CITY OF HOUSTON VOLUME I LAKE HOUSTON REDEVELOPMENT AUTHORITY TAX INCREMENT REINVESTMENT ZONE NUMBER TEN NORTHPARK DRIVE PROJECT LOCATION **OVERPASS PROJECT (T-1013)** LOCATION MAP BEGIN PROJECT NORTHPARK DRIVE [PORTER] STA 3+12.37 N= 10026346.4517 E= 3904489.1660 'northpark dr MAYOR NO. ПГ SYLVESTER TURNER END PROJECT NORTHPARK DRIVE STA 85+91.62 CONTROLLER N= 10026.096.1893 E= 3912697.7022 CHRIS BROWN DISTRICT COUNCIL MEMBERS 59 ΚΙΝGWOOD COUNCIL MEMBERS AT-LARGE AMY PECK TARSHA JACKSON ABBIE KAMIN CAROLYN EVANS-SHABAZZ MIKE KNOX DAVID W. ROBINSON DISTRICT A DISTRICT B DISTRICT C DISTRICT D POSITION 1 POSITION 2 DAVE MARTIN TIFFANY D. THOMAS GREG TRAVIS KARLA CISNEROS MICHAEL KUBOSH LETITIA PLUMMER VICINITY MAP DISTRICT E DISTRICT F DISTRICT G DISTRICT H POSITION 3 POSITION 4 KEY MAP NO 296S, 296T, 296U ROBERT GALLEGOS EDWARD POLLARD MARTHA CASTEX-TATUM SALLIE ALCORN GIMS MAP NO 5670B, 5770A POSITION 5 DISTRICT I DISTRICT J DISTRICT K LHRA BOARD MEMBERS

TDLR REGISTRATION #: _TABS2021011708

SECRETARY JEFFERY NIELSEN DIRECTOR KIMBERLY BRUSATORI CHAIRMAN STANLEY SARMAN VICE CHAIR PHILIP IVY TREASURER TOM BROAD D H S

DIRECTOR DR. MARTIN BASALDUA

DIRECTOR NOLAN CORREA



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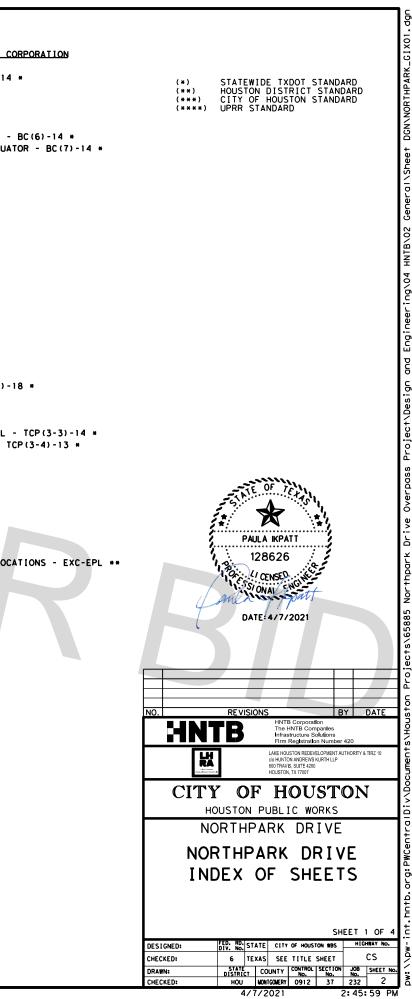
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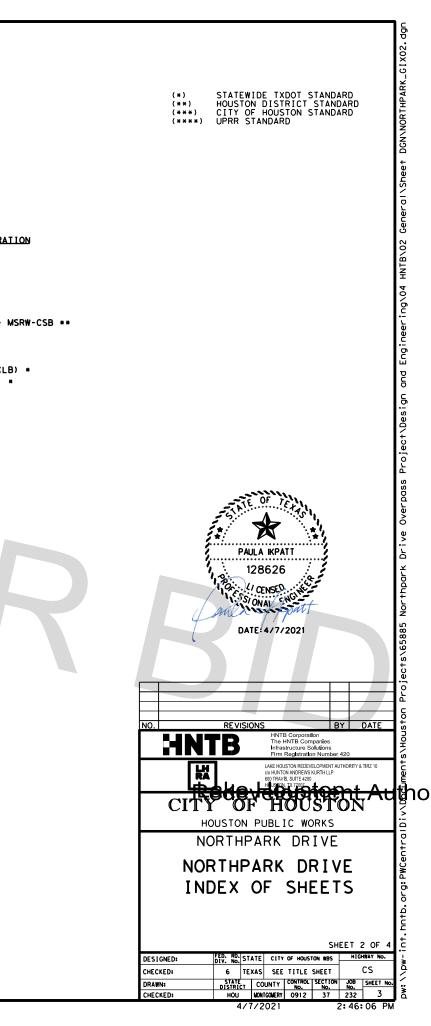
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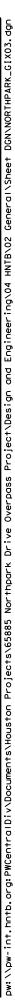
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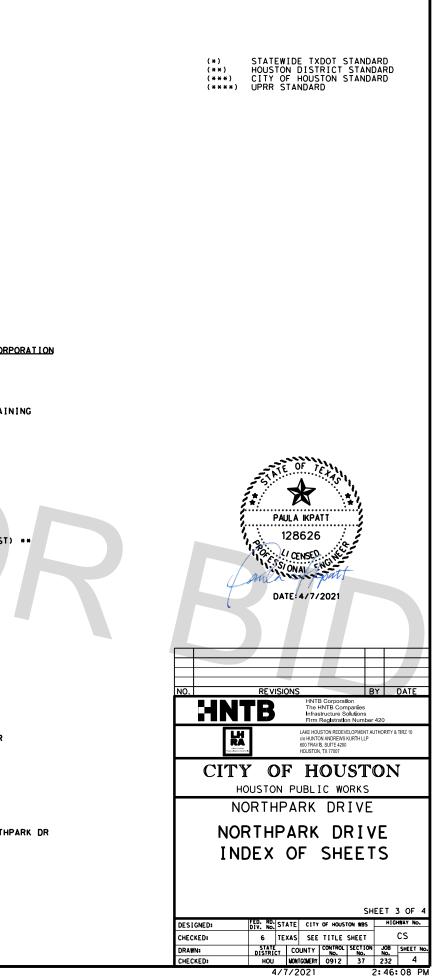
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- 582 ITS GROUND BOX DETAILS TYPE "1" WITH STEEL COVER - ITS(38)-17 *

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584	CONCRETE PANEL CROSSING LAYOUT WBFR
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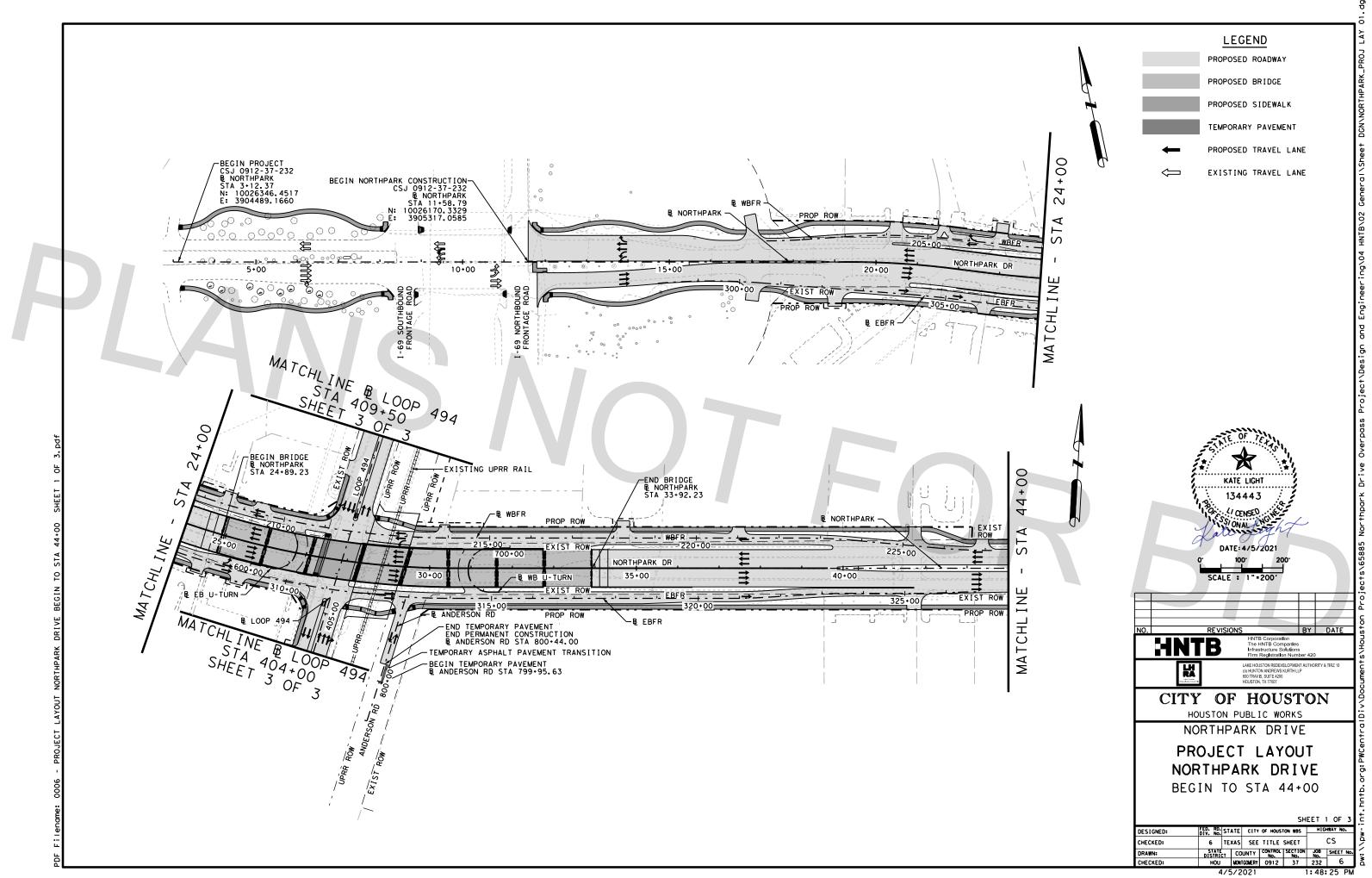
610	SHEET ORIENTATION
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612-613	GENERAL NOTES
614	CLEARING AND GRUBBING
616-620	TREE PRESERVATION
621	TREE PROTECTION
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711	ELECTRICAL DETAILS
	EQUALIZER PIPE
712	EQUALIZER PIPE LAYOUT
713	PLAN AND PROFILE 60" RCP FOUL LIZER PIPE

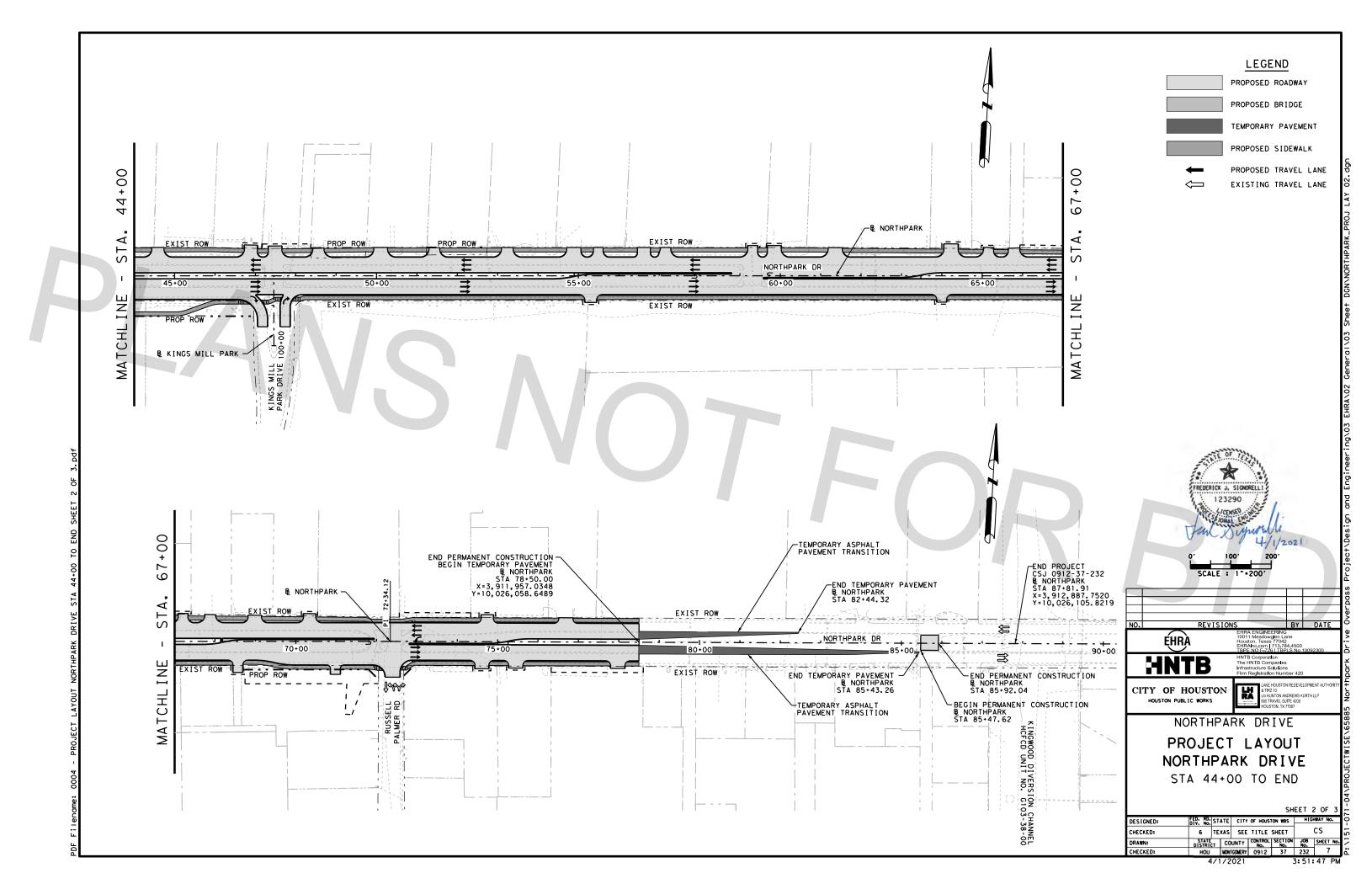
714 PLAN AND PROFILE 48" RCP INFLOW AND OUTFLOW PIPE

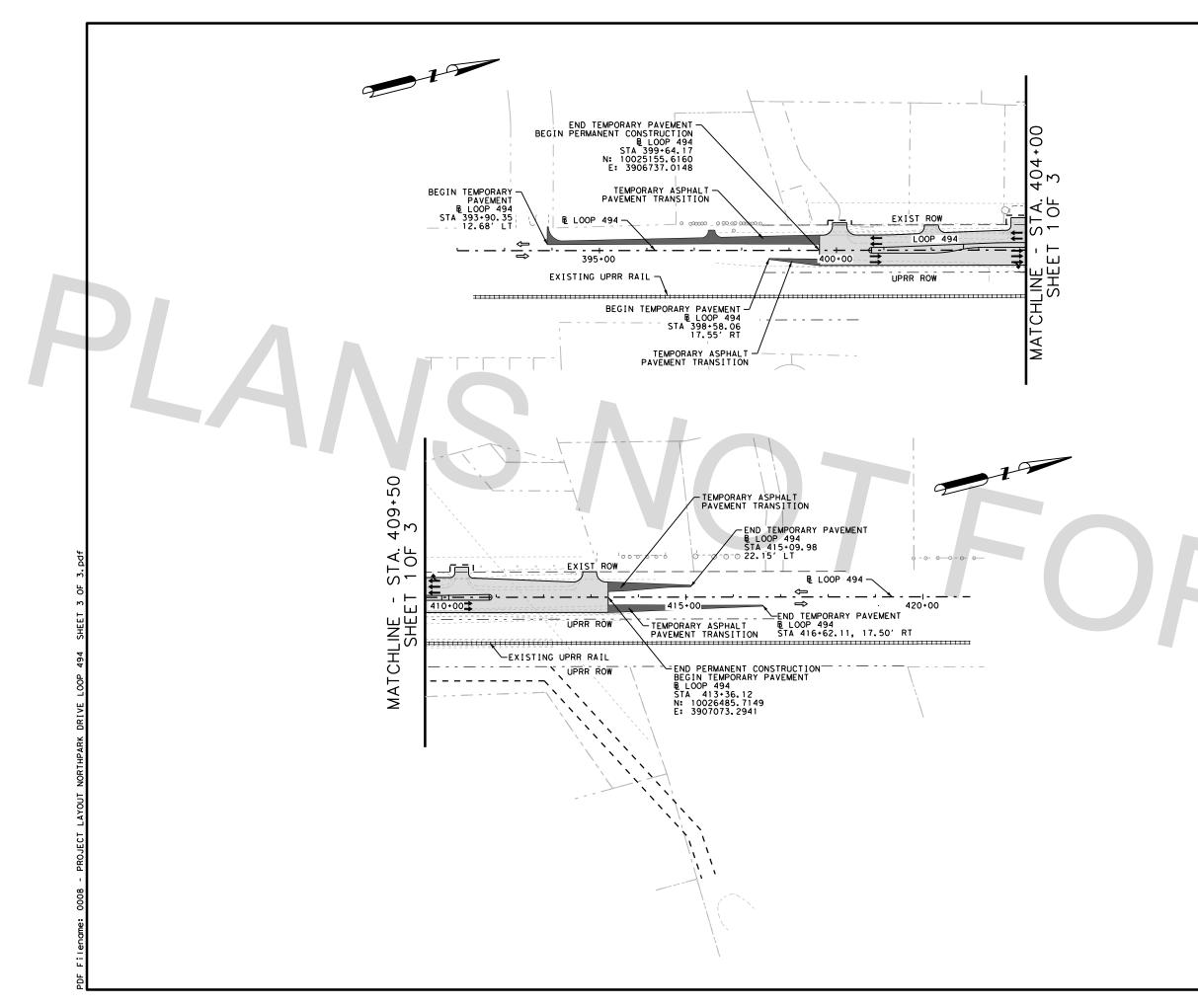
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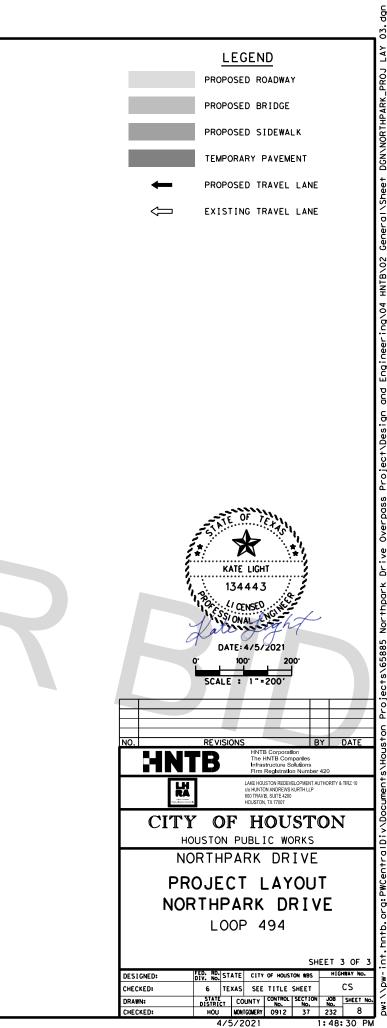




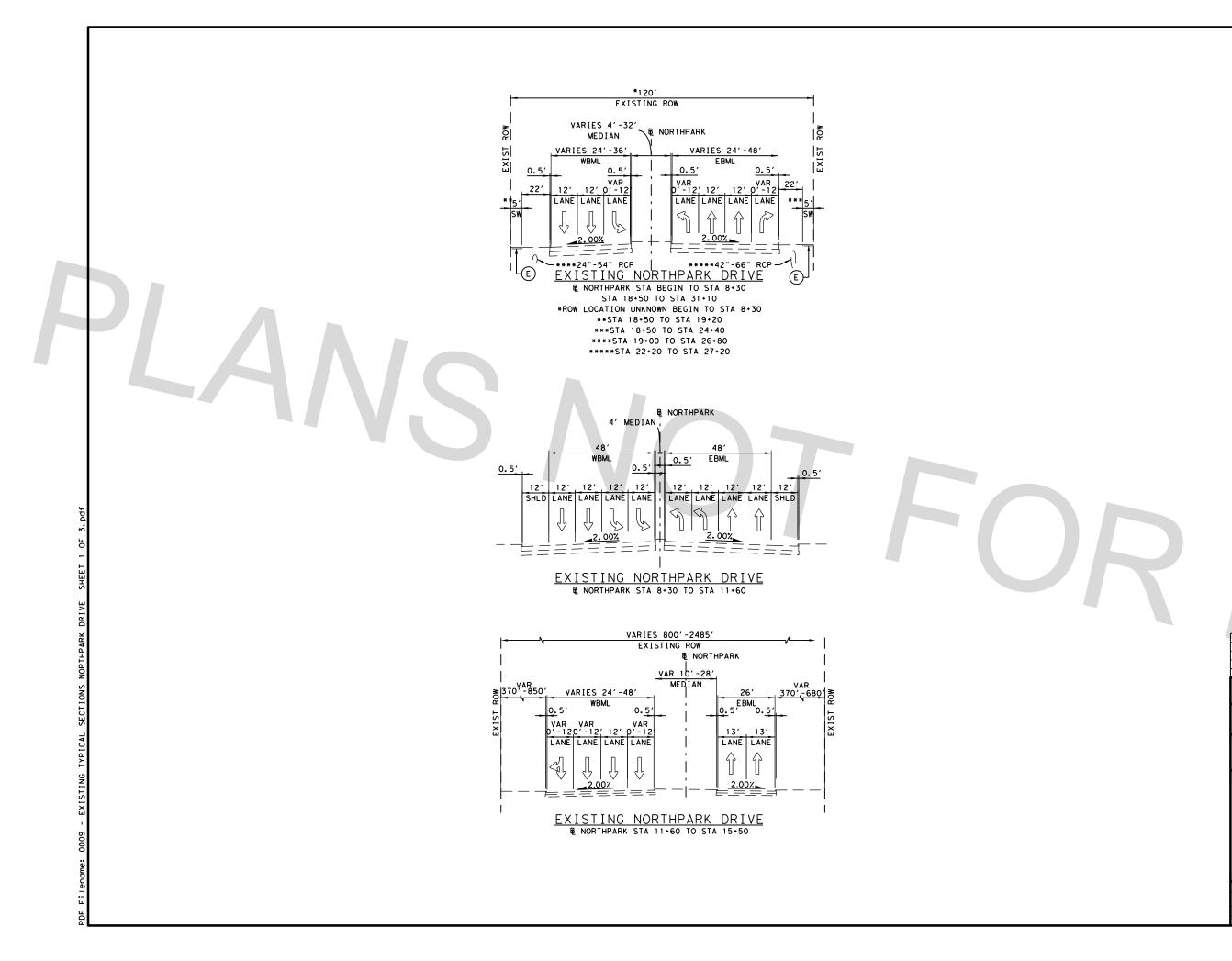








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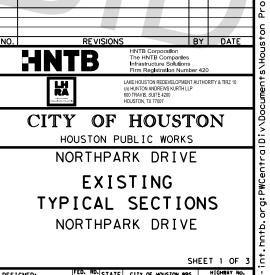


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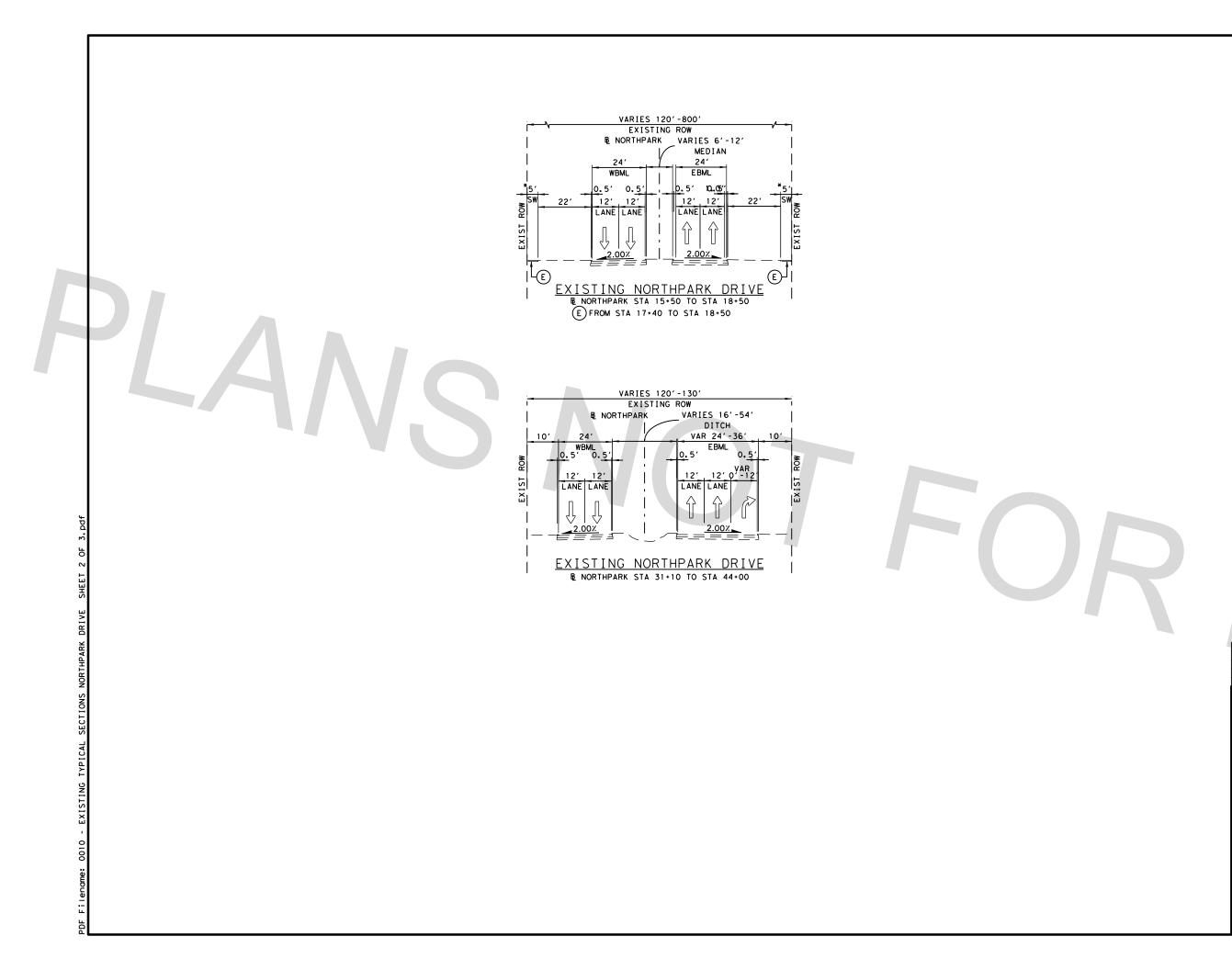
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A	7" REINF CONCRETE PAVMENT
B	1 1/2" ASPHALT PAVEMENT
C	7" CEMENT TREATED BASE
D	6" CEMENT TREATED SUBGRADE
E	5" REINF CONCRETE SIDEWALK
F	6" MONO CURB
\Leftrightarrow	EXIST TRAVEL LANE
EBML =	EASTBOUND MAIN LANES
WBML =	WESTBOUND MAIN LANES





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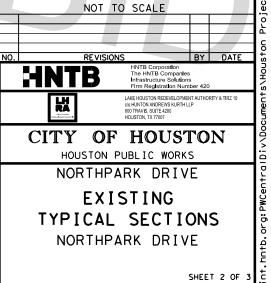


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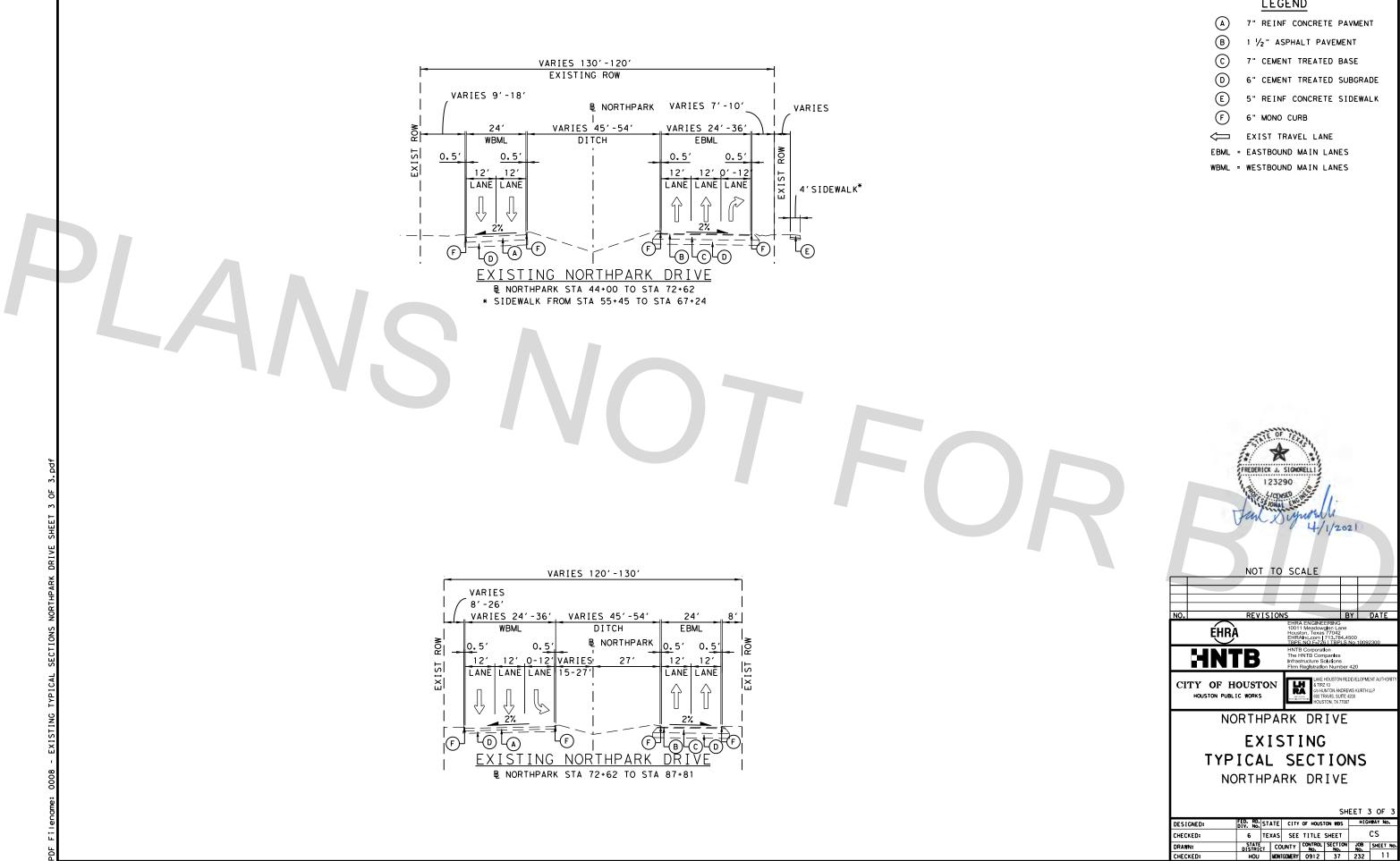
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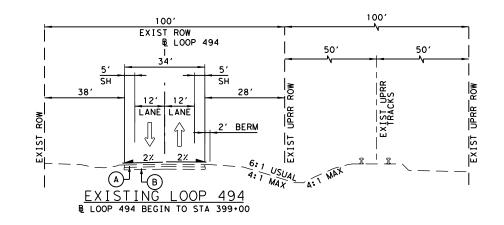
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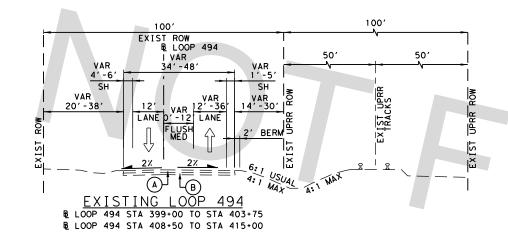


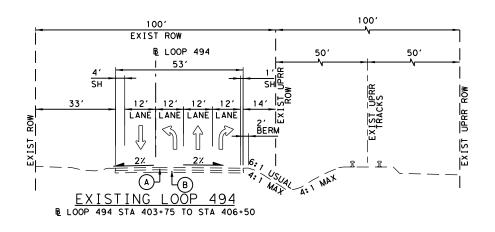
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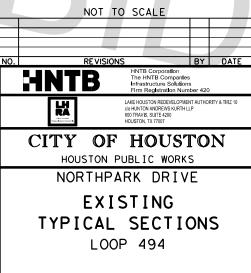
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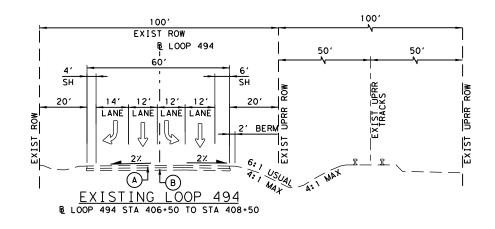
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D		6" CEMENT TREATED SUBGRADE
E		5" REINF CONCRETE SIDEWALK
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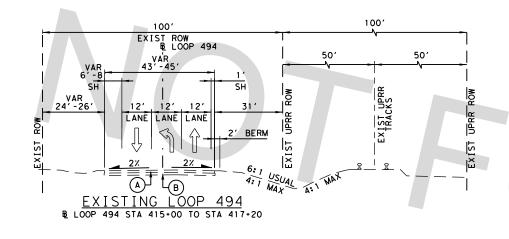


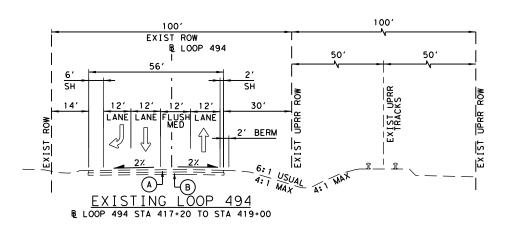


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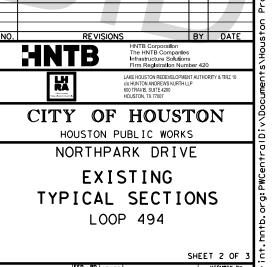
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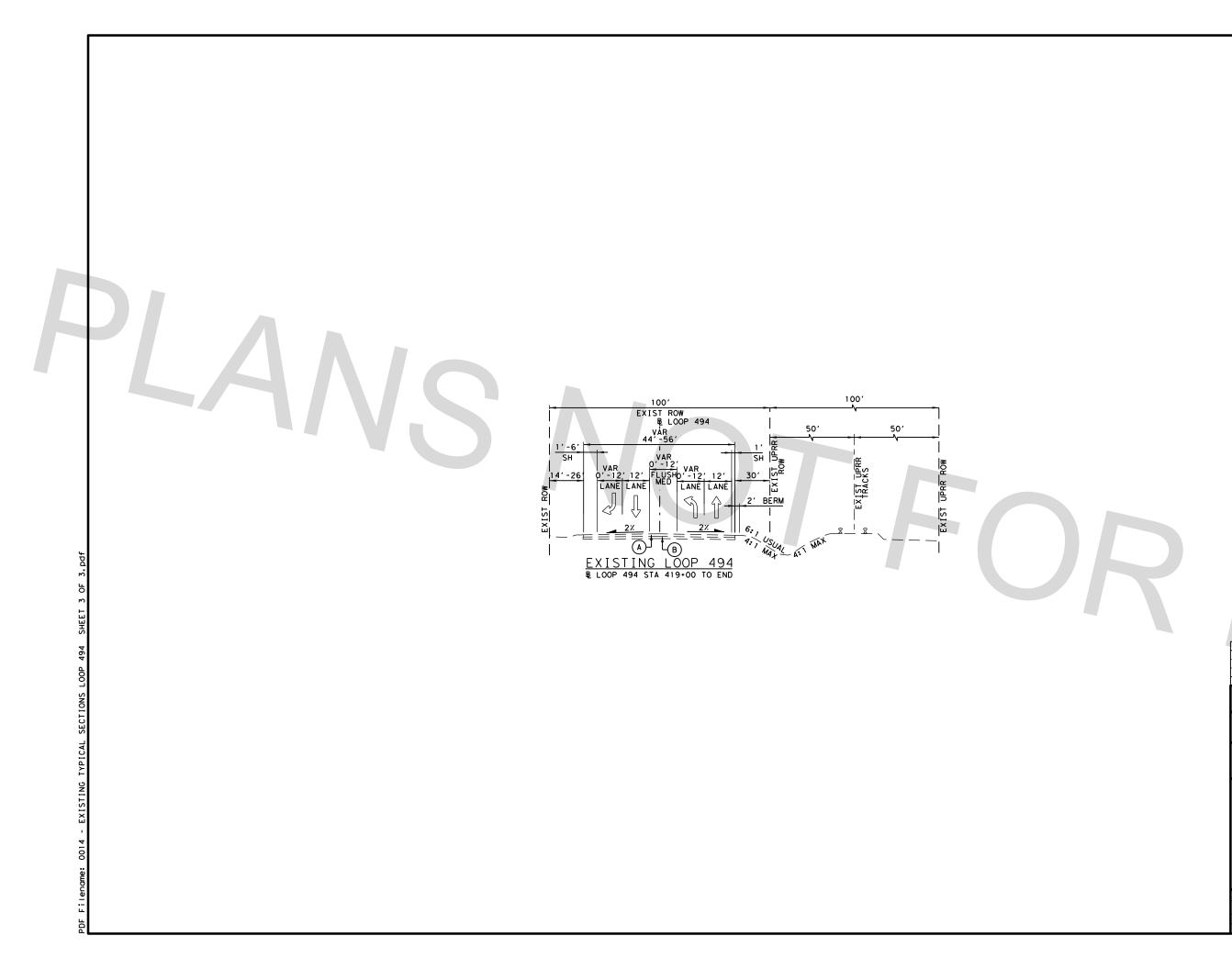
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(A)		7" REINF CONCRETE PAVMENT
B		1 1/2" ASPHALT PAVEMENT
C		7" CEMENT TREATED BASE
D		6" CEMENT TREATED SUBGRADE
E		5" REINF CONCRETE SIDEWALK
F		6" MONO CURB
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WBML	=	WESTBOUND MAIN LANES





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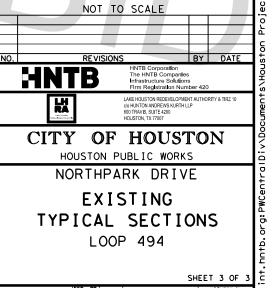


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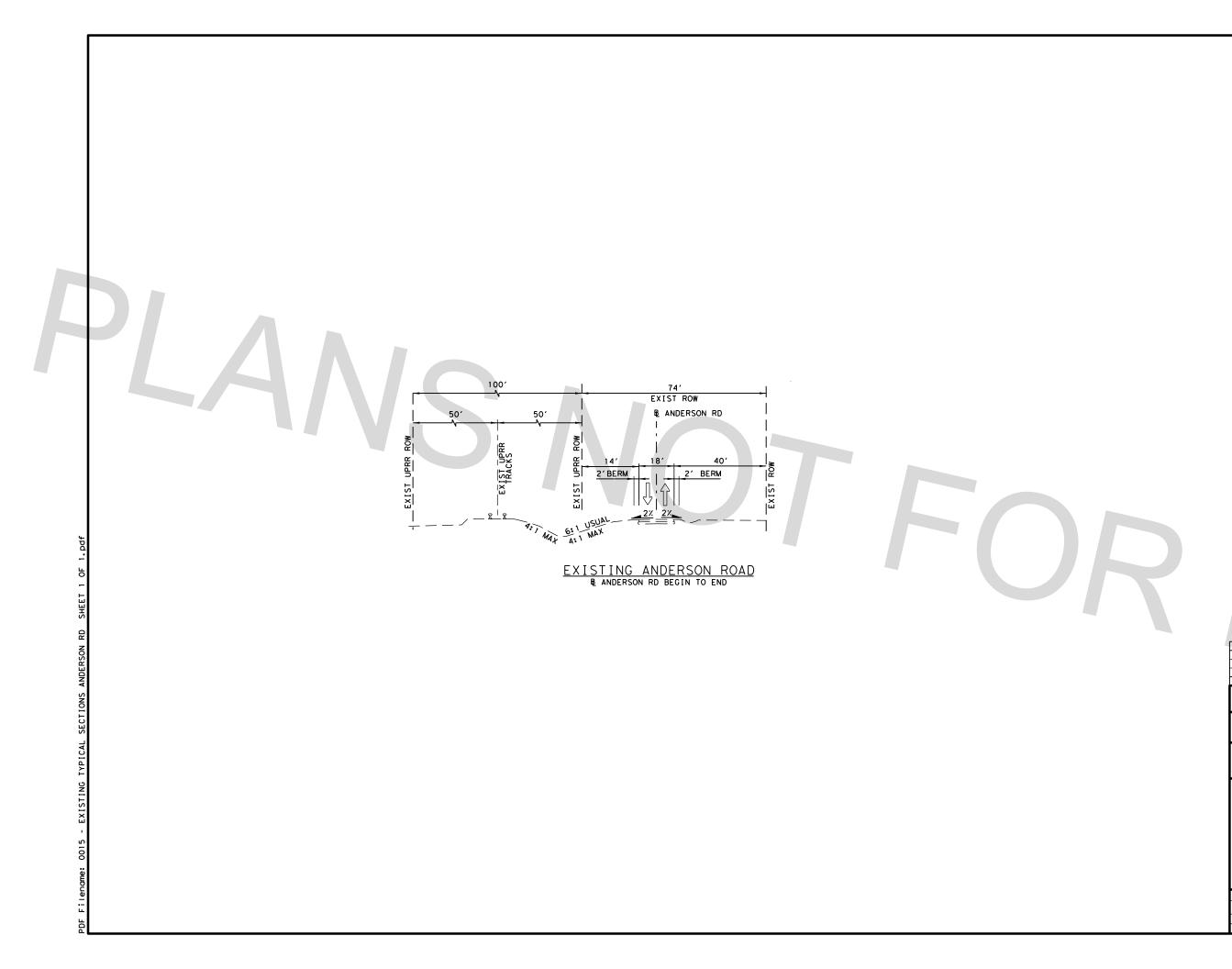


(A)	7" REINF CONCRETE PAVMENT
₿	1 1/2" ASPHALT PAVEMENT
C	7" CEMENT TREATED BASE
D	6" CEMENT TREATED SUBGRADE
E	5" REINF CONCRETE SIDEWALK
F	6" MONO CURB
\Leftrightarrow	EXIST TRAVEL LANE
EBML	= EASTBOUND MAIN LANES
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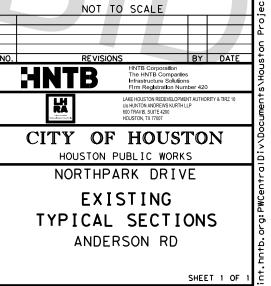


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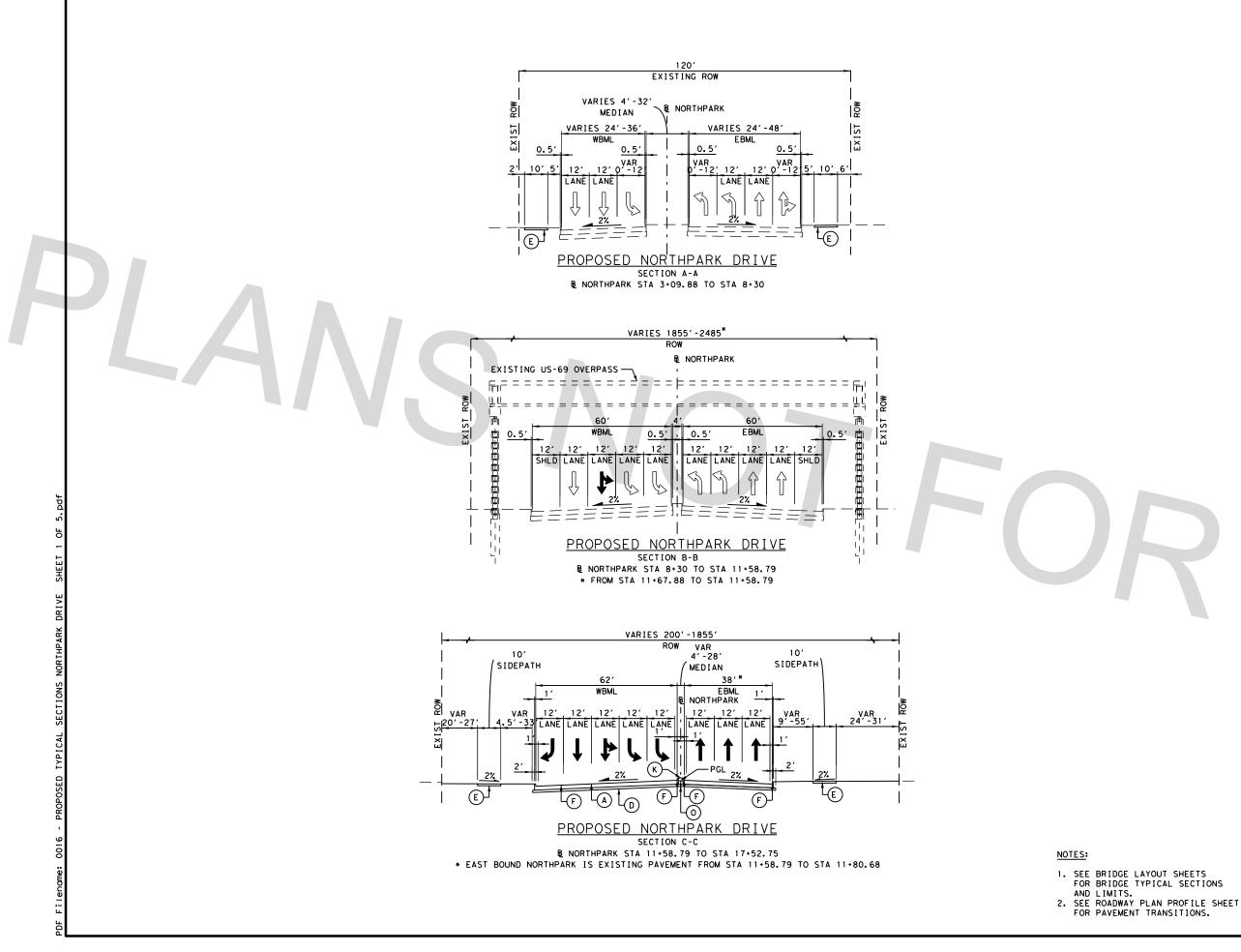


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В		1 1/2" ASPHALT PAVEMENT
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D		6" CEMENT TREATED SUBGRADE
E		5" REINF CONCRETE SIDEWALK
F		6" MONO CURB
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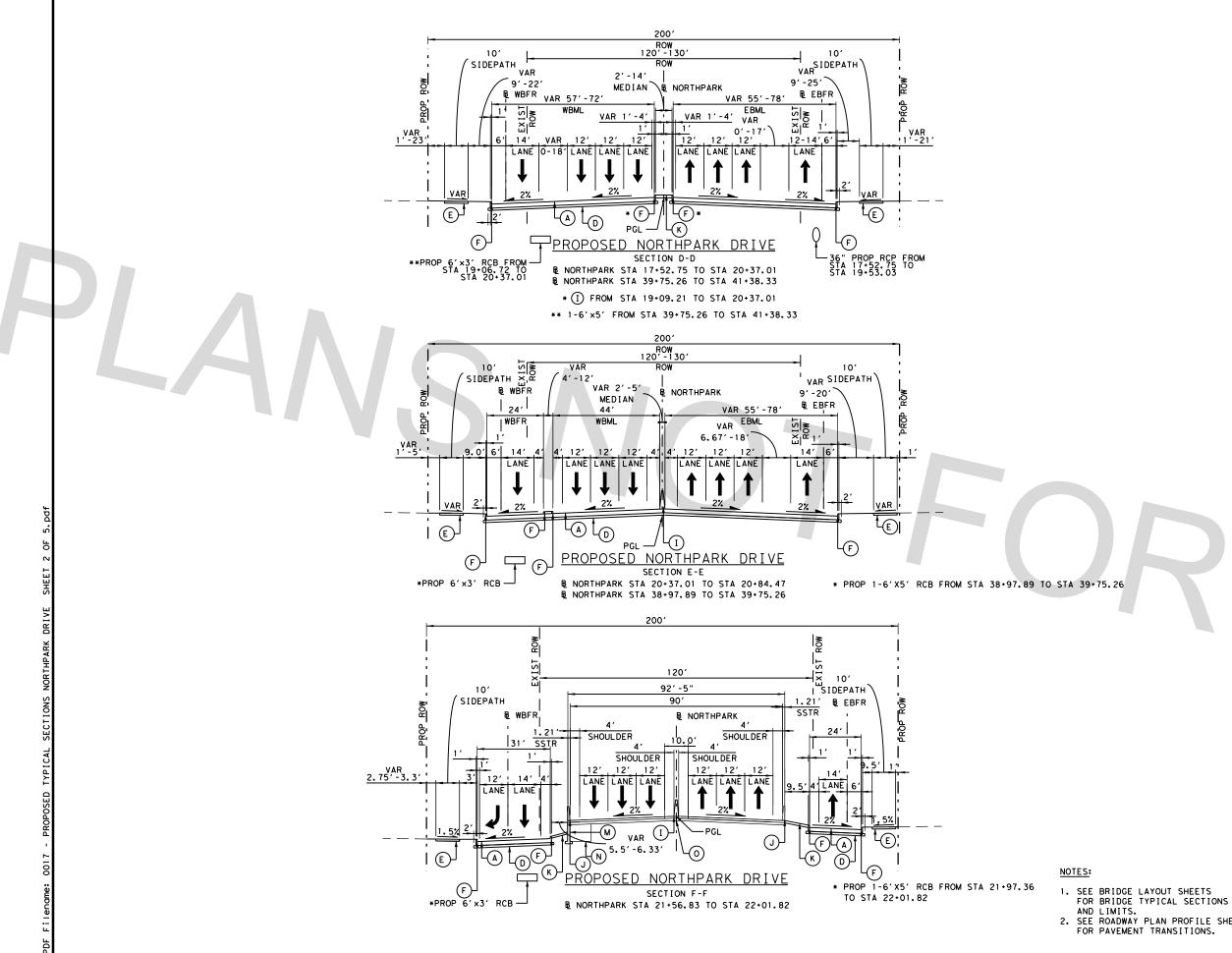


(A)12" REINF CONCRETE PAVMENT 1" ASPHALT STAB BASE (GR 4)(PG 64) ₿ \bigcirc 6" CEMENT TREATED BASE ៙ 8" LIME TREATED BASE E 5" REINF CONCRETE SIDE PATH Ð 12" MONO CURB 6 BLOCK SODDING Θ MOW STRIP 42" BARRIER (SSCB) J 36" RAIL (TY SSTR) K CONCRETE RIP RAP **(**L) TEMPORARY PAVEMENT M MSE RETAINING WALL \mathbb{N} REINFORCED VOLUME \bigcirc LONGITUDINAL JOINT 6" CEMENT TREATED SUBGRADE P PROP TRAVEL LANE EXIST TRAVEL LANE = EASTBOUND MAIN LANES EBML = WESTBOUND MAIN LANES NBML = NORTHBOUND MAIN LANES SBML = SOUTHBOUND MAIN LANES KATE LIGHT 134443 4 CENSED SSI ONAL CNOINE DATE: 4/5/2021 NOT TO SCAL BY DATE REVISION HNTB The HNTB Companies Infrastructure Solutions Firm Registration Num LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007 벖 CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTHPARK DRIVE PROPOSED TYPICAL SECTIONS NORTHPARK DRIVE SHEET 1 OF FED. RD. STATE CITY OF HOUSTON WBS HIGHWAY NO. DESIGNED: CS 6 TEXAS SEE TITLE SHEET CHECKED: STATE COUNTY CONTROL SECTION JOB SHEET NO DISTRICT COUNTY CONTROL SECTION NO. SHEET NO HOU NONTCOMERY 0912 37 232 16 DRAWN: CHECKED:

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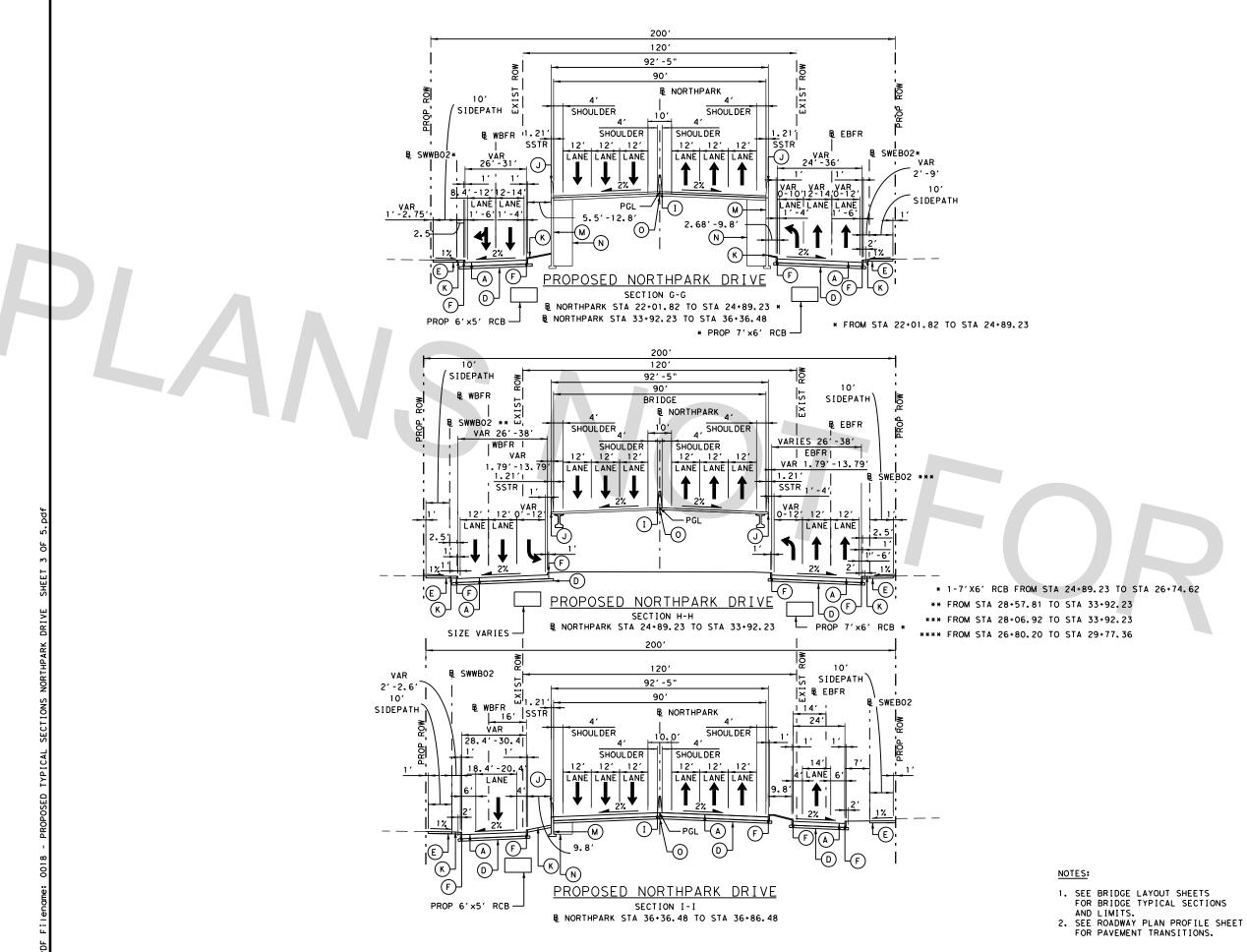
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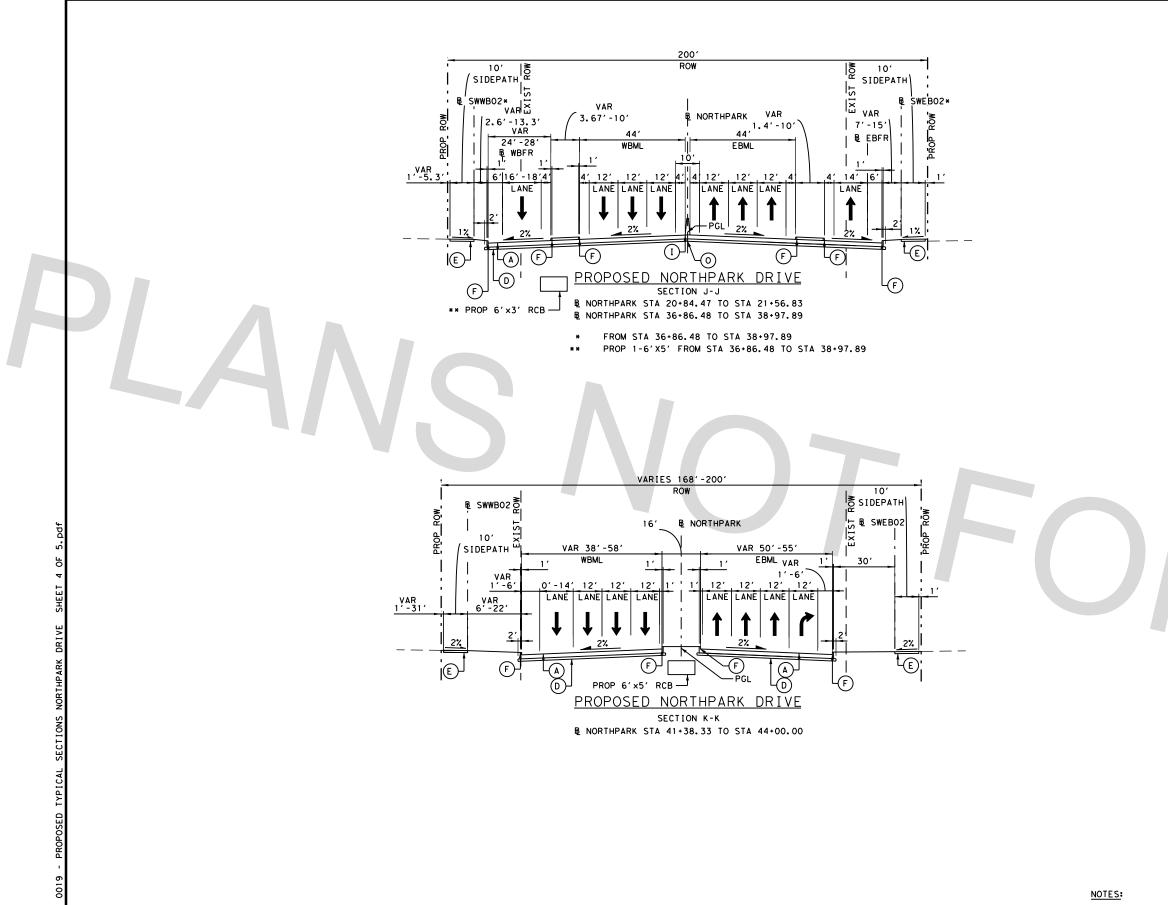
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2. SEE ROADWAY PLAN PROFILE SHEET FOR PAVEMENT TRANSITIONS.



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SEE BRIDGE LAYOUT SHEETS FOR BRIDGE TYPICAL SECTIONS AND LIMITS.
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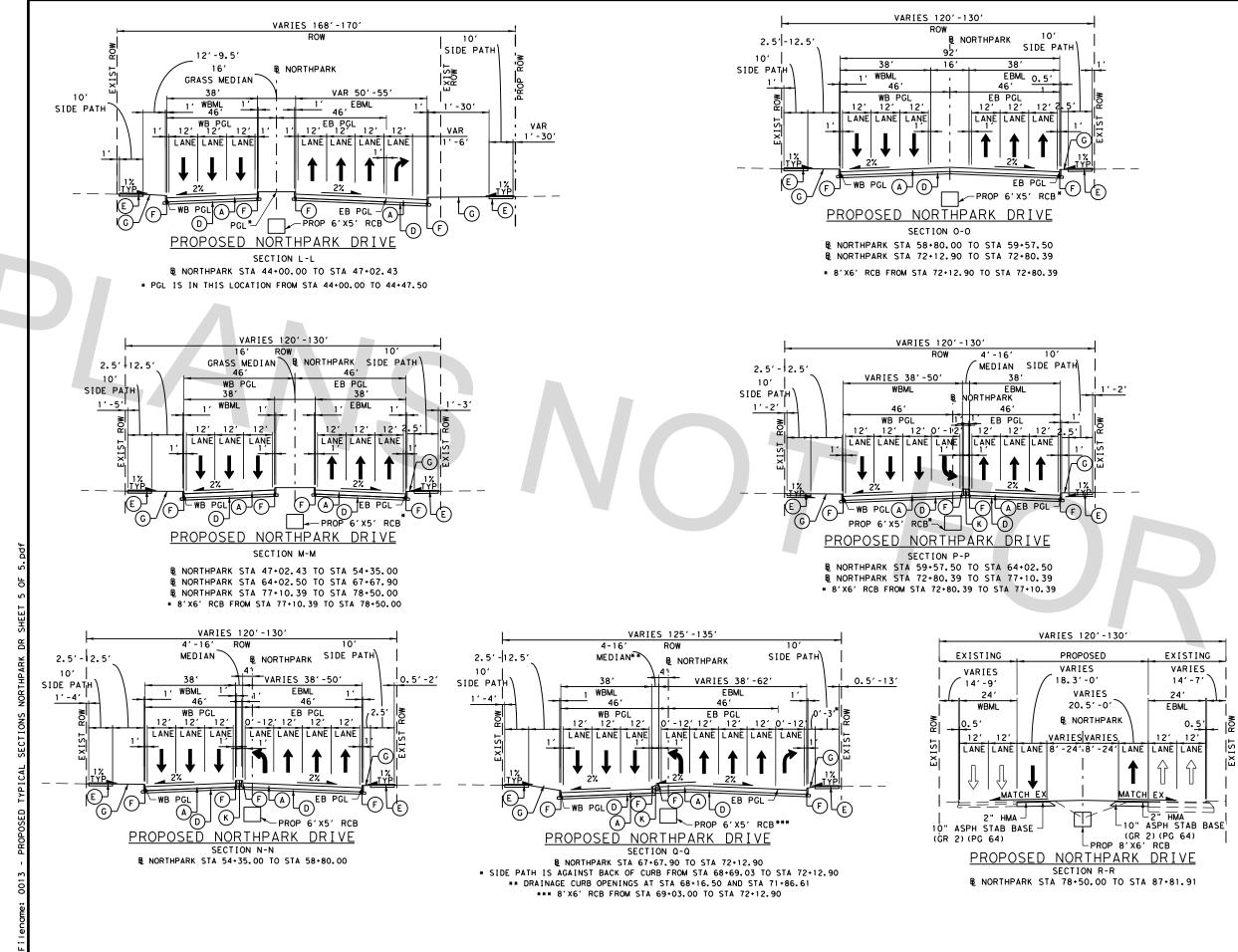
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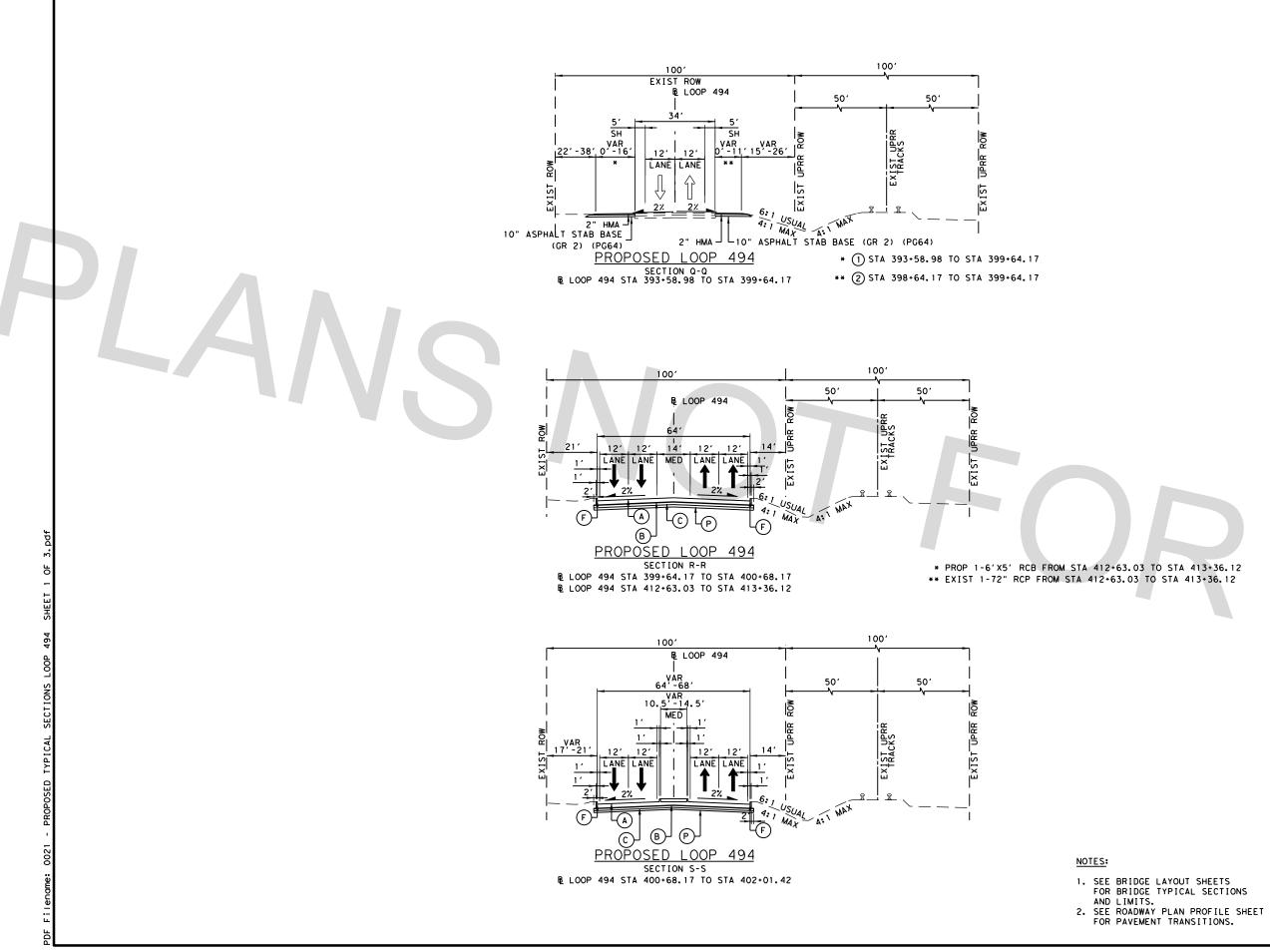




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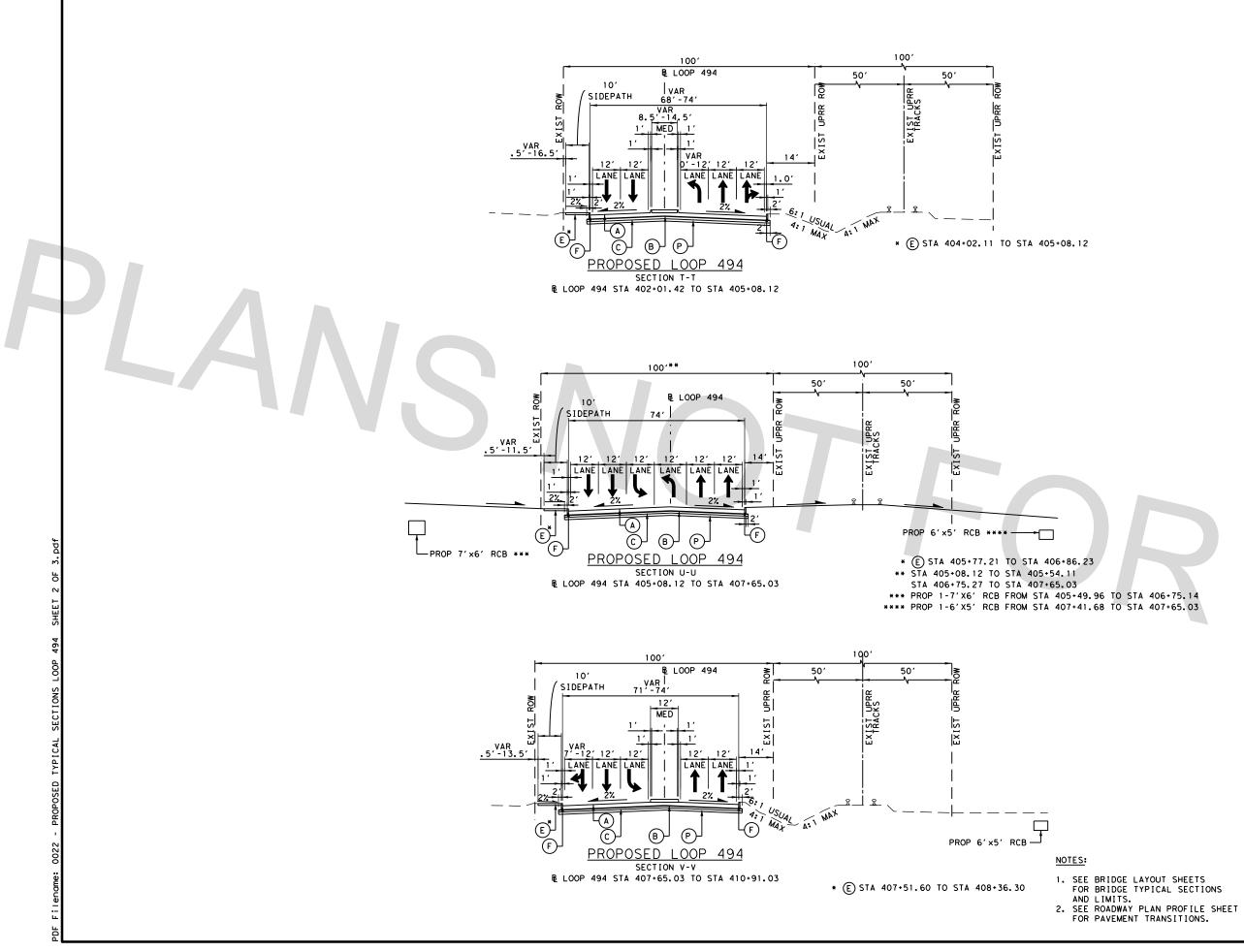
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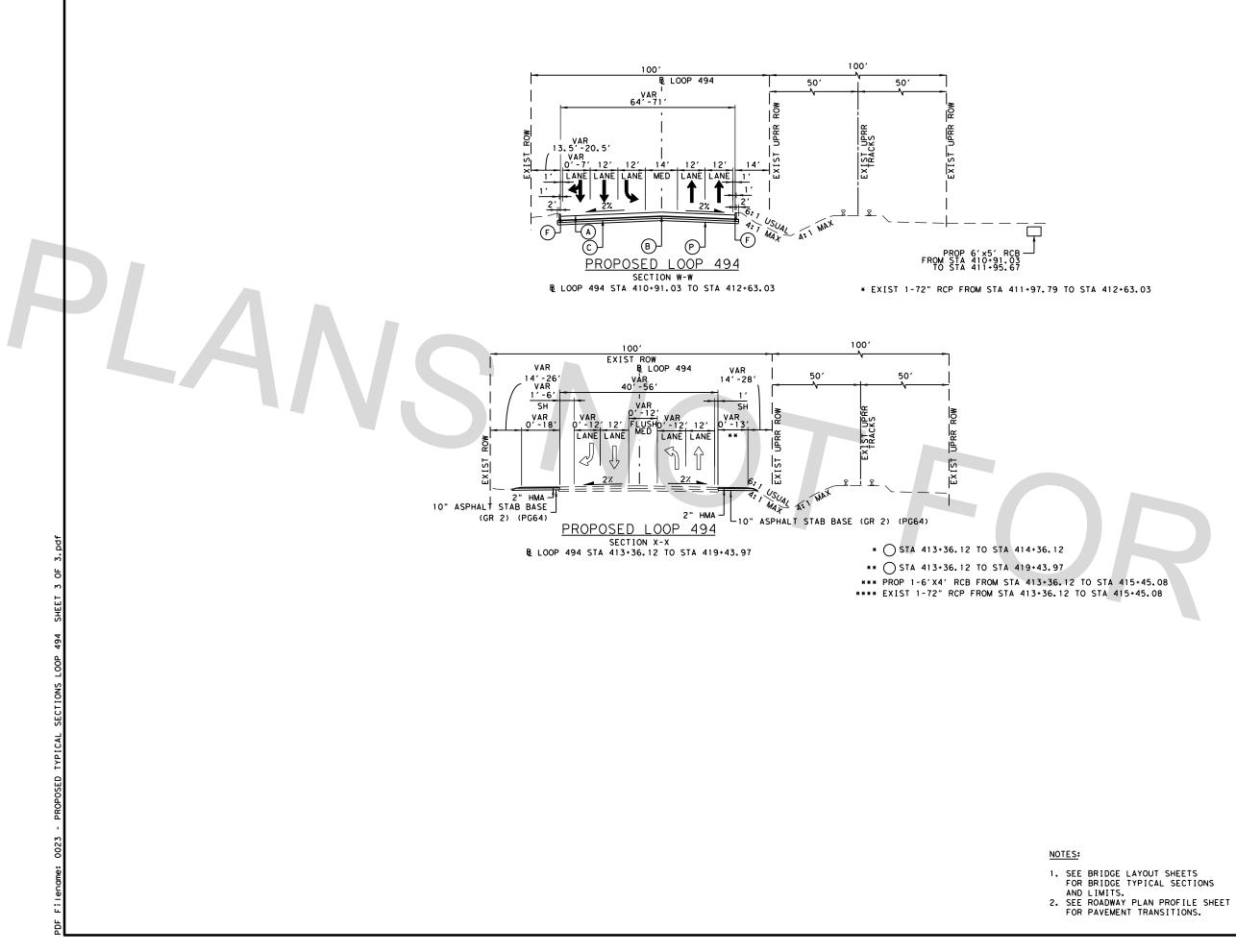


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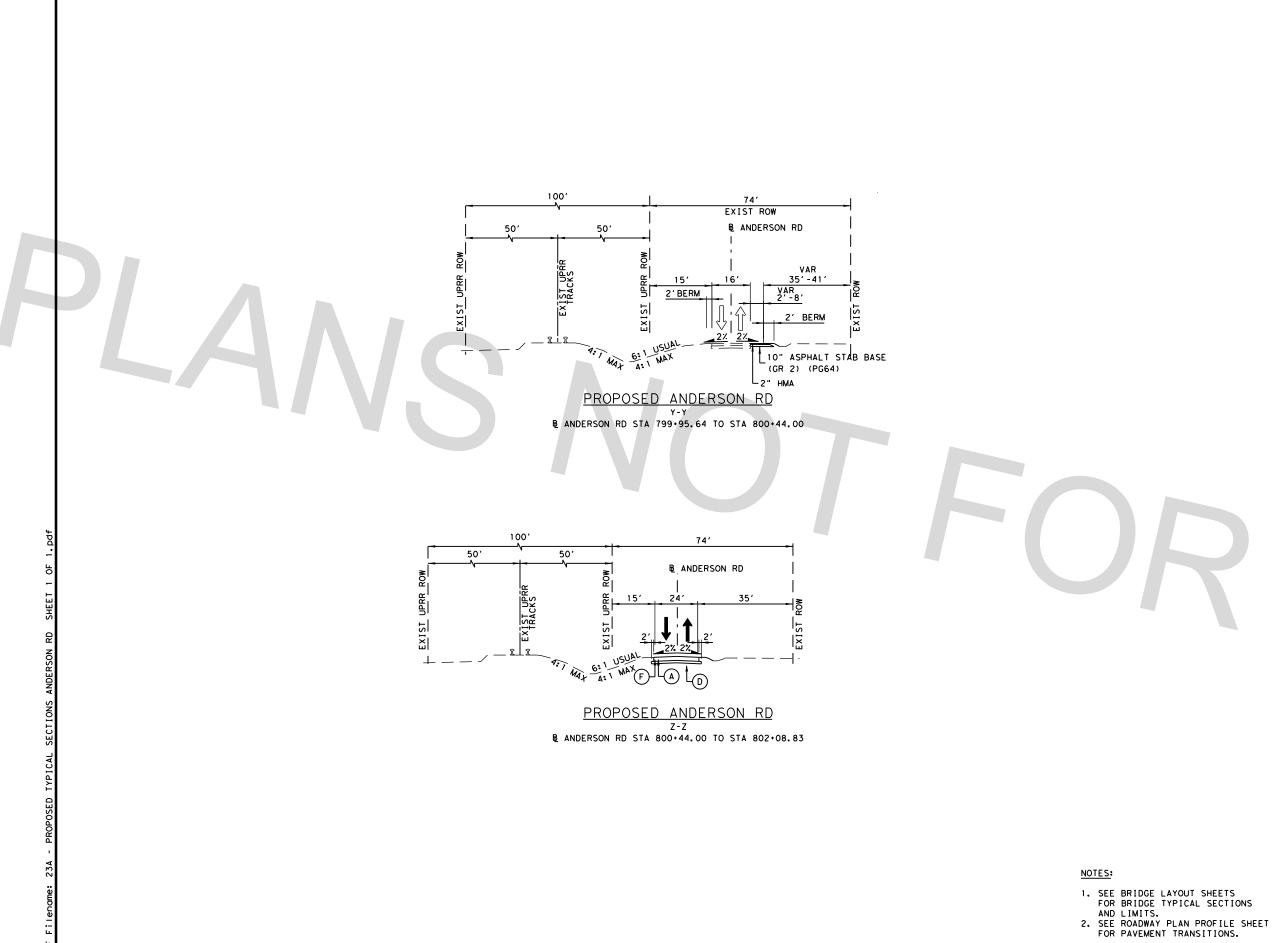
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4/5/2021

Sheet A

County: Montgomery

Control: CSJ 0912-37-232

Project Name: Northpark Drive Overpass Project (T-1013)

General Notes:

General:

Contractor questions on this project are to be addressed to the following individual(s):

Vince Obregon, PE (vobregon@HNTB.com) Paula Ikpatt, PE (pikpatt@HNTB.com) Joel Salinas, PE (jsalinas@HNTB.com)

Contractor questions will be accepted through email, phone, and in person by the above individuals.

Notify the Engineer immediately if discrepancies are discovered in the horizontal control or the benchmark data.

The following standard detail sheets are modified:

Modified Standards

- CONCRETE CURB AND CURB AND GUTTER CCCG-12 (MOD)
- BRIDGE DECK DRAIN DETAILS (BD-2) (MOD)
- MISCELLANEOUS SLAB DETAILS (IGMS) (MOD)
- THICKENED SLAB END DETAILS (IGTS) (MOD)
- PRESTRESSED CONCRETE PANELS (PCP) (MOD)

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 for traffic across the roadway and for ingress and egress to private property in accordance with Section 7.2.4 of the TxDOT standard specifications is subsidiary to the various bid items. Restore access roadways to their original condition upon completing construction.

Grade street intersections and median openings for surface drainage.

Stencil the National Bridge Inventory (NBI) number on each new bridge shown on these plans. The NBI number is shown above the title block for each bridge layout.

General Notes

Sheet A

County: Montgomery

Control: CSJ 0912-37-232

Project Name: Northpark Drive Overpass Project (T-1013)

Clearly mark or highlight on the shop drawings, the items being furnished for this project. Submit required shop drawings in accordance with the shop drawing distribution list shown in the note for Item 5 for review and distribution.

Unless otherwise shown on the plans or otherwise directed, commence work after sunrise and ensure construction equipment is off the road by sunset.

Procure permits and licenses, which are to be issued by the City, County, or Municipal Utility District.

Any groundwater elevation information provided is representative of conditions existing on the day when and for the specific location where this information was collected. The actual groundwater elevation may fluctuate with time, climatic conditions, and construction activity.

General: Roadway Illumination and Electrical

For roadway illumination and electrical items, use materials from pre-qualified producers as shown on the Construction Division (CST) of TxDOT's material producers list. Check the latest link on TxDOT's website for this list. The category/item is "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials found on this list.

Perform electrical work in conformance with the National Electrical Code (NEC) and the Department's standard sheets.

The Contractor may make the electrical grounding connections and permissible splices using the thermal fusion process, Cadweld, ThermOweld, or approved equal, instead of bolted connections and splices.

The Engineer will arrange with the Contractor, an inspection of the completed electrical systems for the highway lighting systems before final acceptance for compliance with plans and specifications. The inspection will be made with personnel from the electrical section of the TxDOT's District Transportation Operations Office. The city's electrical division personnel will also inspect lighting systems within the city limits. Portions of the work found to be deficient during this inspection will not be accepted.

General: Traffic Signals

For traffic signal items, use materials from the Pre-Qualified Producers List (located at http://www.dot.state.tx.us/GSD/purchasing/supps.htm) and the materials pre-qualified for illumination and electrical items (located at http://ftp.dot.state.tx.us/pub/txdotinfo/cmd/mpl/riaes.pdf) as shown on TxDOT's Material Producers List and the Roadway Illumination and Electrical Supplies List. Check the latest links on TxDOT's website for these lists. No substitutions will be allowed for materials found on these lists.

General Notes

Sheet B

Sheet B

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Sheet C

County: Montgomery

Control: CSJ 0912-37-232

Project Name: Northpark Drive Overpass Project (T-1013)

General: Site Management

Mark stations every 100 ft. and maintain the markings for the project duration. Remove the station markings at the completion of the project. This work is subsidiary to the various bid items.

Do not mix or store materials, or store or repair equipment, on top of concrete pavement or bridge decks unless authorized by the Engineer. Permission will be granted to store materials on surfaces if no damage or discoloration will result.

Personal vehicles of employees are not permitted to park within the right of way, including sections closed to public traffic. Employees may park on the right of way at the Contractor's office, equipment, and materials storage yard sites.

Assume ownership of debris and dispose of at an approved location. Do not dispose of debris on private property unless approved in writing by the Engineer.

Control the dust caused by construction operations. For sweeping the base material in preparation for laying asphalt and for sweeping the finished concrete pavement, use one of the following types of sweepers or approved equal:



Wayne Series 900 Elgin White Wing Elgin Pelican

Truck Type - 4 Wheel

M-B Cruiser II Wayne Model 945 Mobile TE-3 Mobile TE-4 Murphy 4042

General: Traffic Control and Construction

Schedule construction operations such that preparing individual items of work follows in close sequence to constructing storm drains in order to provide as little inconvenience as practical to the businesses and residents along the project.

Schedule work so that the base placement operations follow the subgrade work as closely as practical to reduce the hazard to the traveling public and to prevent undue delay caused by wet weather.

If fences cross construction easements shown on the plans and work is required beyond the fences, remove and replace the fences as directed. This work and the materials are subsidiary to the various bid items.

General Notes

Sheet C

County: Montgomery

Control: CSJ 0912-37-232

Project Name: Northpark Drive Overpass Project (T-1013)

When design details are not shown on the plans, provide signs and arrows conforming to the latest "Standard Highway Sign Designs for Texas" manual.

General: Utilities

Consider the locations of underground utilities depicted in the plans as approximate and employ responsible care to avoid damaging utility facilities. Depending upon scope and magnitude of planned construction activities, advanced field confirmation by the utility owner or operator may be prudent. Where possible, protect and preserve permanent signs, markers, and designations of underground facilities.

If the Contractor damages or causes damage (breaks, leaks, nicks, dents, gouges, etc.) to the utility, contact the utility facility owner or operator immediately.

Notify the Engineer at least 48 hours before constructing junction boxes at storm drain and utility intersections.

Install or remove poles and luminaires located near overhead or underground electrical lines using established industry and utility safety practices. Consult the appropriate utility company before beginning such work.

If overhead or underground power lines need to be de-energized, contact the electrical service provider to perform this work. Costs associated with de-energizing the power lines or other protective measures required are at no expense to Lake Houston Redevelopment Authority (LHRA).

If working near power lines, comply with the appropriate sections of Texas State Law and Federal Regulations relating to the type of work involved.

Perform electrical work in conformance with the National Electrical Code (NEC) and Department's standard sheets.

Before beginning any underground work, notify the City of Houston's Chief Inspector, Public Works and Engineering, to establish the locations of any existing electrical systems for lighting facilities within the limits of this project.

Item 5: Control of Work

Submit shop drawings electronically for the fabrication of items as documented in Table 1 below. Information and requirements for electronic submittals can be viewed in the "Guide to Electronic Shop Drawing Submittal" which can be accessed through the following web link, ftp://ftp.dot.state.tx.us/pub/txdot-info/library/pubs/bus/bridge/e submit guide.pdf. References to 11 in. x 17 in. sheets in individual specifications for structural items imply electronic CAD sheets.

General Notes

Sheet D

Sheet D

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County: Montgomery

Control: CSJ 0912-37-232

Sheet E

County: Montgomery

Control: CSJ 0912-37-232

Project Name: Northpark Drive Overpass Project (T-1013)

644	Special Non-Standard Supports (Bridge Mounts, Barrier Mounts, Etc.)	Y	Y	Y	D
647	Large Roadside Sign Supports	Y	Y	Y	D
650	Cantilever Sign Structure Supports - Alternate Design Calcs.	Y	Y	Y	D
650	Sign Structures	Y	Y	N	D
680	Installation of Highway Traffic Signals	Y	Y	N	D
682	Vehicle and Pedestrian Signal Heads	Y	Y	N	D
684	Traffic Signal Cables	Y	Y	N	D
685	Roadside Flashing Beacon Assemblies	Y	Y	N	D
686	Traffic Signal Pole Assemblies (Steel) (Non-Standard only)	Y	Y	Y	D
687	Pedestal Pole Assemblies	Y	Y	N	D
688	Detectors	Y	Y	N	D
784	Repairing Steel Bridge Members	Y	Y	Y	D
SS	Prestr Concr Crown Span	Y	Y	N	D
SS	Sound Barrier Walls	Y	Y	Y	D
SS	Camera Poles	Y	Y	Y	TMS
SS	Pedestrian Bridge (Calcs reg'd.)	Y	Y	Y	D
SS	Screw-In Type Anchor Foundations	Y	Y	N	D
SS	Fiber Optic/Communication Cable	Y	Y	N	TMS
SS	Spread Spectrum Radios for Signals	Y	Y	Ν	D
SS	VIVDS System for Signals	Y	Y	N	D
SS	CTMS Equipment	Y	Y	N	TMS

Notes

Document flow for Working Drawings differs from Shop Drawings in that Working Drawings must be submitted to the Engineer rather than the Engineer of Record and they are for the information of the Engineer only; an approval stamp and distribution to all project offices is not required.

Key to Reviewing Party		
D – Consultant: Submit to Engineer of Record at vobregon@HNTB.com		
TMS – Traffic Management System at vobregon@HNTB.com	_	

Item 7: Legal Relations and Responsibilities

Maintain the roadway slope stability. Maintaining slope stability is subsidiary to the various bid items.

If the work is on or in the vicinity of an at-grade railroad crossing, involves incidental work on railroad right of way, or involves construction of a railroad grade separation structure, notify the railroad company's Division Engineer and the Engineer at least 30 days before performing any work on the railroad right of way and make arrangements for railroad flaggers unless otherwise shown in the contract. Obtain the required Railroad Right of Entry Permit from the railroad company. Payment of applicable permit fees is the responsibility of the Contractor. Acquiring the Railroad Right of Entry Permit is a lengthy process, allow sufficient time for this.

General Notes

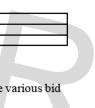
Table 1 2014 Construction Specification Required Shop/Working Drawing Submittals - Consultant Generated Plans						
Spec Item No.'s	Product	Submittal Required	Approval Required (Y/N)	Contractor/ Fabricator P.E. Seal Required	Reviewing Party	Shop or Working Drawing (Note 1)
7.16.1&.2	Construction Load Analyses	Y	Y	Y	D	WD
400	Excavation and Backfill for Structures (cofferdams)	Y	N	Y	D	WD
403	Temporary Special Shoring	Y	N	Y	D	WD
420	Formwork/Falsework	Y	N	Y	D	WD
423	Retaining Walls, (calcs req'd.)	Y	Y	Y	D	SD
425	Optional Design Calculations (Prstrs Bms)	Y	Y	Y	D	SD
425	Prestr Concr Sheet Piling	Y	Y	N	D	SD
425	Prestr Concr Beams	Y	Ý	N	D	SD
425	Prestr Concr Bent	Ý	Ý	N	D	SD
426	Post Tension Details	Y	Y	N	D	SD
434	Elastomeric Bearing Pads (All)	Y	Y	N	D	SD
441	Bridge Protective Assembly	Y	Y	N	D	SD
441	Misc Steel (various steel assemblies)	Y	Y	N	D	SD
441	Steel Pedestals (bridge raising)	Y	Y	N	D	SD
441	Steel Bearings	Y	Y	N	D	SD
441	Steel Bent	Y	Y	N	D	SD
441	Steel Diaphragms	Y	Y	N	D	SD
441	Steel Finger Joint	Y	Y	N	D	SD
441	Steel Plate Girder	Y	Y	N	D	SD
441	Steel Tub-Girders	Y	Y	N	D	SD
441	Erection Plans, including Falsework	Y	N	Y	D	WD
449	Sign Structure Anchor Bolts	Y	Y	N	D	SD
450	Railing	Y	Y	N	D	SD
462	Concrete Box Culvert	Y	Y	N	D	SD
462	Concrete Box Culvert (Alternate Designs Only,calcs reqd.)	Y	Y	Y	D	SD
464	Reinforced Concrete Pipe (Jack and Bore only; ONLY when requested)	Y	Y	Y	D	SD
465	Pre-cast Junction Boxes, Grates, and Inlets	Y	Y	Ν	D	SD
465	Pre-cast Junction Boxes, Grates, and Inlets (Alternate Designs Only, calcs reg'd.)	Y	Y	Y	D	SD
466	Pre-cast Headwalls and Wingwalls	Y	Y	N	D	SD
467	Pre-cast Safety End Treatments	Y	Y	N	D	SD
495	Raising Existing Structure (calcs reqd.)	Y	Y	Y	D	SD
610	Roadway Illumination Supports (Non-Standard only, calcs reqd.)	Y	Y	Y	D	SD
613	High Mast Illumination Poles (Non- standard only, calcs reqd.)	Y	Y	Y	D	SD
627	Treated Timber Poles	Y	Y	N	D	SD

General Notes

Sheet E

Sheet F

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Sheet F

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Sheet G

Sheet G

County: Montgomery

Control: CSJ 0912-37-232

Project Name: Northpark Drive Overpass Project (T-1013)

No significant traffic generator events have been identified.

Item 8: Prosecution and Progress

Create, maintain, and submit for approval, a Critical Path Method (CPM) project schedule using computer software that is fully compatible with the latest version of Primavera Systems, Inc. or Primavera Project Planner (P3 or P6).

The Engineer will supply bidders, upon written request, one electronic copy of the time determination schedule. The time determination schedule provided is for informational use only and is not intended for bidding or construction purposes.

The Engineer will not adjust the number of days for the project and milestones, if any, due to differences in opinion regarding any assumptions made in the preparation of the schedule or for errors, omissions, or discrepancies found in the time determination schedule.

Working days will be computed and charged based on a 6-day workweek in accordance with Section 8.3.1.2.

Provide a virus-free computer disk or other acceptable electronic media containing the Primavera construction schedule.

Item 100: Preparing Right of Way

Clean existing ditches under fill sections of undesirable materials including grass, muck, and trash. Perform this work in accordance with the Construction section of the Item, "Preparing Right of Way." This work is subsidiary to this bid Item.

The Item, "Preparing Right of Way" will be measured for payment only in those designated areas shown on the plans. Preparing right of way necessary to perform construction that is outside designated areas is subsidiary to this bid Item.

Remove abandoned utilities that are in conflict with the new utilities, at no expense to LHRA.

Reestablish and maintain right of way stakes after completing the right of way preparation activities and until the new utilities are in place.

Remove and assume ownership of the existing ground mounted signs within the limits of roadway construction unless otherwise noted or directed. This work is subsidiary to the Item, "Preparing Right of Way."

General Notes

Item 110: Excavation

County: Montgomery

Control: CSJ 0912-37-232

Project Name: Northpark Drive Overpass Project (T-1013)

If manipulating the excavated material requires moving the same material more than once to accomplish the desired results, the excavation is measured and paid for only once regardless of the manipulation required.

Transition the ditch grades and channel bottom widths at structure locations. Use only approved channel excavation in the embankment.

The total excavation quantity shown on the plans includes the quantity for excavating to 2 ft. behind the back of the proposed curb.

Item 132: Embankment

If salvaged base is used for the embankment material, break it into small pieces to achieve the required density and to facilitate placing in the embankment. Obtain approval of the material before placing in the embankment.

Furnish Type C material with a maximum Liquid Limit (LL) of 65, a minimum Plasticity Index (PI) of 5, and composed of suitable earth material such as loam, clay, or other materials that form a suitable embankment.

The embankment material used on the project which has a Liquid Limit exceeding 45 will be tested for Liquid Limits at the rate of one test per 20,000 cu. yd. or per total quantity less than 20,000 cu. yd., unless otherwise directed. Only use material that passes the above tests.

Item 161: Compost Item 162: Sodding for Erosion Control Item 164: Seeding for Erosion Control Item 166: Fertilizer Item 168: Vegetative Watering

Refer to the "Fertilizer, Seed, Sod, Straw, Compost, and Water" plan sheet for material specifications, application rates, and for watering requirements.

Item 204: Sprinkling

Perform subsidiary sprinkling as required under various other items in accordance with the Item, "Sprinkling."

Sprinkling for dust control is subsidiary to the various bid items.

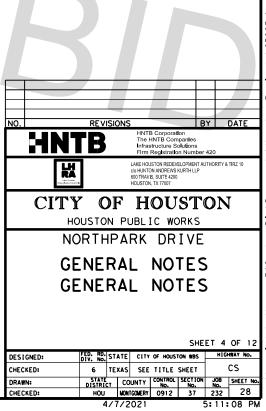
Item 210: Rolling

Use a medium pneumatic roller meeting the requirements of Item 210 as directed. This work is subsidiary to the various bid items. On every asphalt shot, use a minimum of 3 pneumatic rollers or as directed. Use approved rolling patterns. Successive asphalt shots will not be allowed until acceptable rolling has been accomplished on the preceding asphalt shot.

General Notes

Sheet H

Sheet H



Project Name: Northpark Drive Overpass Project (T-1013)

Item 260: Lime Treatment (Road-Mixed)

County: Montgomery

For slurry placing, before discharging through the distributors, sufficiently agitate or mix the lime and water to place the lime in suspension and to obtain a uniform mixture.

The Engineer will observe the lime treatment that the Contractor elects to open to construction traffic immediately after compaction. If the construction traffic damages the subgrade, route the traffic off the damaged section in accordance with the standard specification. If the construction traffic does not damage the subgrade, cure the subgrade until other courses of material cover it. Apply these courses within 14 days with a maximum curing period of 7 days.

Place the hydrated and the commercial lime as a water suspension or slurry according to the slurry placing method shown in Section 260.4.3.2, "Slurry Placement."

Use the type of lime at particular locations as directed.

Place the quicklime dry or as a slurry.

For the dry quicklime, a spreader box is not required if the lime material is evenly distributed.

In limited areas, the Contractor may construct the lime slurry subgrade under a sequence of work in which the application, mixing, and compaction are completed in the same working day, if approved by the Engineer.

Provide documentation from certified public scales showing gross, tare, and net weights. Provide producer's delivery tickets also showing gross, tare, and net weights. Completely empty the lime trailers at the project site. The Engineer may direct the Contractor to reweigh any shipment of lime on certified scales. The cost of this operation is subsidiary to the Item, "Lime Treatment (Road-Mixed)."

The percentage of lime shown on the plans is estimated on the basis of engineering tests. If soil tests made during construction indicate properties different than those originally anticipated, the Engineer may vary the percentage of the lime to provide soil characteristics similar to those of the preliminary tests.

Mix the lime with the new base material in an approved pugmill type stationary mixer.

Item 276: Cement Treatment (Plant-Mixed)

Before placing the new base, wet and coat the vertical construction joints between the new base and the previously placed base with dry cement.

General Notes

Sheet I

County: Montgomery

Control: CSJ 0912-37-232

Project Name: Northpark Drive Overpass Project (T-1013)

If the total thickness of the cement treatment is greater than 8 in., compact it in multiple lifts in accordance with Section 276.4.3, "Compaction." Place the courses in the same working day unless otherwise approved.

Use Class N Cement Treatment containing 4.5 percent cement based on the dry weight of the aggregate. There is no minimum compressive strength requirement for this Item.

The requirement for core drilling to determine the thickness of cement treatment is waived if using less than 500 sq. yd. at one location.

For widening the existing pavement, the Engineer may waive the requirements for preparing the subgrade by scarifying and compacting if the as-cut subgrade can be maintained to the density of the natural ground and to a uniform consistency when placing the base course. Keep the subgrade wet.

Compact in accordance with the standard specifications and complete the finishing operations within a period of 5 hours after adding the cement to the base material.

Cure the final course of cement treatment using an asphalt distributor that distributes the approved curing material and water mixture material at a rate of 0.25 gallons per square-yard evenly and smoothly or as recommended by the manufacturer at the recommended dilution rate, under a pressure necessary for proper distribution. Provide a curing material meeting the requirements of the Item, "Asphalts, Oils, and Emulsions" for curing the cement treatment. Use the following materials for curing the courses of cement treatment:

Curing Material	Application
Water	All courses, except final cours
PCE	Final course

Continue curing until placing another course or opening the finished section to traffic.

Spread the material so that the layers of base are uniform in depth and in loose density before compacting.

Unless otherwise directed, place the next pavement layer within 7 working days of placing the base.

Item 292: Asphalt Treatment (Plant-Mixed)

If using the iron ore topsoil as the primary aggregate, meaning 80 percent or more by weight of the total mixture, the requirements for the water susceptibility test are waived.

Mixtures containing the iron ore topsoil are exempted from test methods TEX-217-F (Part I, separation of deleterious material and Part II, decantation test for coarse aggregate) and TEX-203-F (Sand Equivalent Test).

General Notes

Sheet J

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Sheet J

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Sheet K

County: Montgomery

Control: CSJ 0912-37-232

Project Name: Northpark Drive Overpass Project (T-1013)

Assume responsibility for proportioning the materials entering the asphalt mixture, regardless of the type of plant used.

Furnish the mix designs for approval.

Compact the courses to a minimum density of 95 percent of the maximum density as determined using test method TEX-126-E.

Meet the following grading requirements:

Sieve	Percent Passing			
Size	Grade 4 (Bondbreaker)			
3/4 in.	-			
1 in.	-			
/2 in.	100			
No. 4	30 - 70			
lo. 40	15-45			

Physical requirements are as follows:

Maximum Plasticity Index (PI) = 8 Maximum Liquid Limit (LL) = 35 Maximum Wet Ball Mill = 50 (crushed stone) Maximum LA Abrasion = 50 (iron ore)

N

If blending the materials, perform the Wet Ball Mill test for the composite aggregate.

Form bituminous mix incorporating 3.5 to 7 percent asphaltic binder by dry weight.

For nominal aggregate size less than 0.5 in., design the mix in accordance with test method TEX-204-F. The minimum stability in accordance with TEX-208-F is 30 percent with a laboratory molded density of 96 percent plus or minus 1.5 percent.

If the layer thickness after placing is 1.25 in. or less, the bondbreaker is exempt from the in-place density control described in Section 292.4.5, "Compaction."

Item 360: Concrete Pavement

Where the pavement curb is left off for a later tie, provide the dowels or the tie bars as indicated on the paving detail sheets. The dowel bars and tie bars are subsidiary to the various bid items.

Repair portions of the concrete pavement surfaces that are damaged while in a plastic state before that area receives permanent pavement markings and opens to traffic. Perform repairs that are structurally equivalent to and cosmetically uniform with the adjacent undamaged areas. Do not repair by grouting onto the surface.

General Notes

Sheet K

County: Montgomery

Control: CSJ 0912-37-232

Project Name: Northpark Drive Overpass Project (T-1013)

Equip the batching plants to proportion by weight, aggregates and bulk cement, using approved proportioning devices and approved automatic scales.

For mono curb, the curb height transitions will be paid at the contract unit price of the larger curb height in the transition. The 2.5-in. laydown curbs for driveways will be paid at the unit price bid for the Item, "Conc Curb (Mono) (Ty II)."

High-early strength cement may be used for frontage road and city street intersection construction.

Do not use limestone dust of fracture as fine aggregate.

If the concrete design requires greater than 5.5 sacks of cementitious material per cubic yard, obtain written approval. If placing concrete pavement mixes from April 1 to October 31, inclusive, use Mix Design Option 1 as specified in Section 421.4.2.6.1.

Perform saw cutting as shown on the plans in accordance with Section 360.4.10, "Sawing Joints." This saw cutting is subsidiary to this bid Item.

The pay limits for concrete pavements with traffic rails extends to the outside edge or back of the traffic rail.

Complete the entire Fast Track Concrete construction process, from the time the Fast Track Work Area is closed to traffic, to the time the Fast Track Work Area is opened to traffic. The Fast Track operation includes, but is not limited to, traffic control, existing pavement and subgrade removal, preparation of subgrade, placement of steel, placement of Fast Track concrete pavement, cure time, striping, etc. Perform work in the Fast Track Work Area in an expeditious manner, within the allowable time period for any area shown below:

Fast Track Work Area	
1. Northpark Drive / IH 69 NE	BFR Int. (TCP P2-S3):

2.

Allowable Duration 2 weekend days maximum 2 weekend days maximum

- 6. Northpark Drive / Russell Palmer Int. (TCP P1-S2): 7. Northpark Drive / Russell Palmer Int. (TCP P1-S3):
- 8. Northpark Drive / Russell Palmer Int. (TCP P1-S4):

Northpark Drive / IH 69 NBFR Int. (TCP P3-S1):

3. Northpark Drive / Loop 494 Int. (TCP P2-S2):

4. Northpark Drive / Loop 494 Int. (TCP P2-S3):

5. Northpark Drive / Loop 494 Int. (TCP P3-S1):

2 weekend days maximum

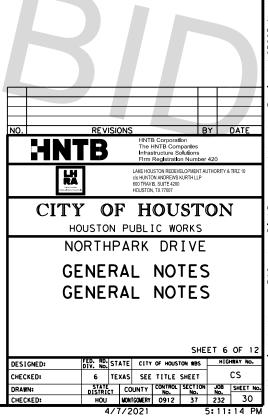
Failure to perform any Fast Track Work Area construction within the above time frames will be cause for the Engineer to require the Contractor to shut down all other construction operations to ensure all resources are directed toward the completion of the Fast Track operation. This shutdown will remain in force until the Fast Track operation is complete. Such a shutdown will not warrant additional time, time suspension, or any additional costs to LHRA.

General Notes

Sheet L

2 weekend days maximum

Sheet L



Sheet M

County: Montgomery

Control: CSJ 0912-37-232

Project Name: Northpark Drive Overpass Project (T-1013)

Unless otherwise directed in writing, provide Class HES concrete with a minimum average flexural strength of 425 psi or a minimum average compressive strength of 3,000 psi in 16 hours. When directed in writing, open the pavement to traffic before the minimum requirements have been attained.

When needed, place and remove forms in accordance with Section 360.4.5, except do not remove forms until at least 6 hours after concrete has been placed. The time for the form removal may be extended with the direction of the Engineer if weather or other conditions make it advisable.

Sprinkling and rolling, required for the compaction of the rough subgrade in advance of finegrading are subsidiary to this Item. Maintenance of a moist condition of the subgrade in advance of fine-grading and concrete is subsidiary work, as provided above.

Item 400: Excavation and Backfill for Structures

Plugging existing pipe culverts is subsidiary to the various bid items.

Item 416: Drilled Shaft Foundations

Include the cost for furnishing and installing anchor bolts mounted in the drilled shafts in the unit bid price for the various diameter drilled shafts.

The Engineer may test using ultrasonic methods the anchor bolts for overhead sign supports, light standards, and traffic signal poles after they are installed. Replace faulty anchor bolts as directed. Do not weld the anchor bolts.

Item 420: Concrete Substructures

Unless otherwise noted, use Class C concrete with an ordinary surface finish for signal, lighting, or sign structure foundations.

Mass concrete is a plans quantity item.

Item 423: Retaining Walls

Place concrete riprap mow strips for retaining walls as shown on the plans and in accordance with the Item, "Riprap." Use Class B concrete reinforced with No. 4 bars spaced at 18 in. centers each direction and placed 2 in. below the surface. This work is paid for under the Item, "Riprap."

Provide and maintain positive drainage away from the earth wall system, including the leveling pad, for the contract duration

County: Montgomery

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Project Name: Northpark Drive Overpass Project (T-1013)

Approved Mechanically Stabilized Earth (MSE) Wall Systems are listed at the website below or from TxOT's home page>Business>Bridge>Retaining Walls>Approved MSE Panel Systems:

http://www.txdot.gov/business/resources/approved-systems/mse-wall.html

Item 432: Riprap

If stone riprap is shown on the plans, use common stone riprap in accordance with Section 432.2.3.3, placed dry in accordance with Section 432.3.2.3. Do not grout. Crushed concrete may also be used.

Item 462: Concrete Box Culverts and Drains Item 464: Reinforced Concrete Pipe

Rubber gaskets are required for concrete pipe joints except for connections of safety end treatments, driveway culverts, and joints between the existing pipes and extensions.

Contractor shall use O-Ring type gaskets for all round pipe applications. No Ram-Nek plastic gaskets will be allowed.

If performing the work under the Item, "Jacking, Boring, or Tunneling Pipe or Box," use tongue and groove pipe instead of rubber gaskets at these locations.

Open, install, and backfill each section, or a portion of a section, in the same day at locations requiring pipe culverts under existing roadways.

Place the pipe drains across existing roadways half at a time to allow passage of traffic. No trenches may remain open overnight.

Known locations of existing stub-outs are shown on the plans, but these stub-outs may be in a different position or condition. Delays, inconveniences, or additional work required will not be a basis for additional compensation.

Provide leave-outs or holes in the proposed storm drain structures and pipes for drainage during interim construction. This work is subsidiary to the various bid items.

The flowline elevations of side road structures are based on the proposed ditches. Field-verify these elevations and adjust them as necessary to meet the field conditions. Before placing these structures, prepare and submit for approval, the data (revised elevation, alignment, length, etc.) for the adjusted structures.

If groundwater is encountered while installing the storm drain system, install a suitable dewatering system to facilitate construction of the storm drains. The costs for materials and labor required to install and maintain this system are subsidiary to the Item, "Reinforced Concrete Pipe."

General Notes

General Notes

Sheet M

Sheet N

Sheet N

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Sheet O

County: Montgomery

Control: CSJ 0912-37-232

Project Name: Northpark Drive Overpass Project (T-1013)

Item 465: Junction Boxes, Manholes, and Inlets

If required on the plans, build manholes and inlets to stage 1 construction, cover with temporary pavement, and complete in a later phase of construction. This temporary covering and pavement are subsidiary to the various bid items.

Construct manholes and inlets in graded areas, first to an elevation at least 4 in. above the top of the highest entering pipe and cover with a wooden cover. Complete the construction of such manholes and inlets to the finished elevation when completing the grading work for such manholes and inlets. Adjust the final elevation, if required, since this elevation is approximate.

Construct manholes and inlets in paved areas to an elevation so their temporary wooden covers are flush with the surface of the base material.

Do not leave excavations or trenches open overnight.

Item 502: Barricades, Signs, and Traffic Handling

Use a traffic control plan for handling traffic through the various phases of construction. Follow the phasing sequence unless otherwise agreed upon by the Engineer. Ensure this plan conforms to the latest "Texas Manual on Uniform Traffic Control Devices" and the latest Barricade and Construction (BC) Standard Sheets. The latest versions of Work Zone Standard Sheets WZ (BTS-1) and WZ (BTS-2) are the traffic control plan for the signal installations.

Submit changes to the traffic control plan to the Engineer. Provide a layout showing the construction phasing, signs, striping, and signalizations for changes to the original traffic control plan.

Furnish and maintain the barricades and warning signs, including the necessary temporary and portable traffic control devices, during the various phases of construction. Place and construct these barricades and warning signs in accordance with the latest "Texas Manual on Uniform Traffic Control Devices" for typical construction layouts.

Cover work zone signs when work related to the signs is not in progress, or when any hazard related to the signs no longer exists.

Keep the delineation devices, signs, and pavement markings clean. This work is subsidiary to the Item, "Barricades, Signs, and Traffic Handling."

If a section is not complete before the end of the workday, pull back the base material to the existing pavement edge on a 6H: 1V slope. Edge drop-offs during the hours of darkness are not permitted.

Cover or remove the permanent signs and construction signs that are incorrect or that do not apply to the current situation for a particular phase.

General Notes

Sheet O

County: Montgomery

Control: CSJ 0912-37-232

Project Name: Northpark Drive Overpass Project (T-1013)

Do not mount signs on drums or barricades, except those listed in the latest Barricades and Construction standard sheets.

Use traffic cones for daytime work only. Replace the cones with plastic drums during nighttime hours.

Place positive barriers to protect drop-off conditions greater than 2 ft. within the clear zone that remain overnight.

Law enforcement assistance will be required for this project and is expected to be required for major traffic control changes and lane closures. Coordinate with local law enforcement and arrange for law enforcement as directed or agreed by the Engineer.

Provide full-time, off-duty, uniformed, certified peace officers, as part of traffic control operations. The peace officers must be able to show proof of certification by the Texas Commission on Law Enforcement Officers Standards. The cost of the officers is paid for on a force account basis.

A minimum of 7 days in advance of any total closure, notify the Houston District Public Information Office of which roadways, ramps, intersections, or lanes will be closed, the dates they will remain closed, and when they will be opened again to traffic.

A minimum of 7 days in advance of any total closure, place a portable changeable message (PCM) sign at the location of each total closure which informs the traveling public of the details of the closure. Alternately, if the Traffic Control Plan provides a positive barrier at the location, a non-trailer mounted static message board sign behind the positive barrier may be used in place of a PCM.

Minimize the number of working days for street closures. The following table lists the maximum number of working days allowed for each street closure. The closure period for each intersection occurs only during the phase when constructing that street, unless otherwise directed. Reopen the street within the number of working days allowed; otherwise the Engineer may cease construction activities not affiliated with reopening the closed street, until it fully reopens to the traveling public. Time charges will not be suspended nor increased to compensate for this occurrence.

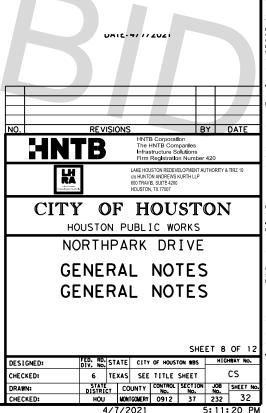
Street Name	Number of Working Days Allowed for Closure
Loop 494	2 days
Russell Palmer Road	2 days
Northpark Dr / Loop 494 Intersection	2 days

General Notes

Sheet P



Sheet P



Sheet Q

County: Montgomery

Control: CSJ 0912-37-232

Project Name: Northpark Drive Overpass Project (T-1013)

Before closing any City of Houston sidewalk, one or more city street lanes, or entire city streets during construction, obtain a permit to do so from the City. Obtain the required permit in person at the City of Houston Permit Office, or apply online at http://www.gims.houstontx.gov.

The Contractor Force Account "Safety Contingency" that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

Item 512: Portable Traffic Barrier

Where required by the Engineer, provide anchor pins for Type 2 Low Profile Concrete Barriers (LPCB) as shown on the current LPCB standard. Anchor pins are subsidiary to the Low Profile Concrete Barrier.

Item 514: Permanent Concrete Traffic Barrier

Add a 3/4-in. longitudinal chamfer to the Single Slope Concrete Barrier (SSCB) railing. Provide a continuous chamfer typically located 6 in. above the final grade. The cost of this is subsidiary to the Item, "Permanent Concrete Traffic Barrier."

Item 529: Concrete Curb, Gutter, and Combined Curb and Gutter Item 530: Intersections, Driveways, and Turnouts Item 531: Sidewalks

An air-entraining admixture is not required.

For concrete curbs, use Grade 7 aggregate conforming to Section 421.2.6 of the Item, "Hydraulic Cement Concrete."

For driveways and turnouts, coarse aggregate Grade No. 3 through No. 8 conforming to the gradation requirements specified in the Item, "Hydraulic Cement Concrete" will be permitted.

For reinforcing steel in sidewalks and pedestrian ramps, use No. 4 bars at a maximum 18 in. spacing center-to-center in both directions.

Item 540: Metal Beam Guard Fence

Painting the timber posts is not required.

Use timber posts for galvanized steel metal beam guard fence, except for anchorage at turned down ends.

General Notes

Sheet Q

County: Montgomery

Control: CSJ 0912-37-232

Project Name: Northpark Drive Overpass Project (T-1013)

Furnish and install wood blocks between the rail elements and the timber posts as detailed on the plans. These block-outs are subsidiary to this bid Item.

The quantity of the metal beam guard fence is subject to change.

Provide a mow strip as shown on the plans, at metal beam guard fence locations, including any guardrail end treatments.

Galvanize the rail elements supplied for this project by using a Type II Zinc Coating.

At locations requiring attachment of Metal Beam Guard Fence (MBGF) to concrete railing or concrete traffic barrier, repair and fill any existing holes in the railing or barrier that are not in the correct location for attaching the new MBGF. Perform this work in accordance with the Item, "Concrete Structure Repair." Existing anchor bolt holes that cannot be utilized must be filled with an epoxy grout before drilling new holes. Then core-drill new holes in the correct locations and repair any resulting spalls at no expense to the Department. This work is considered subsidiary to the MBGF transition section (Item 540).

Item 545: Crash Cushion Attenuators

After completing the project, return remaining unused crash cushion attenuators units to the Area Office Maintenance yard or as directed, at no cost to the Department.

A MASH compliant crash cushion attenuator is required for every temporary and permanent installation.

Item 556: Pipe Underdrains

Do not use crushed blast furnace slag.

Lay the underdrain pipe on a slope to insure proper drainage.

Tie the under drain pipe into the inlets as shown on the plans.

Item 610: Roadway Illumination Assemblies

The cost of providing the electrical conductor in the pole foundation or in the pole base to make connections is subsidiary to the roadway illumination assembly. The quantity for payment is the surface distance between locations.

Fabricate steel roadway illumination poles in accordance with the latest TxDOT RIP (Roadway Illumination Poles) Standards. Poles manufactured according to the latest RIP Standards require no shop drawings. Alternate designs to TxDOT's RIP Standards or the use of aluminum to fabricate poles will require the submission of shop drawings electronically.

General Notes

Sheet R

Sheet R

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Sheet S

County: Montgomery

Control: CSJ 0912-37-232

Project Name: Northpark Drive Overpass Project (T-1013)

For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25 ft. above the surrounding terrain, provide shop drawings (see ftp://ftp.dot.state.tx.us/pub/txdot-info/library/pubs/bus/bridge/e submit guide.pdf) and calculations that are sealed, signed, and dated by a professional engineer registered or licensed in Texas.

Supply anchor bolt assemblies as shown on the RIP standard sheets, unless a larger capacity bolt assembly is required for the 3-second gust wind speed and mounting elevation at the pole installation location.

Item 618: Conduit

When backfilling bore pits, ensure that the conduit is not damaged during installation or due to settling backfill material. Compact select backfill in 3 equal lifts to the bottom of the conduit; or if using sand, place it 2 in. above the conduit. Ensure backfill density is equal to that of the existing soil. Prevent material from entering the conduit.

Construct bore pits a minimum of 5 ft. from the edge of the base or pavement. Close the bore pit holes overnight.

Unless otherwise shown on the plans, install underground conduit a minimum of 24 in. deep. Install the conduit in accordance with the latest National Electrical Code (NEC) and applicable TxDOT standard sheets. Place conduit under driveways or roadways a minimum of 24 in. below the pavement surface.

If using casing to place bored conduit, the casing is subsidiary to the conduit.

If placing the conduit under existing pavement to reach the service poles, bore the conduit in place and extend it a minimum distance of 5 ft. bey ond the edge of shoulder or the back of curb.

Where PVC, duct cable, and HDPE conduit 1 in. and larger is allowed and installed per Department standards, provide a PVC elbow in place of the galvanized rigid metal elbow required by the Electrical Details standards. Ensure the PVC elbow is of the same schedule rating as the conduit to which it is connected. Use only a flat, high tensile strength polyester fiber pull tape to pull conductors through the PVC conduit system.

Remove conductor and conduit to be abandoned to 1 ft. below the ground level. This work is subsidiary to the various bid items.

Do not use cast iron junction boxes in concrete traffic barriers and single slope traffic barriers. Use polymer concrete junction boxes in place of the cast iron junction boxes shown on standard sheets CTBI (3), CTBI (4), and SSCB (4). Mount the junction boxes flush (+0 in., -1/2 in.)with the concrete surface of the concrete barrier.

General Notes

Sheet S

County: Montgomery

Control: CSJ 0912-37-232

Project Name: Northpark Drive Overpass Project (T-1013)

Use materials from pre-qualified producers as shown on TxDOT's Construction Division (CST) material producers list. Check the latest links on TxDOT's website for the list. The category is "Roadway Illumination and Electrical Supplies." The polymer concrete barrier box is subsidiary to Item 618, "Conduit."

Item 620: Electrical Conductors

Test each wire of each cable or conductor after installation. Incomplete circuits or damage to the wire or the cable are cause for immediate rejection of the entire cable being tested. Remove and replace the entire cable at no expense to LHRA. Also test the replacement cable after installation.

When pulling cables or conductors through the conduit, do not exceed the manufacturer's recommended pulling tensions. Lubricate the cables or conductors with a lubricant recommended by the cable manufacturer.

For both transformer and shoe-base type illumination poles, provide double-pole breakaway fuse holders as shown on TxDOT's Construction Division (CST) material producers list. Check the latest link on the Department's website for this list. The category is "Roadway Illumination and Electrical Supplies." The fuse holder is shown on the list under Items 610 and 620. Provide 10 Amp time delay fuses.

Ensure that circuits test clear of faults, grounds, and open circuits.

Split bolt connectors are allowed only for splices on the grounding conductors.

For Roadside Flashing Beacon Assemblies (Item 685) and Pedestal Pole Assemblies (Item 687) within the project, provide single-pole breakaway disconnects as shown on the Construction Division (CST) material producers list. Check the latest link on the Department's website for this list. The category is "Roadway Illumination and Electrical Supplies." The fuse holder is shown on the list under Item 685. For underground (hot) conductors, install a breakaway connector with a dummy fuse (slug). Provide dummy fuse (slug). For grounded (neutral) conductors, install a breakaway connector with a white colored marking and a permanently installed dummy fuse (slug).

For electrical licensing and electrical certification requirements for this project, see Item 7 of the Standard Specifications and any applicable special provisions to Item 7.

Item 624: Ground Boxes

The ground box locations are approximate. Alternate ground box locations may be used as directed, to avoid placing in sidewalks or driveways.

Ground metal ground box covers. Bond the ground box cover and ground conductors to a ground rod located in the ground box and to the system ground.

General Notes

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Ground the existing metal ground box covers as shown on the latest standard sheet ED (4)-14.

During construction and until project completion, provide personnel and equipment necessary to remove ground box lids for inspection. Provide this assistance within 24 hours of notification.

Construct concrete aprons in accordance with the latest standard sheet ED (4)-14. Make the depth of the concrete apron the same as the depth of the ground box, except for Type 1 and Type 2 ground boxes. For Type 1 or Type 2 ground boxes, construct the concrete apron in accordance with details shown on the "Ground Box Details Installations" standard.

Item 628: Electrical Services

Verify and coordinate the electrical service location with the engineering section of the appropriate utility district or company.

Identify the electrical service pole with an address number assigned by the Utility Service Provider. Provide 2-in. numerals visible from the highway. Provide numbers cut out aluminum figures nailed to wood poles or painted figures on steel poles or service cabinets.

Item 662: Work Zone Pavement Markings

At the end of each workday, mark roadways that remain open to traffic during construction operations with standard pavement markings, in accordance with the latest "Texas Manual on Uniform Traffic Control Devices."

Using raised markers for removable work zone pavement markings on final concrete surfaces is optional.

For transition lane lines and detour lane lines, use raised pavement markers as shown for solid lines on the latest Barricade and Construction standard sheet for "Work Zone Pavement Marking Details."

Item 666: Reflectorized Pavement Markings

Use Type III glass beads for thermoplastic and multipolymer pavement markings.

Use a 0.100 in. (100 mil) thickness for thermoplastic pavement markings, measured to the top of the thermoplastic, not including the exposed glass beads.

Use a 0.022 in. (22 mil) thickness for multipolymer pavement markings, measured to the top of the multipolymer, not including the exposed glass beads.

For roadways with asphalt surfaces to be striped with work zone or permanent thermoplastic markings, the Contractor has the option to apply paint and beads markings for a maximum 30-

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day period until placing the thermoplastic markings, or until starting the succeeding phase of work on the striped area. Maintain the paint and beads markings, at no expense to LHRA, until placing the thermoplastic markings or starting the succeeding phase of work on the striped area. The work zone markings, whether paint and beads or thermoplastic, are paid under the Item, "Work Zone Pavement Markings" and the markings are paid for only once for the given phase of construction.

If using paint and bead markings as described above, purchase the traffic paint from the open market.

If the Type II markings become dirty and require cleaning by washing, brushing, compressed air, or other approved methods before applying the Type I thermoplastic markings, this additional cleaning is subsidiary to the Item, "Reflectorized Pavement Markings."

Establish the alignment and layout for work zone striping and permanent striping.

Stripe all roadways before opening them to traffic.

Place pavement markings under these items in accordance with details shown on the plans, the latest "Texas Manual on Uniform Traffic Control Devices," or as directed.

When design details are not shown on the plans, provide pavement markings for arrows, words, and symbols conforming to the latest "Standard Highway Sign Designs for Texas" manual.

Place the pedestrian crosswalk pavement markings only after the pedestrian signals and push buttons are installed and operating.

Item 677: Eliminating Existing Pavement Markings and Markers

Remove existing pavement markings on concrete or asphalt surfaces by flail milling or as directed.

	Basis of Estim	ate
Item	Description	Limit and Rate
134	Backfilling Pavement Edges	
	 Asphalt Emulsion 	0.25 Gal. / Sq. Yd.
150	Blading	1 Hr. / Station
247	Flexible Base	
	Crushed Stone	138 Lb. / Cu. Ft.
260	Lime Treatment (Road-Mixed)	
	For materials used as subgrade *	
	• Lime(HYD, COM, or QK)(SLRY) or	6 % by weight based on
	QK(DRY)	100 Lb. / Cu. Ft. subgrade

General Notes

Sheet V



Sheet V

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Project Name: Northpark Drive Overpass Project (T-1013)

Item	Description	Limit and Rate	Unit
263	Lime Treatment (Plant-Mixed)		TON
	 Hydrated Lime 	3 % by weight of flexible	
		base	
275	Cement Treatment (Road-Mixed)		SY
	For materials used as subgrade *		
	• Cement	6 % by weight based on	TON
		100 Lb. / Cu. Ft. subgrade	
292	Asphalt Treatment (Plant-Mixed)	110 Lb. / Sq. YdIn.	TON
	Asphalt	5 % by weight	
	Aggregate	95 % by weight	
310	Prime Coat	0.25 Gal. / Sq. Yd.	GAL
316	Seal Coat		
	• Asphalt	0.40 Gal. / Sq. Yd.	GAL
	 Aggregate 	1/100 Cu. Yd. / Sq. Yd.	CY
	A-R Binder		
	Asphalt (Rubber)	0.55 Gal. / Sq. Yd.	GAL
	Aggregate	1/100 Cu. Yd. / Sq. Yd.	CY
340	Dense-Graded Hot Mix Asphalt (Small	110 Lb. / Sq. YdIn.	TON
	Quantity)		
	• Asphalt	6 % by weight	
	 Aggregate 	94 % by weight	
	Tack Coat		
	 Applied on new HMA 	0.06 Gal. / Sq. Yd.	
	 Applied on Existing HMA 	0.09 Gal. / Sq. Yd.	
	 Applied on Milled HMA 	0.11 Gal. / Sq. Yd.	
342	Permeable Friction Course (PG-Binder)	95 Lb. / Sq. YdIn.	TON
	Asphalt	6.5 % by weight	
	 Aggregate 	93.5 % by weight	
	Permeable Friction Course (A-R Binder)	95 Lb. / Sq. YdIn.	TON
	Asphalt	8 % by weight	
	Aggregate	92 % by weight	
3000	Crack Attenuating Mixture	115 Lb. / Sq. YdIn.	TON
	Asphalt	7.5 % by weight	
	Aggregate	92.5 % by weight	

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Project Name: Northpark Drive Overpass Project (T-1013)

Item	Description	Limit and Rate	
3076	Dense-Graded Hot Mix Asphalt	110 Lb. / Sq. YdIn.]
	 Asphalt 	6 % by weight	
	Aggregate	94 % by weight	
	Tack Coat		
	 Applied on new HMA 	0.06 Gal. / Sq. Yd.	
	 Applied on Existing HMA 	0.09 Gal. / Sq. Yd.	
	 Applied on Milled HMA 	0.11 Gal. / Sq. Yd.	
3077	Superpave Mixtures	100 Lb. / Sq. YdIn.	5
	Asphalt	8 % by weight	
	 Aggregate 	92 % by weight	

* If used in existing roadway base, rate will be determined on a case by case basis.

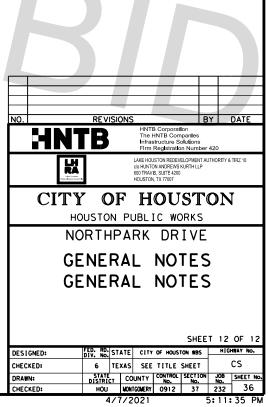
Sheet W

General Notes

Sheet X

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Sheet X

PART I - GENERAL NOTES

THE FOLLOWING NARRATIVE IS A SUPPLEMENT TO THE TRAFFIC CONTROL PLAN (TCP) SHEETS. THE TCP SHEETS DETAIL A GENERAL PLAN FOR CONSTRUCTION PHASING AND TRAFFIC MANAGEMENT.

THE CONTRACTOR MAY PROPOSE/RECOMMEND MODIFICATIONS TO THE SEQUENCE OF WORK FOR CONSIDERATION BY THE ENGINEER. ANY MAJOR RECOMMENDED MODIFICATION BY THE CONTRACTOR SHALL INCLUDE ANY CHANGES TO THE VARIOUS BID ITEMS, IMPACT TO TRAFFIC, AND EFFECT OF OVERALL PROJECT IN TIME AND COST, ETC. IF THIS PROPOSAL IS IMPLEMENTED, THE CONTRACTOR WILL BE RESPONSIBLE FOR DEVELOPING DETAILED PLAN SHEETS TO BE SEALED BY A TEXAS LICENSED ENGINEER.

THE CONTRACTOR CANNOT PROCEED WITH ANY CONSTRUCTION OPERATIONS BASED ON A REVISED PHASE/SEQUENCE UNTIL WRITTEN APPROVAL IS OBTAINED FROM THE ENGINEER. IF AT ANY TIME DURING CONSTRUCTION THE CONTRACTOR'S PROPOSED PLAN OF OPERATION FOR HANDLING TRAFFIC DOES NOT PROVIDE FOR SAFE AND COMFORTABLE MOVEMENT, THE CONTRACTOR WILL IMMEDIATELY CHANGE THEIR OPERATION TO CORRECT THE UNSATISFACTORY CONDITION.

IF THE CONTRACTOR CHOOSES TO USE A DIFFERENT METHOD OF "TRAFFIC CONTROL PLANS" DURING THE CONSTRUCTION THAN WHAT IS OUTLINED IN THE CONTRACT DRAWINGS, THE CONTRACTOR SHALL BE RESPONSIBLE TO PREPARE AND SUBMIT AN ALTERNATE SET OF TRAFFIC CONTROL PLANS TO THE CITY OF HOUSTON PROJECT MANAGER FOR APPROVAL TEN WORKING DAYS PRIOR TO IMPLEMENTATION. THESE PLANS SHALL BE DRAWN TO SALE AND SHALL BE SEALED BY A LICENSED ENGINEER IN THE STATE OF TEXAS. TRANSPORTATION & DRAINAGE OPERATIONS REPRESENTATIVE APPROVAL IS REQUIRED TO ACCEPT THE PROPOSED CHANGES.

CONTRACTOR SHALL SECURE LANE/SIDEWALK CLOSURE PERMITS FROM TRANSPORTATION & DRAINAGE OPERATIONS (MOBILITY PERMIT SECTION AT HTTP://WWW.GIMS.HOUSTONTX.GOV/PORTALWS/MAINPORTAL.ASPX) BEFORE IMPLEMENTING THE TRAFFIC CONTROL PLAN. THE APPLICATION MUST BE SUBMITTED AT LEAST TEN BUSINESS DAYS PRIOR TO THE IMPLEMENTATION OF THE TRAFFIC CONTROL PLAN AND/OR BEGINNING CONSTRUCTION WORK. THE CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL PLANS, CONSTRUCTION SEQUENCING, AND CONSTRUCTION SCHEDULE WITH THE APPLICATION.

CONTRACTOR SHALL HAVE APPROVED TRAFFIC CONTROL PLAN AND PERMIT AT THE JOB SITE FOR INSPECTION AT ALL TIMES.

THE CONTRACTOR IS RESPONSIBLE FOR SCHEDULING AND COORDINATING ALL CONSTRUCTION ACTIVITIES WITH STAKE HOLDERS IN THE VICINITY INCLUDING EMERGENCY RESPONSE AGENCIES SUCH AS HOUSTON POLICE DEPARTMENT, HOUSTON FIRE DEPARTMENT, MONTGOMERY COUNTY, AND METROPOLITAN TRANSIT AUTHORITY.

CONTRACTOR SHALL BE RESPONSIBLE FOR ISSUING ALL WORK DIRECTIVES TO ALL SUB-CONTRACTORS, UTILITY COMPANIES, AND ALL OTHER ENTITIES PERFORMING CONSTRUCTION WORK ASSOCIATED WITH THE PROJECT.

NOTHING IN THESE NOTES OR PLANS SHALL RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT; INCLUDING SAFETY OF ALL MODES OF TRANSPORTATION, PERSONS, AND PROPERTY, AND THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO WORKING HOURS.

THE TRANSPORTATION & DRAINAGE OPERATIONS (MOBILITY PERMITS GROUP) PER THE DIRECTION OF THE CITY TRAFFIC ENGINEER HAVE THE RIGHT TO DEMAND THE INSTALLATION OF ADDITIONAL TRAFFIC CONTROL DEVICES OR MODIFICATIONS TO THESE PLANS AND NOTES, AS DEEMED NECESSARY TO PROMOTE THE SAFE AND ORDERLY FLOW OF TRAFFIC, INCLUDING PEDESTRIANS AND BICYCLES, THROUGH THE CONSTRUCTION WORK ZONE. THE CONTRACTOR SHALL COMPLY WITH THESE ADDITIONAL REQUEST OR MODIFICATIONS WITH DUE DILIGENCE.

ADDITIONAL OFF DUTY POLICE OFFICERS/FLAGGERS MAY BE REQUESTED TO DIRECT TRAFFIC WHEN LANES ARE BLOCKED AT THE DISCRETION OF THE CITY PROJECT MANAGER EVEN IF THEY ARE NOT SPECIFICALLY IDENTIFIED ON THE PROJECT PLANS.

THE CONTRACTOR SHALL REPLACE WITHIN 72 HOURS, ALL TRAFFIC SIGNAL LOOP DETECTORS DAMAGED DURING CONSTRUCTION.

IN GENERAL, A SOLAR POWERED FLASHING ARROW BOARD SHALL BE REQUIRED ON ALL MAJOR THOROUGHFARE LANE CLOSURES. EXCEPTIONS TO FLASHING ARROW BOARDS AND/OR IMPLEMENTATION ON RESIDENTIAL LANE CLOSURES SHALL BE APPROVED BY THE CITY TRAFFIC ENGINEER.

APPROVED TRAFFIC CONTROL PLAN SHALL BE IN PLACE BEFORE STARTING ANY EXCAVATION.

WHEN ENTERING OR LEAVING ROADWAYS CARRYING PUBLIC TRAFFIC, THE CONTRACTORS EQUIPMENT, WHETHER EMPTY OR LOADED SHALL IN ALL CASES YIELD TO PUBLIC TRAFFIC WITH THE ASSISTANCE OF CONTRACTOR PROVIDED CERTIFIED FLAGGER/PEACE OFFICER.

SPILLAGE RESULTING FROM HAULING OPERATIONS ALONG OR ACROSS ANY PUBLIC TRAVELED WAY SHALL BE REMOVED IMMEDIATELY BY THE CONTRACTOR.

MAINTAIN 2 LANES OF TRAFFIC IN EACH DIRECTION ON NORTHPARK DRIVE DURING PEAK HOURS, HOLIDAYS, AND NON-WORK DAYS.

NO LANES SHALL BE CLOSED DURING THE HOURS OF 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM MONDAY THRU FRIDAY WITHOUT APPROVAL OF THE CITY TRAFFIC ENGINEER.

NO WORK SHALL BE PERFORMED IN RESIDENTIAL AREAS FROM 7:00 PM TO 7:00 AM.

HANGING OF BEAMS, PLACEMENT OF BRIDGE DECK FORMWORK AND CONCRETE POURS ABOVE ACTIVE TRAFFIC LANES ARE PROHIBITED. TO ACCOMPLISH NECESSARY BRIDGE CONSTRUCTION OVER ACTIVE LANES, THE CONTRACTOR MAY CLOSE LOOP 494 DURING OFF PEAK HOURS. CLOSURE OF NORTHPARK LANES DURING THIS TIME IS PROHIBITED. OFF PEAK HOURS FOR LOOP 494 ARE 9:00 PM TO 5:00 AM. THE CONTRACTOR SHALL PROVIDE ADEQUATE DETOURS FOR LOOP 494 THROUGH TRAFFIC DURING THIS TIME.

HANGING OF BEAMS, PLACEMENT OF BRIDGE DECK FORMWORK AND CONCRETE POURS ABOVE UPRR TRACKS MUST BE COORDINATED WITH TXDOT AND THE LOCAL UPRR REPRESENTATIVE (NAME: ROOKE JACKSON, NUMBER: 682-274-3898) PRIOR TO TEMPORARY CLOSURE OF TRACKS. SEE RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION.

CONSTRUCTION OF THE EBFR AND WBFR UPRR GRADE CROSSINGS MUST BE COORDINATED WITH TXDOT AND THE LOCAL UPRR REPRESENTATIVE (NAME: ROOKE JACKSON, NUMBER: 682-274-3898) PRIOR TO TEMPORARY CLOSURE OF TRACKS. SEE RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION

TO ACCOMPLISH NECESSARY PHASE 3 BRIDGE CONSTRUCTION ADJACENT TO FRONTAGE ROAD LANES, THE CONTRACTOR MAY CLOSE TWO FRONTAGE ROAD LANES AND TURNAROUNDS DURING OFF PEAK HOURS. ONE THROUGH TRAFFIC LANE MUST REMAIN OPEN. TRAFFIC ON THE OPEN LANE CAN BE TEMPORARILY STOPPED WITH THE USE OF FLAGGER OPERATIONS AND/OR LAW ENFORCEMENT PERSONEL. OFF PEAK HOURS FOR NORTHPARK DRIVE FRONTAGE ROADS ARE 9:00 PM TO 5:00 AM.

THE CONTRACTOR SHALL REQUEST APPROVAL FROM THE ENGINEER FOR ROADWAY CLOSURES AT LEAST 14 CALENDAR DAYS PRIOR TO COSURE. THE CONTRACTOR SHALL PLACE APPROVED ADVANCE WARNING MESSAGE 7 CALENDAR DAYS PRIOR TO CLOSURE.

THE CONTRACTOR SHALL MAINTAIN ACCESS TO DRIVEWAYS AT ALL TIMES. MANAGEMENT OF TRAFFIC FOR UTILITY CONSTRUCTION AND OTHER CONSTRUCTION ACTIVITIES NOT SPECIFICALLY ADDRESSED IN THE TRAFFIC CONTROL PLANS SHALL ADHERE TO THE STANDARD TRAFFIC CONTROL PLANS HEREIN.

ACCESS TO DRIVEWAYS ADJACENT TO THE CONSTRUCTION WORK ZONE SHALL BE MAINTAINED AT ALL TIMES AS MUCH AS POSSIBLE. ADDITIONAL CONES AND/OR DELINEATORS MAY BE REQUIRED TO DELINEATE THE DRIVEWAY ACCESS ROUTE THROUGH THE CONSTRUCTION WORK ZONE. A MINIMUM OF ONE TRAVEL LANE SHALL BE MAINTAINED ACROSS THE DRIVEWAYS, UNLESS PRIOR WRITTEN APPROVAL IS OBTAINED FROM CITY OF HOUSTON PROJECT MANAGER.

THE CONTRACTOR SHALL RESTORE OVERNIGHT 3:1 SLOPE AT DROP OFFS MORE THAN 2-INCHES.

CONTRACTOR SHALL COVER OPEN PAVEMENT EXCAVATIONS FOR MINOR UTILITY WORK WITH ANCHORED STEEL PLATES DURING NON-WORKING HOURS, AND OPEN LANES FOR NORMAL TRAFFIC FLOW WHEN FEASIBLE.

THE CONTRACTOR SHALL PROVIDE ALL ADVANCE WARNING SIGNS PER TXDOT STANDARD BC(1-2)-14 FOR THE PROJECT LIMITS.

PROVIDE ADDITIONAL SIGNS AND BARRICADES AS DIRECTED TO MAINTAIN TRAFFIC SAFETY DURING CONSTRUCTION. CONSIDER THIS WORK SUBSIDIARY TO ITEM 502 "BARRICADES, SIGNS, AND TRAFFIC HANDLING."

REMOVAL OF EXISTING ITEMS SHALL BE DONE ONLY IN AREAS WHERE WORK IS OCCURING AS NOTED IN THE SEQUENCE OF CONSTRUCTION AND/OR SHOWN IN THE TCP PLANS.

UNLESS NOTED OTHERWISE IN THE PLANS, BARRIER PLACEMENT FOR MAJOR TRAFFIC SHIFTS IS ONLY TO OCCUR DURING OFF-PEAK HOURS (AS DEFINED IN THE GENERAL NOTES.)

INSTALL ALL SWP3 MEASURES NECESSARY AT THE BEGINNING OF EACH PHASE OF CONSTRUCTION. REFER TO THE SWP3 PLAN SHEETS.

WHEN TEMPORARY SIGNS ARE REQUIRED TO MAINTAIN TRAFFIC, CONFLICTING PERMANENT SIGNS WILL BE REMOVED OR COVERED PRIOR TO IMPLEMENTATION OF THE TRAFFIC PHASE.

ALL TRAFFIC CONTROL MEASURES AND DEVICES REQUIRED FOR CONSTRUCTION OF THIS RELOCATION MUST CONFORM TO THE TECHNICAL PROVISIONS AND 2011 EDITION, REVISION 2 OCTOBER 2014, OF THE TMUTCD.

COMPLETELY REMOVE ALL PAVEMENT MARKINGS IN CONFLICT WITH THE TEMPORARY PAVEMENT MARKINGS SHOWN IN THESE PLANS, PAVEMENT MARKING REMOVAL BY OVER-PAINTING IS PROHIBITED.

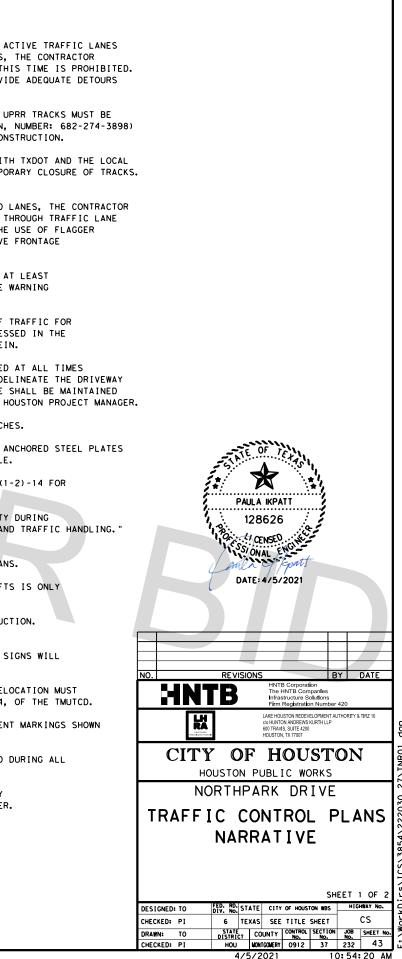
THE CONTRACTOR SHALL REPLACE ANY PERMANENT PAVEMENT MARKINGS THAT ARE REMOVED DURING ALL PHASES OF CONSTRUCTION.

ENSURE ADEQUATE DRAINAGE DURING ALL PHASES OF CONSTRUCTION. SLOTTED TEMPORARY CONCRETE BARRIERS SHALL BE USED WHERE PAVEMENT SLOPES TOWARD TEMPORARY BARRIER. TEMPORARY DRAINAGE IS THE RESPONSIBILITY OF THE CONTRACTOR.

THE CONTRACTOR SHALL COORDINATE WITH TXDOT AND CITY OF HOUSTON FOR SIGNAL REVISIONS AS NECESSARY.

THE CONTRACTOR SHALL COORDINATE WITH ADJACENT PROJECTS AS NECESSARY.

THE MINIMUM LANE WIDTH DURING CONSTRUCTION SHALL BE 10 FEET.



CONSTRUCTION MATERIAL OR EQUIPMENT SHALL NOT BE LEFT IN A POSITION THAT ENDANGERS THE TRAVELING PUBLIC. CONSTRUCTION MATERIAL EQUIPMENT SHALL BE BEHIND BARRIER OR OUTSIDE CLEAR ZONE.

THE CONTRACTOR MAY REMOVE TEMPORARY BARRIER AT THEIR DISCRETION UPON COMPLETION OF WORK WHEN NO PROTECTION OF THE CLEAR ZONE IS REQUIRED.

REMOVE ALL TEMPORARY TRAFFIC CONTROL DEVICES AS SOON AS PRACTICAL WHEN NO LONGER NEEDED OR REQUIRED. TEMPORARY TRAFFIC CONTROL SIGNS, MESSAGE BOARDS, AND ARROW BOARDS THAT ARE NO LONGER APPROPRIATE SHALL BE REMOVED OR COVERED AS SOON AS PRACTICAL.

THE CONTRACTOR SHALL COORDINATE WITH CENTERPOINT AND ENTERGY TO DE-ENERGIZE CONFLICTING OVERHEAD UTILITY LINES DURING ALL PHASES OF CONSTRUCTION.

REFER TO THE LANDSCAPING SHEETS FOR TREE PRESERVATION & TRANSPLANTING REQUIREMENTS, TREE PROTECTION REQUIREMENTS, AND LANDSCAPING GENERAL NOTES.

PART II - CONSTRUCTION NARRATIVE

PHASE 1

CONSTRUCT THE PROPOSED STORM SEWER. CONSTRUCT THE EASTBOUND LANES ANE EAST OF THE UPRR. CONSTRUCT ANDERSON ROAD, KINGS MILL PARK DRIVE, AND RUSSELL PALMER ROAD.

PHASE 1 STEP 1

CONSTRUCT STORM SEWER FROM EAST OF IH-69 TO EAST OF UPRR. CONSTRUCT STORM SEWER FROM NORTHPARK STA 42+50 TO KINGWOOD DIVERSION CHANNEL. CONNECT EXISTING LATERALS TO NEW STORM SEWER. CONSTRUCT THE WESTBOUND DETOUR WITH TEMPORARY ASPHALT. CONSTRUCT THE WESTBOUND DETOUR TEMPORARY DRAINAGE INCLUDING A TEMPORARY SWALE, TEMPORARY INLETS, AND TEMPORARY RCP. CONSTRUCT TEMPORARY PAVEMENT ON ANDERSON ROAD.

PHASE 1 STEP 2

INSTALL TEMPORARY STRIPING ON THE WESTBOUND DETOUR AND SHIFT TRAFFIC. CONSTRUCT REMAINING STORM SEWER UNDER EXISTING WESTBOUND LANES. REMOVE EXISTING CURB AND INSTALL LOW PROFILE CONCRETE BARRIER ALONG THE EXISTING EASTBOUND LANES CONSTRUCT PROPOSED DRAINAGE. CONSTRUCT EASTBOUND LANES INSIDE THE EXISTING NORTHPARK DRIVE MEDIAN WITH PERMANENT AND TEMPORARY PAVEMENT. DO NOT CONSTRUCT PROPOSED MEDIAN CURBS. ADD TEMPORARY PAVEMENT AT EACH TURNAROUND TO TRANSITION BETWEEN EXISTING PAVEMENT AND NEW PAVEME TO ALLOW TURNAROUNDS. CONSTRUCT TEMPORARY ASPHALT TIE-INS AT NORTHPARK STA 78+50 CONSTRUCT PERMANENT AND TEMPORARY PAVEMENT AT ANDERSON ROAD. CONSTRUCT FAST TRACK CONCRETE AT RUSSELL PALMER ROAD. THIS WORK SHOULD BE CONSIDERED WEEKEND WORK. IMPLEMENT THE RUSSELL PALMER DETOUR.

PHASE 1 STEP 3

INSTALL TEMPORARY STRIPING AND LOW PROFILE CONCRETE BARRIER ON NEWLY CONSTRUCTED EASTBOUND LANES AND SHIFT EASTBOUND TRAFFIC. CONSTRUCT PROPOSED DRAINAGE. CONSTRUCT OUTER EASTBOUND LANES AND EBFR EAST OF ANDERSON ROAD. MAINTAIN ACCESS TO ALL DRIVEWAYS AT ALL TIMES. ADJUST BARRIER AND CHANNELING DEVICES AS NECESSARY DURING PHASED CONSTRUCTION. CONSTRUCT REMAINING PERMANENT PAVEMENT AT ANDERSON ROAD. INSTALL TEMPORARY STRIPING AT KINGS MILL PARK DRIVE. CONSTRUCT PERMANENT PAVEMENT AT NORTHBOUND KINGS MILL PARK DRIVE. INSTALL TEMPORARY STRIPING AT RUSSELL PALMER ROAD. CONSTRUCT FAST TRACK CONCRETE PAVEMENT AT RUSSELL PALMER ROAD. THIS WORK SHOULD BE CONSIDERED WEEKEND WORK.

PHASE 1 STEP 4

INSTALL TEMPORARY STRIPING ON ANDERSON ROAD. INSTALL TEMPORARY STRIPING ON KINGS MILL PARK DRIVE AND SHIFT TRAFFIC TO NORTHBOUND LANE. CONSTRUCT PROPOSED DRAINAGE AT KINGS MILL PARK DRIVE. CONSTRUCTION PERMANENT PAVEMENT AT SOUTHBOUND KINGS MILL PARK DRIVE. INSTALL TEMPORARY STRIPING ON RUSSELL PALMER DRIVE. CONSTRUCT FAST TRACK CONCRETE PAVEMENT AT RUSSELL PALMER ROAD. THIS WORK SHOULD BE CONSIDERED WEEKEND WORK.

PHASE 2

CONSTRUCT LOOP 494, REMAINING EBFR, WBFR, AND OUTSIDE LANES OF NORTHPARK DRIVE BETWEEN IH-69 AND LOOP 494.

PHASE 2 STEP 1

INSTALL TEMPORARY STRIPING AND SHIFT TRAFFIC FROM NORTHPARK DRIVE TO PAVEMENT CONSTRUCTED IN PHASE 1. CONSTRUCT PROPOSED DRAINAGE CONSTRUCT WESTBOUND NORTHPARK LANES AND WBFR. MAINTAIN ACCESS TO ALL DRIVEWAYS AT ALL TIMES. ADJUST BARRIER AND CHANNELING DEVICES AS NECESSARY DURING PHASED CONSTRUCTION. CONSTRUCT TEMPORARY PAVEMENT WIDENING ON THE WEST SIDE OF LOOP 494.

PHASE 2 STEP 2

INSTALL TEMPORARY STRIPING ON LOOP 494 AND SHIFT TRAFFIC TO TEMPORARY PAVEMENT CONSTRUCTED IN PHASE 2 STEP 1. CONSTRUCT PROPOSED DRAINAGE ALONG LOOP 494. CONSTRUCT FAST TRACK CONCRETE PAVEMENT AT LOOP 494. THIS WORK SHOULD BE CONSIDERED WEEKEND WORK. CONSTRUCT WESTERN HALF OF LOOP 494 AND ASPHALT TIE-INS.

PHASE 2 STEP 3

INSTALL TEMPORARY STRIPING ON LOOP 494 AND SHIFT TRAFFIC. REMOVE TEMPORARY PAVEMENT ON LOOP 494 CONSTRUCTED IN PHASE 2 STEP 1 CONSTRUCT PROPOSED DRAINAGE ALONG LOOP 494. CONSTRUCT FAST TRACK CONCRETE PAVEMENT AT LOOP 494. THIS WORK SHOULD BE CONSIDERED WEEKEND WORK. CONSTRUCT FAST TRACK CONCRETE PAVEMENT AT LOOP 494. THIS WORK SHOULD BE CONSIDERED WEEKEND WORK. CONSTRUCT FAST TRACK CONCRETE PAVEMENT AT LOOP 494. THIS WORK SHOULD BE CONSIDERED WEEKEND WORK. CONSTRUCT FAST TRACK CONCRETE PAVEMENT AT LOOP 494. THIS WORK SHOULD BE CONSIDERED WEEKEND WORK. CONSTRUCT PROPOSED DRAINAGE ALONG NORTHPARK DRIVE. CONSTRUCT PROPOSED POND EQUALIZER PIPE UNDER NORTHPARK DRIVE AND ALONG NBFR. TEMPORARILY CLOSE BOTH TURN LANES ON THE NBFR AT NORTHPARK DRIVE. CONSTRUCT OUTER NORTHPARK LANES WITH FAST TRACK CONCRETE, PERMANENT PAVEMENT, AND TEMPORARY PAVEMENT. REOPEN THE TURNLANES ON THE NBFR WHEN FAST TRACK CONRETE IS COMPLETE.

PHASE 3

CONSTRUCT NORTHPARK DRIVE OVERPASS AND REMAINING LOOP 494 PAVEMENT.

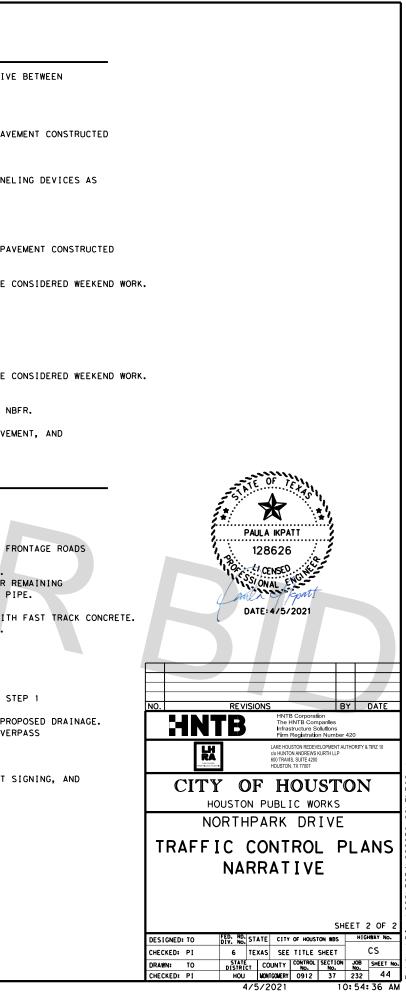
PHASE 3 STEP 1

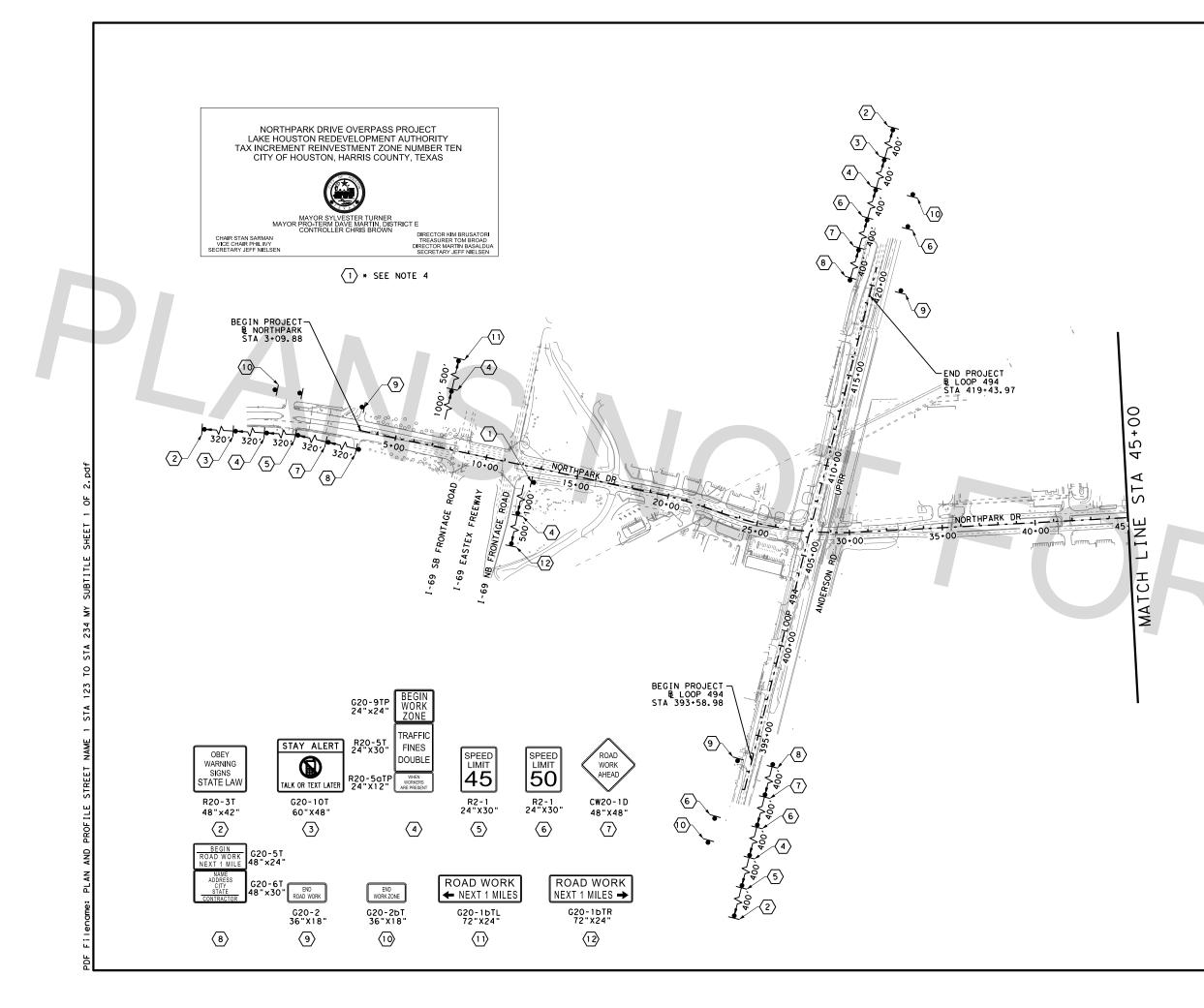
INSTALL TEMPORARY STRIPING AND SHIFT TRAFFIC ON NORTHPARK DRIVE TO THE FRONTAGE ROADS AND OUTSIDE PAVEMENT CONSTRUCTED IN PHASE 2.

INSTALL TEMPORARY STRIPING ON LOOP 494 PAVEMENT CONSTRUCTED IN PHASE 2. CLOSE THE INSIDE LANES OF NORTHPARK DRIVE EAST OF THE UPRR TO ALLOW FOR REMAINING CONSTRUCTION OF MEDIAN, CONCRETE PAVEMENT, AND PROPOSED POND EQUALIZER PIPE. CLOSE LOOP 494 THROUGH TRAFFIC AND IMPLEMENT LOOP 494 DETOUR CONSTRUCT REMAINING LOOP 494 PAVEMENT UNDER NORTHPARK DRIVE OVERPASS WITH FAST TRACK CONCRETE. THIS WORK SHOULD BE CONSIDERED WEEKEND WORK. IMPLEMENT LOOP 494 DETOUR. CONSTRUCT THE INSIDE LANES OF NORTHPARK DRIVE NEAR IH-69.

PHASE 3 STEP 2

INSTALL TEMPORARY STRIPING ON LOOP 494 PAVEMENT CONSTRUCTED IN PHASE 3 STEP 1 INSTALL TEMPORARY STRIPING ON NORTHPARK DRIVE NEAR IH-69. REMOVE TEMPORARY PAVEMENT ON NORTHPARK DRIVE NEAR IH-69 AND CONSTRUCT PROPOSED DRAINAGE. CONSTRUCT RETAINING WALLS, BENTS, AND BRIDGE DECK OF NORTHPARK DRIVE OVERPASS CONSTRUCT TURNAROUNDS WHEN BRIDGE CONSTRUCTION IS COMPLETE. IMPLEMENT LOOP 494 DETOUR AS NECESSARY DURING OVERPASS CONSTRUCTION. COMPLETE ALL MISCELLANEOUS CONSTRUCTION. REMOVE TEMPORARY PAVEMENT, PLACE PERMANENT PAVEMENT MARKINGS, PERMANENT SIGNING, AND INSTALL LANDSCAPING. REMOVE ALL SW3P BEST MANAGEMENT PRACTICES. PERFORM FINAL CLEAN UP.

