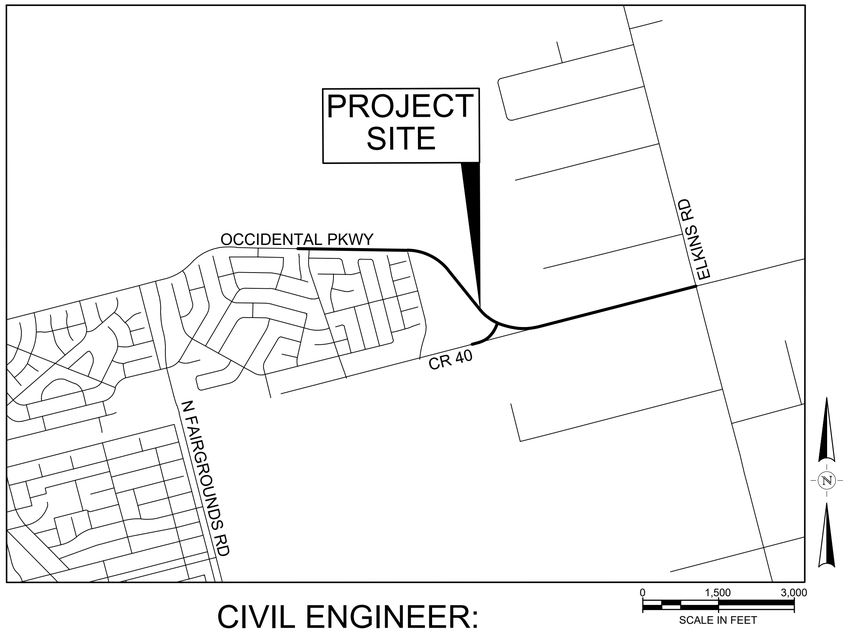
OCCIDENTAL PARKWAY EXTENSION TO ELKINS ROAD

PROJECT NO. P22-05

CITY OF MIDLAND, TEXAS
MIDLAND COUNTY

OCCIDENTAL PARKWAY
DESIGN SPEED: 45 MPH
PROJECT LENGTH : 1.6 MILES



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MAYOR
LORI BLONG

CITY MANAGER
TOMMY GONZALEZ

CITY COUNCIL
ERIC DAVIDSON - AT LARGE
ROBIN POOLE - AT LARGE
SCOTT DUFFORD - DISTRICT 1
JOHN NORMAN - DISTRICT 2
JACK LADD - DISTRICT 3
AMY STRETCHER BURKES - DISTRICT 4

STATE OF TEXAS
JACOB HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/2024
TBPELS ENGINEERING FIRM #F-312

ON 6/25/2024 THE CITY OF MIDLAND REQUESTED TO FINALIZE DESIGN PLANS FOR THE INTERIM SECTION OF PROPOSED OCCIDENTAL PARKWAY FROM CARRIAGE ROAD TO ELKINS ROAD. THE INTERIM IMPROVEMENTS ARE DEFINED AS THE DRAINAGE CONVEYANCE METHODS WITHIN THE SOUTHERN FUTURE LANES PRESENTED IN THESE PLANS. THE ULTIMATE IMPROVEMENTS ARE DEFINED AS THE DRAINAGE CONVEYANCE NORTH OF THE PROPOSED ROADWAY WITHIN THE STACKING STONES AND NATHAN SYKES PROPERTIES WHICH WERE CONCEPTUALLY DESIGNED TO PROVIDE A MORE ADEQUATE AND RELIABLE DRAINAGE SYSTEM. THE FINALIZED INTERIM DRAINAGE DESIGN WILL BE EFFECTIVE IN DRAINING RUNOFF COMING TO AND ALONG THE PROPOSED ROADWAY. HOWEVER, 100-YEAR ULTIMATE CAPACITY WILL NOT BE ACHIEVED IN THE INTERIM CONDITION. THE ONLY WAY TO ACHIEVE ADEQUATE LEVELS OF PROTECTION AGAINST SUBSTANTIAL RAINFALL EVENTS IS TO CONSTRUCT THE ULTIMATE IMPROVEMENTS.

CIVIL ENGINEER:

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TBPELS ENGINEERING FIRM #312

AVO: 45715.006 DATE: AUGUST 2024

811 Know what's below. Call before you dig.

THE INFORMATION SHOWN ON THESE DRAWINGS INDICATING SIZE, TYPE AND LOCATION OF UNDERGROUND, SURFACE, AND AERIAL UTILITIES IS NOT GUARANTEED TO BE EXACT OR COMPLETE. THE CONTRACTOR SHALL CONTACT THE MIDLAND AREA "ONE CALL" SYSTEM AT 1-800-344-8377 (DIG TESS) 48 HOURS PRIOR TO BEGINNING ANY EXCAVATION FOR EXISTING UTILITY LOCATIONS. THE CONTRACTOR SHALL ALSO BE FULLY RESPONSIBLE FOR FIELD VERIFYING LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES AFFECTED BY CONSTRUCTION FOR THIS PROJECT IN ORDER TO AVOID DAMAGING THOSE UTILITIES, AND SHALL IMMEDIATELY ARRANGE FOR REPAIR AND RESTORATION OF CONTRACTOR- DAMAGED UTILITIES TO THE UTILITY COMPANY'S APPROVAL AT THE EXPENSE OF THE CONTRACTOR.

GENERAL NOTES

GENERAL:

THIS DESIGN IS FOR PUBLIC PAVING AND DRAINAGE IMPROVEMENTS.

ALL CONSTRUCTION SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST CITY OF MIDLAND ENGINEERING DEPARTMENT STANDARDS AND SPECIFICATIONS AND THE 2014 TEXAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES.

BASIS OF BEARING IS THE TEXAS COORDINATE SYSTEM NORTH CENTRAL ZONE (4202), NORTH AMERICAN DATUM OF 1983 (NAD83). DISTANCES SHOWN ARE US SURVEY FEET DISPLAYED IN SURFACE VALUES WITH A SCALE FACTOR OF 1.00007025511419. ALL ELEVATIONS ARE RELATED TO NORTH AMERICAN VERTICAL DATUM 1988.

EXISTING ELEVATIONS AND TOPOGRAPHIC FEATURES SHOWN IN THIS CONSTRUCTION DRAWING SET HAVE BEEN LOCATED USING FIELD SURVEYS. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THIS INFORMATION PRIOR TO CONSTRUCTION AND NOTIFYING ENGINEER OF ANY CONFLICTS BETWEEN EXISTING CONDITIONS AND PROJECT DESIGN.

CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL EXISTING UNDERGROUND UTILITIES PRIOR TO BEGINNING EXCAVATION.

THE LOCATION OF EXISTING UTILITIES INDICATED ON THE PLANS HAS BEEN DETERMINED FROM FIELD SURVEYS, LEVEL B SUBSURFACE UTILITY ENGINEER, LEVEL A SUBSURFACE UTILITY ENGINEERING WHERE INDICATED ON THE PLANS, AND AVAILABLE PUBLIC RECORDS. EXACT LOCATION AND ELEVATION OF ALL UTILITIES ARE NOT GUARANTEED AND SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION. IT SHALL BE THE DUTY OF THE CONTRACTOR TO ASCERTAIN WHETHER ANY ADDITIONAL UTILITIES OTHER THAN THOSE SHOWN ON THE PLANS MAY EXIST AND TO LOCATE THE SAME IN THE FIELD PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES WITH FACILITIES IN THE PROJECT AREA FORTY-EIGHT (48) HOURS PRIOR TO CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING DAMAGE TO EXISTING UTILITIES. THE CONTRACTOR IS REQUIRED TO MAINTAIN EXISTING UTILITIES IN A SAFE AND SERVICEABLE CONDITION. NO EXTRA COMPENSATION WILL BE ALLOWED FOR ADDITIONAL WORK OR MATERIALS TO MAINTAIN SERVICE.

CONTRACTOR IS TO TAKE ALL NECESSARY PRECAUTIONS TO PROTECT ALL EXISTING FACILITIES THAT ARE ENCOUNTERED REGARDLESS OF WHETHER OR NOT THEY APPEAR IN THIS CONSTRUCTION DRAWING SET.

ANY ISSUES, CONFLICTS, OR DISCREPANCIES ENCOUNTERED IN FIELD THAT CONFLICT WITH THIS CONSTRUCTION DRAWING SET ARE TO BE BROUGHT TO ATTENTION OF PROJECT ENGINEER PRIOR TO MAKING ANY DESIGN CHANGES IN FIELD.

TRAFFIC CONTROL FOR THIS PROJECT WILL BE CONTRACTOR'S RESPONSIBILITY. CONTRACTOR MUST SUBMIT TRAFFIC CONTROL PLAN, IN ACCORDANCE WITH TMUTCD, TO CITY OF MIDLAND FOR REVIEW AND APPROVAL NO LESS THAN TWO (2) BUSINESS DAYS BEFORE CONTRACTOR BEGINS ANY CONSTRUCTION ACTIVITY.

CONTRACTOR WILL COORDINATE SCHEDULING WITH CITY OF MIDLAND STREETS AND TRAFFIC DEPARTMENT FOR ANY ACTIVITIES THAT MAY DISRUPT NORMAL TRAFFIC.

CONTRACTOR IS TO NOTIFY ALL AFFECTED PROPERTIES AT LEAST FORTY-EIGHT (48) HOURS IN ADVANCE OF ANY KNOWN OR PLANNED INTERRUPTION OF SERVICE OR ACCESS DUE TO ANY CONSTURCTION ACTIVITY PERFORMED BY CONTRACTOR.

OSHA REQUIREMENTS AND ALL OTHER APPLICABLE FEDERAL, STATE, OR CITY OF MIDLAND SAFETY REQUIREMENTS ARE TO BE FOLLOWED AND COMPLIED WITH AT ALL TIMES.

OSHA APPROVED TRENCH SAFETY SYSTEMS ARE REQUIRED FOR ALL TRENCHES 5.0' DEEP OR GREATER UNLESS A COMPLETE GEOTECHNICAL REPORT OR STUDY IS PROVIDED BY OR APPROVED BY CITY OF MIDLAND FOR PROJECT AREA STATING THAT AREA TO BE TRENCHED IS MADE ENTIRELY OF STABLE ROCK.

AT ALL TIMES THAT WORK IS PROGRESSING, THE CONTRACTOR SHALL HAVE A DESIGNATED COMPETENT PERSON ON-SITE WHO SHALL BE RESPONSIBLE FOR SUPERVISING THE WORK AND WHOSE DUTY IT WILL BE TO PERFORM REQUIRED SAFETY INSPECTIONS AND TO DIRECT ALL REQUIRED CONSTRUCTION SAFETY ACTIVITIES.

CONTRACTOR MUST COMPLY WITH ALL STAKING AND TESTING REQUIREMENTS AS DESCRIBED IN PROJECT BID PACKET.

CONTRACTOR IS REMINDED THAT THIS PROJECT IS LOCATED IN AN URBAN ENVIRONMENT. OVERHEAD LINES ARE COMMON, AND CONTRACTOR IS TO PROVIDE PROPER EQUIPMENT TO COMPLETE ALL REQUIRED WORK FOR THIS PROJECT IN AN URBAN ENVIRONMENT.

EXISTING CONDITIONS AT PROJECT LOCATION ARE COMPLEX AND FLUID. THERE (HAVE BEEN, ARE, CONTINUE TO BE, WILL BE) MULTIPLE OR SIGNIFICANT CHANGES IN FIELD CONDITIONS AT THIS LOCATION, AND EXISTING SURFACE OR SUB-SURFACE CONDITIONS SHOWN IN THIS CONSTRUCTION DRAWING SET MAY NOT REFLECT ALL EXISTING CONDITIONS WHEN CONSTURCTION COMMENCES. CONTRACTOR IS REMINDED TO VERIFY ALL EXISTING CONDITIONS BEFORE STARTING DEMOLITION, EXCAVATION, OR CONSTURCTION.

DEMOLITION:

ALL DEMOLITION DIMENSIONS ARE APPROXIMATE BASED ON MOST RELIABLE DATA AVAILABLE. CONTRACTOR IS TO FIELD VERIFY ACTUAL DIMENSIONS. CONTRACTOR IS TO NOTIFY PROJECT ENGINEER OF ANY ADDITIONAL DEMOLITION THAT MAY BE NEEDED AND RECEIVE WRITTEN CONFIRMATION THAT SUCH DEMOLITION IS APPROVED PRIOR TO ANY ADDITIONAL DEMOLITION TAKING PLACE.

CONTRACTOR IS TO NOTIFY ENGINEER OF ANY CONFLICTS OR DISCREPANCIES BEFORE REMOVING ANYTHING NOT NOTED FOR REMOVAL.

ALL SAW-CUTS FOR PAVEMENT REMOVAL ARE TO BE CUT IN CLEAN, STRIAGHT LINES.

CONTRACTOR IS TO TAKE CARE NOT TO DAMAGE OR REMOVE ANY EXISTING INFRASTRUCTURE OR PROPERTY, PUBLIC OR PRIVATE, THAT IS NOT INDICATED BY THIS CONSTRUCTION DRAWING SET. ANY SUCH DAMAGE OR REMOVAL MUST BE REPLACED OR REPAIRED BY CONTRACTOR AT THEIR SOLE EXPENSE TO EQUAL OR BETTER CONDITION.

ALL EXISTING FENCE REMOVED PER THIS CONSTRUCTION DRAWING SET IS TO BE STACKED NEATLY ON ADJACENT OWNER'S PROPERTY UNLESS OTHERWISE NOTED IN THIS CONSTRUCTION DRAWING SET OR PROJECT BID PACKET.

CONSTRUCTION:

ALL ELEVATIONS SHOWN IN STREET AREAS ARE EDGE OF PAVEMENT BACK OF CURB, OR EDGE OF MOW STRIP.

ALL DIMENSIONS ARE MEASURED TO THE EDGE OF PAVEMENT UNLESS OTHERWISE INDICATED. PERCENT SLOPES ARE CALCULATED ALONG OR ACROSS ACTUAL ROADWAY SECTION OR FLOWLINE OF DITCH.

ALL DITCH STATIONS ARE ALONG CENTERLINE OF DITCH.

ALL CULVERT STATIONS ARE ALONG CENTERLINE OF PIPE.

CONTRACTOR IS TO MATCH DESIGN GRADES AND ELEVATIONS SHOWN ON THIS CONSTRUCTION DRAWING SET.

COORDINATE ALL STRIPING, TRAFFIC SIGN, OR OTHER TRAFFIC INFRASTRUCTURE ISSUES WITH CITY TRAFFIC ENGINEER AND NOTIFY CITY INSPECTOR.

NOTIFY CITY INSPECTOR OF ALL FRANCHISE UTILITY OR PRIVATE INFRASTRUCTURE ISSUES AND COORDINATE WITH BOTH CITY AND FRANCHISE UTILITY OR PRIVATE INFRASTRUCTURE OWNER.

COMPACTION TESTING:

ROW USERS ARE NOT REQUIRED TO PERFORM DENSITY TEST ON EACH TRENCH, ALTHOUGH IT IS RECOMMENDED TO DO SO. CITY INSPECTORS MAY PERFORM SPOT TESTS USING A NUCLEAR DENSITY GAUGE OR PROBE ROD TO DETERMINE IF A 95% MODIFIED PROCTOR DENSITY FAILURE HAS OCCURRED. PROBE ROD TESTS SHALL NOT PENETRATE MORE THE TWO INCHES (2") IN A PROPERLY COMPACTED TRENCH. PENETRATION MORE THAN TWO INCHES WILL INDICATE FAILURE.

AREAS OF THE TRENCH THAT HAVE FAILED BACKFILL COMPACTION TESTS, EITHER BY PROBE ROD OR NUCLEAR GAUGE TEST. SHALL BE REMOVED AND RECOMPACTED BY THE ROW USER AT THEIR EXPENSE.

FILL MATERIAL DENSITY REQUIREMENTS:

TESTS TO DETERMINE THE COMPACTED DENSITY OF THE BACKFILL SHALL BE ORDERED BY THE ENGINEER IF IN HIS/HER OPINION THE COMPACTION IS NOT ADEQUATE. TEST SHOWING A MINIMUM COMPACTED DENSITY OF 95% MODIFIED PROCTOR WILL BE DEEMED ADEQUATE COMPACTION.

DENSITY TEST WILL BE MADE BY THE CITY OR A COMMERCIAL LABORATORY CHOSEN BY THE CITY USING TROXLER 3411-B NUCLEAR DENSITY GAUGES OR APPROVED EQUAL AT THE MINIMUM RATE OF ONE TEST FOR EACH 1000 SQUARE YARDS OF BASE. IN NO CASE SHALL LESS THAN THREE TESTS BE RUN ON ANY ONE AREA PROCESSED AS A UNIT.

TESTING SHALL BE PERFORMED IN ACCORDANCE WITH ASTM STANDARDS BY A COMMERCIAL TESTING LABORATORY. ASTM IS THE AMERICAN SOCIETY FOR TESTING AND MATERIALS.

ALL FILL MATERIALS SHALL BE COMPACTED TO AN ABSOLUTE MINIMUM OF NINETY-FIVE PERCENT (95%) MODIFIED PROCTOR DENSITY AT A MOISTURE CONTENT WITHIN TWO PERCENT OF OPTIMUM IN ACCORDANCE WITH ASTM D - 698.

FIELD DENSITIES SHALL BE DETERMINED IN ACCORDANCE WITH ASTM D-2167 (RUBBER BALLOON DENSITY METHOD), ASTM D-1556 (SAND CONE DENSITY METHOD), OR ASTM D-2922 (NUCLEAR DENSITY METHOD).

FOUR (4) FIELD DENSITIES SHALL BE TAKEN PER ACRE OF FILL MATERIAL AND DENSITIES SHALL BE TAKEN FOR EACH SIX INCH (6") DEPTH, OR PORTION THEREOF, OF SUCCEEDING DEPTHS OF FILL MATERIAL. EACH AREA OF FILL MATERIAL LESS THAN ONE HALF (1/2) ACRE SHALL HAVE A MINIMUM OF TWO (2) FIELD DENSITIES FOR EACH SIX INCH (6") DEPTH, AND AREAS OF FILL BETWEEN ONE HALF (1/2) ACRE AND ONE (1) ACRE SHALL HAVE A MINIMUM OF THREE (3) FIELD DENSITIES FOR EACH SIX INCH (6") DEPTH.

EACH LIFT SHALL HAVE A MAXIMUM DEPTH OF SIX INCHES (6").

THE FIELD DENSITIES SHALL BE TAKEN IN SUCH A MANNER AS TO BE A REPRESENTATIVE SAMPLING OF THE (6”) DEPTHS. THE LOCATION OF TESTS SHALL BE PROPORTIONATELY SPACED TO REPRESENT SIX INCH APPROXIMATE EQUAL AREAS OF EACH ACRE BEING TESTED. TESTING SHALL NOT OCCUR AT THE SAME LOCATION IN SUCCEEDING DEPTHS SO A REPRESENTATIVE SAMPLING OF THE TOTAL FILL MAY BE OBTAINED.

THE LOCATION OF THE FIELD DENSITY TESTS SHALL BE INDICATED UPON A MAP TO BECOME A PART OF THE CERTIFIED AS-BUILT CUT AND FILL PLAN.

COPIES OF ALL TEST RESULTS WITH LOCATION MAPS SHALL BE FURNISHED TO THE CITY ENGINEERS WITH THE CERTIFIED AS-BUILT CUT AND FILL PLAN.

FILL MATERIAL WITH A PLASTIC INDEX (PI) OF GREATER THAN TWENTY (20) WILL NOT BE ALLOWED IN ANY PUBLIC RIGHT-OF-WAY. THE SUBSTANDARD MATERIAL SHALL BE DISCARDED AT A LOCATION ABOVE THE PREDICTED PEAK WATER ELEVATION OF THE PLAYA LAKE, AND SELECT FILL MATERIAL SHALL BE IMPORTED TO THE SITE FOR PLACEMENT WITHIN THE PUBLIC RIGHT-OF-WAY.

GRADING:

ALL PROPOSED PERIMETER CUT OR FILL SLOPES SHALL BE CONSTRUCTED AT NO STEEPER THAN 4' HORIZONTAL TO 1' VERTICAL
UNLESS OTHERWISE SHOWN ON PLANS.

CONTRACTOR TO SALVAGE 4" MINIMUM OF TOPSOIL FOR FINAL LIFT PLACEMENT ON ALL AREAS EXCEPT STREETS.

CONTRACTOR MUST PROVIDE TEST REPORTS FOR APPROVAL PRIOR TO BEGINNING ADDITIONAL SOIL LIFTS.

EXCESS EXCAVATION MATERIAL:

ADDITIONAL MATERIAL REQUIRED TO BACKFILL EXCESS DEPTH OF EXCAVATION CAUSED BY NEGLECT OR ERROR ON THE PART OF THE CONTRACTOR OR WET CONDITIONS, SHALL BE FURNISHED AND PLACED AT HIS OWN EXPENSE.

MATERIAL TO BE REMOVED FROM THE RIGHT-OF-WAY BECOMES THE PROPERTY OF THE CONTRACTOR. IF DISPOSAL AREAS ARE AVAILABLE, THEY WILL BE INDICATED ON THE PLANS.

ALL SURPLUS OR WASTE MATERIALS REMAINING AFTER COMPLETION OF THE BACKFILLING OPERATIONS SHALL BE DISPOSED OF IN AN ACCEPTABLE MANNER WITHIN 24 HOURS AFTER COMPLETING THE BACKFILL WORK ON EACH PARTICULAR PIPELINE SECTION. DISPOSAL DISPOSAL SHALL BE ACCOMPLISHED OUTSIDE THE PROJECT LIMITS AT THE CONTRACTOR'S DISCRETION. THE BACKFILLING AND SURPLUS OR WASTE DISPOSAL OPERATIONS SHALL BE A PART OF THE WORK REQUIRED UNDER THE PIPELINE INSTALLATION ITEMS, NOT AS WORK THAT MAY BE DELAYED UNTIL FINAL CLEANUP.

UNTIL FINAL ACCEPTANCE OF THE PROJECT, THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY AND EXPENSE FOR ALL BACKFILL SETTLEMENT AND SHALL REFILL AND RESTORE THE WORK AS DIRECTED TO MAINTAIN AN ACCEPTABLE SURFACE CONDITION. ALL ADDITIONAL MATERIALS REQUIRED SHALL BE FURNISHED WITHOUT ADDITIONAL COST TO THE OWNER.

EXCESS OR UNSUITABLE EXCAVATED MATERIAL SHALL BECOME THE PROPERTY OF THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LAWFUL DISPOSAL OF THE EXCAVATED MATERIAL AT A COST INCIDENTAL TO THE VARIOUS PROJECT BID ITEMS. UNDER NO CIRCUMSTANCES SHALL THE EXCESS OR UNSUITABLE MATERIAL BE PLACED WITHIN THE LIMITS OF FLOODPLAINS OR PLAYA LAKES OR SPREAD EVENLY ACROSS THE SITE.

PAVING:

ALL ASPHALT AND CONCRETE PAVING SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST CITY OF MIDLAND PAVING DETAILS AND SPECIFICATIONS AND THE 2014 TEXAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES.

ALL EXISTING BASE COURSE MATERIAL OR MATERIAL REMAINING AFTER EXCAVATION ARE TO BE PROOF ROLLED WITH MINIMUM TWENTY-FIVE (25) TON PNEUMATIC ROLLER PRIOR TO ANY PAVING ACTIVITY TAKING PLACE. EXCAVATE ANY SOFT MATERIAL AND SCARIFY EXCAVATED AREA PLUS SUFFICIENT DISTANCE BEYOND TO ENSURE PROPER MIXING AND BONDING.

ALL NEW PAVEMENT AND CONCRETE ARE TO BE PLACED CLEANLY AND FLUSH WITH ALL ADJACENT, EXISTING PAVEMENT OR CONCRETE INCLUDING CURBS.

PRIOR TO PAVING ACTIVITIES, APPLY PRIME COAT UNIFORMELY ON TOP OF ALL PREPARED FLEXIBLE BASE COURSE SURFACES. ADDITIONALLY, APPLY PRIME COAT TO ALL JOINTS, INCLUDING COLD JOINTS WITH MATS PREVIOUSLY LAID, AND JOINTS WITH CONCRETE WHERE ASPHALT PAVEMENT WILL ABUT CONCRETE PAVEMENT INCLUDING AT LIP OF CURB.

APPLY TACK COAT UNIFORMELY TO ALL INTERMEDIATE ASPHALT PAVEMENT COURSES WHOSE SURFACE IS SCHEDULED TO REVCIEVE AN OVERLAYING COURSE OF ASPHALT PAVEMENT. ADDITIONALLY, APPLY TACK COAT TO ALL JOINTS, INCLUDING COLD JOINTS WITH MATS PREVIOUSLY LAID, AND JOINTS WITH CONCRETE WHERE ASPHALT PAVEMENT WILL ABUT CONCRETE PAVEMENT INCLUDING AT LIP OF CURB.

BLOT AREAS SHOWNING AN EXCESS OF PRIME COAT OR TACK COAT WITH SAND OR OTHER SIMILAR MATERIAL AND REMOVE BLOTTING MATERIAL BEFORE PAVING.

IN ADDITION TO OTHER REQUIREMENTS SPECIFIED IN CITY OF MIDLAND SPECIFICATIONS, PROVIDE ASPHALT PAVERS THAT DO NOT SUPPORT WEIGHT OF ANY PORTION OF HAULING EQUIPMENT OTHER THAN CONNECTION.

MAINTAIN SUBGRADE OR BASE IN A SMOOTH, CLEAN, COMPACTED CONDITION AND KEEP DAMP WITH WATER UNTIL CONCRETE PAVEMENT IS PLACED.

PLACE CONCRETE PAVEMENT WITHIN 45 MINUTES OF BATCHING AND USE VIBRATORY EQUIPMENT TO CONSOLIDATE CONCRETE. DO NOT USE VIBRATORY EQUIPMENT TO DISTRIBUTE CONCRETE PAVEMENT. SEGREGATED CONCRETE IS SUBJECT TO REJECTION.

SAWCUT ALL CONTROL JOINTS IN PROPOSED CONCRETE PAVEMENT PER CITY OF MIDLAND STANDARD DETIALS.

WHEN PLACED ADJACENT TO CONCRETE PAVEMENT, CURB JOINT SPACING IS TO MATCH CONCRETE PAVEMENT SPACING. WHEN PLACED SEPARATELY FROM PAVEMENT, CURB JOINTS ARE TO BE SPACED NO CLOSER THAN 2.0' AND NO FURTHER THAN 10.0' APART.

CURB JOINTS ARE TO BE TOOL JOINTS EXCEPT FOR EVERY 6TH CONTROL JOINT, WHICH IS TO BE AN EXPANSION JOINT. UTILIZE EXPANSION JOINTS AT ALL JOINTS BETWEEN NEW AND EXISTING CURB-AND-GUTTER.

CONCRETE FILLETS ARE TO BE PLACED INTEGRAL WITH ADJACENT CONCRETE CURB.

ALL CONCRETE PAVEMENT SURFACES ARE TO BE BROOM FINISHED.

DRAINAGE:

CONTRACTOR IS TO ENSURE POSITIVE SURFACE DRAINAGE THROUGHOUT PROJECT SITE WITH SPECIAL ATTENTION GIVEN TO SURFACE DRAINAGE AT ALL INTERSECTIONS.

CONTRACTOR IS TO CORRECT ANY SURFACE GRADES INSTALLED THAT RESULT IN WATER PONDING OR COLLECTING IN ANY LOCATION NOT INTENDED FOR COLLECTION, I.E. ANYWHERE THAT IS NOT A BASIN, POND, ETC. CONTRACTOR IS TO NOTIFY PROJECT ENGINEER IF WATER PONDING OR COLLECTING IS BELIEVED TO BE CAUSED BY DESIGN ERROR AND WAIT FOR DIRECTION FROM PROJECT ENGINEER BEFORE PROCEEDING WITH ANY FIELD CHANGES.

DRAINAGE ANALYSIS CAN BE FOUND ON SHEETS 54 - 56 OF THIS CONSTRUCTION DRAWING SET

EROSION CONTROL:

INSTALL EROSION CONTROL MEASURES PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITY ON PROJECT SITE. INITIAL EROSION CONTROL INSPECTION IS REQUIRED WITH ONGOING MAINTENANCE.

TEMPORARY CONSTRUCTION ENTRANCE IS REQUIRED AT BOTH ENDS OF THE PROJECT. CONTRACTOR SHALL COORDINATE LOCATION WITH THE CITY AND ENGINEER. TEMPORARY CONSTRUCTION ENTRANCES SHALL BE SUBSIDIARY TO THE "PREPARING ROW" BID ITEM.

CONCRETE WASH OUT IS REQUIRED. CONTRACTOR SHALL COORDINATE LOCATION WITH THE CITY AND ENGINEER. CONCRETE WASH OUT SHALL BE SUBSIDIARY TO THE "PREPARING ROW" BID ITEM.

LARGE SITE NOI IS REQUIRED WITH PREPARED SWPP. CONTRACTOR SHALL CONTACT CITY (MDWILLIAMS@MIDLANDTEXAS.GOV) AT LEAST 7 DAYS PRIOR TO CONSTRUCTION.

CONTRACTOR IS TO MAINTAIN EROSION CONTROL MEASURES AT ALL TIMES. REPAIRS TO EXISTING EROSION CONTROL MEASURES ARE TO BE MADE IMMEDIATELY UPON DISCOVERY THAT SUCH REPAIRS ARE NEEDED. ALL EROSION CONTROL MEASURES AT PROJECT SITE ARE TO BE INSPECTED IMMEDIATELY FOLLOWING ANY STORM EVENT.

CONTRACTOR IS TO MAINTAIN A REASONABLY CLEAN PROJECT SITE AT ALL TIMES. ANY SEDIMENT, DEBRIS, ETC. OUTSIDE PROJECT SITE ARE TO BE REMOVED PROMPTLY.

ANY ON-SITE STORAGE OF SPOILS, MATERIALS, OR EQUIPMENT ARE TO BE LOCATED IN A DESIGNATED AREA AS PART OF WORK ZONE AREA.

ON-SITE STORAGE OF SPOILS, MATERIALS, OR EQUIPMENT IS NOT PERMITTED OUTSIDE OF CITY OWNED RIGHT OF WAY.

ALL STOCKPILES ARE TO BE SURROUNDED BY SILT FENCE OR EQUIVALENT MEASURES AS APPROVED BY ENGINEER TO PROPERLY CONTROL SEDIMENT RUNOFF.

CONCRETE TRUCKS CANNOT UNDER ANY CIRCUMSTANCE WASHOUT IN UTILITY TRENCH. CONTRACTOR IS TO PROVIDE A WASHOUT CONTAINER FOR CONCRETE TRUCKS AND MUST REMOVE ALL WASHOUT AND SPOILS FROM PROJECT SITE.

CONTRACTOR TO IMPLEMENT SUPPLEMENTAL EROSION CONTROL MEASURES AS NEEDED DURING STORM EVENTS. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED AT SOLE DISCRETION OF ENGINEER IF AT ANY TIME ENGINEER BELIEVES EXISTING EROSION CONTROL MEASURES ARE INSUFFICIENT FOR NEEDS OF PROJECT SITE.

CONTRACTOR IS REQUIRED AT A MINIMUM TO REMOVE AND DISPOSE OF ACCUMULATED SILT, SEDIMENT, OR OTHER DEBRIS FROM EROSION CONTROLS WHEN SILT, SEDIMENT, OR OTHER DEBRIS HAVE REACHED A HEIGHT EQUAL TO HALF THAT OF EROSION CONTROLS PLACED OR IMPEED THEIR EFFECTIVENESS.

CONTRACTOR IS TO REMOVE ALL TERMPORARY EROSION CONTROL MEASURES FROM PROJECT SITE UPON COMPLETION OF CONSTRUCTION ACTIVITY ONCE PROJECT SITE IS STABILIZED. THIS IS CONSIDERED SUBSIDIARY TO THIS PROJECT SCOPE.

DAMAGES TO ADJACENT PROPERTY OR TO RECEIVING WATERS CAUSED BY IMPROPERLY INSTALLED OR POORLY MAINTAINED EROSION CONTROL MEASURES ARE SOLE RESPONSIBILITY OF CONTRACTOR.

THE CONTRACTOR WILL ENSURE THAT THE PROPER TPDES GENERAL PERMIT TXRI50000 HAS BEEN OBTAINED PRIOR TO COMMENCEMENT OF GRADING ACTIVITY. THE SWPPP CONTRACTOR WILL REFER TO AND PROPERLY CONSTRUCT AND MAINTAIN ALL STORMWATER POLLUTION PREVENTION PLAN MEASURES SET FORTH IN THE TPDES GENERAL PERMIT AND THE SEPARATE SWPPP PLAN. THE DEVICES SHOWN HEREIN ARE TO BE CONSIDERED A MINIMUM.

CONSTRUCTION INSPECTION:

CONSTRUCTION INSPECTION SHALL BE PERFORMED BY CITY OF MIDLAND REPRESENTATION FOR ALL IMPROVEMENTS.

THE CONTRACTOR SHALL NOTIFY CITY OF MIDLAND ENGINEER AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF WORK.

CONSTRUCTION MATERIALS TESTING NOTES:

CONTRACTOR SHALL NOTIFY OWNER'S TESTING LAB AT LEAST 48 HOURS PRIOR TO PLACEMENT OF CONCRETE, CALICHE BASE, OR HMAC PAVING TO ARRANGE FOR APPROPRIATE SAMPLING AND TESTS.

CONTRACTOR SHALL BEAR THE COST OF ALL TESTING. IF THE BASE FAILS THE FIRST TEST THE CONTRACTOR, AT HIS OWN EXPENSE, WILL BE REQUIRED TO HAVE ALL SUBSEQUENT TESTS PERFORMED BY THE COMMERCIAL LABORATORY CHOSEN BY THE CITY.

CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL FEES FROM TESTING LAB FOR ALL RETESTING OF MATERIALS THAT DID NOT ORIGINALLY MEET THE MINIMUM SPECIFICATION REQUIREMENTS. THE COST FOR THESE TESTING SERVICES SHALL BE INCIDENTAL TO THE VARIOUS PROJECT BID ITEMS.

ADDITIONAL NOTES:

CONTRACTOR SHALL COORDINATE STAGING AREA WITH THE CITY AND ENGINEER.

OBSTRUCTIONS SUCH AS STREET SIGNS, GUARD POSTS, AND OTHER ITEMS OF PREFABRICATED CONSTRUCTION MAY BE TEMPORARILY REMOVED DURING CONSTRUCTION PROVIDED THAT ESSENTIAL SERVICE IS MAINTAINED IN A RELOCATED SETTING AS APPROVED BY THE ENGINEER AND THAT NON-ESSENTIAL ITEMS ARE PROPERLY STORED FOR THE DURATION OF CONSTRUCTION. UPON COMPLETION OF THE UNDERGROUND WORK, ALL SUCH ITEMS SHALL BE REPLACED IN THEIR PROPER SETTING. THIS REMOVAL, RELOCATION AND REPLACEMENT SHALL BE AT THE SOLE EXPENSE OF THE CONTRACTOR.

IN THE EVENT OF DAMAGE TO ANY STRUCTURES OR IMPROVEMENTS, EITHER PRIVATELY OR PUBLICLY OWNED, IN THE ABSENCE OF CONSTRUCTION NECESSITY, THE CONTRACTOR WILL BE REQUIRED TO REPLACE OR REPAIR THE DAMAGED PROPERTY TO THE SATISFACTION OF THE ENGINEER AND WITHOUT COST TO THE OWNER.

CONTRACTOR TO PLACE STAKING AT EVERY “50” FEET AND PROVIDE CORRESPONDING “CUT SHEETS” TO THE CITY OF MIDLAND PRIOR TO CONSTRUCTION.

THE LOCATION AND DEPTH OF ALL UTILITIES SHOWN ON THE PLANS ARE APPROXIMATE UNLESS OTHERWISE NOTED WITH A TEST HOLE. THERE MAY BE OTHER UNKNOWN EXISTING UTILITIES NOT SHOWN ON THE PLANS. ALL EXISTING UTILITIES SHALL BE FIELD VERIFIED AND PROTECTED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION.

IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH THE ENGINEER AND VARIOUS UTILITY GAS UTILITY COMPANIES IN THE AREA FOR PROTECTION PURPOSES PRIOR TO THE START OF CONSTRUCTION.

IN THE PREPARATION OF THE PLANS AND SPECIFICATIONS, THE ENGINEER HAS ENDEAVORED TO INDICATE THE LOCATION OF EXISTING UNDERGROUND UTILITIES. IT IS NOT GUARANTEED THAT ALL LINES OR STRUCTURES HAVE BEEN SHOWN ON THE PLANS.

ABBREVIATIONS

PGL	PROFILE GRADE LINE	ESMT	EASEMENT
T/P	TOP OF PAVEMENT	TXDOT	TEXAS DEPARTMENT OF TRANSPORATION
P.I.	POINT OF INFLECTION	PR	PROPOSED
P.T.	POINT OF TANGENCY	EX	EXISTING
P.C.	POINT OF CURVATURE	SF	SQUARE FEET
P.C.C.	POINT OF COMPOUND CURVATURE	CY	CUBIC YARD(S)
P.R.C.	POINT OF REVERSE CURVATURE	SY	SQUARE YARD(S)
CULV	CULVERT	LF	LINEAR FEET
RT	RIGHT	VC	VERTICAL CURVE
LT	LEFT	WSEL	WATER SURFACE ELEVATION
PVI	POINT OF VERTICAL INFLECTION	STA	STATION
ELEV	ELEVATION		
ROW	RIGHT OF WAY		
SIRTP4	1/2" SET IRON ROD		
FIRTP4	1/2" FOUND IRON ROD		

EXISTING LEGEND

⊙	SIGN	—— G1 ——	NATURAL GAS PIPELINE
□ TRANS	TRANSMISSION POLE	—— UGE ——	UNDERGROUND ELECTRIC LINE
PP	POWER POLE	—— OH ELEC ——	OVERHEAD ELECTRIC LINE
→	GUY WIRE	—— Ex F/O ——	UNDERGROUND FIBER OPTIC LINE
BH	BORE HOLE	—— W ——	UNDERGROUND WATER LINE
○ WTR	WATER VALVE	—— x ——	FENCE LINE
△ 100	CONTROL POINT	—○—○—○—○—	PIPE FENCE
●	WATER WELL	——///——	EDGE OF ASPHALT
		————	EDGE OF GRAVEL
		— · · — · · —	PROPERTY LINE
		— — — —	EASEMENT LINE

GAS UTILITY CROSSINGS STANDARDS

1. G1 - BCC PIPELINE - ANY EARTH UNCOVERED OVER TOP OF PIPELINE REQUIRES THE CONTACT OF OWNER (CONOCO PHILLIPS). CONTRACTOR TO INSTALL 8" CONCRETE CAP PROTECTION IN ACCORDANCE WITH THE PROVIDED DETAIL AT THE LOCATION SHOWN IN THE PLANS. PADDING OF A MINIMUM OF 1 FOOT REQUIRED OVER TOP OF CAP IS REQUIRED FOR HEAVY EQUIPMENT.
2. G2 - ENTERPRISE - CONTRACTOR TO REFER TO LETTER OF NO OBJECTION PROVIDED BY ENGINEER PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND MUST ABIDE BY REQUIREMENTS SET FORTH BY ENTERPRISE WITHIN.
3. G3 - ENERGY TRANSFER - CONTRACTOR TO REFER TO GENERAL CROSSING GUIDELINES PROVIDED BY ENGINEER PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND MUST ABIDE BY REQUIREMENTS SET FORTH BY ENERGY TRANSFER WITHIN. CONTRACTOR TO INSTALL 6" THICK CONCRETE CAP PROTECTION IN ACCORDANCE WITH THE PROVIDED DETAIL AT THE LOCATION SHOWN IN THE PLANS.
4. G4 - ONEOK - CONTRACTOR TO INSTALL 8" THICK CONCRETE CAP PROTECTION IN ACCORDANCE WITH THE PROVIDED DETAIL AT THE LOCATION SHOWN IN THE PLANS. CONTRACTOR TO CONTRACT OWNER (ONEOK) TO VERIFY ADEQUATE PROTECTION ESTABLISHMENT.
5. G5 - PLAINS - CONTRACTOR TO TO REFER TO ENCROACHMENT GUIDELINES PROVIDED BY ENGINEER AND MUST ABIDE BY REQUIREMENTS SET FORTH BY PLAINS WITHIN. CONTRACTOR TO INSTALL 8" THICK CONCRETE CAP PROTECTION IN ACCORDANCE WITH THE PROVIDED DETAIL AT THE LOCATIONS SHOWN IN THE PLANS.
6. G6 - TARGA - CONTRACTOR TO INSTALL 8" THICK CONCRETE CAP PROTECTION IN ACCORDANCE WITH THE PROVIDED DETAIL AT THE LOCATION SHOWN IN THE PLANS.
7. G7 - WTG - 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND OWNER (WTG) AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AND PERFORMED UNDER THE "ABANDONED GAS LINE REMOVAL" BID ITEM.
8. GAS - UNKNOWN - GAS LINES ARE ASSUMED ABANDONED AND NO LONGER IN SERVICE. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AND PERFORMED UNDER THE "ABANDONED GAS LINE REMOVAL" BID ITEM.

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND
Engineering Services

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TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558

J. T. Hays

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

GENERAL NOTES AND LEGEND

SHEET NUMBER 2 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C001-GNTS-45715.dwg DATE: August 13, 2024, TIME: 3:29 PM, USER: ah3453 AVO: 45715.006

1	PREPARING ROW	STA	90
2	EXCAVATION	CY	23,190
3	EMBANKMENT	CY	10,147
4	REMOVING STAB BASE AND ASPH PAVE (12"-18")	SY	45
5	REMOVING TREATED BASE (8")	SY	12,074
6	12-INCH THICK CALICHE FLEXIBLE BASE	SY	29,237
7	8-INCH THICK CALICHE FLEXIBLE BASE	SY	5,255
8	8-INCH PREPARED SUBGRADE	SY	34,492
9	PRIME COAT (MC-30)	GAL	2,785
10	TYPE C HMAC	TON	4,551
11	6-INCH FIBER REINFORCED CONCRETE PAVEMENT	SY	514
12	CONCRETE HEADER	LF	406
13	RIPRAP (MOW STRIP) (4 IN)	CY	41
14	REMOVE STR (SMALL FENCE)	LF	1,608
15	MOBILIZATION	LS	1
16	BARRICADES, SIGNS AND TRAFFIC HANDLING	LS	1
17	STORM WATER POLLUTION PREVENTION PLAN	LS	1
18	ROCK FILTER DAMS (INSTALL)(TY 2)	LF	115
19	ROCK FILTER DAMS (REMOVE)	LF	115
20	BIODEG EROSN CONT LOG (INSTALL) (8")	LF	729
21	BIODEG EROSN CONT LOG (REMOVE)	LF	729
22	TEMP SEDMT CONT FENCE (INSTALL)	LF	6,299
23	TEMP SEDMT CONT FENCE (REMOVE)	LF	6,299
24	CONC CURB AND GUTTER	LF	3,199
25	MTL -W-BEAM GD FEN (TIM POST)	LF	831
26	MTL -W-BEAM GD FEN (LOW FILL CULVERT)	LF	75
27	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	4
28	MTL BM GD FEN (LONG SPAN SYSTEM)	EA	4
29	GUARDRAIL END TREATMENT (INSTALL)	EA	4
30	INSTALL NEW WIRE FENCE (TY C)	LF	1,587
31	ALUMINUM SIGNS (TY A)	SF	40
32	IN SM RD SN SUP&AM TY 10BWG(1)SA(P)	EA	8
33	REMOVE SM RD SN SUP&AM	EA	1
34	INSTL OM ASSM (OM-3)(TWT)(WAS)(R)	EA	10
35	REFL PROF PAV MRK TY I (W) 4" (SLD) (090 MIL)	LF	17,706
36	REFL PAV MRK TY I (W) 24" (SLD) (090 MIL)	LF	22
37	REFL PROF PAV MRK TY I (Y) 4" (SLD) (090 MIL)	LF	17,765
38	REFL PAV MRKR TY-II-A-A	EA	444
39	PAV SURF PREP FOR MARK (4")	LF	35,471
40	PAV SURF PREP FOR MARK (24")	LF	22
41	WATER VALVE ADJUSTMENT TO GRADE	EA	2
42	CONCRETE CAP PROTECTION	SY	1,781
43	CONCRETE FLUME	EA	1
44	RIPRAP (STONE PROTECTION)(12 IN)	CY	425
45	CONC BOX CULV (5 FT X 2 FT)	LF	362
46	CONC BOX CULV (6 FT X 2 FT)	LF	480
47	WINGWALL (PW-1) (HW=4 FT)	EA	1
48	SET (PIPE RUNNER ASSEMBLY)	EA	32
49	SET (TY I)(S=5 FT)(HW=3 FT)(2:1)(C)	EA	6
50	SET (TY I)(S=5 FT)(HW=4 FT)(2:1)(C)	EA	4
51	SET (TY I)(S=5 FT)(HW=3 FT)(3:1)(C)	EA	2
52	SET (TY I)(S=5 FT)(HW=4 FT)(3:1)(C)	EA	1
53	SET (TY I)(S=5 FT)(HW=3 FT)(4:1)(C)	EA	6
54	SET (TY I)(S=5 FT)(HW=4 FT)(4:1)(C)	EA	1
55	SET (TY I)(S=6 FT)(HW=3 FT)(2:1)(C)	EA	12
56	ABANDONED GAS LINE REMOVAL 3" (IN ROW)	LF	1,425
57	ANADONED GAS LINE REMOVAL 4" (IN ROW)	LF	1,065

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TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
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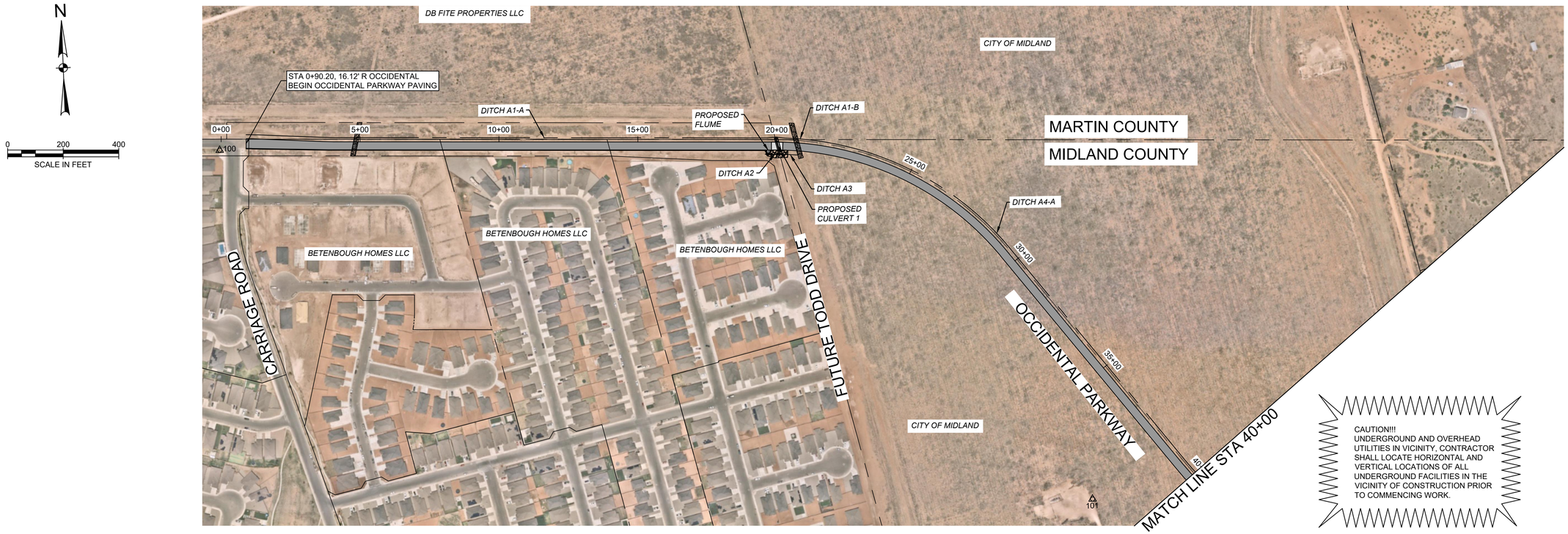
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

QUANTITIES

SHEET NUMBER 3 OF 217



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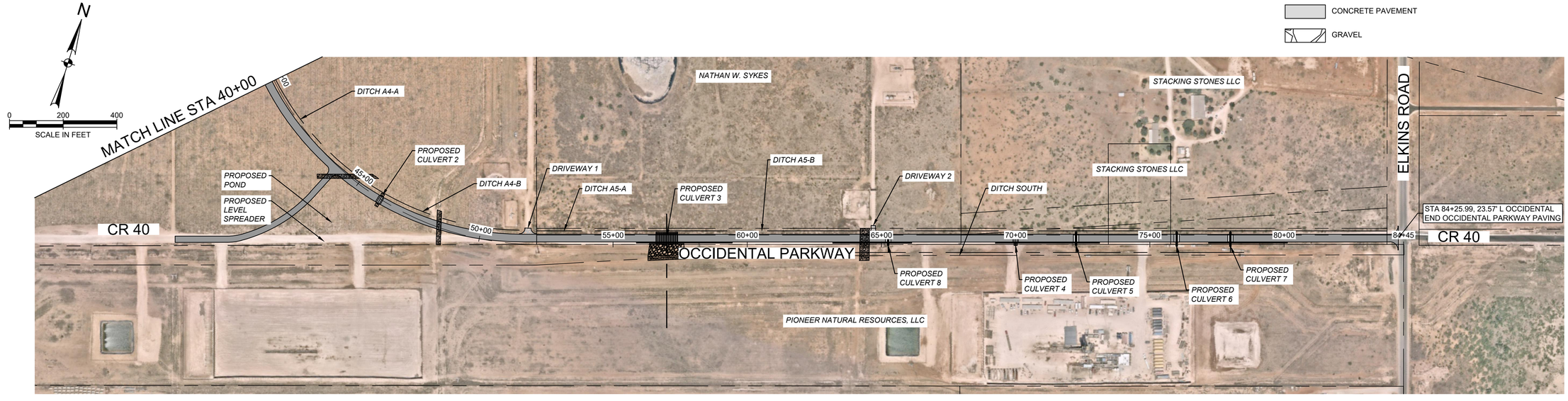
CENTERLINE CURVE TABLE					
CURVE NO.	RADIUS	DELTA	CURVE LENGTH	CHORD BEARING	CHORD DISTANCE
1	1090.00'	50°22'27"	958.32'	S63°55'38"E	927.75'
2	1090.00'	65°41'24"	1249.69'	S71°35'00"E	1182.36'

CENTERLINE COORDINATES			
STATION	NORTHING	EASTING	DESCRIPTION
0+0.00	10727721.62	1760653.52	BEGIN
19+95.98	10727690.76	1762649.26	P.C.
29+54.30	10727283.00	1763482.61	P.T.
39+65.96	10726493.91	1764115.69	P.C.
52+15.66	10726120.41	1765237.51	P.T.
84+45.25	10726925.41	1768365.16	END

SURVEY CONTROL POINTS				
POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
100	10726380.24	1763770.65	2801.32'	SET IRON ROD TURNING POINT
101	10727681.67	1760647.65	2810.30'	SET IRON ROD TURNING POINT
102	10727203.92	1771904.83	2808.67'	FOUND IRON ROD TURNING POINT

LEGEND FOR PROJECT LAYOUT

- 100 — CONTROL POINT NO.
- 0+00 — ULTIMATE CENTERLINE
- ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- GRAVEL



NOTES:

1. BASIS OF BEARING IS THE TEXAS COORDINATE SYSTEM CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (NAD83). DISTANCES SHOWN ARE US SURVEY FEET DISPLAYED IN SURFACE VALUES WITH A SCALE FACTOR OF 1.00007025511419 FROM STATE PLANE.

OCCIDENTAL PARKWAY
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MIDLAND, TEXAS

MIDLAND Engineering Services

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TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB TAYLOR HALFF 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

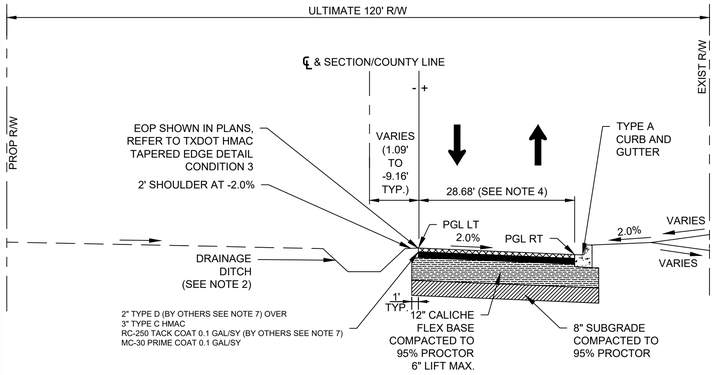
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

PROJECT LAYOUT & SURVEY CONTROL

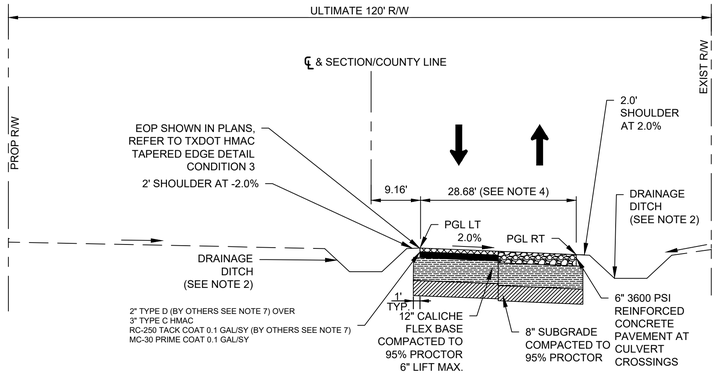
SHEET NUMBER 4 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C100-PROJ-45715.dwg DATE: August 13, 2024, TIME: 3:29 PM, USER: ak3453, AVO: 45715.006



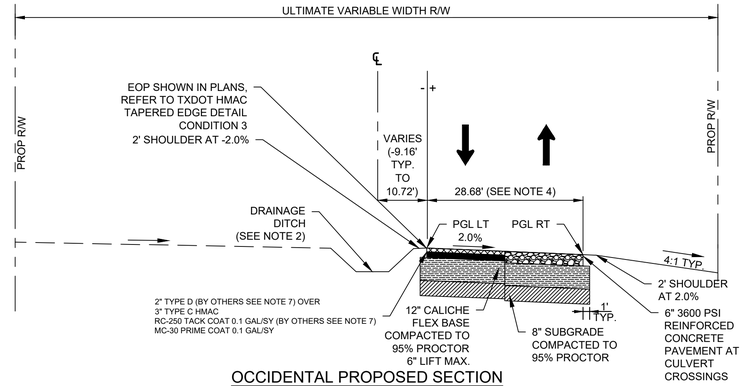
OCCIDENTAL PROPOSED SECTION

BEGIN TO STA 19+81
N.T.S.



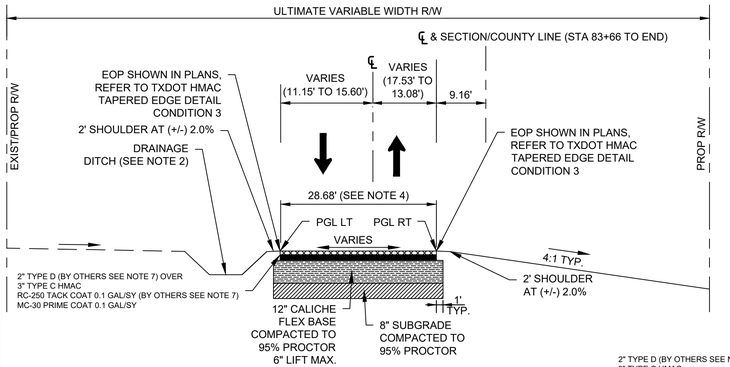
OCCIDENTAL PROPOSED SECTION

STA 19+81 TO 20+83
N.T.S.



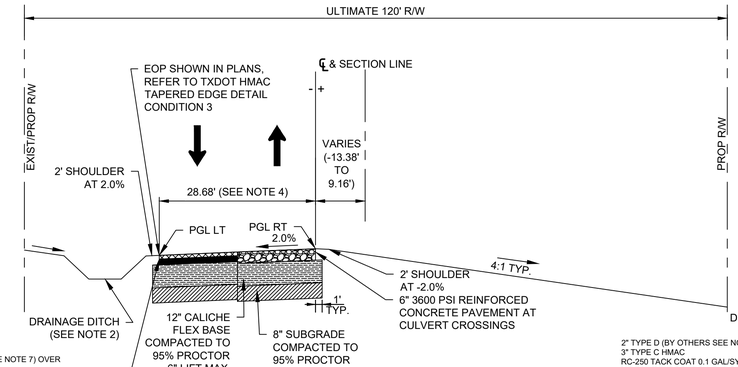
OCCIDENTAL PROPOSED SECTION

STA 20+83 TO 46+11
N.T.S.



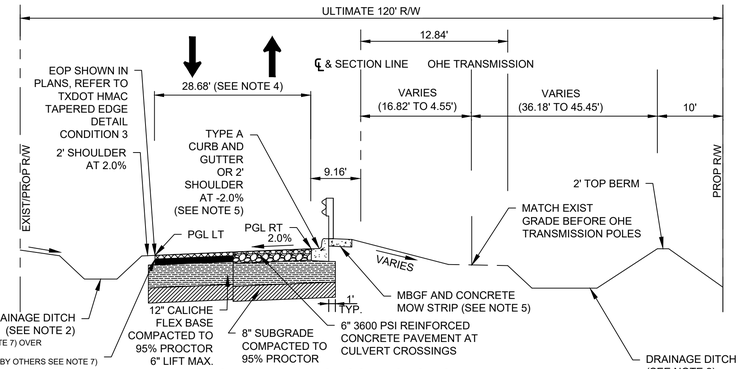
OCCIDENTAL PROPOSED SECTION

CROSS SLOPE TRANSITION
STA 46+11 TO 47+20, 83+66 TO END
N.T.S.



OCCIDENTAL PROPOSED SECTION

STA 47+20 TO 55+88, 80+13 TO 83+66
N.T.S.

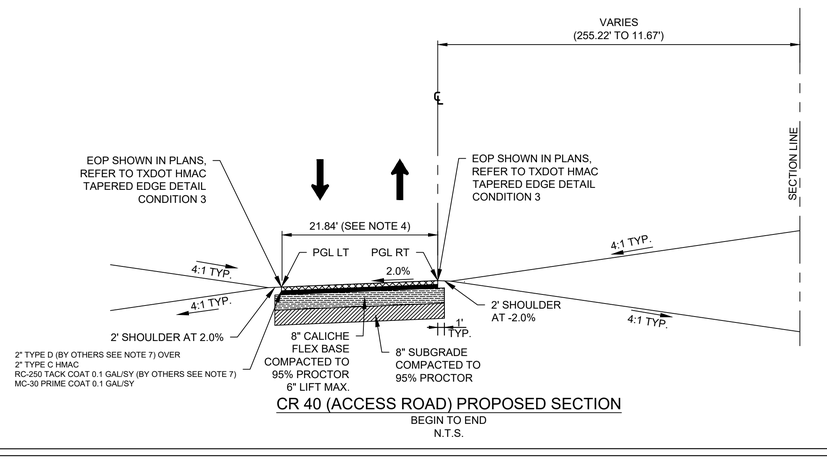


OCCIDENTAL PROPOSED SECTION

STA 55+88 TO 80+13
N.T.S.

NOTES:

1. ALL TYPICAL SECTIONS ARE CUT LOOKING UPSTATION.
2. TYPICAL DITCH AND BERM SIDE SLOPES VARY (2:1 MAX). REFER TO CROSS SECTIONS FOR DETAILS (H:V).
3. FULL PAVEMENT WIDTH SHOWN. REFER TO PAVEMENT MARKINGS AND SIGNAGE SHEETS FOR LANE WIDTHS AND STRIPING DIMENSIONS.
4. PROPOSED TYPE A CURB, METAL BEAM GUARD FENCE, AND MOW STRIP TO BE INSTALLED ONLY WHERE SHOWN ON THE PLANS. OTHERWISE 2 FT SHOULDER DRAINING TOWARDS BERM WILL BE UTILIZED.
5. PROPOSED FLEX BASE AND COMPACTED SUBGRADE SHALL EXTEND A MINIMUM OF 1.0 FT PAST THE PROPOSED EDGE OF PAVEMENT OR BACK OF CURB.
6. PROPOSED SECTIONS WITH SPLIT PAVEMENT ARE FOR INFORMATIONAL PURPOSES ONLY TO DEPICT THE PAVEMENT STRUCTURE FOR THOSE IDENTIFIED AREAS. REFER TO PAVING PLAN AND PROFILE FOR EXACT LIMITS OF CONCRETE AND ASPHALT PAVING.
7. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**



CR 40 (ACCESS ROAD) PROPOSED SECTION

BEGIN TO END
N.T.S.

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TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HATS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
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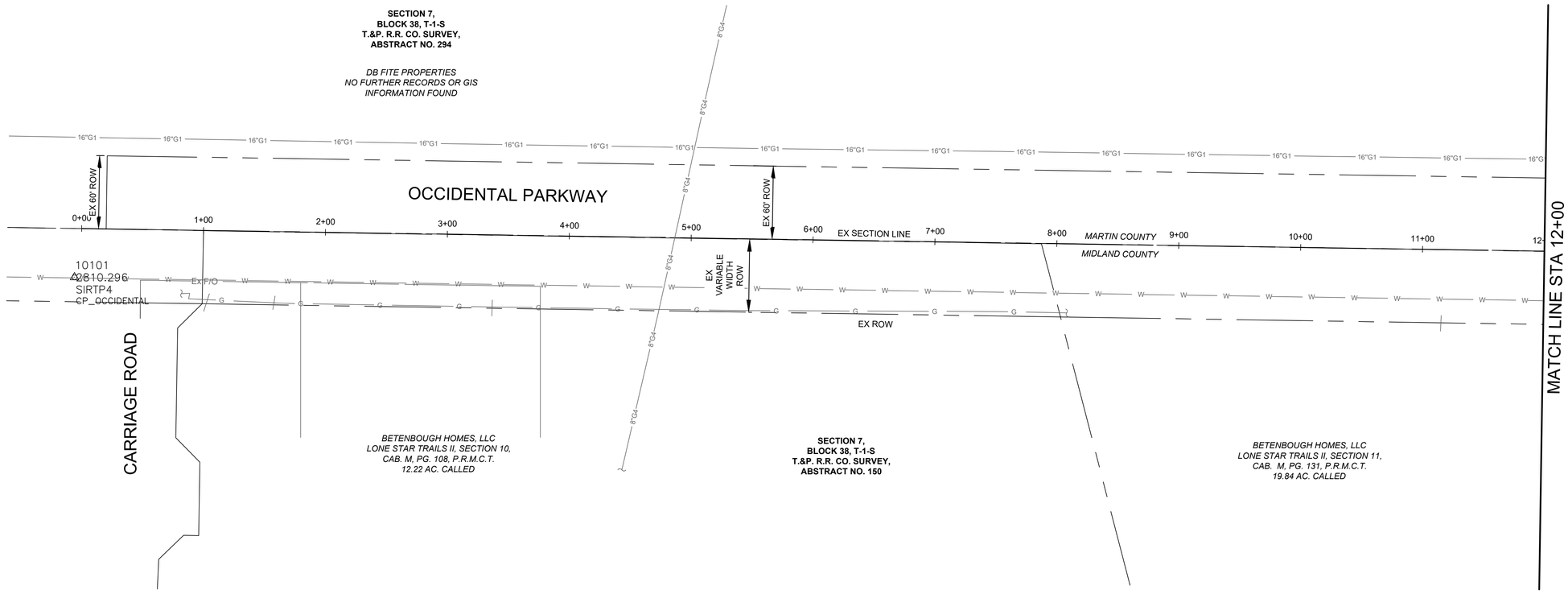
CHECKED BY:	JTH
SCALE:	AS NOTED

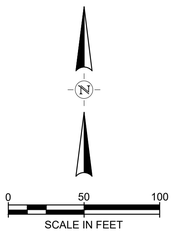
SHEET TITLE

TYPICAL SECTIONS

SHEET NUMBER 5 OF 217

FILE NAME: A:\45000s\45715\006\CAD\Sheets\C200-TYP-45715.dwg DATE: August 13, 2024, TIME: 3:30 PM, USER: ah3453 AVO: 45715.006





LEGEND

- SECTION LINES / EXISTING PROPERTY LINES
- EXISTING EASEMENT
- PROPOSED RIGHT OF WAY
- PROPOSED EASEMENT
- PROPOSED OCCIDENTAL PAVING IMPROVEMENTS
- PROPOSED RIGHT OF WAY/ EASEMENT TO BE DEDICATED BY PLAT
- PROPOSED EASEMENT TO BE ACQUIRED
- PROPOSED RIGHT OF WAY TO BE ACQUIRED

G=ATMOS
G1=BCC PIPELINE (FRONTIER)
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

NOTES:

1. BASIS OF BEARING IS THE TEXAS COORDINATE SYSTEM CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (NAD83). DISTANCES SHOWN ARE US SURVEY FEET DISPLAYED IN SURFACE VALUES WITH A SCALE FACTOR OF 1.00007025511419 FROM STATE PLANE.

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TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
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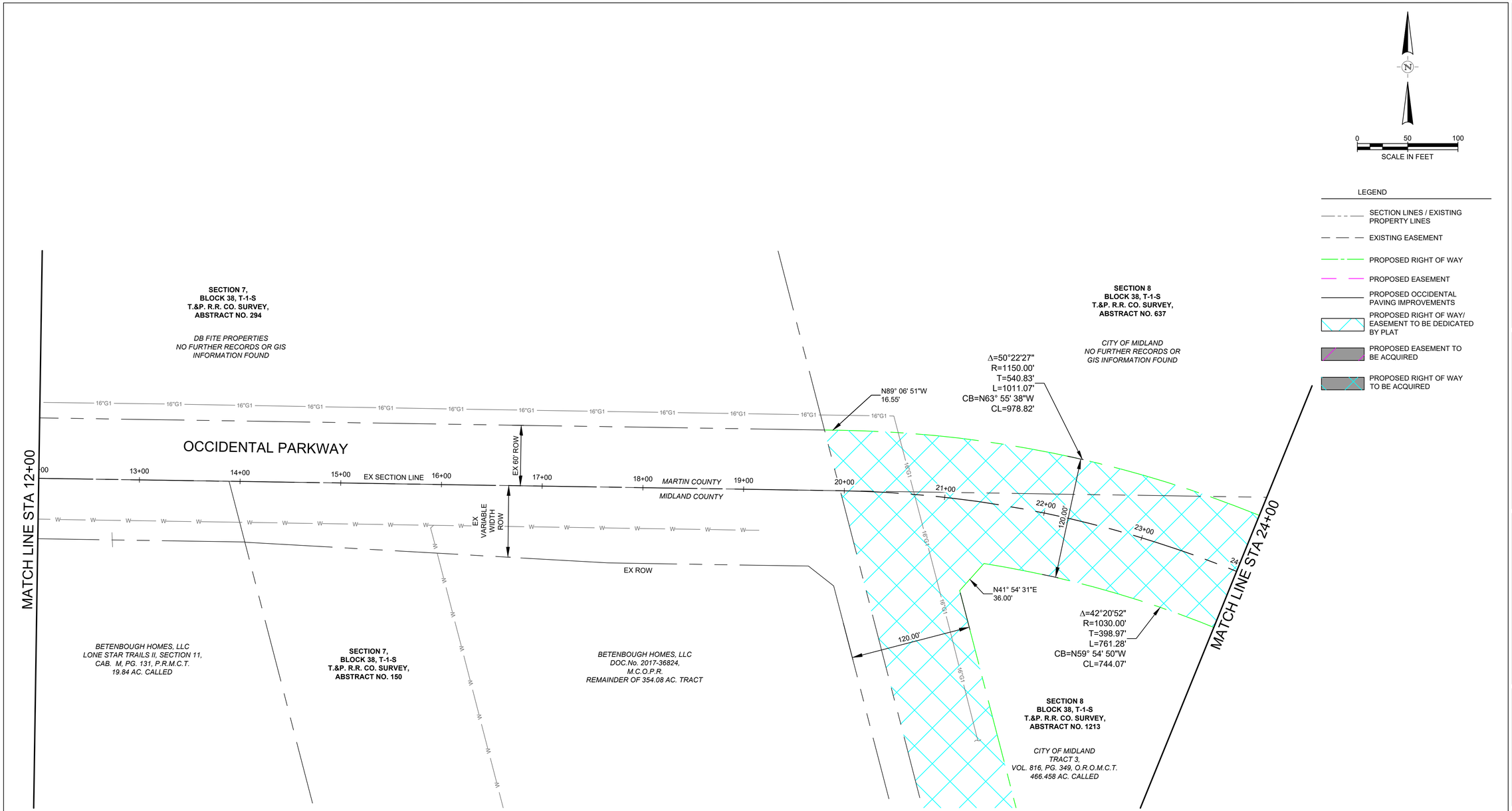
SHEET TITLE

ROW MAP

BEGIN TO STA 12+00

SHEET NUMBER 6 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C300-ROW-45715.dwg DATE: August 13, 2024, TIME: 3:30 PM, USER: ah3453 AVO: 45715.006



NOTES:

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G=ATMOS
G1=BCC PIPELINE (FRONTIER)
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

OCCIDENTAL PARKWAY
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REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
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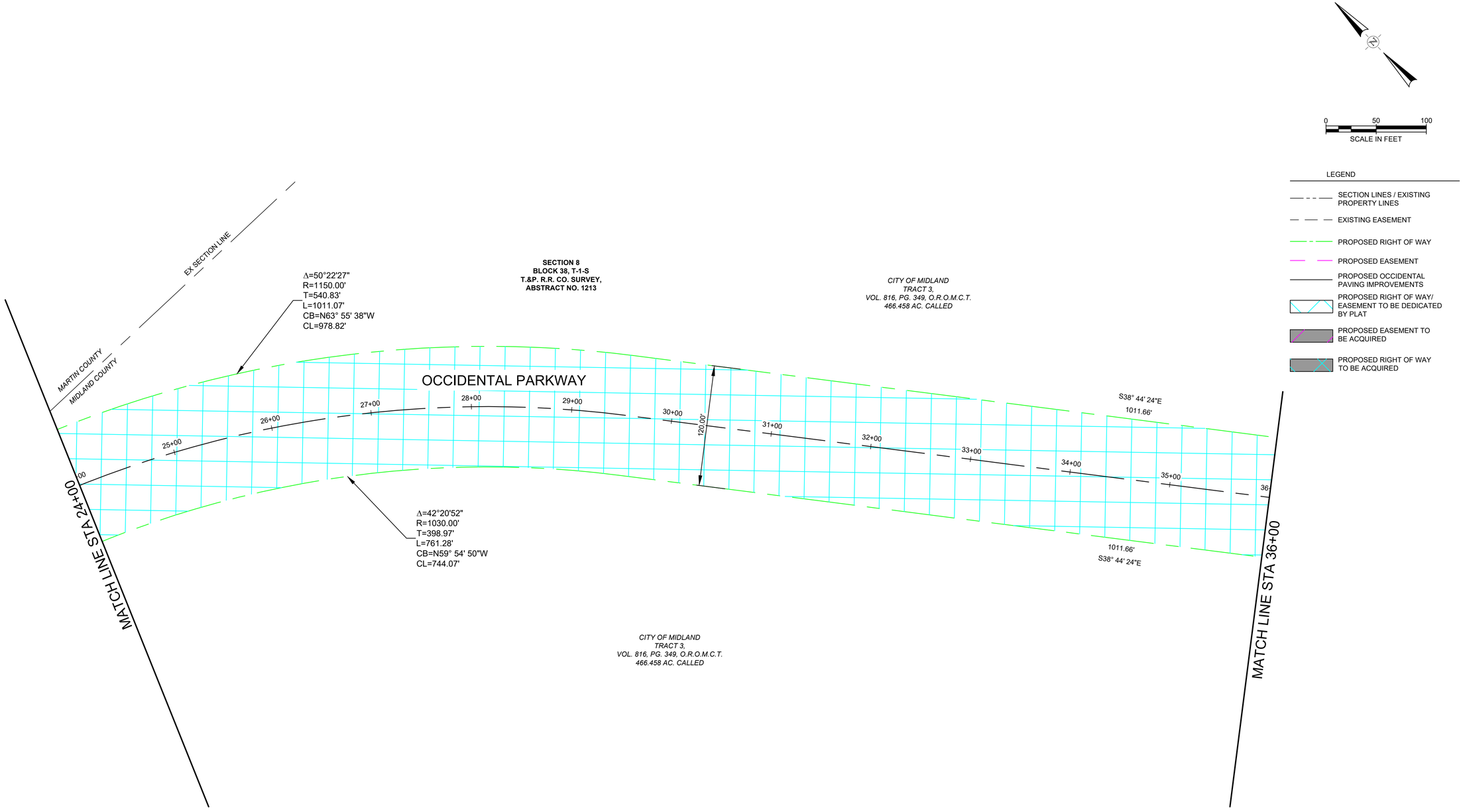
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE
ROW MAP
STA 12+00 TO STA 24+00

SHEET NUMBER 7 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C300-ROW-45715.dwg DATE: August 13, 2024, TIME: 3:30 PM, USER: ah3453 AVO: 45715.006



0 50 100
SCALE IN FEET

LEGEND

- SECTION LINES / EXISTING PROPERTY LINES
- EXISTING EASEMENT
- PROPOSED RIGHT OF WAY
- PROPOSED EASEMENT
- PROPOSED OCCIDENTAL PAVING IMPROVEMENTS
- PROPOSED RIGHT OF WAY/ EASEMENT TO BE DEDICATED BY PLAT
- PROPOSED EASEMENT TO BE ACQUIRED
- PROPOSED RIGHT OF WAY TO BE ACQUIRED

NOTES:

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G7=WTG
GAS=UNKNOWN

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
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FORT WORTH, TEXAS 76137-2797
TEL: 817.847.1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
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DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

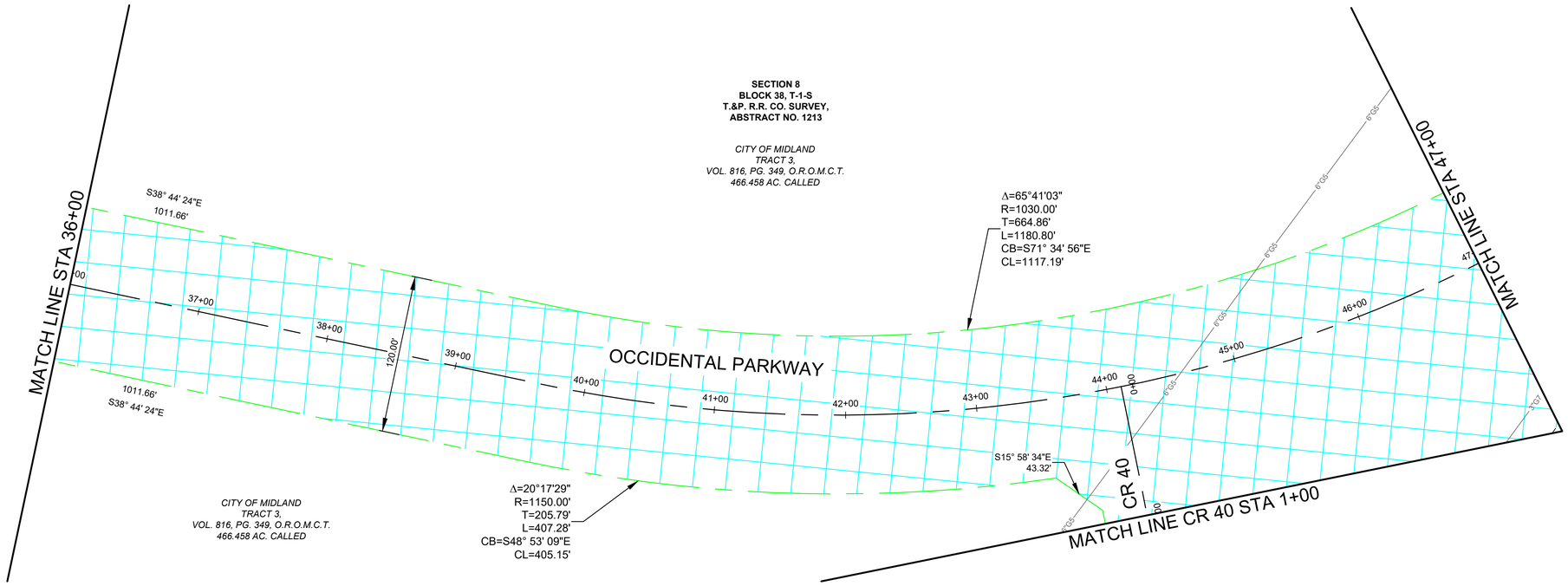
SHEET TITLE

ROW MAP

STA 24+00 TO STA 36+00

SHEET NUMBER 8 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C300-ROW-45715.dwg DATE: August 13, 2024, TIME: 3:30 PM, USER: ah3453 AVO: 45715.006



0 50 100

SCALE IN FEET

LEGEND

- SECTION LINES / EXISTING PROPERTY LINES
- EXISTING EASEMENT
- PROPOSED RIGHT OF WAY
- PROPOSED EASEMENT
- PROPOSED OCCIDENTAL PAVING IMPROVEMENTS
- PROPOSED RIGHT OF WAY/ EASEMENT TO BE DEDICATED BY PLAT
- PROPOSED EASEMENT TO BE ACQUIRED
- PROPOSED RIGHT OF WAY TO BE ACQUIRED

NOTES:

1. BASIS OF BEARING IS THE TEXAS COORDINATE SYSTEM CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (NAD83). DISTANCES SHOWN ARE US SURVEY FEET DISPLAYED IN SURFACE VALUES WITH A SCALE FACTOR OF 1.00007025511419 FROM STATE PLANE.

G=ATMOS
G1=BCC PIPELINE (FRONTIER)
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL: 817.847.1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

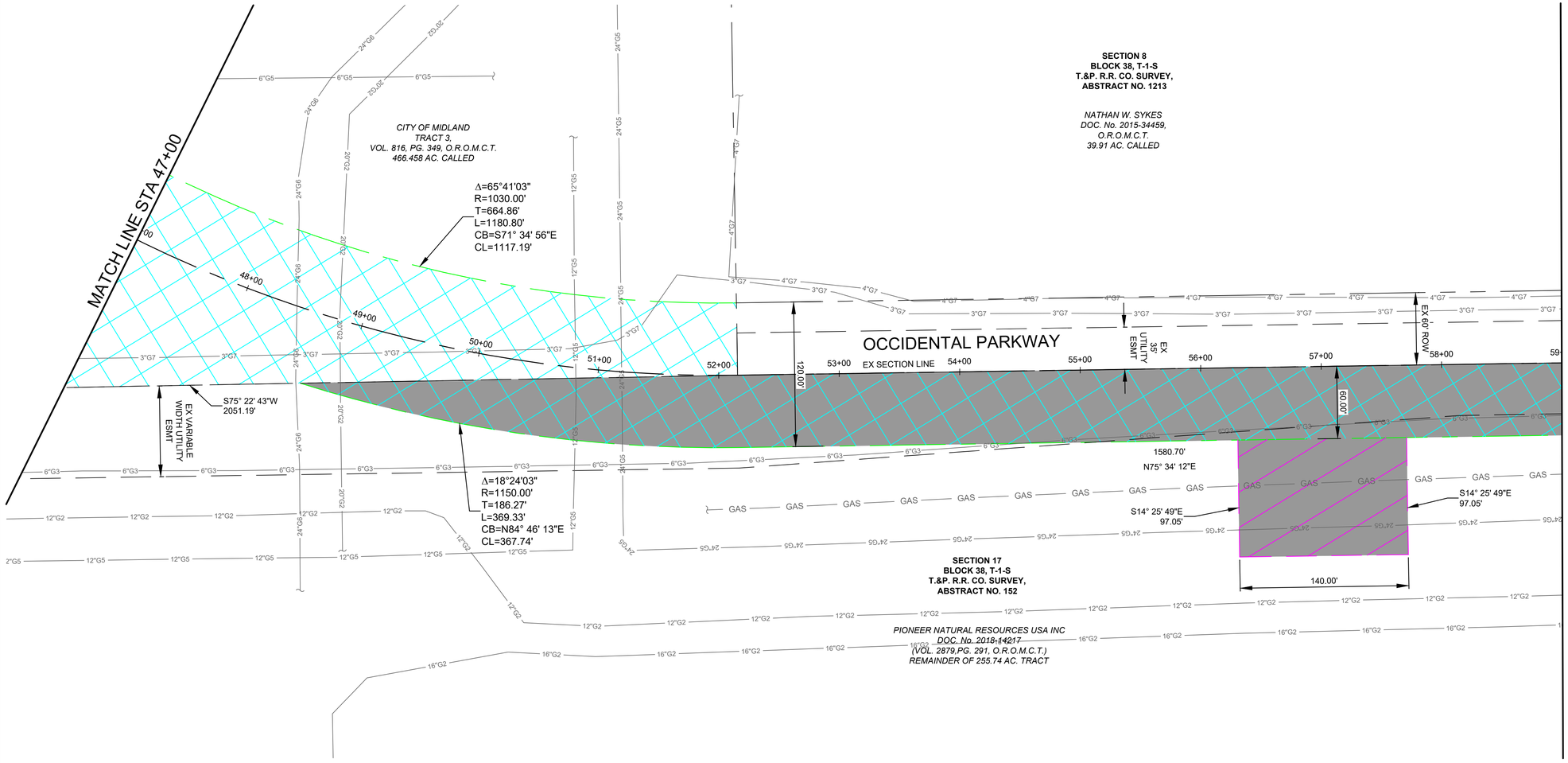
SHEET TITLE

ROW MAP

STA 36+00 TO STA 47+00

SHEET NUMBER 9 OF 217

FILE NAME: A:\45000s\45715006\CADD\Sheets\C300-ROW-45715.dwg DATE: August 13, 2024, TIME: 3:30 PM, USER: ah3453 AVO: 45715.006



0 50 100
SCALE IN FEET

LEGEND

- SECTION LINES / EXISTING PROPERTY LINES
- EXISTING EASEMENT
- PROPOSED RIGHT OF WAY
- PROPOSED EASEMENT
- PROPOSED OCCIDENTAL PAVING IMPROVEMENTS
- PROPOSED RIGHT OF WAY/ EASEMENT TO BE DEDICATED BY PLAT
- PROPOSED EASEMENT TO BE ACQUIRED
- PROPOSED RIGHT OF WAY TO BE ACQUIRED

NOTES:

1. BASIS OF BEARING IS THE TEXAS COORDINATE SYSTEM CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (NAD83). DISTANCES SHOWN ARE US SURVEY FEET DISPLAYED IN SURFACE VALUES WITH A SCALE FACTOR OF 1.00007025511419 FROM STATE PLANE.

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MIDLAND, TEXAS

halff
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FORT WORTH, TEXAS 76137-2797
TEL: 817.847.1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HATE
127508
LICENSED PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

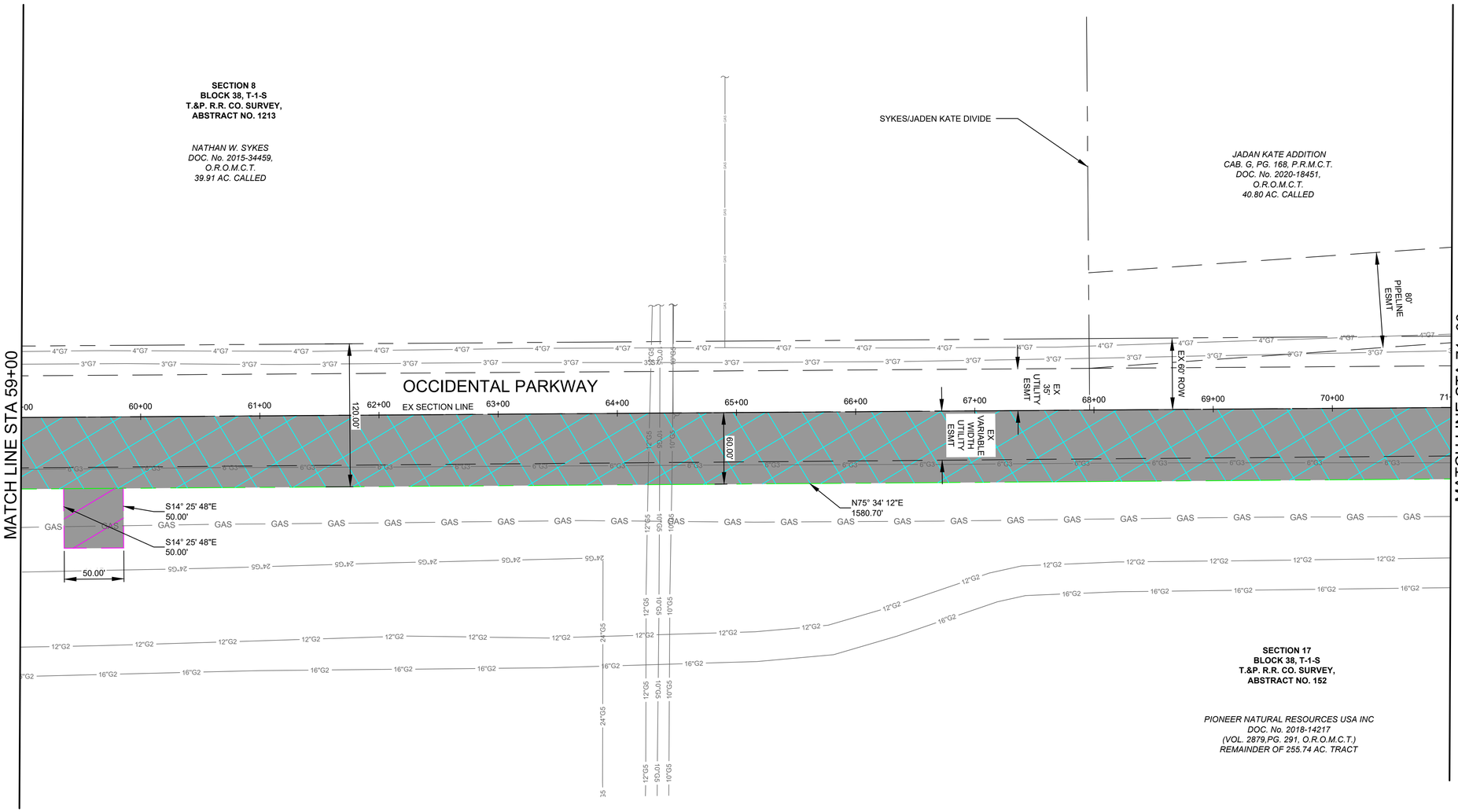
SHEET TITLE

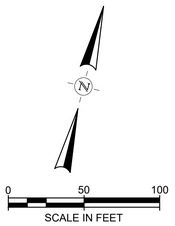
ROW MAP

STA 47+00 TO STA 59+00

SHEET NUMBER 10 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C300-ROW-45715.dwg DATE: August 13, 2024, TIME: 3:30 PM, USER: ah3453 AVO: 45715.006





LEGEND

- SECTION LINES / EXISTING PROPERTY LINES
- EXISTING EASEMENT
- PROPOSED RIGHT OF WAY
- PROPOSED EASEMENT
- PROPOSED OCCIDENTAL PAVING IMPROVEMENTS
- PROPOSED RIGHT OF WAY/ EASEMENT TO BE DEDICATED BY PLAT
- PROPOSED EASEMENT TO BE ACQUIRED
- PROPOSED RIGHT OF WAY TO BE ACQUIRED

NOTES:

1. BASIS OF BEARING IS THE TEXAS COORDINATE SYSTEM CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (NAD83). DISTANCES SHOWN ARE US SURVEY FEET DISPLAYED IN SURFACE VALUES WITH A SCALE FACTOR OF 1.0000702551141 9 FROM STATE PLANE.

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OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817)847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

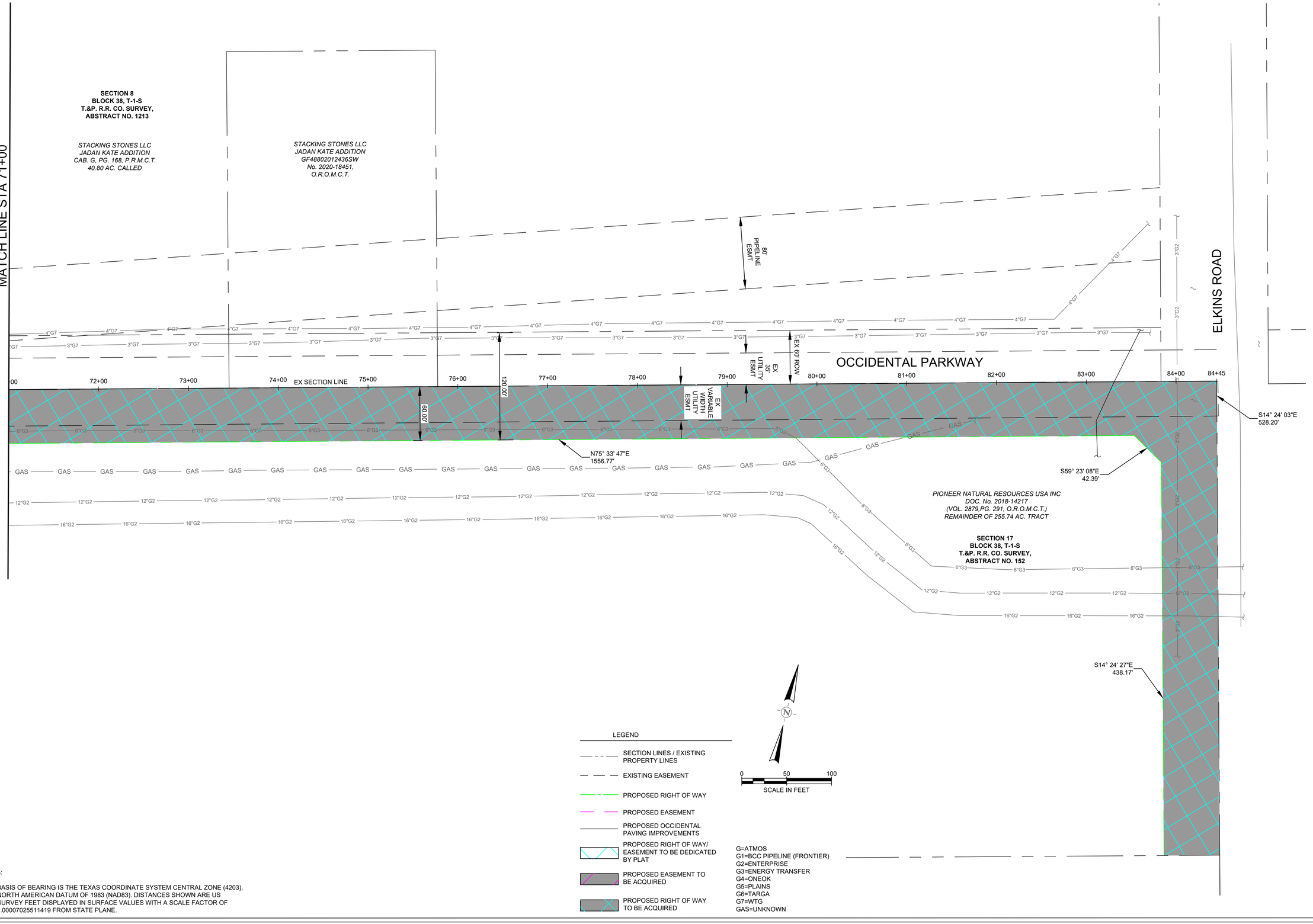
SHEET TITLE

ROW MAP

STA 59+00 TO STA 71+00

SHEET NUMBER 11 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C300-ROW-45715.dwg DATE: August 13, 2024, TIME: 3:30 PM, USER: ak3453 AVO: 45715.006



NOTES:

1. BASIS OF BEARING IS THE TEXAS COORDINATE SYSTEM CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (NAD83). DISTANCES SHOWN ARE US SURVEY FEET DISPLAYED IN SURFACE VALUES WITH A SCALE FACTOR OF 1.00007025511419 FROM STATE PLANE.

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL: 817.847.1422
TBPELS ENGINEERING FIRM #312

REVISION		
NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

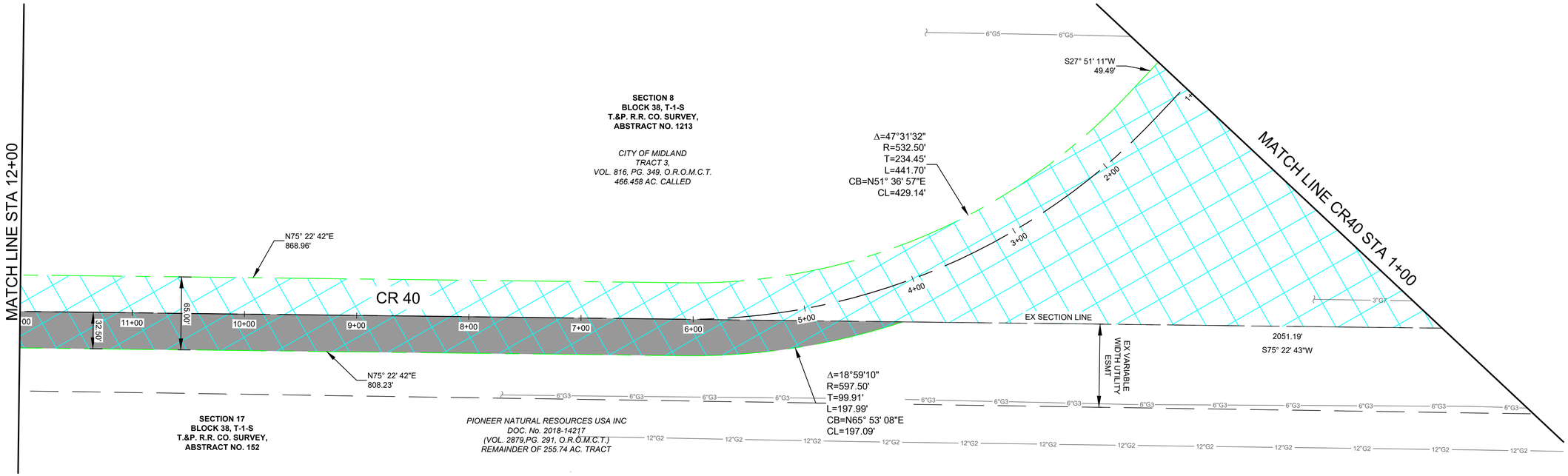
SHEET TITLE

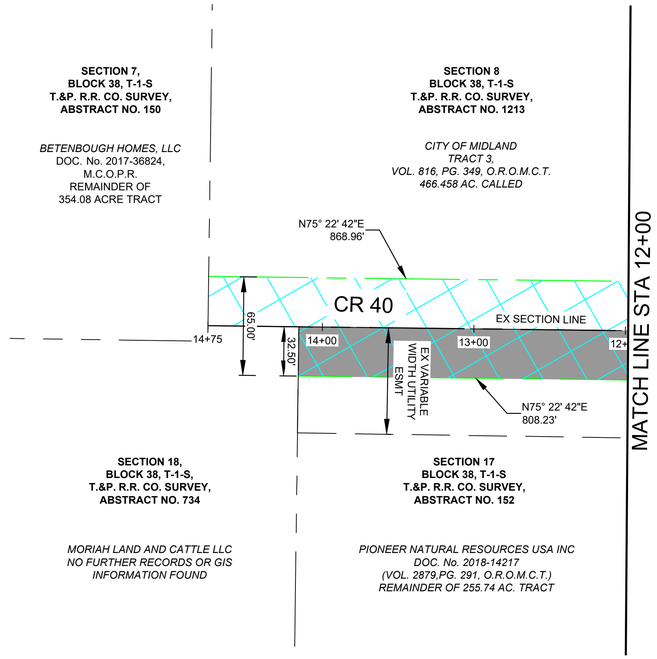
ROW MAP

STA 71+00 TO END

SHEET NUMBER 12 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C300-ROW-45715.dwg DATE: August 13, 2024, TIME: 3:30 PM, USER: ah3453 AVO: 45715.006





NOTES:

1. BASIS OF BEARING IS THE TEXAS COORDINATE SYSTEM CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (NAD83). DISTANCES SHOWN ARE US SURVEY FEET DISPLAYED IN SURFACE VALUES WITH A SCALE FACTOR OF 1.00007025511419 FROM STATE PLANE.

LEGEND

- SECTION LINES / EXISTING PROPERTY LINES
- EXISTING EASEMENT
- PROPOSED RIGHT OF WAY
- PROPOSED EASEMENT
- PROPOSED OCCIDENTAL PAVING IMPROVEMENTS
- PROPOSED RIGHT OF WAY/ EASEMENT TO BE DEDICATED BY PLAT
- PROPOSED EASEMENT TO BE ACQUIRED
- PROPOSED RIGHT OF WAY TO BE ACQUIRED

0 50 100
SCALE IN FEET

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MIDLAND, TEXAS

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2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL: 817.847.1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

JACOB T. HAYS
127559
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

ROW MAP

CR 40

SHEET NUMBER 13 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C300-ROW-45715.dwg DATE: August 13, 2024, TIME: 3:30 PM, USER: ah3453 AVO: 45715.006

NOTES:

1. PHASE 1 OF PROPOSED IMPROVEMENTS SHALL START AT CARRIAGE ROAD INTERSECTION AND TERMINATE AT THE POINT NOTED BELOW AT STA 52+00.
2. PHASE 2 OF PROPOSED IMPROVEMENTS SHALL START AT THE POINT NOTED BELOW AT STA 52+00 AND TERMINATE AT ELKINS ROAD.
3. CONTRACTOR SHALL NOT BEGIN SUBSEQUENT PHASE 2 UNTIL PHASE 1 HAS BEEN FULLY COMPLETED.
4. CONTRACTOR TO INSTALL TRAFFIC CONTROL MEASURES AND JERSEY BARRIER PROTECTION FOR EXISTING TRANSMISSION POWER POLES PRIOR TO COMMENCING PHASE 2 WORK. REFER TO DEMOLITION PLAN FOR JERSEY BARRIER LIMITS. COST FOR JERSEY BARRIER SHALL BE SUBSIDIARY TO THE "BARRICADES, SIGNS, AND TRAFFIC HANDLING" BID ITEM.

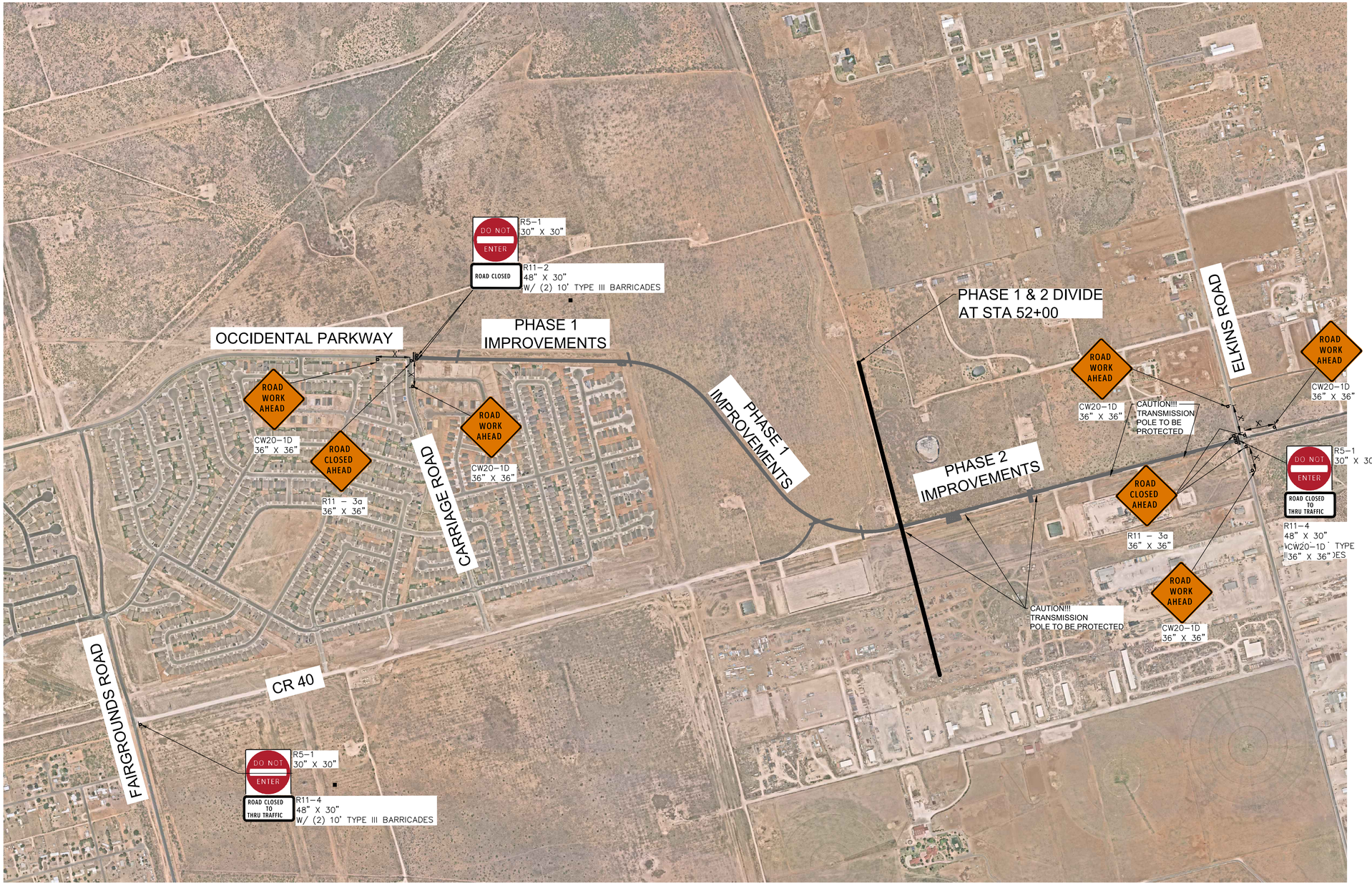
LEGEND FOR TRAFFIC CONTROL

- PROPOSED PAVEMENT
- SIGN
- TYPE III BARRICADE
- VERTICAL PANEL

POSTED SPEED	X DISTANCE
45	320'

0 500 1,000
SCALE IN FEET

N



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

CITY OF MIDLAND Engineering Services

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS 127558 LICENSED PROFESSIONAL ENGINEER CIVIL

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

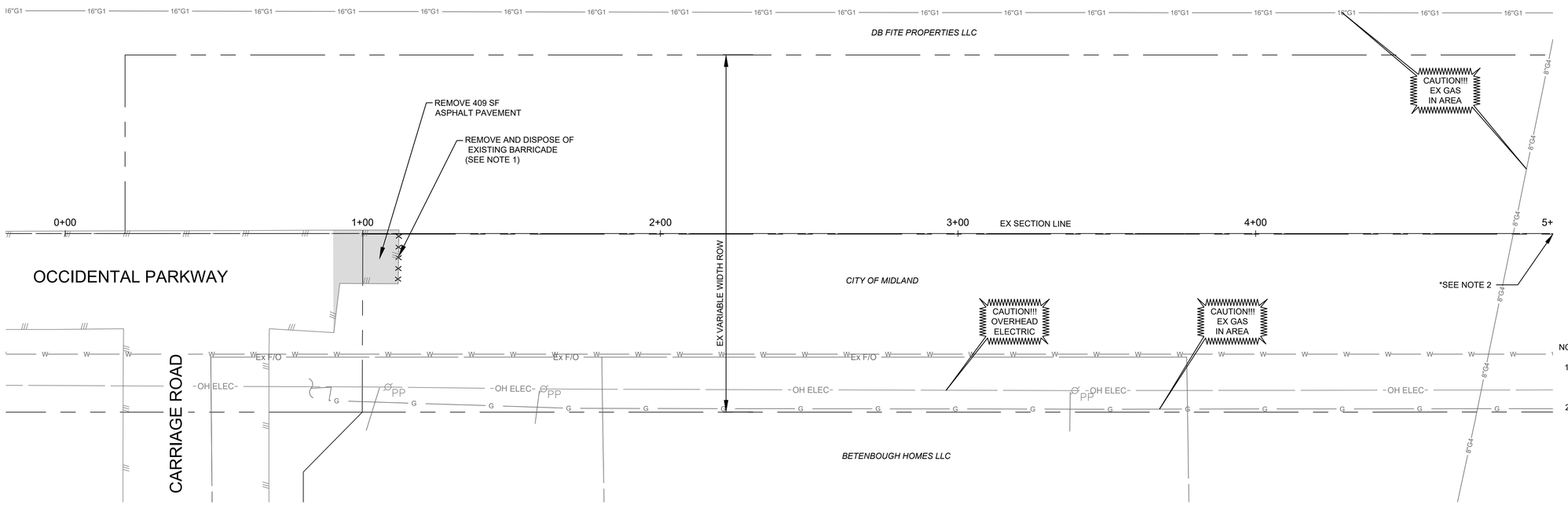
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

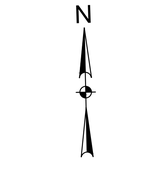
SHEET TITLE

TRAFFIC CONTROL AND SEQUENCING PLAN

SHEET NUMBER 14 OF 217

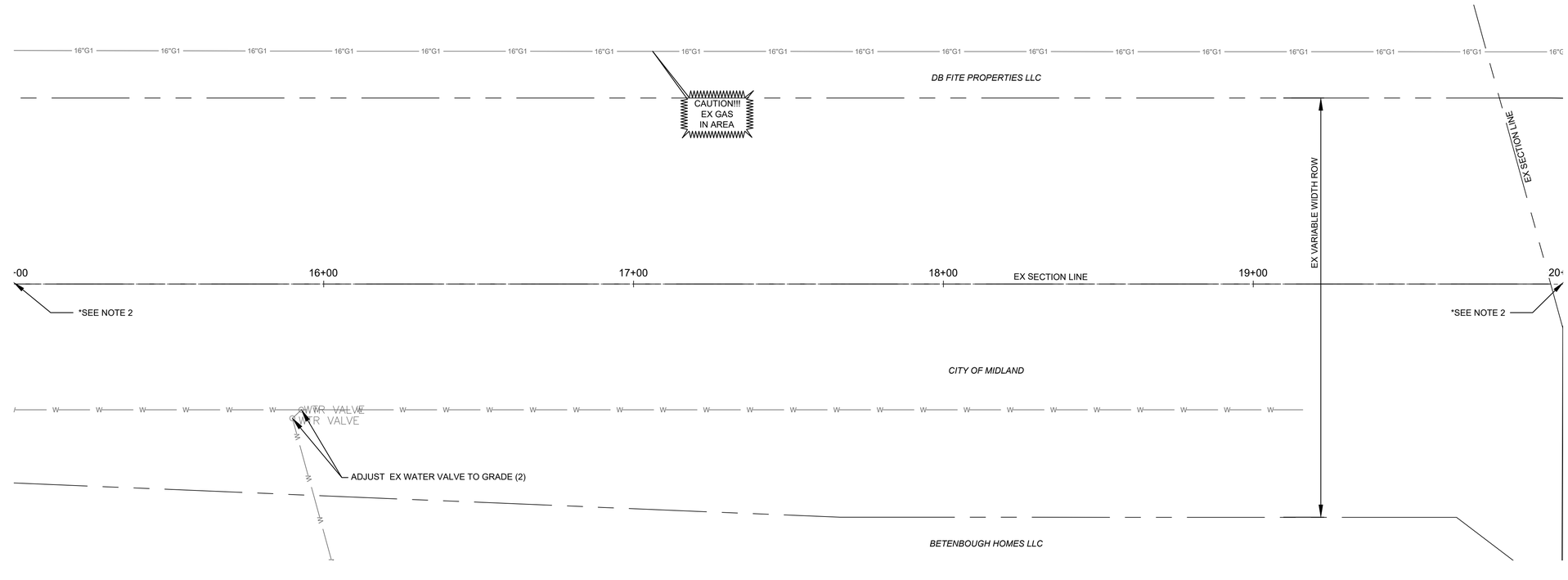
FILE NAME: A:\45000s\45715\0006\CADD\Sheets\C400-TCON-45715.dwg DATE: August 13, 2024, TIME: 3:31 PM, USER: ah3453 AVO: 45715.006





NOTES:

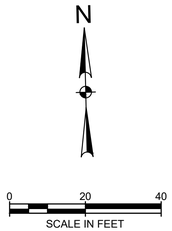
1. REMOVAL AND DISPOSAL OF EXISTING BARRICADE SHALL BE SUBSIDIARY TO THE "PREPARING ROW" BID ITEM.
2. RIGHT OF WAY SHALL BE PREPARED PER THE "PREPARING ROW" SPECIFICATION FOR ENTIRETY OF PROJECT LIMITS. HOWEVER THERE ARE NO ADDITIONAL ITEMS FOR REMOVAL BETWEEN THE FOLLOWING STATION RANGES: STA 5+00 TO 15+00, STA 20+00 TO 45+00.



LEGEND FOR DEMOLITION PLAN

- EXISTING ASPHALT TO BE REMOVED
- EXISTING GRAVEL TO BE REMOVED
- -X-X-X-X- MISCELLANEOUS REMOVAL
- JERSEY BARRIER

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.



G=ATMOS
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G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB TAYLOR HATT
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

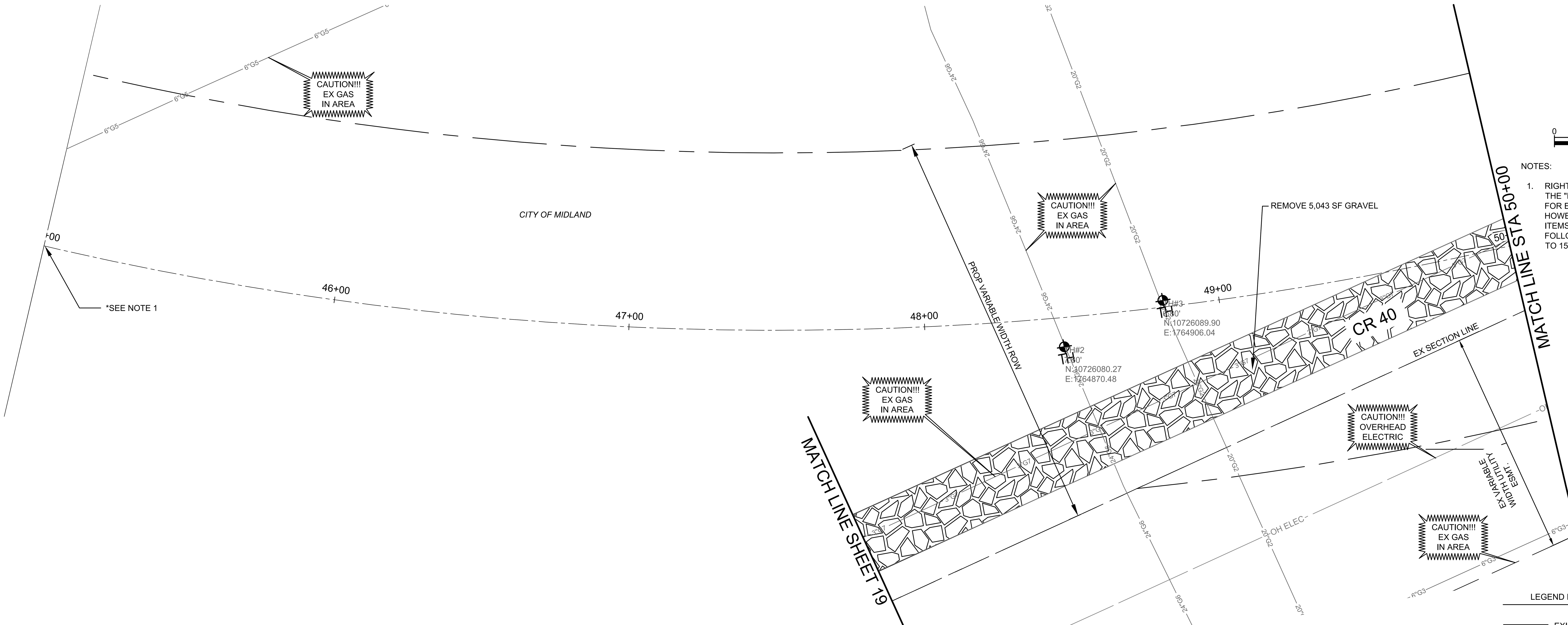
SHEET TITLE

DEMOLITION PLAN

BEGIN TO STA 20+00

SHEET NUMBER 15 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C500-DEMO-45715.dwg DATE: August 13, 2024, TIME: 3:31 PM, USER: ah3453 AVO: 45715.006



N

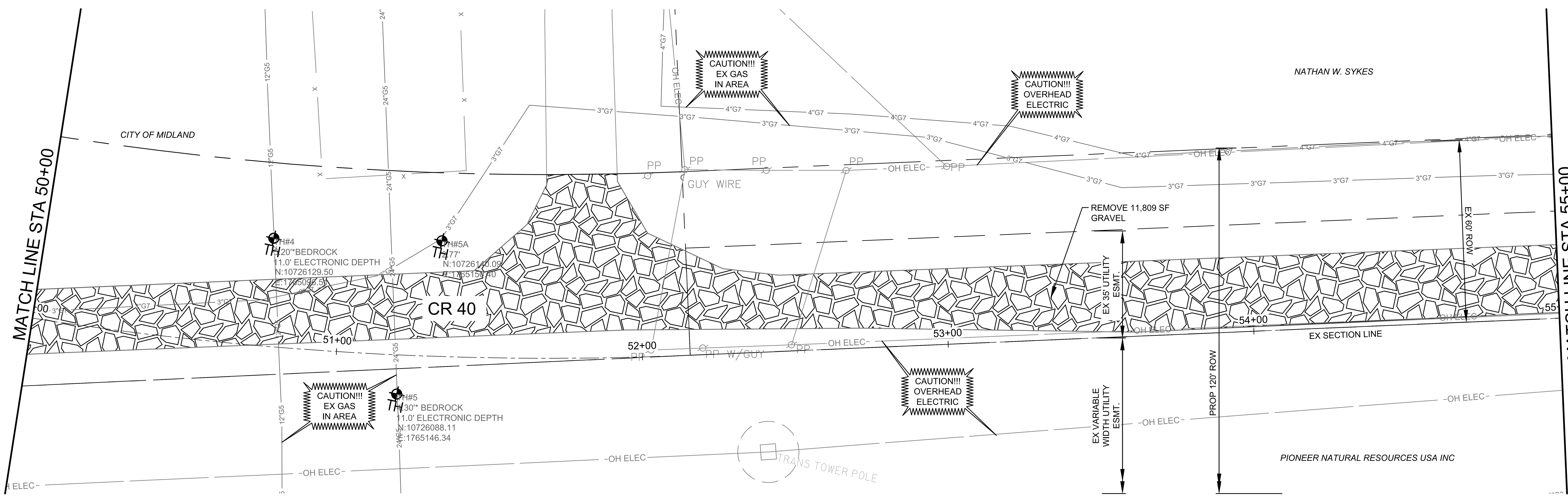
SCALE IN FEET (0, 20, 40)

NOTES:

1. RIGHT OF WAY SHALL BE PREPARED PER THE "PREPARING ROW" SPECIFICATION FOR ENTIRETY OF PROJECT LIMITS. HOWEVER THERE ARE NO ADDITIONAL ITEMS FOR REMOVAL BETWEEN THE FOLLOWING STATION RANGES: STA 5+00 TO 15+00, STA 20+00 TO 45+00.

LEGEND FOR DEMOLITION PLAN

- EXISTING ASPHALT TO BE REMOVED
- EXISTING GRAVEL TO BE REMOVED
- ·X·X·X·X MISCELLANEOUS REMOVAL
- JERSEY BARRIER



CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

N

SCALE IN FEET (0, 20, 40)

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OCCIDENTAL PARKWAY
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MIDLAND, TEXAS

MIDLAND Engineering Services

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2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
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TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

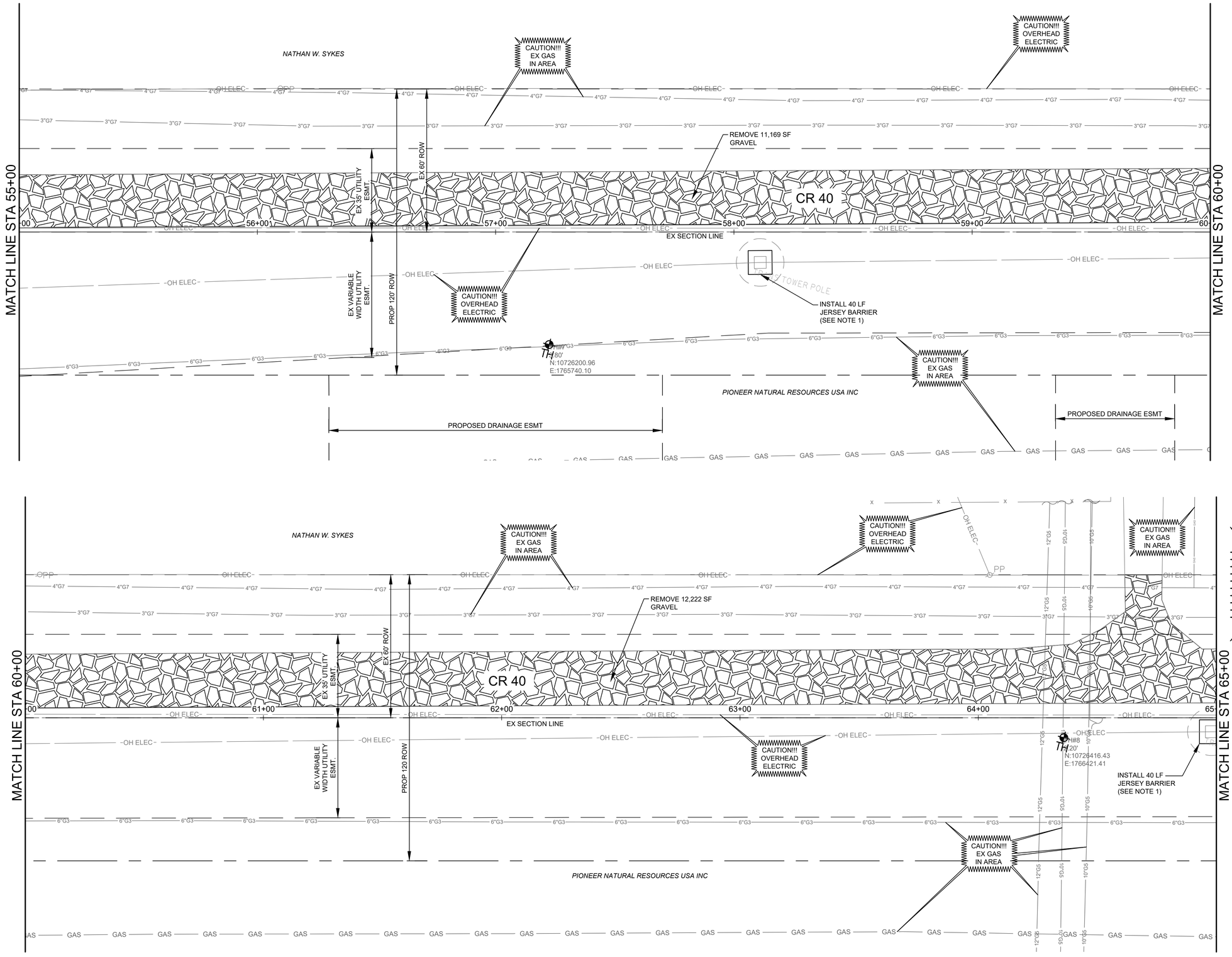
STATE OF TEXAS — JACOB T. HAYS — 137558 — LICENSED PROFESSIONAL ENGINEER

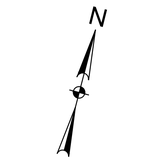
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE
DEMOLITION PLAN
STA 45+00 TO STA 55+00

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C500-DEMO-45715.dwg DATE: August 13, 2024, TIME: 3:31 PM, USER: ah3453 AVO: 45715.006





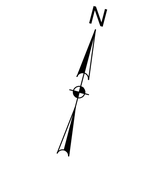
NOTES:

1. CONTRACTOR TO INSTALL JERSEY BARRIER PROTECTION FOR EXISTING TRANSMISSION POWER POLES PRIOR TO COMMENCING WORK. JERSEY BARRIER SHALL BE SUBSIDIARY TO "BARRICADES, SIGNS, AND TRAFFIC HANDLING" BID ITEM.

LEGEND FOR DEMOLITION PLAN

- EXISTING ASPHALT TO BE REMOVED
- EXISTING GRAVEL TO BE REMOVED
- ·X·X·X·X MISCELLANEOUS REMOVAL
- JERSEY BARRIER

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.



