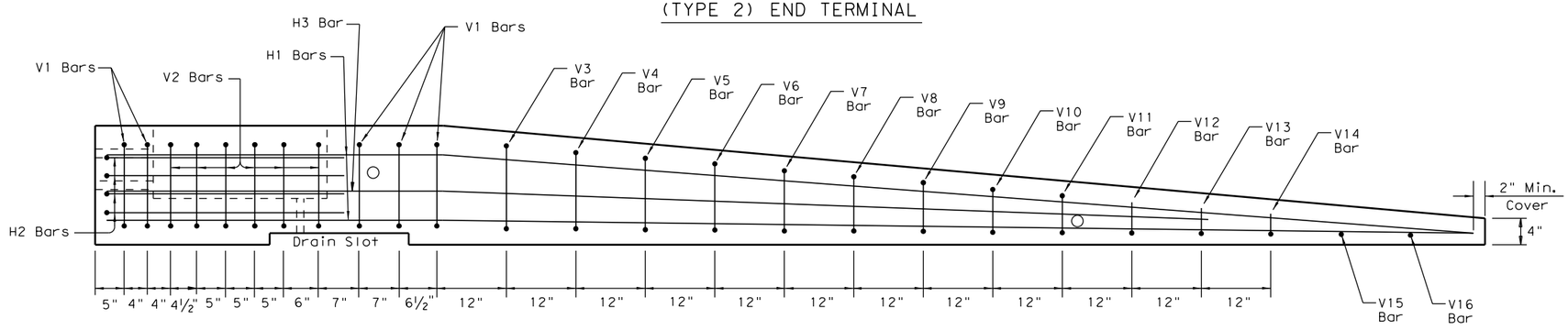


PLAN
(TYPE 2) END TERMINAL



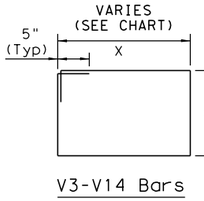
APPROACH VIEW



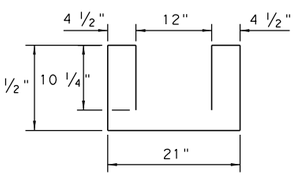
ELEVATION
(TYPE 2) END TERMINAL

TYPE 2 - NOTES

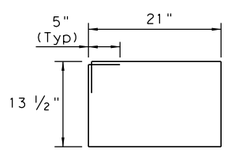
1. Welded wire reinforcment (WWR) is "not" an option for Type 2 Barrier.
2. Type 2 Barrier shall be used as an end treatment for the Type 1 barrier segments, when applicable.
3. The end treatment can be used without the anchor pins in locations that can accommodate approximately 4 ft. of lateral displacement 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.



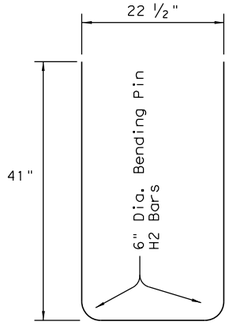
V3-V14 Bars



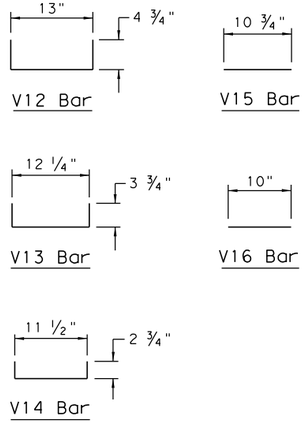
(6)~V2 Bars



(5)~V1 Bars



(4)~H2 Bars
(#5) Bars

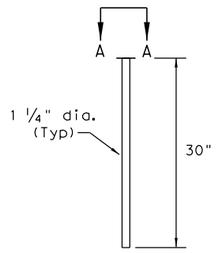


Note: All V Bars are (#4)

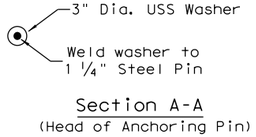
BAR (#4)	X (IN.)	Y (IN.)
V3 BAR	20 ¼	14 ½
V4 BAR	19 ½	13 ½
V5 BAR	18 ½	12 ¼
V6 BAR	17 ½	11 ¼
V7 BAR	17	10 ¼
V8 BAR	16 ¼	9
V9 BAR	15 ½	8
V10 BAR	14 ½	7
V11 BAR	13 ¾	6

REINFORCING STEEL DETAILS
TYPE 2 - END TERMINAL

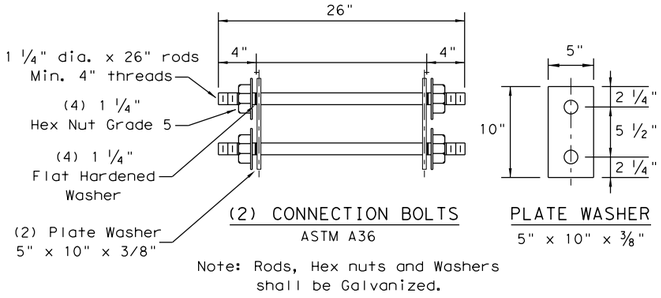
Note:
Anchoring pipes not shown in Elevation View



(7) Anchor Pins
ASTM A36 Steel
(See Note 3)



Section A-A
(Head of Anchoring Pin)

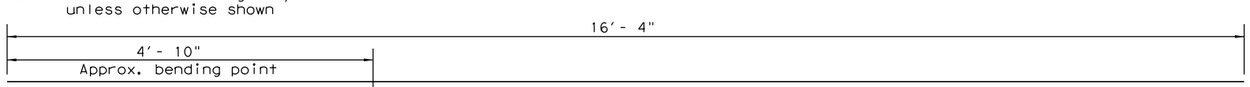


(2) CONNECTION BOLTS
ASTM A36

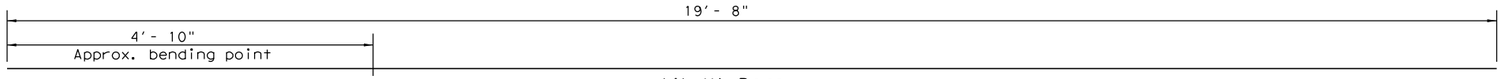
PLATE WASHER
5" x 10" x ⅜"

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

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



(2)~H3 Bars
(#5) Bar



Note: Bends on H1 and H3 bars are slight and do not require formal bends.

(4)~H1 Bars
(#5) Bar

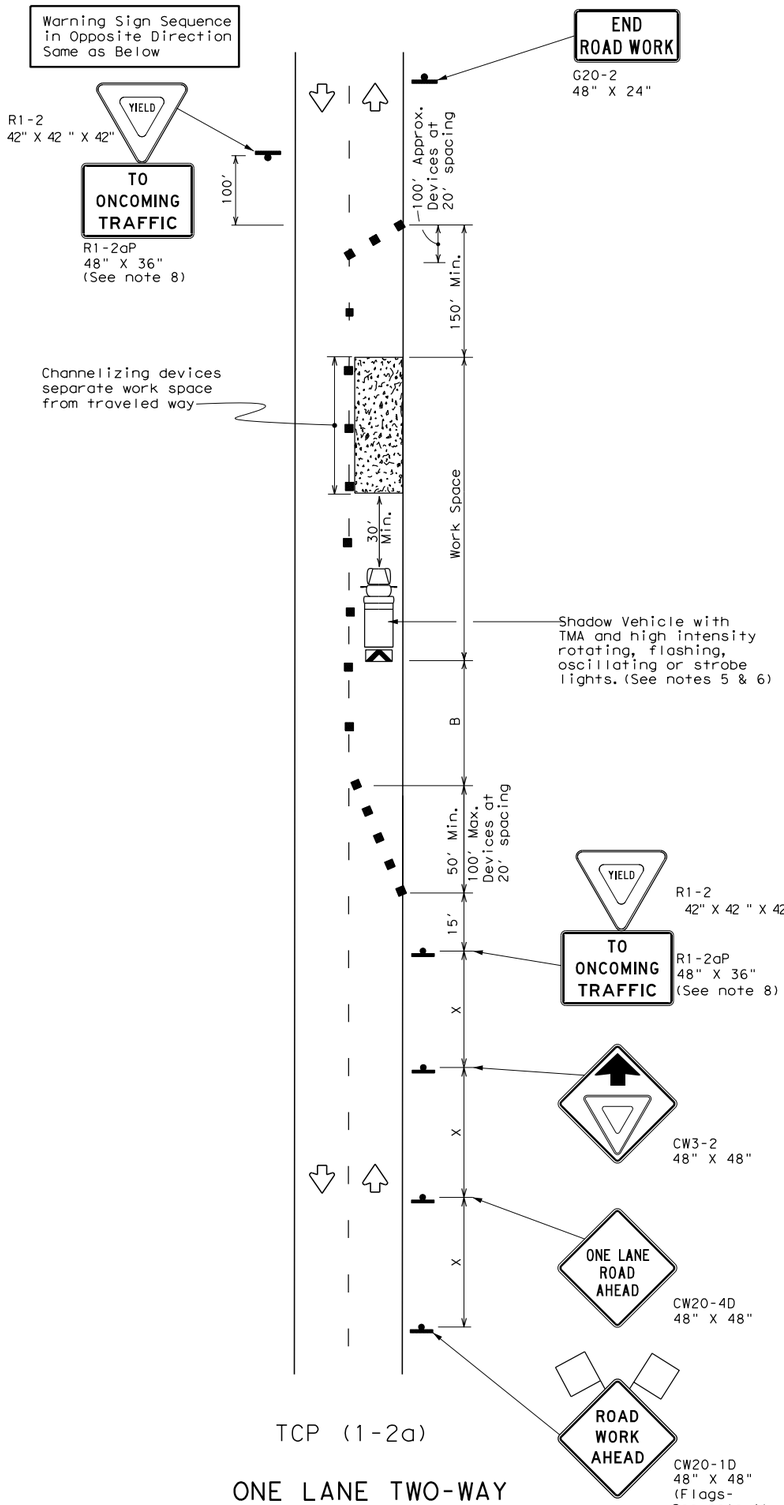
FOR CONTRACTORS INFORMATION ONLY

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

Texas Department of Transportation
Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 2)
LPCB-13

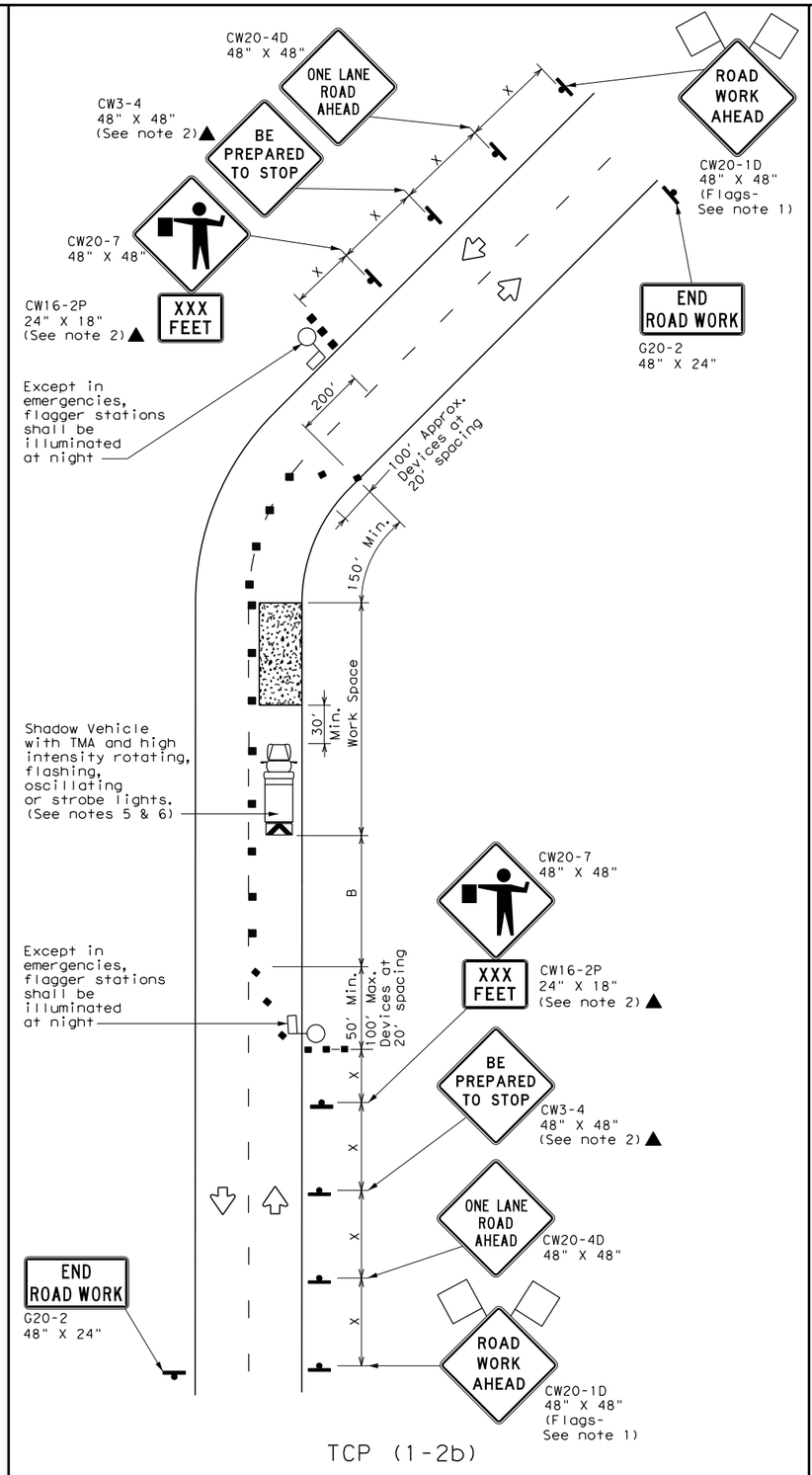
FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
© TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		112



TCP (1-2a)

ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	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

1. Flags attached to signs where shown are REQUIRED.
2. 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.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. 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.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

7. R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
8. R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

TCP (1-2b)

9. Flaggers should use two-way radios or other methods of communication to control traffic.
10. Length of work space should be based on the ability of flaggers to communicate.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
12. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
13. 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(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-90 4-98 2-94 2-12 1-97 2-18	C	S	J	HWY
	DIST	COUNTY		SHEET NO.
	DST	CTY		113

152

DATE: DATE TIME
FILE: DOCUMENT NAME

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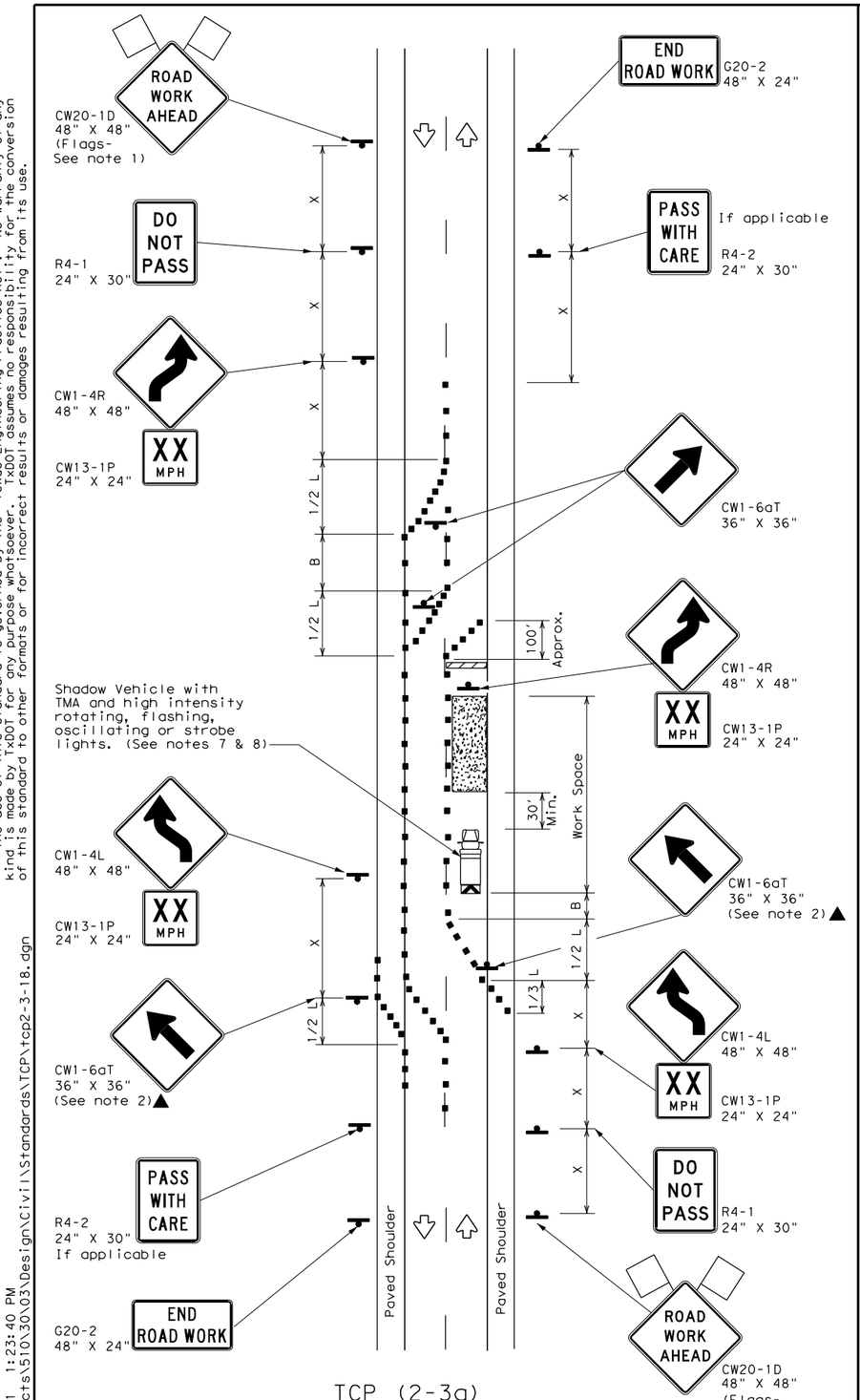
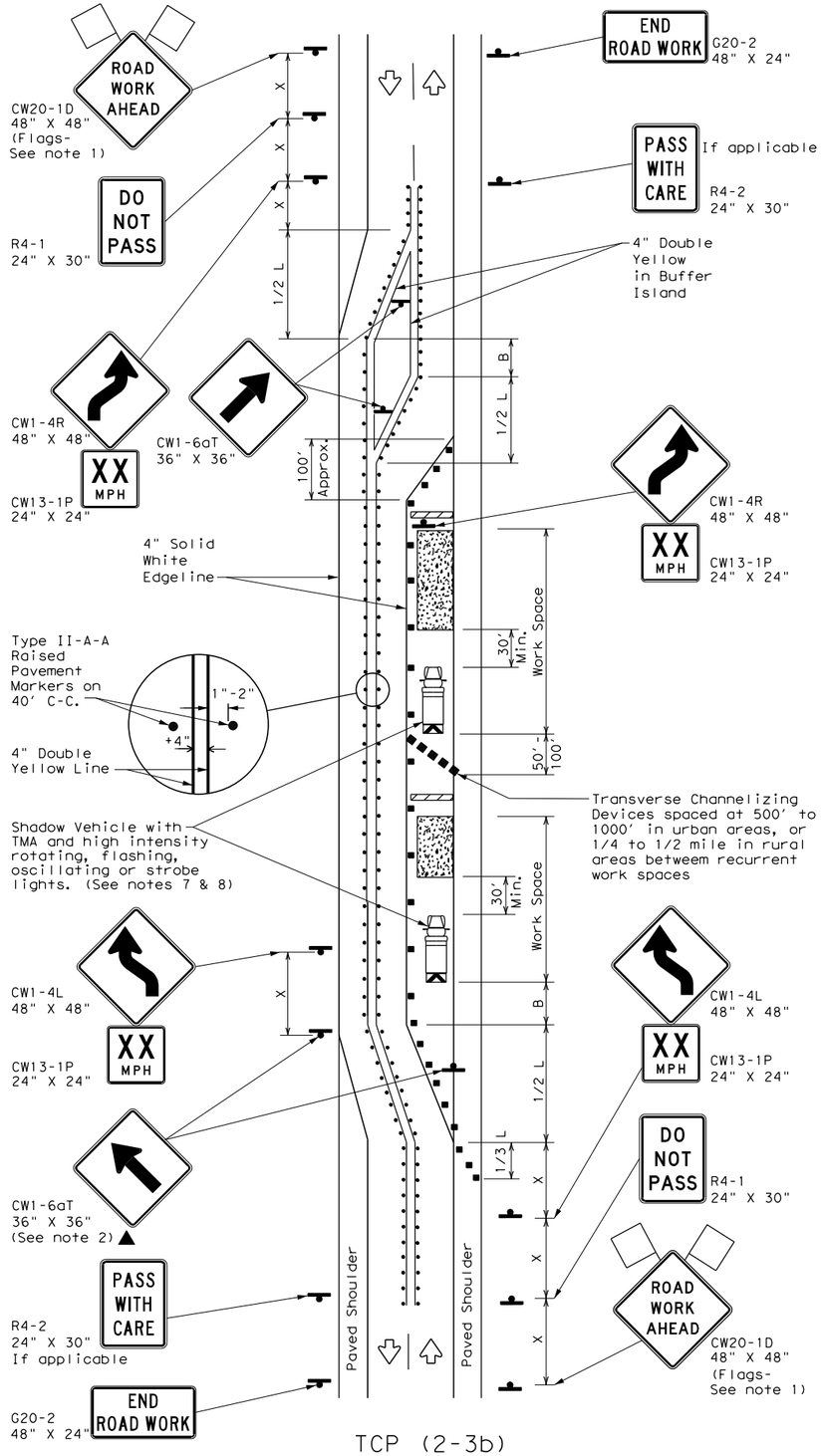


TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

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 ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
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

1. Flags attached to signs where shown, are REQUIRED.
2. 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.
3. 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.
4. 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.
5. 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.
6. Conflicting pavement marking shall be removed for long term projects.
7. 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.
8. 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)

9. 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.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-18

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	SAT	GUADALUPE		114
4-98 2-18				

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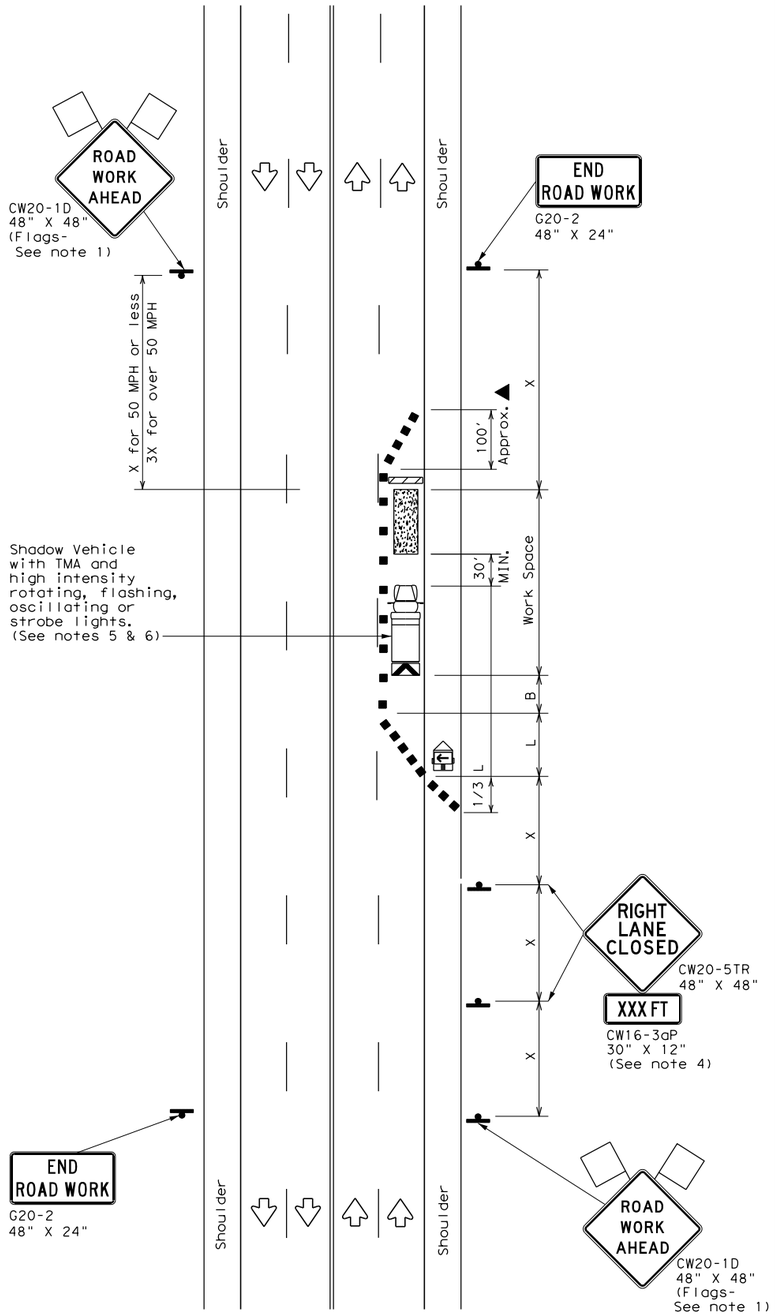
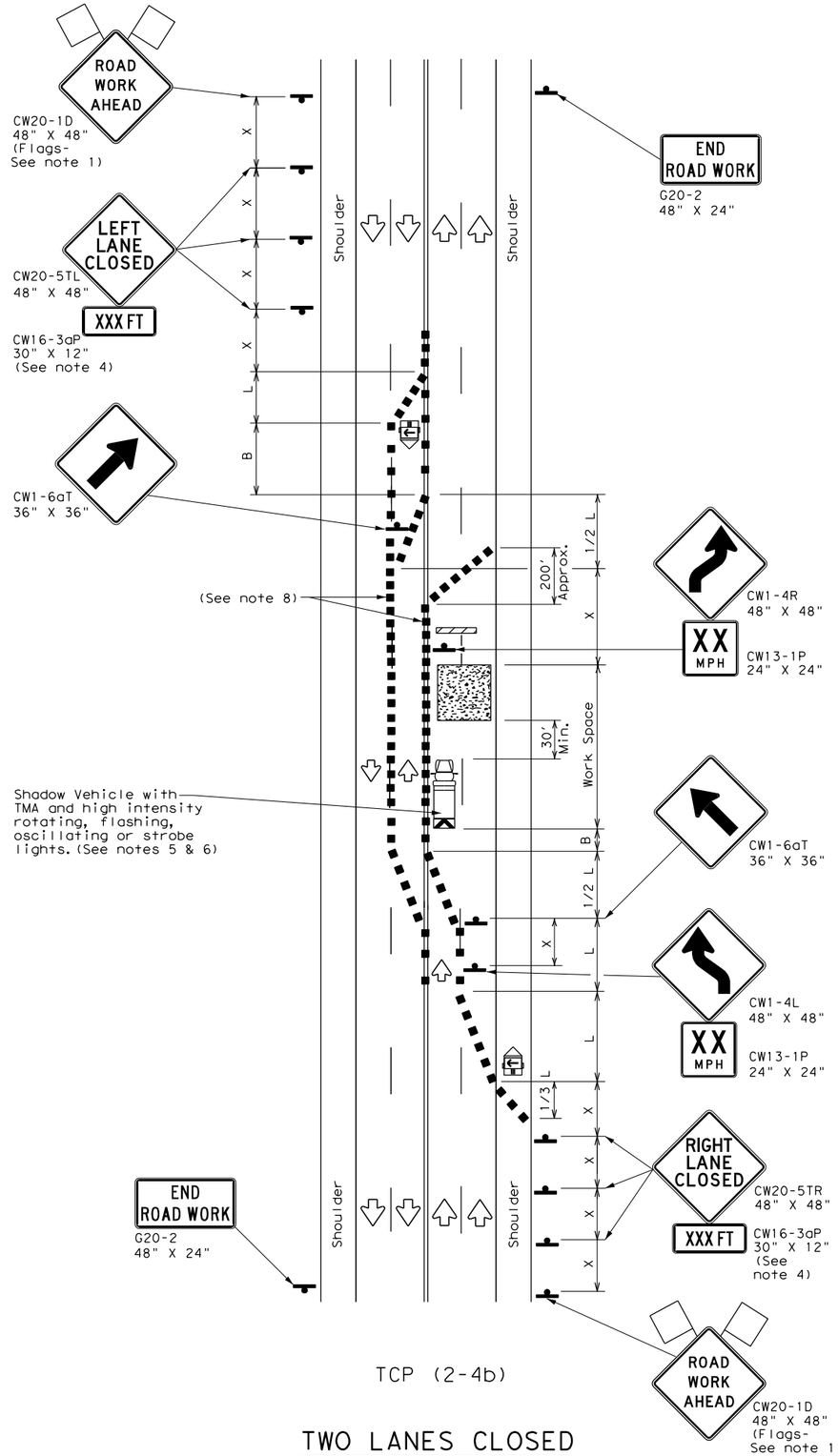


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
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

1. Flags attached to signs where shown, are REQUIRED.
2. 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.
3. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
5. 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.
6. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

7. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED"signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-4b)

8. 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 devices spacing is intended for the area of conflicting markings, not the entire work zone.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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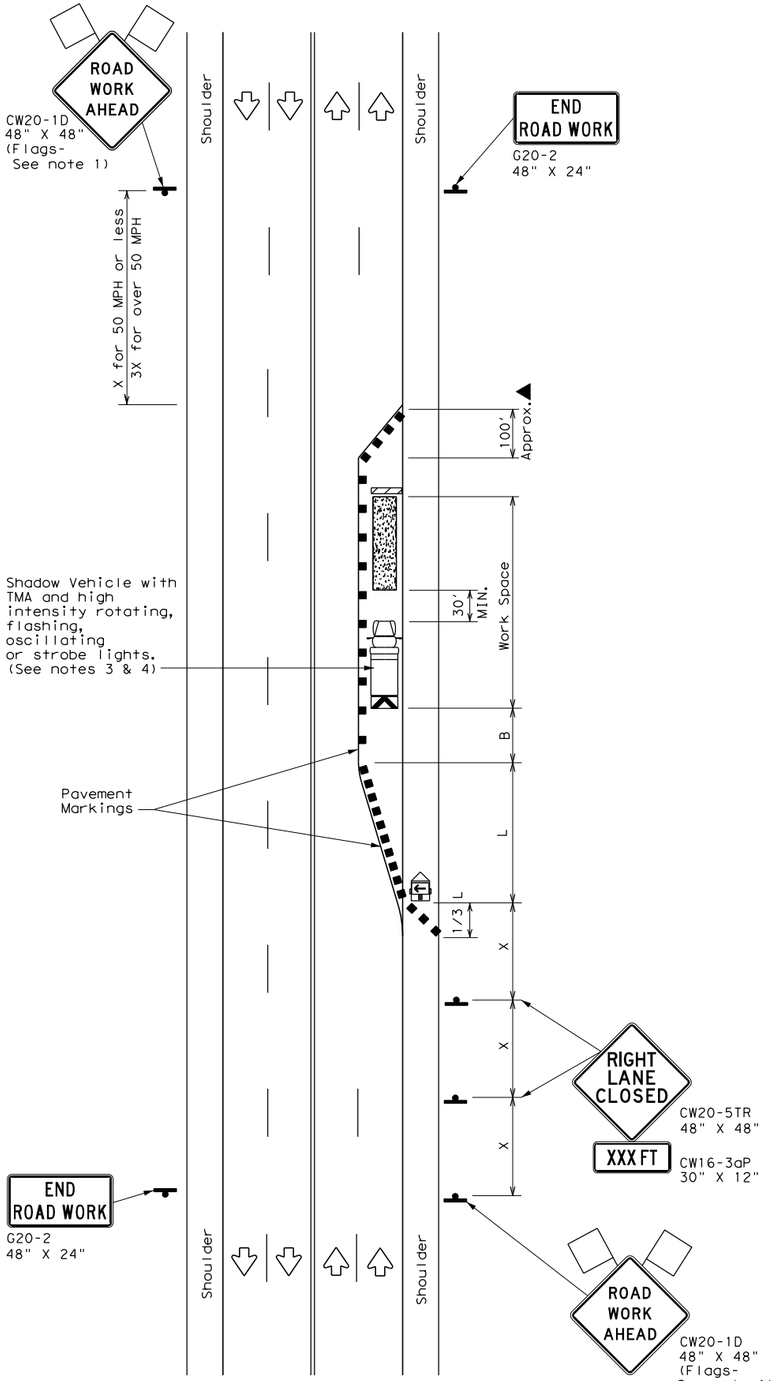
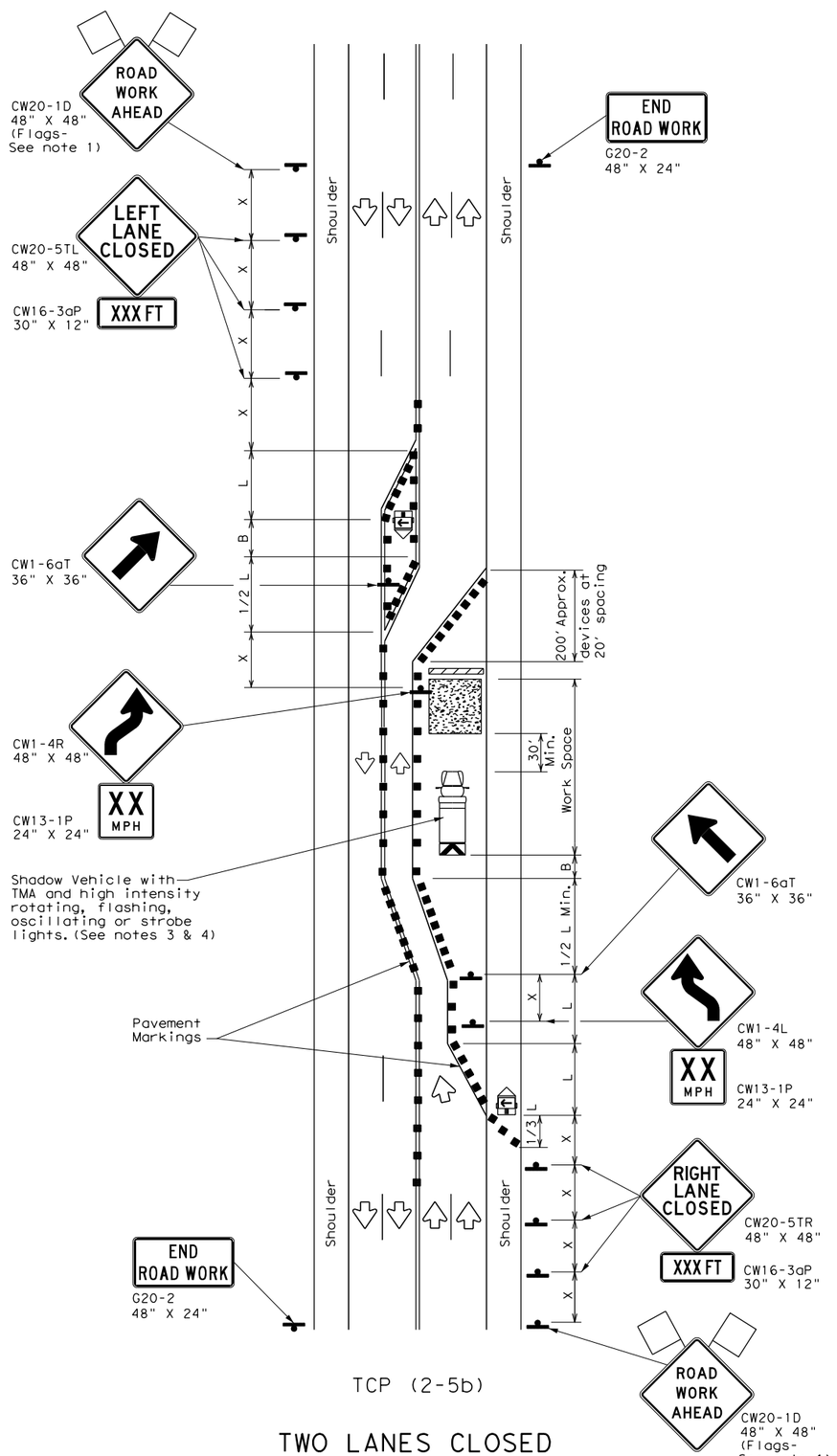
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	SAT	GUADALUPE		115



TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

TWO LANES CLOSED

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
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

1. Flags attached to signs where shown, are REQUIRED.
2. 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.
3. 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 eposure 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 substitutued for the Shadow Vehicle and TMA.
4. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.
5. The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

6. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic, with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-5b)

7. Conflicting pavement markings shall be removed for long-term projects.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
LONG TERM LANE CLOSURES
MULTILANE CONVENTIONAL RDS.

TCP(2-5)-18

FILE: tcp2-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 2-12				KLEIN RD
1-97 3-03	DIST	COUNTY		SHEET NO.
4-98 2-18	SAT	GUADALUPE		116

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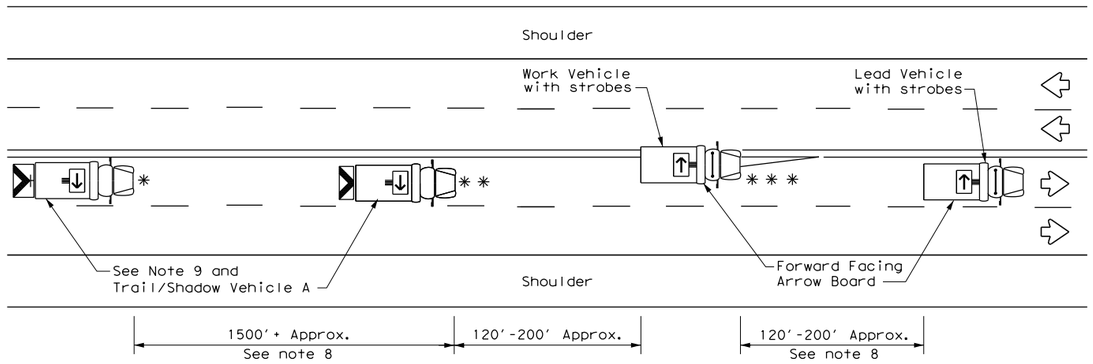
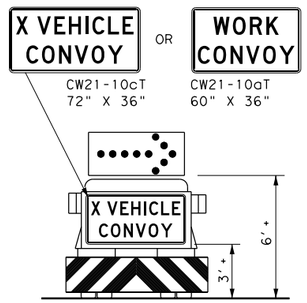


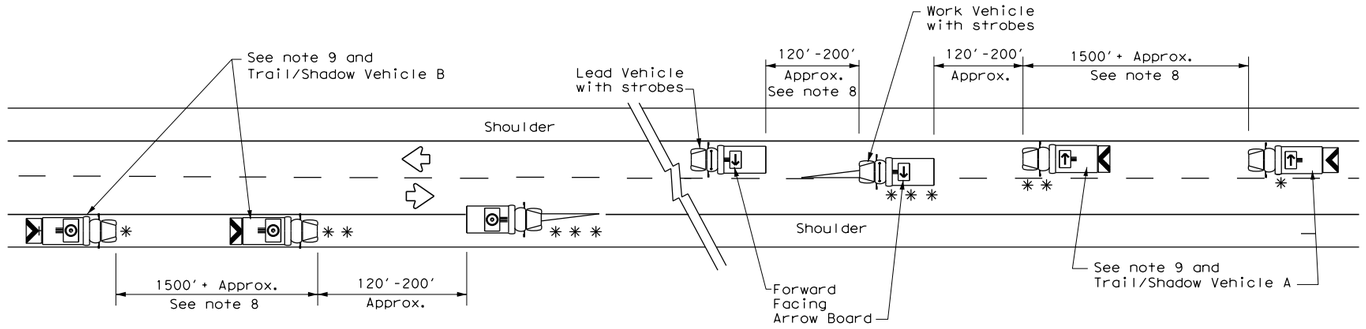
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

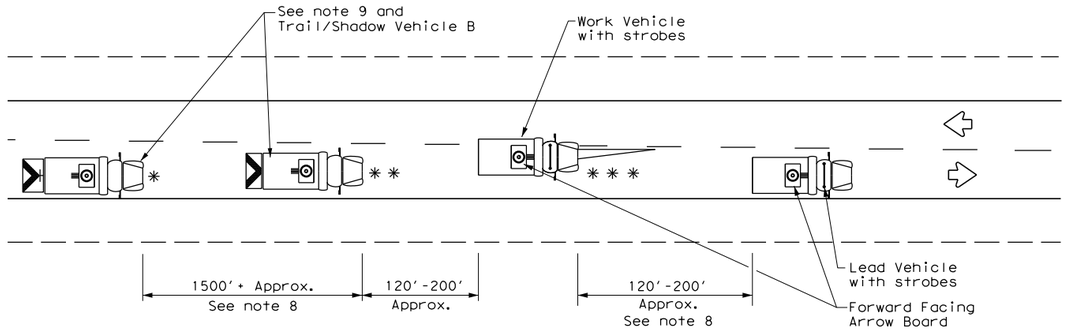


WORK ON SHOULDER

WORK ON TRAVEL LANE

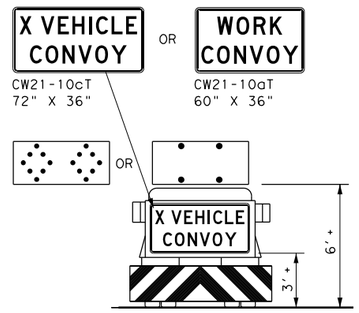
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

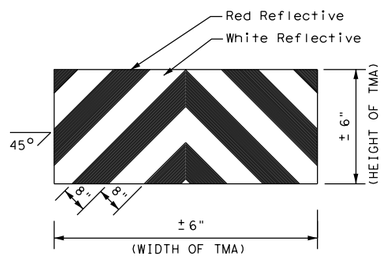
with Flashing Arrow Board in CAUTION display

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 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.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

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	SAT	GUADALUPE		117

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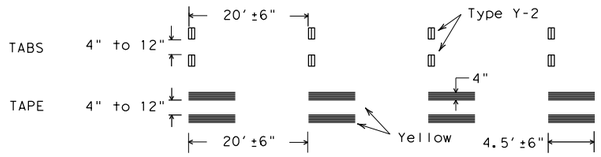
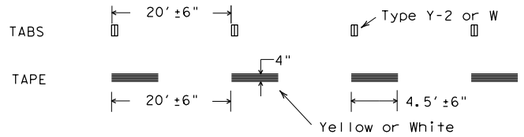
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

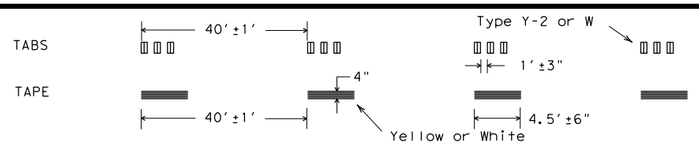


SINGLE NO-PASSING LINE or CHANNELIZATION LINE



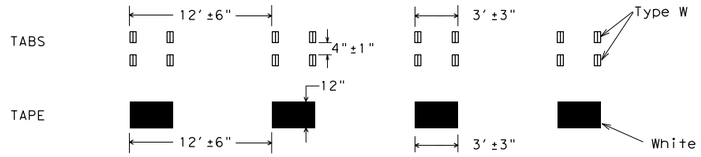
BROKEN LINES

(FOR CENTER LINE OR LANE LINE)

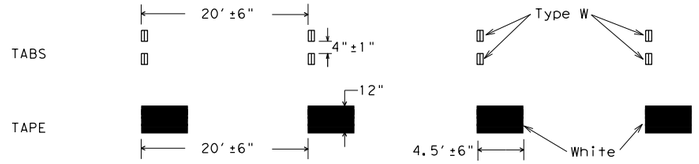


WIDE DOTTED LINES

(FOR LANE DROP LINES)



WIDE GORE MARKINGS



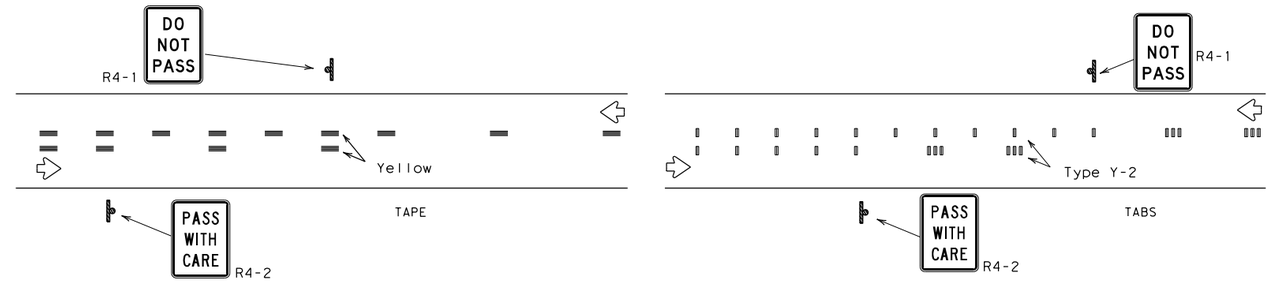
NOTES:

1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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).
8. 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.

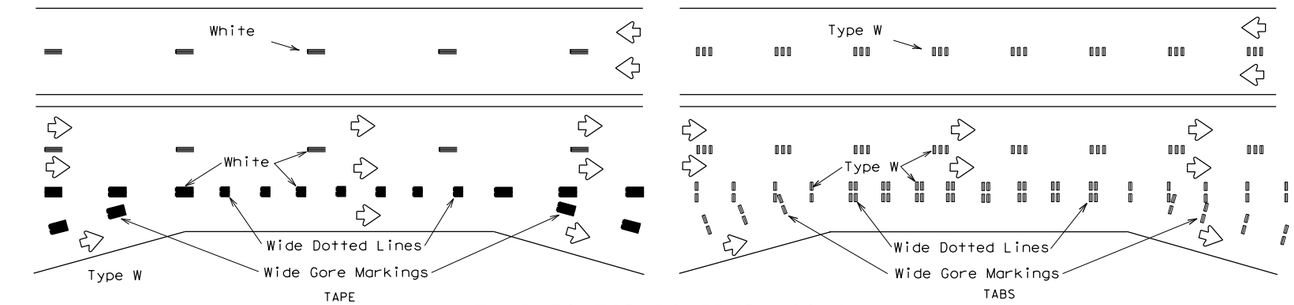
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

1. 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).
2. Tabs shall meet requirements of Departmental Material Specification DMS-8242.
3. 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.
4. 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.

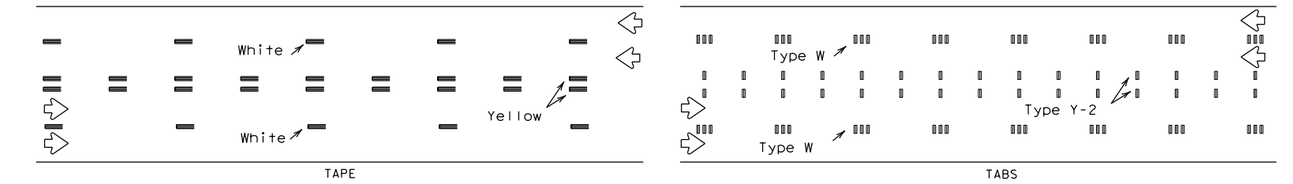
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



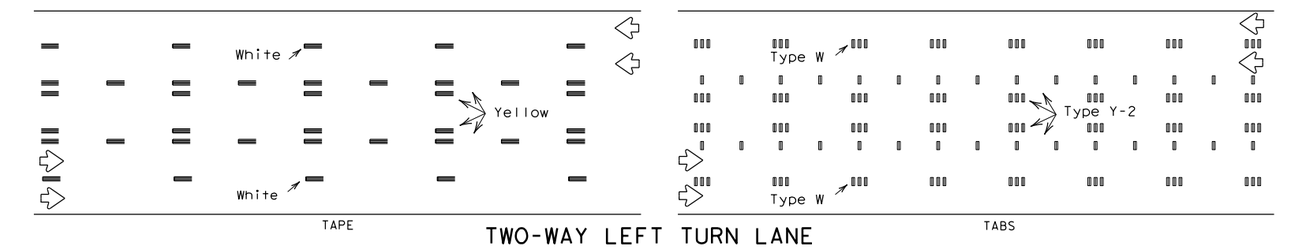
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



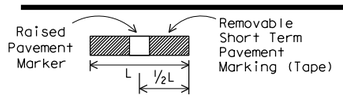
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

1. 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)

1. 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

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

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©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
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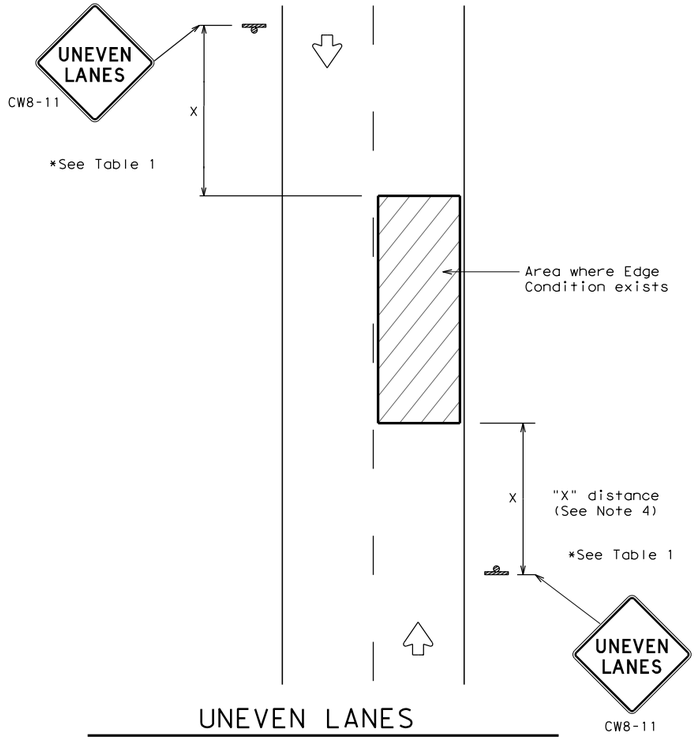
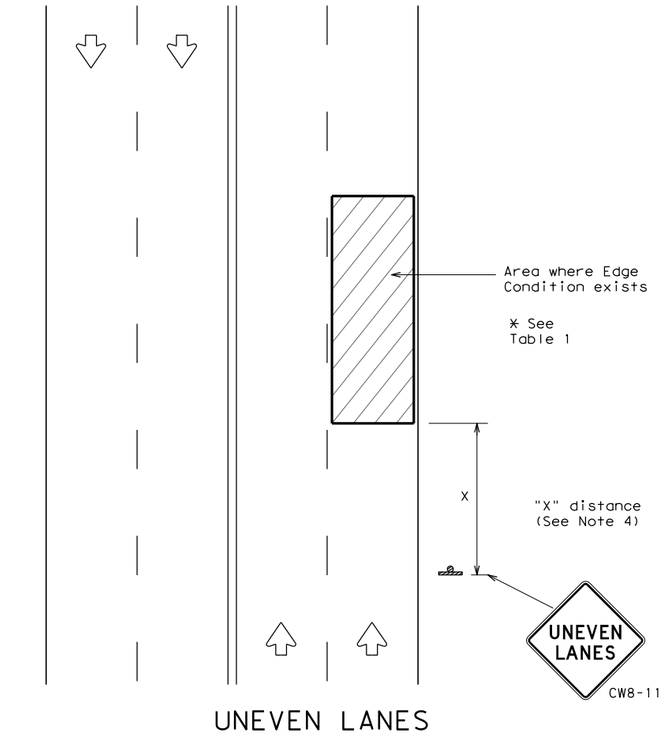
3-03		SAT	GUADALUPE		118
7-13					

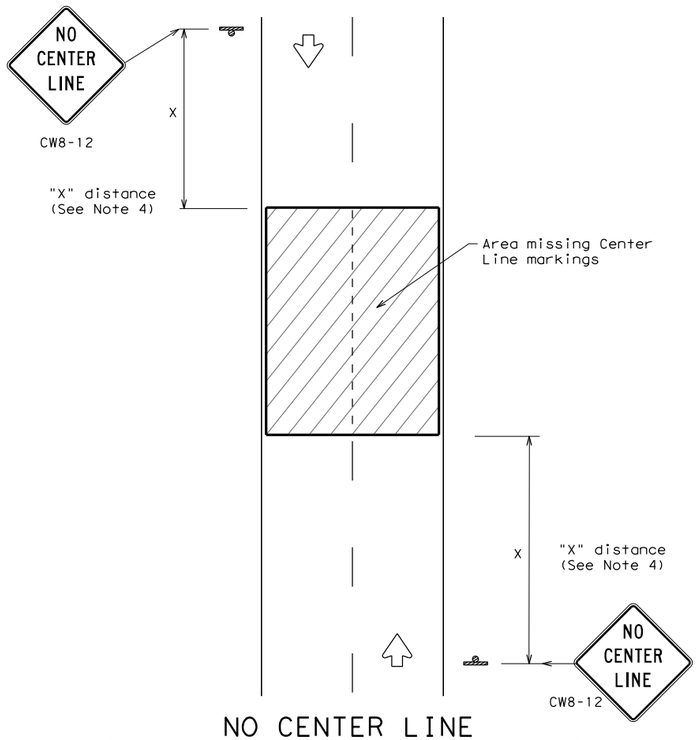
111



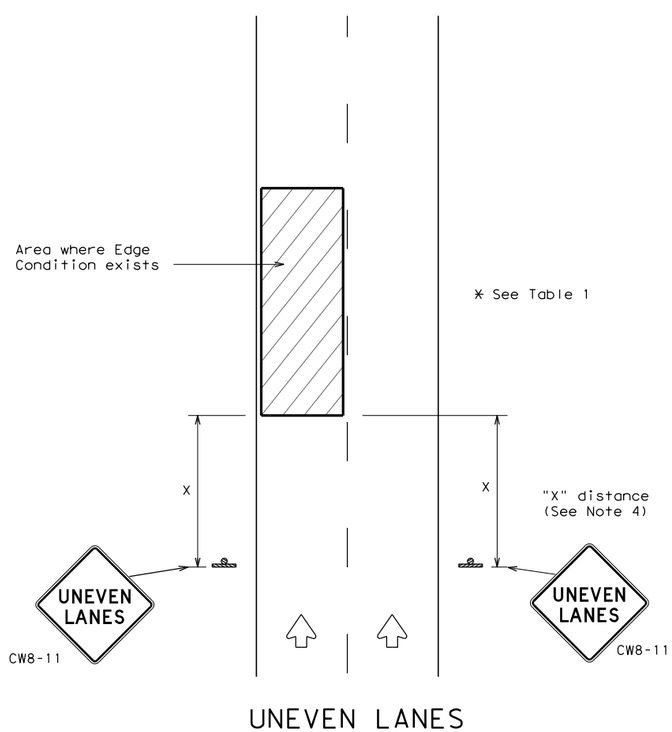
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

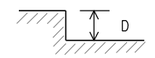
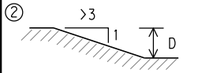
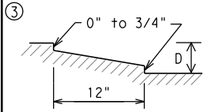
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL} SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

GENERAL NOTES

1. If spalling or holes occur, ROUGH ROAD (CW8-8) signs should be placed in advance of the condition and be repeated every two miles where the condition persists.
2. UNEVEN LANES (CW8-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CW7-3aP) plaque or Advisory Speed (CW13-1P) plaque.
3. NO CENTER LINE (CW8-12) signs and temporary pavement markings as per the WZ(STPM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
4. Signs shall be spaced at the distances recommended as per BC standards.
5. Additional signs may be required as directed by the Engineer. Signs shall remain in place until final surface is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
6. Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
7. Short term markings shall not be used to simulate edge lines.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

TABLE 1

Edge Condition	Edge Height (D)	* Warning Devices
① 	Less than or equal to: 1¼" (maximum-planing) 1½" (typical-overlay)	Sign: CW8-11
	Distance "D" may be a maximum of 1 1/4 " for planing operations and 2" for overlay operations if uneven lanes with edge condition 1 are open to traffic after work operations cease.	
② 	Less than or equal to 3"	Sign: CW8-11
③  Notched Wedge Joint	Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	

TRAFFIC CONTROL DURING PLANING, OVERLAY AND LEVELING OPERATIONS ARE SHOWN ELSEWHERE IN THE PLANS.

MINIMUM WARNING SIGN SIZE	
Conventional roads	36" x 36"
Freeways/expressways, divided roadways	48" x 48"

Texas Department of Transportation

Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
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8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	SAT	GUADALUPE		119

112

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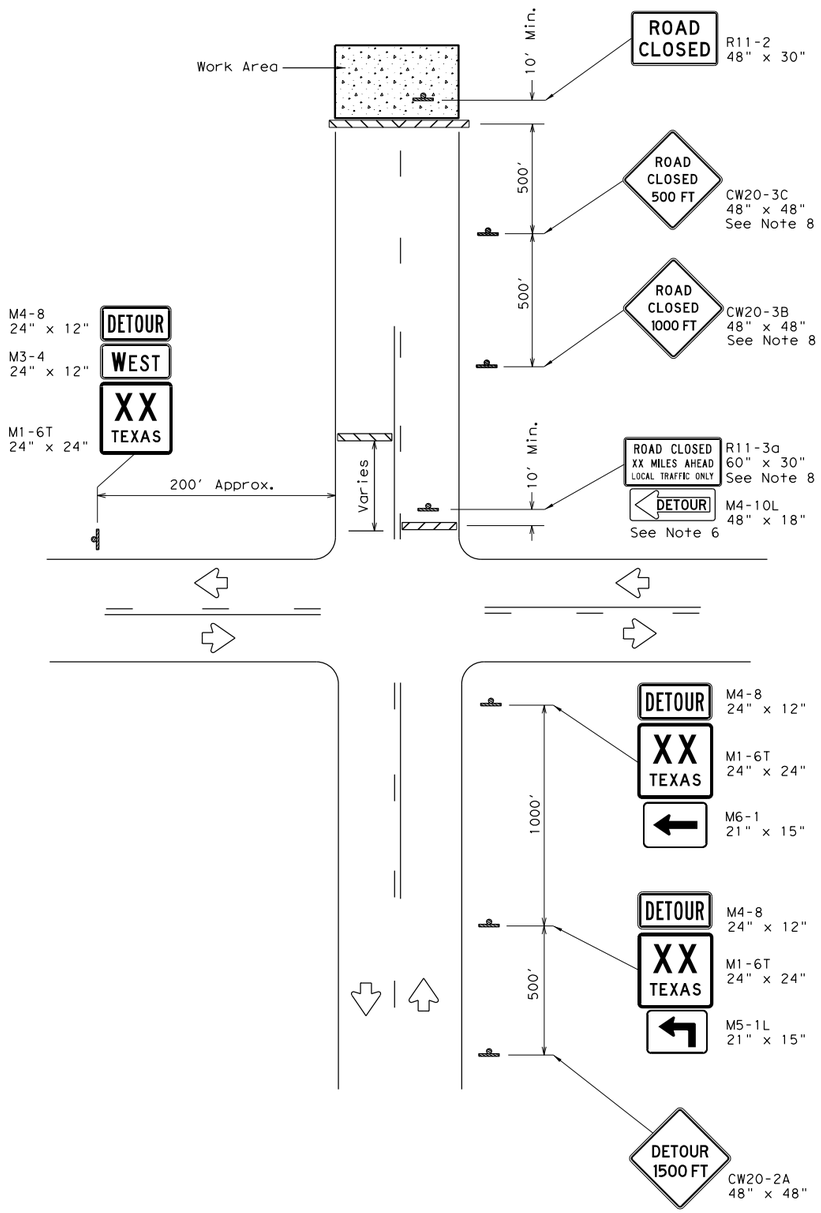
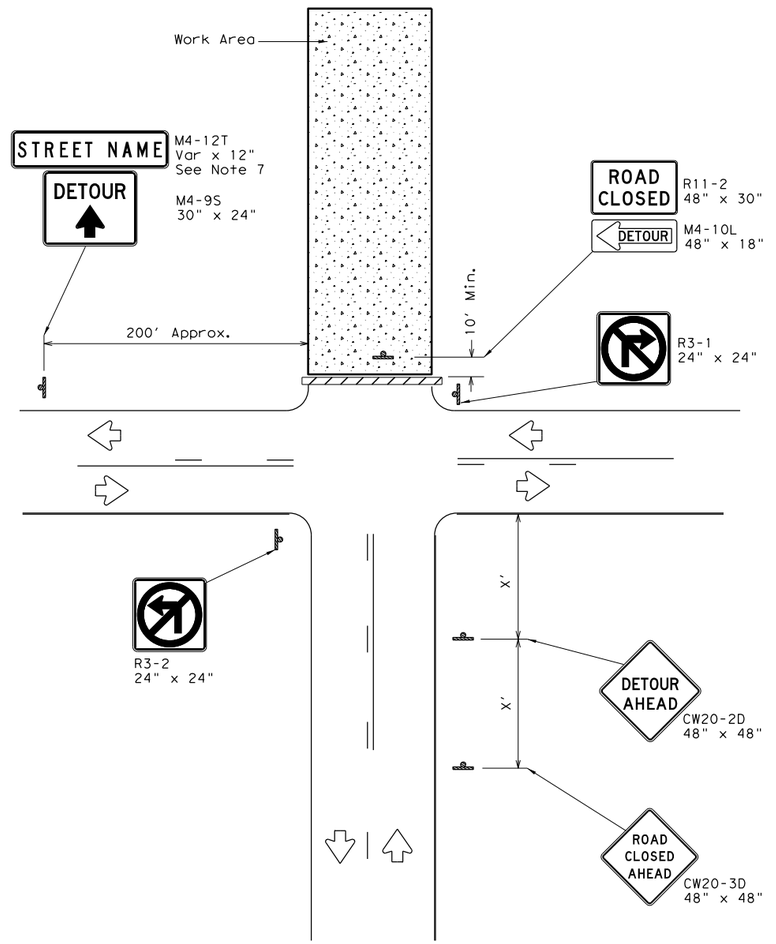


ROAD CLOSURE BEYOND THE INTERSECTION

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.

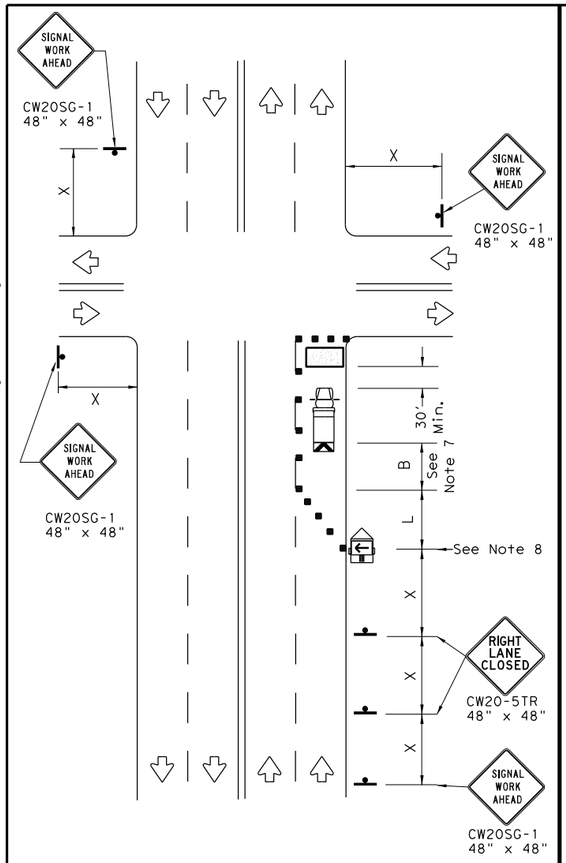
Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE ROAD CLOSURE DETAILS

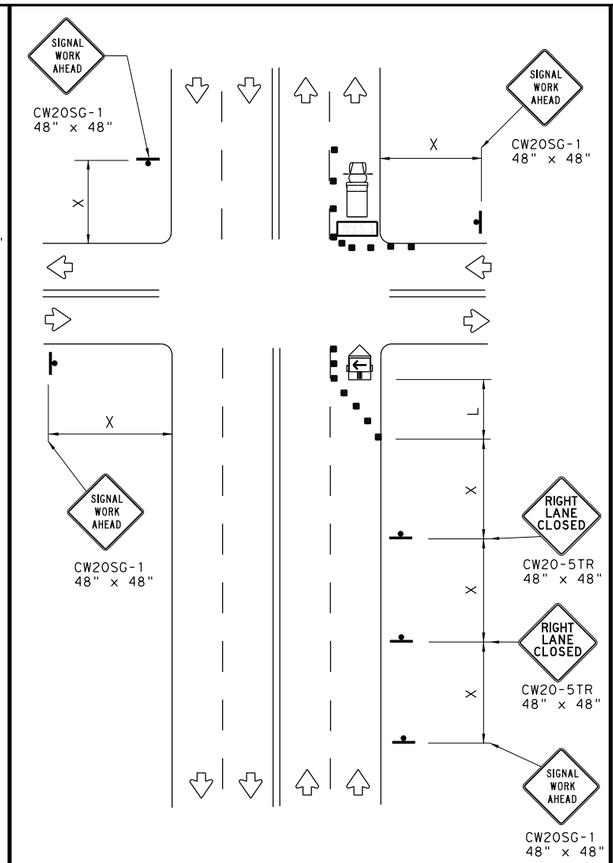
WZ(RCD)-13

FILE: wzrcd-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
1-97 4-98 7-13	DIST	COUNTY		SHEET NO.
2-98 3-03	SAT	GUADALUPE		120



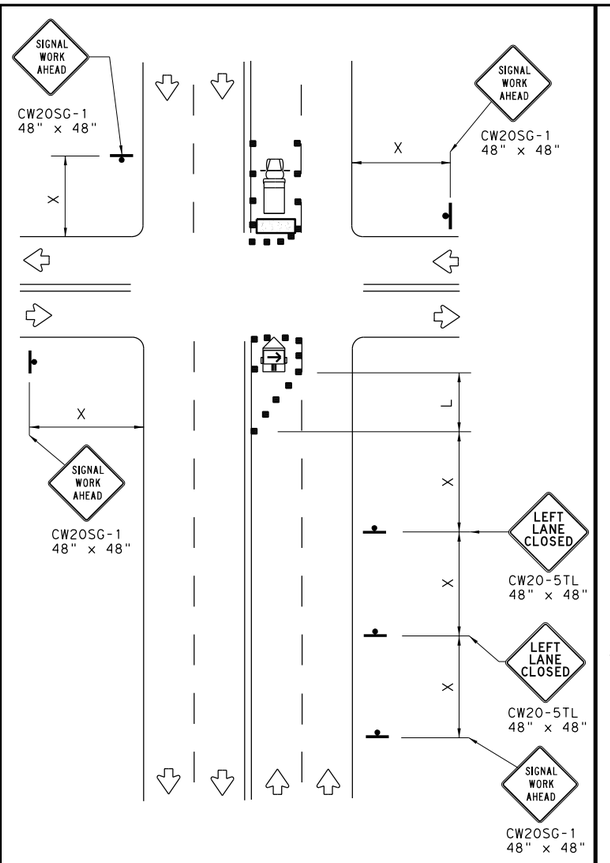
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



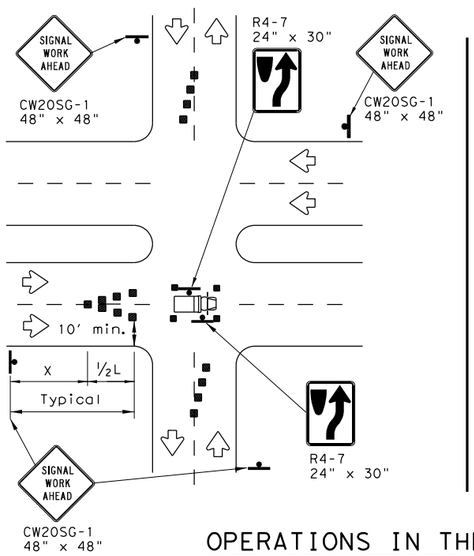
FAR SIDE RIGHT LANE CLOSURE

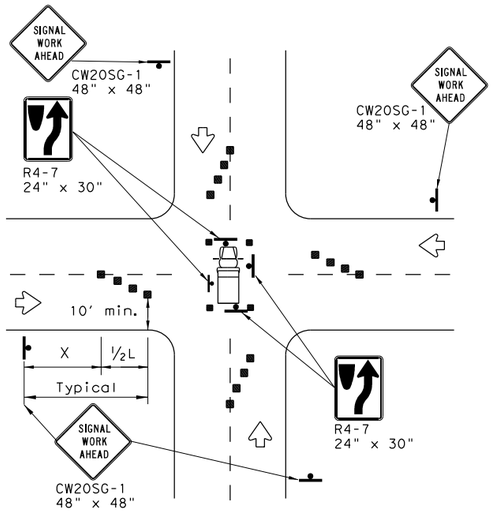
SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY





OPERATIONS IN THE INTERSECTION

SHORT DURATION

GENERAL NOTES

1. 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.
2. Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
3. Flaggers and Flagger Symbol (CW20-7) signs may be required according to field conditions.
4. Vehicles parked in roadway shall be equipped with at least two high intensity rotating, flashing, oscillating or strobe type lights.
5. High level warning devices (flag trees) may be used at corners of the vehicle.
6. 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.
7. 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.
8. 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.
9. 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.

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
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.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

FILE: wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
2-98 10-99 7-13	DIST	COUNTY		SHEET NO.
4-98 3-03	SAT	GUADALUPE		121

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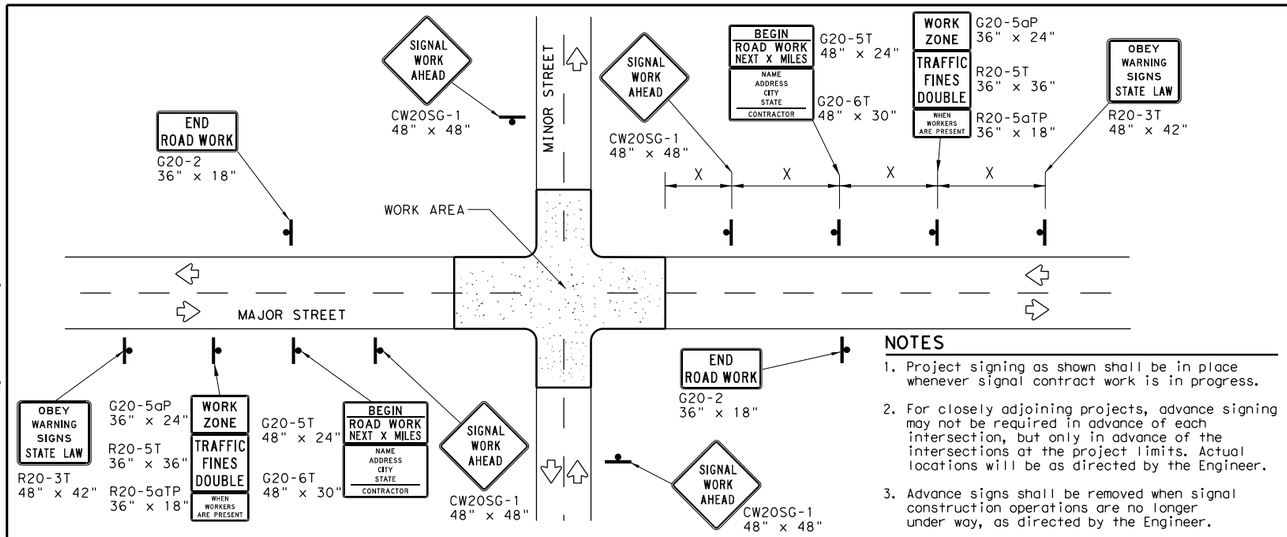


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

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 6G.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

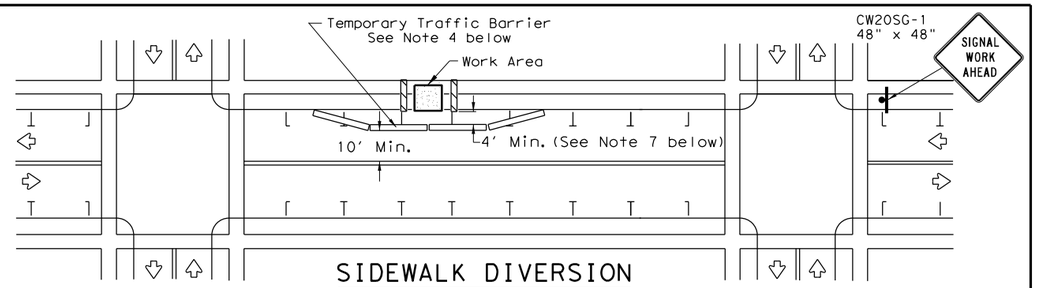
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support 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 fastners. 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

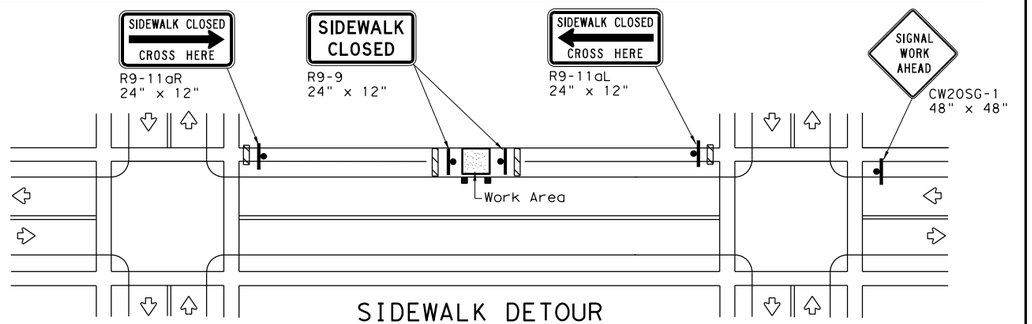
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

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

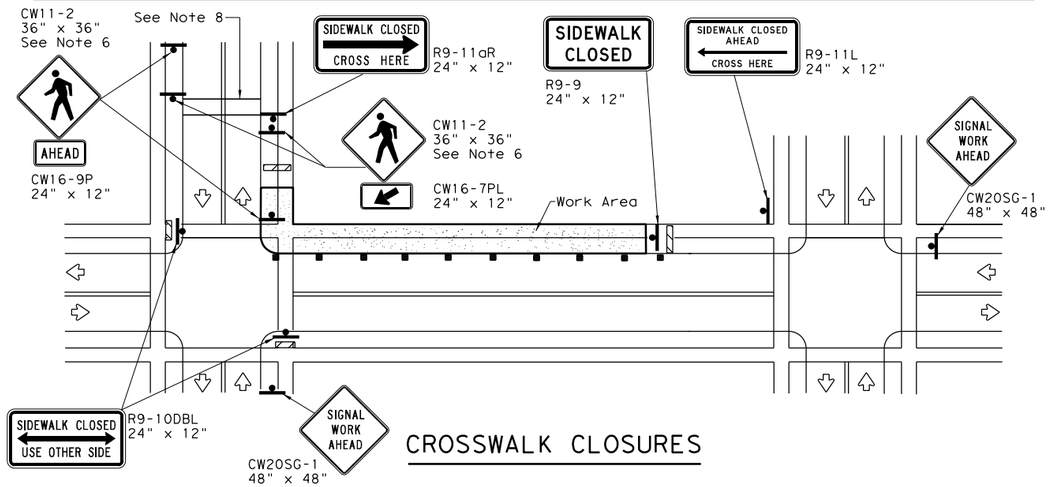
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



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.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

FILE: wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
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2-98 10-99 7-13	DIST	COUNTY		SHEET NO.
4-98 3-03	SAT	GUADALUPE		122

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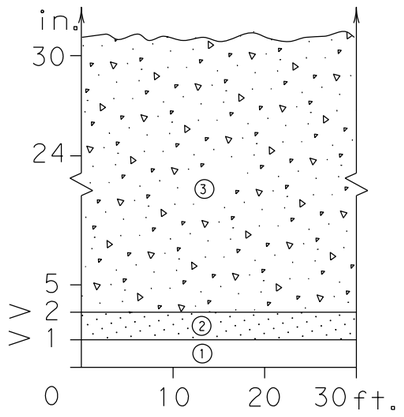
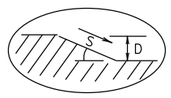
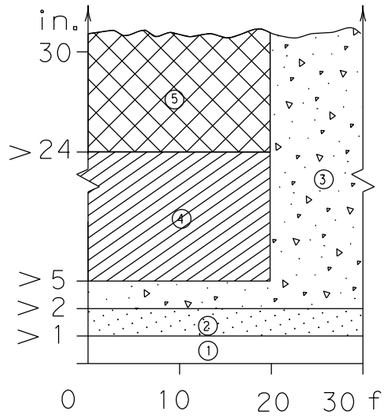
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet

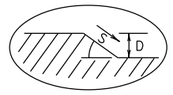


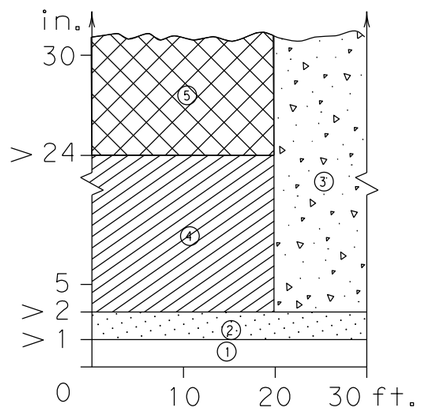
Edge Condition I
S = (3:1) (or flatter)



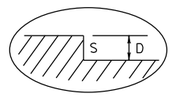


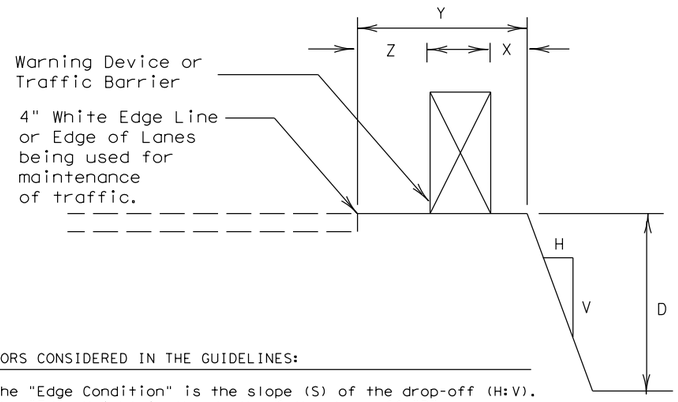
Edge Condition II
S = ((2.99):1) to (1:1)





Edge Condition III
S is steeper than (1:1)





FACTORS CONSIDERED IN THE GUIDELINES:

1. The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height is the depth of the drop-off "D".

2. Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.

3. In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.

4. The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.

5. If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

Zone	Treatment Types Guidelines:
①	No treatment.
②	CW 8-11 "Uneven Lanes" signs.
③	CW 8-9a "Shoulder Drop-Off" or CW 8-11 signs plus vertical panels.
④	CW 8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge fill may be provided to change the edge slope to that of the preferable Edge Condition I.
⑤	Check indications (Figure-1) for positive barrier. Where positive barrier is not indicated, the treatment shown above for Zone- 4 may be used after consideration of other applicable factors.

Edge Condition Notes:

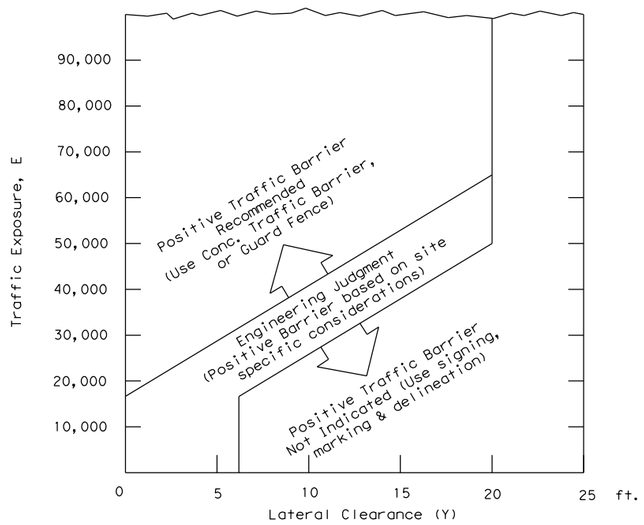
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exeeds 24 inches, the possibility for rollover is greater in most vehicles.

3. Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differen-tial when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.

4. Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 (▨)



1 E = ADT x T
Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the dura-tion time in years of the dropoff condition.

2 Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.

3 An approved end treatment should be provided for any positive barrier end located within a lateral offset of 20 feet from the edge of the travel lane.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.

Engineer's Seal

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E.

1/21/2021
DATE

Texas Department of Transportation
Traffic Operations Division

TREATMENT FOR VARIOUS EDGE CONDITIONS

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
03-01
08-01 correct typos

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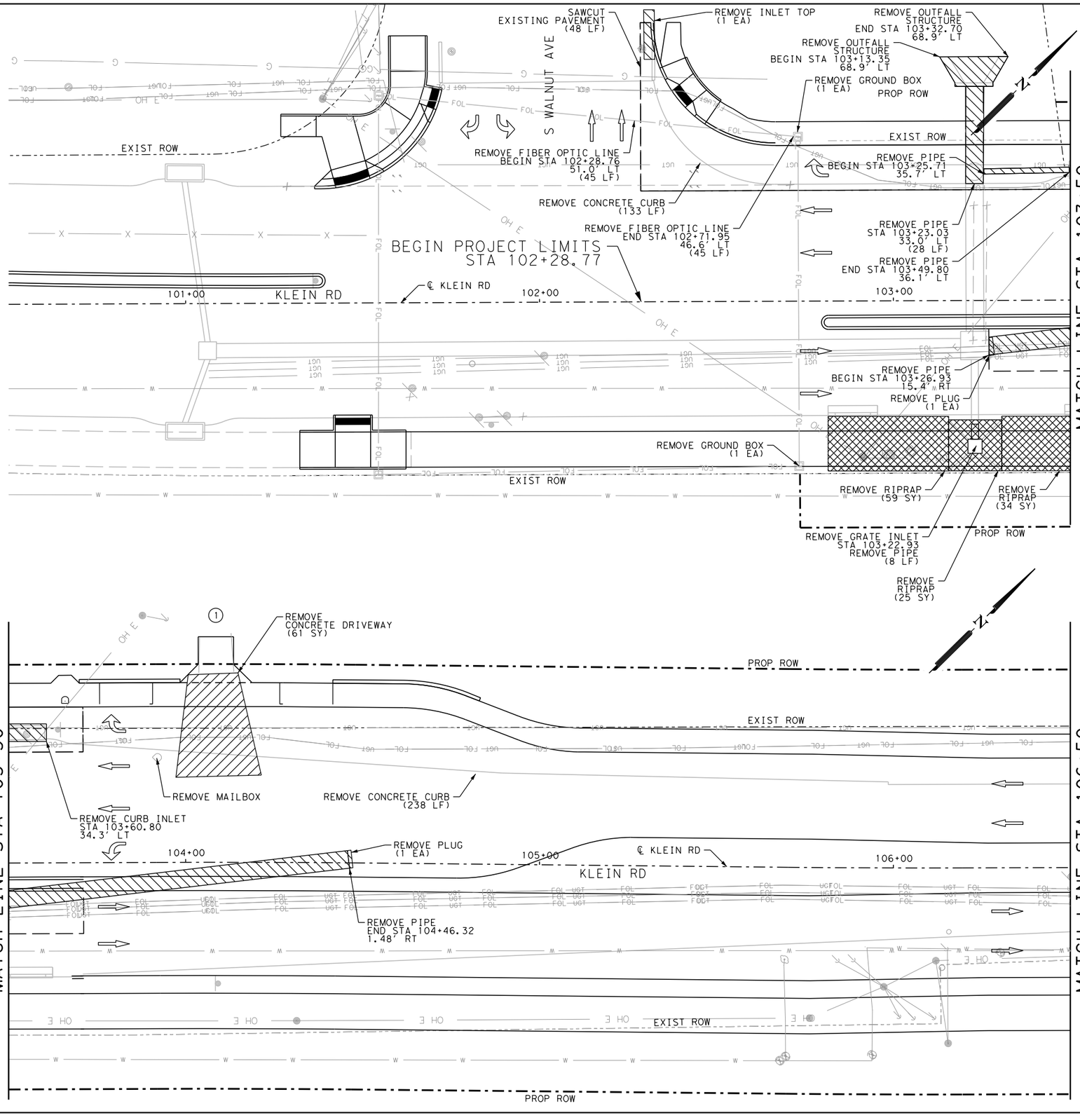
			KLEIN RD
DIST	COUNTY		SHEET NO.
SAT	GUADALUPE		123



ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	4.2

DEMO LEGEND

- REMOVE DRIVEWAY
- REMOVE CONCRETE
- REMOVE SIDEWALK
- REMOVE STRUCTURE
- (TYP) TYPICAL

LEGEND

- FENCE
- WOOD FENCE
- PROPERTY BOUNDARY
- SIGN
- MAILBOX
- STONE COLUMN
- TREE
- SHRUB

NOTES

1. EXISTING FEATURES INDICATED FOR REMOVAL ARE PAID UNDER ITEM 0100 PREPARING ROW.
2. QUANTITIES IDENTIFIED WITHIN THE REMOVAL ITEMS ARE ESTIMATES AND SHOWN FOR CONTRACTOR'S INFORMATION ONLY.

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/30/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/30/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

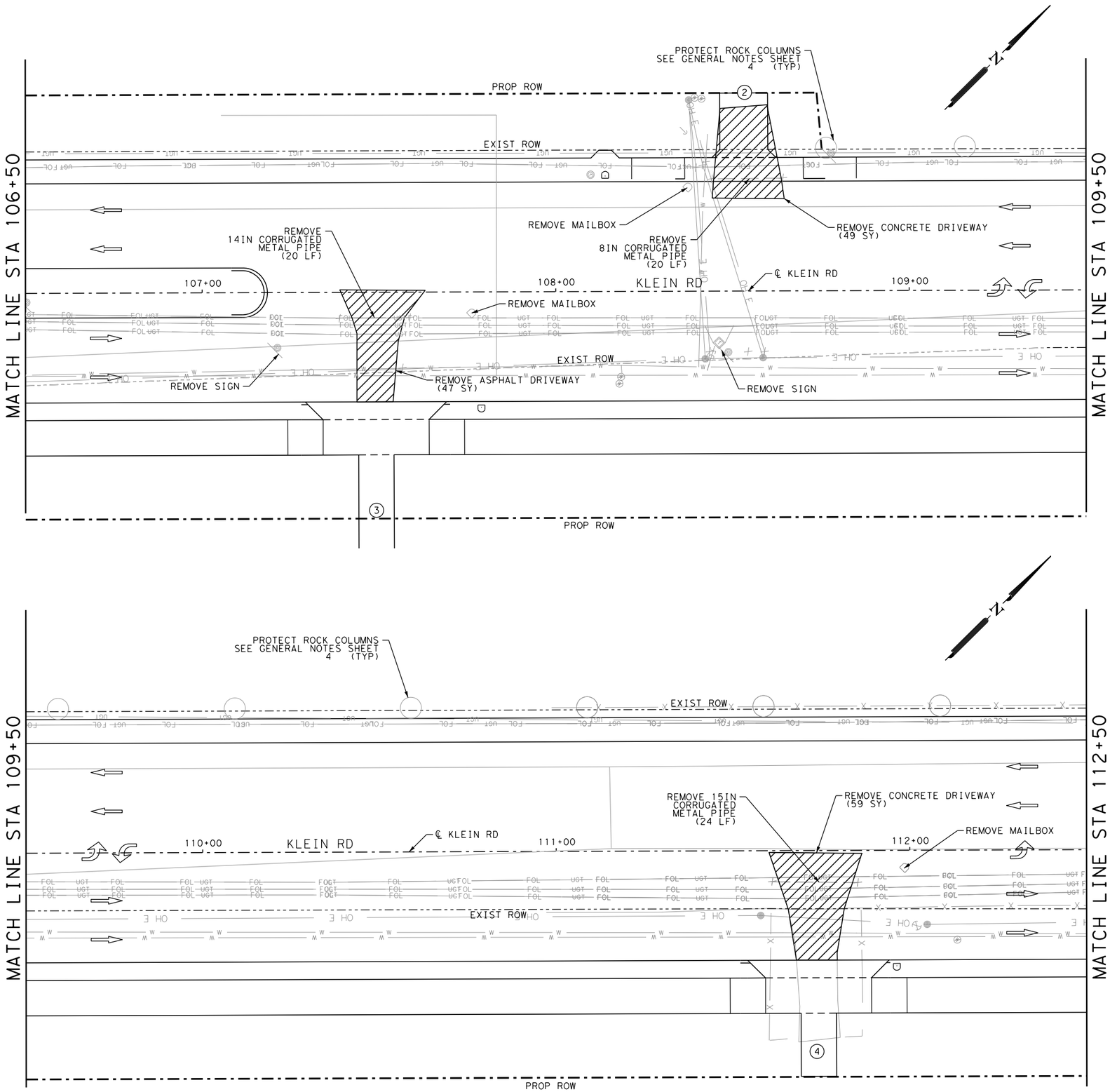
KLEIN RD PHASE 2

DEMOLITION PLAN

BEGIN PROJECT TO STA 106+50

SHEET 1 OF 9

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	124



ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	6.0

DEMO LEGEND

- REMOVE DRIVEWAY
- REMOVE CONCRETE
- REMOVE SIDEWALK
- REMOVE STRUCTURE
- (TYP) TYPICAL

LEGEND

- X X FENCE
- WOOD FENCE
- PROPERTY BOUNDARY
- SIGN
- MAILBOX
- STONE COLUMN
- TREE
- SHRUB

NOTES

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DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/30/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/30/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DEMOLITION PLAN

STA 106+50 TO STA 112+50

SHEET 2 OF 9

DGN:	STATE	PROJECT NO.	ROADWAY
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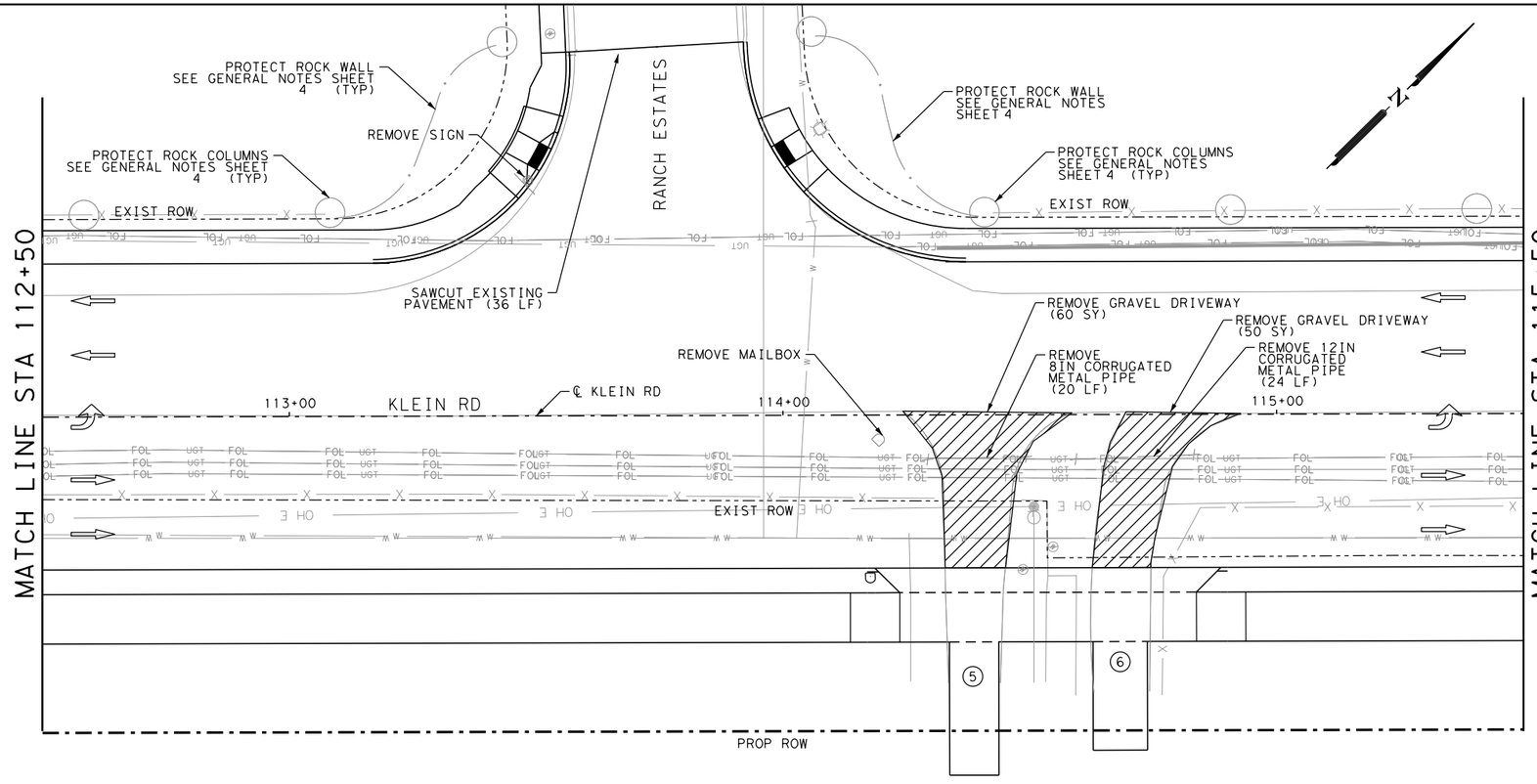
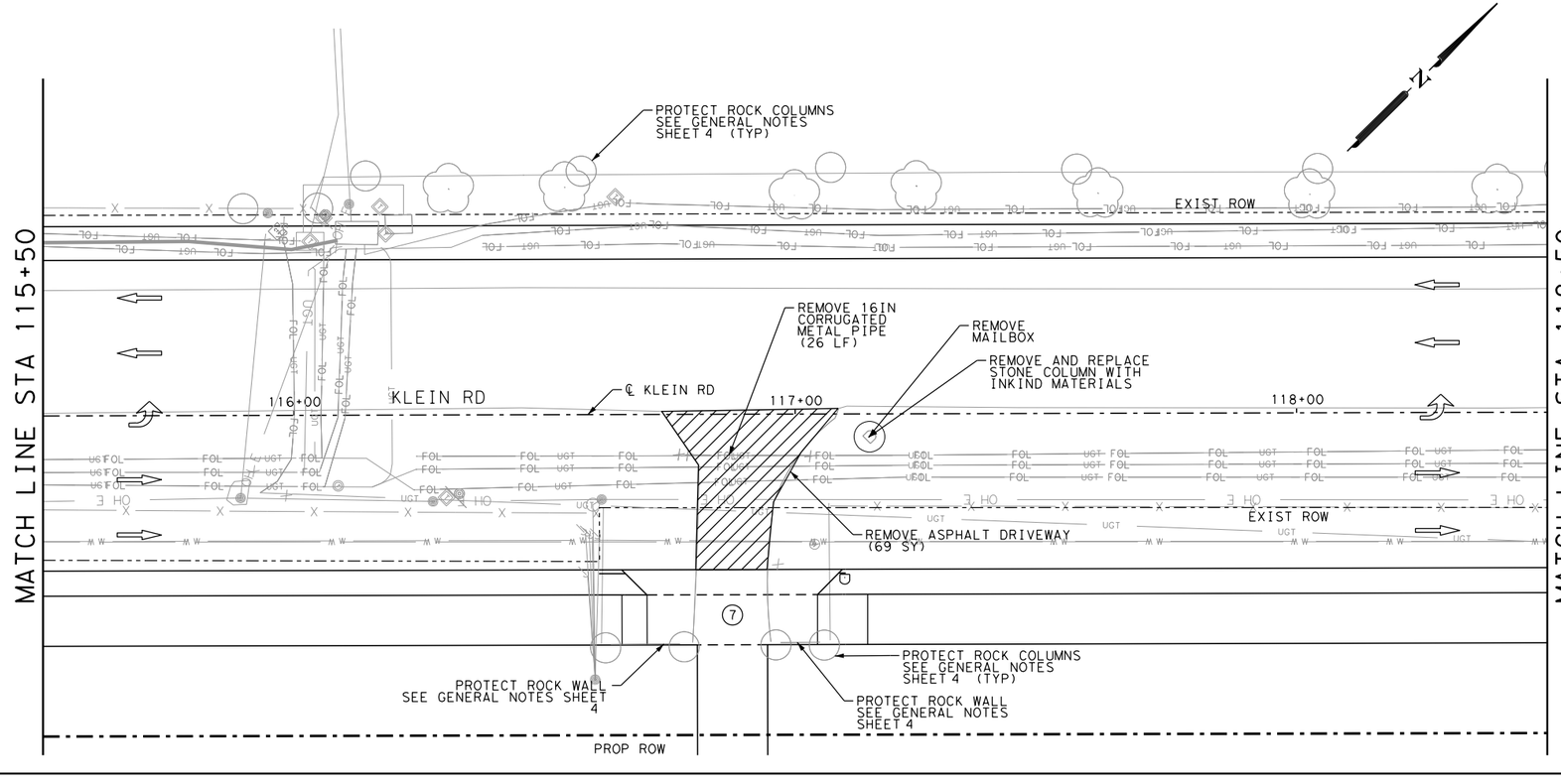
CHK DWG:	GUADALUPE	NEW BRAUNFELS	125





ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	6.0

DEMO LEGEND

- REMOVE DRIVEWAY
- REMOVE CONCRETE
- REMOVE SIDEWALK
- REMOVE STRUCTURE
- (TYP) TYPICAL

LEGEND

- FENCE
- WOOD FENCE
- PROPERTY BOUNDARY
- SIGN
- MAILBOX
- STONE COLUMN
- TREE
- SHRUB

NOTES

1. EXISTING FEATURES INDICATED FOR REMOVAL ARE PAID UNDER ITEM 0100 PREPARING ROW.
2. QUANTITIES IDENTIFIED WITHIN THE REMOVAL ITEMS ARE ESTIMATES AND SHOWN FOR CONTRACTOR'S INFORMATION ONLY.

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED · PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/30/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED · PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/30/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DEMOLITION PLAN

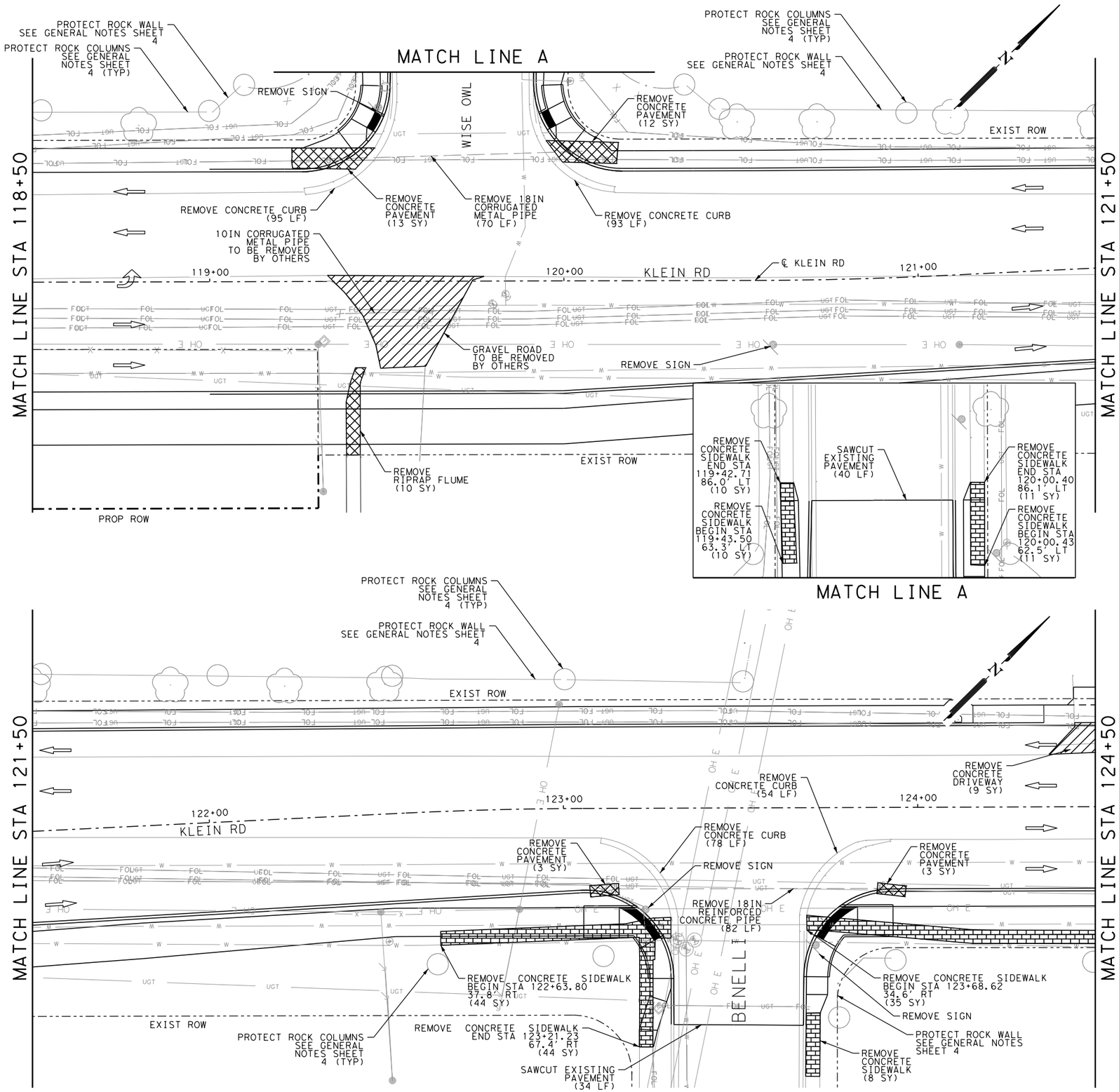
STA 112+50 TO STA 118+50

SHEET 3 OF 9

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	126

Plotted on: 4/30/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Roadway\Demo\5103003dem03.dgn



ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	6.0

DEMO LEGEND

- REMOVE DRIVEWAY
- REMOVE CONCRETE
- REMOVE SIDEWALK
- REMOVE STRUCTURE
- (TYP) TYPICAL

LEGEND

- FENCE
- WOOD FENCE
- PROPERTY BOUNDARY
- SIGN
- MAILBOX
- STONE COLUMN
- TREE
- SHRUB

NOTES

1. EXISTING FEATURES INDICATED FOR REMOVAL ARE PAID UNDER ITEM 0100 PREPARING ROW.
2. QUANTITIES IDENTIFIED WITHIN THE REMOVAL ITEMS ARE ESTIMATES AND SHOWN FOR CONTRACTOR'S INFORMATION ONLY.

DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED
PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/30/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/30/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

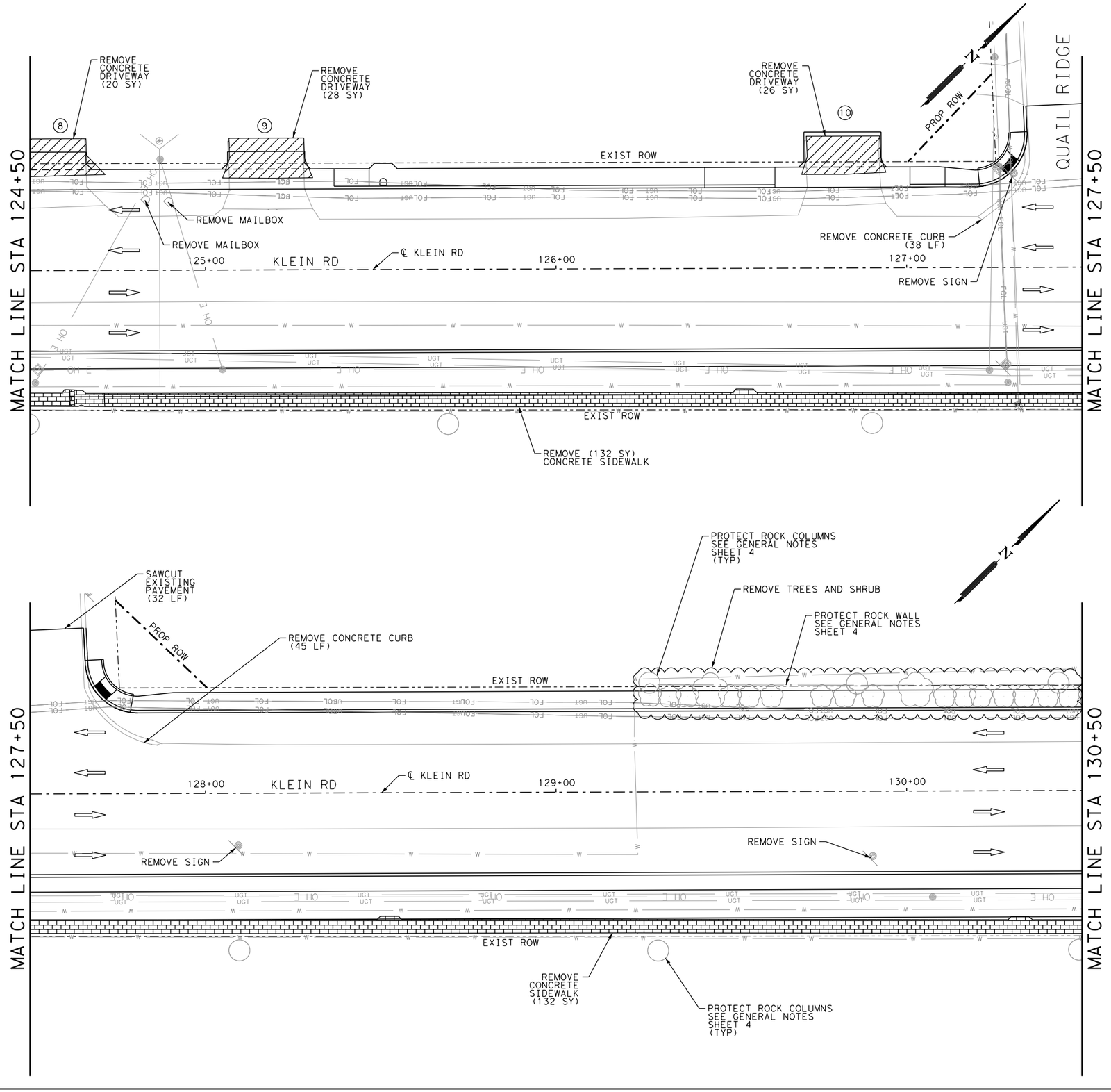
DEMOLITION PLAN

STA 118+50 TO STA 124+50

SHEET 4 OF 9

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	127

Plotted on: 4/30/2021



ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	6.0

DEMO LEGEND

- REMOVE DRIVEWAY
- REMOVE CONCRETE
- REMOVE SIDEWALK
- REMOVE STRUCTURE
- (TYP) TYPICAL

LEGEND

- FENCE
- WOOD FENCE
- PROPERTY BOUNDARY
- SIGN
- MAILBOX
- STONE COLUMN
- TREE
- SHRUB

NOTES

1. EXISTING FEATURES INDICATED FOR REMOVAL ARE PAID UNDER ITEM 0100 PREPARING ROW.
2. QUANTITIES IDENTIFIED WITHIN THE REMOVAL ITEMS ARE ESTIMATES AND SHOWN FOR CONTRACTOR'S INFORMATION ONLY.

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/30/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/30/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DEMOLITION PLAN

STA 124+50 TO STA 130+50

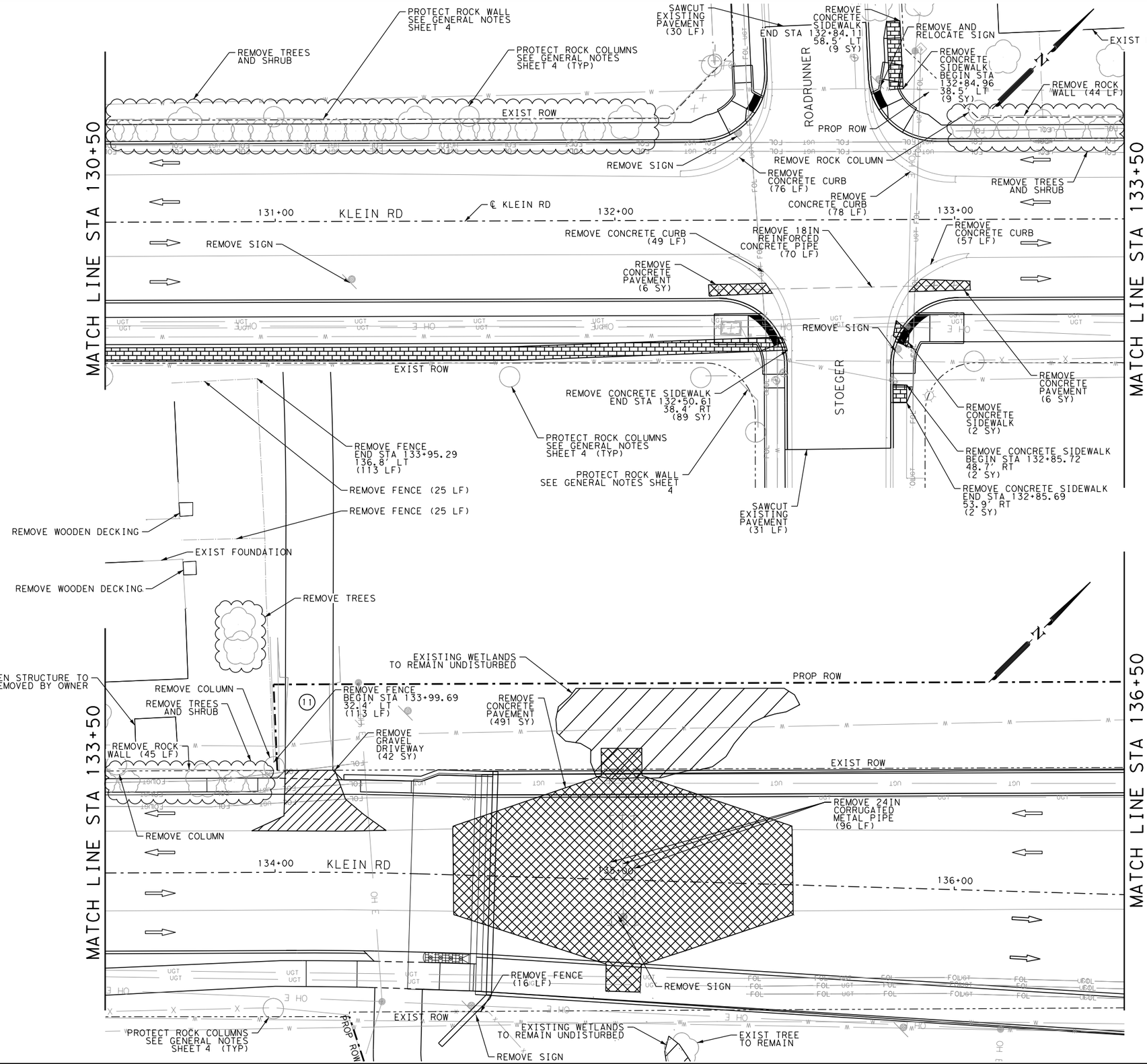
SHEET 5 OF 9

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	128

Design Filename: H:\Projects\510\30\03\Design\Civil\Roadway\Demo\5103003dem05.dgn

Plotted on: 4/30/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Roadway\Demo\5103003dem06.dgn



ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	6.0

DEMO LEGEND

- REMOVE DRIVEWAY
- REMOVE CONCRETE
- REMOVE SIDEWALK
- REMOVE STRUCTURE
- (TYP) TYPICAL

LEGEND

- X X FENCE
- WOOD FENCE
- PROPERTY BOUNDARY
- SIGN
- MAILBOX
- STONE COLUMN
- TREE
- SHRUB

NOTES

1. EXISTING FEATURES INDICATED FOR REMOVAL ARE PAID UNDER ITEM 0100 PREPARING ROW.
2. QUANTITIES IDENTIFIED WITHIN THE REMOVAL ITEMS ARE ESTIMATES AND SHOWN FOR CONTRACTOR'S INFORMATION ONLY.

DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED
PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/30/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/30/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DEMOLITION PLAN

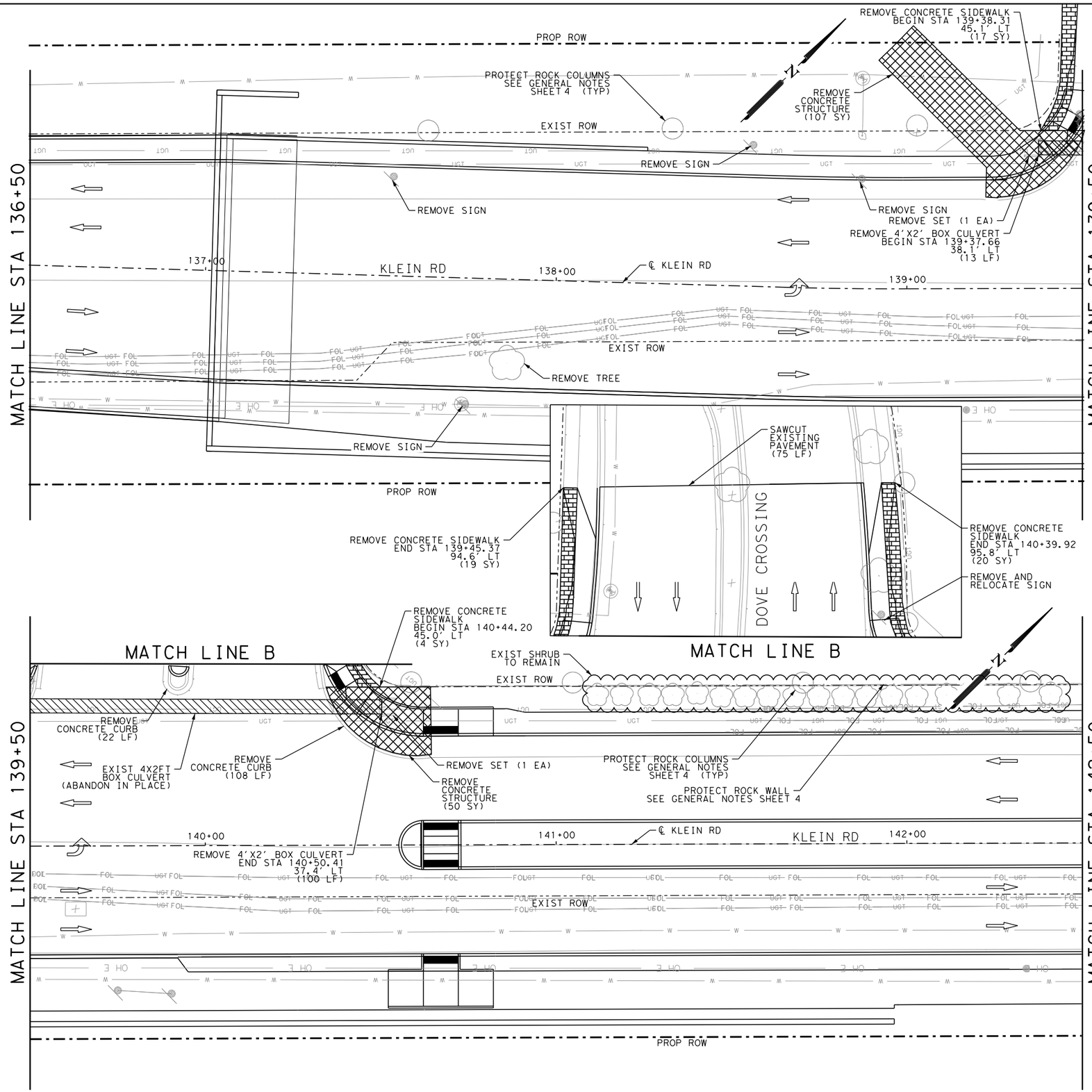
STA 130+50 TO STA 136+50

SHEET 6 OF 9

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	129

Plotted on: 4/30/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Roadway\Demo\5103003dem07.dgn



ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	6.0

DEMO LEGEND

- REMOVE DRIVEWAY
- REMOVE CONCRETE
- REMOVE SIDEWALK
- REMOVE STRUCTURE
- (TYP) TYPICAL

LEGEND

- X X FENCE
- WOOD FENCE
- PROPERTY BOUNDARY
- SIGN
- MAILBOX
- STONE COLUMN
- TREE
- SHRUB

NOTES

1. EXISTING FEATURES INDICATED FOR REMOVAL ARE PAID UNDER ITEM 0100 PREPARING ROW.
2. QUANTITIES IDENTIFIED WITHIN THE REMOVAL ITEMS ARE ESTIMATES AND SHOWN FOR CONTRACTOR'S INFORMATION ONLY.

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/30/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/30/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

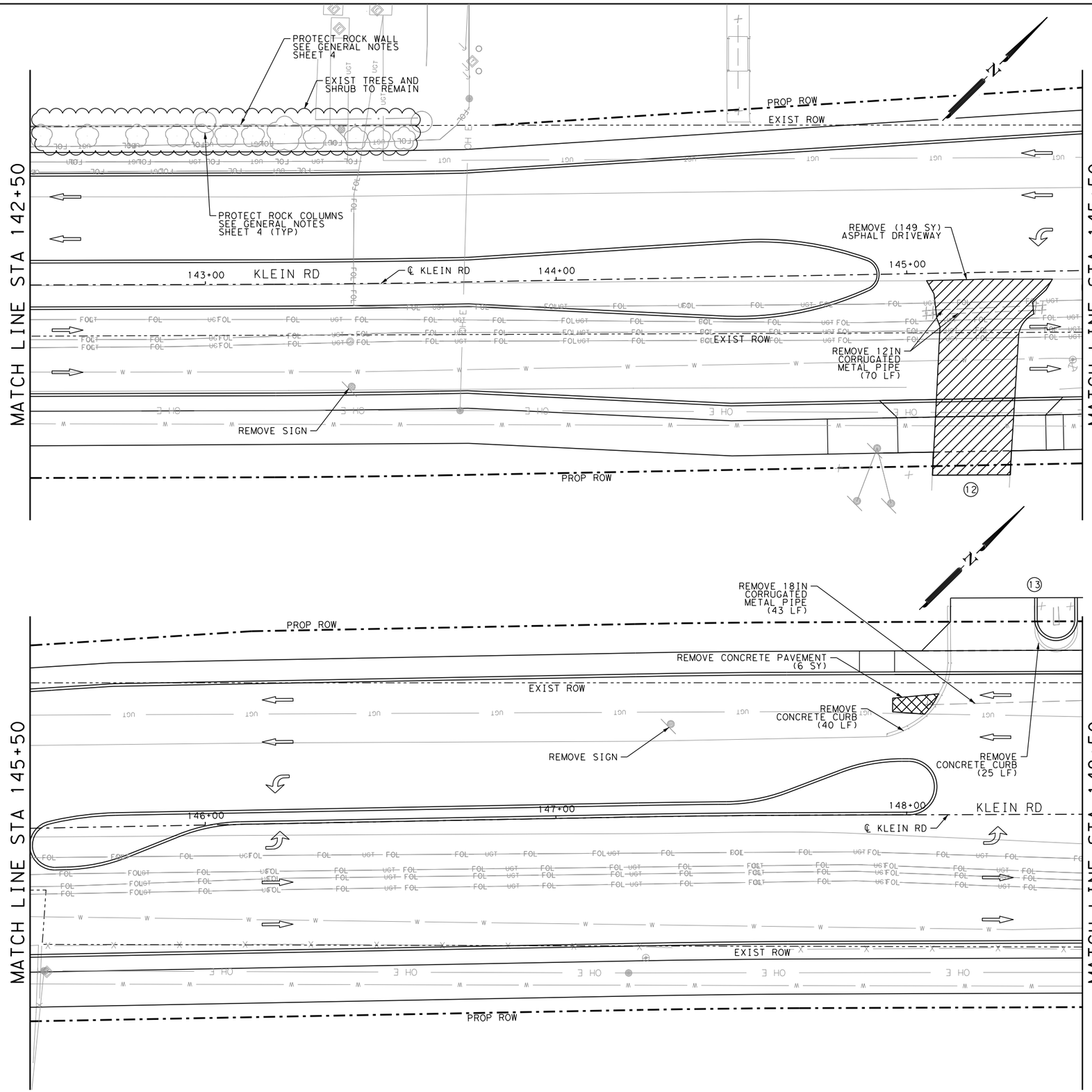
KLEIN RD PHASE 2

DEMOLITION PLAN

STA 136+50 TO STA 142+50

SHEET 7 OF 9

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	130



ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	6.0

DEMO LEGEND

- REMOVE DRIVEWAY
- REMOVE CONCRETE
- REMOVE SIDEWALK
- REMOVE STRUCTURE
- (TYP) TYPICAL

LEGEND

- X X FENCE
- WOOD FENCE
- PROPERTY BOUNDARY
- SIGN
- MAILBOX
- STONE COLUMN
- TREE
- SHRUB

NOTES

1. EXISTING FEATURES INDICATED FOR REMOVAL ARE PAID UNDER ITEM 0100 PREPARING ROW.
2. QUANTITIES IDENTIFIED WITHIN THE REMOVAL ITEMS ARE ESTIMATES AND SHOWN FOR CONTRACTOR'S INFORMATION ONLY.

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/30/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/30/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DEMOLITION PLAN

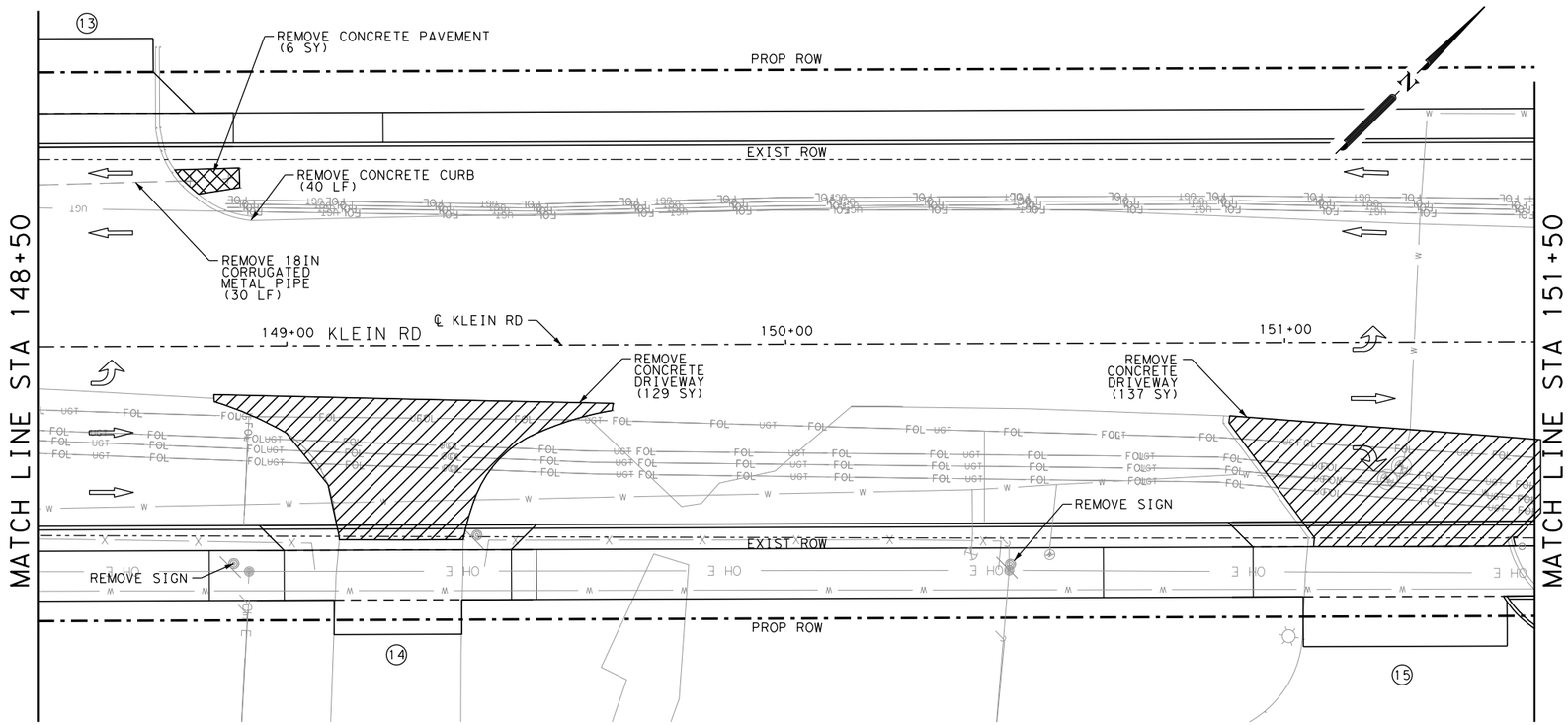
STA 142+50 TO STA 148+50

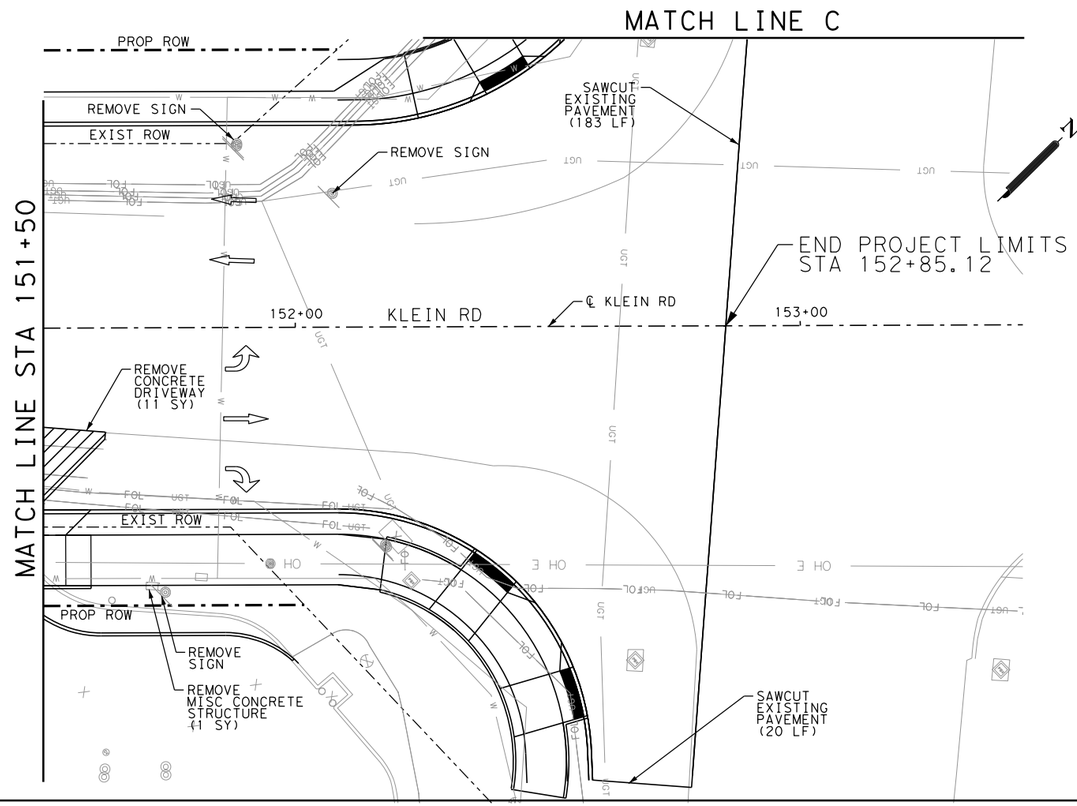
SHEET 8 OF 9

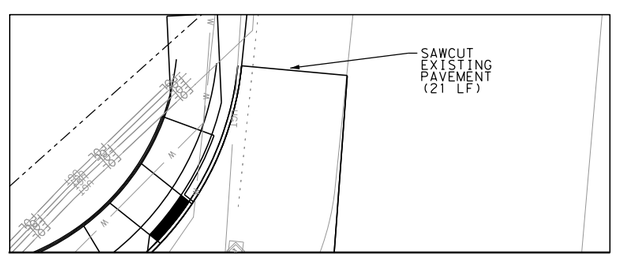
DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	131

Plotted on: 4/30/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Roadway\Demo\5103003dem09.dgn







ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	4.4

DEMO LEGEND

- REMOVE DRIVEWAY
- REMOVE CONCRETE
- REMOVE SIDEWALK
- REMOVE STRUCTURE
- (TYP) TYPICAL

LEGEND

- X X FENCE
- WOOD FENCE
- PROPERTY BOUNDARY
- SIGN
- MAILBOX
- STONE COLUMN
- TREE
- SHRUB

NOTES

1. EXISTING FEATURES INDICATED FOR REMOVAL ARE PAID UNDER ITEM 0100 PREPARING ROW.
2. QUANTITIES IDENTIFIED WITHIN THE REMOVAL ITEMS ARE ESTIMATES AND SHOWN FOR CONTRACTOR'S INFORMATION ONLY.

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/30/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/30/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DEMOLITION PLAN

STA 148+50 TO END PROJECT

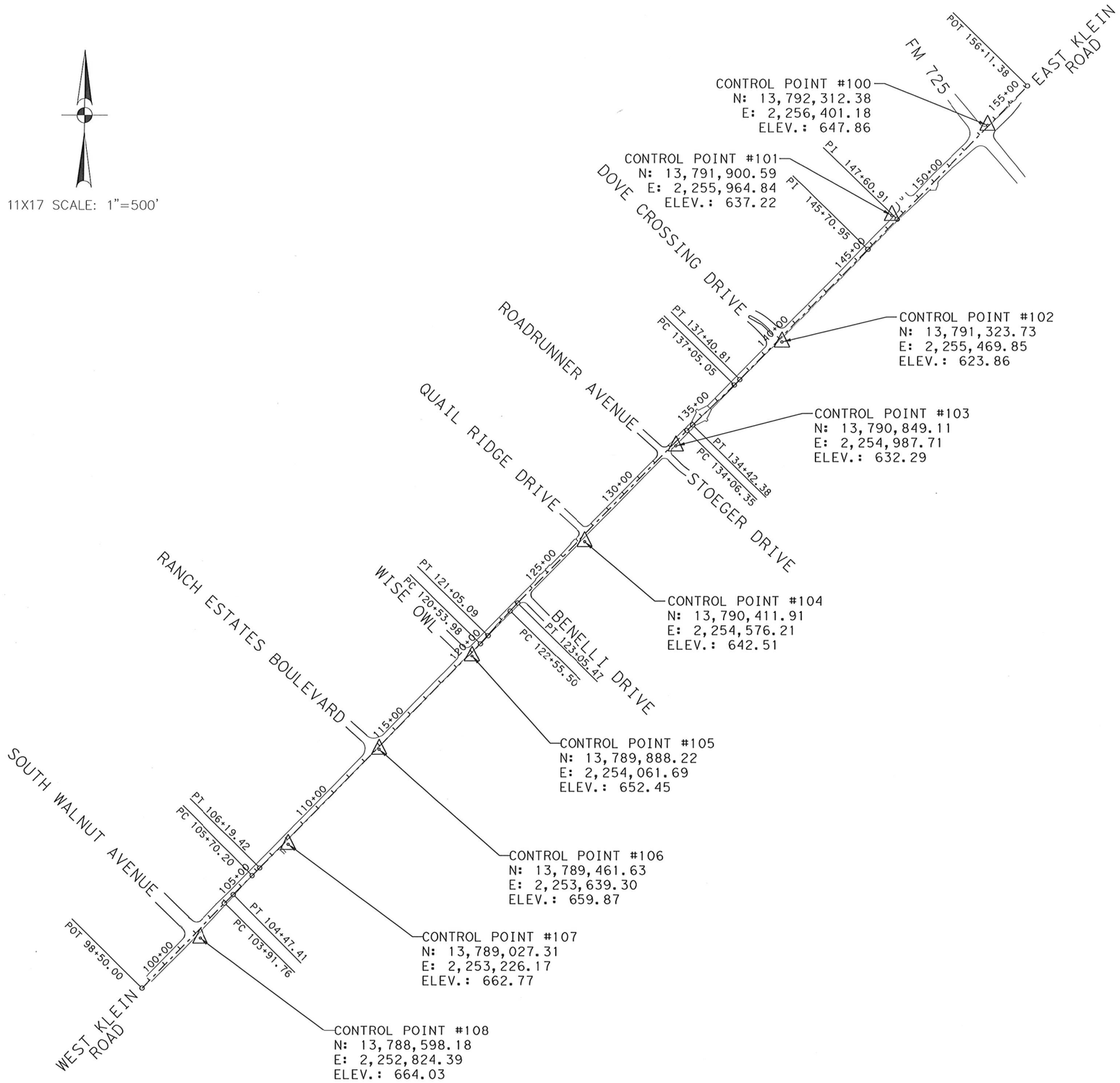
SHEET 9 OF 9

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	132

Plotted on: 12/2/2019

Design Filename: N:\Transpo\Civil\51030-03\dgn-topo\51030-03 CT LAYOUT.dgn

11X17 SCALE: 1"=500'



NOTES:

1. COORDINATES SHOWN ARE DISPLAYED IN US SURVEY FEET, BASED ON THE NORTH AMERICAN DATUM OF 1983 (NA 2011) EPOCH 2010 FROM THE TEXAS COORDINATE SYSTEM ESTABLISHED FOR THE SOUTH CENTRAL ZONE, WITH A SURFACE ADJUSTMENT FACTOR OF 1.00012 APPLIED.