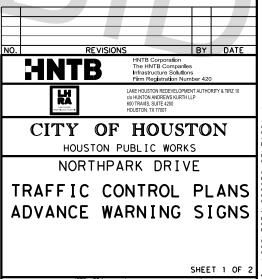




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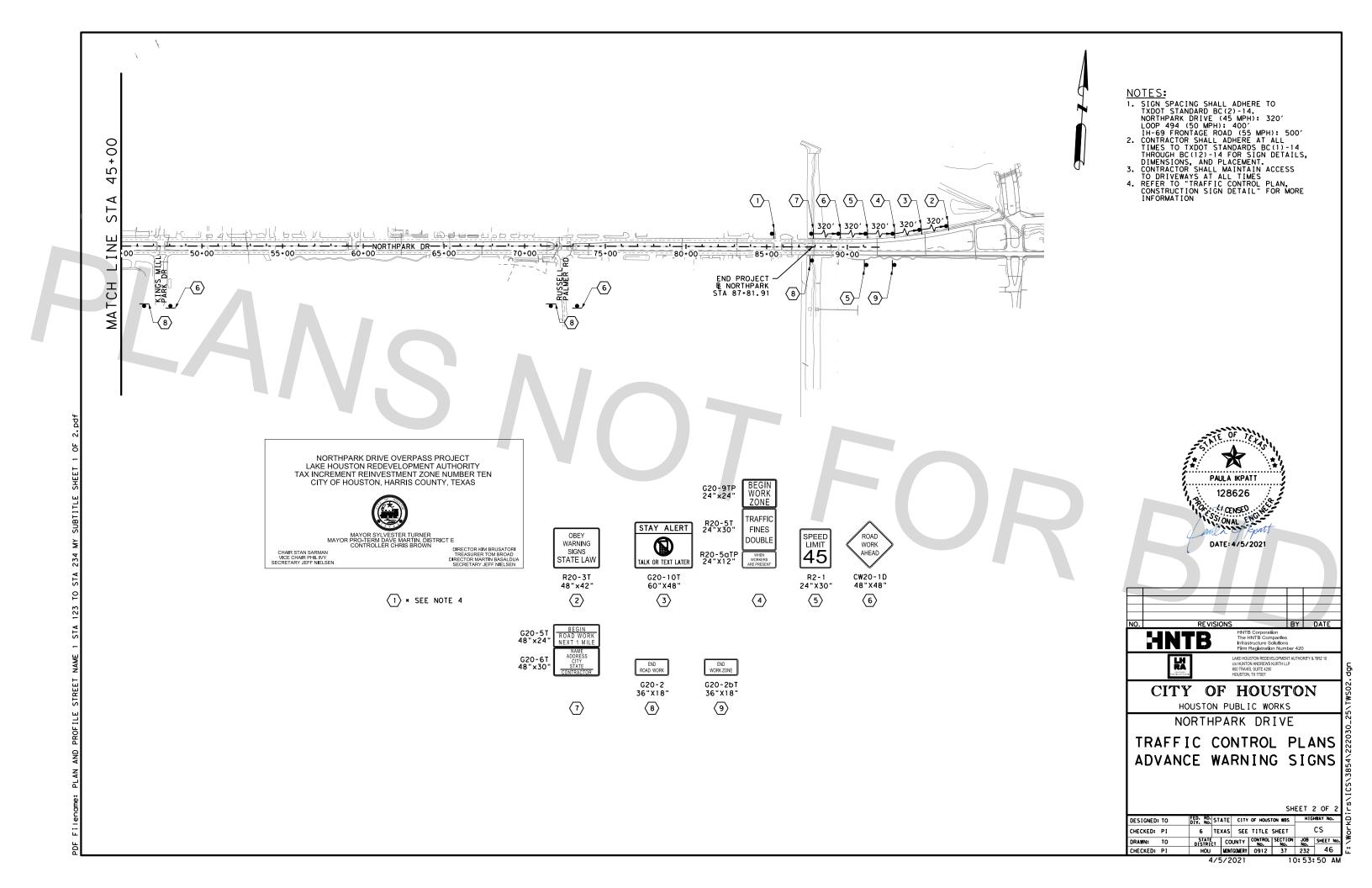
- NOTES: 1. SIGN SPACING SHALL ADHERE TO TXDOT STANDARD BC(2)-14. NORTHPARK DRIVE (45 MPH): 320' LOOP 494 (50 MPH): 400' IH-69 FRONTAGE ROAD (55 MPH): 500' 2. CONTRACTOR SHALL ADHERE AT ALL TIMES TO TXDOT STANDARDS BC(1)-14 THROUGH BC(12)-14 FOR SIGN DETAILS, DIMENSIONS, AND PLACEMENT. 3. CONTRACTOR SHALL MAINTAIN ACCESS TO DRIVEWAYS AT ALL TIMES 4. REFER TO "TRAFFIC CONTROL PLAN, CONSTRUCTION SIGN DETAIL" FOR MORE INFORMATION

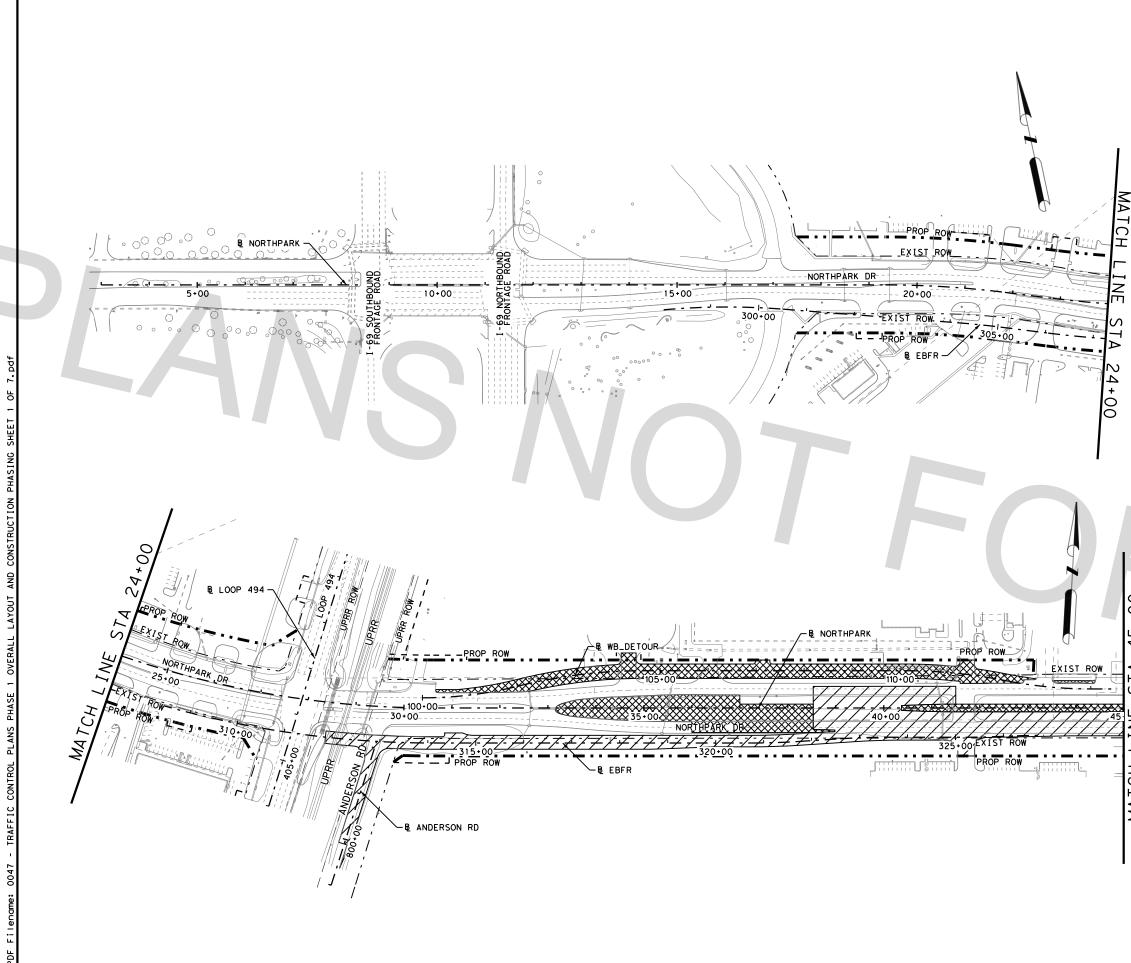


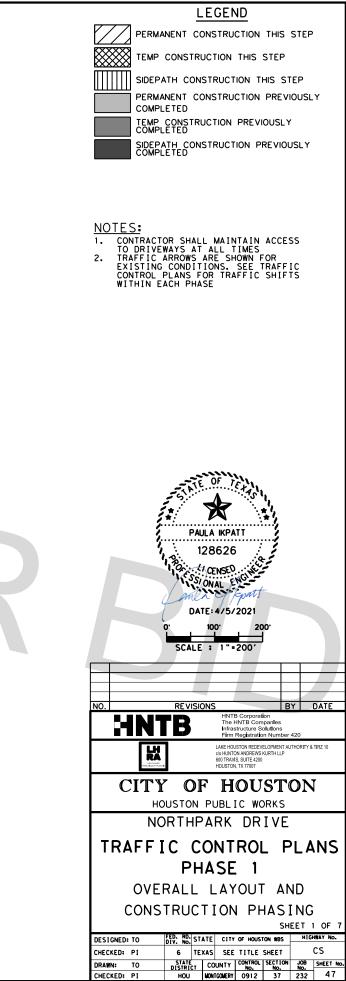


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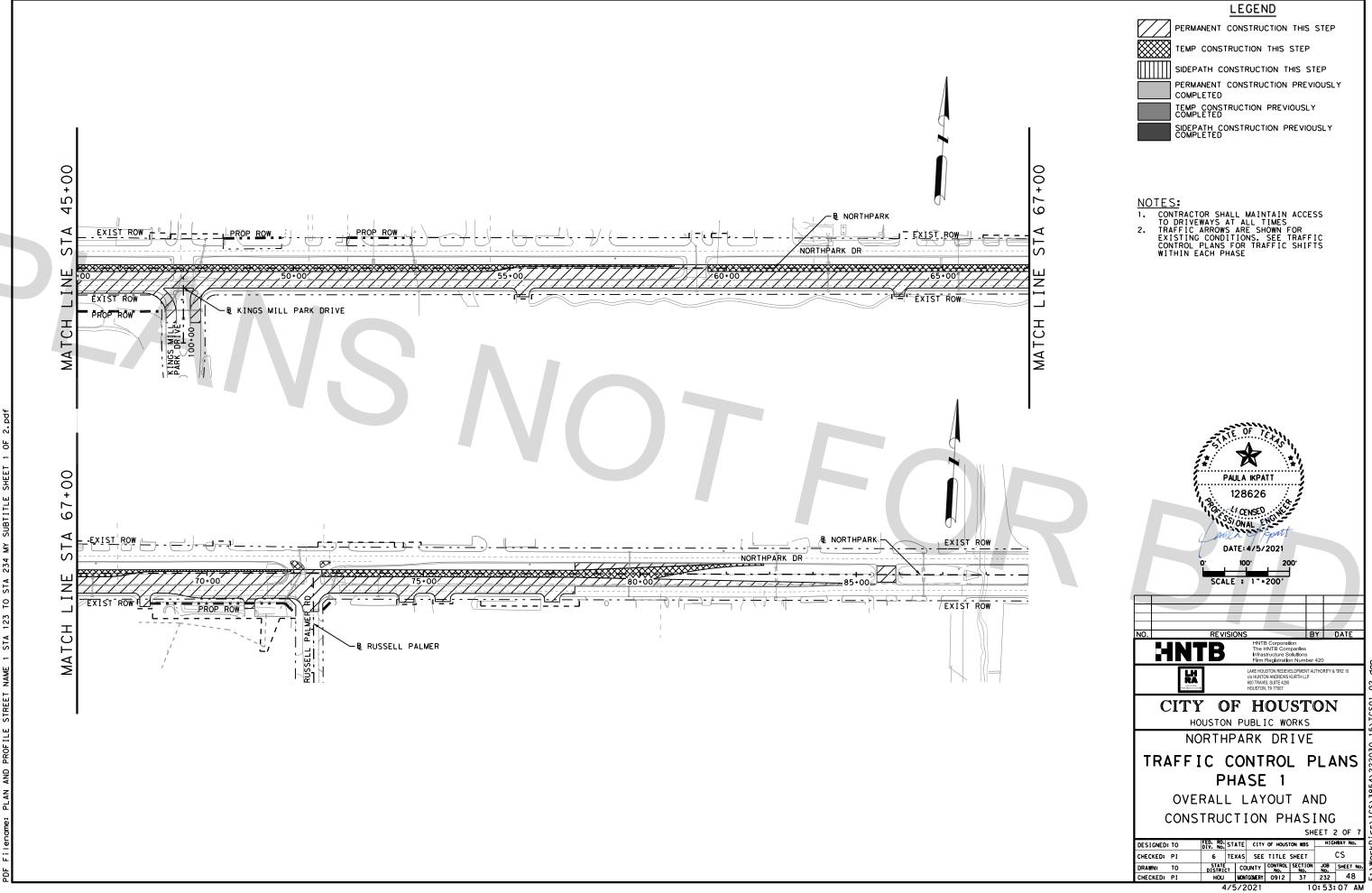
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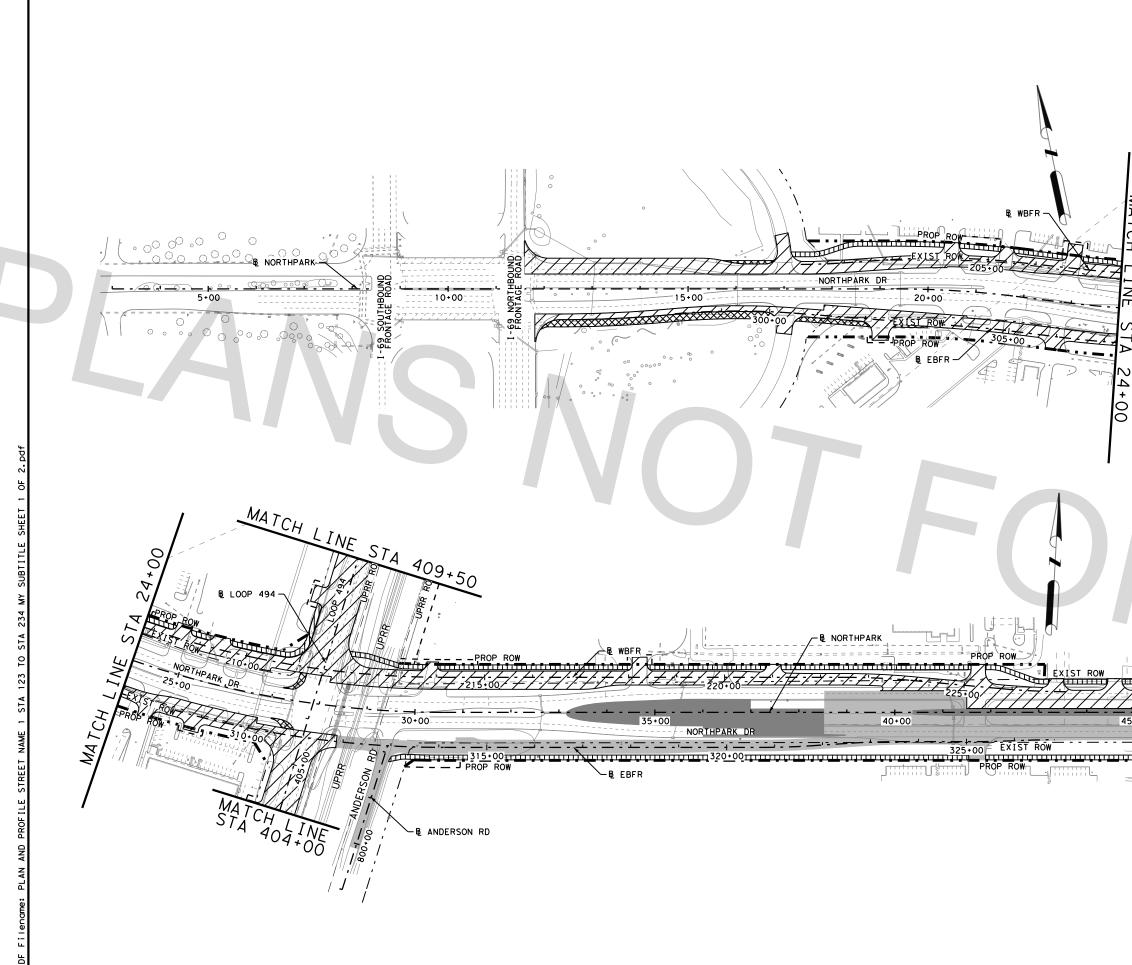
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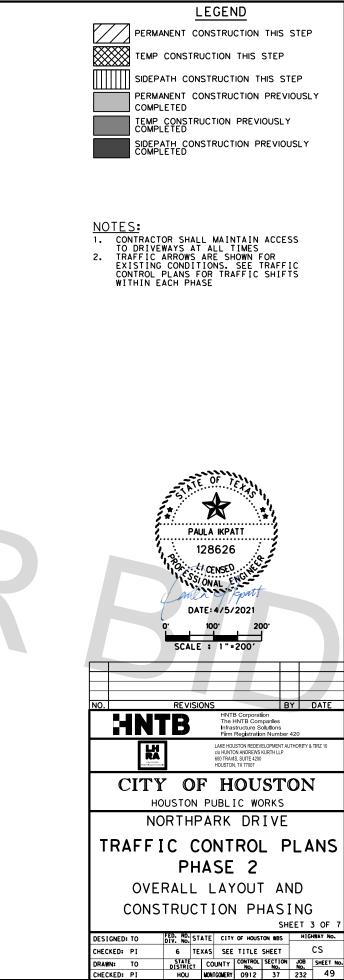
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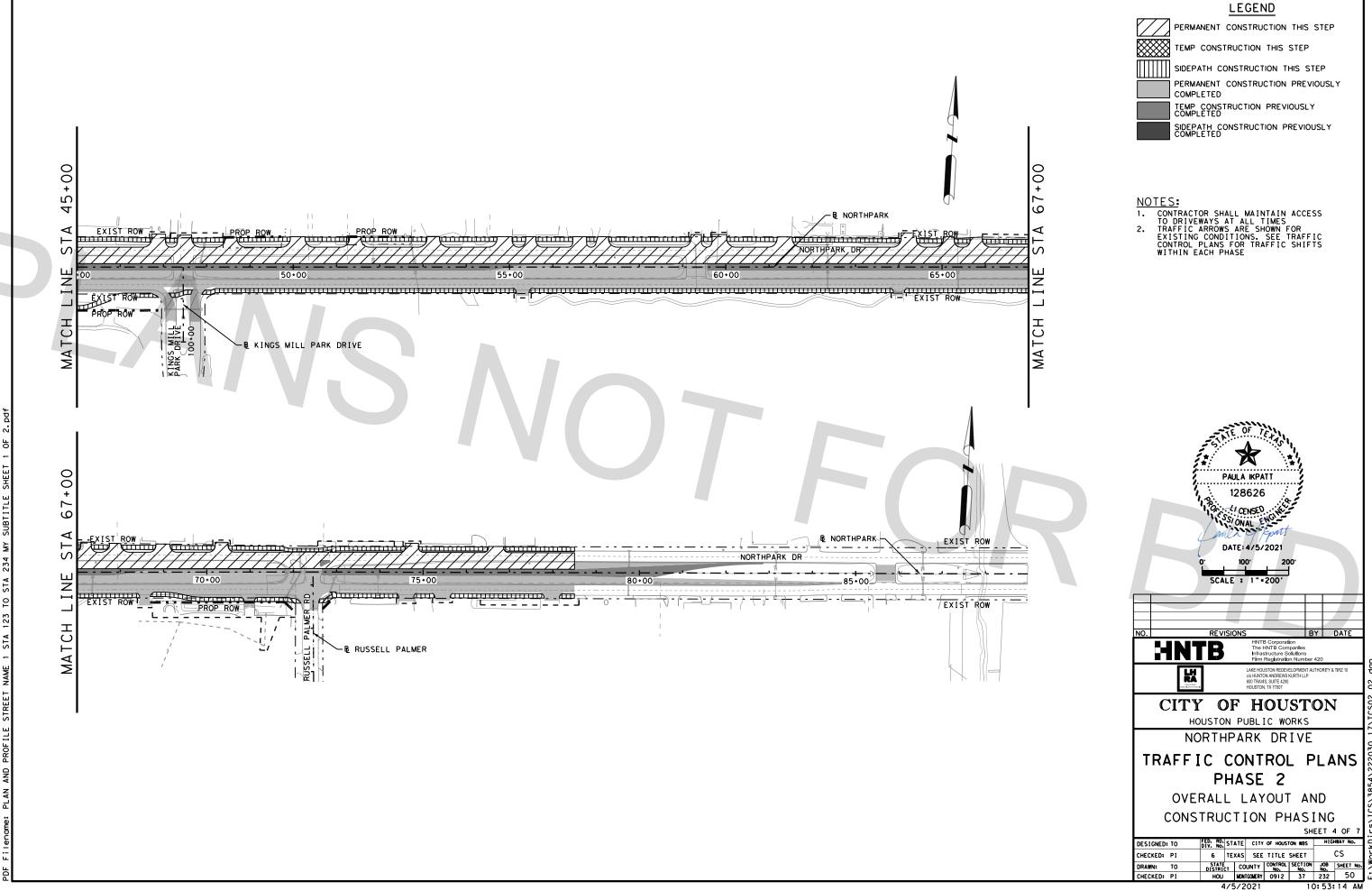
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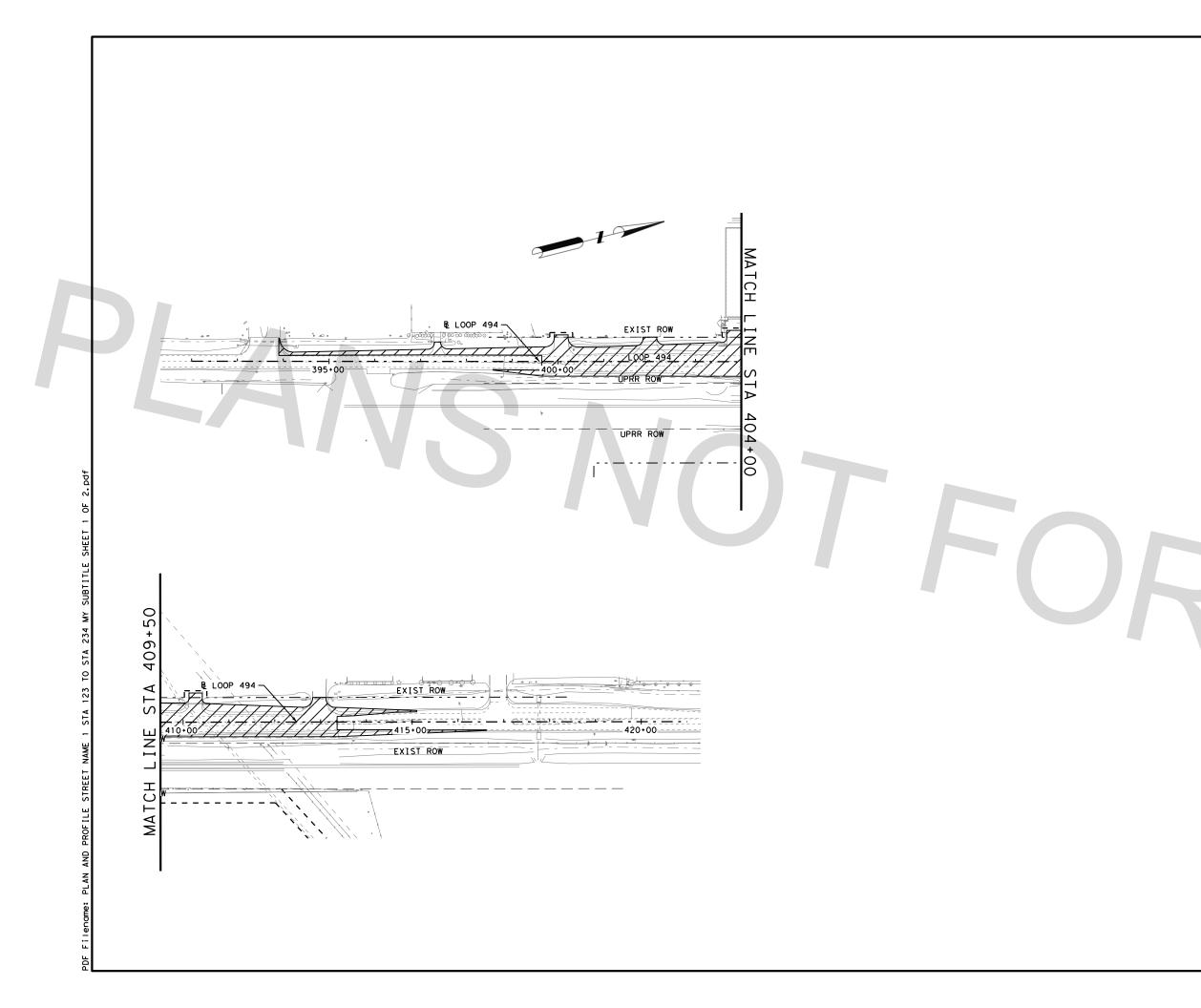
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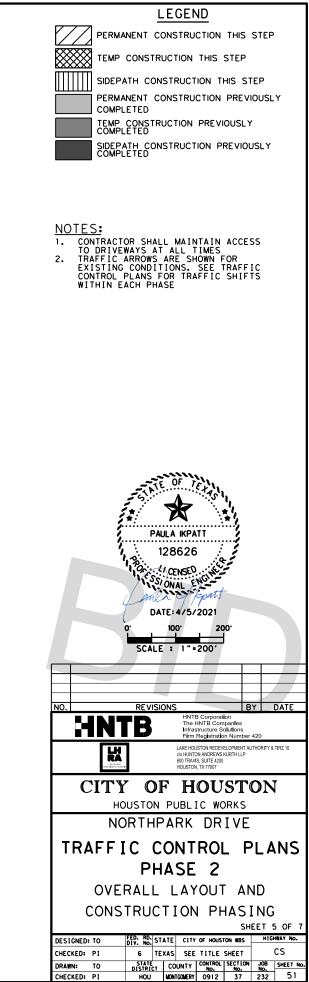
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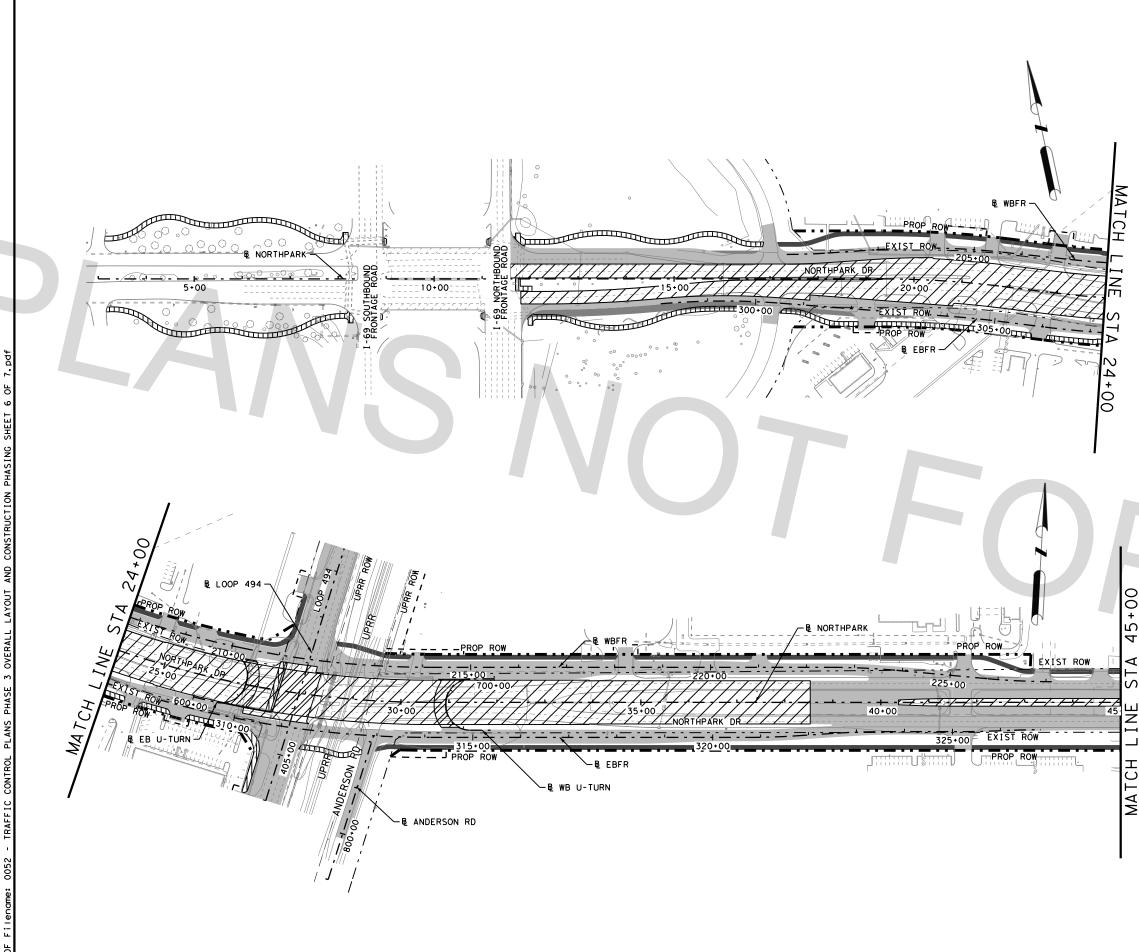


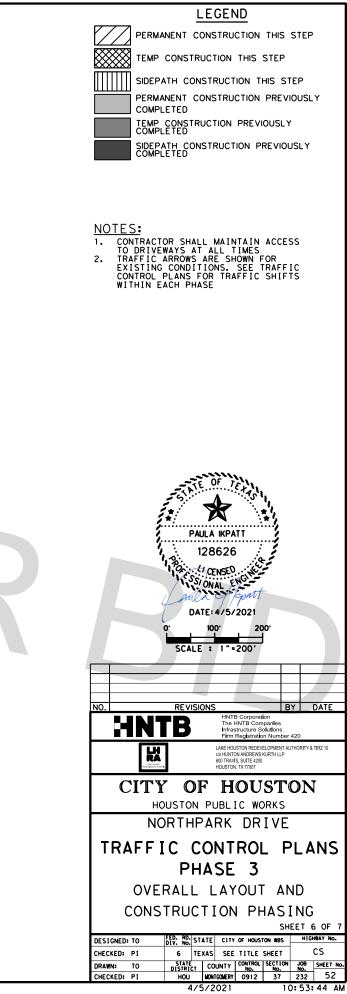




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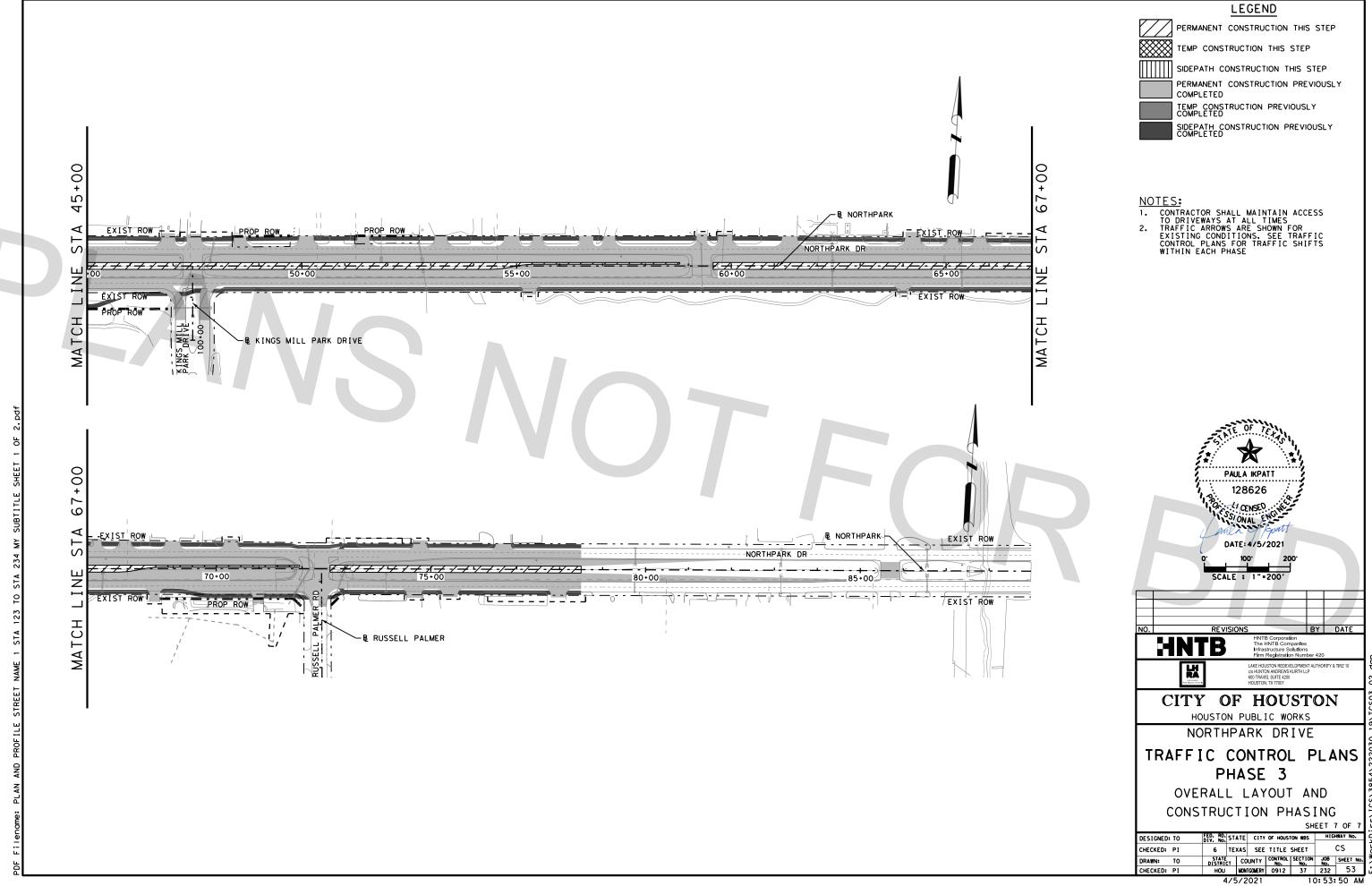


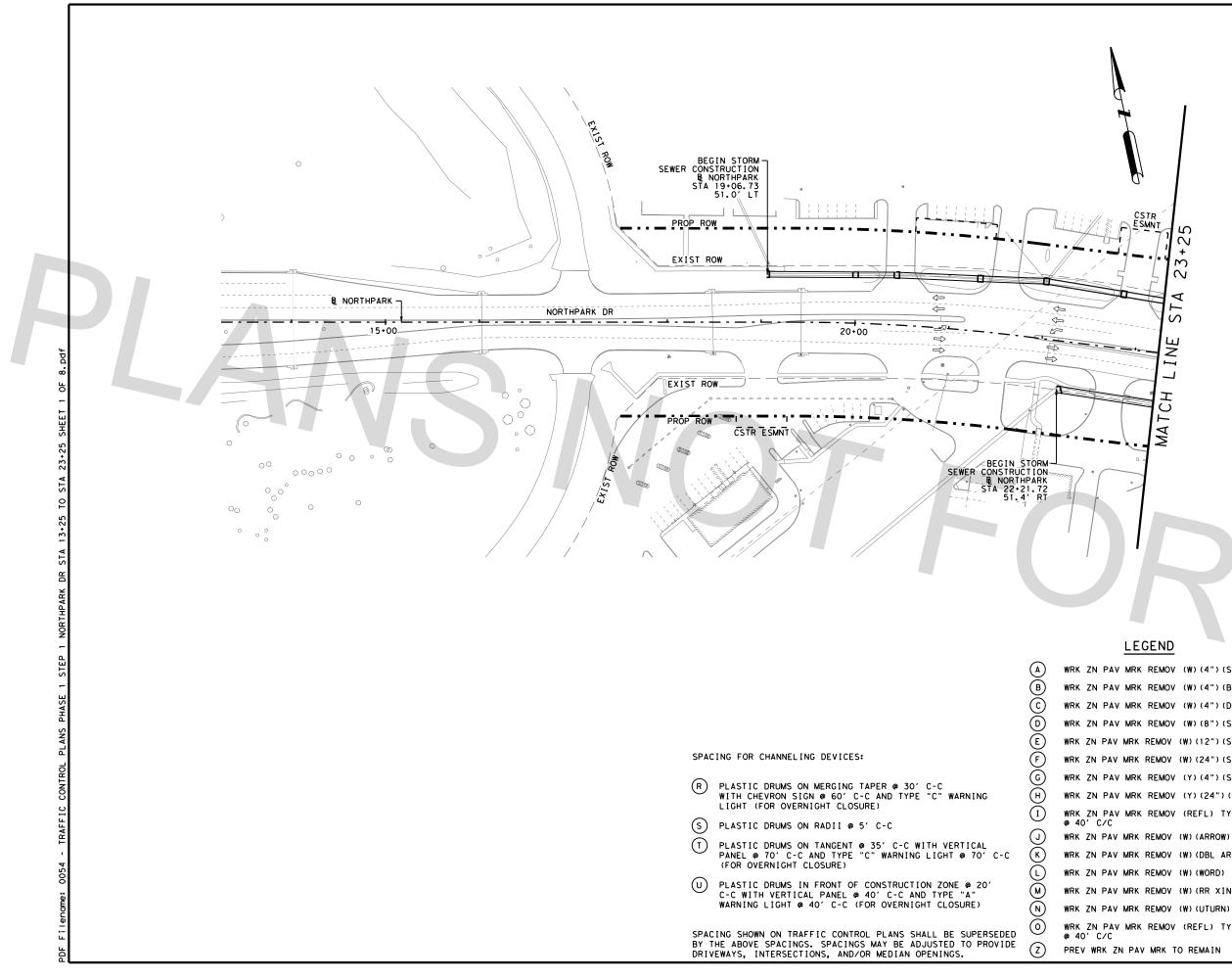
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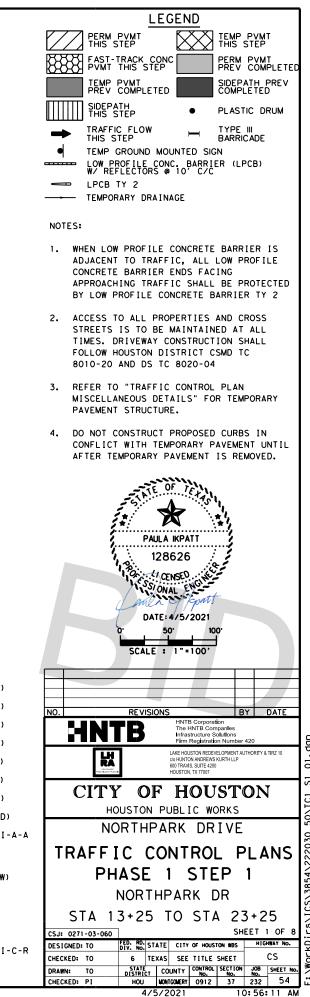
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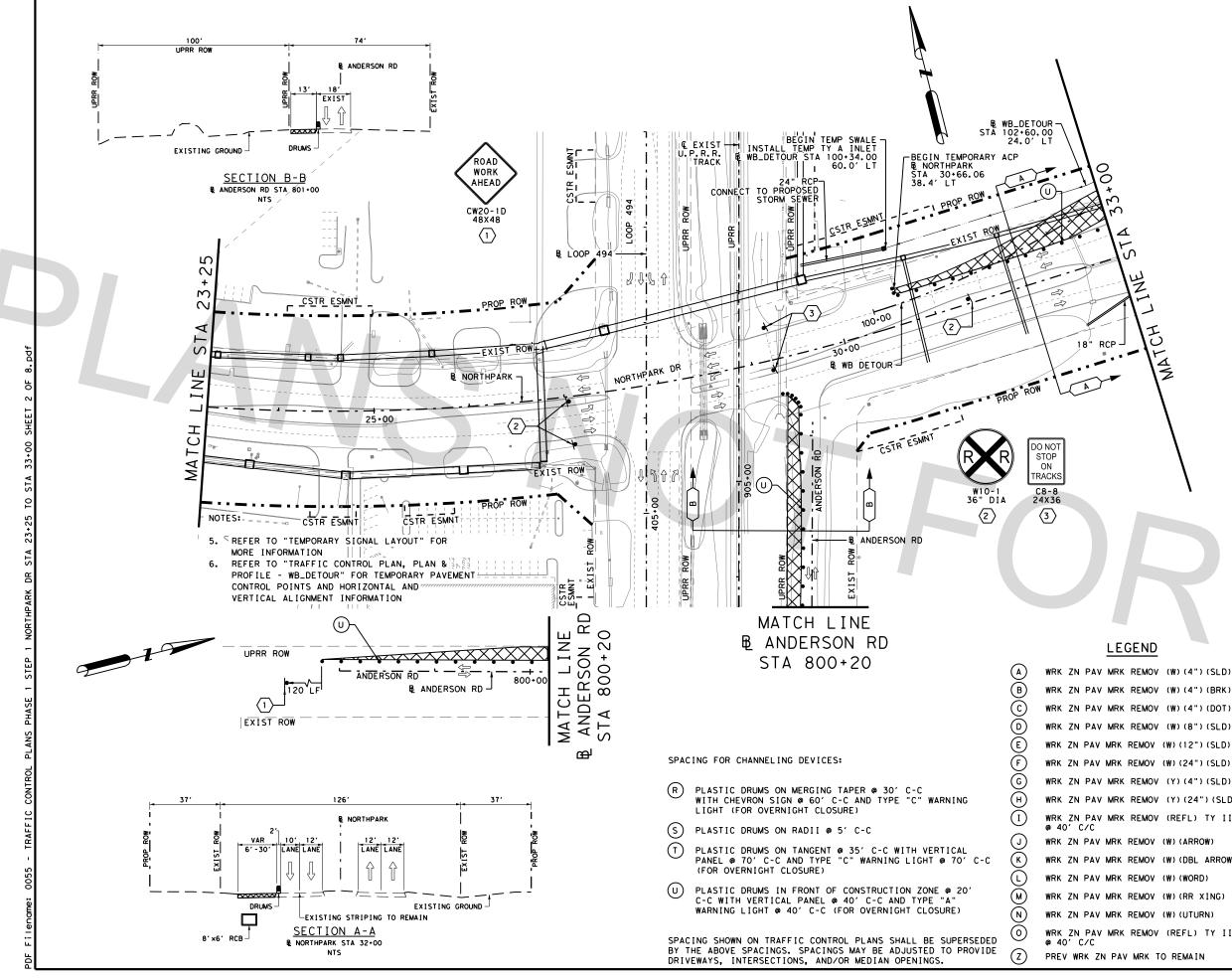
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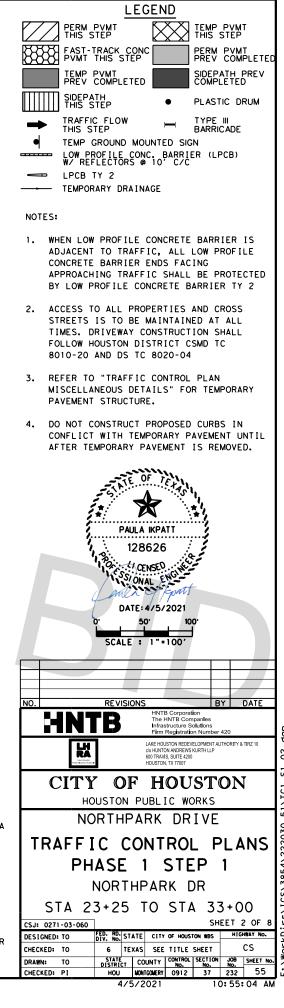
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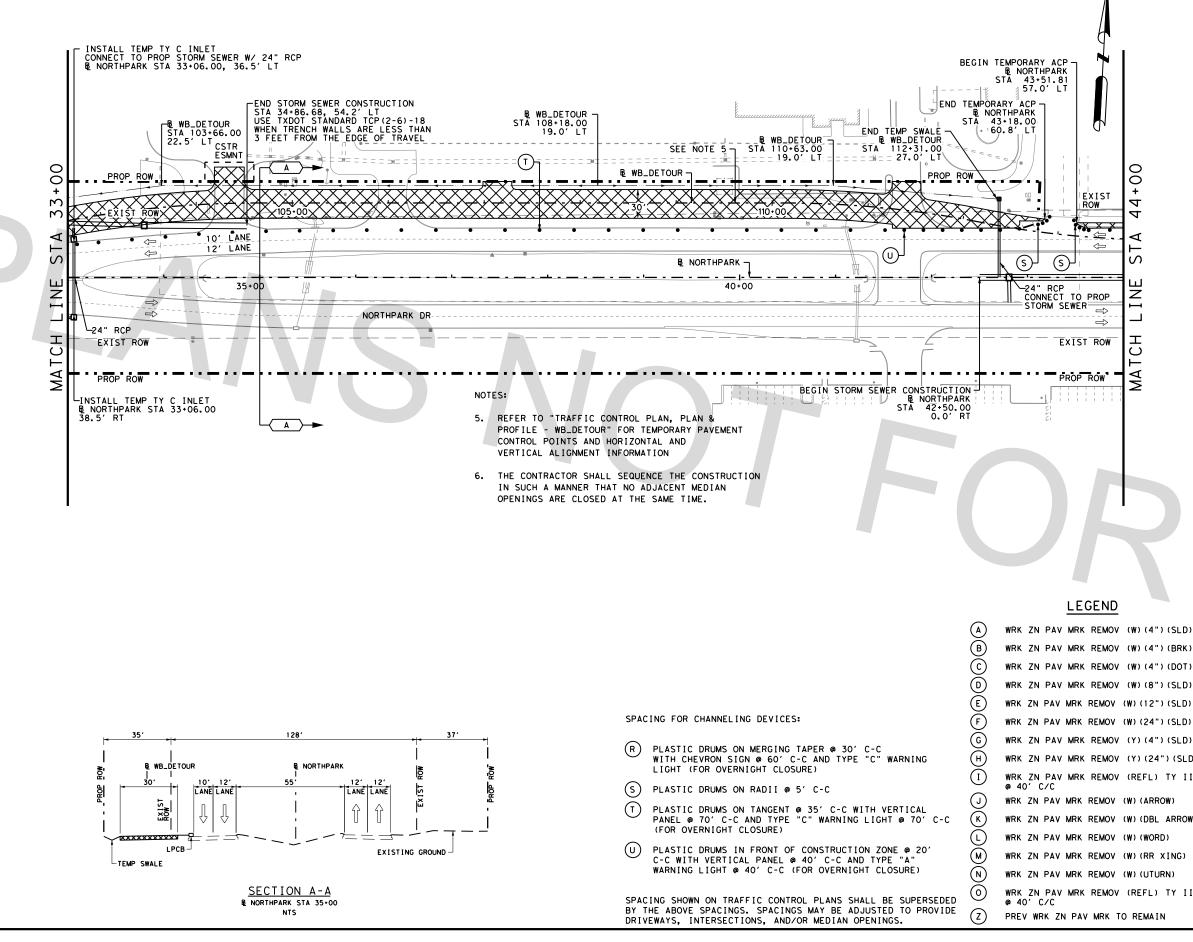
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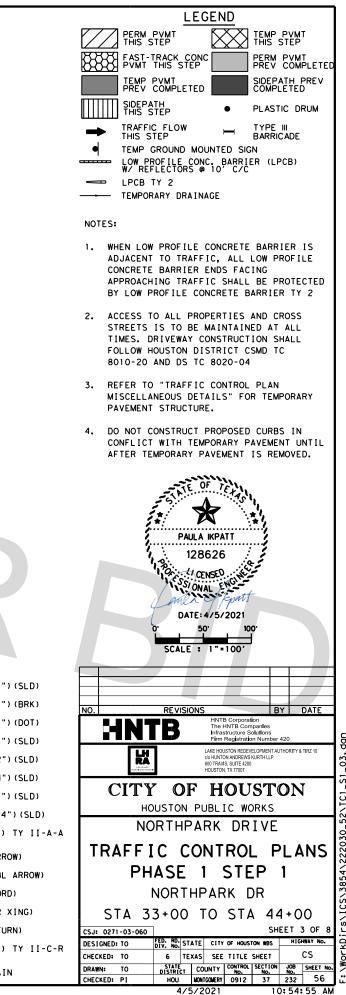




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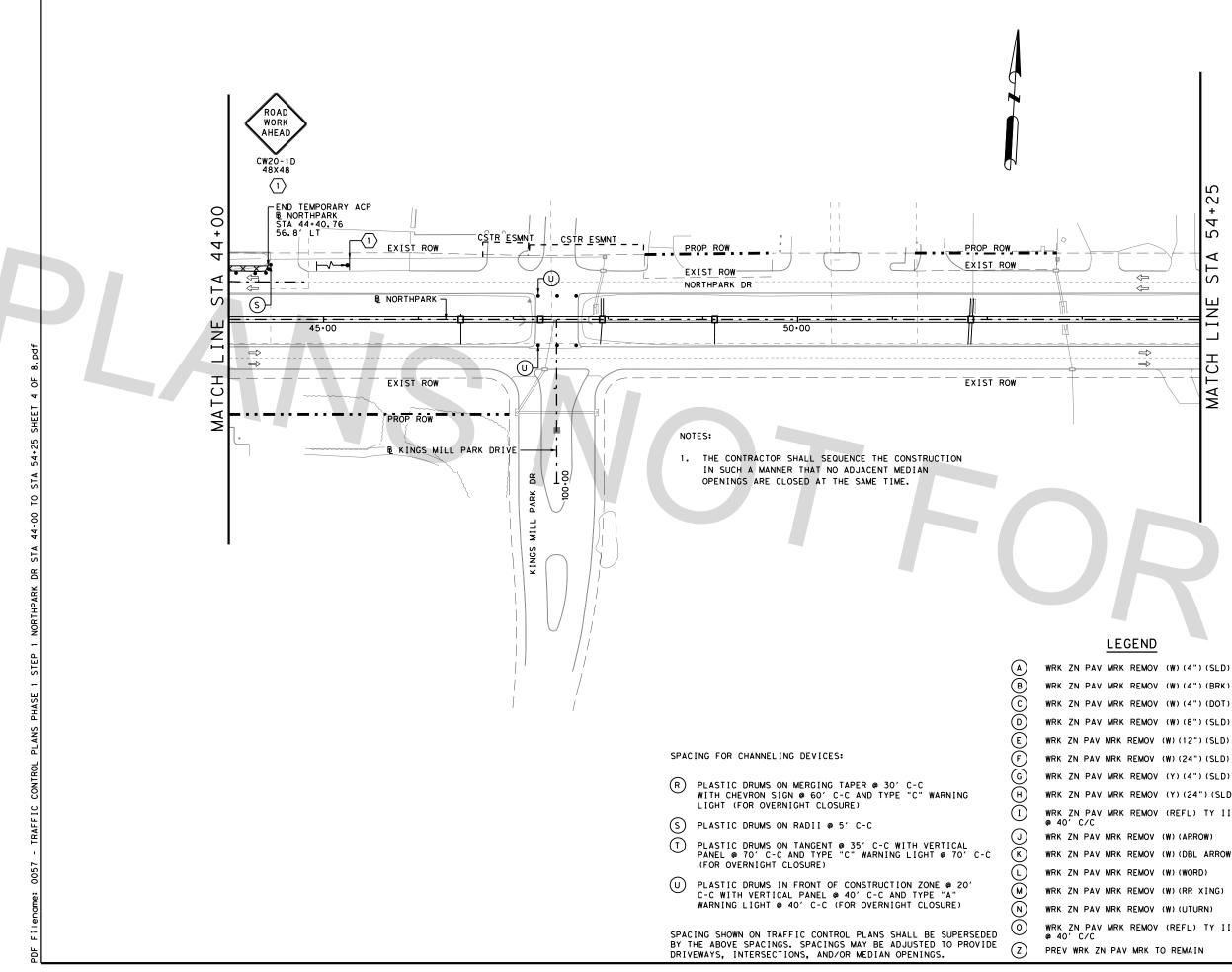
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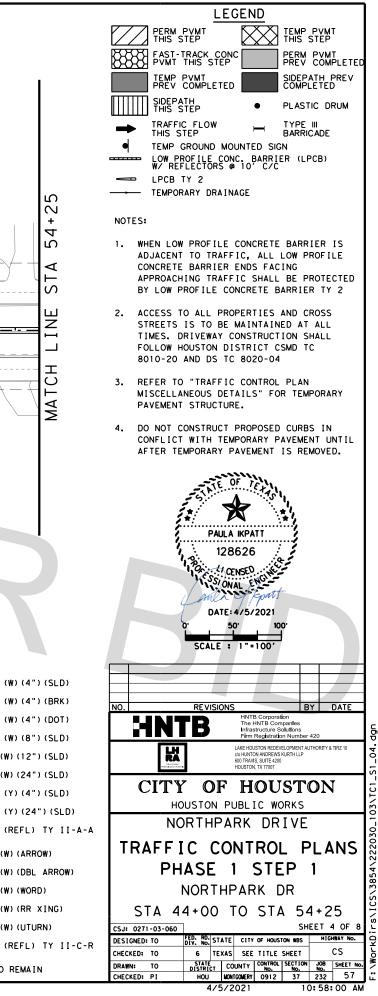
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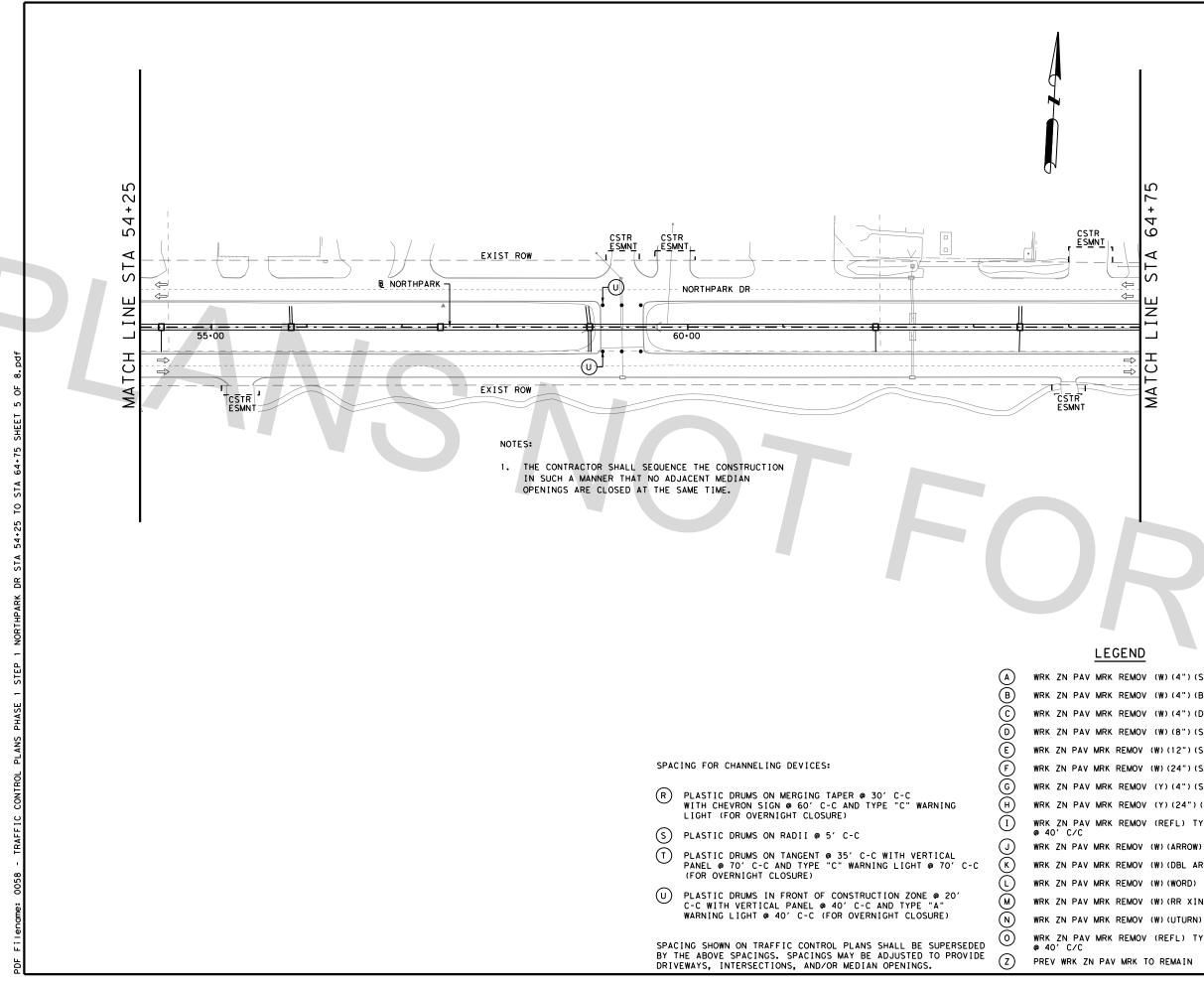
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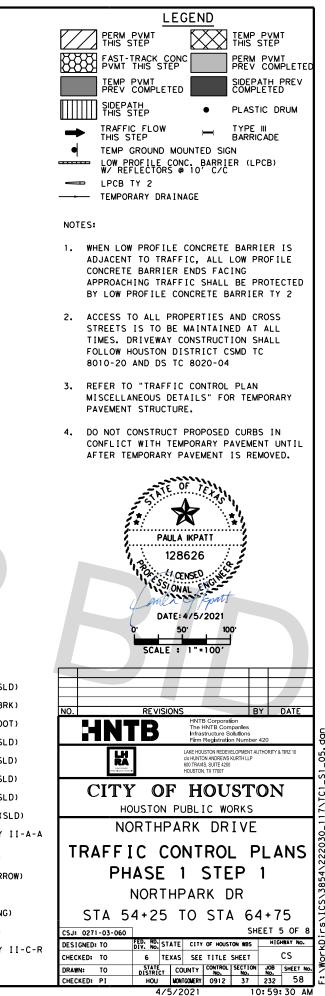
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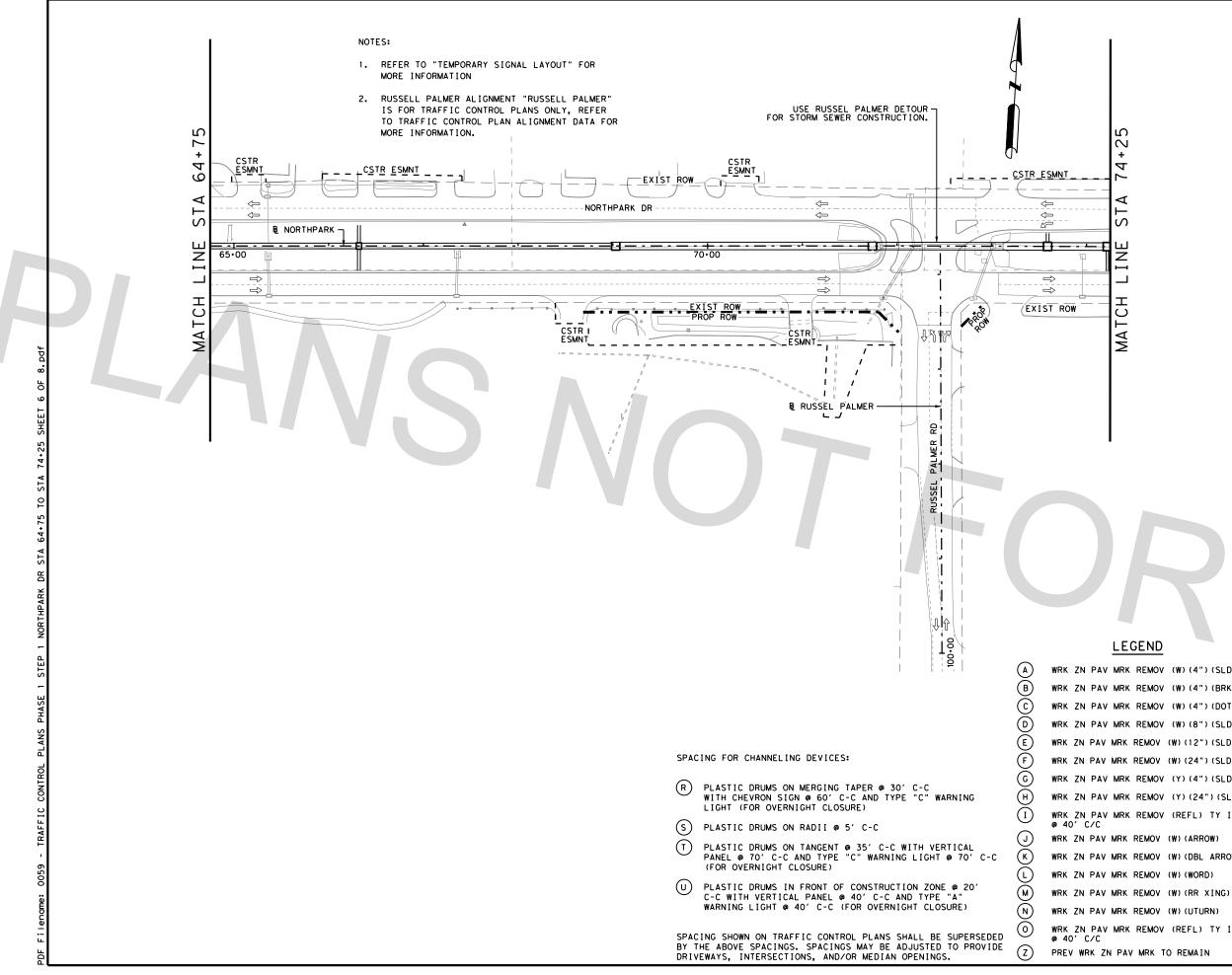
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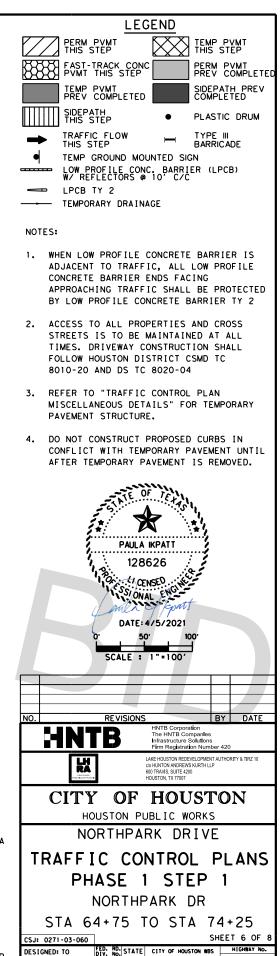
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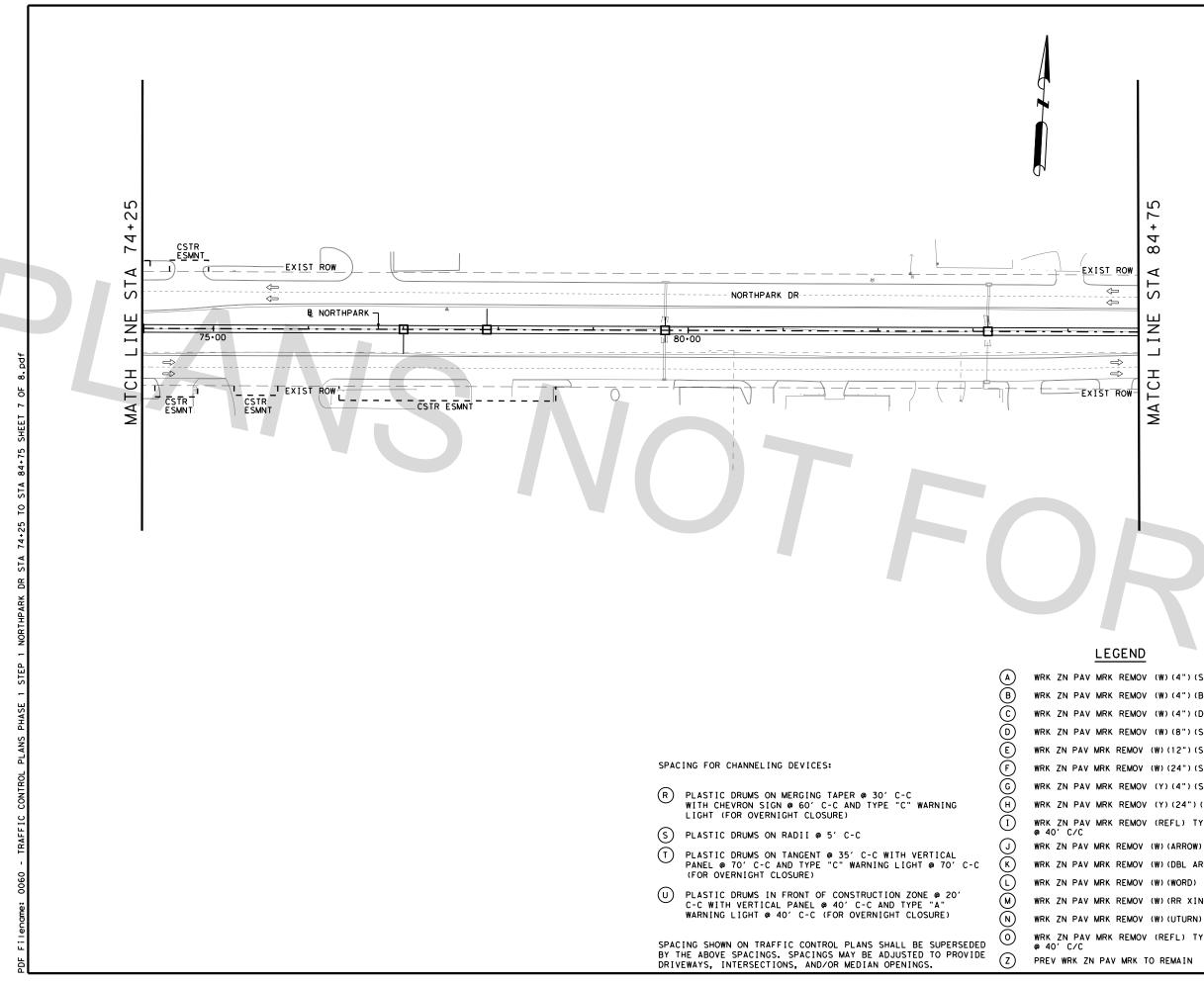
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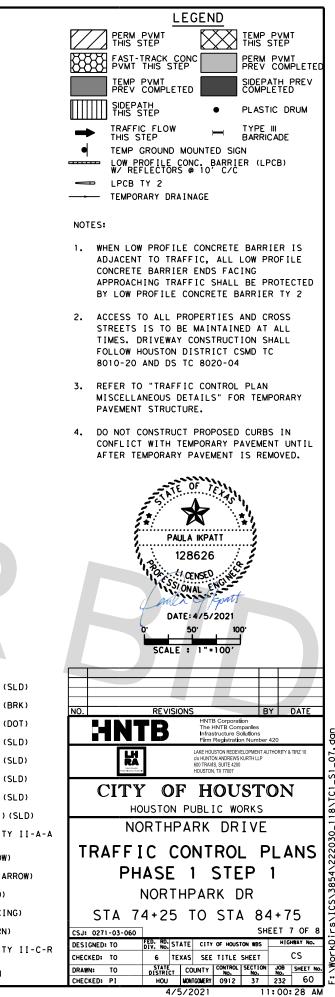
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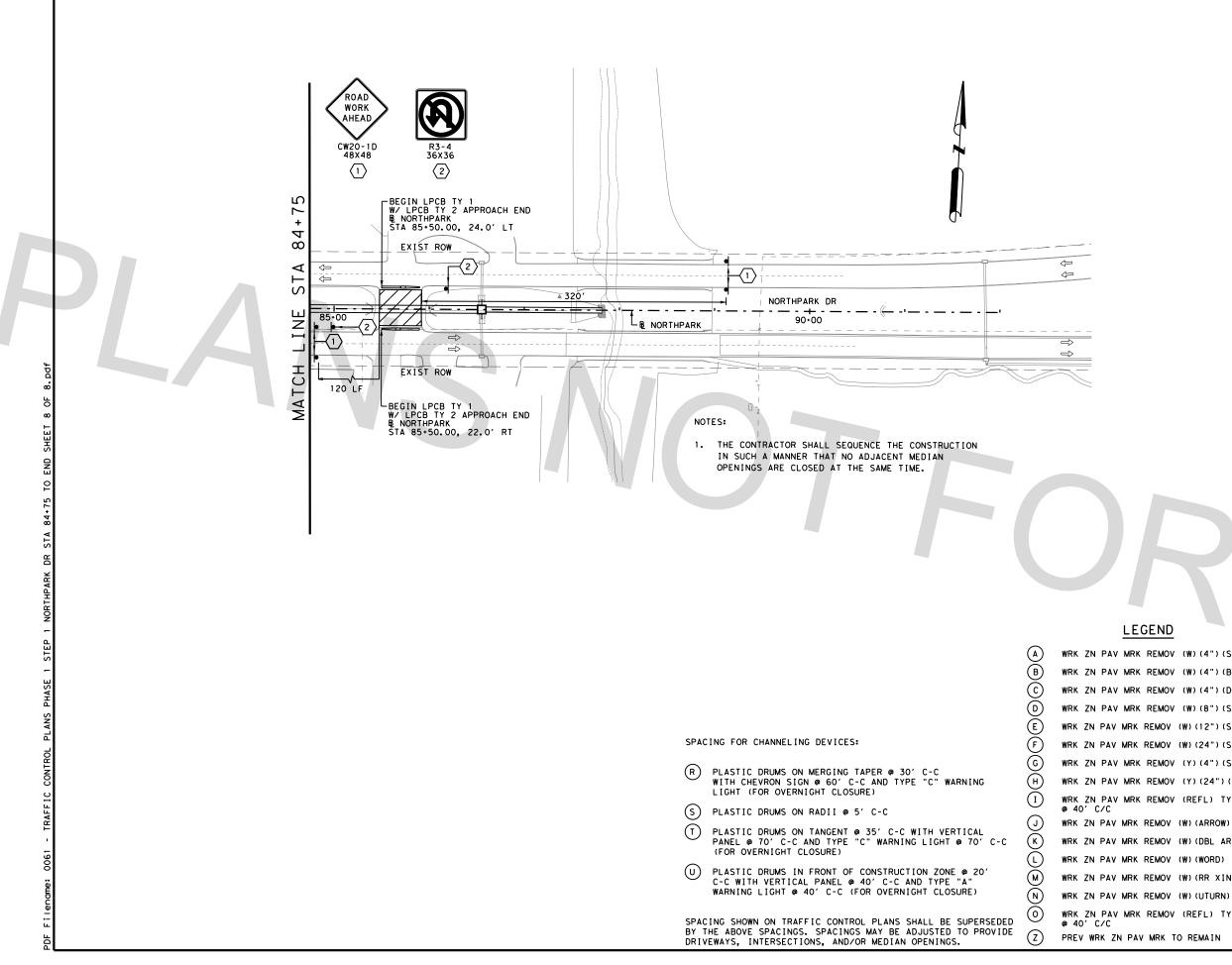
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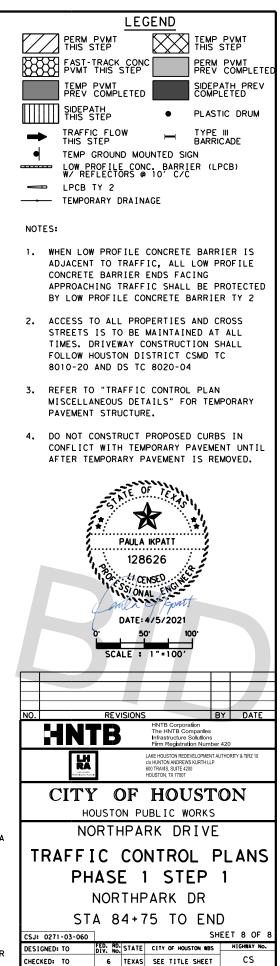
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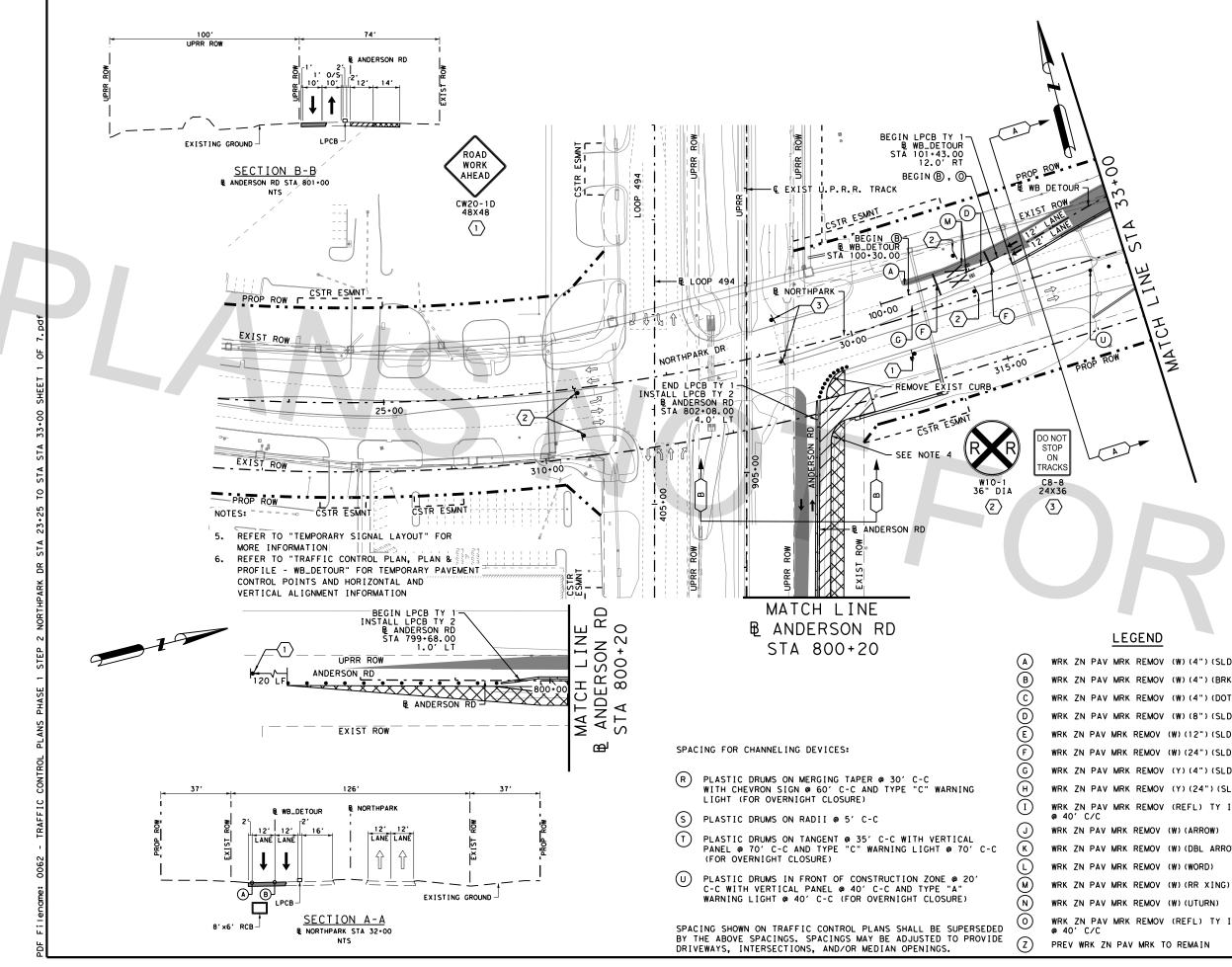
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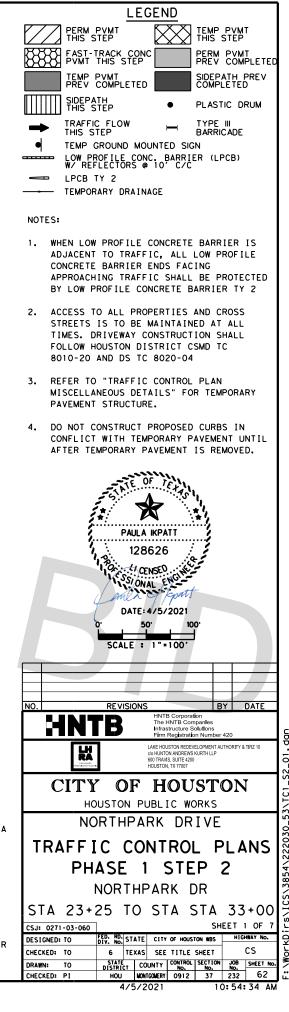
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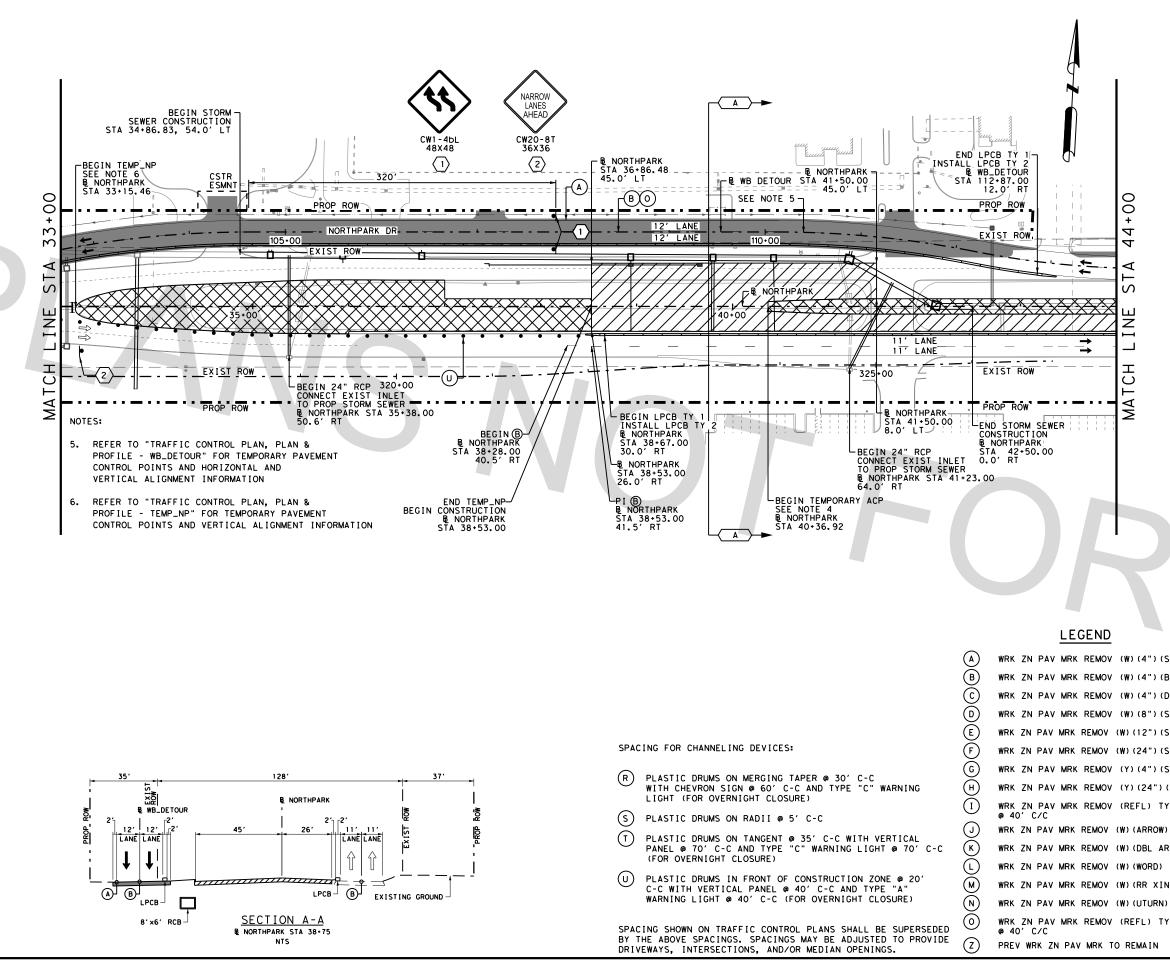
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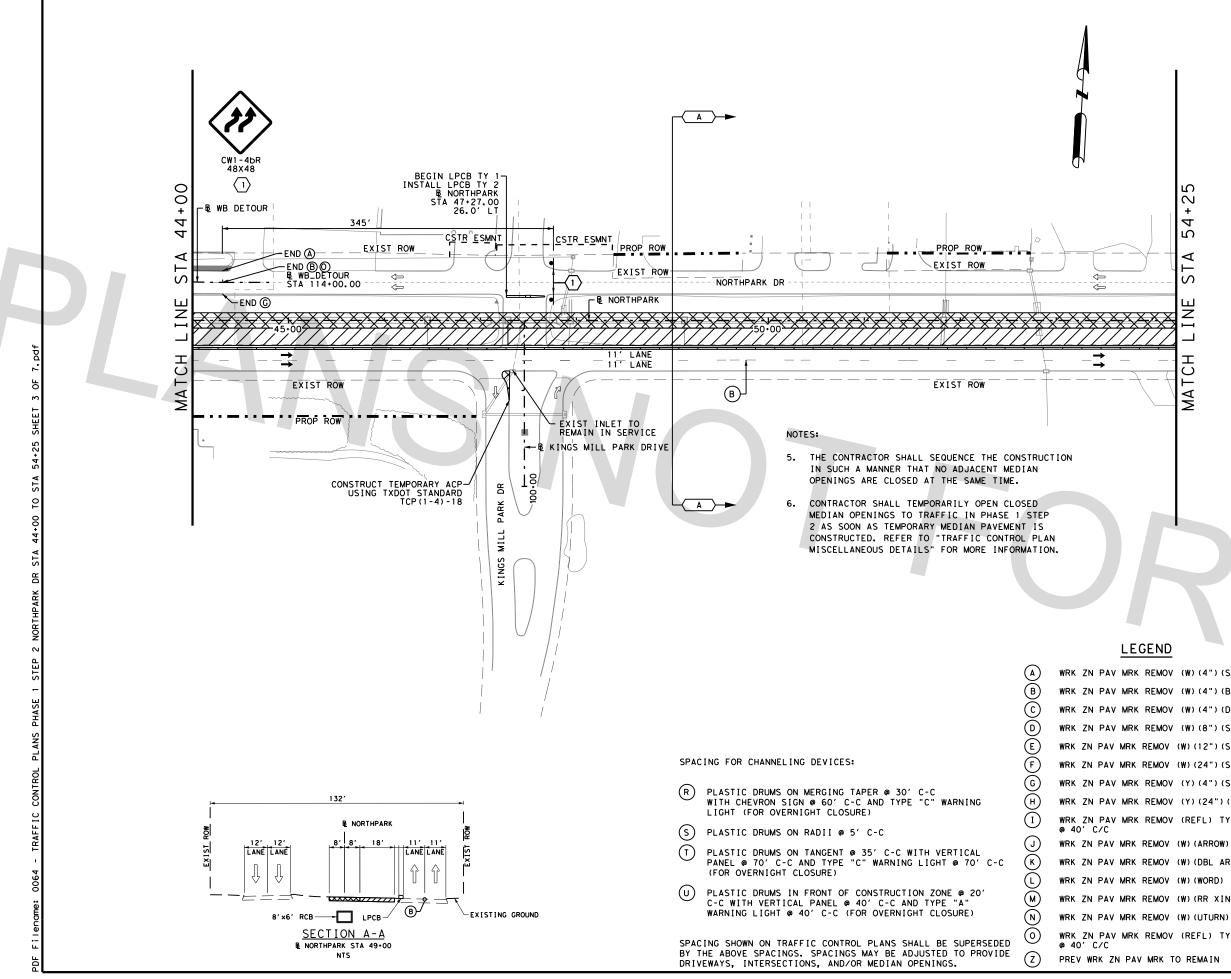
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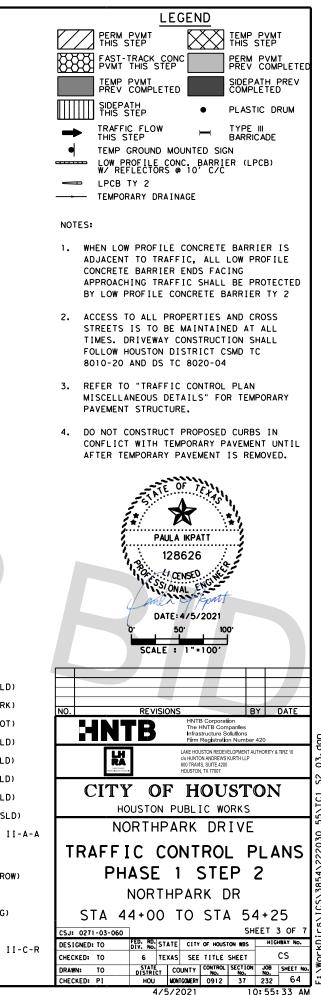
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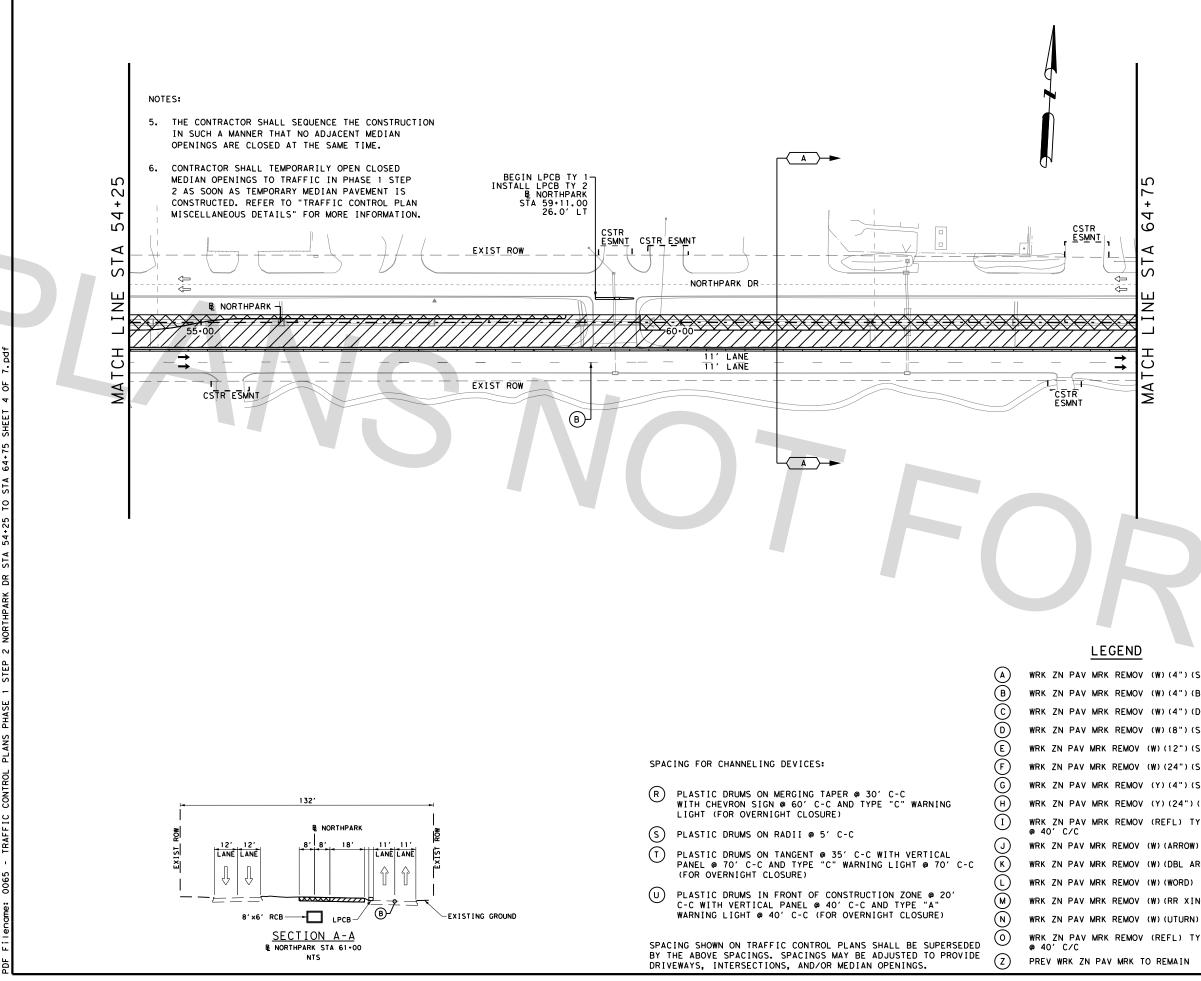
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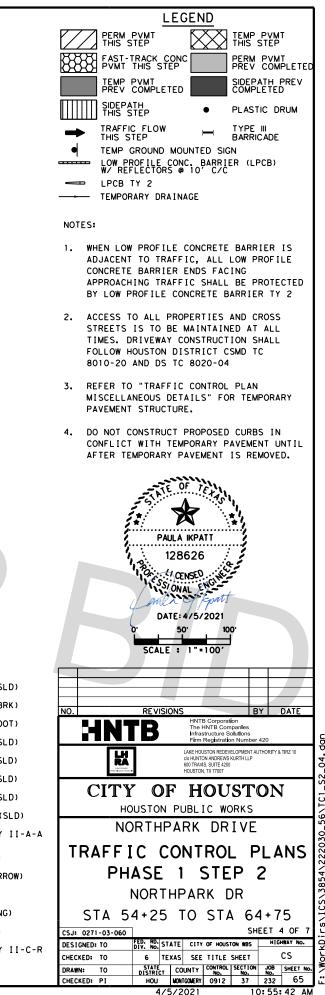
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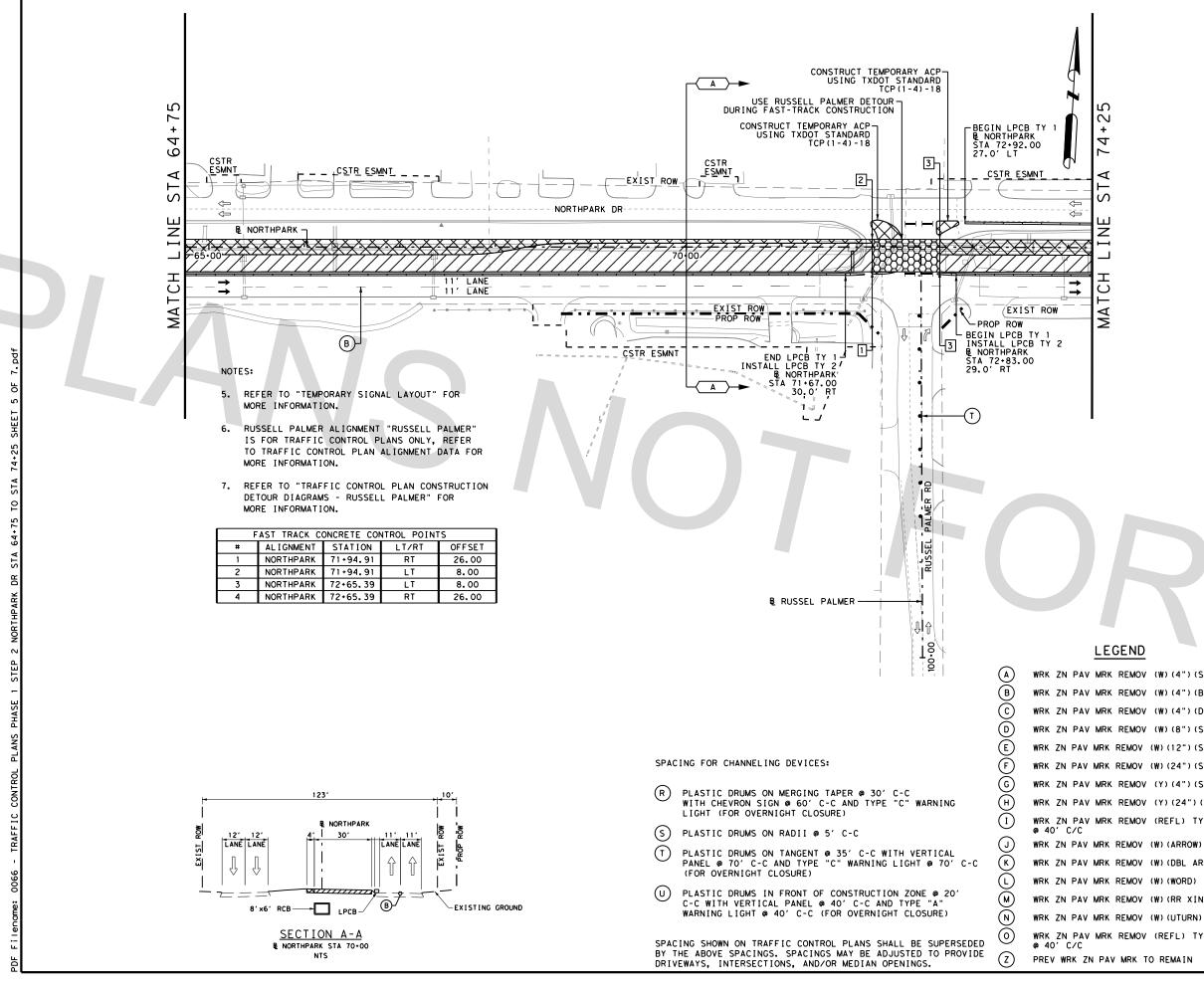
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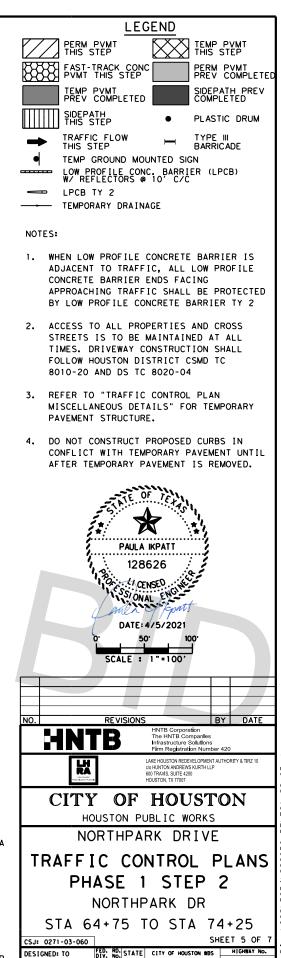
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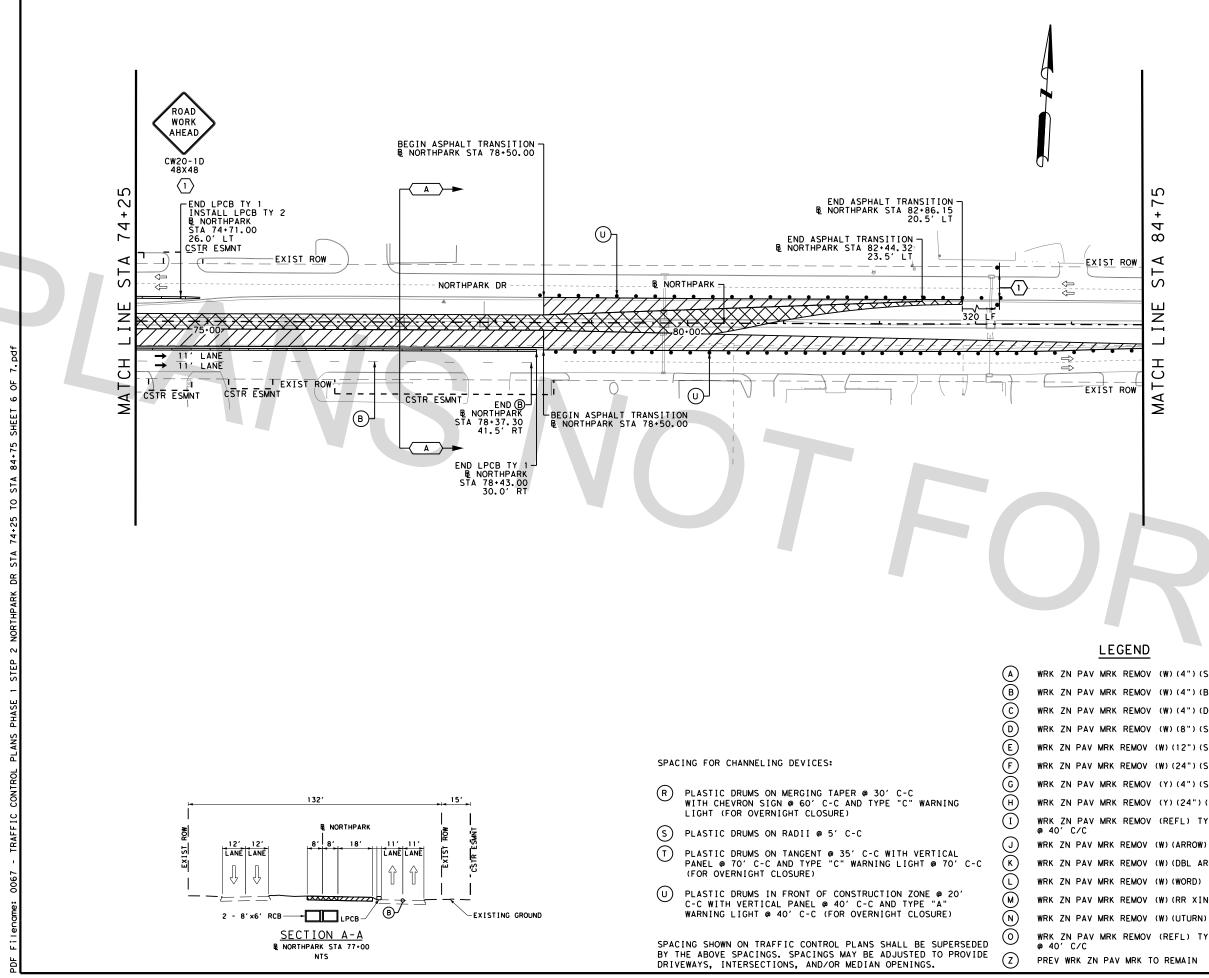
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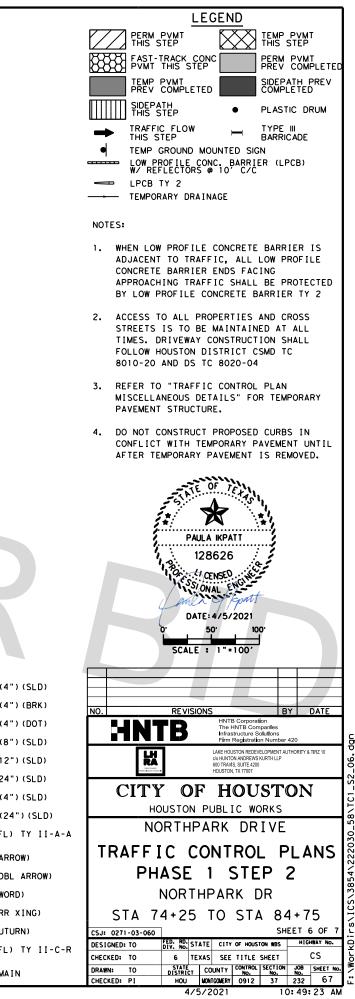
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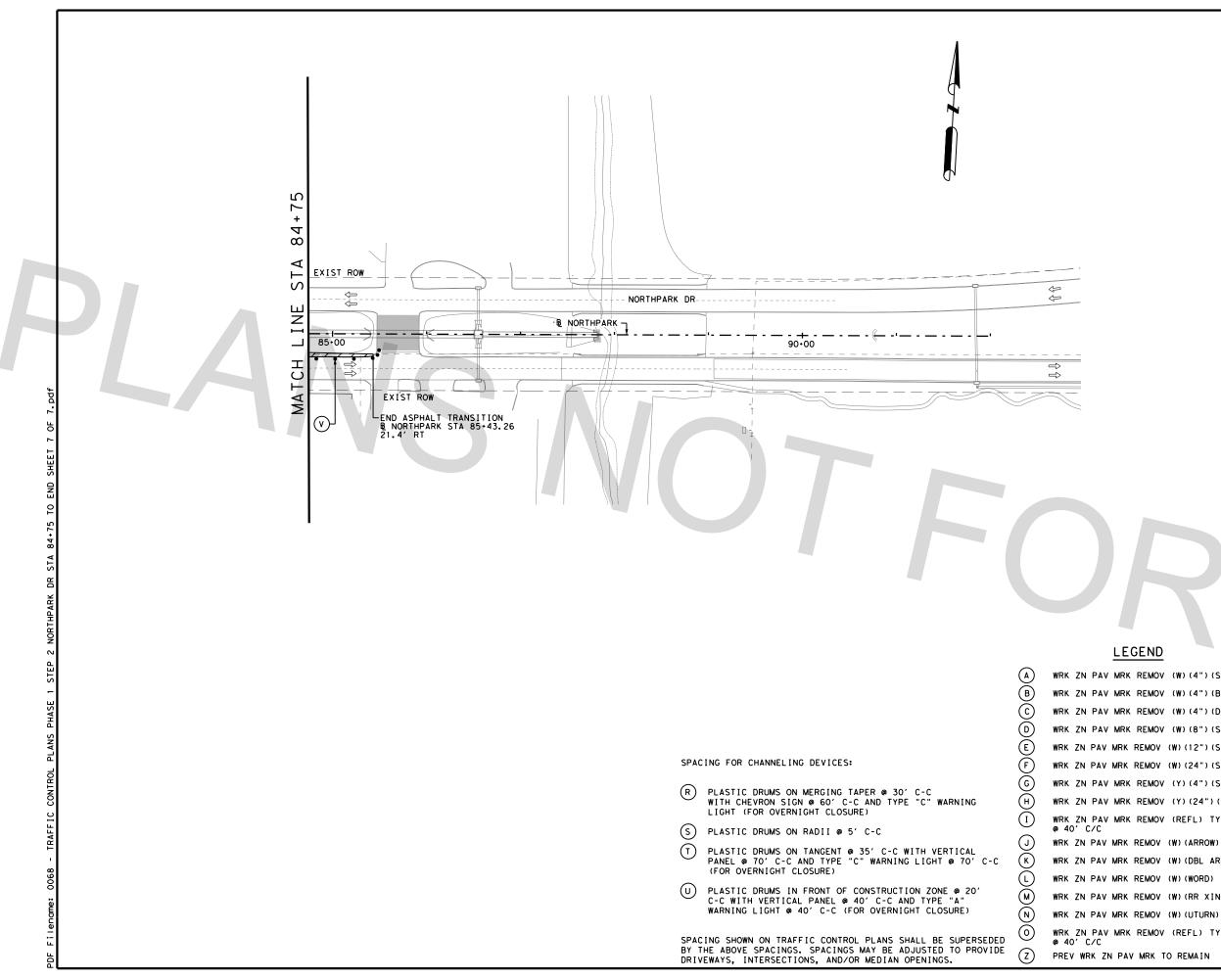
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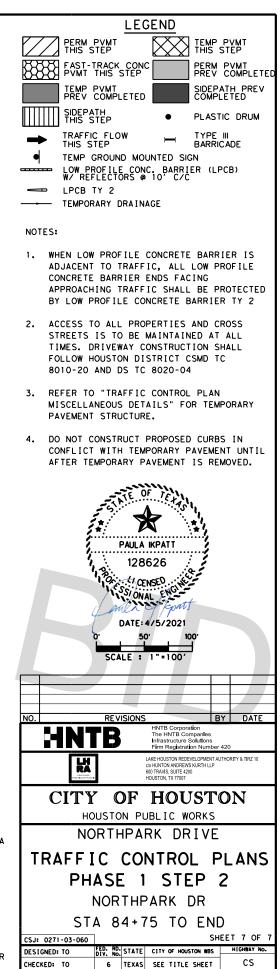
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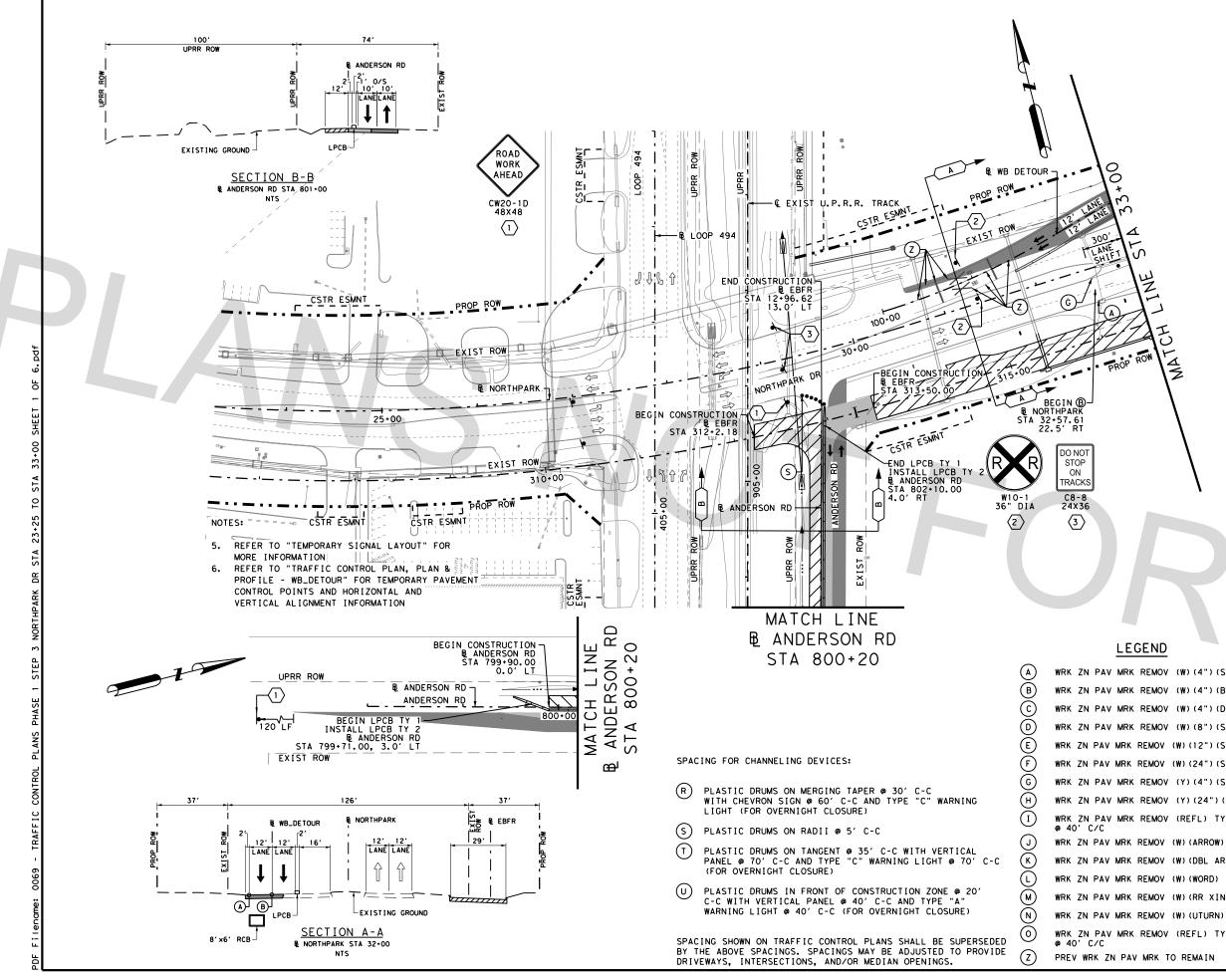
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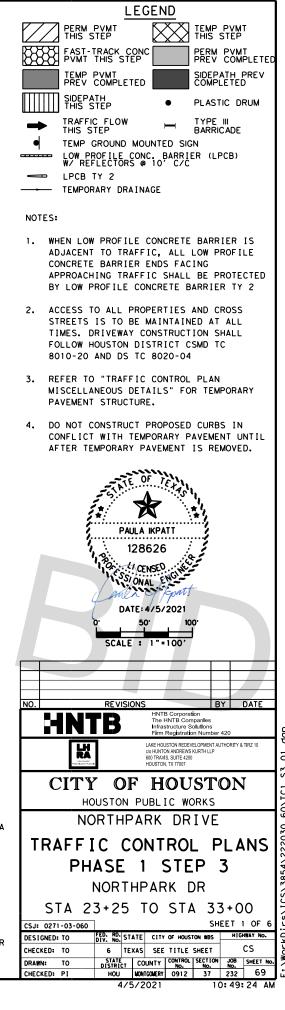
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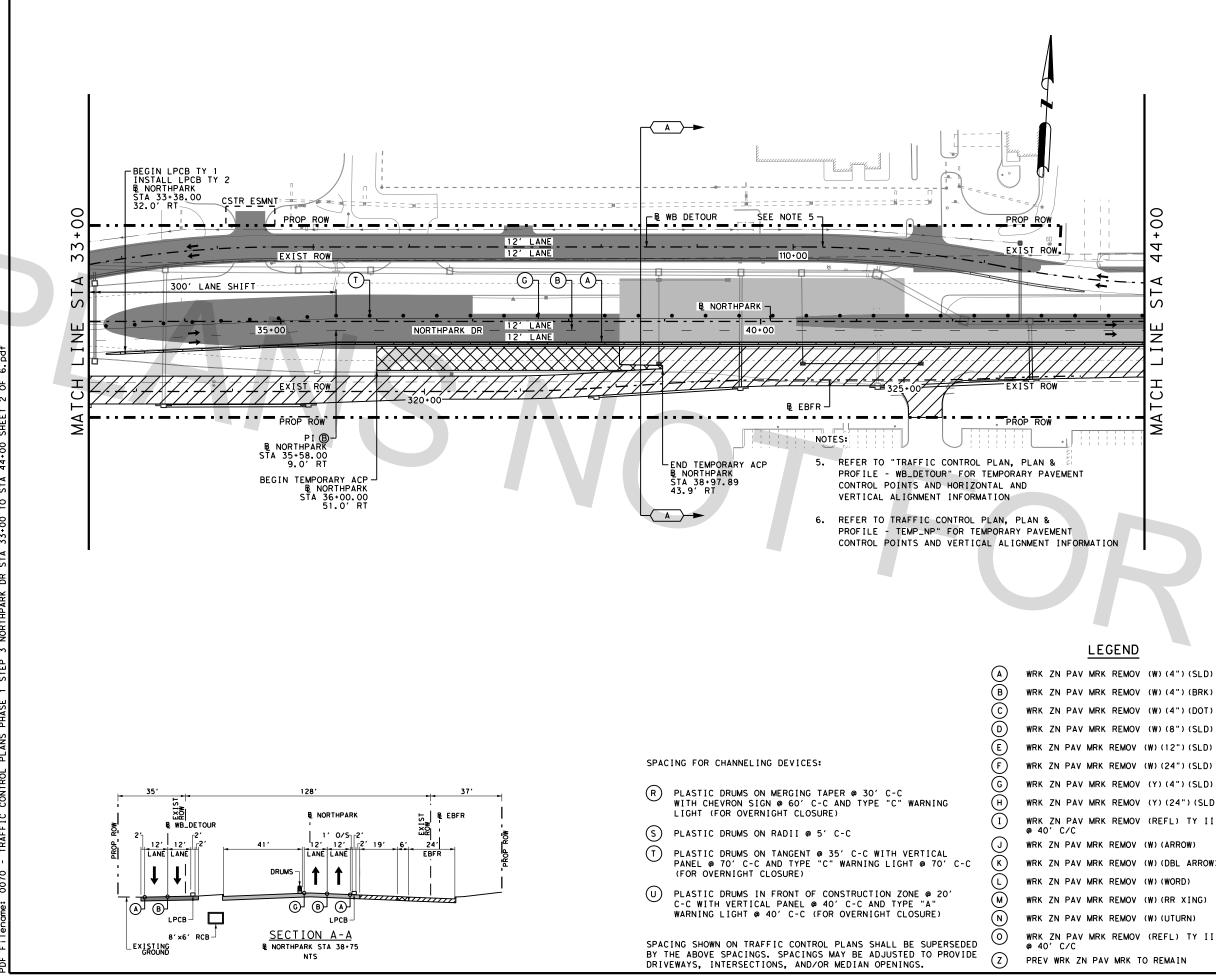
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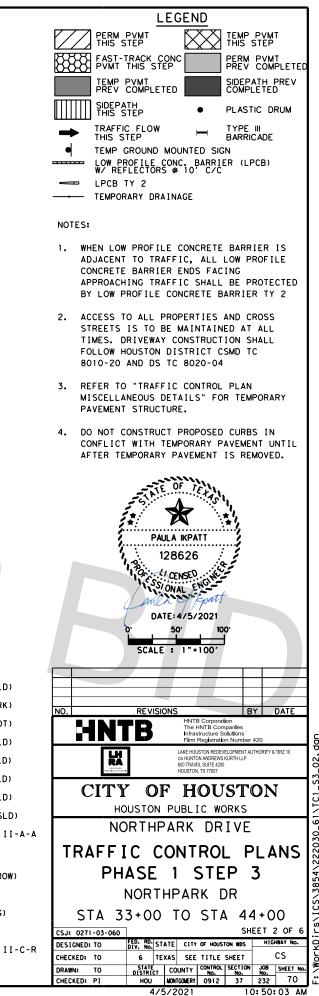




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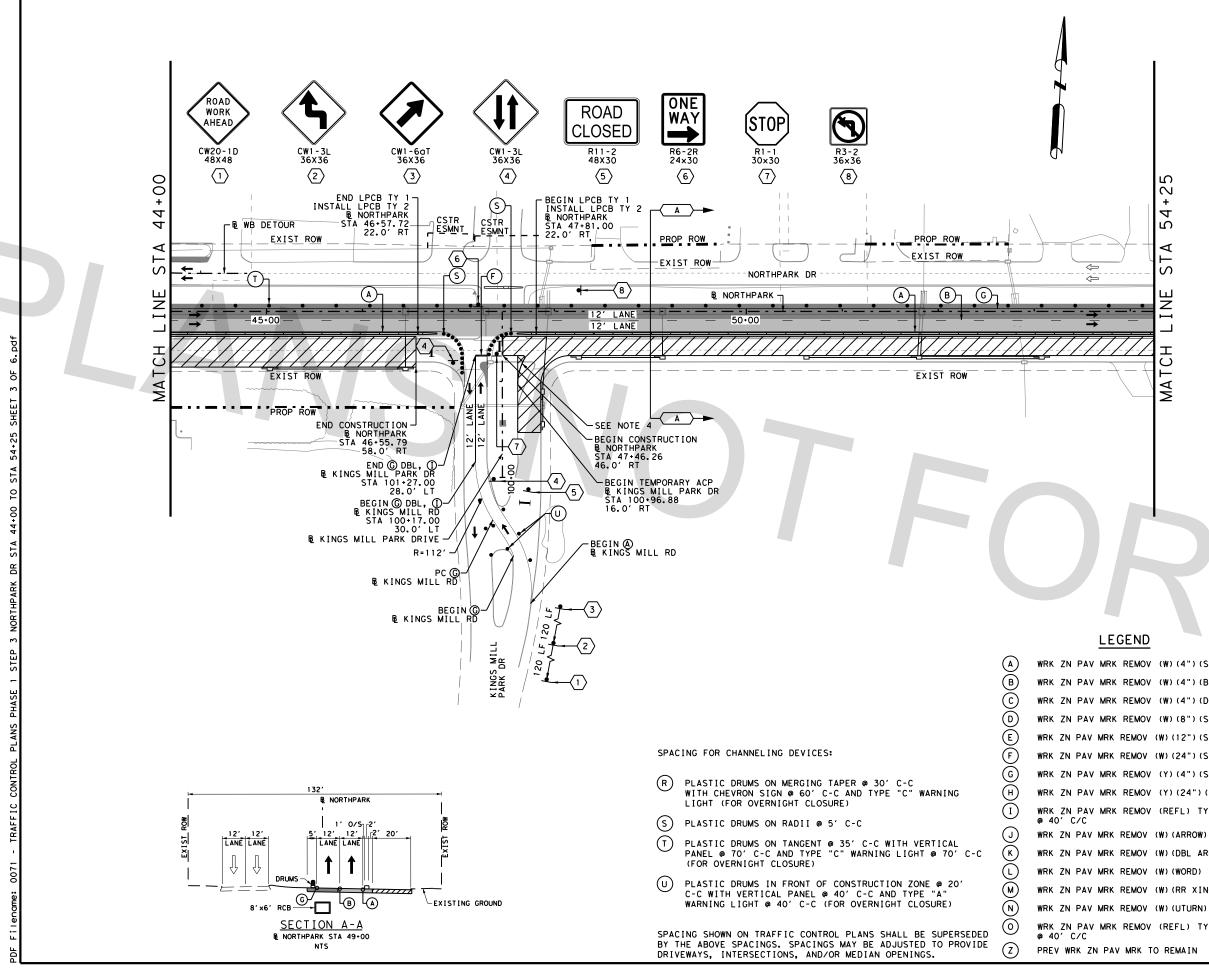
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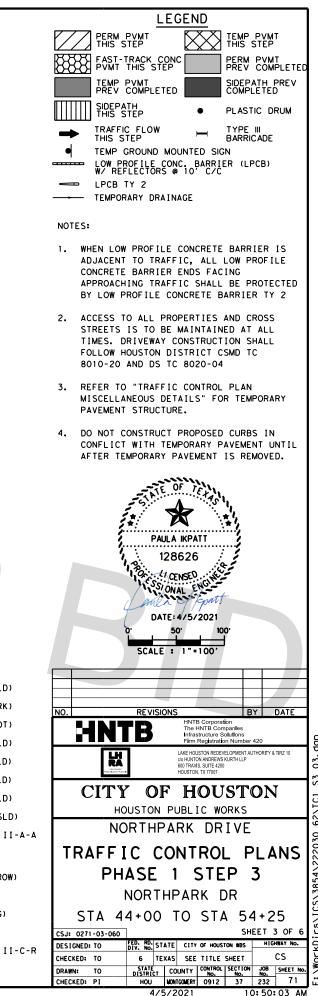
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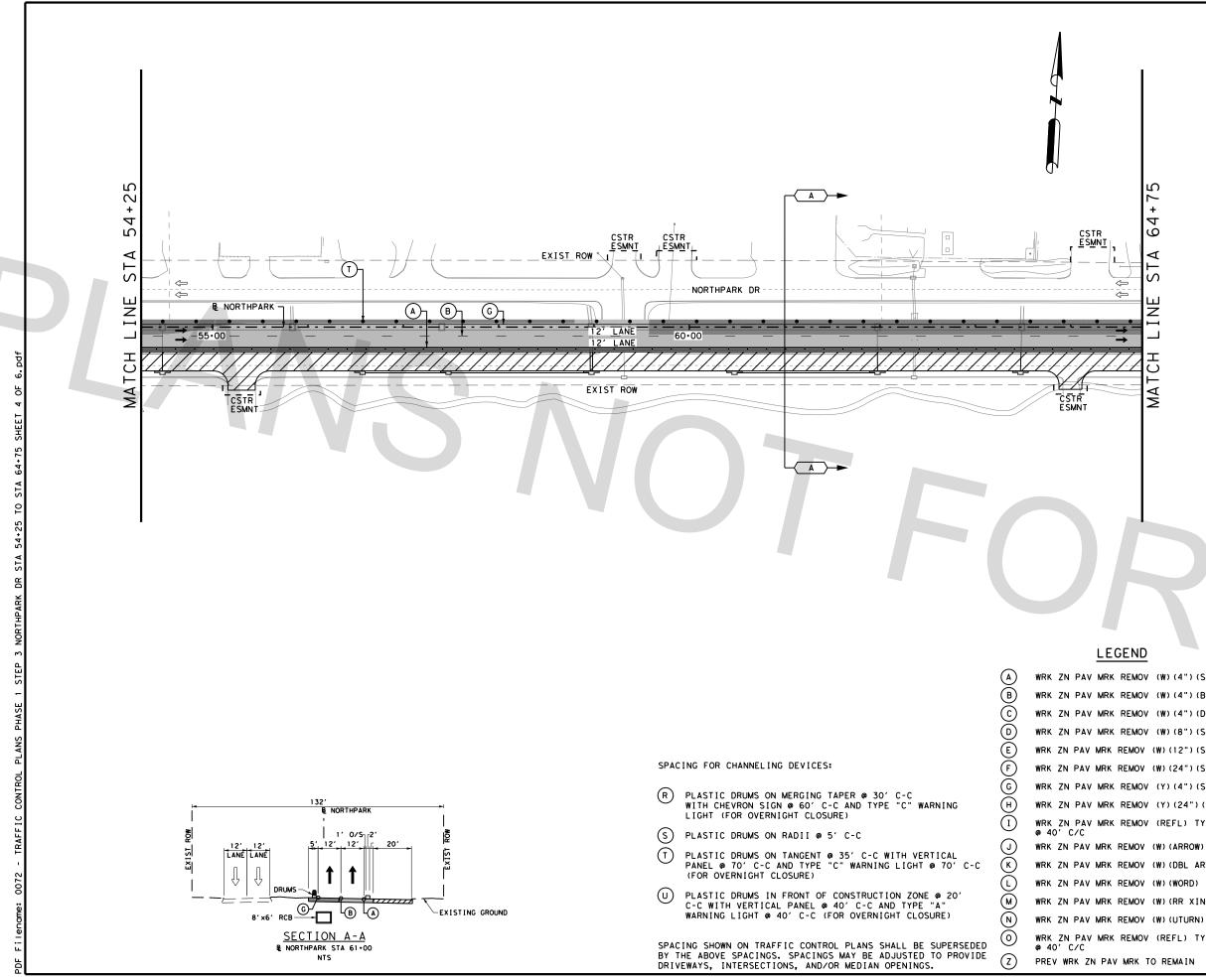
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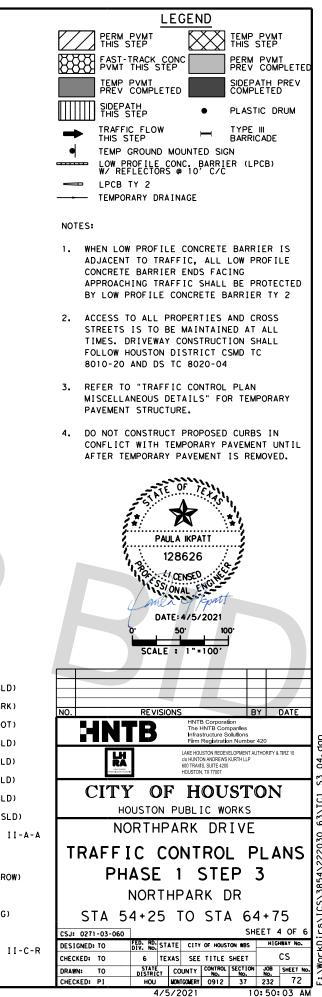
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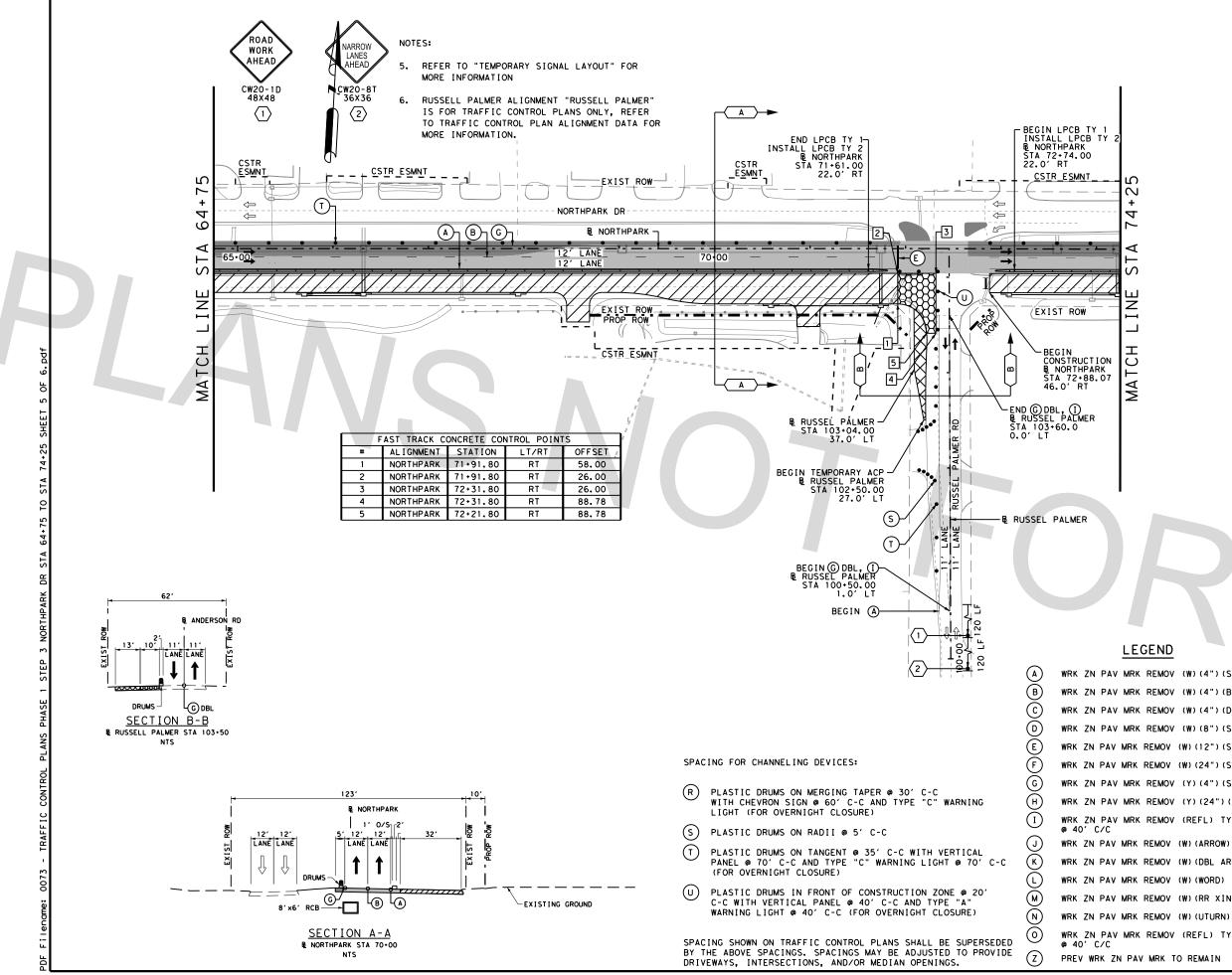
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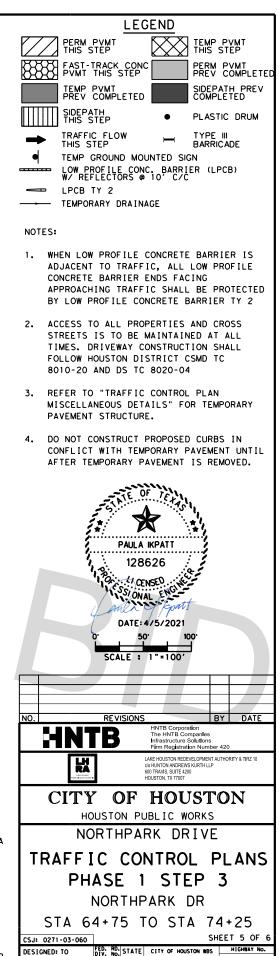
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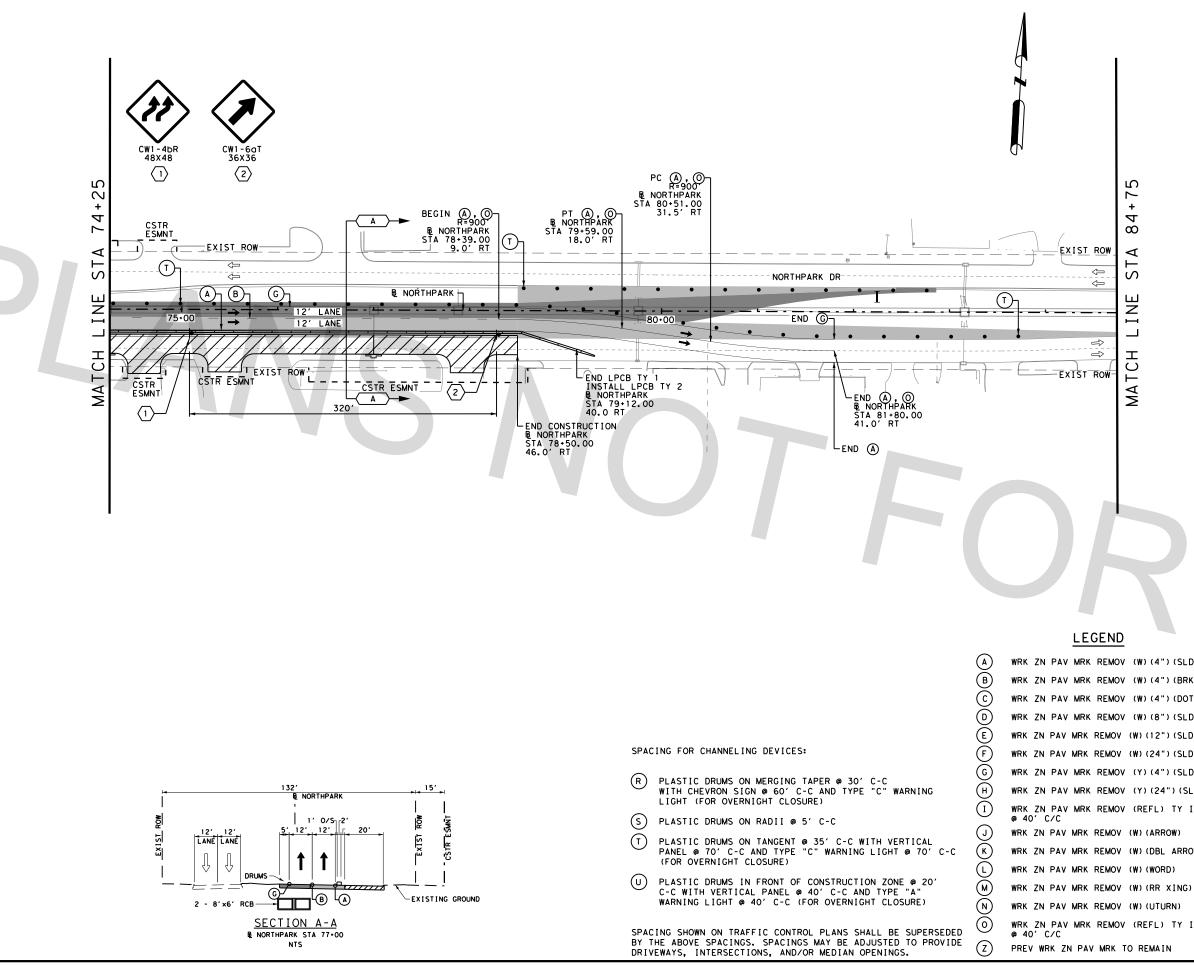
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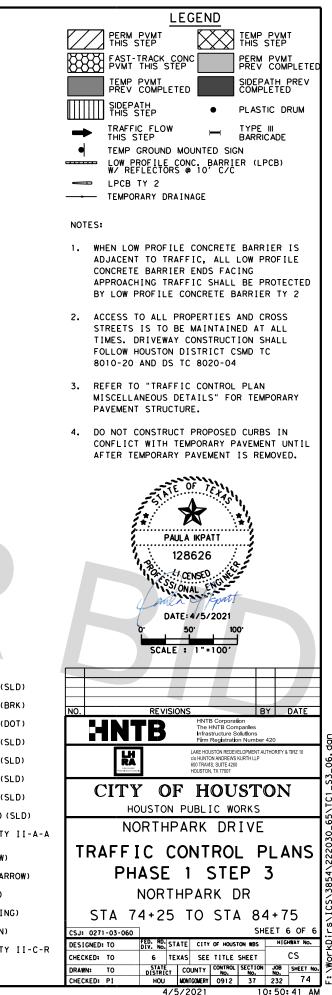
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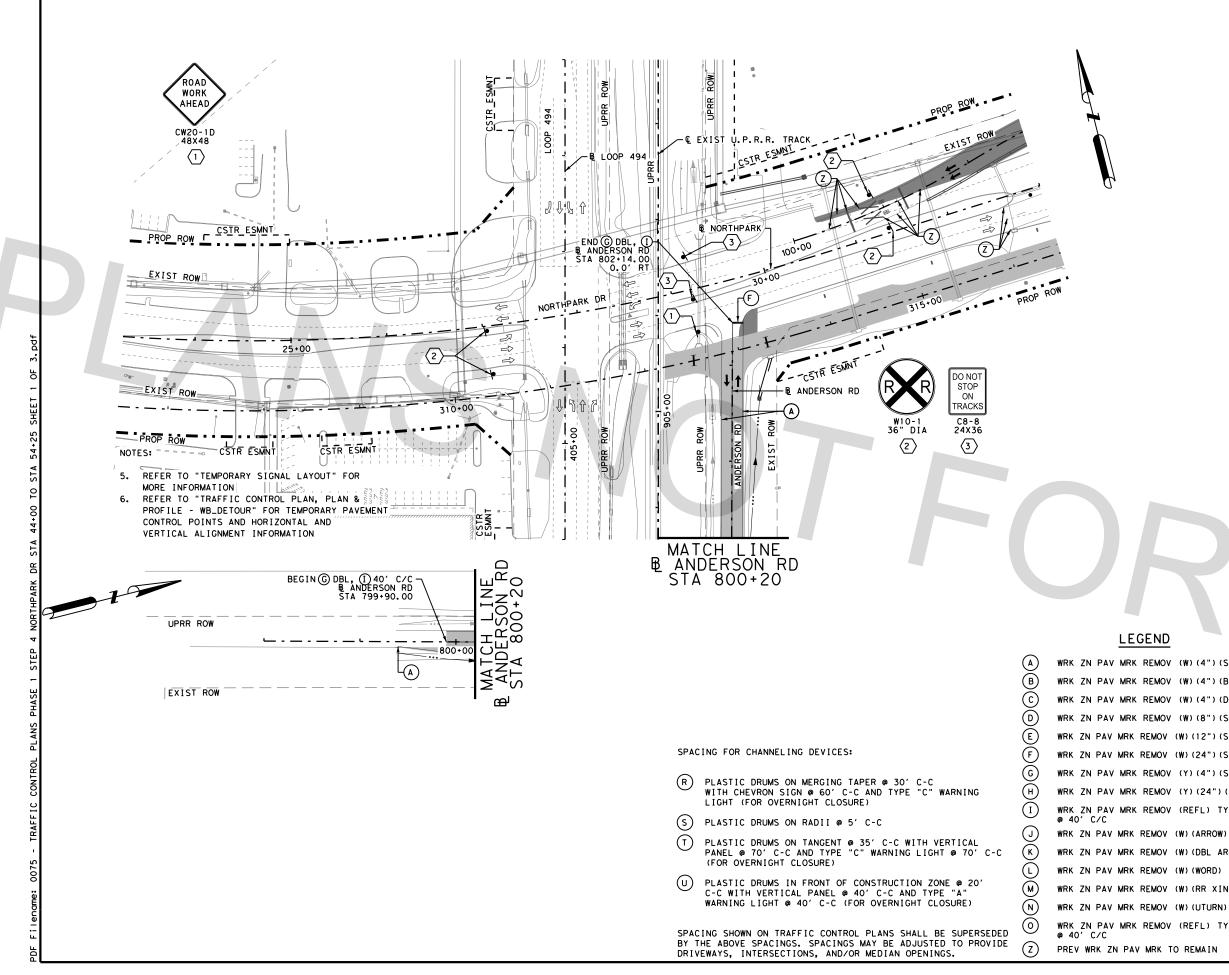
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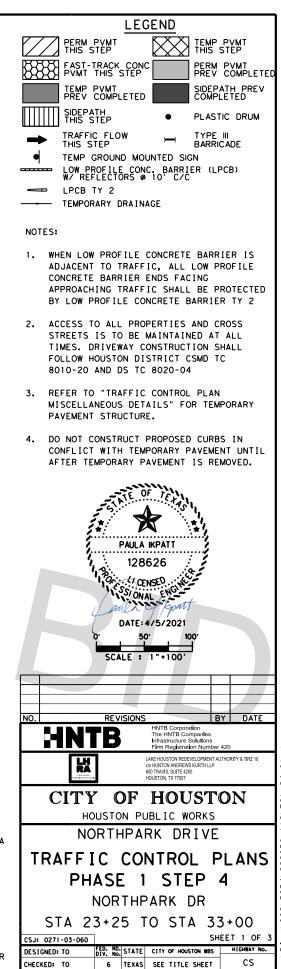
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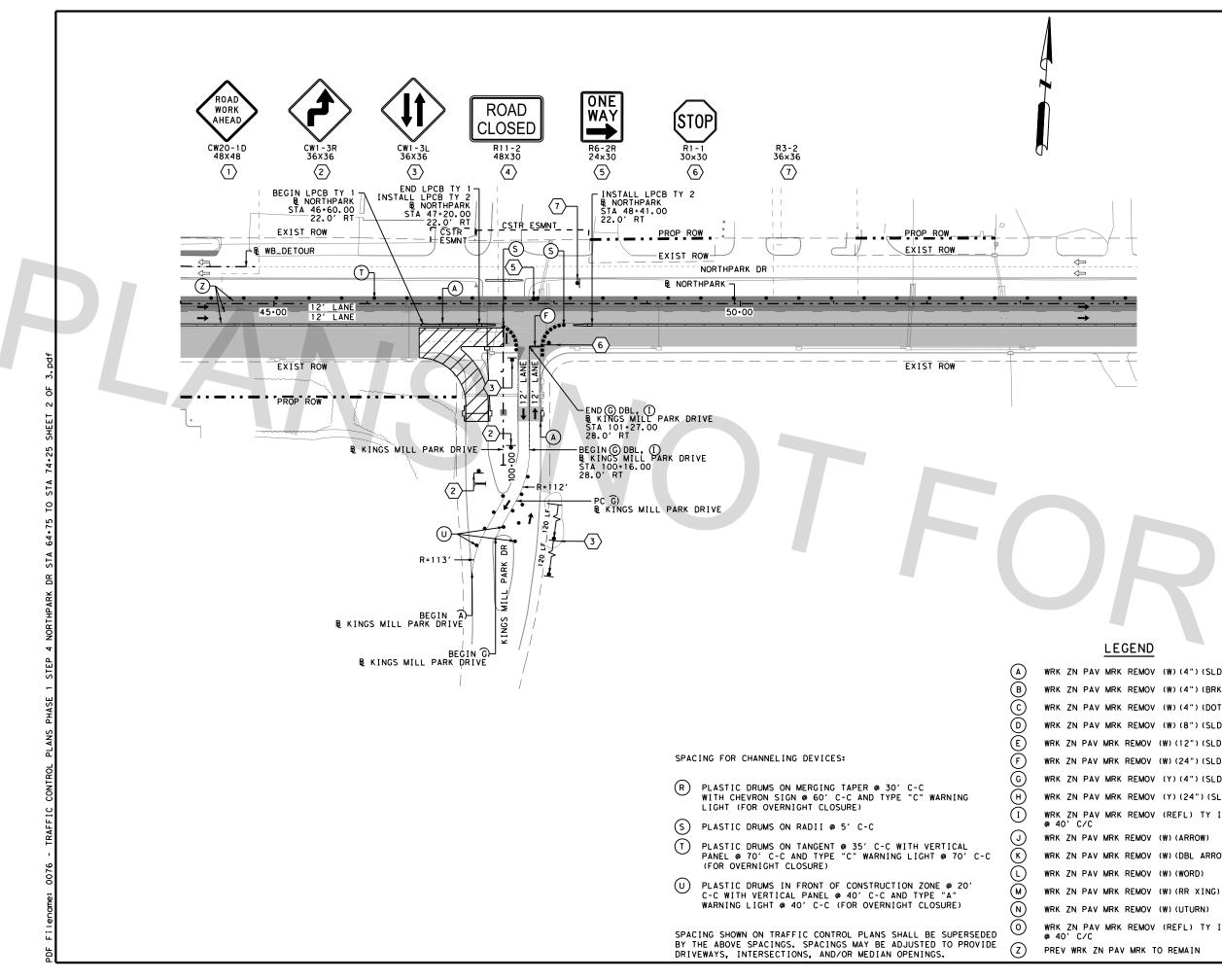
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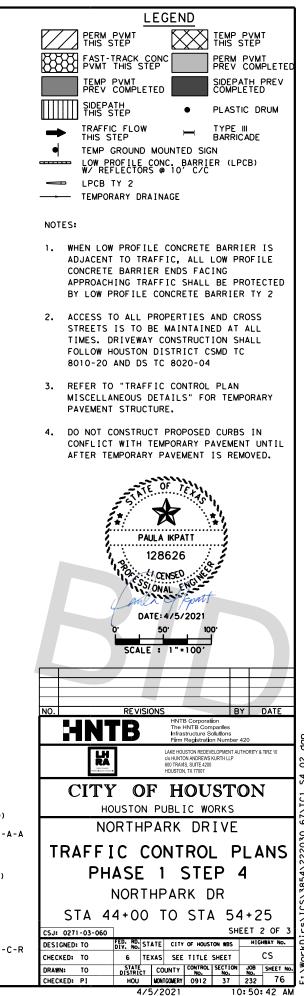
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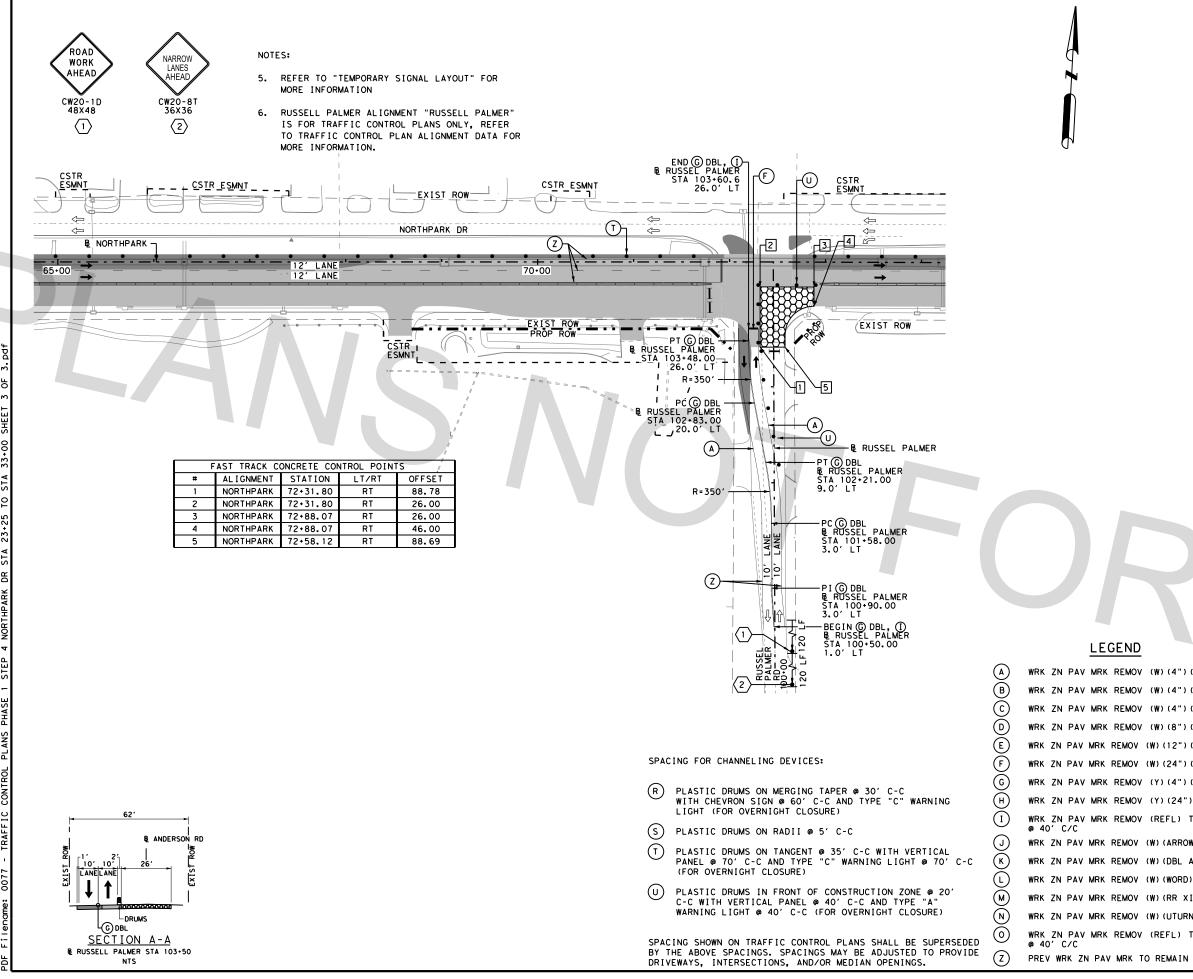
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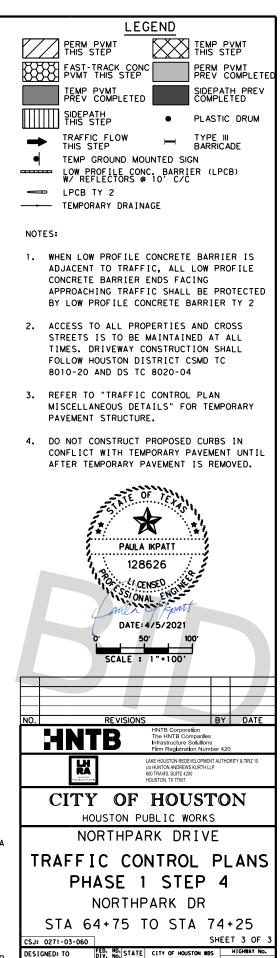
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6 TEXAS SEE TITLE SHEET

4/5/2021

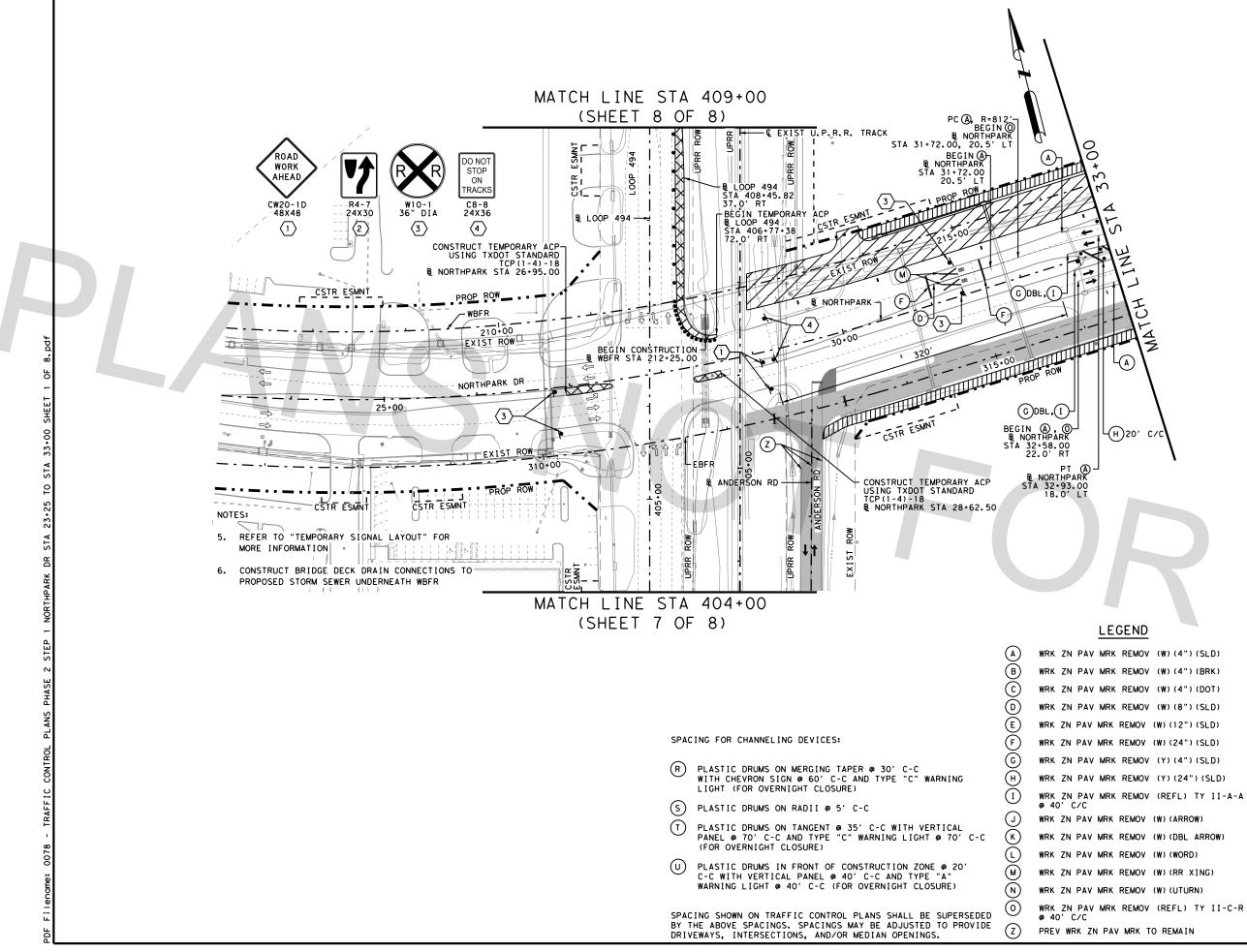
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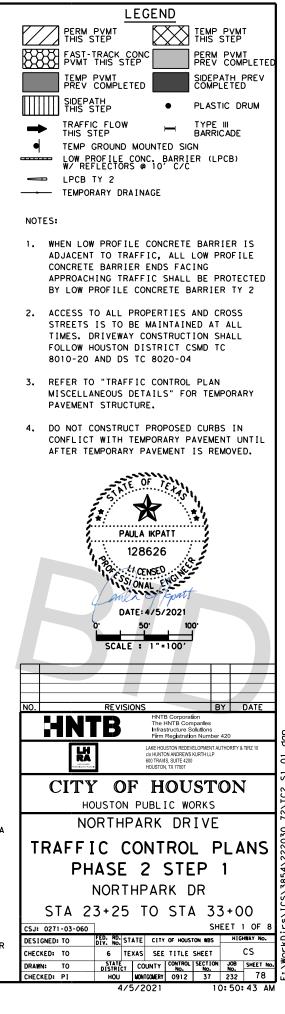
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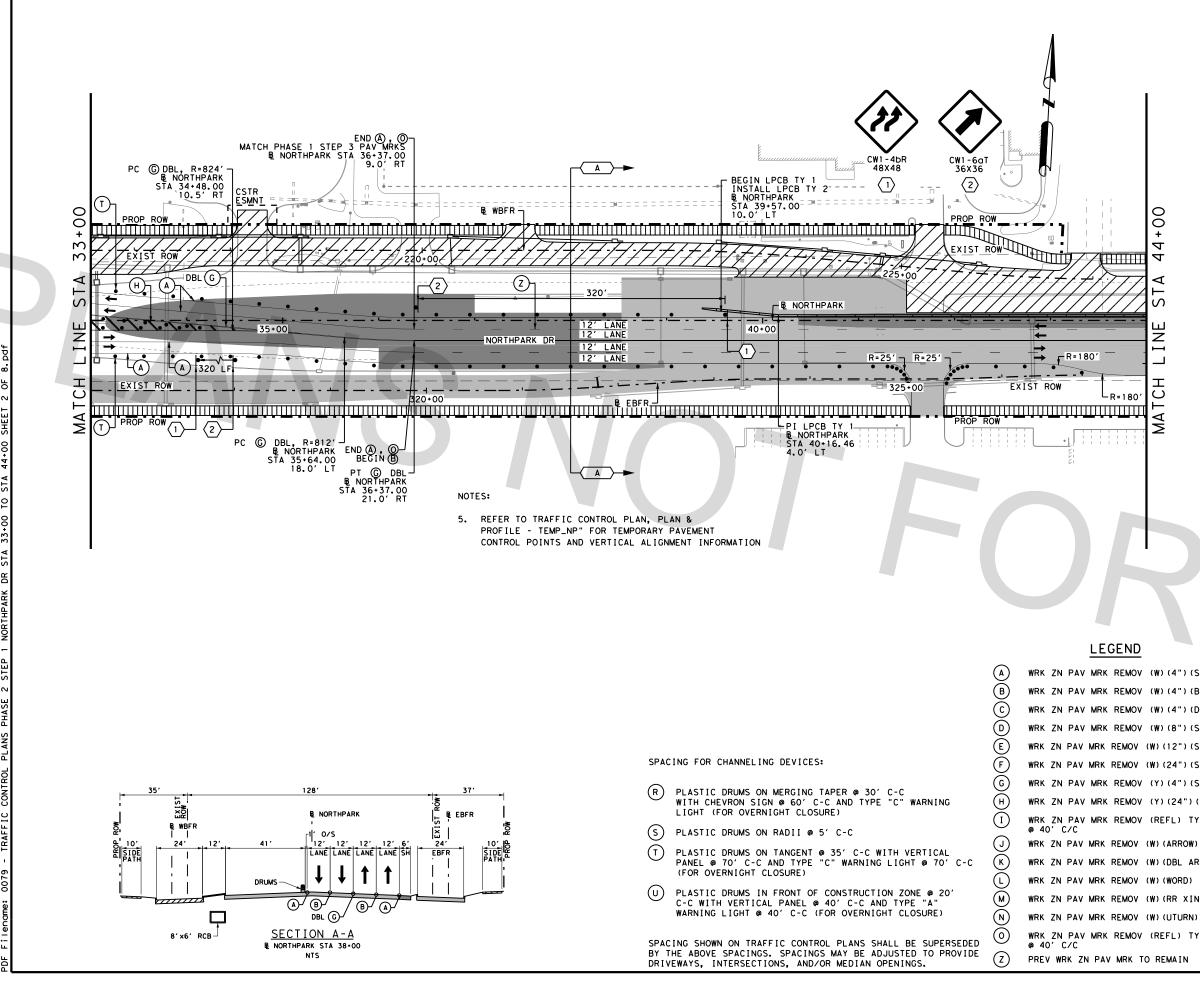
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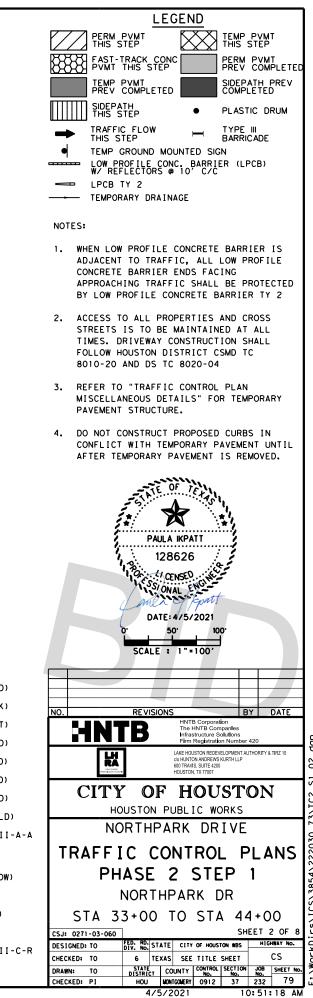
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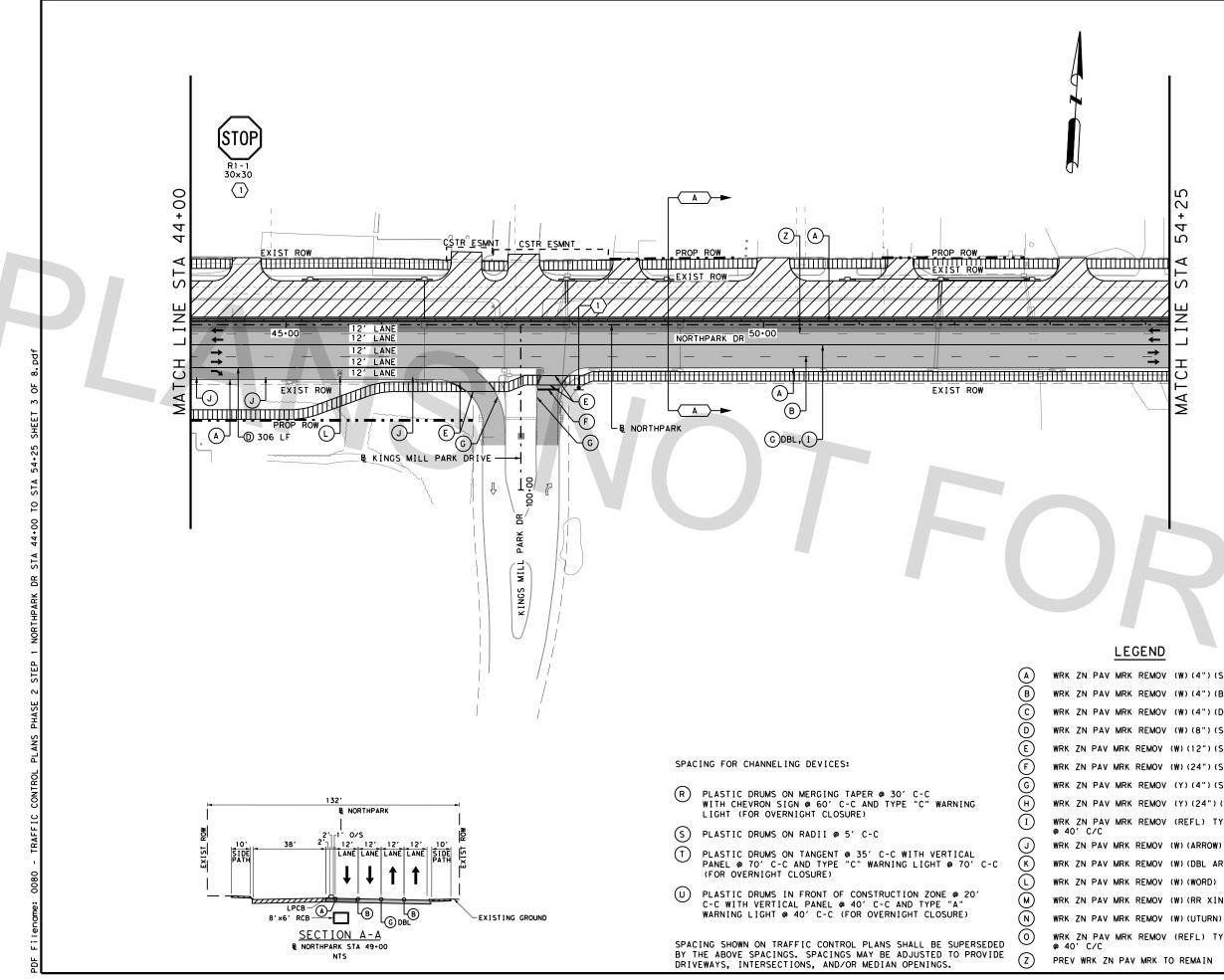
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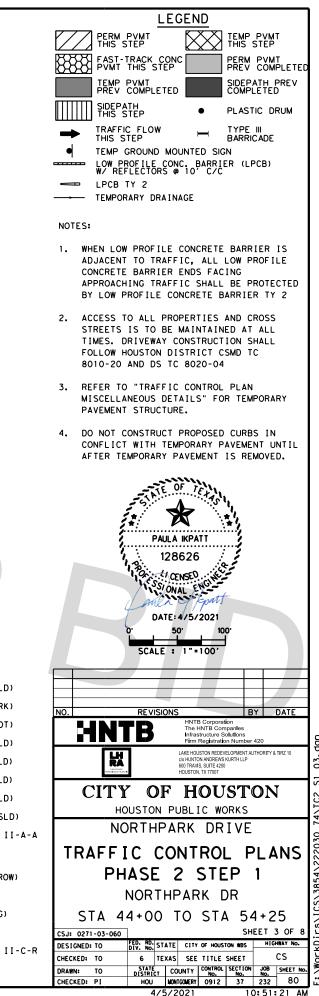
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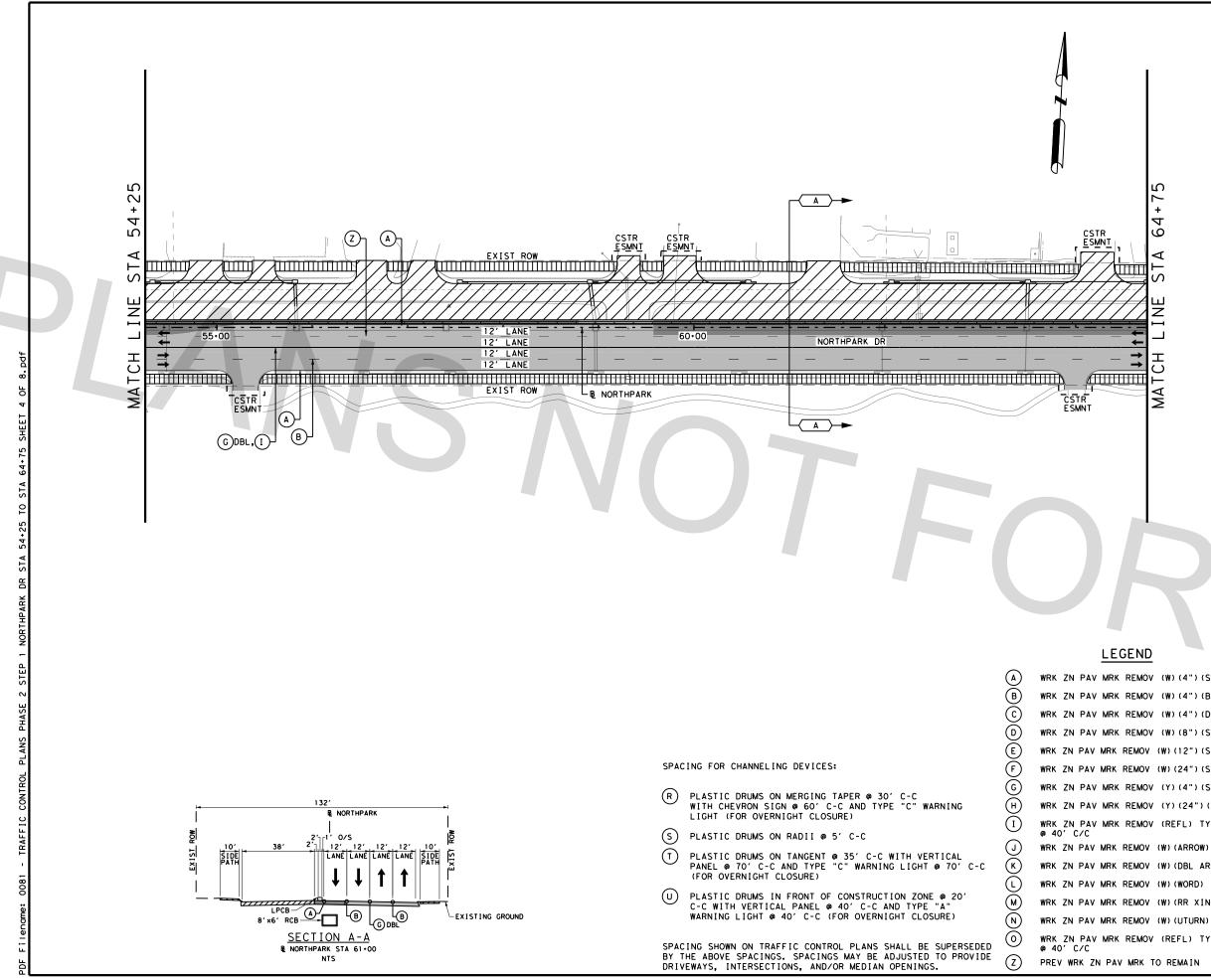
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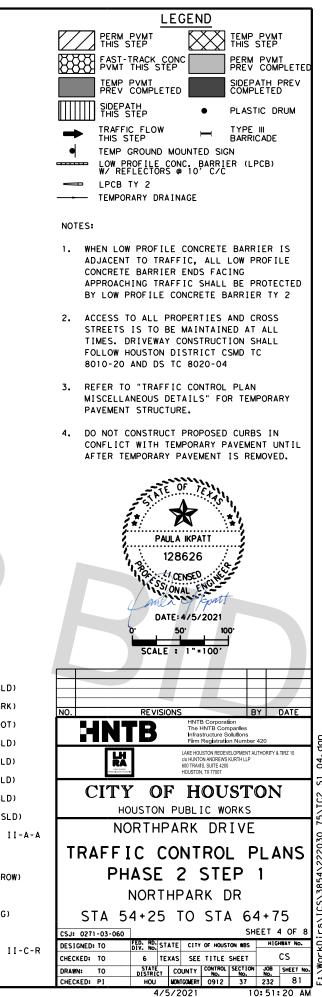
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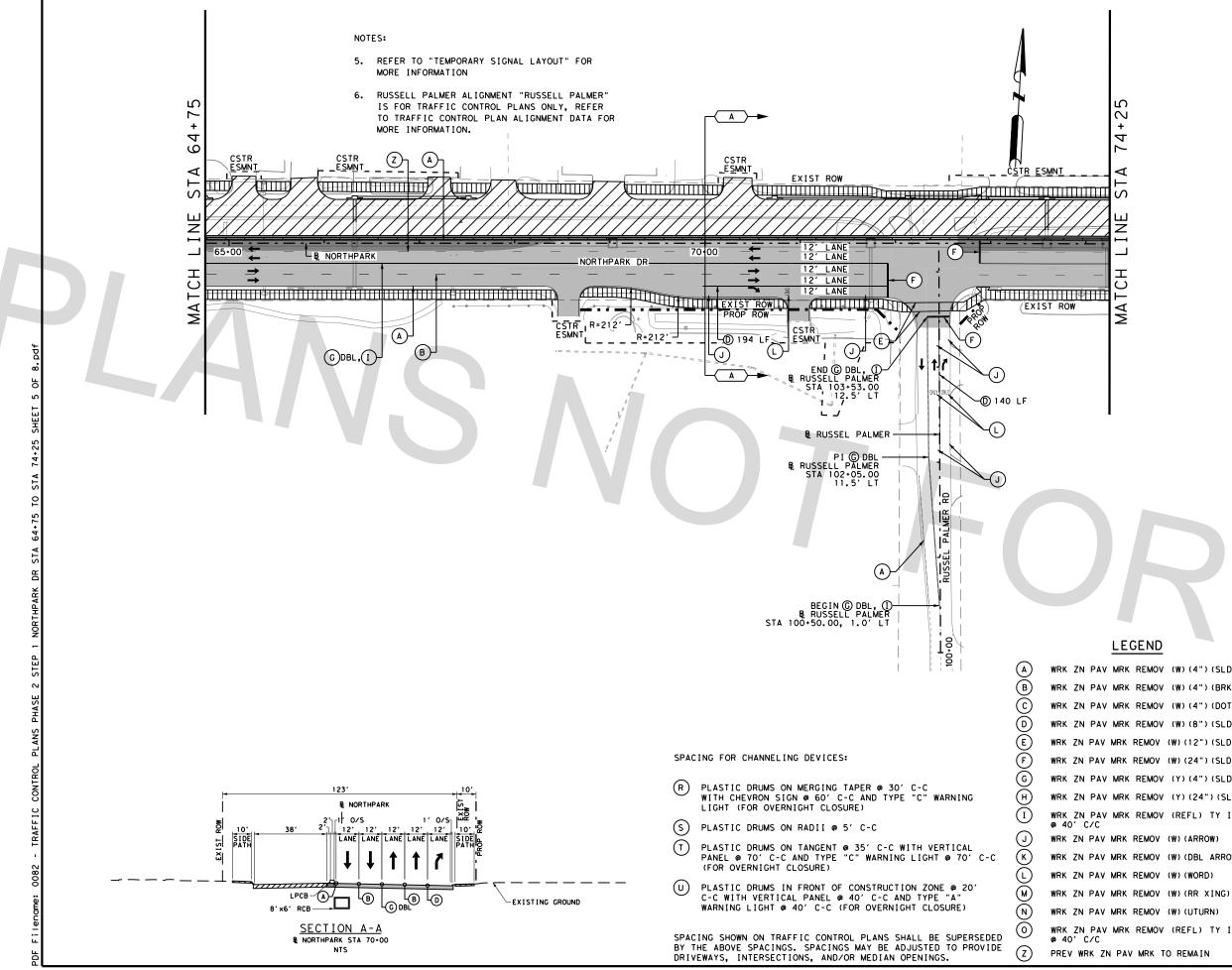
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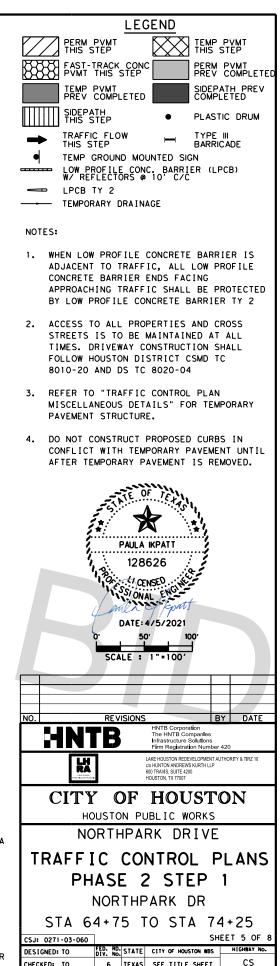
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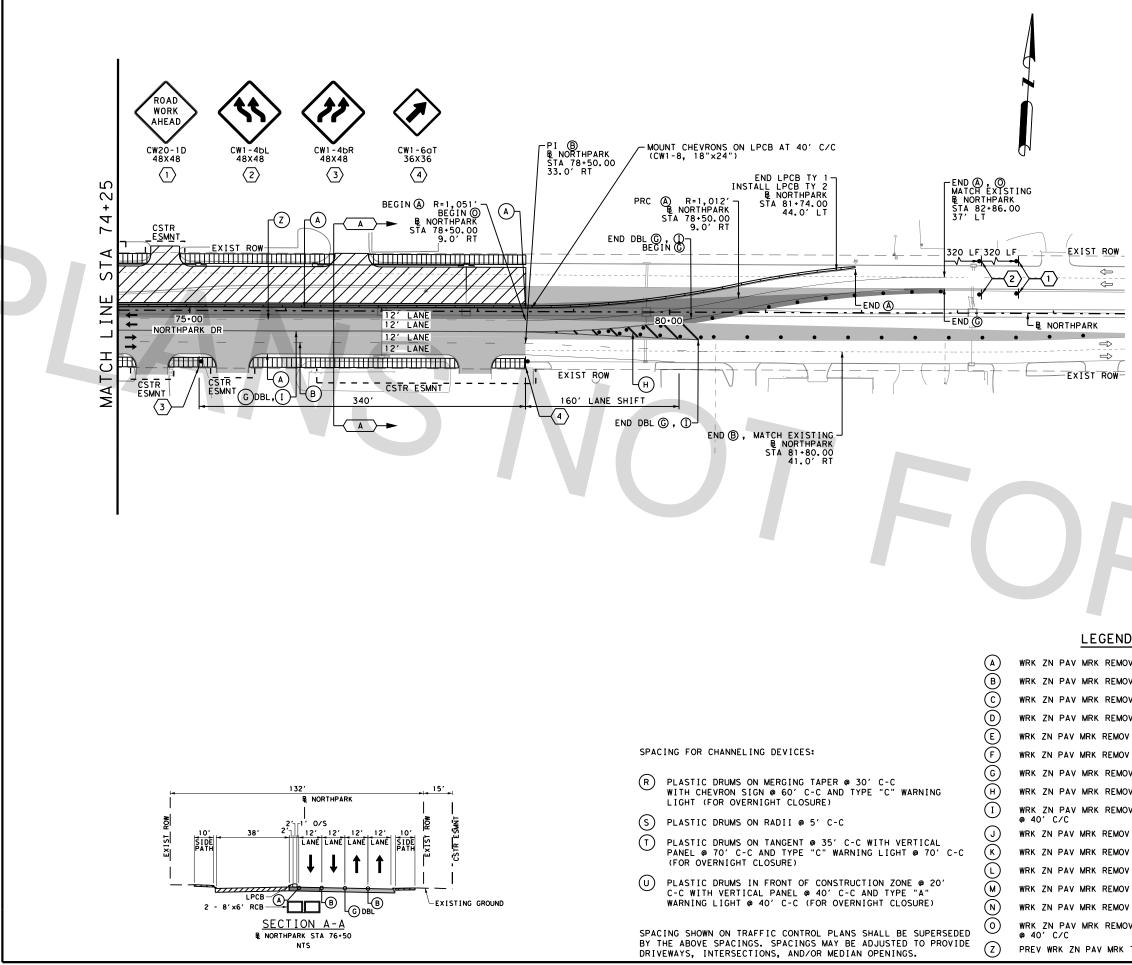
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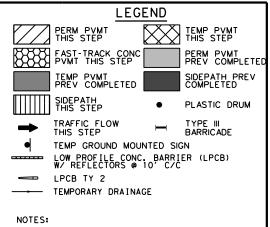
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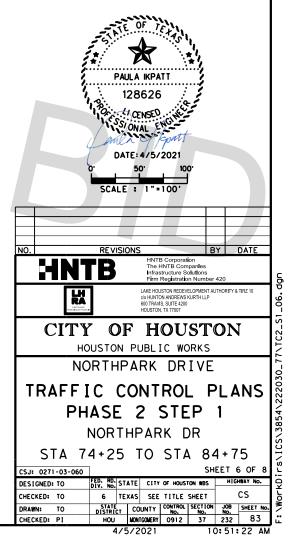
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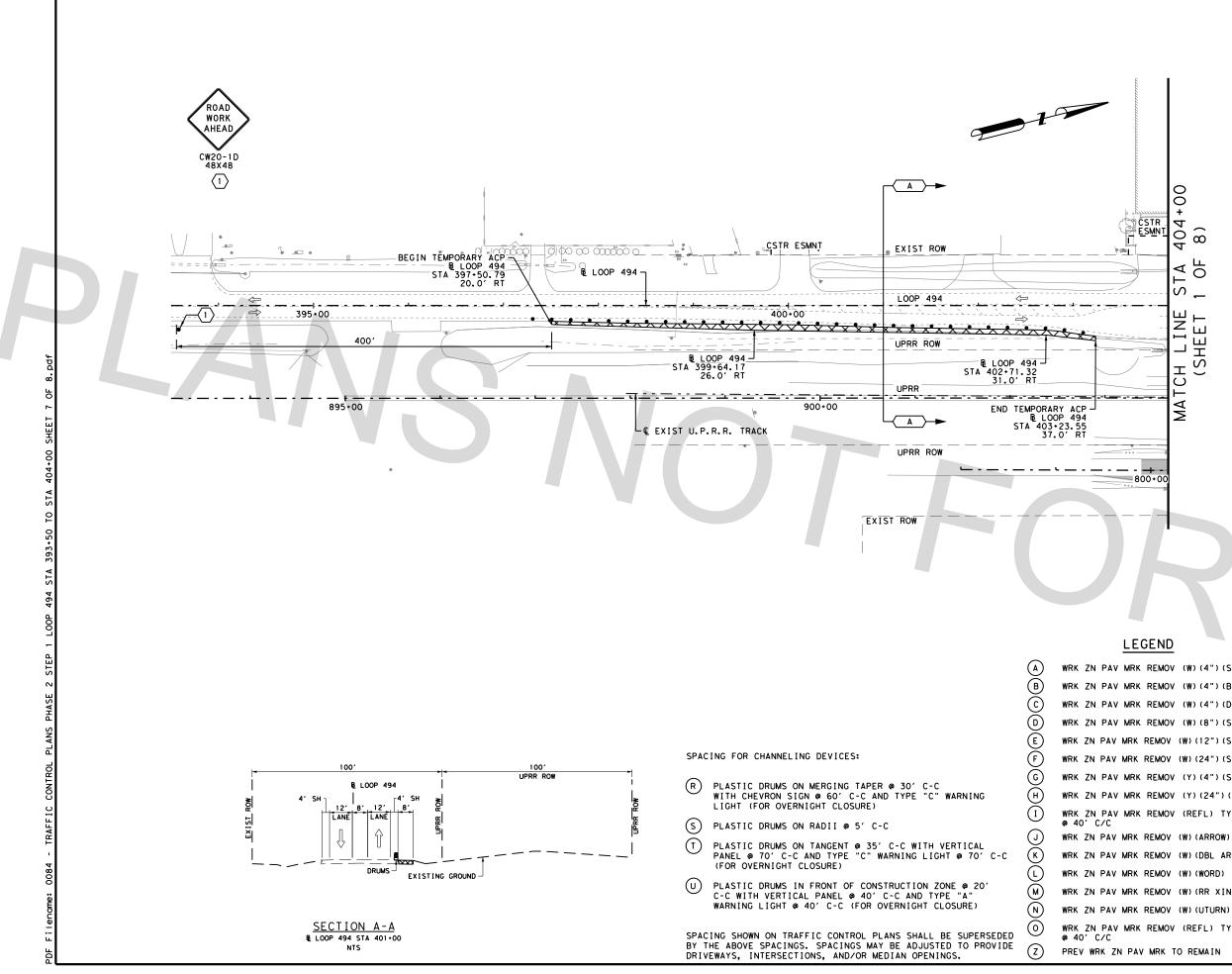


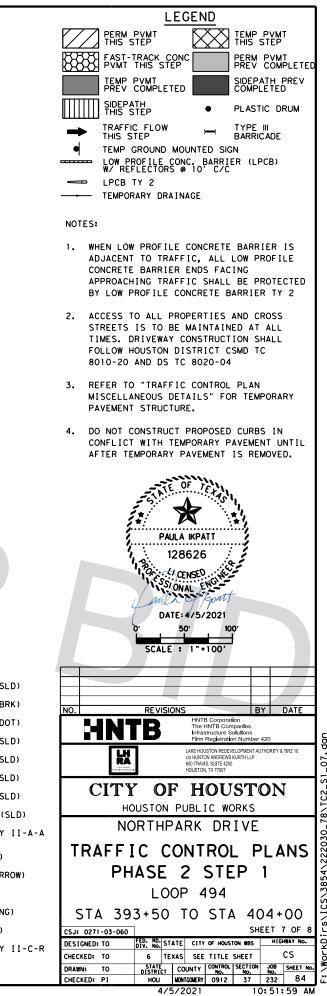
1. WHEN LOW PROFILE CONCRETE BARRIER IS

- ADJACENT TO TRAFFIC, ALL LOW PROFILE CONCRETE BARRIER ENDS FACING APPROACHING TRAFFIC SHALL BE PROTECTED BY LOW PROFILE CONCRETE BARRIER TY 2
- 2. ACCESS TO ALL PROPERTIES AND CROSS STREETS IS TO BE MAINTAINED AT ALL TIMES. DRIVEWAY CONSTRUCTION SHALL FOLLOW HOUSTON DISTRICT CSMD TC 8010-20 AND DS TC 8020-04
- 3. REFER TO "TRAFFIC CONTROL PLAN MISCELLANEOUS DETAILS" FOR TEMPORARY PAVEMENT STRUCTURE.
- 4. DO NOT CONSTRUCT PROPOSED CURBS IN CONFLICT WITH TEMPORARY PAVEMENT UNTIL AFTER TEMPORARY PAVEMENT IS REMOVED.