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OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JOSHUA T. HALFF 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

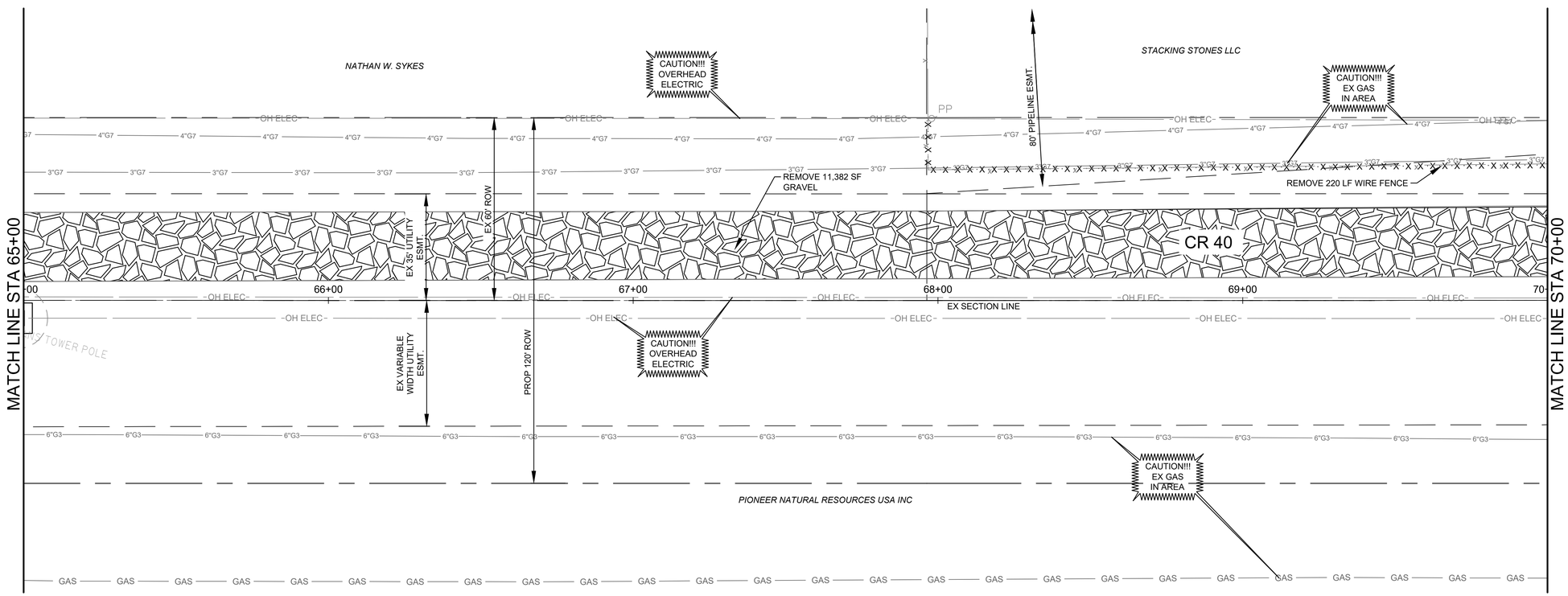
SHEET TITLE

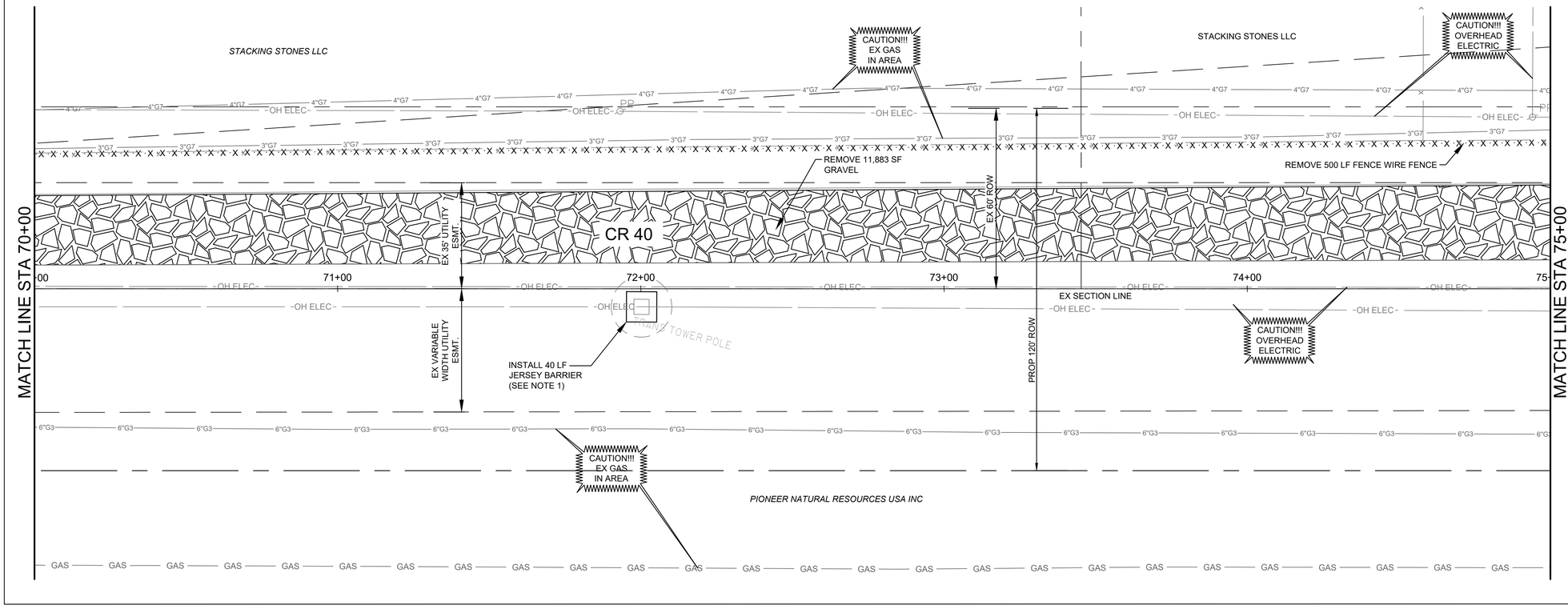
DEMOLITION PLAN

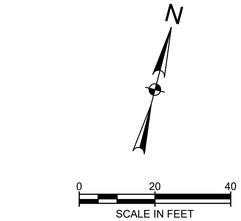
STA 55+00 TO STA 65+00

SHEET NUMBER 17 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C600-DEMO-45715.dwg DATE: August 13, 2024, TIME: 3:31 PM, USER: ah3453 AVO: 45715.006







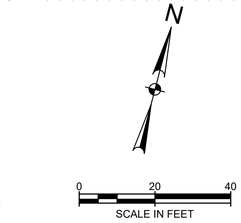
NOTES:

1. CONTRACTOR TO INSTALL JERSEY BARRIER PROTECTION FOR EXISTING TRANSMISSION POWER POLES PRIOR TO COMMENCING WORK. JERSEY BARRIER SHALL BE SUBSIDIARY TO "BARRICADES, SIGNS, AND TRAFFIC HANDLING" BID ITEM.

LEGEND FOR DEMOLITION PLAN

- EXISTING ASPHALT TO BE REMOVED
- EXISTING GRAVEL TO BE REMOVED
- ·X·X·X·X MISCELLANEOUS REMOVAL
- JERSEY BARRIER

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY. CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.



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OCCIDENTAL PARKWAY
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MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
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REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

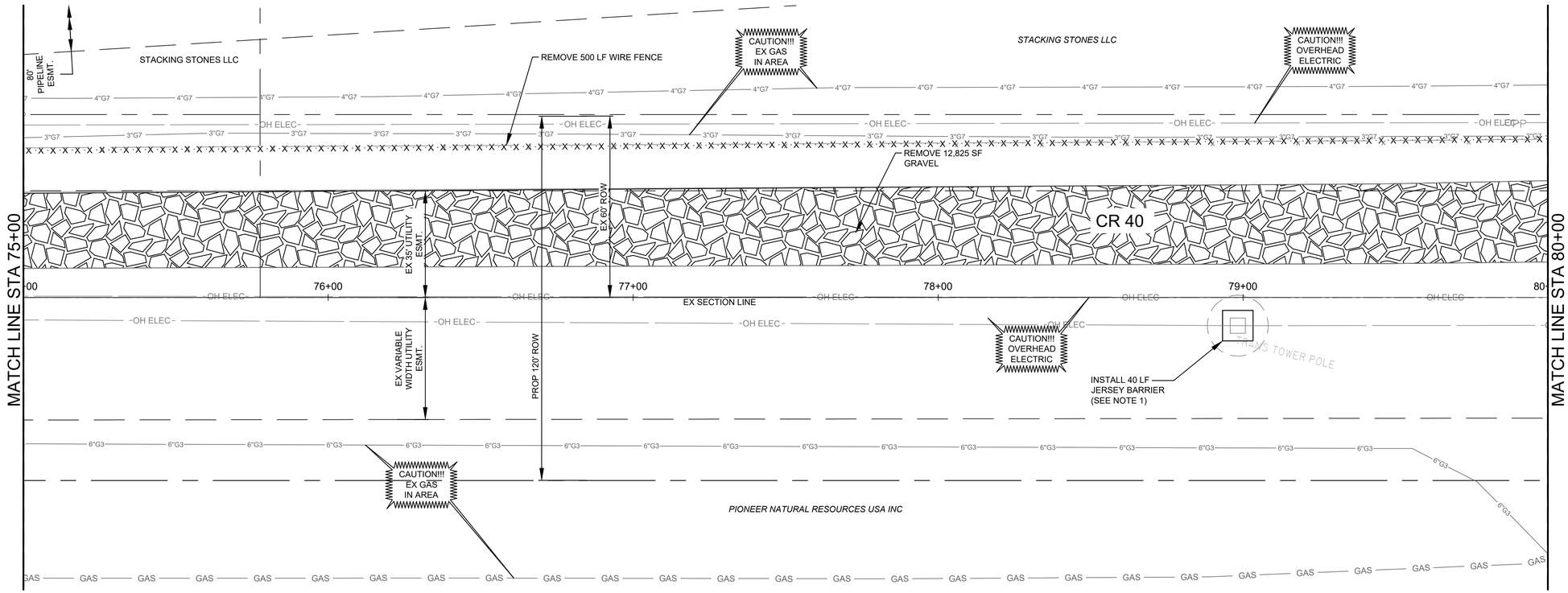
SHEET TITLE

DEMOLITION PLAN

STA 65+00 TO STA 75+00

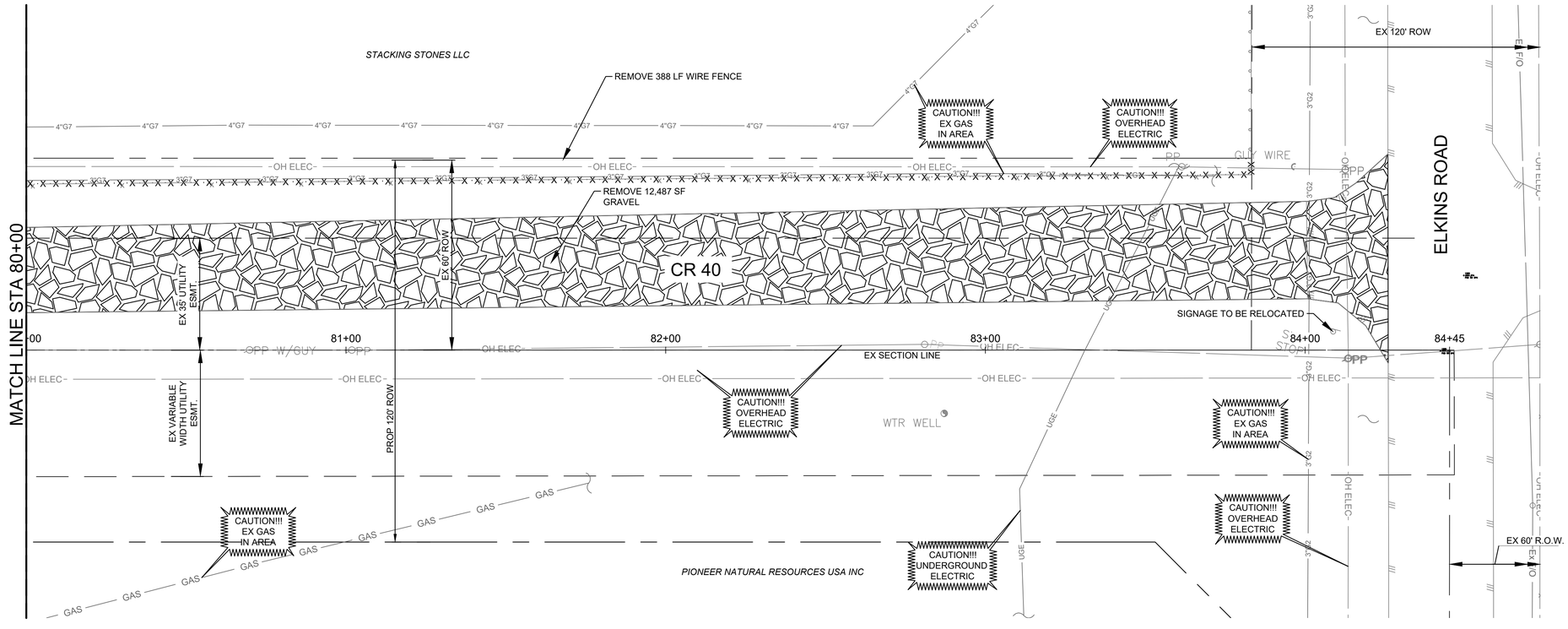
SHEET NUMBER 18 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C500-DEMO-45715.dwg DATE: August 13, 2024, TIME: 3:31 PM, USER: ah3453 AVO: 45715.006



NOTES:

1. CONTRACTOR TO INSTALL JERSEY BARRIER PROTECTION FOR EXISTING TRANSMISSION POWER POLES PRIOR TO COMMENCING WORK. JERSEY BARRIER SHALL BE SUBSIDIARY TO "BARRICADES, SIGNS, AND TRAFFIC HANDLING" BID ITEM.



LEGEND FOR DEMOLITION PLAN

- EXISTING ASPHALT TO BE REMOVED
- EXISTING GRAVEL TO BE REMOVED
- MISCELLANEOUS REMOVAL
- JERSEY BARRIER
- CAUTION!!! UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

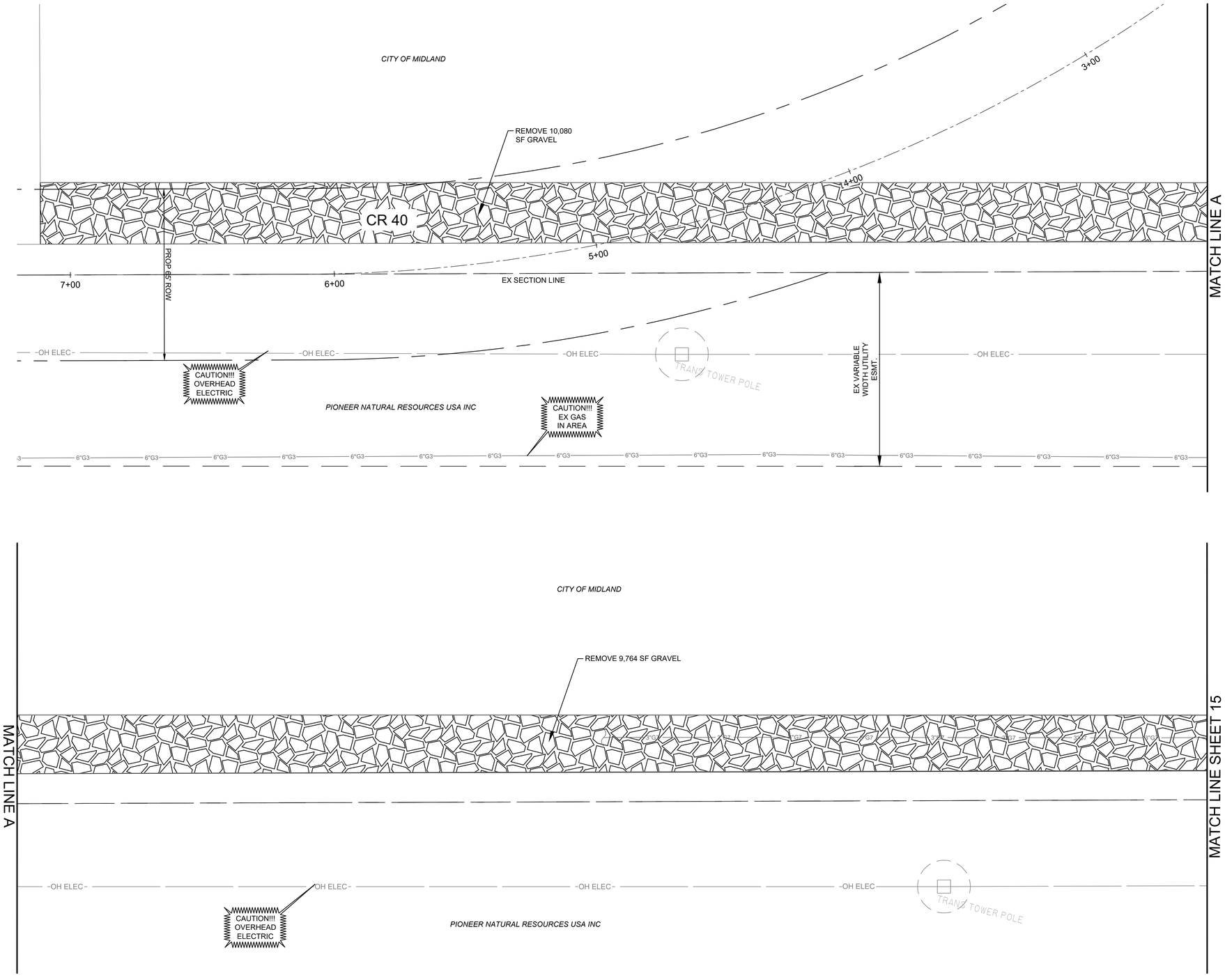
SHEET TITLE

DEMOLITION PLAN

STA 75+00 TO END

SHEET NUMBER 19 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C500-DEMO-45715.dwg DATE: August 13, 2024, TIME: 3:31 PM, USER: ah3453 AVO: 45715.006



N

0 20 40

SCALE IN FEET

LEGEND FOR DEMOLITION PLAN

- EXISTING ASPHALT TO BE REMOVED
- EXISTING GRAVEL TO BE REMOVED
- ·X·X·X·X MISCELLANEOUS REMOVAL
- JERSEY BARRIER

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

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OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL: 817.847.1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

DEMOLITION PLAN

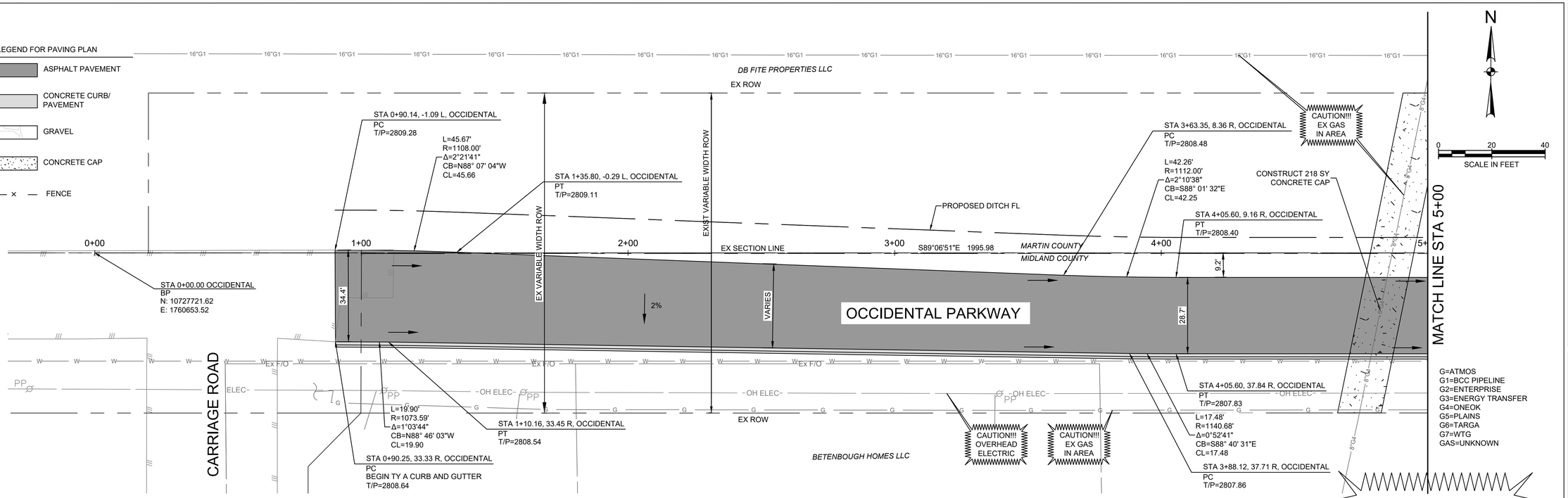
CR 40

SHEET NUMBER 20 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C500-DEMO-45715.dwg DATE: August 13, 2024, TIME: 3:31 PM, USER: ah3453 AVO: 45715.006

LEGEND FOR PAVING PLAN

- ASPHALT PAVEMENT
- CONCRETE CURB/ PAVEMENT
- GRAVEL
- CONCRETE CAP
- — × — FENCE



G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
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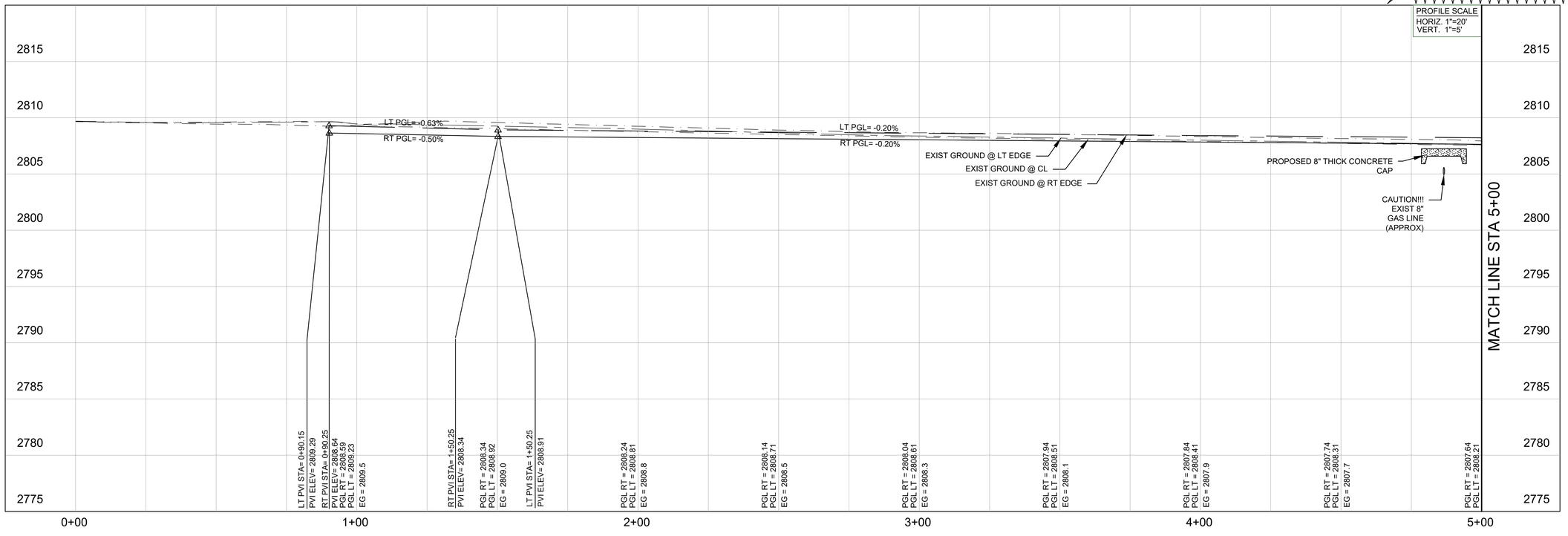
CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

OCCIDENTAL PARKWAY



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T HAYS
127558
LICENSED
PROFESSIONAL
ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

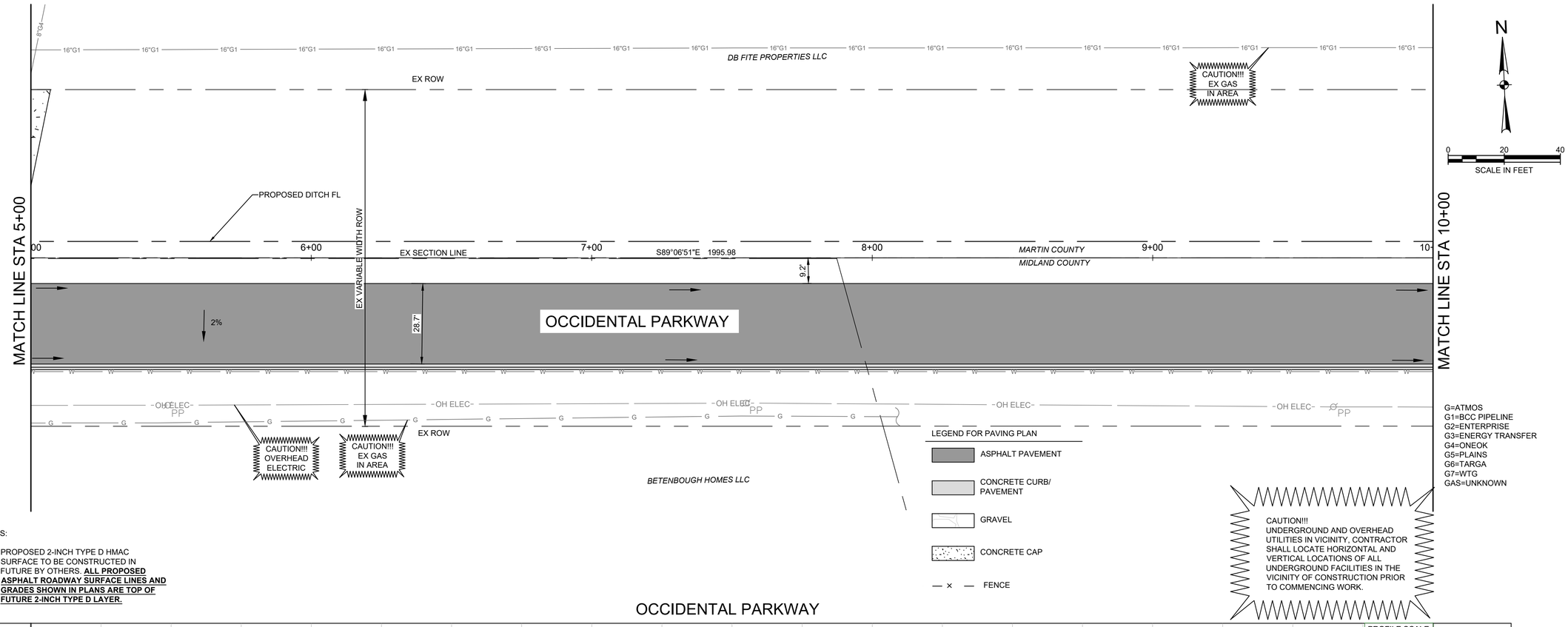
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

PAVING PLAN AND PROFILE
BEGIN TO STA 5+00

SHEET NUMBER 21 OF 217

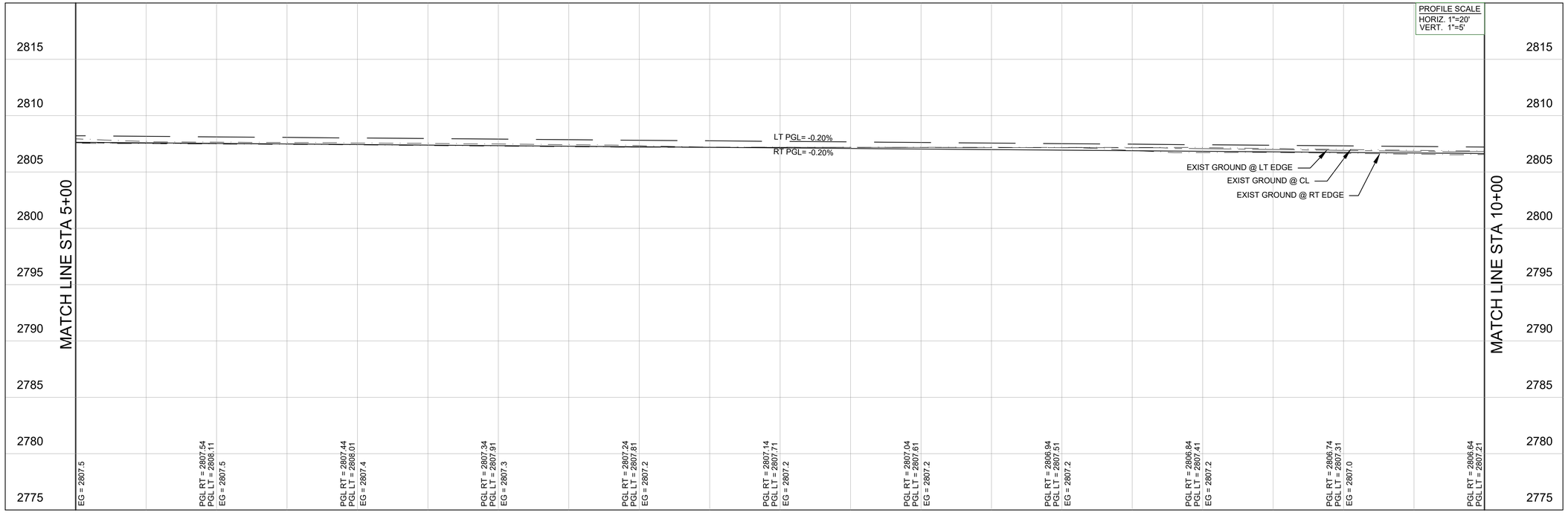
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C600-PAVE-45715.dwg DATE: August 13, 2024, TIME: 3:32 PM, USER: ah3453 AVO: 45715.006



NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

OCCIDENTAL PARKWAY



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

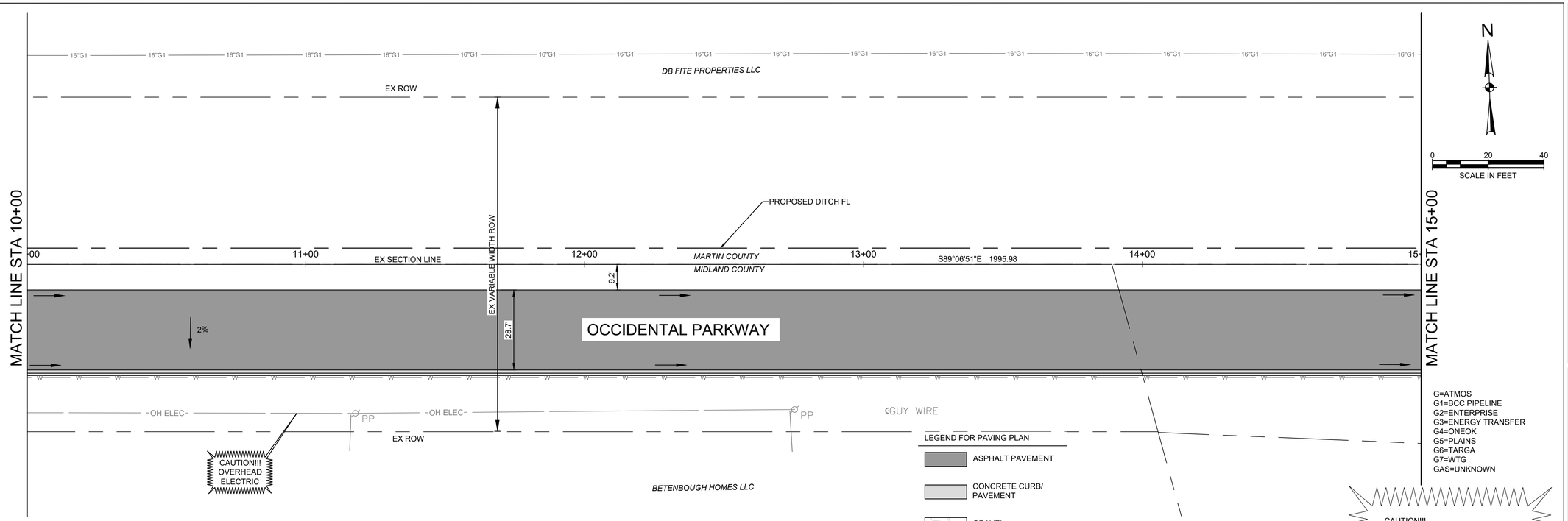
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

PAVING PLAN AND PROFILE
STA 5+00 TO STA 10+00

SHEET NUMBER 22 OF 217

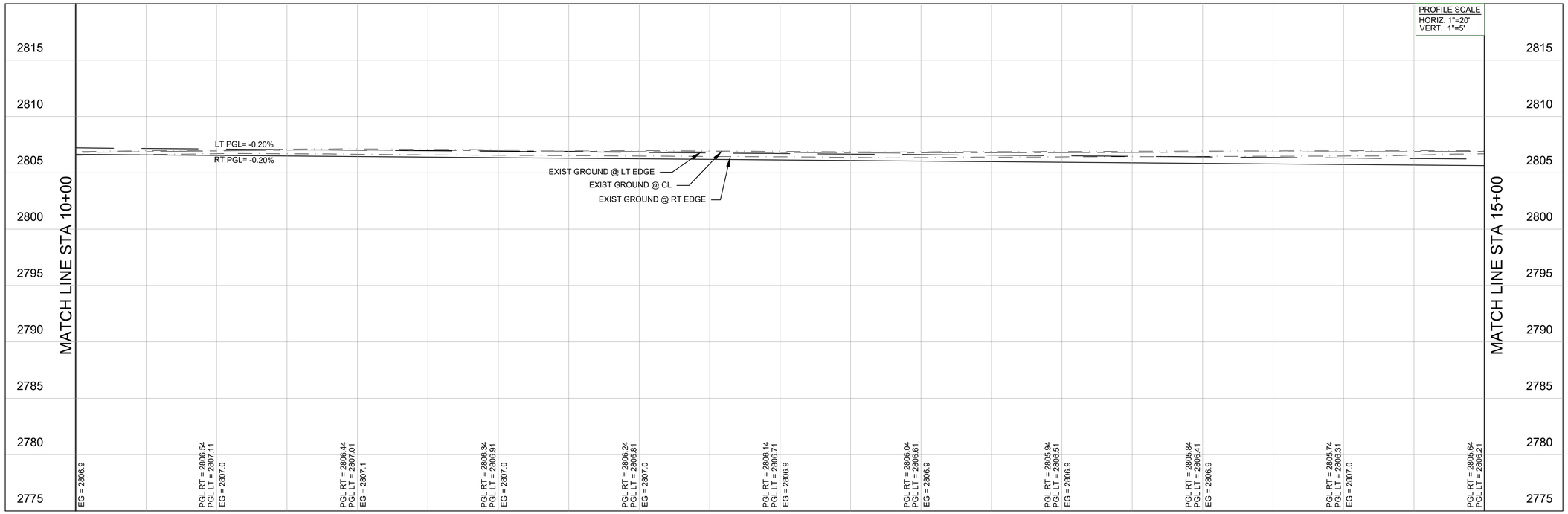
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C600-PAVE-45715.dwg DATE: August 13, 2024, TIME: 3:32 PM, USER: ah3453 AVO: 45715.006



NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

OCCIDENTAL PARKWAY



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

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2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
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SCALE:	AS NOTED

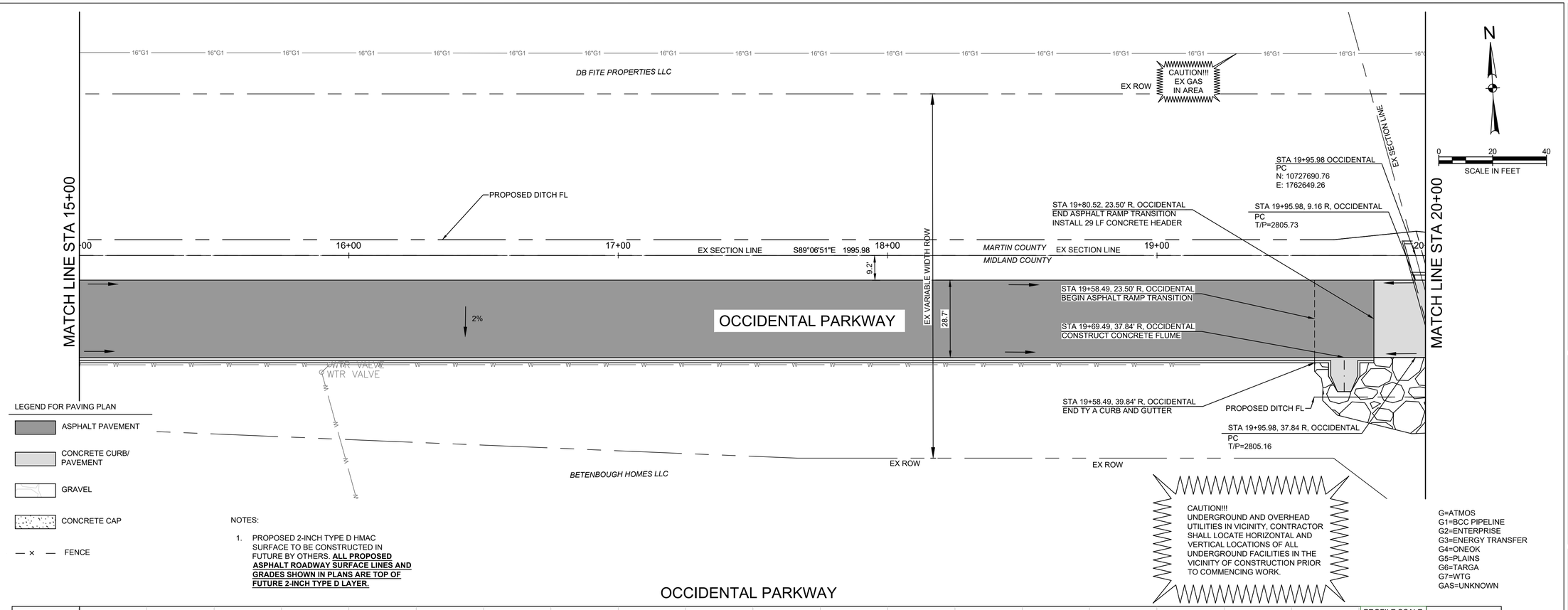
SHEET TITLE

PAVING PLAN AND PROFILE

STA 10+00 TO STA 15+00

SHEET NUMBER 23 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C600-PAVE-45715.dwg DATE: August 13, 2024, TIME: 3:32 PM, USER: ah3453 AVO: 45715.006



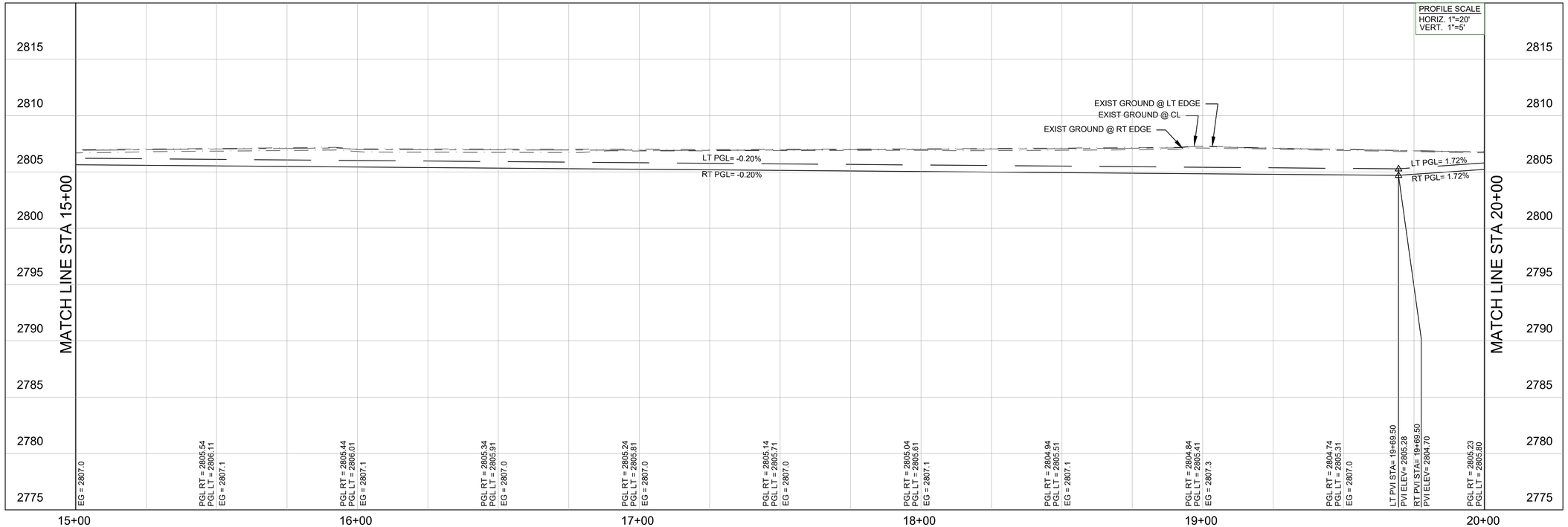
LEGEND FOR PAVING PLAN

- ASPHALT PAVEMENT
- CONCRETE CURB/ PAVEMENT
- GRAVEL
- CONCRETE CAP
- — × — FENCE

NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

OCCIDENTAL PARKWAY



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

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2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

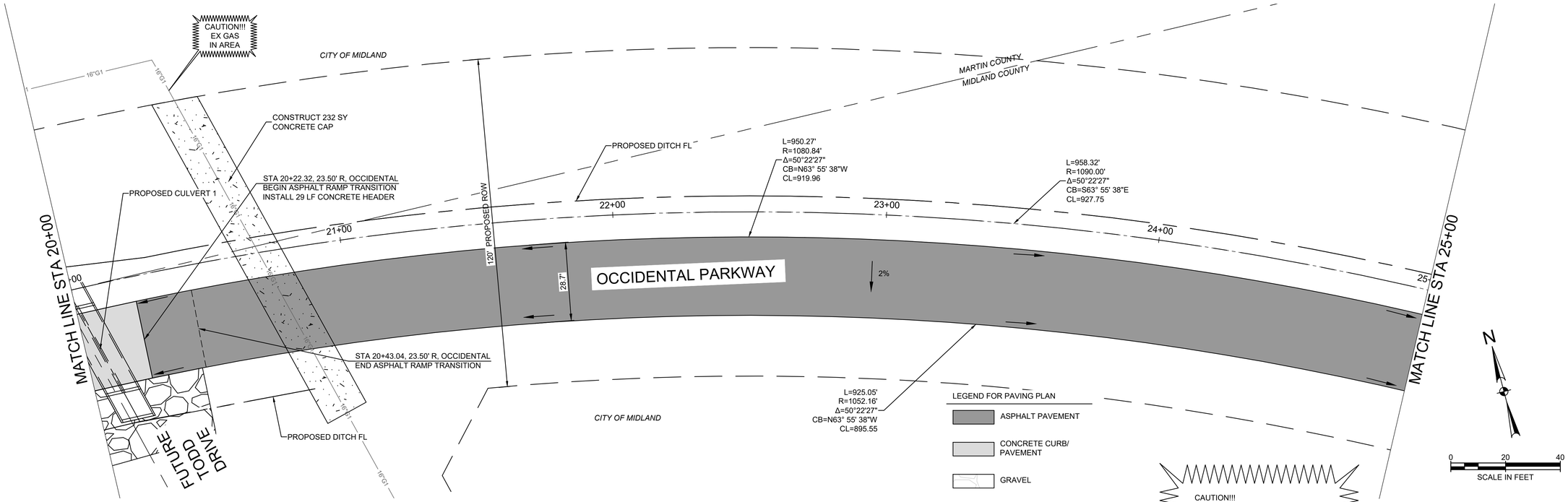
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

PAVING PLAN AND PROFILE
STA 15+00 TO STA 20+00

SHEET NUMBER 24 OF 217

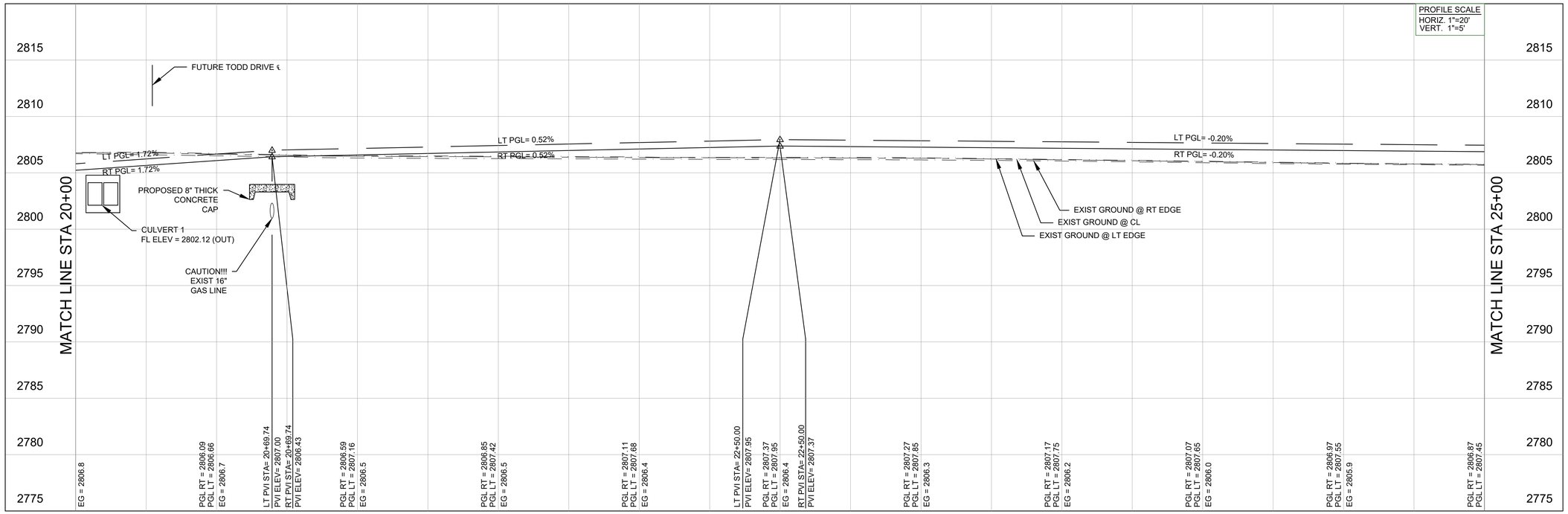
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C600-PAVE-45715.dwg DATE: August 13, 2024, TIME: 3:32 PM, USER: ah3453 AVO: 45715.006



NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

OCCIDENTAL PARKWAY



OCCIDENTAL PARKWAY
TO ELKINS ROAD
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2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

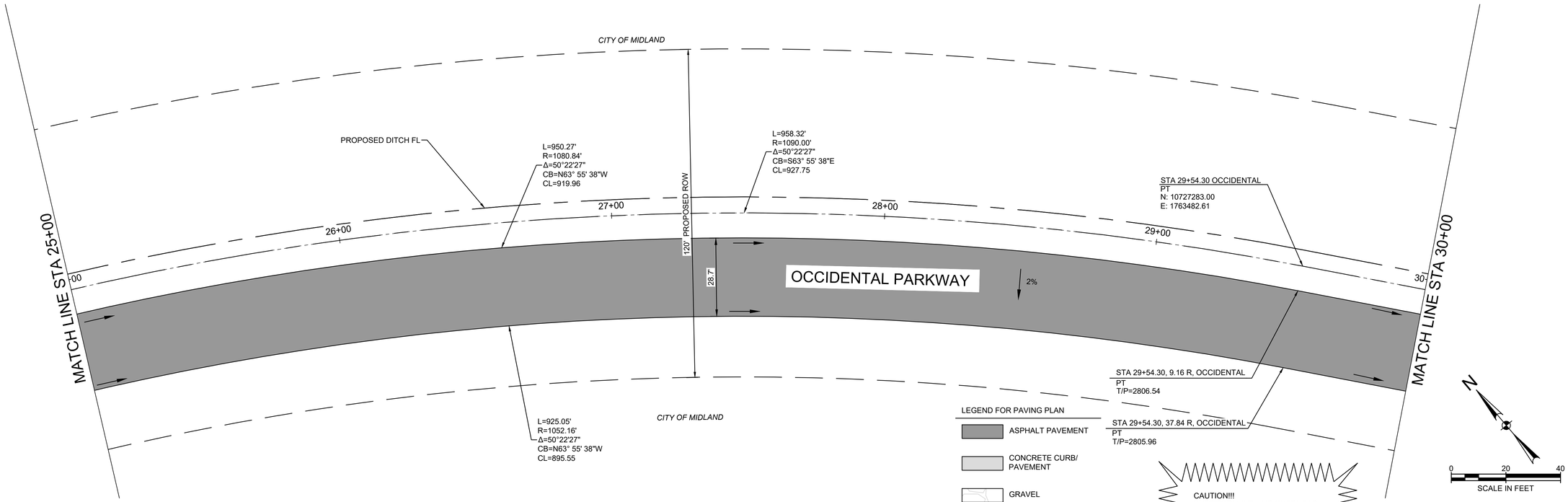
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

PAVING PLAN AND PROFILE
STA 20+00 TO STA 25+00

SHEET NUMBER 25 OF 217

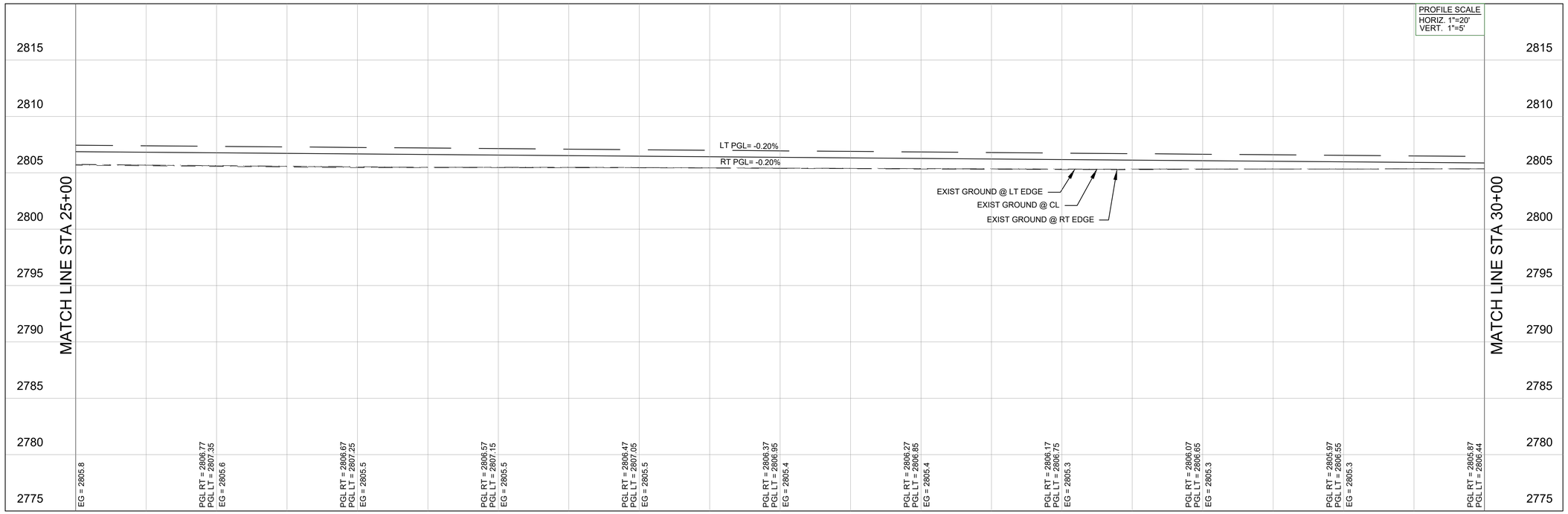
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C600-PAVE-45715.dwg DATE: August 13, 2024, TIME: 3:32 PM, USER: ah3453 AVO: 45715.006



NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

OCCIDENTAL PARKWAY



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
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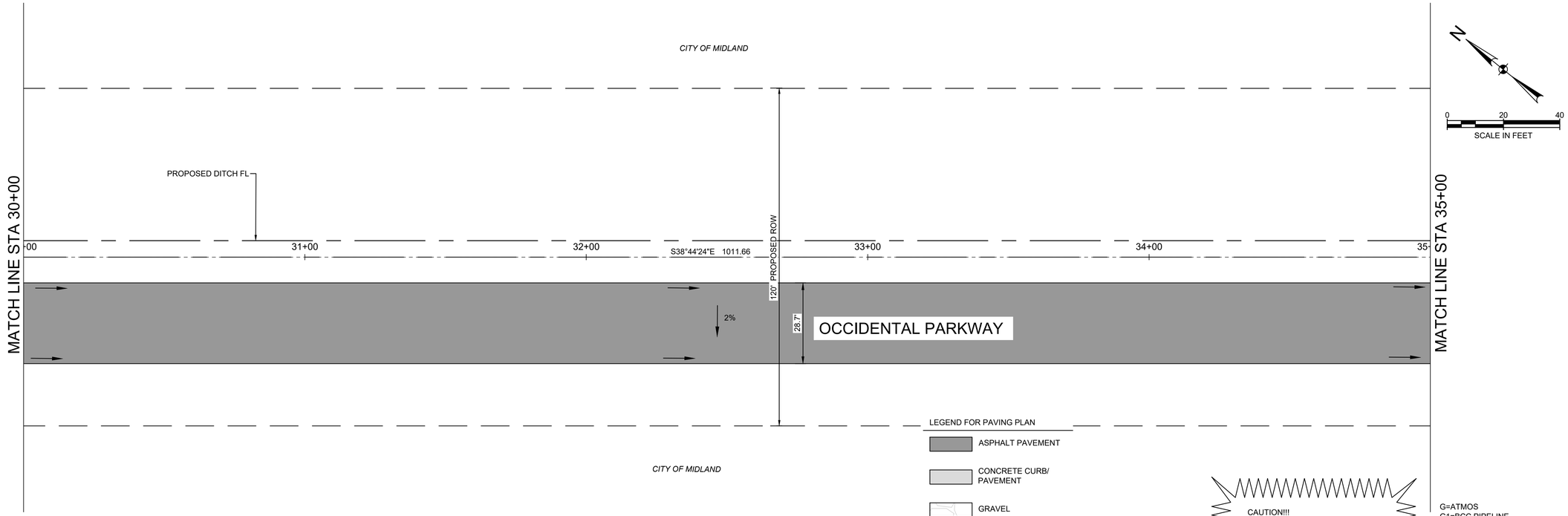
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

PAVING PLAN AND PROFILE
STA 25+00 TO STA 30+00

SHEET NUMBER 26 OF 217

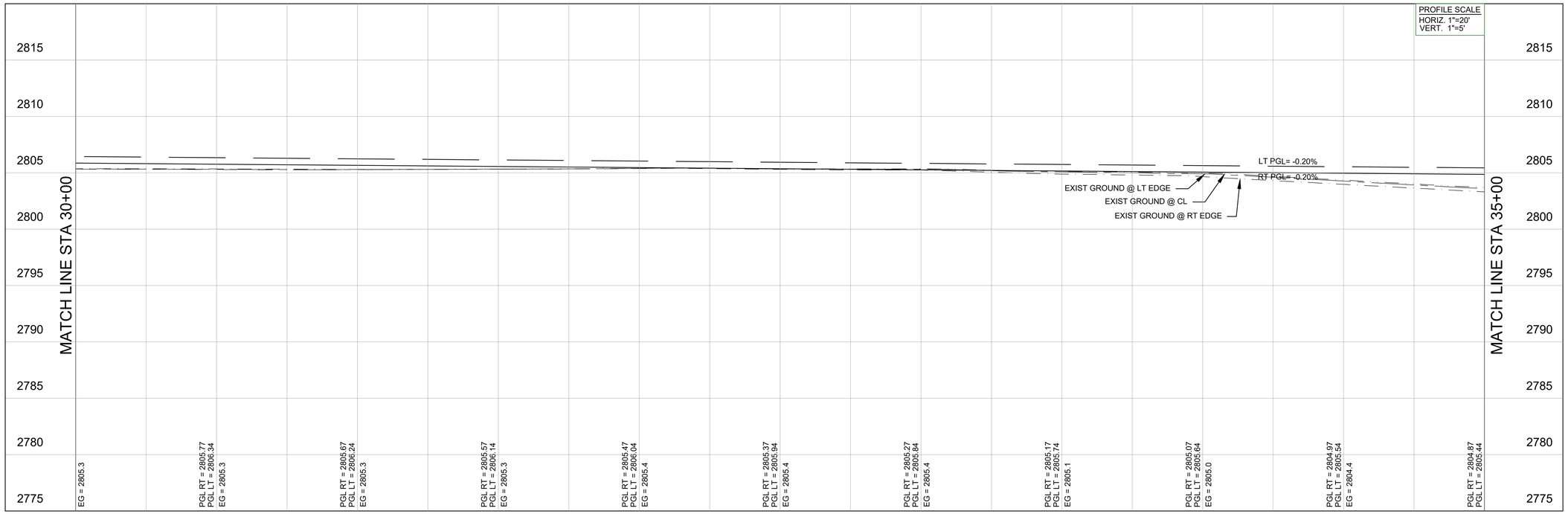
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C600-PAVE-45715.dwg DATE: August 13, 2024, TIME: 3:32 PM, USER: ah3453 AVO: 45715.006



NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

OCCIDENTAL PARKWAY



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

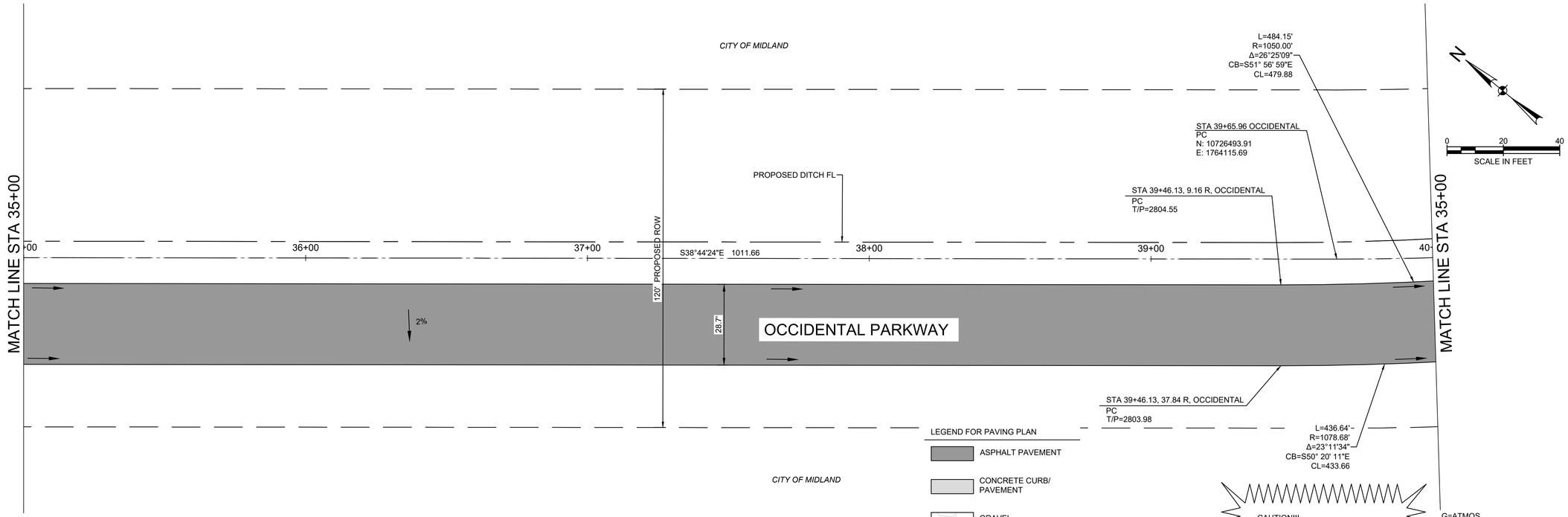
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

PAVING PLAN AND PROFILE
STA 30+00 TO STA 35+00

SHEET NUMBER 27 OF 217

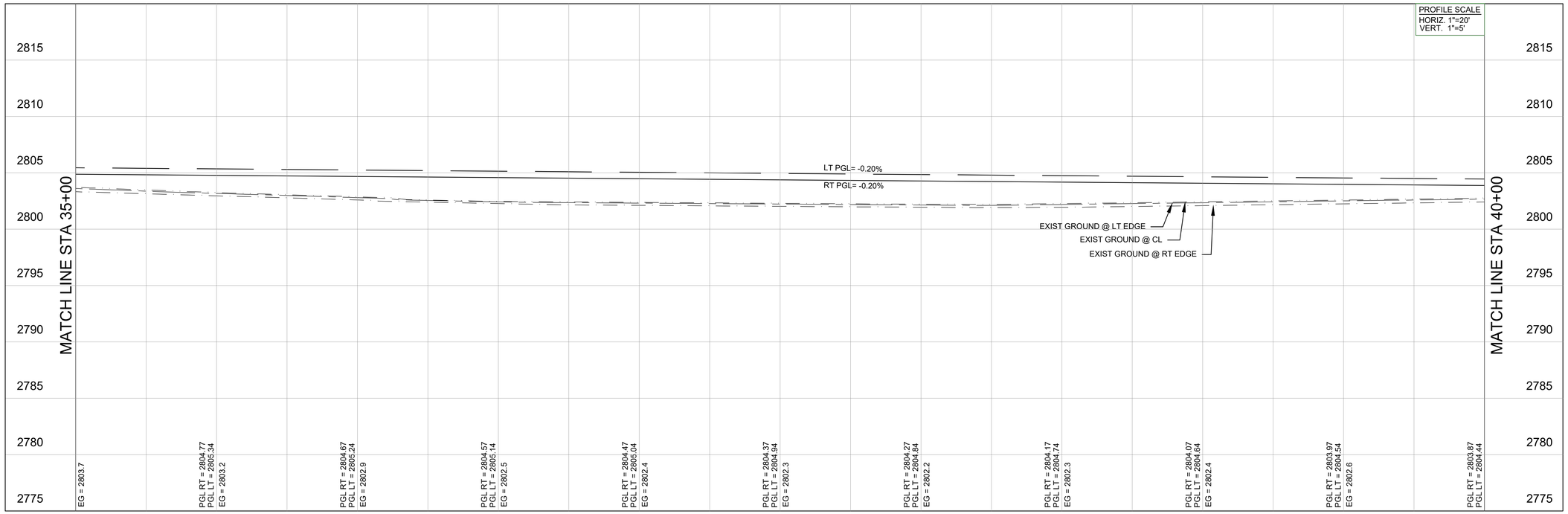
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C600-PAVE-45715.dwg DATE: August 13, 2024, TIME: 3:32 PM, USER: ah3453 AVO: 45715.006



NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

OCCIDENTAL PARKWAY



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL
ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

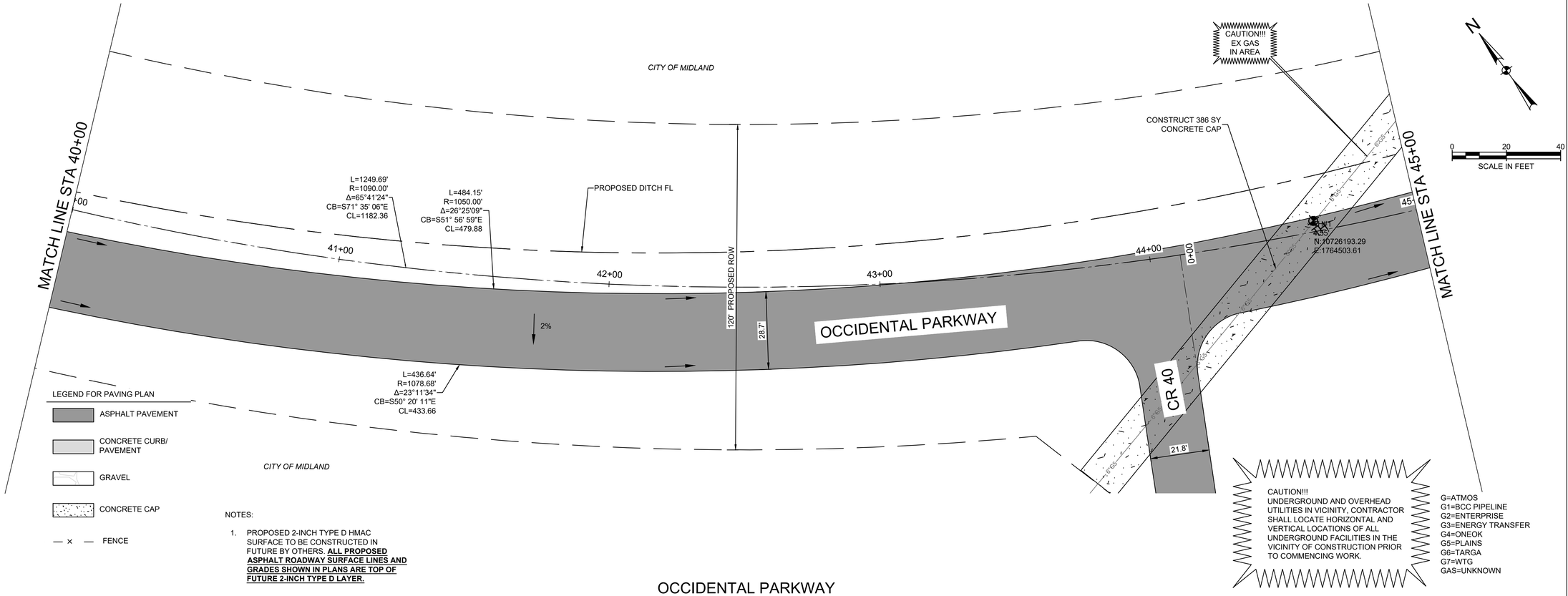
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

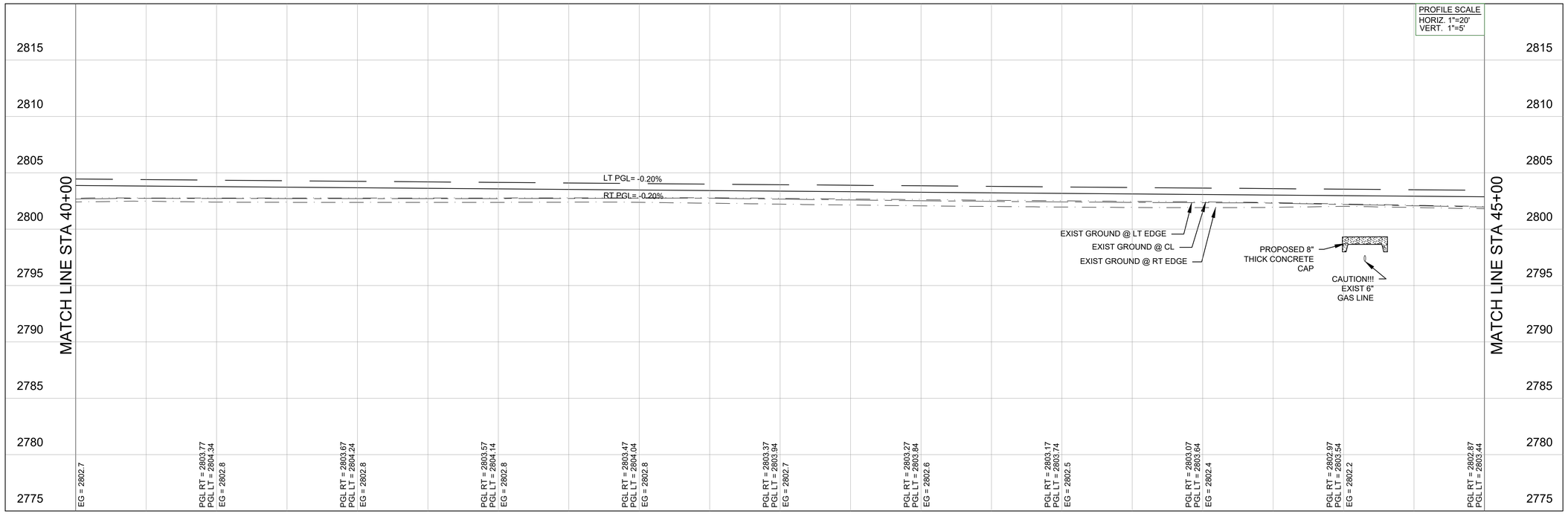
PAVING PLAN AND PROFILE
STA 35+00 TO STA 40+00

SHEET NUMBER 28 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C600-PAVE-45715.dwg DATE: August 13, 2024, TIME: 3:32 PM, USER: ah3453 AVO: 45715.006



OCCIDENTAL PARKWAY



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
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REVISION

NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL
ENGINEER
DATE 8/13/24
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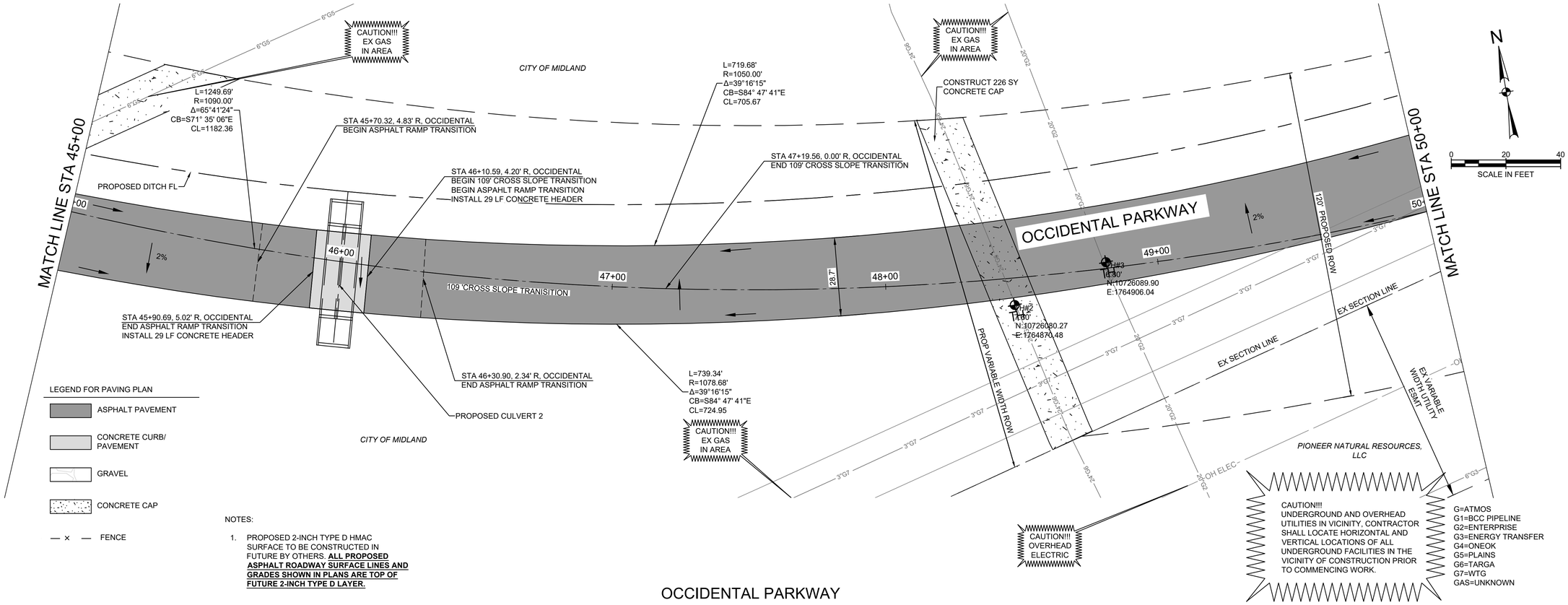
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

PAVING PLAN AND PROFILE
STA 40+00 TO STA 45+00

SHEET NUMBER 29 OF 217

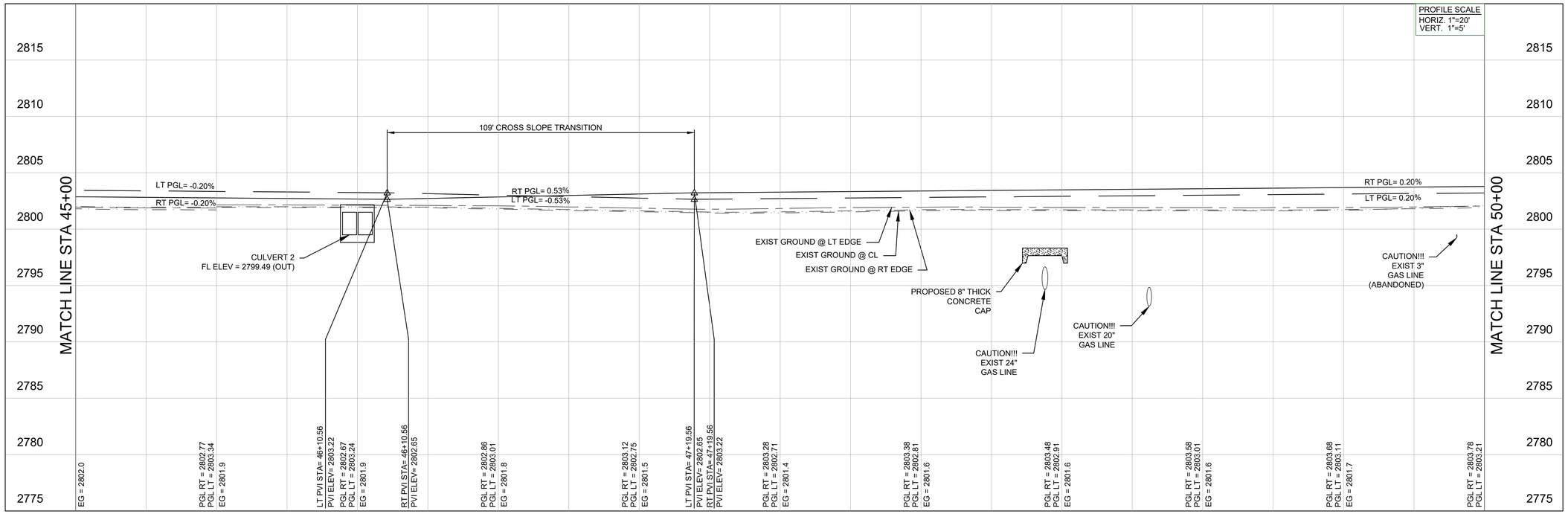
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C600-PAVE-45715.dwg DATE: August 13, 2024, TIME: 3:32 PM, USER: ah3453 AVO: 45715.006



NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

OCCIDENTAL PARKWAY



halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS 127558 LICENSED PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

PAVING PLAN AND PROFILE
STA 45+00 TO STA 50+00

SHEET NUMBER 30 OF 217

LEGEND FOR PAVING PLAN

- ASPHALT PAVEMENT
- CONCRETE CURB/ PAVEMENT
- GRAVEL
- CONCRETE CAP
- FENCE

CITY OF MIDLAND

NATHAN W. SYKES

PIONEER NATURAL RESOURCES, LLC

MATCH LINE STA 50+00

MATCH LINE STA 55+00

OCCIDENTAL PARKWAY

PROPOSED DRIVEWAY

PROPOSED DITCH FL

STA 51+48.68, -35.92 L, OCCIDENTAL
PCC
T/P=2803.51

L=719.68'
R=1050.00'
Δ=39°16'15"
CB=S84° 47' 41"E
CL=705.67

TH#4
20" BEDROCK
11.0' ELECTRONIC DEPTH
N:10726129.50
E:1765096.51

TH#5A
77'
N:10726140.09
E:1765150.40

2%

STA 52+15.66, -37.84 L, OCCIDENTAL
PT
T/P=2803.64

CAUTION!!! EX GAS IN AREA

CAUTION!!! OVERHEAD ELECTRIC

GUY WIRE

EX 60' ROW

28.7'

9.2'

EX 35' UTILITY ESMT

120' PROPOSED ROW

EX SECTION LINE N75°34'12"E 1580.70

L=739.34'
R=1078.68'
Δ=39°16'15"
CB=S84° 47' 41"E
CL=724.95

CAUTION!!! EX GAS IN AREA

TH#5
30" BEDROCK
11.0' ELECTRONIC DEPTH
N:10726088.11
E:1765237.51

STA 51+62.28, -7.86 L, OCCIDENTAL
PT
T/P=2804.11

STA 52+15.66 OCCIDENTAL
PT
N: 10726120.41
E: 1765237.51

L=1249.69'
R=1090.00'
Δ=65°41'24"
CB=S71° 35' 06"E
CL=1182.36

TOWER POLE

EX VARIABLE WIDTH UTILITY ESMT

10 FOOT CLEARZONE AROUND TRANSMISSION TOWER (ALL DIRECTIONS)

STA 51+80.87, 0.00' , OCCIDENTAL
DRIVEWAY 1 INTERSECTION
90°00'00"

CAUTION!!! UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

NOTES:

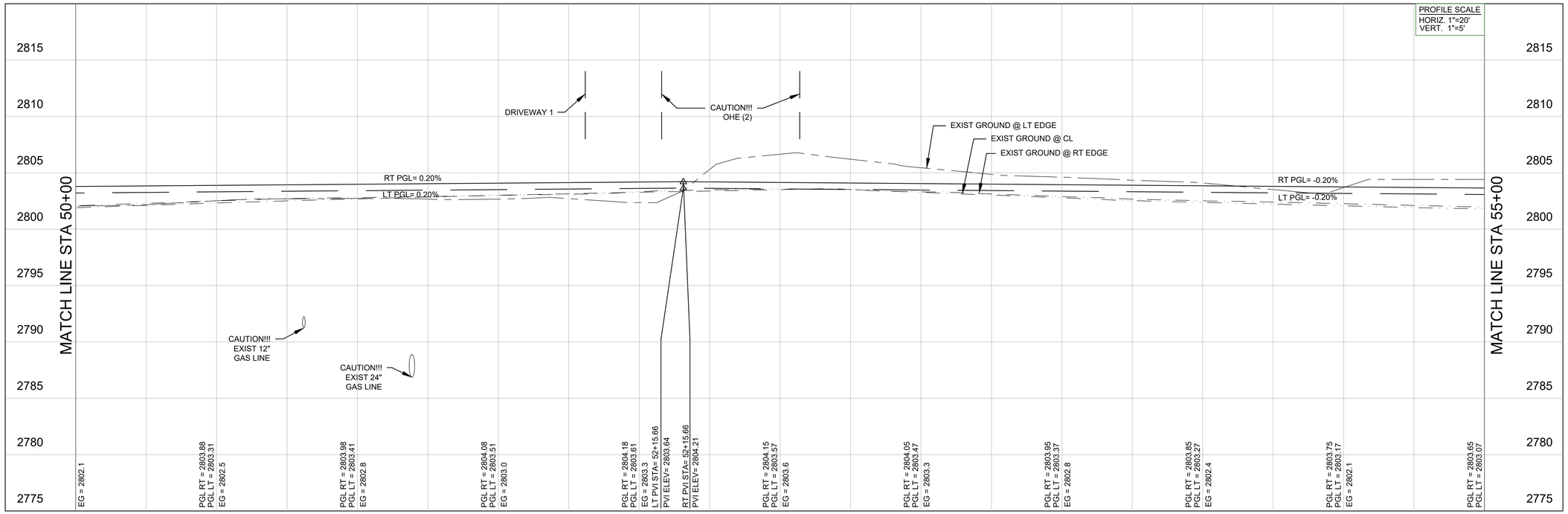
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

N

0 20 40
SCALE IN FEET

OCCIDENTAL PARKWAY

PROFILE SCALE
HORIZ. 1"=20'
VERT. 1"=5'



halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

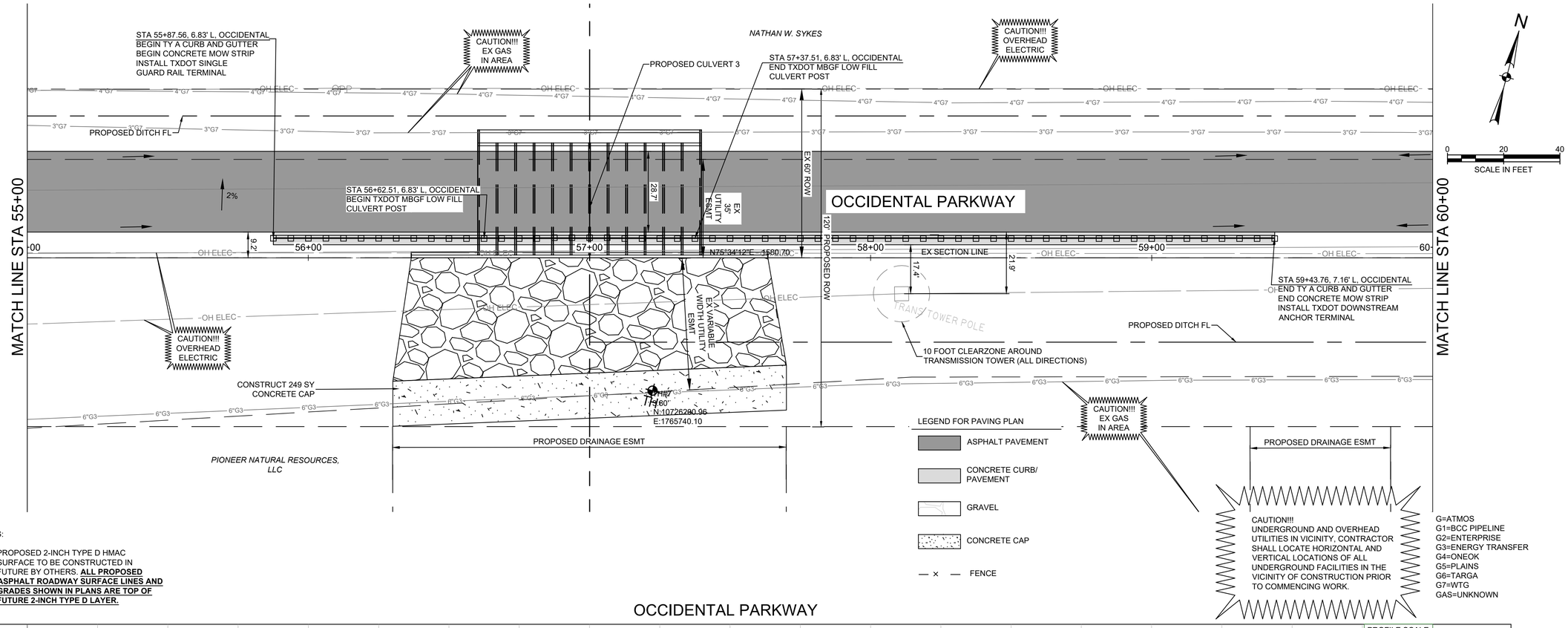
SHEET TITLE

PAVING PLAN AND PROFILE

STA 50+00 TO STA 55+00

SHEET NUMBER 31 OF 217

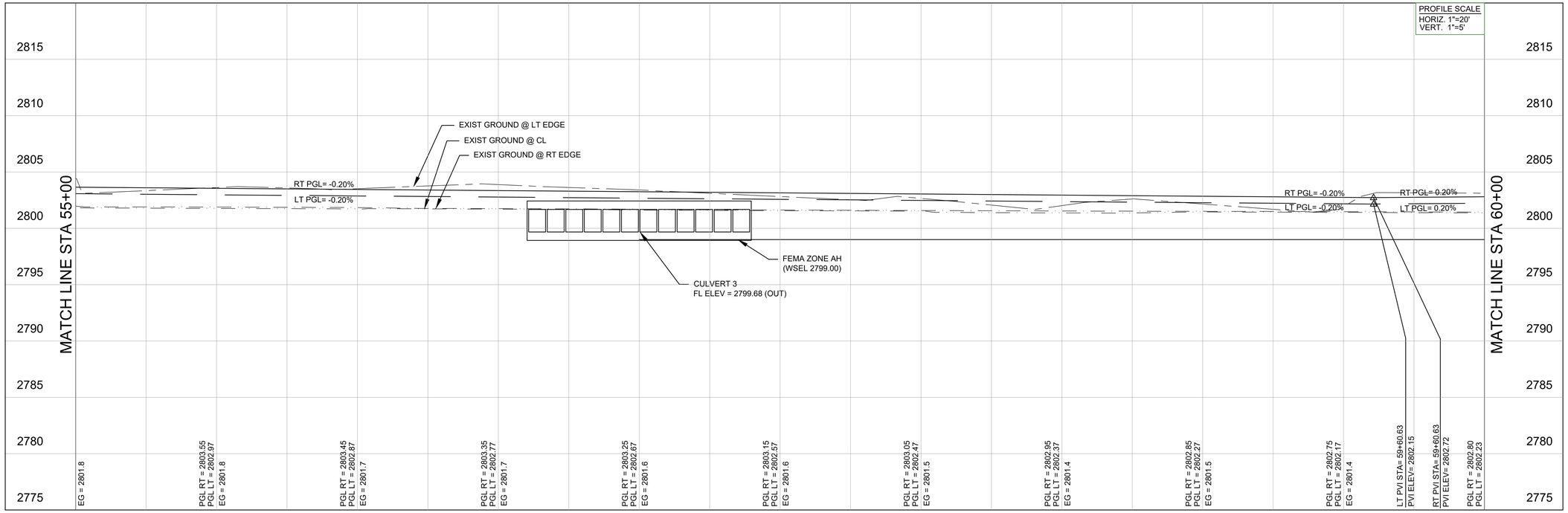
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C600-PAVE-45715.dwg DATE: August 13, 2024, TIME: 3:33 PM, USER: ah3453 AVO: 45715.006



NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

OCCIDENTAL PARKWAY



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

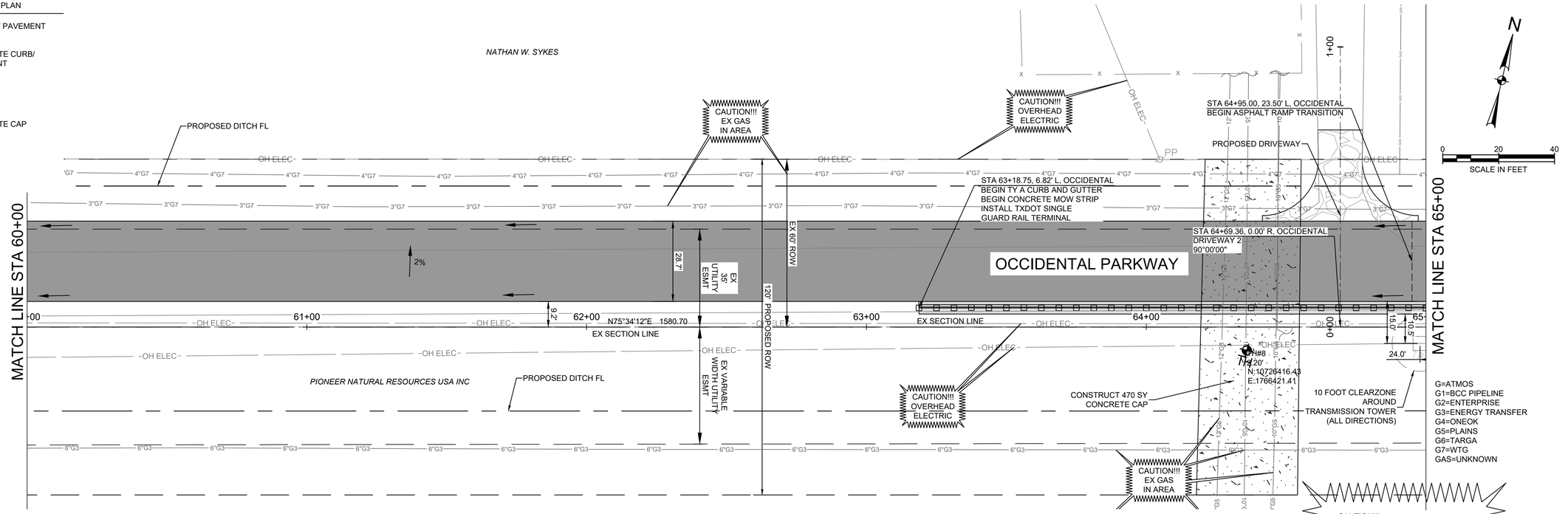
PAVING PLAN AND PROFILE
STA 55+00 TO STA 60+00

SHEET NUMBER 32 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C600-PAVE-45715.dwg DATE: August 13, 2024, TIME: 3:33 PM, USER: ah3453 AVO: 45715.006

LEGEND FOR PAVING PLAN

- ASPHALT PAVEMENT
- CONCRETE CURB/ PAVEMENT
- GRAVEL
- CONCRETE CAP
- — × — FENCE



NOTES:

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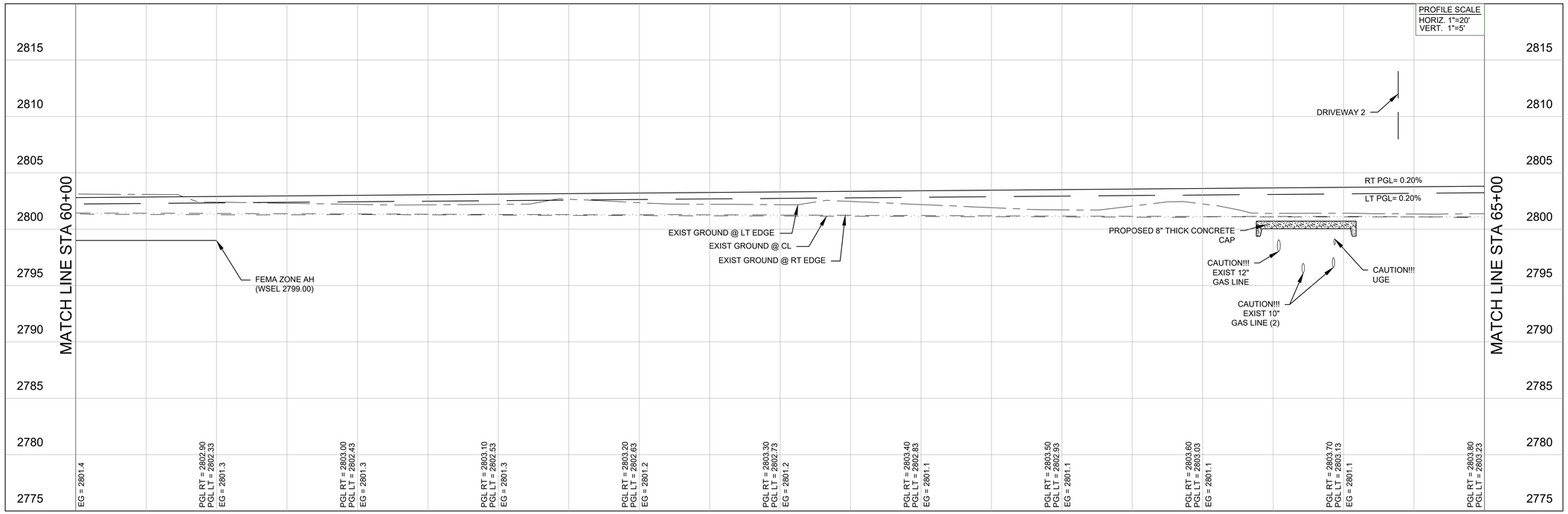
OCCIDENTAL PARKWAY



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FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

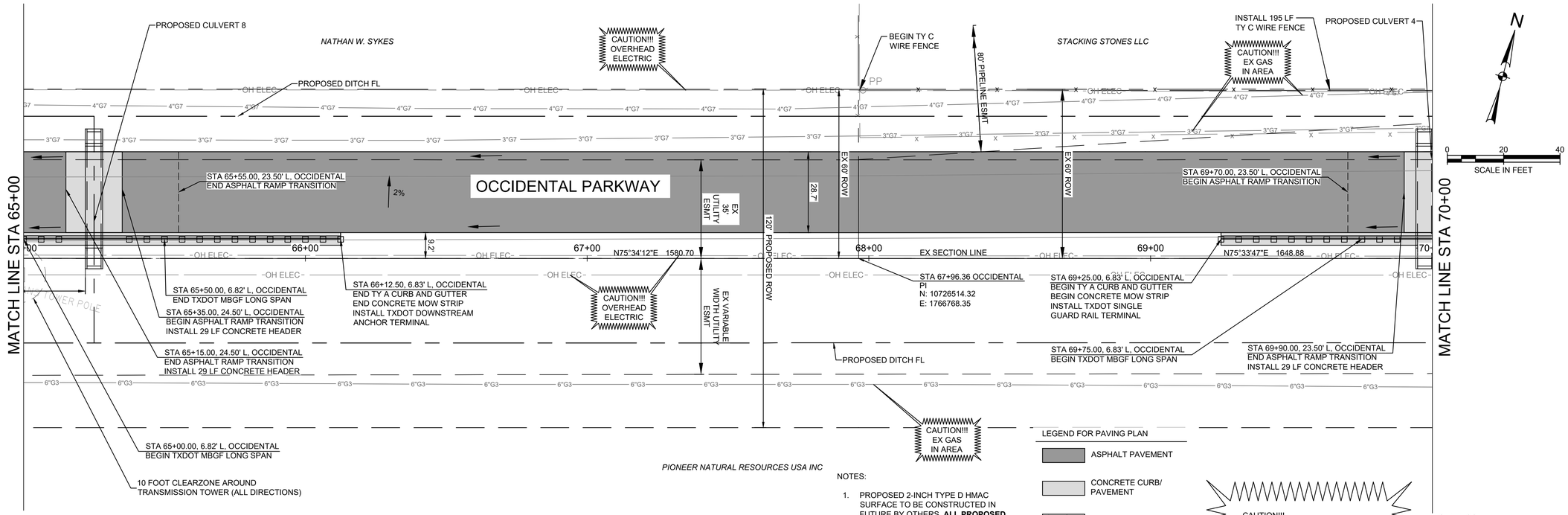
SHEET TITLE

PAVING PLAN AND PROFILE

STA 60+00 TO STA 65+00

SHEET NUMBER 33 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C600-PAVE-45715.dwg DATE: August 13, 2024, TIME: 3:33 PM, USER: ah3453 AVO: 45715.006



NOTES:

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2. PROPOSED TY C WIRE FENCE REPLACEMENT SHALL MATCH STYLE AND CHARACTERISTICS OF EXISTING TY C WIRE FENCE. NEW TY C WIRE FENCE SHALL BE INSTALLED AT THE LIMITS OF EXISTING ROW AS NOTED ON THE PLANS.

LEGEND FOR PAVING PLAN

- ASPHALT PAVEMENT
- CONCRETE CURB/ PAVEMENT
- GRAVEL
- CONCRETE CAP
- — × — FENCE

CAUTION!!!
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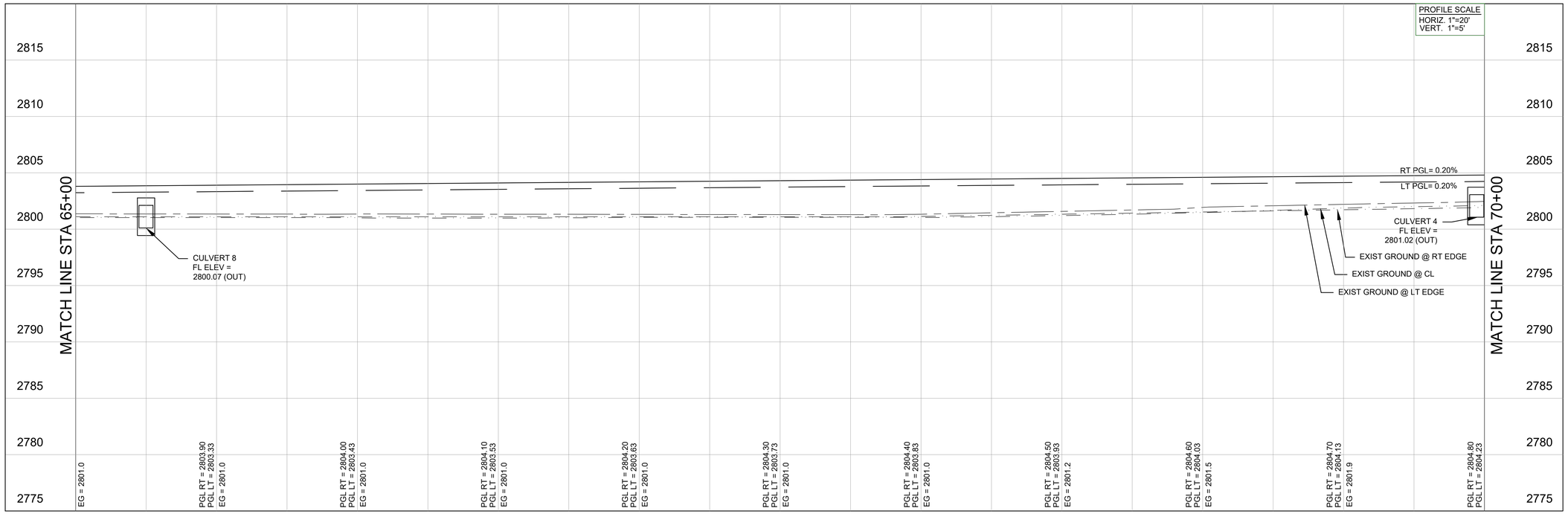
G7=WTG
GAS=UNKNOWN

OCCIDENTAL PARKWAY



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TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

REVISION NO.	DATE	DESCRIPTION

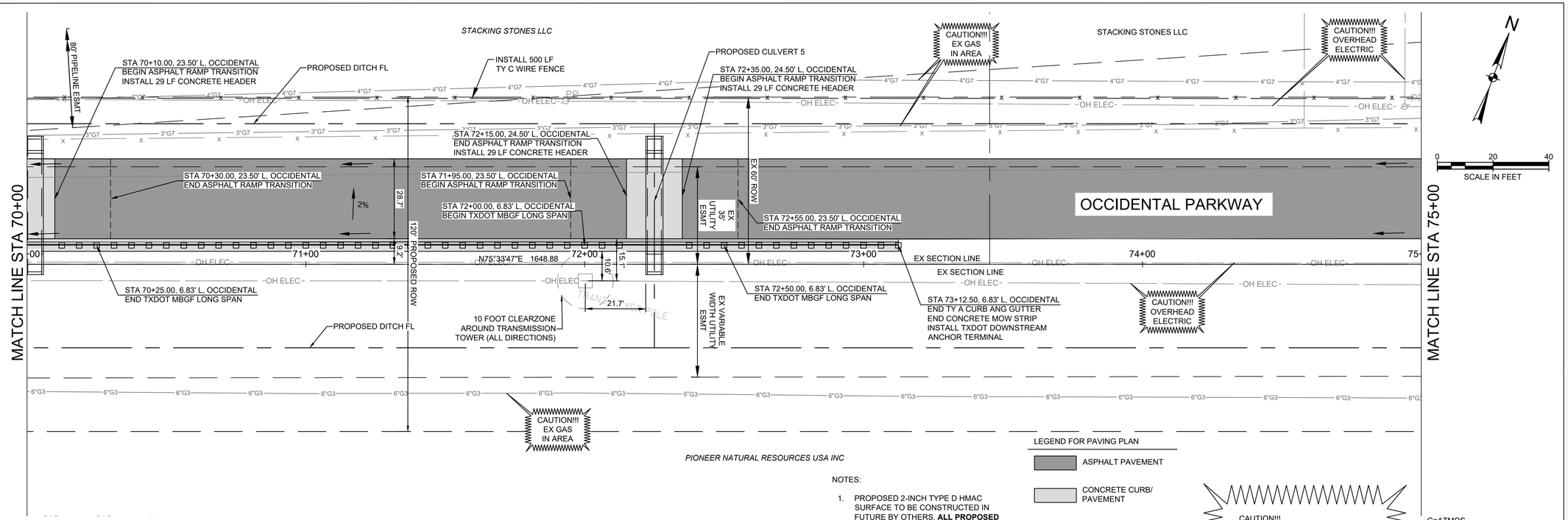
JACOB T. HAYS
127558
LICENSED PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

PAVING PLAN AND PROFILE
STA 65+00 TO STA 70+00

SHEET NUMBER 34 OF 217



NOTES:

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LEGEND FOR PAVING PLAN

- ASPHALT PAVEMENT
- CONCRETE CURB/ PAVEMENT
- GRAVEL
- CONCRETE CAP
- — × — FENCE

CAUTION!!!
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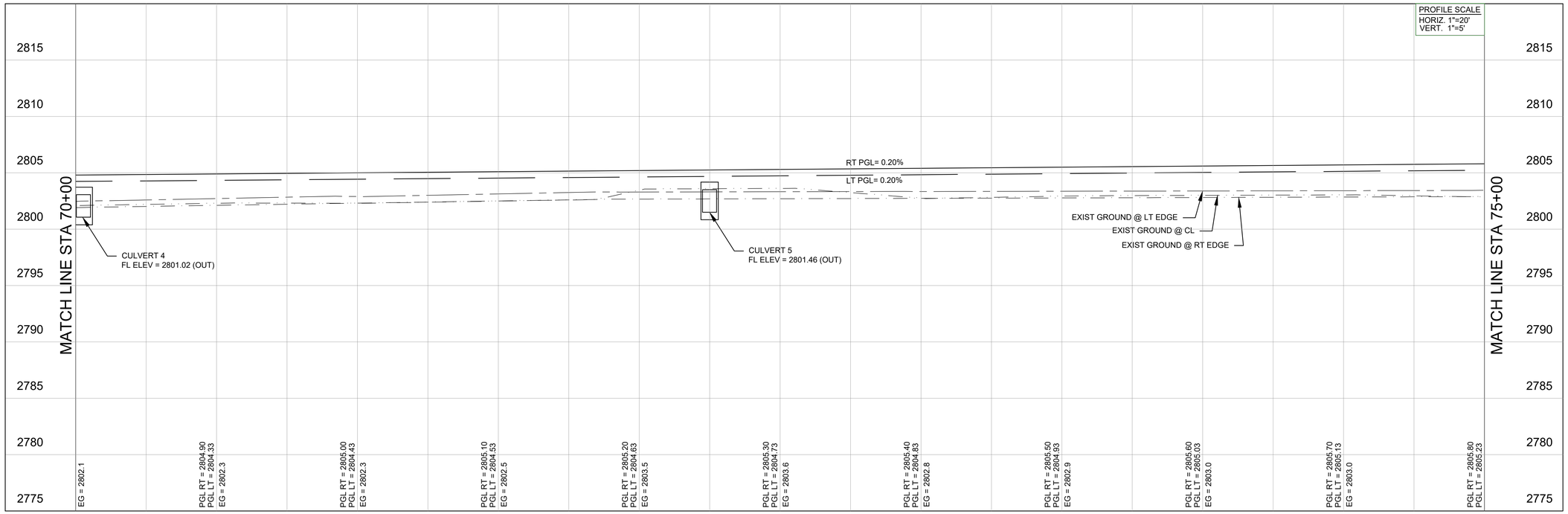
OCCIDENTAL PARKWAY



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

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2601 MEACHAM BLVD. STE 600
FT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

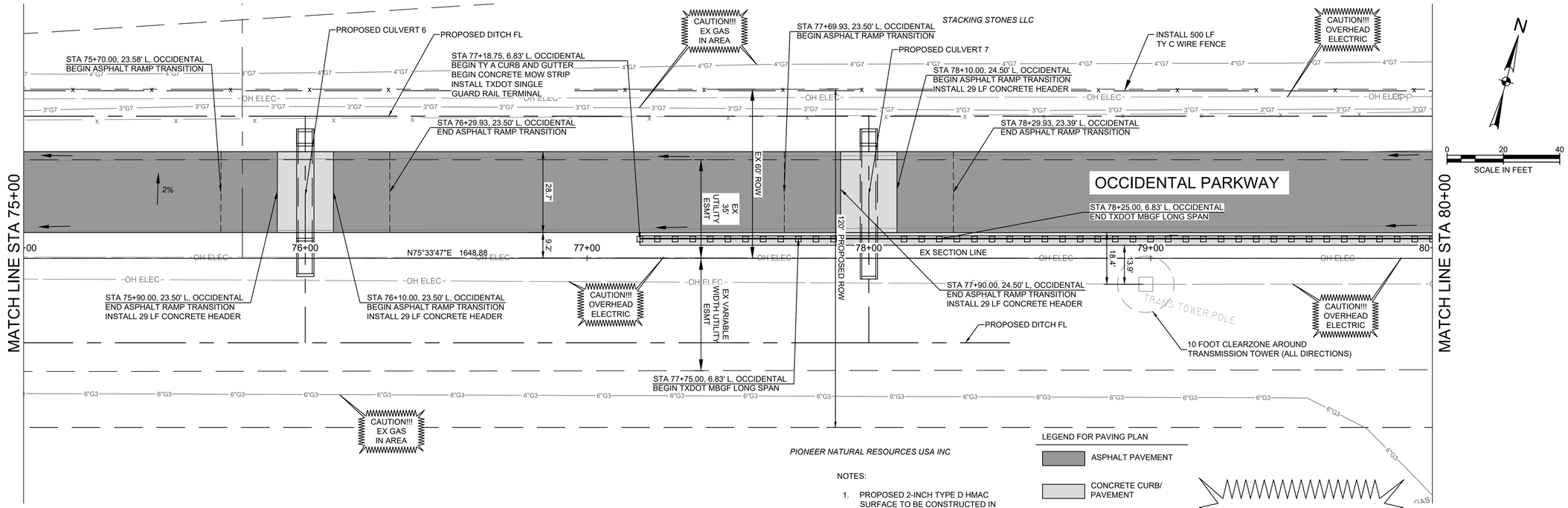
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE
PAVING PLAN AND PROFILE
STA 70+00 TO STA 75+00

SHEET NUMBER 35 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C600-PAVE-45715.dwg DATE: August 13, 2024, TIME: 3:33 PM, USER: ah3453 AVO: 45715.006



NOTES:

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LEGEND FOR PAVING PLAN

- ASPHALT PAVEMENT
- CONCRETE CURB/ PAVEMENT
- GRAVEL
- CONCRETE CAP
- — x — FENCE

CAUTION!!!
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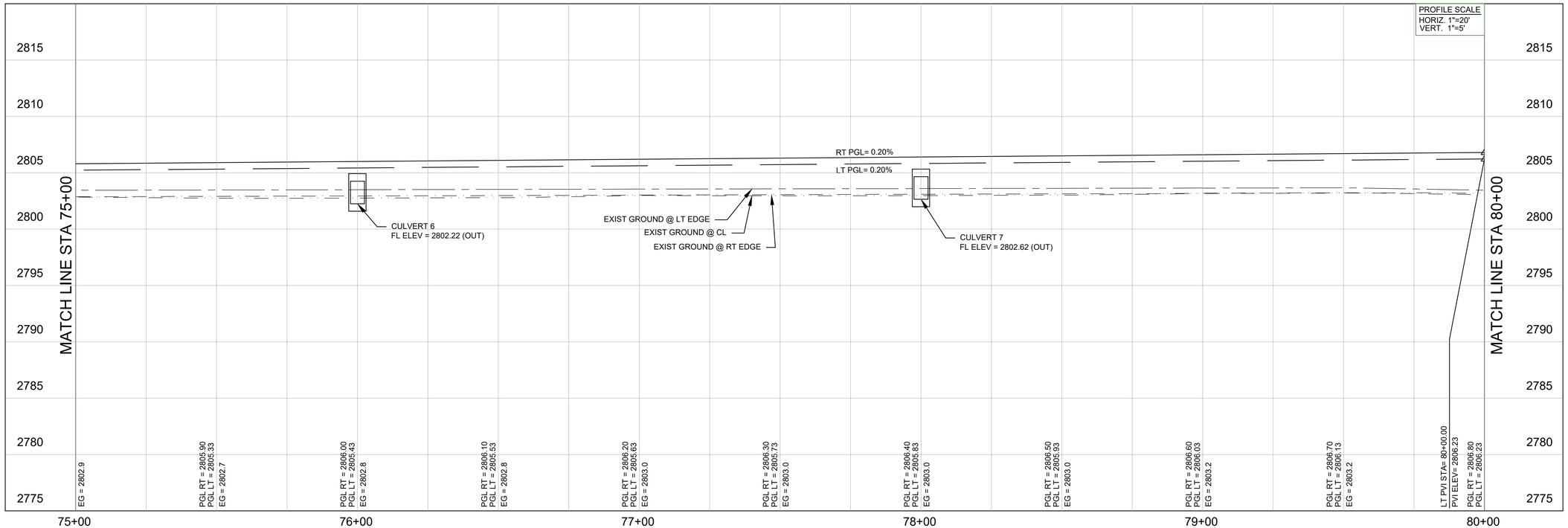
OCCIDENTAL PARKWAY



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FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

CITY OF MIDLAND Engineering Services

REVISION

NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

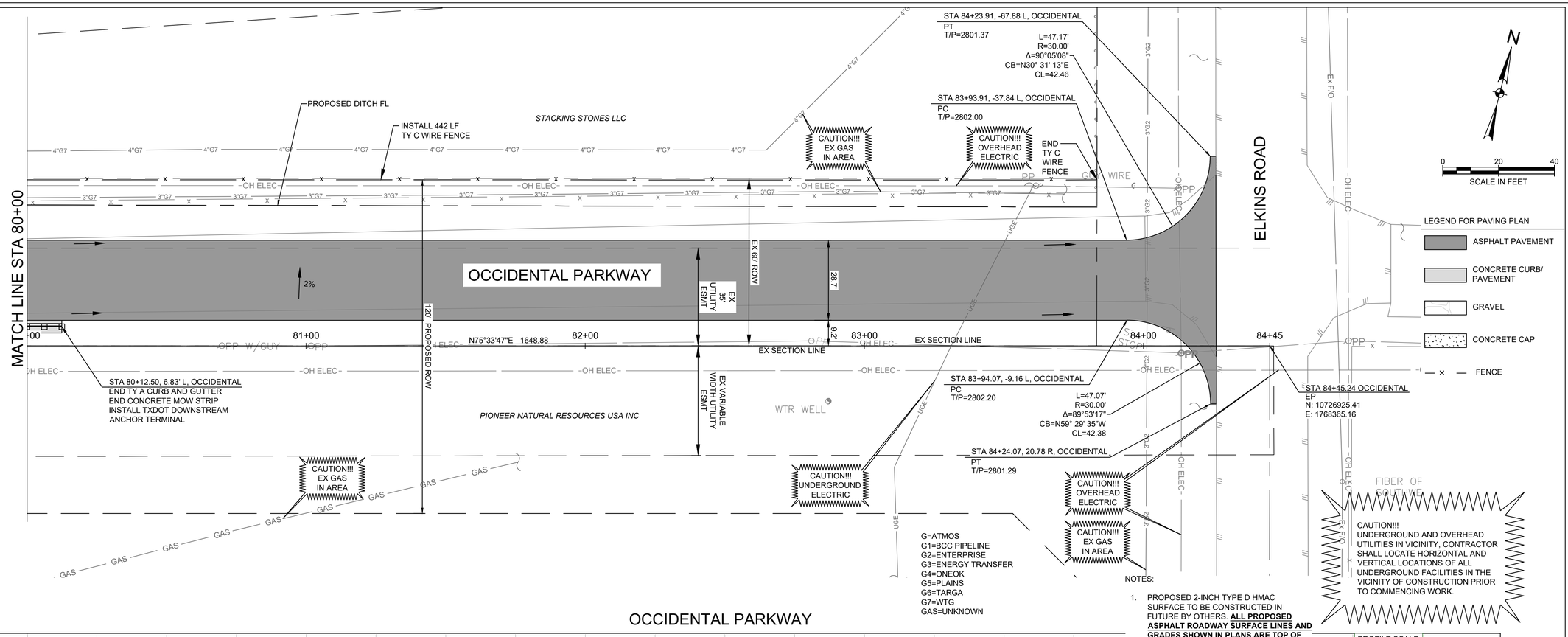
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

PAVING PLAN AND PROFILE
STA 75+00 TO STA 80+00

SHEET NUMBER 36 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C600-PAVE-45715.dwg DATE: August 13, 2024, TIME: 3:33 PM, USER: ah3453 AVO: 45715.006



NOTES:

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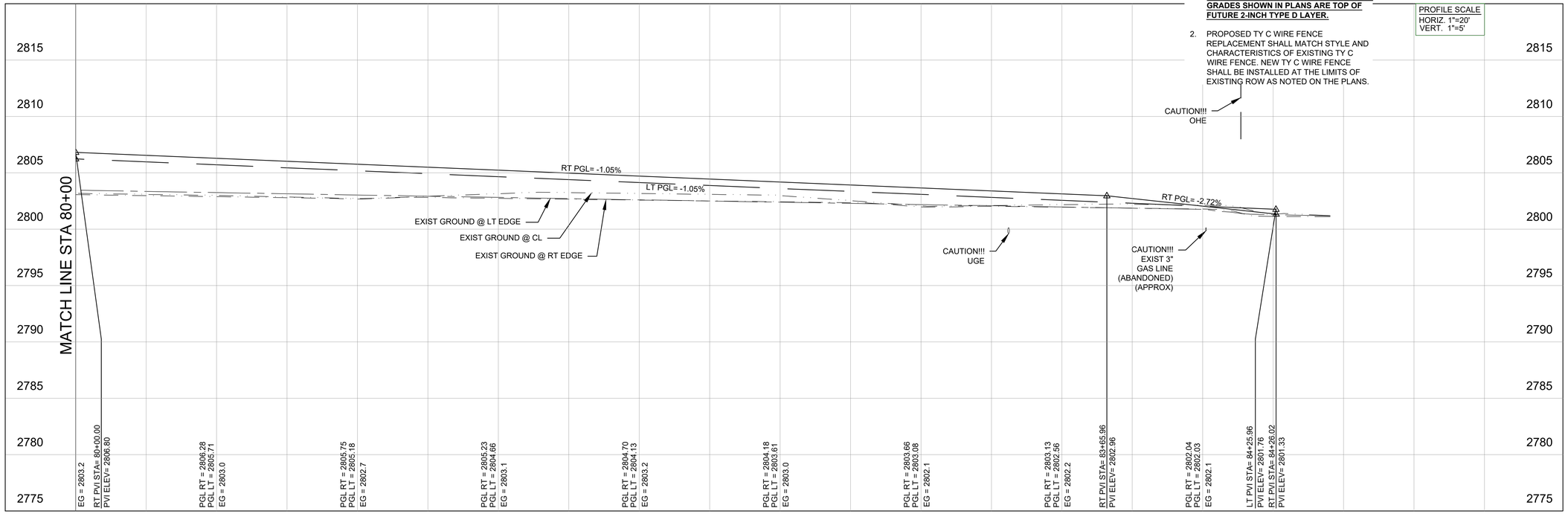
PROFILE SCALE
HORIZ. 1"=20'
VERT. 1"=5'

OCCIDENTAL PARKWAY



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL: 817.847.1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

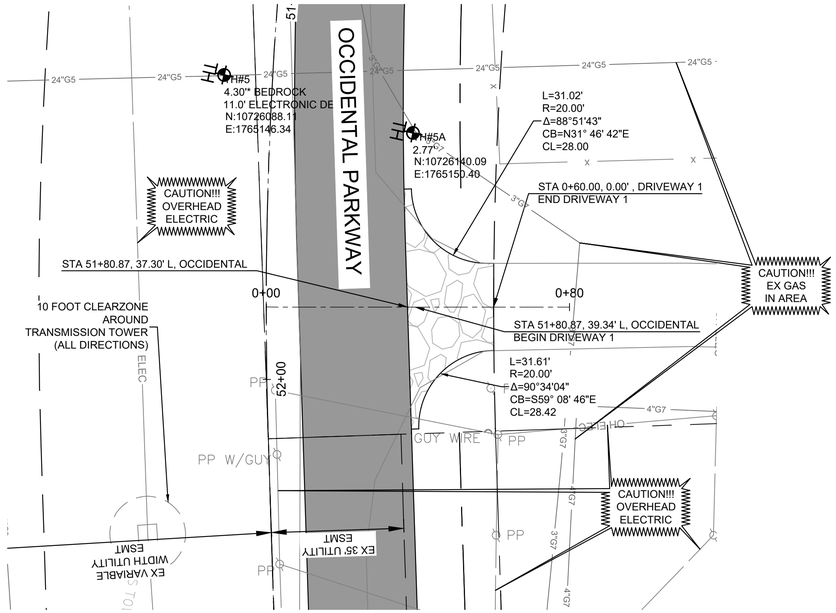
SHEET TITLE

PAVING PLAN AND PROFILE

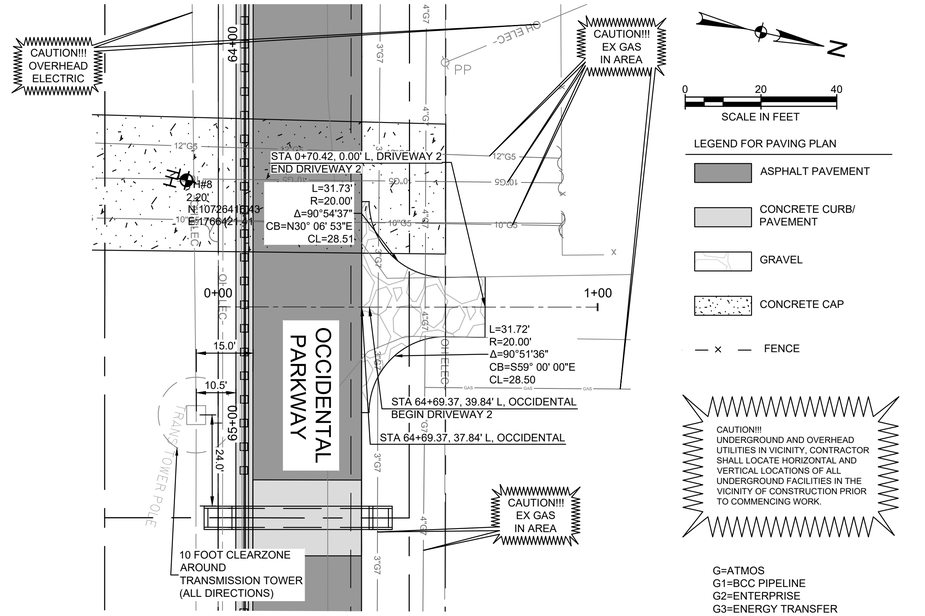
STA 80+00 TO END

SHEET NUMBER 37 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C600-PAVE-45715.dwg DATE: August 13, 2024, TIME: 3:33 PM, USER: ah3453 AVO: 45715.006



DRIVEWAY 1



DRIVEWAY 2

LEGEND FOR PAVING PLAN

- ASPHALT PAVEMENT
- CONCRETE CURB/ PAVEMENT
- GRAVEL
- CONCRETE CAP
- — × — FENCE

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NOTES:

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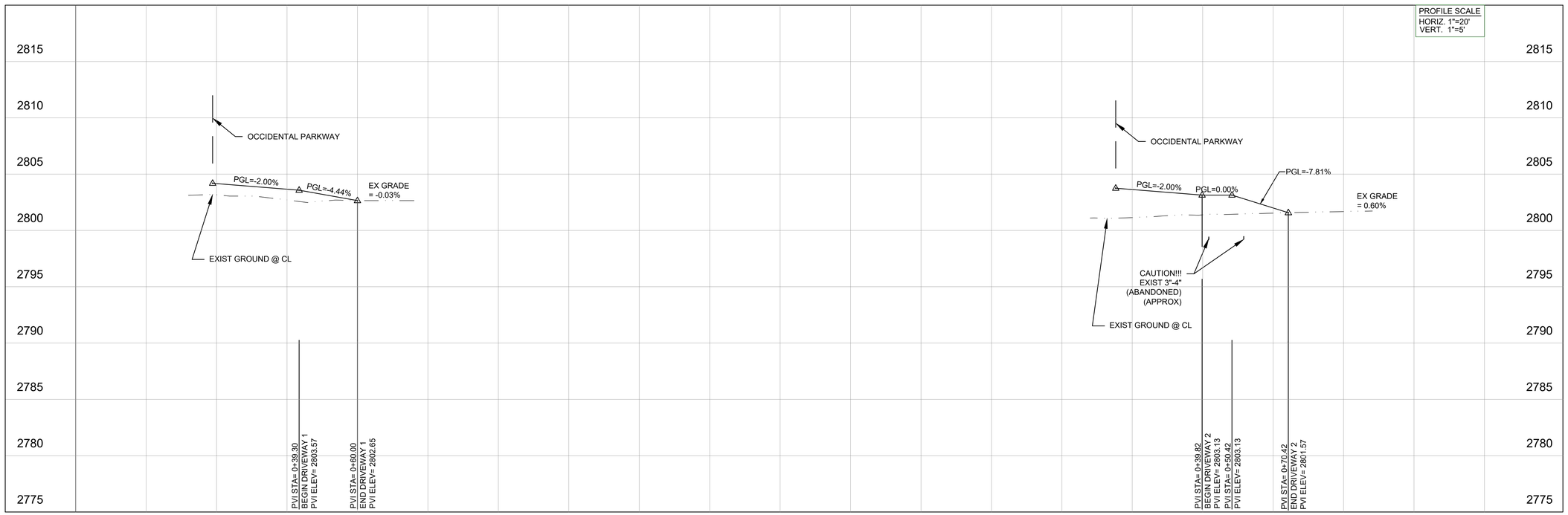


OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HATS 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

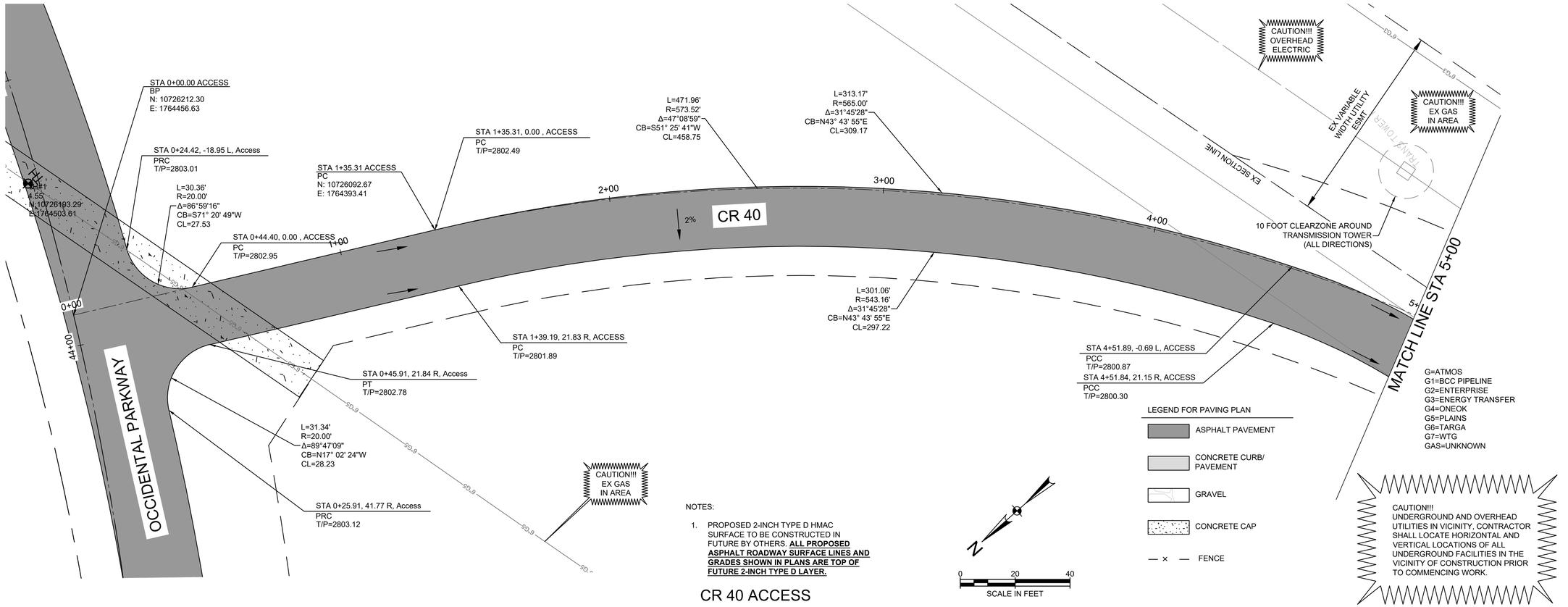
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

PAVING PLAN AND PROFILE
DRIVEWAYS

SHEET NUMBER 38 OF 217

FILE NAME: A:\45000s\45715\006\CADDSheets\C600-PAVE-45715.dwg DATE: August 13, 2024, TIME: 3:33 PM, USER: ah3453 AVO: 45715.006



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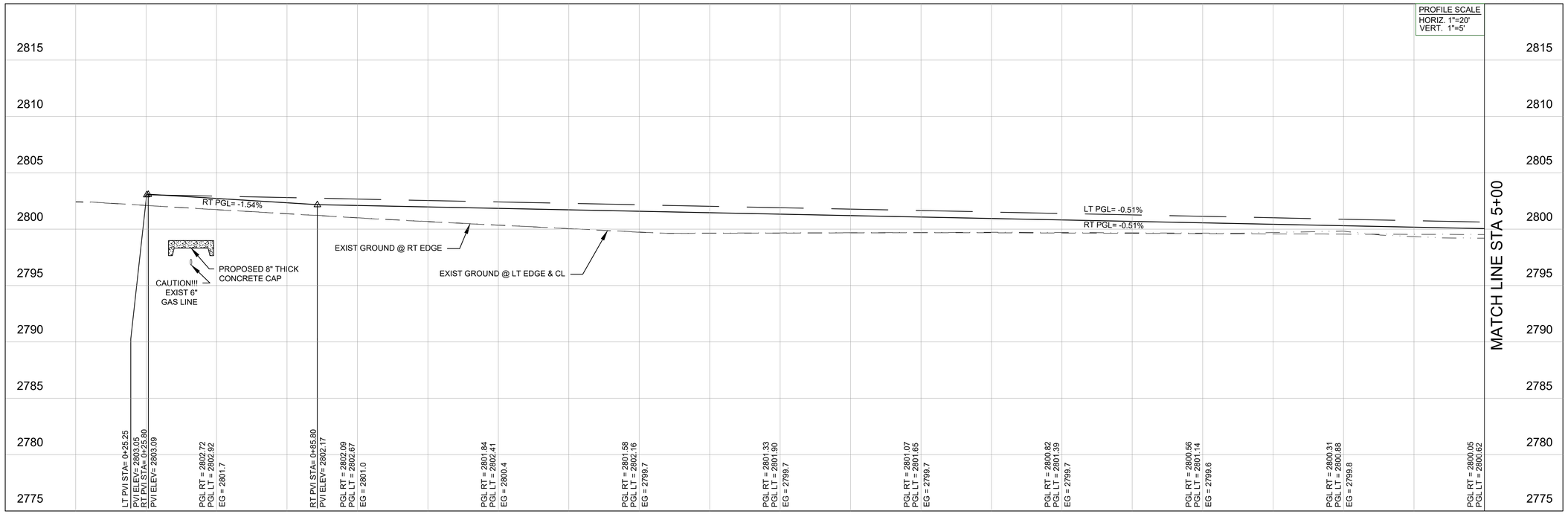
CR 40 ACCESS