2. SURVEY VERTICAL DATA IS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), GEOID 03 AND WAS DERIVED FROM SMARTNET COOPERATIVE NETWORK TOGETHER WITH CONVENTIONAL LEVELING TECHNIQUES.

3. ALIGNMENT SHOWN IS FOR DEISGN PURPOSES ONLY.

LEGEND

△ CONTROL POINT

SURVEYOR'S CERTIFICATION:

THE CONTROL POINTS SHOWN HEREIN WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION.

12-2-19

ERIC J. SNELL DATE
RPLS 6527

STATE OF TEXAS REGISTERED ERIC J. SNELL 6527 PROFESSIONAL LAND SURVEYOR

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

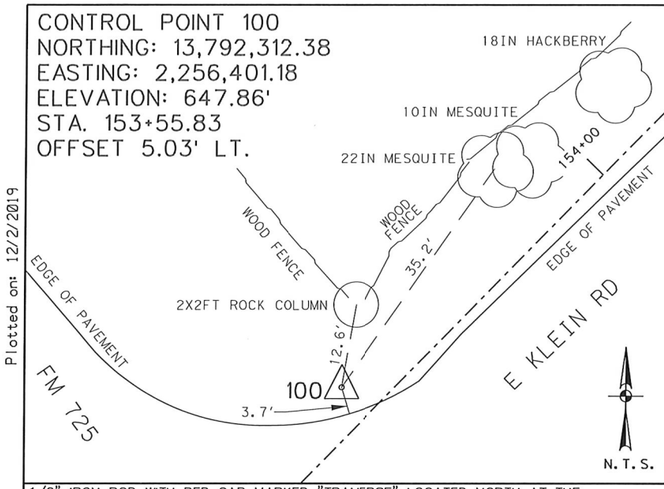
KLEIN RD PH 2

HORIZONTAL AND VERTICAL CONTROL

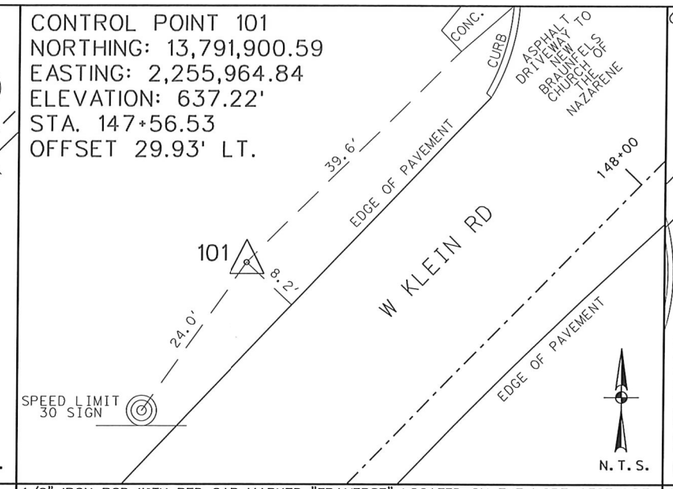
DGN:	JZ	STATE	PROJECT NO.	HIGHWAY NO.
CHK DGN:	ES	TEXAS	NB18-016	N/A
DWG:	JZ	COUNTY	PD JOB# 51030-03	SHEET NO.
CHK DWG:	ES	GUADALUPE		133

Plotted on: 12/2/2019

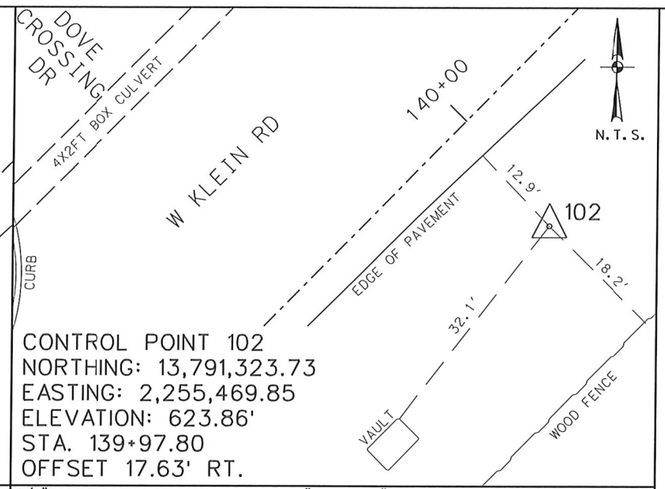
Design Filename: N:\Transpo\Civil\51030-03\dgn-topo\51030-03 CT SKETCHES*2D.dgn



1/2" IRON ROD WITH RED CAP MARKED "TRAVERSE" LOCATED NORTH AT THE INTERSECTION OF FM 725 AND E KLEIN ROAD.



1/2" IRON ROD WITH RED CAP MARKED "TRAVERSE" LOCATED ON THE NORTHWEST SIDE OF W KLEIN RD., APPROXIMATELY 88 FEET SOUTHWEST OF THE ASPHALT DRIVEWAY TO THE NEW BRAUNFELS CHURCH OF THE NAZARENE.



1/2" IRON ROD WITH RED CAP MARKED "TRAVERSE" LOCATED ON THE SOUTHEAST SIDE OF W KLEIN RD. AT THE INTERSECTION OF W KLEIN RD. AND DOVE CROSSING DR.

NOTES:

1. COORDINATES SHOWN ARE DISPLAYED IN US SURVEY FEET, BASED ON THE NORTH AMERICAN DATUM OF 1983 (NA 2011) EPOCH 2010 FROM THE TEXAS COORDINATE SYSTEM ESTABLISHED FOR THE SOUTH CENTRAL ZONE, WITH A SURFACE ADJUSTMENT FACTOR OF 1.00012 APPLIED.

2. SURVEY VERTICAL DATA IS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), GEOID 03 AND WAS DERIVED FROM SMARTNET COOPERATIVE NETWORK TOGETHER WITH CONVENTIONAL LEVELING TECHNIQUES.

3. ALIGNMENT SHOWN IS FOR DESIGN PURPOSES ONLY.

LEGEND

△	CONTROL POINT
FM	FARM TO MARKET ROAD
N.T.S.	NOT TO SCALE
STA.	STATION

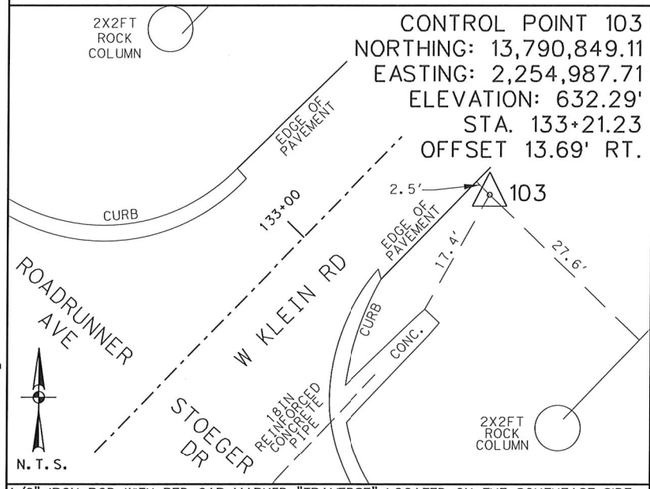
SURVEYOR'S CERTIFICATION:

THE CONTROL POINTS SHOWN HEREIN WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION.

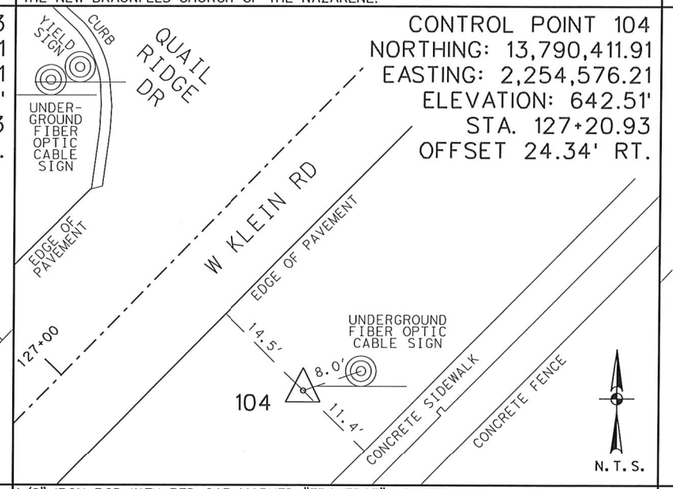
12-2-19

ERIC J. SNELL
RPLS 6527
DATE

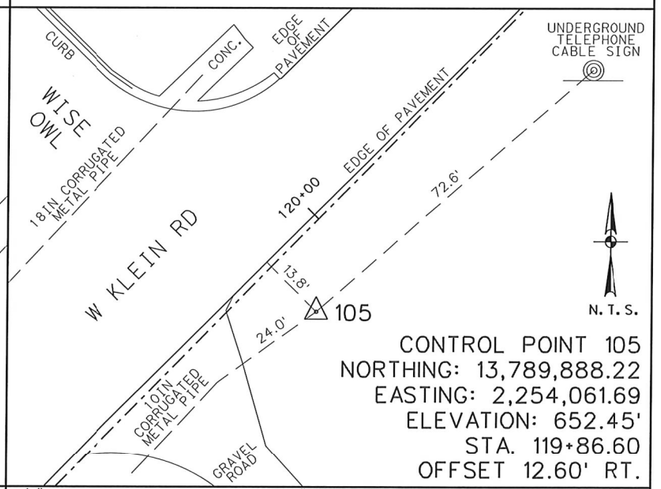
STATE OF TEXAS
REGISTERED
ERIC J. SNELL
6527
PROFESSIONAL
LAND SURVEYOR



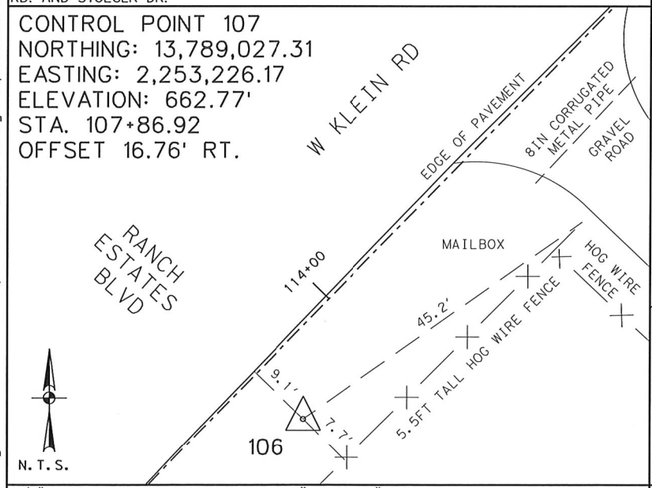
1/2" IRON ROD WITH RED CAP MARKED "TRAVERSE" LOCATED ON THE SOUTHEAST SIDE OF W KLEIN RD., APPROXIMATELY 58 FEET NORTHEAST OF THE INTERSECTION OF W KLEIN RD. AND STOEGER DR.



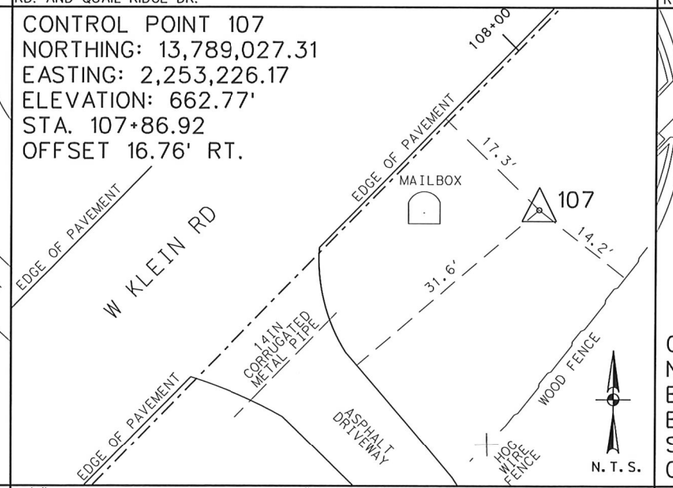
1/2" IRON ROD WITH RED CAP MARKED "TRAVERSE" LOCATED ON THE SOUTHEAST SIDE OF W KLEIN RD., APPROXIMATELY 32 FEET SOUTHWEST OF THE INTERSECTION OF W KLEIN RD. AND QUAIL RIDGE DR.



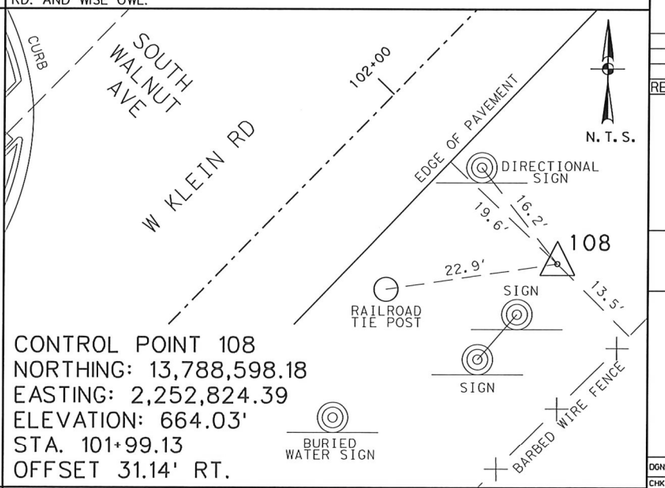
1/2" IRON ROD WITH RED CAP MARKED "TRAVERSE" LOCATED ON THE SOUTHEAST SIDE OF W KLEIN RD., APPROXIMATELY 15 FEET NORTHEAST OF THE INTERSECTION OF W KLEIN RD. AND WISE OWL.



1/2" IRON ROD WITH RED CAP MARKED "TRAVERSE" LOCATED ON THE SOUTHEAST SIDE OF W KLEIN RD., APPROXIMATELY 8 FEET NORTHEAST OF THE INTERSECTION OF W KLEIN RD. AND RANCH ESTATES BLVD.



1/2" IRON ROD WITH RED CAP MARKED "TRAVERSE" LOCATED ON THE SOUTHEAST SIDE OF W KLEIN RD., APPROXIMATELY 585 FEET NORTHEAST OF THE INTERSECTION OF W KLEIN RD. AND SOUTH WALNUT AVE.



1/2" IRON ROD WITH RED CAP MARKED "TRAVERSE" LOCATED ON THE SOUTHEAST SIDE OF W KLEIN RD. AT THE INTERSECTION OF W KLEIN RD. AND S WALNUT AVE.

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PH 2

HORIZONTAL AND VERTICAL CONTROL

DSN:	JZ	STATE	PROJECT NO.	HIGHWAY NO.
CHK DSN:	ES	TEXAS	NB18-016	N/A
DWG:	JZ	COUNTY	PD JOB# 51030-03	SHEET NO.
CHK DWG:	ES	GUADALUPE		134

CL KLEIN RD

Point KLEINCL1 N 13,788,369.82 E 2,252,558.47 Sta 98+50.00

Course from KLEINCL1 to PC KLEINCL_3 N 44° 14′ 57" E Dist 541.76

Curve Data

Curve KLEINCL_3

P.I. Station	104+19.58	N	13,788,777.82	E	2,252,955.91
Delta =	0° 47′ 50" (RT)				
Degree =	1° 25′ 57"				
Tangent =	27.82				
Length =	55.65				
Radius =	4,000.00				
External =	0.10				
Long Chord =	55.65				
Mid. Ord. =	0.10				
P.C. Station	103+91.76	N	13,788,757.89	E	2,252,936.50
P.T. Station	104+47.41	N	13,788,797.48	E	2,252,975.60
C.C.		N	13,785,966.77	E	2,255,801.75

Back = N 44° 14′ 57" E
Ahead = N 45° 02′ 47" E
Chord Bear = N 44° 38′ 52" E

Course from PT KLEINCL_3 to PC KLEINCL_6 N 45° 02′ 47" E Dist 122.79

Curve Data

Curve KLEINCL_6

P.I. Station	105+94.81	N	13,788,901.63	E	2,253,079.92
Delta =	0° 42′ 18" (LT)				
Degree =	1° 25′ 57"				
Tangent =	24.61				
Length =	49.22				
Radius =	4,000.00				
External =	0.08				
Long Chord =	49.22				
Mid. Ord. =	0.08				
P.C. Station	105+70.20	N	13,788,884.24	E	2,253,062.50
P.T. Station	106+19.42	N	13,788,919.23	E	2,253,097.12
C.C.		N	13,791,714.95	E	2,250,236.36

Back = N 45° 02′ 47" E
Ahead = N 44° 20′ 28" E
Chord Bear = N 44° 41′ 37" E

Course from PT KLEINCL_6 to PC KLEINCL_9 N 44° 20′ 28" E Dist 1,434.56

Curve Data

Curve KLEINCL_9

P.I. Station	120+79.54	N	13,789,963.49	E	2,254,117.64
Delta =	2° 39′ 44" (LT)				
Degree =	5° 12′ 31"				
Tangent =	25.56				
Length =	51.11				
Radius =	1,100.00				
External =	0.30				
Long Chord =	51.10				
Mid. Ord. =	0.30				
P.C. Station	120+53.98	N	13,789,945.21	E	2,254,099.77
P.T. Station	121+05.09	N	13,789,982.58	E	2,254,134.63
C.C.		N	13,790,714.03	E	2,253,313.06

Back = N 44° 20′ 28" E
Ahead = N 41° 40′ 45" E
Chord Bear = N 43° 00′ 37" E

Course from PT KLEINCL_9 to PC KLEINCL_12 N 41° 40′ 45" E Dist 150.41

Curve Data

Curve KLEINCL_12

P.I. Station	122+80.49	N	13,790,113.58	E	2,254,251.27
Delta =	2° 36′ 11" (RT)				
Degree =	5° 12′ 31"				
Tangent =	24.99				
Length =	49.97				
Radius =	1,100.00				
External =	0.28				
Long Chord =	49.97				
Mid. Ord. =	0.28				
P.C. Station	122+55.50	N	13,790,094.92	E	2,254,234.65
P.T. Station	123+05.47	N	13,790,131.48	E	2,254,268.72
C.C.		N	13,789,363.47	E	2,255,056.22

CL KLEIN RD CONTINUED

Back = N 41° 40′ 45" E
Ahead = N 44° 16′ 55" E
Chord Bear = N 42° 58′ 50" E

Course from PT KLEINCL_12 to PC KLEINCL_15 N 44° 16′ 55" E Dist 1,100.87

Curve Data

Curve KLEINCL_15

P.I. Station	134+24.37	N	13,790,932.50	E	2,255,049.92
Delta =	1° 52′ 38" (RT)				
Degree =	5° 12′ 31"				
Tangent =	18.02				
Length =	36.04				
Radius =	1,100.00				
External =	0.15				
Long Chord =	36.04				
Mid. Ord. =	0.15				
P.C. Station	134+06.35	N	13,790,919.60	E	2,255,037.34
P.T. Station	134+42.38	N	13,790,944.99	E	2,255,062.92
C.C.		N	13,790,151.59	E	2,255,824.84

Back = N 44° 16′ 55" E
Ahead = N 46° 09′ 33" E
Chord Bear = N 45° 13′ 14" E

Course from PT KLEINCL_15 to PC KLEINCL_18 N 46° 09′ 33" E Dist 422.04

Curve Data

Curve KLEINCL_18

P.I. Station	138+82.28	N	13,791,249.68	E	2,255,380.20
Delta =	1° 51′ 35" (LT)				
Degree =	5° 12′ 31"				
Tangent =	17.85				
Length =	35.70				
Radius =	1,100.00				
External =	0.14				
Long Chord =	35.70				
Mid. Ord. =	0.14				
P.C. Station	138+64.43	N	13,791,237.32	E	2,255,367.32
P.T. Station	139+00.13	N	13,791,262.46	E	2,255,392.67
C.C.		N	13,792,030.71	E	2,254,605.40

Back = N 46° 09′ 33" E
Ahead = N 44° 17′ 59" E
Chord Bear = N 45° 13′ 46" E

Course from PT KLEINCL_18 to PC KLEINCL_21 N 44° 17′ 59" E Dist 419.45

Curve Data

Curve KLEINCL_21

P.I. Station	143+42.87	N	13,791,579.33	E	2,255,701.88
Delta =	0° 53′ 23" (LT)				
Degree =	1° 54′ 35"				
Tangent =	23.29				
Length =	46.59				
Radius =	3,000.00				
External =	0.09				
Long Chord =	46.59				
Mid. Ord. =	0.09				
P.C. Station	143+19.58	N	13,791,562.66	E	2,255,685.62
P.T. Station	143+66.16	N	13,791,596.25	E	2,255,717.89
C.C.		N	13,793,657.89	E	2,253,538.53

Back = N 44° 17′ 59" E
Ahead = N 43° 24′ 36" E
Chord Bear = N 43° 51′ 17" E

Course from PT KLEINCL_21 to PC KLEINCL_24 N 43° 24′ 36" E Dist 357.35

Curve Data

Curve KLEINCL_24

P.I. Station	147+46.35	N	13,791,872.44	E	2,255,979.16
Delta =	0° 52′ 20" (RT)				
Degree =	1° 54′ 35"				
Tangent =	22.83				
Length =	45.67				
Radius =	3,000.00				
External =	0.09				
Long Chord =	45.66				
Mid. Ord. =	0.09				
P.C. Station	147+23.51	N	13,791,855.85	E	2,255,963.47

CL KLEIN RD CONTINUED

P.T. Station	147+69.18	N	13,791,888.78	E	2,255,995.10
C.C.		N	13,789,794.21	E	2,258,142.83

Back = N 43° 24′ 36" E
Ahead = N 44° 16′ 55" E
Chord Bear = N 43° 50′ 46" E

Course from PT KLEINCL_24 to KLEINCL26 N 44° 16′ 55" E Dist 842.33

Point KLEINCL26 N 13,792,491.82 E 2,256,583.21 Sta 156+11.51

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Ending chain KLEINCL description

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

HORIZONTAL ALIGNMENT DATA SHEET

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	135

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\General\5103003_HADS.dgn

CL DOVE CROSSING

Point DOVECROSSING1 N 13,791,490.85 E 2,255,212.06 Sta 50+00.00

Course from DOVECROSSING1 to PC DOVECROSSING_3 S 67° 43′ 34" E Dist 21.61

Curve Data

Curve DOVECROSSING_3

P.I. Station		50+66.68	N	13,791,465.54	E	2,255,273.75
Delta	=	7° 35′ 00"	(RT)			
Degree	=	8° 25′ 33"				
Tangent	=	45.07				
Length	=	90.00				
Radius	=	680.00				
External	=	1.49				
Long Chord	=	89.93				
Mid. Ord.	=	1.49				
P.C. Station		50+21.61	N	13,791,482.66	E	2,255,232.06
P.T. Station		51+11.61	N	13,791,443.07	E	2,255,312.81
C.C.			N	13,790,853.63	E	2,254,973.75
Back	= S 67° 40′ 27" E					
Ahead	= S 60° 05′ 28" E					
Chord Bear	= S 63° 52′ 58" E					

Course from PT DOVECROSSING_3 to PC DOVECROSSING_6 S 60° 05′ 28" E Dist 67.15

Curve Data

Curve DOVECROSSING_6

P.I. Station		51+90.98	N	13,791,403.49	E	2,255,381.61
Delta	=	13° 55′ 40"	(RT)			
Degree	=	57° 17′ 45"				
Tangent	=	12.21				
Length	=	24.31				
Radius	=	100.00				
External	=	0.74				
Long Chord	=	24.25				
Mid. Ord.	=	0.74				
P.C. Station		51+78.77	N	13,791,409.58	E	2,255,371.02
P.T. Station		52+03.07	N	13,791,395.03	E	2,255,390.42
C.C.			N	13,791,322.90	E	2,255,321.16
Back	= S 60° 05′ 28" E					
Ahead	= S 46° 09′ 48" E					
Chord Bear	= S 53° 07′ 38" E					

Course from PT DOVECROSSING_6 to PC DOVECROSSING_9 S 46° 03′ 16" E Dist 21.49

Curve Data

Curve DOVECROSSING_9

P.I. Station		52+28.36	N	13,791,377.50	E	2,255,408.65
Delta	=	4° 21′ 04"	(RT)			
Degree	=	57° 17′ 45"				
Tangent	=	3.80				
Length	=	7.59				
Radius	=	100.00				
External	=	0.07				
Long Chord	=	7.59				
Mid. Ord.	=	0.07				
P.C. Station		52+24.57	N	13,791,380.12	E	2,255,405.90
P.T. Station		52+32.16	N	13,791,374.68	E	2,255,411.20
C.C.			N	13,791,307.60	E	2,255,337.04
Back	= S 46° 28′ 57" E					
Ahead	= S 42° 07′ 53" E					
Chord Bear	= S 44° 18′ 25" E					

Course from PT DOVECROSSING_9 to DOVECROSSING11 S 42° 07′ 53" E Dist 250.00

Point DOVECROSSING11 N 13,791,189.28 E 2,255,578.91 Sta 54+82.16

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Ending chain DOVECROSSING description

CL CHANNELA1

Chain CHANNELA1 contains:
CHANNELA11 CUR CHANNELA1_3 CUR CHANNELA1_6 CHANNELA18

Beginning chain CHANNELA1 description
Feature: Grade_DitchBottom

==========

Point CHANNELA11 N 13,788,705.09 E 2,252,961.14 Sta 203+71.13

Course from CHANNELA11 to PC CHANNELA1_3 N 44° 14′ 57" E Dist 20.63

Curve Data

Curve CHANNELA1_3

P.I. Station		204+19.20	N	13,788,739.52	E	2,252,994.69
Delta	=	0° 47′ 50"	(RT)			
Degree	=	1° 27′ 08"				
Tangent	=	27.44				
Length	=	54.89				
Radius	=	3,945.50				
External	=	0.10				
Long Chord	=	54.89				
Mid. Ord.	=	0.10				
P.C. Station		203+91.76	N	13,788,719.86	E	2,252,975.54
P.T. Station		204+46.64	N	13,788,758.91	E	2,253,014.11
C.C.			N	13,785,966.77	E	2,255,801.75
Back	= N 44° 14′ 57" E					
Ahead	= N 45° 02′ 47" E					
Chord Bear	= N 44° 38′ 52" E					

Course from PT CHANNELA1_3 to PC CHANNELA1_6 N 45° 02′ 47" E Dist 122.79

Curve Data

Curve CHANNELA1_6

P.I. Station		205+94.38	N	13,788,863.30	E	2,253,118.66
Delta	=	0° 42′ 18"	(LT)			
Degree	=	1° 24′ 47"				
Tangent	=	24.95				
Length	=	49.89				
Radius	=	4,054.50				
External	=	0.08				
Long Chord	=	49.89				
Mid. Ord.	=	0.08				
P.C. Station		205+69.44	N	13,788,845.67	E	2,253,101.01
P.T. Station		206+19.33	N	13,788,881.14	E	2,253,136.10
C.C.			N	13,791,714.95	E	2,250,236.36
Back	= N 45° 02′ 47" E					
Ahead	= N 44° 20′ 28" E					
Chord Bear	= N 44° 41′ 37" E					

Course from PT CHANNELA1_6 to CHANNELA18 N 44° 20′ 28" E Dist 1,287.90

Point CHANNELA18 N 13,789,802.23 E 2,254,036.25 Sta 219+07.23

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Ending chain CHANNELA1 description

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

HORIZONTAL ALIGNMENT DATA SHEET

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	136

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\General\5103003_HADS.dgn

CL DRIVEWAY 16

Chain DRWY_16 contains:
125 CUR DRWY_16_3 126

Beginning chain DRWY_16 description
Feature: Road_Centerline

Point 125 N 13,790,924.88 E 2,255,075.21 Sta 0+00.00

Course from 125 to PC DRWY_16_3 S 44° 06′ 36" E Dist 29.06

Curve Data

Curve DRWY_16_3

P.I. Station	0+54.06	N	13,790,886.07	E	2,255,112.83
Delta =	90° 00′ 15" (LT)				
Degree =	229° 10′ 59"				
Tangent =	25.00				
Length =	39.27				
Radius =	25.00				
External =	10.36				
Long Chord =	35.36				
Mid. Ord. =	7.32				
P.C. Station	0+29.06	N	13,790,904.02	E	2,255,095.43
P.T. Station	0+68.33	N	13,790,903.47	E	2,255,130.78
C.C.		N	13,790,921.42	E	2,255,113.38

Back = S 44° 06′ 36" E
Ahead = N 45° 53′ 09" E
Chord Bear = S 89° 06′ 44" E

Course from PT DRWY_16_3 to 126 N 45° 53′ 09" E Dist 46.79

Point 126 N 13,790,936.04 E 2,255,164.38 Sta 1+15.12

Ending chain DRWY_16 description

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/20/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/20/2021 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

HORIZONTAL ALIGNMENT DATA SHEET

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	136A

Plotted on: 4/20/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\General\5103003_HADS_SH2.dgn

WALL C

Chain WALLC contains:
CUR WALLC_1 WALLC4 WALLC5

Beginning chain WALLC description
Feature: Struc_Wall

			Curve Data			
Curve WALLC_1						
P.I. Station		30+11.47	N	13,790,956.70	E	2,255,035.77
Delta	=	1° 09′ 57" (RT)				
Degree	=	5° 04′ 58"				
Tangent	=	11.47				
Length	=	22.94				
Radius	=	1,127.25				
External	=	0.06				
Long Chord	=	22.94				
Mid. Ord.	=	0.06				
P.C. Station		30+00.00	N	13,790,948.59	E	2,255,027.66
P.T. Station		30+22.94	N	13,790,964.64	E	2,255,044.04
C.C.			N	13,790,151.59	E	2,255,824.84
Back	= N 44° 59′ 36" E					
Ahead	= N 46° 09′ 33" E					
Chord Bear	= N 45° 34′ 35" E					

Course from PT WALLC_1 to WALLC4 N 24° 21′ 28" E Dist 5.39

Point WALLC4 N 13,790,969.55 E 2,255,046.26 Sta 30+28.32

Course from WALLC4 to WALLC5 N 46° 09′ 33" E Dist 15.87

Point WALLC5 N 13,790,980.54 E 2,255,057.71 Sta 30+44.19

Ending chain WALLC description

WALL E

Chain WALLE2 contains:
WALLE21 WALLE23 WALLE24

Beginning chain WALLE2 description
Feature: Struc_Wall

Point WALLE21 N 13,790,914.20 E 2,255,102.46 Sta 49+80.00

Course from WALLE21 to WALLE23 N 0° 43′ 05" W Dist 20.00

Point WALLE23 N 13,790,934.20 E 2,255,102.21 Sta 50+00.00

Course from WALLE23 to WALLE24 N 43° 50′ 27" W Dist 65.86

Point WALLE24 N 13,790,981.70 E 2,255,056.59 Sta 50+65.86

Ending chain WALLE2 description

WALL F

Chain WALLF contains:
WALLF1 WALLF2

Beginning chain WALLF description
Feature: Struc_Wall

Point WALLF1 N 13,791,087.49 E 2,255,285.66 Sta 60+00.00

Course from WALLF1 to WALLF2 N 43° 50′ 27" W Dist 103.00

Point WALLF2 N 13,791,161.78 E 2,255,214.32 Sta 61+03.00

Ending chain WALLF description

WALL H

Chain WALLH contains:
WALLH1 WALLH2

Beginning chain WALLH description
Feature: Struc_Wall

Point WALLH1 N 13,791,161.78 E 2,255,214.32 Sta 80+00.00

Course from WALLH1 to WALLH2 N 46° 09′ 33" E Dist 23.25

Point WALLH2 N 13,791,177.89 E 2,255,231.09 Sta 80+23.25

Ending chain WALLH description

WALL G

Chain WALLG contains:
WALLG1 CUR WALLG_3 WALLG5

Beginning chain WALLG description
Feature: Struc_Wall

Point WALLG1 N 13,791,087.49 E
2,255,285.66 Sta 70+00.00

Course from WALLG1 to PC WALLG_3 N 46° 09′ 33" E
Dist 162.68

			Curve Data			
Curve WALLG_3						
P.I. Station		71+81.36	N			
13,791,213.12	E	2,255,416.47				
Delta	=	1° 51′ 35" (LT)				
Degree	=	4° 58′ 33"				
Tangent	=	18.69				
Length	=	37.37				
Radius	=	1,151.50				
External	=	0.15				
Long Chord	=	37.37				
Mid. Ord.	=	0.15				
P.C. Station		71+62.68	N			
13,791,200.17	E	2,255,402.99				
P.T. Station		72+00.05	N			
13,791,226.49	E	2,255,429.52				
C.C.			N			
13,792,030.71	E	2,254,605.40				
Back	= N 46° 09′ 33" E					
Ahead	= N 44° 17′ 59" E					
Chord Bear	= N 45° 13′ 46" E					

Course from PT WALLG_3 to WALLG5 N 44° 17′ 59" E
Dist 296.12

Point WALLG5 N 13,791,438.43 E
2,255,636.34 Sta 74+96.17

Ending chain WALLG description

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/20/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/20/2021 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

RETAINING WALL HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 1

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	137

Plotted on: 1/22/2021

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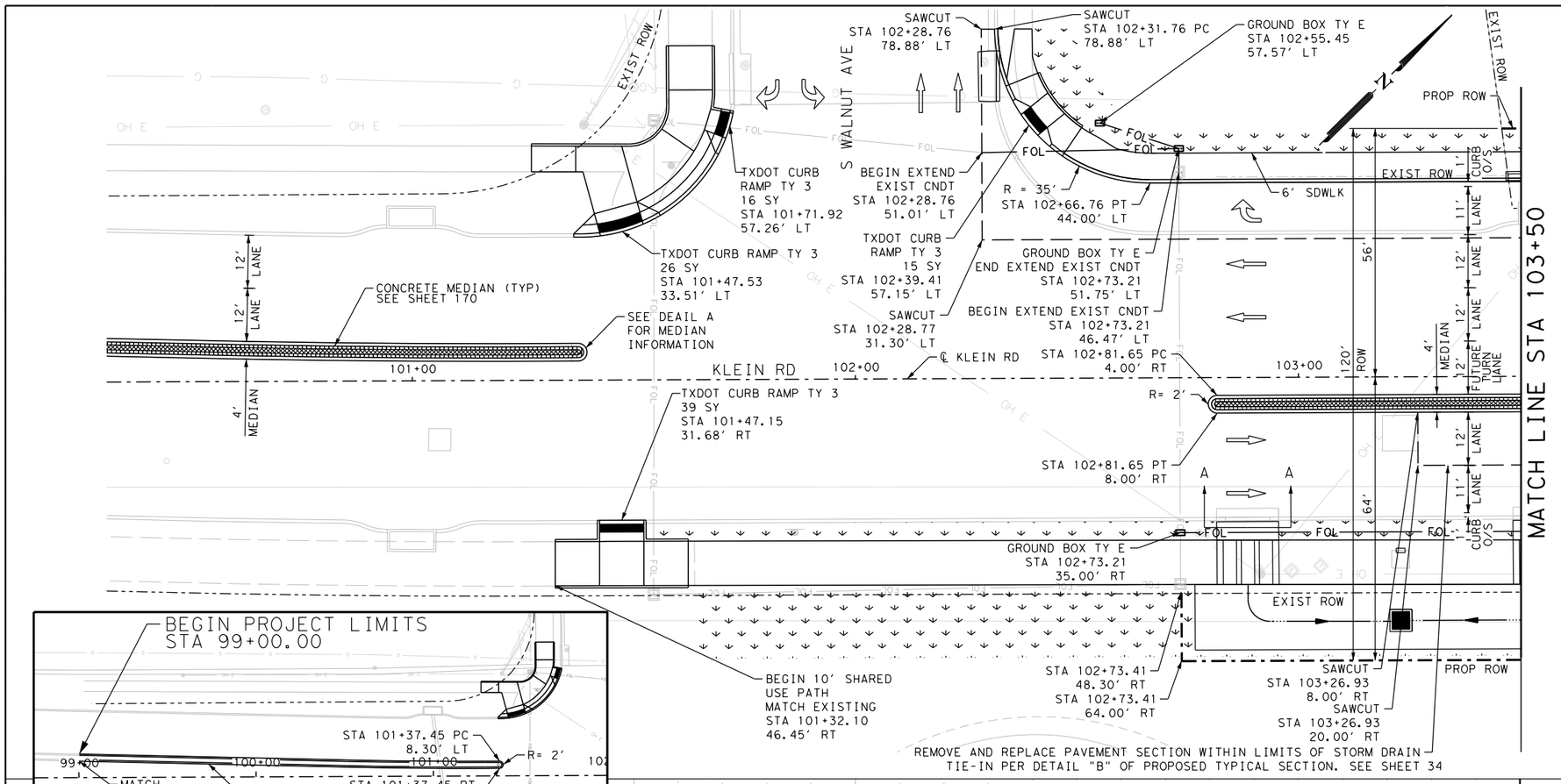
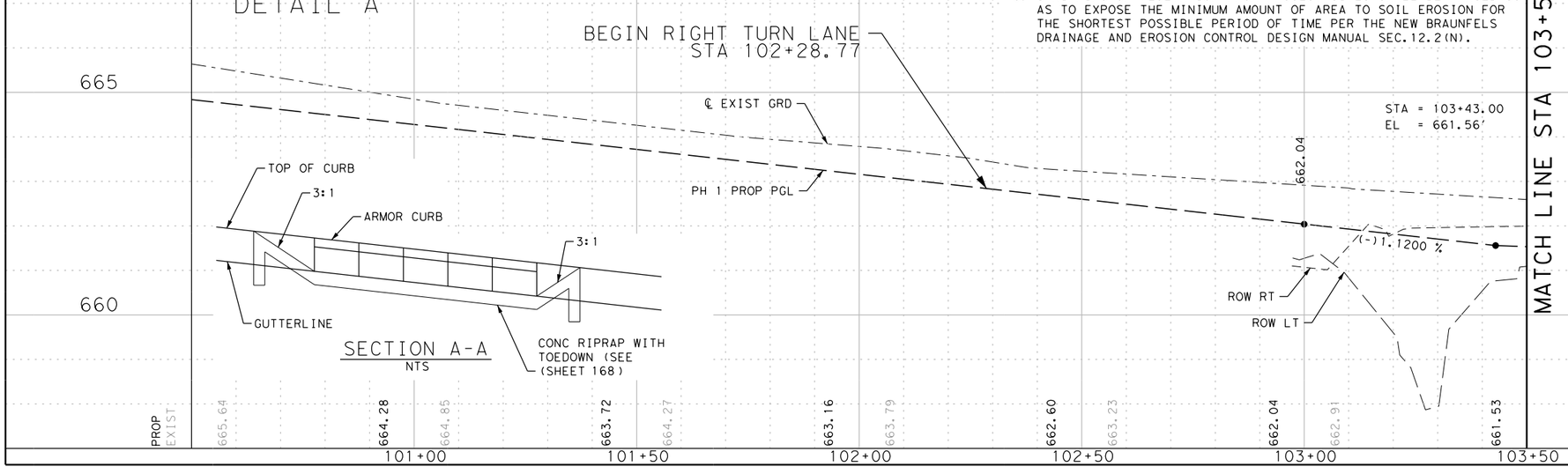


DETAIL A



ITEM	DESCRIPTION	UNIT	QTY
0110-6001	EXCAVATION (ROADWAY)	CY	131
0132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	10
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	510
0162-6002	BLOCK SODDING	SY	510
0168-6001	VEGETATIVE WATERING	MG	7.96
0247-6041	FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	CY	79
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	3.0
0260-6027	LIME TRT (EXST MATL)(8")	SY	290
0310-6001	PRIME COAT (MULTI OPTION)	GAL	81.87
0316-6251	AGGR(TY-PE GR-5 SAC-B)	CY	2
0316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	54.58
0340-6014	D-GR HMA(SQ) TY-B PG70-22	TON	47.1
0340-6050	D-GR HMA(SQ) TY-C PG70-22	TON	41.9
0340-6272	TACK COAT	GAL	48.54
0341-6049	D-GR HMA TY-D PG76-22	TON	28.0
0432-6003	RIPRAP (CONC)(6 IN)	CY	1.5
0529-6002	CONC CURB (TY II)	LF	758
0531-6001	CONC SIDEWALKS (4")	SY	294
0531-6020	CURB RAMPS (TY 3)	SY	133
0536-6002	CONC MEDIAN	SY	114
0618-6033	CONDT (PVC) (SCH 40) (4")	LF	292
0624-6012	GROUND BOX TY E (122317)W/APRON	EA	3
2005-6002	FILTER FABRIC (TY 1)	SY	449
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	290

NOTES

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2. SEE INTERSECTION LAYOUT SHEETS FOR INTERSECTION DETAILS.
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6. STRIPPING OF VEGETATION FROM PROJECT SITES SHALL BE PHASED SO AS TO EXPOSE THE MINIMUM AMOUNT OF AREA TO SOIL EROSION FOR THE SHORTEST POSSIBLE PERIOD OF TIME PER THE NEW BRAUNFELS DRAINAGE AND EROSION CONTROL DESIGN MANUAL SEC.12.2(N).

LEGEND OF FEATURES

CURB INLET
BLOCK SODDING
TRAFFIC FLOW ARROW
GROUND BOX
PROPERTY BOUNDARY
SWALE/GRADING
FIELD INLET
DRIVEWAY NO.
—FOL— 2~4" SCH 40 PVC
FULL DEPTH ASPHALT PAVEMENT
MANHOLE
DROP INLET

DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED
PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

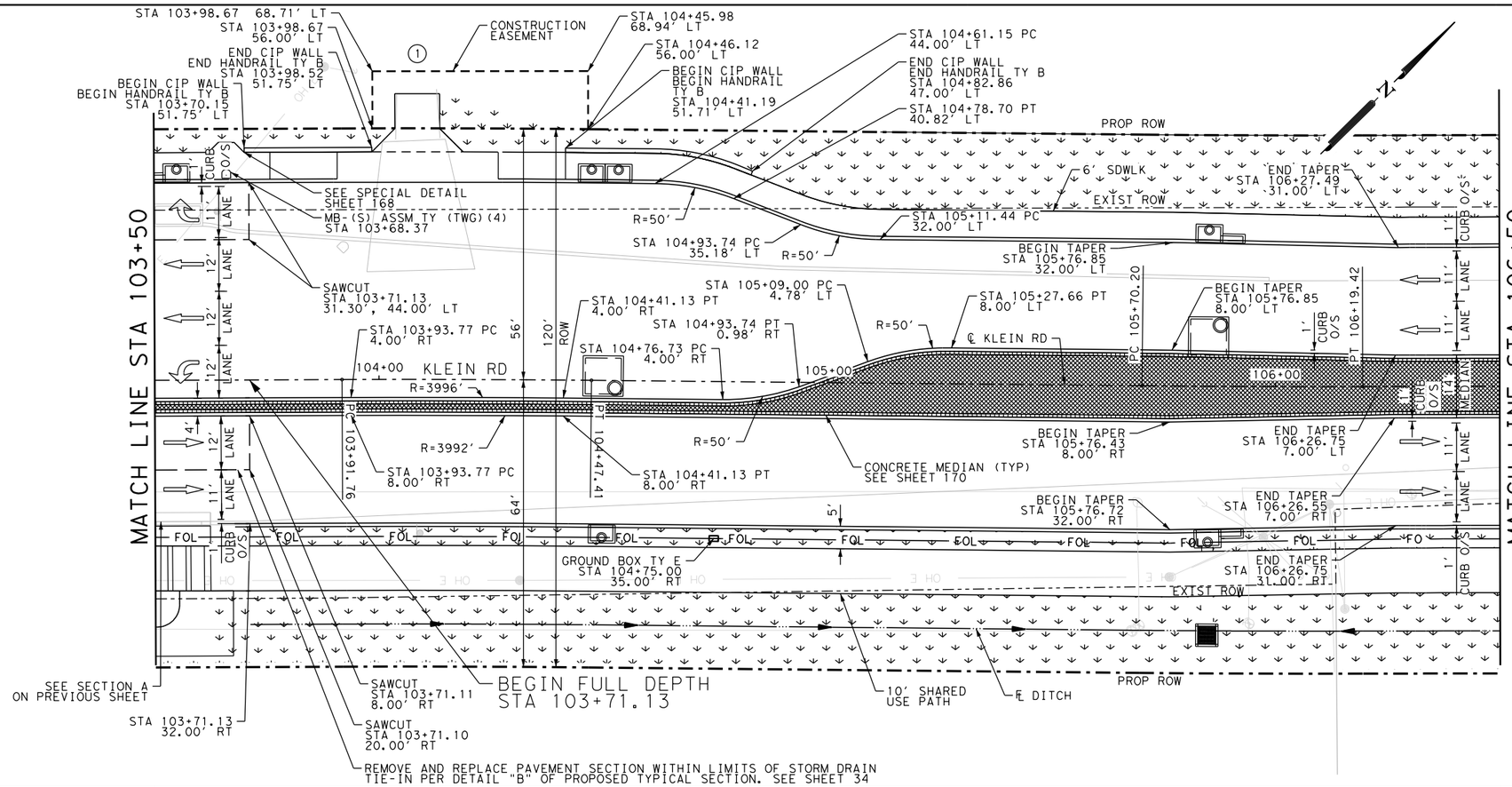
KLEIN RD PHASE 2

ROADWAY PLAN & PROFILE

BEGIN PROJECT TO STA 103+50

SHEET 1 OF 18

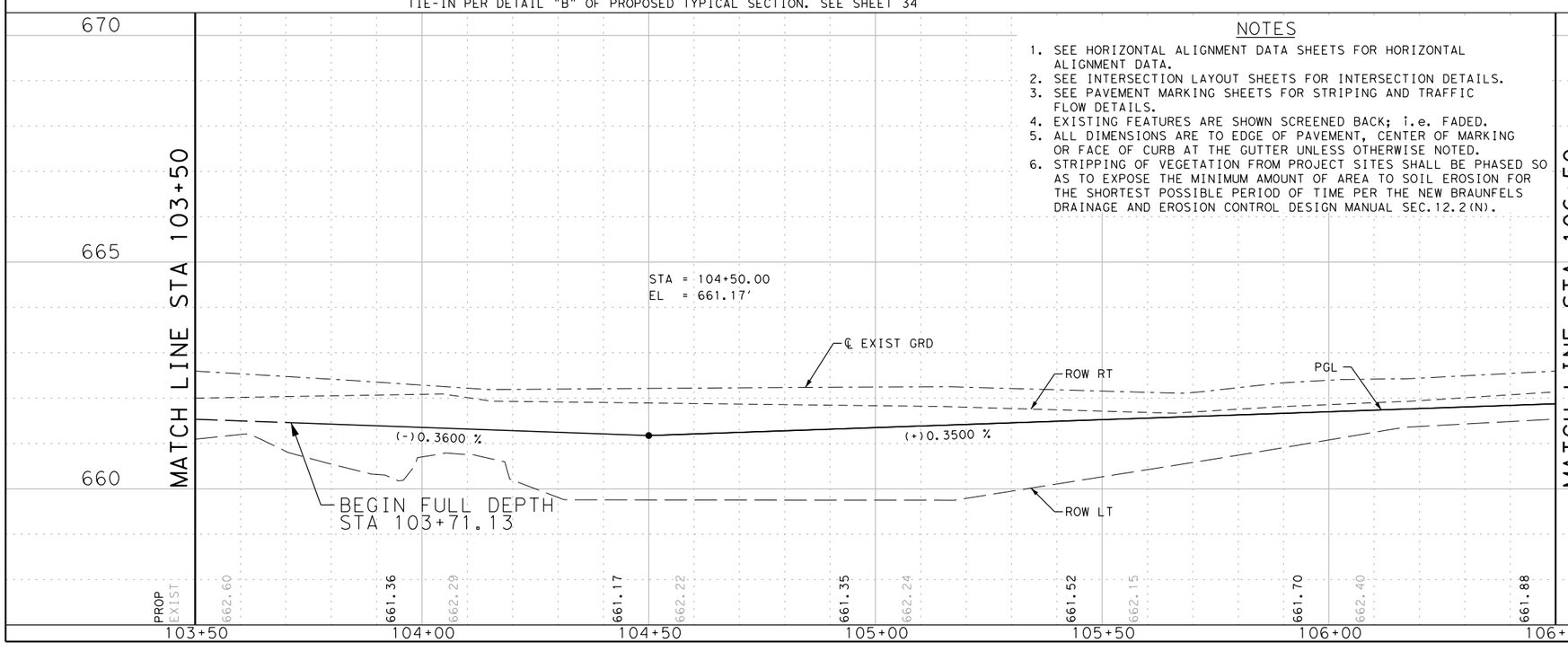
DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	138



ITEM	DESCRIPTION	UNIT	QTY
0110-6001	EXCAVATION (ROADWAY)	CY	1757
0132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	109
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	1063
0162-6002	BLOCK SODDING	SY	1040
0168-6001	VEGETATIVE WATERING	MG	16.59
0247-6041	FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	CY	601
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	22.1
0260-6027	LIME TRT (EXST MATL)(8")	SY	2202
0310-6001	PRIME COAT (MULTI OPTION)	GAL	628.95
0316-6251	AGGR(TY-PE GR-5 SAC-B)	CY	15
0316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	419.30
0340-6014	D-GR HMA(SQ) TY-B PG70-22	TON	361.7
0340-6050	D-GR HMA(SQ) TY-C PG70-22	TON	324.2
0340-6272	TACK COAT	GAL	375.83
0341-6049	D-GR HMA TY-D PG76-22	TON	216.2
0423-6008	RETAINING WALL (CAST - IN - PLACE)	SF	310
0450-6048	RAIL (HANDRAIL)(TY B)	LF	71
0529-6002	CONC CURB (TY II)	LF	1102
0530-6004	DRIVEWAYS (CONC)	SY	44
0531-6001	CONC SIDEWALKS (4")	SY	512
0536-6002	CONC MEDIAN	SY	271
0560-6014	MAILBOX INSTALL-S (TWG-POST) TY 4	EA	1
0618-6033	CONDT (PVC) (SCH 40) (4")	LF	600
0624-6012	GROUND BOX TY E (122317)W/APRON	EA	1
2005-6002	FILTER FABRIC (TY 1)	SY	544
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	2202
6210-6001	PVC MOISTURE BARRIER	SY	134

LEGEND OF FEATURES

CURB INLET — SWALE/GRADING — MANHOLE
BLOCK SODDING — FIELD INLET — DROP INLET
TRAFFIC FLOW ARROW — DRIVEWAY NO.
GROUND BOX — FOL — 2~4" SCH 40 PVC
PROPERTY BOUNDARY — FULL DEPTH ASPHALT PAVEMENT



NOTES

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DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

ROADWAY PLAN & PROFILE

STA 103+50 TO STA 106+50

SHEET 2 OF 18

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	139

Plotted on: 1/22/2021

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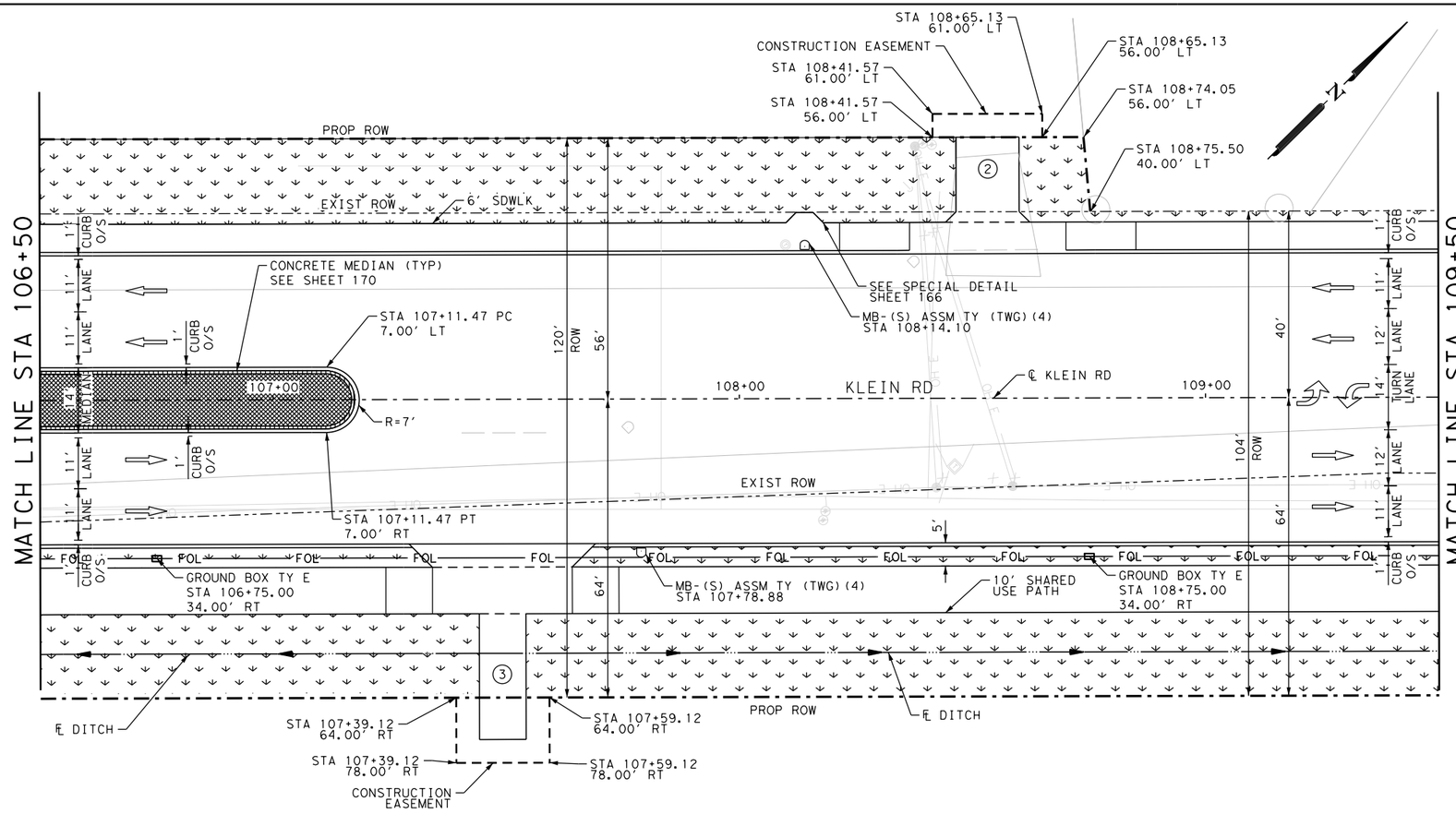
Plotted on: 1/22/2021



ITEM	DESCRIPTION	UNIT	QTY
0110-6001	EXCAVATION (ROADWAY)	CY	1994
0132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	8
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	1125
0162-6002	BLOCK SODDING	SY	1125
0168-6001	VEGETATIVE WATERING	MG	17.55
0247-6041	FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	CY	595
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	21.8
0260-6027	LIME TRT (EXST MATL)(8")	SY	2175
0310-6001	PRIME COAT (MULTI OPTION)	GAL	632.11
0316-6251	AGGR(TY-PE GR-5 SAC-B)	CY	15
0316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	421.41
0340-6014	D-GR HMA(SQ) TY-B PG70-22	TON	363.5
0340-6050	D-GR HMA(SQ) TY-C PG70-22	TON	338.6
0340-6272	TACK COAT	GAL	392.48
0341-6049	D-GR HMA TY-D PG76-22	TON	225.7
0529-6002	CONC CURB (TY II)	LF	660
0530-6004	DRIVEWAYS (CONC)	SY	137
0531-6001	CONC SIDEWALKS (4")	SY	479
0536-6002	CONC MEDIAN	SY	92
0560-6014	MAILBOX INSTALL-S (TWG-POST) TY 4	EA	2
0618-6033	CONDT (PVC) (SCH 40) (4")	LF	600
0624-6012	GROUND BOX TY E (122317)W/APRON	EA	2
2005-6002	FILTER FABRIC (TY 1)	SY	509
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	2175
6210-6001	PVC MOISTURE BARRIER	SY	120

LEGEND OF FEATURES

CURB INLET
BLOCK SODDING
TRAFFIC FLOW ARROW
GROUND BOX
PROPERTY BOUNDARY
SWALE/GRADING
FIELD INLET
DRIVEWAY NO.
—FOL— 2~4" SCH 40 PVC
FULL DEPTH ASPHALT PAVEMENT
MANHOLE
DROP INLET

NOTES

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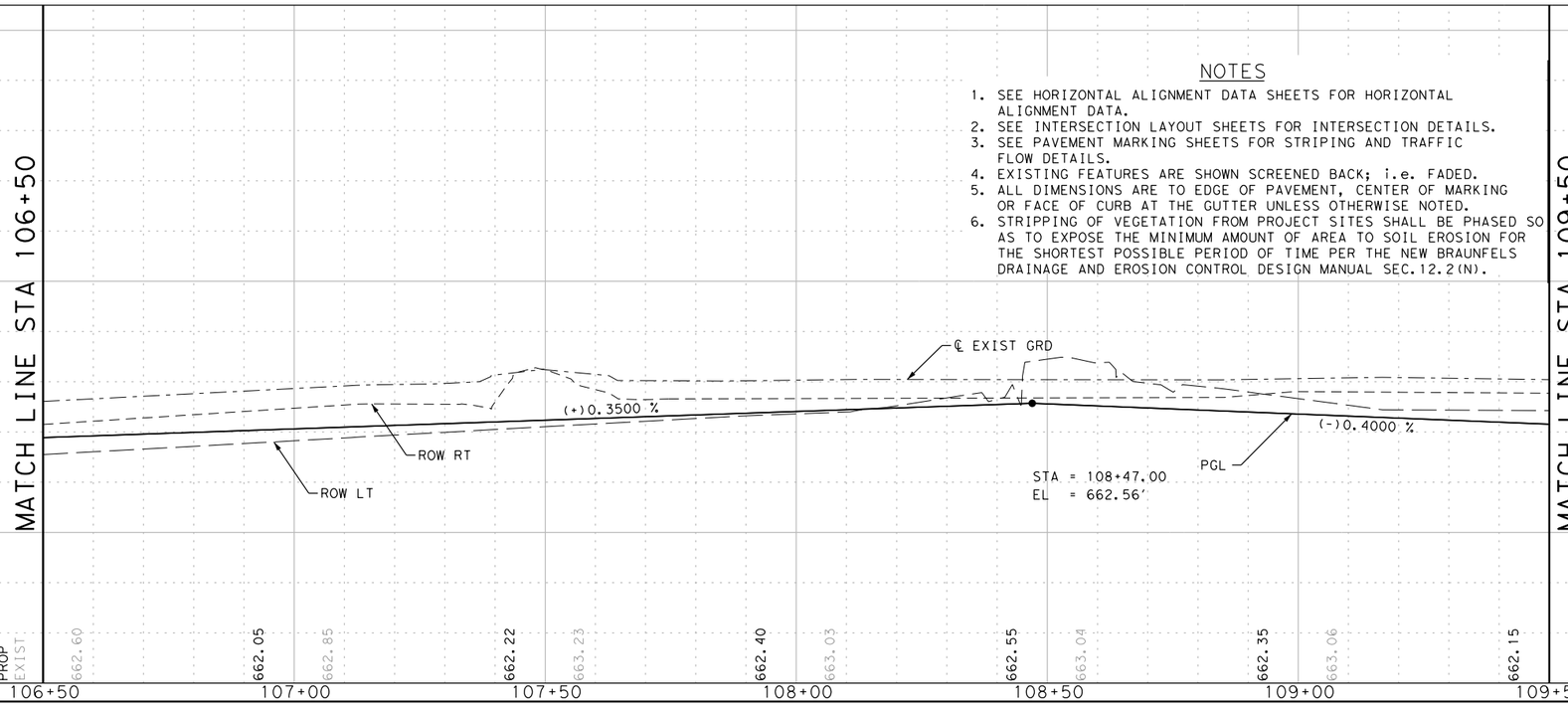

DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

ROADWAY PLAN & PROFILE

STA 106+50 TO STA 109+50

SHEET 3 OF 18

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	140

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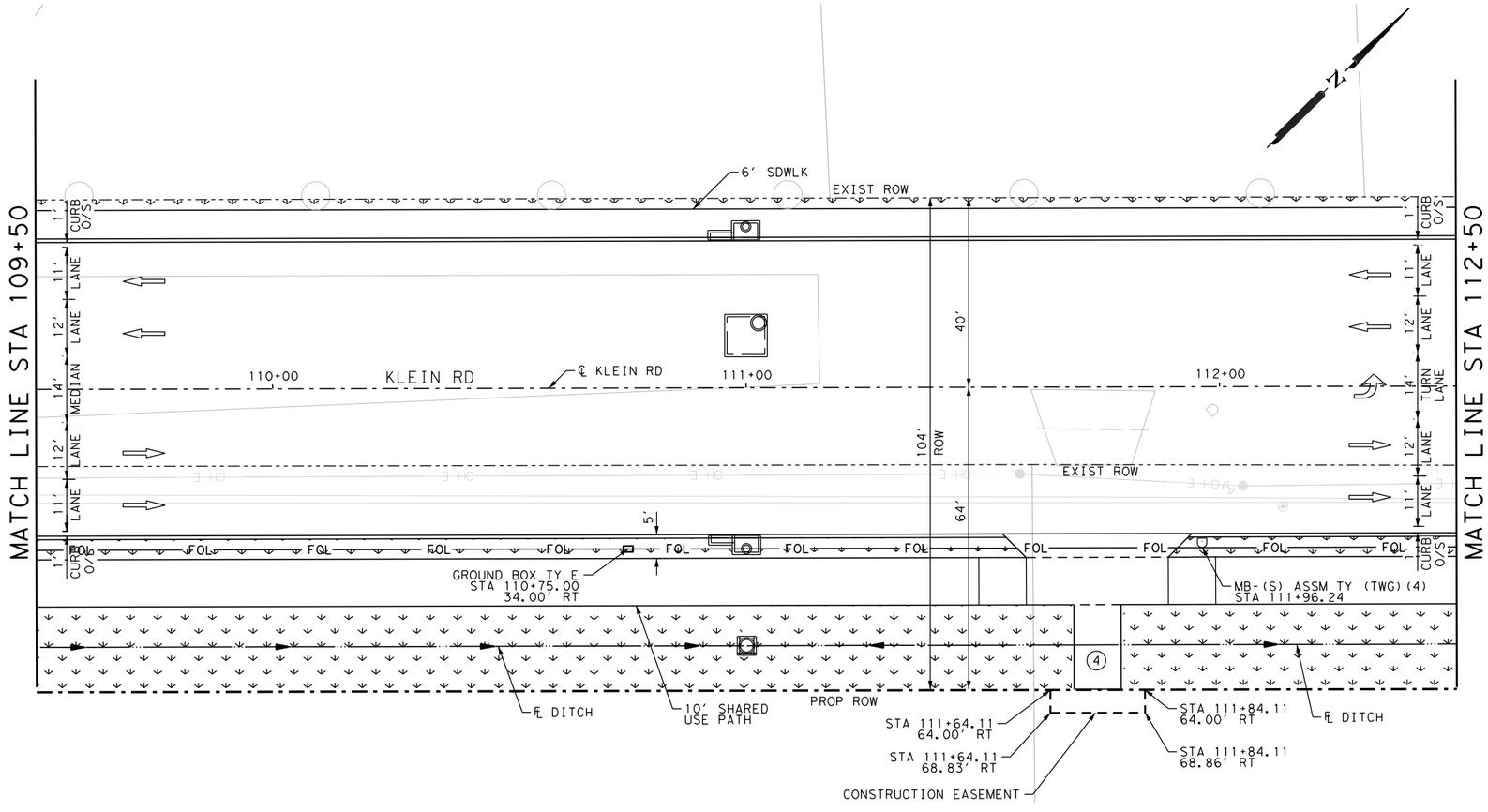
Plotted on: 1/22/2021



ITEM	DESCRIPTION	UNIT	QTY
0110-6001	EXCAVATION (ROADWAY)	CY	2849
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	765
0162-6002	BLOCK SODDING	SY	765
0168-6001	VEGETATIVE WATERING	MG	11.94
0247-6041	FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	CY	614
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	22.4
0260-6027	LIME TRT (EXST MATL)(8")	SY	2239
0310-6001	PRIME COAT (MULTI OPTION)	GAL	655.00
0316-6251	AGGR(TY-PE GR-5 SAC-B)	CY	16
0316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	436.67
0340-6014	D-GR HMA(SQ) TY-B PG70-22	TON	376.7
0340-6050	D-GR HMA(SQ) TY-C PG70-22	TON	356.6
0340-6272	TACK COAT	GAL	413.34
0341-6049	D-GR HMA TY-D PG76-22	TON	237.7
0529-6002	CONC CURB (TY II)	LF	578
0530-6004	DRIVEWAYS (CONC)	SY	75
0531-6001	CONC SIDEWALKS (4")	SY	500
0560-6014	MAILBOX INSTALL-S (TWG-POST) TY 4	EA	1
0618-6033	CONDT (PVC) (SCH 40) (4")	LF	600
0624-6012	GROUND BOX TY E (122317)W/APRON	EA	1
2005-6002	FILTER FABRIC (TY 1)	SY	532
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	2239
6210-6001	PVC MOISTURE BARRIER	SY	120

LEGEND OF FEATURES

- CURB INLET
- BLOCK SODDING
- TRAFFIC FLOW ARROW
- GROUND BOX
- PROPERTY BOUNDARY
- SWALE/GRADING
- FIELD INLET
- DRIVEWAY NO.
- FOL — 2~4" SCH 40 PVC
- FULL DEPTH ASPHALT PAVEMENT
- MANHOLE
- DROP INLET

NOTES

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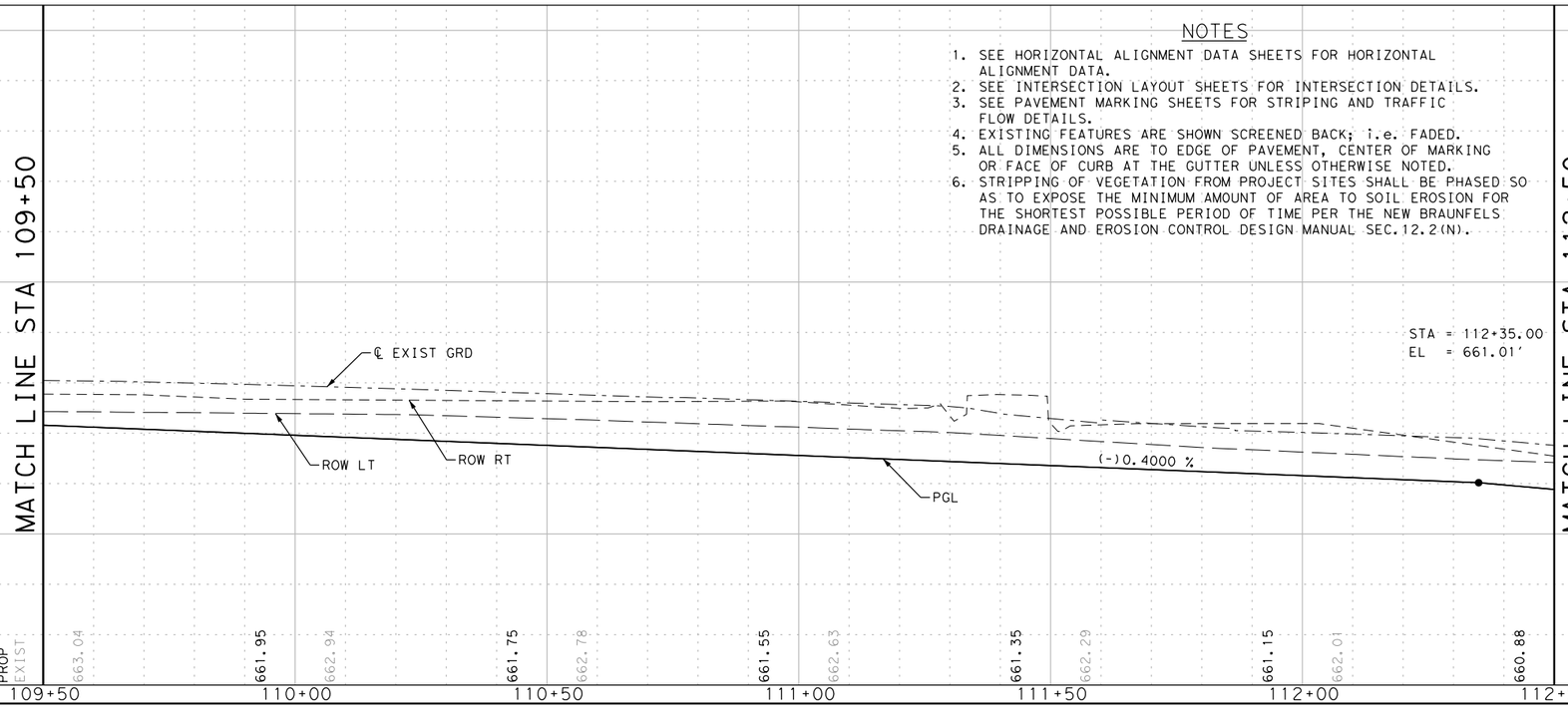


DESIGN

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

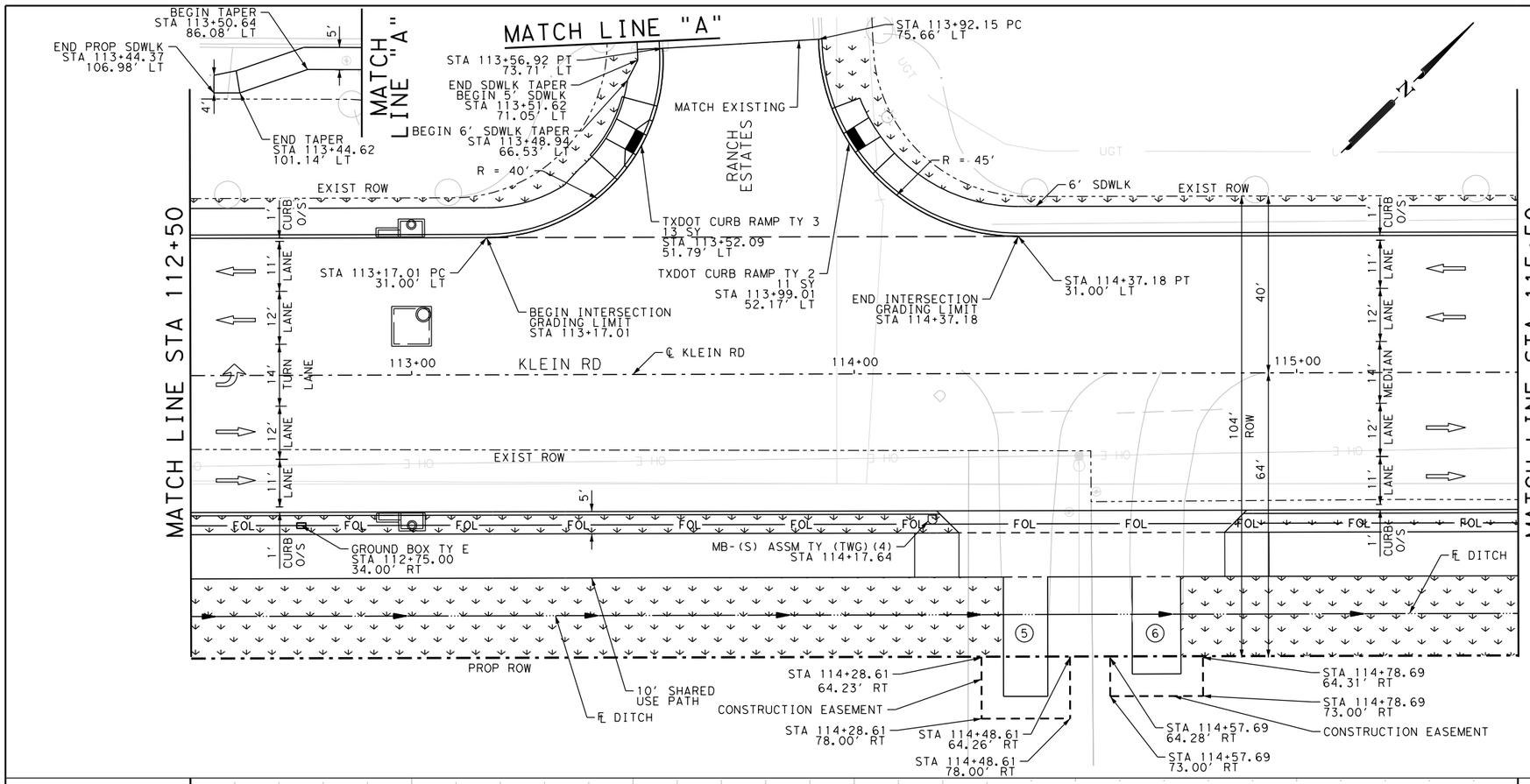
ROADWAY PLAN & PROFILE

STA 109+50 TO STA 112+50

SHEET 4 OF 18

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	141

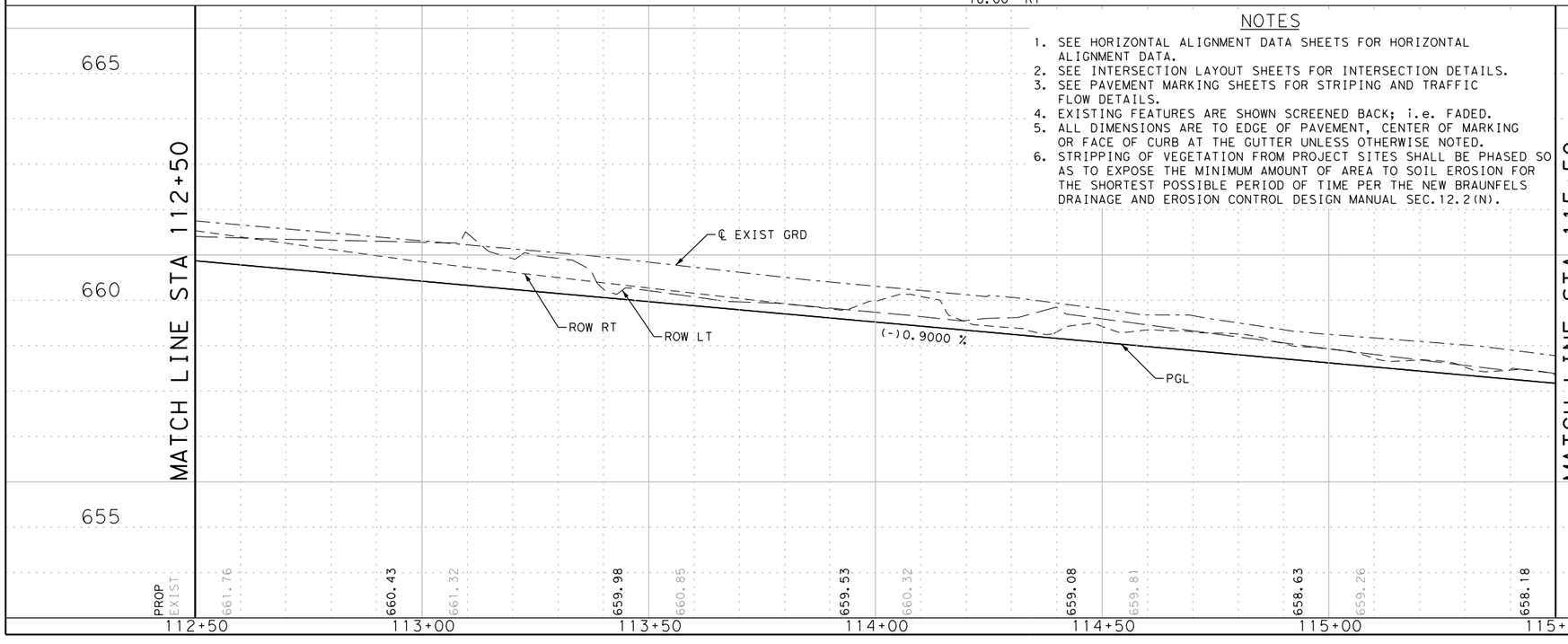
Design Filename: H:\Projects\510\30\03\Design\Civil\Roadway\5103003pp04.dgn



ITEM	DESCRIPTION	UNIT	QTY
0110-6001	EXCAVATION (ROADWAY)	CY	2451
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	742
0162-6002	BLOCK SODDING	SY	742
0168-6001	VEGETATIVE WATERING	MG	11.58
0247-6041	FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	CY	687
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	25.0
0260-6027	LIME TRT (EXST MATL)(8")	SY	2499
0310-6001	PRIME COAT (MULTI OPTION)	GAL	732.92
0316-6251	AGGR(TY-PE GR-5 SAC-B)	CY	18
0316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	488.62
0340-6014	D-GR HMA(SQ) TY-B PG70-22	TON	421.5
0340-6050	D-GR HMA(SQ) TY-C PG70-22	TON	400.9
0340-6272	TACK COAT	GAL	464.78
0341-6049	D-GR HMA TY-D PG76-22	TON	267.3
0529-6002	CONC CURB (TY II)	LF	494
0530-6004	DRIVEWAYS (CONC)	SY	160
0531-6001	CONC SIDEWALKS (4")	SY	458
0531-6019	CURB RAMPS (TY 2)	SY	12
0531-6020	CURB RAMPS (TY 3)	SY	16
0560-6014	MAILBOX INSTALL-S (TWG-POST) TY 4	EA	1
0618-6033	CONDT (PVC) (SCH 40) (4")	LF	600
0624-6012	GROUND BOX TY E (122317)W/APRON	EA	1
2005-6002	FILTER FABRIC (TY 1)	SY	516
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	2499
6210-6001	PVC MOISTURE BARRIER	SY	107

LEGEND OF FEATURES

CURB INLET · SWALE/GRADING · MANHOLE
BLOCK SODDING · FIELD INLET · DROP INLET
TRAFFIC FLOW ARROW · DRIVEWAY NO.
GROUND BOX · —FOL— 2~4" SCH 40 PVC
PROPERTY BOUNDARY · FULL DEPTH ASPHALT PAVEMENT



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DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

ROADWAY PLAN & PROFILE

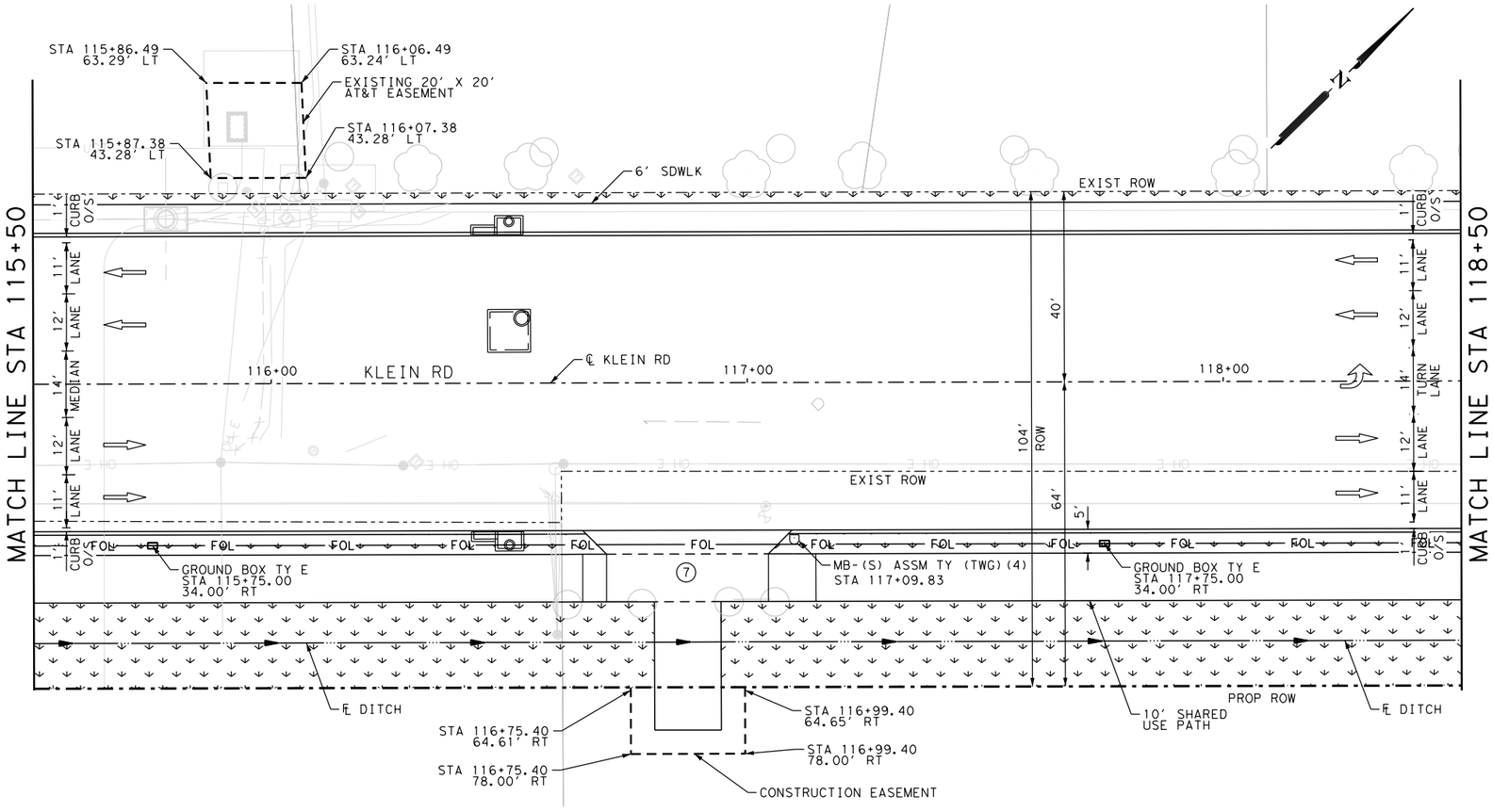
STA 112+50 TO STA 115+50

SHEET 5 OF 18

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	142

Plotted on: 1/22/2021

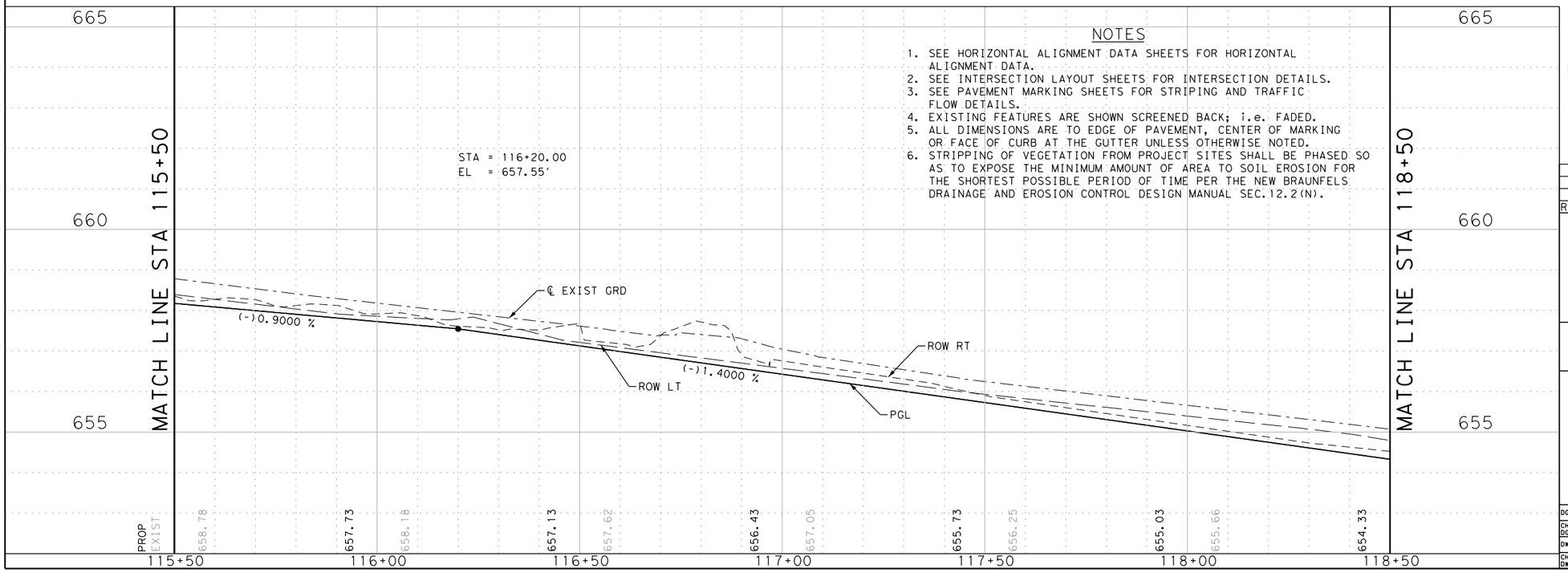
Design Filename: H:\Projects\510\30\03\Design\Civil\Roadway\5103003pp05.dgn



ITEM	DESCRIPTION	UNIT	QTY
0110-6001	EXCAVATION (ROADWAY)	CY	2293
0132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	2
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	786
0162-6002	BLOCK SODDING	SY	786
0168-6001	VEGETATIVE WATERING	MG	12.27
0247-6041	FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	CY	614
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	22.4
0260-6027	LIME TRT (EXST MATL)(8")	SY	2239
0310-6001	PRIME COAT (MULTI OPTION)	GAL	655.00
0316-6251	AGGR(TY-PE GR-5 SAC-B)	CY	16
0316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	436.67
0340-6014	D-GR HMA(SQ) TY-B PG70-22	TON	376.7
0340-6050	D-GR HMA(SQ) TY-C PG70-22	TON	356.6
0340-6272	TACK COAT	GAL	413.34
0341-6049	D-GR HMA TY-D PG76-22	TON	237.7
0529-6002	CONC CURB (TY II)	LF	534
0530-6004	DRIVEWAYS (CONC)	SY	102
0531-6001	CONC SIDEWALKS (4")	SY	496
0560-6014	MAILBOX INSTALL-S (TWG-POST) TY 4	EA	1
0618-6033	CONDT (PVC) (SCH 40) (4")	LF	600
0624-6012	GROUND BOX TY E (122317)W/APRON	EA	2
2005-6002	FILTER FABRIC (TY 1)	SY	528
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	2239
6210-6001	PVC MOISTURE BARRIER	SY	119

LEGEND OF FEATURES

CURB INLET — SWALE/GRADING — MANHOLE
BLOCK SODDING — FIELD INLET — DROP INLET
TRAFFIC FLOW ARROW — DRIVEWAY NO.
GROUND BOX — FOL — 2~4" SCH 40 PVC
PROPERTY BOUNDARY — FULL DEPTH ASPHALT PAVEMENT



NOTES

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DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

ROADWAY PLAN & PROFILE

STA 115+50 TO STA 118+50

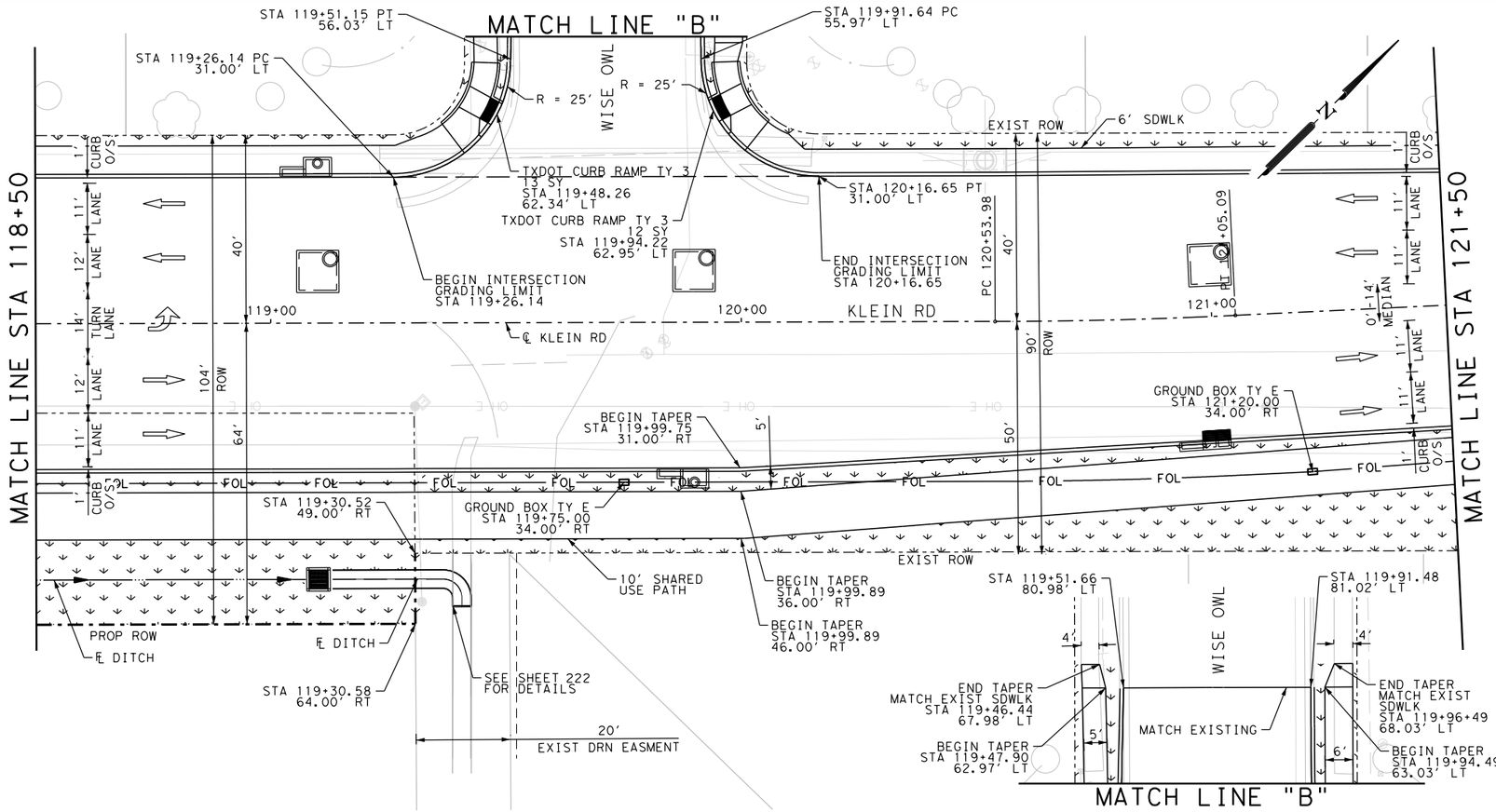
SHEET 6 OF 18

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	143

Plotted on: 1/22/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Roadway\510303pp06.dgn

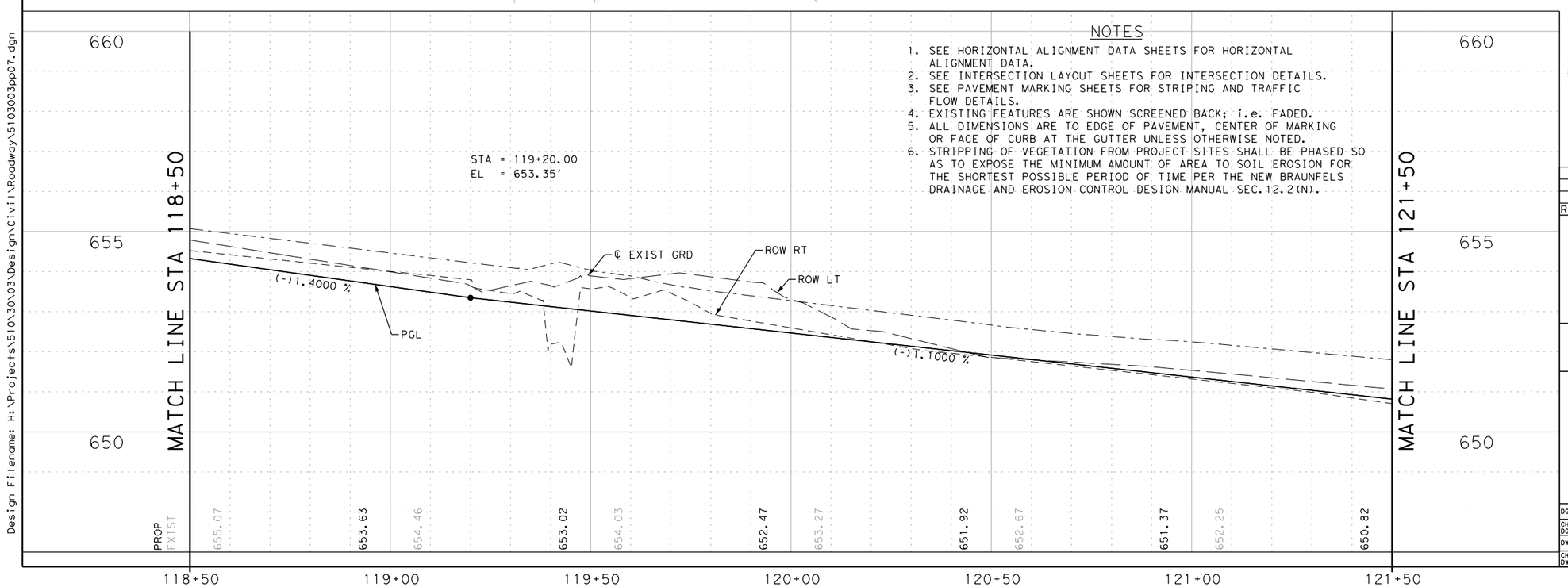
Plotted on: 1/22/2021



ITEM	DESCRIPTION	UNIT	QTY
0110-6001	EXCAVATION (ROADWAY)	CY	2432
0132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	17
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	525
0162-6002	BLOCK SODDING	SY	525
0168-6001	VEGETATIVE WATERING	MG	8.19
0247-6041	FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	CY	668
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	24.4
0260-6027	LIME TRT (EXST MATL)(8")	SY	2434
0310-6001	PRIME COAT (MULTI OPTION)	GAL	712.51
0316-6251	AGGR(TY-PE GR-5 SAC-B)	CY	17
0316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	475.01
0340-6014	D-GR HMA(SQ) TY-B PG70-22	TON	409.7
0340-6050	D-GR HMA(SQ) TY-C PG70-22	TON	388.4
0340-6272	TACK COAT	GAL	450.28
0341-6049	D-GR HMA TY-D PG76-22	TON	259.0
0529-6002	CONC CURB (TY II)	LF	578
0531-6001	CONC SIDEWALKS (4")	SY	516
0531-6020	CURB RAMPS (TY 3)	SY	30
0618-6033	CONDT (PVC) (SCH 40) (4")	LF	604
0624-6012	GROUND BOX TY E (122317)W/APRON	EA	2
2005-6002	FILTER FABRIC (TY 1)	SY	580
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	2434
6210-6001	PVC MOISTURE BARRIER	SY	134

LEGEND OF FEATURES

CURB INLET
BLOCK SODDING
TRAFFIC FLOW ARROW
GROUND BOX
PROPERTY BOUNDARY
SWALE/GRADING
FIELD INLET
DRIVEWAY NO.
2~4" SCH 40 PVC
FULL DEPTH ASPHALT PAVEMENT
MANHOLE
DROP INLET



NOTES

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DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

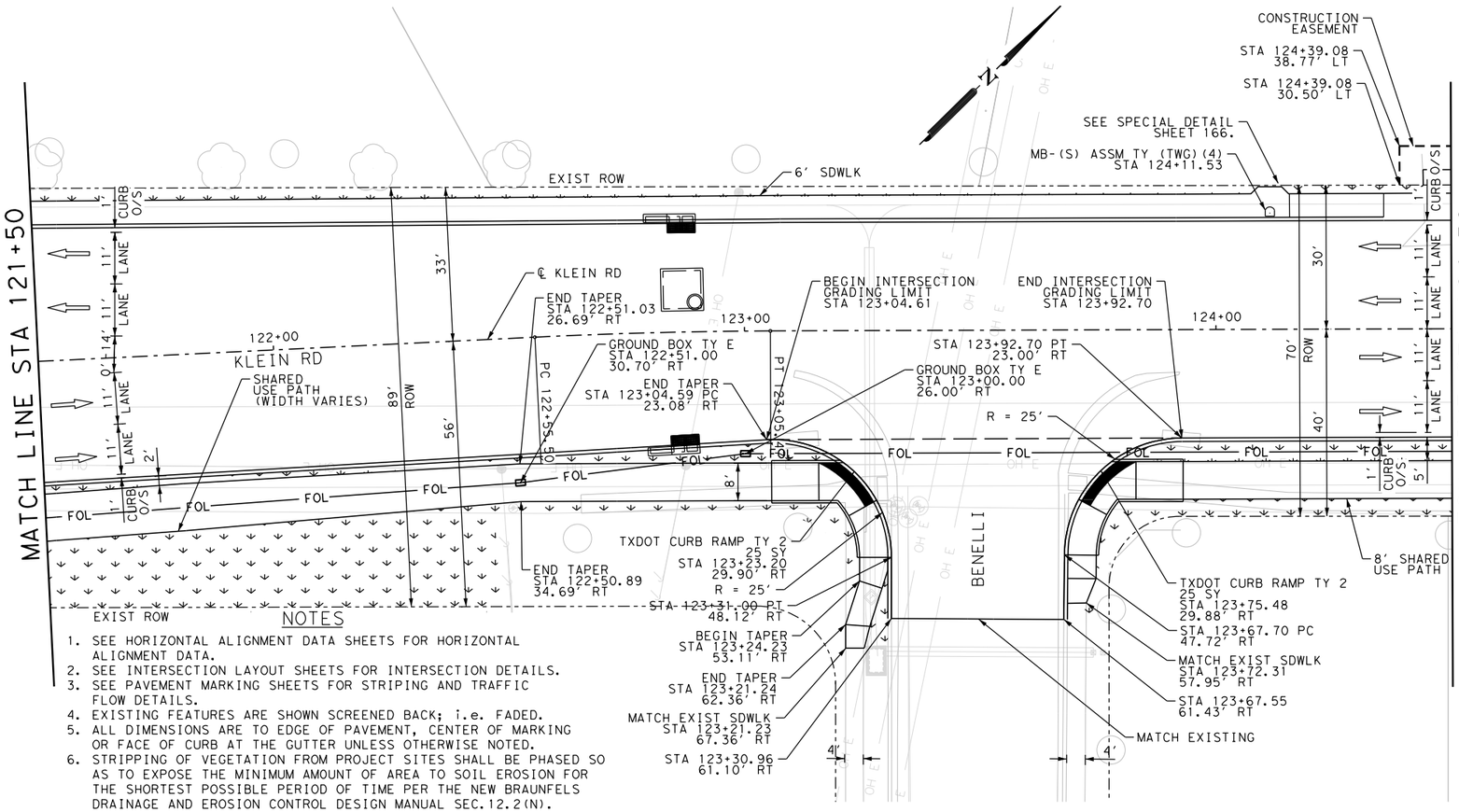
ROADWAY PLAN & PROFILE

STA 118+50 TO STA 121+50

SHEET 7 OF 18

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	144

Design Filename: H:\Projects\510\30\03\Design\Civil\Roadway\5103003pp07.dgn



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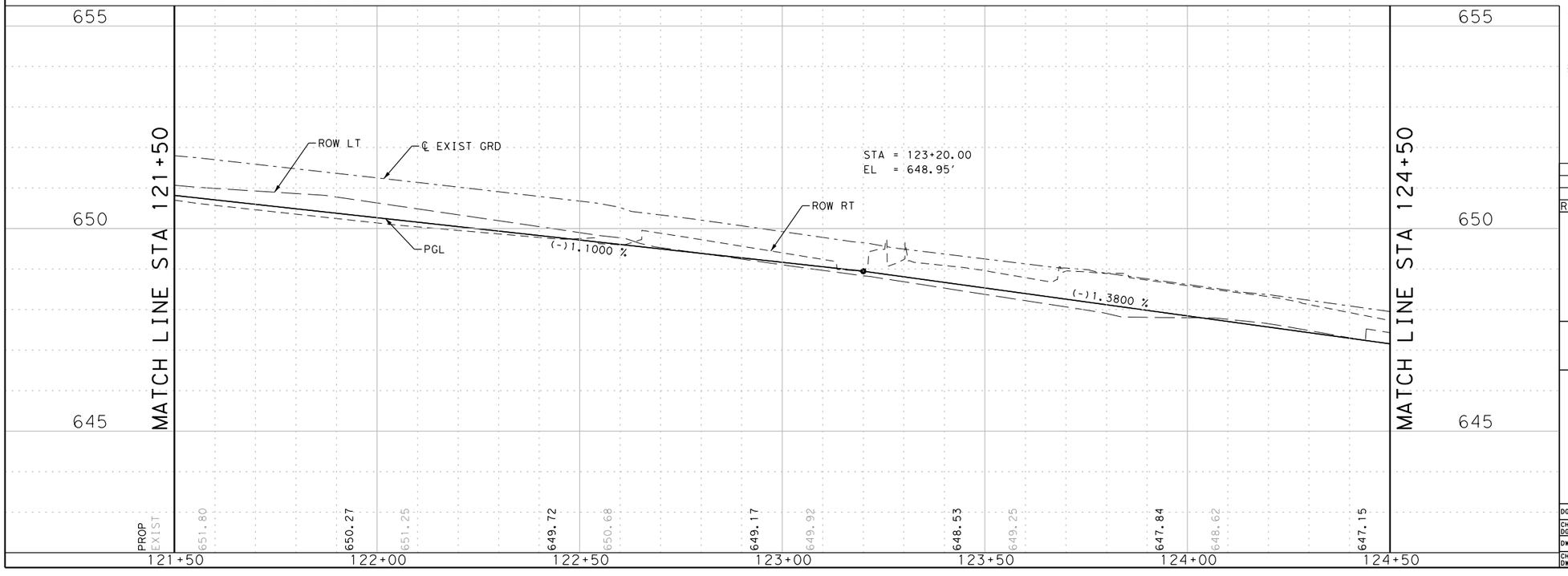


ITEM	DESCRIPTION	UNIT	QTY
0110-6001	EXCAVATION (ROADWAY)	CY	1506
0132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	34
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	402
0162-6002	BLOCK SODDING	SY	402
0168-6001	VEGETATIVE WATERING	MG	6.28
0247-6041	FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	CY	538
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	19.7
0260-6027	LIME TRT (EXST MATL)(8")	SY	1965
0310-6001	PRIME COAT (MULTI OPTION)	GAL	572.40
0316-6251	AGGR(TY-PE GR-5 SAC-B)	CY	14
0316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	381.60
0340-6014	D-GR HMA(SQ) TY-B PG70-22	TON	329.2
0340-6050	D-GR HMA(SQ) TY-C PG70-22	TON	308.5
0340-6272	TACK COAT	GAL	357.65
0341-6049	D-GR HMA TY-D PG76-22	TON	205.7
0529-6002	CONC CURB (TY II)	LF	534
0530-6004	DRIVEWAYS (CONC)	SY	13
0531-6001	CONC SIDEWALKS (4")	SY	377
0531-6019	CURB RAMPS (TY 2)	SY	58
0560-6014	MAILBOX INSTALL-S (TWG-POST) TY 4	EA	1
0618-6033	CONDT (PVC) (SCH 40) (4")	LF	598
0624-6012	GROUND BOX TY E (122317)W/APRON	EA	2
2005-6002	FILTER FABRIC (TY 1)	SY	469
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	1965
6210-6001	PVC MOISTURE BARRIER	SY	108

LEGEND OF FEATURES

CURB INLET
BLOCK SODDING
TRAFFIC FLOW ARROW
GROUND BOX
PROPERTY BOUNDARY
SWALE/GRADING
FIELD INLET
DRIVEWAY NO.
FOL 2~4" SCH 40 PVC
FULL DEPTH ASPHALT PAVEMENT
MANHOLE
DROP INLET

DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED
PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

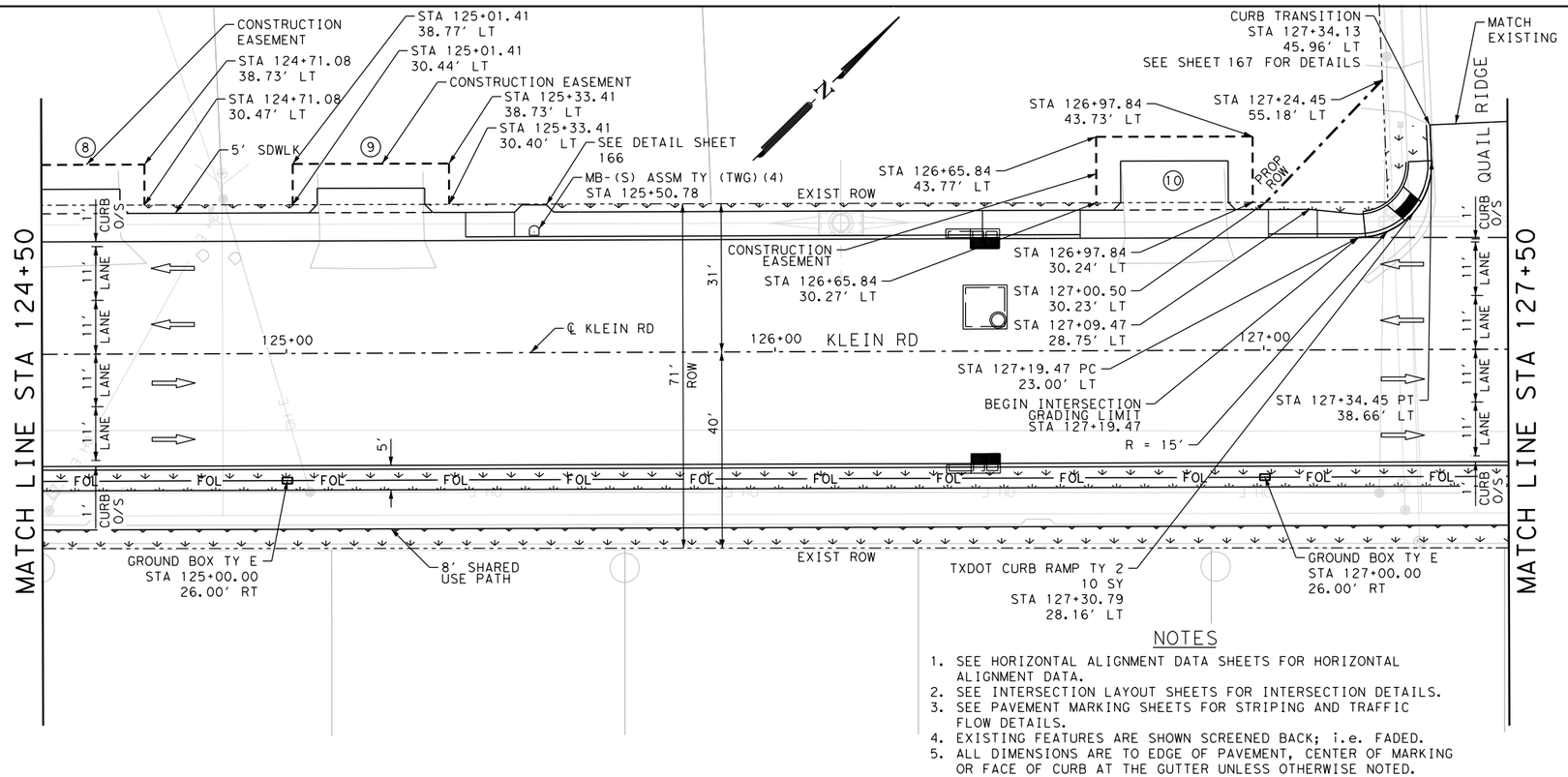
KLEIN RD PHASE 2

ROADWAY PLAN & PROFILE

STA 121+50 TO STA 124+50

SHEET 8 OF 18

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	145



ITEM	DESCRIPTION	UNIT	QTY
0110-6001	EXCAVATION (ROADWAY)	CY	1227
0132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	58
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	327
0162-6002	BLOCK SODDING	SY	327
0168-6001	VEGETATIVE WATERING	MG	5.11
0247-6041	FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	CY	479
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	17.6
0260-6027	LIME TRT (EXST MATL)(8")	SY	1751
0310-6001	PRIME COAT (MULTI OPTION)	GAL	508.70
0316-6251	AGGR(TY-PE GR-5 SAC-B)	CY	12
0316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	339.13
0340-6014	D-GR HMA(SQ) TY-B PG70-22	TON	292.5
0340-6050	D-GR HMA(SQ) TY-C PG70-22	TON	272.4
0340-6272	TACK COAT	GAL	315.81
0341-6049	D-GR HMA TY-D PG76-22	TON	181.6
0529-6002	CONC CURB (TY II)	LF	431
0530-6004	DRIVEWAYS (CONC)	SY	127
0531-6001	CONC SIDEWALKS (4")	SY	349
0531-6019	CURB RAMPS (TY 2)	SY	11
0560-6014	MAILBOX INSTALL-S (TWG-POST) TY 4	EA	1
0618-6033	CONDT (PVC) (SCH 40) (4")	LF	600
0624-6012	GROUND BOX TY E (122317)W/APRON	EA	2
2005-6002	FILTER FABRIC (TY 1)	SY	386
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	1751
6210-6001	PVC MOISTURE BARRIER	SY	133

NOTES

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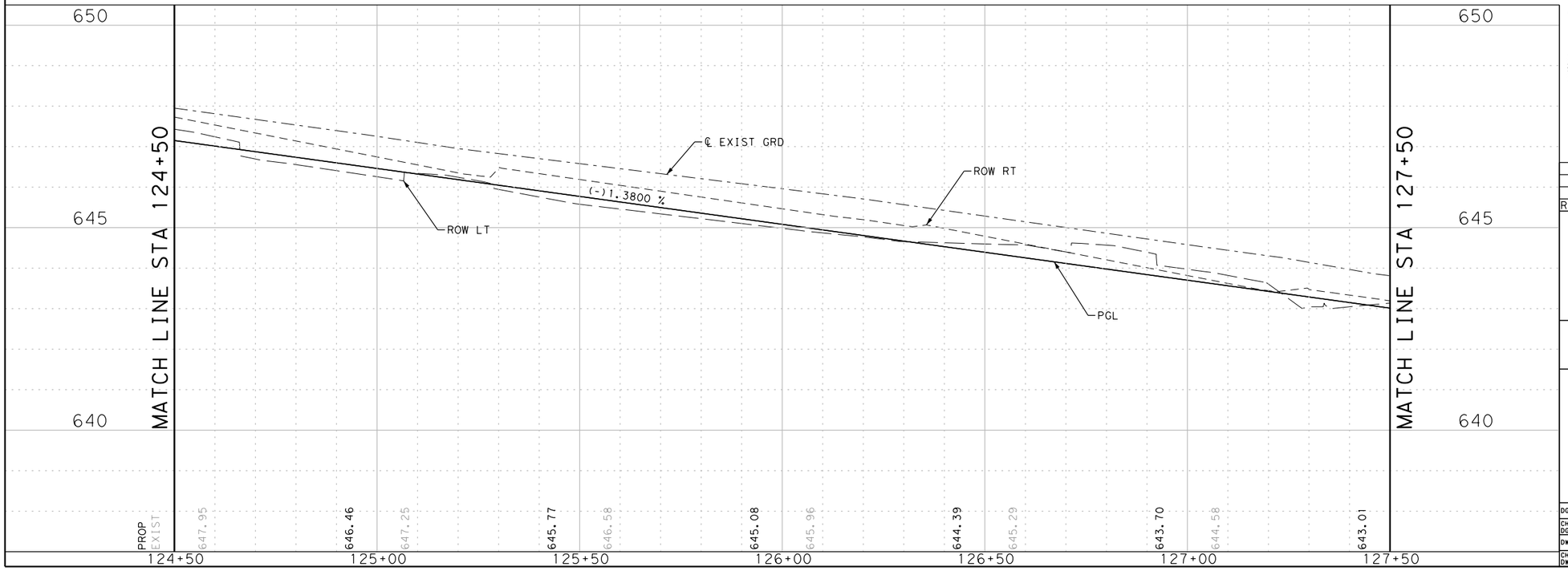
LEGEND OF FEATURES

CURB INLET
SWALE/GRADING
MANHOLE
BLOCK SODDING
FIELD INLET
DROP INLET
TRAFFIC FLOW ARROW
DRIVEWAY NO.
GROUND BOX
FOL 2~4" SCH 40 PVC
PROPERTY BOUNDARY
FULL DEPTH ASPHALT PAVEMENT



DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

ROADWAY PLAN & PROFILE

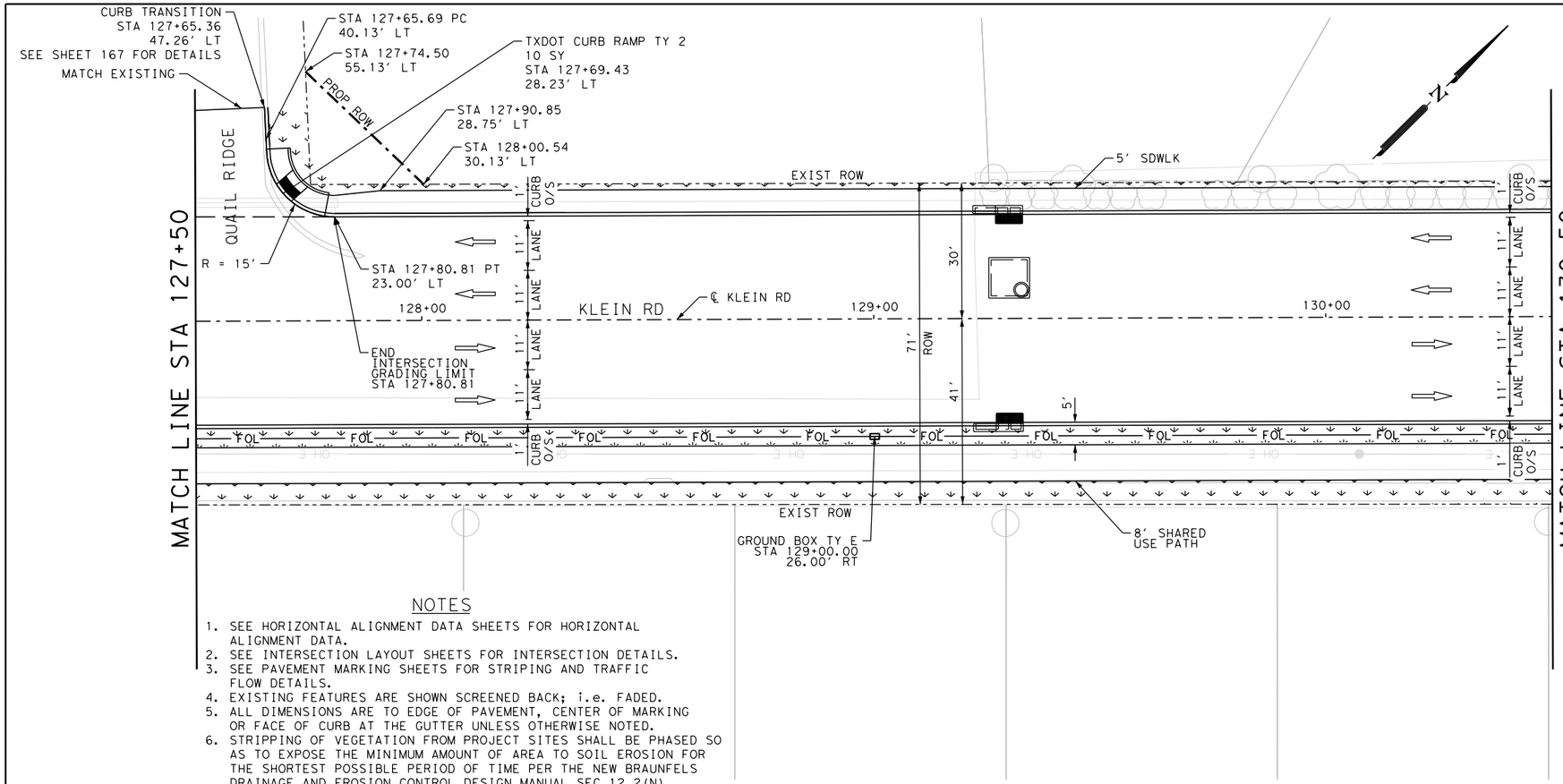
STA 124+50 TO STA 127+50

SHEET 9 OF 18

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	146

Plotted on: 1/22/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Roadway\5103003pp09.dgn



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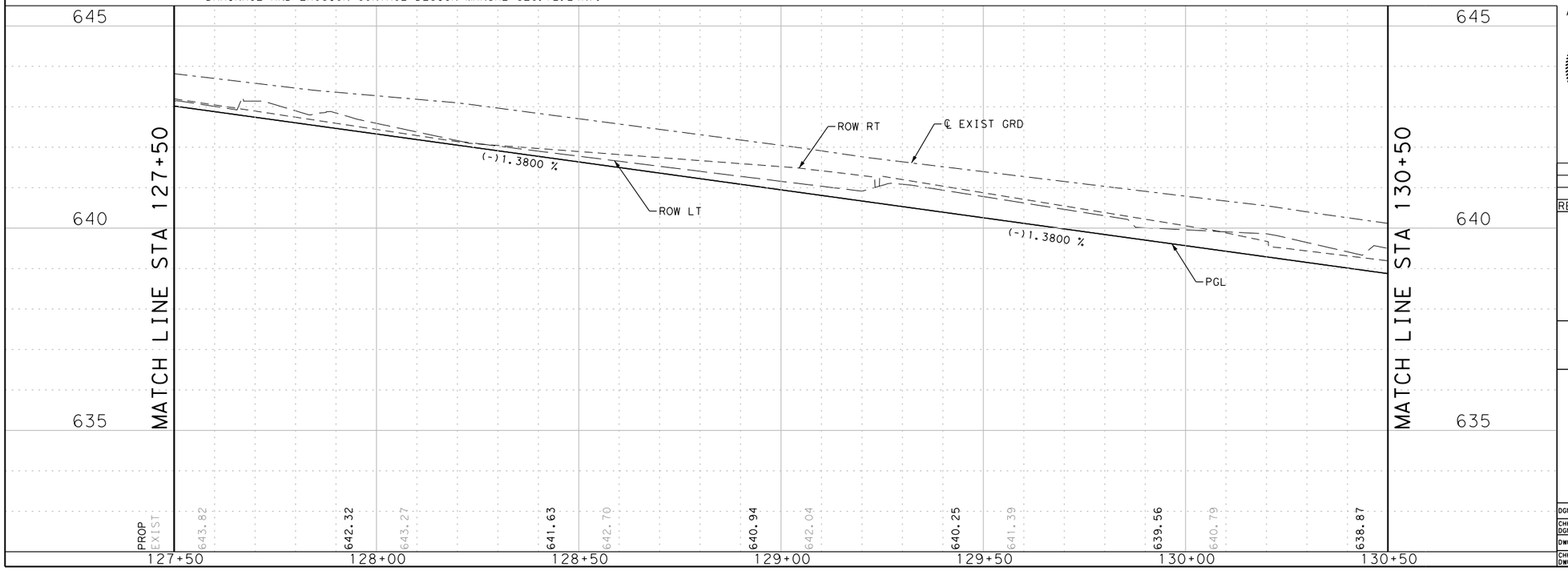
ITEM	DESCRIPTION	UNIT	QTY
0110-6001	EXCAVATION (ROADWAY)	CY	1438
0132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	35
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	365
0162-6002	BLOCK SODDING	SY	365
0168-6001	VEGETATIVE WATERING	MG	5.70
0247-6041	FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	CY	479
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	17.6
0260-6027	LIME TRT (EXST MATL)(8")	SY	1753
0310-6001	PRIME COAT (MULTI OPTION)	GAL	509.20
0316-6251	AGGR(TY-PE GR-5 SAC-B)	CY	12
0316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	339.47
0340-6014	D-GR HMA(SQ) TY-B PG70-22	TON	292.8
0340-6050	D-GR HMA(SQ) TY-C PG70-22	TON	272.7
0340-6272	TACK COAT	GAL	316.11
0341-6049	D-GR HMA TY-D PG76-22	TON	181.8
0529-6002	CONC CURB (TY II)	LF	560
0531-6001	CONC SIDEWALKS (4")	SY	416
0531-6019	CURB RAMPS (TY 2)	SY	11
0618-6033	CONDT (PVC) (SCH 40) (4")	LF	600
0624-6012	GROUND BOX TY E (122317)W/APRON	EA	1
2005-6002	FILTER FABRIC (TY 1)	SY	461
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	1753
6210-6001	PVC MOISTURE BARRIER	SY	133

LEGEND OF FEATURES

CURB INLET
BLOCK SODDING
TRAFFIC FLOW ARROW
GROUND BOX
PROPERTY BOUNDARY
SWALE/GRADING
FIELD INLET
DRIVEWAY NO.
—FOL— 2~4" SCH 40 PVC
FULL DEPTH ASPHALT PAVEMENT
MANHOLE
DROP INLET



DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

ROADWAY PLAN & PROFILE

STA 127+50 TO STA 130+50

SHEET 10 OF 18

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	147

Plotted on: 1/22/2021

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Plotted on: 1/22/2021

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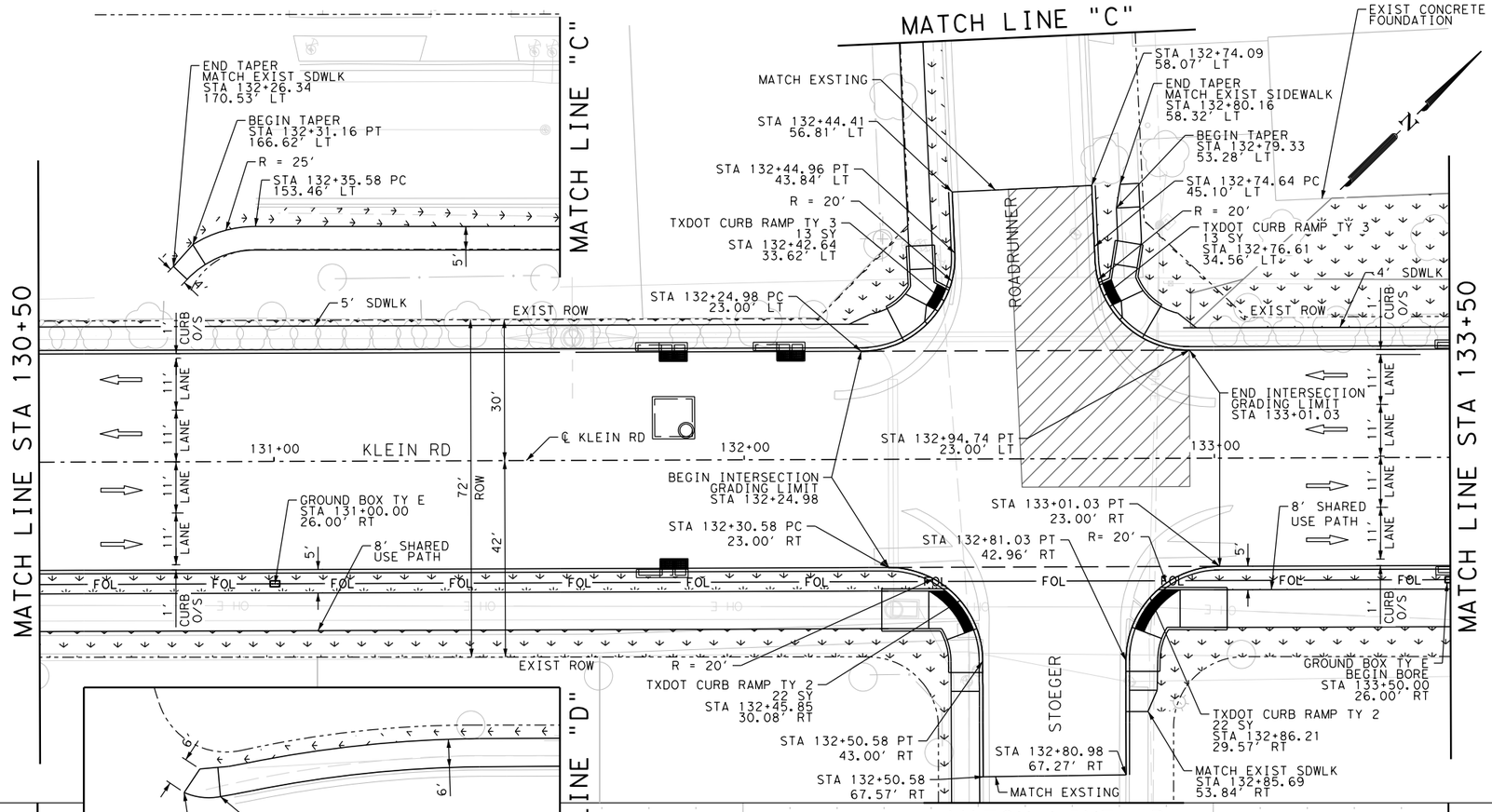

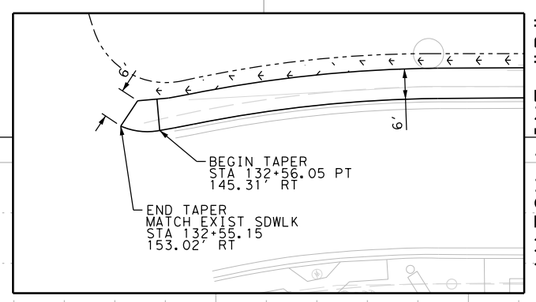

ITEM	DESCRIPTION	UNIT	QTY
0110-6001	EXCAVATION (ROADWAY)	CY	1563
0132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	30
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	466
0162-6002	BLOCK SODDING	SY	466
0168-6001	VEGETATIVE WATERING	MG	7.27
0247-6041	FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	CY	503
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	18.4
0260-6027	LIME TRT (EXST MATL)(8")	SY	1837
0310-6001	PRIME COAT (MULTI OPTION)	GAL	534.31
0316-6251	AGGR(TY-PE GR-5 SAC-B)	CY	13
0316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	356.21
0340-6011	D-GR HMA(SQ) TY-B PG64-22	TON	125.9
0340-6014	D-GR HMA(SQ) TY-B PG70-22	TON	327.3
0340-6050	D-GR HMA(SQ) TY-C PG70-22	TON	286.7
0340-6272	TACK COAT	GAL	332.37
0341-6049	D-GR HMA TY-D PG76-22	TON	211.2
0529-6002	CONC CURB (TY II)	LF	553
0531-6001	CONC SIDEWALKS (4")	SY	488
0531-6019	CURB RAMPS (TY 2)	SY	50
0531-6020	CURB RAMPS (TY 3)	SY	32
0618-6033	CONDT (PVC) (SCH 40) (4")	LF	600
0624-6012	GROUND BOX TY E (122317)W/APRON	EA	2
2005-6002	FILTER FABRIC (TY 1)	SY	604
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	1837
6210-6001	PVC MOISTURE BARRIER	SY	114

LEGEND OF FEATURES

CURB INLET
BLOCK SODDING
TRAFFIC FLOW ARROW
GROUND BOX
PROPERTY BOUNDARY
SWALE/GRADING
FIELD INLET
DRIVEWAY NO.
FOL 2~4" SCH 40 PVC
FULL DEPTH ASPHALT PAVEMENT
MANHOLE
DROP INLET

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT DATA.
2. SEE INTERSECTION LAYOUT SHEETS FOR INTERSECTION DETAILS.
3. SEE PAVEMENT MARKING SHEETS FOR STRIPING AND TRAFFIC FLOW DETAILS.
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6. STRIPPING OF VEGETATION FROM PROJECT SITES SHALL BE PHASED SO AS TO EXPOSE THE MINIMUM AMOUNT OF AREA TO SOIL EROSION FOR THE SHORTEST POSSIBLE PERIOD OF TIME PER THE NEW BRAUNFELS DRAINAGE AND EROSION CONTROL DESIGN MANUAL SEC.12.2(N).

DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

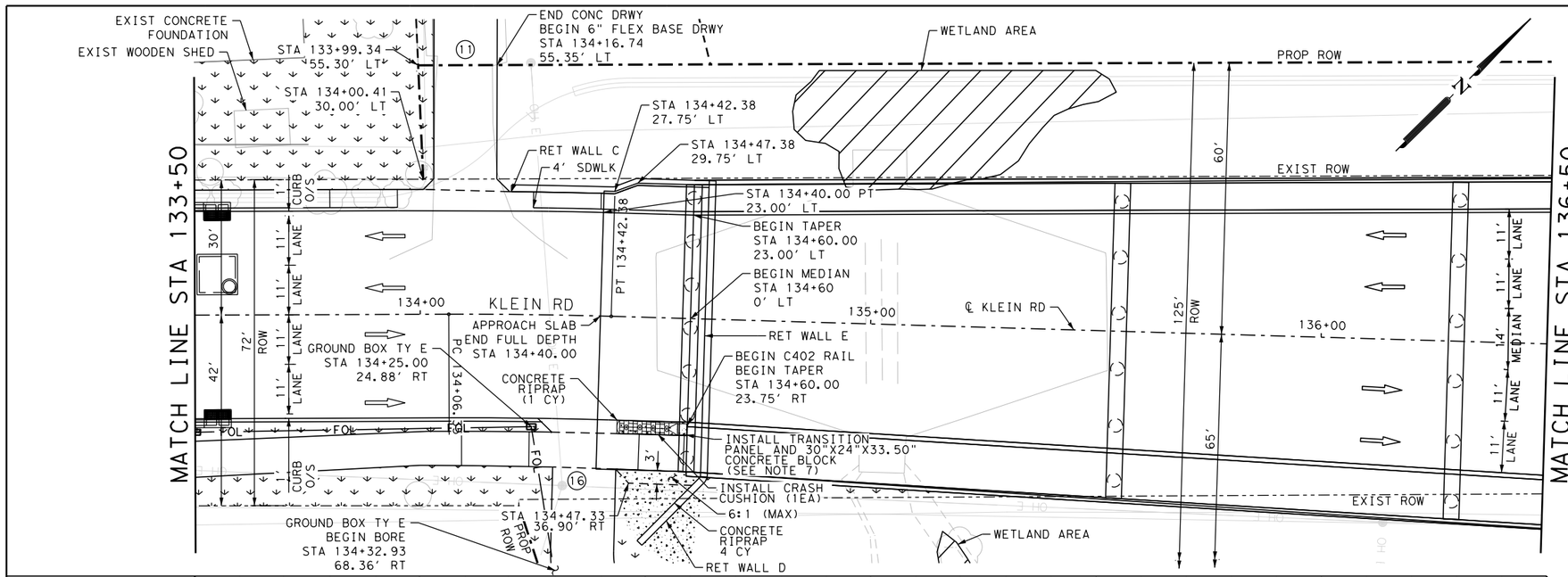
KLEIN RD PHASE 2

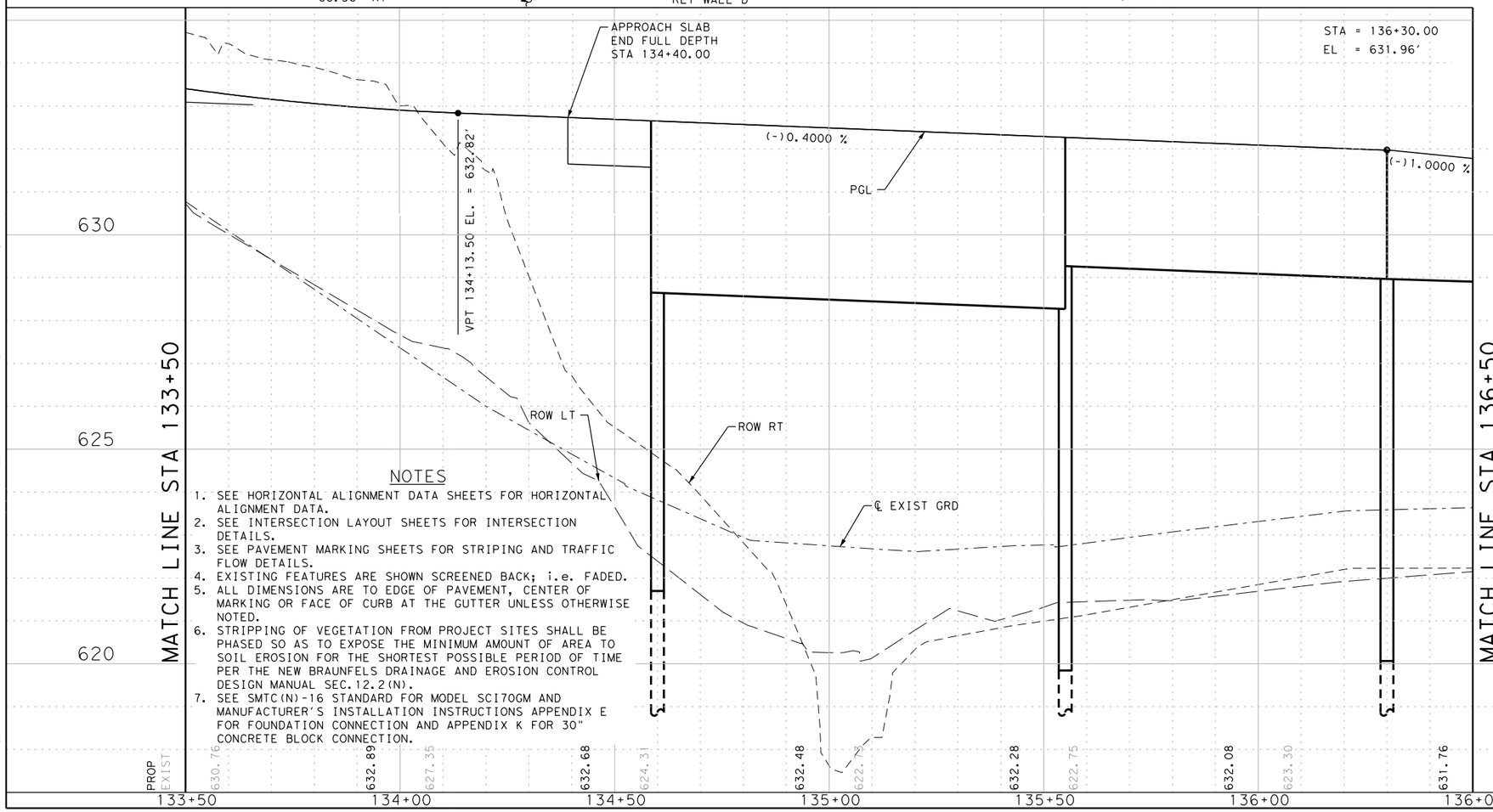
ROADWAY PLAN & PROFILE

STA 130+50 TO STA 133+50

SHEET 11 OF 18

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	148





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7. SEE SMTC(N)-16 STANDARD FOR MODEL SCI70GM AND MANUFACTURER'S INSTALLATION INSTRUCTIONS APPENDIX E FOR FOUNDATION CONNECTION AND APPENDIX K FOR 30" CONCRETE BLOCK CONNECTION.

ITEM	DESCRIPTION	UNIT	QTY
0110-6001	EXCAVATION (ROADWAY)	CY	1713
0132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	2918
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	147
0162-6002	BLOCK SODDING	SY	147
0168-6001	VEGETATIVE WATERING	MG	2.30
0247-6041	FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	CY	140
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	5.2
0260-6027	LIME TRT (EXST MATL)(8")	SY	511
0310-6001	PRIME COAT (MULTI OPTION)	GAL	148.46
0316-6251	AGGR(TY-PE GR-5 SAC-B)	CY	4
0316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	98.97
0340-6014	D-GR HMA(SQ) TY-B PG70-22	TON	85.4
0340-6050	D-GR HMA(SQ) TY-C PG70-22	TON	79.4
0340-6272	TACK COAT	GAL	91.97
0341-6049	D-GR HMA TY-D PG76-22	TON	52.9
0432-6003	RIPRAP (CONC)(6 IN)	CY	5
0450-6034	RAIL (TY C402)	LF	630
0529-6002	CONC CURB (TY II)	LF	160
0530-6004	DRIVEWAYS (CONC)	SY	110
0531-6001	CONC SIDEWALKS (4")	SY	122
0545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA	1
0618-6033	CONDT (PVC) (SCH 40) (4")	LF	240
0618-6034	CONDT (PVC) (SCH 40) (4") (BORE)	LF	434
0624-6012	GROUND BOX TY E (122317)W/APRON	EA	2
2005-6002	FILTER FABRIC (TY 1)	SY	134
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	511
6210-6001	PVC MOISTURE BARRIER	SY	49

LEGEND OF FEATURES

CURB INLET
BLOCK SODDING
TRAFFIC FLOW ARROW
GROUND BOX
PROPERTY BOUNDARY
SWALE/GRADING
FIELD INLET
DRIVEWAY NO.
—FOL— 2~4" SCH 40 PVC
FULL DEPTH ASPHALT PAVEMENT
MANHOLE
DROP INLET

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/22/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

ROADWAY PLAN & PROFILE

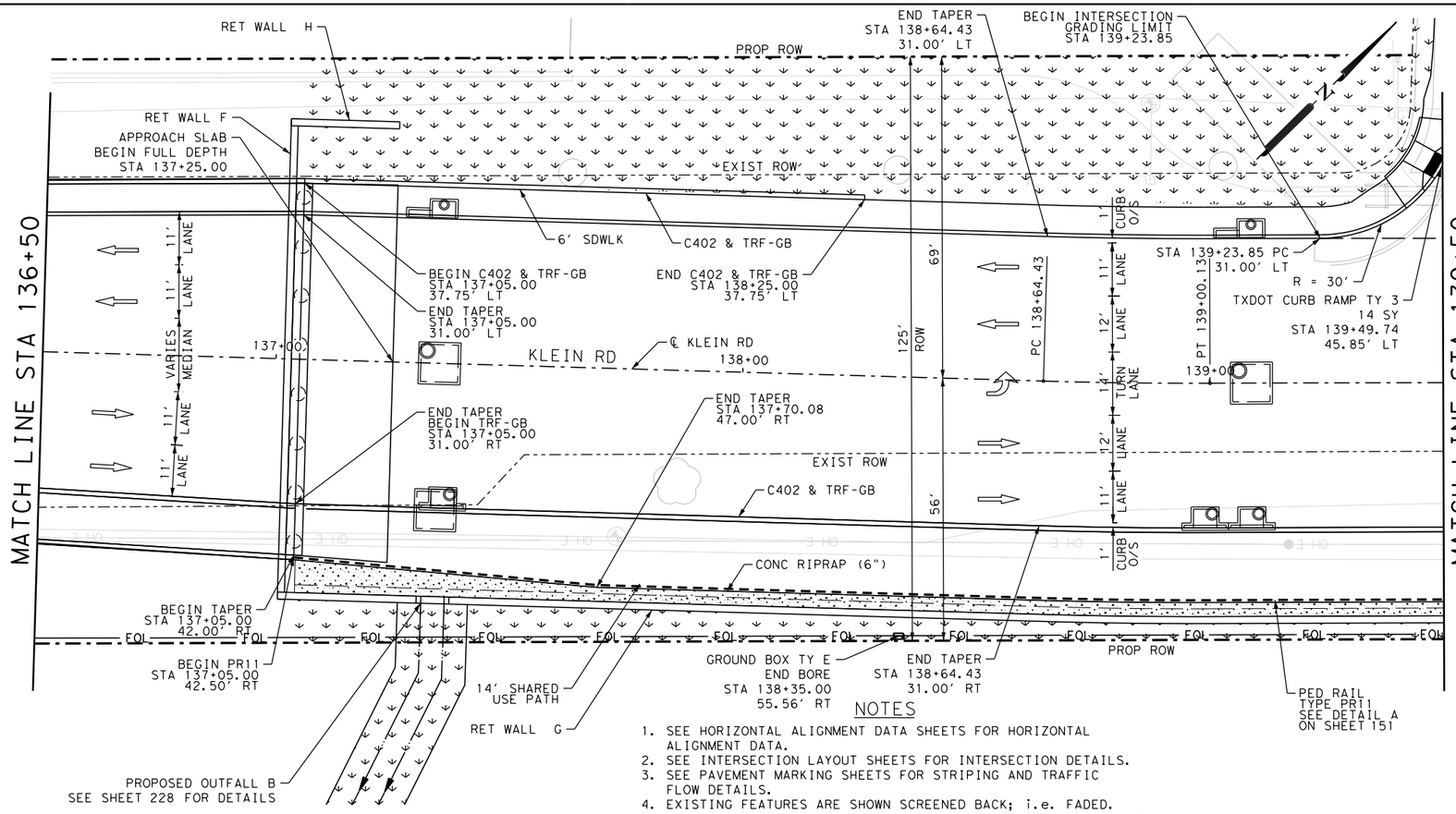
STA 133+50 TO STA 136+50

SHEET 12 OF 18

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	149

Plotted on: 4/22/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Roadway\5103003ppl2.dgn



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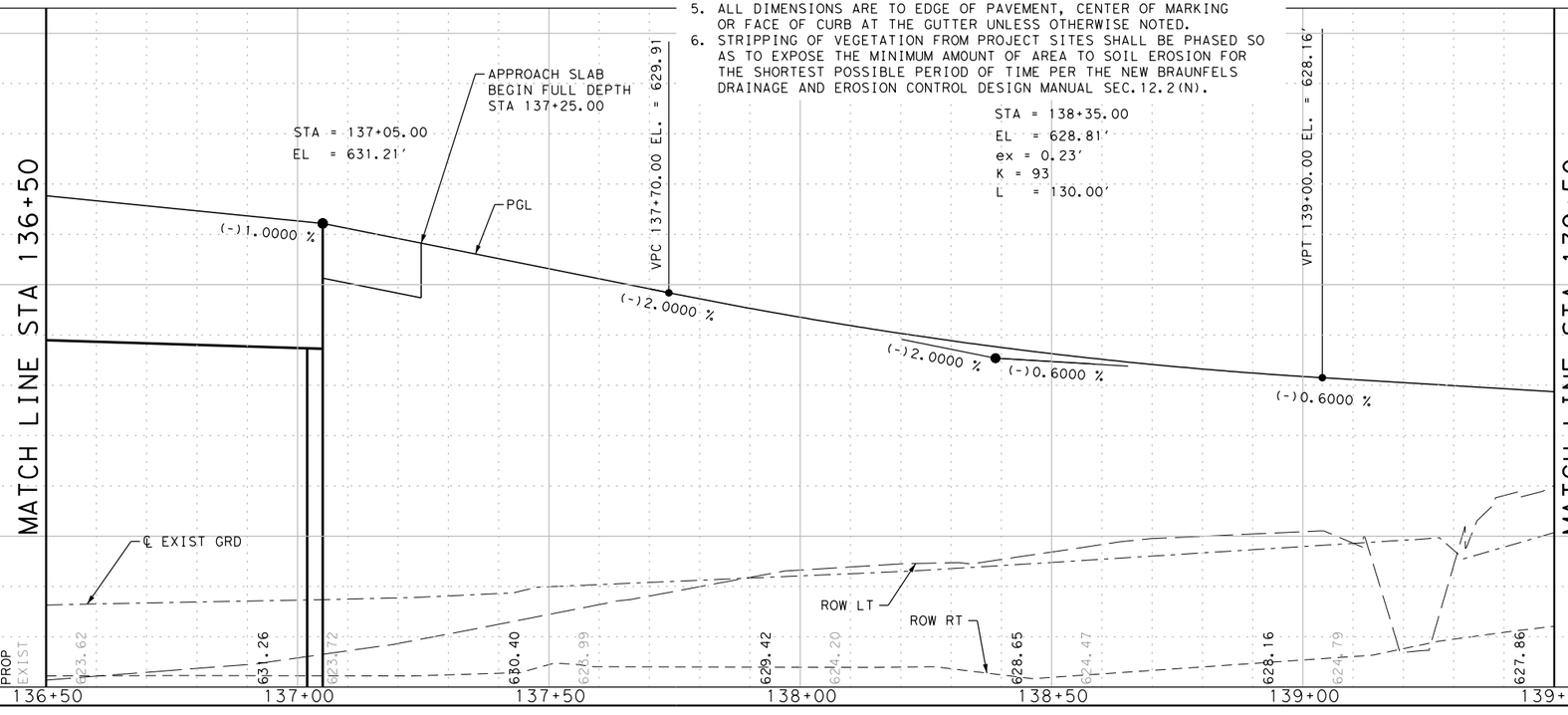
ITEM	DESCRIPTION	UNIT	QTY
0110-6001	EXCAVATION (ROADWAY)	CY	104
0132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	3547
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	1155
0162-6002	BLOCK SODDING	SY	1155
0168-6001	VEGETATIVE WATERING	MG	18.02
0247-6041	FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	CY	465
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	17.0
0260-6027	LIME TRT (EXST MATL)(8")	SY	1695
0310-6001	PRIME COAT (MULTI OPTION)	GAL	495.72
0316-6251	AGGR(TY-PE GR-5 SAC-B)	CY	12
0316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	330.48
0340-6014	D-GR HMA(SQ) TY-B PG70-22	TON	285.1
0340-6050	D-GR HMA(SQ) TY-C PG70-22	TON	269.8
0340-6272	TACK COAT	GAL	312.72
0341-6049	D-GR HMA TY-D PG76-22	TON	179.9
0420-6066	CL C CONC (RAIL FOUNDATION)	CY	55
0432-6003	RIPRAP (CONC)(6 IN)	CY	16.1
0450-6034	RAIL (TY C402)	LF	367
0450-6103	RAIL (TY PR11)	LF	247
0529-6002	CONC CURB (TY II)	LF	216
0531-6001	CONC SIDEWALKS (4")	SY	433
0531-6020	CURB RAMPS (TY 3)	SY	15
0618-6033	CONDT (PVC) (SCH 40) (4")	LF	232
0618-6034	CONDT (PVC) (SCH 40) (4") (BORE)	LF	372
0624-6012	GROUND BOX TY E (122317)W/APRON	EA	1
2005-6002	FILTER FABRIC (TY I)	SY	474
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	1695
6210-6001	PVC MOISTURE BARRIER	SY	100

LEGEND OF FEATURES

CURB INLET
BLOCK SODDING
TRAFFIC FLOW ARROW
GROUND BOX
PROPERTY BOUNDARY
SWALE/GRADING
FIELD INLET
DRIVEWAY NO.
—FOL— 2~4" SCH 40 PVC
FULL DEPTH ASPHALT PAVEMENT
MANHOLE
DROP INLET



0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED
PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/22/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/22/2021 DATE

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

ROADWAY PLAN & PROFILE

STA 136+50 TO STA 139+50

SHEET 13 OF 18

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	150

Plotted on: 4/22/2021

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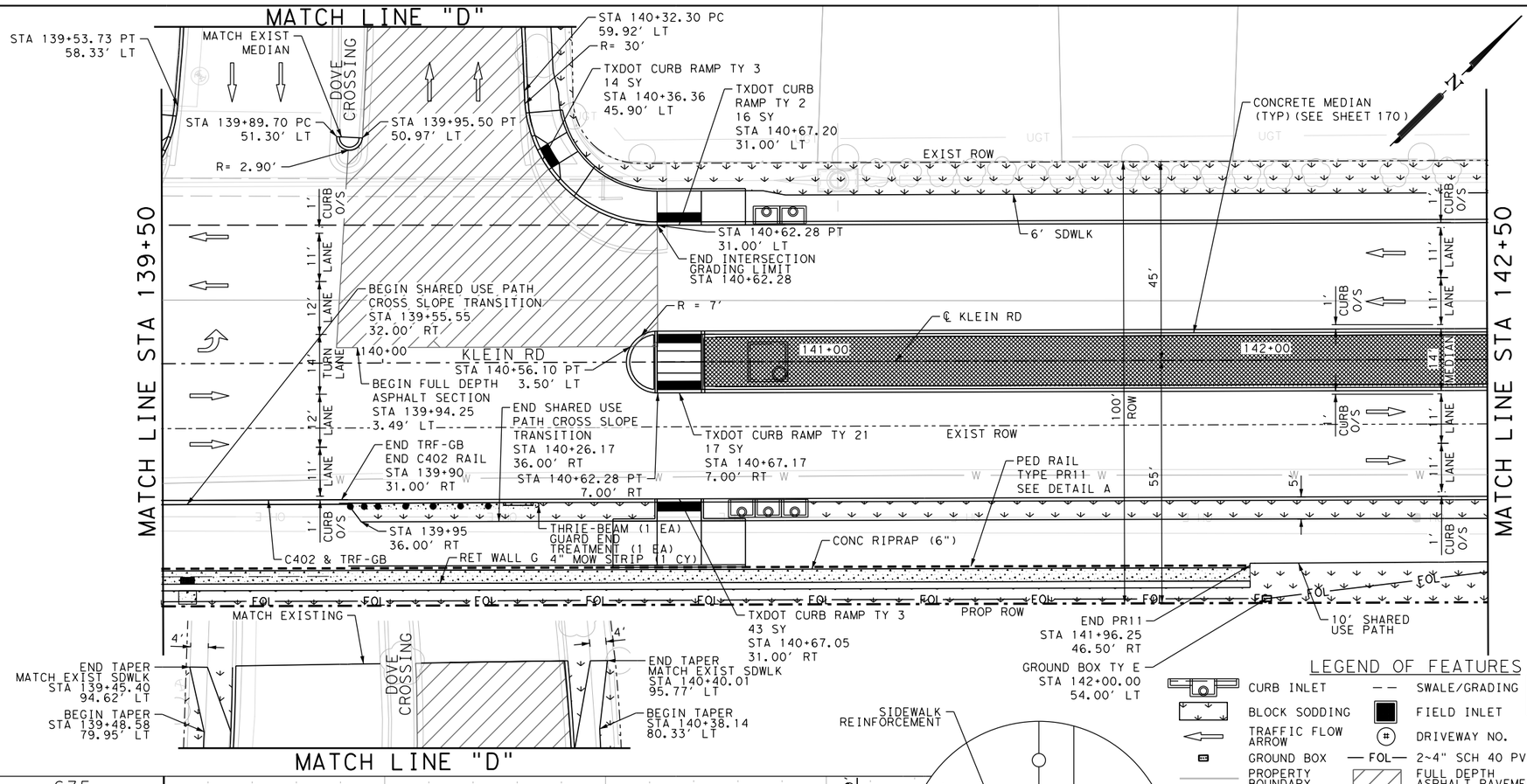
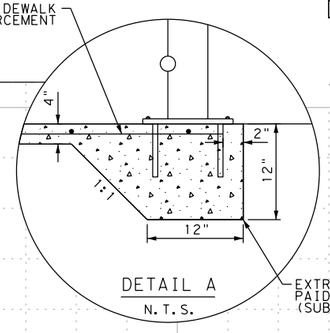


ITEM	DESCRIPTION	UNIT	QTY
0110-6001	EXCAVATION (ROADWAY)	CY	694
0132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	1107
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	610
0162-6002	BLOCK SODDING	SY	610
0168-6001	VEGETATIVE WATERING	MG	9.52
0247-6041	FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	CY	581
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	21.4
0260-6027	LIME TRT (EXST MATL)(8")	SY	2135
0310-6001	PRIME COAT (MULTI OPTION)	GAL	614.88
0316-6251	AGGR(TY-PE GR-5 SAC-B)	CY	15
0316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	409.92
0340-6011	D-GR HMA(SQ) TY-B PG64-22	TON	341.6
0340-6014	D-GR HMA(SQ) TY-B PG70-22	TON	408.5
0340-6050	D-GR HMA(SQ) TY-C PG70-22	TON	322.7
0340-6272	TACK COAT	GAL	374.12
0341-6049	D-GR HMA TY-D PG76-22	TON	270.1
0420-6066	CL C CONC (RAIL FOUNDATION)	CY	6
0432-6003	RIPRAP (CONC)(6 IN)	CY	14
0432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	1
0450-6034	RAIL (TY C402)	LF	42
0450-6103	RAIL (TY PR11)	LF	247
0529-6002	CONC CURB (TY II)	LF	850
0531-6001	CONC SIDEWALKS (4")	SY	461
0531-6019	CURB RAMPS (TY 2)	SY	19
0531-6020	CURB RAMPS (TY 3)	SY	62
0531-6030	CURB RAMPS (TY 21)	SY	17
0536-6002	CONC MEDIAN	SY	254
0540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	1
0540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	1
0618-6033	CONDT (PVC) (SCH 40) (4")	LF	602
0624-6012	GROUND BOX TY E (122317)W/APRON	EA	1
2005-6002	FILTER FABRIC (TY 1)	SY	591
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	2135
6210-6001	PVC MOISTURE BARRIER	SY	115

LEGEND OF FEATURES

CURB INLET; SWALE/GRADING; MANHOLE; BLOCK SODDING; FIELD INLET; DRIVEWAY NO.; DROP INLET; TRAFFIC FLOW ARROW; GROUND BOX; FOL 2~4" SCH 40 PVC; PROPERTY BOUNDARY; FULL DEPTH ASPHALT PAVEMENT



DETAIL A
N.T.S.

EXTRA CONCRETE NOT PAID FOR SEPARATELY (SUBSIDIARY TO ITEM 531)

NOTES

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DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/29/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/29/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

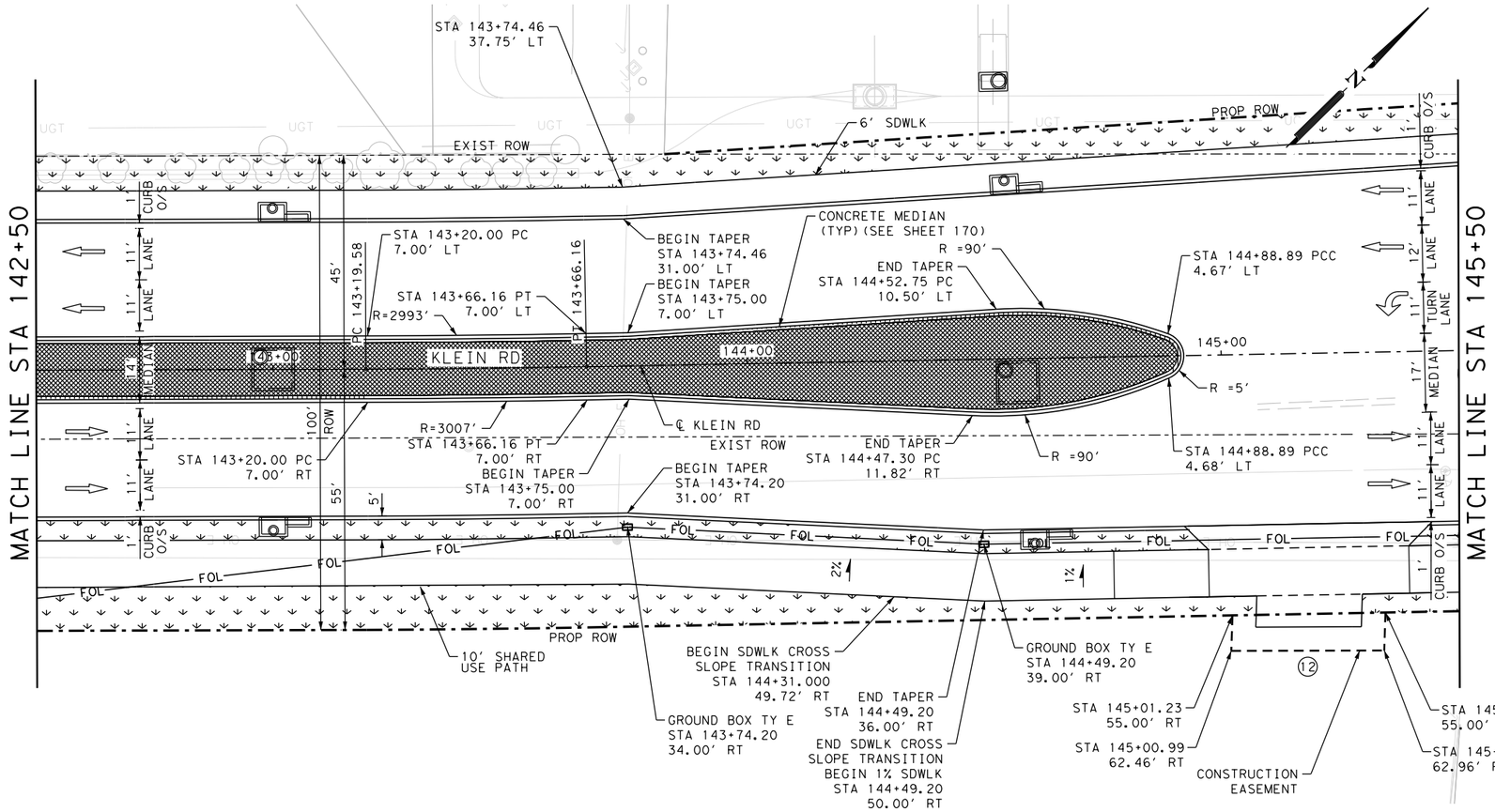
KLEIN RD PHASE 2

ROADWAY PLAN & PROFILE

STA 139+50 TO STA 142+50

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	151

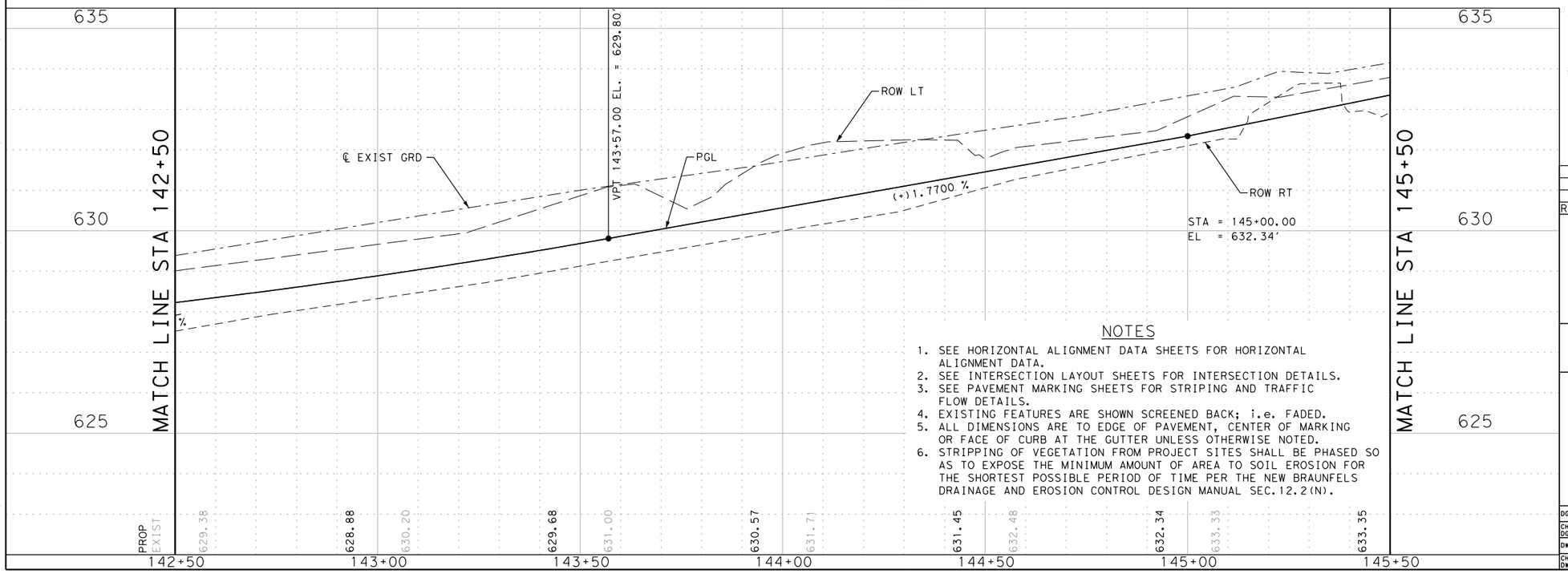
Plotted on: 1/22/2021



ITEM	DESCRIPTION	UNIT	QTY
0110-6001	EXCAVATION (ROADWAY)	CY	1834
0132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	123
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	550
0162-6002	BLOCK SODDING	SY	550
0168-6001	VEGETATIVE WATERING	MG	8.58
0247-6041	FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	CY	571
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	21.1
0260-6027	LIME TRT (EXST MATL)(8")	SY	2104
0310-6001	PRIME COAT (MULTI OPTION)	GAL	601.02
0316-6251	AGGR(TY-PE GR-5 SAC-B)	CY	14
0316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	400.68
0340-6014	D-GR HMA(SQ) TY-B PG70-22	TON	345.6
0340-6050	D-GR HMA(SQ) TY-C PG70-22	TON	309.1
0340-6272	TACK COAT	GAL	358.31
0341-6049	D-GR HMA TY-D PG76-22	TON	206.1
0529-6002	CONC CURB (TY II)	LF	990
0530-6004	DRIVEWAYS (CONC)	SY	83
0531-6001	CONC SIDEWALKS (4")	SY	487
0536-6002	CONC MEDIAN	SY	389
0618-6033	CONDT (PVC) (SCH 40) (4")	LF	602
0624-6012	GROUND BOX TY E (122317)W/APRON	EA	2
2005-6002	FILTER FABRIC (TY 1)	SY	518
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	2104
6210-6001	PVC MOISTURE BARRIER	SY	111

LEGEND OF FEATURES

- CURB INLET
- BLOCK SODDING
- TRAFFIC FLOW ARROW
- GROUND BOX
- PROPERTY BOUNDARY
- SWALE/GRADING
- FIELD INLET
- DRIVEWAY NO.
- —FOL— 2~4" SCH 40 PVC
- FULL DEPTH ASPHALT PAVEMENT
- MANHOLE
- DROP INLET



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DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

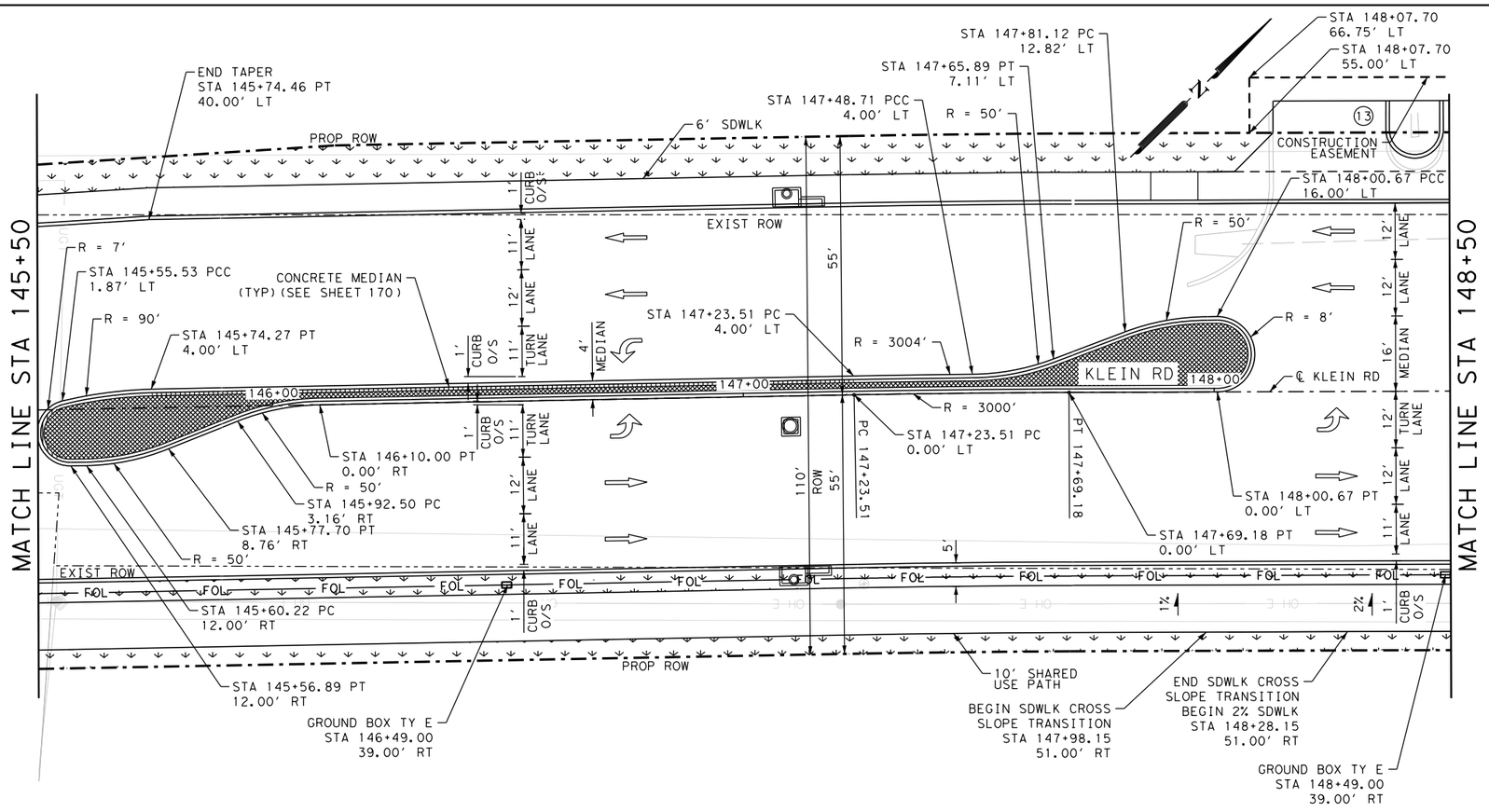
ROADWAY PLAN & PROFILE

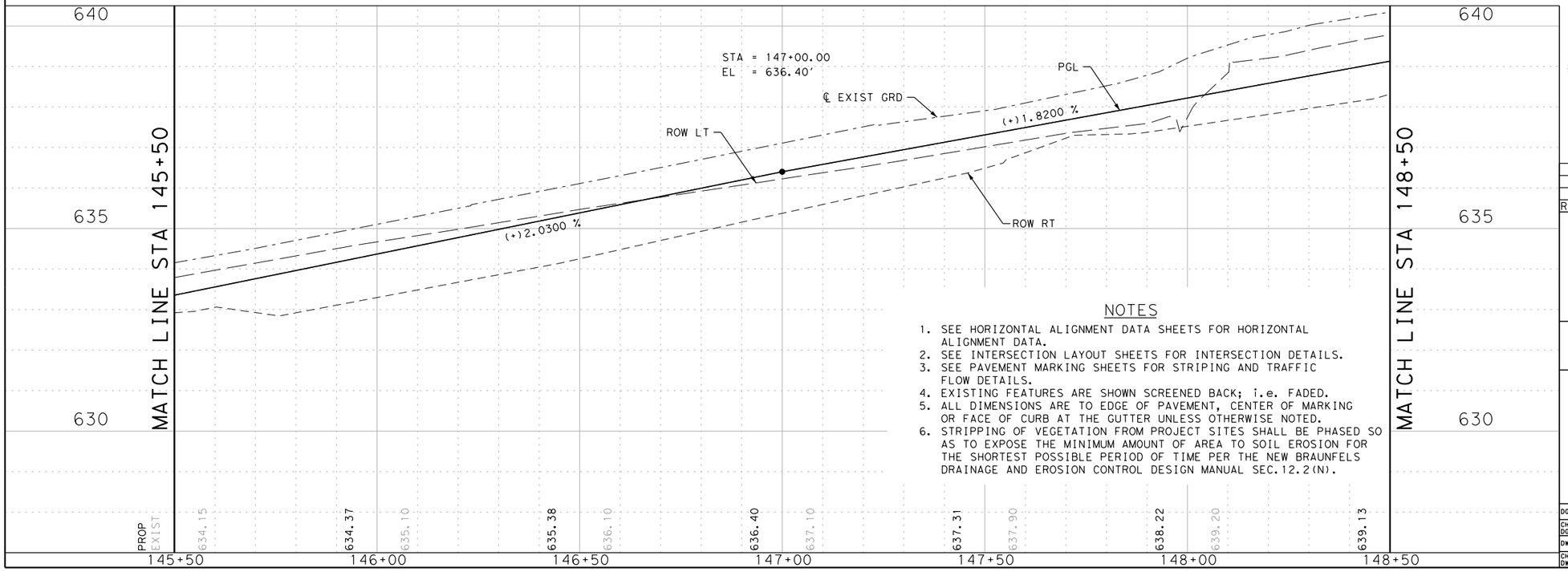
STA 142+50 TO STA 145+50

SHEET 15 OF 18

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	152

Design Filename: H:\Projects\510\30\03\Design\Civil\Roadway\5103003pp15.dgn





ITEM	DESCRIPTION	UNIT	QTY
0110-6001	EXCAVATION (ROADWAY)	CY	2233
0132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	61
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	505
0162-6002	BLOCK SODDING	SY	505
0168-6001	VEGETATIVE WATERING	MG	7.88
0247-6041	FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	CY	719
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	26.3
0260-6027	LIME TRT (EXST MATL)(8")	SY	2623
0310-6001	PRIME COAT (MULTI OPTION)	GAL	760.21
0316-6251	AGGR(TY-PE GR-5 SAC-B)	CY	18
0316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	506.81
0340-6014	D-GR HMA(SQ) TY-B PG70-22	TON	437.2
0340-6050	D-GR HMA(SQ) TY-C PG70-22	TON	399.1
0340-6272	TACK COAT	GAL	462.72
0341-6049	D-GR HMA TY-D PG76-22	TON	266.1
0529-6002	CONC CURB (TY II)	LF	1068
0530-6004	DRIVEWAYS (CONC)	SY	78
0531-6001	CONC SIDEWALKS (4")	SY	495
0536-6002	CONC MEDIAN	SY	200
0618-6033	CONDT (PVC) (SCH 40) (4")	LF	600
0624-6012	GROUND BOX TY E (122317)W/APRON	EA	2
2005-6002	FILTER FABRIC (TY 1)	SY	525
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	2623
6210-6001	PVC MOISTURE BARRIER	SY	133

LEGEND OF FEATURES

CURB INLET
BLOCK SODDING
TRAFFIC FLOW ARROW
GROUND BOX
PROPERTY BOUNDARY
SWALE/GRADING
FIELD INLET
DRIVEWAY NO.
2~4" SCH 40 PVC
FULL DEPTH ASPHALT PAVEMENT
MANHOLE
DROP INLET

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT DATA.
2. SEE INTERSECTION LAYOUT SHEETS FOR INTERSECTION DETAILS.
3. SEE PAVEMENT MARKING SHEETS FOR STRIPING AND TRAFFIC FLOW DETAILS.
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6. STRIPPING OF VEGETATION FROM PROJECT SITES SHALL BE PHASED SO AS TO EXPOSE THE MINIMUM AMOUNT OF AREA TO SOIL EROSION FOR THE SHORTEST POSSIBLE PERIOD OF TIME PER THE NEW BRAUNFELS DRAINAGE AND EROSION CONTROL DESIGN MANUAL SEC.12.2(N).

DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED
PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

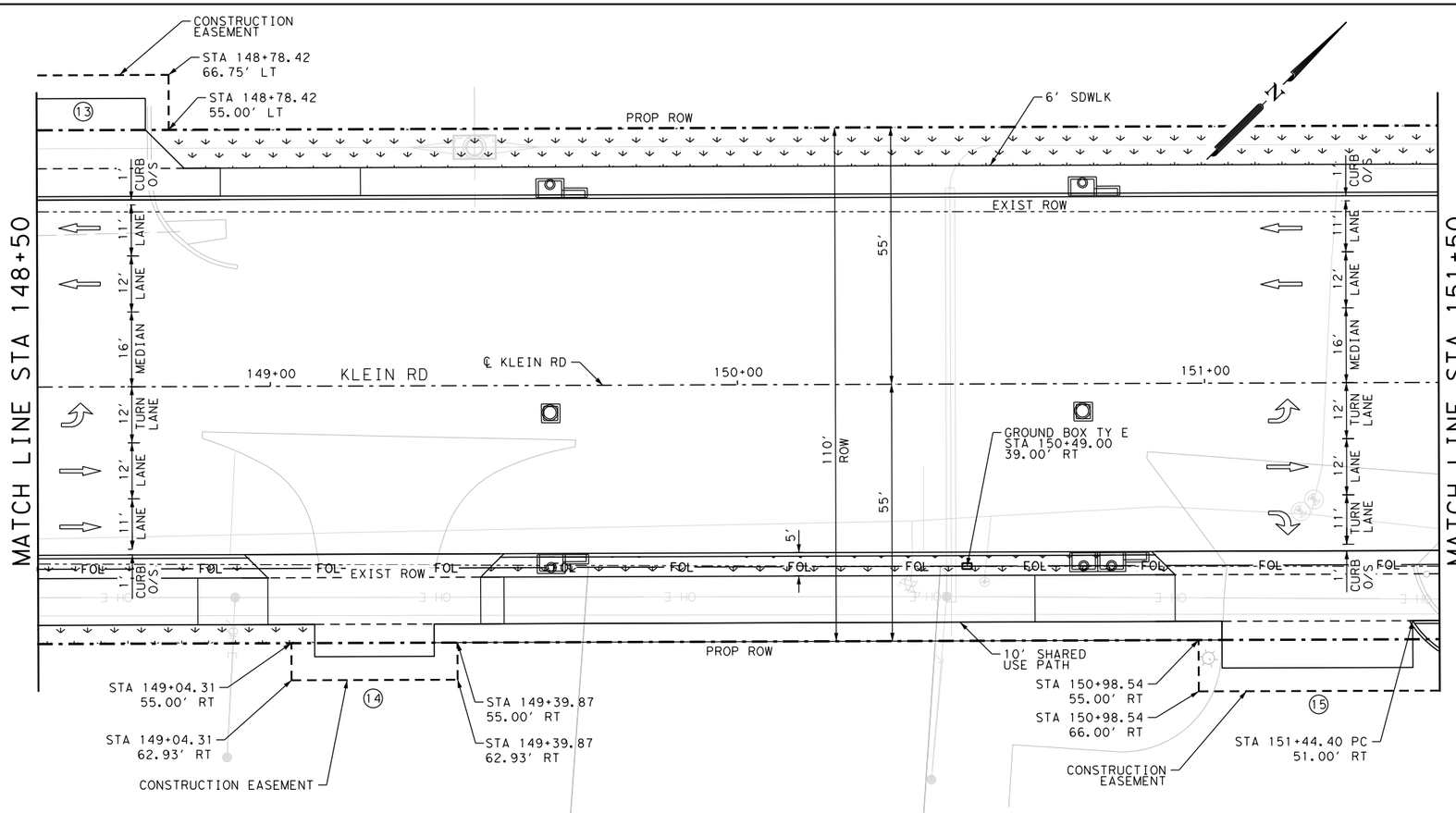
ROADWAY PLAN & PROFILE

STA 145+50 TO STA 148+50

SHEET 16 OF 18

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	153

Plotted on: 1/22/2021



ITEM	DESCRIPTION	UNIT	QTY
0110-6001	EXCAVATION (ROADWAY)	CY	2418
0132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	30
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	360
0162-6002	BLOCK SODDING	SY	360
0168-6001	VEGETATIVE WATERING	MG	5.62
0247-6041	FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	CY	744
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	27.1
0260-6027	LIME TRT (EXST MATL)(8")	SY	2706
0310-6001	PRIME COAT (MULTI OPTION)	GAL	795.01
0316-6251	AGGR(TY-PE GR-5 SAC-B)	CY	19
0316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	530.01
0340-6014	D-GR HMA(SQ) TY-B PG70-22	TON	457.2
0340-6050	D-GR HMA(SQ) TY-C PG70-22	TON	437.1
0340-6272	TACK COAT	GAL	506.67
0341-6049	D-GR HMA TY-D PG76-22	TON	291.4
0529-6002	CONC CURB (TY II)	LF	511
0530-6004	DRIVEWAYS (CONC)	SY	269
0531-6001	CONC SIDEWALKS (4")	SY	394
0618-6033	CONDT (PVC) (SCH 40) (4")	LF	600
0624-6012	GROUND BOX TY E (122317)W/APRON	EA	1
2005-6002	FILTER FABRIC (TY 1)	SY	425
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	2706
6210-6001	PVC MOISTURE BARRIER	SY	133

LEGEND OF FEATURES

CURB INLET
BLOCK SODDING
TRAFFIC FLOW ARROW
GROUND BOX
PROPERTY BOUNDARY
SWALE/GRADING
FIELD INLET
DRIVEWAY NO.
— FOL — 2~4" SCH 40 PVC
FULL DEPTH ASPHALT PAVEMENT
MANHOLE
DROP INLET

NOTES

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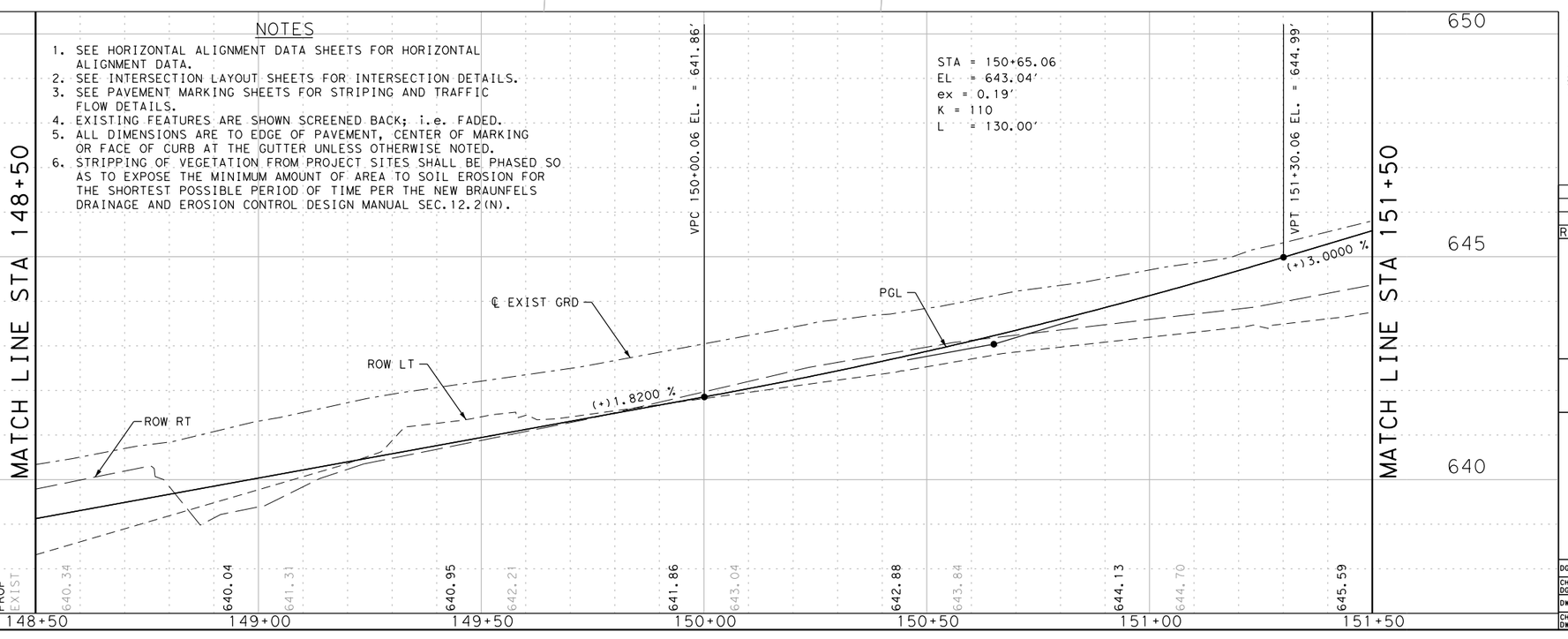


DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

ROADWAY PLAN & PROFILE

STA 148+50 TO STA 151+50

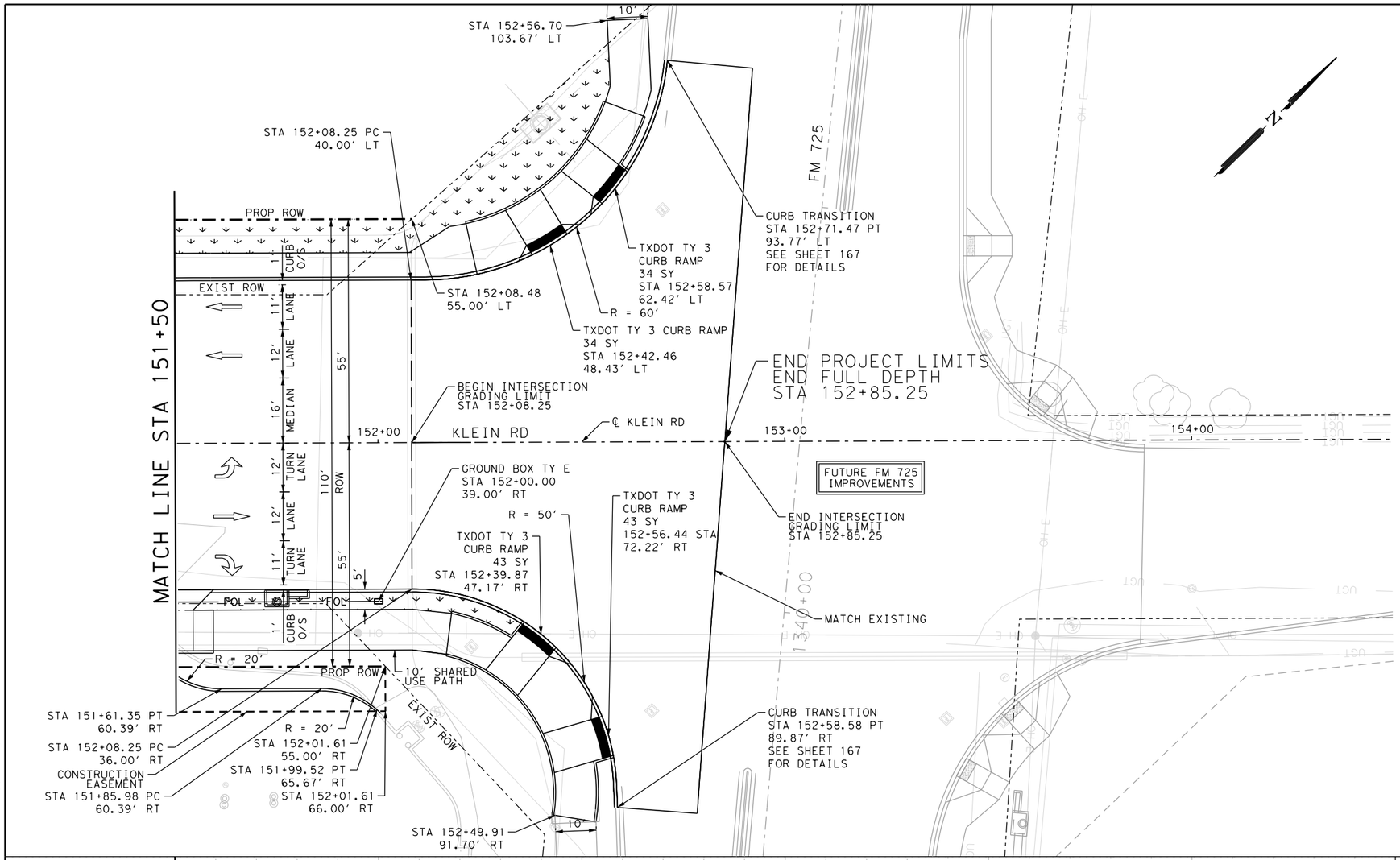
SHEET 17 OF 18

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	154

Design Filename: H:\Projects\510\30\03\Design\Civil\Roadway\5103003pp17.dgn

Plotted on: 1/22/2021

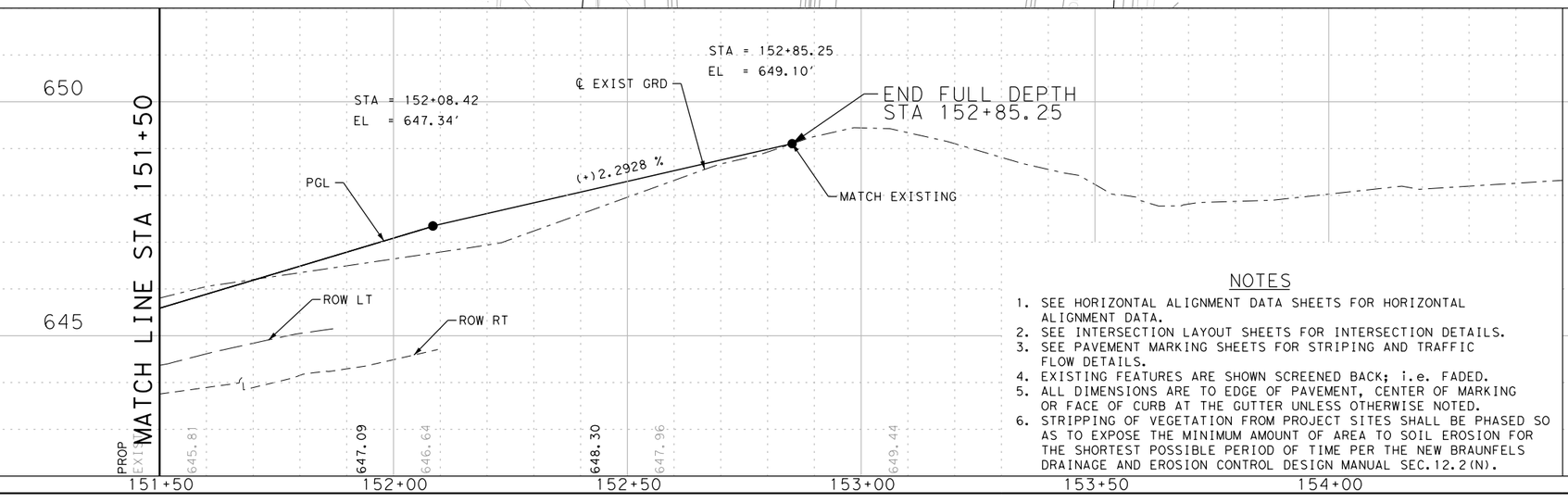
Design Filename: H:\Projects\510\30\03\Design\Civil\Roadway\5103003pp18.dgn



ITEM	DESCRIPTION	UNIT	QTY
0110-6001	EXCAVATION (ROADWAY)	CY	311
0132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	107
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	170
0162-6002	BLOCK SODDING	SY	170
0168-6001	VEGETATIVE WATERING	MG	2.66
0247-6041	FL BS (CMP IN PLC)(TYA GR1&2)(FNAL POS)	CY	444
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	16.2
0260-6027	LIME TRT (EXST MATL)(8")	SY	1613
0310-6001	PRIME COAT (MULTI OPTION)	GAL	475.85
0316-6251	AGGR(TY-PE GR-5 SAC-B)	CY	11
0316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL	317.24
0340-6014	D-GR HMA(SQ) TY-B PG70-22	TON	273.7
0340-6050	D-GR HMA(SQ) TY-C PG70-22	TON	264.0
0340-6272	TACK COAT	GAL	306.00
0341-6049	D-GR HMA TY-D PG76-22	TON	176.0
0529-6002	CONC CURB (TY II)	LF	203
0530-6004	DRIVEWAYS (CONC)	SY	12
0531-6001	CONC SIDEWALKS (4")	SY	151
0531-6020	CURB RAMPS (TY 3)	SY	170
0618-6033	CONDT (PVC) (SCH 40) (4")	LF	100
0624-6012	GROUND BOX TY E (122317)W/APRON	EA	1
2005-6002	FILTER FABRIC (TY 1)	SY	337
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	1613
6210-6001	PVC MOISTURE BARRIER	SY	63

LEGEND OF FEATURES

CURB INLET
SWALE/GRADING
MANHOLE
BLOCK SODDING
FIELD INLET
DROP INLET
TRAFFIC FLOW ARROW
DRIVEWAY NO.
GROUND BOX
FOL 2~4" SCH 40 PVC
PROPERTY BOUNDARY
FULL DEPTH ASPHALT PAVEMENT



NOTES

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DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED
PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

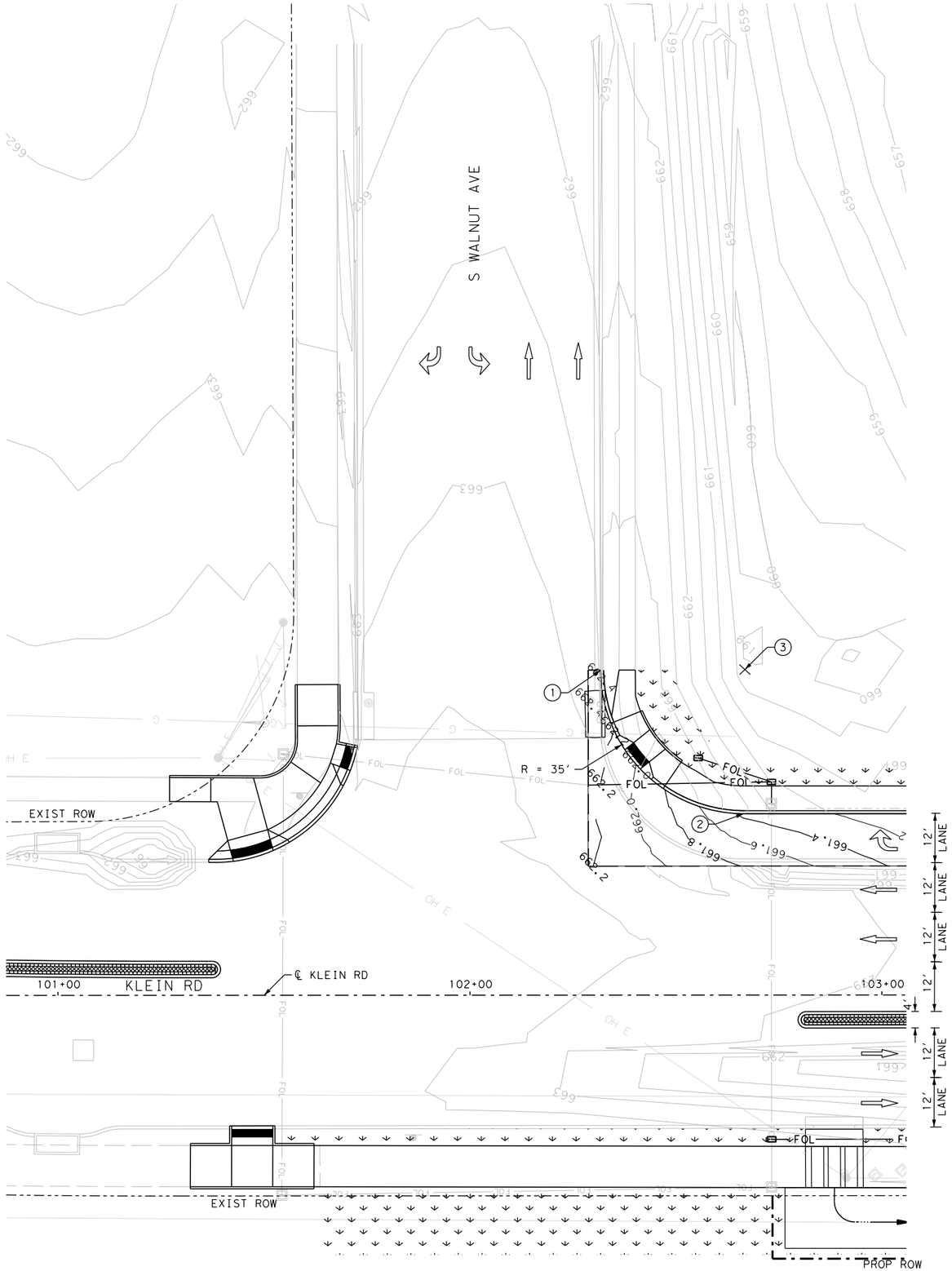
KLEIN RD PHASE 2

ROADWAY PLAN & PROFILE

STA 151+50 TO END PROJECT

SHEET 18 OF 18

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	155



LEGEND

- CURB INLET
- BLOCK SODDING
- TRAFFIC FLOW ARROW
- GROUND BOX
- PROPERTY BOUNDARY
- SWALE/GRADING
- FIELD INLET
- FOL — 2~4" SCH 40 PVC
- FULL DEPTH ASPHALT PAVEMENT
- MANHOLE
- DROP INLET
- (X) POINT NUMBER
- 801 — EXISTING CONTOURS
- 850.1 — PROPOSED CONTOURS

NOTES

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POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	13788698.32	2252768.35	662.42	PC
2	13788698.82	2252817.52	661.36	PT
3	13788723.48	2252792.68	MATCH EXIST	CENTER

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

INTERSECTION DETAIL

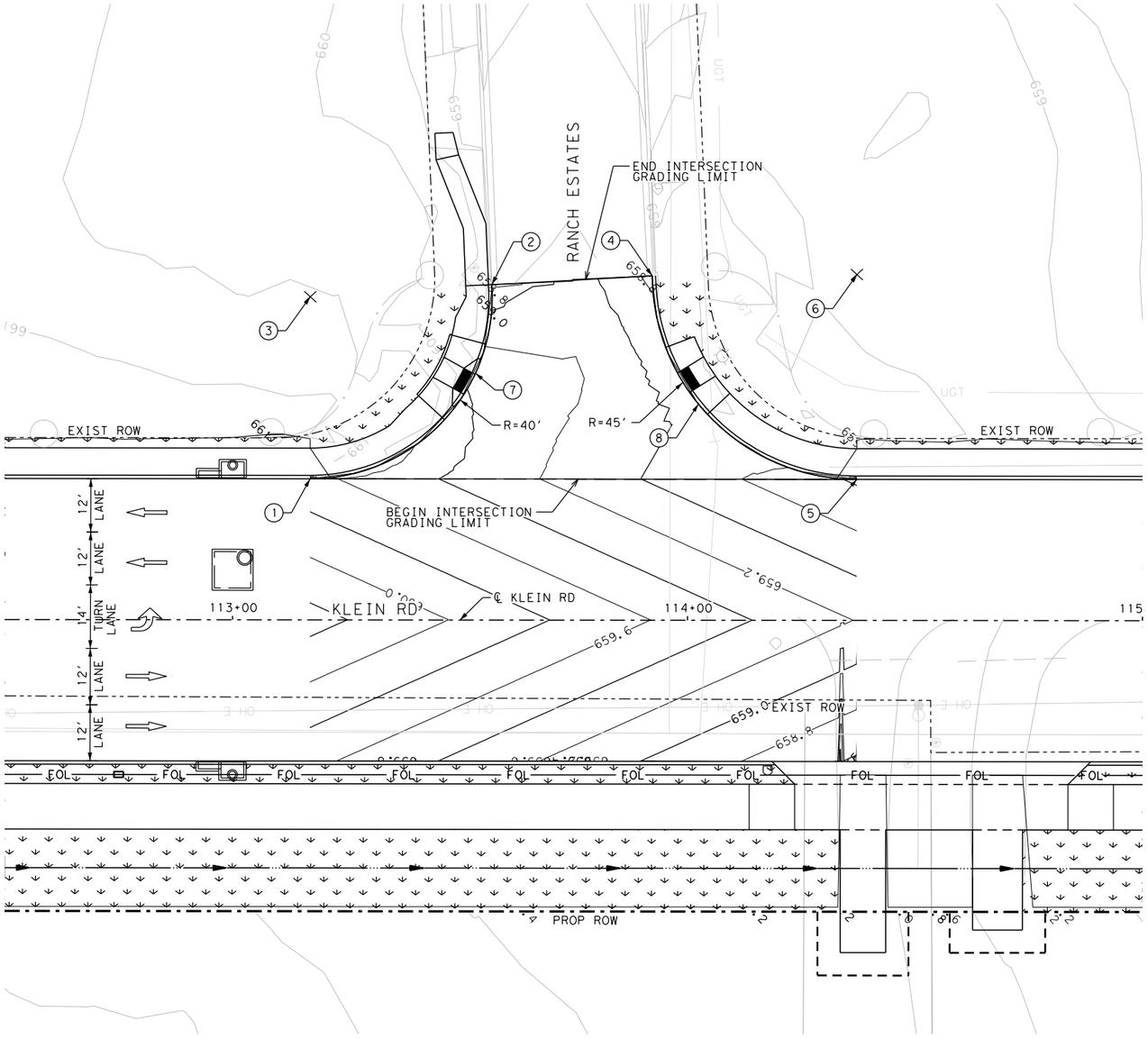
S WALNUT AVE

SHEET 1 OF 8

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	156

Plotted on: 1/22/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Roadway\5103003int01.dgn



LEGEND

- CURB INLET
- BLOCK SODDING
- TRAFFIC FLOW ARROW
- GROUND BOX
- PROPERTY BOUNDARY
- SWALE/GRADING
- FIELD INLET
- FOL — 2~4" SCH 40 PVC
- FULL DEPTH ASPHALT PAVEMENT
- MANHOLE
- DROP INLET
- (X) POINT NUMBER
- 801 — EXISTING CONTOURS
- 850.1 — PROPOSED CONTOURS

NOTES

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DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	13789439.81	2253562.52	659.65	PC
2	13789498.2	2253559.87	MATCH EXIST	PT
3	13789467.77	2253533.91	MATCH EXIST	CENTER
4	13789524.76	2253583.09	MATCH EXIST	PC
5	13789525.75	2253646.5	658.57	PT
6	13789557.2	2253614.32	MATCH EXIST	CENTER
7	13789482.05	2253571.26	659.35	GRADE BREAK
8	13789512.4	2253610.33	658.97	GRADE BREAK

PAPE-DAWSON ENGINEERS
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TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

INTERSECTION DETAIL

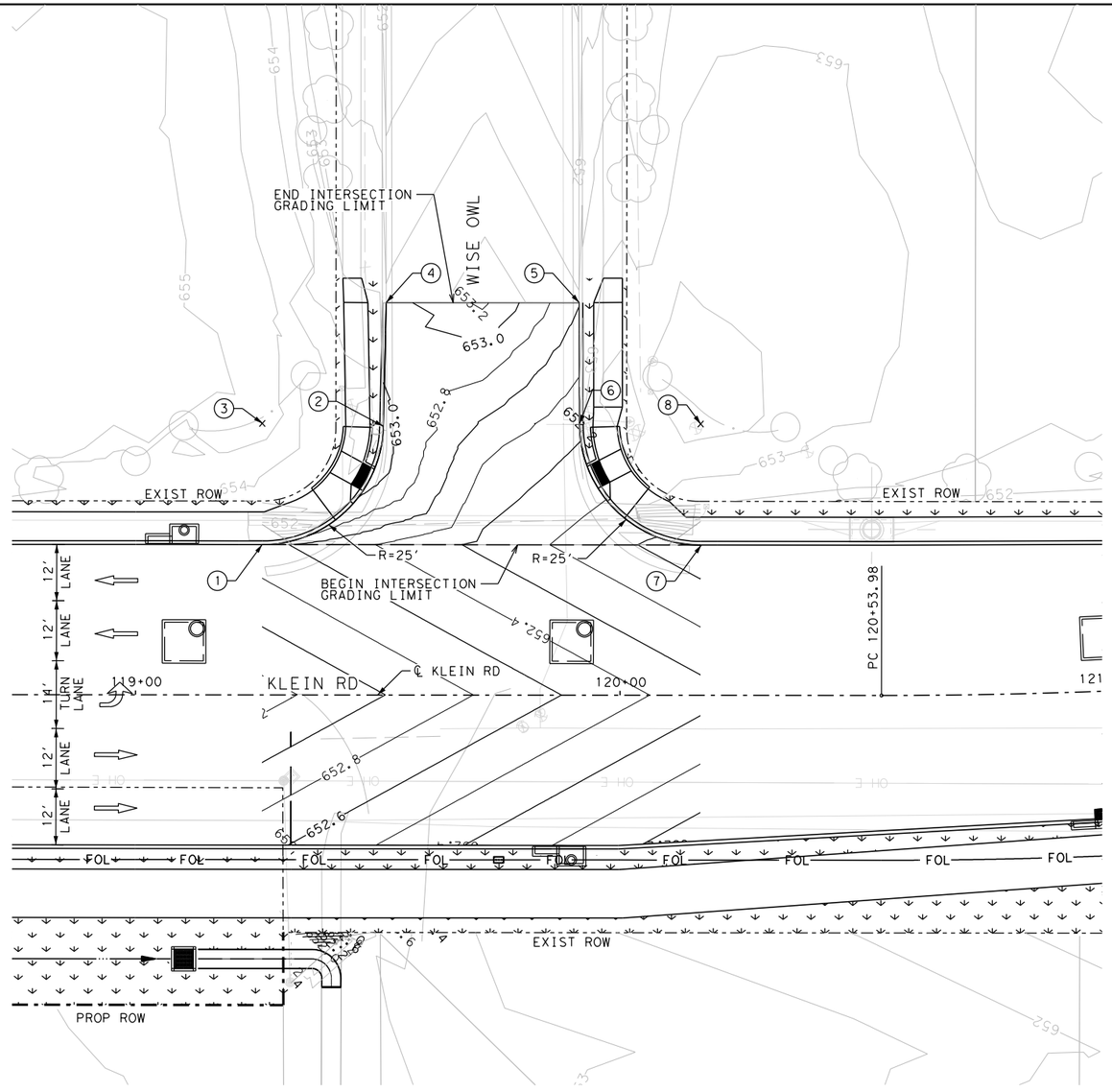
RANCH ESTATES

SHEET 2 OF 8

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	157

Plotted on: 1/22/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Roadway\51030031nt02.dgn



LEGEND

- CURB INLET
- BLOCK SODDING
- TRAFFIC FLOW ARROW
- GROUND BOX
- PROPERTY BOUNDARY
- SWALE/GRADING
- FIELD INLET
- FOL — 2~4" SCH 40 PVC
- FULL DEPTH ASPHALT PAVEMENT
- MANHOLE
- DROP INLET
- (X) POINT NUMBER
- 801 — EXISTING CONTOURS
- 850.1 — PROPOSED CONTOURS

NOTES

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POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	13789875.43	2253988.23	652.66	PC
2	13789910.8	2253987.81	653.05	PT
3	13789892.9	2253970.35	MATCH EXIST	CENTER
4	13789928.63	2253970.35	MATCH EXIST	
5	13789957.14	2253998.15	MATCH EXIST	
6	13789939.72	2254016.14	652.25	PC
7	13789940.15	22540.48	651.66	PT
8	13789957.62	2254033.6	MATCH EXIST	CENTER

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

INTERSECTION DETAIL

WISE OWL

SHEET 3 OF 8

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	158

Plotted on: 1/22/2021

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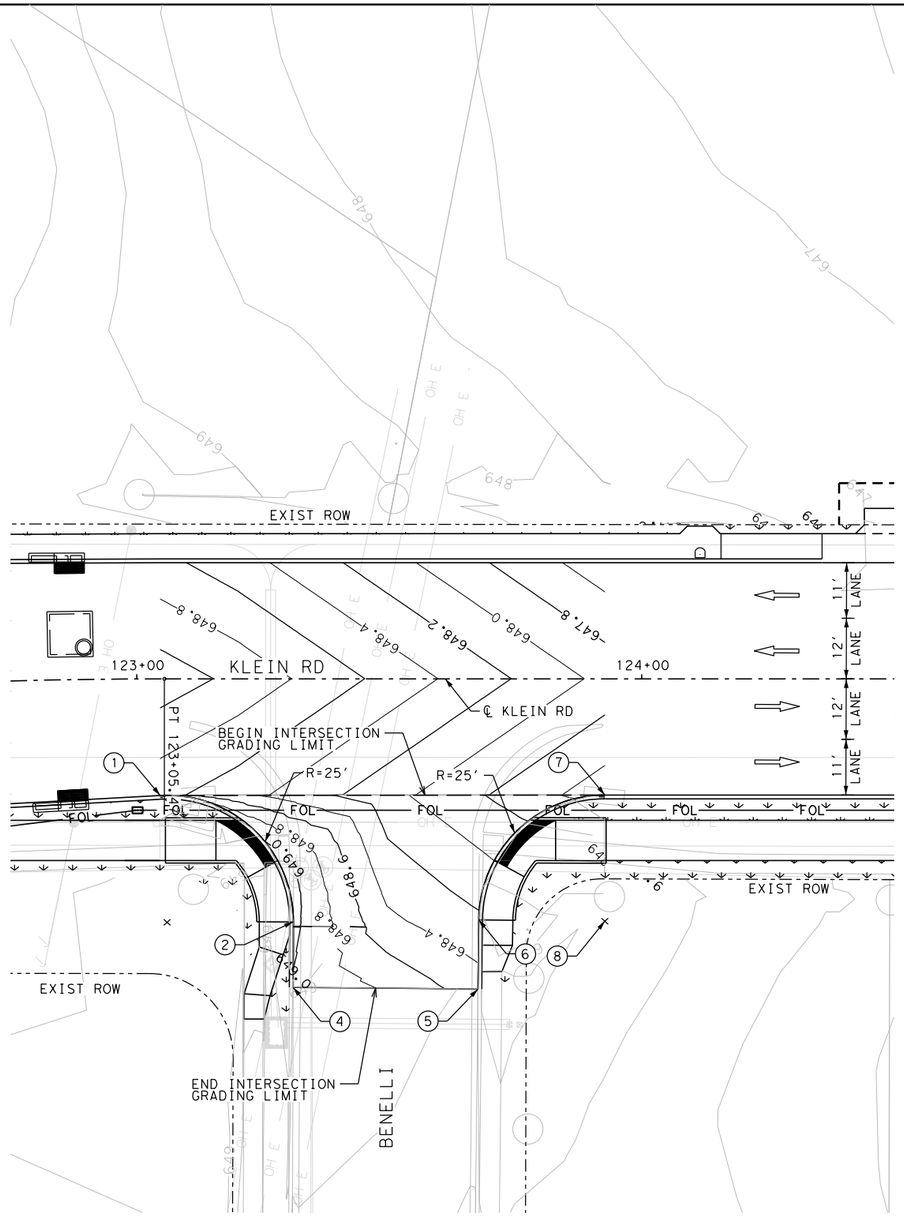

LEGEND

- CURB INLET
- BLOCK SODDING
- TRAFFIC FLOW ARROW
- GROUND BOX
- PROPERTY BOUNDARY
- SWALE/GRADING
- FIELD INLET
- FOL — 2~4" SCH 40 PVC
- FULL DEPTH ASPHALT PAVEMENT
- MANHOLE
- DROP INLET
- (X) POINT NUMBER
- 801 — EXISTING CONTOURS
- 850.1 — PROPOSED CONTOURS

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT DATA.
2. SEE INTERSECTION LAYOUT SHEETS FOR INTERSECTION DETAILS.
3. SEE PAVEMENT MARKING SHEETS FOR STRIPING AND TRAFFIC FLOW DETAILS.
4. EXISTING FEATURES ARE SHOWN SCREENED BACK; i.e. FADED.
5. ALL DIMENSIONS ARE TO EDGE OF PAVEMENT, CENTER OF MARKING OR FACE OF CURB AT THE GUTTER UNLESS OTHERWISE NOTED.
6. STRIPPING OF VEGETATION FROM PROJECT SITES SHALL BE PHASED SO AS TO EXPOSE THE MINIMUM AMOUNT OF AREA TO SOIL EROSION FOR THE SHORTEST POSSIBLE PERIOD OF TIME PER THE NEW BRAUNFELS DRAINAGE AND EROSION CONTROL DESIGN MANUAL SEC.12.2(N).

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	13790115.88	2254285.63	651.66	PC
2	13790115.53	2254321.63	648.8	PT
3	13790098.31	2254303.48	MATCH EXIST	CENTER
4	13790107.07	2254330.25	MATCH EXIST	
5	13790133.03	2254356.04	MATCH EXIST	
6	13790141.56	2254347.48	648.27	PC
7	13790177.85	2254346.07	647.48	PT
8	13790160.41	2254363.98	MATCH EXIST	CENTER

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

INTERSECTION DETAIL

BENELLI

SHEET 4 OF 8

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	159

Plotted on: 1/22/2021

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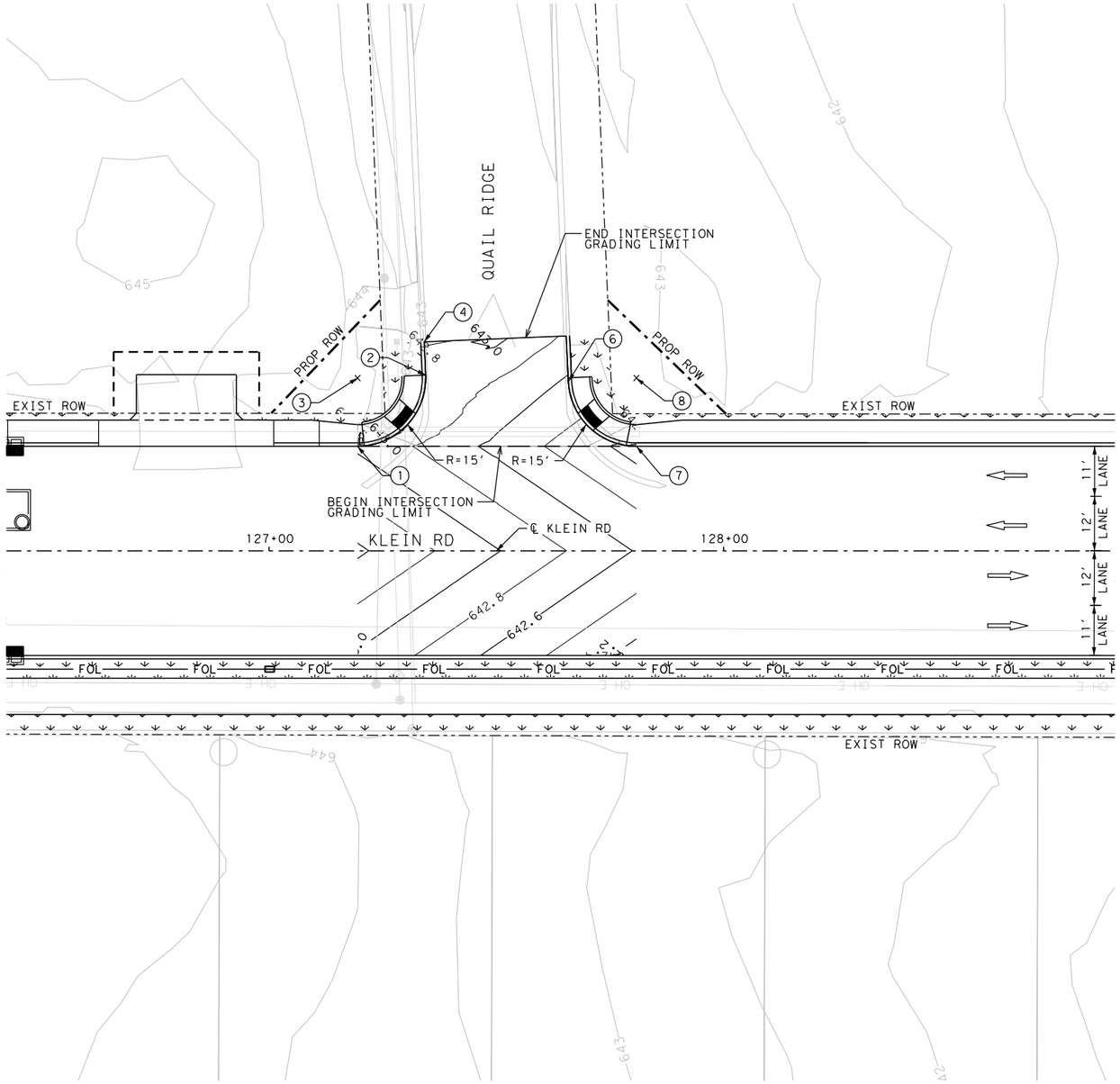

LEGEND

- CURB INLET
- BLOCK SODDING
- TRAFFIC FLOW ARROW
- GROUND BOX
- PROPERTY BOUNDARY
- SWALE/GRADING
- FIELD INLET
- FOL — 2~4" SCH 40 PVC
- FULL DEPTH ASPHALT PAVEMENT
- MANHOLE
- DROP INLET
- (X) POINT NUMBER
- 801 — EXISTING CONTOURS
- 850.1 — PROPOSED CONTOURS

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT DATA.
2. SEE INTERSECTION LAYOUT SHEETS FOR INTERSECTION DETAILS.
3. SEE PAVEMENT MARKING SHEETS FOR STRIPING AND TRAFFIC FLOW DETAILS.
4. EXISTING FEATURES ARE SHOWN SCREENED BACK; i.e. FADED.
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6. STRIPPING OF VEGETATION FROM PROJECT SITES SHALL BE PHASED SO AS TO EXPOSE THE MINIMUM AMOUNT OF AREA TO SOIL EROSION FOR THE SHORTEST POSSIBLE PERIOD OF TIME PER THE NEW BRAUNFELS DRAINAGE AND EROSION CONTROL DESIGN MANUAL SEC.12.2(N).

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	13790443.92	2254541.3	642.97	PC
2	13790465.58	2254540.55	642.94	PT
3	13790454.39	2254530.56	MATCH EXIST	CENTER
4	13790470.45	2254535.1	MATCH EXIST	
5	13790493.71	2254555.97	MATCH EXIST	
6	13790487.07	2254563.45	642.57	PC
7	13790487.83	2254584.13	642.12	PT
8	13790498.3	2254573.39	MATCH EXIST	CENTER

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

INTERSECTION DETAIL

QUAIL RIDGE

SHEET 5 OF 8

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	160

Plotted on: 1/22/2021

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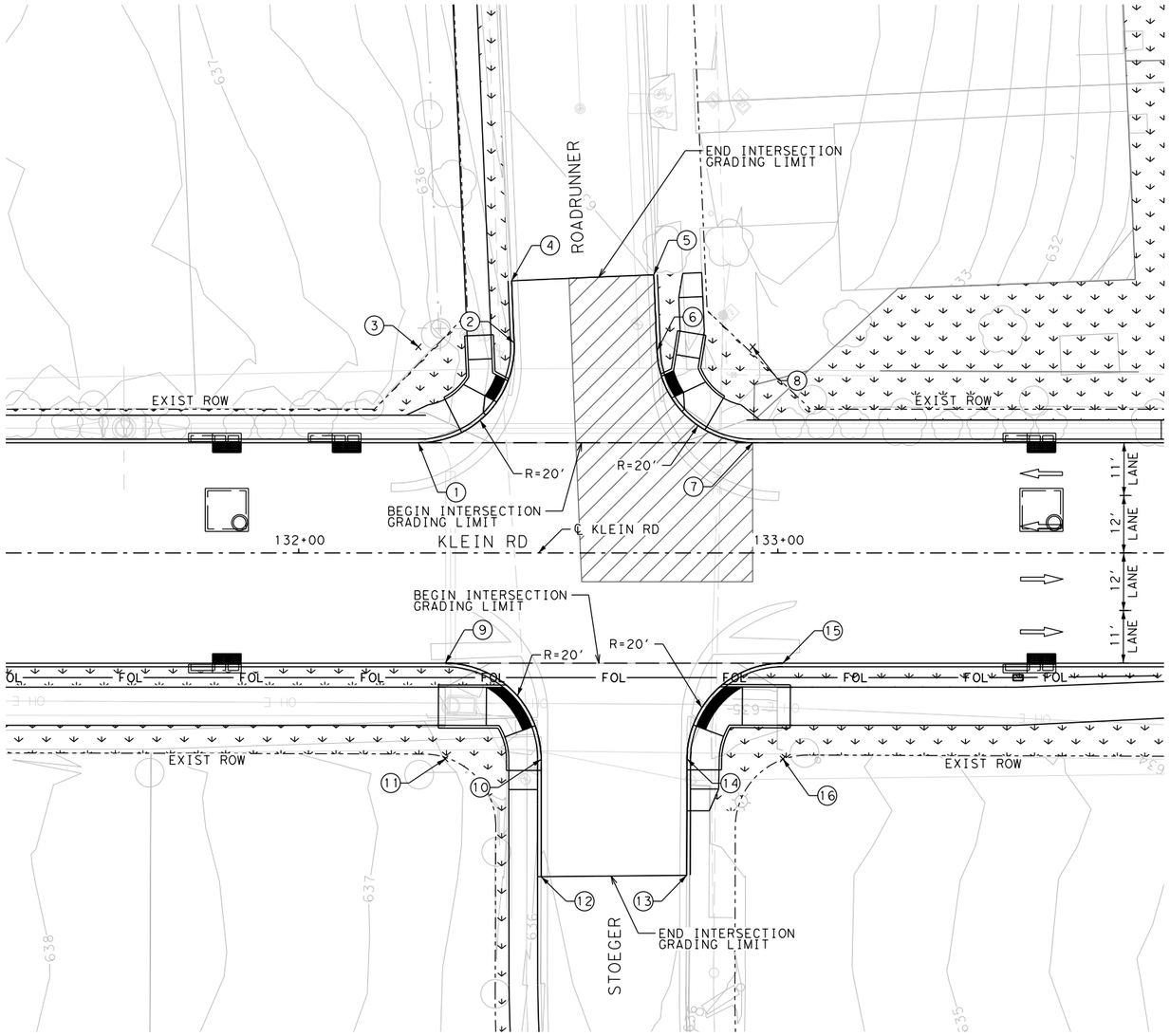

N

LEGEND

- CURB INLET
- BLOCK SODDING
- TRAFFIC FLOW ARROW
- GROUND BOX
- PROPERTY BOUNDARY
- SWALE/GRADING
- FIELD INLET
- FOL — 2~4" SCH 40 PVC
- FULL DEPTH ASPHALT PAVEMENT
- MANHOLE
- DROP INLET
- (X) POINT NUMBER
- 801 — EXISTING CONTOURS
- 850.1 — PROPOSED CONTOURS

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT DATA.
2. SEE INTERSECTION LAYOUT SHEETS FOR INTERSECTION DETAILS.
3. SEE PAVEMENT MARKING SHEETS FOR STRIPING AND TRAFFIC FLOW DETAILS.
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DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/30/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/30/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	13790805.82	2254894.24	635.62	PC
2	13790834.68	2254893.27	634.89	PT
3	13790819.78	2254879.92	MATCH EXIST	CENTER
4	13790843.34	2254883.6	MATCH EXIST	
5	13790865.46	2254903.43	MATCH EXIST	
6	13790854.83	2254915.29	634.18	PC
7	13790855.76	2254942.95	633.94	PT
8	13790869.73	2254928.63	MATCH EXIST	CENTER
9	13790777.71	2254931.09	635.52	PC
10	13790778.07	2254959.37	635.36	PT
11	13790763.75	2254945.41	MATCH EXIST	CENTER
12	13790760.91	2254976.96	MATCH EXIST	
13	13790782.89	2254997.97	MATCH EXIST	
14	13790799.9	2254980.6	634.49	PC
15	13790828.15	2254980.28	633.8	PT
16	13790814.19	2254994.59	MATCH EXIST	CENTER

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

INTERSECTION DETAIL

ROADRUNNER/STOEGER

SHEET 6 OF 8

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	161

Plotted on: 4/30/2021

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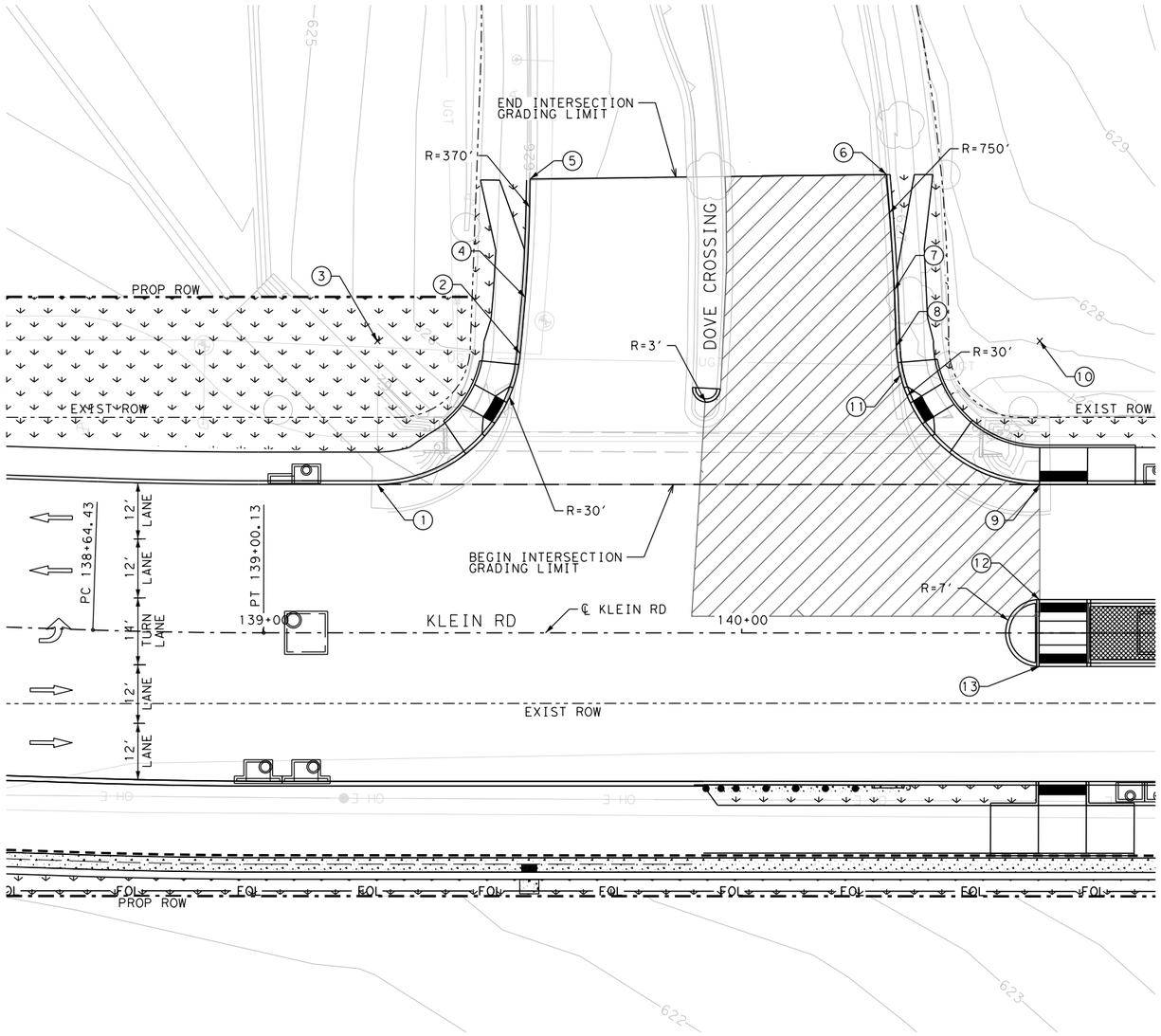

LEGEND

- CURB INLET
- BLOCK SODDING
- TRAFFIC FLOW ARROW
- GROUND BOX
- PROPERTY BOUNDARY
- SWALE/GRADING
- FIELD INLET
- FOL — 2~4" SCH 40 PVC
- FULL DEPTH ASPHALT PAVEMENT
- MANHOLE
- DROP INLET
- (X) POINT NUMBER
- 801 — EXISTING CONTOURS
- 850.1 — PROPOSED CONTOURS

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT DATA.
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DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/30/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/30/2021 DATE

0 10 20 30 60

SCALE: PLAN 1" = 30'

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	13791301.09	2255387.05	627.4	PC
2	13791341.56	2255388.36	626.57	PT
3	13791322.04	2255365.58	MATCH EXIST	CENTER
4	13791350.56	2255380.65	626.35	PC
5	13791368.5	2255363.64	MATCH EXIST	PT
6	13791422.45	2255415	626.56	PC
7	13791407.83	2255432.22	626.67	PT
8	13791398.16	2255442.93	626.74	PC
9	13791399.84	2255483.41	626.57	PT
10	13791421.11	2255462.26	MATCH EXIST	CENTER
11	13791395.27	2255447.02	626.77	GRADE BREAK
12	13791383.4	2255500.9	627.05	PT
13	13791373.62	2255510.92	627.05	PT

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

INTERSECTION DETAIL

DOVE CROSSING

SHEET 7 OF 8

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	162

Plotted on: 4/30/2021

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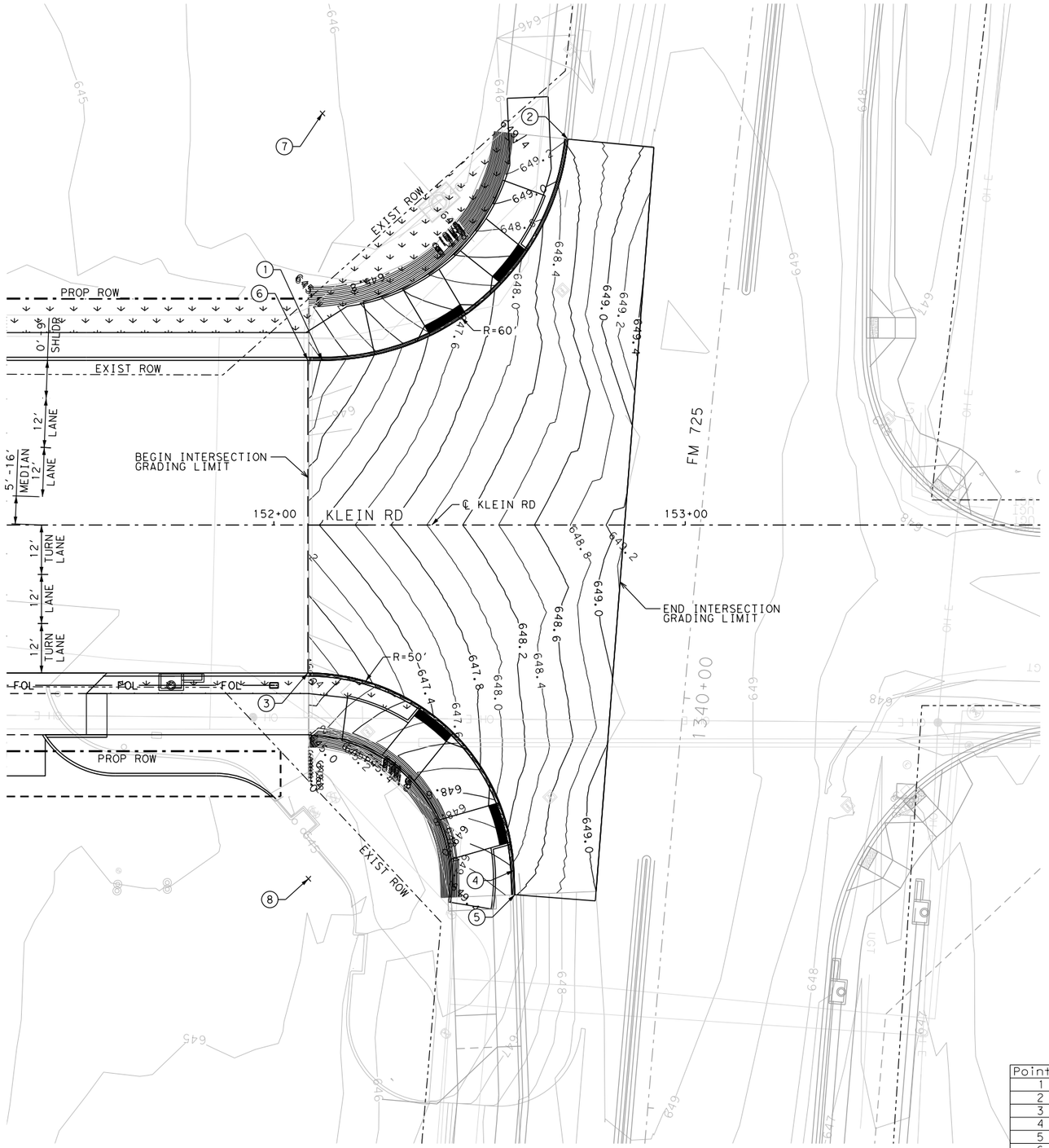

LEGEND

- CURB INLET
- BLOCK SODDING
- TRAFFIC FLOW ARROW
- GROUND BOX
- PROPERTY BOUNDARY
- SWALE/GRADING
- FIELD INLET
- — FOL — 2~4" SCH 40 PVC
- FULL DEPTH ASPHALT PAVEMENT
- MANHOLE
- DROP INLET
- (X) POINT NUMBER
- 801 EXISTING CONTOURS
- 850.1 PROPOSED CONTOURS

NOTES

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Point #	Northing	Easting	ELEVATION	DESCRIPTION
1	13792233.59	2256275.5	646.64	PC
2	13792313.85	2256278.66	648.63	PT
3	13792178.11	2256327.55	646.62	PC
4	13792180.35	2256396.74	648.47	PT
5	13792176.4	2256401.13	648.59	
6	13792231.05	2256273.02	646.53	
7	13792275.48	2256232.54	MATCH EXIST	CENTER
8	13792143.17	2256363.31	MATCH EXIST	CENTER

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1"= 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

INTERSECTION DETAIL

FM 725

SHEET 8 OF 8

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	163

Plotted on: 1/22/2021

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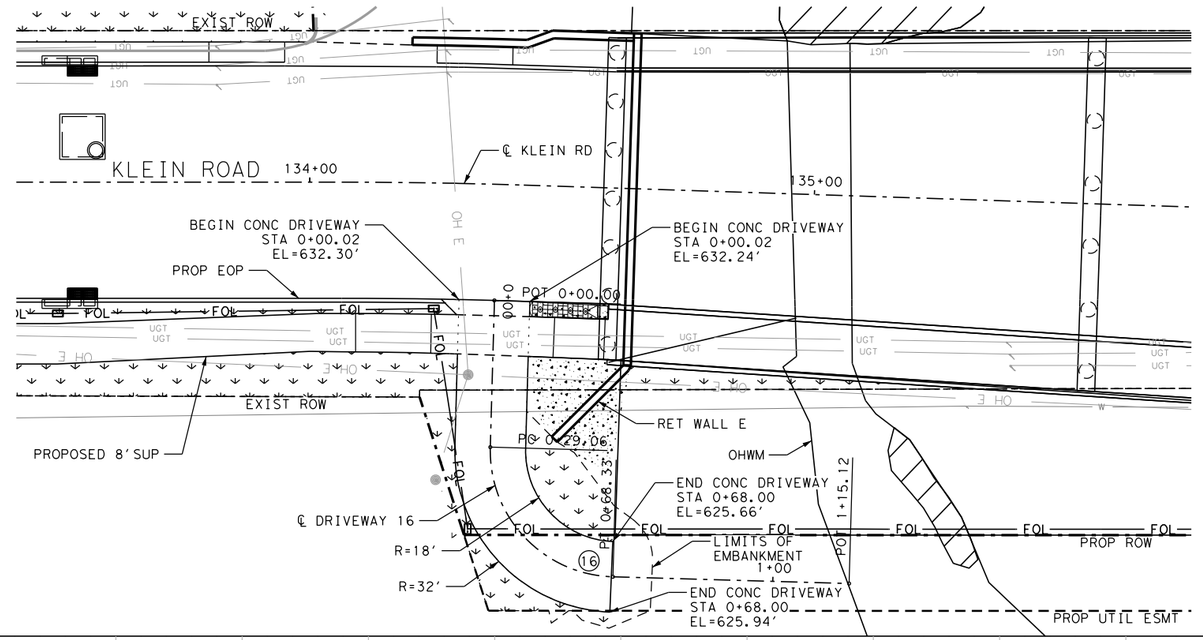

NOTES

1. SEE PAVEMENT MARKING SHEETS FOR STRIPING AND TRAFFIC FLOW DETAILS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK; i.e. FADED.
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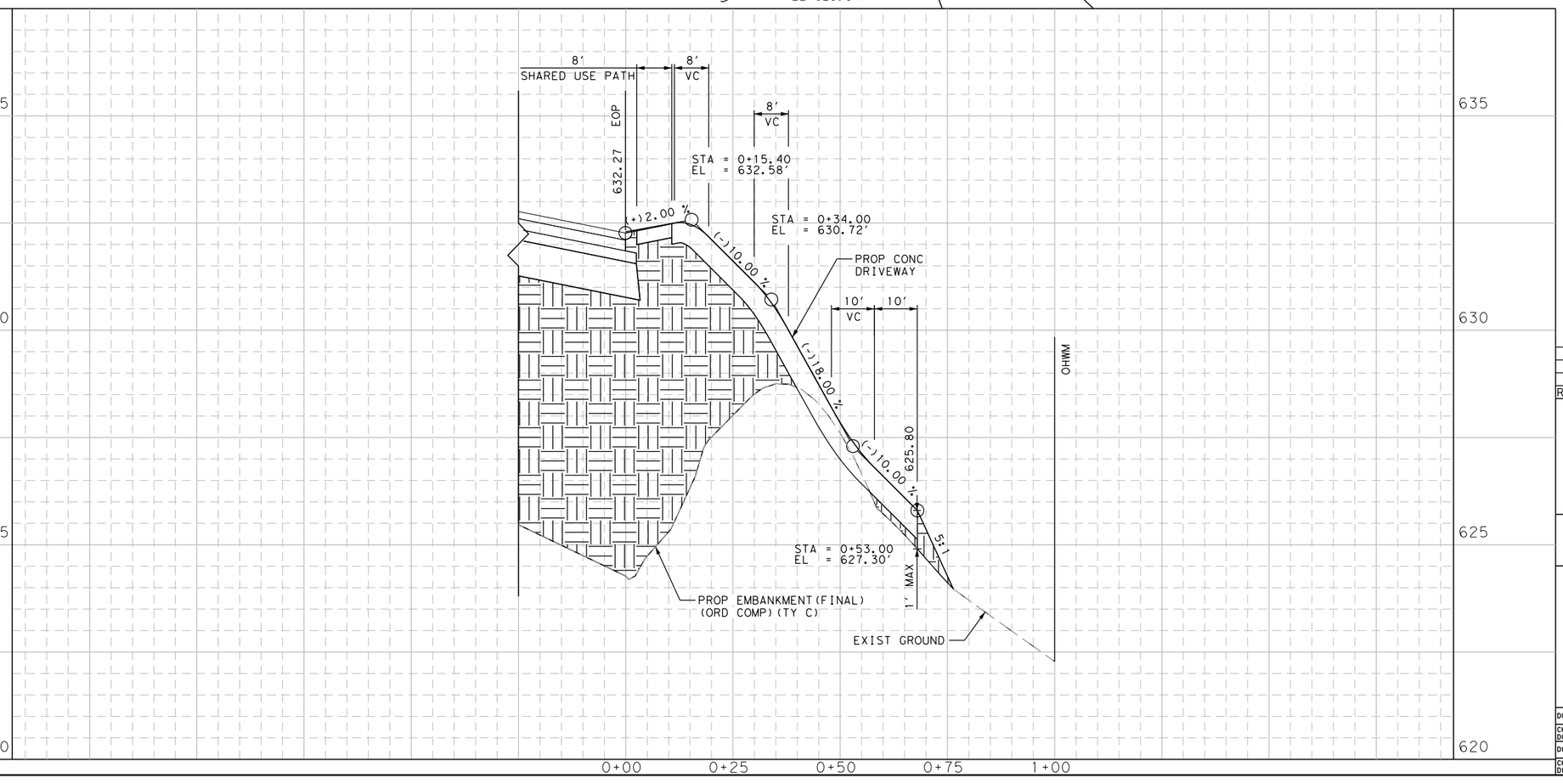
LEGEND OF FEATURES

- CURB INLET
- BLOCK SODDING
- TRAFFIC FLOW ARROW
- GROUND BOX
- PROPERTY BOUNDARY
- SWALE/GRADING
- FIELD INLET
- DRIVEWAY NO.
- 2~4" SCH 40 PVC
- WETLAND
- MANHOLE
- DROP INLET



DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/22/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":10'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DRIVEWAY 16 SPECIAL DETAIL

177 W KLEIN RD

SHEET 1 OF 1

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	163A

Plotted on: 4/22/2021

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Plotted on: 4/22/2021

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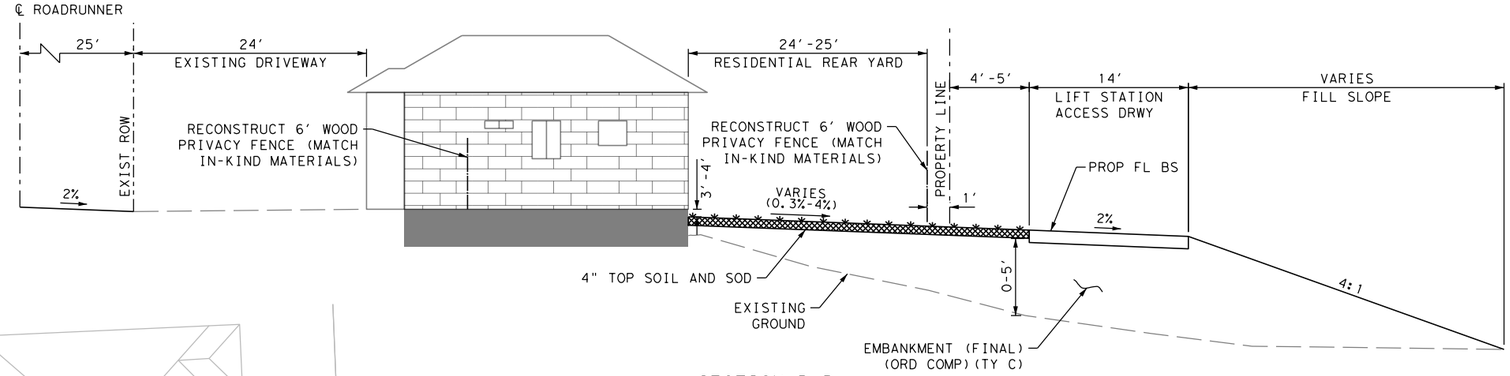
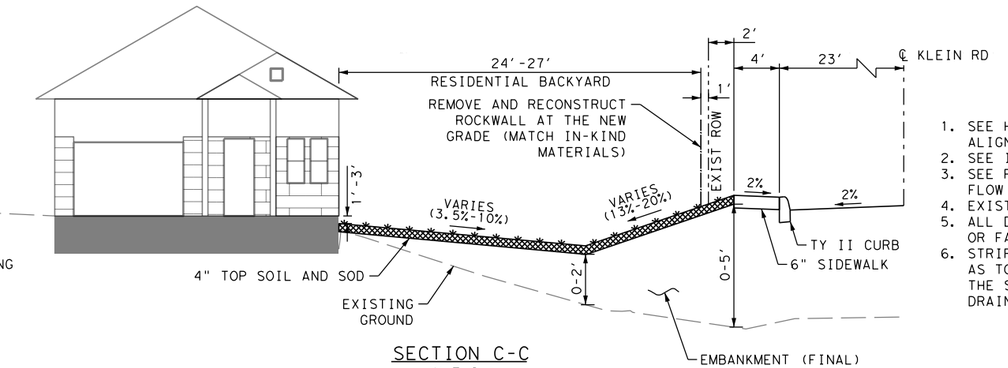
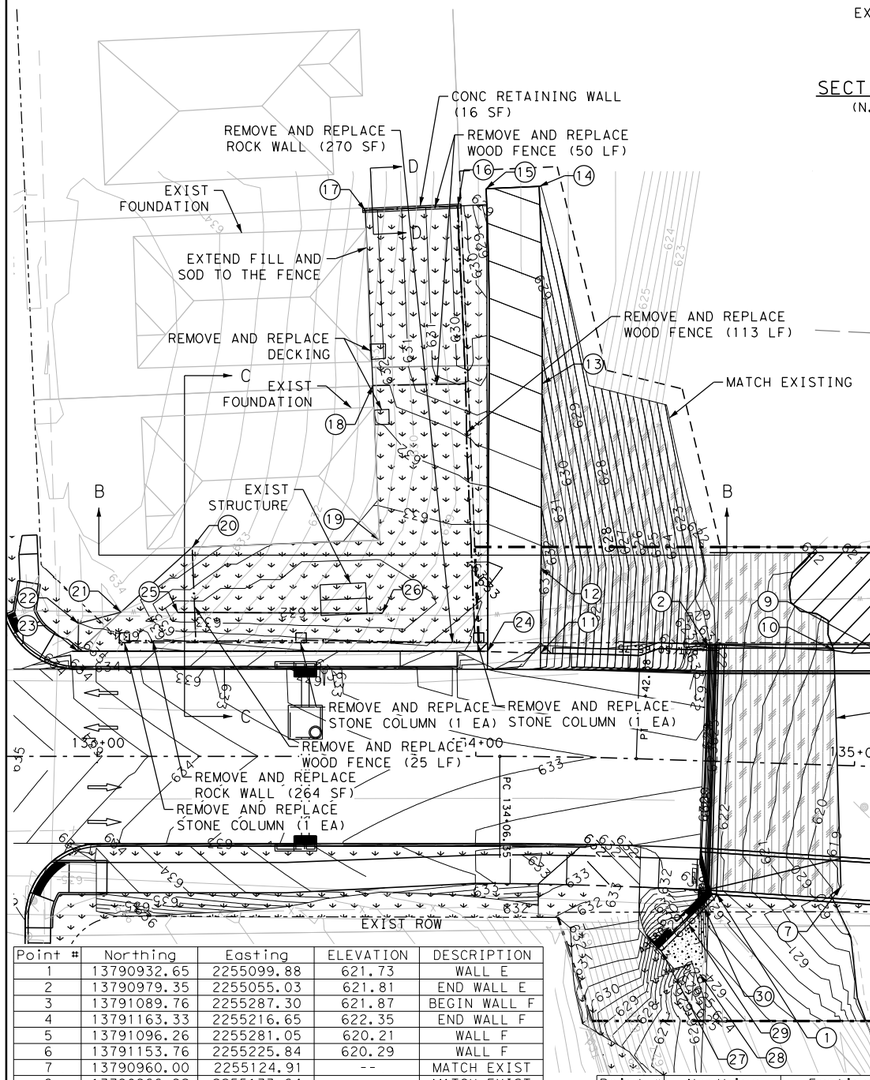


SECTION B-B
(N.T.S.)

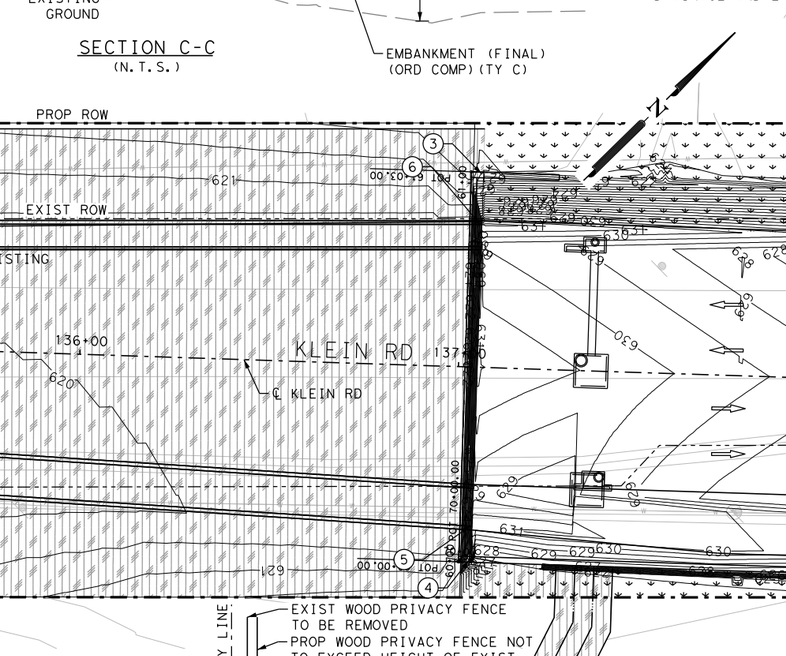


SECTION C-C
(N.T.S.)



Point #	Northing	Easting	ELEVATION	DESCRIPTION
1	13790932.65	2255099.88	621.73	WALL E
2	13790979.35	2255055.03	621.81	END WALL E
3	13791089.76	2255287.30	621.87	BEGIN WALL F
4	13791163.33	2255216.65	622.35	END WALL F
5	13791096.26	2255281.05	620.21	WALL F
6	13791153.76	2255225.84	620.29	WALL F
7	13790960.00	2255124.91	--	MATCH EXIST
8	13790966.92	2255133.64	--	MATCH EXIST
9	13791010.84	2255087.93	--	MATCH EXIST
10	13791002.28	2255078.94	--	MATCH EXIST
11	13790946.31	2255025.35	632.46	FL BS DRIVEWAY
12	13790962.10	2255009.35	632.8	FL BS DRIVEWAY
13	13790999.90	2254971.04	629.3	FL BS DRIVEWAY
14	13791032.08	2254936.84	627.76	MATCH EXIST
15	13791021.64	2254927.51	628.04	MATCH EXIST
16	13791018.83	2254930.64	628.25	MATCH EXIST
17	13790994.79	2254909.34	631.75	MATCH EXIST
18	13790967.14	2254940.27	631.75	EMBANKMENT
19	13790936.73	2254974.29	632.68	EMBANKMENT

Point #	Northing	Easting	ELEVATION	DESCRIPTION
20	13790899.98	2254941.1	633.73	MATCH EXIST
21	13790874.54	2254940.24	633.56	MATCH EXIST
22	13790864.47	2254934.56	634.01	MATCH EXIST
23	13790859.26	2254939.73	634.59	BACK OF SDWLK
24	13790936.65	2255015.2	632.61	FL BS DRIVEWAY
25	13790885.26	2254950.77	632	DITCH
26	13790923.8	2254988.61	632	DITCH
27	13790914.2	2255102.46	625.69	BEGIN WALL E
28	13790916.99	2255114.38	626.1	MATCH EXIST
29	13790924.28	2255103.83	623.8	OUTFALL A
30	13790930.28	2255103.76	623.8	OUTFALL A



SECTION D-D
(N.T.S.)

LEGEND

WETLAND AREA TO REMAIN UNDISTURBED

TEMP, PERM BROADCAST SEEDING &SOIL RETENTION BLANKET LIMITS

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT DATA.
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3. SEE PAVEMENT MARKING SHEETS FOR STRIPING AND TRAFFIC FLOW DETAILS.
4. EXISTING FEATURES ARE SHOWN SCREENED BACK; i.e. FADED.
5. ALL DIMENSIONS ARE TO EDGE OF PAVEMENT, CENTER OF MARKING OR FACE OF CURB AT THE GUTTER UNLESS OTHERWISE NOTED.
6. STRIPPING OF VEGETATION FROM PROJECT SITES SHALL BE PHASED SO AS TO EXPOSE THE MINIMUM AMOUNT OF AREA TO SOIL EROSION FOR THE SHORTEST POSSIBLE PERIOD OF TIME PER THE NEW BRAUNFELS DRAINAGE AND EROSION CONTROL DESIGN MANUAL SEC.12.2(N).

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/22/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/22/2021 DATE

0 20 40 60

SCALE: 1" = 40'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

CHANNEL GRADING LAYOUT

SHEET 1 OF 1

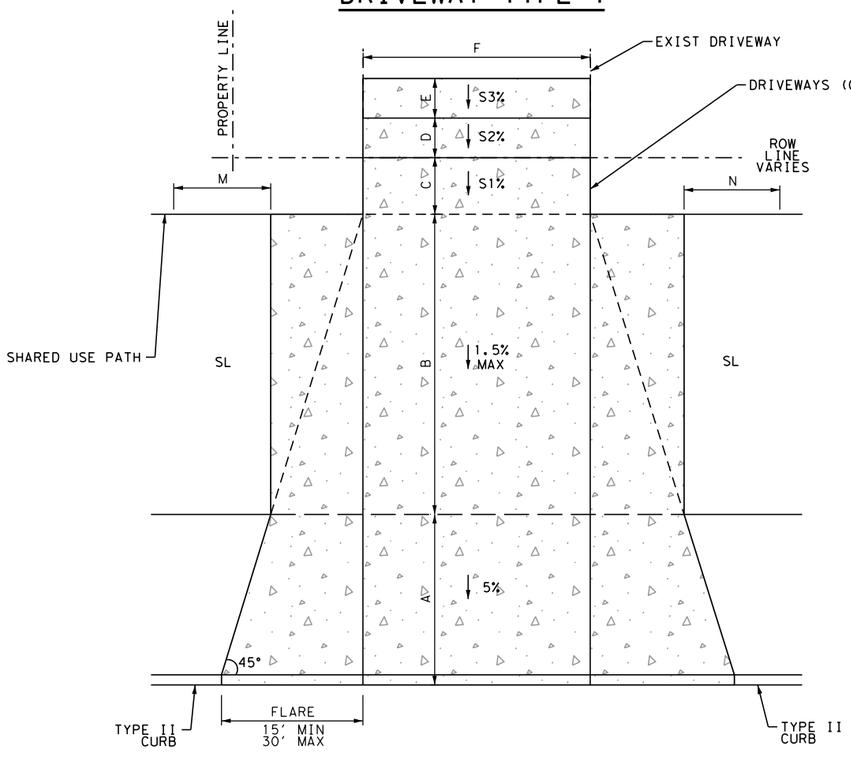
DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	164

DRIVEWAY NO.	DRIVEWAY TYPE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	S1	S2	S3	S4	S5	STA	RT/LT
1	2	-	-	-	-	-	-	6.00'	13.00'	-	ME	15.00'	15.00'	-	-	-	-	-	-13.50%	-	104+16.77	LT
2	2	-	-	-	-	-	-	6.00'	FL	-	ME	15.00'	15.00'	-	-	-	-	-	5.48%	-	108+53.39	LT
3	1	5.00'	10.00'	8.50'	8.50'	10.00'	ME	-	-	-	-	-	-	10.00'	10.00'	-5.00%	5.00%	8.19%	-	-	107+49.12	RT
4	1	5.00'	10.00'	10.00'	FL	-	ME	-	-	-	-	-	-	10.00'	10.00'	6.03%	-	-	-	-	111+74.11	RT
5	1	5.00'	10.00'	8.50'	8.50'	15.00'	ME	-	-	-	-	-	-	10.00'	10.00'	-5.00%	5.00%	7.55%	-	-	114+38.61	RT
6	1	5.00'	10.00'	8.50'	8.50'	10.00'	ME	-	-	-	-	-	-	10.00'	10.00'	-5.00%	5.00%	6.82%	-	-	114+68.20	RT
7	1	5.00'	10.00'	8.50'	8.50'	10.00'	ME	-	-	-	-	-	-	10.00'	5.00'	-5.00%	5.00%	4.75%	-	-	116+87.40	RT
8	2	-	-	-	-	-	-	5.75'	5.00'	-	ME	20.00'	10.00'	-	-	-	-	-	8.27%	-	124+55.08	LT
9	2	-	-	-	-	-	-	5.75'	5.00'	-	ME	20.00'	10.00'	-	-	-	-	-	6.18%	-	125+17.41	LT
10	2	-	-	-	-	-	-	5.75'	5.00'	-	ME	20.00'	10.00'	-	-	-	-	-	8.16%	-	126+81.84	LT
11	2	-	-	-	-	-	-	4.75'	21.00'	100.00'	ME	15.00'	15.00'	-	-	-	-	-	1.50%	-5.02%	134+10.00	LT
12	1	5.00'	10.00'	6.75'	-	-	ME	-	-	-	-			5.00'	20.00'	-2.37%	-	-	-	-	145+19.08	RT
13	2	-	-	-	-	-	-	6.75'	15.00'	-	ME	10.00'	30.00'	-	-	-	-	-	9.55%	-	148+42.06	LT
14	1	5.00'	10.00'	6.93'	-	-	ME	-	-	-	-	-	-	5.00'	15.00'	10.78%	-	-	-	-	149+21.96	RT
15	1	5.00'	10.00'	10.00'	-	-	ME	-	-	-	-	-	-	5.00'	30.00'	-8.27%	-	-	-	-	151+23.78	RT
16	SEE DRIVEWAY 16 SPECIAL DETAIL SHEET FOR DETAILS																					

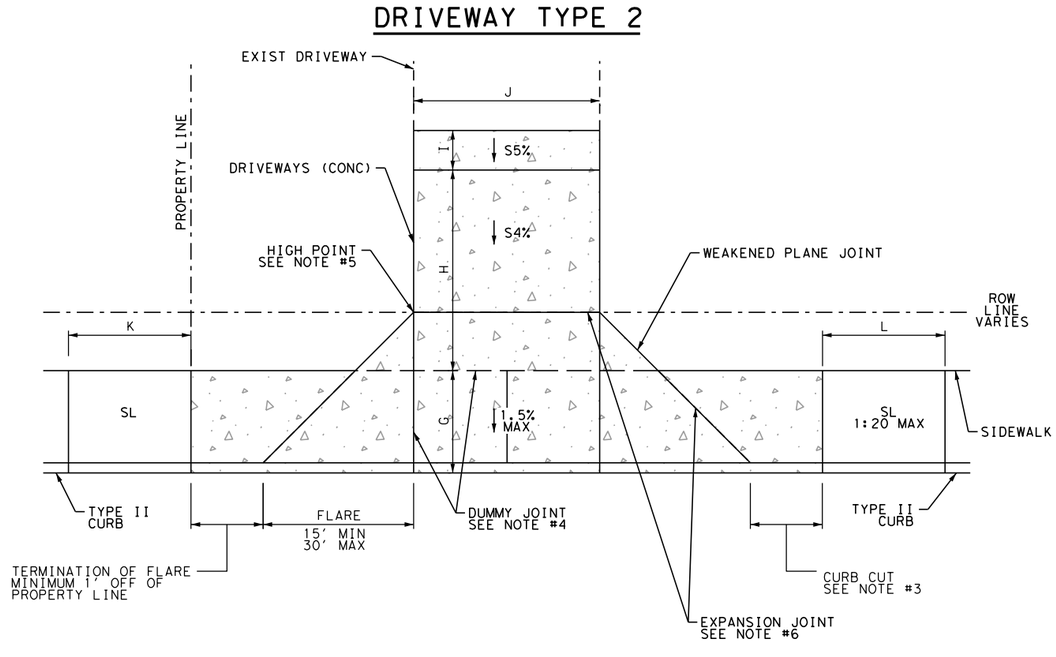
* ME = MATCH EXISTING DRIVEWAY WIDTH
** FL = EXTEND DRIVEWAY TO EXISTING FENCE LINE

NOTE
DRIVEWAY 11 TO BE CONSTRUCTED WITH CONCRETE UP TO ROW LINE AND CONTINUED WITH 6" FLEX BASE TO THE LIMIT OF CONSTRUCTION.

DRIVEWAY TYPE 1



DRIVEWAY TYPE 2



FLARE PLAN VIEW

NOTES:

1. SEE SHEET 166 FOR PLANAR ELEMENT DEFINITIONS AND GOVERNING SLOPES
2. SEE SPECIAL DETAILS SHEETS 168 AND 169 FOR ADDITIONAL DRIVEWAY DETAILS
3. CURB CUT LENGTH NO GREATER THAN REQUIRED TO MATCH SLOPE OF ADJACENT SIDEWALK
4. DUMMY JOINTS TO BE PROVIDED AT MINIMUM 4-FT. INTERVALS PERPENDICULAR TO THE CURB LINE WITHIN THE SIDEWALK AREA AND PARALLEL TO THE SIDEWALK AREA
5. PROVIDE A MINIMUM 7" HIGH POINT. HIGH POINT HEIGHT SHALL BE MEASURED FROM THE GUTTER FLOW LINE TO THE DRIVEWAY APRON. NOTE HIGH POINT MAY OCCUR OUTSIDE OF ROW.
6. PROVIDE EXPANSION JOINTS AT ALL SIDEWALK AND DRIVEWAY THROAT JOINTS. EXPANSION JOINTS SHALL BE PLACED USING 1/2" ASPHALTIC MATERIAL WITH 1/2" DOWELS 16" O.C.