REMOV (W)(4")(SLD)				
REMOV (W)(4")(BRK)				
REMOV (W)(4")(DOT)				
REMOV (W)(8")(SLD)				
REMOV (W)(12")(SLD)				
REMOV (W)(24")(SLD)				
REMOV (Y)(4")(SLD)				
REMOV (Y)(24")(SLD)				
REMOV (REFL) TY II-A-A				
REMOV (W) (ARROW)				
REMOV (W) (DBL ARROW)				
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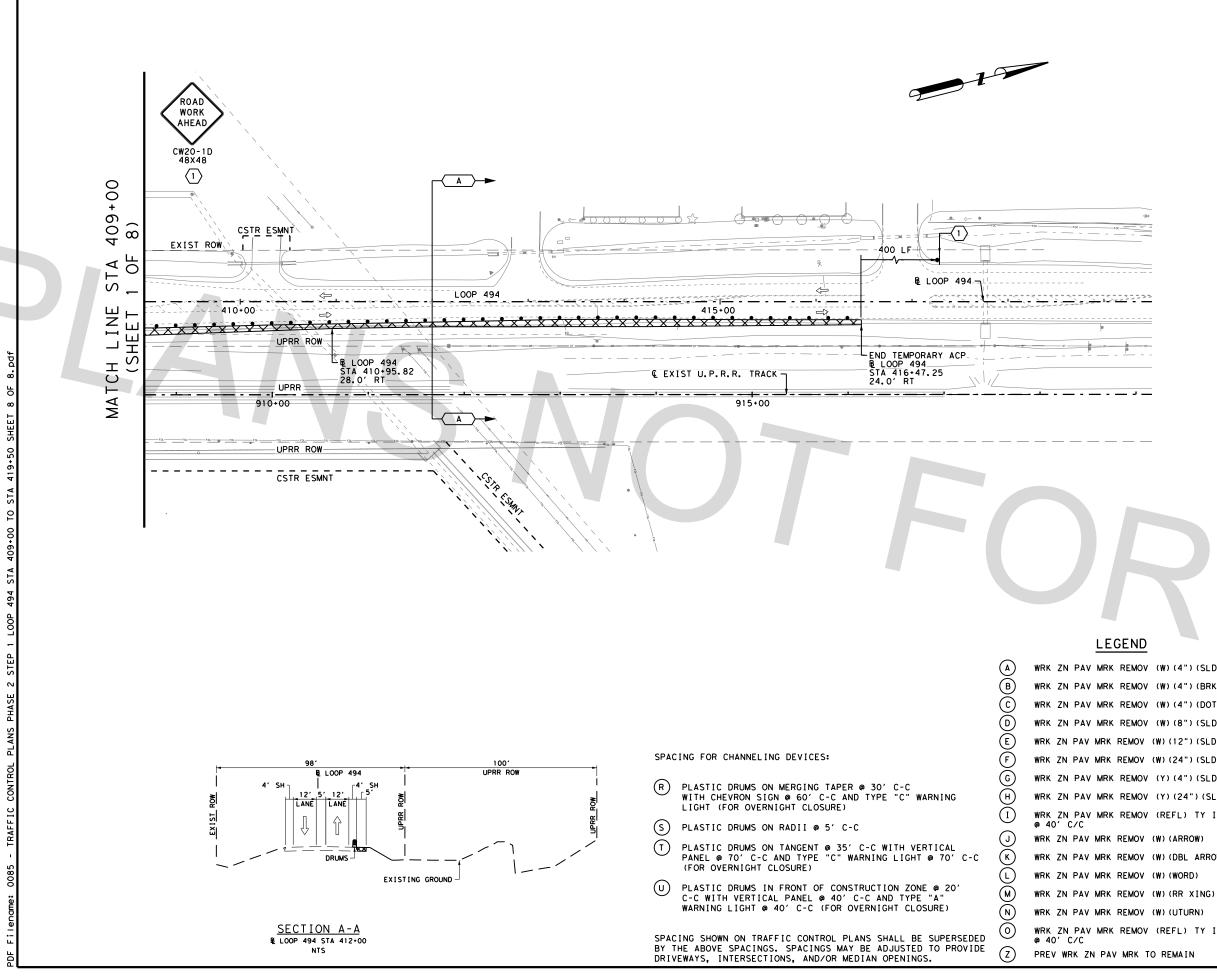
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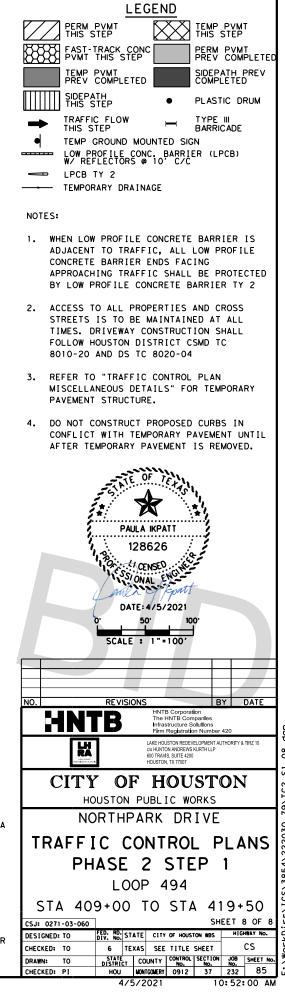
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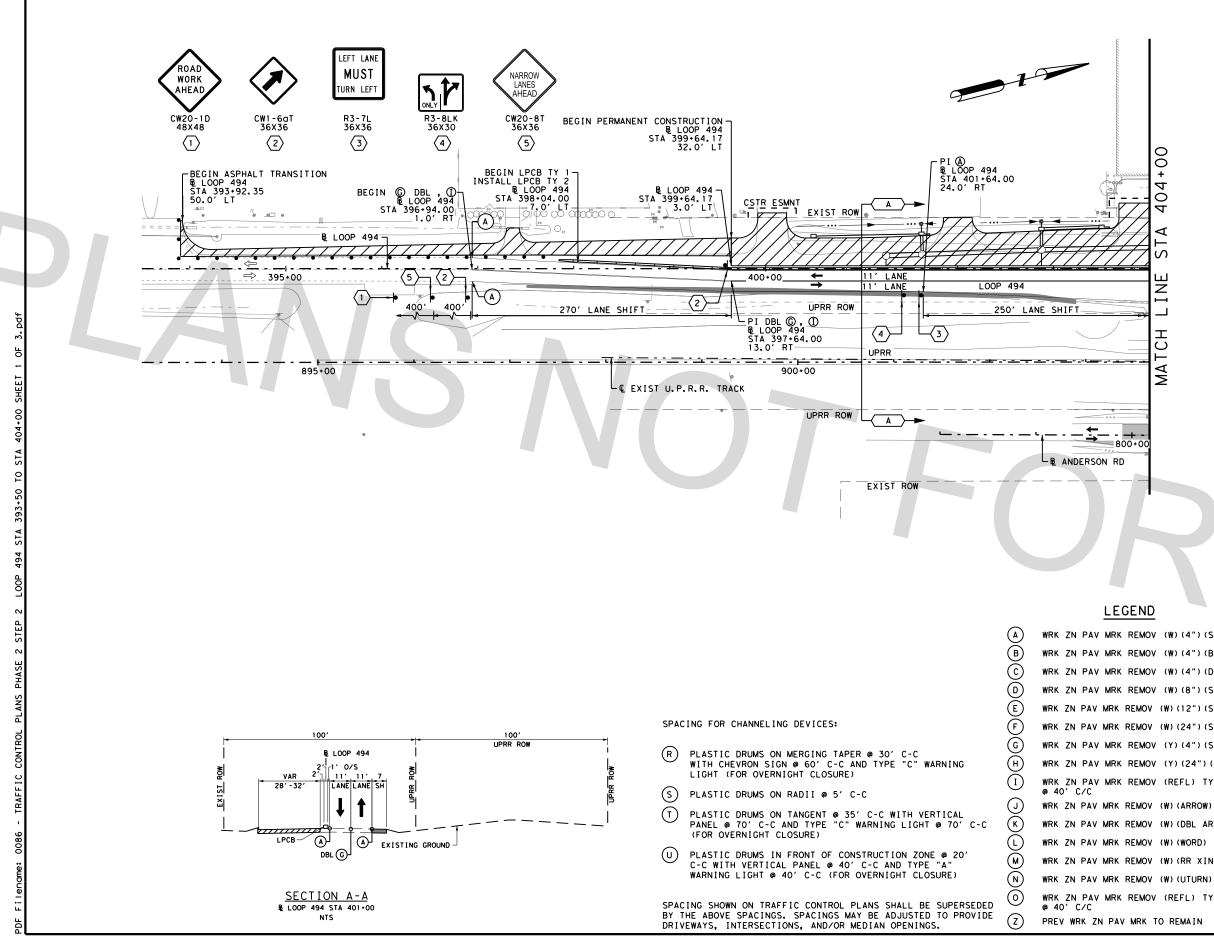
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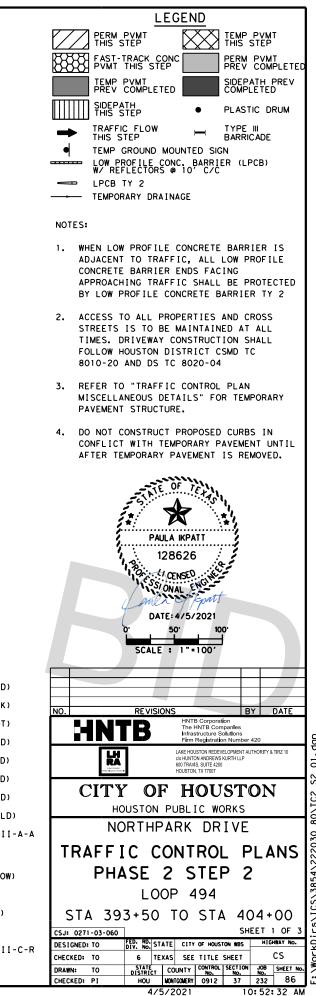
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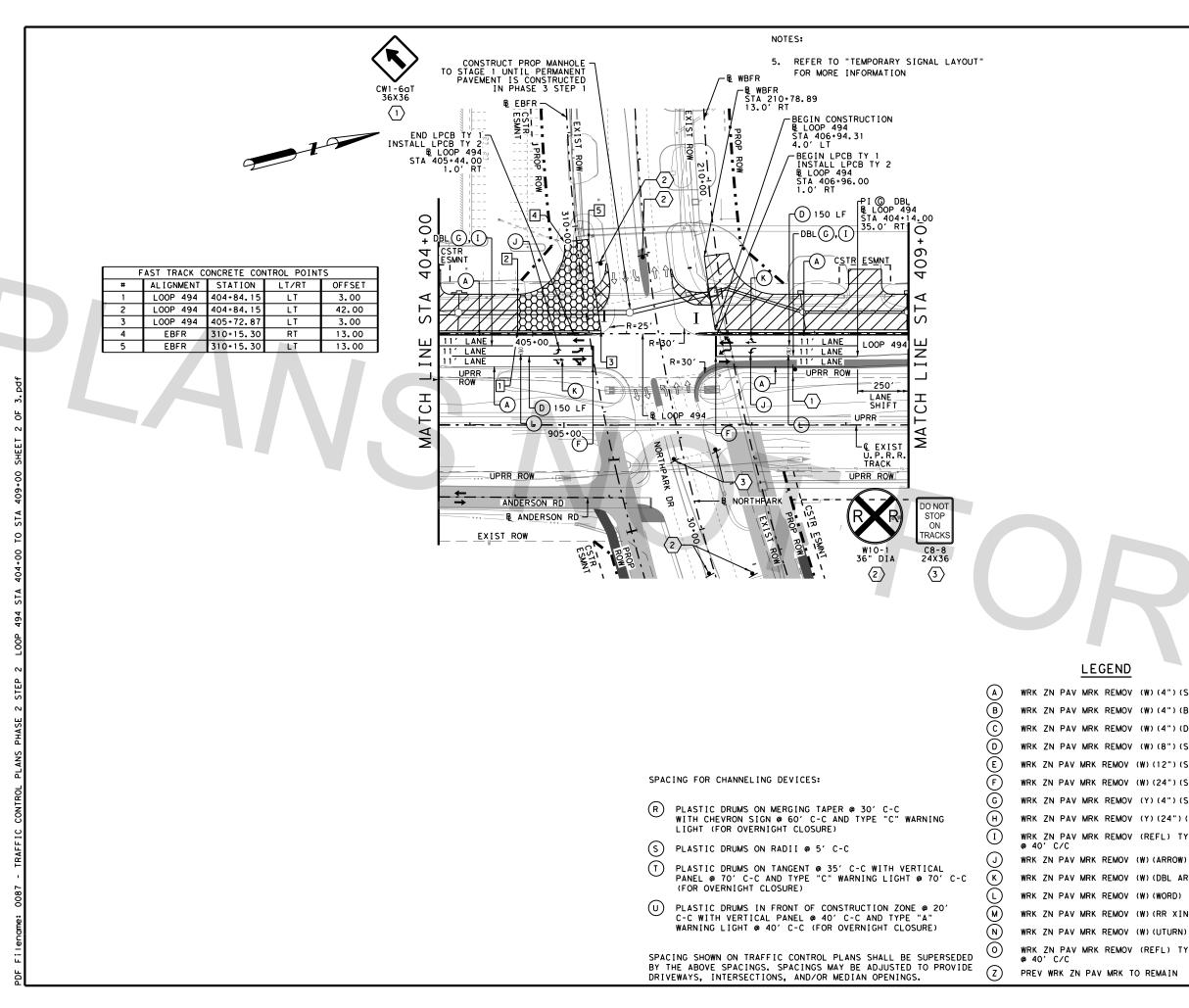
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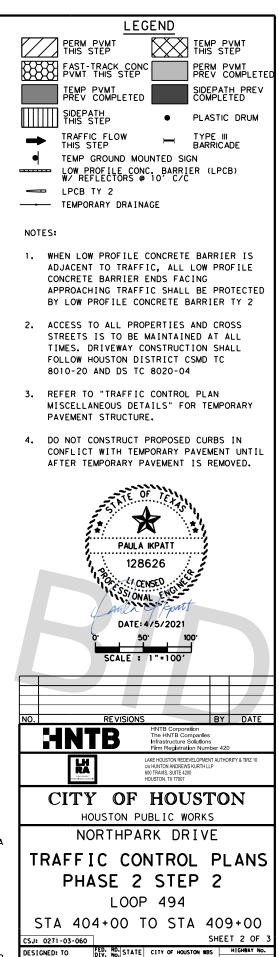
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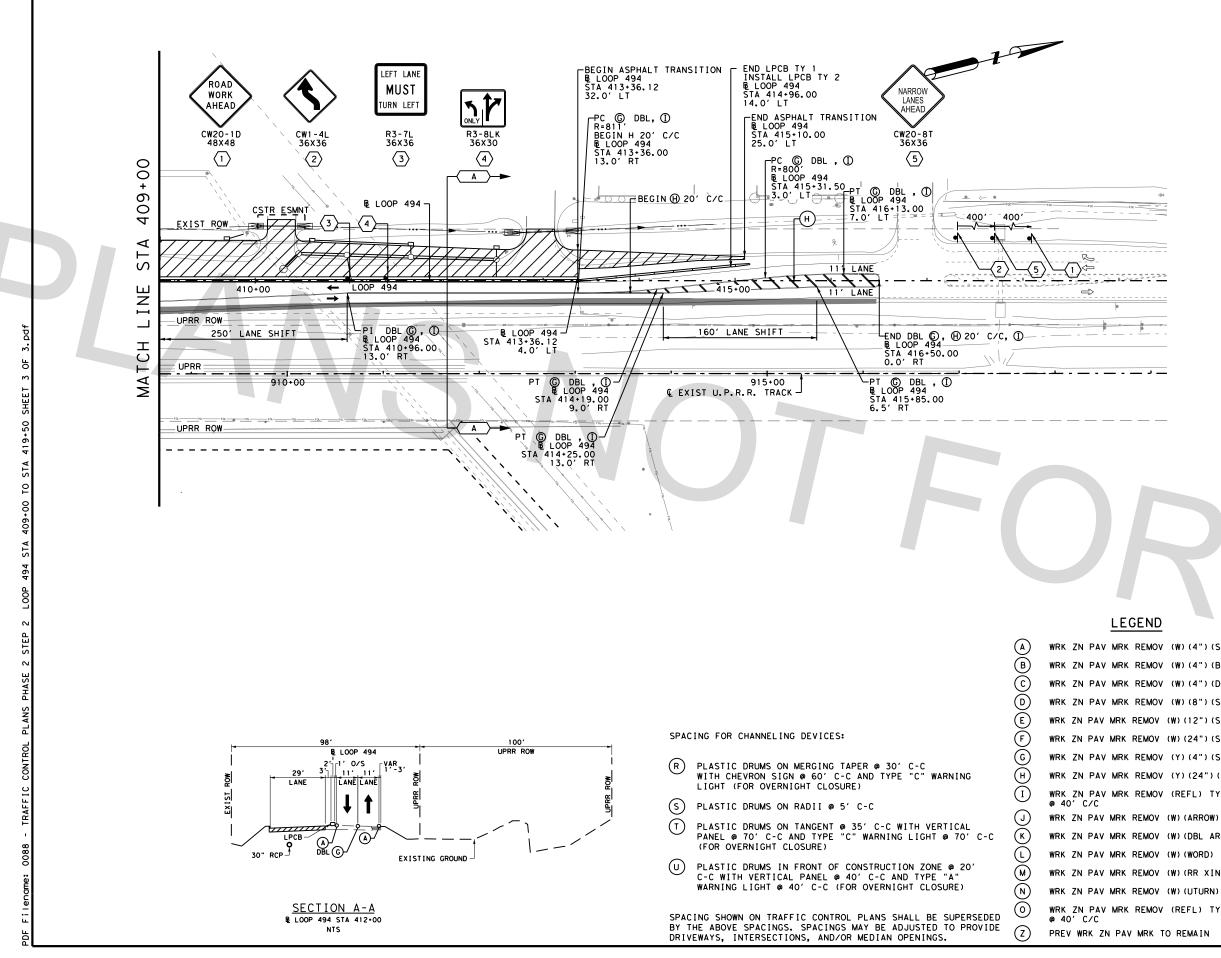
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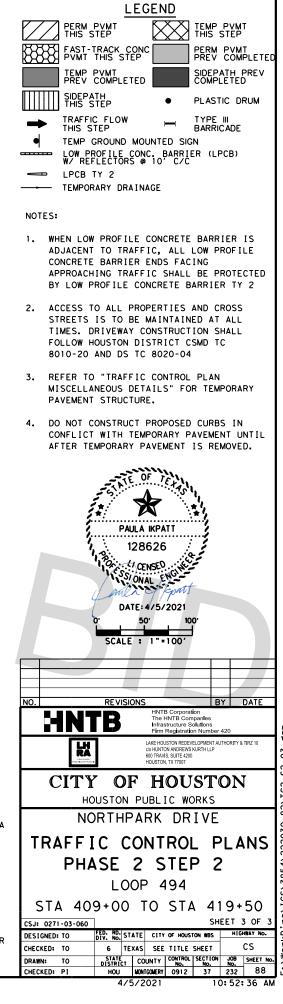
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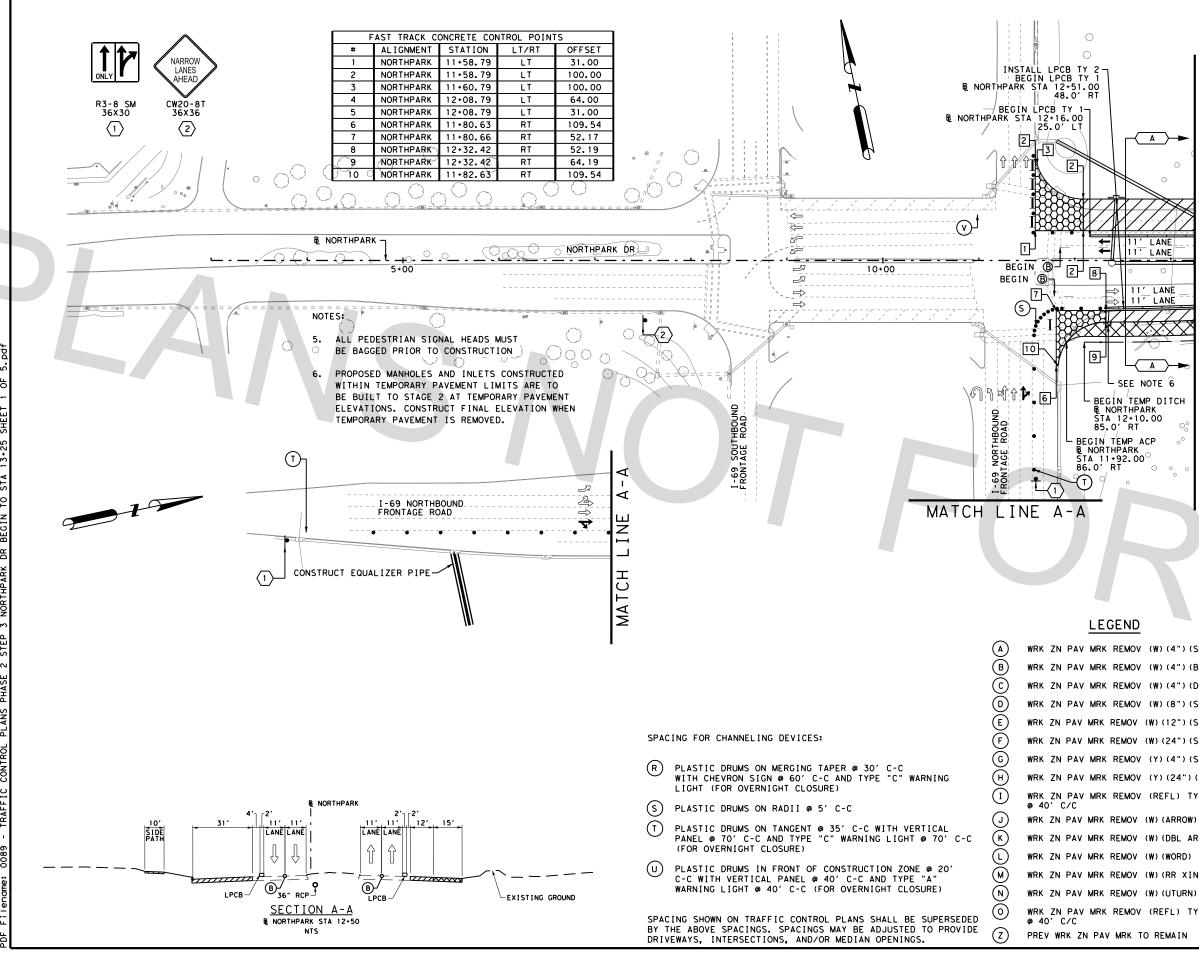
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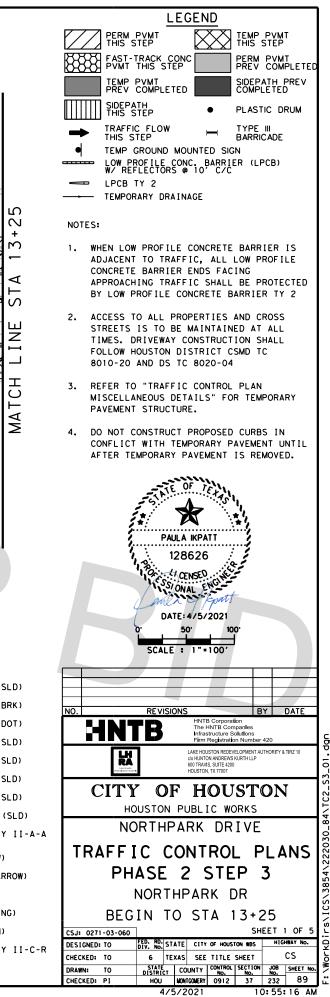
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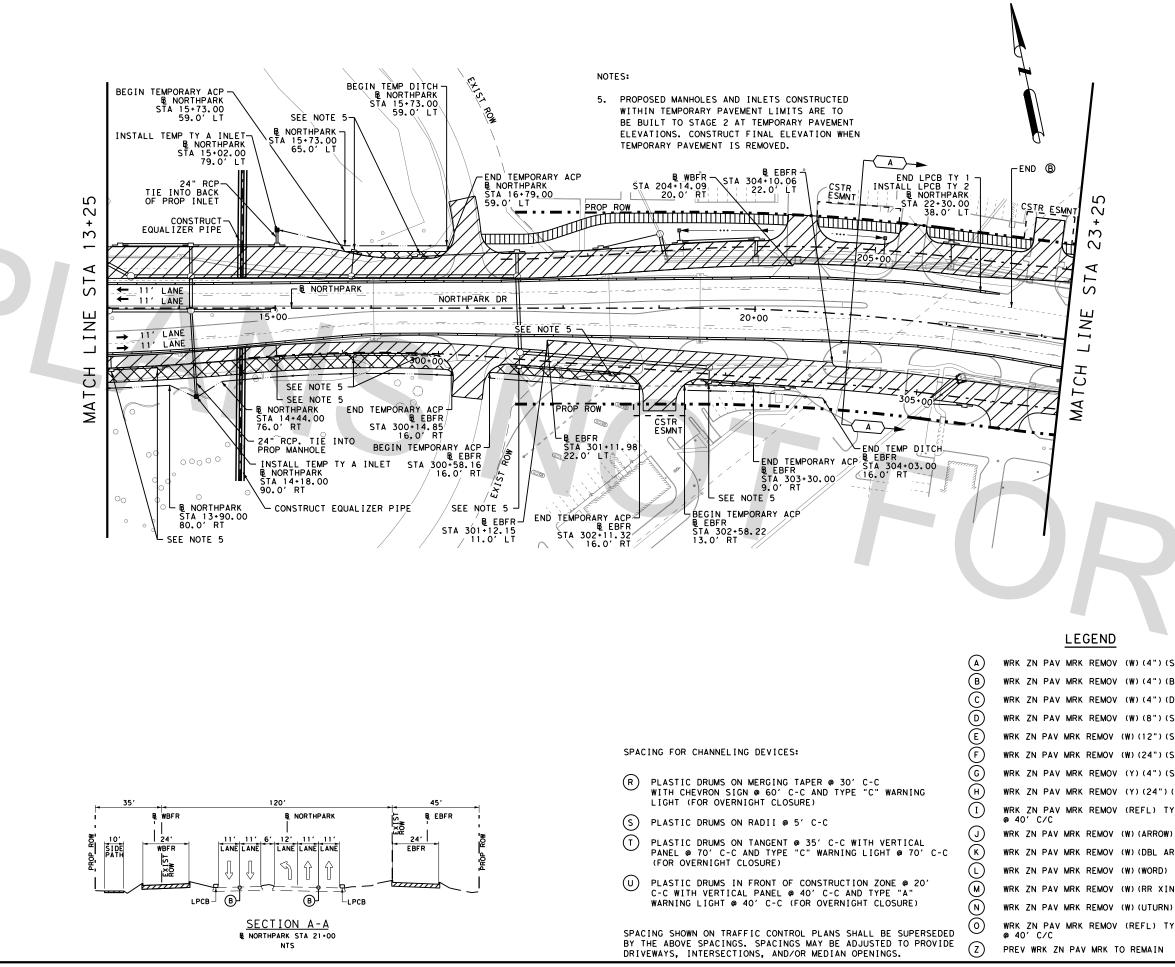
LANE

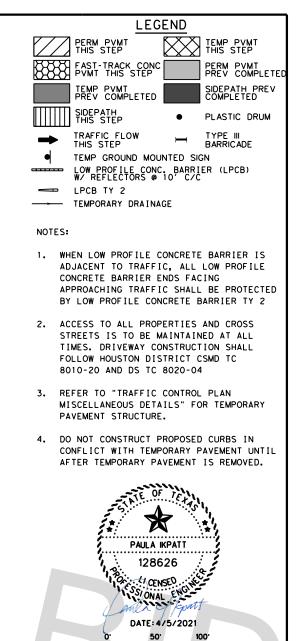
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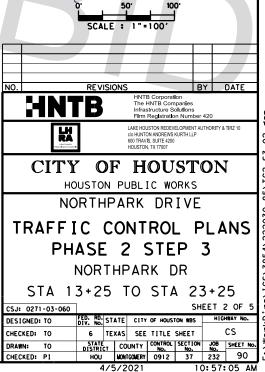
11' LANE

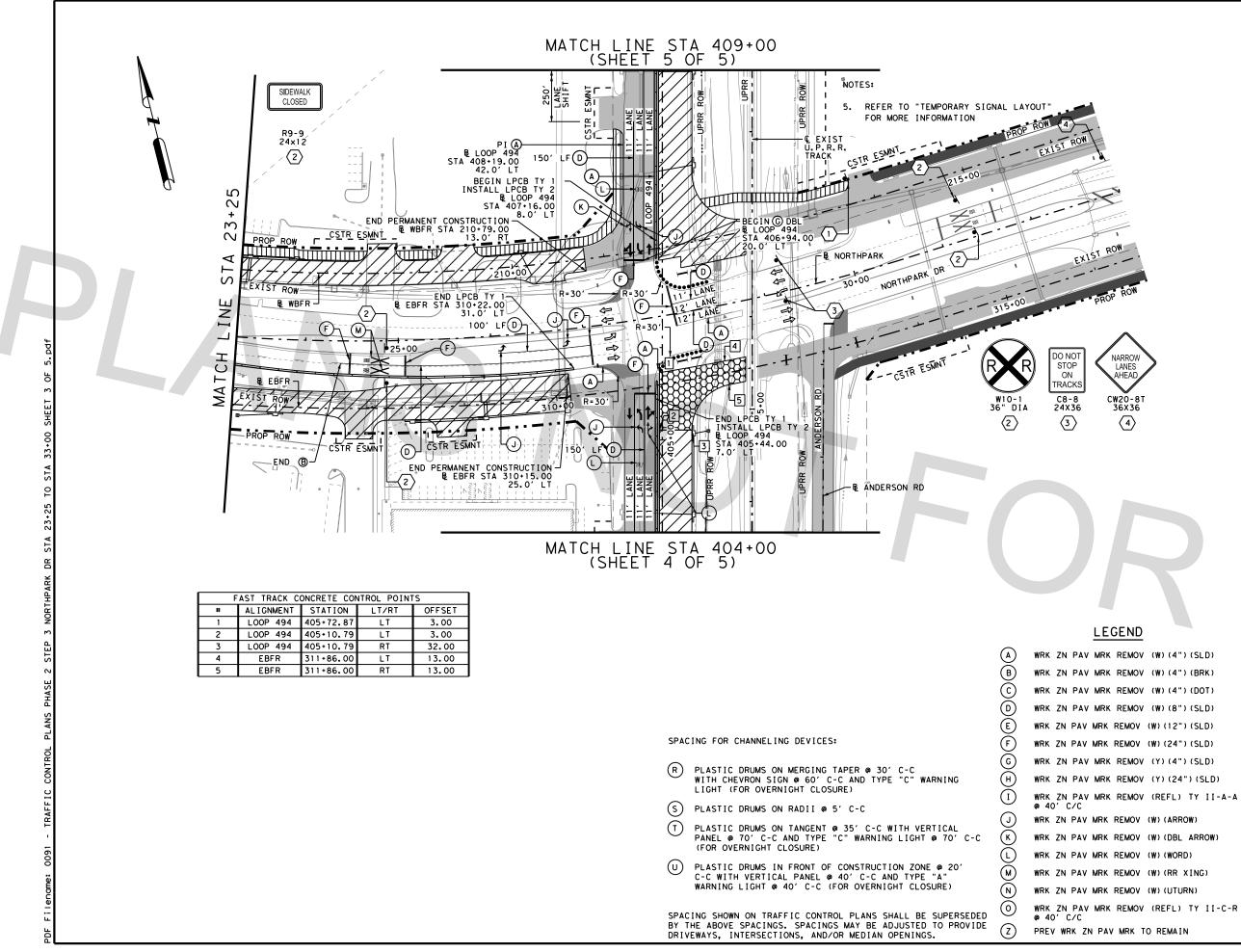
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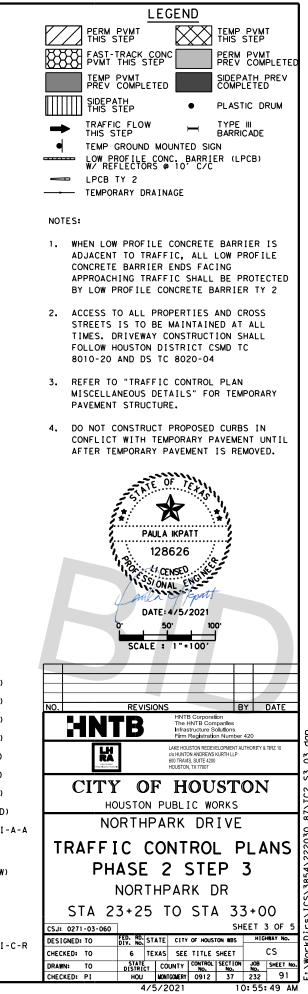
11' LANE

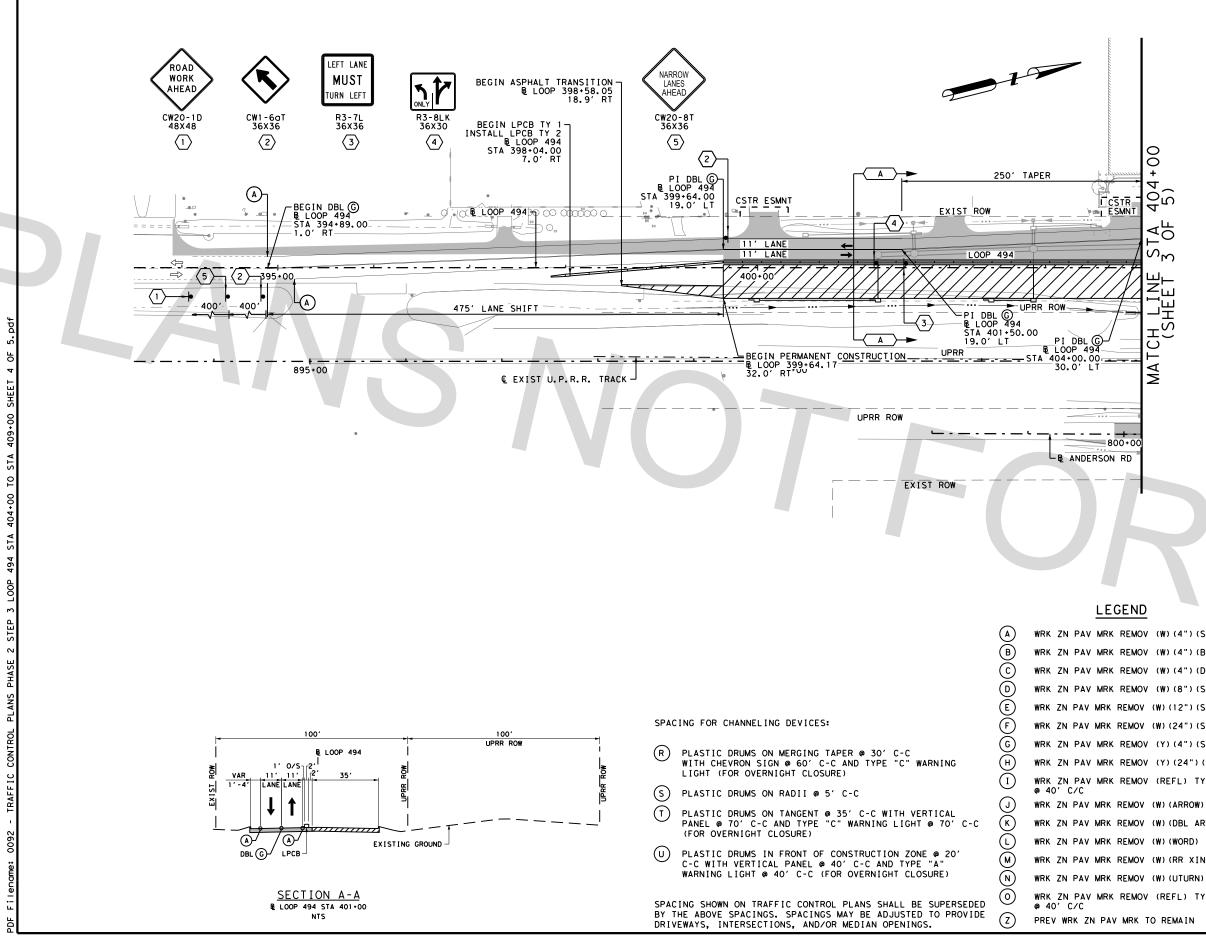


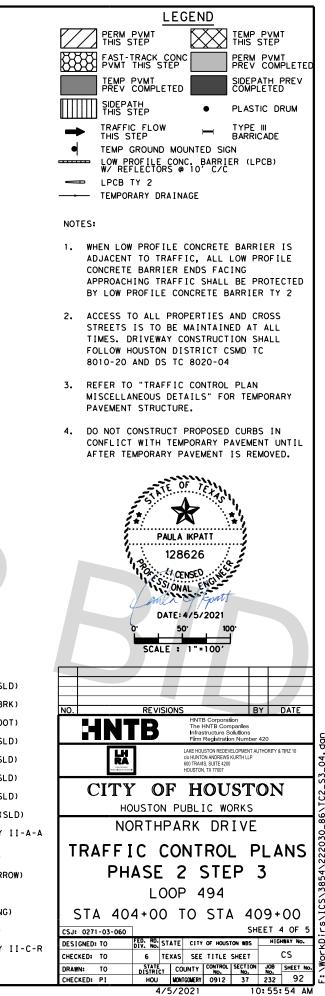












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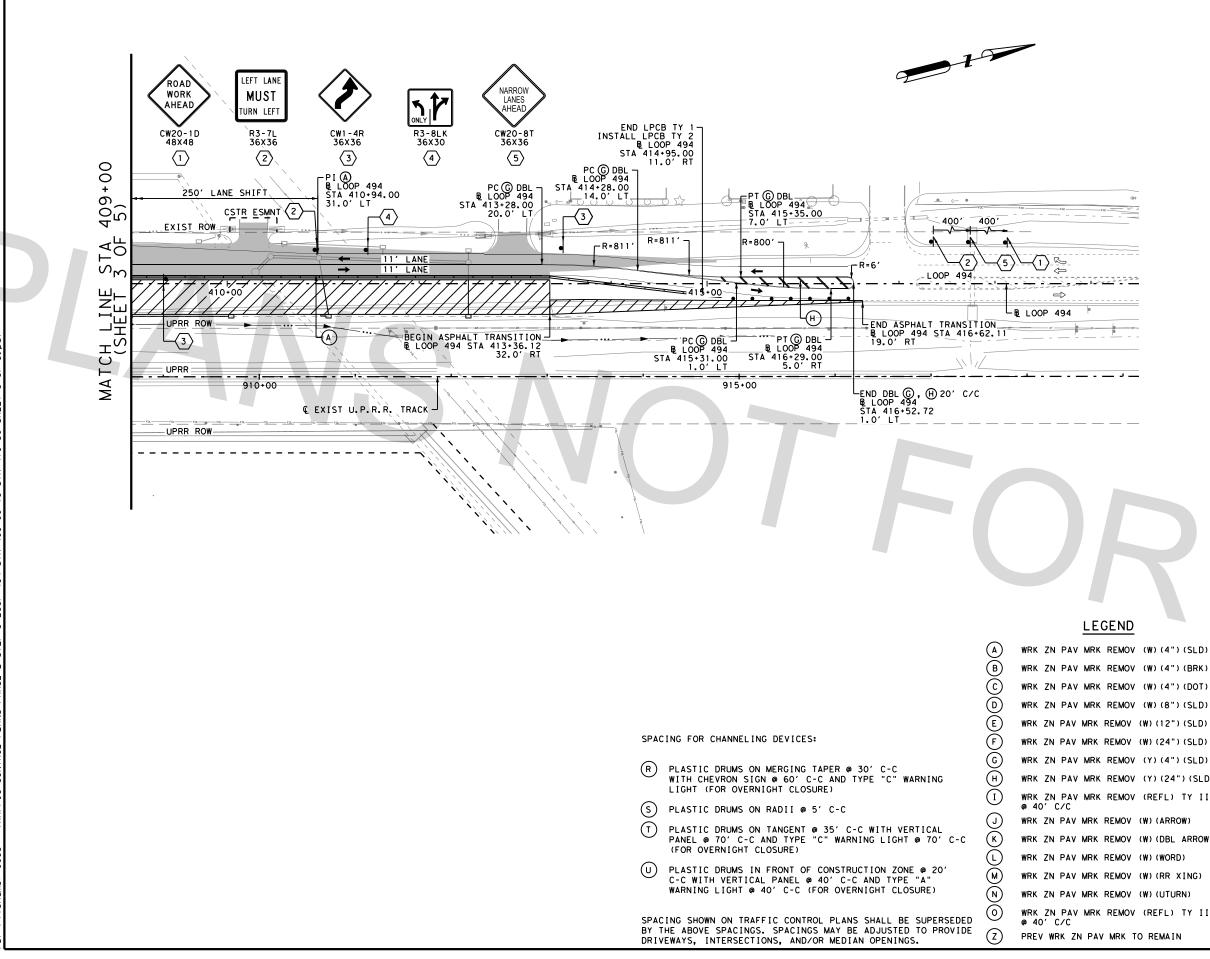
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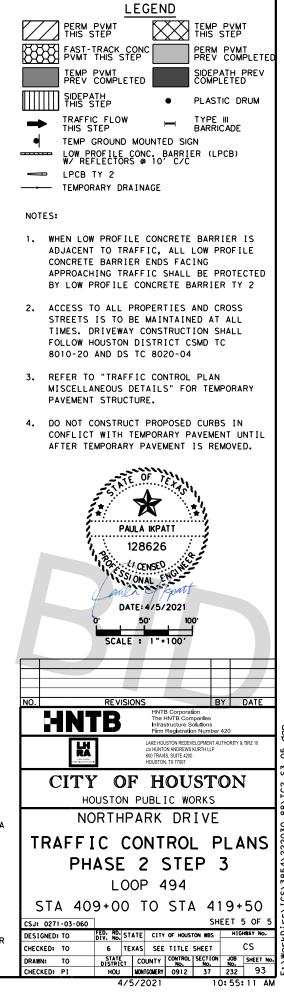
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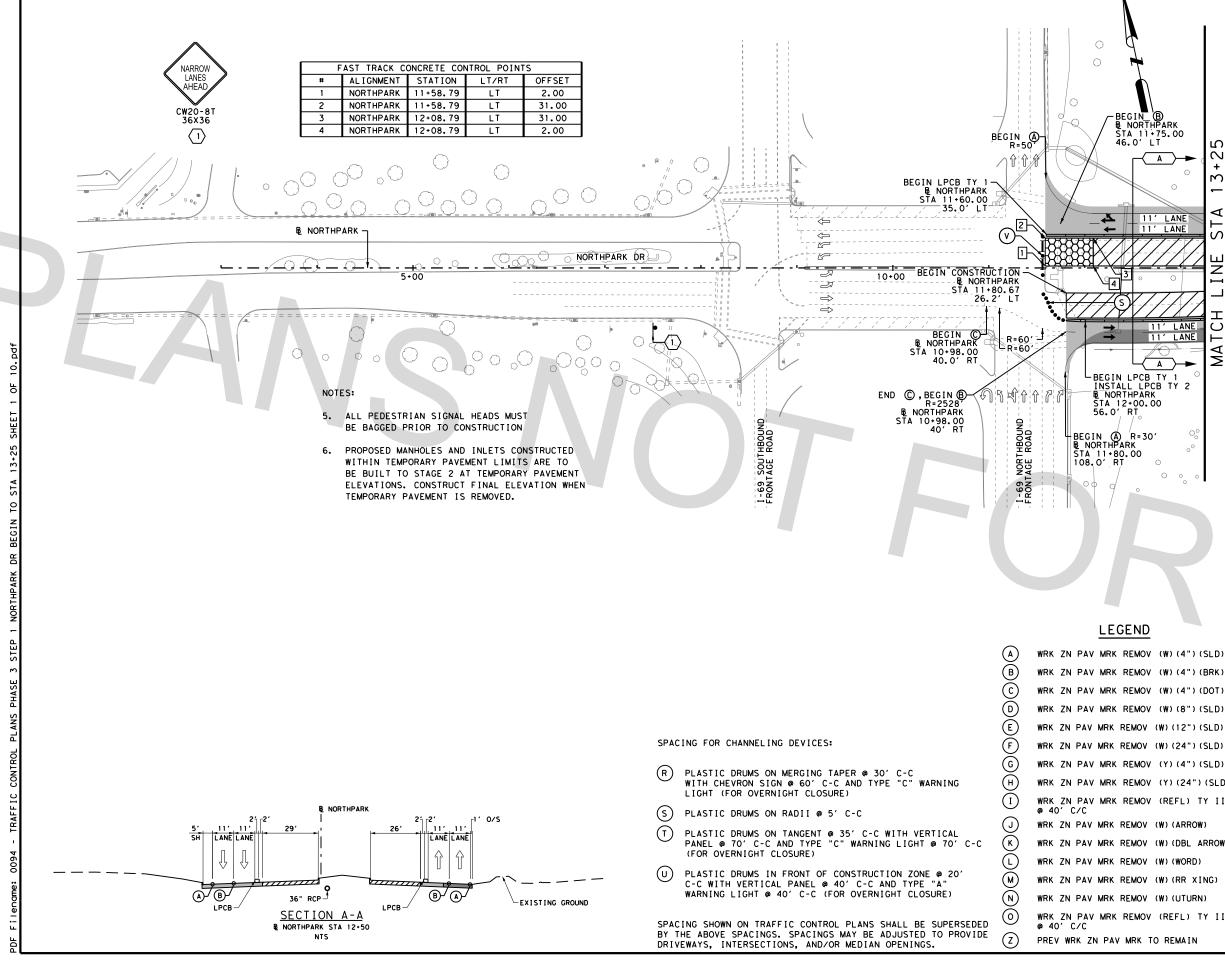
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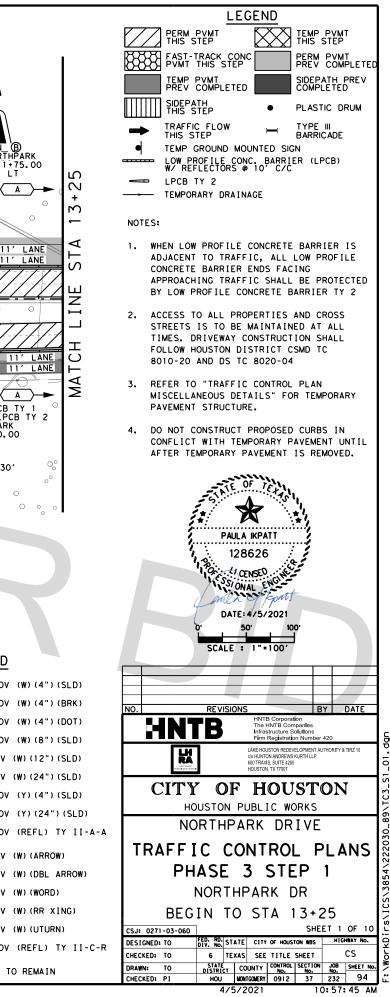
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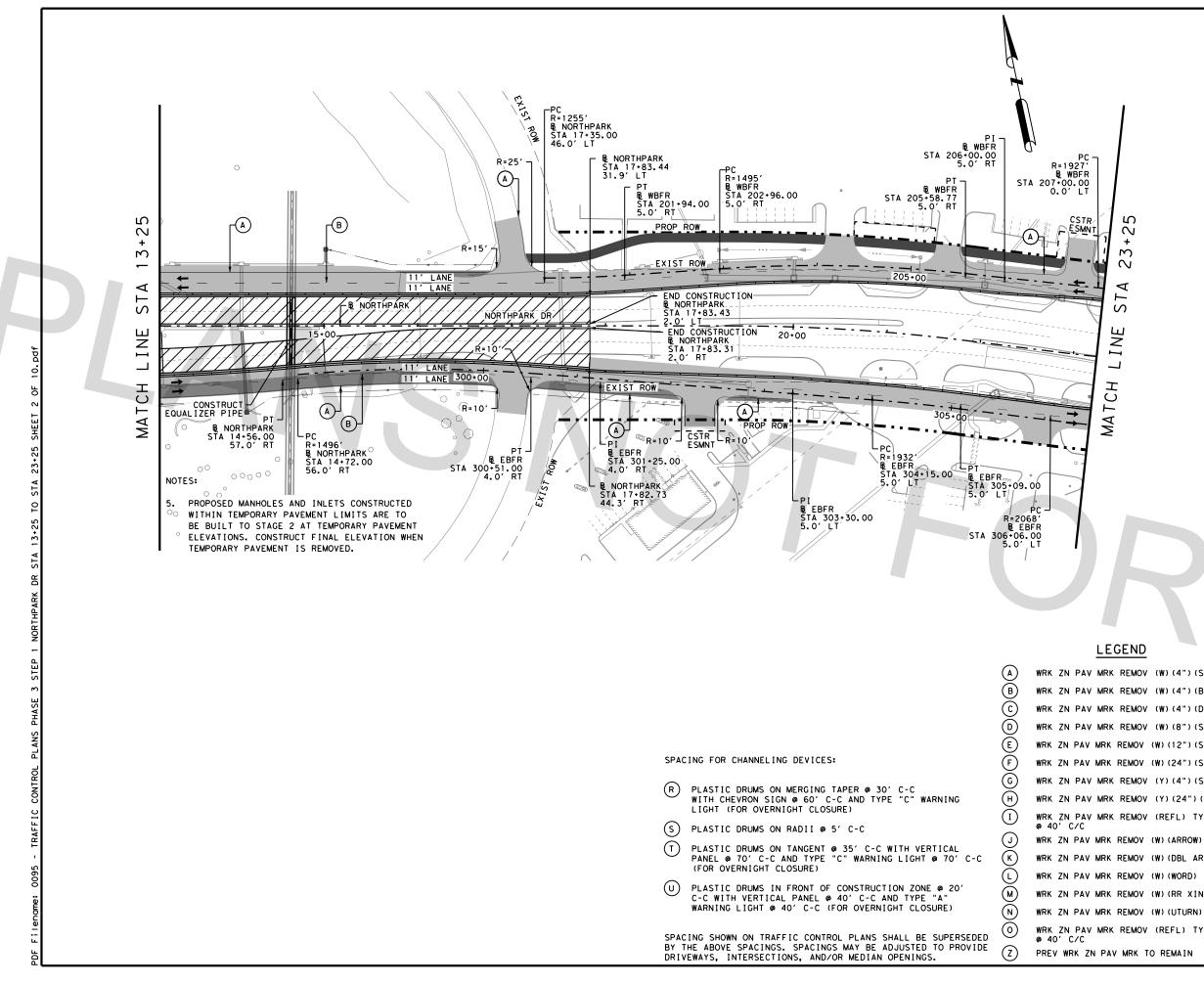
WRK ZN PAV MRK REMOV (Y) (24") (SLD) WRK ZN PAV MRK REMOV (REFL) TY II-A-A WRK ZN PAV MRK REMOV (W) (DBL ARROW) WRK ZN PAV MRK REMOV (REFL) TY II-C-R

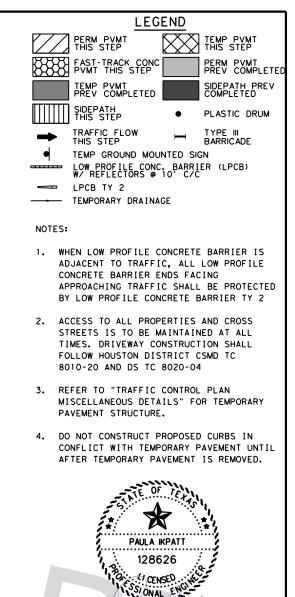




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WRK ZN PAV MRK REMOV (W) (4") (BRK) WRK ZN PAV MRK REMOV (W) (4") (DOT) WRK ZN PAV MRK REMOV (W) (24") (SLD) WRK ZN PAV MRK REMOV (Y) (24") (SLD) WRK ZN PAV MRK REMOV (REFL) TY II-A-A WRK ZN PAV MRK REMOV (W) (DBL ARROW) WRK ZN PAV MRK REMOV (REFL) TY II-C-R



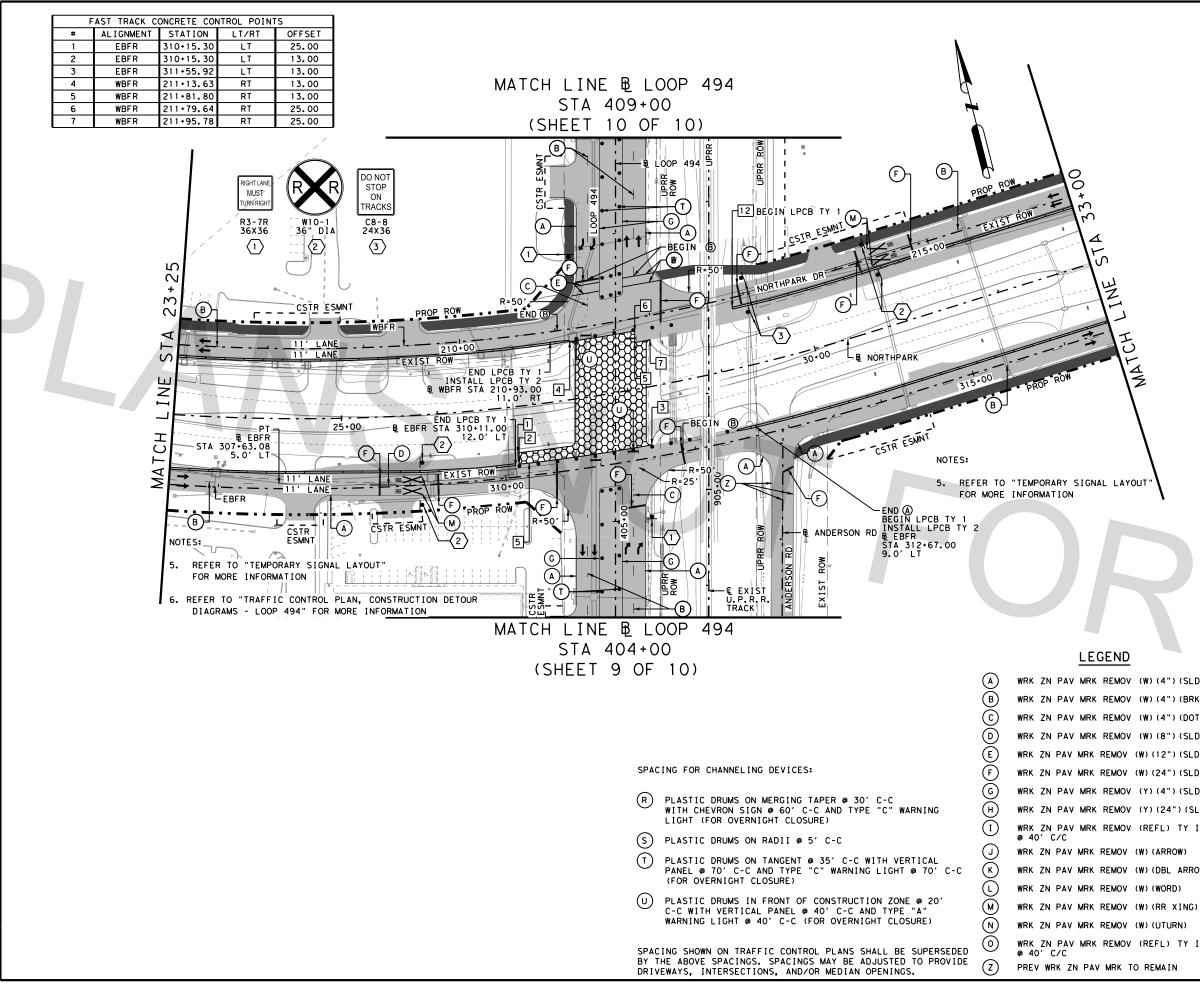


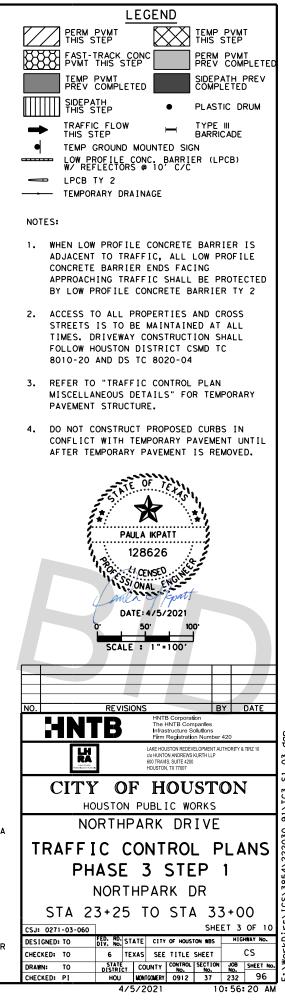


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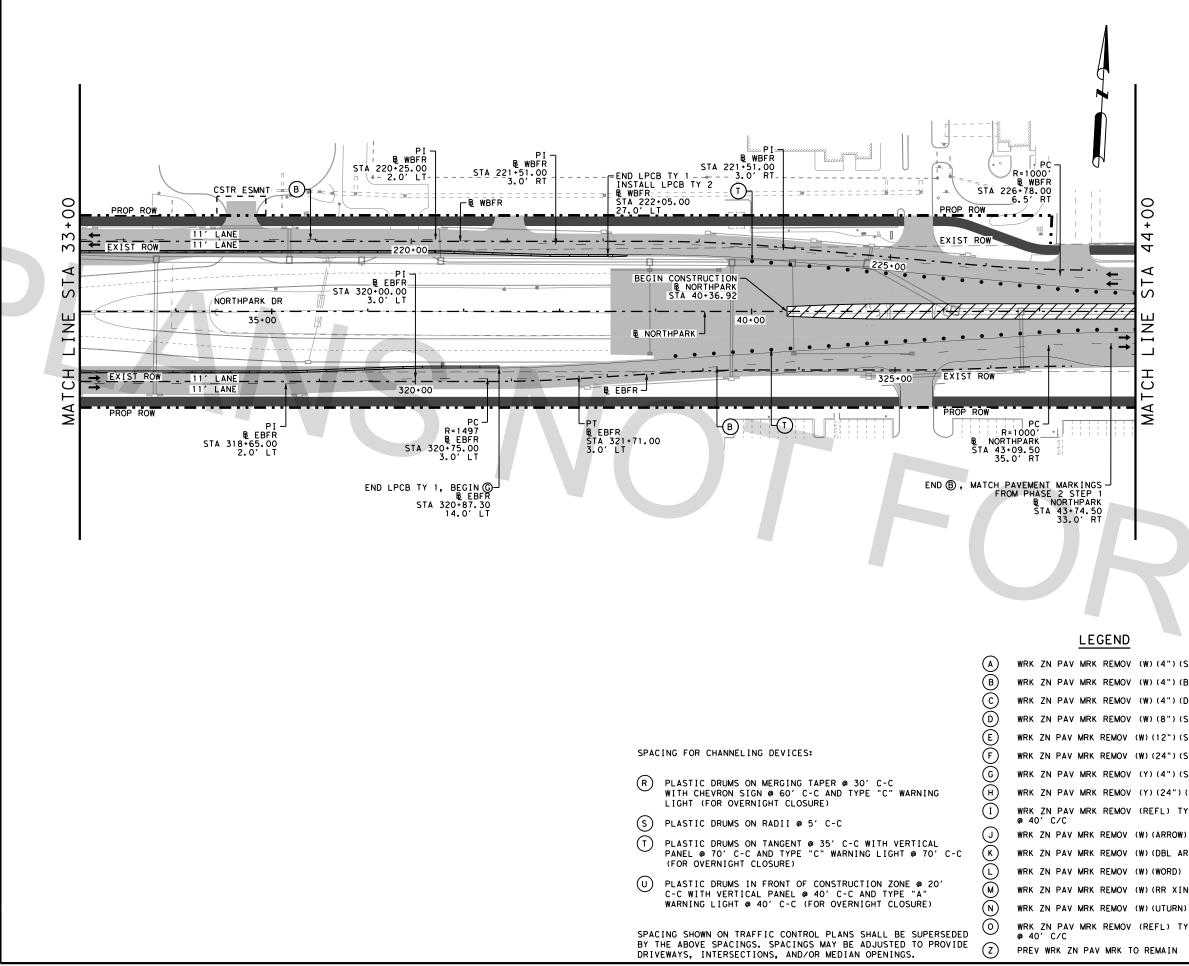
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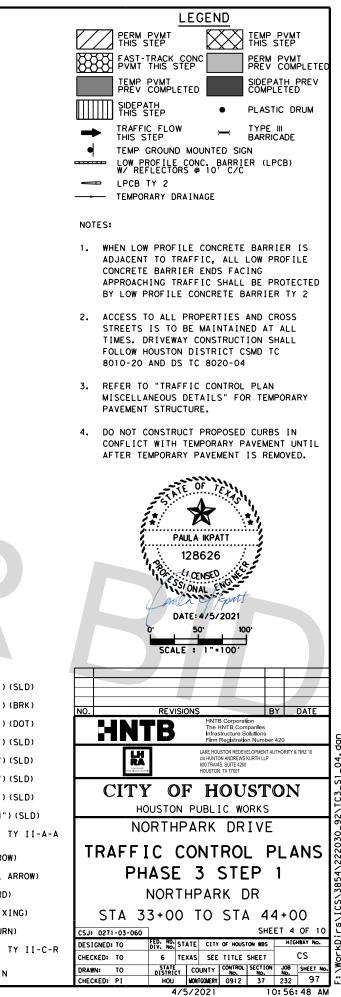




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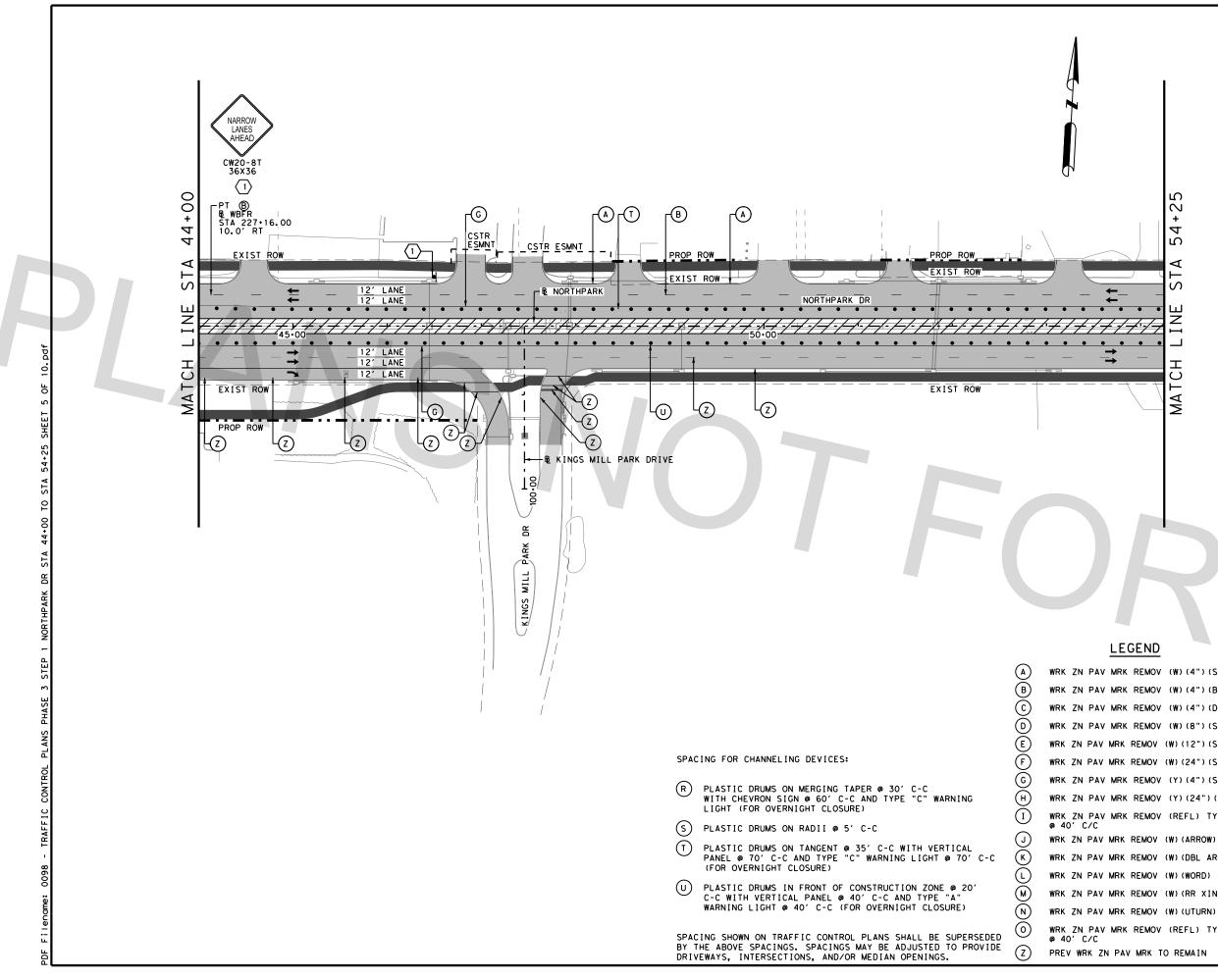
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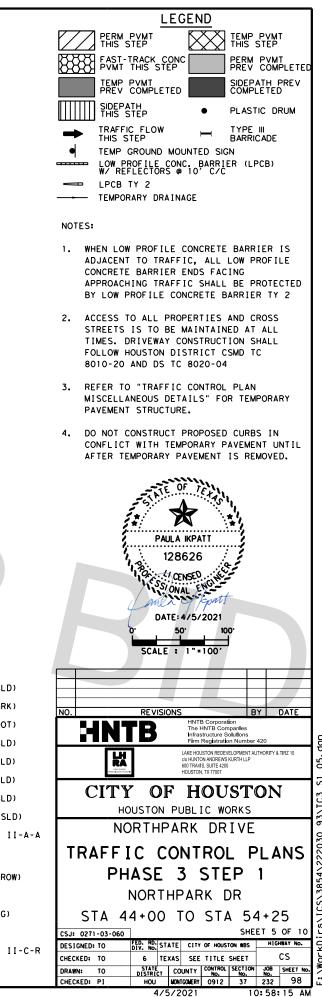
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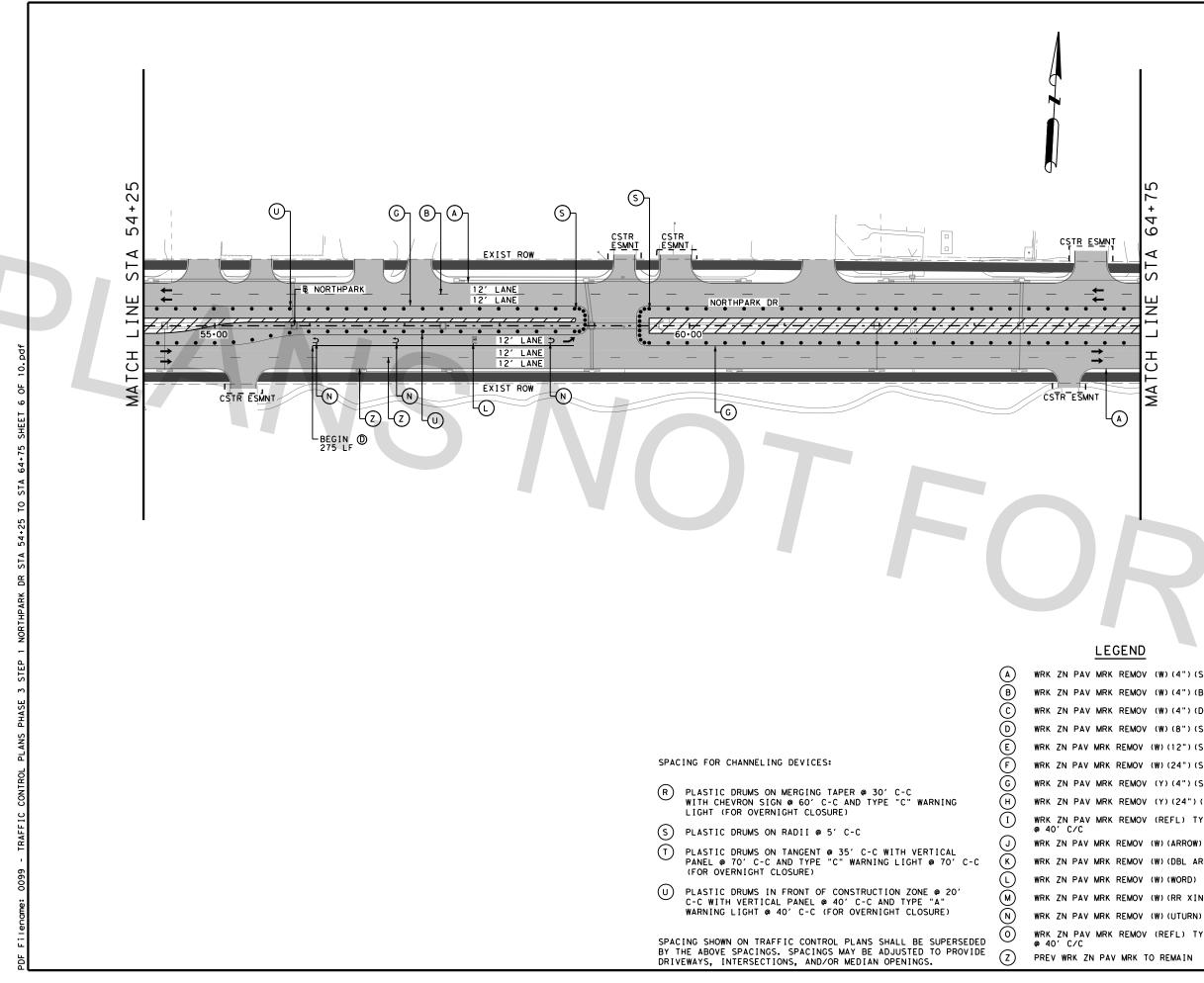
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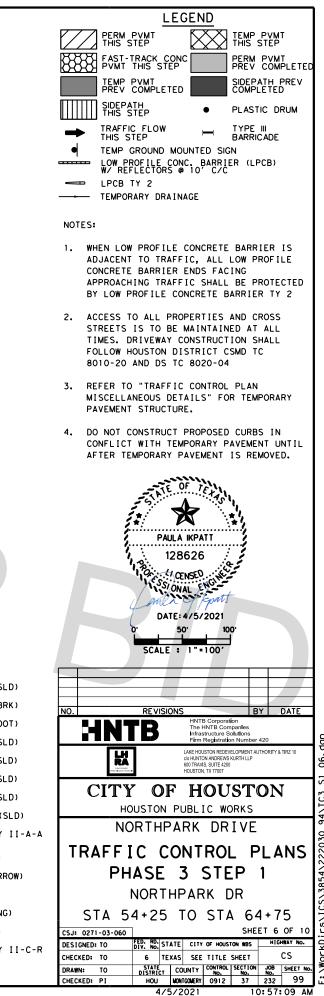
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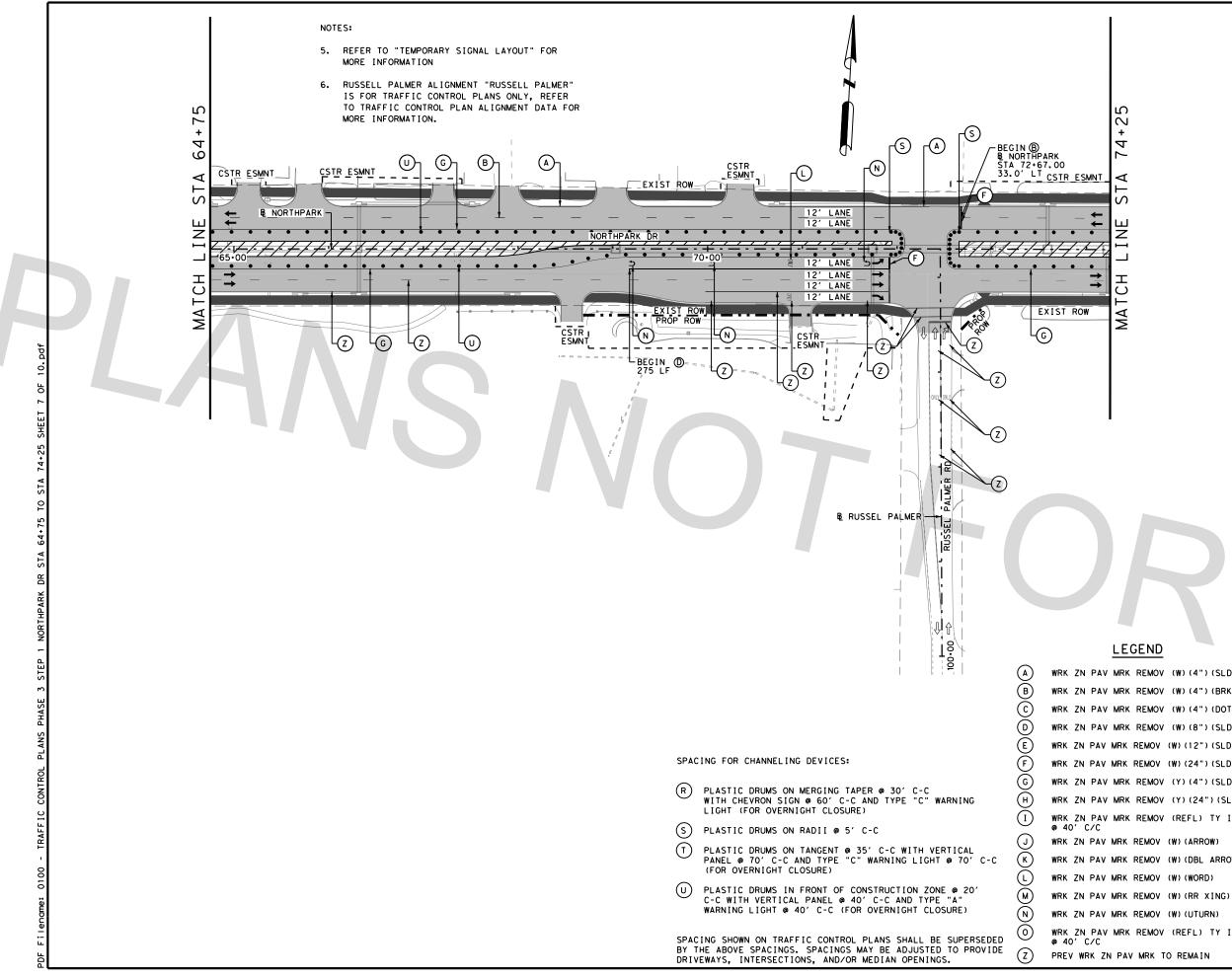
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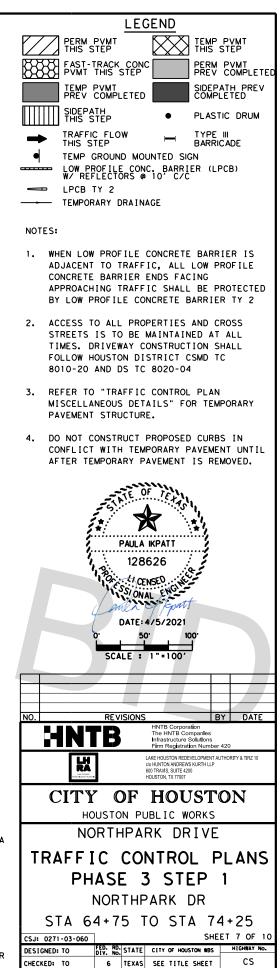
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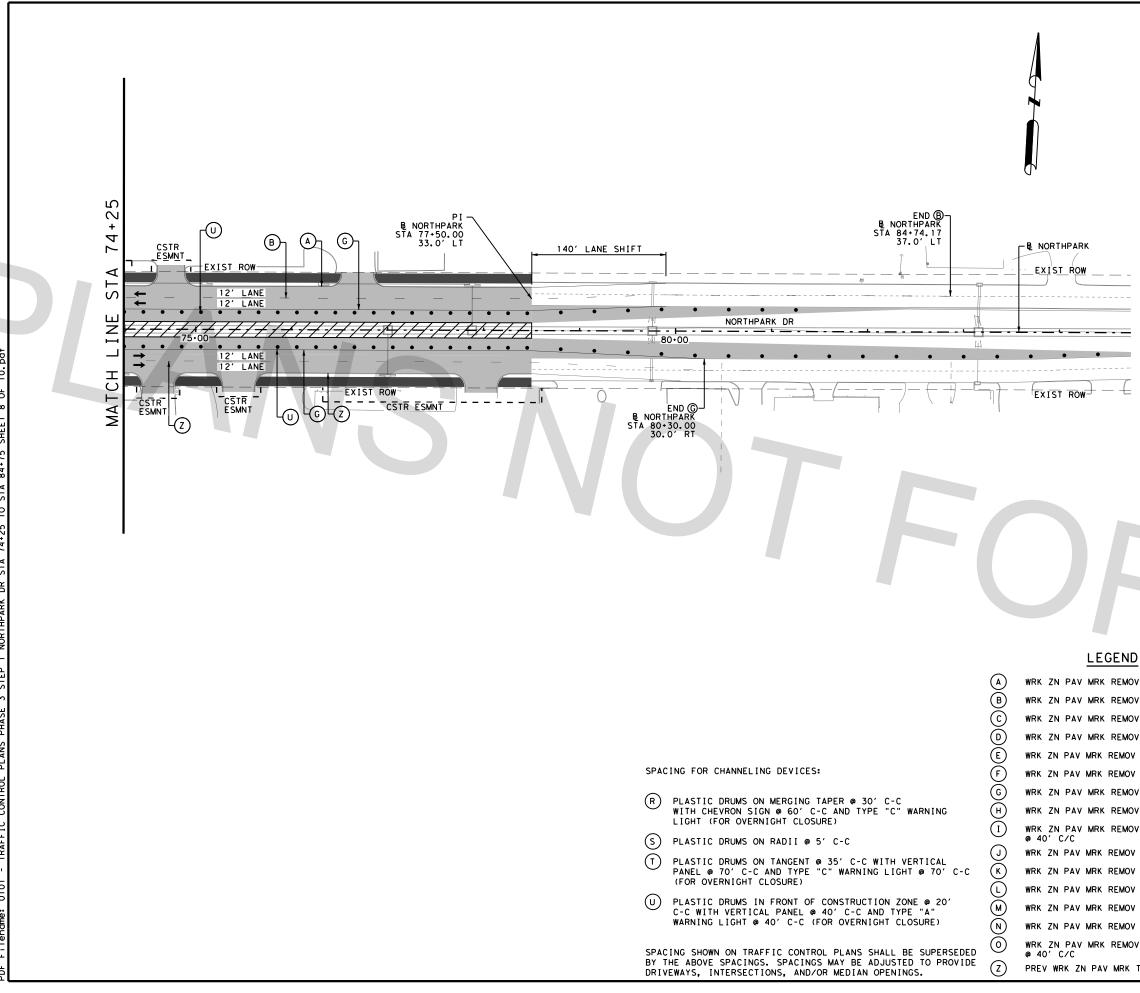
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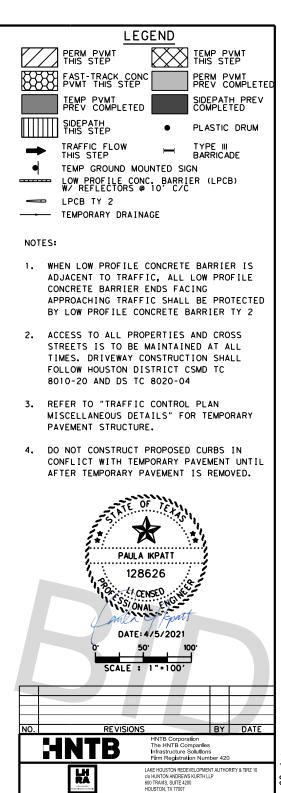
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CITY OF HOUSTON

HOUSTON PUBLIC WORKS

NORTHPARK DRIVE

TRAFFIC CONTROL PLANS

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6 TEXAS SEE TITLE SHEET

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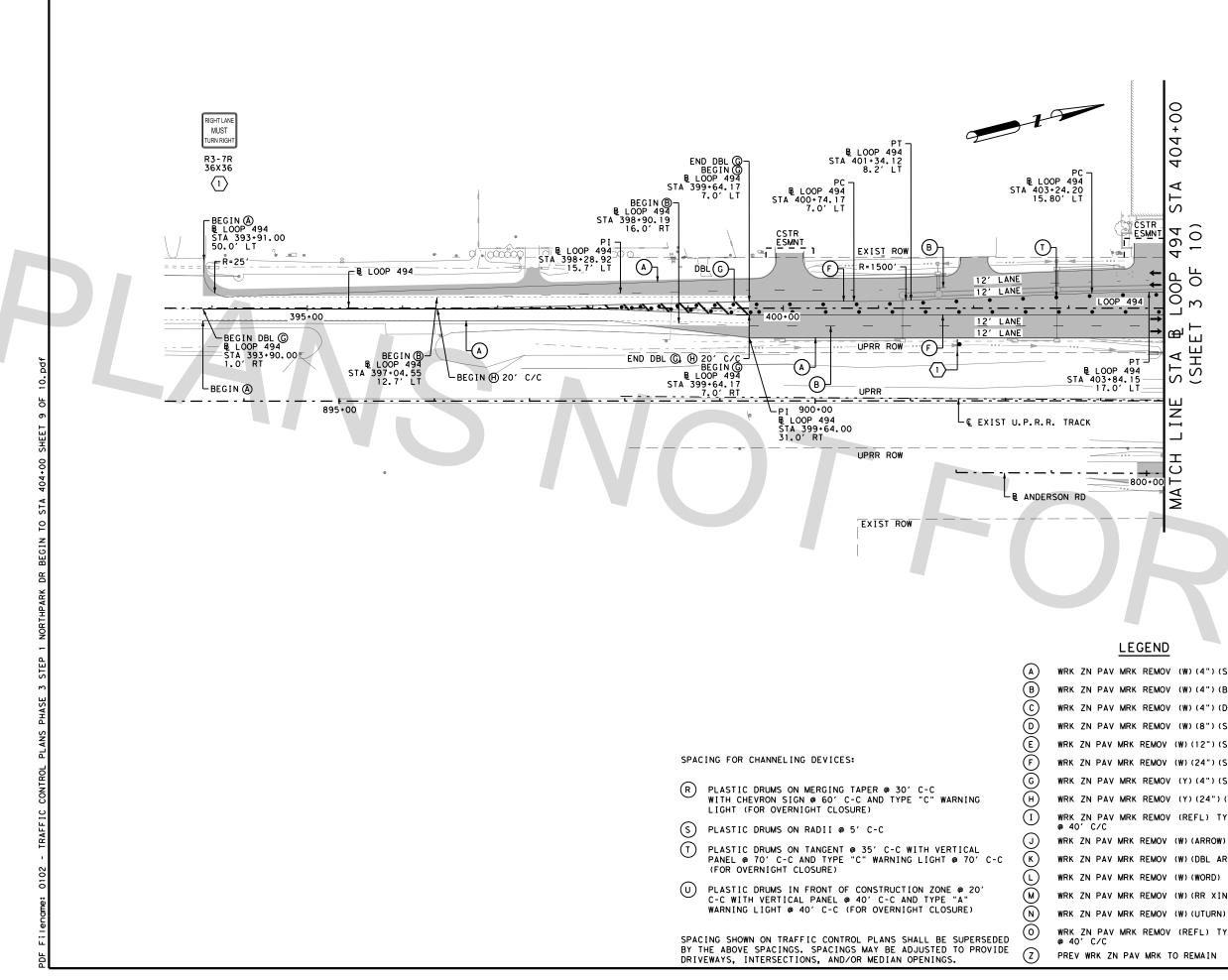
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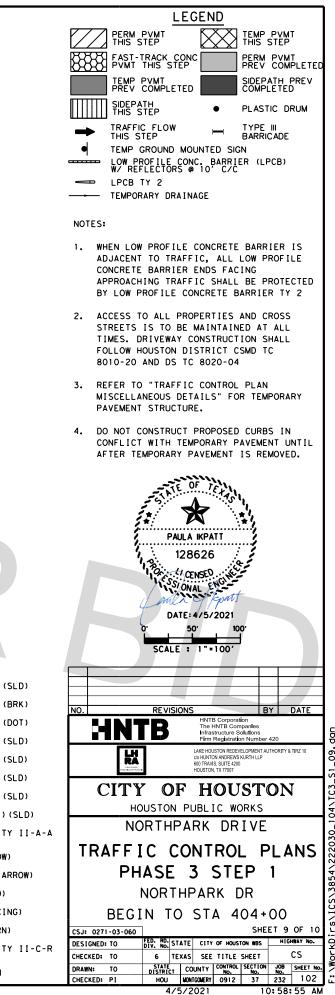
SHEET 8 OF 10

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REMOV (W)(4")(SLD)				
REMOV (W)(4")(BRK)				
REMOV (W)(4")(DOT)				
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REMOV (Y)(24")(SLD)				
REMOV (REFL) TY II-A-A				
REMOV (W) (ARROW)				
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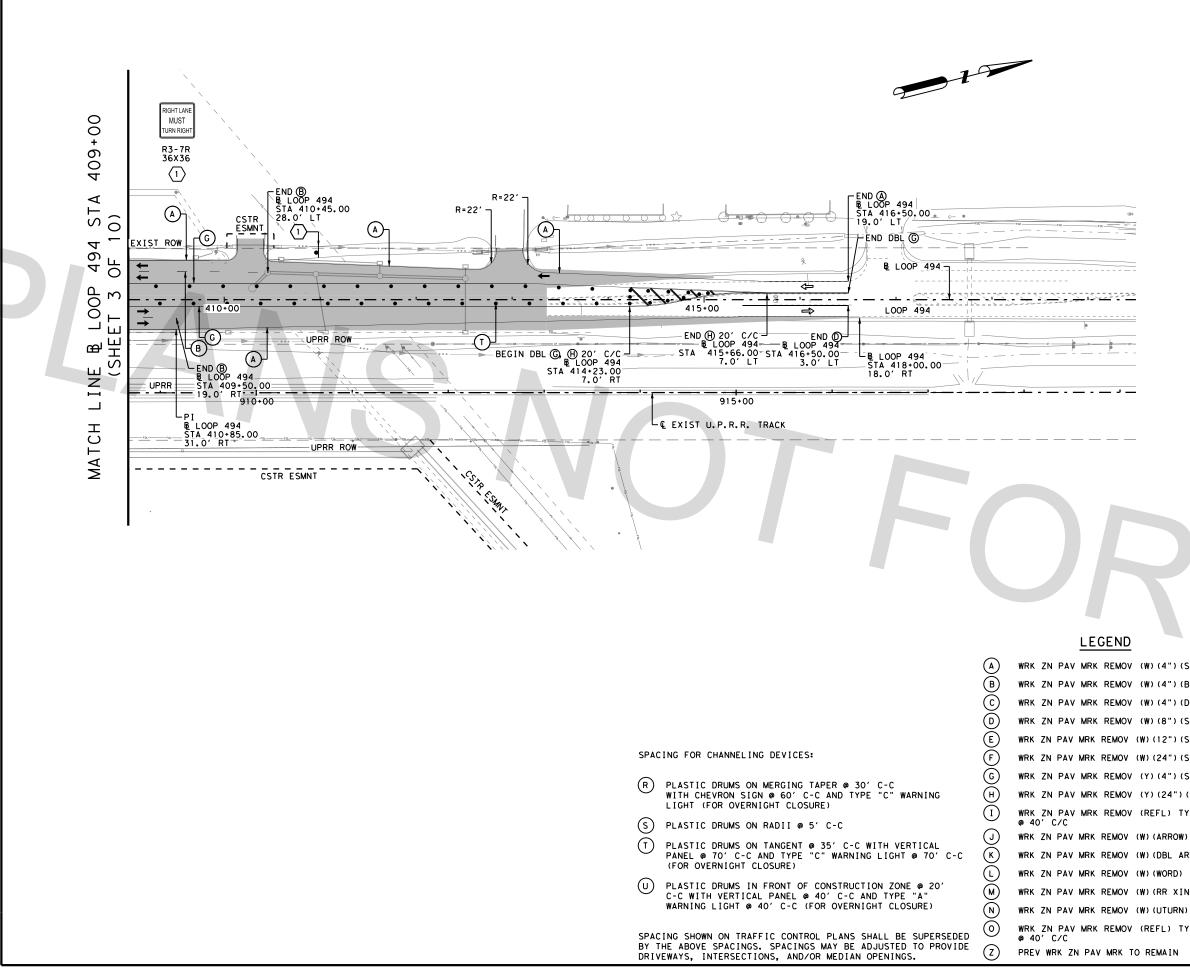
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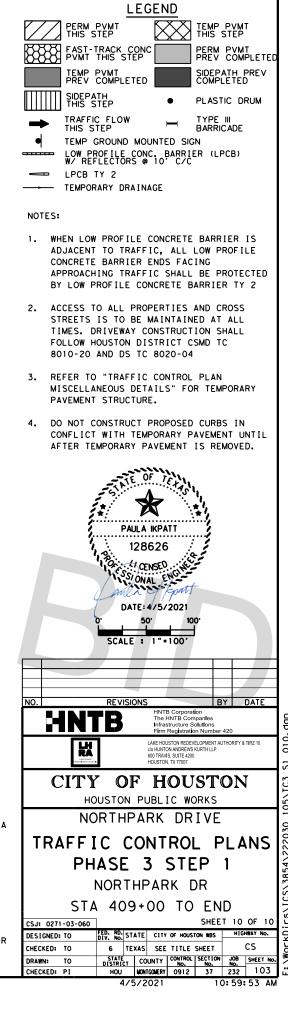
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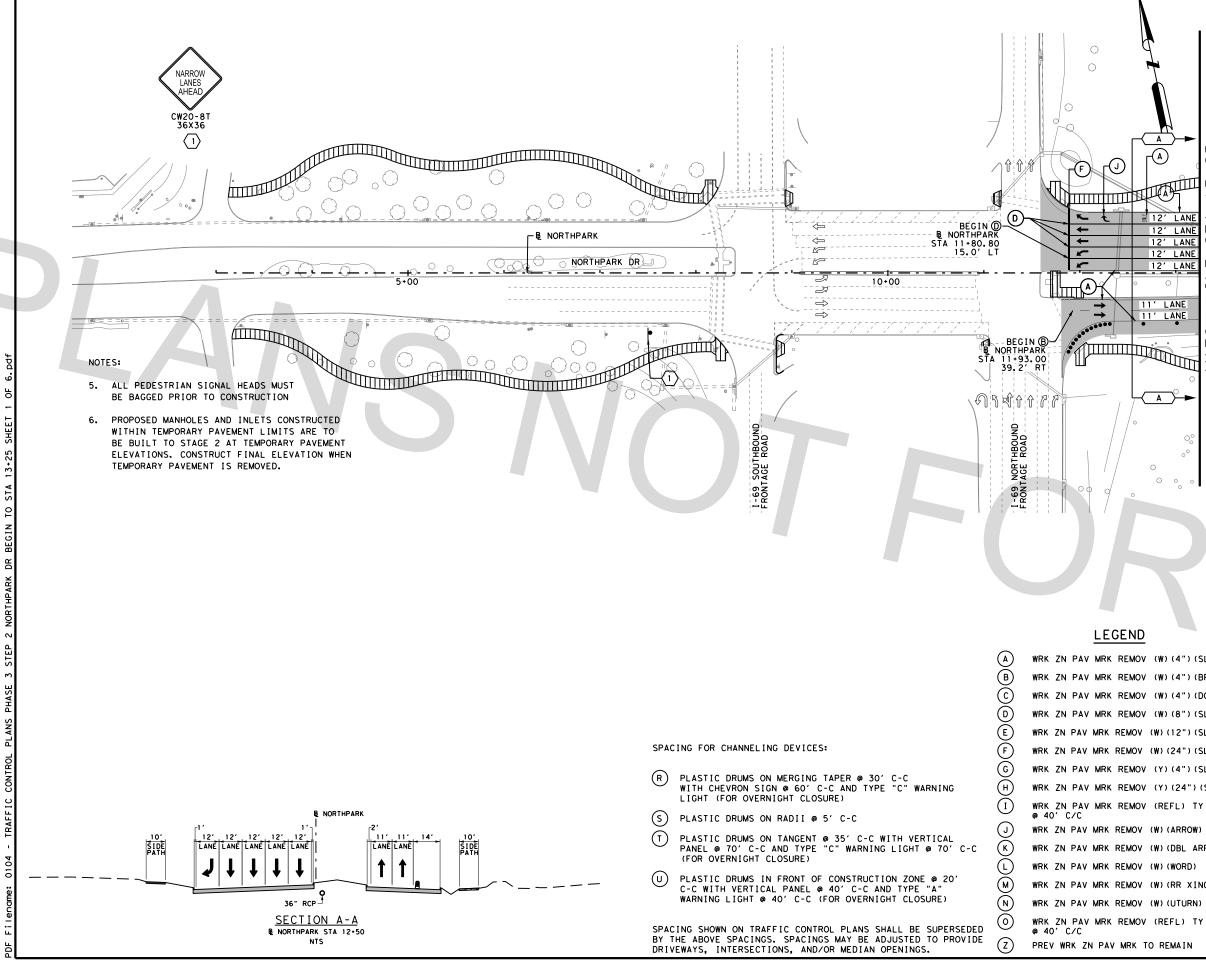
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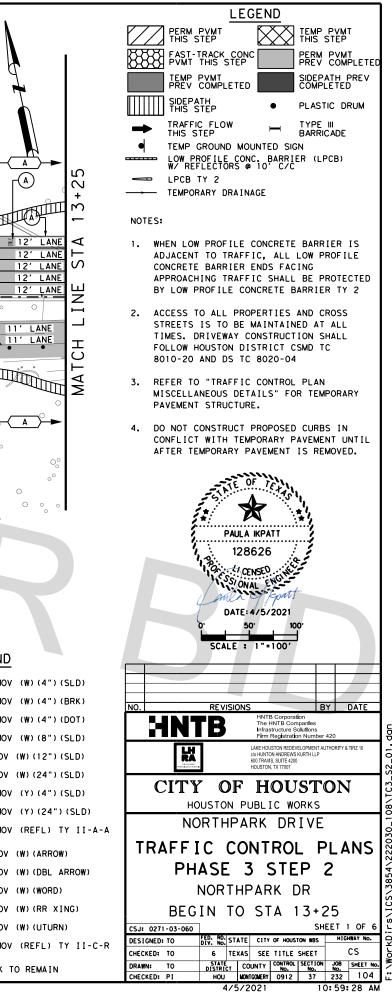
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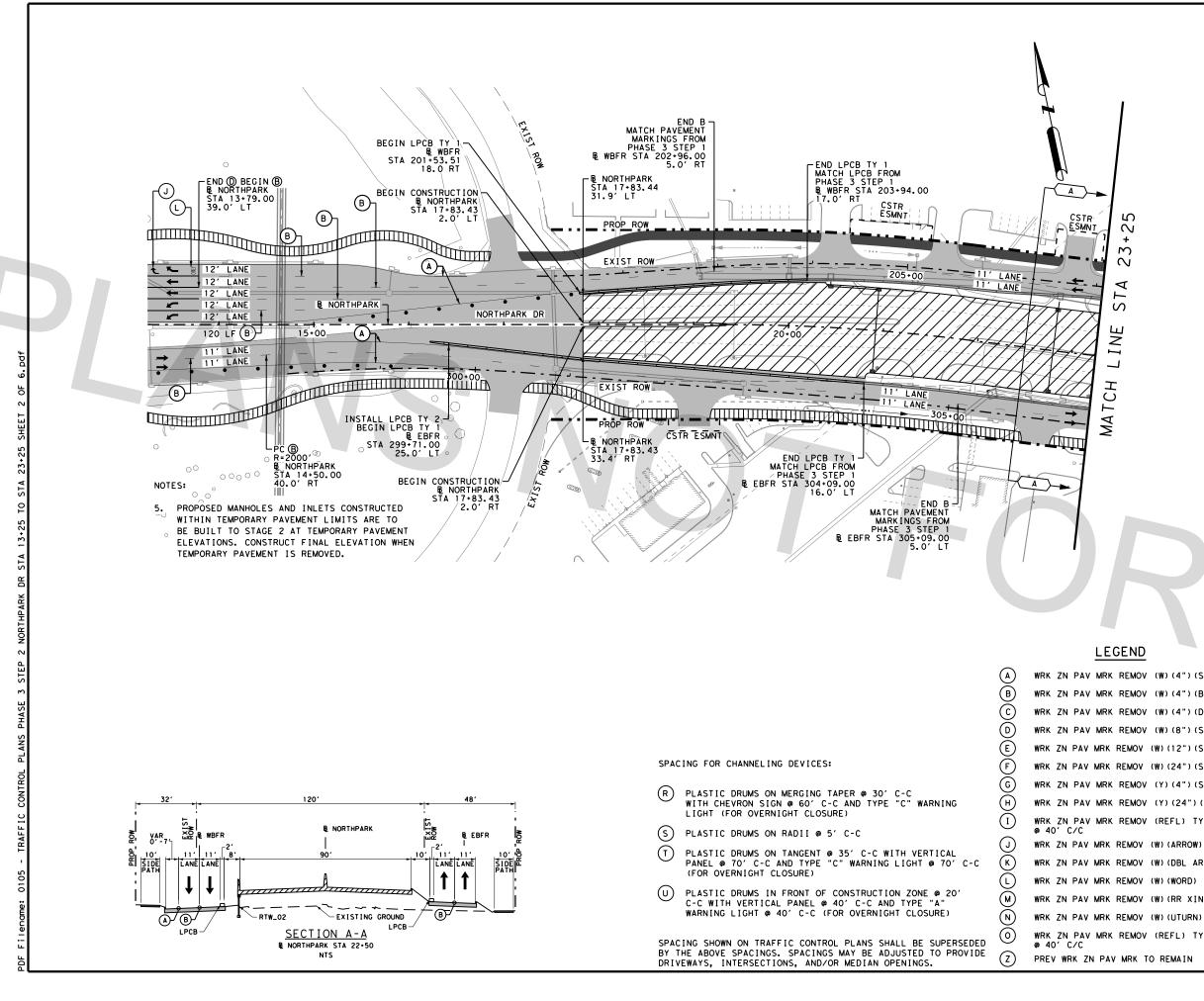


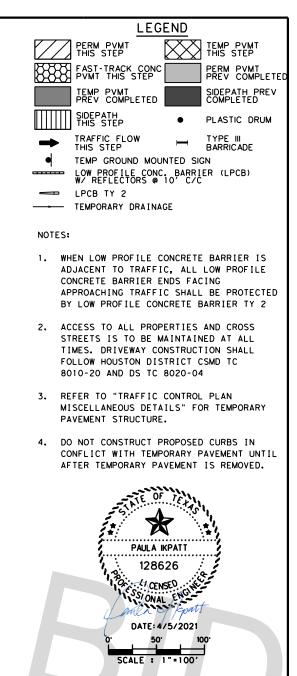


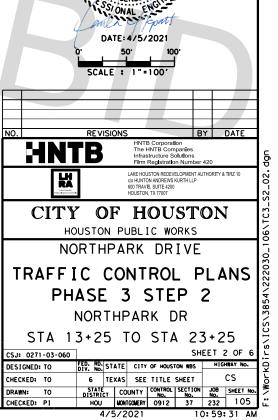
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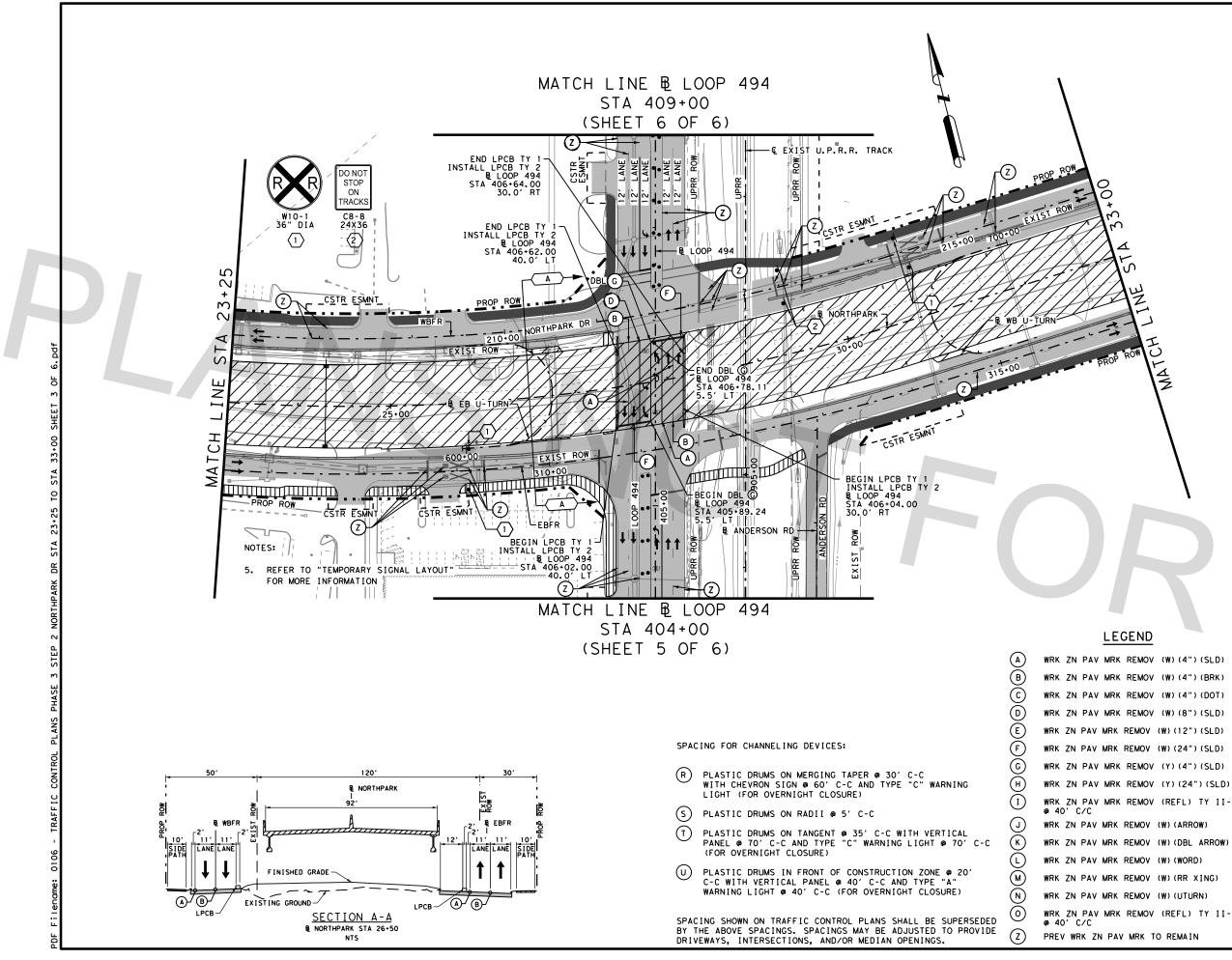
11' LANE

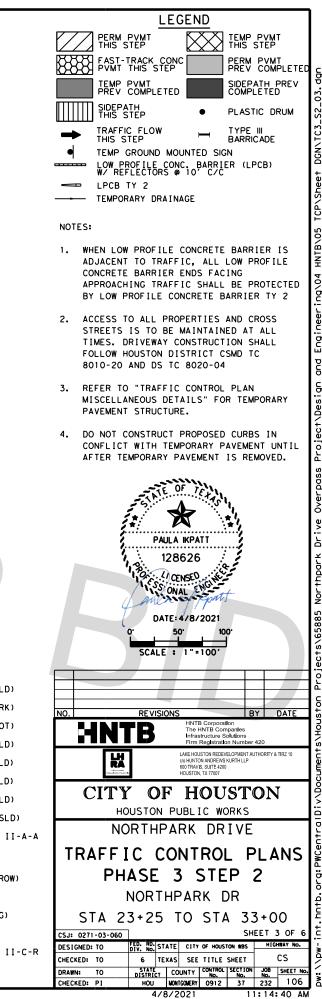
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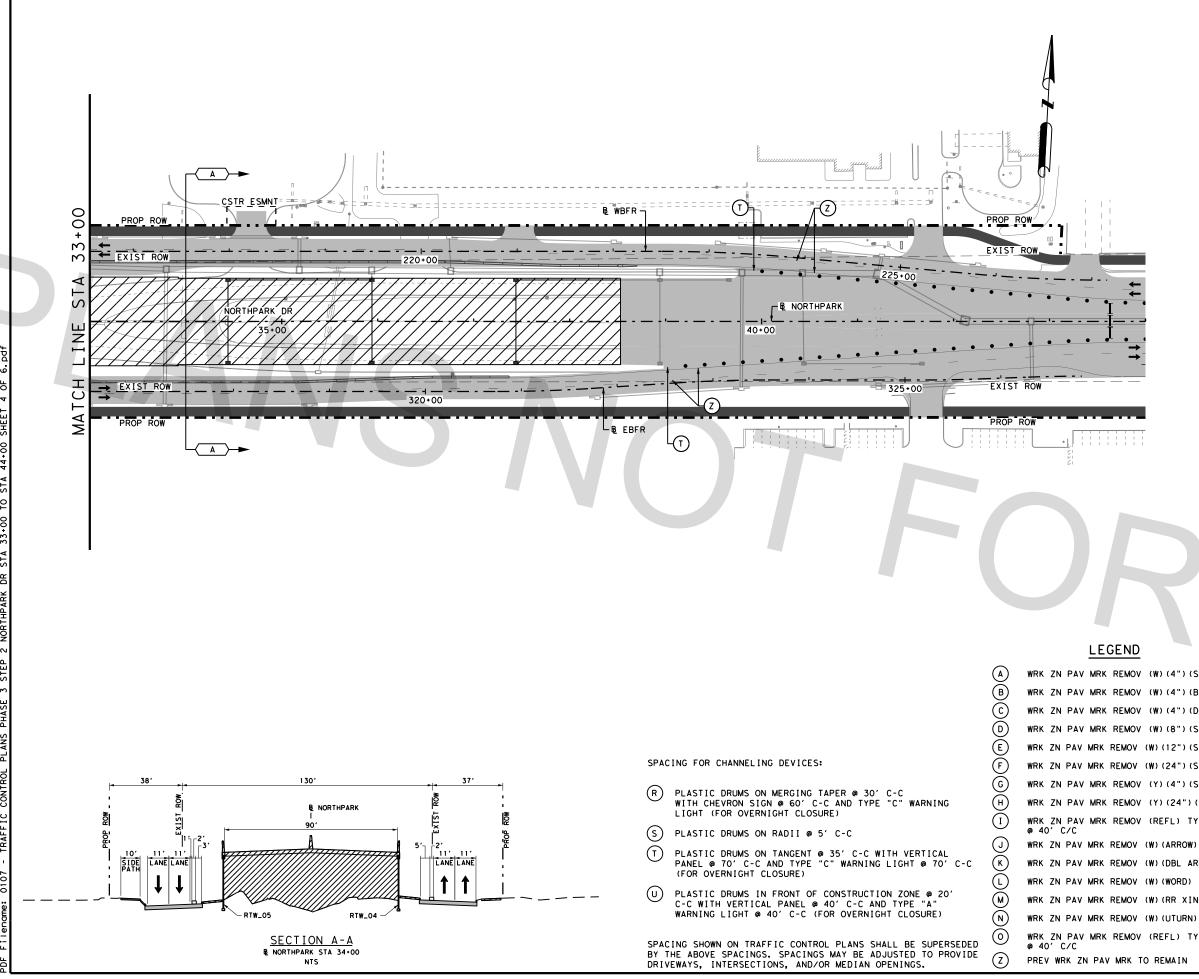


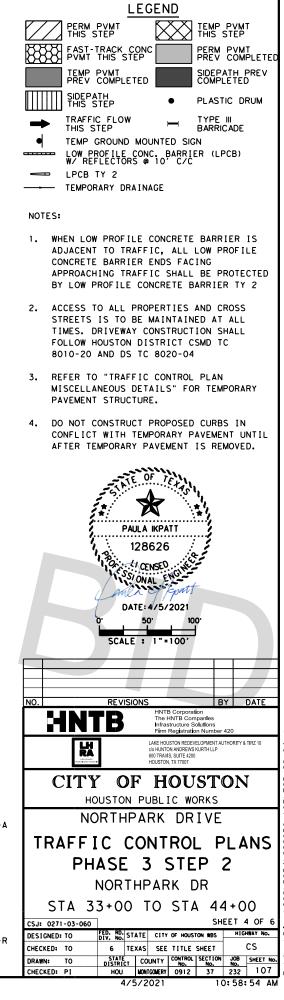


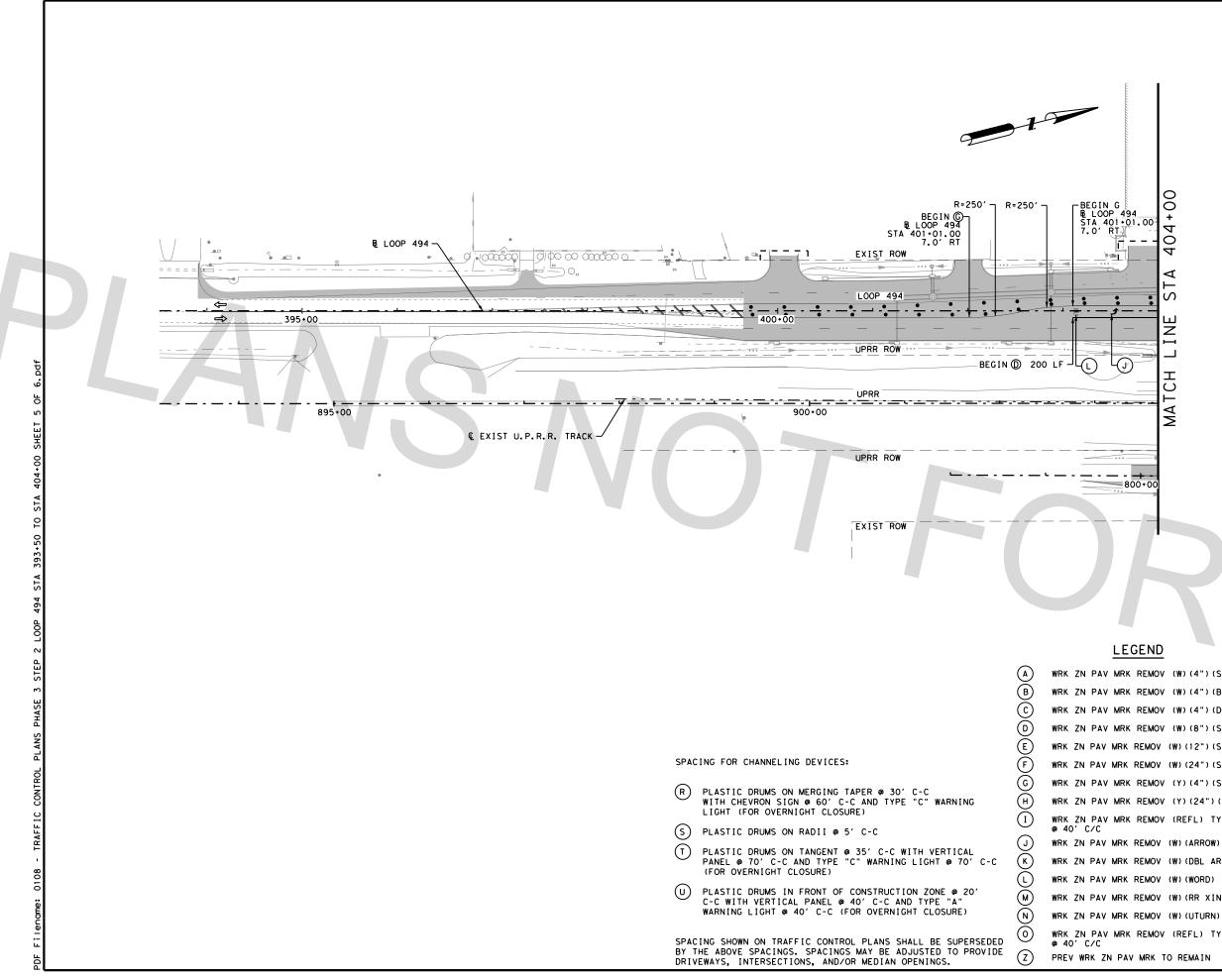


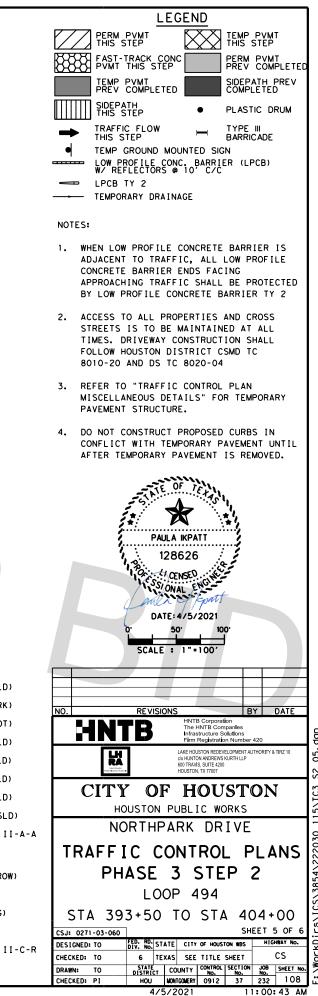
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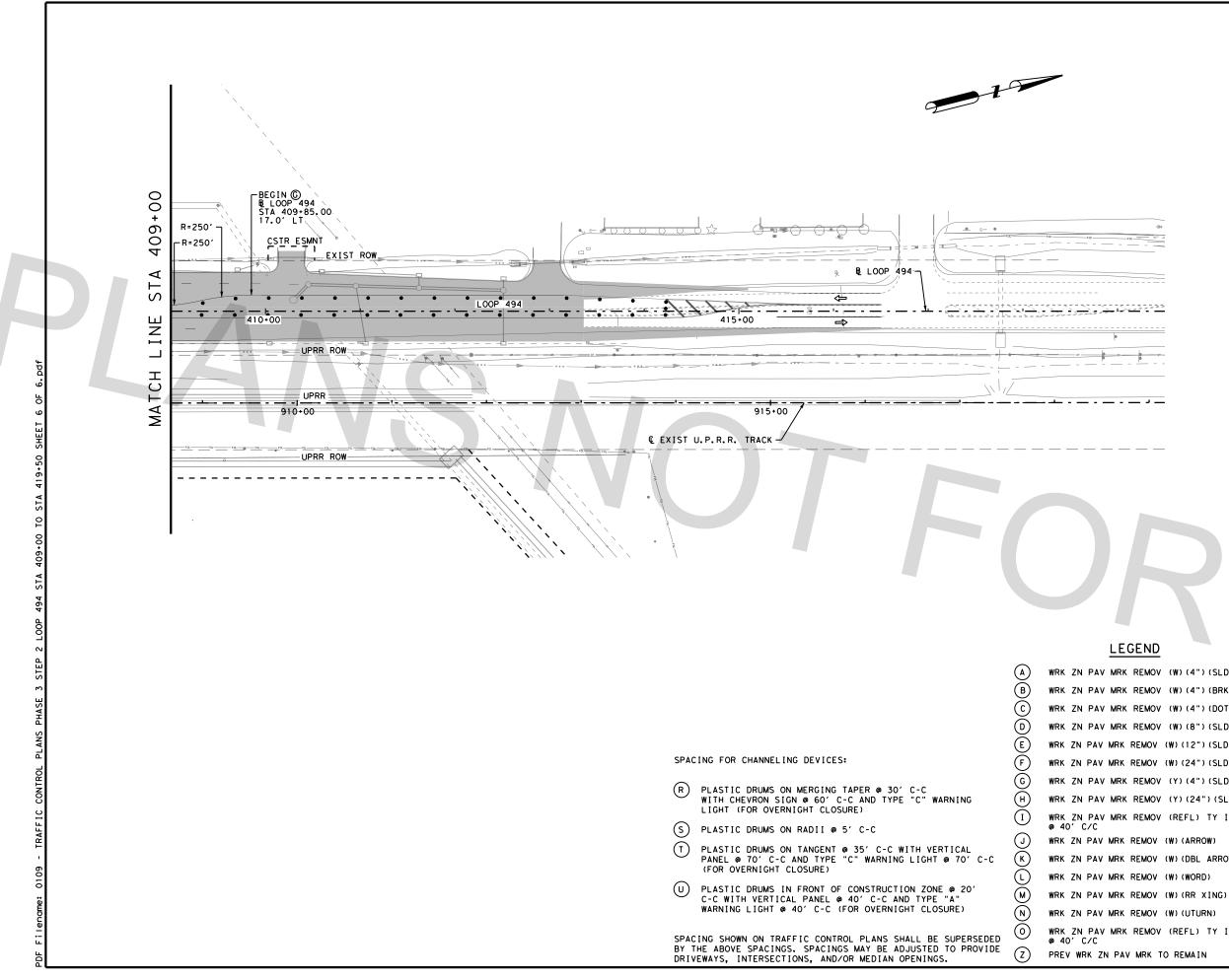
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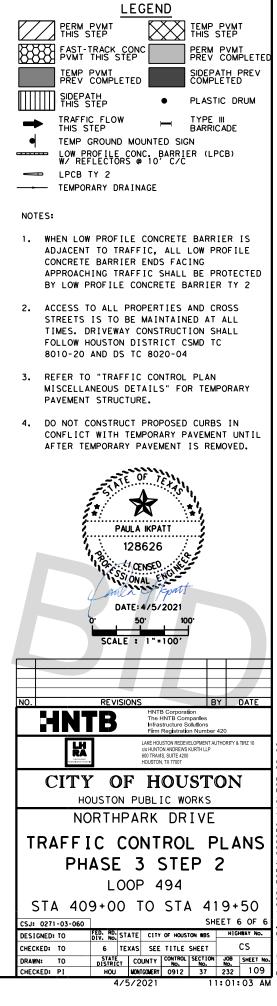
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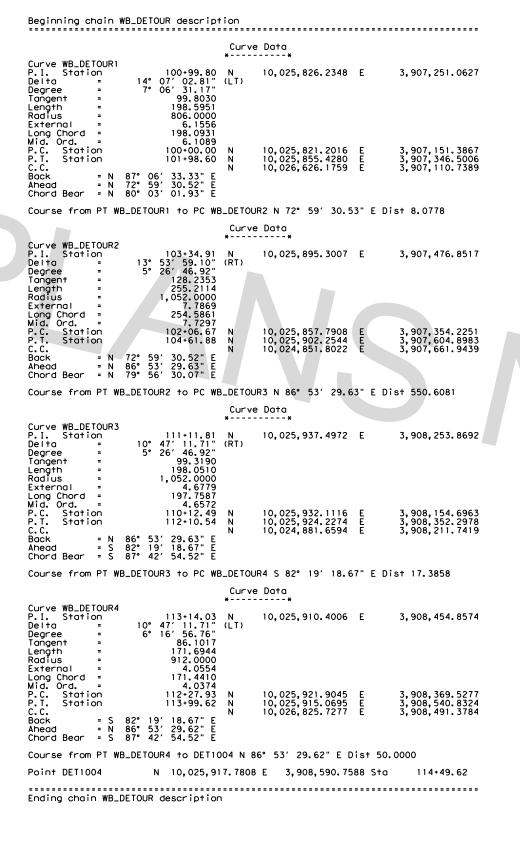
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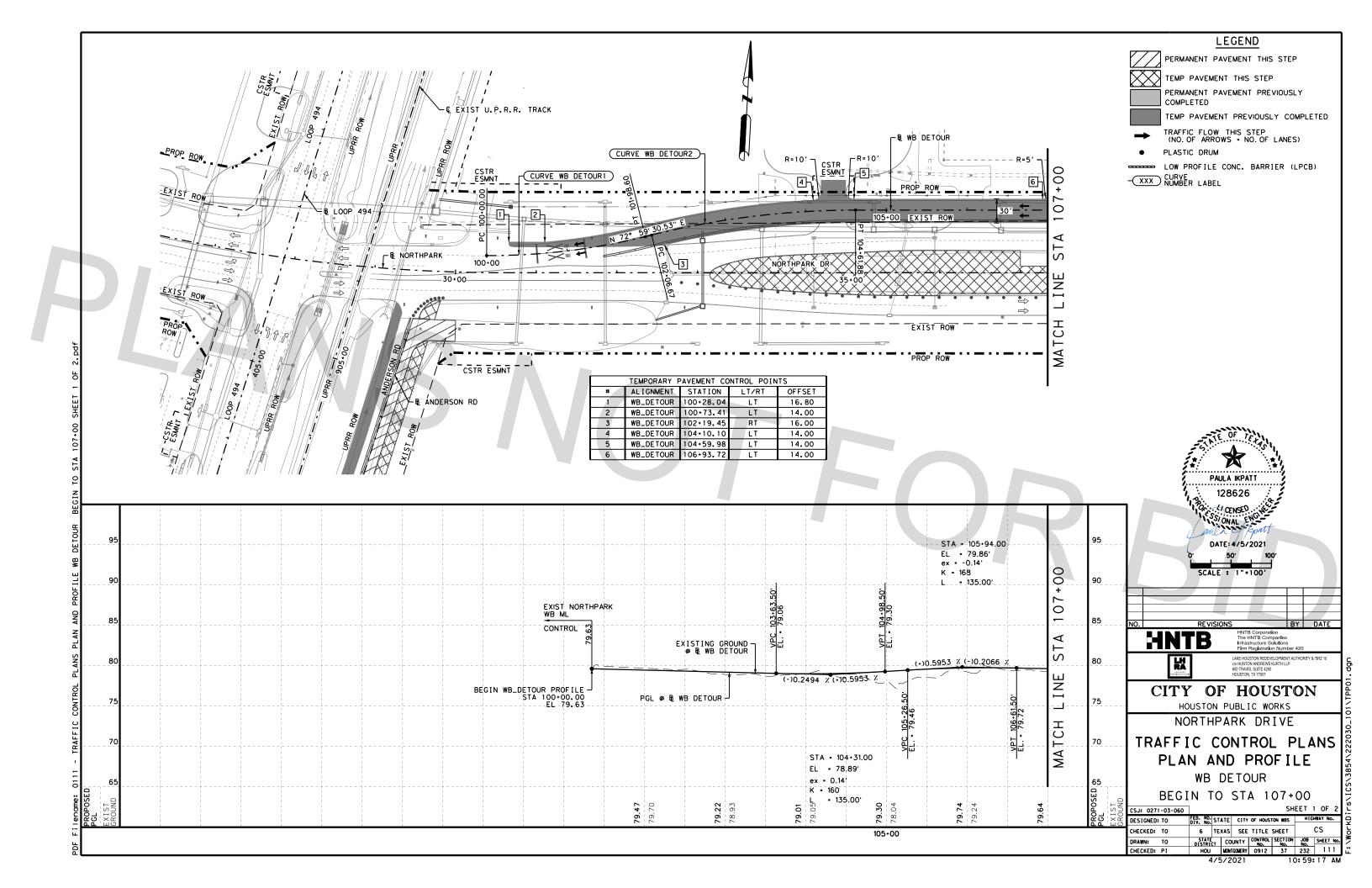
B RUSSEL PALMER

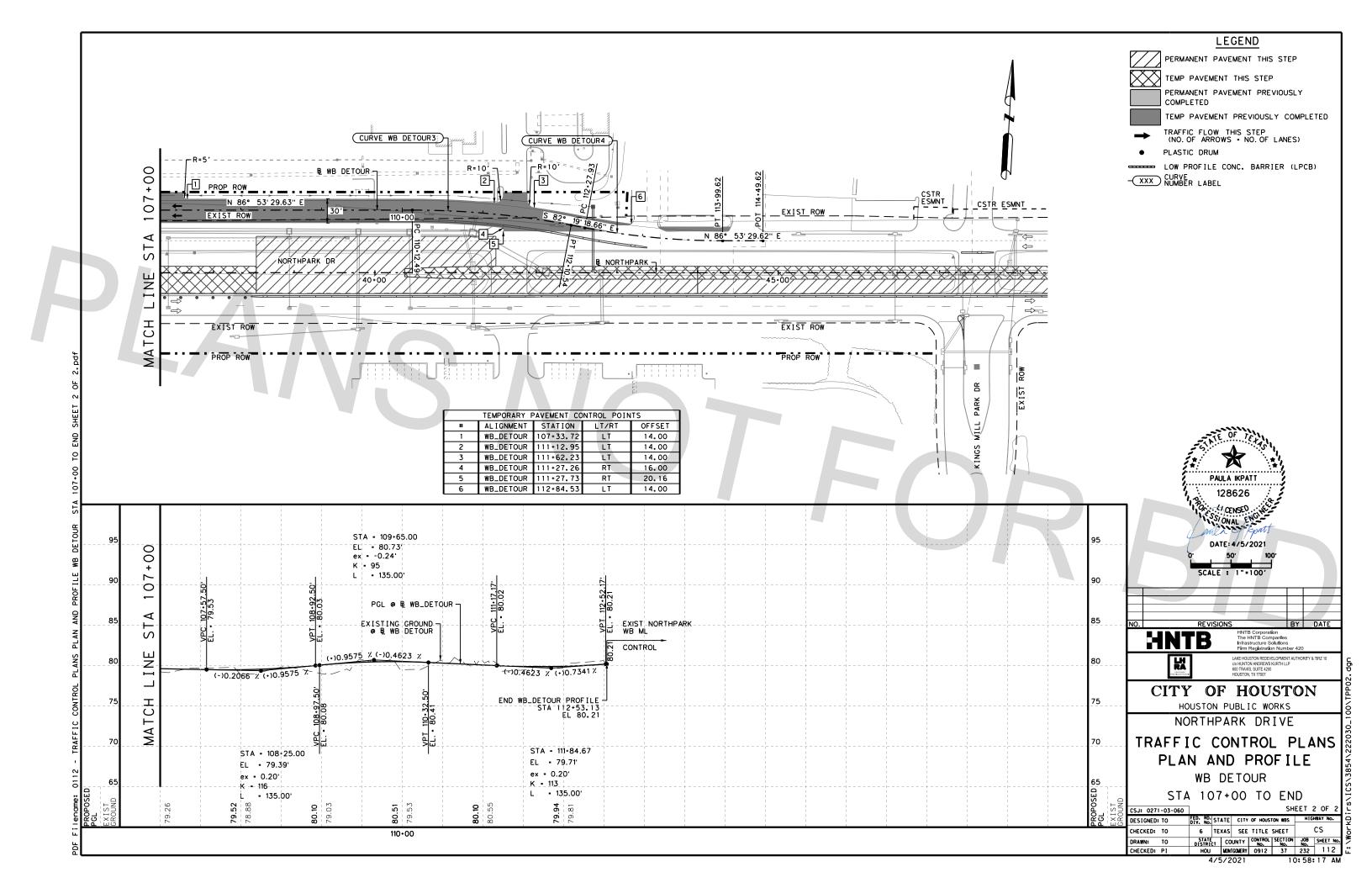
Beginning chain RUSSE	LL_ = = =	PALMER description		
Point RP1003	Ν	10,025,598.7871 E 3,9	911,378.4906 Sta	
Course from RP1003 to	RP	004 N 3° 21' 12.83" W I	Dist 430.0000	
Point RP1004	Ν	10,026,028.0507 E 3,9	911,353.3368 Sta	
Ending chain RUSSELL_PALMER description				

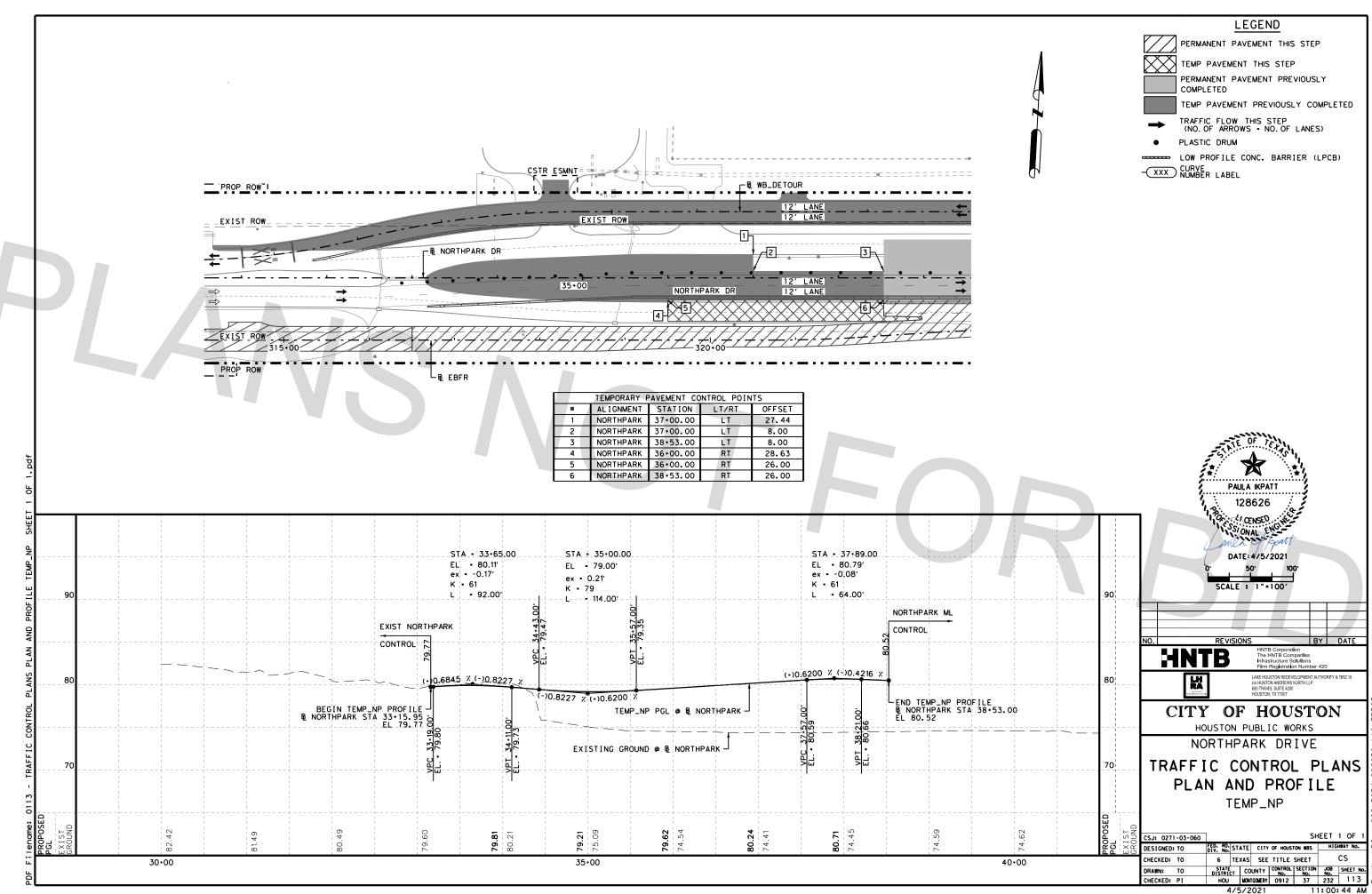
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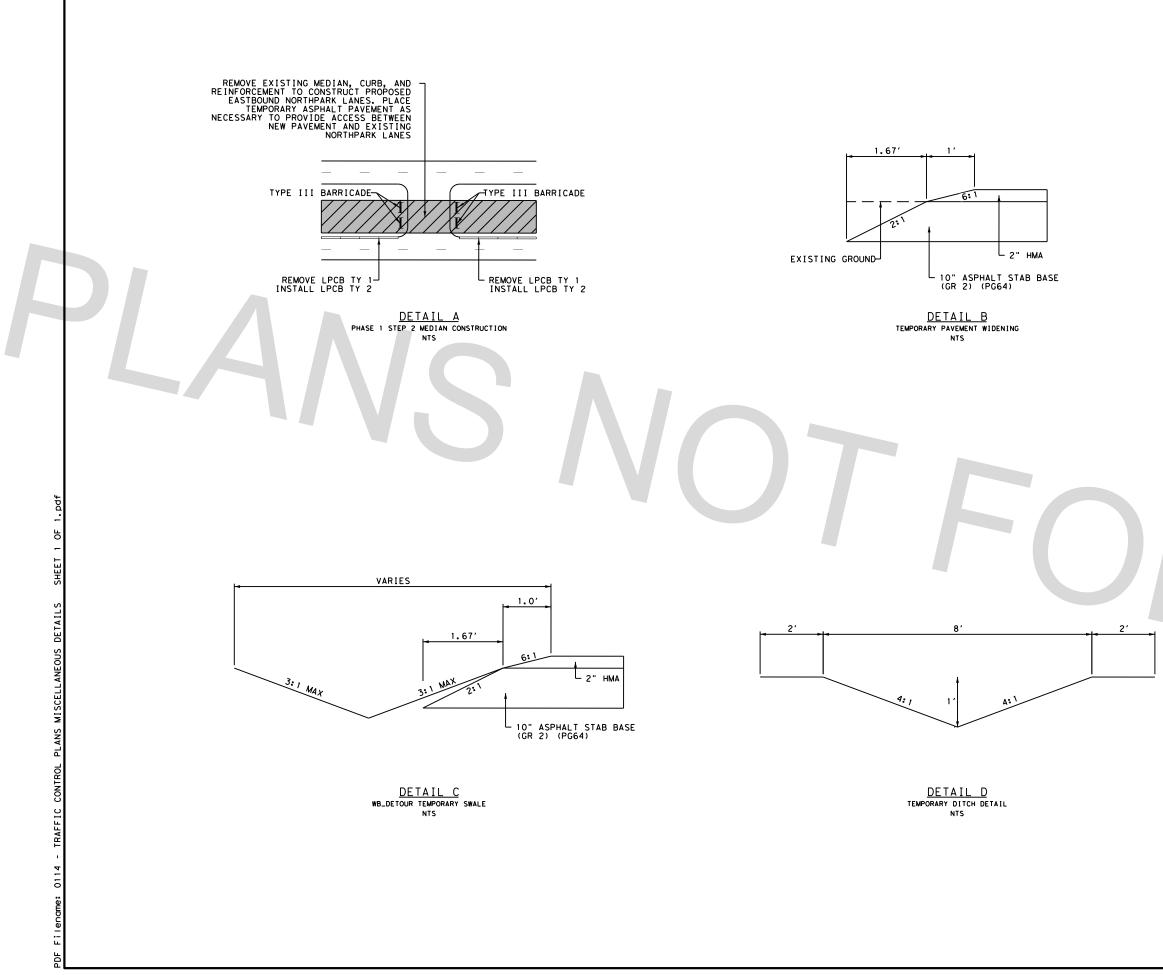




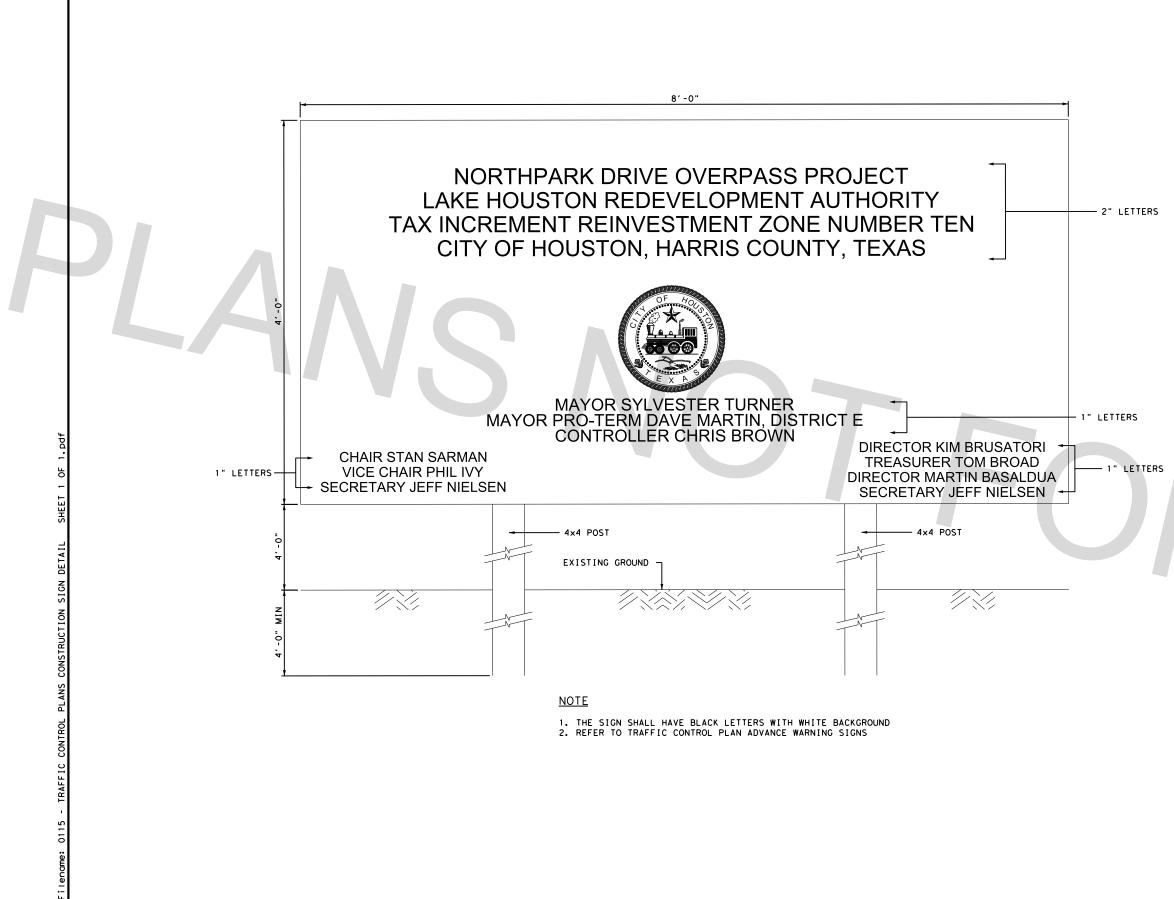




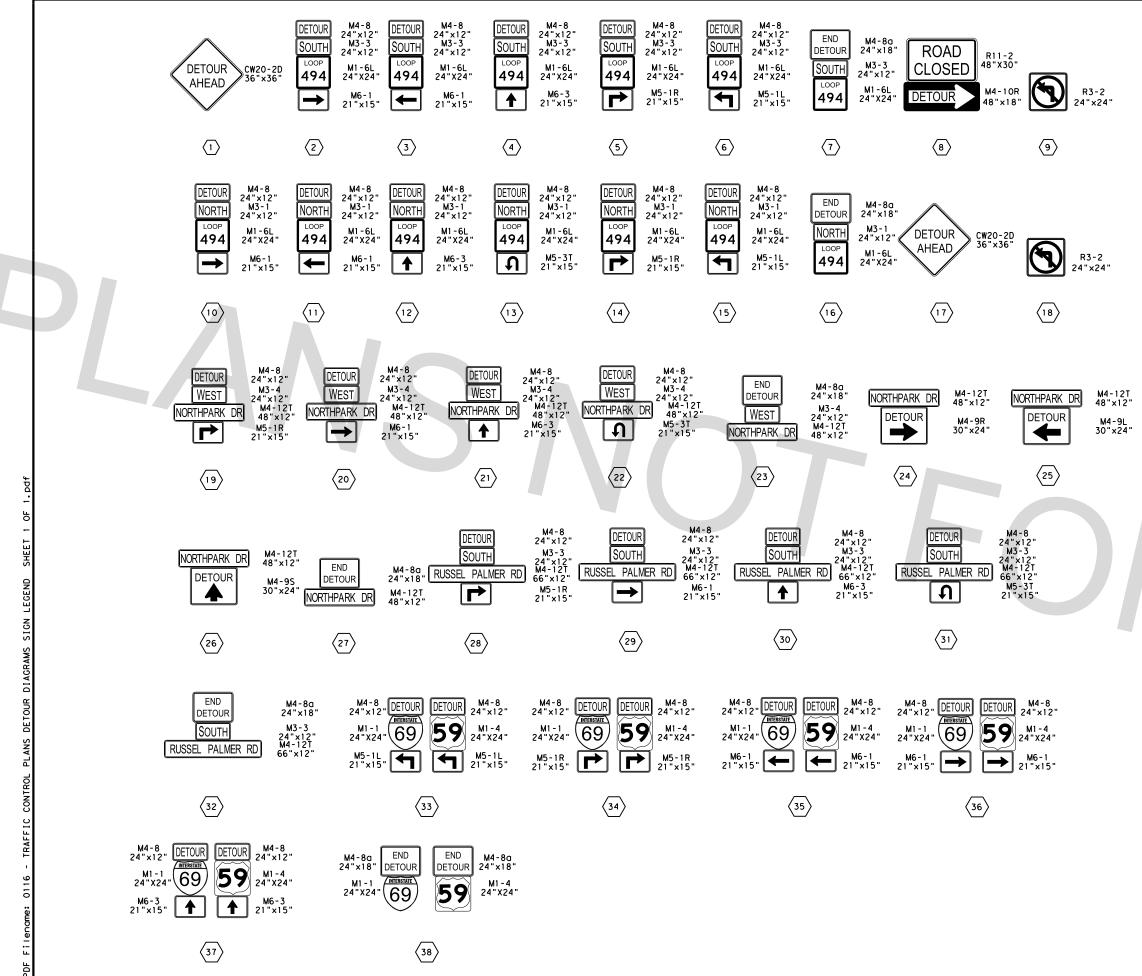
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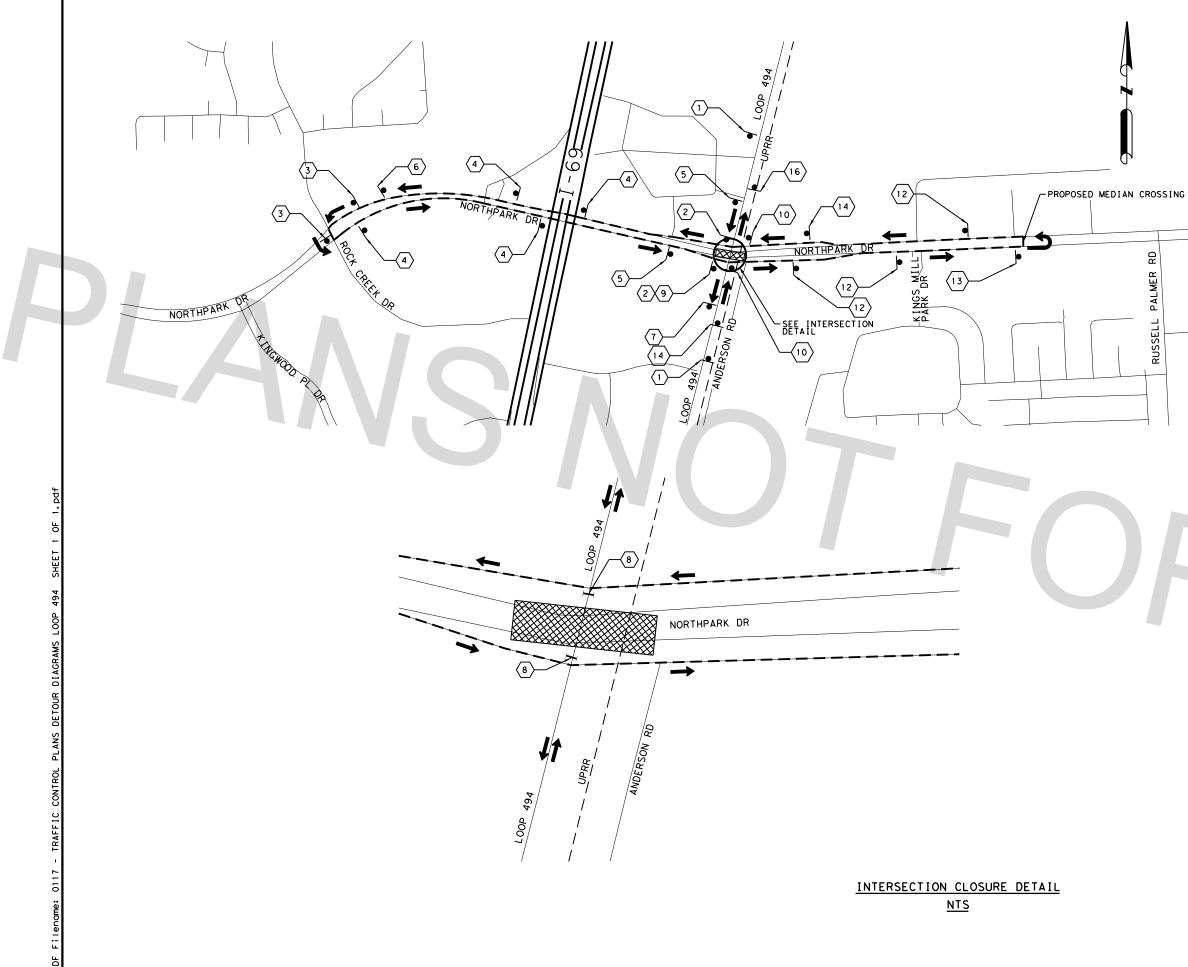
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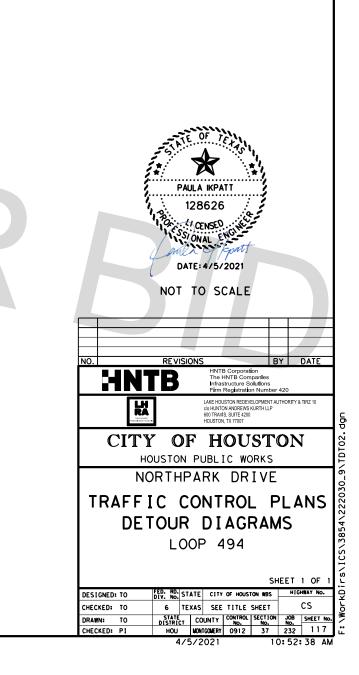


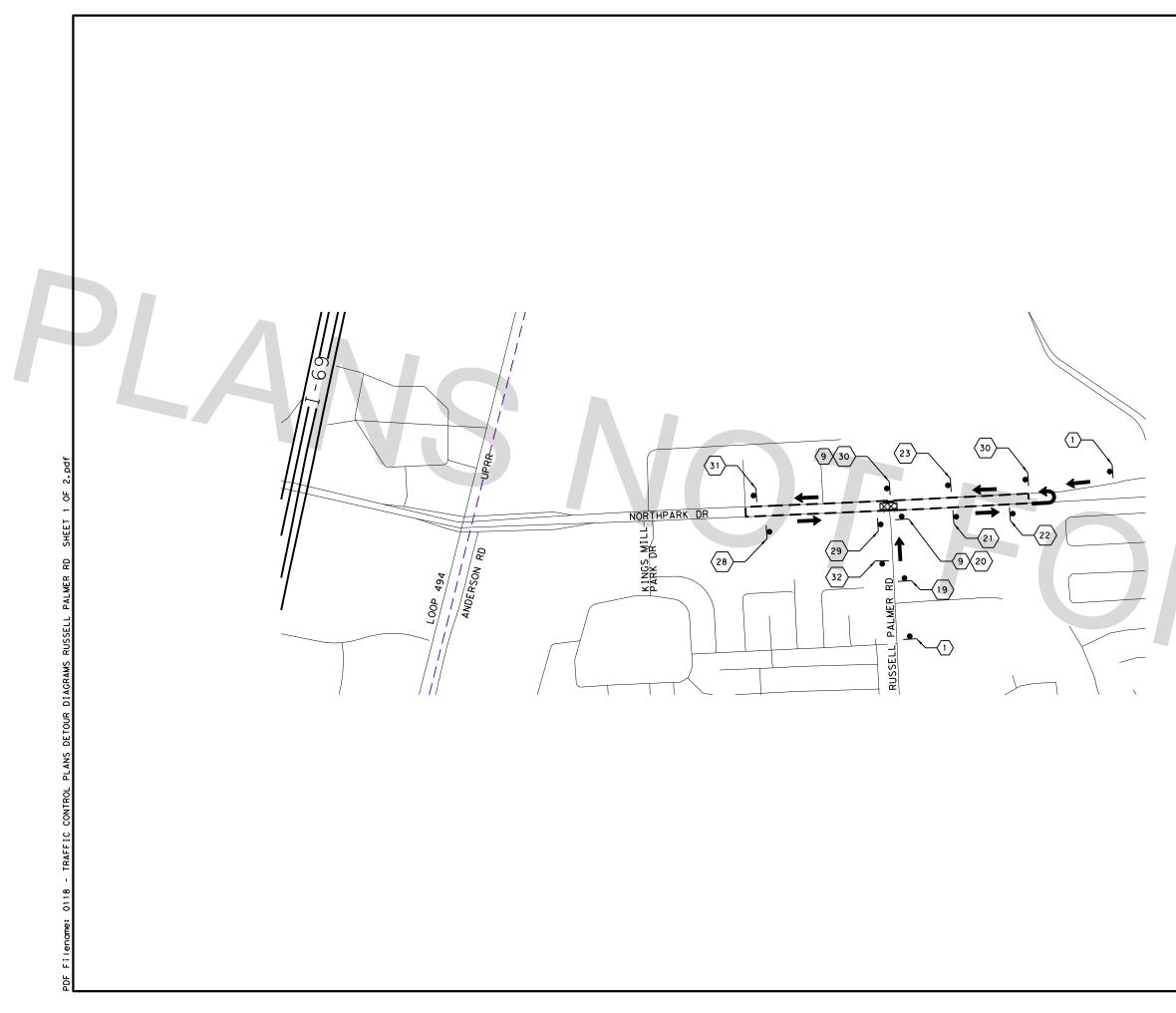
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•	CONSTRUCTION WARNING SIGN
Η	TY III BARRICADE
-	PROPOSED TRAVEL FLOW
· — —	DETOUR PATH

NOTES:

- 1. DETOURS ARE FOR OFF-PEAK CLOSURES ONLY.
- 2. REFER TO TRAFFIC CONTROL PLAN CONSTRUCTION DETOUR DIAGRAM LEGEND





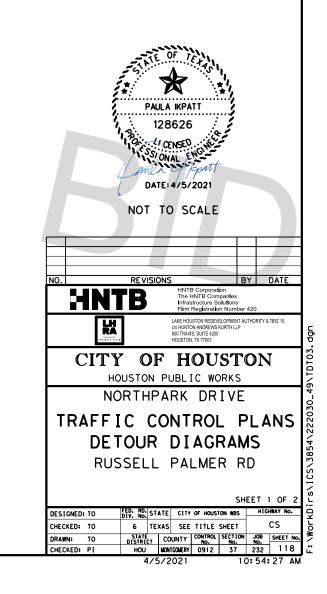
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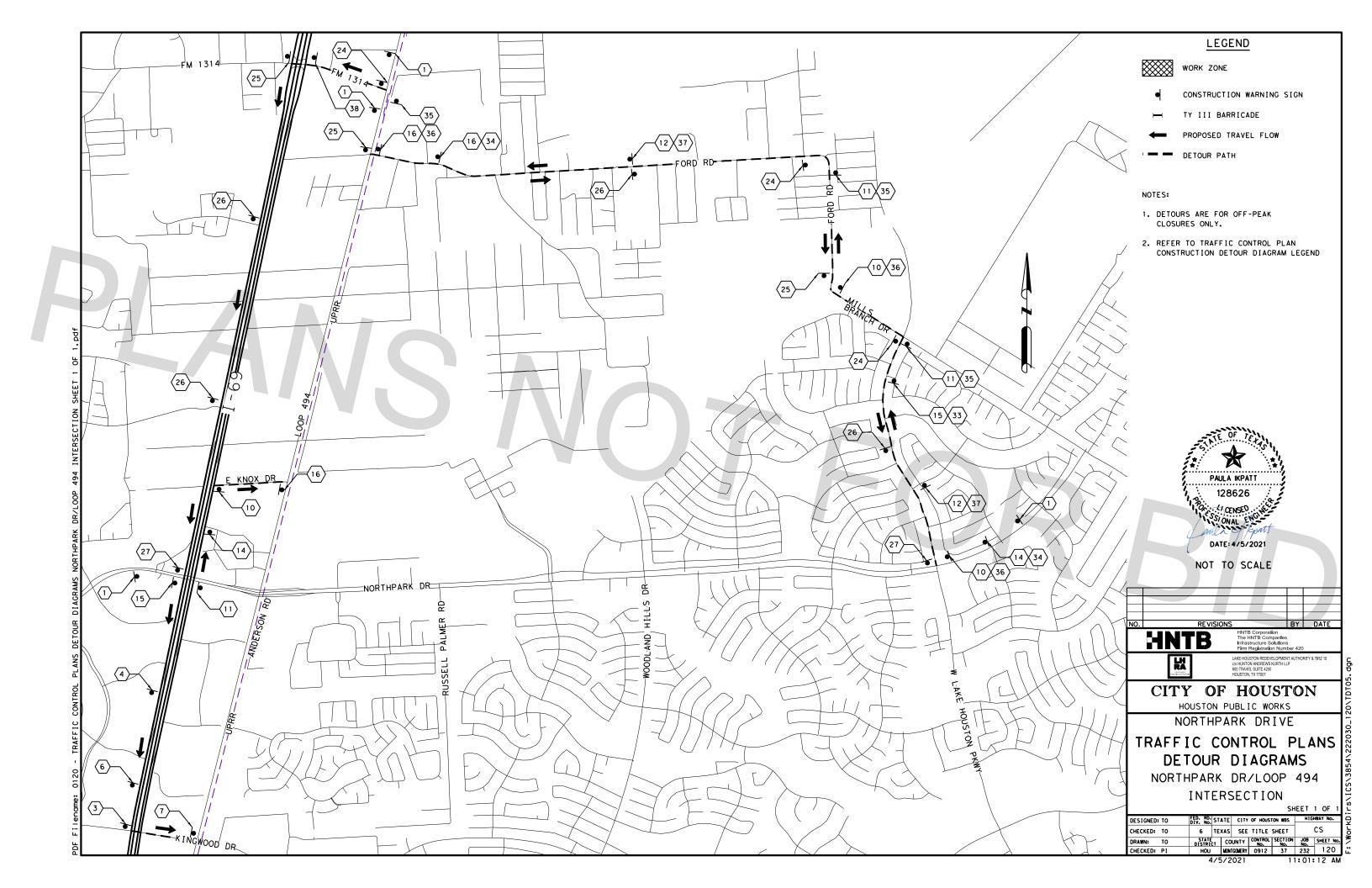
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•	CONSTRUCTION WARNING SIGN
H	TY III BARRICADE
-	PROPOSED TRAVEL FLOW
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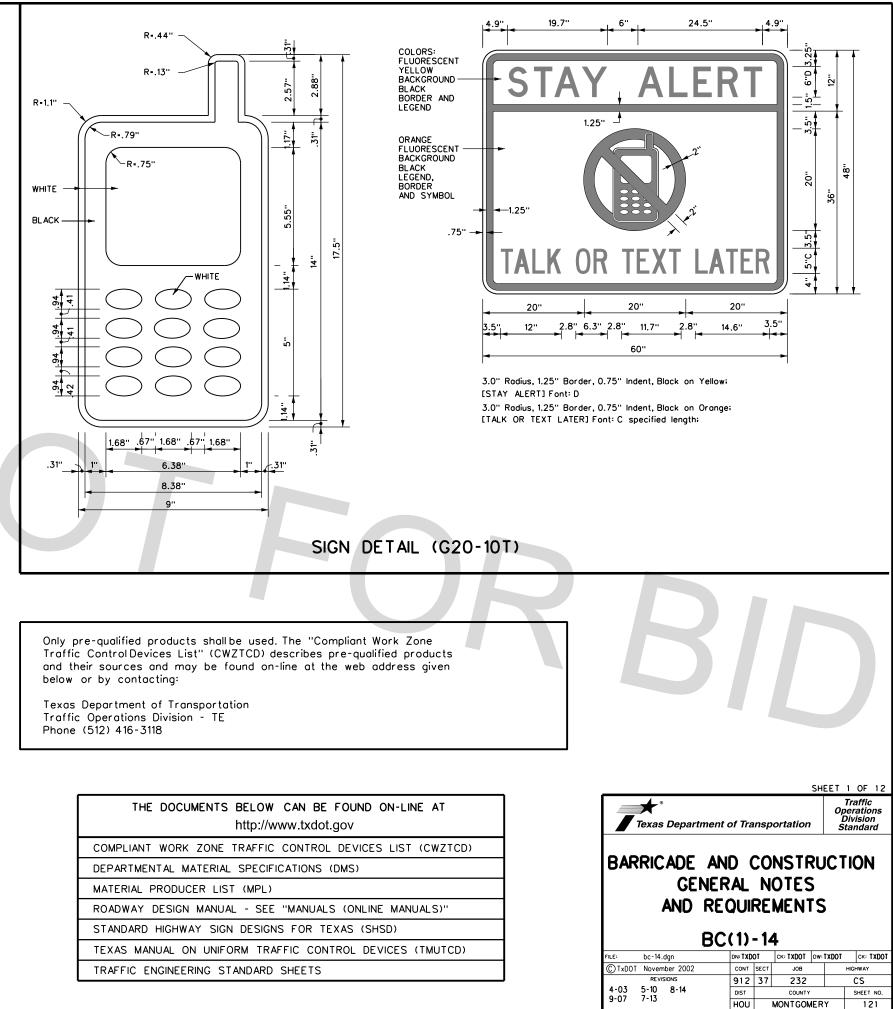


BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

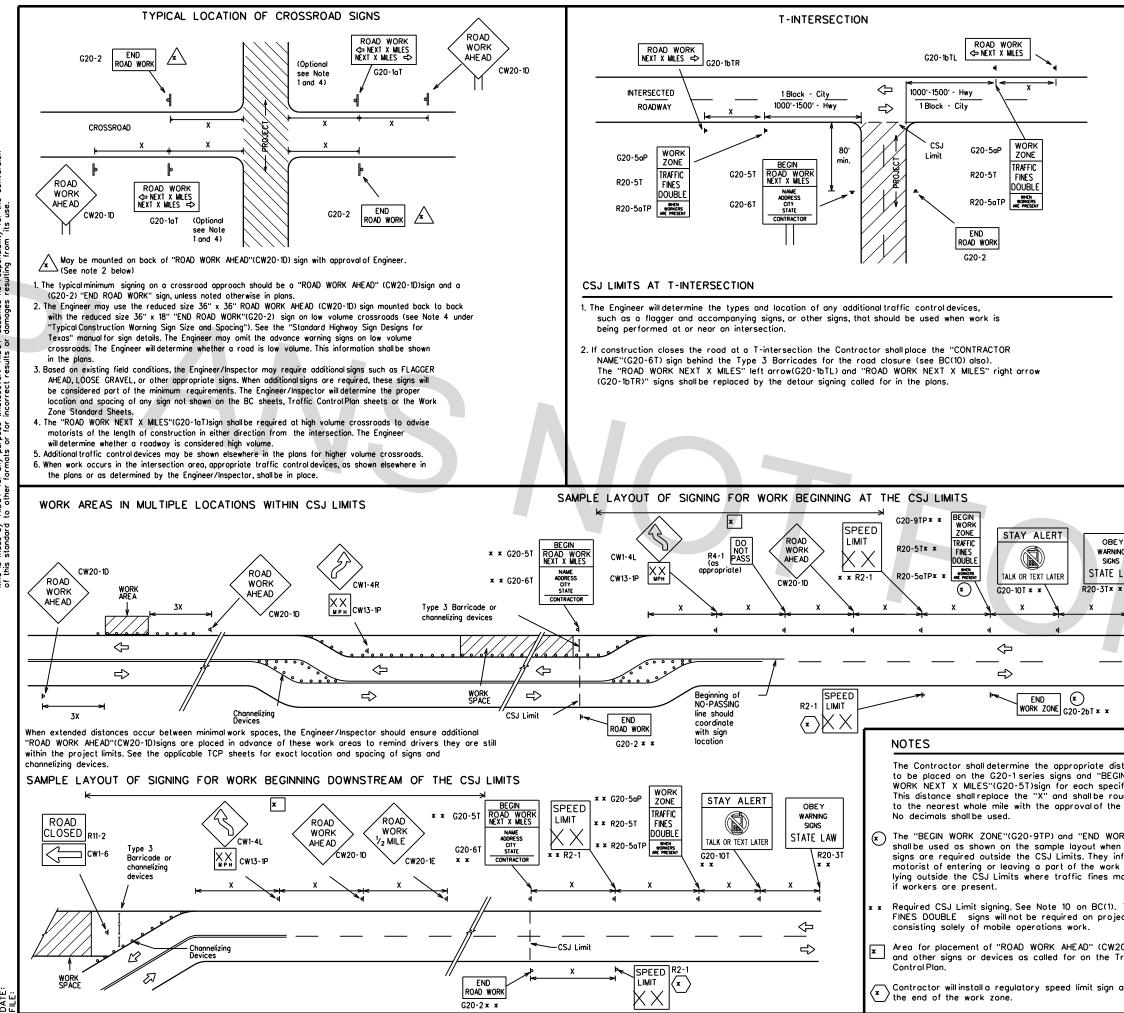
- 1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manualon 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 travellanes. 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.



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



IYP	ICAL CONS	STRUCTIO	N WAH	RNING SIG	N SIZE	- ANL) SPAC	ING
		SIZ	E			-	SPA	ACING
0	Sign Number r Series	Conventi Roo		Expressw Freewo	· ·		Posted Speed	Sign Spacing "X"
	V20 ⁴ V21						MPH	Feet (Apprx.)
	V22	48'' ×	48''	48'' × 48	, n	ŀ		120 160
	V23 V25					ŀ	40	240
						ŀ	45	320
	V1, CW2, V7, CW8,	36" × 36		× 48''		ŀ	50	400
	V9, CW8,	JO X JO	40	x 40		Ē	55	500 ²
	V14					Ī	60	600 ²
	V3, CW4,						65	700 ²
		48" × 48	'' 48'	' x 48''			70	800 ²
	V8-3,						75	900 ²
CV	V10, CW12						80	1000 2
							*	* 3
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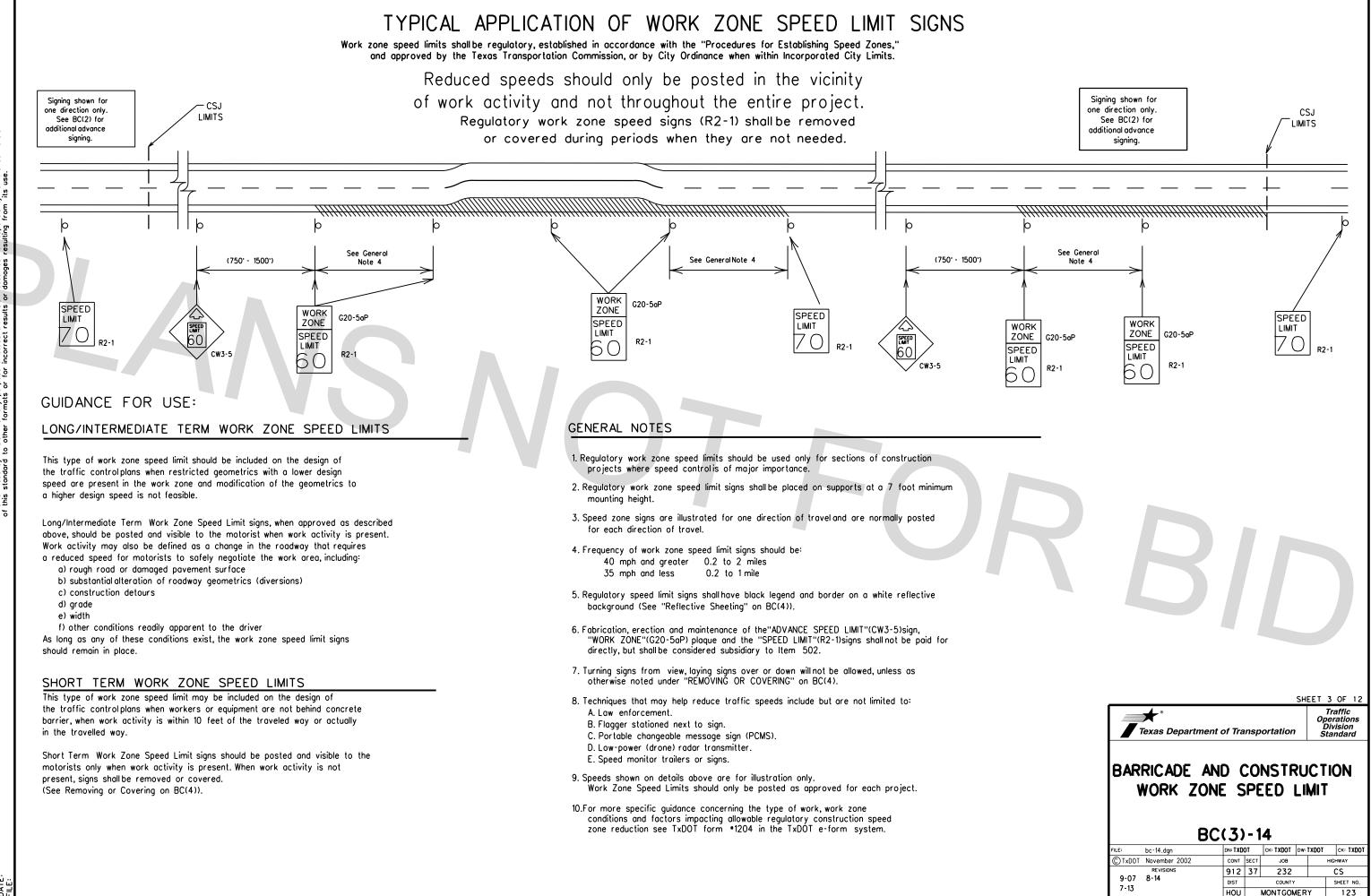
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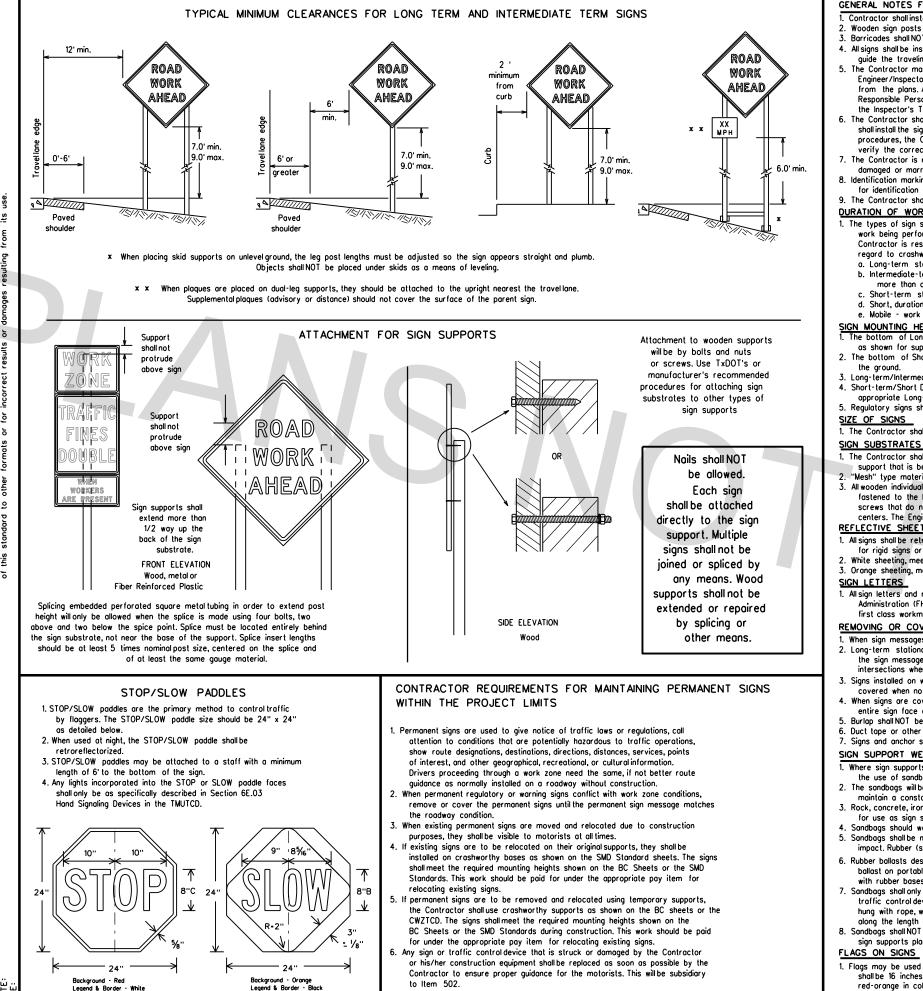
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TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING

1.5.6





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

- 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)
- 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

- 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
- 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 payed 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.

- 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.
- "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

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 or Type GL , shall be used for rigid signs with orange backgrounds.

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

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
 Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any
- intersections where the sign may be seen from approaching traffic. 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.
- 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. Burlop 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.
- . 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.