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL: 817.847.1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
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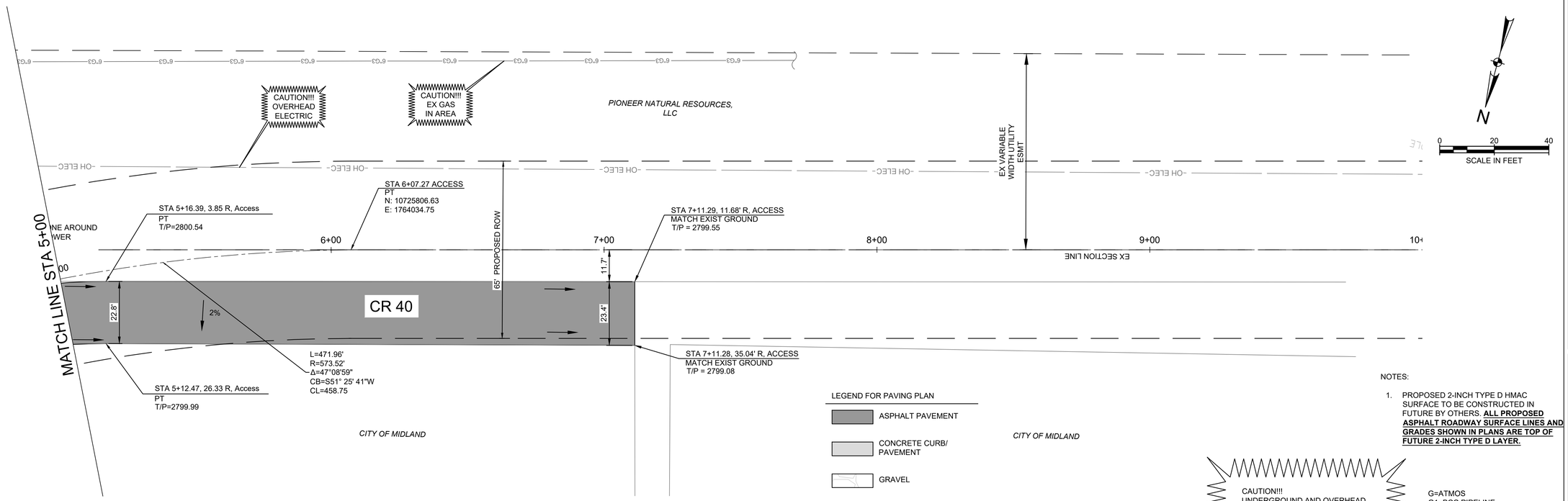
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

PAVING PLAN AND PROFILE
CR40 BEGIN TO STA 5+00

SHEET NUMBER 39 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C600-PAVE-45715.dwg DATE: August 13, 2024, TIME: 3:33 PM, USER: ah3453 AVO: 45715.006



LEGEND FOR PAVING PLAN

- ASPHALT PAVEMENT
- CONCRETE CURB/ PAVEMENT
- GRAVEL
- CONCRETE CAP
- — × — FENCE

NOTES:

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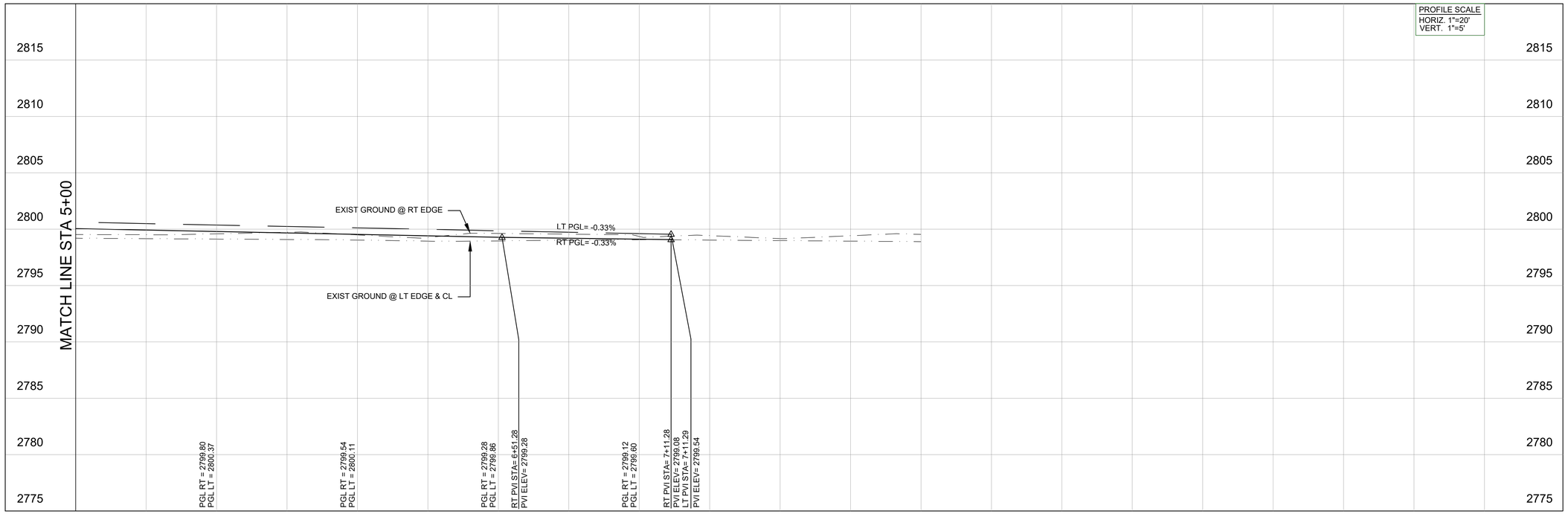
CR 40 ACCESS



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD. STE 600
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JACOB T. HAYS
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STATE OF TEXAS

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TBPELS ENGINEERING FIRM #F-312

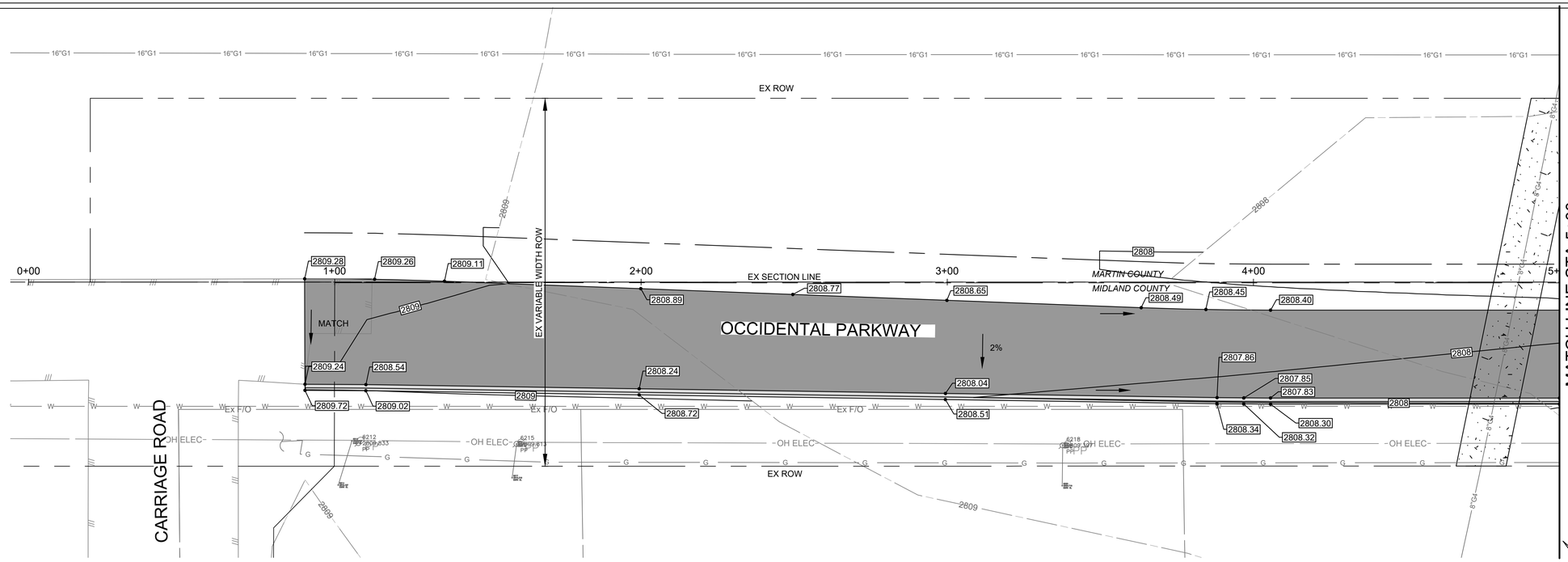
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

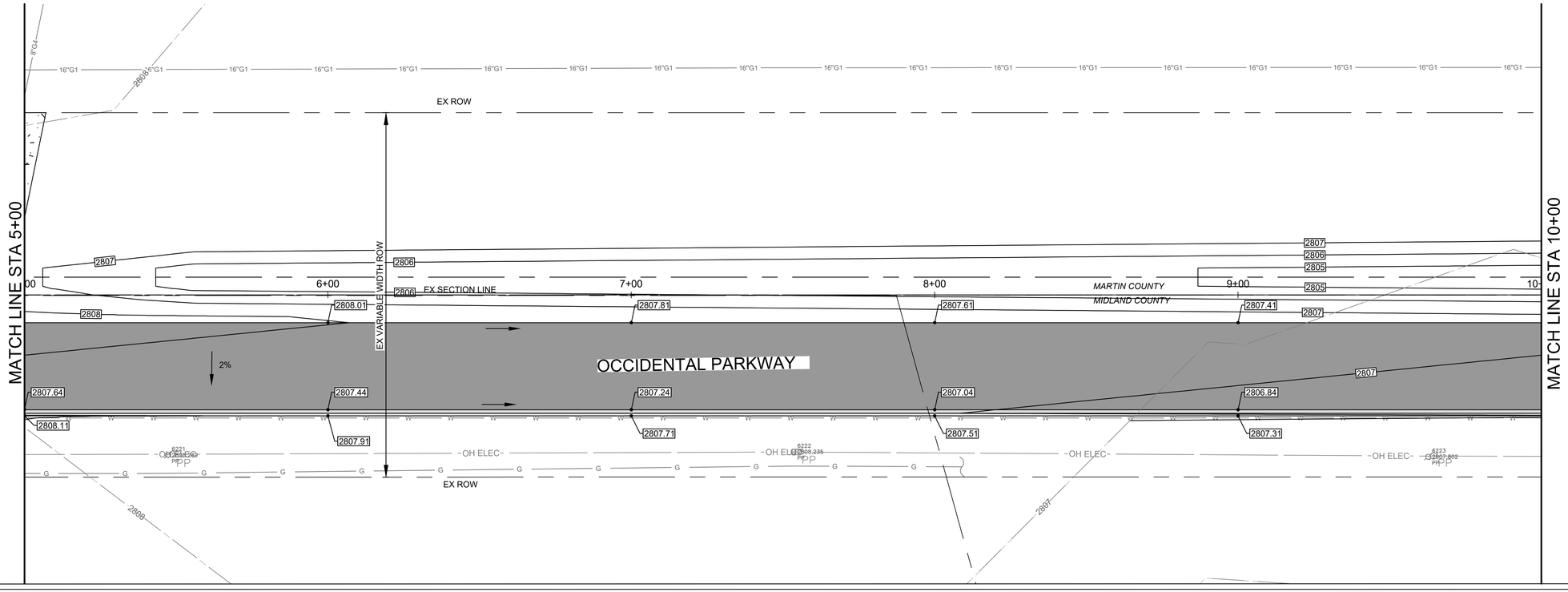
SHEET TITLE

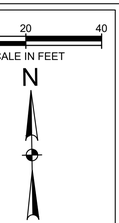
PAVING PLAN AND PROFILE
CR40 STA 5+00 TO END

SHEET NUMBER 40 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C600-PAVE-45715.dwg DATE: August 13, 2024, TIME: 3:33 PM, USER: ah3453 AVO: 45715.006







0 20 40
SCALE IN FEET

LEGEND FOR GRADING PLAN

- ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- 3305 — PROP CONTOUR
- EXIST CONTOUR
- DITCH FLOWLINE
- 2800.00 SPOT ELEVATION
- FLOW DIRECTION

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

JTH

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

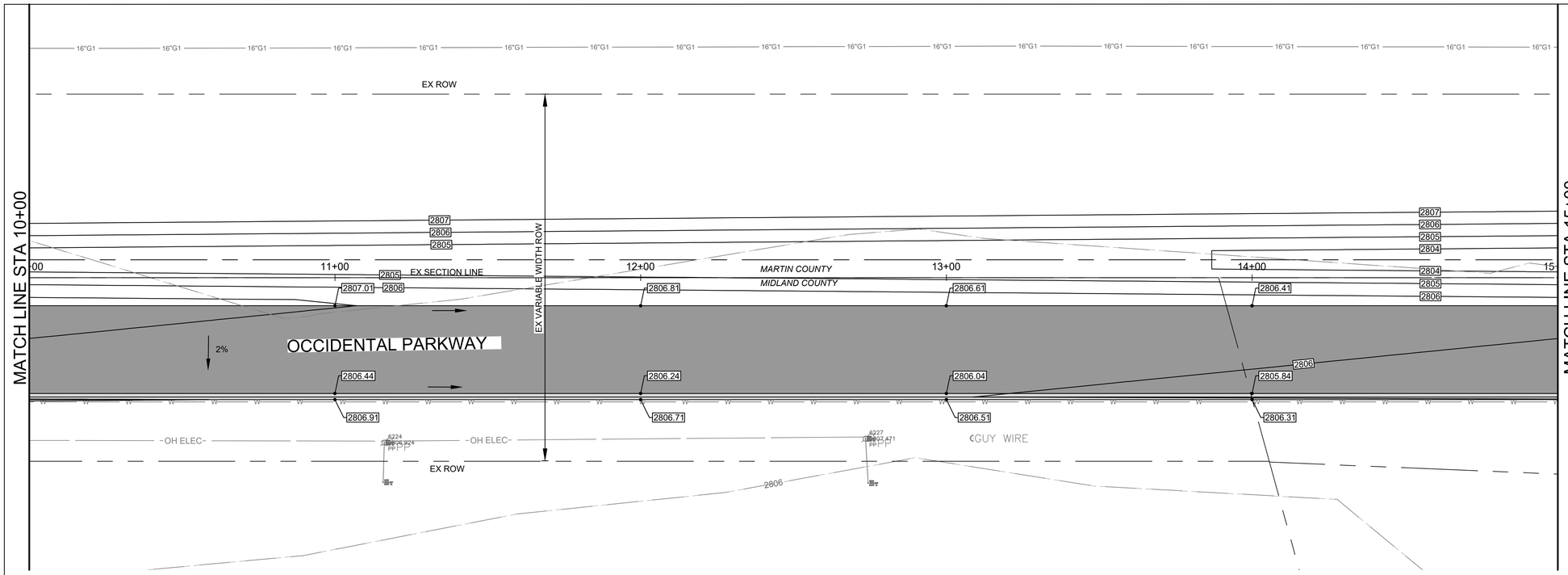
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

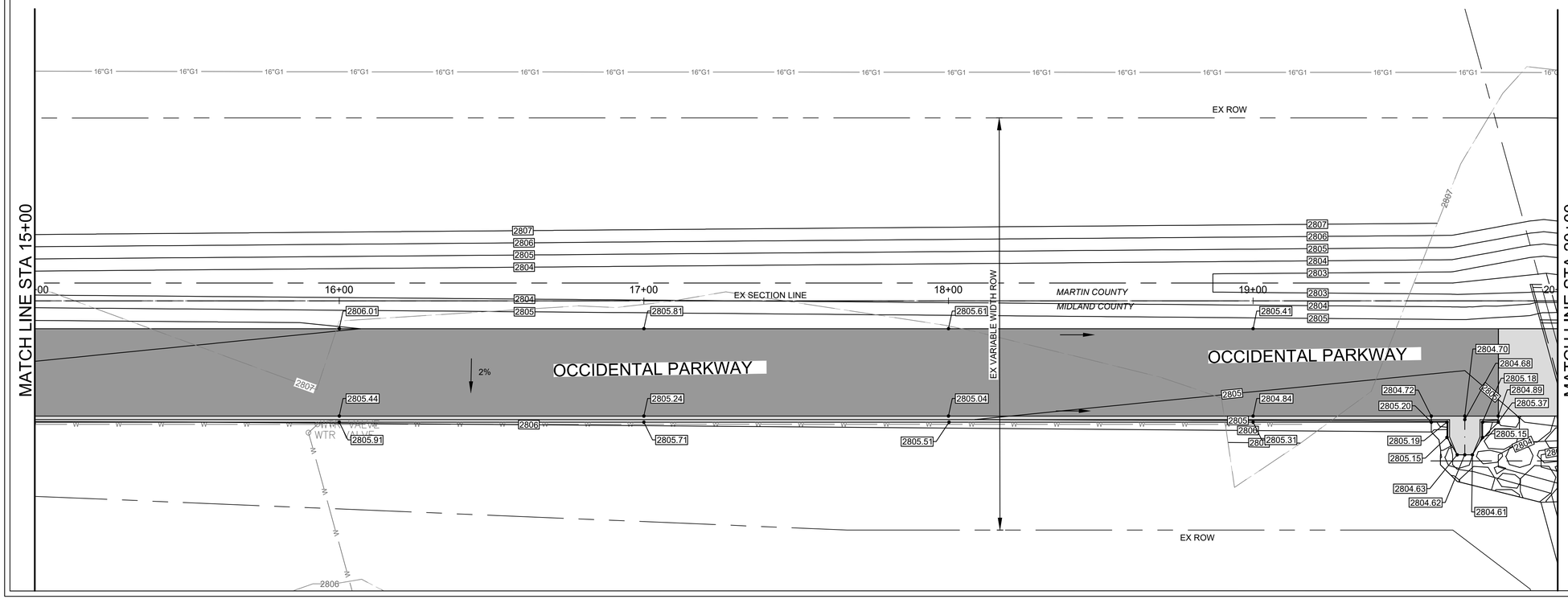
SHEET TITLE

GRADING PLAN
STA 0+00 TO STA 10+00

SHEET NUMBER 41 OF 217

FILE NAME: A:\45000s\45715006\CADD\Sheets\C700-GRAD-45715.dwg DATE: August 13, 2024, TIME: 3:34 PM, USER: ah3453 AYO: 45715.006





0 20 40
SCALE IN FEET

N

LEGEND FOR GRADING PLAN

- ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- 3305 — PROP CONTOUR
- EXIST CONTOUR
- DITCH FLOWLINE
- 2800.00 SPOT ELEVATION
- FLOW DIRECTION

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

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2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL
ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

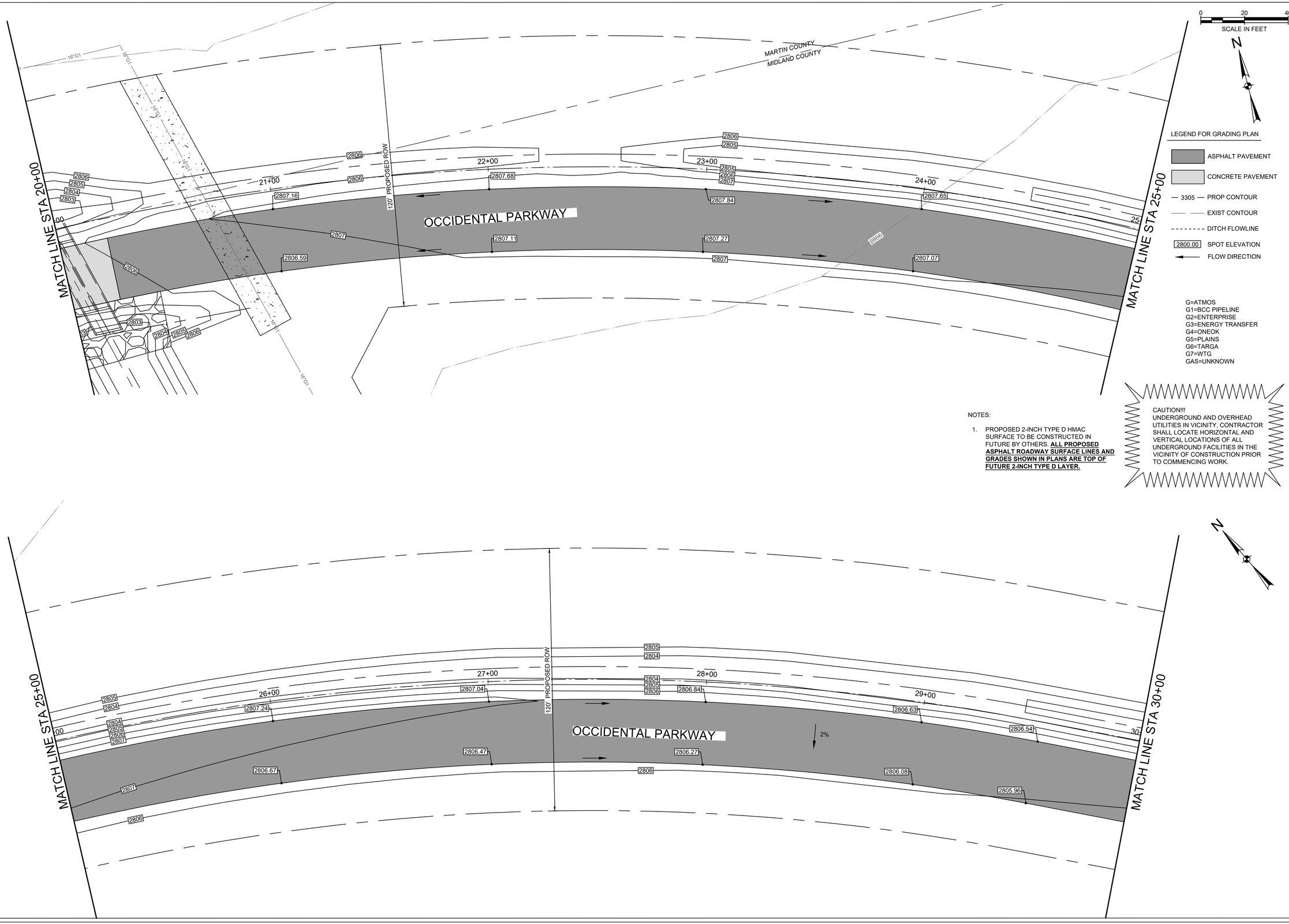
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

GRADING PLAN
STA 10+00 TO STA 20+00

SHEET NUMBER 42 OF 217

FILE NAME: A:\45000s\45715006\CADD\Sheets\C700-GRAD-45715.dwg DATE: August 13, 2024, TIME: 3:34 PM, USER: ah3453 AVO: 45715.006



NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

OCCIDENTAL PARKWAY
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MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION		
NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL
ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

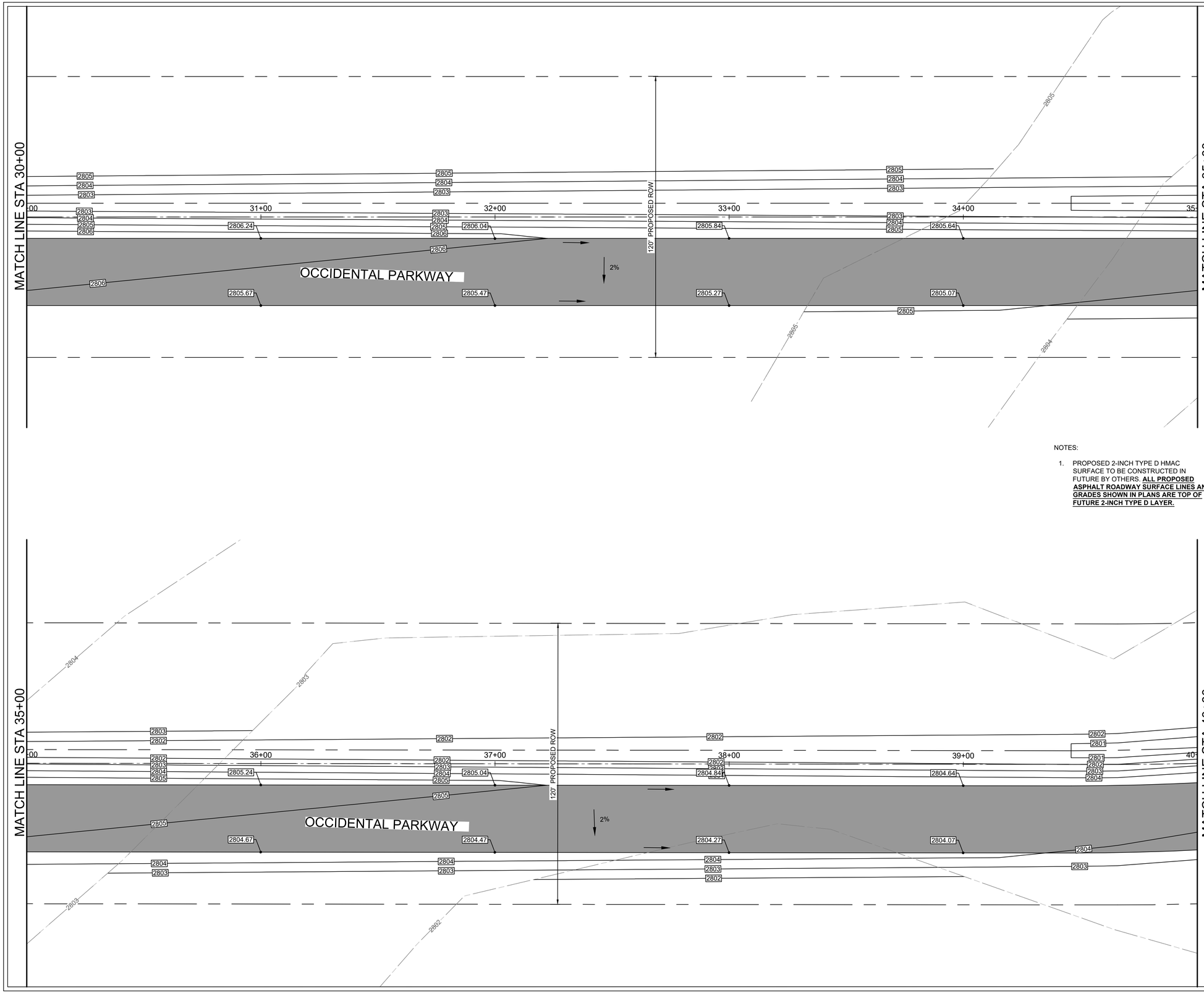
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

GRADING PLAN
STA 20+00 TO STA 30+00

SHEET NUMBER 43 OF 217

FILE NAME: A:\45000s\45715006\CADD\Sheets\C700-GRAD-45715.dwg DATE: August 13, 2024, TIME: 3:34 PM, USER: ah3453 AVO: 45715.006



NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

CAUTION!!!
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OCCIDENTAL PARKWAY
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2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
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TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

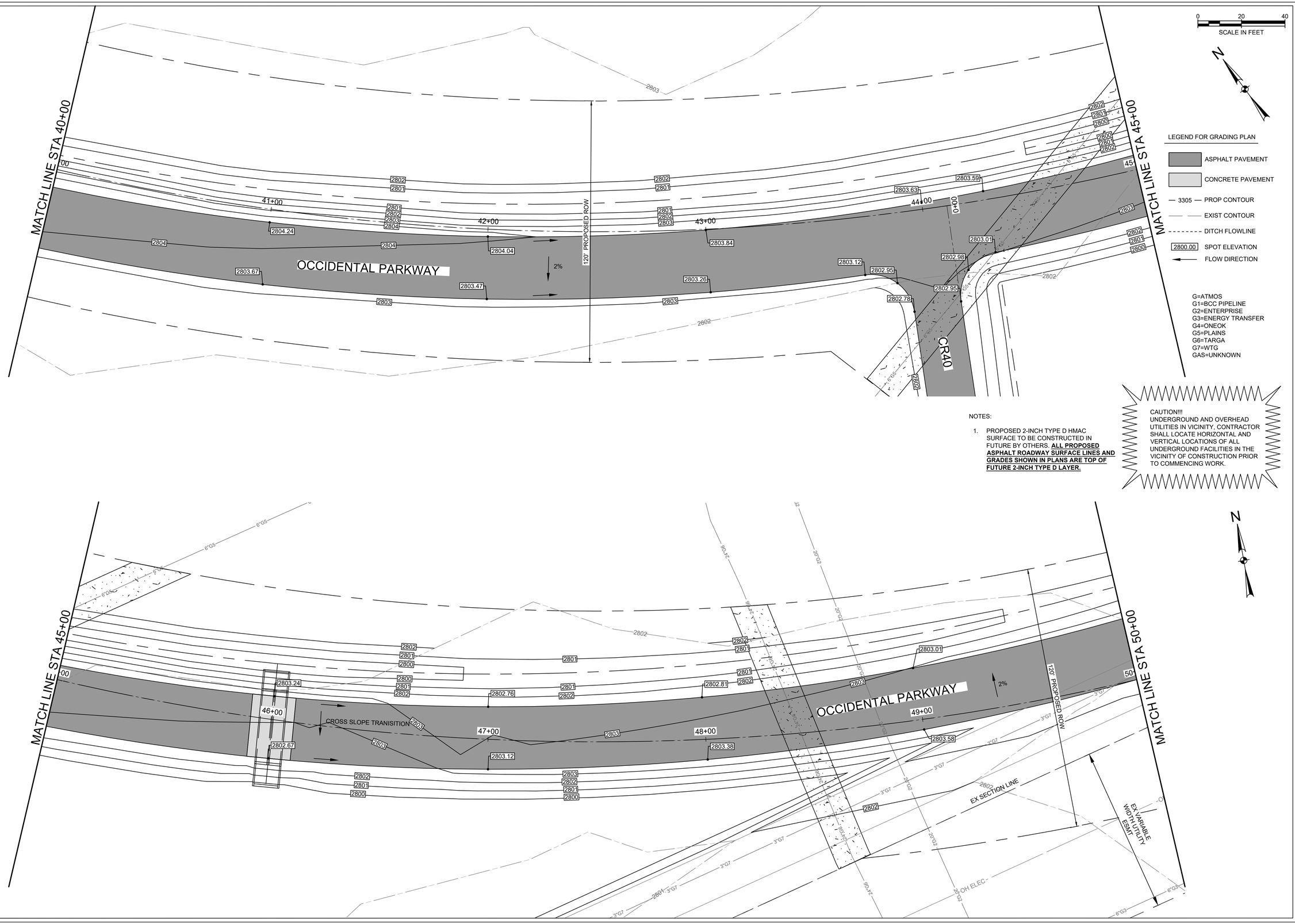
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

GRADING PLAN
STA 30+00 TO STA 40+00

SHEET NUMBER 44 OF 217

FILE NAME: A:\45000s\45715006\CADD\Sheets\C700-GRAD-45715.dwg DATE: August 13, 2024, TIME: 3:34 PM, USER: ah3453 AYO: 45715.006



NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

CAUTION!!!
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TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL
ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

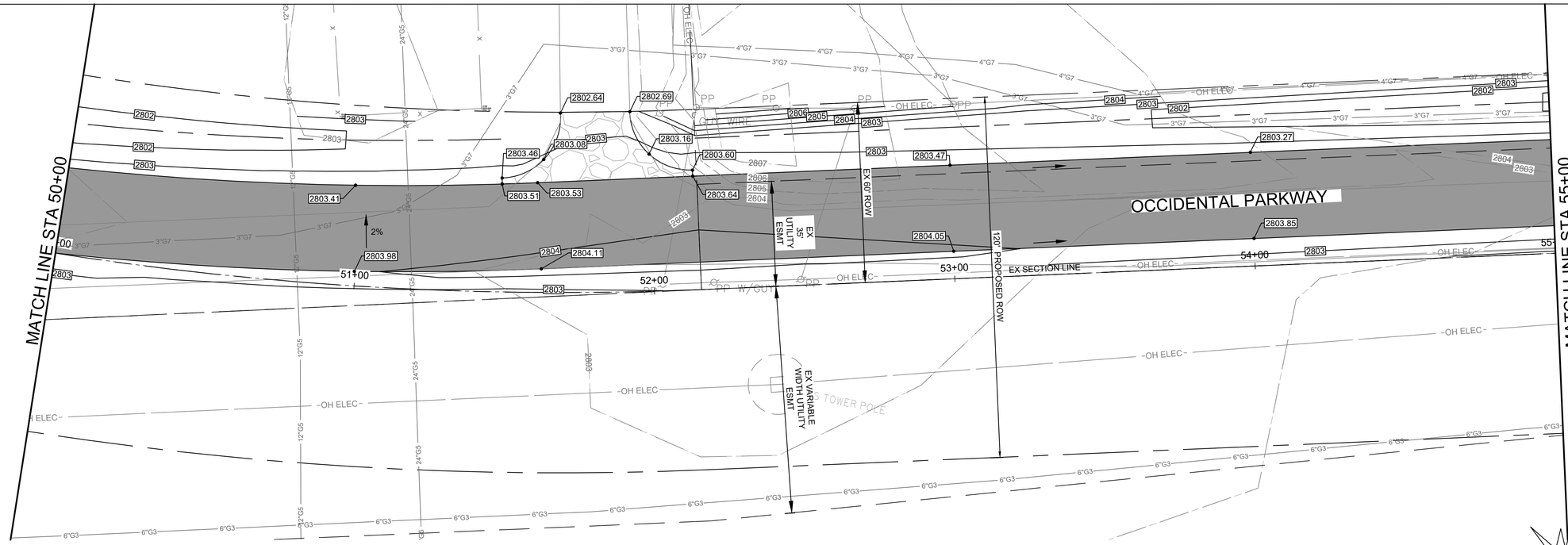
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

GRADING PLAN
STA 40+00 TO STA 50+00

SHEET NUMBER 45 OF 217

FILE NAME: A:\45000s\45715006\CADD\Sheets\C700-GRAD-45715.dwg DATE: August 13, 2024, TIME: 3:35 PM, USER: ah3453 AVO: 45715.006



0 20 40
SCALE IN FEET

N

LEGEND FOR GRADING PLAN

- ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- 3305 — PROP CONTOUR
- EXIST CONTOUR
- DITCH FLOWLINE
- 2800.00 SPOT ELEVATION
- FLOW DIRECTION

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

CAUTION!!!
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OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS 127558 LICENSED PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

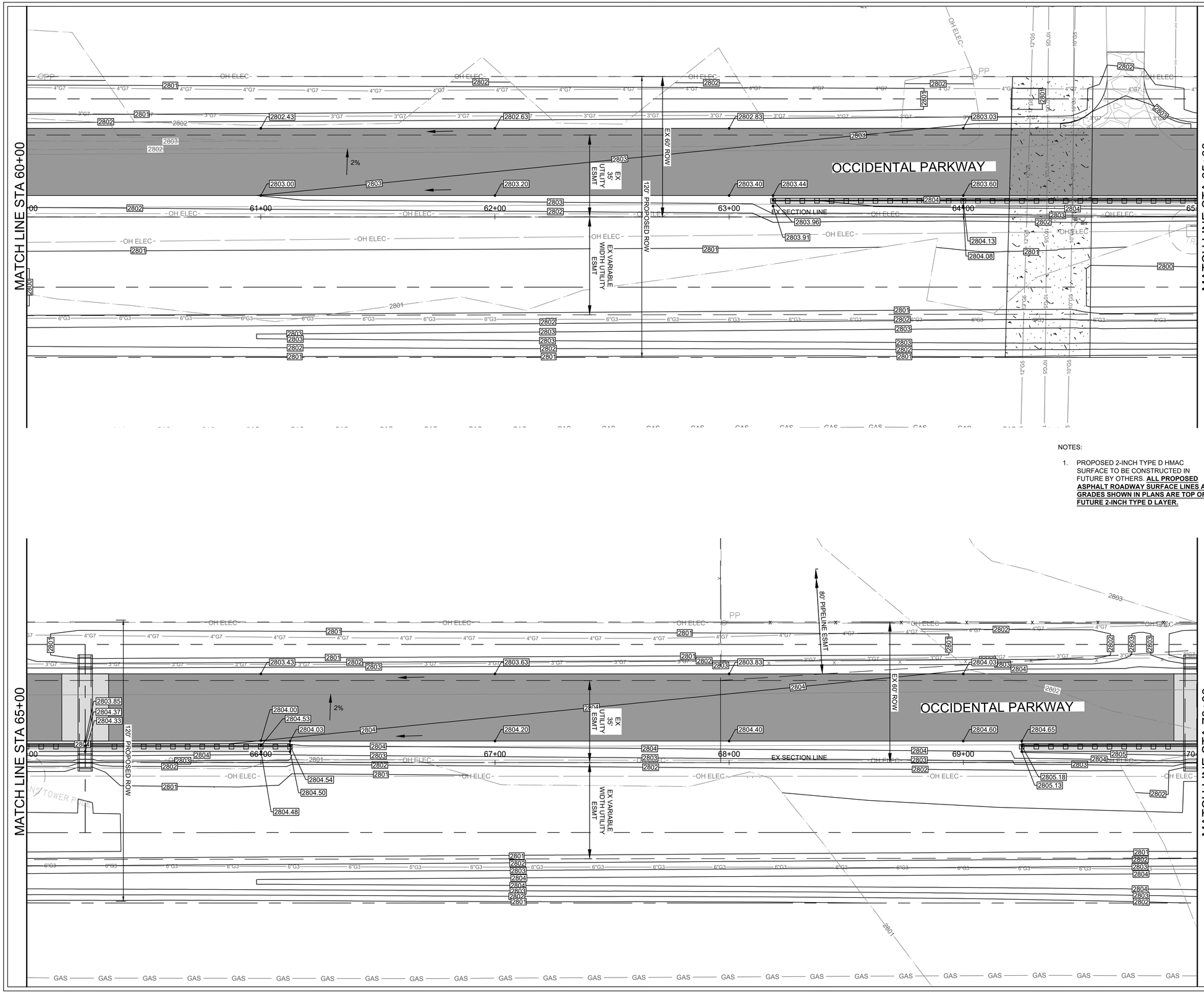
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

GRADING PLAN
STA 50+00 TO STA 60+00

SHEET NUMBER 46 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C700-GRAD-45715.dwg DATE: August 13, 2024, TIME: 3:35 PM, USER: ah3453 AVO: 45715.006



0 20 40
SCALE IN FEET

N

LEGEND FOR GRADING PLAN

- ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- 3305 PROP CONTOUR
- EXIST CONTOUR
- DITCH FLOWLINE
- 2800.00 SPOT ELEVATION
- FLOW DIRECTION

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

CAUTION!!!
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OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL
ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

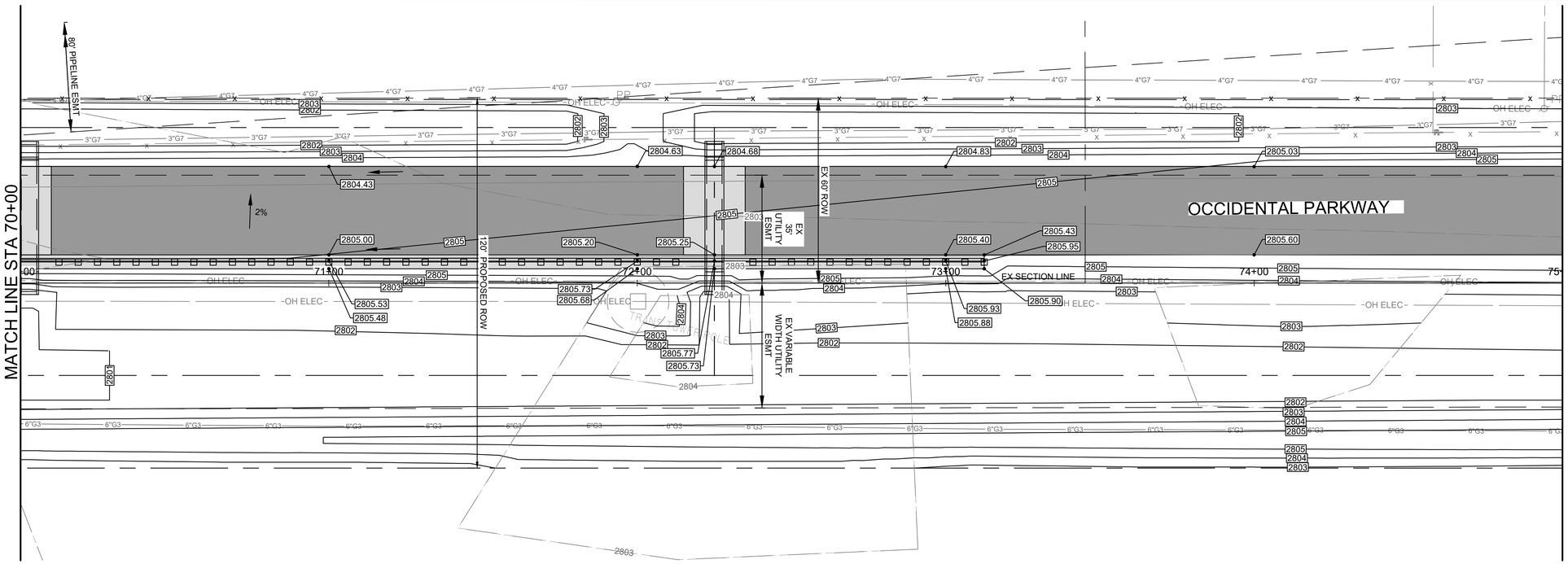
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

GRADING PLAN
STA 60+00 TO STA 70+00

SHEET NUMBER 47 OF 217

FILE NAME: A:\45000s\45715006\CADD\Sheets\C700-GRAD-45715.dwg DATE: August 13, 2024, TIME: 3:35 PM, USER: ah3453 AVO: 45715.006



0 20 40
SCALE IN FEET

N

LEGEND FOR GRADING PLAN

- ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- 3305 PROP CONTOUR
- EXIST CONTOUR
- DITCH FLOWLINE
- 2800.00 SPOT ELEVATION
- FLOW DIRECTION

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
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G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

CAUTION!!!
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OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL
ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

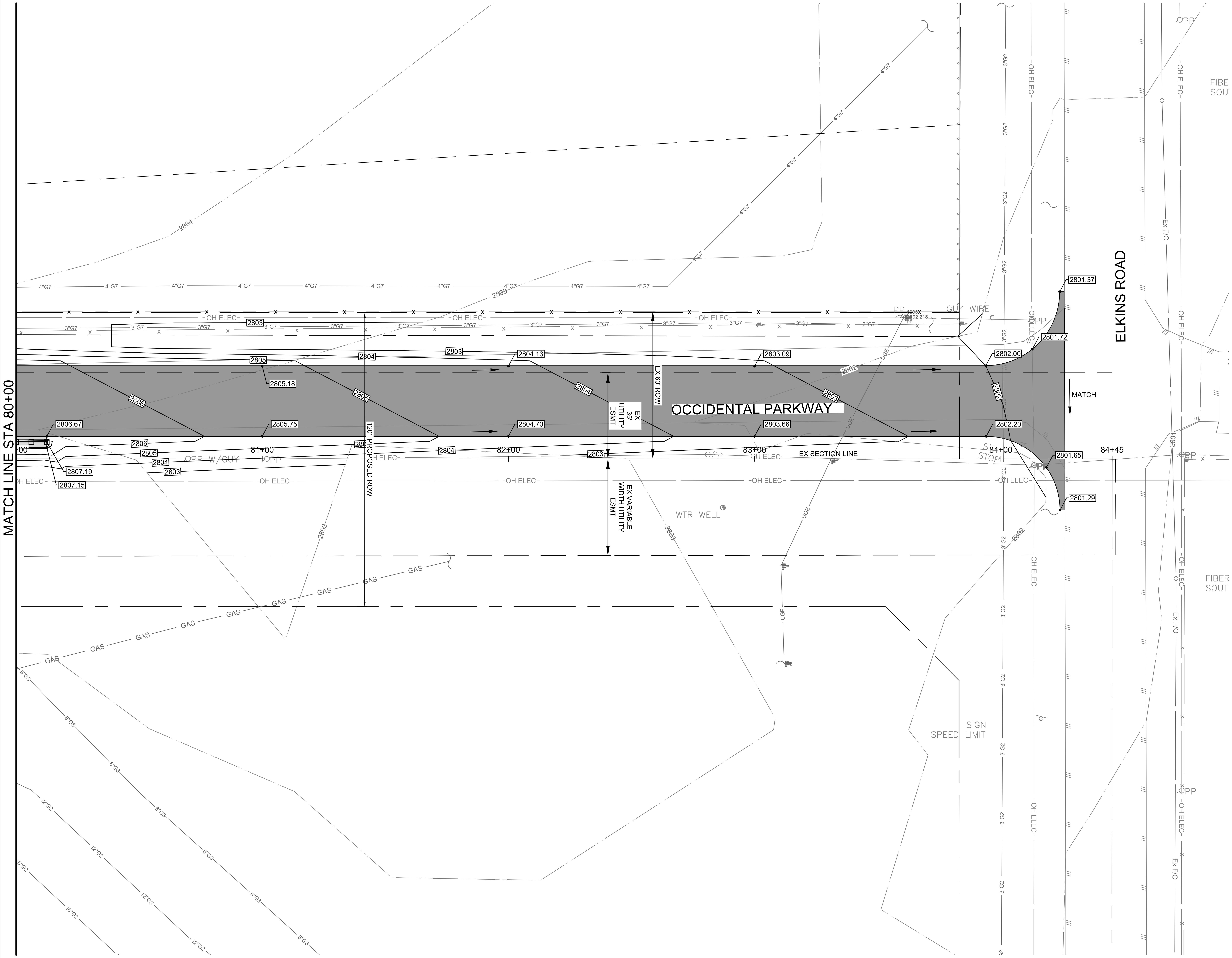
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

GRADING PLAN
STA 70+00 TO STA 80+00

SHEET NUMBER 48 OF 217

FILE NAME: A:\45000s\45715006\CADD\Sheets\C700-GRAD-45715.dwg DATE: August 13, 2024, TIME: 3:35 PM, USER: ah3453 AVO: 45715.006



SCALE IN FEET (0, 20, 40)

N

LEGEND FOR GRADING PLAN

- ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- 3305 — PROP CONTOUR
- EXIST CONTOUR
- DITCH FLOWLINE
- 2800.00 SPOT ELEVATION
- FLOW DIRECTION

G=ATMOS
G1=BCC PIPELINE
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G7=WTG
GAS=UNKNOWN

CAUTION!!!
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NOTES:

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OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION		
NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127556
LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

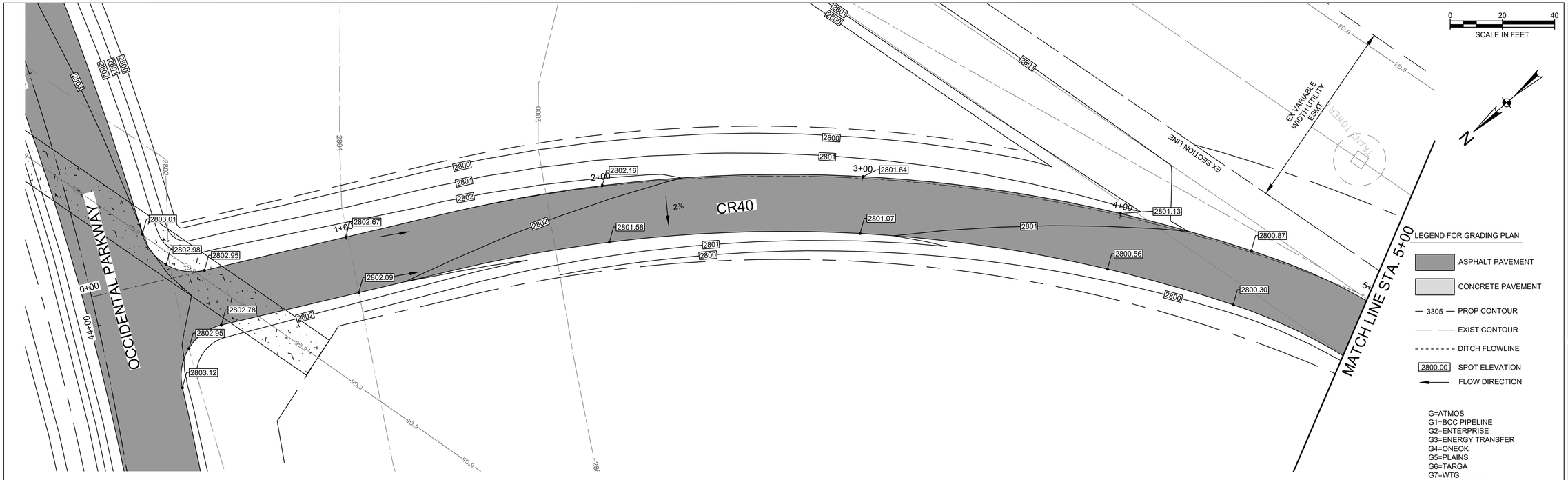
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

GRADING PLAN
STA 80+00 TO END

SHEET NUMBER 49 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C700-GRAD-45715.dwg DATE: August 13, 2024, TIME: 3:35 PM, USER: ah3453 AVO: 45715.006



CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

NOTES:

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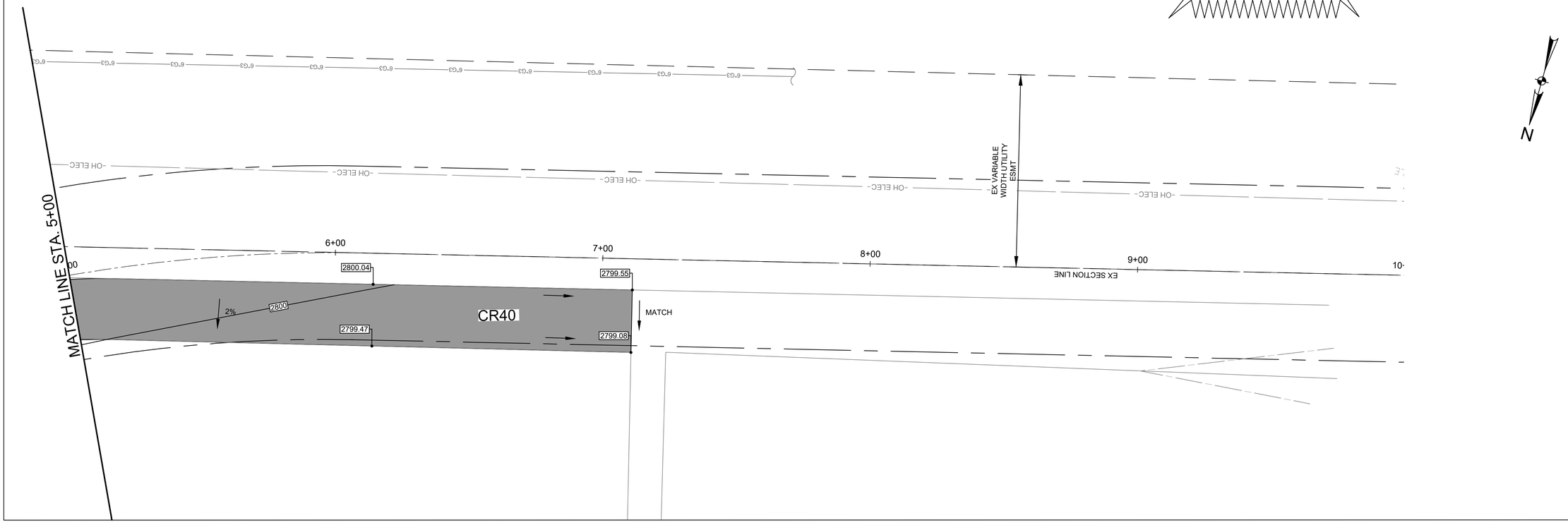


OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

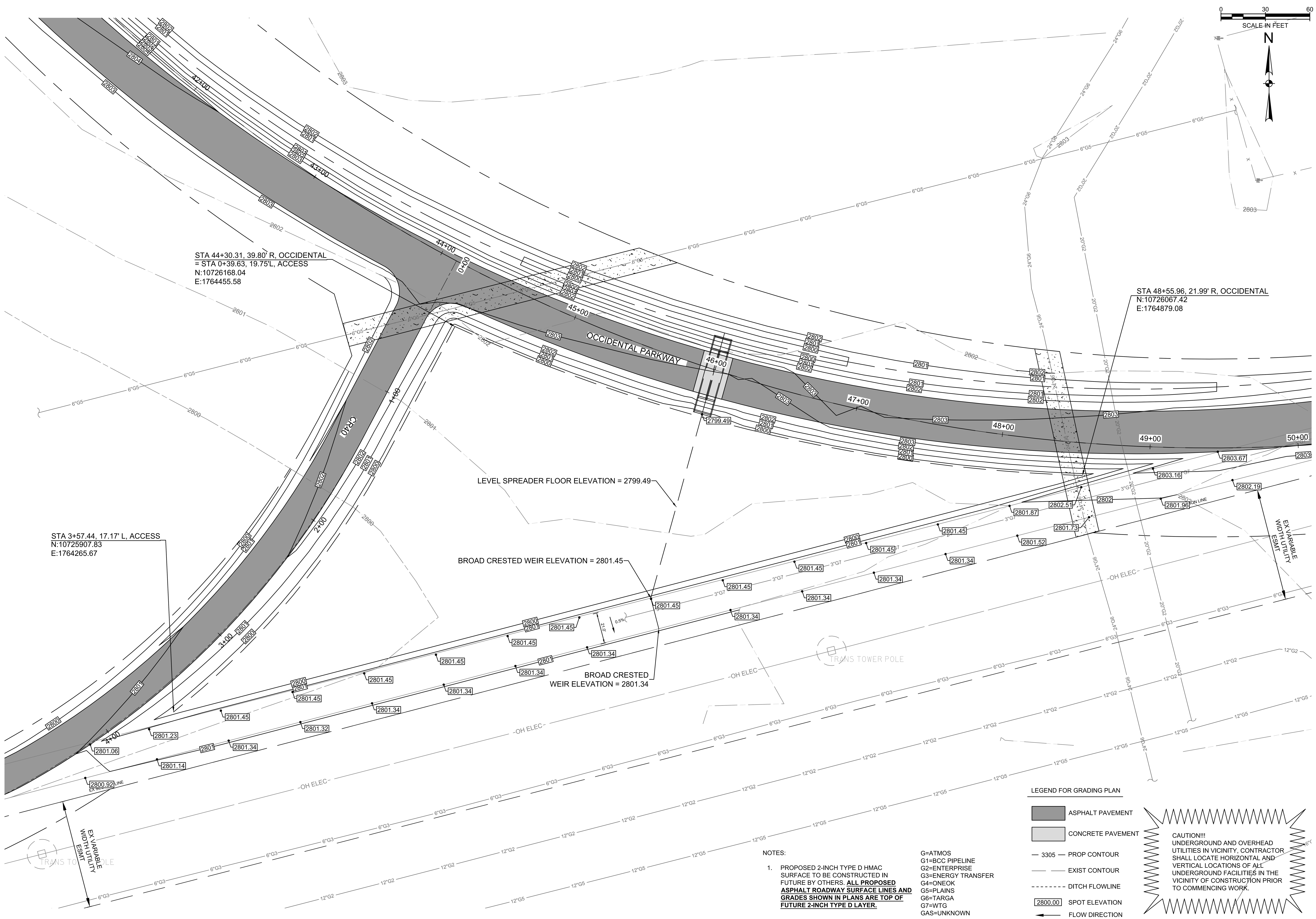
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

GRADING PLAN
CR 40

SHEET NUMBER 50 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C700-GRAD-45715.dwg DATE: August 13, 2024, TIME: 3:35 PM, USER: ah3453 AVO: 45715.006



NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

LEGEND FOR GRADING PLAN

- ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- 3305 — PROP CONTOUR
- EXIST CONTOUR
- DITCH FLOWLINE
- 2800.00 SPOT ELEVATION
- FLOW DIRECTION

CAUTION!!!
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OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

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FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

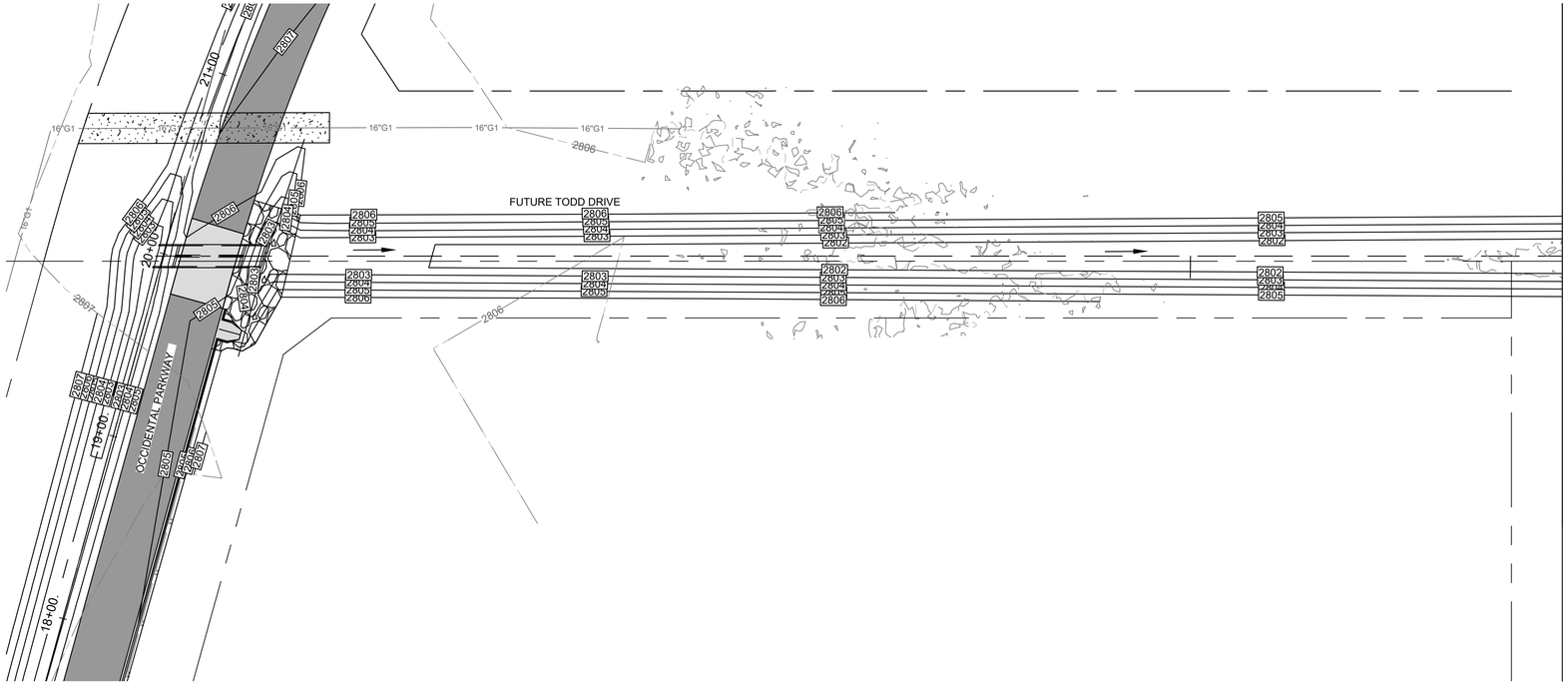
REVISION		
NO.	DATE	DESCRIPTION

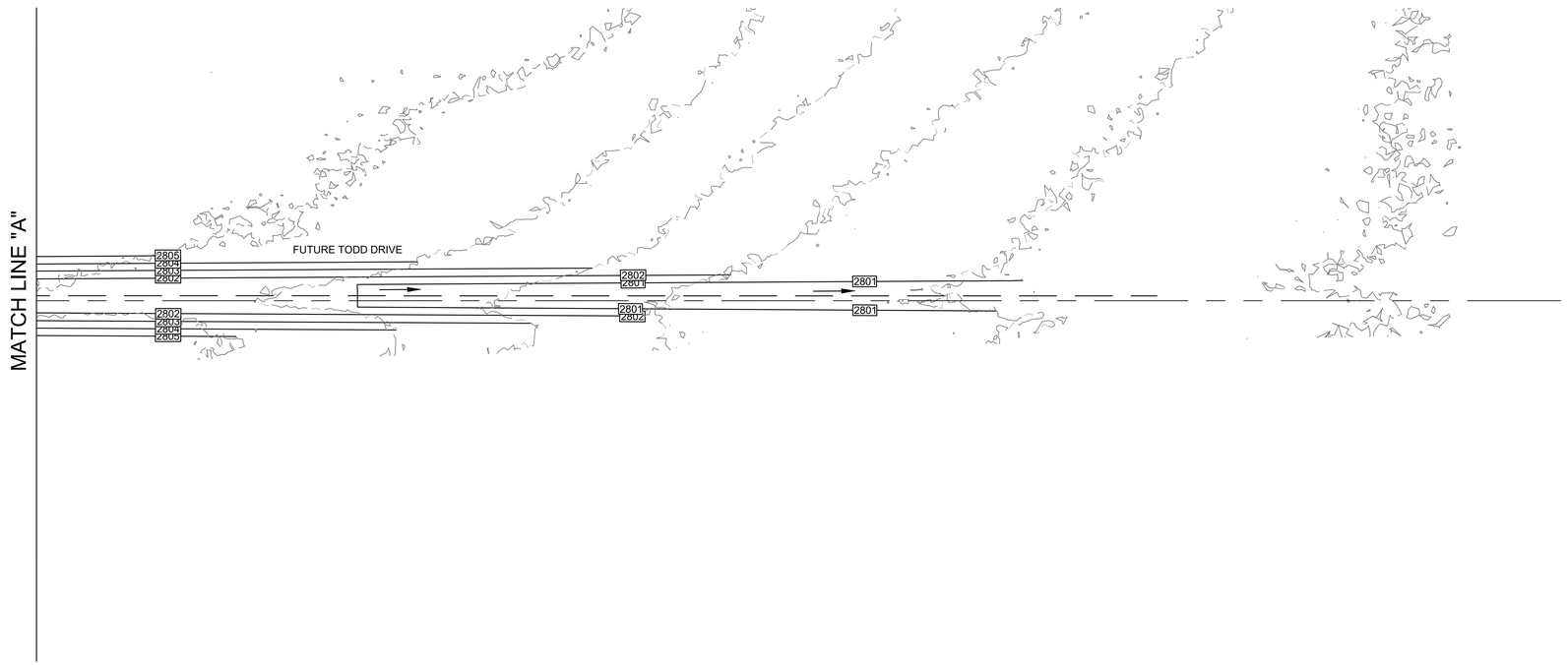
JACOB T. HAYS
127558
LICENSED PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

GRADING PLAN
POND AND LEVEL SPREADER





CHANNEL DETAILS:
STARTING FL ELEVATION: 2802.12
ENDING FL ELEVATION: 2800.38
LENGTH: 1287.85 FT
SHAPE: TRAPEZOIDAL
BOTTOM WIDTH: 12.68 FT
SIDE SLOPES: 4 TO 1 (H:V)

0 40 80
SCALE IN FEET

N

LEGEND FOR GRADING PLAN

- ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- 3305 PROP CONTOUR
- EXIST CONTOUR
- DITCH FLOWLINE
- 2800.00 SPOT ELEVATION
- FLOW DIRECTION

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

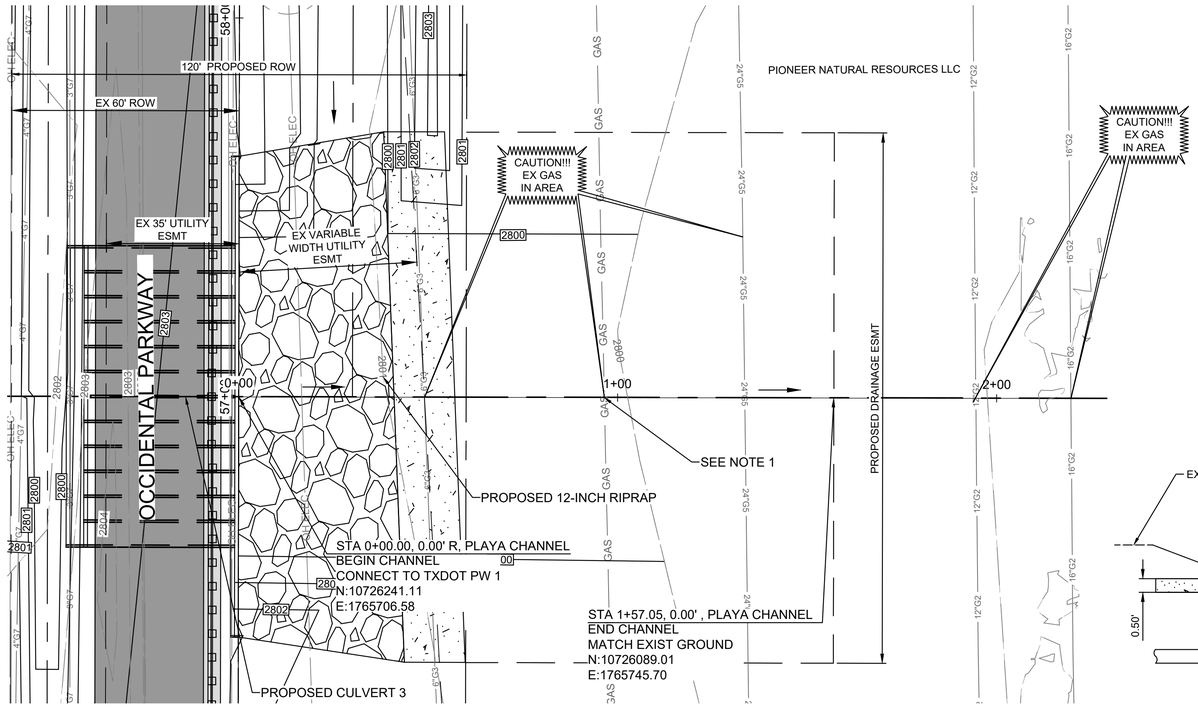
GRADING PLAN
FUTURE TODD CHANNEL

SHEET NUMBER 52 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C700-GRAD-45715.dwg DATE: August 13, 2024, TIME: 3:36 PM, USER: ah3453 AVO: 45715.006

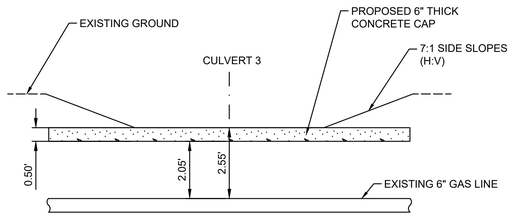
NOTES:

1. GAS LINE IS ASSUMED TO BE ABANDONED AND NO LONGER IN SERVICE BASED ON RECORDS. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF CHANNEL GRADING AND SHAPING THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.



PLAYA CHANNEL

CHANNEL DETAILS:
STARTING FL ELEVATION: 2799.68
ENDING FL ELEVATION: 2799.41
LENGTH: 157.05 FT
SHAPE: TRAPEZOIDAL
BOTTOM WIDTH: 79.58 FT
SIDE SLOPES: 4 TO 1 (H:V)
TRANSITIONING 7 TO 1 (H:V)



CHANNEL SECTION DETAIL
AT CONCRETE CAP
(NOT TO SCALE)

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

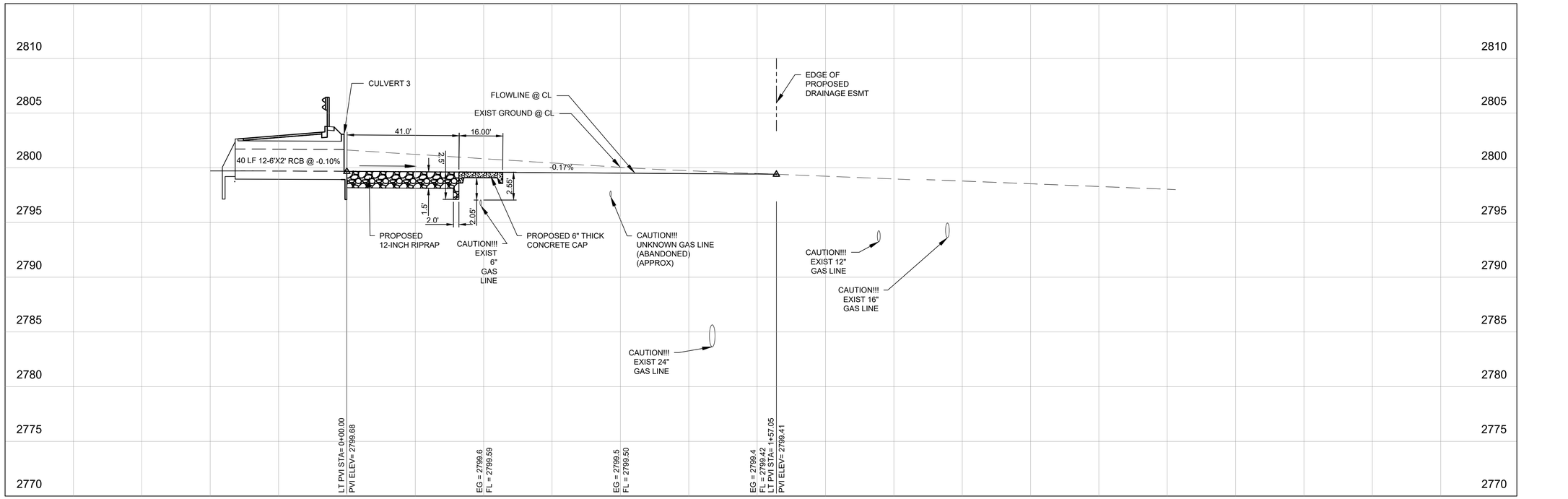
0 20 40
SCALE IN FEET

N

LEGEND FOR GRADING PLAN

- ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- 3305 PROP CONTOUR
- EXIST CONTOUR
- DITCH FLOWLINE
- 2800.00 SPOT ELEVATION
- FLOW DIRECTION

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL
ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

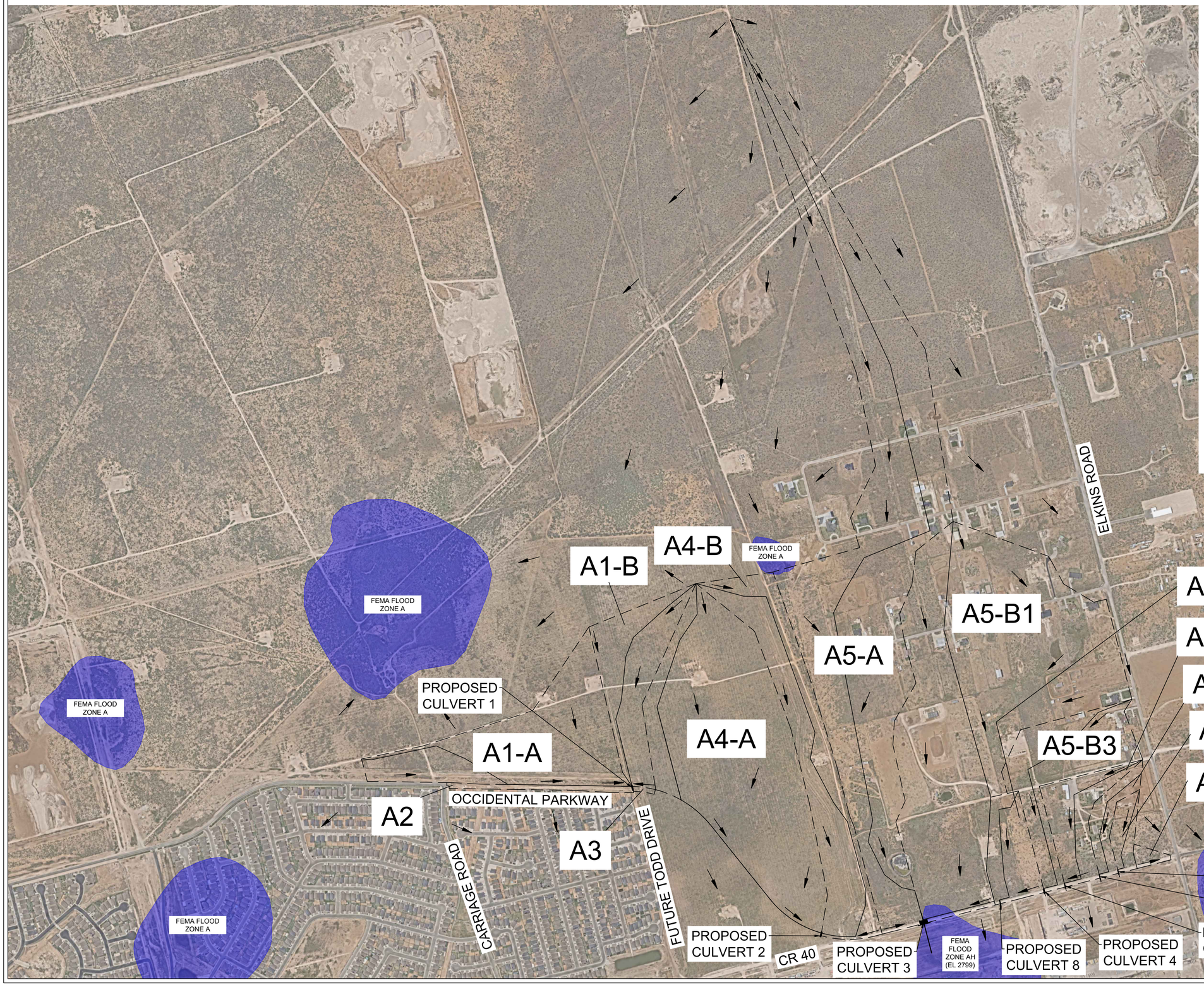
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

GRADING PLAN & PROFILE
PLAYA CHANNEL

SHEET NUMBER 53 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C700-GRAD-45715.dwg DATE: August 13, 2024, TIME: 3:36 PM, USER: ah3453 AVO: 45715.006



N

0 500 1,000

SCALE IN FEET

LEGEND FOR DRAINAGE AREA MAP

A1 DRAINAGE AREA NO.

DRAINAGE AREA DELINEATION

PROPOSED TIME OF CONCENTRATION PATH

FLOW ARROW

100-YEAR MAPPED FLOOD ZONE

NOTES:

1. DRAINAGE AREAS WERE DELINEATED BASED ON 2018 LIDAR TOPOGRAPHIC DATA AND NEARMAP AERIAL IMAGERY.

SUMMARY	
NAME	AREA (ACRES)
A1-A	43.37
A1-B	23.33
A2	2.45
A3	0.27
A4-A	84.72
A4-B	39.40
A5-A	143.73
A5-B1	131.97
A5-B2	11.43
A5-B3	24.95
A5-B4	12.89
A5-B5	5.82
A5-B6	4.19
A5-B7	1.87

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

CITY OF MIDLAND Engineering Services

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION		
NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127598
LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

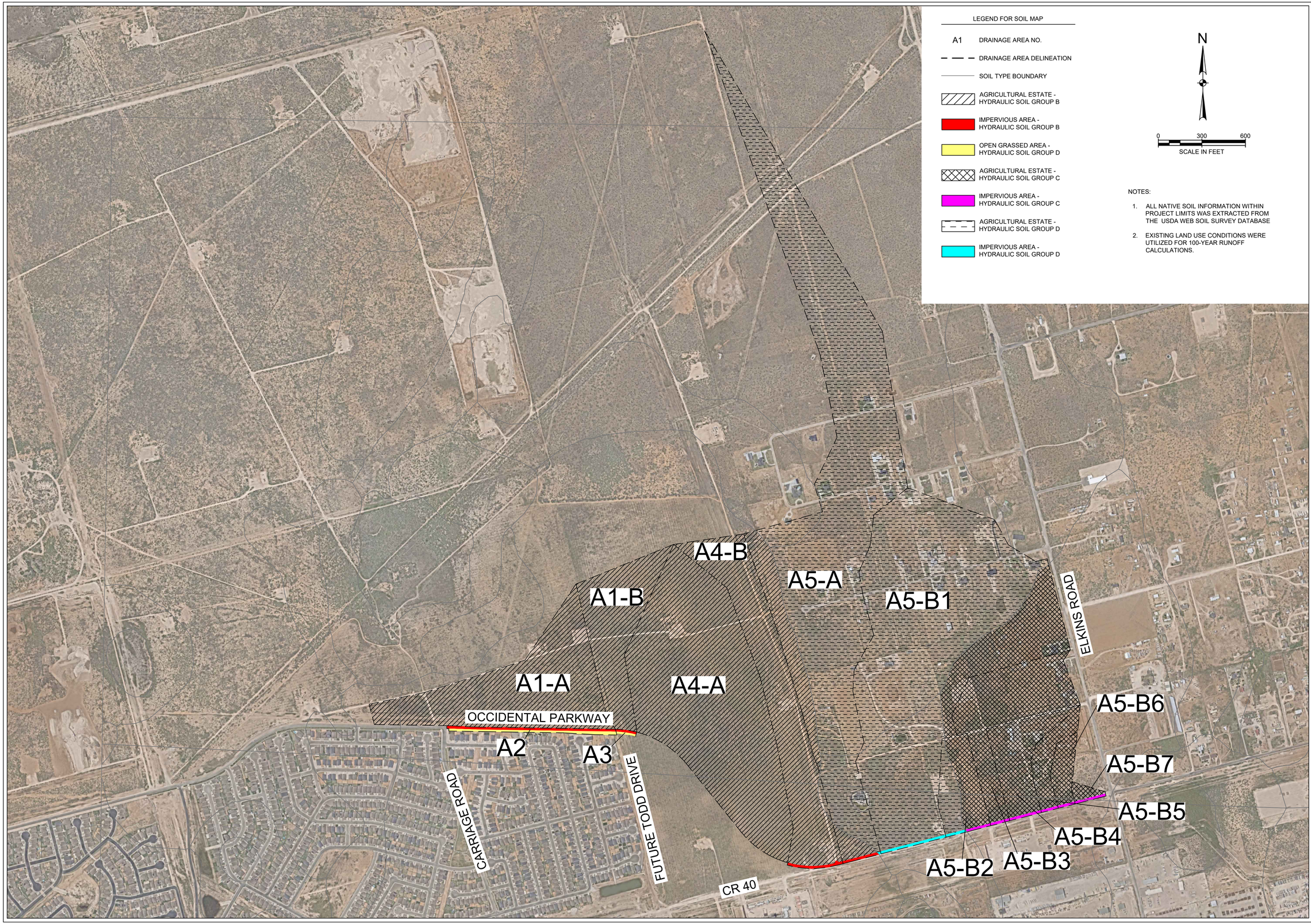
SHEET TITLE

DRAINAGE

DRAINAGE AREA MAP

SHEET NUMBER 54 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C800-DMAP-45715.dwg DATE: August 13, 2024, TIME: 3:36 PM, USER: ah3453 AVO: 45715.006



LEGEND FOR SOIL MAP

- A1 — DRAINAGE AREA NO.
- DRAINAGE AREA DELINEATION
- SOIL TYPE BOUNDARY
- AGRICULTURAL ESTATE - HYDRAULIC SOIL GROUP B
- IMPERVIOUS AREA - HYDRAULIC SOIL GROUP B
- OPEN GRASSED AREA - HYDRAULIC SOIL GROUP D
- AGRICULTURAL ESTATE - HYDRAULIC SOIL GROUP C
- IMPERVIOUS AREA - HYDRAULIC SOIL GROUP C
- AGRICULTURAL ESTATE - HYDRAULIC SOIL GROUP D
- IMPERVIOUS AREA - HYDRAULIC SOIL GROUP D

N

0 300 600

SCALE IN FEET

NOTES:

1. ALL NATIVE SOIL INFORMATION WITHIN PROJECT LIMITS WAS EXTRACTED FROM THE USDA WEB SOIL SURVEY DATABASE
2. EXISTING LAND USE CONDITIONS WERE UTILIZED FOR 100-YEAR RUNOFF CALCULATIONS.

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JOSHUA T. HALFF 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

DRAINAGE SOIL MAP

SHEET NUMBER 55 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C801-SMAP-45715.dwg DATE: August 13, 2024, TIME: 3:36 PM, USER: ah3453 AVO: 45715.006

SCS CURVE NUMBER (AMC II Conditions)

DRAINAGE AREA	AREA (ACRES)	USE	SOIL GROUP	CN	CNw (AMC 1.4)	CNw (ROUNDED)
A1-A	43.37	AE	B	73	62	-
A1-B	23.33	AE	B	73	62	-
A2	1.31	IMPERVOUS	B	98	-	85
	1.14	OPEN	B	69	-	
A3	0.16	IMPERVOUS	B	98	-	86
	0.11	OPEN	B	69	-	
A4-A	84.72	AE	B	73	62	-
A4-B	38.32	AE	B	73	62	63
	0.64	AE	D	86	78	
	0.44	IMPERVOUS	B	98	-	
A5-A	130.31	AE	D	86	78	77
	13.12	AE	B	73	62	
	0.30	IMPERVOUS	B/D	98	-	
A5-B1	111.45	AE	D	86	78	77
	20.01	AE	C	82	72	
	0.51	IMPERVOUS	D	98		
A5-B2	6.65	AE	C	82	72	75
	4.43	AE	D	86	78	
	0.35	IMPERVOUS	C/D	98	-	
A5-B3	24.80	AE	C	82	72	72
	0.15	IMPERVOUS	C	98	-	
A5-B4	12.64	AE	C	82	72	73
	0.25	IMPERVOUS	C	98	-	
A5-B5	5.69	AE	C	82	72	73
	0.13	IMPERVOUS	C	98	-	
A5-B6	4.06	AE	C	82	72	73
	0.13	IMPERVOUS	C	98	-	
A5-B7	1.09	AE	C	82	72	83
	0.78	IMPERVOUS	C	98	-	

PROJECT	Longest Flowpath (ft) (1)	Length (ft) (2)	n-Value (3)	Land Use/Surface Description (4)	Slope (%) (5)	Rainfall (in) (6)	TcO (sec) (7)	Length (ft) (8)	Slope (%) (9)	Assumption for velocity (Paved/Unpaved) (11)	Velocity (ft/s) (10)	TcS (sec) (12)	Length (ft) (13)	Conveyance Type (15)	Velocity (ft/s) (16)	TcC (sec) (17)	Final Time of Concentration (Tc) (min) (18)	Lag Time (Tlag) (min) (19)	Time Step (min) (20)
OCCIDENTAL PARKWAY																			
A1-A	2945	100	0.130	Range (natural)	0.40	2.74	1079	1549	0.40	Unpaved	1.02	1518	1296	Ditch	3.00	432	50	30.29	9
						T_o Total	1079			Ts Total		1518				Tc Total	432		
A1-B	2467	100	0.130	Range (natural)	0.10	2.74	1878	2367	0.40	Unpaved	1.02	2320	0	N/A	3.00	0	70	41.98	12
						T_o Total	1878			Ts Total		2320				Tc Total	0		
A2	-	-	-	Smooth Surface (concrete, asphalt, bare earth)	-	2.74	#VALUE!	-	-	Paved	#VALUE!	#VALUE!	-	N/A	3.00	#VALUE!	10	6.00	2
						T_o Total	#VALUE!			Ts Total		#VALUE!				Tc Total	#VALUE!		
A3	-	-	-	Smooth Surface (concrete, asphalt, bare earth)	-	2.74	#VALUE!	-	-	Paved	#VALUE!	#VALUE!	-	N/A	3.00	#VALUE!	10	6.00	2
						T_o Total	#VALUE!			Ts Total		#VALUE!				Tc Total	#VALUE!		
A4-A	4442	100	0.130	Range (natural)	0.10	2.74	1878	2290	0.60	Unpaved	1.25	1832	2052	Ditch	3.00	684	73	43.94	13
						T_o Total	1878			Ts Total		1832				Tc Total	684		
A4-B	4904	100	0.130	Range (natural)	0.10	2.74	1878	4444	0.50	Unpaved	1.14	3895	360	Ditch	3.00	120	98	58.93	17
						T_o Total	1878			Ts Total		3895				Tc Total	120		
A5-A	10677	100	0.130	Range (natural)	0.10	2.74	1878	10577	0.50	Unpaved	1.14	9271	0	Ditch	3.00	0	186	111.49	32
						T_o Total	1878			Ts Total		9271				Tc Total	0		
A5-B1	4747	100	0.130	Range (natural)	0.90	2.74	780	3719	0.40	Unpaved	1.02	3645	928	Ditch	3.00	309	79	47.34	14
						T_o Total	780			Ts Total		3645				Tc Total	309		
A5-B2	1348	100	0.130	Range (natural)	1.00	2.74	748	1142	0.50	Unpaved	1.14	1001	106	Ditch	3.00	35	30	17.84	5
						T_o Total	748			Ts Total		1001				Tc Total	35		
A5-B3	2735	100	0.130	Range (natural)	1.00	2.74	748	2483	0.50	Unpaved	1.14	2176	152	Ditch	3.00	51	50	29.75	9
						T_o Total	748			Ts Total		2176				Tc Total	51		
A5-B4	1876	100	0.130	Range (natural)	1.00	2.74	748	1594	0.50	Unpaved	1.14	1397	182	Ditch	3.00	61	37	22.05	6
						T_o Total	748			Ts Total		1397				Tc Total	61		
A5-B5	1317	100	0.130	Range (natural)	1.00	2.74	748	1115	0.50	Unpaved	1.14	977	102	Ditch	3.00	34	29	17.59	5
						T_o Total	748			Ts Total		977				Tc Total	34		
A5-B6	951	100	0.130	Range (natural)	1.00	2.74	748	750	0.50	Unpaved	1.14	657	71	Ditch	3.00	24	24	14.29	4
						T_o Total	748			Ts Total		657				Tc Total	24		
A5-B7	409	100	0.130	Range (natural)	1.00	2.74	748	309	0.50	Paved	1.44	215	0	Ditch	4.00	0	10	6.00	2
						T_o Total	748			Ts Total		215				Tc Total	0		

TR-55 GRAPHICAL PEAK DISCHARGE CALCULATION (Qp) FOR EXISTING CONDITIONS

DRAINAGE AREA	TOTAL AREA (AC)	TOTAL AREA (SQ MILE)	CN	Tc (MIN)	Tc (HR)	S	Ia (IN)	P (IN)	Ia/P	Q(IN)	qu(CSM/IN)	Qp (CFS)	Culvert Qp (CFS)	Culvert ID
A1-A	43.37	0.068	62	50	0.83	6.13	1.23	6.83	0.18	2.68	375	68.02	95.34	CULVERT 1
A1-B	23.33	0.036	62	70	1.17	6.13	1.23	6.83	0.18	2.68	280	27.32		
A2	2.45	0.004	85	10	0.17	1.76	0.35	6.83	0.10	5.09	850	16.56	-	-
A3	0.27	0.000	86	10	0.17	1.63	0.33	6.83	0.10	5.20	850	1.87	-	-
A4-A	84.72	0.132	62	73	1.22	6.13	1.23	6.83	0.18	2.68	295	104.53	143.81	CULVERT 2
A4-B	39.40	0.062	63	98	1.63	5.87	1.17	6.83	0.17	2.77	230	39.28		
A5-A	143.73	0.225	78	186	3.10	2.82	0.56	6.83	0.10	4.32	160	155.26	415.90	CULVERT 3
A5-B1	131.97	0.206	77	79	1.32	2.99	0.60	6.83	0.10	4.21	300	260.64		
A5-B2	11.43	0.018	75	30	0.50	3.33	0.67	6.83	0.10	4.00	540	38.58	38.58	CULVERT 8
A5-B3	24.95	0.039	72	50	0.83	3.89	0.78	6.83	0.11	3.68	400	57.46	57.46	CULVERT 4
A5-B4	12.89	0.020	73	37	0.62	3.70	0.74	6.83	0.11	3.79	475	36.25	36.25	CULVERT 5
A5-B5	5.82	0.009	73	29	0.48	3.70	0.74	6.83	0.11	3.79	550	18.95	18.95	CULVERT 6
A5-B6	4.19	0.007	73	24	0.40	3.70	0.74	6.83	0.11	3.79	600	14.88	14.88	CULVERT 7
A5-B7	1.87	0.003	83	10	0.17	2.05	0.41	6.83	0.10	4.87	850	12.09	-	-

100-YEAR EXISTING CONDITIONS - DITCH CALCUALTIONS

DITCH NAME	Qp (CFS)	CHANNEL SHAPE	MIN SLOPE (%)	MAX SLOPE (%)	SIDE SLOPE (H TO V)	BOTTOM WIDTH (FT)	CALCULATED MAX NORMAL DEPTH SECTION (FT) N=0.045	CALCULATED MAX VELOCITY SECTION (FPS) N=0.035
A1-A	68.02	TRAPEZOIDAL	0.20	2.69	4 to 1	6.00	2.4	5.84
A1-B	27.32	TRAPEZOIDAL	0.20	7.04	4 to 1	6.00	1.5	6.29
A2	16.56	TRAPEZOIDAL	0.50	25.00	4 to 1	4.00	1.1	8.89
A3	1.87	TRAPEZOIDAL	7.16	7.16	4 to 1	4.00	0.2	2.86
A4-A	104.53	TRAPEZOIDAL	0.20	3.50	4 to 1	6.00	2.9	7.23
A4-B	39.28	TRAPEZOIDAL	0.35	0.70	4 to 1	6.00	1.6	3.08
A5-A	155.26	TRAPEZOIDAL	0.10	0.77	2 to 1	6.00	4.8	5.24
A5-B1	260.64	TRAPEZOIDAL	0.19	15.03	2 to 1	9.00	4.8	16.85
A5-B2	38.58	TRAPEZOIDAL	0.20	11.09	2 to 1	9.00	1.8	8.05
A5-B3	57.46	TRAPEZOIDAL	0.20	12.37	2 to 1	9.00	2.2	9.59
A5-B4	36.25	TRAPEZOIDAL	0.20	11.30	2 to 1	9.00	1.7	7.92
A5-B5	18.95	TRAPEZOIDAL	0.20	10.89	2 to 1	9.00	1.2	6.19
A5-B6	14.88	TRAPEZOIDAL	0.42	8.71	2 to 1	9.00	0.8	5.27
A5-B7	12.09	TRAPEZOIDAL	0.20	1.68	2 to 1	9.00	0.9	2.90
SOUTH	166.12	TRAPEZOIDAL	0.15	25.00	4 to 1	16.00	2.9	14.25

100-YEAR EXISTING CONDITIONS - CULVERT CALCULATIONS

CULVERT NO.	DRAINAGE AREA	Qp (CFS)	VELOCITY (FPS)	CULVERT TYPE	CULVERT SPAN (FT)	CULVERT RISE/DIAMETER (FT)	NUMBER OF BARRELS	OVERTOPPING ROADWAY ELEVATION (FT)	HEADWATER WSE (FT)	FREEBOARD (FT)	TAILWATER WSE (FT)
1	A1-A, A1-B	95.34	4.75	CONCRETE BOX (N=0.015)	5.00	2.00	2	2805.28	2805.30	-0.02	2804.58
2	A4-A, A4-B	143.81	6.80	CONCRETE BOX (N=0.015)	5.00	2.00	2	2803.24	2803.33	-0.09	2801.65
3	A5-A, A5-B1	415.90	2.20	CONCRETE BOX (N=0.015)	6.00	2.00	12	2802.15	2802.59	-0.44	2802.44
4	A5-B3	57.46	3.41	CONCRETE BOX (N=0.015)	5.00	2.00	2	2804.23	2803.05	1.18	2802.70
5	A5-B4	36.25	4.44	CONCRETE BOX (N=0.015)	5.00	2.00	1	2804.68	2803.67	1.01	2803.10
6	A5-B5	18.95	2.96	CONCRETE BOX (N=0.015)	5.00	2.00	1	2805.43	2803.77	1.66	2803.52
7	A5-B6	14.88	2.45	CONCRETE BOX (N=0.015)	5.00	2.00	1	2805.83	2804.02	1.81	2803.82
8	A5-B2	38.58	4.77	CONCRETE BOX (N=0.015)	5.00	2.00	1	2803.28	2802.35	0.93	2801.71

100-YEAR EXISTING CONDITIONS - BROAD CRESTED WEIR CALCULATION (LEVEL SPREADER TAILWATER WSE)

Q (CFS)	C (DISCHARGE COEFFICIENT)	WEIR LENGTH (FT)	HYDRAULIC HEAD (FT)	HYDRAULIC HEAD (IN)	WEIR ELEVATION (FT)	CONTROLLING TAILWATER ELEVATION (FT)
143.81	3.09	522.6	0.20	2.39	2801.45	2801.65

NOTES:

1. CITY OF MIDLAND DRAINAGE DESIGN MANUAL WAS USED AS BASIS FOR DESIGN.
2. 100 YEAR-24 HOUR DESIGN STORM WAS UTILIZED TO DEVELOP PEAK RUNOFF.
3. CULVERT CALCULATIONS WERE CONDUCTED USING HY-8.

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

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2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
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TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

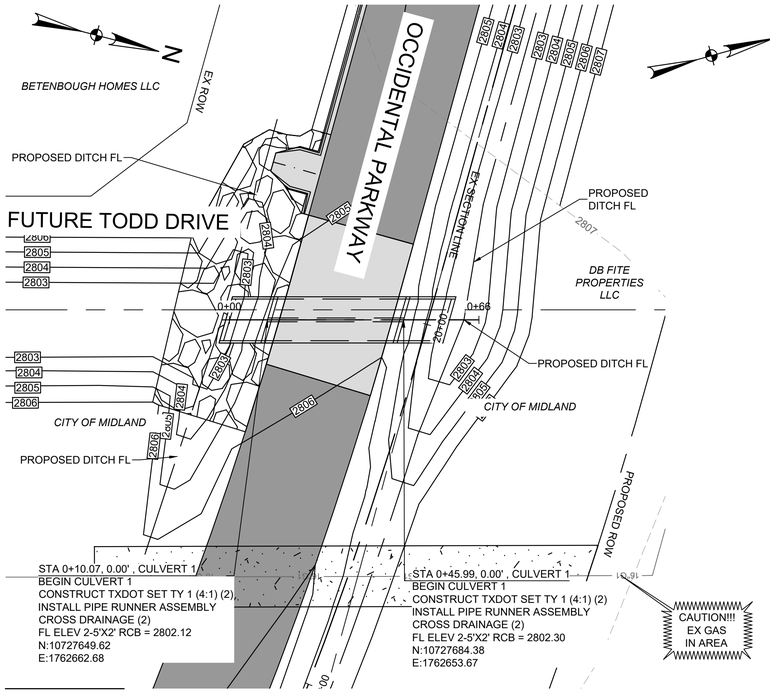
JACOB T. HALFF 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

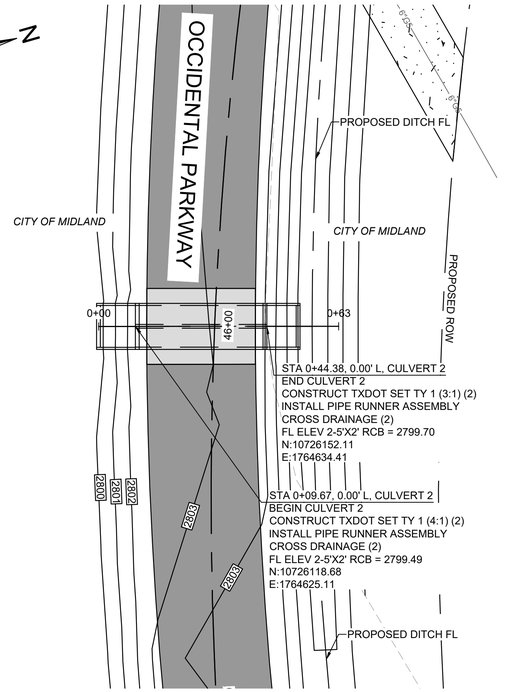
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE
DRAINAGE CALCULATIONS

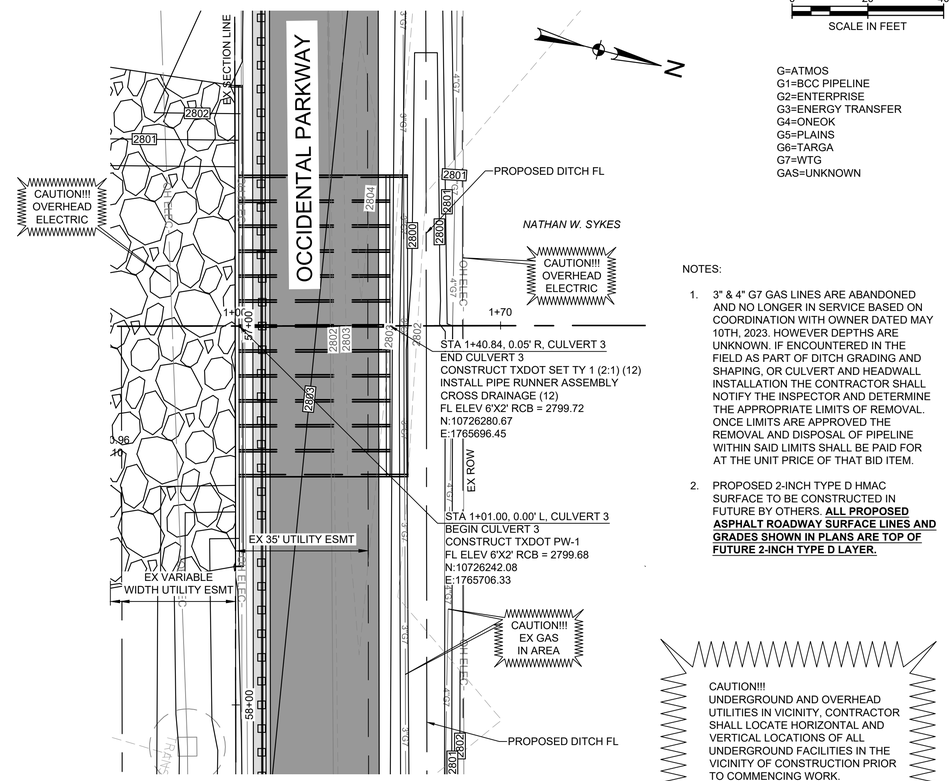
SHEET NUMBER 56 OF 217



CULVERT 1



CULVERT 2



CULVERT 3

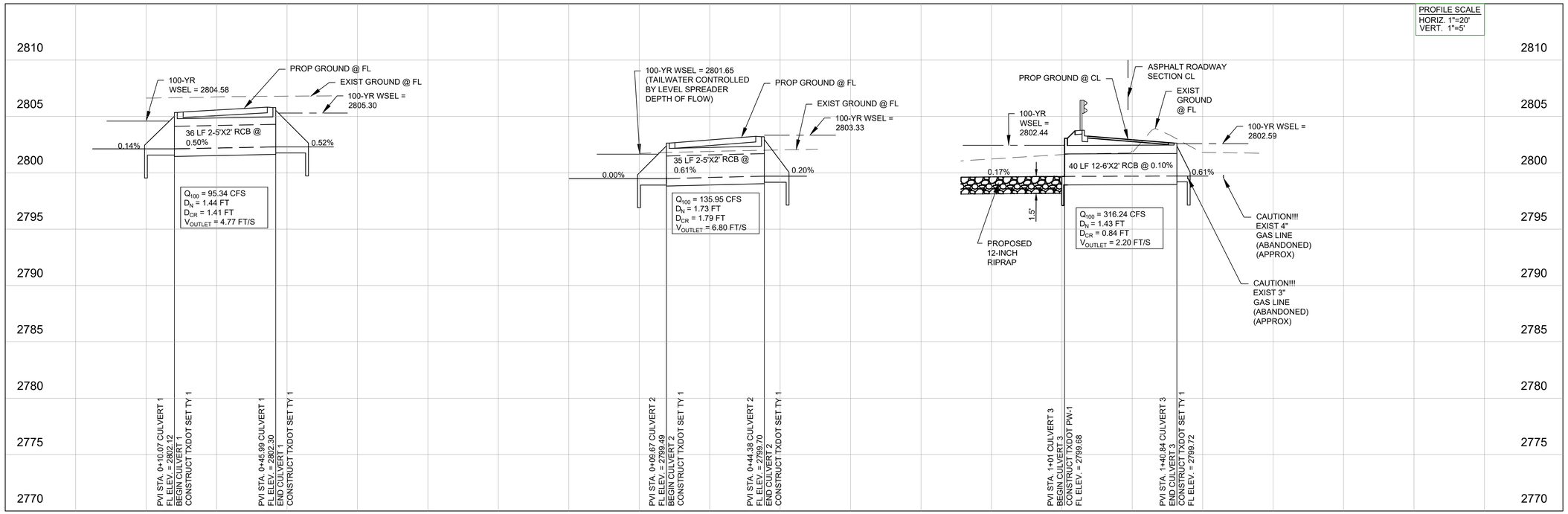
0 20 40
SCALE IN FEET

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

NOTES:

1. 3" & 4" G7 GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.
2. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.



CULVERT 3

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

CITY OF MIDLAND
Engineering Services

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817)847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

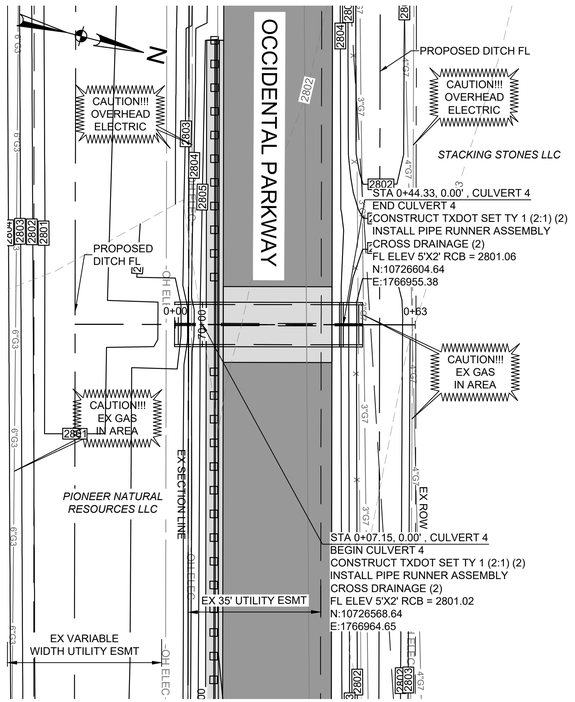
SHEET TITLE

CULVERT PLAN AND PROFILE

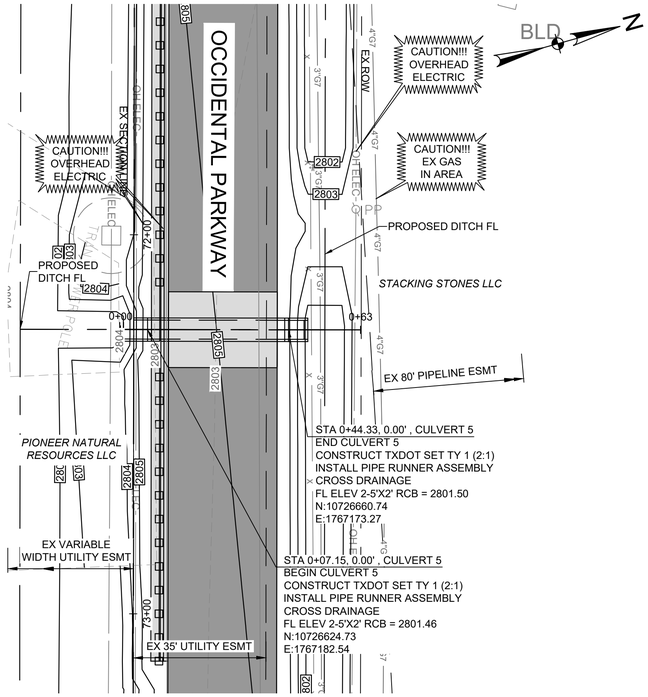
1-3

SHEET NUMBER 57 OF 217

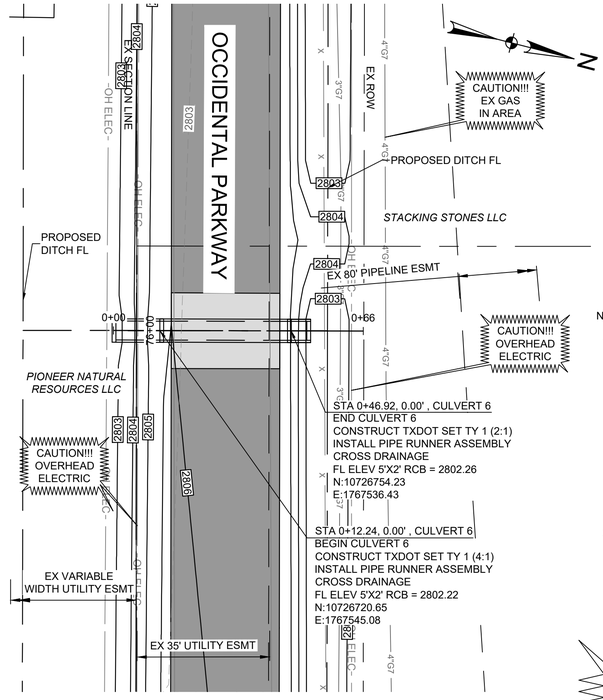
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C805-CULV-45715.dwg DATE: August 13, 2024, TIME: 3:37 PM, USER: ah3453 AVO: 45715.006



CULVERT 4



CULVERT 5



CULVERT 6

0 20 40
SCALE IN FEET

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

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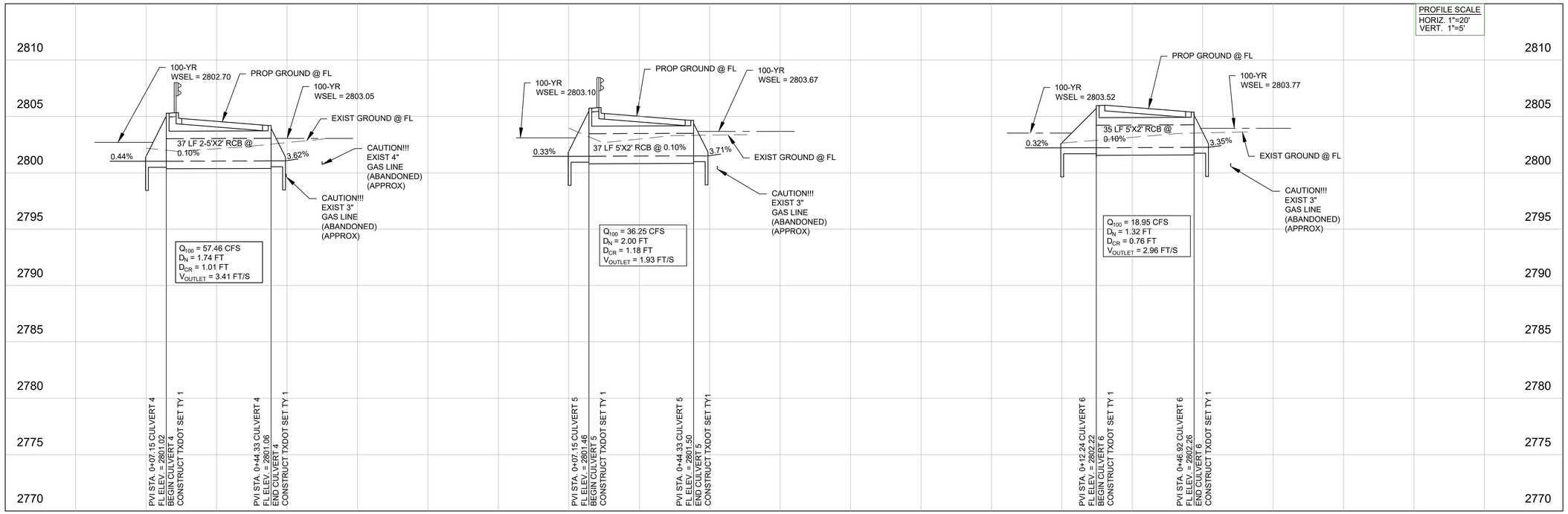
PROFILE SCALE
HORIZ. 1"=20'
VERT. 1"=5'



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

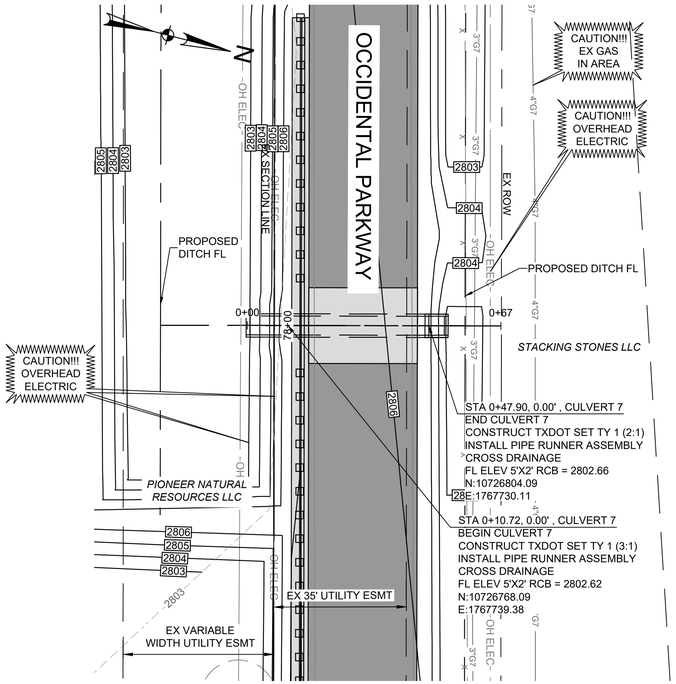
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

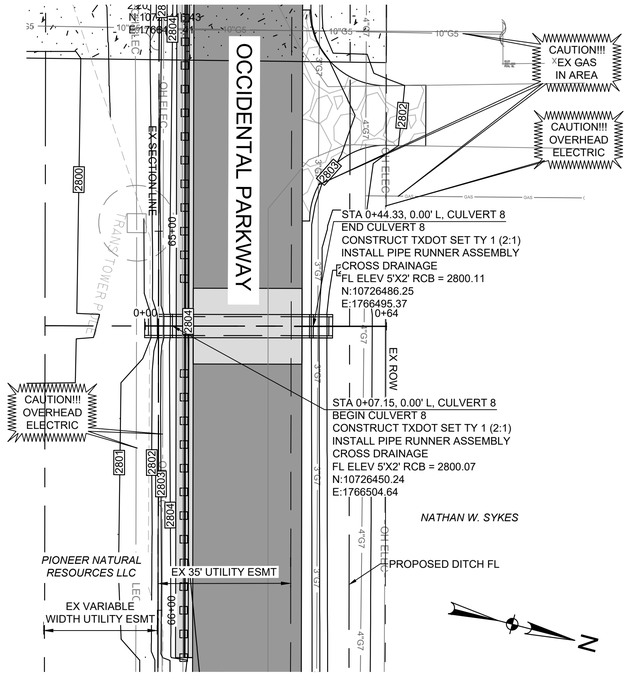
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE
CULVERT PLAN AND PROFILE
4-6

SHEET NUMBER 58 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C805-CULV-45715.dwg DATE: August 13, 2024, TIME: 3:37 PM, USER: ah3453 AVO: 45715.006





0 20 40
SCALE IN FEET

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

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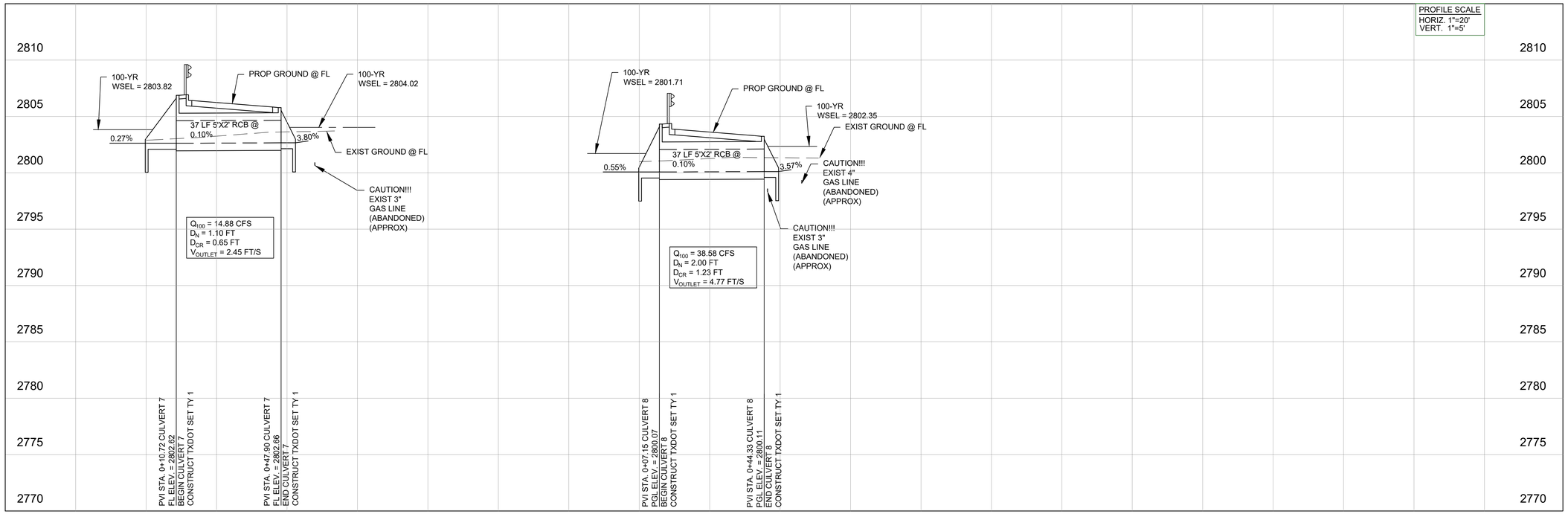
CULVERT 7

CULVERT 8



PROFILE SCALE
HORIZ. 1"=20'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
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TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

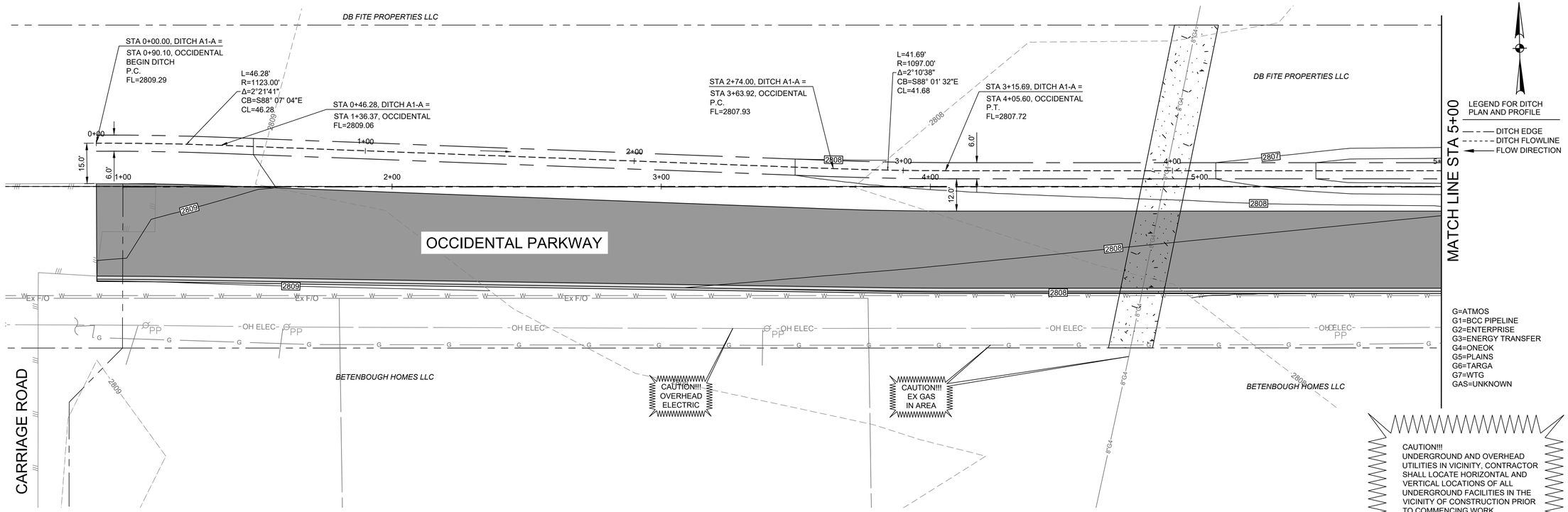
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

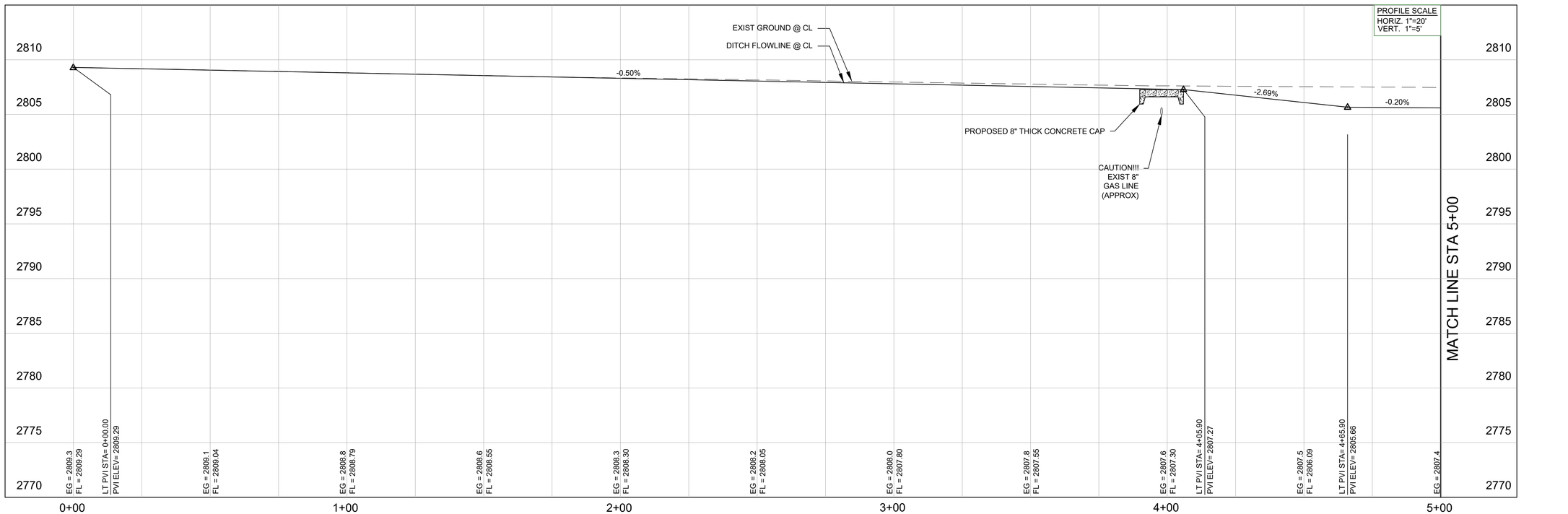
SHEET TITLE
CULVERT PLAN AND PROFILE
7 & 8

SHEET NUMBER 59 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C805-CULV-45715.dwg DATE: August 13, 2024, TIME: 3:37 PM, USER: ah3453 AVO: 45715.006



DITCH A1-A



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
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FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

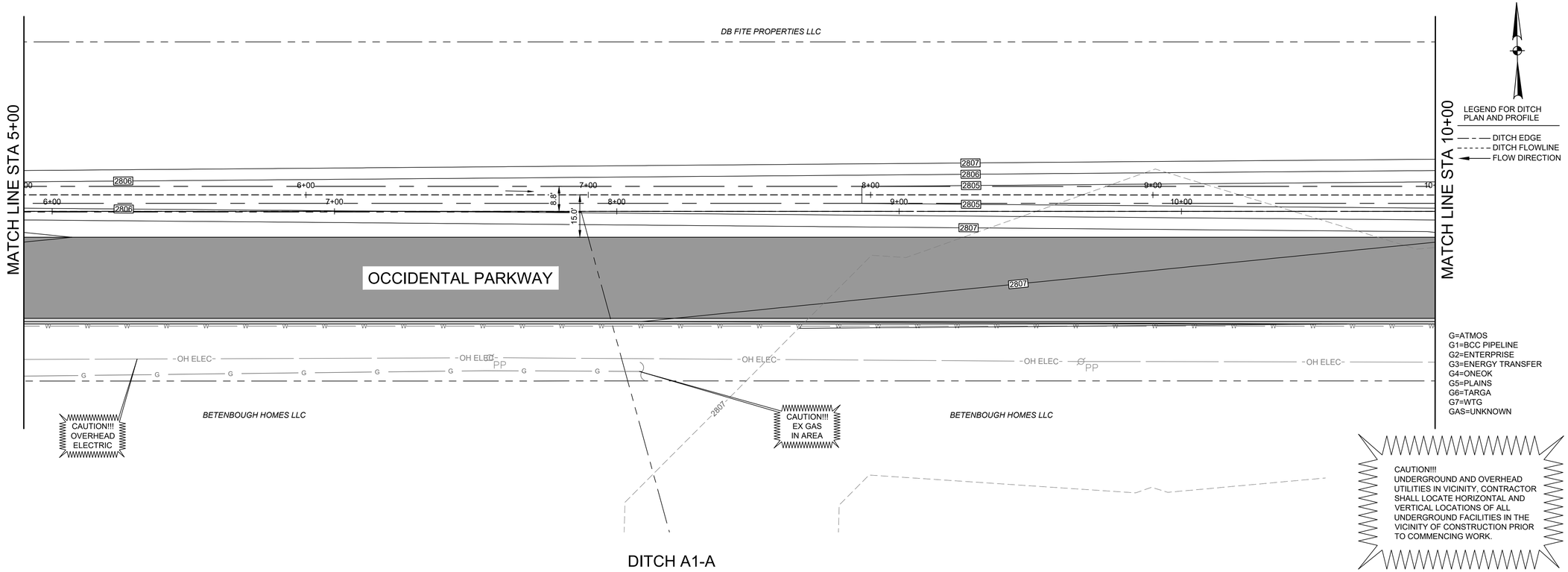
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE
DITCH PLAN AND PROFILE
A1-A BEGIN TO STA 5+00

SHEET NUMBER 60 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:38 PM, USER: ah3453 A\O: 45715.006