LIMITS OF PAYMENT FOR CONCRETE DRIVEWAY

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/12/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/12/2021 DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

MISCELLANEOUS DRIVEWAY DETAILS

SHEET 1 OF 1

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	165

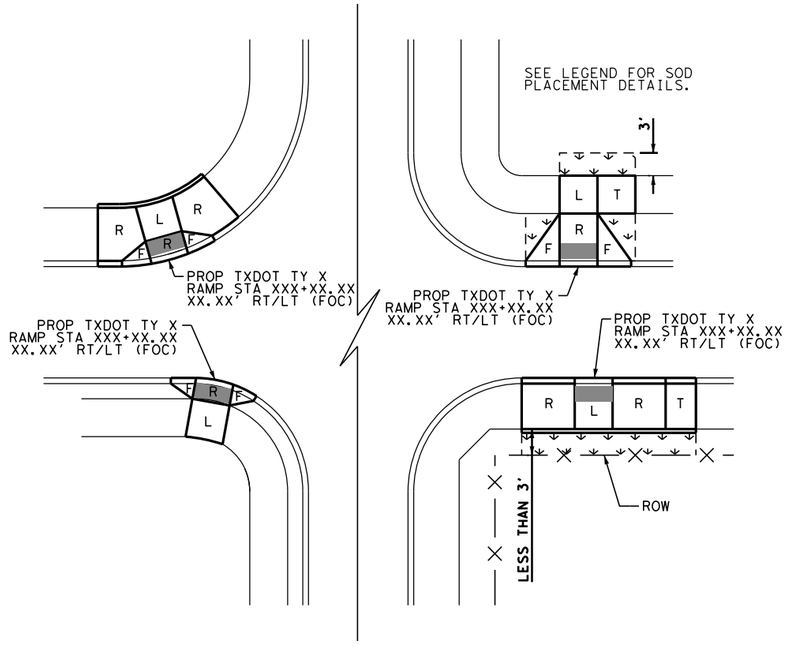
Plotted on: 4/12/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Roadway\Driveways\5103003_WKleinRd_Drwy_01.dgn

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\General\5103003_sample01.dgn

HORIZONTAL RAMP CONTROL

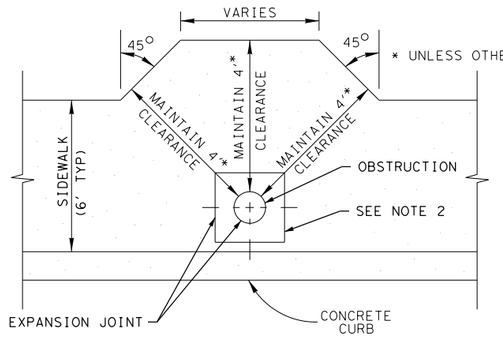


OBSTRUCTION CONFLICT

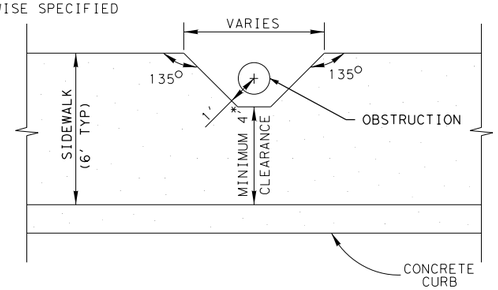
NOTES:

1. UTILIZE DETAIL AT OBSTRUCTION ENCROACHMENTS INTO THE PEDESTRIAN ACCESS ROUTE. A MINIMUM UNOBSTRUCTED CLEARANCE OF 4', UNLESS OTHERWISE SPECIFIED, SHOULD BE MAINTAINED AROUND THE OBSTRUCTION MEASURED FROM THE MOST RESTRICTIVE LOCATION OR AS APPROVED BY THE ENGINEER

2. IF OBSTRUCTION IS LOCATED WITHIN THE SIDEWALK, CONSTRUCT 2' SQUARE CONSTRUCTION JOINT CENTERED ON OBSTRUCTION TO FACILITATE FUTURE MAINTENANCE WITHOUT FULL SIDEWALK PANEL REMOVAL/REPLACEMENT



OBSTRUCTION IN SIDEWALK



OBSTRUCTION OUTSIDE SIDEWALK

LEGEND OF EXISTING FEATURES

- CABLE TV PEDESTAL
- CONTROL POINT
- ELECTRIC JUNCTION BOX
- ELECTRIC METER
- ELECTRIC SERVICE POLE
- FIRE HYDRYANT
- GAS VALVE/COVER
- GUY ANCHOR
- GUY POLE (DEADMAN)
- IRRIGATION CONTROL VALVE
- LIGHT POLE
- MAIL BOX
- MANHOLE-SANITARY SEWER
- MANHOLE-TELEPHONE
- MANHOLE-STORM DRAIN
- PULL BOX
- SIGN
- SPRINKLER HEAD
- TELEPHONE PEDESTAL
- TRAFFIC SIGNAL CONTROLLER
- TRAFFIC SIGNAL LIGHT
- TRANSFORMER
- TREE/BUSHES
- WATER METER
- WATER VALVE

PLANAR ELEMENT DEFINITIONS AND GOVERNING SLOPES

F = FLARE (10:1 OR LESS)

R = RAMP (CROSS SLOPE NOT TO EXCEED 48:1; LONGITUDINAL NOT TO EXCEED 12:1)

L = LANDING (SHALL NOT EXCEED 48:1 SLOPE IN ANY DIRECTION)

L1 = SHARED LANDING (SHALL NOT EXCEED 48:1 SLOPE IN ANY DIRECTION)

LS = LEVEL SIDEWALK (SHALL NOT EXCEED 48:1 SLOPE IN ANY DIRECTION)(PAID AS SIDEWALK)

SL = SLOPED SIDEWALK (LONGITUDINAL SLOPES MAY NOT EXCEED 20:1, CROSS SLOPES MAY NOT EXCEED 48:1)

T = TRANSITION (PAID FOR UNDER CONC SIDEWALKS)

TOC = TOP OF CURB

FOC = FACE OF CURB

↓ = BLOCK SOD: PLACED BEHIND CONSTRUCTION LIMITS NEIGHBORING ROW, PLACED FULL LIMITS BETWEEN BACK OF CURB AND CONSTRUCTION IF DIVORCED OR AS SHOWN ON THE PLANS

– × – = EXISTING FENCE

(NSPI) = ITEM IS INCIDENTAL TO CURB RAMP/SIDEWALK CONSTRUCTION. (NO SEPERATE PAY ITEM)

NOTES

1. FLARE (F), RAMP (R), AND LANDING (L), DIRECTLY IN CONTACT WITH THE CURB RAMP ARE PAID FOR UNDER ITEM 531 "CURB RAMPS"
2. LEVEL SIDEWALK (LS) AND RAMPS (R) NOT DIRECTLY IN CONTACT WITH THE CURB RAMP ARE PAID FOR UNDER ITEM 531 "SIDEWALK"

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

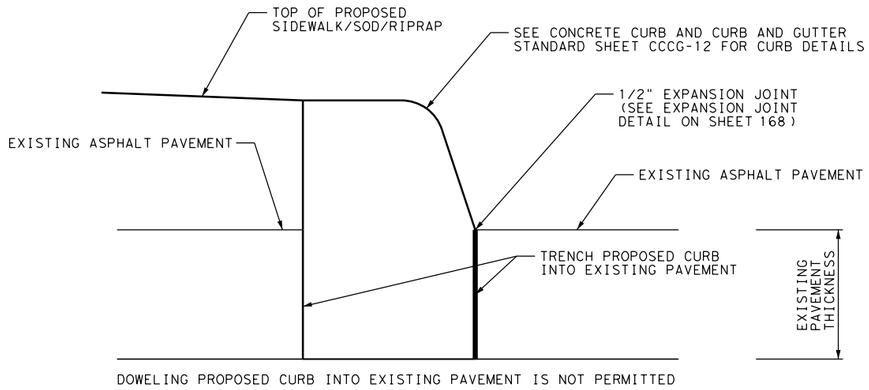
SPECIAL DETAILS

SHEET 1 OF 6

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	166

CURB TRENCH DETAIL

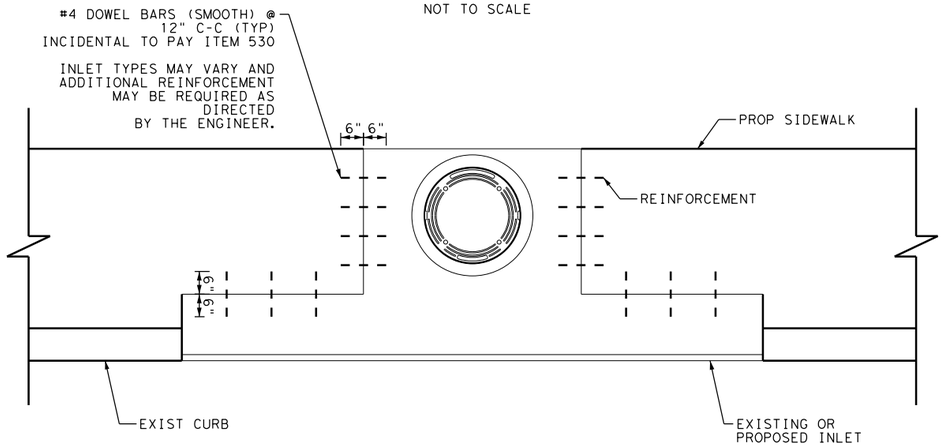
USE WHEN INSTALLING A CURB INTO EXISTING ASPHALT PAVEMENT



DOWELING PROPOSED CURB INTO EXISTING PAVEMENT IS NOT PERMITTED

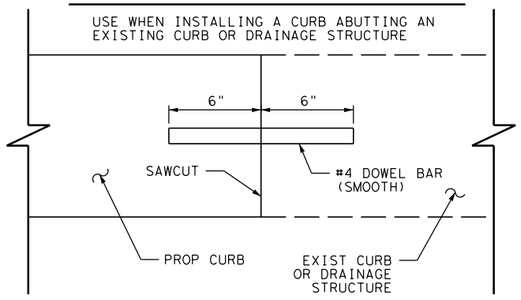
INLET DOWELING DETAIL

NOT TO SCALE

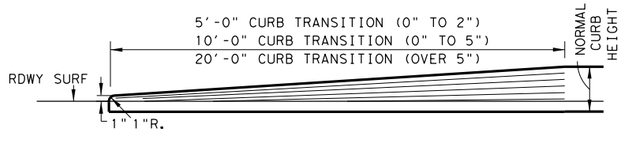


CURB TIE-IN DETAIL

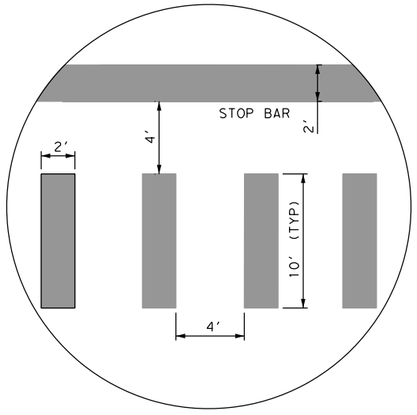
USE WHEN INSTALLING A CURB ABUTTING AN EXISTING CURB OR DRAINAGE STRUCTURE



TYPICAL TRANSITION FOR CONCRETE CURB ENDS



CROSSWALK DETAIL



NOT TO SCALE

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

SPECIAL DETAILS

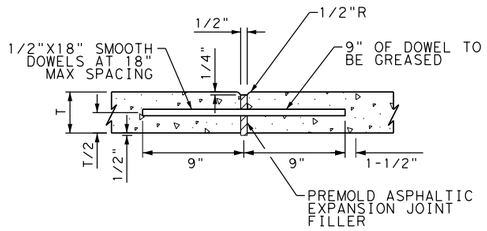
SHEET 2 OF 6

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	167

Plotted on: 1/21/2021

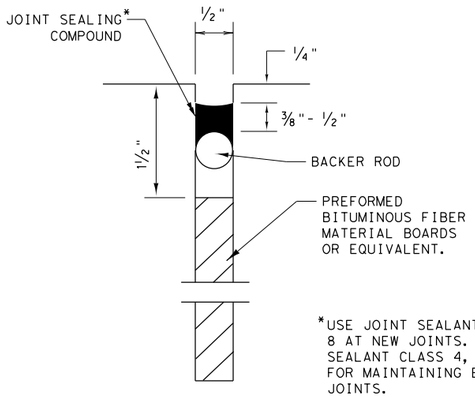
Design Filename: H:\Projects\510\30\03\Design\Civil\General\5103003_sample03.dgn

SIDEWALK EXPANSION JOINT DETAIL



NOTES:

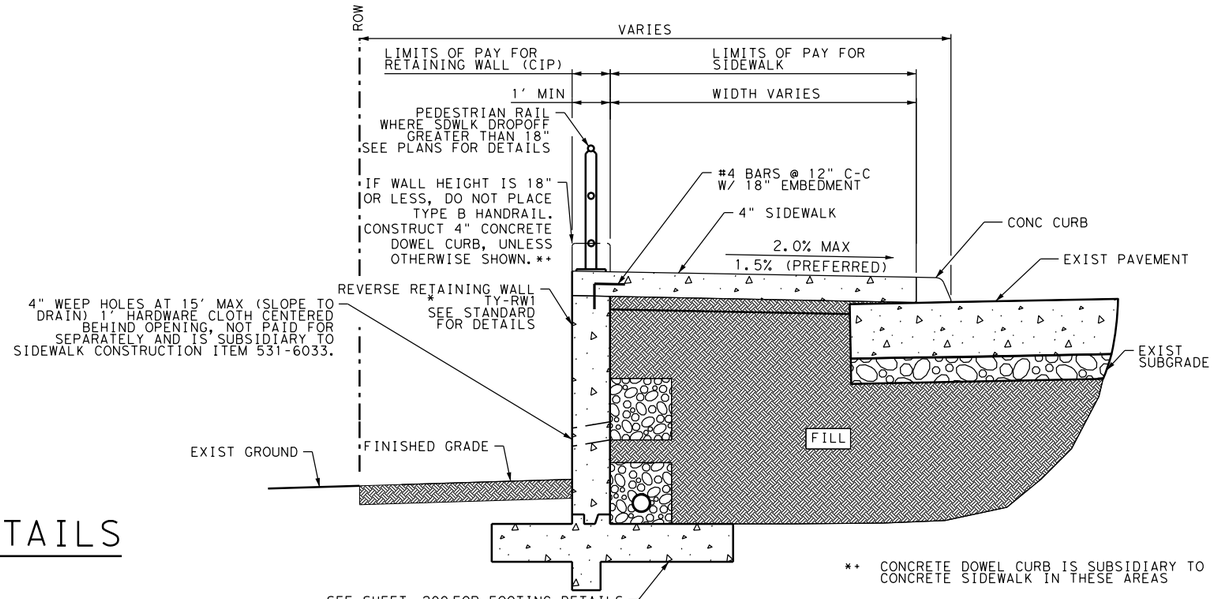
1. SIDEWALK EXPANSION JOINT DOWELS ARE CONSIDERED SUBSIDIARY TO ITEM 531.
2. EXPANSION JOINTS ARE TO BE USED BETWEEN CONCRETE DRIVEWAY AND SIDEWALK.



*USE JOINT SEALANT CLASS 5 OR 8 AT NEW JOINTS. USE JOINT SEALANT CLASS 4, 5, 7, OR 8 FOR MAINTAINING EXISTING JOINTS.

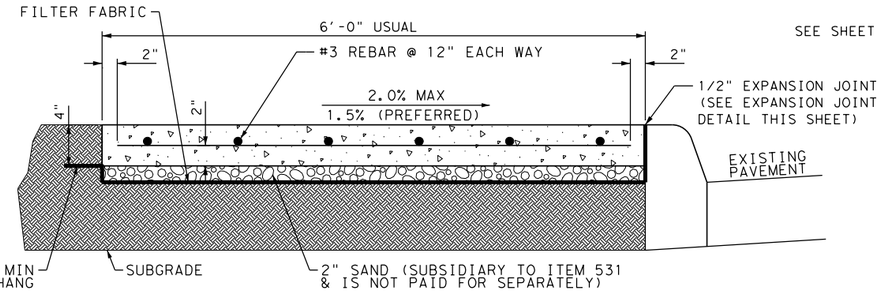
EXPANSION JOINT DETAIL

REVERSE RETAINING WALL DETAIL
RETAINING WALL (CAST-IN-PLACE)



*+ CONCRETE DOWEL CURB IS SUBSIDIARY TO CONCRETE SIDEWALK IN THESE AREAS

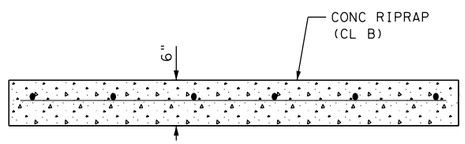
SIDEWALK DETAILS



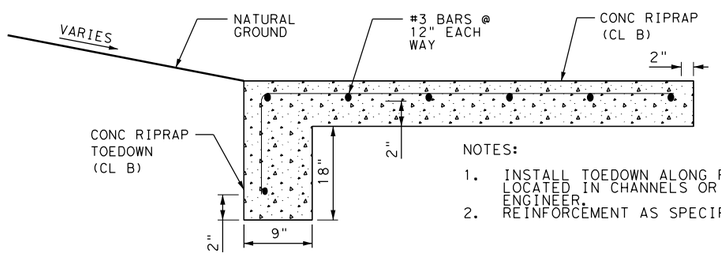
PLACE GROOVED JOINTS IN THE SIDEWALK AT A MAX SPACING OF 10 FT
PLACE 1/2" EXPANSION JOINTS AT A MAX SPACING OF 40 FT TO COINCIDE WITH THE CURB EXPANSION JOINTS (SEE SIDEWALK EXPANSION JOINT DETAIL).

* UNLESS OTHERWISE SHOWN

CONCRETE RIPRAP DETAIL



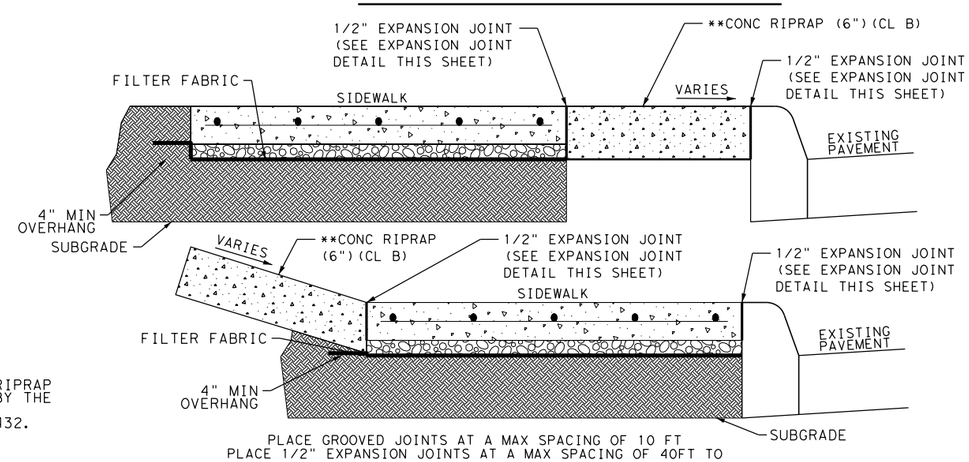
CONCRETE RIPRAP W/ TOEDOWN DETAIL



NOTES:

1. INSTALL TOEDOWN ALONG PERIMETER OF RIPRAP LOCATED IN CHANNELS OR AS DIRECTED BY THE ENGINEER.
2. REINFORCEMENT AS SPECIFIED IN ITEM 432.

RIPRAP JOINT DETAIL



PLACE GROOVED JOINTS AT A MAX SPACING OF 10 FT
PLACE 1/2" EXPANSION JOINTS AT A MAX SPACING OF 40FT TO COINCIDE WITH THE CURB EXPANSION JOINTS.

** REINFORCEMENT AS SPECIFIED IN ITEM 432

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

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JOHN A. TYLER, P.E. — 1/21/2021 DATE

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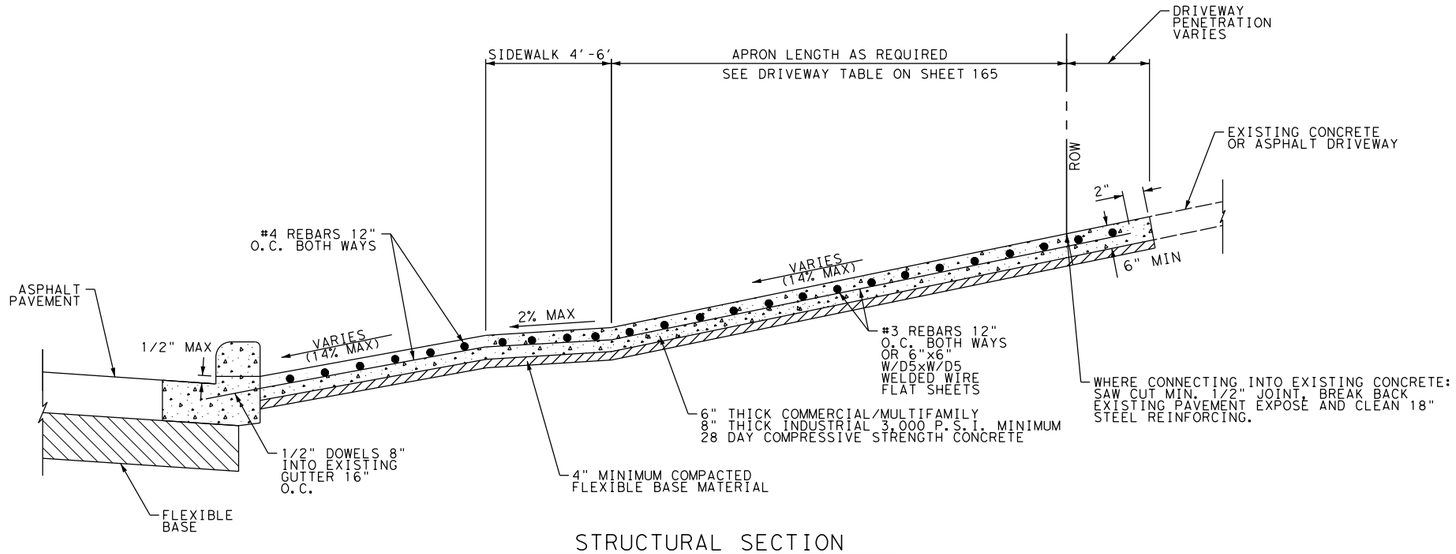
City of New Braunfels

KLEIN RD PHASE 2

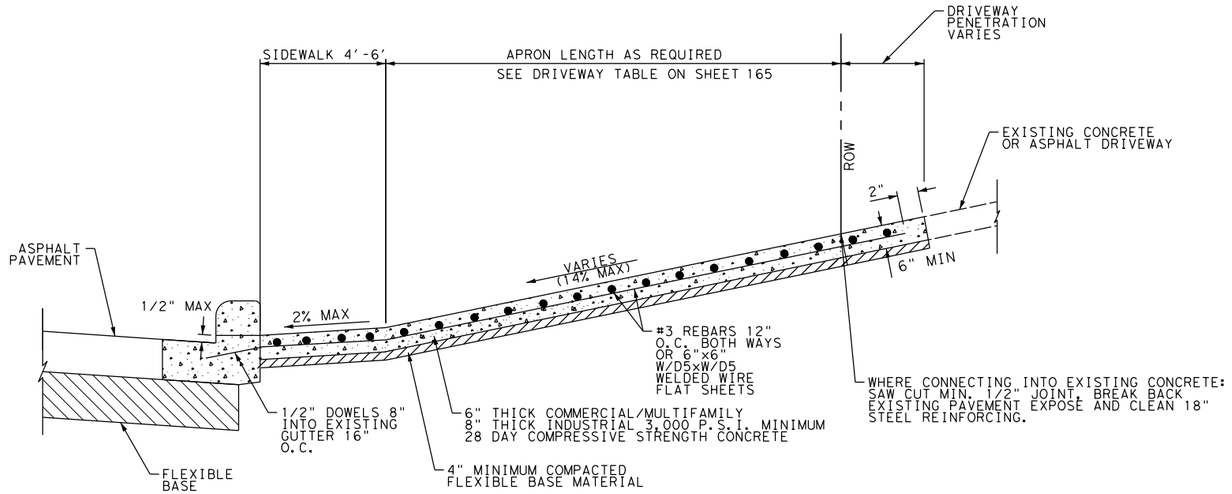
SPECIAL DETAILS

SHEET 3 OF 6

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	168



STRUCTURAL SECTION
SIDEWALK OFFSET FROM CURB



STRUCTURAL SECTION
SIDEWALK ADJACENT TO CURB

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

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PAPE-DAWSON ENGINEERS
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TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

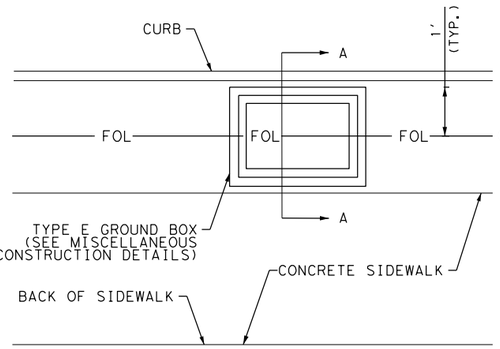
City of New Braunfels

KLEIN RD PHASE 2

SPECIAL DETAILS

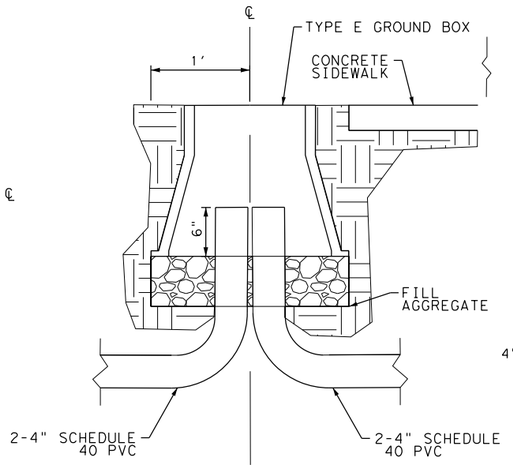
SHEET 4 OF 6

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	169

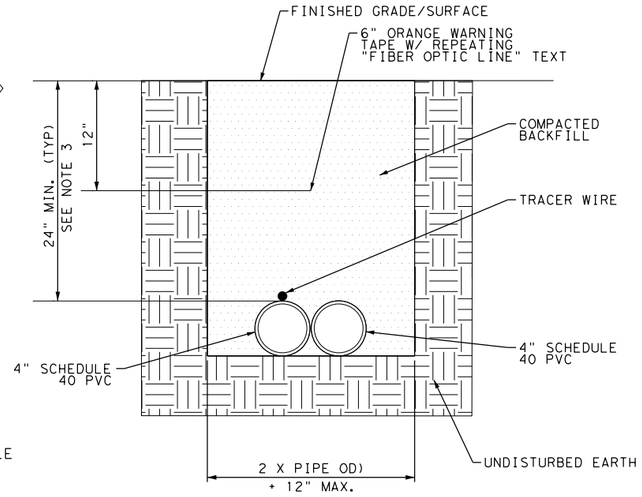


COMMUNICATIONS VAULT DETAIL

NOTE: SEE SHEET 172 FOR USE IN ALL LOCATIONS OUTSIDE FM 725 ROW



SECTION A-A



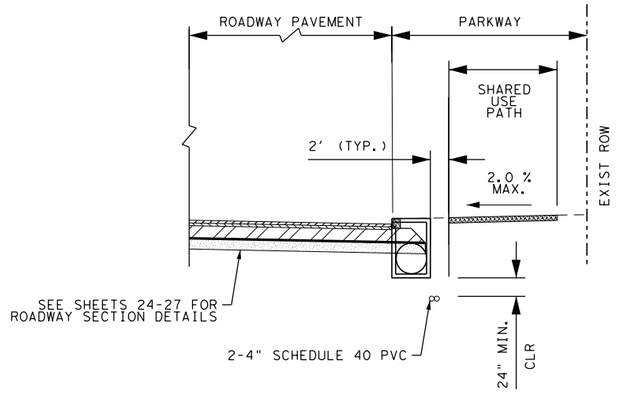
TYPICAL CONDUIT TRENCH DETAIL

NOTES:

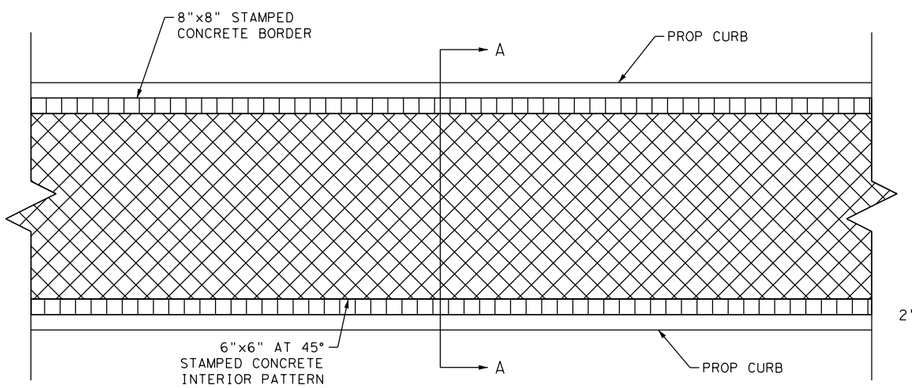
1. A 10 AWG INSULATED TRACER WIRE TO BE TAPED SECURELY TO THE TOP OF THE EMPTY 4" CONDUIT.

2. 4" CONDUIT WILL ENTER ALL VAULTS WITH A MINIMUM OF 6" EXPOSED ABOVE PEA GRAVEL

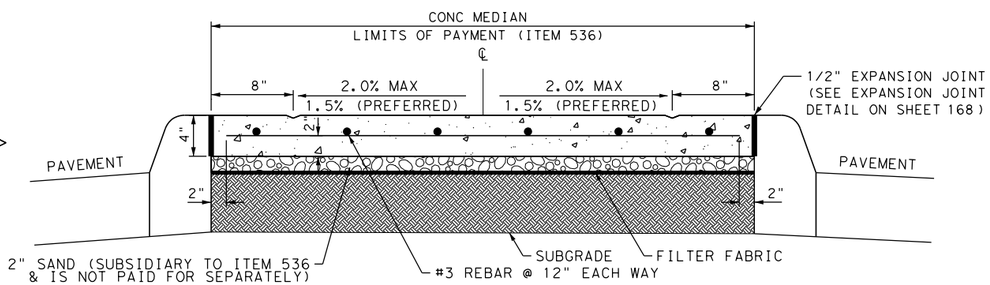
3. VERTICALLY DEFLECT CONDUIT FOR 24" MIN CLEARANCE BELOW PROPOSED DRAINAGE STRUCTURES



TYPICAL CONDUIT PLACEMENT AT PROPOSED DRAINAGE STRUCTURE



CONCRETE MEDIAN



SECTION A-A

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

SPECIAL DETAILS

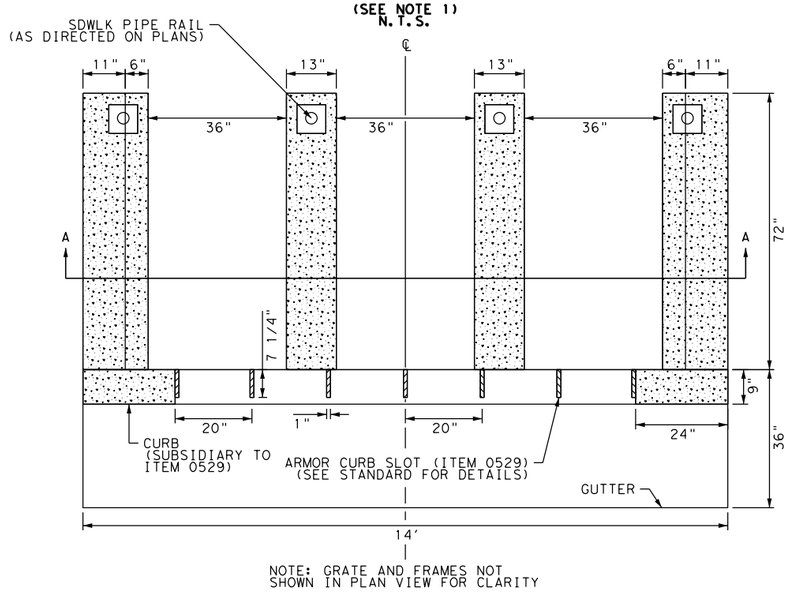
SHEET 5 OF 6

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	170

Plotted on: 1/21/2021

SIDEWALK (TYPE A) DETAIL

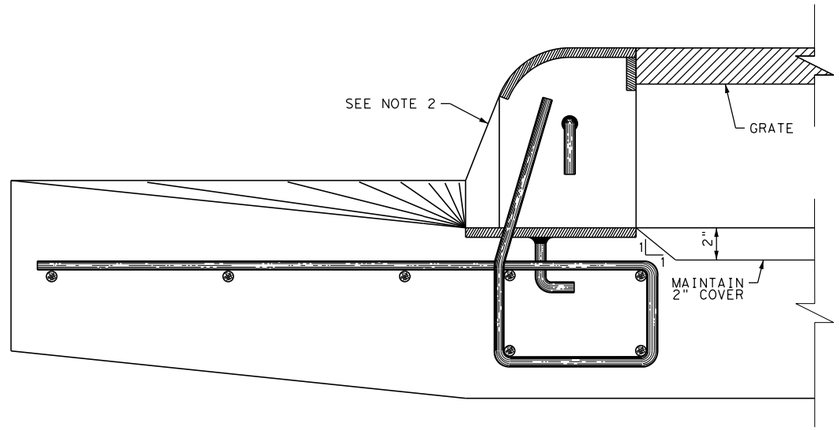
(SEE NOTE 1)
N.T.S.



NOTE: GRATE AND FRAMES NOT SHOWN IN PLAN VIEW FOR CLARITY

ARMOR CURB SLOT DETAIL

N.T.S.



NOTES:

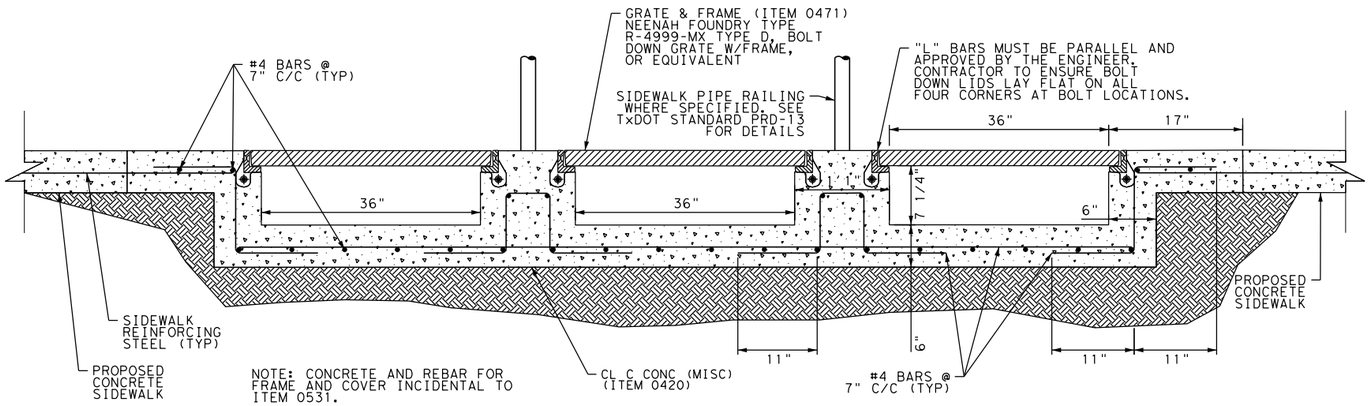
1) SIDEWALK (TY A) IS PAID SEPARATELY UNDER THE FOLLOWING PAY ITEMS UNLESS OTHERWISE SHOW:

   ITEM 0104-6029 REMOVING CONC (CURB OR CURB & GUTTER)
   ITEM 0471-6003 GRATE & FRAME
   ITEM 0529-6020 CONC CURB & GUTTER (ARMOR CURB)
   ITEM 0420-6074 CL C CONC (MISC)

2) SEE ARMOR CURB SLOT STANDARD FOR ADDITIONAL DETAILS

SECTION A-A

N.T.S.



NOTE: CONCRETE AND REBAR FOR FRAME AND COVER INCIDENTAL TO ITEM 0531.

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED · PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED · PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

SIDEWALK TYPE A SPECIAL DETAILS

SHEET 6 OF 6

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	171

Design Filename: H:\Projects\510\30\03\Design\Civil\General\5103003_sample06.dgn

Plotted on: 1/21/2021

FCA132418T-00006

FIBERGLASS / PCX POLYMER CONCRETE ASSEMBLY

13" x 24" x 18"
(For actual dimensions see drawing)

Fiberglass / Polymer Concrete Assembly, Tapered Sides, No Floor, WUC 3.6, ANSI/SCTE 77 - "T15/20K," 3/8" Hex Bolts, Standard Nameplate (Specify at time of order) Installed

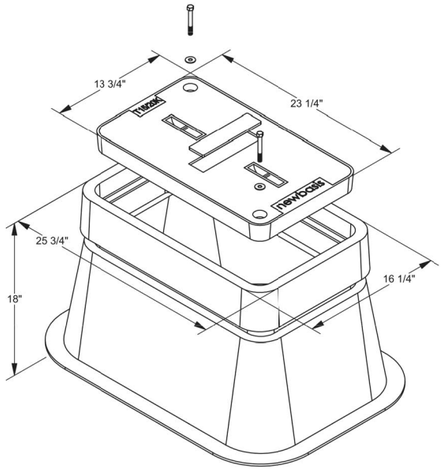
LOAD RATINGS
Incidental Traffic - Parking Lot, Sidewalk
Conforms to:
- WUC 3.6
- ASTM C 857
- ANSI/SCTE 77

FEATURES:
- USDA/RUS Approved
- Drop-In nameplate
- Shipped assembled
- Skid resistant cover
- Stainless steel bolts
- Cast-in floating nut box
  - Integral drain holes

Additional product information continued on the reverse

newbasis
Composites for Infrastructure
2626 Kansas Avenue
Riverside, California 92507
951.787.0600
951.787.0632 (fax)
info@newbasis.com
newbasis.com

GROUND BOX TY E (122317) W/APRON



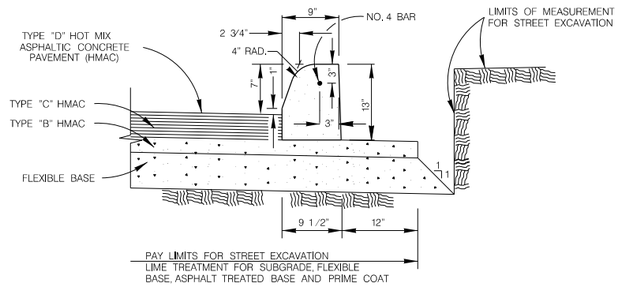
Inside Dimensions		
Length	Width	Depth
[redacted]	[redacted]	12"
29 1/2"	20"	

13" x 24" x 18" COMMUNICATIONS VAULT DETAIL

PCX POLYMER CONCRETE
The Next Generation

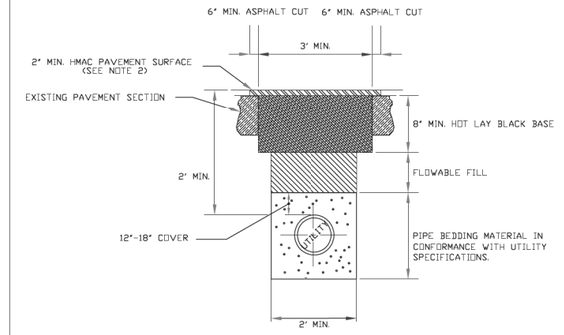
NOTES:

1. COMMUNICATIONS VAULT SHALL BE NEWBASIS 13"x24"x18" (TAPERED) OR APPROVED EQUAL
2. VAULT LID NAMEPLATE SHALL HAVE "CITY OF NEW BRAUNFELS FIBER OPTICS" IN RAISED LETTERS



CONCRETE CURB

REF. TXDOT ITEM 0529-6002 CONC CURB (TY II) ON FLEXIBLE BASE
SCALE : 1" = 2'

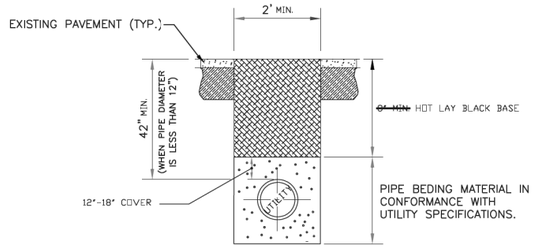


NOTES:
1. THE EXISTING PAVING SURFACE SHALL BE SAW CUT IN A STRAIGHT LINE AT A MINIMUM OF 12"WIDER THAN UNDISTURBED SIDES OF THE TRENCH SYMMETRICAL ABOUT THE CENTERLINE OF THE EXCAVATION.
2. REPLACEMENT HMAC SURFACE LAYER SHALL BE OF THE TYPE AND THICKNESS BASED ON FUNCTIONAL CLASSIFICATION.
   A) MIN. 2"HMAC TYPE "D"FOR TRENCH REPAIRS IN LOCAL/RESIDENTIAL STREETS.
   B) MIN. 3"HMAC TYPE "C"FOR TRENCH REPAIRS IN COLLECTOR/ARTERIAL STREETS.
3. DAMAGED PAVEMENT OUTSIDE THE TRENCH CUT SHALL BE REMOVED AND REPLACED
4. PRIME AND TACK COAT ALL EXPOSED EDGES AND SURFACES.
5. HOT LAY BLACK BASE LAYED IN 8"LIFTS @ 95% COMPACTION.
6. IF EXCAVATION AREA IS OPEN FOR TEMPORARY PUBLIC USE, THE SURFACE SHALL BE MAINTAINED LEVEL WITH ADJACENT RIDING SURFACE WITH COLD MIX AC OR TEMPORARY HMAC.
7. CALICHE OR EXISTING MATERIAL SHALL NOT BE USED TO BACKFILL THE UTILITY EXCAVATION.

TRENCH REPAIR DETAIL
OUTSIDE LIMITS OF OVERLAY (MODIFIED)

ISSUE DATE: APRIL 2015	SCALE: N.T.S
DRAWN BY: AMF	CONTACT: GF

CITY OF NEW BRAUNFELS
ENGINEERING DIVISION
424 S. CASTEL AVE.
NEW BRAUNFELS, TEXAS 78130
PHONE: 830.221.4020
FAX: 830.626.3600



NOTES:
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3. PRIME AND TACK COAT ALL EXPOSED EDGES AND SURFACES.
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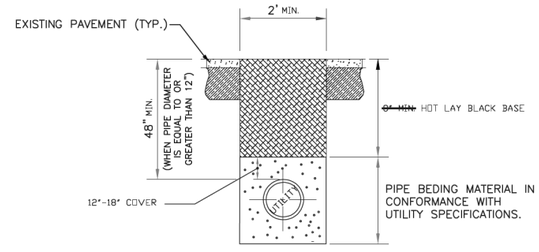
5. IF EXCAVATION AREA IS OPEN FOR TEMPORARY PUBLIC USE, THE SURFACE SHALL BE MAINTAINED LEVEL WITH ADJACENT RIDING SURFACE WITH COLD MIX AC OR TEMPORARY HMAC.
6. CALICHE OR EXISTING MATERIAL SHALL NOT BE USED TO BACKFILL THE UTILITY EXCAVATION
7. FOR EXCAVATIONS OF EXCESSIVE DEPTH, WIDTHS GREATER THAN 3' MAY BE REQUIRED TO ACHIEVE PROPER COMPACTION.

TRENCH REPAIR DETAIL
BLACK BASE
WITHIN LIMITS OF OVERLAY (MODIFIED)

ISSUE DATE: APRIL 2015	SCALE: N.T.S
DRAWN BY: AMF	CONTACT: GF

CITY OF NEW BRAUNFELS
ENGINEERING DIVISION
424 S. CASTEL AVE.
NEW BRAUNFELS, TEXAS 78130
PHONE: 830.221.4020
FAX: 830.626.3600



NOTES:
1. THE EXISTING PAVING SURFACE SHALL BE SAW CUT IN A STRAIGHT LINE AT A MINIMUM OF 12"WIDER THAN UNDISTURBED SIDES OF THE TRENCH SYMMETRICAL ABOUT THE CENTERLINE OF THE EXCAVATION.
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TRENCH REPAIR DETAIL
BLACK BASE
WITHIN LIMITS OF OVERLAY (MODIFIED)

ISSUE DATE: APRIL 2015	SCALE: N.T.S
DRAWN BY: AMF	CONTACT: GF

CITY OF NEW BRAUNFELS
ENGINEERING DIVISION
424 S. CASTEL AVE.
NEW BRAUNFELS, TEXAS 78130
PHONE: 830.221.4020
FAX: 830.626.3600

DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED
PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

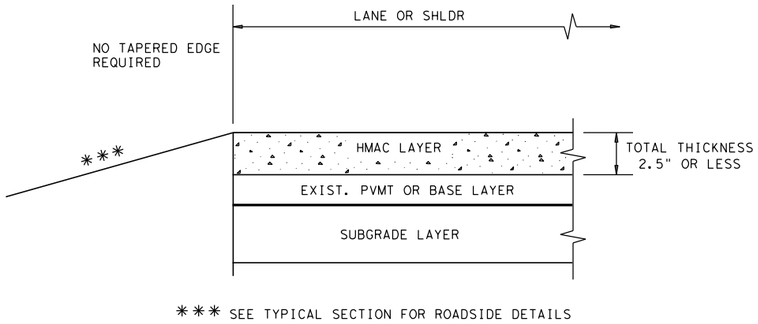
KLEIN RD PHASE 2

MISCELLANEOUS CONSTRUCTION DETAILS

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	172

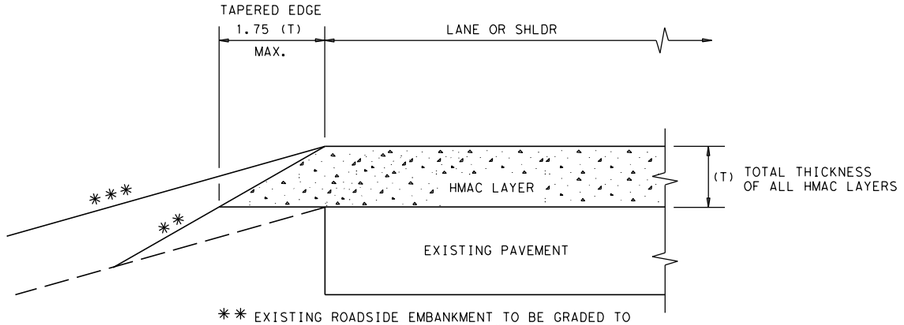
Design Filename: H:\Projects\5103\03\Design\Civil\Standards\Roadway\constrstds1.dgn

DATE: 1/21/2021
FILE: H:\projects\510\30\03\Design\Civil\Standards\Roadway\tehmac11.dgn



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

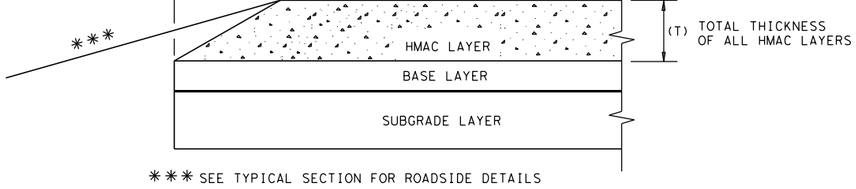
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY WITH THICKNESS OF 2.5" OR LESS



** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

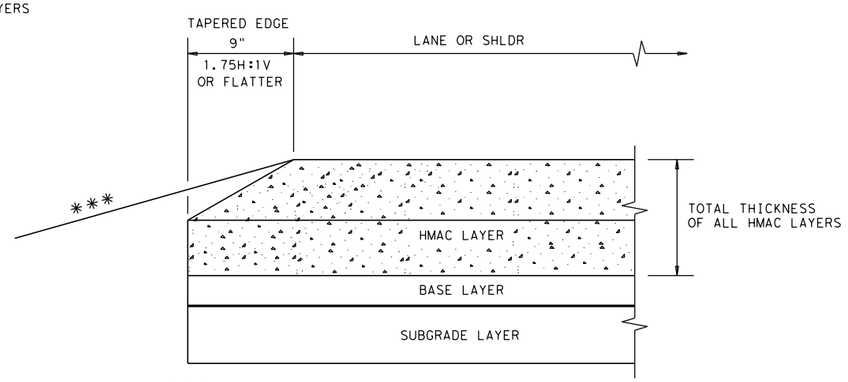
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 2
OVERLAY OF EXISTING PAVEMENT HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 3
NEW OR RECONSTRUCTED PAVEMENT HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 4
NEW OR RECONSTRUCTED PAVEMENT HMAC THICKNESS 5" OR GREATER

(NOT TO SCALE)

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

Texas Department of Transportation

Design Division Standard

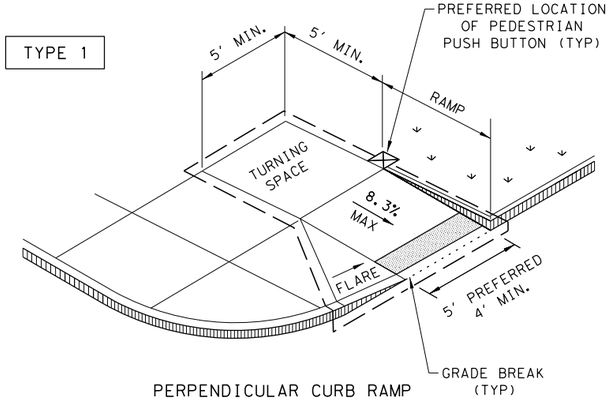
TAPERED EDGE DETAILS
HMAC PAVEMENT

TE(HMAC)-11

FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:
© TxDOT January 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		173

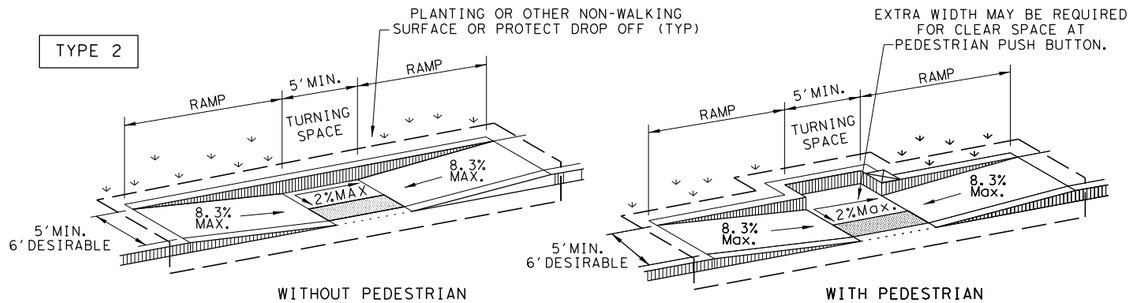
DATE: 1/21/2021
FILE: H:\Projects\510\30\03\Design\Civil\Standards\Roadway\ped18.dgn

TYPE 1



PERPENDICULAR CURB RAMP

TYPE 2

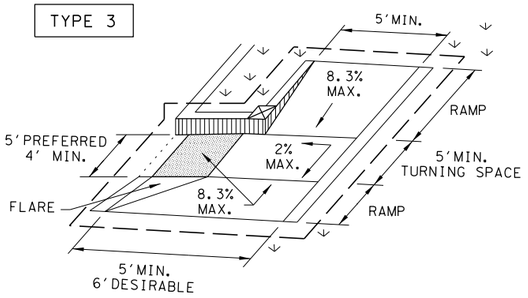


WITHOUT PEDESTRIAN PUSH BUTTON

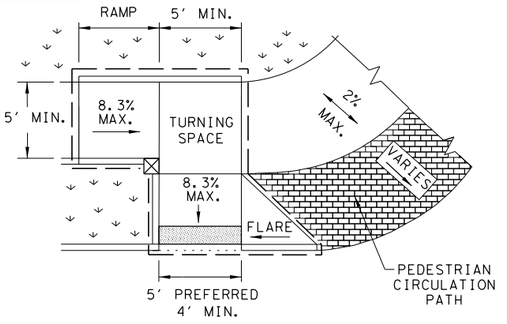
WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3

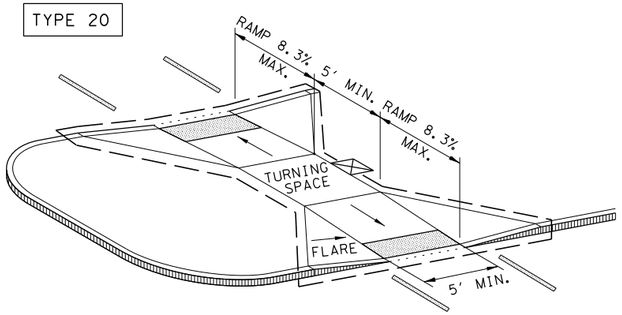


TYPE 6



COMBINATION CURB RAMPS

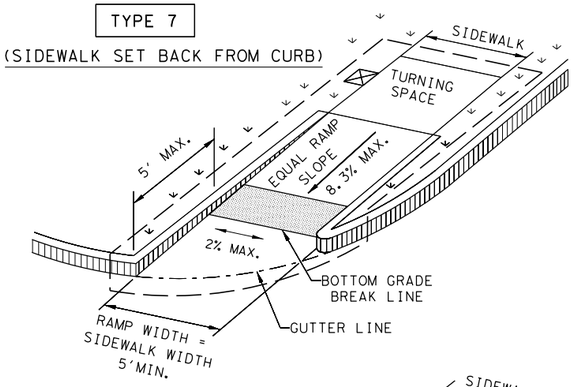
TYPE 20



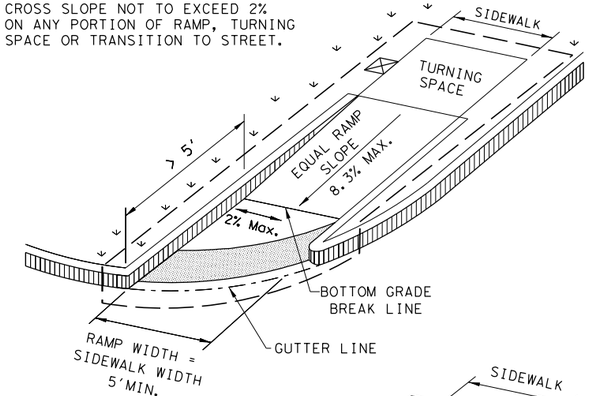
CURB RAMPS AT MEDIAN ISLANDS

TYPE 7

(SIDEWALK SET BACK FROM CURB)

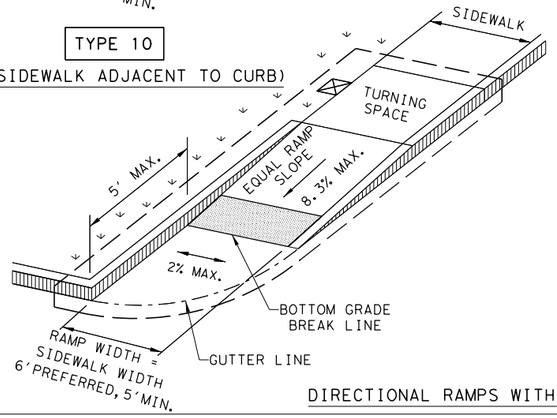


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.

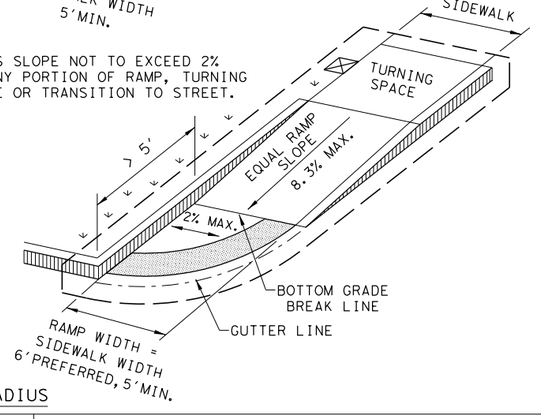


TYPE 10

(SIDEWALK ADJACENT TO CURB)

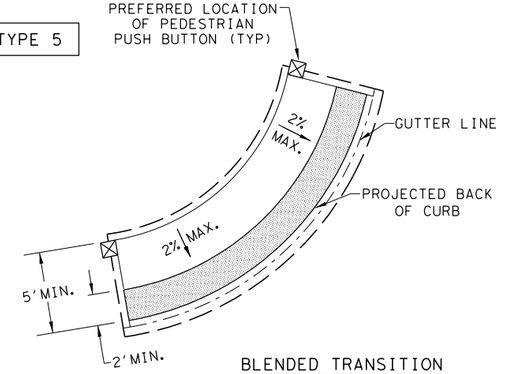


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

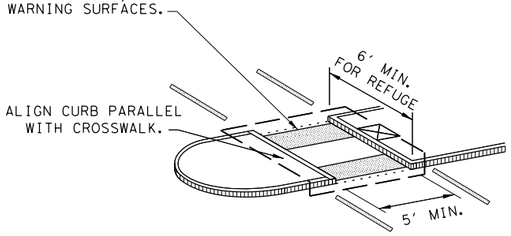
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

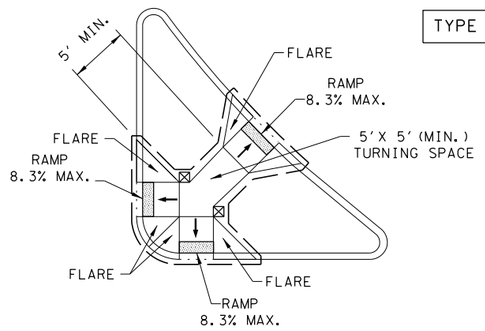
TYPE 21

INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 6' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.



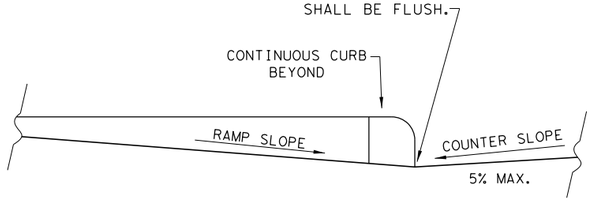
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS

BOTTOM GRADE BREAK OF CURB RAMP WILL NORMALLY BE AT GUTTER LINE. SURFACE SLOPES AT GRADE BREAKS SHALL BE FLUSH.



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

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.

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		174

DATE: 1/21/2021
FILE: H:\Projects\510\30\03\Design\Civil\Standards\Roadway\ped18.dgn

GENERAL NOTES

CURB RAMPS

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 applicalble 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.

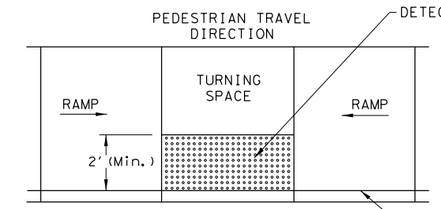
DETECTABLE WARNING PAVERS (IF USED)

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

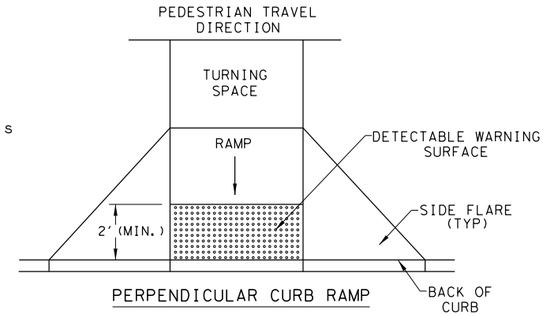
27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items 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.

DETECTABLE WARNING SURFACE DETAILS



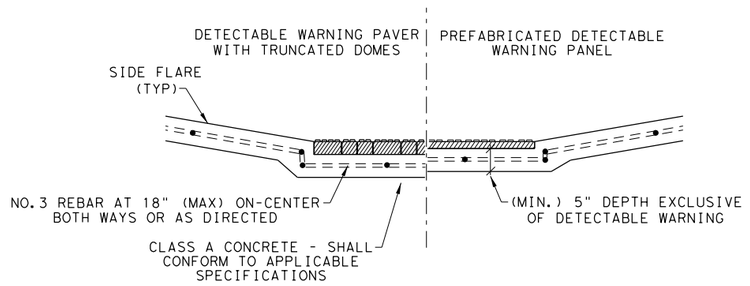
PARALLEL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.

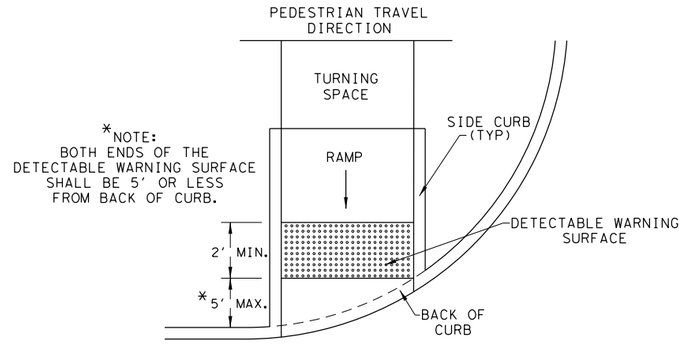


PERPENDICULAR CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS



DIRECTIONAL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG	
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY	
REVISIONS				KLEIN RD	
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.	
	SAT	GUADALUPE		175	

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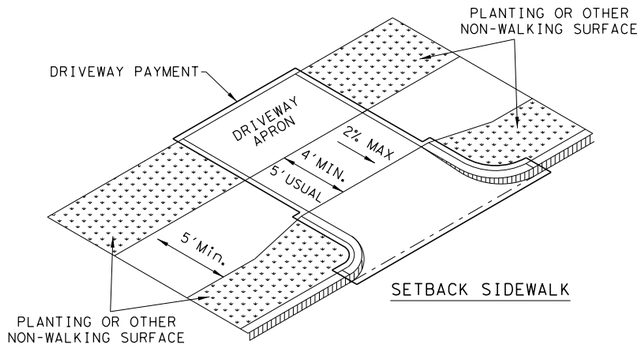
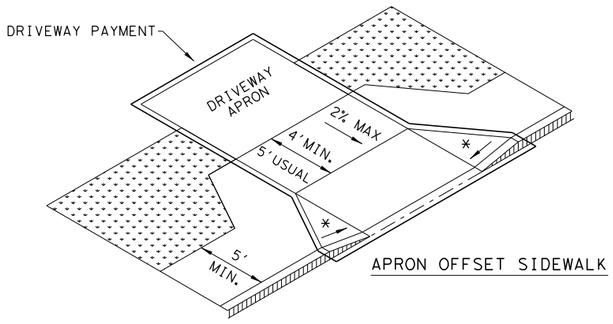
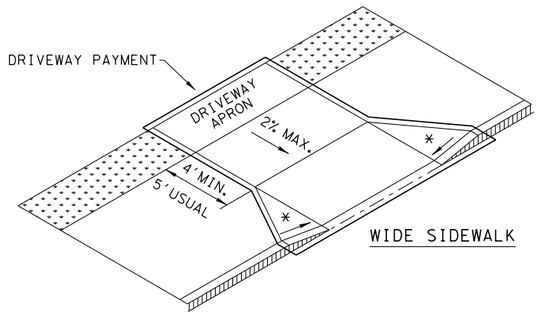
SIDEWALK TREATMENT AT DRIVEWAYS



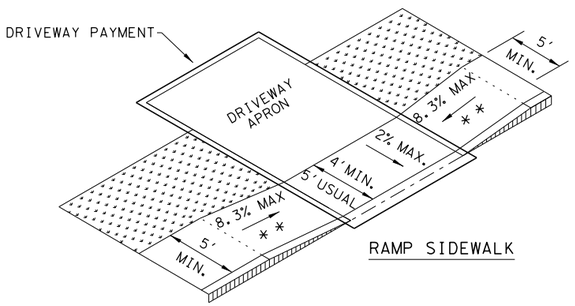
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

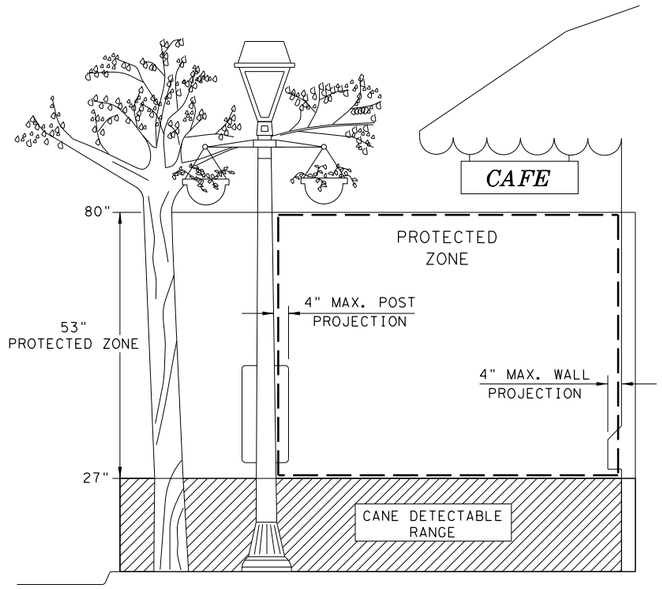


RAMP SIDEWALK

NOTES:

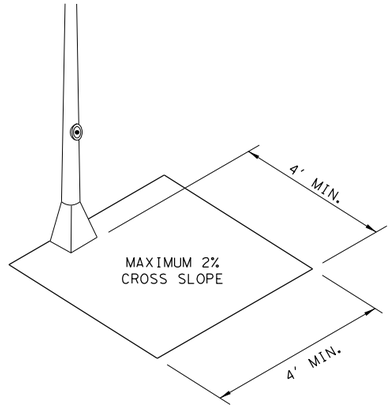
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.

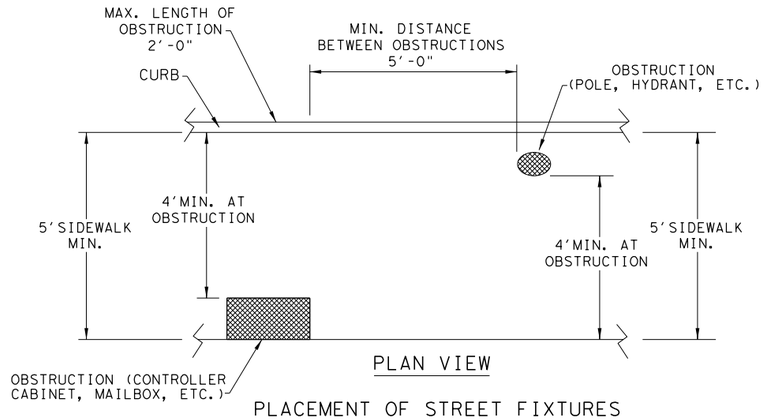


PROTECTED ZONE

NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



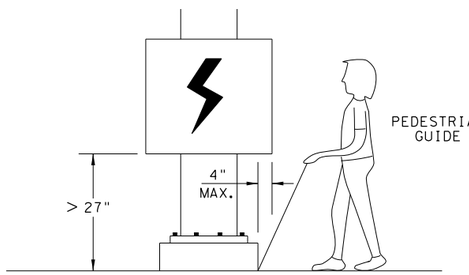
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



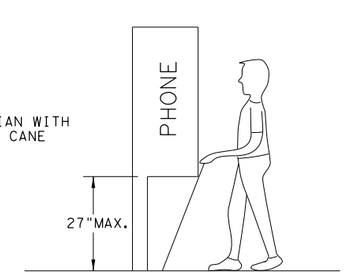
PLAN VIEW

PLACEMENT OF STREET FIXTURES

NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



WHEN AN OBSTRUCTION OF A HEIGHT GREATER THAN 27" FROM THE SURFACE WOULD CREATE A PROTRUSION OF MORE THAN 4" INTO THE PEDESTRIAN CIRCULATION AREA, CONSTRUCT ADDITIONAL CURB OR FOUNDATION AT THE BOTTOM TO PROVIDE A MAXIMUM 4" OVERHANG.



PROTRUDING OBJECTS OF A HEIGHT ≤ 27" ARE DETECTABLE BY CANE AND DO NOT REQUIRE ADDITIONAL TREATMENT.

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG	
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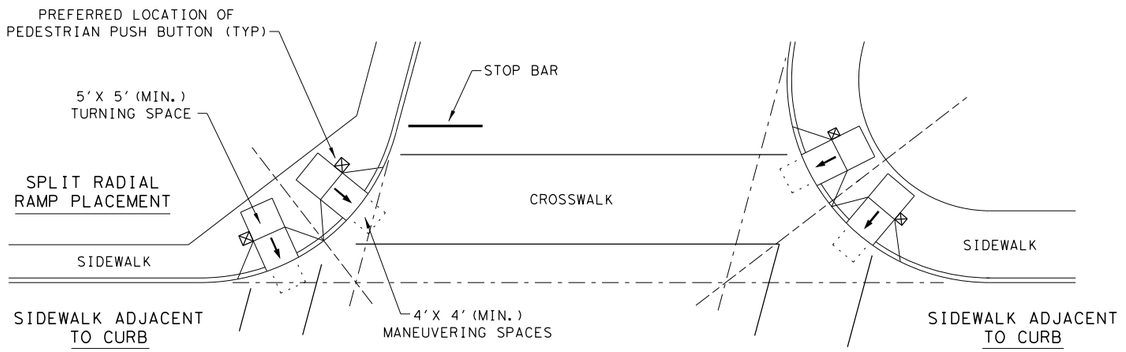
REVISIONS				KLEIN RD	
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.	
	SAT	GUADALUPE		176	

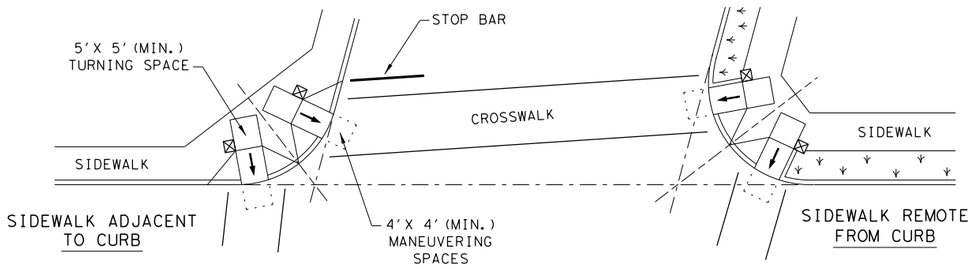
DATE: 1/21/2021
FILE: H:\Projects\510\30\03\Design\Civil\Standards\Roadway\ped18.dgn

TYPICAL CROSSING LAYOUTS

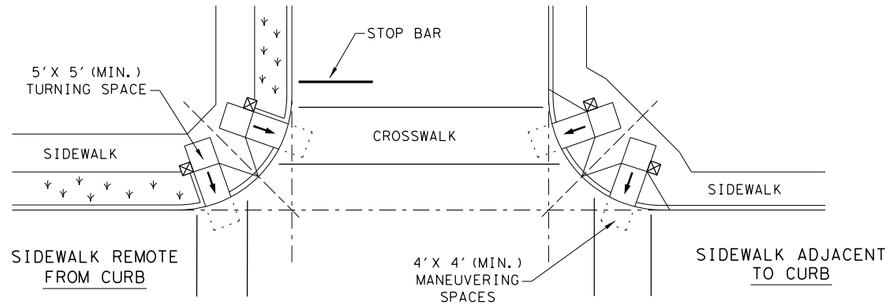
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



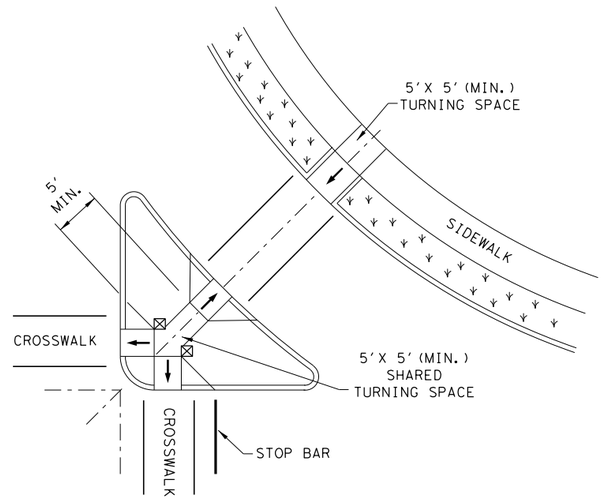
SKEWED INTERSECTION WITH "LARGE" RADIUS



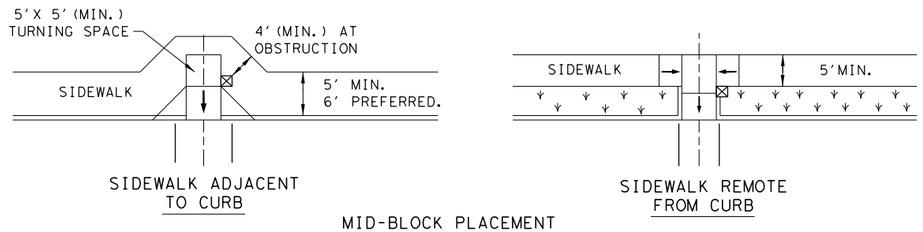
SKEWED INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

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

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES
CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
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REVISIONS					KLEIN RD
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY			SHEET NO.
	SAT	GUADALUPE			177

DATE: 1/21/2021
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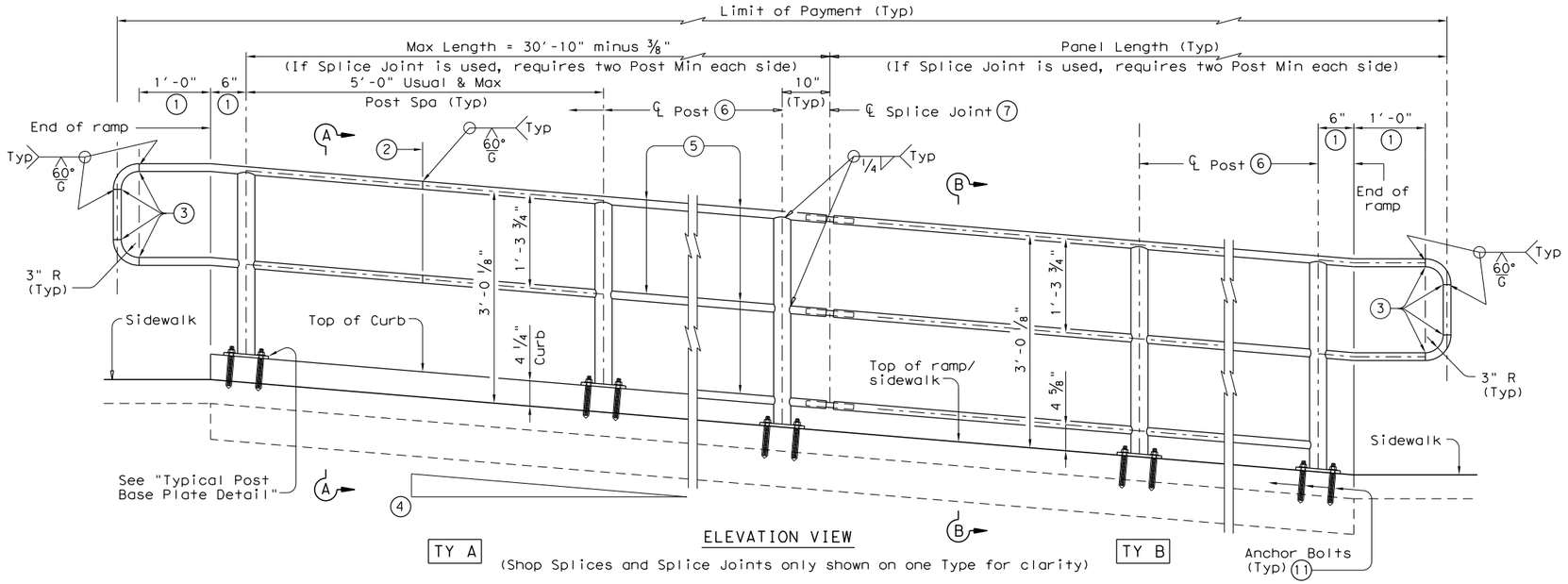
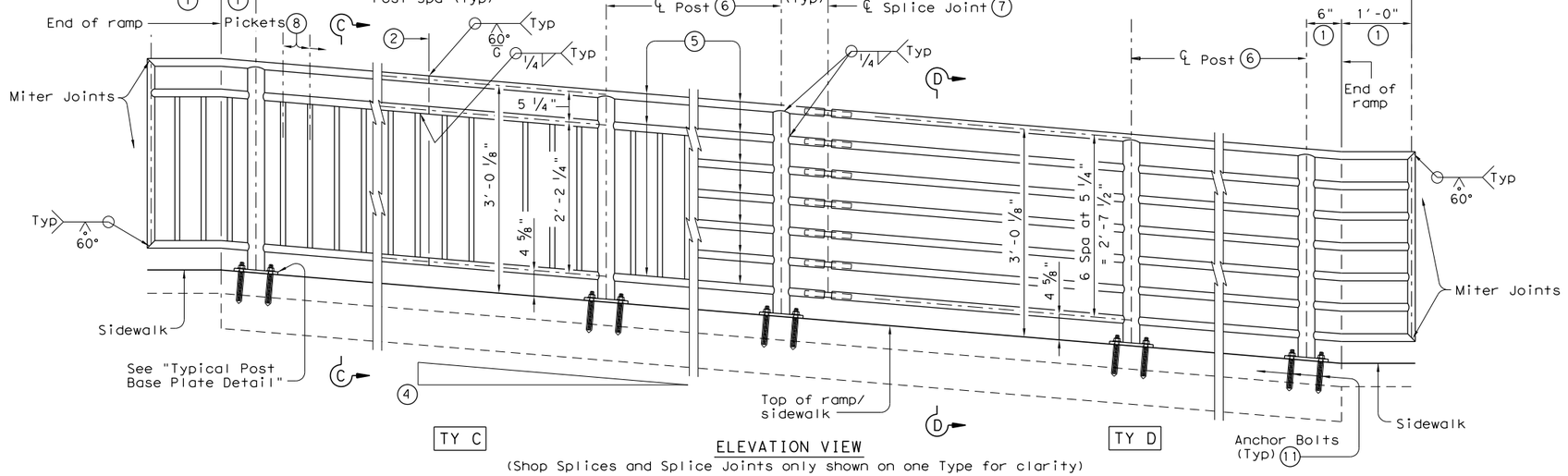


ELEVATION VIEW

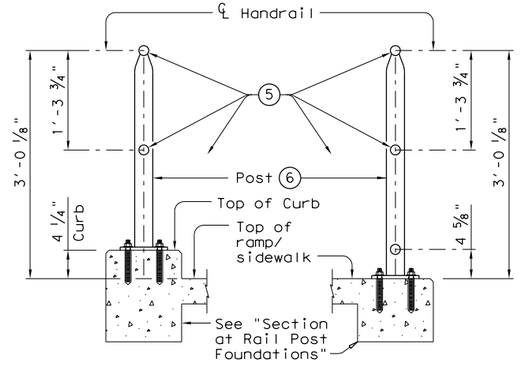
(Shop Splices and Splice Joints only shown on one Type for clarity)



ELEVATION VIEW

(Shop Splices and Splice Joints only shown on one Type for clarity)

RECOMMENDED USAGE (9)(10)	
Dropoff Height/ Condition	Recommended Rail Options
< 30" dropoff	TY A, TY B, TY C, or TY D
≥ 30" dropoff, or along Bike Path	TY E or TY F

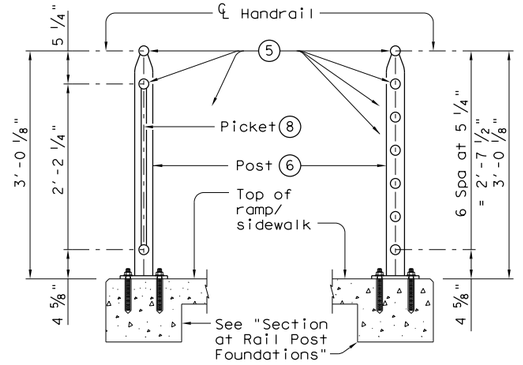


SECTION A-A

(Showing Handrail TY A)

SECTION B-B

(Showing Handrail TY B)



SECTION C-C

(Showing Handrail TY C)

SECTION D-D

(Showing Handrail TY D)

1. Parallel to ground.
2. One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
3. Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
4. See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.
5. 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.
6. 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting. Plumb all posts.
7. See "Handrail Fabrication Details" for Splice Joints.
8. ℄ ⅝" Dia. Round Bar equal spacing at 4 ½" Max. Plumb all pickets.
9. When needed for accessibility (grade > 5 percent) or as needed for pedestrian safety.
10. Not to be used on bridges.
11. See "General Notes" for anchor bolt information.

SHEET 1 OF 3

Texas Department of Transportation

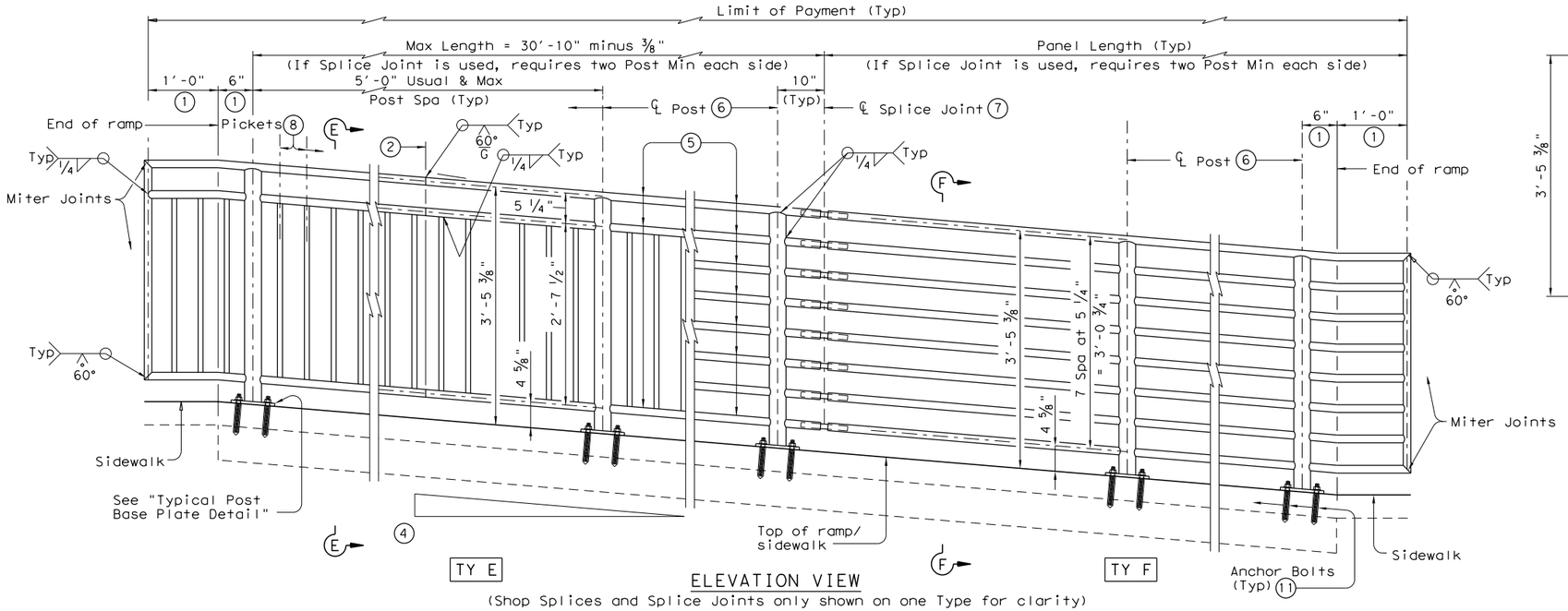
Design Division Standard

PEDESTRIAN HANDRAIL DETAILS

PRD-13

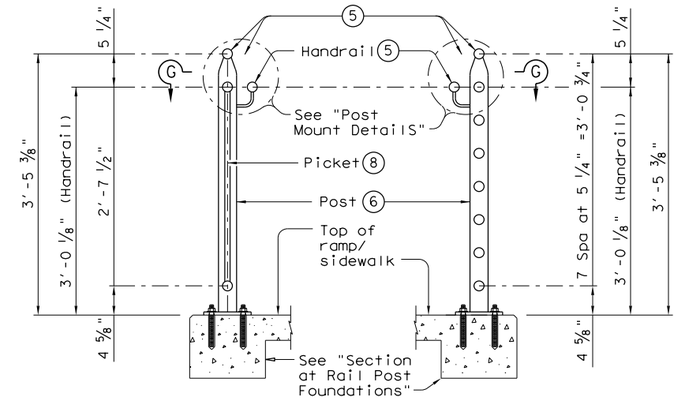
FILE: prd13.dgn	DN: TxDOT	CK: AM	DW: JTR	CK: CGL
©TxDOT Decmeber 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED MAY, 2013 (VP)				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		178

DATE: 1/21/2021
FILE: H:\Projects\510\30\03\Design\Civil\Standards\Roadway\prd13.dgn



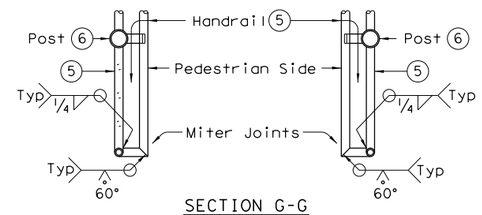
ELEVATION VIEW

(Shop Splices and Splice Joints only shown on one Type for clarity)

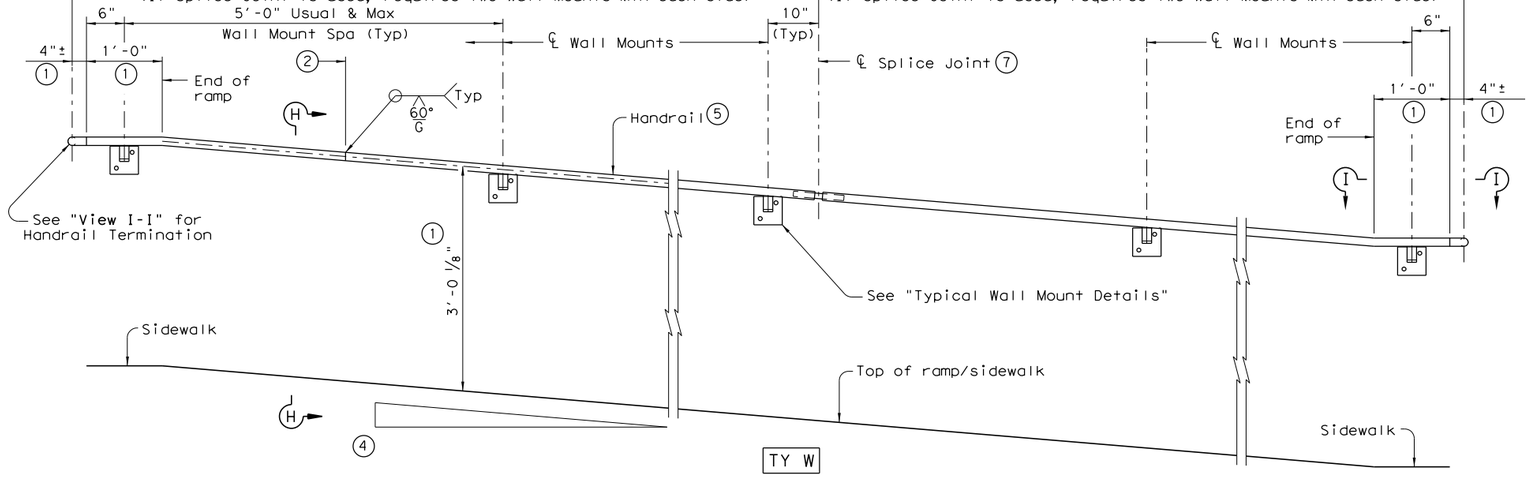


SECTION E-E
(Showing Handrail TY E)

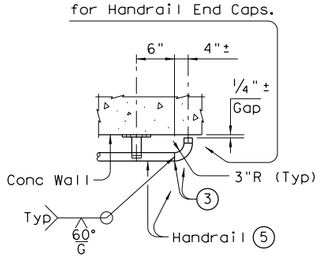
SECTION F-F
(Showing Handrail TY F)



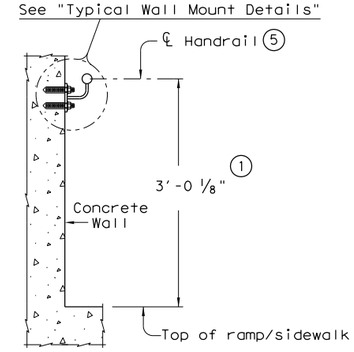
SECTION G-G
(Showing Handrail Termination)



ELEVATION VIEW



VIEW I-I
(Showing Handrail Termination)



SECTION H-H
(Showing Handrail TY W)

1. Parallel to ground.
2. One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
3. Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
4. See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.
5. 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.
6. 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting. Plumb all posts.
7. See "Handrail Fabrication Details" for Splice Joints.
8. ℄ ⅝" Dia. Round Bar equal spacing at 4 ½" Max. Plumb all pickets.
11. See "General Notes" for anchor bolt information.

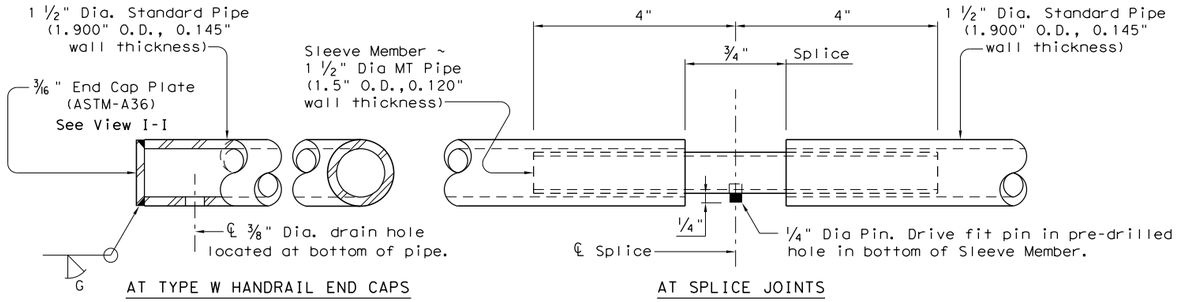
Texas Department of Transportation — Design Division Standard

PEDESTRIAN HANDRAIL DETAILS

PRD-13

FILE: prd13.dgn	DN: TxDOT	CK: AM	DW: JTR	CK: CGL
©TxDOT December 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED MAY, 2013 (VP)				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		179

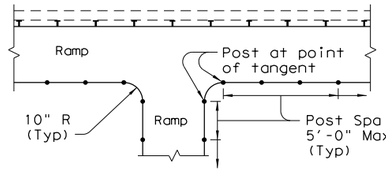
DATE: 1/21/2021
FILE: H:\Projects\510\30\03\Design\Civil\Standards\Roadway\prd13.dgn



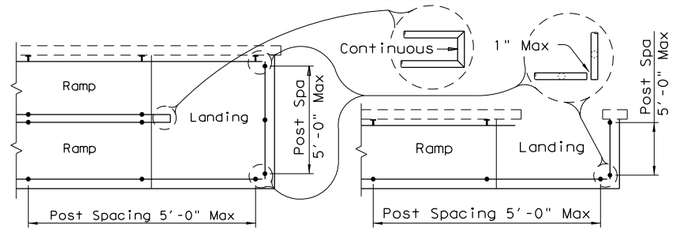
AT TYPE W HANDRAIL END CAPS

AT SPLICE JOINTS

HANDRAIL FABRICATION DETAILS



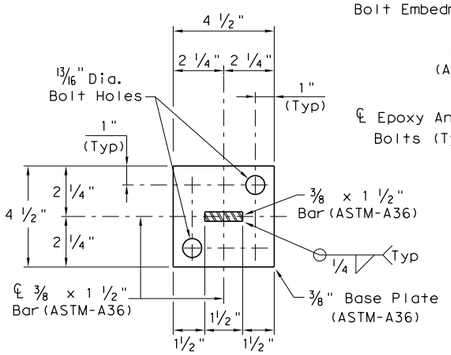
RAMP INTERSECTION



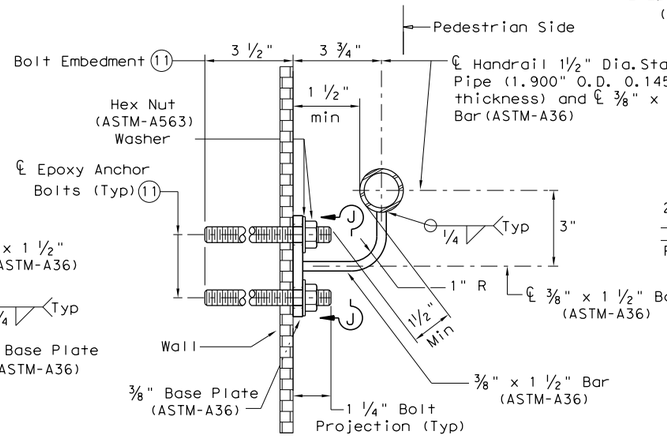
MULTI-LEVEL RAMP

SINGLE-LEVEL RAMP

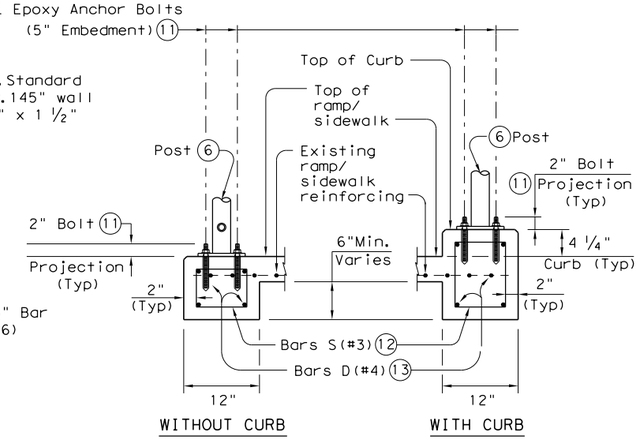
PLAN SHOWING RAIL AT RAMP CONDITIONS



SECTION J-J
(Anchor Bolts not shown for clarity)



SECTION AT WALL MOUNT



SECTION AT RAIL POST FOUNDATIONS

TYPICAL WALL MOUNT DETAILS

GENERAL NOTES

Designed according to ADAAG, Texas Accessibility Standards, Uniform Building Code, and AASHTO LRFD Specifications.

Handrail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Pipe will conform to ASTM-A53 Grade B or A500 Grade B. Steel plates and steel bars will conform to ASTM-A36. Mechanical tubing (MT) will conform to ASTM A513 Grade 1015 or higher. Galvanize all steel components except reinforcing steel unless noted otherwise.

Concrete for foundations will be in accordance with Item 531 "Sidewalks". All reinforcing steel must be Grade 60. Bar laps, where required, will be as follows: Uncoated ~ #4 = 1'-5" Epoxy coated ~ #4 = 2'-1"

When the plans require painted steel, follow the requirements for painting galvanized steel in Item 446, "Cleaning and Painting Steel". Sleeve Members will receive galvanization and only get field painted after installation unless directed otherwise by Engineer.

Epoxy Anchor bolts for wall mount and post base plate will be 5/8" Dia. ASTM A36 threaded rods with one hex nut and one hardened steel washer at each bolt. 5/8" Dia. threaded rod embedment depth for wall mounts is 3 ½" and embedment depth for post base plate is 5".

Embed threaded rods into concrete with a Type III (Class C) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Mix and dispense adhesive with the manufacturer's static mixing nozzle/dual cartridge system. Core drill holes (percussion drilling not permitted).

At the contractor's option the post base plate anchor bolts may be cast with the Ramp/Sidewalk (See Cast-in-Place Anchor Bolt Options).

Optional cast-in-place anchor bolts will be 5/8" Dia ASTM A307 Grade A bolts (or A36 threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer at each bolt. Embedment depth of cast-in-place bolt will be 8" for post base plate.

Handrails and any wall or other surface adjacent to them will be free of any sharp or abrasive elements.

Submit shop drawings to the Engineer unless otherwise noted. For curved handrail applications, fabricate the handrail to the curve if radius is less than 600 ft. Shop drawings are required when rail is fabricated to the curve.

For all handrails, erection drawings will be submitted to the Engineer for approval to ensure proper installation.

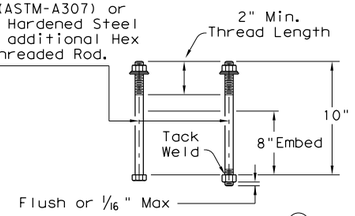
Drawings will show handrail mount locations with bolts setting, spacing, ramp slope, and/or splice joint locations, and handrail lengths with identification showing where each handrail goes on the layout.

Payment for concrete sidewalks or curb ramps will be paid for in accordance with Item 531 "Sidewalks".

Payment for all items shown is to be included in unit price bid in accordance with Item 450 "Railing" of the type specified.

All exposed edges will be rounded or chamfered to approximately 1/8" by grinding.

℄ 5/8" Dia. Hex Head Anchor Bolt (ASTM-A307) or Threaded Rod (ASTM-A36) with one Hardened Steel Washer placed under Hex Nut. One additional Hex Nut will be furnished for each Threaded Rod.



CAST-IN-PLACE ANCHOR BOLT OPTIONS
(Used for Post Base Plate only)

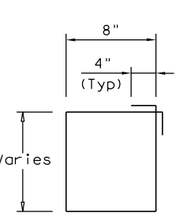
(5) 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp/sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.

(6) 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). Plumb all posts. See "Post Mount Detail" for crimping and trimming post to fit the diamenter of top rail. Provide holes as needed in post for galvanizing drainage and venting.

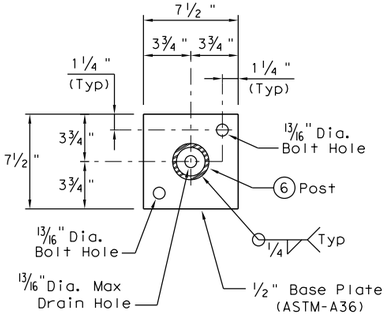
(11) See "General Notes" for anchor bolt information.

(12) Bars S(#3) spaced at 12" Max (Spaced 3" from outside edge of overall length of Ramp/Sidewalk).

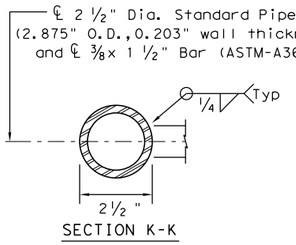
(13) Provide 1 ½" end cover to Bars D(#4) from outside edge of overall length of Ramp/Sidewalk.



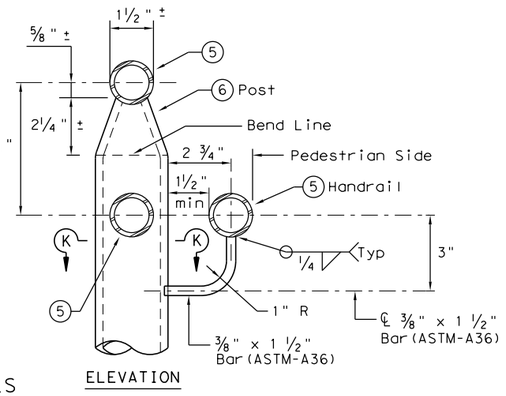
BARS S (#3)



TYPICAL POST BASE PLATE DETAIL



SECTION K-K



ELEVATION

POST MOUNT DETAILS

SHEET 3 OF 3

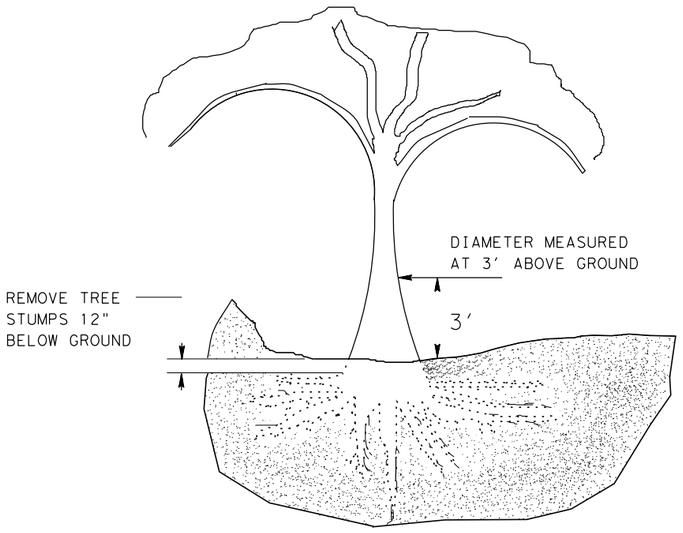
Texas Department of Transportation

Design Division Standard

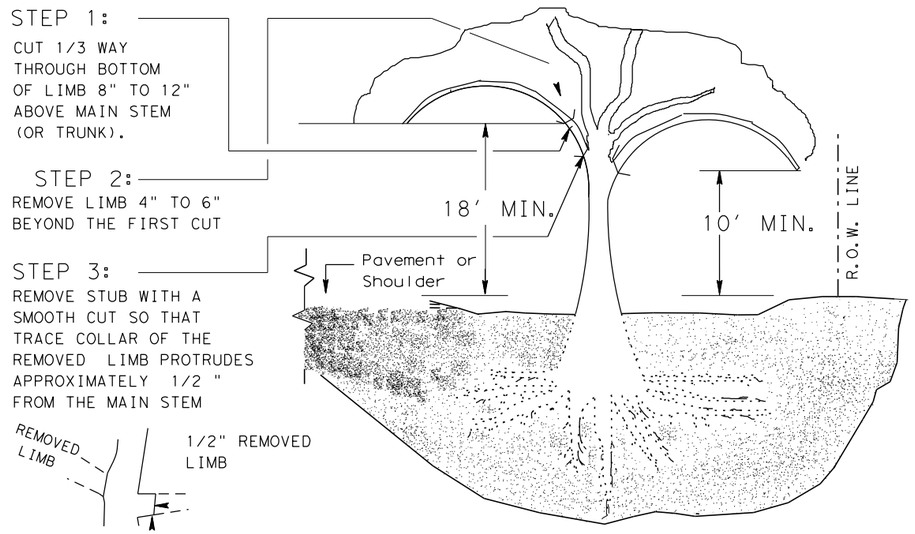
PEDESTRIAN HANDRAIL DETAILS

PRD-13

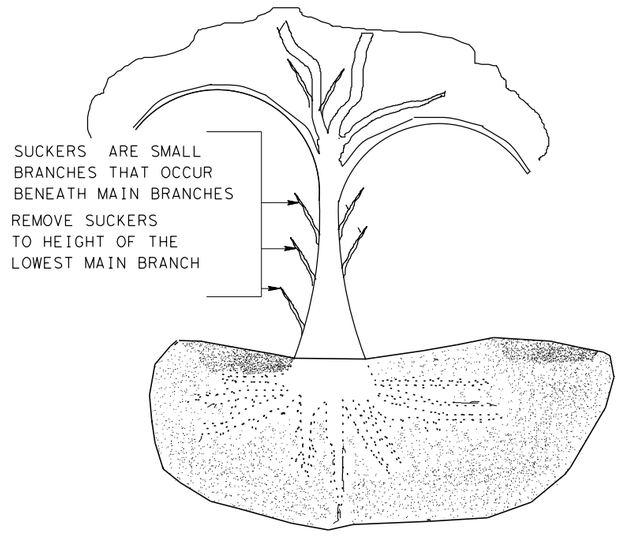
FILE: prd13.dgn	DN: TxDOT	CK: AM	DW: JTR	CK: CGL
©TxDOT December 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
REVISED MAY, 2013 (VP)	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		180



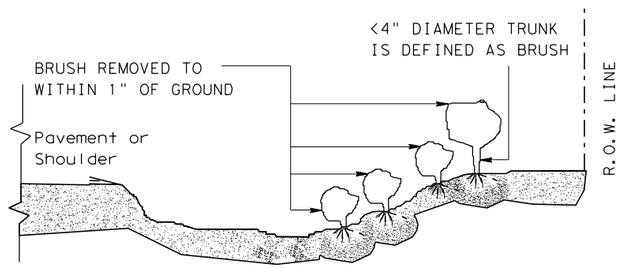
TREE REMOVAL



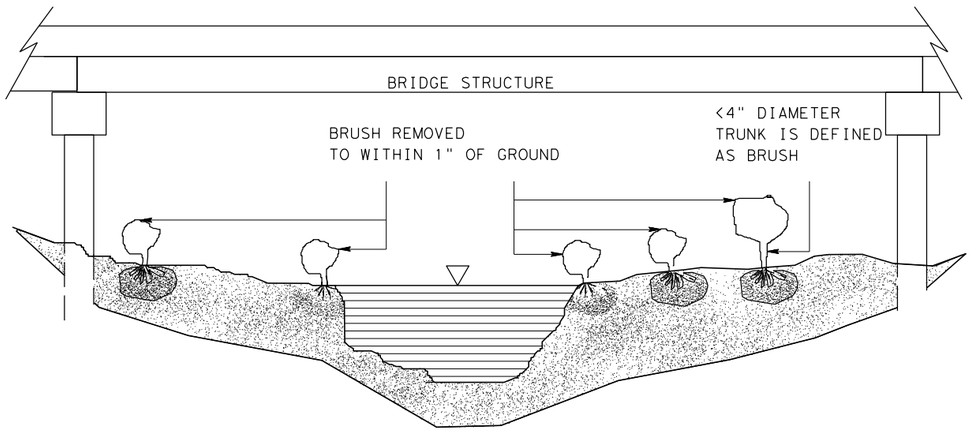
TREE TRIMMING



STEPS 1, 2 AND 3 APPLY WHEN REMOVING LIMBS 2" IN DIAMETER OR LARGER.



BRUSH REMOVAL



BRUSH REMOVAL UNDER BRIDGE AND IN CHANNEL

GENERAL NOTES:

TREE TRIMMING

1. TRIM AND REMOVE ALL TREE LIMBS ON THE PAVEMENT SIDE OF THE TRUNK 18' ABOVE THE PAVEMENT OR BRIDGE DECK ELEVATION, UNLESS OTHERWISE SHOWN ON THE PLANS.

2. TRIM AND REMOVE ALL TREE LIMBS BETWEEN THE TRUNK AND R.O.W. LINE 10' ABOVE NATURAL GROUND, TERRAIN OR OTHER STRUCTURE ELEVATION, UNLESS OTHERWISE SHOWN ON THE PLANS.

TREE REMOVAL

3. FOR TREES MARKED FOR REMOVAL, THE DIAMETER OF TREES ARE DETERMINED BY MEASUREMENT OF THE TRUNK CIRCUMFERENCE 3' ABOVE THE GROUND. TREES WITH TRUNKS OF LESS THAN 4" DIAMETER ARE CONSIDERED TO BE BRUSH. TREES WITH MULTIPLE TRUNKS AT THE POINT OF MEASUREMENT ARE MEASURED AND PAID FOR SEPARATELY.

4. MEASUREMENTS FOR PAYMENT OF TREE DIAMETERS ARE DIVIDED INTO THE RANGES SHOWN IN TABLE 1.

TABLE 1
TREE TRUNK SIZE FOR TREE REMOVAL PAYMENT

PAY ITEM	RANGE FOR PAY ITEMS			
	TRUNK DIAMETER *		TRUNK CIRCUMFERENCE	
	LOWER LIMIT IS GREATER THAN	UPPER LIMIT IS LESS THAN OR EQUAL TO	LOWER LIMIT IS GREATER THAN	UPPER LIMIT IS LESS THAN OR EQUAL TO
752 6005	4	12	12 1/2	37 1/2
752 6006	12	18	37 1/2	56 1/2
752 6007	18	24	56 1/2	75 1/2
752 6008	24	30	75 1/2	94
752 6009	30	36	94	113
752 6010	36	42	113	132
752 6011	42	48	132	151
752 6012	48	60	151	188 1/2
752 6013	60	72	188 1/2	226
752 6019	72	84	226	264
	84	GREATER THAN 84	264	NOT APPLICABLE

*SEE GENERAL NOTE #3.

Texas Department of Transportation — Maintenance Division Standard

TREE AND BRUSH REMOVAL

TRB-15(1)

FILE:	DN: JEO	CK: LJB	DW: JEO	CK:
© TxDOT MARCH 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
Revised table 1 to 2014 Specification	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		181

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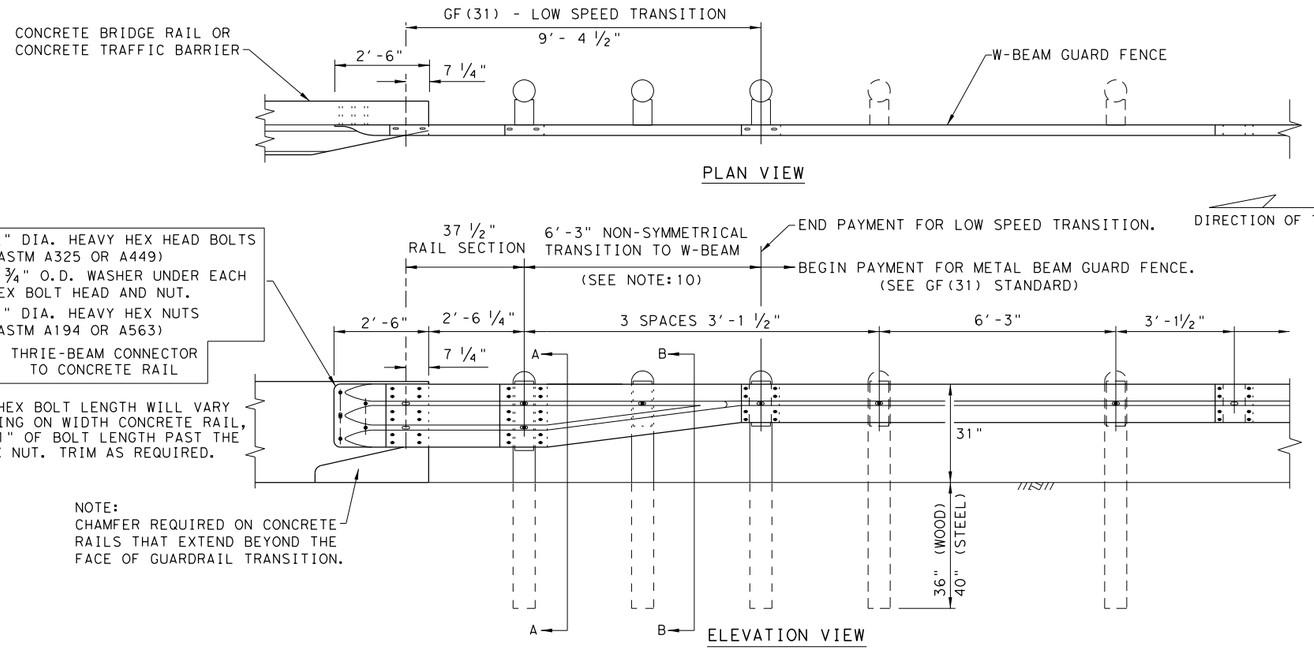
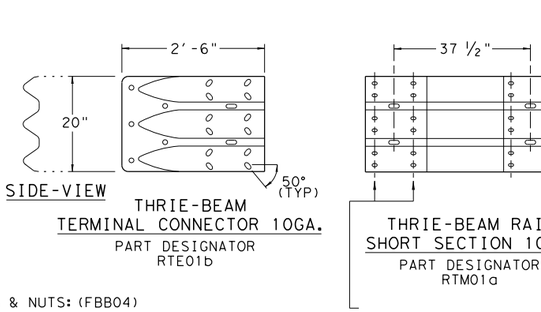
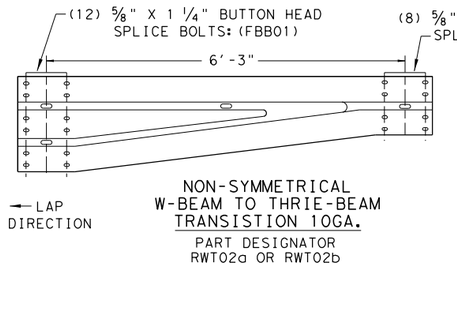


GENERAL NOTES

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 TRANSITIONS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. REFER TO GF(31)STANDARD SHEET.
2. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS.
3. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
4. 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 (FWC16a)AND NOT MORE THAN 1" BEYOND IT. TRIM BOLT LENGTH TO MEET REQUIRED LENGTH.
5. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
6. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
7. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
8. 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 CAN FURNISH COMPOSITE MATERIAL BLOCKS.
9. REFER TO GF(31)STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
10. FOR ROUND WOOD POSTS SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 1/2" DIA. MINIMUM THROUGHOUT THE TRANSITION.





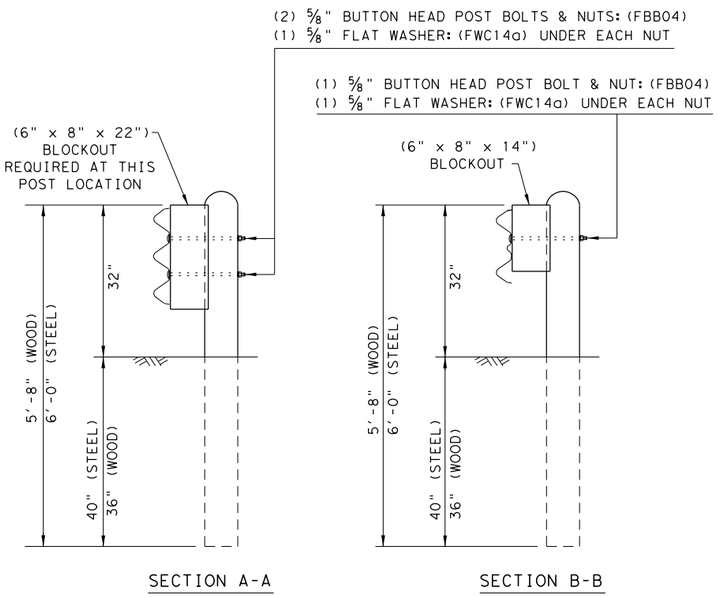
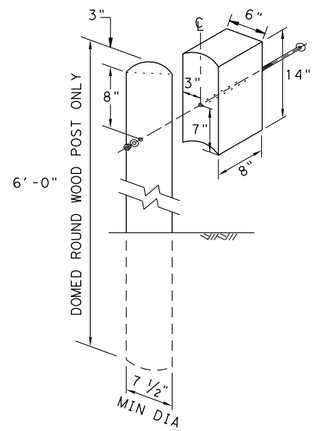
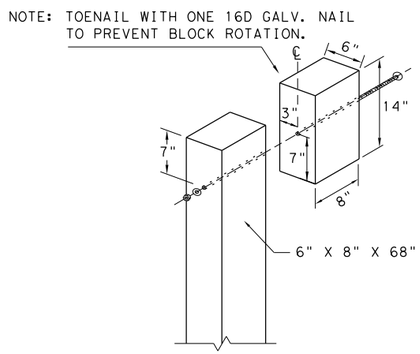
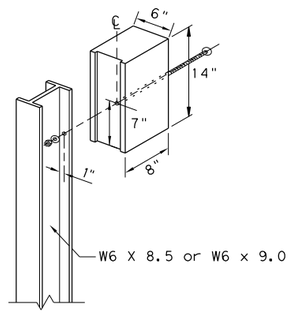


PLATE WASHER INSTRUCTIONS

BRIDGE APPROACH - UPSTREAM: THE SHORT RAIL LAPS OVER THE TERMINAL CONNECTOR. PLATE WASHERS ARE INSTALLED UNDER THE SPLICE NUTS AGAINST INSIDE OF CONNECTOR.
BRIDGE EXIT - DOWNSTREAM: THE TERMINAL CONNECTOR LAPS OVER THE NESTED RAIL. PLATE WASHERS ARE INSTALLED UNDER THE BOLT HEAD AGAINST OUTSIDE OF CONNECTOR.







NOTE: * "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.

LOW-SPEED TRANSITION

Texas Department of Transportation | Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-2 MASH COMPLIANT

GF(31)TR TL2-19

FILE: gf31tr1219.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		183

DATE: 1/21/2021
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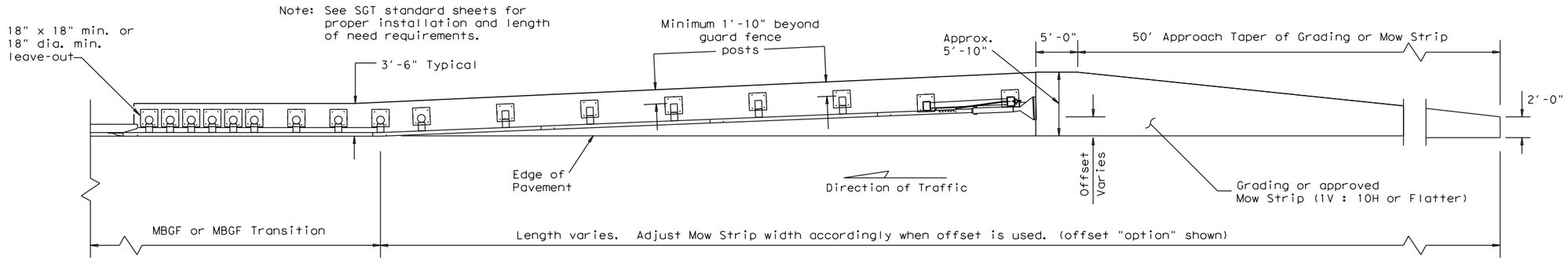
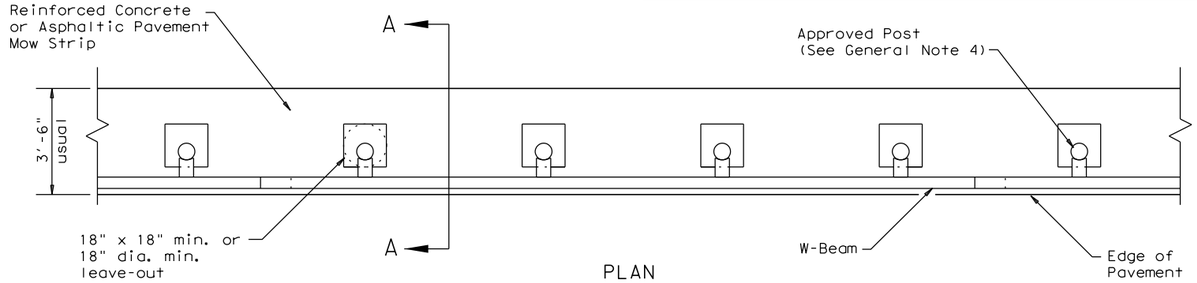
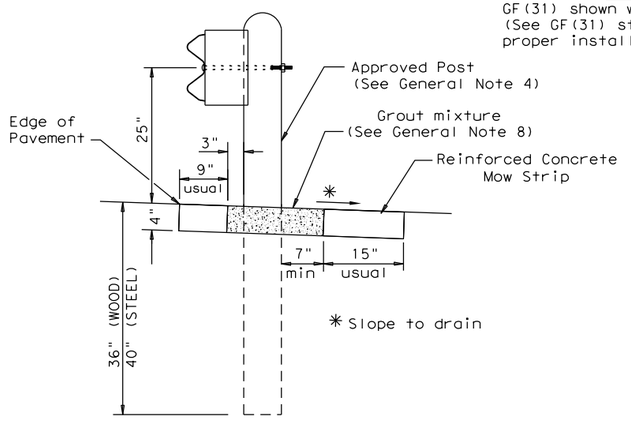


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



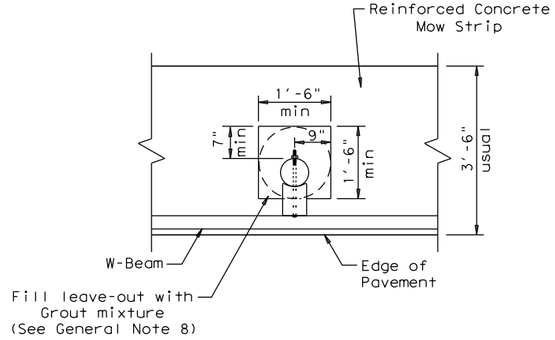
PLAN

GF(31) shown with Mow Strip
(See GF(31) standard sheet for proper installation)



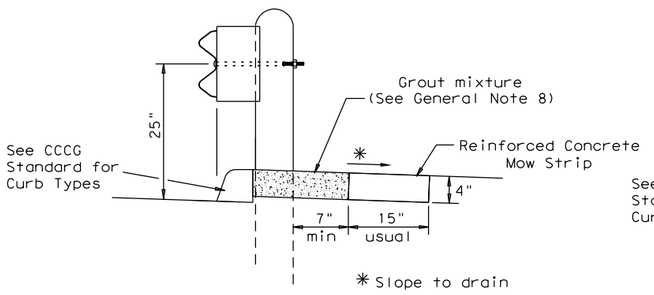
SECTION A-A

Typical



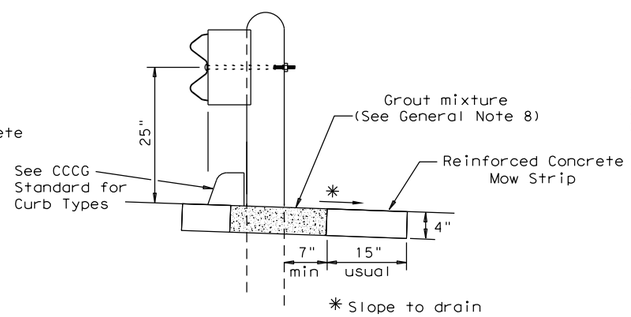
MOW STRIP DETAIL

Reinforced Concrete Mow Strip with 18" x 18" Square or 18" Dia. minimum leave-out.



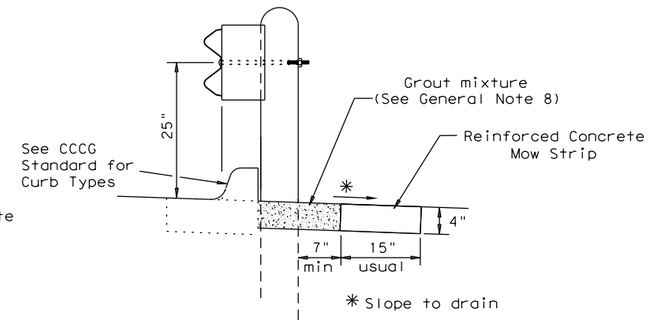
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

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.

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 ½" 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.

Texas Department of Transportation

Design Division Standard

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					KLEIN RD	
	DIST	COUNTY			SHEET NO.	
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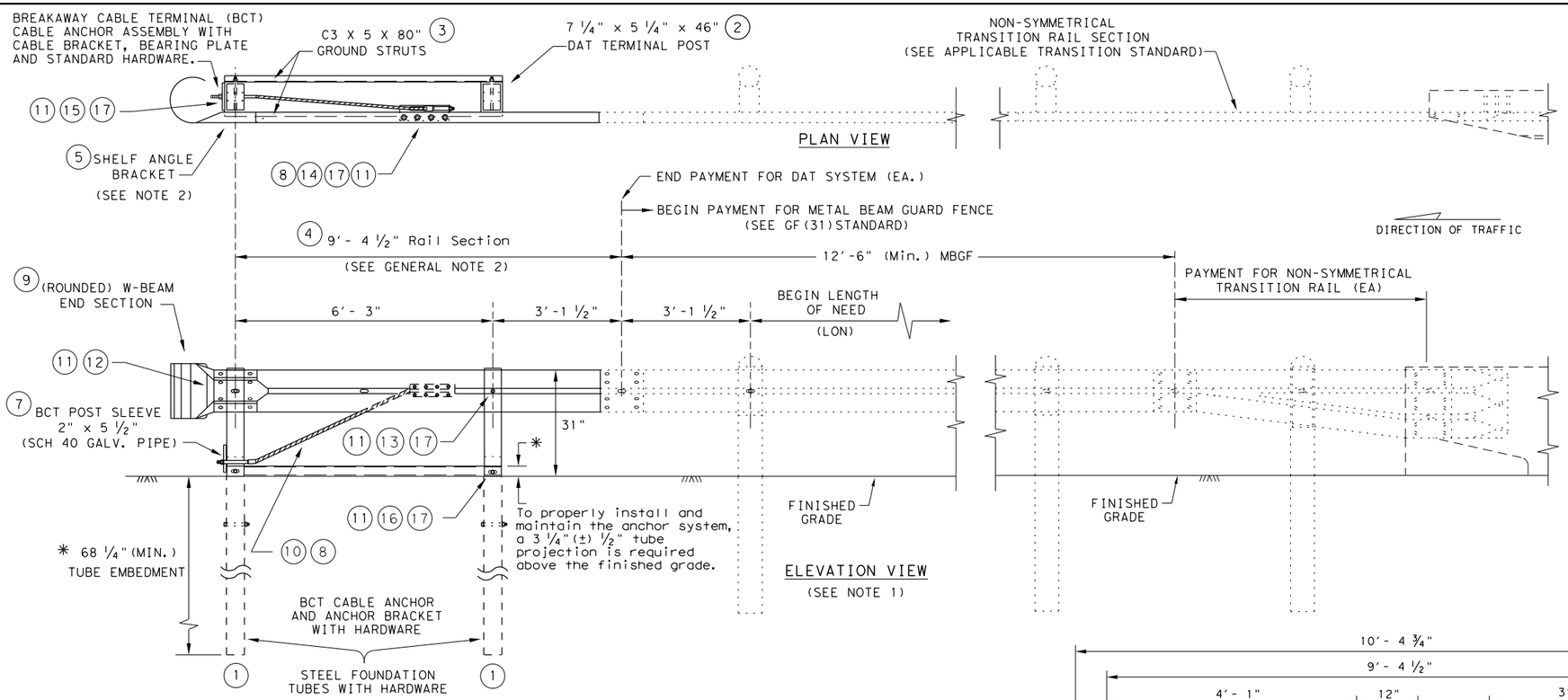


DOWNSTREAM ANCHOR TERMINAL (DAT)

NOTE: ONLY FOR DOWNSTREAM USE, WHEN LOCATED OUTSIDE THE HORIZONTAL CLEARANCE AREA OF OPPOSING TRAFFIC.

GENERAL NOTES

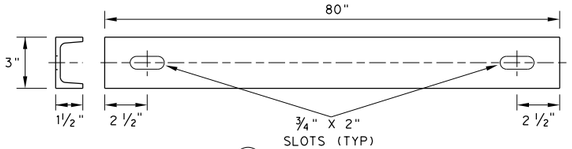
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 3 3/4" ABOVE THE FINISHED GRADE.
4. ALL HARDWARE FOR DAT SHALL BE ASTM A307 UNLESS OTHERWISE SHOWN.
5. REFER TO GF(31) SHEET FOR TERMINAL CONNECTION DETAILS.

MOW STRIP INSTALLATION

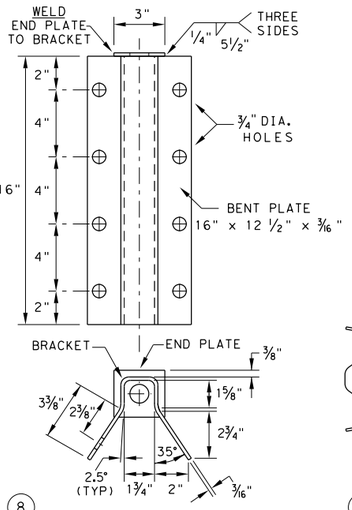
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

#	(DAT) PARTS LIST	QTY
(1)	STEEL FOUNDATION TUBE	2
(2)	DAT TERMINAL POST	2
(3)	CHANNEL STRUT	2
(4)	TERMINAL RAIL ELEMENT	1
(5)	SHELF ANGLE BRACKET	1
(6)	BCT BEARING PLATE	1
(7)	BCT POST SLEEVE	1
(8)	GUARDRAIL ANCHOR BRACKET	1
(9)	(ROUNDED) W-BEAM END SECTION	1
(10)	BCT CABLE ANCHOR	1
(11)	RECESSED NUT, GUARDRAIL	20
(12)	1 1/4" BUTTON HEAD BOLT	4
(13)	10" BUTTON HEAD BOLT	2
(14)	5/8" X 2" HEX HEAD BOLT	8
(15)	5/8" X 8" HEX HEAD BOLT	4
(16)	5/8" X 10" HEX HEAD BOLT	2
(17)	5/8" FLAT WASHER	18

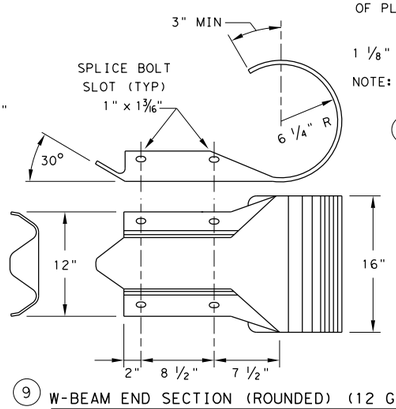
(4) TERMINAL RAIL ELEMENT FOR DAT



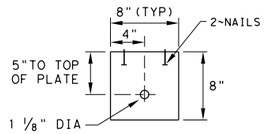
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

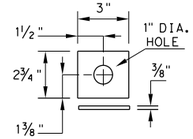


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

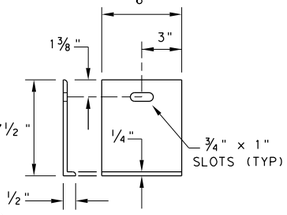


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

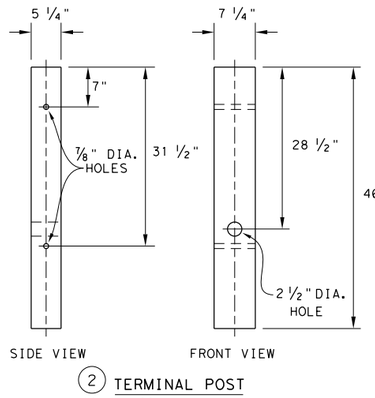
(6) BEARING PLATE
8"x 8"x 5/8" R



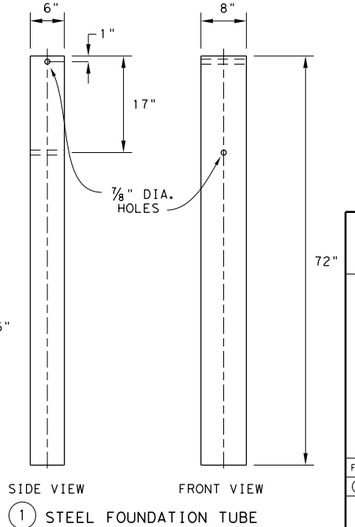
END PLATE



(5) SHELF ANGLE BRACKET



(2) TERMINAL POST
7 1/4"x 5 1/4"x 46" WOOD POST



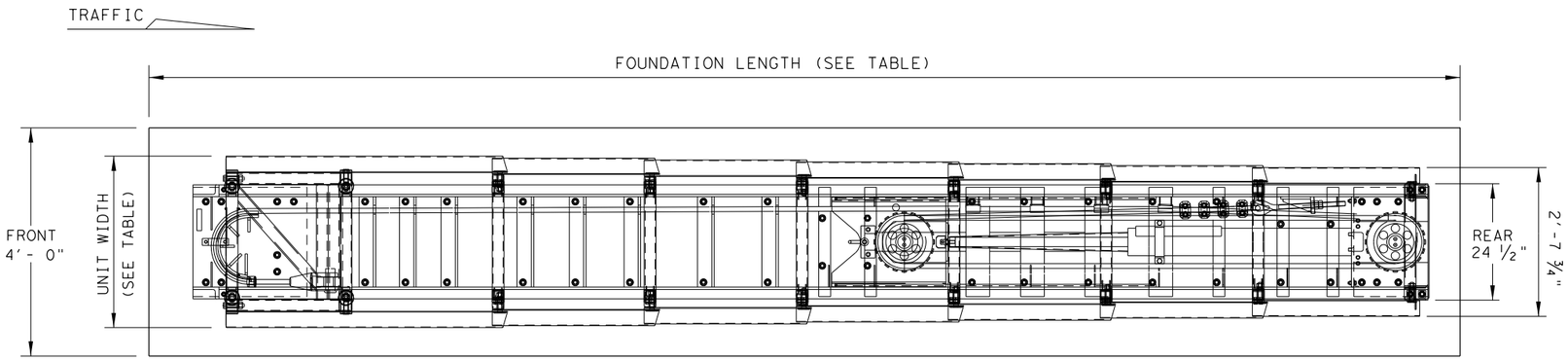
(1) STEEL FOUNDATION TUBE
6"x 8"x 1/8" x 72" STEEL TUBE

Texas Department of Transportation — Design Division Standard

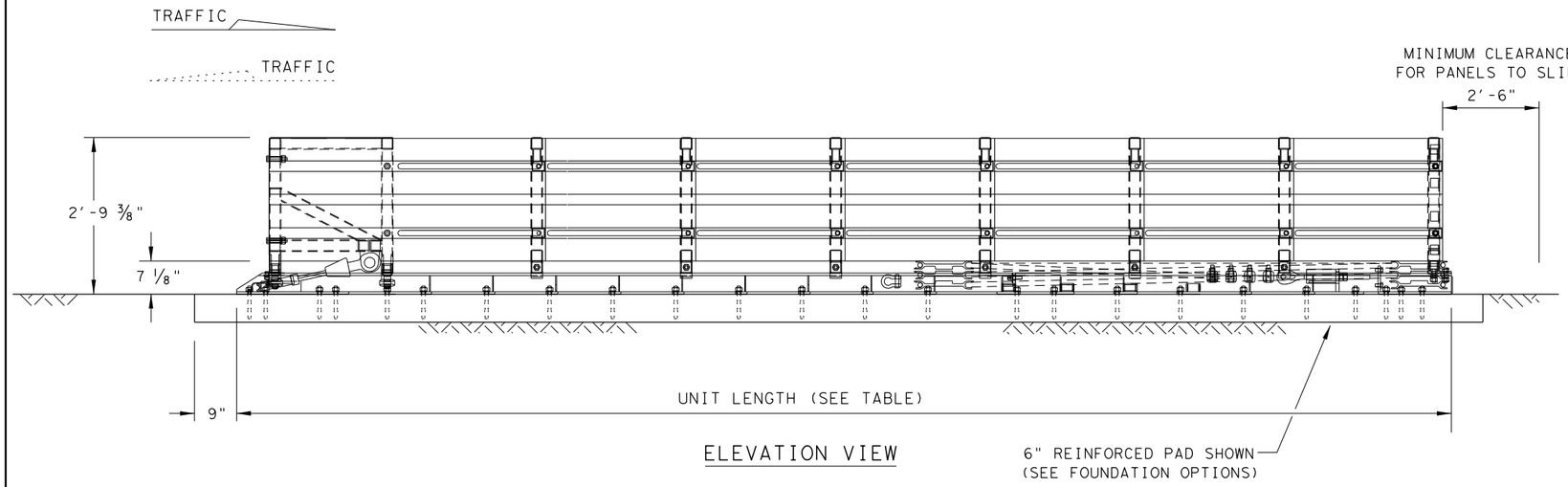
METAL BEAM GUARD FENCE
(DOWNSTREAM ANCHOR TERMINAL)
TL-3 MASH COMPLIANT
GF(31)DAT-19

FILE: gf31dat19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		185

DATE: 4/20/2021
FILE: H:\Projects\510\30\03\Design\Civil\Standards\Roadway\smtcn16.dgn



PLAN VIEW



ELEVATION VIEW

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: WORK AREA PROTECTION, CORP. AT (800) 327-4417, OR (630) 377-9100.
2. FOR BI-DIRECTIONAL TRAFFIC, APPROPRIATE TRANSITION PANELS WILL BE REQUIRED.
3. ADDITIONAL DETAILS FOR THE TRANSITION OPTION AND FOUNDATION OPTION WILL BE SHOWN ON THE MANUFACTURER'S SHOP DRAWINGS FURNISHED TO THE ENGINEER.
4. CONCRETE SHALL BE CLASS "S" WITH A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.
5. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
6. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
7. THE SCI100GM & SCI70GM SYSTEMS SHOULD BE APPROXIMATELY PARALLEL WITH THE BARRIER OR CENTERLINE OF MERGING BARRIERS.

NOTE:
FOR ATTACHMENT AND TRANSITIONS TO OTHER SHAPES, BARRIERS, RAILINGS AND BI-DIRECTIONAL TRAFFIC FLOWS ARE AVAILABLE. (SEE MANUFACTURER'S PRODUCT MANUAL)

NOTE:
SIDE PANELS CAN TRAVEL 30" BEYOND THE LAST TERMINAL BRACE AT THE REAR OF THE CUSHION. ALL OBJECTS THAT MAY INTERFERE WITH THIS MOTION CAN AFFECT PERFORMANCE OF AND MAY CAUSE UNDUE DAMAGE TO THE CRASH CUSHION.

MODEL	TEST LEVEL	UNIT LENGTH (approx.)	UNIT WIDTH	FOUNDATION LENGTH	OBSTACLE WIDTH
SCI70GM	TL-2	13′-6"	2′-10 ⅝"	15′- 6 ¼"	24"to 36"
SCI100GM	TL-3	21′-6"	3′-1 ½"	23′- 0"	24"to 36"

SYSTEM AND PAD LENGTHS VARY DEPENDING ON BACKUP TYPE.

FOUNDATION OPTIONS
6" REINFORCED CONCRETE (5 ½" ANCHOR EMBEDMENT)
8" UNREINFORCED CONCRETE (5 ½" ANCHOR EMBEDMENT)
3" MIN. ASPHALT OVER 3" MIN. CONCRETE (16 ½" ANCHOR EMBED.)
6" ASPHALT OVER 6" COMPACT SUBBASE (16 ½" ANCHOR EMBED.)
8" MINIMUM ASPHALT (16 ½" ANCHOR EMBEDMENT)

FOR STEEL PLACEMENT IN CONCRETE FOUNDATIONS, SEE MANUFACTURER'S PRODUCT MANUAL.

TRANSITION OPTIONS
CONCRETE VERTICAL WALL
CONCRETE TRAFFIC BARRIERS
GUARDRAIL (W-BEAM)
GUARDRAIL (THRIE-BEAM)

TRANSITION TYPES ARE SHOWN ELSEWHERE ON THE PLANS (I.E. ATTENUATOR LOCATION DETAILS OR IN THE GENERAL NOTES).

FOR BI-DIRECTIONAL TRANSITION PANEL AND END SHOE DETAILS, SEE MANUFACTURER'S PRODUCT MANUAL.