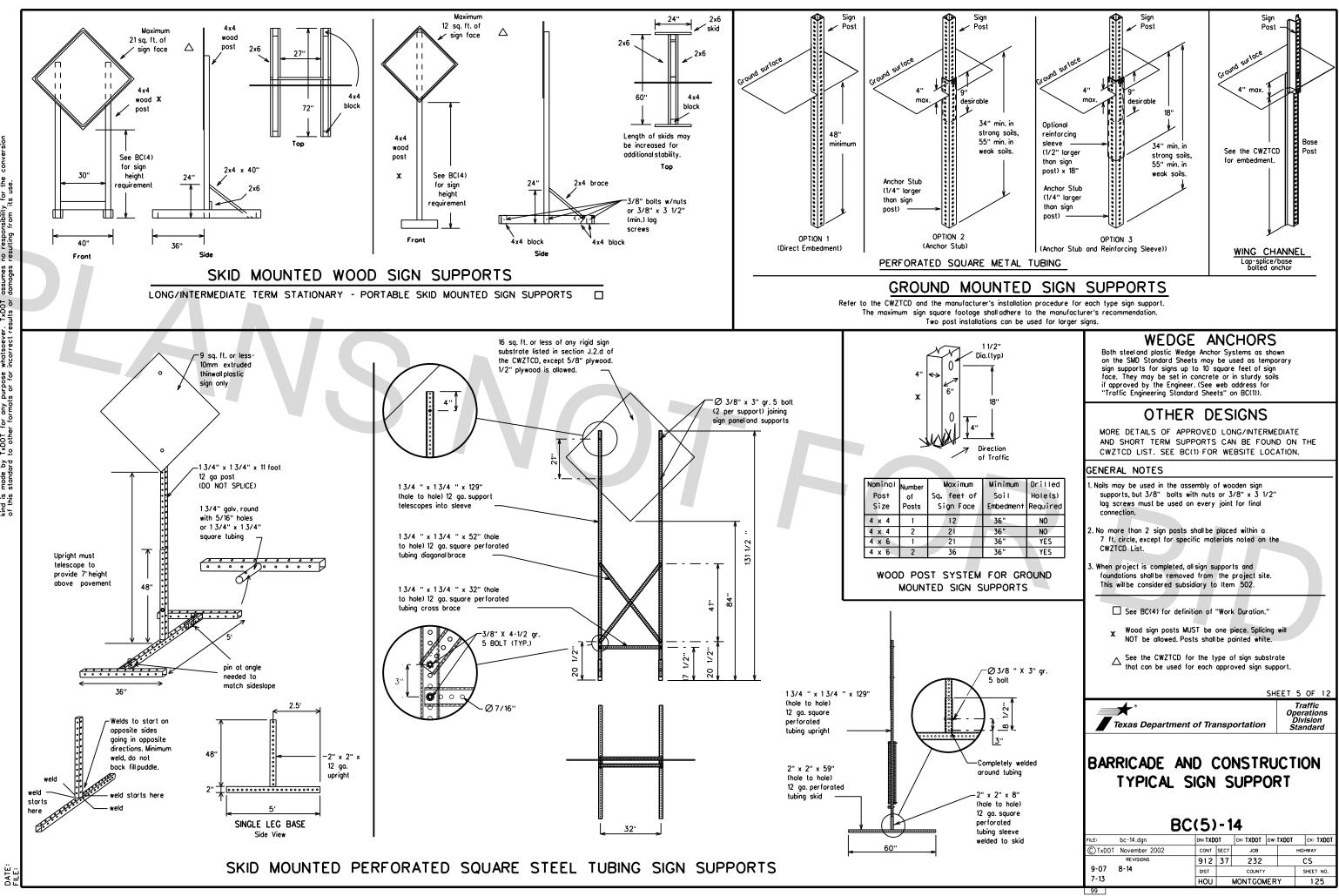
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the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes. 6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic ControlDevice List" (CWZTCD). The Contractor

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

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"

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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 avail-
- able 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	WORD OR PHRASE	ABBREVIATION
Access Rood	CCS RD	Major MAJ	
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Cannot	CANT	North	N
Center	CTR	Nor thbound	(route) N
Construction Ahead	CONST AHD	Parking	PKING
CROSSING	XING	Road	RD
Detour Route	DETOUR RTE	Right Lane	RT LN
Do Not	DONT	Saturday	SAT
East	F	Service Road	SERV RD
Eastbound	(route) E	Shoulder	SHLDR
	EMER	Slippery	SLIP
Emergency		South	S
Emergency Vehicle	EMER VEH	Southbound	(route) S
Entrance, Enter	EXP LN	Speed	SPD
Express Lane		Street	ST
Expressway XXXX Feet	XXXX FT	Sunday	SUN
		Telephone	PHONE
Fog Ahead	FOG AHD FRWY, FWY	Temporary	TEMP
Freeway Freeway Blocked	FWY BLKD	Thursday	THURS
		To Downtown	TO DWNTN
Friday		Traffic	TRAF
Hazardous Driving Hazardous Material	HAZ URIVING	Travelers	TRVLRS
	HAZMAT	Tuesday	TUES
High-Occupancy Vehicle	HUV	Time Minutes	TIME MIN
	HWY	Upper Level	UPR LEVEL
Highway Hour(s)	HR, HRS	Vehicles (s)	VEH, VEHS
		Warning	WARN
Information It Is	INFO ITS	Wednesday	WED
		Weight Limit	WT LIMIT
Left		West	W
		Westbound	(route) W
Left Lane	LFT LN	Wet Pavement	WET PVMT
Lane Closed	LN CLOSED	Will Not	WONT
Lower Level	LWR LEVEL	4	
Maintenance	MAINT	J	

RECOMMENDED	PHASES	AND	FORMATS	FOR	PCMS	MESSAGES	DUR

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

Road/Lane/Ramp Closure List			Other Condition List			
FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED		ROADWORK XXX FT		ROAD REPAIRS XXXX FT	
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT		FLAGGER XXXX FT		LANE NARROWS XXXX FT	
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT		RIGHT LN NARROWS XXXX FT		TWO-WAY TRAFFIC XX MILE	
RIGHT X LANES CLOSED	RIGHT X LANES OPEN		MERGING TRAFFIC XXXX FT		CONST TRAFFIC XXX FT	
CENTER LANE CLOSED	DAYTIME LANE CLOSURES		LOOSE GRAVEL XXXX FT		UNEVEN LANES XXXX FT	
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED		DETOUR X MILE		ROUGH ROAD XXXX FT	
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE		ROADWORK PAST SH XXXX		ROADWORK NEXT FRI-SUN	
EXIT CLOSED	RIGHT LN TO BE CLOSED		BUMP XXXX FT		US XXX EXIT X MILES	
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI		TRAFFIC SIGNAL XXXX FT		L ANE S SHIF T	
XXXXXXXX BLVD CLOSED	≭ LANES SHIFT in	Phose 1 m	nust be used with STA	(IN L	ANE in Phase 2.	

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 Phose 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.

STAY IN LANE

Action to Take/Effect on Travel

MERGE

RIGHT

DETOUR

NEXT

X EXITS

USE

EXIT XXX

STAY ON

US XXX

SOUTH

TRUCKS

USE

US XXX N

WATCH

FOR

TRUCKS

EXPECT

DELAYS

REDUCE

SPEED

XXX FT

USE

OTHER

ROUTES

List

FORM

X LINES

RIGHT

USE

XXXXX

RD EXIT

USE EXIT

I-XX

NORTH

USE

I-XX F

TO I-XX N

WATCH

FOR

TRUCKS

EXPECT

DELAYS

PREPARE

ΤO

STOP

END

SHOULDER

USE

WATCH

WORKERS

FOR

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

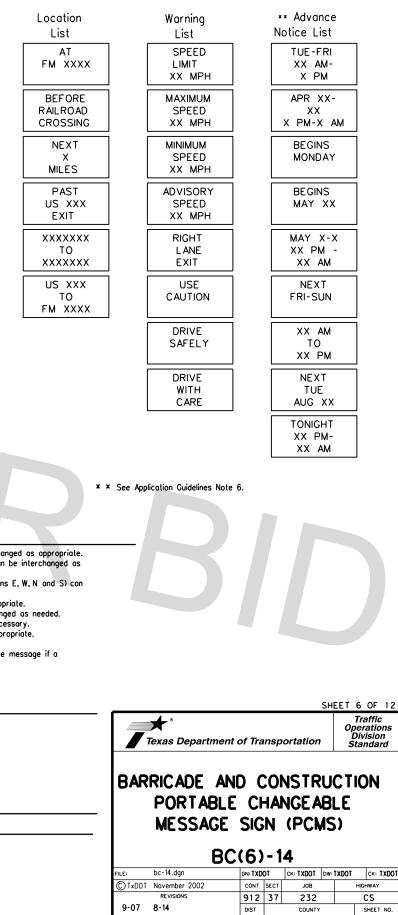
- 1. When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
- 2. When symbol signs, such as the "Flagger Symbol"(CW20-7) are represented graphically on the Full Matrix 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

Roadway

designation • IH-number, US-number, SH-number, FM-number

RING ROADWORK ACTIVITIES

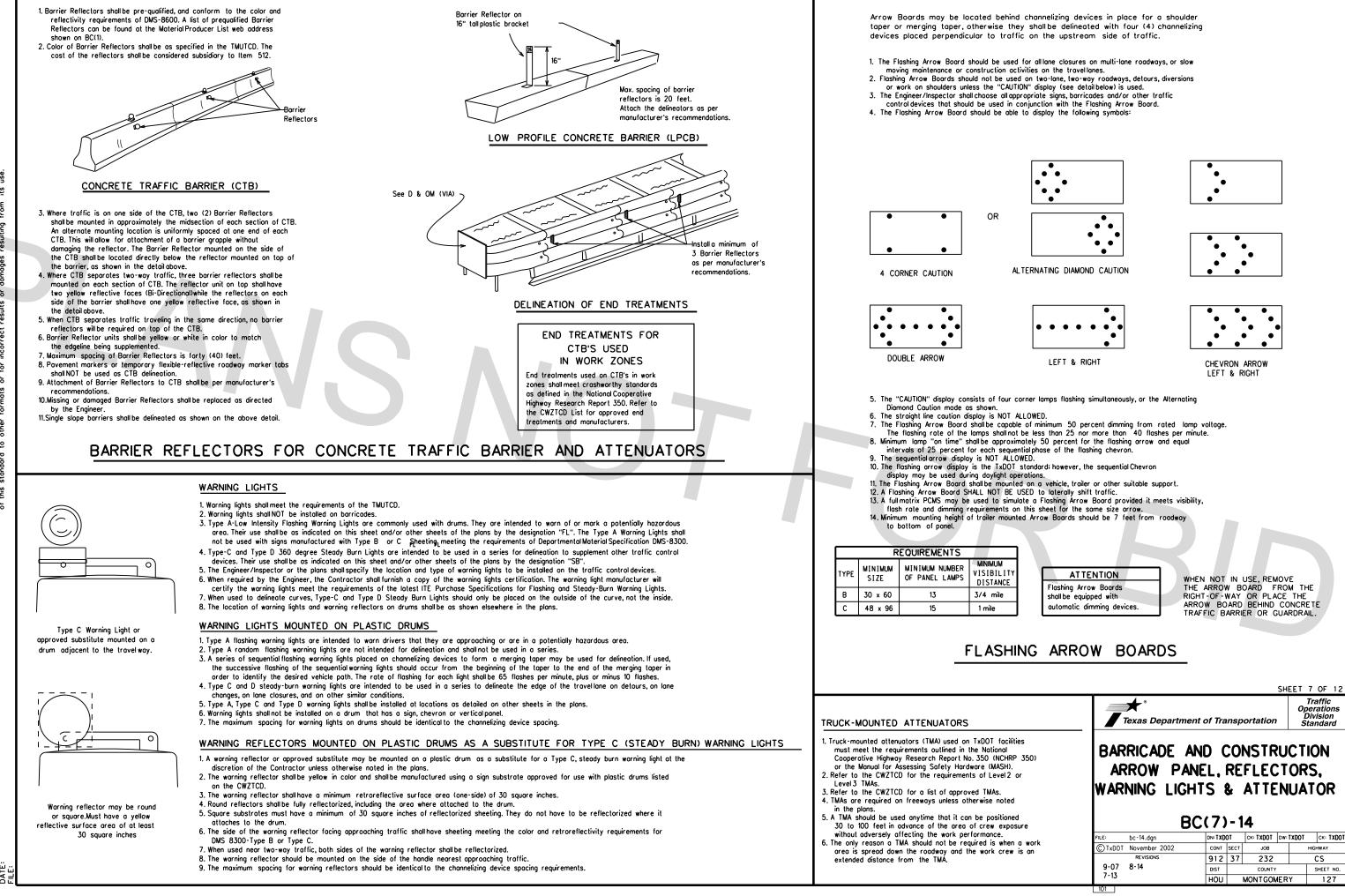
Phase 2: Possible Component Lists



7-13

100

HOU MONTGOMERY



GENERAL NOTES

- 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).
- Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
- The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

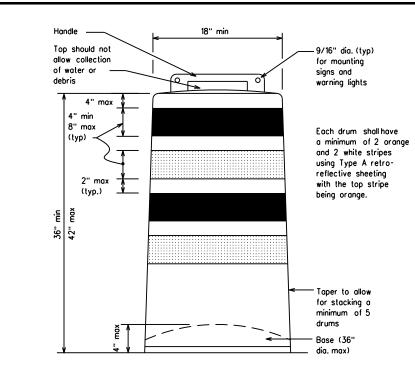
- Pre-qualified plastic drums shall meet the following requirements:
- 1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- 2. The body and base shall lock together in such a manner that the body
- separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or oir turbulence created by passing vehicles.
- Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
- Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
- The top of the drum shallhave 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.
- Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
 Drum body shall have a maximum unballasted weight of 11 lbs.
- 10.Drum and base shall be marked with manufacturer's name and model number.

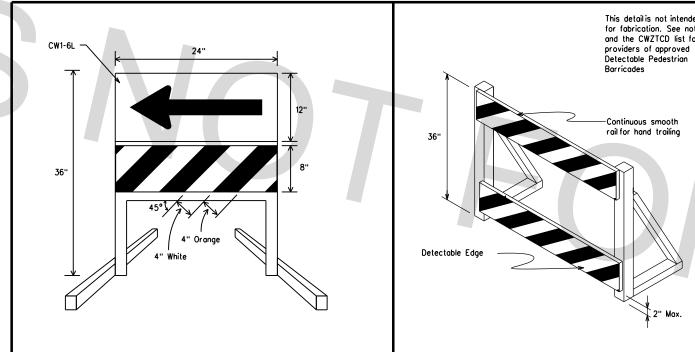
RETROREFLECTIVE SHEETING

- The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A reflective sheeting shall be supplied unless otherwise specified in the plans.
- 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 povement surface may not exceed 12 inches.
- Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
- Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
- 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.



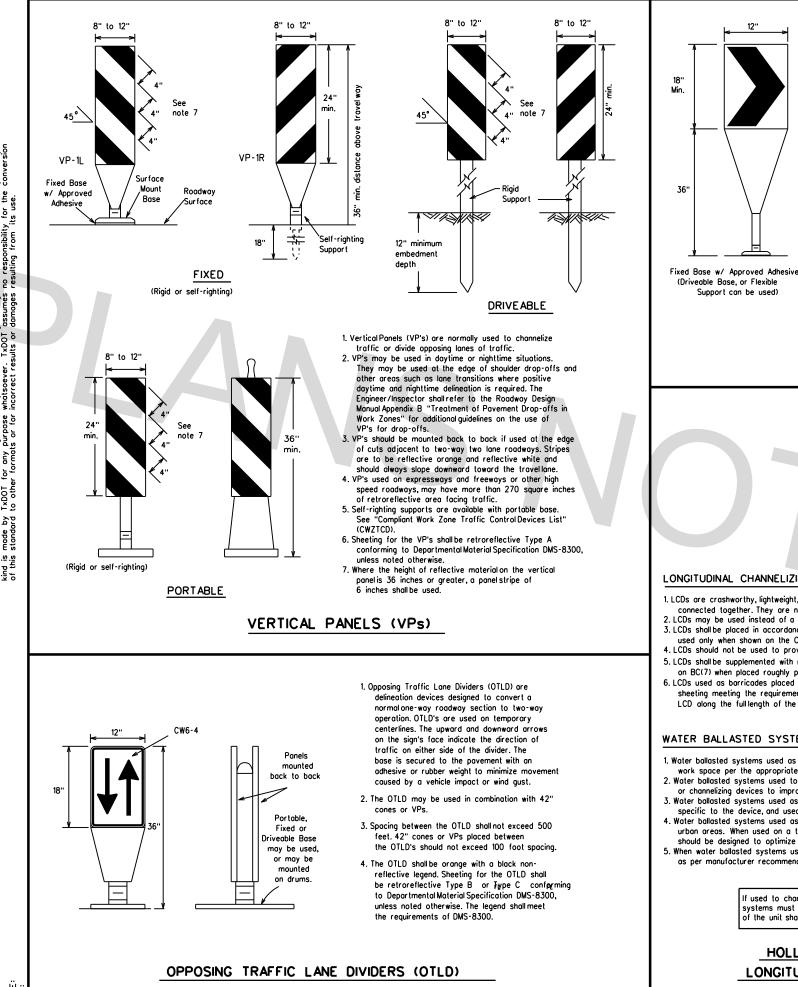


DIRECTION INDICATOR BARRICADE

- The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional evidence to diverse in exceedence.
- 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 travellane.
- 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 op_Type C Orgage 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

- DETECTABLE PEDESTRIAN BARRICADES
- When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility.
- 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.
- 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.
- 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.

	Image: Non-State of the systemImage: Non-Sta
	Plywood, Aluminum or Metalsign substrates shall NOT be used on plastic drums
	SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS
ed	 Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
or	 Chevrons and other work zone signs with an orange background shall be manufactured with Type B or Type C 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.
	 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.
	 R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.
	SHEET 8 OF 12 Traffic
	Texas Department of Transportation Standard
	BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES
	FILE: bc~14.dgn DN: TXDOT CK: TXDOT DW: TXDOT CK: TXDOT (C) TxDOT November 2002 CONT SECT JOB HIGHWAY REVISIONS Q12 37 232 CS
	REVISIONS 912 37 232 CS 4-03 7-13 DIST COUNTY SHEET NO. 9-07 8-14 HOU MONTGOMERY 128
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- 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 or Type C 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.

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CHEVRONS

LONGITUDINAL CHANNELIZING DEVICES (LCD)

12"

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 travellanes.
- 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 ballosted 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 f the unit shall not be less than 32 inches in height.

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

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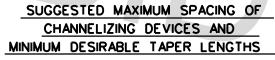
GENERAL NOTES

- 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	D	Minimum esirable er Lengt * *	hs	Suggested Spacing Channeli Devi	g of zing
×		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	2	150'	165'	180'	30'	60'
35	$L \cdot \frac{WS^2}{60}$	205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45		450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55	L-WS	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 -Length of Taper (FT.) W-Width of Offset (FT.) S-Posted Speed (MPH)



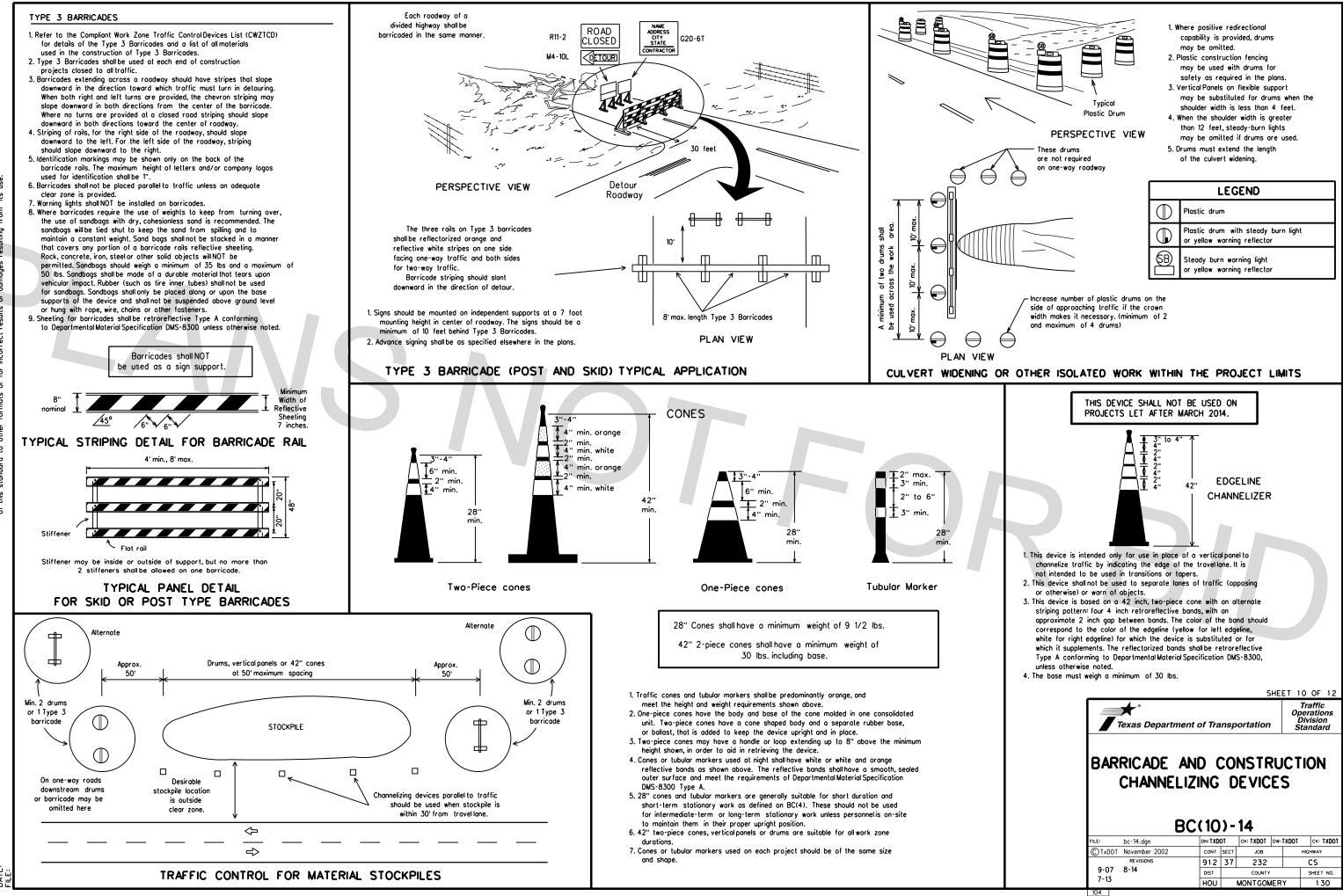


BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-14

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WORK ZONE PAVEMENT MARKINGS

GENERAL

- The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
- Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- 3. Additional supplemental pavement marking details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
- When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
- 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).
- All roised 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.
- Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

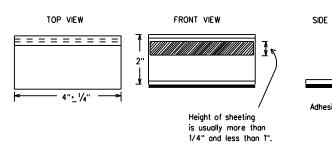
MAINTAINING WORK ZONE PAVEMENT MARKINGS

- 1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
- 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.
- Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

- Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
- The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
- 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.
- 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 SECUR TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKE TABS TO THE PAVEMENT SURFACE

- Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
- 2. Tobs 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

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

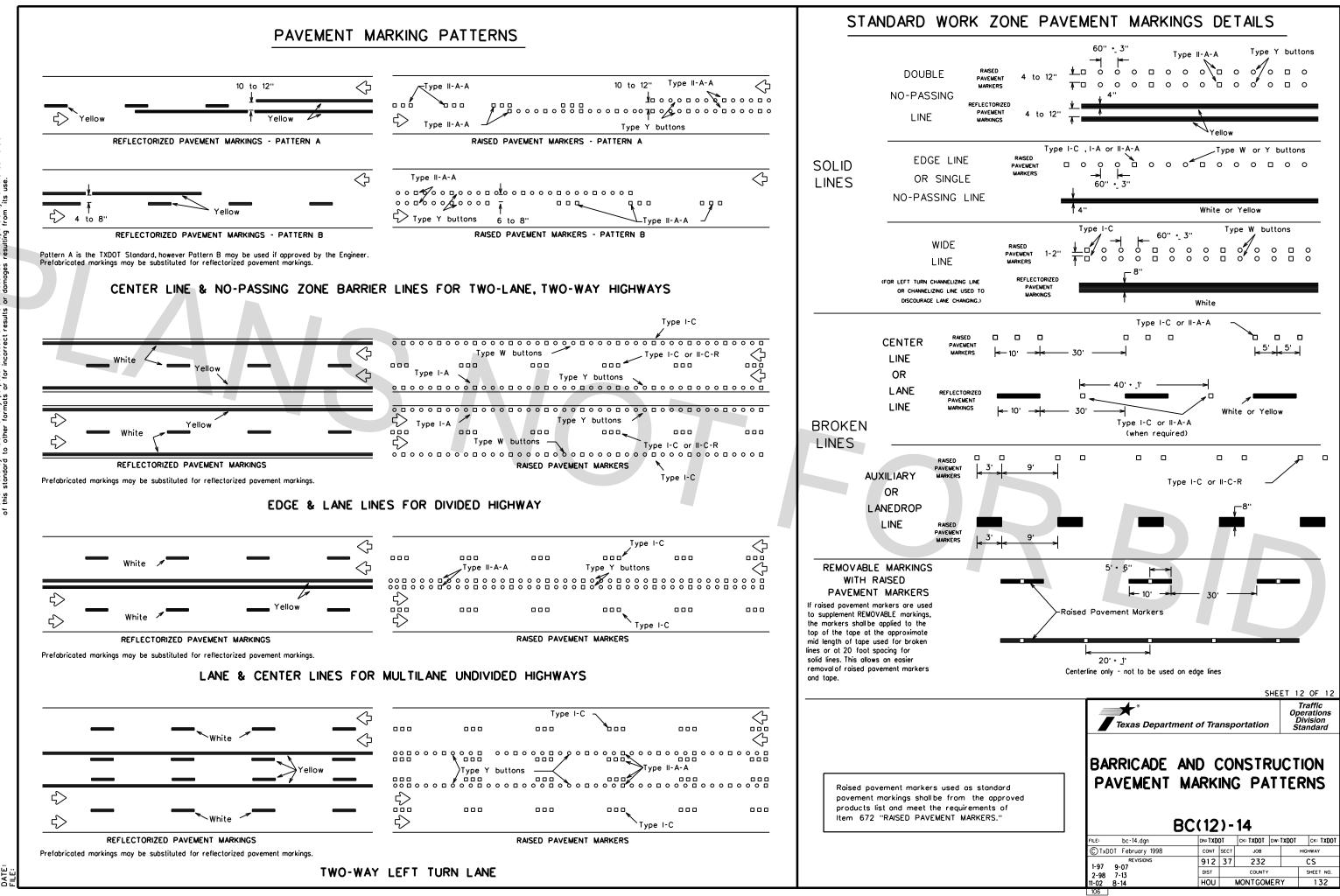
Guidemarks shall be designated as:

YELLOW - (two amber reflective surfaces with yellow body). WHITE - (one silver reflective surface with white body).

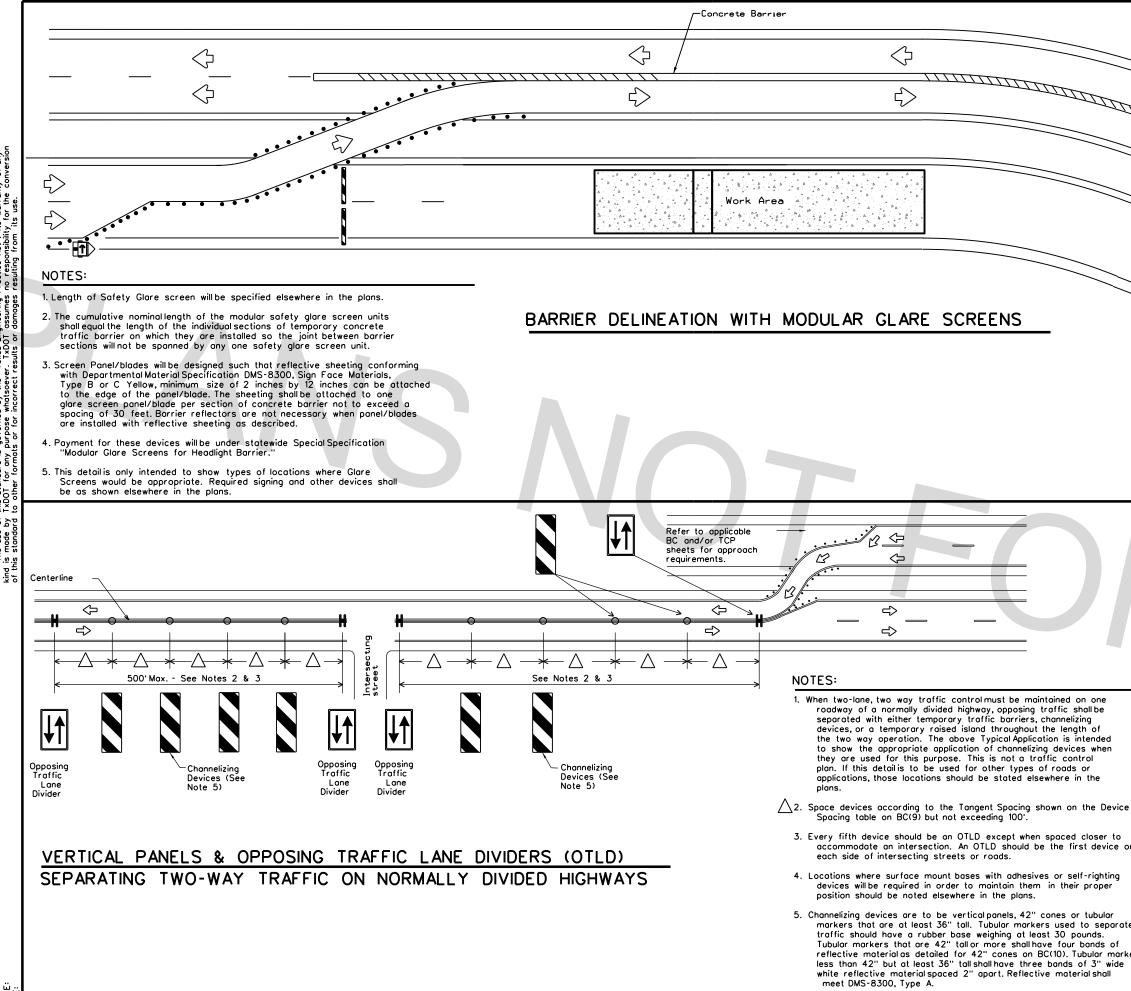
	DEPARTMENTAL MATERIAL SPECIFICATIONS	
	PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
	TRAFFIC BUTTONS	DMS-4300
	EPOXY AND ADHESIVES	DMS-6100
VIEW	BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
T۲ ا	PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
	TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
 	TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242
sive pod RE IR	A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the MaterialProducer List web address shown on BC(1).	
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	SHEE	T 11 OF 12
	Texas Department of Transportation	Traffic Operations Division Standard
	BARRICADE AND CONSTRU	CTION

ARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

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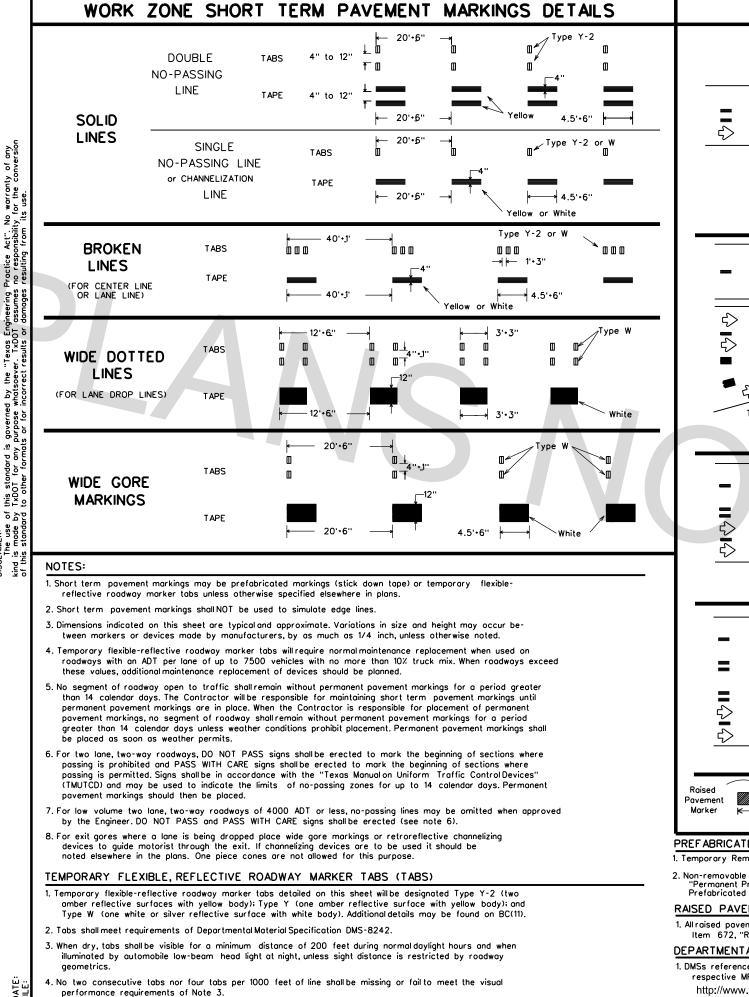
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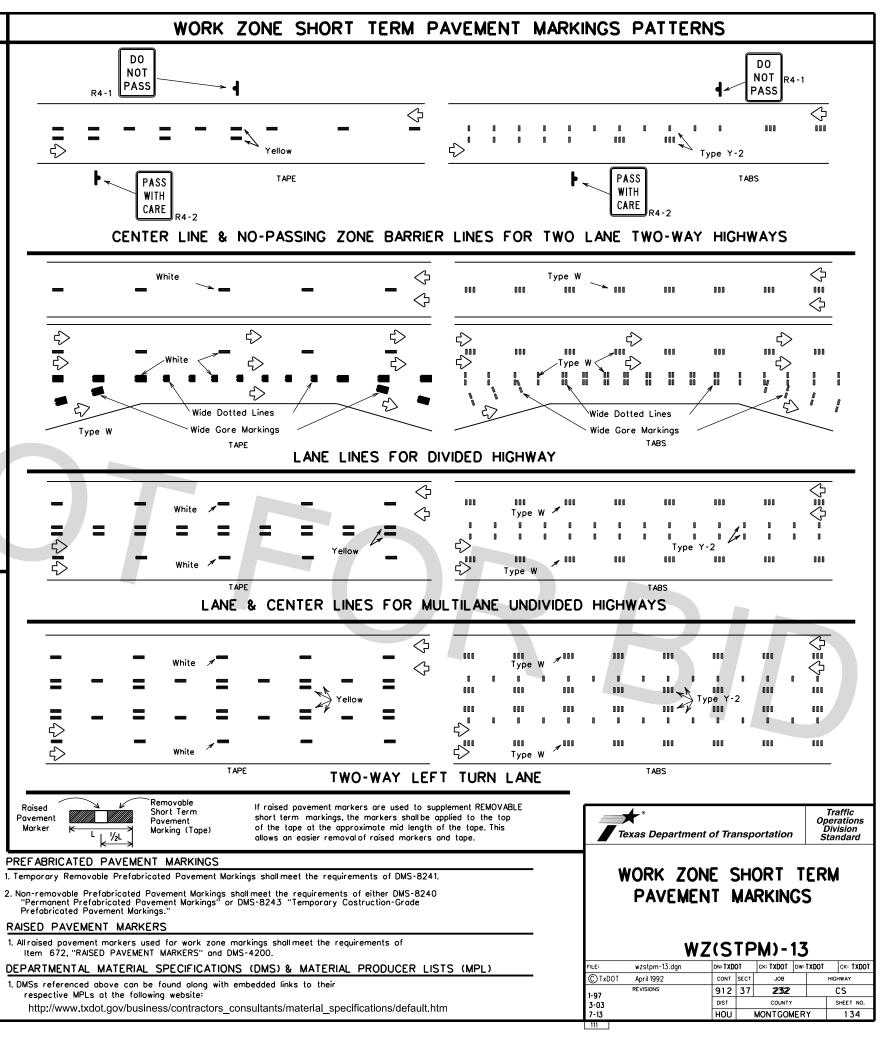


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	LEGEND	
	Type 3 Barricade	
• • •	Channelizing Devices	
Ê	Trailer Mounted Flashing Arrow Board	
 	Sign	
	Safety glare screen	
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
	TMENTAL MATERIAL SPECIF	FICATIONS
SIGN FACE M		DMS-8300
	AND OBJECT MARKERS	DMS-8600
MODULAR GLA	ARE SCREENS FOR HEADLIGHT BARRIER	DMS-8610
the Complian CWZTCD)des and may be	qualified products shall be used. A copy on t Work Zone Traffic Control Devices List" cribes pre-qualified products and their sou found at the following web address:	urces
http://	/www.txdot.gov/business/resources/producer	r-list.html
	RI	
2	BI	D
2	B Texas Department of Transport	Division
2		rtation Operation: Division Standard
2	Texas Department of Transpor TRAFFIC CONTROL TYPICAL DETA	rtation Operation. Division Standard
2	Texas Department of Transpor	rtation Operation Division Standard
R	Texas Department of Transpor TRAFFIC CONTROL TYPICAL DETA WZ(TD) -	Comparison
2	Texas Department of Transpor TRAFFIC CONTROL TYPICAL DETA WZ(TD)-	tation Operation Division Standard UPLAN US 17

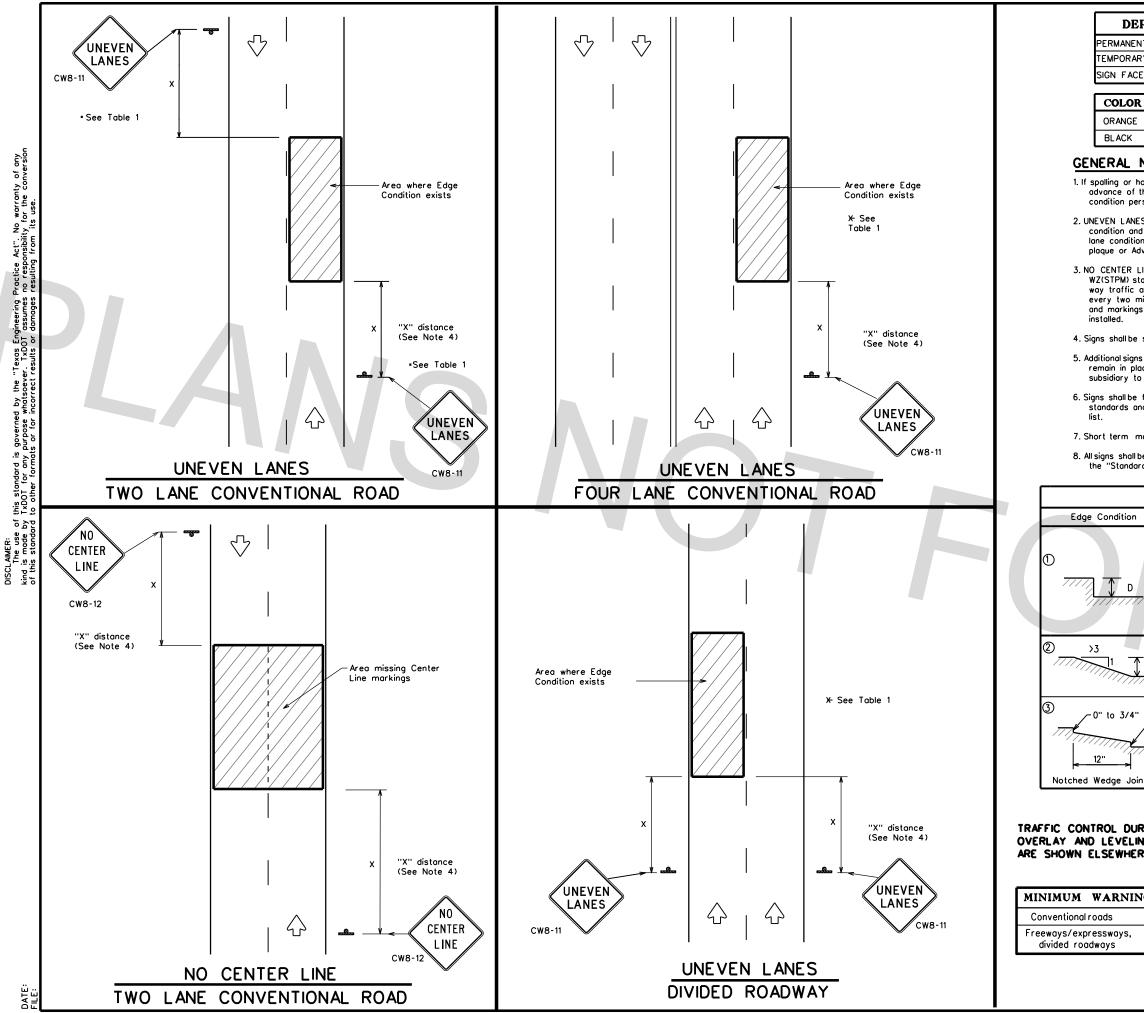
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1. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

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EP/	ARTMENTA	L MATERIAL	SPECIFICA?	TIONS					
		PAVEMENT MARKING		DMS-8240					
	MATERIALS	EFABRICATED PAVEN	IENT MARKINGS	DMS-8241 DMS-8300					
n	URACE	CHE							
R	USAGE BACKGROUND		ETING MATE						
	LEGEND & BOR		REFLECTIVE SHE						
N	OTES				_				
	condition and be	OAD (CW8-8) signs sho repeated every two n							
ndr onr	S (CW8-11) signs shall be installed in advance of the d repeated every mile. Signs installed along the uneven on may be supplemented with the NEXT XX MILES (CW7-3aP) dvisory Speed (CW13-1P) plaque.								
are ore mile	INE (CW8-12) signs and temporary pavement markings as per the tandard shall be installed if yellow centerlines separating two are obscured or obliterated. Repeat NO CENTER LINE signs niles where the center line markings are not in place. The signs s shall remain in place until permanent pavement markings are								
ns m lace	spaced at the distances recommended as per BC standards. s may be required as directed by the Engineer. Signs shall acc until final surface is applied. Signs shall be considered b Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."								
e fal and/	bricated and moun 'or listed on the "(ted on supports as sh Compliant Work Zone T	own on the BC raffic ControlDevic	es"					
mar	kings shall not be u	used to simulate edge	lines.						
		cordance with the deta Ins for Texas," latest o							
		TABLE 1							
	Edge Heigh	t (D)	⊁ Warning D	evices					
	Less than 11/4" (maxim 11/4" (maxim 11/2" (typica	num-planing)	Sign: C	W8-11					
77	operations lanes with	D" may be a maximu and 2" for overlay edge condition 1 are operations cease.	operations if unev						
D	Less than	or equal to 3"	Sign	CW8-11					
int	D D D D D D D D D D D D D D D D D D D								
	NG PLANING,	Texas	Department of	Transportation	Traffic Operations Division Standard				
	OPERATIONS	S.	SIGNIN	G FOR					
NG	SIGN SIZE]	UNEVEN	I LANES	5				
	36" × 36"								
_	48" × 48"			UL)-13					
		<u> </u>		TXDOT CK: TXDOT	DW:TXDOT CK: TXDOT HIGHWAY				
		REVI 8-05 2-08 7-1		12 37 232	CS				

DIST

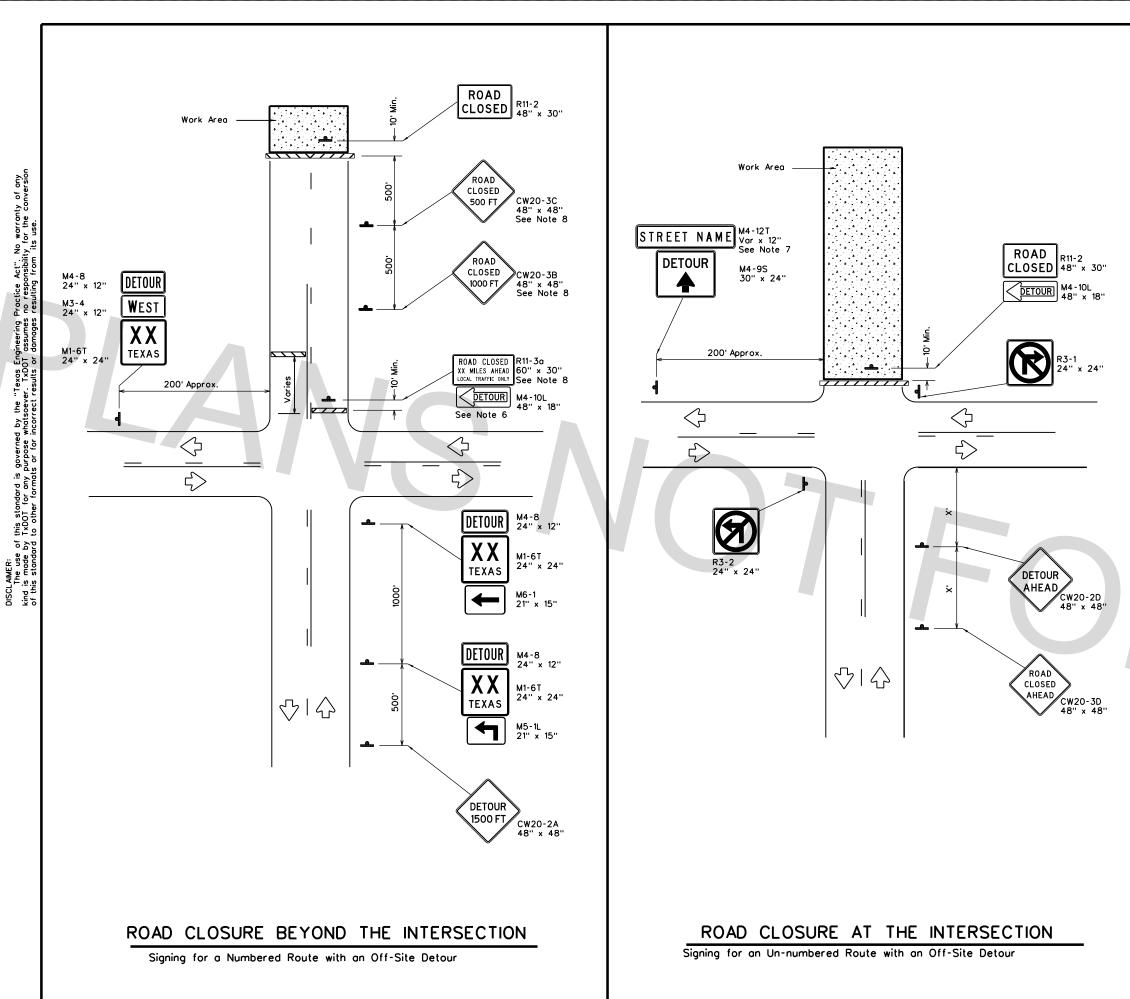
8-95 2-98 7-13 1-97 3-03

112

COUNTY

HOU MONTGOMERY

SHEET NO.



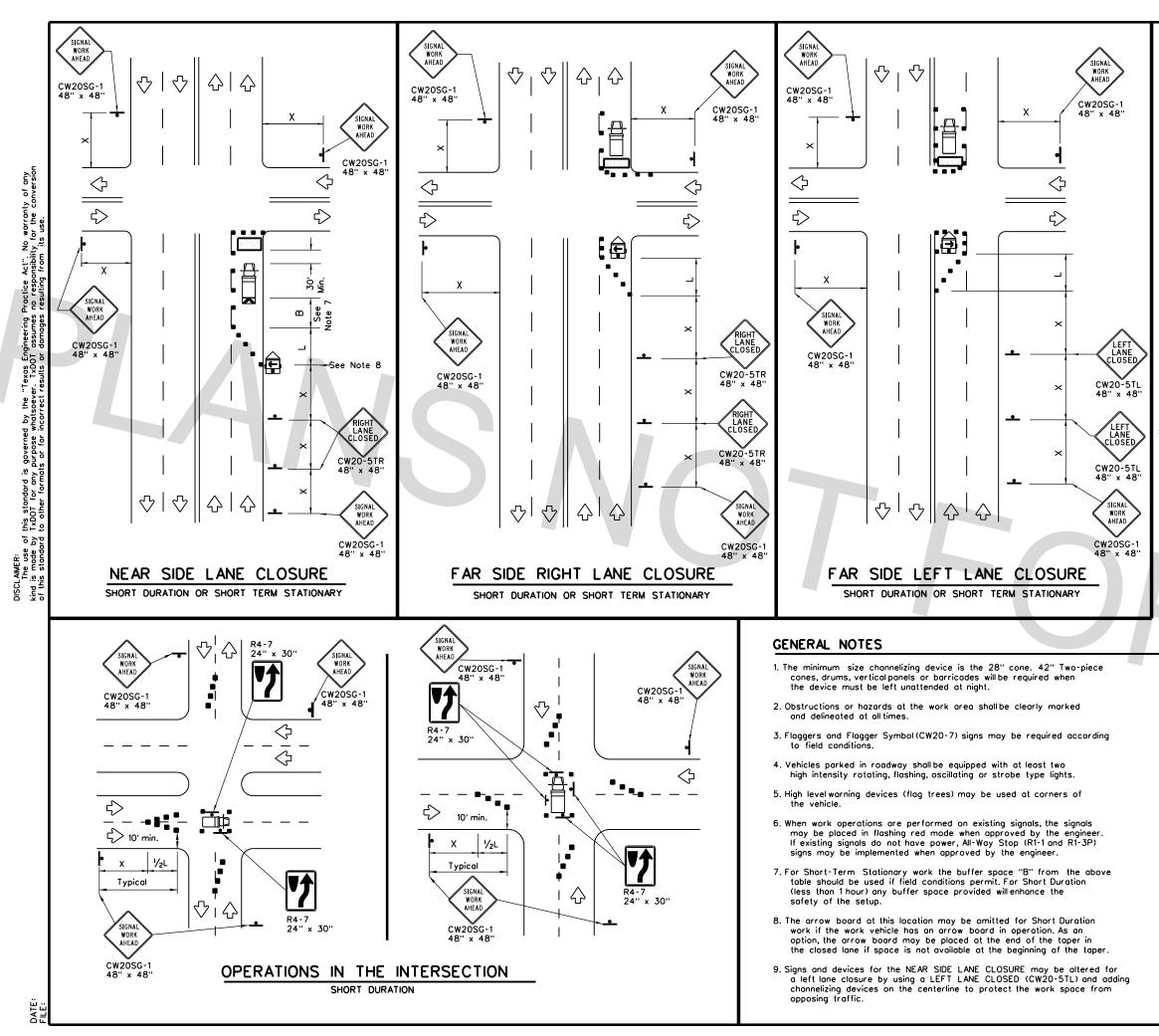
LEGEND							
Type 3 Barricade							
-	📥 Sign						

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'

GENERAL NOTES

- This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.
- 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.
- 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 (CW20-3C) signs.
- 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.

Traffic Operations Division Standard								
WORK ZONE ROAD CLOSURE DETAILS								
_		-						
-		<u>))-13</u>	v: TXDOT	ск: Тхрот				
v	VZ(RC))-13 CK: TXDOT DV		CK: TXDOT				
FILE: wzrcd-13.dgn)) - 13 ck: TXDOT DV JOB						
File: wzrcd-13.dgn ©TxDOT August 1995	NZ(RCC DN: TXDOT CONT SECT)) - 13 ck: TXDOT DV JOB		IGHWAY				



LEGEND							
<u>e 7 7 7 2</u>	Type 3 Barricade		Channelizing Devices				
	Heavy Work Vehicle	K	Truck Mounted Attenuator (TMA)				
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)				
4	Sign	2	Traffic Flow				
\bigtriangleup	Flag	٩	Flagger				

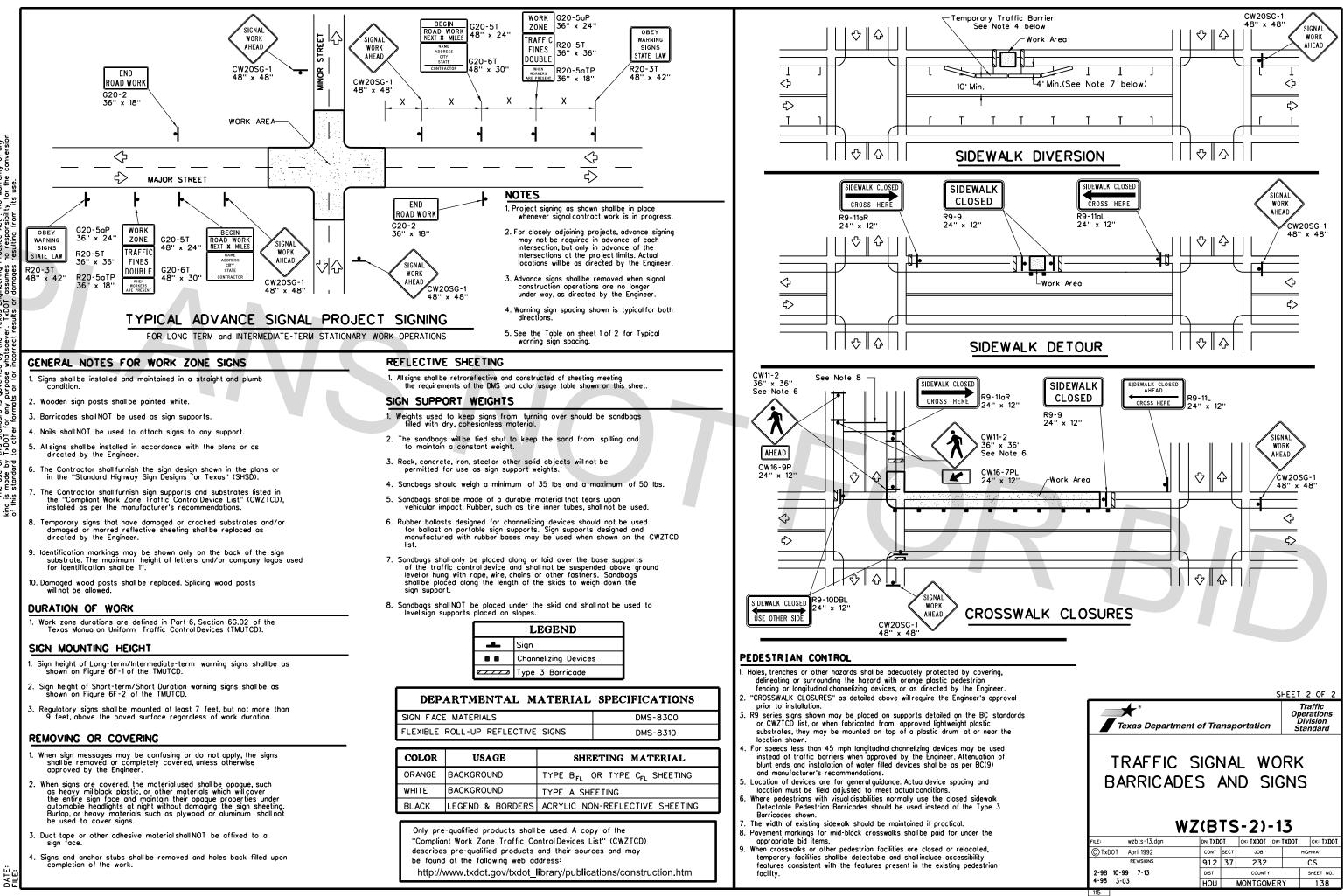
Posted Speed	Formula	D	Minimum esirable er Lengt x x	hs	Suggested Spacing Channelia Devis) of zing	Minimum Sign Spacing "X"	Suggested Longitudinal Buffer Space
×		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	"B"
30	2	150'	165'	180'	30'	60'	120'	90'
35	$L = \frac{WS^2}{60}$	205'	225'	245'	35'	70'	160'	120'
40	80	265'	295'	320'	40'	80'	240'	155'
45		450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55	L=WS	550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	4 10'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

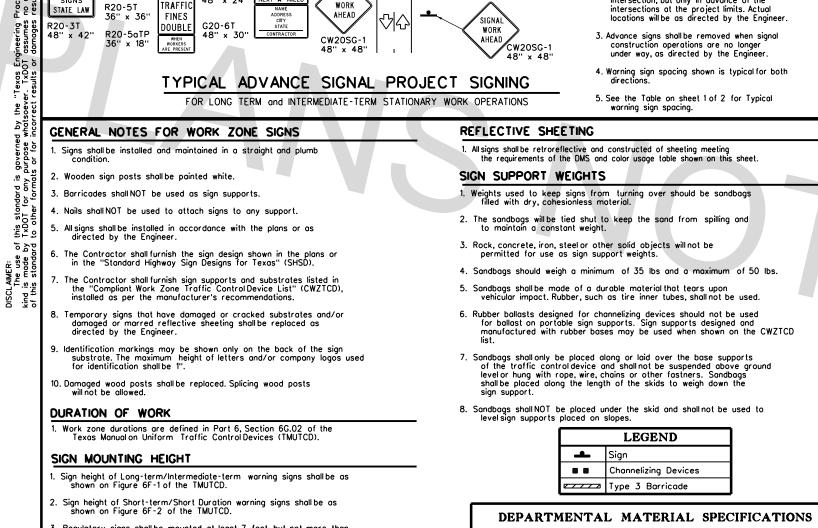
*** *** Taper lengths have been rounded off.

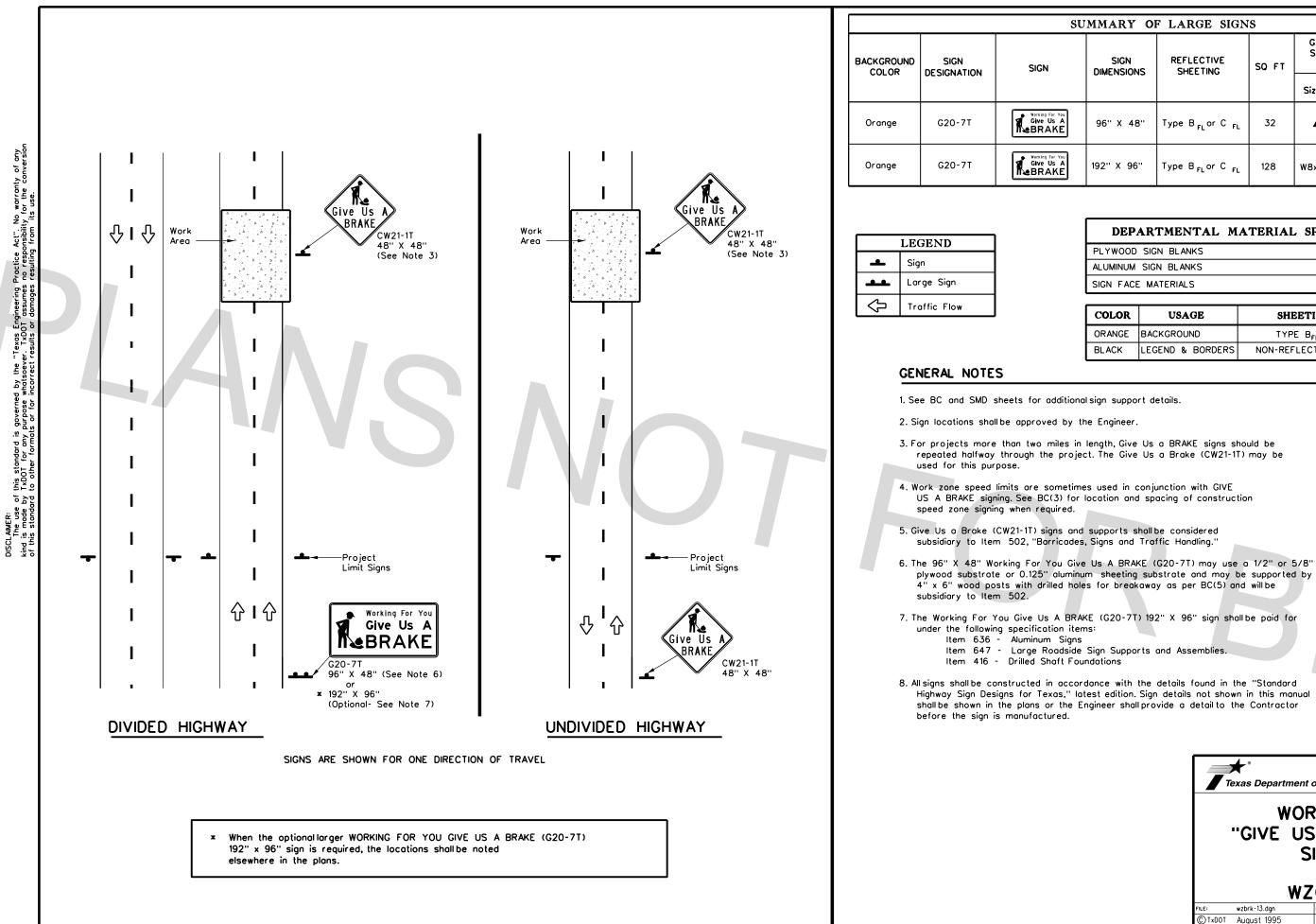
L-Length of Taper(FT) W-Width of Offset(FT) S-Posted Speed(MPH)

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

		-	HEET 1 OF 2				
Texas Department	nt of Trans	portation	Traffic Operations Division Standard				
TRAFFIC SIGNAL WORK TYPICAL DETAILS WZ(BTS-1)-13							
w	Z(BTS	5-1)-1;	3				
FillE: wzbts-13.dgn			3 Тхдот ск: Тхдот				
		CK: TXDOT DW:	-				
FILE: wzbts-13.dgn	DN: TXDOT	CK: TXDOT DW:	TXDOT CK: TXDOT				
FILE: wzbts-13.dgn C TxDOT April 1992	DN: TXDOT CONT SEC	CK: TXDOT DW:	TXDOT CK: TXDOT HIGHWAY				







U	UMMARY OF LARGE SIGNS									
	SIGN DIMENSIONS	REFLECTIVE	SQ FT	GALVANIZED STRUCTURAL STEEL			DRILLED SHAFT			
	DIMENSIONS	SHEETING		Size	(LF)		24" DIA. (LF)			
	96" X 48"	Type B _{FL} or C _{FL}	32				•			
	192'' X 96''	Type B _{FL} or C _{FL}	128	W8×18	16	17	12			

▲ See Note 6 Below

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

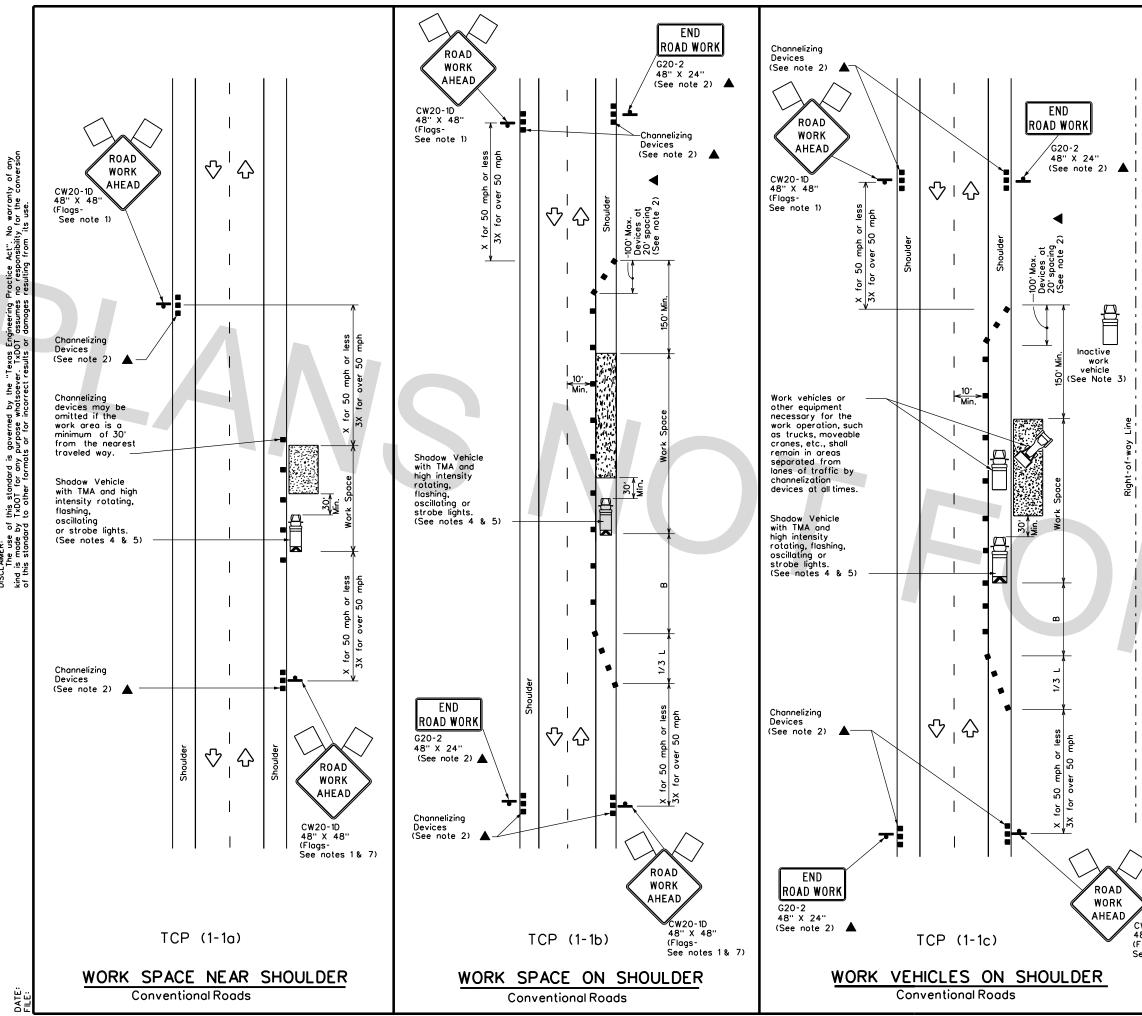
COLOR	USAGE	SHEETING MATERIAL
ORANGE	RANGE BACKGROUND TYPE B _{FL} OR TYPE C _{FL}	
BLACK	LEGEND & BORDERS	NON-REFLECTIVE ACRYLIC FILM

repeated halfway through the project. The Give Us a Brake (CW21-1T) may be

plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be

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

Texas Department of	of Tra	insp	ortation	0p	Traffic perations Division tandard	
WORK ZONE "GIVE US A BRAKE" SIGNS WZ(BRK)-13						
FILE: wzbrk-13.dgn	DN: TXD	OT	CK: TXDOT DW	TXDOT	CK: TXDOT	
©TxDOT August 1995	CONT	SECT	JOB		HIGHWAY	
REVISIONS	912	37	232		CS	
6-96 5-98 7-13	DIST		COUNTY		SHEET NO.	
8-96 3-03	HOU		MONTGOMER	۲Y	139	
116						



DISCLANKER: The use of this standard is governe this standard to other formate or for

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

Posted Speed	Formula	Desirable Taper Lengths x x		Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X"	Suggested Longitudinal Buffer Space	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	"8"
30	2	150'	165'	180'	30'	60'	120'	90'
35	L. <u>WS²</u>	205'	225'	245'	35'	70'	160'	120'
40	60	265'	295'	320'	40'	80'	240'	155'
45		450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55	L-WS	550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	4 10'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

*** *** Toper 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		
	1	✓				

GENERAL NOTES

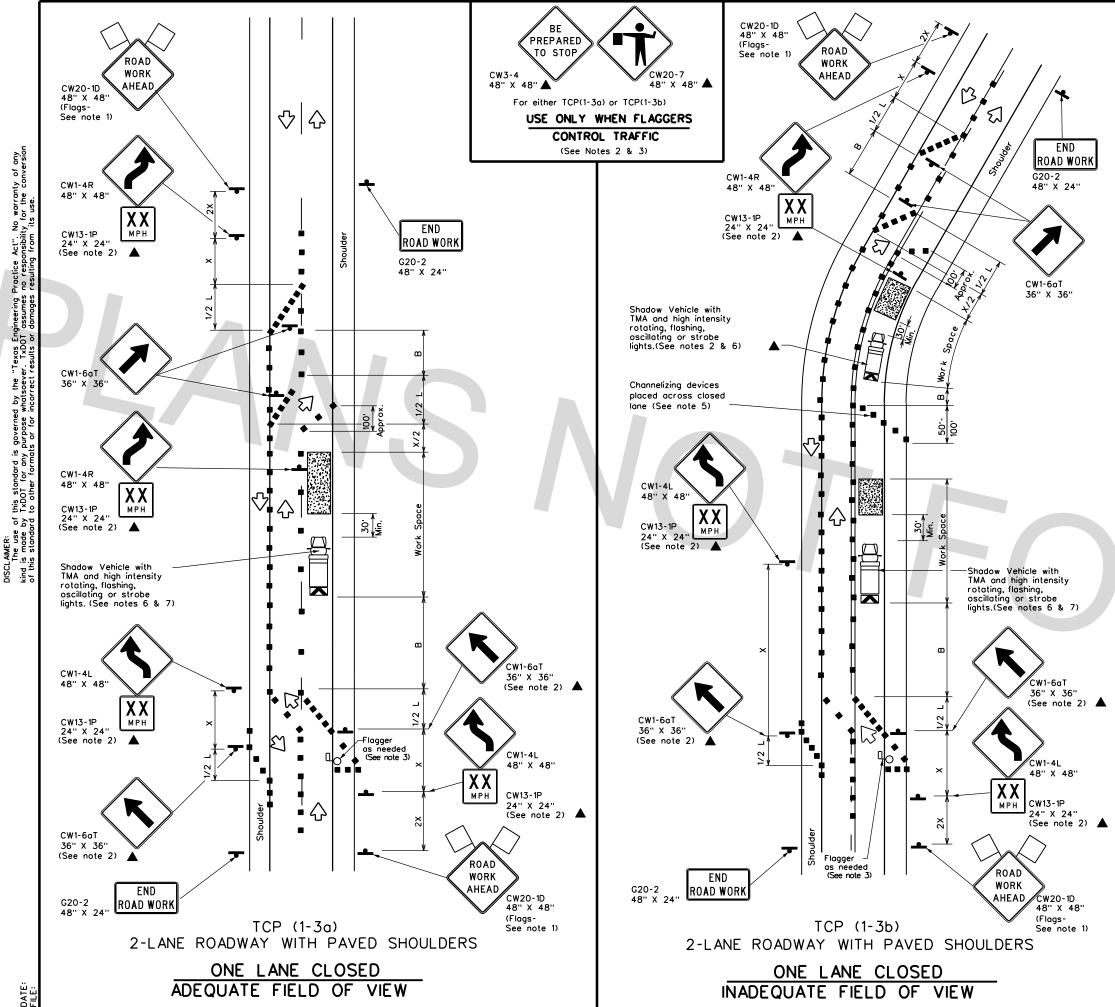
1. Flags attached to signs where shown are REQUIRED.

- 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. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.

- 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.
- 5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces. 6. See TCP(5-1)for shoulder work on divided highways, expressways and
- freeways. 7. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

1	Texas Departmen	t of Transı	portation	Traffic Operations Division Standard
CW20-1D 48" X 48" (Flogs-	TRAFFIC C CONVEN SHOUL TCP(TIONAL	ROA[WORK	
See notes 1 & 7)	Fi∟E: tcp1-1-18.dgn	DN: TXDOT	CK: TXDOT DW:	TXDOT CK: TXDOT
	© TxDOT December 1985	CONT SECT	JOB	HIGHWAY
	RE VISIONS 2-94 4-98	912 37	232	CS
	8-95 2-12	DIST	COUNTY	SHEET NO.
	1-97 2-18	HOU	MONTGOMER	Y 140
	151			



LEGEND							
<u>~~~~</u>	Type 3 Barricade		Channelizing Devices				
₽	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)				
Ē	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)				
4	Sign	\langle	Traffic Flow				
\Diamond	Flag	LO	Flagger				

Posted Speed	Formula	Minimum Desirable Taper Lengths X X		Špacino Channelia	Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space	
×		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	"X" Distance	"B"
30	2	150'	165'	180'	30'	60'	120'	90'
35	L- <u>WS²</u>	205'	225'	245'	35'	70'	160'	120'
40	00	265'	295'	320'	40'	80'	240'	155'
45		450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55	L-WS	550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	4 10'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

*** *** Taper lengths have been rounded off.

L-Length of Taper(FT) W-Width of Offset(FT) S-Posted Speed(MPH)

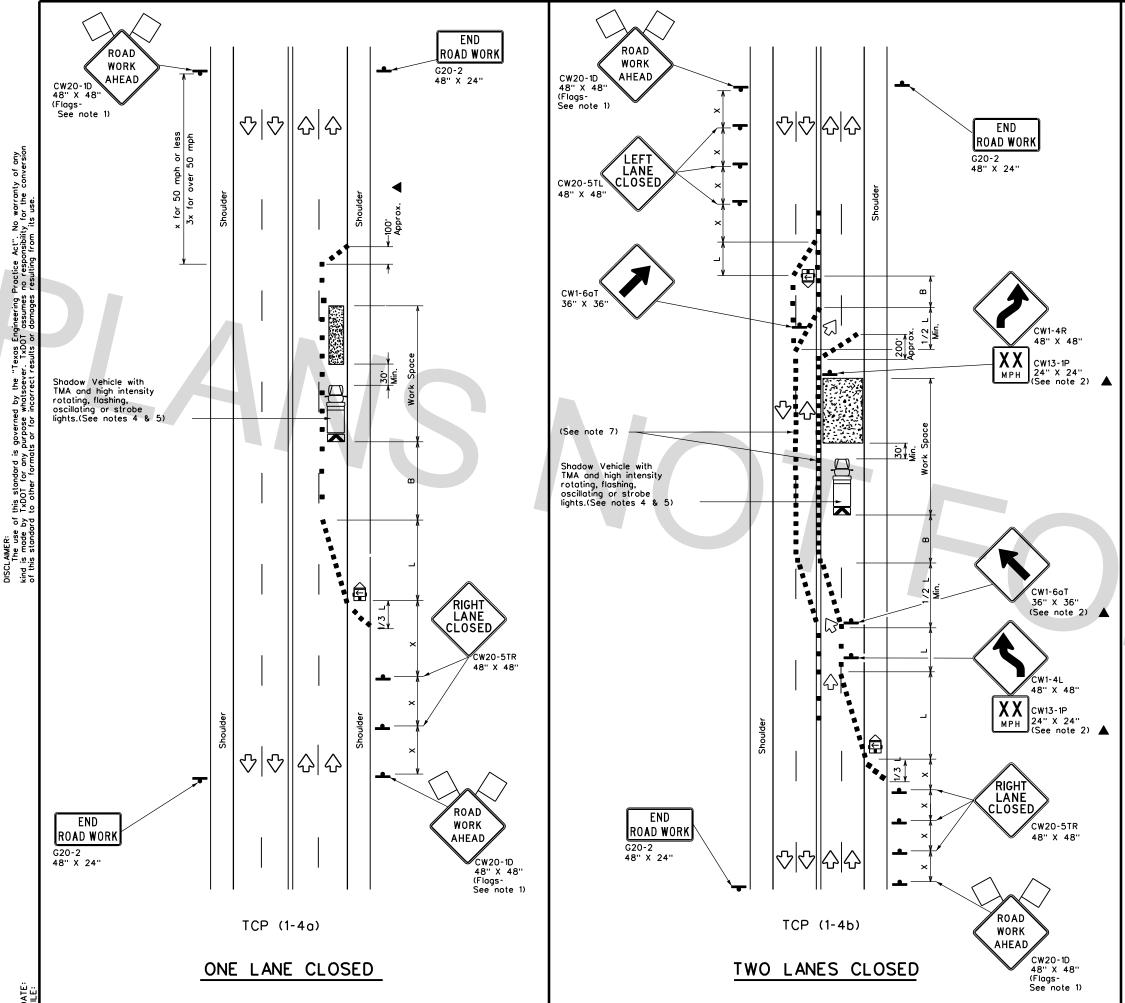
TYPICAL USAGE						
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY		
	1	1				

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. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
- 4. DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
- 5. When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
- 6. A Shadow Vehicle with a TMA should be used anytime it can be position 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.
- 7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
- 8. 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 speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

Texas Department	of Tra	ansp	ortation	Op D	Traffic erations Division Candard	
TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO LANE ROADS TCP(1-3)-18						
FILE: tcp1-3-18.dgn	DN: TXD	от	CK: TXDOT DW:	TXDOT	CK: TXDOT	
© TxDOT December 1985	CONT	SECT	JOB		HIGHWAY	
REVISIONS	912	37	232		CS	
2-04 4-09						
2-94 4-98 8-95 2-12 1-97 2-18	DIST		COUNTY		SHEET NO.	



DATE:

LEGEND						
<u>e 7 7 7 7</u>	Type 3 Barricade		Channelizing Devices			
	Heavy Work Vehicle	K	Truck Mounted Attenuator (TMA)			
(L)	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)			
•	Sign	Ŷ	Traffic Flow			
\Diamond	Flag	۵	Flagger			

Posted Formula Speed		D	Minimum lesiroble er Lengt x x		Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X"	Suggested Longitudinal Buffer Space
×		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	"В"
30	2	150'	165'	180'	30'	60'	120'	90'
35	$L = \frac{WS^2}{60}$	205'	225'	245'	35'	70'	160'	120'
40	80	265'	295'	320'	40'	80'	240'	155'
45		450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55	L=WS	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 SHORT TERM INTERMEDIATE LONG TERM DURATION STATIONARY TERM STATIONARY STATIONARY									
	1	1							

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 CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
- 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.
- 5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

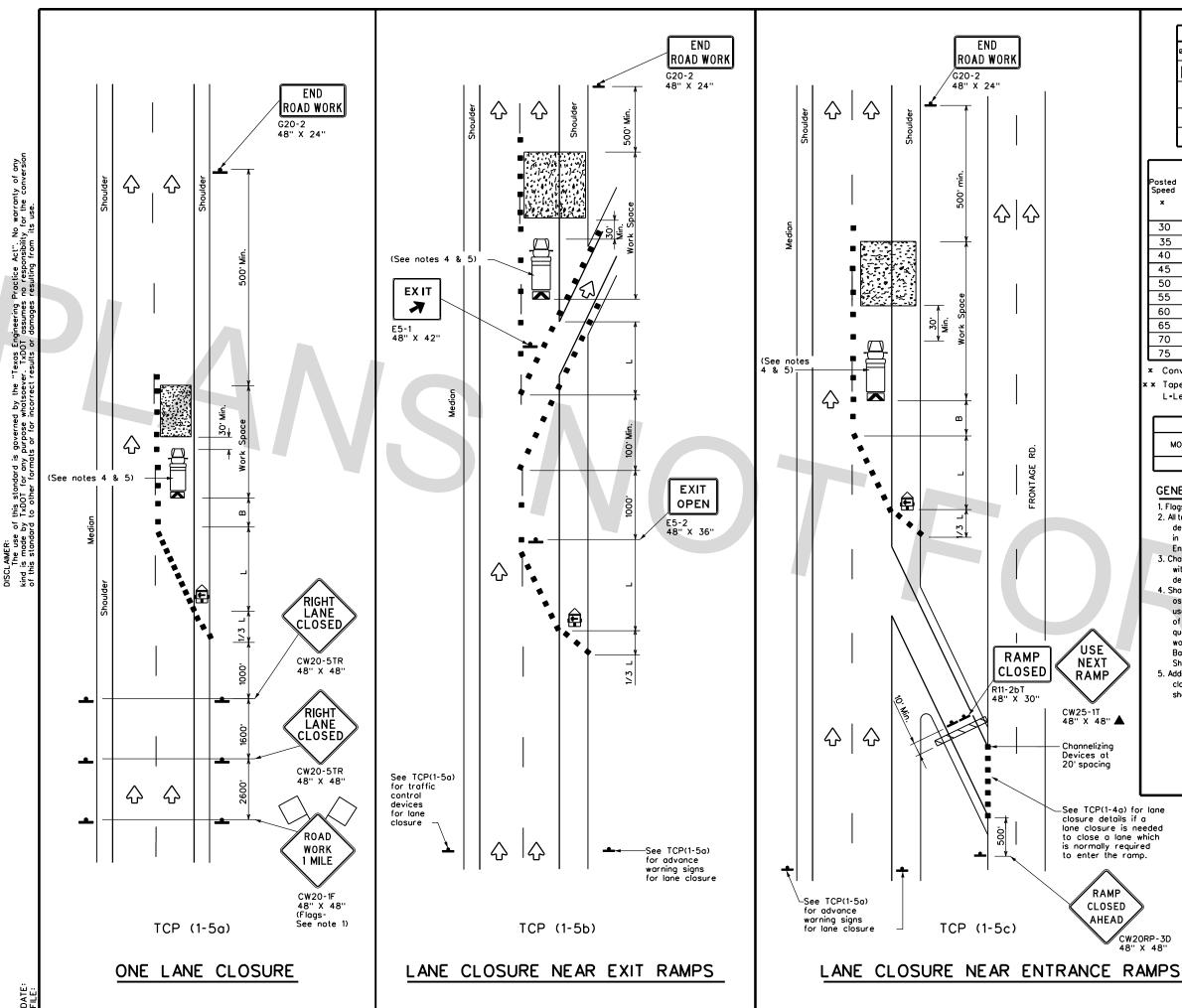
TCP (1-4a)

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 where needed to protect the work space from opposing traffic with the arrow panel placed in the closed lane near the end of the merging taper.

TCP (1-4b)

7. 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 1/2S where S is the speed in mph. This tighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

Texas Department	nt of Trans	portation	Op L	Traffic erations Division tandard				
TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS								
			D2					
	(1-4)		D2					
		- 18	. TXDOT	ск: ТХДОТ				
ТСР	(1-4)	- 18 CK: TXDOT DW	: TXDOT	ск: ТХДОТ ніснумач				
FILE: tcp1-4-18.dgn ©TxDOT December 1985 REVISIONS	(1-4)	- 18 ск: тхрот ри	: TXDOT					
FILE: tcp1-4-18.dgn © TxDOT December 1985	(1-4) DN: TXDOT CONT SEC	- 18 ск: тхрот ри	: TXDOT	HIGHWAY				



LEGEND									
	Type 3 Barricade		Channelizing Devices						
□‡	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)						
Ē	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)						
_	Sign	\langle	Traffic Flow						
\bigtriangleup	Flag	ЦO	Flagger						

Posted Speed			Minimum Desirable Taper Lengths x x 10' 11' 12'		Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing ''X''	Suggested Longitudinal Buffer Space "B"
		10' Offset		12 [.] Offset	On a Taper	On a Tangent	Distance	В
30	2	150'	165'	180'	30'	60'	120'	90'
35	$L = \frac{WS^2}{60}$	205'	225'	245'	35'	70'	160'	120'
40	00	265'	295'	320'	40'	80'	240'	155'
45		450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55	L-WS	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'

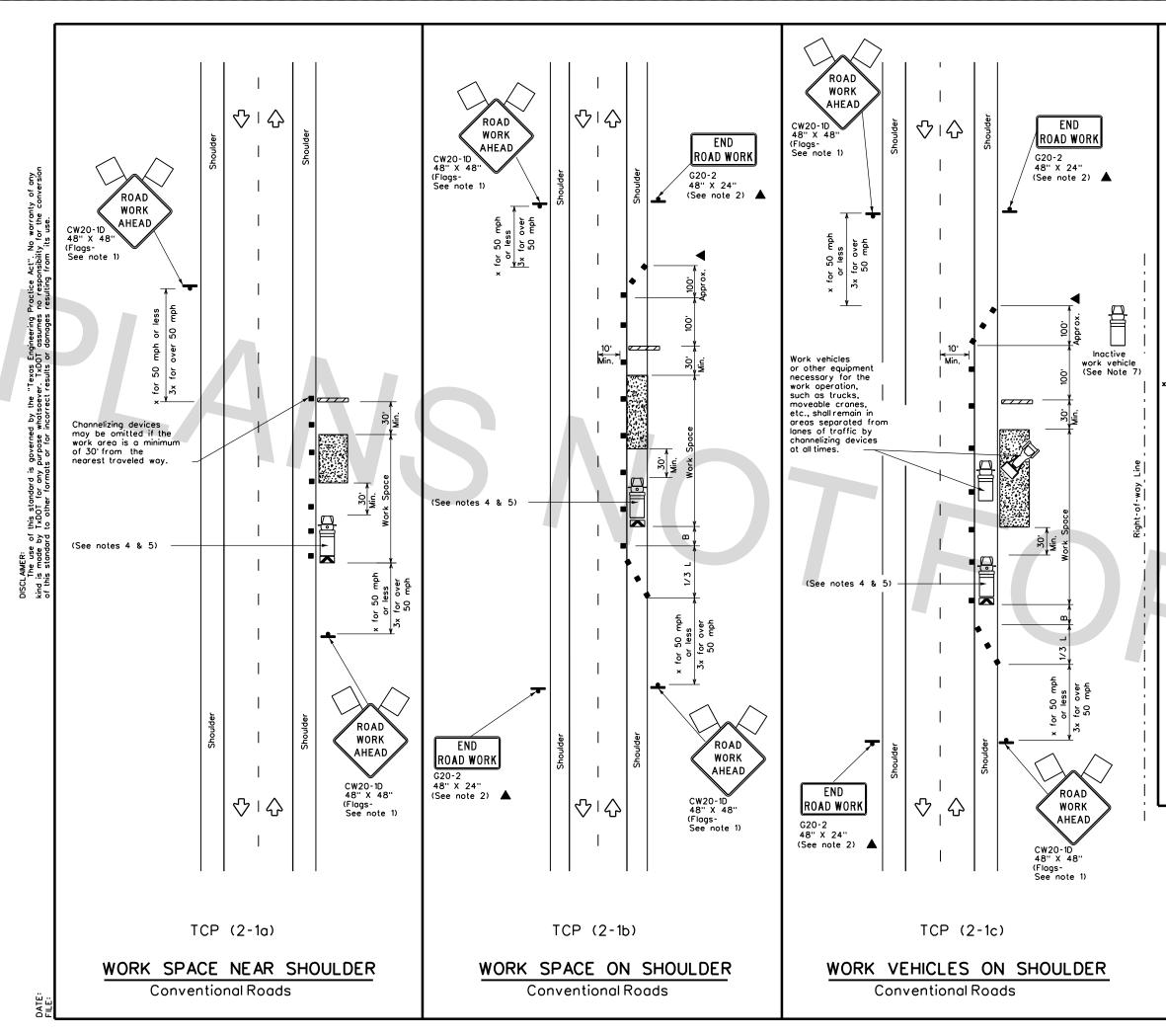
* Taper lengths have been rounded off.

L-Length of Taper(FT) W-Width of Offset(FT) S-Posted Speed(MPH)

	TYPICAL USAGE								
MOBILE	MOBILE SHORT SHORT TERM INTERMEDIATE LONG TERM DURATION STATIONARY TERM STATIONARY STATIONARY								
		1							

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. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA. 5. 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. Traffic Operations Division Standard * Texas Department of Transportation TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS TCP(1-5)-18 CW20RP-3D 48" X 48" DN: TXDOT CK: TXDOT DW: TXDOT CK: TXDOT LE: tcp1-5-18.dgn © TxDOT February 2012 CONT SECT JOB HIGHWAY REVISIONS 232 CS 912 37 2-18 DIST COUNT SHEET NO HOU MONTGOMERY 143 155



	LEGEND								
<u>e 7 7 7 2</u>	Type 3 Barricade		Channelizing Devices						
	Heavy Work Vehicle	K	Truck Mounted Attenuator (TMA)						
(L)	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)						
4	Sign	2	Traffic Flow						
\bigtriangleup	Flag	۵	Flagger						

Posted Speed	Formula	x x		Špacino Channeli Devi	Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space	
Ĺ		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	"B"
30	<u>ws</u> ²	150'	165'	180'	30'	60'	120'	90'
35	$L = \frac{WS}{60}$	205'	225'	245'	35'	70'	160'	120'
40	00	265'	295'	320'	40'	80'	240'	155'
45		450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55	L=WS	550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	4 10'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Taper lengths have been rounded off.

L-Length of Taper(FT) W-Width of Offset(FT) S-Posted Speed(MPH)

TYPICAL USAGE							
MOBILE	SHORT SHORT TERM INTERMEDIATE LONG TERM DURATION STATIONARY TERM STATIONARY STATIONARY						
	1	1	1	 ✓ 			

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.

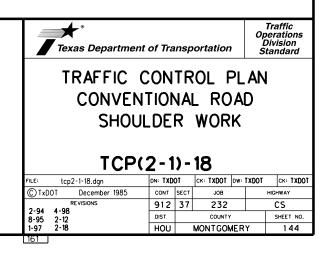
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.

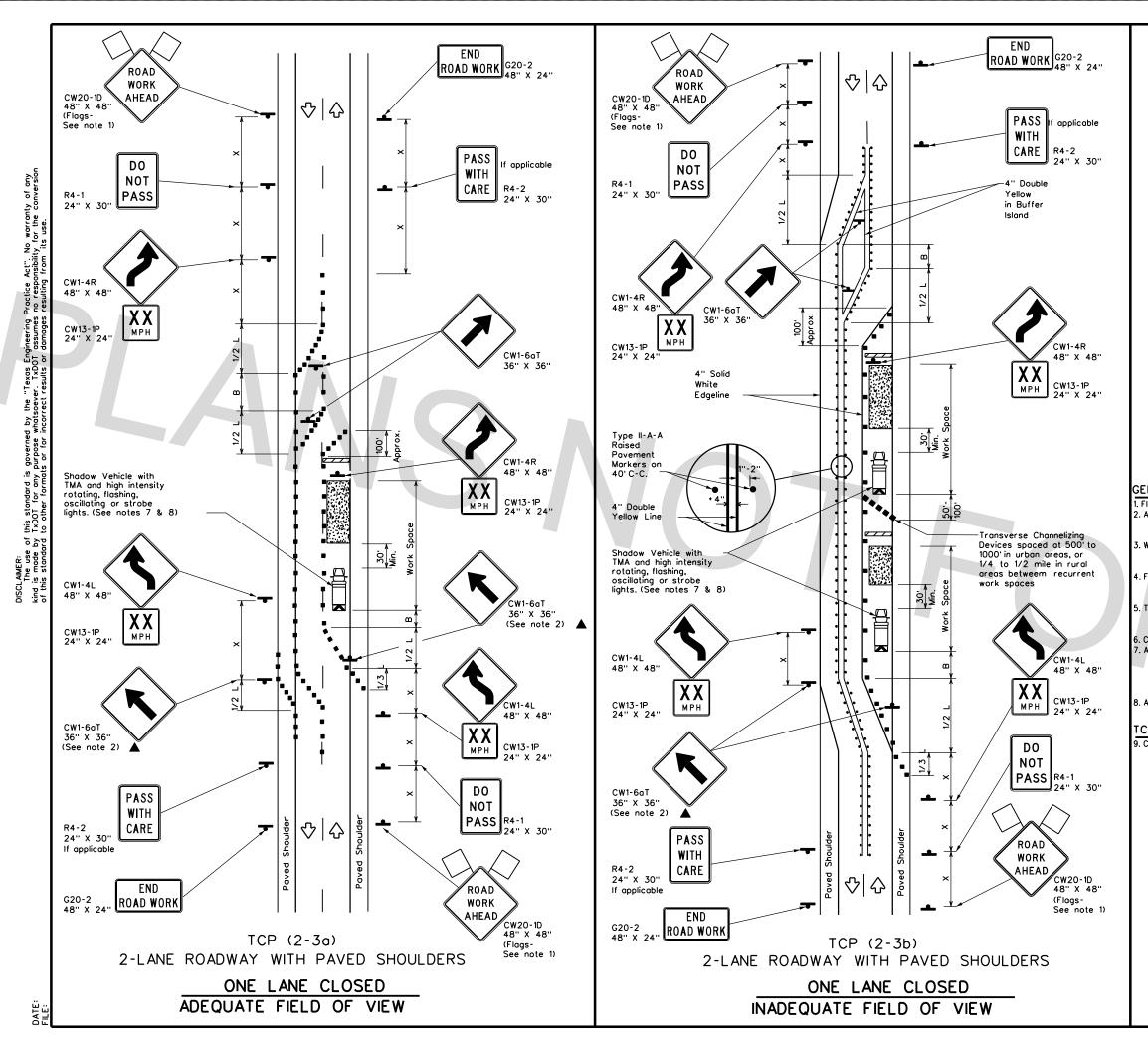
3. Stockpiled material should be placed a minimum of 30 feet from

nearest traveled way.
Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.

5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space

- 6. See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
- Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
- CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways





	LEGEND									
<u>e z z z z z</u>	Type 3 Barricade		Channelizing Devices							
Ē	Heavy Work Vehicle	K	Truck Mounted Attenuator (TMA)							
F	Trailer Mounted Flashing Arrow Board	••••	Raised Pavement Markers Ty II-AA							
-	Sign	\langle	Traffic Flow							
\Diamond	Flag	۵	Flagger							

Posted Formula Speed		Desirable Taper Lengths * *		Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X"	Suggested Longitudinal Buffer Space	
×		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	"B"
30	2	150'	165'	180'	30'	60'	120'	90'
35	$L = \frac{WS^2}{60}$	205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45		450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55	L=WS	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'

*** *** Toper lengths have been rounded off.

L-Length of Taper(FT) W-Width of Offset(FT) S-Posted Speed(MPH)

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

When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.

Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.

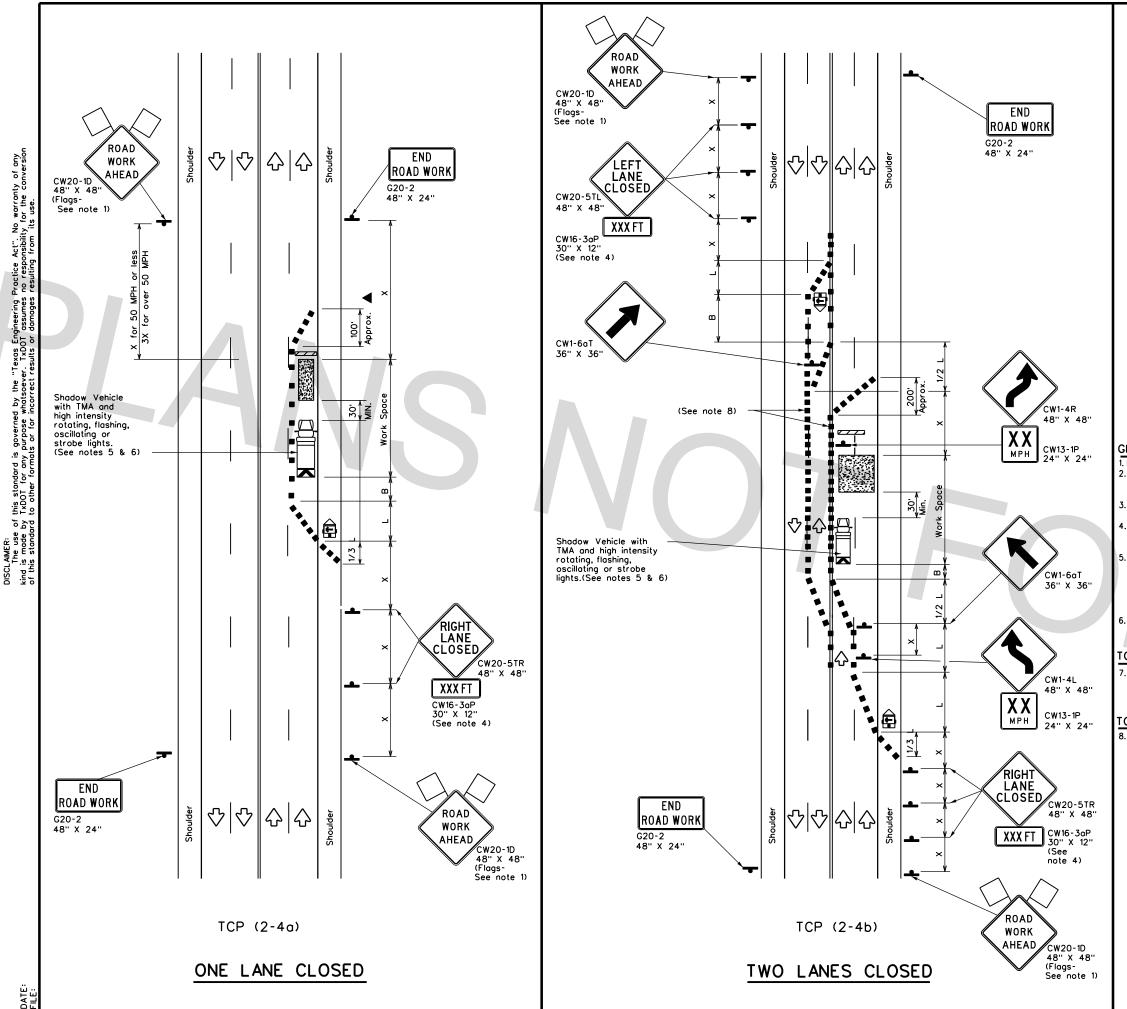
be positioned at end of traffic queue. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.

Conflicting pavement marking shall be removed for long term projects.
A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted.
Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

CP (2-3a)

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

Traffic Operations Division Standard									
TRAFFIC C TRAFFIC TWO-L TCP(SH ANE	IIF 5 f	TS ON ROADS		I				
FILE: tcp(2-3)-18.dgn	dn: TXD	OT	CK: TXDOT DW:	TXDOT	CK: TXDOT				
© TxDOT December 1985	CONT	SECT	JOB		HIGHWAY				
REVISIONS 8-95 3-03	912	37	232		CS				
1-97 2-12	DIST		COUNTY		SHEET NO.				
4-98 2-18	HOU		MONTGOMER	Y	145				
163									



	LEGEND												
	D	N	Ту	ype 3 Barricade						Channel	izing Devic	es	
		Цþ	He	eavy Work Vehicle				Ζ		Truck Mounted Attenuator (TMA)			
		Ē		Trailer Mounted Tashing Arrow Board						Portable Changeable Message Sign (PCMS)			
		ŀ	Siq	gn				\bigcirc		Traffic	Flow		
	<	$\langle \rangle$	Fle	og				۵C)	Flagger			
Poste Spee			hs		Suggested Maximu Spacing of Channelizing Devices			Minimum Sign Spacing "X"	Suggested Longitudinal Buffer Space				
×				10' Offset	11' Offset	12' Offset)n a oper	Т	On a angent	Distance	"B ["]	
30			_2	150'	165'	180'		30'		60'	120'	90'	
35)	L- <u>W:</u> 60	<u>s</u>	205'	225'	245'		35' 70'		70'	160'	120'	
40		00	<u> </u>	265'	295'	320'		40'		80'	240'	155'	
45				450'	495'	540'		45'		90'	320'	195'	
50			500' 550' 600' 50'		50'		100'	400'	240	•			
55		L = W S	s	550'	605'	660'		55'		110'	500'	295	
60			-	600'	660'	720'		60'		120'	600'	350	•
65				650'	715'	780'		65'		130'	700'	4 10'	
70				700'	770'	840'		70'		140'	800'	475	
75				750'	825'	900'		75'		150'	900'	540	

*** *** 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.

. 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.

. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.

Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

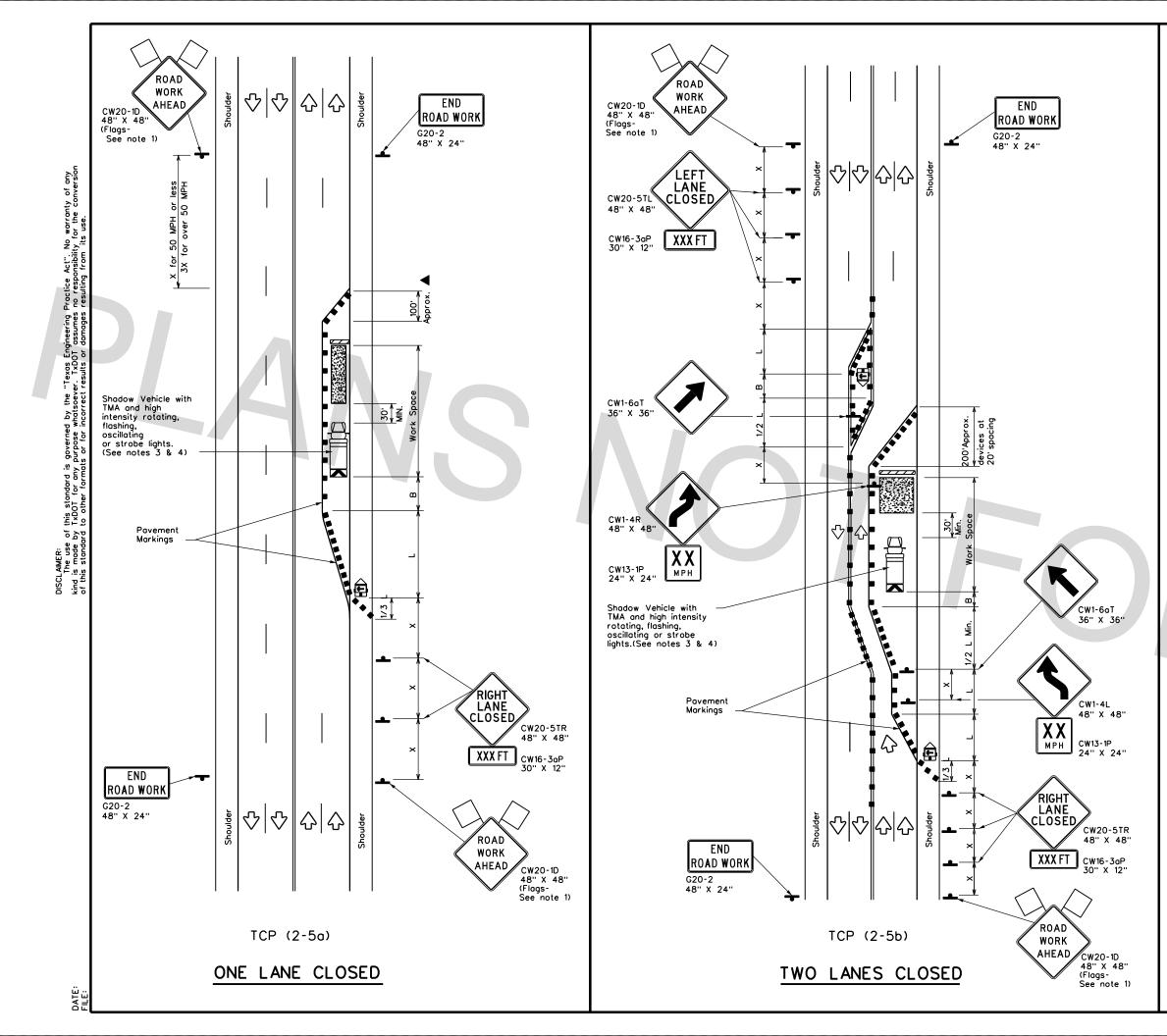
TCP (2-4a)

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.

CP (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 Tra	ansp	ortation	Ope D	raffic erations ivision andard
TRAFFIC (LANE CLOSUR CONVENT TCP	ES TION	or IAL	N MUL	TIL	ANE
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1-97 2-12 4-98 2-18 164	HOU		MONTGOMER	Y	146



LEGEND								
	Type 3 Barricade		Channelizing Devices					
	Heavy Work Vehicle	Χ	Truck Mounted Attenuator (TMA)					
Ē	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)					
-	Sign	\sim	Traffic Flow					
\Diamond	Flag	Ŀo	Flagger					

Posted Speed	Formula	x x		Suggested Spacing Channelia Devie	g of zing ces	Minimum Sign Spacing "X"	Suggested Longitudinal Buffer Space	
^		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	"8"
30	ws ²	150'	165'	180'	30'	60'	120'	90'
35	$L = \frac{WS}{60}$	205'	225'	245'	35'	70'	160'	120'
40	80	265'	295'	320'	40'	80'	240'	155'
45		450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55	L=WS	550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	4 10'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

*** *** 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					
			✓	1					

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. 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.

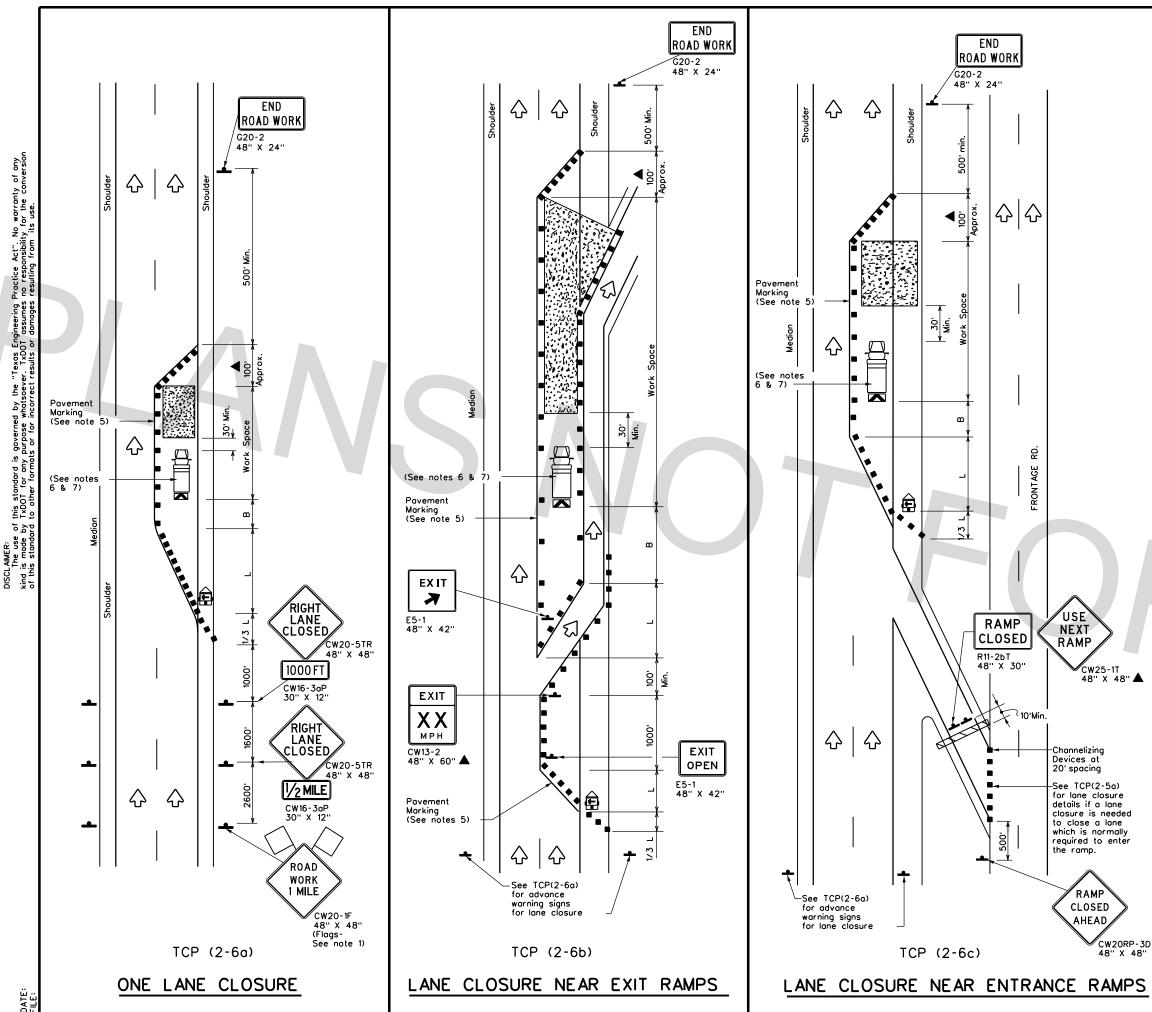
TCP (2-5a)

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 toper.

TCP (2-5b)

7. Conflicting pavement markings shall be removed for long-term projects.

Texas Departmen	nt of Trans	portation	Traffic Operations Division Standard	:		
)NVEN (2-5)		RDS.			
		- 18	RDS.	от		
TCP	<u>(2-5)</u>	- 18		DT		
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LEGEND							
	Type 3 Barricade		Channelizing Devices				
□¢	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)				
Ē	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)				
-	Sign	\Diamond	Troffic Flow				
\Diamond	Flog	۵	Flagger				

Posted Speed	Formula	x x			Suggested Spacing Channeliz Devie	g of zing ces	Minimum Sign Spacing "X"	Suggested Longitudinal Buffer Space
L ^		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	"B"
30	2	150'	165'	180'	30'	60'	120'	90'
35	$L = \frac{WS^2}{60}$	205'	225'	245'	35'	70'	160'	120'
40	00	265'	295'	320'	40'	80'	240'	155'
45		450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55	L-WS	550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	4 10'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Taper lengths have been rounded off.

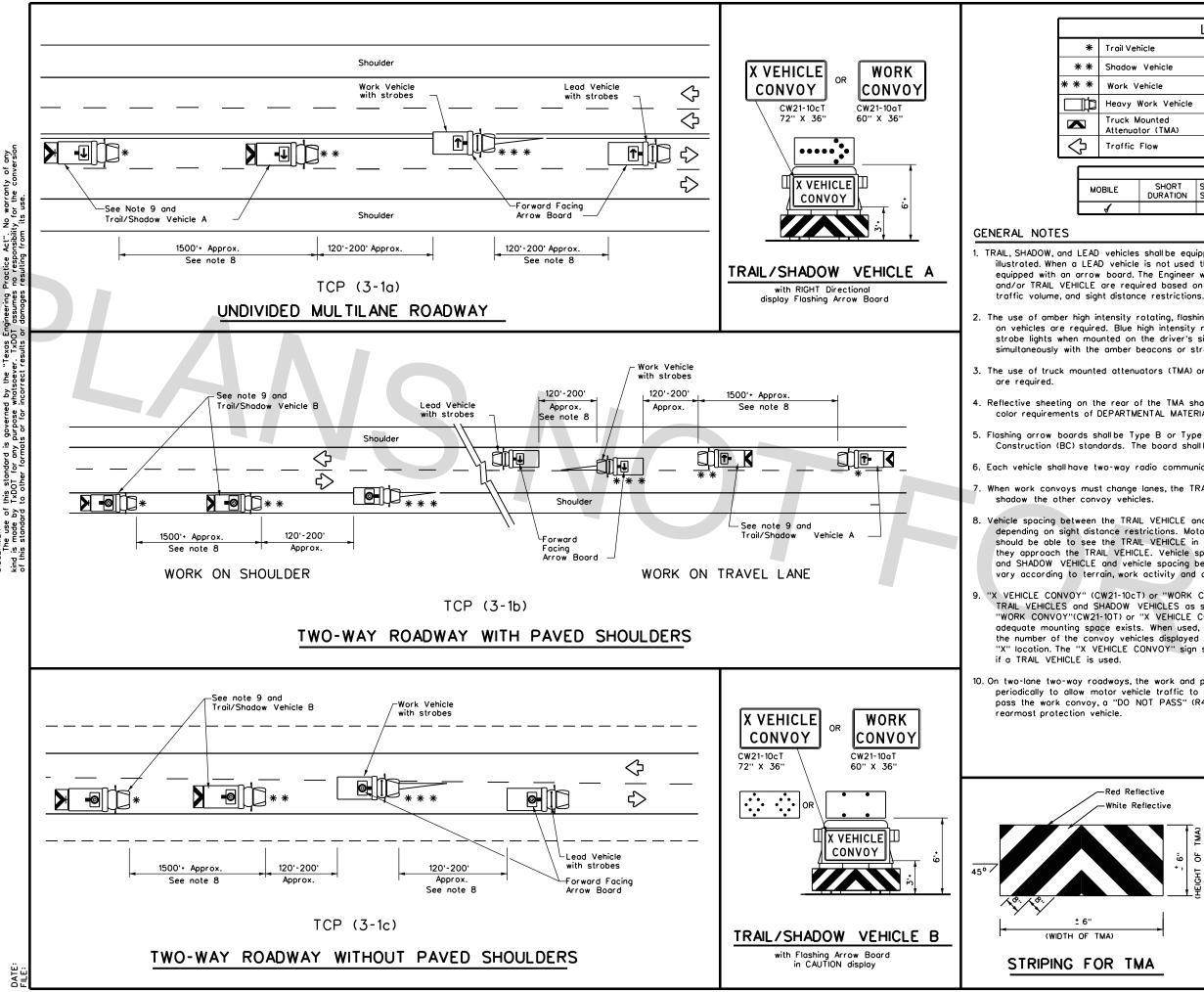
L-Length of Taper(FT) W-Width of Offset(FT) S-Posted Speed(MPH)

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

GENERAL NOTES

Flags attached to signs where shown, are REQUIRED. . All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards. Channelizing devices used along the work space or along tangent sections may be supplemented with vertical panels (VP) placed on everyother channelizing device. If night time conditions make it difficult to see at least two VPs, the VPs may be placed on each channelizing device. The placement of pavement markings may be omitted on Intermediate-ter stationary work zones with the approval of the Engineer. Shadow Vehicle with TMA and high intensity rotating, flashing,oscillating or strobe lights. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space. Traffic Operations Division Standard * Texas Department of Transportation TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS TCP(2-6)-18

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REVISIONS 2-94 4-98	912	37	232		CS			
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166								



Practice no resp Engineering 1 001 assumes exas TxD(governe purpose CLAMER: The use of this standard is of d is made by TxDDT for any p this standard to other formats

LEGEND					
Trail Vehicle					
Shadow Vehicle	ARROW BOARD DISPLAY				
Work Vehicle	₽	RIGHT Directional			
Heavy Work Vehicle	F	LEFT Directional			
Truck Mounted Attenuator (TMA)	₽	Double Arrow			
Traffic Flow	0	CAUTION (Alternating Diamond or 4 Corner Flash)			
TYPICAL USAGE					

ILE	SHORT DURATION		INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY			
1							

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,

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

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.

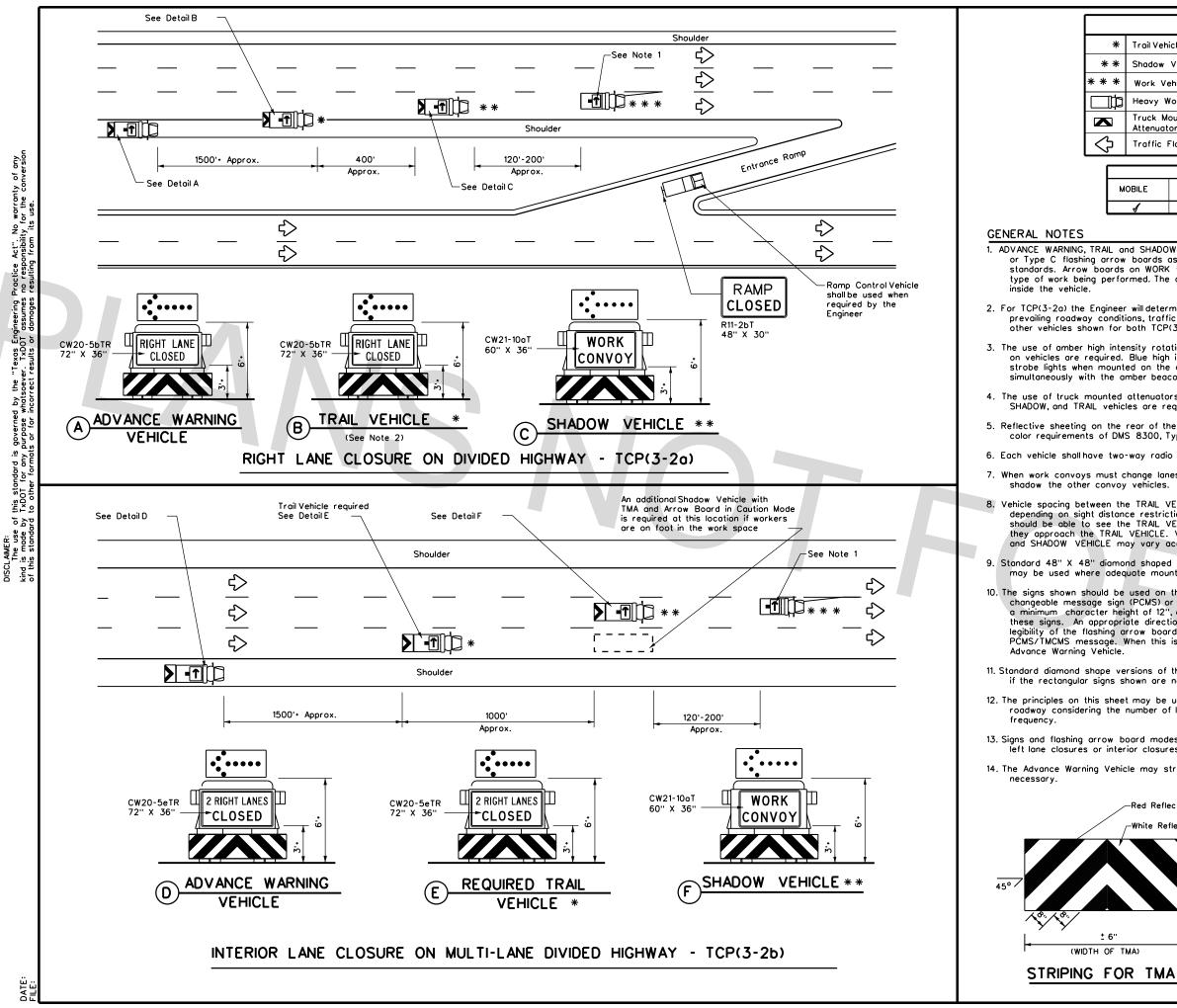
When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to

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

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

Red Reflective White Reflective	Texas Departme	ent of Trans	portation	Op D	Traffic erations Division tandard	
	MOBILE	TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS				
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A)	FILE: LCP3-1.dgn © TxDOT December 1985 REVISIONS	CP(3- DN: TXDOT	1) - 13 ск: Тхрот с јов	ow: TXDOT		
A) R TMA	FILE: tcp3-1.dgn © TxDOT December 1985	CP(3- DN: TXDOT CONT SECT	1) - 13 ск: Тхрот с јов	ow: TXDOT	HIGHWAY	



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- 12. The principles on this sheet roadway considering the r
- 13. Signs and flashing arrow bo left lane closures or interi
- 14. The Advance Warning Vehic

			LE	GEND			
*	Trail Vehicle						
*	Shadow Vehicle			ARROW BOARD DISPLAY		SPLAY	
*	Work V	ehicle		₽	RIGHT Directional		
þ	Heavy Work Vehicle			E.	LEFT Directional		
~		ick Mounted		€	Double Arrow		
	Attenuator (TMA)		• •	CAUTION (Alternating			
Traffic Flow				Diamond or 4 Co	rner Flash)		
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ed. unt	Blue high ed on the	intensity ro	tating le of	g, flashing the vehic	g, oscillating or cle may be operati	ed	
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	rear of th S 8300, 1		meet	or exce	ed the reflectivity	and	
wo	way radi	o communico	ation	capability			
	hange lar vehicles.		L VEI	HICLE sh	ould change lanes	first to	
an th AIL	ce restric e TRAIL \ VEHICLE.	tions. Motor: /EHICLE in ti Vehicle spo	ists o ime t icing	opproachi o slow d between	VEHICLE will vary ing the work convo- lown and/or change the WORK VEHICLE activity and other	é lanes as E	
		d warning sig Inting space			ame message as t	hose shown	
ign hei pri g a	(PCMS) of ght of 12' ate direct rrow boa	or a truck m , and display tional arrow o rd, must be	ounte ring tl displa used	d change he same y, simulat in the se	icle. As an option, eable message sign legend may be su- ting the size and econd phase of the will not be required	(TMCMS) with bstituted for	
		the CW20-5 not available		es signs	may be used as a	an option	
					the left side of t at distance,and ram		
		es shallbe a es which clo			ltered when implen nes.	nenting	
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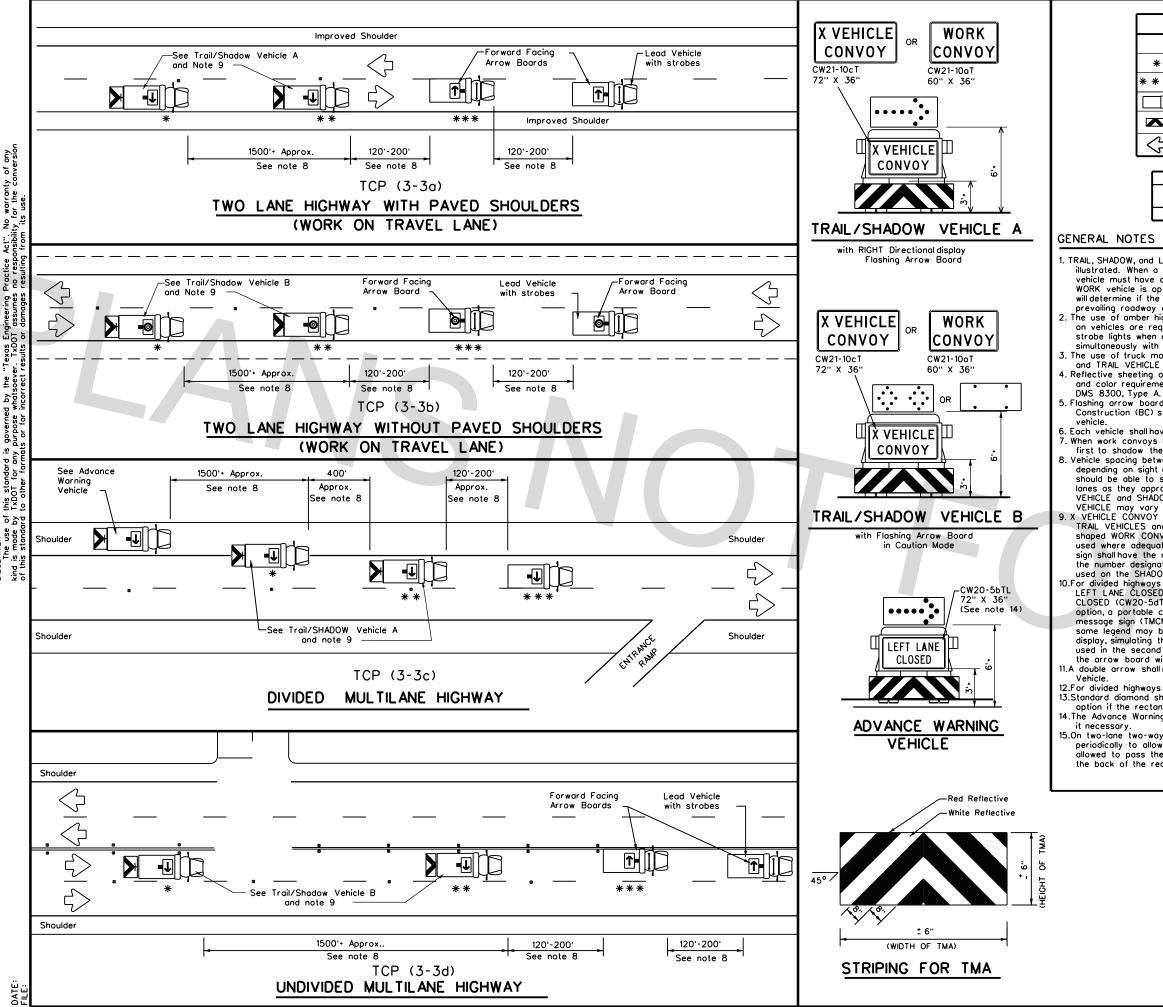
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SHEET NO.

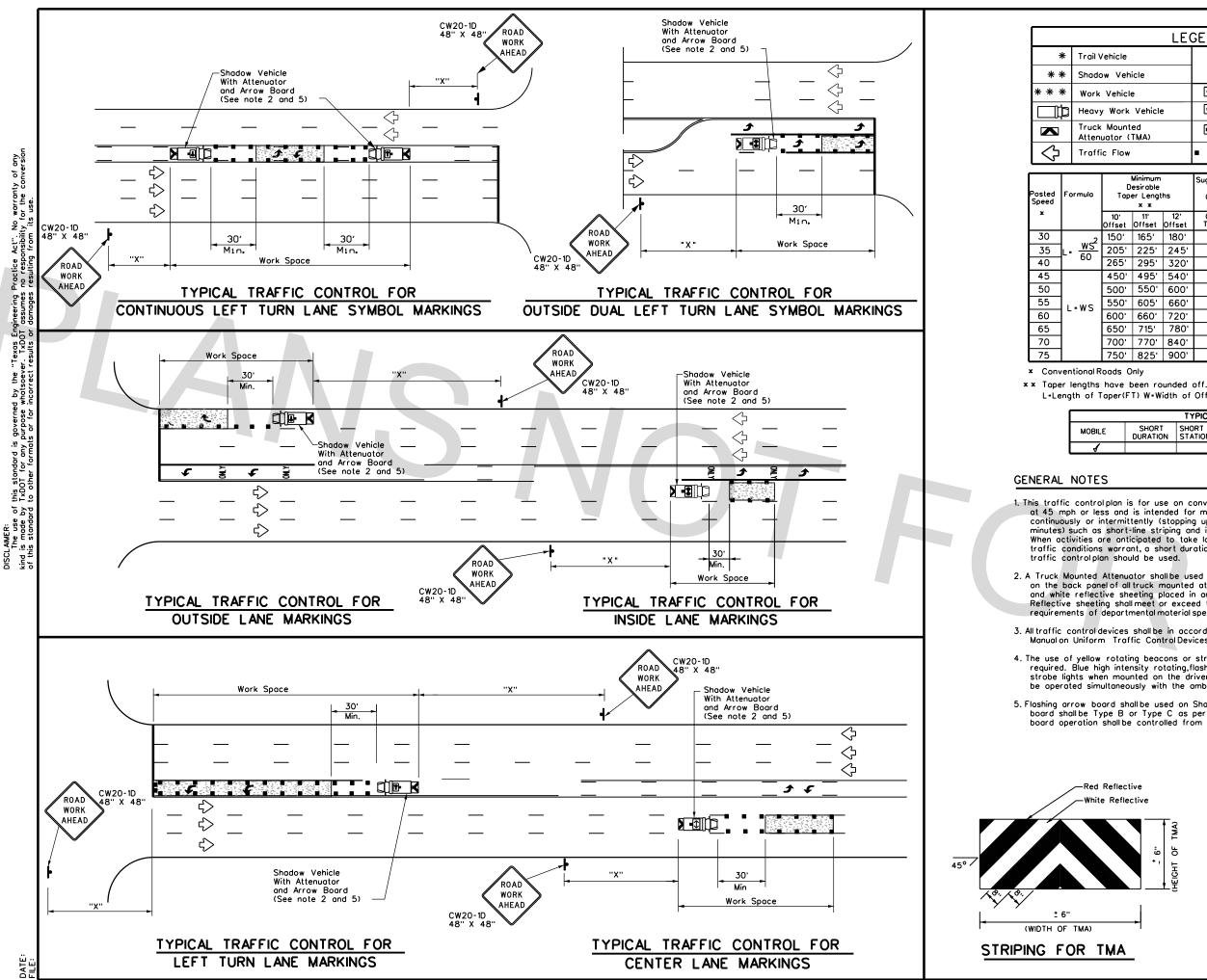


LEGEND						
*	Trail Vehicle		ARROW BOARD DISPLAY			
* *	Shadow Vehicle		ARROW BOARD DISPLAT			
* * *	Work Vehicle	₽	RIGHT Directional			
Цþ	Heavy Work Vehicle	E	LEFT Directional			
	Truck Mounted Attenuator (TMA)	₽	Double Arrow			
\diamondsuit	Traffic Flow	9	CAUTION (Alternating Diamond or 4 Corner Flash)			

TYPICAL USAGE								
MOBILE			INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY				
4								

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

Texas Department of Transportat	Traffic Operations Division Standard
TRAFFIC CONTROL MOBILE OPERATIO RAISED PAVEME MARKER INSTALLAT	DNS NT
REMOVAL TCP(3-3)-14	
	DOT DW:TXDOT CK: TXDOT
TCP(3-3)-14	DOT DW: TXDOT CK: TXDOT OB HIGHWAY
TCP(3-3)-14 FILE: tcp3-3.dgn DN: TXDOT ckr: TXI © TxDOT September 1987 CONT Sect JU REVISIONS 912 37 2	
TCP(3-3)-14 FILE: tcp3-3.dgn DN: TXDOT ck: TXI © TXDOT September 1987 ONI SECT JU 2-94 4-98 912 37 2	OB HIGHWAY
TCP(3-3)-14 FILE: tcp3-3.dgn DN: TXDOT cx: TXI © TxDOT September 1987 CONT SECT JJ REVISIONS 912 37 2 8-95 7-13 DIST CON	0B HIGHWAY 32 CS



LEGEND						
	ARROW BOARD DISPLAY					
	ARROW BOARD DISPERT					
∎ ∎	RIGHT Directional					
- 1	LEFT Directional					
¥	Double Arrow					
	Channelizing Devices					

D	Minimum esirable er Lengt * *	hs	Suggested Spacing Channeliz Devic	g of zing	Minimum Sign Spacing "X"	Suggested Longitudinal Buffer Space	
10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	"B ⁱ "	
150'	165'	180'	30'	60'	120'	90'	
205'	225'	245'	35'	70'	160'	120'	
265'	295'	320'	40'	80'	240'	155'	
450'	495'	540'	45'	90'	320'	195'	
500'	550'	600'	50'	100'	400'	240'	
550'	605'	660'	55'	110'	500'	295'	
600'	660'	720'	60'	120'	600'	350'	
650'	715'	780'	65'	130'	700'	4 10'	
700'	770'	840'	70'	140'	800'	475'	
750'	825'	900'	75'	150'	900'	540'	

L-Length of Taper(FT) W-Width of Offset(FT) S-Posted Speed(MPH)

TYPICAL USAGE							
LE	SHORT DURATION		INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY			
,							

 This traffic control plan is for use on conventional roads posted at 45 mph or less and is intended for mobile operations that move continuously or intermittently (stopping up to approximately 15 minutes) such as short-line striping and in-lane rumble strips. When activities are anticipated to take longer amounts of time or traffic conditions warrant, a short duration or short-term stationary traffic controlplan should be used.

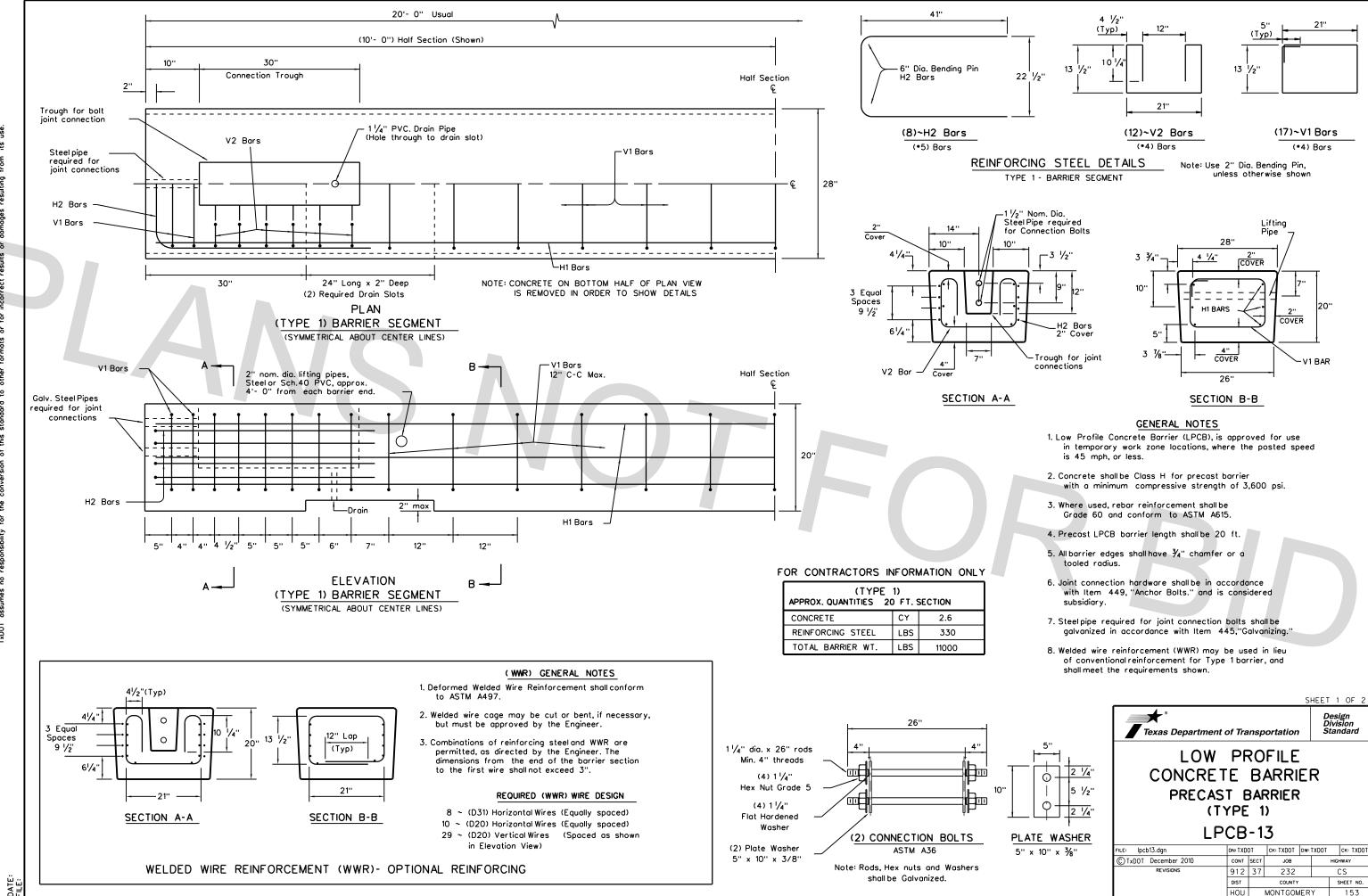
2. A Truck Mounted Attenuator shall be used on Shadow Vehicle. Striping on the back panel of all truck mounted attenuators shall be 8" red and white reflective sheeting placed in an inverted "V" design. Reflective sheeting shall meet or exceed the reflectivity and color requirements of departmental material specification DMS-8300, Type A.

All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.

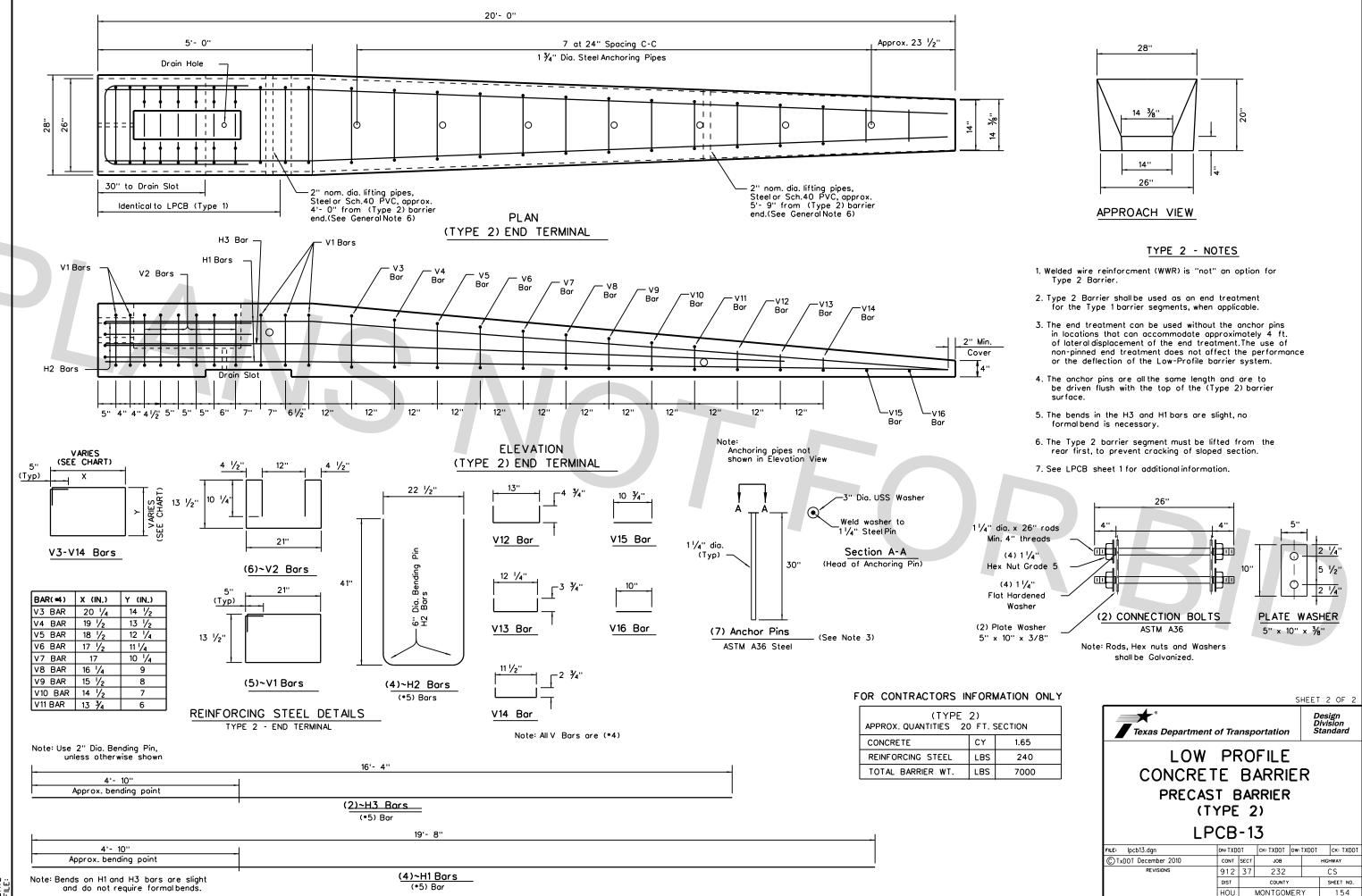
4. The use of yellow rotating beacons or strobe lights on vehicles are required. Blue high intensity rotating,flashing, oscillating or strobe lights when mounted on the drivers side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.

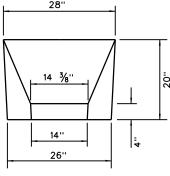
5. Flashing arrow board shall be used on Shadow Vehicle. Flashing arrow board shall be Type B or Type C as per BC Standards. The arrow board operation shall be controlled from inside the truck.

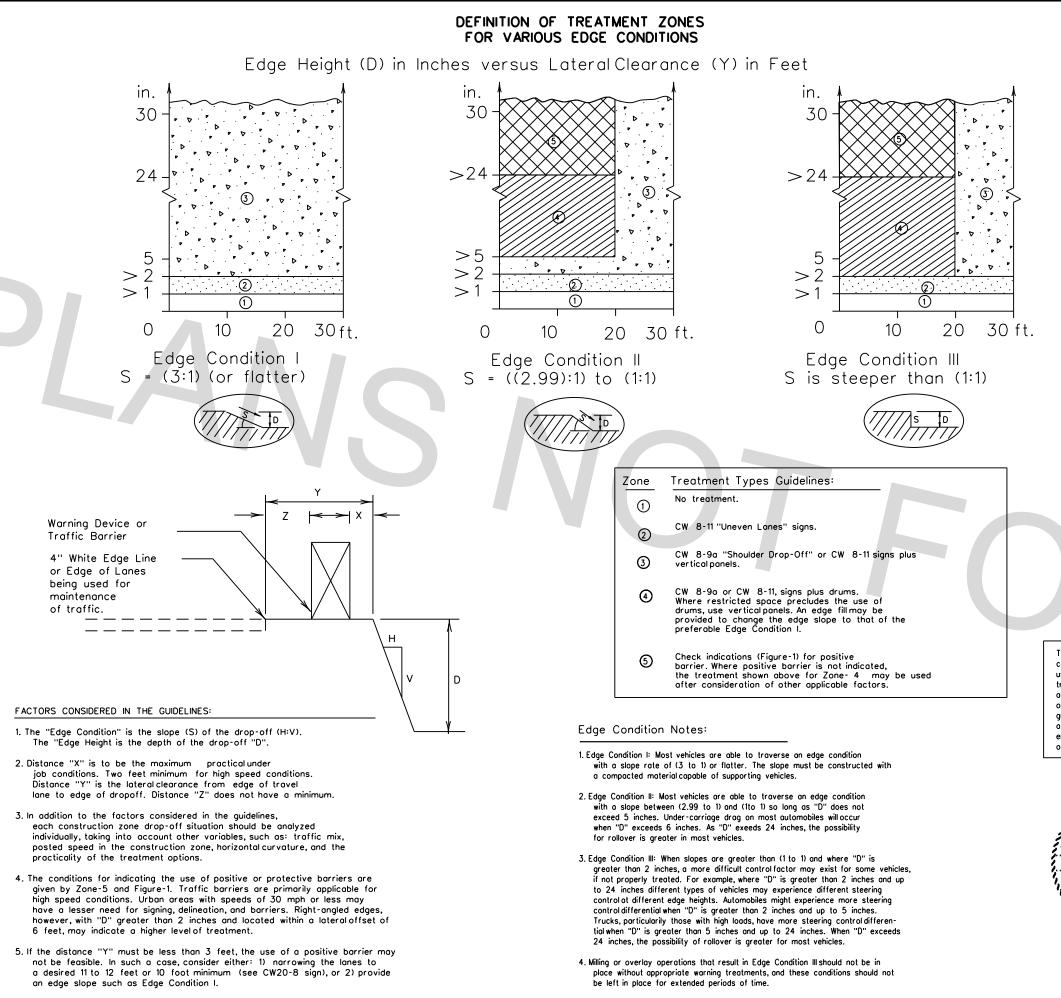
Reflective e Reflective	Texas Department of Tra	nsportation	Op D	Traffic erations Division tandard
6 "	TRAFFIC CONT MOBILE OPERA	TIONS	FOR	
(HEIGHT	ISOLATED WO UNDIVIDED H			
	UNDIVIDED H		rs	
	UNDIVIDED H	IGHWAY 3-4)-1	rs	Ск: ТХДОТ
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		IGHWAY 3 - 4) - 1	(S 3 DW:TXDOT	
	UNDIVIDED HI TCP(3 FILE: tcp3-4.dgn DN: TXDC © TxDOT July, 2013 CONT	IGHWAY 3 - 4) - 1 ot ck: 1x001 sect job	rs 3 Dw:TXDOT	HIGHWAY



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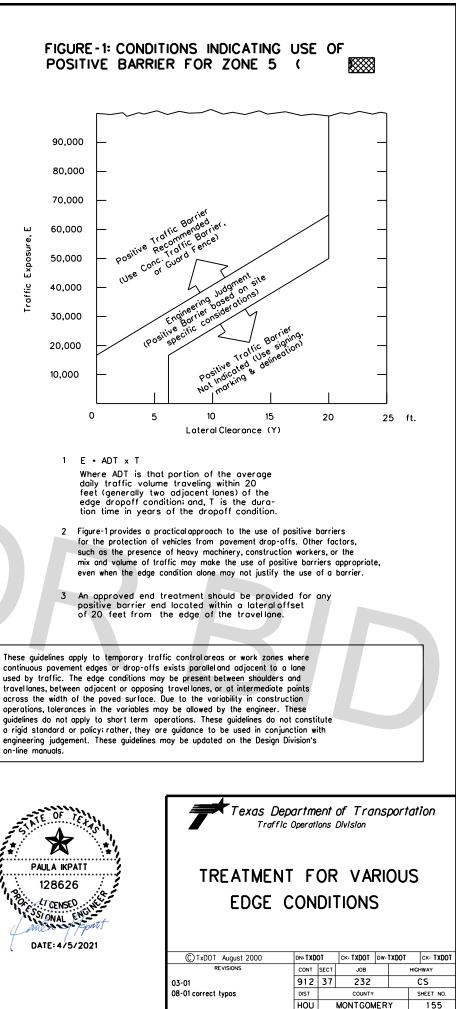


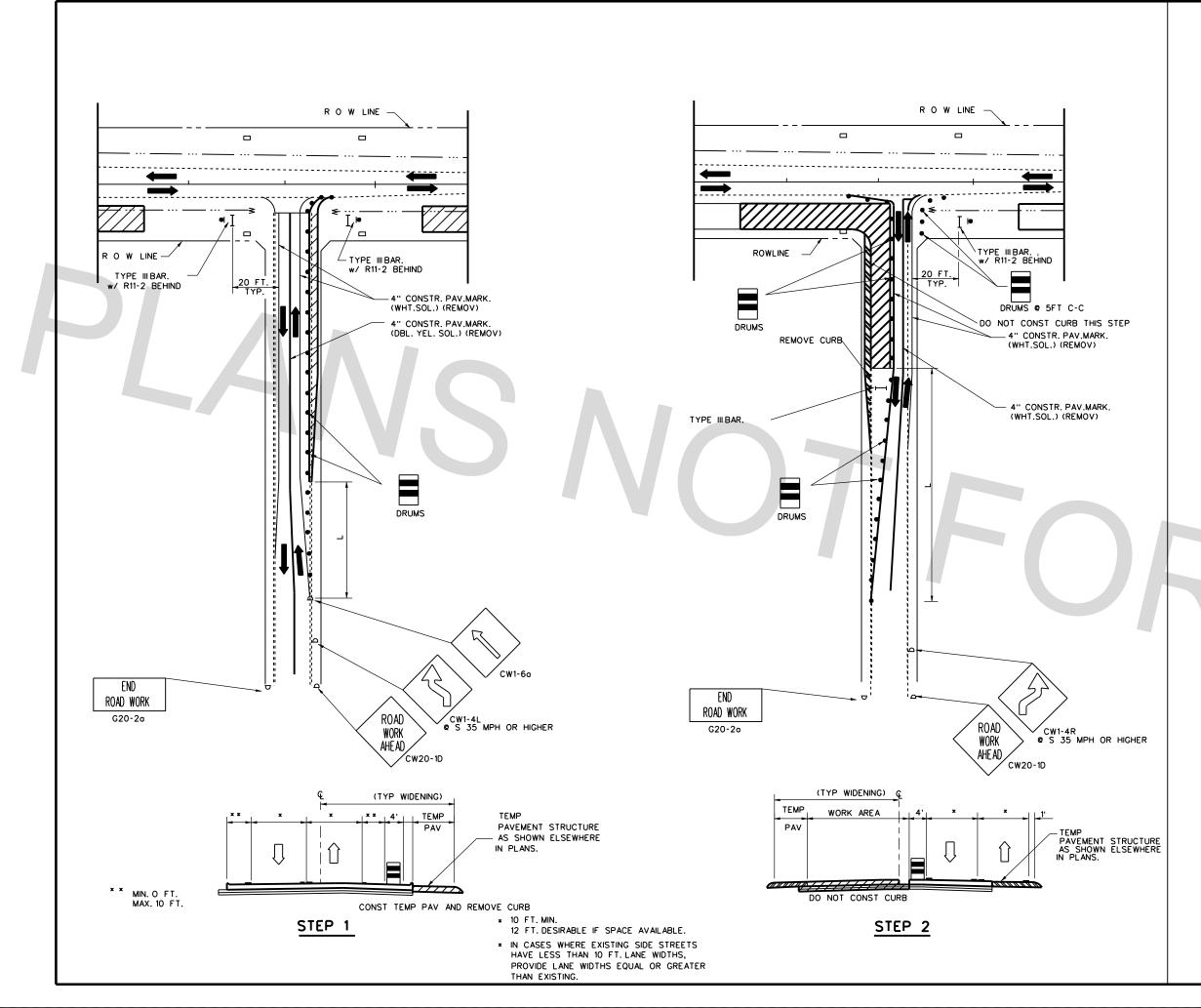
governed by the "Texas Engineering Practice Act". No warranty of any for any purpose watestover. TADTO assumes no responsibility for the con-other fromdis or for incorrect results or domoges resulting from its use. of this standard is is made by TxDOT of this standard to kind sion Å,

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TYPICAL ADVANCE SIGNING TO REMAIN PLACE DURING ALL PHASES OR AS DIRECTED BY ENGINEER



CONSTRUCTION WARNING SIGN SPACING

POSTED SPEED (MPH)	"X" SIGN SPACINGS (FEET)
30 OR LESS	120
35	160
40	240
45	320
50	400
55	500
60	600
65	700
70	800

TYPICAL TRANSITION LENGTHS AND

SUGGESTED MAXIMUM SPACING OF DEVICES

			WINIMUM DESIRABLE TAPER LENGTHS⊛⊛			STED MAX. F DEVICE	MINIMUM SIGN SPACING
POSTED SPEED	FORMULA	10' OFFSET	11' OFFSET	12' OFFSET	ON A TAPER	ON A TANGENT	DISTANCE
30		150 [.]	165'	180 [.]	30 [.]	60'-75'	120'
35	L• <u>WS</u> ²	205 [.]	225'	245'	35'	70'-90'	160'
40		265'	295 [.]	320'	40'	80'-100'	240'
45		450'	495'	540'	45'	90'-110'	320'
50		500 [.]	550 [.]	600 [.]	50 [.]	100'-125'	400'
55	L-WS	550'	605 [.]	660 [.]	55'	110'-140'	500'
60		600 [.]	660'	720'	60 [.]	120'-150'	€600'
65		650'	715'	780'	65'	130'-165'	⊙700 [.]
70		700 [.]	770'	840'	70'	140'-175'	€800'

CONVENTIONAL ROADS ONLY

€ € TAPER LENGTHS HAVE BEEN ROUNDED OFF.

LEGEND

- CONSTRUCTION AREA
- TEMPORARY PAVEMENT
- OPEN TO TRAFFIC

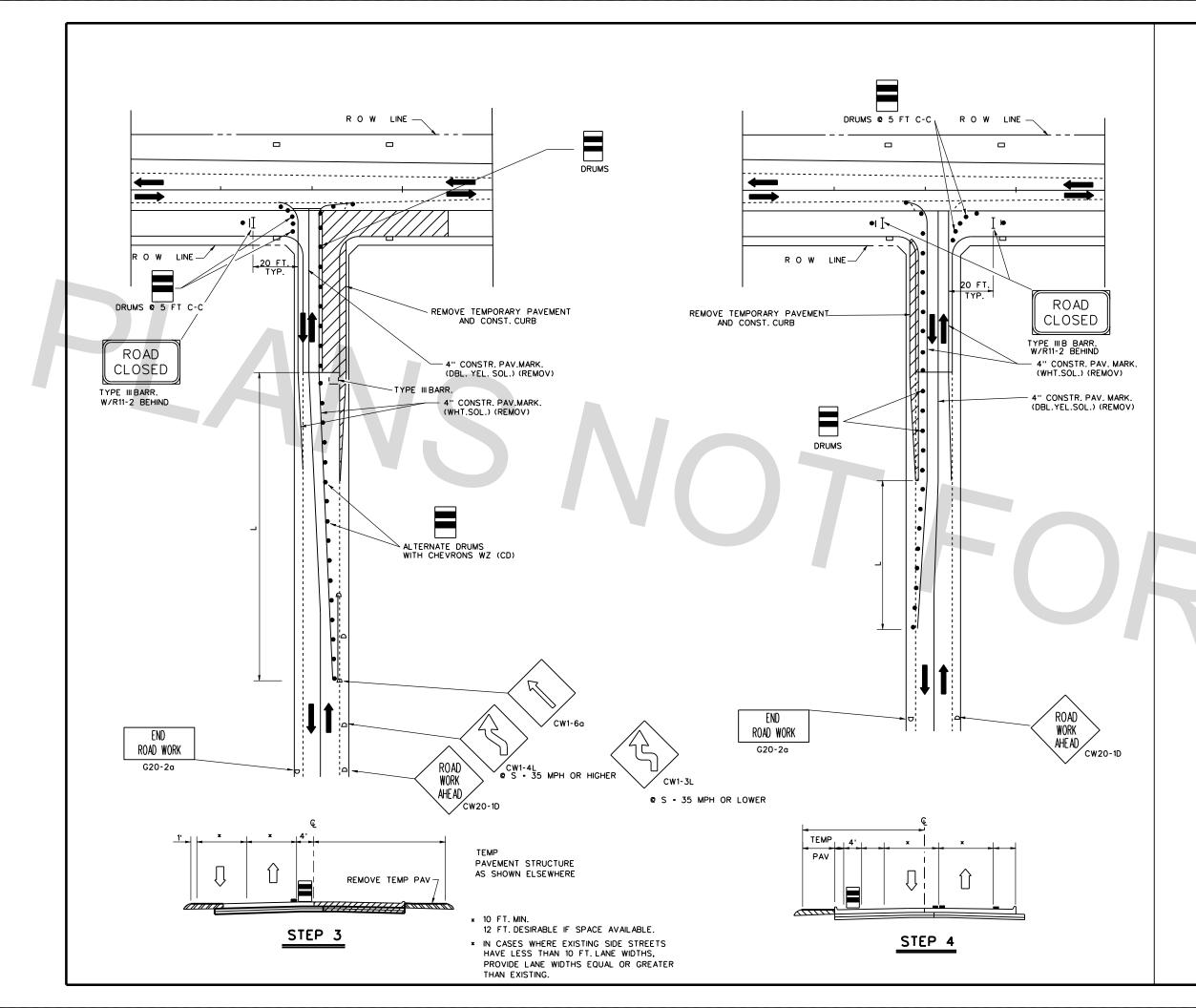
SHEET 1 OF 2

Texas Department of TransportationHouston District

TWO WAY ROADWAY INTERSECTION PHASING

TWRIP(1) TC2010-09

FILE:	DN:TXD	от	CK: TXDOT	DW:	TXDOT	CK: TXDOT	
© TxDOT OCT 2009	CONT	SECT	JOB		HIGHWAY		⊿
REVISIONS	912	37	232			CS	ŝ
	DIST		COUNTY	(s	HEET NO.	
	HOU		MONTGO	<i>I</i> FR	Y	156	Ε.



TYPICAL ADVANCE SIGNING TO REMAIN PLACE DURING ALL PHASES OR AS DIRECTED BY ENGINEER

END ROAD WORK G20-2a

ROAD WORK AHEAD CW20-1D

CONSTRUCTION WARNING SIGN SPACING

POSTED SPEED (MPH)	"X" SIGN SPACINGS (FEET)
30 OR LESS	120
35	160
40	240
45	320
50	400
55	500
60	600
65	700
70	800

TYPICAL TRANSITION LENGTHS AND SUGGESTED MAXIMUM SPACING OF DEVICES

				SIRABLE SUGGESTED MAX. NGTHS ● ● SPAC. OF DEVICE		MINIMUM SIGN SPACING	
POSTED SPEED	FORMULA	10' OFFSET	11' OFFSET	12' OFFSET	ON A TAPER	ON A TANGENT	DISTANCE
30		150'	165'	180'	30'	60'-75'	120'
35	L• <u>₩S</u> ² 60	205 [.]	225 [.]	245'	35'	70'-90'	160'
40		265'	295'	320'	40'	80'-100'	240'
45		450'	495'	540'	45'	90'-110'	320'
50		500'	550 [.]	600'	50'	100'-125'	400'
55	L•WS	550'	605'	660'	55'	110'-140'	500 [.]
60		600 [.]	660'	720'	60 [.]	120'-150'	€)600'
65		650'	715'	780'	65'	130'-165'	⊙700 [,]
70		700 [.]	770'	840'	70'	140'-175'	€800'

CONVENTIONAL ROADS ONLY

€ € TAPER LENGTHS HAVE BEEN ROUNDED OFF.

LEGEND

CONSTRUCTION AREA

OPEN TO TRAFFIC

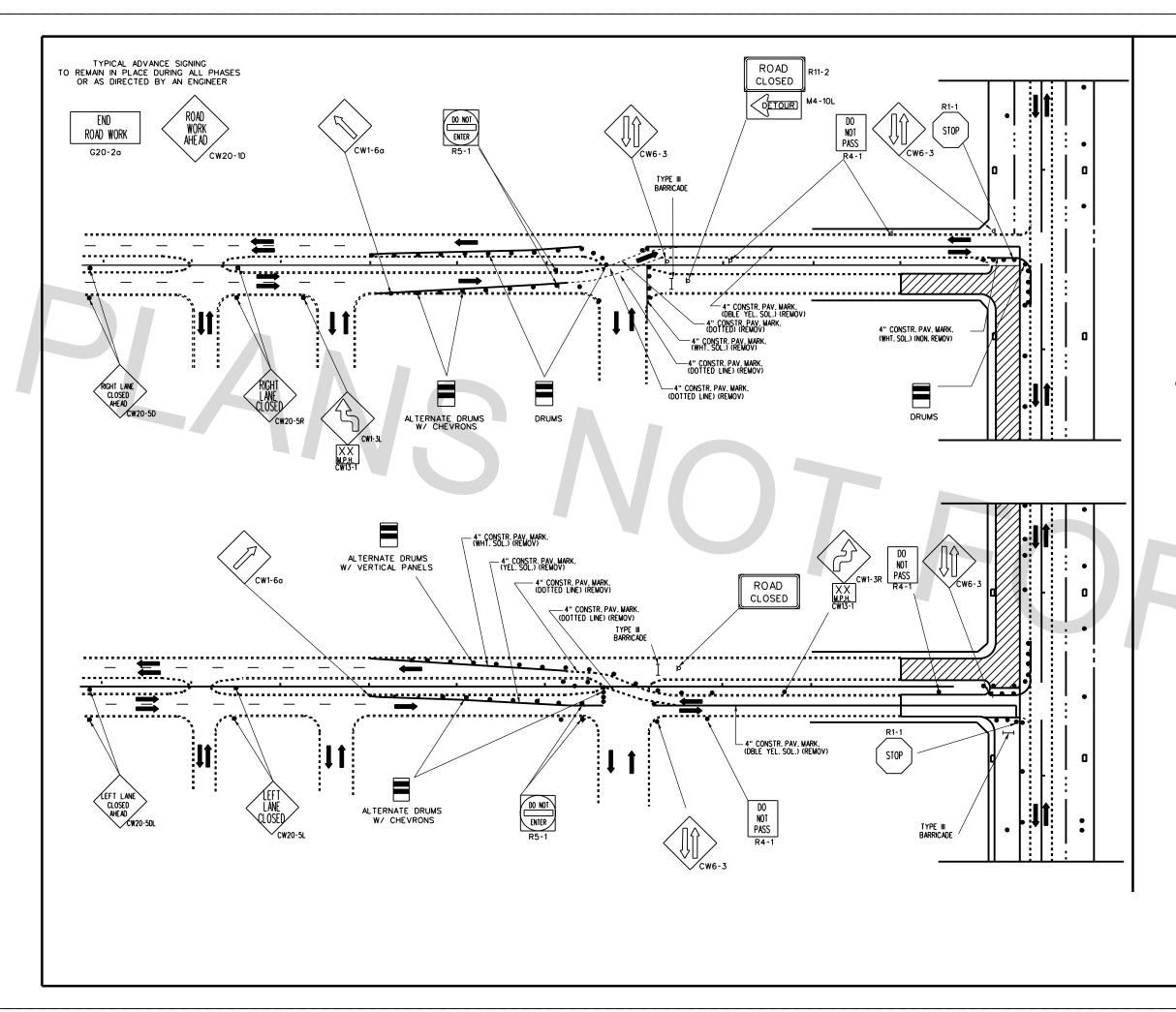
SHEET 2 OF 2

Texas Department of TransportationHouston District

TWO WAY ROADWAY INTERSECTION PHASING

TWRIP(2) TC2010-09

FILE:	DN: TXDO	T	CK: TXDOT	DW:	TXDOT	CK: TXDOT	
©⊺xDOT OCT 2009	CONT S	ЕСТ	JOB		HIG	HWAY	_
REVISIONS	912	37	232			cs	-5B
	DIST		COUNTY	ŕ	1	SHEET NO.	Т
	HOU		MONTGON	<i>I</i> ER	Y	157	STD



TYPICAL	TRANSITION	LENGTHS
	AND	

SUGGESTED MAXIMUM SPACING OF DEVICES

					SUGGE SPAC. 0	STED MAX.	MINIMUM SIGN SPACING
POSTED SPEED	FORMULA	10' OFFSET	11' OFFSET	12' OFFSET	ON A TAPER	ON A TANGENT	DISTANCE
30		150'	165'	180'	30'	60'-75'	120'
35	L• <u>WS</u> 2	205'	225'	245'	35'	70'-90'	160'
40		265'	295'	320'	40'	80'-100'	240'
45		450'	495'	540'	45'	90'-110'	320'
50		500 [.]	550'	600'	50'	100'-125'	400'
55	L•WS	550 [.]	605 [.]	660 [.]	55'	110'-140'	500'
60		600 [.]	660 [.]	720 [.]	60 [.]	120'-150'	€600'
65		650 [.]	715'	780'	65'	130'-165'	⊛700 [.]
70		700 [.]	770'	840'	70'	140'-175'	⊙800 '

CONVENTIONAL ROADS ONLY

* TAPER LENGTHS HAVE BEEN ROUNDED OFF.