0 20 40
SCALE IN FEET

N

LEGEND FOR DITCH PLAN AND PROFILE
- DITCH EDGE
- DITCH FLOWLINE
- FLOW DIRECTION

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

CAUTION!!!
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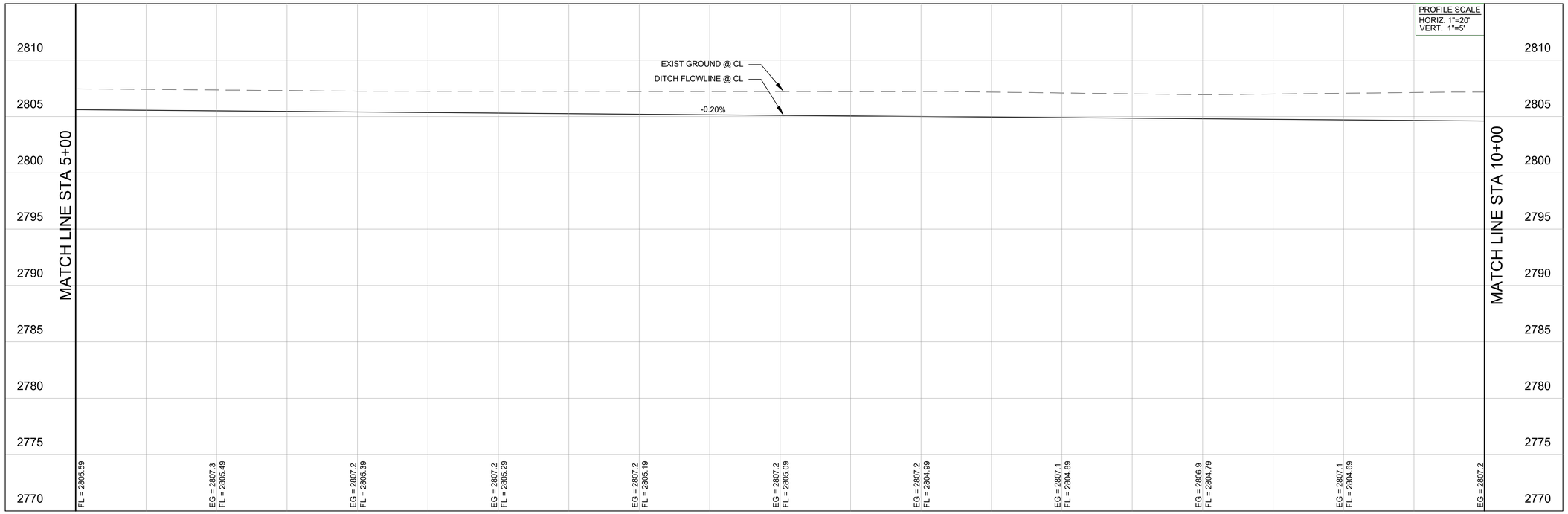
DITCH A1-A



OCCIDENTAL PARKWAY
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MIDLAND, TEXAS

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2601 MEACHAM BLVD. STE 600
FT WORTH, TEXAS 76137-2797
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REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
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PROFESSIONAL ENGINEER
STATE OF TEXAS

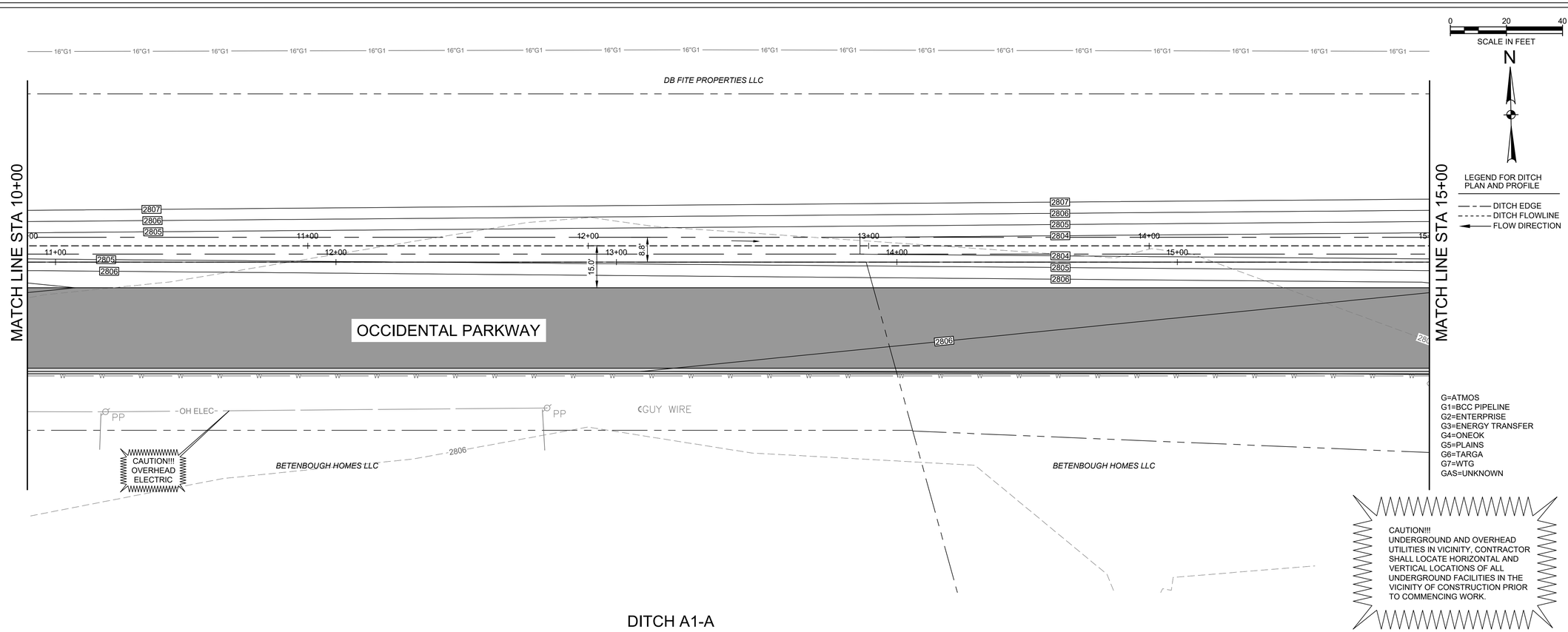
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

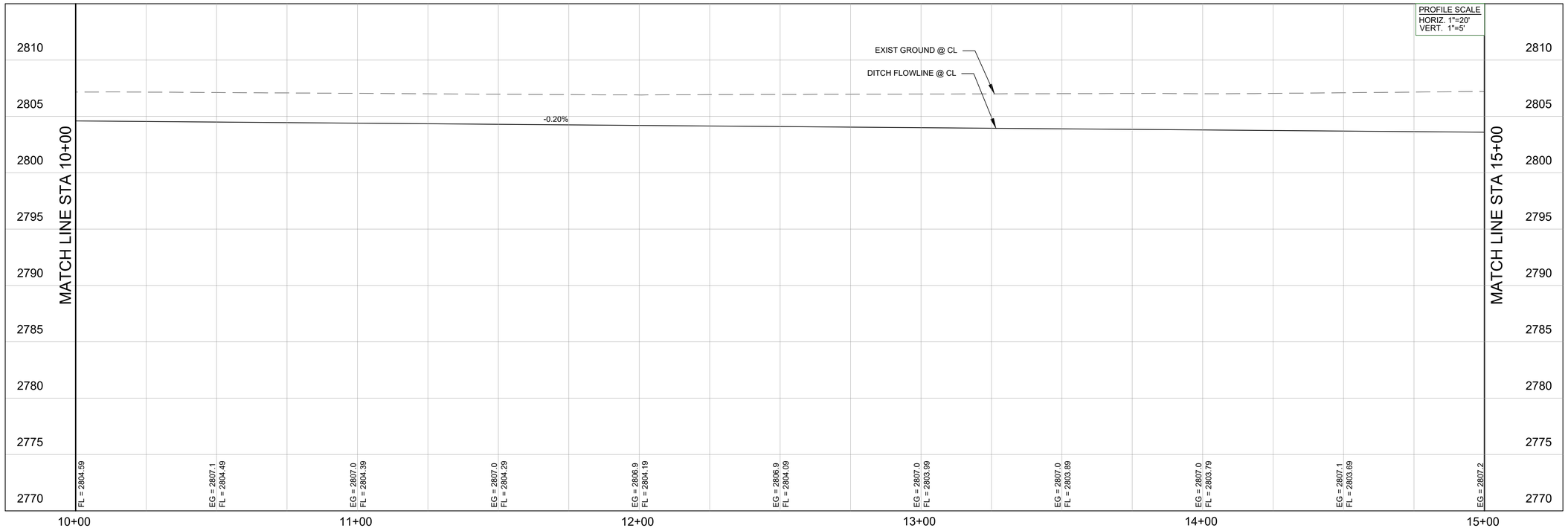
SHEET TITLE
DITCH PLAN AND PROFILE
A1-A STA 5+00 TO STA 10+00

SHEET NUMBER 61 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:38 PM, USER: ah3453 A\O: 45715.006



DITCH A1-A



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
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REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
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PROFESSIONAL ENGINEER
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DATE 8/13/24
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PROJECT NO.:	45715.006
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CHECKED BY:	JTH
SCALE:	AS NOTED

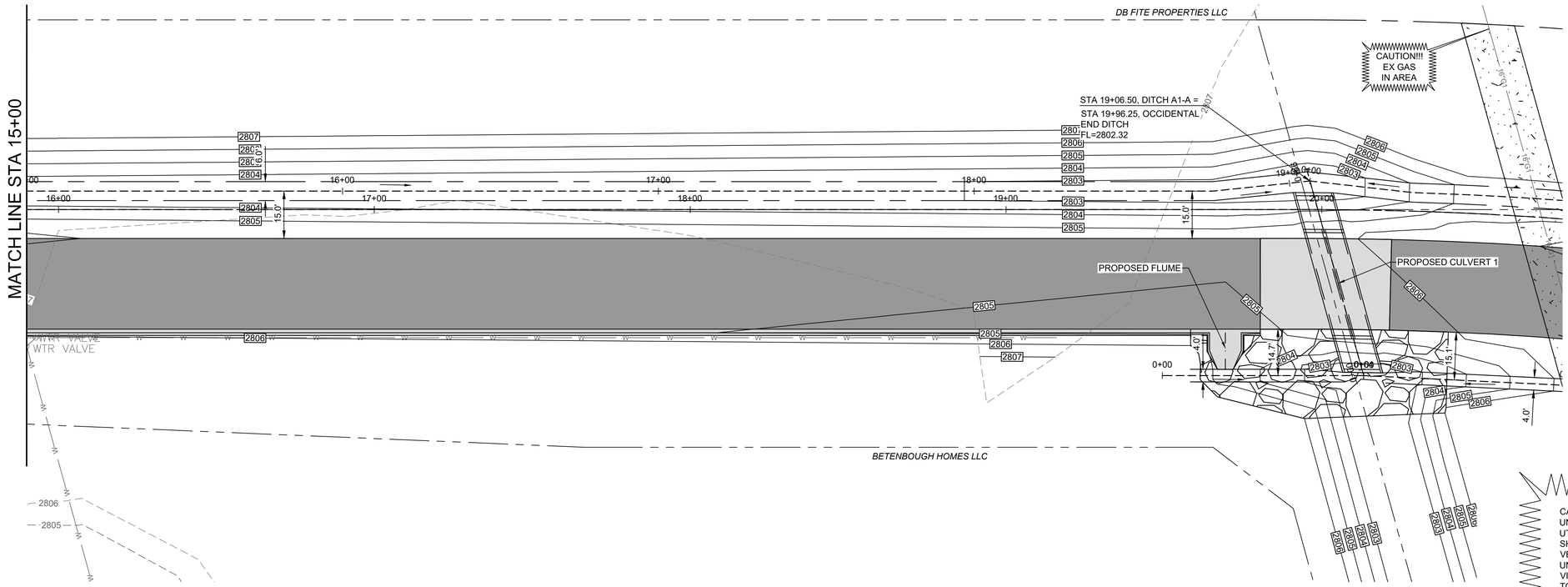
SHEET TITLE

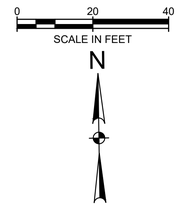
DITCH PLAN AND PROFILE

A1-A STA 10+00 TO STA 15+00

SHEET NUMBER 62 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:38 PM, USER: ah3453 A\O: 45715.006





G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

CAUTION!!!
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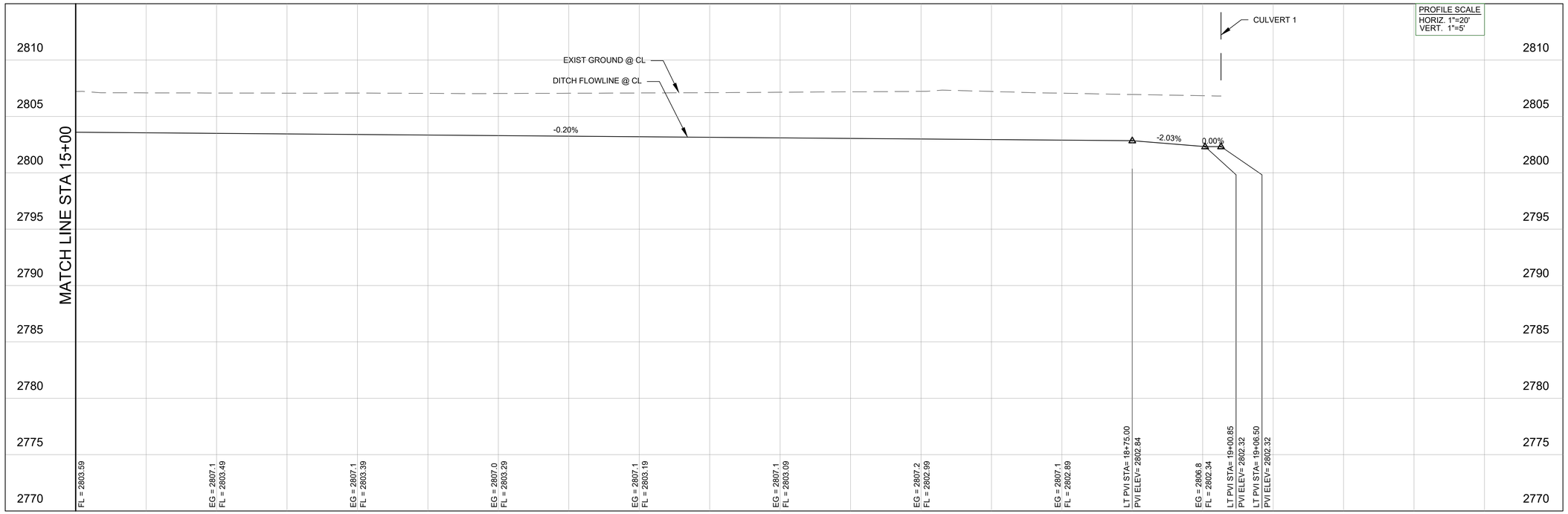
DITCH A1-A



OCCIDENTAL PARKWAY
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MIDLAND, TEXAS

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JACOB T. HAYS
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PROJECT NO.:	45715.006
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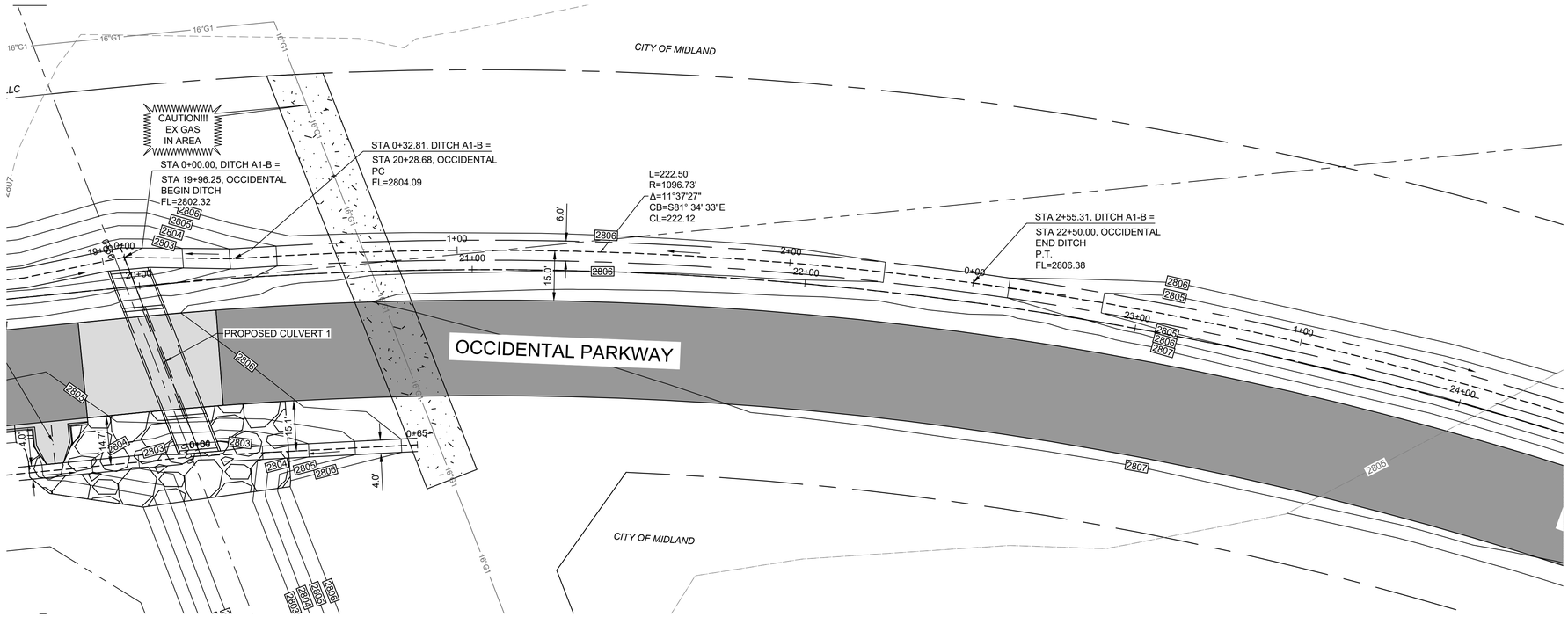
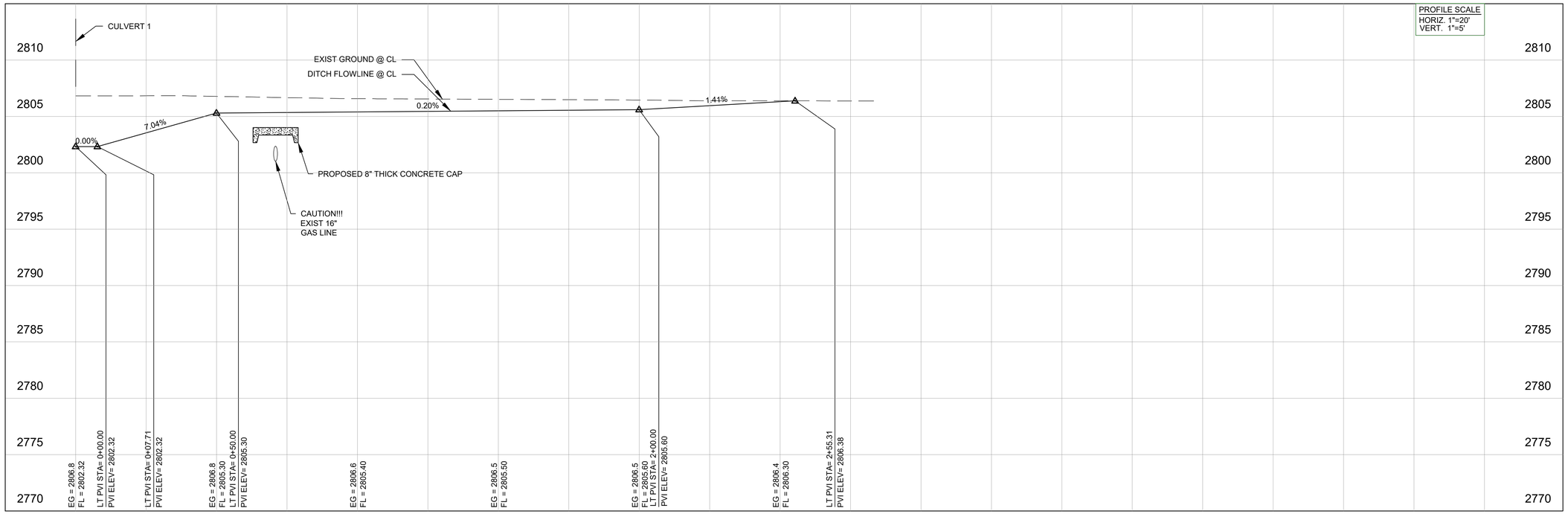
SHEET TITLE
DITCH PLAN AND PROFILE
A1-A STA 15+00 TO END

SHEET NUMBER 63 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:38 PM, USER: ah3453 A\O: 45715.006



DITCH A1-B



PROFILE SCALE
HORIZ. 1"=20'
VERT. 1"=5'

0 20 40
SCALE IN FEET

N

LEGEND FOR DITCH PLAN AND PROFILE
- DITCH EDGE
- DITCH FLOWLINE
- FLOW DIRECTION

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

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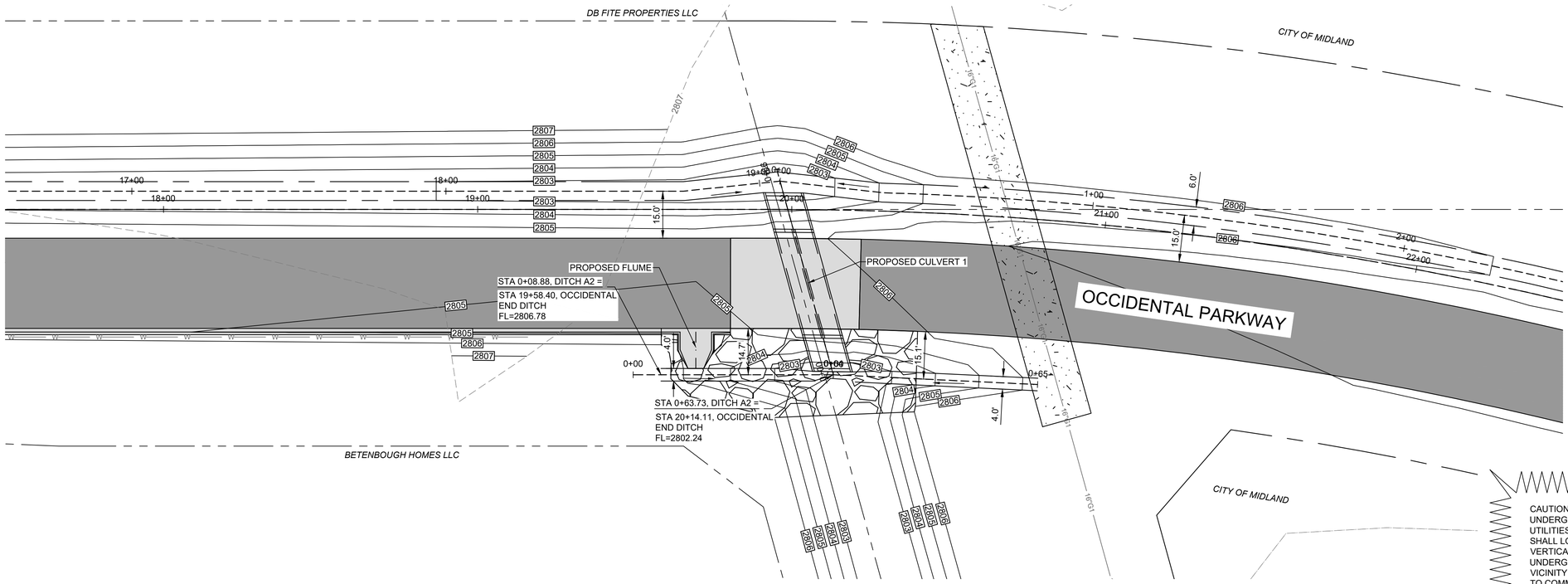
SHEET TITLE
DITCH PLAN AND PROFILE
A1-B BEGIN TO END

SHEET NUMBER 64 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:38 PM, USER: ah3453 A\O: 45715.006



0 20 40
SCALE IN FEET

N

LEGEND FOR DITCH PLAN AND PROFILE

- DITCH EDGE
- DITCH FLOWLINE
- FLOW DIRECTION

G=ATMOS
G1=BCC PIPELINE
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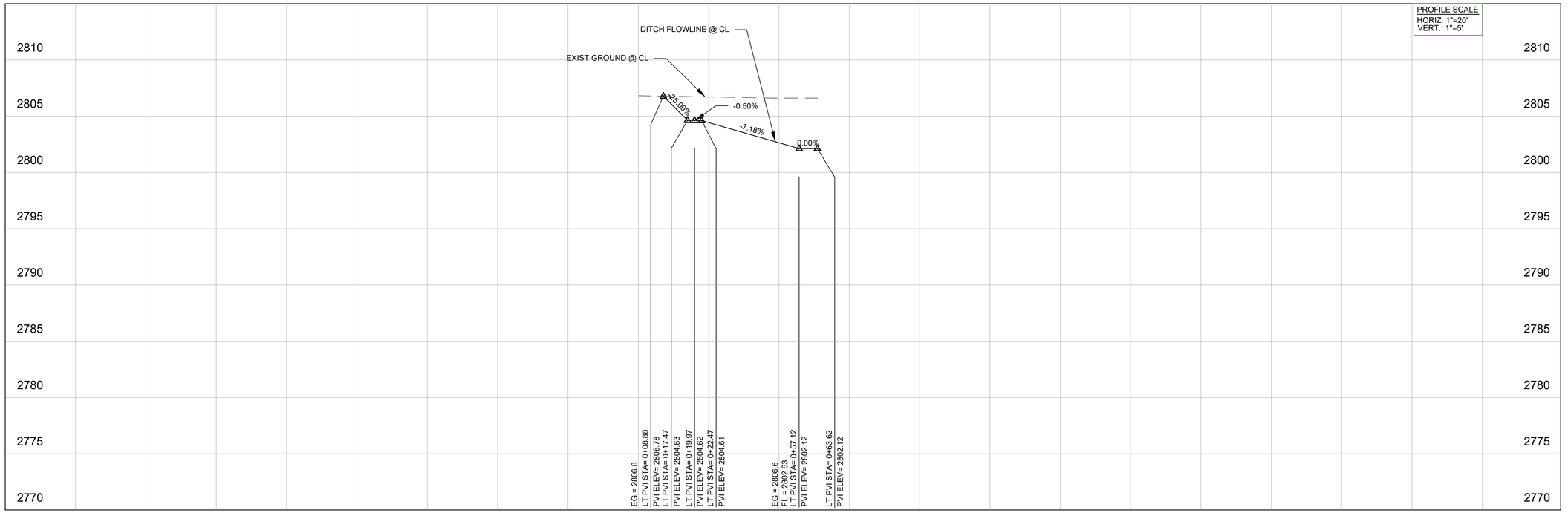
DITCH A2



PROFILE SCALE
HORIZ. 1"=20'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

CITY OF MIDLAND
Engineering Services

halff
2601 MEACHAM BLVD. STE 600
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REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

DATE 8/13/24
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PROJECT NO.:	45715.006
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CHECKED BY:	JTH
SCALE:	AS NOTED

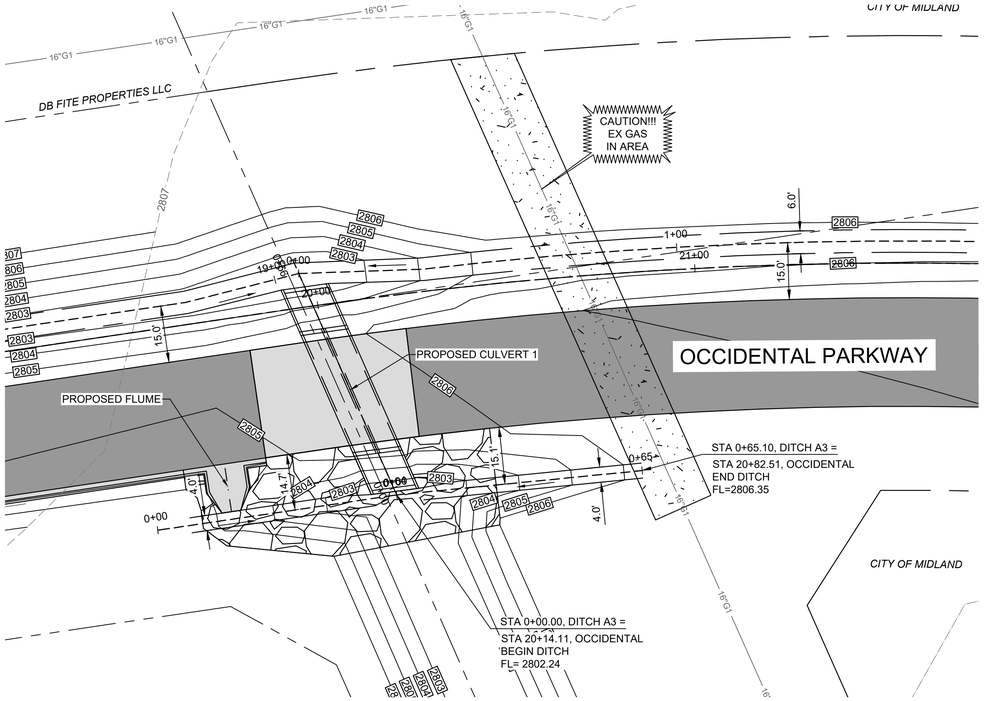
SHEET TITLE

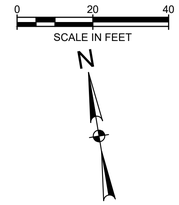
DITCH PLAN AND PROFILE

A2 BEGIN TO END

SHEET NUMBER 65 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:38 PM, USER: ah3453 AVO: 45715.006





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G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
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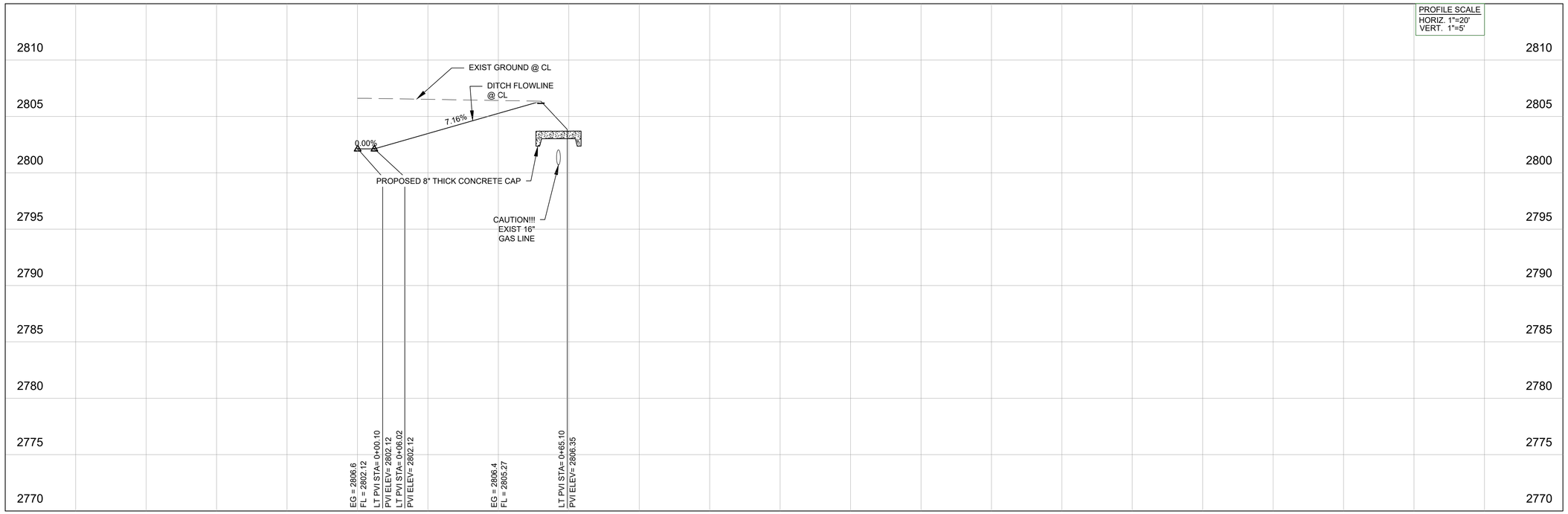
DITCH A3



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

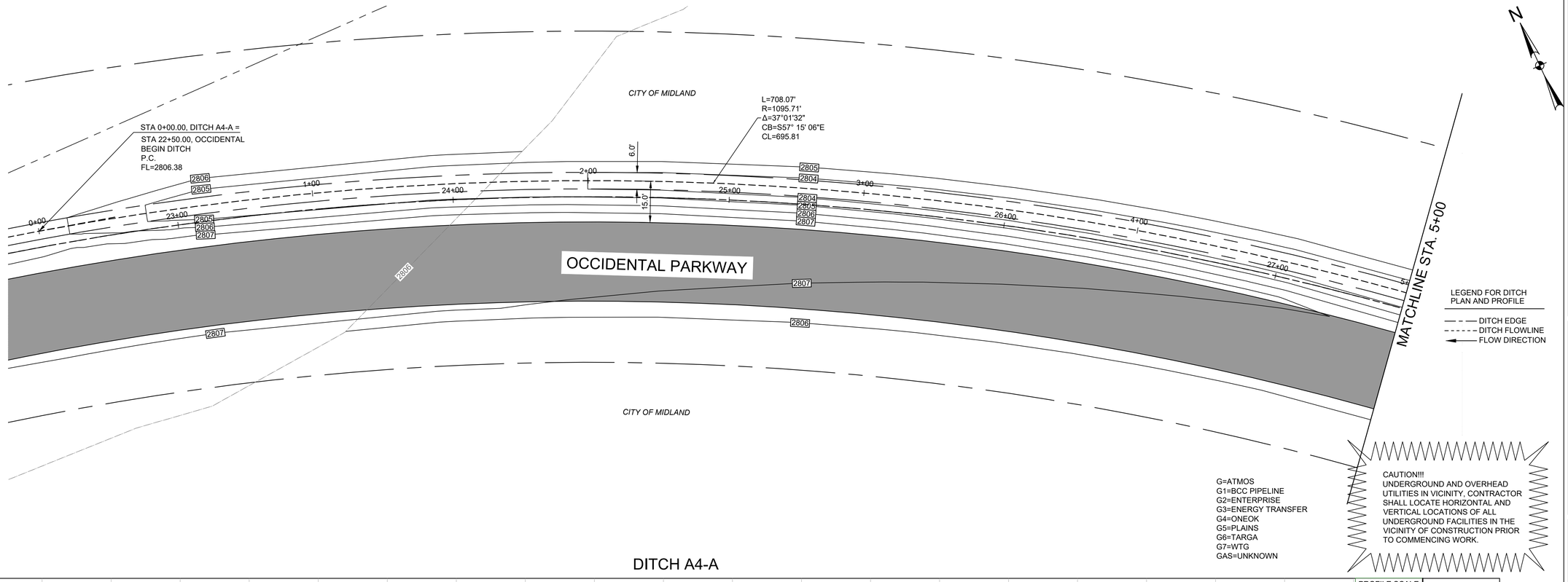
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

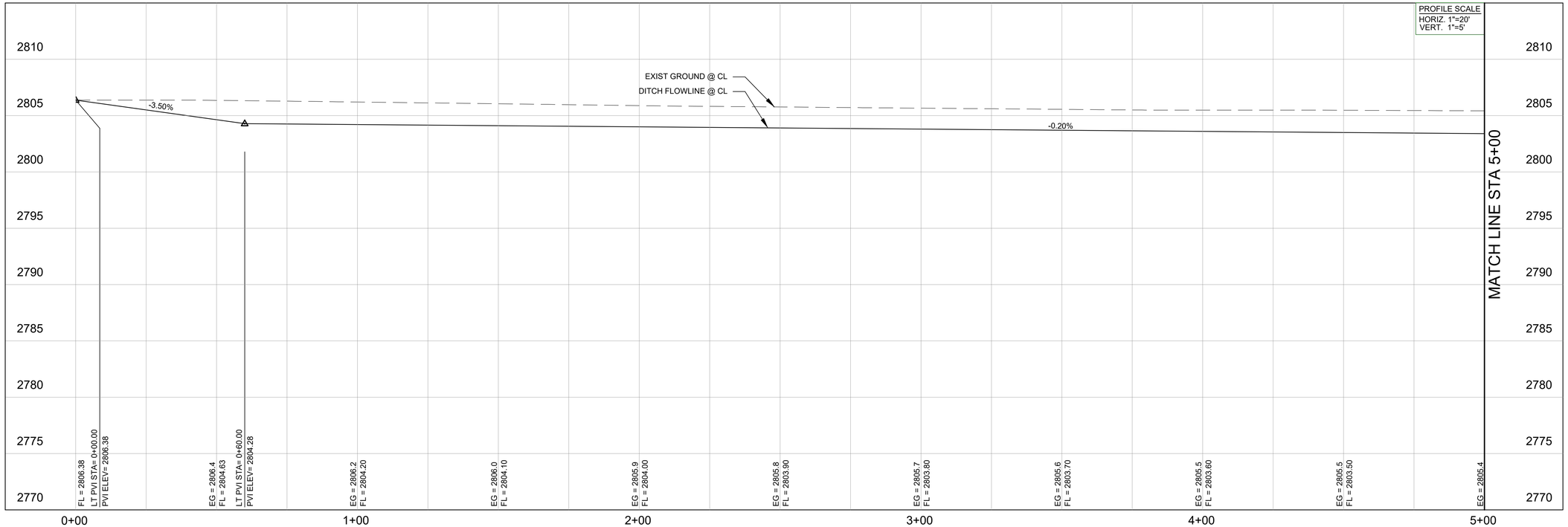
SHEET TITLE
DITCH PLAN AND PROFILE
A3 BEGIN TO END

SHEET NUMBER 66 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:39 PM, USER: ah3453 A/O: 45715.006



DITCH A4-A



OCCIDENTAL PARKWAY
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MIDLAND, TEXAS

MIDLAND Engineering Services

halff
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FORT WORTH, TEXAS 76137-2797
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REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

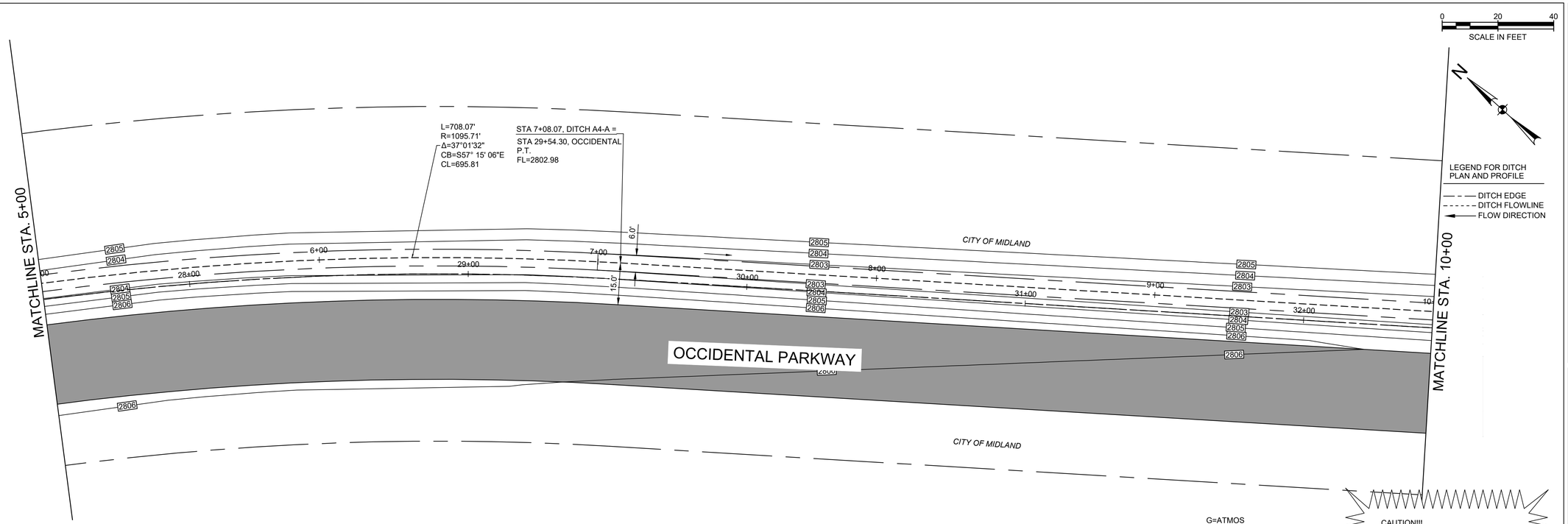
SHEET TITLE

DITCH PLAN AND PROFILE

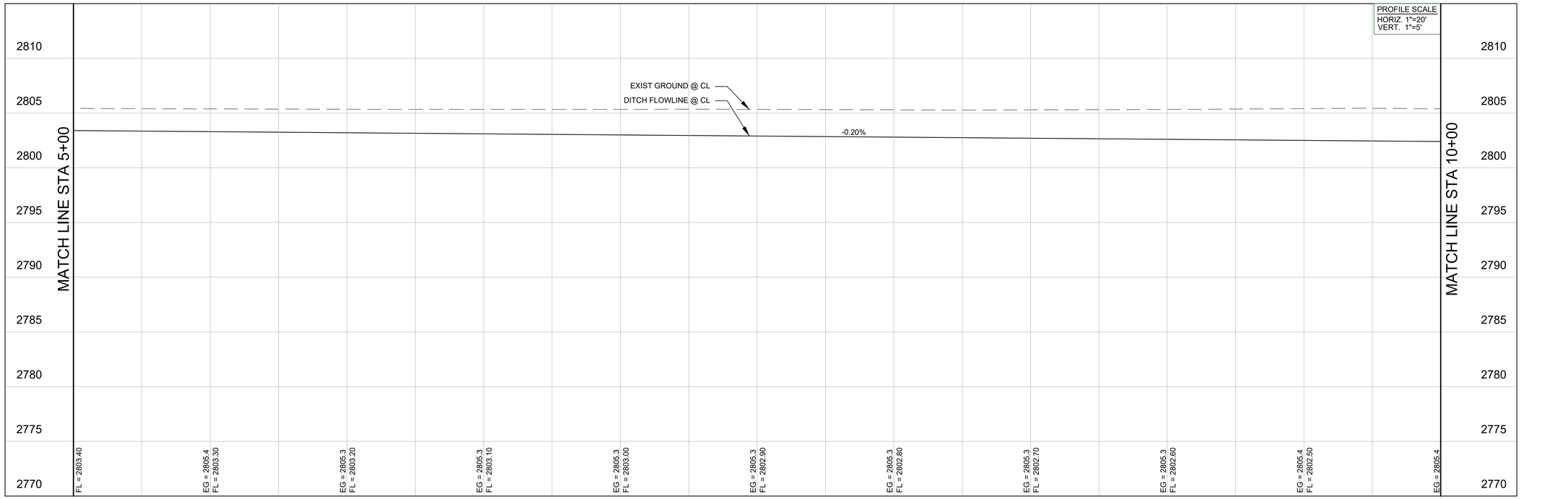
A4-A BEGIN TO STA 5+00

SHEET NUMBER 67 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:39 PM, USER: ah3453 AVO: 45715.006



DITCH A4-A



OCCIDENTAL PARKWAY
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MIDLAND, TEXAS

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REVISION

NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

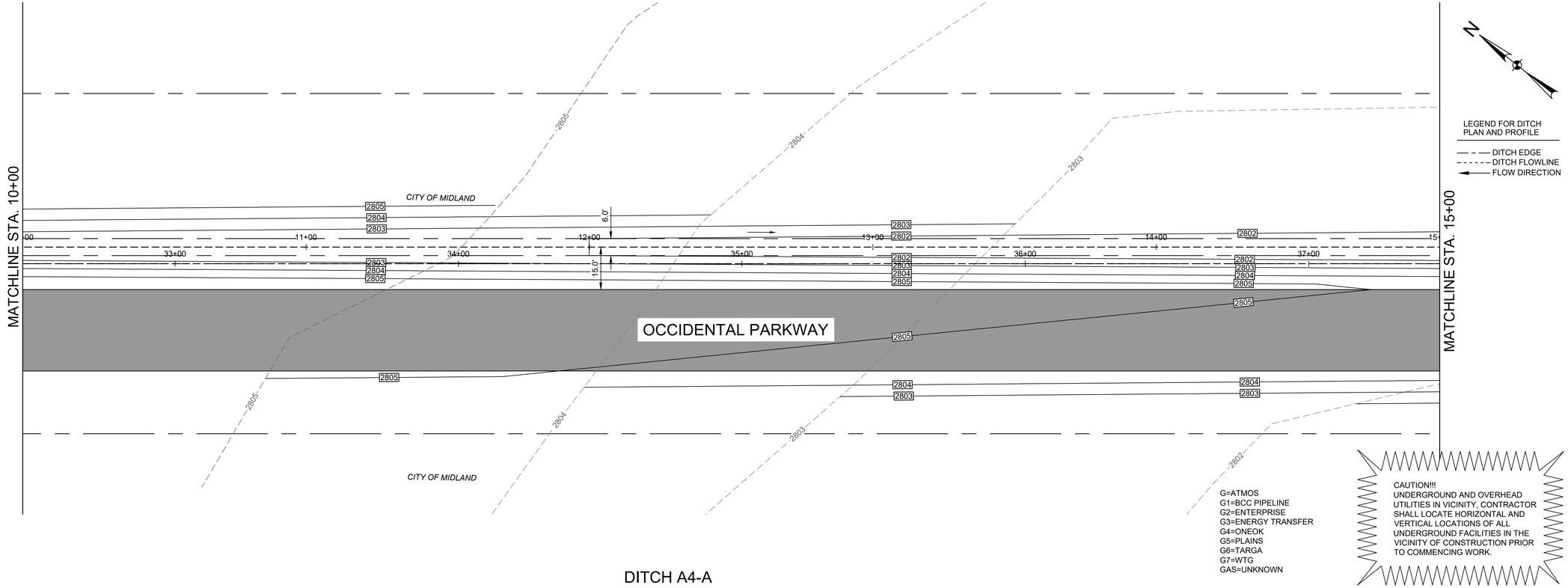
SHEET TITLE

DITCH PLAN AND PROFILE

A4-A STA 5+00 TO STA 10+00

SHEET NUMBER 68 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:39 PM, USER: ah3453 A\O: 45715.006



0 20 40
SCALE IN FEET

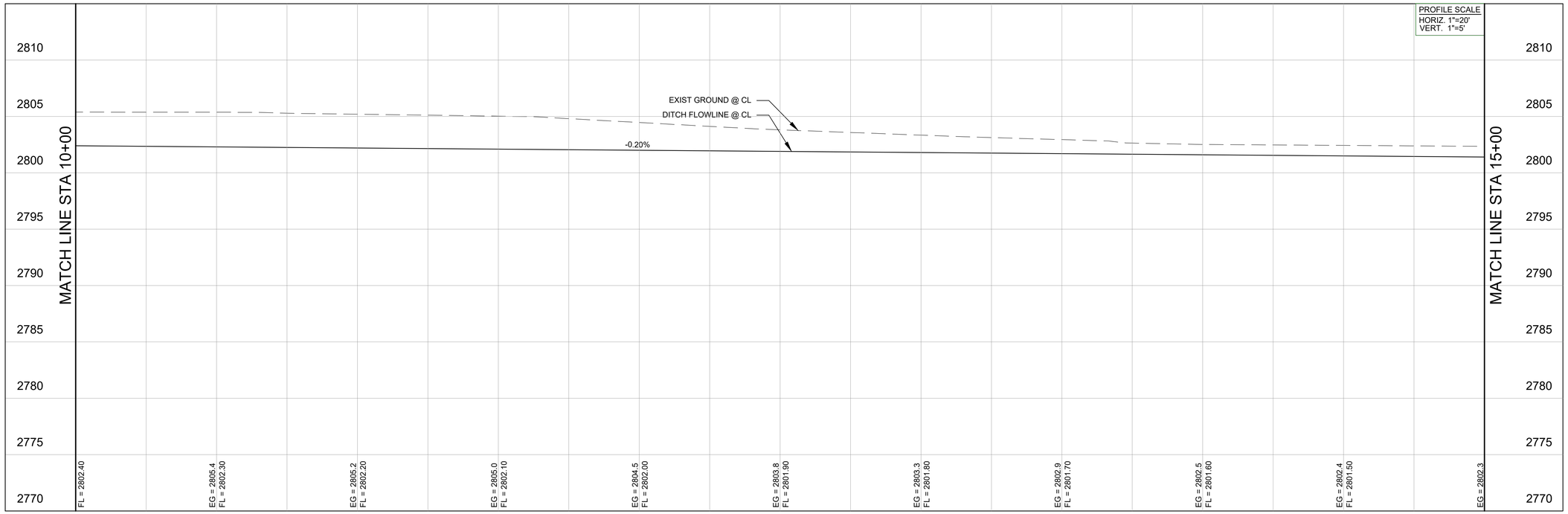
LEGEND FOR DITCH PLAN AND PROFILE

- DITCH EDGE
- DITCH FLOWLINE
- FLOW DIRECTION

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

DITCH A4-A



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TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

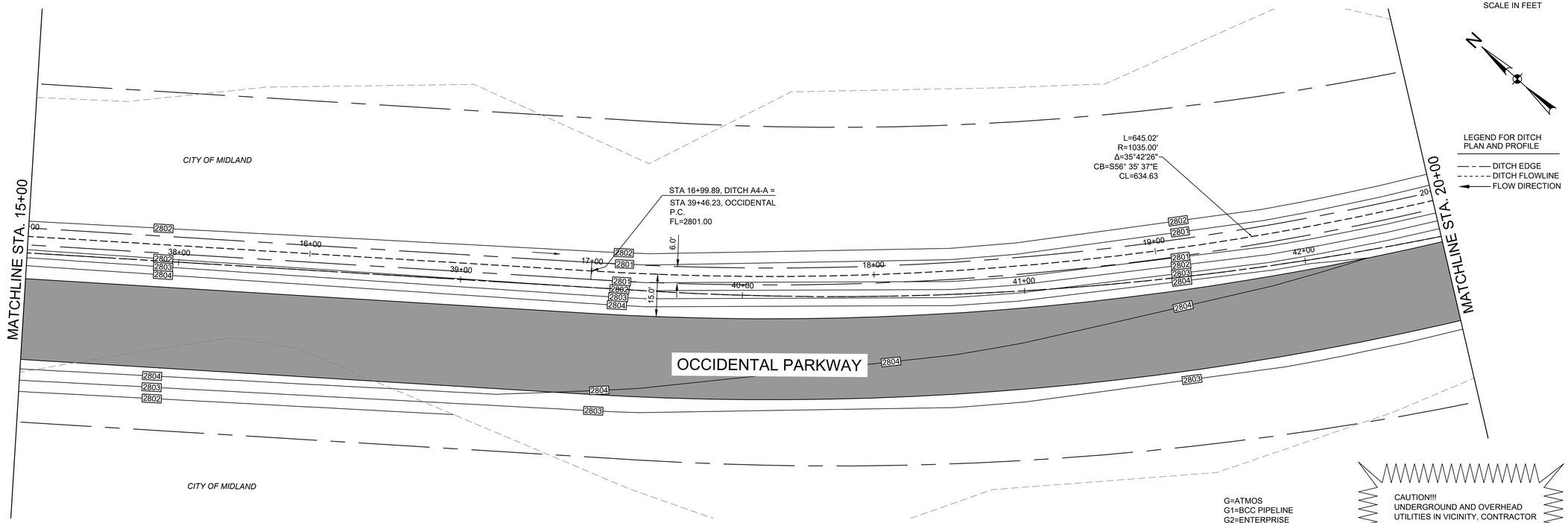
SHEET TITLE

DITCH PLAN AND PROFILE

A4-A STA 10+00 TO STA 15+00

SHEET NUMBER 69 OF 217

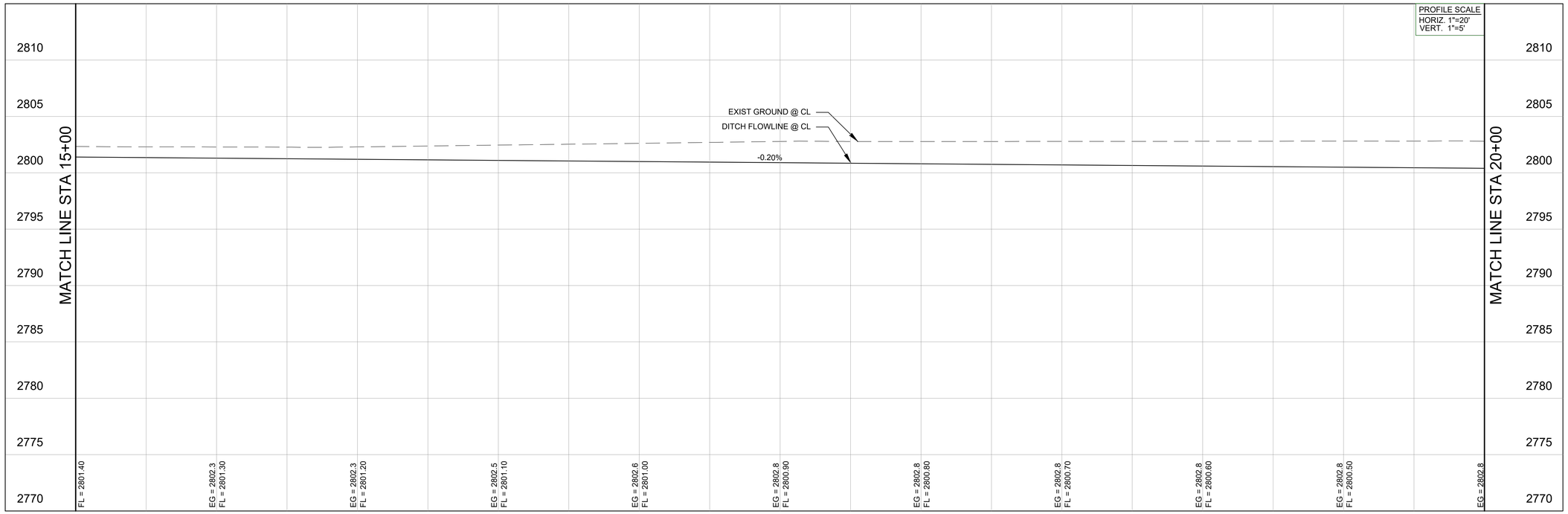
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:39 PM, USER: ah3453 AVO: 45715.006



G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

DITCH A4-A



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

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2601 MEACHAM BLVD. STE 600
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TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

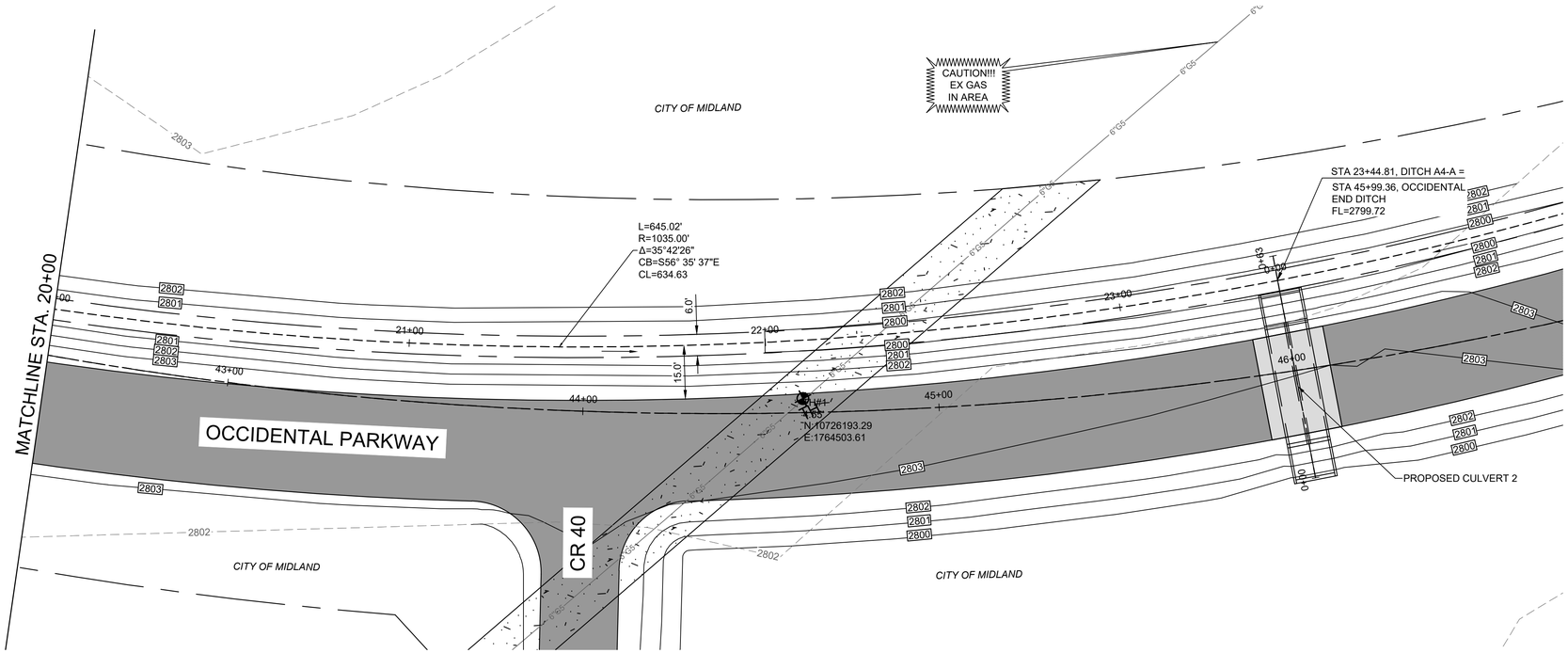
SHEET TITLE

DITCH PLAN AND PROFILE

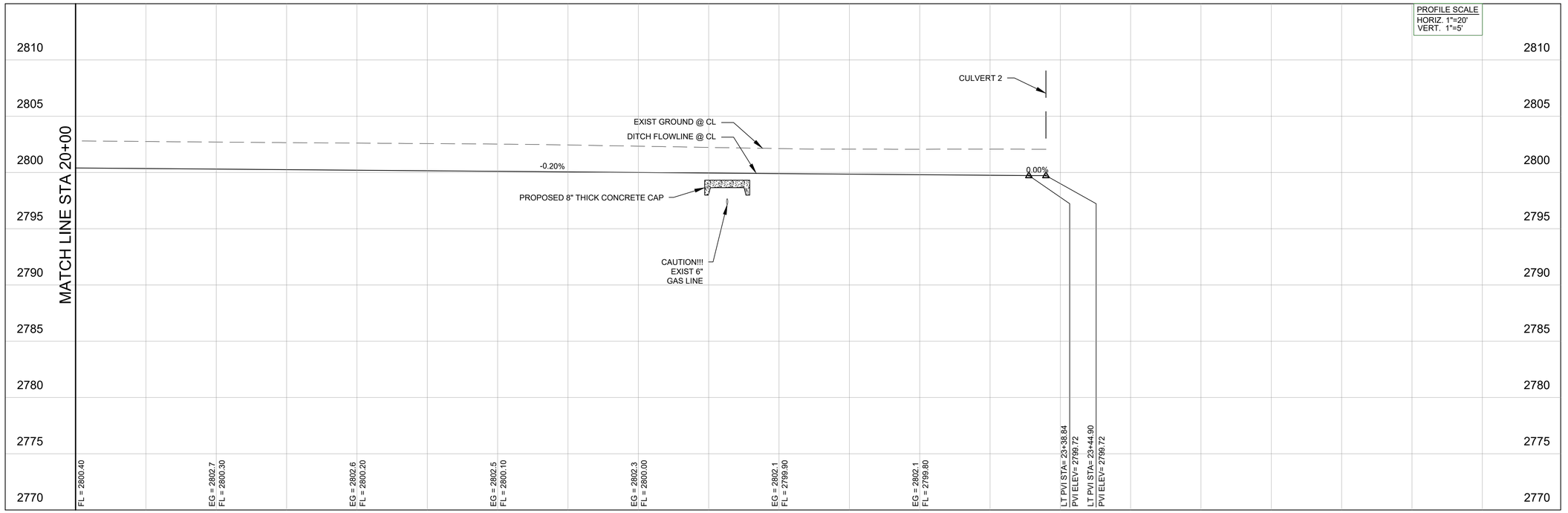
A4-A STA 15+00 TO STA 20+00

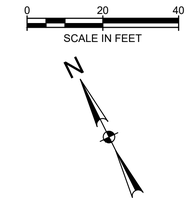
SHEET NUMBER 70 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:39 PM, USER: ah3453 AVO: 45715.006



DITCH A4-A





LEGEND FOR DITCH PLAN AND PROFILE

- DITCH EDGE
- DITCH FLOWLINE
- FLOW DIRECTION

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

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JACOB T. HAYS
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STATE OF TEXAS

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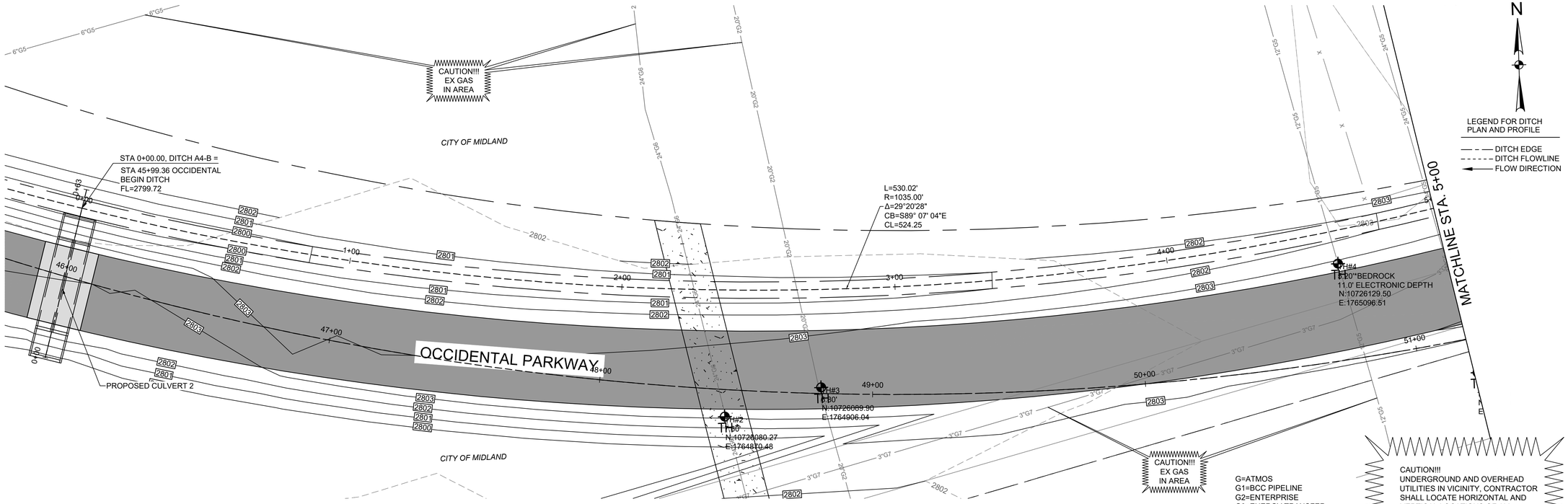
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

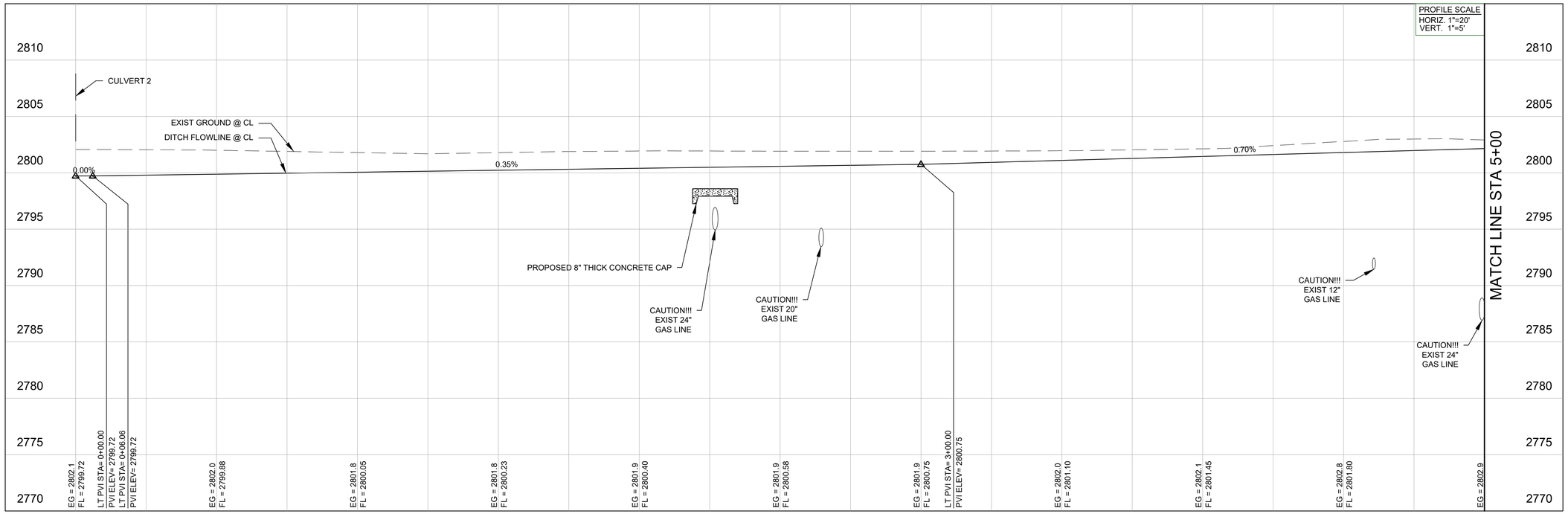
SHEET TITLE
DITCH PLAN AND PROFILE
A4-A STA 20+00 TO END

SHEET NUMBER 71 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:39 PM, USER: ah3453 AVO: 45715.006



DITCH A4-B



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TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS 127558 LICENSED PROFESSIONAL ENGINEER

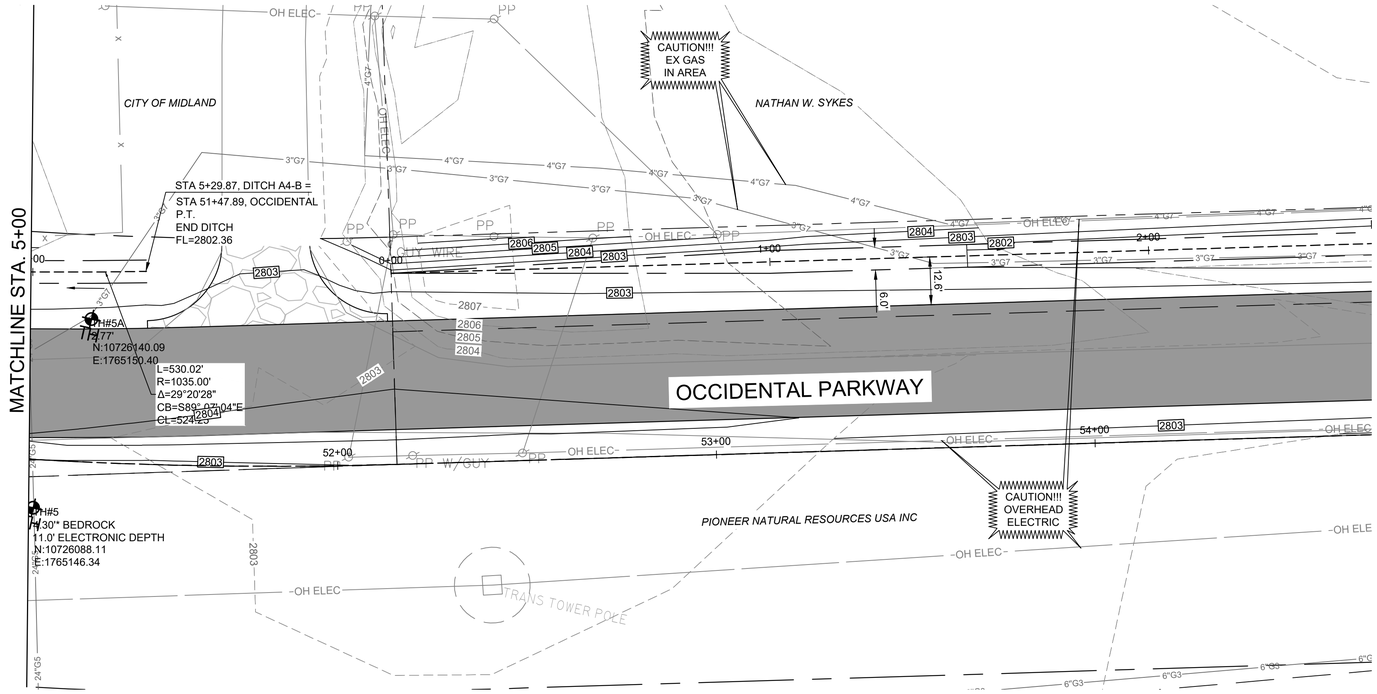
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE
DITCH PLAN AND PROFILE
A4-B BEGIN TO STA 5+00

SHEET NUMBER 72 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:39 PM, USER: ah3453 AVO: 45715.006



0 20 40
SCALE IN FEET

N

LEGEND FOR DITCH PLAN AND PROFILE

- DITCH EDGE
- DITCH FLOWLINE
- FLOW DIRECTION

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

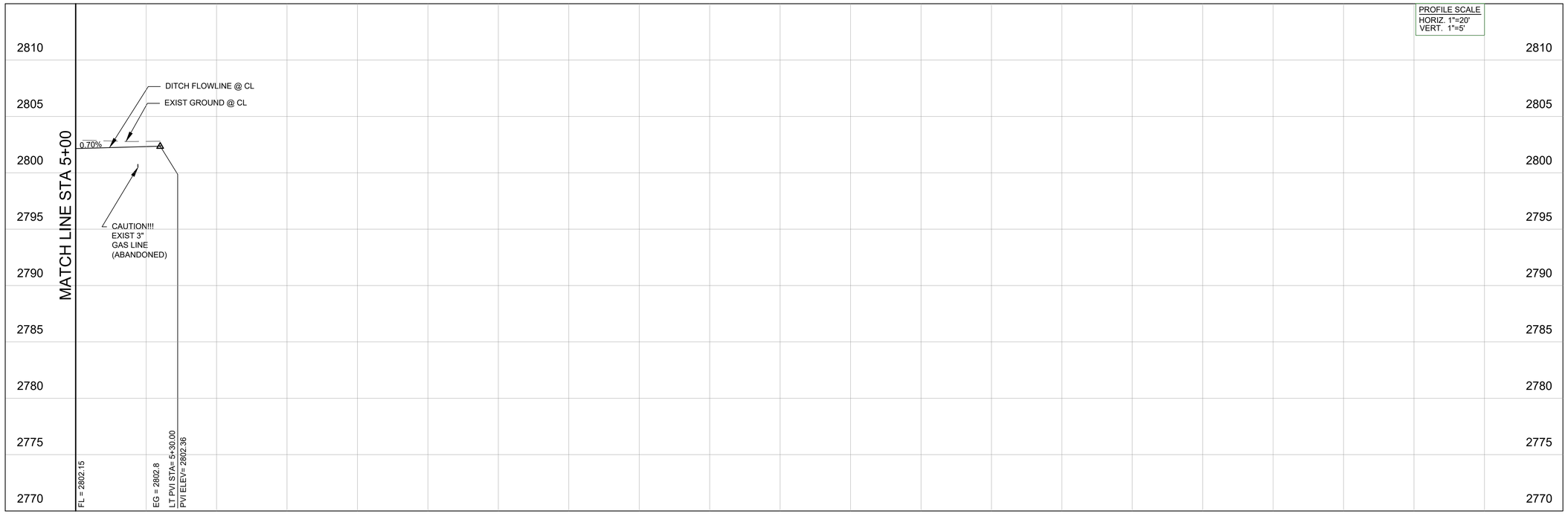
NOTES:

1. 3" & 4" G7 GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

DITCH A4-B

PROFILE SCALE
HORIZ. 1"=20'
VERT. 1"=5'



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL: 817.847.1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

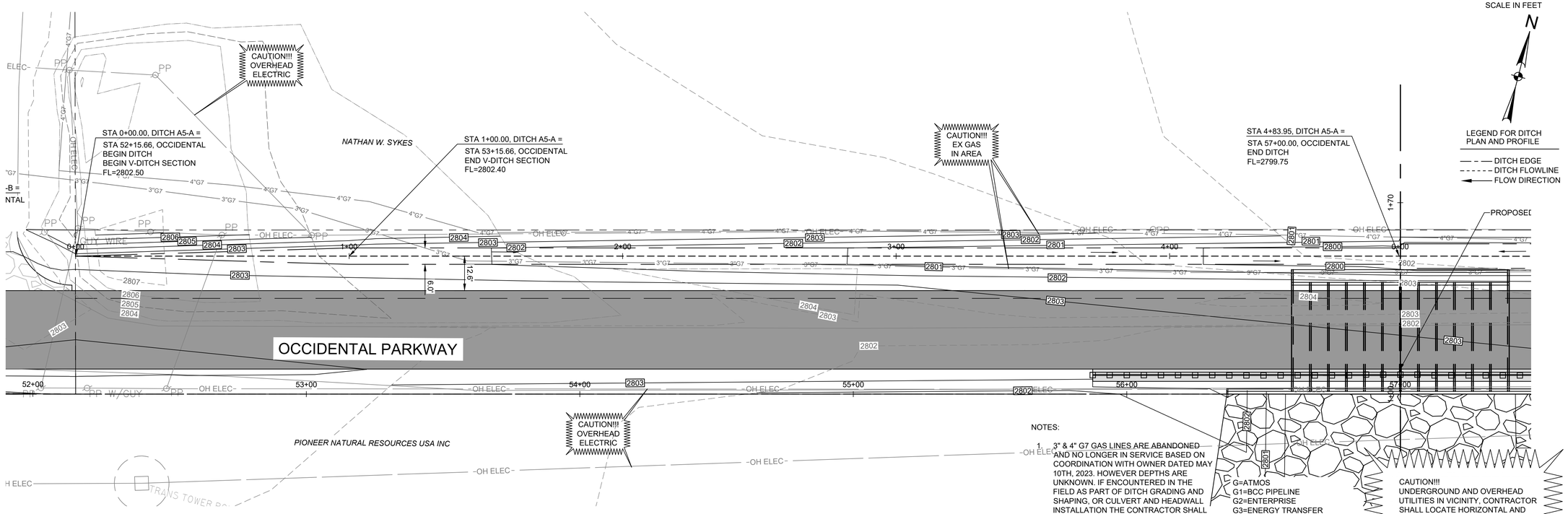
SHEET TITLE

DITCH PLAN AND PROFILE

A4-B STA 5+00 TO END

SHEET NUMBER 73 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:39 PM, USER: ah3453 A\O: 45715.006



NOTES:

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G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

CAUTION!!!
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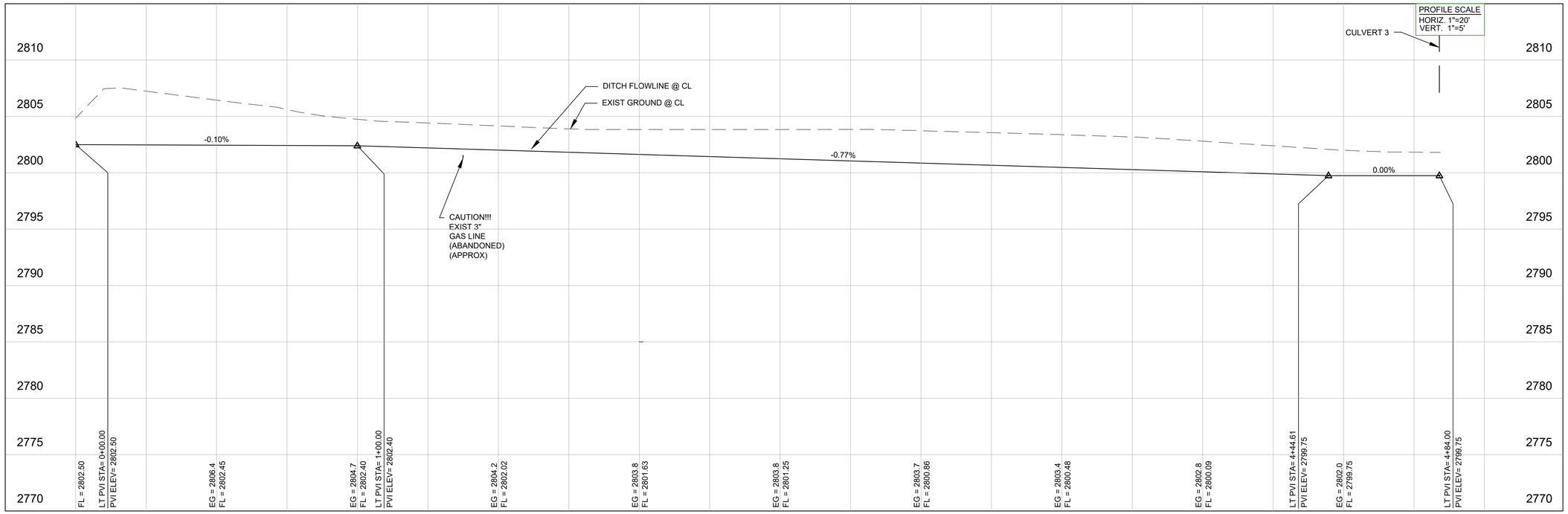
DITCH A5-A



OCCIDENTAL PARKWAY
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MIDLAND, TEXAS

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2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

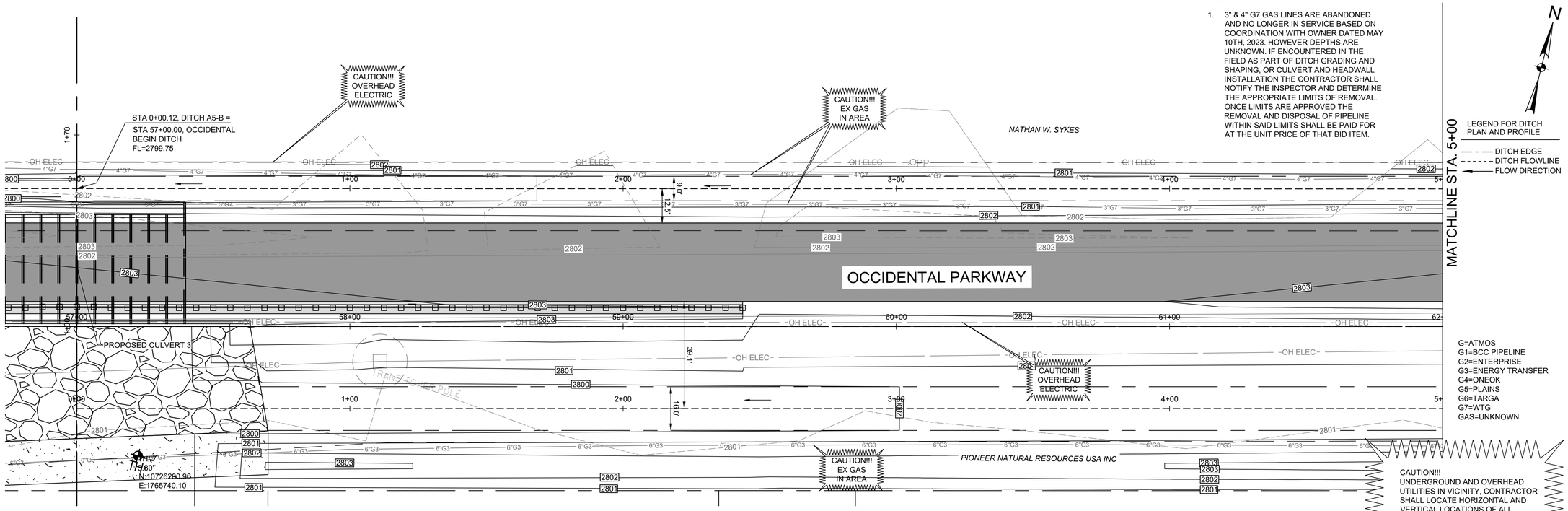
SHEET TITLE

DITCH PLAN AND PROFILE

A5-A BEGIN TO END

SHEET NUMBER 74 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:39 PM, USER: ah3453 AVO: 45715.006



NOTES:

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0 20 40
SCALE IN FEET

N

LEGEND FOR DITCH PLAN AND PROFILE
- DITCH EDGE
- DITCH FLOWLINE
- FLOW DIRECTION

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

CAUTION!!!
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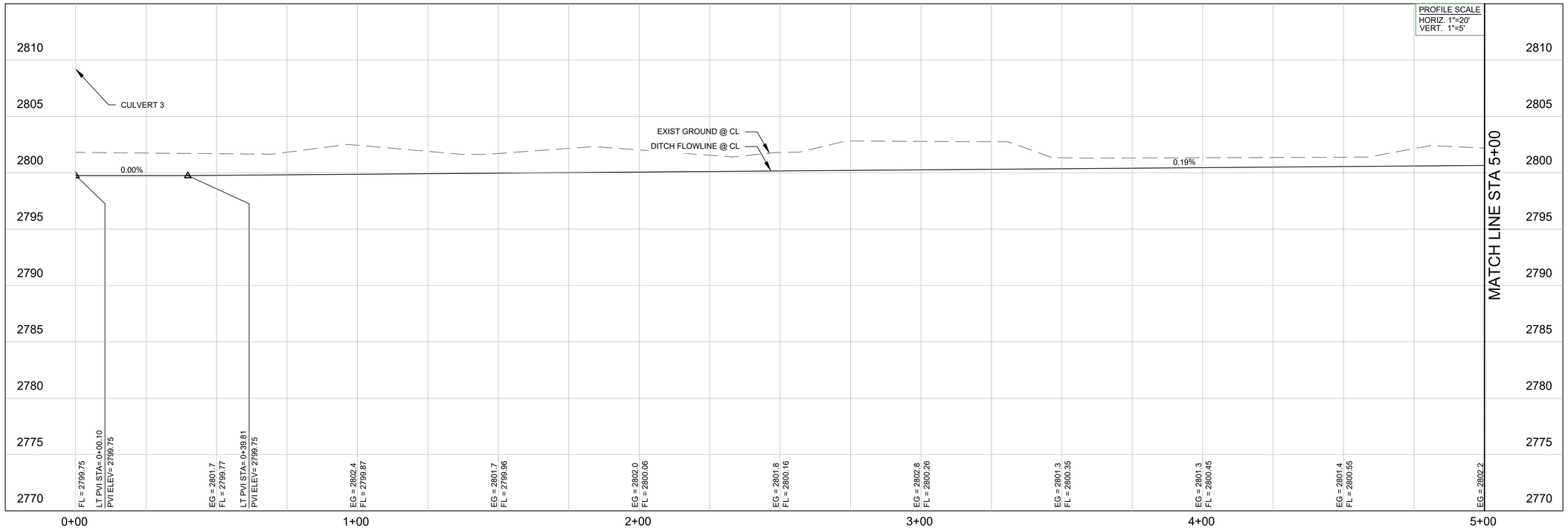
DITCH A5-B



OCCIDENTAL PARKWAY
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MIDLAND, TEXAS

MIDLAND Engineering Services

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2801 MEACHAM BLVD, STE 600
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REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
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PROFESSIONAL ENGINEER
STATE OF TEXAS

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PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE
DITCH PLAN AND PROFILE
A5-B BEGIN TO STA 5+00

SHEET NUMBER 75 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:40 PM, USER: ah3453 AVO: 45715.006

NOTES:

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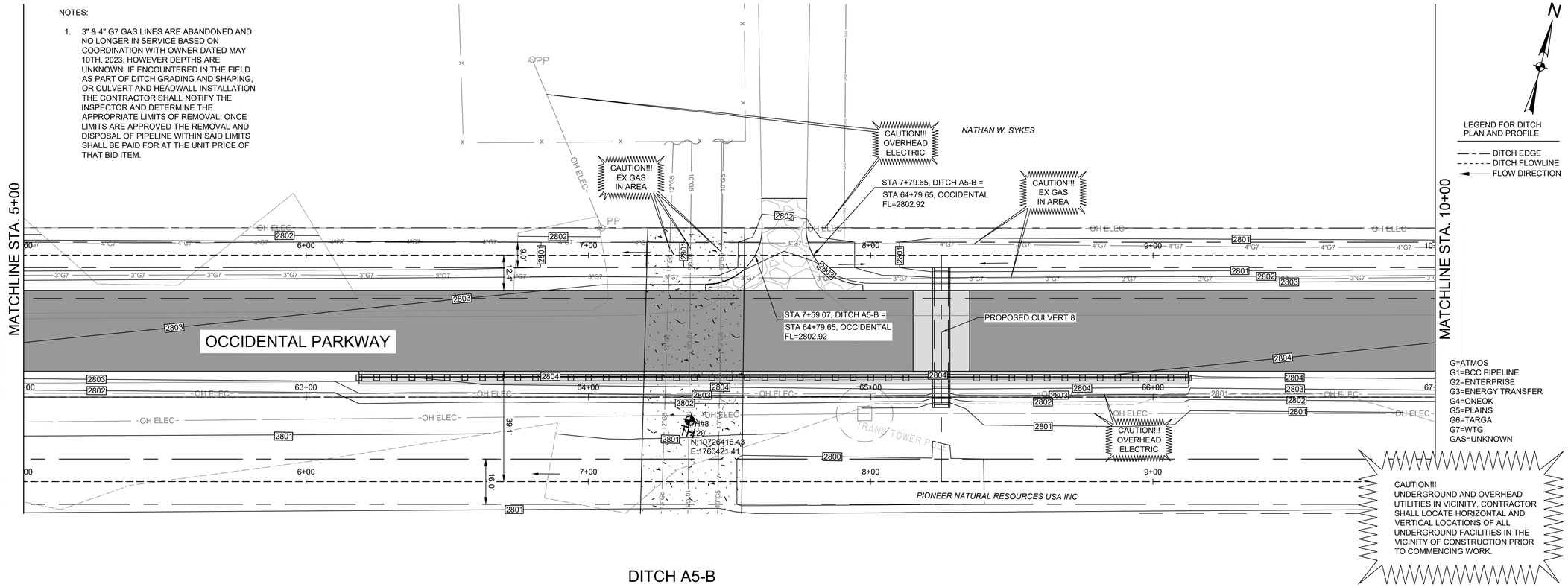


0 20 40
SCALE IN FEET

N

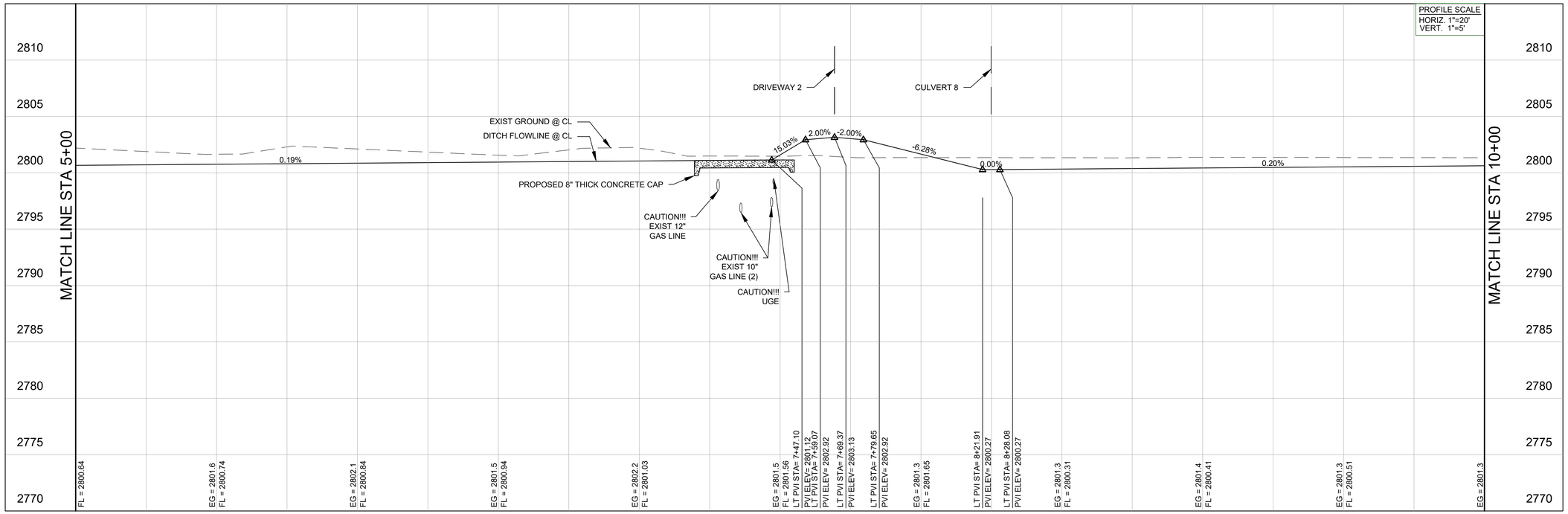
LEGEND FOR DITCH PLAN AND PROFILE
- DITCH EDGE
- DITCH FLOWLINE
- FLOW DIRECTION

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

CAUTION!!! UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

DITCH A5-B

PROFILE SCALE
HORIZ. 1"=20'
VERT. 1"=5'



OCCIDENTAL PARKWAY
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MIDLAND, TEXAS

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FORT WORTH, TEXAS 76137-2797
TEL 817.847.1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

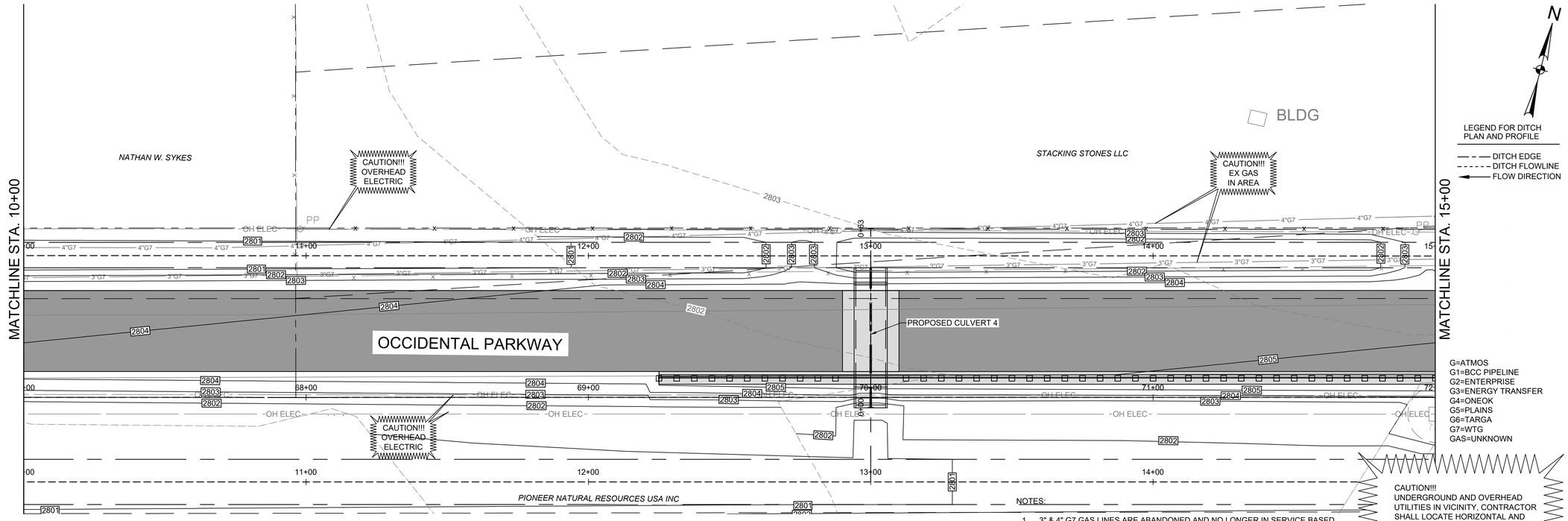
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE
DITCH PLAN AND PROFILE
A5-B STA 5+00 TO STA 10+00

SHEET NUMBER 76 OF 217

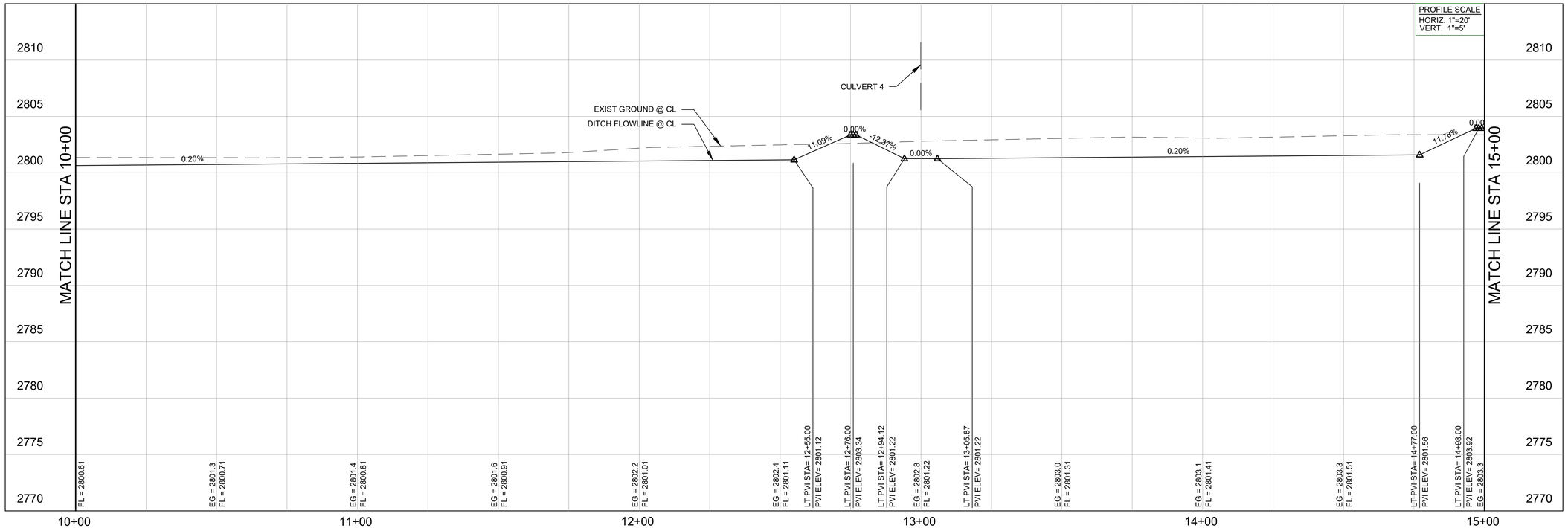
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:40 PM, USER: ah3453 AVO: 45715.006



NOTES:

1. 3" & 4" G7 GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

DITCH A5-B



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2801 MEACHAM BLVD. STE 600
FT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

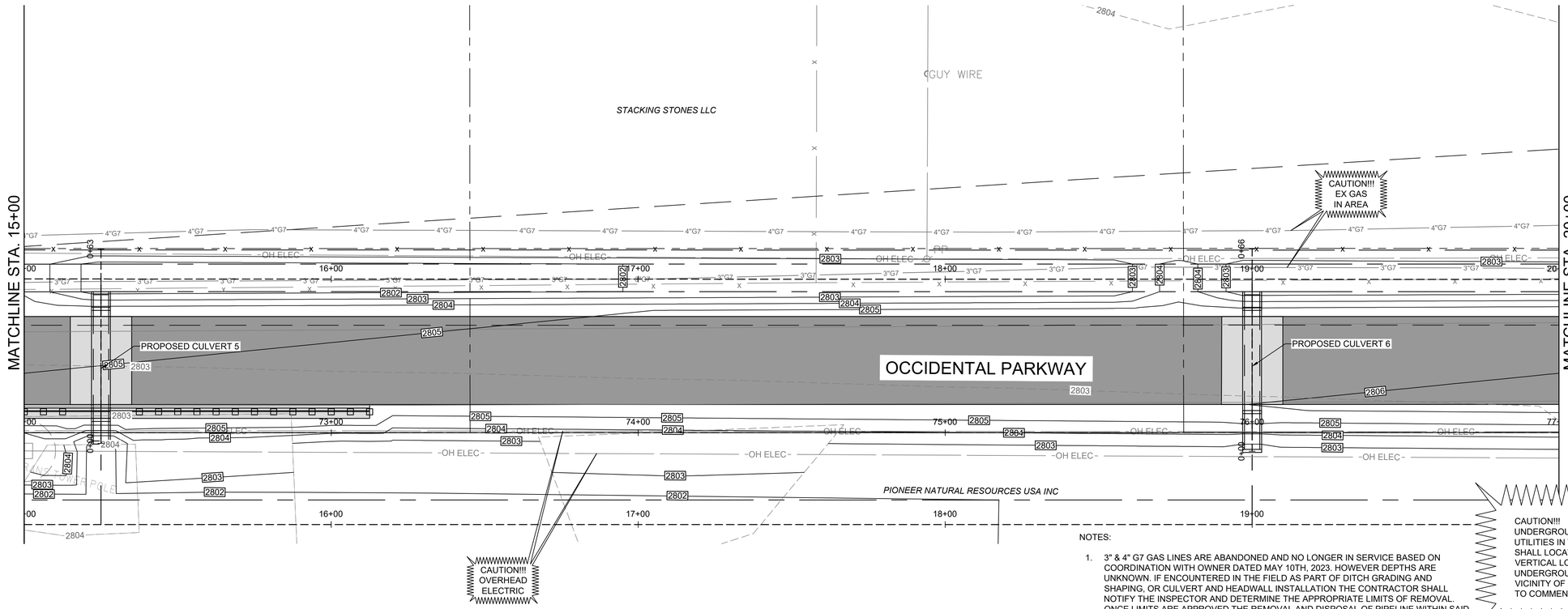
SHEET TITLE

DITCH PLAN AND PROFILE

A5-B STA 10+00 TO STA 15+00

SHEET NUMBER 77 OF 217

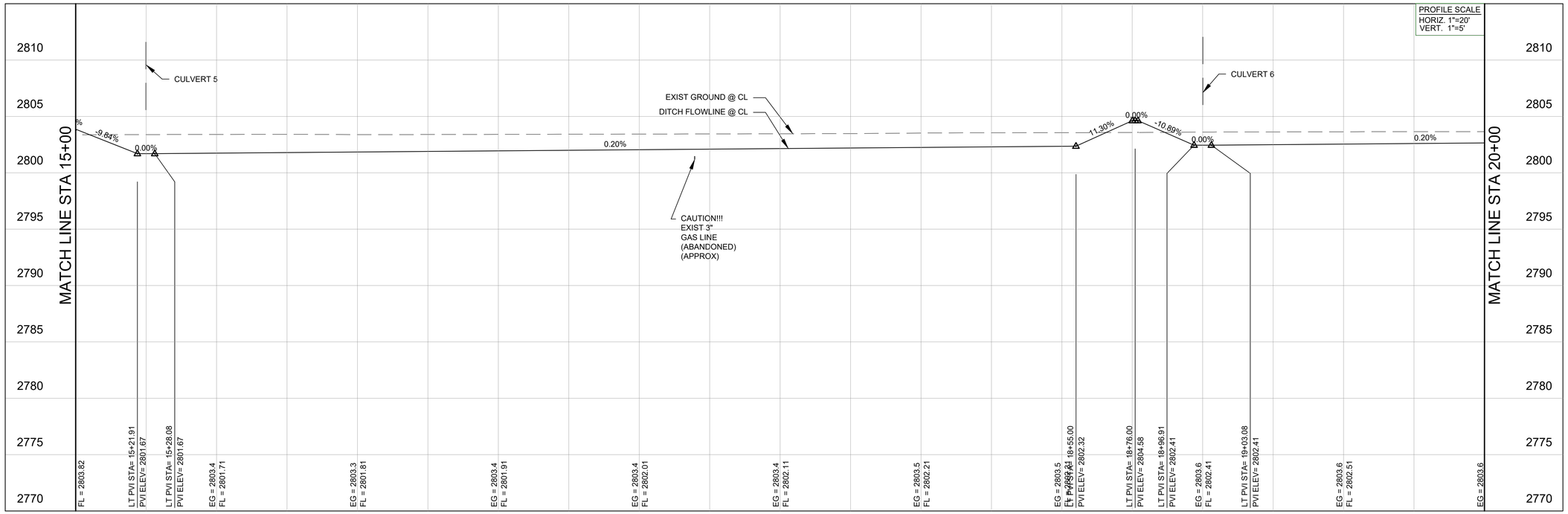
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:40 PM, USER: ah3453 AVO: 45715.006



DITCH A5-B

NOTES:

1. 3" & 4" G7 GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL: 817.847.1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

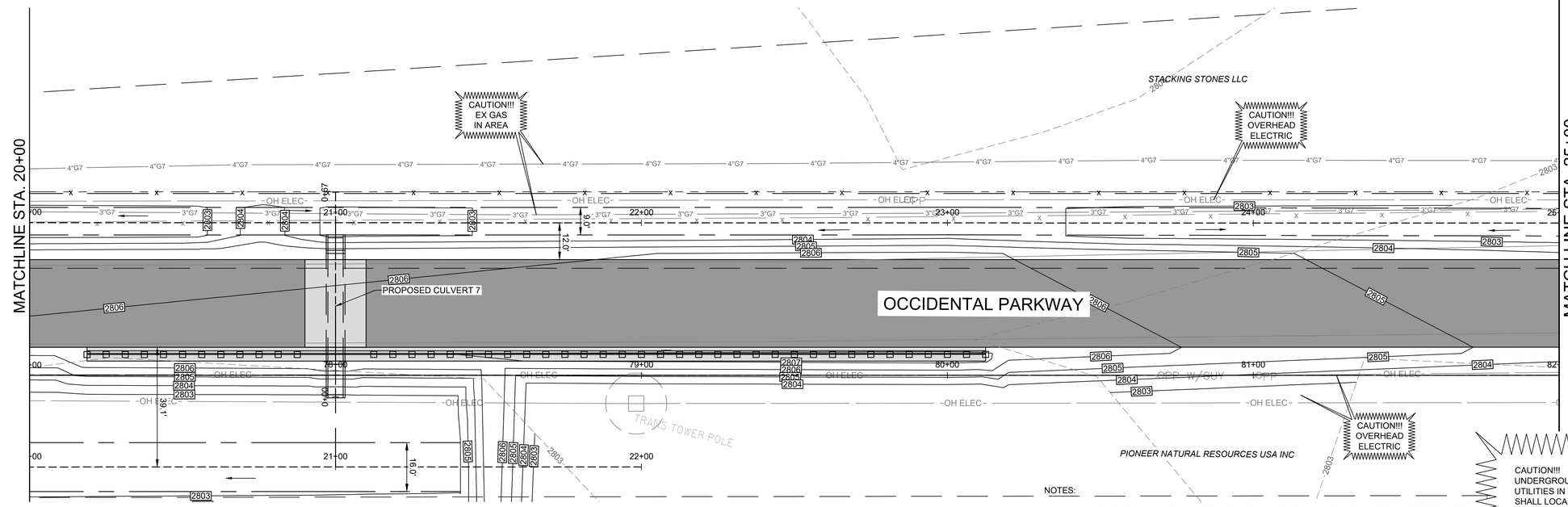
SHEET TITLE

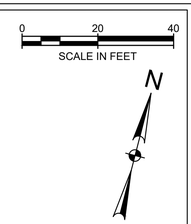
DITCH PLAN AND PROFILE

A5-B STA 15+00 TO STA 20+00

SHEET NUMBER 78 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:40 PM, USER: ah3453 A\O: 45715.006





LEGEND FOR DITCH PLAN AND PROFILE

- DITCH EDGE
- DITCH FLOWLINE
- FLOW DIRECTION

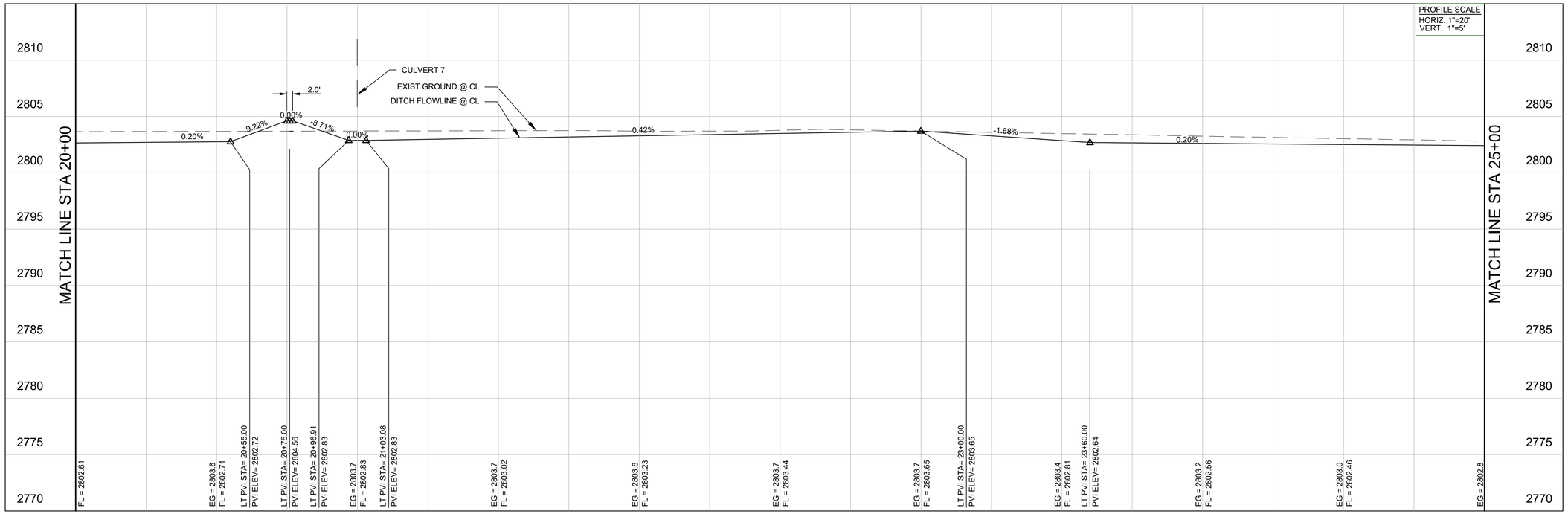
G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

NOTES:

1. 3" & 4" G7 GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

DITCH A5-B



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL: 817.847.1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

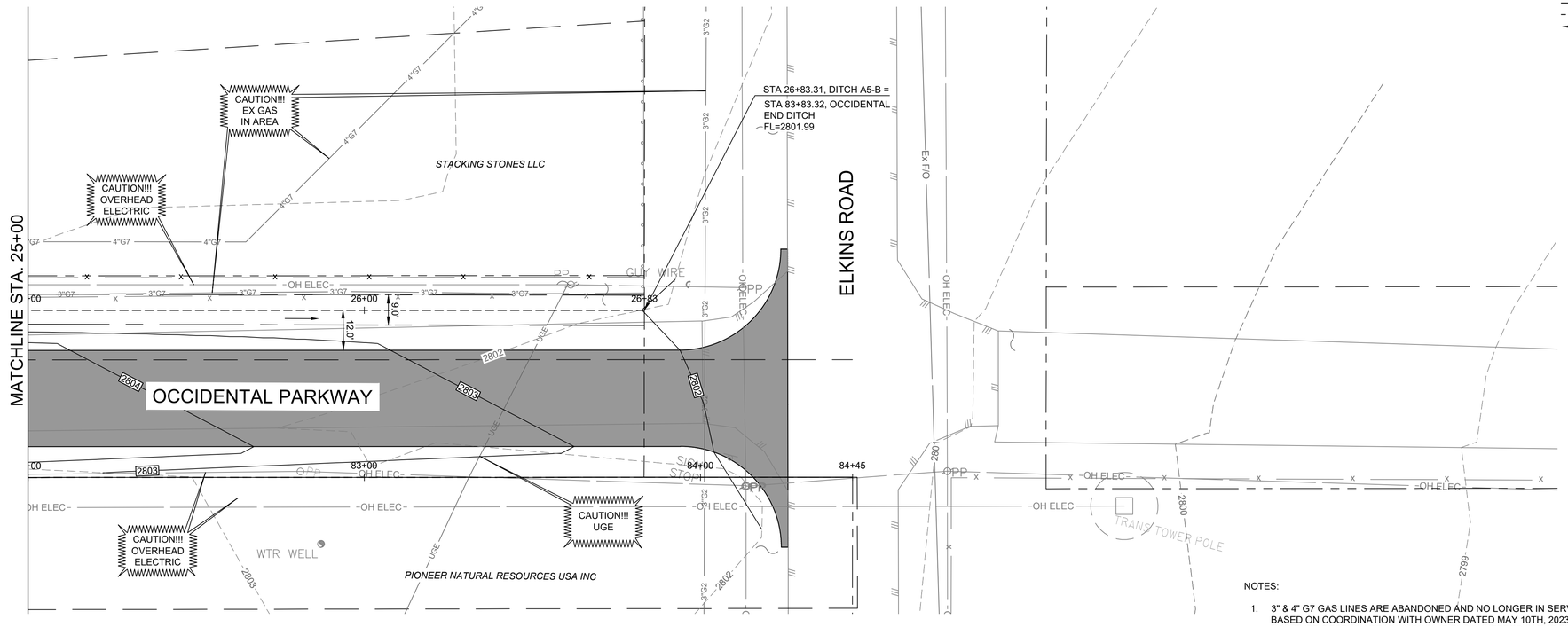
SHEET TITLE

DITCH PLAN AND PROFILE

A5-B STA 20+00 TO STA 25+00

SHEET NUMBER 79 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:40 PM, USER: ah3453 A\O: 45715.006



DITCH A5-B

LEGEND FOR DITCH PLAN AND PROFILE

- DITCH EDGE
- DITCH FLOWLINE
- FLOW DIRECTION

SCALE IN FEET: 0 20 40

N

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

NOTES:

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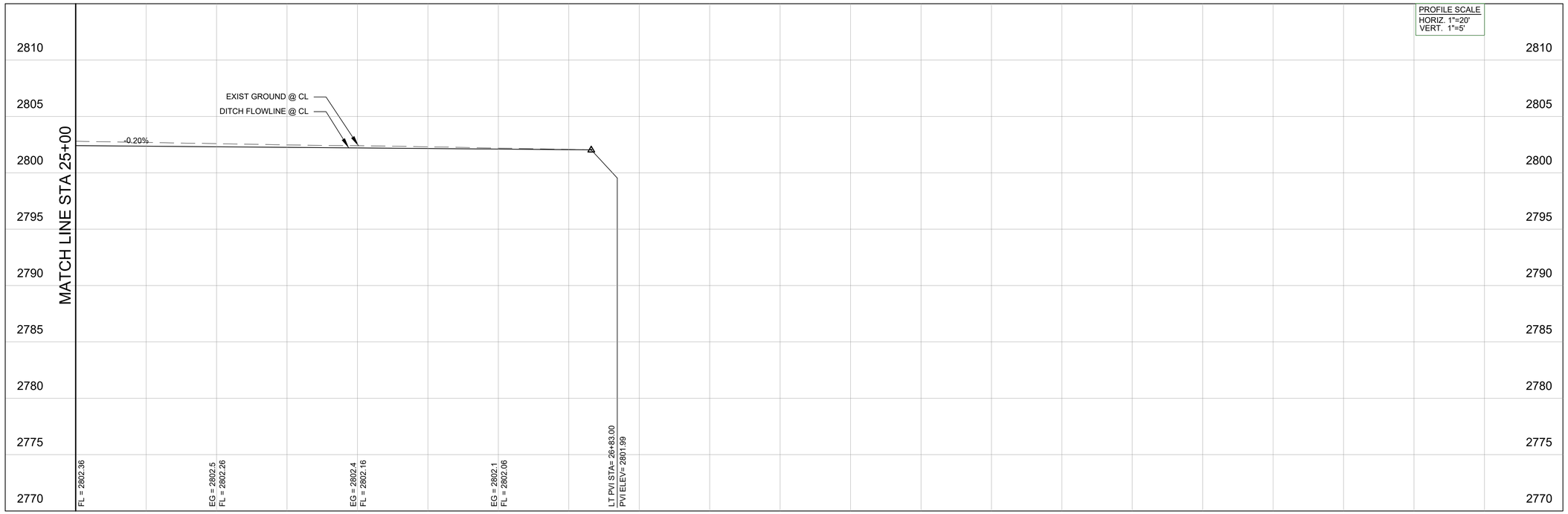


OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

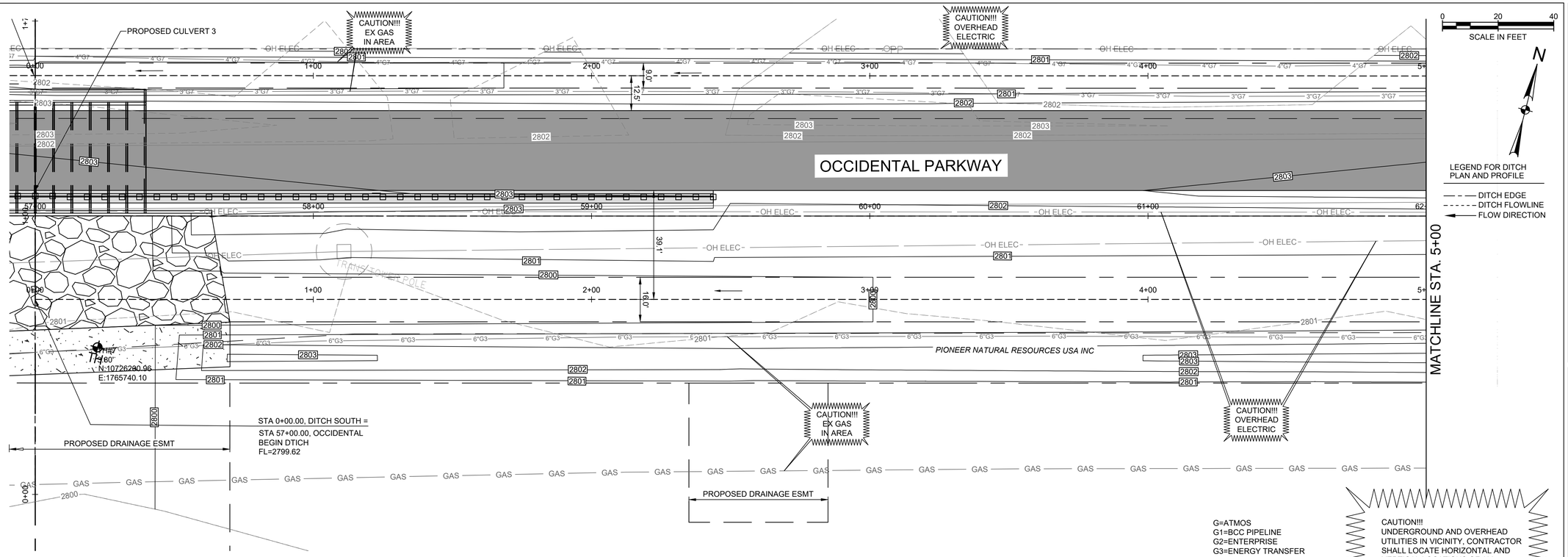
SHEET TITLE

DITCH PLAN AND PROFILE

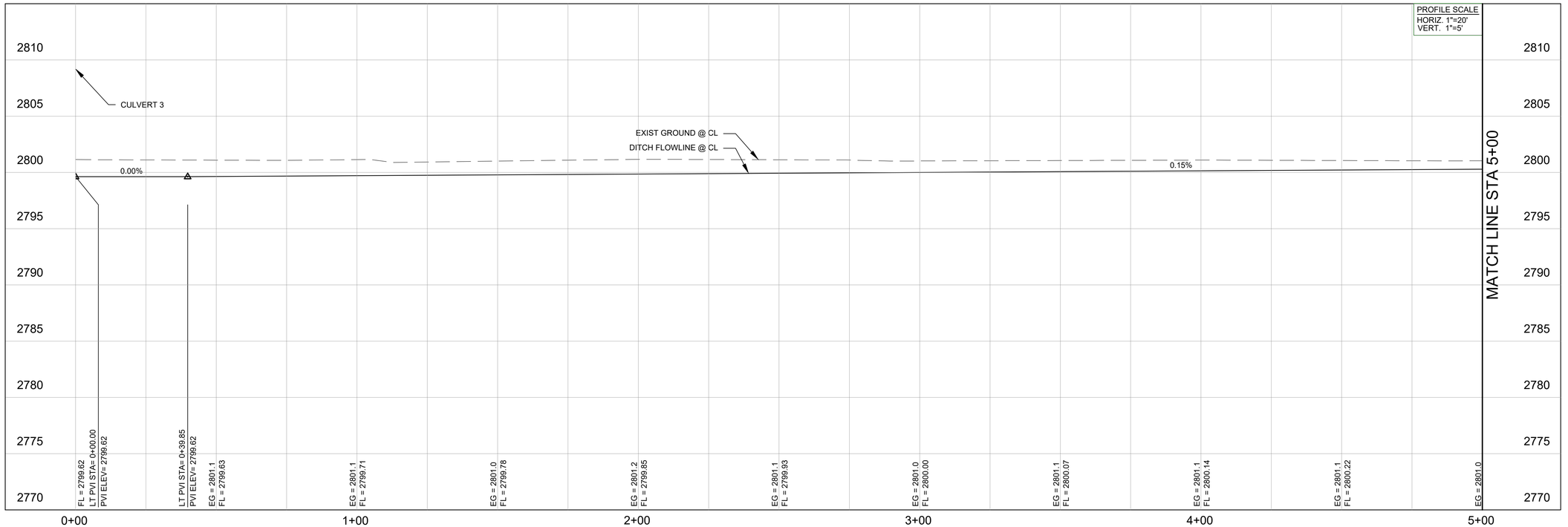
A5-B STA 25+00 TO END

SHEET NUMBER 80 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:40 PM, USER: ah3453 A\O: 45715.006



DITCH SOUTH



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

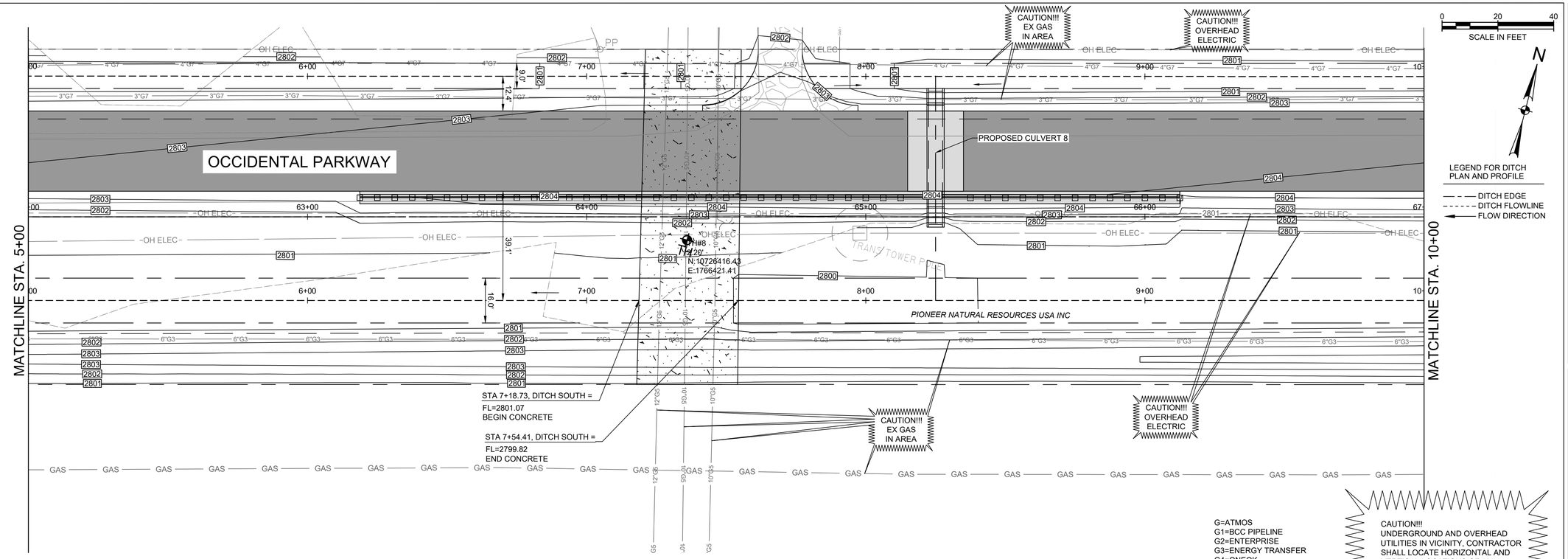
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

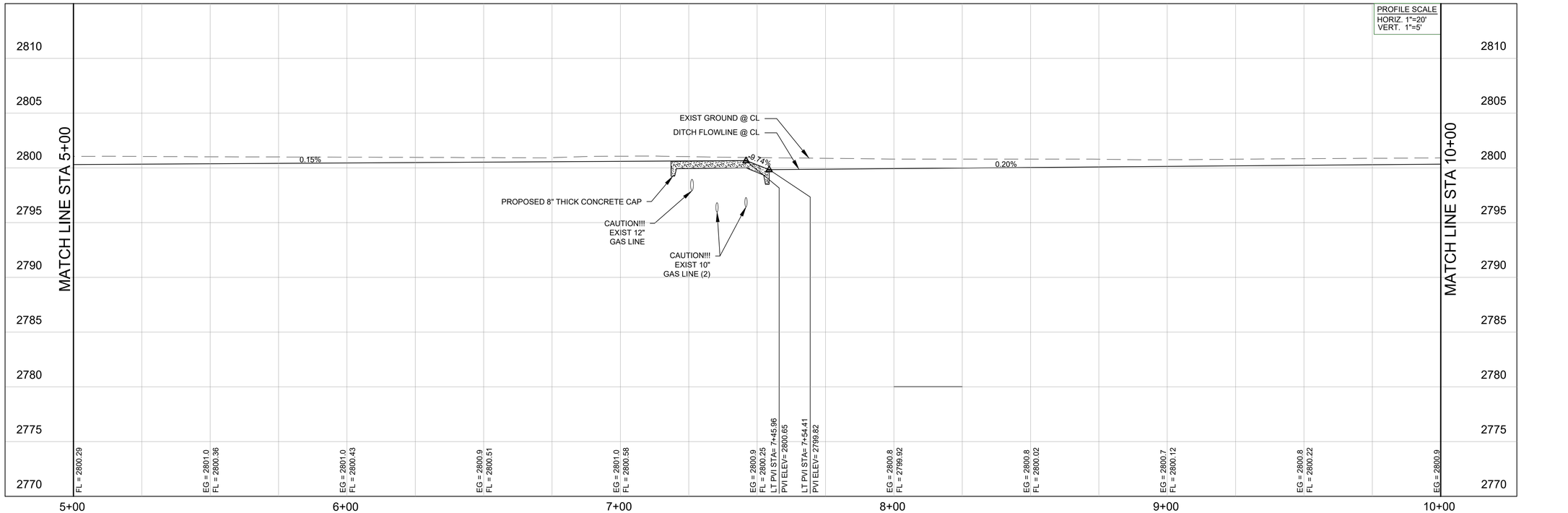
DITCH PLAN AND PROFILE
SOUTH BEGIN TO STA 5+00

SHEET NUMBER 81 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:40 PM, USER: ah3453 AVO: 45715.006