LOW MAINTENANCE

Texas Department of Transportation

Design Division Standard

WORK AREA PROTECTION CORP (SMART-NARROW)

SMTC(N)-16

FILE: smtcn16.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP
©TxDOT: February 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
REVISED 06, 2013 (VP)	DIST	COUNTY		SHEET NO.
REVISED 03, 2016 (VP)	SAT	GUADALUPE		185A

DATE: 1/21/2021 1:27:39 PM
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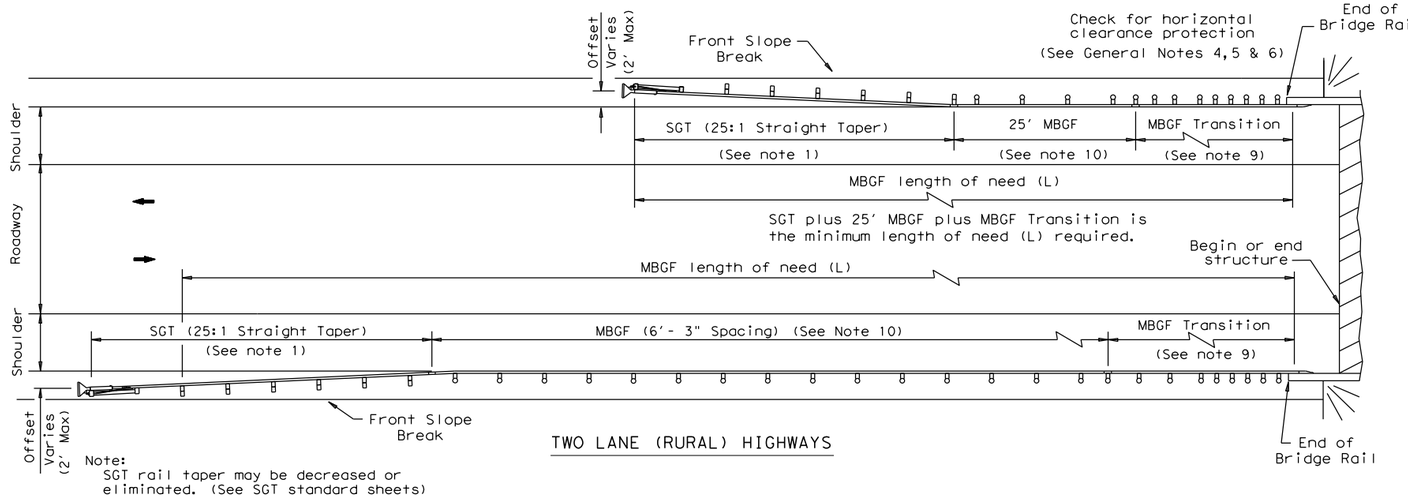
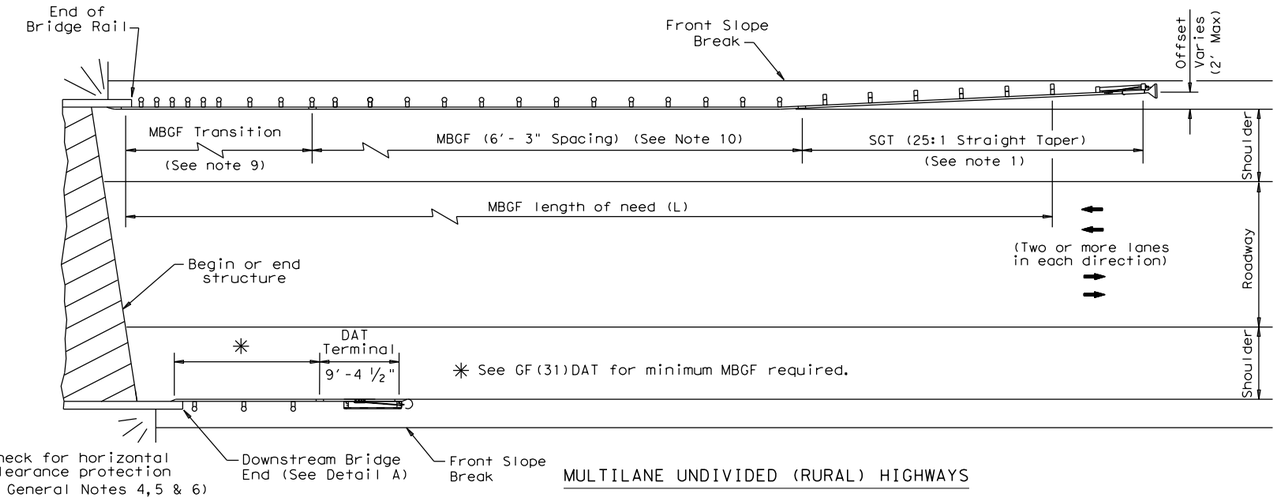
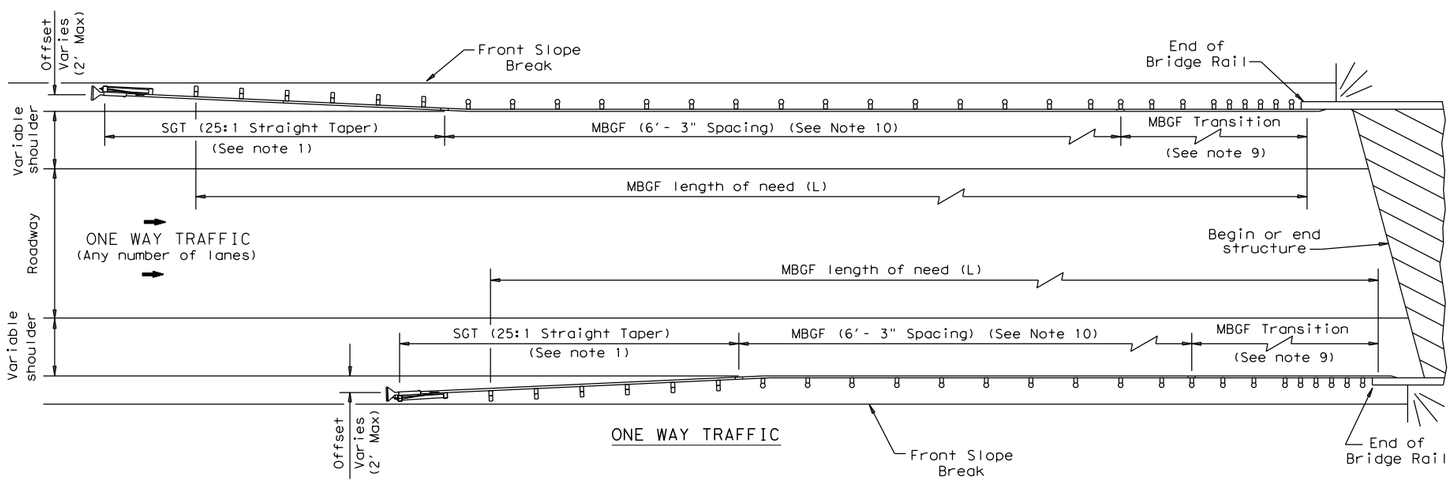


TWO LANE (RURAL) HIGHWAYS

Note:
SGT rail taper may be decreased or eliminated. (See SGT standard sheets)



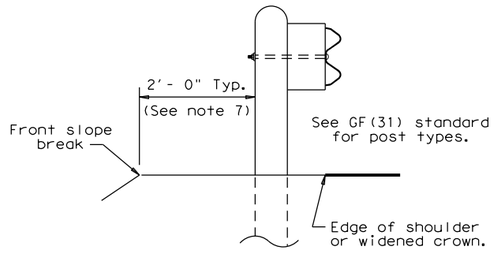
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



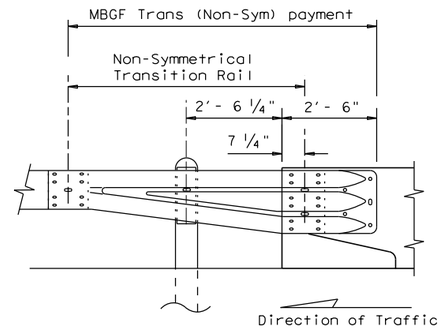
ONE WAY TRAFFIC

GENERAL NOTES

1. For more detail: See GF(31), SGT( )31, GF(31)TR, and GF(31)TL2 standard sheets.
2. Quantities of metal beam guard fence (MBGF) at individual bridge ends are as shown in the plans.
3. Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the higher volume category.
4. MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
5. Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
6. Direct connection of MBGF to concrete rails are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (This requires a minimum of three standard line posts plus the DAT terminal, See Detail A)
7. The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'- 0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained (See Typical Cross Section at MBGF).
8. For restrictive bridge widths: The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF (See MBGF Transition Standards). Metal beam guard fence at these bridge location(s) shall be flared at the rate of 25:1 or flatter, and be of the length necessary to locate the terminal end at the 2 ft. "maximum" offset from the shoulder edge in the approach direction.
9. Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
10. A minimum 25' length of MBGF will be required.



TYPICAL CROSS SECTION AT MBGF



Note:
All rail elements shall be lapped in the direction of adjacent traffic.

DETAIL A
Showing Downstream Rail Attachment

Texas Department of Transportation

Design Division Standard

BRIDGE END DETAILS

(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

BED-14

FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
©TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED APRIL 2014 SEE (MEMO 0414)				KLEIN RD
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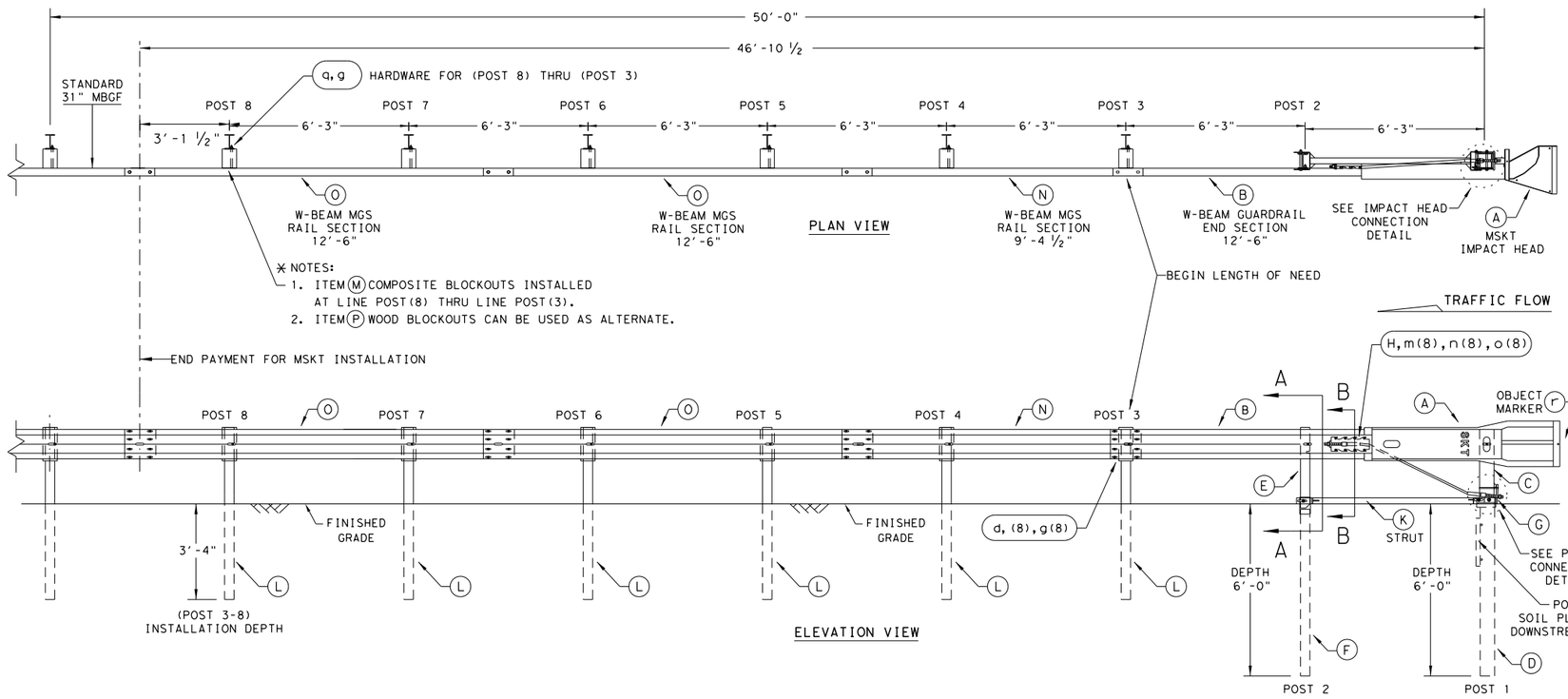


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.

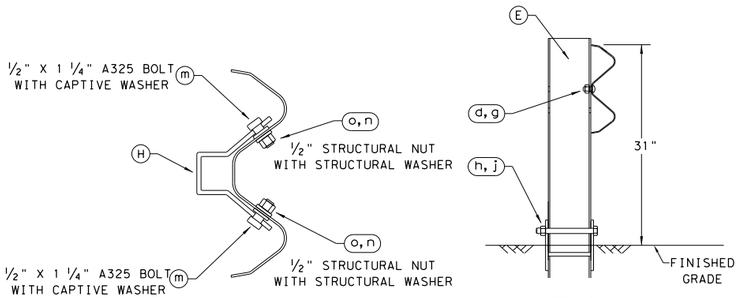
GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435. 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION~062717).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
7. A COMPOSITE MATERIAL BLOCKOUTS THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
8. IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, & REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 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.
13. THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN THEIR PLACE.
14. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POSTS 3-8 TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST. SPECIAL DRIVING CAP TO BE USED ON LOWER POSTS 1 & 2 TO PREVENT DAMAGE TO THE WELDED PLATES.

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X 1/8" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 1/2")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
		SMALL HARDWARE	
a	2	5/8" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	5/8" WASHER	W0516
c	2	5/8" HEX NUT	N0516
d	25	5/8" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
e	2	5/8" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	5/8" WASHER	W050
g	33	5/8" Dia. H.G.R NUT	N050
h	1	3/4" Dia. x 8 1/2" HEX BOLT (GRD A449)	B340854A
j	1	3/4" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	1/2" x 1 1/4" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	1/2" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 3/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	5/8" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

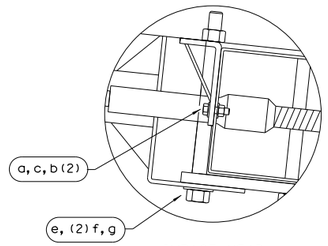
SEE NOTES: ✳

ALTERNATIVE ITEMS NOT SHOWN. ✳✳
✳ ITEM(P) 8" WOOD-BLOCKOUT
✳✳ ITEM(Q) 25'GUARD FENCE PANEL

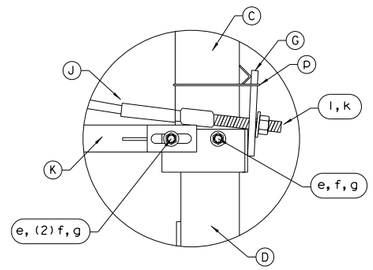


SECTION B-B
ANCHOR BRACKET

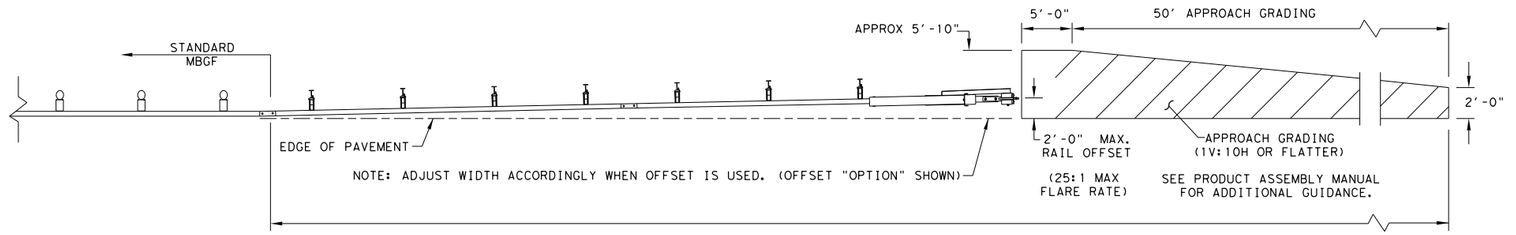
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



TRAFFIC FLOW

APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT USED FOR ALL TANGENT TYPE END TREATMENTS.

NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE MSKT END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL

MSKT-MASH-TL-3

SGT(12S)31-18

FILE: sgt12s3118.dgn	DN:TxDOT	CK:KM	DW:VP	CK:CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
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	DIST	COUNTY		SHEET NO.	
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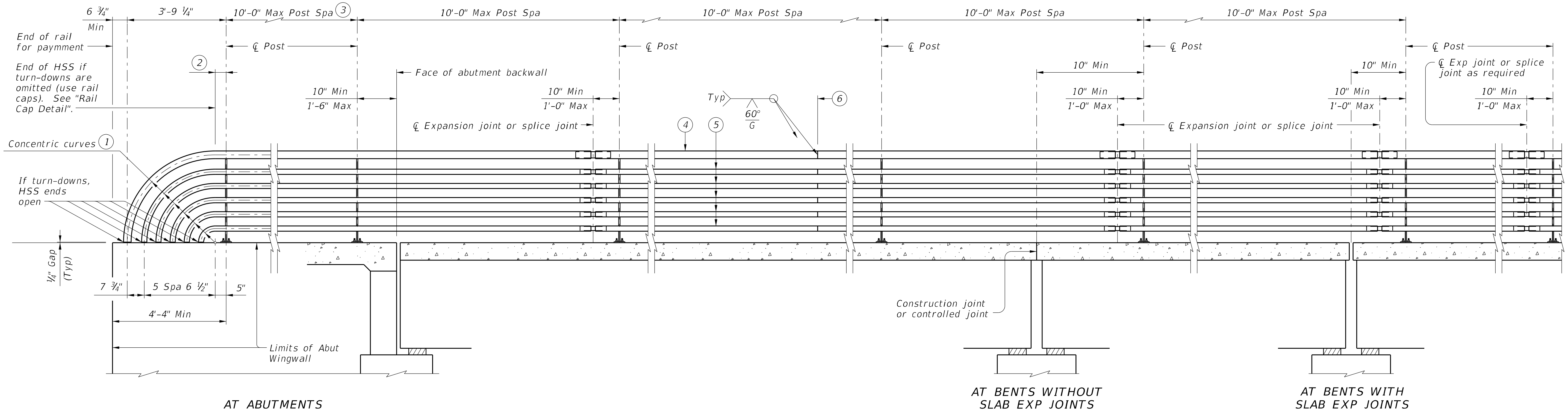
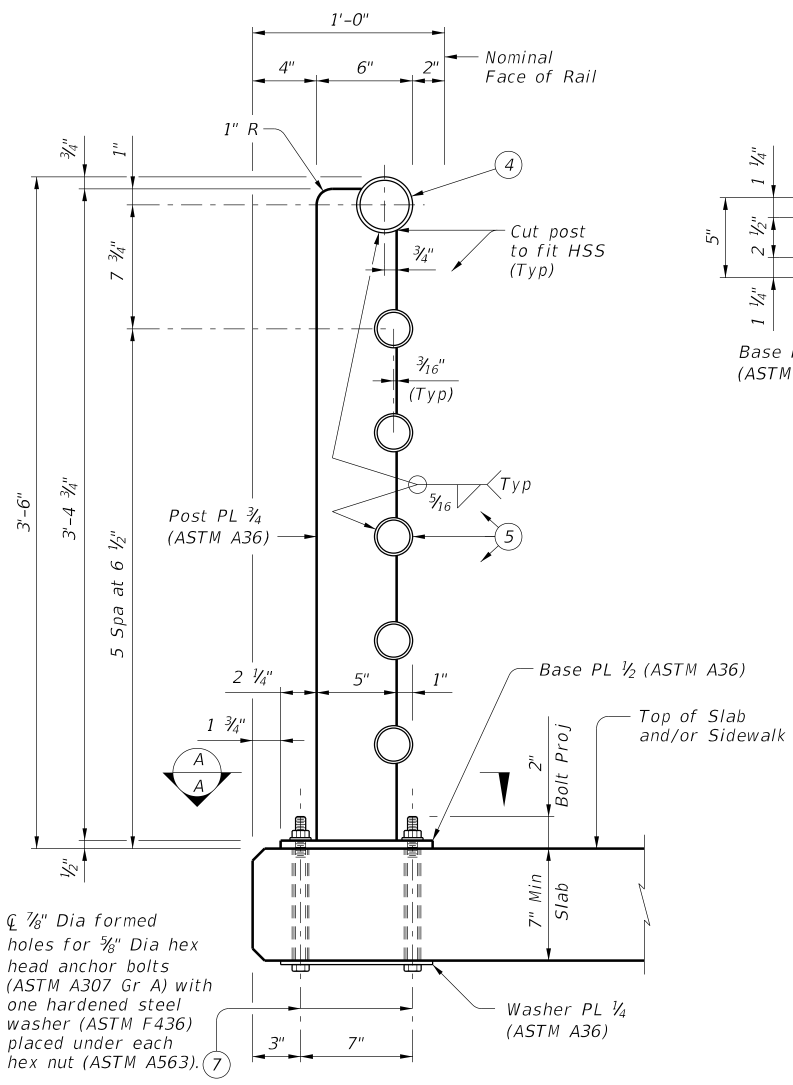
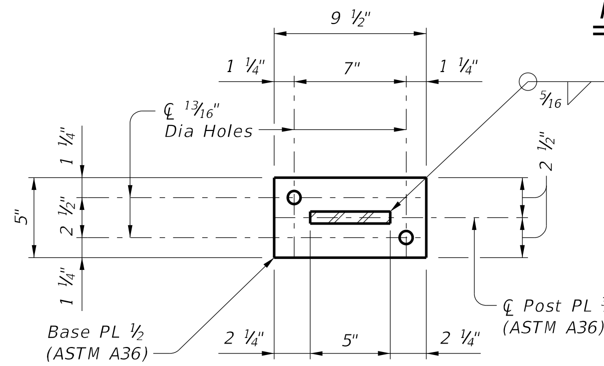


ROADWAY ELEVATION OF RAIL

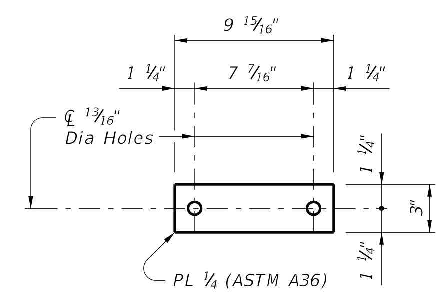


ON BRIDGE SLAB

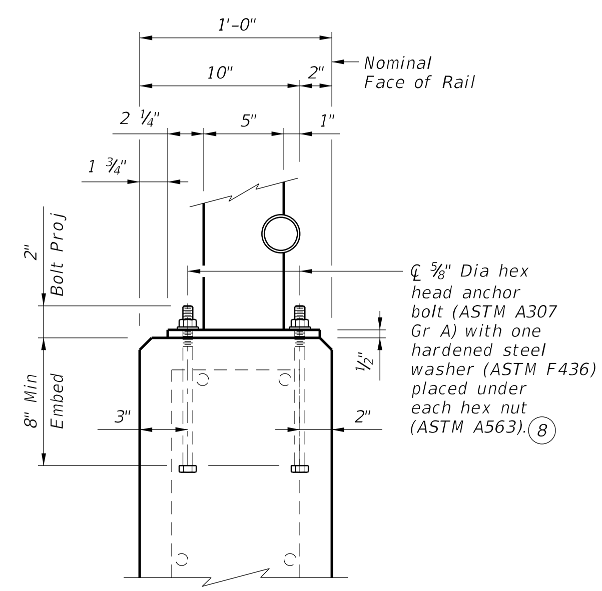


SECTION A-A

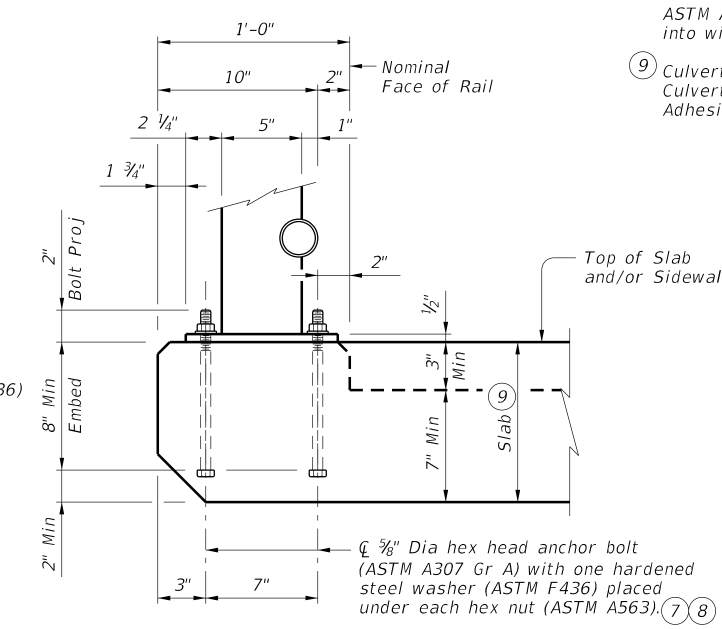
Showing base plate detail.



WASHER PLATE DETAIL



ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS



ON CULVERTS WITH OR WITHOUT CURBS

Used with 1'-0" Min thick parallel wings on culverts.

SECTIONS THRU RAIL

(1) Portion of railing with turn-downs to be used or omitted as indicated on Bridge Layout.

(2) 10" Min ~ 1'-6" Max if turn-downs are omitted.

(3) Min of 2 posts required on wingwall.

(4) HSS 3.500 x 0.216 (Rail Member)

(5) HSS 2.375 x 0.154 (Rail Member)

(6) One shop splice per panel is permitted (with minimum 85 percent penetration). The weld may be square groove or single vee groove. Grind smooth.

(7) At Contractor's option, adhesive anchors may be used. Adhesive anchors must be 5/8" Dia ASTM A307 Grade A fully threaded rods. Minimum adhesive anchor embedment depth is 5" into slabs or culverts without curbs. See "Material Notes" for adhesive anchor requirements.

(8) At Contractor's option, adhesive anchors may be used. Adhesive anchors must be 5/8" Dia ASTM A307 Grade A fully threaded rods. Minimum adhesive anchor embedment depth is 7" into wingwalls or culverts with curbs. See "Material Notes" for adhesive anchor requirements.

(9) Culverts without curbs for cast-in-place anchor bolts require a 10" Min slab thickness. Culverts with curbs for cast-in-place anchor bolts require a curb plus slab thickness of 10" Min. Adhesive anchors may be used with a 7" Min slab thickness or culverts with curbs.

SHEET 1 OF 2

Texas Department of Transportation | Bridge Division Standard

PEDESTRIAN RAIL

TYPE PR11

FILE: rlstd028-19.dgn	DN: TAR	CK: TBE	DW: JTR	CK: TAR
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		188

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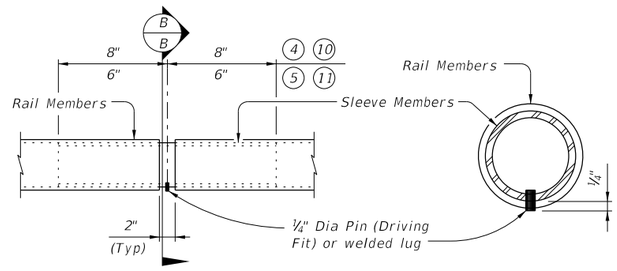
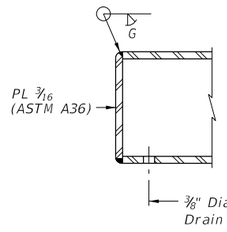


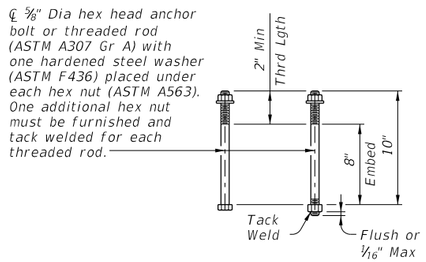
AT SPLICES OR EXP JTS

SECTION B-B

PIPE SPLICE DETAIL



RAIL CAP DETAIL



CAST-IN-PLACE & FORMED HOLE ANCHOR BOLT OPTIONS

④ HSS 3.500 x 0.216 (Rail Member)

⑤ HSS 2.375 x 0.154 (Rail Member)

⑩ HSS 2.875 x 0.203 (Sleeve Member)

⑪ HSS 1.900 x 0.145 (Sleeve Member)

CONSTRUCTION NOTES:

Panel lengths of railing must be attached to a minimum of three posts except at abutment wingwalls.

At the Contractor's option anchor bolts may be an adhesive anchorage system. See "Material Notes".

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

Face of rail and posts must be vertical transversely unless otherwise approved. Posts must be perpendicular to adjacent roadway grade. Use Type VIII epoxy mortar under post base plates if gaps larger than 1/16" exist.

For curved railing applications, fabricate the HSS rail to the radius when the radius is 600' or less. Submit shop drawings for approval when tubes are required to be fabricated to a radius. Shop drawings must be submitted to the Engineer for approval.

Round or chamfer all exposed edges of steel components 1/16" by grinding prior to galvanizing.

MATERIAL NOTES:

Provide ASTM A500 Gr B, A1085 or A53 Gr B for all HSS.

Galvanize all metal components of steel rail system. Apply additional coatings when shown elsewhere on the plans. When plans require paint over galvanizing, follow the requirements for painting galvanized steel in Item 445, "Galvanizing" and when field painting, Item 446, "Field Cleaning and Painting Steel". Sleeve members and anchor bolts must receive galvanization prior to installation and only field paint after installation unless directed otherwise by Engineer.

Anchor bolts must be ⅝" Dia ASTM A307 Gr A with one hardened steel washer (ASTM F436) placed under each hex nut or ASTM A307 Gr A threaded rods with one tack welded hex nut each and with one hex nut with one hardened steel washer (ASTM F436) each. Nuts must conform to ASTM A563 requirements.

Optional adhesive anchorage system must be ⅝" Dia ASTM A307 Gr A fully threaded rods with one hex nut and one hardened steel washer (ASTM F436). Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into slab, wingwalls, or culvert curbs using a Type III, Class C, D, E, or F anchor adhesive. Anchor adhesive chosen must be able to achieve a nominal bond strength in tension, Na, of a single anchor of 10 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

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.

For all rails, submit erection drawings showing section lengths, splice locations, rail post spacing and anchor bolt setting for approval.

Average weight of railing is 30 plf.

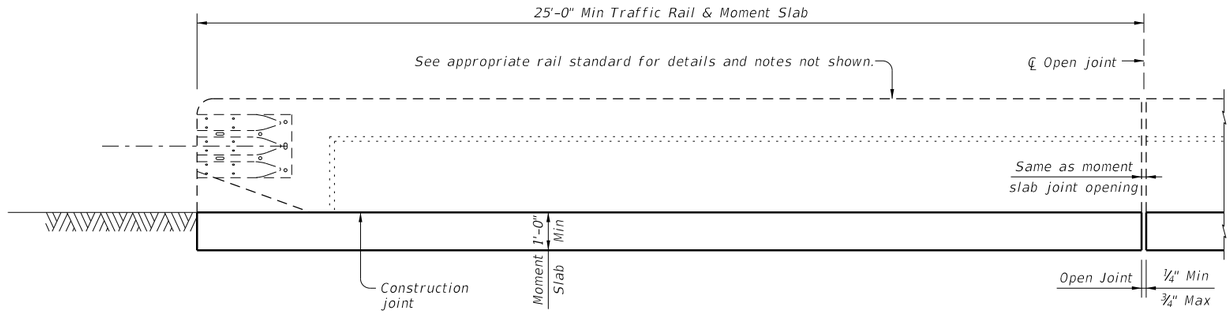
Texas Department of Transportation

Bridge Division Standard

PEDESTRIAN RAIL

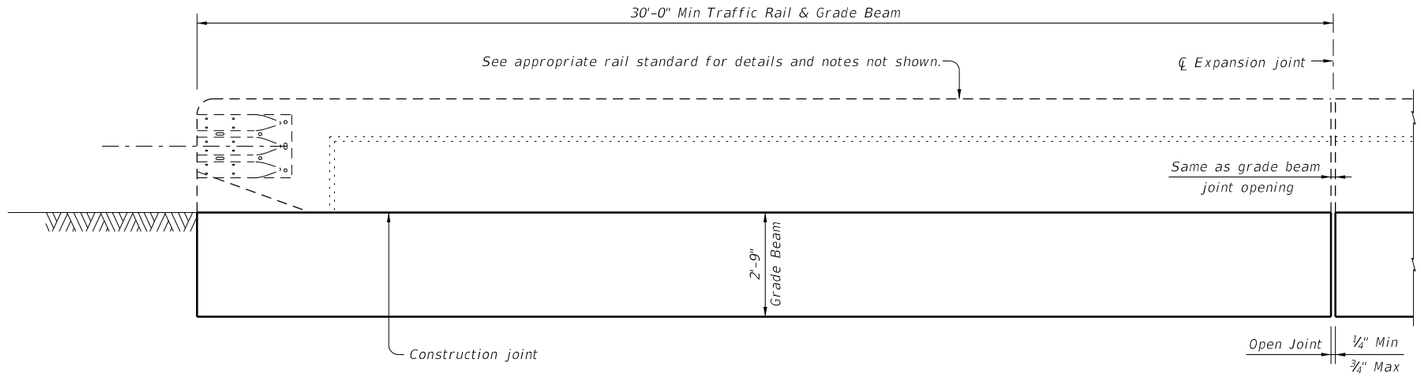
TYPE PR11

FILE: rlstd028-19.dgn	DN: TAR	CK: TBE	DW: JTR	CK: TAR
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		189



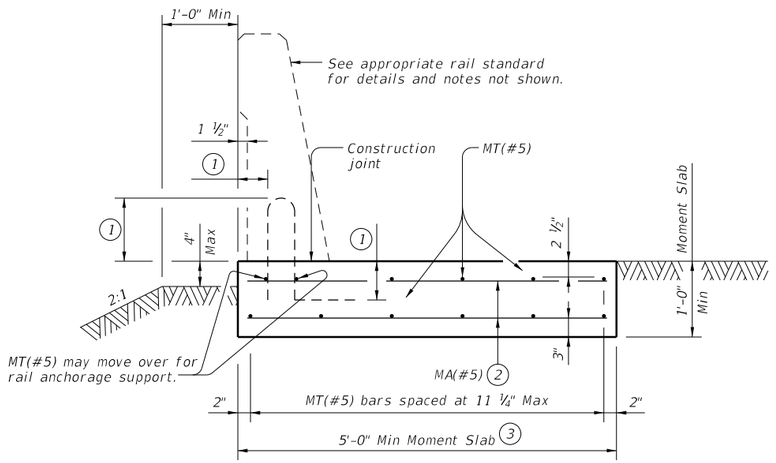
ROADWAY ELEVATION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



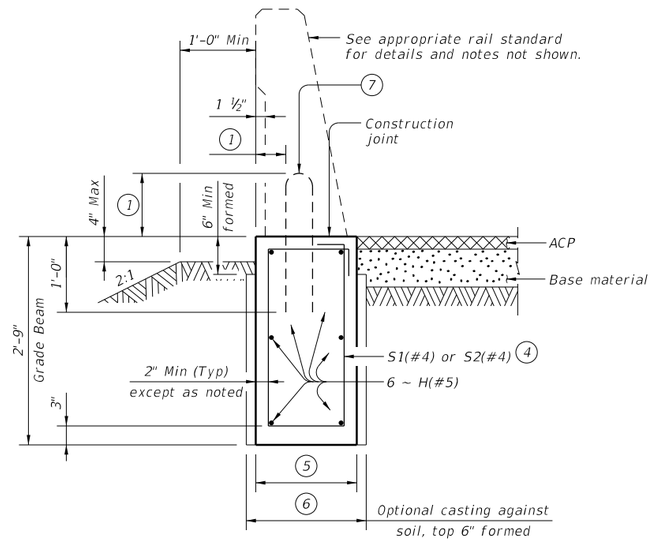
ROADWAY ELEVATION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



SECTION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar.)



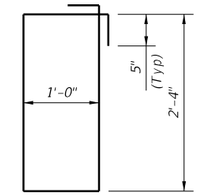
SECTION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar.)

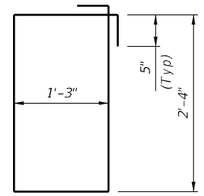
1. See applicable bridge rail standard.
2. MA(#5) space longitudinally along moment slab at 12" Max. (Spaced 2 ½" longitudinally from outside edge of moment slab).
3. Approximate moment slab concrete = 0.19 CY/LF and reinforcement = 22.4 LB/LF.
4. S1(#4) or S2(#4) spaced longitudinally along grade beam at 8" Max. (Spaced 2 ½" longitudinally from outside edge of grade beam).
5. Use bar S1(#4) with 1'-4" grade beam width and bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS. Approximate grade beam concrete = 0.14 CY/LF and reinforcement = 13.8 LB/LF.

   Use bar S2(#4) with 1'-7" grade beam width and bridge rail types: T66 and C66. Approximate grade beam concrete = 0.16 CY/LF and reinforcement = 14.2 LB/LF.
6. 1'-6" for bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS.

   1'-9" bridge rail types: T66 and C66.
7. Modify reinforcing on standard bridge rail anchorage if necessary by extending rail anchorage 12" Min, vertically into traffic rail



BARS S1(#4)



BARS S2(#4)

CONSTRUCTION NOTES:

Align moment slab (TRF-MS) or grade beam (TRF-GB) open joints with rail open joints maintaining no less than minimum rail length. Provide moment slab (TRF-MS) or grade beam (TRF-GB) with open joints at no greater than 100' spacing 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 required elsewhere.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for bars S1(#4), S2(#4) and H(#5) unless noted otherwise. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #5 = 2'-4"
Epoxy coated ~ #5 = 3'-6"

GENERAL NOTES:

Use of these details will result in a moment slab (TRF-MS) or grade beam (TRF-GB) foundation that is acceptable for traffic rails which are MASH TL-2, TL-3, or TL-4 compliant.

See elsewhere in the plans for selected options between moment slab (TRF-MS) and/or grade beam (TRF-GB).

The foundation design resistance is based on the current AASHTO bridge railing requirements with the assumption of fair to good soil support conditions. Poor soil conditions will require suitably deeper and/or wider foundations.

See appropriate rail standard for details and notes not shown.

This detail is intended for use as a guide to unusual railing anchorage situations but may be included in the plans, modified as necessary to apply to specific installations required on the project.

Payment for moment slab (TRF-MS) and/or grade beam (TRF-GB) will be by Class "C" concrete or Class "C" (HPC) concrete for rail foundations.

The associated bridge railing will be paid for by the linear foot which includes the concrete and reinforcement.

Excavation will be subsidiary to other Items.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL FOUNDATIONS

FOR MASH TL-2, TL-3 & TL-4 BRIDGE RAILS

TRF

FILE: rlstd027-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEBERG RD
07-20: Added moment slab with rail foundation lengths.	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		190

DATE: DATE/ZONE 1:27:47 PM
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ITEM	DESCRIPTION	UNIT	QTY
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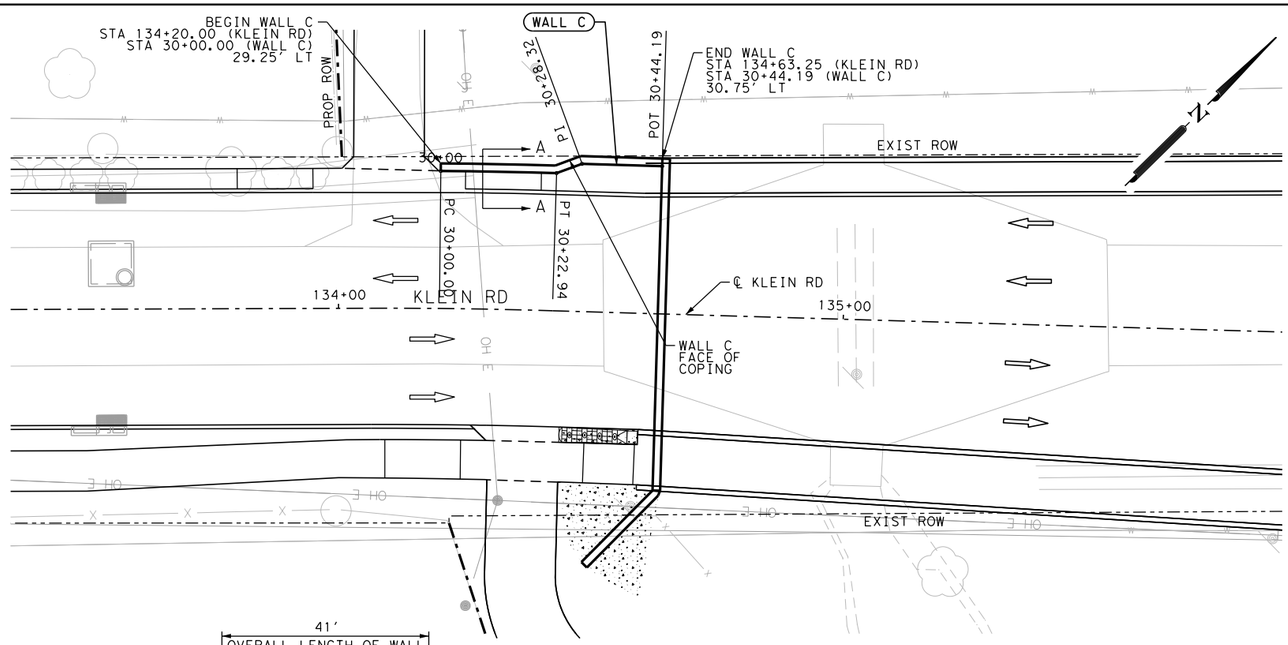
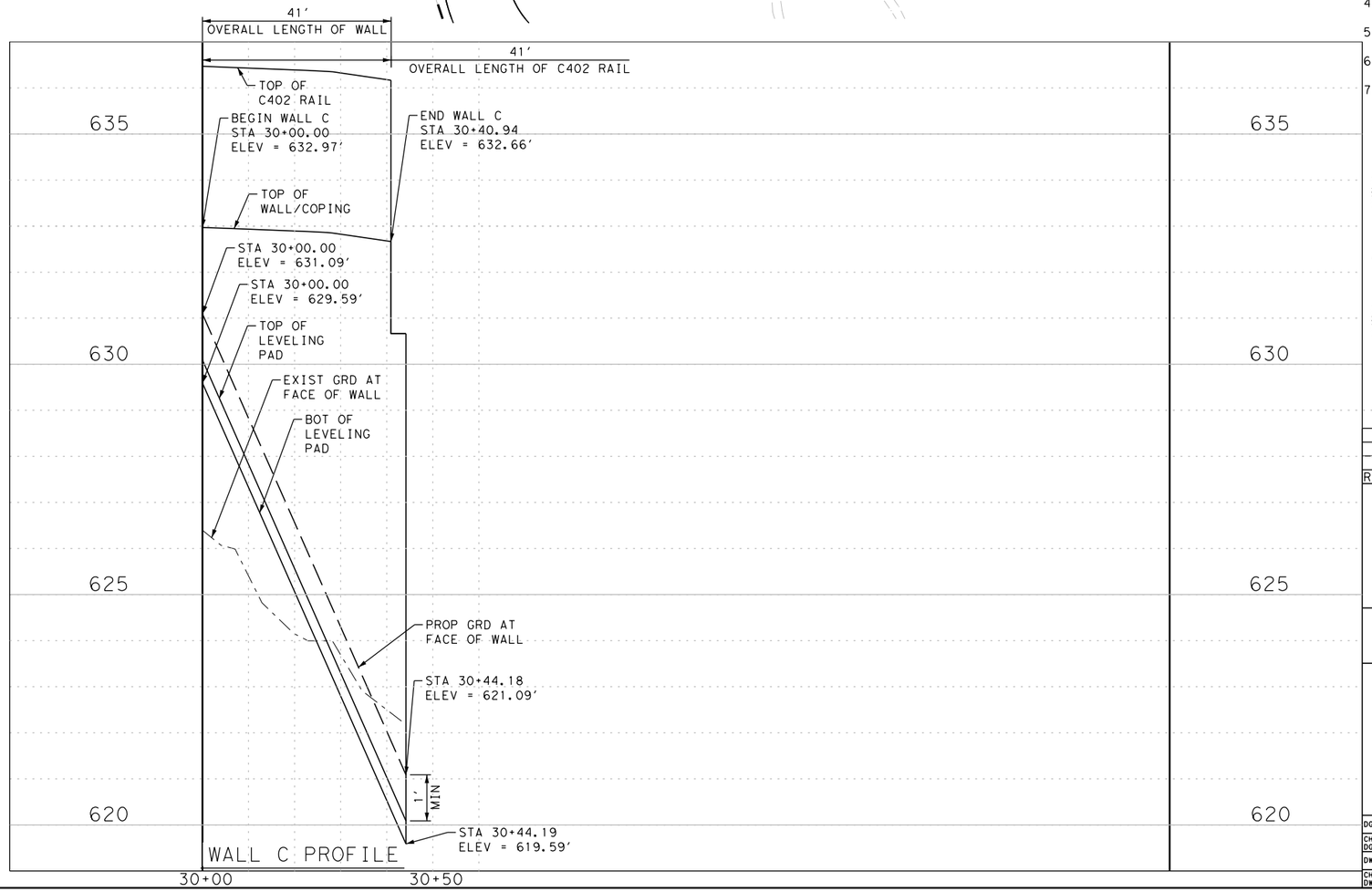
0450-6034	RAIL (TY C402)	LF	41





LEGEND

- TRAFFIC FLOW ARROW
- FIELD INLET
- CURB INLET
- DROP INLET
- MANHOLE

NOTES

1. ALL RETAINING WALL MEASUREMENTS ARE TO FACE OF WALL UNLESS OTHERWISE NOTED.
2. SQUARE FOOT SURFACE AREA OF RETAINING WALL IS MEASURED BETWEEN FINISHED GRADE AT TOP OF WALL AND THE PLAN DESIGNED TOP OF LEVELING PAD. THE PLAN DESIGNED TOP OF LEVELING PAD IS SET AT A MINIMUM OF 1' BELOW PROPOSED GROUND AT THE FACE OF WALL.
3. ANY ADJUSTMENTS MADE TO ACCOMODATE THE AVAILABLE DESIGNS WILL NOT BE MEASURED. THE QUANTITY FOR WHICH PAYMENT IS MADE WILL BE THE QUANTITY AS SHOWN IN THE PLANS.
4. SEE MSE RETAINING WALL MISC DETAILS SHEET FOR SECTION AT CORNER OF WALL.
5. SEE BORING LOGS SHEETS FOR GEOTECHNICAL INFORMATION.
6. EXISTING FEATURES ARE SHOWN SCREENED BACK; i.e. FADED.
7. SEE MISCELLANEOUS WALL DETAILS SHEETS (196-198) FOR SECTION DETAILS.

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

RETAINING WALL PLAN & PROFILE

WALL C

SHEET 1 OF 5

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	191

ITEM	DESCRIPTION	UNIT	QTY
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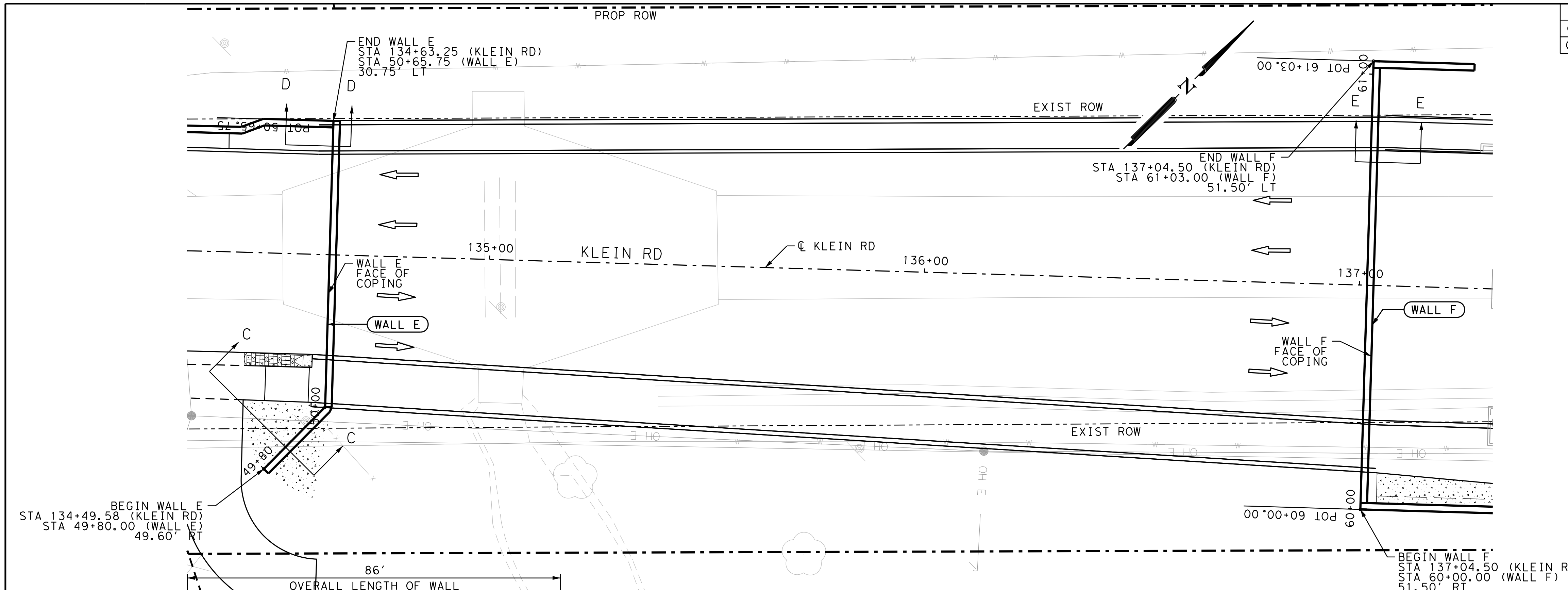
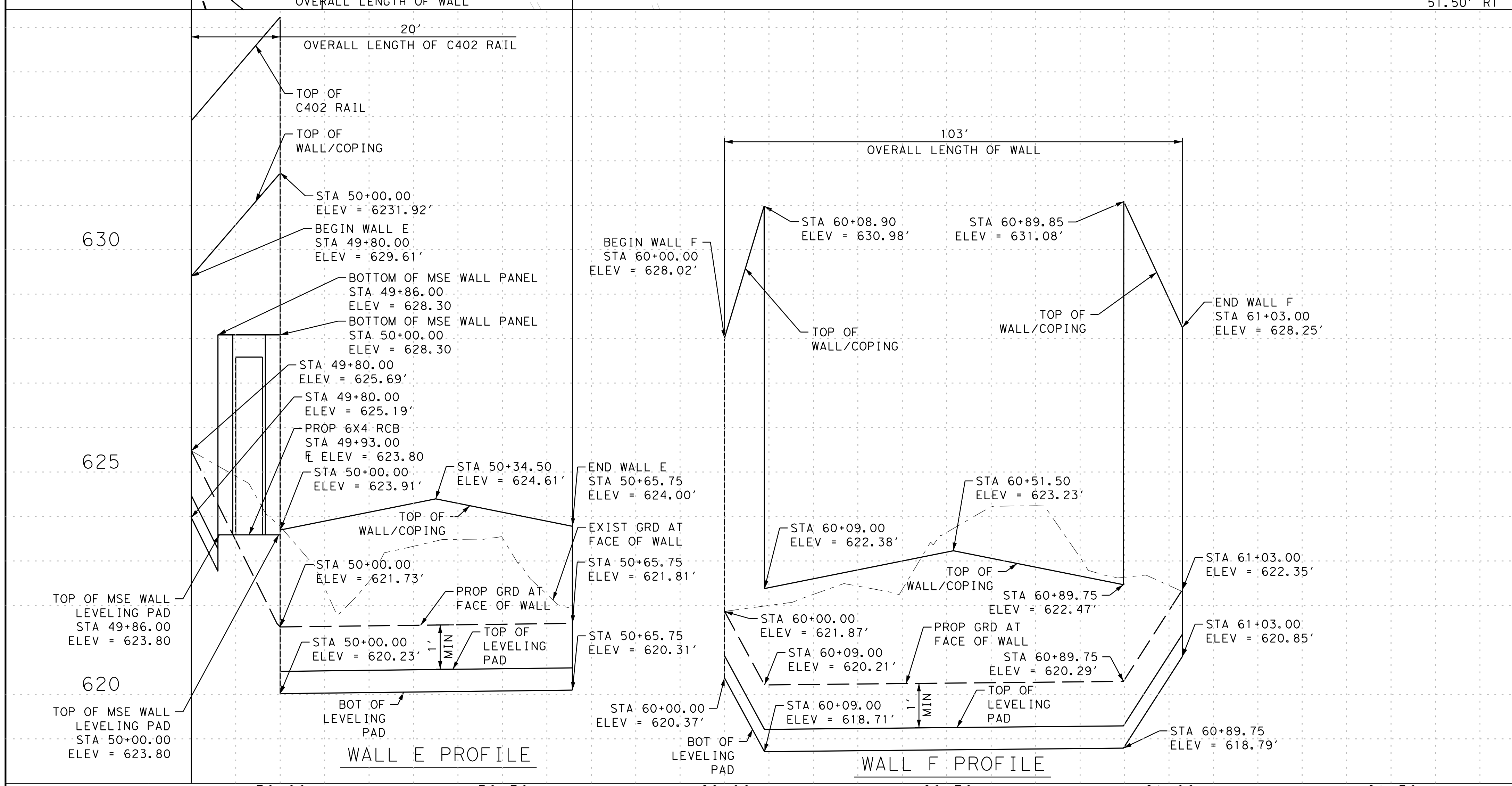
0450-6034	RAIL (TY C402)	LF	20





LEGEND

- TRAFFIC FLOW ARROW
- FIELD INLET
- CURB INLET
- DROP INLET
- MANHOLE

NOTES

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DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

RETAINING WALL PLAN & PROFILE

WALL E & WALL F

SHEET 2 OF 5

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	192

Plotted on: 4/21/2021

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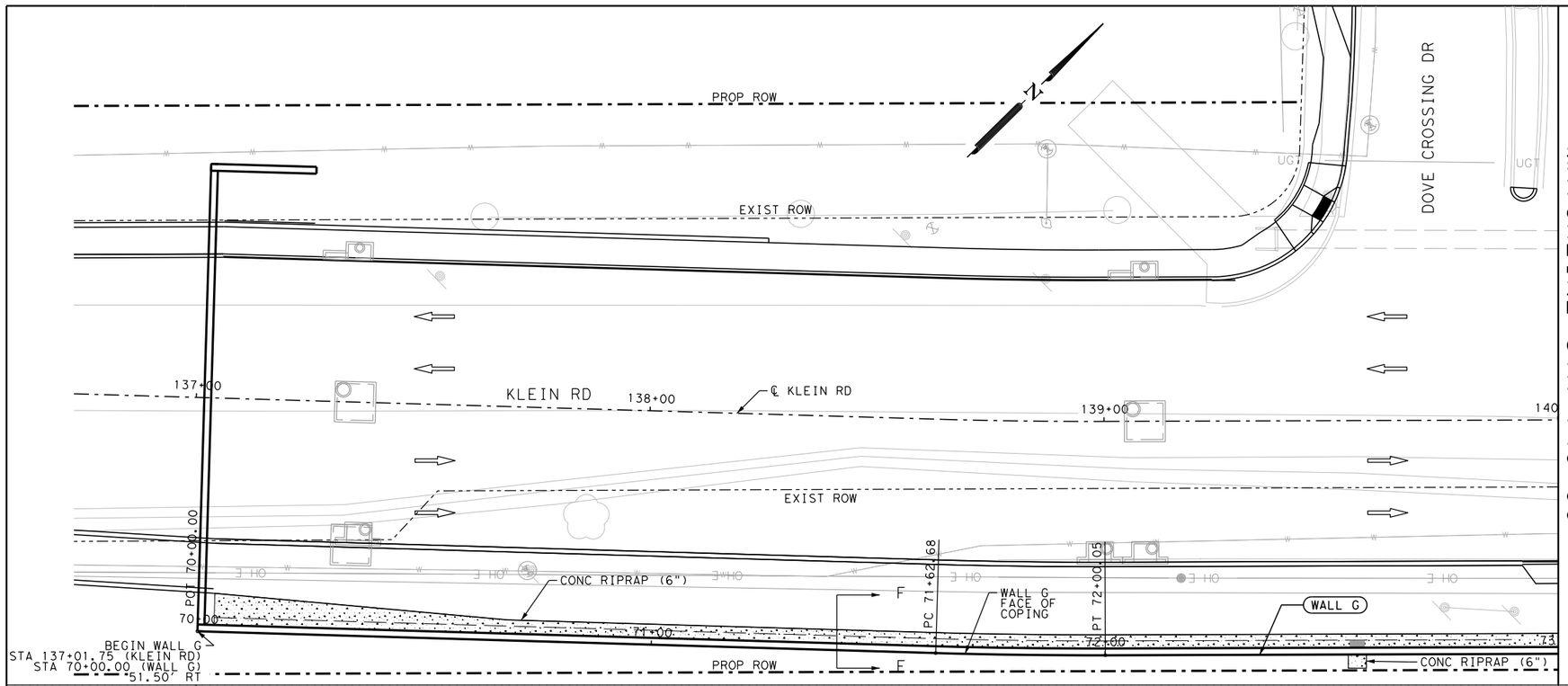

MATCHLINE STA 140+00

ITEM	DESCRIPTION	UNIT	QTY
0423-6001	RETAINING WALL (MSE)	SF	1907

LEGEND

TRAFFIC FLOW ARROW
FIELD INLET
CURB INLET
DROP INLET
MANHOLE

NOTES

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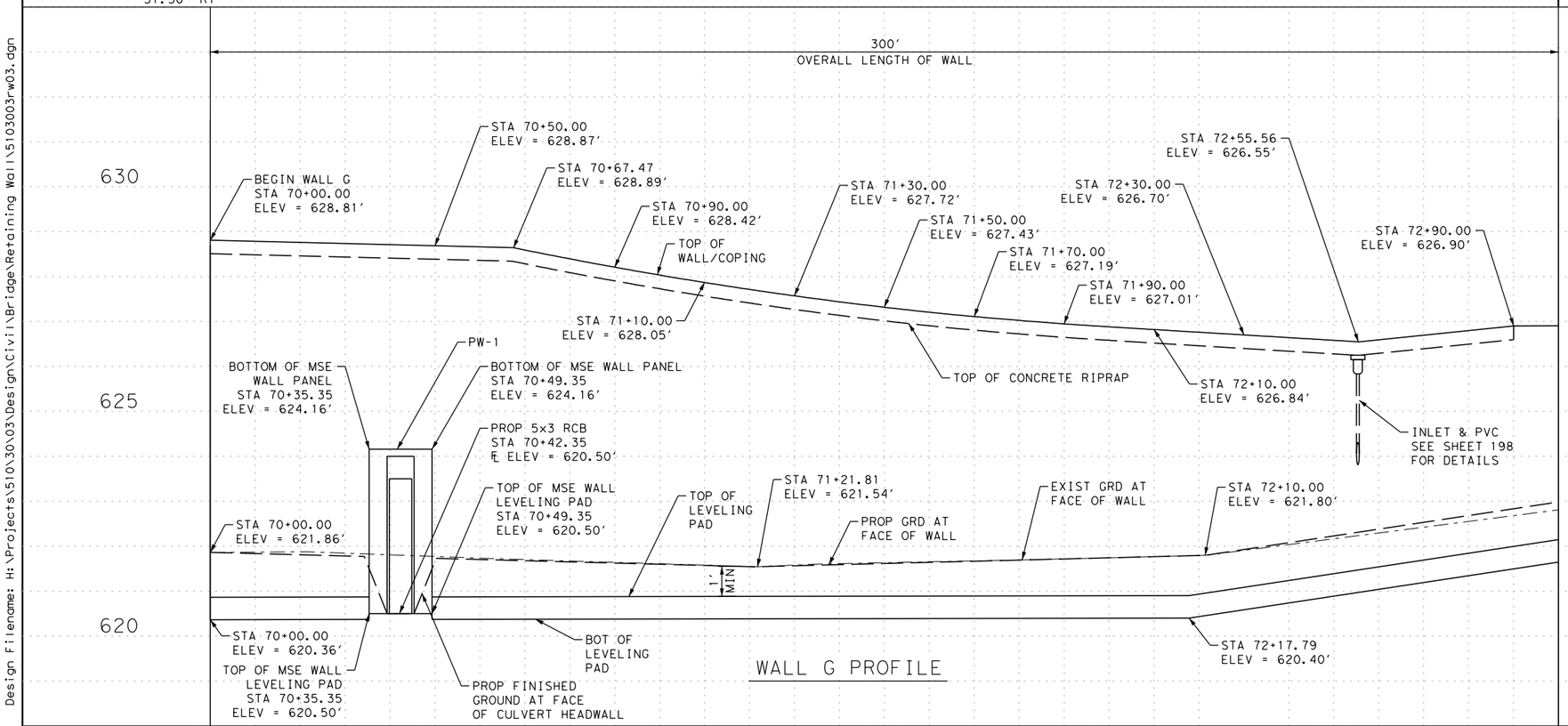

WALL G PROFILE

DESIGN

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

RETAINING WALL PLAN & PROFILE

WALL G (1 OF 2)

SHEET 3 OF 5

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	193

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Bridge\Retaining Wall\5103003rw03.dgn

Plotted on: 1/21/2021

ITEM	DESCRIPTION	UNIT	QTY
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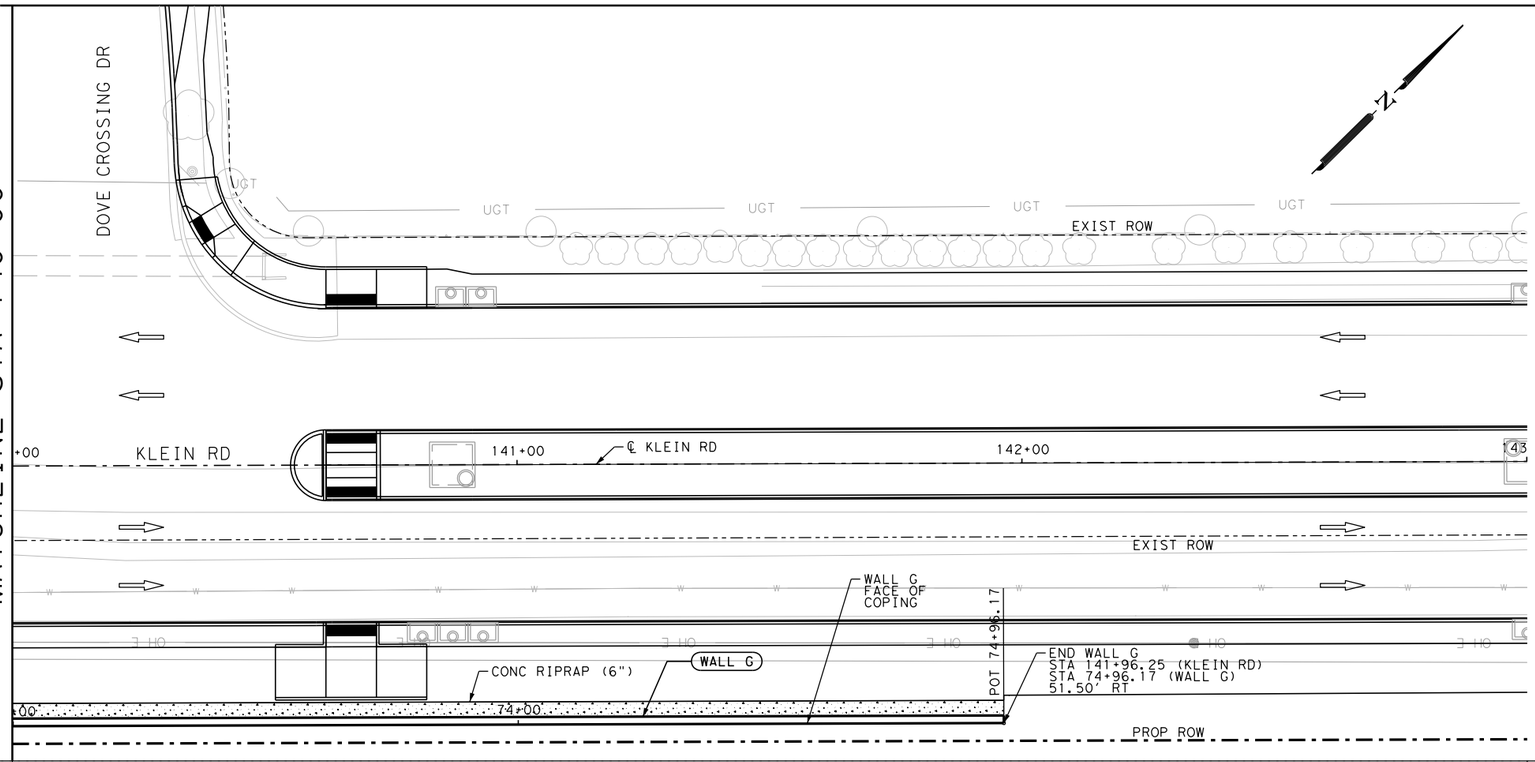

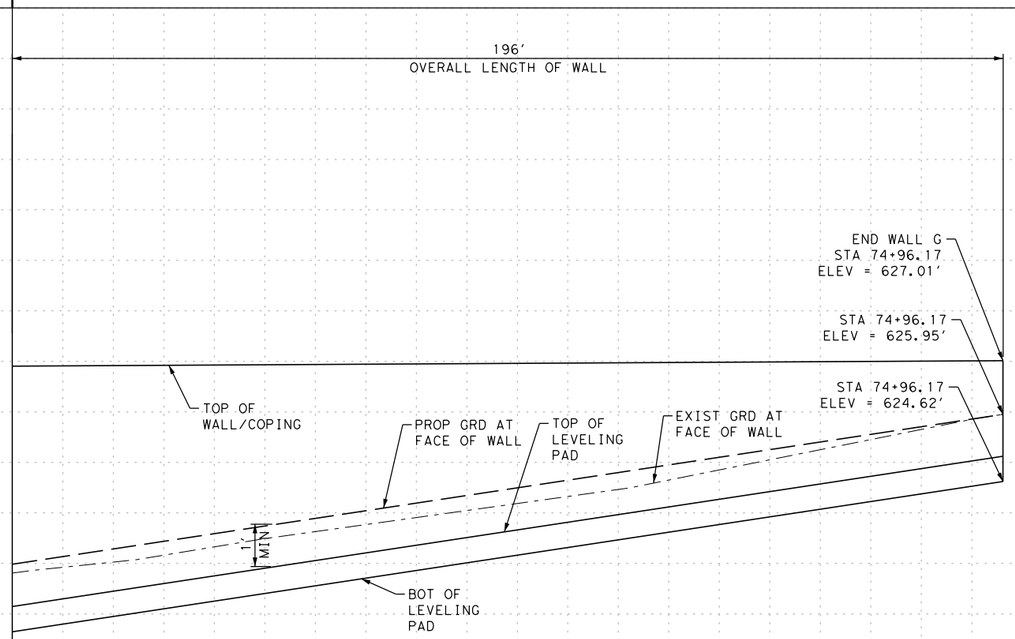

WALL G PROFILE

LEGEND

TRAFFIC FLOW ARROW
FIELD INLET
CURB INLET
DROP INLET
MANHOLE

NOTES

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DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

RETAINING WALL PLAN & PROFILE

WALL G (2 OF 2)

SHEET 4 OF 5

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	194

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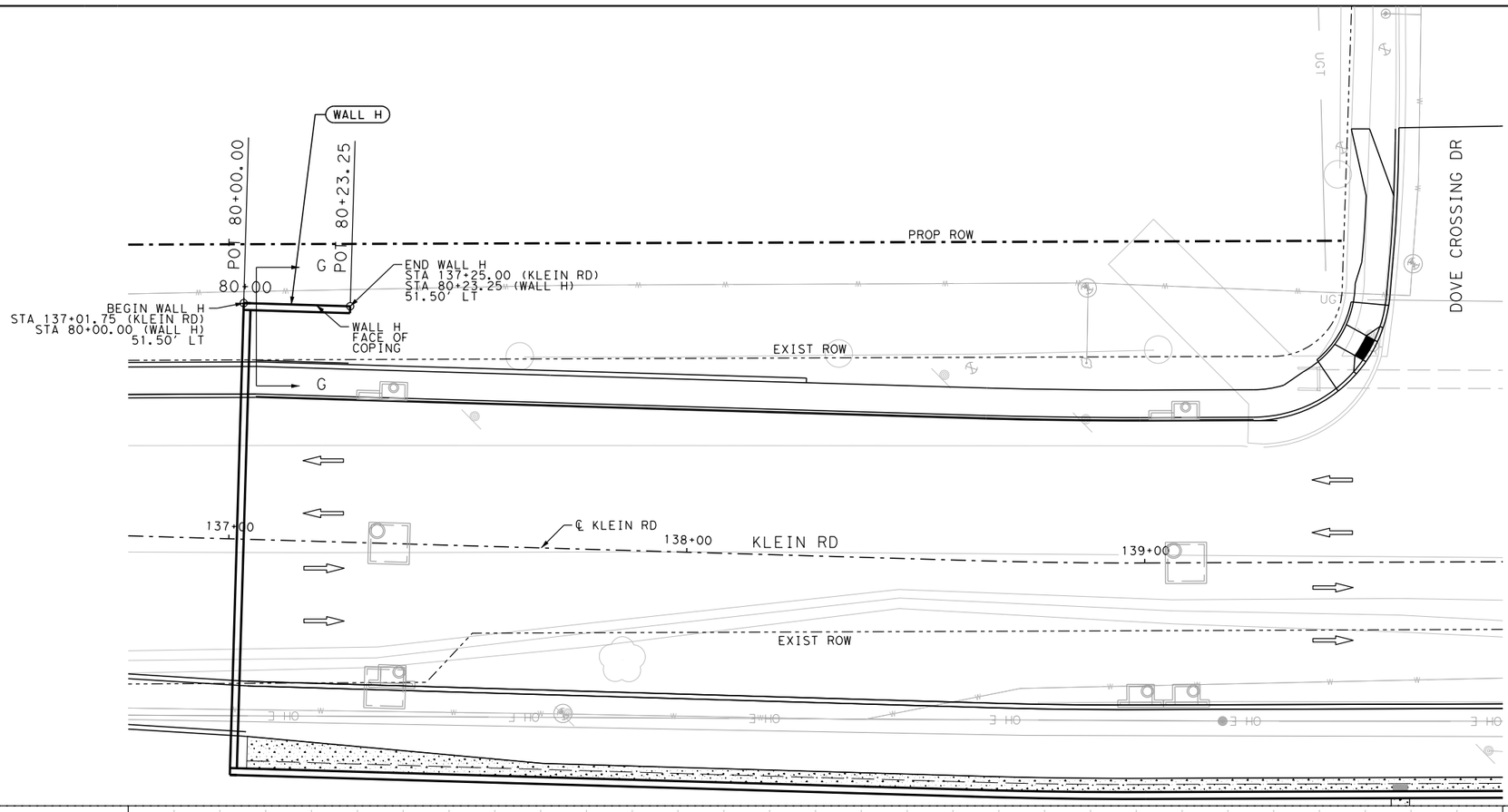

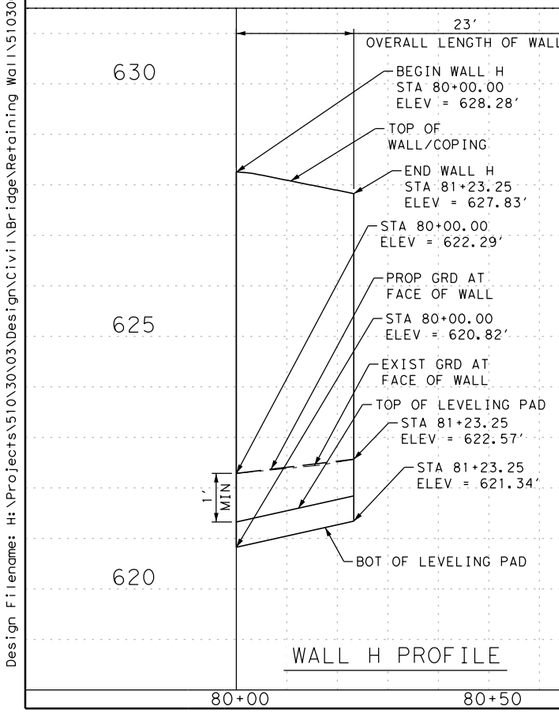

WALL H PROFILE

ITEM	DESCRIPTION	UNIT	QTY
0423-6001	RETAINING WALL (MSE)	SF	162

LEGEND

TRAFFIC FLOW ARROW
FIELD INLET
CURB INLET
DROP INLET
MANHOLE

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7. SEE MISCELLANEOUS WALL DETAILS SHEETS (196-198) FOR SECTION DETAILS.

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1": 30' PROFILE 1": 3'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

RETAINING WALL PLAN & PROFILE

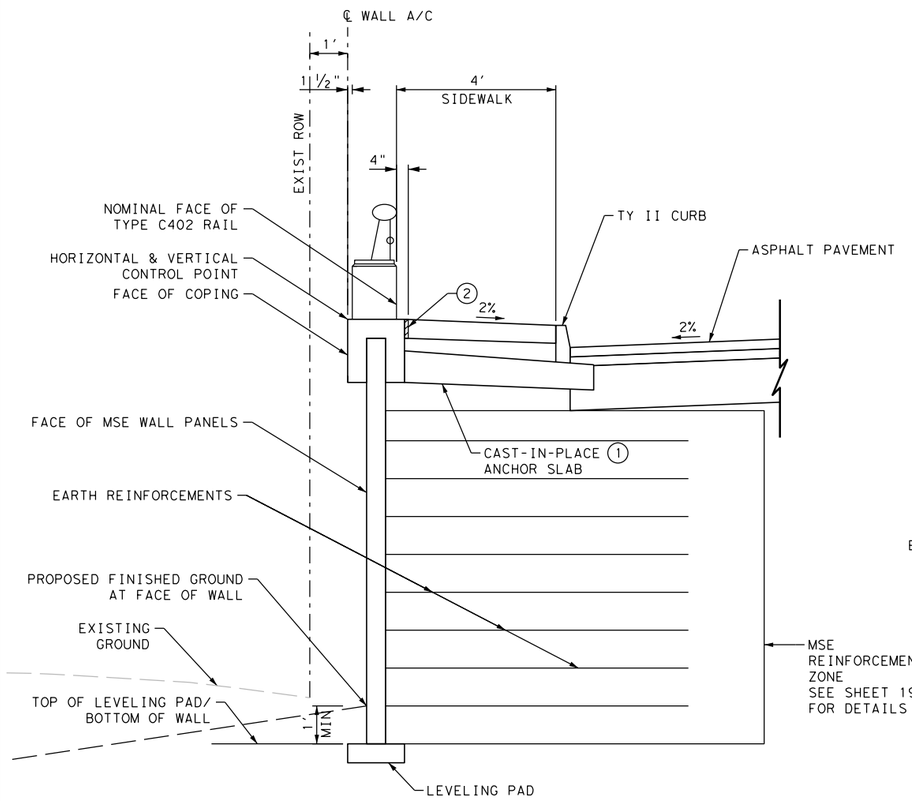
WALL H

SHEET 5 OF 5

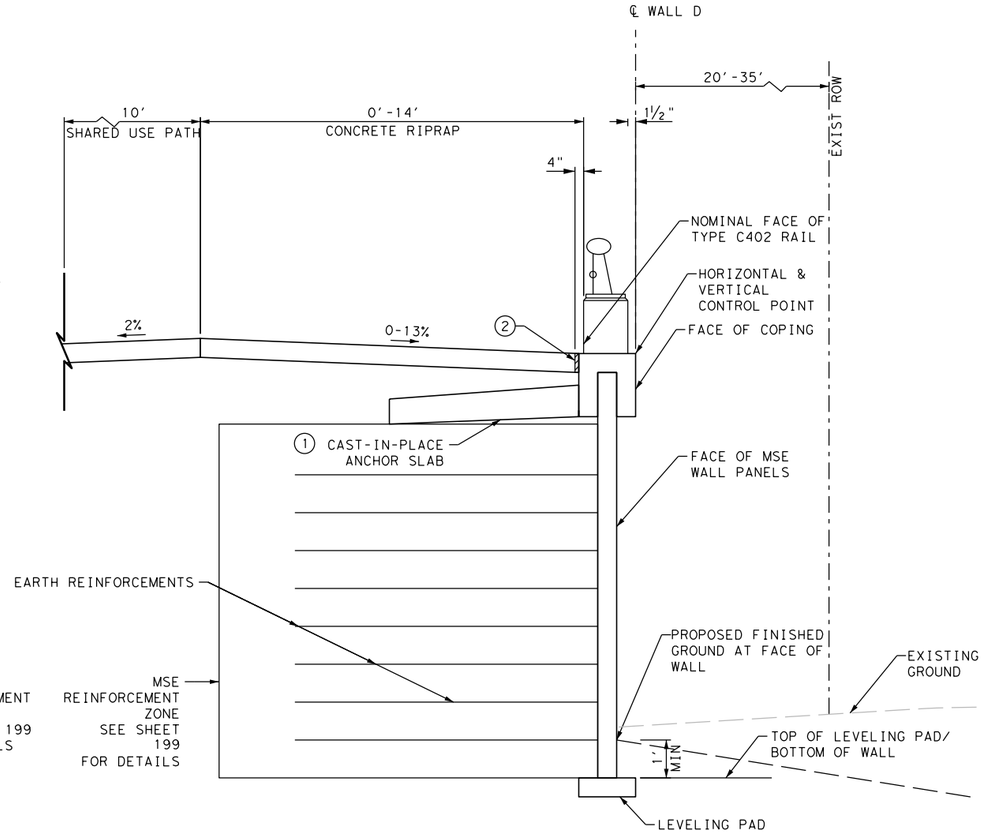
DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	195

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Bridge\Retaining Wall\5103003rw05.dgn



SECTION A-A
(N.T.S.)



SECTION C-C
(N.T.S.)

NOTES:

1. SEE RW (TRF) "RETAINING WALL TRAFFIC RAILING FOUNDATIONS" STANDARD FOR ADDITIONAL DETAILS.
2. 1/2" EXPANSION JOINT FILLER MATERIAL.

DESIGN

STATE OF TEXAS — TYLER PAYNE DUBE — 118612 — LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 4/12/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/12/2021 DATE

NOT TO SCALE

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SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

MISCELLANEOUS WALL DETAILS

SHEET 1 OF 3

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	196

Plotted on: 4/12/2021

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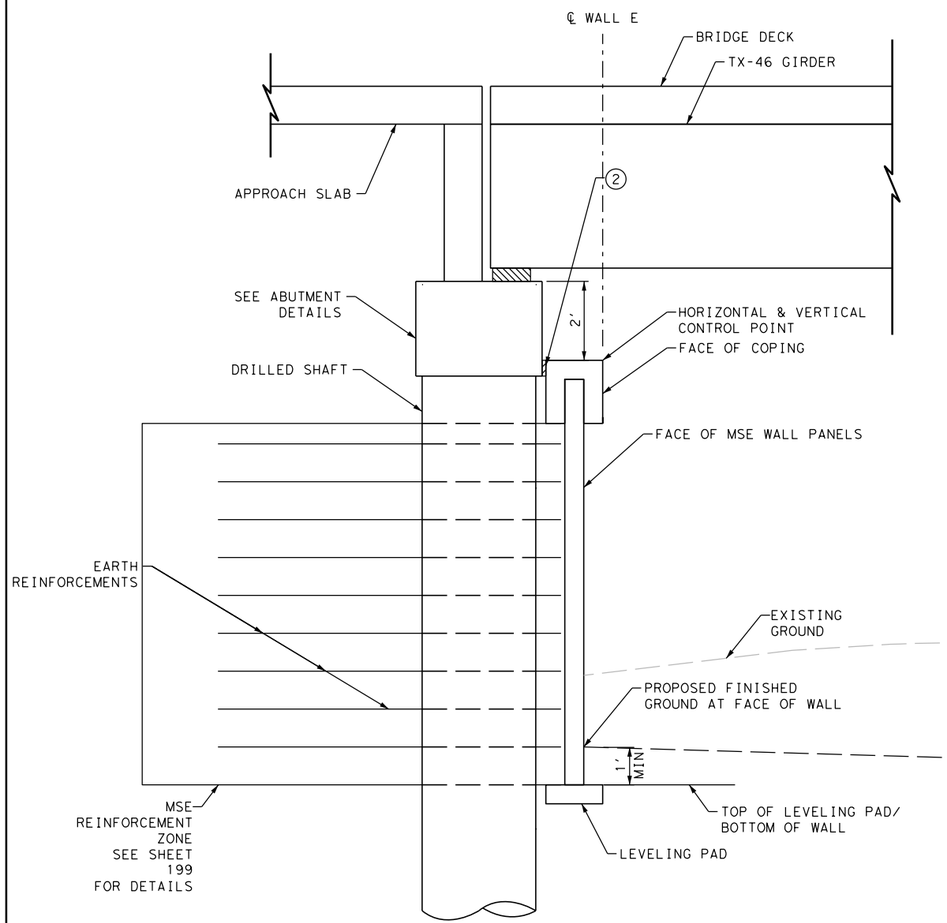
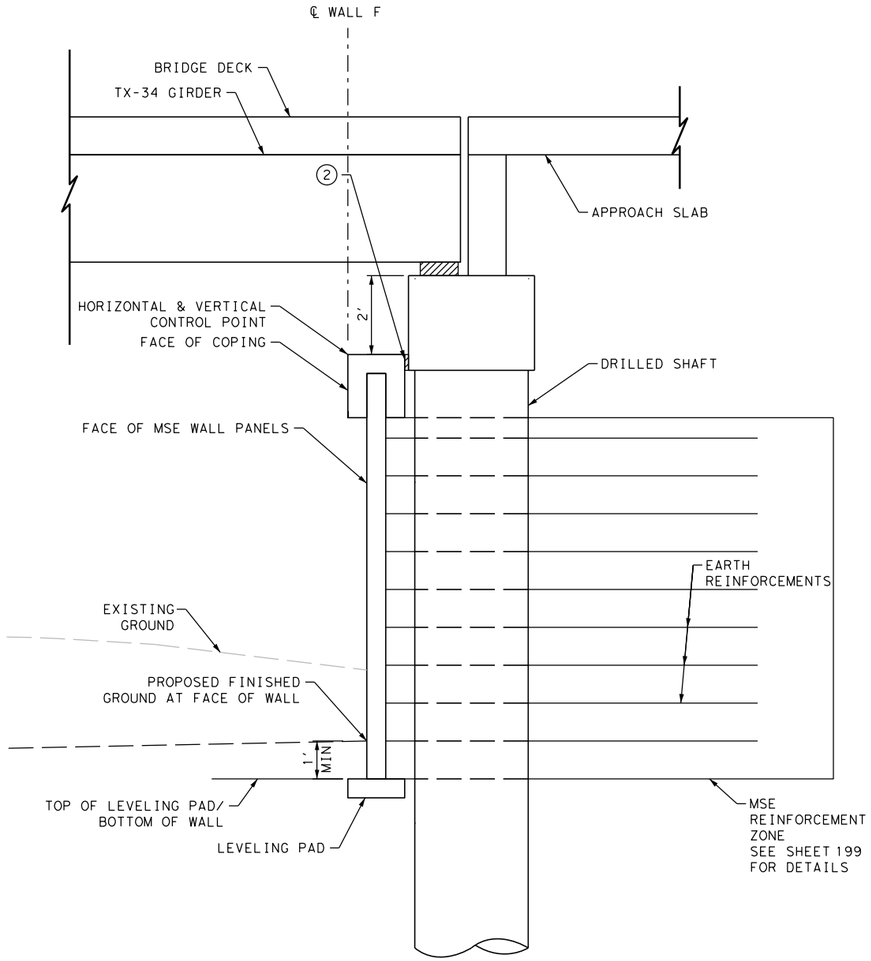


SECTION D-D
(N.T.S.)



SECTION E-E
(N.T.S.)

NOTES:

1. SEE RW (TRF) "RETAINING WALL TRAFFIC RAILING FOUNDATIONS" STANDARD FOR ADDITIONAL DETAILS.
2. 1/2" EXPANSION JOINT FILLER MATERIAL.

DESIGN

STATE OF TEXAS · TYLER PAYNE DUBE · 118612 · LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

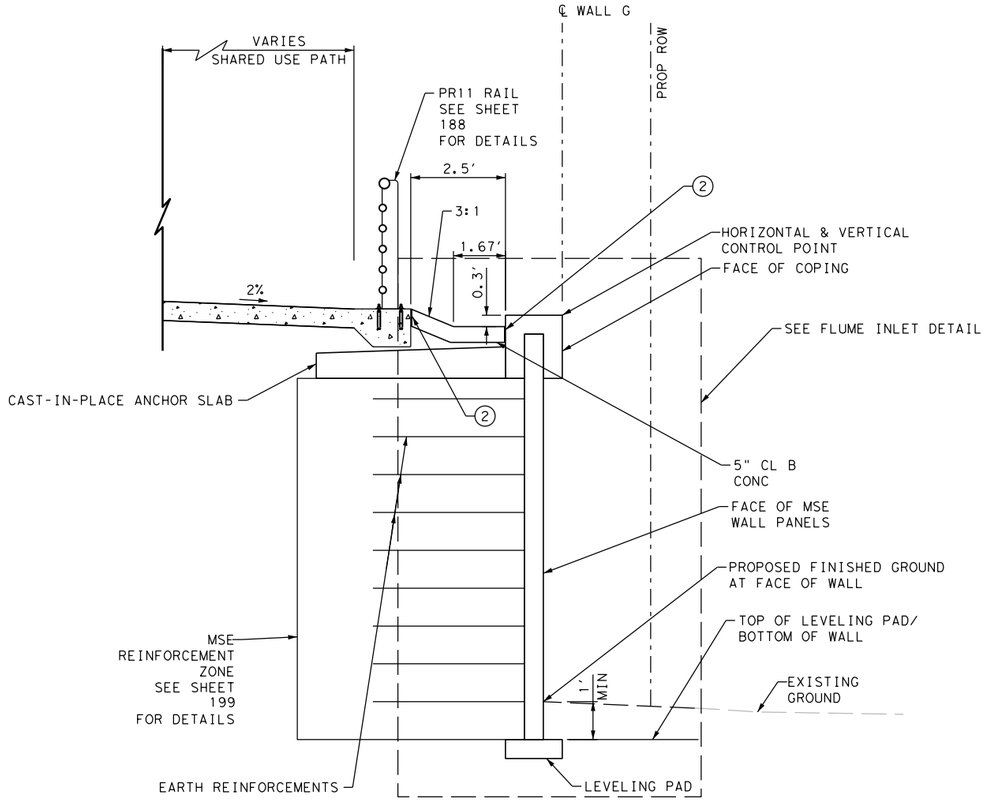
City of New Braunfels

KLEIN RD PHASE 2

MISCELLANEOUS WALL DETAILS

SHEET 2 OF 3

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	197



SECTION F-F
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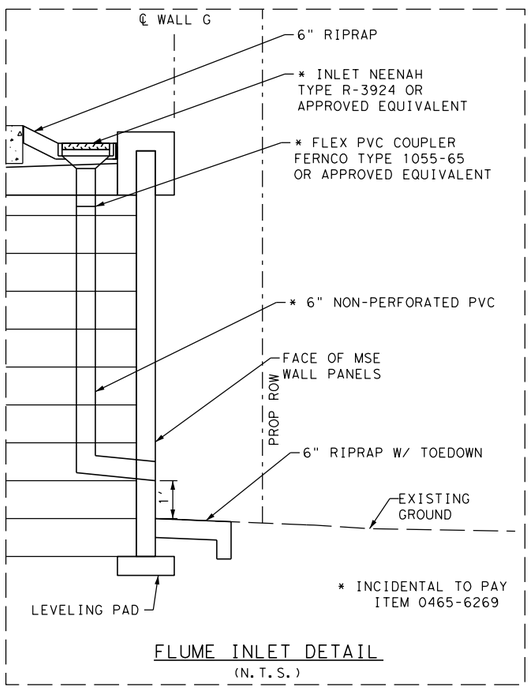
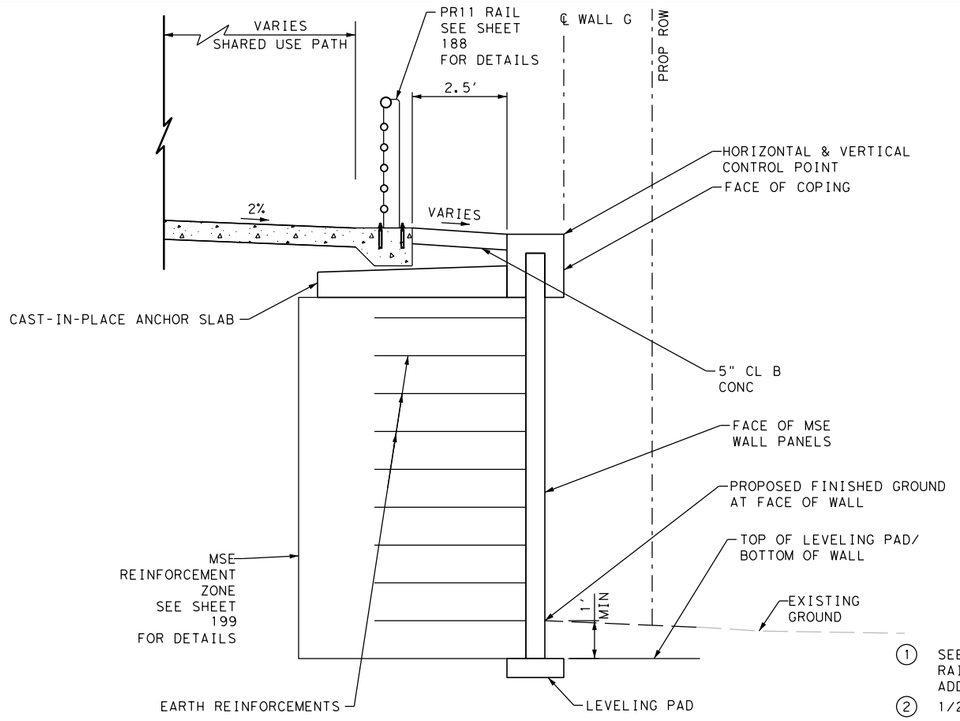
(N.T.S.)



FLUME INLET DETAIL
(N.T.S.)



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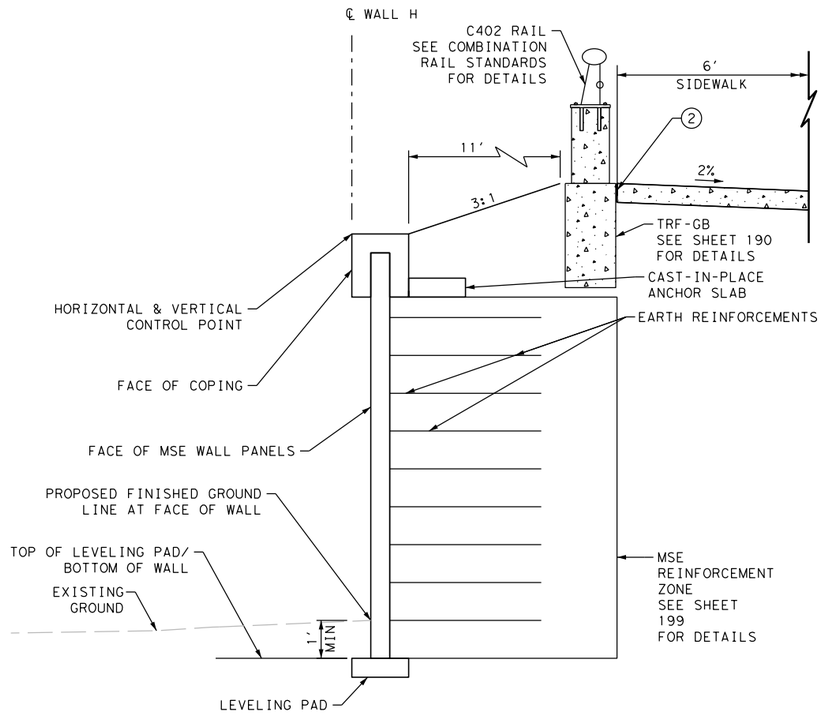
(N.T.S.)



SECTION G-G
(N.T.S.)

NOTES:

1. SEE RW (TRF) "RETAINING WALL TRAFFIC RAILING FOUNDATIONS" STANDARD FOR ADDITIONAL DETAILS.
2. 1/2" EXPANSION JOINT FILLER MATERIAL.

DESIGN

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED
PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/22/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/22/2021 DATE

NOT TO SCALE

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SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
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City of New Braunfels

KLEIN RD PHASE 2

MISCELLANEOUS WALL DETAILS

SHEET 3 OF 3

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	198

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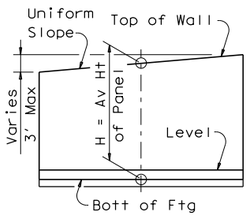
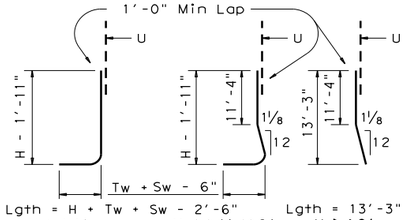


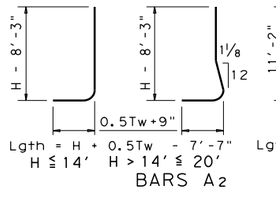
H DEFINITION

Wall Height "H"	PROPERTIES							REINFORCING STEEL FOR ONE 32' PANEL (DESIGN A)																										QUANTITY FOR ONE 32' PANEL		Wall Height "H"
	WALL DIMENSIONS						Max Soil Press	A_1 ~ 26 #5 at 15" c-c		A_2 ~ 25 #6 at 15" c-c		A_3 ~ 25 #7 at 15" c-c		A_4 ~ 26 #8 at 15" c-c		A_5 ~ 25 #9 at 15" c-c		A_6 ~ 25 #11 at 15" c-c		A_7 ~ 26 #11 at 15" c-c		B ~ 26 #5 at 15" c-c		C					D (#5) at 12" c-c		Dowel F at 12" c-c		H (#5) at 12" c-c		T (#5) at 12" c-c		U ~ 26 #5 at 15" c-c		CONC (CY)	REINF (LB)	
(Ft)	Fw	Tw	Sw	Hw	Ft	Kw	T/SF	Lgth	Wt	Lgth	Wt	Lgth	Wt	Lgth	Wt	Lgth	Wt	Lgth	Wt	Lgth	Wt	Lgth	Wt	Size	No	Spa	Lgth	Wt	No	Wt	No	Wt	No	Wt	No	Wt	Lgth	Wt			(Ft)
2	1'-8"	8"	1'-0"	0	9"	9"	0.11																						4	131	3	24			2	66	3'-4"	90	3.6	312	2
3	2'-0"	1'-0"	1'-0"	0	9"	9"	0.15																						6	197	4	32	2	66	2	66	5'-4"	145	5.1	506	3
4	2'-8"	1'-4"	1'-0"	4"	1'-0"	9"	0.21	3'-10"	104													3'-6"	95	#4	26	15"	1'-10"	32	8	263	6	48	2	66	2	66	7'-4"	199	7.4	873	4
5	3'-6"	1'-9"	1'-0"	9"	1'-0"	9"	0.23	5'-3"	142													4'-6"	122	#4	26	15"	2'-3"	39	10	329	7	56	2	66	3	99	8'-4"	226	9.6	1079	5
6	4'-3"	2'-2"	1'-0"	1'-1"	1'-0"	9"	0.24	6'-8"	181													5'-6"	149	#4	26	15"	2'-8"	46	12	394	8	64	3	99	3	99	8'-4"	226	11.6	1259	6
7	5'-0"	2'-6"	1'-0"	1'-6"	1'-0"	9"	0.27	8'-0"	217													6'-6"	176	#4	26	15"	3'-0"	52	14	460	9	72	3	99	3	99	8'-4"	226	13.7	1401	7
8	5'-8"	2'-10"	1'-0"	1'-10"	1'-0"	9"	0.30	9'-4"	253													7'-6"	203	#4	26	15"	3'-4"	58	16	526	10	80	3	99	4	131	8'-4"	226	15.7	1575	8
9	6'-4"	3'-2"	1'-0"	2'-2"	1'-0"	9"	0.33	10'-8"	284													8'-6"	231	#4	26	15"	3'-8"	64	18	591	11	88	3	99	4	131	8'-4"	226	17.7	1714	9
10	7'-0"	3'-6"	1'-0"	2'-6"	1'-0"	9"	0.36	12'-0"	325	4'-2"	156											9'-6"	258	#4	38	10"	4'-0"	102	20	657	12	96	4	131	4	131	8'-4"	226	19.6	2082	10
11	7'-9"	3'-10"	1'-0"	2'-11"	1'-0"	9"	0.39	13'-4"	362	5'-4"	200											10'-6"	285	#6	38	10"	4'-4"	247	22	723	13	104	4	131	5	164	8'-4"	226	21.7	2436	11
12	8'-6"	4'-3"	1'-0"	3'-3"	1'-0"	9"	0.40	14'-9"	400	6'-7"	247											11'-6"	312	#6	38	10"	4'-9"	271	24	789	14	112	4	131	5	164	8'-4"	226	23.8	2651	12
13	9'-2"	4'-7"	1'-0"	3'-7"	1'-0"	9"	0.43	16'-1"	436	7'-8"	288	6'-9"	345									12'-6"	339	#7	38	10"	5'-1"	395	26	854	15	120	5	164	6	197	8'-4"	226	25.8	3364	13
14	9'-10"	4'-11"	1'-0"	3'-11"	1'-0"	1'-0"	0.47	17'-5"	472	8'-11"	335	8'-1"	413									13'-6"	366	#8	38	10"	5'-5"	550	28	920	16	128	5	164	6	197	8'-4"	226	28.2	3771	14
15	10'-6"	5'-3"	1'-1 1/8"	4'-1 7/8"	1'-0"	1'-0"	0.50	18'-10"	511	10'-1"	379	9'-6"	485									14'-6"	393	#9	38	10"	5'-9"	743	30	986	17	136	6	197	6	197	8'-4"	226	30.3	4253	15
16	11'-2"	5'-7"	1'-2"	4'-5"	1'-3"	1'-3"	0.55	13'-3"	359	11'-2"	419	10'-11"	558	8'-5"	584							15'-6"	420	#9	38	10"	6'-1"	786	32	1051	18	144	6	197	7	230	8'-4"	226	36.0	4974	16
17	11'-10"	5'-11"	1'-3 1/8"	4'-7 7/8"	1'-3"	1'-3"	0.58	13'-3"	359	12'-5"	466	12'-4"	630	9'-10"	683							16'-6"	447	#9	38	10"	6'-5"	829	34	1117	19	152	7	230	7	230	8'-4"	226	38.5	5369	17
18	12'-6"	6'-3"	1'-4"	4'-11"	1'-6"	1'-3"	0.63	13'-3"	359	13'-7"	510	13'-9"	703	11'-2"	775							17'-6"	475	#9	38	10"	6'-9"	872	34	1117	19	152	7	230	8	263	8'-4"	226	44.3	5682	18
19	13'-3"	6'-7"	1'-5"	5'-3"	1'-6"	1'-6"	0.66	13'-3"	359	14'-9"	554	15'-2"	775	12'-8"	879							18'-6"	502	#9	38	10"	7'-2"	926	36	1183	20	160	7	230	8	263	8'-4"	226	48.1	6057	19
20	13'-10"	6'-11"	1'-6 1/4"	5'-4 3/4"	1'-6"	1'-6"	0.70	13'-3"	359	15'-11"	598	16'-7"	847	14'-1	978							19'-6"	529	#10	38	10"	7'-5"	1213	38	1248	21	168	8	263	8	263	8'-4"	226	50.9	6692	20
21	14'-6"	7'-3"	1'-7"	5'-8"	1'-9"	1'-6"	0.75	13'-3"	359	11'-2"	419	18'-0"	920	15'-5"	1070	9'-7"	815					20'-6"	556	#10	38	10"	7'-9"	1267	40	1314	22	176	8	263	9	296	8'-4"	226	57.7	7681	21
22	15'-2"	7'-7"	1'-8 1/8"	5'-10 7/8"	1'-9"	1'-6"	0.78	13'-3"	359	11'-2"	419	19'-5"	992	16'-11"	1174	10'-11"	928					21'-6"	583	#10	38	10"	8'-1"	1322	42	1380	23	184	8	263	9	296	8'-4"	226	61.0	8126	22
23	16'-0"	8'-0"	1'-9 1/4"	6'-2 3/4"	1'-9"	1'-6"	0.79	13'-3"	359	11'-2"	419	20'-11"	1069	18'-5"	1278	12'-4"	1048					22'-6"	610	#8	76	5"	8'-6"	1725	44	1446	24	192	9	296	10	329	8'-4"	226	64.8	8997	23
24	16'-6"	8'-3"	1'-10 1/8"	6'-4 7/8"	2'-0"	1'-6"	0.86	13'-3"	359	11'-2"	419	22'-3"	1137	19'-9"	1371	13'-7"	1155					23'-6"	637	#8	76	5"	8'-9"	1776	46	1511	25	200	9	296	10	329	8'-4"	226	72.4	9416	24
25	17'-3"	8'-7"	1'-11 1/4"	6'-8 3/4"	2'-0"	1'-6"	0.89	13'-3"	359	11'-2"	419	12'-2"	622	21'-2"	1469	15'-0"	1275	6'-1"	808			24'-6"	664	#8	76	5"	9'-2"	1860	48	1577	26	208	9	296	10	329	8'-4"	226	76.4	10112	25
26	18'-0"	9'-0"	2'-0 1/8"	6'-11 7/8"	2'-3"	1'-6"	0.93	13'-3"	359	11'-2"	419	12'-2"	622	22'-8"	1574	16'-4"	1388	7'-1"	941			25'-6"	692	#8	76	5"	9'-6"	1928	50	1643	27	217	10	329	11	361	8'-4"	226	85.2	10698	26
27	18'-6"	9'-4"	2'-1 1/4"	7'-0 3/4"	2'-3"	1'-6"	0.97	13'-3"	359	11'-2"	419	12'-2"	622	24'-1"	1672	17'-8"	1502	8'-1"	1074			26'-6"	719	#9	76	5"	9'-10"	2541	52	1708	28	225	10	329	11	361	8'-4"	226	89.0	11757	27
28	19'-3"	9'-7"	2'-2 3/8"	7'-5 5/8"	2'-3"	1'-9"	1.00	13'-3"	359	11'-2"	419	12'-2"	622	25'-5"	1764	19'-0"	1615	9'-1"	1206			27'-6"	746	#9	76	5"	10'-1"	2606	54	1774	29	233	10	329	12	394	8'-4"	226	94.5	12293	28
29	20'-0"	10'-0"	2'-3 1/2"	7'-8 1/2"	2'-3"	1'-9"	1.02	13'-3"	359	11'-2"	419	12'-2"	622	27'-0"	1874	20'-5"	1735	10'-1"	1339			28'-6"	773	#9	76	5"	10'-5"	2692	56	1840	30	241	11	361	12	394	8'-4"	226	99.2	12874	29
30	20'-6"	10'-4"	2'-4 5/8"	7'-9 3/8"	2'-3"	1'-9"	1.06	13'-3"	359	11'-2"	419	12'-2"	622	14'-4"	995	21'-9"	1849	11'-1"	1472	17'-0"	2348	29'-6"	800	#10	76	5"	10'-9"	3516	58	1906	31	249	11	361	12	394	8'-4"	226	103.3	15515	30
31	21'-3"	10'-7"	2'-5 3/4"	8'-2 1/4"	2'-3"	1'-9"	1.09	13'-3"	359	11'-2"	419	12'-2"	622	14'-4"	995	23'-0"	1955	12'-1"	1605	18'-4"	2533	30'-6"	827	#10	76	5"	11'-2"	3652	60	1971	32	257	11	361	13	427	8'-4"	226	108.2	16209	31
32	22'-0"	11'-0"	2'-6 1/2"	8'-5 1/2"	2'-6"	1'-9"	1.13	13'-3"	359	11'-2"	419	12'-2"	622	14'-4"	995	24'-5"	2075	13'-1"	1738	19'-10"	2740	31'-6"	854	#10	76	5"	11'-6"	3761	60	1971	32	257	12	394	13	427	8'-4"	226	118.9	16837	32

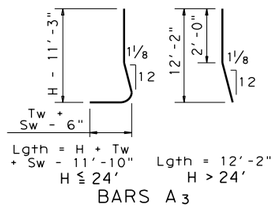


BARS A_1

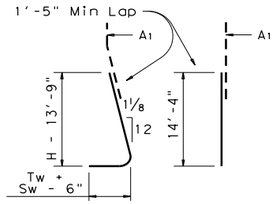
1. Place vertical bars inside of horizontal bars (Typ both faces).
2. Place footing toe against undisturbed soil.
3. See standard RW 2 for size.



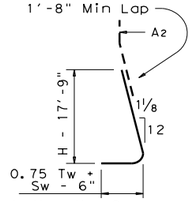
BARS A_2



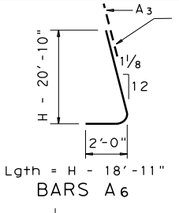
BARS A_3



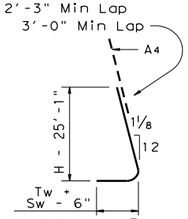
BARS A_4



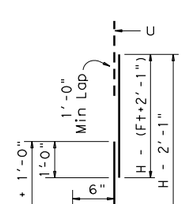
BARS A_5



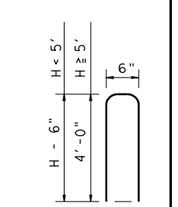
BARS A_6



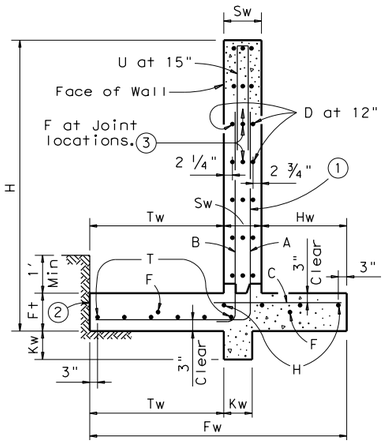
BARS A_7



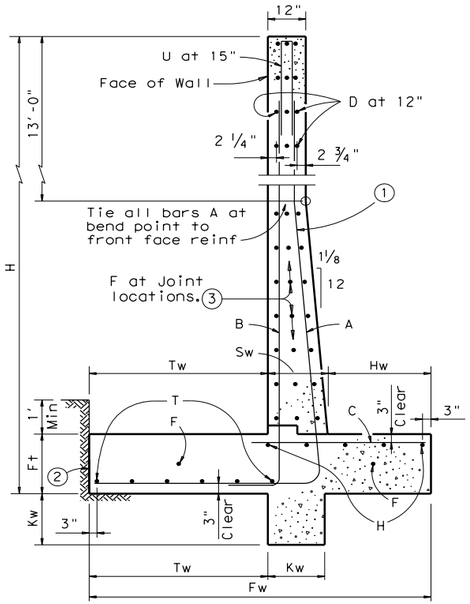
BARS B



BARS U

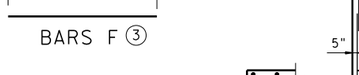


H ≦ 14'



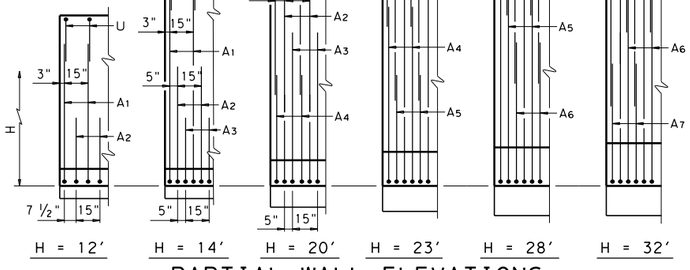
H > 14'

SECTIONS



BARS D, H, T

BARS F (3)



PARTIAL WALL ELEVATIONS

(Showing vertical reinforcing pattern in back face)

GENERAL NOTES:

All concrete to be Class "C".
All reinforcing steel to be Grade 60.
For notes and details not shown on this sheet see sheet RW2.
Quantities are based on "H" being average height of panel.
Retaining Walls are designed to be coded as follows on Retaining Wall Layout Sheets.

HC - 21 - 28
LA - 28 - 32

- Panel Length ~ 32' is standard; 28' requires special quantities
- Average Height "H" of panel
- Design - A = no surcharge or slope above wall; B = slopes up to 4:1; C = traffic surcharge and/or slopes up to 2.5:1
- Footing pressure design ~ L = low, H = high

Texas Department of Transportation — Bridge Division Standard

RETAINING WALLS

RW 1(L)A

FILE: rwstde05.dgn	DN: TxDOT	CK: TxDOT	DW: GHO	CK: MPM
©TxDOT March 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		199

DATE: 1/21/2021 1:28:29 PM
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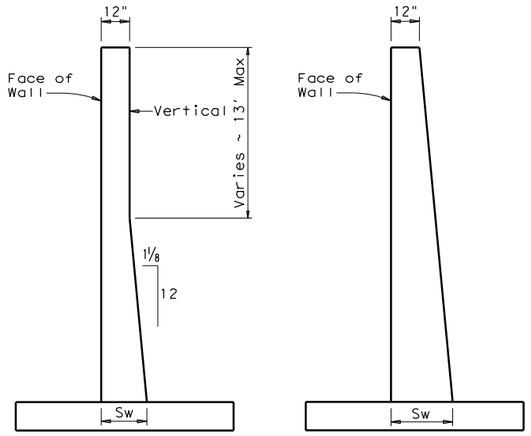
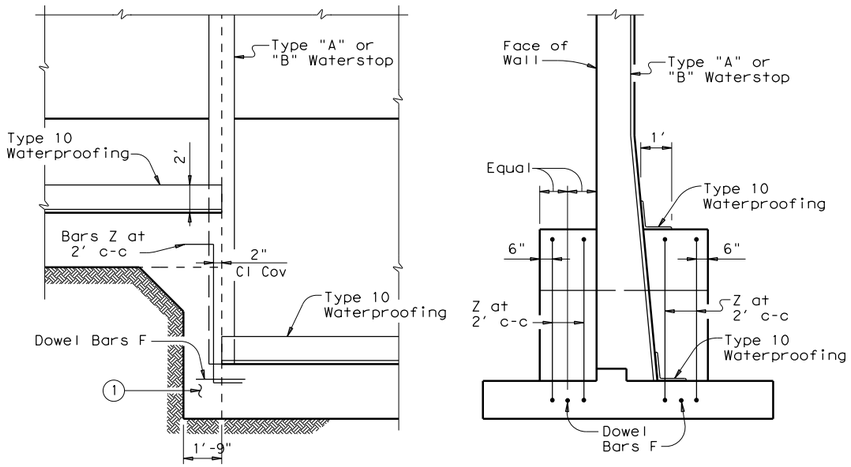


AS DETAILED
ALL HEIGHTS
(Basis for payment)

FRONT FACE VERTICAL
BACK FACE SLOPED

ALTERNATE STEM SLOPE DETAILS

Walls with slopes other than those shown may be used after approval by the Engineer. Sw shall not be less than shown in Table on Sheet 1. No payment will be made for excess concrete due to changing of slope of wall stem.

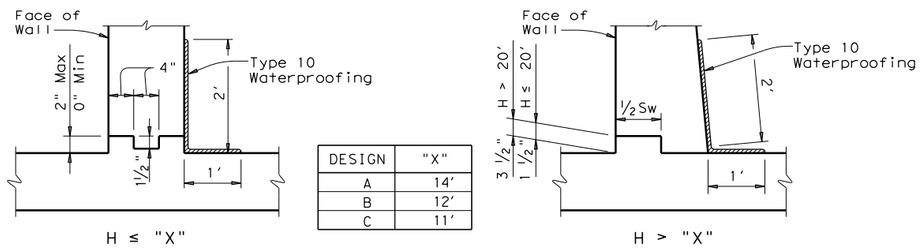


PARTIAL ELEVATION

PARTIAL SECTION

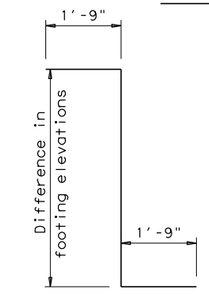
SHOWING WATERSTOP AT FOOTING JOINT

(1) Unreinforced Class "C" Concrete when difference in top of footing elevations is less than 6'. Omit when Dowel Bars F can be placed between adjacent footings with 4" cover top and bottom.



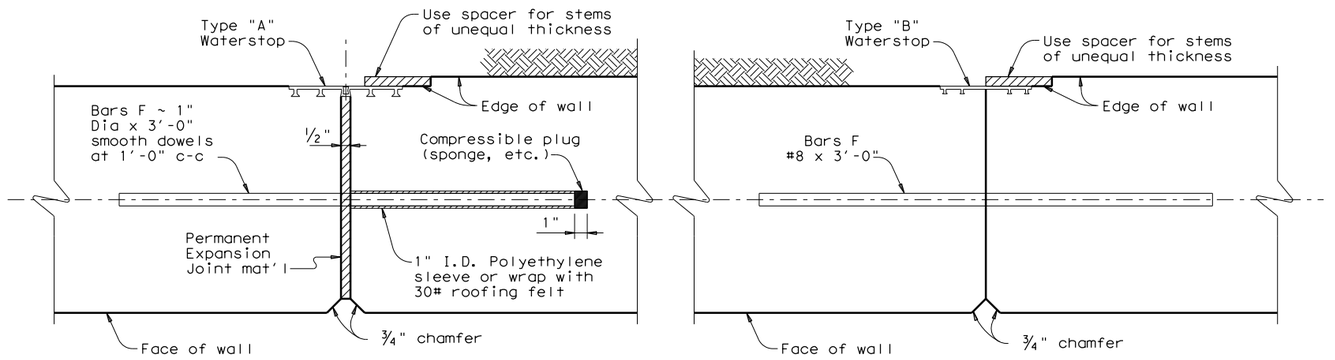
DESIGN	"X"
A	14'
B	12'
C	11'

JOINT AND WATERSTOP DETAILS



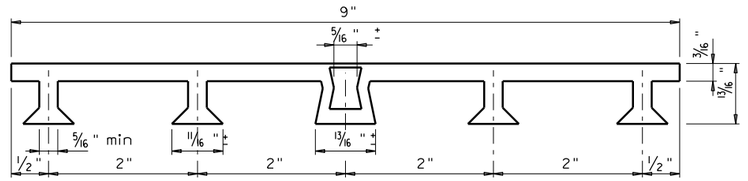
BARS Z (#5)

Omit Bars Z when difference in top of footing elevations is less than 6'.

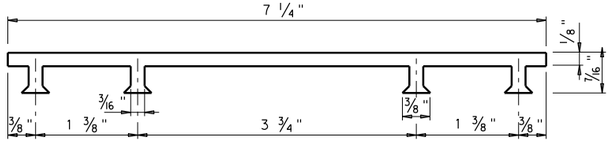


EXPANSION JOINT

CONSTRUCTION JOINT



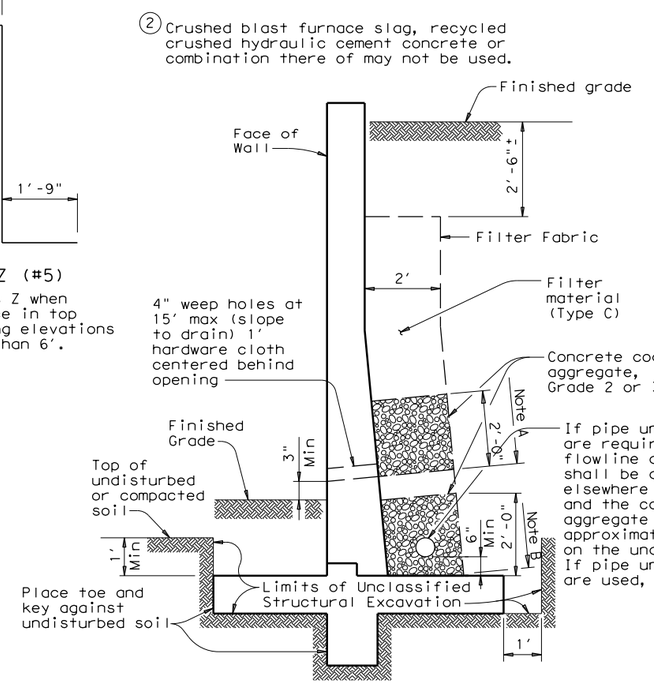
PVC WATERSTOP TYPE "A"



PVC WATERSTOP TYPE "B"

Note: Dimensions and shapes may vary slightly depending on manufacturer.

(2) Crushed blast furnace slag, recycled crushed hydraulic cement concrete or combination there of may not be used.



DRAINAGE DETAILS AND EXCAVATION DIAGRAM

Note A: Stop coarse aggregate at this level when weep holes are used.

Note B: Use coarse aggregate to here with filter material above when underdrains are used.

GENERAL NOTES:

Walls are designed assuming unit weight of soil = 120 pcf, and coefficient of horizontal earth pressure = 0.33.

Walls are designed to provide a minimum factor of safety against sliding of 1.5. The undisturbed or compacted soil depth in front of walls, from bottom of Key up, shall not be less than Kw + Ft + 1'.

Retaining walls are detailed to be placed on grades up thru 10% with footing level, with no changes in reinforcing steel. Steeper grades can be accommodated by shortening Bars A1 and B and increasing length of legs of Bars U by the same amount. No change in Quantities will be involved

Retaining walls may be placed on Horizontal Curves by adjusting lengths of footing Bars T and H. Minor revisions of Concrete Quantities may be required.

Designed in accordance with current AASHTO Standard and Interim Specifications.

All concrete to be Class "C".

All reinforcing steel to be Grade 60.

Texas Department of Transportation

Bridge Division Standard

RETAINING WALL MISCELLANEOUS DETAILS

RW 2

FILE: rwstde11.dgn	DN: TxDOT	CK: TxDOT	DW: JGD	CK: MJG
©TxDOT March 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
04-11: Added Note 2.	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		200

DATE: 1/21/2021 1:28:31 PM
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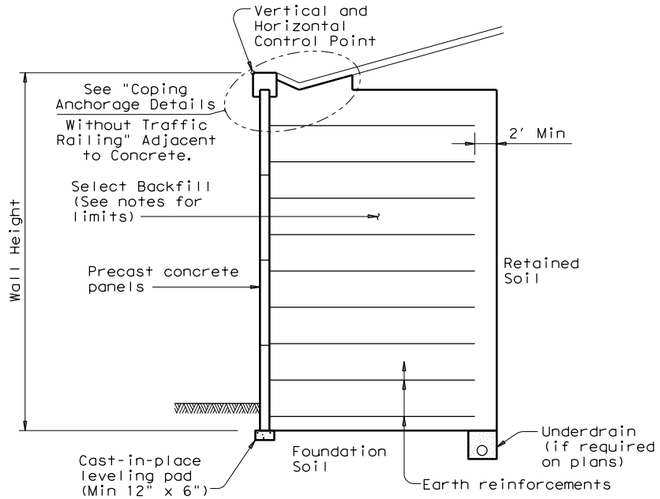
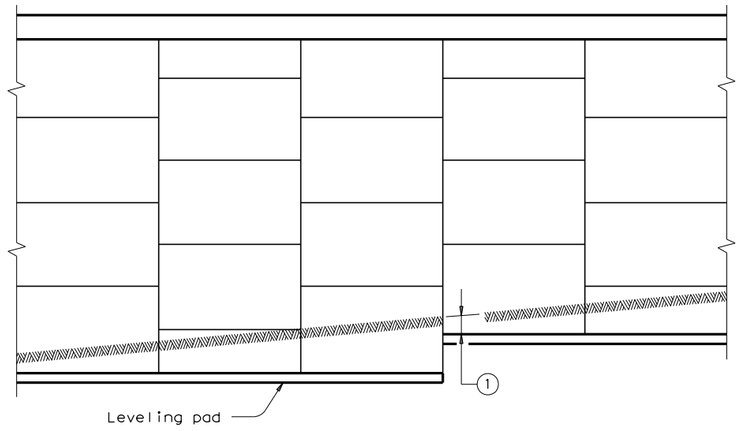
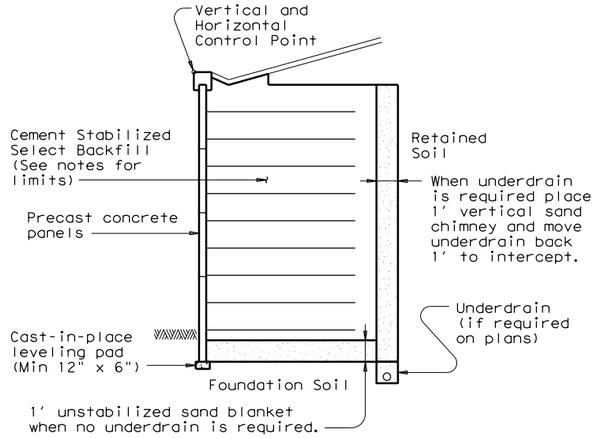


TYPICAL SECTION

(Wall at bottom of slope)

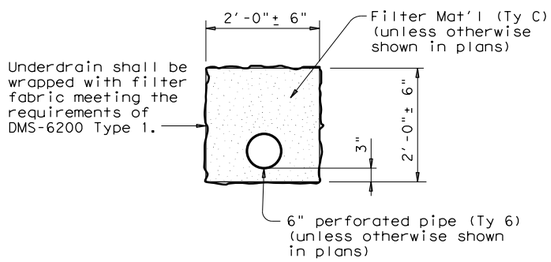


ELEVATION

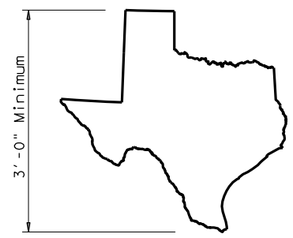


SPECIAL DRAINAGE PROVISIONS

(When cement stabilized backfill is used)



UNDERDRAIN DETAIL



MAP OF TEXAS EMBLEM ②

① Minimum embedment conforming to values given on the RW(MSE)DD standard.

② Map of Texas emblem shall be formed into a wall panel next to each bridge abutment. The exact location of each emblem shall be approved by the Engineer. The cost of forming the emblems will not be paid for directly, but shall be incidental to the Item "Retaining Wall". The map of Texas shall be inset a minimum of ¾" into the face of the panel, and shall receive a smooth finish. The inset area shall be finished in a contrasting color as approved by the Engineer.

Texas Department of Transportation

Bridge Division Standard

MECHANICALLY STABILIZED EARTH RETAINING WALL

RW(MSE)

FILE: rwstde01.dgn	DN: TxDOT	CK: TxDOT	DW: JGD	CK: MJG
©TxDOT March 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS 04-11: Added Table & Corrosion Criteria. 01-13: Wall embed, (WS) table, retained fill, soil strength.				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		201

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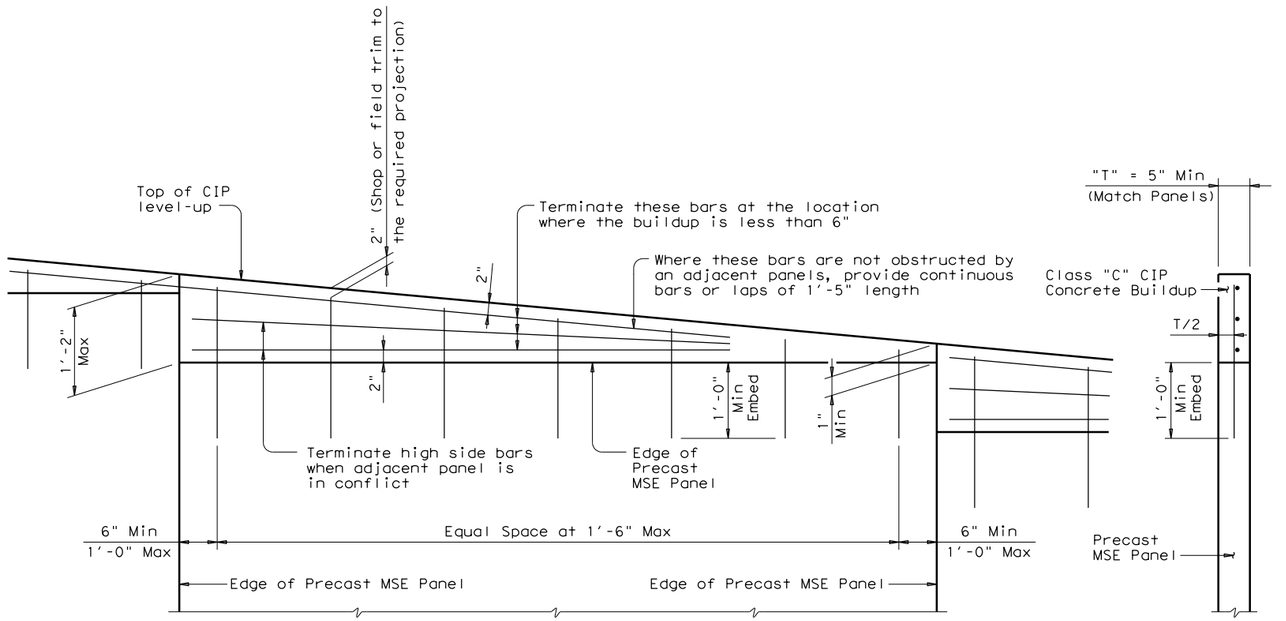


LEVEL UP DETAIL (5)

Provide Grade 60 (#4) Reinforcement

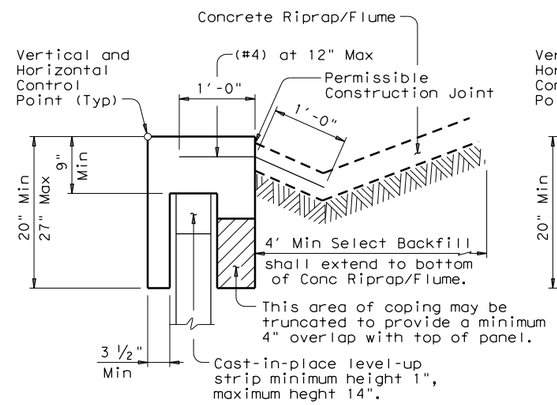
(3) Precast coping shall be anchored to prevent rotation or displacement. Use these details to develop custom anchorage for precast copings. Details shall include coping reinforcement. Concrete flume (if required) shall be paid for separately from Item 423.

(4) Soil design parameter must be based on long term soil strength. Design parameters must be listed on the RW(MSE)DD standard.

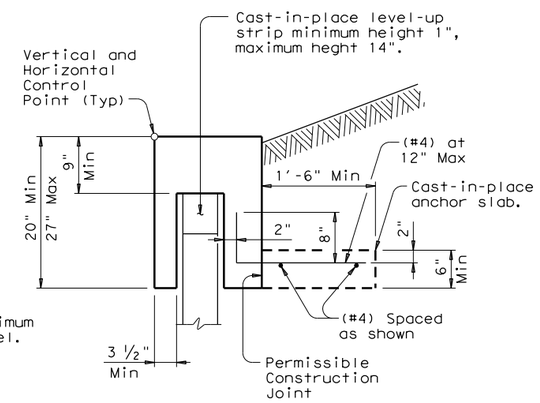
(5) Cast vertical bars into the top of panels. At contractor's option vertical bars may be embedded 4" with a Type III Clac C epoxy anchorage system. Follow manufacturer's directions for installing the epoxied vertical bars.

(6)

SELECT BACKFILL UNIT WEIGHT			
Type AS, BS & DS	Unit Weight	Inernal Stability	External Stability
	105 PCF	Pullout	Sliding, Overturning, Eccentricity
	125 PCF	Rupture	Bearing



ADJACENT TO CONCRETE
(Excluding Concrete Pavement)



ADJACENT TO SOIL

COPING ANCHORAGE DETAILS WITHOUT TRAFFIC RAILING (3)

DESIGN PARAMETERS:

Design of retaining walls shall be based on the following design parameters unless stated elsewhere in the plans:

Retained Soil	Unit Weight = 125 pcf Ø = (4) C = 0 psf
Foundation Soil	Ø = (4) C = 0 psf
Select Backfill	Unit Weight = See Table (6) Ø = 34 C = 0 psf
Cement Stabilized Select Backfill	Unit Weight = 125 pcf Ø = 45 C = 0 psf

Stress in steel and concrete shall be in accordance with current AASHTO Standard and Interim Specifications. The minimum length of earth reinforcements are as shown on the RW(MSE)DD standard.

STABILITY CRITERIA:

Stability criteria applies to both dry and drawdown analysis.
Factor of safety in sliding along the base of the structure shall be greater than or equal to 1.5.
Factor of safety in overturning shall be greater than or equal to 2.0.
The base pressure resultant shall fall within the middle third of the retaining wall.
The factor of safety against pullout of the earth reinforcements shall be greater than or equal to 1.5 at each level. Pullout resistance shall be determined from test data evaluated at ¾ inch strain.

CORROSION CRITERIA:

The earth reinforcement elements shall be designed to have a minimum design life of 75 years, using current AASHTO corrosion rates.
Stress calculations (rupture) shall be done on the calculated earth reinforcement section remaining after 75 years. Pullout calculations may be based on non-corroded section.

PRECAST COPINGS:

Wall supplier is to maximize lengths of precast coping. Precast coping is to be provided in 10' minimum lengths (typical). To optimize coping lengths at radiuses, end of runs or other wall geometric conditions favorable to shorter coping sections, shorter lengths may be used pending approval by the Engineer. This applies only to coping without railing.

JOINT SEALER:

The joints between coping segments must be sealed in accordance with the DMS-6310 "Joint Sealant's and Fillers", joint sealing material, Class 4. The joint must be sealed 3" below and 6" above the adjoining pavement surface, or as directed by the Engineer. The purpose of the joint sealing is to contain surface drainage and prevent infiltration into the retaining wall backfill.

GENERAL NOTES:

Section and elevation shown is for informational purposes only. Specific geometry is to be determined based on wall layouts and other plan information.
The select backfill specified for use within the mechanically stabilized earth volume shall extend horizontally from the back of the panels to a minimum 2' beyond the end of the earth reinforcements. The select backfill shall extend vertically from the top of the leveling pad or 4" below the lowest earth reinforcement, whichever is lower, to the top of panels.
The uppermost earth reinforcements shall be no more than 3.0' below the top of wall.
The lowest level of earth reinforcements shall be no more than 2.0' above the top of the leveling pad.
Minimum wire size for earth reinforcements shall be W7.0. If different longitudinal and cross wires are used in an earth reinforcement mesh, the smaller wire shall have at least 50% of the cross sectional area of the larger wire.
A maximum of four wire mesh configurations (wire sizes) will be allowed on a project. Each mesh configuration shall have a unique transverse bar spacing, differing from other configurations by a minimum of 3". Earth reinforcement lengths shall be stepped in increments no finer than 12".
Standard precast concrete panels shall have a maximum height of 6', and a maximum surface area of 50 sq ft. Top and bottom panels may exceed these limitations as necessary to achieve required wall grades. Maximum height of any panel shall be 7'-6". Minimum panel thickness shall be 5". Panels shall be arranged to provide offset horizontal joints.
An open joint shall be provided around the perimeter of the concrete panels. The joint configuration shall be such that 1) the filter fabric and/or pad materials are not exposed at the wall face and 2) the design opening is between ⅜" and ¾".
A one-piece corner panel shall be provided for wall angle changes of greater than 30 degrees. Butting of chamfered panels will be allowed for angle changes of 30 degrees or less.
Concrete coping shall be provided along the top of wall, at the vertical steps at bridge backwalls, and at other vertical steps along the top of wall. The joints between all coping segments shall be sealed to prevent infiltration of water into the retaining wall backfill. Sealing shall be in accordance with the DMS-6310 "Joint Sealants and Fillers", using Class 4 joint sealant.
When obstructions (inlets, drilled shafts, piling, etc.) prevent placement of soil reinforcements in their normal locations, provide details and calculations that establish support for the affected panels. Furnish the same earth reinforcement coverage as that required in the absence of the obstruction. For skewed (rotated) earth reinforcements no adjustment in length is needed for skew angles between 1 and 10 degrees. For skew angles greater than 10 degrees adjust the length of earth reinforcement to provide a cosine length of the reinforcement equivalent to the stated design length for the section of wall. Provide calculations that justify any alterations made to the soil reinforcements or modifications to their normal placement. Do not use panels without any soil reinforcements connected to them unless they are connected with galvanized hardware to adjacent panels which do have supporting Soil reinforcements attached to them and as approved by the Engineer.
Reinforced concrete must be Class "C", Precast concrete Class "H", Unreinforced concrete Class "A".
All reinforcing steel must be Grade 60.
Coping and anchor slabs are considered subsidiary to the Item "Retaining Wall".
These details are to be used in conjunction with the retaining wall layout, standard RW(MSE)DD and other applicable standards.