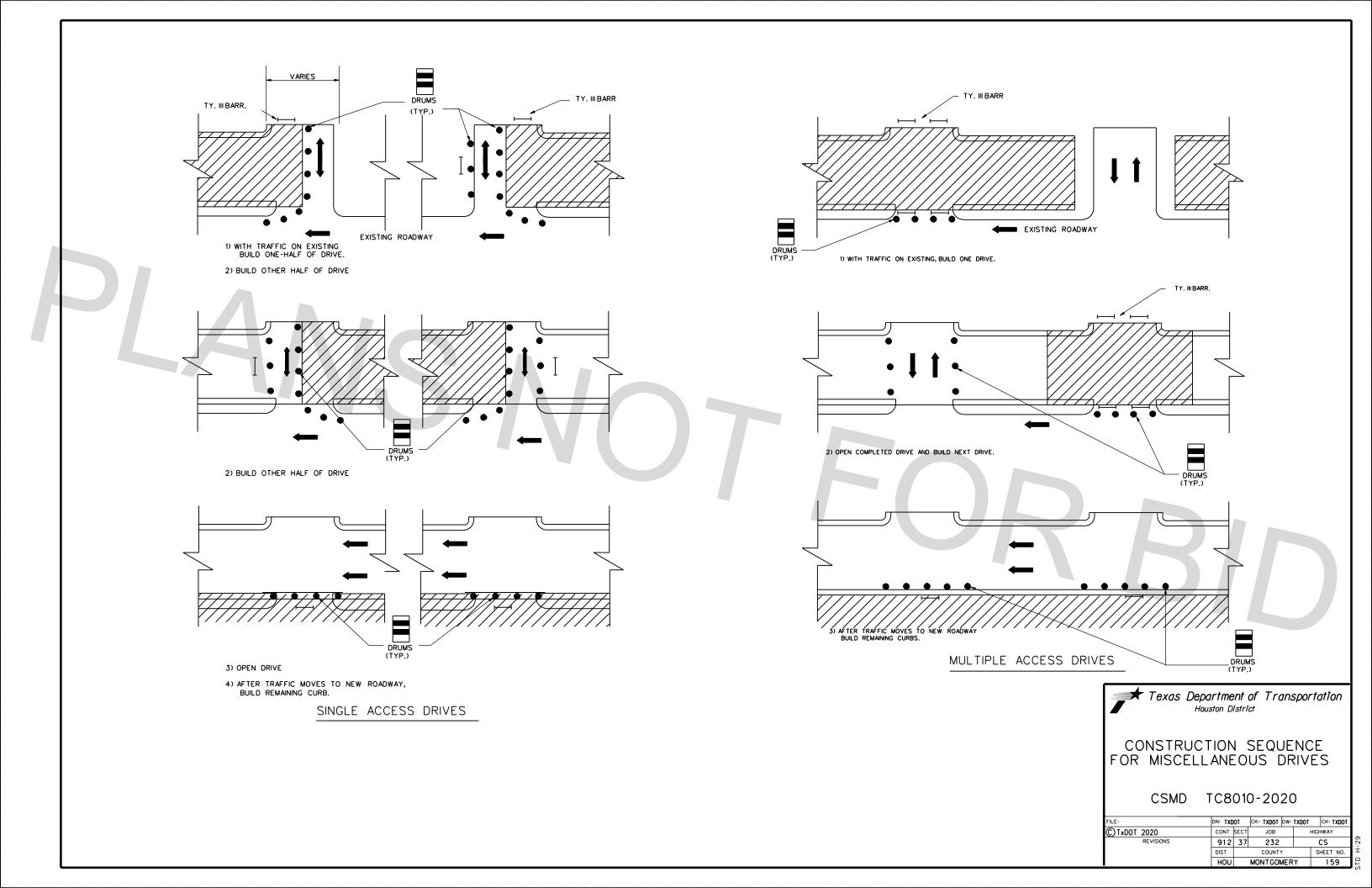
CONSTRUCTION WARNING

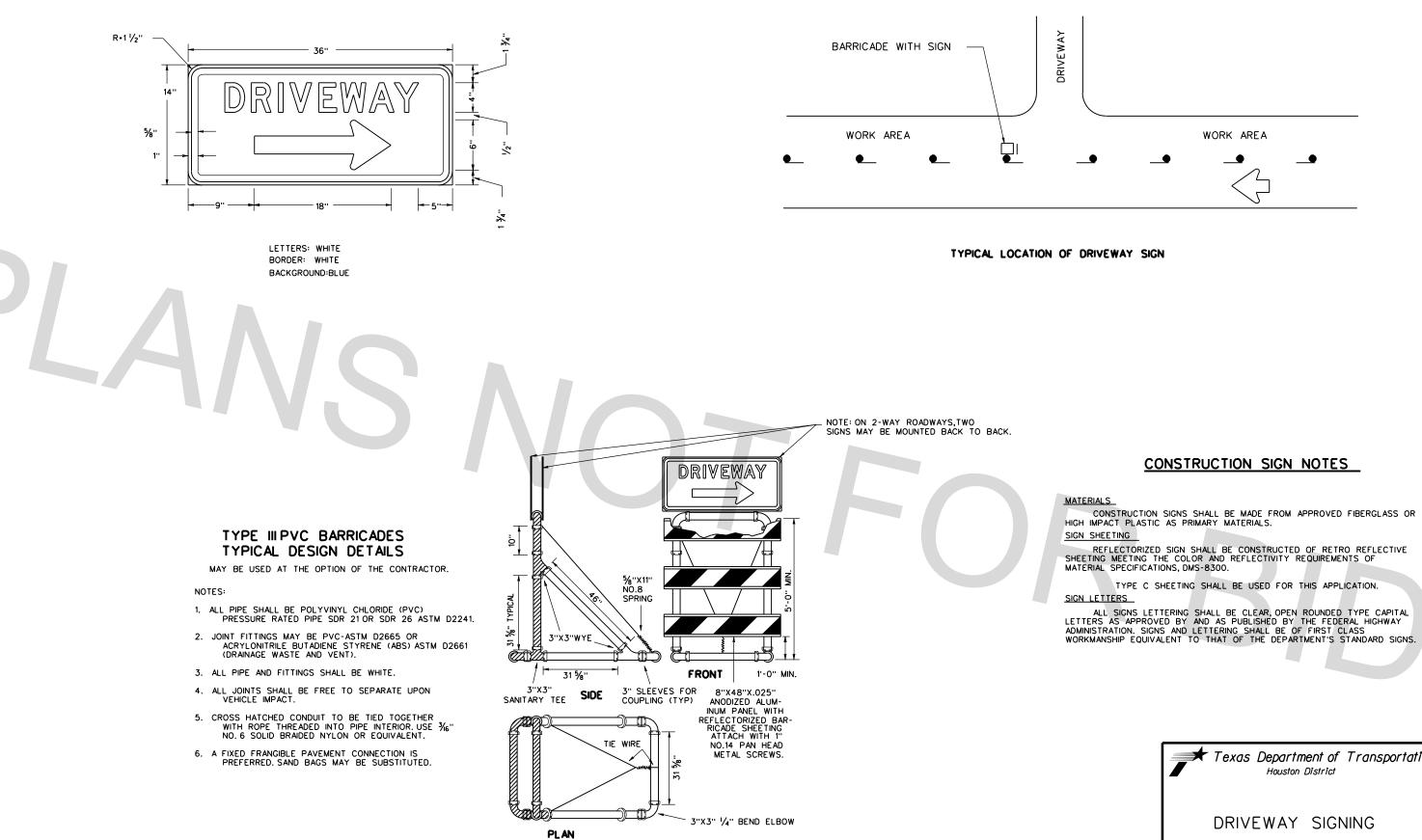
SIGN SF	ACING
POSTED SPEED (MPH)	"X" SIGN SPACINGS (FEET)
30 OR LESS	120
35	120
40	240
45	320
50	400
55	500
60	600
65	700
70	800

LEGEND

OPEN TO TRAFFIC

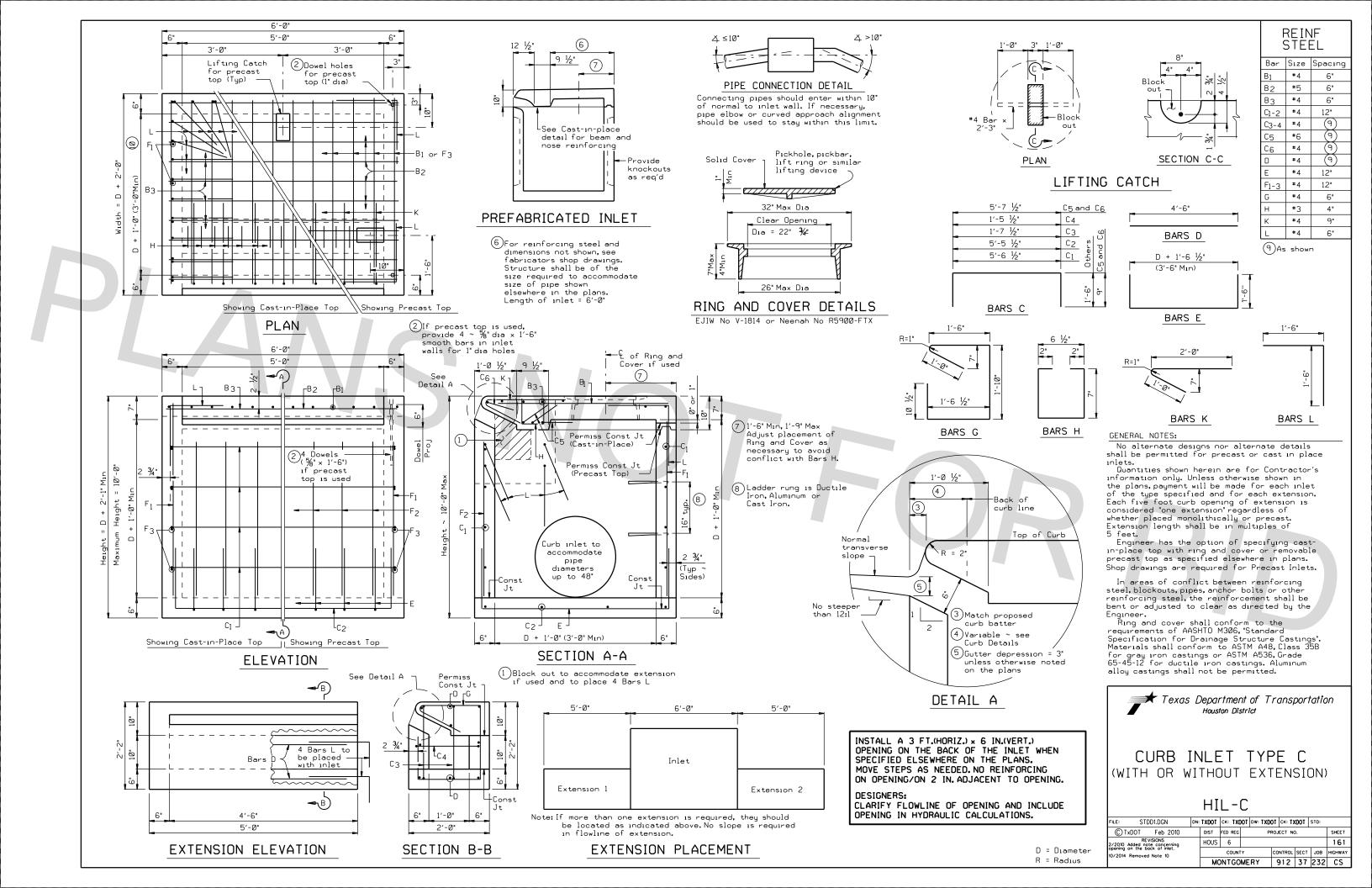
Texas Department of Transportation Houston District BOULEVARD CLOSURES TCPTC 3050-96 DNIXDOT CK:TXDOT DW:TXDOT CK: TXDO CTxDOT 2006 REVISIONS REV. 5/2006 CONT SECT JOB HIGHWAY 912 37 232 CS DIST COUNTY SHEET NO нои MONTGOMERY 158

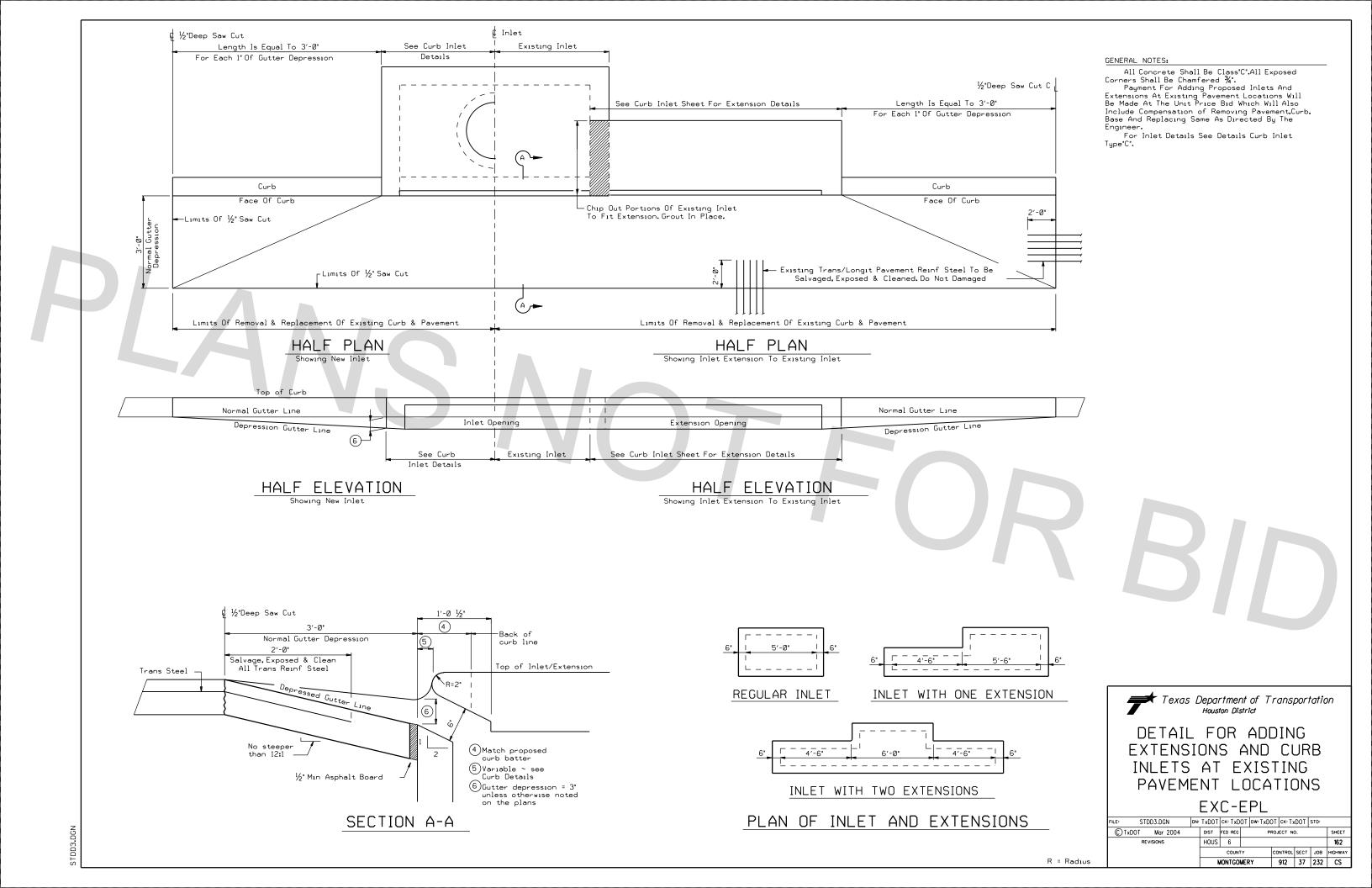


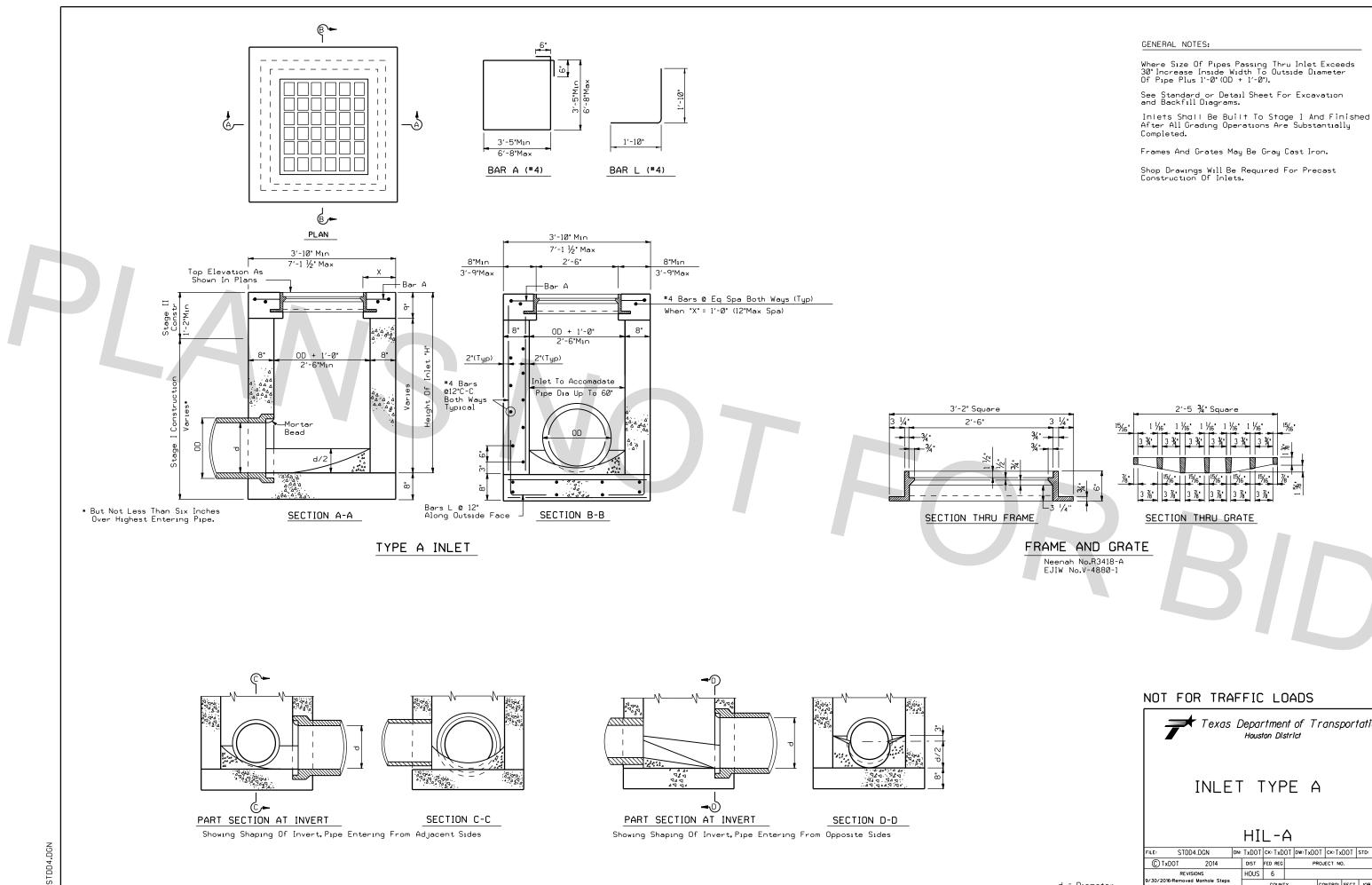


REFLECTORIZED SIGN SHALL BE CONSTRUCTED OF RETRO REFLECTIVE SHEETING MEETING THE COLOR AND REFLECTIVITY REQUIREMENTS OF

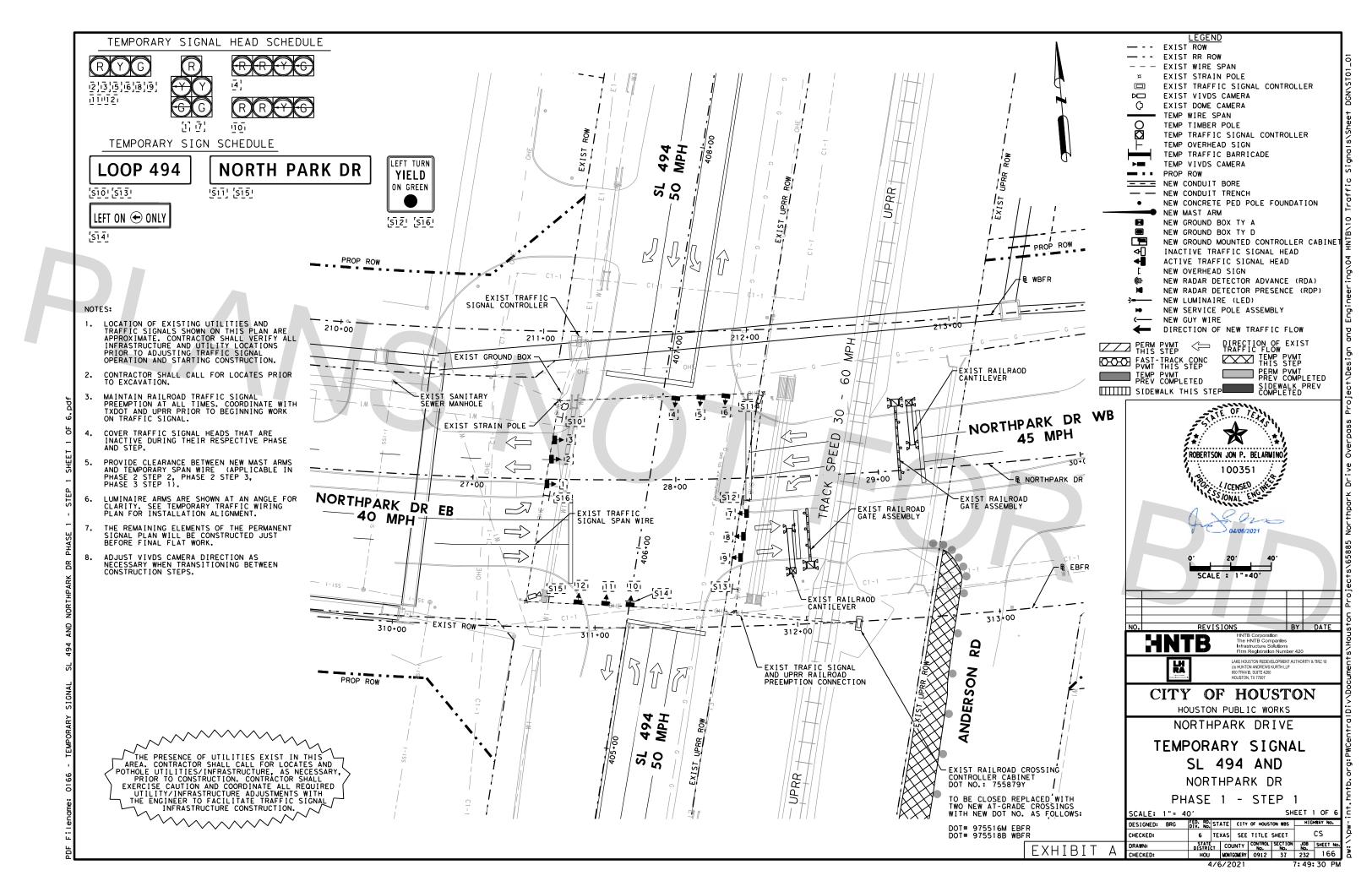
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REVISIONS	912	37	232		CS	H-30
	DIST		COUNTY		SHEET NO.	
	HOU		MONTGOM	ERY	160	STD

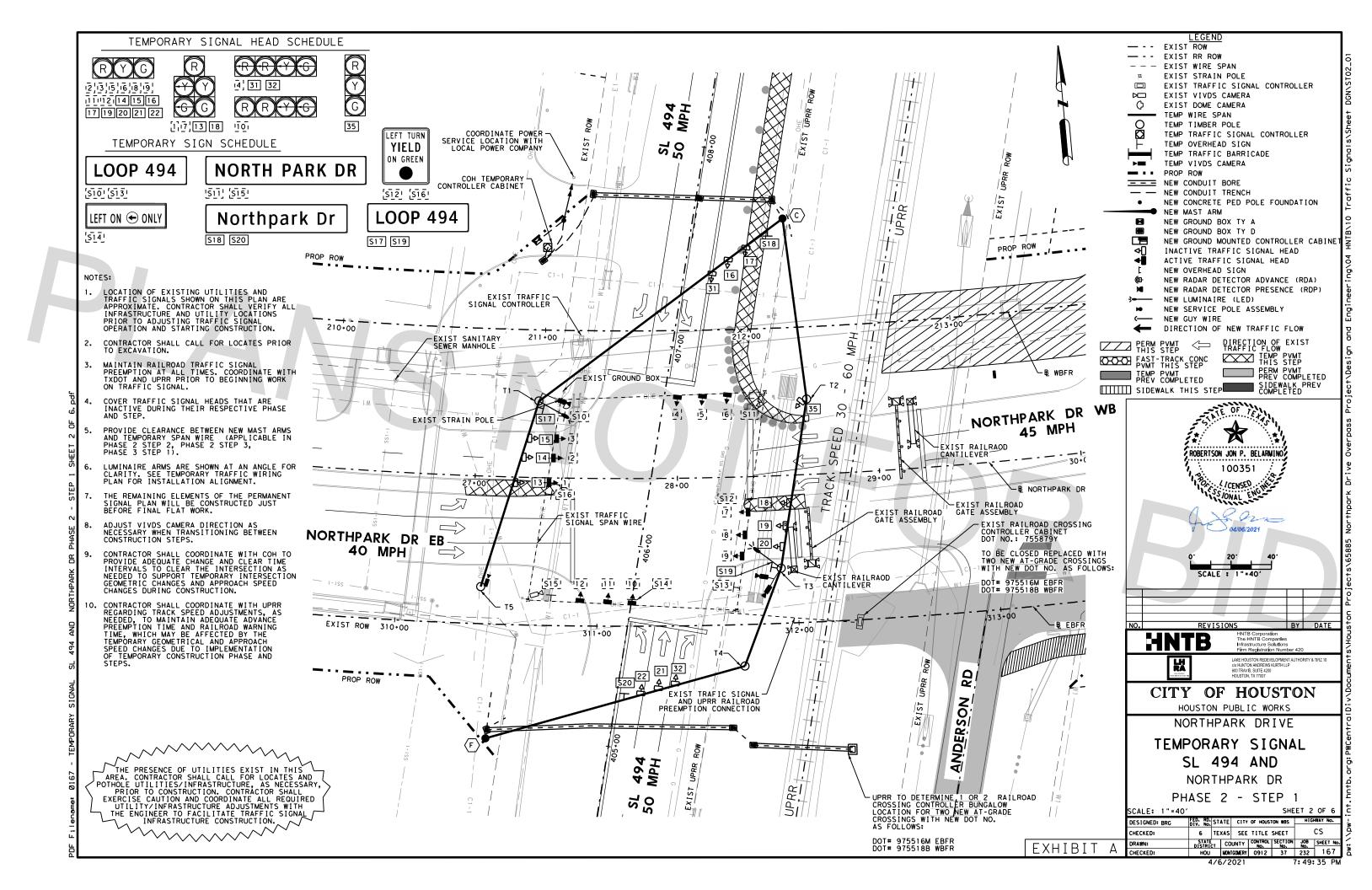


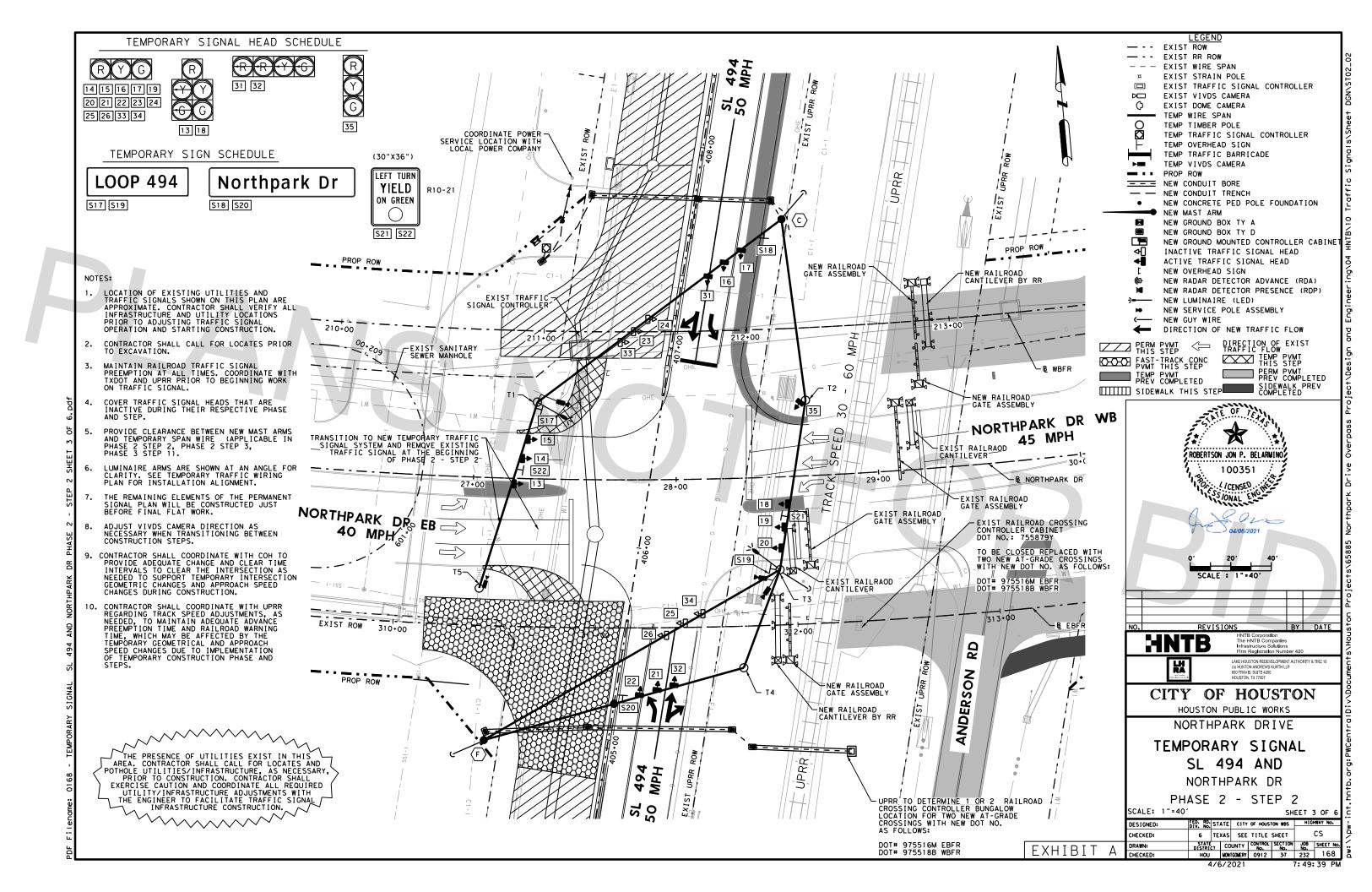


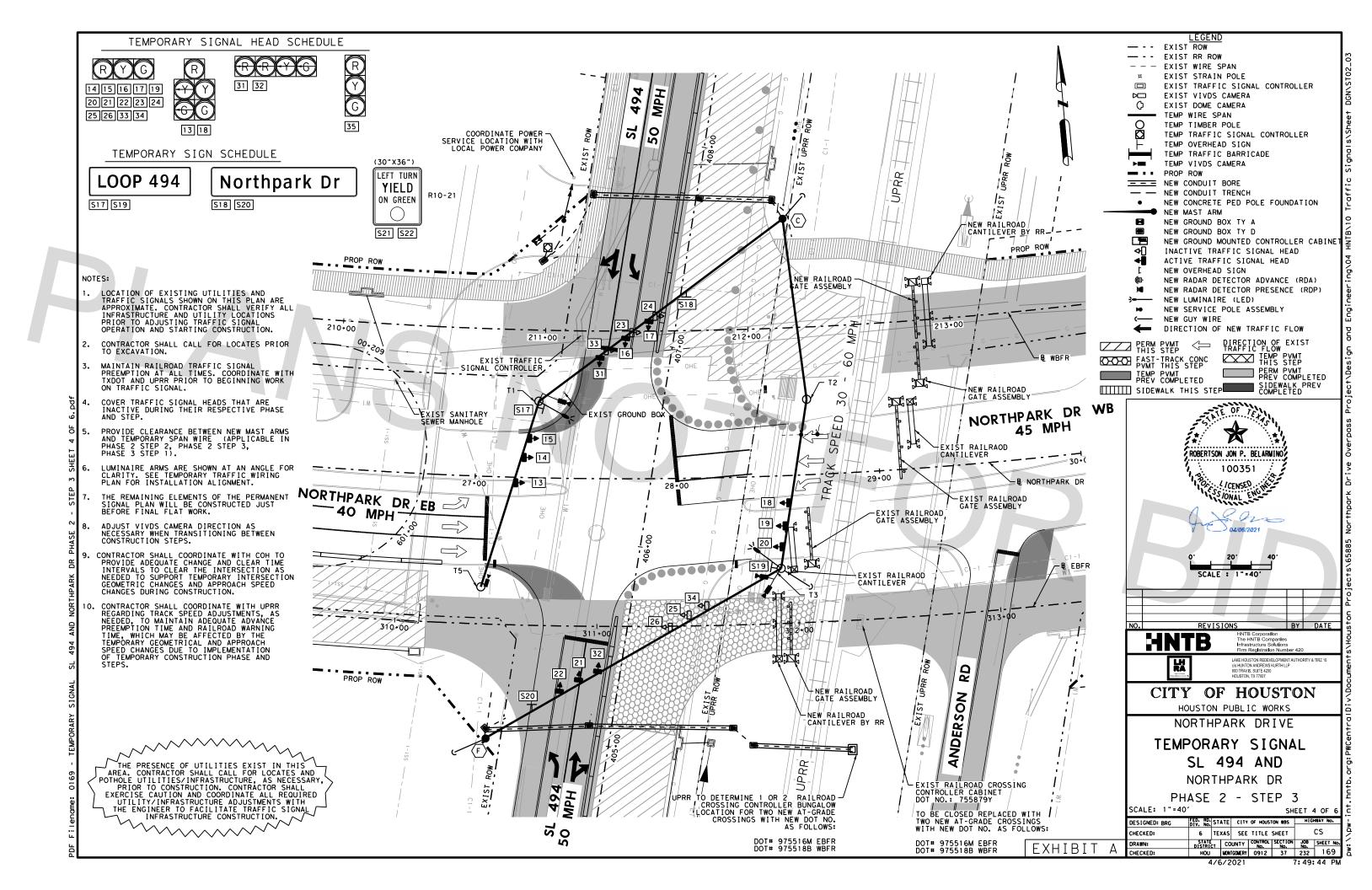


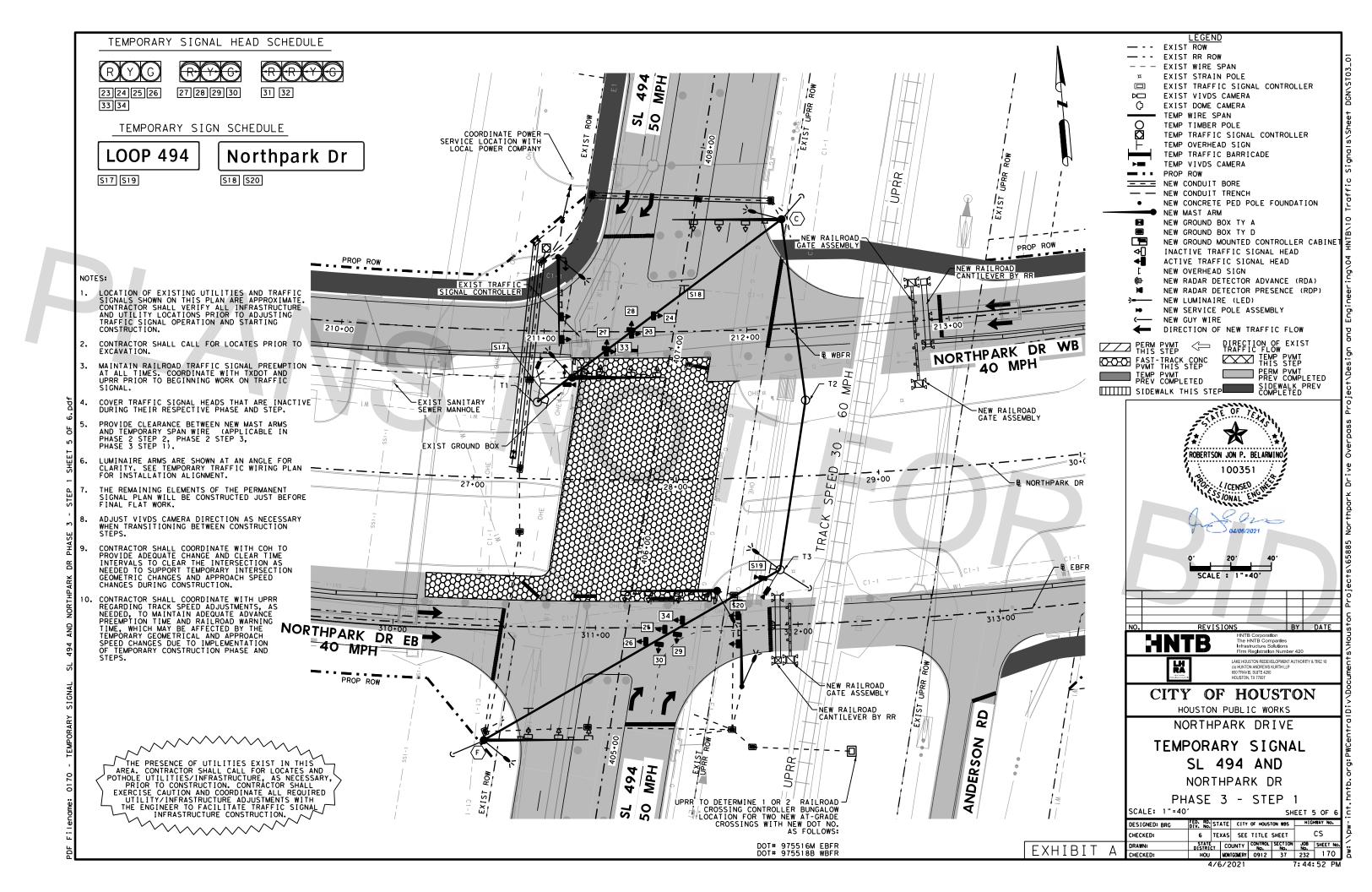
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© TxDOT 2014	DIST	FED REG		PROJECT N	э.		SHEET		
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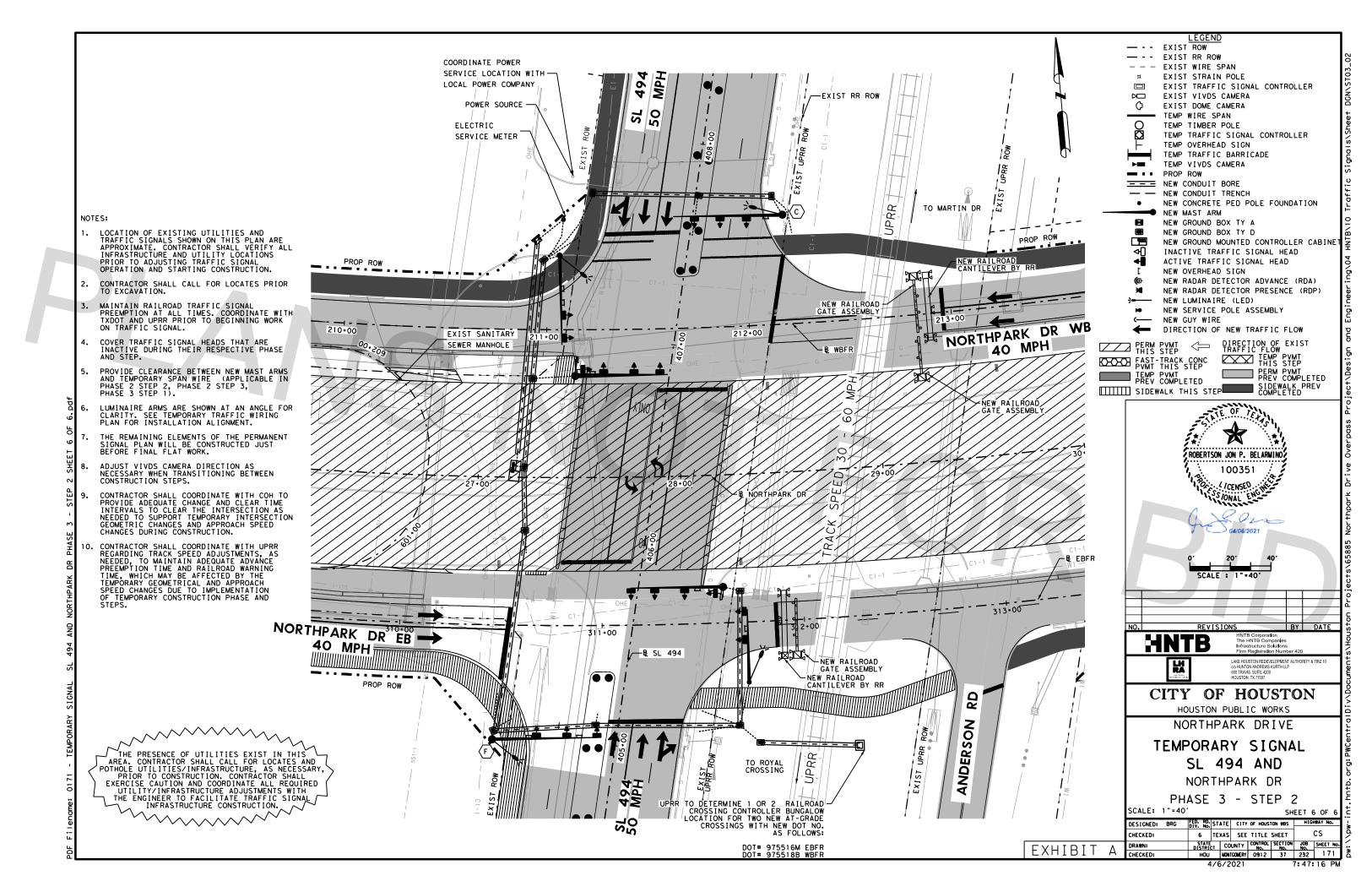


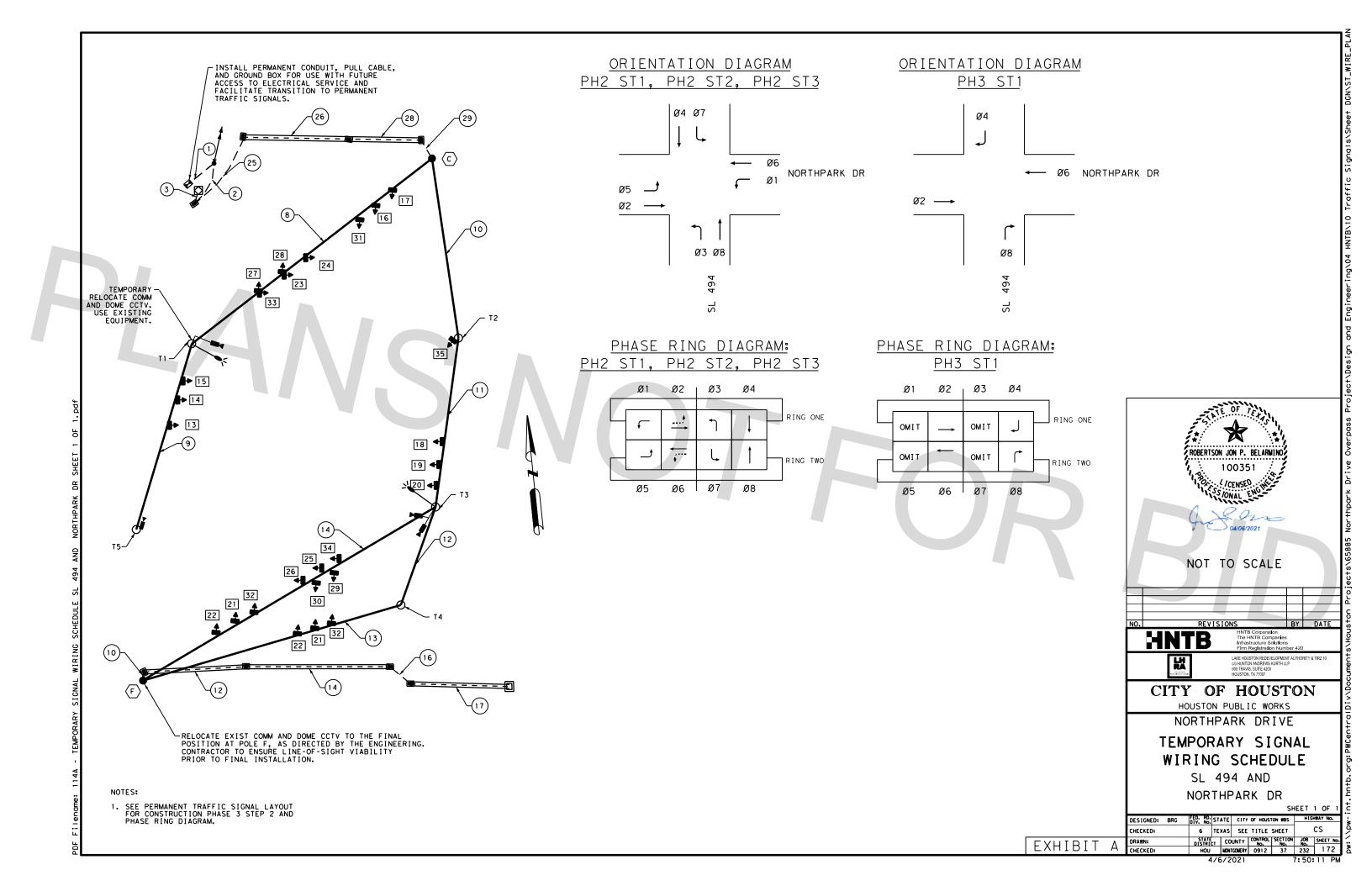












		1												TEN	MPORARY SI	GNAL	AERIAL	SP	AN, CONE	DUIT,	CABLE SC	HEDU	JLE										
						COND	UIT	(618))							PC	OWER			ILLU	MINATION	IN	DICATIONS		SPAN	IWIR	۶E		ΥI	VDS			СС
	RUN NO.						PVC	;							POWER		GRO	UND		LI	GHTING		SIGNAL		WIRE	STRA	ND		۷I	VDS		сст	v c
	KON NO.	HIGH VOLT LOW VOLT		(SCHD 80)		3" (SCHD	80)			4" (SC	CHD 8	30)		2-#6 AWG XHHW EMP POWER)	#8	RE BOND SOLID (BB)	#8	RE GRND SOLID (BB)		/4C Tray Cable		#14/7C	1/ MSG	'4" GUY GR CABLE	MSG	3/8" GR CABLE	#	16/3C	R-	59 COAX	USE I DA TO M	TA/
				TRENCH											LENGTH								LENGTH										
			ΕA		ΕA	LF	EA		F	EA	LF	ΕA	LF	ΕA	LF	ΕA	LF	ΕA	LF	EA	LF	ΕA	LF	ΕA	LF	ΕA	LF	ΕA	LF	ΕA	LF	EA	_
	N-1*	HV	1	N			_	_						-	0.5				0.5														+
	N-2* 3	HV	1	N			_	_		_	1.0			2	25 10			1	25	2	25	1.0	10						1.0		1.0		+
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	N-28*	HV					_	_		_										2	40	10						4	40	4	40		+
_	N-29*	HV			1	N	_			_			N	-						2	15	10				-		4	15	4	15		+
	A8	HV				IN	_	_		_										2	165	4	165	1	165	1	165	2	165	2	165	1	+
	A0	HV					_	_													165	1	100		100	1	100		100	1	100		+
	A9 A10	HV						-												1	105	6	105	1	105		105	2	105	2	105		+
-	A10	HV	+ +											-							85	5	85	1	85	1	85	2	85	2	85		+
-	A11 A12	HV					-			-				-							00	1	55	1	55		55	2	05	2	05		+
	A13	HV																				1	135		135	1	135						+
	A14	HV																				3	170	1	170		170						+
	N-10*	НУ	+ +		1	N																- ⁻	110		110	· ·	110	+ +					+
	N-12*	НУ										1	N																				+
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	N-16*	HV			1	N																											+
	N-17*	HV					1	N	1					1																			+
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	N-POLE F*	ну																										10					1
	T1-LUM ARM	Η٧																		1	20												1
	T3-LUM ARM	HV																		1	20												
	T1	HV														1	35																1
	T2	HV														1	35																
	T3	HV														1	35																
	T4	HV														1	35	1															
	T5	HV														1	35																
	SLACK +	HV						V		2	10									4	10	26						4	10	4	10	1	
	TOTAL (LF)										40				70		175		35		865		4775		815		815		1650		1650		
	EST. TOTAL										45				160		195		40		955		5255		900		900		1815		1815		

RUN NO.

N-1* N-2*

3 N-25* N-26* N-28* N-29* A8 A9 A10 A11 A12 A13 A14

A14 N-10* N-12* N-14*

N-14* N-16* N-17* N-POLE C* N-POLE F* T1-LUM ARM T3-LUM ARM T1

Τ4 TF SLACK + TOTAL (LF) EST. TOTAL

RAILROAD PREEMPT

RR RELAY TRAF SIG

14C/#14

LENGTH LF

10 840 925

SCHEDULE LEGEND: N - PERMANENT SIGNAL CONDUIT/POLE. A - AERIAL RUN * - SEE PERMANENT SIGNAL PLAN FOR DETAILS. RUN ID MAY NOT BE THE SAME BETWEEN TEMP SIGNAL AND PERMANENT PLAN.

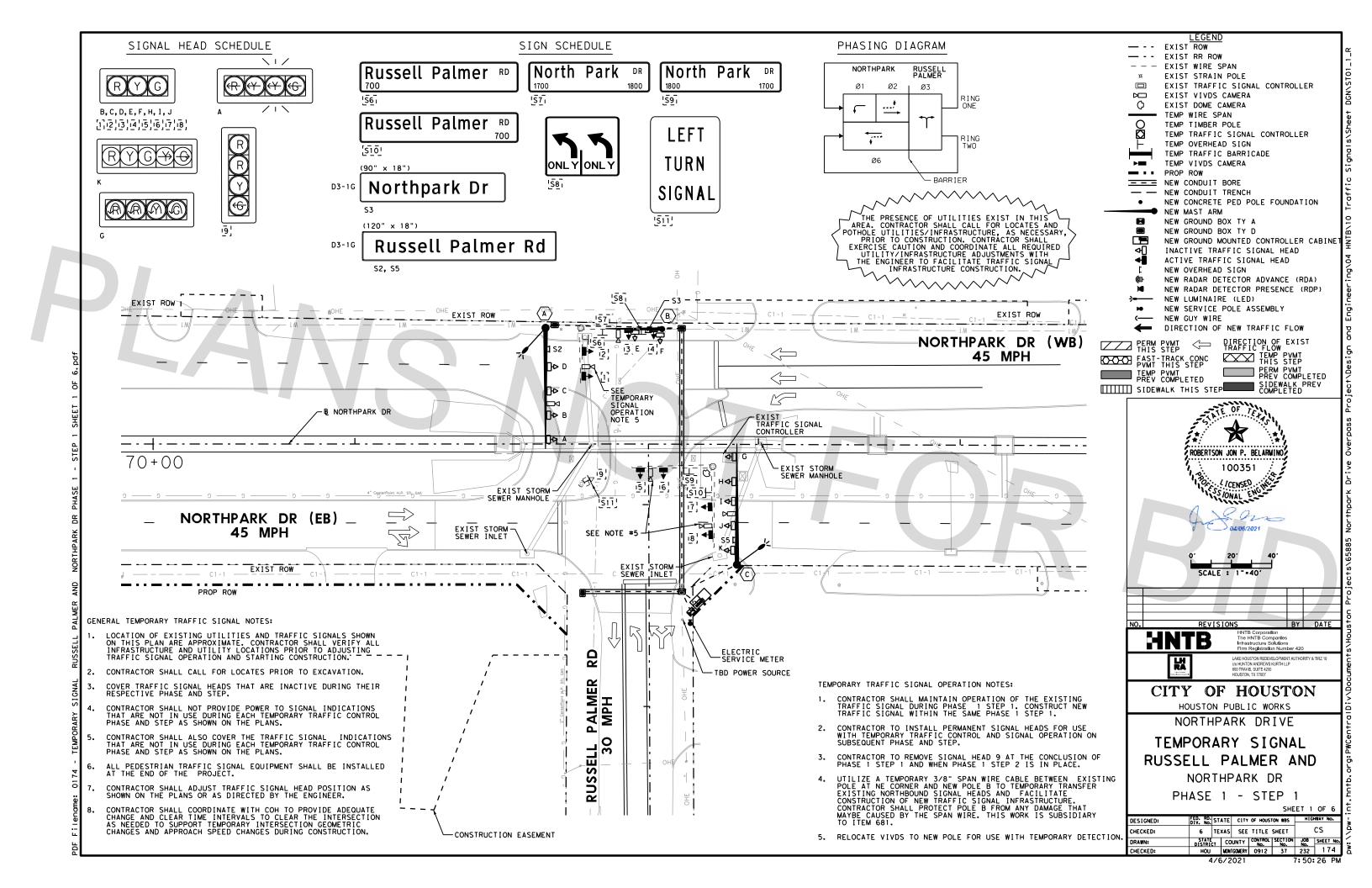
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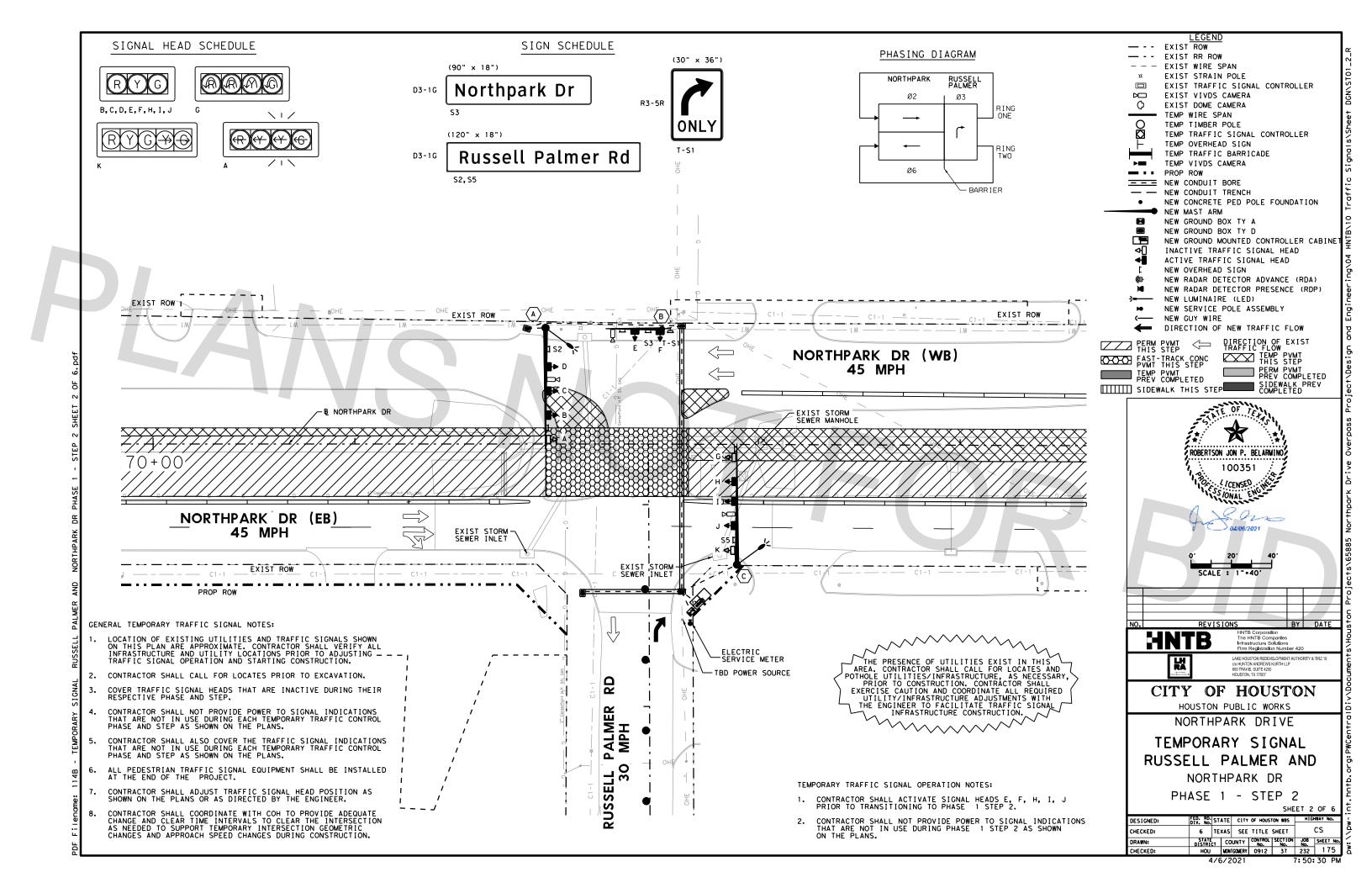
ITEM	DESCRIPTION	UNIT	QTY
620 6007	ELEC CONDR (NO.8) BARE	LF	235
620 6010	ELEC CONDR (NO.6) INSULATED	LF	160
621 6005	TRAY CABLE (4 CONDR) (12 AWG)	LF	955
625 6001	ZINC-COAT STL WIRE STRAND (1/4")	LF	900
625 6003	ZINC-COAT STL WIRE STRAND (3/8")	LF	900
627 6002	TIMBER POLE (CL 2) 40 FT	EA	5
680 6004	REMOVING TRAFFIC SIGNALS	EA	1
681 6001	TEMP TRAF SIGNALS	EA	1
681 SUB10	DETECTOR UNIT (DUAL CHANNEL)	EA	12
681 SUB11	SIGN D3-1G - "Northpark Dr" (90"X18")	EA	2
681 SUB13	SIGN D3-1G - "Loop 494 (66"X18")	EA	2
681 SUB14	SIGN R10-21 (30"X36")	EA	2
681 SUB15	CCTV CABLE	EA	415
681 SUB16	BROADBAND RADIO CABLE	EA	415
681 SUB6	CONTROLLER FULL-ACTUATED W/CABINET	EA	1
681 SUB7	TRAFFIC SIGNAL CONTROLLER FOUNDATION	EA	1
681 SUB8	GROUND ROD, 5/8" X 10' COPPER	EA	6
681 SUB9	DETECTOR CARD RACK (8 SLOT & 4 SLOT)	EA	1
682 6001	VEH SIG SEC (12")LED(GRN)	EA	17
682 6002	VEH SIG SEC (12")LED(GRN ARW)	EA	8
682 6003	VEH SIG SEC (12")LED(YEL)	EA	17
682 6004	VEH SIG SEC (12")LED(YEL ARW)	EA	8
682 6005	VEH SIG SEC (12")LED(RED)	EA	17
682 6006	VEH SIG SEC (12")LED(RED ARW)	EA	8
684 6033	TRF SIG CBL (TY A)(14 AWG)(7 CONDR)	LF	5255
684 6040	TRF SIG CBL (TY A)(14 AWG)(14 CONDR)	EA	925
690 6021	REMOVAL OF TIMBER POLES	EA	5
690 6069	INSTALL OF LUMINAIRE MAST ARMS	EA	4
690 6081	INSTL DOWN GUY AND ANCHOR W/GUARD	EA	5
690 6083	REMOVE DOWN GUY AND ANCHOR W/GUARD	EA	5
6000 6130	INSTALL LUMINAIRE 250 W EQ (LED)	EA	2
6010 6012	RELOCATE CCTV FIELD EQUIPMENT	EA	1
6062 6042	RELOCATE ITS RADIO	EA	1
6094 6019	VIVDS MULTI CON COM CAX CBL(3COND16AWG)	LF	1815
6306 6006	VIVDS TEMPORARY	EA	4
6306 6019	VIVDS TEMPORARY (REMOVE)	EA	4

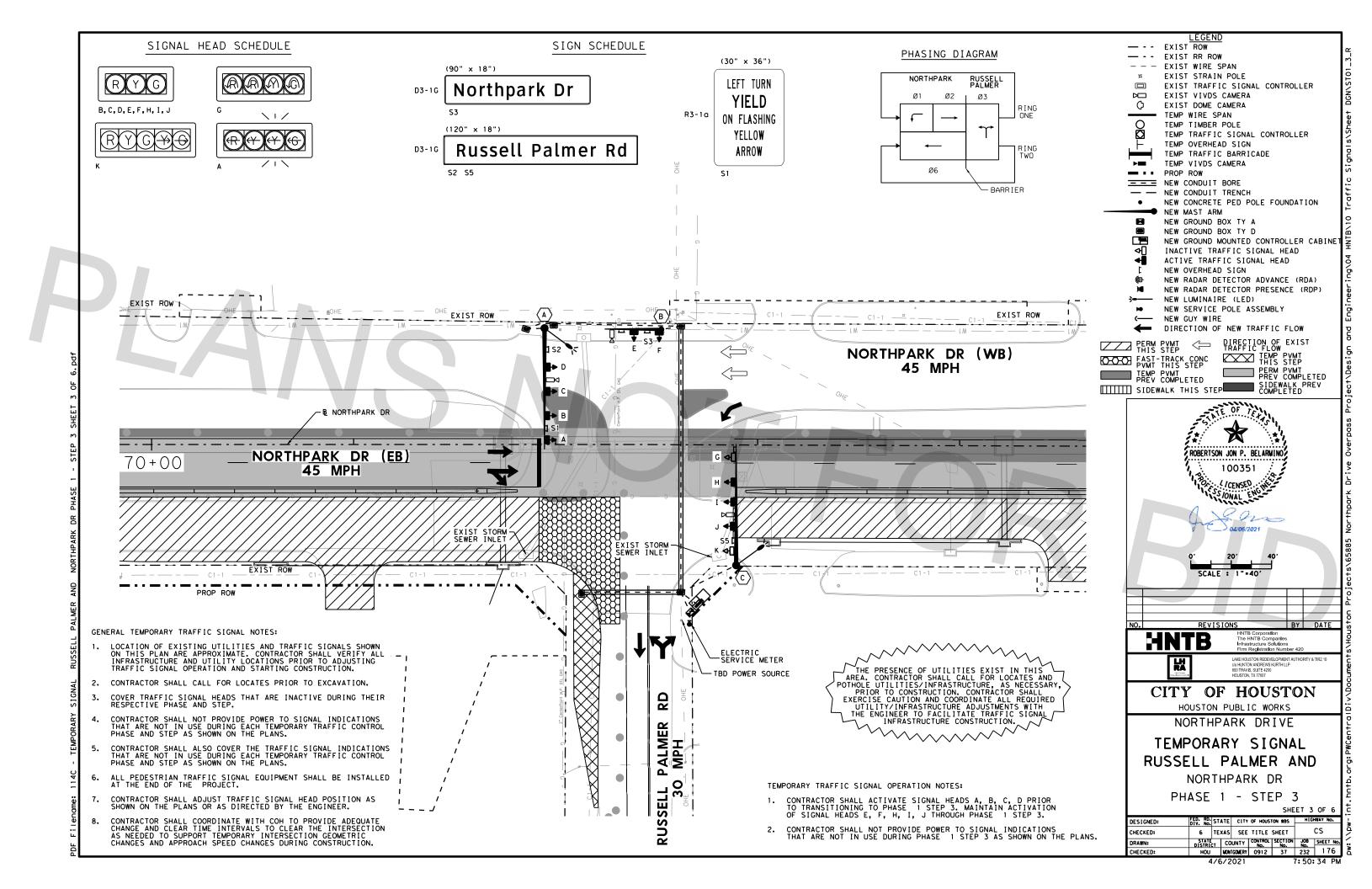
SEE PERMANENT TRAFFIC SIGNAL PLANS FOR ADDITIONAL DETAILS FOR USE WITH TEMPORARY TRAFFIC SIGNAL OPERATION. SUBSIDIARY TO ITEM 681

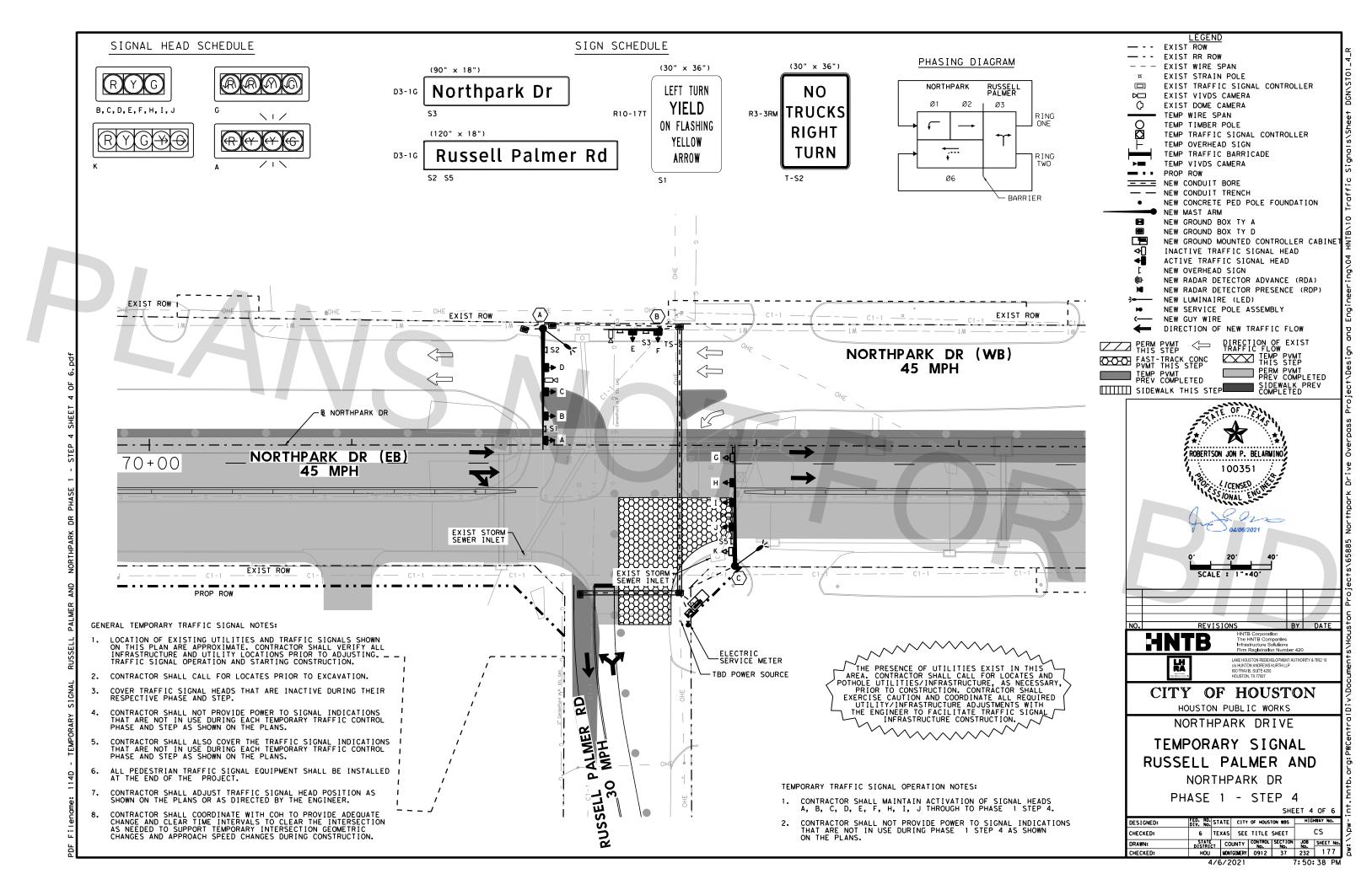
CCTV CAMERA XIST TYPE A/POWER TCH EQUIP LENGTH LF 10 45 55 40 15 165	BROAD	DMM CABLE DBAND RADIO EXIST TYPE MM/POWER ATCH EQUIP LENGTH LF 10 45 55 40 15 165	NOMERISON JON P. BELANNINO 100351 CENSES AND INCLUSE STANDING	
35	1	35	Desian and Engine))
10 375	1	10 375		•
			ROBERTISON JON P. BELARNING 100351 10351 <	
			HOUSTON PUBLIC WORKS	
			SIGNAL DETAILS SL 494 AND NORTHPARK DR	•
			SHEET 1 OF 1	

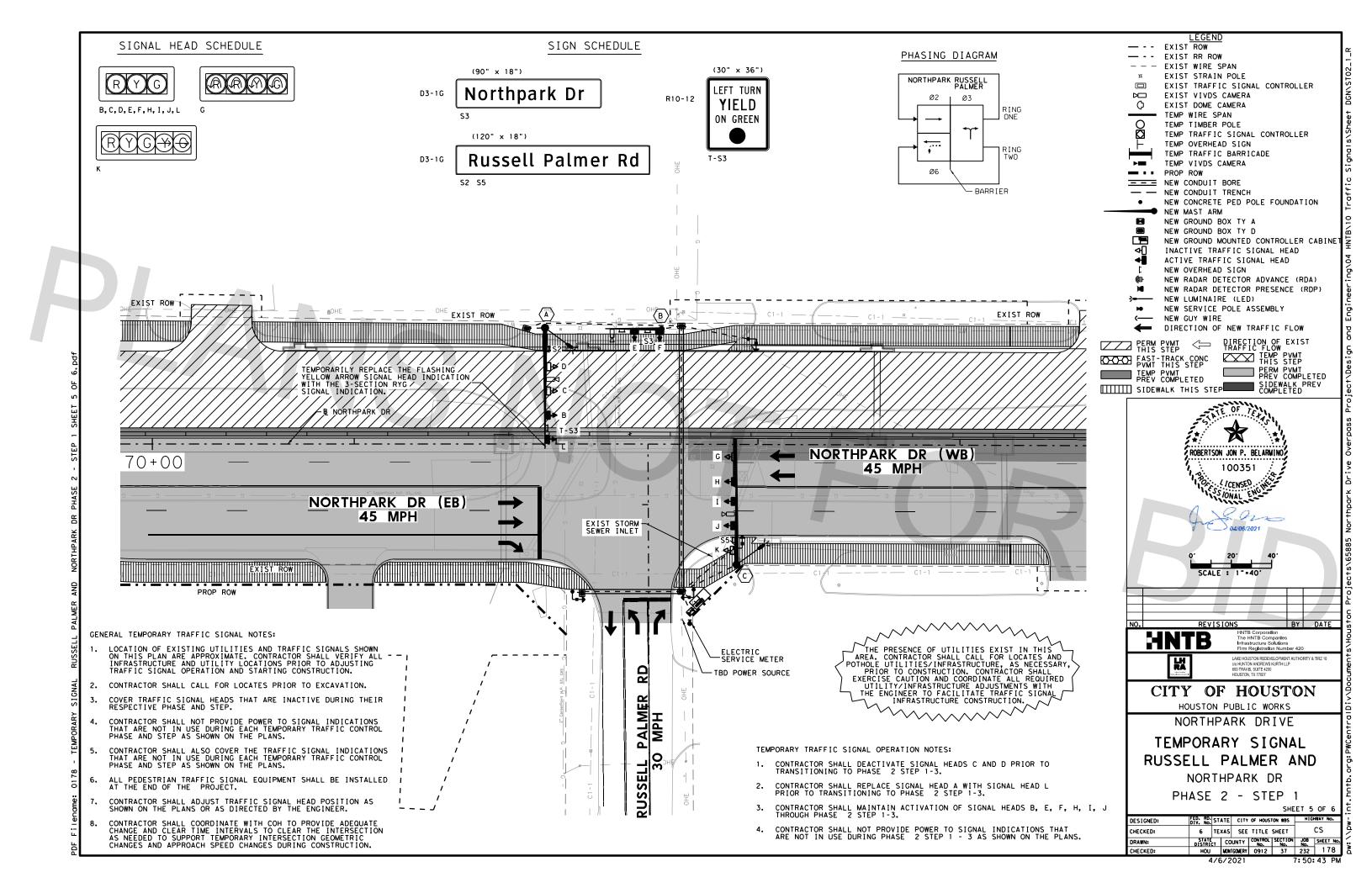
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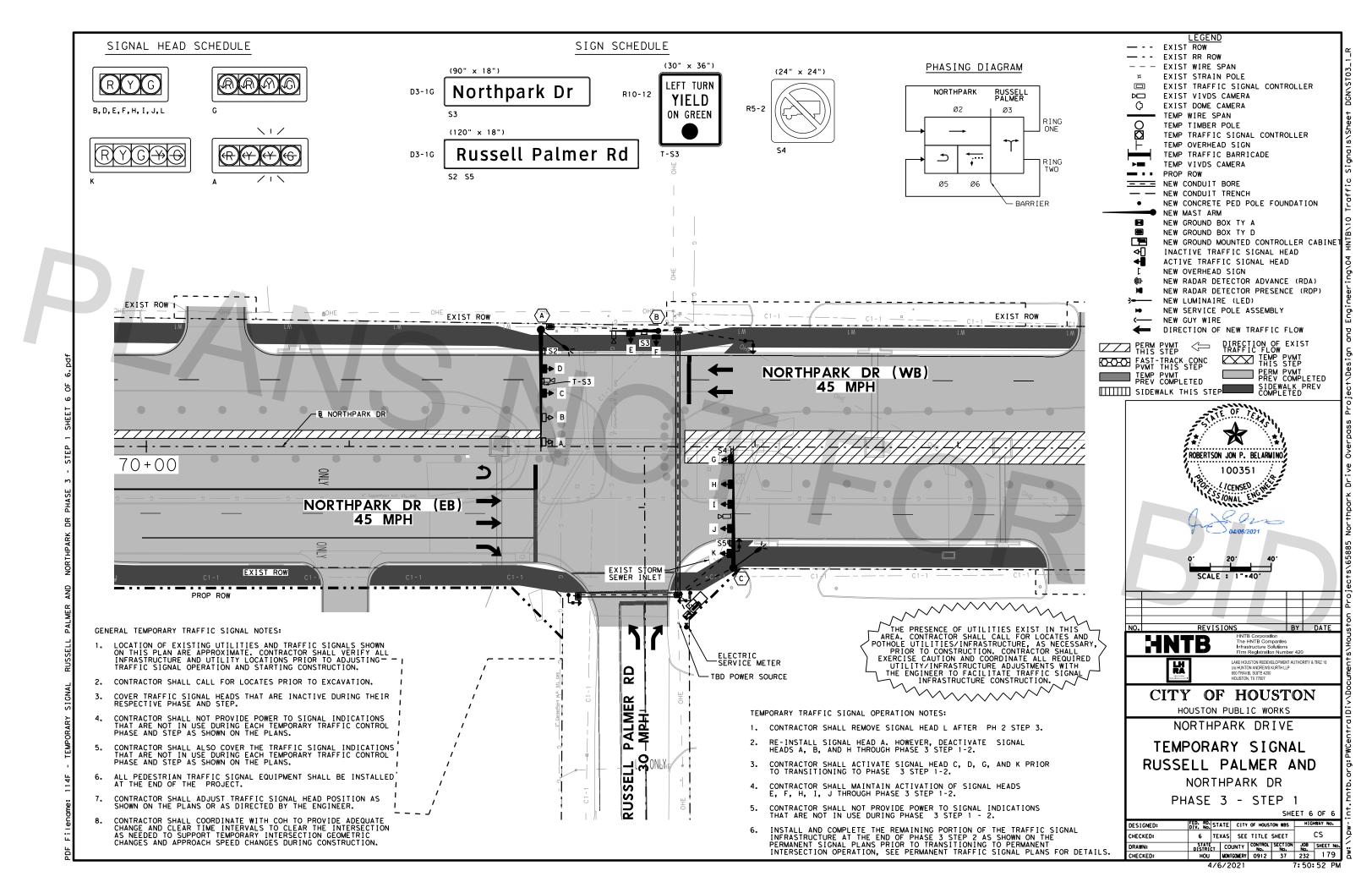












 $\langle A \rangle$ (MA) RELOCATE EXISTING CCTV AND -BROADBAND RADIO TO POLE C

 \sim

(3)

		CONDUIT								IVDS	5		CCTV	COMM CABLE		
			P١	/C					TEMP C	DETE	CTION	ССТ	V CAMERA	BROADBAND RADIO		
RUN NO.	LOW VOLT	3"	(SCHD 80)		4" (SC	HD :	80)	#	16/30	R	-59 COAX	DAT	XIST TYPE A/POWER ATCH EQUIP	CC CC	EXIST TYP MM/POWER MATCH EQUI	
		NO.	TRENCH	NO.	TRENCH	NO.	BORE	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	
		ΕA	LF	ΕA	LF	ΕA	LF	ΕA	LF	ΕA	LF	ΕA	LF	ΕA	LF	
N-3*	LV					2	Ν	3	15	3	15	1	15	1	15	
N-6*	LV	1	N													
N-8*	LV	1	N					1	40	1	40					
N-11*	LV	1	N					1	30	1	30	1	30	1	30	
N-26*	LV			1	N											
N-32*	LV					1	Ν	2	135	2	135					
N-POLE A	LV							1	20	1	20					
N-POLE B	LV							1	20	1	20					
N-POLE C	LV							1	20	1	20	1	20	1	20	
N-MA	LV							1	55	1	55					
N-MB	LV							1	30	1	30					
N-MC	LV							1	55	1	55					
SLACK +	LV							1	10	1	10	1	10	1	10	
OTAL (LF)									640		640		75		75	
ST. TOTAL									705		705		85		85	

SCHEDULE LEGEND:

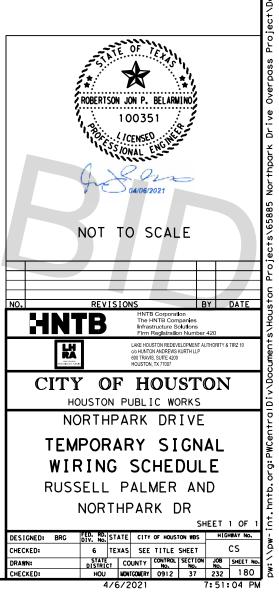
N - PERMANENT SIGNAL CONDUIT/POLE/MAST ARM.

* - SEE PERMANENT SIGNAL PLAN FOR DETAILS. + - FOR CONSTRUCTION PHASE ADJUSTMENT

ITEM	DESCRIPTION	UNIT	QTY]
625 6003	ZINC-COAT STL WIRE STRAND (3/8")	LF	60	°
680 6004	REMOVING TRAFFIC SIGNALS	EA	1	°
681 6001	TEMP TRAF SIGNALS	EA	1]
681 SUB1	SIGN R3-5R (30"X36")	ΕA	1	٥
681 SUB11	SIGN D3-1G - "Northpark Dr" (90"X18")	ΕA	1	°
681 SUB12	SIGN D3-1G - "Russell Palmer Rd" (120"X18")	EA	2	°
681 SUB15	CCTV CABLE	ΕA	85	°
681 SUB16	BROADBAND RADIO CABLE	ΕA	85	°
681 SUB2	SIGN R3-3RM (30"X36")	ΕA	1	°
681 SUB3	SIGN R10-12 (30"X36")	ΕA	1	°
682 6001	VEH SIG SEC (12")LED(GRN)	ΕA	1	°
682 6003	VEH SIG SEC (12")LED(YEL)	ΕA	1	°
682 6005	VEH SIG SEC (12")LED(RED)	EA	1	P۰
6094 6019	VIVDS MULTI CON COM CAX CBL(3COND16AWG)	LF	705	l°
6010 6012	RELOCATE CCTV FIELD EQUIPMENT	ΕA	1	P٩
6062 6042	RELOCATE ITS RADIO	ΕA	1	l°
6306 6014	VIVDS CAM ASSY (RELOCATE)	ΕA	3	°
6306 6019	VIVDS TEMPORARY (REMOVE)	ΕA	3]°

SEE PERMANENT TRAFFIC SIGNAL PLANS FOR ADDITIONAL DETAILS FOR USE WITH TEMPORARY TRAFFIC SIGNAL OPERATION.

• - SUBSIDIARY TO ITEM 681

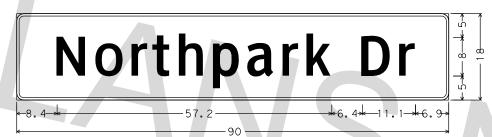


DGN\ST_WI Engineering\04 HNTB\10 Traffic Signals\Sheet Pup ß Pro é 5



D3-1G(2) 8in;

1.5" Radius, 0.5" Border, White on, Green; "SL 494", ClearviewHwy-3-W; "494", ClearviewHwy-3-W;



6.6

D3-1G(2) 8in; 1.5" Radius, 0.5" Border, White on, Green; "Northpark Dr", ClearviewHwy-3-W;

Russell Palmer Rd

-120-

— 39. 4—

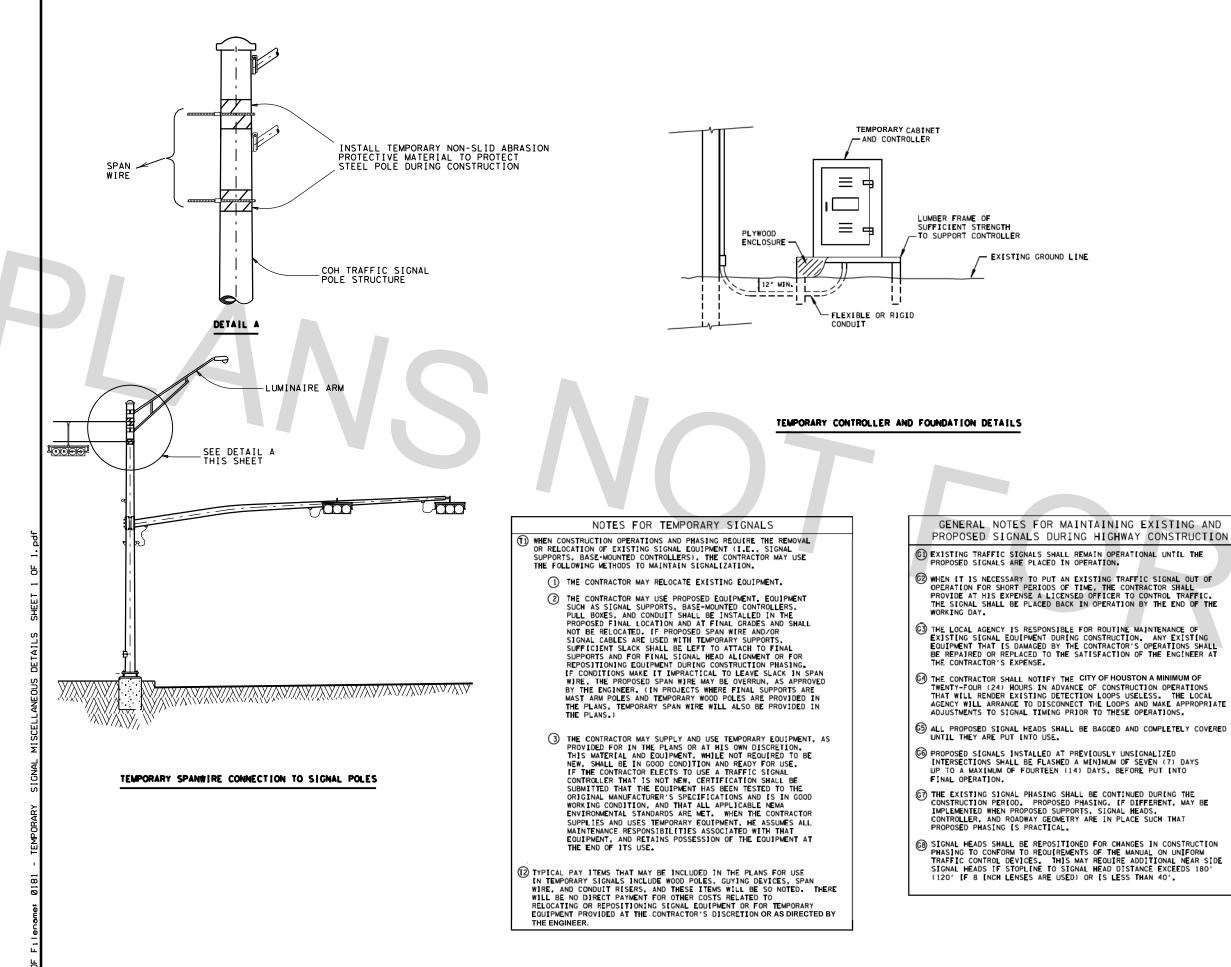
-<u>+6.6+12.2-+6.9</u>,

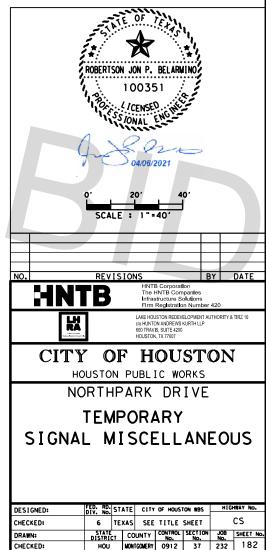
-8.4-

D3-1G(2) 8in; 1.5" Radius, 0.5" Border, White on, Green; "Russell Palmer Rd", ClearviewHwy-3-W;

-39.9-

Thork Drive Overpass Project/Design and Engineer ing/04 HNTB/10 Traffic Signals/Sheet Don/Spol.dgn
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04/06/2021
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Firm Registration Number 420
CITY OF HOUSTON
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DRAWN: STATE DISTRICT COUNTY CONTROL No. SECTION No. MOB SHEET No. S

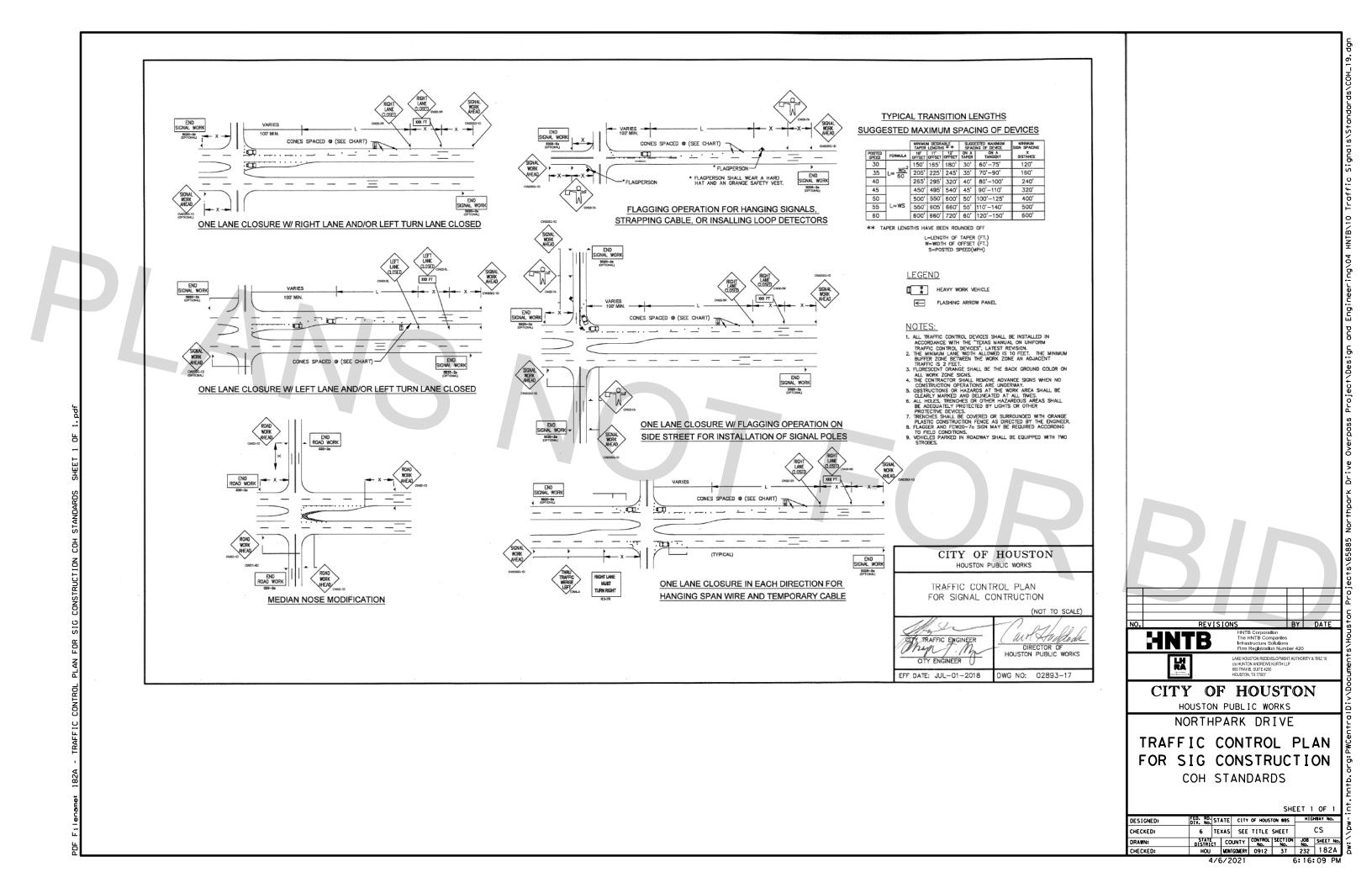


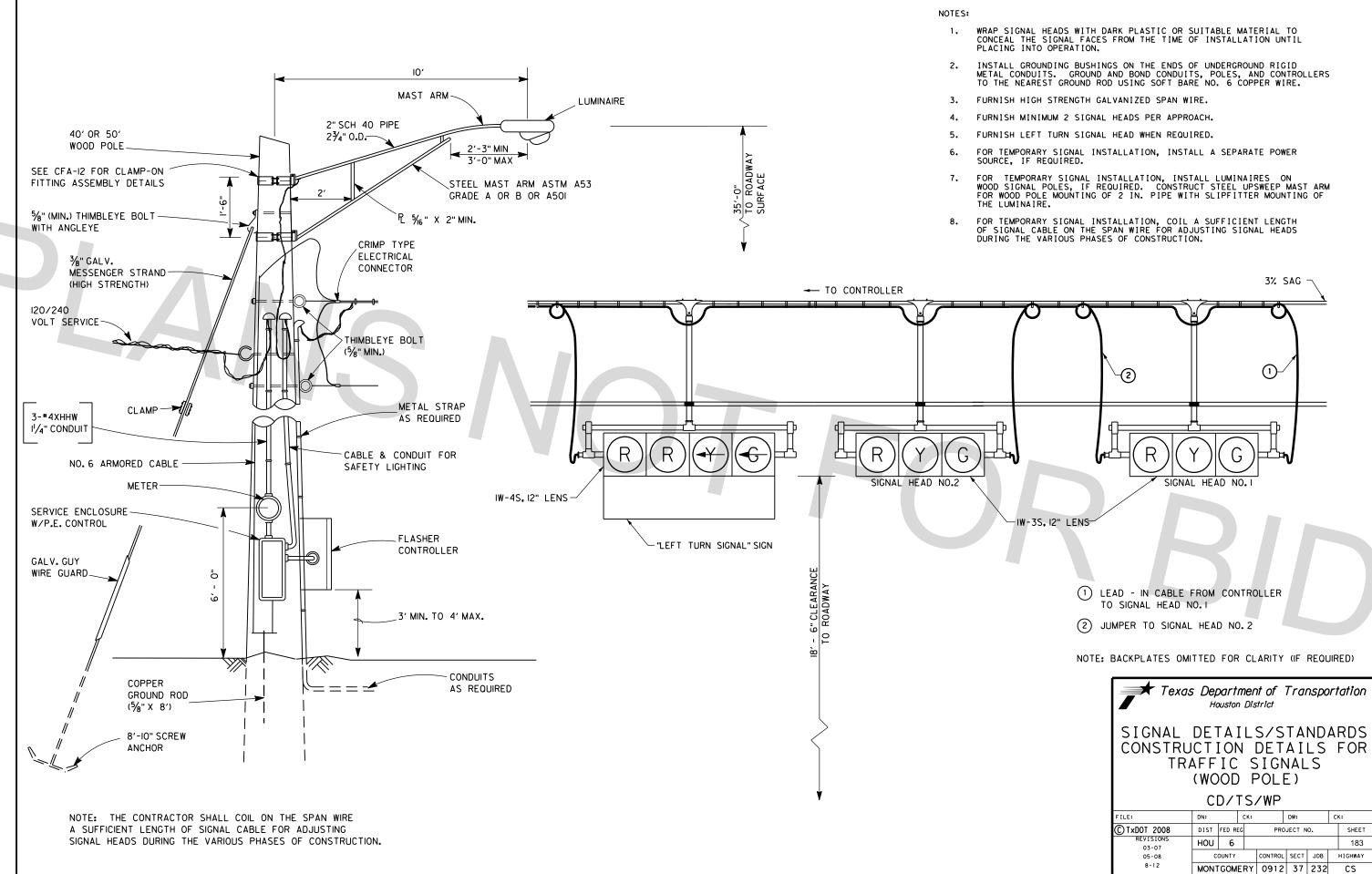


4/6/2021

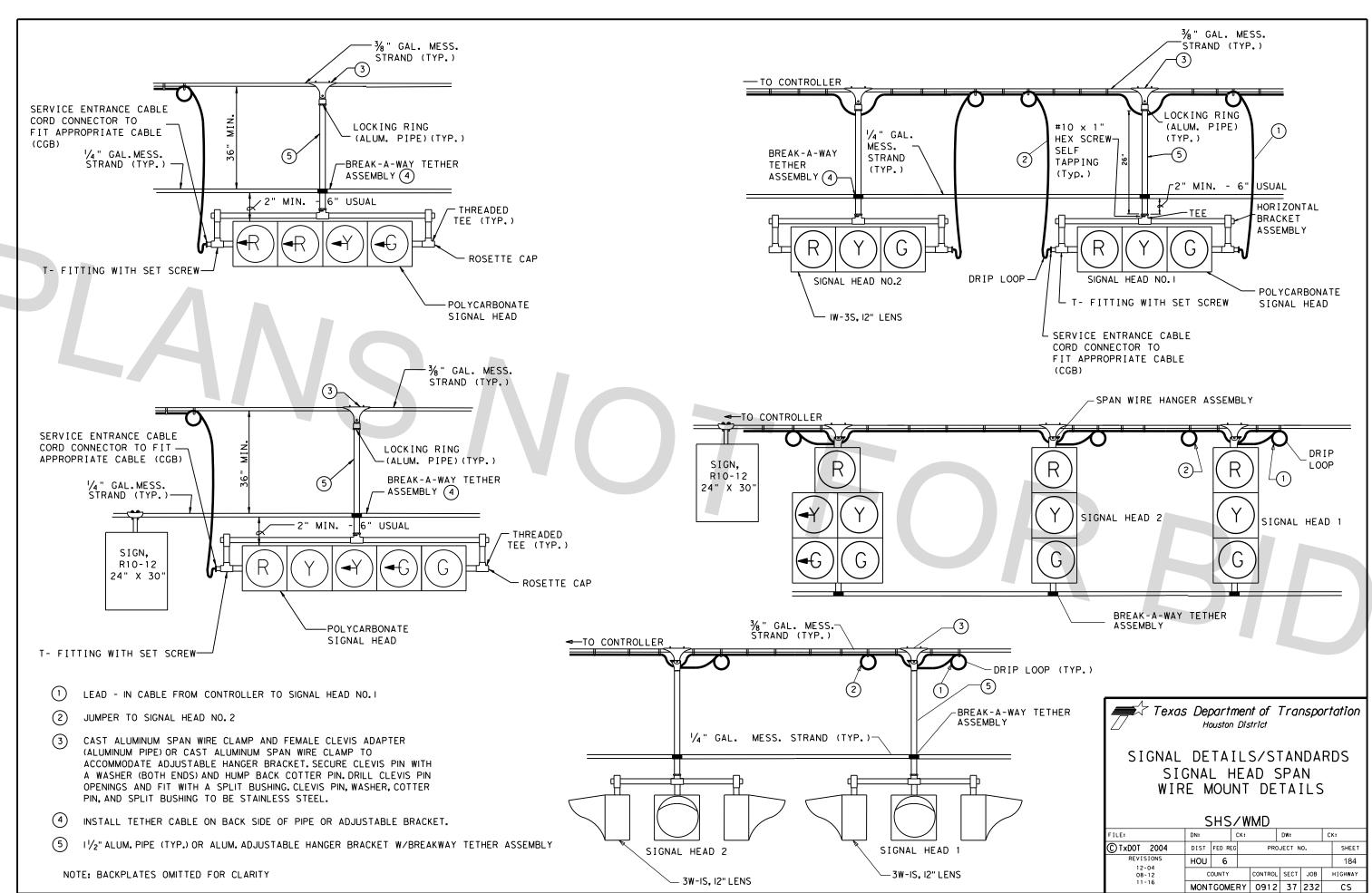
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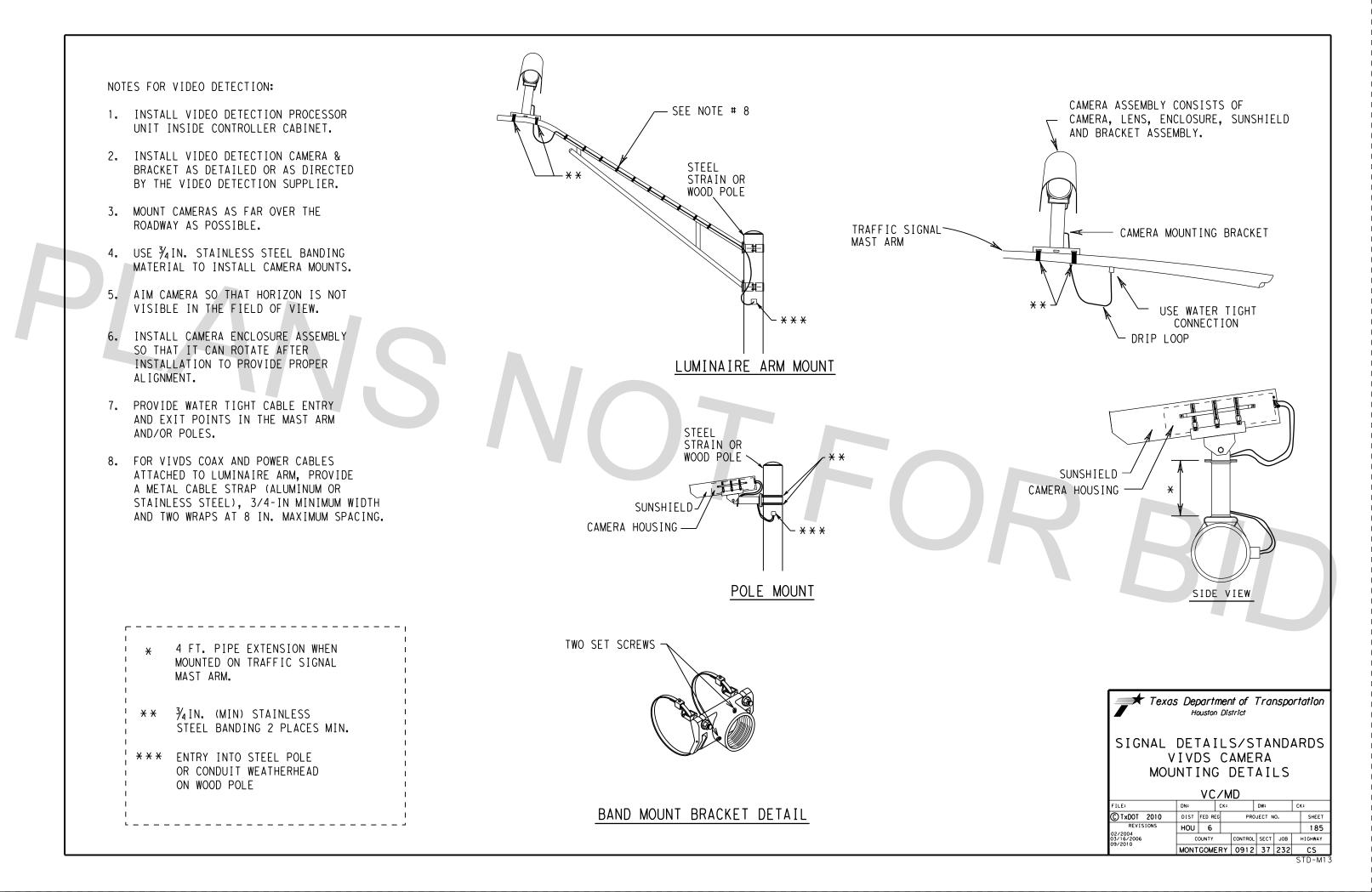


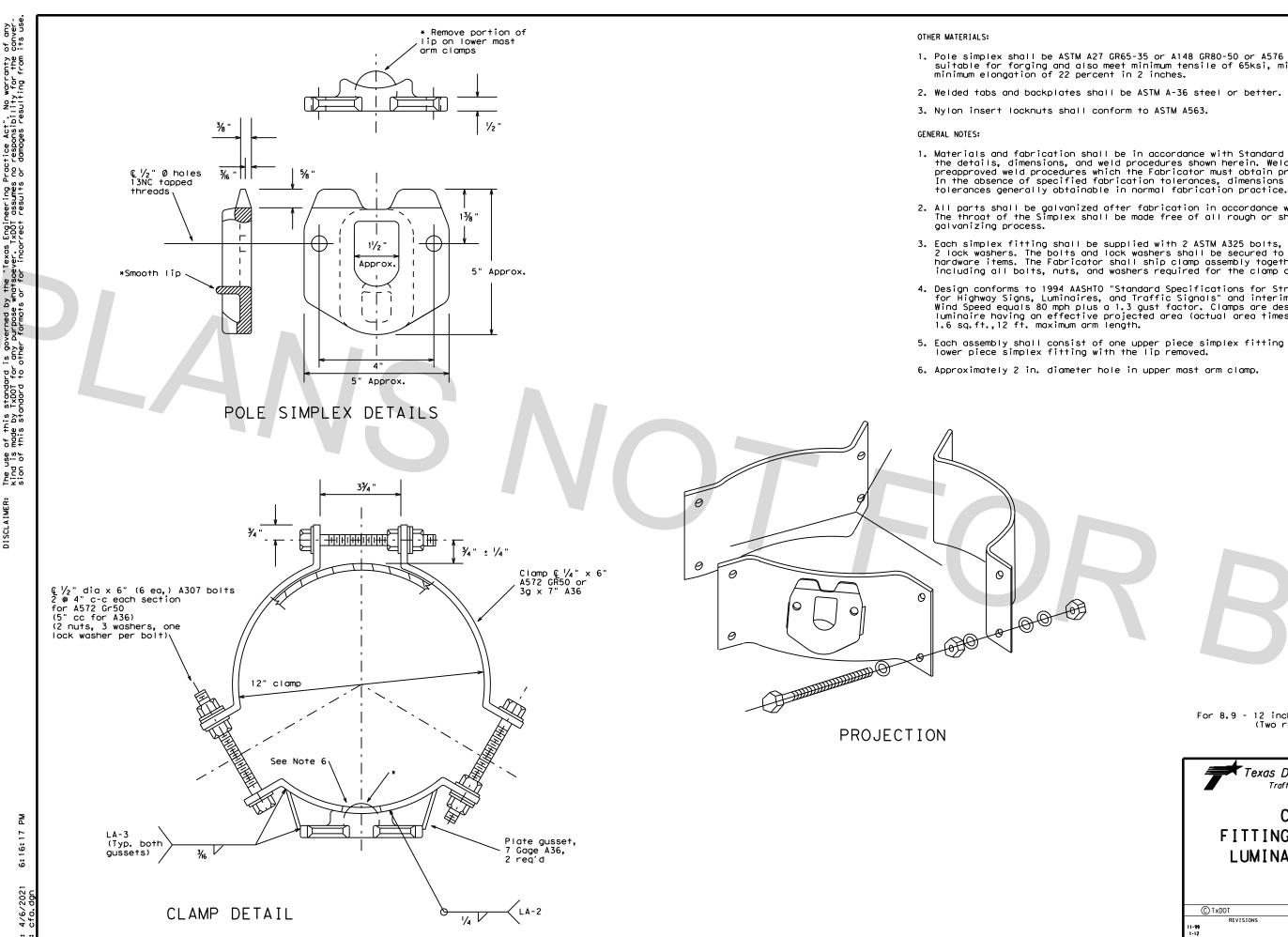


STD-M10



STD-M11





DATE:

1. Pole simplex shall be ASTM A27 GR65-35 or A148 GR80-50 or A576 GR1021. ASTM A576 must be suitable for forging and also meet minimum tensile of 65ksi, minimum yield of 35ksi, and a minimum elongation of 22 percent in 2 inches.

1. Materials and fabrication shall be in accordance with Standard Sheet "MA-C" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absence of specified fabrication tolerances, dimensions shall be within the

2. All parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing". The throat of the Simplex shall be made free of all rough or sharp edges resulting from the

3. Each simplex fitting shall be supplied with 2 ASTM A325 bolts, $\frac{1}{2}$ in. X $\frac{1}{2}$ in. and 2 lock washers. The bolts and lock washers shall be secured to the clamp with the other hardware items. The Fabricator shall ship clamp assembly together in a single package, including all bolts, nuts, and washers required for the clamp and simplex fitting.

4. Design conforms to 1994 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" and interim revisions thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor. Clamps are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq.ft.,12 ft. maximum arm length.

5. Each assembly shall consist of one upper piece simplex fitting having a smooth lip and one lower piece simplex fitting with the lip removed.

For 8.9 - 12 inch diameter Signal Poles (Two req'd for each mast arm)

Texas Department of Transportation Traffic Operations Division

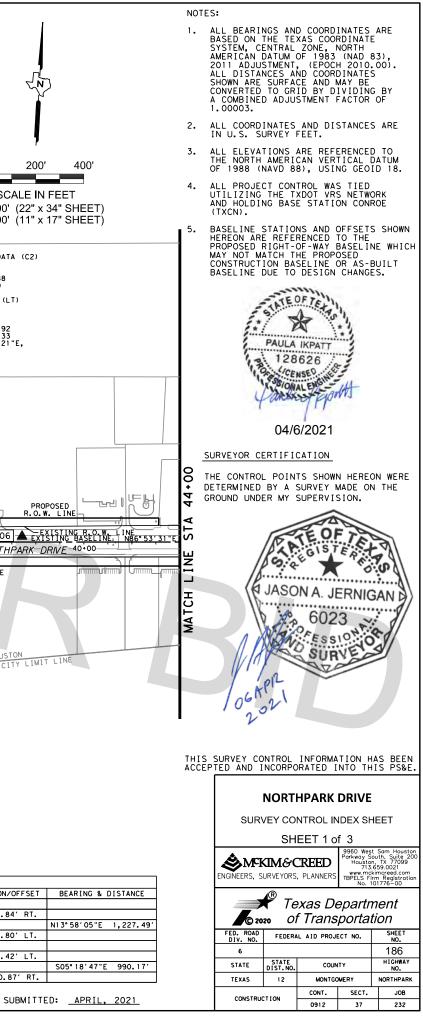
CLAMP ON FITTING ASSEMBLY FOR LUMINAIRE MAST ARM

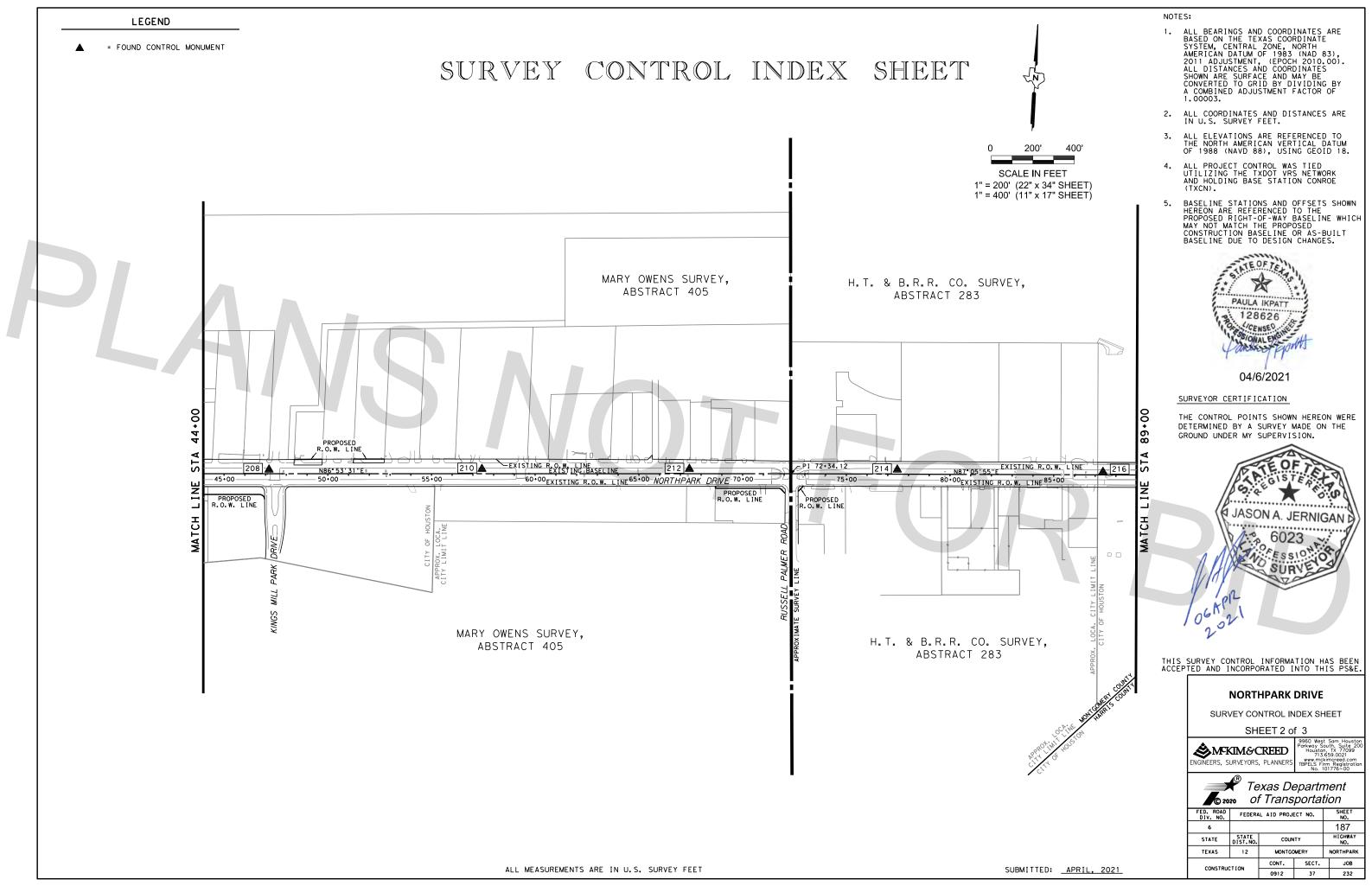
CFA-12

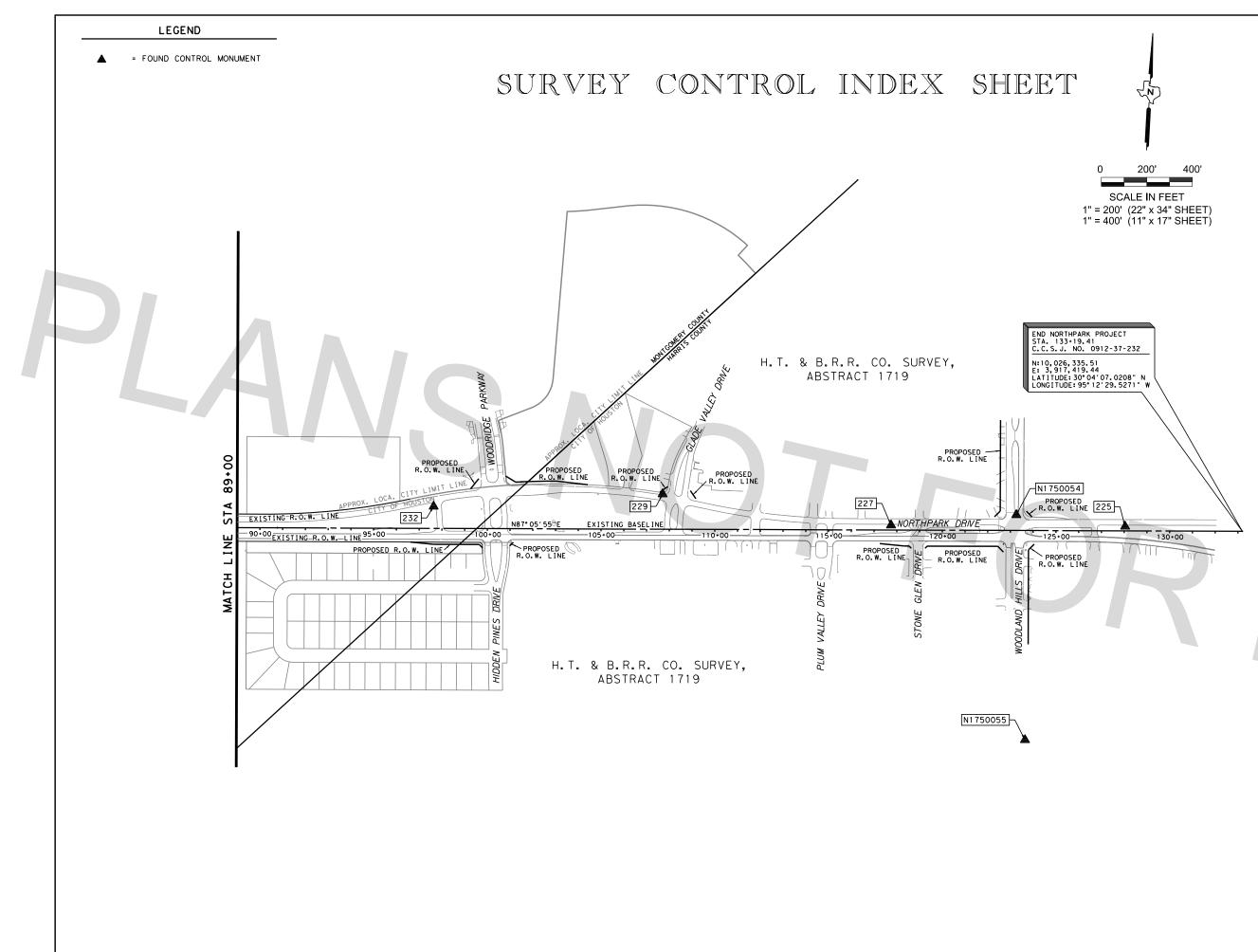
C TxDOT	DN: KAB		CK: RES	DW:	FDN	CK: CAL
REVISIONS	CONT	SECT	JOB		HIGHWAY	
1-12	0912	37	232			
	DIST		COUNTY		SHEET NO.	
	HOU		MONTGOMERY		185A	
170						

130

LEGEND					
FOUND CONTROL MONUMENT					
	SURVEY	CONTRO	L INDEX	K SHEET	7
					0
			ENS SURVEY,		SCAL
		ABST	RACT 405	. ///	1" = 200' (2 1" = 400' (2
				· · · · · · · · · · · · · · · · · · ·	
	BEGIN NORTHPARK STA. 10+00.00	1	CURVE DATA (C1) 59.23	ПИЛ	NE CURVE DATA 5+77.60
APPROX. LOCATION CI	ITY LIMIT LINE C. C. S. J. NO. 091 N:10.025.203.37 N:10.025.203.37	$\begin{array}{c} N = 10, 0 \\ E = 3, 90 \\ R = 2, 00 \\$	59.23 25.982.97 6.197.79 0.00	N = 10 E = 3, R = 2,	6+77.60 ,025,779.88 906,782.20 000.00'
CITY OF HOUS	STON E: 3, 905, 161, 74 LATITUDE: 30° 04' 1 / LONGITUDE: 95° 14'	∆ = 07°C L = 249. 1.2809" N T = 125. 48.9398" W D = 02°5	02.09"(RT) 71' 02' 1'53.24"	7. μ Δ = 22 L = 77 T = 39 D = 02	7.41' 3.68' 51'53.24"
d and a second		PC STA. PT STA.	53.24" = 19-34.21 = 21+83.92 S74*24'49"E,	PC STA PT STA 7 CH B&D	51'53.24" = 22*83.92 = 30*61.33 = S81°58'21"E, 772.53'
			249.54	54	772.53'
	234		CA. CITY LIMIT LINE/		
	the fill			N. 20	
	10+00 <u>S77+59-25-E</u>	R. O. W. LINE		1. Y. Y.	
	8 8 8 9 9 9	PC TOUTO	Ē	1000 T	
	₹ 23	202 2010 22	The run II	\$ <u>8</u> <u>8</u>	
ω	HIGHMAN.	00 TC 83.93			
	S. / /		1:93:34 WG R. 22 25:00		206
	5.	R. O. W. LINE	204	- PT 30+61.33 30+00 EXISTING R.O.W. LINE	5+00-NORTHPA
MASSEY ≝ SURVEY, ≸		F L		PROPOSED I	R.O.W. LINE
ABSTRACT					
S L AA				No and Andrews	
			Posen		
SURVEY CONTROL MONUMENT TABLE				APPR	DX. LOCA. CITY
	NE STATION/OFFSET BEARING & DISTANCE			CITY OF HOUSTON	
234 10,026,250.22 3,904,984.76 82.66' FND.5/8"I.R. W/TXDOT ALUMINUM CAP OUTSIDE	S75°19′37"E 985.85′		EY, 5		
	I.93 / 36.82' RT. S78°17'44"E 1,049.81 3.04 / 13.26' RT.	ABSTRACT 405	SL/	· ````	
	N85°15′24″E 890.51′ 2.19 / 23.06′ LT.	-			
	N87° 07′ 26″E 974.72′ 5.90 / 19.12′ LT.				
	N86° 42′ 57″E 1,026.37 3.26 / 22.27′ LT.				
212 10,026,023.44 3,910,850.74 78.25' FND.5/8"I.R. W/T×DOT ALUMINUM CAP 67+43	N86°52′22"E 1,000.16	<u> </u>	I		
	3.42 / 22.61' LT.				
214 10,026,074.59 3,911,851.92 78.10' FND.5/8"I.R. W/TxDOT ALUMINUM CAP 77+45	3.42 / 22.61' LT. N87*04'31"E 1,002.49 5.83 / 21.24' LT.				
	3.42 / 22.61' LT. N87*04'31"E 1,002.49 5.83 / 21.24' LT. N87*32'10"E 991.17' 5.96 / 13.67' LT. N87*32'10"E 991.17'	-	SURVE	Y CONTROL MONUMENT TABLE	
216 10,026,117.20 3,912,842.17 73.71' FND.5/8"I.R. W/TxDOT ALUMINUM CAP 87+36 232 10,026,251.55 3,913,863.26 71.24' FND.5/8"I.R. W/TxDOT ALUMINUM CAP 97+63	3. 42 / 22. 61' LT. N87° 04' 31"E 1,002. 49 5. 83 / 21. 24' LT. N87° 32' 10"E 991. 17' 5. 96 / 13. 67' LT. N82° 30' 16"E 1,029. 89 3. 55 / 96. 16' LT. N83° 48' 06"E 1,008. 23	, MONUMENT NORTHING	SURVE'		INE STATION/OF
216 10,026,117.20 3,912,842.17 73.71' FND.5/8"I.R. W/TxDOT ALUMINUM CAP 87+36 232 10,026,251.55 3,913,863.26 71.24' FND.5/8"I.R. W/TxDOT ALUMINUM CAP 97+63 229 10,026,360.41 3,914,865.60 72.91' FND.5/8"I.R. W/TxDOT ALUMINUM CAP 107+70	3. 42 / 22. 61' LT. N87* 04' 31 "E 1,002. 49 5. 83 / 21. 24' LT. N87* 32' 10 "E 991.17' 5. 96 / 13. 67' LT. N82* 30' 16 "E 1,029. 89 3. 55 / 96. 16' LT. N83* 48' 06 "E 1,008. 23 5. 11 / 154. 14' LT. S85* 20' 51 "E 1,013. 64	/ MONUMENT NORTHING / N1750052 10, 025, 229, 51 3 /	EASTING ELEV. ,906,729.48 80.83′ FND.5/8"1.	R. W/TxDOT ALUMINUM CAP 26+9	.66 / 590.84′
216 10,026,117.20 3,912,842.17 73.71' FND.5/8"I.R. W/T×DOT ALUMINUM CAP 87.36 232 10,026,251.55 3,913,863.26 71.24' FND.5/8"I.R. W/T×DOT ALUMINUM CAP 97.63 229 10,026,360.41 3,914,865.60 72.91' FND.5/8"I.R. W/T×DOT ALUMINUM CAP 107.70 227 10,026,278.19 3,915,875.90 73.27' FND.5/8"I.R. W/T×DOT ALUMINUM CAP 117.74	3. 42 / 22. 61' LT. N87* 04' 31 "E 1,002. 49 5. 83 / 21. 24' LT. N87* 32' 10 "E 991.17' 5. 96 / 13. 67' LT. N87* 32' 10 "E 1,029. 89 3. 55 / 96. 16' LT. N83* 48' 06 "E 1,008. 23 0. 11 / 154.14' LT. S85* 20' 51 "E 1,013. 64 4. 95 / 20. 89' LT. N87* 12' 14 "E 1,029. 04	MONUMENT NORTHING N1750052 10,025,229.51 3 N1750053 10,026,420.70 3	EASTING ELEV. ,906,729.48 80.83' FND.5/8"I. ,907,025.77 79.18' FND.5/8"I.	R. W/T×DOT ALUMINUM CAP 28+9	3.21 / 621.80'
216 10,026,117.20 3,912,842.17 73.71' FND.5/8"I.R. W/T×DOT ALUMINUM CAP 87.36 232 10,026,251.55 3,913,863.26 71.24' FND.5/8"I.R. W/T×DOT ALUMINUM CAP 97.63 229 10,026,360.41 3,914,865.60 72.91' FND.5/8"I.R. W/T×DOT ALUMINUM CAP 107.70 227 10,026,278.19 3,915,875.90 73.27' FND.5/8"I.R. W/T×DOT ALUMINUM CAP 117.74	3. 42 / 22. 61' LT. N87* 04' 31 "E 1,002. 49 5. 83 / 21. 24' LT. N87* 32' 10 "E 991.17' 5. 96 / 13. 67' LT. N87* 32' 10 "E 991.17' 3. 55 / 96. 16' LT. N82* 30' 16 "E 1,029.89 9. 11 / 154.14' LT. N83* 48' 06 "E 1,008.23 9. 11 / 154.14' LT. S85* 20' 51 "E 1,013.64 4. 95 / 20.89' LT. LT.	MONUMENT NORTHING / N1750052 10,025,229.51 3 / N1750053 10,026,420.70 3 / N1750054 10,026,420.70 3 / N1750054 10,026,353.53 3	EASTING ELEV. ,906,729.48 80.83' FND.5/8"1. ,907,025.77 79.18' FND.5/8"1. ,916,423.28 73.14' FND.5/8"1.	R. W/T×DOT ALUMINUM CAP 28+9	1.66 / 590.84' 3.21 / 621.80' 25.45 / 68.42'







- ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83), 2011 ADJUSTMENT, (EPOCH 2010.00). ALL DISTANCES AND COORDINATES SHOWN ARE SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY A COMBINED ADJUSTMENT FACTOR OF 1.00003. 1.00003.
- 2. ALL COORDINATES AND DISTANCES ARE IN U.S. SURVEY FEET.
- ALL ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), USING GEOID 18. 3.
- ALL PROJECT CONTROL WAS TIED UTILIZING THE TXDOT VRS NETWORK AND HOLDING BASE STATION CONROE (TXCN). 4.
- BASELINE STATIONS AND OFFSETS SHOWN HEREON ARE REFERENCED TO THE PROPOSED RIGHT-OF-WAY BASELINE WHICH MAY NOT MAICH THE PROPOSED 5. CONSTRUCTION BASELINE OR AS-BUILT BASELINE DUE TO DESIGN CHANGES.



04/6/2021

SURVEYOR CERTIFICATION

THE CONTROL POINTS SHOWN HEREON WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION.



THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E.

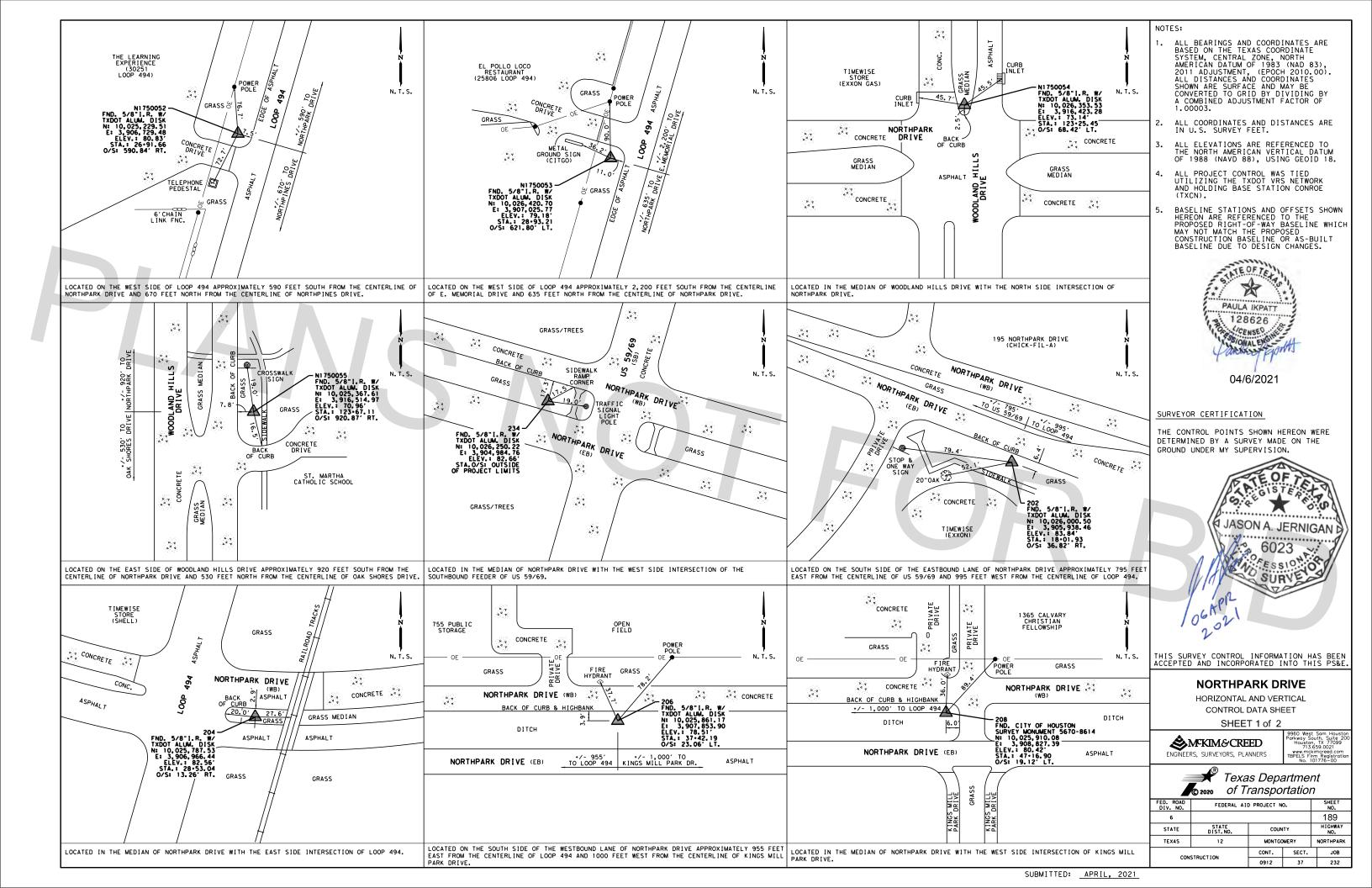
NORTHPARK DRIVE

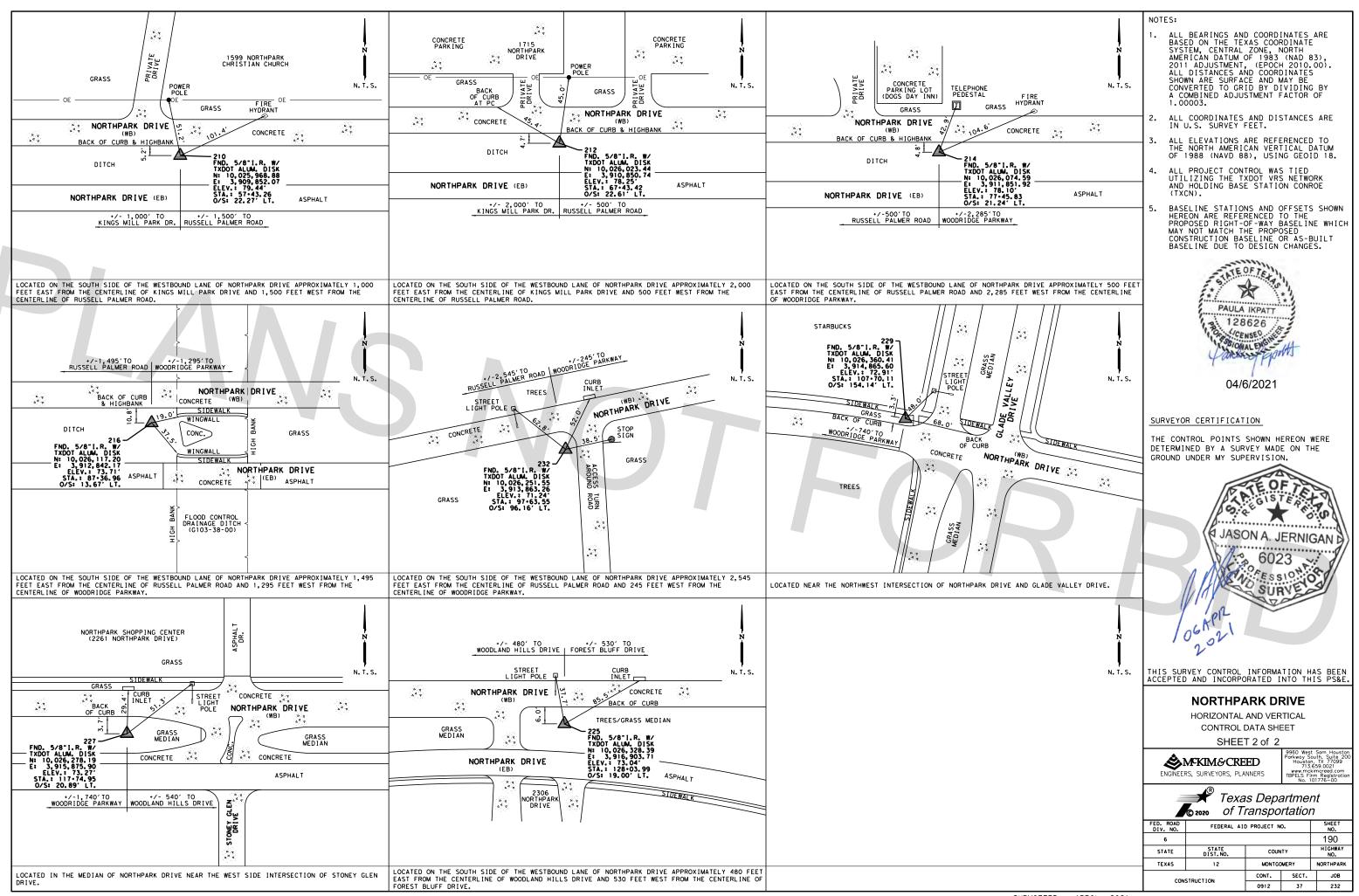
SURVEY CONTROL INDEX SHEET

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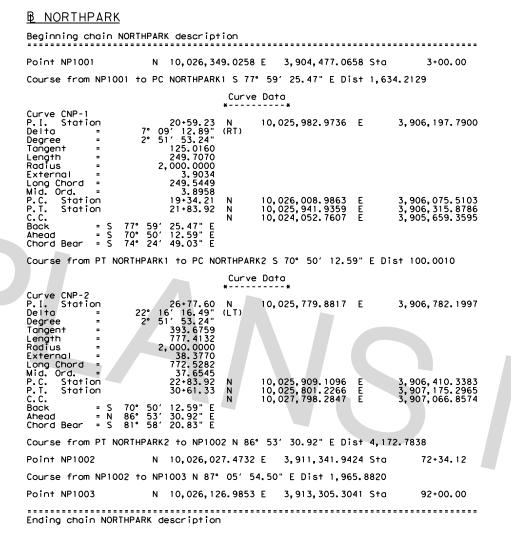
ENGINEERS, SURVEYORS, PLANNERS	9960 West Som Houston Parkway South, Suite 200 Houston, TX 77099 713.659.0021 www.mckimcreed.com TBPELS Firm Registration No. 101776-00
A R	

Texas Department								
FED. ROAD DIV. NO.	FEDERA	L AID PROJE	ECT NO.	SHEET NO.				
6				188				
STATE	STATE DIST.NO.	COUN	TY	HIGHWAY NO.				
TEXAS	12	MONTGO	NORTHPARK					
CONSTRUC	TION	CONT.	CONT. SECT.					
CONSTRUC		0912	37	232				





MAINLANES



FRONTAGE ROADS

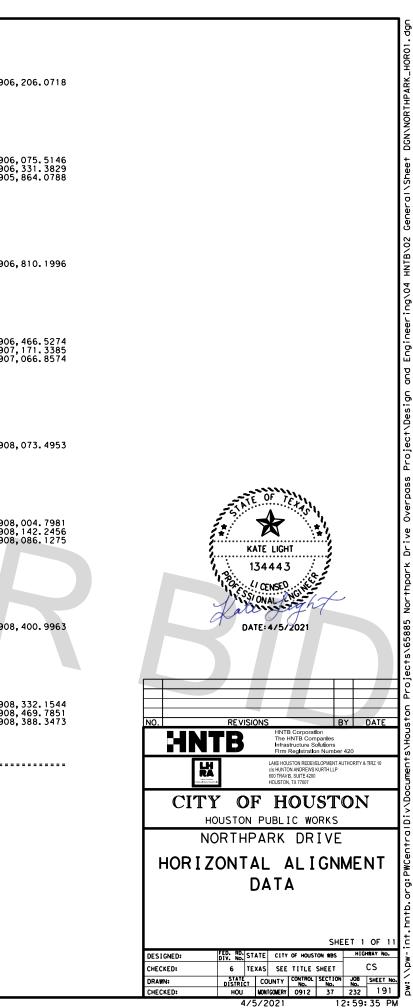
<u>BE WBFR</u>

Beginning chain WBFR description

	Curve *	Data *		
Curve WBFR1 P.I. Station 201+51.64 Delta = 3° 54′ 22.87″ Degree = 4° 35′ 01.18″ Tangent = 42.6282 Length = 85.2234	N (LT)	10,026,091.4731	E	3,905,932.8628
Radius = 1,250.0000 External = 0.7267 Long Chord = 85.2069 Mid. Ord. = 0.7267 P.C. Station 201+09.01 P.T. Station 201+94.23 C.C. Back = 57' 59' 25.47" Back = \$ 81' 53' 48.35" E Chord Bear = \$ 79' 56' 36.91" E	N N N	10,026,100.3430 10,026,085.4644 10,027,322.9840	E E E	3,905,891.1676 3,905,975.0655 3,906,151.2619

Course from PT WBFR1 to PC WBFR2 S 81° 53' 48.34" E Dist 101.4622

		Curve			
Curve WBFR2 P.I. Station Delta = Degree = Tangent = Length = Radius = External = Long Chord =	204+27.57 10° 02′ 54.91" 3° 49′ 10.99" 131.8739 263.0714 1,500.0000 5.7857 262.7344	N (RT)	10,026,052.5740	E	3,90
Mid. Ord. = P.C. Station P.T. Station C.C. Back = S Ahead = S	5.7635 202+95.70 205+58.77 81° 53′ 48.35″ E 71° 50′ 53.43″ E		10,026,071.1626 10,026,011.4905 10,024,586.1390	E E E	3,90 3,90 3,90
Chord Bear = S	76° 52′ 20.89" E NBFR2 to PC WBFR3 S	71° 50)' 53.43" F Dist	142, 222	3
		Curve	Data		-
Curve WBFR3 P.I. Station Delta = Degree = Tangent = Length = Radius =	210+62.66 21° 15′ 35.64″ 2° 58′ 23.93″ 361.6709 715.0235 1,927.0000	* N (LT)	* 10,025,854.5096	E	3,90
External = Long Chord = Mid. Ord. = P.C. Station C.C. Back = S Ahead = N Chord Bear = S	33.6465 710.9287 33.0691 207+00.99 214+16.01 71* 50' 53.43" E 86* 53' 30.92" E 82* 28' 41.25" E	N N N	10,025,967.1832 10,025,874.1193 10,027,798.2847	E E E	3,90 3,90 3,90
Course from PT N	WBFR3 to PC WBFR4 N	86° 53	3′ 30.92" E Dist	834.687	4
		Curve *	Data *		
Curve WBFR4 P.I. Station Delta = Degree = Tangent = Length = Radius = External = Long Chord =	223+19,50 5° 15' 07.67" 3° 49' 10.99" 68.7984 137.5005 1,500.0000 1.5769 137.4523	N (RT)	10,025,923.1059	E	3,90
Mid. Ord. = P.C. Station P.T. Station C.C. Back = N Ahead = S	1.5753 222+50.70 223+88.20 86° 53′ 30.92″ E 87° 51′ 21.41″ E	N N N	10,025,919.3757 10,025,920.5320 10,024,421.5821	E E E	3,90 3,90 3,90
Chord Bear = N	89° 31' 04.76" E NBFR4 to PC WBFR5 S	87° 51	' 21.41" F Dist	190.041	4
		Curve		150:041	5
Curve WBFR5 P.I. Station Delta = Degree = Tangent = Length = Radius = External =	226+47,13 5° 15′ 07.67″ 3° 48′ 52.68″ 68.8901 137.6838 1,502.0000	* N (LT)	* 10,025,910.8448	E	3,90
External = Long Chord = Mid. Ord. = P.C. Station P.T. Station C.C. Back = S Ahead = N Chord Bear = N	1.5790 137.6356 1.5774 225+78.24 227+15.93 87° 51′ 21.41″ E 86° 53′ 30.92″ E 89° 31′ 04.76″ E	N N N	10,025,913.4221 10,025,914.5800 10,027,414.3706	E E E	3,90 3,90 3,90
Ending chain WB	R description				



<u>B</u>EBFR

Beginning chain EBFR description	
	Curve Data
Curve CEB-1 P.I. Station 299+26.65	N 10,026,039.3106 E 3,905,736.5538 P (RT) D T L L L L L L L L L L L L L L L L L L
C.C. Back = S 83° 03′ 13.28" E Ahead = S 73° 32′ 20.07" E	N 10,026,054.4080 E 3,905,612.6349 P N 10,026,003.9368 E 3,905,856.2723 P N 10,024,565.4182 E 3,905,431.2261 G A A A C
Chord Bear = S 78° 17' 46.68" E Course from PT CEB-1 to PC CEB-2 S	
	Curve Data
Degree = 2° 58′ 23.93" Tangent = 45.4473 Length = 90.8777 Radius = 1,927.0000	** C N 10,025,887.8995 E 3,906,248.9867 D (RT) D T L
External = 0.5359 Long Chord = 90.8693 Mid. Ord. = 0.5357 P.C. Station 304+14.96 P.T. Station 305+05.84 C.C. Back = S 73° 32' 20.07" E Ahead = S 70° 50' 12.59" E Chord Bear = S 72° 11' 16.33" E	N 10,025,900.7776 E 3,906,205.4022 M N 10,025,872.9810 E 3,906,291.9156 P N 10,024,052.7607 E 3,905,659.3595 C
Course from PT CEB-2 to PC CEB-3 S	70° 50′ 12.59" E Dist 100.0010
	Curve Data
Degree = 2° 45' 50.06" Tangent = 408.0451 408.0451 Length = 805.7888 8000 Radius = 2,073.0000 239.7777 Long Chord = 800.7255 30.7255	
Mid. Ord. = 39.0288 P.C. Station 306+05.84 P.T. Station 314+11.63 C.C. Back = S70° 50' 12.59" E Ahead = N 86° 53' 30.92" E Chord Bear = S 81° 58' 20.83" E	N 10,025,840.1547 E 3,906,386.3754 N 10,025,728.3340 E 3,907,179.2546 N 10,027,798.2847 E 3,907,066.8574 B
Course from PT CEB-3 to PC CEB-4 N	1 86° 53′ 30.92" E Dist 663.4623 =
	Curve Data **
Degree = 3° 49′ 10.99" Tangent = 48.7600 Length = 97.4857 Radius = 1,500.0000 External = 0.7923 Long Chord = 97.4686	N 10,025,766.9504 E 3,907,890.4293
Mid. Ord. = 0.7919 P.C. Station 320+75.09 P.T. Station 321+72.57 C.C. Back = N 86° 53′ 30.92″ E	N 10,025,764.3067 E 3,907,841.7410 N 10,025,772.7506 E 3,907,938.8431 N 10,027,262.1002 E 3,907,760.4116

 Mid. Or 3
 0.7519

 P.C. Station
 320+75.09

 P.T. Station
 321+72.57

 C.C.
 Back
 = N

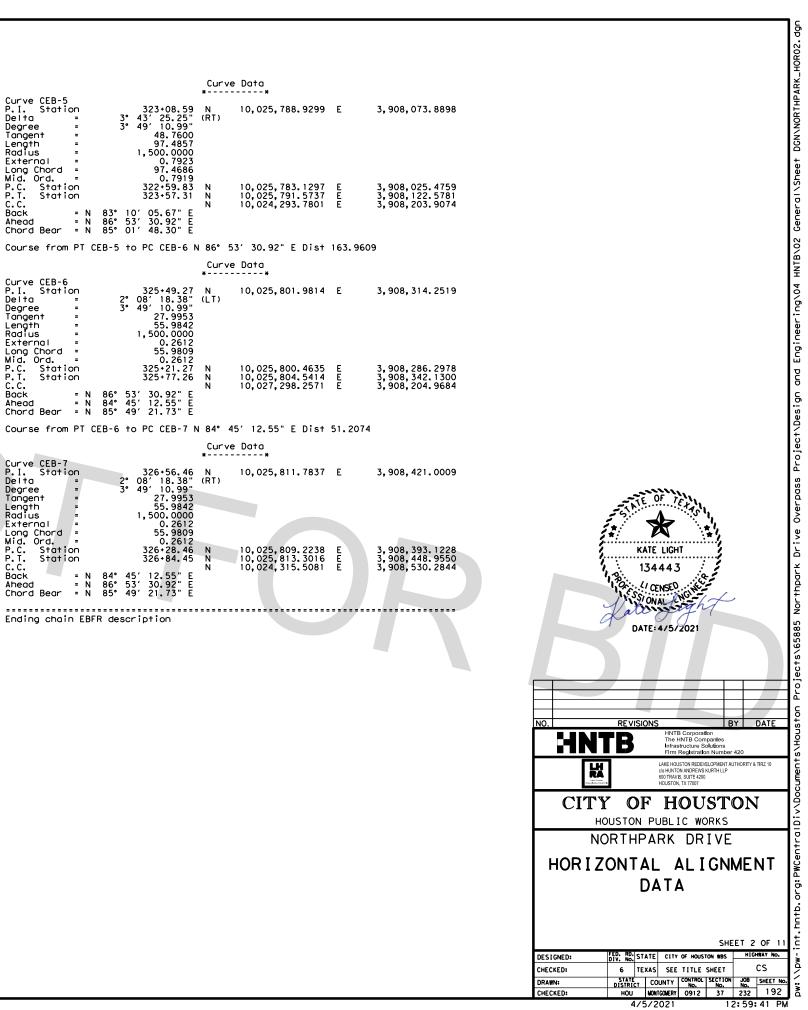
 Back
 = N
 83°
 10'
 05.67"
 E

 Chord Bear
 = N
 85°
 01'
 48.30"
 E

Course from PT CEB-4 to PC CEB-5 N 83° 10' 05.67" E Dist 87.2524

	С *-	urve	Da	ta *				
Curve CEB-5 P.I. Station 323+08.59 Delta = 3° 43' 25.25" Degree = 3° 49' 10.99" Tangent = 48.7600 Length = 97.4857	N (R	т)	10,	025,	788.	9299	E	3,90
Length = 97.4857 Radius = 1,500.0000 External = 0.7923 Long Chord = 97.4686 Mid. Ord. = 0.7919 P.C. Station 322+59.83 P.T. Station 322+57.31 C.C. Back = N 83° 10′ 05.67″ E Ahead = N 86° 53′ 30.92″ E Chord Bear = N 85° 01′ 48.30″ E	N N N N N		10,	025,	791.	1297 5737 7801	E E E	3,90 3,90 3,90
Course from PT CEB-5 to PC CEB-6 N	1 8	6° 53	• 3	50.92	2"Е	Dist	163.960	9
	٢	urve	Da	ta				
Curve CEB-6 P.I. Station 325+49.27 Delta = 2° 08' 18.38 Degree = 3° 49' 10.99" Tangent = 27.9953	*- N (L		10,	025,	801.	9814	E	3,90
Length = 55.9842 Radius = 1,500.0000 External = 0.2612 Long Chord = 55.9809 Mid. Ord. = 0.2612 P.C. Station 325+71.27 P.T. Station 325+77.26	NN		10,	025,	804.	4635	E	3,90 3,90
C.C. Back = N 86° 53′ 30.92″ E Ahead = N 84° 45′ 12.55″ E Chord Bear = N 85° 49′ 21.73″ E	N		10,	021,	298.	2571	E	3,90
Course from PT CEB-6 to PC CEB-7 N	18	4° 45	' 1	2.55	5" E	Dist	51.2074	
		urve						
Curve CEB-7 P.I. Station 326+56.46 Delta = 2° 08' 18.38" Degree = 3° 49' 10.99" Tangent = 27.9953	N (R		10,	025,	811.	7837	E	3,90
Length = 55.9842 Radius = 1,500.0000 External = 0.2612 Long Chord = 55.9809 Mid. Ord. = 0.2612								
P.C. Station 326+28.46 P.T. Station 326+84.45 C.C. Back = N 84° 45' 12.55" E Ahead = N 86° 53' 30.92" E Chord Bear = N 85° 49' 21.73" E	N N N		10,	025,	813.	2238 3016 5081	E E E	3,90 3,90 3,90
Chord Dedi - N 03 43 21.13 E								

Ending chain EBFR description



<u>U-TURNS</u>

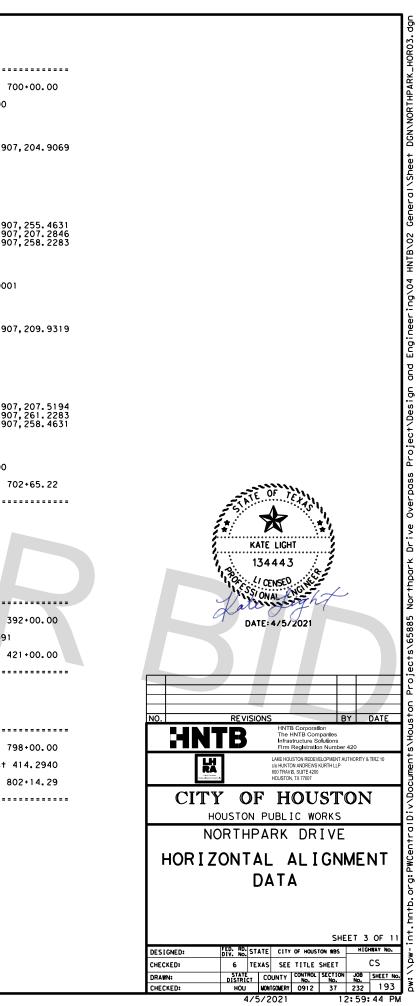
<u>BEBU-TURN</u>

Beginning chain	EBUTURN descriptic					== Po
		Curve	Data			Co
Curve EBUTURN-1 P.I. Station Delta = Degree = Tangent = Length = Radius = External = Long Chord =	600+25.00 1° 23' 53.30'' 2° 47' 46.61'' 25.0012 50.0000 2,049.0000 0.1525 49.9988	* N (LT)	* 10,025,781.1082	E	3, 906, 706. 2679	Cui P. De De Tai Lei Ra Ex
Mid. Ord. = P.C. Station P.T. Station C.C. Back = S Ahead = S Chord Bear = S	0.1525 600*00.00 600*50.00 79* 09' 56.93" E 80* 33' 50.24" E 79* 51' 53.59" E	N N N	10,025,785.8076 10,025,777.0093 10,027,798.2847	E E E	3,906,681.7123 3,906,730.9308 3,907,066.8574	Lor Mic P.(P.(Bac Ahe
		Curve				Cho
Curve EBUTURN-2 P.I. Station Delta = Degree = Tangent = Length = Radius = Externol =	600+96,96 85° 16′ 33,24″ 112° 20′ 40,80″ 46,9593 75,9056 51,0000 18,3266	N (LT)	10,025,769.3105	Ε	3, 906, 777. 2547	Cur P. De Deg Tar
Long Chord = Mid. Ord. = P.C. Station P.T. Station C.C. = Back = S Ahead = N Chord Bear = N	69.0911 13.4819 600+50.00 601+25.91 80° 33' 50.24" E 14° 09' 36.53" E 56° 47' 53.14" E	N N N	10,025,777.0093 10,025,814.8429 10,025,827.3192	Е	3, 906, 730. 9308 3, 906, 788. 7425 3, 906, 739. 2921	Ler Rac Exi Lor Mic P.(P.(Bac
Course from PT E	BUTURN_2 to PC EBU			E Dist	8.0274	Ahe
Curve EBUTURN-3		Curve *	Data *			Coi
P.I. Station Delta = Degree = Tangent = Length = Radius = External = Long Chord =	601+89.34 94° 44′ 35.29" 112° 20′ 40.80" 55.4069 84.3326 51.0000 24.3055 75.0476	N (LT)	10,025,876.3498	Ε	3,906,804.2606	Po End
Mid. Ord. = P.C. Station P.T. Station	16.4607 601+33.93 602+18.27	N N	10,025,822.6264 10,025,885.4154	Ē	3,906,790.7063 3,906,749.6004	<u> </u>
C.C. Back = N Ahead = N Chord Bear = N	14° 09′ 36.53" E 80° 34′ 58.76" W 33° 12′ 41.12" W	Ň	10, 025, 835, 1027	Ē	3,906,741.2559	Beq
		Curve *				Po
Curve EBUTURN-4 P.I. Station Delta = Degree = Tangent = Length =	602+43.27 1° 28′ 38.84″ 2° 57′ 17.69″ 25.0014 50.0000	N (RT)	10,025,889.5061	E	3,906,724.9360	Po Po End
Radius = External = Long Chord = Mid. Ord. = P.C. Station P.T. Station C.C.	1,939.0000 0.1612 49.9986 0.1612 602+18.27 602+68.27	N N N	10,025,885.4154 10,025,894.2314 10,027,798.2848	E E F	3, 906, 749. 6004 3, 906, 700. 3852 3, 907, 066, 8574	Beq
Back = N Abead = N	80° 34′ 58.76" W 79° 06′ 19.92" W 79° 50′ 39.34" W	IN .	10,021,198.2848	c	3,907,066.8574	Po Cou
Ending chain EBU						Po

<u>B</u> WB U-TURN

	RN1	1	v 10,	025,85	7.3628	E 3	, 907,3	05.38	96 Sta	
Course from	WBUTU	RN1 to								0000
					Curve	Data				
Curve WBUTUF P.I. Static Degree Tangent Length Radius External Long Chord Mid. Ord.		89° 112°	35' C 20' 4 50 79 51 20 71	00.63 1.05" 0.80" 0.6307 0.7400 0.0000 0.8642 0.8642 0.8623 1.8068	N (LT)	10,02	25,851.	9067	Ε	3,90
P.C. Static P.T. Static				50.00 29.74	N N	10,02	25,854.	3318	E E E	3,90
C.C. Back Ahead Chord Bear	= S	86° 53 2° 4 42° 00	I' 30.	92" W 13" E 40" W	N	10,02	25,803.	1209	L	3,90
Course from	PT WB	UTURN.	_1 to	PC WBL	TURN_2	S 2°	41′ 30	.13"	E Dist	5.000
					Curve *		*			
Curve WBUTUF . I. Static Delta Degree angent ength Cadius External .ong Chord Iid. Ord.		90° 112°	24' 5 20' 4 51 80 51 21 72	86.11 8.95" 10.80" .3720 .4812 .0000 .3884 2.3865 .0688	N (LT)	10,02	25, 745.	0219	E	3,90
P.C. Static P.T. Static C.C. Back Ahead Chord Bear	on on = S = N =	2° 4 86° 5 47° 5	701+ 702+ 1′30. 3′30.	13" E 92" E 60" E	N N N	10,02 10,02 10,02	5,796. 5,747. 5,798.	3372 8073 7322	E E E	3, 9(3, 9(3, 9(
Course from	PT WB	UTURN.	_2 to	WBUTUR	N8 N 80	6° 53′	30.92	" E D	ist 50.	0000
oint WBUTUF	RN8	ľ	N 10,	025,75	0.5182	E 3	, 907 , 3	11.15	48 S†a	
Ending chair		G ST	REE	rs						
Inding chair	CTINO	<u>g st</u>	<u>REE</u>	<u>rs</u>						
INTERSEC	<u>CTIN(</u> 194 hain L(00P_49	94 des	scripti						
INTERSEC	CTINO 194 hain Lo	00P_49	94 des	scripti					 84 Sta	
INTERSEC B LOOP 2 Beginning ct Point LP4941	<u>CTIN(</u> 194 nain L(00P_49	94 des N 10,	oz4,41	4.7554	Е 3	, 906, 5			. 999
INTERSEC <u>B LOOP 4</u> Beginning ct Point LP4941 Course from	CTIN(194 nain L(1001 LP494	00P_49	94 des N 10, to LP4	024,41 1941002	4.7554	E 3	8,906,5 8.10"	E Dis	+ 2,899	. 999
INTERSEC <u>B</u> LOOP 2 Beginning ct Point LP4941 Course from Point LP4941	CTIN(194 1001 LP494 1002	00P_49 	94 des N 10, to LP4 N 10,	024,41 941002 027,22	4.7554 N 14° 6.2905	E 3 11'1 E 3	6,906,5 8.10" 6,907,2	E Dis 60.52	+ 2,899 85 Sta	
Ending chair <u>INTERSEC</u> <u>Beginning ct</u> Point LP4941 Course from Point LP4941 Ending chair	CTINC 194 nain L0 1001 LP494 1002	00P_49	94 des N 10, to LP4 N 10,	024,41 941002 027,22	4.7554 N 14° 6.2905	E 3 11'1 E 3	6,906,5 8.10" 6,907,2	E Dis 60.52	+ 2,899 85 Sta	
Ending chair <u>INTERSEC</u> <u>Beginning ct</u> Beginning ct Course from Point LP4941 Ending chair <u>B</u> ANDERS Beginning ct	CTINC 194 1001 LP494 1002 D LOOP. SON F	00P_49 1001 - 1001 - N 2494 0 RD NDERS0	94 des N 10, to LP4 N 10, descri	024,41 0941002 027,22 ption	4.7554 N 14° 6.2905	E 3 11'1 E 3	906,5 8.10 9,907,2	E Dis 60.52	+ 2,899 85 Sta	
INTERSEC <u>INTERSEC</u> <u>Beginning ct</u> Beginning ct Course from Point LP4941 Ending chair <u>B ANDERS</u> Beginning ct	CT INC 194 1001 LP494 1002 D LOOP SON F Dain A	00P_49 1001 - 1001 - 1001 - NDERSC	94 des N 10, to LP4 N 10, descri	024,41 024,41 1941002 027,22 ption	4.7554 N 14° 6.2905	E 3 11'1 E 3	5,906,5 8.10" 5,907,2	E Dis 60.52	+ 2,899 85 Sta	
Ending chair <u>INTERSEC</u> <u>Beginning ch</u> Point LP4941 Course from Point LP4941 Ending chair <u>B</u> ANDERS Beginning ch	CTINC 194 1001 LP494 1002 n LOOP SON F hain Al	00P_49 1001 - 494 0 <u>RD</u> NDERS0	94 des N 10, Ho LP4 N 10, descri	024,41 1941002 027,22 ption descrip 025,32	4.7554 N 14° 6.2905 	E 3 11'1 E 3 E 3	906,5 8.10" 9,907,2 907,2 907,2 907,2	E Dis 60.52	+ 2,899 85 Sta 01 Sta	

Ending chain ANDERSONRD description

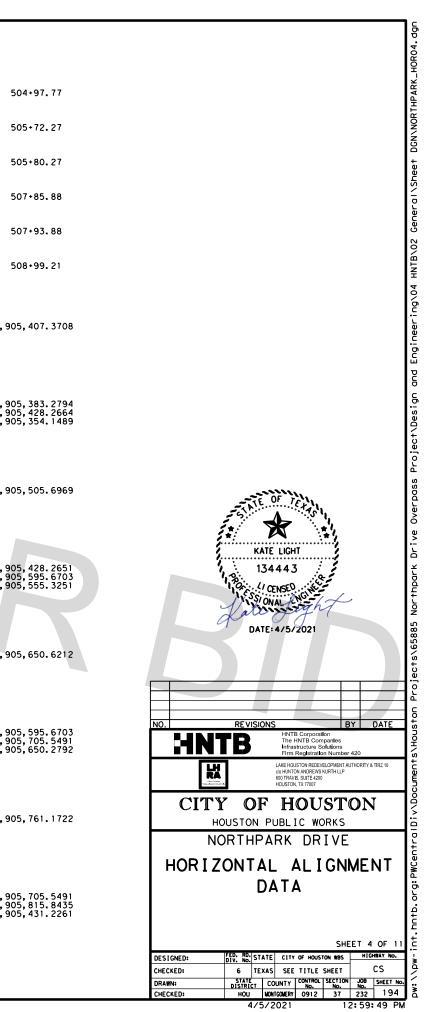


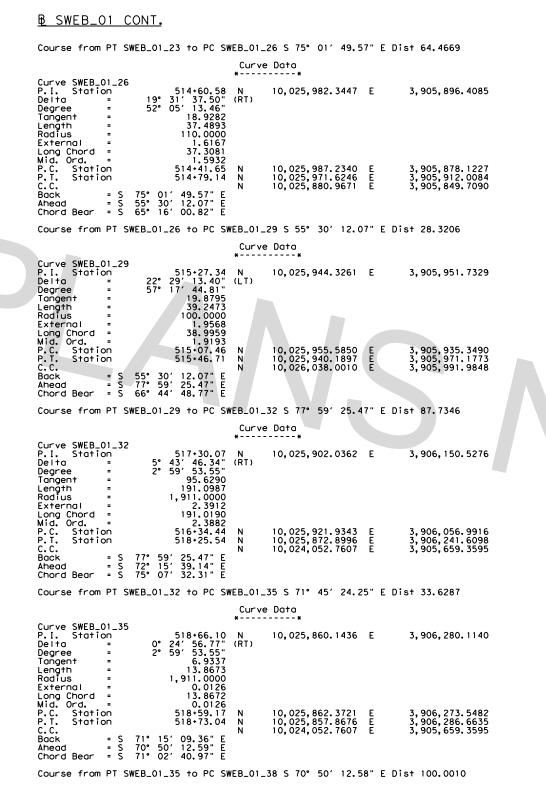
<u>SIDEPATH</u>

<u>B_____</u>SWEB_01

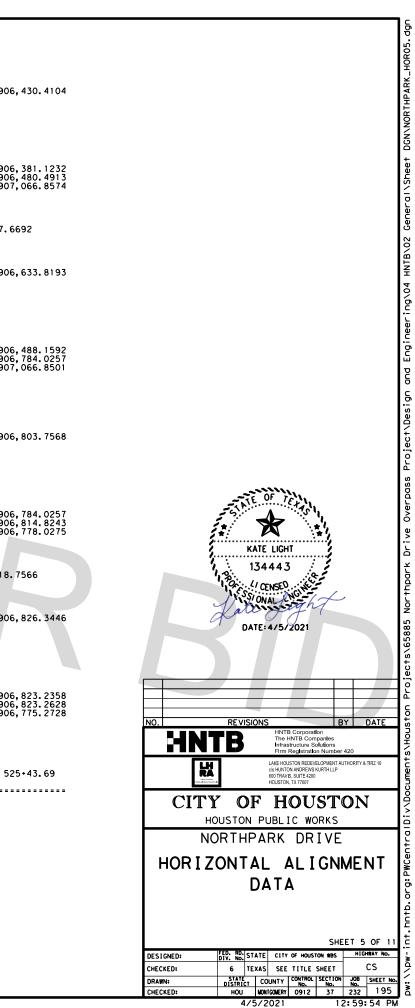
	SWEB_01 descriptio					Poi
		Curve	Data			Cou
Curve SWEB_01_1		*				Poi
P.I. Station Delta =	500+43.81 37°14′55.29"	N (RT)	10,026,275.5440	E	3,904,539.1261	Cou
Degree = Tangent =	44° 04′ 25.24" 43.8113					Poi
Length = Radius =	84.5146 130.0000					Cou
External = Long Chord =	7.1839 83.0341					Poi
Mid. Ord. = P.C. Station	6.8077 500+00.00	N	10,026,285,3205	E	3,904,496.4196	Cou
P.T. Station C.C.	500+84.51		10,026,285.3205 10,026,241.9124 10,026,158.5986	E E	3,904,567.2038 3,904,467.4100	Poi
Back = S Ahead = S	77° 06′ 21.11" E 39° 51′ 25.82" E					Cou
Chord Bear = S	58° 28′ 53.46" E					Poi
		Curve *				Cou
Curve SWEB_01_2 P.I. Station	501+40.62	N	10,026,198.8450	E	3,904,603.1591	
Delta = Degree =	50° 15′ 34.04"	(LT)				Cur P.I
Tangent = Length =	56.1033 104.2725					De I Deg
Radius = External =	114.0000 13.0574					Tañ Len
Long Chord = Mid. Ord. =	100.6754 11.7155					Rad Ext
P.C. Station P.T. Station	500+84.51 501+88.79	N N	10,026,241.9124	E	3,904,567.2038 3,904,659.2186	Lon Mid
C.C. Back = S	39° 51′ 25.82" E 87° 44′ 09.82" E	N	10,026,314.9723	E	3,904,654.7152	P.C P.T
Ahead = N Chord Bear = S	87° 44′ 09.82" E 66° 03′ 38.00" E					C.C Bac
		Curve	Data			Ahe Cho
Curve SWEB_01_3 P.I. Station	502.34 14	ж	10 026 202 8530	Е	3 004 704 5306	
Delta =	502+34.14 28° 19′ 16.58" 31° 52′ 20.75"	(RT)	10,026,202.8530	-	3,904,704.5396	Cur
Tangent =	45.3564 88.8582					P.I Del
Length = Radius = External =	179.7660 5.6336					Deg
Long Chord = Mid, Ord, =	87.9563 5.4624					Rad
P.C. Station P.T. Station	501+88.79	N N	10,026,201.0613 10,026,182.9293	E	3,904,659.2186 3,904,745.2857	Ext Lon Mid
C.C. Back = N	87° 44′ 09.82″ E	Ň	10,026,021.4356	Ē	3,904,666.3199	P. C P. T
Ahead = S Chord Bear = S	63° 56′ 33.60" E 78° 06′ 11.89" E					C.C Bac
		Curve	Data			Ahe Cho
Curve SWEB_01_4			*			0110
P.I. Station Delta =	503+51.51 42° 52′ 56.80" 30° 27′ 49.70"	N (LT)	10,026,149.3903	E	3,904,811.0953	Cur
Degree = Tangent =	30° 27′ 49.70" 73.8632					P.I Del
Lenāth = Radius =	140.7652 188.0782					Deg
External =	13.9841 137.5027					Len Rad
Long Chord = Mid. Ord. = P.C. Station	13.0163 502+77.65	N	10,026,182.9293	Е	3,904,745.2857	Ext Lon
P.T. Station C.C.	504+18.41	N N	10,026,169.5978 10,026,350.5007	E E	3,904,882.1406 3,904,830.6861	Mid P.C P.T
Back = S Ahead = N	62° 59′ 41.92" E 74° 07′ 21.28" E					P.T C.C
Chord Bear = S	84° 26′ 10.32" E	_	_			Bac Ahe
		Curve *				Cho
Curve SWEB_01_5 P.I. Station	504+55.72	N	10,026,179.8039	Е	3,904,918.0228	_
Delta = Degree =	34° 58′ 01.76"	(RT)				Cur P.I
Tangent = Length =	37.3055 73.3604					Del Deg
Radius = External =	163.8560 4.1931 72.7403					Len
Long Chord = Mid. Ord. =	72.7493 4.0884	N	10 026 160 5070	F	3 004 992 1406	Rad Ext
P.C. Station P.T. Station	504+18.41 504+91.77	N N N	10,026,169.5978 10,026,173.4704 10,026,011.9931	E E F	3,904,882.1406 3,904,954.7867 3,904,926,9683	Mid
C.C. Back = N Ahead = S	74° 07′ 21.28" E 80° 13′ 31.33" E	N	10,020,011,9931	C	3,904,926.9683	Mid P.C P.T C.C
Chord Bear = N	86° 56′ 54.97" E					Bac
						Ahe Cho