DITCH SOUTH



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

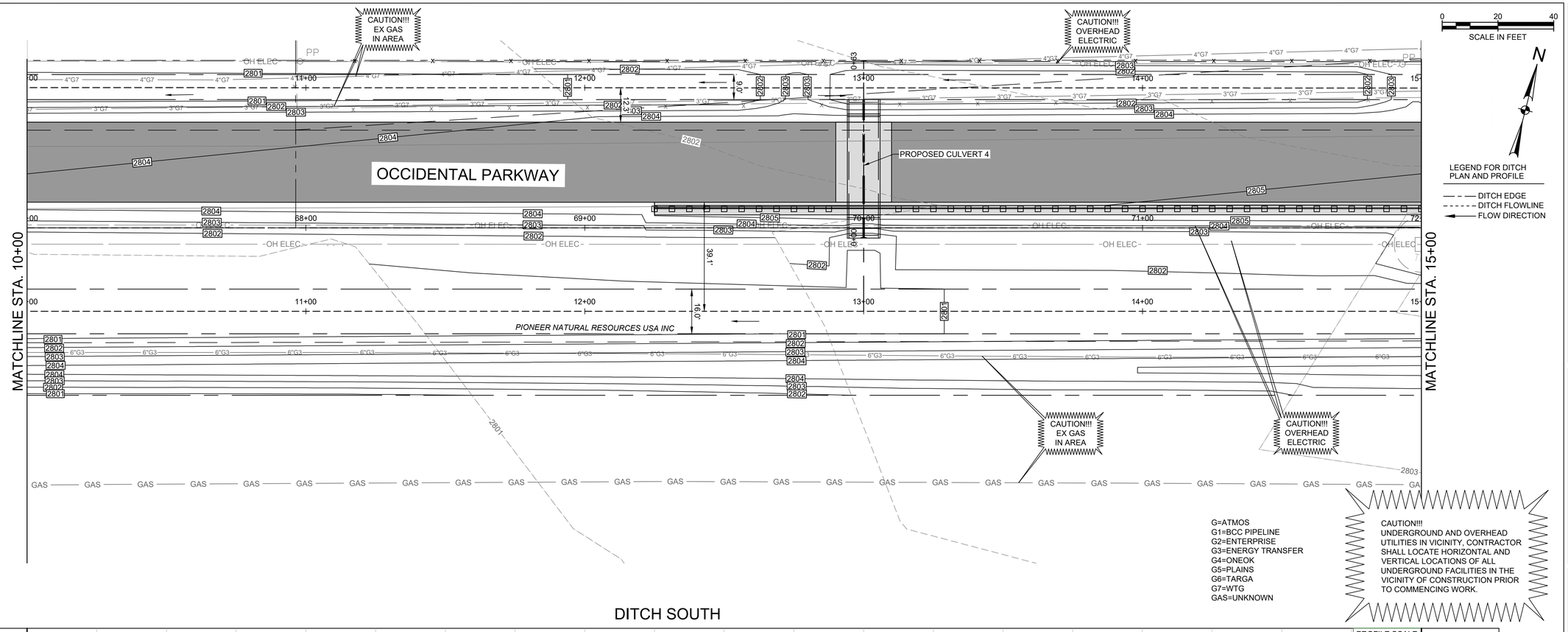
SHEET TITLE

DITCH PLAN AND PROFILE

SOUTH STA 5+00 TO STA 10+00

SHEET NUMBER 82 OF 217

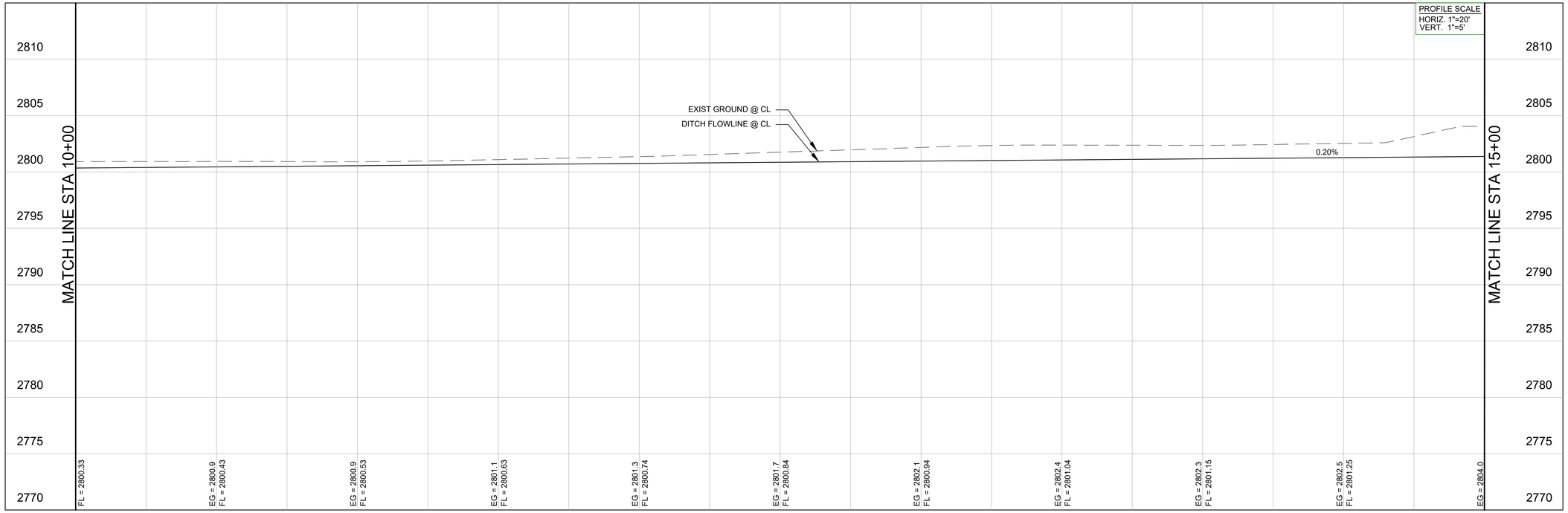
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:40 PM, USER: ah3453 A\O: 45715.006



G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

DITCH SOUTH



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

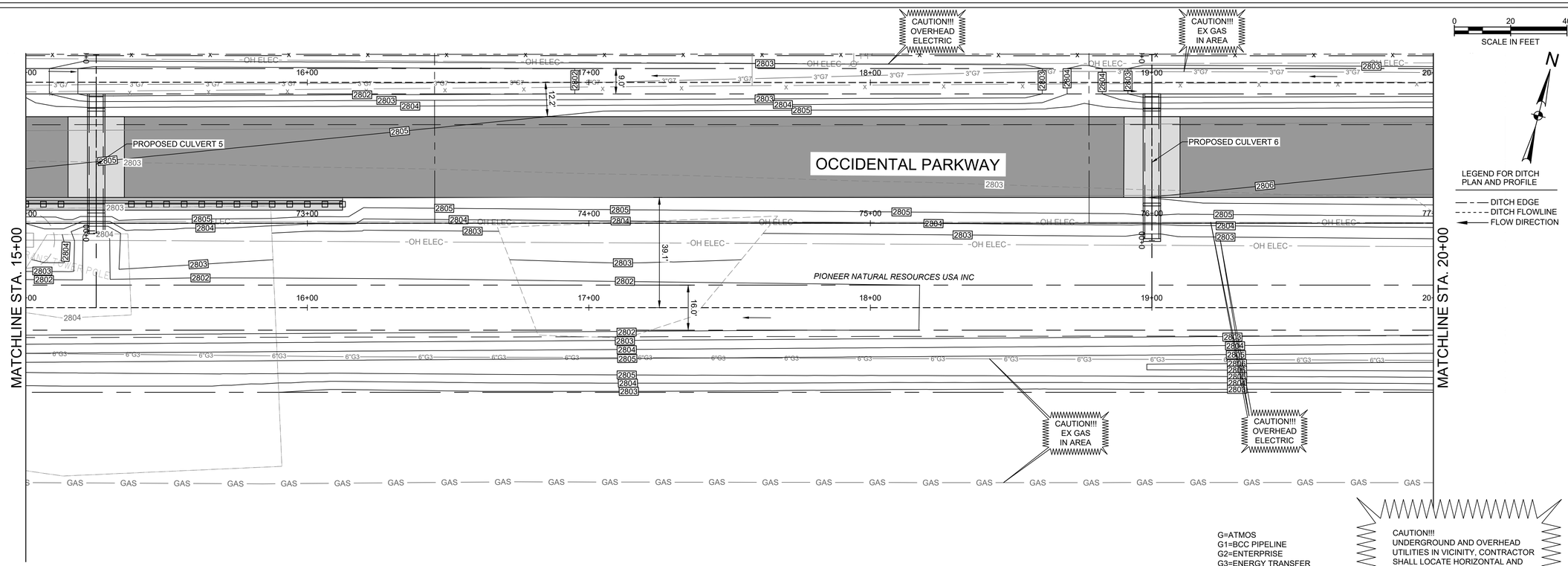
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

DITCH PLAN AND PROFILE SOUTH STA 10+00 TO STA 15+00

SHEET NUMBER 83 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:41 PM, USER: ah3453 AVO: 45715.006



0 20 40
SCALE IN FEET

N

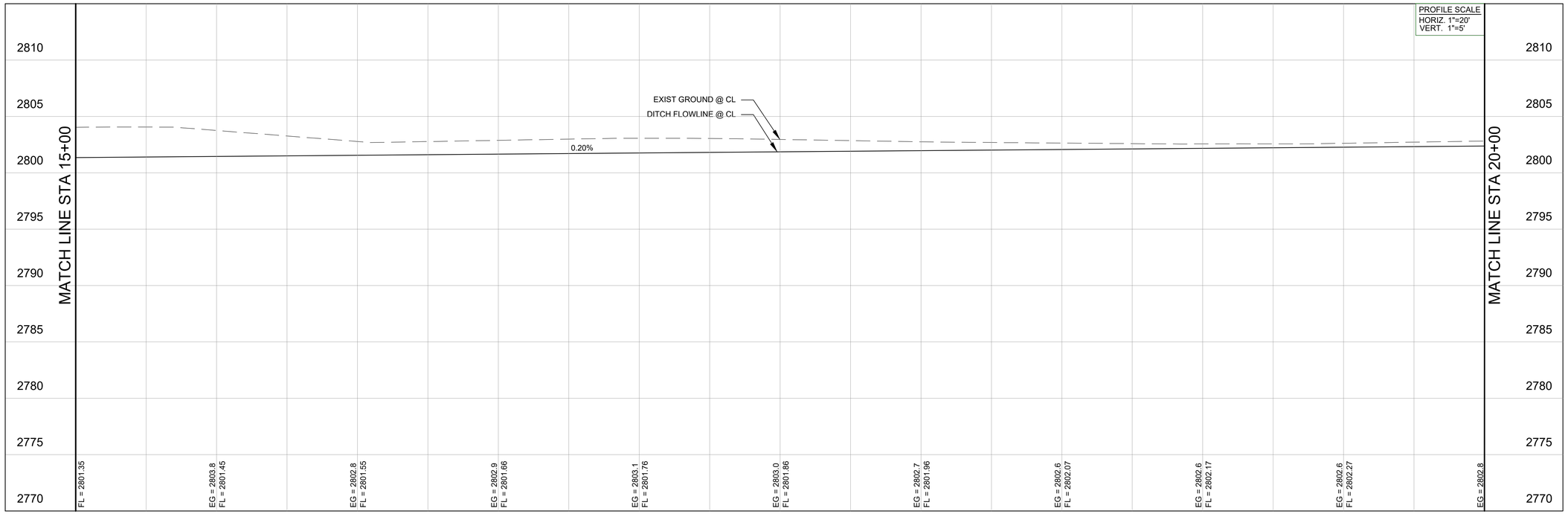
LEGEND FOR DITCH PLAN AND PROFILE

——— DITCH EDGE
- - - - - DITCH FLOWLINE
◄—— FLOW DIRECTION

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

DITCH SOUTH



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL: 817.847.1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

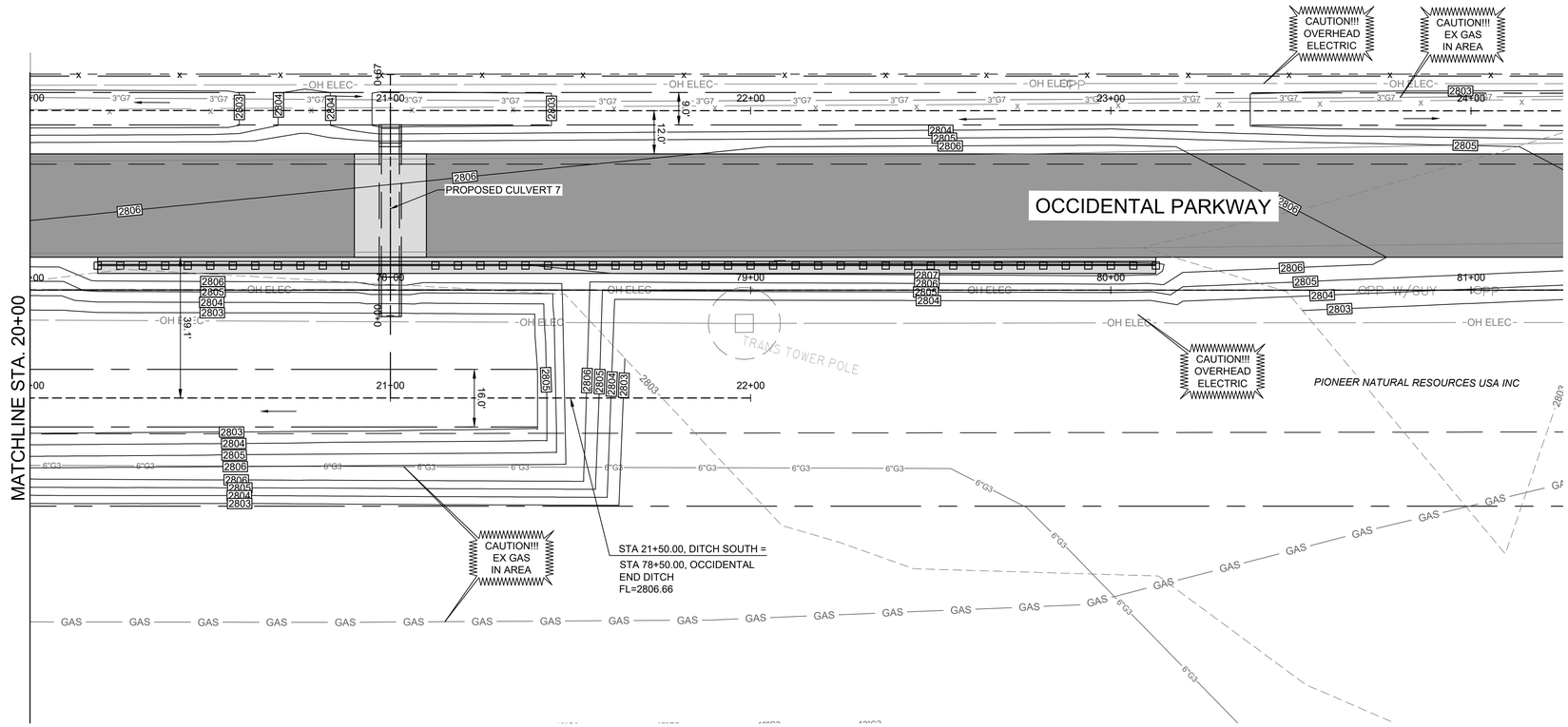
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

DITCH PLAN AND PROFILE
SOUTH STA 15+00 TO STA 20+00

SHEET NUMBER 84 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:41 PM, USER: ah3453 AVO: 45715.006



0 20 40
SCALE IN FEET

N

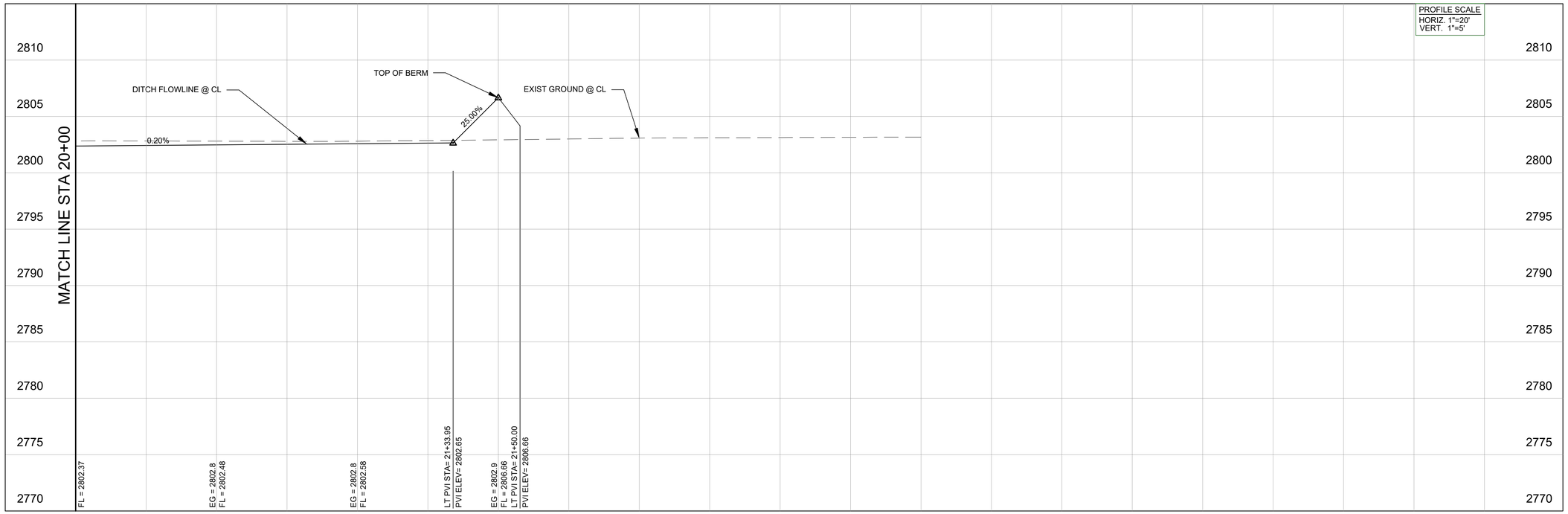
LEGEND FOR DITCH PLAN AND PROFILE

— - — DITCH EDGE
- - - - - DITCH FLOWLINE
◄—— FLOW DIRECTION

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

DITCH SOUTH



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL: 817.847.1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

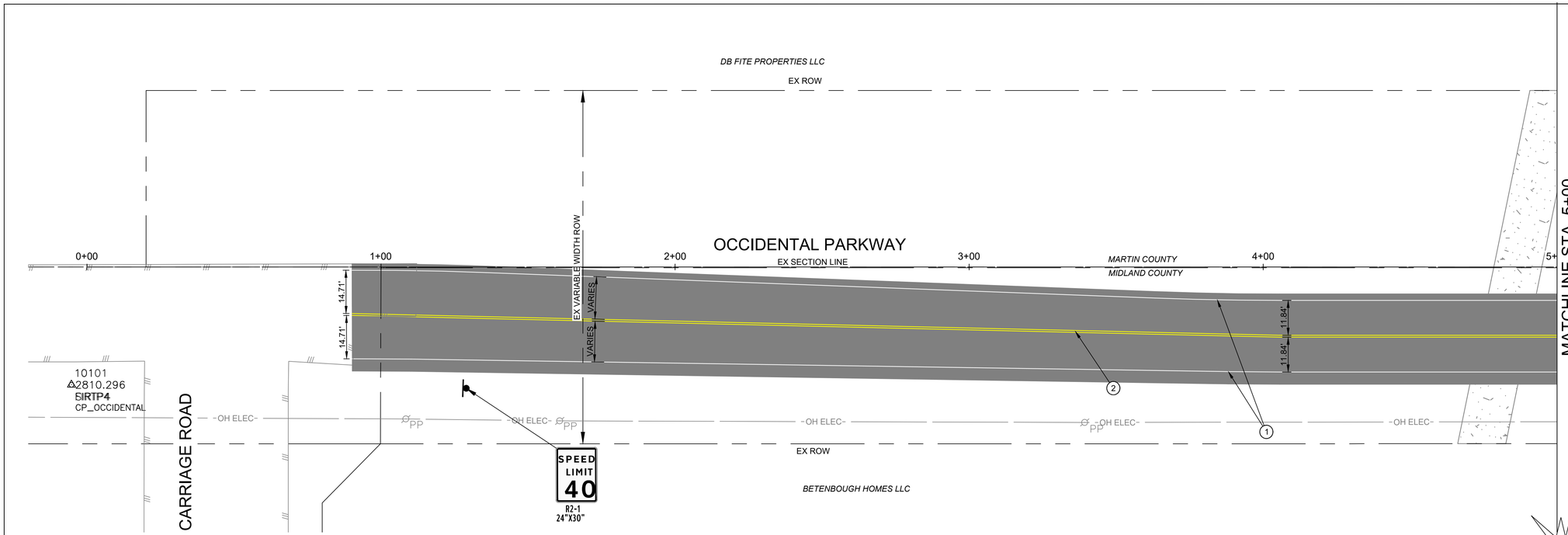
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

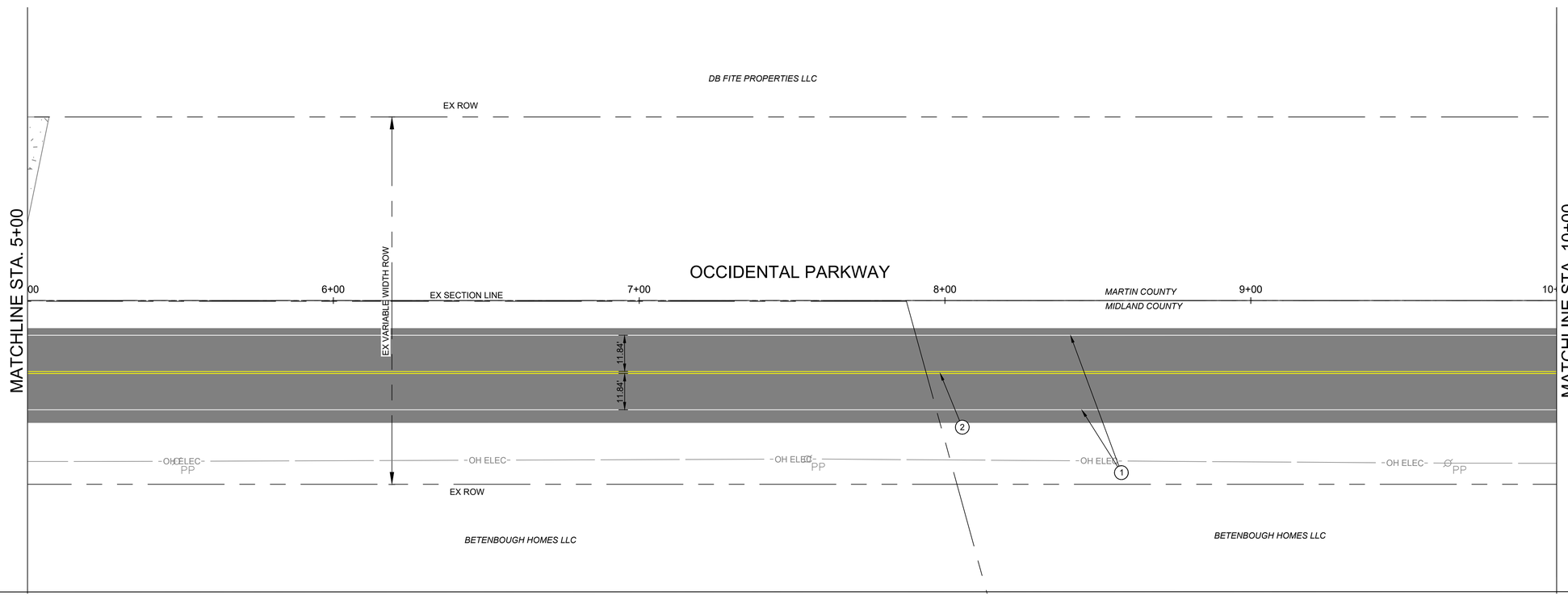
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE
DITCH PLAN AND PROFILE
SOUTH STA 20+00 TO END

SHEET NUMBER 85 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C806-DTCH-45715.dwg DATE: August 13, 2024, TIME: 3:41 PM, USER: ah3453 A/O: 45715.006





0 20 40
SCALE IN FEET

N

LEGEND FOR PAVEMENT MARKINGS

1. 4" WHITE SOLID
2. 4" DOUBLE YELLOW SOLID W/ BUTTON SPACING @ 40'
3. 24" WHITE SOLID

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

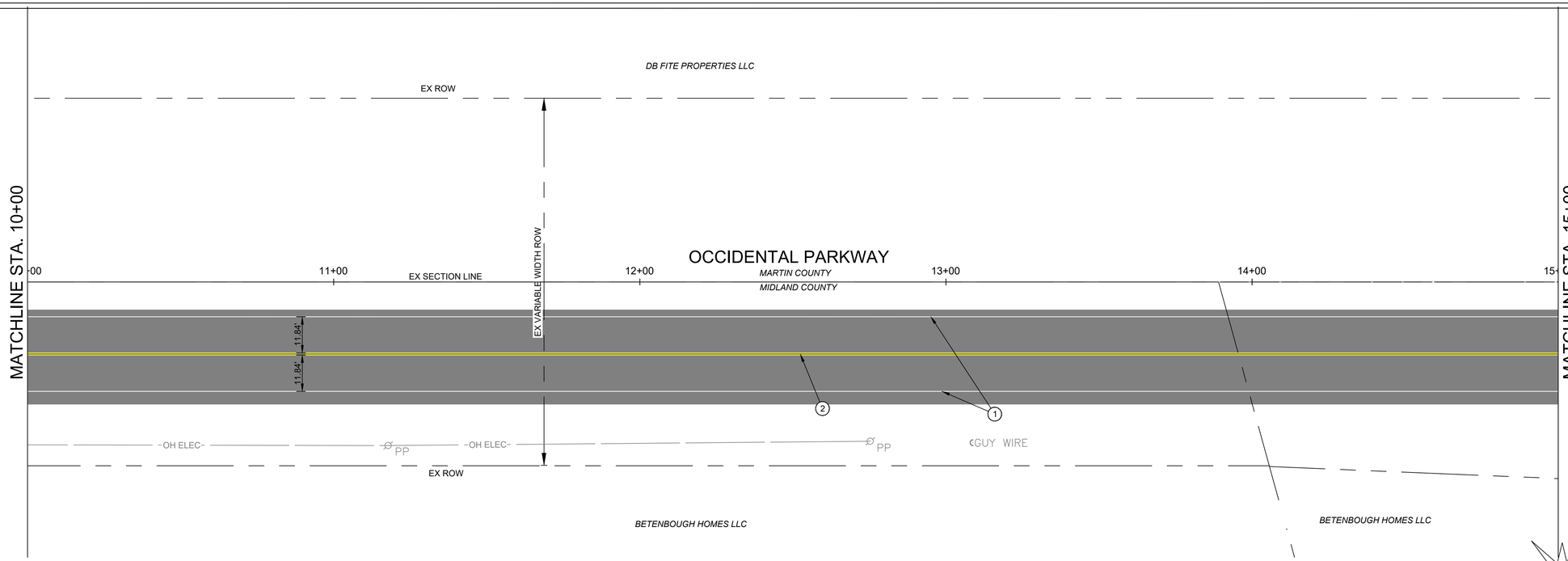
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

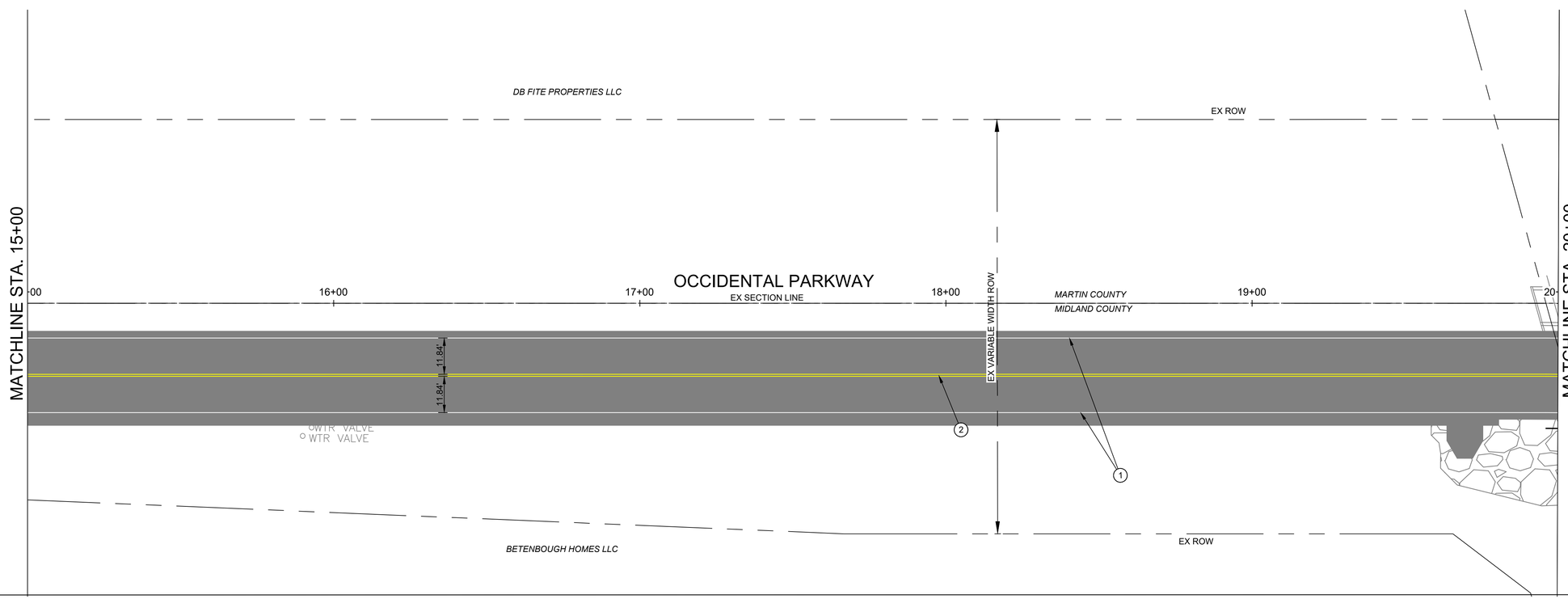
SHEET TITLE

PAVEMENT MARKINGS AND SIGN
BEGIN TO STA 10+00

SHEET NUMBER 86 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C900-PMRK-45715.dwg DATE: August 13, 2024, TIME: 3:41 PM, USER: ah3453 AVO: 45715.006





0 20 40
SCALE IN FEET

N

LEGEND FOR PAVEMENT MARKINGS

1. 4" WHITE SOLID
2. 4" DOUBLE YELLOW SOLID W/ BUTTON SPACING @ 40'
3. 24" WHITE SOLID

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
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TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

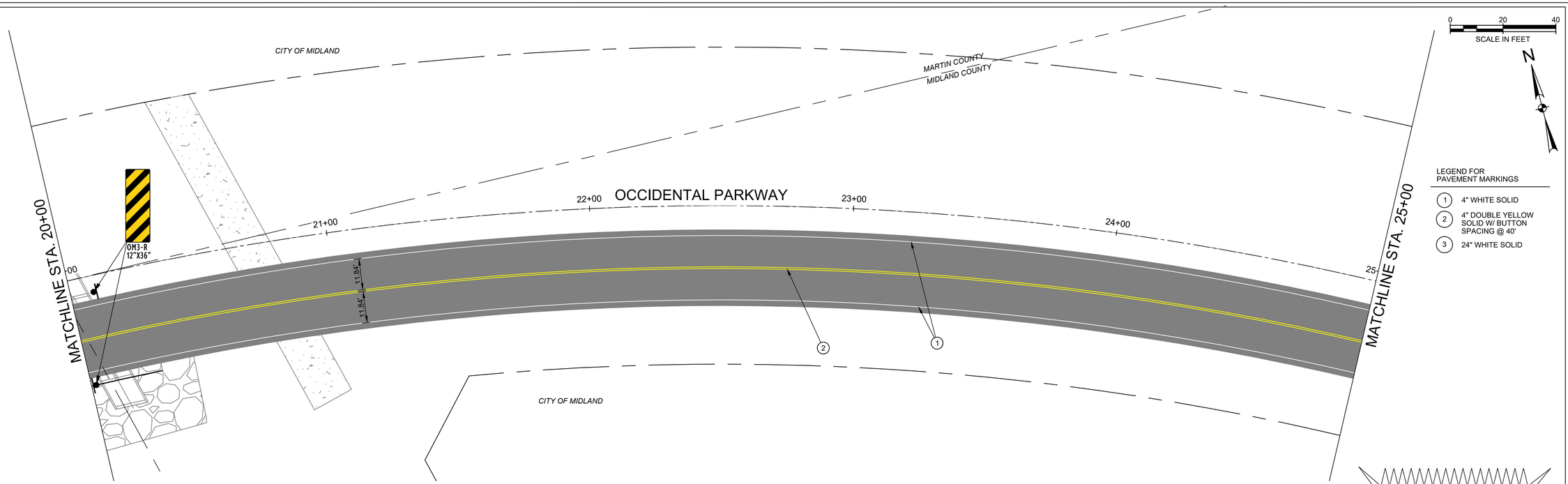
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

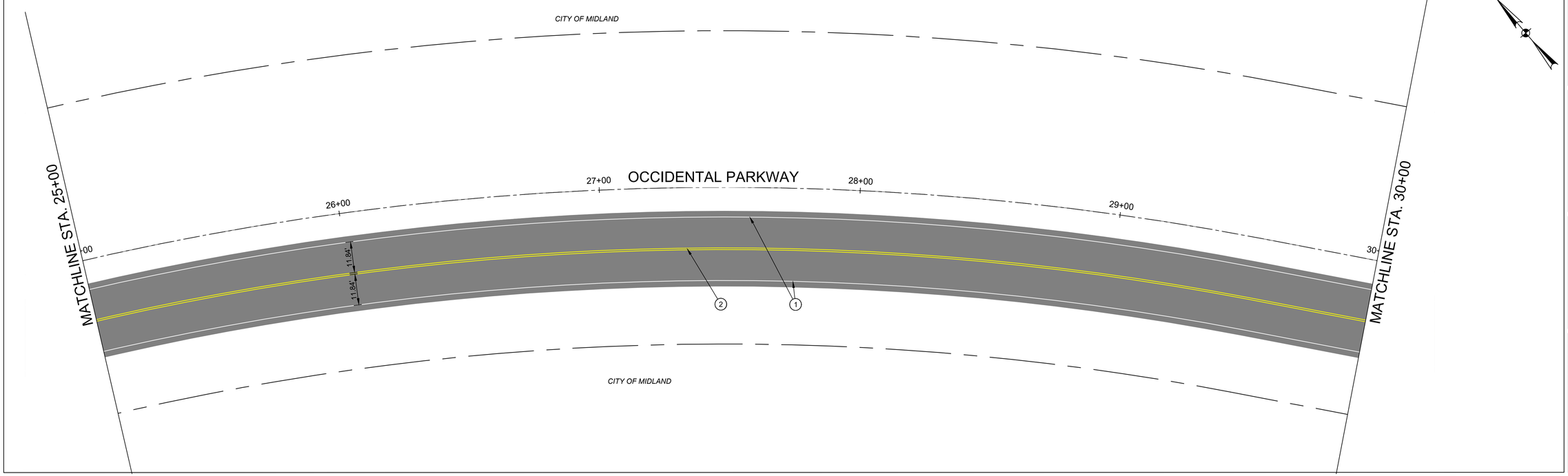
SHEET TITLE

PAVEMENT MARKINGS AND SIGN
STA 10+00 TO STA 20+00

SHEET NUMBER 87 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C900-PMRK-45715.dwg DATE: August 13, 2024, TIME: 3:41 PM, USER: ah3453 AVO: 45715.006





0 20 40
SCALE IN FEET

N

LEGEND FOR PAVEMENT MARKINGS

1. 4" WHITE SOLID
2. 4" DOUBLE YELLOW SOLID W/ BUTTON SPACING @ 40'
3. 24" WHITE SOLID

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

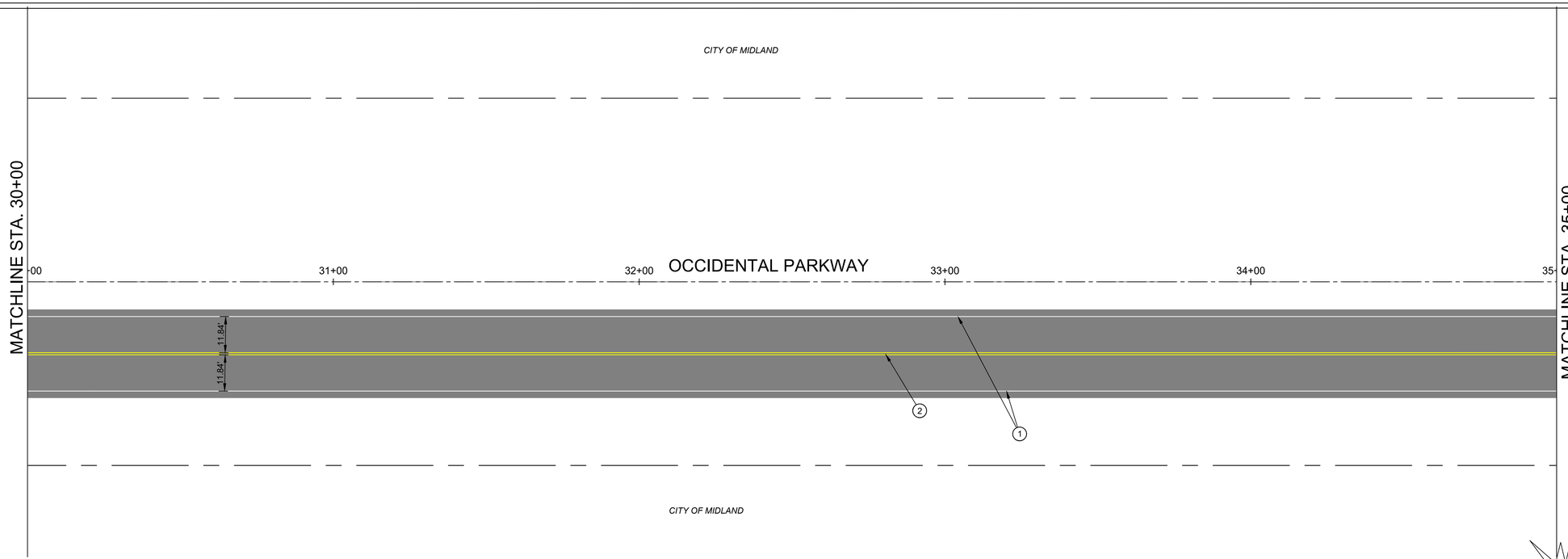
SHEET TITLE

PAVEMENT MARKINGS AND SIGN

STA 20+00 TO STA 30+00

SHEET NUMBER 88 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C900-PMRK-45715.dwg DATE: August 13, 2024, TIME: 3:41 PM, USER: ah3453 AVO: 45715.006



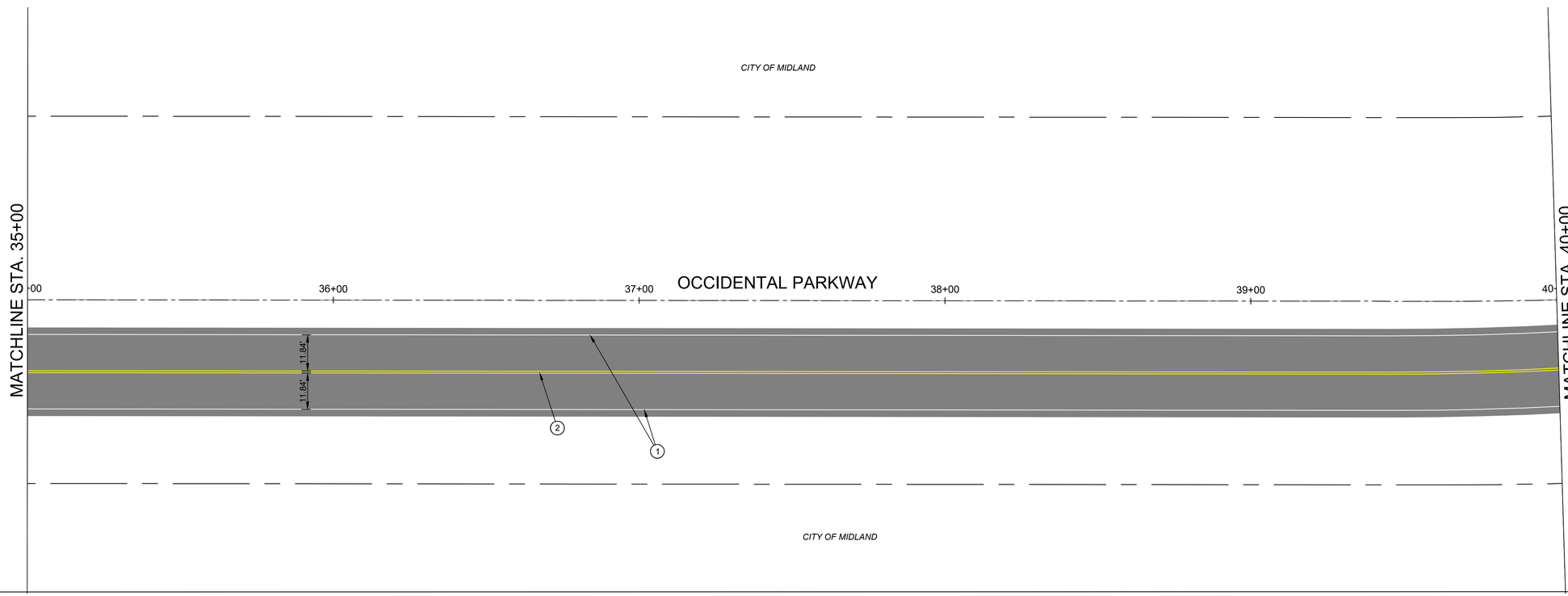
0 20 40
SCALE IN FEET

N

LEGEND FOR PAVEMENT MARKINGS

1. 4" WHITE SOLID
2. 4" DOUBLE YELLOW SOLID W/ BUTTON SPACING @ 40'
3. 24" WHITE SOLID

CAUTION!!!
UNDERGROUND AND OVERHEAD UTILITIES IN VICINITY, CONTRACTOR SHALL LOCATE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UNDERGROUND FACILITIES IN THE VICINITY OF CONSTRUCTION PRIOR TO COMMENCING WORK.



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OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
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TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

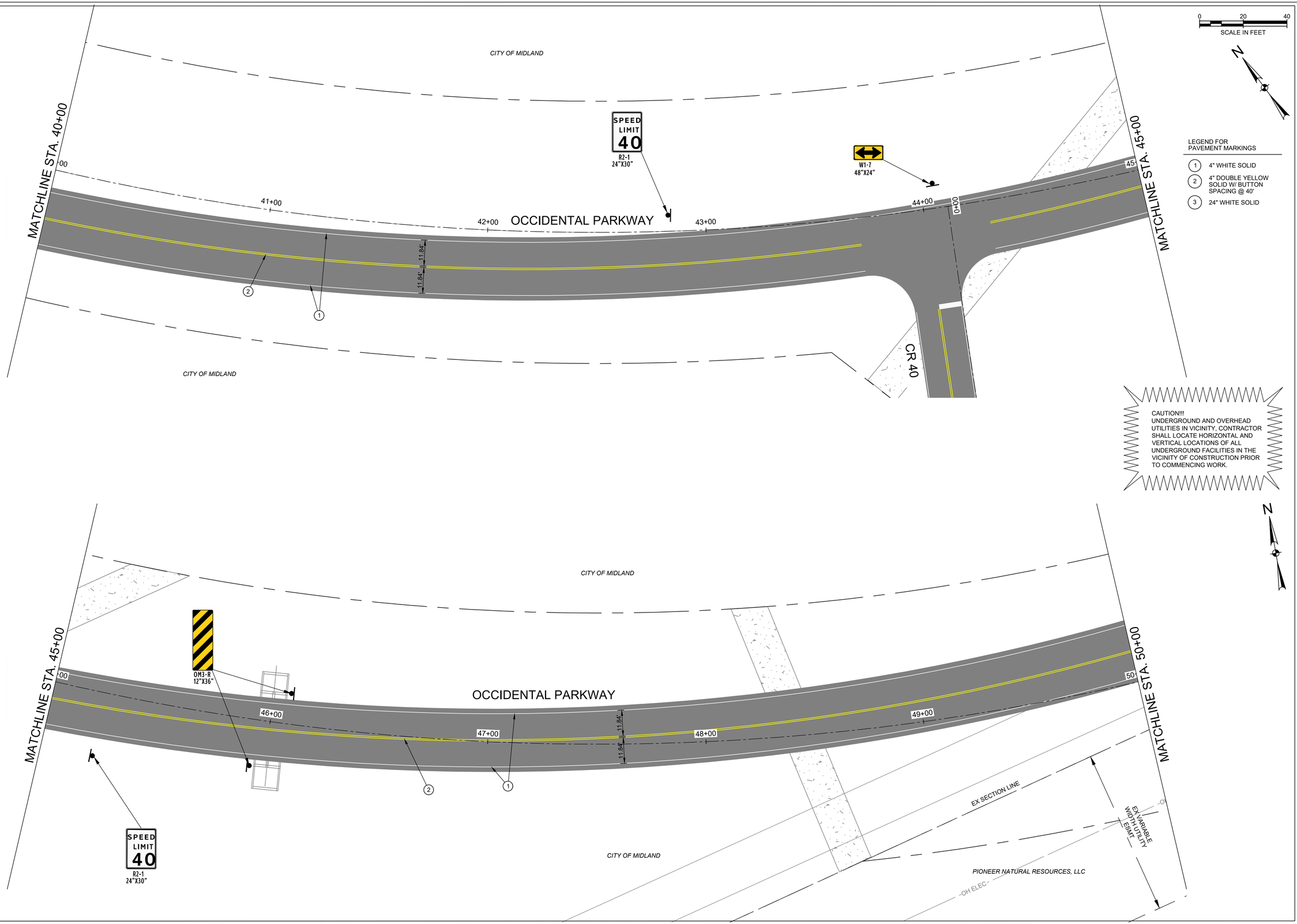
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

PAVEMENT MARKINGS AND SIGN
STA 30+00 TO STA 40+00

SHEET NUMBER 89 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C900-PMRK-45715.dwg DATE: August 13, 2024, TIME: 3:42 PM, USER: ah3453 AVO: 45715.006



OCCIDENTAL PARKWAY
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MIDLAND, TEXAS

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FORT WORTH, TEXAS 76137-2797
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TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

PAVEMENT MARKINGS AND SIGN

STA 40+00 TO STA 50+00

SHEET NUMBER 90 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C900-PMRK-45715.dwg DATE: August 13, 2024, TIME: 3:42 PM, USER: ah3453 AVO: 45715.006

CAUTION!!!
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OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

CITY OF MIDLAND Engineering Services

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL: 817.847.1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

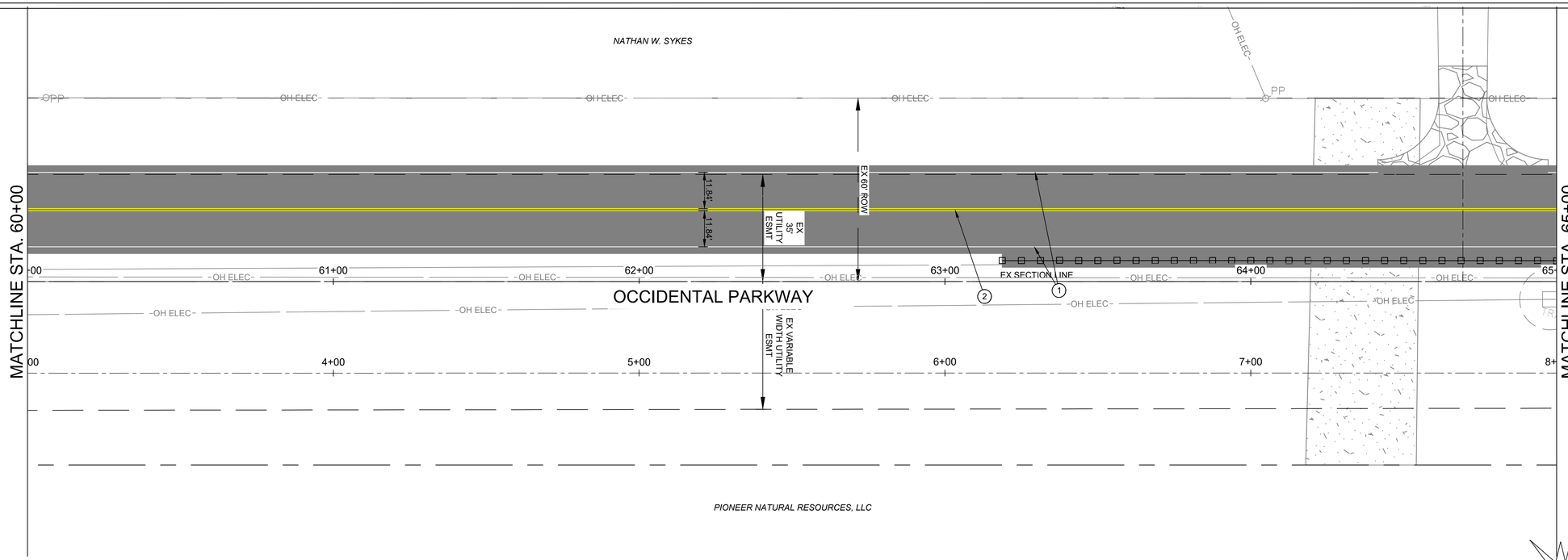
SHEET TITLE

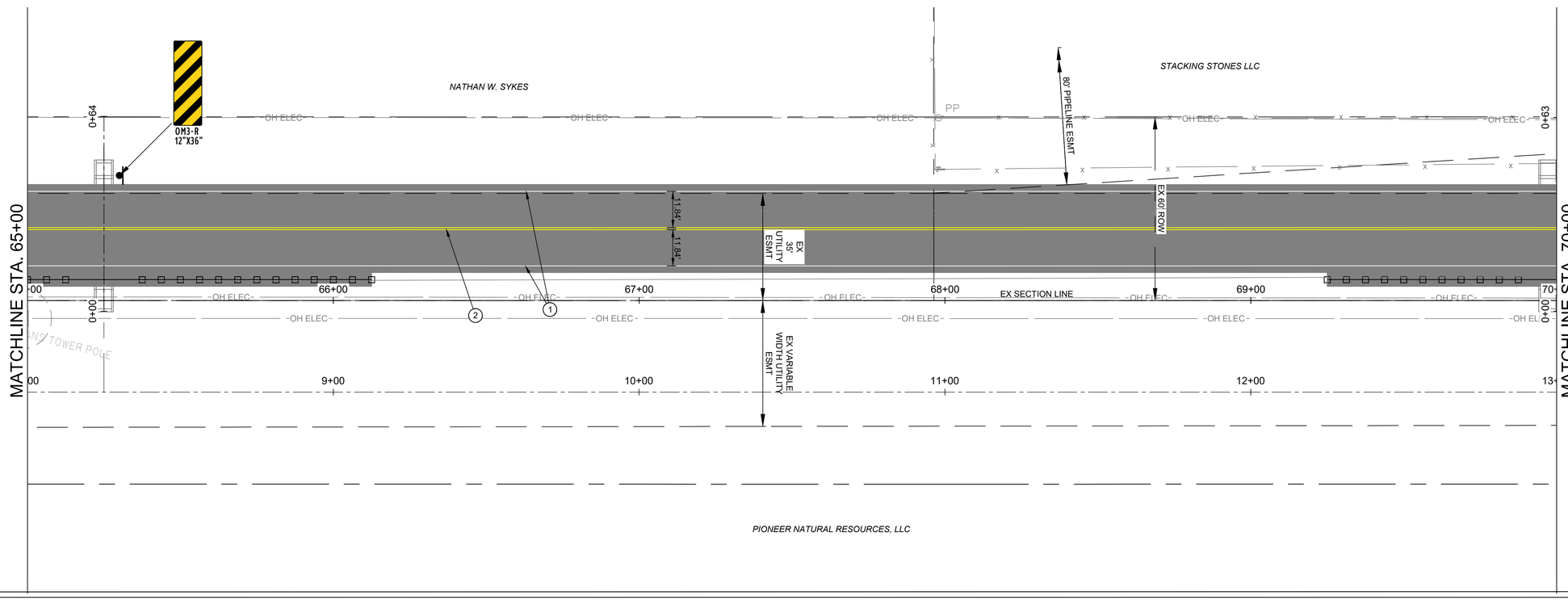
PAVEMENT MARKINGS AND SIGN

STA 50+00 TO STA 60+00

SHEET NUMBER 91 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C900-PMRK-45715.dwg DATE: August 13, 2024, TIME: 3:42 PM, USER: ah3453 AVO: 45715.006





0 20 40
SCALE IN FEET

N

LEGEND FOR PAVEMENT MARKINGS

1. 4" WHITE SOLID
2. 4" DOUBLE YELLOW SOLID W/ BUTTON SPACING @ 40'
3. 24" WHITE SOLID

CAUTION!!!
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MIDLAND, TEXAS

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TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

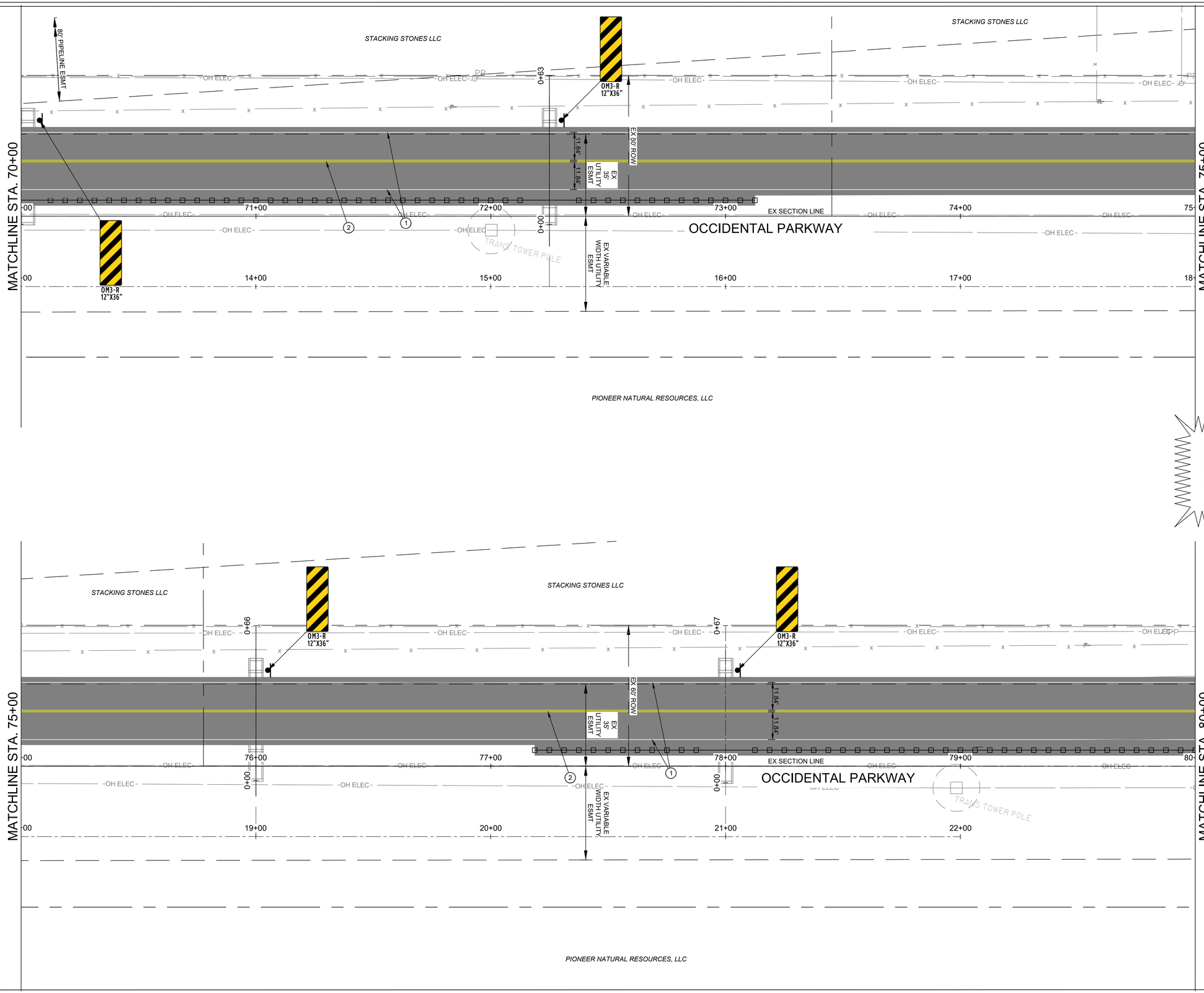
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

PAVEMENT MARKINGS AND SIGN
STA 60+00 TO STA 70+00

SHEET NUMBER 92 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C900-PMRK-45715.dwg DATE: August 13, 2024, TIME: 3:42 PM, USER: ah3453 AVO: 45715.006



LEGEND FOR PAVEMENT MARKINGS

1. 4" WHITE SOLID
2. 4" DOUBLE YELLOW SOLID W/ BUTTON SPACING @ 40'
3. 24" WHITE SOLID

CAUTION!!!
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TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

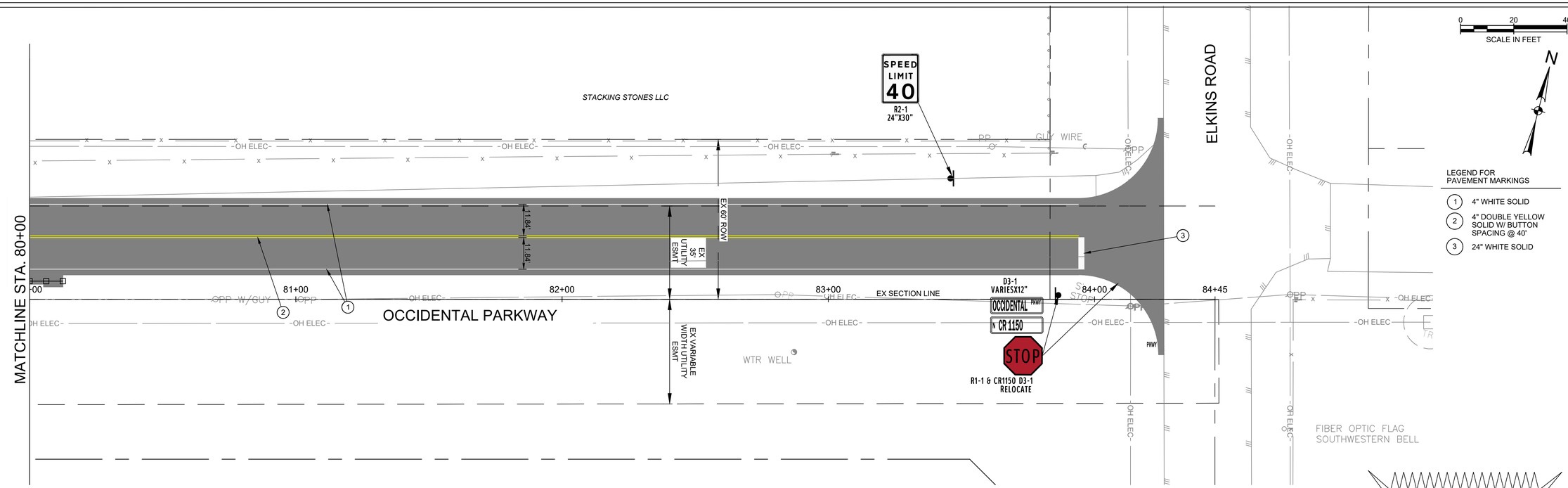
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

PAVEMENT MARKINGS AND SIGN
STA 70+00 TO STA 80+00

SHEET NUMBER 93 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C900-PMRK-45715.dwg DATE: August 13, 2024, TIME: 3:42 PM, USER: ah3453 AVO: 45715.006



CAUTION!!!
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OCCIDENTAL PARKWAY
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FORT WORTH, TEXAS 76137-2797
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TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

JACOB T HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

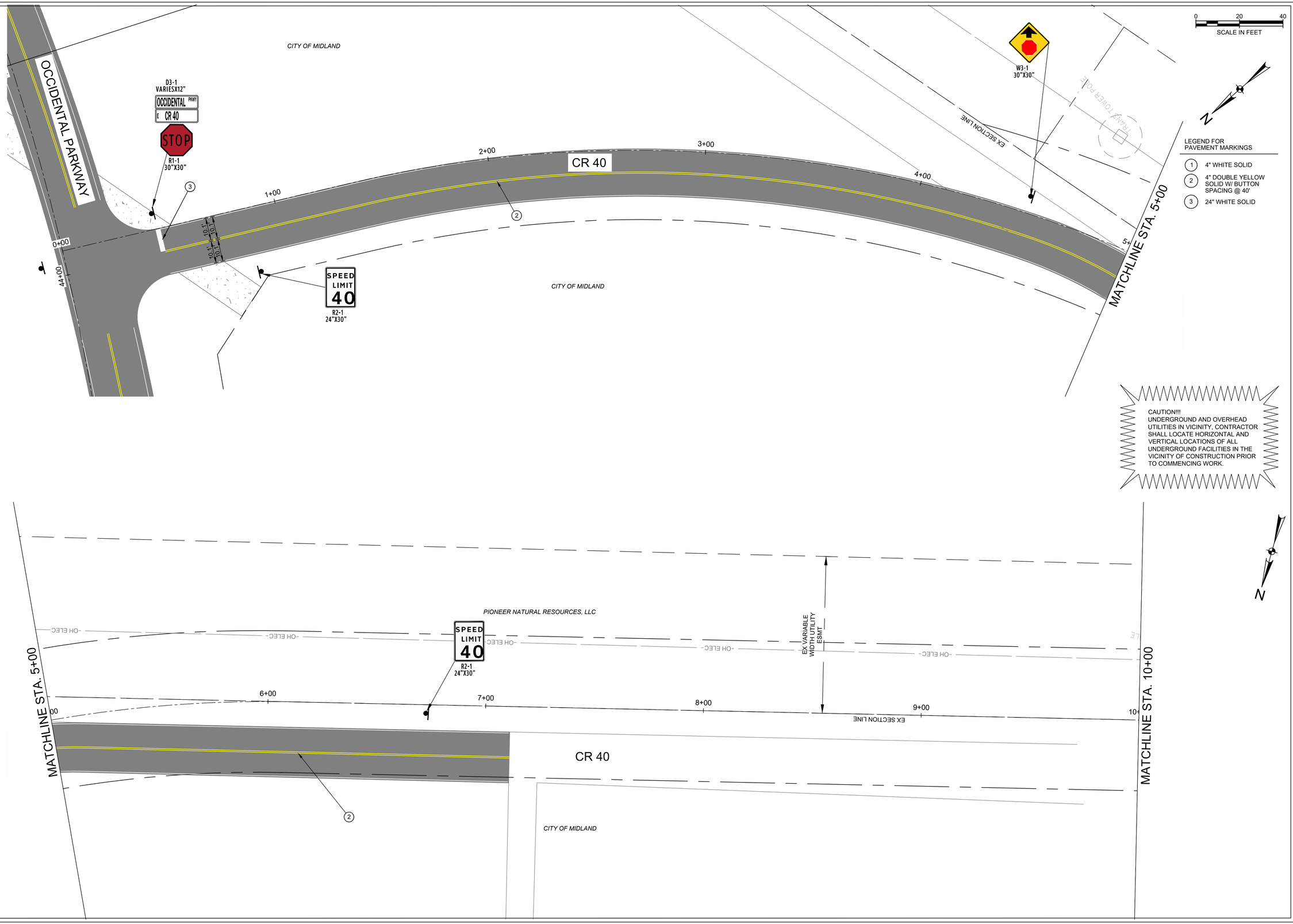
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

PAVEMENT MARKINGS AND SIGN
STA 80+00 TO END

SHEET NUMBER 94 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C900-PMRK-45715.dwg DATE: August 13, 2024, TIME: 3:42 PM, USER: ah3453 AVO: 45715.006



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

CITY OF MIDLAND
Engineering Services

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FORT WORTH, TEXAS 76137-2797
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TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

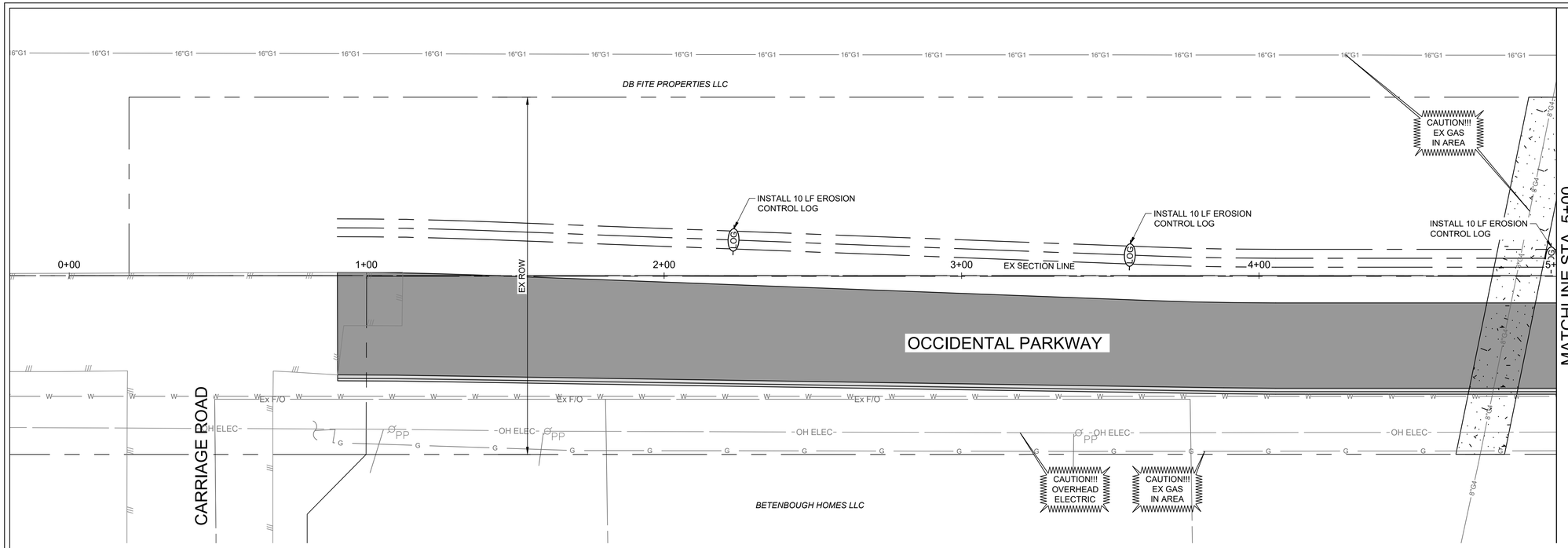
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

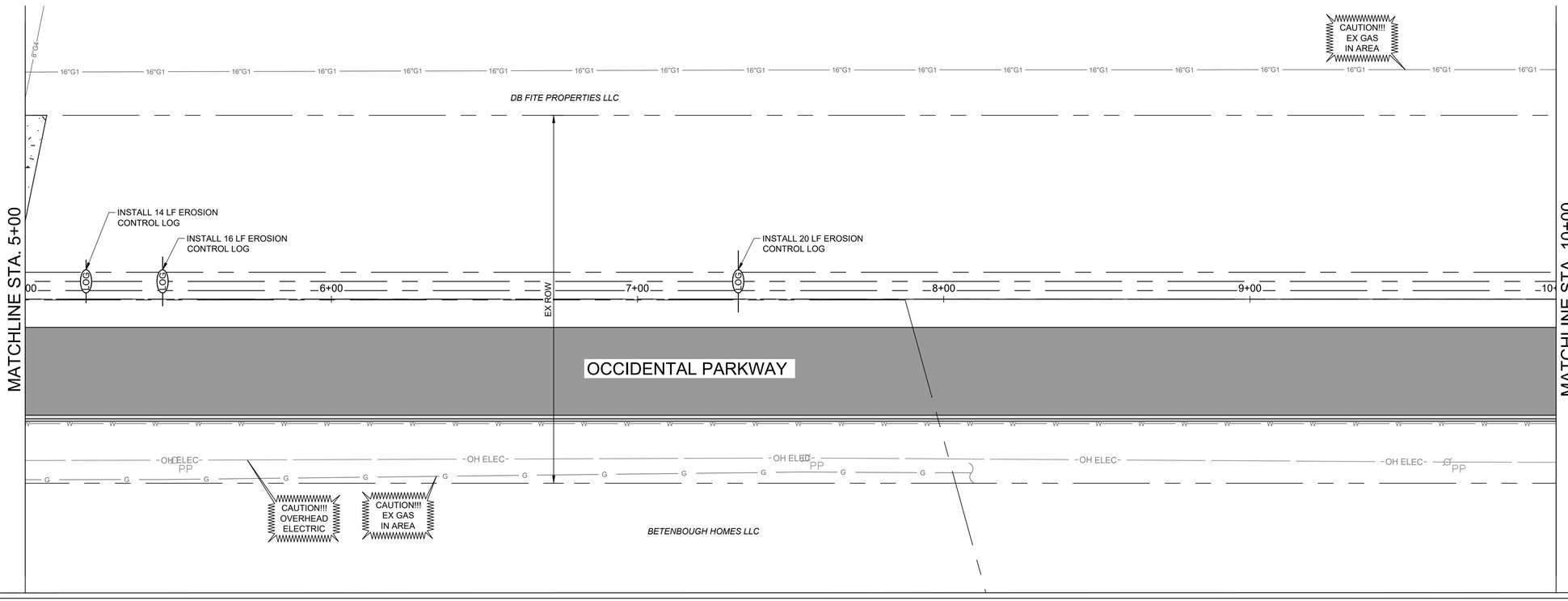
SHEET TITLE

PAVEMENT MARKINGS AND SIGN
CR40 BEGIN TO END

SHEET NUMBER 95 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C900-PMRK-45715.dwg DATE: August 13, 2024, TIME: 3:42 PM, USER: ah3453 AVO: 45715.006





N

0 20 40
SCALE IN FEET

LEGEND:

- ROCK RIPRAP
- RFB — ROCK FILTER BERM
- LOG — EROSION CONTROL LOG
- SF — SILT FENCE

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

NOTES:

1. REFER TO EROSION CONTROL NOTES AND REQUIREMENTS ON SHEET 2.

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817)847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB HATT 127558 LICENSED PROFESSIONAL ENGINEER

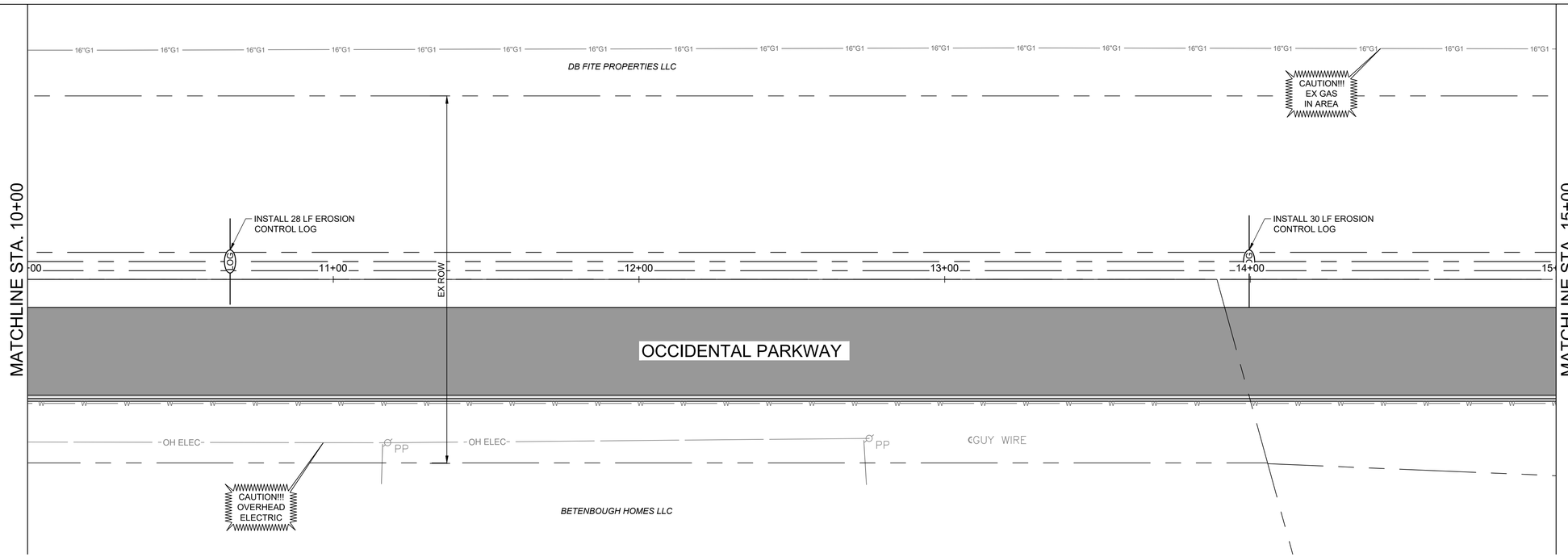
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

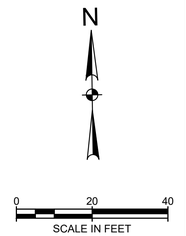
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE
OCCIDENTAL EROSION CONTROL PLANS BEGIN TO STA 10+00

SHEET NUMBER 96 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C1000-ERCN-45715.dwg DATE: August 13, 2024, TIME: 3:42 PM, USER: ah3453 AVO: 45715.006





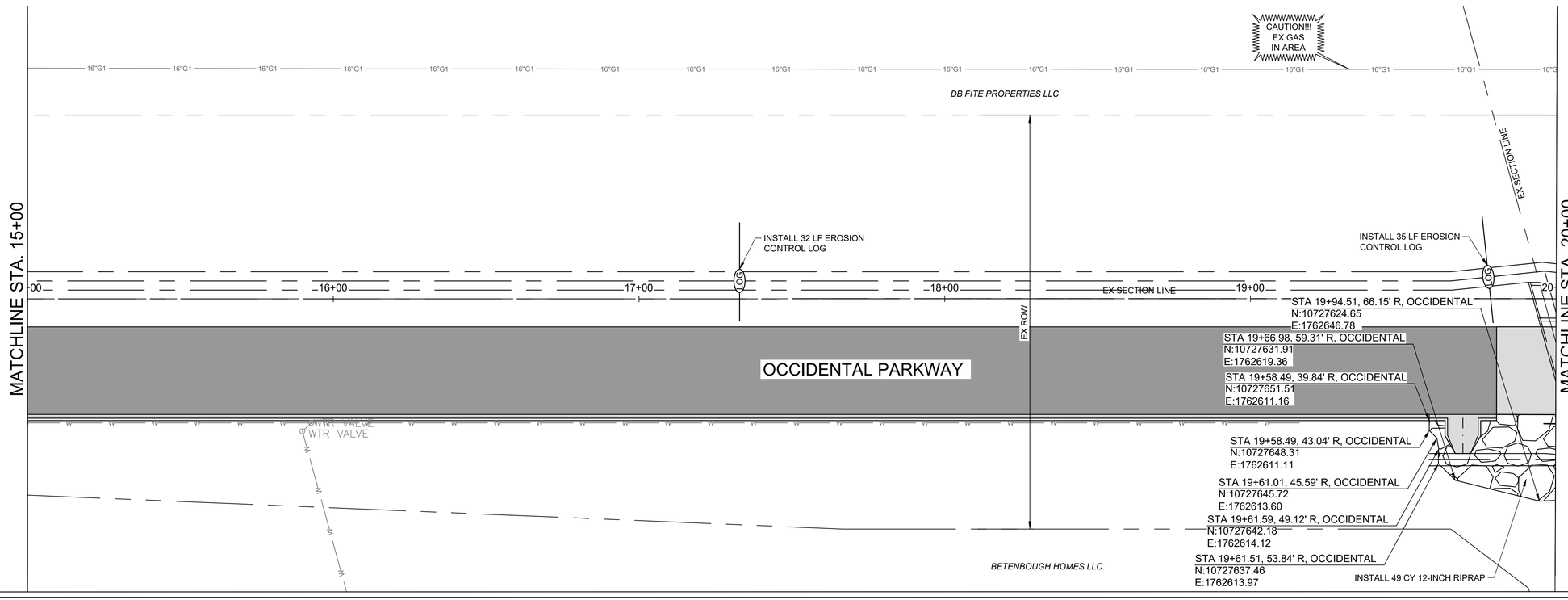
LEGEND:

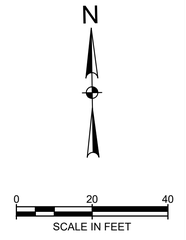
- ROCK RIPRAP
- RFB — ROCK FILTER BERM
- LOG — EROSION CONTROL LOG
- SF — SILT FENCE

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

NOTES:

1. REFER TO EROSION CONTROL NOTES AND REQUIREMENTS ON SHEET 2.





OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB TAYLOR HALFF 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

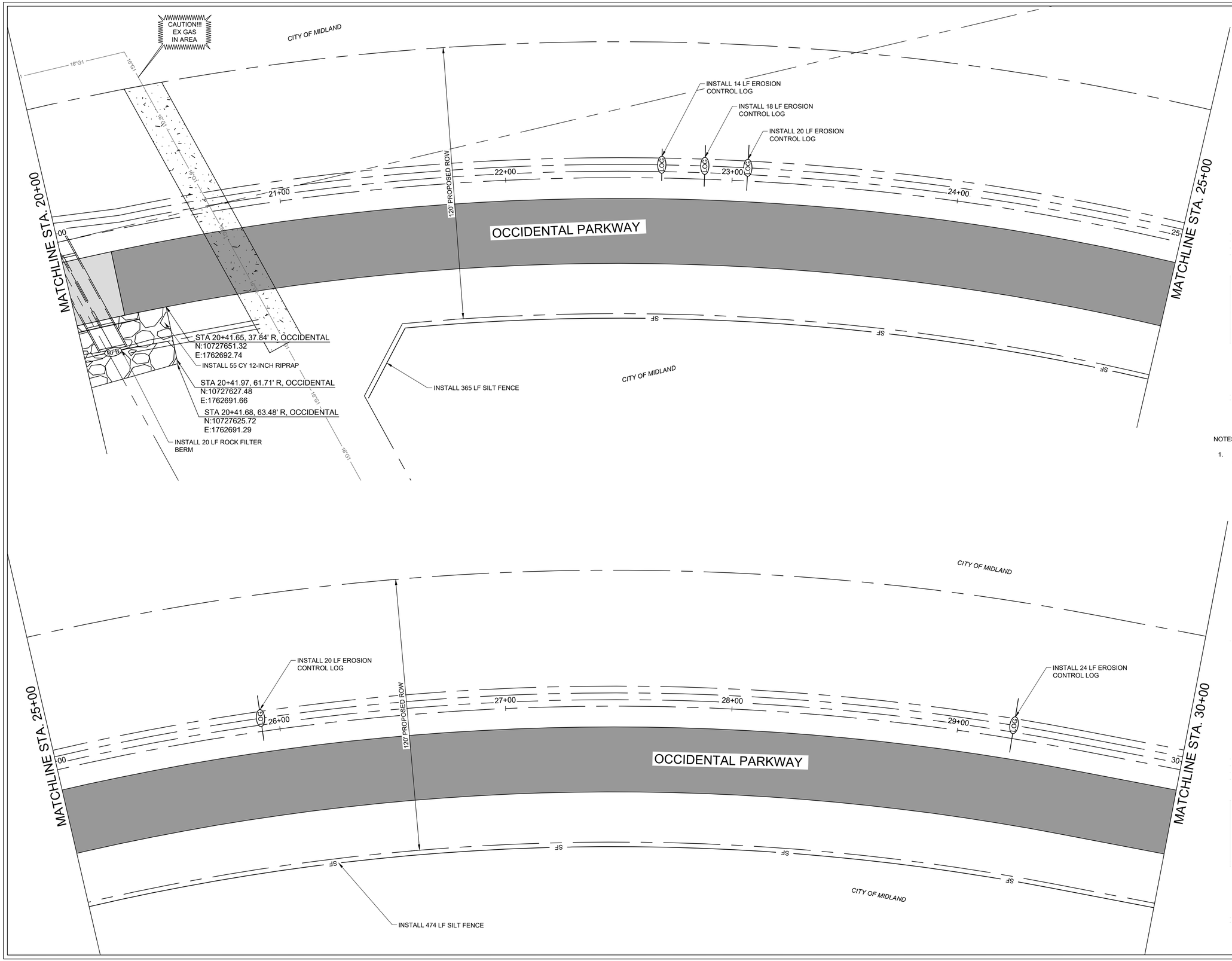
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

OCCIDENTAL EROSION CONTROL PLANS
STA 10+00 TO STA 20+00

SHEET NUMBER 97 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C1000-ERCN-45715.dwg DATE: August 13, 2024, TIME: 3:43 PM, USER: ah3453 AVO: 45715.006



NOTES:

1. REFER TO EROSION CONTROL NOTES AND REQUIREMENTS ON SHEET 2.

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

CITY OF MIDLAND
Engineering Services

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL: 817.847.1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
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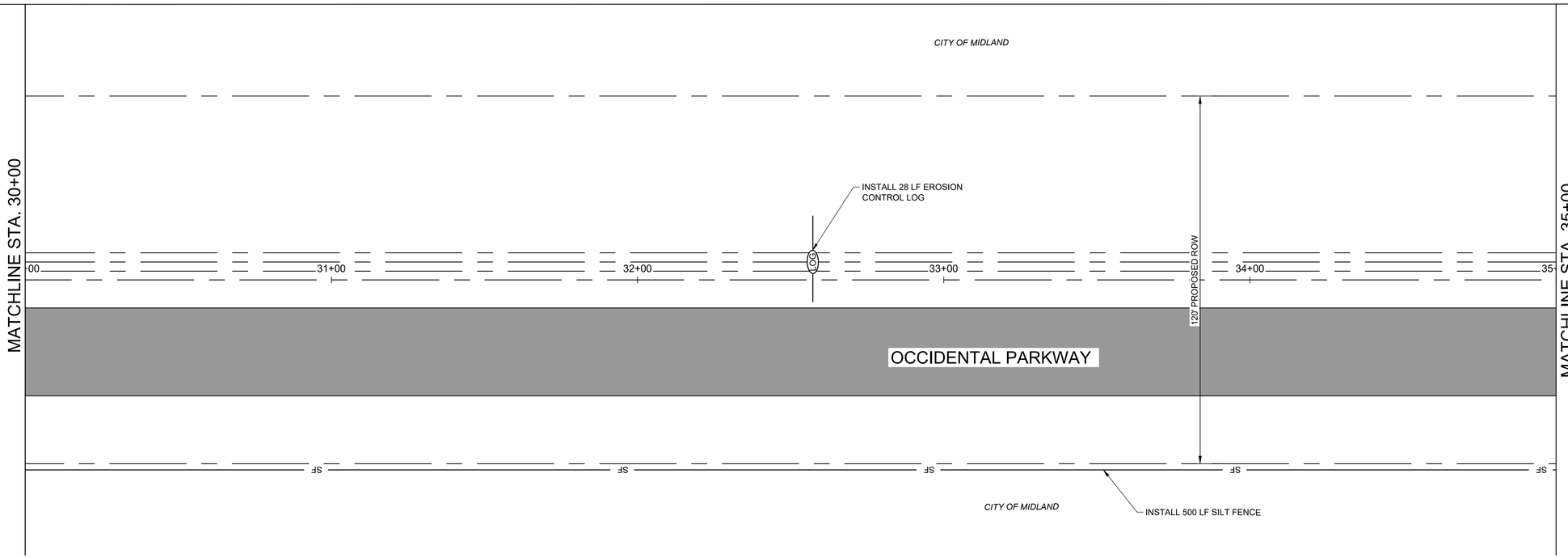
CHECKED BY:	JTH
SCALE:	AS NOTED

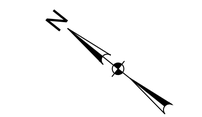
SHEET TITLE

OCCIDENTAL EROSION CONTROL PLANS
STA 20+00 TO STA 30+00

SHEET NUMBER 98 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C1000-ERCN-45715.dwg DATE: August 13, 2024, TIME: 3:43 PM, USER: ah3453 AVO: 45715.006





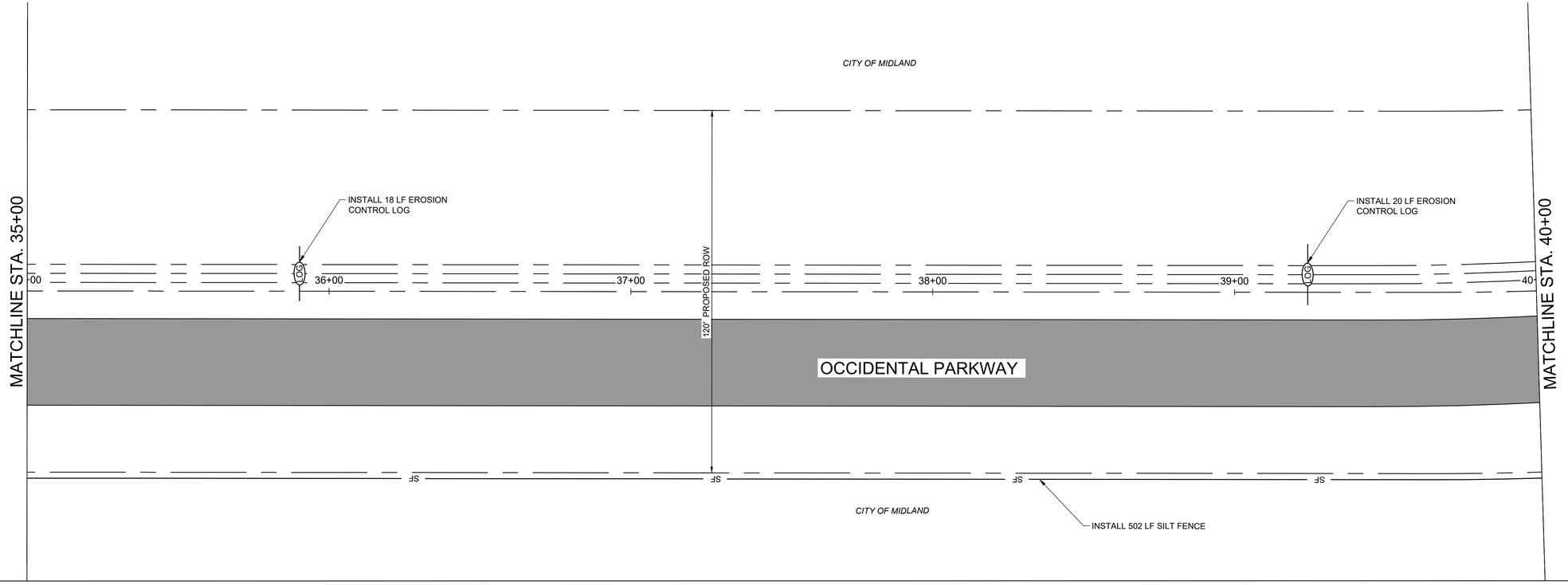
LEGEND:

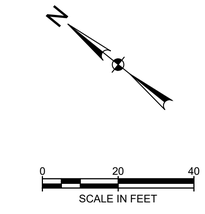
- ROCK RIPRAP
- RFB — ROCK FILTER BERM
- LOG — EROSION CONTROL LOG
- SF — SILT FENCE

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

NOTES:

1. REFER TO EROSION CONTROL NOTES AND REQUIREMENTS ON SHEET 2.





OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
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TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HALFF 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
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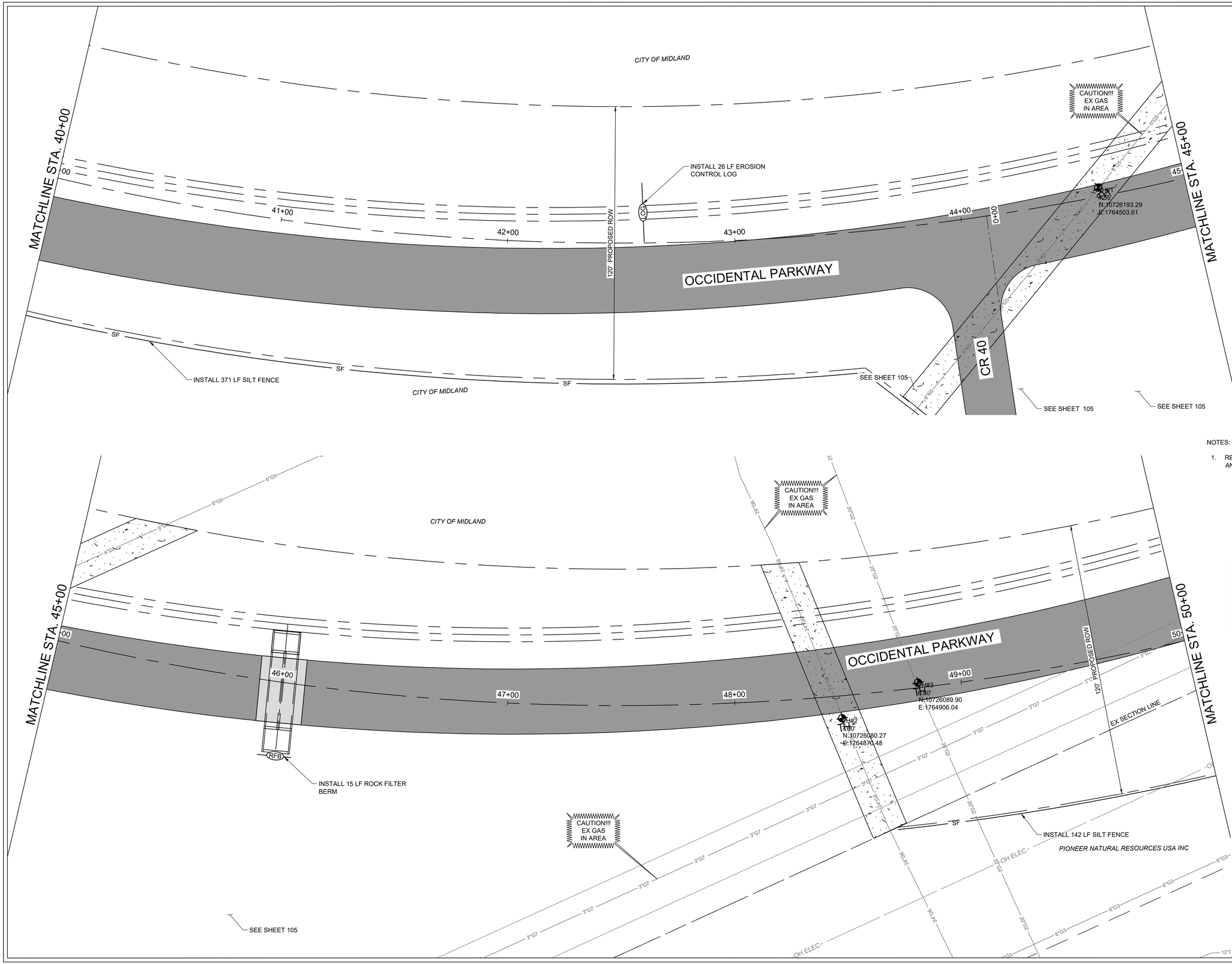
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

OCCIDENTAL EROSION CONTROL PLANS
STA 30+00 TO STA 40+00

SHEET NUMBER 99 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C1000-ERCN-45715.dwg DATE: August 13, 2024, TIME: 3:43 PM, USER: ah3453 AVO: 45715.006



LEGEND:

- ROCK RIPRAP
- RFB — ROCK FILTER BERM
- LOG — EROSION CONTROL LOG
- SF — SILT FENCE

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

NOTES:

1. REFER TO EROSION CONTROL NOTES AND REQUIREMENTS ON SHEET 2.

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

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REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
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PROJECT NO.:	45715.006
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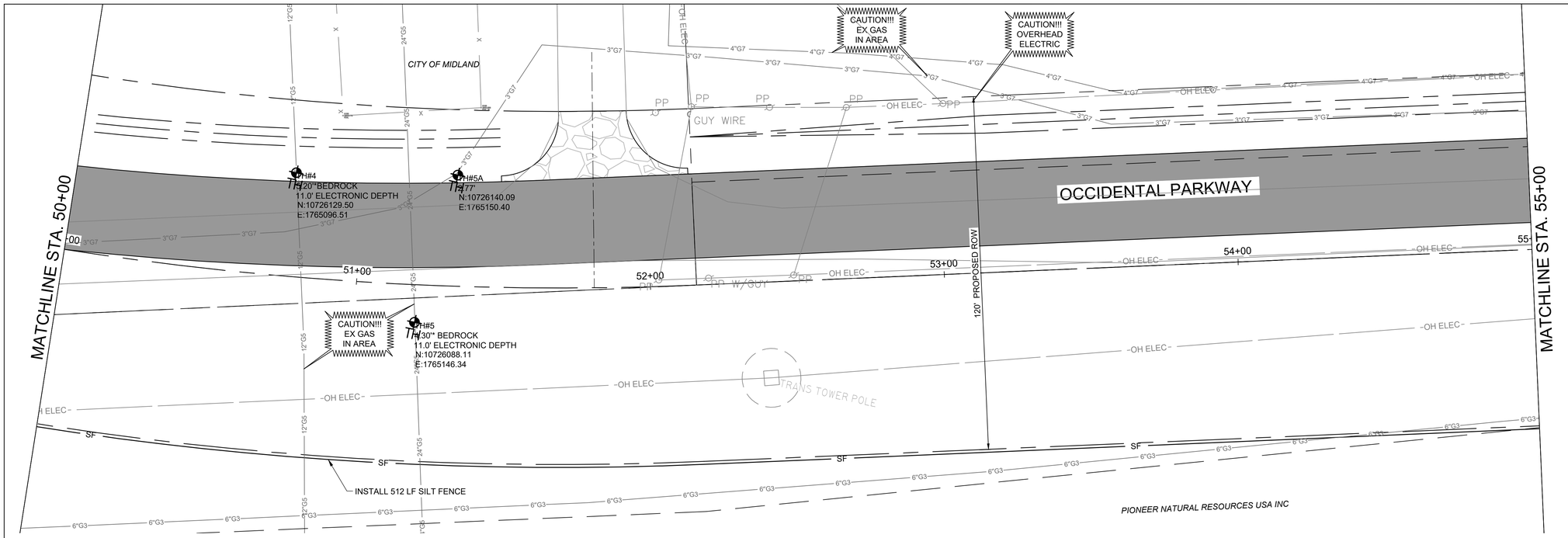
SCALE:	AS NOTED

SHEET TITLE

OCCIDENTAL EROSION CONTROL PLANS
STA 40+00 TO STA 50+00

SHEET NUMBER 100 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C1000-ERCN-45715.dwg DATE: August 13, 2024, TIME: 3:43 PM, USER: ah3453 AVO: 45715.006



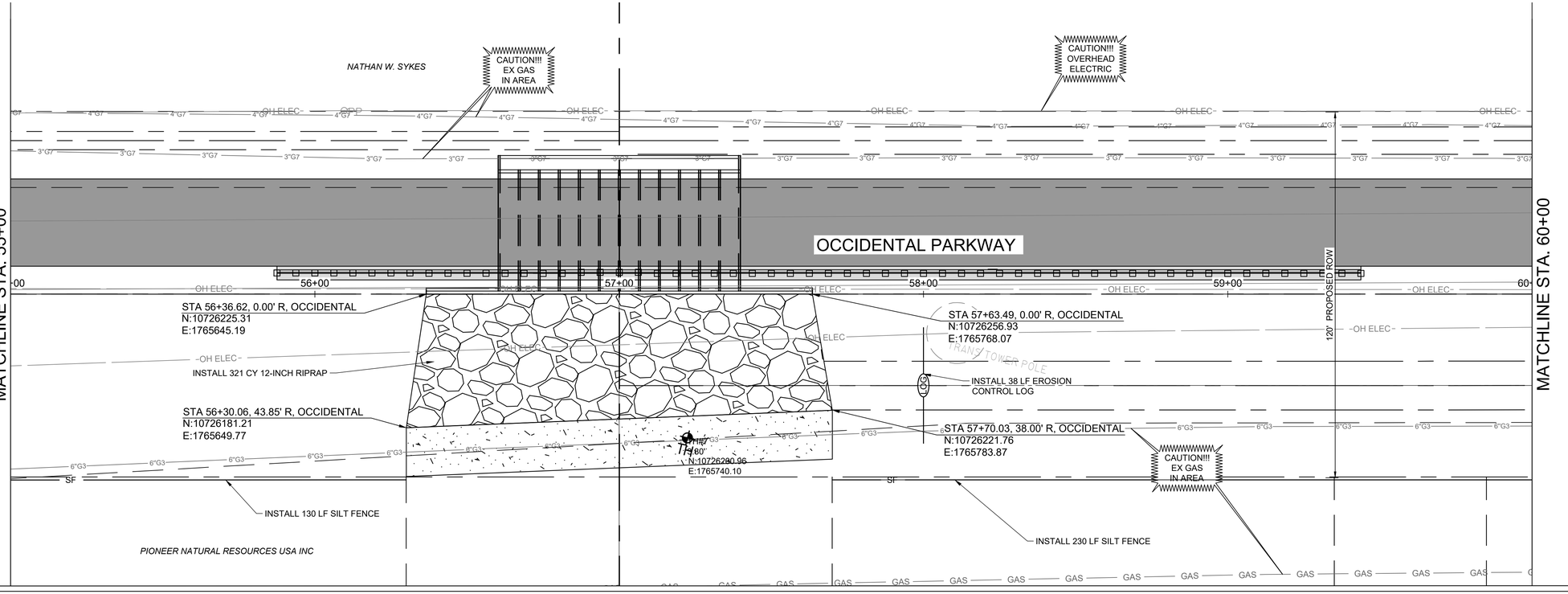
LEGEND:

- ROCK RIPRAP
- RFB — ROCK FILTER BERM
- LOG — EROSION CONTROL LOG
- SF — SILT FENCE

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

NOTES:

1. REFER TO EROSION CONTROL NOTES AND REQUIREMENTS ON SHEET 2.



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL: 817.847.1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JASON T. HALFF 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

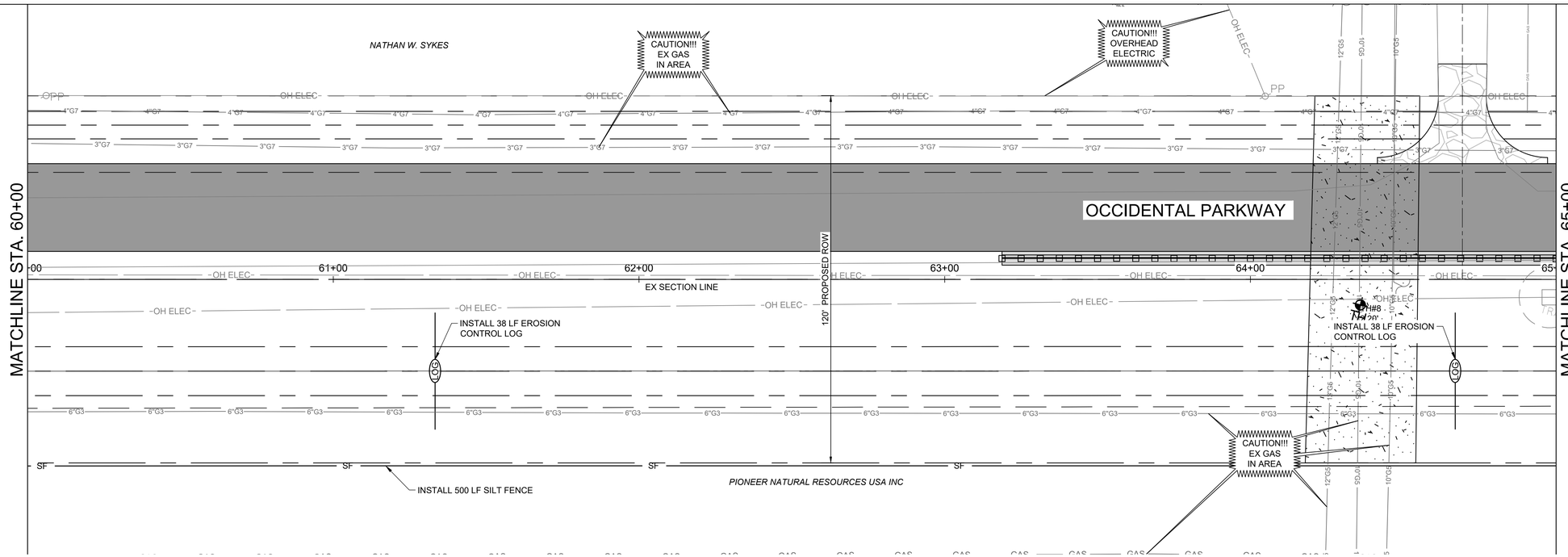
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

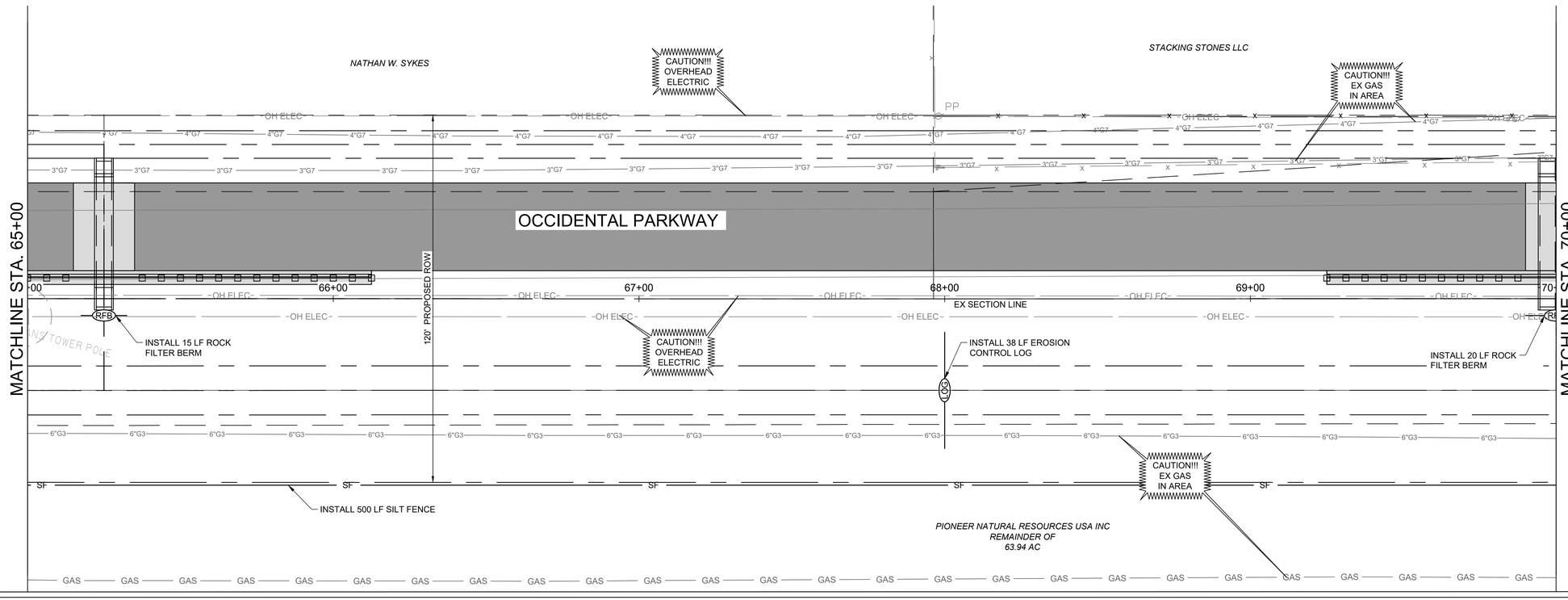
SHEET TITLE

OCCIDENTAL EROSION CONTROL PLANS
STA 50+00 TO STA 60+00

SHEET NUMBER 101 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C1000-ERCN-45715.dwg DATE: August 13, 2024, TIME: 3:43 PM, USER: ah3453 AVO: 45715.006





N

0 20 40
SCALE IN FEET

LEGEND:

- ROCK RIPRAP
- RFB — ROCK FILTER BERM
- LOG — EROSION CONTROL LOG
- SF — SILT FENCE

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

NOTES:

1. REFER TO EROSION CONTROL NOTES AND REQUIREMENTS ON SHEET 2.

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HALFF 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

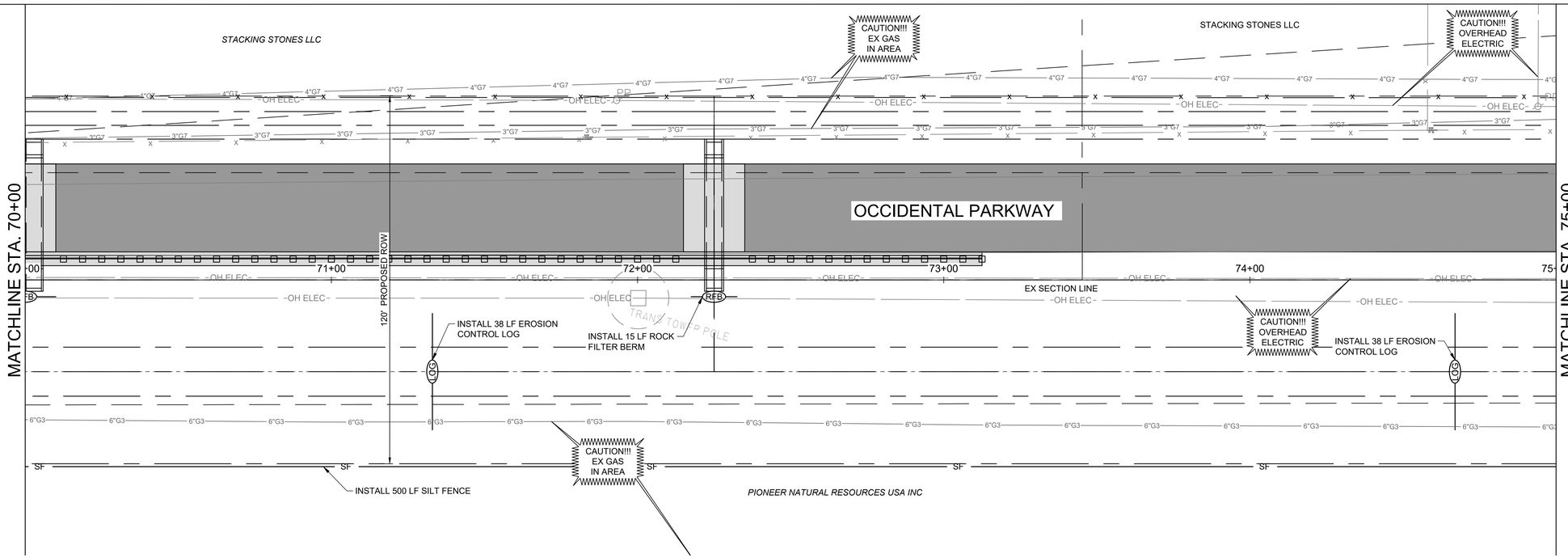
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

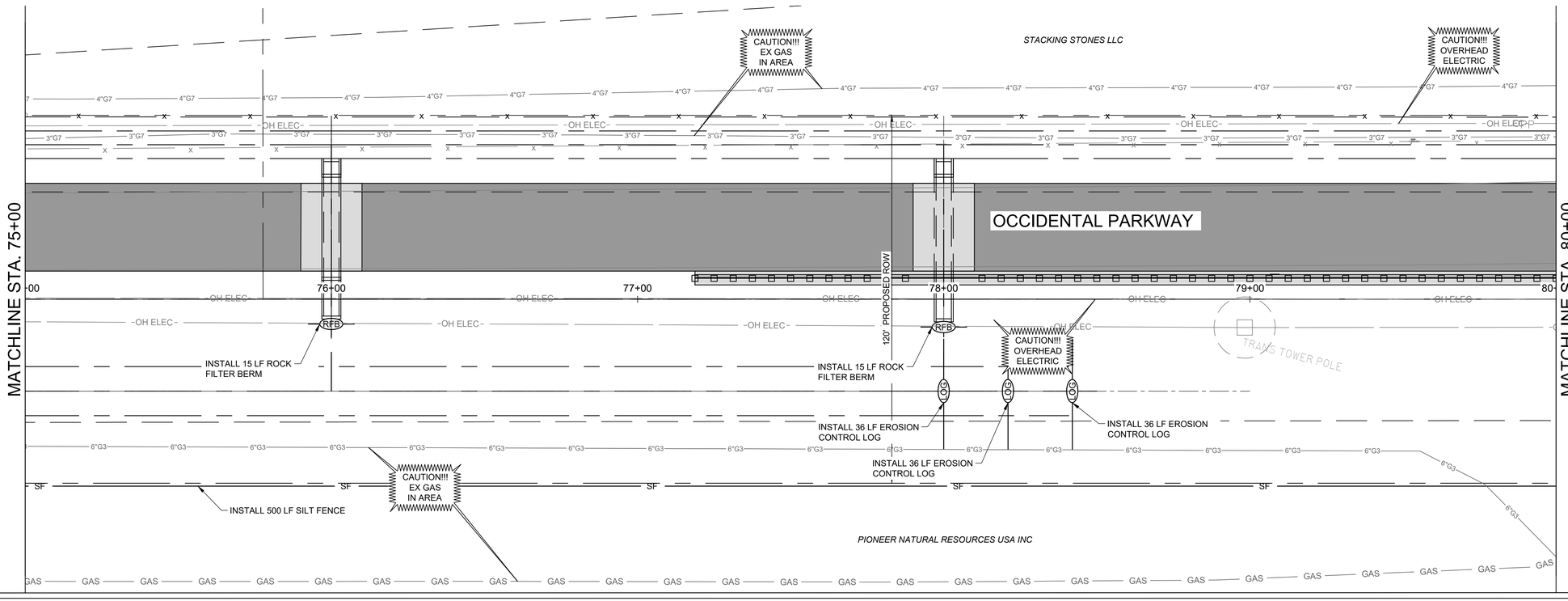
SHEET TITLE

OCCIDENTAL EROSION CONTROL PLANS
STA 60+00 TO STA 70+00

SHEET NUMBER 102 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C1000-ERCN-45715.dwg DATE: August 13, 2024, TIME: 3:43 PM, USER: ah3453 AVO: 45715.006





N

0 20 40
SCALE IN FEET

LEGEND:

- ROCK RIPRAP
- RFB — ROCK FILTER BERM
- LOG — EROSION CONTROL LOG
- SF — SILT FENCE

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

NOTES:

1. REFER TO EROSION CONTROL NOTES AND REQUIREMENTS ON SHEET 2.

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB TAYLOR HALFF 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

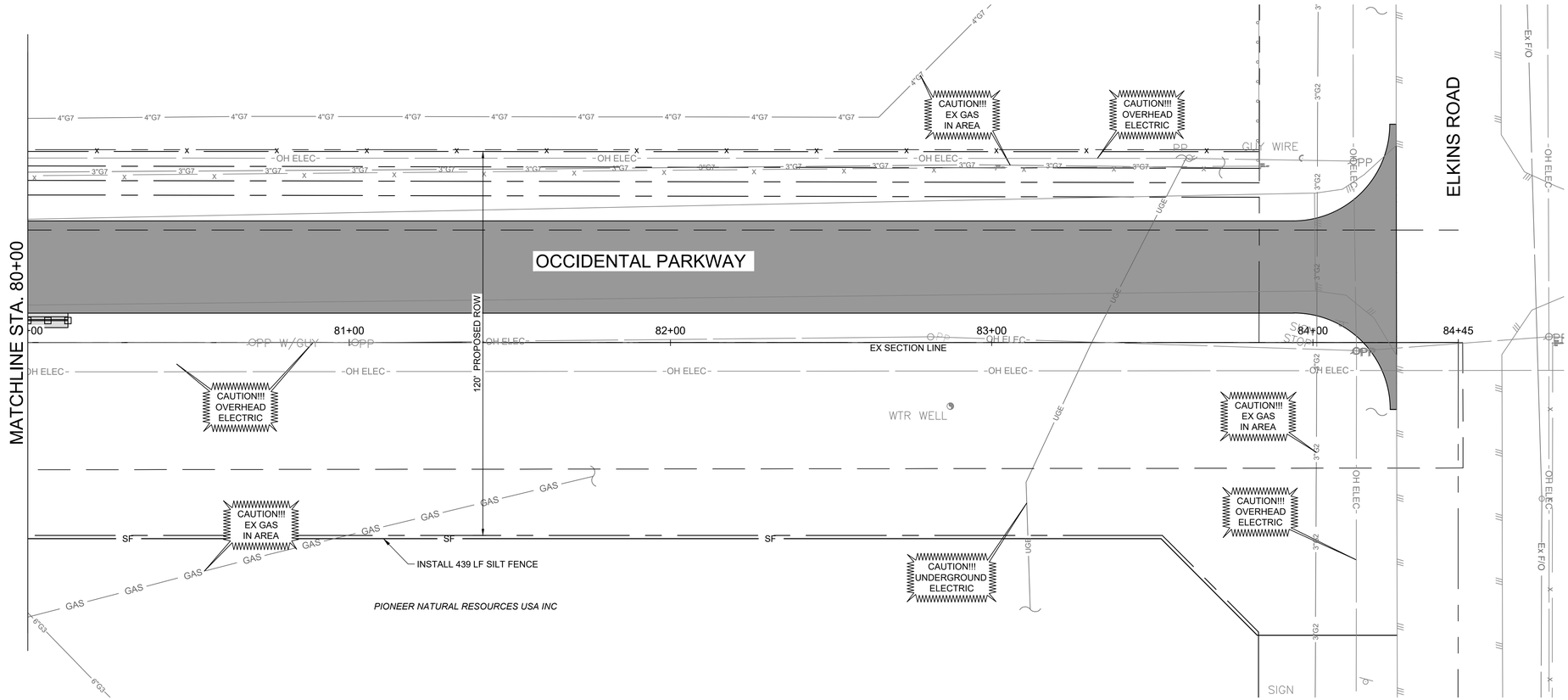
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

OCCIDENTAL EROSION CONTROL PLANS
STA 70+00 TO STA 80+00

SHEET NUMBER 103 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C1000-ERCN-45715.dwg DATE: August 13, 2024, TIME: 3:44 PM, USER: ah3453 AVO: 45715.006



N

0 20 40
SCALE IN FEET

LEGEND:

- ROCK RIPRAP
- RFB — ROCK FILTER BERM
- LOG — EROSION CONTROL LOG
- SF — SILT FENCE

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

NOTES:

1. REFER TO EROSION CONTROL NOTES AND REQUIREMENTS ON SHEET 2.

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

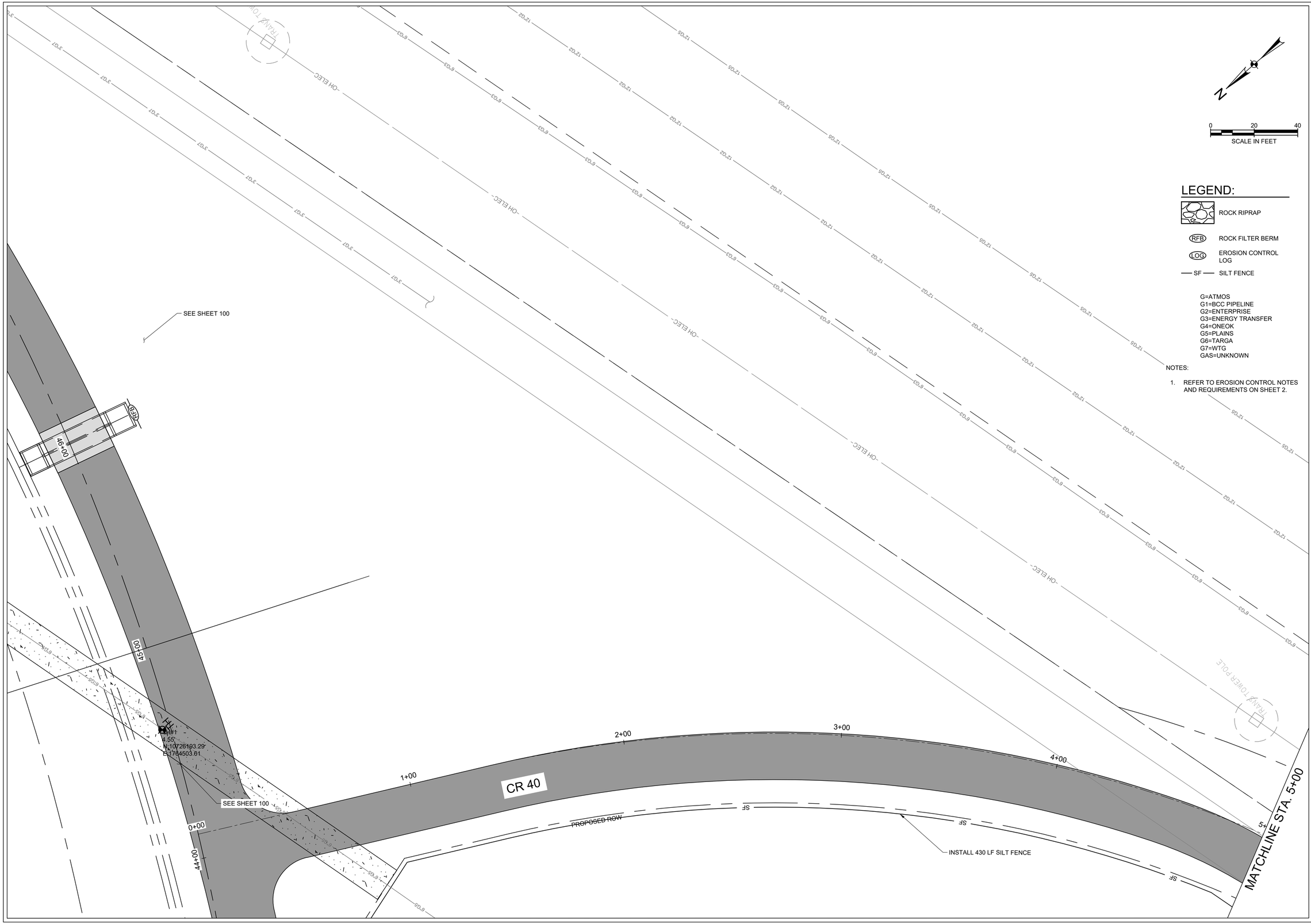
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

OCCIDENTAL EROSION CONTROL PLANS STA 80+00 TO END

SHEET NUMBER 104 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C1000-ERCN-45715.dwg DATE: August 13, 2024, TIME: 3:44 PM, USER: ah3453 AVO: 45715.006



OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HATF
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

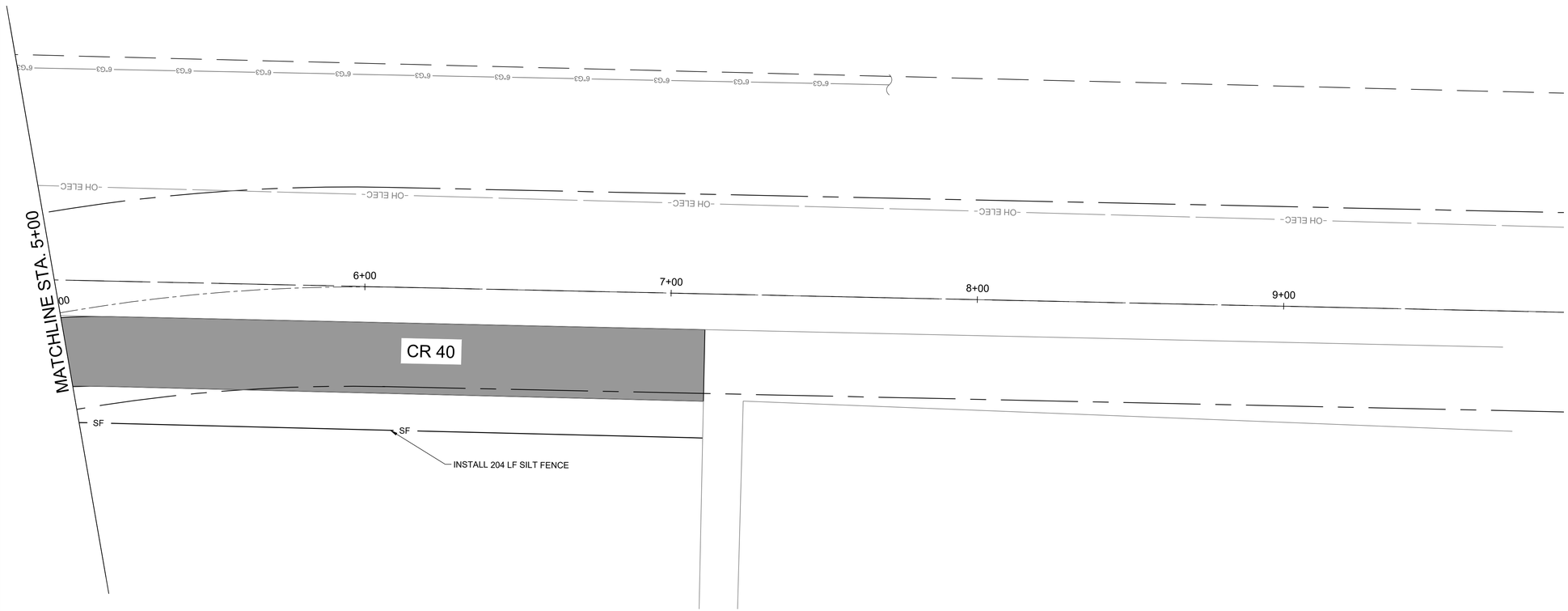
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

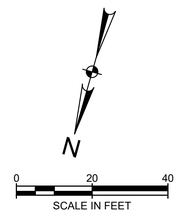
SHEET TITLE

CR 40 EROSION CONTROL PLANS
STA 0+00 TO END

SHEET NUMBER 105 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C1000-ERCN-45715.dwg DATE: August 13, 2024, TIME: 3:44 PM, USER: ah3453 AVO: 45715.006





LEGEND:

- ROCK RIPRAP
- (RFB) ROCK FILTER BERM
- (LOG) EROSION CONTROL LOG
- —SF— SILT FENCE

G=ATMOS
G1=BCC PIPELINE
G2=ENTERPRISE
G3=ENERGY TRANSFER
G4=ONEOK
G5=PLAINS
G6=TARGA
G7=WTG
GAS=UNKNOWN

NOTES:

1. REFER TO EROSION CONTROL NOTES AND REQUIREMENTS ON SHEET 2.

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HATT
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CR 40 EROSION CONTROL PLANS
STA 5+00 TO END

SHEET NUMBER 106 OF 217

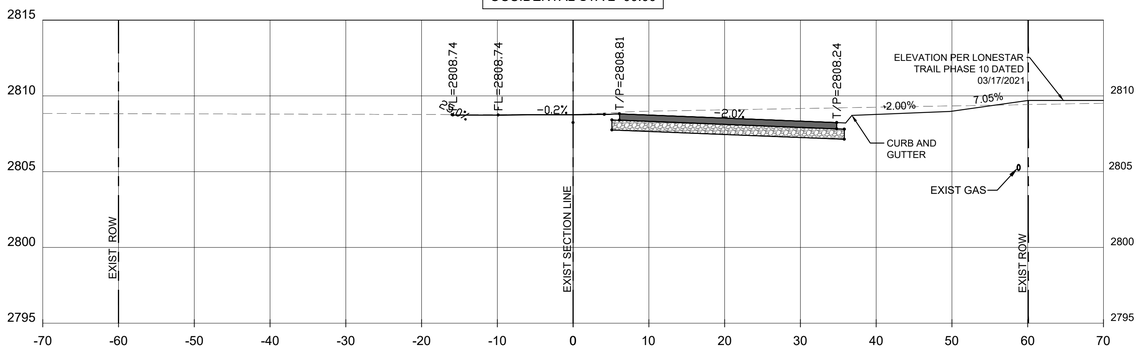
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C1000-ERCN-45715.dwg DATE: August 13, 2024, TIME: 3:44 PM, USER: at3453 AVO: 45715.006

NOTES:

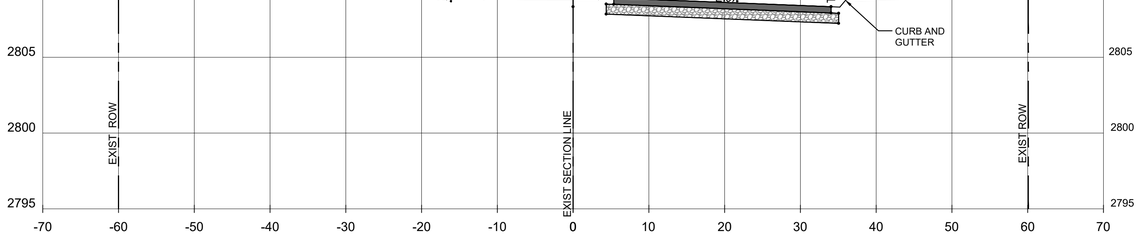
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

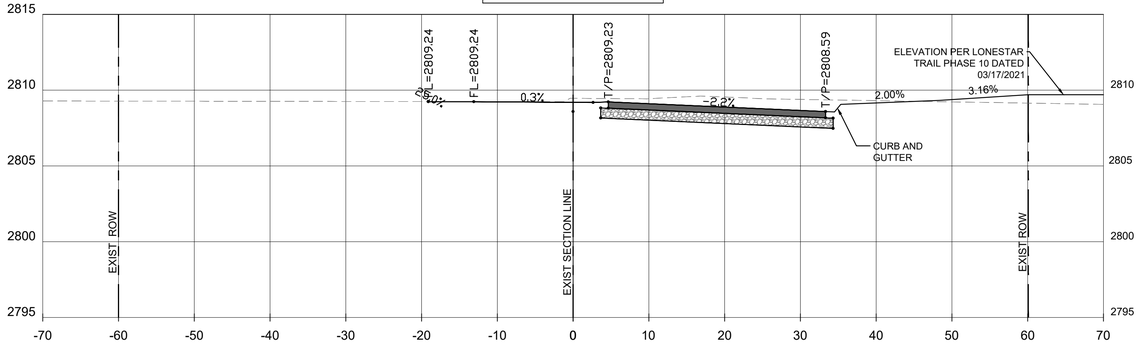
OCCIDENTAL STA 2+00.00



OCCIDENTAL STA 1+50.00



OCCIDENTAL STA 1+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

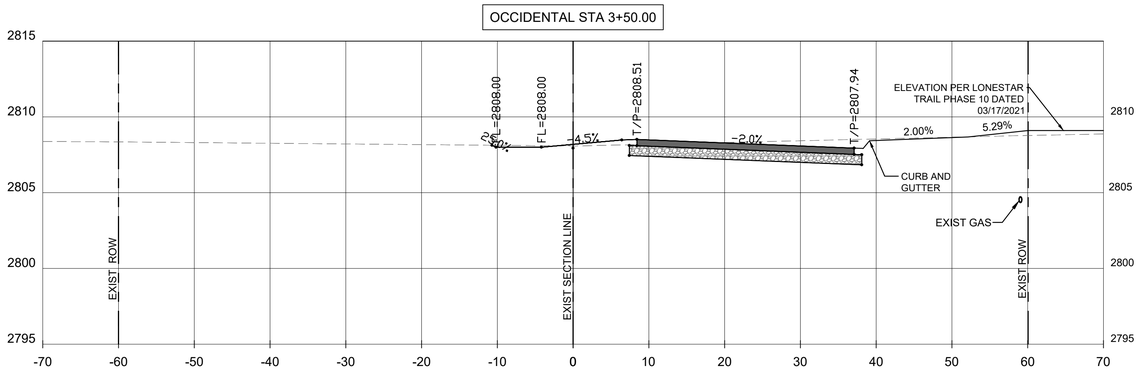
SHEET TITLE

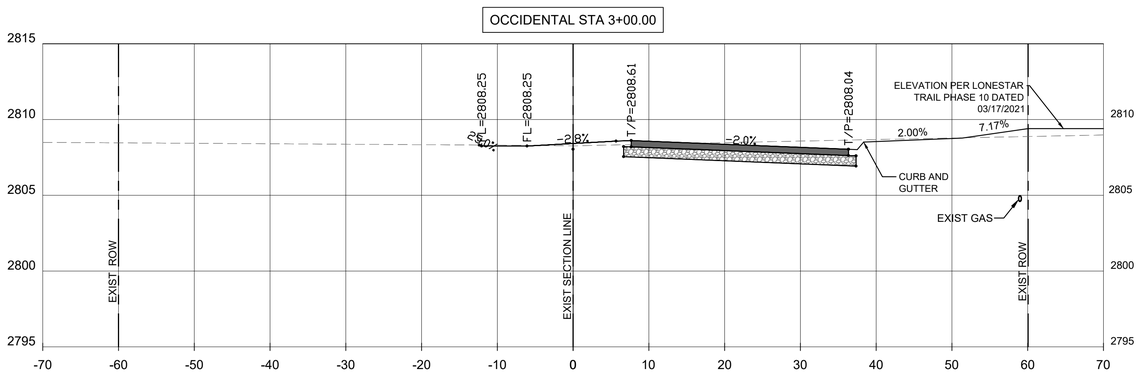
CROSS SECTIONS
STA 1+00 TO 2+00

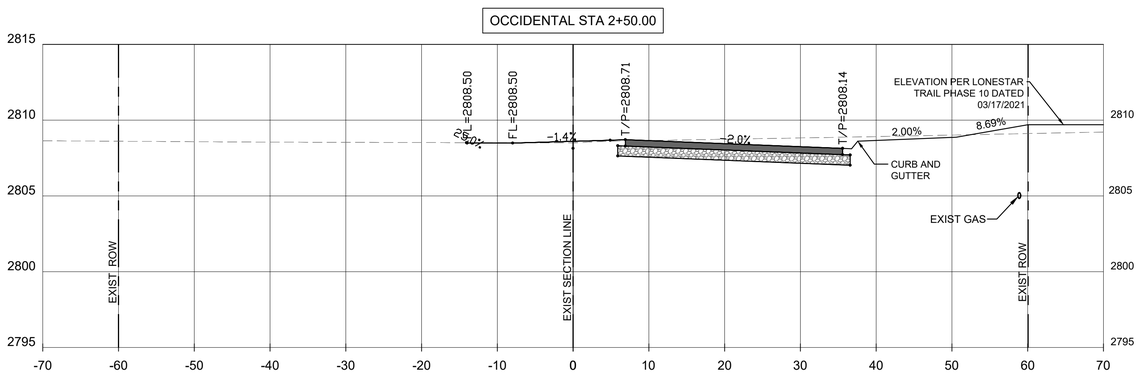
SHEET NUMBER 107 OF 217

NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**
2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.







SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

JACOB T. HATF
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 2+50 TO 3+50

SHEET NUMBER 108 OF 217

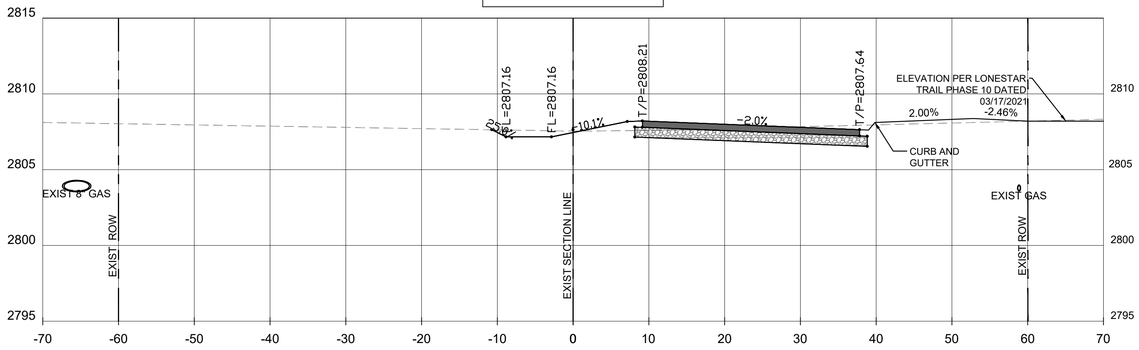
FILE NAME: A:\45000s\45715006\CADDSheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:44 PM, USER: ah3453 AVO: 45715.006

NOTES:

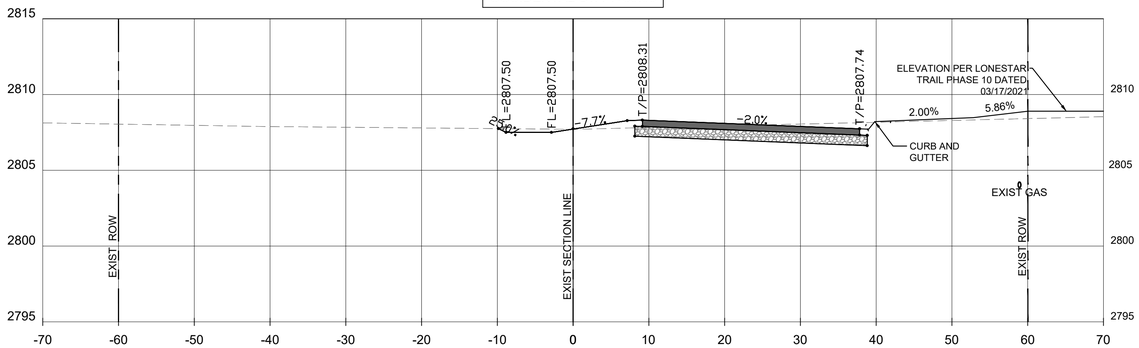
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

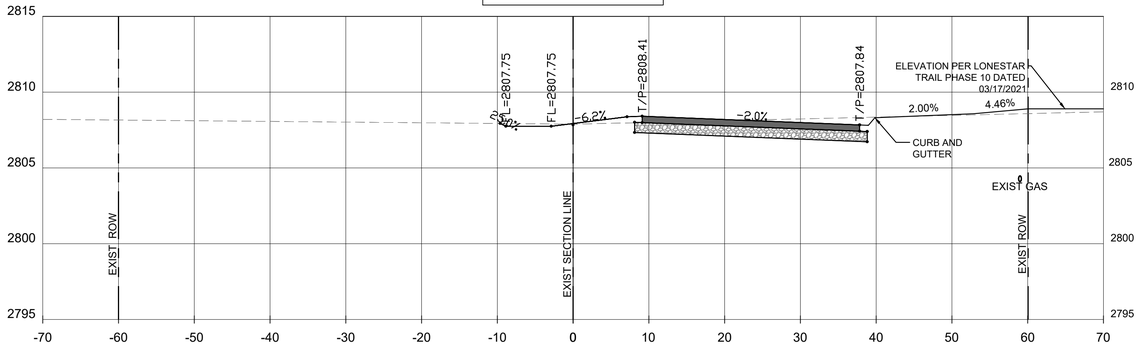
OCCIDENTAL STA 5+00.00



OCCIDENTAL STA 4+50.00



OCCIDENTAL STA 4+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JOSEPH T. HALFF
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 4+00 TO 5+00

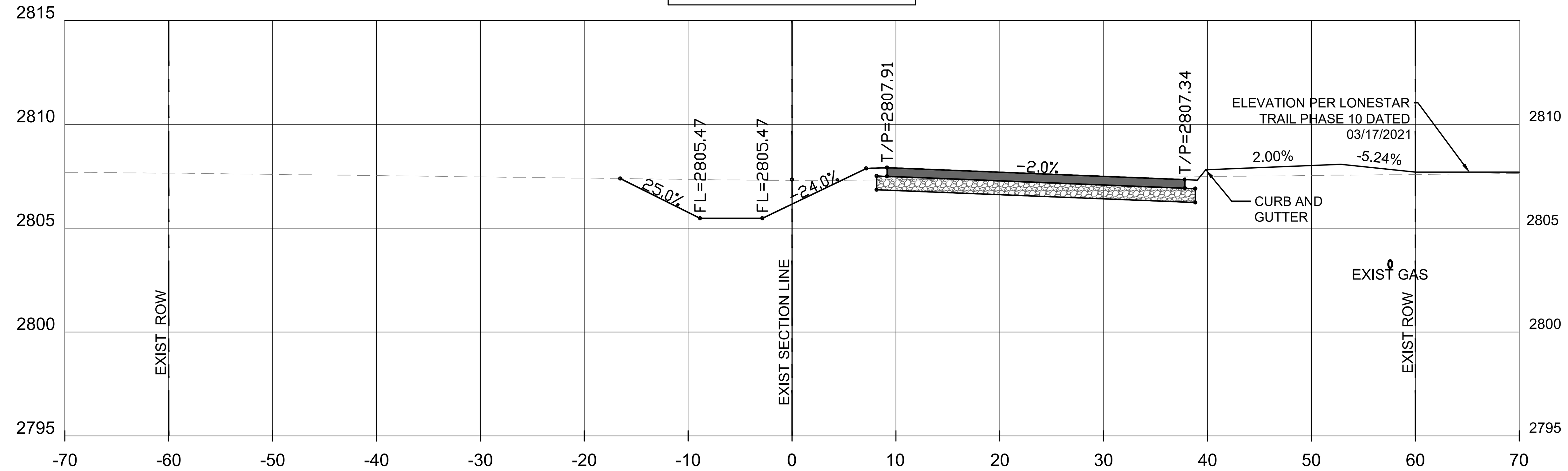
SHEET NUMBER 109 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:45 PM, USER: ajh3453 AVO: 45715.006

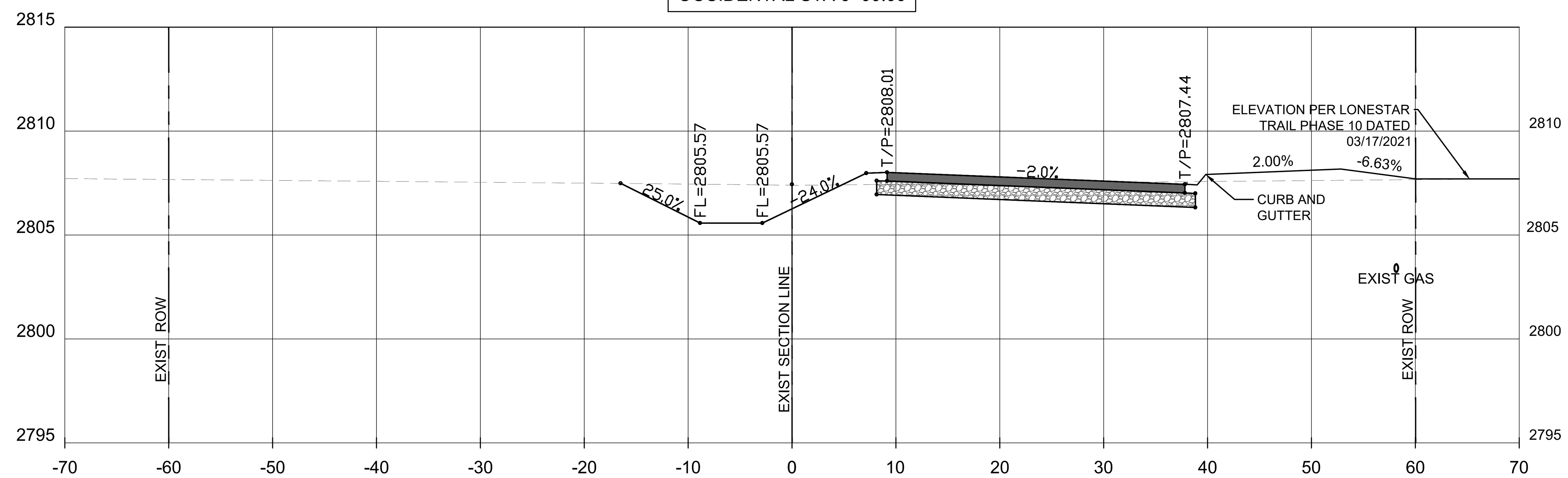
NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**
2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

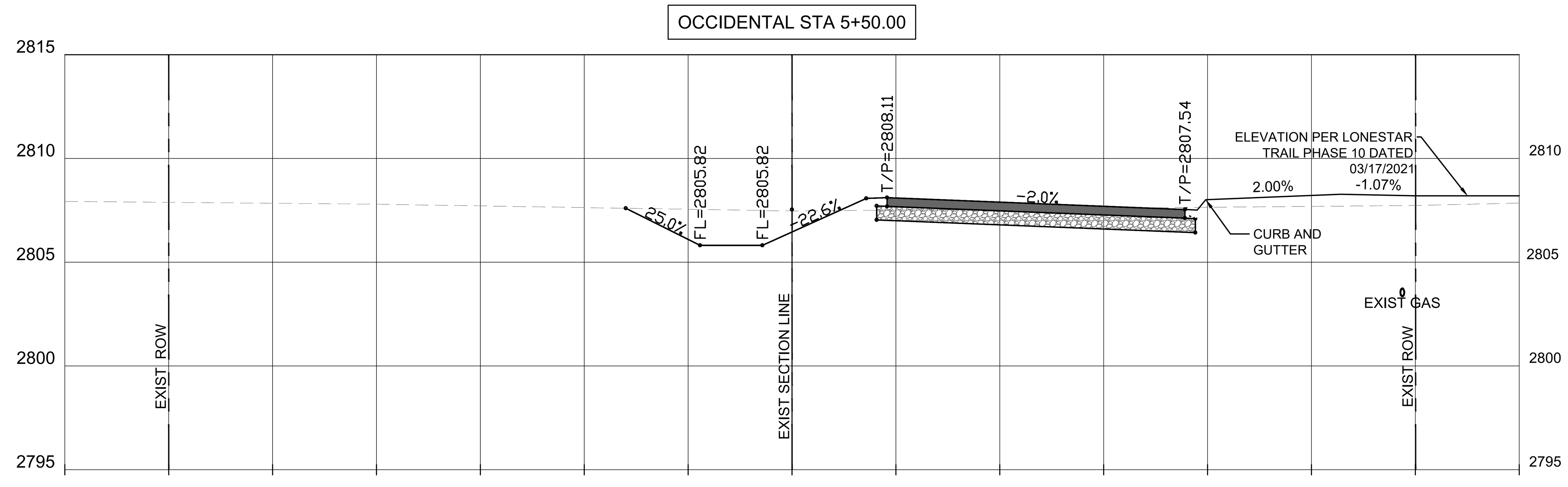
OCCIDENTAL STA 6+50.00



OCCIDENTAL STA 6+00.00



OCCIDENTAL STA 5+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION		
NO.	DATE	DESCRIPTION

JACOB T. HAYS
127556
LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

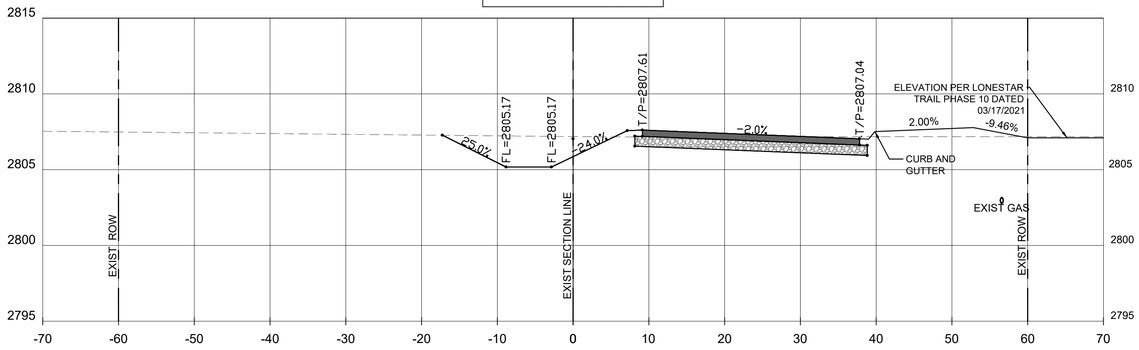
CROSS SECTIONS
STA 5+50 TO 6+50

NOTES:

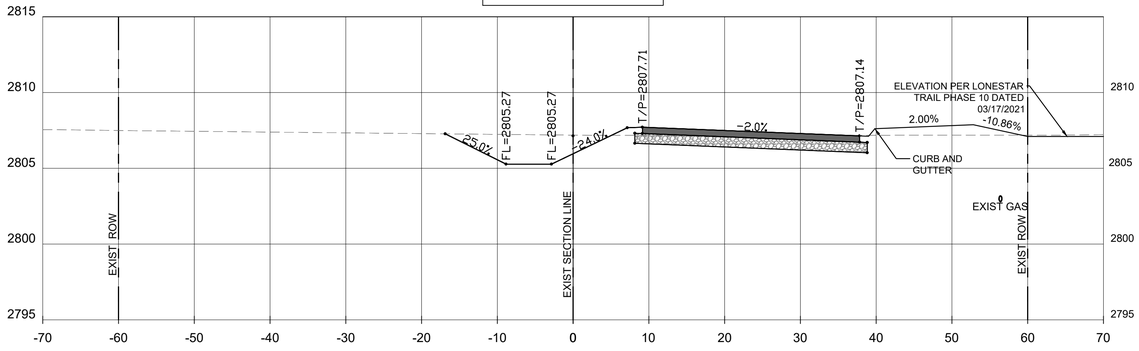
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

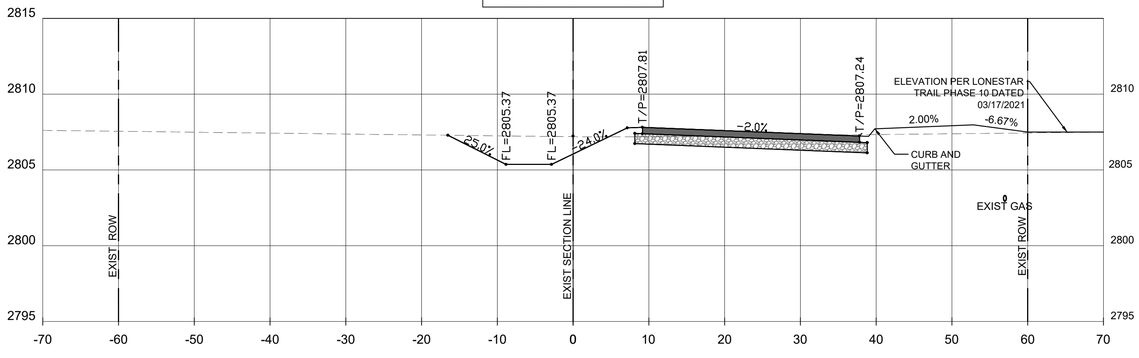
OCCIDENTAL STA 8+00.00



OCCIDENTAL STA 7+50.00



OCCIDENTAL STA 7+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JOSEPH T. HATT
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 7+00 TO 8+00

SHEET NUMBER 111 OF 217

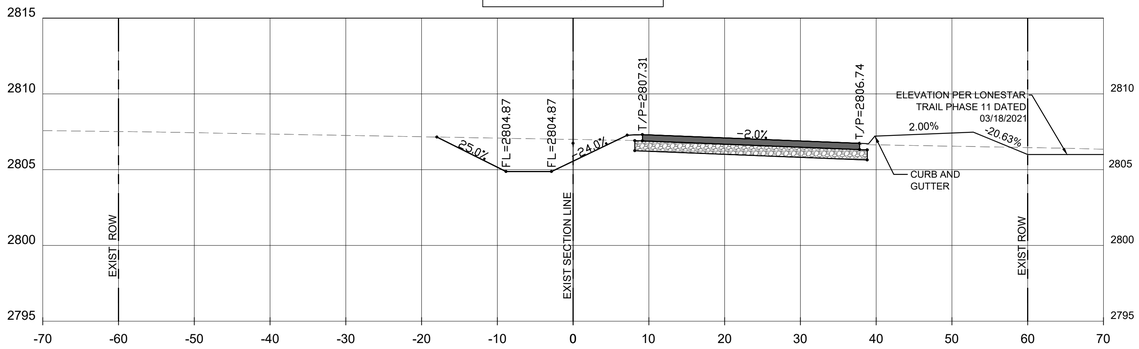
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:45 PM, USER: ajh3453 AVO: 45715.006

NOTES:

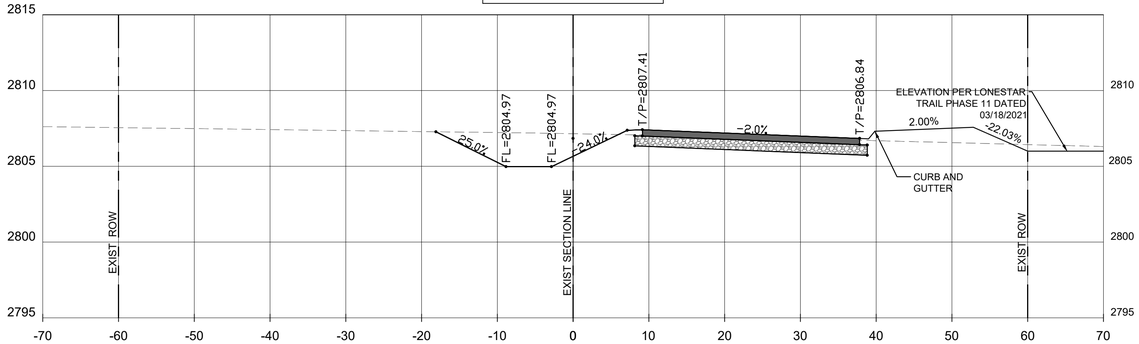
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

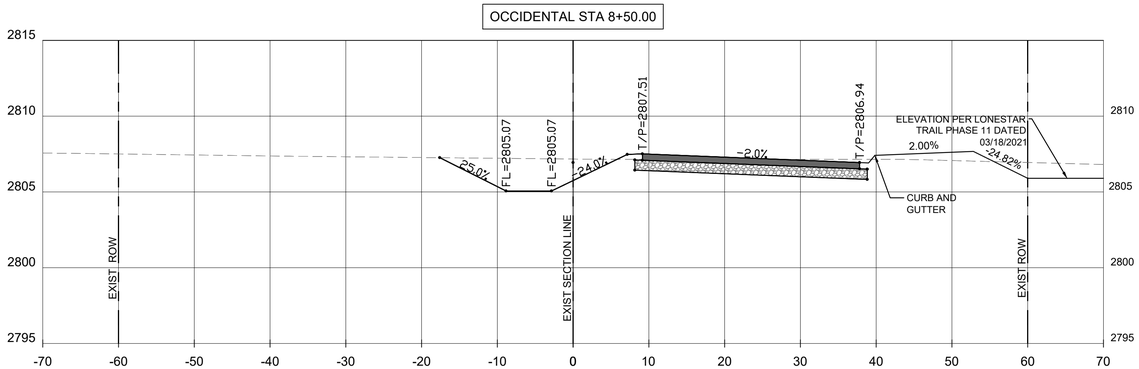
OCCIDENTAL STA 9+50.00



OCCIDENTAL STA 9+00.00



OCCIDENTAL STA 8+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

JAMES T. HUFF
127558
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 8+50 TO 9+50

SHEET NUMBER 112 OF 217

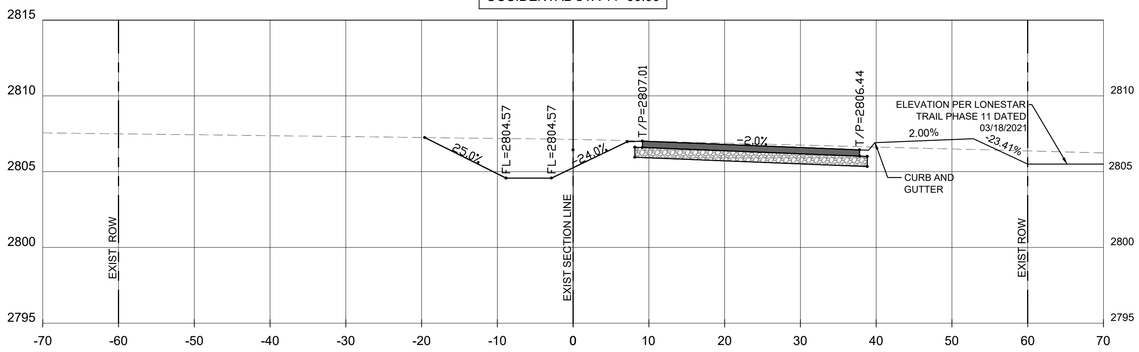
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:45 PM, USER: ah3453 AVO: 45715.006

NOTES:

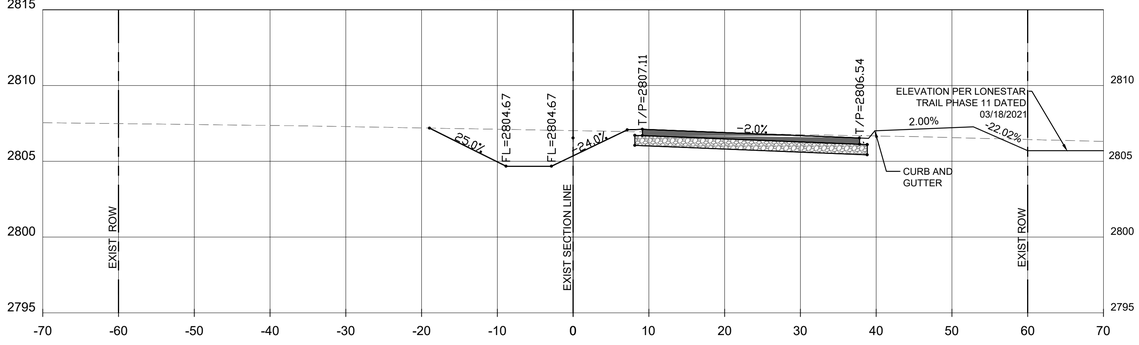
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

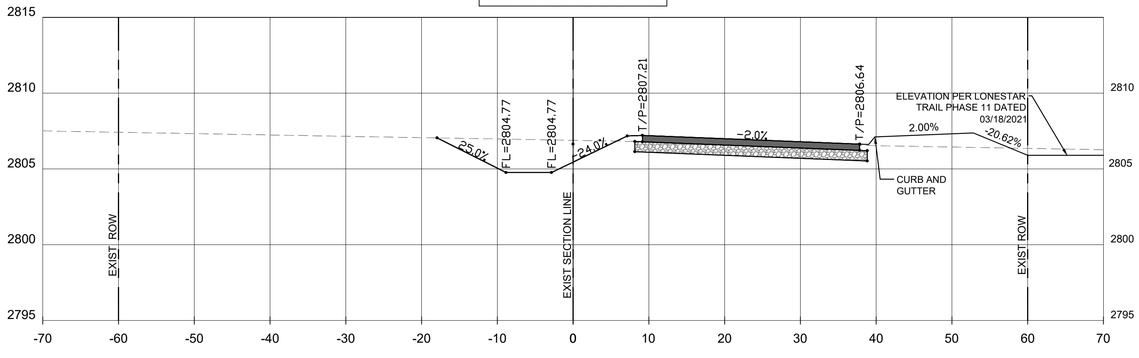
OCCIDENTAL STA 11+00.00



OCCIDENTAL STA 10+50.00



OCCIDENTAL STA 10+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 10+00 TO 11+00

SHEET NUMBER 113 OF 217

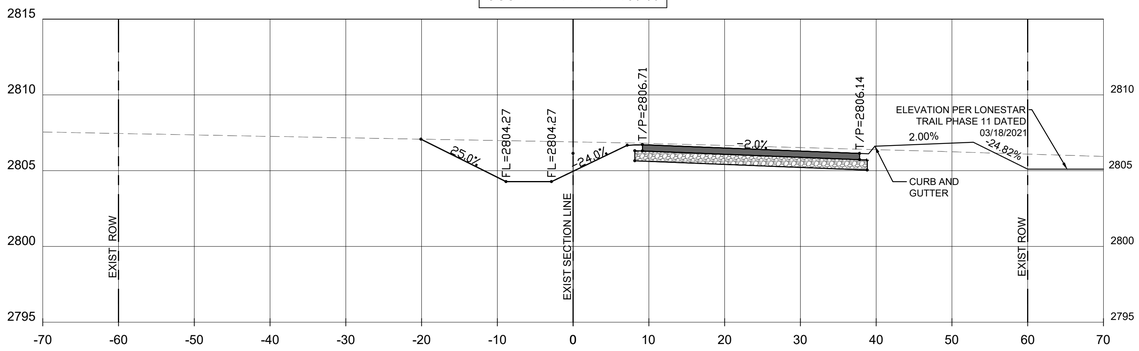
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:45 PM, USER: ah3453 AVO: 45715.006

NOTES:

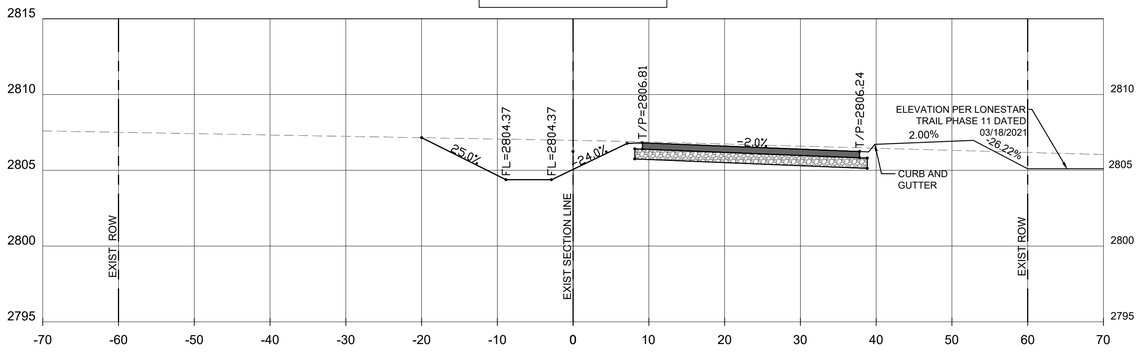
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

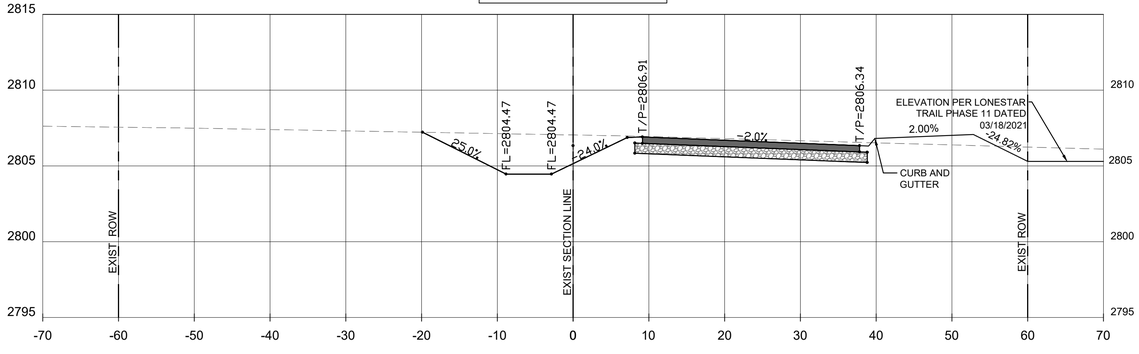
OCCIDENTAL STA 12+50.00



OCCIDENTAL STA 12+00.00



OCCIDENTAL STA 11+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JOSEPH T. HATT
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 11+50 TO 12+50

SHEET NUMBER 114 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:46 PM, USER: ajh3453 AVO: 45715.006

NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

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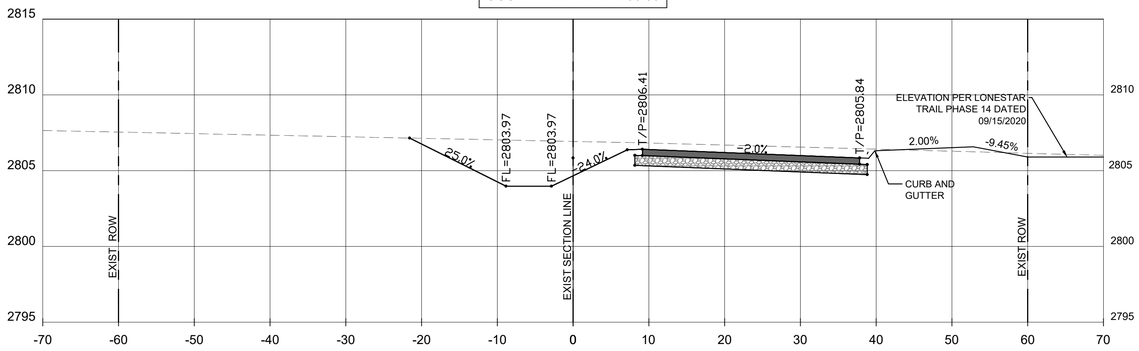
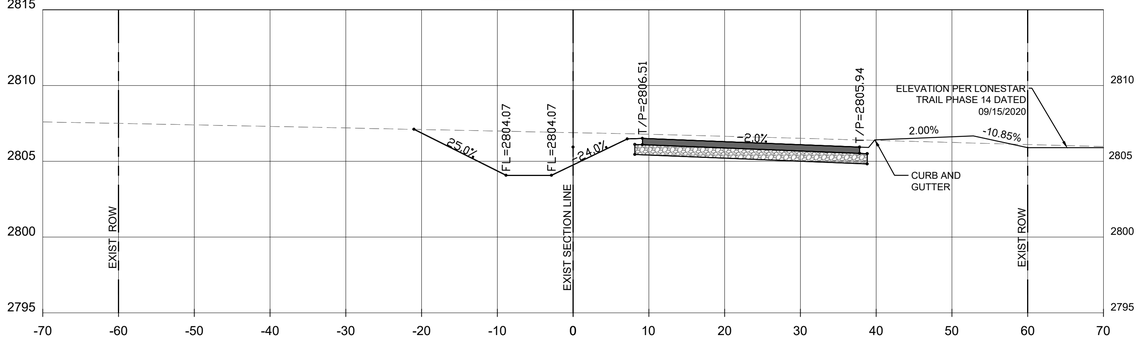
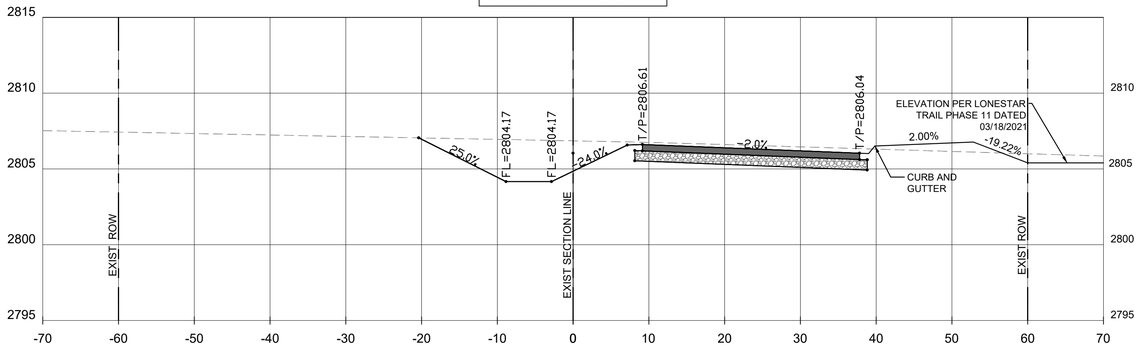
OCCIDENTAL STA 14+00.00



OCCIDENTAL STA 13+50.00



OCCIDENTAL STA 13+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HATE
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 13+00 TO 14+00

SHEET NUMBER 115 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:46 PM, USER: ah3453 AVO: 45715.006

NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

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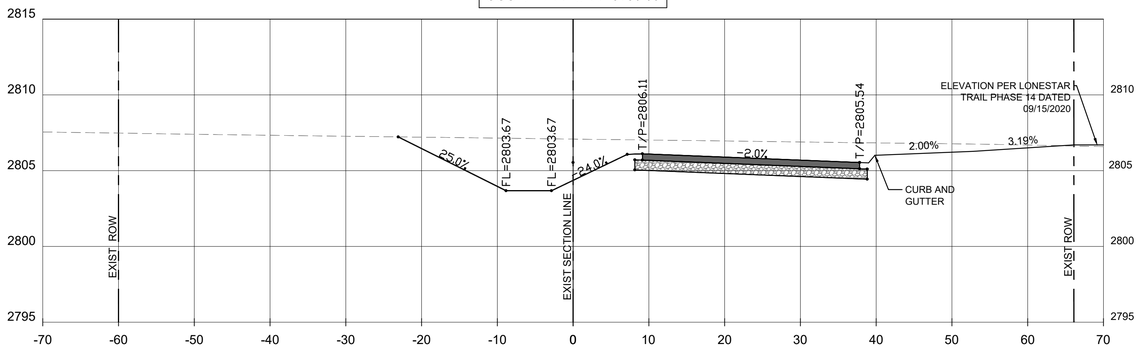
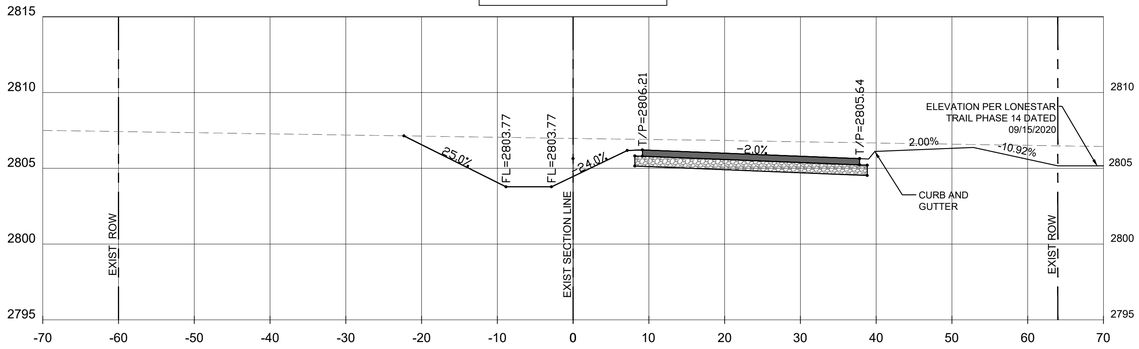
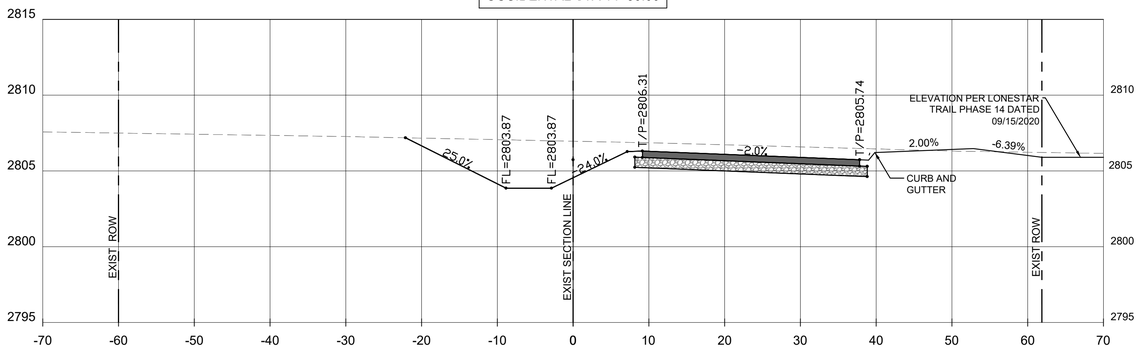
OCCIDENTAL STA 15+50.00



OCCIDENTAL STA 15+00.00



OCCIDENTAL STA 14+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 14+50 TO 15+50

SHEET NUMBER 116 OF 217

FILE NAME: A:\45000s\45715\006\CAD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:46 PM, USER: ah3453 AVO: 45715.006

NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

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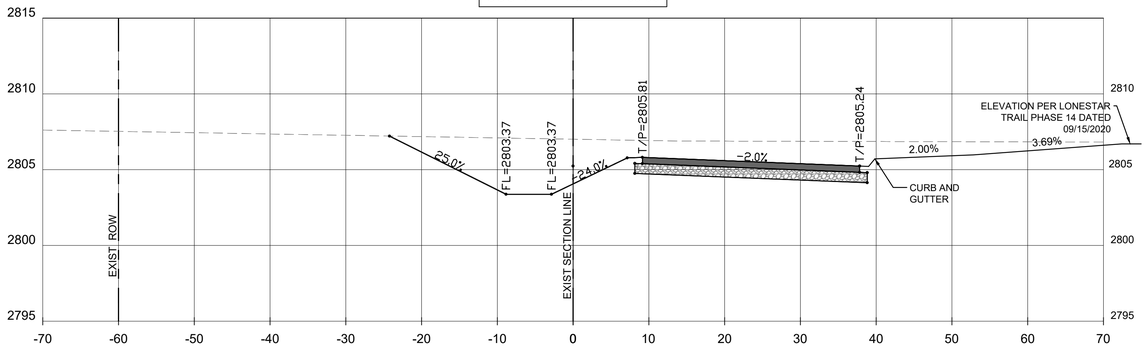
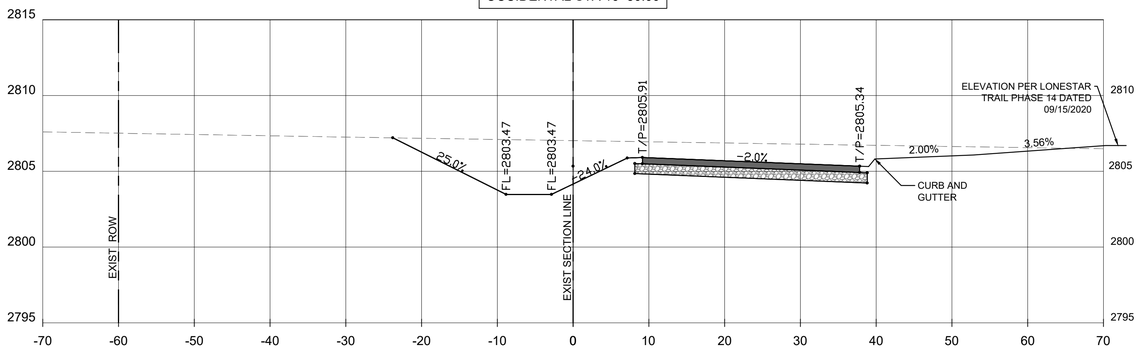
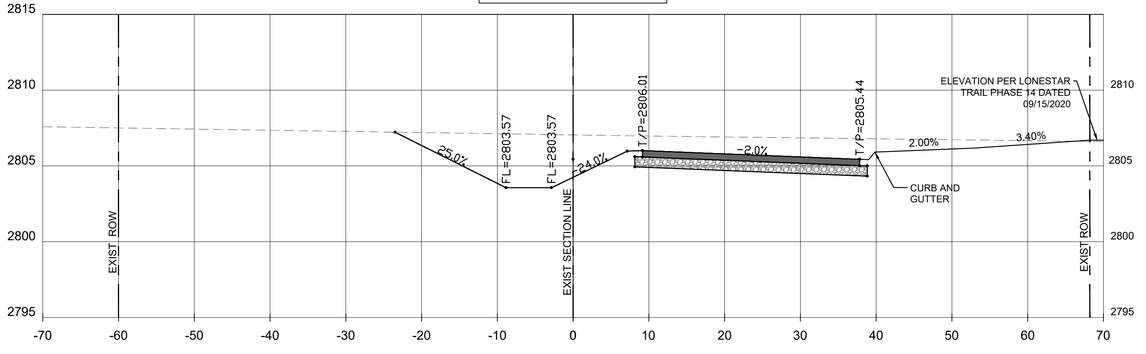
OCCIDENTAL STA 17+00.00



OCCIDENTAL STA 16+50.00



OCCIDENTAL STA 16+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JOSEPH T. HALFF
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 16+00 TO 17+00

SHEET NUMBER 117 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:46 PM, USER: ajh3453 AVO: 45715.006

NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

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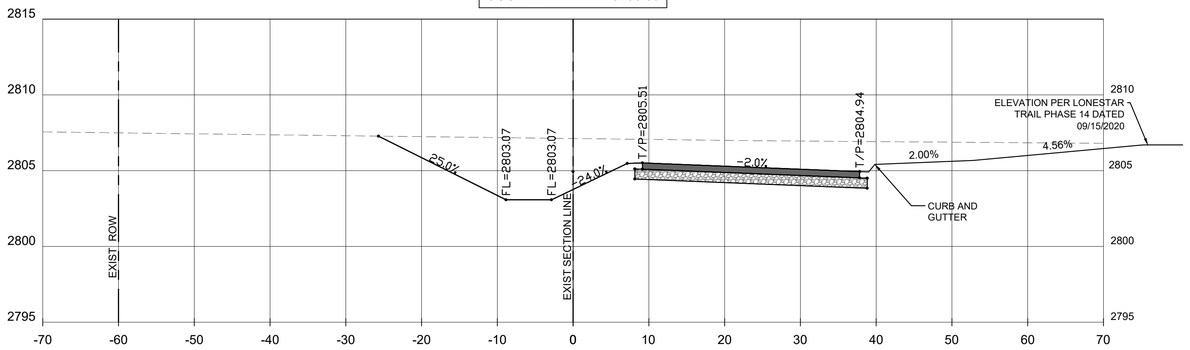
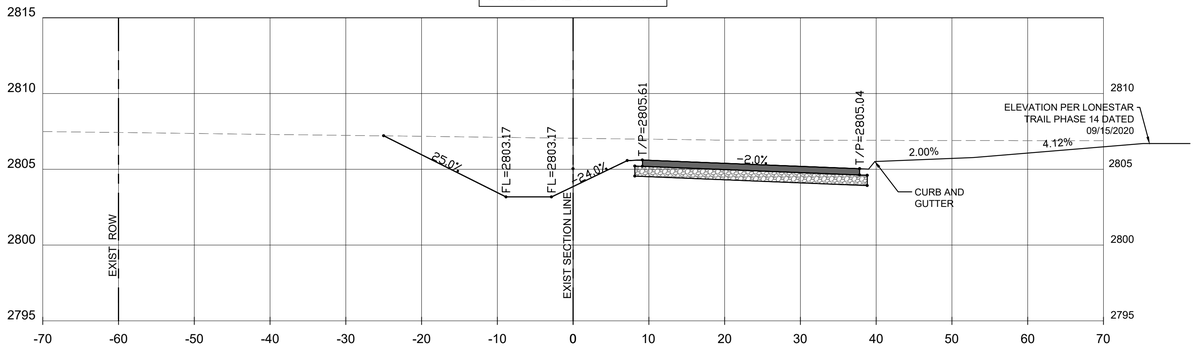
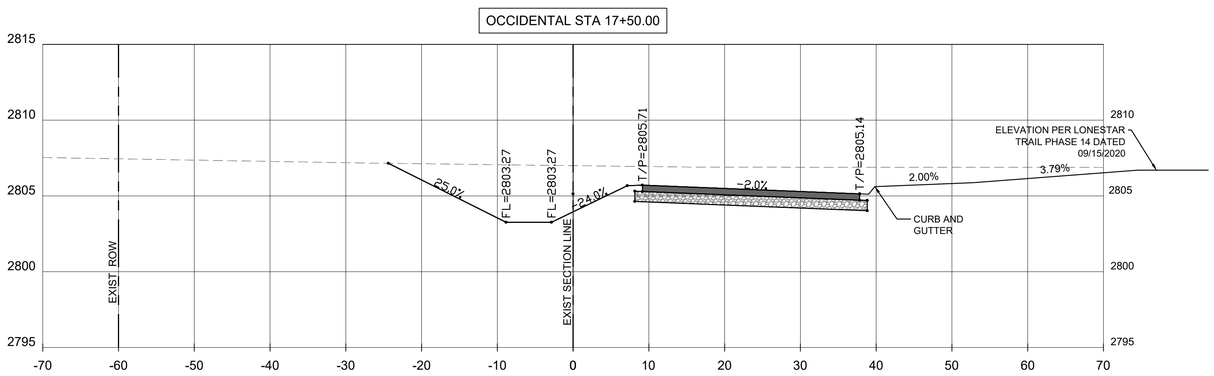
OCCIDENTAL STA 18+50.00



OCCIDENTAL STA 18+00.00



OCCIDENTAL STA 17+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 17+50 TO 18+50

SHEET NUMBER 118 OF 217

FILE NAME: A:\45000s\45715006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:46 PM, USER: ah3453 AVO: 45715.006

NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

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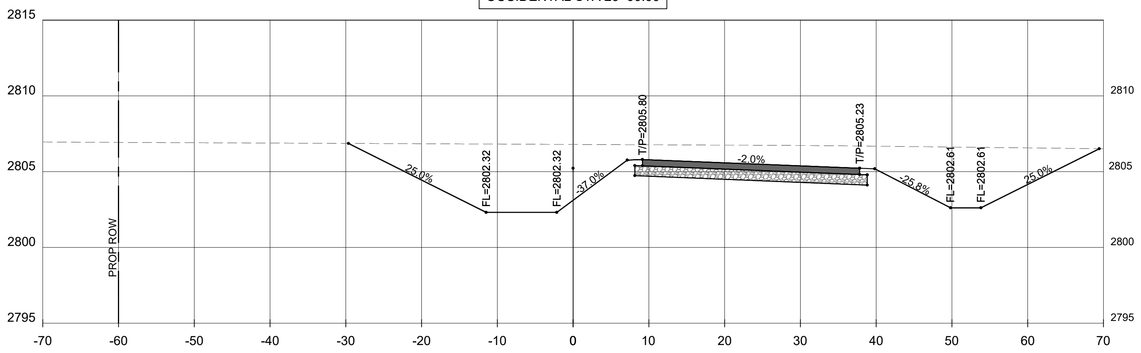
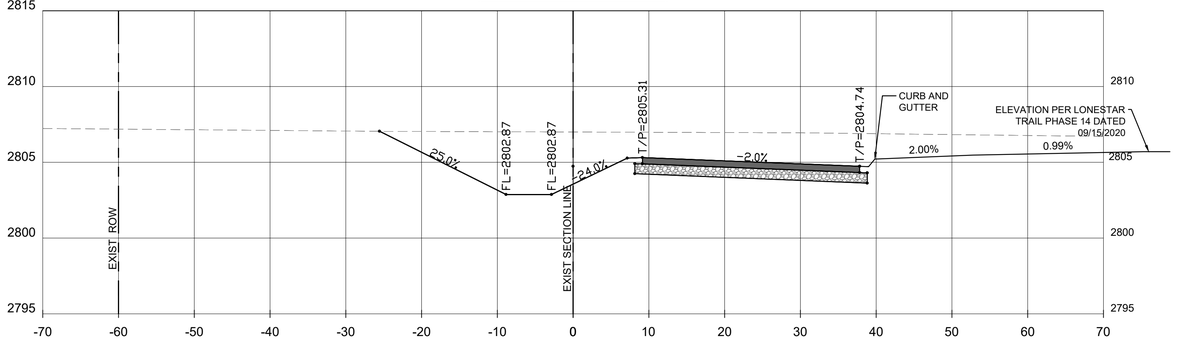
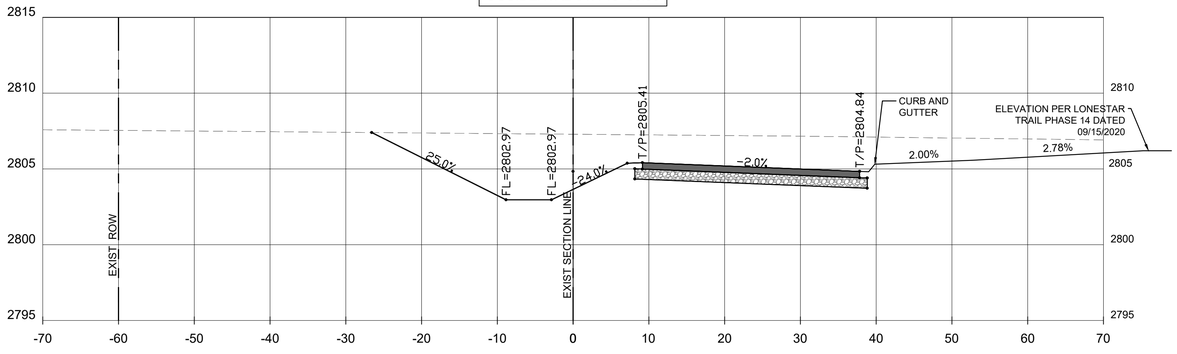
OCCIDENTAL STA 20+00.00



OCCIDENTAL STA 19+50.00



OCCIDENTAL STA 19+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127508
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 19+00 TO 20+00

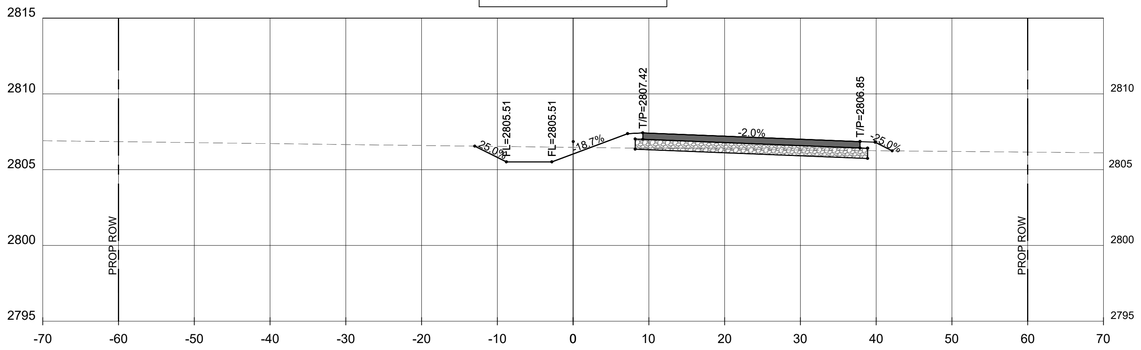
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:46 PM, USER: ah3453 AVO: 45715.006

NOTES:

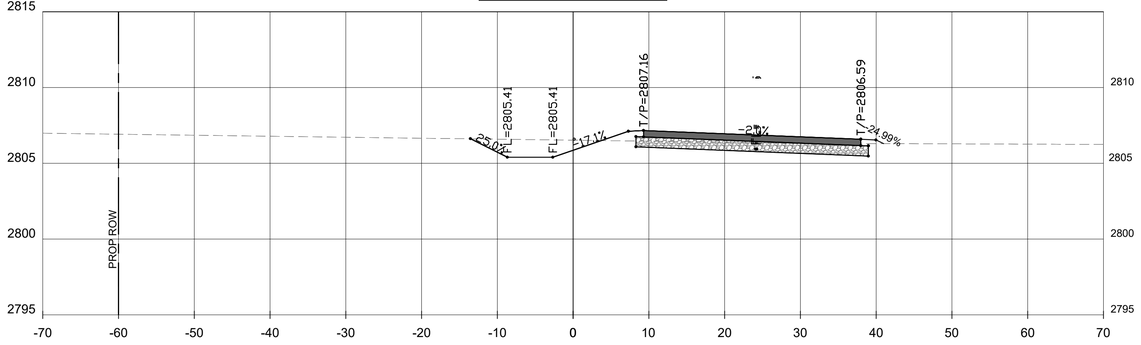
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

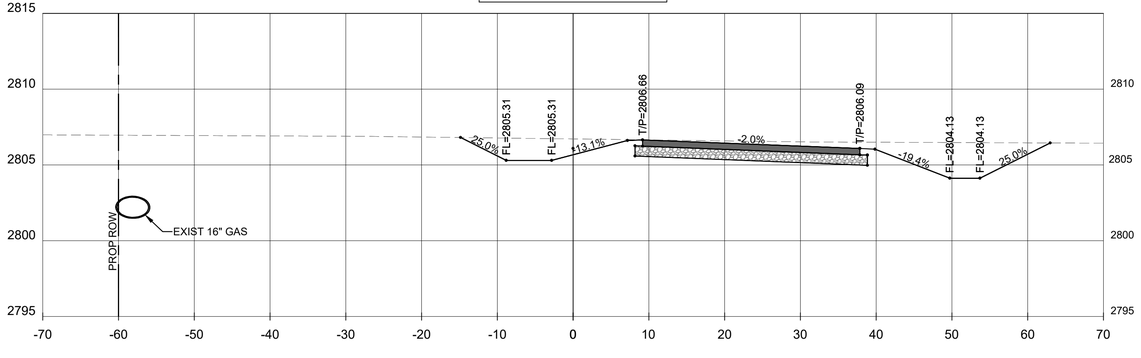
OCCIDENTAL STA 21+50.00



OCCIDENTAL STA 21+00.00



OCCIDENTAL STA 20+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 20+50 TO 21+50

SHEET NUMBER 120 OF 217

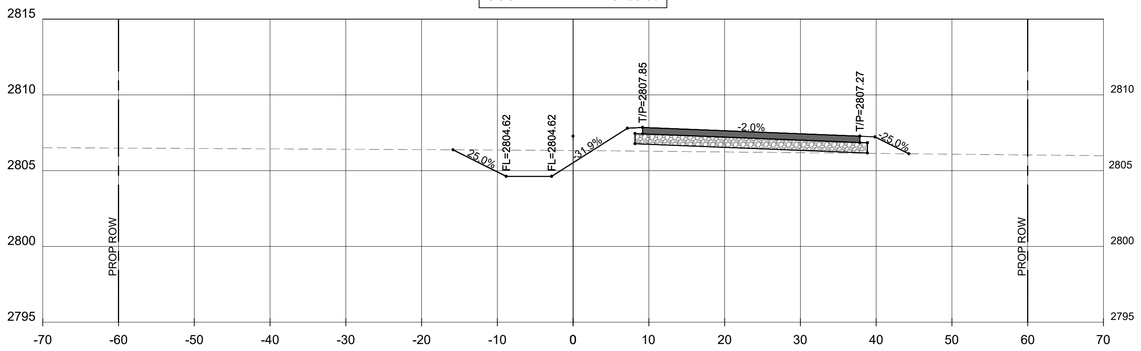
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:47 PM, USER: ah3453 AVO: 45715.006

NOTES:

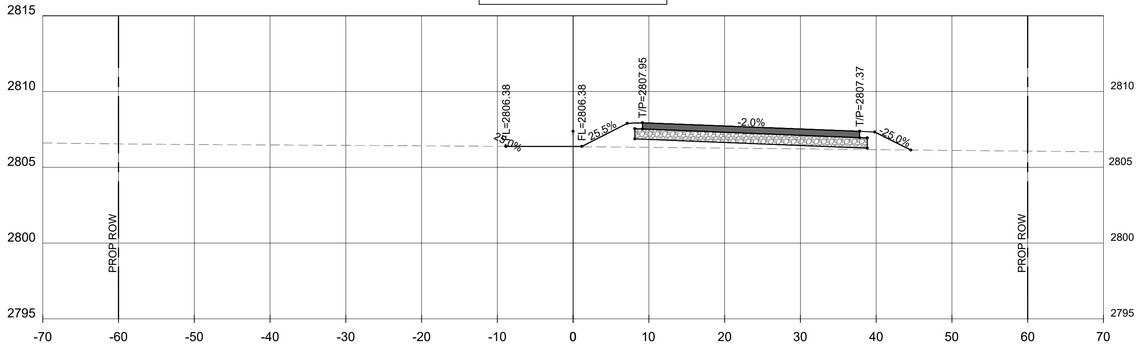
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

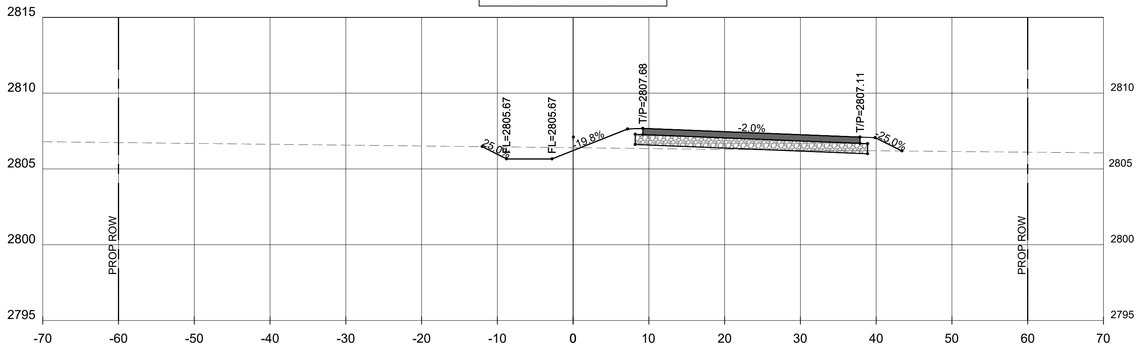
OCCIDENTAL STA 23+00.00



OCCIDENTAL STA 22+50.00



OCCIDENTAL STA 22+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JOSEPH T. HALFF
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 22+00 TO 23+00

SHEET NUMBER 121 OF 217

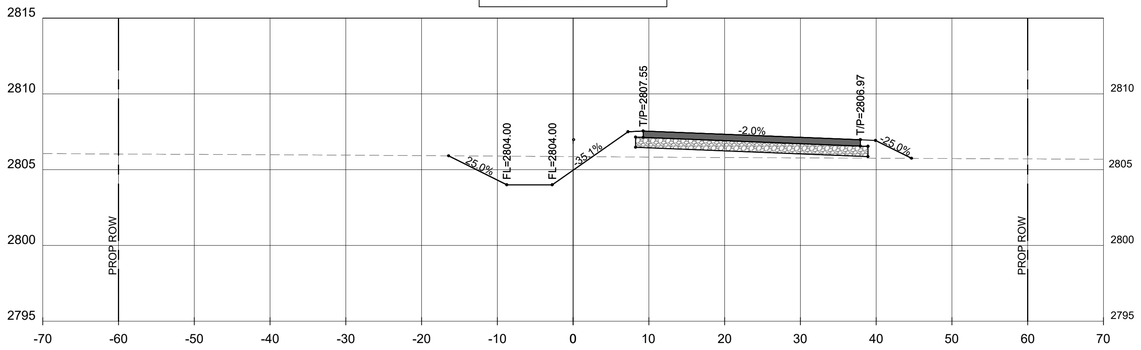
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:47 PM, USER: ajh3453 AVO: 45715.006

NOTES:

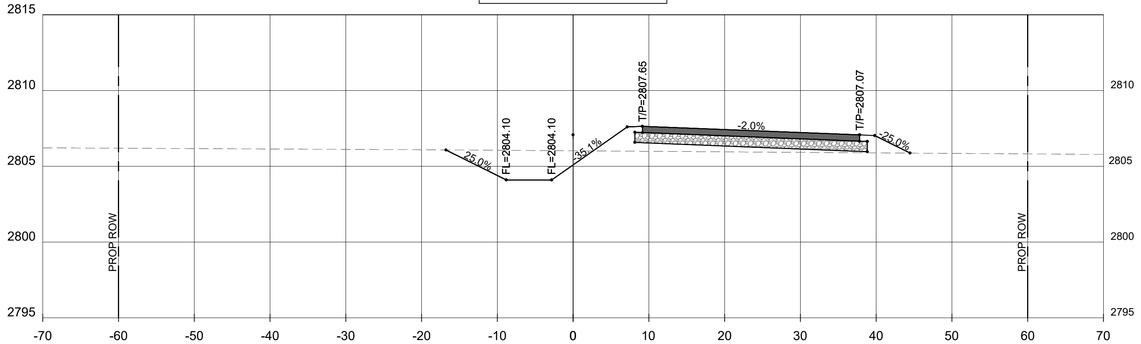
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

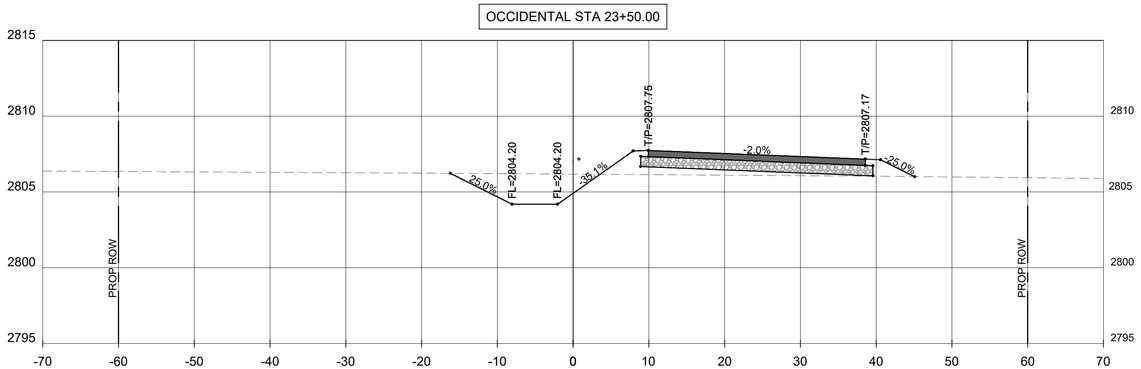
OCCIDENTAL STA 24+50.00



OCCIDENTAL STA 24+00.00



OCCIDENTAL STA 23+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 23+50 TO 24+50

SHEET NUMBER 122 OF 217

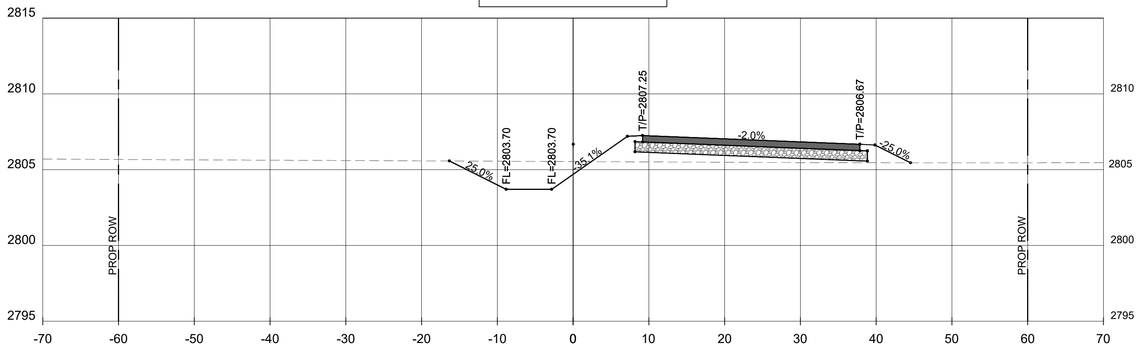
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:47 PM, USER: ah3453 AVO: 45715.006

NOTES:

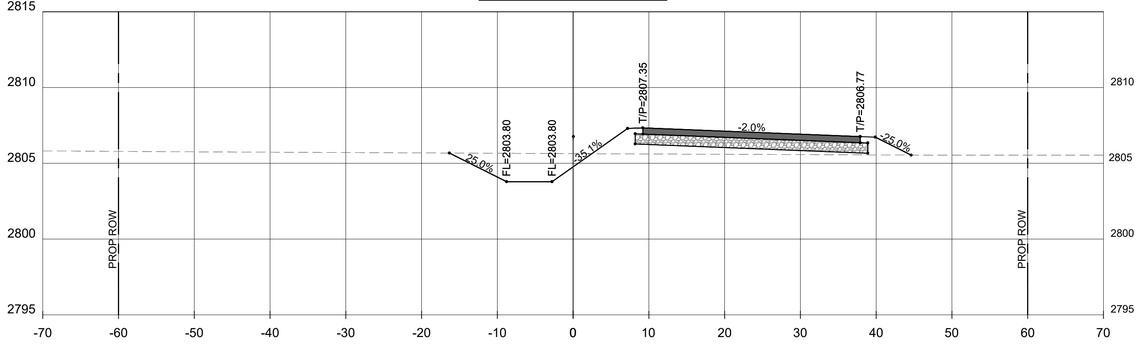
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

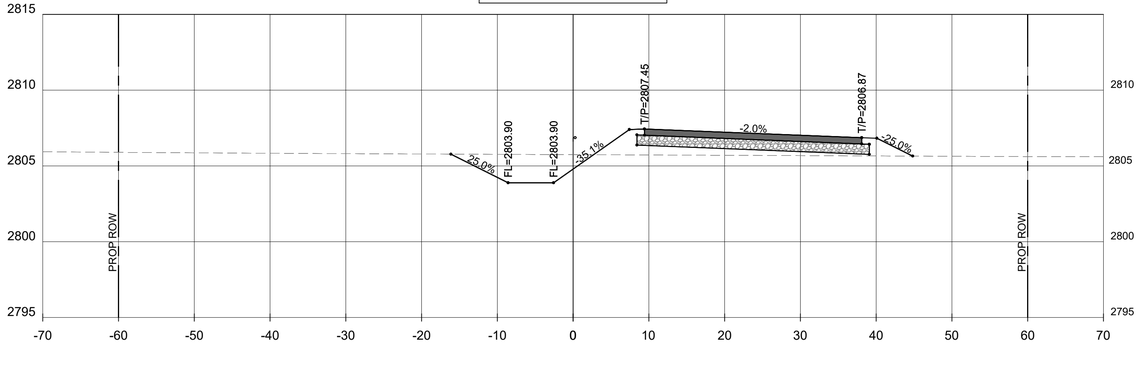
OCCIDENTAL STA 26+00.00



OCCIDENTAL STA 25+50.00



OCCIDENTAL STA 25+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817)847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 25+00 TO 26+00

SHEET NUMBER 123 OF 217

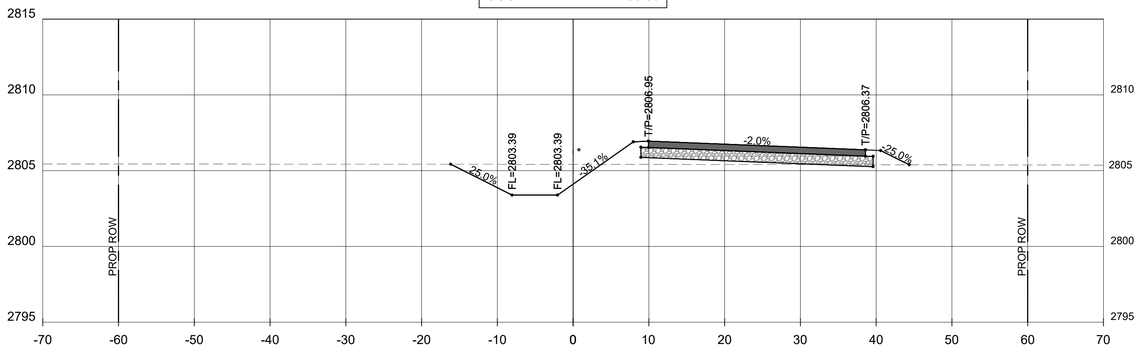
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:47 PM, USER: ah3453 AVO: 45715.006

NOTES:

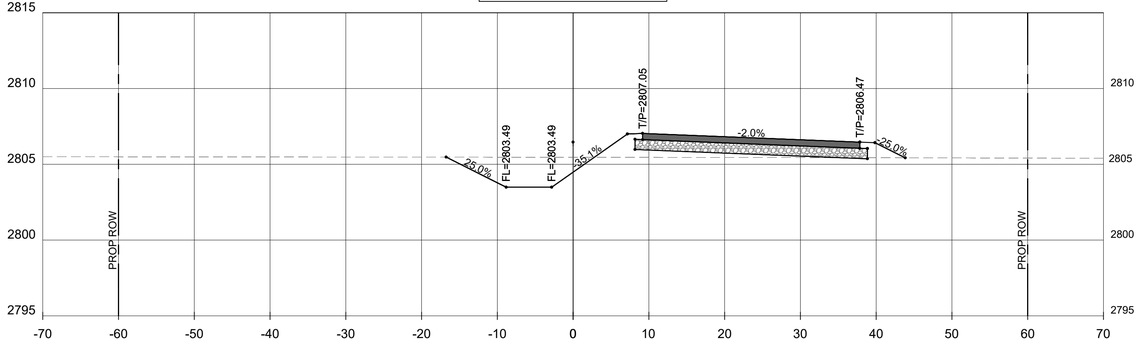
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

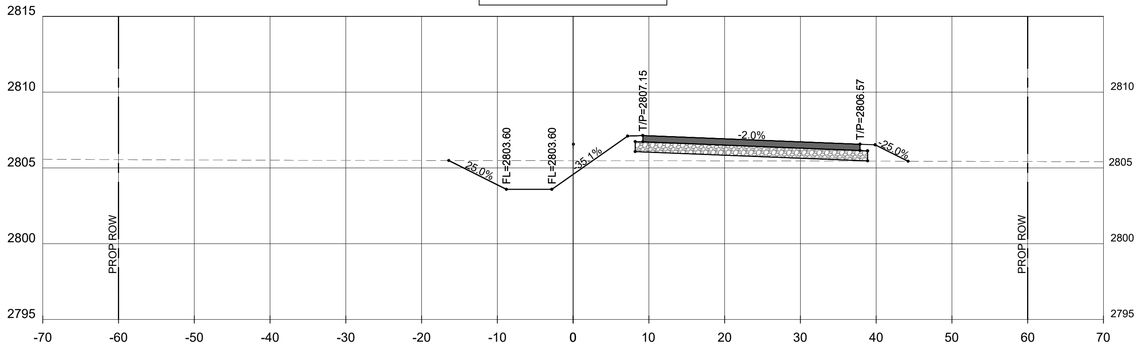
OCCIDENTAL STA 27+50.00



OCCIDENTAL STA 27+00.00



OCCIDENTAL STA 26+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 26+50 TO 27+50

SHEET NUMBER 124 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:47 PM, USER: ah3453 AVO: 45715.006

NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

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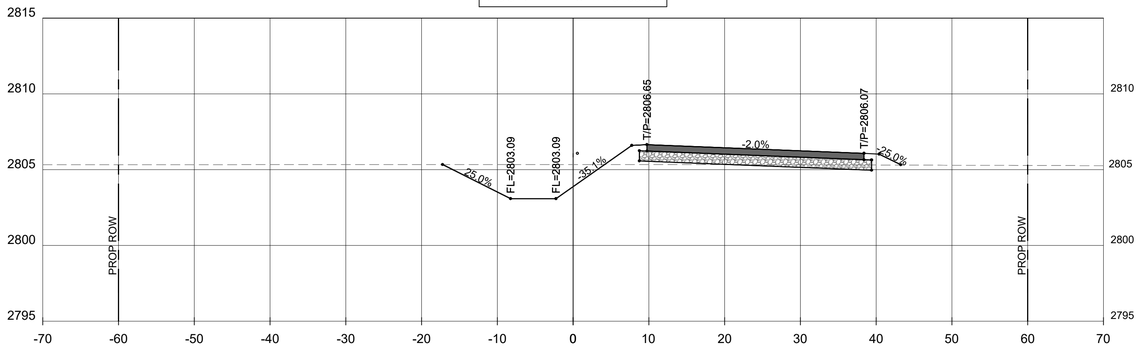
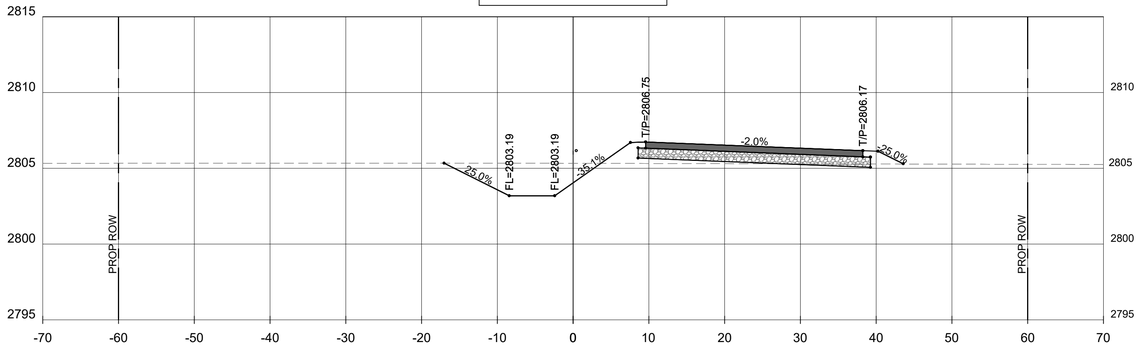
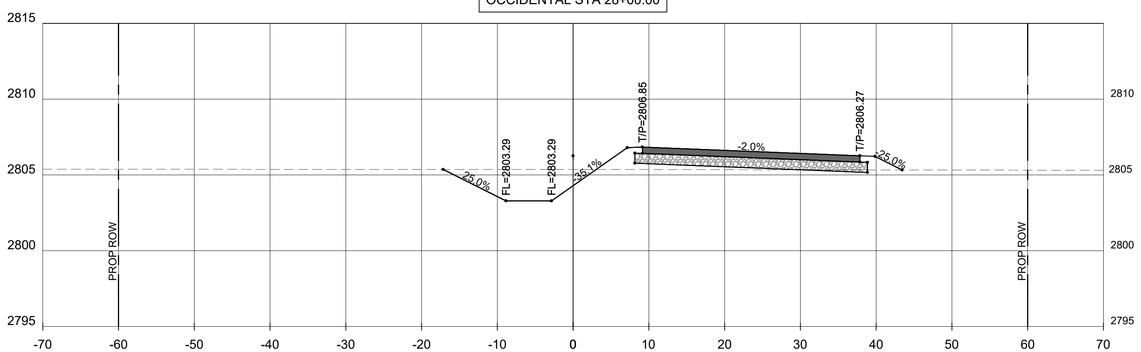
OCCIDENTAL STA 29+00.00



OCCIDENTAL STA 28+50.00



OCCIDENTAL STA 28+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127556
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 28+00 TO 29+00

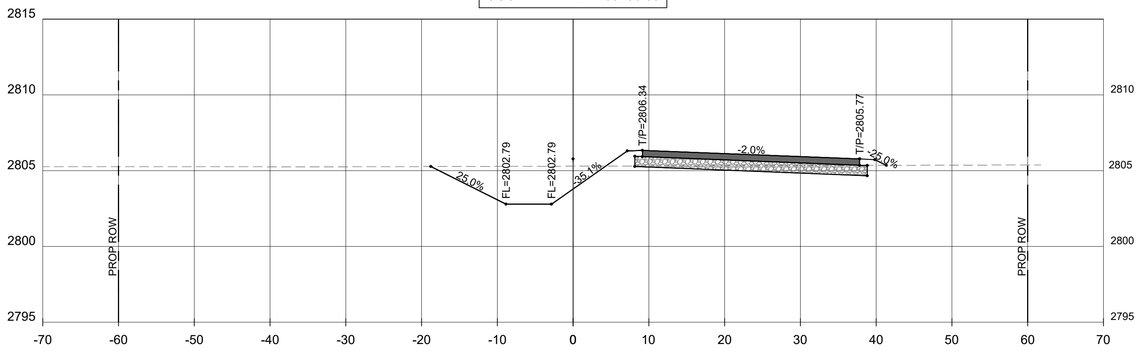
FILE NAME: A:\45000s\45715\006\CADDSheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:47 PM, USER: ah3453 AVO: 45715.006

NOTES:

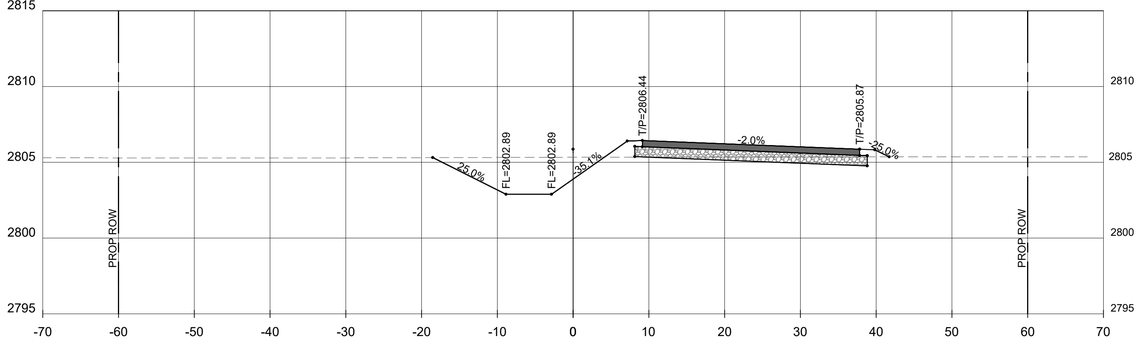
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

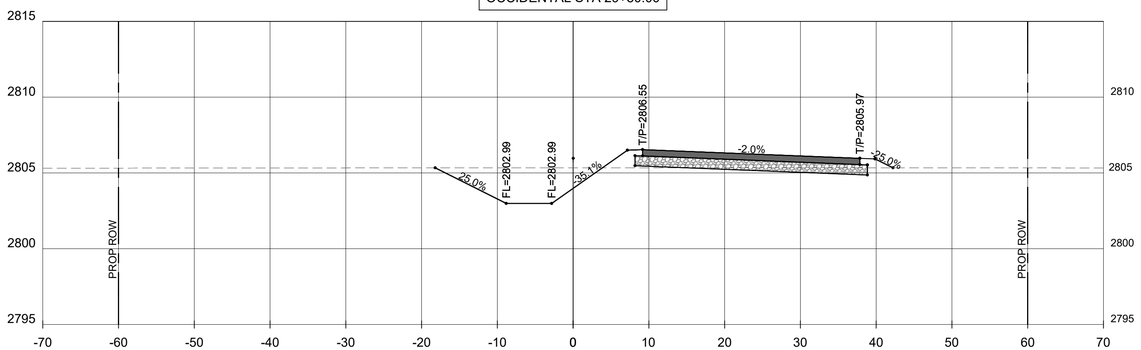
OCCIDENTAL STA 30+50.00



OCCIDENTAL STA 30+00.00



OCCIDENTAL STA 29+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 29+50 TO 30+50

SHEET NUMBER 126 OF 217

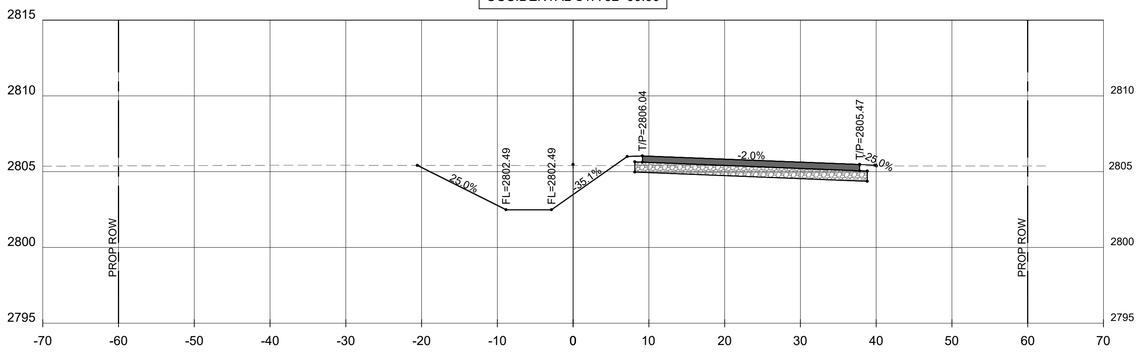
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:48 PM, USER: ah3453 AVO: 45715.006

NOTES:

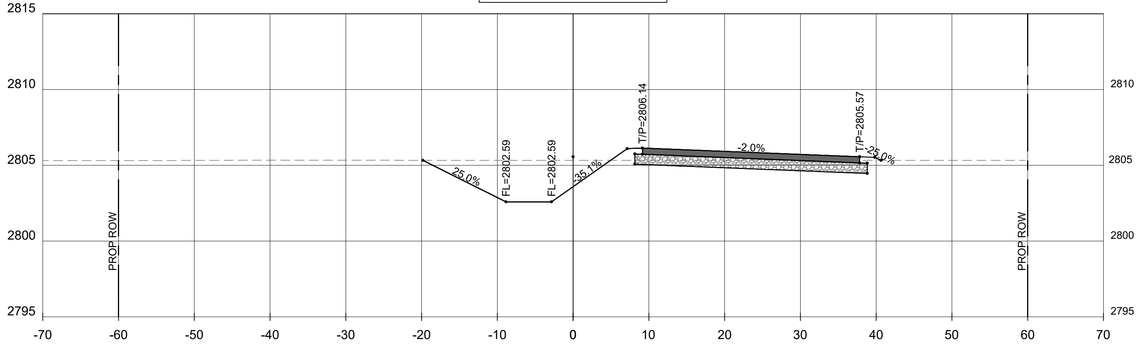
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

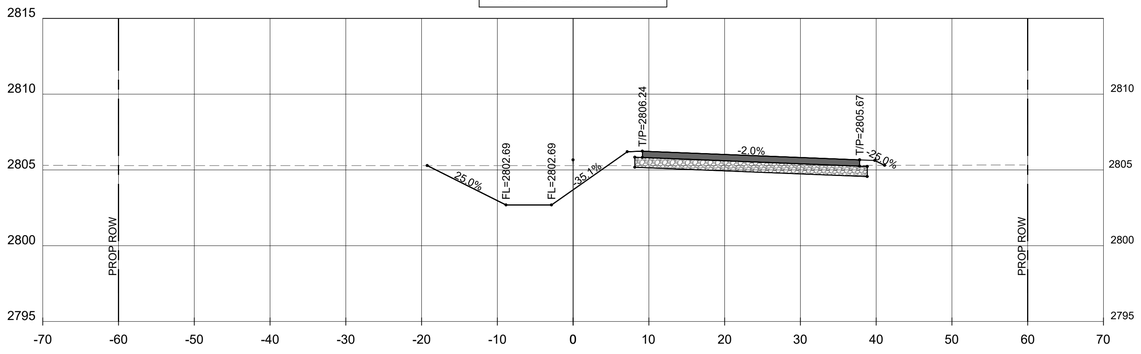
OCCIDENTAL STA 32+00.00



OCCIDENTAL STA 31+50.00



OCCIDENTAL STA 31+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION		
NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 31+00 TO 32+00

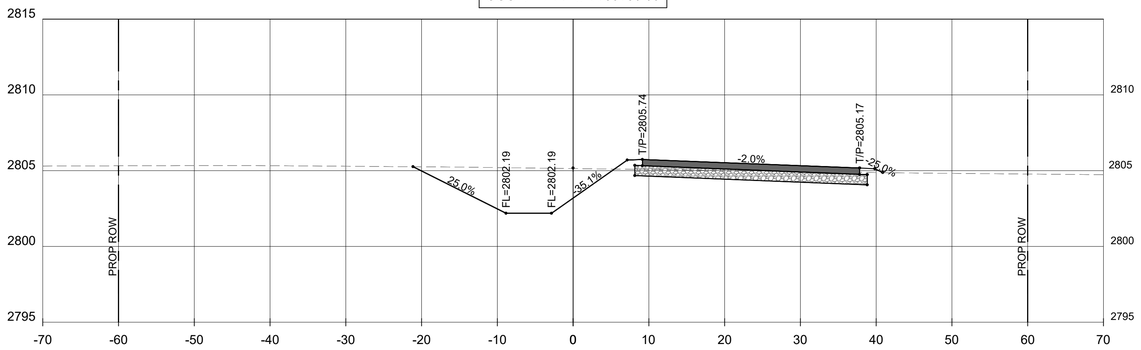
SHEET NUMBER 127 OF 217

NOTES:

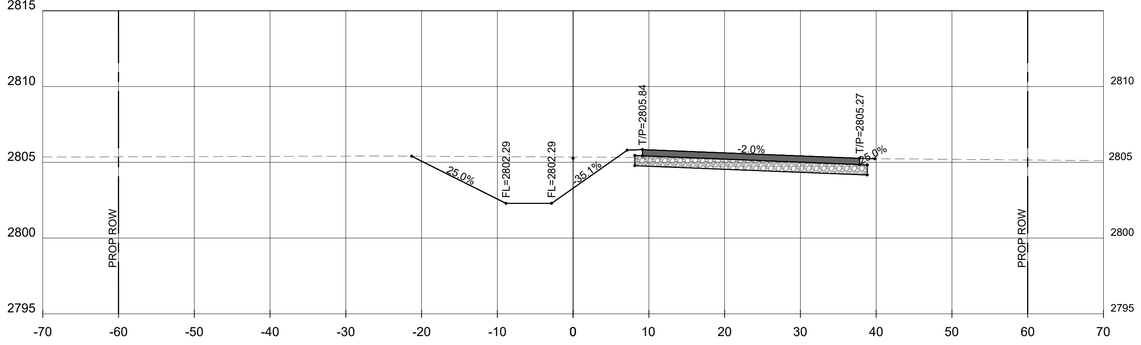
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

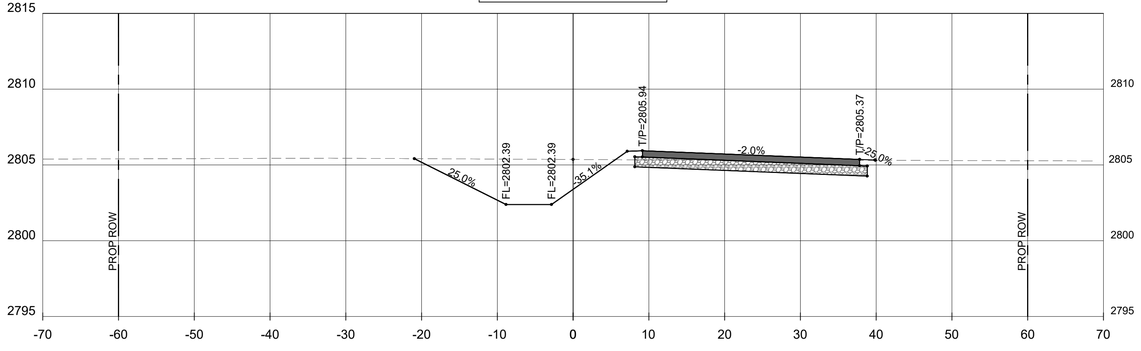
OCCIDENTAL STA 33+50.00



OCCIDENTAL STA 33+00.00



OCCIDENTAL STA 32+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 32+50 TO 33+50

SHEET NUMBER 128 OF 217

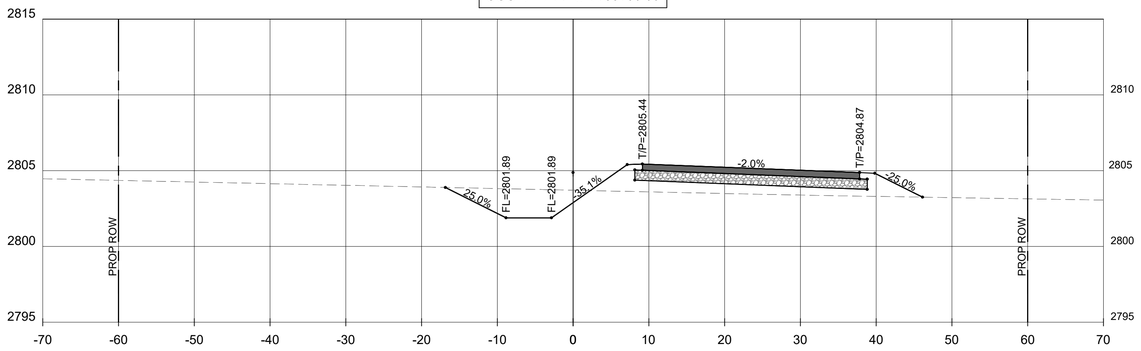
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:48 PM, USER: ah3453 AVO: 45715.006

NOTES:

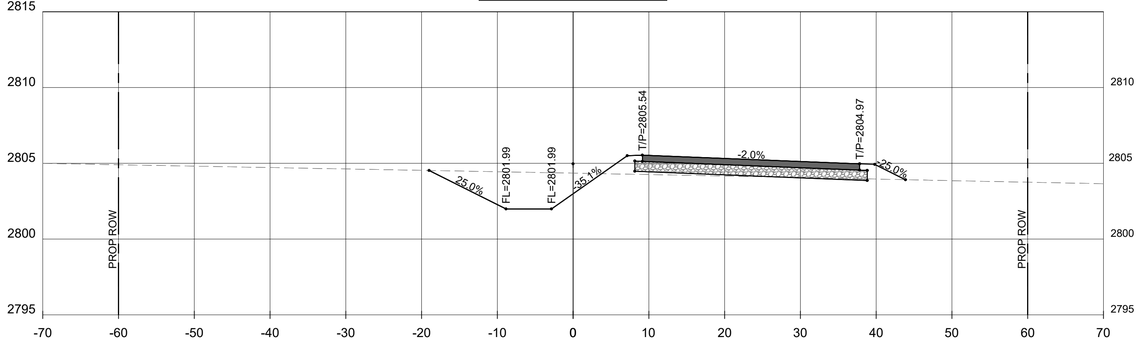
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

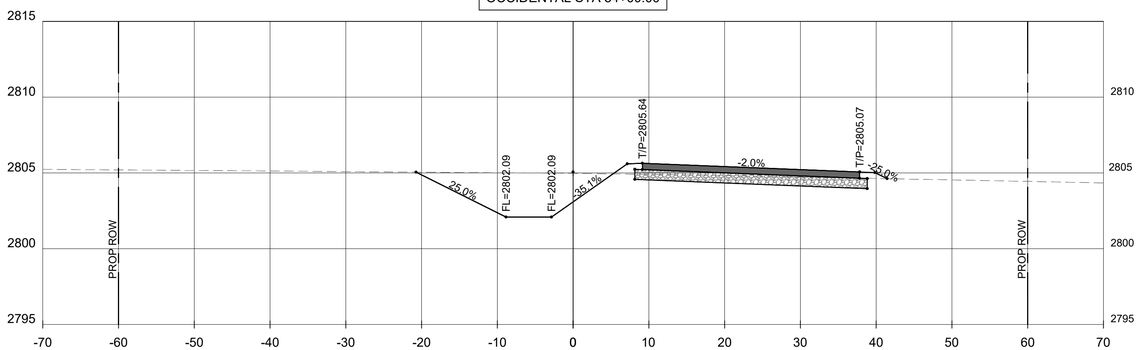
OCCIDENTAL STA 35+00.00



OCCIDENTAL STA 34+50.00



OCCIDENTAL STA 34+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HATE
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 34+00 TO 35+00

SHEET NUMBER 129 OF 217

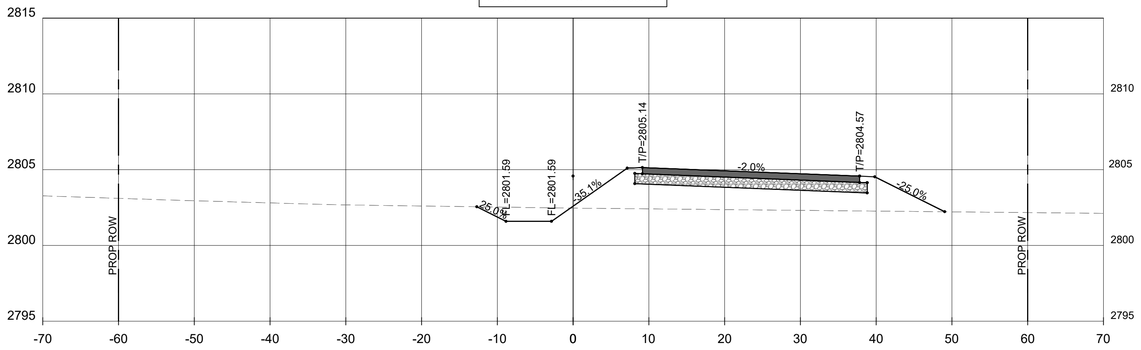
FILE NAME: A:\45000s\45715\006\CAD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:48 PM, USER: ah3453 AVO: 45715.006

NOTES:

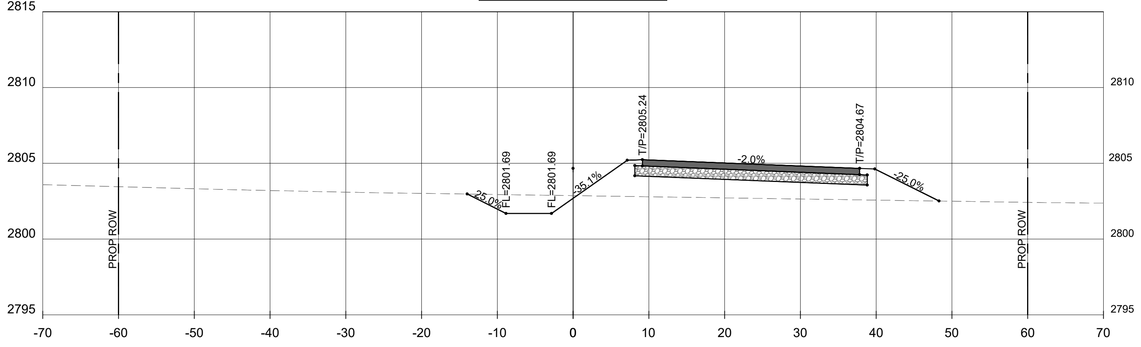
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

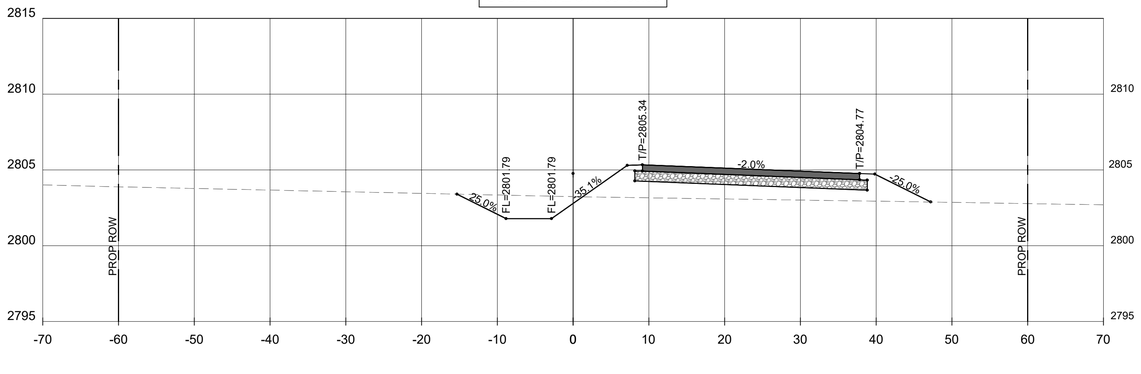
OCCIDENTAL STA 36+50.00



OCCIDENTAL STA 36+00.00



OCCIDENTAL STA 35+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB TAYLOR HATT
127558
LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 35+50 TO 36+50

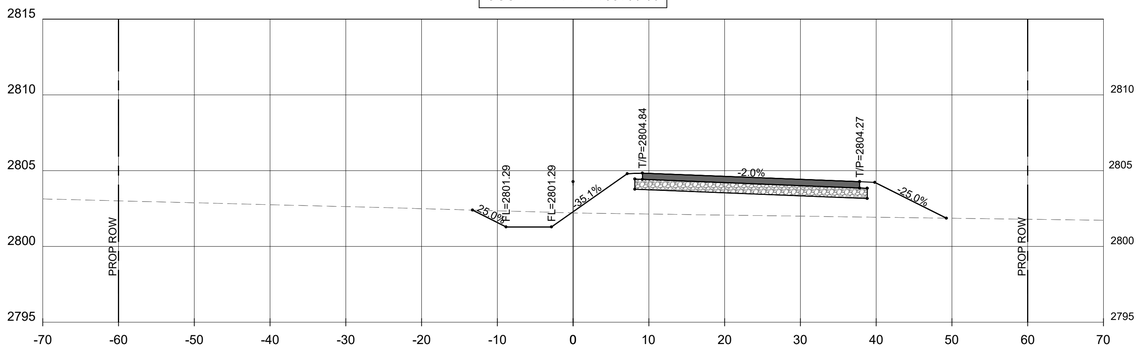
SHEET NUMBER 130 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:48 PM, USER: ah3453 AVO: 45715.006

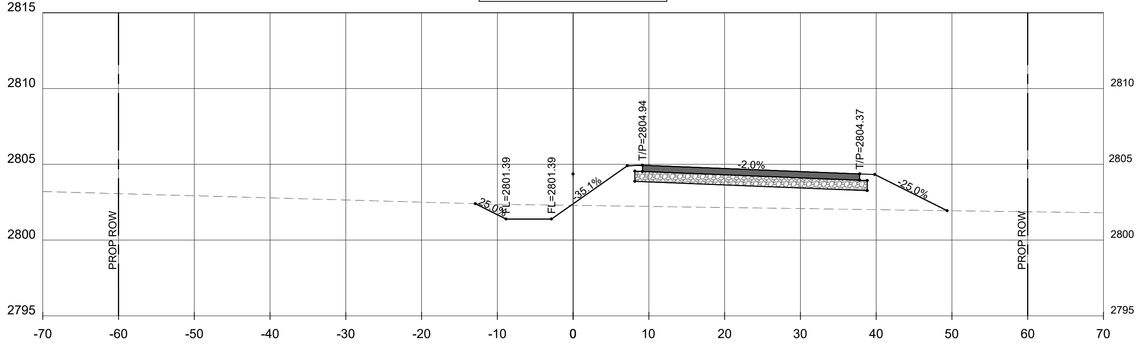
NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**
2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

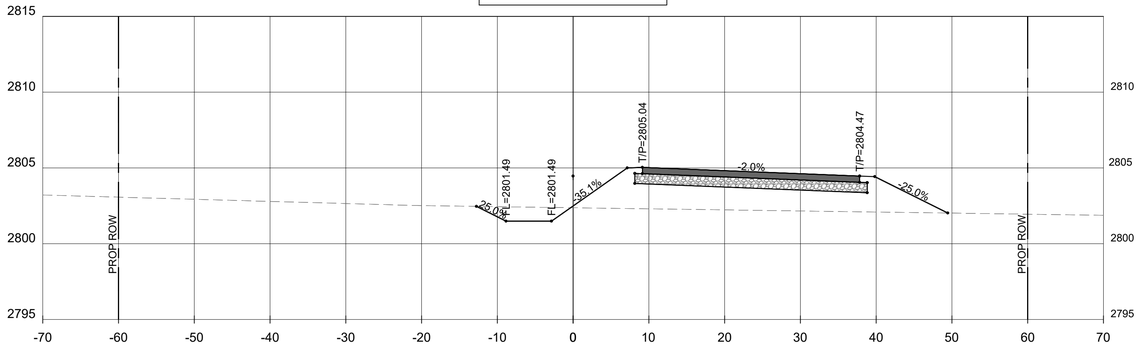
OCCIDENTAL STA 38+00.00



OCCIDENTAL STA 37+50.00



OCCIDENTAL STA 37+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 37+00 TO 38+00

SHEET NUMBER 131 OF 217

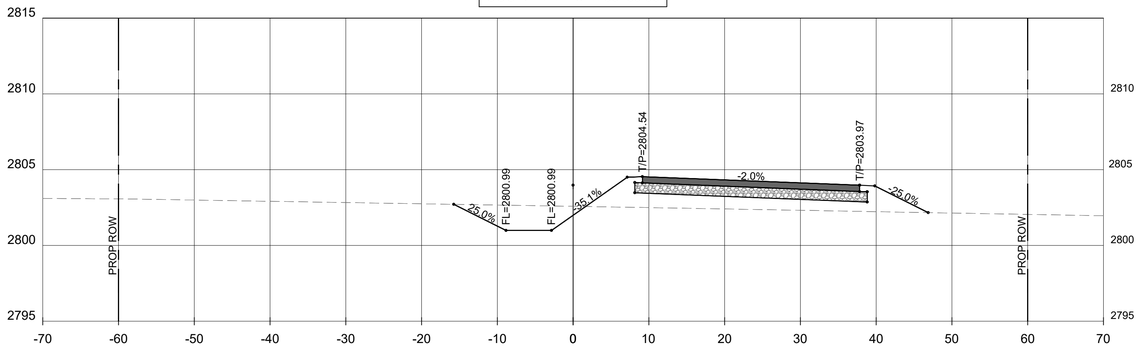
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:48 PM, USER: ah3453 AVO: 45715.006

NOTES:

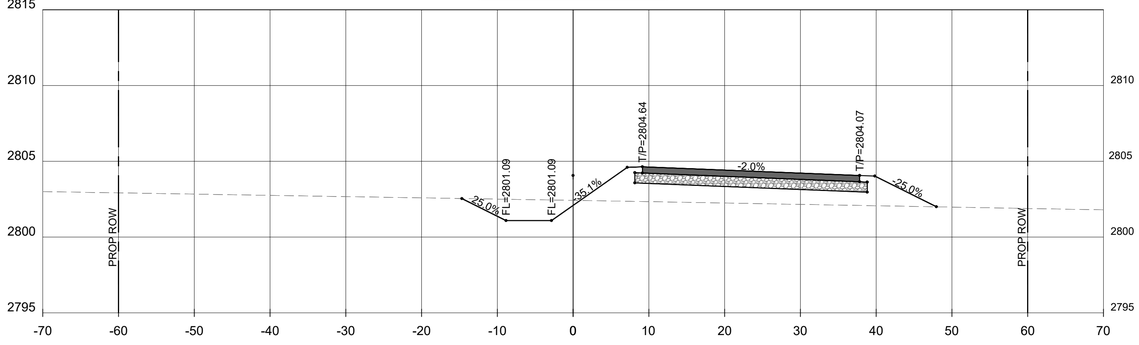
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

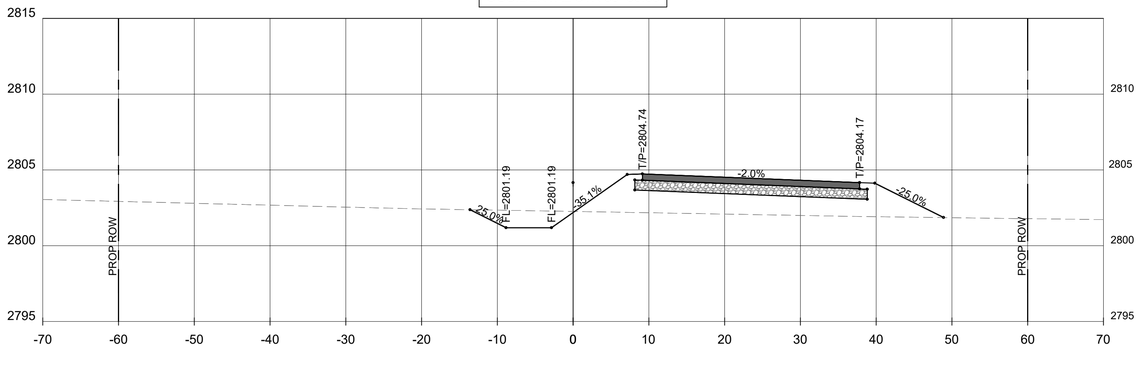
OCCIDENTAL STA 39+50.00



OCCIDENTAL STA 39+00.00



OCCIDENTAL STA 38+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 38+50 TO 39+50

SHEET NUMBER 132 OF 217

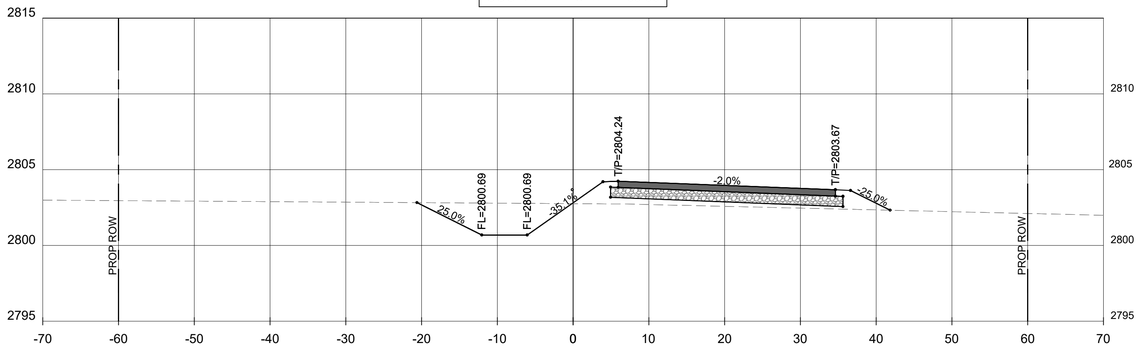
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:49 PM, USER: ah3453 AVO: 45715.006

NOTES:

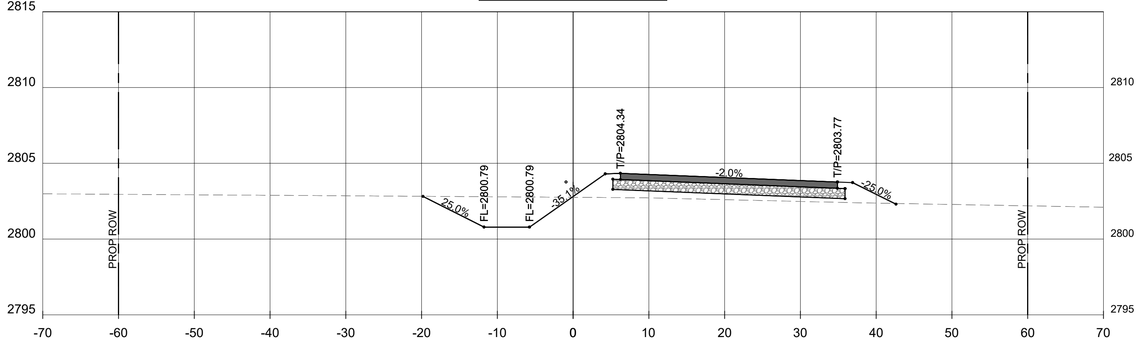
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

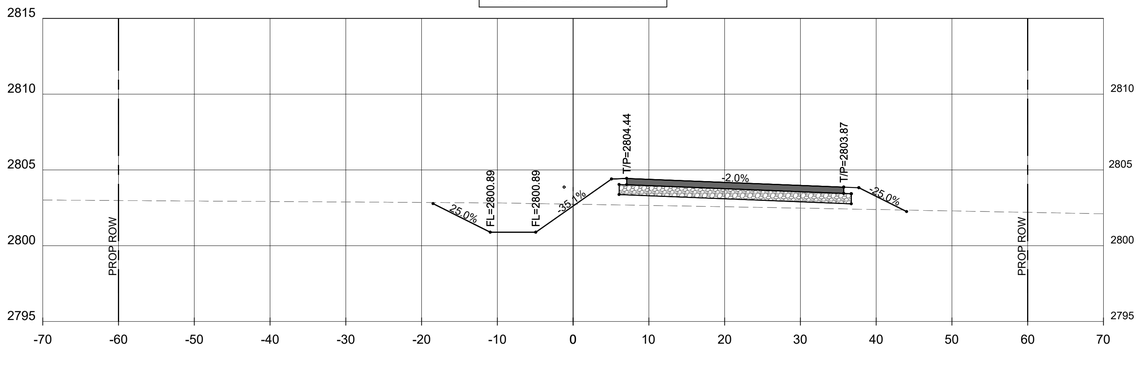
OCCIDENTAL STA 41+00.00



OCCIDENTAL STA 40+50.00



OCCIDENTAL STA 40+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HALFF
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 40+00 TO 41+00

SHEET NUMBER 133 OF 217

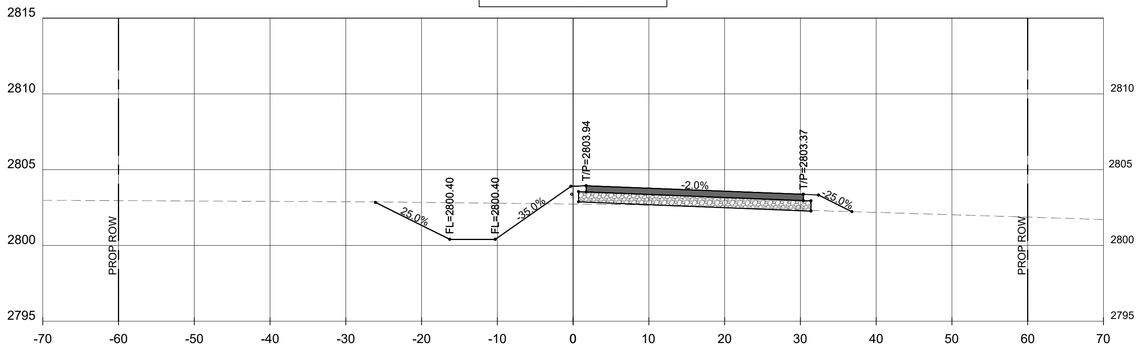
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:49 PM, USER: ah3453 AVO: 45715.006

NOTES:

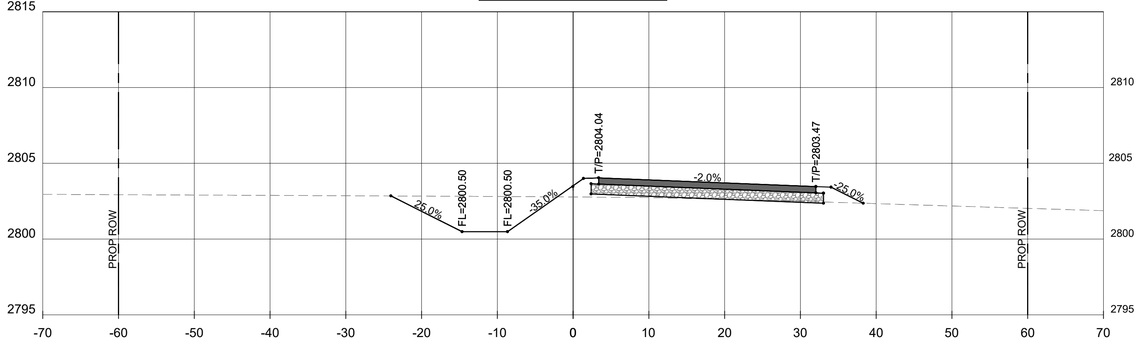
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

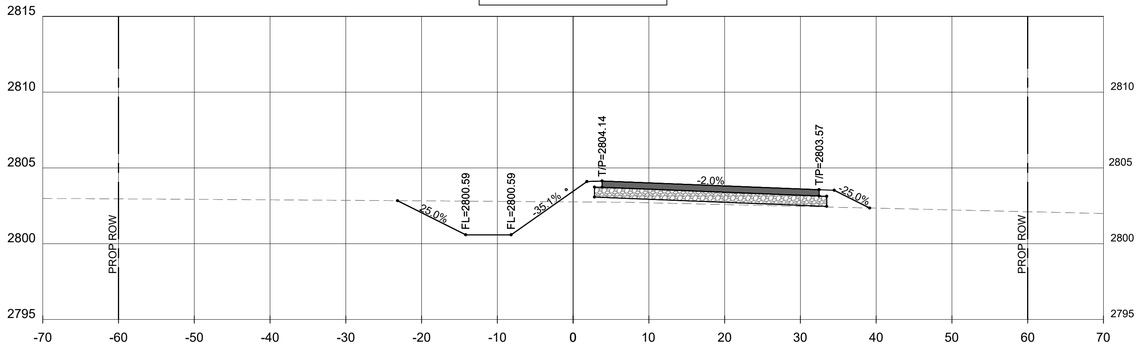
OCCIDENTAL STA 42+50.00



OCCIDENTAL STA 42+00.00



OCCIDENTAL STA 41+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HATT
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 41+50 TO 42+50

SHEET NUMBER 134 OF 217

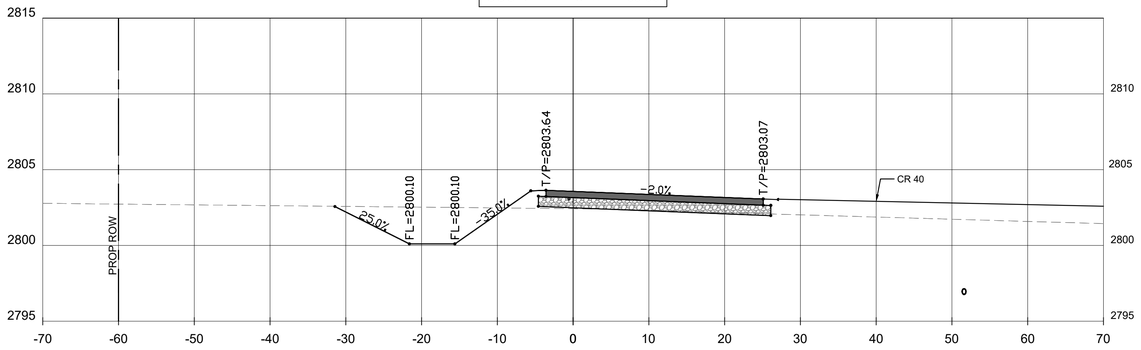
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:49 PM, USER: ah3453 AVO: 45715.006

NOTES:

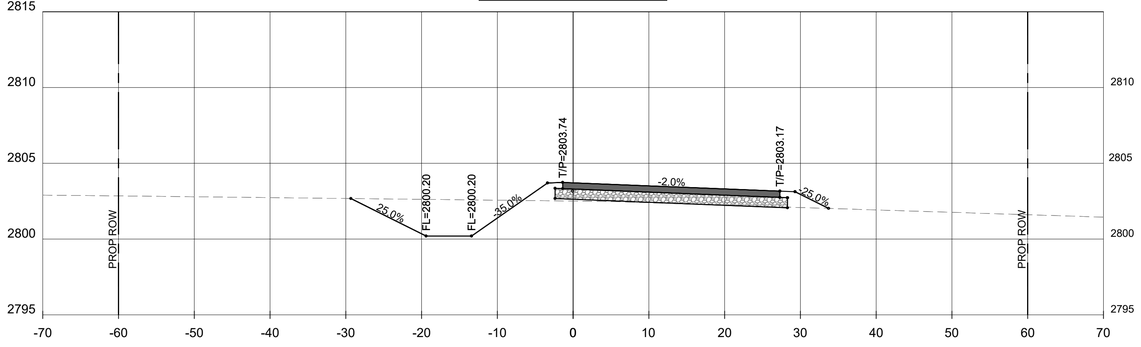
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

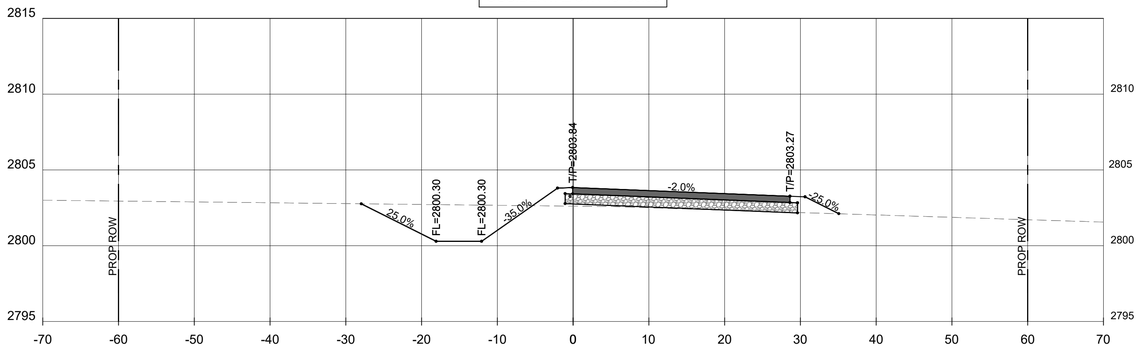
OCCIDENTAL STA 44+00.00



OCCIDENTAL STA 43+50.00



OCCIDENTAL STA 43+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HALFF
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 43+00 TO 44+00