Texas Department of Transportation

Bridge Division Standard

MECHANICALLY STABILIZED EARTH RETAINING WALL

RW(MSE)

FILE: rwstde01.dgn	DN: TxDOT	CK: TxDOT	DW: JGD	CK: MJG
©TxDOT March 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS 04-11: Added Table & Corrosion Criteria. 01-13: Wall embed, (WS) table, retained fill, soil strength.				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		202

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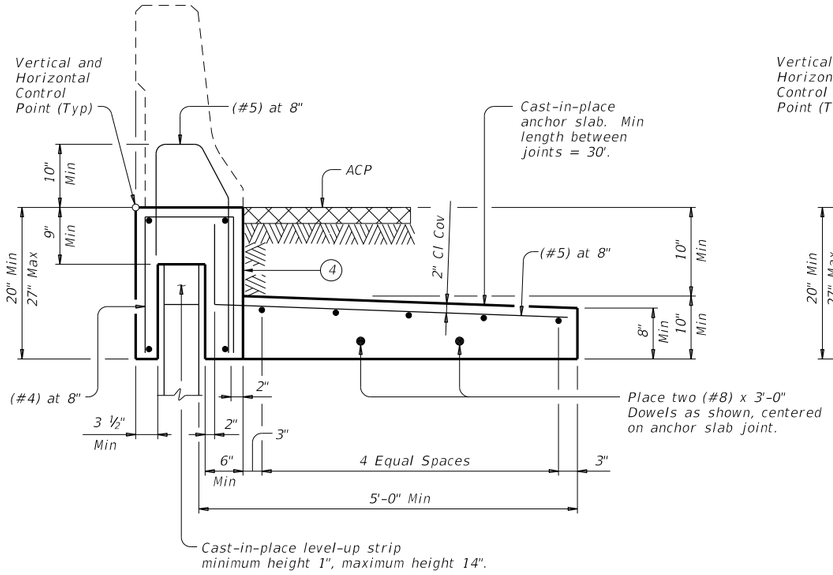
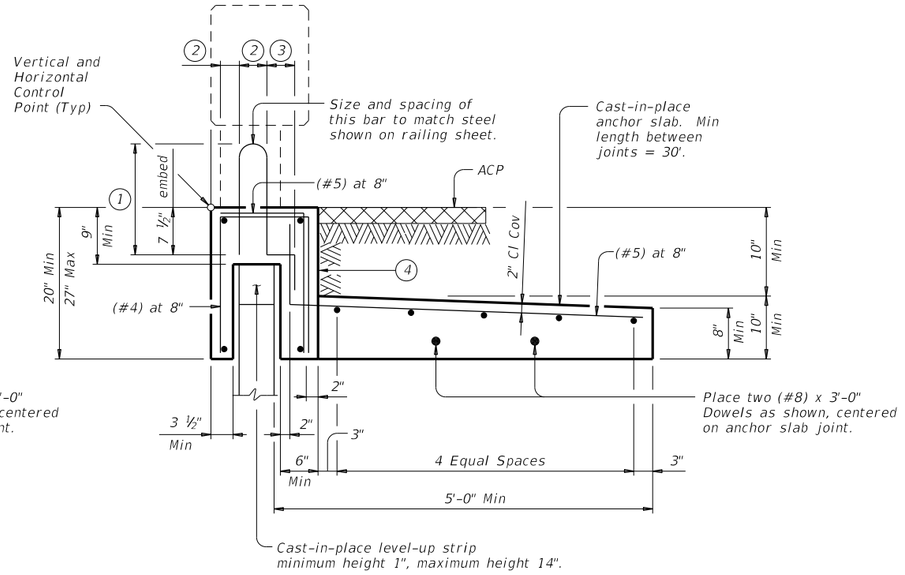


"WIDE BASED" ADJACENT TO ACP

(Showing T551 Rail, other rails listed similar)

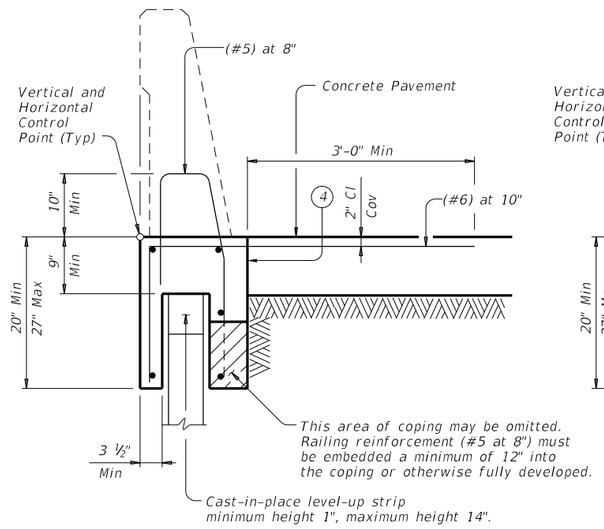


"NARROW BASED" ADJACENT TO ACP

(Showing T223 Rail, other rails listed similar)

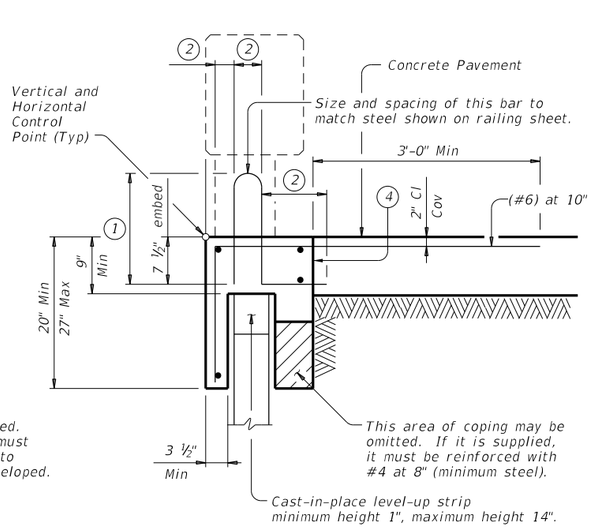
Rail Type	Detail	Precasting Rail with Coping Allowed
T1F/T1W/C1W/T2P/C2P	NARROW	NO
T221/C221/T222	NARROW	YES
T223/C223	NARROW	NO
T401/T402/C402	NARROW	NO
T411/C411	NARROW	NO
T551/T552	WIDE	YES
T66	NARROW	NO
SSTR	WIDE	YES

1. Reinforcement length equal to length shown on the appropriate Rail standard plus 1".
2. Match dimension on the appropriate Rail standard.
3. Match dimension on the appropriate Rail standard. Bend end of rail anchorage reinforcing as shown as required to maintain Clear Cover.
4. See "Coping Joint Sealer Details".



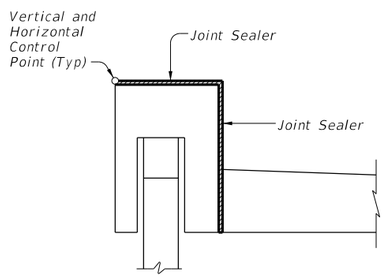
"WIDE BASED" ADJACENT TO CONCRETE PAVEMENT

(Showing SSTR Rail, other rails listed similar)

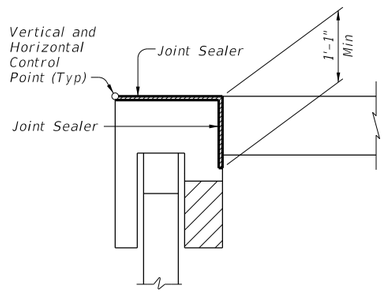


"NARROW BASED" ADJACENT TO CONCRETE PAVEMENT

(Showing T223 Rail, other rails listed similar)



ADJACENT TO ACP



ADJACENT TO CONCRETE PAVEMENT

COPING JOINT SEALER DETAILS

(Reinforcing steel not shown for clarity)

CAST-IN-PLACE COPINGS:

Provide compressible material to isolate precast panel from cast-in-place coping to prevent cracking. Attach compressible material to both sides of precast panel prior to casting concrete for coping.

When cast-in-place coping is anchored to reinforced concrete pavement, a smooth level-up strip must be provided on the top of the precast panels. The purpose of the level-up is to allow the pavement and coping to move longitudinally relative to the wall without causing damage.

Align coping and railing joints with precast panel joints. Optional rail joints are allowed as approved by Engineer. Provide railing construction joints or expansion joints at no greater than 100' spacing.

PRECAST COPINGS:

Provide a smooth level-up strip on top of the precast panels prior to installation of the coping. Shims may be used on top of the level-up strip to facilitate alignment. Total shim thickness not to exceed 1".

Provide precast coping in 10' minimum lengths.

JOINTED CONCRETE PAVEMENT:

When coping is adjacent to and anchored into jointed concrete pavement, the coping joints must coincide with the pavement joints.

JOINT SEALER:

Seal joints between coping segments in accordance with Item 438, "Cleaning and Sealing Joints". Provide Class 4 joint seal. Place sealant flush with coping surface. The purpose of the joint sealing is to reduce surface drainage infiltration into the retaining wall backfill. Sealing coping joint is considered subsidiary to other items.

GENERAL NOTES:

Details on this sheet are to be used in development of specific details for mounting traffic railing on mechanically stabilized earth (MSE) walls.

The specific details proposed must have strengths equivalent to those shown on this sheet. Areas of particular importance are the connection of the coping to the railing, the strength of the vertical coping leg connecting the railing to the anchor slab, and the connection of the coping to the anchor slab or concrete pavement.

Submit shop drawings for the traffic railing foundations to the Engineer in accordance with Item 423 "Retaining Wall". The shop drawings must include bar bending details.

Precasting of railing with the coping will be allowed as noted in the table on this sheet.

The Contractor's attention is directed to the fact that various configurations of precast coping/railing combinations are covered by patent. The contractor must provide for use of these systems in accordance with Article 7.3.

Provide Class C concrete (f'c=3,600 psi).

Provide Grade 60 reinforcing steel.

Provide (#4) longitudinal bars, unless otherwise shown.

Coping and anchor slabs must be considered subsidiary to Item 423 "Retaining Wall". The traffic railing will be paid for by the linear foot for the appropriate railing type.

Texas Department of Transportation

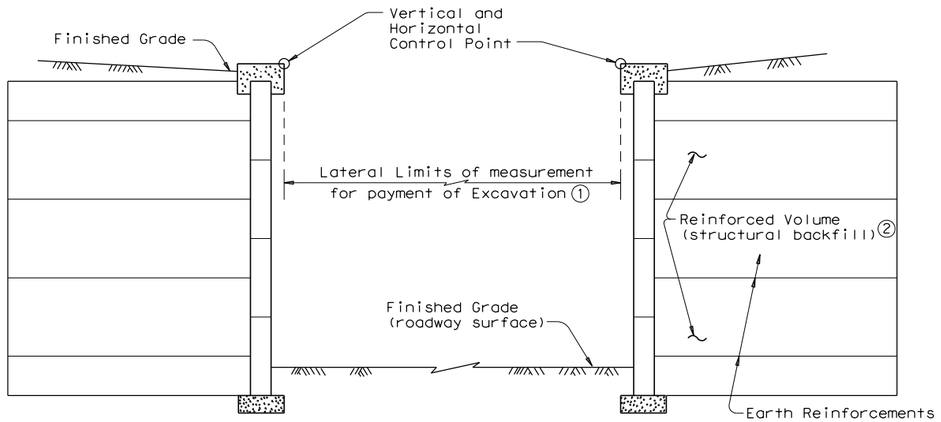
Bridge Division Standard

RETAINING WALL TRAFFIC RAILING FOUNDATIONS

RW(TRF)

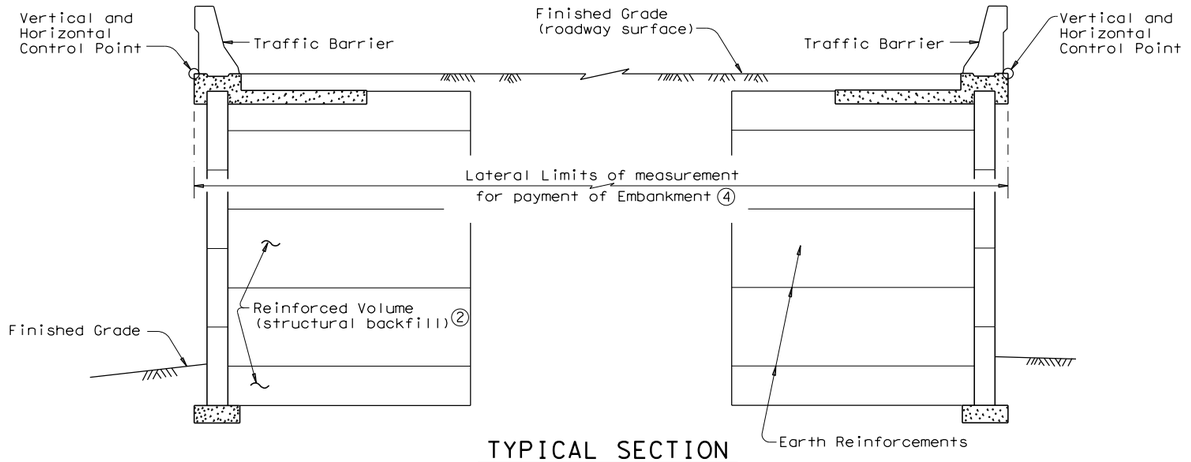
FILE: rwstde03-18.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: MPM
©TxDOT March 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
01-13: Precast option with Rails. 03-18: Cast-In-Place Copings, railing construction and expansion joints.	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		203

DATE: 1/21/2021 1:28:37 PM
FILE: H:\Projects\510730\03\Design\Civil\Standards\Retaining Walls\rwstde12.dgn



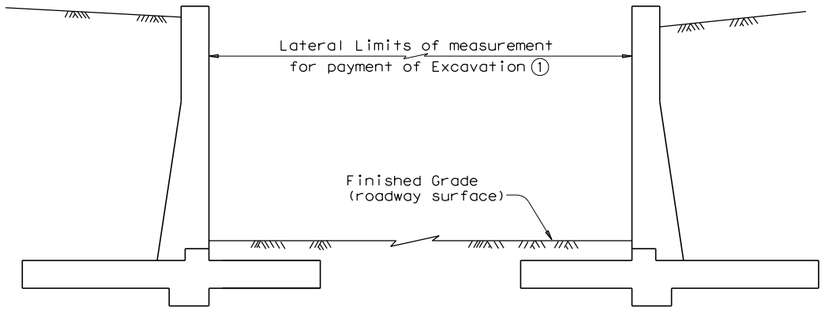
TYPICAL SECTION

Excavation Between MSE Retaining Walls ③



TYPICAL SECTION

Embankment Between MSE Retaining Walls ③



TYPICAL SECTION

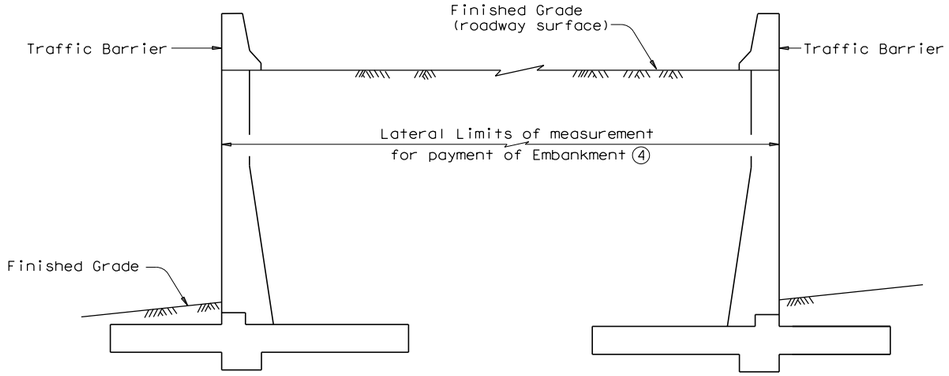
Excavation Between Conventional Retaining Walls

① Only the Excavation above the proposed subgrade elevation will be measured for payment.

② Meeting requirements of Retaining-Wall Item.

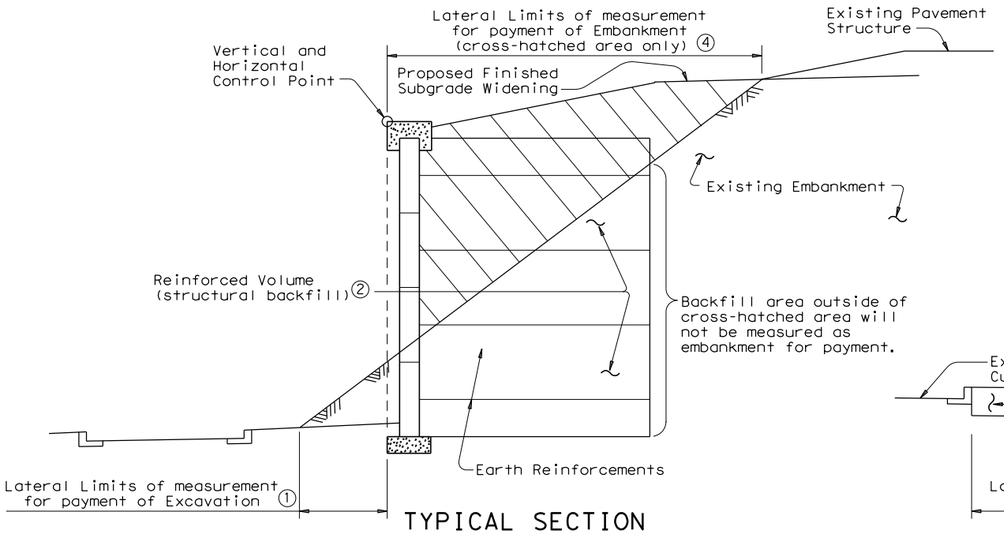
③ Earthwork measurement with other designs of retaining walls will be made to the outside finished face in the same manner.

④ Only the Embankment above the existing ground line will be measured for payment.



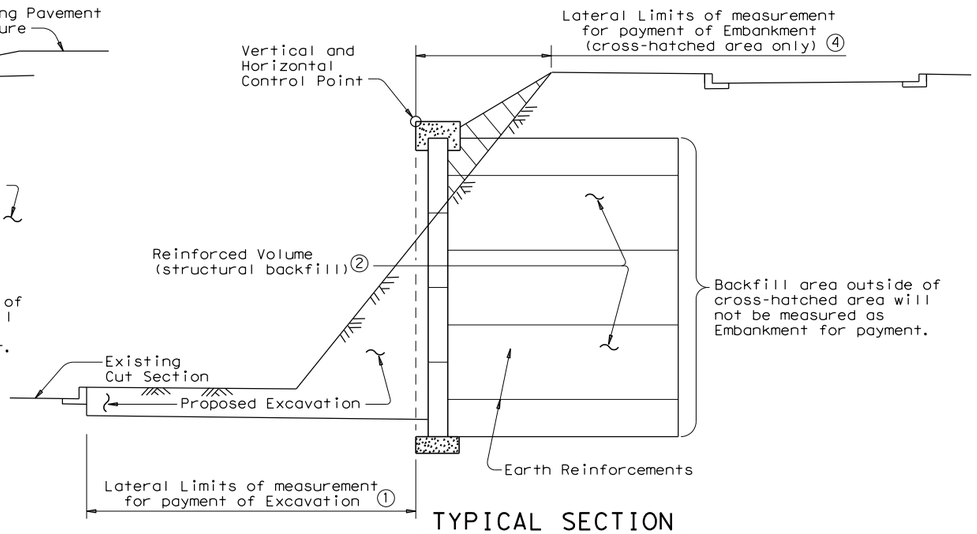
TYPICAL SECTION

Embankment Between Conventional Retaining Walls



TYPICAL SECTION

Widening Embankment with MSE Retaining Walls ③



TYPICAL SECTION

Widening Cut Section with MSE Retaining Walls ③

Texas Department of Transportation

Bridge Division Standard

EARTHWORK MEASUREMENT AT RETAINING WALLS

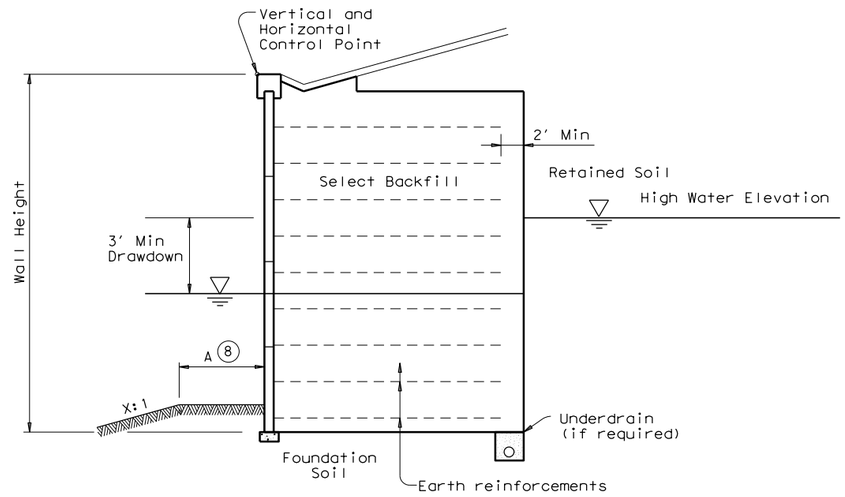
RW(EM)

FILE: rwstde12.dgn	DN: TxDOT	CK: TxDOT	DW: BWH	CK: JMH
©TxDOT March 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		204

DATE: 1/21/2021 1:28:40 PM
FILE: H:\Projects\510\30\03\Design\Civil\Standards\Retaining Walls\rwstde16.dgn

WALL SUMMARY

MSE Retaining Wall	Begin Station (1)	End Station (1)	Retained Soil Friction Angle (2)	Foundation Soil Friction Angle (2)	Ground Improvement (3)	Min Earth Reinforcement Length (4)	Min Wall Embedment (7)	Underdrain Required (5)	Drawdown Analysis (6)	Bench Width (8)
C	30+00.00	30+40.94	34°	24.0° to 29.3° (D)	NO	8′	1′	YES	YES	2′
D	40+00.00	40+56.90	34°	24.0° to 29.3° (D)	NO	8′	1′	YES	YES	2′
E	50+00.00	50+65.75	34°	24.0° to 29.3° (D)	NO	16′	1′	YES	YES	2′
F	60+00.00	60+09.00	34°	24.0° to 29.3° (D)	NO	8′	1′	YES	YES	2′
	60+09.00	60+89.75	34°	24.0° to 29.3° (D)	NO	16′	1′	YES	YES	2′
	60+89.75	61+03.00	34°	24.0° to 29.3° (D)	NO	8′	1′	YES	YES	2′
G	70+00.00	74+96.17	34°	24.0° to 29.3° (D)	NO	8′	1′	YES	YES	2′
H	80+00.00	81+23.25	34°	24.0° to 29.3° (D)	NO	8′	1′	YES	YES	2′



TYPICAL SECTION
(RAPID DRAWDOWN CONDITION)

(1) Indicate limits for which the stated soil design requirements/assumptions are applicable.

(2) Retained and Foundation friction angle listed should be based on local experience or measured/correlated long term strength values.

(3) Indicate if ground improvement is required or not required. If shown as required, refer to Ground Improvement Detail(s) for additional information.

(4) Indicate on table minimum length and length ratio required. The minimum default length of earth reinforcements shall be either 8′-0" or 70% of the wall height, whichever is greater. Wall height and design wall height may differ depending on project geometry and loading conditions. Note: Wall height at bridge abutments is equal to the distance between the top of leveling pad and finished grade at the bridge abutment backwall.

(5) Indicate if underdrain is required or not required.

(6) Indicate if rapid drawdown analysis is required.

(7) Guidance to wall designer of record for determination of minimum wall embedment: Unless noted elsewhere in the plans, the minimum embedment provided from the top of leveling pad to finish grade shall be 1′ for level ground where there is no potential for erosion or future excavation or 2′ for sloping ground (4.0H:1.0V or steeper) or where there is potential for removal of soil in front of the wall.

(8) Horizontal Bench width at base of wall varies. Use the following criteria to establish base width.
A = 2.0′ Min for X $\geq$ 4. or
A = 4.0′ Min for X $\leq$ 4.
Applicable to both drawdown and dry condition.

STATE OF TEXAS
TYLER PAYNE DUBE
118612
LICENSED PROFESSIONAL ENGINEER

TYLER PAYNE DUBE, P.E. — 1/21/2021 DATE

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

SPECIAL NOTES:
This sheet is to be filled out by the wall designer of record at time of plan preparation to provide soil strength parameters for the design of the specified walls.
The completed sheet shall be signed, sealed, and dated by a licensed Professional Engineer.

Texas Department of Transportation — Bridge Division Standard

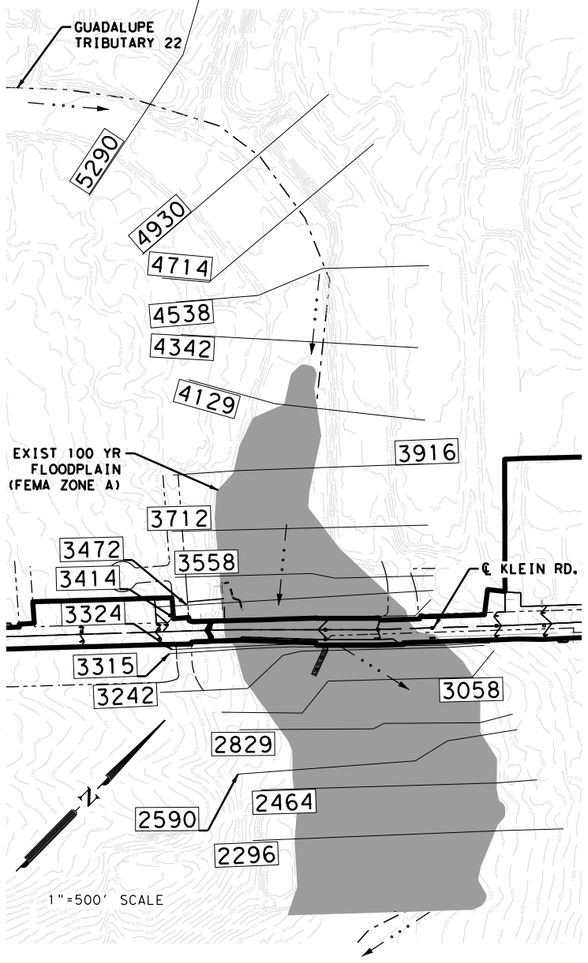
MECHANICALLY STABILIZED EARTH RETAINING WALL DESIGN DATA

RW(MSE)DD

FILE: rwstde16.dgn	DN: TxDOT	CK: MJG	DW: JTR	CK: MJG
©TxDOT January 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		205

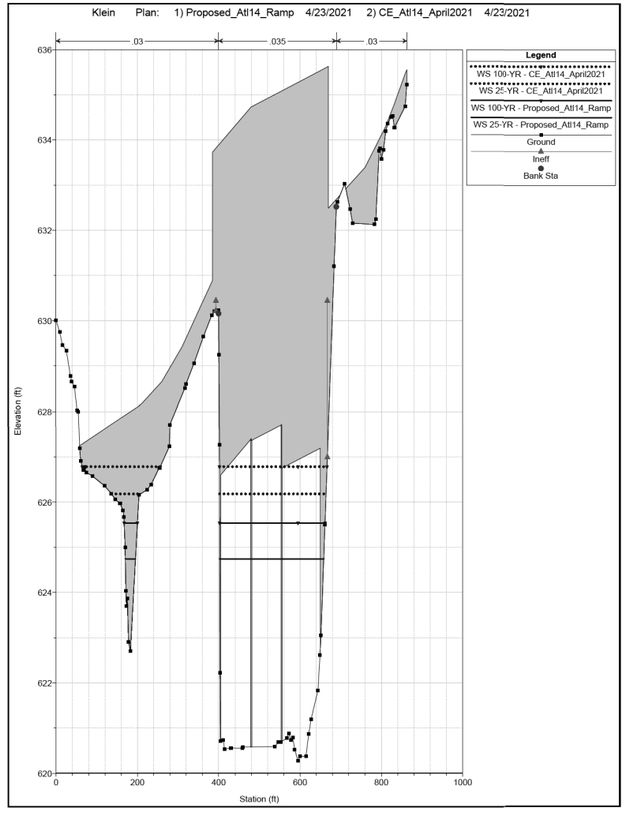
Plotted on: 4/23/2021

HEC-RAS CROSS-SECTION LAYOUT

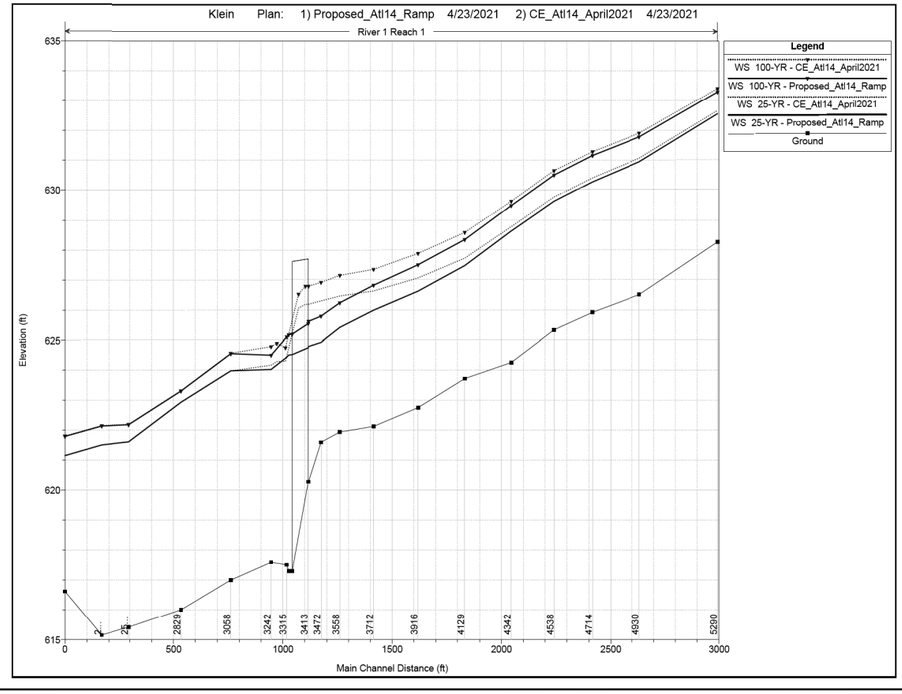


NOTE:
1. HEC-RAS V5.0.7 USED FOR HYDRAULIC ANALYSIS.
2. N-VALUE (CHANNEL) = 0.035 - 0.05
   N-VALUE (OVERBANKS) = 0.03 - 0.05
3. CROSS SECTIONS ELEVATIONS FROM PROPOSED SURFACE SUPPLEMENTED WITH 2017 LIDAR DATA.
4. DOWNSTREAM BOUNDARY CONDITIONS SET TO NORMAL DEPTH WITH 0.2% SLOPE.
5. HYDROLOGIC MODELING PERFORMED IN HEC-HMS V4.2.1, USING SCS CURVE NUMBER METHOD.
6. FLOW CHANGED DOWNSTREAM OF BRIDGE FACE FOR PROPOSED CONDITIONS TO ACCOUNT FOR ROADWAY DRAINAGE SYSTEMS A AND B. REDUCED DRAINAGE AREA FOR PROPOSED CONDITIONS ACCOUNTS FOR INTERCEPTED FLOW AT STA 105+85 IN SYSTEM G TAKEN FROM WEST KLEIN ROAD RECONSTRUCTION PROJECT IN FINAL DRAINAGE REPORT (06/29/2018) PREPARED BY TRIHYDRO CORPORATION.
7. NO ADVERSE IMPACTS SHOWN TO SURROUNDING FLOODPLAIN AS A RESULT OF THIS PROJECT.

HEC-RAS BRIDGE UPSTREAM



HEC-RAS CHANNEL PROFILE



HEC-RAS BRIDGE OUTPUT

Plan: Proposed_Atl14_Ramp River 1 Reach 1 RS: 3413 Profile: 25-YR

E.G. US. (ft)	625.06	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	624.78	E.G. Elev (ft)	625.05	624.88
Q Total (cfs)	4267.90	W.S. Elev (ft)	624.74	624.52
Q Bridge (cfs)	4267.90	Crit W.S. (ft)	622.85	622.71
Q Weir (cfs)		Max Chl Dpth (ft)	4.47	7.21
Weir Sta Lft (ft)		Vel Total (ft/s)	4.42	4.26
Weir Sta Rgt (ft)		Flow Area (sq ft)	965.48	1002.12
Weir Submerg		Froude # Chl	0.37	0.32
Weir Max Depth (ft)		Specif Force (cu ft)	2552.22	2883.57
Min El Weir Flow (ft)	630.45	Hydr Depth (ft)	4.04	4.25
Min El Prs (ft)	627.71	W.P. Total (ft)	261.68	258.38
Delta EG (ft)	0.23	Conv. Total (cfs)	97869.9	90393.1
Delta WS (ft)	0.29	Top Width (ft)	239.05	235.66
BR Open Area (sq ft)	1540.24	Frctn Loss (ft)	0.15	0.03
BR Open Vel (ft/s)	4.42	C & E Loss (ft)	0.02	0.02
BR Sluice Coef		Shear Total (lb/sq ft)	0.44	0.54
BR Sel Method	Energy only	Power Total (lb/ft s)	1.94	2.30

Plan: Proposed_Atl14_Ramp River 1 Reach 1 RS: 3413 Profile: 100-YR

E.G. US. (ft)	626.02	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	625.61	E.G. Elev (ft)	626.00	625.77
Q Total (cfs)	6315.30	W.S. Elev (ft)	625.54	625.19
Q Bridge (cfs)	6315.30	Crit W.S. (ft)	623.49	623.45
Q Weir (cfs)		Max Chl Dpth (ft)	5.26	7.88
Weir Sta Lft (ft)		Vel Total (ft/s)	5.47	5.44
Weir Sta Rgt (ft)		Flow Area (sq ft)	1155.57	1160.60
Weir Submerg		Froude # Chl	0.42	0.39
Weir Max Depth (ft)		Specif Force (cu ft)	3881.91	4150.13
Min El Weir Flow (ft)	630.45	Hydr Depth (ft)	4.83	4.89
Min El Prs (ft)	627.71	W.P. Total (ft)	266.45	263.46
Delta EG (ft)	0.33	Conv. Total (cfs)	130469.8	113668.7
Delta WS (ft)	0.44	Top Width (ft)	239.03	237.25
BR Open Area (sq ft)	1540.24	Frctn Loss (ft)	0.20	0.05
BR Open Vel (ft/s)	5.47	C & E Loss (ft)	0.04	0.03
BR Sluice Coef		Shear Total (lb/sq ft)	0.63	0.85
BR Sel Method	Energy only	Power Total (lb/ft s)	3.47	4.62

DESIGN

STATE OF TEXAS — RANDALL K HANEY — 111446 — LICENSED PROFESSIONAL ENGINEER

RANDALL K HANEY, P.E. — 4/23/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/23/2021 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

HYDRAULIC DATA SHEETS

SHEET 1 OF 2

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	206

Design Filename: H:\Projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_HYDDATA.dgn

HEC-RAS CROSS-SECTION OUTPUT

HEC-RAS River: River 1 Reach: Reach 1

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	5290	25-YR	Proposed_Atl14_Ramp	4267.90	628.26	632.55		633.14	0.007740	6.13	696.00	222.93	0.57
Reach 1	5290	25-YR	CE_Atl14_April2021	4507.60	628.26	632.66		633.28	0.007896	6.28	717.56	230.91	0.58
Reach 1	5290	100-YR	Proposed_Atl14_Ramp	6315.30	628.26	633.29		634.14	0.009491	7.42	867.55	274.05	0.64
Reach 1	5290	100-YR	CE_Atl14_April2021	6654.30	628.26	633.40		634.29	0.009614	7.57	898.59	276.87	0.65
Reach 1	4930	25-YR	Proposed_Atl14_Ramp	4267.90	626.50	630.95		631.22	0.003579	4.26	1040.20	403.12	0.39
Reach 1	4930	25-YR	CE_Atl14_April2021	4507.60	626.50	631.06		631.34	0.003549	4.28	1088.45	405.75	0.39
Reach 1	4930	100-YR	Proposed_Atl14_Ramp	6315.30	626.50	631.78		632.11	0.003289	4.67	1393.81	475.81	0.39
Reach 1	4930	100-YR	CE_Atl14_April2021	6654.30	626.50	631.90		632.24	0.003279	4.71	1454.00	483.77	0.39
Reach 1	4714	25-YR	Proposed_Atl14_Ramp	4267.90	625.91	630.27		630.51	0.002956	3.96	1103.36	387.88	0.36
Reach 1	4714	25-YR	CE_Atl14_April2021	4507.60	625.91	630.41		630.65	0.002846	3.98	1156.77	392.68	0.35
Reach 1	4714	100-YR	Proposed_Atl14_Ramp	6315.30	625.91	631.16		631.45	0.002706	4.35	1459.31	416.41	0.35
Reach 1	4714	100-YR	CE_Atl14_April2021	6654.30	625.91	631.28		631.59	0.002690	4.41	1511.71	420.95	0.35
Reach 1	4538	25-YR	Proposed_Atl14_Ramp	4267.90	625.33	629.61		629.91	0.003789	4.41	996.24	409.83	0.40
Reach 1	4538	25-YR	CE_Atl14_April2021	4507.60	625.33	629.76		630.06	0.003844	4.41	1047.25	424.38	0.40
Reach 1	4538	100-YR	Proposed_Atl14_Ramp	6315.30	625.33	630.50		630.88	0.003787	5.08	1337.99	508.74	0.42
Reach 1	4538	100-YR	CE_Atl14_April2021	6654.30	625.33	630.65		631.02	0.003762	5.04	1412.96	511.47	0.41
Reach 1	4342	25-YR	Proposed_Atl14_Ramp	4267.90	624.25	628.62	627.15	629.03	0.005314	5.13	845.83	270.52	0.47
Reach 1	4342	25-YR	CE_Atl14_April2021	4507.60	624.25	628.77	627.25	629.18	0.005156	5.18	885.43	275.57	0.47
Reach 1	4342	100-YR	Proposed_Atl14_Ramp	6315.30	624.25	629.48	627.87	630.00	0.005341	5.91	1112.94	374.13	0.49
Reach 1	4342	100-YR	CE_Atl14_April2021	6654.30	624.25	629.63	628.04	630.16	0.005205	5.97	1163.89	382.27	0.49
Reach 1	4129	25-YR	Proposed_Atl14_Ramp	4267.90	623.72	627.47		627.84	0.005736	4.90	872.43	282.88	0.48
Reach 1	4129	25-YR	CE_Atl14_April2021	4507.60	623.72	627.72		628.08	0.005089	4.79	943.45	290.62	0.46
Reach 1	4129	100-YR	Proposed_Atl14_Ramp	6315.30	623.72	628.34		628.83	0.005627	5.63	1140.90	334.63	0.49
Reach 1	4129	100-YR	CE_Atl14_April2021	6654.30	623.72	628.58		629.05	0.005064	5.55	1220.68	339.50	0.47
Reach 1	3916	25-YR	Proposed_Atl14_Ramp	4267.90	622.75	626.62	624.93	626.86	0.003531	3.94	1083.69	324.84	0.38
Reach 1	3916	25-YR	CE_Atl14_April2021	4507.60	622.75	627.06	625.01	627.27	0.002661	3.67	1227.68	330.61	0.34
Reach 1	3916	100-YR	Proposed_Atl14_Ramp	6315.30	622.75	627.50	625.49	627.82	0.003643	4.60	1374.94	346.03	0.40
Reach 1	3916	100-YR	CE_Atl14_April2021	6654.30	622.75	627.88	625.57	628.18	0.003007	4.43	1509.84	367.81	0.37
Reach 1	3712	25-YR	Proposed_Atl14_Ramp	4267.90	622.13	625.98	624.15	626.20	0.002910	3.72	1145.99	322.66	0.35
Reach 1	3712	25-YR	CE_Atl14_April2021	4507.60	622.13	626.62	624.22	626.80	0.001925	3.33	1354.44	330.87	0.29
Reach 1	3712	100-YR	Proposed_Atl14_Ramp	6315.30	622.13	626.81	624.69	627.12	0.003205	4.46	1418.39	340.90	0.38
Reach 1	3712	100-YR	CE_Atl14_April2021	6654.30	622.13	627.34	624.77	627.61	0.002486	4.16	1606.25	375.04	0.34
Reach 1	3558	25-YR	Proposed_Atl14_Ramp	4267.90	621.94	625.41		625.67	0.004027	3.96	1055.42	471.37	0.40
Reach 1	3558	25-YR	CE_Atl14_April2021	4507.60	621.94	626.45		626.57	0.001019	2.42	1719.99	558.06	0.21
Reach 1	3558	100-YR	Proposed_Atl14_Ramp	6315.30	621.94	626.23		626.58	0.003826	4.50	1357.14	529.08	0.40
Reach 1	3558	100-YR	CE_Atl14_April2021	6654.30	621.94	627.14		627.32	0.001238	2.96	2047.70	587.23	0.24
Reach 1	3472	25-YR	Proposed_Atl14_Ramp	4267.90	621.59	624.92		625.25	0.006099	4.61	928.23	470.09	0.49
Reach 1	3472	25-YR	CE_Atl14_April2021	4507.60	621.59	626.29		626.45	0.001735	3.19	1400.64	549.50	0.28
Reach 1	3472	100-YR	Proposed_Atl14_Ramp	6315.30	621.59	625.78		626.20	0.005313	5.12	1227.92	494.36	0.47
Reach 1	3472	100-YR	CE_Atl14_April2021	6654.30	621.59	626.91		627.17	0.002348	4.07	1616.24	599.47	0.33
Reach 1	3414	25-YR	Proposed_Atl14_Ramp	4267.90	620.28	624.78	622.80	625.06	0.001582	4.20	1016.47	281.17	0.37
Reach 1	3414	25-YR	CE_Atl14_April2021	4507.60	620.28	626.18	624.44	626.34	0.001381	3.11	1419.25	538.46	0.25
Reach 1	3414	100-YR	Proposed_Atl14_Ramp	6315.30	620.28	625.61	623.43	626.02	0.001875	5.13	1230.06	293.20	0.42
Reach 1	3414	100-YR	CE_Atl14_April2021	6654.30	620.28	626.78	625.00	627.00	0.001699	3.73	1767.31	617.31	0.29
Reach 1	3413			Bridge									

HEC-RAS River: River 1 Reach: Reach 1 (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	3324	25-YR	Proposed_Atl14_Ramp	4267.90	617.30	624.50	622.66	624.83	0.002010	5.93	1027.15	243.10	0.44
Reach 1	3324	100-YR	Proposed_Atl14_Ramp	6315.30	617.30	625.17	623.37	625.69	0.002748	7.48	1190.75	244.90	0.53
Reach 1	3315	25-YR	Proposed_Atl14_Ramp	4267.90	617.51	624.43		624.79	0.003056	6.12	967.09	662.94	0.47
Reach 1	3315	100-YR	Proposed_Atl14_Ramp	6315.30	617.51	625.10		625.66	0.003983	7.56	1143.28	699.70	0.55
Reach 1	3308	25-YR	CE_Atl14_April2021	4507.60	617.58	624.29	624.29	624.98	0.005503	9.25	1073.93	645.88	0.72
Reach 1	3308	100-YR	CE_Atl14_April2021	6654.30	617.58	624.74	624.74	625.55	0.006426	10.57	1372.53	677.60	0.79
Reach 1	3268	25-YR	CE_Atl14_April2021	4507.60	618.18	624.28		624.54	0.004291	6.64	1303.68	637.03	0.54
Reach 1	3268	100-YR	CE_Atl14_April2021	6654.30	618.18	624.89		625.19	0.004291	7.20	1700.48	675.89	0.55
Reach 1	3242	25-YR	Proposed_Atl14_Ramp	4503.40	617.59	624.02		624.55	0.006226	7.12	819.90	622.44	0.54
Reach 1	3242	25-YR	CE_Atl14_April2021	4507.60	617.59	624.16		624.46	0.004386	6.08	1258.20	631.93	0.45
Reach 1	3242	100-YR	Proposed_Atl14_Ramp	6600.30	617.59	624.49		625.32	0.008598	8.84	947.56	659.21	0.64
Reach 1	3242	100-YR	CE_Atl14_April2021	6654.30	617.59	624.78		625.11	0.004421	6.55	1664.49	680.49	0.46
Reach 1	3058	25-YR	Proposed_Atl14_Ramp	4503.40	617.00	623.97		624.07	0.001338	3.14	1928.69	698.16	0.25
Reach 1	3058	25-YR	CE_Atl14_April2021	4507.60	617.00	623.98		624.07	0.001339	3.15	1929.72	698.23	0.25
Reach 1	3058	100-YR	Proposed_Atl14_Ramp	6600.30	617.00	624.55		624.68	0.001558	3.65	2334.51	710.94	0.27
Reach 1	3058	100-YR	CE_Atl14_April2021	6654.30	617.00	624.56		624.69	0.001563	3.66	2343.93	711.03	0.27
Reach 1	2829	25-YR	Proposed_Atl14_Ramp	4503.40	616.00	622.93	622.93	623.59	0.007889	8.55	854.87	603.69	0.61
Reach 1	2829	25-YR	CE_Atl14_April2021	4507.60	616.00	622.93	622.93	623.59	0.007901	8.55	854.98	603.70	0.61
Reach 1	2829	100-YR	Proposed_Atl14_Ramp	6600.30	616.00	623.30	623.29	624.13	0.009257	9.63	1083.94	626.47	0.67
Reach 1	2829	100-YR	CE_Atl14_April2021	6654.30	616.00	623.31	623.30	624.14	0.009257	9.65	1091.02	628.15	0.67
Reach 1	2590	25-YR	Proposed_Atl14_Ramp	4503.40	615.42	621.61	621.19	622.25	0.007015	6.87	738.23	422.33	0.56
Reach 1	2590	25-YR	CE_Atl14_April2021	4507.60	615.42	621.61	621.19	622.25	0.007025	6.88	738.36	422.42	0.56
Reach 1	2590	100-YR	Proposed_Atl14_Ramp	6600.30	615.42	622.18	621.93	622.97	0.006928	7.37	1026.36	541.27	0.56
Reach 1	2590	100-YR	CE_Atl14_April2021	6654.30	615.42	622.19	621.94	622.99	0.006929	7.38	1033.51	542.63	0.56
Reach 1	2464	25-YR	Proposed_Atl14_Ramp	4503.40	615.16	621.51		621.78	0.002928	3.67	1125.87	537.94	0.34
Reach 1	2464	25-YR	CE_Atl14_April2021	4507.60	615.16	621.51		621.78	0.002933	3.67	1125.94	537.95	0.34
Reach 1	2464	100-YR	Proposed_Atl14_Ramp	6600.30	615.16	622.14		622.49	0.002797	3.99	1483.13	585.92	0.34
Reach 1	2464	100-YR	CE_Atl14_April2021	6654.30	615.16	622.15		622.51	0.002799	4.00	1490.89	586.60	0.34
Reach 1	2296	25-YR	Proposed_Atl14_Ramp	4503.40	616.62	621.15	619.98	621.37	0.002001	2.73	1279.06	561.12	0.28
Reach 1	2296	25-YR	CE_Atl14_April2021	4507.60	616.63	621.15	619.99	621.37	0.002001	2.73	1280.30	561.52	0.28
Reach 1	2296	100-YR	Proposed_Atl14_Ramp	6600.30	616.62	621.79	620.43	622.09	0.002001	3.11	1659.36	619.03	0.29
Reach 1	2296	100-YR	CE_Atl14_April2021	6654.30	616.63	621.81	620.45	622.10	0.002001	3.12	1668.98	619.88	0.29

Plotted on: 4/23/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_HYDDATA.dgn

DESIGN

STATE OF TEXAS — RANDALL K HANEY — 111446 — LICENSED PROFESSIONAL ENGINEER

RANDALL K HANEY, P.E. — 4/23/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/23/2021 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

HYDRAULIC DATA SHEETS

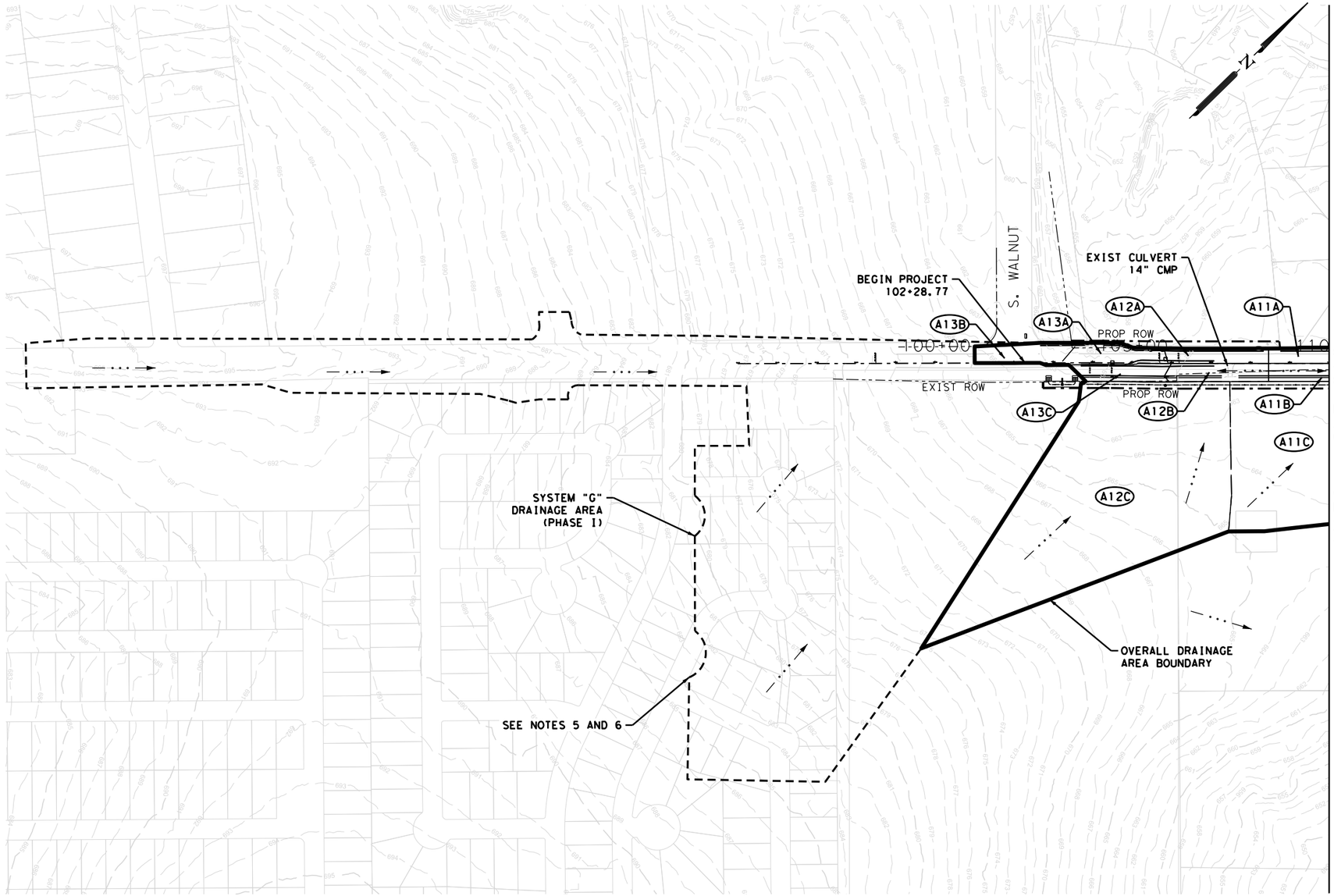
SHEET 2 OF 2

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	207

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_DA01.dgn

RUNOFF COMPUTATIONS - RATIONAL METHOD								
AREA ID	AREA (AC)	C	CA	Tc (MIN)	INTENSITY (IN/HR)	DISCHARGE (CFS)	TO INLET / JUNCTION	FREQUENCY (YR)
A11C	3.54	0.66	2.34	13	7.85	18.40	AD-A11C	25
A12A	0.23	0.86	0.20	10	8.94	1.75	CI-A12A	25
A12B	0.27	0.82	0.22	10	8.94	1.99	CI-A12B	25
A12C	6.16	0.65	3.99	11	8.45	33.70	AD-A12C	25
A13A	0.28	0.86	0.24	10	8.94	2.15	CI-A13A	25
A13B	0.27	0.90	0.24	10	8.94	2.17	CI-A13B	25
A13C	0.23	0.81	0.19	10	8.94	1.68	CI-A13C	25



LEGEND

- R.O.W.
- DRAINAGE AREA BOUNDARY
- 801 EXISTING 1' CONTOUR
- 850 EXISTING 5' CONTOUR
- SYSTEM "G" DRAINAGE AREA BOUNDARY
- (X-X) INTERIOR DRAINAGE AREA
- 100-YR FLOODPLAIN
- FLOW ARROW

NOTES

1. DRAINAGE AREAS OUTSIDE OF ROW DELINEATED USING 0.5-FT RESOLUTION ORTHOPHOTOGRAPHY FOR GUADALUPE COUNTY (2013, P2 ENERGY SOLUTIONS), OBTAINED FROM TEXAS NATURAL RESOURCES INFORMATION SYSTEM.
2. C-VALUES FOR AREAS OUTSIDE OF ROW INTERPRETED FROM CITY OF SAN ANTONIO UNIFIED DEVELOPMENT CODE (TABLE 5.5.3A, VERSION 2/27/2019) FOR CITY OF NEW BRAUNFELS ZONING (8/12/2019)
3. DESIGN FLOWS WERE DEVELOPED FOR THE 25-YR DESIGN STORM AND 100-YR CHECK STORM EVENTS USING POINT PRECIPITATION FREQUENCY ESTIMATES PUBLISHED BY THE NOAA ATLAS 14, VOLUME 11, VERSION 2. LATITUDE: 29.6621° LONGITUDE: -98.0981°
4. DRAINAGE AREA FLOWS DEVELOPED ASSUMING ULTIMATE CONDITION BASED ON CITY OF NEW BRAUNFELS ZONING MAP (8/12/2019).
5. DRAINAGE AREA FOR SYSTEM "G" TAKEN FROM CITY OF NEW BRAUNFELS W. KLEIN RD RECONSTRUCTION PROJECT F.M. 1044 TO WALNUT AVE. 100% PLANS (NOVEMBER 2017) PREPARED BY TRIHYDRO CORPORATION.
6. DESIGN FLOW FOR SYSTEM "G" TAKEN FROM WEST KLEIN ROAD RECONSTRUCTION PROJECT FINAL DRAINAGE REPORT (06/29/2018) PREPARED BY TRIHYDRO CORPORATION.

DESIGN

STATE OF TEXAS · ANDRES MORALES · 130189 · LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 150 300 450

SCALE: PLAN 1" = 300'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DRAINAGE AREA MAP SYSTEM A

SHEET 1 OF 3

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	208

Plotted on: 1/21/2021

RUNOFF COMPUTATIONS - RATIONAL METHOD								
AREA ID	AREA (AC)	C	CA	Tc (MIN)	INTENSITY (IN/HR)	DISCHARGE (CFS)	TO INLET / JUNCTION	FREQUENCY (YR)
A1A	0.21	0.76	0.16	10	8.94	1.43	CI-A1A	25
A1B	0.16	0.81	0.13	10	8.94	1.12	CI-A1B	25
A2A	0.03	0.78	0.02	10	8.94	0.22	CI-A2A	25
A2B	0.66	0.71	0.46	10	8.94	4.14	CI-A2B	25
A2C	0.24	0.77	0.19	10	8.94	1.67	CI-A2C	25
A3A	0.49	0.73	0.36	10	8.94	3.20	CI-A3A	25
A3B	0.27	0.77	0.21	10	8.94	1.85	CI-A3B	25
A4A	0.25	0.84	0.21	10	8.94	1.86	CI-A4A	25
A4B	0.34	0.80	0.27	10	8.94	2.39	CI-A4B	25
A5A	0.35	0.83	0.29	10	8.94	2.60	CI-A5A	25
A5B	0.36	0.68	0.25	10	8.94	2.21	CI-A5B	25
A6A	0.37	0.69	0.25	10	8.94	2.25	CI-A6A	25
A7A	0.37	0.81	0.30	10	8.94	2.67	CI-A7A	25
A8A	0.24	0.83	0.20	10	8.94	1.77	CI-A8A	25
A8B	4.74	0.66	3.10	10	8.94	27.76	AD-A8B	25
A9A	0.37	0.84	0.31	10	8.94	2.79	CI-A9A	25
A9B	0.37	0.82	0.30	10	8.94	2.72	CI-A9B	25
A10A	0.19	0.83	0.15	10	8.94	1.38	CI-A10A	25
A10B	0.21	0.82	0.18	10	8.94	1.57	CI-A10B	25

LEGEND

- R.O.W.
- DRAINAGE AREA BOUNDARY
- 801 EXISTING 1' CONTOUR
- 850 EXISTING 5' CONTOUR
- SYSTEM "G" DRAINAGE AREA BOUNDARY
- (X-X) INTERIOR DRAINAGE AREA
- 100-YR FLOODPLAIN
- FLOW ARROW

NOTES

1. DRAINAGE AREAS OUTSIDE OF ROW DELINEATED USING 0.5-FT RESOLUTION ORTHOPHOTOGRAPHY FOR GUADALUPE COUNTY (2013, P2 ENERGY SOLUTIONS), OBTAINED FROM TEXAS NATURAL RESOURCES INFORMATION SYSTEM.
2. C-VALUES FOR AREAS OUTSIDE OF ROW INTERPRETED FROM CITY OF SAN ANTONIO UNIFIED DEVELOPMENT CODE (TABLE 5.5.3A, VERSION 2/27/2019) FOR CITY OF NEW BRAUNFELS ZONING (8/12/2019)
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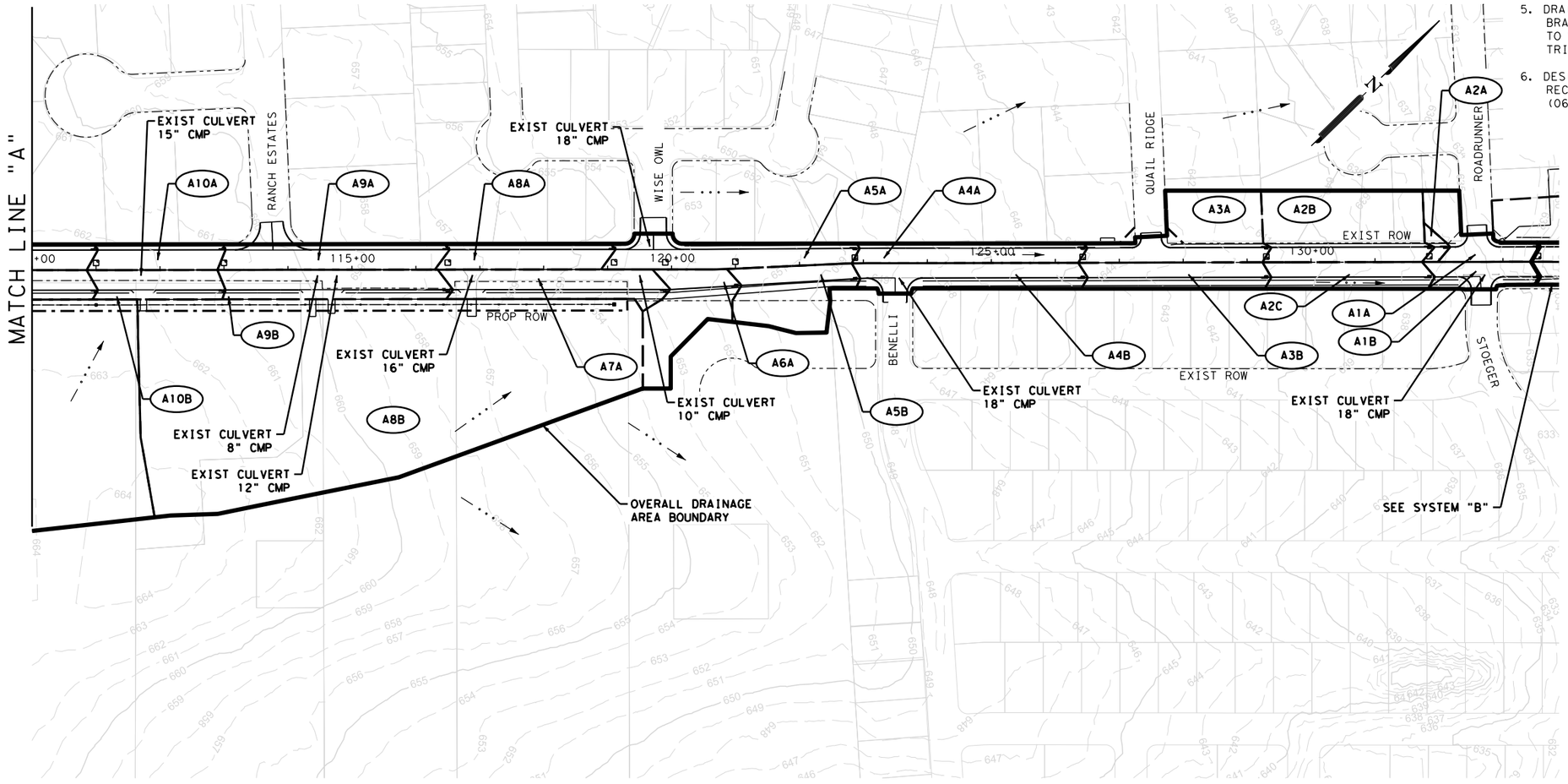
4. DRAINAGE AREA FLOWS DEVELOPED ASSUMING ULTIMATE CONDITION BASED ON CITY OF NEW BRAUNFELS ZONING MAP (8/12/2019).
5. DRAINAGE AREA FOR SYSTEM "G" TAKEN FROM CITY OF NEW BRAUNFELS W. KLEIN RD RECONSTRUCTION PROJECT F.M. 1044 TO WALNUT AVE. 100% PLANS (NOVEMBER 2017) PREPARED BY TRIHYDRO CORPORATION.
6. DESIGN FLOW FOR SYSTEM "G" TAKEN FROM WEST KLEIN ROAD RECONSTRUCTION PROJECT FINAL DRAINAGE REPORT (06/29/2018) PREPARED BY TRIHYDRO CORPORATION.



DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 100 200 300

SCALE: 1"= 200'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DRAINAGE AREA MAP SYSTEM A

SHEET 2 OF 3

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	209

Design Filename: H:\Projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_DA02.dgn

Plotted on: 1/21/2021

RUNOFF COMPUTATIONS - RATIONAL METHOD								
AREA ID	AREA (AC)	C	CA	Tc (MIN)	INTENSITY (IN/HR)	DISCHARGE (CFS)	TO INLET / JUNCTION	FREQUENCY (YR)
B1A	0.29	0.86	0.25	10	9.21	2.30	CI-B1A	25
B1B	0.26	0.90	0.23	10	9.21	2.15	CI-B1B	25
B2A	0.16	0.86	0.14	10	9.21	1.25	CI-B2A	25
B2B	0.14	0.90	0.12	10	9.21	1.14	CI-B2B	25
B3A	0.43	0.80	0.34	10	9.21	3.17	CI-B3A	25
B3B	0.40	0.90	0.36	10	9.21	3.28	CI-B3B	25
B4A	0.27	0.70	0.19	10	9.21	1.72	CI-B4A	25
B4B	0.18	0.81	0.14	10	9.21	1.32	CI-B4B	25
B5C	0.34	0.75	0.25	10	9.21	2.30	CI-B5C	25
B5D	0.29	0.82	0.24	10	9.21	2.22	CI-B5D	25
B6A	0.32	0.80	0.26	10	9.21	2.35	CI-B6A	25
B6B	0.30	0.83	0.24	10	9.21	2.24	CI-B6B	25
B7A	0.16	0.80	0.13	10	9.21	1.17	CI-B7A	25
B7B	0.14	0.83	0.12	10	9.21	1.10	CI-B7B	25
B8A	0.34	0.90	0.30	10	9.21	2.79	CI-B8A	25
B8B	0.75	0.91	0.68	10	9.21	6.25	CI-B8B	25
B8C	0.24	0.85	0.20	10	9.21	1.87	CI-B8C	25
B1F1	0.18	0.90	0.16	10	9.21	1.51	DI-F1	25

LEGEND

- R.O.W.
- DRAINAGE AREA BOUNDARY
- 801 EXISTING 1' CONTOUR
- 850 EXISTING 5' CONTOUR
- SYSTEM "G" DRAINAGE AREA BOUNDARY
- (X-X) INTERIOR DRAINAGE AREA
- 100-YR FLOODPLAIN
- FLOW ARROW

NOTES

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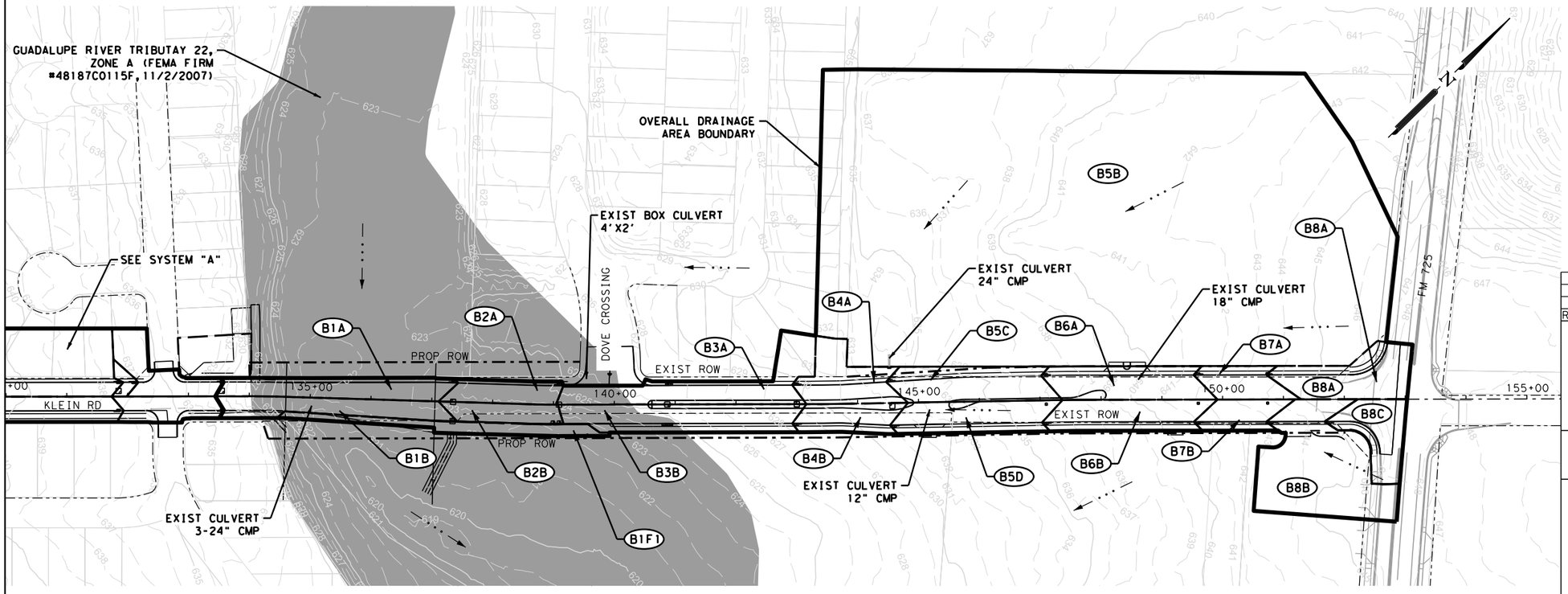
6. DESIGN FLOW FOR SYSTEM "G" TAKEN FROM WEST KLEIN ROAD RECONSTRUCTION PROJECT FINAL DRAINAGE REPORT (06/29/2018) PREPARED BY TRIHYDRO CORPORATION.



DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 100 200 300

SCALE: 1"= 200'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DRAINAGE AREA MAP SYSTEM B

SHEET 3 OF 3

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	210

Design Filename: H:\Projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_DA03.dgn

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_HDS03.dgn

RUNOFF COMPUTATIONS AND DITCH ANALYSIS COMPUTATIONS - RATIONAL METHOD

CHANNEL A1 - STATION	DRN AREA (AC)	C	T_c (MIN)	INTENSITIES (IN/HR)		FLOW (CFS)		BOTTOM WIDTH	CHANNEL DEPTH	CHANNEL SLOPE	FORESLOPE	BACKSLOPE	N VALUE	CHANNEL FLOW DEPTH		CROSS SECTIONAL AREA		VELOCITIES	
				I_{25}	I_{100}	Q_{25}	Q_{100}	FT	FT	%	H:1V	H:1V		FT (25YR)	FT (100YR)	SQ FT (25YR)	SQ FT (100YR)	FT/S (25YR)	FT/S (100YR)
(STA 202+08)	4.20	0.65	10.0	8.94	11.46	24.41	31.29	5	1.50	0.45%	6	4	0.035	1.06	1.20	10.97	13.21	2.22	2.37
(STA 202+19)	2.00	0.44	10.0	8.94	11.46	7.87	10.08	5	1.50	0.83%	6	4	0.035	0.51	0.59	3.90	4.67	2.02	2.16
(STA 207+23)	2.75	0.44	10.0	8.94	11.46	10.82	13.87	5	1.00	0.35%	6	6	0.035	0.74	0.83	6.92	8.25	1.56	1.68
(STA 207+34)	0.80	0.44	10.0	8.94	11.46	3.15	4.03	0	0.42	1.79%	20	20	0.015	0.28	0.32	1.91	2.24	1.65	1.80
(STA 210+53)	1.00	0.44	10.0	8.94	11.46	3.93	5.04	5	1.00	1.17%	6	6	0.035	0.32	0.36	2.20	2.60	1.79	1.94
(STA 211+04)	1.41	0.44	10.0	8.94	11.46	5.55	7.11	0	0.42	1.17%	20	20	0.015	0.30	0.33	1.85	2.22	3.00	3.20
(STA 213+01)	2.23	0.44	10.0	8.94	11.46	8.77	11.24	5	1.00	1.11%	6	6	0.035	0.49	0.56	3.94	4.67	2.23	2.41
(STA 213+11)	2.95	0.44	10.0	8.94	11.46	11.60	14.88	0	0.42	1.11%	20	20	0.015	0.41	0.45	3.31	3.98	3.51	3.74
(STA 215+25)	3.86	0.44	10.0	8.94	11.46	15.18	19.46	5	1.00	1.54%	6	6	0.035	0.60	0.68	5.19	6.19	2.93	3.14
(STA 215+41)	0.87	0.44	10.0	8.94	11.46	3.42	4.38	0	0.67	0.95%	3	3	0.015	0.41	0.45	0.51	0.60	6.70	7.30

ON GRADE INLET COMPUTATIONS

ID	TYPE	DESCRIPTION	CHAIN	STATION	OFFSET	DRAINAGE AREA ID	LONGITUDINAL SLOPE	LENGTH	LENGTH REQUIRED	CURB DEPRESSION	AREA DISCHARGE + CARRYOVER	CAPACITY	SPREAD SLOPE 1	SPREAD WIDTH 1	SPREAD N	ALLOWABLE PONDED WIDTH	COMPUTED PONDED WIDTH	ALLOWABLE PONDED DEPTH	COMPUTED PONDED DEPTH	CARRYOVER FLOW	BY PASS FLOW
							%	FT	FT	FT	CFS	CFS	%	FT		FT	FT	FT	FT	CFS	CFS
A13B	C	PCO (3FT) (LEFT)	KLEINCL	103+55.00	44.75 'L	A13B	0.360	9.500	5.898	0.250	2.17	2.17	6.0	36.0	0.015	12.00	5.74	0.58	0.34		
A12A	C	PCO (3FT) (RIGHT)	KLEINCL	105+85.00	32.60 'L	A12A	0.350	9.500	8.113	0.250	1.75	1.75	2.0	24.0	0.015	12.00	10.58	0.58	0.21		
A12B	C	PCO (3FT) (LEFT)	KLEINCL	105+85.00	32.50 'R	A12B	0.350	9.500	8.731	0.250	1.99	1.99	2.0	24.0	0.015	12.00	11.10	0.58	0.22		
A11B	C	PCO (3FT) (RIGHT)	KLEINCL	111+00.00	31.75 'R	A11B	0.400	9.500	8.793	0.250	1.91	1.91	2.0	31.0	0.015	12.00	10.66	0.58	0.21		
A11A	C	PCO (3FT) (LEFT)	KLEINCL	111+00.00	31.75 'L	A11A	0.400	9.500	8.202	0.250	1.69	1.69	2.0	31.0	0.015	12.00	10.18	0.58	0.20		
A10A	C	PCO (3FT) (LEFT)	KLEINCL	113+00.00	31.75 'L	A10A	0.900	9.500	8.789	0.250	1.38	1.38	2.0	31.0	0.015	12.00	8.11	0.58	0.16		
A10B	C	PCO (3FT) (RIGHT)	KLEINCL	113+00.00	31.75 'R	A10B	0.900	9.500	9.462	0.250	1.57	1.57	2.0	31.0	0.015	12.00	8.51	0.58	0.17		
A9B	C	PCO (3FT) (RIGHT)	KLEINCL	116+50.00	31.75 'R	A9B	1.400	9.500	14.275	0.250	2.72	2.34	2.0	31.0	0.015	12.00	9.63	0.58	0.19		0.38 C.O. TO A7A
A9A	C	PCO (3FT) (LEFT)	KLEINCL	116+50.00	31.75 'L	A9A	1.400	9.500	14.481	0.250	2.79	2.38	2.0	31.0	0.015	12.00	9.72	0.58	0.19		0.41 C.O. TO A8A
A8A	C	PCO (3FT) (LEFT)	KLEINCL	119+10.00	31.75 'L	A8A	1.400	9.500	12.613	0.250	2.18	2.01	2.0	31.0	0.015	12.00	8.87	0.58	0.18	0.41 C.O. FROM A9A	0.18 C.O. TO A5A
A7A	C	PCO (3FT) (RIGHT)	KLEINCL	119+90.00	31.75 'R	A7A	1.100	9.500	14.424	0.250	3.05	2.61	2.0	31.0	0.015	12.00	10.52	0.58	0.21	0.38 C.O. FROM A9B	0.44 C.O. TO A6A
A6A	C & G	PCU (3FT) (RIGHT)	KLEINCL	121+00.00	26.24 'R	A6A	1.100	9.500	n/a	0.250	2.69	2.36	2.0	31.0	0.015	12.00	10.04	0.58	0.20	0.44 C.O. FROM A7A	0.33 C.O. TO A5B
A5A	C & G	PCU (3FT) (LEFT)	KLEINCL	122+87.00	23.07 'L	A5A	1.100	9.500	n/a	0.250	2.78	2.42	2.0	24.0	0.015	12.00	10.15	0.58	0.20	0.18 C.O. FROM A8A	0.35 C.O. TO A4A
A5B	C & G	PCU (3FT) (RIGHT)	KLEINCL	122+87.00	23.89 'R	A5B	1.100	9.500	n/a	0.250	2.54	2.25	2.0	24.0	0.015	12.00	9.82	0.58	0.20	0.33 C.O. FROM A6A	0.29 C.O. TO A4B
A4A	C & G	PCU (3FT) (LEFT)	KLEINCL	126+43.00	23.00 'L	A4A	1.380	9.500	n/a	0.250	2.22	1.98	2.0	22.0	0.015	12.00	8.95	0.58	0.18	0.35 C.O. FROM A5A	0.24 C.O. TO A3A
A4B	C & G	PCU (3FT) (RIGHT)	KLEINCL	126+43.00	23.00 'R	A4B	1.380	9.500	n/a	0.250	2.68	2.31	2.0	22.0	0.015	12.00	9.61	0.58	0.19	0.29 C.O. FROM A5B	0.37 C.O. TO A3B
A3A	C & G	PCU (3FT) (LEFT)	KLEINCL	129+30.00	23.00 'L	A3A	1.380	9.500	n/a	0.250	3.45	2.82	2.0	22.0	0.015	12.00	10.55	0.58	0.21	0.24 C.O. FROM A4A	0.62 C.O. TO A2B
A3B	C & G	PCU (3FT) (RIGHT)	KLEINCL	129+30.00	23.00 'R	A3B	1.380	9.500	n/a	0.250	2.22	1.98	2.0	22.0	0.015	12.00	8.95	0.58	0.18	0.37 C.O. FROM A4B	0.24 C.O. TO A2C
A2B	C & G	PCU (3FT) (LEFT)	KLEINCL	131+85.00	23.00 'L	A2B	1.680	9.500	n/a	0.250	4.76	3.54	2.0	22.0	0.015	12.00	11.48	0.58	0.23	0.62 C.O. FROM A3A	1.22 C.O. TO A2A
A2C	C & G	PCU (3FT) (RIGHT)	KLEINCL	131+85.00	23.00 'R	A2C	1.680	9.500	n/a	0.250	1.91	1.72	2.0	22.0	0.015	12.00	8.16	0.58	0.16	0.24 C.O. FROM A3B	0.19 C.O. TO A1B
A2A	C & G	PCU (3FT) (LEFT)	KLEINCL	132+10.00	23.00 'L	A2A	1.680	9.500	n/a	0.250	1.44	1.35	2.0	22.0	0.015	12.00	7.34	0.58	0.15	1.22 C.O. FROM A2B	0.09 C.O. TO A1A
A1B	C & G	PCU (3FT) (RIGHT)	KLEINCL	133+55.00	23.00 'R	A1B	1.310	9.500	n/a	0.250	1.31	1.26	2.0	22.0	0.015	12.00	7.43	0.58	0.15	0.19 C.O. FROM A2C	0.05 C.O. TO B1B
A1A	C & G	PCU (3FT) (LEFT)	KLEINCL	133+55.00	23.00 'L	A1A	1.310	9.500	n/a	0.250	1.52	1.43	2.0	22.0	0.015	12.00	7.84	0.58	0.16	0.09 C.O. FROM A2A	0.09 C.O. TO B1A

SAG INLET COMPUTATIONS

ID	TYPE	DESCRIPTION	CHAIN	STATION	OFFSET	DRAINAGE AREA ID	LENGTH	INLET PERIMETER	INLET AREA	CURB DEPRESSION	AREA REDUCTION FACTOR	PERIMETER REDUCTION FACTOR	AREA DISCHARGE + CARRYOVER	CAPACITY	SPREAD SLOPE 1	SPREAD WIDTH 1	SPREAD SLOPE 2	SPREAD WIDTH 2	SPREAD N	ALLOWABLE PONDED WIDTH	COMPUTED PONDED WIDTH (LT)	COMPUTED PONDED WIDTH (RT)	ALLOWABLE PONDED DEPTH	COMPUTED PONDED DEPTH	CARRYOVER FLOW
							FT	FT	FT^2	FT			CFS	CFS	%	FT	%	FT		FT	FT	FT	FT	FT	CFS
A13A	C	PCO (3FT) (NONE)-2	KLEINCL	104+50.00	44.75 'LT	A13A	10.000	n/a	n/a	0.250	n/a	n/a	2.1	12.9	2.0	31.0	0.0	0.0	0.015	12.00	8.773	8.820	0.58	0.18	
A13C	C	PCO (3FT) (NONE)	KLEINCL	104+50.00	32.75 'RT	A13C	5.000	n/a	n/a	0.250	n/a	n/a	1.7	7.8	2.0	24.0	0.0	0.0	0.013	12.00	7.584	7.625	0.58	0.21	
A-G2	G	PAZD FG 4x4-4	KLEINCL	103+22.92	55.00 'RT	n/a	n/a	16.667	8.194	n/a	0.500	0.500	33.4	39.6	25.0	6.0	2.0	15.0	0.015	21.00	10.046	2.047	1.13	0.95	
A12C	G	PAZD FG 4x4-4	KLEINCL	105+85.00	55.50 'RT	A12C	n/a	16.667	8.194	n/a	0.500	0.500	33.7	39.6	0.0	2.5	25.0	6.0	0.035	17.00	7.320	6.658	1.50	1.28	
A11C	G	PAZD FG 3x3-3	KLEINCL	111+00.00	54.50 'RT	A11C	n/a	16.667	4.535	n/a	0.500	0.500	18.4	26.7	0.0	2.5	16.7	6.0	0.035	19.00	9.461	4.051	1.50	1.03	
A8B	G	PAZD FG 4x4-4	KLEINCL	119+10.00	54.50 'RT	A8B	n/a	16.667	8.194	n/a	0.500	0.500	27.8	39.6	0.0	2.5	25.0	6.0	0.035	17.00	6.846	3.803	1.60	1.12	

INLET TYPE ABBREVIATIONS

C = CURB

G = GRATE

SD = SLOTTED DRAIN

C & G = CURB AND GRATE

NOTES:

1. TOP OF PIPE ELEVATION, SOFFIT OF CULVERT, OR WATER SUFRACE ELEVATION IN CHANNEL IS USED FOR TAILWATER CONDITIONS BASED ON OUTFALL CONDITION.

2. RATIONAL METHOD USED FOR DRAINAGE AREAS LESS THAN 200AC FOR PEAK FLOW CALCULATIONS.

3. 10 MIN. MINMUM WAS USED FOR TIME OF CONCENTRATION CALCUATIONS.

4. INLET ID PREFIX FOR SAG AND ON GRADE COMPUTATIONS NOT SHOWN FOR CLARITY.

DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

STORM DRAIN COMPUTATION SYSTEM A

SHEET 1 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	211

Plotted on: 4/22/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_HDS04.dgn

STORM DRAIN COMPUTATIONS

LINE ID	UPSTREAM NODE	DOWNSTREAM NODE	LENGTH (FT)	HYDRAULIC LENGTH (FT)	SLOPE %	SHAPE	MATERIAL	# OF BARRELS	STR SIZE	MANNING'S N	UPSTREAM JUNCTION LOSS (FT)	FRICTION SLOPE (FT)	UNIFORM DEPTH (FT)	ACTUAL DEPTH UPSTREAM (FT)	ACTUAL DEPTH DOWNSTREAM (FT)	UNIFORM VELOCITY (FT/SEC)	ACTUAL VELOCITY UPSTREAM (FT/SEC)	ACTUAL VELOCITY DOWNSTREAM (FT/SEC)	HGL UPSTREAM (FT)	HGL DOWNSTREAM (FT)	TC (MIN)	CUMLATIVE AREA (ACRE)	INTENSITY (IN/HR)	DISCHARGE (CFS)	CAPACITY (CFS)
A-G2	AD-G2	COLLAR	13.80	15.80	1.64	Circular	Concrete	1	24" RCP	0.012	1.79	0.02	1.79	2.00	1.86	11.26	10.63	10.96	663.15	658.96	0.0	0.00	0.00	0.00	33.40
A14	MH-A14	MH-A13	119.71	123.71	0.50	Box	Concrete	1	5'x2' RBC	0.012	0.82	0.01	1.49	2.00	1.49	8.27	6.14	8.27	658.82	656.64	11.2	0.78	8.51	61.40	92.65
A13	MH-A13	MH-A12	127.35	135.35	0.50	Box	Concrete	1	5'x3' RBC	0.012	0.04	0.01	1.58	2.29	2.97	8.51	5.87	4.53	656.44	656.48	11.7	7.44	8.36	67.11	159.41
A12	MH-A12	MH-A11	506.91	514.91	0.50	Box	Concrete	1	5'x3' RBC	0.012	0.65	0.01	2.16	3.00	2.16	9.63	6.92	9.63	656.48	653.04	13.4	11.46	7.83	103.87	159.41
A11	MH-A11	MH-A10	192.00	200.00	0.50	Box	Concrete	1	5'x3' RBC	0.012	0.47	0.01	2.44	3.00	2.44	10.07	8.17	10.06	653.95	652.26	13.8	11.86	7.72	122.61	159.41
A10	MH-A10	MH-A9	342.00	350.00	0.50	Box	Concrete	1	5'x3' RBC	0.012	0.05	0.01	2.46	2.77	2.46	10.11	8.97	10.11	652.49	650.47	14.6	12.60	7.50	124.35	159.41
A9	MH-A9	MH-A8	252.00	260.00	0.70	Box	Concrete	1	5'x3' RBC	0.012	0.06	0.01	2.20	2.82	2.21	11.46	8.95	11.42	650.71	648.34	15.0	17.58	7.39	126.34	188.62
A8	MH-A8	MH-A7	72.00	80.00	0.60	Box	Concrete	1	5'x3' RBC	0.012	0.56	0.01	2.65	3.00	3.00	11.35	10.00	10.00	649.18	648.23	15.2	17.95	7.36	150.06	174.63
A7	MH-A7	MH-A6	101.53	109.53	0.60	Box	Concrete	1	5'x3' RBC	0.012	0.07	0.01	2.67	3.00	3.00	11.38	10.12	10.12	647.95	647.37	15.3	18.31	7.33	151.86	174.63
A6	MH-A6	MH-A5	179.15	187.15	0.60	Box	Concrete	1	5'x3' RBC	0.012	0.08	0.01	2.69	3.00	3.00	11.40	10.22	10.22	646.79	645.86	15.6	19.02	7.26	153.35	174.63
A5	MH-A5	MH-A4	348.22	356.22	0.60	Box	Concrete	1	5'x3' RBC	0.012	0.13	0.01	2.74	3.00	3.00	11.42	10.42	10.42	643.24	641.58	16.1	19.61	7.14	156.31	174.63
A4	MH-A4	MH-A3	279.00	287.00	0.60	Box	Concrete	1	5'x3' RBC	0.012	0.06	0.01	2.74	3.00	3.00	11.55	10.55	10.55	638.61	637.38	16.5	20.36	7.06	158.18	174.63
A3	MH-A3	MH-A2	247.00	255.00	0.60	Box	Concrete	1	5'x3' RBC	0.012	0.08	0.01	2.78	3.00	3.00	11.54	10.71	10.71	634.66	633.60	16.9	21.30	6.97	160.71	174.63
A2	MH-A2	MH-A1	162.00	170.00	0.35	Box	Concrete	1	5'x4' RBC	0.012	0.00	0.00	3.47	3.49	3.23	9.51	9.44	10.20	629.51	628.68	17.2	21.66	6.91	164.80	192.81
A1	MH-A1	OUTFALL	119.21	123.21	0.30	Box	Concrete	1	6'x4' RBC	0.012	0.00	0.00	3.09	3.57	2.88	8.94	7.76	9.62	627.72	626.68	17.5	21.66	0.00	166.02	230.17
A13B	CI-A13B	CI-A13A	90.64	95.64	0.50	Circular	Concrete	1	24" RCP	0.012	0.13	0.01	0.48	0.70	1.07	3.78	2.20	1.27	656.61	656.52	10.8	0.55	8.64	2.17	18.64
A13C	CI-A13C	MH-A13	29.75	35.25	2.20	Circular	Concrete	1	24" RCP	0.012	0.08	0.02	0.29	0.65	0.30	5.89	1.90	5.75	656.46	655.45	11.2	0.78	8.51	1.68	39.10
A13A	CI-A13A	MH-A13	40.20	50.39	0.50	Circular	Concrete	1	24" RCP	0.012	0.08	0.01	0.67	1.17	1.29	4.54	2.19	1.95	656.52	656.44	11.2	0.78	8.51	4.17	18.64
A4B	CI-A4B	MH-A4	26.25	32.00	0.50	Circular	Concrete	1	24" RCP	0.012	0.16	0.01	0.49	0.72	0.49	3.85	2.27	3.83	639.83	639.48	16.1	19.61	7.14	2.31	18.64
A4A	CI-A4A	MH-A4	8.25	14.00	1.79	Circular	Concrete	1	24" RCP	0.012	0.10	0.02	0.33	0.69	0.36	5.76	2.05	5.14	639.81	639.33	16.1	19.61	7.14	1.98	35.31
A3B	CI-A3B	MH-A3	26.25	32.00	0.50	Circular	Concrete	1	24" RCP	0.012	0.15	0.01	0.46	0.66	0.46	3.68	2.17	3.66	635.83	635.49	16.5	20.36	7.06	1.98	18.64
A3A	CI-A3A	MH-A3	8.25	14.00	0.50	Circular	Concrete	1	24" RCP	0.012	0.18	0.01	0.55	0.80	0.55	4.06	2.41	4.02	635.95	635.66	16.5	20.36	7.06	2.82	18.64
A2A	CI-A2A	CI-A2B	20.00	25.03	1.00	Circular	Concrete	1	24" RCP	0.012	0.02	0.01	0.32	0.78	0.96	4.19	1.20	0.90	631.74	631.73	10.4	0.69	8.81	1.35	26.36
A2C	CI-A2C	MH-A2	26.25	32.00	2.20	Circular	Concrete	1	24" RCP	0.012	0.08	0.02	0.30	0.66	0.30	5.94	1.90	5.75	631.83	630.89	16.9	21.30	6.97	1.72	39.10
A2B	CI-A2B	MH-A2	8.25	14.00	1.00	Circular	Concrete	1	24" RCP	0.012	0.23	0.01	0.60	1.06	0.65	6.07	2.85	5.46	631.73	631.23	16.9	21.30	6.97	4.83	26.36
A1B	CI-A1B	MH-A1	26.25	32.00	0.50	Circular	Concrete	1	24" RCP	0.012	0.11	0.01	0.37	0.53	0.37	3.19	1.91	3.19	628.35	628.06	17.2	21.66	6.91	1.26	18.64
A1A	CI-A1A	MH-A1	8.25	14.00	2.06	Circular	Concrete	1	24" RCP	0.012	0.07	0.02	0.28	0.60	0.29	5.50	1.80	4.99	628.43	627.95	17.2	21.66	6.91	1.43	37.84
A12C	AD-A12C	CI-A12B	18.00	21.50	2.50	Circular	Concrete	1	24" RCP	0.012	1.79	0.03	1.44	2.00	1.67	13.91	10.73	12.04	662.31	657.61	11.4	6.43	8.44	33.70	41.68
A12A	CI-A12A	MH-A12	17.60	23.10	1.11	Circular	Concrete	1	24" RCP	0.012	0.11	0.01	0.35	0.63	0.36	4.69	2.05	4.53	656.73	656.26	11.7	7.44	8.36	1.75	27.75
A12B	CI-A12B	MH-A12	39.50	45.00	2.50	Circular	Concrete	1	24" RCP	0.012	0.01	0.03	1.51	2.00	1.65	13.99	11.31	12.84	657.90	656.49	11.7	7.44	8.36	35.54	41.68
A11C	AD-A11C	CI-A11B	18.25	21.25	2.20	Circular	Concrete	1	24" RCP	0.012	0.72	0.02	1.01	2.00	1.20	11.59	5.86	9.40	659.22	657.31	13.3	3.80	7.84	18.40	39.10
A11B	CI-A11B	MH-A11	38.75	44.25	2.20	Circular	Concrete	1	24" RCP	0.012	0.04	0.02	1.06	1.76	1.17	11.86	6.83	10.46	657.78	656.34	13.4	11.46	7.83	20.04	39.10
A11A	CI-A11A	MH-A11	16.75	22.25	1.15	Circular	Concrete	1	24" RCP	0.012	0.11	0.01	0.34	0.62	0.35	4.69	2.03	4.53	656.64	656.18	13.4	11.46	7.83	1.69	28.23
A10B	CI-A10B	MH-A10	38.75	44.25	0.50	Circular	Concrete	1	24" RCP	0.012	0.13	0.01	0.41	0.59	0.41	3.42	2.03	3.42	655.48	655.10	13.8	11.86	7.72	1.57	18.64
A10A	CI-A10A	MH-A10	16.75	22.25	1.15	Circular	Concrete	1	24" RCP	0.012	0.09	0.01	0.31	0.56	0.32	4.42	1.90	4.29	655.45	655.02	13.8	11.86	7.72	1.38	28.30
A9A	CI-A9A	MH-A9	16.75	22.25	1.15	Circular	Concrete	1	24" RCP	0.012	0.14	0.01	0.41	0.74	0.42	5.18	2.25	4.93	652.33	651.82	14.6	12.60	7.50	2.38	28.23
A9B	CI-A9B	MH-A9	38.75	44.25	0.50	Circular	Concrete	1	24" RCP	0.012	0.16	0.01	0.50	0.72	0.50	3.86	2.28	3.84	652.31	651.89	14.6	12.60	7.50	2.34	18.64
A8A	CI-A8A	MH-A8	16.75	22.25	2.17	Circular	Concrete	1	24" RCP	0.012	0.02	0.02	0.32	1.23	1.59	6.18	0.99	0.75	649.19	649.18	15.0	17.58	7.39	2.01	38.81
A8B	AD-A8B	MH-A8	59.50	65.50	1.60	Circular	Concrete	1	24" RCP	0.012	1.25	0.02	1.47	2.00	1.54	11.19	8.84	10.70	652.43	648.59	15.0	17.58	7.39	27.76	33.35
A7A	CI-A7A	MH-A7	38.75	44.25	2.33	Circular	Concrete	1	24" RCP	0.012	0.07	0.02	0.36	0.89	1.81	6.85	1.92	0.87	647.93	647.95	15.2	17.95	7.36	2.61	40.27
A6A	CI-A6A	MH-A6	31.49	37.24	0.50	Circular	Concrete	1	24" RCP	0.012	0.02	0.01	0.50	1.46	1.60	3.86	0.96	0.88	646.81	646.79	15.3	18.31	7.33	2.36	18.64
A5A	CI-A5A	MH-A5	8.33	14.08	2.56	Circular	Concrete	1	24" RCP	0.012	0.10	0.03	0.34	0.79	0.37	6.93	2.11	5.95	644.19	643.56	15.6	19.02	7.26	2.42	42.17

INLET TYPE ABBREVIATIONS

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NOTES:

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2. RATIONAL METHOD USED FOR DRAINAGE AREAS LESS THAN 200AC FOR PEAK FLOW CALCULATIONS.

3. 10 MIN. MINMUM WAS USED FOR TIME OF CONCENTRATION CALCUATIONS.

4. INLET ID PREFIX FOR SAG AND ON GRADE COMPUTATIONS NOT SHOWN FOR CLARITY.

DESIGN

STATE OF TEXAS · ANDRES MORALES · 130189 · LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 4/22/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/22/2021 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

STORM DRAIN COMPUTATION SYSTEM A

SHEET 2 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	212

Plotted on: 1/21/2021

ON GRADE INLET COMPUTATIONS

ID	TYPE	DESCRIPTION	CHAIN	STATION	OFFSET	DRAINAGE AREA ID	LONGITUDINAL SLOPE	LENGTH	LENGTH REQUIRED	CURB DEPRESSION	AREA DISCHARGE + CARRYOVER	CAPACITY	SPREAD SLOPE 1	SPREAD WIDTH 1	SPREAD N	ALLOWABLE PONDED WIDTH	COMPUTED PONDED WIDTH	ALLOWABLE PONDED DEPTH	COMPUTED PONDED DEPTH	CARRYOVER FLOW	BY PASS FLOW
							%	FT	FT	FT	CFS	CFS	%	FT		FT	FT	FT	FT	CFS	CFS
B1A	C	PCO (3FT)(LEFT)	KLEINCL	137+35.00	31.75'L	B1A	2.000	9.5	14.097	0.25	2.30	2.00	2.0	31.0	0.015	12.00	8.46	0.58	0.17		0.31 C.O. TO B2A
B2A	C	PCO (3FT)(LEFT)	KLEINCL	139+09.00	31.75'L	B2A	0.600	9.5	8.602	0.25	1.56	1.56	2.0	31.0	0.015	12.00	9.16	0.58	0.18	0.31 C.O. FROM B1A	
B4A	C	PCO (3FT)(RIGHT)	KLEINCL	143+00.00	31.75'L	B4A	1.458	9.5	12.599	0.25	2.14	1.97	2.0	24.0	0.015	12.00	8.74	0.58	0.18	0.42 C.O. FROM B5C	0.17 C.O. TO B3A
B4B	C	PCO (3FT)(LEFT)	KLEINCL	143+00.00	31.75'R	B4B	1.458	9.5	11.204	0.25	1.74	1.68	2.0	24.0	0.015	12.00	8.09	0.58	0.16	0.42 C.O. FROM B5D	0.06 C.O. TO B3B
B5C	C	PCO (3FT)(RIGHT)	KLEINCL	144+55.00	35.38'L	B5C	1.770	9.5	14.83	0.25	2.64	2.22	2.0	24.0	0.015	12.00	9.12	0.58	0.18	0.34 C.O. FROM B6A	0.42 C.O. TO B4A
B5D	C	PCO (3FT)(LEFT)	KLEINCL	144+60.00	36.75'R	B5D	1.770	9.5	14.818	0.25	2.64	2.22	2.0	24.0	0.015	12.00	9.12	0.58	0.18	0.42 C.O. FROM B6B	0.42 C.O. TO B4B
B6B	C	PCO (3FT)(LEFT)	KLEINCL	147+10.00	36.75'R	B6B	1.820	9.5	14.89	0.25	2.63	2.21	2.0	36.0	0.015	12.00	9.06	0.58	0.18	0.39 C.O. FROM B7B	0.42 C.O. TO B5D
B6A	C	PCO (3FT)(RIGHT)	KLEINCL	147+10.00	40.75'L	B6A	1.820	9.5	14.284	0.25	2.45	2.11	2.0	36.0	0.015	12.00	8.81	0.58	0.18	0.10 C.O. FROM B7A	0.34 C.O. TO B5C
B7A	C	PCO (3FT)(RIGHT)	KLEINCL	149+60.00	40.75'L	B7A	1.820	9.5	11.888	0.25	1.77	1.67	2.0	36.0	0.015	12.00	7.81	0.58	0.16	0.60 C.O. FROM B8A	0.10 C.O. TO B6A
B7B	C	PCO (3FT)(LEFT)	KLEINCL	149+60.00	36.75'R	B7B	1.820	9.5	14.659	0.25	2.56	2.17	2.0	36.0	0.015	12.00	8.97	0.58	0.18	1.46 C.O. FROM B8B	0.39 C.O. TO B6B
B8A	C	PCO (3FT)(RIGHT)	KLEINCL	150+74.00	40.75'L	B8A	2.491	9.5	16.513	0.25	2.79	2.19	2.0	36.0	0.015	12.00	8.73	0.58	0.18		0.60 C.O. TO B7A
B8B	C	PCO (3FT)(LEFT) + (3FT)(NONE)	KLEINCL	150+76.97	36.75'R	B8B	2.518	15	26.656	0.25	6.48	5.02	2.0	36.0	0.015	12.00	11.94	0.58	0.24	0.23 C.O. FROM B8C	1.46 C.O. TO B7B
B8C	C	PCO (3FT)(LEFT)	KLEINCL	151+75.00	36.75'R	B8C	3.000	9.5	13.763	0.25	1.87	1.65	2.0	36.0	0.015	12.00	7.26	0.58	0.15		0.23 C.O. TO B8B
B1B	SD	PMBD (4FT)	KLEINCL	137+36.50	29.00'R	B1B	2.000	n/a	33.262	n/a	2.15	0.93	2.0	31.0	0.015	12.00	8.25	0.58	0.17		1.22 C.O. TO B2B
B2B	SD	PMBD (4FT) - 2	KLEINCL	139+09.00	29.00'R	B2B	0.600	n/a	24.093	n/a	2.36	2.16	2.0	31.0	0.015	12.00	10.70	0.58	0.21	1.22 C.O. FROM B1B	0.20 C.O. TO B3B

SAG INLET COMPUTATIONS

ID	TYPE	DESCRIPTION	CHAIN	STATION	OFFSET	DRAINAGE AREA ID	LENGTH	INLET PERIMETER	INLET AREA	CURB DEPRESSION	AREA REDUCTION FACTOR	PERIMETER REDUCTION FACTOR	AREA DISCHARGE + CARRYOVER	CAPACITY	SPREAD SLOPE 1	SPREAD WIDTH 1	SPREAD SLOPE 2	SPREAD WIDTH 2	SPREAD N	ALLOWABLE PONDED WIDTH	COMPUTED PONDED WIDTH (LT)	COMPUTED PONDED WIDTH (RT)	ALLOWABLE PONDED DEPTH	COMPUTED PONDED DEPTH	CARRYOVER FLOW
							FT	FT	FT^2	FT			CFS	CFS	%	FT	%	FT		FT	FT	FT	FT	FT	CFS
B3A	C	PCO (3FT)(NONE)-2	KLEINCL	140+87.20	31.75'LT	B3A	10.000	n/a	n/a	0.250	n/a	n/a	3.3	12.9	2.0	24.0	0.0	0.0	0.015	12.00	10.070	9.334	0.58	0.24	
B3B	C	PCO (3FT)(NONE)-3	KLEINCL	140+87.20	31.75'RT	B3B	15.000	n/a	n/a	0.250	n/a	n/a	3.5	18.0	2.0	24.0	0.0	0.0	0.015	12.00	10.282	9.530	0.58	0.20	
B1F1	G	BD R3924 NEENAH	WALLG	72+55.55	2.33'LT	B1F1	n/a	8.400	2.300	n/a	0.500	0.500	1.5	2.1	0.0	1.7	33.3	0.8	0.015	2.50	2.303	1.804	0.30	0.24	

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3. 10 MIN. MINMUM WAS USED FOR TIME OF CONCENTRATION CALCUATIONS.

4. INLET ID PREFIX FOR SAG AND ON GRADE COMPUTATIONS NOT SHOWN FOR CLARITY.

DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

STORM DRAIN COMPUTATION SYSTEM B

SHEET 3 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	213

Design Filename: H:\Projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_HDS05.dgn

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_HDS06.dgn

STORM DRAIN COMPUTATIONS

LINE ID	UPSTREAM NODE	DOWNSTREAM NODE	LENGTH (FT)	HYDRAULIC LENGTH (FT)	SLOPE %	SHAPE	MATERIAL	# OF BARRELS	STR SIZE	MANNING'S N	UPSTREAM JUNCTION LOSS (FT)	FRICTION SLOPE (FT)	UNIFORM DEPTH (FT)	ACTUAL DEPTH UPSTREAM (FT)	ACTUAL DEPTH DOWNSTREAM (FT)	UNIFORM VELOCITY (FT/SEC)	ACTUAL VELOCITY UPSTREAM (FT/SEC)	ACTUAL VELOCITY DOWNSTREAM (FT/SEC)	HGL UPSTREAM (FT)	HGL DOWNSTREAM (FT)	TC (MIN)	CUMLATIVE AREA (ACRE)	INTENSITY (IN/HR)	DISCHARGE (CFS)	CAPACITY (CFS)
B8	MH-B8	MH-B7	111.00	114.00	1.67	Circular	Concrete	1	24" RCP	0.012	0.32	0.02	0.71	1.41	0.71	8.55	3.60	8.46	638.25	635.70	11.1	1.63	8.83	8.51	34.11
B7	MH-B7	MH-B6	246.90	249.90	1.84	Circular	Concrete	1	24" RCP	0.012	0.32	0.02	0.84	1.63	0.84	9.76	4.44	9.74	636.51	631.18	11.5	2.24	8.69	12.15	35.74
B6	MH-B6	MH-B5	247.51	253.01	1.49	Circular	Concrete	1	24" RCP	0.012	0.34	0.02	1.04	1.86	1.04	9.68	5.25	9.65	631.11	626.61	18.9	12.87	6.90	16.01	32.16
B5	MH-B5	MH-B4	149.10	157.10	1.28	Box	Concrete	1	5'x2' RBC	0.012	0.15	0.01	1.06	2.00	2.00	11.49	6.07	6.07	627.97	627.23	19.4	13.32	6.82	60.67	148.26
B4	MH-B4	MH-B3	204.80	212.80	0.40	Box	Concrete	1	5'x2' RBC	0.012	0.07	0.00	1.61	2.00	2.00	7.81	6.28	6.28	627.23	626.31	19.9	14.14	6.71	62.82	82.87
B3	MH-B3	MH-B2	170.20	178.20	0.31	Box	Concrete	1	5'x2' RBC	0.012	0.12	0.00	1.86	2.00	2.00	7.22	6.70	6.70	626.31	625.37	20.4	14.44	6.64	67.01	72.63
B2	MH-B2	MH-B1	165.99	173.99	0.10	Box	Concrete	1	5'x3' RBC	0.012	0.00	0.00	2.97	3.00	3.00	4.67	4.62	4.62	625.37	625.10	21.0	14.73	6.53	69.29	71.29
B1	MH-B1	CI-B1B	23.50	29.62	0.10	Box	Concrete	1	5'x3' RBC	0.012	0.23	0.00	2.97	3.00	3.00	4.68	4.64	4.64	625.10	624.82	21.1	14.99	6.51	69.52	71.29
B1B	CI-B1B	OUTFALLB	15.50	22.17	0.10	Box	Concrete	1	5'x3' RBC	0.012	0.00	0.00	2.97	3.00	3.00	4.69	4.64	4.64	624.82	624.79	21.2	14.99	0.00	69.64	71.29
B1A	CI-B1A	MH-B1	27.75	33.25	2.20	Circular	Concrete	1	24" RCP	0.012	0.09	0.02	0.32	0.70	0.33	6.20	2.02	5.99	625.87	624.88	21.0	14.73	6.53	2.00	39.10
B2B	CI-B2B	MH-B2	23.00	37.20	2.20	Circular	Concrete	1	24" RCP	0.012	0.01	0.02	0.33	2.00	2.00	6.34	0.69	0.69	625.38	625.37	20.4	14.44	6.64	2.16	39.10
B2A	CI-B2A	MH-B2	27.75	33.25	2.20	Circular	Concrete	1	24" RCP	0.012	0.00	0.02	0.28	2.00	2.00	5.76	0.50	0.50	625.37	625.37	20.4	14.44	6.64	1.56	39.10
B3B	CI-B3B	MH-B3	27.75	33.25	0.50	Circular	Concrete	1	24" RCP	0.012	0.02	0.01	0.61	2.00	2.00	4.33	1.12	1.12	626.33	626.31	19.9	14.14	6.71	3.53	18.64
B3A	CI-B3A	MH-B3	27.75	35.10	0.50	Circular	Concrete	1	24" RCP	0.012	0.02	0.01	0.59	2.00	2.00	4.27	1.06	1.06	626.33	626.31	19.9	14.14	6.71	3.34	18.64
B4B	CI-B4B	MH-B4	27.75	33.25	0.92	Circular	Concrete	1	24" RCP	0.012	0.00	0.01	0.36	2.00	2.00	4.35	0.54	0.54	627.24	627.23	19.4	13.32	6.82	1.68	25.32
B4A	CI-B4A	MH-B4	27.75	33.25	0.92	Circular	Concrete	1	24" RCP	0.012	0.01	0.01	0.39	2.00	2.00	4.56	0.63	0.63	627.24	627.23	19.4	13.32	6.82	1.97	25.32
B5B	MH-B5B	CI-B5C	18.72	21.72	1.00	Circular	Concrete	1	30" RCP	0.012	0.23	0.01	2.09	2.50	2.50	10.26	9.17	9.17	628.93	628.48	18.9	10.33	6.91	44.99	47.80
B5D	CI-B5D	MH-B5	27.91	33.41	1.52	Circular	Concrete	1	24" RCP	0.012	0.01	0.02	0.37	1.99	2.00	5.61	0.71	0.71	627.98	627.97	18.9	12.87	6.90	2.22	32.45
B5C	CI-B5C	MH-B5	36.44	41.94	1.00	Circular	Concrete	1	30" RCP	0.012	0.05	0.01	2.16	2.50	2.50	10.31	9.49	9.49	628.48	627.97	18.9	12.87	6.90	46.56	47.80
B6B	CI-B6B	MH-B6	28.75	31.75	0.90	Circular	Concrete	1	24" RCP	0.012	0.16	0.01	0.42	0.70	0.42	4.67	2.24	4.59	631.31	630.77	11.5	2.24	8.69	2.21	25.07
B6A	CI-B6A	MH-B6	45.75	48.75	1.12	Circular	Concrete	1	24" RCP	0.012	0.15	0.01	0.39	0.69	0.39	4.97	2.21	4.93	631.55	630.73	11.5	2.24	8.69	2.11	27.92
B7B	CI-B7B	MH-B7	29.25	32.25	1.73	Circular	Concrete	1	24" RCP	0.012	0.03	0.02	0.35	1.03	1.53	5.83	1.33	0.84	636.52	636.51	11.1	1.63	8.83	2.17	34.64
B7A	CI-B7A	MH-B7	45.25	48.25	0.94	Circular	Concrete	1	24" RCP	0.012	0.01	0.01	0.36	1.11	1.53	4.35	0.93	0.65	636.52	636.51	11.1	1.63	8.83	1.67	25.55
B8C	CI-B8C	CI-B8B	90.03	98.03	1.00	Circular	Concrete	1	24" RCP	0.012	0.10	0.01	0.35	0.62	0.35	4.42	1.98	4.42	638.86	637.69	10.7	0.99	8.97	1.65	26.36
B8A	CI-B8A	MH-B8	45.25	48.25	1.00	Circular	Concrete	1	24" RCP	0.012	0.05	0.01	0.40	0.88	1.31	4.84	1.64	1.01	638.28	638.25	10.8	1.32	8.92	2.19	26.36
B8B	CI-B8B	MH-B8	29.25	34.08	1.00	Circular	Concrete	1	24" RCP	0.012	0.30	0.01	0.70	1.24	0.73	6.57	3.14	6.25	638.48	637.67	10.8	1.32	8.92	6.45	26.36

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NOTES:

1. TOP OF PIPE ELEVATION, SOFFIT OF CULVERT, OR WATER SUFRACE ELEVATION IN CHANNEL IS USED FOR TAILWATER CONDITIONS BASED ON OUTFALL CONDITION.

2. RATIONAL METHOD USED FOR DRAINAGE AREAS LESS THAN 200AC FOR PEAK FLOW CALCULATIONS.

3. 10 MIN. MINMUM WAS USED FOR TIME OF CONCENTRATION CALCUATIONS.

4. INLET ID PREFIX FOR SAG AND ON GRADE COMPUTATIONS NOT SHOWN FOR CLARITY.

DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

STORM DRAIN COMPUTATION SYSTEM B

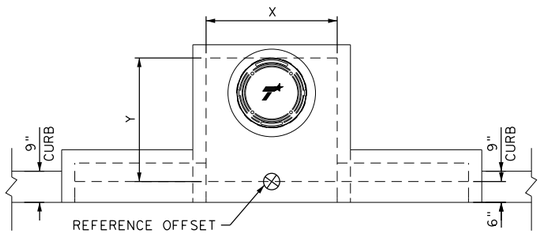
SHEET 4 OF 4

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	214

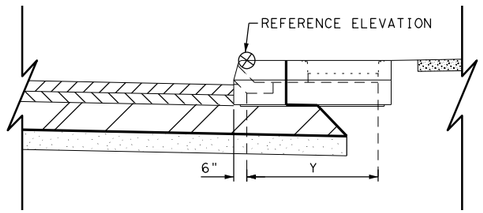
Plotted on: 1/21/2021

CONTROL POINTS FOR DRAINAGE STRUCTURES

NOTE: REFER TO DRAINAGE STANDARDS FOR VARIABLE DIMENSIONS

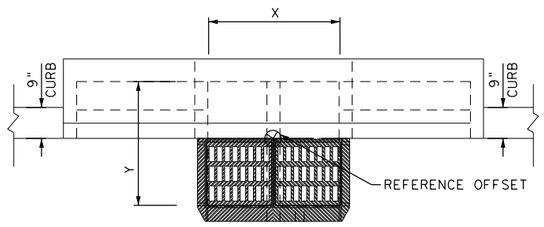


PLAN VIEW

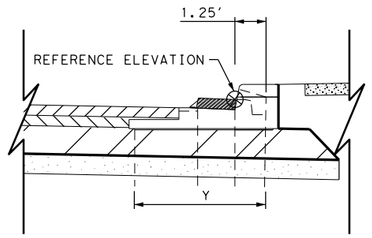


SIDE VIEW

CURB INLETS

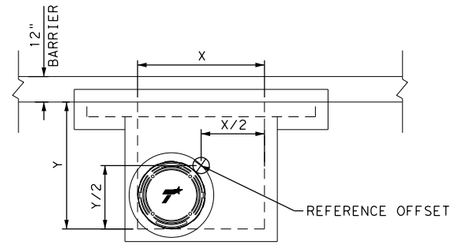


PLAN VIEW

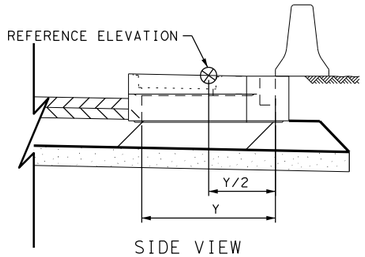


SIDE VIEW

CURB & GRATE INLETS

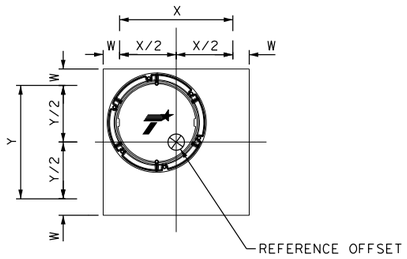


PLAN VIEW

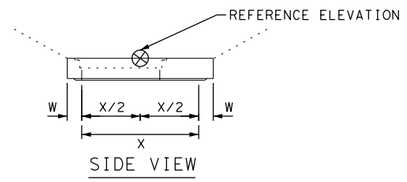


SIDE VIEW

PRECAST MEDIAN BARRIER DRAIN

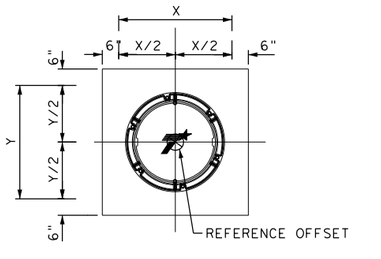


PLAN VIEW

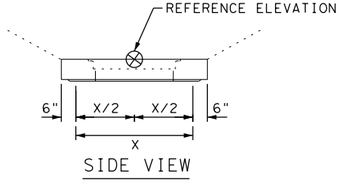


SIDE VIEW

PRECAST SLAB LIDS



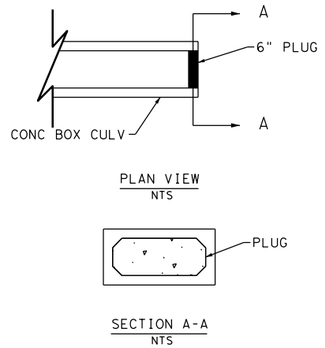
PLAN VIEW



SIDE VIEW

PRECAST AREA ZONE DRAIN

PLUG DETAIL



NOTES

1. SEE PERTINENT STRUCTURE LAYOUT OR PROFILE FOR ADDITIONAL DETAILS OF EACH STRUCTURE.
2. ALL PIPES ARE NORMAL TO AND STRAIGHT FROM STRUCTURE TO STRUCTURE UNLESS OTHERWISE SHOWN.
3. ANGLES AS SHOWN ON THE PLANS INDICATE DEVIATIONS OF PIPE ALIGNMENT FROM BEING NORMAL TO PROPOSED INLET, MH, ETC.
4. THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES AND DRAINAGE STRUCTURES INDICATED IN THE PLANS ARE TAKEN FROM THE BEST RECORDS AVAILABLE AND ARE NOT GUARANTEED TO BE ACCURATE. CONTRACTOR SHALL VERIFY ACTUAL LOCATION PRIOR TO BEGINNING CONSTRUCTION.
5. SEE HORIZONTAL ALIGNMENT SHEETS FOR ROADWAY ALIGNMENT.
6. SHORING OF EXISTING UTILITY POLES SUBSIDIARY TO INLET AND MANHOLE ITEMS.
7. MANHOLE LIDS TO BE BOLTED AND PLACED AT FINISHED GRADE AND OUTSIDE OF NORMAL WHEEL PATH (CENTER OF LANE).
8. ALL INLET STATION, OFFSET, AND ELEVATION REFERENCES ARE TO THE INLET STRUCTURE CONTAINING THE DOWNSTREAM LATERAL.
9. THIS PROJECT INCLUDES INSTALLATIONS GREATER THEN 5-FEET IN DEPTH LOCATED IN PUBLIC RIGHT-OF-WAY OR EASEMENTS. DEEP TRENCHES POSE COMPACTION TESTING AND CONSTRUCTION CHALLENGES AND CITY METHODS FOR TESTING AND COMPACTION MAY NOT BE ACHIEVABLE. AN INSTALLATION COMPACTION PLAN WILL BE REQUIRED AND MUST BE SUBMITTED FOR APPROVAL TO CITY PRIOR TO INSTALLATION.
10. EXISTING FEATURES ARE SHOWN SCREENBACK (I.E. FADED)

DESIGN

STATE OF TEXAS · ANDRES MORALES · 130189 · LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DRAINAGE NOTES

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	215

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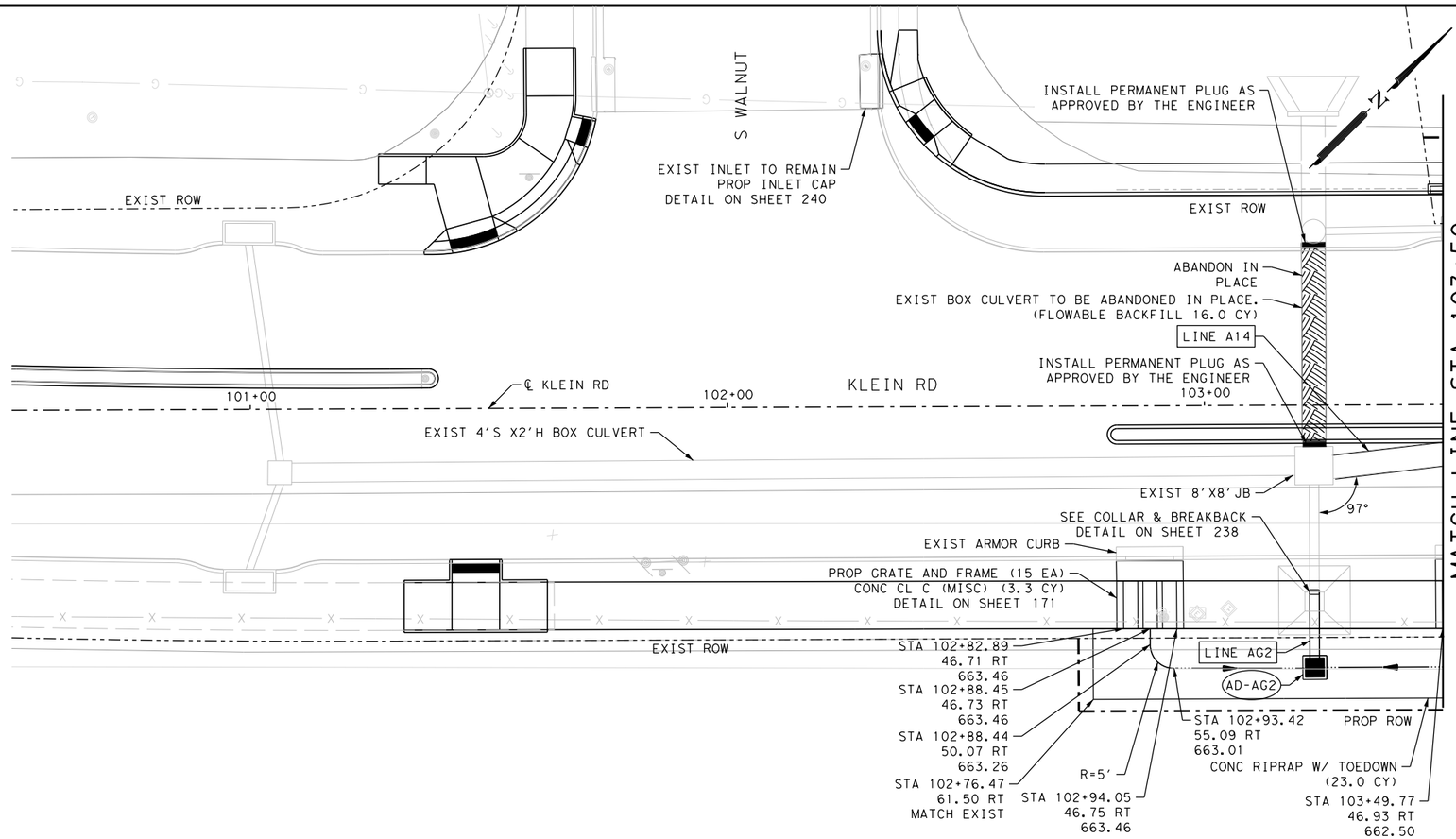

ITEM	DESCRIPTION	UNIT	QTY
0401-6001	FLOWABLE BACKFILL	CY	16
0402-6001	TRENCH EXCAVATION PROTECTION	LF	23
0420-6010	CL A CONC (PLUG)	EA	2
0420-6074	CL C CONC (MISC)	CY	3
0432-6003	RIPRAP (CONC)(6 IN)	CY	27
0462-6006	CONC BOX CULV (5 FT X 2 FT)	LF	120
0464-6005	RC PIPE (CL III)(24 IN)	LF	14
0465-6160	INLET(COMPL)(PAZD)(FG)(4FTX4FT-4FTX4FT)	EA	1
0471-6003	GRATE & FRAME	EA	15
0479-6003	ADJUSTING MANHOLES & INLETS	EA	1

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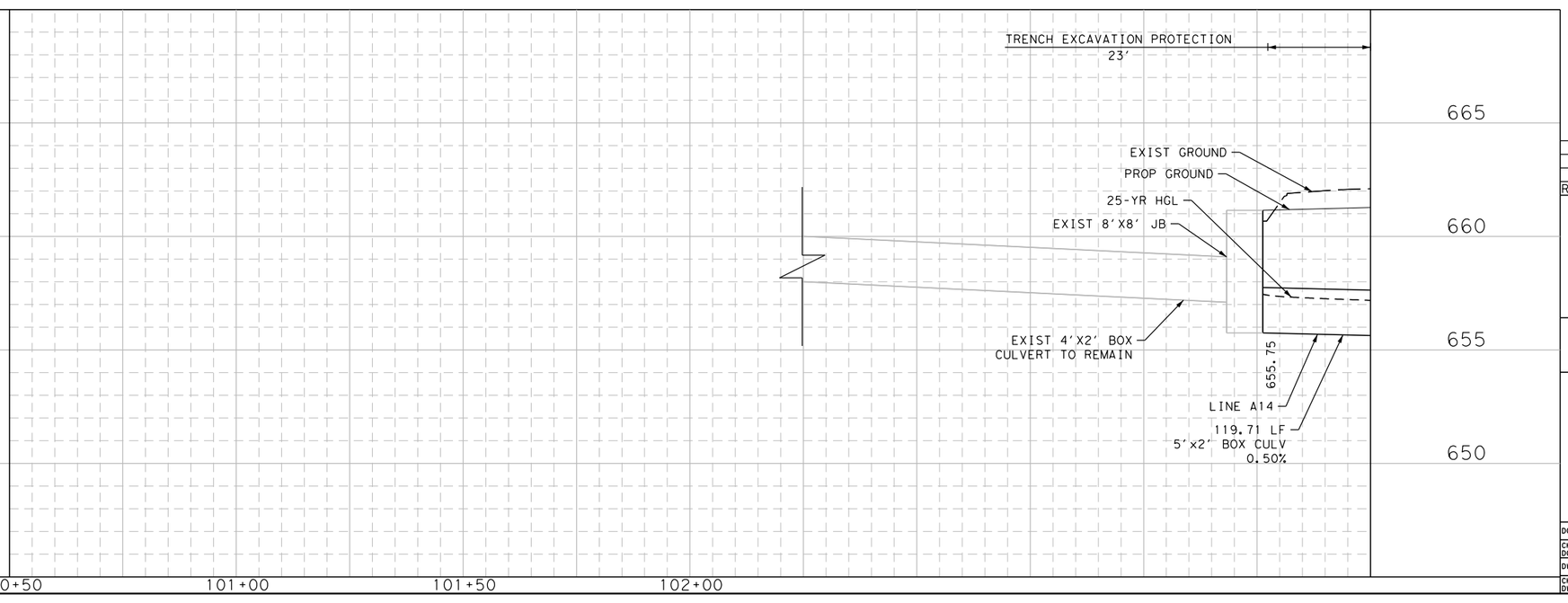
4. ALL STORM DRAIN SYSTEMS TO BE INSTALLED IN ACCORDANCE WITH TXDOT ITEM 402 "TRENCH EXCAVATION PROTECTION."