Course from PT SWEB_01_5 to 33 S 80* 17' 37.01" E Dist 6.0000 Point 33 N 10,026,172.4588 E 3,903,960.7008 Sto Course from 34 to 35 S 76* 28' 32.46" E Dist 74.4958 Point 35 N 10,026,155.0374 E Jist 74.4357 Course from 34 to 35 S 77* 57' 54.51" E Dist 8.0000 Point 35 N 10,026,153.3393 E 3,905,040.9551 Sto Course from 35 to 36 S 78* 25' 46.58" E Dist 205.6145 Point 35 N 10,026,112.1289 E 3,905,220.2316 Sto Course from 37 to 38 S 76* 31' 57.16" E Dist 8.0000 Point 37 N 10,026,110.5384 E 3,905,250.2316 Sto Course from 37 to 38 S 76* 54' 17.75" E Dist 105.3244 Point 38 N 10,026,066.6753 E J,905,322.8171 Sto Course from 38 to PC SWEB_01_20 S 77* 59' 25.48" E Dist 31.1440 Curve Outor Curve SWEB_01_20 Curve SWEB_01_21 Curve SWEB_01_21 Curve SWEB_01_22 Curve SWEB_01_22 Stotion S09.78,11 N 10,026,039.2261 E 3, N 10,026,039.2261 E 3, N 10,026,039.2261 E 3, N 10,026,039.2261 E 3, Curve SWEB_01_22 Stotion S11=53.55 N 10,026,039.0534 E 3, Curve SWEB_01_22 Stotion S11=53.55 N 10,026,039.0534 E 3, Curve SWEB_01_22 Points Stotion S11=53.55 N 10,026,039.0534 E 3, Curve SWEB_01_23 Points Stotion S11=53.55 N 10,026,039.0534 E 3, N 10,026,039.0534 E 3, Curve SWEB_01_23 Points Stotion S11=53.55 N 10,026,039.0534 E 3, Cu									
Caurse from 33 to 34 S 76' 28' 32.46' E Dist 74.4958 Point 34 N 10,026,155.0374 E 3,905,033.1309 Sto Caurse from 34 to 35 S 77' 57' 54.51' E Dist 8.0000 Point 35 N 10,026,153.3693 E 3,905,040.9551 Sto Caurse from 35 to 36 S 78' 25' 46.58' E Dist 205.6145 Point 36 N 10,026,112.1289 E 3,905,242.3913 Sto Caurse from 37 to 38 S 76' 54' 17.75' E Dist 8.0000 Point 37 N 10,026,010.5384 E 3,905,250.2316 Sto Caurse from 37 to 38 S 76' 54' 17.75' E Dist 105.3244 Point 38 N 10,026,086.6753 E 3,905,352.8171 Sto Caurse from 38 to PC SWEB_01_20 S 77' 59' 25.48' E Dist 31.1440 Curve Data Curve SWEB_01_20 Point 37 N 10,026,086.6753 E 3,905,352.8171 Sto Caurse from 38 to PC SWEB_01_20 S 77' 59' 25.48' E Dist 31.1440 Curve Data Curve SWEB_01_20 Point 37 N 10,026,086.6753 E 3,905,352.8171 Sto Caurse from 38 to PC SWEB_01_20 S 77' 59' 25.48' E Dist 31.1440 Curve Data Curve SWEB_01_20 Point 37 N 10,026,086.0753 E 3,905,352.8171 Sto Caurse from 38 to PC SWEB_01_20 S 77' 59' 25.48' E Dist 31.1440 Curve Data Curve SWEB_01_20 Point 35 Stotion 19' 59' 72.13' N 10,026,080.1950 E 3, C.C. Back : S 77' 59' 25.47' E Ancad A : S 56' 00' 44.51' E Curve Data Curve SWEB_01_21 Point 35 Stotion 509 377.11 N 10,026,082.0312 E 3, Curve Data Curve SWEB_01_22 Pi.1 Stotion 511 4555 S N 10,026,026.0314 E 3, Decree : 25' 52' 23.67' Tangent : 10' 62' 55' 37' (T) Decree : 25' 52' 23.67' Tangent : 10' 65' 55' 37' (T) Decree : 25' 52' 23.67' Tangent : 10' 65' 55' 37' (T) Decree : 10' 65' 55' 37' (T) Decree : 10' 65' 55' 70' 10,026,028.0314 E 3, Curve Data Curve SWEB_01_22 Pi.1 Stotion 511 4555 S N 10,026,029.0534 E 3, Pi.1 Stotion 511 4555 S N 10,026,028.0534 E 3, Curve Data Curve SWEB_01_22 Pi.1 Stotion 512 40.65 N 10,026,028.9303 E 3, Pi.1 Stotion 512 40.65 N 10,026,028.9303 E 3, Pi.1 Stotion 512 40.05 N 10,026,028.9303 E 3, Pi.1 Stotion 512 40.05 N 10,026,028.9303 E 3, Pi.1 Stotion 512 40.05 N 10,026,028.9303 E 3, Pi.1 Stotion 512 40,05 N 10,026,028.9303 E 3, Pi.2 Stotion 512 40,05 N 10,026,028.9303	Course from	PT SW	EB_01_	.5 to 33 S a	80° 17'	37.01"	E Dist 6.	. 0000	
Point 34 N 10,026,155.0374 E 3,905,033,1309 Sta Course from 34 to 35 S 77* 57* 54.51* E Dist 8.0000 Point 35 N 10,026,153.3693 E 3,905,040,9551 Sta Course from 35 to 36 S 78* 25* 46.58* E Dist 205.6145 Point 36 N 10,026,112.1289 E 3,905,242.3913 Sta Course from 36 to 37 S 78* 31* 57.16* E Dist 8.0000 Point 37 N 10,026,112.1289 E 3,905,242.3913 Sta Course from 37 to 38 S 76* 54* 17.75* E Dist 105.3244 Point 38 N 10,026,066.6753 E 3,905,352.8171 Sta Course from 38 to PC SWEB_0L20 S 77* 59* 25.47* E Dist 31.1440 Curve SWEB_01_20 Station 10.026,075.0700 E 3, Degree 10* 57* 51* 25.47* E N 10,026,075.0700 E 3, Degree 12* 5001 Station 509* 50.35 N 10,026,013.7101 E 3, Degree 25* 52* 25.47* E N 10,026,013.7101 E 3, 3, 3, 3, Degree 12* 50* 70.39 N 10,026,013.7101 E 3, 3, 3, 3, Defree 12* 52* 25.47* E N 10,026,039.2261 E 3, 3, 3, 3, 3, 3, 3, 3, 3,	Point 33		N	10,026,1	72.4588	E 3,9	904,960.70	008 Sta	
Course from 34 to 35 S 77* 57 54.51* E Dist 8.000 Point 35 N 10,026,153.3693 E 3,905,040.9551 Sta Course from 35 to 36 S 78* 25' 46.58* E Dist 205.6145 Point 36 N 10,026,112.1289 E 3,905,242.3913 Sta Course from 36 to 37 S 78* 31' 57.16* E Dist 8.0000 Point 37 N 10,026,0110.5384 E 3,905,250.2316 Sta Course from 37 to 38 S 76* 54' 17.75* E Dist 105.3244 Point 38 N 10,026,086.6753 E 3,905,352.8171 Sta Course from 38 to PC SWEB.01.20 S 77* 59' 25.48* E Dist 31.1440 Curve SWEB.01.20 Defree SWEB.01.20 Defree SWEB.01.20 Curve SWEB.01.20 Defree SWEB.01.20 Defree SWEB.01.20 Curve SWEB.01.20 Defree SWEB.01.20 Curve SWEB.01.20 Defree SWEB.01.20 Curve SWEB.01.21 Sto 76.35 N 10,026,080.1350 E 3, Curve Data Curve Data Curve Data Curve Data Curve Data Curve SWEB.01.21 Sto 77.535 N 10,026,062.0312 E 3, Curve Data Curve SWEB.01.21 Sto 77.535 N 10,026,026.0312 E 3, Curve Data Curve SWEB.01.22 Pil. Station Sul 435.55 N 10,026,022.0312 E 3, Curve Data Curve SWEB.01.22 Pil. Station Sul 435.55 N 10,026,022.0312 E 3, Curve Data Curve SWEB.01.22 Pil. Station Sul 435.55 N 10,026,022.032 E 3, Curve Data Curve SWEB.01.22 Pil. Station Sul 435.55 N 10,026,028.030 E 3, Curve SWEB.01.22 Pil. Station Sul 435.55 N 10,026,028.030 E 3, Curve Data Curve SWEB.01.22 Pil. Station Sul 435.55 N 10,026,028.030 E 3, Curve SWEB.01.23 Pil. Station Sul 435.55 N 10,026,028.030 E 3, Curve SWEB.01.23 Pil. Station Sul 435.55 N 10,026,028.030 E 3, Curve SWEB.01.23 Pil. Station Sul 436.000 Cuterona Curve SWEB.01.23 Pil. Station Sul 436.000 Curve SWEB.01.23 Pil. Station Sul 436.000 Curve SWEB.01.23 Pil. Station Sul 436.000 Curve SWEB.01.23 Pil. Station Sul 436.000 Curve SWEB.01.23 Pil. Station Sul 44.55.55 N 10,026,	Course from	33 to	34 S	76° 28′ 32.	.46" E [Dist 74.	4958		
Point 35 N 10,026,153,3693 E 3,905,040,9551 Sta Course from 35 to 36 S 78* 25' 46,58* E Dist 205,6145 Point 36 N 10,026,112,1289 E 3,905,242,3913 Sta Course from 36 to 37 S 78* 31' 57.16* E Dist 8,0000 Point 37 N 10,026,110.5384 E 3,905,250.2316 Sta Course from 37 to 38 S 76* 54' 17.75* Dist 105,3244 Point 38 N 10,026,086,6753 E 3,905,352.8171 Sta Course from 38 to PC SWEB_01_20 S 77* 59' 25.48* E Dist 31.1440 Curve SWEB_01_20 P.1. Station P.1. Station Detta 19* 57' 21:35' (RT) Degree 40* 55' 32.00° Tangent 246,030 External 25 S 68* 00' 44.51* E Curve Data Curve SWEB_01_21 P.1. Station External 25 S 68* 00' 44.51* E Chard Bear 5 S 68* 00' 44.51* E Curve Data Curve SWEB_01_21 P.1. Station Curve SWEB_01_21 P.1. Station Curve SWEB_01_22 P.1. Station Curve SWEB_01_21 P.1. Station Curve SWEB_01_21 P.1. Station Curve SWEB_01_22 P.1. Station Curve SWEB_01_21 P.1. Station Curve SWEB_01_22 P.1. Station Detta 21' 06' 15:97' (RT) Degree 10' 05' 15:97' (RT) Degree	Point 34		N	10,026,1	55.0374	E 3,9	905,033.13	309 Sta	
Course from 35 to 36 S 78° 25′ 46.58° E Dist 205.6145 Point 36 N 10,026,112.1289 E 3,905,242.3913 Sto Course from 36 to 37 S 78° 31′ 57.16° E Dist 8.0000 Point 37 N 10,026,110.5384 E 3,905,250.2316 Sto Course from 37 to 38 S 76° 54′ 17.75° E Dist 105.3244 Point 38 N 10,026,066.6753 E 3,905,352.8171 Sto Course from 38 to PC SWEB_01_20 S 77° 59′ 25.48° E Dist 31.1440 Curve SWEB_01_20 Dist. Station Degree 40° 55′ 32.00° Early 100 Course from 38 to PC SWEB_01_20 S 77° 59′ 25.48° E Dist 31.1440 Curve SWEB_01_20 Dist. Station Curve SWEB_01_20 For Station 10° 57′ 21.76 N 10,026,080.1950 E 3, Padius 1 40° 0000 Early 10° Course from 500° 73.11 N 100.026,080.1950 E 3, Curve SWEB_01_21 50° 53.45° E Chord Bear + S 68° 00′ 44.51° E Curve SWEB_01_21 510° 70.39 N 100.026,080.1950 E 3, Curve SWEB_01_21 510° 70.39 N 100.026,080.013.7101 E 3, Delto 1 170.6225 Curve Data Curve SWEB_01_22 510° 70.39 N 100.026,020.013.7101 E 3, Delto 21° 10° 50° 77.11 N 100.026,020.013.4 E 3, Curve SWEB_01_22 510° 70.43 N 100.026,020.0534 E 3, Curve SWEB_01_22 55° 212.09° 41 P, C. Station 50° 77.11 N 100.026,020.0534 E 3, Curve SWEB_01_22 55° 88° 00° 12.1°57° Degree 10° 55° 54.94° Curve Data Curve SWEB_01_22 55° 50° 88° 50° 88° 50° 80° 50° 85° 50° 80° 80° 80° 80° 80° 80° 80° 80° 80° 8	Course from	34 to	35 S	77° 57′ 54.	.51" E [Dist 8.(0000		
Point 36 N 10,026,112.1289 E 3,905,242.3913 Sta Course from 36 to 37 S 78* 31' 57.16* E Dist 8,0000 Point 37 N 10,026,110.5384 E 3,905,250.2316 Sta Course from 37 to 38 S 76* 54' 17.75* E Dist 105,3244 Point 38 N 10,026,086.6753 E 3,905,352.8171 Sta Course from 38 to PC SWEB_01_20 T* 59' 25.48* E Dist 31,1440 Curve SWEB_01_20 P.1. Station 509+54.98 Mid. 0rd, - 2,1176 N 10,026,075.0700 E 3, Degree - 40* 55' 21.93* (RT) 10,026,075.0700 E 3, Degree - 40* 55' 20.00* Tangent - 24.6305 Mid. 0rd, - 2,1176 N 10,026,080.1950 E 3, Curve SWEB_01_21 Curve SWEB_01_21 Curve SWEB_01_21 Curve SWEB_01_21 P.1. Station 509+30.35 N 10,026,080.1950 E 3, P.C. Station 509+79.11 N 10,026,082.1950 E 3, P.C. Station 509+79.11 N 10,026,082.0902 E 3, Curve SWEB_01_21 P.1. Station 500+30.5 N 10,026,082.035 E 3, P.C. Station 510+70.39 N 10,026,013.7101 E 3, Degree - 225 22 527 277 Tangent - 174.4367 Radius - 240.0000 External - 16.7696 Long Chord Bear - 5 58* 02' 02.18* E Aread - 55* 02' 02.18* E Aread - 100.125 N 10,026,029.0534 E 3, Curve SWEB_01_22 P.1. Station - 51+53.55 N 10,026,029.0534 E 3, Curve SWEB_01_22 P.1. Station - 51+53.55 N 10,026,029.0534 E 3, Curve SWEB_01_22 P.1. Station - 51+53.405 N 10,026,029.0534 E 3, P.1. Station - 51+53.405 N 10,026,029.0534 E 3, Back - S 59* 02' 02.18* E Aread - 105.526 Radius - 300.0000 External - 110.5226 N 10,026,029.0534 E 3, P.1. Station - 51+53.55 N 10,026,029.0534 E 3, P.1. Station - 51+53.55 N 10,026,029.0534 E 3, Back - N 79* 30' 43.15* E Curve Data Curve SWEB_01_23 P.1. Station - 51+53.55 N 10,026,029.0534 E 3, Back - N 79* 30' 43.15* E Aread Bear - S 79* 30' 43.15* E Area	Point 35		N	10,026,1	53.3693	E 3,9	905,040.9	551 Sta	
Course from 36 to 37 S 78* 31' 57.16" E Dist 8.0000 Point 37 N 10,026,110.5384 E 3,905,250.2316 Sto Course from 37 to 38 S 76* 54' 17.75" E Dist 105.3244 Point 38 N 10,026,066.6753 E 3,905,352.8171 Sto Course from 38 to PC SWEB_01_20 S 77* 59' 25.48" E Dist 31.1440 Curve SWEB_01_20 pin Station 19* 57' 21.93* Curve Course from 38 to PC SWEB_01_20 S 77* 59' 25.48" E Dist 31.1440 Curve SWEB_01_20 pin Station 29* 57' 21.93* Curve SWEB_01_20 pin Station 29* 57' 21.93* N 10,026,075.0700 E 3, Perform 4 46' 52' 20.00" Tangent 40' 55' 21.93* N 10,026,080.1950 E 3, Pr. 5 Station 509*79.11 N 10,026,080.1950 E 3, Pr. 5 Station 509*79.11 N 10,026,080.1950 E 3, Pr. 5 Station 509*79.11 N 10,026,082.0335 N 10,026,080.1950 E 3, Pr. 5 Station 509*79.11 N 10,026,013.7101 E 3, Bergree 2 23' 52' 23.54" E Curve Data Curve SWEB_01_21 Station 509*79.11 N 10,026,013.7101 E 3, Bergree 2 23' 52' 23.54" E Curve Data Curve SWEB_01_21 Station 509*79.11 N 10,026,013.7101 E 3, Bergree 2 23' 52' 23.54" E Curve Data Curve SWEB_01_21 Station 509*79.11 N 10,026,025.0331 E 3, N 10,026,025.0332 E 3, N 10,026,025.0332 E 3, N 10,026,025.0334 E 3, N 10,026,039.2261 E 3, Curve SWEB_01_22 F. 1. Station 509*79.11 N 10,026,039.2261 E 3, Pr. 5 Station 512*64.05 N 10,026,039.2261 E 3, Curve SWEB_01_22 F. 1. Station 512*64.05 N 10,026,029.0534 E 3, Curve SWEB_01_23 P. C. Station 512*64.05 N 10,026,029.0534 E 3, P. C. Station 512*64.05 N 10,026,028.9303 E 3, Curve SWEB_01_23 P. C. Station 512*64.05 N 10,026,038.802 E 3, Curve SWEB_01_23 P. C. Station 512*64.05 N 10,026,028.9303 E 3, Curve SWEB_01_23 P. C. Station 512*64.05 N 10,026,038.862 E 3, Curve SWEB_01_23 P. C. Station 512*64.05	Course from	35 to	36 S	78° 25′ 46.	.58" E C	Dist 209	5.6145		
Point 37 N 10,026,110.5384 E 3,905,250.2316 Sta Course from 37 to 38 5 76* 54' 17.75" E Dist 105.3244 Point 38 N 10,026,086.6753 E 3,905,352.8171 Sta Course from 38 to PC SWEB_01_20 S 77* 59' 25.48" E Dist 31.1440 Curve Data Curve SWEB_01_20 P.1. Station 509+54.98 N 10,026,075.0700 E 3, Degree 40' 55' 32.00" Tangent 1 24.6305 Radfus 1 40.0000 External 2.176 P.C. Station 509+79.11 N 10,026,080.1950 E 3, C.C. Station 509+79.11 N 10,026,082.0302 E 3, C.C. Station 509+79.11 N 10,026,082.0312 E 3, Curve SWEB_01_21 510+70.39 N 10,026,082.0312 E 3, Curve SWEB_01_21 510+70.39 N 10,026,062.0312 E 3, Curve SWEB_01_21 510+70.39 N 10,026,029.0334 E 3, Curve SWEB_01_22 512+09.49 E 100,026,029.0334 E 3, Curve SWEB_01_22 512+09.49 E 100,026,029.0334 E 3, Curve SWEB_01_22 512+09.49 E 100,026,029.0334 E 3, Curve SWEB_01_22 512+09.48 E 100,026,029.0334 E 3, Curve Data Curve SWEB_01_22 512+09.48 E 100,026,029.0334 E 3, Curve Data Curve SWEB_01_22 512+09.48 E 100,026,029.0334 E 3, Curve Data Curve SWEB_01_23 513+70 K 100,026,029.0334 E 3, Curve Data Curve SWEB_01_23 513+20.64 N 10,026,029.0334 E 3, Curve Data Curve SWEB_01_23 513+20.64 N 100,026,029.0334 E 3, Curve Data Curve SWEB_01_23 513+20.64 N 100,026,028.9303 E 3, Curve SWEB_01_23 513+20.64 N 100,026,028.9303 E 3, Curve Data Curve SWEB_01_23 512+64.05 N 100,026,028.9303	Point 36		Ν	10,026,1	12.1289	E 3,9	905,242.39	913 Sta	
Course from 37 to 38 5 76' 54' 17. 75' E Dist 105.3244 Point 38 N 10,026,086.6753 E 3,905,352.8171 Sta Course from 38 to PC SWEB_01_20 S 77' 59' 25.48' E Dist 31.1440 Curve SWEB_01_20 Deita Station 19' 57' 21.93' (R1) Degree 40' 55' 32.00' Tangent 40' 55' 32.00' Radius 1 16.0000 Exter Chord 4 40' 55' 32.47' Radius 1 10,026,080.1950 E 3, P' T. Station 509' 79.11 N 10,026,082.033 E 3, C.C. Curve SWEB_01_21' Peria Station 509' 79.11 N 10,026,082.0312 E 3, Curve SWEB_01_21' Defree 2 23' 52' 23.67' Curve SWEB_01_21' Peria Station 509' 79.11 N 10,026,062.0312 E 3, Curve SWEB_01_21' Peria Station 509' 79.11 N 10,026,062.0312 E 3, Curve SWEB_01_21' Peria Station 509' 79.11 N 10,026,062.0312 E 3, Curve SWEB_01_22' Prit. Station 509' 79.11 N 10,026,062.0312 E 3, Curve SWEB_01_22' Prit. Station 509' 79.11 N 10,026,028.0324 E 3, Curve SWEB_01_22' Prit. Station 509' 79.11 N 10,026,028.0324 E 3, Curve Data Curve SWEB_01_22' Prit. Station 511' 53.55 N 10,026,029.0534 E 3, Curve Data Curve SWEB_01_22' Prit. Station 511' 53.55 N 10,026,029.0534 E 3, Curve Data Curve Data Curve Data Curve Data Curve SWEB_01_23 Prit. Station 511' 53.55 N 10,026,029.0534 E 3, Curve Data Curve Da	Course from	36 to	5 37 S	78° 31′ 57.	.16" E [Dist 8.(0000		
Point 38 N 10,026,086.6753 E 3,905,352.8171 Sta Course from 38 to PC SWEB_01_20 S 77* 59' 25.48" E Dist 31,1440 Curve SWEB_01_20 P: 1. Station Delta 19' 57' 21:33 Curve SWEB_01_20 P: 1. Station Delta 19' 57' 21:33 Mid. Ord. 4 26.7619 Reduus 1 40.0000 External 2:1501 N 10,026,080.1950 E 3, Curve SWEB_01_21 P: 1. Station 509*19,11 N 10,025,943.2592 E 3, Back 15 S8* 02' 03:54" E Ahead 15 58* 02' 03:54" E Curve Data Curve SWEB_01_21 P: 1. Station 509*19,11 N 10,026,080.1950 E 3, Curve SWEB_01_21 Delta 138' 37.33" Curve SWEB_01_21 Delta 23' 52' 23:67" Tangent 23' 52' 23:67" Tangent 23' 52' 23:67" Curve SWEB_01_21 P: 1. Station 509*19,11 N 10,026,062.0312 E 3, Curve SWEB_01_21 Delta 11' 138' 37.33" N 10,026,062.0312 E 3, Curve SWEB_01_22 P: 1. Station 509*19,11 N 10,026,062.0312 E 3, Curve SWEB_01_21 Delta 23' 52' 23:67" Tangent 23' 52' 23:67" Tangent 50*19' 20:49" Curve SWEB_01_22 P: 1. Station 509*19,11 N 10,026,062.0312 E 3, Curve SWEB_01_22 P: 1. Station 509*19,11 N 10,026,062.0312 E 3, Curve SWEB_01_22 P: 1. Station 509*19,11 N 10,026,062.0312 E 3, Curve SWEB_01_22 P: 1. Station 509*19,11 N 10,026,039.2261 E 3, N 10,026,039.234 E 3, N 10,026,039.234 E 3, N 10,026,039.334 E 3, N 10,026,039.334 E 3, N 10,026,038.933 E 3, N 10,026,038.933 E 3, N 10,026,038.933 E 3, N 10,026,038.933 E 3, N 10,026,038.850 E 3, Back N 79* 30' 43.15" E Curve Data Curve SWEB_01_23 P: 1. Station 511*507 N 10,026,038.862 E 3, N 10,026,038.850 E 3, N 10,026,038.85	Point 37		Ν	10,026,1	10.5384	E 3,9	905,250.2	316 Sta	
Course from 38 to PC SWEB_01_20 S 77* 59' 25.48" E Dist 31.1440 $\begin{array}{c} Curve Data \\ \hline \\ Curve SWEB_01_20 \\ P.1. Station \\ Degree \\ 19' 57' 21.33' (RT) \\ Degree \\ 24' 6305 \\ Length \\ 10' 70 \\ Curve Data \\ 25176 \\ P.C. 57ation \\ 509'79.11 \\ N \\ 10,026,080.1950 \\ E \\ Aread \\ S \\ S \\ Corree SWEB_01_21 \\ P.I. Station \\ 10' 70 \\ P.I. Station \\ 10' 70' 70' 70' 70' 70' 70' 70' 70' 70' 7$	Course from	37 to	38 S	76° 54′ 17.	.75" E C	Dist 10	5.3244		
$\begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} $	Point 38		Ν	10,026,08	86.6753	E 3,9	905,352.8	171 Sta	
Curve SWEB_01_20 P.1. Station Degree = 40° 55° 32.00° Congent = 19° 57° 21.33° (RT) Degree = 40° 55° 32.00° Congent = 22.1501 Congent = 2.1501 Cong Chord = 48.5158 Mid. Ord. = 2.1176 P.C. Station 509*30.35 N 10,026.062.0302 E 3, C.C. Back = S 77° 59° 25.47° E Ahead = S 58° 02° 03.54° E Curve Data Curve SWEB_01_21 P.1. Station 509*79.11 N 10,026,062.0312 E 3, Curve SWEB_01_21 P.1. Station 509*79.11 N 10,026,013.7101 E 3, Degree = 23° 52° 23.67° Tangent = 91.2722 Length = 174.4367 Radius = 246.0066 Long Chord = 15.6744 P.C. Station 509*79.11 N 10,026,013.7101 E 3, Degree = 23° 52° 23.67° Tangent = 91.2722 Length = 174.4367 Radius = 58° 02° 02.18° E N 10,026,029.0534 E 3, Curve SWEB_01_22 P.1. Station 501*73.55 N 10,026,029.0534 E 3, C.C. Back = S 58° 02° 02.18° E N 10,026,029.0534 E 3, Radius = 300.0000 External = 21° 06° 15.97° Degree = 19° 05° 54.94° Curve SWEB_01_22 P.1. Station 511*53.55 N 10,026,029.0534 E 3, Radius = 300.0000 External = 110.5026 Radius = 300.0000 External = 105° 54.94° N 10,026,028.9303 E 3, N 10,026,028.9534 E 3, N 10,026,028.9534 E 3, N 10,026,028.9533 E 3, N 10,026,028.9534 E 3, Curve SWEB_01_22 P.1. Station 511*63.55 N 10,026,028.9534 E 3, Curve SWEB_01_22 P.1. Station 512*64.05 N 10,026,028.9534 E 3, N 10,026,028.9533 E 3, N 10,026,028.9533 E 3, N 10,026,028.9533 E 3, N 10,025,734.0655 E 3, Back = N 79° 30° 43.15° E Ahead = N 80°.00.08° E Curve Data Curve SWEB_01_23 P.1. Station 512*64.05 N 10,026,028.9303 E 3, N 10,025,734.0655 E 3, Back = N 79° 30° 43.15° E Ahead = N 499.0000 External = 1.3.1292 Radius = 1.0743 N 10,026,028.9303 E 3, N 10,025,028.9303 E 3, N 10,025,028.9303 E 3, N 10,025,028.9303 E 3, N 10,025,028.9303 E 3, N 10,025,038.862 E 3, Ahead = S 79° 23' 00.88° E Curve Data E Ahead = S 79° 23' 00.88° E	Course from	38 to	PC SW	EB_01_20 S	77° 59′	25.48	" E Dist :	31.1440	
Curve SWEB_01_20 P. I. Station Deiro Degree = $19^{+} 57' 21.33^{+}$ (RT) Degree = $40^{+} 55' 32.00^{+}$ Curve SWEB_01_21 Prove SWEB_01_21 Prove SWEB_01_21 Prove SWEB_01_21 Prove SWEB_01_22 Prove SWEB_01_23 Prove SV									
Delto = 19* 57' 21.93" (RT) Degree = 40* 55' 32.00" Tangent = 24.6305 Length = 48.7619 Radius = 140.0000 External = 2.1501 Long Chad = 42.5158 Mid. Ord. = 58* 02' 03.54" E Anead = 5 58* 02' 03.54" E Curve SWEB_01_21 Pit. Station 509*79.11 N 10,026,062.0303 E Curve SWEB_01_21 Pit. Station 509*79.11 N 10,026,013.7101 E Curve SWEB_01_21 Pit. Station 509*79.11 N 10,026,013.7101 E Curve SWEB_01_21 Pit. Station 509*79.11 Pit. Station 509*79.11 Pit. Station 509*79.11 N 10,026,013.7101 E Curve SWEB_01_21 Pit. Station 509*79.11 Pit. Station 509*79.11 N 10,026,022.0312 E State 23* 52' 23.67" Curve Data Curve SWEB_01_22 Pit. Station 501*70.39 N 10,026,022.0312 E 3, Curve SwEB_01_22 Pit. Station 501*73.55 N 10,026,029.0534 E Curve Data Curve SWEB_01_22 Pit. Station 501*53.55 N 10,026,039.2261 E Curve SWEB_01_22 Pit. Station 511*53.55 N 10,026,029.0534 E Curve Data Curve SWEB_01_22 Pit. Station 511*53.55 N 10,026,029.0534 E Curve Data Curve SWEB_01_22 Pit. Station 511*53.55 N 10,026,029.0534 E Curve Data Curve SWEB_01_22 Pit. Station 511*53.55 N 10,026,029.0534 E Curve SWEB_01_22 Pit. Station 511*53.55 N 10,026,029.0534 E Curve Data Curve SWEB_01_23 Pit. Station 511*53.55 N 10,026,029.0534 E Curve Data Curve SWEB_01_23 Pit. Station 513*20.64 N 10,026,029.0534 E Curve Data Curve SWEB_01_23 Pit. Station 513*20.64 N 10,026,029.0534 E Curve Data Curve SWEB_01_23 Pit. Station 513*20.64 N 10,026,029.0534 E Anead = S 79* 23' 00.88* E Curve Data N 10,026,028.9303 E 3, N 10,025,734.0655 E Curve Data N 10,026,028.9303 E 3, N 10,026,028.9303 E 3, N 10,026,028.9303 E 3, N 10,026,028.9303 E 3, N 10,026,028.9303 E 3, N 10,026,028.9303 E 3, N 10,026,038.862 E Curve Data N 10,026,038.862 E Curve Data N 10,026,038.862 E Curve Data N 10,026,038.862 E Curve Data N 10,026,038.862 E N 10,026,038.862 E N 10,026,038.862 E N 10,026,038.862 E N 10,026,038.862 E N 10,026,038.9303 E 3, N 10,026,038.862 E N 10,026,038.862 E N 10,026,038.862 E				E00.E4 00			075 0700	-	7 (
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Back = S 77* 59' 25.47" E Chord Bear = S 68° 00' 44.51" E Curve SWEB_01_21 P:I. Station 510*70.39 N 10,026,013.7101 E 3, Degree = 23° 52' 23.67" Tangent = 91.2722 Length = 174.4367 Radius = 240.0000 External = 16.7696 Long Chord = 170.6225 Mid. Ord, = 58° 02' 02.18" E Ahead = N 80° 19' 20.49" E Curve Data Curve SWEB_01_22 P.I. Station 511*53.55 N 10,026,029.0534 E 3, Curve SWEB_01_22 P.I. Station 512*64.49" Curve SWEB_01_22 P.I. Station 512*64.94" Degree = 19' 05' 54.94" Curve SWEB_01_22 P.I. Station 511*53.55 N 10,026,029.0534 E 3, Curve SWEB_01_22 P.I. Station 512*64.05 N 10,026,029.0534 E 3, Curve SWEB_01_22 P.I. Station 512*64.05 N 10,026,029.0534 E 3, Curve SWEB_01_22 P.I. Station 511*53.55 N 10,026,029.0534 E 3, Curve SWEB_01_22 P.I. Station 511*53.55 N 10,026,029.0534 E 3, Curve SWEB_01_22 P.I. Station 511*53.55 N 10,026,029.0534 E 3, Curve SWEB_01_23 P.I. Station 511*53.55 N 10,026,029.0534 E 3, Curve SWEB_01_23 P.I. Station 511*53.75 N 10,026,028.9303 E 3, Curve SWEB_01_23 P.I. Station 511*50.76 (RT) Degree = 3° 50' 52.57" Tangent = 113.1020 Mid. Ord. = 1,489.0000 External = 1,489.0000 Externa		on		509+30.35		10,026	080.1950	Ē	3,9
Ahead = \$ \$ \$8* 02' 03.54" E Chord Bear = \$ \$6* 00' 44.51" E Curve Data P.1. Station 510*70.39 N 10,026,013.7101 E pelta = 41* 38' 37.33" (LT) Degree = 23* 52' 23.67" Tangent = 174.4367 Radius = 240.0000 External = 16.7696 Long Chord = 15.6744 P.C. Station 501*53.55 N 10,026,062.0312 E Ahead = N 80* 19' 20.49" E Curve Data Curve Data Curve SWEB_01_22 P.1. Station 511*53.55 N 10,026,029.0534 E Ahead = N 80* 19' 20.49" E Curve Data Curve SWEB_01_22 P.1. Station 511*53.55 N 10,026,039.2261 E Delta = 21* 06' 15.97" Curve SWEB_01_22 P.1. Station 511*63.55 N 10,026,029.0534 E Curve SWEB_01_22 P.1. Station 511*63.55 N 10,026,029.0534 E Delta = 21* 06' 15.97" Curve SWEB_01_22 P.1. Station 511*63.55 N 10,026,029.0534 E Ahead = N 79* 30' 43.15" E Ahead = S 79* 23' 00.88" E Curve Data Curve SWEB_01_23 P.C. Station 511*63.55 N 10,026,029.0534 E S.0000 External = 5.1846 Long Chord = 109.8789 Mid. Ord. = 5.0735 P.C. Station 511*63.55 N 10,026,029.0534 E S.0000 External = 5.12*64.05 N 10,026,028.0534 E Ahead = S 79* 23' 00.88" E Curve Data Curve Data Tangent = 113.1292 Radius = 11.489.0000 External = 113.1292 Radius = 1.489.0000 External = 1.13.1292 Radius = 1.489.0000 External = 1.0730 Degree = 3* 50' 52.57" Tangent = 1.13.1292 Radius = 1.489.0000 External = 1.0743 P.1. Station 513*77.18 N 10,026,028.9303 E J. 0000 External = 1.0743 P.C. Station 513*77.18 N 10,026,028.9303 E J. 00024,565.4182 E J. 0000 External = 1.0743 P.C. Station 513*77.18 N 10,024,565.4182 E J. 0000 External = 1.0743 P.C. Station 513*77 E	C.C.		770 50			10,025	943.2592	Ē	3,9
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Chord Bear = S 78° 51′ 20.85° E Curve SWEB_01_22 P.I. Station 512+09.43 N 10,026,039.2261 E 3, Delta = 21° 06′ 15.97° (RT) Degree = 19° 05′ 54.94″ Tangent = 55.8846 Length = 110.5026 Radius = 300.0000 External = 5.0735 P.C. Station 512+64.05 N 10,026,029.0534 E 3, C.C. N 10,026,028.9303 E 3, C.C. N 10,025,734.0655 E 3, Back = N 79° 30′ 43.15° E Ahead = S 79° 23′ 00.88° E Curve SWEB_01_23 P.I. Station 513+20.64 N 10,026,018.5042 E 3, Delta = 4° 21′ 11.30° Degree = 3° 50′ 52.57° Tangent = 56.5918 Length = 113.1292 Radius = 1,489.0000 External = 1.0743 P.C. Station 512+64.05 N 10,026,028.9303 E 3, Delta = 4° 21′ 11.30° Degree = 3° 50′ 52.57° Tangent = 1.0743 P.C. Station 512+64.05 N 10,026,028.9303 E 3, Delta = 4° 21′ 11.30° Degree = 3° 50′ 52.57° Tangent = 56.5918 Length = 113.1292 Radius = 1,489.0000 External = 1.0743 P.C. Station 512+64.05 N 10,026,028.9303 E 3, P.T. Station 512+64.05 N 10,026,028.9303 E 3, D.0000 External = 1.0743 P.C. Station 512+64.05 N 10,026,028.9303 E 3, P.T. Station 512+64.05 N 10,026,028.9303 E 3, D.0000 External = 1.0743 P.C. Station 512+64.05 N 10,026,028.9303 E 3, D.0000 External = 1.0743 P.C. Station 512+64.05 N 10,026,028.9303 E 3, D.0000 External = 1.0743 P.C. Station 512+64.05 N 10,026,028.9303 E 3, D.0024,565.4182 E 3,	Back		58° 02 80° 19	' 02.18" E				-	•,
Curve SWEB_01_22 P.I. Station $512 + 09.43$ N 10,026,039.2261 E 3, Delta = 21° 06′ 15.97" (RT) Degree = 19° 05′ 54.94" Tangent = 55.8846 Length = 110.5026 Radius = 300.0000 External = 5.1608 Long Chord = 109.8789 Mid. Ord. = 5.0735 P.C. Station $511 + 53.55$ N 10,026,029.0534 E 3, P.T. Station $512 + 64.05$ N 10,026,028.9303 E 3, C.C. Back = N 79° 30′ 43.15" E Ahead = 5 79° 23′ 00.88" E Curve Data Curve SWEB_01_23 P.I. Station $513 + 20.64$ N 10,026,018.5042 E 3, Delta = 4° 21′ 11.30" Degree = 3° 50′ 52.57" Tangent = 13.1292 Radius = 1,489.0000 External = 1.0743 P.C. Station $512 + 64.05$ N 10,026,018.5042 E 3, Delta = 4° 21′ 11.30" Degree = 3° 50′ 52.57" Tangent = 1.0743 P.C. Station $512 + 64.05$ N 10,026,028.9303 E 3, Length = 1.13.1292 Radius = 1,489.0000 External = 1.0743 P.C. Station $512 + 64.05$ N 10,026,028.9303 E 3, Long Chord = 1.0743 P.C. Station $512 + 64.05$ N 10,026,028.9303 E 3, D. 0,026,028.9303 E 3, D. 0,024,565.4182 E 3, N 10,024,565.4182 E 3, D. 0,024,565.4182 E 3,			78° 51	20.85" E					
P.I. Station $512+09.43$ N $10,026,039.2261$ E 3, Delta = $21^{\circ} 06' 15.97'' (RT)$ Degree = $19^{\circ} 05' 54.94'' (RT)$ Degree = $19^{\circ} 05' 54.94'' (RT)$ Degree = $10^{\circ} 05' 54.94'' (RT)$ Degree = $10^{\circ} 05' 54.94'' (RT)$ External = 5.0735 P.C. Station $511+53.55$ N $10,026,029.0534$ E 3, P.T. Station $512+64.05$ N $10,026,028.9303$ E 3, C.C. N $10,025,734.0655$ E 3, Back = N $79^{\circ} 30' 43.15'' E$ Ahead = S $79^{\circ} 23' 00.88'' E$ Curve SWEB_01_23 P.I. Station $513+20.64$ N $10,026,018.5042$ E 3, Delta = $4^{\circ} 21' 11.30'' (RT)$ Degree = $3^{\circ} 50' 52.57''$ Tangent = 56.5918 Length = 113.1292 Radius = $1,489.0000$ External = 1.0750 Long Chord = 113.1020 Mid. Ord. = 1.0743 P.C. Station $512+64.05$ N $10,026,028.9303$ E 3, P.T. Station $512+64.05$ N $10,026,028.9303$ E 3, Delta = 1.0743 P.C. Station $512+64.05$ N $10,026,028.9303$ E 3, P.T. Station $512+64.05$ N $10,026,028.9303$ E 3, D.C. N $10,024,565.4182$ E 3, D.C. N $10,024,565.4182$ E 3, D.C. N $10,024,565.4182$ E 3, Deck = S $75^{\circ} 01' 49.57'' E$					Curve *	Data			
Delta = $21^{\circ} 06' 15.97"$ (RT) Degree = $19^{\circ} 05' 54.94"$ Tangent = 55.8846 Length = 110.5026 Radius = 300.0000 External = 5.1608 Long Chord = 109.8789 Mid. Ord. = 5.0735 P.C. Station $511+53.55$ N $10,026,029.0534$ E $3,7$ P.T. Station $512+64.05$ N $10,026,028.9303$ E $3,7$ C.C. Back = N $79^{\circ} 30' 43.15"$ E Ahead = $5 79^{\circ} 23' 00.88"$ E Chord Bear = $5 89^{\circ} 56' 08.86"$ E Curve Data ** Curve SWEB_01_23 P.I. Station $513+20.64$ N $10,026,018.5042$ E $3,7$ Delta = $4^{\circ} 21' 11.30"$ (RT) Degree = $3^{\circ} 50' 52.57"$ Tangent = 56.5918 Length = 113.1292 Radius = $1,489.0000$ External = 1.0743 N $10,026,028.9303$ E $3,7$ P.C. Station $512+64.05$ N $10,026,028.9303$ E $3,7$ P.T. Station $512+64.05$ N $10,026,028.9303$ E $3,7$ Degree = $3^{\circ} 50' 52.57"$ Tangent = 1.0743 N $10,026,028.9303$ E $3,7$ P.C. Station $512+64.05$ N $10,026,028.9303$ E $3,7$ P.T. Station $513+77.18$ N $10,026,028.9303$ E $3,7$ P.T. Station $513+77.18$ N $10,026,03.8862$ E $3,7$ Back = S $79^{\circ} 23' 00.88"$ E Ahead = S $75^{\circ} 01' 49.57"$ E				512+09.43	N	10.026	039.2261	E	3.9
Back = N 79° 30' 43.15" E Ahead = S 79° 23' 00.88" E Chord Bear = S 89° 56' 08.86" E $\begin{array}{r} Curve Data \\ **\\ Curve SWEB_01_23 \\ P.I. Station 513+20.64 \\ P.I. Station 513+20.64 \\ P.I. Station 513+20.64 \\ P.I. Station 512,57" \\ Tangent = 4° 21' 11.30" (RT) \\ Degree = 3° 50' 52.57" \\ Tangent = 56.5918 \\ Length = 113.1292 \\ Radius = 1,489.0000 \\ External = 1,489.0000 \\ External = 1,0743 \\ P.C. Station 512+64.05 \\ P.I. Station 512+64.05 \\ P.I. Station 513+77.18 \\ P.G. Station 513+77.18 \\ $	Delta Degree Tangent Length Radius External Long Chord Mid. Ord.	- - - - - - -	21° 19°	06' 15.97" 05' 54.94" 55.8846 110.5026 300.0000 5.1608 109.8789 5.0735	(RT)			_	
Back = N 79° 30' 43.15" E Ahead = S 79° 23' 00.88" E Chord Bear = S 89° 56' 08.86" E $\begin{array}{r} Curve Data \\ **\\ Curve SWEB_01_23 \\ P.I. Station 513+20.64 \\ P.I. Station 513+20.64 \\ P.I. Station 513+20.64 \\ P.I. Station 512,57" \\ Tangent = 4° 21' 11.30" (RT) \\ Degree = 3° 50' 52.57" \\ Tangent = 56.5918 \\ Length = 113.1292 \\ Radius = 1,489.0000 \\ External = 1,489.0000 \\ External = 1,0743 \\ P.C. Station 512+64.05 \\ P.I. Station 512+64.05 \\ P.I. Station 513+77.18 \\ P.G. Station 513+77.18 \\ $	P.I. Statio			512+64.05	N	10,026	028.9303	E	3,9
Chord Bear = S 89° 56′ 08.86″ E Curve Data ** Curve SWEB_01_23 P.I. Station 513+20.64 N 10,026,018.5042 E 3,° Delta = 4° 21′ 11.30″ (RT) Degree = 3° 50′ 52.57″ Tangent = 56.5918 Length = 113.1292 Radius = 1,489.0000 External = 1.0750 Long Chord = 113.1020 Mid. Ord. = 1.0743 P.C. Station 512+64.05 N 10,026,028.9303 E 3,° P.T. Station 513+77.18 N 10,026,003.8862 E 3,° P.T. Station 513+77.18 N 10,026,003.8862 E 3,° P.T. Station 513+77.18 N 10,026,038.862 E 3,° Back = S 79° 23′ 00.88″ E Ahead = S 75° 01′ 49.57″ E	Back		79° 30	43.15" E	in in	10,025,	, 134.0035	-	5,
Curve SWEB_01_23 ************************************				08.86" E					
Curve SWEB_01_23 P.1. Station 513+20.64 N 10,026,018.5042 E 3, Delta = 4° 21' 11.30" (RT) Degree = 3° 50' 52.57" Tangent = 56.5918 Length = 113.1292 Radius = 1,489.0000 External = 1.0750 Long Chord = 113.1020 Mid. Ord. = 1.0743 P.C. Station 512+64.05 N 10,026,028.9303 E 3, P.T. Station 513+77.18 N 10,026,003.8862 E 3, C.C. N 10,024,565.4182 E 3, Back = S 75° 01' 49.57" E									
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$				513+20 64			018 5042	F	7 (
Back = S 79°23′00.88″E Ahead = S 75°01′49.57″E	Delta Degree Tangent Length Radius External Long Chord Mid. Ord.	- - - - - - -		21' 11.30" 50' 52.57" 56.5918 113.1292 1,489.0000 1.0750 113.1020 1.0743	(RT)				
Back = S 79°23′00.88″E Ahead = S 75°01′49.57″E	P.T. Static	n		513+77.18	N	10,026,	,003.8862	E	3, 9
	Back Ahead	= S = S = S	75° 01	′ 49.57" E		,		-	3,





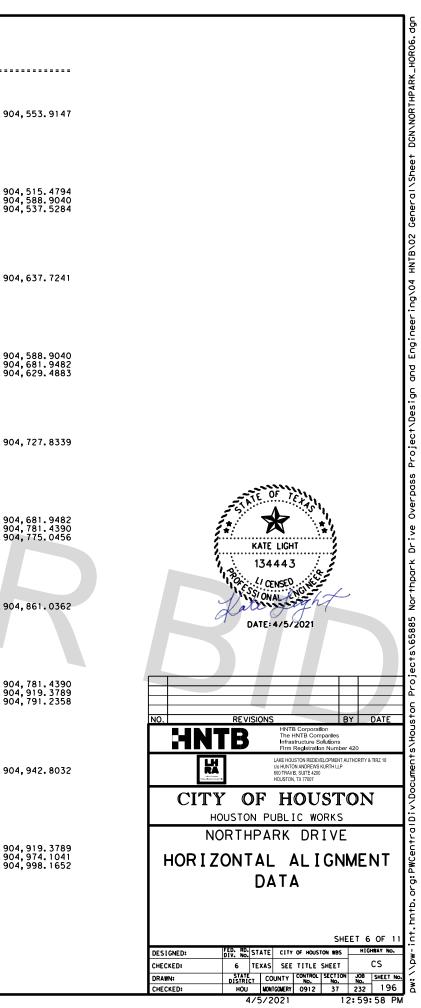
	Curve		
Curve SWEB_01_38 P.I. Station 520+25.21 Delta = 2° 51' 41.93" Degree = 2° 44' 33.85" Tangent = 52.1786 Length = 104.3355 Radius = 2,089.0000 External = 0.6516 Long Chord = 104.3246	* N (LT)	* 10,025,807.9132 E	3, 906
Wid. Ord. = 0.6513 P.C. Station 519+73.04 P.T. Station 520+77.37 C.C. Back = 50' 12.59" E Ahead = 73° 41' 54.52" E Chord Bear = 72° 16' 03.55" E	N N N	10,025,825.0413 E 10,025,793.2671 E 10,027,798.2847 E	3, 906 3, 906 3, 907
Course from PT SWEB_01_38 to PC SW	/EB_01_4	41 S 88° 54′ 59,52" E Di	st 7.6
	Curve	Data	
Curve SWEB_01_41	*	-	
P. I. Station 522+36.65 Delta = 8° 18° 34.63" Degree = 2° 44' 43.32" Tangent = 151.6049 Length = 302.6781 Radius = 2,087.0000 External = 5.4992 Long Chord = 302.4129	N (LT)	10,025,751.0845 E	3,906,
Mid. Ord. = 5.4848 P.C. Station 520+85.04 P.T. Station 523+87.72 C.C.	N N N	10,025,793.1220 E 10,025,730.5394 E 10,027,798.2868 E	3,906 3,906 3,907
Back = S 73° 54′ 06.66" E Ahead = S 82° 12′ 41.30" E Chord Bear = S 78° 03′ 23.98" E			
	Curve	Data	
Curve SWEB_01_42		*	
P. I. Station 524+07.63 Delta = 48° 26′ 59.11″ Degree = 129° 26′ 57.03″ Tangent = 19.9149 Length = 37.4276 Radius = 44.2612 External = 4.2739 Long Chord = 36.3224	N (RT)	10,025,727.8406 E	3, 906
Mid. Ord. = 3.8976 P.C. Station 523+87.72 P.T. Station 524+25.15	N N	10,025,730.5394 E 10,025,711.2843 E	3,906 3,906
C.C. Back = S 82° 12' 41.30" E Ahead = S 33° 45' 42.19" E Chord Bear = S 57° 59' 11.74" E	Ň	10, 025, 686. 6865 E	3, 906
Course from PT SWEB_01_42 to PC SW	EB_01_4	15 S 26° 38' 40.82" E Di	st 18.
	Curve		
Curve SWEB_01_45 524+56.48 P.I. Station 524+56.48 Delta = 28° 30' 12.64" Degree = 115° 44' 56.58" Tangent = 12.5730 Length = 24.6253 Radius = 49.5000 External = 1.5718		10,025,682.3369 E	3, 906
External = 1.5718 Long Chord = 24.3721 Mid. Ord. = 1.5234 P. C. Station 524*43.90 P. T. Station 524*68.53 C.C. Back = Back = 1.4° 18' 54.54" E Ahead = 5 14° 11' 18.10" W Chord Bear = 0° 03' 48.22" E	N N N	10,025,694.5195 E 10,025,670.1474 E 10,025,682.2804 E	3, 906, 3, 906, 3, 906,
Course from PT SWEB_01_45 to 39 S	14° 11′	18.10" W Dist 75.1609	
Point 39 N 10,025,59	7.2793	E 3,906,804.8401 Sta	52
Ending chain SWEB_01 description			



<u>B</u> SWEBO2

<u>¢ SWEBUZ</u>	<u>¤ 5WV</u>
Beginning chain SWEB_02 description	Beginni
Point SWEB2001 N 10,025,699.0063 E 3,906,913.4211 Sta 625+00.00	
Course from SWEB2001 to PC SWEB_021 S 84° 54' 16.57" E Dist 38.1138 Curve Data	Curve S P.I. S Delta Degree
Curve SWEB_021 P.1. Station 625+42.12 N 10,025,695.2656 E 3,906,955.3724 Delta = 9° 09' 24.71" (RT) Degree = 114° 35' 29.61" Tangent = 4.0040 Length = 7.9909 Radius = 50.0000 External = 0.1601 Long Chord = 7.9824	Tangent Length Radius Externc Long Ch Mid. Or P.C. S P.T. S C.C.
P.C. Station 625+38.11 N 10,025,695.6212 E 3,906,951.3843 P.T. Station 625+46.10 N 10,025,694.2799 E 3,906,959.2532 C.C. N 10,025,645.8188 E 3,906,946.9436 Back = S 84° 54′ 16.57″ E Ahead = S 75° 44′ 51.86″ E	Back Ahead Chord B
Chord Bear = S 80° 19′ 34.21" E Course from PT SWEB_021 to PC SWEB_022 S 75° 44′ 51.86" E Dist 27.4657	Curve S P.I. S Delta
Curve Data	Degree Tangent
With the system of the syst	Length Radius Externo Long Ch Mid. Or P.C. S P.T. S C.C. Back
Long Chord = 19.6171 Mid. Ord. = 1.2212 P.C. Station 625+73.57 N 10,025,687.5181 E 3,906,985.8735 P.T. Station 625+93.39 N 10,025,687.4983 E 3,907,005.4905 C.C. N 10,025,726.2869 E 3,906,995.7211	Ahead Chord B
Bock = S 75° 44′ 51.86″ E Ahead = N 75° 51′ 48.07″ E Chord Bear = S 89° 56′ 31.89″ E	Curve S P.I. S Delta
Course from PT SWEB_022 to PC SWEB_023 N 75° 51′ 48.07" E Dist 84.0016	Degree Tangent
Curve Data	Length Radius
Curve SWEB_023 P.I. Station 626+83.21 N 10,025,709.4351 E 3,907,092.5889 Delta = 13° 16′ 16.85″ (RT) Degree = 114° 35′ 29.61″ Tangent = 5.8167 Length = 11.5814 Radius = 50.0000 External = 0.3372 Long Chord = 11.5556	Externo Long Ch Mid. Or P.C. S C.C. Back Ahead Chord E
Mid. Ord. = 0.3349 P.C. Station 626+77.39 N 10,025,708.0144 E 3,907,086.9483 P.T. Station 626+88.97 N 10,025,709.5229 E 3,907,098.4050 C.C. N 10,025,659.5286 E 3,907,099.1600 Back = N 75° 51′ 48.07" E Ahead = N 89° 08′ 04.92" E Chord Bear = N 82° 29′ 56.50" E	Curve S P.I. S Delta Degree Tangent
Curve Data	Length Radius Externo
Curve SWEB_024 P.I. Station 627+29.86 N 10,025,710.1405 E 3,907,139.2913 Delta = 2° 14′ 34.00″ (LT) Degree = 2° 44′ 33.85″ Tangent = 40.8910 Length = 81.7715 Radius = 2,089.0000 External = 0.4002 Long Chord = 81.7663	Long Ch Mid. Or P.C. S P.T. S C.C. Back Ahead Chord E
Mid. Ord. = 0.4001 P.C. Station 626+88.97 N 10,025,709.5229 E 3,907,098.4050 P.T. Station 627+70.74 N 10,025,712.3576 E 3,907,180.1221 C.C. N 10,027,798.2848 E 3,907,066.8574 Back = N 89° 08′ 04.92″ E Ahead = N 86° 53′ 30.92″ E Chord Bear = N 88° 00′ 47.92″ E	Curve S P.I. S Delta Degree Tangent
Course from PT SWEB_024 to SWEB2002 N 86° 53′ 30.92" E Dist 1,338.6658	Length Radius Externo
Point SWEB2002 N 10,025,784.9395 E 3,908,516.8188 Sta 641+09.41 Ending chain SWEB_02 description	Long Ch Mid. Or P.C. S P.T. S C.C.
	Back

		SWWB_01 descriptio				
			Curve			
P.I. Delta Degre Tange Lengt Radiu Exter Long	ee = ent = th = us = rnal = Chord =	500+39.17 37° 50′ 32.40″ 50° 08′ 22.61″ 75.4739 114.2725 6.5273 74.1096	N (LT)	10,026,414.0636	Ε	3, 9
Mid. P.C. P.T. C.C. Back	Ord. = Station Station = S	6.1746 500+00.00 500+75.47 78° 52′ 29.84" E		10,026,421.6218 10,026,431.6746 10,026,533.7469	E E E	3, 9) 3, 9) 3, 9)
Ahead		63° 16′ 57.75″ E 82° 12′ 13.95″ E	Curve	Data		
P.I. Delta Degre Tange Lengt Radiu Exter Long	ee = ent = th = us = rnal = Chord =	501+30.44 63°46′18.86″ 64°51′06.23″ 54.9623 98.3349 88.3489 15.7010 93.3371		* 10,026,456.9224	E	3,9
Mid. P.C. P.T. C.C. Back Ahead	Ord. = Station Station = N d = S	13.3317 500+75.47 501+73.81 62° 39' 14.07" E 53° 34' 27.06" E	N N N	10,026,431.6746 10,026,424.2868 10,026,353.1989	E E E	3, 9) 3, 9) 3, 9)
	i Bear = S	85° 27′ 36.49" E	Curve			
P.I. Delto Degro Tango Leng Radiu Exter	ee = ent = th = us = rnol =	502+27, 45 33° 13′ 42.14″ 31° 52′ 20.75″ 53.6390 104.2543 179.7660 7.8319	* (LT)	* 10,026,396.5081	Ε	3,9
Mid. P.C. P.T. C.C. Back Ahead	Chord = Ord. = Station Station = S d = N d Bear = S	102.7994 7.5049 501+73.81 502+78.06 58° 48′ 35.21″ E 87° 57′ 42.65″ E 75° 25′ 26.28″ E	N N N	10,026,424.2868 10,026,398.4158 10,026,578.0680	E E E	3, 9) 3, 9) 3, 9) 3, 9)
Curve	e SWWB_01_4		Curve *	Data *		
P.I. Delta Degre Tange Lengt Radiu Exter	Station ====================================	503+57.77 45° 56′ 00.23″ 30° 27′ 49.70″ 79.7055 150.7802 188.0782 16.1921 146.7747	N (RT)	10,026,402.5676	E	3, 9
Mid. P.C. P.T. C.C. Back Ahead Chord	Ord. = Station Station = N d = S d Bear = S	14.9086 502+78.06 504+28.84 87° 00' 50.97" E 47° 03' 08.80" E 70° 01' 08.91" E	N N N	10,026,398.4158 10,026,348.2620 10,026,210.5929	E E E	3, 9(3, 9(3, 9(
Curve	e SWWB_01_5		Curve *	Data *		
P.I. Delto Degre Lenge Radiu Exter Long Mid. P.C.	Station ====================================	504+60.84 30° 56' 16.67" 49° 32' 53.81" 32.0014 62.4400 115.6363 4.3464 61.6842 4.1889 504+28.84 504+91.28	N (LT) N	10,026,326.4585 10,026,348.2620 10,026,319.7988	E	3, 90 3, 90 3, 90
P.T. C.C. Back Ahead Chord	Station = S d = S d Bear = S	504+91.28 47° 03′ 08.80" E 77° 59′ 25.47" E 62° 31′ 17.14" E	N N	10,026,319.7998 10,026,432.9051	E	3,91

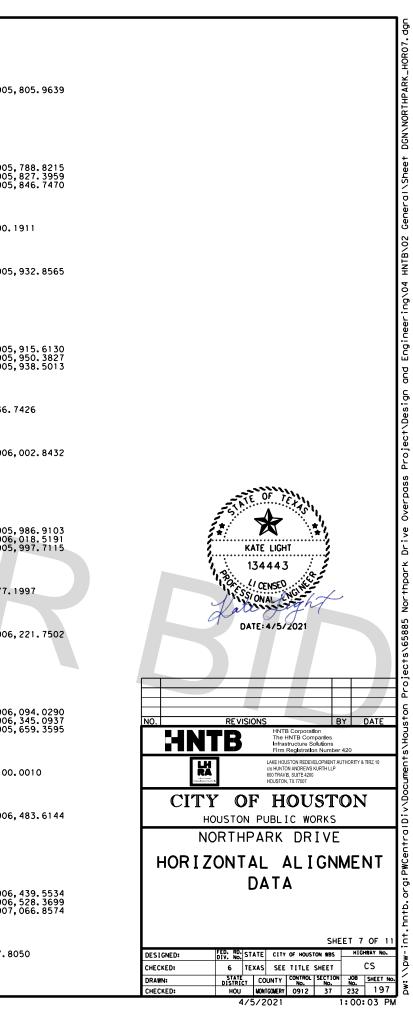


<u>B SWWB01 CONT.</u>

Course from PT SWWB_01_5 to 40 S	77° 59′	25.47"	E Dist 18	.1377		
Point 40 N 10,026,3	16.0258	E 3,9	04,991.84	48 Sta	505+09.42	
Course from 40 to 41 S 76° 36' 10	.45" E	Dist 82.	5962			
Point 41 N 10,026,2	96.8884	E 3,9	05,072.19	34 Sta	505+92.02	
Course from 41 to 42 S 78° 36' 41	.77" E	Dist 13.	2485			
Point 42 N 10,026,2	94.2724	E 3,9	05,085.18	10 Sta	506+05.27	
Course from 42 to 43 S 77° 51' 06	.25" E	Dist 203	. 5477			
Point 43 N 10,026,2	51.4373	E 3,9	05,284.17	06 Sta	508+08.81	
Course from 43 to 44 S 76° 04' 17	.40" E	Dist 8.0	000			
Point 44 N 10,026,2	49.5116	E 3,9	05,291.93	54 Sta	508+16.81	
Course from 44 to PC SWWB_01_18 S	77° 59	′25 . 48"	E Dist 1	11.8257		
		Data				
Curve SWWB_01_18 P.I. Station 509+51.91 Delta = 17° 04′ 46.75" Degree = 36° 57′ 54.07" Tangent = 23.2751 Length = 46.2049 Radius = 155.0000	(LT)	10,026,	221.4005	E	3, 905, 424. 0791	
External = 1.7378 Long Chord = 46.0340						
Mid. Ord. = 1.7185 P.C. Station 509+28.64	N	10,026,	226.2435 223.4574	E	3,905,401.3135 3,905,447.2631	
C.C. 509+74.84	N N	10,026, 10,026,	223.4574 377.8510	E	3,905,447.2631 3,905,433.5652	
Back = S 77° 59' 25.47" E Ahead = N 84° 55' 47.78" E						
Chord Bear = 5 86° 31' 48.85" E		Dette				
	*	Data *				
Curve SWWB_01_19 P.I. Station 510+53.78 Delta = 33° 46' 40.58"	N (BT)	10,026,	230.4336	E	3, 905, 525. 8936	
Degree = 22° 02' 12.62"	(RT)					
Tangent = 78.9394 Length = 153.2794 Radius = 260.0000						
External = 11.7194						
Long Chord = 151.0694 Mid. Ord. = 11.2139 P.C. Station 509+74.84		10.026	227 4574	F	3 005 447 2631	
P.T. Station 511+28.12 C.C.		10,026,	223.4574 192.5155 964.4747	E	3,905,447.2631 3,905,595.1298 3,905,470.2403	
Bock = N 84° 55′ 47.78" E Ahead = S 61° 17′ 31.64" E	in in	10,023,	504.4747	L	5, 505, 470, 2405	
Chord Bear = 5 78° 10' 51.93" E						
		Data				
Curve SWWB_01_20 P.I. Station 511+85.39	N	10.026.	165,0068	F	3,905,645.3590	
Delta = 36° 14′ 28.83″ Degree = 32° 44′ 25.60″	ίΞτ)			-	0,000,00000000	
Tangent = 57.2687 Length = 110.6929						
Radius = 175.0000 External = 9.1323						
Long Chord = 108.8568 Mid. Ord. = 8.6794						
P.C. Station 511+28.12 P.T. Station 512+38.82	N		192.5155 172.5151	E E	3,905,595.1298 3,905,702.1334	
C.C. Back = S 61° 17′ 31.64" E	N	10,026,	346.0046	Ē	3, 905, 679, 1900	
Ahead = N 82° 27' 59.53" E Chord Bear = S 79° 24' 46.06" E						
		Data				
Curve SWWB_01_21	*	*				
P.I. Station 512+87.69 Delta = 46° 02′ 58.87"	(RT)	10,026,	178.9153	E	3,905,750.5860	
Degree = 49° 49′ 20.70" Tangent = 48.8735						
Length = 92.4276 Radius = 115.0000						
External = 9.9545 Long Chord = 89.9600						
Mid. Ord. = 9.1614 P.C. Station 512+38.82	N		172.5151	Ē	3,905,702.1334	
P.T. Station 513+31.24 C.C.	N	10,026, 10,026,	148.4743 058.5054	E E	3,905,788.8215 3,905,717.1933	
Back = N 82° 28′ 30.58" E Ahead = S 51° 28′ 30.55" E Chard Back = S 74° 28′ 50.99" E						
Chord Bear = \$ 74° 29' 59.99" E						

		Curve				
Curve SWWB_01_22 P.I. Station Delta = Degree = Tangent = Length = Radius = External = Long Chord =	513+53.16 26° 30′ 54.92″ 61° 36′ 30.11″ 21.9117 43.0384 93.0000 2.5464 42.6554	N (LT)		134.8265	Σ	3,90
Mid. Ord. = P.C. Station P.T. Station C.C. Back = S Ahead = S	2.4786 513+31.24 513+74.28 51° 28′ 30.55″ E 77° 59′ 25.47″ E	N N N	10,026,	148.4743 130.2673 221.2318	3 E	3,905 3,905 3,905
Chord Bear = S	64° 43′ 58.01" E					
Course from PI	SWWB_01_22 to PC SW	WB_01_2 Curve	_	59' 25.	57" E	Dist 90.
Curve SWWB_01_2	5	*	*			
P.I. Station Delta = Degree = Tangent = Length = Radius = External = Long Chord =	514+82.10 18° 12' 37.24" 52° 05' 13.46" 17.6293 34.9613 110.0000 1.4037 34.8144	N (LT)	10,026,	107.8325	5 E	3,905
Mid. Ord. = P.C. Station P.T. Station C.C.	1.3861 514+64.47 514+99.43	N N N	10,026, 10,026, 10,026,	111.5008 109.736 219.0932	B E 7 E 2 E	3,905 3,905 3,905
Back = S Ahead = N Chord Bear = S	77° 59′ 25.47" E 83° 47′ 57.29" E 87° 05′ 44.09" E					
	SWWB_01_25 to PC SW	WB_01_2	28 N 83°	47′57.	29" E	Dist 36.
		Curve				
Curve SWWB_01_22 P.I. Station Delta = Degree =	515+52.20 18° 12′ 37.24" 57° 17′ 44.81"	N (RT)	10,026,	115.4364	4 E	3,906
Tangent = Length = Radius = External = Long Chord =	16.0267 31.7830 100.0000 1.2761 31.6494					
Mid. Ord. = P.C. Station P.T. Station C.C.	1.2600 515+36.18 515+67.96	N N N	10,026,	113.7054 112.1017 014.2904	7 E	3,905 3,906 3,905
Back = N Ahead = S Chord Bear = S	83° 47′ 57.29" E 77° 59′ 25.47" E 87° 05′ 44.09" E					
Course from PT	SWWB_01_28 to PC SW	WB_01_3	51 S 77°	59′25.	.48" E	Dist 77.
		Curve *				
Curve SWWB_01_3 P.I. Station Delta = Degree = Tangent = Length = Radius = External = Long Chord =	1 517+75.74 7° 09' 12.89" 2° 44' 33.85" 130.5792 260.8190 2,089.0000 4.0771 260.6496	N (RT)	10,026,	068.8680	ΟE	3,906
Mid. Ord. = P.C. Station P.T. Station C.C.	4.0692 516+45.16 519+05.98	N N N	10,026,	096.0383 026.0042 052.760	2 E	3,900 3,900 3,905
Back = S Ahead = S Chord Bear = S	77° 59′ 25.47" E 70° 50′ 12.59" E 74° 24′ 49.03" E					
Course from PT	SWWB_01_31 to PC SW	WB_01_3	34 S 70°	50' 12.	.58" E	Dist 100
		Curve				
Curve SWWB_01_3 P.I. Station Delta = Degree = Tangent = Length = Radius = External = Long Chord =	520+52.63 2° 47′ 47.46″ 2° 59′ 53.55″ 46.6457 93.2729 1,911.0000 0.5692 93.2636	N (LT)	10,025,	977.8660	ΟE	3,906
Mid. Ord. = P.C. Station P.T. Station C.C. Back = S Ahead = S Chord Bear = S	0.5690 520+05.98 520+99.25 70° 50′ 12.59″ E 73° 38′ 00.04″ E 72° 14′ 06.32″ E	N N N	10,025,	993.1779 964.7220 798.2847	ЭE	3,900 3,900 3,907
Course from PT	SWWB 01 34 to PC SW	WB 01 3	37 S 58°	53' 56	.09" F	Dist 7.4

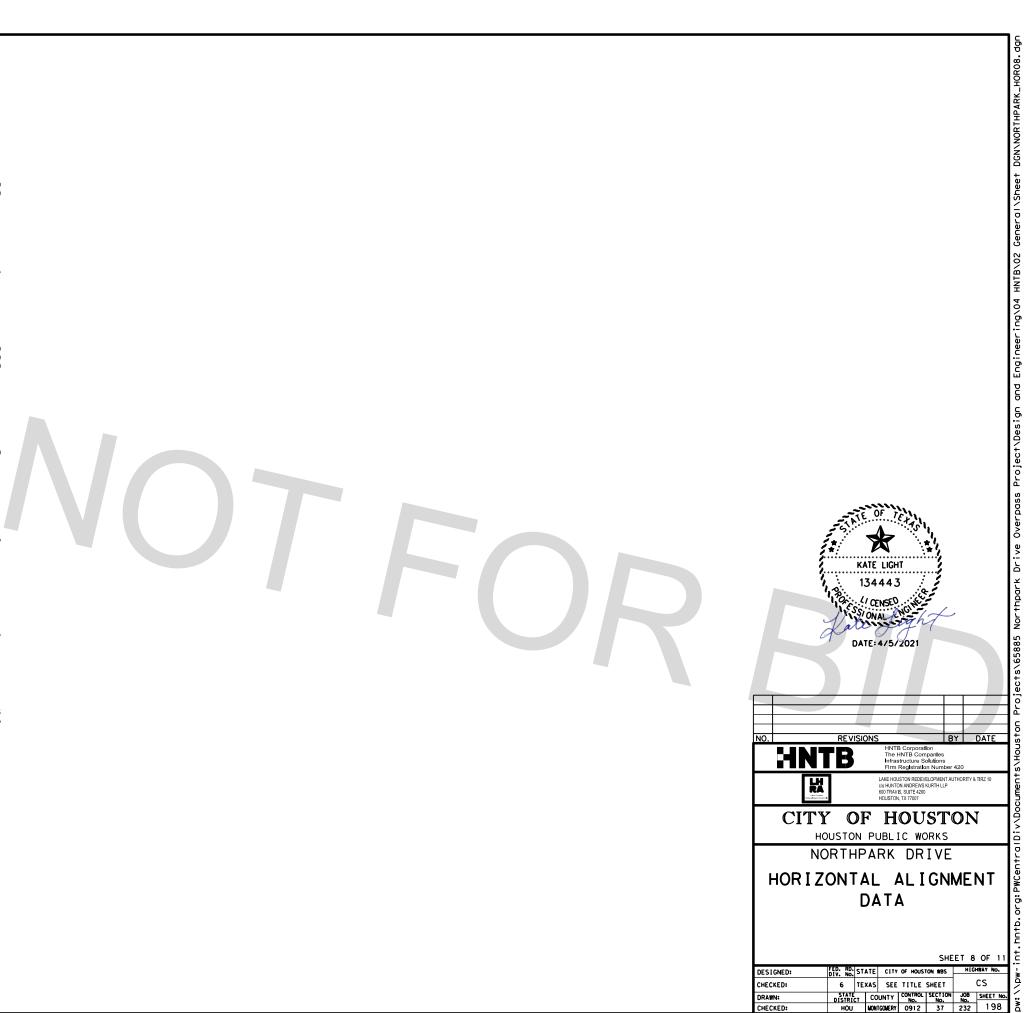
Course from PT SWWB_01_34 to PC SWWB_01_37 S 58° 53' 56.09" E Dist 7.8050



<u>B SWWB01 CONT.</u>

		Curve *			
Curve SWWB_01_37 P.I. Station Delta = Degree = Tangent = Length = Radius =	, 522+61,39 9* 13' 29,42" 2* 59' 42,27" 154,3337 308,0003 1,913,0000	N (LT)	10,025,917.7864	E	3, 906, 683. 3031
External = Long Chord = Mid. Ord. = P.C. Station P.T. Station C.C. Back = S Ahead = S Chord Bear = S	6.2154 307.6677 6.1953 521+07.06 524+15.06 73° 51′ 33.92″ E 83° 05′ 03.34″ E 78° 28′ 18.63″ E	N N N	10,025,960.6904 10,025,899.2031 10,027,798.2847	E E E	3,906,535.0529 3,906,836.5139 3,907,066.8574
		Curve			
Curve SWWB_01_38		*		_	
P.I. Station Delta = Degree = Tangent = Length = Radius = External = Long Chord = Mid. Ord. =	524+30.01 33* 56' 51.72" 116* 55' 48.57" 14.9564 29.0325 49.0000 2.2318 28.6097 1345	N (LT)	10,025,897.4022	E	3,906,851.3615
P.C. Station P.T. Station C.C. Back = S Ahead = N Chord Bear = N	524+15.06 524+44.09 83° 05' 03.34" E 62° 58' 04.94" E 79° 56' 30.80" E	N N N	10,025,899.2031 10,025,904.1997 10,025,947.8466	E E E	3,906,836.5139 3,906,864.6839 3,906,842.4140
Course from PT S	WWB_01_38 to PC SW	WB_01_4	11 N 55° 53′ 35.0	03" E Di	st 6.3702
		Curve			
Curve SWWB_01_41 P.I. Station Delta = Degree = Tangent = Length = Radius =	524+57.50 17* 02' 06.96" 121* 54' 21.29" 7.0390 13.9741 47.0000	N (LT)	10,025,911.5222	E	3,906,875.9150
External = Long Chord = Mid. Ord. = P.C. Station C.C. Back = N Ahead = N Chord Bear = N	0.5242 13.9227 0.5184 524+50.46 524+64.44 57° 48′ 16.43″ E 40° 46′ 09.47″ E 49° 17′ 12.95″ E	N N N	10,025,907.7717 10,025,916.8531 10,025,947.5448	E E E	3, 906, 869, 9584 3, 906, 880, 5116 3, 906, 844, 9164
Course from PT S	WWB_01_41 to PC SW	WB_01_4	14 N 37° 08' 05.5	52" E Di	s† 5.9587
		Curve *			
Curve SWWB_01_44 P.I. Station Delta = Degree = Tangent = Length = Radius = External =	524+78,39 19*18/43.50" 121*54/21,29" 7,9967 15,8418 47,0000 0,6754	N (LT)	10,025,928.2718	Ε	3,906,888.5225
Long Chord = Mid. Ord. = P.C. Station P.T. Station C.C. Back = N Ahead = N	15.7669 0.6659 524+70.39 524+86.24 33° 30′ 01.60″ E 14° 11′ 18.10″ E	N N N	10,025,921.6035 10,025,936.0246 10,025,947.5448	E E E	3,906,884.1088 3,906,890.4826 3,906,844.9164
Chord Bear = N	23° 50′ 39.85" E				
Course from PT S	WWB_01_44 to 45 N	14° 11'	18.10" E Dist 7	1.0310	
Point 45	N 10,026,00	4.8889	E 3,906,907.89	931 Sta	525+57.27

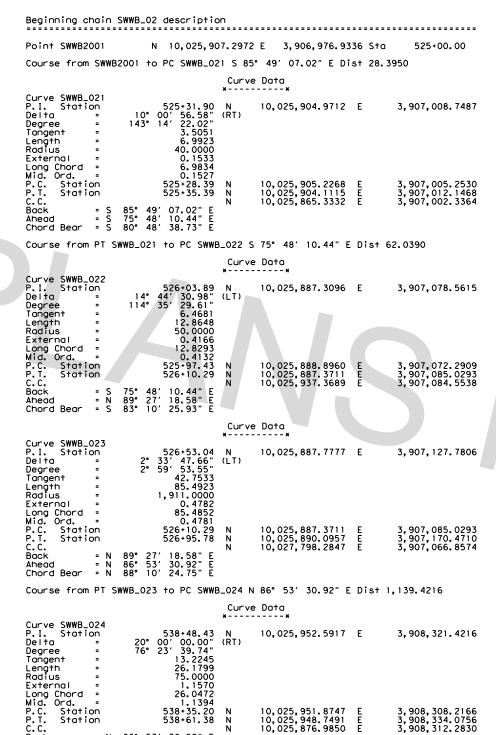
Ending chain SWWB_01 description



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<u>B</u> SWWB02



	Curve Data **
Curve SWWB_025 P.I. Station 539+35.87 Delta = 20° 00′ 00.00″ Degree = 67° 24′ 24.48″ Tangent = 14.9878 Length = 20.6706 Radius = 85.0000 External = 1.3113 Long Chord = 29.5202	
Mid. Ord. = 1.2913 P.C. Station 539+20.89 P.T. Station 539+50.56 C.C. Back = S 73° 06' 29.08" E Ahead = N 86° 53' 30.92" E Chord Bear = S 83° 06' 29.08" E	
Course from PT SWWB_025 to SWWB200	02 N 86° 53' 30.92" E Dist 88.6075
Point SWWB2002 N 10,025,93	32.7218 E 3,908,508.7943 Sta
Ending chain SWWB_02 description	

C.C. Back Ahead

Course from PT SWWB_024 to PC SWWB_025 S 73° 06' 29.07" E Dist 59.5018

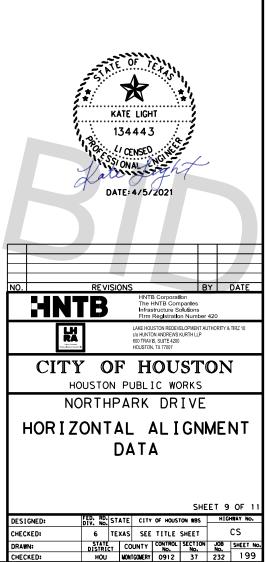
L.L. Back = N 86° 53′ 30.92" E Ahead = S 73° 06′ 29.08" E Chord Bear = S 83° 06′ 29.08" E

N

3,908,405.3513

3,908,391.0102 3,908,420.3171 3,908,415.7084

540+39.16



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<u>B</u> OFFSITE DRAINAGE

Beginning chain P_STM description

Point STM1 N 10.025.	880.9443 E 3.906.334.7036	Sta 500+00.00
Course from STM1 to STM2 S 69° 1	3' 30.23" E Dist 254.7110	
Point STM2 N 10,025,	790.5989 E 3,906,572.8535	Sta 502+54.71
Course from STM2 to STM3 S 78° 4	1' 07.07" E Dist 207.7042	
Point STM3 N 10,025,	749.8477 E 3,906,776.5209	Sta 504+62.42
Course from STM3 to STM4 N 11° 4	6′ 19.42" E Dist 111.3074	
Point STM4 N 10,025,	858.8140 E 3,906,799.2296	Sta 505+73.72
Course from STM4 to STM5 N 14° 1	6′ 10.66" E Dist 288.6801	
Point STM5 N 10,026,	138.5874 E 3,906,870.3851	Sta 508+62.40
Course from STM5 to STM6 N 70° 1	6′ 33.34" E Dist 74.7549	
Point STM6 N 10,026,	163.8164 E 3,906,940.7540	Sta 509+37.16
Course from STM6 to STM7 N 58° 3	8′ 57.60" E Dist 150.7964	
Point STM7 N 10,026,	242.2720 E 3,907,069.5339	Sta 510+87.95
Course from STM7 to STM8 N 61° 4	0′ 22.30" E Dist 606.6313	
Point STM8 N 10,026,	530.1217 E 3,907,603.5228	Sta 516+94.59
Course from STM8 to STM9 N 85° 5	3′ 40.42" E Dist 93.3310	
Point STM9 N 10,026,	536.8034 E 3,907,696.6143	Sta 517+87.92
Course from STM9 to STM10 N 63°	45′ 46.11" E Dist 99.5397	
	580.8087 E 3,907,785.8986	
Ending chain P_STM description		

B DRAINAGE BYPASS

 Beginning chain STM_BYPASS description

 Point STMBYPASS3
 N 10,025,869.8160 E
 3,907,084.1670 Sta
 100+00.00

 Course from STMBYPASS3 to STMBYPASS4 N 14° 09' 36.53" E Dist 454.0093
 Point STMBYPASS4
 N 10,026,310.0305 E
 3,907,195.2326 Sta
 104+54.01

 Ending chain STM_BYPASS description
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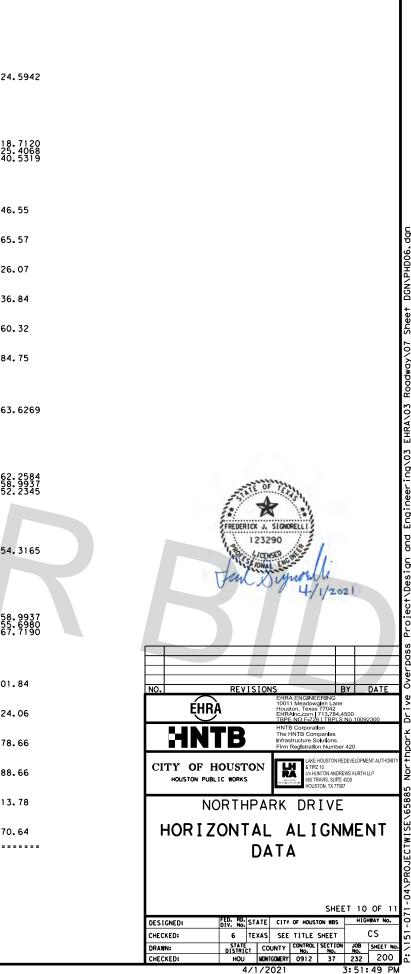
Beginning chain K	MP desc	ription		
Point KMP1	Ν	10,025,719.8616	E 3,908,866.7117	Sta 100+00.00
Course from KMP1	to KMP2	N 3º 09' 51.97"	W Dist 172.9533	
Point KMP2	Ν	10,025,892.5511	E 3,908,857.1644	Sta 101+72,95
Ending chain KMP	descrip	tion		

<u>B</u> SWEB_03

Point SWEB001	X 3.908.51	6 9199	Y 10.025.784.93	 25 S+a	641+09.41
Course from SWEB001	TO PC SWEB_031	N 86°	53' 30.92" E Dis	104.3	967
		Curve	Data		
Degree = Tangent = Length =	642+27.03 20°00'00.00" 76°23'39.74" 13.2245 26.1799 75.0000	х (LT)	3,908,634.2670	Y	10,025,791.3168
External = Long Chord = Mid. Ord. = C. Station C. Station	26.0472 26.0472 1.1394 642+13.81 642+39.99	X X X	3,908,621.0619 3,908,646.4304 3,908,616.9954	Y Y Y	10,025,790.5998 10,025,796.5070 10,025,865.4895
Back = N 86 Ahead = N 66 Chord Bear = N 76 Course from PT SWEB.		_032 N	66° 53′ 30.92" E	Dist 5	6.5780

<u>B SWEB_03 CONT.</u>

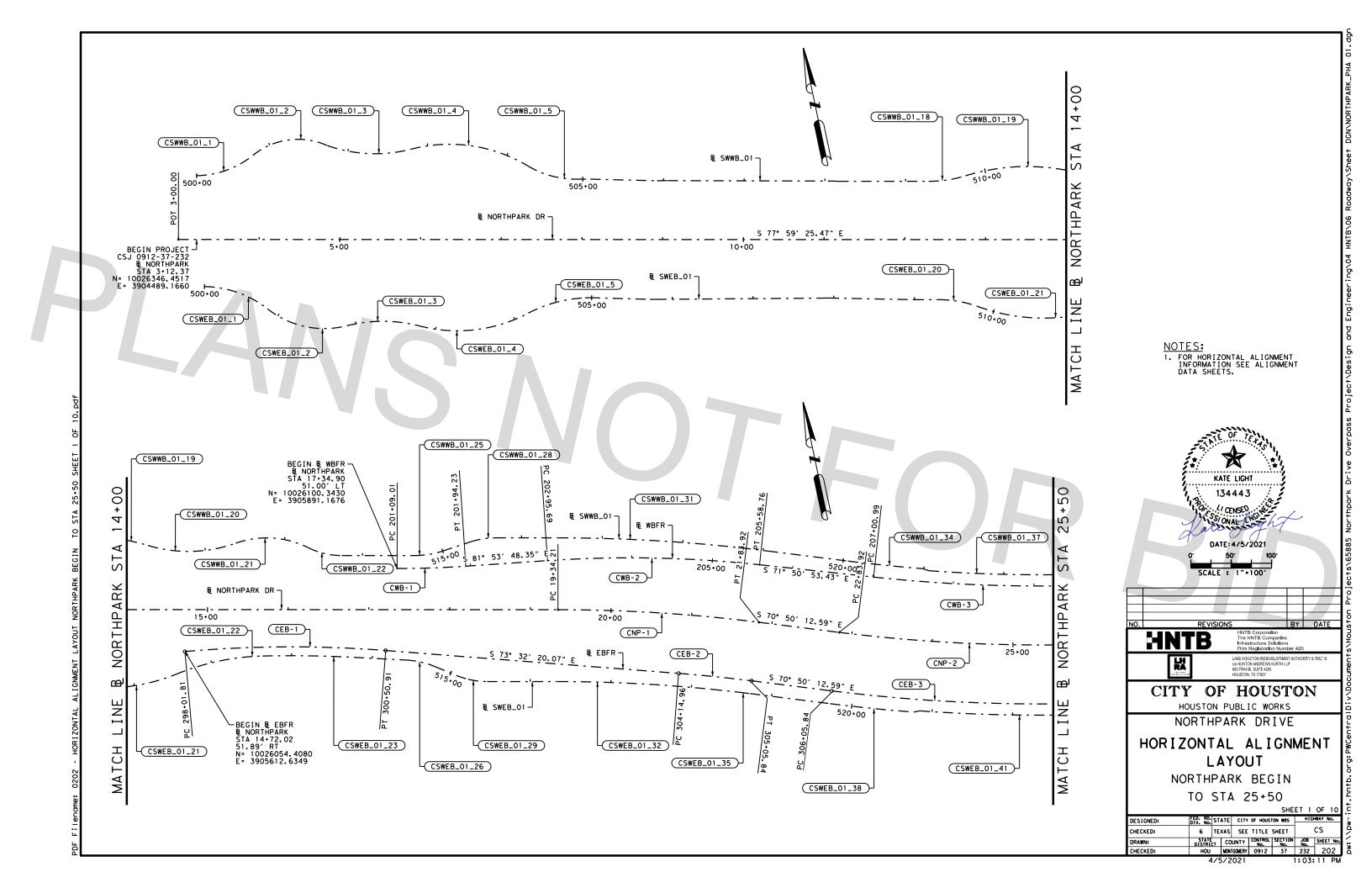
	Curve	Data		
Curve SWEB_032 P.I. Station 643+11.55 Delta 20°00'00.00" Degree = 67°24'24.48" Tangent = 14,9878 Length = 29.6706 Radius = 85.0000 External = 1.3113	X (RT)	3,908,712.2543	Y	10,025,824
Long Chord = 29.5202 Mid. Ord. = 2913 P.C. Station 642-96.56 P.T. Station 642-96.56 P.T. Station 643-26.24 C.C. = N 66° 53′ 30.92″ E Ahead = N 86° 53′ 30.92″ E Chord Bear = N 76° 53′ 30.92″ E	X X X	3,908,698.4690 3,908,727.2200 3,908,731.8287	Y Y Y	10,025,818 10,025,825 10,025,740
Course from PT SWEB_032 to SWEB00 Point SWEB002 X 3,908,8	2 N 86° 47.3609	Y 10,025,831.93	04 Sta	3179 644+46
Course from SWEB002 to SWEB003 N Point SWEB003 X 3,908,8 Course from SWEB003 to SWEB004 N	64.6359		88 Sta	644+65
Course from SWEB004 to SWEB005 N		25.85" E Dist 10	7703	645+26
Course from SWEB005 to SWEB006 N	34.8168 86° 53′ 55.3235	30.92" E Dist 2,	023.483	645+36 32 665+60
Course from SWEB006 to SWEB007 N		43.84" E Dist 24	4271	665+84
Course from SWEB007 to PC SWEB_03		53' 30.92" E Dis	+ 28.28	
Curve SWEB_033 P.I. Station 666+38.27 Delta 13* 41' 07.97" Degree 27* 14' 25.2600 Length 25.2400 Length 20.3333 External 1.5090 Long Chord 5.120	(RT)	3,911,032.9689	Y	10,025,963
Mid. Ord. = 1,4982 P.C. Station 666+13.03 P.T. Station 666+63.27 C.C. = N 86° 53′ 30.92″ E	× ×	3,911,007.7660 3,911,057.7800 3,911,019.1702	Y Y Y	10,025,962 10,025,958 10,025,752
Bock = N 86° 53′ 30.92″ E Anead = S 79° 25′ 21.11″ E Chord Bear = S 86° 15′ 55.09″ E	Curve	Data		
Curve SWEB_034 P.I. Station 6666+88.75 Delta = 13°41′07.97" Tangent = 26°59′01.98" Tangent = 25°400.4800 Length = 50.7175 Radius = 212.3333 External = 1.5233 Long Chord = 50.5930	* (LT)	* 3,911,082.8270	Y	10,025,954
Mid. Ord. = 1.5125 P.C. Station 666+63.27 P.T. Station 6667+13.99 C.C. = S 79° 25′ 21.11" E Ahead = N 86° 53′ 30.92" E Chord Bear = S 86° 15′ 55.09" E	X X X	3,911,057.7800 3,911,108.2696 3,911,096.7569	Y Y Y	10,025,958 10,025,955 10,026,167
Course from PT SWEB_034 to SWEB00	8 N 86°	53' 30.92" F Dis	+ 187.8	8474
	95.8406	Y 10,025,965.88	30 Sta	669+01
Point SWEB009 X 3,911,3 Course from SWEB009 to SWEB010 N		Y 10,025,964.08 30.92" E Dist 54		669+24
Point SWEB010 X 3,911,3 Course from SWEB010 to SWEB011 N		Y 10,025,967.04 42.11" E Dist 10		669+78
Point SWEB011 X 3,911,3 Course from SWEB011 to SWEB012 N		Y 10,025,967.55 40.97" E Dist 25		669+88
Point SWEB012 X 3,911,4 Course from SWEB012 to SWEB013 N		Y 10,025,981.52 54.50" E Dist 55		670+13
Point SWEB013 X 3,911,9	59.5151	Y 10,026,009.71	17 Sta	675+70
Ending chain SWEB_03 description				

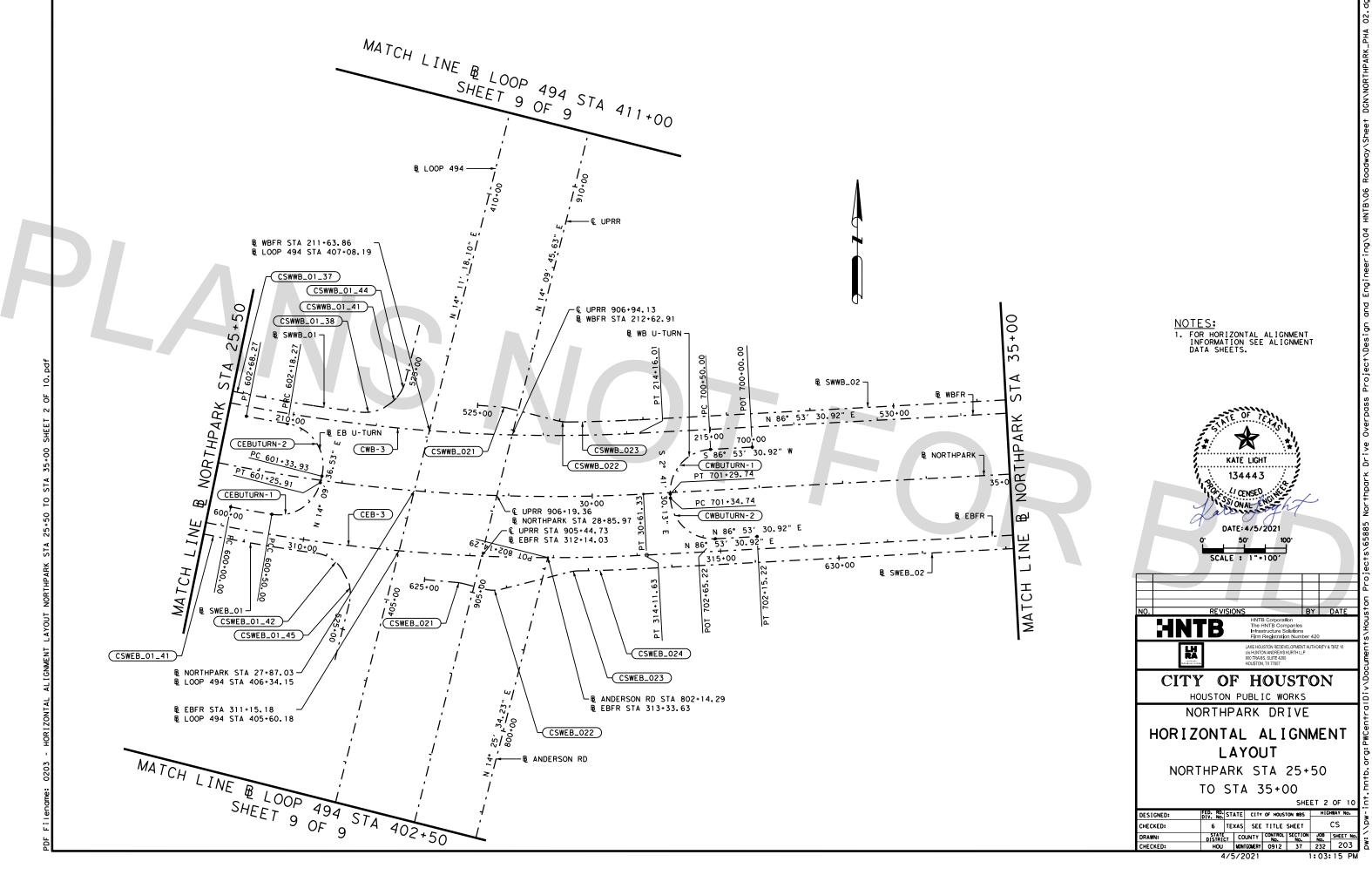


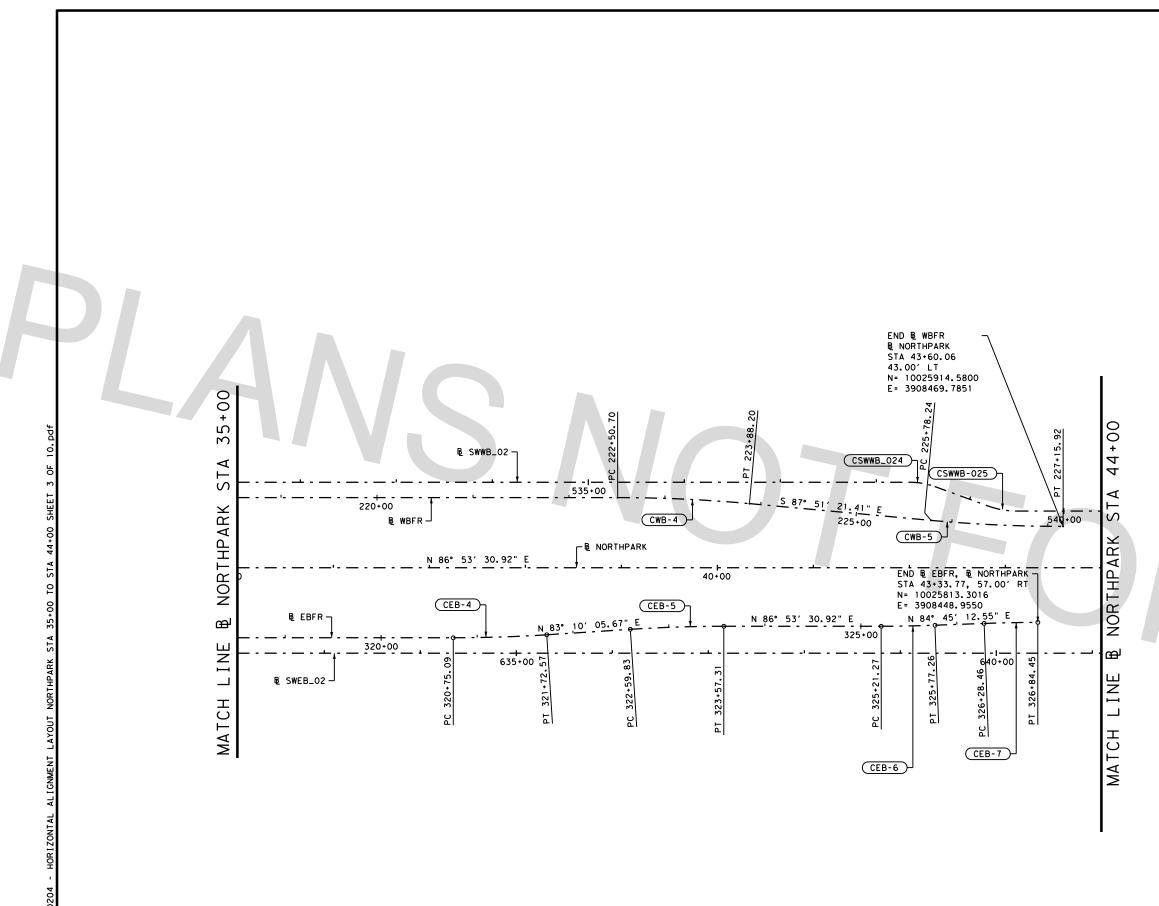
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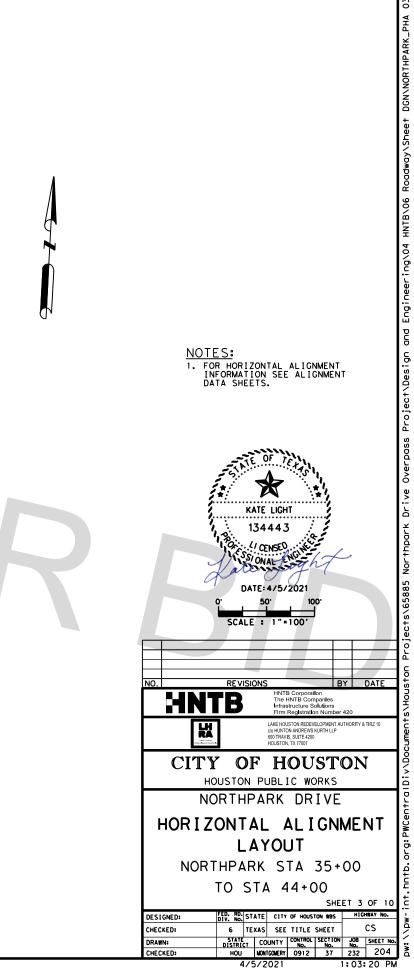
Beginning chain SWWB.	_03	description	
Point SWWB2019	х	3,908,508.7943 Y 10,025,932.7218 Sta 5	540+39.16
Course from SWWB2019	to	SWWB2020 N 86° 53′ 30.92" E Dist 74.9287	
Point SWWB2020	х	3,908,583.6128 Y 10,025,936.7844 Sta 5	541+14.09
Course from SWWB2020	to	SWWB2021 N 86° 38' 02.22" E Dist 116.0028	
Point SWWB2021	х	3,908,699.4154 Y 10,025,943.5954 Sta 5	542+30.09
Course from SWWB2021	to	SWWB2022 N 88° 11′ 33.60" E Dist 125.6181	
Point SWWB2022	х	3,908,824.9711 Y 10,025,947.5573 Sta 5	543+55.71
Course from SWWB2022	to	SWWB2023 N 86° 24' 50.48" E Dist 124.0298	
Point SWWB2023	х	3,908,948.7580 Y 10,025,955.3149 Sta 5	544+79.74
Course from SWWB2023	to	SWWB2024 N 86° 14' 29.59" E Dist 30.9483	
Point SWWB2024	х	3,908,979.6398 Y 10,025,957.3436 Sta 5	545+10.69
Course from SWWB2024	to	SWWB2025 N 86° 15' 03.02" E Dist 120.7277	
Point SWWB2025	х	3,909,100.1091 Y 10,025,965.2378 Sta 5	546+31.42
Course from SWWB2025	to	SWWB2026 N 87° 32' 00.14" E Dist 36.3851	
Point SWWB2026	Х	3,909,136.4605 Y 10,025,966.8037 Sta 5	546+67.80
Course from SWWB2026	t0	SWWB2027 N 86° 53' 30.92" E Dist 1,033.9308	
Point SWWB2027	X	3,910,168.8704 Y 10,026,022.8630 Sta 5	557+01.73
Course from SWWB2027	to	SWWB2028 N 87° 22' 52.91" E Dist 1,110.1410	
Point SWWB2028	х	3,911,277.8522 Y 10,026,073.5830 Sta 5	568+11.87
Course from SWWB2028	†0	SWWB2029 S 84° 44' 22.85" E Dist 17.2937	
Point SWWB2029	X	3,911,295.0731 Y 10,026,071.9975 Sta 5	568+29.17
Course from SWWB2029	to	SWWB2030 N 86° 53' 30.92" E Dist 44.4692	
Point SWWB2030	х	3,911,339.4768 Y 10,026,074.4086 Sta 5	568+73.64
Course from SWWB2030	†0	SWWB2031 N 87° 05′ 54.45" E Dist 29.4499	
Point SWWB2031	х	3,911,368.8890 Y 10,026,075.8993 Sta 5	569+03.09
Course from SWWB2031	†0	SWWB2032 N 78° 17' 05.75" E Dist 26.1061	
Point SWWB2032	х	3,911,394.4514 Y 10,026,081.2001 Sta 5	569+29.19
Course from SWWB2032	†0	SWWB2033 S 77° 00′ 42.98" E Dist 7.3049	
Point SWWB2033	х	3,911,401.5694 Y 10,026,079.5583 Sta 5	569+36.50
Course from SWWB2033	†0	SWWB2034 N 87° 05′ 54.50" E Dist 553.6949	
Point SWWB2034	х	3,911,954.5544 Y 10,026,107.5861 Sta 5	574+90.19
Ending chain SWWB_03	de	scription	

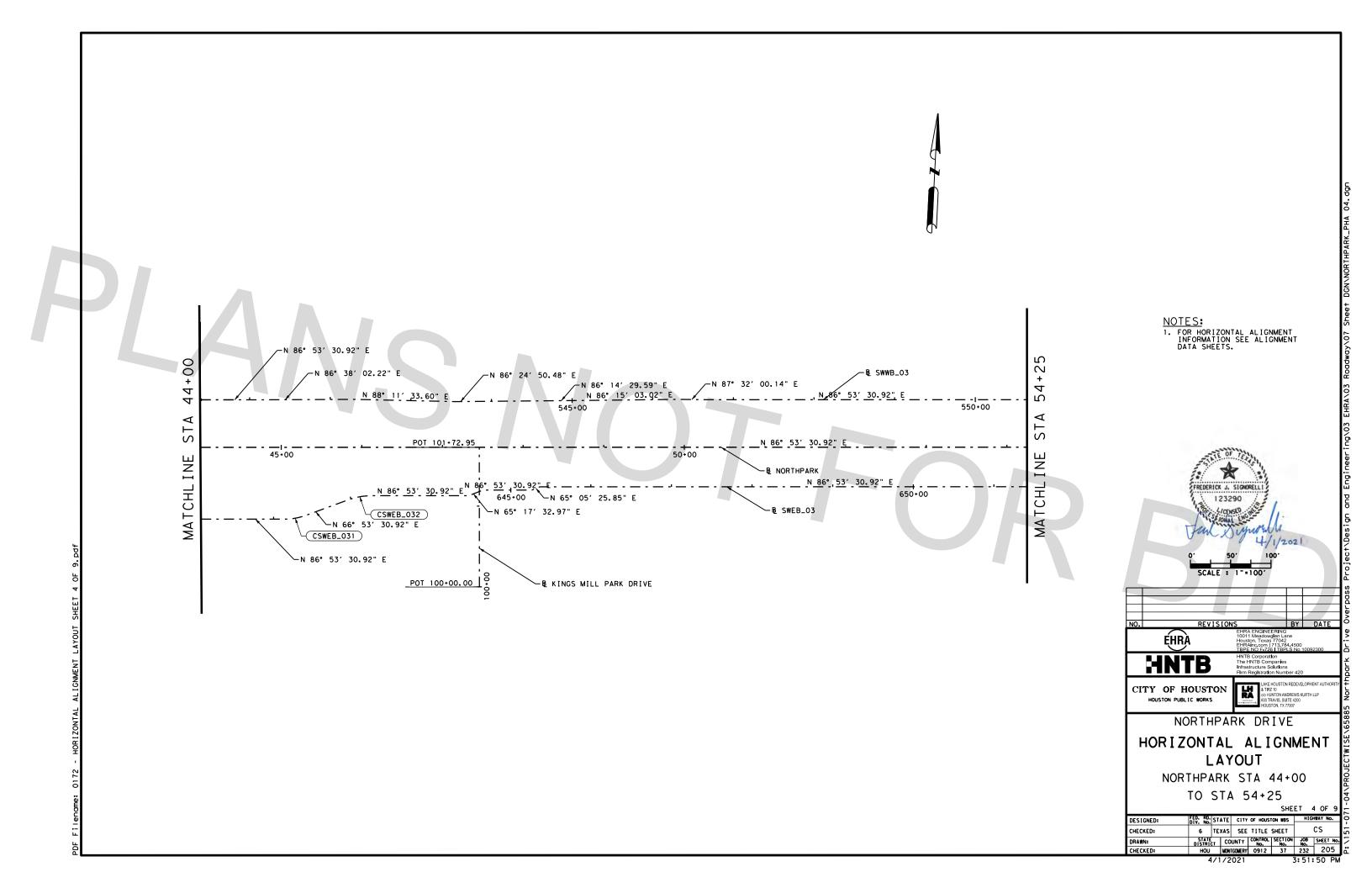
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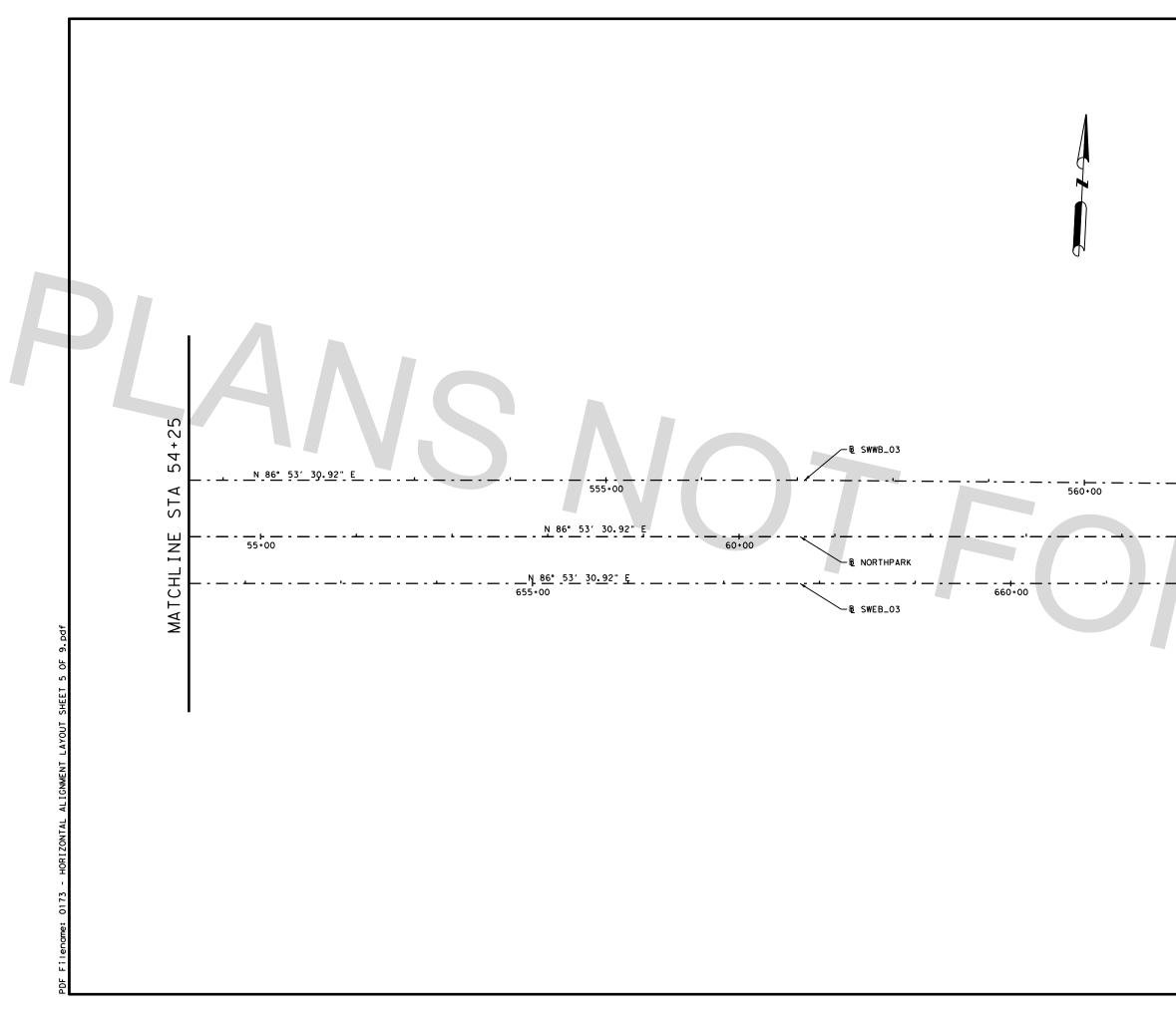


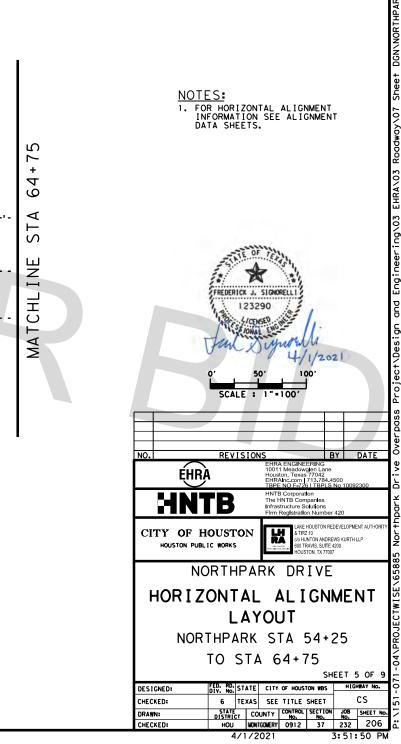


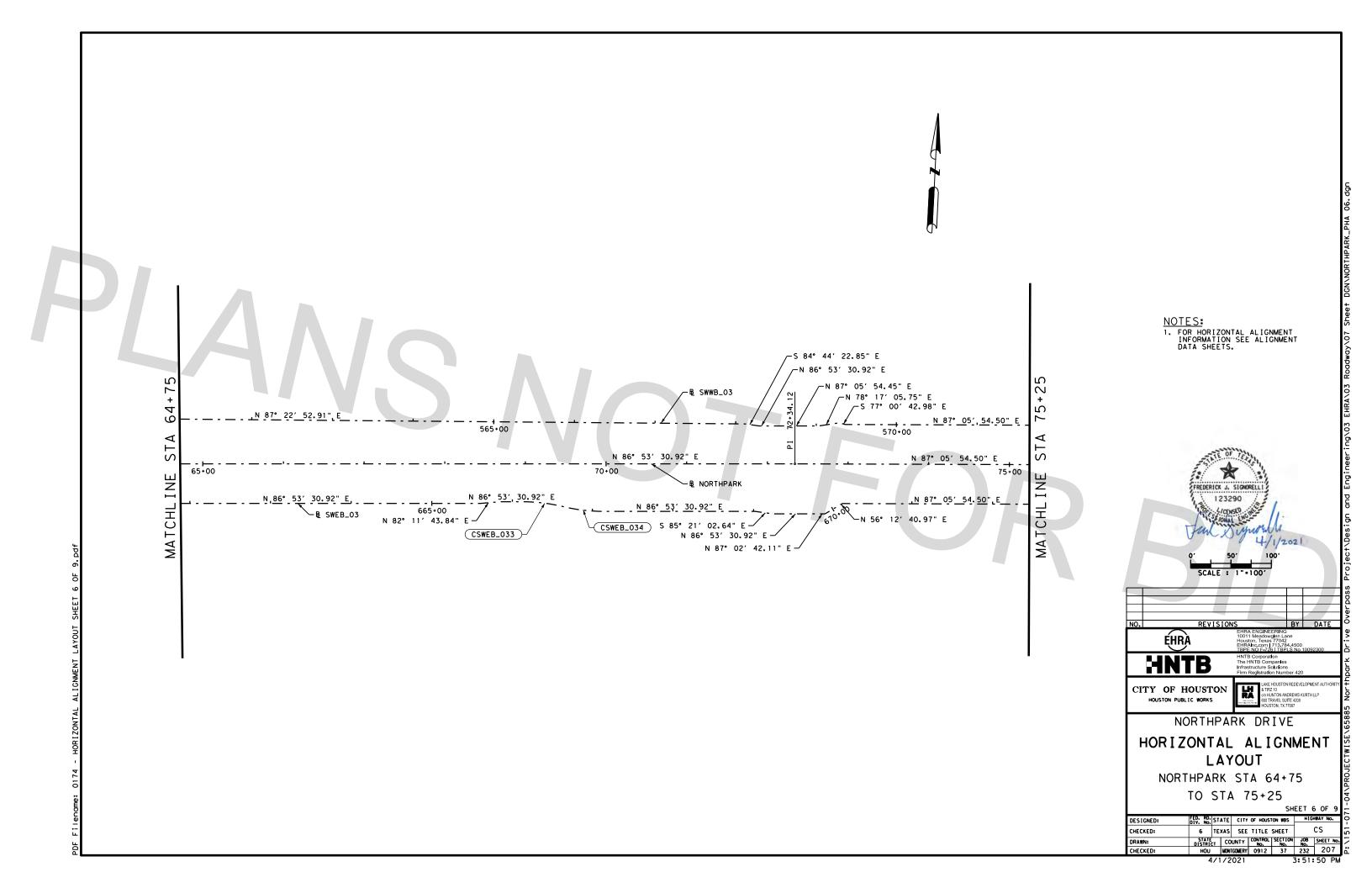


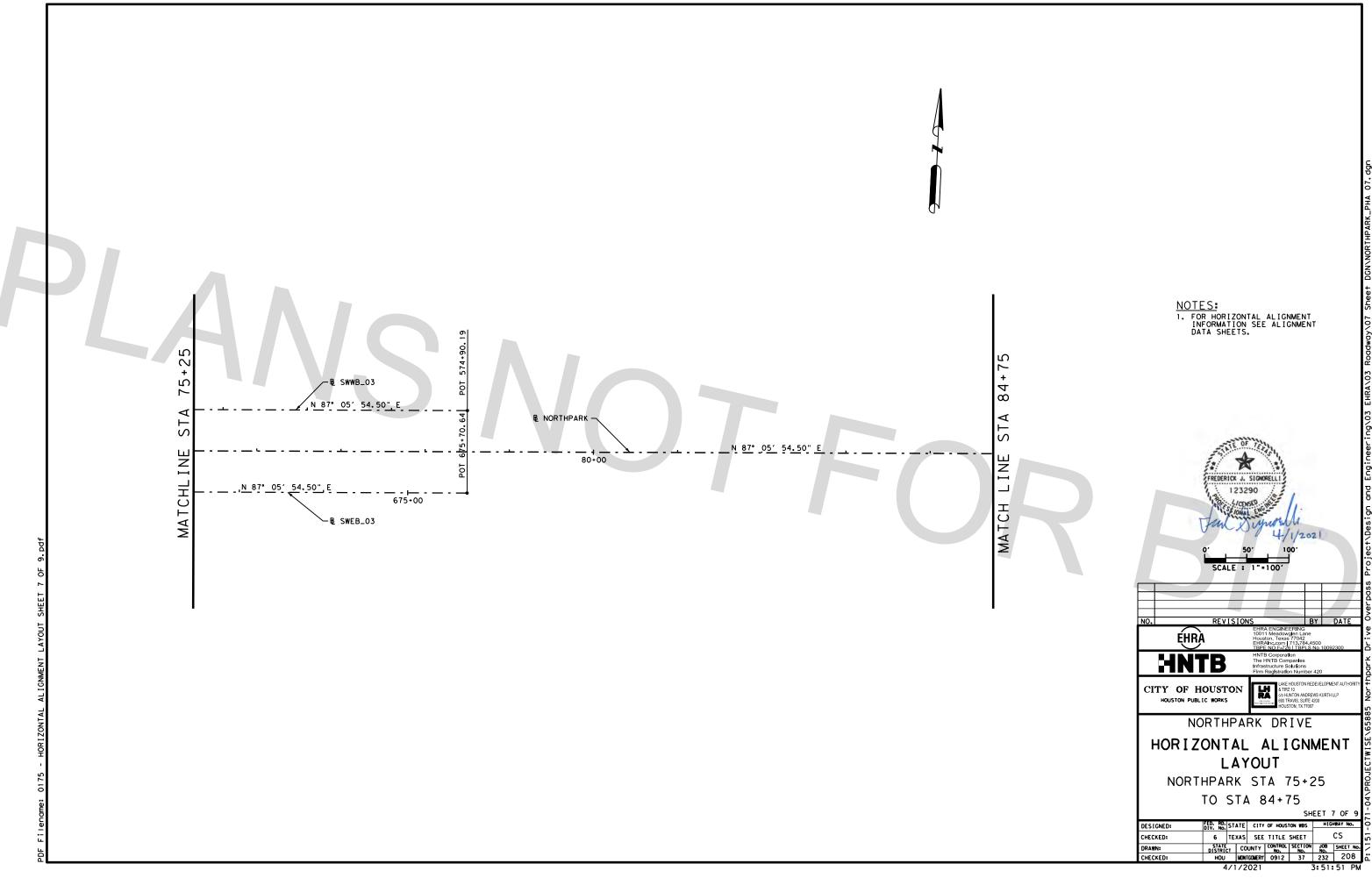


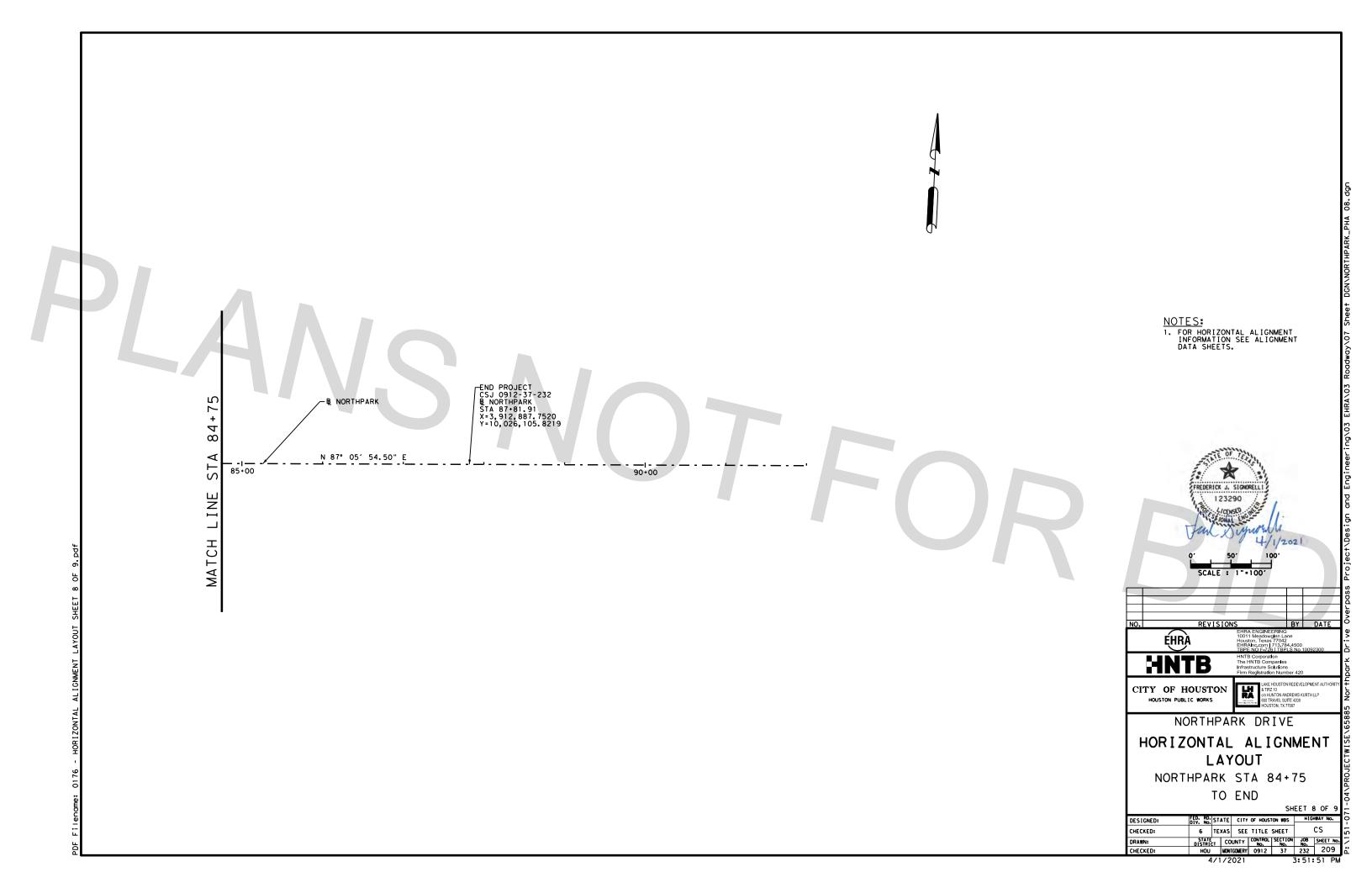


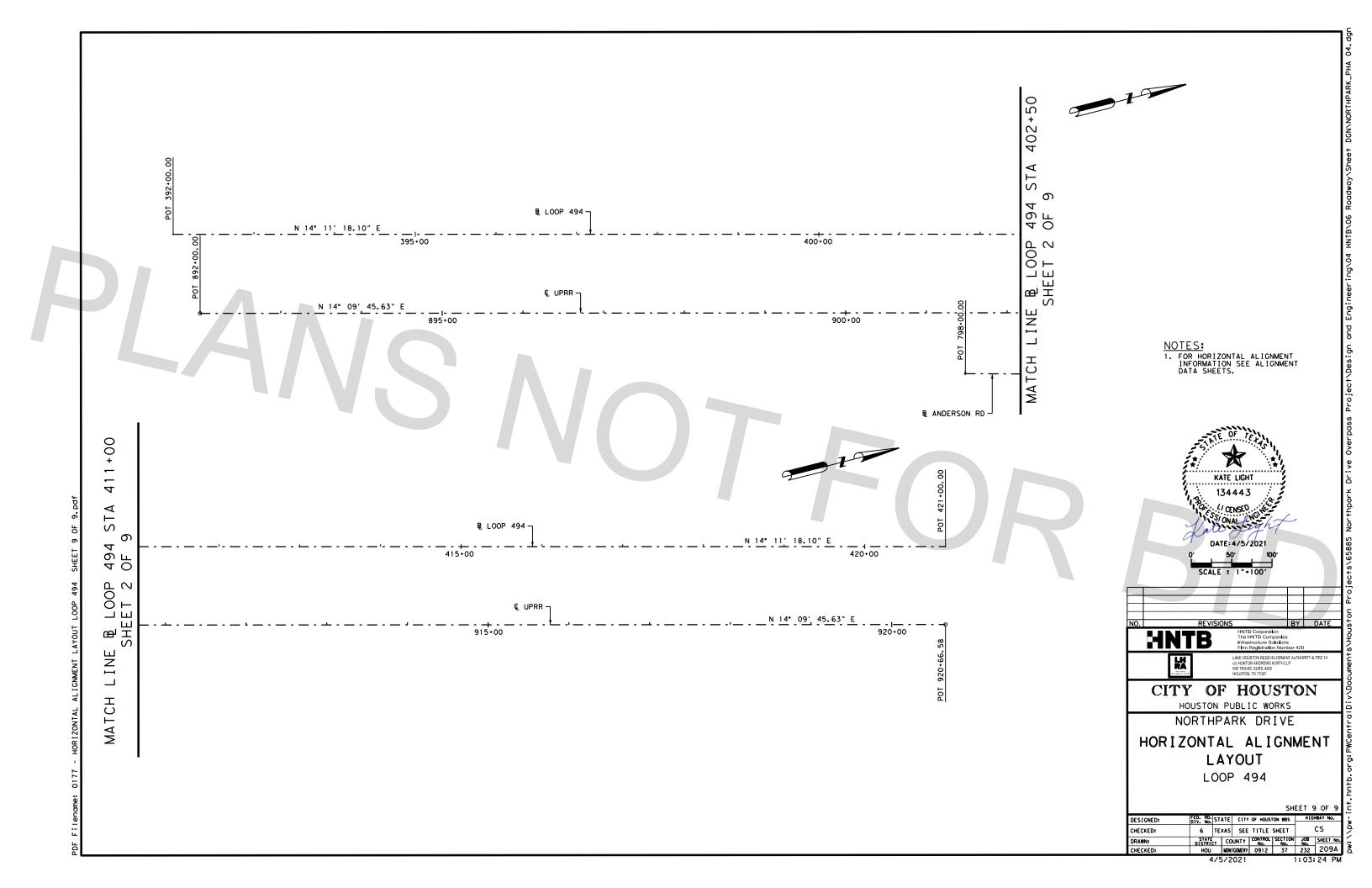


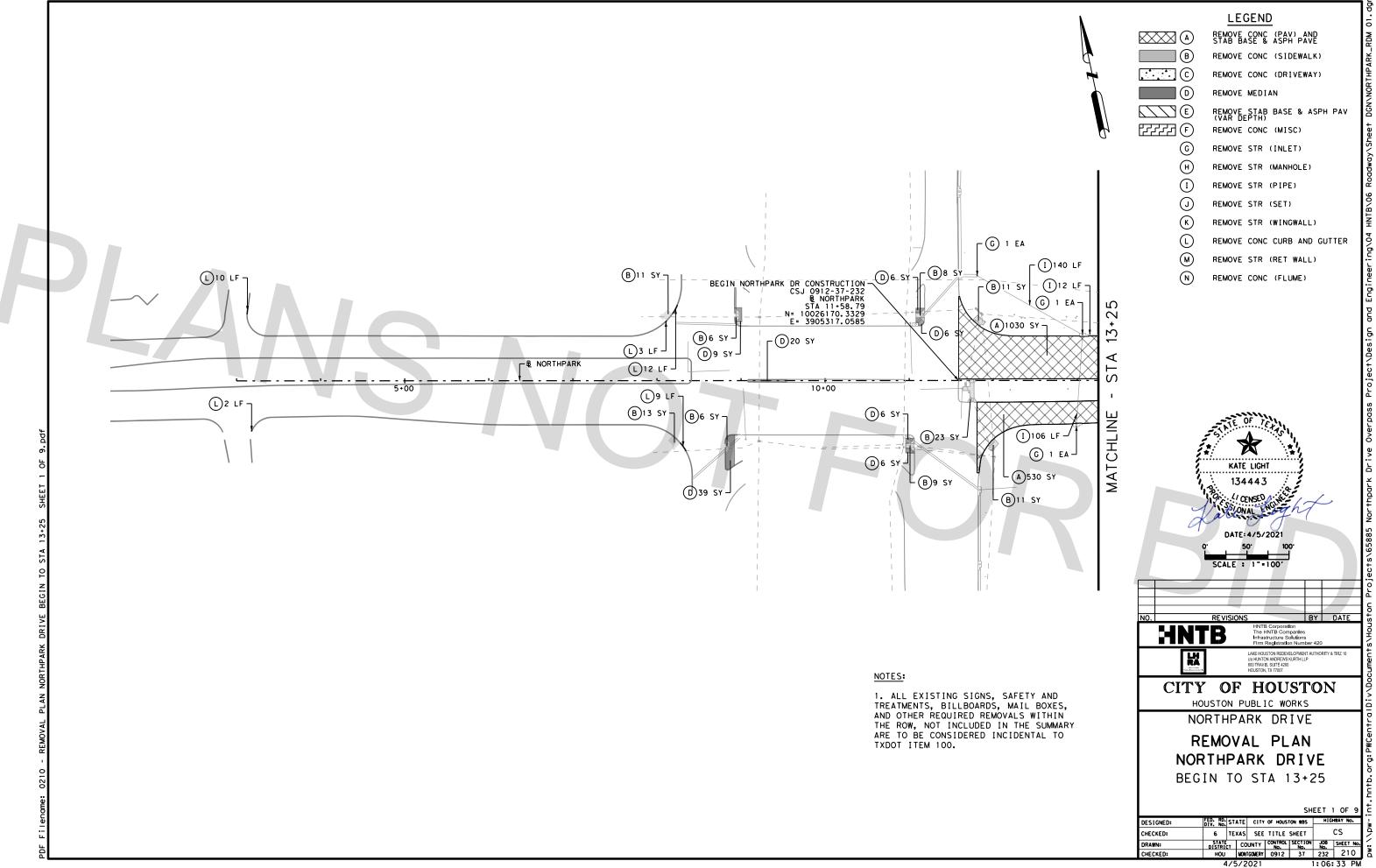




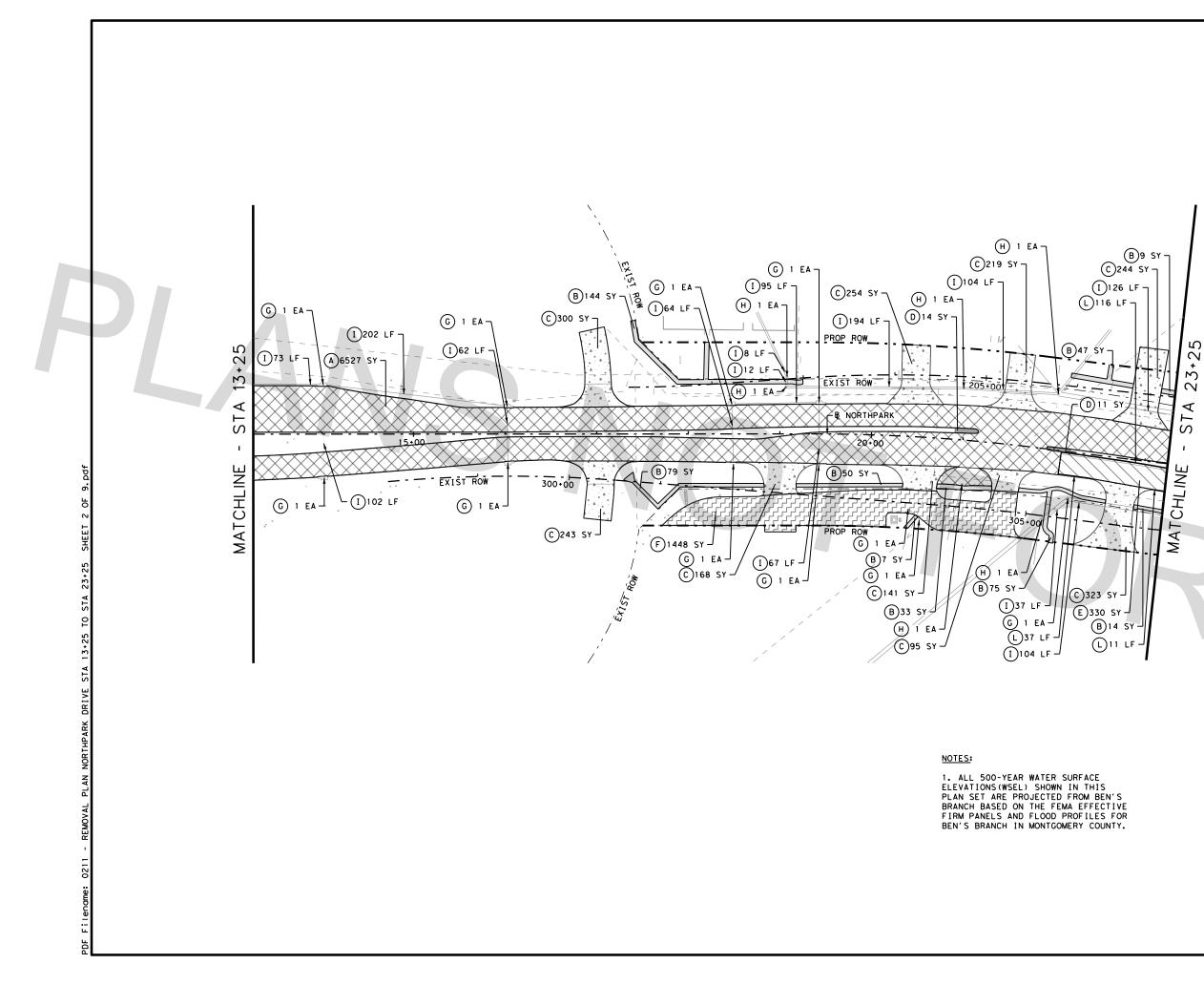








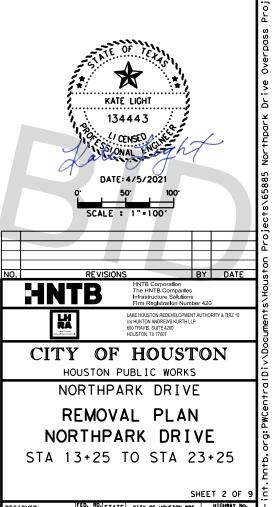
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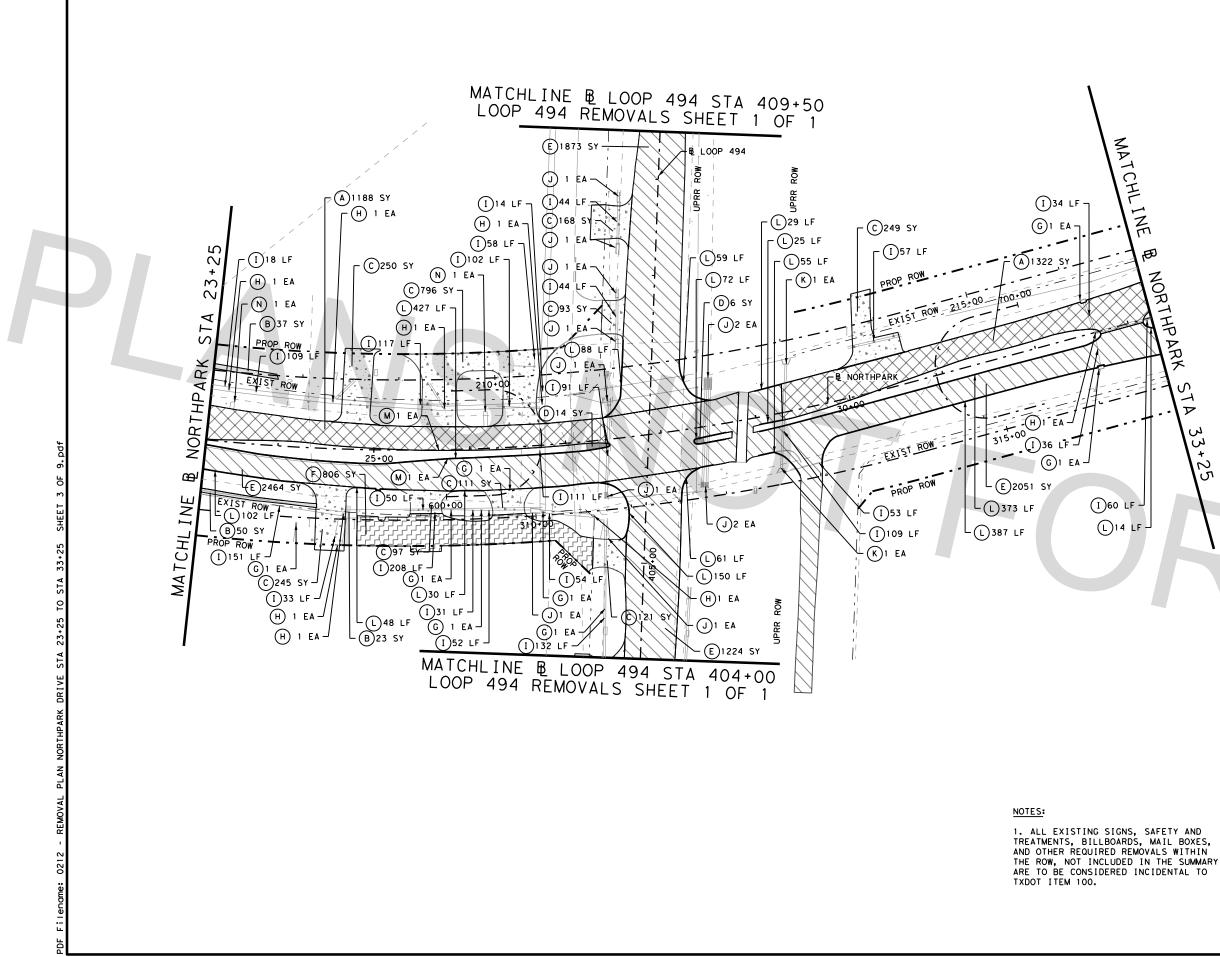


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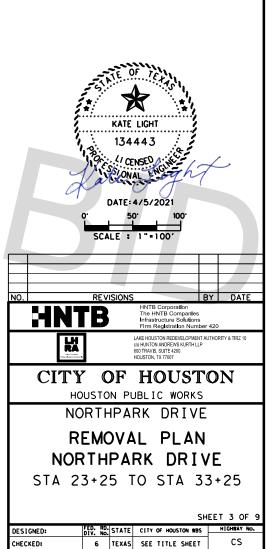




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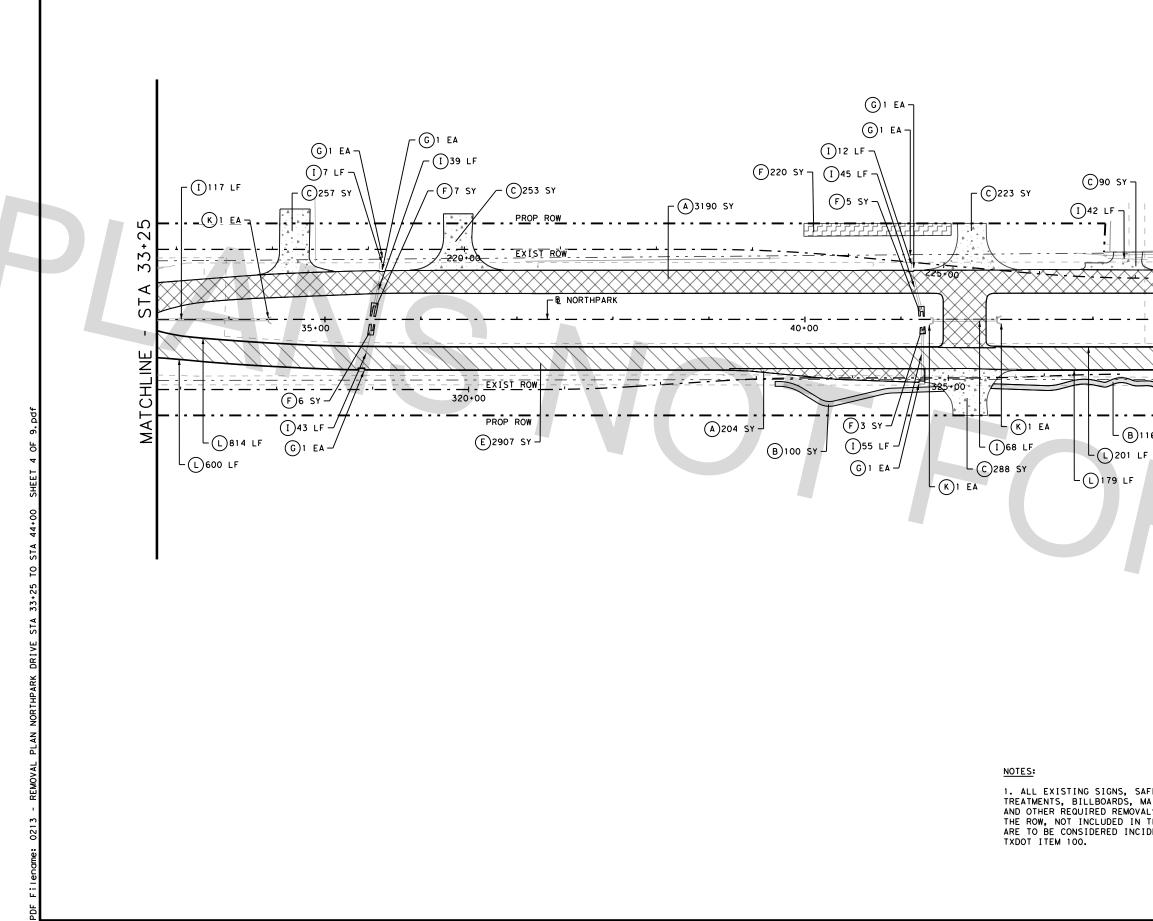
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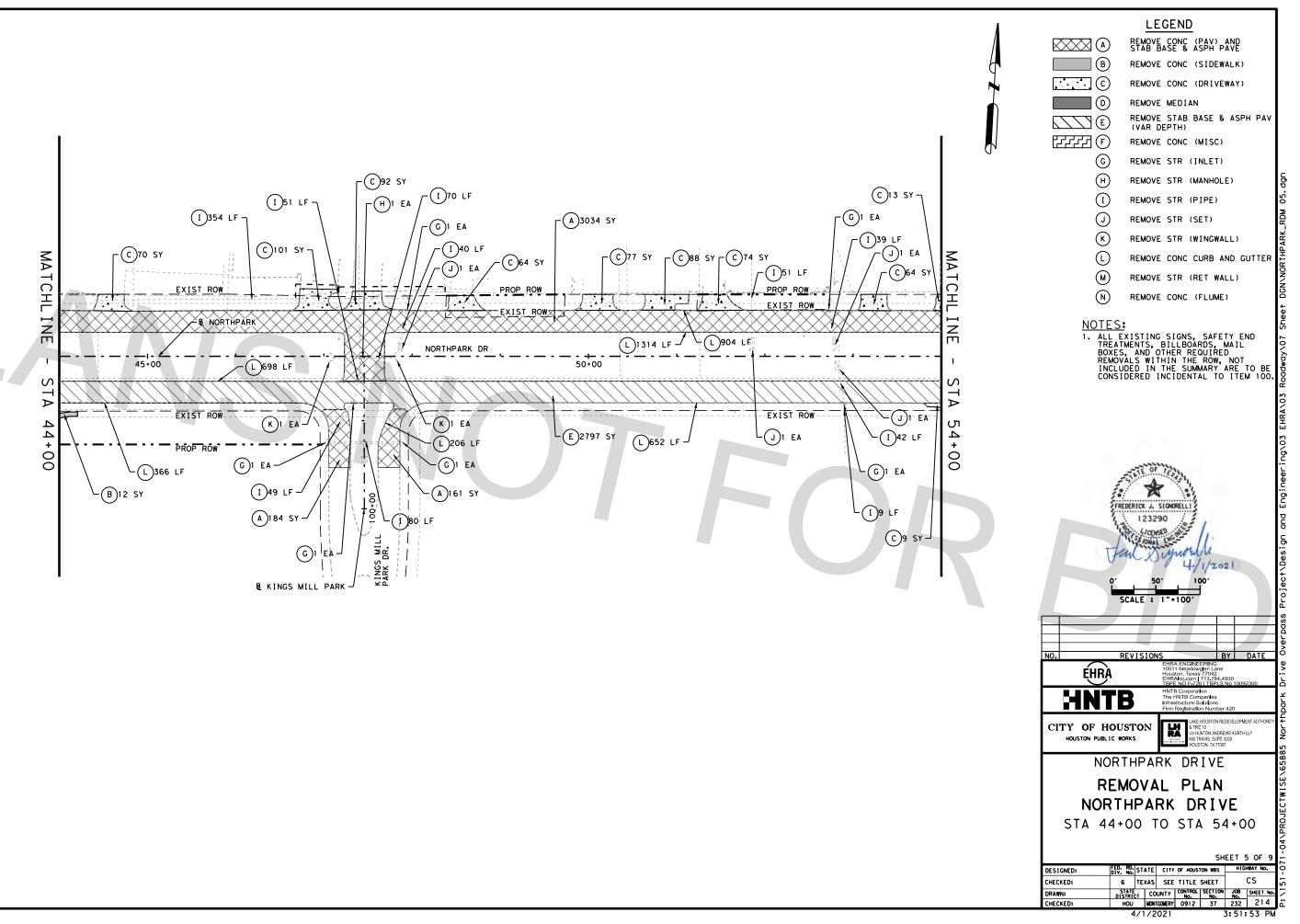
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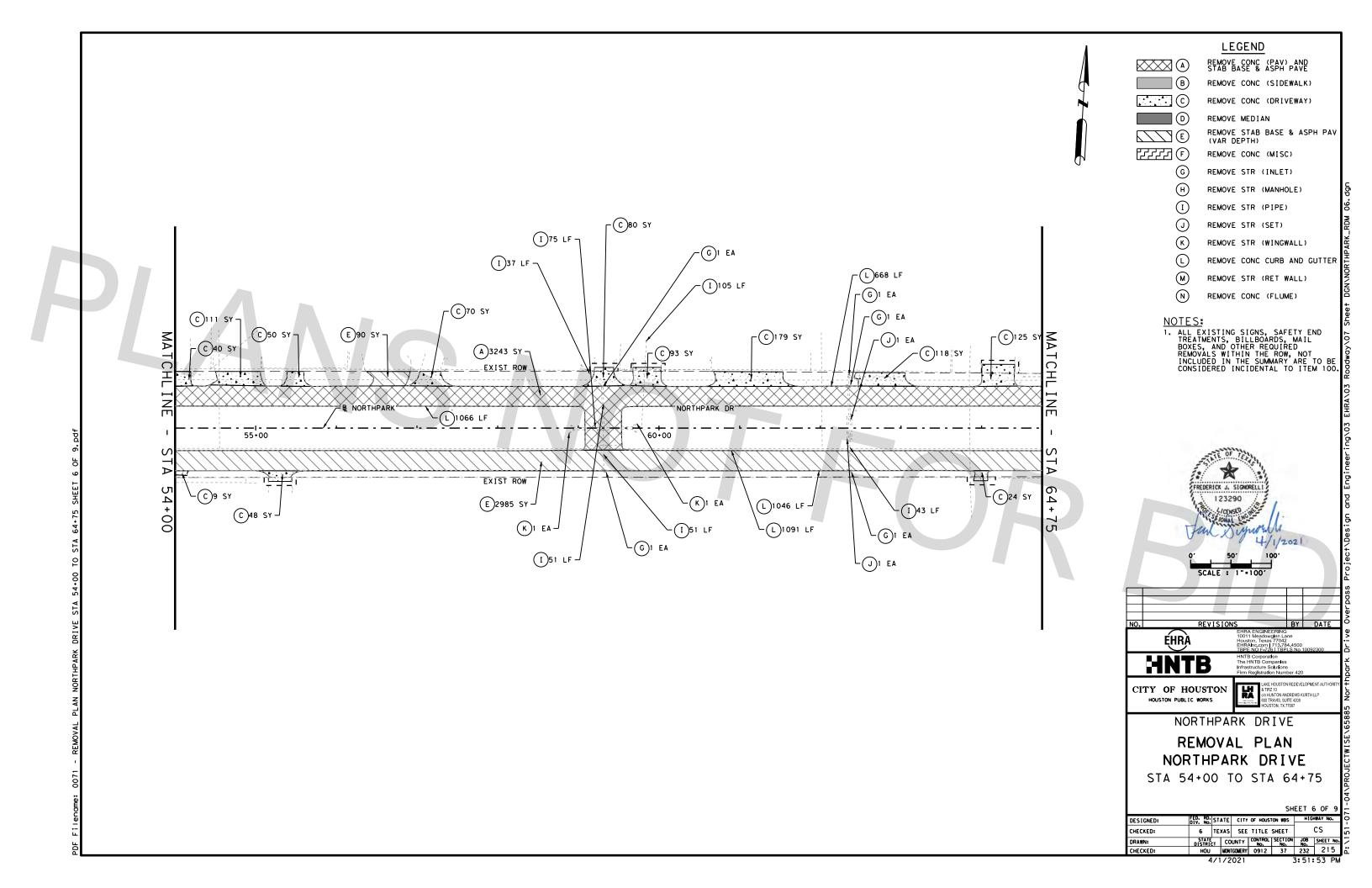
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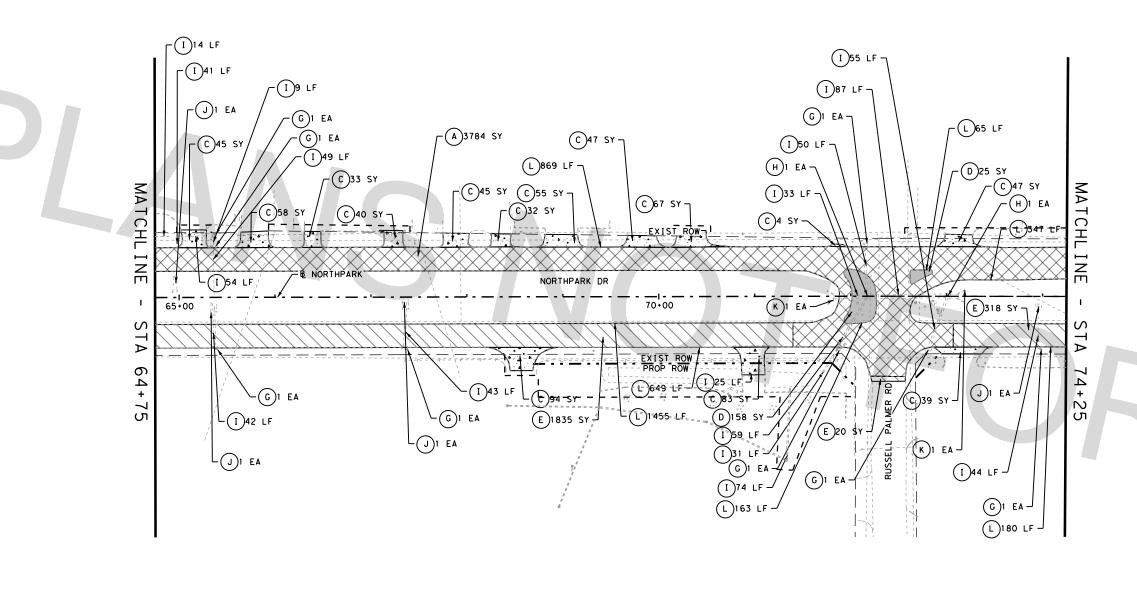
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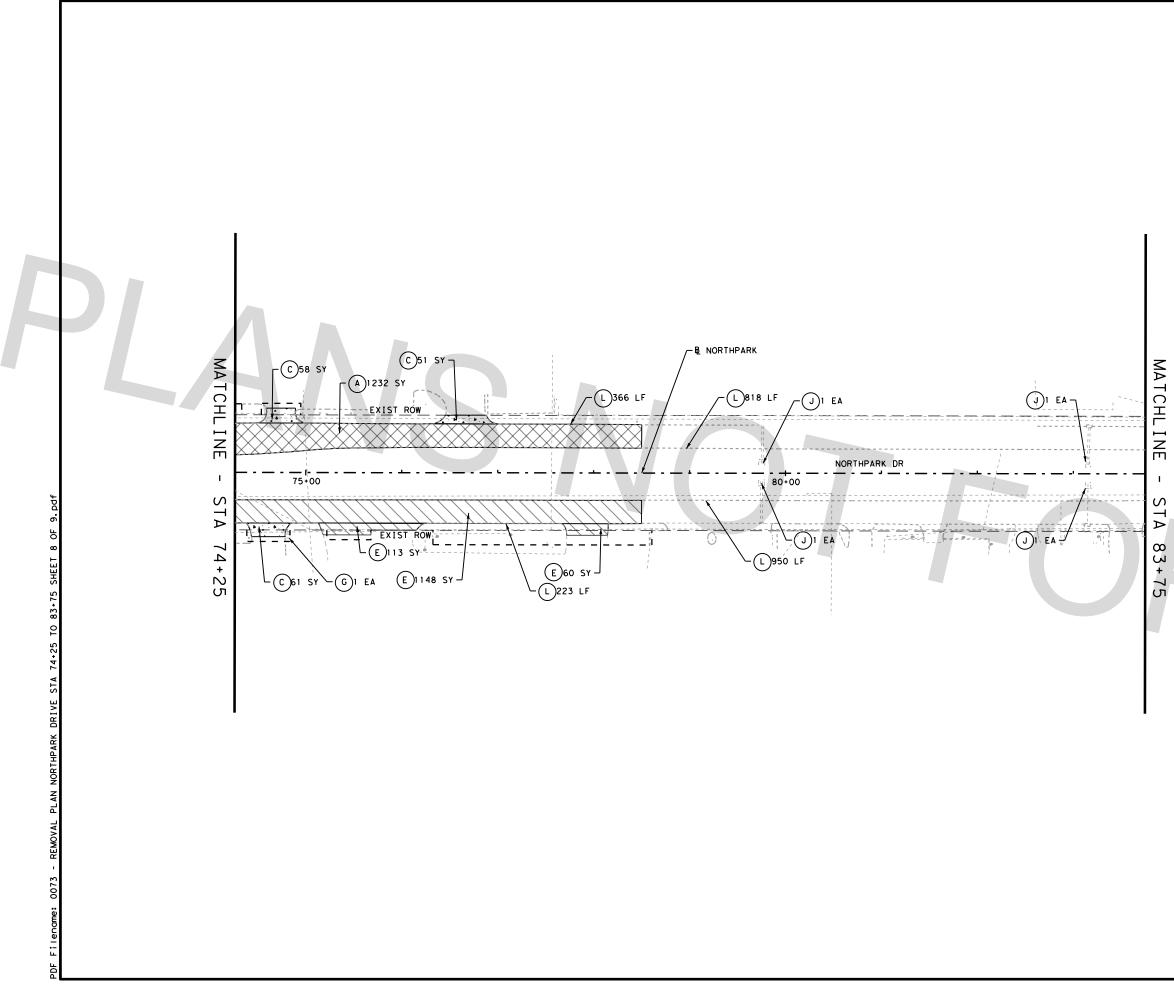






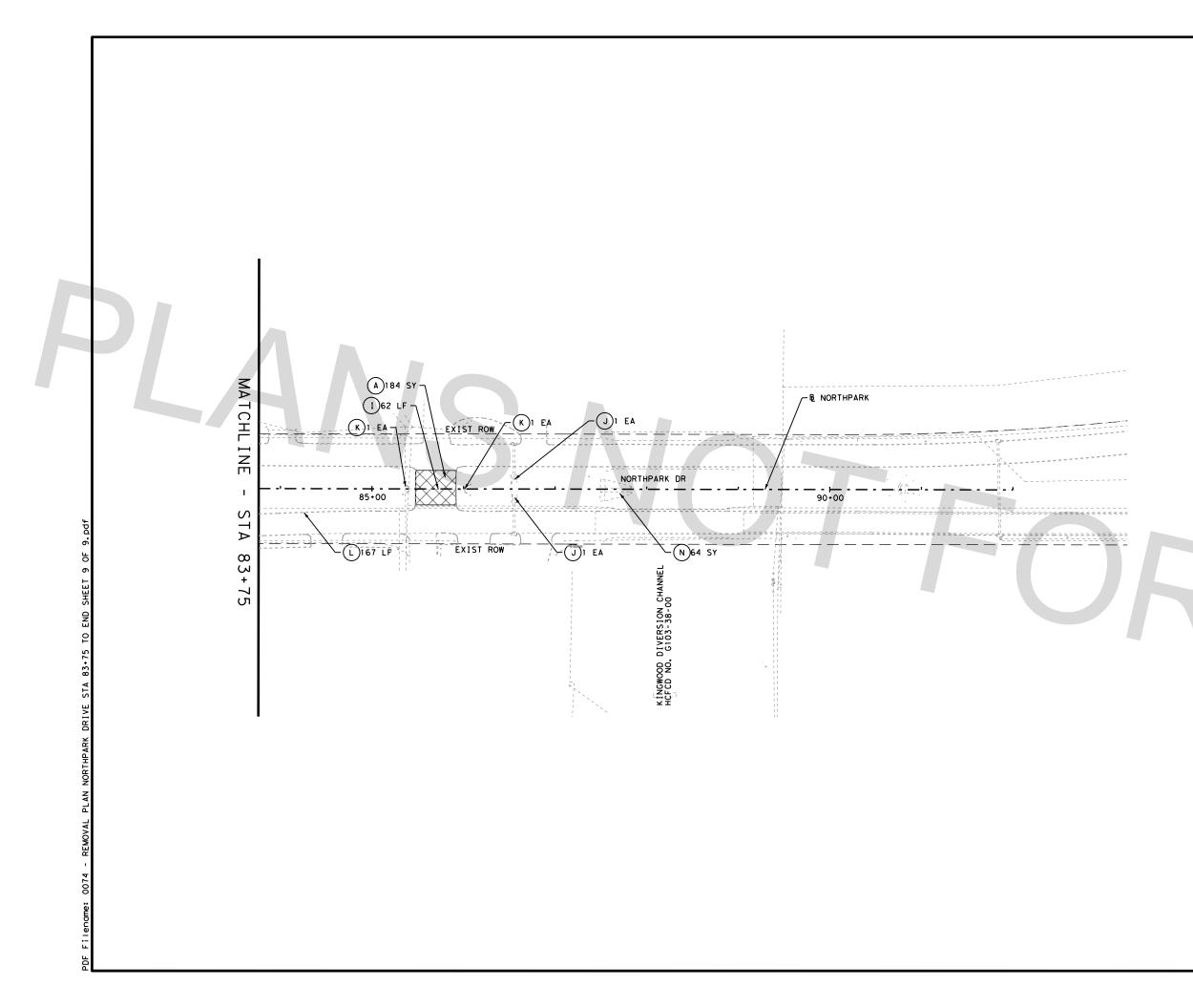
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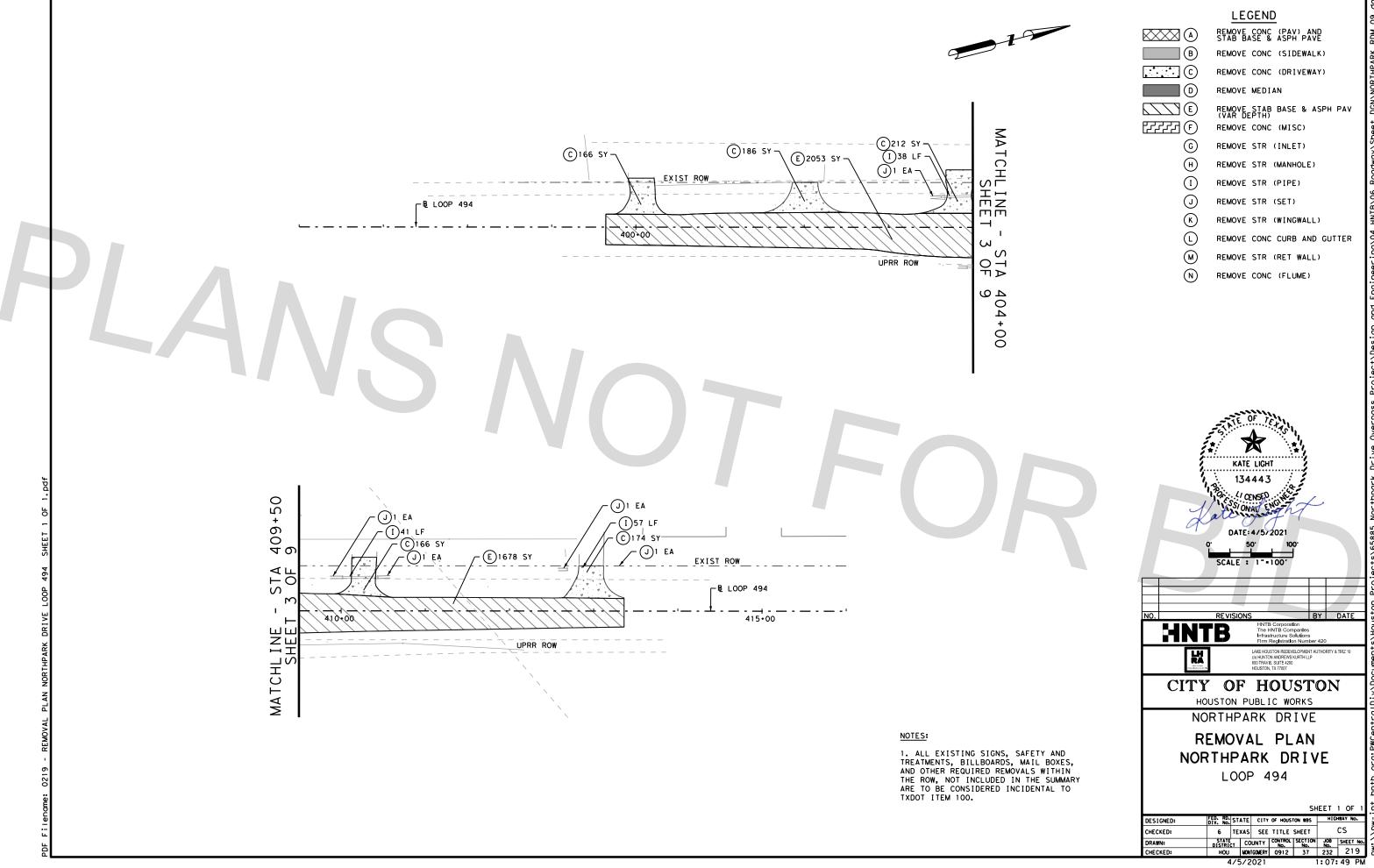


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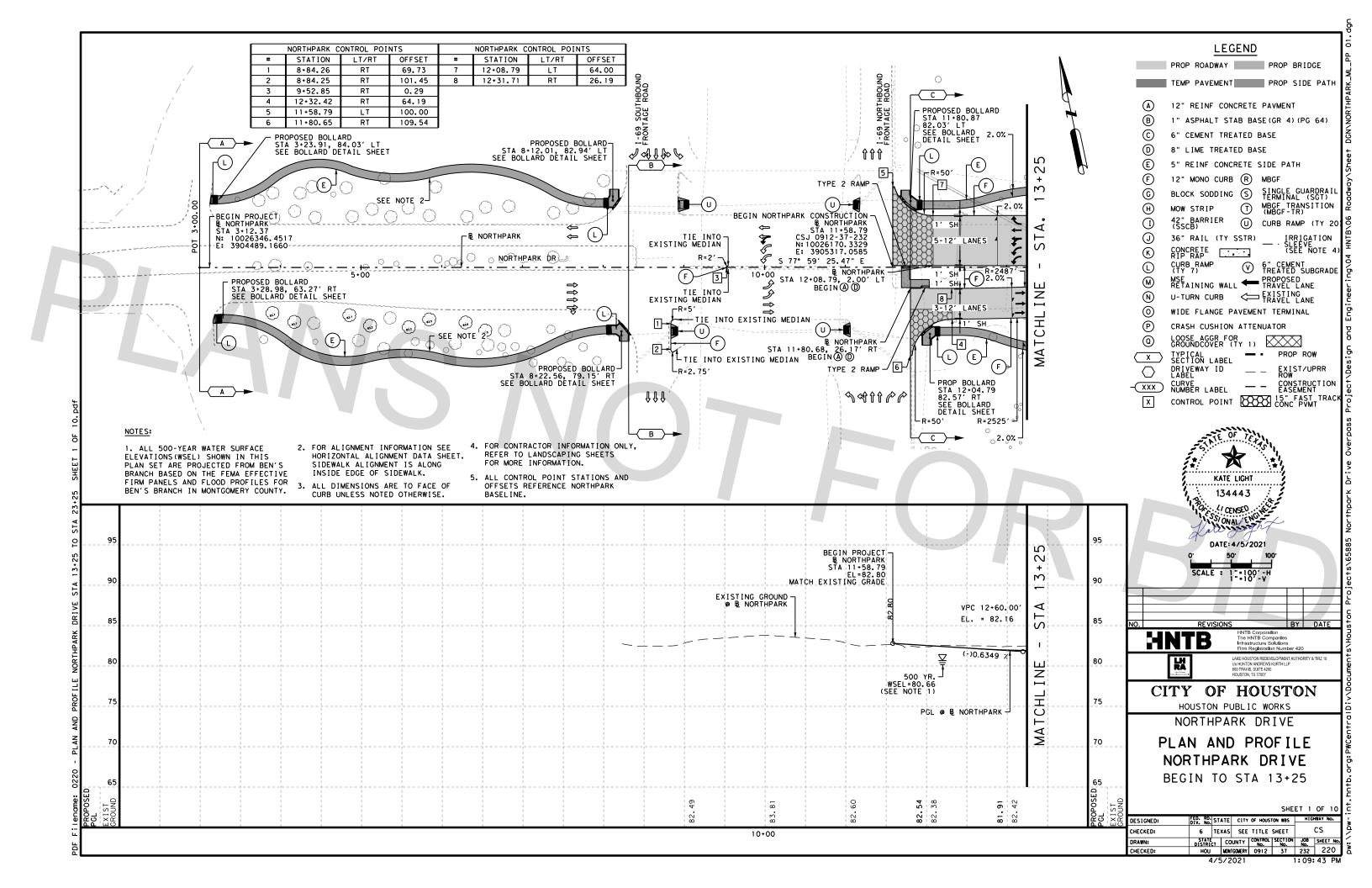


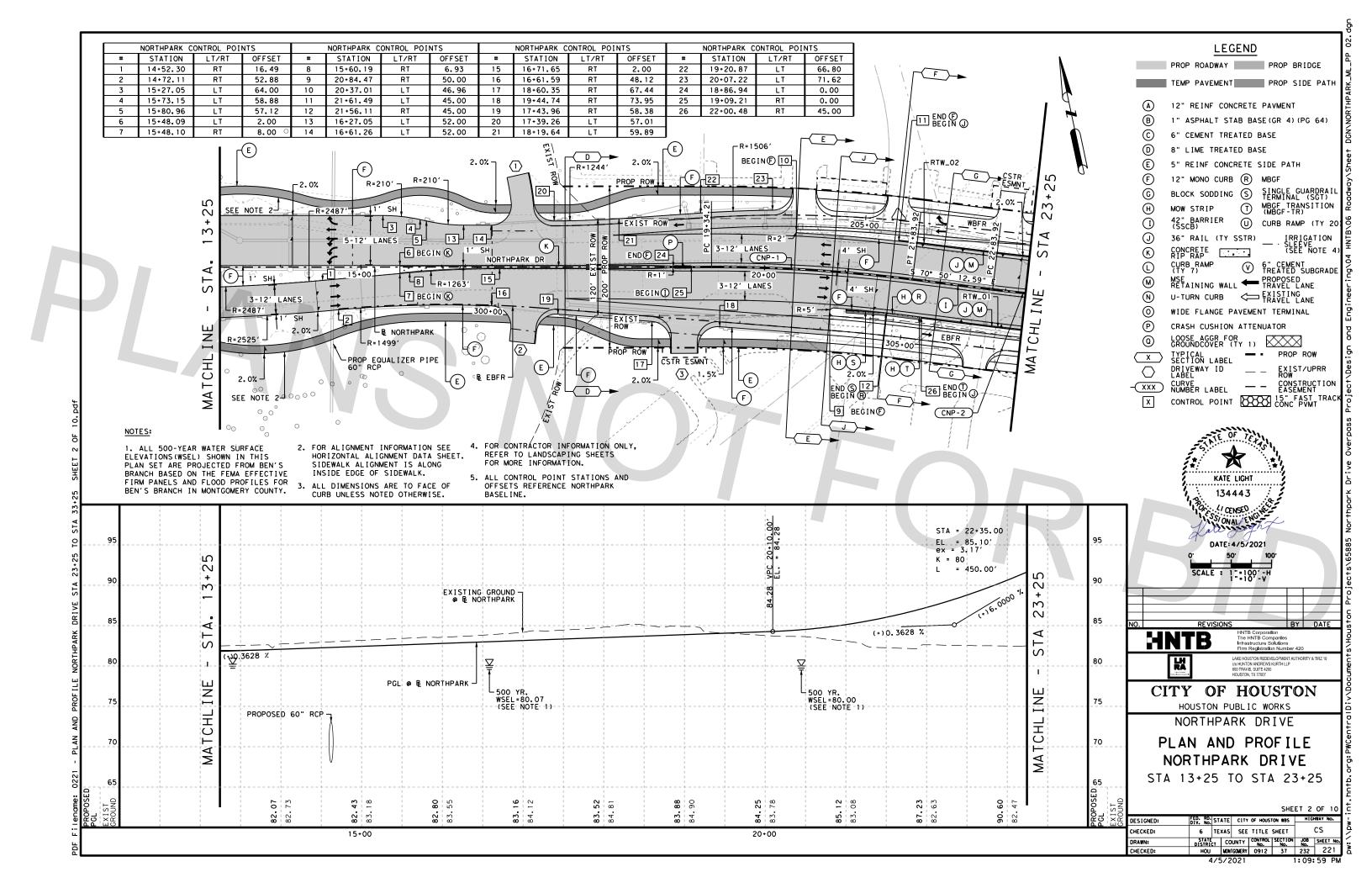
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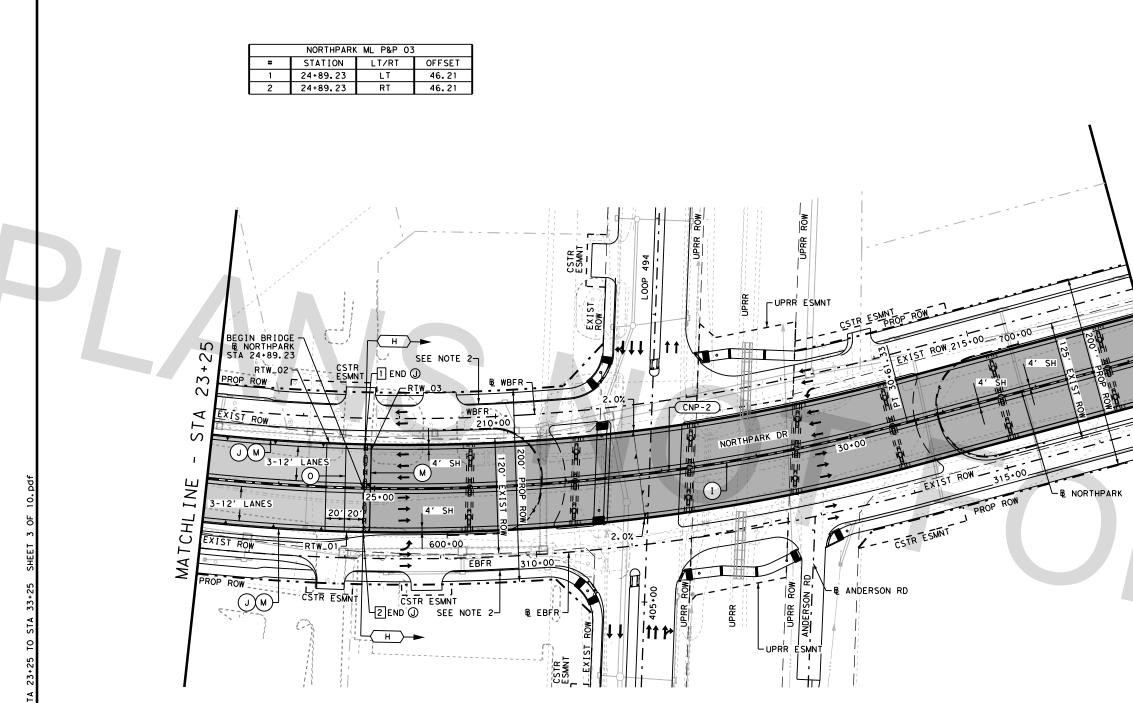


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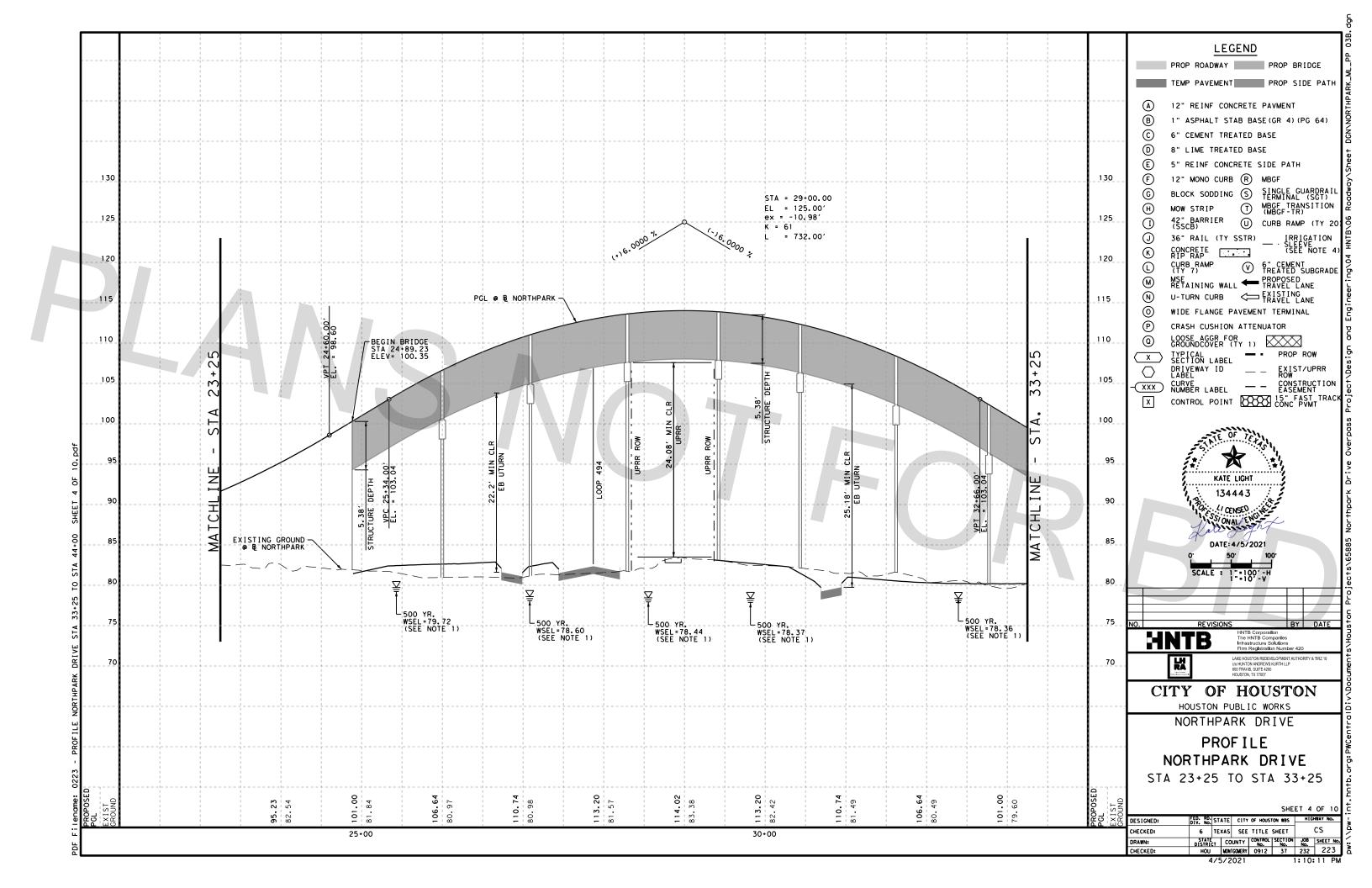


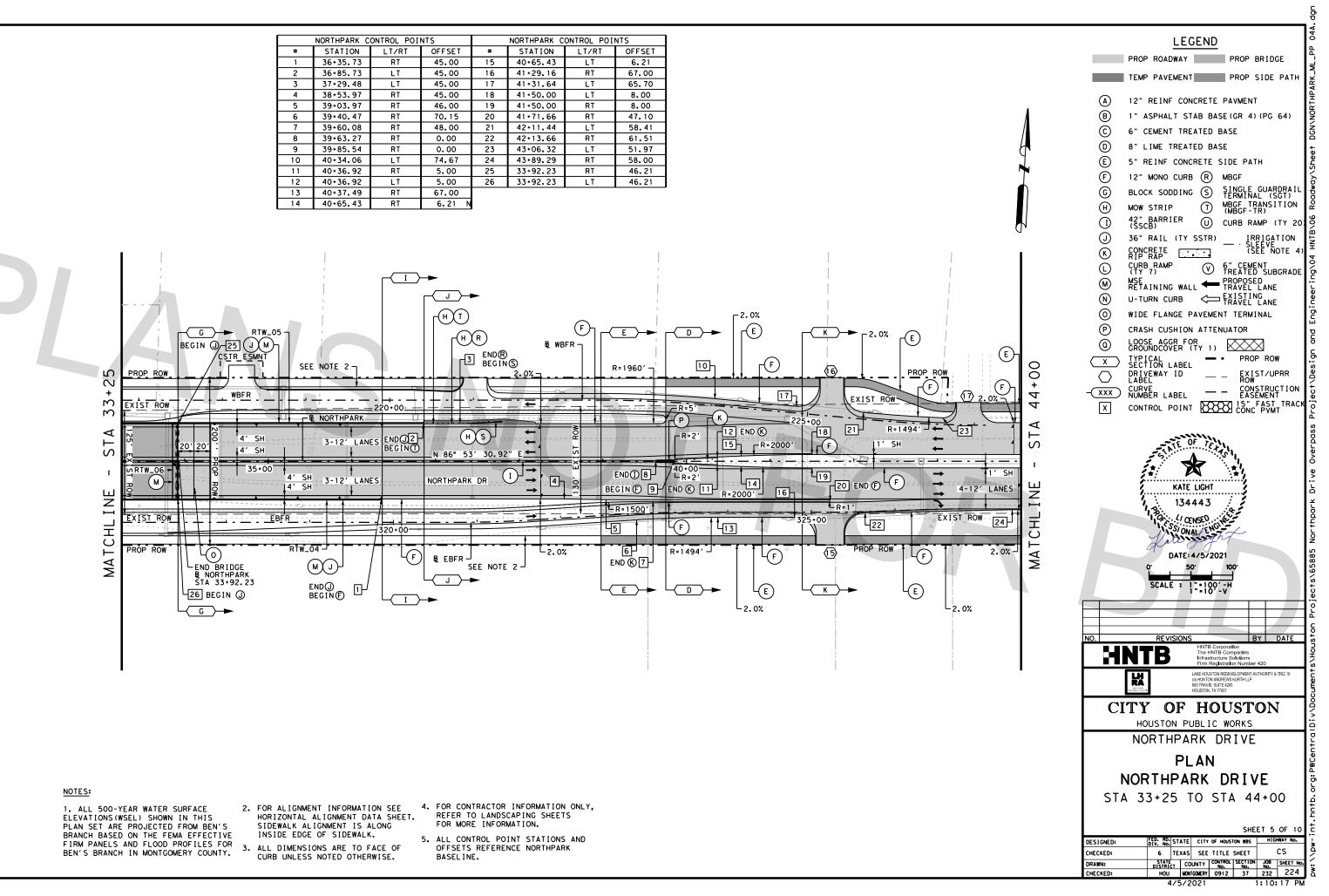


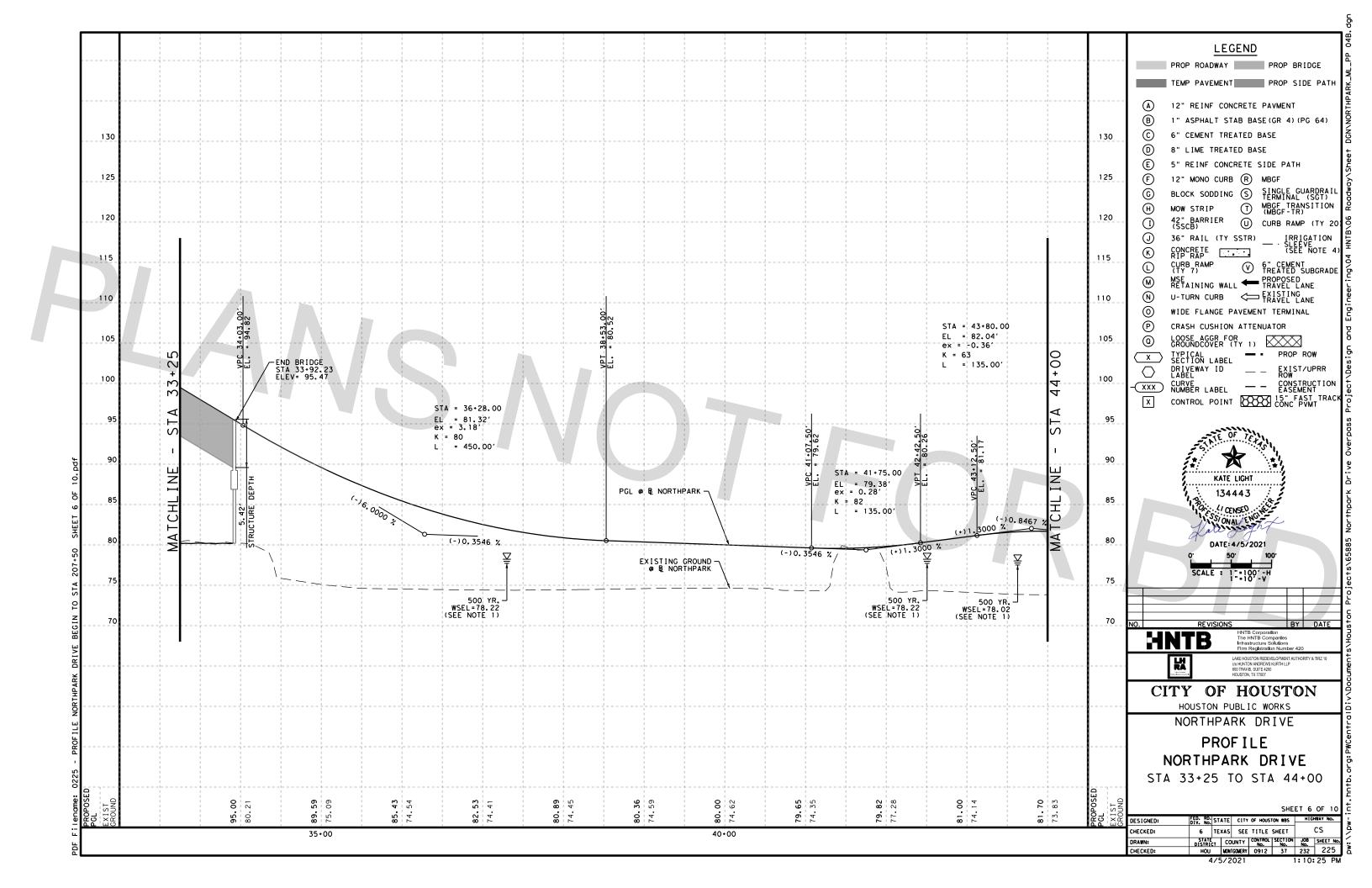
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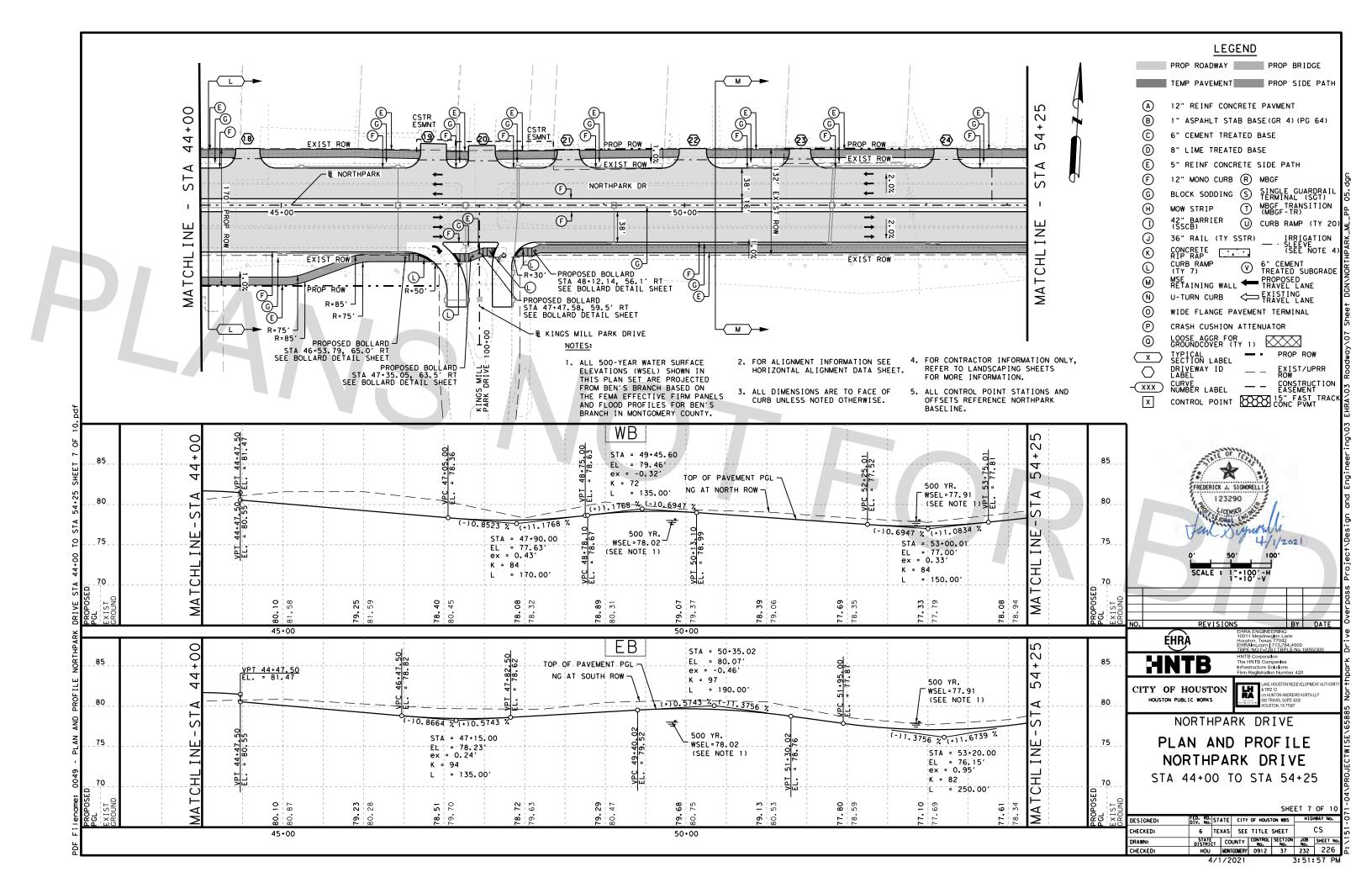
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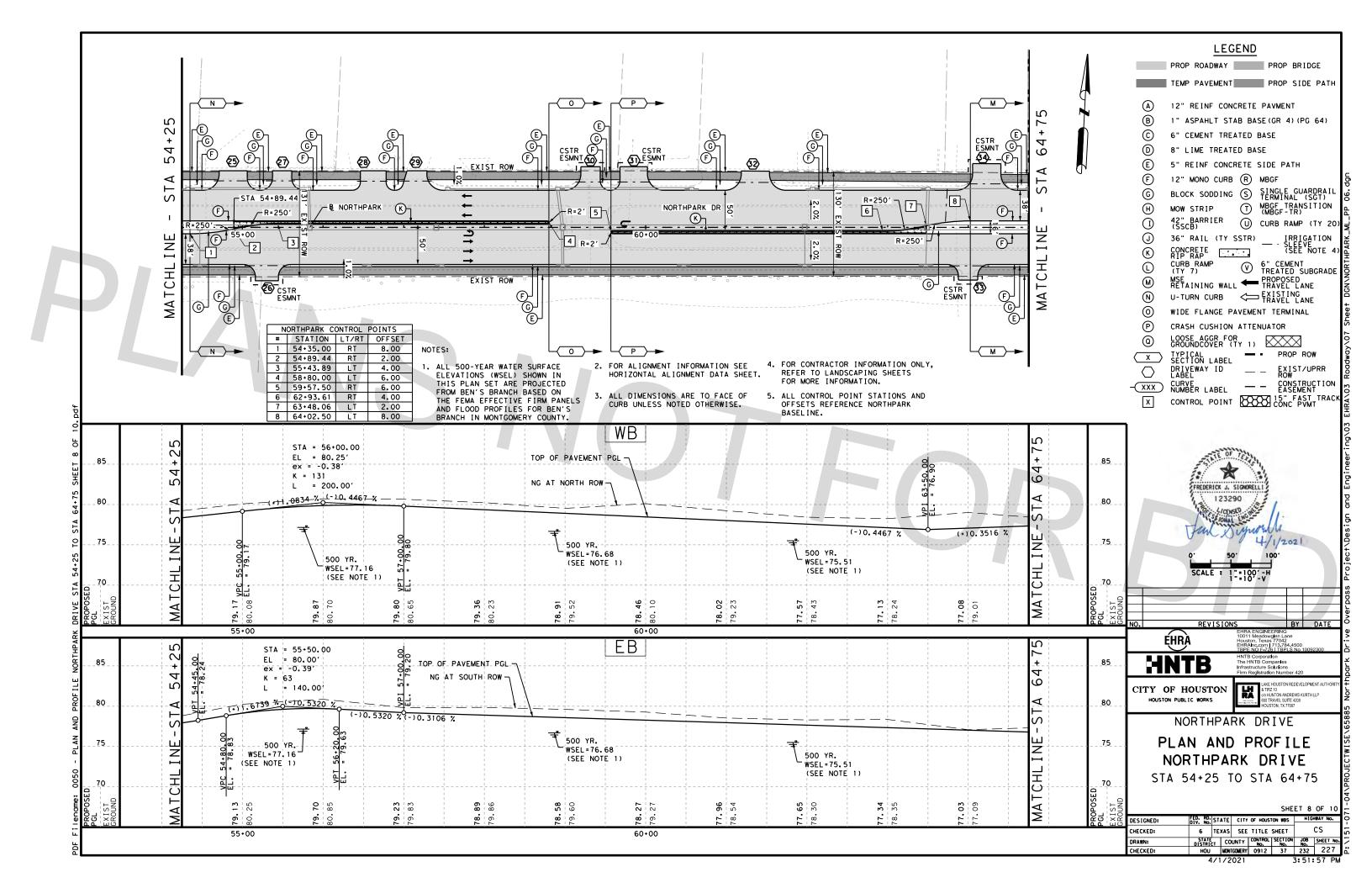
- 2. FOR ALIGNMENT INFORMATION SEE HORIZONTAL ALIGNMENT DATA SHEET. SIDEWALK ALIGNMENT IS ALONG INSIDE EDGE OF SIDEWALK.
- 3. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS NOTED OTHERWISE.
- 4. FOR CONTRACTOR INFORMATION ONLY, REFER TO LANDSCAPING SHEETS FOR MORE INFORMATION.
- 5. ALL CONTROL POINT STATIONS AND OFFSETS REFERENCE NORTHPARK BASELINE.