SHEET NUMBER 135 OF 217

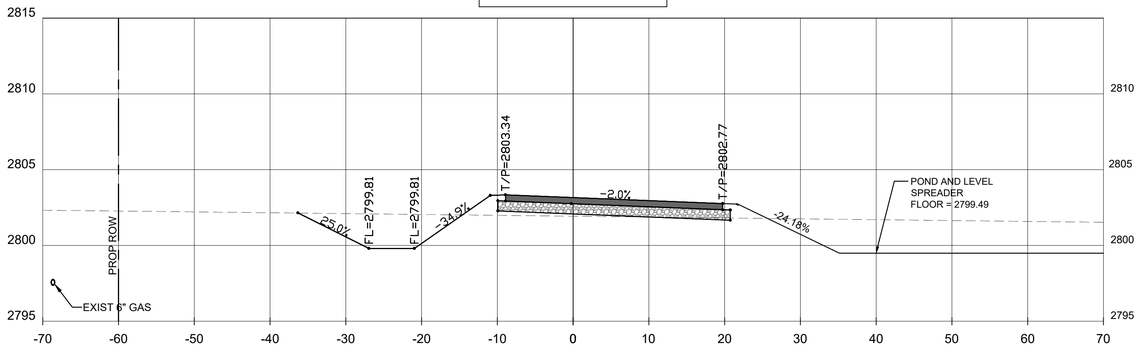
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:49 PM, USER: ah3453 AVO: 45715.006

NOTES:

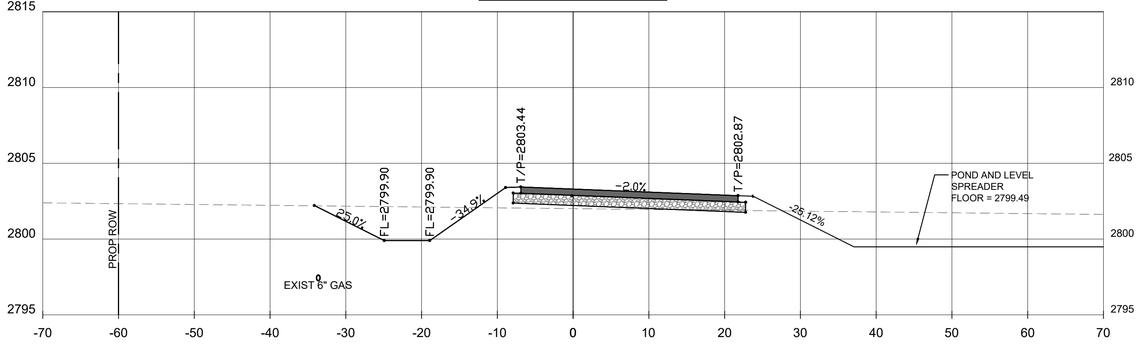
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

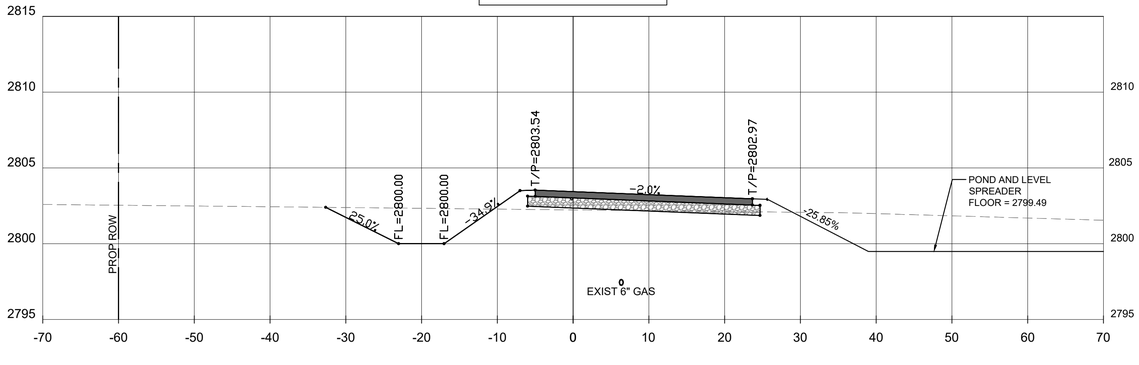
OCCIDENTAL STA 45+50.00



OCCIDENTAL STA 45+00.00



OCCIDENTAL STA 44+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB TAYLOR HATT
127558
LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 44+50 TO 45+50

SHEET NUMBER 136 OF 217

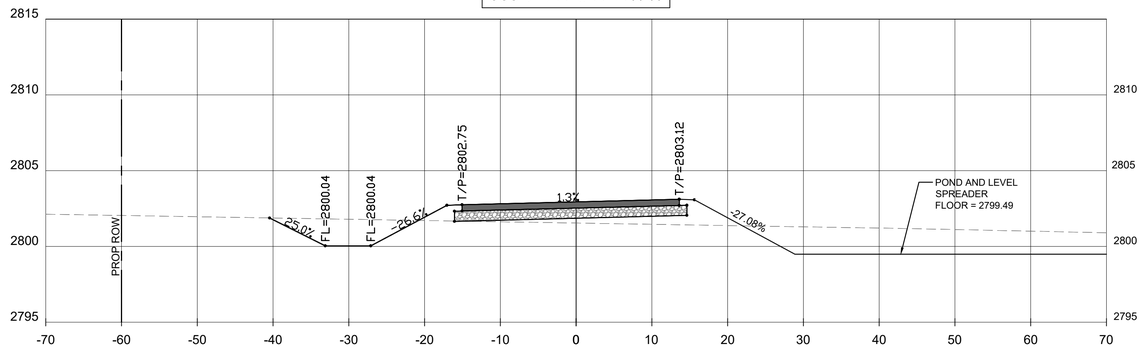
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:49 PM, USER: ah3453 AVO: 45715.006

NOTES:

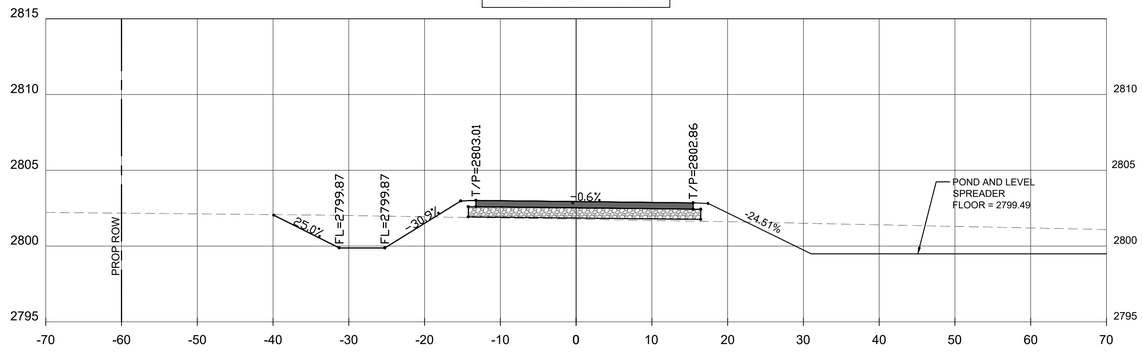
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

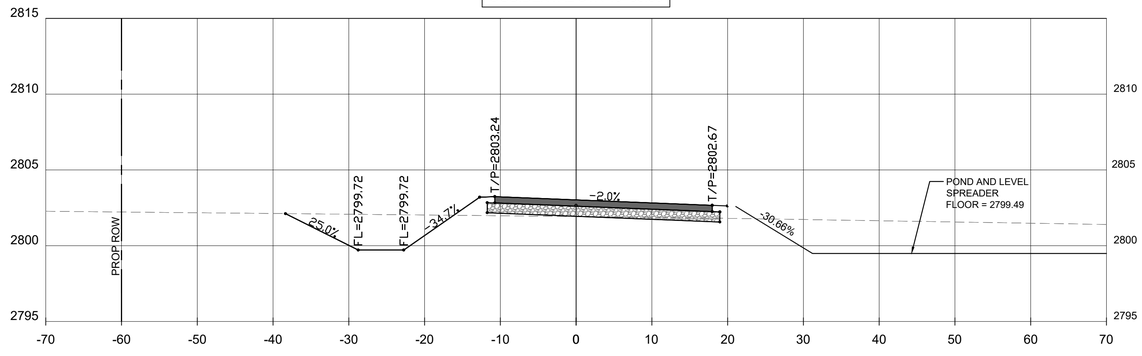
OCCIDENTAL STA 47+00.00



OCCIDENTAL STA 46+50.00



OCCIDENTAL STA 46+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 46+00 TO 47+00

SHEET NUMBER 137 OF 217

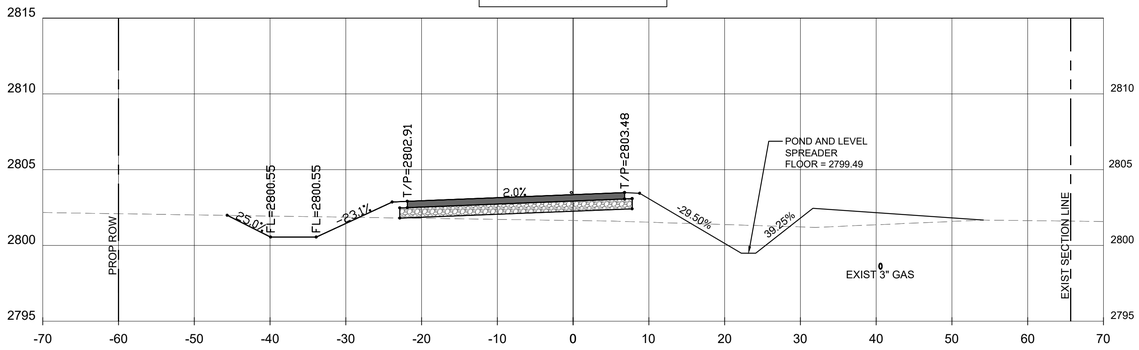
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:49 PM, USER: ah3453 AVO: 45715.006

NOTES:

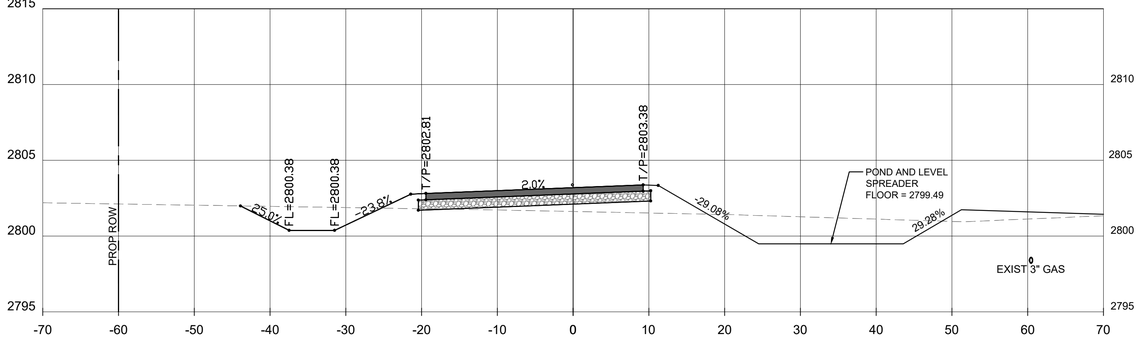
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

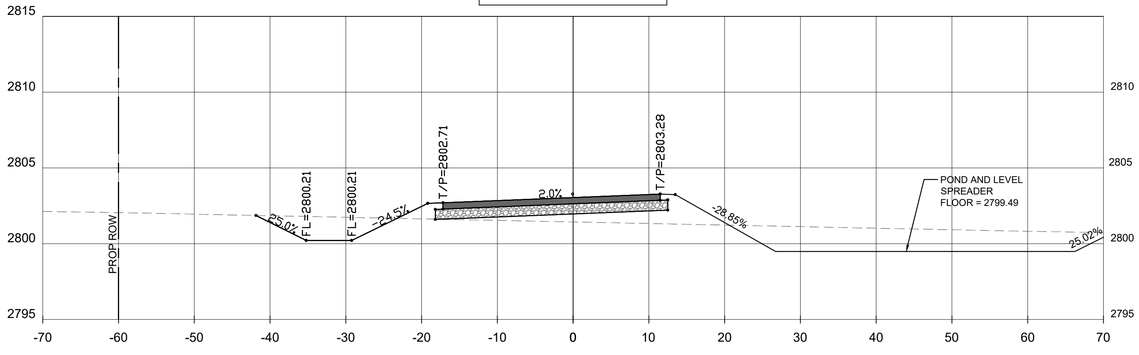
OCCIDENTAL STA 48+50.00



OCCIDENTAL STA 48+00.00



OCCIDENTAL STA 47+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HALFF
127558
LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 47+50 TO 48+50

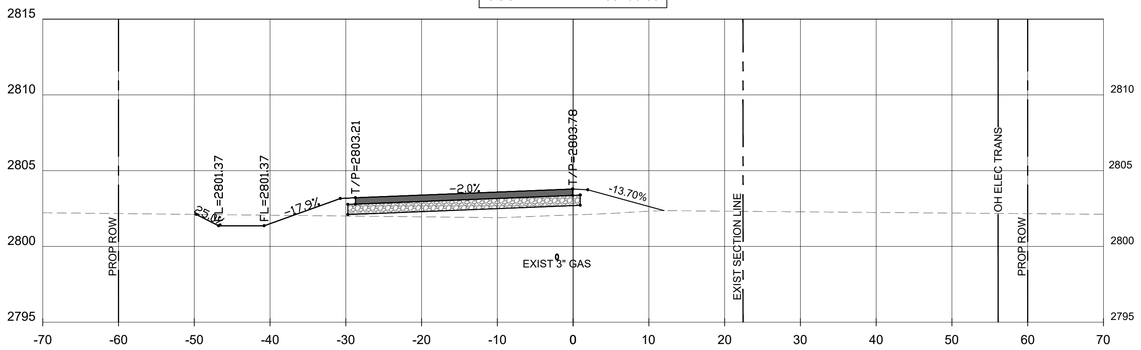
SHEET NUMBER 138 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:50 PM, USER: ah3453 AVO: 45715.006

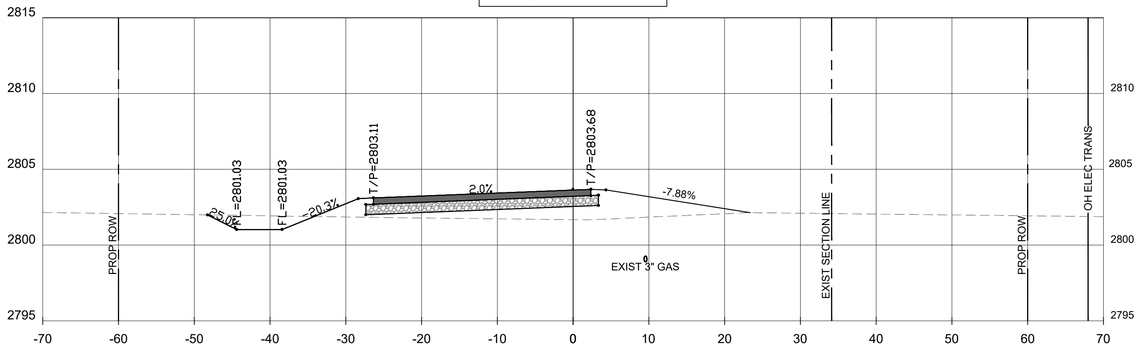
NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**
2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

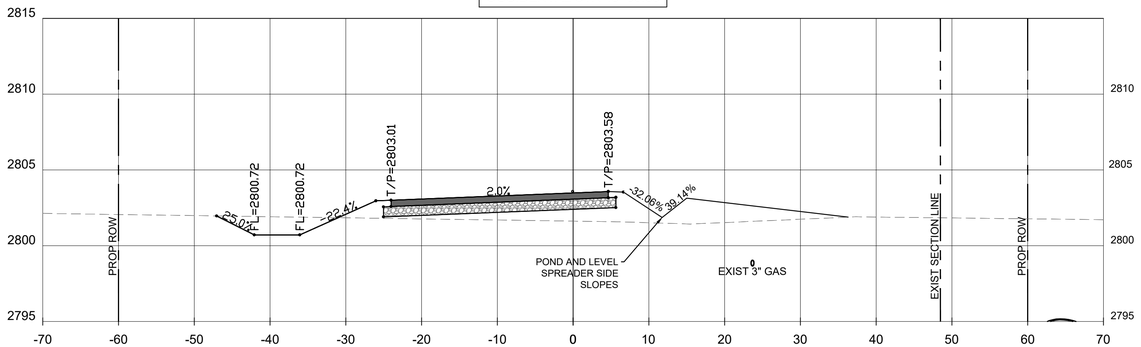
OCCIDENTAL STA 50+00.00



OCCIDENTAL STA 49+50.00



OCCIDENTAL STA 49+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL
ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 49+00 TO 50+00

SHEET NUMBER 139 OF 217

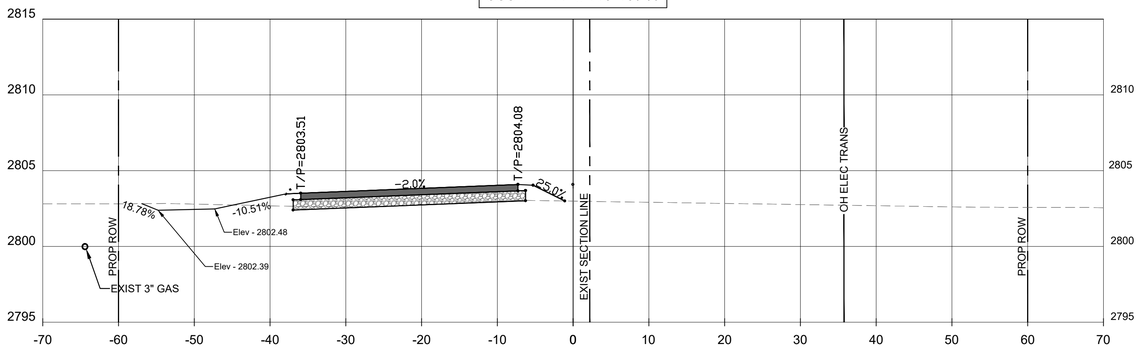
FILE NAME: A:\45000s\45715006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:50 PM, USER: ah3453 AVO: 45715.006

NOTES:

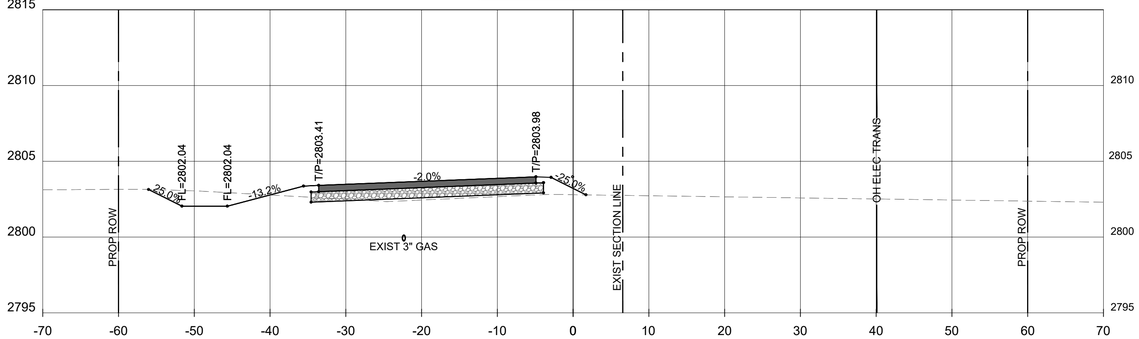
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

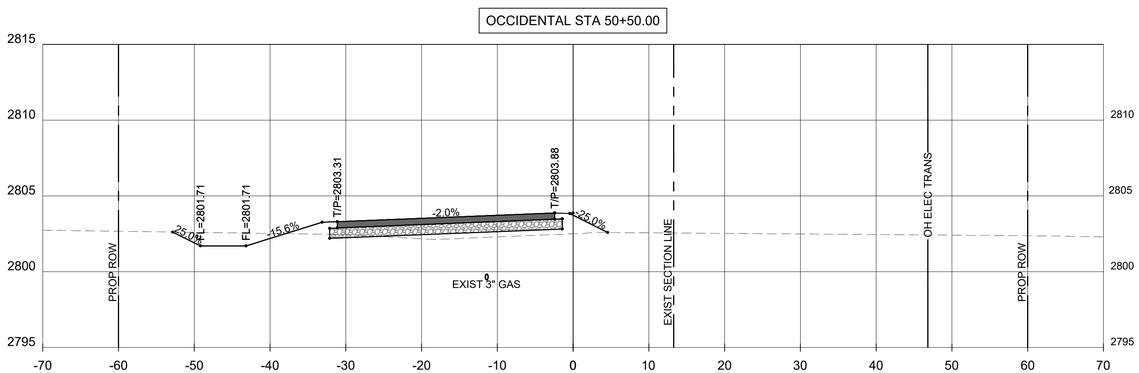
OCCIDENTAL STA 51+50.00



OCCIDENTAL STA 51+00.00



OCCIDENTAL STA 50+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL
ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 50+50 TO 51+50

SHEET NUMBER 140 OF 217

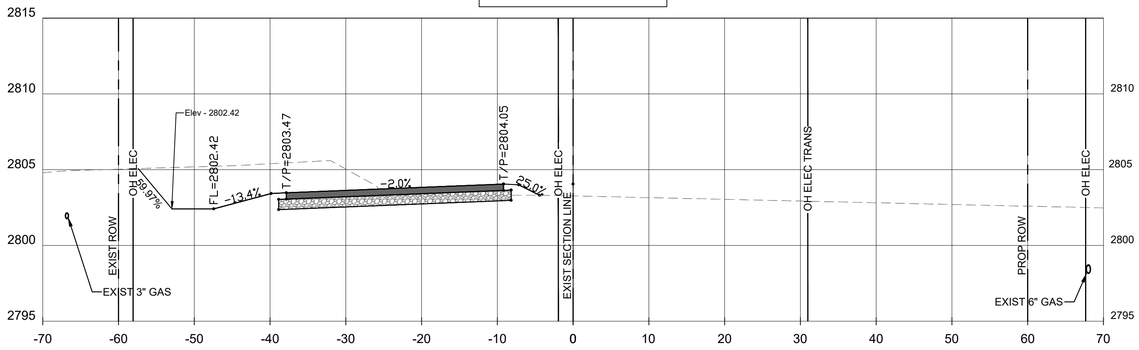
FILE NAME: A:\45000s\45715006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:50 PM, USER: ah3453 AVO: 45715.006

NOTES:

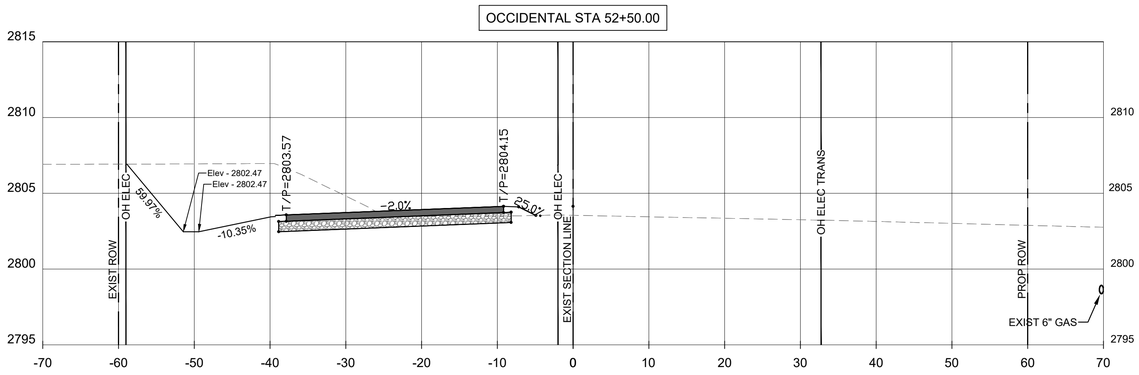
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

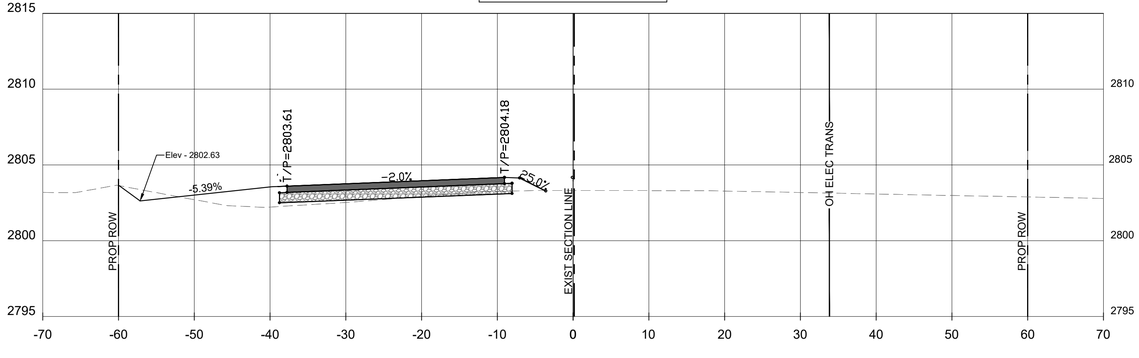
OCCIDENTAL STA 53+00.00



OCCIDENTAL STA 52+50.00



OCCIDENTAL STA 52+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 52+00 TO 53+00

SHEET NUMBER 141 OF 217

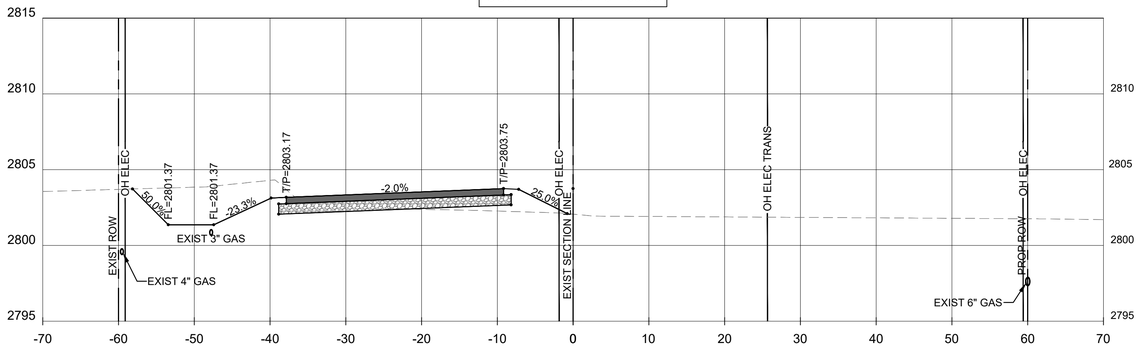
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:50 PM, USER: ah3453 AVO: 45715.006

NOTES:

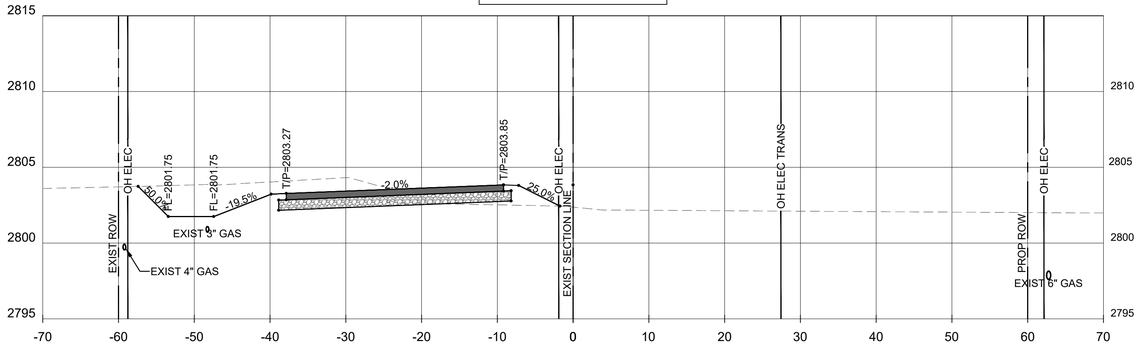
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

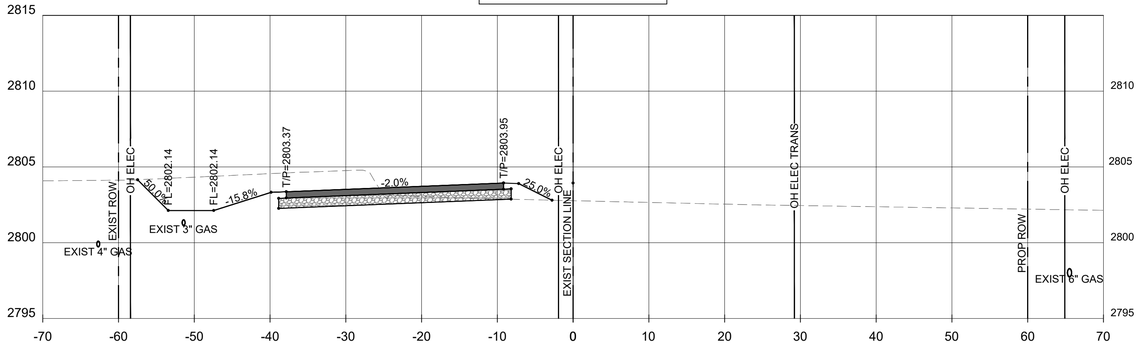
OCCIDENTAL STA 54+50.00



OCCIDENTAL STA 54+00.00



OCCIDENTAL STA 53+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HALFF 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

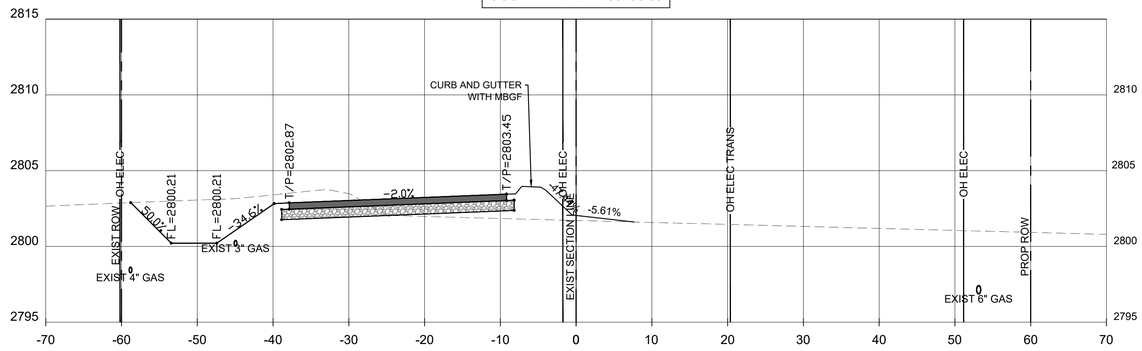
CROSS SECTIONS
STA 53+50 TO 54+50

NOTES:

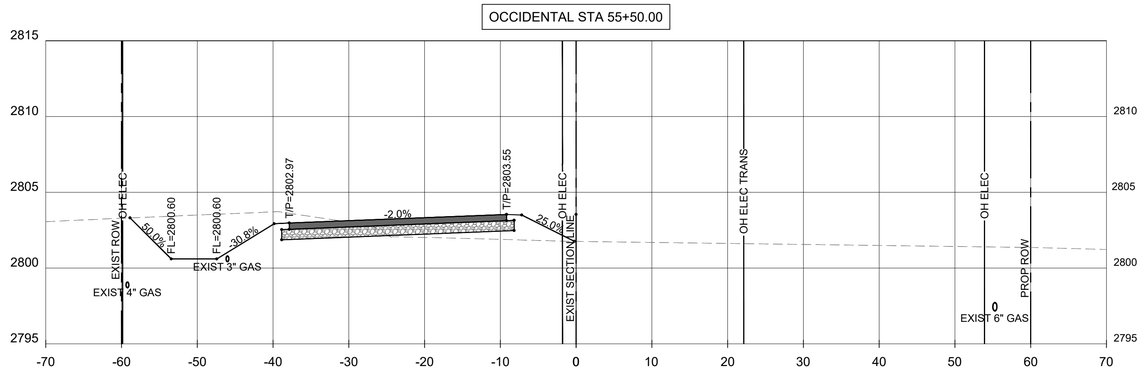
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

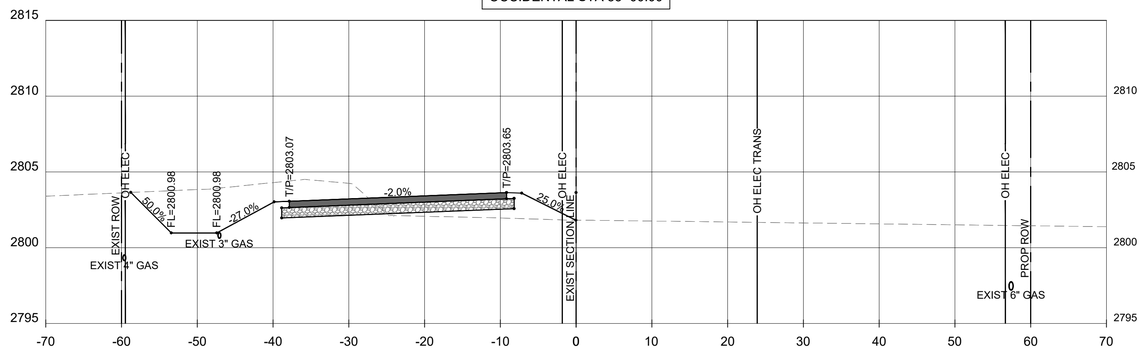
OCCIDENTAL STA 56+00.00



OCCIDENTAL STA 55+50.00



OCCIDENTAL STA 55+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB TAYLOR HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 55+00 TO 56+00

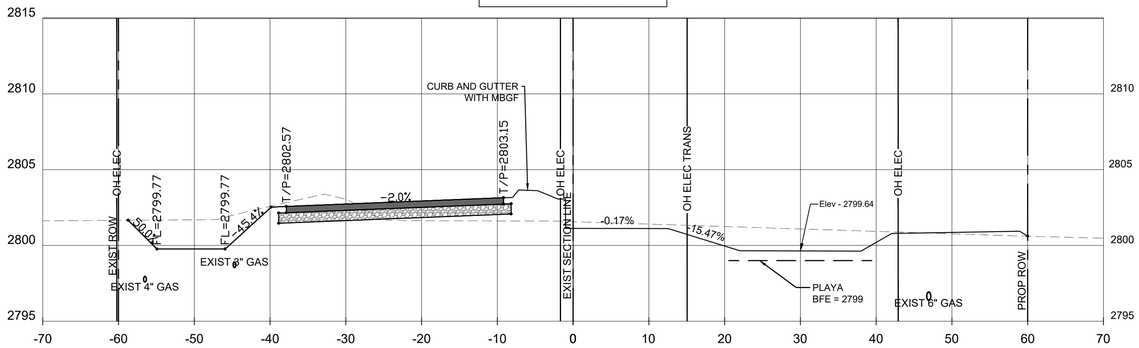
SHEET NUMBER 143 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:51 PM, USER: ah3453 AVO: 45715.006

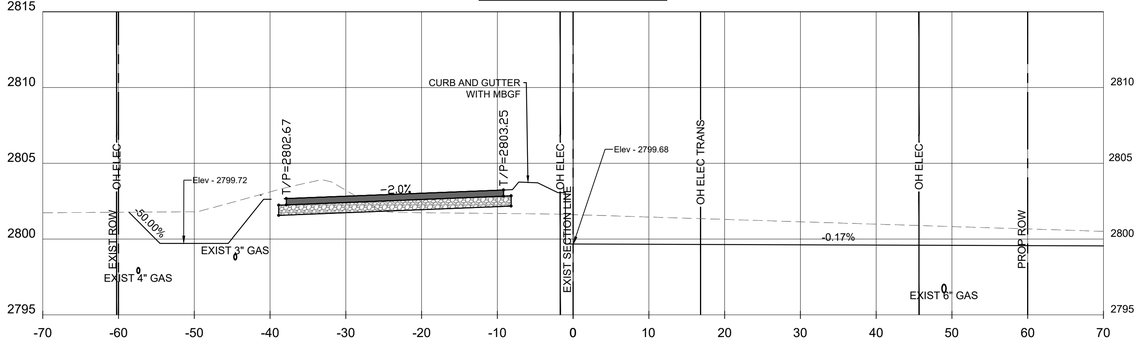
NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**
2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

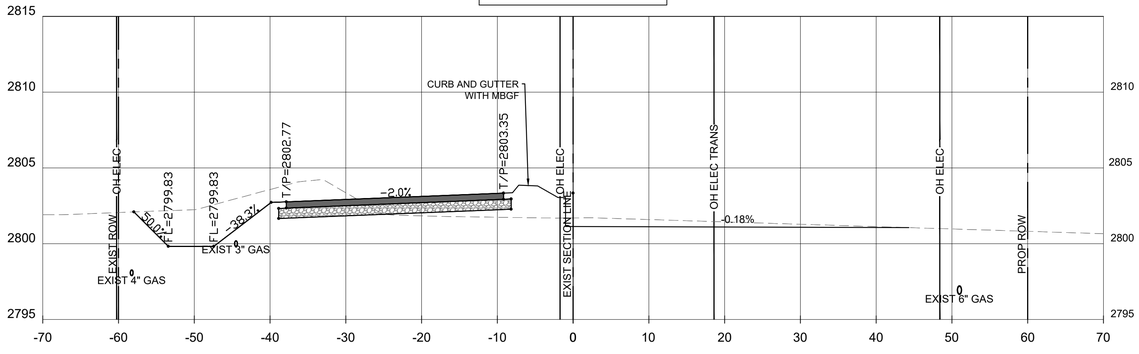
OCCIDENTAL STA 57+50.00



OCCIDENTAL STA 57+00.00



OCCIDENTAL STA 56+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HALFF 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 56+50 TO 57+50

SHEET NUMBER 144 OF 217

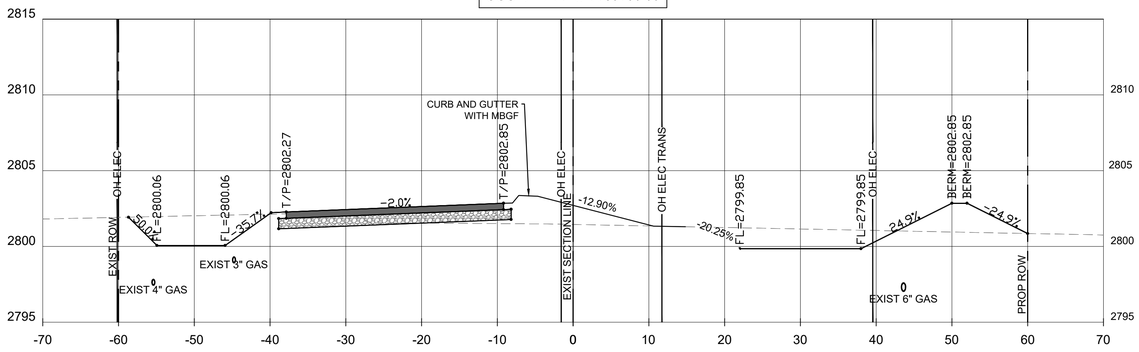
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:51 PM, USER: ah3453 AVO: 45715.006

NOTES:

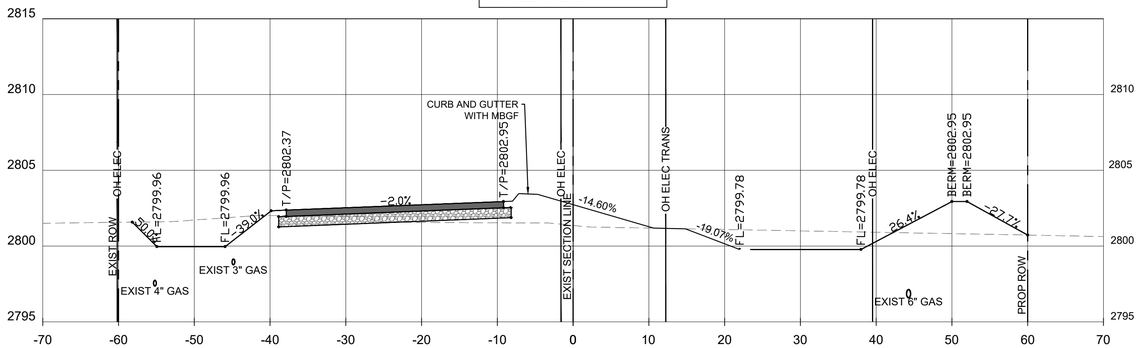
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

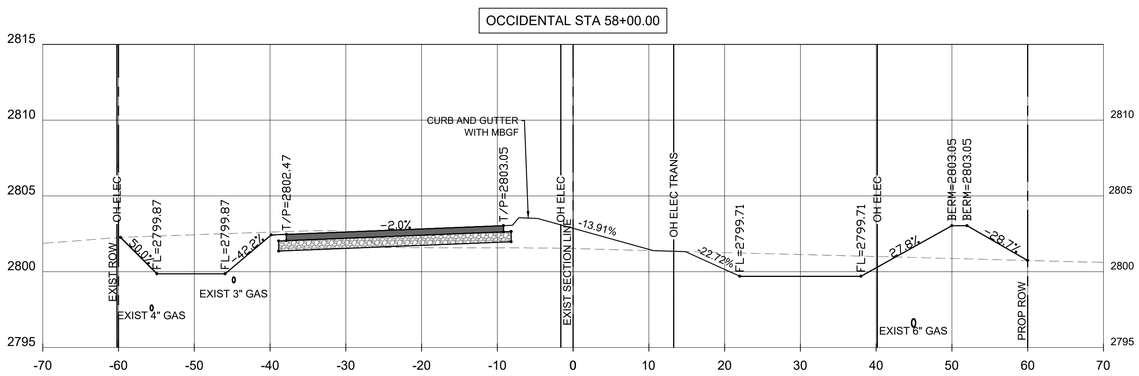
OCCIDENTAL STA 59+00.00



OCCIDENTAL STA 58+50.00



OCCIDENTAL STA 58+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL
ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

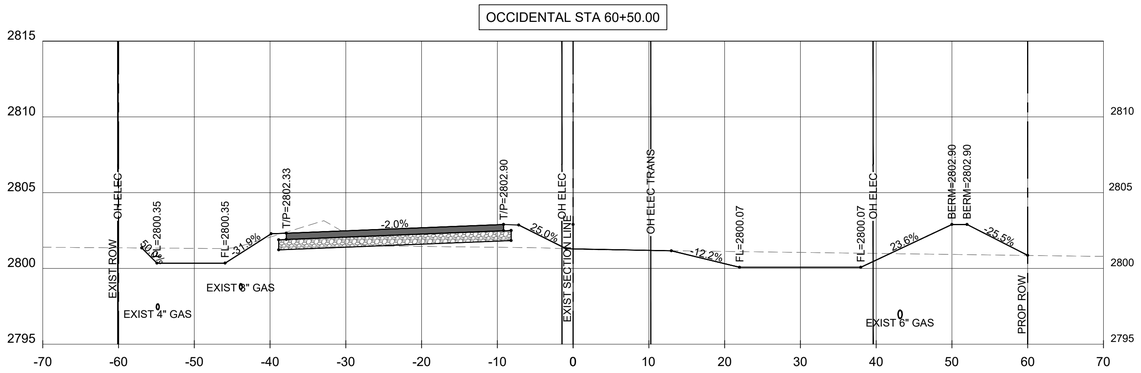
PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

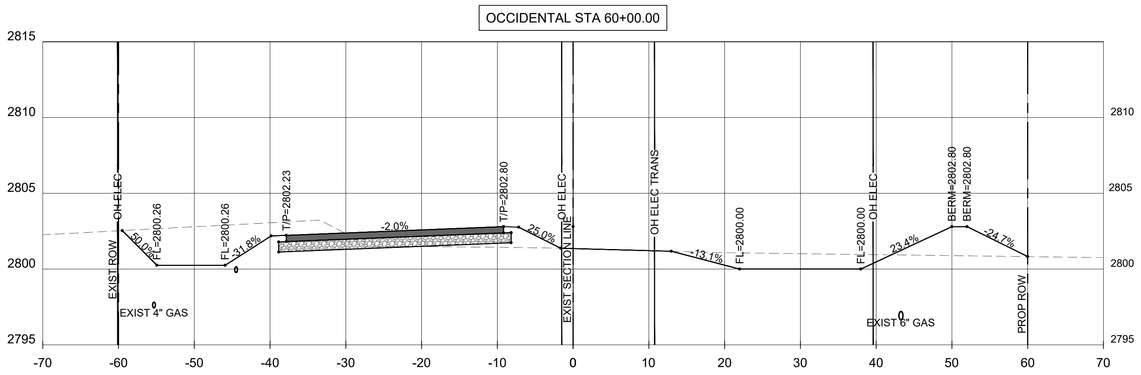
SHEET TITLE

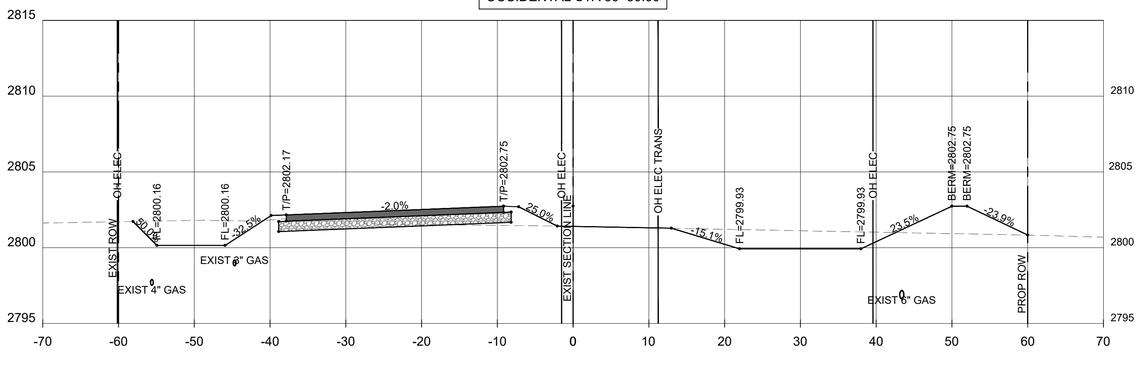
CROSS SECTIONS
STA 58+00 TO 59+00

SHEET NUMBER 145 OF 217

FILE NAME: A:\45000s\45715006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:51 PM, USER: ah3453 AVO: 45715.006







NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**
2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

CITY OF MIDLAND Engineering Services

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 59+50 TO 60+50

SHEET NUMBER 146 OF 217

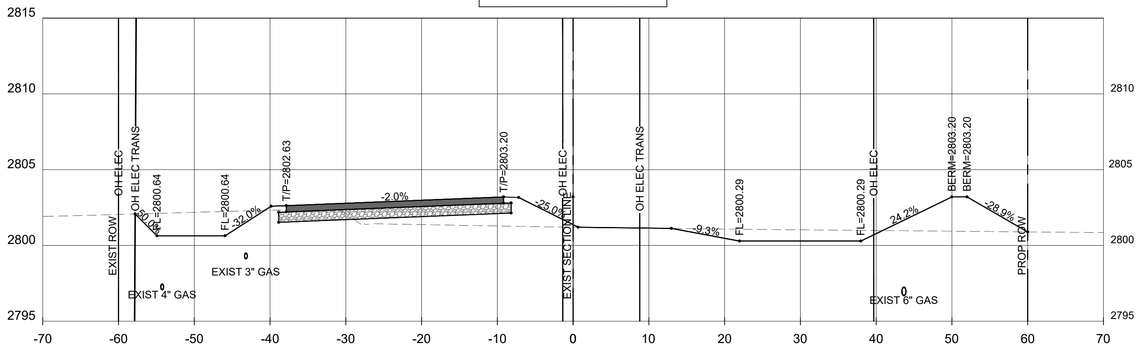
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:51 PM, USER: ah3453 AVO: 45715.006

NOTES:

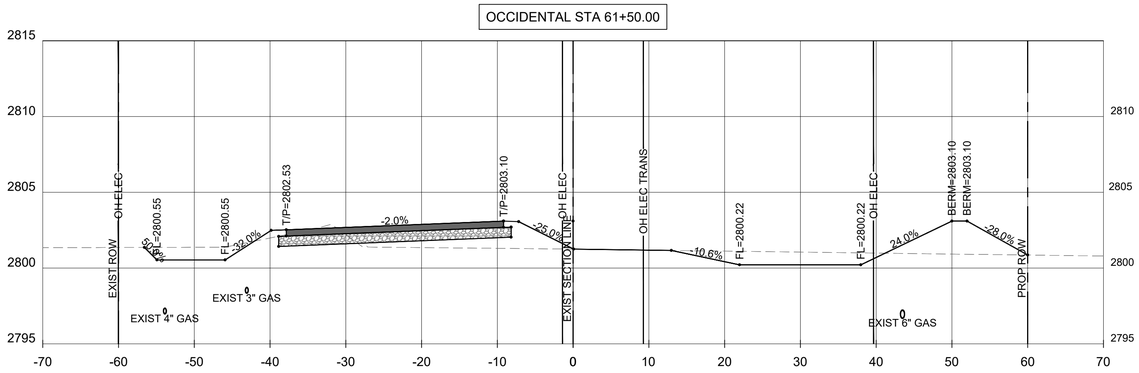
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

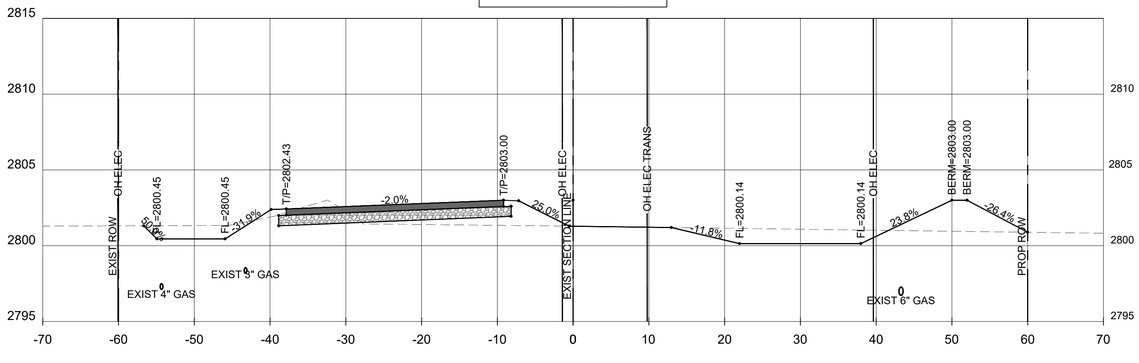
OCCIDENTAL STA 62+00.00



OCCIDENTAL STA 61+50.00



OCCIDENTAL STA 61+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HALFF 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 61+00 TO 62+00

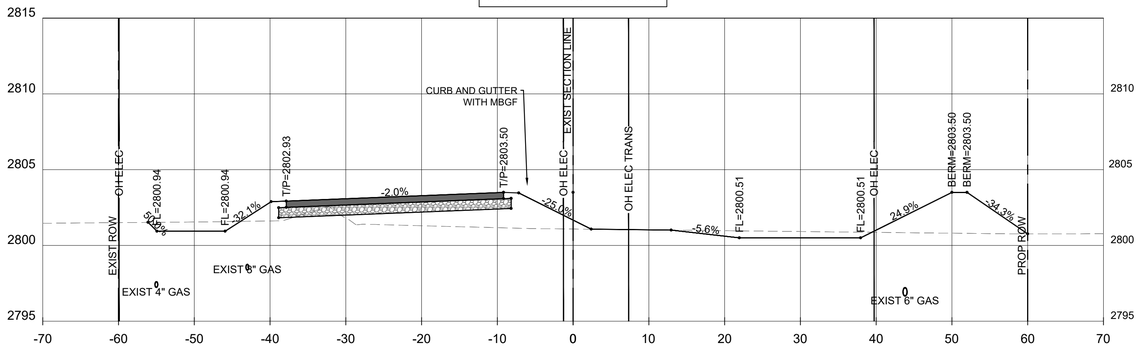
SHEET NUMBER 147 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:52 PM, USER: ait3453 AVO: 45715.006

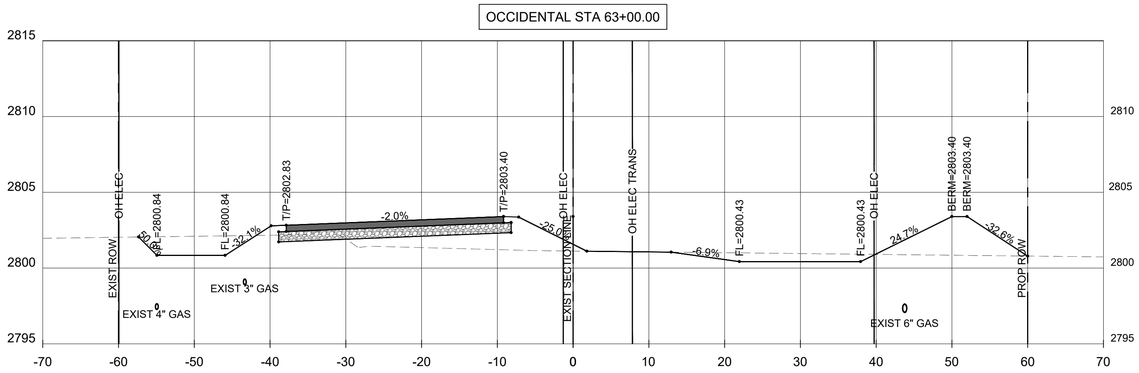
NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**
2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

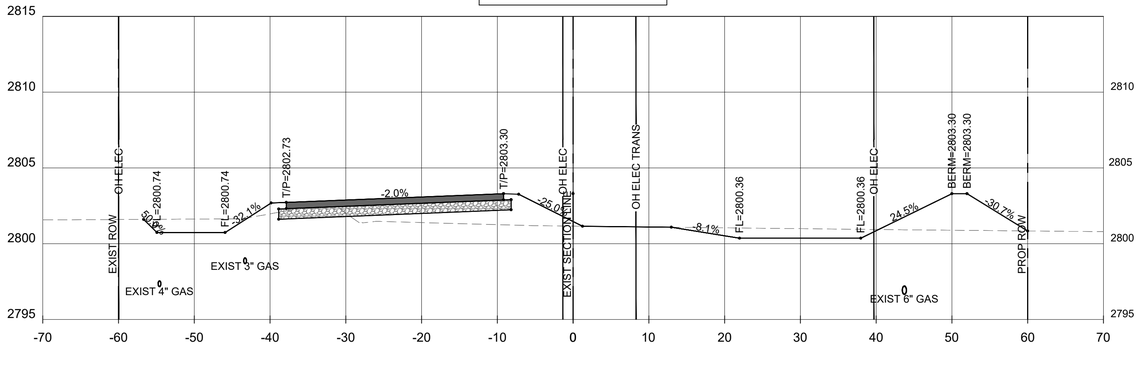
OCCIDENTAL STA 63+50.00



OCCIDENTAL STA 63+00.00



OCCIDENTAL STA 62+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HALFF 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 62+50 TO 63+50

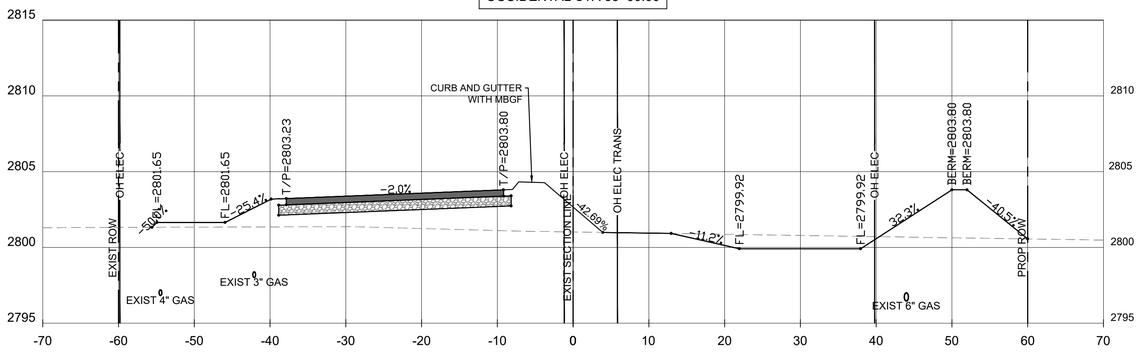
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:52 PM, USER: ah3453 AVO: 45715.006

NOTES:

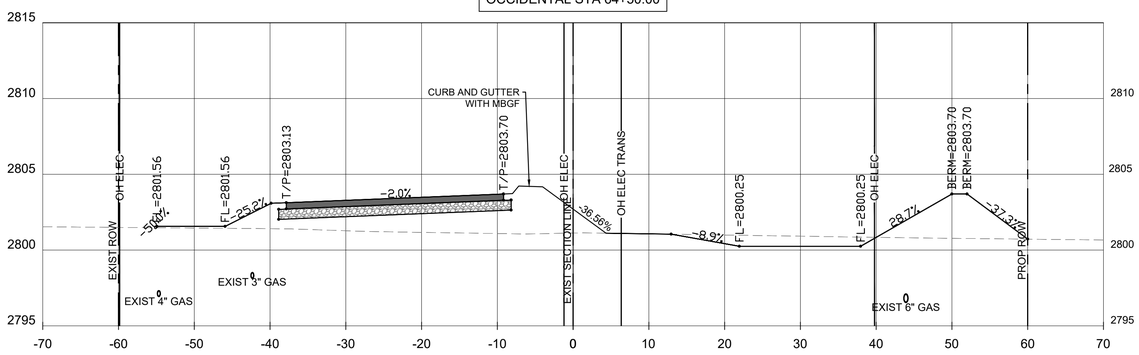
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

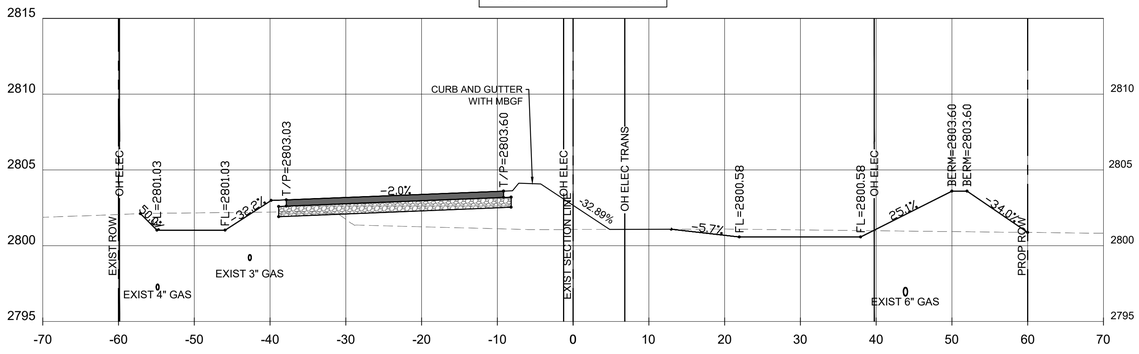
OCCIDENTAL STA 65+00.00



OCCIDENTAL STA 64+50.00



OCCIDENTAL STA 64+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION		
NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 64+00 TO 65+00

SHEET NUMBER 149 OF 217

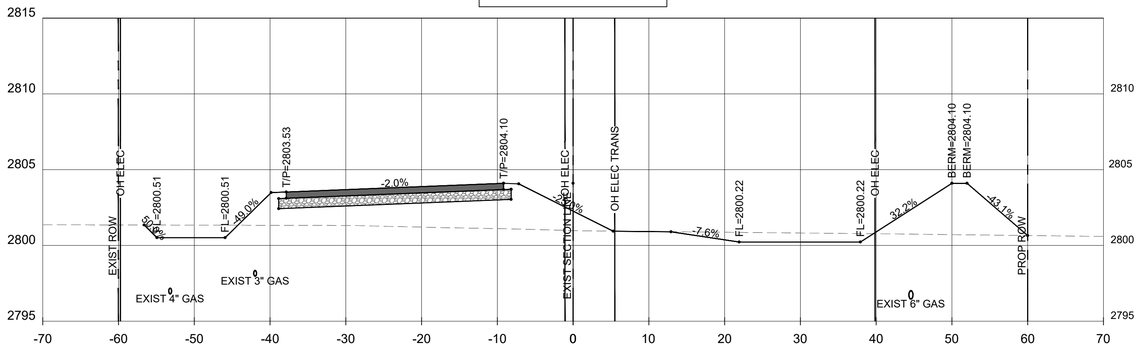
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:52 PM, USER: ah3453 AVO: 45715.006

NOTES:

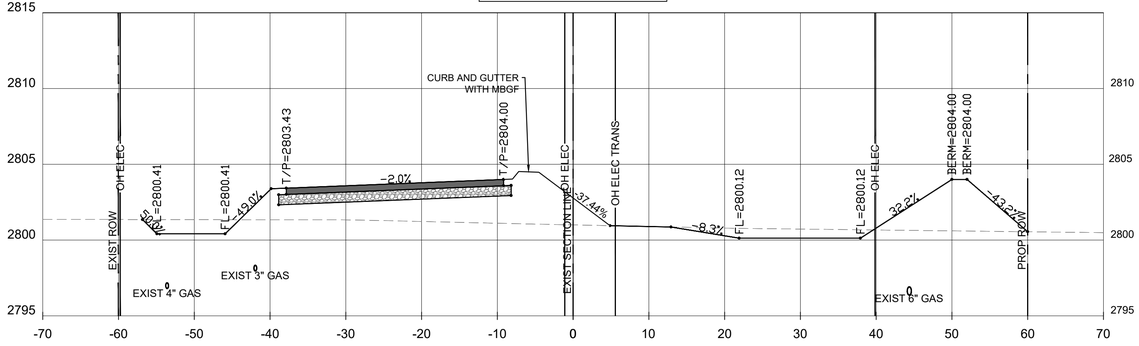
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

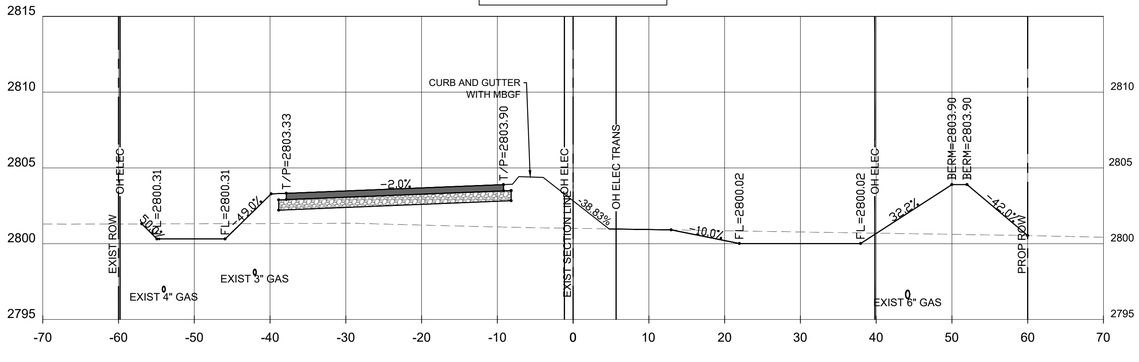
OCCIDENTAL STA 66+50.00



OCCIDENTAL STA 66+00.00



OCCIDENTAL STA 65+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 65+50 TO 66+50

SHEET NUMBER 150 OF 217

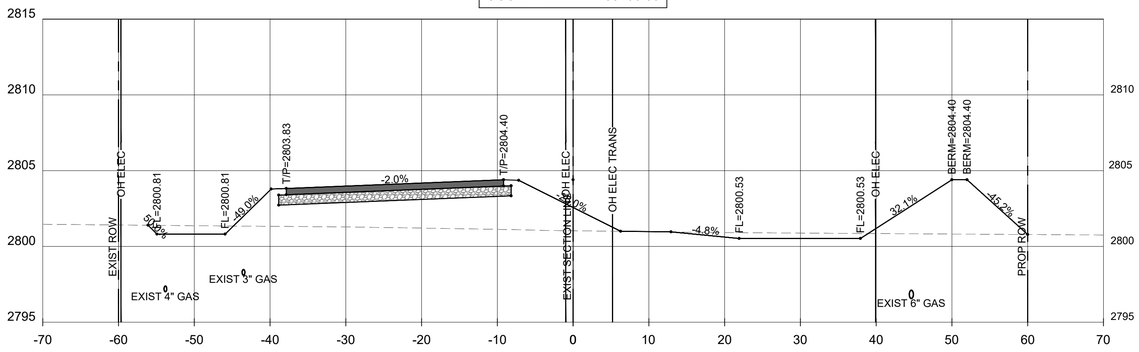
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:52 PM, USER: ah3453 AVO: 45715.006

NOTES:

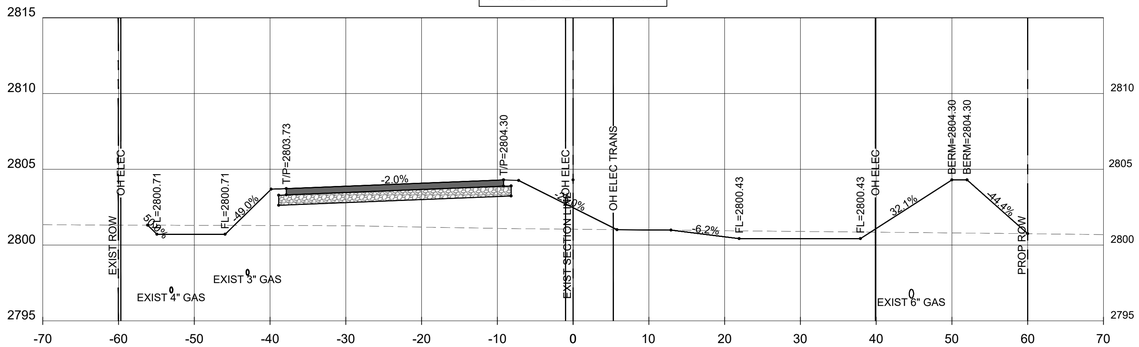
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

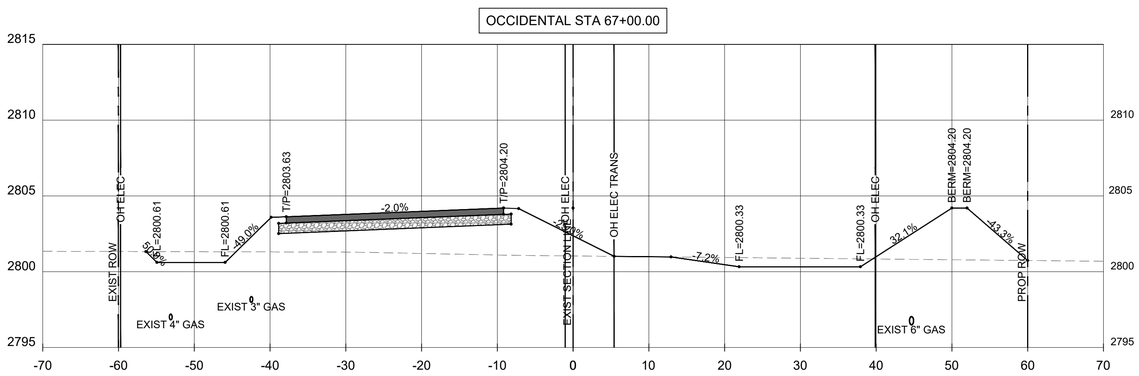
OCCIDENTAL STA 68+00.00



OCCIDENTAL STA 67+50.00



OCCIDENTAL STA 67+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION		
NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL
ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 67+00 TO 68+00

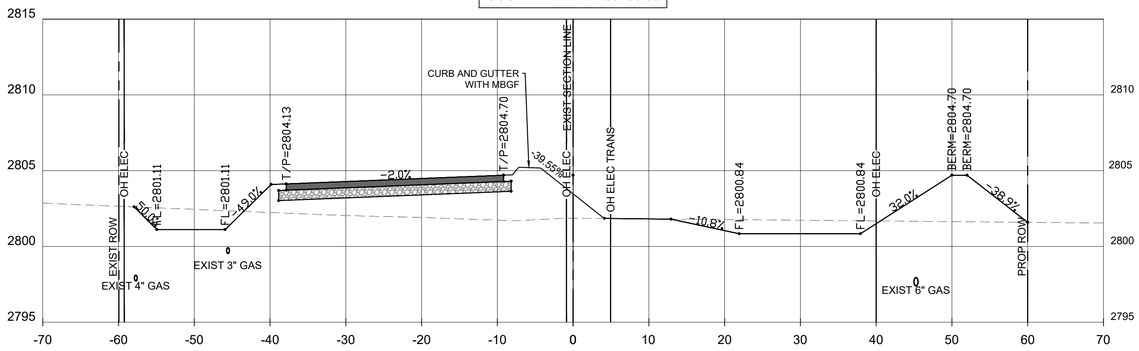
SHEET NUMBER 151 OF 217

NOTES:

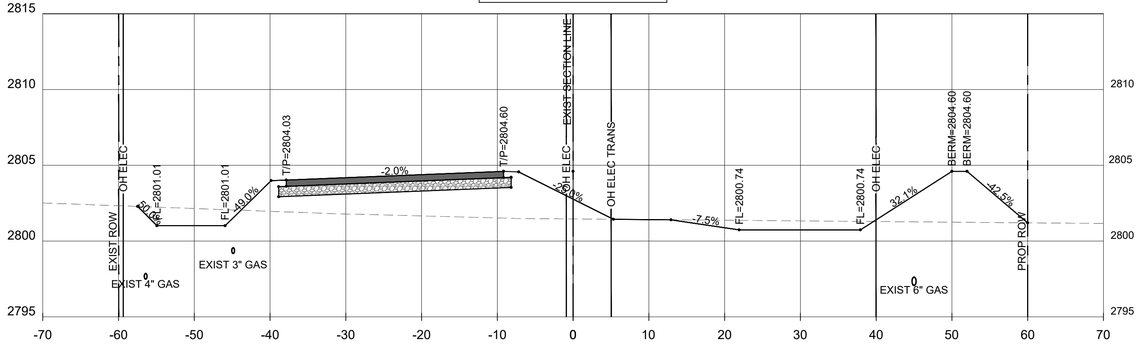
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

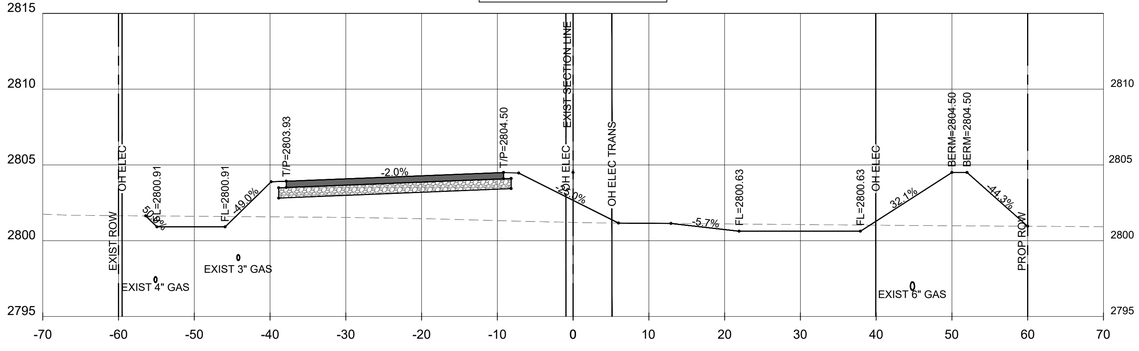
OCCIDENTAL STA 69+50.00



OCCIDENTAL STA 69+00.00



OCCIDENTAL STA 68+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HATF
127508
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 68+50 TO 69+50

SHEET NUMBER 152 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:53 PM, USER: ah3453 AVO: 45715.006

NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**
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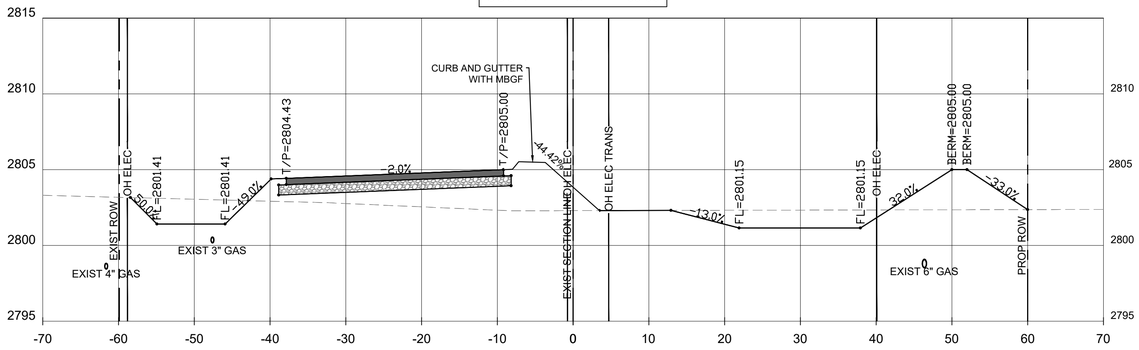
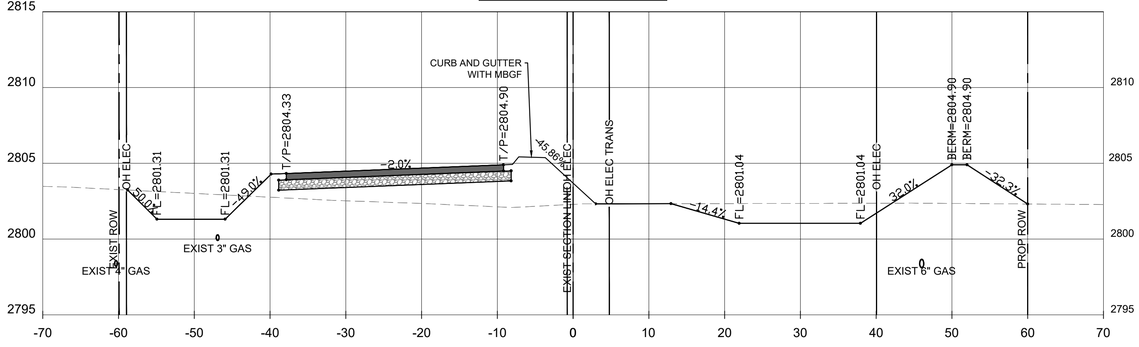
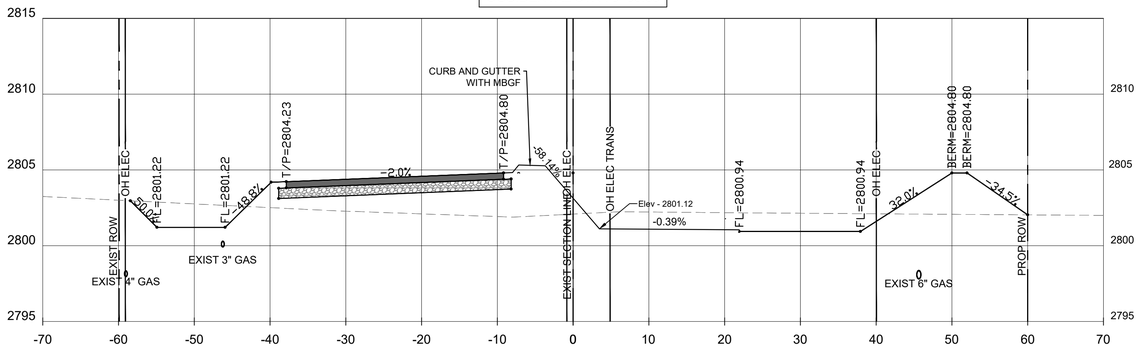
OCCIDENTAL STA 71+00.00



OCCIDENTAL STA 70+50.00



OCCIDENTAL STA 70+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HALFF 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 70+00 TO 71+00

SHEET NUMBER 153 OF 217

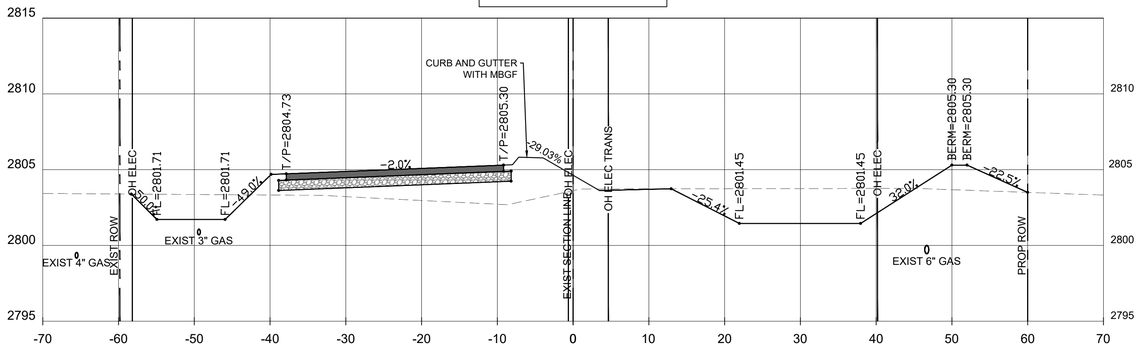
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:53 PM, USER: ah3453 AVO: 45715.006

NOTES:

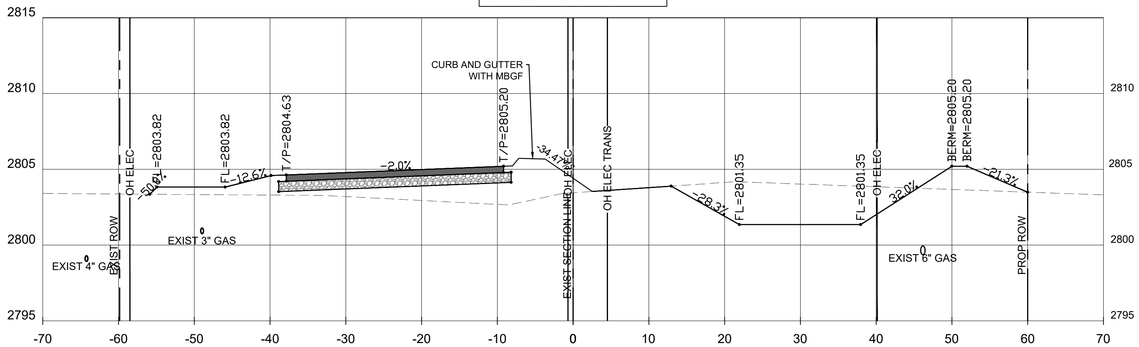
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

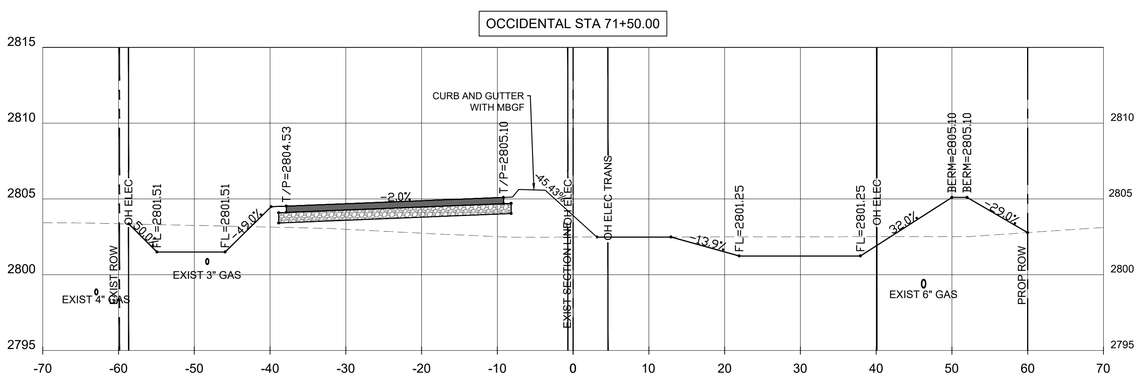
OCCIDENTAL STA 72+50.00



OCCIDENTAL STA 72+00.00



OCCIDENTAL STA 71+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER
DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 71+50 TO 72+50

SHEET NUMBER 154 OF 217

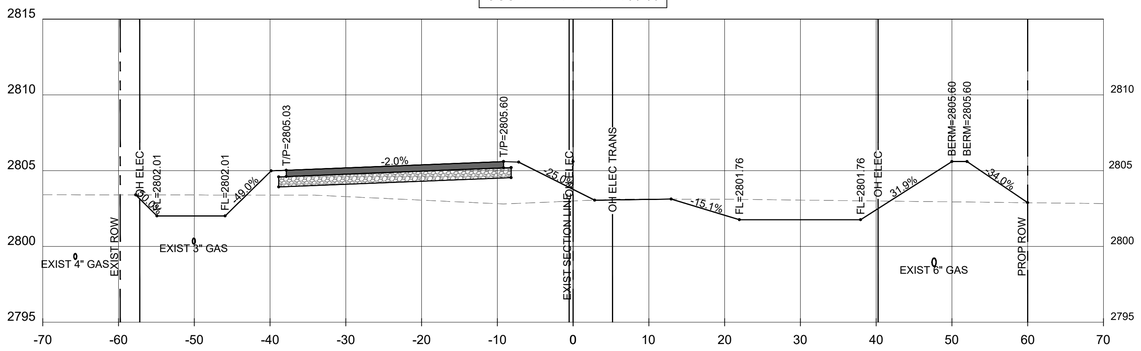
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:53 PM, USER: ah3453 AVO: 45715.006

NOTES:

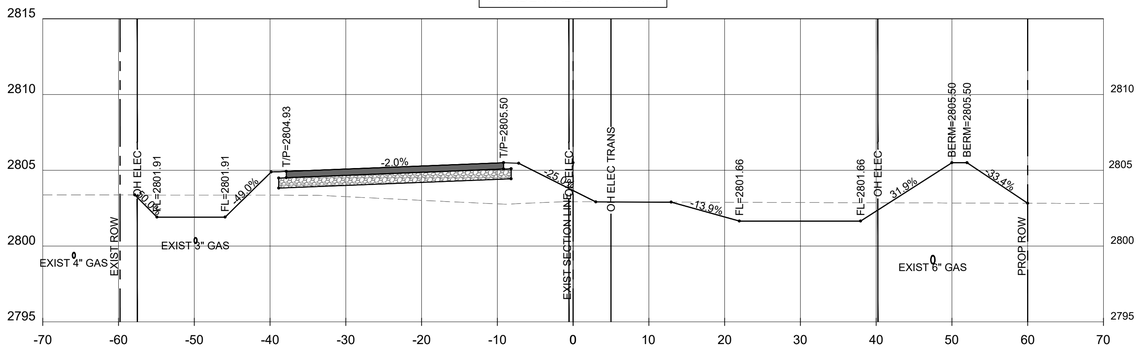
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

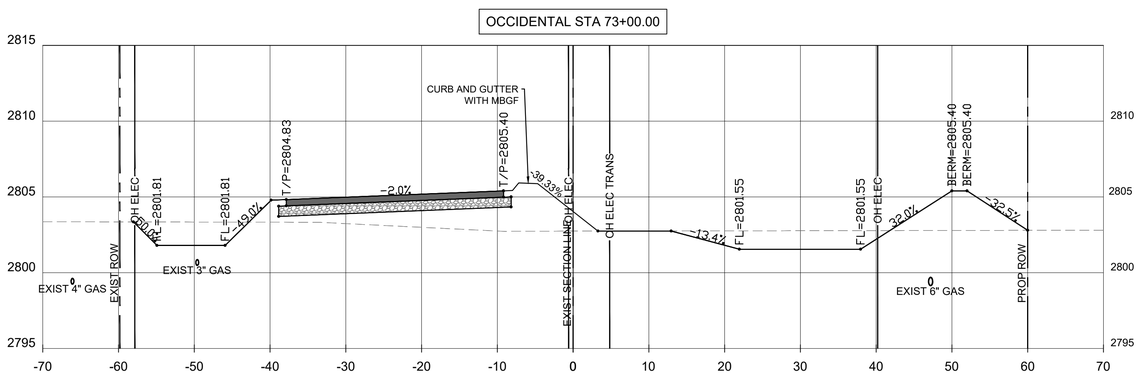
OCCIDENTAL STA 74+00.00



OCCIDENTAL STA 73+50.00



OCCIDENTAL STA 73+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION		
NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HATF
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 73+00 TO 74+00

SHEET NUMBER 155 OF 217

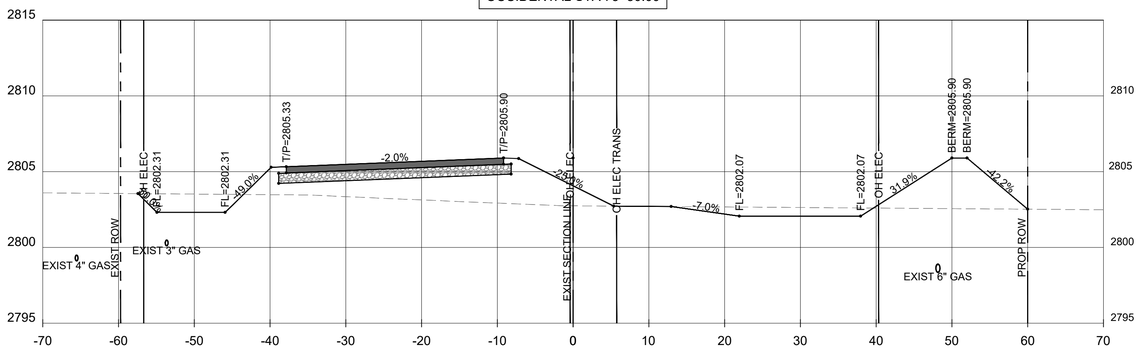
FILE NAME: A:\45000s\45715\006\CAD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:54 PM, USER: ah3453, AVO: 45715.006

NOTES:

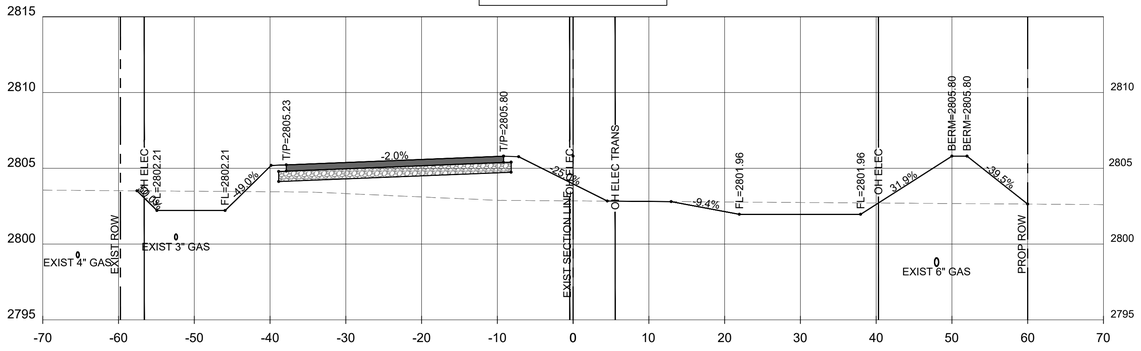
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

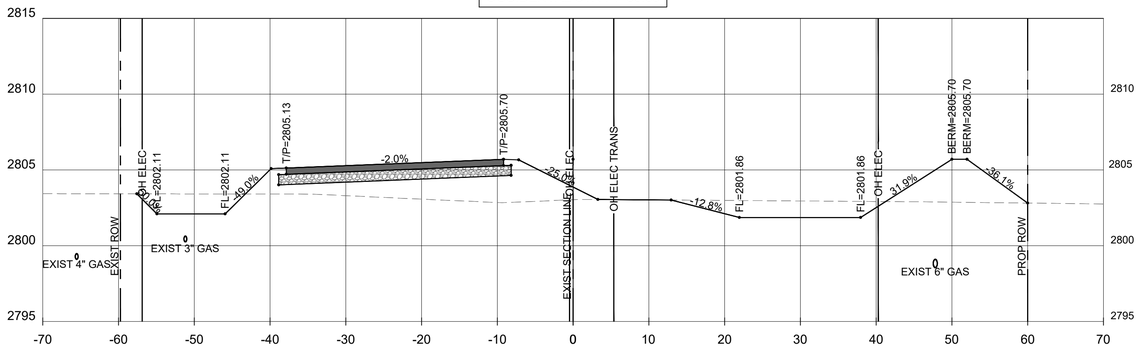
OCCIDENTAL STA 75+50.00



OCCIDENTAL STA 75+00.00



OCCIDENTAL STA 74+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION		
NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127556
LICENSED
PROFESSIONAL
ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 74+50 TO 75+50

NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

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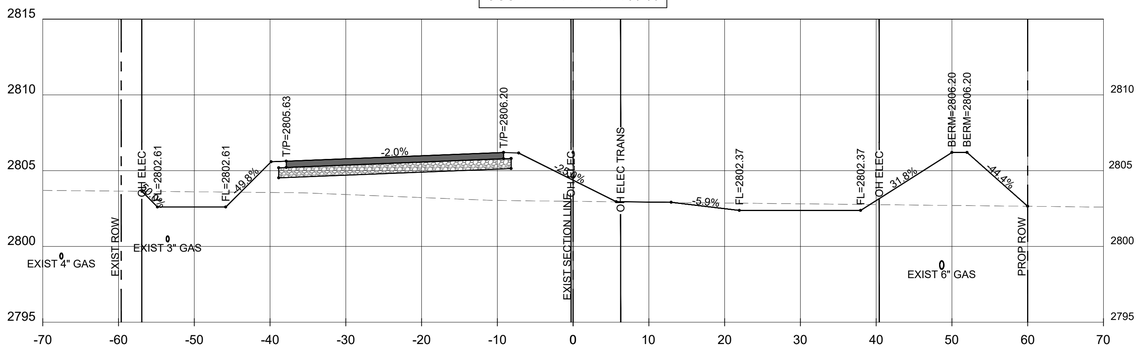
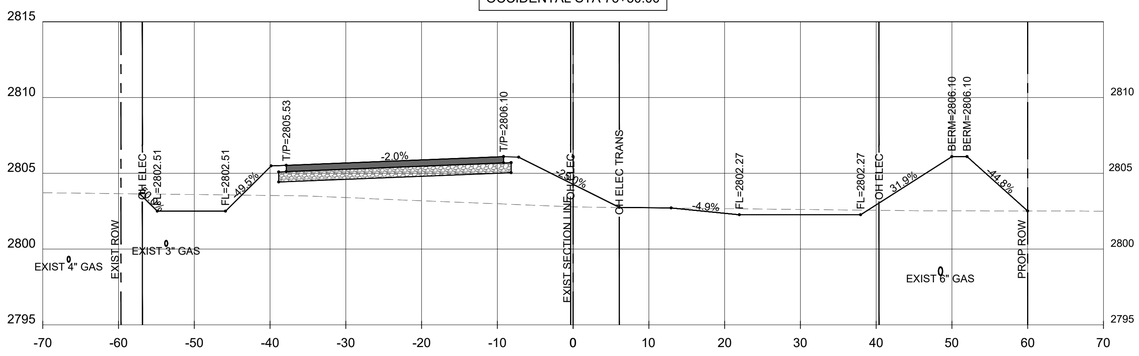
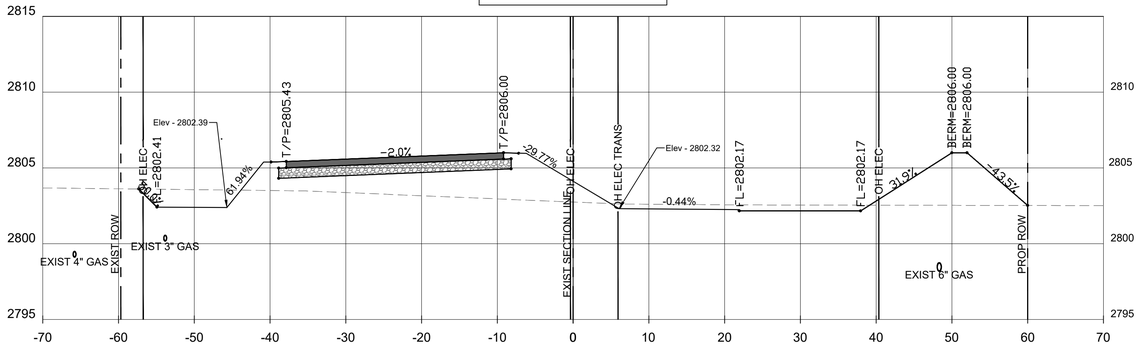
OCCIDENTAL STA 77+00.00



OCCIDENTAL STA 76+50.00



OCCIDENTAL STA 76+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JOSEPH T. HALFF
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 76+00 TO 77+00

SHEET NUMBER 157 OF 217

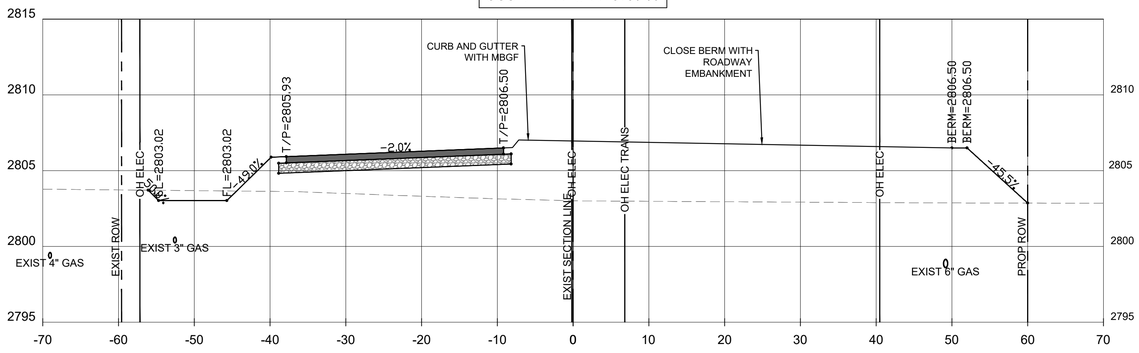
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:54 PM, USER: ajh3453 AVO: 45715.006

NOTES:

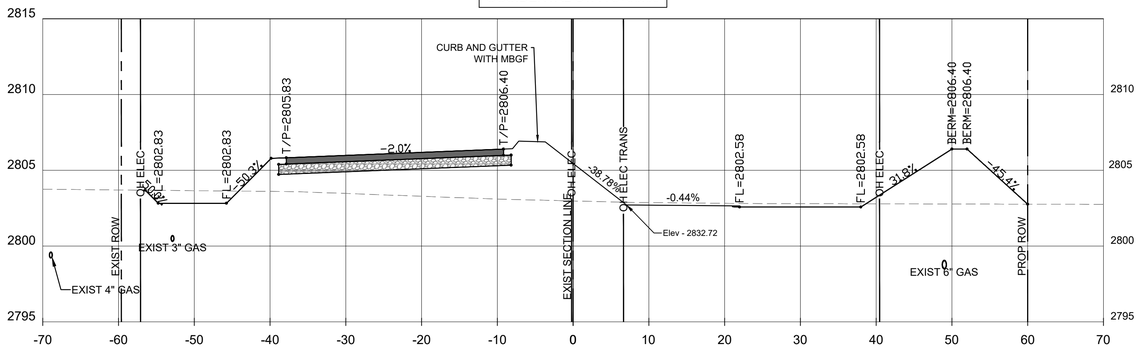
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

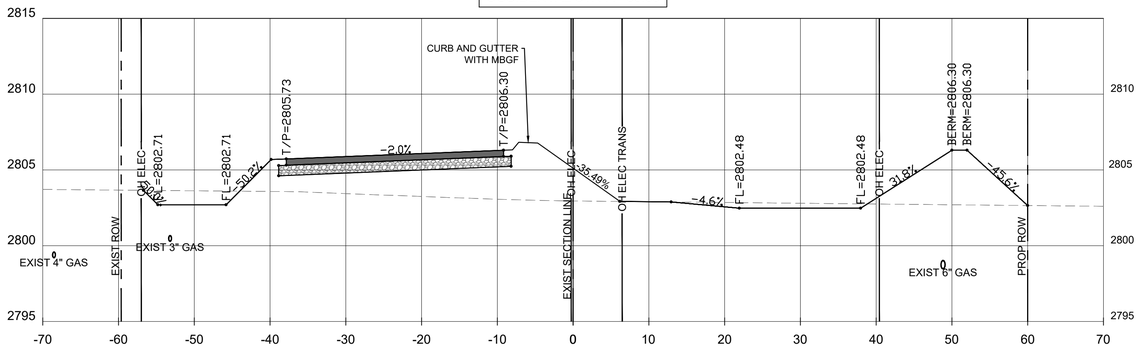
OCCIDENTAL STA 78+50.00



OCCIDENTAL STA 78+00.00



OCCIDENTAL STA 77+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB TAYLOR HAYS
127558
LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 77+50 TO 78+50

SHEET NUMBER 158 OF 217

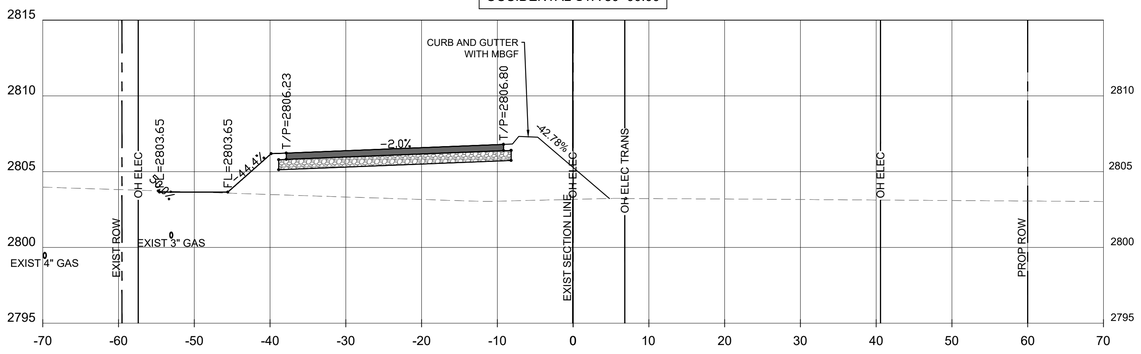
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:54 PM, USER: ah3453 AVO: 45715.006

NOTES:

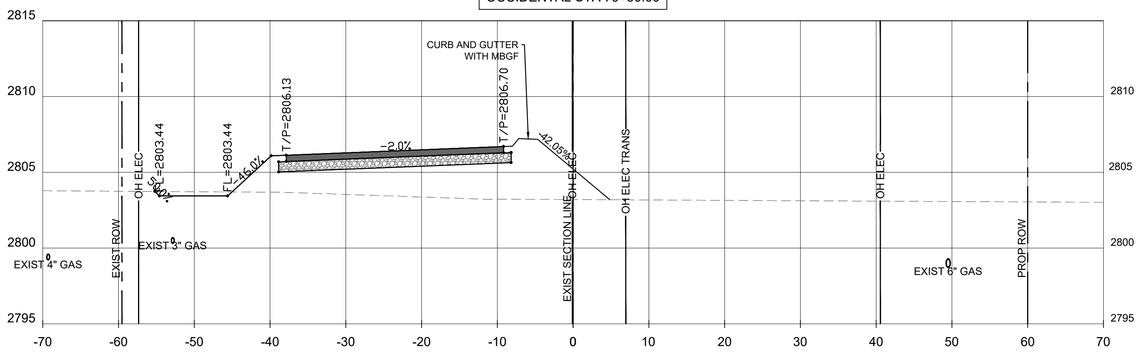
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

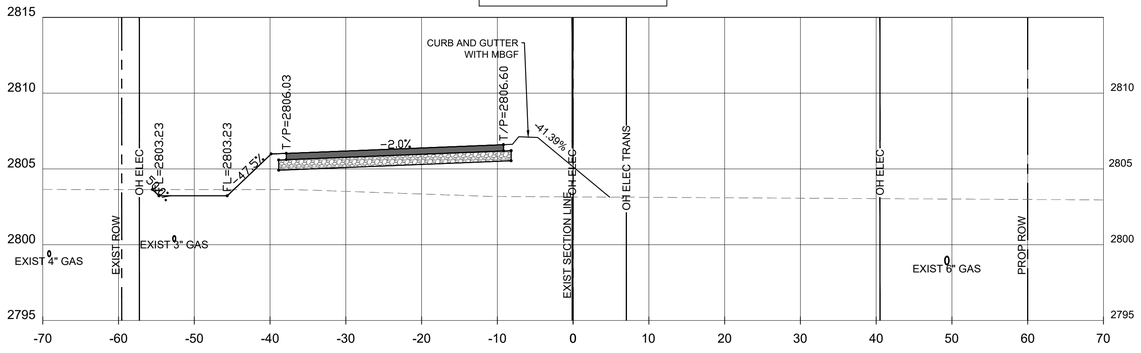
OCCIDENTAL STA 80+00.00



OCCIDENTAL STA 79+50.00



OCCIDENTAL STA 79+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HATS
127558
LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 79+00 TO 80+00

SHEET NUMBER 159 OF 217

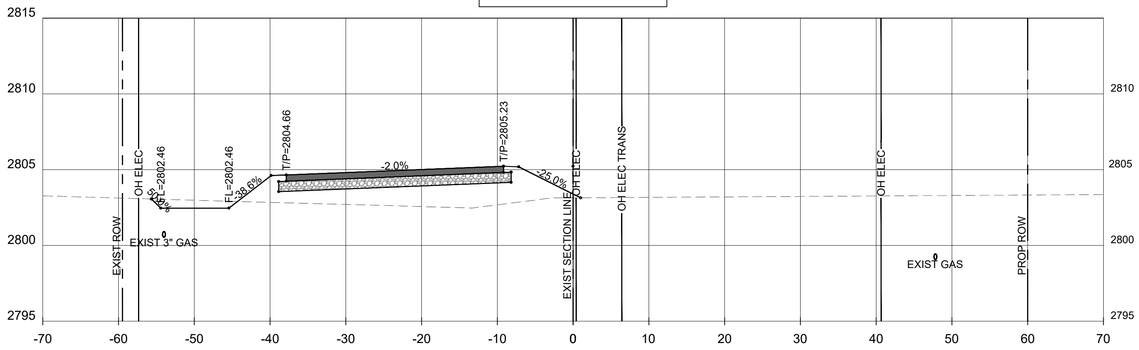
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:55 PM, USER: ah3453 AVO: 45715.006

NOTES:

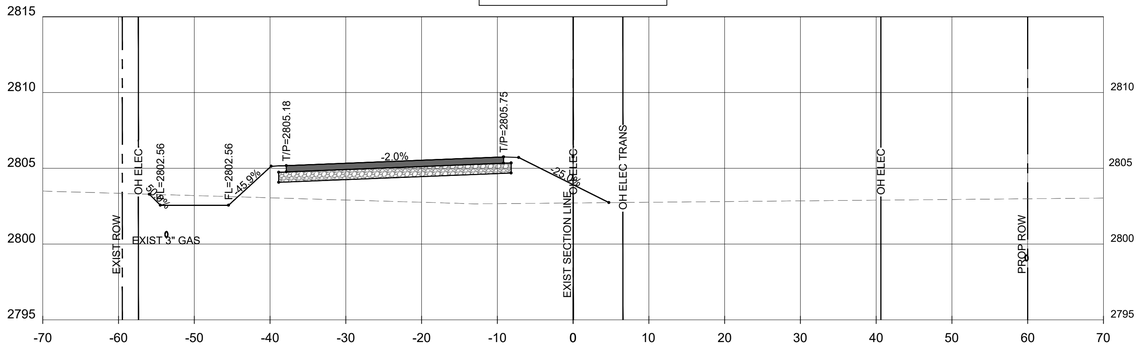
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

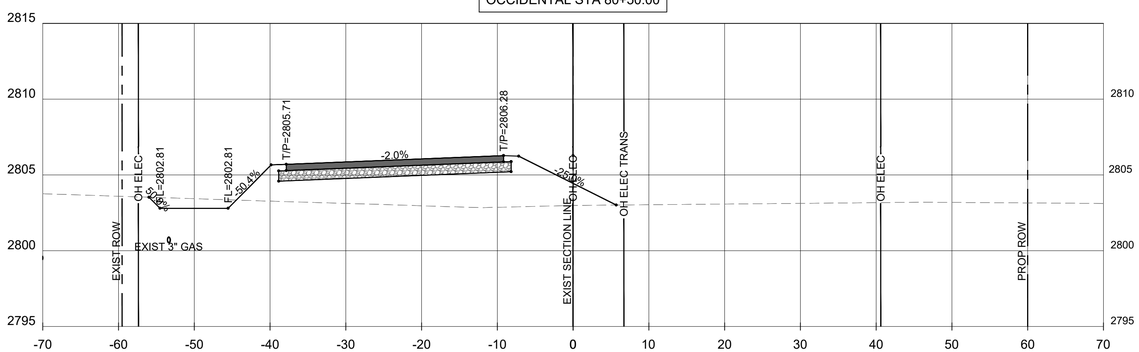
OCCIDENTAL STA 81+50.00



OCCIDENTAL STA 81+00.00



OCCIDENTAL STA 80+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 80+50 TO 81+50

SHEET NUMBER 160 OF 217

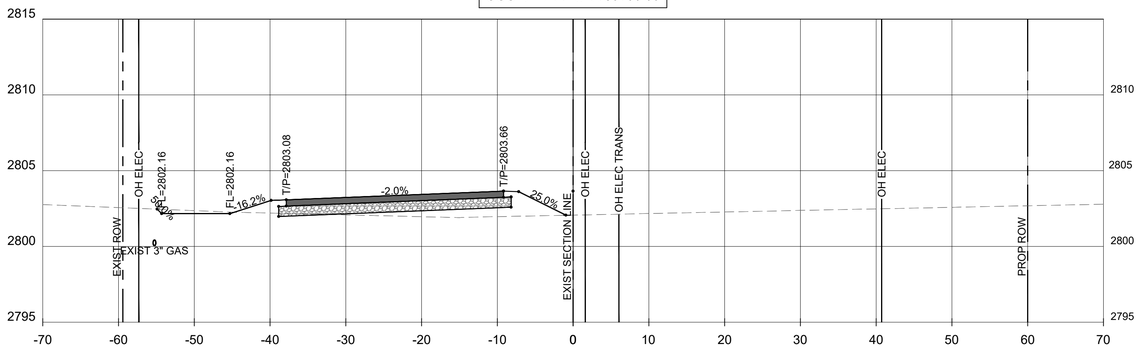
FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:55 PM, USER: ah3453 AVO: 45715.006

NOTES:

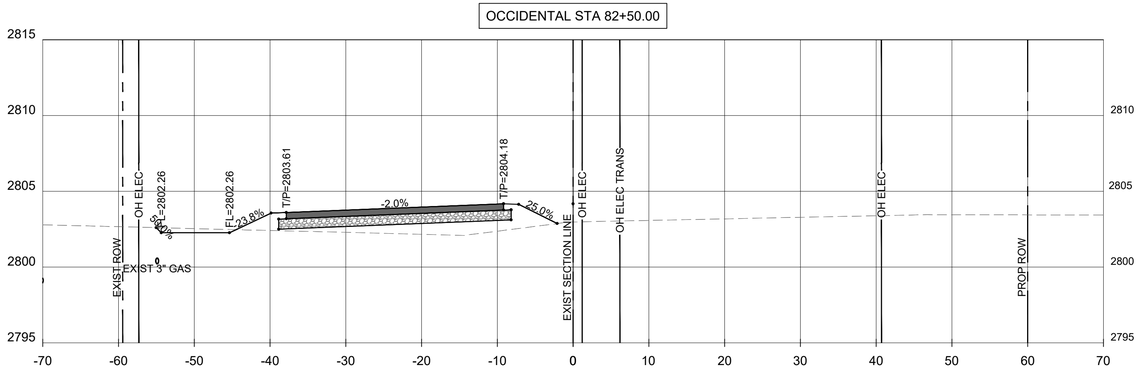
1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

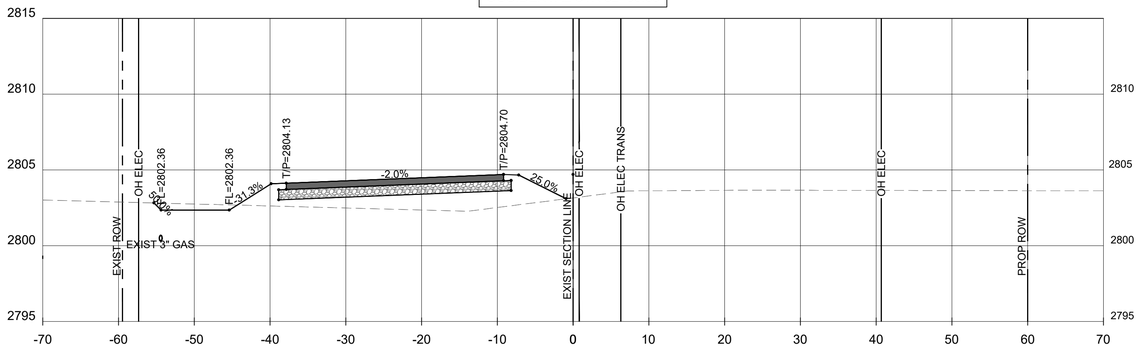
OCCIDENTAL STA 83+00.00



OCCIDENTAL STA 82+50.00



OCCIDENTAL STA 82+00.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD., STE 600
FORT WORTH, TEXAS 76137-2797
TEL: (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION

NO.	DATE	DESCRIPTION

STATE OF TEXAS
JACOB T. HAYS
127558
LICENSED
PROFESSIONAL
ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 82+00 TO 83+00

SHEET NUMBER 161 OF 217

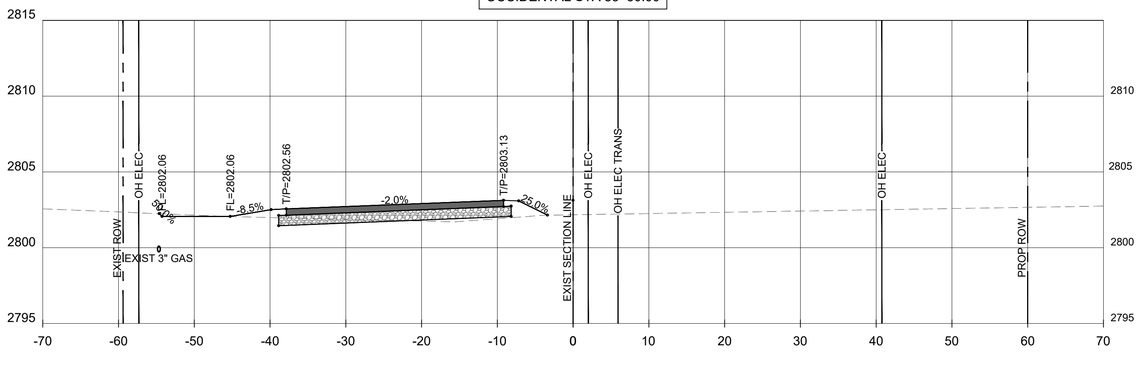
FILE NAME: A:\45000s\45715006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:55 PM, USER: ah3453 AVO: 45715.006

NOTES:

1. PROPOSED 2-INCH TYPE D HMAC SURFACE TO BE CONSTRUCTED IN FUTURE BY OTHERS. **ALL PROPOSED ASPHALT ROADWAY SURFACE LINES AND GRADES SHOWN IN PLANS ARE TOP OF FUTURE 2-INCH TYPE D LAYER.**

2. 3" & 4" GAS LINES ARE ABANDONED AND NO LONGER IN SERVICE BASED ON COORDINATION WITH OWNER DATED MAY 10TH, 2023. HOWEVER DEPTHS ARE UNKNOWN. IF ENCOUNTERED IN THE FIELD AS PART OF DITCH GRADING AND SHAPING, OR CULVERT AND HEADWALL INSTALLATION THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AND DETERMINE THE APPROPRIATE LIMITS OF REMOVAL. ONCE LIMITS ARE APPROVED THE REMOVAL AND DISPOSAL OF PIPELINE WITHIN SAID LIMITS SHALL BE PAID FOR AT THE UNIT PRICE OF THAT BID ITEM.

OCCIDENTAL STA 83+50.00



SCALE
HORIZ. 1"=10'
VERT. 1"=5'

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB TAYLOR HATT
127558
LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

CROSS SECTIONS
STA 83+50

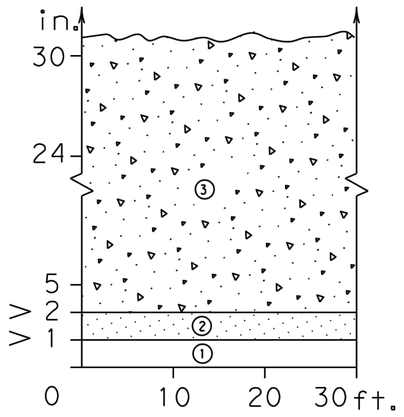
SHEET NUMBER 162 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\C11000-XSEC-45715.dwg DATE: August 13, 2024, TIME: 3:55 PM, USER: ah3453 AVO: 45715.006

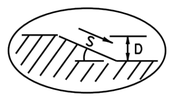
DATE:
FILE:

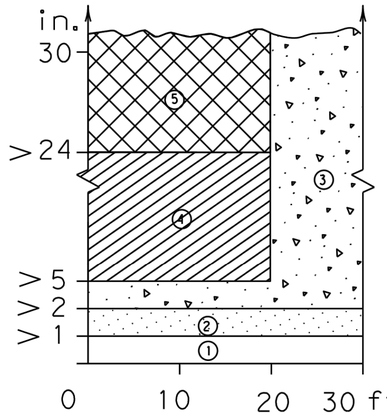
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet

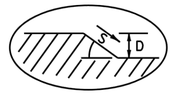


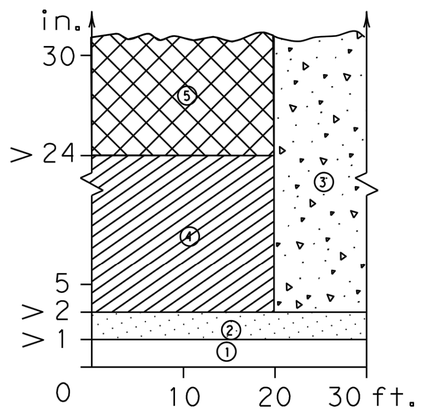
Edge Condition I
S = (3:1) (or flatter)



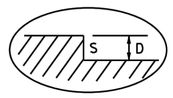


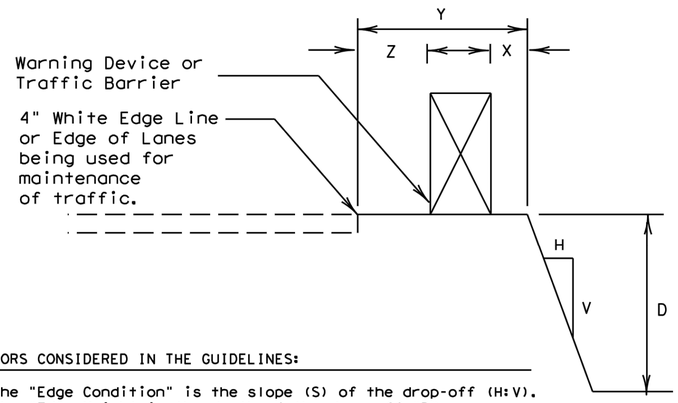
Edge Condition II
S = ((2.99):1) to (1:1)





Edge Condition III
S is steeper than (1:1)





FACTORS CONSIDERED IN THE GUIDELINES:

1. The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height is the depth of the drop-off "D".

2. Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.

3. In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.

4. The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.

5. If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

Zone	Treatment Types Guidelines:
①	No treatment.
②	CW 8-11 "Uneven Lanes" signs.
③	CW 8-9a "Shoulder Drop-Off" or CW 8-11 signs plus vertical panels.
④	CW 8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge fill may be provided to change the edge slope to that of the preferable Edge Condition I.
⑤	Check indications (Figure-1) for positive barrier. Where positive barrier is not indicated, the treatment shown above for Zone- 4 may be used after consideration of other applicable factors.

Edge Condition Notes:

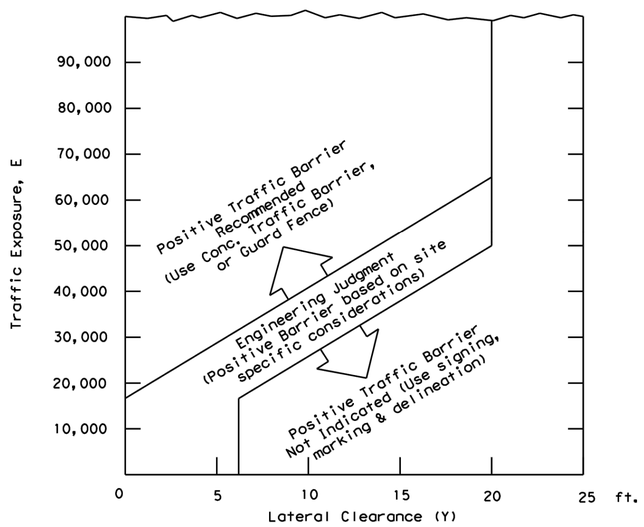
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exeeds 24 inches, the possibility for rollover is greater in most vehicles.

3. Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.

4. Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 (▨)



1 E = ADT x T
Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.

2 Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.

3 An approved end treatment should be provided for any positive barrier end located within a lateral offset of 20 feet from the edge of the travel lane.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.

Engineer's Seal

DATE 8/13/2024
TBPELS ENGINEERING FIRM #F-312

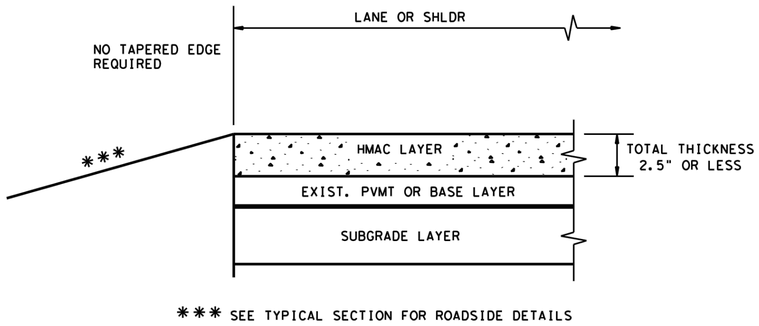
Texas Department of Transportation
Traffic Operations Division

TREATMENT FOR VARIOUS EDGE CONDITIONS

REVISIONS
03-01
08-01 correct typos

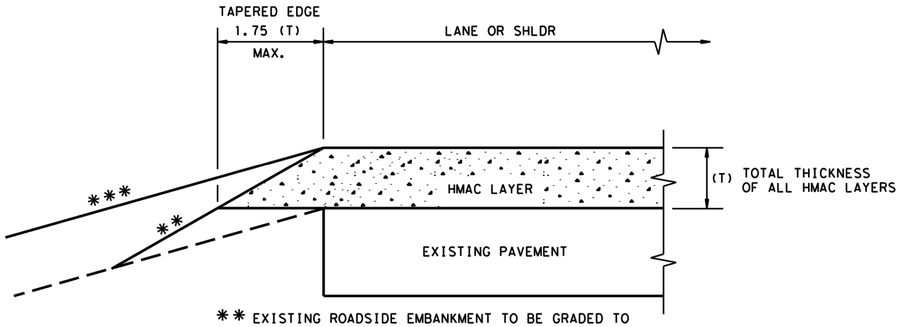
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
			163

DATE:
FILE:



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

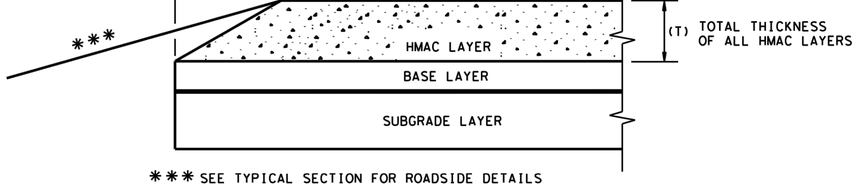
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY WITH THICKNESS OF 2.5" OR LESS



** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

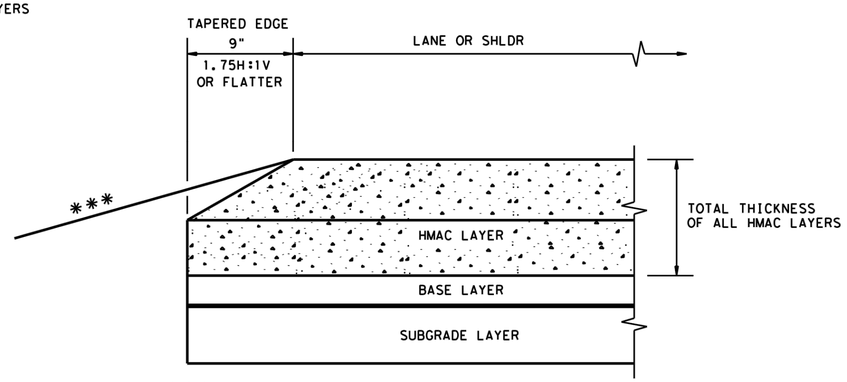
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 2
OVERLAY OF EXISTING PAVEMENT HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 3
NEW OR RECONSTRUCTED PAVEMENT HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 4
NEW OR RECONSTRUCTED PAVEMENT HMAC THICKNESS 5" OR GREATER

(NOT TO SCALE)

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

Texas Department of Transportation

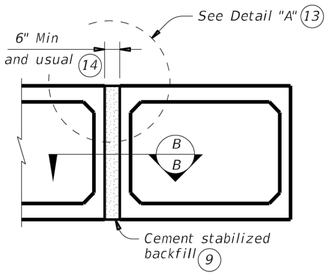
Design Division Standard

TAPERED EDGE DETAILS HMAC PAVEMENT

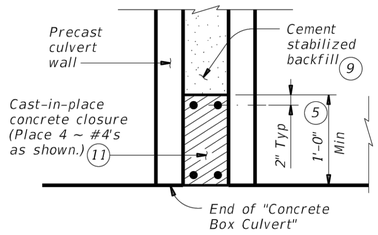
TE(HMAC)-11

FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:	
	CONT	SECT	JOB	HIGHWAY	
REVISIONS					
	DIST	COUNTY		SHEET NO.	
				164	

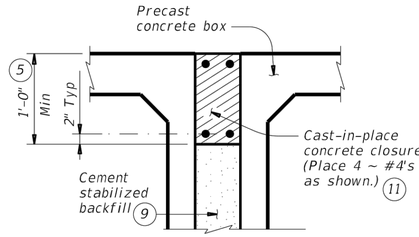
DATE:
FILE:



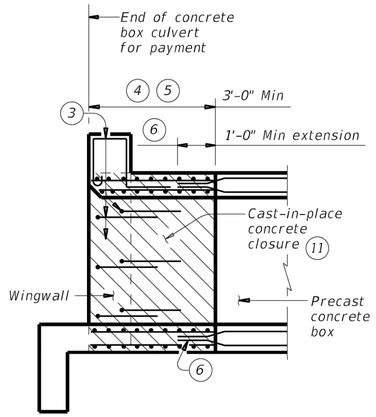
MULTIPLE UNIT PLACEMENT



SECTION B-B

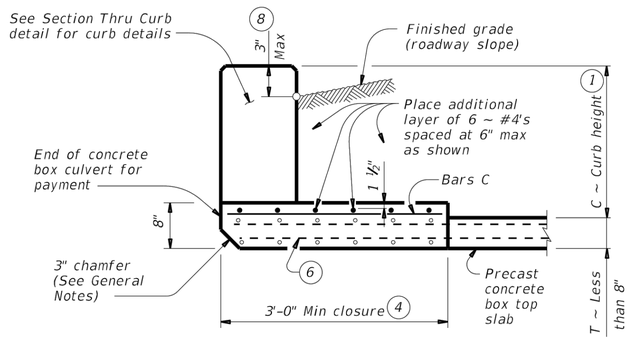


DETAIL "A" (13)

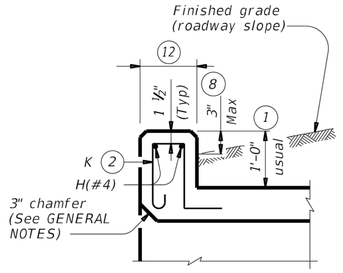


WINGWALL CONNECTION

(Also applies to safety end treatment.)