LEGEND

- CI-5A — CURB INLET & DESIGNATION
- MH-2B — MANHOLE & DESIGNATION
- AD-2B — AREA ZONE DRAIN & DESIGNATION
- LINE A1-3 — STORM DRAIN STRUCTURE & DESIGNATION
- FLOW ARROW
- W — EXIST WATER LINE
- OH E — EXIST OVERHEAD ELECTRIC
- UG T — EXIST UNDERGROUND COMMUNICATIONS



DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DRAINAGE PLAN & PROFILE

BEGIN PROJECT TO STA 103+50

SHEET 1 OF 17

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	216

Plotted on: 1/21/2021

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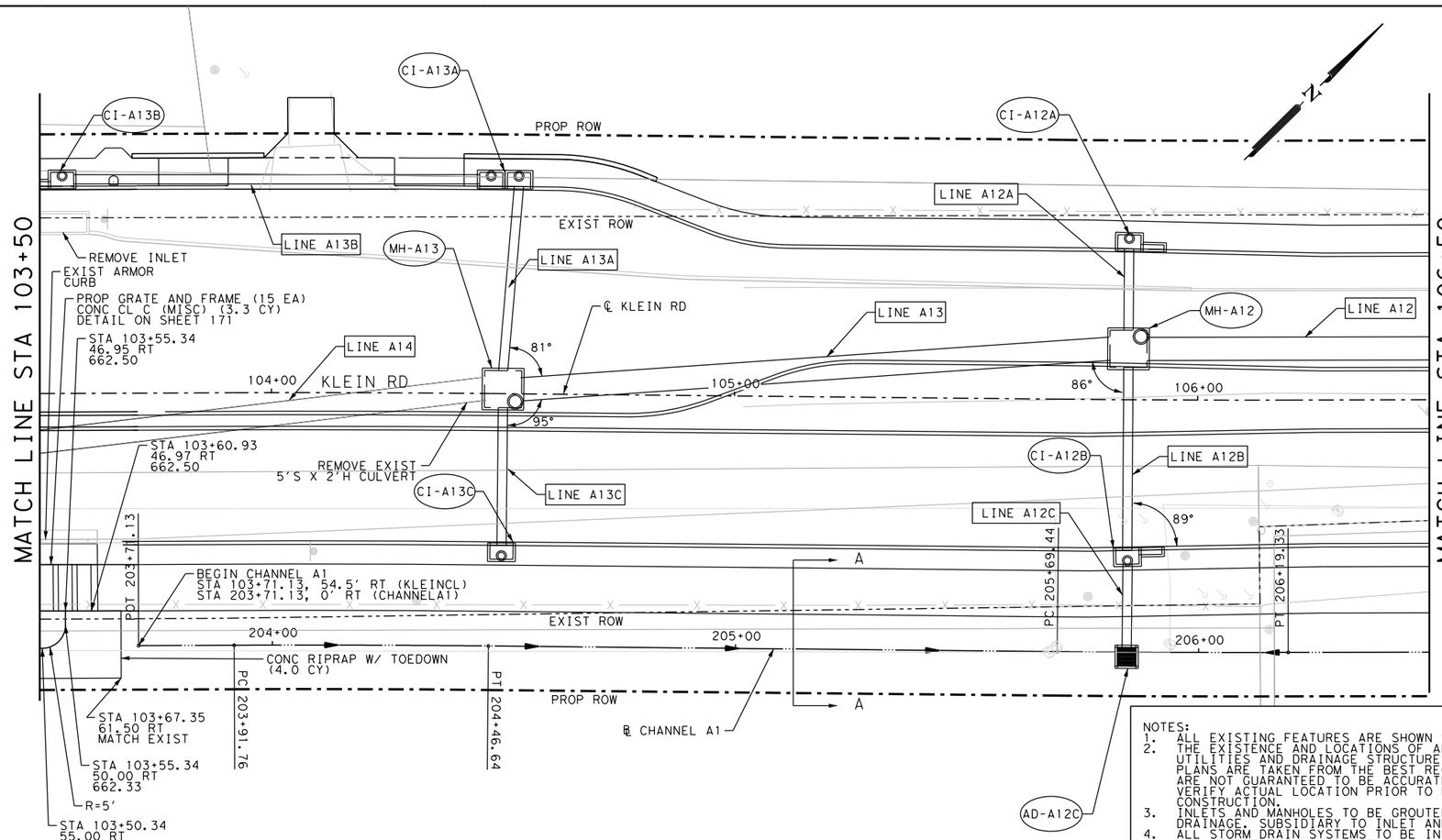
ITEM	DESCRIPTION	UNIT	QTY
0402-6001	TRENCH EXCAVATION PROTECTION	LF	474
0420-6074	CL C CONC (MISC)	CY	3
0432-6003	RIPRAP (CONC)(6 IN)	CY	7
0462-6007	CONC BOX CULV (5 FT X 3 FT)	LF	635
0464-6005	RC PIPE (CL III)(24 IN)	LF	233
0465-6013	INLET (COMPL)(PCO)(3FT)(NONE)	EA	3
0465-6014	INLET (COMPL)(PCO)(3FT)(LEFT)	EA	2
0465-6015	INLET (COMPL)(PCO)(3FT)(RIGHT)	EA	1
0465-6077	INLET (COMPL)(PSL)(RC)(8FTX8FT)	EA	2
0465-6160	INLET(COMPL)(PAZD)(FG)(4FTX4FT-4FTX4FT)	EA	1
0471-6003	GRATE & FRAME	EA	15



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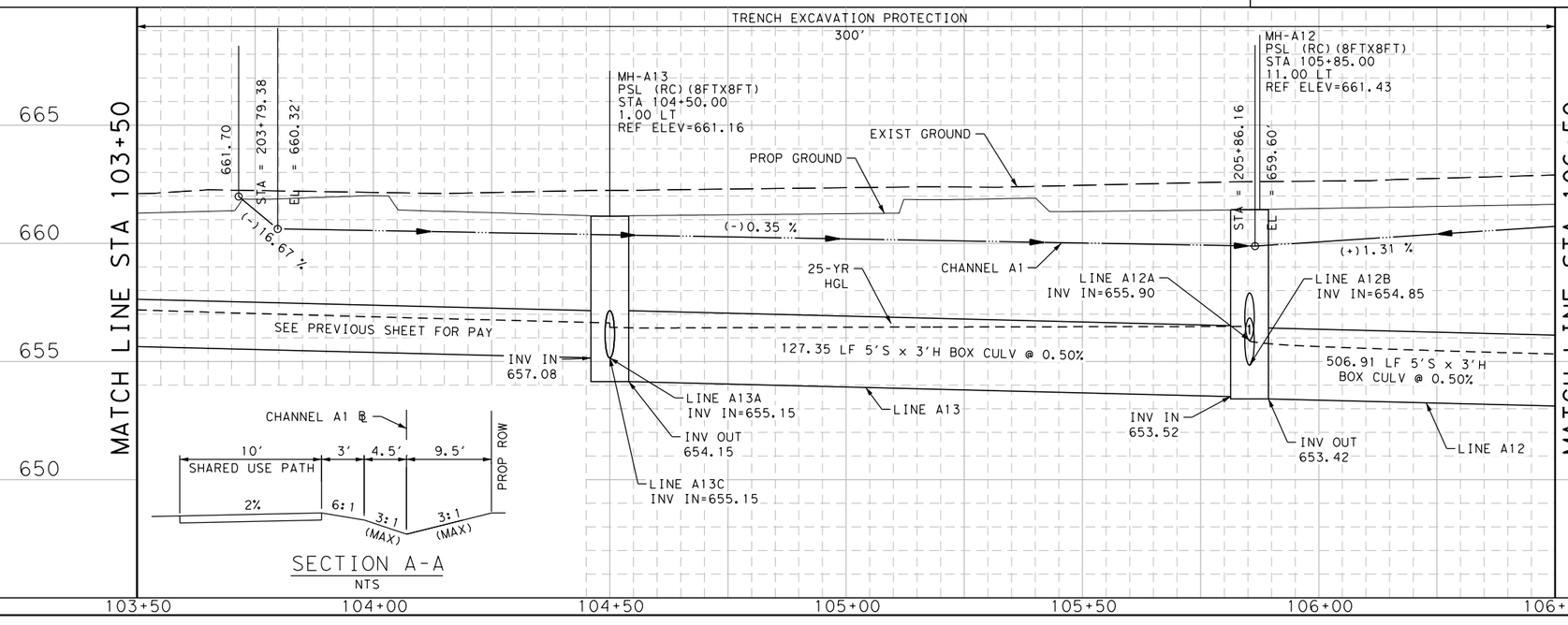


SECTION A-A
NTS

LEGEND

CI-5A	CURB INLET & DESIGNATION
MH-2B	MANHOLE & DESIGNATION
AD-2B	AREA ZONE DRAIN & DESIGNATION
LINE A1-3	STORM DRAIN STRUCTURE & DESIGNATION
→	FLOW ARROW
W	EXIST WATER LINE
OH E	EXIST OVERHEAD ELECTRIC
UG T	EXIST UNDERGROUND COMMUNICATIONS

DESIGN

STATE OF TEXAS · ANDRES MORALES · 130189 · LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DRAINAGE PLAN & PROFILE

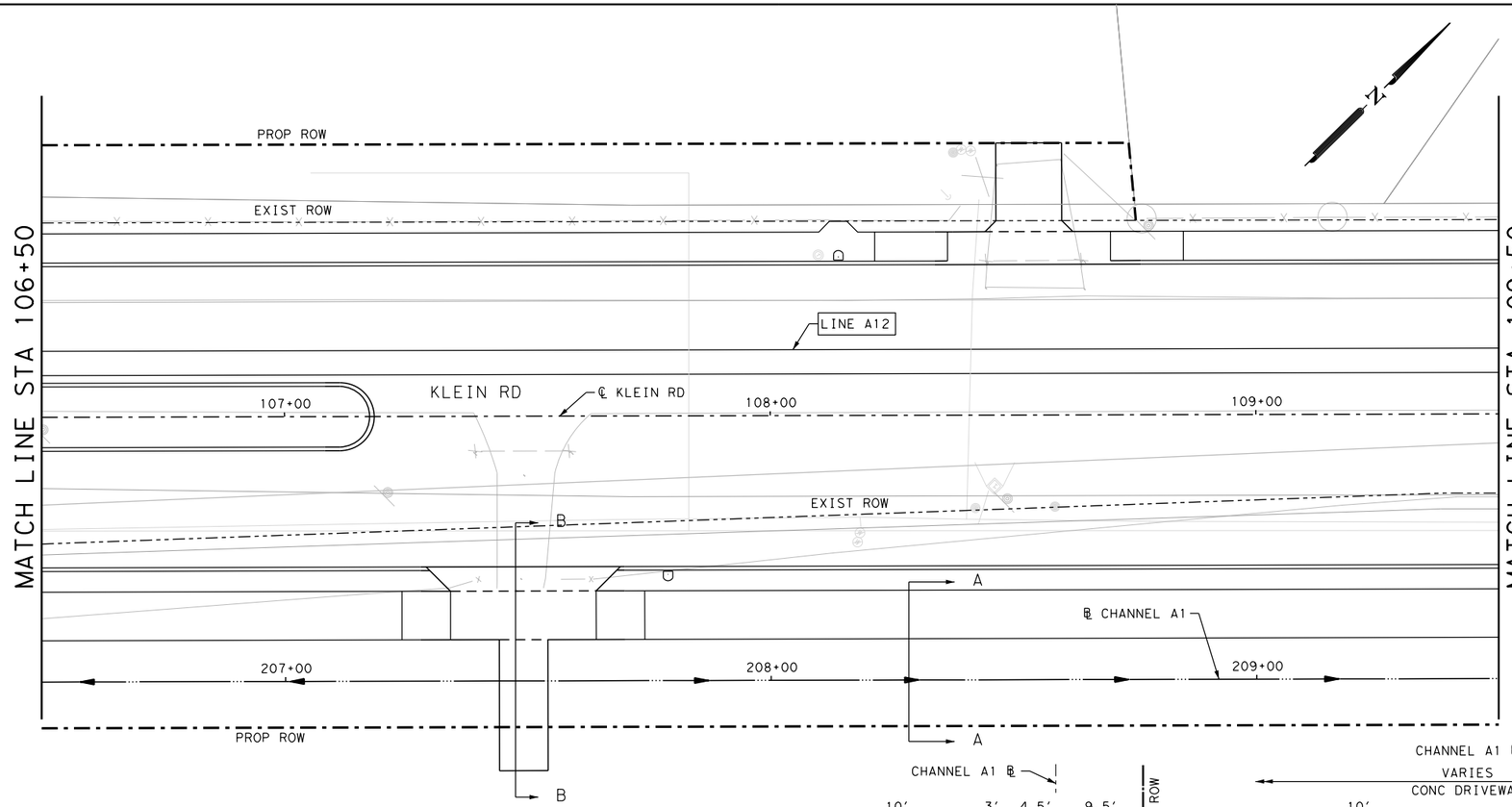
STA 103+50 TO STA 106+50

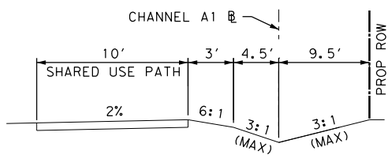
SHEET 2 OF 17

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	217

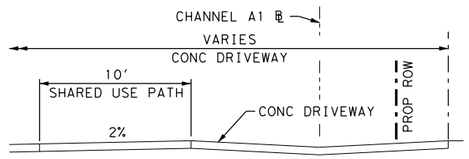
Plotted on: 1/21/2021

ITEM	DESCRIPTION	UNIT	QTY
0402-6001	TRENCH EXCAVATION PROTECTION	LF	300



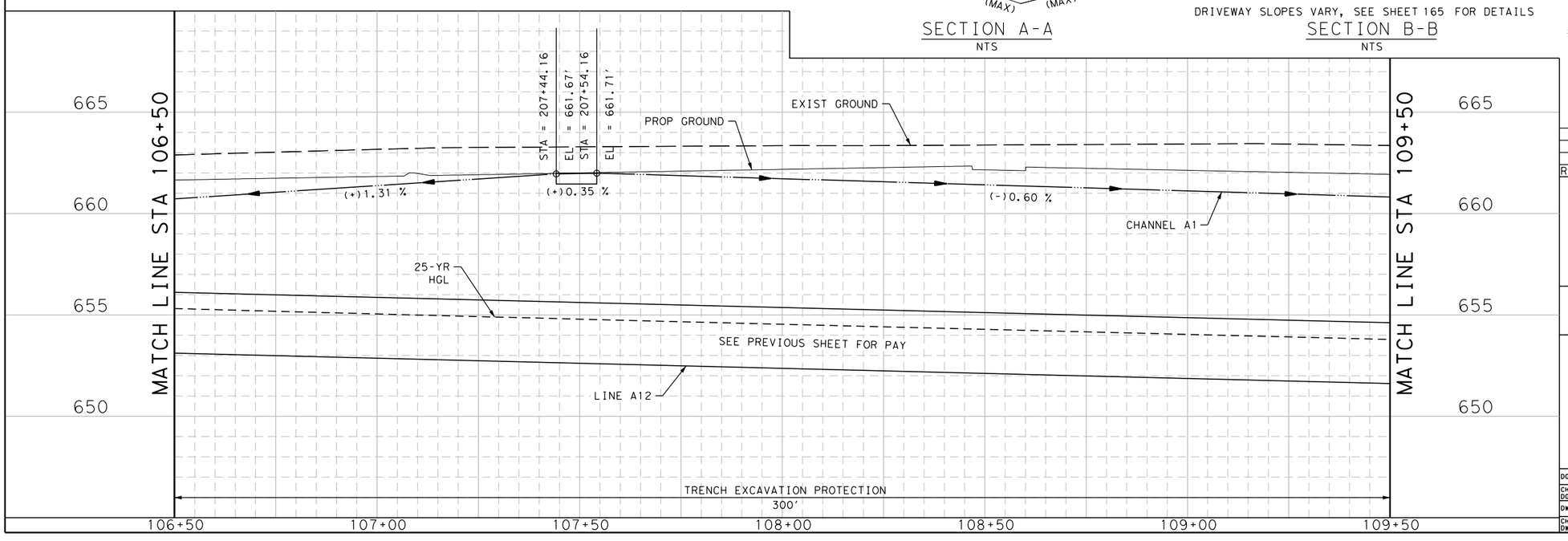


SECTION A-A
NTS



DRIVEWAY SLOPES VARY, SEE SHEET 165 FOR DETAILS

SECTION B-B
NTS



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LEGEND

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DESIGN

STATE OF TEXAS · ANDRES MORALES · 130189 · LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DRAINAGE PLAN & PROFILE

STA 106+50 TO STA 109+50

SHEET 3 OF 17

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	218

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Plotted on: 1/21/2021

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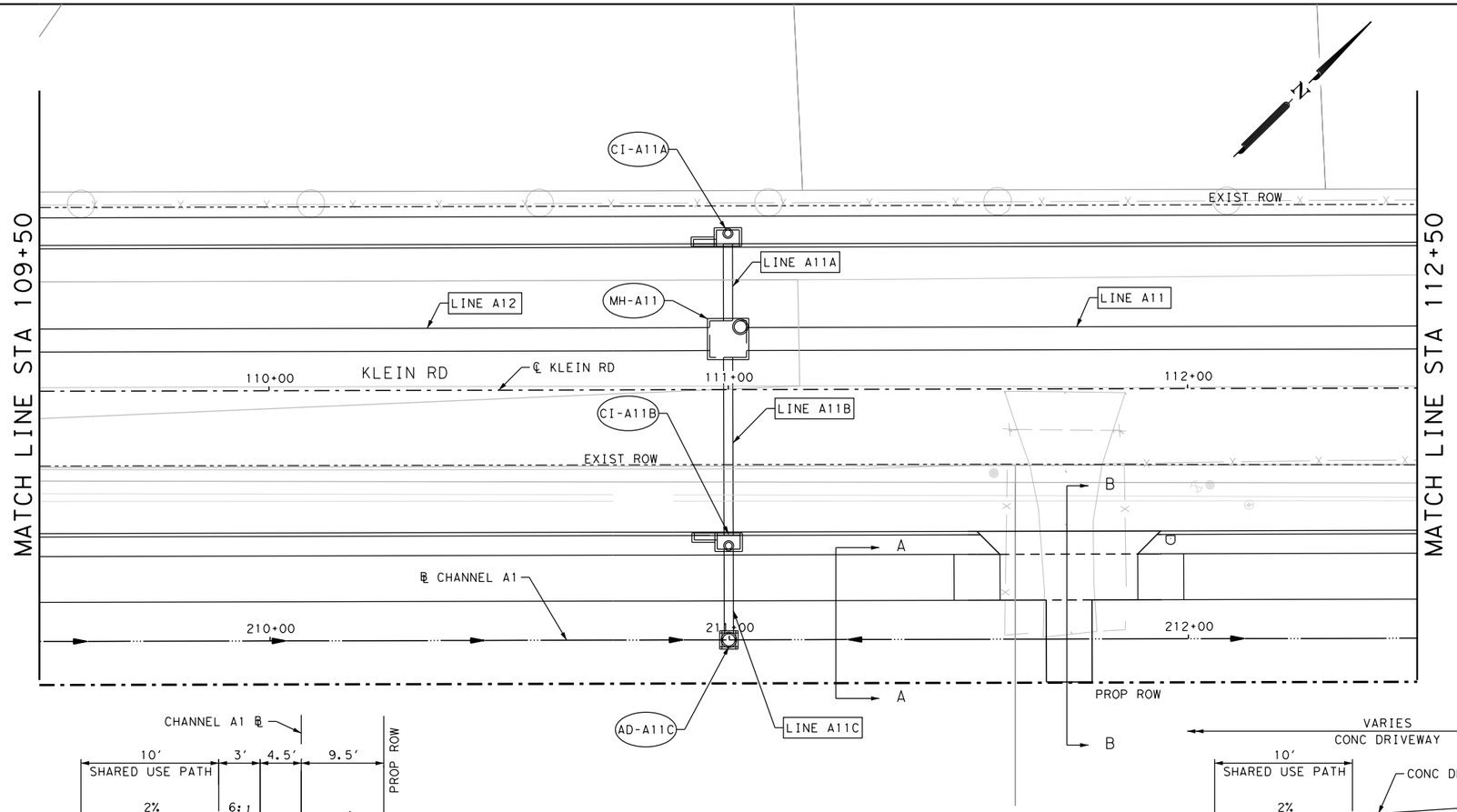
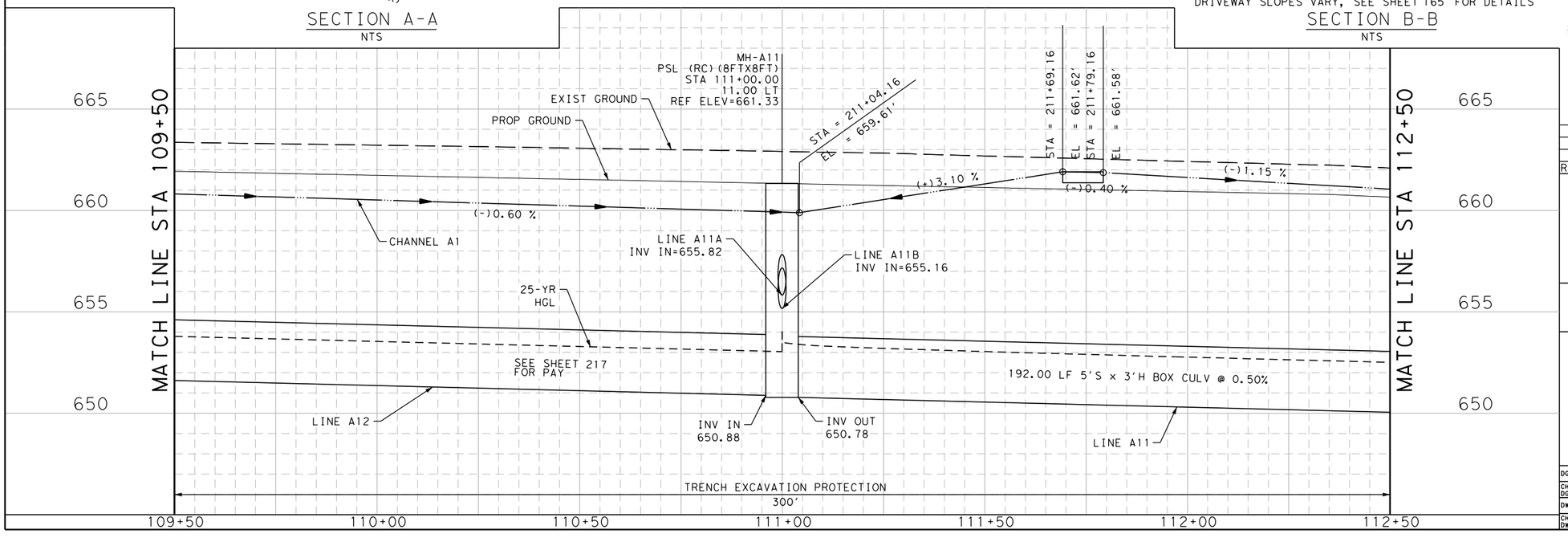
ITEM	DESCRIPTION	UNIT	QTY
0402-6001	TRENCH EXCAVATION PROTECTION	LF	388
0462-6007	CONC BOX CULV (5 FT X 3 FT)	LF	192
0464-6005	RC PIPE (CL III)(24 IN)	LF	74
0465-6014	INLET (COMPL)(PCO)(3FT)(LEFT)	EA	1
0465-6015	INLET (COMPL)(PCO)(3FT)(RIGHT)	EA	1
0465-6077	INLET (COMPL)(PSL)(RC)(8FTX8FT)	EA	1
0465-6158	INLET(COMPL)(PAZD)(FG)(3FTX3FT-3FTX3FT)	EA	1



SECTION A-A
NTS

DRIVEWAY SLOPES VARY, SEE SHEET 165 FOR DETAILS

SECTION B-B
NTS



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LEGEND

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DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV.NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DRAINAGE PLAN & PROFILE

STA 109+50 TO STA 112+50

SHEET 4 OF 17

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	219

Plotted on: 1/21/2021

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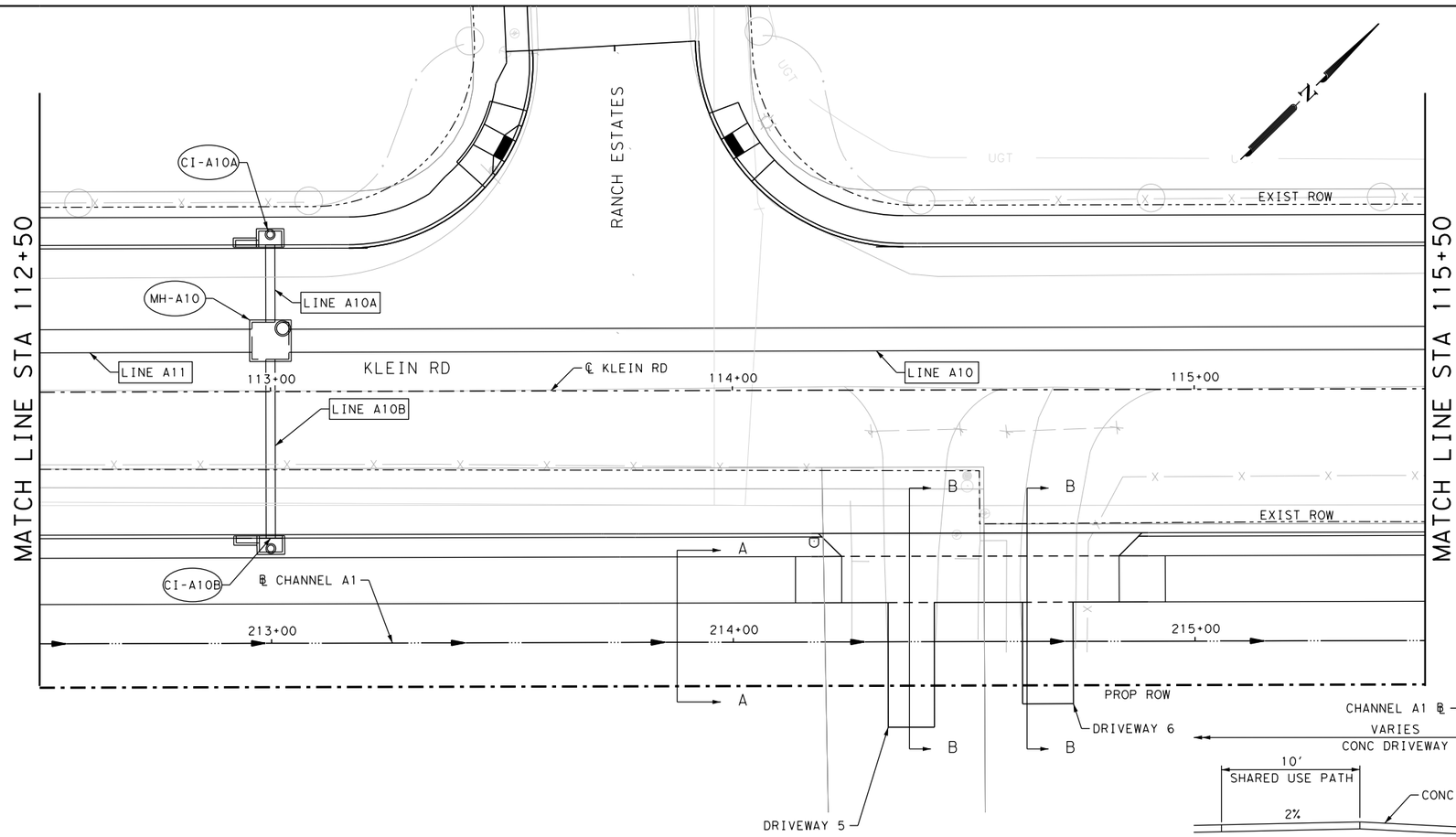
ITEM	DESCRIPTION	UNIT	QTY
0402-6001	TRENCH EXCAVATION PROTECTION	LF	367
0462-6007	CONC BOX CULV (5 FT X 3 FT)	LF	342
0464-6005	RC PIPE (CL III) (24 IN)	LF	56
0465-6014	INLET (COMPL) (PCO) (3FT) (LEFT)	EA	1
0465-6015	INLET (COMPL) (PCO) (3FT) (RIGHT)	EA	1
0465-6077	INLET (COMPL) (PSL) (RC) (8FTX8FT)	EA	1



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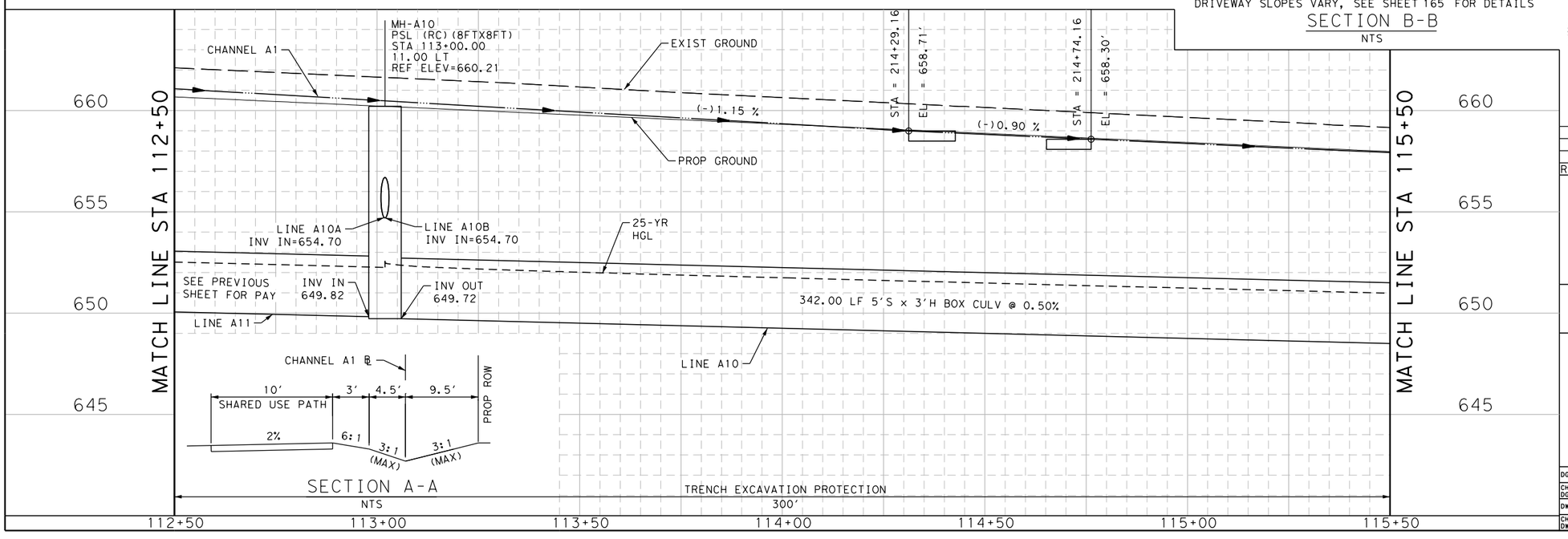
LEGEND

CI-5A	CURB INLET & DESIGNATION
MH-2B	MANHOLE & DESIGNATION
AD-2B	AREA ZONE DRAIN & DESIGNATION
LINE A1-3	STORM DRAIN STRUCTURE & DESIGNATION
→	FLOW ARROW
W	EXIST WATER LINE
OH E	EXIST OVERHEAD ELECTRIC
UG T	EXIST UNDERGROUND COMMUNICATIONS

DRIVEWAY SLOPES VARY, SEE SHEET 165 FOR DETAILS

SECTION B-B
NTS



SECTION A-A
NTS

TRENCH EXCAVATION PROTECTION
300'

DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
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City of New Braunfels

KLEIN RD PHASE 2

DRAINAGE PLAN & PROFILE

STA 112+50 TO STA 115+50

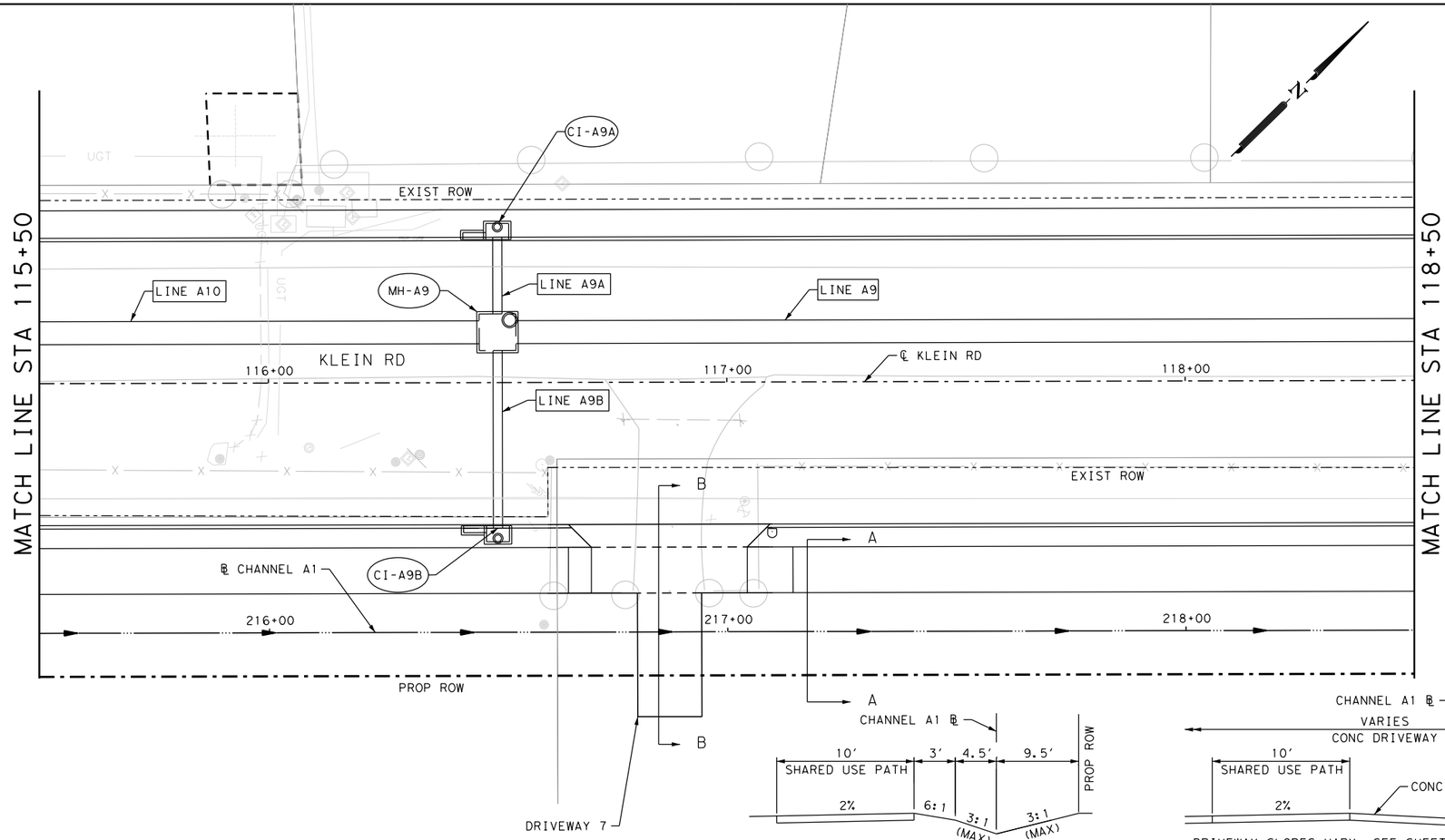
SHEET 5 OF 17

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	220

Plotted on: 1/21/2021

Design Filename: H:\projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_DRN06.dgn

ITEM	DESCRIPTION	UNIT	QTY
0402-6001	TRENCH EXCAVATION PROTECTION	LF	367
0462-6007	CONC BOX CULV (5 FT X 3 FT)	LF	252
0464-6005	RC PIPE (CL III) (24 IN)	LF	56
0465-6014	INLET (COMPL) (PCO) (3FT) (LEFT)	EA	1
0465-6015	INLET (COMPL) (PCO) (3FT) (RIGHT)	EA	1
0465-6077	INLET (COMPL) (PSL) (RC) (8FTX8FT)	EA	1



NOTES:
1. ALL EXISTING FEATURES ARE SHOWN SCREENED BACK
2. THE EXISTENCE AND LOCATIONS OF ALL UNDERGROUND UTILITIES AND DRAINAGE STRUCTURES INDICATED IN THE PLANS ARE TAKEN FROM THE BEST RECORDS AVAILABLE AND ARE NOT GUARANTEED TO BE ACCURATE. CONTRACTOR SHALL VERIFY ACTUAL LOCATION PRIOR TO BEGINNING CONSTRUCTION.
3. INLETS AND MANHOLES TO BE GROUTED TO PROVIDE POSITIVE DRAINAGE. SUBSIDIARY TO INLET AND MANHOLE ITEMS.
4. ALL STORM DRAIN SYSTEMS TO BE INSTALLED IN ACCORDANCE WITH TXDOT ITEM 402 "TRENCH EXCAVATION PROTECTION."

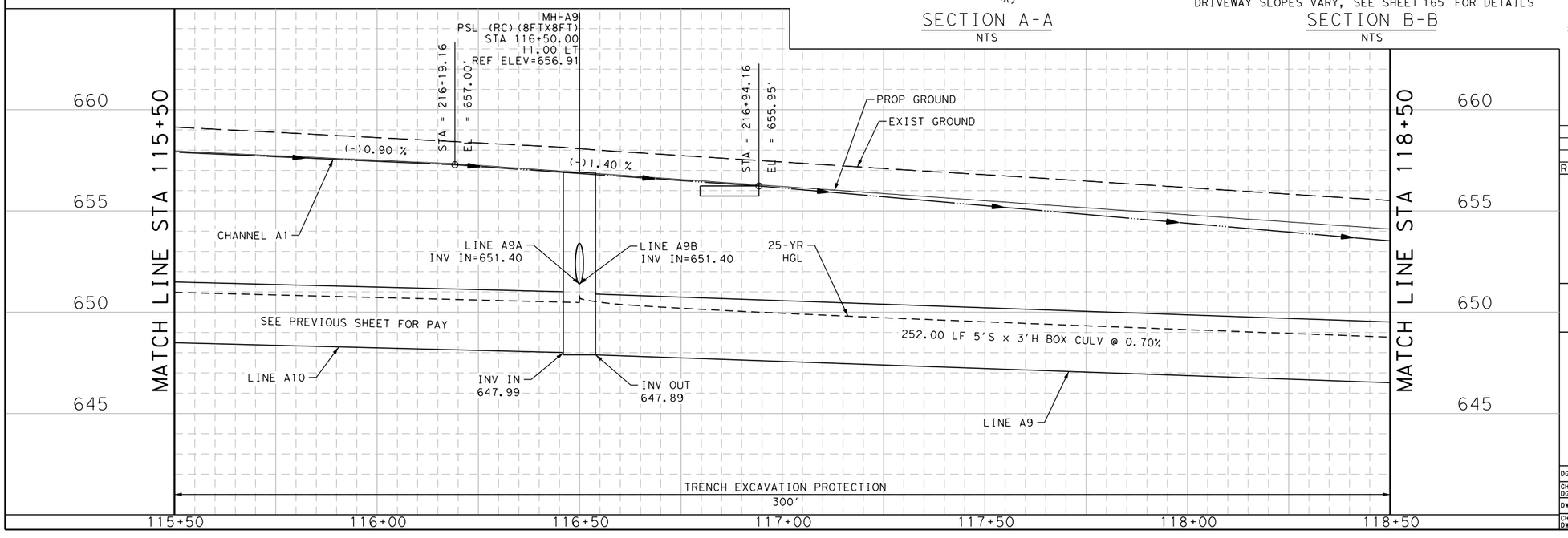
LEGEND

- CI-5A — CURB INLET & DESIGNATION
- MH-2B — MANHOLE & DESIGNATION
- AD-2B — AREA ZONE DRAIN & DESIGNATION
- LINE A1-3 — STORM DRAIN STRUCTURE & DESIGNATION
- FLOW ARROW
- W — EXIST WATER LINE
- OH E — EXIST OVERHEAD ELECTRIC
- UG T — EXIST UNDERGROUND COMMUNICATIONS

SECTION A-A
NTS

DRIVEWAY SLOPES VARY, SEE SHEET 165 FOR DETAILS

SECTION B-B
NTS



DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30′ PROFILE 1":6′

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DRAINAGE PLAN & PROFILE

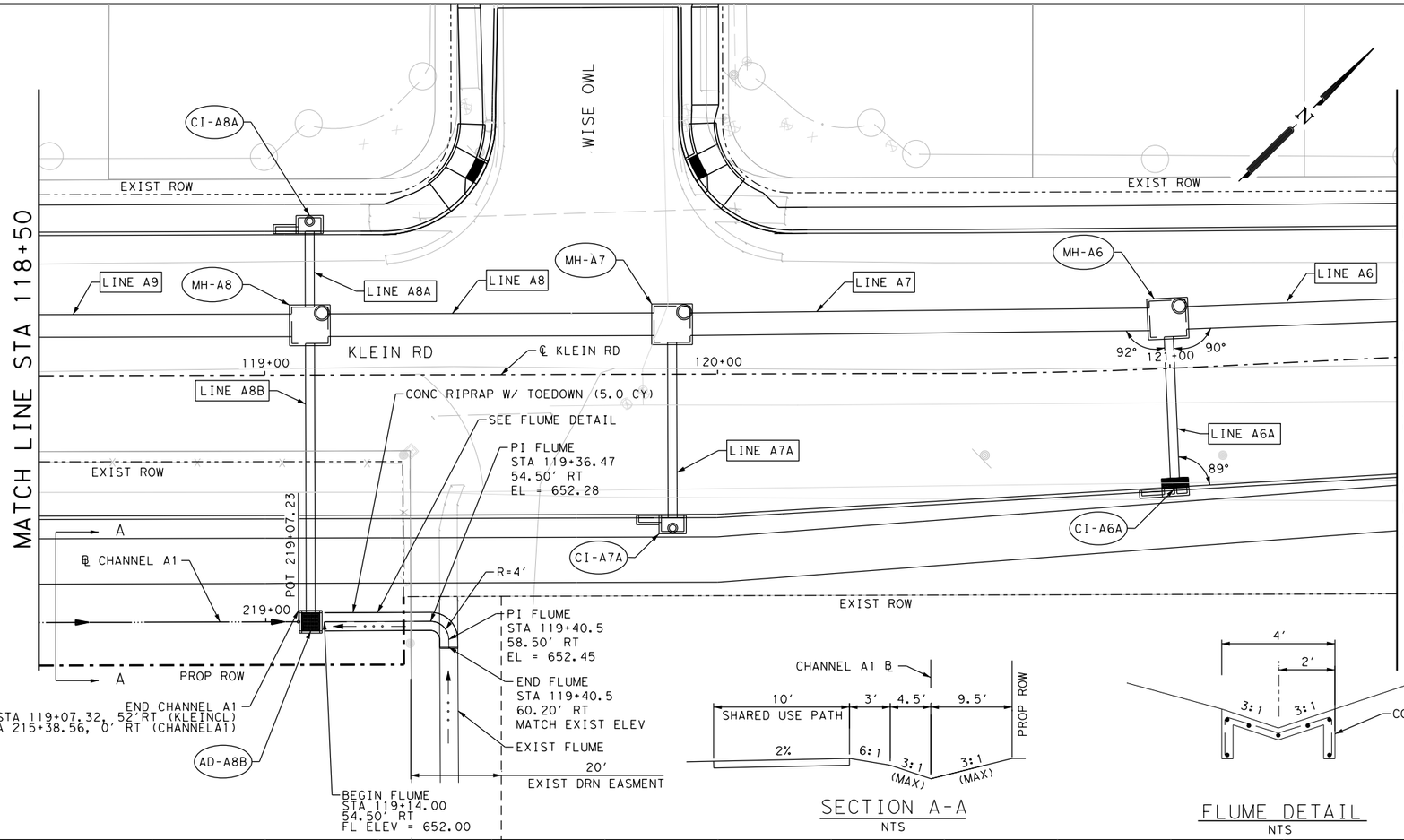
STA 115+50 TO STA 118+50

SHEET 6 OF 17

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	221

Plotted on: 1/21/2021

Design Filename: H:\projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_DRN07.dgn



SECTION A-A
NTS

FLUME DETAIL
NTS

ITEM	DESCRIPTION	UNIT	QTY
0402-6001	TRENCH EXCAVATION PROTECTION	LF	469
0432-6003	RIPRAP (CONC)(6 IN)	CY	5
0462-6007	CONC BOX CULV (5 FT X 3 FT)	LF	353
0464-6005	RC PIPE (CL III)(24 IN)	LF	147
0465-6014	INLET (COMPL)(PCO)(3FT)(LEFT)	EA	1
0465-6015	INLET (COMPL)(PCO)(3FT)(RIGHT)	EA	1
0465-6031	INLET (COMPL)(PCU)(3FT)(RIGHT)	EA	1
0465-6077	INLET (COMPL)(PSL)(RC)(8FTX8FT)	EA	3
0465-6160	INLET(COMPL)(PAZD)(FG)(4FTX4FT-4FTX4FT)	EA	1

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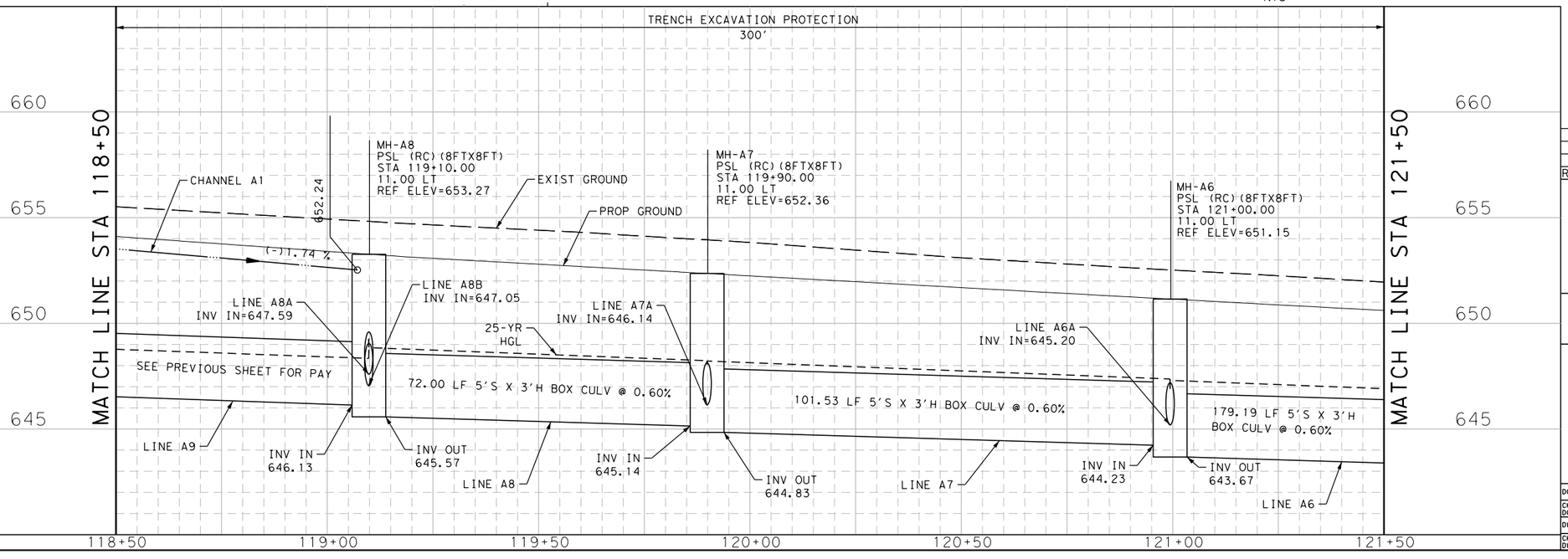
3. INLETS AND MANHOLES TO BE GROUTED TO PROVIDE POSITIVE DRAINAGE. SUBSIDIARY TO INLET AND MANHOLE ITEMS.
4. ALL STORM DRAIN SYSTEMS TO BE INSTALLED IN ACCORDANCE WITH TXDOT ITEM 402 "TRENCH EXCAVATION PROTECTION."

LEGEND

- CI-5A — CURB INLET & DESIGNATION
- MH-2B — MANHOLE & DESIGNATION
- AD-2B — AREA ZONE DRAIN & DESIGNATION
- LINE A1-3 — STORM DRAIN STRUCTURE & DESIGNATION
- FLOW ARROW
- W — EXIST WATER LINE
- OH E — EXIST OVERHEAD ELECTRIC
- UG T — EXIST UNDERGROUND COMMUNICATIONS



DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DRAINAGE PLAN & PROFILE

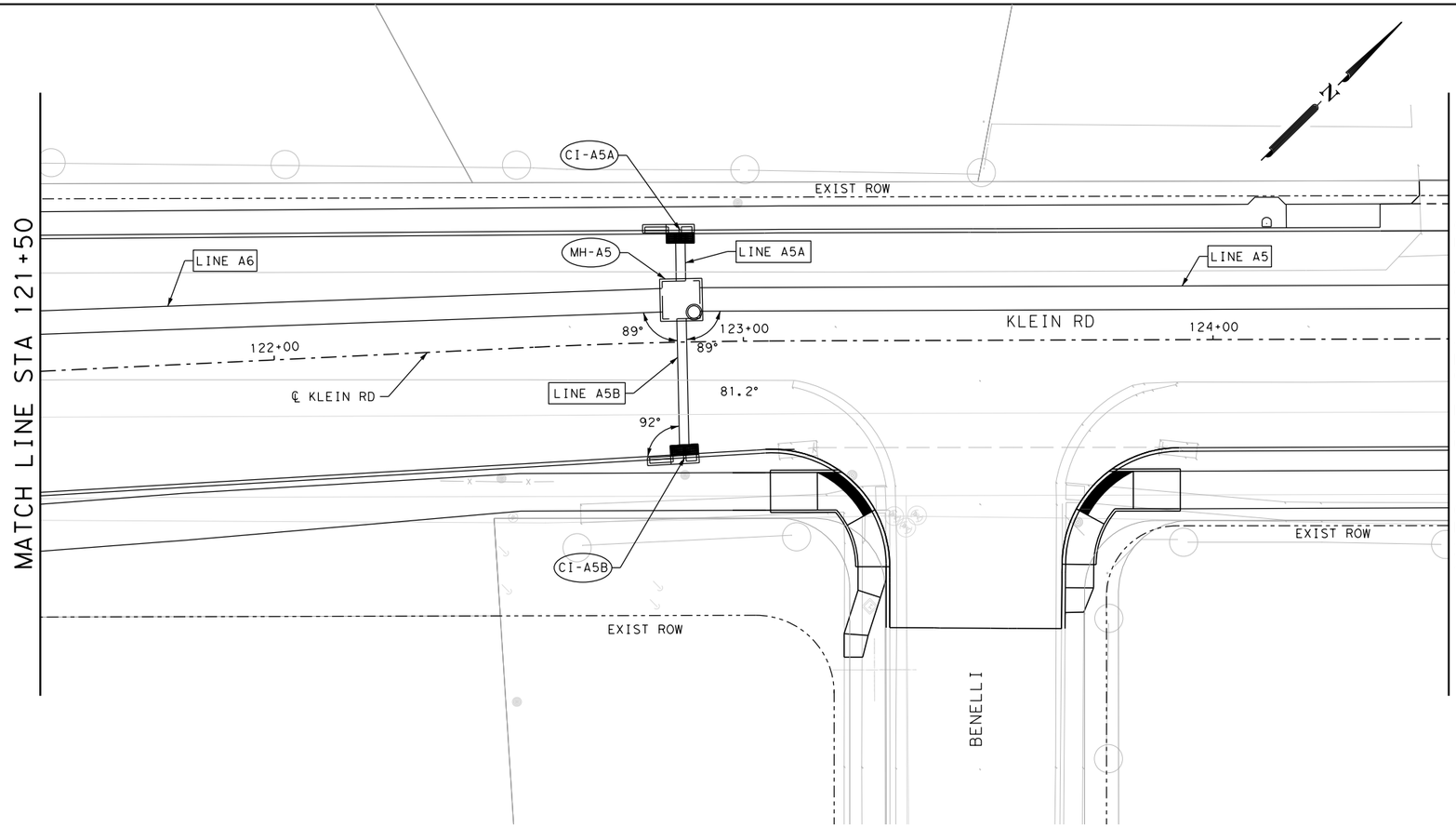
STA 118+50 TO STA 121+50

SHEET 7 OF 17

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	222

Plotted on: 1/21/2021

Design Filename: H:\projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_DRN08.dgn



ITEM	DESCRIPTION	UNIT	QTY
0402-6001	TRENCH EXCAVATION PROTECTION	LF	347
0462-6007	CONC BOX CULV (5 FT X 3 FT)	LF	349
0464-6005	RC PIPE (CL III)(24 IN)	LF	36
0465-6030	INLET (COMPL)(PCU)(3FT)(LEFT)	EA	1
0465-6031	INLET (COMPL)(PCU)(3FT)(RIGHT)	EA	1
0465-6077	INLET (COMPL)(PSL)(RC)(8FTX8FT)	EA	1

NOTES:
1. ALL EXISTING FEATURES ARE SHOWN SCREENED BACK.
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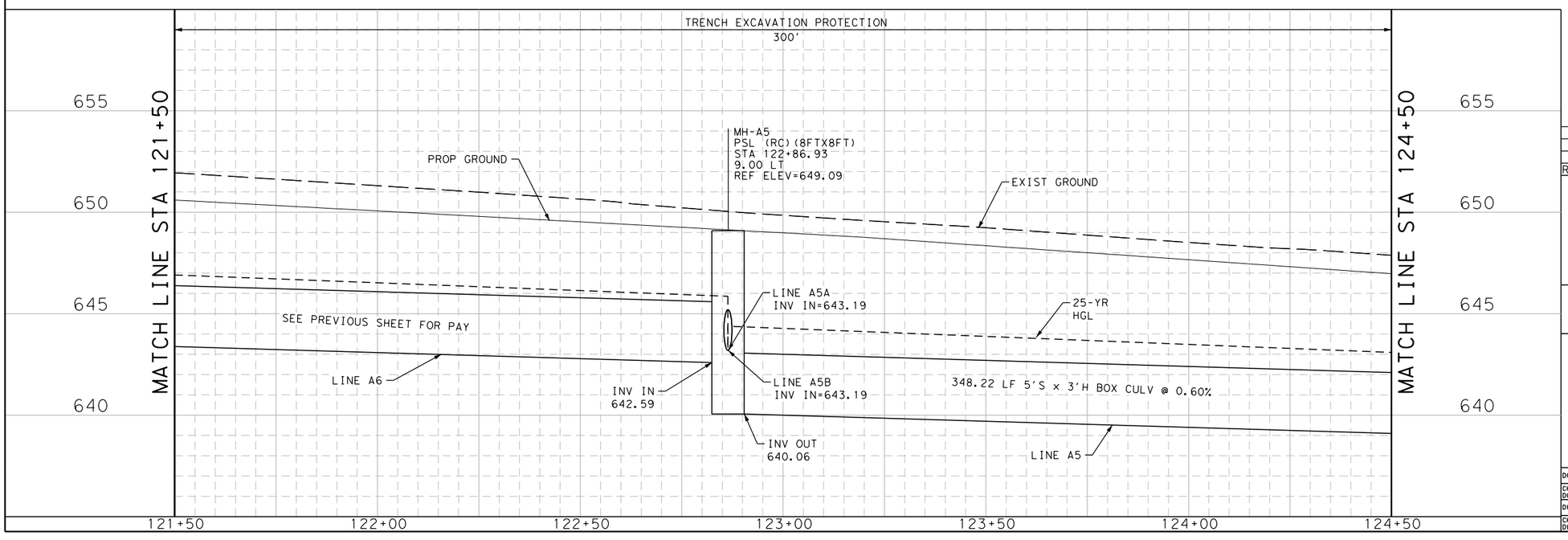
4. ALL STORM DRAIN SYSTEMS TO BE INSTALLED IN ACCORDANCE WITH TXDOT ITEM 402 "TRENCH EXCAVATION PROTECTION."

LEGEND

- CI-5A — CURB INLET & DESIGNATION
- MH-2B — MANHOLE & DESIGNATION
- AD-2B — AREA ZONE DRAIN & DESIGNATION
- LINE A1-3 — STORM DRAIN STRUCTURE & DESIGNATION
- FLOW ARROW
- W — EXIST WATER LINE
- OH E — EXIST OVERHEAD ELECTRIC
- UG T — EXIST UNDERGROUND COMMUNICATIONS



DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DRAINAGE PLAN & PROFILE

STA 121+50 TO STA 124+50

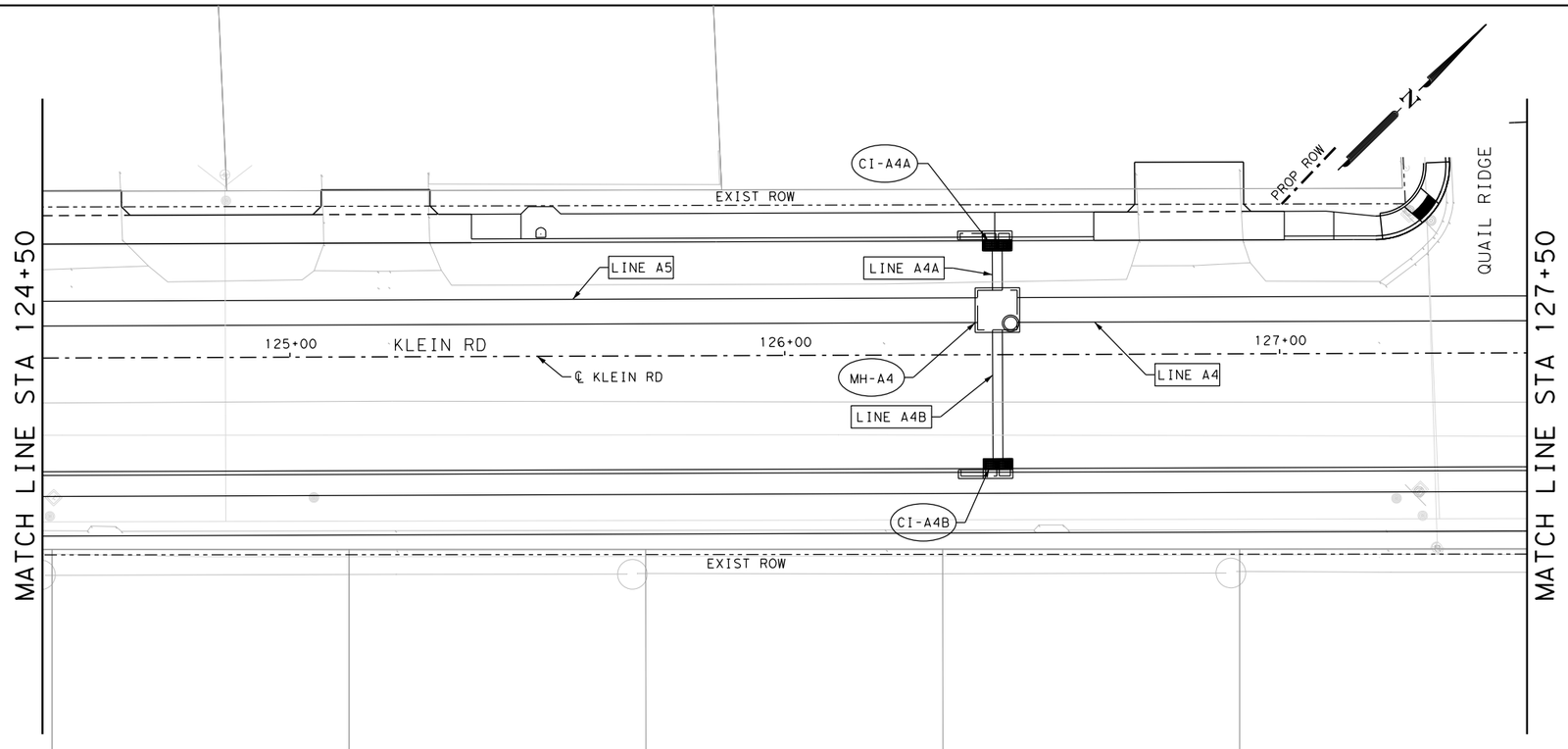
SHEET 8 OF 17

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	223

Plotted on: 1/21/2021

Design Filename: H:\projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_DRN09.dgn

ITEM	DESCRIPTION	UNIT	QTY
0402-6001	TRENCH EXCAVATION PROTECTION	LF	346
0462-6007	CONC BOX CULV (5 FT X 3 FT)	LF	279
0464-6005	RC PIPE (CL III) (24 IN)	LF	35
0465-6030	INLET (COMPL) (PCU) (3FT) (LEFT)	EA	1
0465-6031	INLET (COMPL) (PCU) (3FT) (RIGHT)	EA	1
0465-6077	INLET (COMPL) (PSL) (RC) (8FTX8FT)	EA	1



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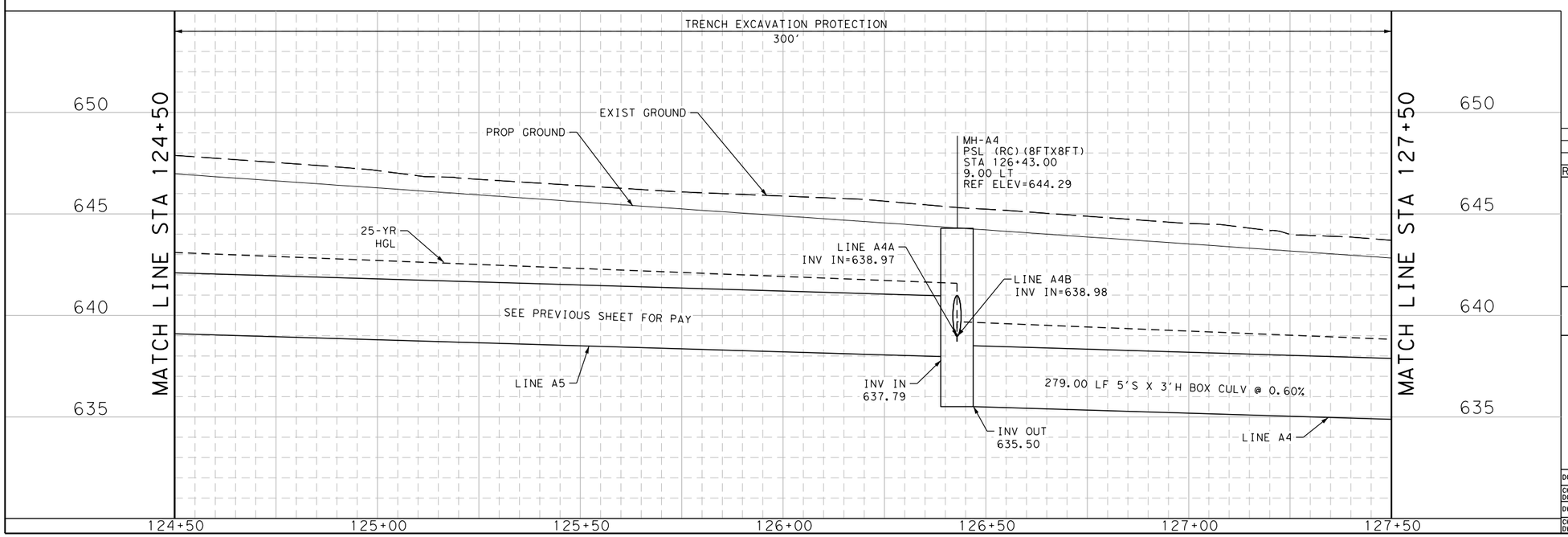
4. ALL STORM DRAIN SYSTEMS TO BE INSTALLED IN ACCORDANCE WITH TXDOT ITEM 402 "TRENCH EXCAVATION PROTECTION."

LEGEND

CI-5A	CURB INLET & DESIGNATION
MH-2B	MANHOLE & DESIGNATION
AD-2B	AREA ZONE DRAIN & DESIGNATION
LINE A1-3	STORM DRAIN STRUCTURE & DESIGNATION
→	FLOW ARROW
W	EXIST WATER LINE
OH E	EXIST OVERHEAD ELECTRIC
UG T	EXIST UNDERGROUND COMMUNICATIONS



DESIGN

STATE OF TEXAS · ANDRES MORALES · 130189 · LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

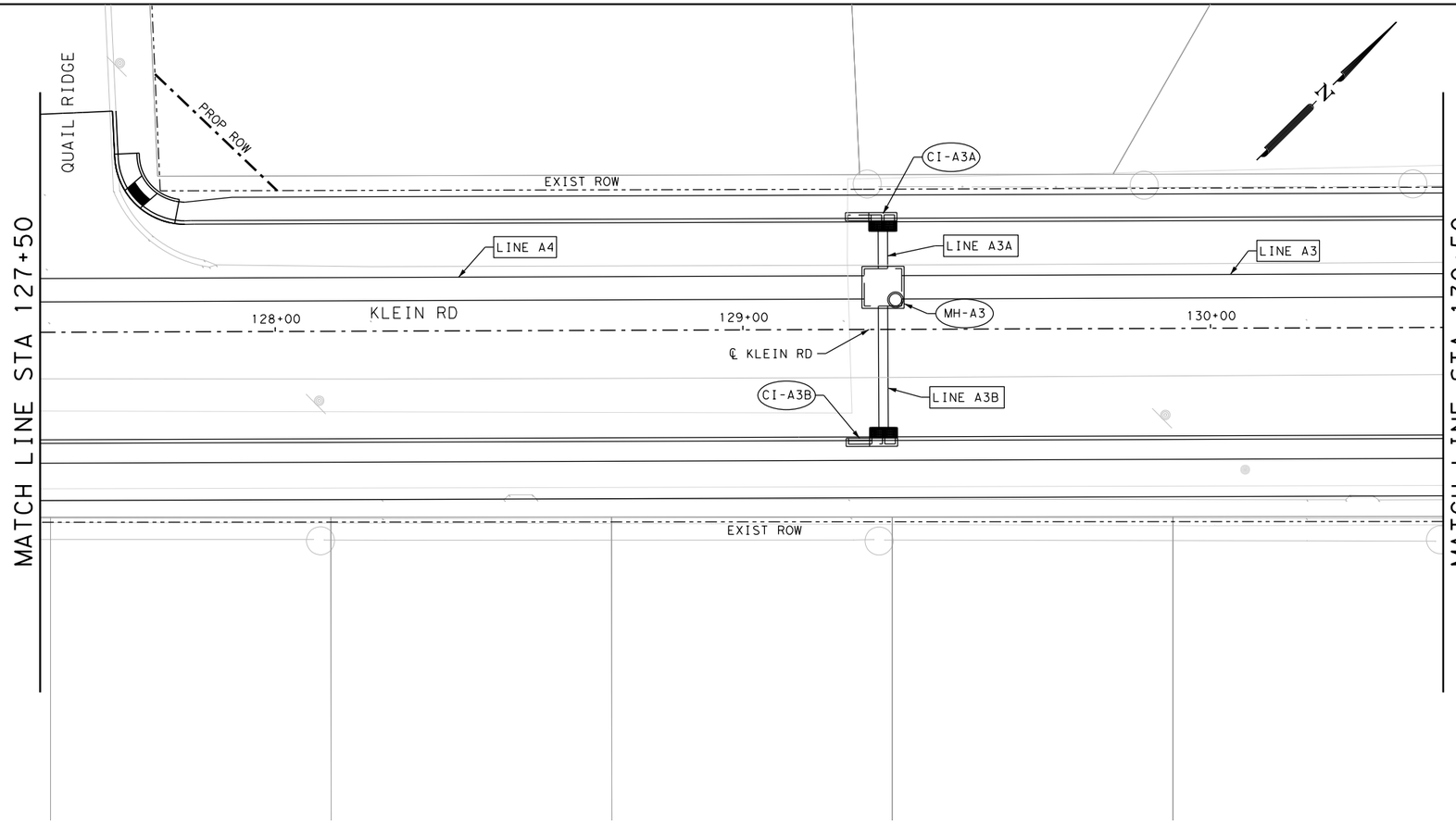
KLEIN RD PHASE 2

DRAINAGE PLAN & PROFILE

STA 124+50 TO STA 127+50

SHEET 9 OF 17

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	224



ITEM	DESCRIPTION	UNIT	QTY
0402-6001	TRENCH EXCAVATION PROTECTION	LF	341
0462-6007	CONC BOX CULV (5 FT X 3 FT)	LF	247
0464-6005	RC PIPE (CL III) (24 IN)	LF	35
0465-6030	INLET (COMPL) (PCU) (3FT) (LEFT)	EA	1
0465-6031	INLET (COMPL) (PCU) (3FT) (RIGHT)	EA	1
0465-6077	INLET (COMPL) (PSL) (RC) (8FTX8FT)	EA	1

NOTES:
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4. ALL STORM DRAIN SYSTEMS TO BE INSTALLED IN ACCORDANCE WITH TXDOT ITEM 402 "TRENCH EXCAVATION PROTECTION."

LEGEND

- CI-5A — CURB INLET & DESIGNATION
- MH-2B — MANHOLE & DESIGNATION
- AD-2B — AREA ZONE DRAIN & DESIGNATION
- LINE A1-3 — STORM DRAIN STRUCTURE & DESIGNATION
- FLOW ARROW
- W — EXIST WATER LINE
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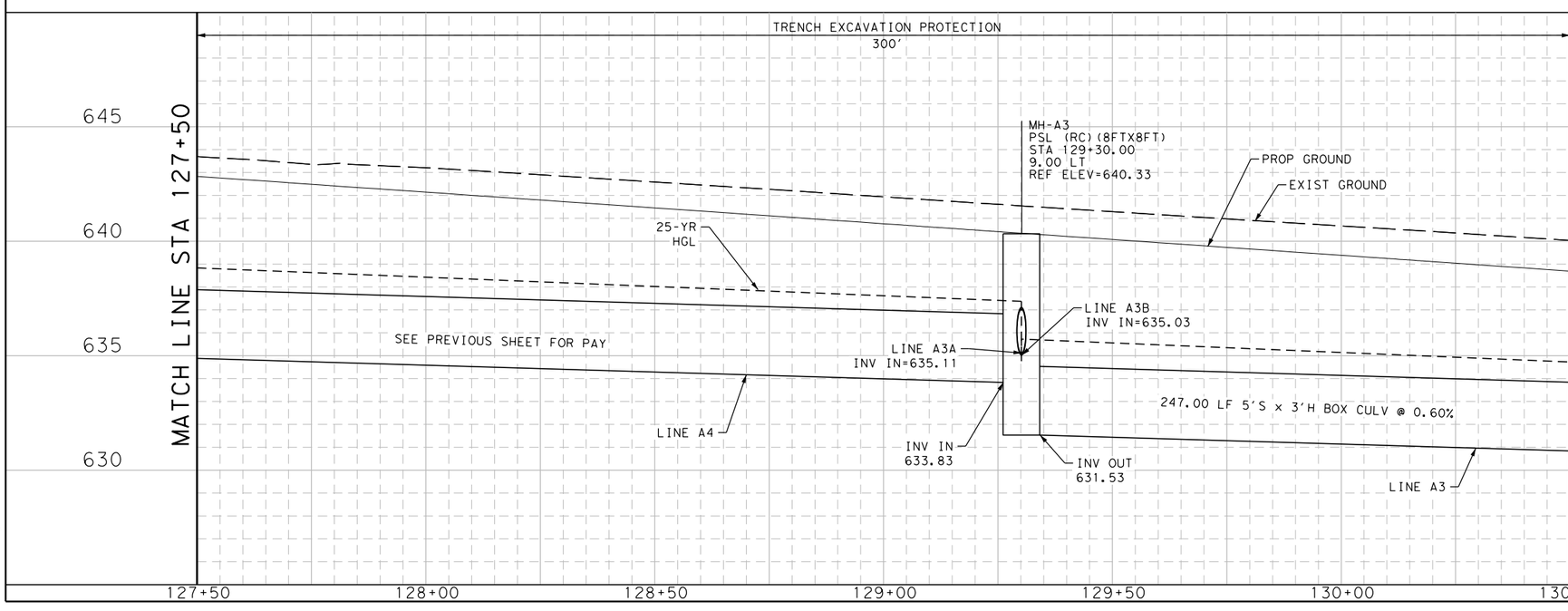


DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

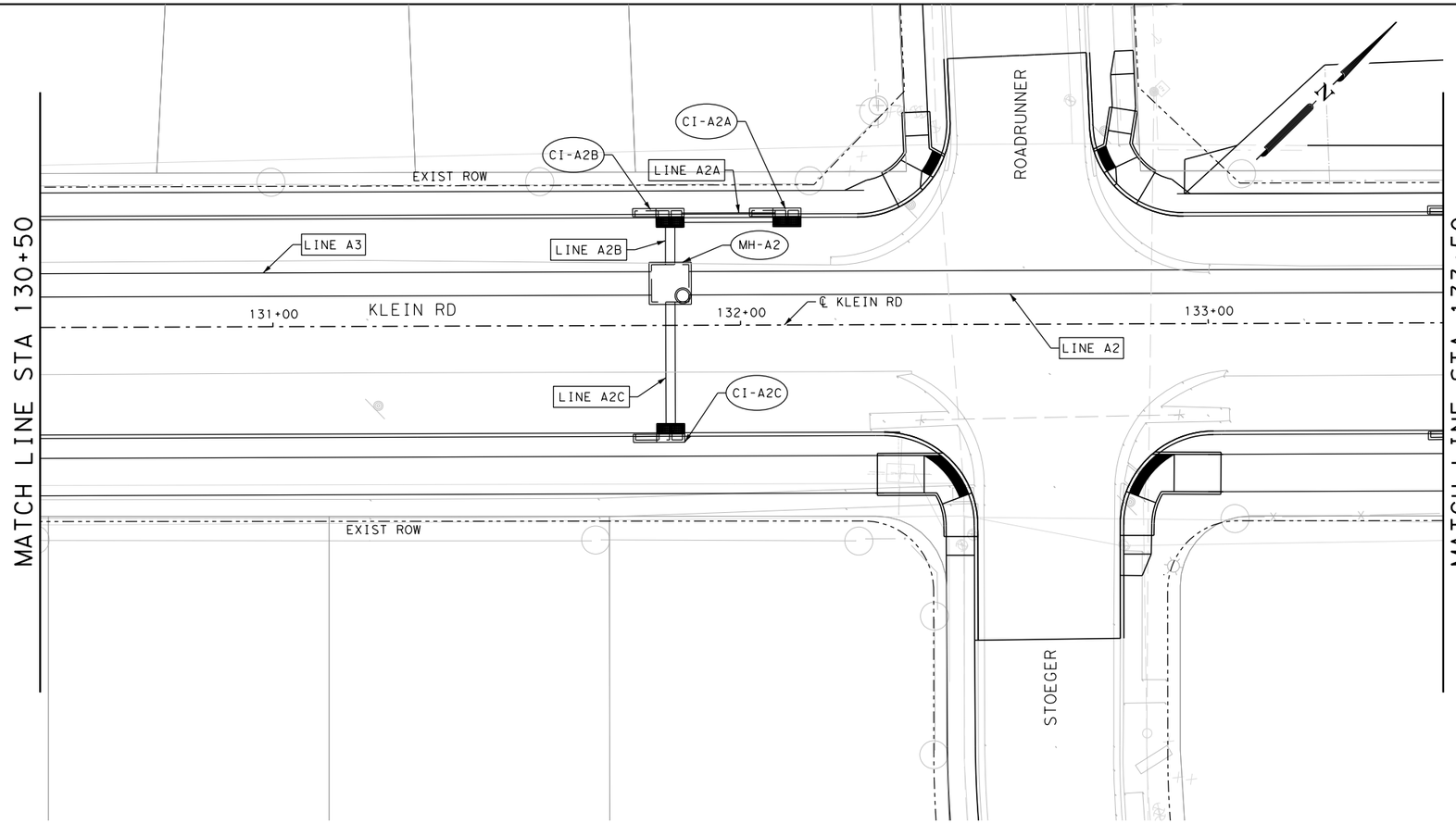
KLEIN RD PHASE 2

DRAINAGE PLAN & PROFILE

STA 127+50 TO STA 130+50

SHEET 10 OF 17

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	225



ITEM	DESCRIPTION	UNIT	QTY
0402-6001	TRENCH EXCAVATION PROTECTION	LF	366
0462-6008	CONC BOX CULV (5 FT X 4 FT)	LF	162
0464-6005	RC PIPE (CL III)(24 IN)	LF	55
0465-6030	INLET (COMPL)(PCU)(3FT)(LEFT)	EA	2
0465-6031	INLET (COMPL)(PCU)(3FT)(RIGHT)	EA	1
0465-6077	INLET (COMPL)(PSL)(RC)(8FTX8FT)	EA	1

NOTES:
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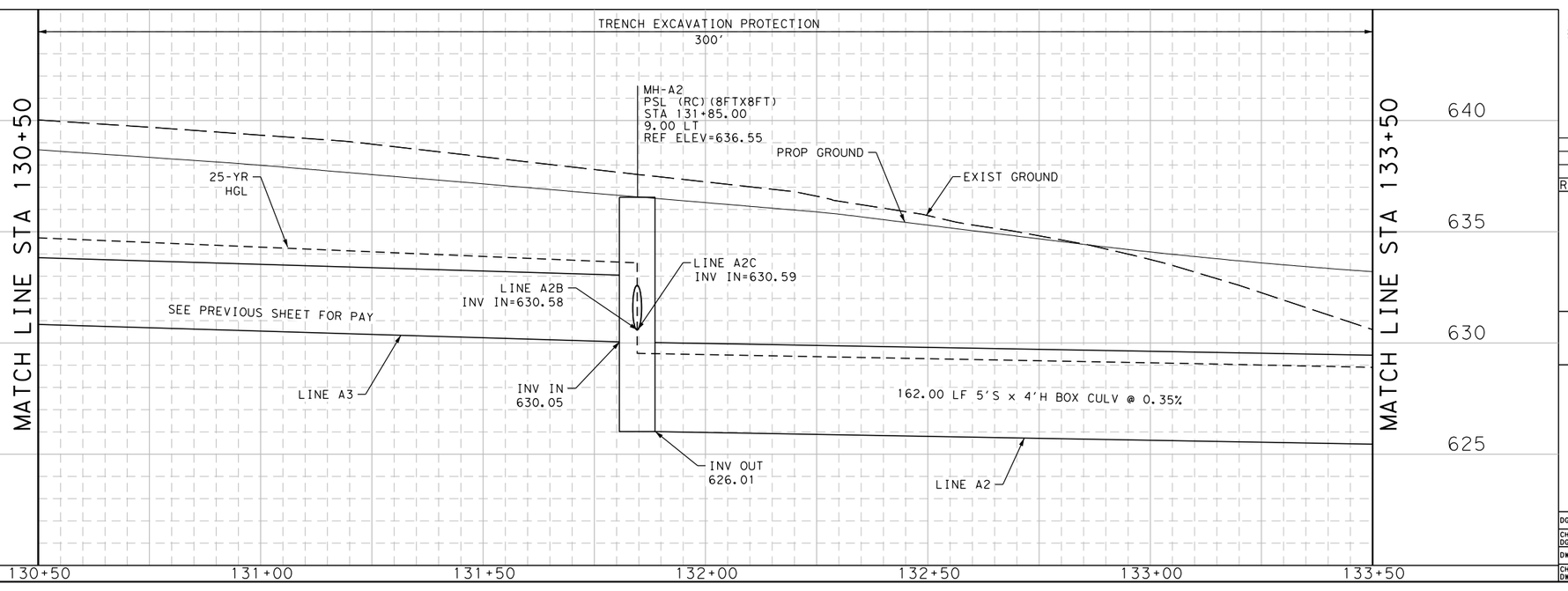
4. ALL STORM DRAIN SYSTEMS TO BE INSTALLED IN ACCORDANCE WITH TXDOT ITEM 402 "TRENCH EXCAVATION PROTECTION."

LEGEND

- CI-5A — CURB INLET & DESIGNATION
- MH-2B — MANHOLE & DESIGNATION
- AD-2B — AREA ZONE DRAIN & DESIGNATION
- LINE A1-3 — STORM DRAIN STRUCTURE & DESIGNATION
- FLOW ARROW
- W — EXIST WATER LINE
- OH E — EXIST OVERHEAD ELECTRIC
- UG T — EXIST UNDERGROUND COMMUNICATIONS



DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DRAINAGE PLAN & PROFILE

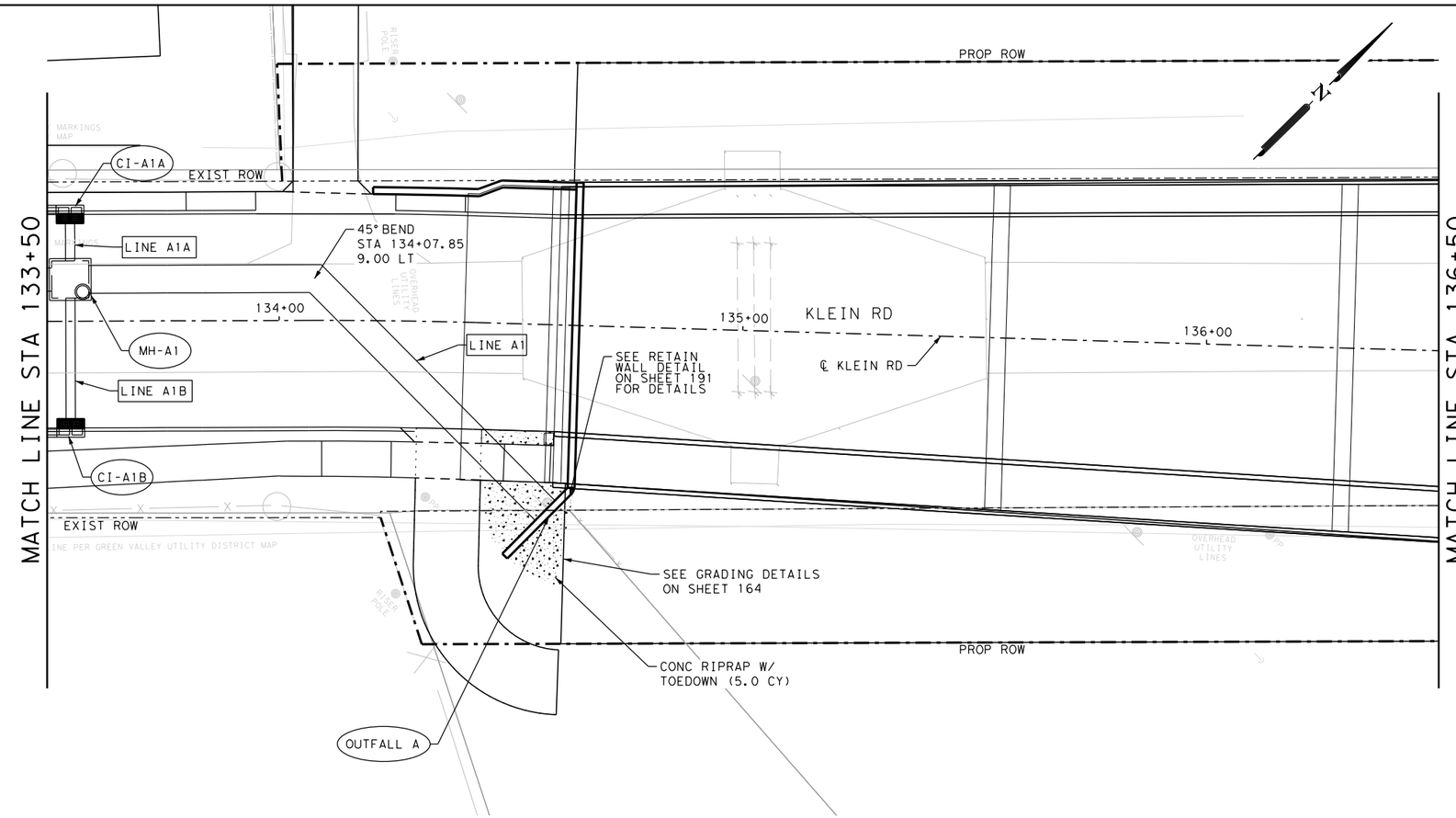
STA 130+50 TO STA 133+50

SHEET 11 OF 17

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	226

Plotted on: 4/22/2021

Design Filename: H:\projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_DRN12.dgn



ITEM	DESCRIPTION	UNIT	QTY
0110-6002	EXCAVATION (CHANNEL)	CY	20
0402-6001	TRENCH EXCAVATION PROTECTION	LF	5
0432-6003	RIPRAP (CONC)(6 IN)	CY	5
0462-6011	CONC BOX CULV (6 FT X 4 FT)	LF	120
0464-6005	RC PIPE (CL III)(24 IN)	LF	35
0465-6030	INLET (COMPL)(PCU)(3FT)(LEFT)	EA	1
0465-6031	INLET (COMPL)(PCU)(3FT)(RIGHT)	EA	1
0465-6077	INLET (COMPL)(PSL)(RC)(8FTX8FT)	EA	1
0466-6180	WINGWALL (PW - 1) (HW=5 FT)	EA	1

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LEGEND

CI-5A	CURB INLET & DESIGNATION
MH-2B	MANHOLE & DESIGNATION
AD-2B	AREA ZONE DRAIN & DESIGNATION
LINE A1-3	STORM DRAIN STRUCTURE & DESIGNATION
→	FLOW ARROW
W	EXIST WATER LINE
OH E	EXIST OVERHEAD ELECTRIC
UG T	EXIST UNDERGROUND COMMUNICATIONS

DESIGN

STATE OF TEXAS · ANDRES MORALES · 130189 · LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 4/22/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/22/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

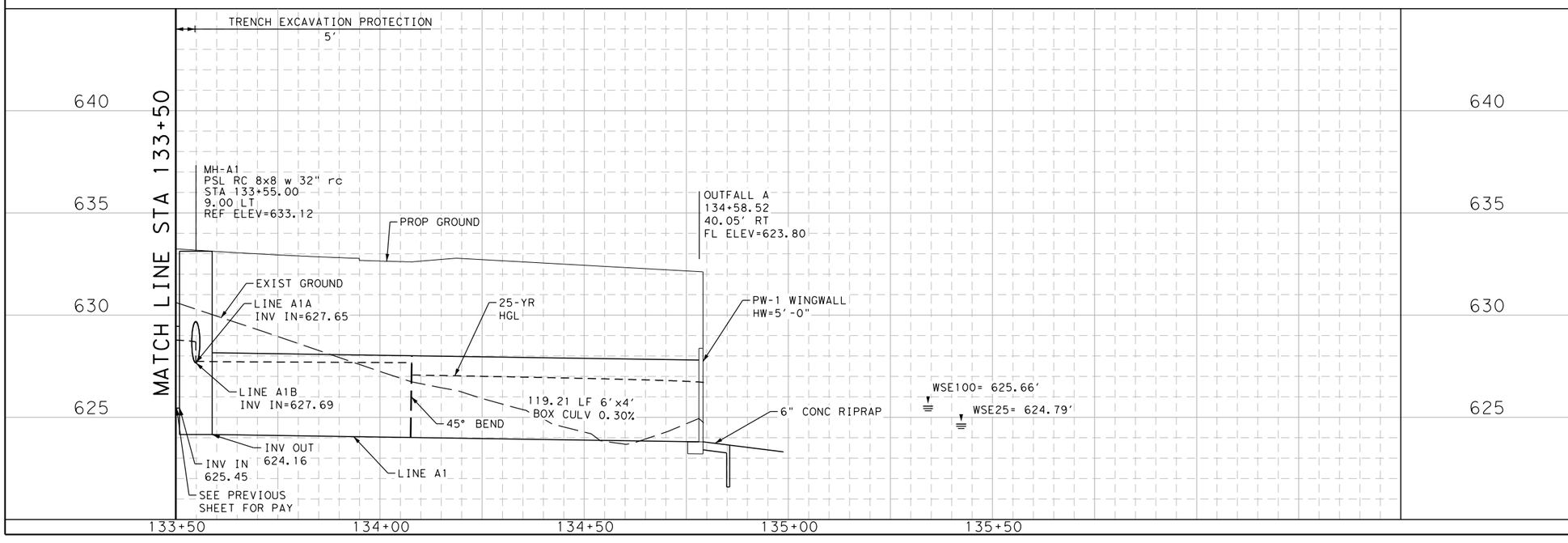
KLEIN RD PHASE 2

DRAINAGE PLAN & PROFILE

STA 133+50 TO STA 136+50

SHEET 12 OF 17

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	227



Plotted on: 1/21/2021

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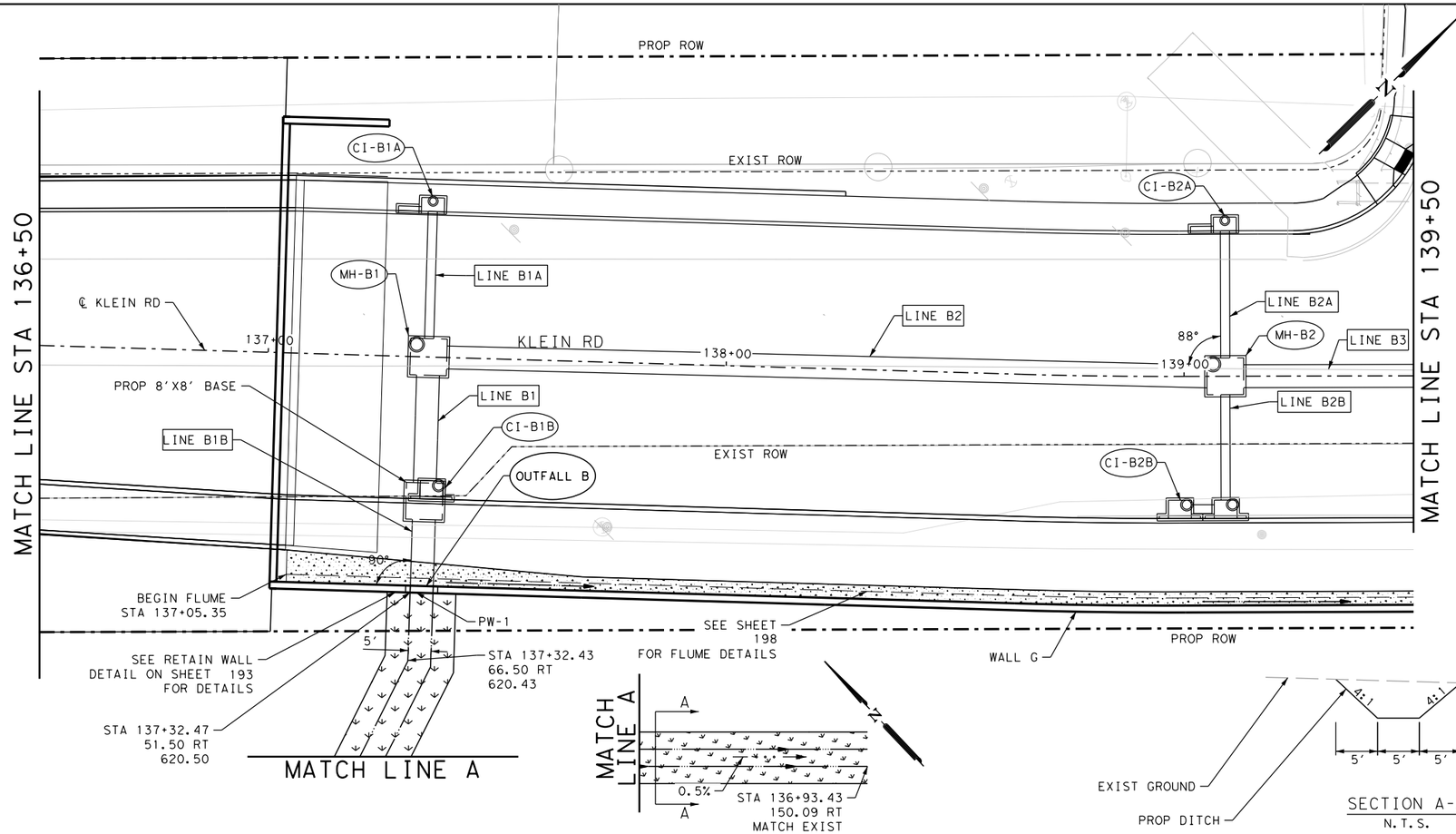

ITEM	DESCRIPTION	UNIT	QTY
0110-6002	EXCAVATION (CHANNEL)	CY	86
0462-6006	CONC BOX CULV (5 FT X 2 FT)	LF	171
0462-6007	CONC BOX CULV (5 FT X 3 FT)	LF	205
0464-6005	RC PIPE (CL III)(24 IN)	LF	84
0465-6014	INLET (COMPL)(PCO)(3FT)(LEFT)	EA	2
0465-6045	INLET (COMPL)(PMBD)(4FT)	EA	3
0465-6077	INLET (COMPL)(PSL)(RC)(8FTX8FT)	EA	2
0466-6179	WINGWALL (PW - 1) (HW=4 FT)	EA	1

NOTES:
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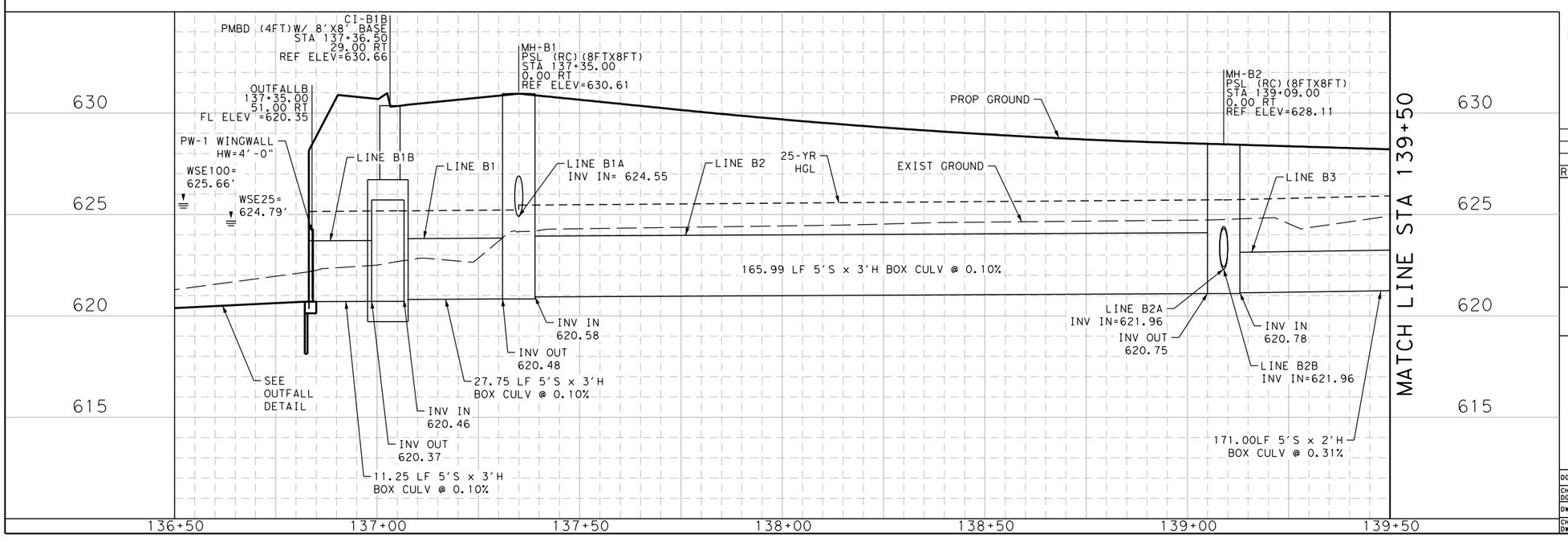
3. INLETS AND MANHOLES TO BE GROUTED TO PROVIDE POSITIVE DRAINAGE. SUBSIDIARY TO INLET AND MANHOLE ITEMS.
4. ALL STORM DRAIN SYSTEMS TO BE INSTALLED IN ACCORDANCE WITH TXDOT ITEM 402 "TRENCH EXCAVATION PROTECTION."

LEGEND

- CI-5A — CURB INLET & DESIGNATION
- MH-2B — MANHOLE & DESIGNATION
- AD-2B — AREA ZONE DRAIN & DESIGNATION
- LINE A1-3 — STORM DRAIN STRUCTURE & DESIGNATION
- FLOW ARROW
- W — EXIST WATER LINE
- OH E — EXIST OVERHEAD ELECTRIC
- UG T — EXIST UNDERGROUND COMMUNICATIONS



DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

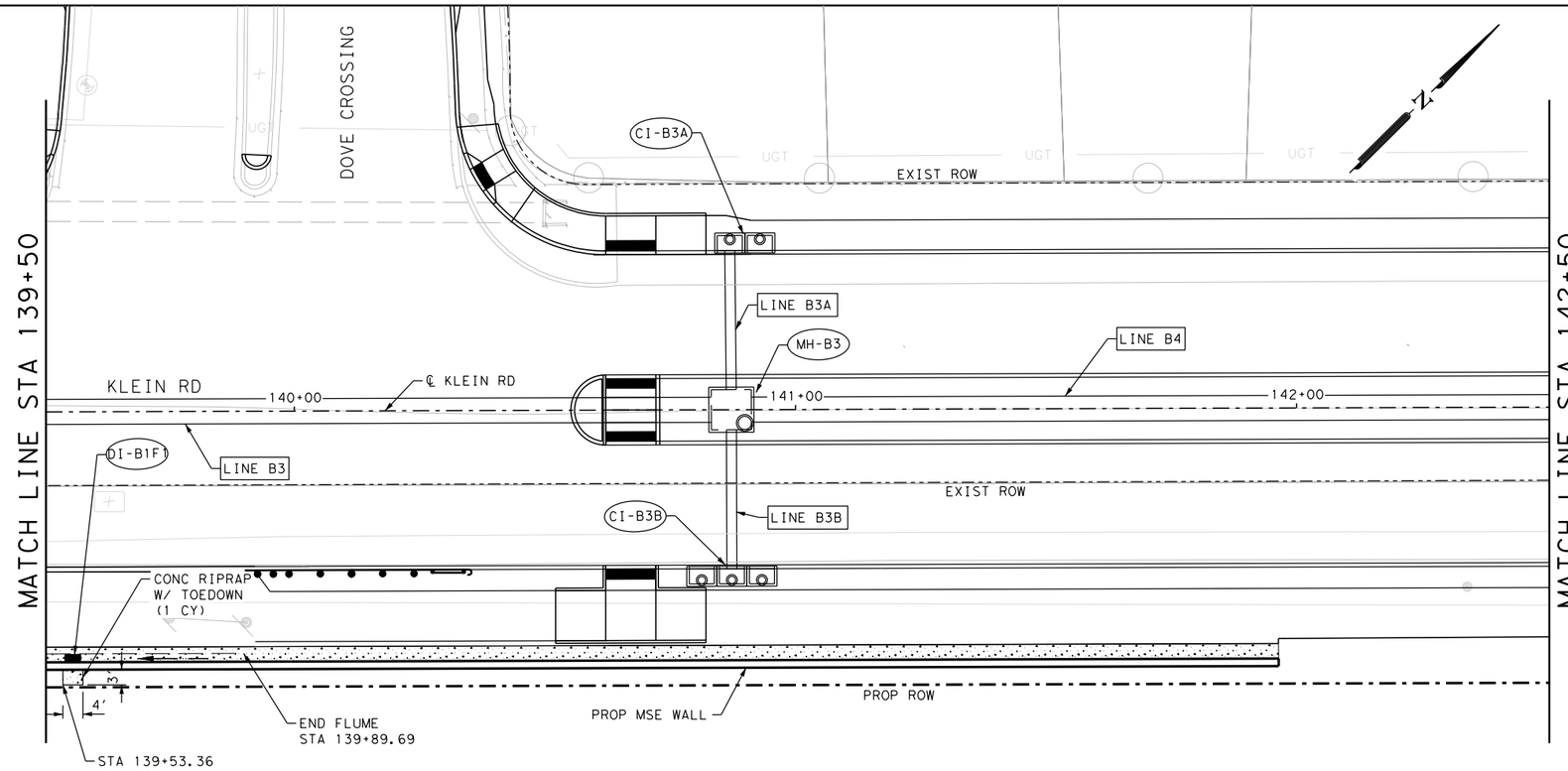
KLEIN RD PHASE 2

DRAINAGE PLAN & PROFILE

STA 136+50 TO STA 139+50

SHEET 13 OF 17

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	228



ITEM	DESCRIPTION	UNIT	QTY
0402-6001	TRENCH EXCAVATION PROTECTION	LF	168
0432-6003	RIPRAP (CONC)(6 IN)	CY	1
0462-6006	CONC BOX CULV (5 FT X 2 FT)	LF	205
0464-6005	RC PIPE (CL III)(24 IN)	LF	56
0465-6013	INLET (COMPL)(PCO)(3FT)(NONE)	EA	5
0465-6077	INLET (COMPL)(PSL)(RC)(8FTX8FT)	EA	1
0465-6269	INLET (COMPL)(TY C)	EA	1

NOTES:
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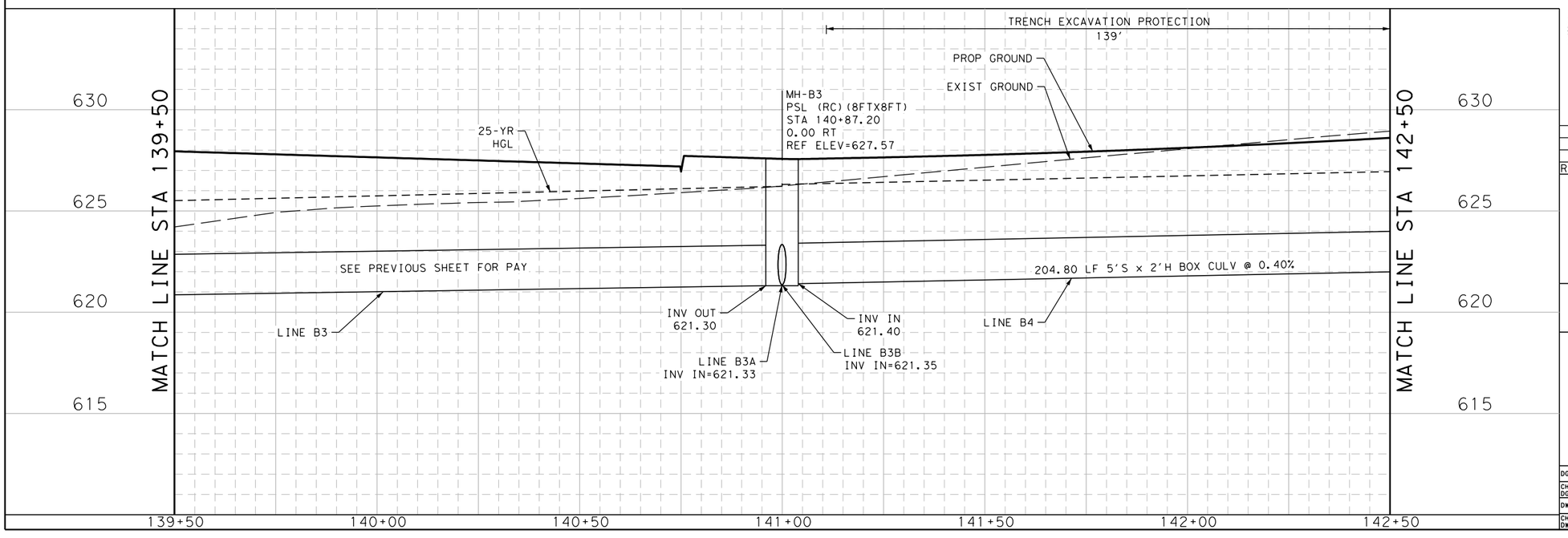
4. ALL STORM DRAIN SYSTEMS TO BE INSTALLED IN ACCORDANCE WITH TXDOT ITEM 402 "TRENCH EXCAVATION PROTECTION."

LEGEND

CI-5A	CURB INLET & DESIGNATION
MH-2B	MANHOLE & DESIGNATION
AD-2B	AREA ZONE DRAIN & DESIGNATION
LINE A1-3	STORM DRAIN STRUCTURE & DESIGNATION
	FLOW ARROW
W	EXIST WATER LINE
OH E	EXIST OVERHEAD ELECTRIC
UG T	EXIST UNDERGROUND COMMUNICATIONS



DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DRAINAGE PLAN & PROFILE

STA 139+50 TO STA 142+50

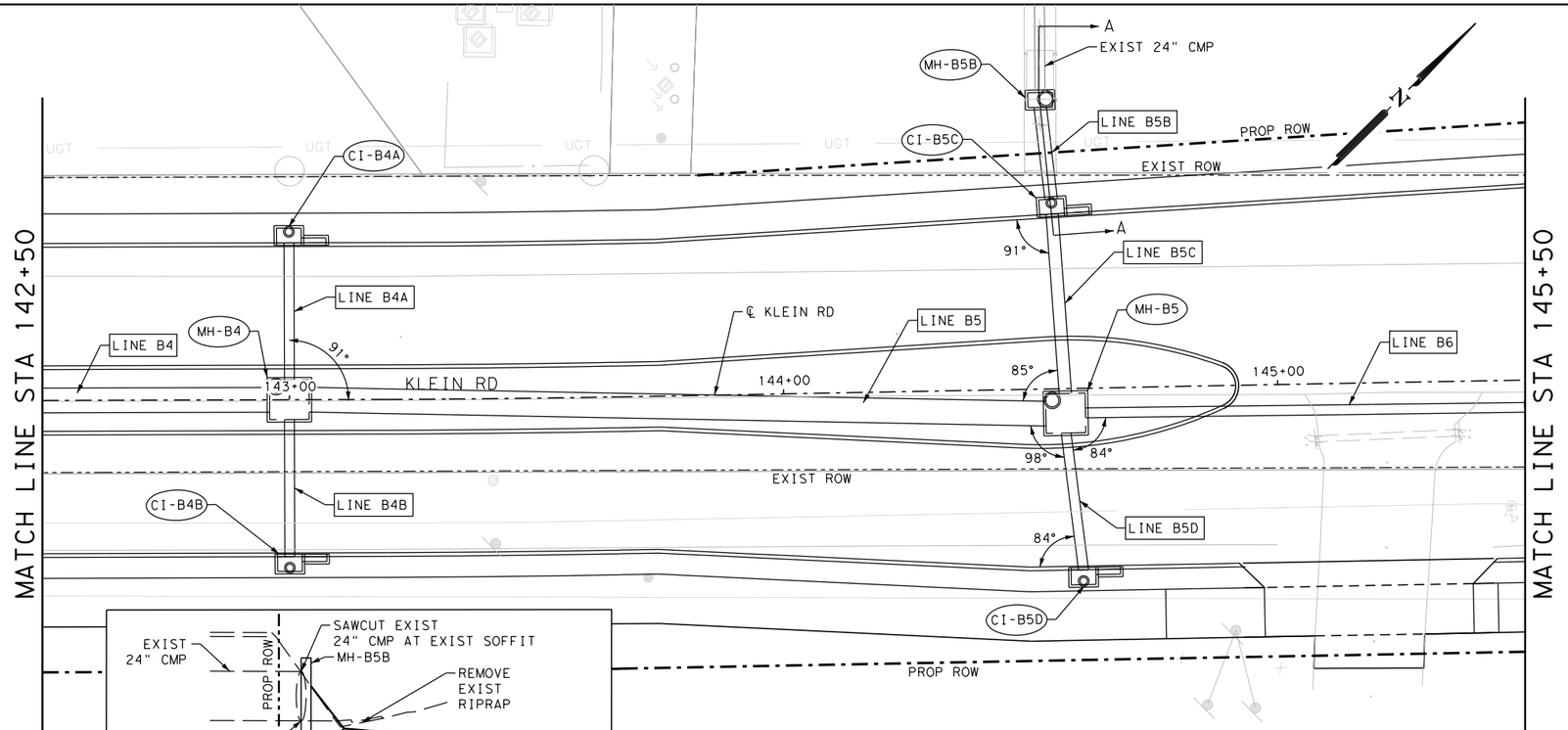
SHEET 14 OF 17

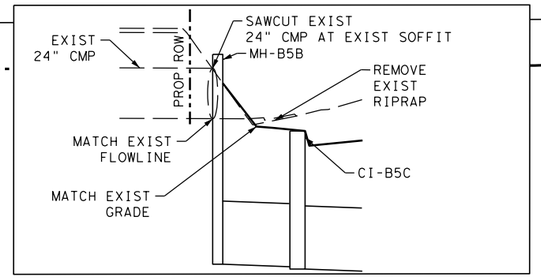
DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	229

Plotted on: 1/21/2021

Design Filename: H:\projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_DRN14.dgn

Plotted on: 1/21/2021





SECTION A-A
N.T.S.

ITEM	DESCRIPTION	UNIT	QTY
0402-6001	TRENCH EXCAVATION PROTECTION	LF	464
0462-6006	CONC BOX CULV (5 FT X 2 FT)	LF	150
0464-6005	RC PIPE (CL III)(24 IN)	LF	331
0464-6007	RC PIPE (CL III)(30 IN)	LF	56
0465-6014	INLET (COMPL)(PCO)(3FT)(LEFT)	EA	2
0465-6015	INLET (COMPL)(PCO)(3FT)(RIGHT)	EA	2
0465-6072	INLET (COMPL)(PSL)(RC)(3FTX5FT)	EA	1
0465-6077	INLET (COMPL)(PSL)(RC)(8FTX8FT)	EA	2

NOTES:
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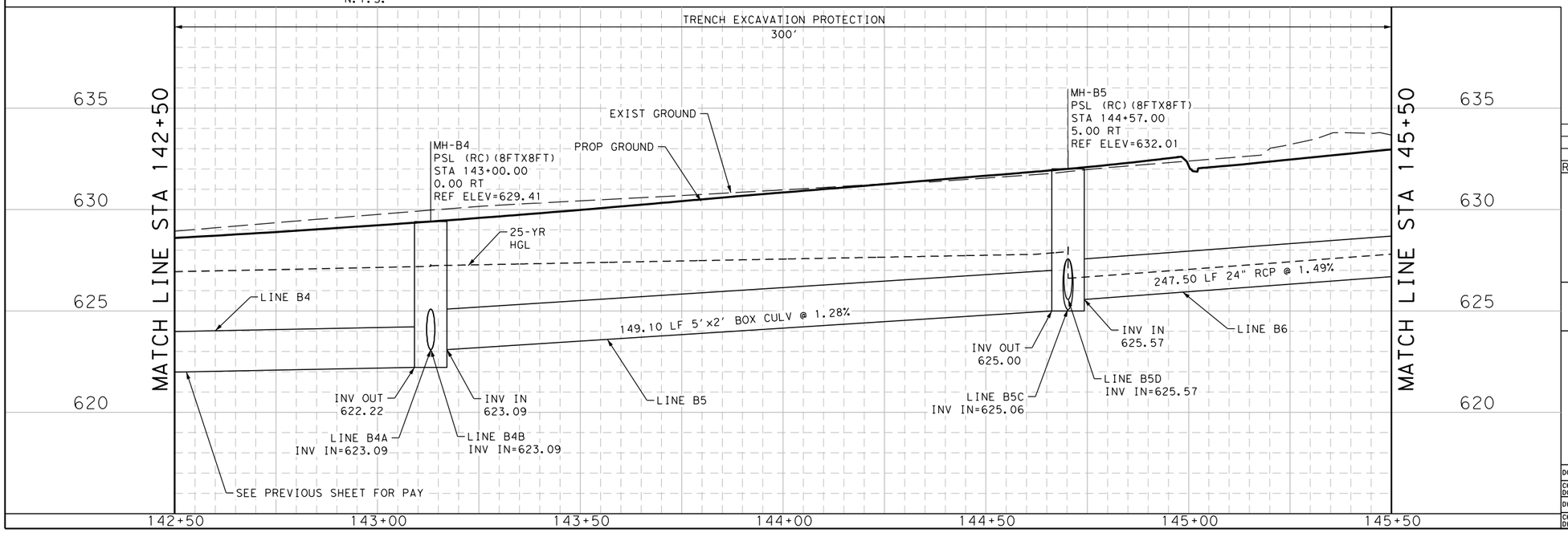
4. ALL STORM DRAIN SYSTEMS TO BE INSTALLED IN ACCORDANCE WITH TXDOT ITEM 402 "TRENCH EXCAVATION PROTECTION."

LEGEND

- CI-5A — CURB INLET & DESIGNATION
- MH-2B — MANHOLE & DESIGNATION
- AD-2B — AREA ZONE DRAIN & DESIGNATION
- LINE A1-3 — STORM DRAIN STRUCTURE & DESIGNATION
- FLOW ARROW
- W — EXIST WATER LINE
- OH E — EXIST OVERHEAD ELECTRIC
- UG T — EXIST UNDERGROUND COMMUNICATIONS



DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DRAINAGE PLAN & PROFILE

STA 142+50 TO STA 145+50

SHEET 15 OF 17

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	230

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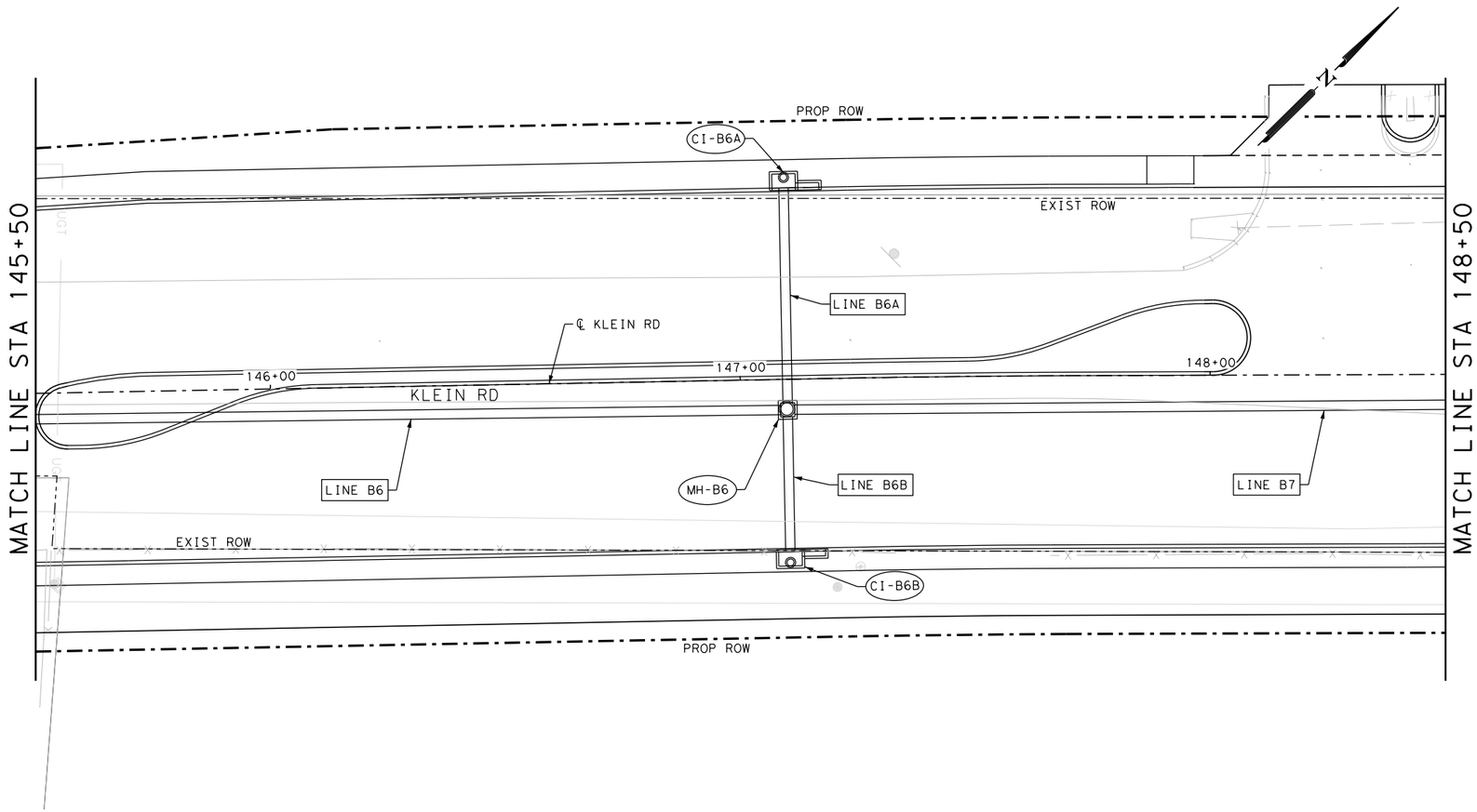
Plotted on: 1/21/2021

Design Filename: H:\projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_DRN16.dgn

ITEM	DESCRIPTION	UNIT	QTY
0402-6001	TRENCH EXCAVATION PROTECTION	LF	380
0464-6005	RC PIPE (CL III)(24 IN)	LF	322
0465-6014	INLET (COMPL)(PCO)(3FT)(LEFT)	EA	1
0465-6015	INLET (COMPL)(PCO)(3FT)(RIGHT)	EA	1
0465-6070	INLET (COMPL)(PSL)(RC)(3FTX3FT)	EA	1



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LEGEND

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- MH-2B — MANHOLE & DESIGNATION
- AD-2B — AREA ZONE DRAIN & DESIGNATION
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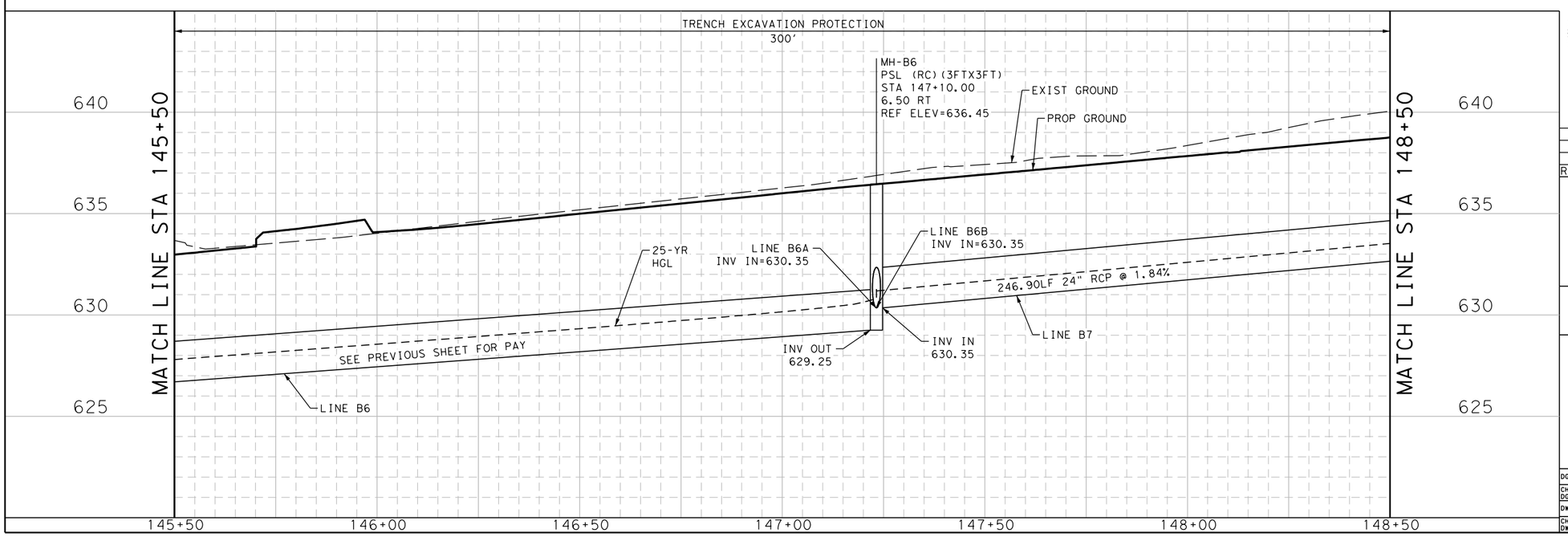
- FLOW ARROW
- W — EXIST WATER LINE
- OH E — EXIST OVERHEAD ELECTRIC
- UG T — EXIST UNDERGROUND COMMUNICATIONS



DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

DRAINAGE PLAN & PROFILE

STA 145+50 TO STA 148+50

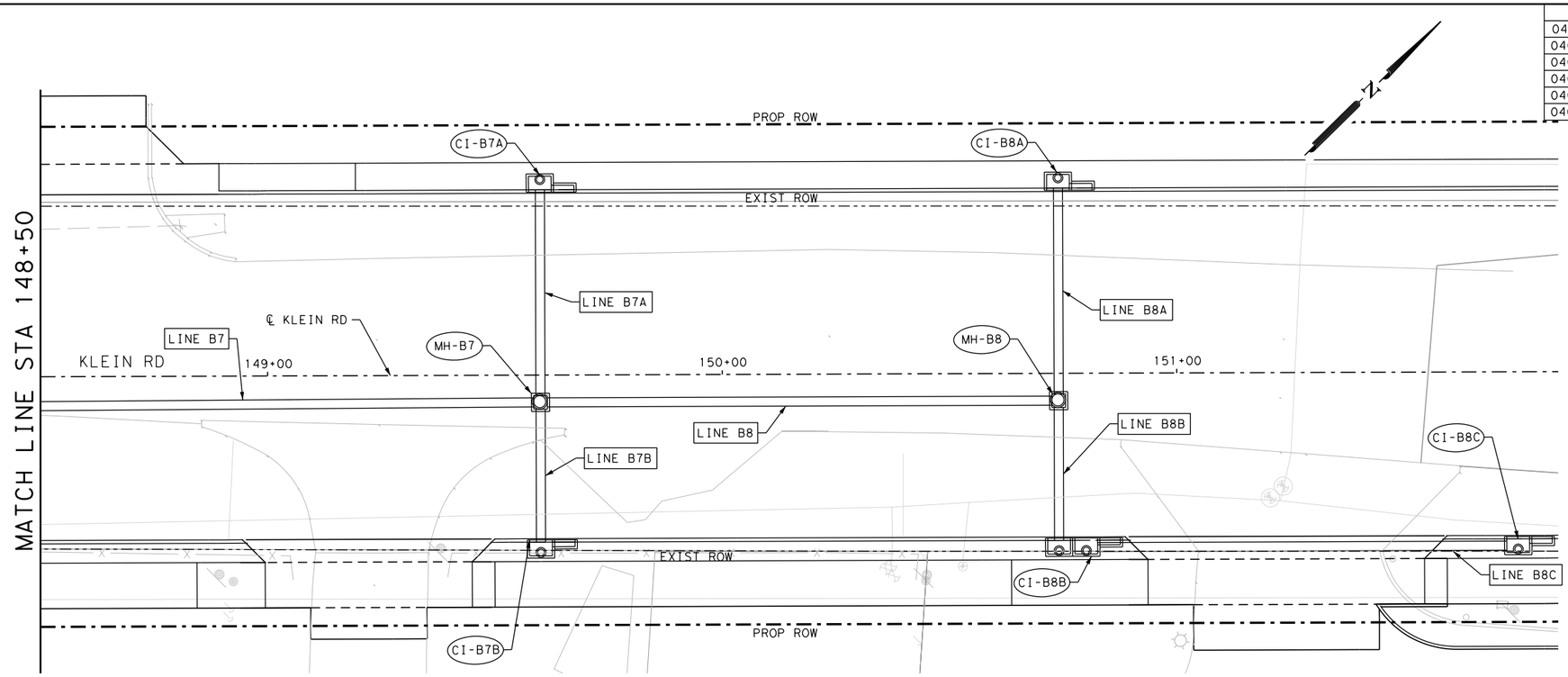
SHEET 16 OF 17

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	231

Plotted on: 1/21/2021

Design Filename: H:\projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_DRN17.dgn

ITEM	DESCRIPTION	UNIT	QTY
0402-6001	TRENCH EXCAVATION PROTECTION	LF	484
0464-6005	RC PIPE (CL III) (24 IN)	LF	331
0465-6013	INLET (COMPL) (PCO) (3FT) (NONE)	EA	1
0465-6014	INLET (COMPL) (PCO) (3FT) (LEFT)	EA	3
0465-6015	INLET (COMPL) (PCO) (3FT) (RIGHT)	EA	2
0465-6070	INLET (COMPL) (PSL) (RC) (3FTX3FT)	EA	2



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LEGEND

- CI-5A — CURB INLET & DESIGNATION
- MH-2B — MANHOLE & DESIGNATION
- AD-2B — AREA ZONE DRAIN & DESIGNATION
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- FLOW ARROW
- W — EXIST WATER LINE
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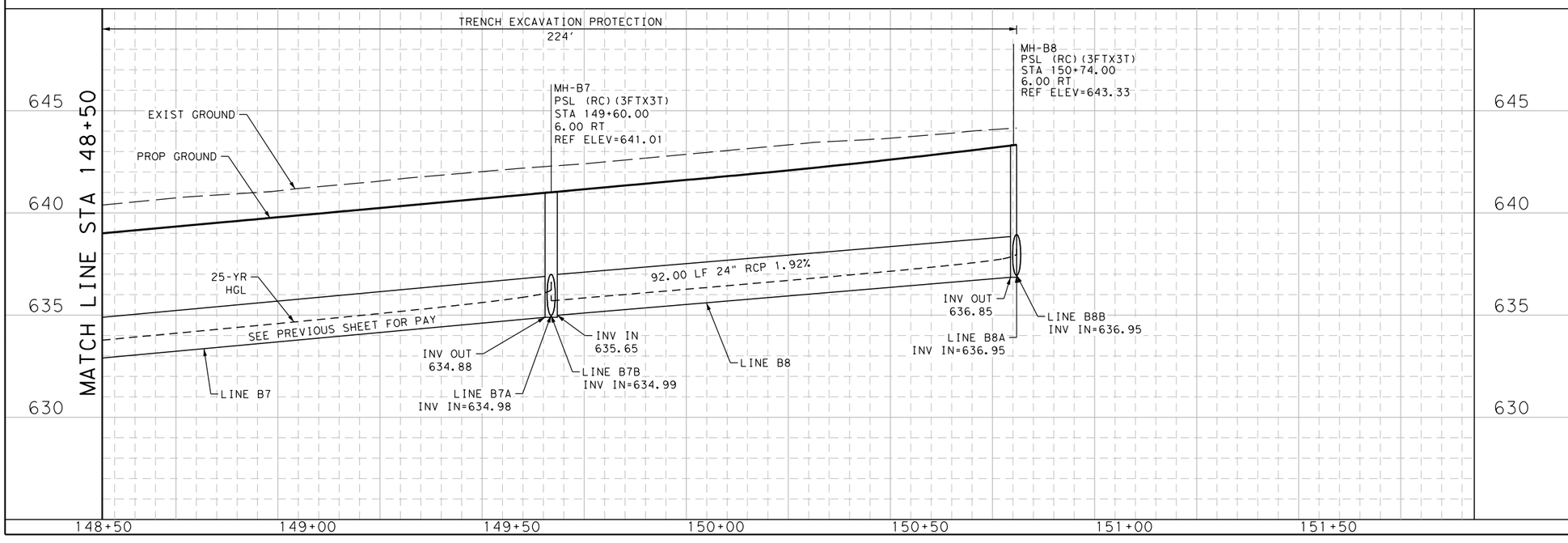
- UG T — EXIST UNDERGROUND COMMUNICATIONS



DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

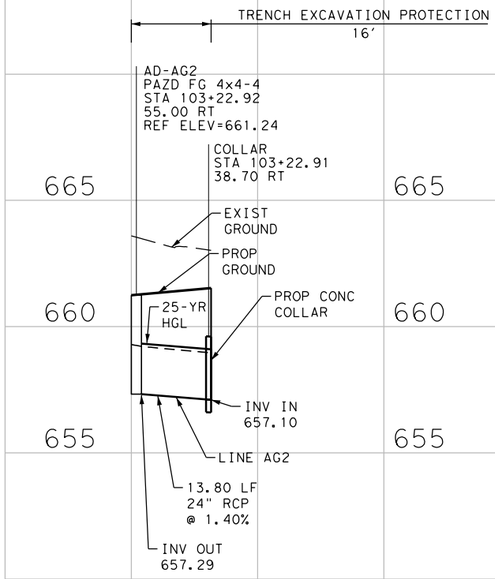
KLEIN RD PHASE 2

DRAINAGE PLAN & PROFILE

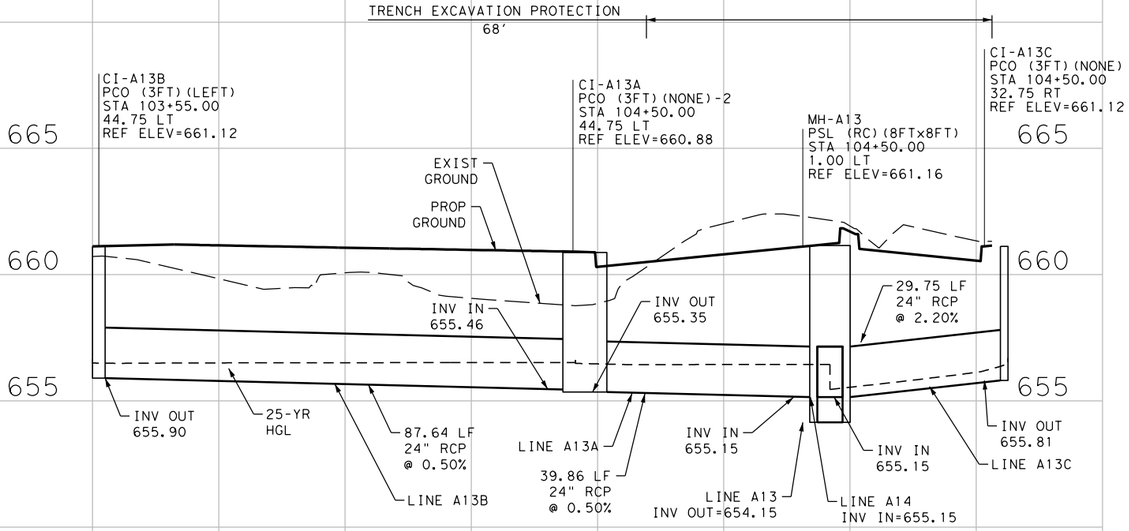
STA 148+50 TO END PROJECT

SHEET 17 OF 17

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	232



LATERAL AG2



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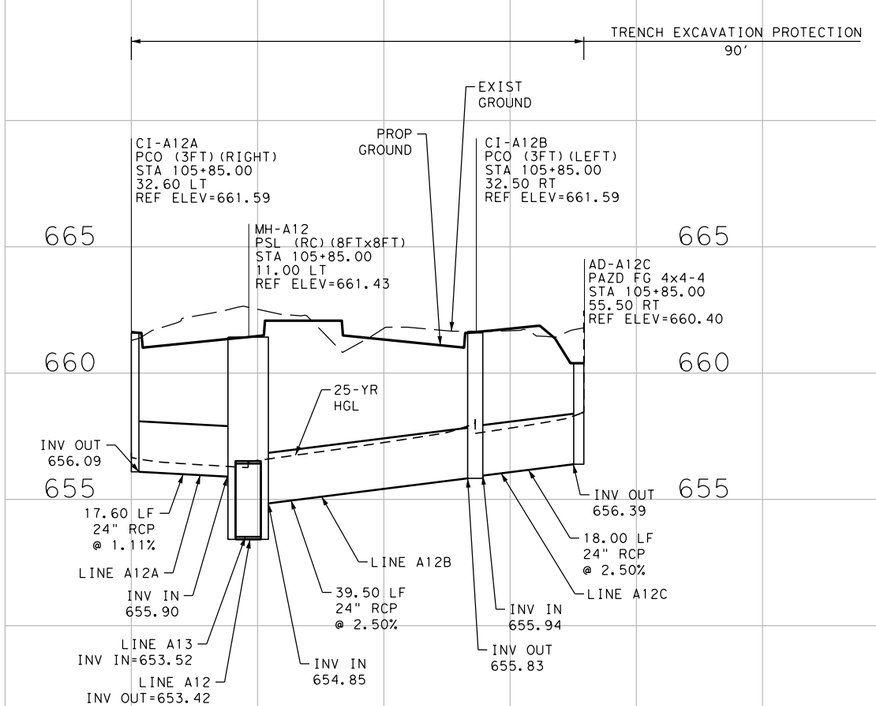

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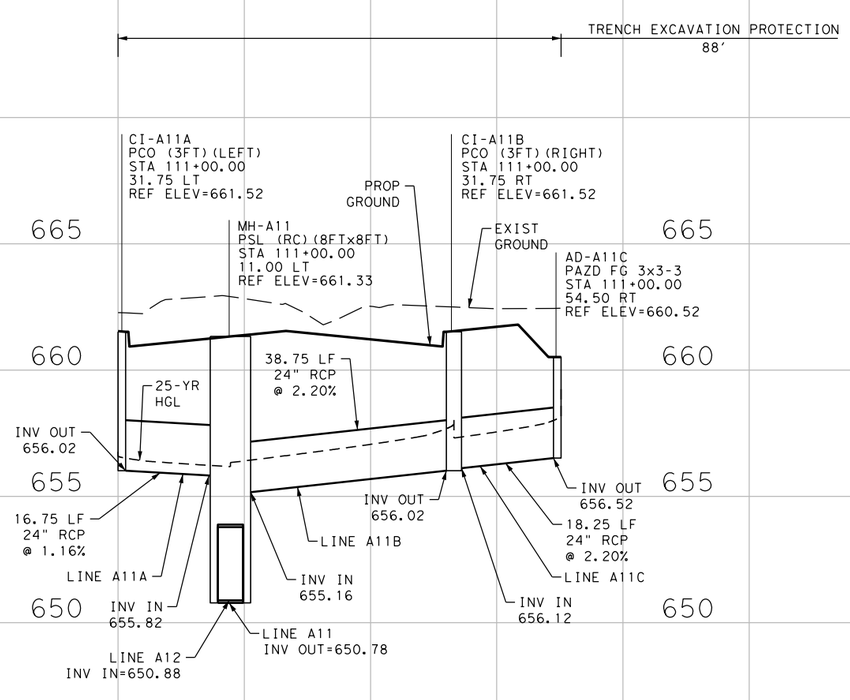
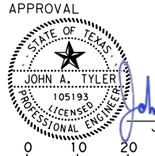


LATERAL A11

DESIGN

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL



JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

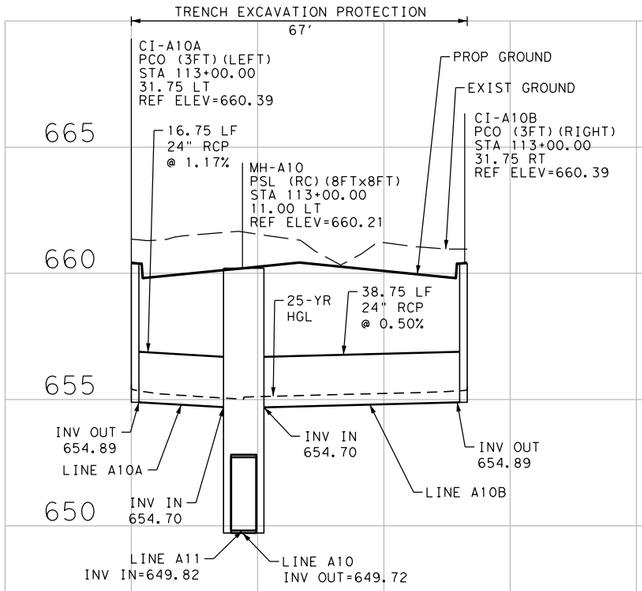
STORM DRAIN LATERALS AG2, A11, A12, A13

SHEET 1 OF 3

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	233

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_LATA1.dgn



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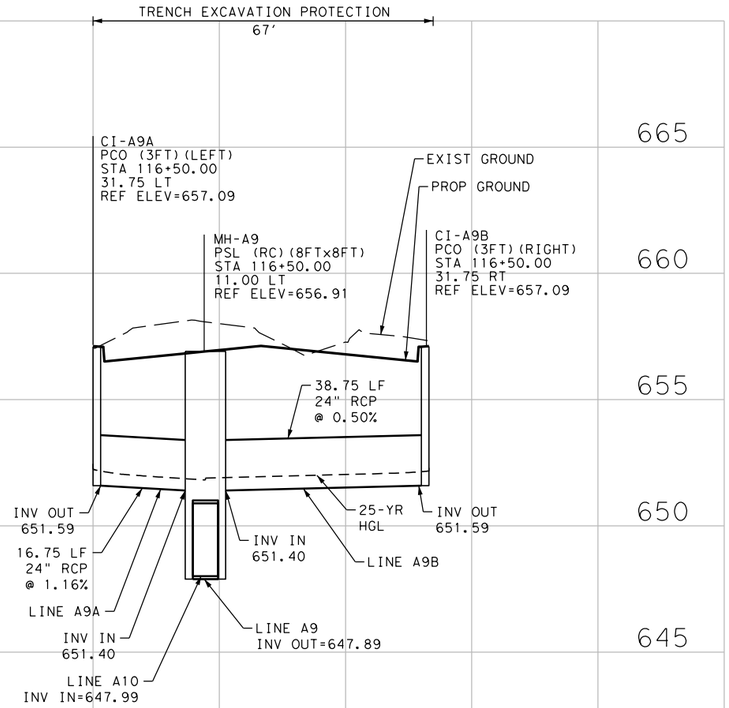
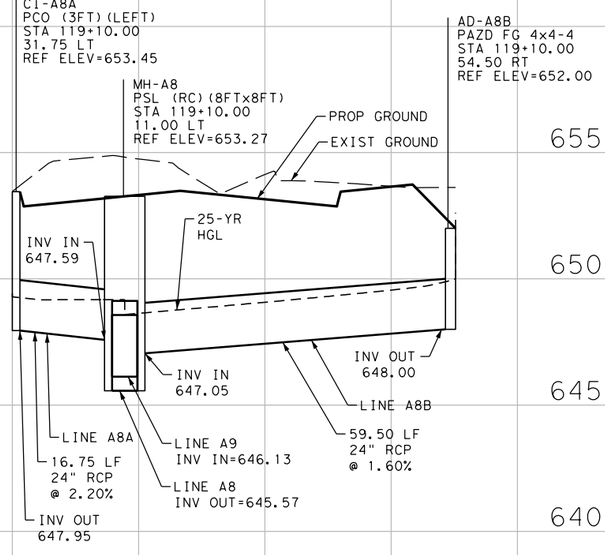


LATERAL A9



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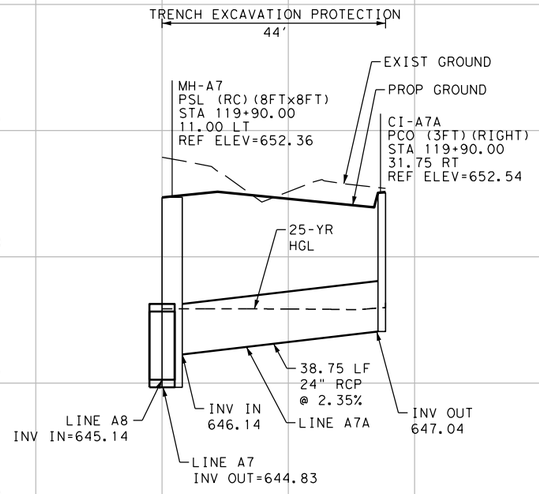

LATERAL A7

DESIGN

STATE OF TEXAS · ANDRES MORALES · 130189 · LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

STORM DRAIN LATERALS A7, A8, A9, A10

SHEET 2 OF 3

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	234

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_LATA2.dgn

Plotted on: 1/21/2021

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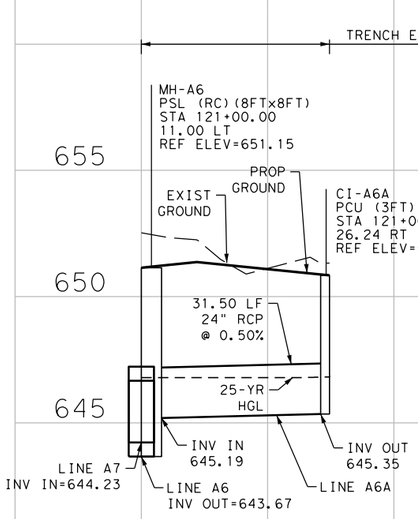
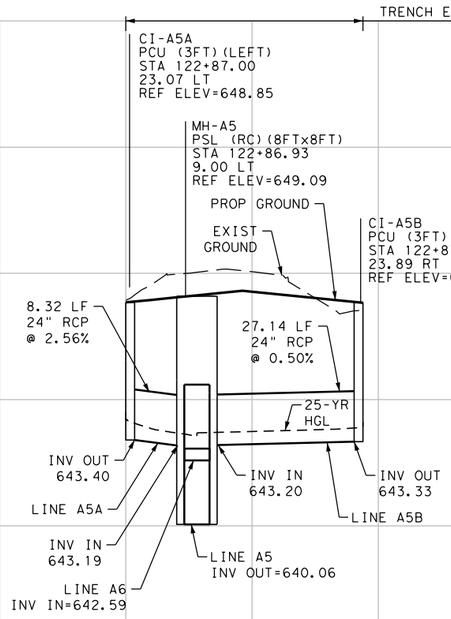
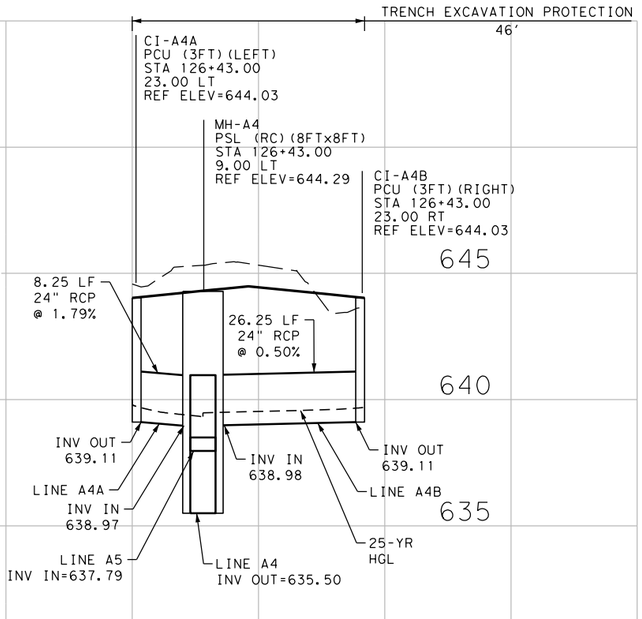
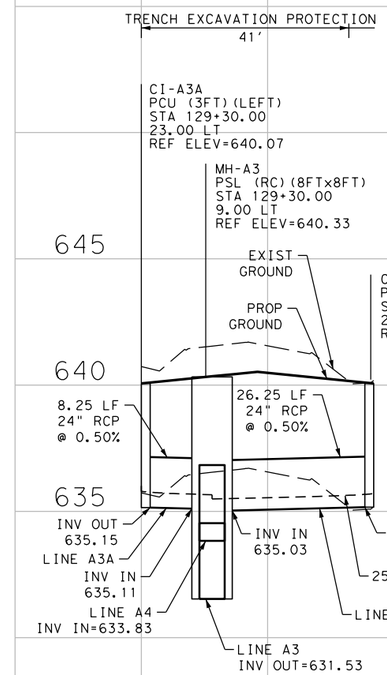
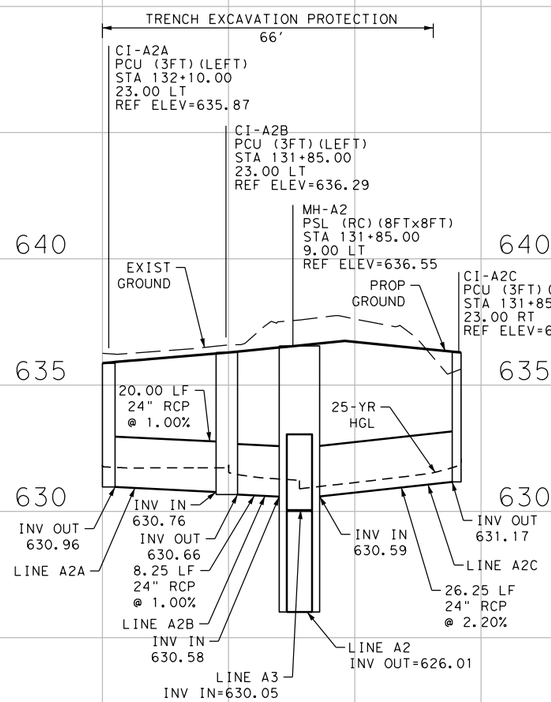
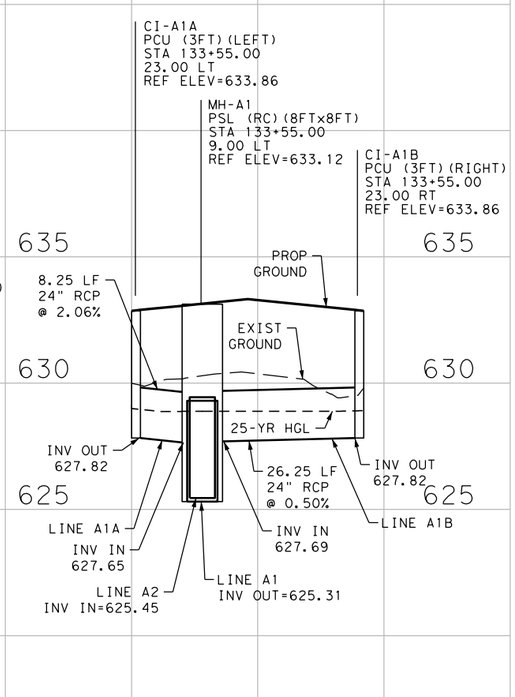












DESIGN

STATE OF TEXAS
ANDRES MORALES
130189
LICENSED
PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

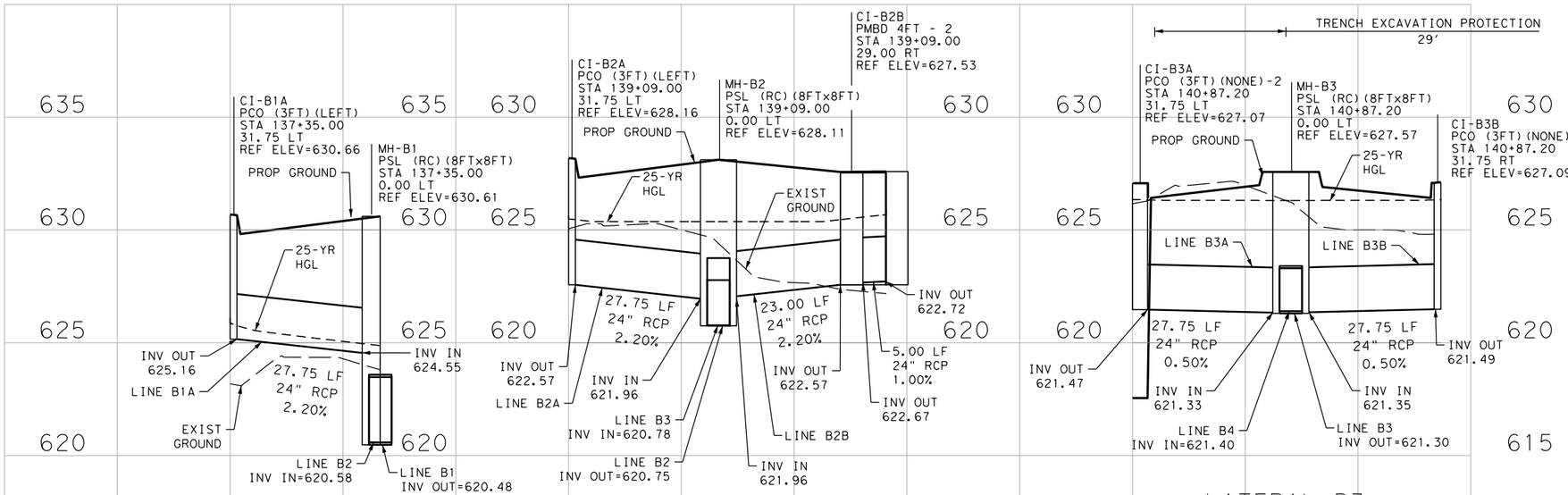
City of New Braunfels

KLEIN RD PHASE 2

STORM DRAIN LATERALS A1, A2, A3, A4, A5, A6

SHEET 3 OF 3

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	235



DESIGN

STATE OF TEXAS
ANDRES MORALES
130189
LICENSED
PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED
PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

STORM DRAIN LATERALS B1, B2, B3, B4, B5

SHEET 1 OF 2

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	236

Plotted on: 1/21/2021

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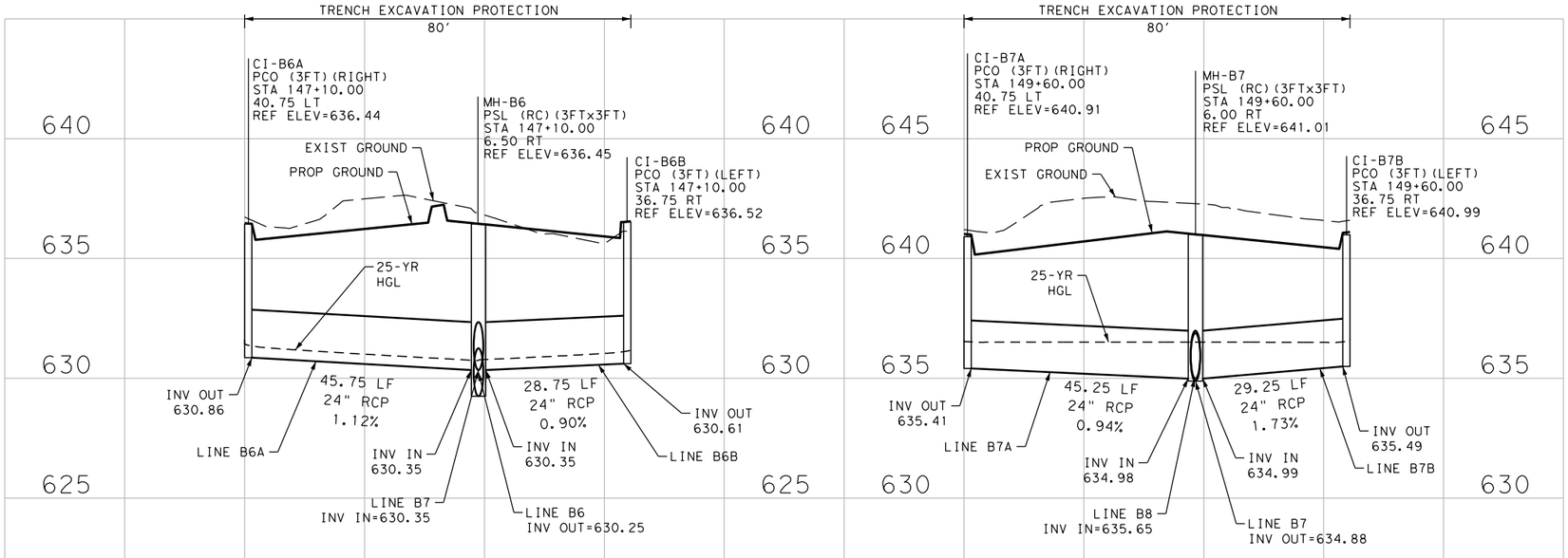

DESIGN

STATE OF TEXAS · ANDRES MORALES · 130189 · LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS · JOHN A. TYLER · 105193 · LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

0 10 20 30 60

SCALE: PLAN 1":30' PROFILE 1":6'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

STORM DRAIN LATERALS B6, B7, B8

SHEET 2 OF 2

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	237

Plotted on: 1/21/2021

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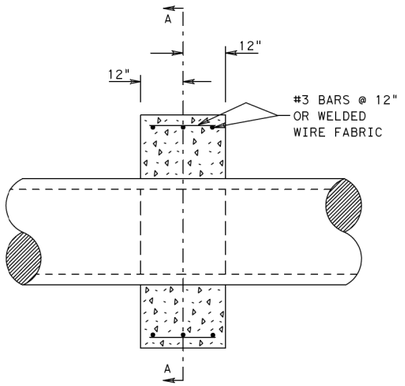
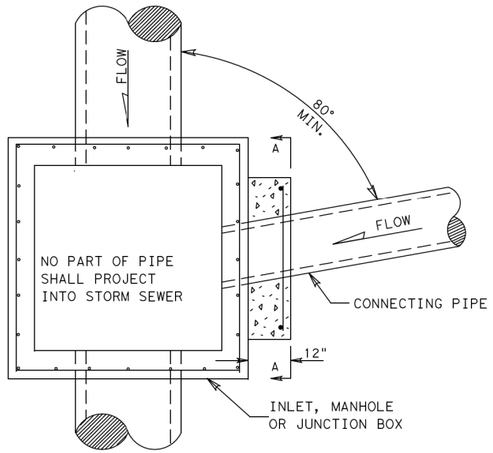
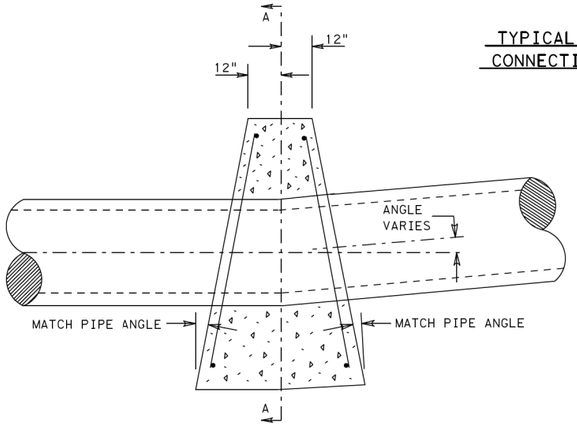


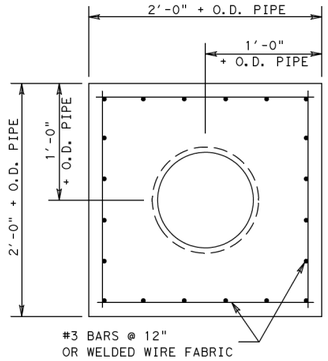
STRAIGHT DRAINAGE PIPE



TYPICAL DRAINAGE PIPE
CONNECTION WITH MANHOLE



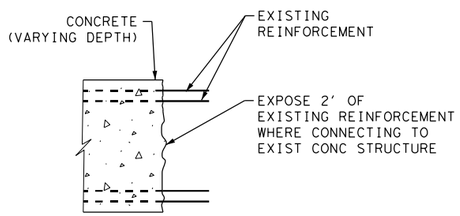
DRAINAGE PIPE W/HORIZ. & VERT. BENDS



SECTION A-A

NOTES:
1. ALL CONCRETE SHALL BE CLASS "A".
2. ALL REINFORCING STEEL SHALL HAVE MINIMUM COVER OF 3 INCHES.
3. COLLAR MAY BE USED FOR CORRIGATED METAL OR REINFORCED CONCRETE PIPES.
4. PIPES MAY BE PLACED ON ANY SIDE AS INDICATED IN THE PLANS.
5. PROPOSED CONCRETE COLLAR WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO THE VARIOUS BID ITEMS.