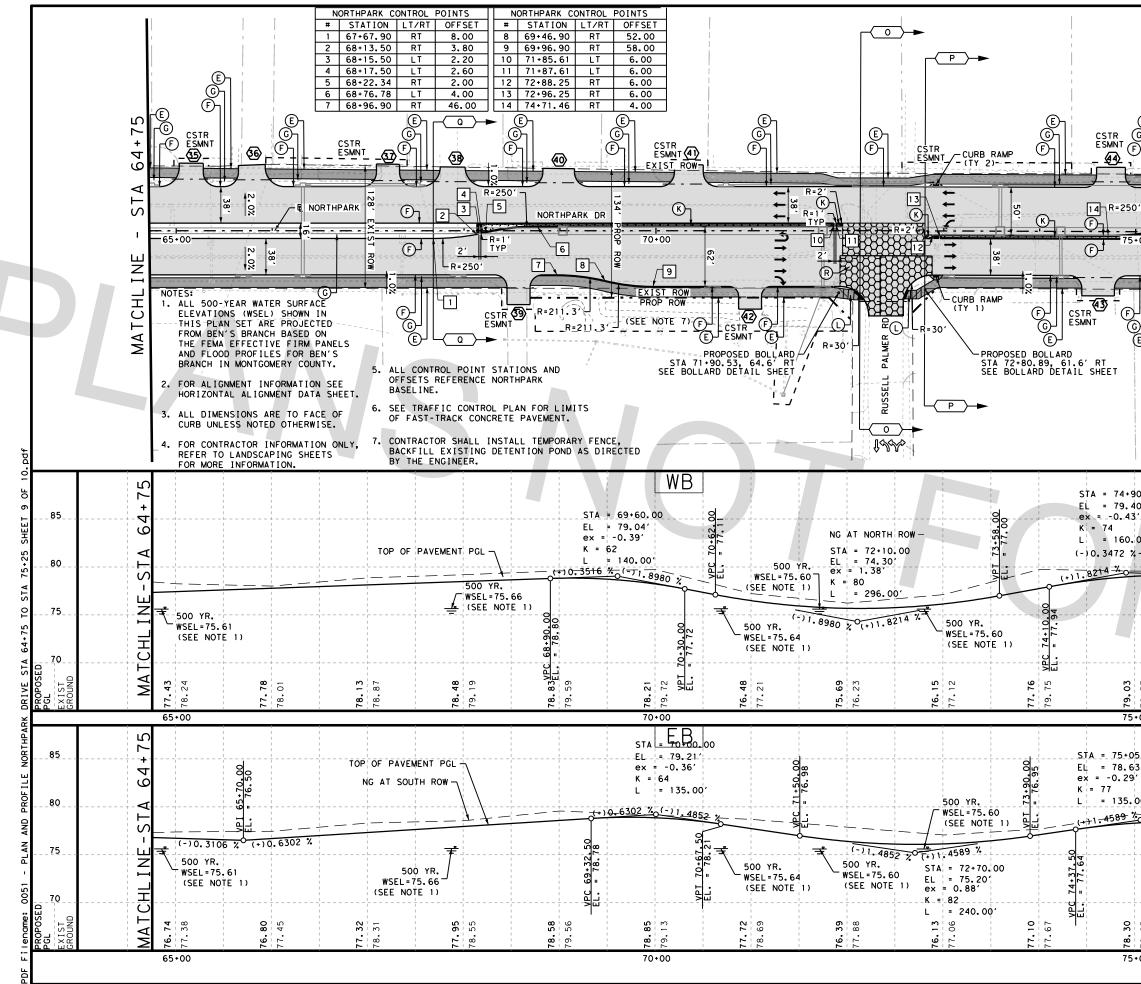




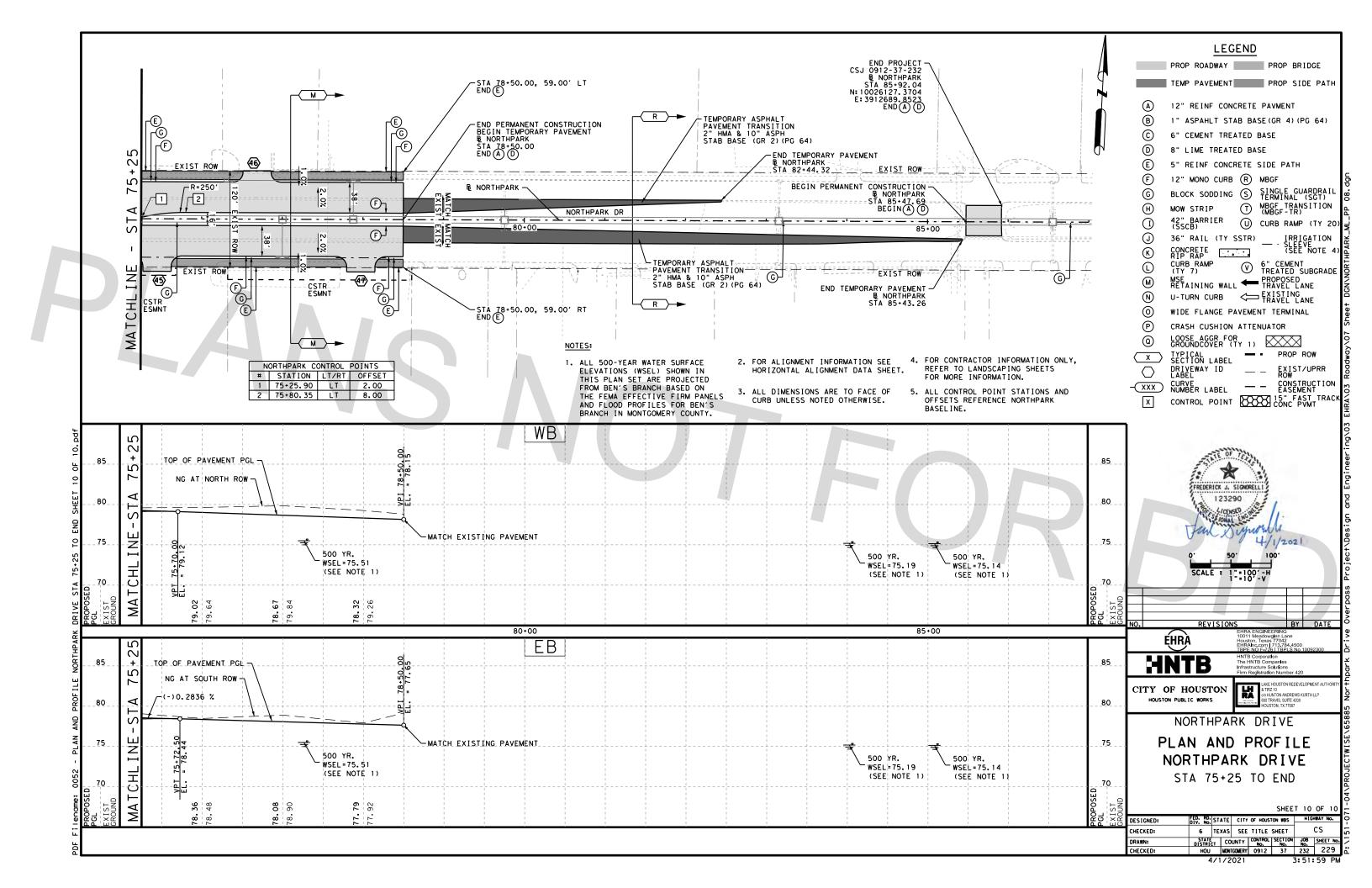


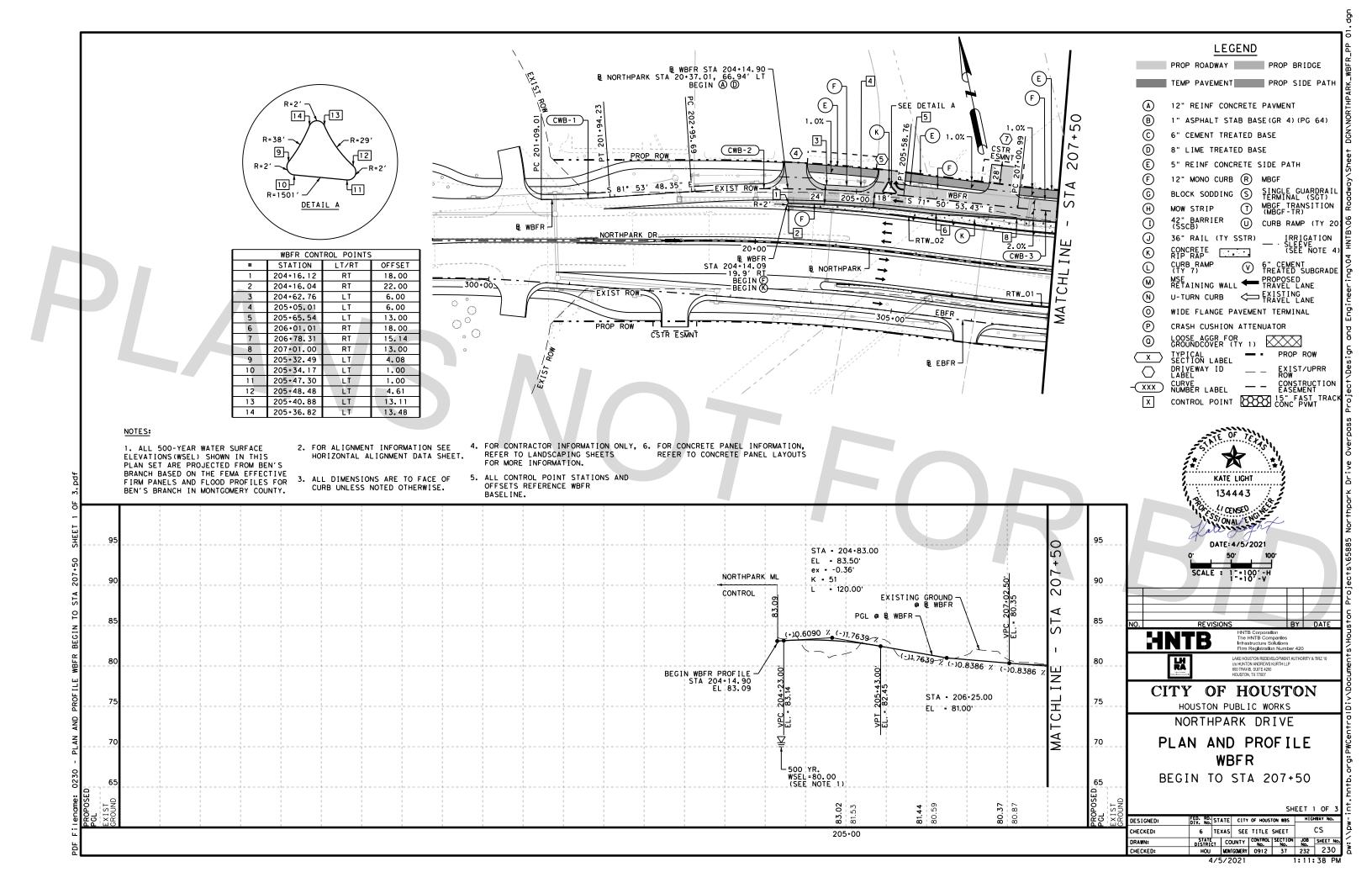


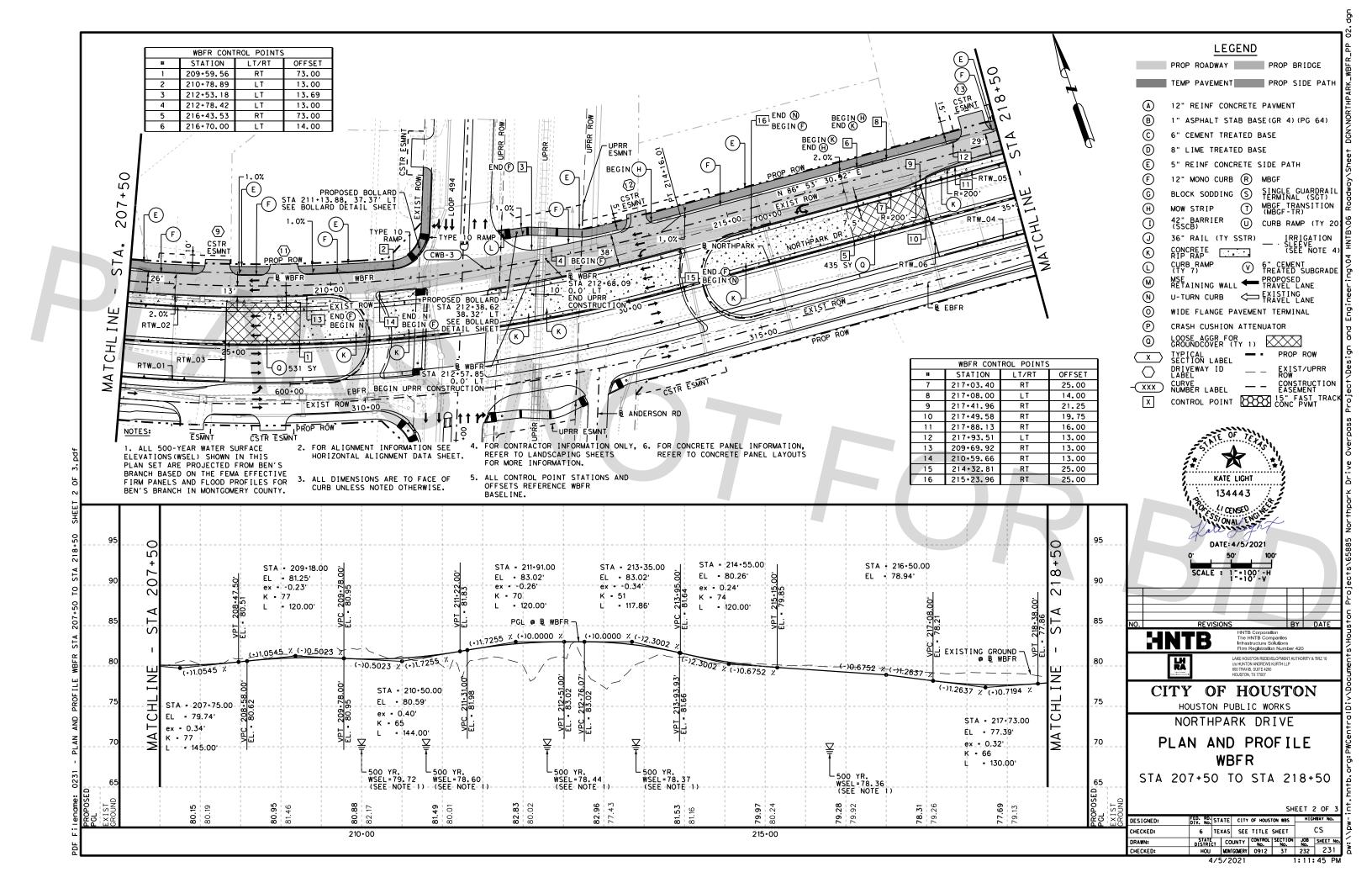


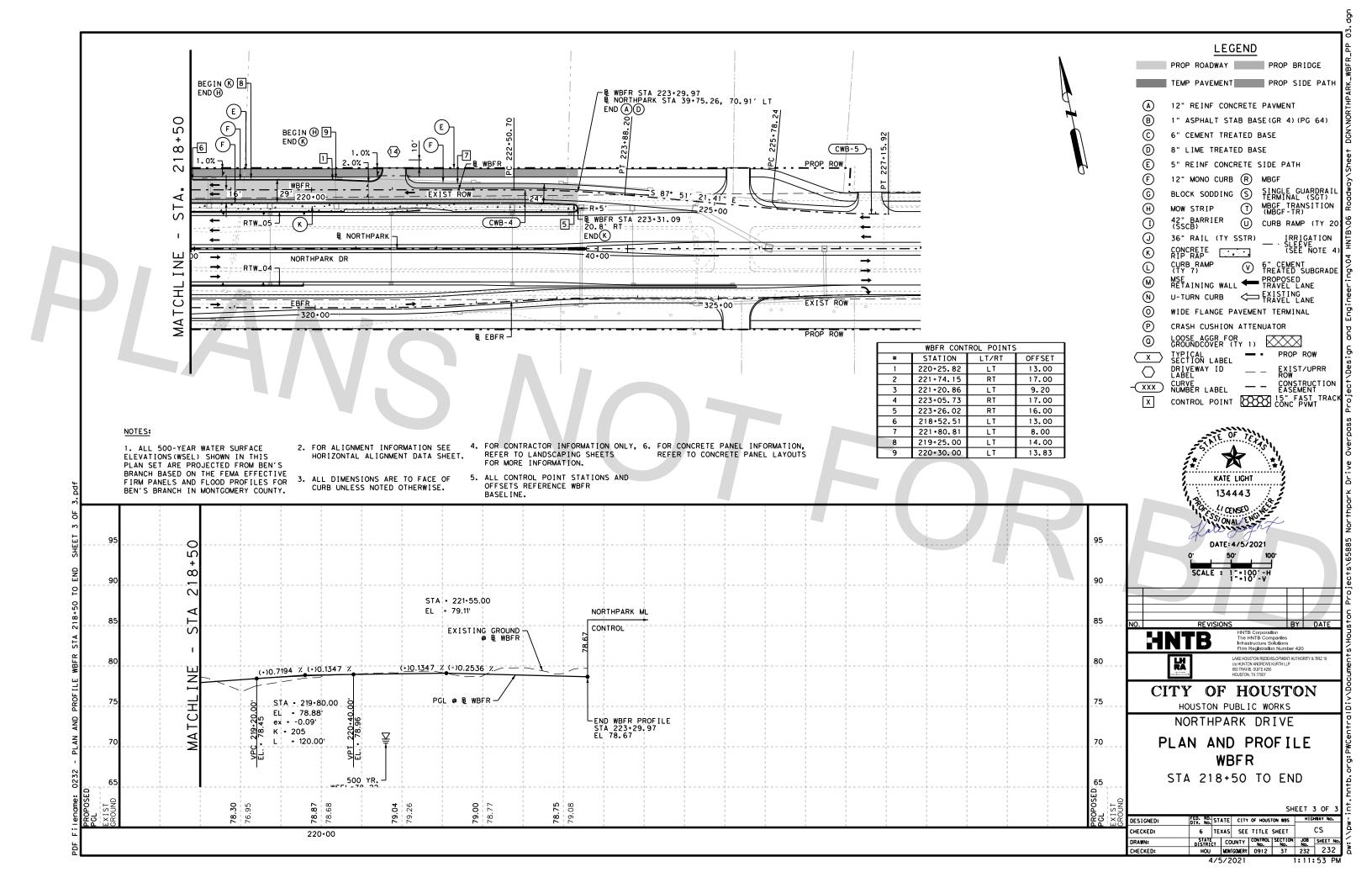


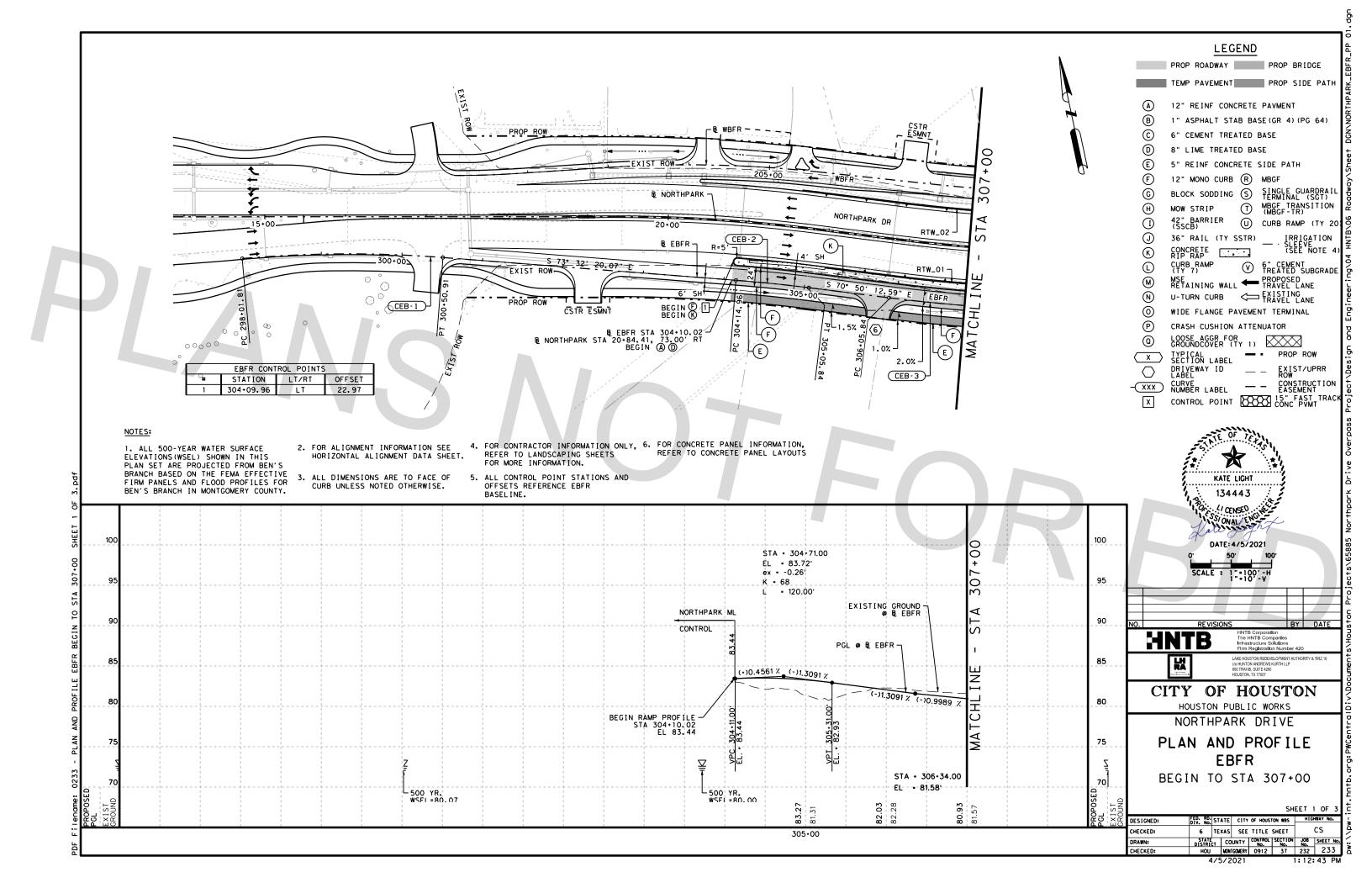
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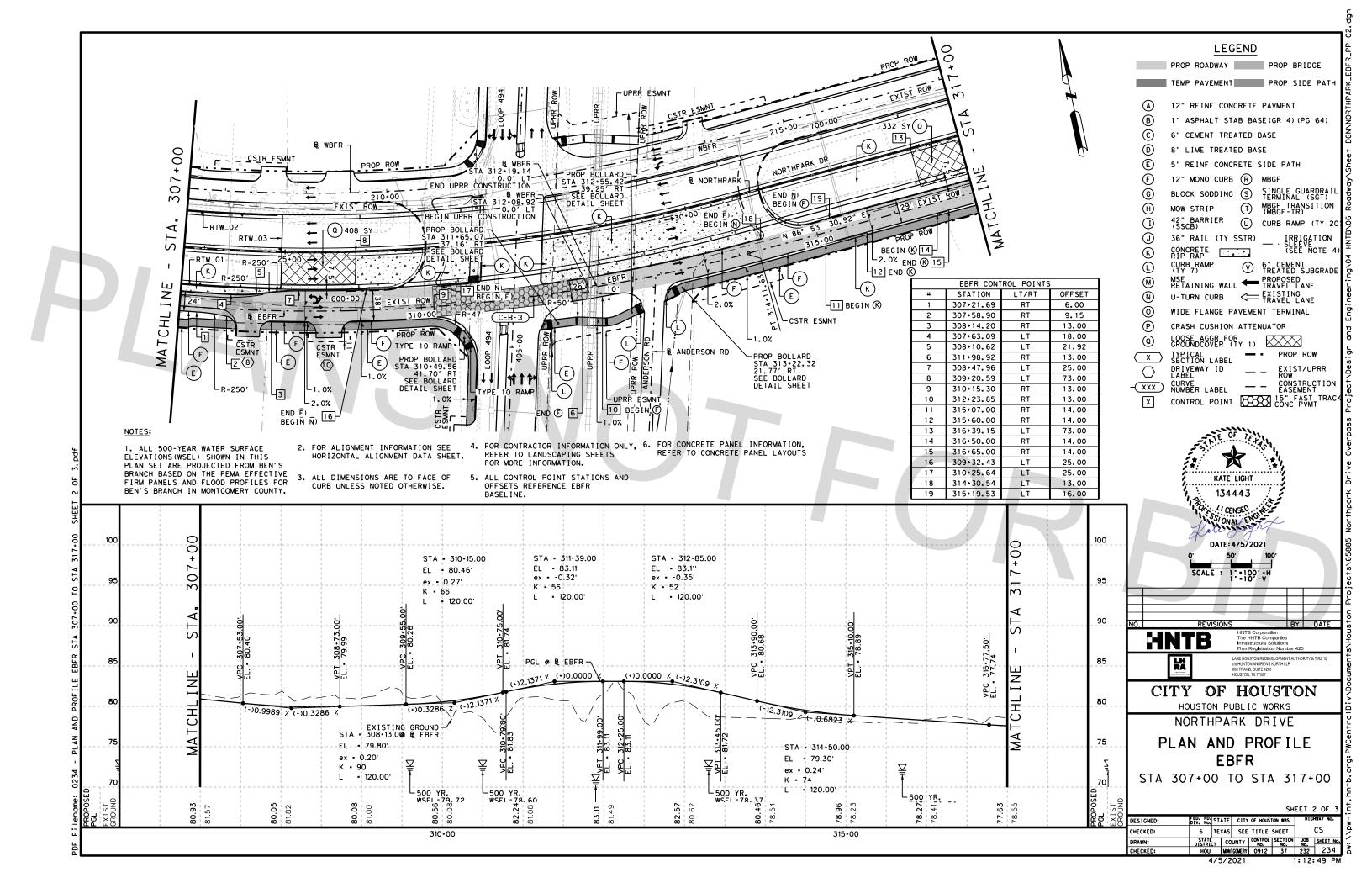


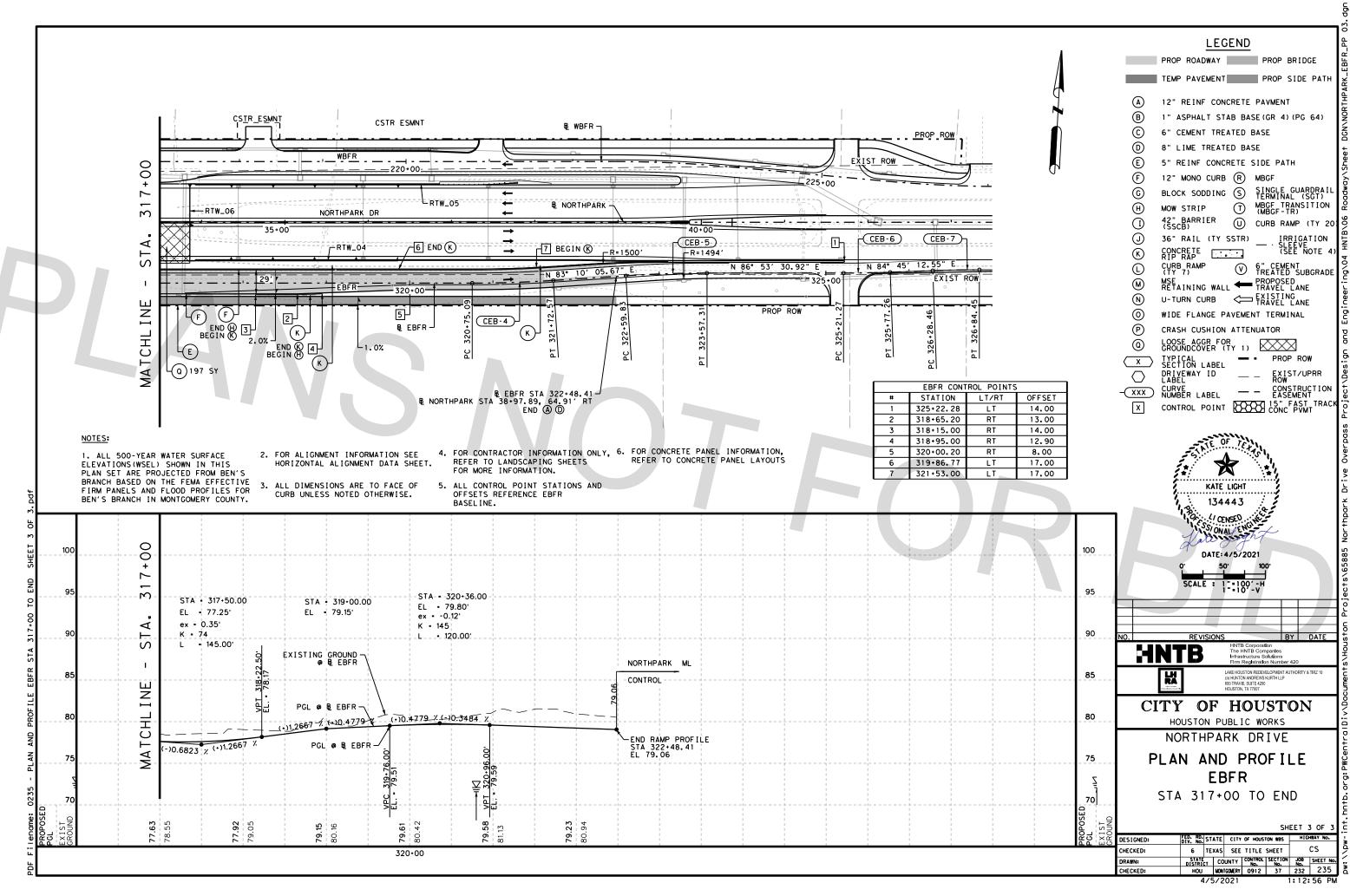


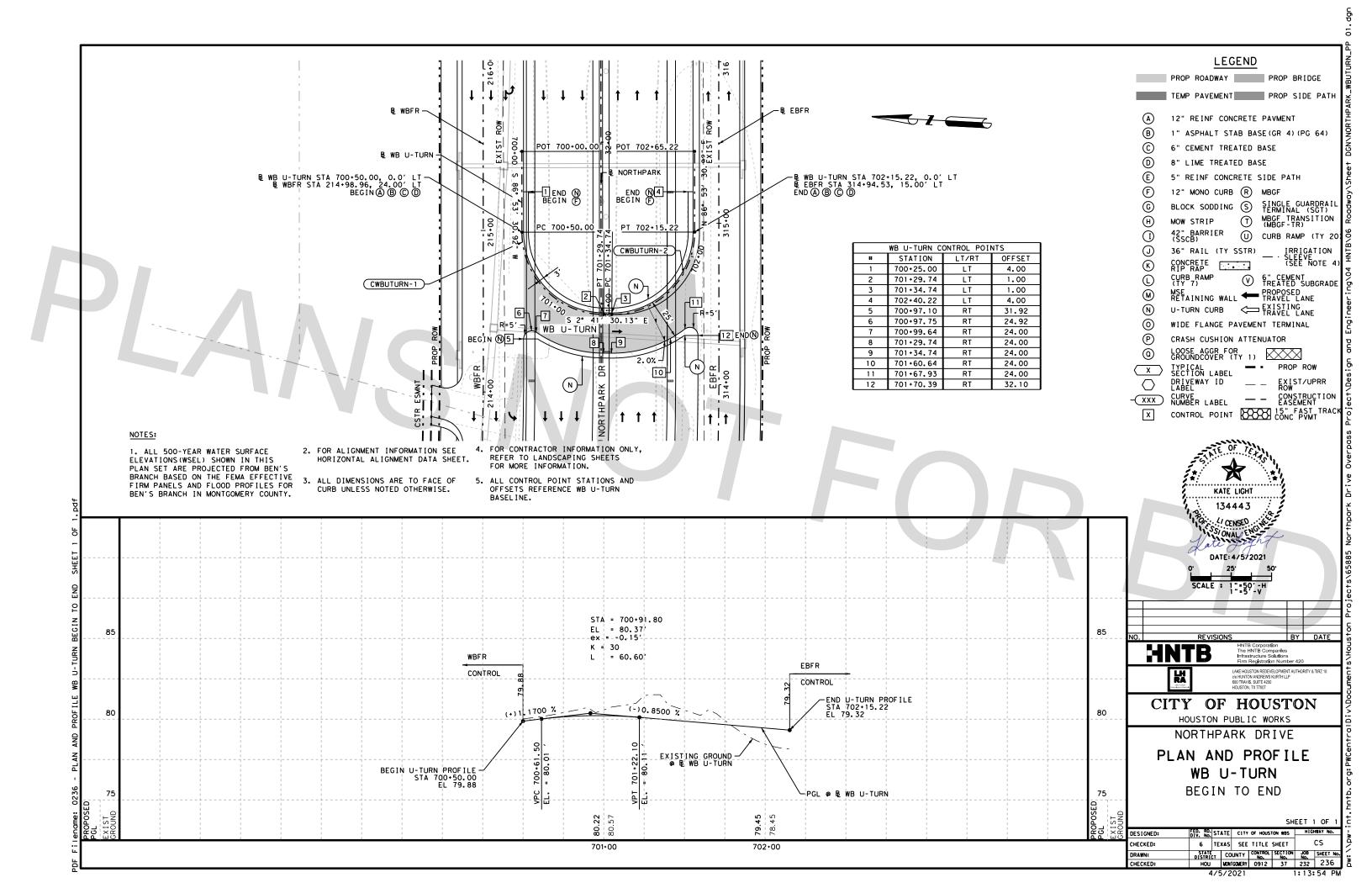


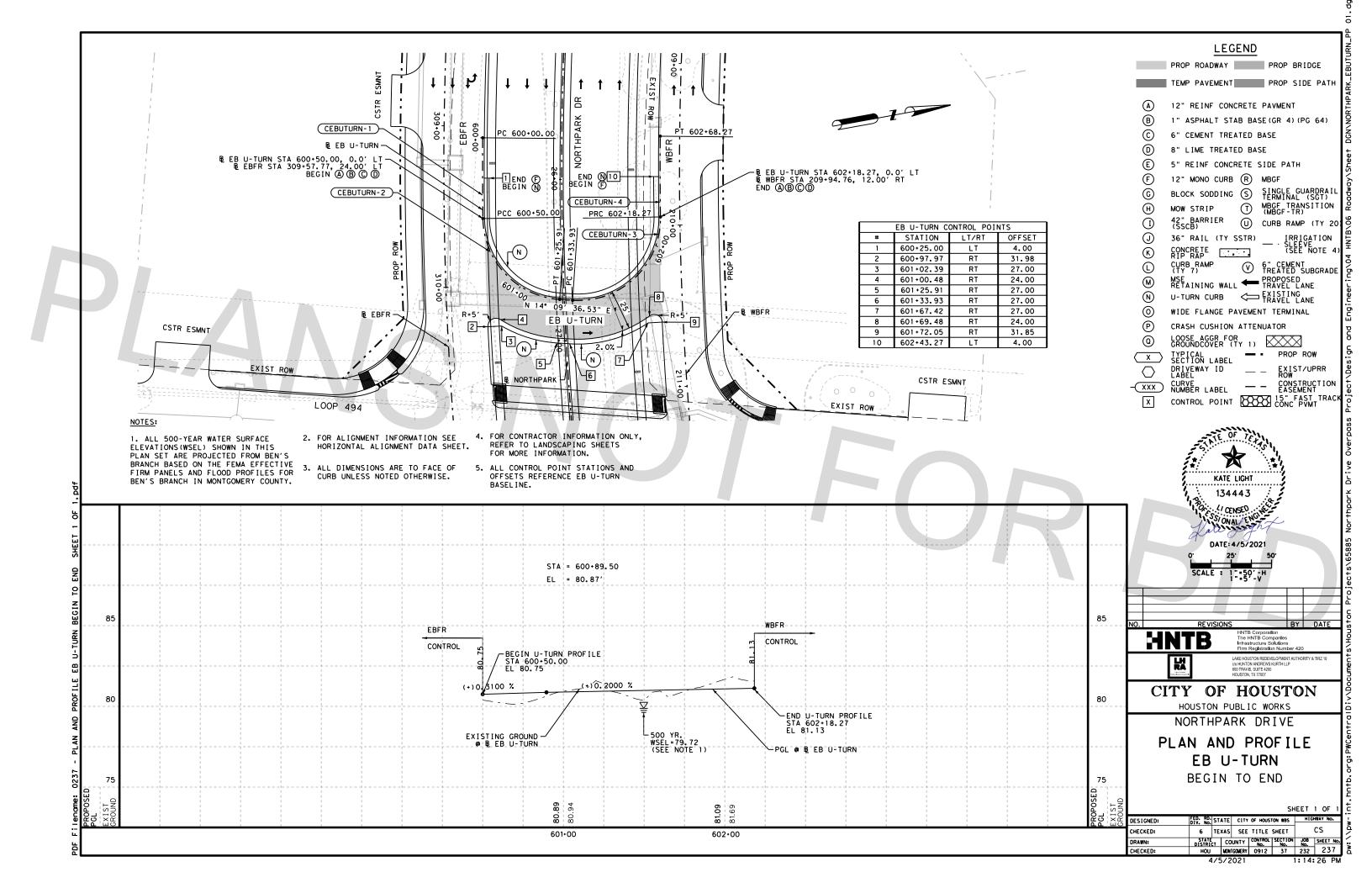


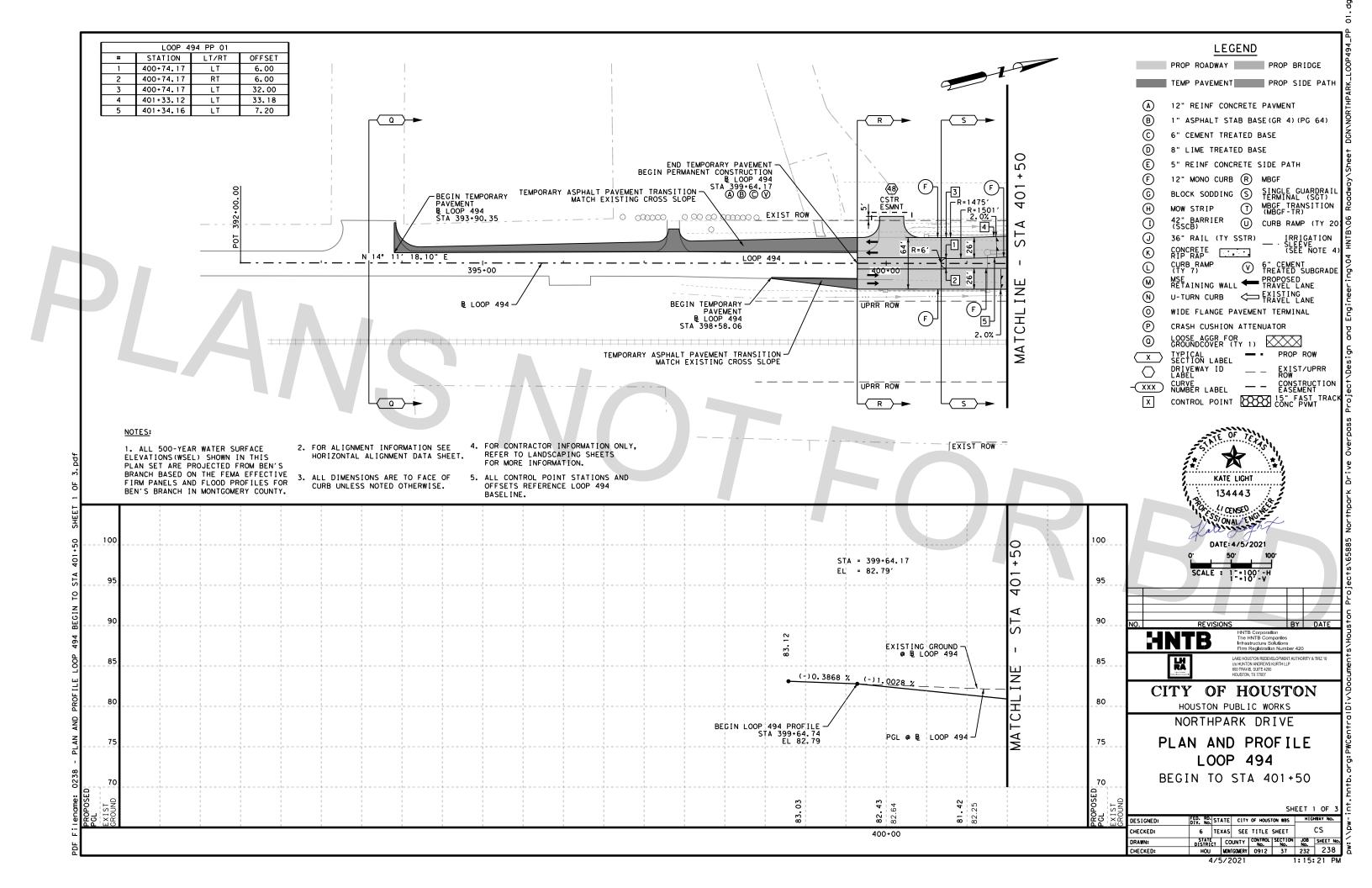


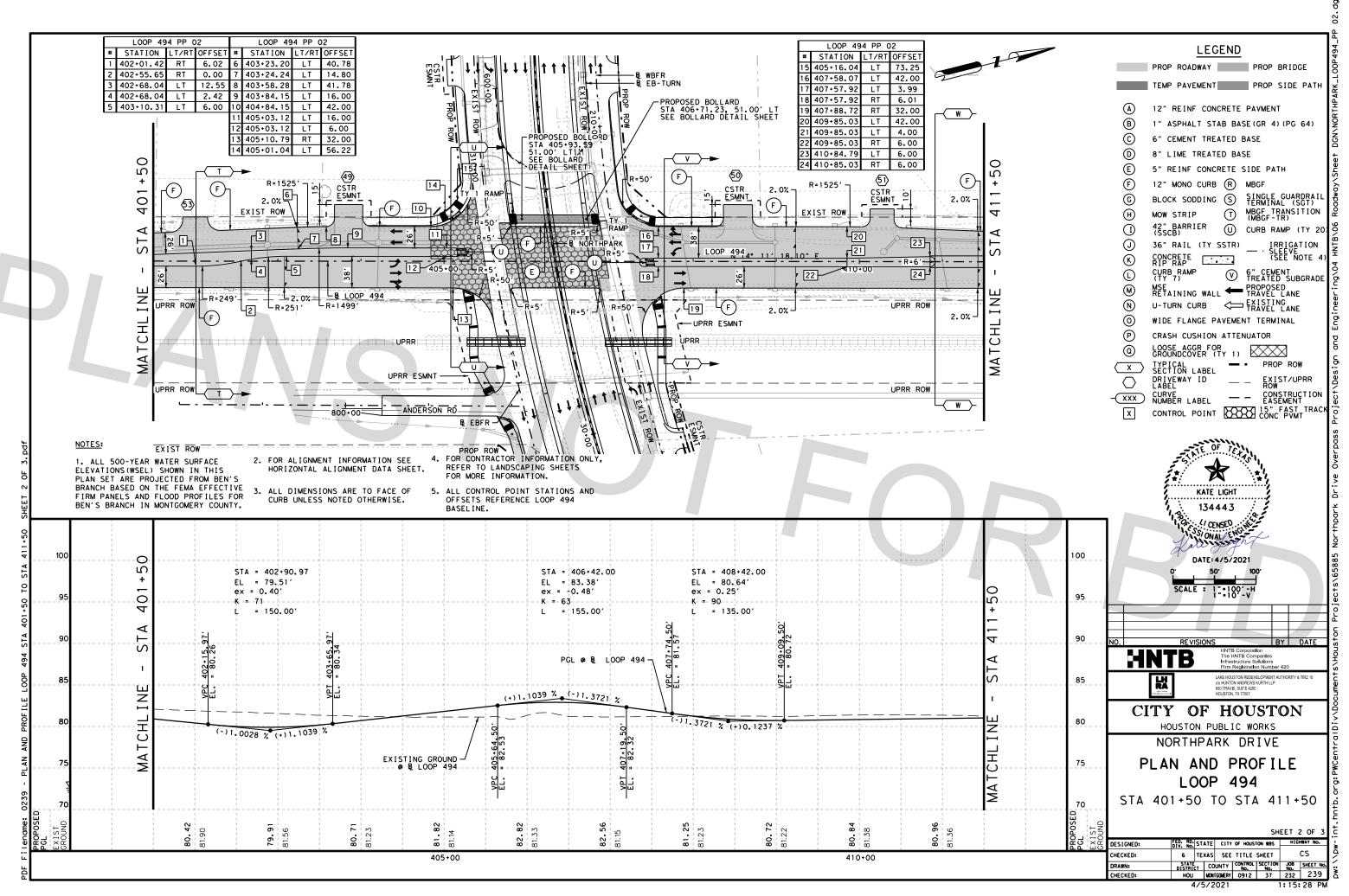


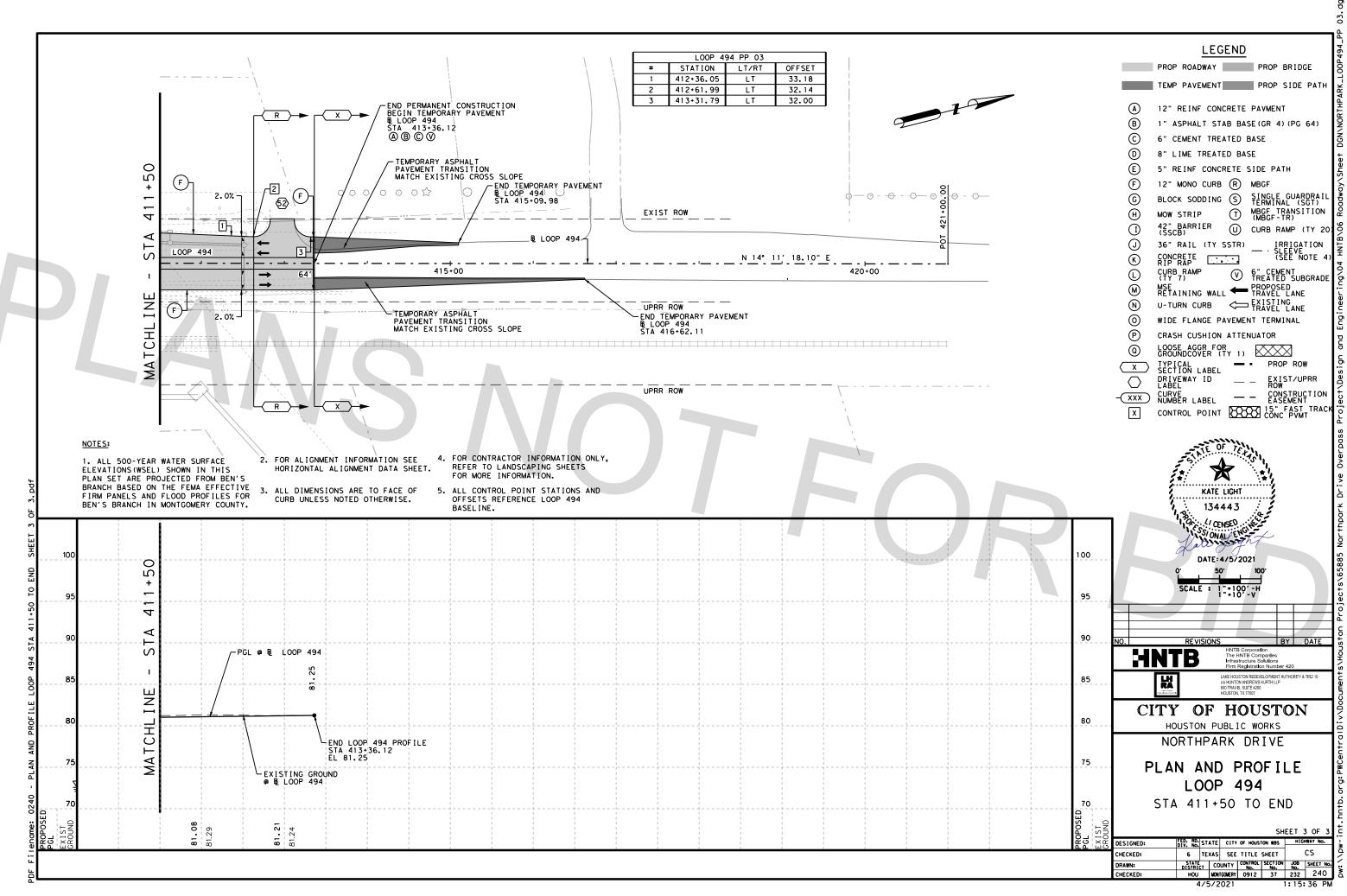


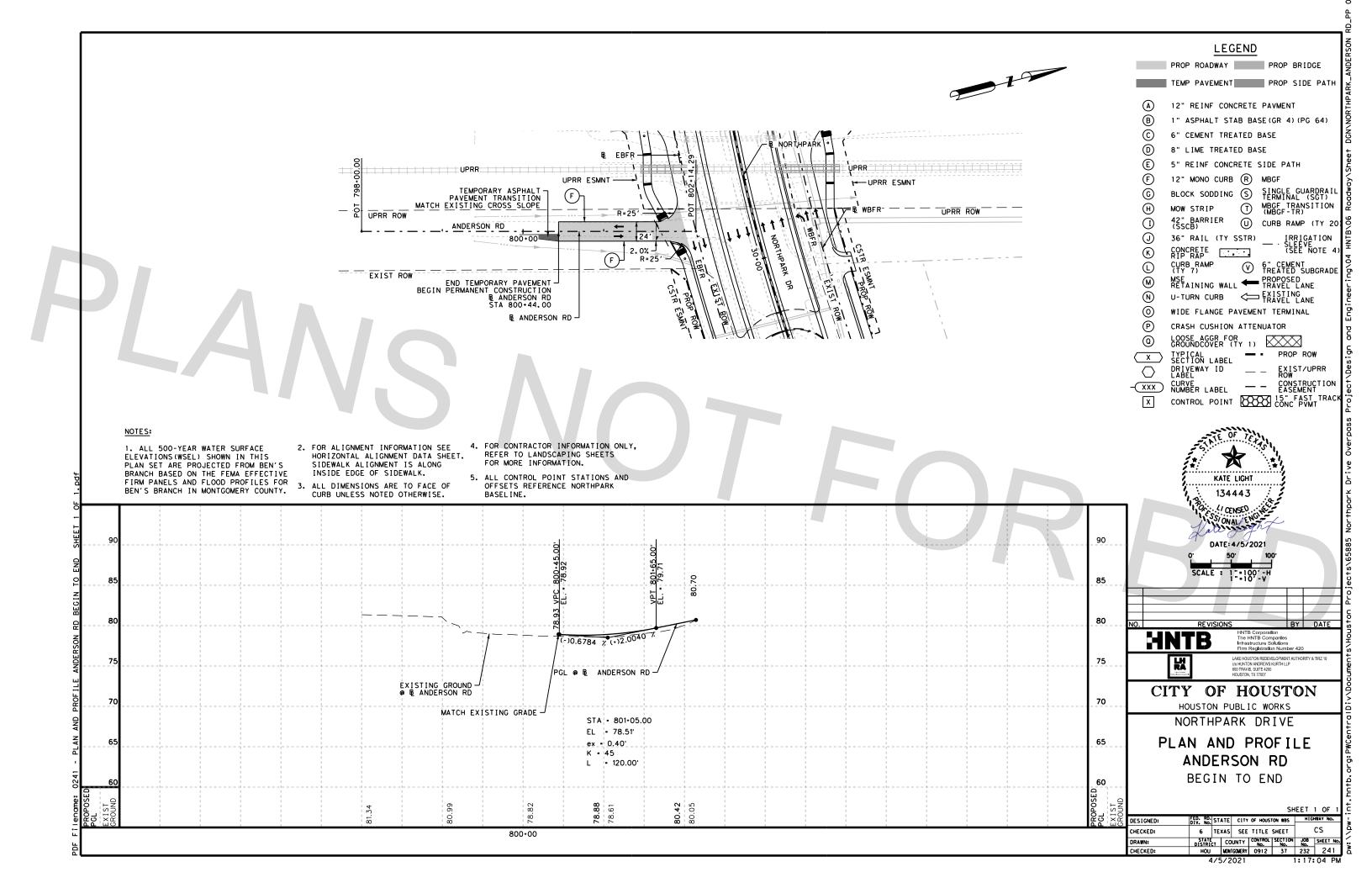


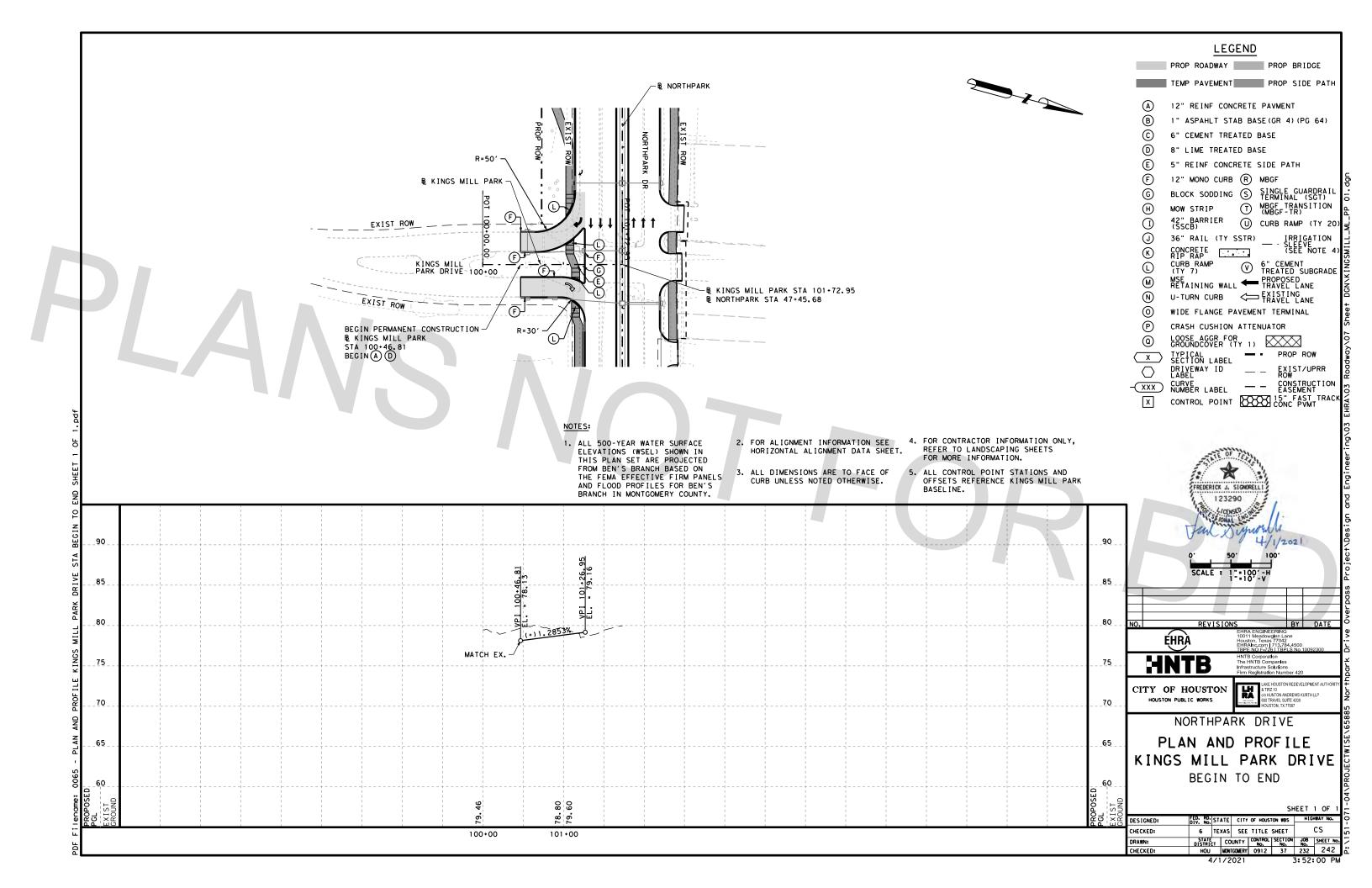


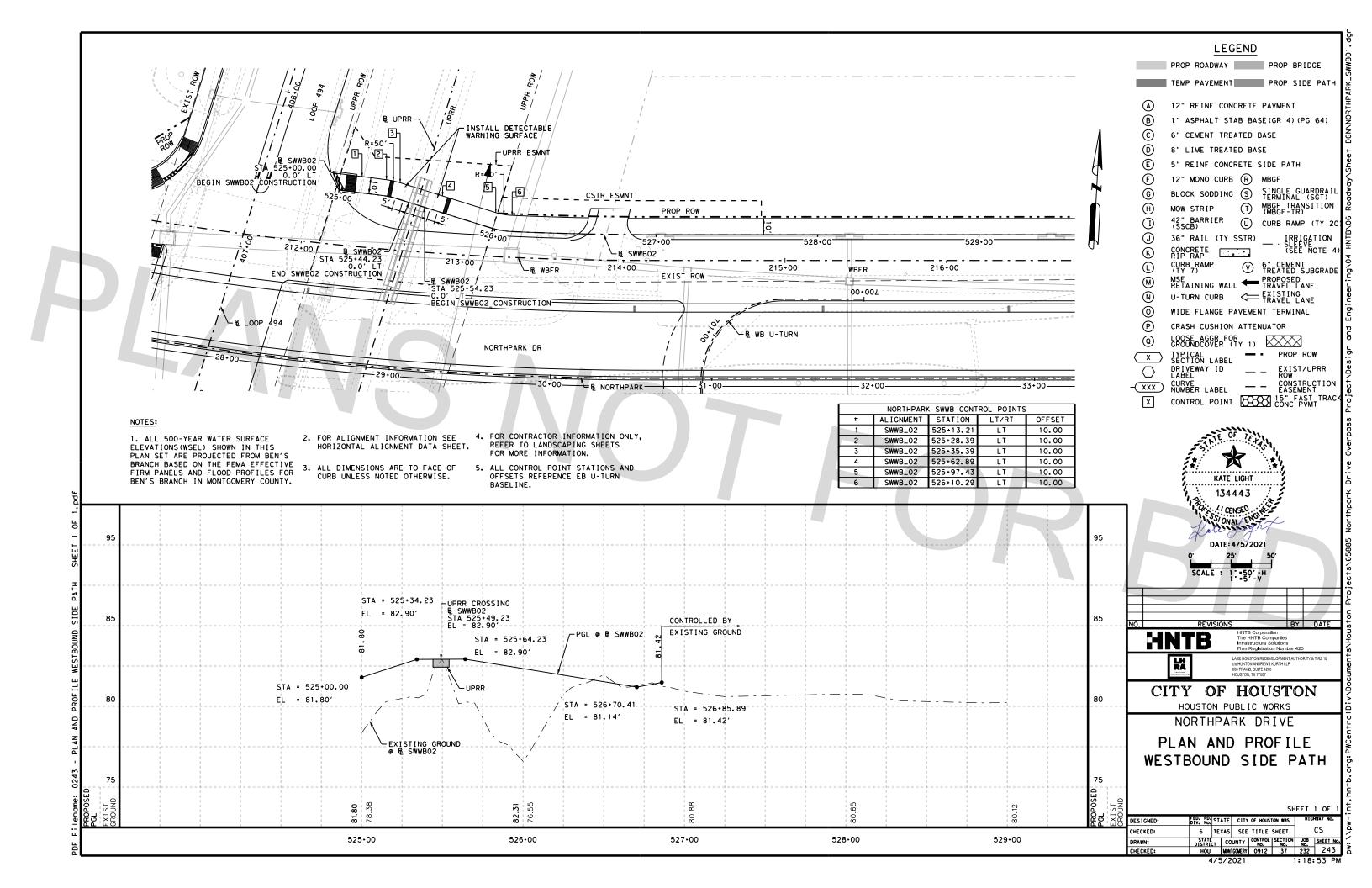


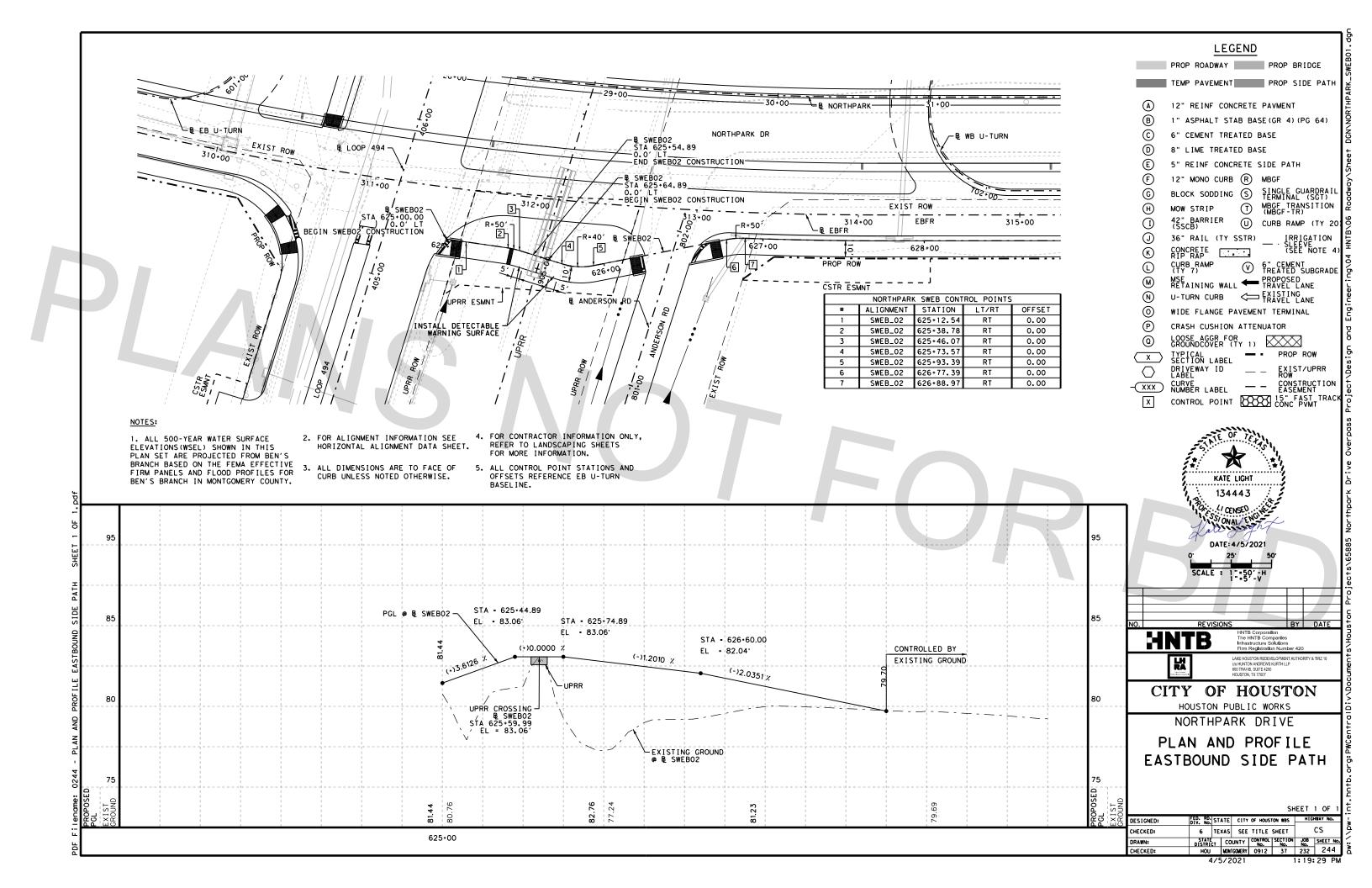


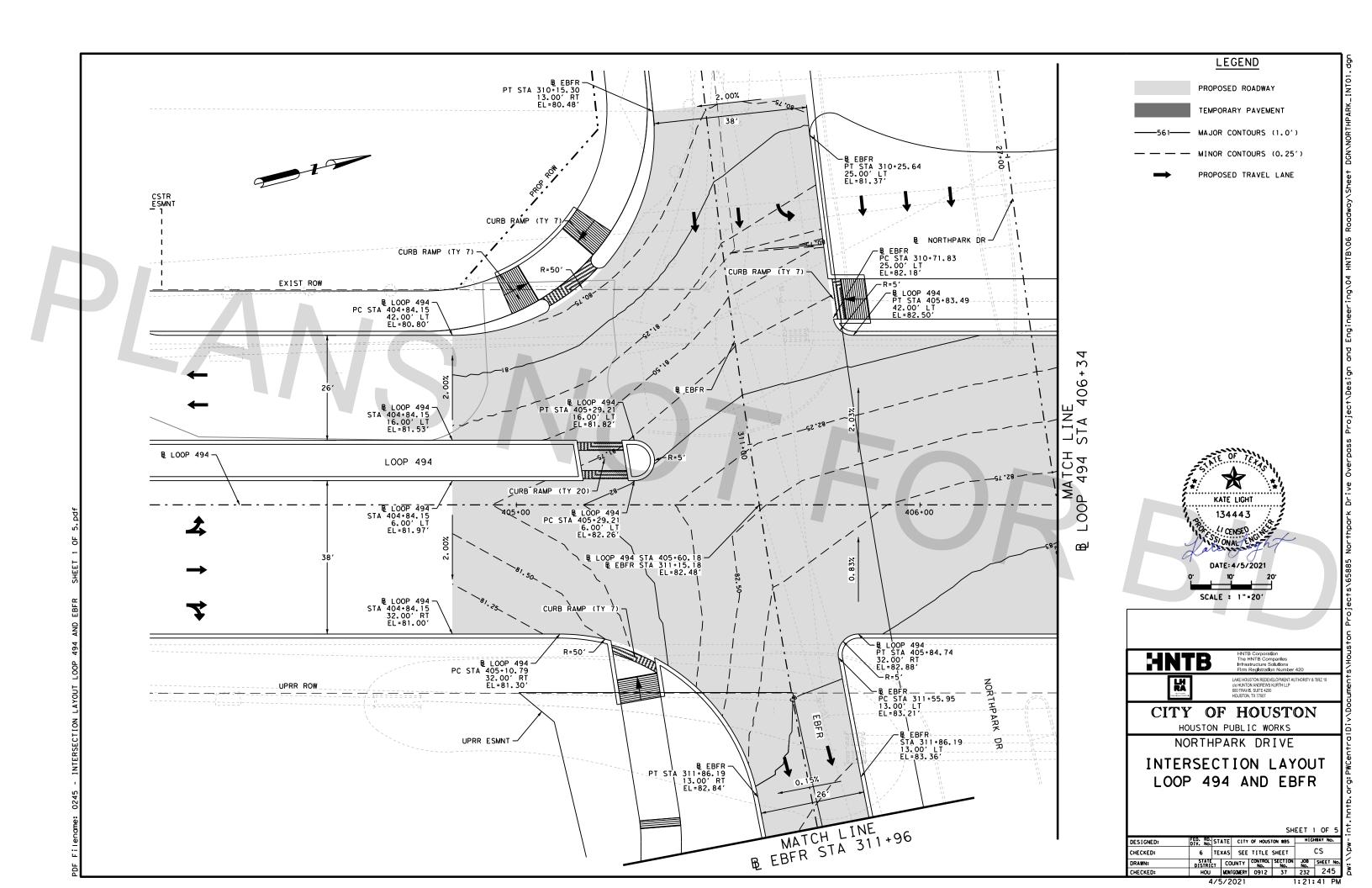


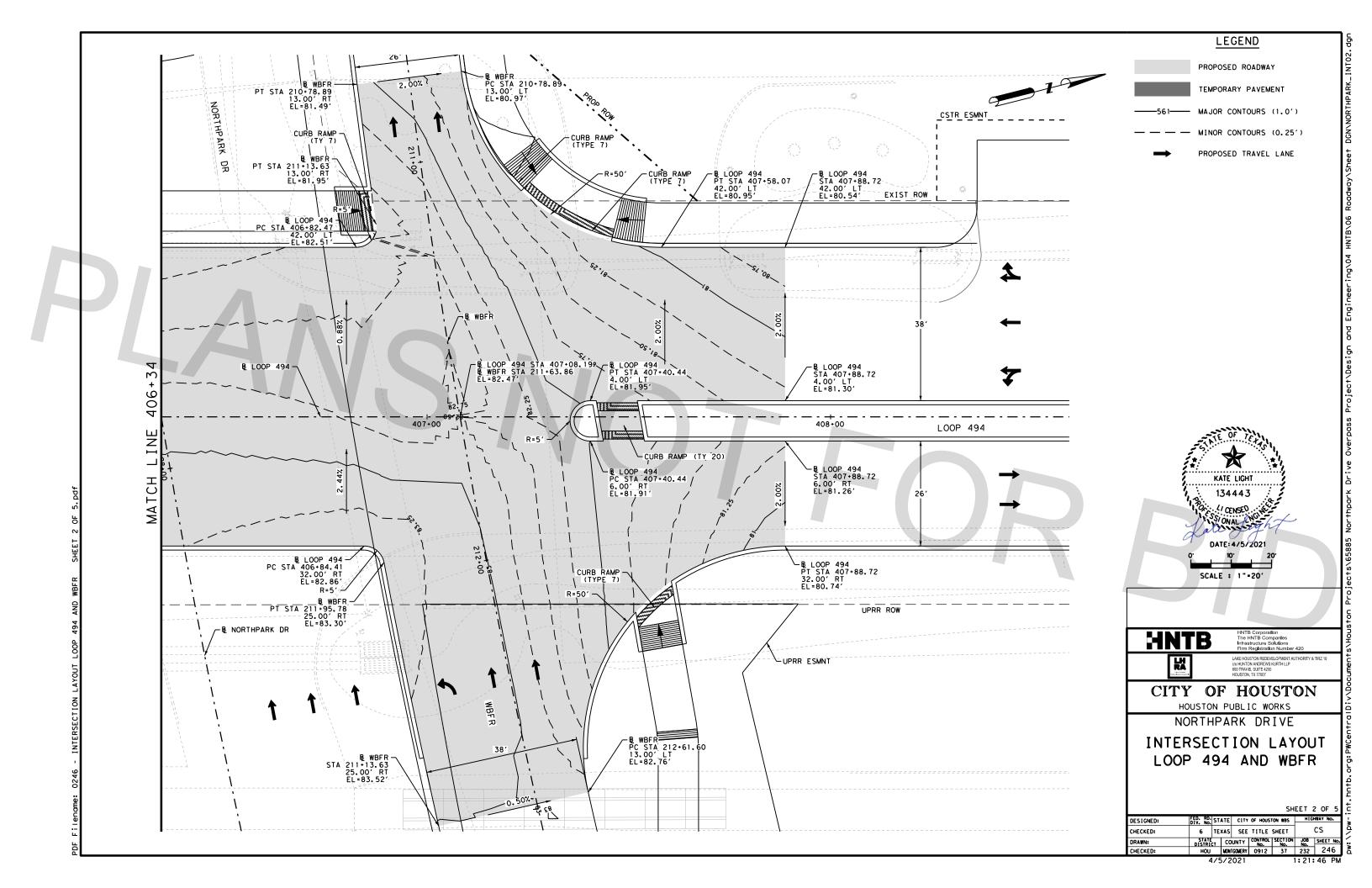


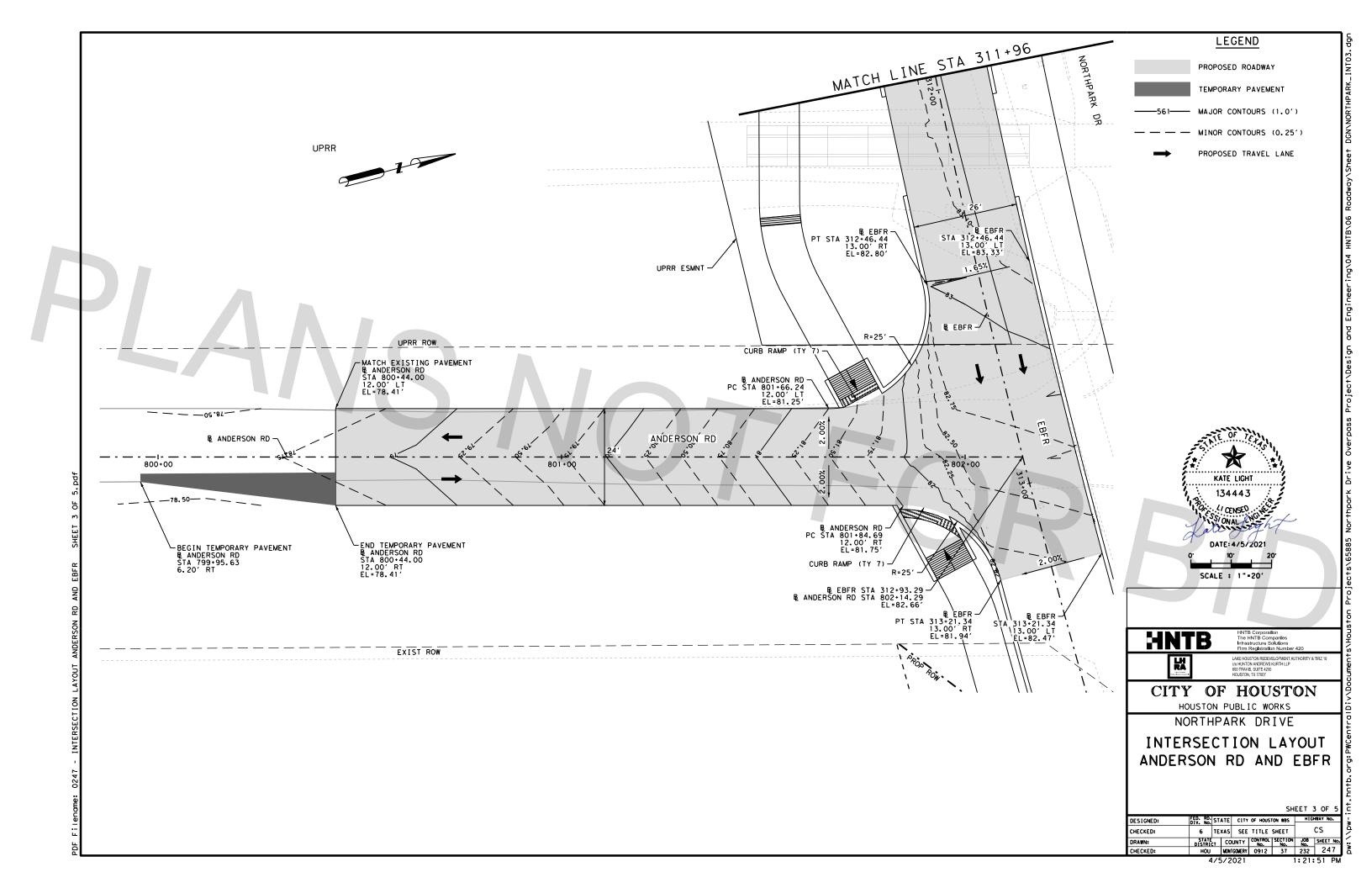


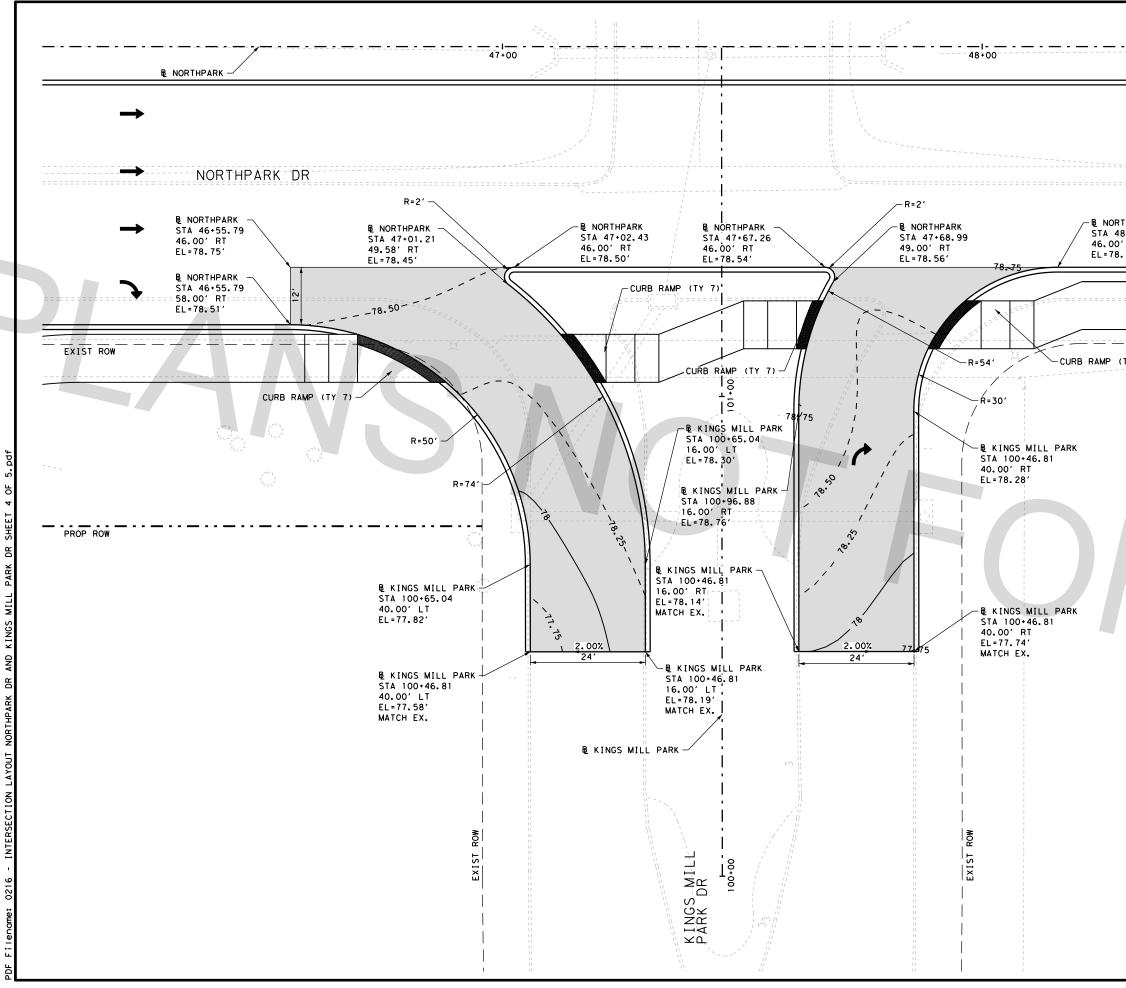




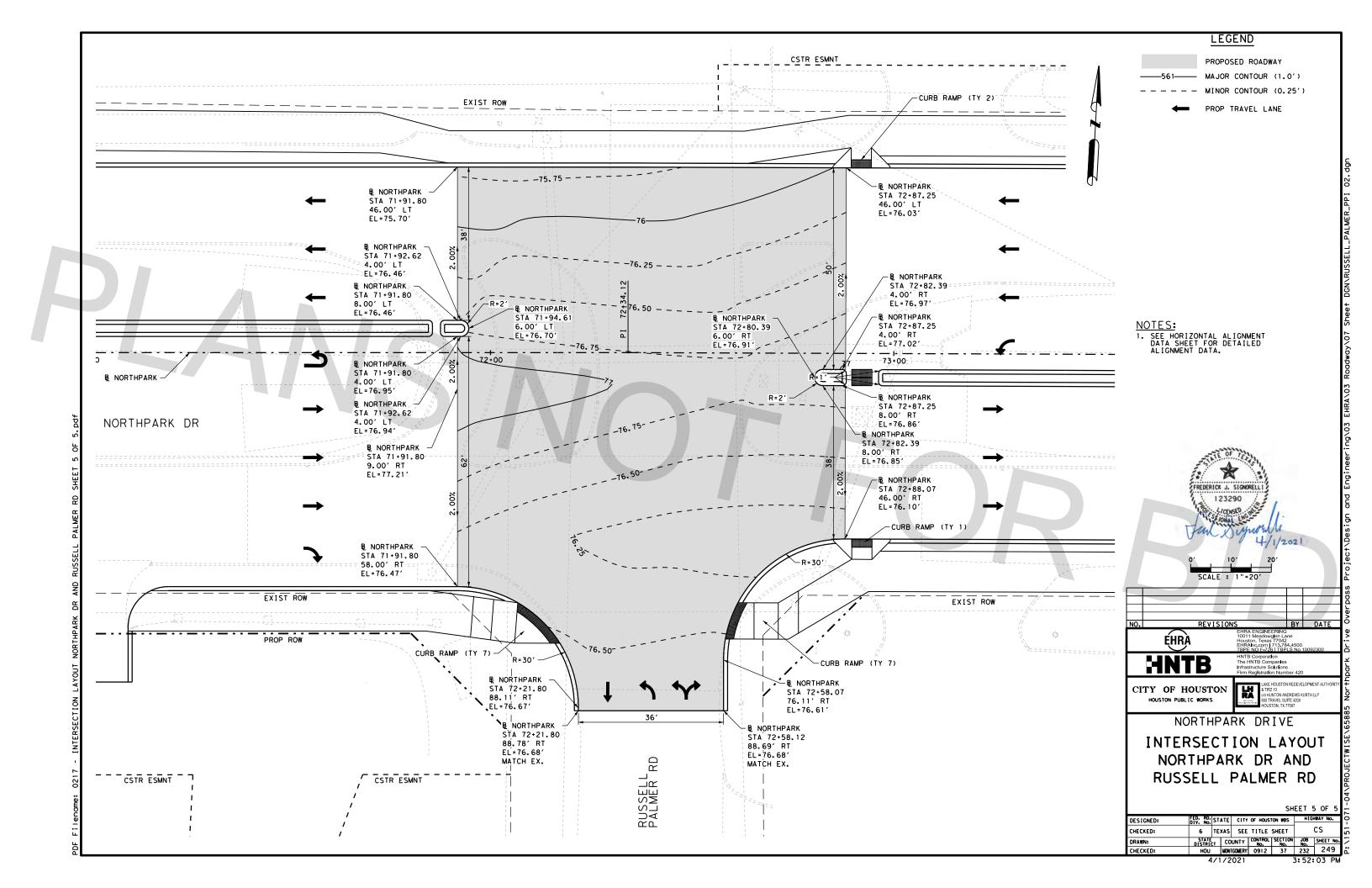


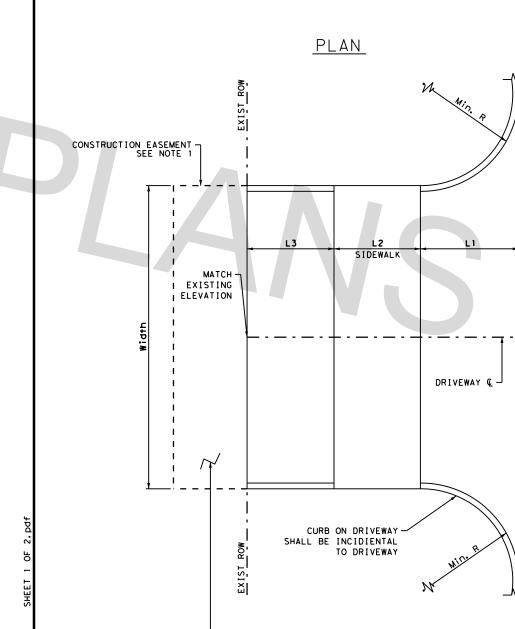






	LEGEND
	PROPOSED ROADWAY 561 MAJOR CONTOUR (1.0') MINOR CONTOUR (0.25')
	- PROP TRAVEL LANE
	Ę
DRTHPARK 48+15.75 DO'RT 78.81'	NOTES:
(TY 7)	NOTES: 1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR DETAILED ALIGNMENT DATA.
	1. SEE HORIZONTAL ALIGNMENT DATA SHEET FOR DETAILED ALIGNMENT DATA.
R	123290 10' 20' SCALE : 1"=20' 10' 20' 10'
	NO. REVISIONS BY DATE EHRA ENGINEERING 1011 Meadowglen Lane Houston, Texas 7704 EHRAInc.com 1713.784.4500 TEPE NO F-72 & TEPE No 10092300
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	NORTHPARK DRIVE
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	NORTHPARK DRIVE INTERSECTION LAYOUT NORTHPARK DR AND KINGS MILL PARK DR SHEET 4 OF 5 DESIGNED: 500. R0. STATE CITY OF HOUSTON HDS HIGHNAT NO. CHECKED: 6 TEXAS SEE TITLE SHEET CS
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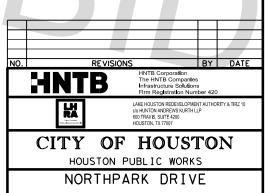




L _{Existing} o	r proposed	Driveway
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DRIVEWAY	CONTROLLING	STATION AT CL	LT/RT	RADIUS	WIDTH	LENGTH	FACE OF CURB	TO SIDEWALK	SIDE	WALK	SIDEWAL	K TO ROW	CONC	CSTR
NUMBER	PGL	OF DRIVEWAY	LIZRI	(FT)	(FT)	(FT)	SLOPE (%)	L1(FT)	SLOPE (%)	L2(FT)	SLOPE (%)	L3(FT)	(SY)	ESMNT(FT)
1	NORTHPARK	17+01.90	LT	25	28.00	59.75	5.00%	12.23	2.00%	10.00	5.28%	37.22	215.61	
2	NORTHPARK	17+03.87	RT	25	32.00	40.09	6.00%	6.78	2.00%	10.00	7.00%	23.31	172.41	
3	NORTHPARK	19+00.42	RT	25	34.00	35.44	6.00%	18.44	2.00%	10.00	6.00%	7.00	141.67	6
4	WBFR	204+23.79	LT	25	30.00	26.72	0.50%	15.72	0.10%	10.00	0.50%	1.00	117.46	
5	WBFR	205+37.83	LT	20/14	26.50	20.09	4.00%	6.51	1.00%	10.00	6.00%	3.58	71.01	
6	EBFR	305+95.36	RT	20/15	26.50	21.00	-6.00%	10.00	0.50%	10.00	0.50%	1.00	71.01	
7	WBFR	206+77.64	LT	13	30.00	37.00	2.00%	3.00	1.00%	10.00	5.00%	24.00	132.07	23
8	EBFR	307+85.92	RT	15/14	29.50	22.00	4.00%	3.00	2.00%	10.00	7.50%	9.00	62.72	6
9	WBFR	208+58.58	LT	13	30.50	19.00	1.00%	1.00	1.00%	10.00	1.00%	8.00	72.87	5
10	EBFR	308+85.17	RT	14	32.00	20.25	4.00%	3.25	2.00%	10.00	6.00%	7.00	82.47	6
11	WBFR	209+42.59	LT	13	34.00	14.00	-0.30%	1.00	-0.30%	10.00	-0.30%	3.00	61.21	
12	WBFR	213+87.45	LT	15/10	24.00	19.00	-4.00%	3.00	1.00%	10.00	0.50%	6.00	57.82	5
13	WBFR	218+23.01	LT	14	31.00	28.92	2.00%	2.92	2.00%	10.00	5.00%	16.00	108.71	15
14	WBFR	221+02.23	LT	14	30.00	17.06	4.00%	6.06	2.00%	10.00	2.00%	1.00	73.35	
15	NORTHPARK	41+71.66	RT	25	35.00	35.75	6.00%	24.75	2.00%	10.00	2.00%	1.00	168.95	
16	NORTHPARK	41+73.93	LT	25	24.00	38.00	5.50%	27.00	2.00%	10.00	2.00%	1.00	155.62	
17	NORTHPARK	43+36.86	LT	15	30.00	20.75	6.00%	9.75	2.00%	10.00	2.00%	1.00	83.69	
48	LOOP 494	400+06.79	LT	20	30,00	27.63	1.00%	27.63					106.19	5
49	LOOP 494	403+85.10	LT	10	34.00	26.43	4.75%	26.43					104.61	15
50	LOOP 494	408+53.79	LT	10	35.00	26.55	6.00%	26.55					107.86	15
51	LOOP 494	410+27.27	LT	10	29.00	22.41	4.50%	22.41					76.99	10
52	LOOP 494	412+97.29	LT	20	29.00	23.03	-2.75%	12.03			1.00%	11	88.97	
53	LOOP 494	402+00.27	LT	15	30.00	17.36	1.00%	17.36					68.65	





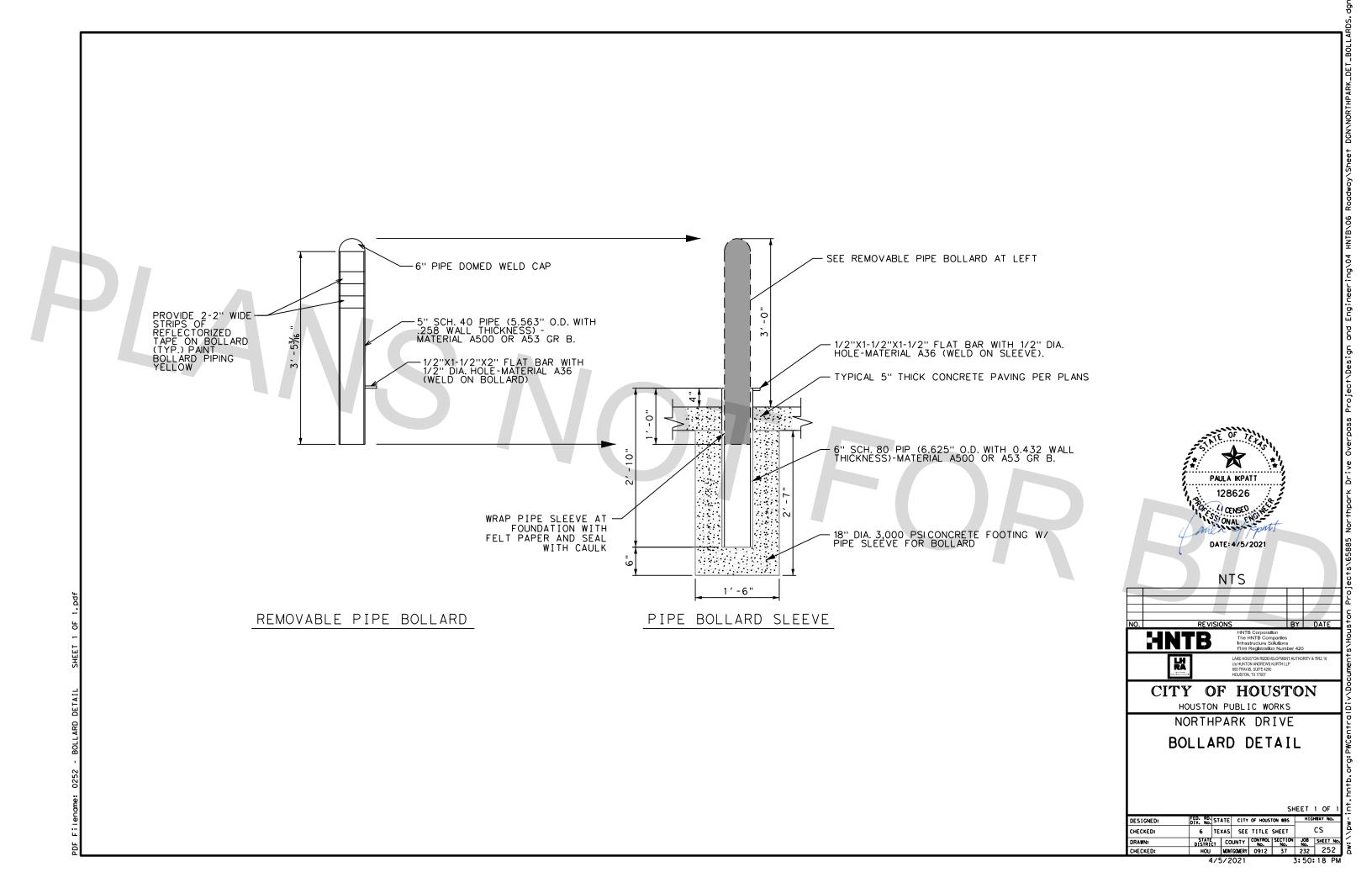
DRIVEWAY SUMMARY

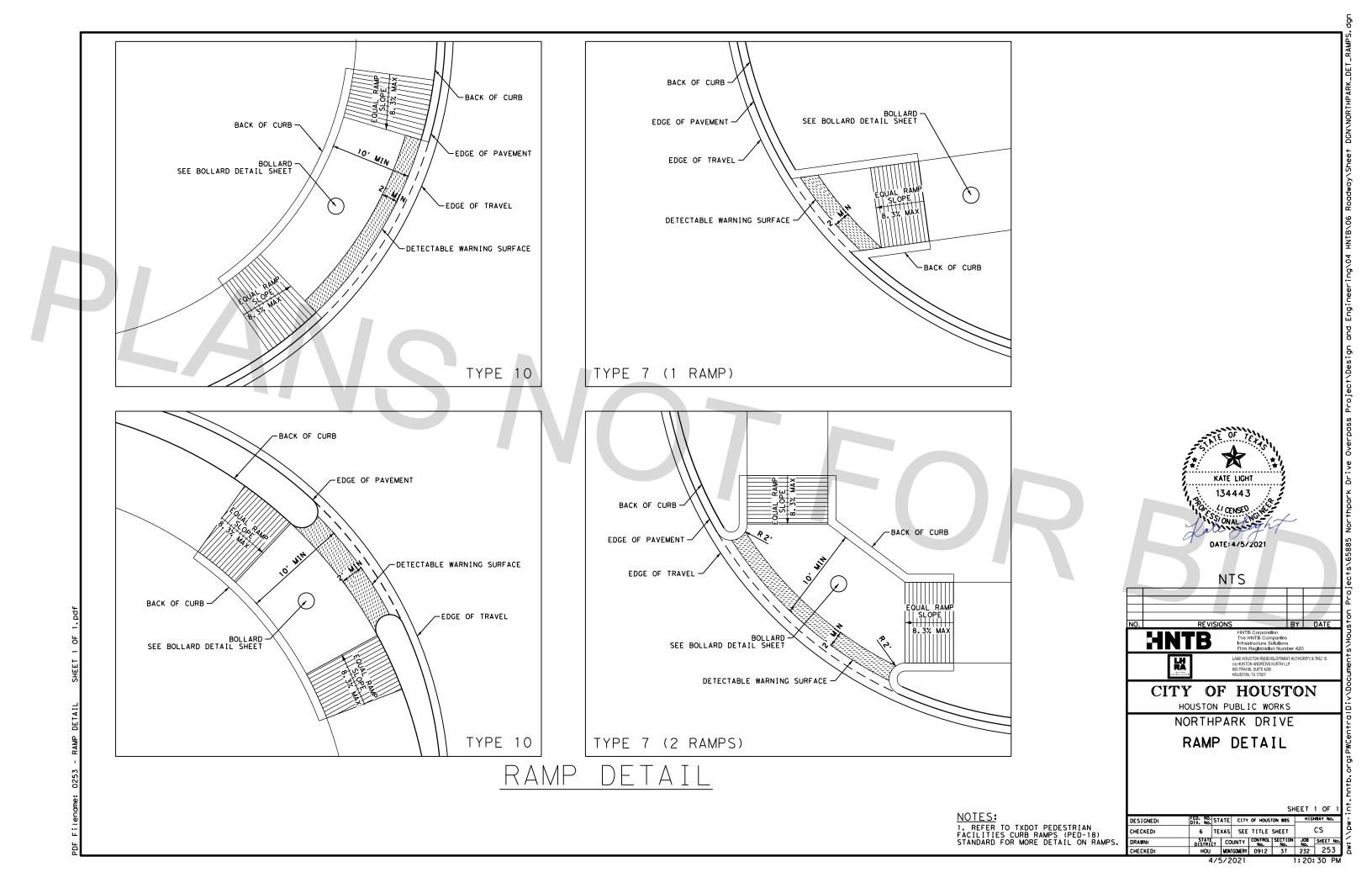
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	4/5/2021								

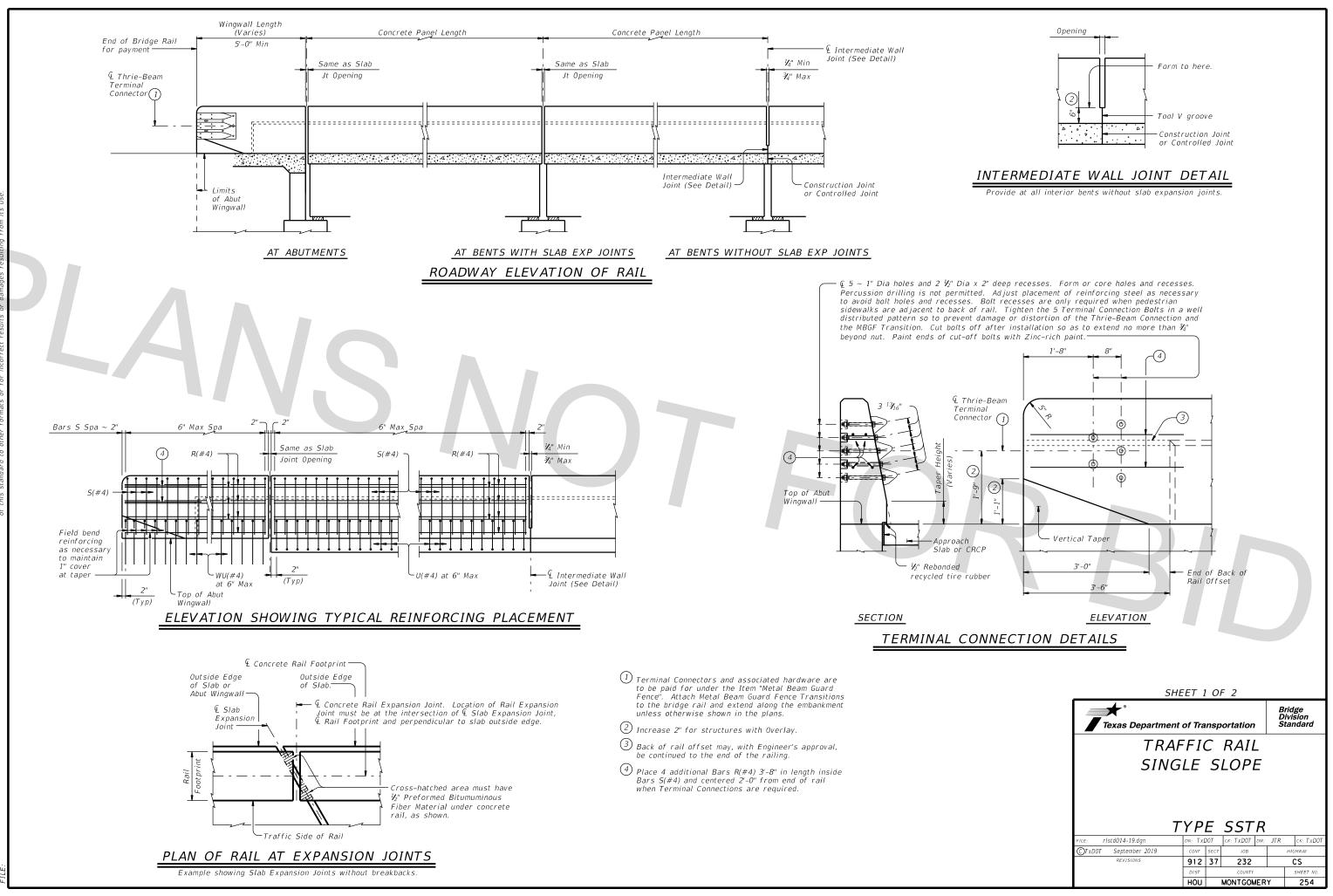
NOTES: 1. CONSTRUCTION EASEMENTS ON SELECT DRIVEWAYS. SEE DRIVEWAY SUMMARY TABLE FOR APPLICABLE DRIVEWAYS.

DRIVEWAY	CONTROLLING	STATION AT CL	LT/RT	ANGLE	RADIUS	RADIUS	WIDTH	LENGTH	FACE OF CURB	TO SIDEWALK	SIDEV	VALK	SIDEWAL	K TO ROW	CONC	EASEMENT
NUMBER	PGL	OF DRIVEWAY	LI/KI	(DEG)	R1 (FT)	R2 (FT)	(FT)	(FT)	SLOPE (%)	L1 (FT)	SLOPE (%)	L2 (FT)	SLOPE (%)	L3 (FT)	(SY)	(FT)
18	NORTHPARK	44+58.66	LT	90	20	20	30	24.3	7.62%	13.00	1.50%	10	7.75%	1.29	104	
19	NORTHPARK	46+88.91	LT	90	12.5	20	32	22.3	7.97%	11.29	1.50%	10	10.00%	1	125	8
20	NORTHPARK	47+48.82	LT	90	20	12.5	33	21.9	7.95%	10.94	1.50%	10	6.86%	1	120	6
21	NORTHPARK	48+56.09	LT	90	20	20	27.5	22.9	6.50%	11.84	1.50%	10	4.76%	1.05	93	
22	NORTHPARK	50+10.33	LT	90	20	20	34	24.2	1.29%	13.20	1.50%	10	2.06%	0.97	114	
23	NORTHPARK	51 + 43.20	LT	90	20	20	26.5	24.2	3.15%	13	1.50%	10	4.20%	1.19	94	
24	NORTHPARK	53+23.74	LT	90	20	20	29	24.2	5.85%	13	1.50%	10	5.93%	1.18	101	
25	NORTHPARK	54 + 88.61	LT	90	15	20	35	24.2	5.46%	13	1.50%	10	4.24%	1.18	113	
26	NORTHPARK	55+30.36	RT	90	15	15	28.6	15.2	2.00%	3	1.50%	10	2.91%	2.21	78	5
27	NORTHPARK	55+49.28	LT	90	15	15	24	24.2	6.08%	13	1.50%	10	5.98%	1.17	79	
28	NORTHPARK	56+62.25	LT	90	10	10	32	24.2	2.54%	13	1.50%	10	1.71%	1.17	94	
29	NORTHPARK	57+09.46	LT	73.5	20	10	25	25.2	2.09%	13.56	1.50%	10.43	2.48%	1.21	90	
30	NORTHPARK	59+31.64	LT	90	12	20	24	24.2	6.00%	13	1.50%	10	6.17%	1.16	95	5
31	NORTHPARK	59+85.20	LT	90	20	12	34	24.2	6.69%	13	1.50%	10	6.67%	1.15	127	5
32	NORTHPARK	61+36.04	LT	90	20	20	35	23.7	7.44%	12.37	1.50%	10	7.46%	1.34	115	
33	NORTHPARK	63+99.74	RT	90	14	14	24	14.4	2.33%	3	1.50%	10	1.57%	1.36	64	5
34	NORTHPARK	64+22.87	LT	90	20	20	35	22	7.96%	9.92	1.50%	10	7.81%	2.06	152	11
35	NORTHPARK	65+15.69	LT	90	15	20	25	21.4	7.89%	9.13	1.50%	10	6.98%	2.3	87	3
36	NORTHPARK	65+78.88	LT	90	20	15	28	22.6	5.82%	8.59	1.50%	10	1.00%	4.01	89	
37	NORTHPARK	67 + 20.74	LT	90	15	15	24	21.4	7.99%	7.38	1.50%	10	6.27%	4.06	77	2
38	NORTHPARK	67+88.21	LT	90	20	20	26	20.5	6.03%	6.8	1.50%	10	6.28%	3.66	82	
39	NORTHPARK	68+56.78	RT	90	13	13	24	23.6	0.54%	1.71	1.50%	10.05	0.68%	12.14	95	7
40	NORTHPARK	68+98.65	LT	90	15	15	33	18.9	7.34%	5.86	1.50%	10	7.00%	3	83	
41	NORTHPARK	70+34.32	LT	90	15	15	30	16.9	7.87%	4.7	1.50%	10	7.08%	2.19	90	6
42	NORTHPARK	70+98.14	RT	90	10	10	24	11.7	12.00%	0.5	2.00%	10	10.33%	1.17	71	12
43	NORTHPARK	74+61.10	RT	90	13	13	34	14	1.67%	3	1.50%	10	-6.13%	1	91	7
44	NORTHPARK	74+74.11	LT	90	12	12	30	14	1.00%	3	1.00%	10	-7.62%	1	80	7
45	NORTHPARK	75+44.98	RT	90	13	13	35	14	1.00%	3	1.50%	10	2.67%	1	85	5
46	NÖRTHPARK	76+68.57	LT	90	12	12	35	14	7.33%	3	1.50%	10	7.00%	1	64	
47	NORTHPARK	77+97.57	RT	90	13	13	35	14	1.00%	3	1.50%	10	2.50%	1	85	5

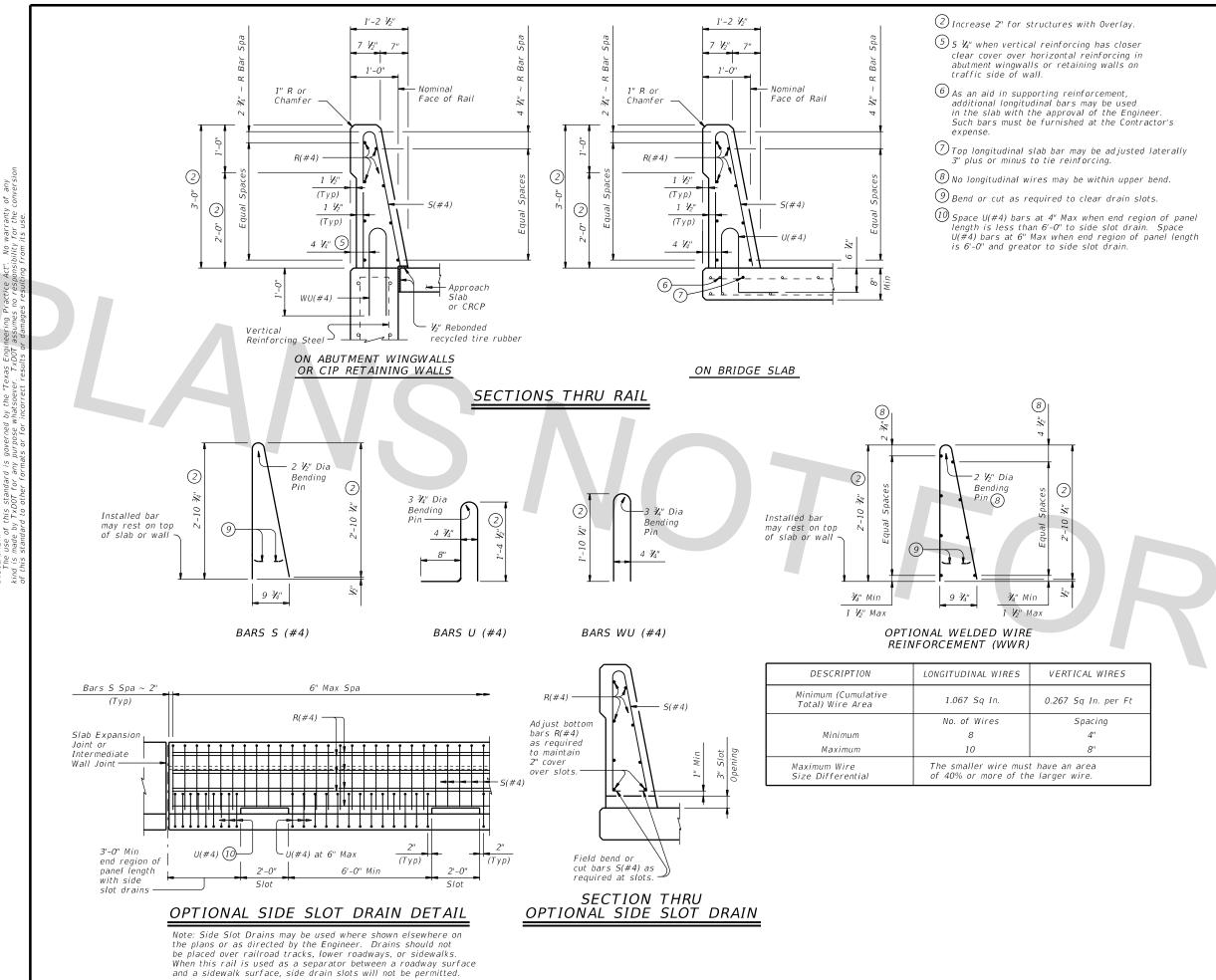
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CITY OF HOUSTON	The HNTB Companies Infrastructure Solutions Firm Registration Number 420
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	ONS BY DATE ONS BY DATE EHRA ENGINEERING 10011 Meadwagen Lane Houston, Texas 77042 ENGINEERING 10017 Meadwagen Lane Houston, Texas 77042 ITBPE NO.17760 TBPE NO.10092300 AVEC NO.1700 TBPE NO.17760 TBPE NO.10092300 MITB Comparies Infrastructure Solitions Infrastructure Solitions UNITS COMParies UNITS NUMBER 4200 HOUSTON, TX 77007 AVEC NO.1700 ARK DRIVE Y SUMMARRY ARK DRIVE Y SUMMARRY SHEET 2 OF 2 C C SHEET 2 OF 400 FEBER 200 HOUSTON, TX 77007 FIGHTAN ADDENS AUET LUP SOLITAVE SUME 4200 HOUSTON, TX 77007 C
DESIGNED: FED. RD. STAT DIV. No. STAT CHECKED: 6 TEXA	SHEET 2 OF 2 TE CITY OF HOUSTON 1095 HIGHNAY NO. AS SEE TITLE SHEET CS IN COUNTY CONTROL SECTION 1009 SHEET NO.
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DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TXDDT for any purpose whatsoever. TXDDT assumes no responsibility for the conversi of this standard to other formats or for incorrect results or damages resulting from its use.



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CONSTRUCTION NOTES:

This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer. Provide sensor control for both line and grade. Tack welding to provide bracing for slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S at any location on the cage. If increased bracing is needed provide additional anchorage devices and weld in the upper two thirds of the cage. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing".

If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a \mathscr{Y}_8 " width x \mathscr{Y}_4 " tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

The back of railing must be vertical unless otherwise shown in the plans or approved by the Engineer.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM A1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other than shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars. Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #4 = 1'-7" Epoxy coated $\sim #4 = 2'-5''$

GENERAL NOTES:

This rail has been successfully evaluated by full-scale crash test to meet MASH TL-4 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

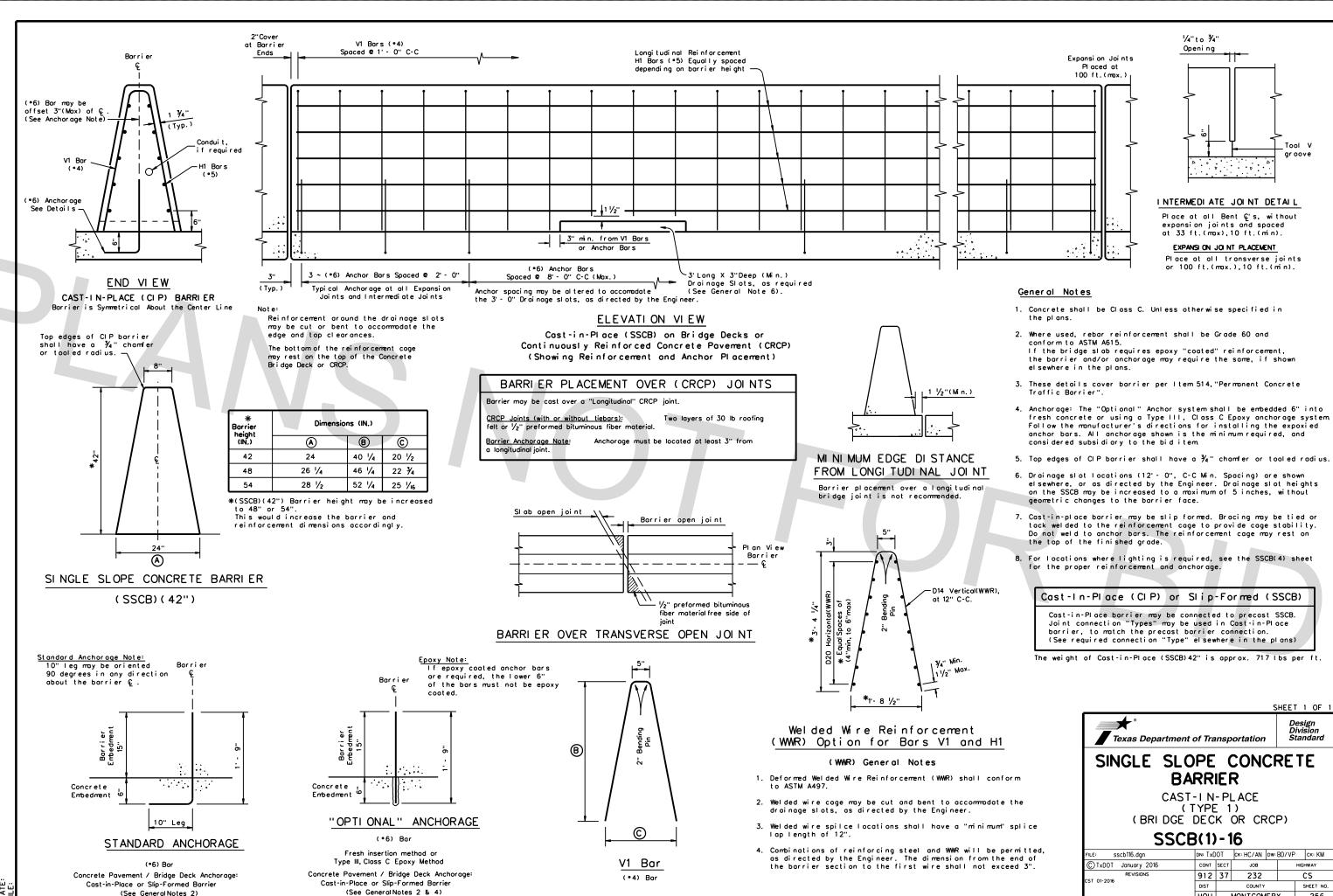
Do not use this railing on bridges with expansion joints providing more than 5" movement. Rail anchorage details shown on this standard may require

modification for select structure types. See appropriate details elsewhere in plans for these modifications. Shop drawings will not be required for this rail. Average weight of railing with no overlay is 376 plf.

Cover dimensions are clear dimensions, unless noted otherwise

Reinforcing bar dimensions shown are out-to-out of bar.

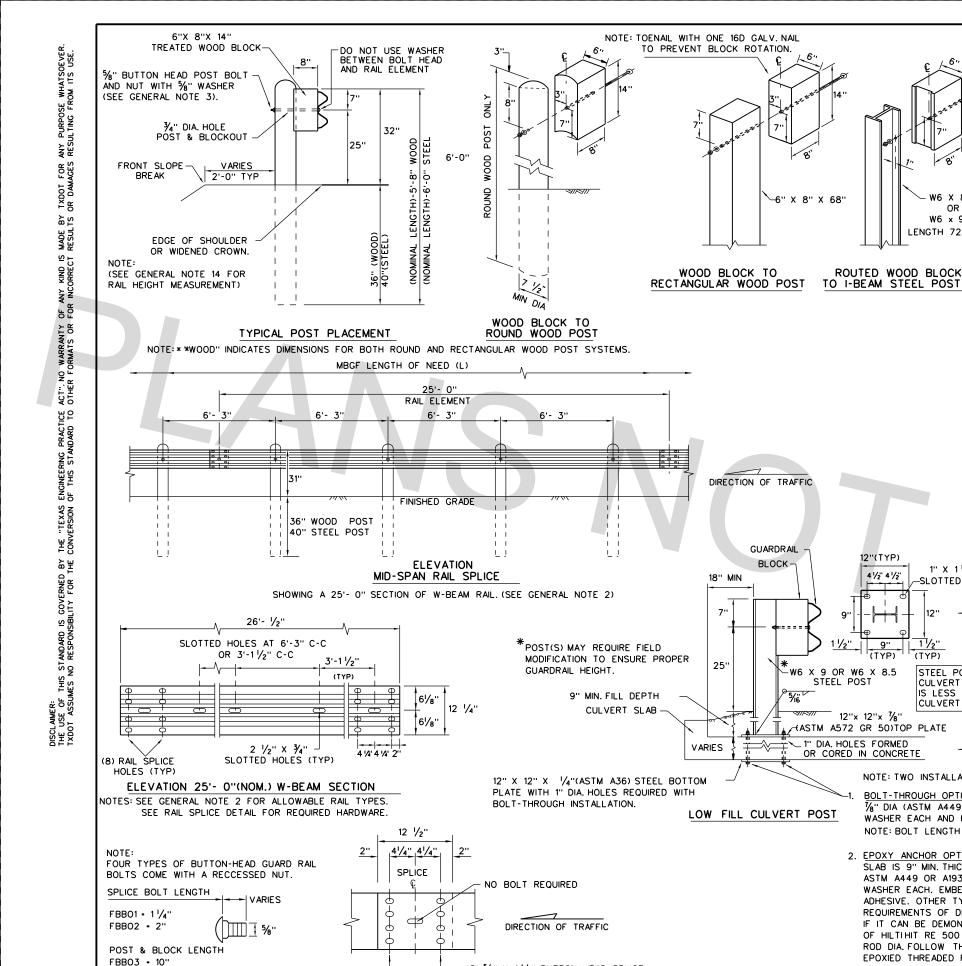
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CTxDOT September 2019	CONT	SECT	JOB		HIGHWAY					
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	DIST		COUNTY		SHEET NO.					
	HOU		MONTGOMER	Y	255					



HOU

MONTGOMERY

256



MID-SPAN

NOTE: GF(31), MID-SPAN RAIL SPLICES ARE

REQUIRED WITH 6'-3" POST SPACINGS.

RAIL SPLICE DETAIL

FBB04 • 18'

BUTTON HEAD BOLT

SPLICE & POST BOLT DETAILS.

NOTE: SEE GENERAL NOTE 3 FOR

(8) 5/8" X 1 1/4" BUTTON HEAD SPLICE

BOLTS WITH RECCESSED NUTS.

- TRANSITION SECTIONS OF GUARDRAIL.
- FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
- 5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
- AT A RATE OF 25:1 OR FLATTER.
- INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
- 10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
- THAN 150 FT. RADIUS.
- ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
- SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
- 11/2' (TYP) STEEL POST CONNECTION TO CULVERT SLAB (USE WHEN THERE IS LESS THAN 36" COVER OVER CULVERT SLAB).
- NOTE: TWO INSTALLATION OPTIONS.

1" X 1 1/2"

-SLOTTED HOLES

12"(TYP)

4 1/2" 4 1/2"

9"

(TYP)

X 8.5

OR

W6 × 9.0

LENGTH 72"(TYP)

- BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS 1/2" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS. NOTE: BOLT LENGTH . SLAB PLUS 2 1/4" MIN.
- 2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 7/8" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTIHIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTIHIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS 1/4" MIN. BEYOND NUT.

NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."

2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE

3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 3/1" WASHER (FWC16o) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.

4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."

6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.

7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED

8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25

9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.

11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS

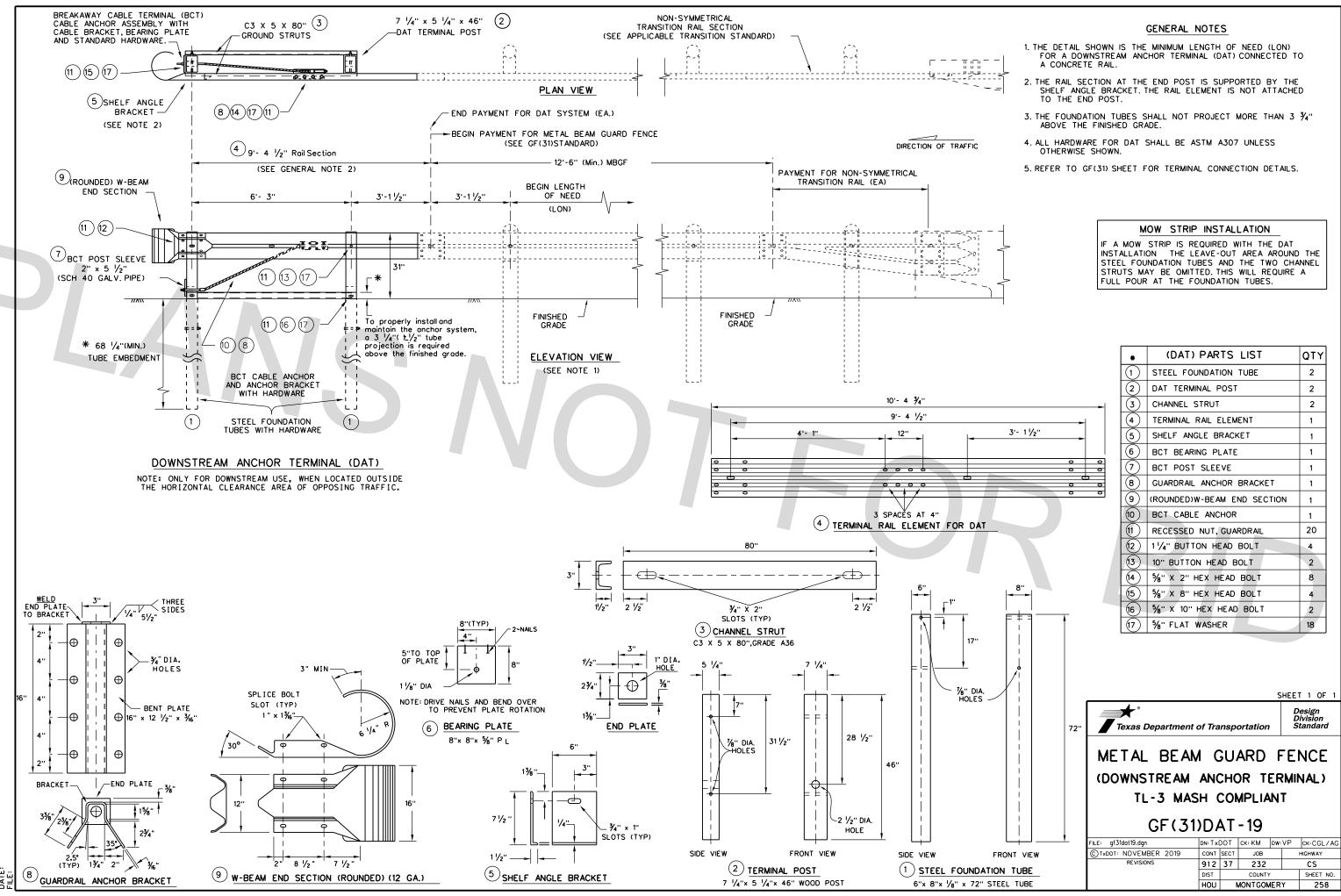
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS

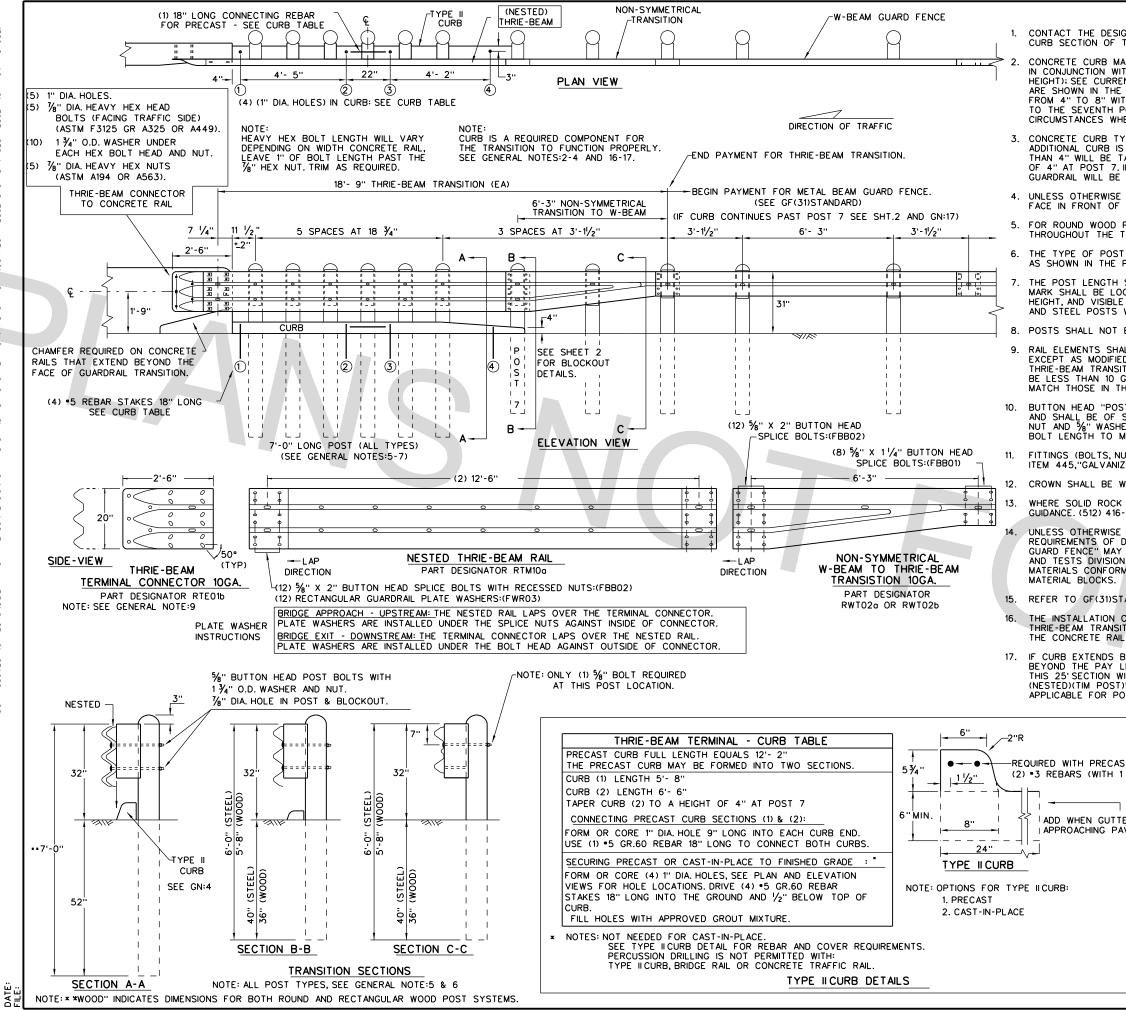
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION.

14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

> NOTE: TRANSISTIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS. SEE GF(31)TL3 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS. SEE GF(31)TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS







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GENERAL NOTES

CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678

CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THREE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- $\frac{1}{4}$ ") HEIGHT); SEE CURRENT CCCG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE:17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.

CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT

4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.

5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 1/2" DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.

6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF(31) STANDARD SHEET.

THE POST LENGTH SHALL BE MARKED ON ALL 7'- 0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1FT. REGION OF THE POST, AT LEAST $\frac{5}{8}$ " IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.

POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.

RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.

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 %" WASHER (FWC160) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.

FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.

CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.

WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678

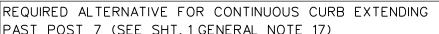
UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. TXDOT'S MATERIALS AND TESTS DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE

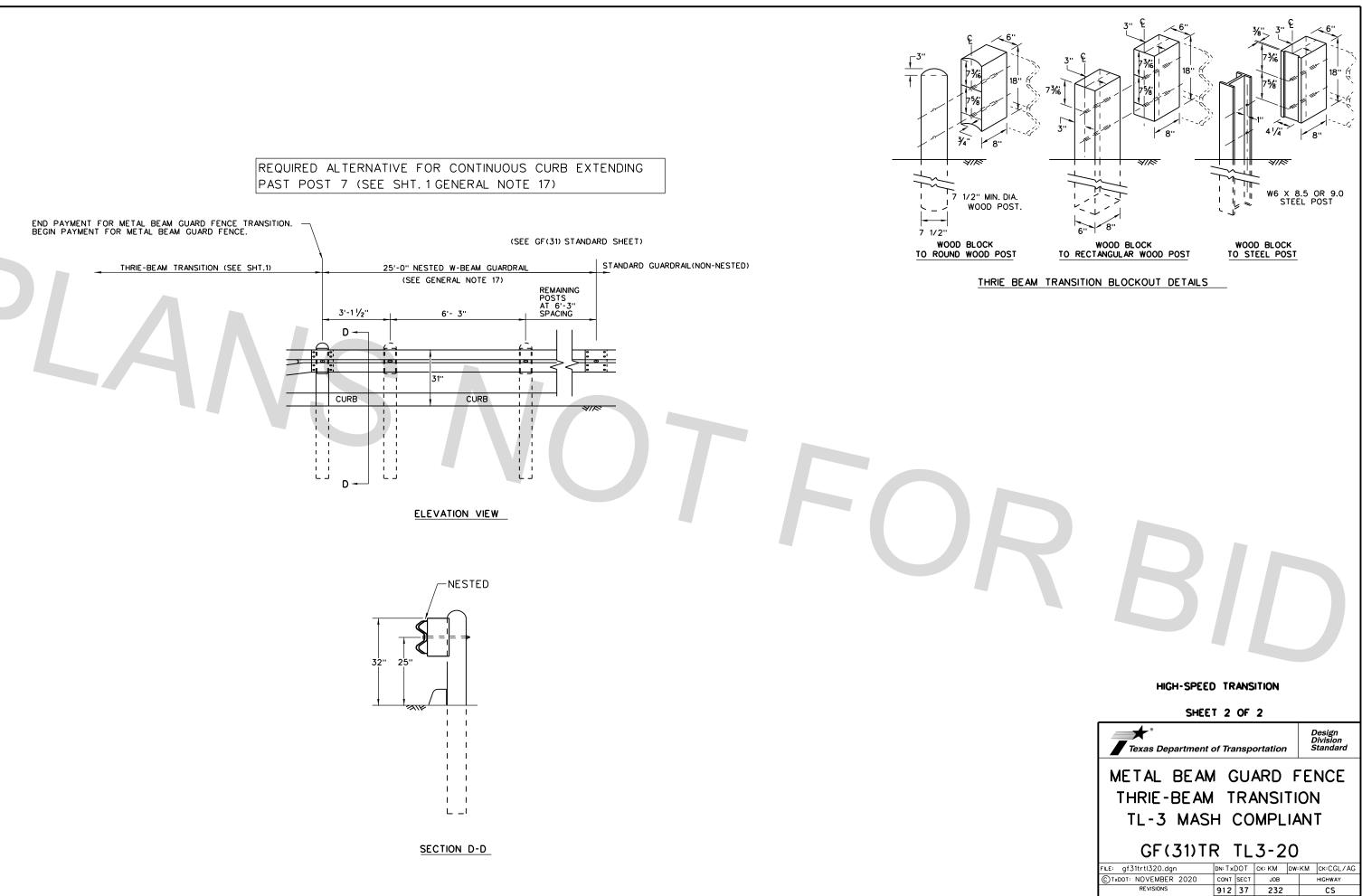
REFER TO GF(31)STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.

THE INSTALLATION OF THE TYPE ILCURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.

IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION, (SEE SHT.2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT, PAY ITEM "0540 6XXX MTL W-BEAM GD FEN (NESTED)(TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED)(STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT.2 FOR ADDITIONAL INFORMATION.

T CURB	HIGH-SPEEC) TR	ANS	ITION		
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ER IS USED IN VEMENT SECTION.	Texas Department of	of Tra	nsp	ortation	D	Design Division Standard
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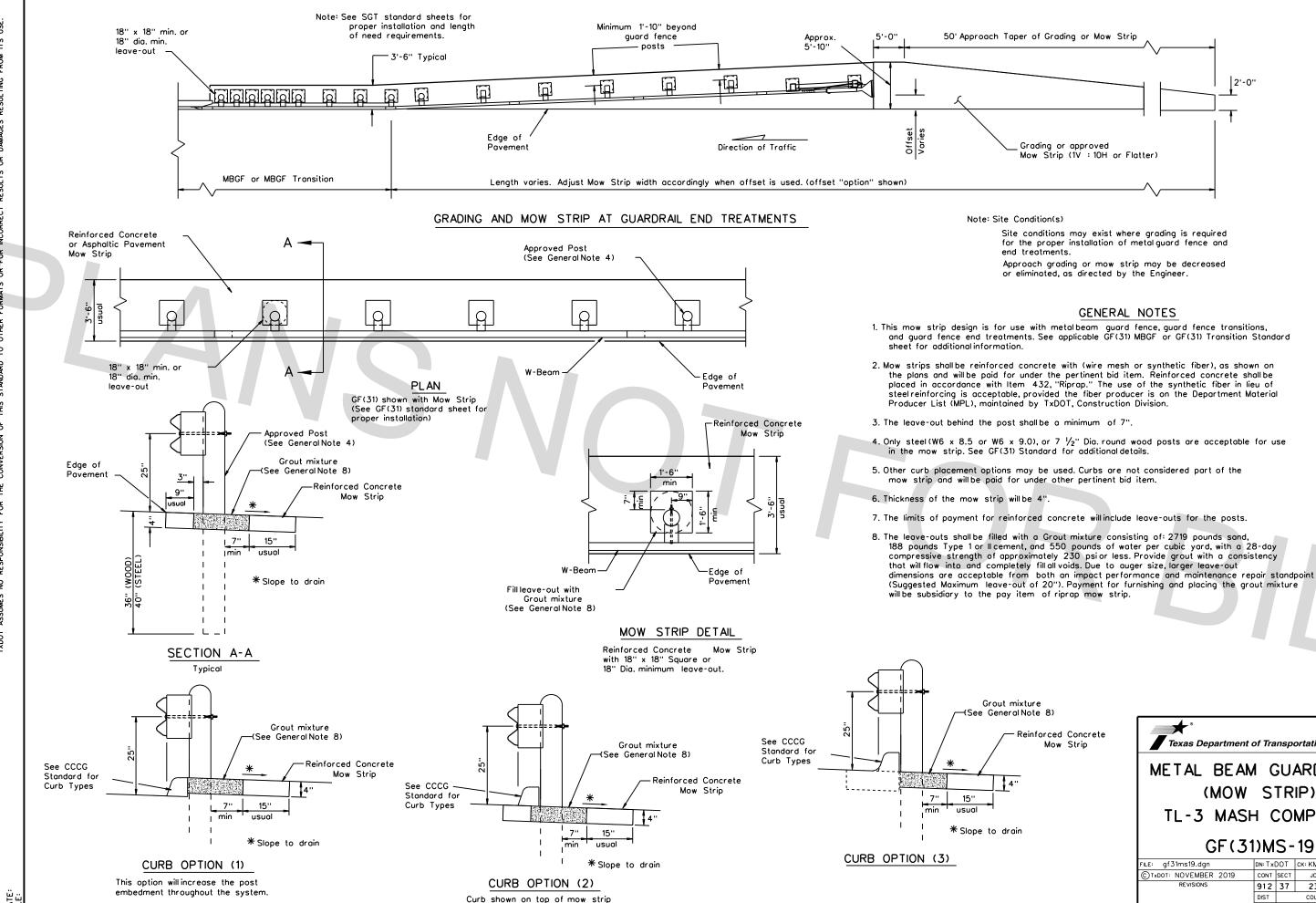
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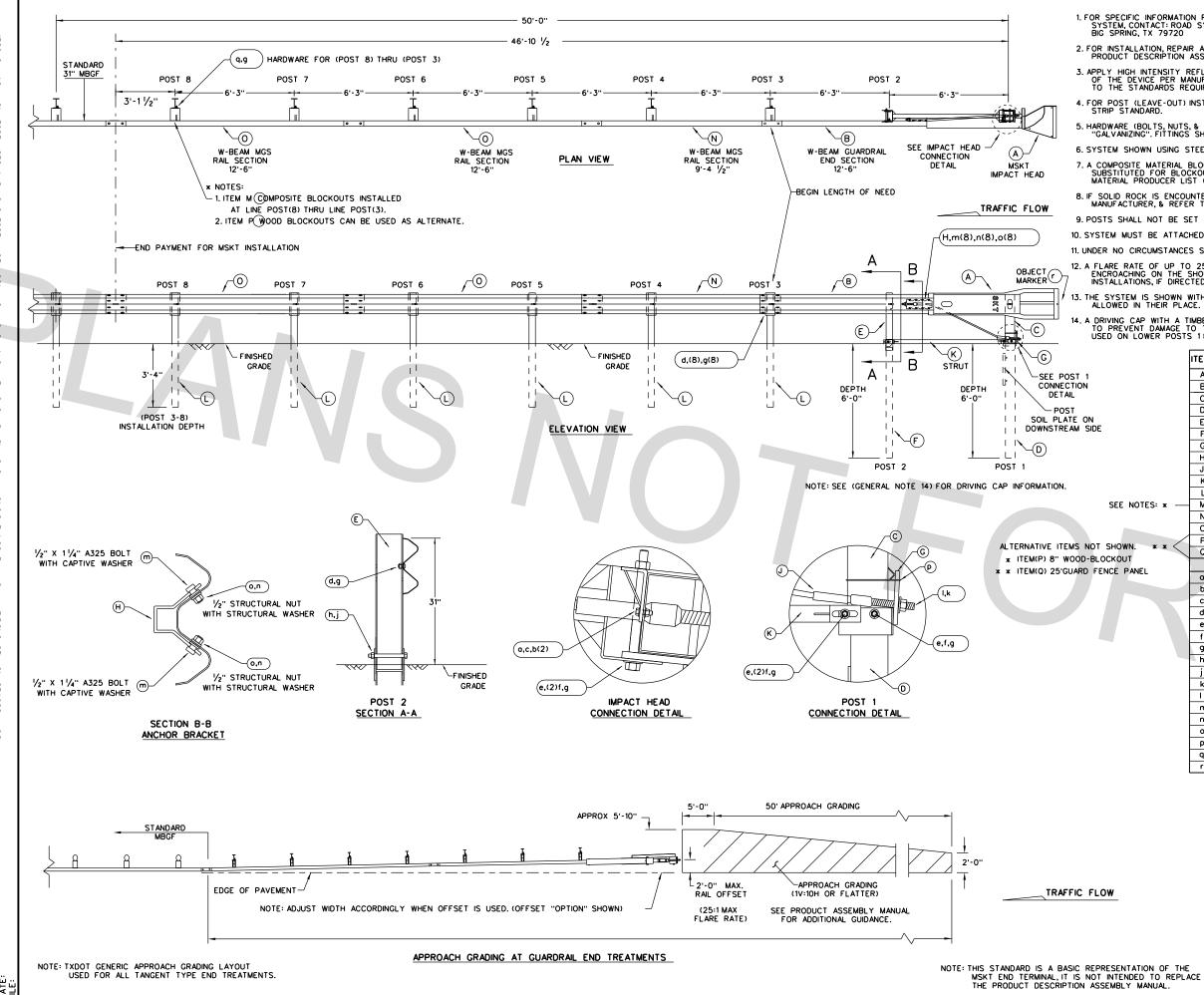
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DISCLAIMER: THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT" NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.



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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, "CALVANIZING". 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.

т	EM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
	Α	1	MSKT IMPACT HEAD	MS3000
	В	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
	С	1	POST 1 - TOP (6" X 6" X 1/8" TUBE)	MTPHP1A
	D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
	Ε	1	POST 2 - ASSEMBLY TOP	UHP2A
	F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
	G	1	BEARING PLATE	E750
	н	1	CABLE ANCHOR BOX	S760
	J	1	BCT CABLE ANCHOR ASSEMBLY	E770
	к	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
	0	2	W-BEAM MGS RAIL SECTION (12'-6'')	G12023
	P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
** < -	0	1	WOOD BLOCKOUT 6 X 8 X 14 W-BEAM MGS RAIL SECTION (25'-0'')	-
	<u>u</u>	•		G1209
		-	SMALL HARDWARE	1
	a	2	%6" x 1" HEX BOLT (GRD 5)	B5160104A
	Ь	4	%" WASHER	W0516
	с	2	‰" HEX NUT	N0516
	d	25	5%" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
	e	2	5%" Dia. x 9" HEX BOLT (GRD A449)	B580904A
	f	3	5%" WASHER	W050
	g	33	5%" Dia. H.G.R NUT	N050
	h	1	¾" Dio.×8 ½" HEX BOLT (GRD A449)	B340854A
	j	1	¾" Dia. HEX NUT	N030
	k	2	1 ANCHOR CABLE HEX NUT	N100
	1	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
	0	8	1 1/16" O.D. × %6" I.D. STRUCTURAL WASHERS	W012A
	р	1	BEARING PLATE RETAINER TIE	CT-100ST
	9	6	5%" × 10" H.G.R. BOLT	B581002
	r	1	OBJECT MARKER 18" X 18"	E 3151
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		Γ	Texas Department of Transportation	Design Division Standard
			SINGLE GUARDRAIL TERM MSKT-MASH-TL-3	INAL
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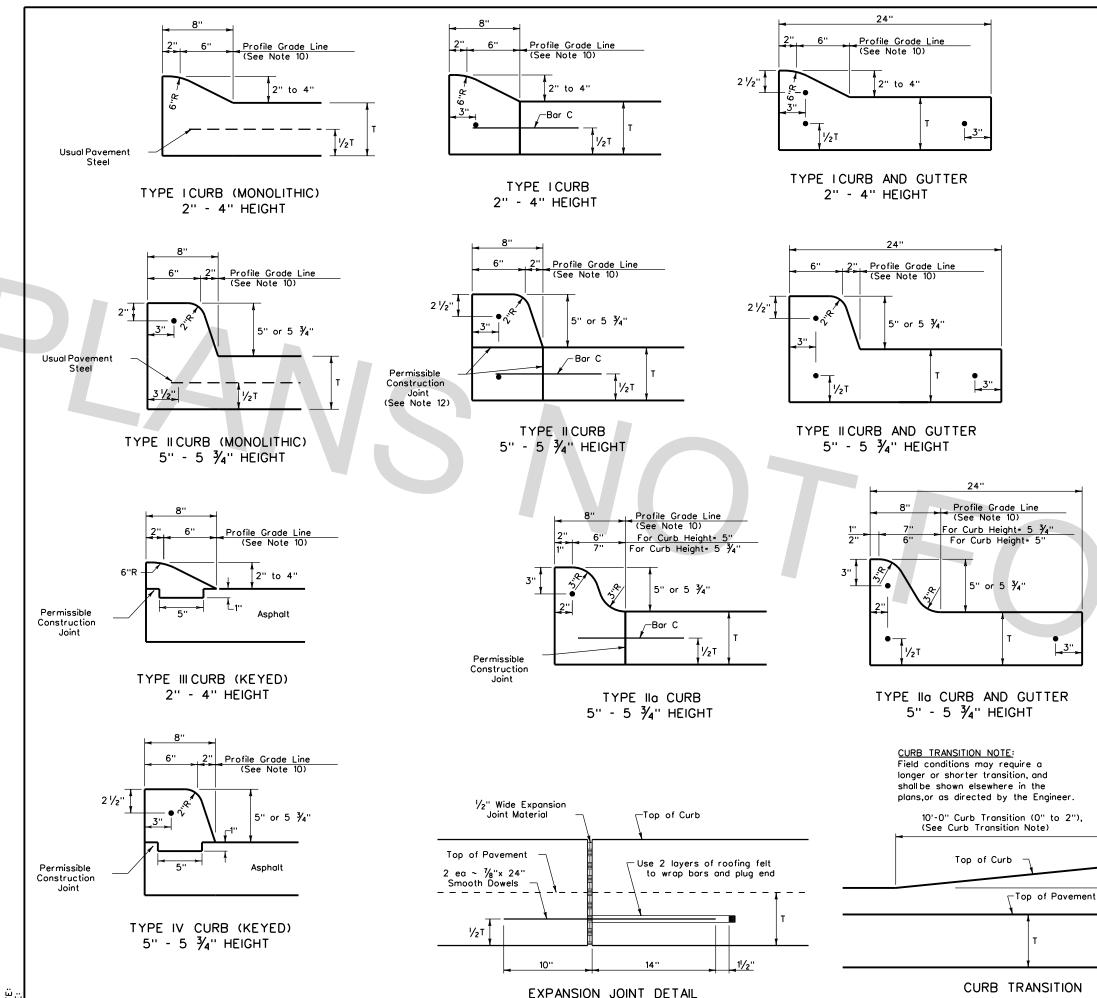
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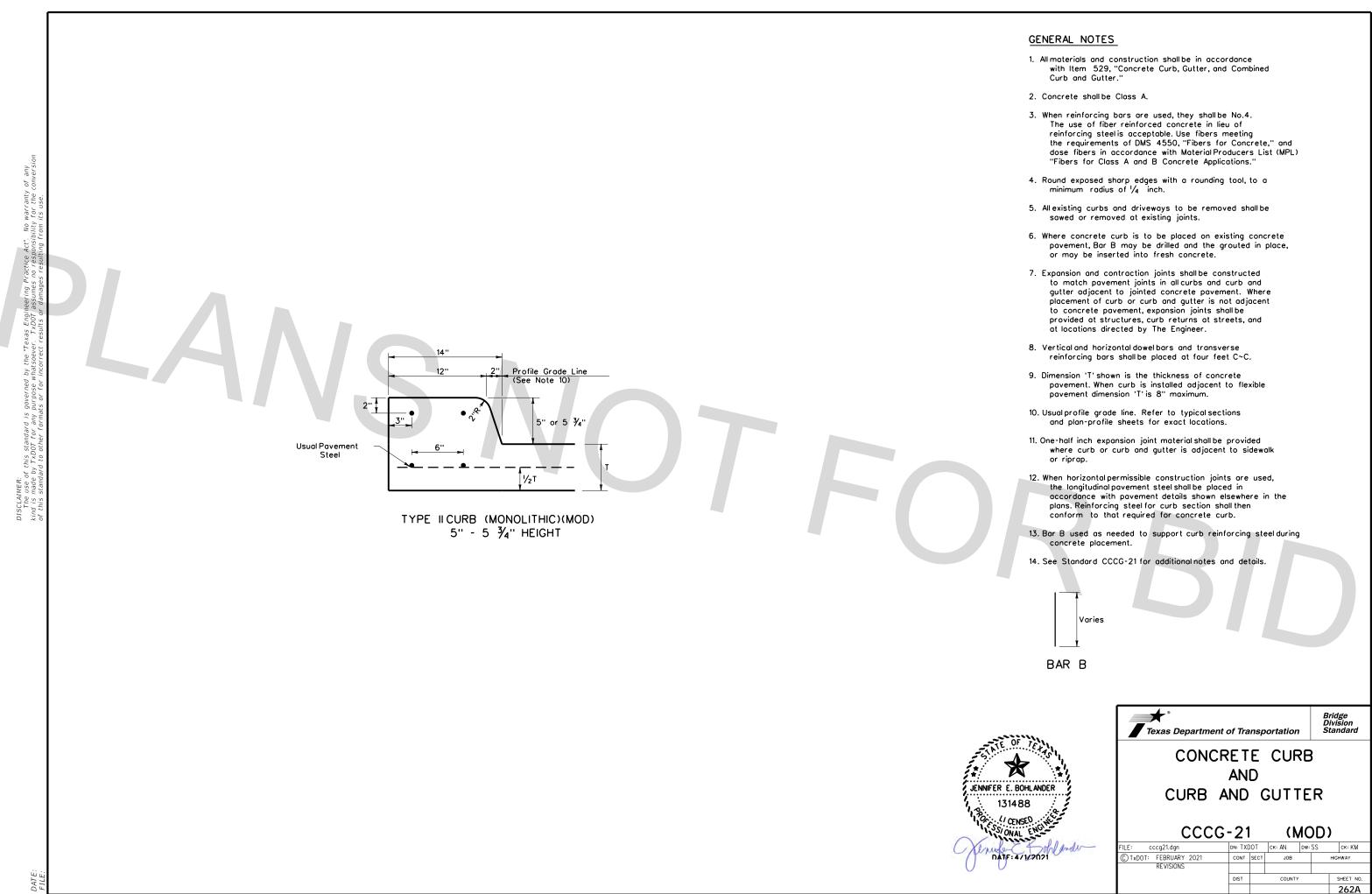
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Note: To be paid for as Highest Curb

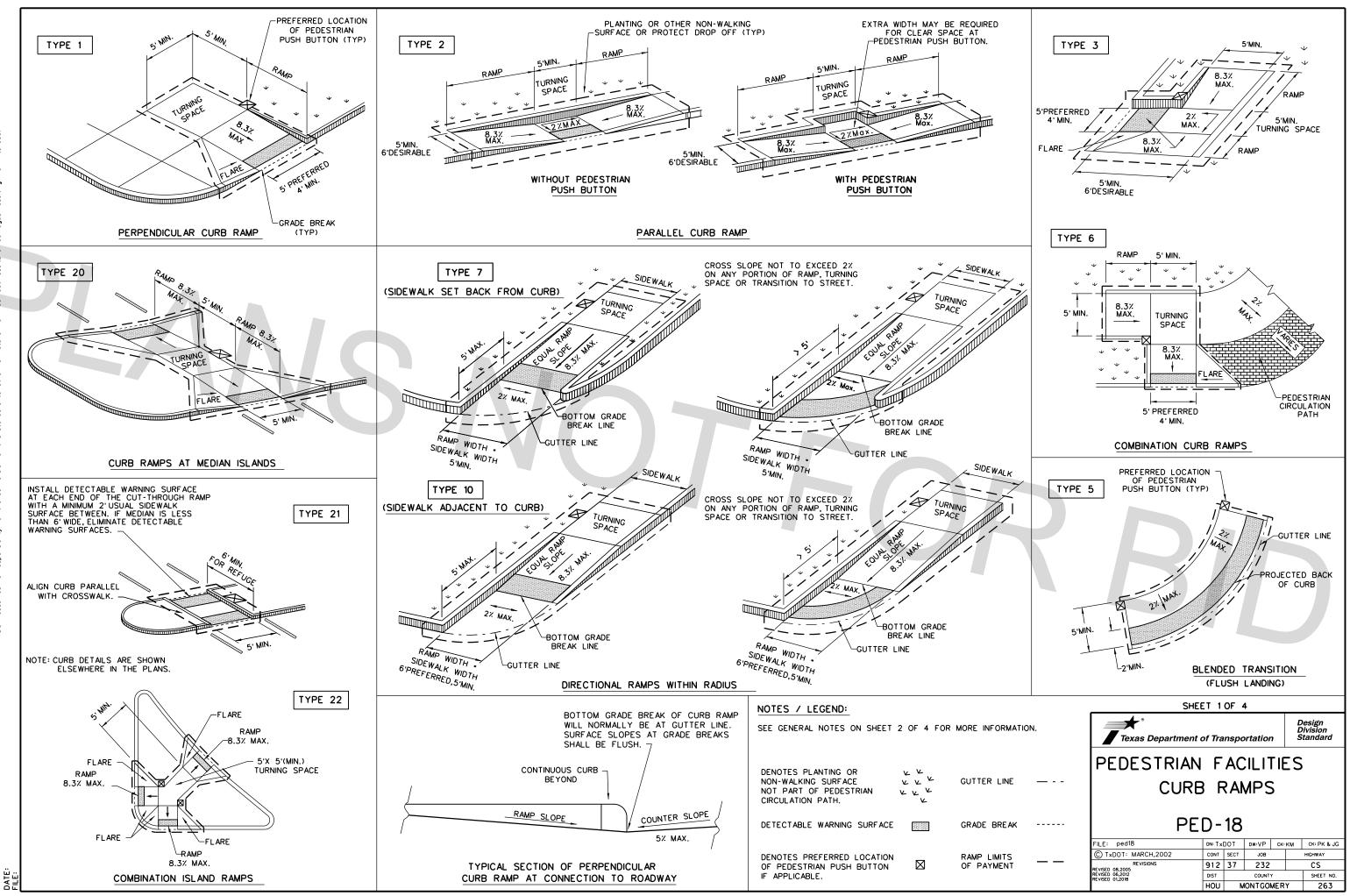
GENERAL NOTES

- All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
- 2. Concrete shall be Class A.
- 3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
- Round exposed sharp edges with a rounding tool, to a minimum rodius of 1/4 inch.
- 5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
- 6. Where concrete curb is to be placed on existing concrete pavement, Bar B may be drilled and the grouted in place, or may be inserted into fresh concrete.
- 7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
- Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C~C.
- Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
- 10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
- One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprop.
- 12. When horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.
- 13. Bor B used as needed to support curb reinforcing steel during concrete placement.

BAR B	BAR C				
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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 applicable standards may remain in place unless otherwise shown on the plans

DETECTABLE WARNING MATERIAL

- 19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
- 20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
- 21. Detectable warning surfaces must be firm, stable and slip resistant.
- 22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
- 23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
- 24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

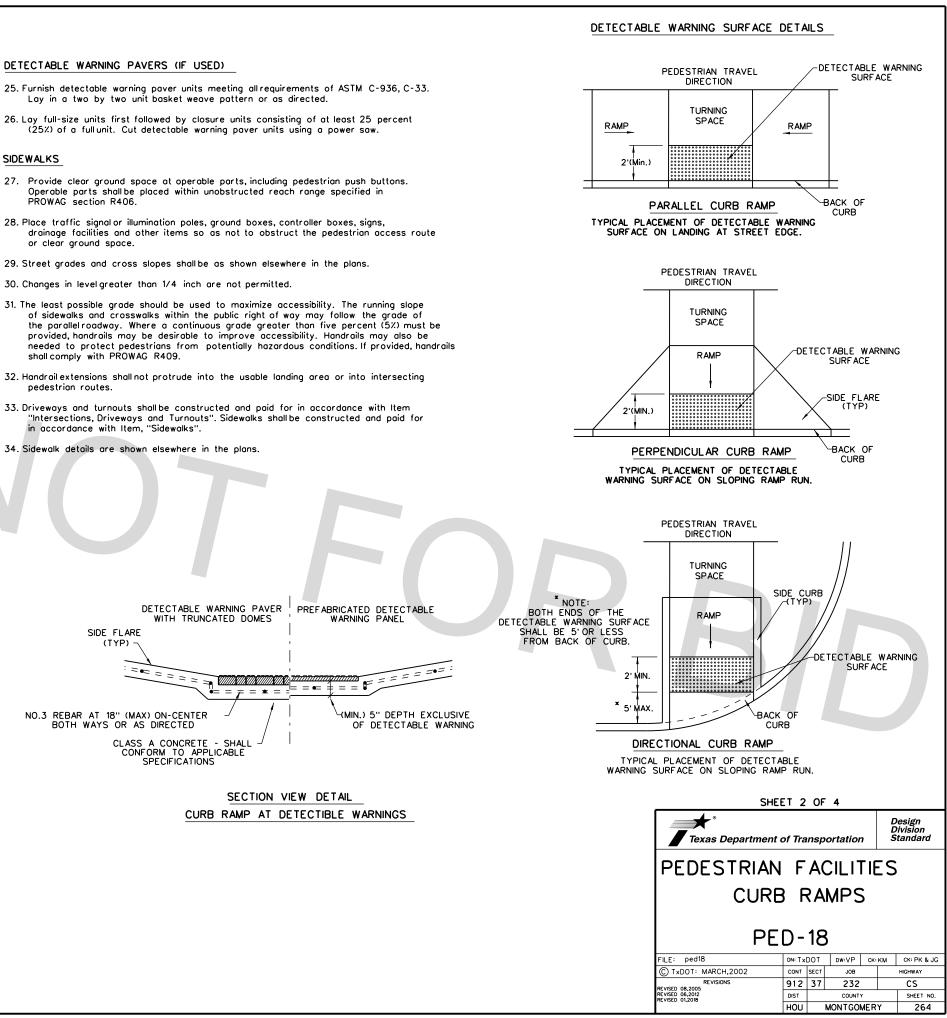
DETECTABLE WARNING PAVERS (IF USED)

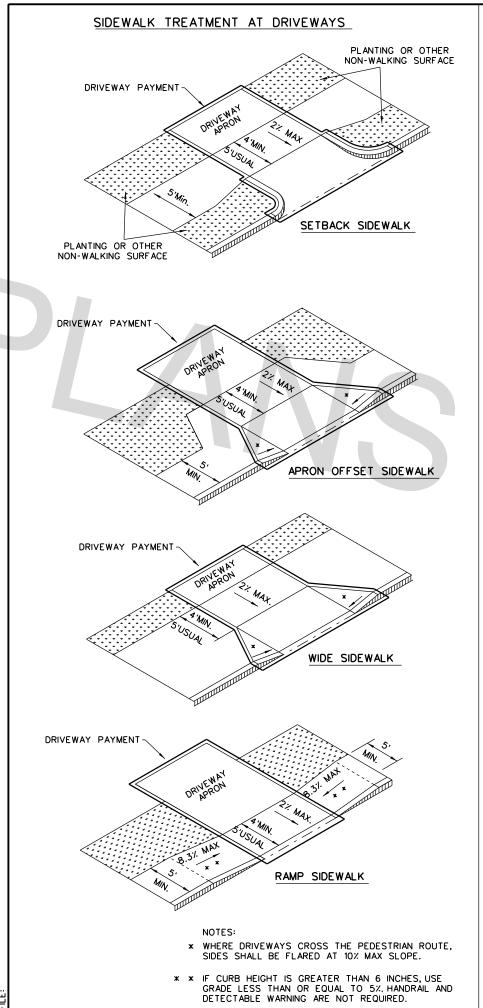
- Lay in a two by two unit basket weave pattern or as directed.
- (25%) of a fullunit. Cut detectable warning paver units using a power saw.

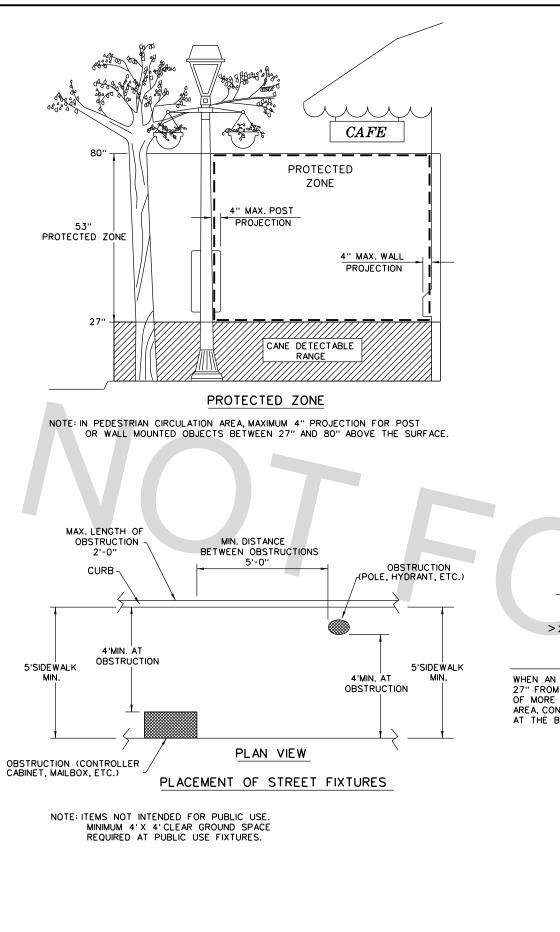
SIDEWALKS

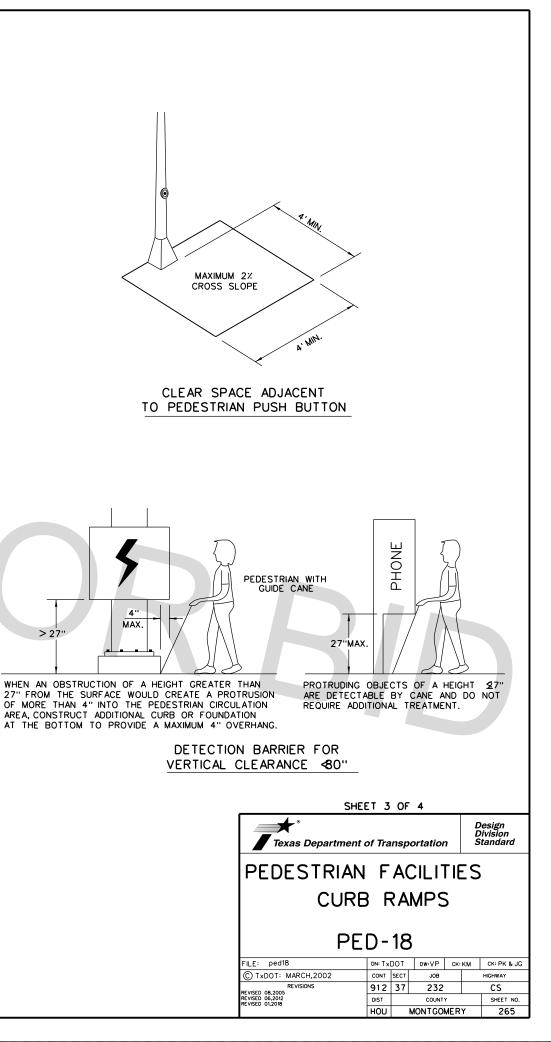
- Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
- drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.

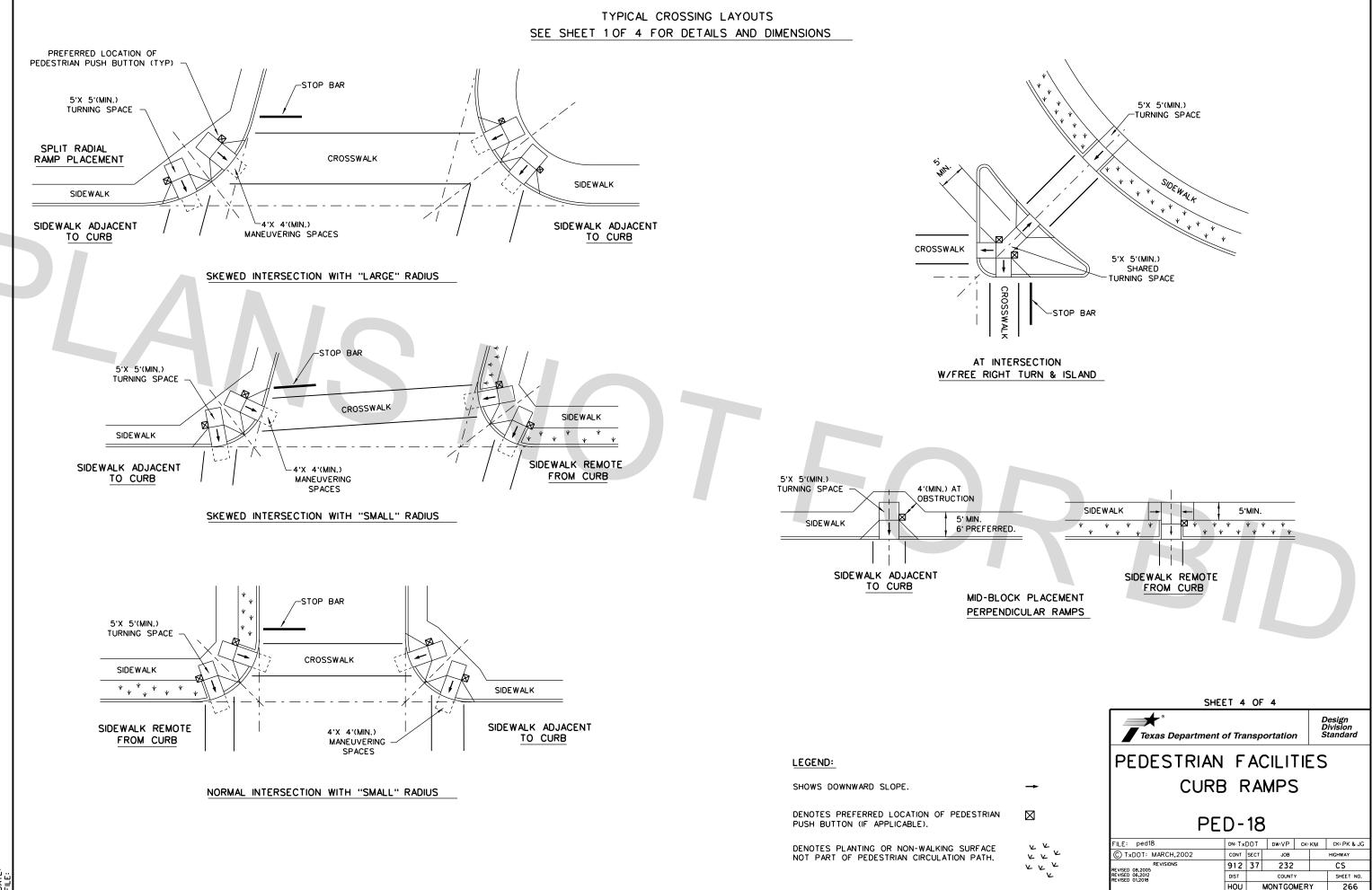
- of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be shall comply with PROWAG R409.
- pedestrian routes.
- "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.