CONCRETE PIPE COLLAR AND CONNECTION DETAIL



* WORK ASSOCIATED WITH THE ABOVE WORK IS NOT PAID FOR SEPARATEY BUT IS SUBSIDIARY TO ITEM 360

CONCRETE BREAKBACK DETAIL

NOT TO SCALE

DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

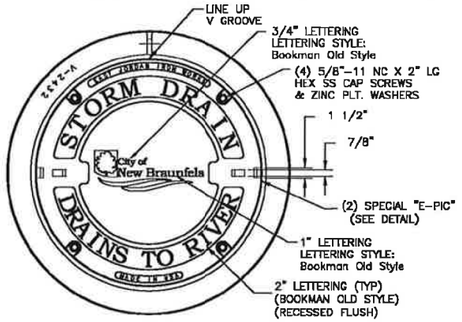
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

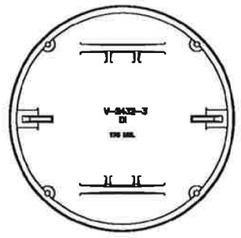
City of New Braunfels

KLEIN RD PHASE 2

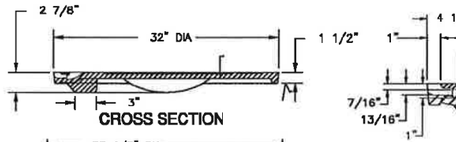
MISCELLANEOUS DETAILS

DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	238



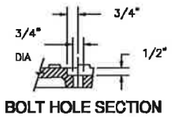


COVER BOTTOM

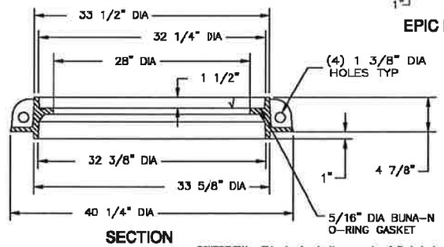


CROSS SECTION

EPIC DETAIL



BOLT HOLE SECTION



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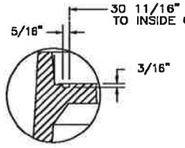


MACHINE GROOVE DETAIL

EJIW EAST JORDAN IRON WORKS EST.1893
800-626-4653
www.ejiw.com
MADE IN USA

PRODUCT NUMBER
NCR08-1536J

CATALOG NUMBER
V2432
V2432-3 DI

MANHOLE ASSEMBLY

LOAD RATING
HEAVY DUTY

COATING
UNDIPPED

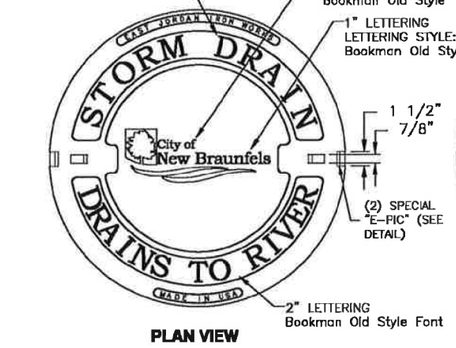
MATERIAL SPECIFICATION
COVER – DUCTILE IRON ASTM A536
FRAME – GRAY IRON ASTM A48 CL35B

OPEN AREA
N/A

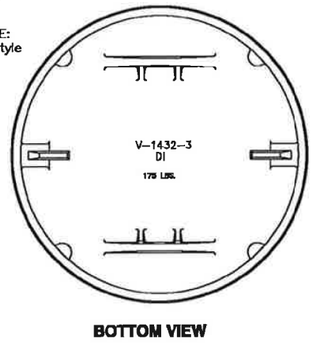
√ DESIGNATES MACHINED SURFACE

DRAWN	DATE
GAD	07/24/08
LAST REVISED	DATE

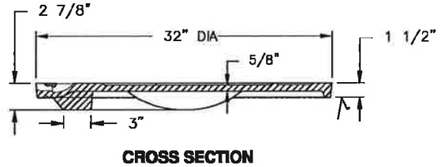
REFERENCE INFORMATION



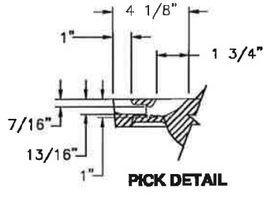
PLAN VIEW



BOTTOM VIEW



CROSS SECTION



PICK DETAIL

EJIW EAST JORDAN IRON WORKS EST.1893
800-626-4653
www.ejiw.com
MADE IN USA

PRODUCT NUMBER
NCR08-1536I

CATALOG NUMBER
V1432-3

COVER

LOAD RATING
HEAVY DUTY

COATING
UNDIPPED

MATERIAL SPECIFICATION
COVER – DUCTILE IRON ASTM A536

OPEN AREA
N/A

√ DESIGNATES MACHINE SURFACE

DRAWN	DATE
GAD	07/24/08
LAST REVISED	DATE

REFERENCE INFORMATION

OR APPROVED EQUAL

DESIGN

STATE OF TEXAS
ANDRES MORALES
130189
LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 1/21/2021 DATE

APPROVAL

STATE OF TEXAS
JOHN A. TYLER
105193
LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 1/21/2021 DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

City of New Braunfels

KLEIN RD PHASE 2

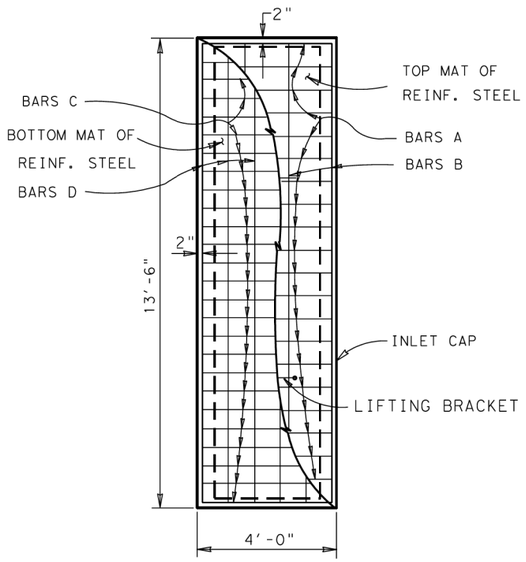
DRAINAGE MANHOLE LID DETAIL

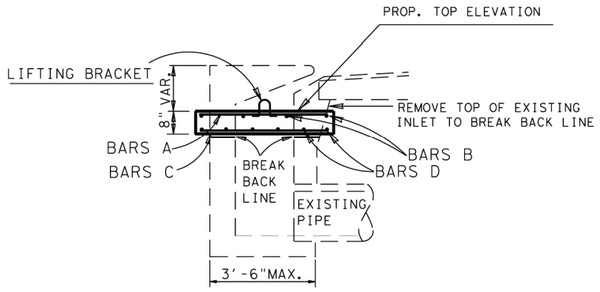
DGN:	STATE	PROJECT NO.	ROADWAY
CHK DGN:	TEXAS	NB 18-026	KLEIN RD
DWG:	COUNTY	CITY	SHEET NO.
CHK DWG:	GUADALUPE	NEW BRAUNFELS	239

Plotted on: 1/21/2021

Design Filename: H:\Projects\510\30\03\Design\Civil\Drainage\5103003_WKleinRd_DrnMhLid.dgn

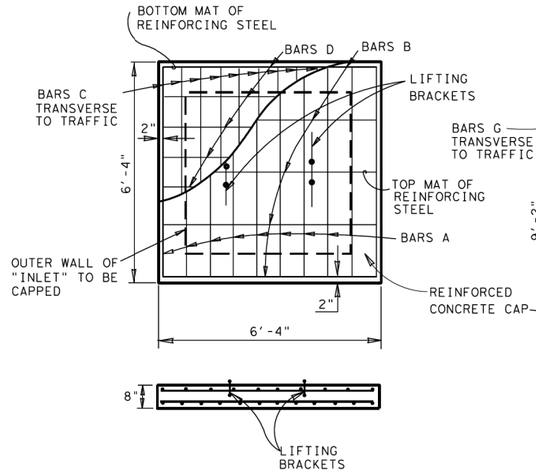
CAP FOR A CURB INLET





REINFORCING STEEL					
BAR	NO.	SIZE	SPAC.	LEN.	WGT.
A	24	4	7"	3'-8"	59
B	4	4	1'-2"	13'-2"	35
C	19	6	9"	3'-8"	105
D	9	4	6"	13'-2"	80
REINFORCING STEEL =				279 LBS.	✳
CL "A" CONCRETE =				1.33 C.Y.	✳

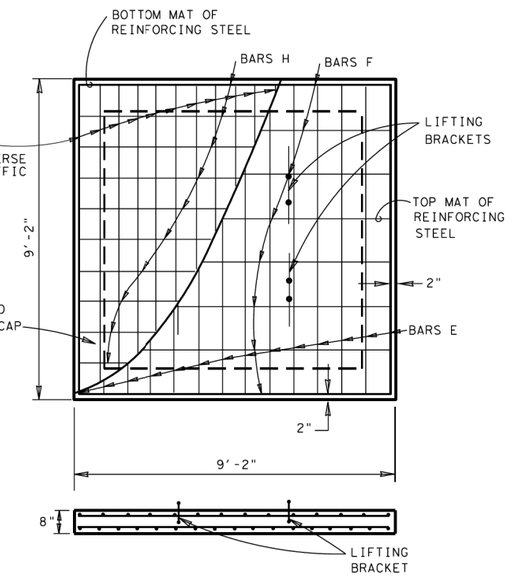
6'-4" SQUARE CAP



REINFORCING STEEL					
BAR	NO.	SIZE	SPAC.	LEN.	WGT.
A	10	4	8"	6'-0"	40
B	5	4	18"	6'-0"	20
C	12	6	6"	6'-0"	108
D	8	4	10"	6'-0"	32
REINFORCING STEEL =				200 LBS.	✳
CL "A" CONCRETE =				0.99 C.Y.	✳

✳ FOR CONTRACTORS INFORMATION ONLY

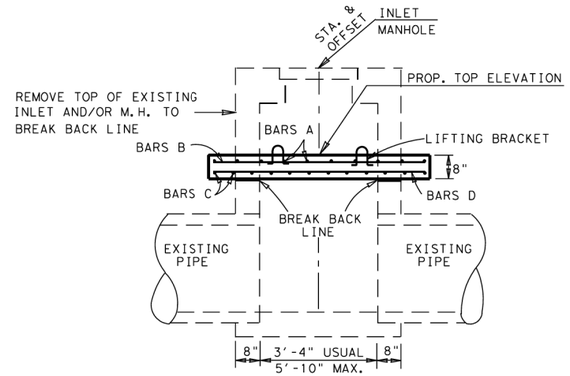
9'-2" SQUARE CAP



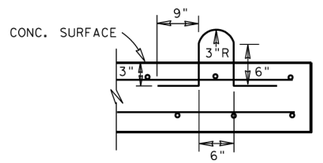
REINFORCING STEEL					
BAR	NO.	SIZE	SPAC.	LEN.	WGT.
E	14	4	7"	8'-10"	83
F	8	4	7"	8'-10"	47
G	17	6	7"	8'-10"	226
H	12	4	10"	8'-10"	71
REINFORCING STEEL =				427 LBS.	✳
CL "A" CONCRETE =				2.08 C.Y.	✳

✳ FOR CONTRACTORS INFORMATION ONLY

CAP SIZE	LOCATION	AT STR. NO.	TOP OF CAP ELEV.
13'-6"	STA 102+30 AT S. WALNUT NB INTERSECTION		



CAP FOR A DROP INLET OR MANHOLE



LIFTING BRACKET

NO. 4 REBAR

PLACEMENT OF LIFTING BRACKETS

CURB INLET CAP: 2 CENTERED 4FT +/- FROM EACH END
6'-4" CAP: 2 CENTERED 2FT +/- FROM EACH END
9'-2" CAP: 4 PLACED 3FT +/- IN FROM EACH END

NOTES:

1) REMOVAL OF THE TOP PORTION OF THE INLET AND/OR MANHOLE WHERE REQUIRED PLUS FURNISHING & INSTALLING THE CONC. CAP WILL BE PAID FOR UNDER ITEM 479 "ADJUSTING MANHOLES AND INLETS"

2) ALL CONCRETE SHALL BE CLASS "A" AND SHALL MEET THE REQUIREMENTS OF ITEMS 420 & 421

3) ALL REINFORCING STEEL SHALL BE GRADE 60 AND SHALL MEET THE REQUIREMENTS OF ITEM 440

4) THE BREAK-BACK LINE SHALL BE CUT SMOOTH TO ENSURE UNIFORM BEARING OF THE CAP ON THE INLET/M.H. WALLS.

SAN ANTONIO DISTRICT STANDARD

CAPPING INLETS & MANHOLES

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	NB 18-026		240
STATE	STATE DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	HIGHWAY NO.
			KLEIN RD

10/95

STRUCTURE DESIGN
/BRIDGE/STDS/CAPINLET.DGN

DATE: 1/21/2021 1:31:20 PM
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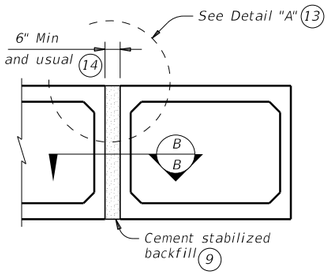
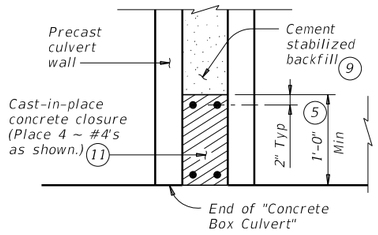
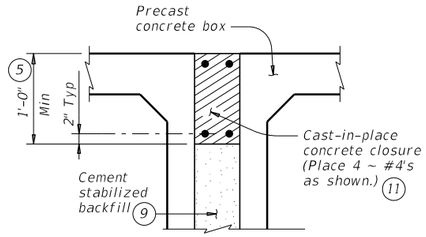


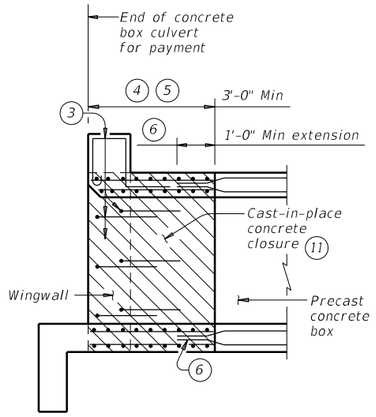
MULTIPLE UNIT PLACEMENT



SECTION B-B

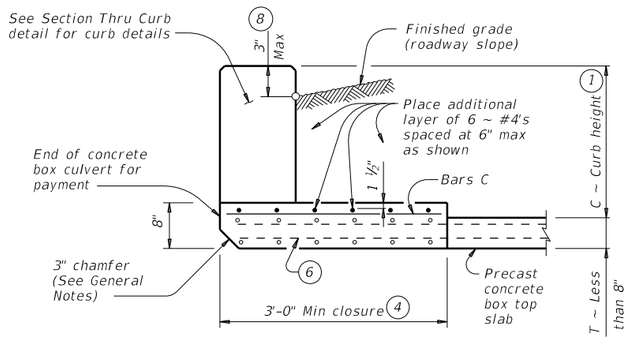


DETAIL "A" (13)

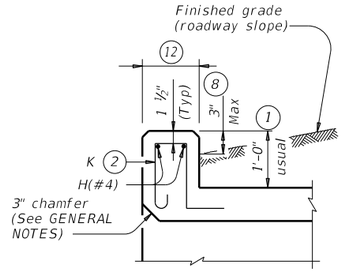


WINGWALL CONNECTION

(Also applies to safety end treatment.)

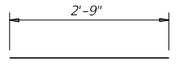


SECTION THRU TOP SLABS LESS THAN 8"

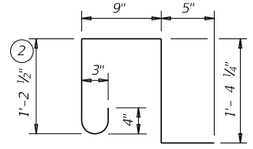


SECTION THRU CURB

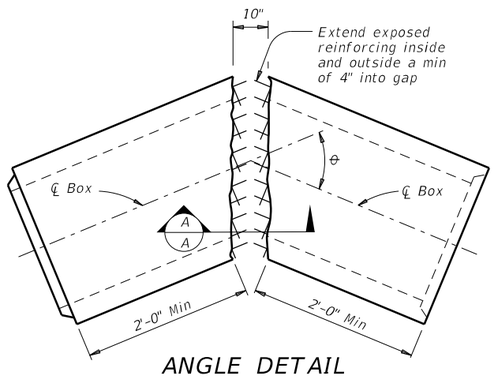
QUANTITIES PER FOOT OF CURB (10)	
Reinforcing Steel	4.12 Lb
Concrete	0.037 CY



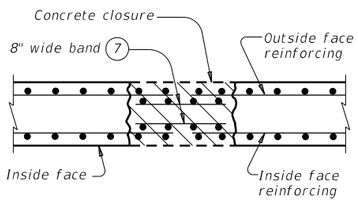
BARS C (#4)
(Spa = 1'-0" Max)



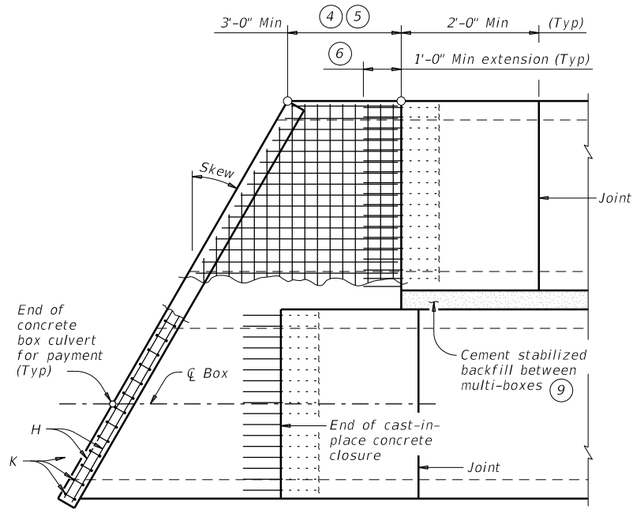
BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi-box placement.)

(1) 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.

(2) 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.

(3) 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.

(4) 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.

(5) 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.

(6) Extend precast box reinforcing a minimum of 1'-0" into concrete closure (Typ).

(7) 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.

(8) 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.

(9) Cement stabilized backfill between boxes is considered part of the box culvert for payment.

(10) All curb concrete and reinforcing is considered part of the box culvert for payment.

(11) Any additional concrete and reinforcing required for the closures will be considered subsidiary to the box culvert for payment.

(12) 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.

(13) 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".

(14) 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.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

BOX CULVERTS PRECAST MISCELLANEOUS DETAILS

SCP-MD

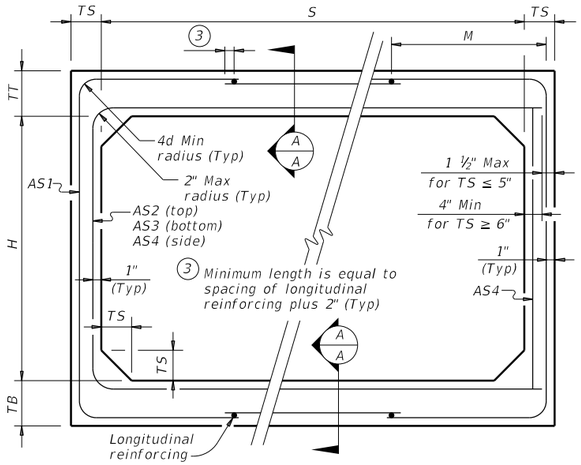
FILE: scpmdsts-20.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		241

BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
3	2	7	6	4	< 2	–	0.17	0.25	0.16	0.10	0.17	0.17	0.14	3.3
3	2	4	4	4	2 < 3	31	0.13	0.19	0.18	0.10	–	–	–	2.4
3	2	4	4	4	3 – 5	31	0.10	0.11	0.12	0.10	–	–	–	2.4
3	2	4	4	4	10	31	0.10	0.10	0.10	0.10	–	–	–	2.4
3	2	4	4	4	15	31	0.10	0.13	0.13	0.10	–	–	–	2.4
3	2	4	4	4	20	31	0.11	0.17	0.17	0.10	–	–	–	2.4
3	2	4	4	4	25	31	0.14	0.21	0.21	0.10	–	–	–	2.4
3	2	4	4	4	30	31	0.17	0.25	0.25	0.10	–	–	–	2.4
3	2	4	4	4	35	31	0.20	0.29	0.30	0.10	–	–	–	2.4
3	3	7	6	4	< 2	–	0.17	0.27	0.17	0.10	0.17	0.17	0.14	3.7
3	3	4	4	4	2 < 3	31	0.10	0.22	0.21	0.10	–	–	–	2.8
3	3	4	4	4	3 – 5	31	0.10	0.14	0.14	0.10	–	–	–	2.8
3	3	4	4	4	10	31	0.10	0.11	0.11	0.10	–	–	–	2.8
3	3	4	4	4	15	31	0.10	0.14	0.15	0.10	–	–	–	2.8
3	3	4	4	4	20	31	0.10	0.18	0.19	0.10	–	–	–	2.8
3	3	4	4	4	25	31	0.10	0.23	0.23	0.10	–	–	–	2.8
3	3	4	4	4	30	31	0.12	0.27	0.28	0.10	–	–	–	2.8
3	3	4	4	4	35	31	0.14	0.32	0.32	0.10	–	–	–	2.8

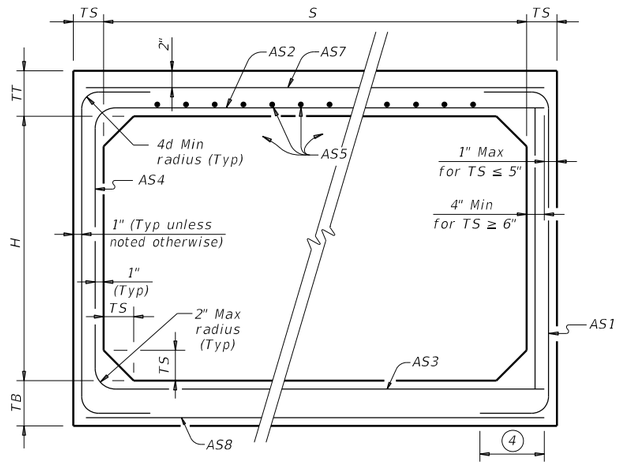
(1) For box length = 8'-0"

(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"

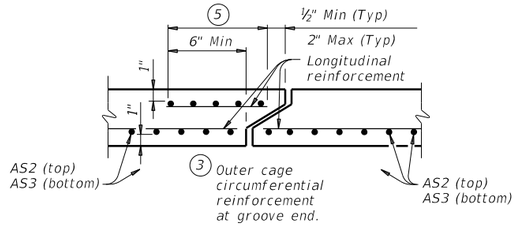
FILL HEIGHT 2 FT AND GREATER



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)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

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

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

3'-0" SPAN

SCP-3

FILE: scp03sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		242

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DATE: 1/21/2021 1:31:36 PM
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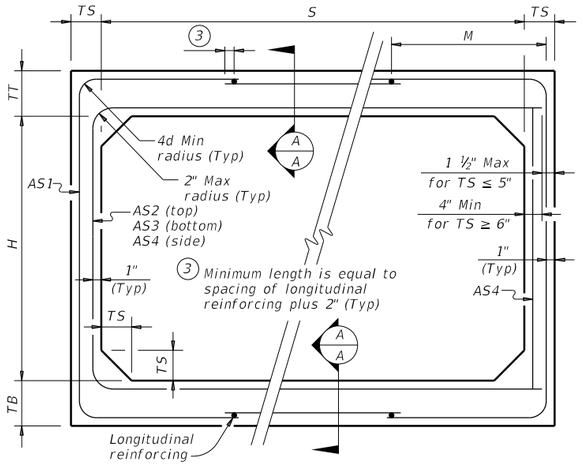
BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
5	2	8	7	6	< 2	–	0.19	0.27	0.18	0.14	0.19	0.19	0.17	6.0
5	2	6	6	6	2 < 3	44	0.22	0.20	0.16	0.14	–	–	–	5.1
5	2	6	6	6	3 – 5	44	0.16	0.14	0.14	0.14	–	–	–	5.1
5	2	6	6	6	10	36	0.15	0.14	0.14	0.14	–	–	–	5.1
5	2	6	6	6	15	36	0.20	0.18	0.18	0.14	–	–	–	5.1
5	2	6	6	6	20	36	0.26	0.23	0.24	0.14	–	–	–	5.1
5	2	6	6	6	25	36	0.33	0.29	0.29	0.14	–	–	–	5.1
5	2	6	6	6	30	36	0.39	0.34	0.35	0.14	–	–	–	5.1
5	3	8	7	6	< 2	–	0.19	0.31	0.21	0.14	0.19	0.19	0.17	6.6
5	3	6	6	6	2 < 3	45	0.18	0.24	0.19	0.14	–	–	–	5.7
5	3	6	6	6	3 – 5	36	0.14	0.17	0.16	0.14	–	–	–	5.7
5	3	6	6	6	10	36	0.14	0.16	0.17	0.14	–	–	–	5.7
5	3	6	6	6	15	35	0.16	0.21	0.22	0.14	–	–	–	5.7
5	3	6	6	6	20	35	0.21	0.27	0.28	0.14	–	–	–	5.7
5	3	6	6	6	25	35	0.26	0.34	0.34	0.14	–	–	–	5.7
5	3	6	6	6	30	35	0.31	0.41	0.41	0.14	–	–	–	5.7
5	4	8	7	6	< 2	–	0.19	0.33	0.24	0.14	0.19	0.19	0.17	7.2
5	4	6	6	6	2 < 3	45	0.16	0.27	0.22	0.14	–	–	–	6.3
5	4	6	6	6	3 – 5	45	0.14	0.19	0.18	0.14	–	–	–	6.3
5	4	6	6	6	10	36	0.14	0.18	0.18	0.14	–	–	–	6.3
5	4	6	6	6	15	35	0.14	0.23	0.24	0.14	–	–	–	6.3
5	4	6	6	6	20	35	0.17	0.30	0.31	0.14	–	–	–	6.3
5	4	6	6	6	25	35	0.21	0.37	0.38	0.14	–	–	–	6.3
5	4	6	6	6	30	35	0.25	0.44	0.45	0.14	–	–	–	6.3
5	5	8	7	6	< 2	–	0.19	0.35	0.26	0.14	0.19	0.19	0.17	7.8
5	5	6	6	6	2 < 3	45	0.14	0.29	0.24	0.14	–	–	–	6.9
5	5	6	6	6	3 – 5	45	0.14	0.21	0.20	0.14	–	–	–	6.9
5	5	6	6	6	10	45	0.14	0.19	0.20	0.14	–	–	–	6.9
5	5	6	6	6	15	36	0.14	0.24	0.25	0.14	–	–	–	6.9
5	5	6	6	6	20	35	0.15	0.31	0.32	0.14	–	–	–	6.9
5	5	6	6	6	25	35	0.18	0.38	0.39	0.14	–	–	–	6.9
5	5	6	6	6	30	35	0.21	0.46	0.47	0.14	–	–	–	6.9

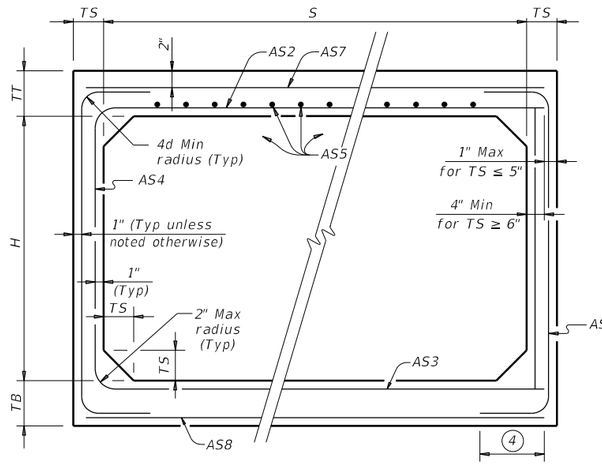
(1) For box length = 8'-0"

(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



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)

SECTION A-A

(Showing top and bottom slab joint reinforcement.)

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.

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HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

5'-0" SPAN

SCP-5

FILE: scp05sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		243

DATE: 1/21/2021 1:31:38 PM
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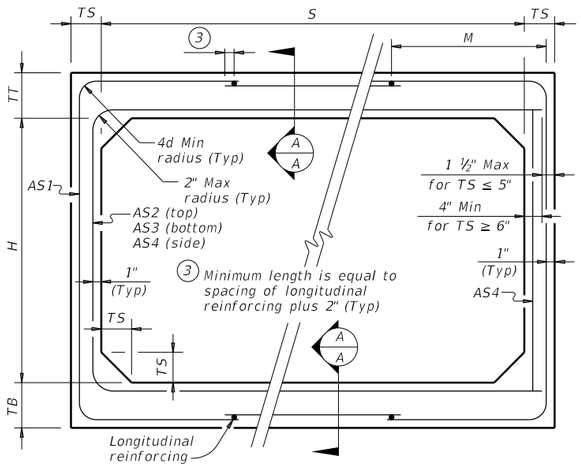
BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
6	2	8	7	7	< 2	–	0.23	0.27	0.19	0.17	0.19	0.19	0.17	7.2
6	2	7	7	7	2 < 3	43	0.25	0.21	0.17	0.17	–	–	–	6.8
6	2	7	7	7	3 – 5	43	0.20	0.17	0.17	0.17	–	–	–	6.8
6	2	7	7	7	10	39	0.20	0.17	0.17	0.17	–	–	–	6.8
6	2	7	7	7	15	39	0.26	0.20	0.20	0.17	–	–	–	6.8
6	2	7	7	7	20	39	0.34	0.26	0.26	0.17	–	–	–	6.8
6	2	7	7	7	25	39	0.43	0.32	0.32	0.17	–	–	–	6.8
6	2	7	7	7	30	39	0.52	0.38	0.39	0.17	–	–	–	6.8
6	3	8	7	7	< 2	–	0.20	0.31	0.22	0.17	0.19	0.19	0.17	7.9
6	3	7	7	7	2 < 3	43	0.21	0.24	0.19	0.17	–	–	–	7.5
6	3	7	7	7	3 – 5	39	0.17	0.18	0.17	0.17	–	–	–	7.5
6	3	7	7	7	10	39	0.17	0.18	0.19	0.17	–	–	–	7.5
6	3	7	7	7	15	38	0.22	0.24	0.24	0.17	–	–	–	7.5
6	3	7	7	7	20	38	0.28	0.31	0.31	0.17	–	–	–	7.5
6	3	7	7	7	25	38	0.35	0.38	0.39	0.17	–	–	–	7.5
6	3	7	7	7	30	38	0.42	0.46	0.46	0.17	–	–	–	7.5
6	4	8	7	7	< 2	–	0.19	0.34	0.25	0.17	0.19	0.19	0.17	8.6
6	4	7	7	7	2 < 3	43	0.19	0.27	0.21	0.17	–	–	–	8.2
6	4	7	7	7	3 – 5	39	0.17	0.21	0.19	0.17	–	–	–	8.2
6	4	7	7	7	10	39	0.17	0.20	0.21	0.17	–	–	–	8.2
6	4	7	7	7	15	38	0.18	0.27	0.27	0.17	–	–	–	8.2
6	4	7	7	7	20	38	0.24	0.34	0.35	0.17	–	–	–	8.2
6	4	7	7	7	25	38	0.29	0.43	0.42	0.17	–	–	–	8.2
6	4	7	7	7	30	38	0.35	0.51	0.52	0.17	–	–	–	8.2
6	5	8	7	7	< 2	–	0.19	0.37	0.28	0.17	0.19	0.19	0.17	9.3
6	5	7	7	7	2 < 3	43	0.17	0.30	0.24	0.17	–	–	–	8.9
6	5	7	7	7	3 – 5	43	0.17	0.23	0.21	0.17	–	–	–	8.9
6	5	7	7	7	10	39	0.17	0.22	0.23	0.17	–	–	–	8.9
6	5	7	7	7	15	38	0.17	0.28	0.29	0.17	–	–	–	8.9
6	5	7	7	7	20	38	0.20	0.37	0.38	0.17	–	–	–	8.9
6	5	7	7	7	25	38	0.25	0.45	0.46	0.17	–	–	–	8.9
6	5	7	7	7	30	38	0.30	0.54	0.55	0.17	–	–	–	8.9
6	6	8	7	7	< 2	–	0.19	0.38	0.30	0.17	0.19	0.19	0.17	10
6	6	7	7	7	2 < 3	52	0.17	0.32	0.26	0.17	–	–	–	9.6
6	6	7	7	7	3 – 5	52	0.17	0.24	0.22	0.17	–	–	–	9.6
6	6	7	7	7	10	43	0.17	0.23	0.24	0.17	–	–	–	9.6
6	6	7	7	7	15	39	0.17	0.29	0.31	0.17	–	–	–	9.6
6	6	7	7	7	20	39	0.18	0.38	0.39	0.17	–	–	–	9.6
6	6	7	7	7	25	38	0.23	0.46	0.48	0.17	–	–	–	9.6
6	6	7	7	7	30	38	0.27	0.55	0.57	0.17	–	–	–	9.6

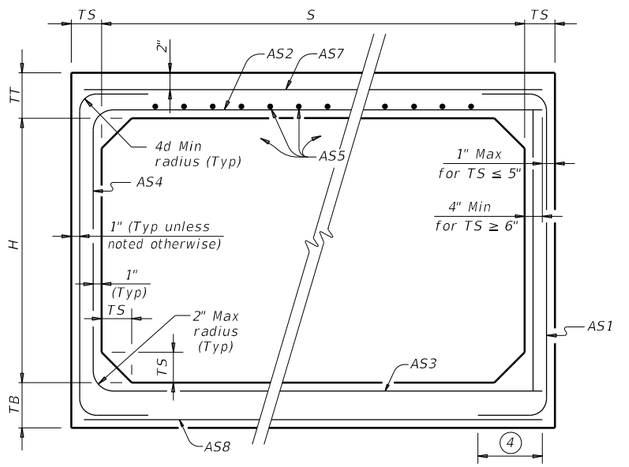
(1) For box length = 8'-0"

(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"

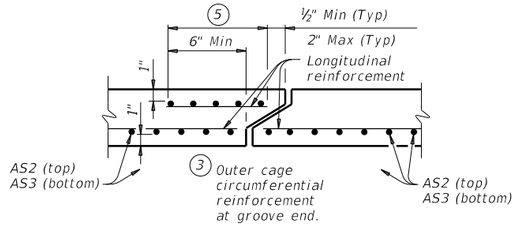
FILL HEIGHT 2 FT AND GREATER



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)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

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

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

6'-0" SPAN

SCP-6

FILE: scp06sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		244

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)
STA 134+58, OUTFALL A, RT	1 ~ 6′ X 4′	5	SCP-6	PW-1	0°	4:1	7"	7"	0.000′	4.583′	N/A	N/A	N/A	7.167	N/A	5.0	0.0	2.0	0
STA 137+46, OUTFALL B, RT	1 ~ 5′ X 3′	4	SCP-5	PW-1	0°	3:1	6"	6"	0.000′	3.500′	N/A	N/A	N/A	6.000	N/A	0.0	0.0	1.0	0

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.

DESIGN

STATE OF TEXAS — ANDRES MORALES — 130189 — LICENSED PROFESSIONAL ENGINEER

ANDRES MORALES, P.E. — 4/22/2021 DATE

APPROVAL

STATE OF TEXAS — JOHN A. TYLER — 105193 — LICENSED PROFESSIONAL ENGINEER

JOHN A. TYLER, P.E. — 4/22/2021 DATE

Texas Department of Transportation

Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

BCS

FILE: bcsstde1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		245

DATE: 4/22/2021 3:41:02 PM
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DATE: 1/21/2021 1:31:44 PM
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TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

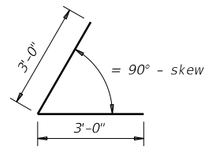
Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing (2~wings) (4)		Estimated Quantities per ft of Toewall (1~toewall)	
Maximum Wingwall Height Hw	W	X	Y	Z	Bars J1		Bars J2					
					Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'-0"	7"	#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)

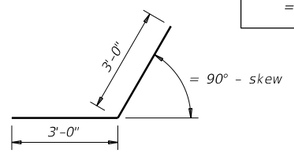
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

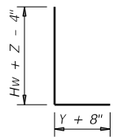
Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



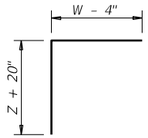
BARS D1



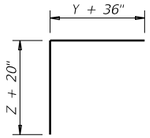
BARS D2



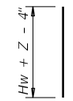
BARS J1



BARS J2



BARS J3



BARS V

WING DIMENSION FORMULAS:
(All values are in feet.)

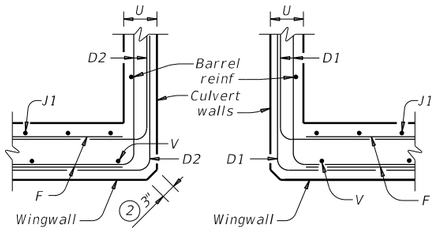
Hw = H + T + C
Lw = (Hw) (SL) ÷ cosine (θ) for Type PW-1
= (Hw - 1') (SL) ÷ cosine (θ) for Type PW-2 and Hw ≥ 4'
= (Hw - 0.5') (SL) ÷ cosine (θ) for Type PW-2 and Hw < 4'

For cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine (θ)

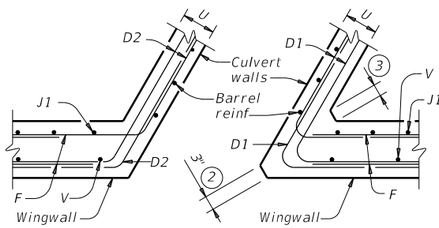
For precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ cosine (θ)
Total Wingwall Area (two wings ~ SF)
= (2)(Hw)(Lw) for Type PW-1
= (2)(Hw)(Lw) - 6 SF for Type PW-2 and Hw ≥ 4'
= (2)(Hw)(Lw) - 1.5 SF for Type PW-2 and Hw < 4'

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

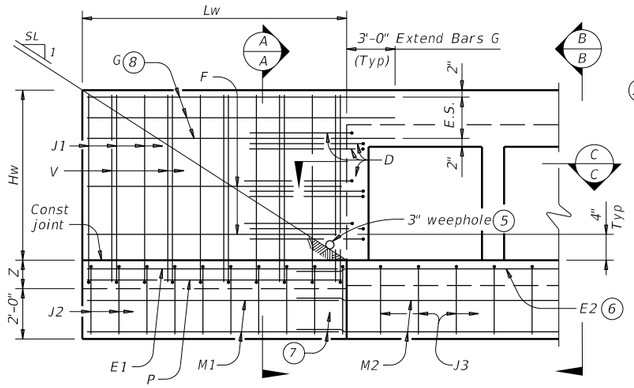
See applicable box culvert standard sheet for S, H, T, and U values.



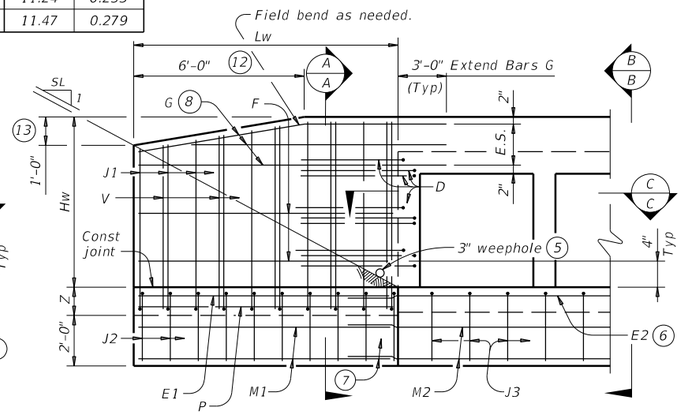
SECTION C-C - PW-1



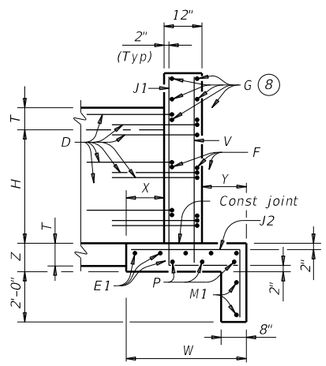
SECTION C-C - PW-2



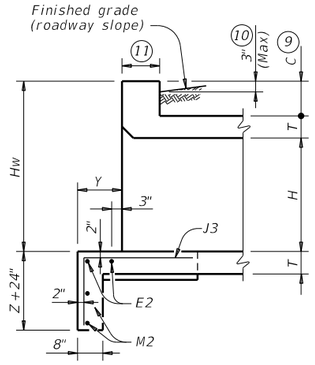
PARTIAL ELEVATION - PW-1



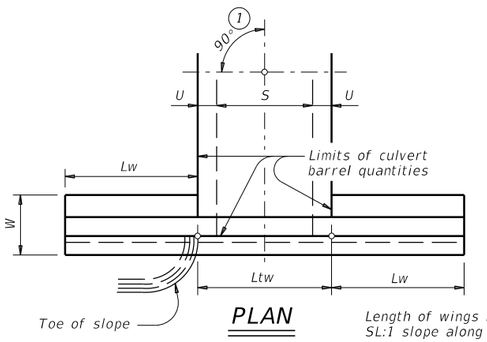
PARTIAL ELEVATION - PW-2



SECTION A-A
(Showing wing reinforcement.)

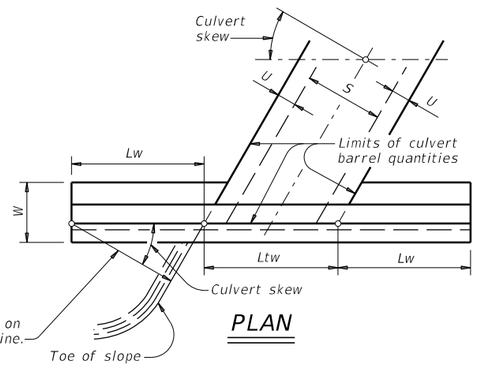


SECTION B-B
(Showing wing reinforcement.)



PLAN

DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR SKEWED BOX CULVERTS
(Showing 30° skew.)

1. Skew = 0°
2. At discharge end, chamfer may be ¾" minimum.
3. For 15° skew ~ 1"
   For 30° skew ~ 2"
   For 45° skew ~ 3"
4. 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.
5. Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
6. Extend Bars E2 1'-6" minimum into the wingwall footing.
7. Lap Bars M1 1'-6" minimum with Bars M2.
8. Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.
9. 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.
10. 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.
11. 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elswhere in the plans.
12. 3'-0" for Hw < 4'.
13. 6" for Hw < 4'.

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 reinforing 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.

Texas Department of Transportation
Bridge Division Standard

CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR BOX CULVERTS
TYPES PW-1 AND PW-2

PW

FILE: pwstde01-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		246

DATE: 1/21/2021 1:31:46 PM
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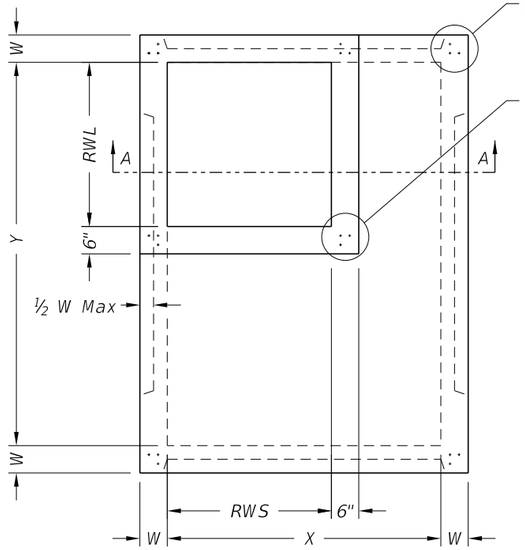
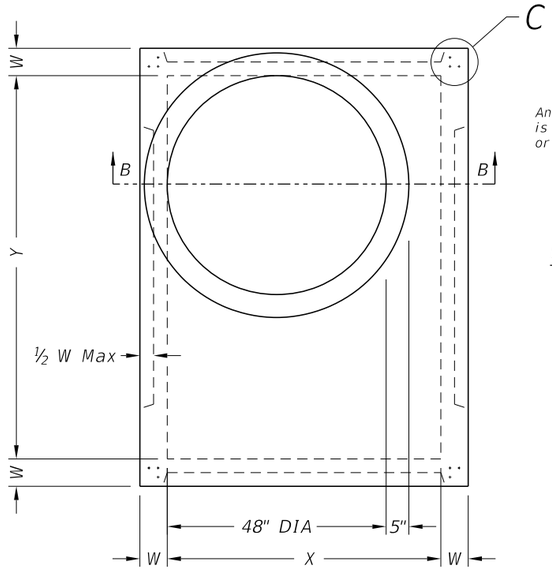


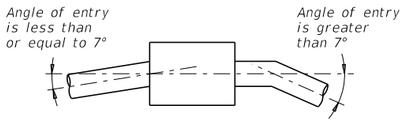
PLAN VIEW "A"

SQUARE REDUCED RISER OPTION



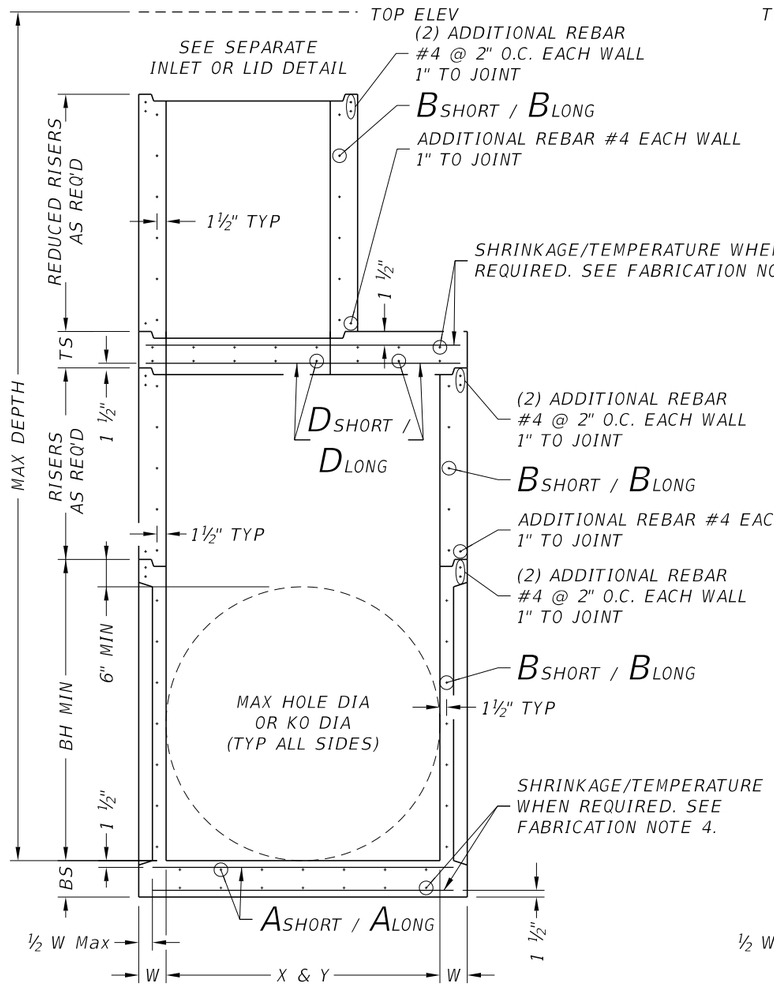
PLAN VIEW "B"

ROUND REDUCED RISER OPTION



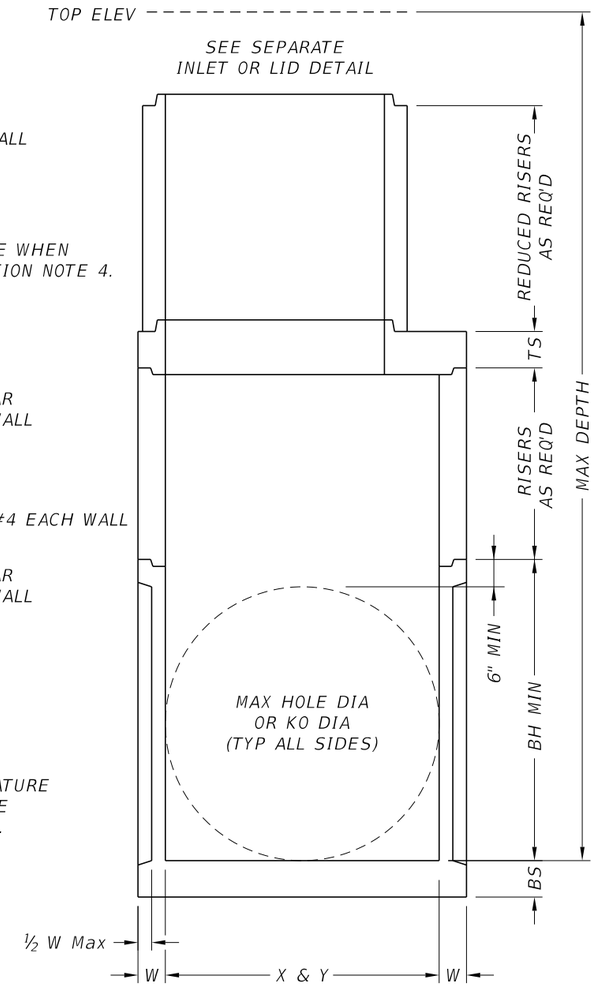
PIPE CONNECTION DETAIL

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 ½" 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 in^2/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 ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.

Cover dimensions are clear dimensions, unless noted otherwise.

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 ½ 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."

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST BASE

PB

FILE: prestd01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		247

DATE: 1/21/2021 11:31:49 PM
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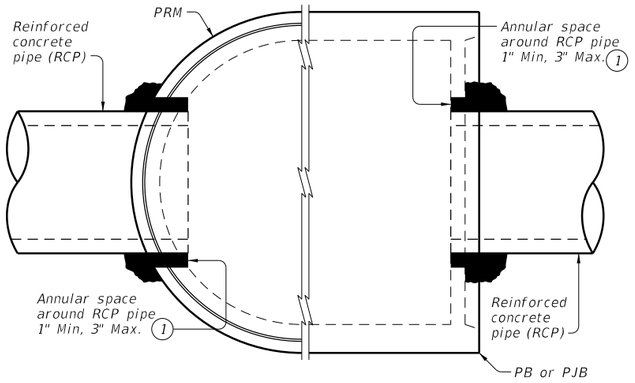
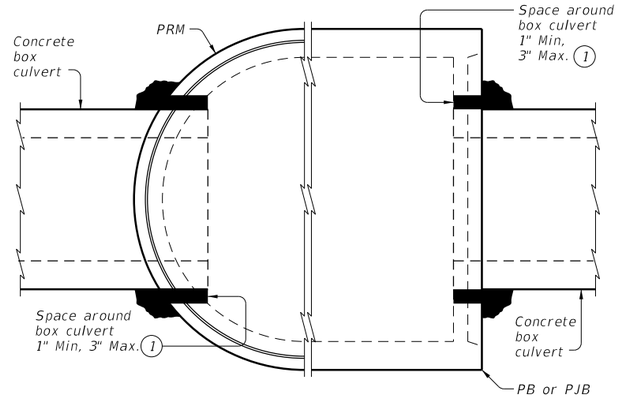


PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

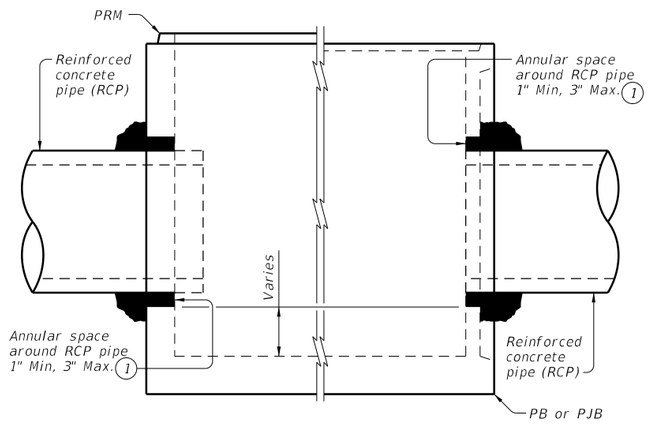
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

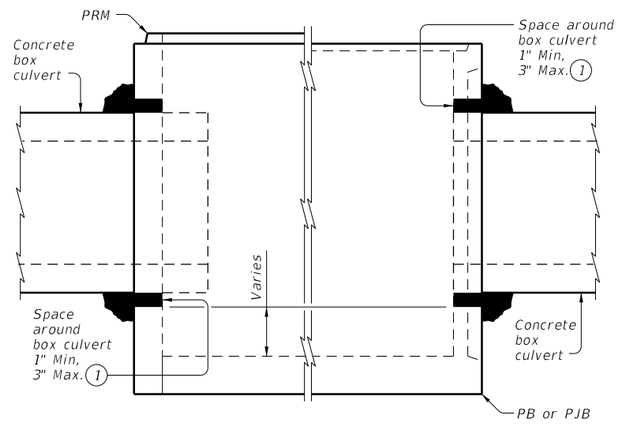
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

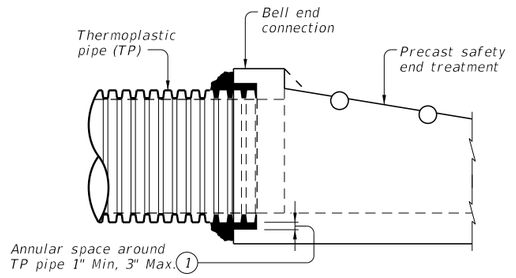
TYPICAL HALF ELEVATION



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.

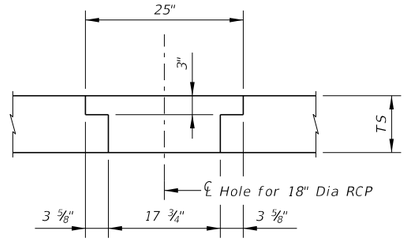
Texas Department of Transportation

Bridge Division Standard

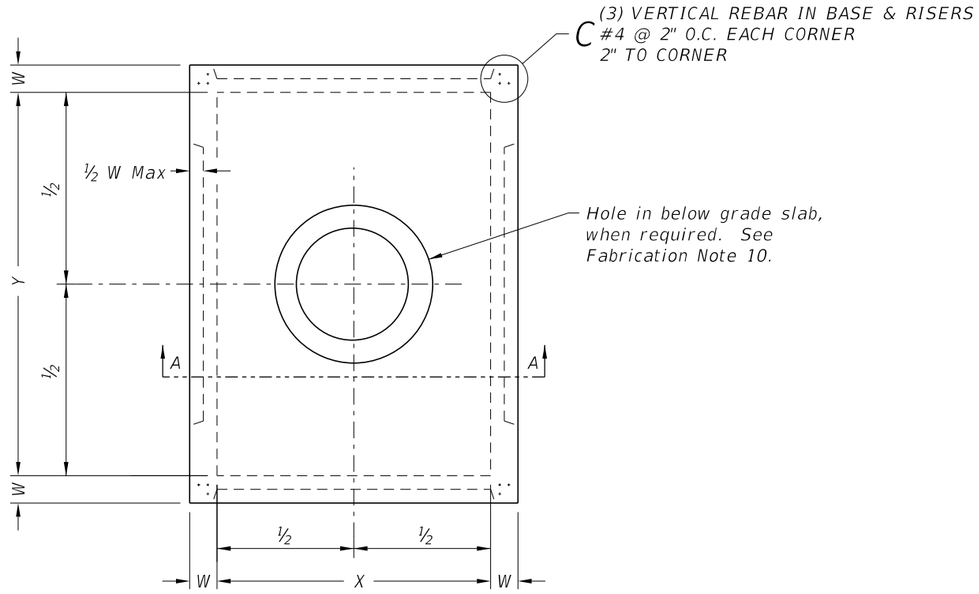
PIPE AND BOX GROUTED CONNECTIONS FOR PRECAST STRUCTURES

PBGC

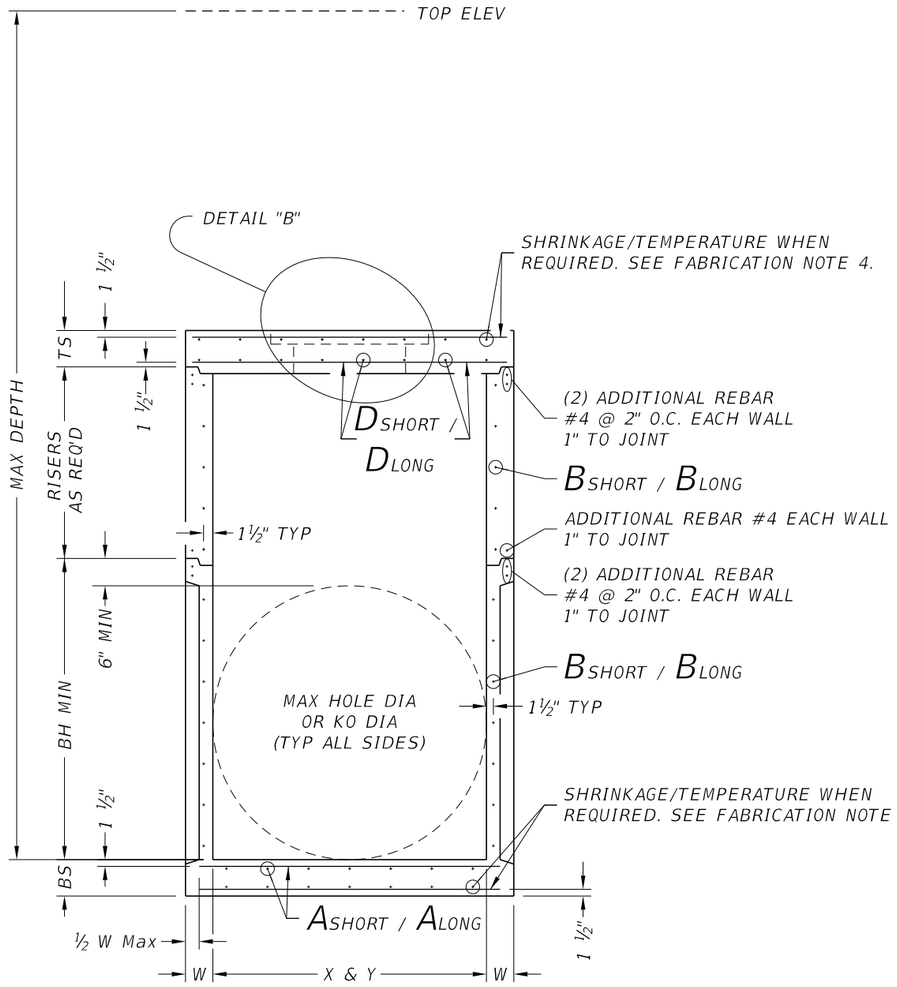
FILE: pbgcstd1-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		248



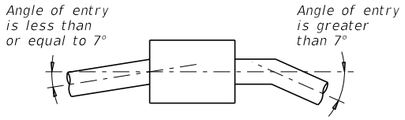
DETAIL "B"



PLAN VIEW



SECTION A-A



PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PJB wall. If necessary, use pipe elbow or curved approach alignment to stay within this limit.

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 ½" 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 ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.
10. Provide hole in below grade slab only when PJB is installed with inlet type POD.

INSTALLATION NOTES:

1. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to junction box.
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 ½ 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 Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for junction box is per Item 465 "Junction Boxes, Manholes, and Inlets" by type and size.

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST JUNCTION BOX

PJB

FILE: prestd09-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		249

DATE: 1/21/2021 1:31:52 PM
FILE: H:\Projects\510\30\03\Design\Civil\Standards\Drainage\prestd09-20.dgn

	Size	MAX DEPTH = 15 ft. to top of BASE SLAB										MAX DEPTH = 25 ft. to top of BASE SLAB										Min Height (See Gen Note 3)	Max HOLE DIA (See Fab Note 2)	Max KO DIA (See Fab Note 2)
		Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)				Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)						
		Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness			
	X x Y	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	BH MIN	HOLE DIA	KO DIA
	ft.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	ft.	in.	in.
Precast Junction Box (PJB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	0.37	0.37	9	0.29	0.29	6	0.24	0.24	6	N/A	0.37	0.37	9	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	0.41	0.41	9	0.47	0.47	6	0.38	0.38	6	N/A	0.41	0.41	9	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	N/A	0.48	0.48	9	0.39	0.18	6	0.23	0.59	6	N/A	0.48	0.48	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	N/A	0.42	0.42	9	0.53	0.26	6	0.39	0.59	6	N/A	0.42	0.42	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	N/A	0.43	0.43	9	0.62	0.62	6	0.59	0.59	6	N/A	0.43	0.43	9	5.5	60	60
	5x6	0.27	0.27	9	0.34	0.45	6	N/A	0.48	0.48	9	0.47	0.45	9	0.38	0.54	8	N/A	0.48	0.48	9	5.5	60/72	60/72
	6x6	0.27	0.27	9	0.45	0.45	6	N/A	0.56	0.56	9	0.52	0.52	9	0.54	0.54	8	N/A	0.56	0.56	9	6.5	72	72
	8x8	0.46	0.46	9	0.51	0.51	8	N/A	0.45	0.45	12	0.87	0.87	9	0.59	0.59	10	N/A	0.45	0.45	12	8.5	96	72
Precast Base (PB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	N/A	N/A	N/A	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	0.47	0.47	6	0.38	0.38	6	N/A	N/A	N/A	N/A	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	3x3	0.30	0.34	9	0.39	0.18	6	0.23	0.59	6	3x3	0.40	0.40	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x3	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	3x3	0.46	0.37	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	4x4	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	4x4	0.39	0.39	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	48"	0.39	0.39	9	0.53	0.26	6	0.39	0.59	6	48"	0.47	0.47	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x5	0.33	0.40	9	0.53	0.26	6	0.39	0.59	6	3x5	0.48	0.48	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	3x3	0.34	0.34	9	0.62	0.62	6	0.59	0.59	6	3x3	0.53	0.53	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	4x4	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	4x4	0.64	0.64	9	5.5	60	60
	5x5	0.38	0.38	6	0.34	0.34	6	48"	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	48"	0.64	0.64	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	3x5	0.34	0.40	9	0.62	0.62	6	0.59	0.59	6	3x5	0.53	0.53	9	5.5	60	60
	5x6	0.31	0.31	9	0.34	0.45	6	3x3	0.34	0.34	9	0.47	0.45	9	0.38	0.54	8	3x3	0.61	0.50	9	5.5	60/72	60/72
	5x6	0.27	0.27	9	0.34	0.45	6	4x4	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	4x4	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	48"	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	48"	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	3x5	0.45	0.45	9	0.47	0.45	9	0.38	0.54	8	3x5	0.61	0.61	9	5.5	60/72	60/72
	6x6	0.29	0.29	9	0.45	0.45	6	3x3	0.41	0.41	9	0.52	0.52	9	0.54	0.54	8	3x3	0.74	0.74	9	6.5	72	72
	6x6	0.27	0.27	9	0.45	0.45	6	4x4	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	4x4	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	48"	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	48"	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	3x5	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	3x5	0.87	0.87	9	6.5	72	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x3	0.61	0.61	12	0.91	0.91	9	0.70	0.70	10	3x3	0.85	0.85	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	4x4	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	4x4	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	48"	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	48"	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x5	0.70	0.85	12	0.87	0.87	9	0.70	0.70	10	3x5	1.01	1.01	12	8.5	96	72

** Unless otherwise indicated.

FABRICATION NOTES:
1. Maximum spacing of reinforcement is 8".
2. At manufacturer's option, provide cast or cored holes or thin wall panels (KO) to the maximum diameter shown for each. When no penetration is required, it is acceptable to provide a wall with no sectional reduction.

GENERAL NOTES:
1. Precast Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PJB for details.
2. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PB for details.
3. Min Height shown is for stock base units. Use stock base units whenever practical. Smaller height base units can be used in special installation circumstances, when noted elsewhere in the plans. Absolute minimum height of base units is 2'-6".

HL93 LOADING

Texas Department of Transportation | Bridge Division Standard

DESIGN DATA FOR PRECAST BASE AND JUNCTION BOX

PDD

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		250

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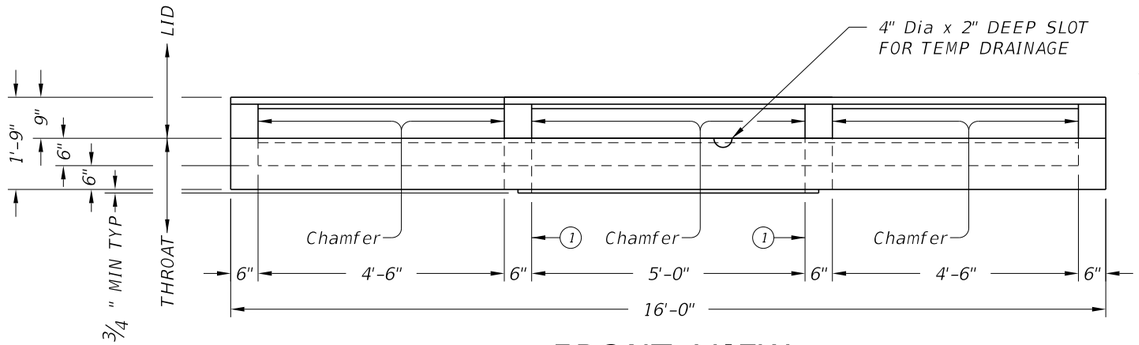
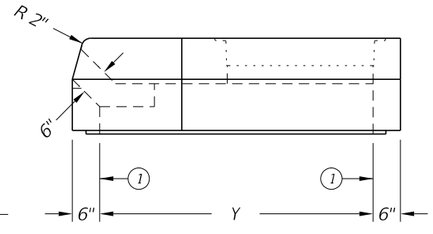


FRONT VIEW

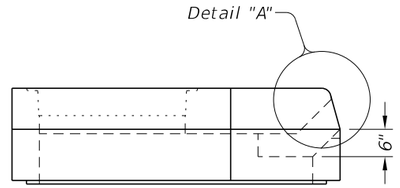
(SHOWING LEFT AND RIGHT EXTENSIONS)



RIGHT VIEW

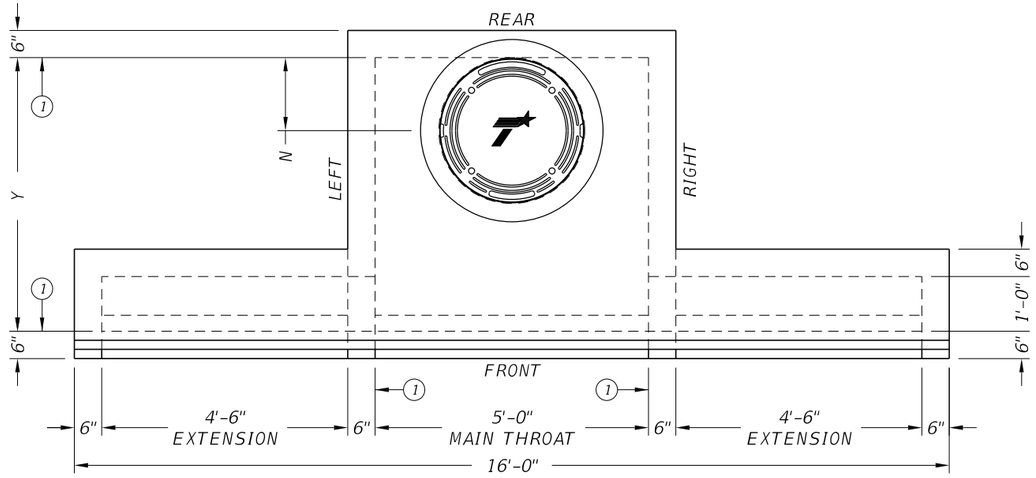
REAR VIEW

(EXTENSIONS NOT SHOWN)



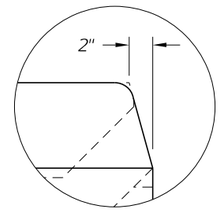
LEFT VIEW

(1) Matches inside face of wall of precast base or riser below inlet.



PLAN VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)



DETAIL "A"

HS20 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST CURB INLET OUTSIDE ROADWAY

PCO

FILE: prestd03-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		251

DATE: 1/21/2021 1:31:57 PM
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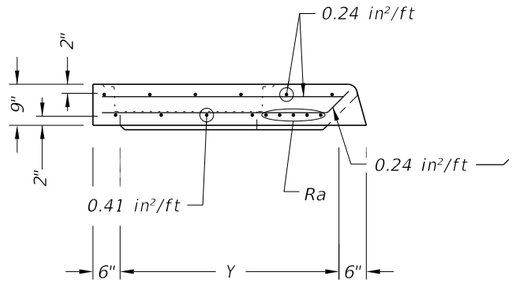
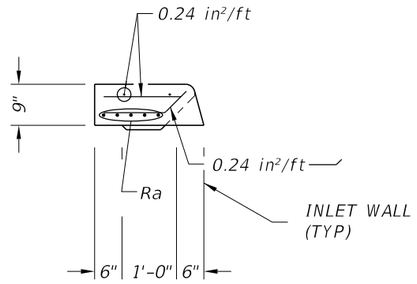
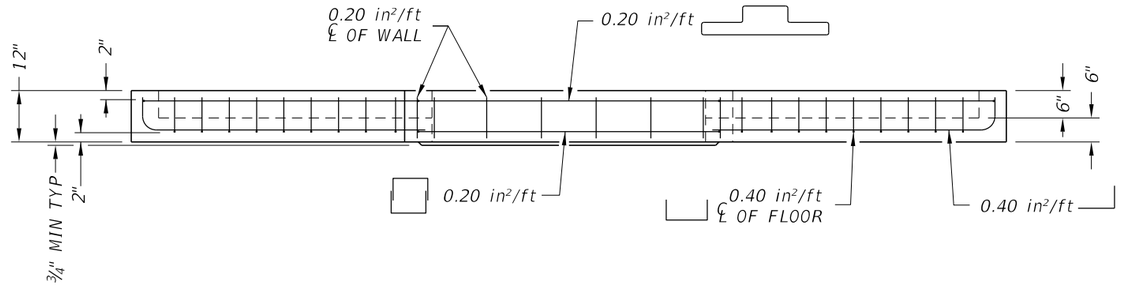


LID SECTION A-A

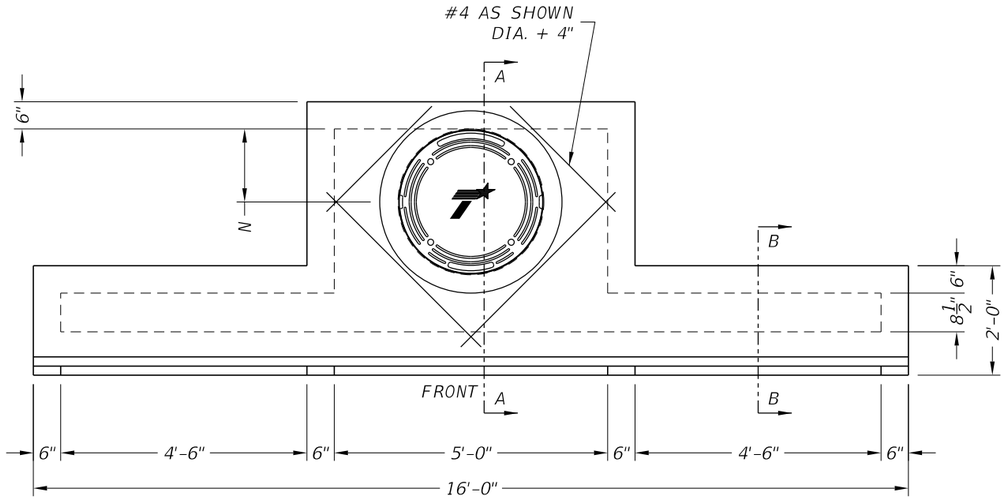


LID SECTION B-B



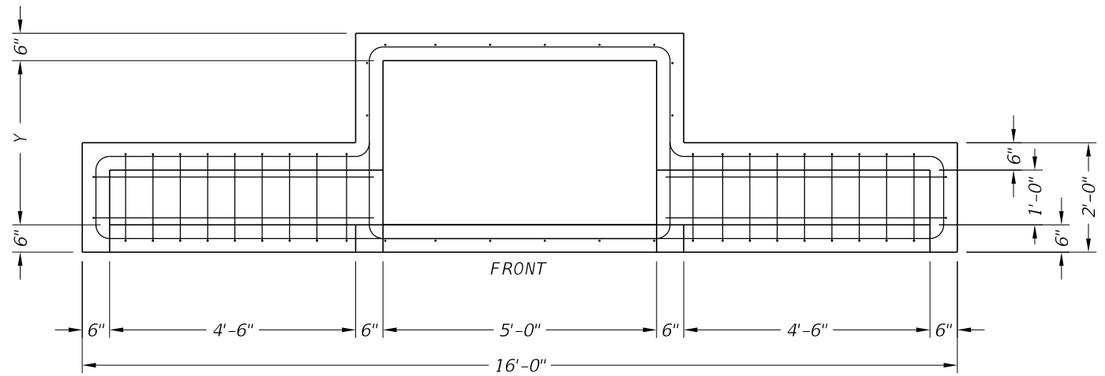
THROAT ELEVATION VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)



LID PLAN VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)



THROAT PLAN VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)

SIZE(Y)	N	MH DIA*	Ra
3'	9"	18"	(4) #5 Additional
4'	16"	32"	(4) #5 Additional
5'	16"	32"	(4) #5 Additional
6'	16"	32"	(4) #5 Additional

* Nominal ring and cover size.

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. Extensions may be right, left, both or none. Provide extensions as specified elsewhere in the plans.
4. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾". Lid may employ a butt joint with dowels at the Contractor's option.
5. Provide lifting devices in conformance with Manufacturer's recommendations.
6. Provide cast iron solid cover, unless noted otherwise elsewhere in the plans.
7. Chamfer vertical edges of inlet lid ¾" as shown in Front View, sheet 1.

INSTALLATION NOTES:

1. Inlet throat and lid are not intended for direct traffic. Do not place in roadway.
2. Seal tongue and groove joints and butt 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 ½ 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. Open area of main throat = 360 sq in. Open area of one extension throat = 324 sq in.
3. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, size, and extension placement. Extensions are subsidiary to inlet.

Cover dimensions are clear dimensions, unless noted otherwise.

HS20 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

PRECAST CURB INLET OUTSIDE ROADWAY

PCO

FILE: prestd03-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		252

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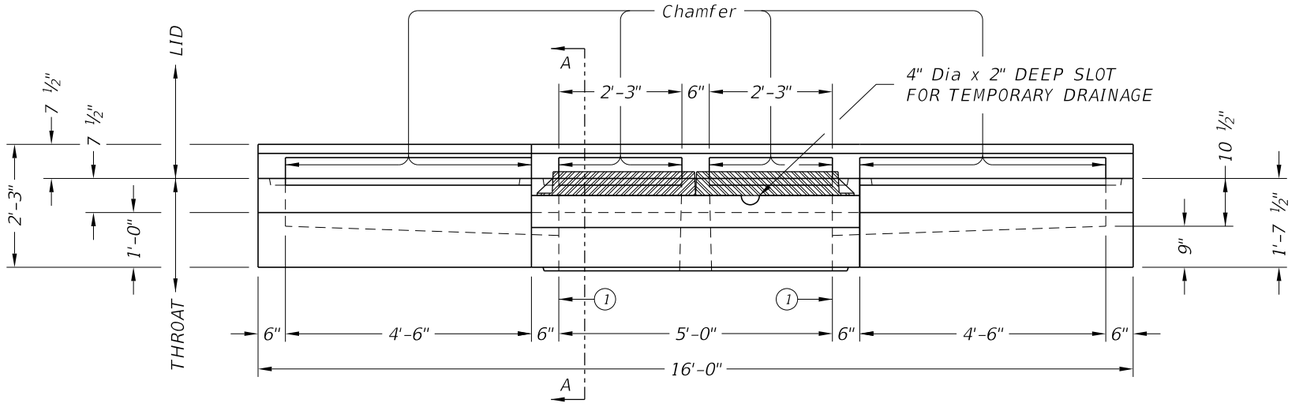
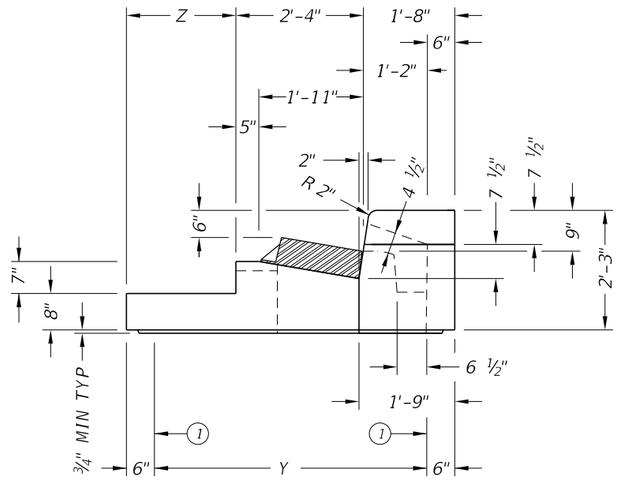
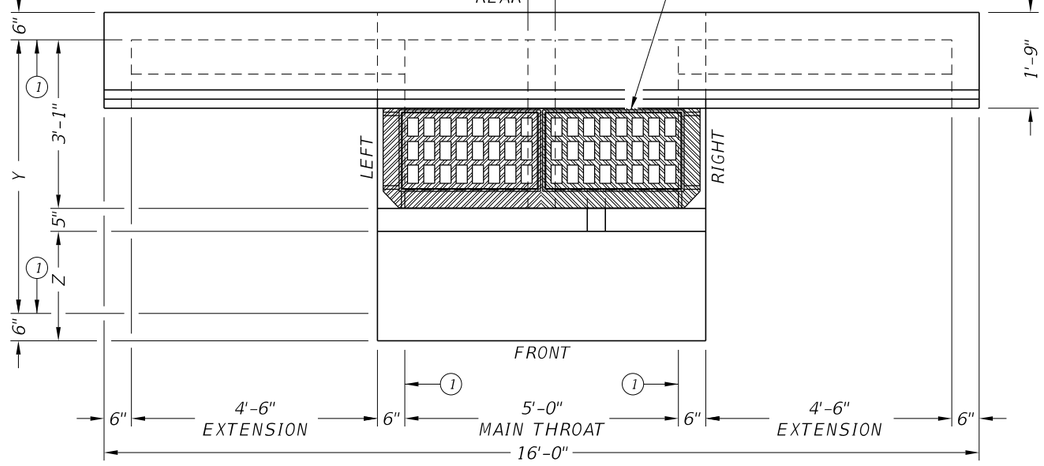


FRONT VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)



SECTION A-A



PLAN VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)

(1) Matches inside face of wall of precast base or riser below inlet.

HS20 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

PRECAST CURB INLET UNDER ROADWAY

PCU

FILE: prestd04-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
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	SAT	GUADALUPE		253

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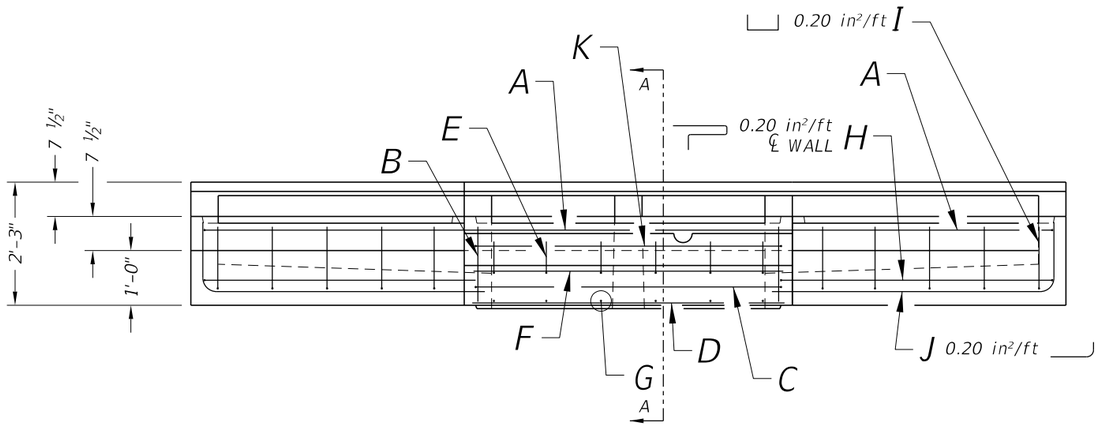
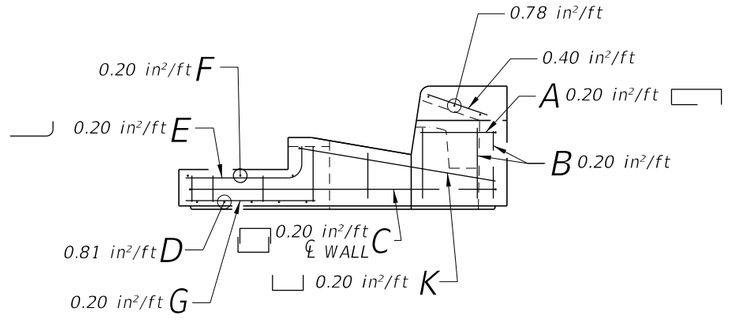


FRONT VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)



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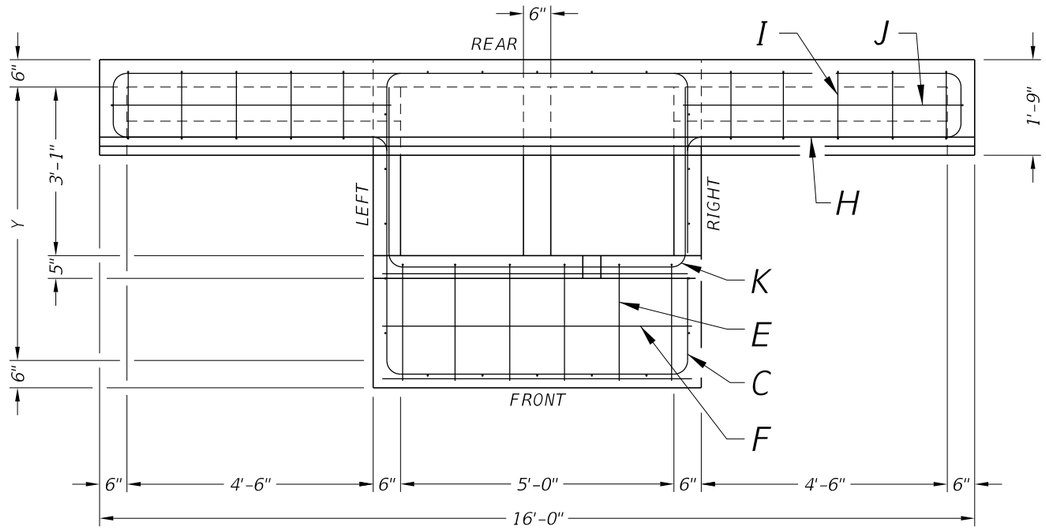

PLAN VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)

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 ½" to reinforcing steel from surface of concrete or lower outside shoulder.
4. Extensions may be right, left, both or none. Provide extensions as specified elsewhere in plans.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾". Top slab may employ a butt joint with dowels at the Contractor's option.
6. Provide lifting devices in conformance with Manufacturer's recommendations.
7. Chamfer vertical edges on inlet lid ¾" as shown in Front View, sheet 1.

INSTALLATION NOTES:

1. Inlet throat is placed under roadway and intended for direct traffic. Inlet lid is not for direct traffic. Do not place Inlet lid in roadway.
2. Seal tongue and groove joints and butt 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 ½ 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. Open area of main throat = 324 sq in. Open area of one extension throat = 324 sq in.
3. Payment for inlet is per Item 465, "Junction Boxes, Manholes and Inlets" by type, size and extension placement. Extensions are subsidiary to inlet.

SIZE(Y)	Z
3'	0'
4'	1'
5'	2'
6'	3'

HS20 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

PRECAST CURB INLET UNDER ROADWAY

PCU

FILE: prestd04-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
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	SAT	GUADALUPE		254

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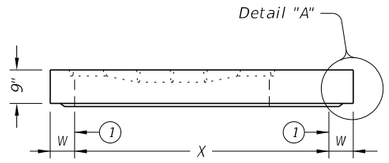
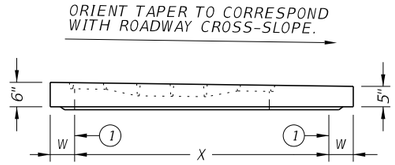
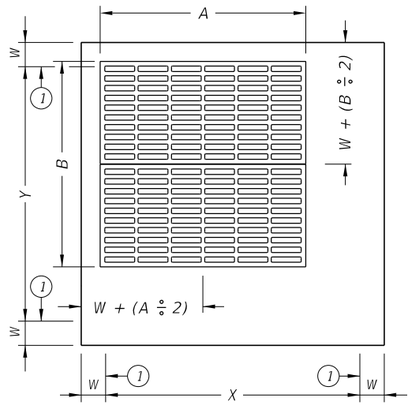


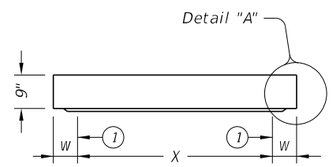
STYLE 'FG'



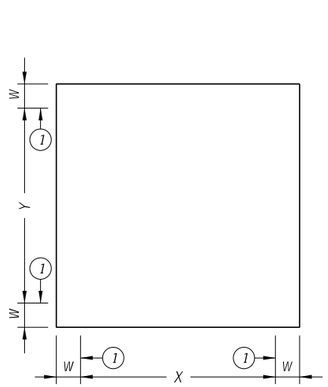
STYLE 'SFG'
ELEVATION VIEW



PLAN VIEW
CAST-IN FRAME & GRATE
STYLES 'FG' & 'SFG'

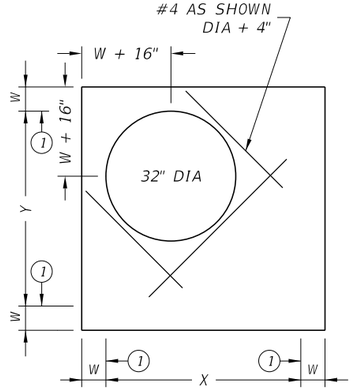


ELEVATION VIEW

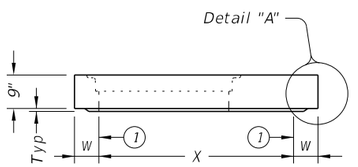


PLAN VIEW
NO OPENINGS
STYLE 'SL'

ELEVATION VIEW



PLAN VIEW
SHIP LOOSE RING & COVER
STYLE 'RH'



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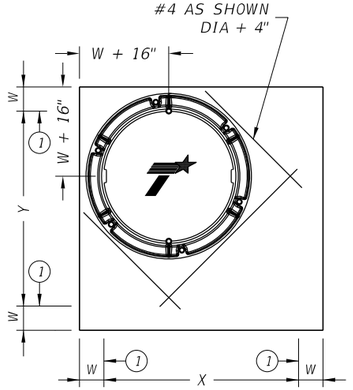
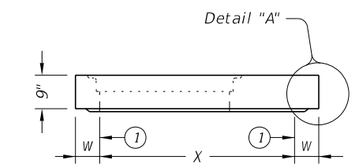
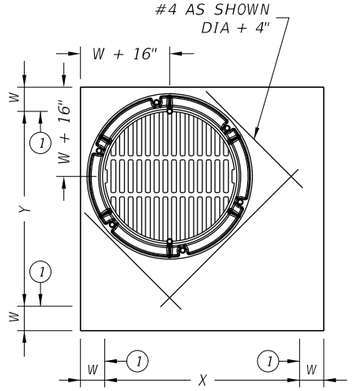


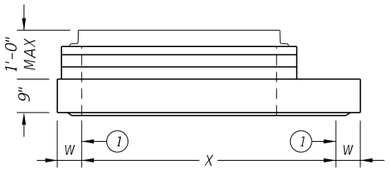
PLAN VIEW
32" DIA CAST-IN RING & COVER
STYLE 'RC'



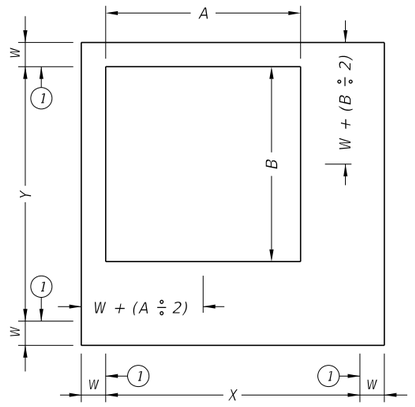
ELEVATION VIEW



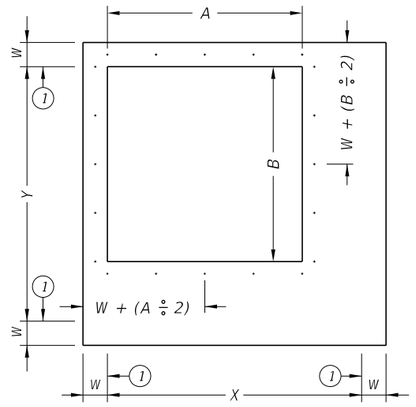
PLAN VIEW
32" DIA CAST-IN RING & GRATE
STYLE 'RG'



ELEVATION VIEW



PLAN VIEW
SHIP LOOSE FRAME & GRATE
STYLE 'SH'



PLAN VIEW
EXPOSED REBAR
STYLE 'S1'

(1) Matches inside face of wall of precast base or riser below inlet.

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation
Bridge Division Standard

PRECAST SLAB LID

PSL

FILE: prestd05-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		255

DATE: 1/21/2021 1:32:03 PM
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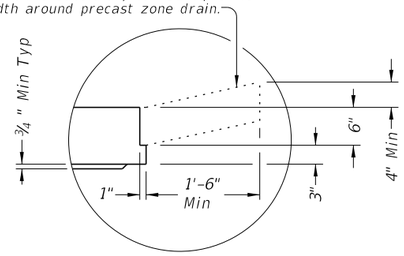
Style	Size (X x Y)	W (2)	A x B (nominal)	Short Span Reinf Steel Area	Long Span Reinf Steel Area
SL	3'x3'	6"	n/a	0.37 in²/ft	0.37 in²/ft
RH,RC,RG,SH,S1,FG	3'x3'	6"	3'x3' or 32" Dia	0.37 in²/ft	0.37 in²/ft
SFG	3'x3'	6"	3'x3'	0.32 in²/ft	0.32 in²/ft
SL	4'x4'	6"	n/a	0.34 in²/ft	0.34 in²/ft
RH,RC,RG,SH,S1,FG	4'x4'	6"	3'x3' or 32" Dia	0.41 in²/ft	0.41 in²/ft
SH,S1,FG	4'x4'	6"	4'x4'	0.41 in²/ft	0.41 in²/ft
SFG	4'x4'	6"	4'x4'	0.32 in²/ft	0.32 in²/ft
SL	3'x5'	6"	n/a	0.39 in²/ft	0.39 in²/ft
RH,RC,RG,SH,S1,FG	3'x5'	6"	3'x3' or 32" Dia	0.48 in²/ft	0.48 in²/ft
SH,S1,FG	3'x5'	6"	3'x5'	0.48 in²/ft	0.48 in²/ft
SFG	3'x5'	6"	3'x5'	0.32 in²/ft	0.32 in²/ft
SL	4'x5'	6"	n/a	0.42 in²/ft	0.42 in²/ft
RH,RC,RG,SH,S1,FG	4'x5'	6"	3'x3' or 32" Dia	0.42 in²/ft	0.42 in²/ft
SH,S1,FG	4'x5'	6"	4'x4'	0.63 in²/ft	0.63 in²/ft
SH,S1,FG	4'x5'	6"	3'x5'	0.66 in²/ft	0.66 in²/ft
SL	5'x5'	6"	n/a	0.36 in²/ft	0.36 in²/ft
RH,RC,RG,SH,S1,FG	5'x5'	6"	3'x3' or 32" Dia	0.43 in²/ft	0.43 in²/ft
SH,S1,FG	5'x5'	6"	4'x4'	0.63 in²/ft	0.63 in²/ft
SH,S1,FG	5'x5'	6"	3'x5'	0.63 in²/ft	0.63 in²/ft
SL	5'x6'	6"/8"	n/a	0.48 in²/ft	0.48 in²/ft
RH,RC,RG,SH,S1,FG	5'x6'	6"/8"	3'x3' or 32" Dia	0.48 in²/ft	0.48 in²/ft
SH,S1,FG	5'x6'	6"/8"	4'x4'	0.60 in²/ft	0.60 in²/ft
SH,S1,FG	5'x6'	6"/8"	3'x5'	0.60 in²/ft	0.60 in²/ft
SL	6'x6'	6"/8"	n/a	0.43 in²/ft	0.43 in²/ft
RH,RC,RG,SH,S1,FG	6'x6'	6"/8"	3'x3' or 32" Dia	0.56 in²/ft	0.56 in²/ft
SH,S1,FG	6'x6'	6"/8"	4'x4'	0.56 in²/ft	0.56 in²/ft
SH,S1,FG	6'x6'	6"/8"	3'x5'	0.59 in²/ft	0.59 in²/ft
SL	8'x8'	8"/10"	n/a	0.45 in²/ft	0.45 in²/ft
RH,RC,RG,SH,S1,FG	8'x8'	8"/10"	3'x3' or 32" Dia	0.45 in²/ft	0.45 in²/ft
SH,S1,FG	8'x8'	8"/10"	4'x4'	0.45 in²/ft	0.45 in²/ft
SH,S1,FG	8'x8'	8"/10"	3'x5'	0.45 in²/ft	0.45 in²/ft

(2) See sheet PDD for corresponding wall thickness (W) of base unit or riser.

Construct cast-in-place reinforced concrete apron, when shown elsewhere in plans. Use Class "A" concrete. Apron is subsidiary to PSL. 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 PSL, use detail above to create an apron ledge on all 4 sides.

FABRICATION NOTES:

1. Locate penetration (Style 'RH'), ring and cover (Style 'RC'), ring and grate (Style 'RG'), and frame and grate (Style 'FG') in a corner. Only one penetration is allowed per slab lid.
2. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
3. Provide Grade 60 reinforcing steel or equivalent area of WWR.
4. Provide clear cover of ¾" to reinforcing from lower outside shoulder of slab for structural reinforcement, and 2" from top of slab for shrinkage and temperature reinforcement. Place short span reinforcing closest to surface.
5. Slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing. Provide steel area = 0.11 in²/ft each way.
6. No substitution is allowed for diagonal #4 bars around openings.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.

INSTALLATION NOTES:

1. Precast slab lids are intended for direct traffic and may 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 ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. Initial installation of grade adjustment rings for Styles 'RH' and 'SH' is limited to 1'-0" Max as shown.
5. Grade adjustment rings for Styles 'RH' and 'SH' may be increased to 2'-0" Max when future construction affects final grade of structure. Make adjustments greater than 2'-0" with additional risers. Adjustments can be made up to Max depth shown on sheet PDD. Structure must be evaluated if Max depth will be exceeded.
6. Orient long dimension of grate slots perpendicular to traffic, unless noted otherwise on plans

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Payment for lid 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.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation | Bridge Division Standard

PRECAST SLAB LID

PSL

FILE: prestd05-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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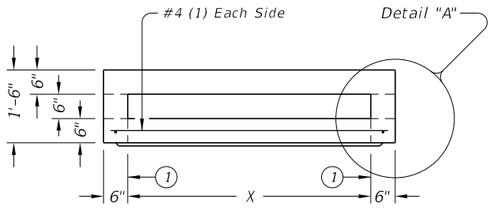
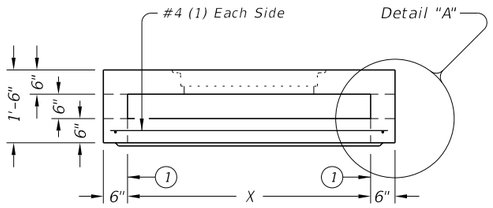


ELEVATION VIEW



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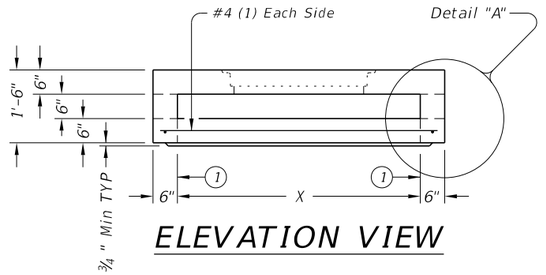

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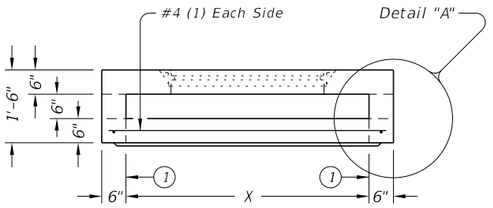

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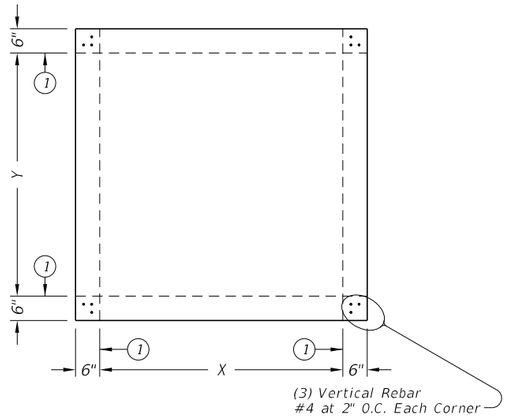
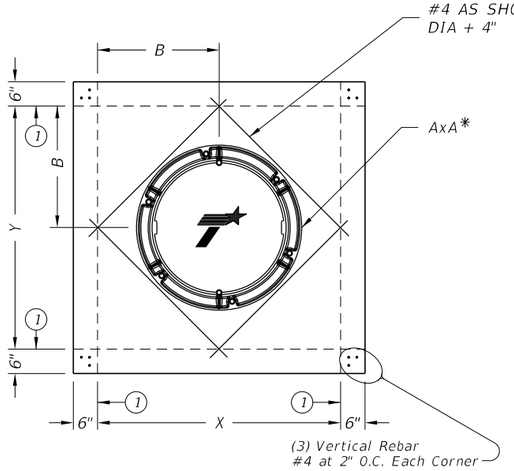


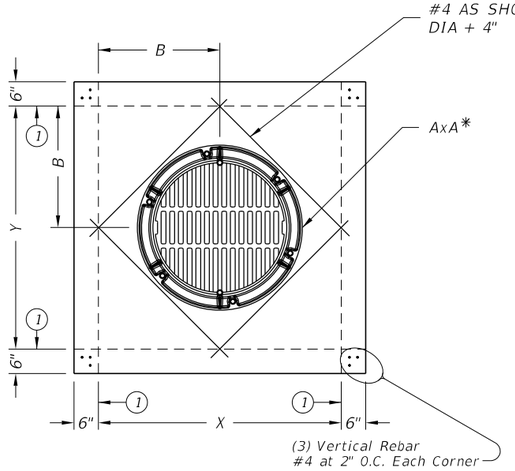
PLAN VIEW
NO OPENINGS

STYLE 'SL'



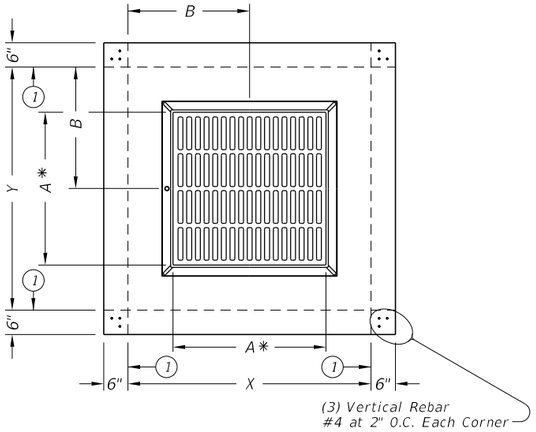
PLAN VIEW
32" DIA CAST-IN RING & COVER

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.

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 in²/ft	0.37 in²/ft
RC,RG	3'x3'	32" Dia	1.5'x1.5'	0.37 in²/ft	0.37 in²/ft
FG	3'x3'	3'x3'	1.5'x1.5'	0.37 in²/ft	0.37 in²/ft
SL	4'x4'	n/a	n/a	0.34 in²/ft	0.34 in²/ft
RC,RG	4'x4'	32" Dia	2'x2'	0.34 in²/ft	0.34 in²/ft
FG	4'x4'	3'x3'	2'x2'	0.34 in²/ft	0.34 in²/ft
FG	4'x4'	4'x4'	2'x2'	0.34 in²/ft	0.34 in²/ft
SL	5'x5'	n/a	n/a	0.43 in²/ft	0.43 in²/ft
RC,RG	5'x5'	32" Dia	2.5'x2.5'	0.68 in²/ft	0.68 in²/ft
FG	5'x5'	3'x3'	2.5'x2.5'	0.43 in²/ft	0.43 in²/ft
FG	5'x5'	4'x4'	2.5'x2.5'	0.43 in²/ft	0.43 in²/ft

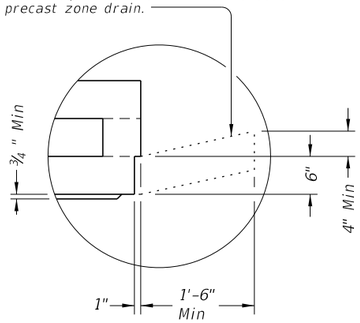
* Nominal frame/grate or ring/cover size.

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 ¾" 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 ¾".
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 ½ 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.

Texas Department of Transportation

Bridge Division Standard

PRECAST AREA ZONE DRAIN

PAZD

FILE: prestd08-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		257

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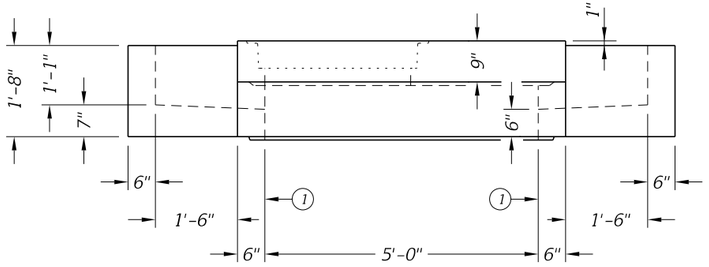
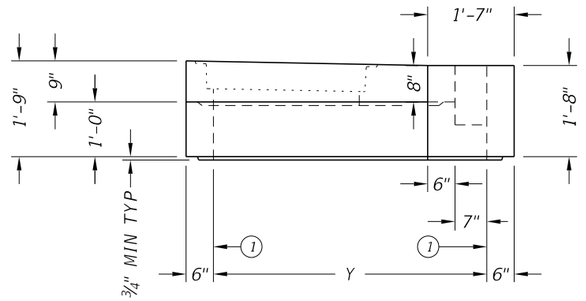
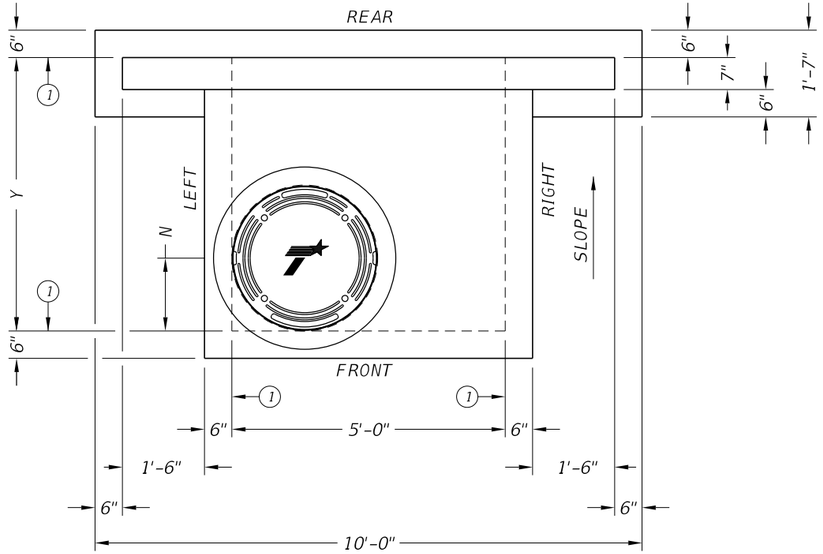


FRONT VIEW

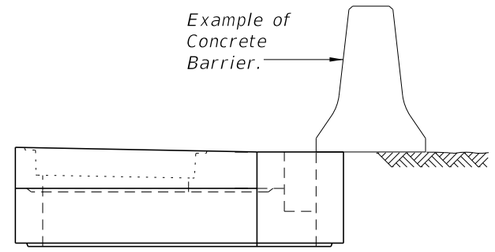


RIGHT VIEW

(1) Matches inside face of wall of precast base or riser below inlet.



PLAN VIEW



BARRIER PLACEMENT DETAIL

(SHOWING EXAMPLE OF BARRIER AND BARRIER DRAIN)

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

PRECAST MEDIAN BARRIER DRAIN

PMBD

FILE: prestd07-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		258

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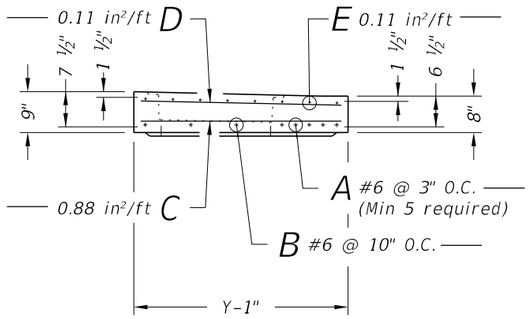
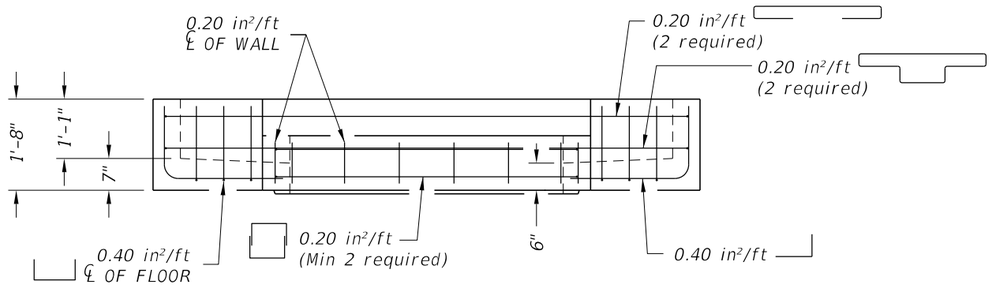
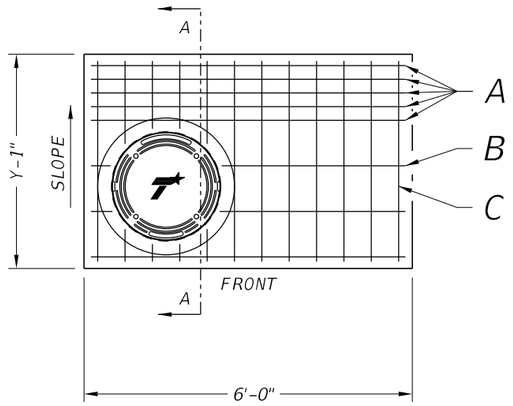


SECTION A-A

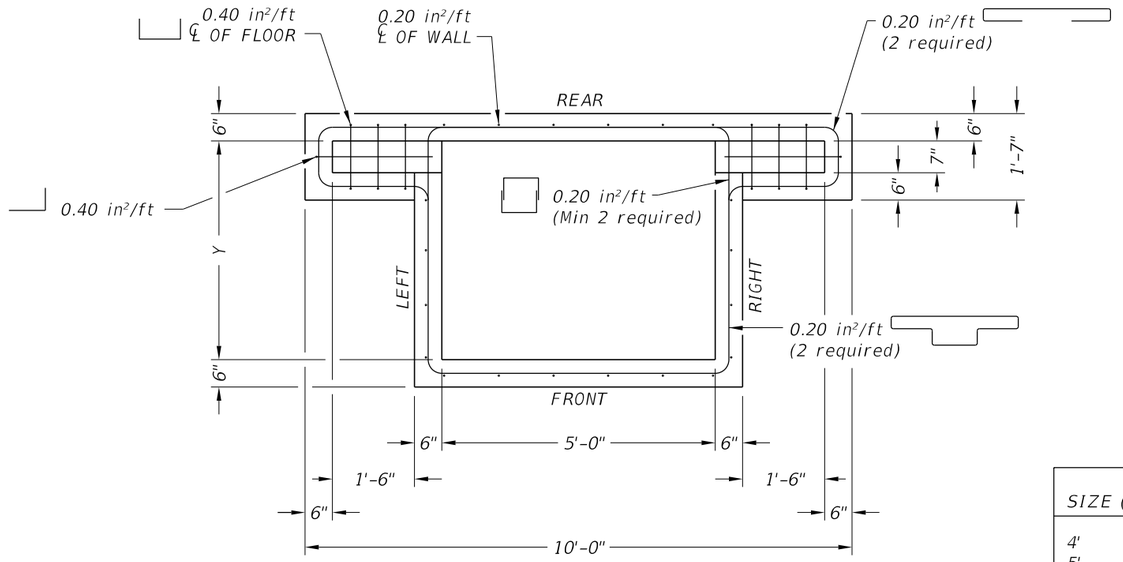


FRONT VIEW



PLAN VIEW TOP SLAB

(BOTTOM MAT SHOWN)



PLAN VIEW RISER

SIZE (Y)	MH DIA*	N
4'	24"	12"
5'	32"	16"
6'	32"	16"

*Nominal ring and cover size.

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. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
4. Provide lifting devices in conformance with Manufacturer's recommendations.
5. Provide cast iron solid cover, unless noted otherwise elsewhere in plans.

INSTALLATION NOTES:
1. 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 ½ the joint depth, whichever is greater.
2. Do not grout rubber gasket joints without Manufacturer's recommendation.
3. When pinned precast median barrier is used, longitudinally adjust pin locations to avoid drilling into the PMBD inlet. When CIP median barrier is anchored to CRCP, transversely adjust anchorage bar to avoid conflicting with the PMBD inlet.

GENERAL NOTES:
1. Designed according to ASTM C913.
2. Open area of throat = 756 sq in.
3. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type and size.

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST MEDIAN BARRIER DRAIN

PMBD

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REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		259

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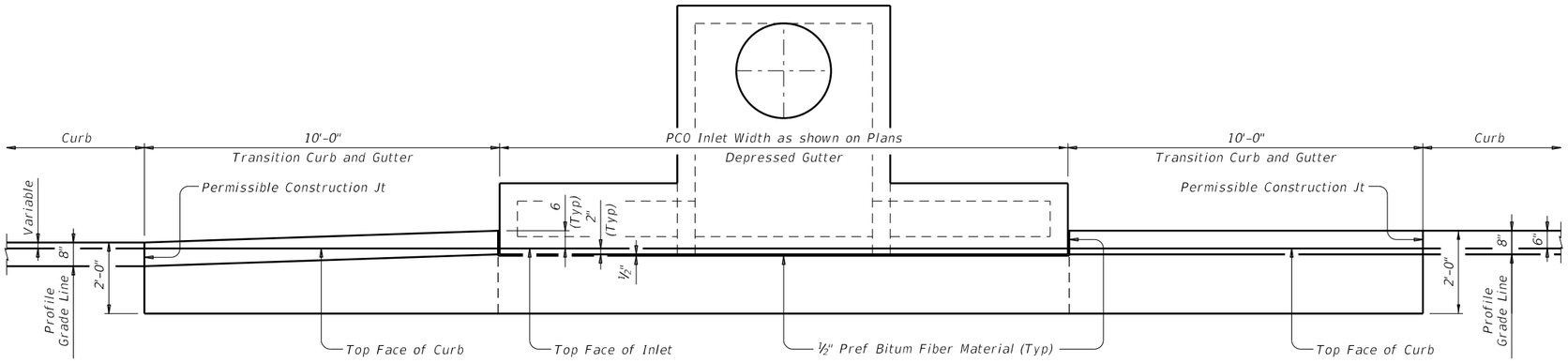
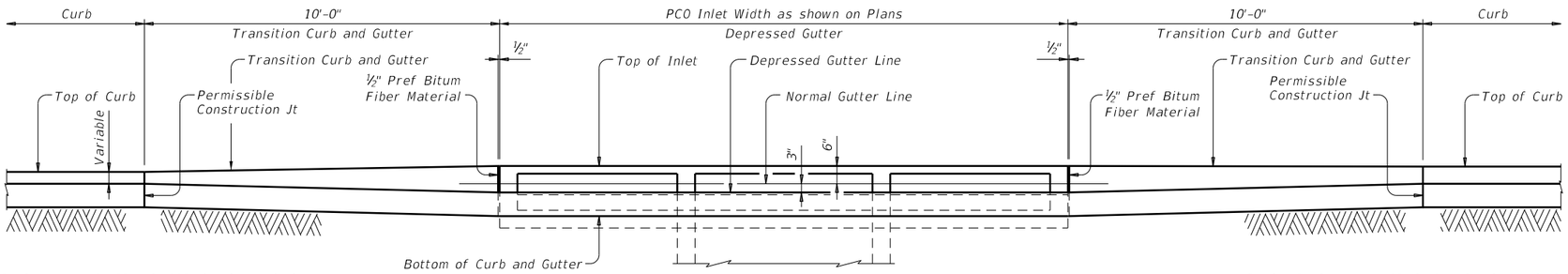


SHOWING TYPE I, IIa & III Curb and Gutter

SHOWING TYPE II & IV Curb and Gutter

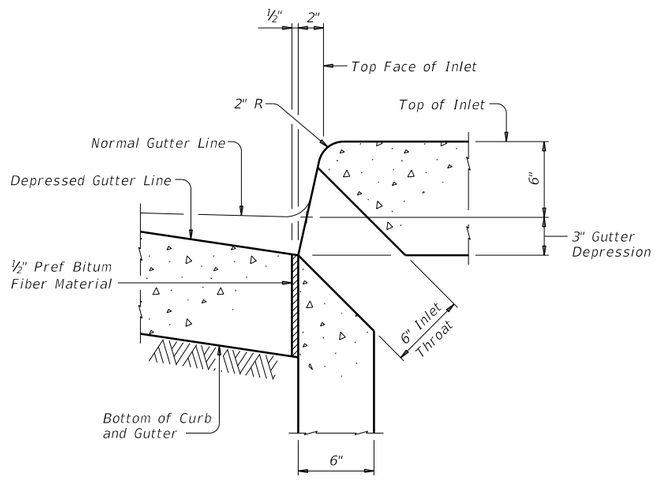
PLAN



SHOWING TYPE I, IIa & III Curb and Gutter

SHOWING TYPE II & IV Curb and Gutter

ELEVATION



SECTION AT GUTTER AND INLET

Reinforcing steel not shown for clarity.

CONSTRUCTION NOTES:
Align top face of curb with PCO Inlet as shown.

MATERIAL NOTES:
Provide ½" Preformed Bituminous Fiber Material.

GENERAL NOTES:
See Precast Curb Inlet Outside Roadway (PCO) standard for details and notes not shown.
See Concrete Curb and Curb and Gutter (CCCG-12) standard for details and notes not shown.
Curb and Gutter Transitions is paid for and in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
Preformed Bituminous Fiber Material is subsidiary to PCO Inlet.

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Bridge Division Standard

CURB AND GUTTER TRANSITION DETAILS FOR PCO INLET

CGT-PCO

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REVISIONS				KLEIN RD
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		260