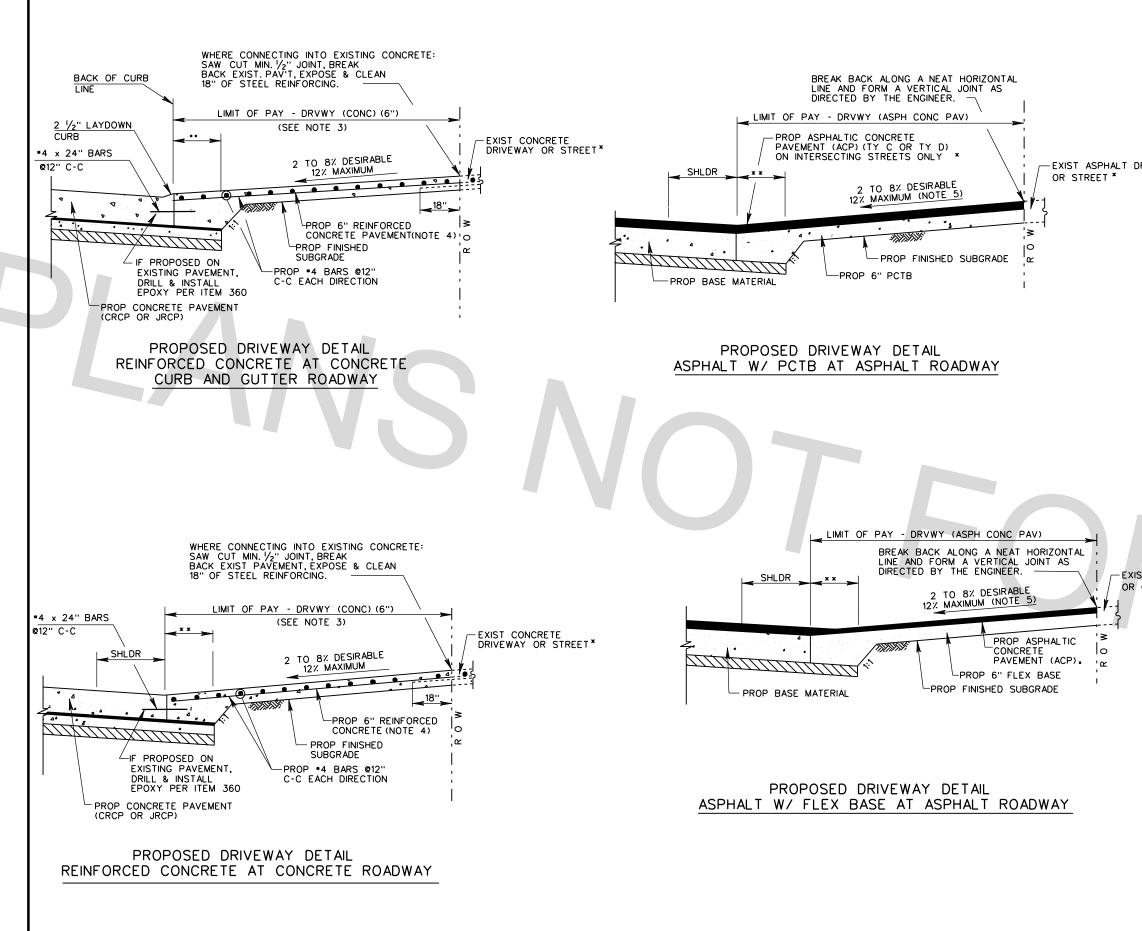












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COUNTY

MONTGOMERY

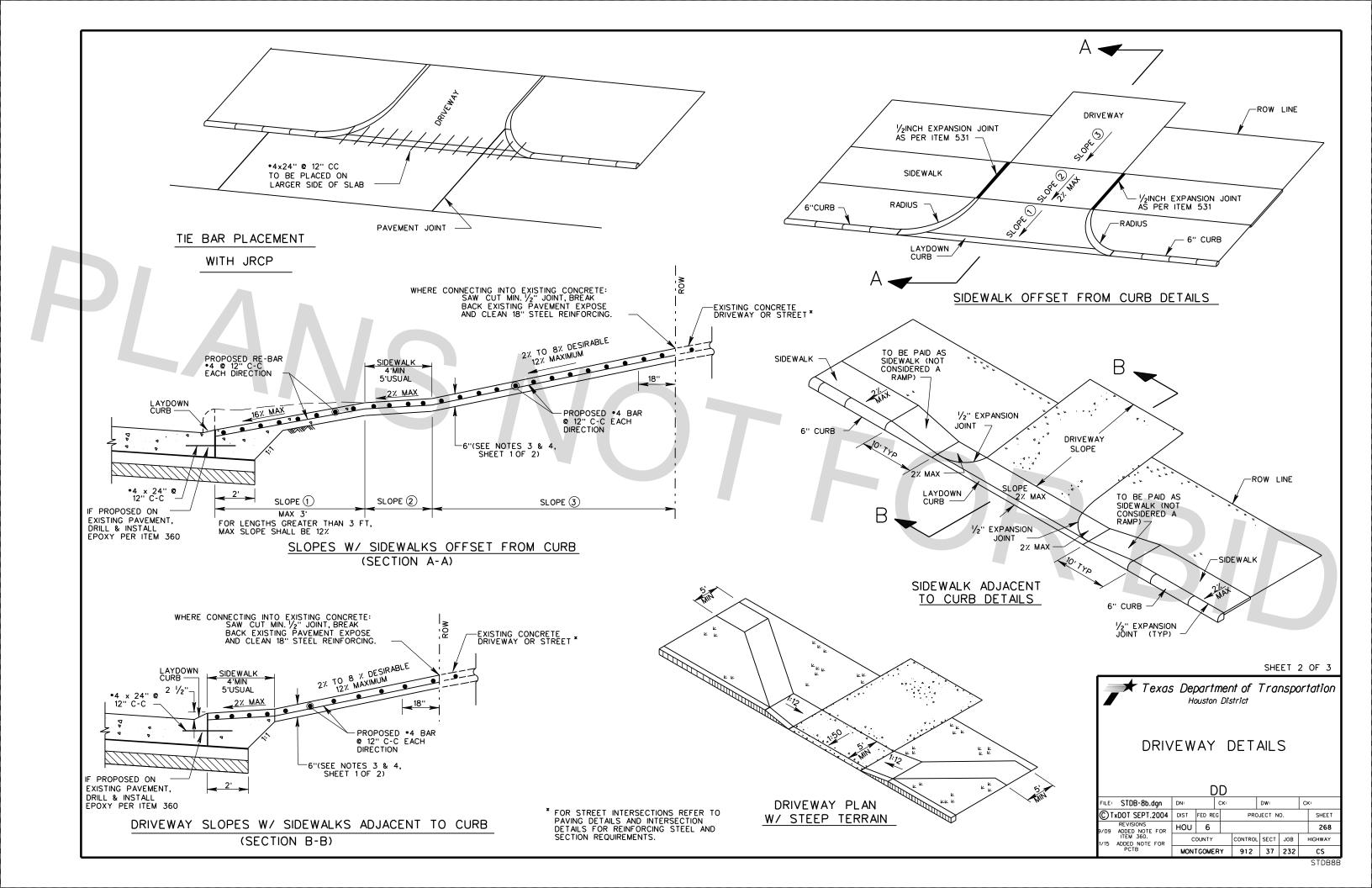
3/17 MODIFIED PAVEMENT SLOPES

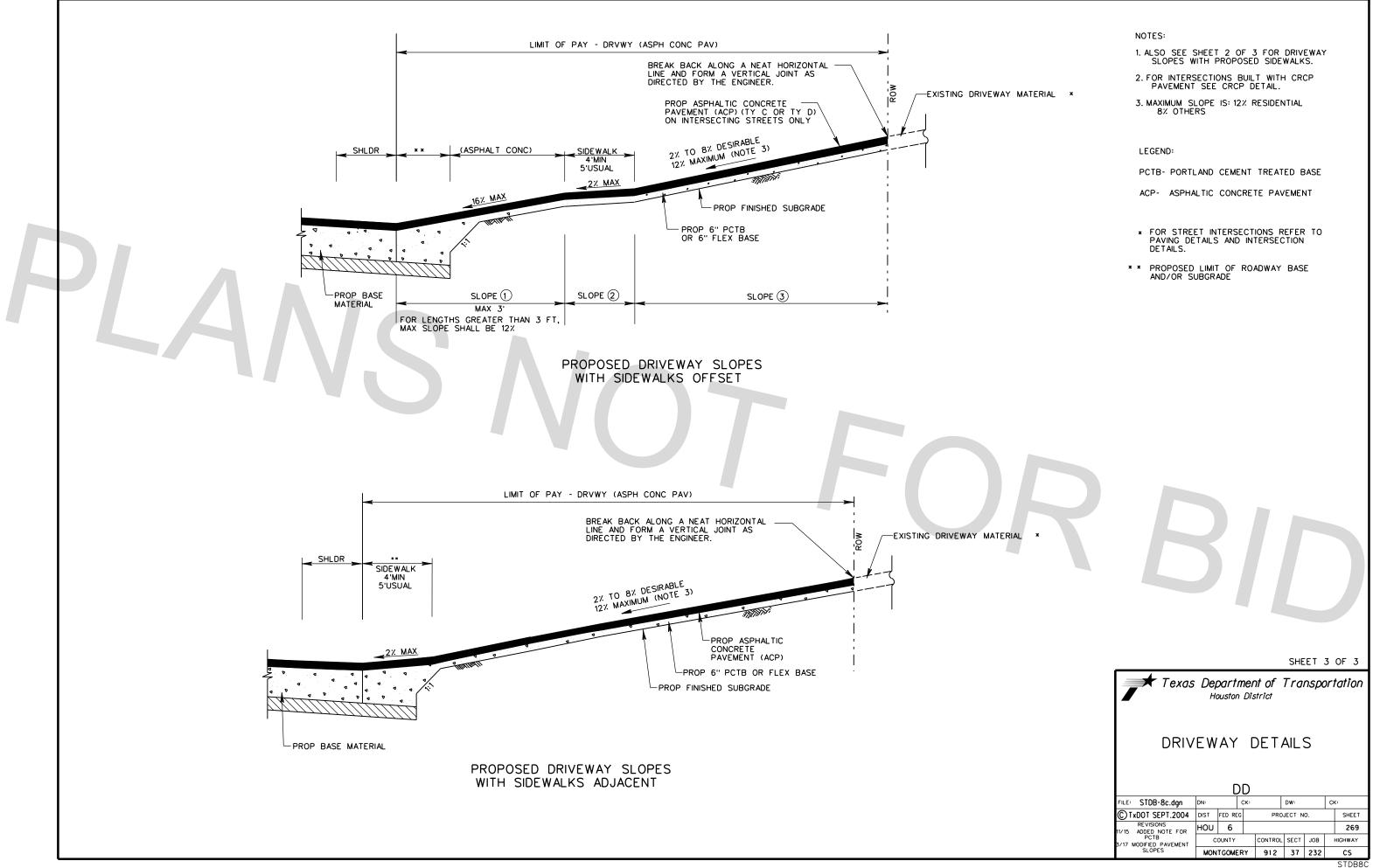
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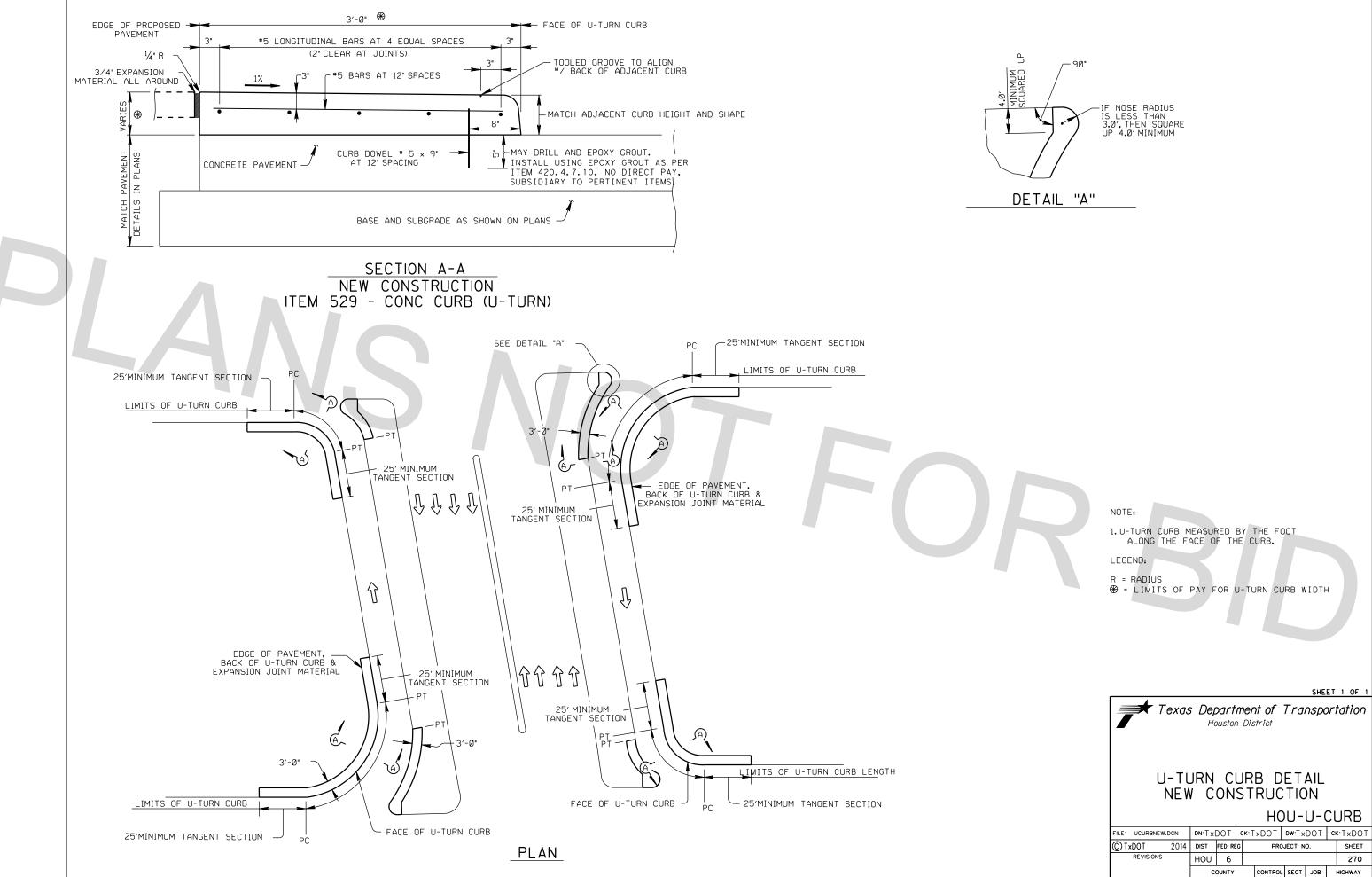
HIGHWAY





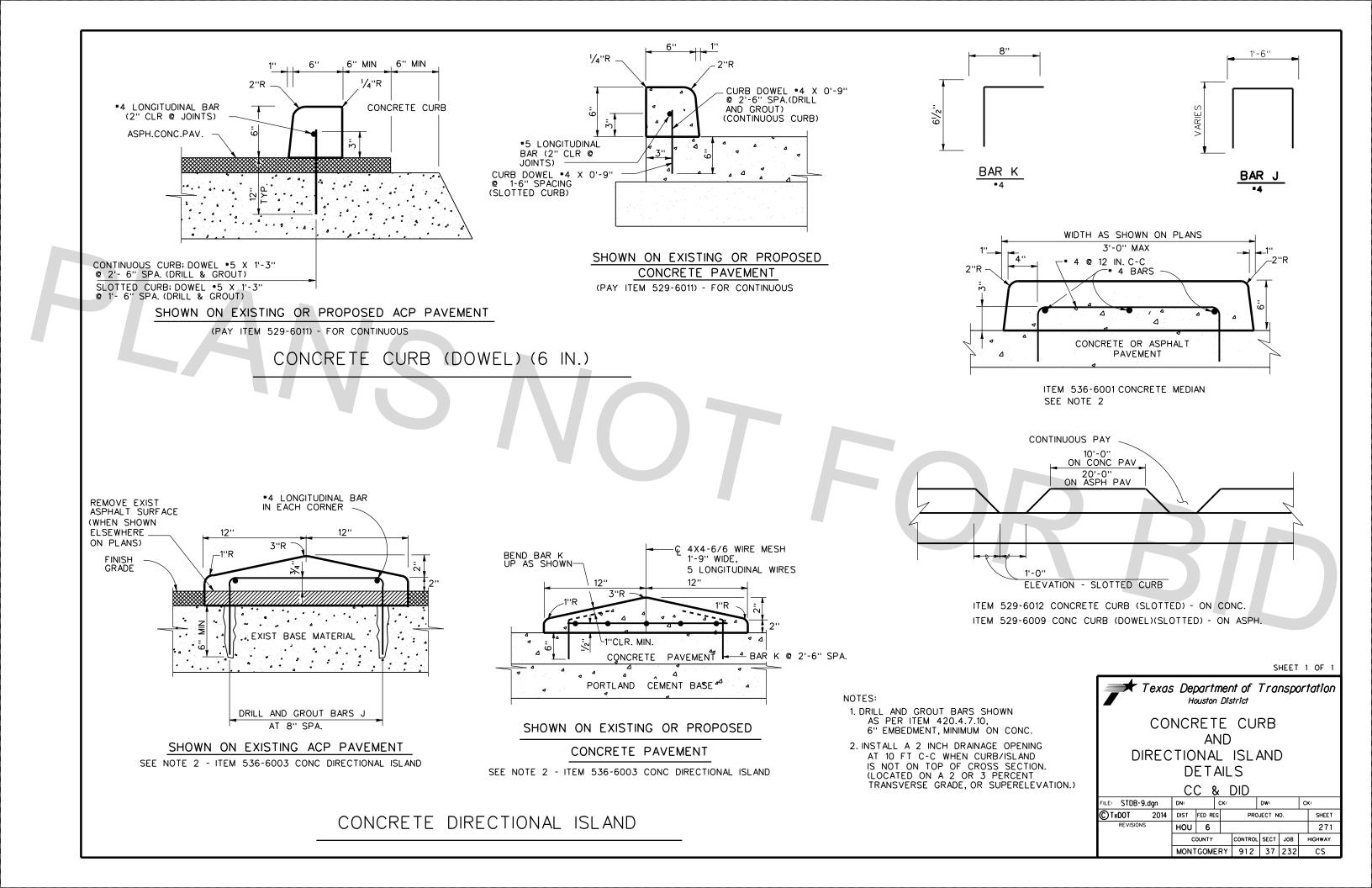
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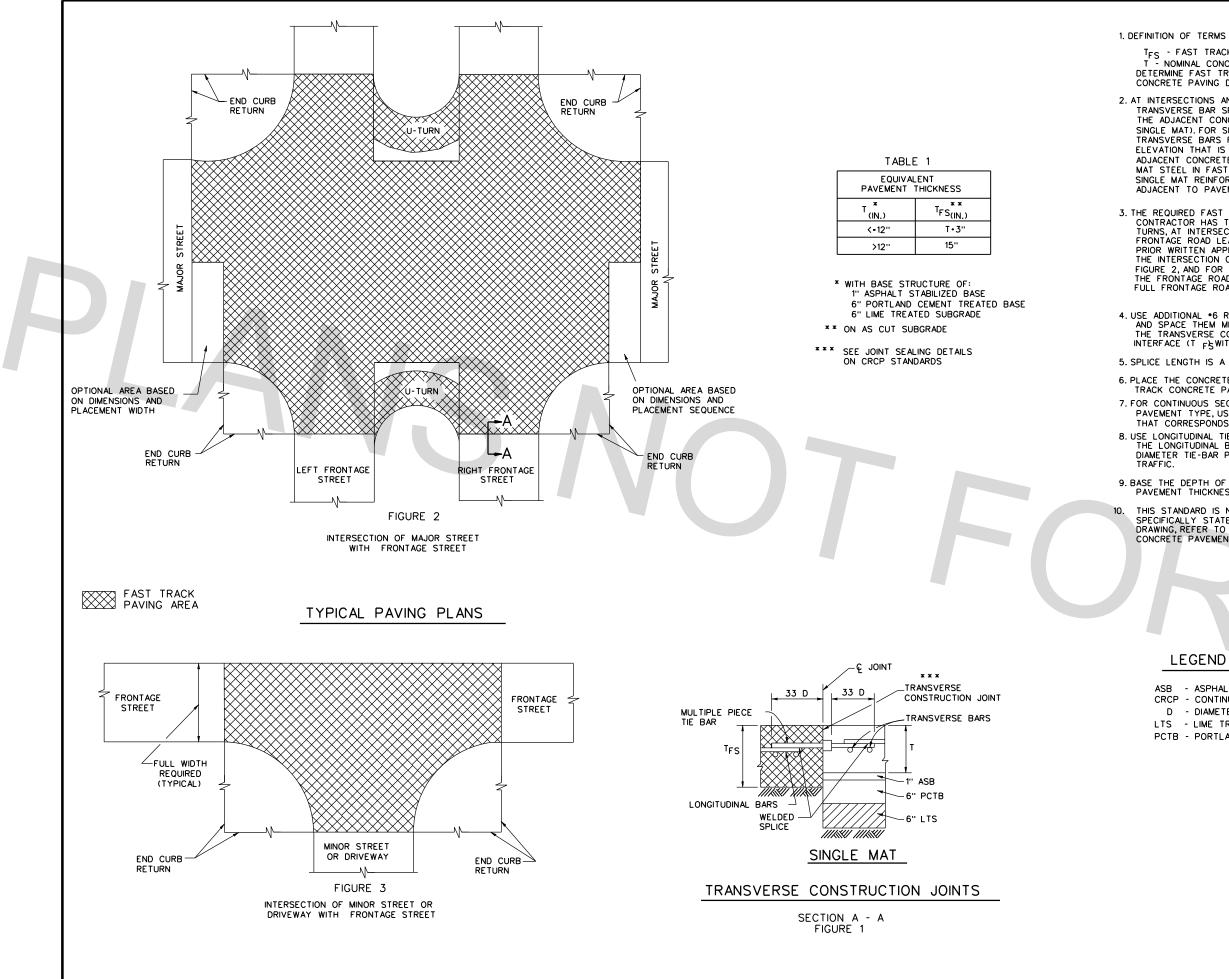
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PCTB 3/17 MODIFIED PAVEMENT	с	OUNTY		CONTROL	SECT	JOB		HIGHWAY
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STD B11





GENERAL NOTES

 ${\rm T}_{\rm FS}$ - FAST TRACK CONCRETE PAVING DEPTH AT INTERSECTIONS AND LEAVE OUTS. - NOMINAL CONCRETE PAVING DEPTH AS SHOWN IN THE PLANS. DETERMINE FAST TRACK CONCRETE PAVING DEPTH USING TABLE 1 AND THE NOMINAL CONCRETE PAVING DEPTH "T" SHOWN IN THE PLANS.

2. AT INTERSECTIONS AND LEAVE-OUT LOCATIONS USE THE SAME LONGITUDINAL AND TRANSVERSE BAR SPACING FOR THE FAST TRACK PAVING AREA AS THAT USED FOR THE ADJACENT CONCRETE PAVING DEPTH "T" (EXCEPT BAR SIZE SHALL BE •7 ON SINGLE MAT). FOR SINGLE MAT FAST TRACK PAVING, PLACE THE LONGITUDINAL AND TRANSVERSE BARS FOR THE FAST TRACK PAVING AREA AT THE HORIZONTAL PLANE ELEVATION THAT IS TWO TIE-BAR DIAMETERS LOWER THAN THAT USED FOR THE ADJACENT CONCRETE PAVEMENT DEPTH "T", AS SHOWN IN FIGURE 1. USE SINGLE MAT STEEL IN FAST TRACK PAVING AREAS ADJACENT TO PAVEMENT SLABS WITH SINGLE MAT REINFORCING. USE DOUBLE MAT STEEL IN FAST TRACK PAVING AREAS ADJACENT TO PAVEMENT SLABS WITH DOUBLE MAT REINFORCING.

3. THE REQUIRED FAST TRACK PAVING AREAS WILL BE SHOWN ON THE PLANS. THE CONTRACTOR HAS THE OPTION TO UTILIZE FAST TRACK CONCRETE PAVING AT U-TURNS, AT INTERSECTIONS, AT MINOR STREETS, AND AT DRIVEWAYS WITH FRONTAGE ROAD LEAVE-OUT AREAS THAT ARE NOT SHOWN ON THE PLANS, WITH PRIOR WRITTEN APPROVAL FROM THE ENGINEER. TYPICAL PAVING PLANS FOR THE INTERSECTION OF A MAJOR STREET WITH THE FRONTAGE ROAD ARE SHOWN AS EVOLUTE 2 AND FOR THE INTERSECTION. FIGURE 2, AND FOR THE INTERSECTION OF A MINOR STREET OR DRIVEWAY WITH THE FRONTAGE ROAD AS FIGURE 3. FAST TRACK PAVE THE FRONTAGE ROAD FOR THE FULL FRONTAGE ROAD WIDTH AND PLACE IN STAGES AS REQUIRED.

4. USE ADDITIONAL •6 REINFORCING STEEL BARS (MINIMUM 42 INCHES LONG) AND SPACE THEM MIDWAY BETWEEN ALTERNATE LONGITUDINAL BARS ALONG THE THE TRANSVERSE CONSTRUCTION JOINT FORMED AT THE FAST TRACK PAVING INTERFACE (T FSWITH THE ADJACENT PAVEMENT SLAB (T).

5. SPLICE LENGTH IS A MINIMUM OF 33 TIMES THE NOMINAL STEEL DIAMETER.

6. PLACE THE CONCRETE PLACEMENT AT A UNIFORM DEPTH THROUGHOUT THE FAST TRACK CONCRETE PAVING AREA.

7. FOR CONTINUOUS SECTIONS OF ROADWAY WHERE FAST TRACK PAVING IS THE PRIMARY PAVEMENT TYPE, USE THE BAR SIZE AND SPACING FROM THE CRCP STANDARDS THAT CORRESPONDS TO THE FAST TRACK SLAB THICKNESS.

8. USE LONGITUDINAL TIE-BARS OF THE SAME SIZE DIAMETER AND SPACING AS THE LONGITUDINAL BAR. A SINGLE PIECE TIE-BAR MAY BE USED IF THE 33 TIMES DIAMETER TIE-BAR PROJECTION DOES NOT INTERFERE WITH THE SAFE HANDLING OF

9. BASE THE DEPTH OF SAW CUTS FOR SAWED JOINTS ON THE FAST TRACK CONCRETE PAVEMENT THICKNESS.

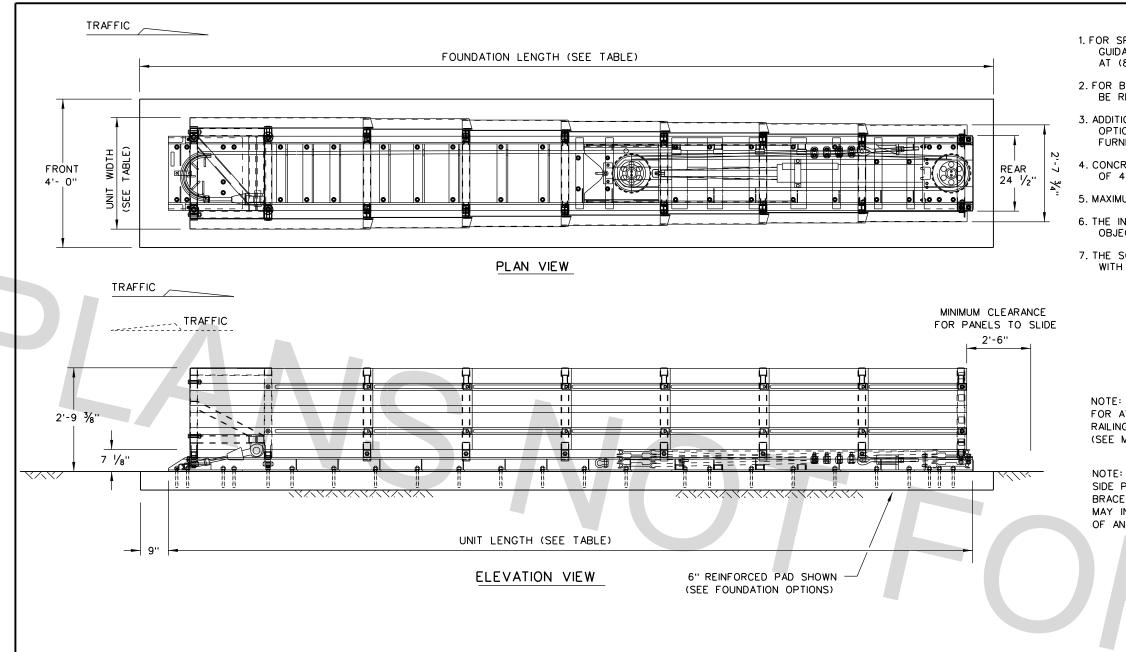
THIS STANDARD IS NOT INTENDED TO REPLACE OTHER STANDARDS EXCEPT WHERE SPECIFICALLY STATED HEREIN. FOR PAVING DETAILS NOT SHOWN ON THIS DRAWING, REFER TO THE STANDARD SHEETS FOR CONTINUOUSLY REINFORCED CONCRETE PAVEMENT SHOWN ELSEWHERE IN THE PLANS.

LEGEND

- ASPHALT STABILIZED BASE
- CRCP CONTINUOUSLY REINFORCED CONCRETE PAVEMENT
- D DIAMETER
- LTS LIME TREATED SUBGRADE
- PCTB PORTLAND CEMENT TREATED BASE

SHEET 1 OF 1

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	MONTGOMERY			912	37	232		CS



MODEL	TEST LEVEL	UNIT LENGTH (approx.)	UNIT WIDTH	FOUNDATION LENGTH	OBSTACLE WIDTH
SCI70GM	TL-2	13'-6''	2'-10 5/8''	15'- 6 1⁄4''	24"to 36"
SCI100GM	TL-3	21'-6''	3'-1 1/2"	23'- 0"	24"to 36"

SYSTEM AND PAD LENGTHS VARY DEPENDING ON BACKUP TYPE.

FOUNDATION OPTIONS
6" REINFORCED CONCRETE (5 1/2" ANCHOR EMBEDMENT)
8" UNREINFORCED CONCRETE (5 1/2" ANCHOR EMBEDMENT)
3" MIN. ASPHALT OVER 3" MIN. CONCRETE (16 $\frac{1}{2}$ " ANCHOR EMBED.)
6" ASPHALT OVER 6" COMPACT SUBBASE (16 1/2" ANCHOR EMBED.)
8" MINIMUM ASPHALT (16 1/2" 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.

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.

FOR ATTACHMENT AND TRANSITIONS TO OTHER SHAPES, BARRIERS, RAILINGS AND BI-DIRECTIONAL TRAFFIC FLOWS ARE AVAILABLE. (SEE MANUFACTURER'S PRODUCT MANUAL)

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.

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Texas Department of	f Tra	nsp	ortation		Design Division Standar			
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© TxDOT: February 2006	CONT	SECT	JOB		HIGHWAY			
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OW MAINTENANCE	HOU		MONTGOM	ERY	27	3		

															CR	ASH CUSHIO	۶N				
		PLAN				DIRECTION OF	FOUNDAT	TION PAD	BACKUP SUPPO	DRT		AVAILABLE			MOVE /	RESET	L	L F	RR	२	s
0C 0.	TCP PHASE	SHEET NUMBER	LOCATION	STA	TEST LEVEL	TRAFFIC (UNI/BI)	PROPOSED MATERIAL	PROPOSED THICKNESS	DESCRIPTION	WIDTH	HEIGHT	AVAILABLE SITE LENGTH	INSTALL	REMOVE	MOVE/ RESET	FROM LOC.•	N	w	N 1	N	N
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LEGEND

L-LOW MAINTENANCE R-REUSABLE S-SACRIFICIAL N-NARROW W-WIDE

FOR DEFINITIONS SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS ATTENUATORS / CRASH CUSHIONS SECTION.

http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/rdwylse.htm

INTERIM REVIEW ONLY

60% SUBMITTAL

THESE DOCUMENTS ARE FOR INTERIM REVIEW AND NOT FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES.

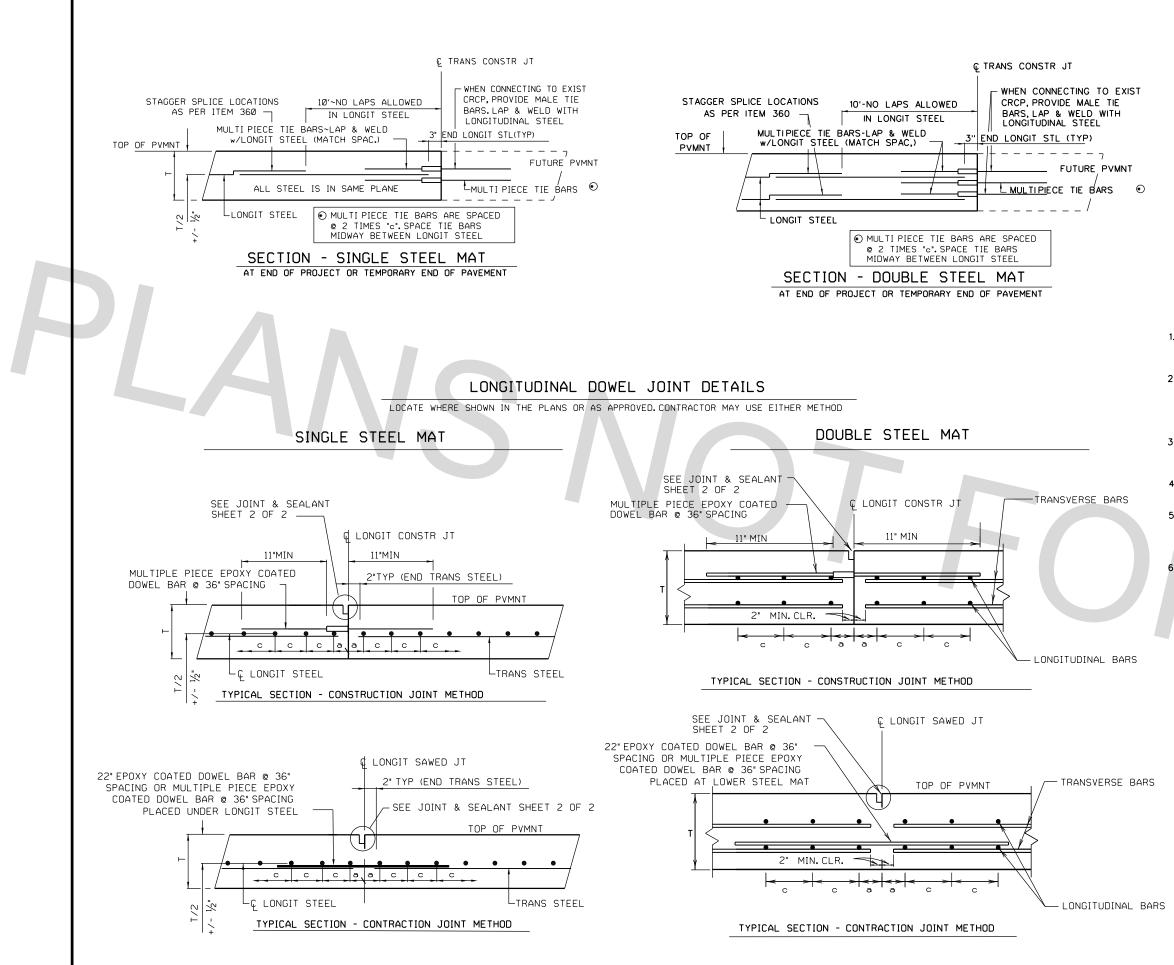
RESPONSIBLE ENGINEER: KATE LIGHT, P.E.

TEXAS REGISTRATION NO. 134443 DATE: 4/5/2021

CRASH CUSHION SUMMARY SHEET

SHEET 1 OF 1

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GENERAL NOTES

- 1. DETAILS FOR 7.0 IN. TO 13.0 IN. THICK CONCRETE PAVEMENT ARE SHOWN ON STANDARD CRCP(1)-17. DETAILS FOR 14 IN. TO 15 IN. THICK CONCRETE PAVEMENT ARE SHOWN ON STANDARD CRCP(2)-17.
- 2. DOWELS AND TIE BARS DOWELS ARE ONE INCH MINIMUM DIAMETER. ENSURE DOWELS ARE FREE OF GREASE AND ARE EPOXY COATED. DO NOT SHEAR CUT DOWELS DURING FABRICATION. PROVIDE TIE BARS PER ITEM 360. FURNISH MULTIPIECE TIE BARS AND DOWELS WITH STOP COUPLINGS AND WITH THREADS ON THE BARS.
- 3. USE CHAIRS OF SUFFICIENT STRUCTURAL QUALITY AND NUMBER TO SUPPORT THE MAT TO THE VERTICAL TOLERANCES. CHAIRS WILL BE APPROVED BY THE ENGINEER AND DO NOT REQUIRE GALVANIZING
- 4. MECHANICALLY PLACING REINFORCING STEEL IS NOT ALLOWED. NO BARS, DOWELS OR TIE BARS MAY BE VIBRATED INTO POSITION.
- 5. WHERE DIFFERENT THICKNESS PAVEMENTS MEET, TRANSITION THE THINNER SECTION TO THE THICKER SECTION OVER A DISTANCE OF 20 FT. PLACE REINFORCING STEEL WITHIN THE TRANSITION THE SAME AS IN THE THICKER PAVEMENT.
- 6. PERFORM WELDING PER ITEM 448. FURNISH WELDABLE REBAR PER ITEM 440.

SHEET 1 OF 2

Texas Department of Transportation Houston District

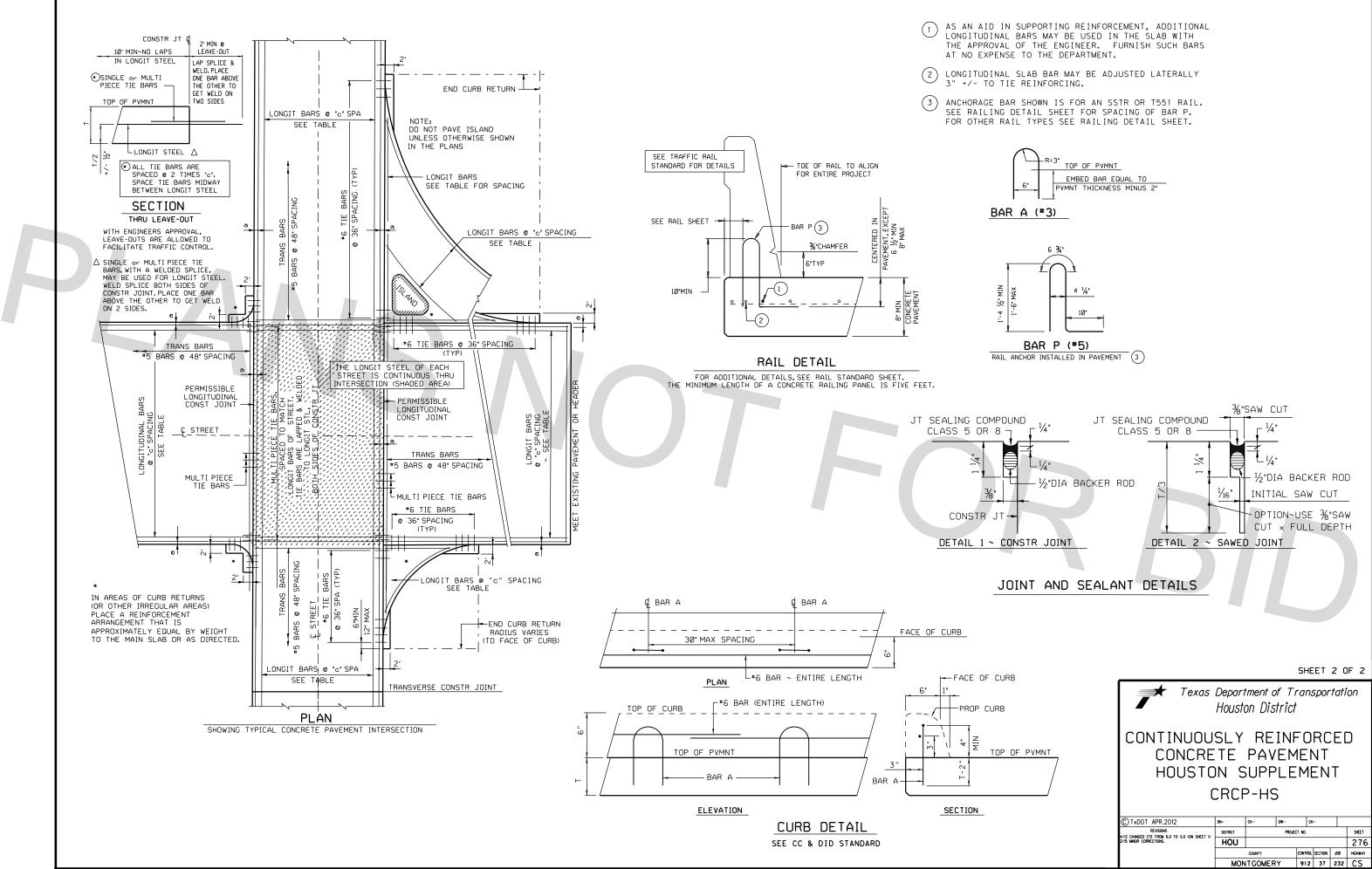
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT HOUSTON SUPPLEMENT CRCP-HS TxDOT APR.2012 DW:-CK:-REVISIONS 20 CHANCED CTE FROM 6.0 TO 5.0 14 UPDATE TO REFERENCE CRCP-13 STND. 5 REVISED GENERAL NOTES, MINOR CORRECTIONS. 7 REVISED NOTE *3 OF GENERAL NOTES, MINOR CORRECTIONS. DISTRICT PROJECT NO. HOU 275

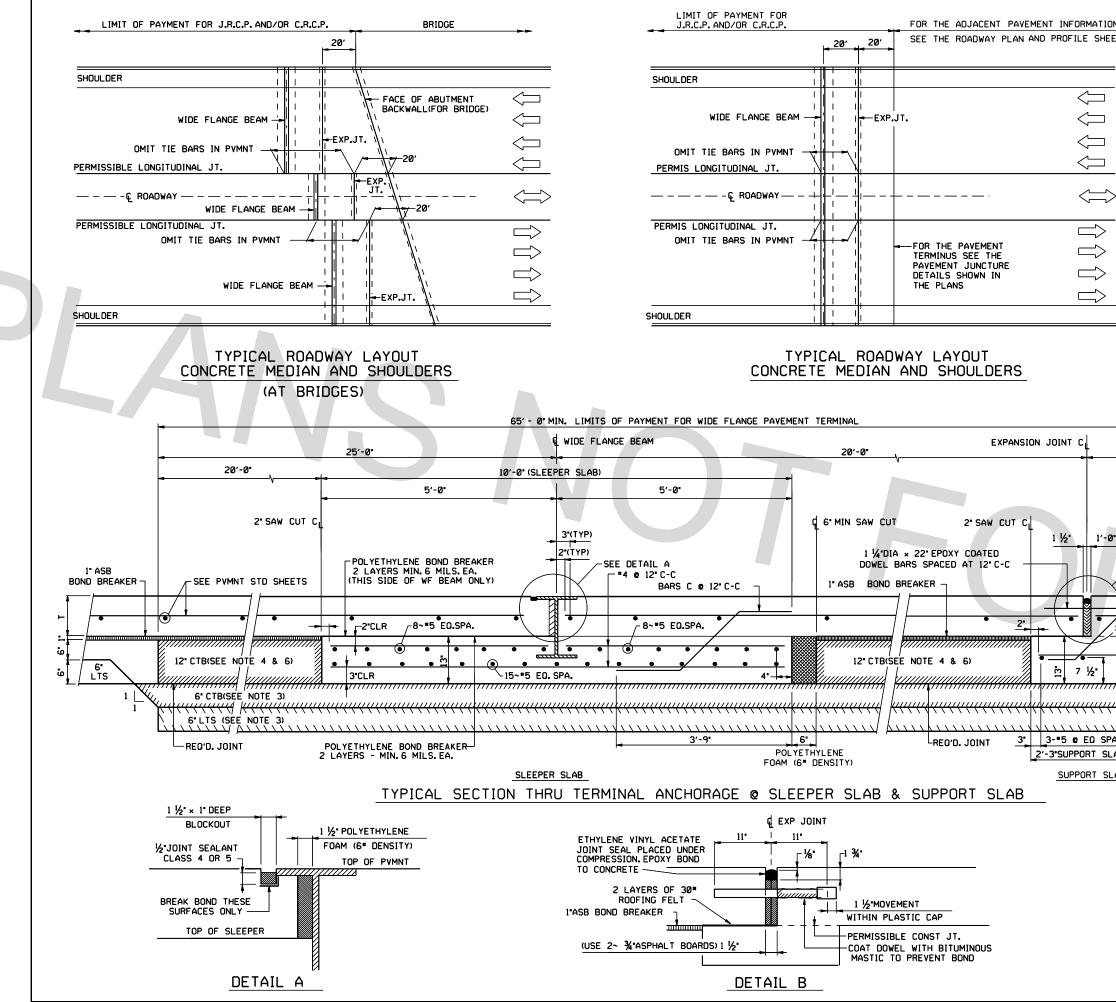
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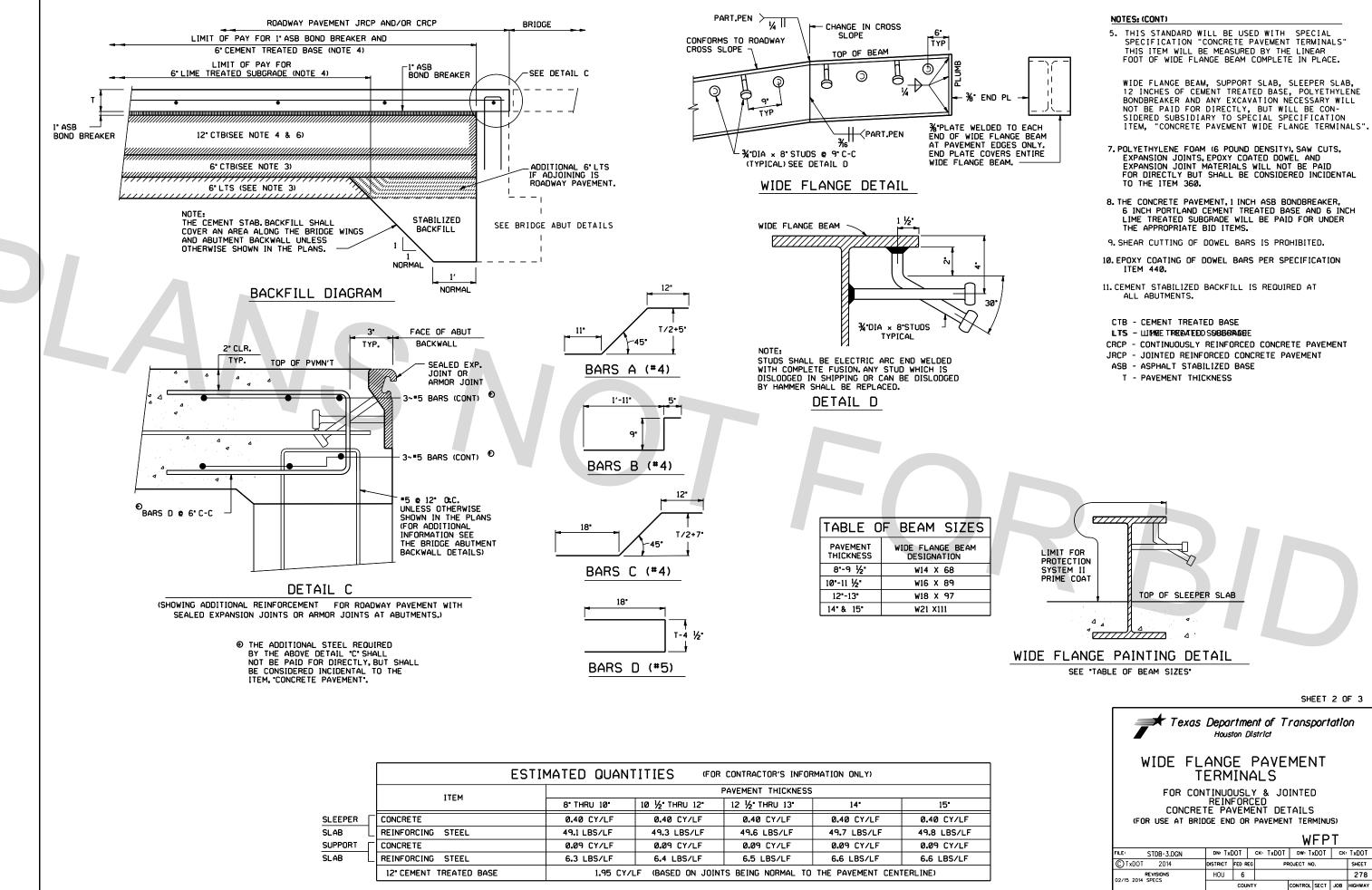
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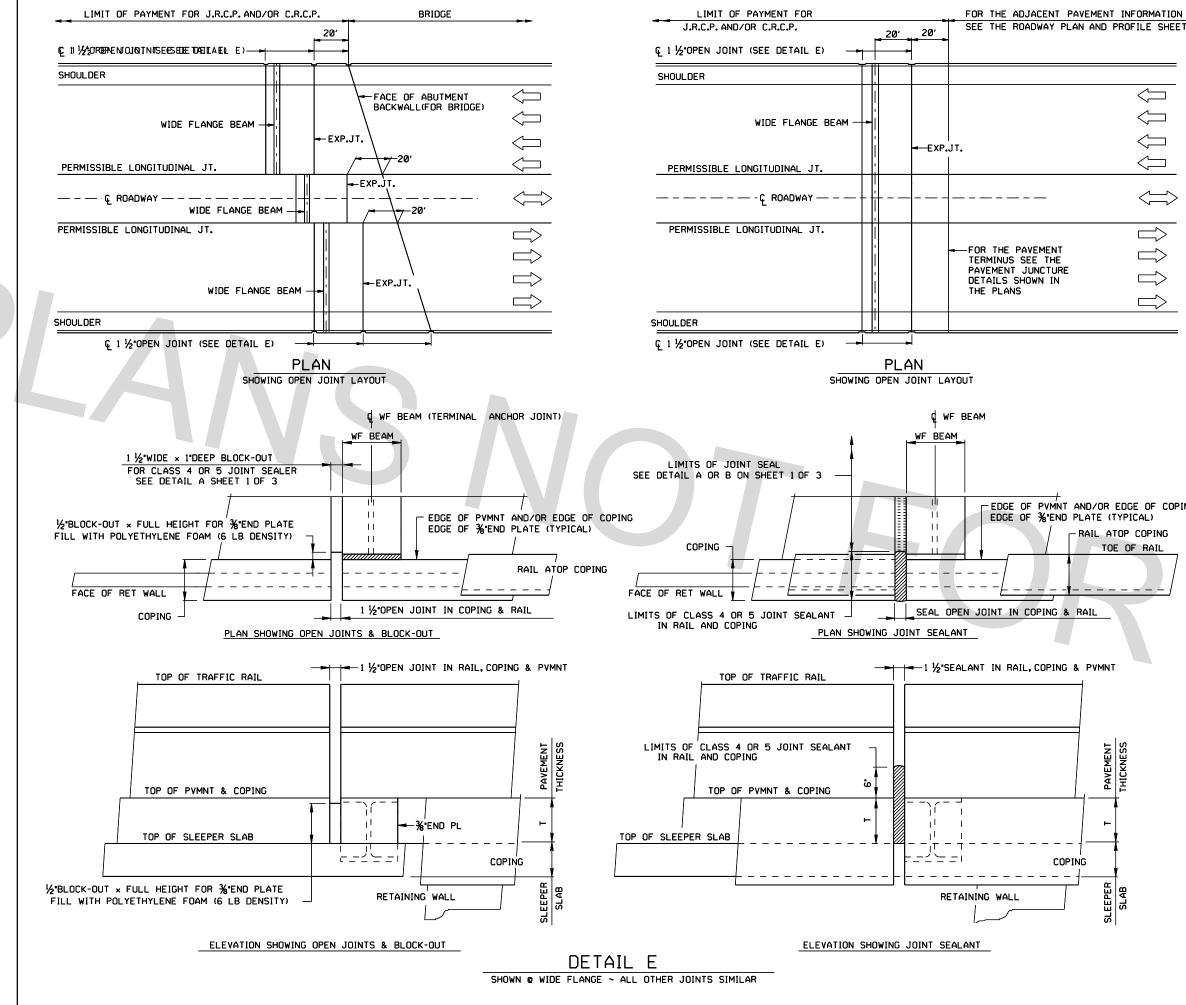
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SHEETS 1.B	ELOCK-OUT REQUIRED & EAM ADJACENT TO & S PLACED ABUTTING C TABILIZED BASE. THE ILLED WITH POLYETHY EE SHEET 3 OF 3 FO	INCH END PLATE WH ONCRETE PAVEMENT BLOCKED OUT ARE 'LENE FOAM (6 POU	HERE BLOCK-OUT ,RIPRAP OR A WILL BE ND DENSITY).
C	OR ADDITIONAL DETAI NUANTITIES AND THE W WEE SHEET 2 OF 3.		ENT MEMBER
	EPLACE 6 INCH LIME EMENT TREATMENT WI ILL AT STRUCTURES BACKFILL EMBANKMENT BACKFILL EMBANKMENT	TH CEMENT STABIL WITH CEMENT STAE . SEE "CEMENT S	IZED BACK- ILIZED TABILIZED
	2 INCH CEMENT STABI JUBSTITUTED FOR 12 I IPTION, ON APPLICABLE TABILIZED BACKFILL	NCH CTB, AT CONTR	ACTOR'S
J	CTB - CEMENT TREAT(LTS - LIME TREATED RCP - CONTINUOUSLY RCP - JOINTED REINF(ASB - ASPHALT STABI T - PAVEMENT THIC	SUBGRADE REINFORCED CONCRI DRCED CONCRETE Pr LIZED BASE	
	R END BRIDGE WAY PAVEMENT	-	
20'-0 ' MI	N	-	
- EDGE OF SUPPO	DRT SLAB		
€ 2" SAW CUT 1'-0"			
SEE DETAIL B			
BARS A C	18" C-C e 18" C-C		
	•		
			E DETAILS
• 12• CTB(SEE	NOTE 4 & 6)	AND LIM	ITS OF PAY & LTS SEE
+ / //////////////////////////////////		ABUTMEN	IT BACKFILL DETAIL
<u></u>	~~~~	OR THE	T 2 OF 3 PAVEMENT
SPA 3"			E DETAILS IN IN PLANS.
SLAB			
SLAB			SHEET 1 OF 3
	Texas	Department of T Houston District	ransportation
		ANGE PAVE ERMINALS	MENT
	FOR CON	TINUOUSLY & JC REINFORCED	INTED
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		OL LING ON THICKEN	WFPT
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			STDB-3



	ESTI	ESTIMATED QUANTITIES (FOR CONTRACTOR'S INFORMATION ONLY)								
	ITEM	ITEM PAVEMENT THICKNESS								
		8" THRU 10"	10 ½ THRU 12	12 1/2" THRU 13"	14"	15"				
SLEEPER	CONCRETE	0.40 CY/LF	0.40 CY/LF	0.40 CY/LF	0.40 CY/LF	0.40 CY/LF				
SLAB	REINFORCING STEEL	49.1 LBS/LF	49.3 LBS/LF	49.6 LBS/LF	49.7 LBS/LF	49.8 LBS/LF				
SUPPORT	CONCRETE	0.09 CY/LF	0.09 CY/LF	0.09 CY/LF	0.09 CY/LF	0.09 CY/LF				
SLAB	REINFORCING STEEL	6.3 LBS/LF	6.4 LBS/LF	6.5 LBS/LF	6.6 LBS/LF	6.6 LBS/LF				
	12" CEMENT TREATED BASE 1.95 CY/LF (BASED ON JOINTS BEING NORMAL TO THE PAVEMENT CENTERLINE)									

912 37 232 CS

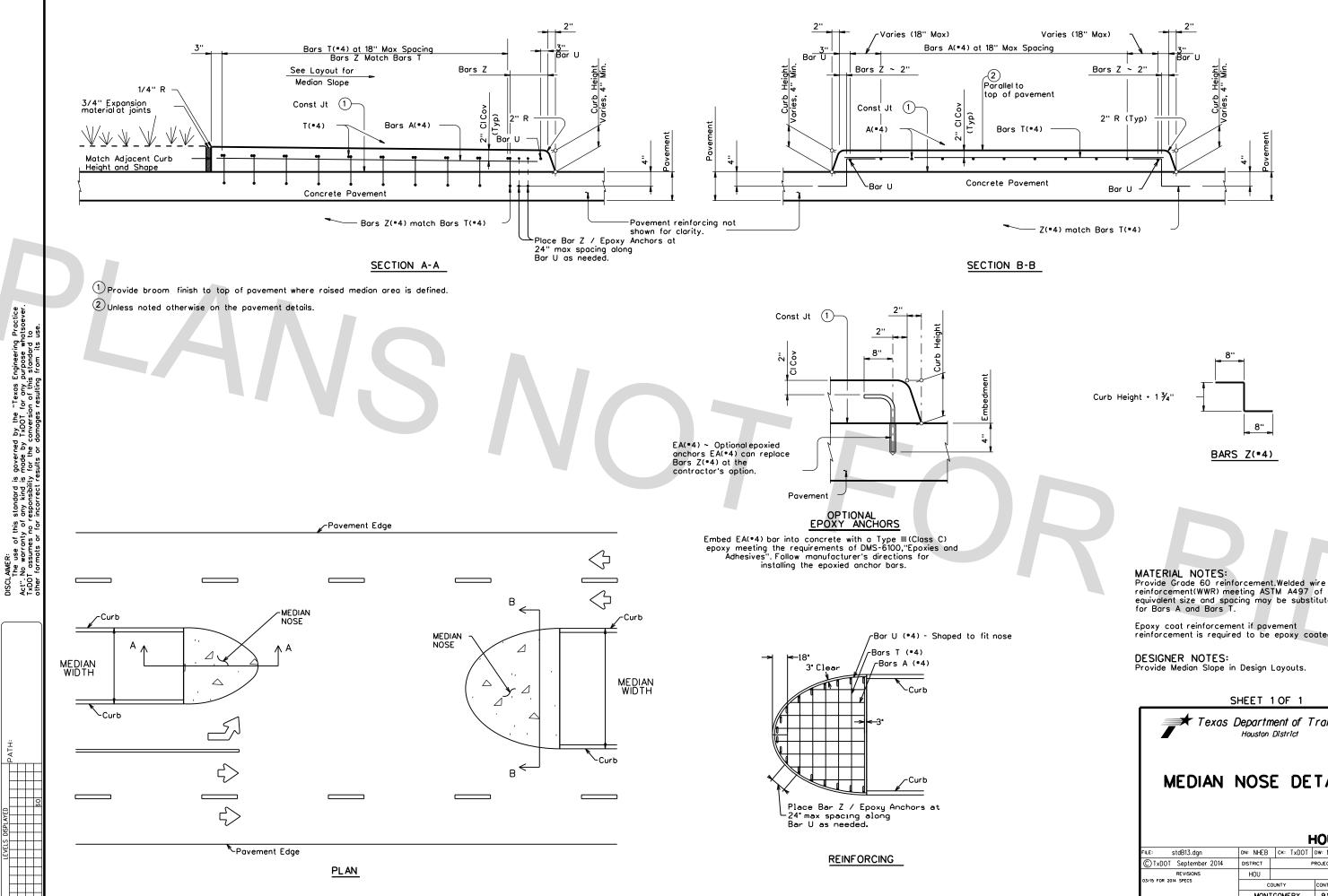
MONTGOMERY



T AND/OR EDGE OF COPING) PLATE (TYPICAL)	
RAIL ATOP COPING	
& RAIL	
G & PVMNT	
THICKNESS	SHEET 3 OF 3
	Texas Department of Transportation Houston District
	DE FLANGE PAVEMENT TERMINALS
	FOR CONTINUOUSLY & JOINTED REINFORCED
SLEEPER	CONCRETE PAVEMENT DETAILS
ស 	(FOR USE AT RETAINING WALLS)
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SEE THE ROADWAY PLAN AND PROFILE SHEETS



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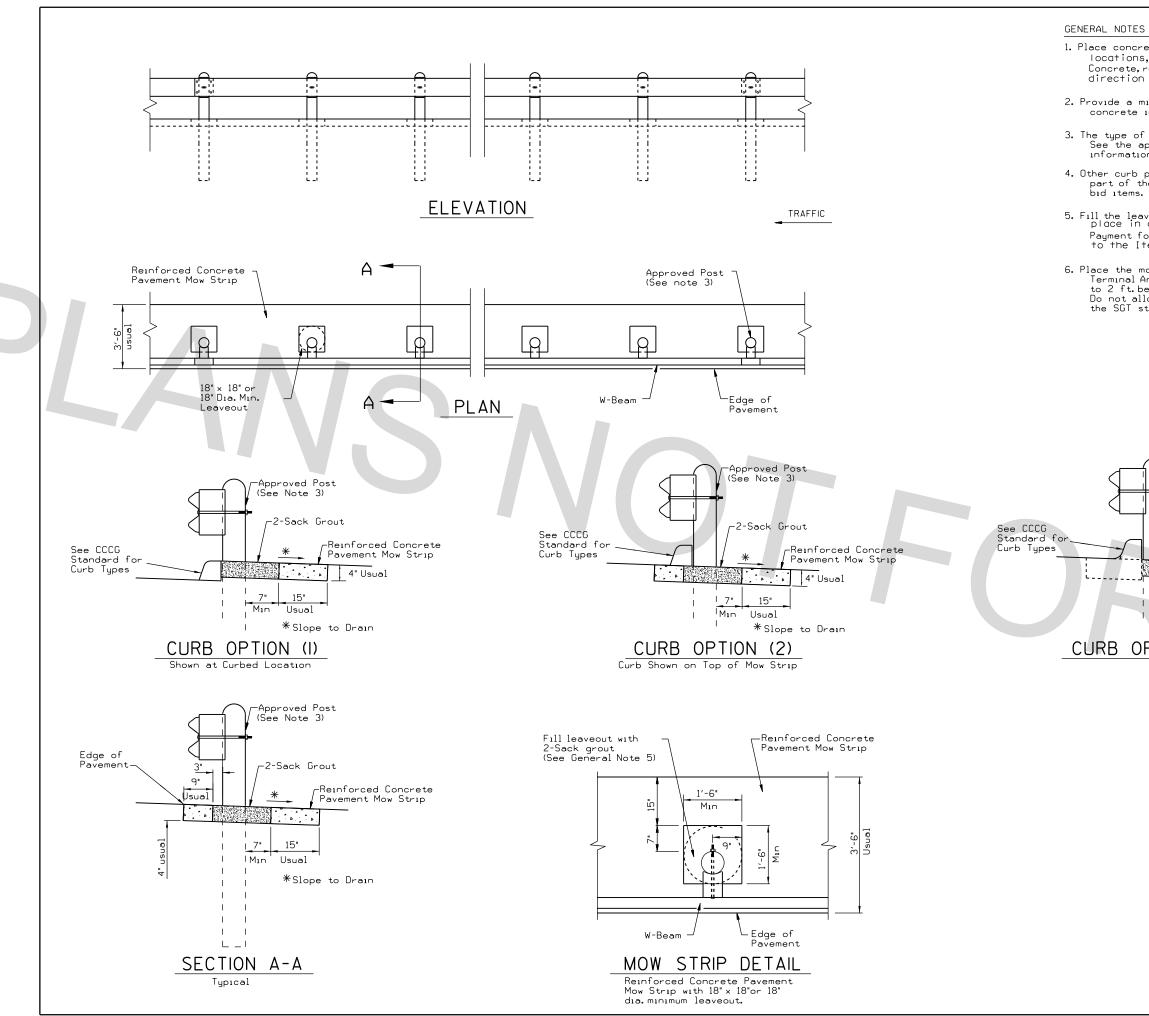
reinforcement(WWR) meeting ASTM A497 of equivalent size and spacing may be substituted for Bars A and Bars T.

reinforcement is required to be epoxy coated.

DESIGNER NOTES: Provide Median Slope in Design Layouts.

SHEET 1 OF 1

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1. Place concrete riprap mow strips at all Metal Beam Guard Fence locations, and in accordance with Item 432, "Riprap". Use Class B Concrete, reinforced with No. 3 bars spaced at 18 in. centers each direction and 2 in. below the surface.

2. Provide a minimum of 7 in. leave out behind the post. Do not place concrete in the leave out.

3. The type of approved post 1s shown elsewhere on the plans. See the applicable standard sheets for additional details and information.

4. Other curb placement options may be used. Curbs are not considered part of the mow strip and are paid for under other pertinent bid items.

5. Fill the leave outs with no more than a 2-sack grout mixture and place in accordance with Section 421.2.7, "Mortar and Grout." Payment for furnishing and placing the grout mixture is subsidiary to the Item 432, "RIPRAP."

6. Place the mow strip the entire length of the guard fence plus any Terminal Anchor Section (TAS) or Single Guardrail Terminal (SGT) to 2 ft. beyond the face of the object marker at the end of the SGT. Do not allow concrete to adhere to the ground line strut shown on the SGT standard sheet.

	Grout Reinforced Concrete Pavement Mow Strip 4" Usual ope to Drain	
R <u>BOPTION (3)</u>		SHEET 1 OF 1
	Texas Department of Tran Houston District	sportation

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SODDING	PERMANENT SEEDING	TEMPORARY SEEDING	Reference Item 161, Streets and Bridges 2014 for specifications, dimensions	162, 164, 166, 168 of the Texas Standard Specifications for Construction and Maintenance of Highways, volumes and measurements that are not shown. Use latest Houston District, Special Provisions for the	, pse items indicated.
	√		161-6017 COMPOST MANUF TOPSOIL (BIP)(4'') SY	APPLICATION RATE Item 161.2.1. Compost Manufactured Topsoil(CMT)	Item 161.2. Materials. Submit quality control (QC) documentation to the Engineer. Compost producer's STA certification must be dated to meet STA requirements (certification must be within 30 or 90 days per STA requirements). Lab analysis performed by an STA-certified lab must be dated within 30 days before delivery of the compost.
\			162-6002 BLOCK SODDING SY	GRASS SPECIES Item 162.2. Materials. Common Bermuda (Cynodon Dactylon)	Item 162.2.1. Block Sod. Use block polletized or roll type sod. REMOVE PLASTIC BACKING FROM ROLL TYPE SOD. Place sod within 48 hours of delivery to site. No exceptions. Place sod with joints alternating on each row to prevent continuous joint lines. Peg sod as needed with wood pegs to hold sod in place. Pegging sod is subsidiary to Item 162.
	V		164-6066 DRILL SEEDING(PERM)(WARM OR COOL) SY Item 164.1. Description Provide and install seeding as shown on District Standard	PLANTING MONTH SEED MIX March, April, May, June, July, August, September, October Little Bluestem (Schizachyrium scoparium) - 1.4 lbs PLS/acre	PLS (Pure Live Seed) Provide documentation of PLS requirements per Item 164.2.1. CONSTRUCTION. Cultivate the area to a depth of 4 inches before placing the seed unless otherwise directed. When performing permanent seeding after an established temporary seeding, cultivate the seedbed to a depth of 4 inches or mow the area before placement of the permanent seed. Plant the seed and place the straw or hay mulch after the area has been completed to lines and grades as shown on the plans.
	J	Λ	164-6052 BROADCAST SEED(PERM)(SPECIAL MIX) SY Item 164.1. Description Provide and install seeding as shown on District Standard	November, December, January, February,	4 inches or mow the area before placement of the permanent seed. Plant the seed and place the straw or hay mulch after the area has been completed to lines and grades as shown on the plans. Drill Seeding. Plant seed or seed mixture uniformly over the area shown on the plans at a depth of 1/4 to 1/3 inch using a cultipacker(turfgrass) type seeder. Plant seed along the contour of the slopes.
			164-6051 DRILL SEED(TEMP)(WARM OR COOL) SY Item 164.1. Description Provide and install seeding as shown on District Standard	PLANTING MONTH SEED MIX March, April, May, June, July, August, September, October	Use broadcast seeding method where site conditions prevent drill seeding method. Broadcast Seeding. Distribute the dry seed or dry seed mixture uniformly over the areas shown on the plans using hand or mechanical distribution on top of soil.
		\checkmark	164-6009 BROADCAST SEED(TEMP)(WARM) SY Item 164.1. Description Provide and install seeding as shown on District Standard	November, December, January, February,	
	\	\	162-6003 STRAW OR HAY MULCH SY	APPLICATION RATE Immediately after planting the seed or seed mixture, apply straw or hay mulch uniformly over the seeded area. Apply straw or hay mulch at 2 tons per acre. Use tacking agent with straw or hay mulch as described on this sheet.	Use straw or hay mulch in conformance with Article 162.2.5, "Mulch." Use biodegradable tacking agents only applied at a rate in accordance with manufacturer's recommendations. Use the following products or an approved equal(see note this sheet): Conweb/Contac Guar Gum, Profile Products Corporation, (307) 655-9565, Ramtec/Procol/Viscol Guar Gum, Ramtec Corporation, (800) 366-1180
√	V	、	166-6001 FERTILIZER AC Item 166.2. Materials Use fertilizer as shown on District Standard	APPLICATION RATE Deliver and evenly distribute fertilizer at a rate of 4000 lbs/acre.	 Use a NON-GHEMICAL fertilizer which meets all the following criteria: (1) BRAND NAME must be registered with the Texas State Chemist as a commercial fertilizer. (2) Meets USEPA guidelines for unrestricted use. (3) Derived from biological sources such as, but not limited to: sewage sludge, manures, vegetation, etc. (4) In granular form and essentially dust free. Submit proof of registration and nutrient source to Engineer. Use the following products or an approved equal(see note this sheet): Sigma, SIGMA AgriScience, 281-851-6749 Sustanite-standard grade, Automation Nation, Inc., 713-675-4999 Milorganite, MMSD, 800-287-9645 Agricultural Organic P/L, Ag Org, INC., 713-523-4396
V	V	1	168-6001 VEGETATIVE WATERING MG	APPLICATION RATE Item 168.3 Construction. 6000 gallons/acre x 20 consecutive per working day x working days = 120,000 gallons total/acre	Begin watering immediately after installation of seed or sod. Replace, fertilize, and water any seed or sod in poor condition due to the failure to apply the specified amount of water within the time allowed at no expense to the Department.

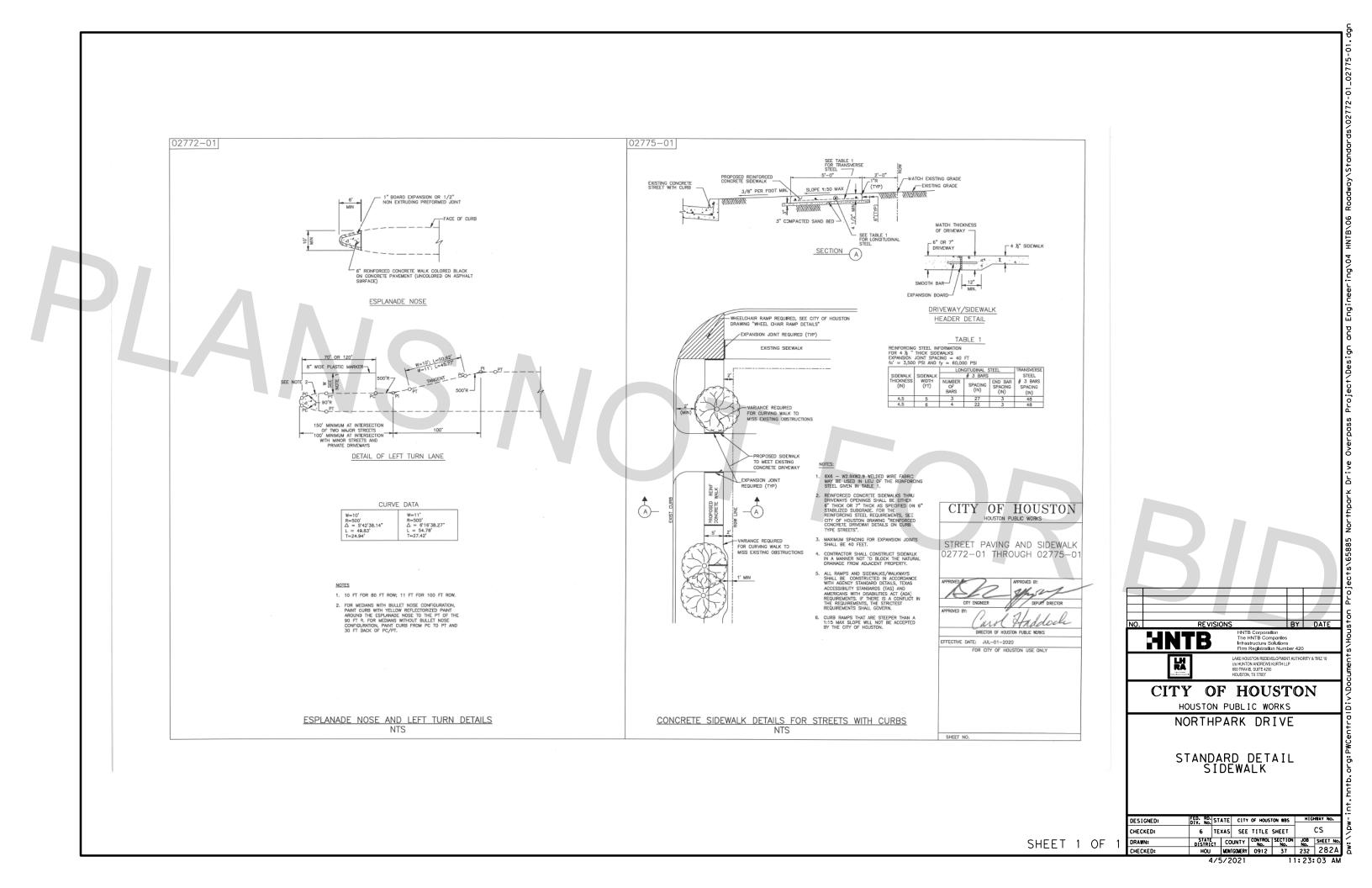
SEQUENCE OF WO

BLOCK SOD	PERMANENT SEEDING	TEMPORARY SEEDING
1.FERTILIZER 2.CULTIVATE SOIL (ITEM 162.3) 3.SOD 4.VEGETATIVE WATERING	1.FERTILIZER 2.COMPOST MANUFACTURED TOPSOIL 3.CULTIVATE SOIL (ITEMS 164.3 AND 161.3.1) 4.PERMANENT SEEDING 5.STRAW OR HAY MULCH 6.VEGETATIVE WATERING	1.FERTILIZER 2.CULTIVATE SOIL (PER ITEM 164.3) 3.TEMPORARY SEEDING 4.STRAW OR HAY MULCH 5.VEGETATIVE WATERING

FERTILIZER, SEED, SOD, STRAW, COMPOST, AND WATER

SHEET 1 OF 1

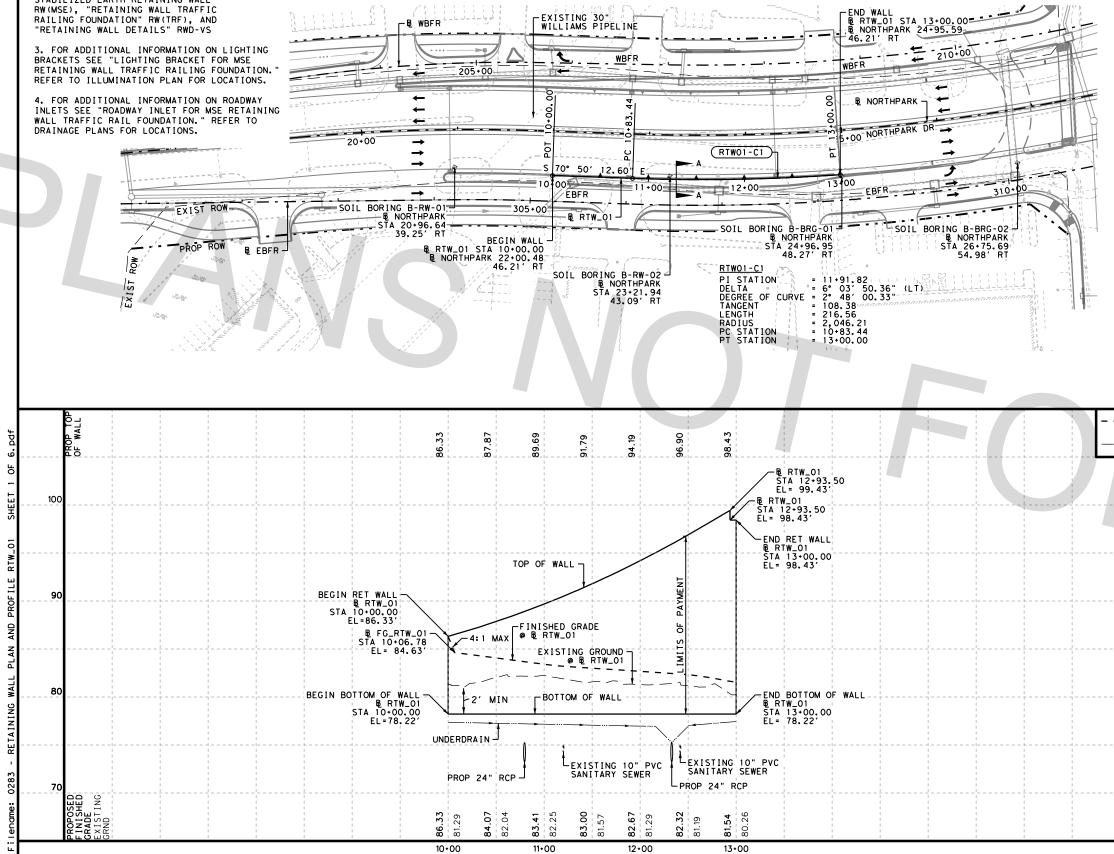
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REVISIONS								



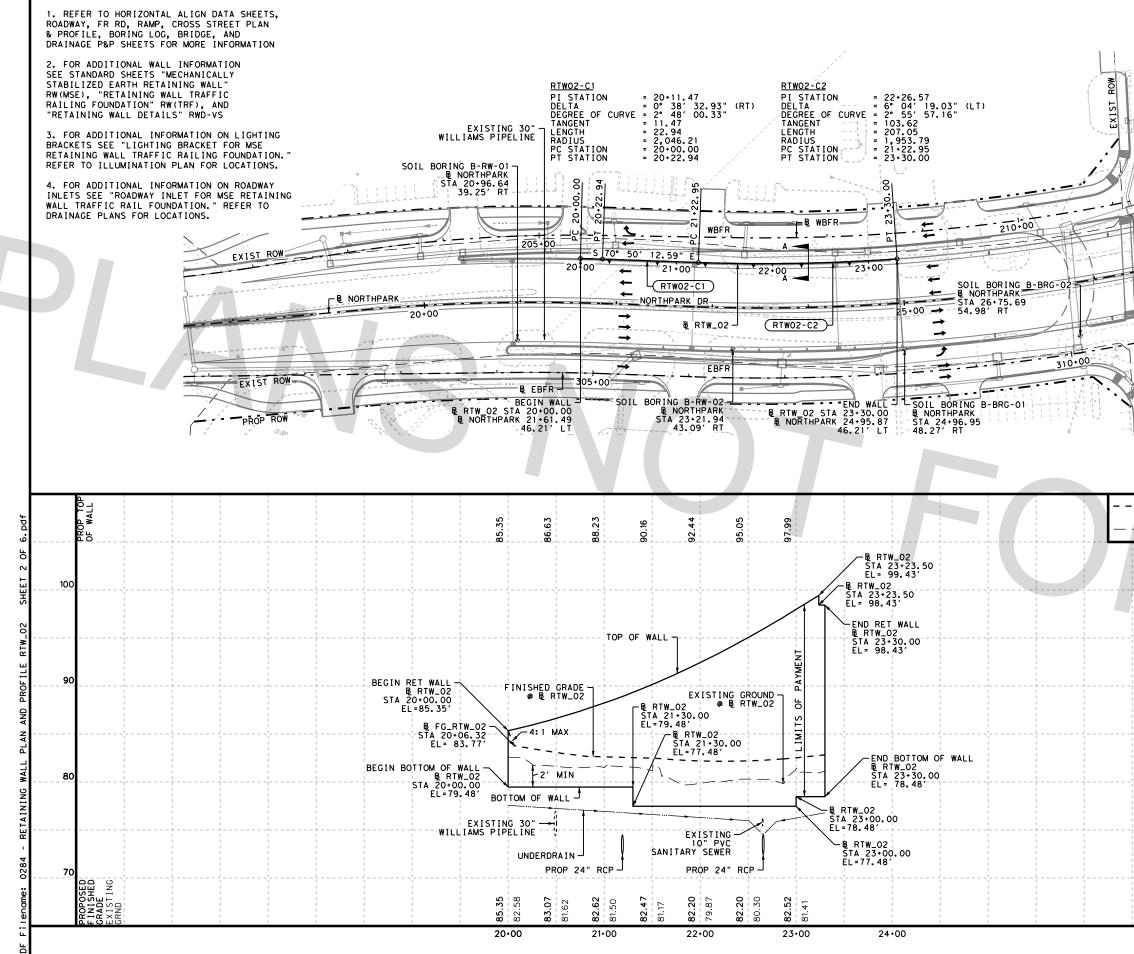
NOTES:

1. REFER TO HORIZONTAL ALIGN DATA SHEETS, ROADWAY, FR RD, RAMP, CROSS STREET PLAN & PROFILE, BORING LOG, BRIDGE, AND DRAINAGE P&P SHEETS FOR MORE INFORMATION

2. FOR ADDITIONAL WALL INFORMATION SEE STANDARD SHEETS "MECHANICALLY STABILIZED EARTH RETAINING WALL" RW(MSE), "RETAINING WALL TRAFFIC RAILING FOUNDATION" RW(TRF), AND "RETAINING WALL DETAILS" RWD-VS

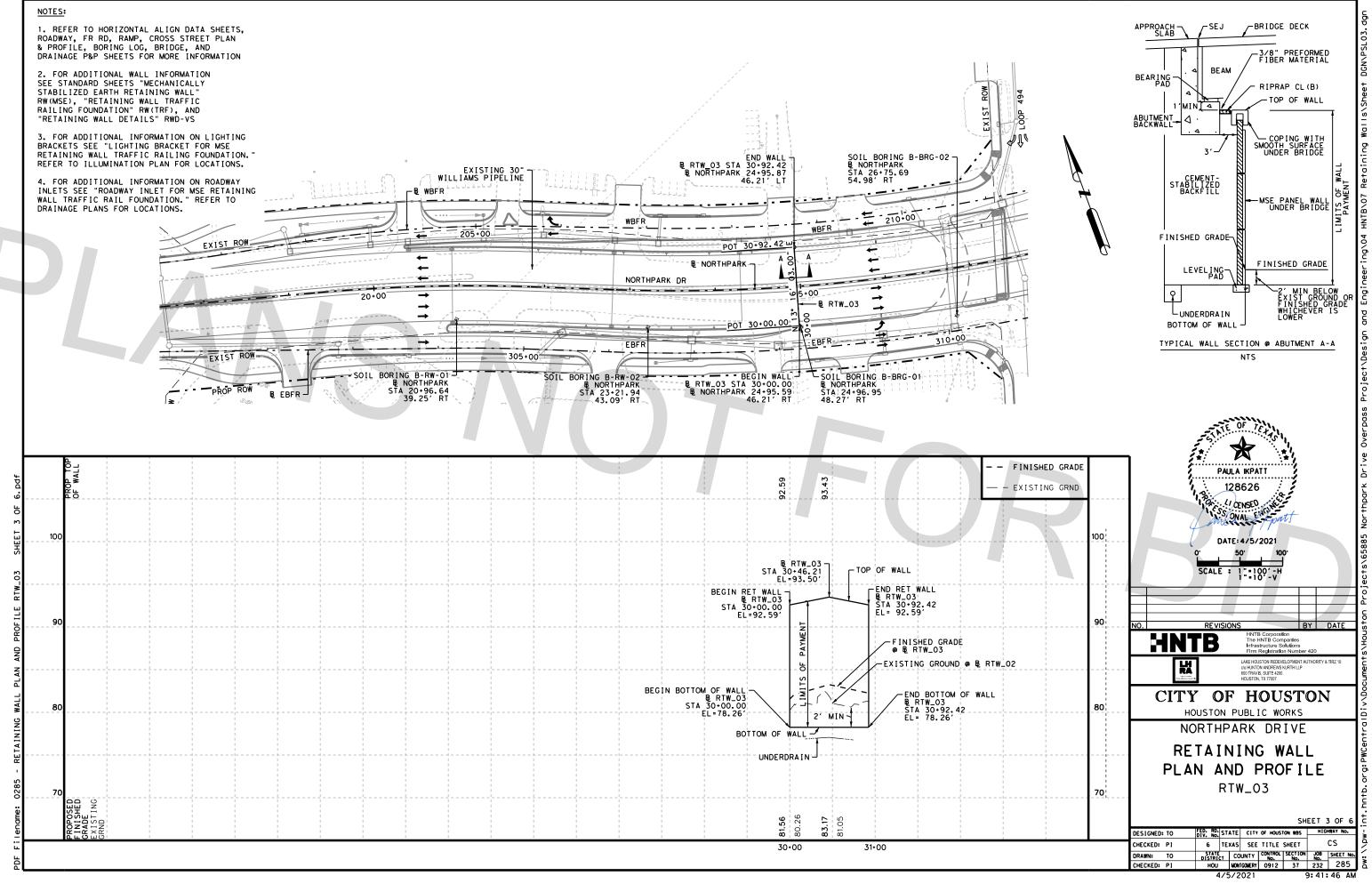


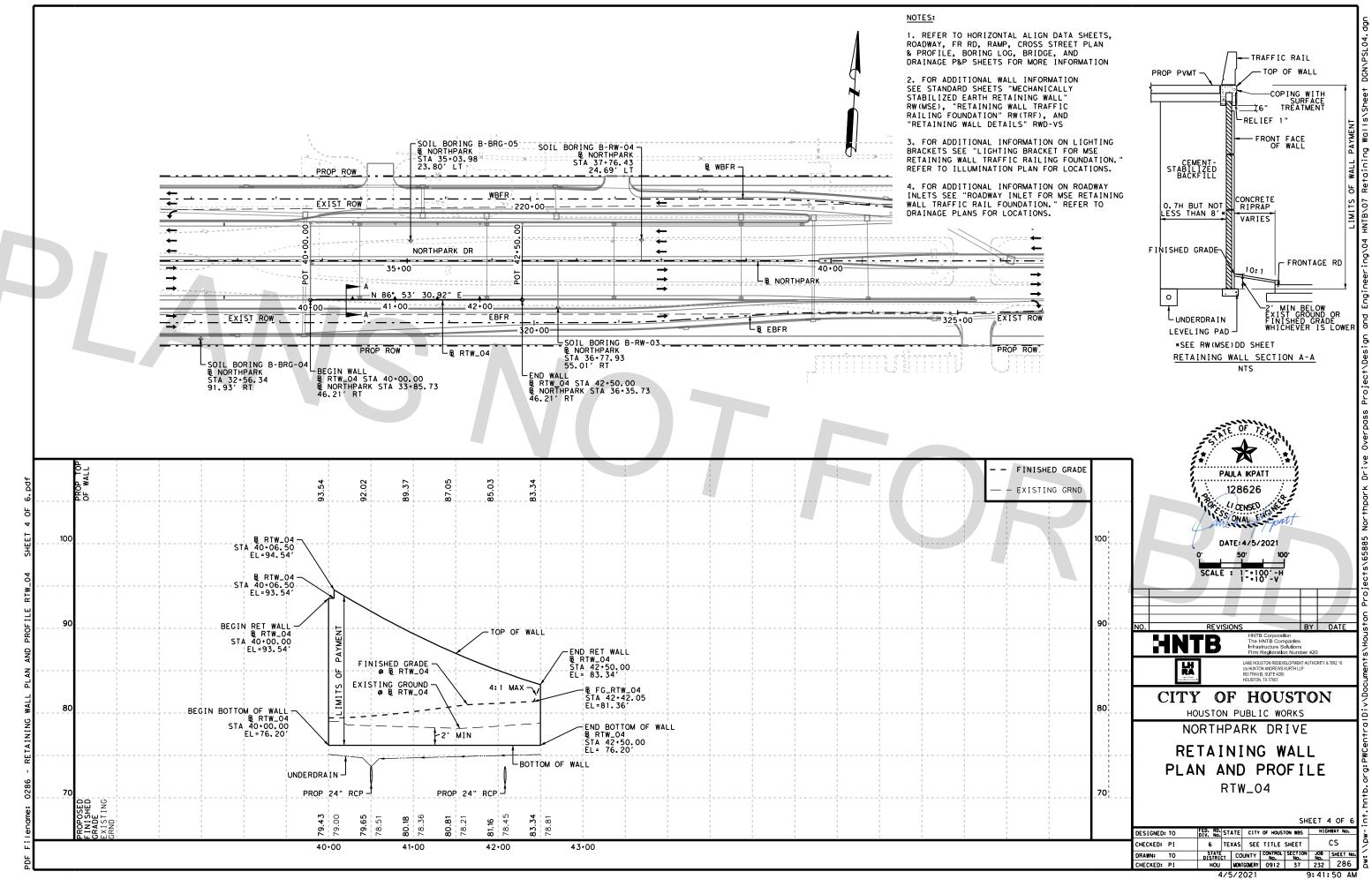
← TRAFFIC RAIL TOP OF WALL PROP PVMT COPING WITH SURFACE -RELIEF 1" Nal - FRONT FACE OF WALL OF WALL PA Retaining CEMENT-STABILIZED BACKFILL 0.7H BUT NOT L IMITS HNTB\07 FINISHED GRADE - FRONTAGE RD 10:1 0 -2' MIN BELOW EXIST GROUND OR FINISHED GRADE WHICHEVER IS LOWER LEVELING PAD -*SEE RW(MSE)DD SHEET RETAINING WALL SECTION A-A NTS X - FINISHED GRADE PAULA IKPATT EXISTING GRND 128626 4 CENSED ONAL ENGINE 100 DATE: 4/5/2021 50' 100 SCALE : 1 = 100'-H 90 BY DATE **REVISIO** HNTB The HNTB Companies Infrastructure Solutions Firm Registration Num LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007 벖 CITY OF HOUSTON 80 HOUSTON PUBLIC WORKS NORTHPARK DRIVE RETAINING WALL PLAN AND PROFILE RTW_01 70 SHEET 1 OF FED. RD. STATE CITY OF HOUSTON WBS HIGHWAY NO. DESIGNED: TO CS CHECKED: PI 6 TEXAS SEE TITLE SHEET STATE DISTRICT COUNTY CONTROL SECTION JOB SHEET NO. NO. NO. NO. HOU NONTCOMERY 0912 37 232 283 DRAWN: TO HECKED: 4/5/2021 9:41:39 AM

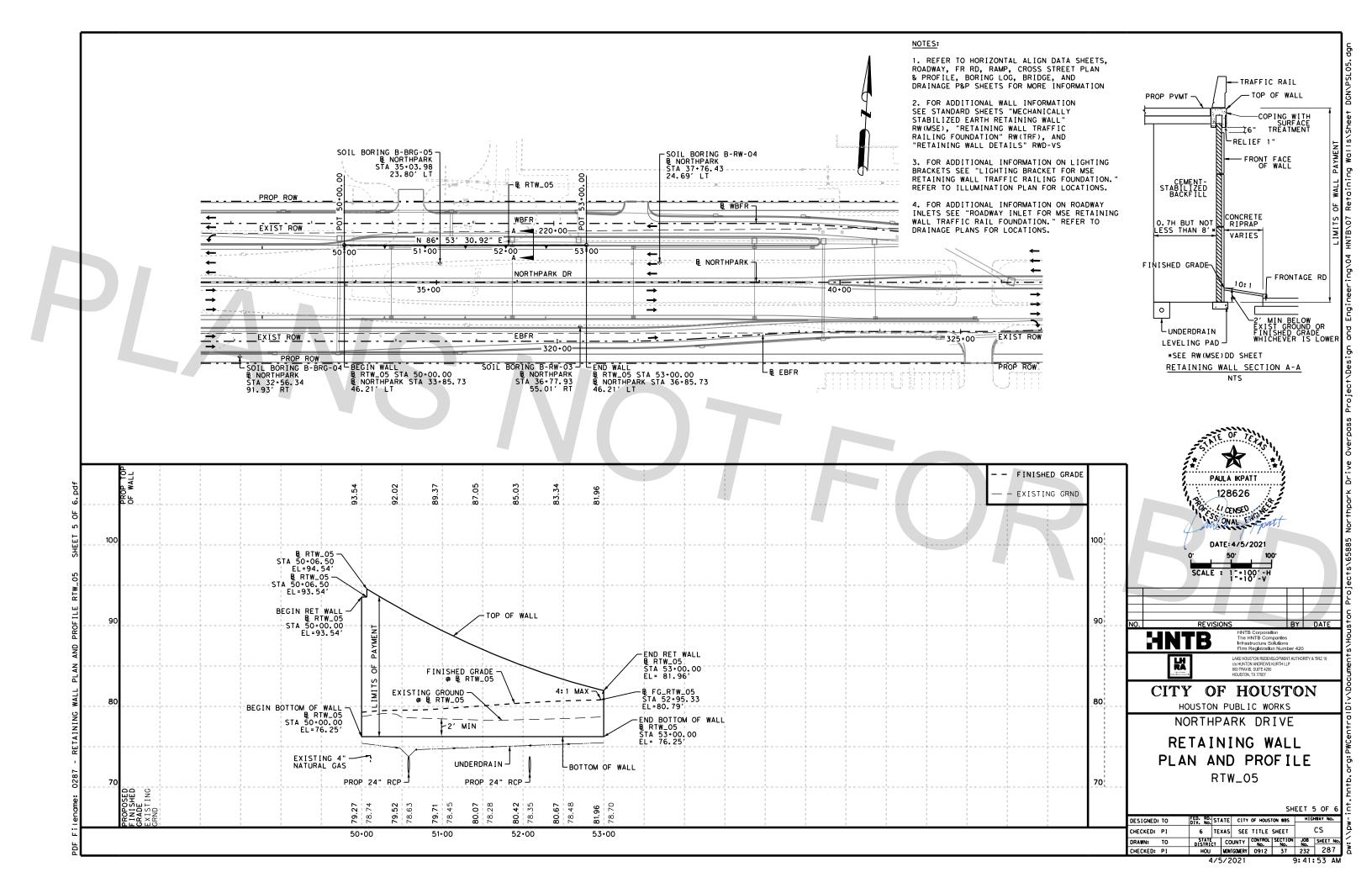


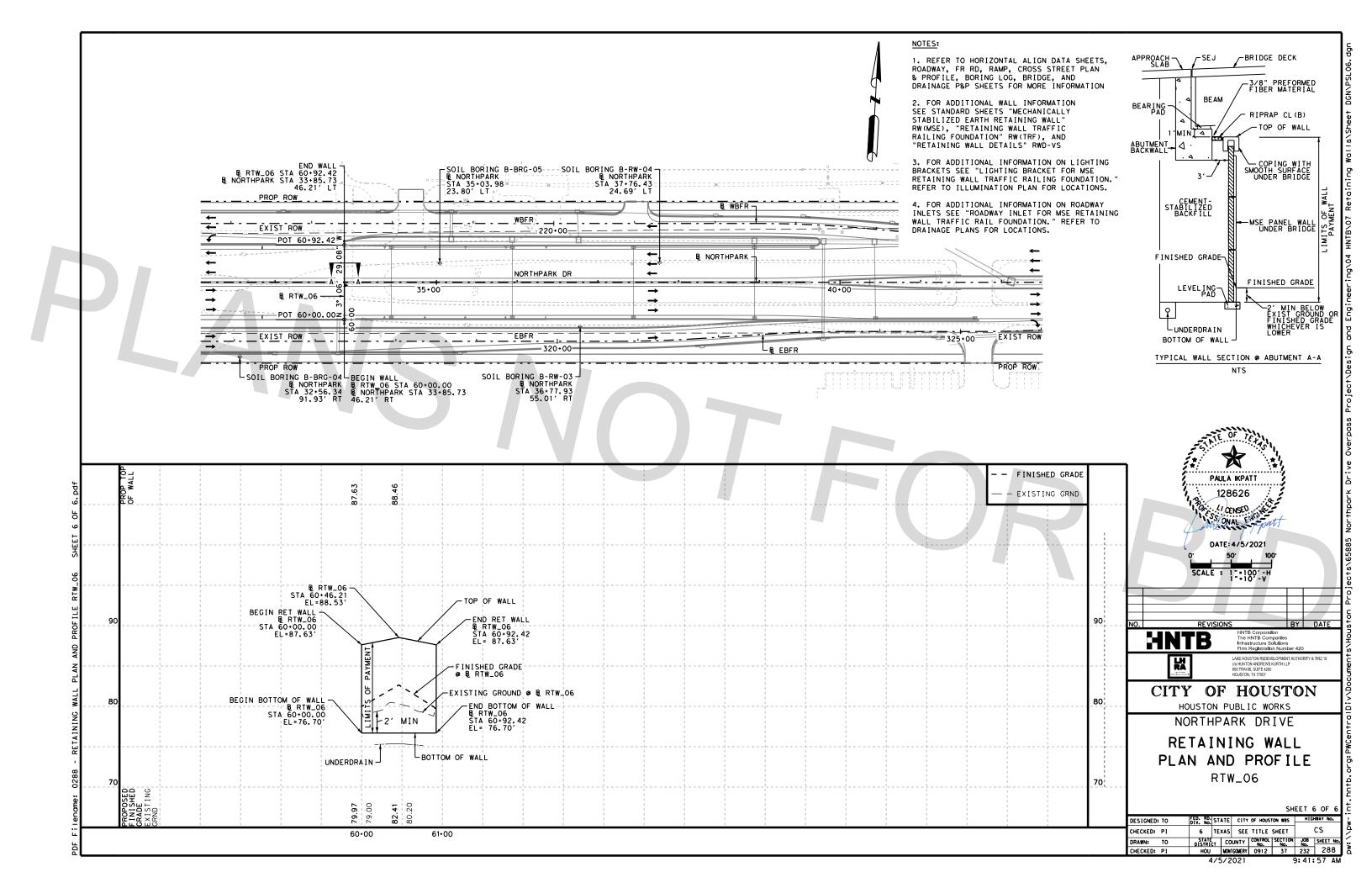
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← TRAFFIC RAIL TOP OF WALL PROP PVMT COPING WITH SURFACE COPING WITH -RELIEF 1" Nal - FRONT FACE OF WALL \$0€ OF WALL PA Retaining CEMENT-STABILIZED BACKFILL 0.7H BUT NOT LESS THAN 8' * L IMITS HNTB\07 FINISHED GRADE - FRONTAGE RD 10:1 0 -2' MIN BELOW EXIST GROUND OR FINISHED GRADE WHICHEVER IS LOWER LEVELING PAD -*SEE RW(MSE)DD SHEET RETAINING WALL SECTION A-A NTS ÕĒ X FINISHED GRADE PAULA IKPATT EXISTING GRND 128626 4 CENSED CENSEU SS ONAL ENGINE 100 DATE: 4/5/2021 50' 100 SCALE : 1 = 100'-H 90 BY DATE **REVISIO** HNTB The HNTB Companies Infrastructure Solutions Firm Registration Num LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007 벖 CITY OF HOUSTON 80 HOUSTON PUBLIC WORKS NORTHPARK DRIVE RETAINING WALL PLAN AND PROFILE RTW_02 70 SHEET 2 OF TED. RD. STATE CITY OF HOUSTON WBS HIGHWAY NO DESIGNED: TO CS CHECKED: PI 6 TEXAS SEE TITLE SHEET STATE DISTRICT COUNTY CONTROL SECTION JOB SHEET NO. NO. NO. NO. HOU MONTGOMERY 0912 37 232 284 DRAWN: TO CHECKED: PI 4/5/2021 9:41:43 AM











DRILLING LOG

RW-01

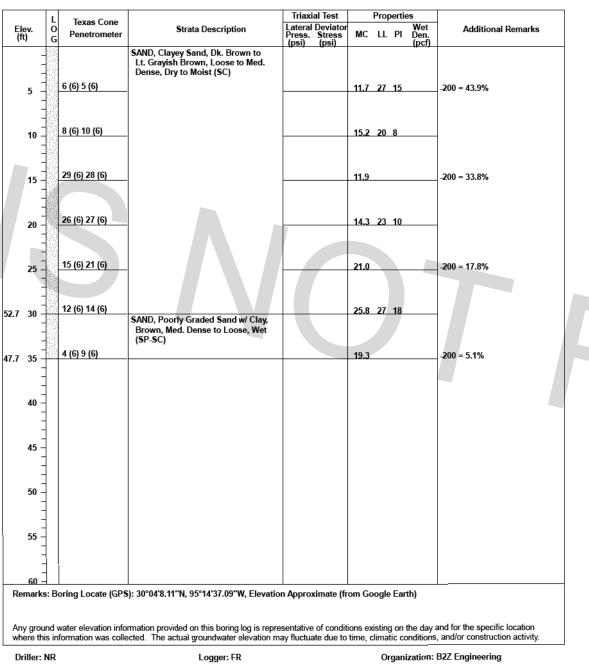
20+96.64

39.25 RT

County Montgomery Highway Northpark Drive C**S**J 0912-37-232

Hole Structure Station Offset

District RETAINING WALL Date Grnd. Elev. 82.73 ft GW Elev. 55.00 ft



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1 of 1

Houston

2-21-20



County Montgomery

C**S**J

Highway Northpark Drive

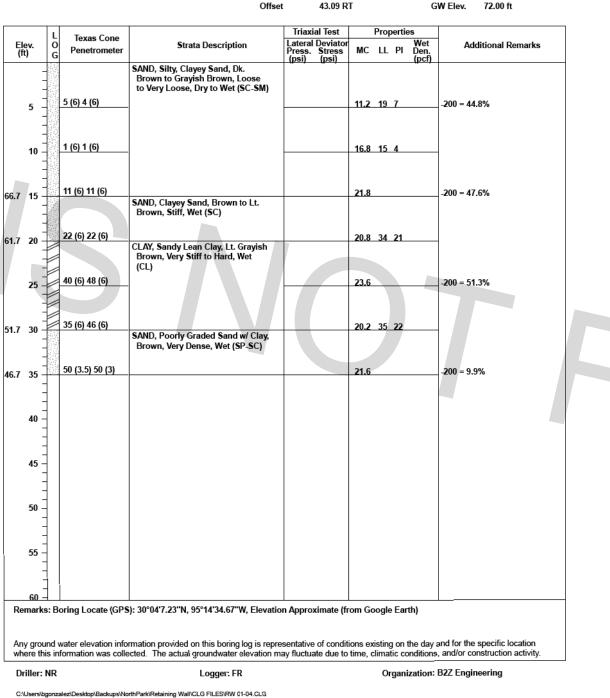
0912-37-232

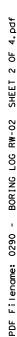
DRILLING LOG

RW-02 Hole RETAINING WALL Structure Station 23+21.94

District Houston Date 2-21-20 Grnd. Elev. 81.74 ft GW Elev. 72.00 ft

1 of 1





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Version 3.3

County Montgomery

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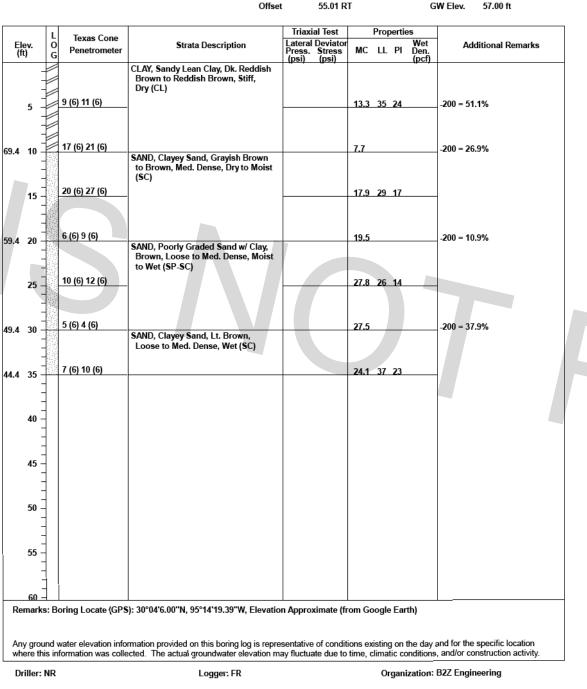
Highway Northpark Drive

0912-37-232

DRILLING LOG

RW-03 Hole RETAINING WALL Structure Station 36+77.93

District Houston Date 2-26-20 Grnd. Elev. 79.37 ft GW Elev. 57.00 ft



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Version 3.3

DRILLING LOG

RW-04 Hole RETAINING WALL Structure Station 37+76.43

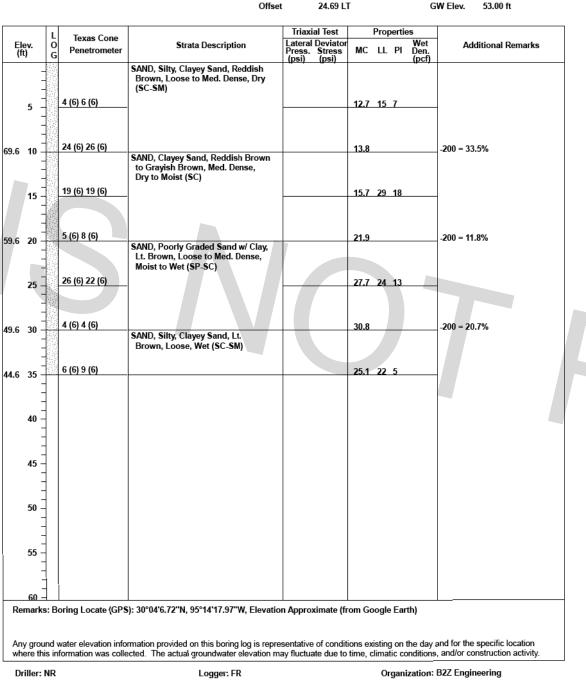
County Montgomery

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Highway Northpark Drive

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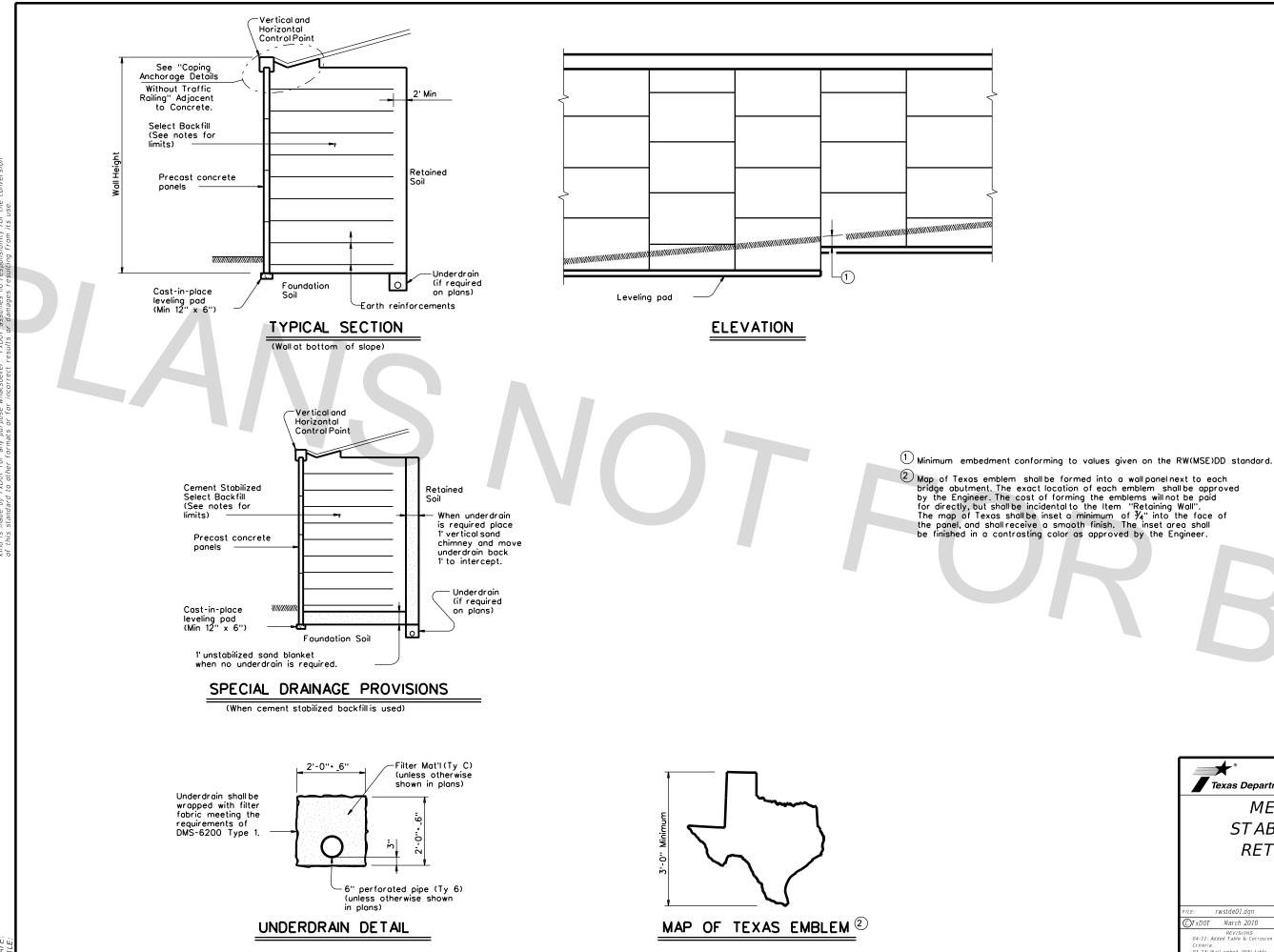
District Houston Date 2-26-20 Grnd. Elev. 79.58 ft GW Elev. 53.00 ft



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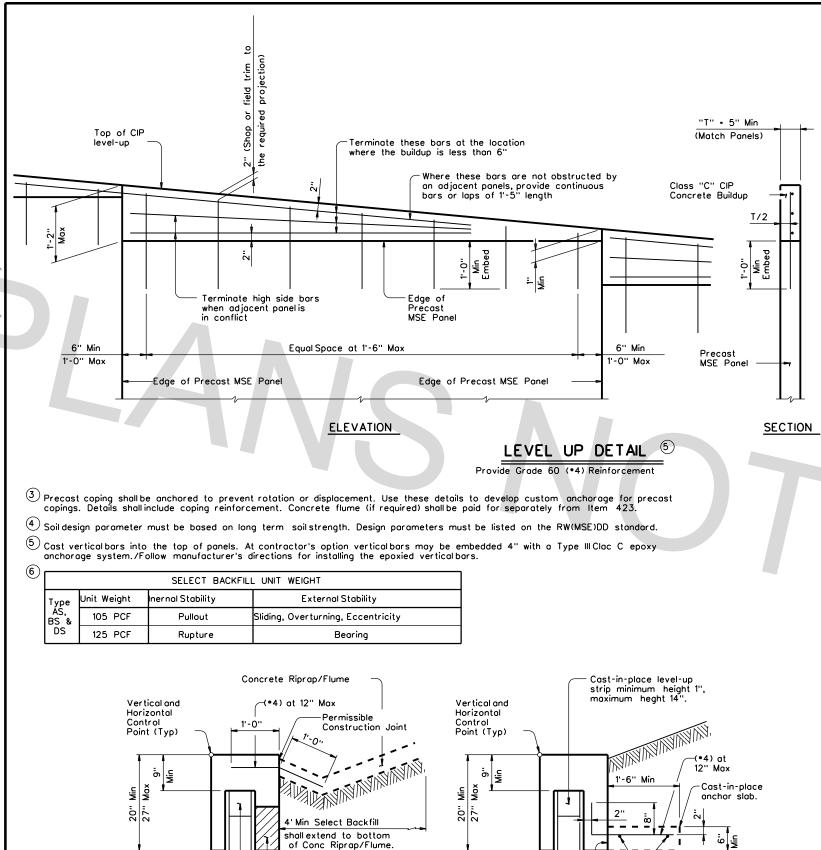
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			S	HEET 1 OF 2		
Texas Department	of Tra	nsp	ortation	Bridge Division Standard		
MECHANICALLY						
STABILIZED EARTH						
RETAINING WALL						
RW(MSE)						
FILE: rwstde01.dgn	DN: TXD	TC	CK: TXDOT DW:	JGD CK: MJG		
CTxDOT March 2010	CONT	SECT	JOB	HIGHWAY		
REVISIONS 04-11: Added Table & Corrosion	912 37 232			NP		
Criteria. 01-13: Wall embed. (WS) table.	DIST		COUNTY	SHEET NO.		
vi-is: wai embed, (ws) table, retained fill, soil strength.	HOU		MONTGOMER	Y 293		



This area of coping may be

4" overlap with top of panel.

Cast-in-place level-up

ADJACENT TO CONCRETE

(Excluding Concrete Pavement)

strip minimum height 1", maximum heght 14".

3 1/2"

Min

truncated to provide a minimum

COPING ANCHORAGE DETAILS WITHOUT TRAFFIC RAILING

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
Channe in sheet and seconds shell b	a la anandanan with averant AASUTO Standard

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 $\frac{3}{4}$ 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 wallbackfill.

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 $\frac{3}{6}$ " and $\frac{3}{4}$ ".

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.

4) Spaced

3

as shown

Permissible

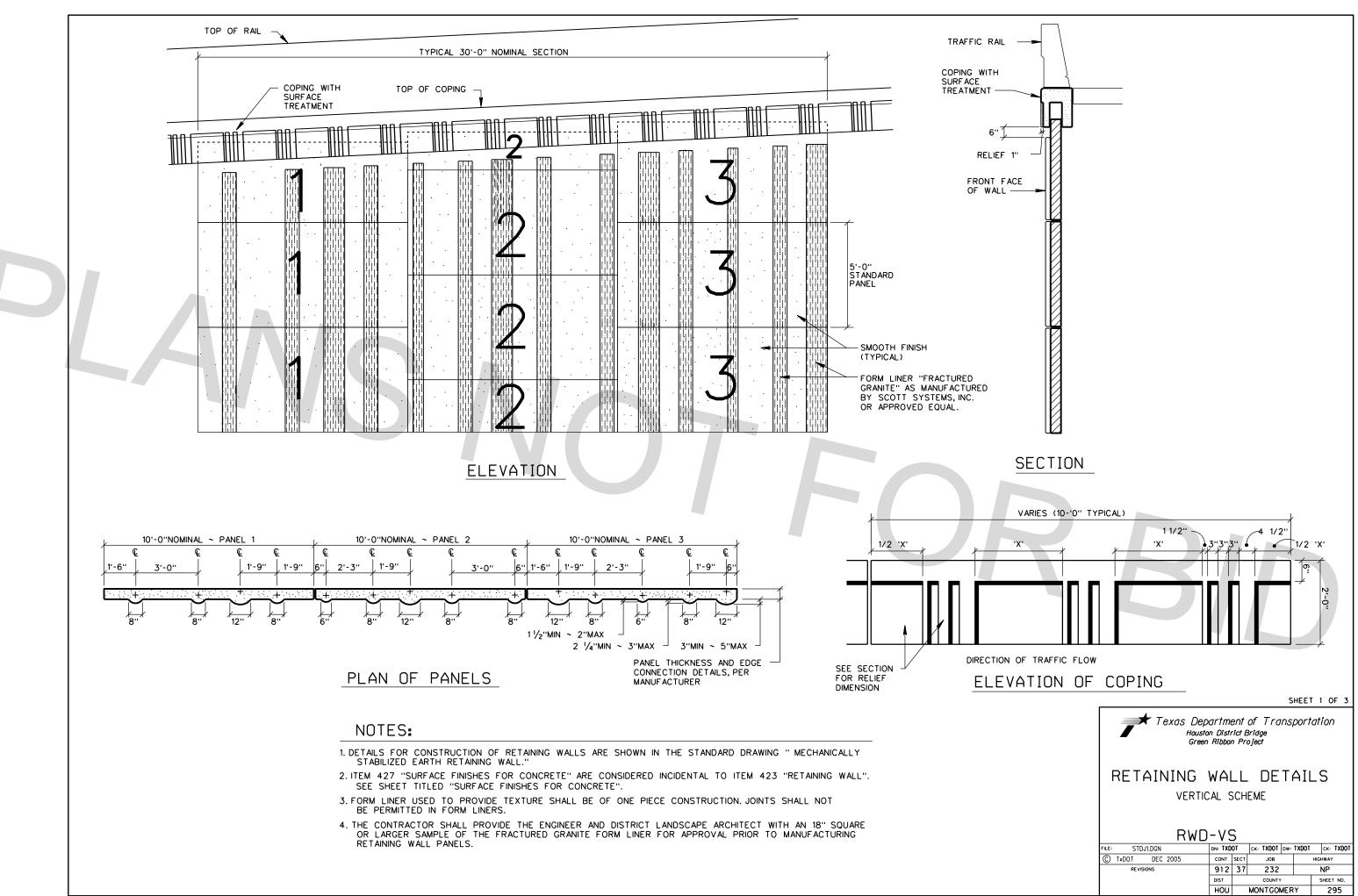
ADJACENT TO SOIL

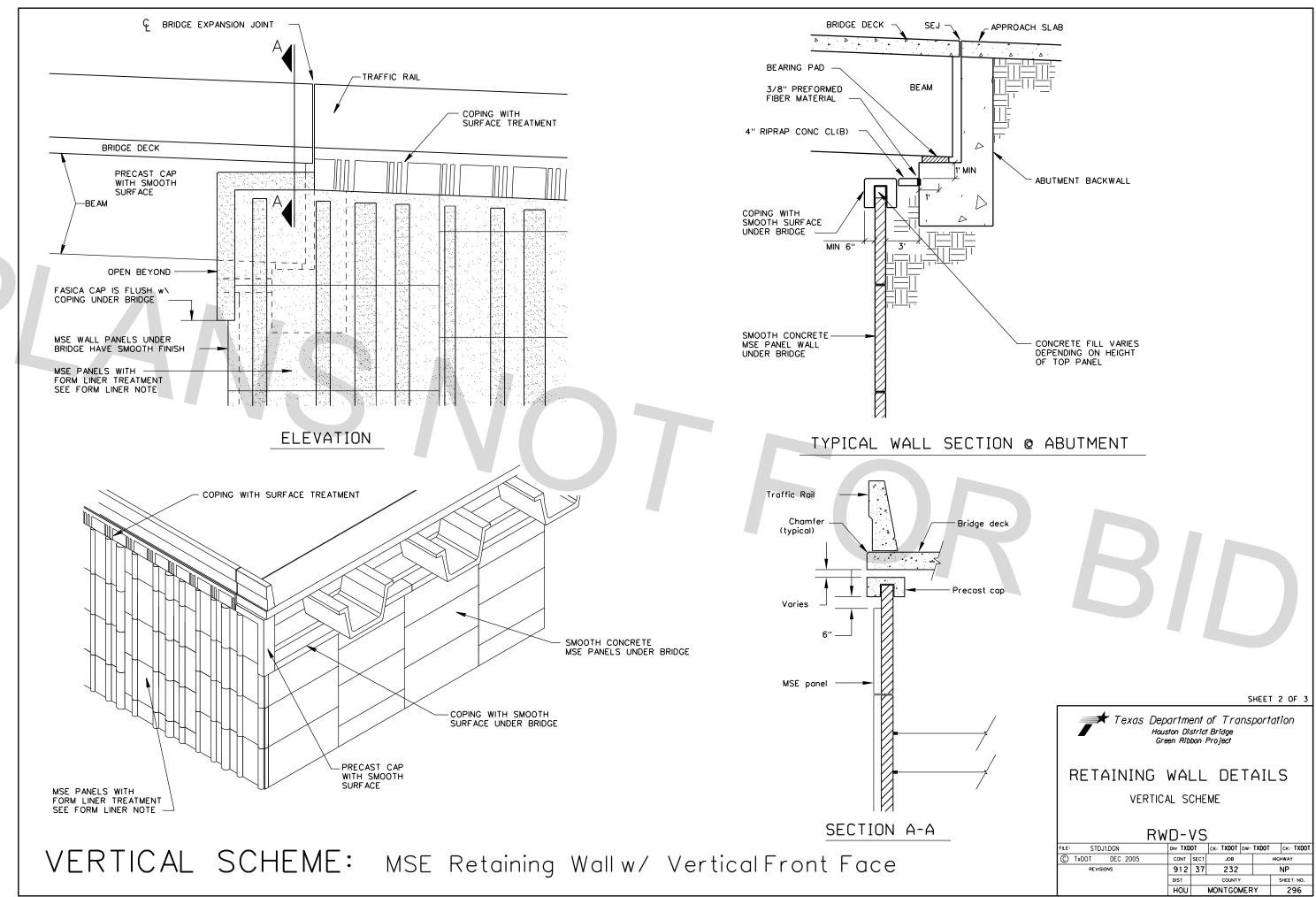
Construction Joint

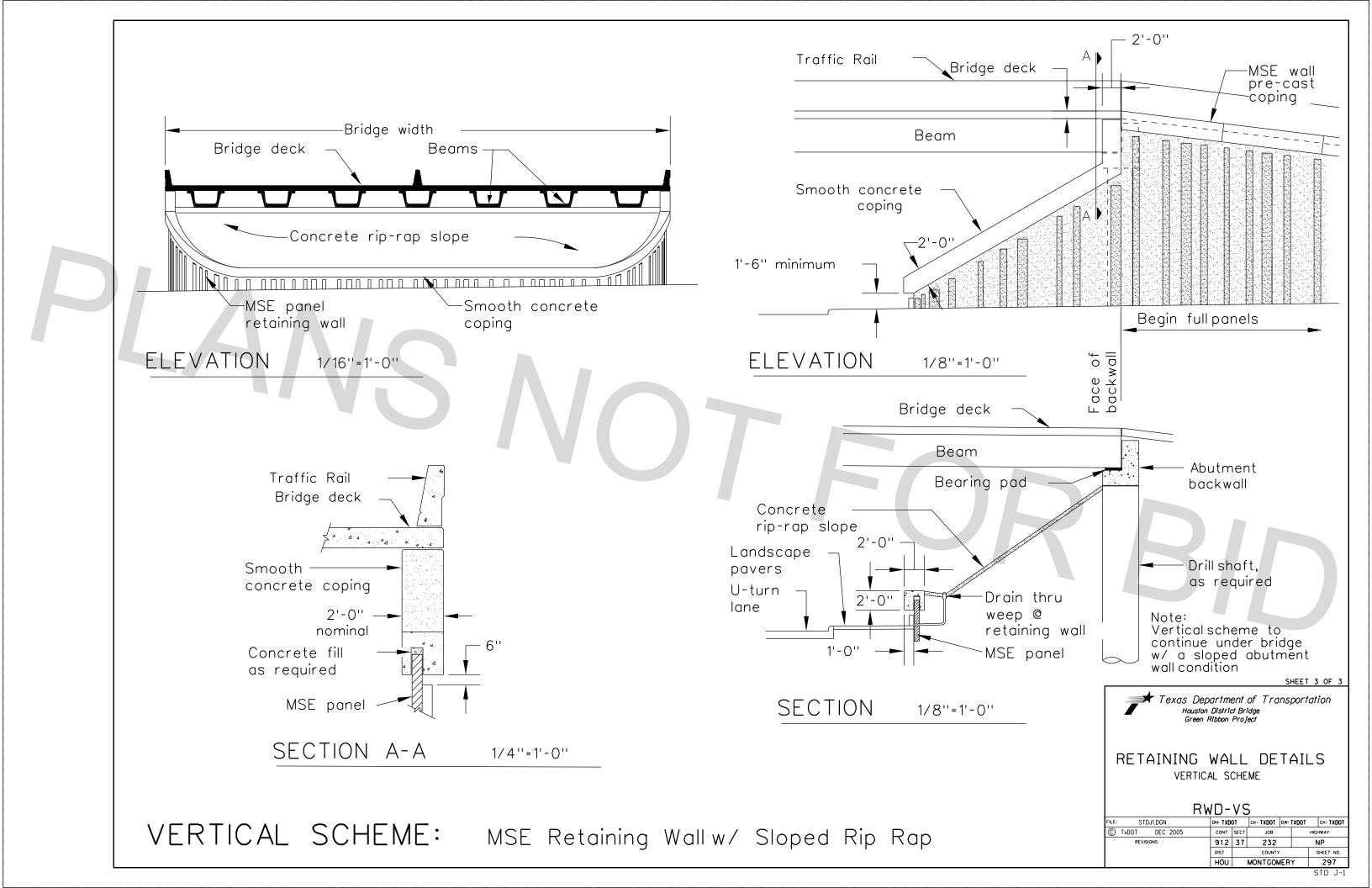
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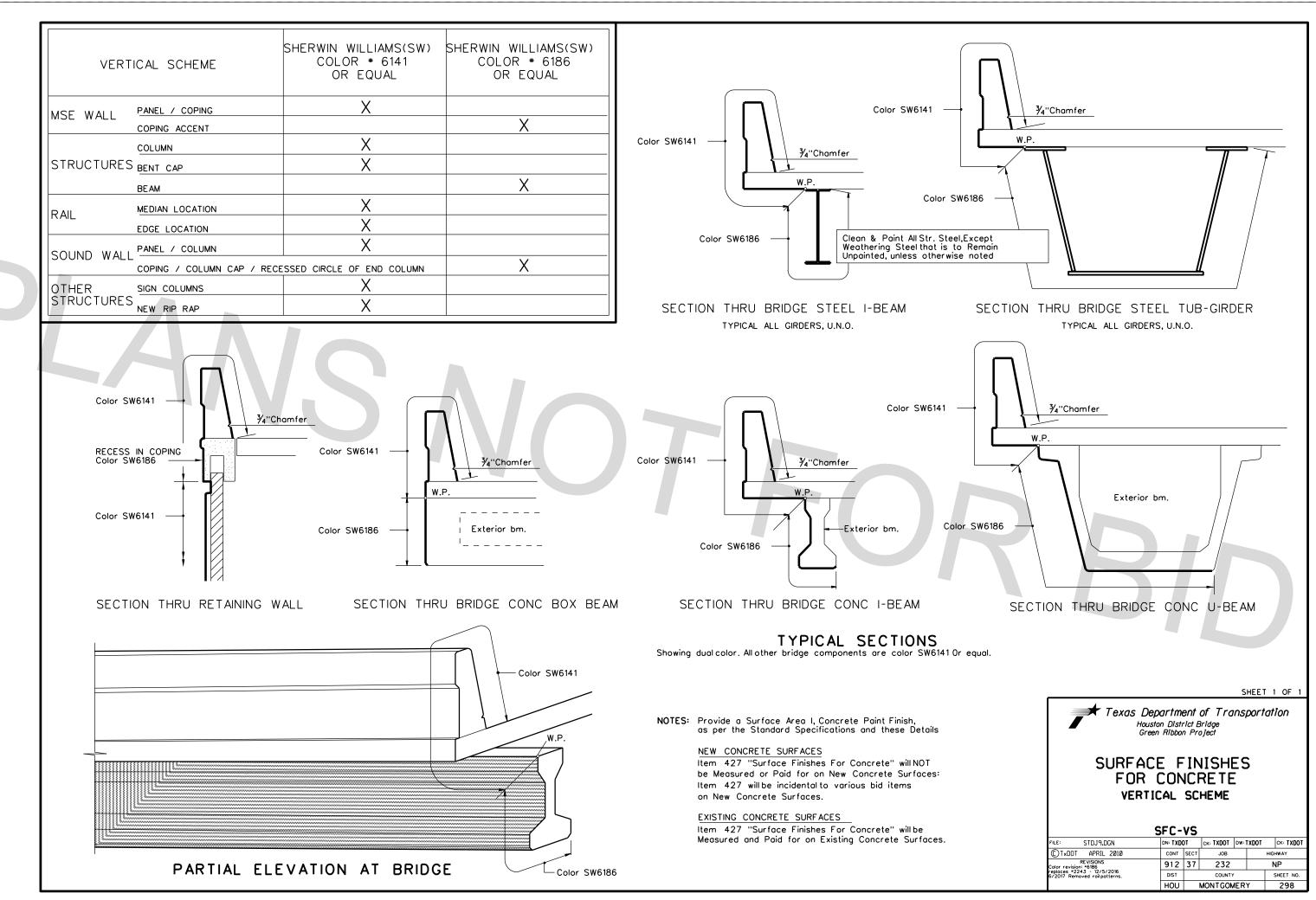
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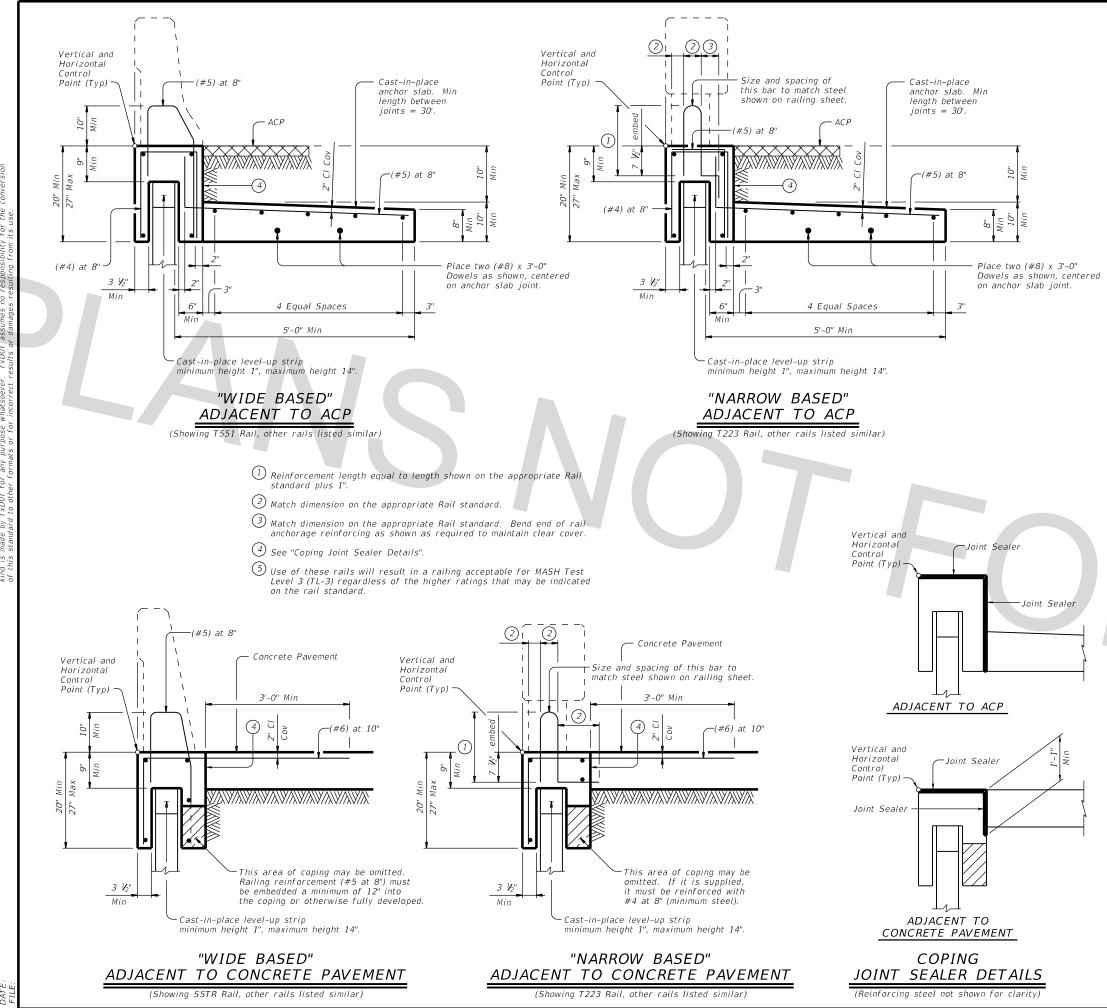
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CTxDOT March 2010	CONT	SECT	JOB		HIGHWAY		
REVISIONS 04-11: Added Table & Corrosion	912	37	232		NP		
Criteria. 01-13: Wall embed, (WS) table,	DIST		COUNTY		SHEET NO.		
retained fill, soil strength.	HOU		MONTGON	IERY	294		











ISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any the use of this standard is governed by the "Texas Engineering from its use and is made by TxDDT for any purpose whatsoever. TxDDT assumes no responsibility for the convers if this standard to other formals or for incorrect results or damages resulting from its use.

Rail Type (5)	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
Т66	NARROW	NO
SSTR	WIDE	YES

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

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.

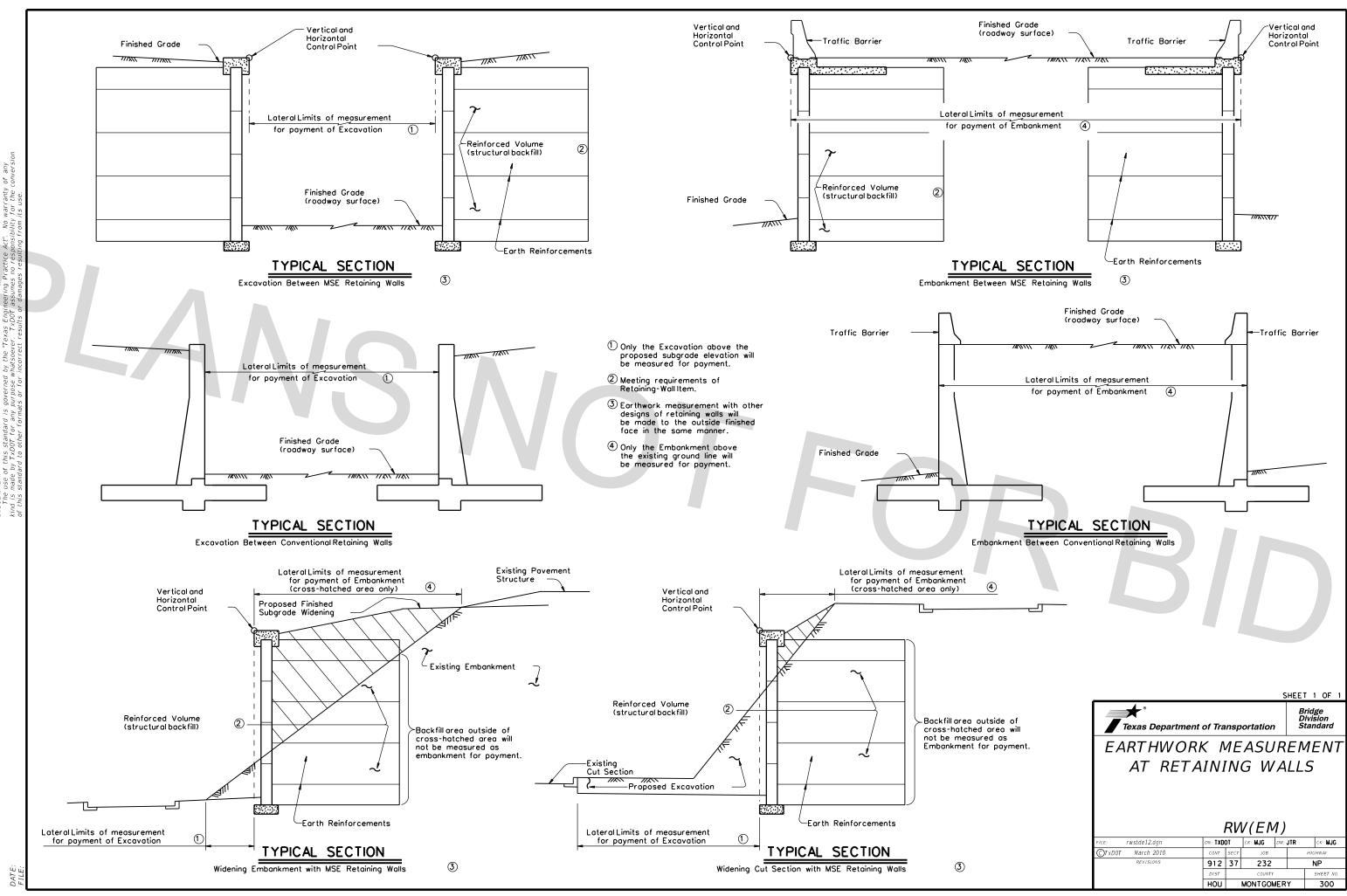
The Contractor's attention is directed to the fact that various configurations of precast coping/railing combinations are covered by patent. The contractor must provide for use of these systems in accordance with Article 7.3. Provide Class C concrete ($f'_{r=3}$ 600 psi)

Provide Class C concrete (f'c=3,600 psi). Provide Grade 60 reinforcing steel.

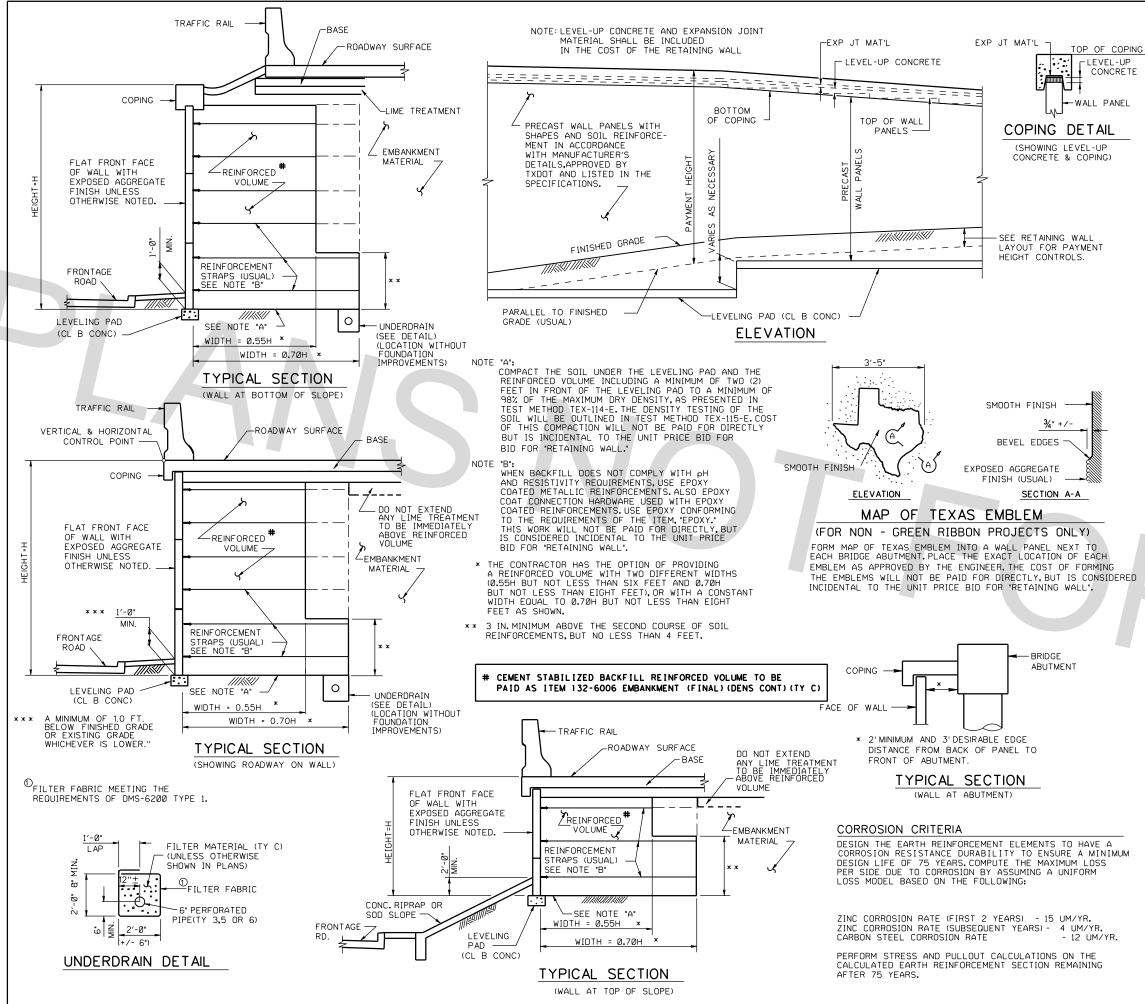
Provide (#4) longitudinal bars, unless otherwise shown.

Coping and anchor slabs are considered subsidiary to Item 423 "Retaining Wall". Payment for traffic railing is per the linear foot for the appropriate railing type.

			S	HEET 1 OF 1		
Texas Department	of Tra	nsp	ortation	Bridge Division Standard		
RETAINING WALL						
TRAFI	TRAFFIC RAILING					
FOU	FOUNDATIONS					
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©TxDOT March 2010	CONT	SECT	JOB	HIGHWAY		
REVISIONS 01-13: Precast option with Rails.	912	37	232	NP		
03-18: Cast-In-Place Copings, railing construction and expansion joints.	DIST	DIST COUNTY SHE				
02-20: Note 5 added for precast rail option.	HOU		MONTGOMER	Y 299		



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NOTES

RAILING AND ROADWAY SLAB ARE PAID FOR UNDER THE APPROPRIATE ROADWAY ITEMS. MODIFICATIONS TO THE RAIL OR ROADWAY SLAB TO FORM COPING ARE CONSIDERED INCIDENTAL TO THE SQUARE FOOT COST OF THE BID ITEM. "RETAINING WALL".

PLACE THE UPPERMOST REINFORCEMENT STRAPS NO MORE THAN 3.5' BELOW THE TOP OF THE WALL, PLACE THE LOWEST LEVEL OF REINFORCEMENT STRAPS NO MORE THAN 2.0' ABOVE THE TOP OF THE LEVELING PAD.

PROVIDE UNDERDRAINS ONLY AT LOCATIONS SHOWN ON THE PLANS. INCLUDE THE COST OF FURNISHING AND INSTALLING UNDERDRAINS IN THE UNIT PRICE BID FOR "RETAINING WALL."

THE REINFORCED VOLUME CONSISTS OF CEMENT STABILIZED BACKFILL IN ACCORDANCE WITH ITEM 132 AND HOUSTON DISTRICT SPECIAL PROVISION (132-001).

PAYMENT HEIGHT SHOWN IN RETAINING WALL LAYOUTS IS CONSIDERED THE MINIMUM HEIGHT TO BE FURNISHED. ADDITIONAL WALL FURNISHED BELOW PAYMENT LINE DUE TO DETAILING OR FABRICATOR DESIGN REQUIREMENTS WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED INCIDENTAL. THE CONTRACTOR MAY USE A DIFFERENT TYPE OF TRAFFIC RAIL AND COPING ON RETAINING WALLS IF THE DESIGN AND DETAILS ARE APPROVED BY THE ENGINEER.

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 STEEL AREA OF SOIL REINFORCEMENTS AS THAT REQUIRED IN THE ABSENCE OF THE OBSTRUCTION. 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.

DESIGN PARAMETERS

BASE RETAINING WALL DESIGN ON THE FOLLOWING DESIGN PATTERNS:

EMBANKMENT MATERIAL (BEHIND CEMENT STABILIZED BACKFILL) CEMENT STABILIZED BACKETLL

UNIT WEIGHT - 125 PCF Ø 30°C = Ø PSF KA = 0.333

UNIT WEIGHT = 125 PCF Ø 45℃ = Ø PSE

ALLOWABLE STRESSES IN STEEL AND CONCRETE ARE IN ACCORDANCE WITH CURRENT A.A.S.H.T.O. AND INTERIM SPECIFICATIONS.

THE MINIMUM LENGTH OF REINFORCEMENT STRAPS FOR A 0.55H STEP WALL IS SIX FEET AND FOR A 0.70H WALL IS EIGHT FEET.

EXTERNAL STABILITY CRITERIA

PROVIDE A FACTOR OF SAFETY IN SLIDING ALONG THE BASE OF THE STRUCTURE OF GREATER THAN OR EQUAL TO 1.5. PROVIDE A FACTOR OF SAFETY IN OVERTURNING OF GREATER THAN OR EQUAL TO 2.0.

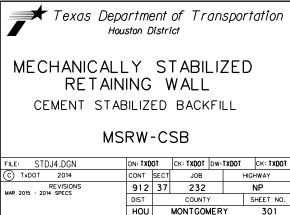
THE MAXIMUM ALLOWABLE BEARING PRESSURE IS 1/2 THE ULTIMATE BEARING CAPACITY OF THE FOUNDATION.

THE WIDTHS SHOWN HEREIN ARE CONSIDERED MINIMUM UNLESS A LARGER WIDTH IS SPECIFIED ON THE WALL PLANS OR REQUIRED BY THE FABRICATOR'S DETAILS.

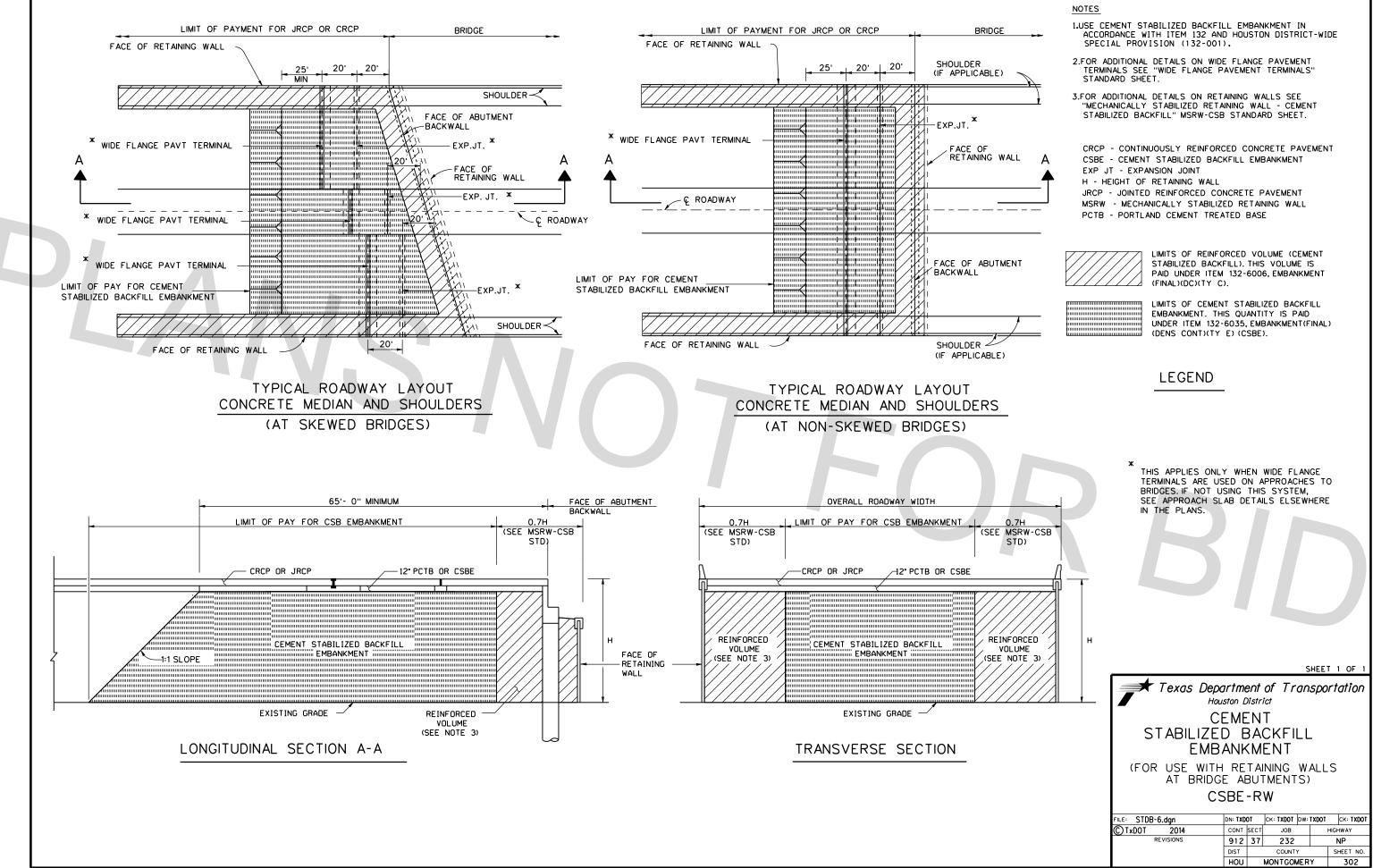
ENSURE THE BASE PRESSURE RESULTANT FALLS WITHIN THE MIDDLE THIRD OF THE RETAINING WALL.

PROVIDE A FACTOR OF SAFETY AGAINST PULLOUT OF THE EARTH REINFORCEMENTS OF GREATER THAN OR EQUAL TO 1.5 AT EACH LEVEL DETERMINE PULLOUT RESISTANCE FROM TEST DATA EVALUATED AT%INCH STRAIN.

SHEET 1 OF

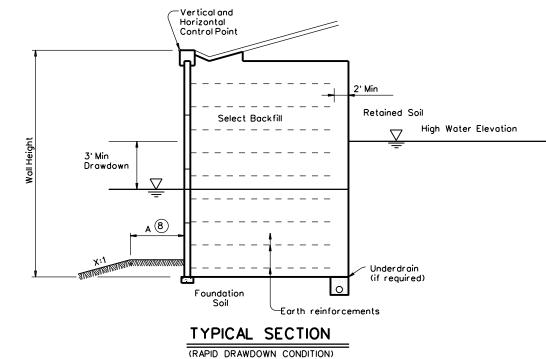


STD J-4



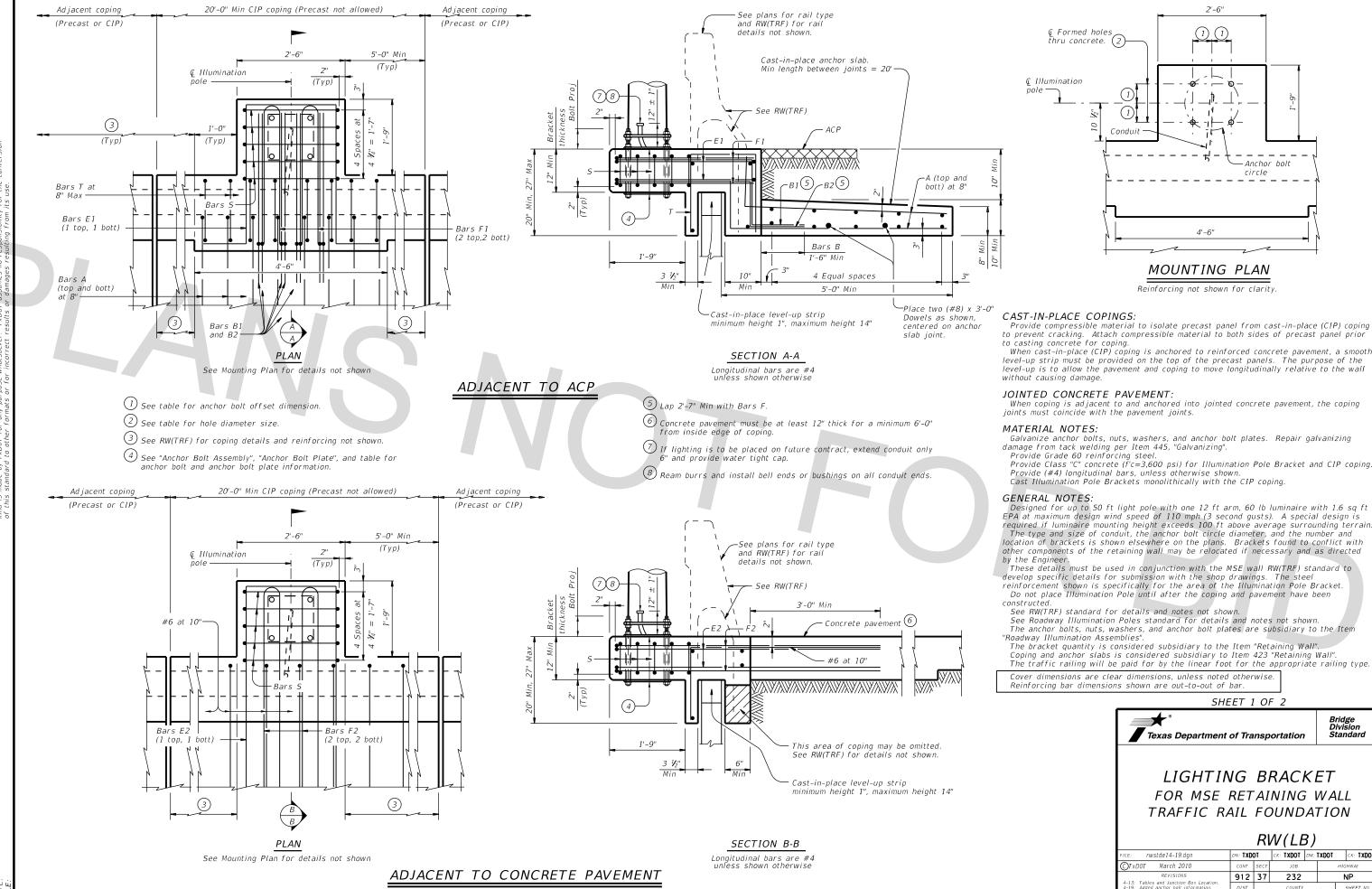


				WALL SUN	MARY						
MSE Retaining Wall	Begin Station	End Station	Retained Soil Friction Angle	Foundation Soil Friction Angle 2	Ground Improvement 3	Min Earth Reinforcement Length 4	Min Wall Embedment 7	Under drain Requir ed 5	Drawdown Analysis 6	Bench Width 8	
RTW 01	ALL	ALL	30 Degrees	30 Degrees	Not Required	8' or 70% Wall Ht	2'	Yes	Not Required	2'	
	ALL	ALL	30 Degrees	30 Degrees	Not Required	8' or 70% Wall Ht	2'	Yes	Not Required	2'	
	ALL	ALL	30 Degrees	30 Degrees	Not Required	8' or 70% Wall Ht	2'	Yes	Not Required	2'	
RTW_04	ALL	ALL	30 Degrees	29.5 Degrees	Not Required	8' or 70% Wall Ht	2'	Yes	Not Required	2'	
RTW_05	ALL	ALL	30 Degrees	29.5 Degrees	Not Required	8' or 70% Wall Ht	2'	Yes	Not Required	2'	
	ALL	ALL	30 Degrees	29.5 Degrees	Not Required	8' or 70% Wall Ht	2'	Yes	Not Required	2'	
Verti Horiz Cont	cal and ontal ol Point	//		are applic	able.	tated soil design require					
				C Retained experience	and Foundation fricti e or measured/corre	on angle listed should l lated long term streng	pe based on local gth values.			SPECIAL NOTES: This sheet is to be filled out by the	; wall
Y`		2' Min		(3) Indicate if as require informatio	f ground improvemen ed, refer to Ground li	t is required or not rec mprovement Detail(s) fo	uired. If shown or additional			This sheet is to be filled out by the designer of record at time of plan pre to provide soilstrength parameters fo design of the specified walls. The completed sheet shall be signed and dated by a licensed Professional E	paration r the



- 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.
- $^{\textcircled{6}}$ Indicate if rapid drawdown analysis is required.
- 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 $X \ge 4$. or A • 4.0' Min for $X \le 4$. Applicable to both drawdown and dry condition.

					SHE	ET 1 OF 1
	Texas Department	of Tra	nsp	ortation		Bridge Division Standard
MARK McCLELLAND	MECH ST ABILI RET AI DES	'ZE NIN	D VG	EAF	RT F ALL	-1
13 CENSED Willard		<u> </u>		SE)D		
DATE: 4/1/2021	FILE: rwstde16.dgn	DN: TXD	_		DW: BWH	ск: ЈМН
B2Z ENGINEERING	©TxDOT January 2013	CONT	SECT	JOB		HIGHWAY
REGISTRATION NUMBER F-11187	REVISIONS	912	37	232		NP
		DIST		COUNTY		SHEET NO.
		HOU		MONTGOM	ERY	303



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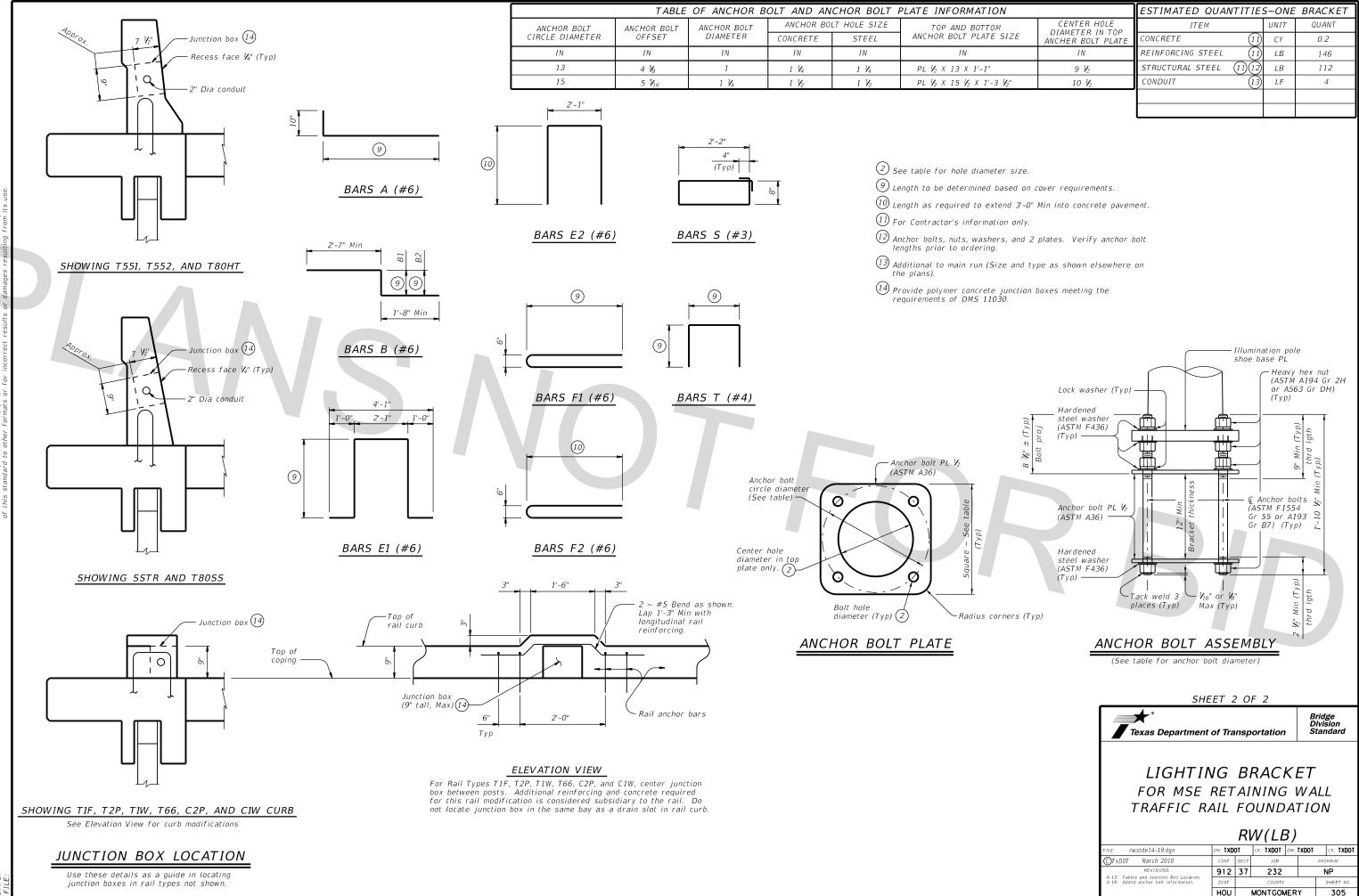
Provide compressible material to isolate precast panel from cast-in-place (CIP) coping to prevent cracking. Attach compressible material to both sides of precast panel prior

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

Provide Class "C" concrete (f'c=3,600 psi) for Illumination Pole Bracket and CIP coping.

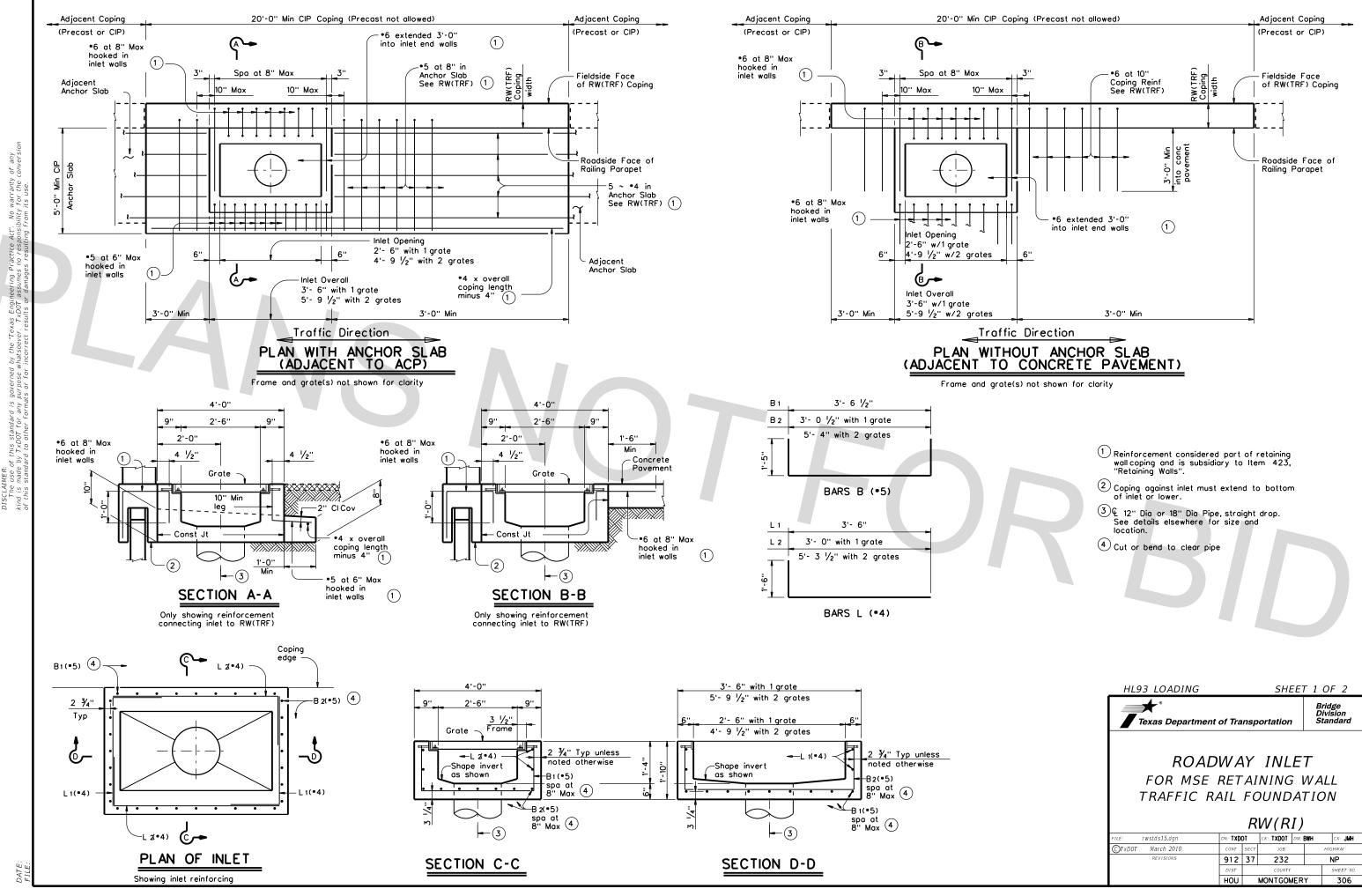
required if luminaire mounting height exceeds 100 ft above average surrounding terrain. The type and size of conduit, the anchor bolt circle diameter, and the number and location of brackets is shown elsewhere on the plans. Brackets found to conflict with other components of the retaining wall may be relocated if necessary and as directed

SHEET 1 OF 2						
Texas Department of Transportation Standard						
LIGHTING BRACKET FOR MSE RETAINING WALL TRAFFIC RAIL FOUNDATION RW(LB)						
FILE: rwstde14-19.dgn	DN: TXD	OT	CK: TXDOT DW:	TXDOT	CK: TXDOT	
CTxDOT March 2010	CONT	SECT	JOB	H	IIGHWAY	
REVISIONS 4-13: Tables and Junction Box Location.	912 37 232				NP	
4-15: Tables and Junction Box Edication. 4-19: Added anchor bolt information.	DIST	DIST COUNTY			SHEET NO.	
	HOU		MONTGOMER	Y	304	

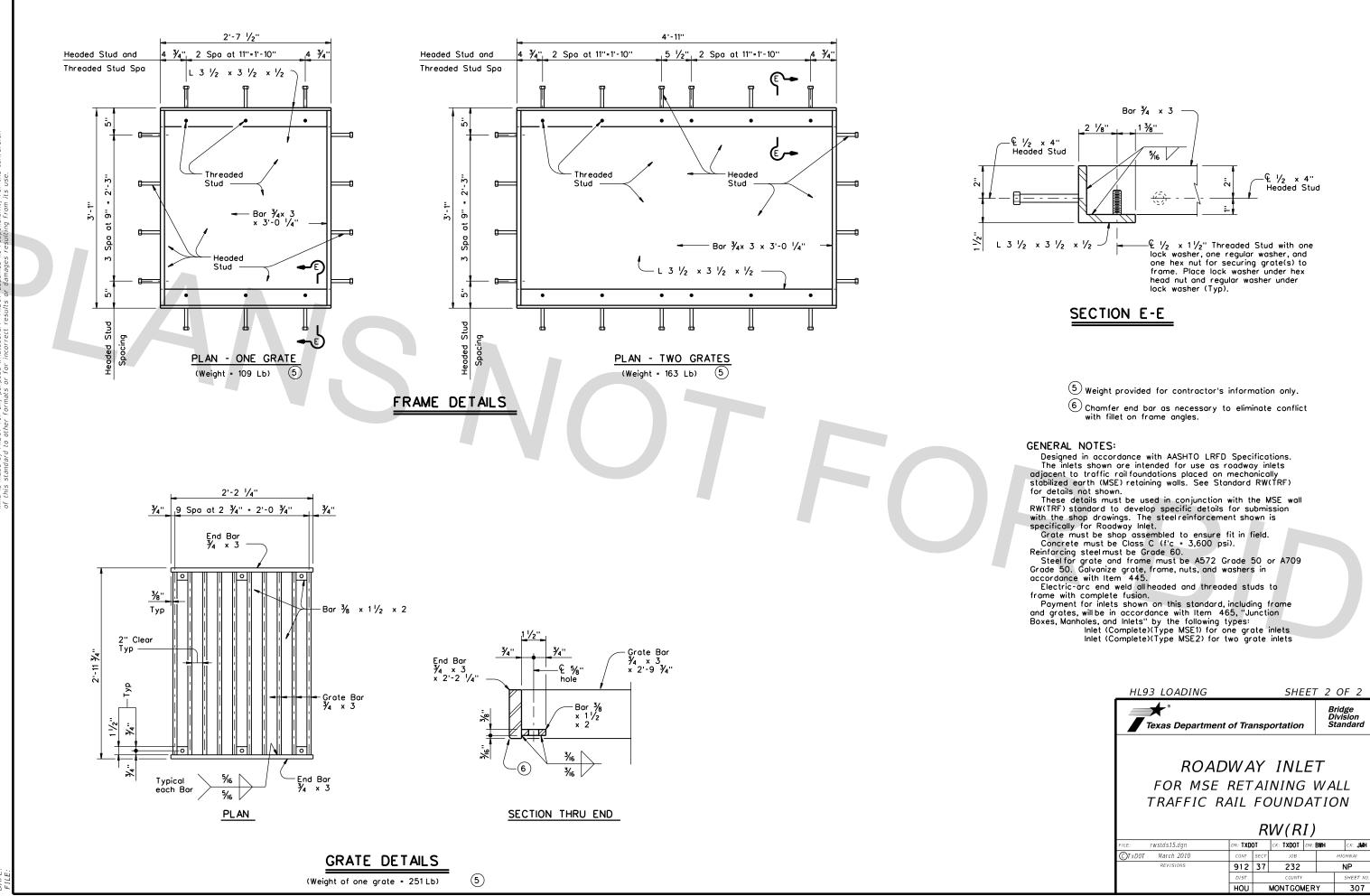


No warranty of any lity for the conversion respons TXDOT assumes no r g urt DISCLAIMER: The use of this standard is kind is made by TxDOT for any

ON		ESTIMATED QUANTITIES	S~ONE	BRACKET
ОМ	CENTER HOLE DIAMETER IN TOP	ITEM	UNIT	QUANT
e size	ANCHER BOLT PLATE	CONCRETE (11)	СҮ	0.2
	IN	REINFORCING STEEL (11)	LB	146
	9 ½	STRUCTURAL STEEL (11)(12)	LB	112
-3 ½"	10 ¥2	CONDUIT (13)	LF	4



Pract ing asst x DOT as this stan ' TxDOT 1



No warranty of any lity for the conversio neering Pract assumes no r exas Engin r. TxDOT on d DISCLAIMER: The use of this standard is kind is made by TXDOT for any