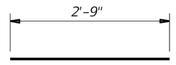


SECTION THRU TOP SLABS LESS THAN 8"

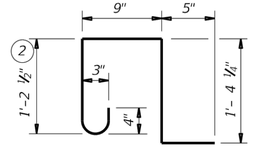


SECTION THRU CURB

QUANTITIES PER FOOT OF CURB (10)	
Reinforcing Steel	4.12 Lb
Concrete	0.037 CY



BARS C (#4)
(Spa = 1'–0" Max)



BARS K (#4)
(Spa = 1'–0" Max)
(Length = 4'–2")

1 (1) 0" Min to 5'–0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail, or curbs taller than 1'–0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631–CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2 (2) For curbs less than 1'–0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

3 (3) Extend curb, wingwall, or safety end treatment reinforcing into concrete closure. Bend or trim, as necessary, any reinforcing that does not fit into closure area.

4 (4) Provide a 3'–0" Min cast–in–place concrete closure. Break back boxes in the field or cast boxes short. Provide bands of reinforcing in the closure that are the same size and spacing as in the precast box section. Provide #4 longitudinal reinforcement spaced at 12 inches Max within the closure. Except where shown otherwise, construct the cast–in–place closure flush with the inside and outside faces of the precast box section.

5 (5) For multiple unit placements, adjust the length of the closure for the interior walls as necessary. Provide a 3'–0" Min cast–in–place closure in the top slab, bottom slab, and exterior wall. See Section B–B detail when interior walls are cast full length.

6 (6) Extend precast box reinforcing a minimum of 1'–0" into concrete closure (Typ).

7 (7) Place bands of reinforcing matching the inside and outside face reinforcing in the gaps of the top and bottom slabs. Place a band matching the outside face reinforcing of the wall in the gaps of the walls (placed in the outside face only). Tack weld the bands to the exposed reinforcing at each point of contact.

8 (8) For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

9 (9) Cement stabilized backfill between boxes is considered part of the box culvert for payment.

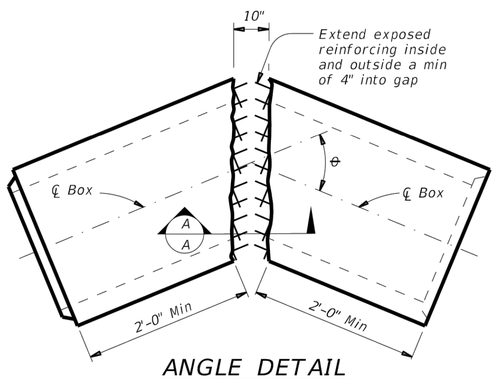
10 (10) All curb concrete and reinforcing is considered part of the box culvert for payment.

11 (11) Any additional concrete and reinforcing required for the closures will be considered subsidiary to the box culvert for payment.

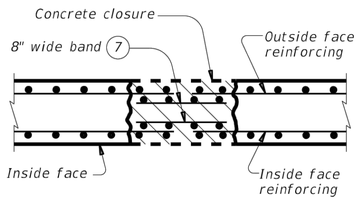
12 (12) 1'–0" typical. 2'–3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.

13 (13) For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in Detail "A".

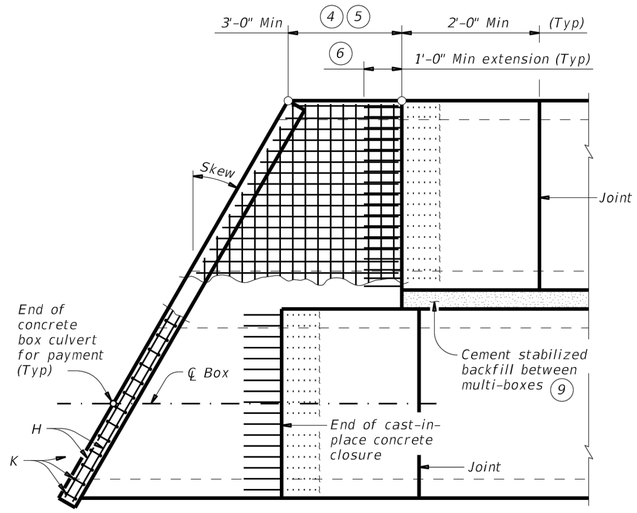
14 (14) This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi–box placement.)

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide ASTM A1064 welded wire reinforcement.
Provide Class C concrete (f'c = 3,600 psi) for the closures.
Provide cement stabilized backfill meeting the requirements of Item 400, "Excavation and Backfill for Structures."
Any additional concrete required for the closures will be considered subsidiary to the box culvert.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to the Single Box Culverts Precast (SCP) standard sheets for details and notes not shown.
Chamfer the bottom edge of the top slab closure 3 inches at culvert closure ends.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bars dimensions are out–to–out of bars.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

BOX CULVERTS PRECAST MISCELLANEOUS DETAILS

SCP-MD

FILE: scpmdsts-20.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				165

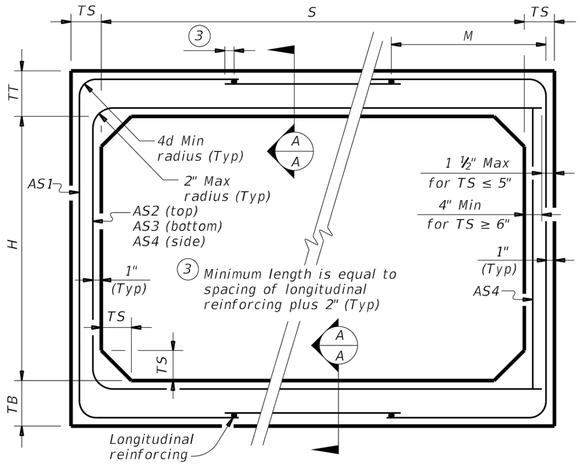
DATE:
FILE:

BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
5	2	8	7	6	< 2	–	0.19	0.27	0.18	0.14	0.19	0.19	0.17	6.0
5	2	6	6	6	2 < 3	44	0.22	0.20	0.16	0.14	–	–	–	5.1
5	2	6	6	6	3 – 5	44	0.16	0.14	0.14	0.14	–	–	–	5.1
5	2	6	6	6	10	36	0.15	0.14	0.14	0.14	–	–	–	5.1
5	2	6	6	6	15	36	0.20	0.18	0.18	0.14	–	–	–	5.1
5	2	6	6	6	20	36	0.26	0.23	0.24	0.14	–	–	–	5.1
5	2	6	6	6	25	36	0.33	0.29	0.29	0.14	–	–	–	5.1
5	2	6	6	6	30	36	0.39	0.34	0.35	0.14	–	–	–	5.1
5	3	8	7	6	< 2	–	0.19	0.31	0.21	0.14	0.19	0.19	0.17	6.6
5	3	6	6	6	2 < 3	45	0.18	0.24	0.19	0.14	–	–	–	5.7
5	3	6	6	6	3 – 5	36	0.14	0.17	0.16	0.14	–	–	–	5.7
5	3	6	6	6	10	36	0.14	0.16	0.17	0.14	–	–	–	5.7
5	3	6	6	6	15	35	0.16	0.21	0.22	0.14	–	–	–	5.7
5	3	6	6	6	20	35	0.21	0.27	0.28	0.14	–	–	–	5.7
5	3	6	6	6	25	35	0.26	0.34	0.34	0.14	–	–	–	5.7
5	3	6	6	6	30	35	0.31	0.41	0.41	0.14	–	–	–	5.7
5	4	8	7	6	< 2	–	0.19	0.33	0.24	0.14	0.19	0.19	0.17	7.2
5	4	6	6	6	2 < 3	45	0.16	0.27	0.22	0.14	–	–	–	6.3
5	4	6	6	6	3 – 5	45	0.14	0.19	0.18	0.14	–	–	–	6.3
5	4	6	6	6	10	36	0.14	0.18	0.18	0.14	–	–	–	6.3
5	4	6	6	6	15	35	0.14	0.23	0.24	0.14	–	–	–	6.3
5	4	6	6	6	20	35	0.17	0.30	0.31	0.14	–	–	–	6.3
5	4	6	6	6	25	35	0.21	0.37	0.38	0.14	–	–	–	6.3
5	4	6	6	6	30	35	0.25	0.44	0.45	0.14	–	–	–	6.3
5	5	8	7	6	< 2	–	0.19	0.35	0.26	0.14	0.19	0.19	0.17	7.8
5	5	6	6	6	2 < 3	45	0.14	0.29	0.24	0.14	–	–	–	6.9
5	5	6	6	6	3 – 5	45	0.14	0.21	0.20	0.14	–	–	–	6.9
5	5	6	6	6	10	45	0.14	0.19	0.20	0.14	–	–	–	6.9
5	5	6	6	6	15	36	0.14	0.24	0.25	0.14	–	–	–	6.9
5	5	6	6	6	20	35	0.15	0.31	0.32	0.14	–	–	–	6.9
5	5	6	6	6	25	35	0.18	0.38	0.39	0.14	–	–	–	6.9
5	5	6	6	6	30	35	0.21	0.46	0.47	0.14	–	–	–	6.9

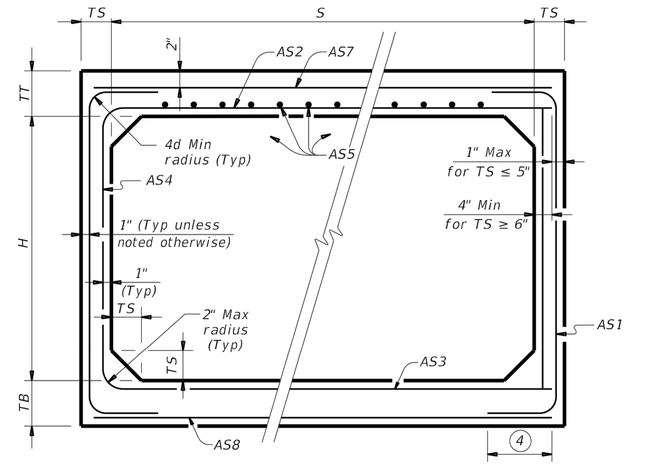
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

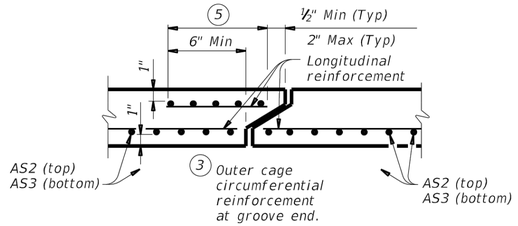
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f`c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

5'-0" SPAN

SCP-5

FILE: scp05sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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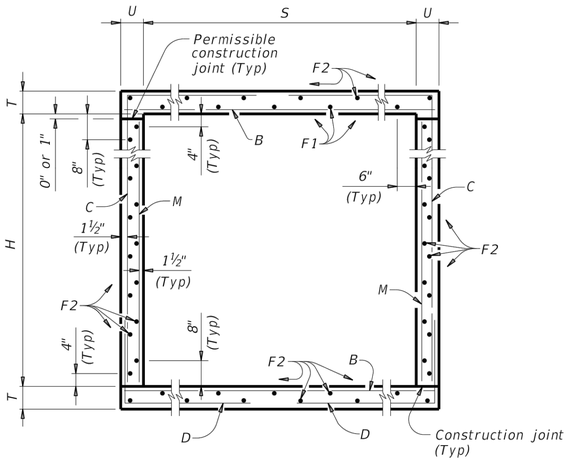
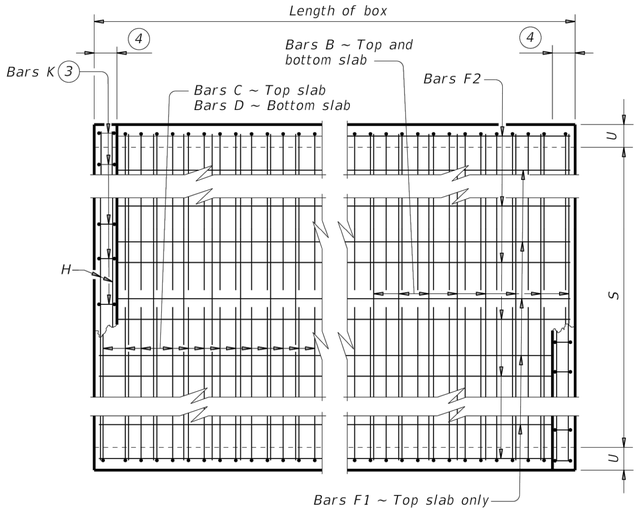
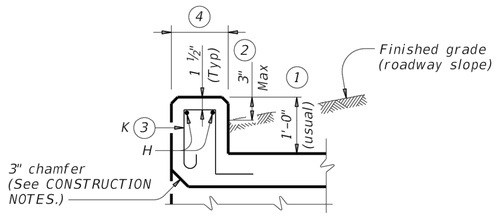
	DIST	COUNTY		SHEET NO.
				166



TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB

(1) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

(2) For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(3) For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

(4) 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR.
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed.

MATERIAL NOTES:

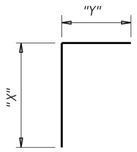
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

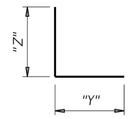
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Single Box Culverts Cast-In-Place Miscellaneous Detail (SCC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

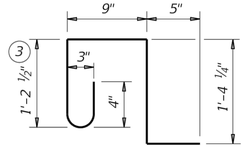
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



BARS C



BARS D



BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE 0' TO 30' FILL

SCC-5 & 6

FILE: CD-SCC56-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
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04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
				167

DATE:
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SECTION DIMENSIONS				FILL HEIGHT (5)	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																										QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
5' – 0"	2' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	6' – 3"	704	2' – 6"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	2' – 0"	144	4	39' – 9"	106	22	39' – 9"	584	5' – 11"	16	14	39	0.391	80.5	0.5	55	16.1	3,276
5' – 0"	2' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	6' – 4"	713	2' – 7"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	2' – 0"	144	4	39' – 9"	106	22	39' – 9"	584	5' – 11"	16	14	39	0.429	81.0	0.5	55	17.6	3,294
5' – 0"	3' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	7' – 3"	817	3' – 6"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	3' – 0"	216	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.434	87.8	0.5	55	17.8	3,567
5' – 0"	3' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	7' – 4"	826	3' – 7"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	3' – 0"	216	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.472	88.3	0.5	55	19.3	3,585
5' – 0"	4' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	8' – 3"	929	4' – 6"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	4' – 0"	289	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.477	92.4	0.5	55	19.5	3,752
5' – 0"	4' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	8' – 4"	939	4' – 7"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	4' – 0"	289	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.515	92.9	0.5	55	21.1	3,771
5' – 0"	5' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	9' – 3"	1,042	5' – 6"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	5' – 0"	361	4	39' – 9"	106	30	39' – 9"	797	5' – 11"	16	14	39	0.521	99.7	0.5	55	21.3	4,044
5' – 0"	5' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	9' – 4"	1,051	5' – 7"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	5' – 0"	361	4	39' – 9"	106	30	39' – 9"	797	5' – 11"	16	14	39	0.559	100.2	0.5	55	22.8	4,062
6' – 0"	2' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	6' – 7"	742	2' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	2' – 0"	144	5	39' – 9"	133	25	39' – 9"	664	6' – 11"	18	16	45	0.440	89.1	0.5	63	18.1	3,628
6' – 0"	2' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	6' – 8"	1,126	2' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	2' – 0"	144	5	39' – 9"	133	25	39' – 9"	664	6' – 11"	18	16	45	0.485	108.6	0.5	63	19.9	4,407
6' – 0"	2' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	6' – 10"	1,155	2' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	2' – 0"	110	5	39' – 9"	133	25	39' – 9"	664	7' – 1"	19	18	50	0.551	109.9	0.5	69	22.6	4,463
6' – 0"	3' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	7' – 7"	854	3' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	3' – 0"	216	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.484	96.4	0.5	63	19.9	3,918
6' – 0"	3' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	7' – 8"	1,295	3' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	3' – 0"	216	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.528	117.3	0.5	63	21.6	4,754
6' – 0"	3' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	7' – 10"	1,324	3' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	3' – 0"	164	5	39' – 9"	133	29	39' – 9"	770	7' – 1"	19	18	50	0.601	118.1	0.5	69	24.6	4,792
6' – 0"	4' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	8' – 7"	967	4' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	4' – 0"	289	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.527	101.0	0.5	63	21.6	4,104
6' – 0"	4' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	8' – 8"	1,464	4' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	4' – 0"	289	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.571	123.3	0.5	63	23.4	4,996
6' – 0"	4' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	8' – 10"	1,493	4' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	4' – 0"	219	5	39' – 9"	133	29	39' – 9"	770	7' – 1"	19	18	50	0.650	123.7	0.5	69	26.5	5,016
6' – 0"	5' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	9' – 7"	1,080	5' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	5' – 0"	361	5	39' – 9"	133	33	39' – 9"	876	6' – 11"	18	16	45	0.570	108.3	0.5	63	23.3	4,395
6' – 0"	5' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	9' – 8"	1,633	5' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	5' – 0"	361	5	39' – 9"	133	33	39' – 9"	876	6' – 11"	18	16	45	0.614	132.0	0.5	63	25.1	5,343
6' – 0"	5' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	9' – 10"	1,661	5' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	5' – 0"	274	5	39' – 9"	133	33	39' – 9"	876	7' – 1"	19	18	50	0.700	131.9	0.5	69	28.5	5,345
6' – 0"	6' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	10' – 7"	1,192	6' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	6' – 0"	433	5	39' – 9"	133	37	39' – 9"	982	6' – 11"	18	16	45	0.613	115.6	0.5	63	25.0	4,685
6' – 0"	6' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	10' – 8"	1,802	6' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	6' – 0"	433	5	39' – 9"	133	37	39' – 9"	982	6' – 11"	18	16	45	0.657	140.7	0.5	63	26.8	5,690
6' – 0"	6' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	10' – 10"	1,830	6' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	6' – 0"	329	5	39' – 9"	133	37	39' – 9"	982	7' – 1"	19	18	50	0.749	140.2	0.5	69	30.5	5,675

(5) For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation | Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-5 & 6

FILE: CD-SCC56-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
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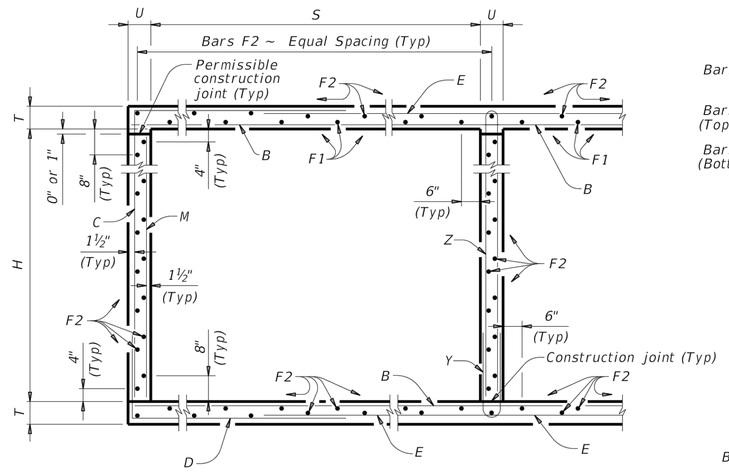
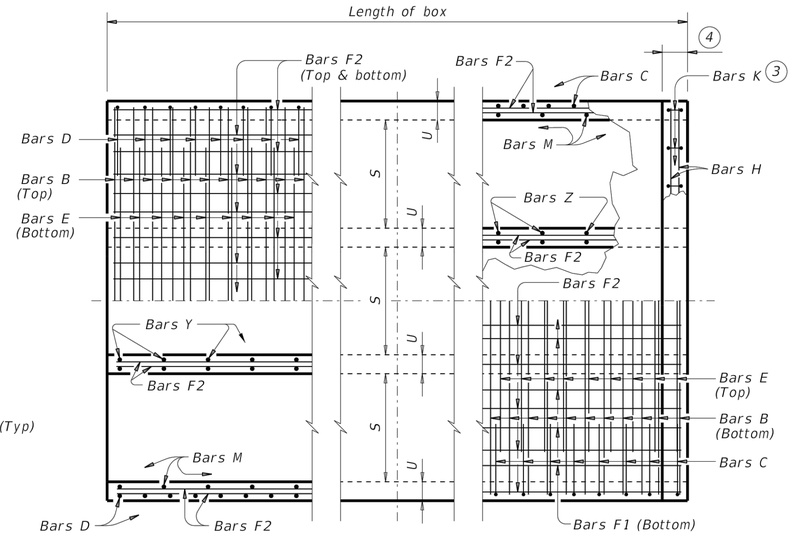
REVISIONS				
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
				168

DATE:
FILE:



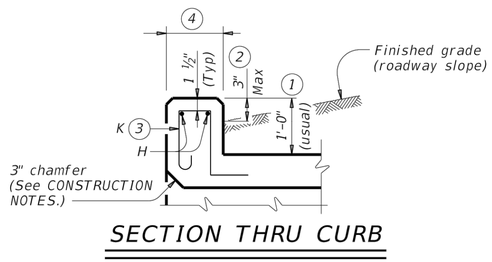
TYPICAL SECTION



BOTTOM SLAB

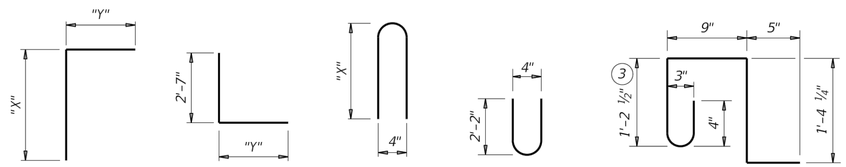
TOP SLAB

PART PLANS



SECTION THRU CURB

TABLE OF BAR DIMENSIONS		
H	"X"	"Y"
2'-0"	2'-6 ½"	3'-8 ½"
3'-0"	3'-6 ½"	3'-8 ½"
4'-0"	4'-6 ½"	3'-8 ½"
5'-0"	5'-6 ½"	3'-8 ½"



BARS C | BARS D | BARS Z | BARS Y | BARS K (#4) (Spa = 1'-0" Max) (Length = 4'-2")

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4. 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed, and Bars Y and Z may be reversed.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Multiple Box Culverts Cast-In-Place Miscellaneous Detail (MC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

HL93 LOADING

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE
5'-0" SPAN
0' TO 20' FILL
MC-5-20

FILE: CD-MC520-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
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	DIST	COUNTY		SHEET NO.
				169

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DATE:
FILE:

NUMBER OF SPANS	SECTION DIMENSIONS				BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																														QUANTITIES					
					Bars B					Bars C & D							Bars E					Bars F1 ~ #4				Bars F2 ~ #4				Bars M ~ #4				Bars Y & Z ~ #4						Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
												Bars C		Bars D																				Bars Y		Bars Z											
	S	H	T	U	No.	Size	Spa	Length	Wt	No.	Size	Spa	Length	Wt	Length	Wt	No.	Size	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	Length	Wt	No.	Wt	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)
2	5' – 0"	2' – 0"	8"	7"	108	#5	9"	11' – 6"	1,295	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	8' – 8"	976	8	18"	39' – 9"	212	38	18"	39' – 9"	1,009	108	9"	2' – 0"	144	54	9"	4' – 7"	165	5' – 3"	189	11' – 6"	31	26	72	0.710	135.2	0.9	103	29.3	5,510
3	5' – 0"	2' – 0"	8"	7"	108	#5	9"	17' – 1"	1,924	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	14' – 3"	1,605	12	18"	39' – 9"	319	54	18"	39' – 9"	1,434	108	9"	2' – 0"	144	108	9"	4' – 7"	331	5' – 3"	379	17' – 1"	46	38	106	1.029	188.8	1.3	152	42.4	7,705
4	5' – 0"	2' – 0"	8"	7"	108	#5	9"	22' – 8"	2,553	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	19' – 10"	2,234	16	18"	39' – 9"	425	70	18"	39' – 9"	1,859	108	9"	2' – 0"	144	162	9"	4' – 7"	496	5' – 3"	568	22' – 8"	61	48	134	1.348	242.4	1.7	195	55.6	9,891
5	5' – 0"	2' – 0"	8"	7"	108	#5	9"	28' – 3"	3,182	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	25' – 5"	2,863	20	18"	39' – 9"	531	86	18"	39' – 9"	2,284	108	9"	2' – 0"	144	216	9"	4' – 7"	661	5' – 3"	758	28' – 3"	75	60	167	1.667	296.0	2.1	242	68.8	12,082
6	5' – 0"	2' – 0"	8"	7"	108	#5	9"	33' – 10"	3,811	108	#5	9"	6' – 3"	704	6' – 4"	713	108	#5	9"	31' – 0"	3,492	24	18"	39' – 9"	637	102	18"	39' – 9"	2,708	108	9"	2' – 0"	144	270	9"	4' – 7"	827	5' – 3"	947	33' – 10"	90	70	195	1.986	349.6	2.5	285	82.0	14,268
2	5' – 0"	3' – 0"	8"	7"	108	#6	9"	11' – 6"	1,865	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	8' – 8"	976	8	18"	39' – 9"	212	44	18"	39' – 9"	1,168	108	9"	3' – 0"	216	54	9"	4' – 7"	165	7' – 3"	262	11' – 6"	31	26	72	0.775	159.9	0.9	103	31.9	6,497
3	5' – 0"	3' – 0"	8"	7"	108	#6	9"	17' – 1"	2,771	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	14' – 3"	1,605	12	18"	39' – 9"	319	62	18"	39' – 9"	1,646	108	9"	3' – 0"	216	108	9"	4' – 7"	331	7' – 3"	523	17' – 1"	46	38	106	1.115	223.5	1.3	152	45.9	9,093
4	5' – 0"	3' – 0"	8"	7"	108	#6	9"	22' – 8"	3,677	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	19' – 10"	2,234	16	18"	39' – 9"	425	80	18"	39' – 9"	2,124	108	9"	3' – 0"	216	162	9"	4' – 7"	496	7' – 3"	785	22' – 8"	61	48	134	1.456	287.2	1.7	195	59.9	11,682
5	5' – 0"	3' – 0"	8"	7"	108	#6	9"	28' – 3"	4,583	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	25' – 5"	2,863	20	18"	39' – 9"	531	98	18"	39' – 9"	2,602	108	9"	3' – 0"	216	216	9"	4' – 7"	661	7' – 3"	1,046	28' – 3"	75	60	167	1.796	350.8	2.1	242	73.9	14,274
6	5' – 0"	3' – 0"	8"	7"	108	#6	9"	33' – 10"	5,488	108	#5	9"	7' – 3"	817	6' – 4"	713	108	#5	9"	31' – 0"	3,492	24	18"	39' – 9"	637	116	18"	39' – 9"	3,080	108	9"	3' – 0"	216	270	9"	4' – 7"	827	7' – 3"	1,308	33' – 10"	90	70	195	2.137	414.5	2.5	285	88.0	16,863
2	5' – 0"	4' – 0"	8"	7"	108	#6	9"	11' – 6"	1,865	108	#5	9"	8' – 3"	929	6' – 4"	713	108	#5	9"	8' – 8"	976	8	18"	39' – 9"	212	44	18"	39' – 9"	1,168	108	9"	4' – 0"	289	54	9"	4' – 7"	165	9' – 3"	334	11' – 6"	31	26	72	0.840	166.3	0.9	103	34.5	6,754
3	5' – 0"	4' – 0"	8"	7"	108	#6	9"	17' – 1"	2,771	108	#5	9"	8' – 3"	929	6' – 4"	713	108	#5	9"	14' – 3"	1,605	12	18"	39' – 9"	319	62	18"	39' – 9"	1,646	108	9"	4' – 0"	289	108	9"	4' – 7"	331	9' – 3"	667	17' – 1"	46	38	106	1.202	231.8	1.3	152	49.4	9,422
4	5' – 0"	4' – 0"	8"	7"	108	#6	9"	22' – 8"	3,677	108	#5	9"	8' – 3"	929	6' – 4"	713	108	#5	9"	19' – 10"	2,234	16	18"	39' – 9"	425	80	18"	39' – 9"	2,124	108	9"	4' – 0"	289	162	9"	4' – 7"	496	9' – 3"	1,001	22' – 8"	61	48	134	1.564	297.2	1.7	195	64.3	12,083
5	5' – 0"	4' – 0"	8"	7"	108	#6	9"	28' – 3"	4,583	108	#5	9"	8' – 3"	929	6' – 4"	713	108	#5	9"	25' – 5"	2,863	20	18"	39' – 9"	531	98	18"	39' – 9"	2,602	108	9"	4' – 0"	289	216	9"	4' – 7"	661	9' – 3"	1,335	28' – 3"	75	60	167	1.926	362.7	2.1	242	79.1	14,748
6	5' – 0"	4' – 0"	8"	7"	108	#6	9"	33' – 10"	5,488	108	#5	9"	8' – 3"	929	6' – 4"	713	108	#5	9"	31' – 0"	3,492	24	18"	39' – 9"	637	116	18"	39' – 9"	3,080	108	9"	4' – 0"	289	270	9"	4' – 7"	827	9' – 3"	1,668	33' – 10"	90	70	195	2.288	428.1	2.5	285	94.0	17,408
2	5' – 0"	5' – 0"	8"	7"	108	#6	9"	11' – 6"	1,865	108	#5	9"	9' – 3"	1,042	6' – 4"	713	108	#5	9"	8' – 8"	976	8	18"	39' – 9"	212	50	18"	39' – 9"	1,328	108	9"	5' – 0"	361	54	9"	4' – 7"	165	11' – 3"	406	11' – 6"	31	26	72	0.904	176.7	0.9	103	37.0	7,171
3	5' – 0"	5' – 0"	8"	7"	108	#6	9"	17' – 1"	2,771	108	#5	9"	9' – 3"	1,042	6' – 4"	713	108	#5	9"	14' – 3"	1,605	12	18"	39' – 9"	319	70	18"	39' – 9"	1,859	108	9"	5' – 0"	361	108	9"	4' – 7"	331	11' – 3"	812	17' – 1"	46	38	106	1.288	245.3	1.3	152	52.8	9,965
4	5' – 0"	5' – 0"	8"	7"	108	#6	9"	22' – 8"	3,677	108	#5	9"	9' – 3"	1,042	6' – 4"	713	108	#5	9"	19' – 10"	2,234	16	18"	39' – 9"	425	90	18"	39' – 9"	2,390	108	9"	5' – 0"	361	162	9"	4' – 7"	496	11' – 3"	1,217	22' – 8"	61	48	134	1.672	313.9	1.7	195	68.6	12,750
5	5' – 0"	5' – 0"	8"	7"	108	#6	9"	28' – 3"	4,583	108	#5	9"	9' – 3"	1,042	6' – 4"	713	108	#5	9"	25' – 5"	2,863	20	18"	39' – 9"	531	110	18"	39' – 9"	2,921	108	9"	5' – 0"	361	216	9"	4' – 7"	661	11' – 3"	1,623	28' – 3"	75	60	167	2.056	382.5	2.1	242	84.3	15,540
6	5' – 0"	5' – 0"	8"	7"	108	#6	9"	33' – 10"	5,488	108	#5	9"	9' – 3"	1,042	6' – 4"	713	108	#5	9"	31' – 0"	3,492	24	18"	39' – 9"	637	130	18"	39' – 9"	3,452	108	9"	5' – 0"	361	270	9"	4' – 7"	827	11' – 3"	2,029	33' – 10"	90	70	195	2.439	451.0	2.5	285	100.1	18,326

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE

5'-0" SPAN

0' TO 20' FILL

MC-5-20

FILE: CD-MC520-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
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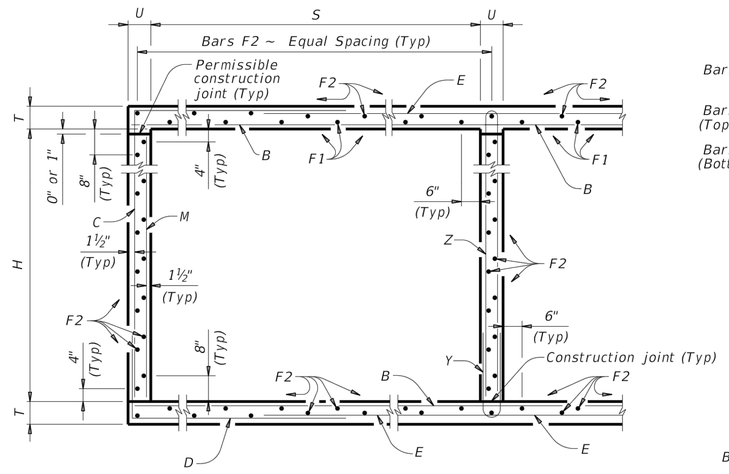
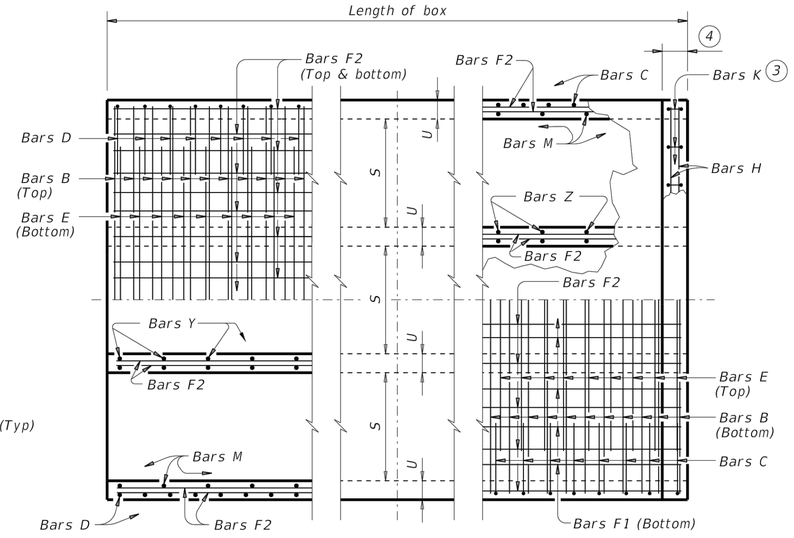
REVISIONS				
	DIST	COUNTY		SHEET NO.
				170

DATE:
FILE:

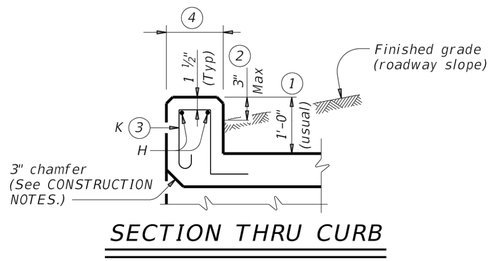


TYPICAL SECTION



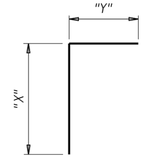
BOTTOM SLAB TOP SLAB

PART PLANS

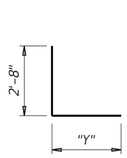


SECTION THRU CURB

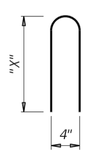
TABLE OF BAR DIMENSIONS		
H	"X"	"Y"
2'–0"	2'–7 ½"	4'–1"
3'–0"	3'–7 ½"	4'–1"
4'–0"	4'–7 ½"	4'–1"
5'–0"	5'–7 ½"	4'–1"
6'–0"	6'–7 ½"	4'–1"



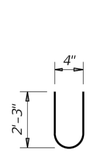
BARS C



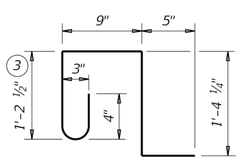
BARS D



BARS Z



BARS Y



BARS K (#4)
(Spa = 1'–0" Max)
(Length = 4'–2")

1 0" Min to 5'–0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'–0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631–CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2 For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3 For curbs less than 1'–0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4 1'–0" typical. 2'–3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'–1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed, and Bars Y and Z may be reversed.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1–to–2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'–8" Min
- Uncoated or galvanized ~ #5 = 2'–1" Min
- Uncoated or galvanized ~ #6 = 2'–6" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Multiple Box Culverts Cast–In–Place Miscellaneous Detail (MC–MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out–to–out of bar.

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation | Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE
6'-0" SPAN
0' TO 16' FILL
MC-6-16

FILE: CD-MC616-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
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REVISIONS				
	DIST	COUNTY		SHEET NO.
				171

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DATE:
FILE:

BILLS OF REINFORCING STEEL (For Box Length = 40 feet)

NUMBER OF SPANS	SECTION DIMENSIONS				Bars B					Bars C & D								Bars E					Bars F1 ~ #4				Bars F2 ~ #4				Bars M ~ #4				Bars Y & Z ~ #4								Bars H 4 ~ #4		Bars K		QUANTITIES					
													Bars C		Bars D																						Bars Y		Bars Z													
	S	H	T	U	No.	Size	Spa	Length	Wt	No.	Size	Spa	Length	Wt	Length	Wt	No.	Size	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	Length	Wt	Length	Wt	No.	Spa	Length	Wt	No.	Wt	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)
2	6' – 0"	2' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	44	18"	39' – 9"	1,168	108	9"	2' – 0"	144	54	9"	4' – 9"	171	5' – 5"	195	13' – 6"	36	30	84	0.894	182.4	1.0	120	36.8	7,414
3	6' – 0"	2' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	63	18"	39' – 9"	1,673	108	9"	2' – 0"	144	108	9"	4' – 9"	343	5' – 5"	391	20' – 1"	54	44	122	1.302	260.9	1.5	176	53.6	10,611
4	6' – 0"	2' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	82	18"	39' – 9"	2,177	108	9"	2' – 0"	144	162	9"	4' – 9"	514	5' – 5"	586	26' – 8"	71	56	156	1.711	339.4	2.0	227	70.4	13,801
5	6' – 0"	2' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	101	18"	39' – 9"	2,682	108	9"	2' – 0"	144	216	9"	4' – 9"	685	5' – 5"	782	33' – 3"	89	70	195	2.120	417.9	2.5	284	87.3	16,999
6	6' – 0"	2' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	120	18"	39' – 9"	3,186	108	9"	2' – 0"	144	270	9"	4' – 9"	857	5' – 5"	977	39' – 10"	106	82	228	2.529	496.4	3.0	334	104.1	20,189
2	6' – 0"	3' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	50	18"	39' – 9"	1,328	108	9"	3' – 0"	216	54	9"	4' – 9"	171	7' – 5"	268	13' – 6"	36	30	84	0.958	192.8	1.0	120	39.3	7,832
3	6' – 0"	3' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	71	18"	39' – 9"	1,885	108	9"	3' – 0"	216	108	9"	4' – 9"	343	7' – 5"	535	20' – 1"	54	44	122	1.389	274.4	1.5	176	57.1	11,152
4	6' – 0"	3' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	92	18"	39' – 9"	2,443	108	9"	3' – 0"	216	162	9"	4' – 9"	514	7' – 5"	803	26' – 8"	71	56	156	1.819	356.1	2.0	227	74.7	14,469
5	6' – 0"	3' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	113	18"	39' – 9"	3,000	108	9"	3' – 0"	216	216	9"	4' – 9"	685	7' – 5"	1,070	33' – 3"	89	70	195	2.250	437.7	2.5	284	92.5	17,790
6	6' – 0"	3' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	134	18"	39' – 9"	3,558	108	9"	3' – 0"	216	270	9"	4' – 9"	857	7' – 5"	1,338	39' – 10"	106	82	228	2.681	519.3	3.0	334	110.2	21,107
2	6' – 0"	4' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	50	18"	39' – 9"	1,328	108	9"	4' – 0"	289	54	9"	4' – 9"	171	9' – 5"	340	13' – 6"	36	30	84	1.023	199.2	1.0	120	41.9	8,089
3	6' – 0"	4' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	71	18"	39' – 9"	1,885	108	9"	4' – 0"	289	108	9"	4' – 9"	343	9' – 5"	679	20' – 1"	54	44	122	1.475	282.6	1.5	176	60.5	11,481
4	6' – 0"	4' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	92	18"	39' – 9"	2,443	108	9"	4' – 0"	289	162	9"	4' – 9"	514	9' – 5"	1,019	26' – 8"	71	56	156	1.927	366.1	2.0	227	79.1	14,870
5	6' – 0"	4' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	113	18"	39' – 9"	3,000	108	9"	4' – 0"	289	216	9"	4' – 9"	685	9' – 5"	1,359	33' – 3"	89	70	195	2.380	449.5	2.5	284	97.7	18,264
6	6' – 0"	4' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	134	18"	39' – 9"	3,558	108	9"	4' – 0"	289	270	9"	4' – 9"	857	9' – 5"	1,698	39' – 10"	106	82	228	2.832	533.0	3.0	334	116.2	21,652
2	6' – 0"	5' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	56	18"	39' – 9"	1,487	108	9"	5' – 0"	361	54	9"	4' – 9"	171	11' – 5"	412	13' – 6"	36	30	84	1.088	209.6	1.0	120	44.5	8,505
3	6' – 0"	5' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	79	18"	39' – 9"	2,098	108	9"	5' – 0"	361	108	9"	4' – 9"	343	11' – 5"	824	20' – 1"	54	44	122	1.562	296.2	1.5	176	64.0	12,024
4	6' – 0"	5' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	102	18"	39' – 9"	2,708	108	9"	5' – 0"	361	162	9"	4' – 9"	514	11' – 5"	1,235	26' – 8"	71	56	156	2.035	382.7	2.0	227	83.4	15,536
5	6' – 0"	5' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	125	18"	39' – 9"	3,319	108	9"	5' – 0"	361	216	9"	4' – 9"	685	11' – 5"	1,647	33' – 3"	89	70	195	2.509	469.3	2.5	284	102.8	19,056
6	6' – 0"	5' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	148	18"	39' – 9"	3,930	108	9"	5' – 0"	361	270	9"	4' – 9"	857	11' – 5"	2,059	39' – 10"	106	82	228	2.983	555.9	3.0	334	122.3	22,570
2	6' – 0"	6' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	62	18"	39' – 9"	1,646	108	9"	6' – 0"	433	54	9"	4' – 9"	171	13' – 5"	484	13' – 6"	36	30	84	1.153	220.0	1.0	120	47.1	8,921
3	6' – 0"	6' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	87	18"	39' – 9"	2,310	108	9"	6' – 0"	433	108	9"	4' – 9"	343	13' – 5"	968	20' – 1"	54	44	122	1.648	309.7	1.5	176	67.4	12,565
4	6' – 0"	6' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	112	18"	39' – 9"	2,974	108	9"	6' – 0"	433	162	9"	4' – 9"	514	13' – 5"	1,452	26' – 8"	71	56	156	2.144	399.4	2.0	227	87.7	16,204
5	6' – 0"	6' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	137	18"	39' – 9"	3,638	108	9"	6' – 0"	433	216	9"	4' – 9"	685	13' – 5"	1,936	33' – 3"	89	70	195	2.639	489.1	2.5	284	108.0	19,849
6	6' – 0"	6' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	162	18"	39' – 9"	4,302	108	9"	6' – 0"	433	270	9"	4' – 9"	857	13' – 5"	2,420	39' – 10"	106	82	228	3.134	578.9	3.0	334	128.3	23,488

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

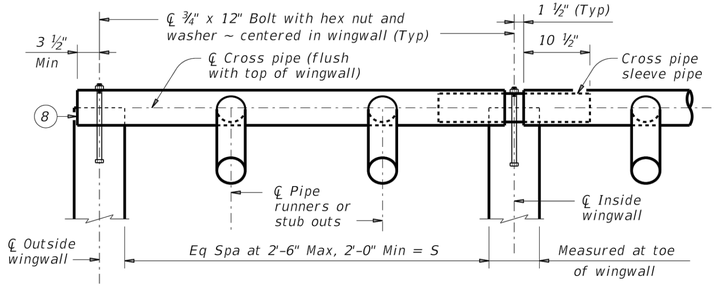
MULTIPLE BOX CULVERTS CAST-IN-PLACE

6'-0" SPAN
0' TO 16' FILL

MC-6-16

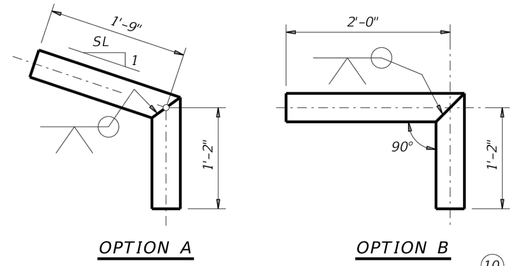
FILE: CD-MC616-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				172

DATE:
FILE:



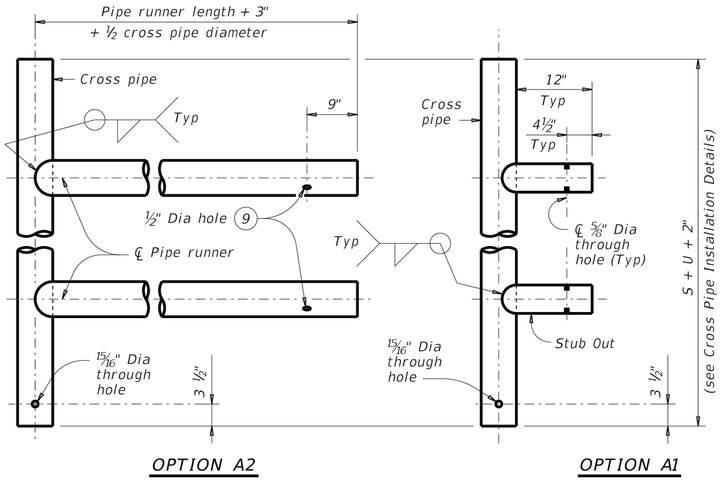
NOTE: At Contractor's option, make the cross pipe continuous across the inside wingwalls. If option is selected, omit the sleeve pipe and make a 15⁄16" diameter through hole in the cross pipe to accept the anchor bolt at the centerline of each inside wingwall.

CROSS PIPE INSTALLATION DETAILS



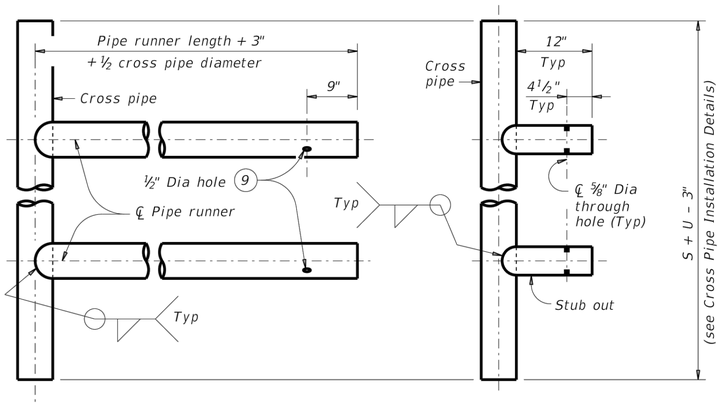
OPTION A OPTION B

BOTTOM ANCHOR PIPE DETAILS (10)



OPTION A2 OPTION A1

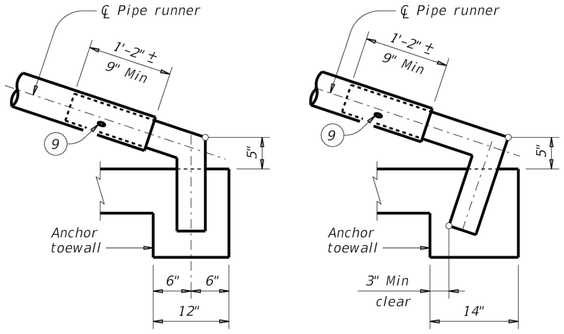
FOR USE IN OUTSIDE CULVERT BAY



OPTION A2 OPTION A1

FOR USE IN INSIDE CULVERT BAY

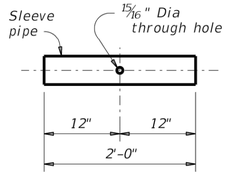
CROSS PIPE AND CONNECTIONS DETAILS



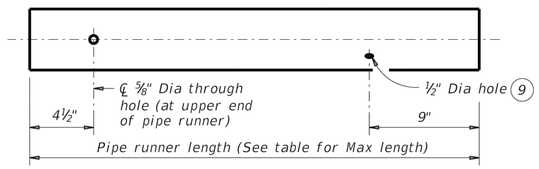
OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Wingwall not shown for clarity.)



CROSS PIPE SLEEVE PIPE DETAILS



NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

(6) Cross pipe is the same size as the pipe runner. Cross pipe stub out is the same size as the anchor pipe.

(7) Note that actual slope of safety pipe runner may vary slightly from side slope.

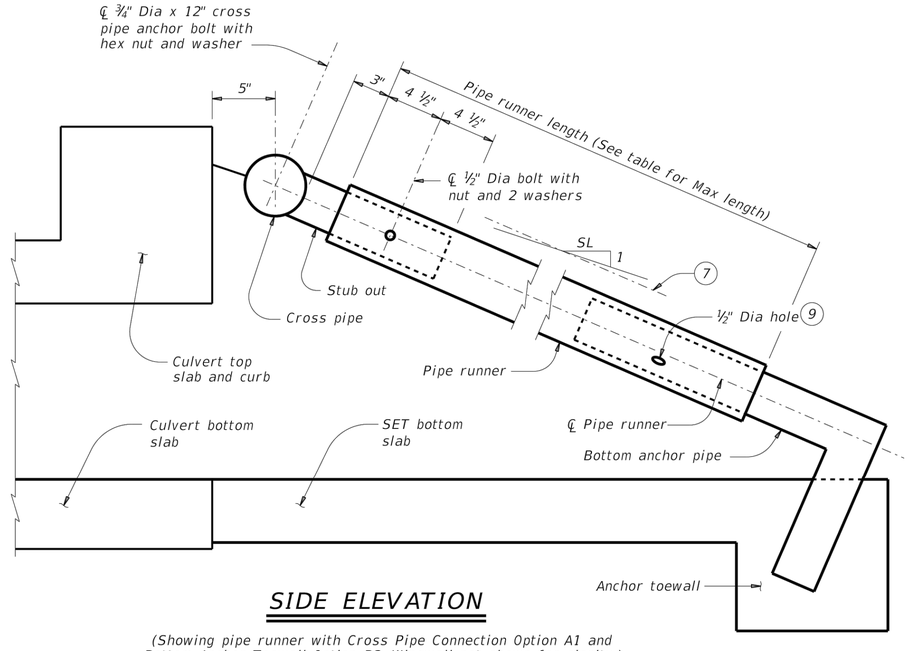
(8) Take care to ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(9) After installation, inspect the 1#2" hole to ensure that the lap of the safety pipe runner with the bottom anchor pipe is adequate.

(10) At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the runner) may be substituted for the mitered and welded joint in the bottom anchor pipe.

MAXIMUM PIPE RUNNER LENGTHS AND (6) REQUIRED PIPE RUNNER AND ANCHOR PIPE SIZES

Maximum Pipe Runner Length	Required Pipe Runner Size			Required Anchor Pipe Size		
	Pipe Size	Pipe O.D.	Pipe I.D.	Pipe Size	Pipe O.D.	Pipe I.D.
10'- 0"	3" STD	3.500"	3.068"	2" STD	2.375"	2.067"
19'- 8"	4" STD	4.500"	4.026"	3" STD	3.500"	3.068"
34'- 2"	5" STD	5.563"	5.047"	4" STD	4.500"	4.026"



SIDE ELEVATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Bottom Anchor Toewall Option B2. Wingwall not shown for clarity.)

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

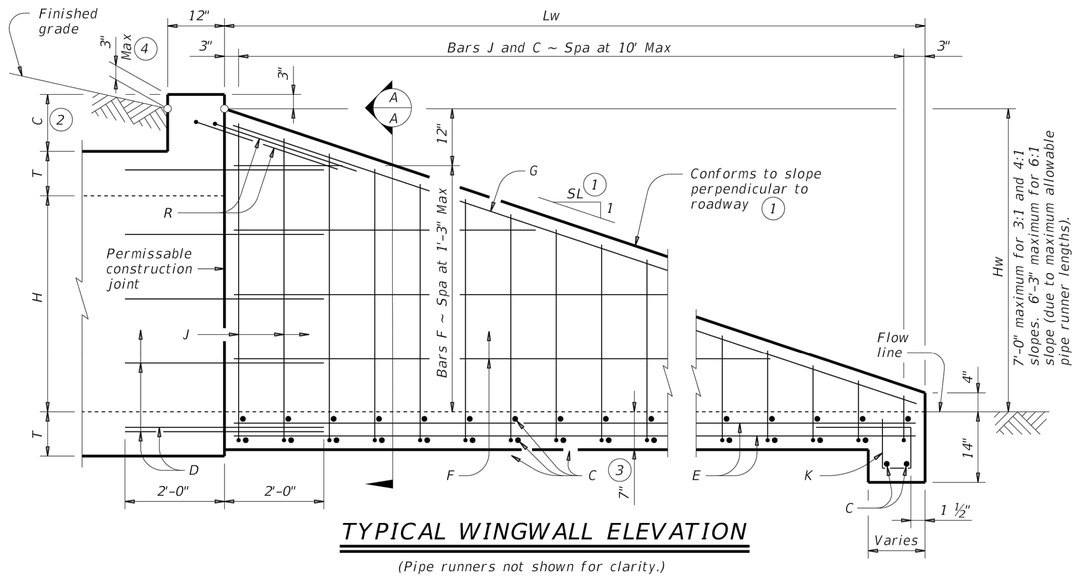
SAFETY END TREATMENT

FOR 0° SKEW BOX CULVERTS
(MAXIMUM Hw = 7'-0")
TYPE I ~ CROSS DRAINAGE

SETB-CD

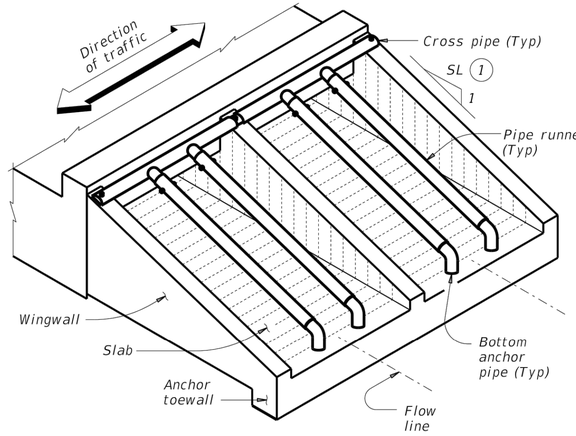
FILE: setbcdse-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				173

DATE:
FILE:



TYPICAL WINGWALL ELEVATION

(Pipe runners not shown for clarity.)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

WING DIMENSION CALCULATIONS:

$Hw = H + T + C - 0.250'$

$Lw = (Hw - 0.333') (SL)$

For cast-in-place culverts:

$Atw = (N) (S) + (N + 1) (U)$

For precast culverts:

$Atw = (N) (2U + S) + (N - 1) (0.500')$

Total Wingwall Area (SF)
$= (0.5) (Hw + 0.333') (Lw) (N + 1)$

Total Concrete Volume (CY)
$= [(\text{Wingwall Area}) (0.583') +$
$(Lw) (Atw) (0.583') +$
$(Atw) (1.167') (1.167' - 0.583')] \div (27)$

PIPE RUNNER DIMENSION CALCULATIONS:

Pipe Runner Length
$= (Lw) (K1) - (1.917')$

Total Reinforcing (Lb)
$= (1.55) (Lw) (Atw) +$
$(4.43) (Atw) +$
$(K2) (Hw) (N + 1) (\sqrt{Lw})$

C = Height of curb above top of top slab (feet)
Hw = Height of wingwall (feet)
K = Constant value for use in formulas

Slope SL:1	K1	K2
3:1	~	1.054 ~ 7.45
4:1	~	1.031 ~ 8.49
6:1	~	1.014 ~ 10.30

Atw = Anchor toewall length (feet)
Lw = Length of wingwall (feet)
N = Number of culvert barrels
SL:1 = Side slope ratio (horizontal : 1 vertical)

See applicable box culvert standard for H, S, T, and U values.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide galvanized reinforcing steel if required elsewhere in the plans.

Adjust reinforcing as necessary to provide a minimum clear cover of 1 ½".

Provide Class "C" concrete (f`c = 3,600 psi).

Provide pipe runners, cross pipes, and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Provide ASTM A307 bolts.

Galvanize all steel components, except the concrete reinforcing, unless required elsewhere in the plans, after fabrication.

Repair galvanizing damaged during transport or construction in accordance with the Item 445, "Galvanizing".

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.

Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

The quantities for pipe runners, reinforcing steel, and concrete resulting from the formulas given herein are for Contractor's information only.

See the Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.

Alternate design drawings bearing the seal of a professional engineer will be acceptable for precast construction of the safety end treatments.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing dimensions are out-to-out of bars.

SECTION A-A

(Showing typical wingwall and wing slab reinforcing. Pipe runners not shown for clarity.)

AT TOP OF EXTERIOR WINGWALL

(Cast-in-place culvert)

AT TOP OF INTERIOR WINGWALL

(Cast-in-place culvert)

AT OUTSIDE OF BOTTOM SLAB

(Cast-in-place culvert)

AT INTERIOR WINGWALL

(Precast culvert)

PLAN VIEWS OF CORNER DETAILS

(1) Recommended values of slope are: 3:1, 4:1, and 6:1. Provide 3:1 or flatter slope.

(2) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet.

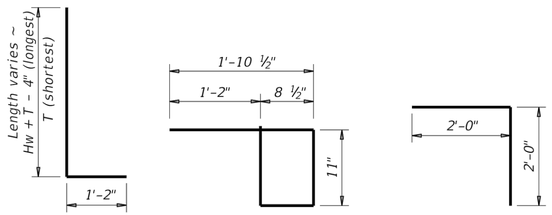
(3) Wingwall and slab thicknesses may be the same as the adjacent culvert wall and slab thicknesses (7" minimum). If thicknesses greater than the minimum (7") are used, no changes will be made in quantities and no additional compensation will be allowed.

(4) For vehicle safety, reduce curb height, if necessary, to provide a maximum 3" projection. No changes will be made in quantities and no additional compensation will be allowed for this work.

(5) For culverts with C = 0", the precast culvert reinforcing may extend 1'-0" minimum into wingwall. Wingwall Bars D and R may be omitted. Otherwise, refer to the Wingwall Connection detail on the Box Culvert Precast Miscellaneous Details (SCP-MD) standard sheet.

TABLE OF REINFORCING BAR SIZES AND SPACING

Bar	Size	Spacing
C	#4	10" Max
D	#4	Match F and E
E	#4	1'-0" Max
F	#4	1'-3" Max
G	#6	As shown
J	#4	10" Max
K	#4	1'-0" Max
R	#4	As shown



BARS J

BARS K

(Length = 4'-3")

BARS R

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR 0° SKEW BOX CULVERTS (MAXIMUM Hw = 7'-0") TYPE I ~ CROSS DRAINAGE

SETB-CD

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TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

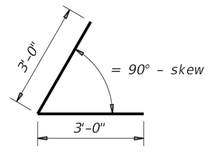
Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing (2~wings) (4)		Estimated Quantities per ft of Toewall (1~toewall)	
					Bars J1		Bars J2					
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'–6"	2'–10"	10"	1'–0"	7"	#4	1'–0"	#4	1'–0"	48.64	0.406	6.85	0.071
2'–9"	2'–10"	10"	1'–0"	7"	#4	1'–0"	#4	1'–0"	49.31	0.424	6.85	0.071
3'–0"	2'–10"	10"	1'–0"	7"	#4	1'–0"	#4	1'–0"	49.98	0.444	6.85	0.071
3'–3"	2'–10"	10"	1'–0"	7"	#4	1'–0"	#4	1'–0"	53.32	0.462	6.85	0.071
3'–6"	2'–10"	10"	1'–0"	7"	#4	1'–0"	#4	1'–0"	53.98	0.480	6.85	0.071
4'–0"	3'–2"	1'–2"	1'–0"	7"	#4	1'–0"	#4	1'–0"	55.77	0.532	6.85	0.071
4'–6"	3'–2"	1'–2"	1'–0"	7"	#4	1'–0"	#4	1'–0"	59.77	0.568	6.85	0.071
5'–0"	3'–9"	1'–7"	1'–2"	7"	#4	1'–0"	#4	1'–0"	63.45	0.632	6.96	0.075
5'–6"	3'–9"	1'–7"	1'–2"	7"	#4	1'–0"	#4	1'–0"	67.46	0.668	6.96	0.075
6'–0"	4'–4"	2'–0"	1'–4"	7"	#5	1'–0"	#5	1'–0"	80.67	0.730	7.07	0.078
6'–6"	4'–4"	2'–0"	1'–4"	7"	#5	1'–0"	#5	1'–0"	85.05	0.768	7.07	0.078
7'–0"	5'–0"	2'–3"	1'–9"	8"	#5	1'–0"	#5	1'–0"	92.15	0.864	8.07	0.093
7'–6"	5'–0"	2'–3"	1'–9"	8"	#5	1'–0"	#5	1'–0"	96.54	0.902	8.07	0.093
8'–0"	5'–6"	2'–8"	1'–10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'–6"	5'–6"	2'–8"	1'–10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'–6"	6'–0"	2'–10"	2'–2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'–6"	6'–5"	3'–0"	2'–5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'–6"	7'–2"	3'–6"	2'–8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'–6"	7'–8"	3'–9"	2'–11"	1'–0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'–6"	8'–2"	4'–0"	3'–2"	1'–2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'–6"	8'–10"	4'–5"	3'–5"	1'–4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'–6"	9'–6"	4'–10"	3'–8"	1'–6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'–0"	9'–11"	5'–0"	3'–11"	1'–7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING
(2~wings)

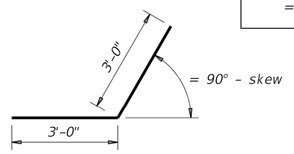
Bar	Size	No.	Spa
D1	#6	~	1'–0"
D2	#6	~	1'–0"
E1	#4	~	1'–0"
F	#4	~	1'–0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'–0"
V	#4	~	1'–0"

TABLE OF TOEWALL REINFORCING

Bar	Size	No.	Spa
J3	#4	~	1'–0"
M2	#4	2	~
E2	#4	~	1'–0"



BARS D1



BARS D2

WING DIMENSION FORMULAS:

(All values are in feet.)

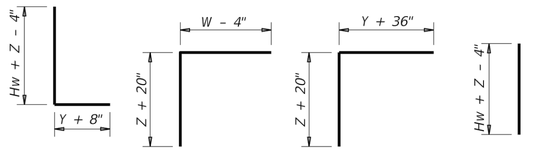
Hw = H + T + C
Lw = (Hw) (SL) ÷ cosine (θ) for Type PW–1
= (Hw – 1') (SL) ÷ cosine (θ) for Type PW–2 and Hw ≥ 4'
= (Hw – 0.5') (SL) ÷ cosine (θ) for Type PW–2 and Hw < 4'

For cast–in–place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine (θ)

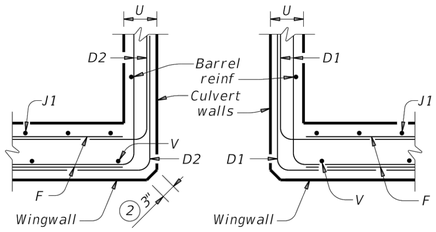
For precast culverts:
Ltw = [(N) (2 U + S) + (N – 1) (0.5')] ÷ cosine (θ)
Total Wingwall Area (two wings ~ SF)
= (2)(Hw)(Lw) for Type PW–1
= (2)(Hw)(Lw) – 6 SF for Type PW–2 and Hw ≥ 4'
= (2)(Hw)(Lw) – 1.5 SF for Type PW–2 and Hw < 4'

Hw = Height of wingwall
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans
SL:1 = Channel slope ratio. (horizontal: 1 vertical, usual value is 2:1)
θ = Culvert skew

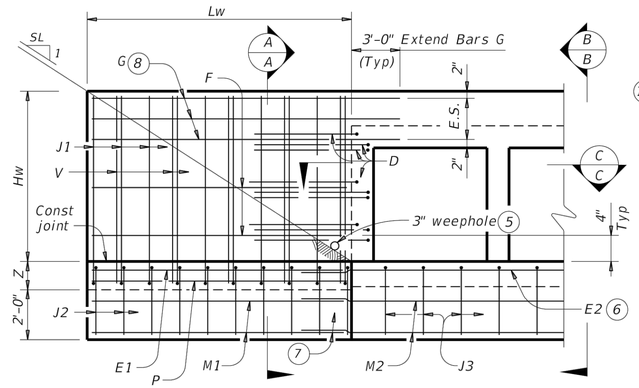
See applicable box culvert standard sheet for S, H, T, and U values.



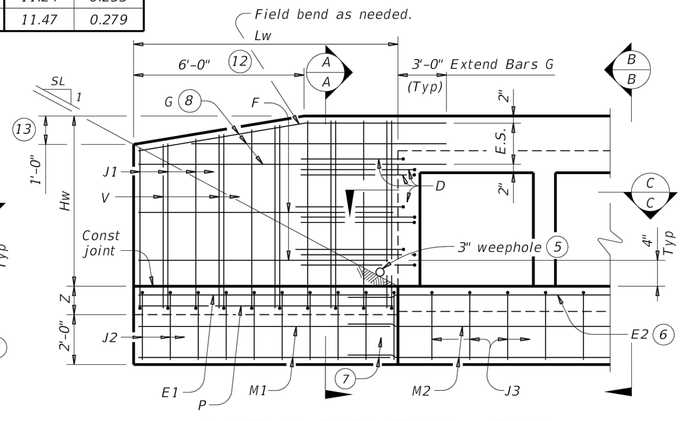
BARS J1 BARS J2 BARS J3 BARS V



SECTION C-C - PW-1

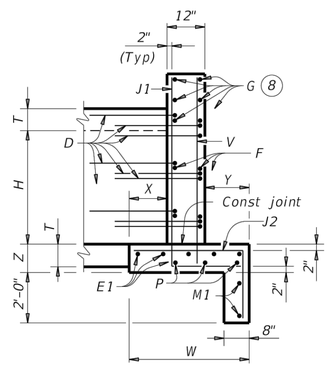


PARTIAL ELEVATION - PW-1

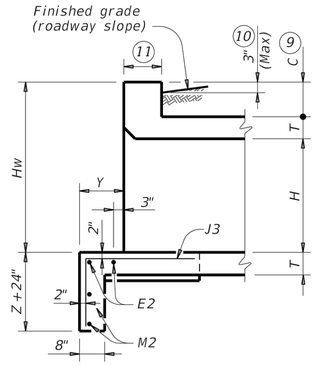


PARTIAL ELEVATION - PW-2

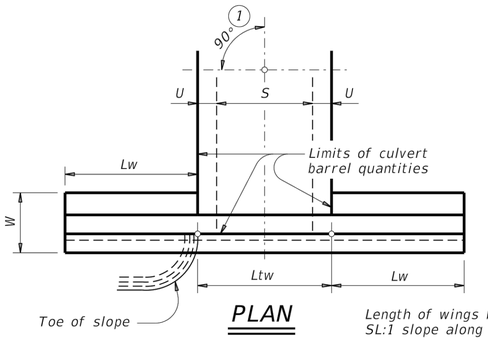
SECTION C-C - PW-2



SECTION A-A
(Showing wing reinforcement.)



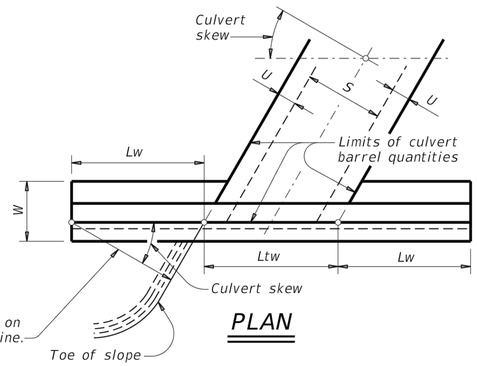
SECTION B-B
(Showing wing reinforcement.)



PLAN

Length of wings based on SL:1 slope along this line.

DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR SKEWED BOX CULVERTS
(Showing 30° skew.)

1. Skew = 0°
2. At discharge end, chamfer may be ¾" minimum.
3. For 15° skew ~ 1"
   For 30° skew ~ 2"
   For 45° skew ~ 3"
4. Quantities shown are for two Type PW–1 wings. Adjust concrete volume for Type PW–2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
5. Provide weepholes for Hw = 5'–0" and greater. Fill around weepholes with coarse gravel.
6. Extend Bars E2 1'–6" minimum into the wingwall footing.
7. Lap Bars M1 1'–6" minimum with Bars M2.
8. Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.
9. 0" Min to 5'–0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'–0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631–CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
10. For vehicle safety, the following requirements must be met:
    - For structures without bridge rail, construct curbs no more than 3" above finished grade.
    - For structures with bridge rail, construct curbs flush with finished grade.

    Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
11. 1'–0" typical. 2'–3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elswhere in the plans.
12. 3'–0" for Hw < 4'.
13. 6" for Hw < 4'.

DESIGNER NOTES:
Type PW–1 can be used for all applications and must be used if railing is to be mounted to the wingwall.
Type PW–2 can only be used for applications without a railing mounted to the wingwall.

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforing steel if required elsewhere in the plans.

GENERAL NOTES:
Designed in accordance with AASHTO LRFD Bridge Design Specifications.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for wingwall type and additional dimensions and information.
Quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing dimensions are out–to–out of bars.

Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR BOX CULVERTS
TYPES PW-1 AND PW-2

PW

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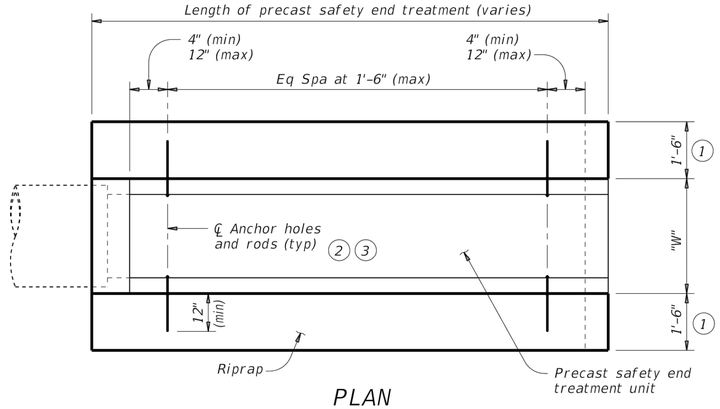
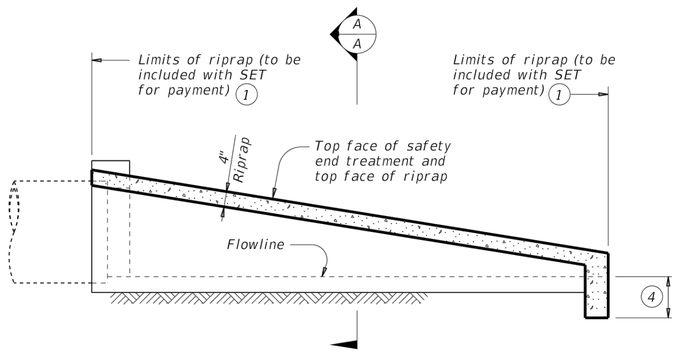
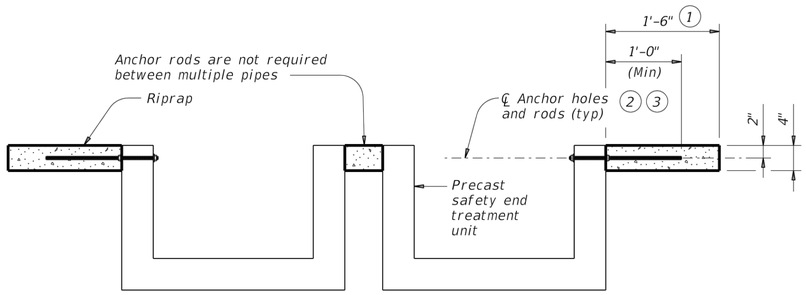


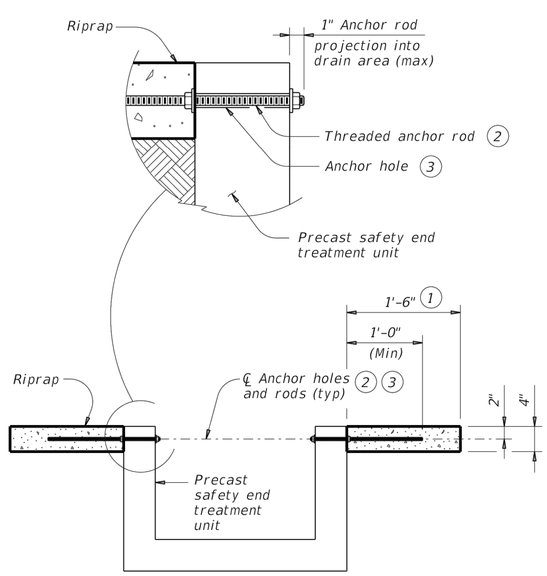
PLAN



LONGITUDINAL ELEVATION



MULTIPLE PIPE INSTALLATION



SINGLE PIPE INSTALLATION

SECTION A-A

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) 5

Nominal Culvert (Pipe) I.D.	PSET-SC and PSET-SP Standards				PSET-RC and PSET-RP Standards			
	Unit Width "W"	Side Slope			Unit Width "W"	Side Slope		
		3:1	4:1	6:1		3:1	4:1	6:1
12"	23.0"	0.1	0.2	0.2	16.0"	0.1	0.1	0.2
15"	26.5"	0.2	0.2	0.3	19.5"	0.1	0.2	0.2
18"	30.0"	0.2	0.2	0.3	23.0"	0.2	0.2	0.3
24"	37.0"	0.3	0.3	0.5	30.0"	0.2	0.3	0.4
30"	44.5"	0.3	0.4	0.6	37.0"	0.3	0.3	0.5
36"	51.5"	0.4	0.5	0.7	44.0"	0.3	0.4	0.6
42"	58.5"	0.5	0.6	0.8	51.0"	0.4	0.5	0.7

(1) Riprap placed beyond the limits shown will be paid as concrete riprap in accordance with Item 432, "Riprap". When riprap is cast integrally with the precast safety end treatment, this dimension is 1'-0" minimum.

(2) 1#2" Dia ASTM A307 Gr A threaded anchor rod with 2 nuts and 2 washers. Galvanize all components in accordance with Item 445, "Galvanizing". Repair galvanizing that is damaged during transport or construction in accordance with the specifications.

(3) 3#4" through holes in walls of safety end treatment for riprap anchor rods may be drilled with rotary (coring or masonry) type drilling equipment or may be formed. Do not use percussive (star) type drilling equipment. If holes are drilled, patch spalls in the inside face of the wall exceeding 1#2" from the holes.

(4) Provide riprap toe wall when dimension is shown elsewhere in the plans or when field conditions require a toe wall.

(5) Quantities shown are for one end of one reinforced concrete pipe culvert. For multiple pipe culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only. Quantities are based on the minimum unit lengths shown on the Precast Saftey End Treatment (SET) standard sheets.

MATERIAL NOTES:

Provide Class "B" riprap in accordance with Item 432, "Riprap".

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise. The anchor rods shown are always required.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".

Refer to PSET-SC or PSET-SP standard sheets for details of square safety end treatments not shown. Refer to PSET-RC or PSET-RP standard sheets for details of round safety end treatments not shown.

For precast units with integrally cast riprap, substitute reinforcing steel in the amount on 0.26 in./ft. minimum for the threaded anchor rods shown. When requested, submit sealed engineering drawings for approval prior to construction. Shop drawings will not be required. Note that a proprietary precast unit with integral riprap is available from L&R Precast Concrete Works, Inc. (956) 583-6293 or www.lrprecast.com.

Payment for riprap and toewalls is included in the price bid for each safety end treatment.

These riprap details are only applicable when notes that require placement of riprap with precast safety end treatments are shown elsewhere in the plans.

Precast units with integrally cast riprap are permitted unless noted otherwise on the plans.

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT
TYPE II
RIPRAP DETAILS

PSET-RR

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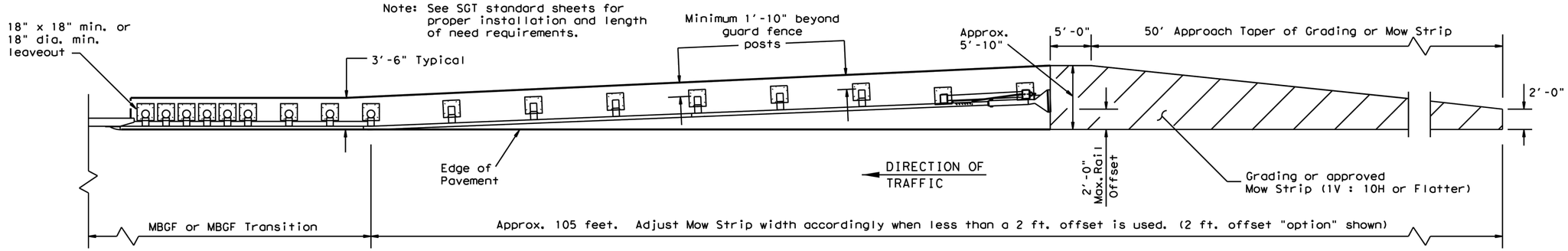
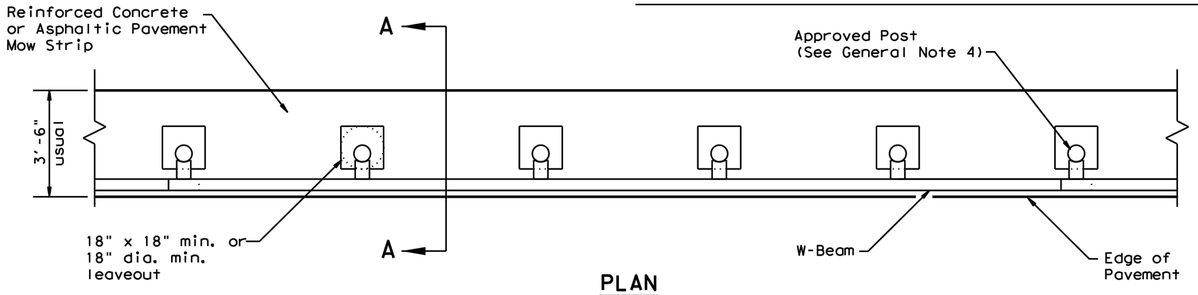
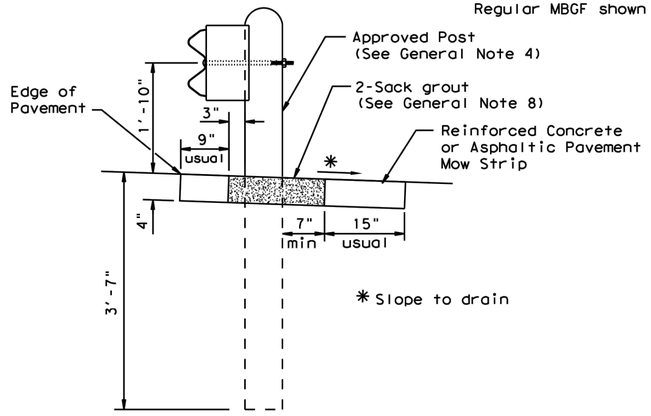


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



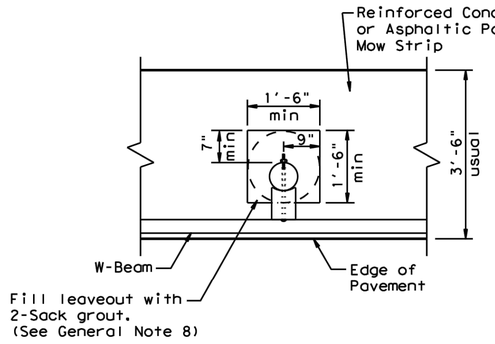
PLAN

Regular MBGF shown with Mow Strip



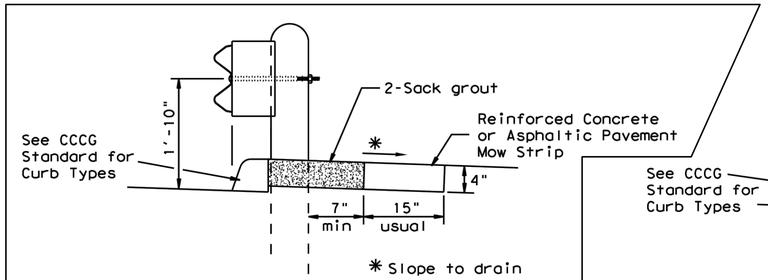
SECTION A-A

Typical



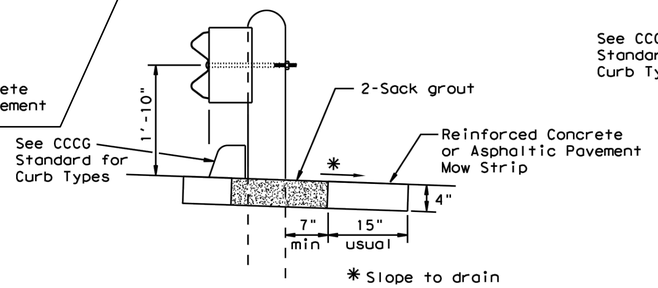
MOW STRIP DETAIL

Reinforced Concrete or Asphaltic Pavement Mow Strip with 18" x 18" or 18" dia. minimum leaveout.



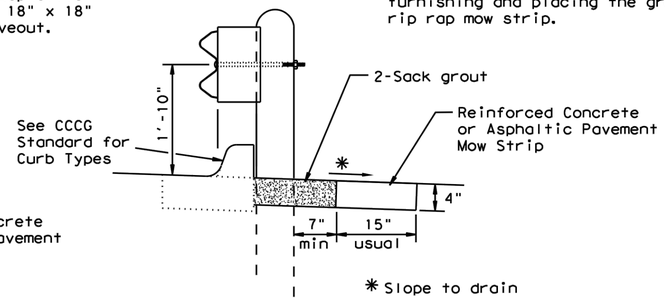
CURB OPTION (1)

This option will increase the post embedment through out the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.

Approach grading or mow strip may be decreased or eliminated. As directed by the Engineer.

GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments (See SGT standards for proper SGT installation).
2. Mow strips shall be asphaltic pavement or reinforced concrete (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item of work. Asphaltic pavement shall meet the requirements of the item, and be placed in accordance with the pertinent bid item as shown on the plans. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leaveout behind the post shall be a minimum of 7".
4. The type of approved post will be shown elsewhere in the plans. See the applicable standard sheets for additional details and information.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Depth of mow strip will be 4".
7. The limits of payment for asphaltic pavement or reinforced concrete will include leaveouts for posts.
8. The leave-outs shall be filled with no more than a 2-sack grout mixture (1 part cement, 5 parts water, and 14 parts sand by volume) with a 28-day compressive strength of approximately 120 psi or less. Provide grout of a consistency that will flow into and completly fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay Item of rip rap mow strip.

ONLY FOR USE IN MAINTENANCE REPAIRS.

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE

(MOW STRIP)

MBGF (MS)-19

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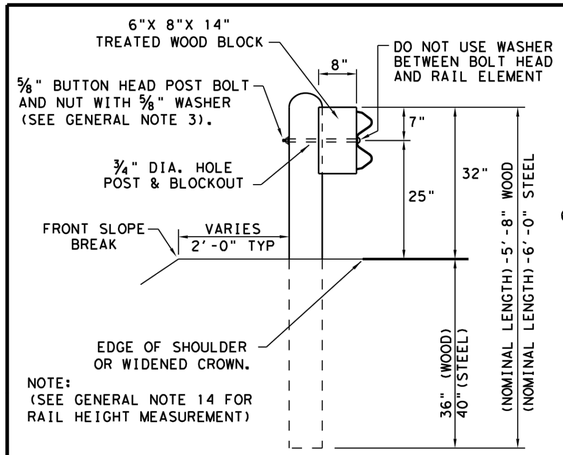
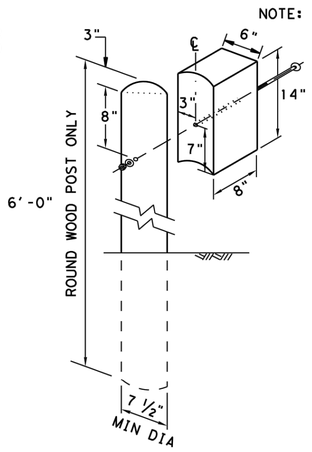
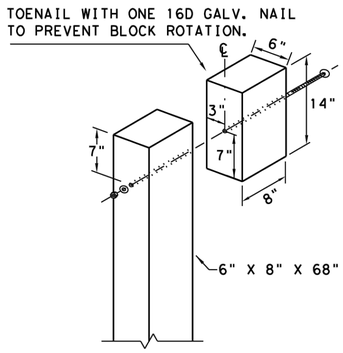


TYPICAL POST PLACEMENT

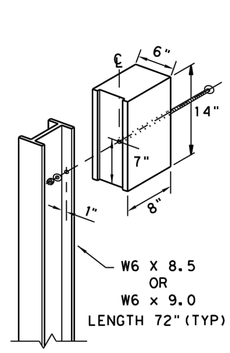


WOOD BLOCK TO ROUND WOOD POST

NOTE: TOENAIL WITH ONE 16D GALV. NAIL TO PREVENT BLOCK ROTATION.

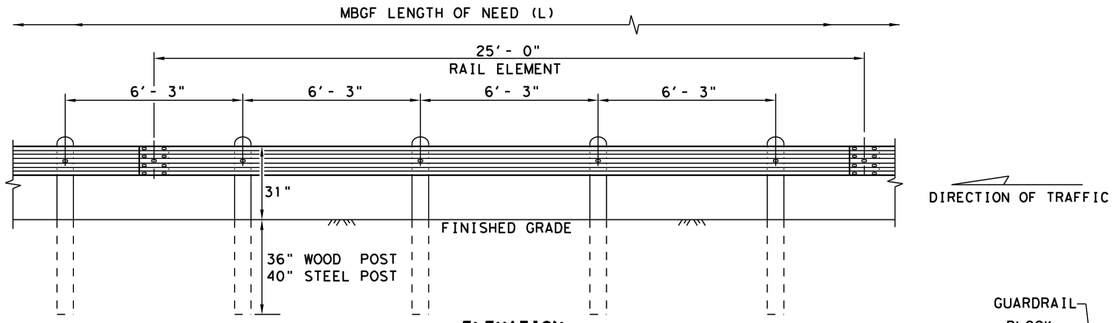


WOOD BLOCK TO RECTANGULAR WOOD POST



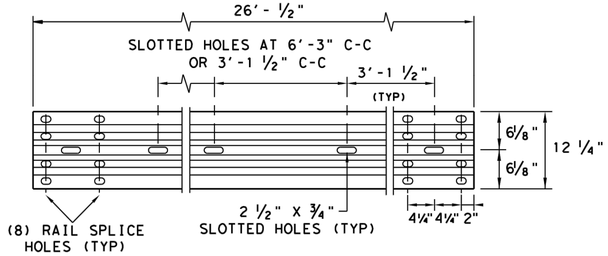
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

NOTE: ** "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



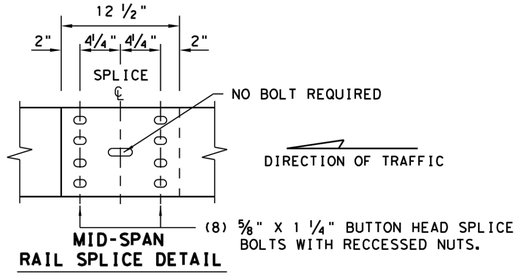
ELEVATION MID-SPAN RAIL SPLICE

SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



ELEVATION 25'- 0" (NOM.) W-BEAM SECTION

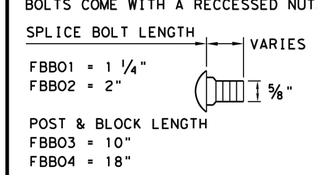
NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.



MID-SPAN RAIL SPLICE DETAIL

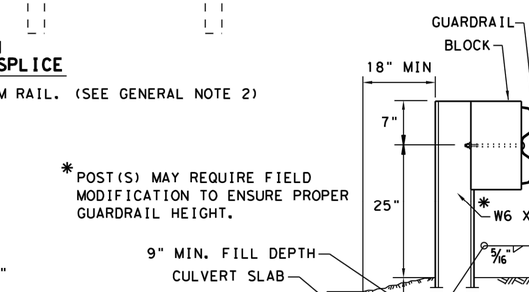
NOTE: GF(31), MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.

NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL BOLTS COME WITH A RECCESSED NUT.



BUTTON HEAD BOLT

NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. ⅞" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 ¼" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE ⅞" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS ¼" MIN. BEYOND NUT.

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

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.

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 ½" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210,"COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE
TL-3 MASH COMPLIANT
GF(31)-19

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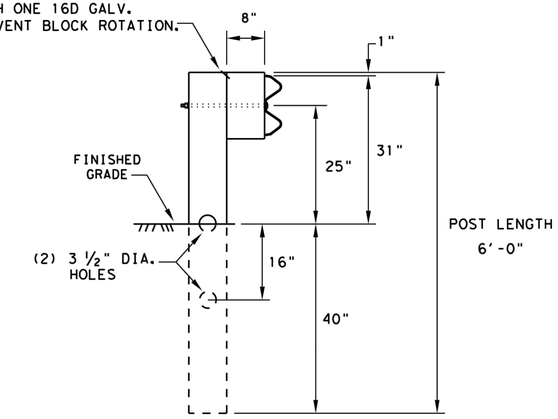
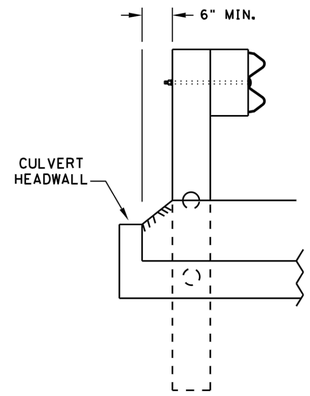
NOTE: TOENAIL WITH ONE 16D GALV. NAIL TO PREVENT BLOCK ROTATION.



RECTANGULAR CRT POST (6"X 8" X 6' LONG)

(6) CRT REQUIRED
SEE ELEVATION DETAIL FOR LOCATIONS



LATERAL OFFSET BETWEEN THE GUARDRAIL AND THE CULVERT HEADWALL

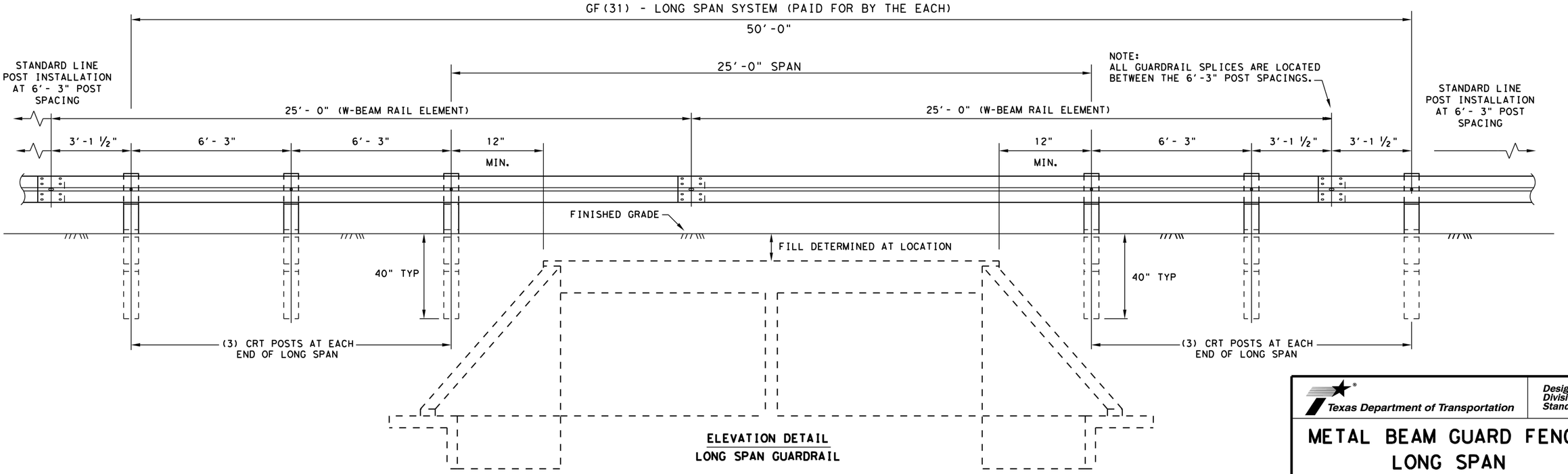
GENERAL NOTES

1. THE TYPE OF LINE POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF THE TRANSITIONS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENT SHALL MEET ALL REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 12'- 6" OR 25'- 0" NOMINAL LENGTHS.
3. RAIL POST HOLES ARE OFFSET 3'- 1 ½" FROM STANDARD GUARDRAIL TO ACCOMMODATE THE MIDSPAN SPLICING.
4. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NO MORE THAN 1" BEYOND IT.
5. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
7. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
8. REFER TO GF(31) STANDARD SHEET FOR ADDITIONAL DETAILS.
9. FLAME CUTTING OF HOLES IN GUARDRAIL SHALL NOT BE PERMITTED. IF YOU ENCOUNTER MIS-ALIGNED BOLT HOLES IN GUARDRAIL CONTACT THE DESIGN DIVISION FOR ADDITIONAL INFORMATION & OPTIONS.

DIRECTION OF TRAFFIC

NOTE: SEE GF(31) STANDARD FOR STANDARD LINE POSTS.

GF(31) - LONG SPAN SYSTEM (PAID FOR BY THE EACH)



ELEVATION DETAIL
LONG SPAN GUARDRAIL

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE LONG SPAN TL-3 MASH COMPLIANT

GF(31)LS-19

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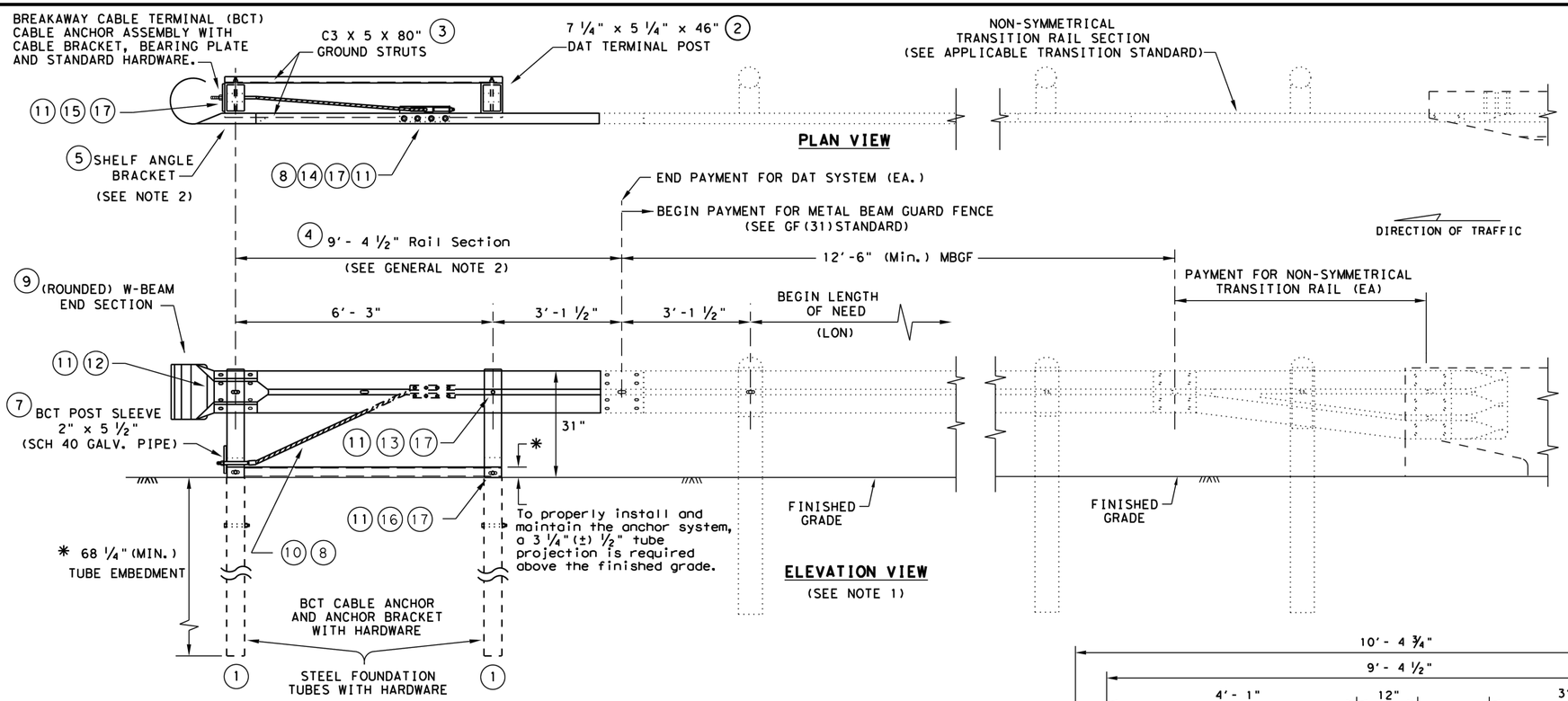


DOWNSTREAM ANCHOR TERMINAL (DAT)

NOTE: ONLY FOR DOWNSTREAM USE, WHEN LOCATED OUTSIDE THE HORIZONTAL CLEARANCE AREA OF OPPOSING TRAFFIC.

GENERAL NOTES

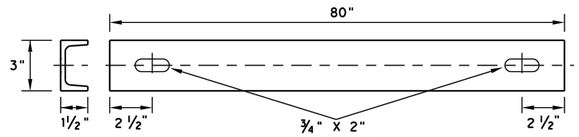
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 3 3/4" ABOVE THE FINISHED GRADE.
4. ALL HARDWARE FOR DAT SHALL BE ASTM A307 UNLESS OTHERWISE SHOWN.
5. REFER TO GF(31) SHEET FOR TERMINAL CONNECTION DETAILS.

MOW STRIP INSTALLATION

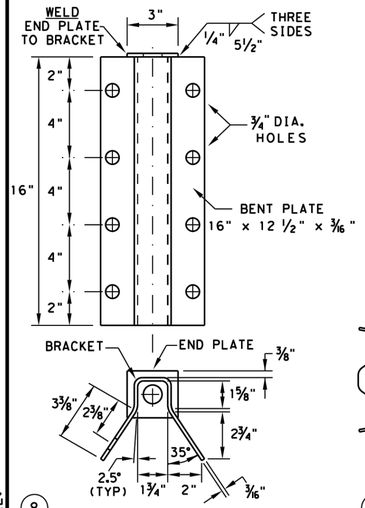
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

#	(DAT) PARTS LIST	QTY
(1)	STEEL FOUNDATION TUBE	2
(2)	DAT TERMINAL POST	2
(3)	CHANNEL STRUT	2
(4)	TERMINAL RAIL ELEMENT	1
(5)	SHELF ANGLE BRACKET	1
(6)	BCT BEARING PLATE	1
(7)	BCT POST SLEEVE	1
(8)	GUARDRAIL ANCHOR BRACKET	1
(9)	(ROUNDED) W-BEAM END SECTION	1
(10)	BCT CABLE ANCHOR	1
(11)	RECESSED NUT, GUARDRAIL	20
(12)	1 1/4" BUTTON HEAD BOLT	4
(13)	10" BUTTON HEAD BOLT	2
(14)	5/8" X 2" HEX HEAD BOLT	8
(15)	5/8" X 8" HEX HEAD BOLT	4
(16)	5/8" X 10" HEX HEAD BOLT	2
(17)	5/8" FLAT WASHER	18

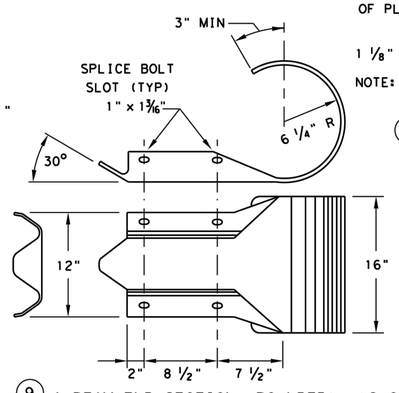
(4) TERMINAL RAIL ELEMENT FOR DAT



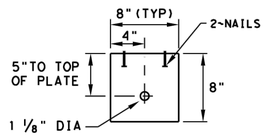
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

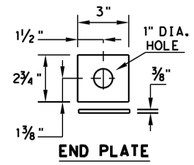


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

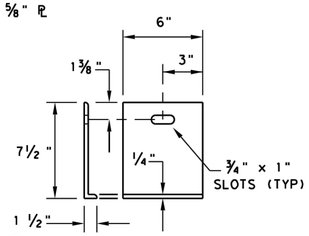


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

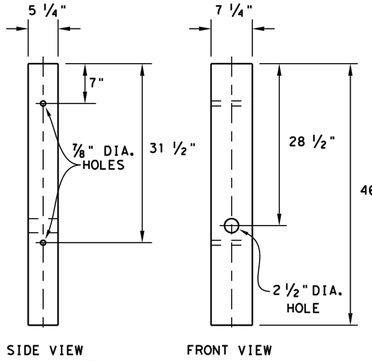
(6) BEARING PLATE
8"x 8"x 5/8" PL



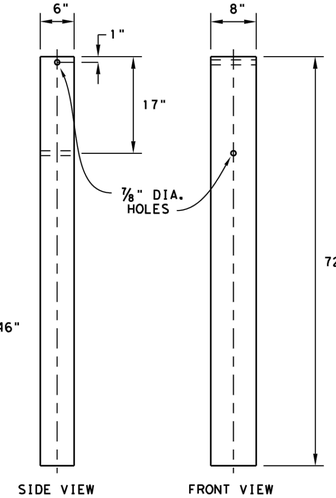
END PLATE



(5) SHELF ANGLE BRACKET



(2) TERMINAL POST
7 1/4"x 5 1/4"x 46" WOOD POST



(1) STEEL FOUNDATION TUBE
6"x 8"x 1/8" x 72" STEEL TUBE

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE
(DOWNSTREAM ANCHOR TERMINAL)
TL-3 MASH COMPLIANT

GF(31)DAT-19

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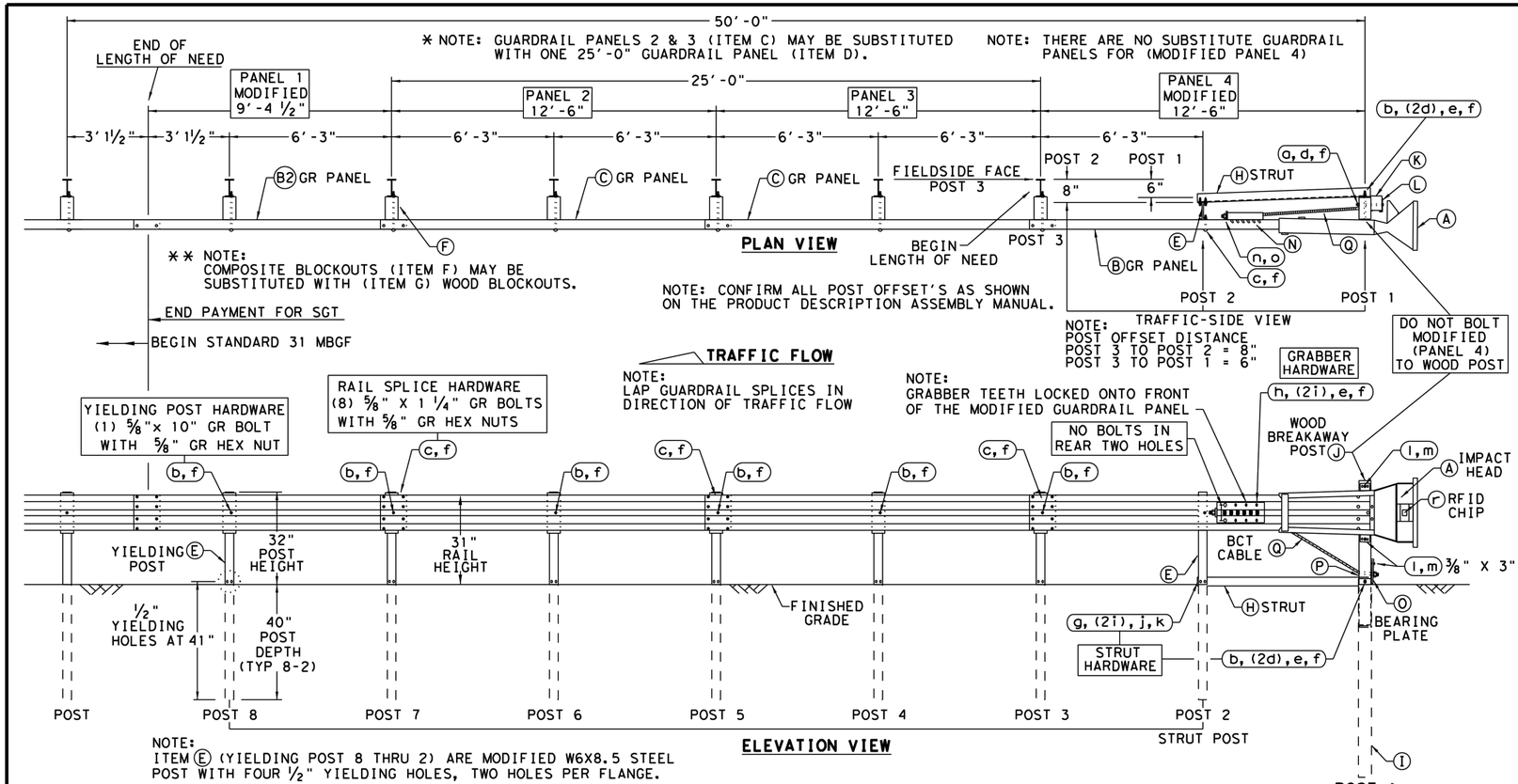
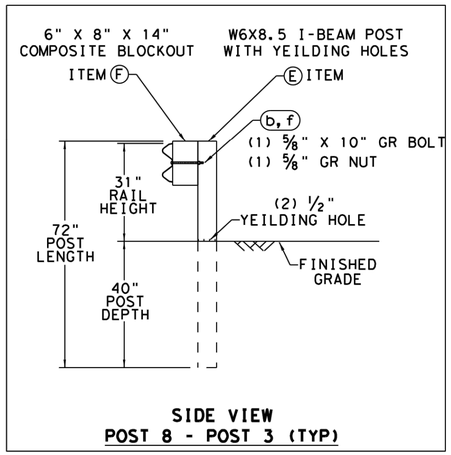


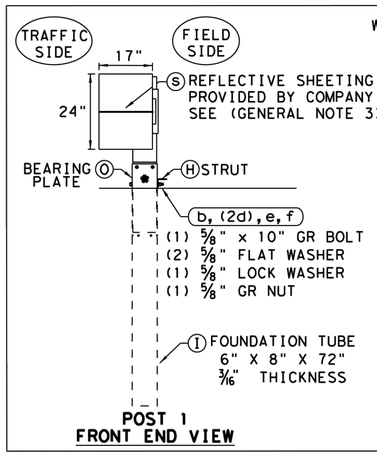
GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL.
3. MANUFACTURER WILL APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" TO THE FACE PLATE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. THE OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. THE NOMINAL HEIGHT OF THE GUARDRAIL BEAM IS 31 INCHES WITH A TOLERANCE OF +/- ONE INCH.
5. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
6. (POST 2 THROUGH POST 8) ARE MODIFIED STEEL-YIELDING POSTS WITH YIELDING HOLES AT GROUND LEVEL. THERE ARE NO SUBSTITUTE POSTS.
7. POSTS SHALL NOT BE SET IN CONCRETE.
8. IF SOLID ROCK IS ENCOUNTERED FOR ANY OF THE POSTS IN THE SYSTEM, CONTACT THE MANUFACTURER FOR SPECIFIC INSTALLATION GUIDANCE.
9. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
10. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS DMS-7210 REQUIREMENTS MAY BE SUBSTITUTED FOR AN APPROVED WOOD BLOCKOUT. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
11. THE ENTIRE SYSTEM MUST BE INSTALLED IN A STRAIGHT LINE WITHOUT ANY CURVE. HOWEVER, THE SYSTEM CAN BE OFFSET BY TWO FEET AS SHOWN ON THE APPROACH GRADING DETAIL TO HELP OFF-SET THE IMPACT HEAD FROM SHOULDER OF THE ROAD.

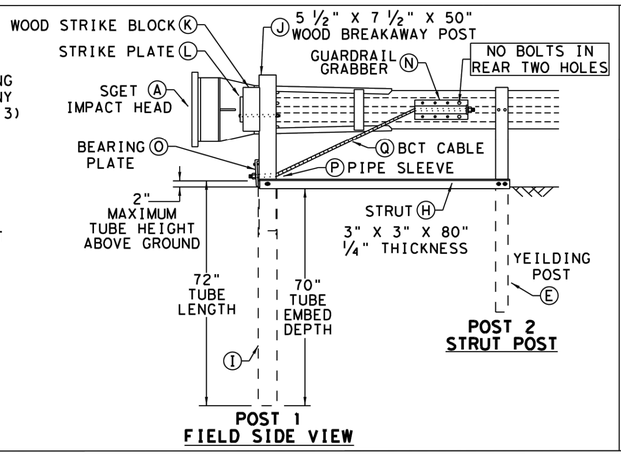
ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA	GP94
C	2	STANDARD GUARDRAIL PANEL 12'-6" 12GA	GP126
* D	1	STANDARD GUARDRAIL PANEL 25'-0" 12GA	GP25
E	7	MODIFIED YIELDING I-BEAM POST W6x8.5	YP6MOD
F	6	COMPOSITE BLOCKOUT 6" X 8" X 14"	CBO8
ALTERNATIVE ITEMS ** G	6	WOOD BLOCKOUT 6" X 8" X 14"	WBO8
NOTE: SEE PLAN VIEW H	1	STRUT 3" X 3" X 80" x 1/4" A36 ANGLE	STR80
I	1	FOUNDATION TUBE 6" X 8" X 72" x 3/16"	FNDT6
J	1	WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50"	WBRK50
K	1	WOOD STRIKE BLOCK	WSBLK14
L	1	STRIKE PLATE 1/4" A36 BENT PLATE	SPLT8
M	1	REINFORCEMENT PLATE 12 GA. GR55	REPLT17
N	1	GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2"	GGR17
O	1	BEARING PLATE 8" X 8 5/8" X 5/8" A36	BPLT8
P	1	PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.)	PSLV4
Q	1	BCT CABLE 3/4" X 81" LENGTH	CBL81
		SMALL HARDWARE	
a	1	5/8" X 12" GUARDRAIL BOLT 307A HDG	12GRBLT
b	7	5/8" X 10" GUARDRAIL BOLT 307A HDG	10GRBLT
c	33	5/8" X 1 1/4" GR SPLICE BOLTS 307A HDG	1GRBLT
d	3	5/8" FLAT WASHER F436 A325 HDG	58FW436
e	1	5/8" LOCK WASHER HDG	58LW
f	39	5/8" GUARDRAIL HEX NUT HDG	58HN563
g	2	1/2" X 2" STRUT BOLT A325 HDG	2BLT
h	6	1/2" X 1 1/4" PLATE BOLT A325 HDG	125BLT
i	16	1/2" FLAT WASHER F436 A325 HDG	12FWF436
j	8	1/2" LOCK WASHER HDG	12LW
k	8	1/2" HEX NUT A563 HDG	12HN563
l	4	3/8" X 3" HEX LAG SCREW GR5 HDG	38LS
m	4	3/8" FLAT WASHER F436 A325 HDG	38FW844
n	2	1" FLAT WASHER F436 A325 HDG	1FWF436
o	2	1" HEX NUT A563DH HDG	1HN563
p	1	18" TO 24" LONG ZIP TIE RATED 175-200LB	ZPT18
q	1	1 1/2" X 4" SCH-40 PVC PIPE	PSPCR4
r	1	RFID CHIP RATED MIL-STD-810F	RFID810F
s	1	IMPACT HEAD REFLECTIVE SHEETING	RS30M



SIDE VIEW
POST 8 - POST 3 (TYP)

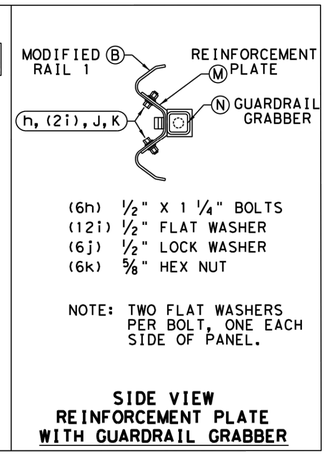


POST 1
FRONT END VIEW



POST 1
FIELD SIDE VIEW

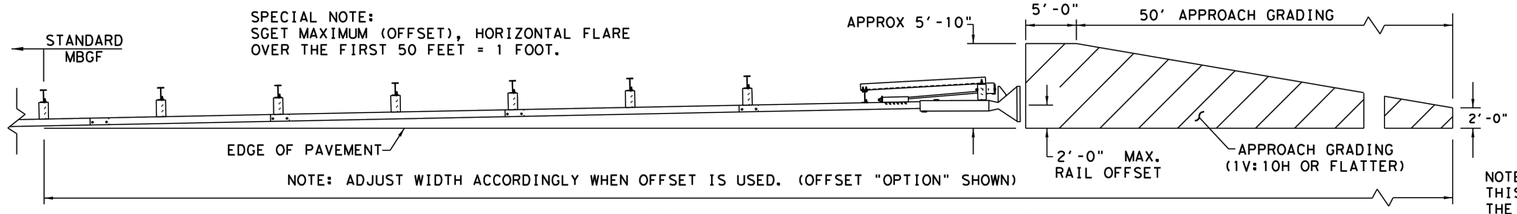
POST 2
STRUT POST



(6h) 1/2" X 1 1/4" BOLTS
(12i) 1/2" FLAT WASHER
(6j) 1/2" LOCK WASHER
(6k) 5/8" HEX NUT

NOTE: TWO FLAT WASHERS PER BOLT, ONE EACH SIDE OF PANEL.

SIDE VIEW
REINFORCEMENT PLATE
WITH GUARDRAIL GRABBER



APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SGET TERMINAL SYSTEM AND IS NOT INTENDED TO REPLACE THE MANUFACTURER'S ASSEMBLY MANUAL.

Texas Department of Transportation

Design Division Standard

SPIG INDUSTRY, LLC
SINGLE GUARDRAIL TERMINAL
SGET - TL-3 - MASH
SGT(15)31-20

FILE: sgt153120.dgn	DN: TxDOT		CK: KM	DW: VP		CK: VP
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					181	

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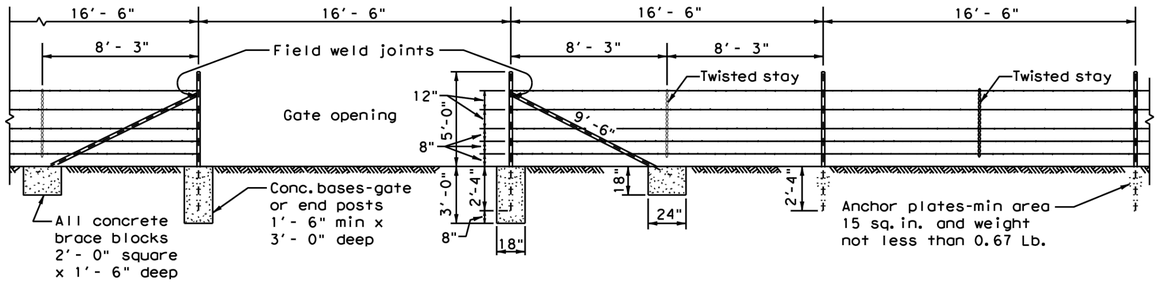
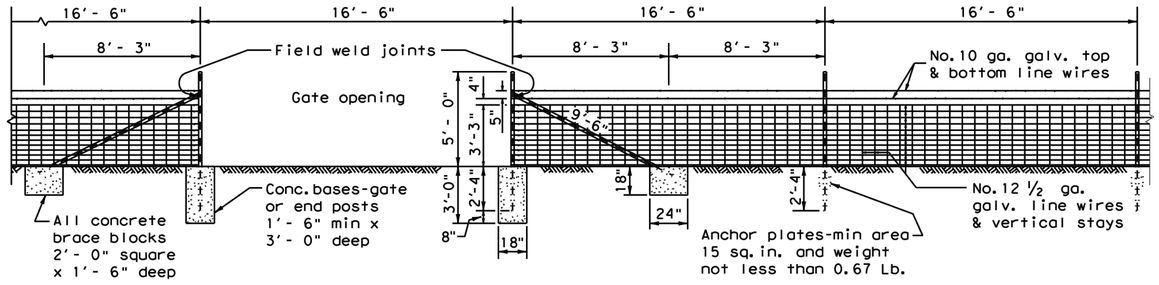


SECTION GALVANIZED BARBED WIRE FENCE WITH METAL POSTS

BRACING DETAIL USED AT ENDS AND GATES

TYPE "C" FENCE

(See General Note 8)



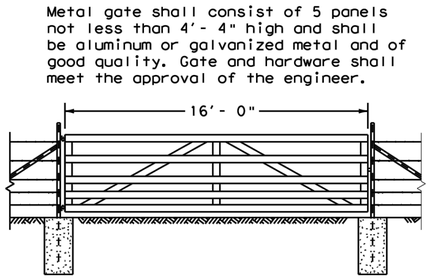
SECTION GALVANIZED WOVEN WIRE FENCE WITH METAL POSTS

BRACING DETAIL USED AT ENDS AND GATES

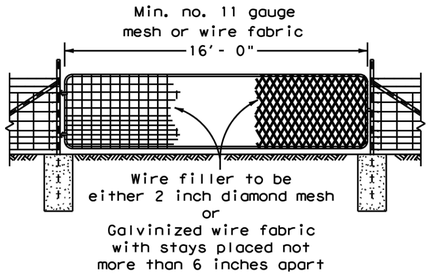
TYPE "D" FENCE

(See General Note 8)

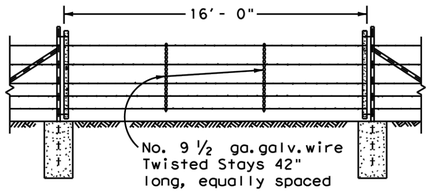
Note:
For Steel pipe and T-Post requirements. (See General Notes 6 & 7)



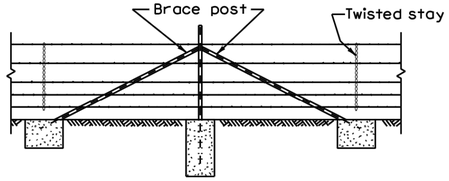
DETAIL TYPE 1 GATE



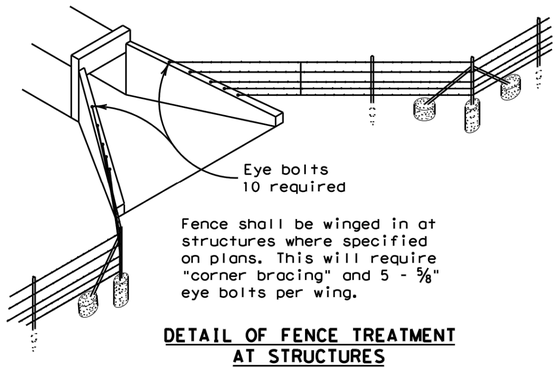
DETAIL TYPE 2 GATE



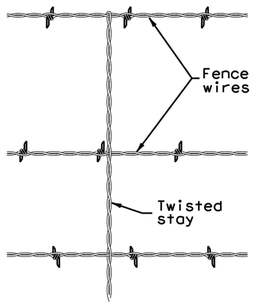
DETAIL TYPE 3 GATE



CORNER OR PULL POST ASSEMBLY

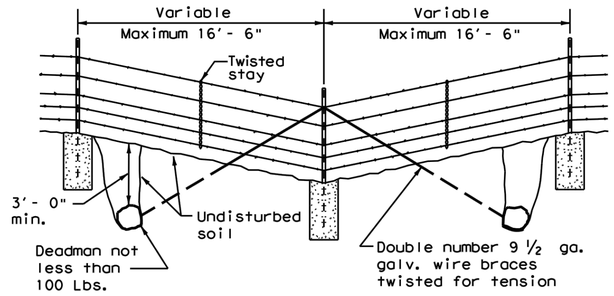


DETAIL OF FENCE TREATMENT AT STRUCTURES

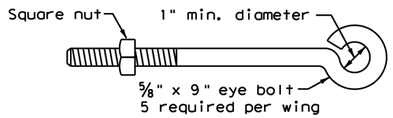


DETAIL OF STAY

(Barbed Wire Fence)



DETAIL OF FENCE SAG



DETAIL OF EYE BOLT

GENERAL NOTES

1. Any high point which interferes with the placing of wire mesh shall be excavated to provide a 2 inch clearance.
2. Latches for Type 1 and Type 2 gates shall be good commercial quality and design latch of the spring, fork or chain type. All latches shall be suitable to the gate and shall be approved by the Engineer.
3. Hinges for Type 2 gates shall be a commercial design approved by the Engineer suitable for post and gate.
4. Concrete shall be of the design and consistency approved by the Engineer and shall contain not less than 4 sacks of cement per cubic yard. Concrete footings are to be crowned at the top to shed water.
5. Steel anchor plates shall be of a design and thickness sufficient to prevent turning of the post in firm soil.
6. Steel pipe end posts, corner and pull posts shall be a minimum of 2" Std. pipe (2.375" O.D., 0.154" wall thickness) with a 1¼" Std. pipe brace (1.660" O.D., 0.140" wall thickness), with a 2"x2"x1/4" angle, or other as approved by the Engineer. Fasteners for securing barbed wire or woven wire fence to metal posts shall be a minimum of 11 gauge galvanized steel wire. Tubular posts shall be fitted with water malleable iron caps.
7. If Steel pipe is used for posts and braces, use standard pipe in accordance with ASTM A 53, Class B or A 501. For T-Posts use steel that meets ASTM A 702. Metal line posts shall be not less than 6'-6" in length and shall weigh not less than (1.33 lbs./lin.ft.). These Items shall be in accordance with Item 552, "Wire Fence."
8. Barbed Wire shall be in accordance with ASTM A 121, Class 1 Design designation 12-2-4-1 4R or 12-2-5-1 4R, or as approved by the Engineer.

   Woven Wire Fence (Type D) shall be in accordance with ASTM A 116, Class 1 No. 12-1/2 Grade 60 (See Table 1 ASTM A 116) to the height and design shown on the plans, or as approved by the Engineer.
9. The location of gates and corner posts will be as indicated elsewhere in these plans.

Texas Department of Transportation

Design Division Standard

BARBED WIRE AND WOVEN WIRE FENCE (STEEL POSTS)

WF(2)-10

FILE: wf210.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
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				182

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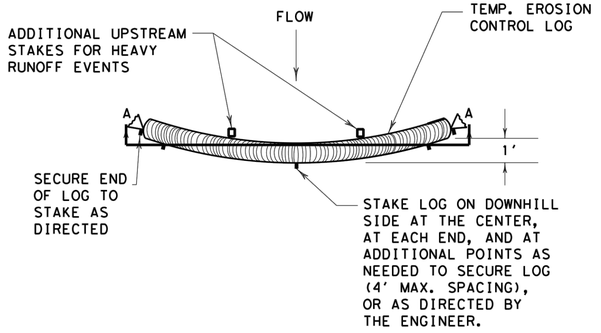
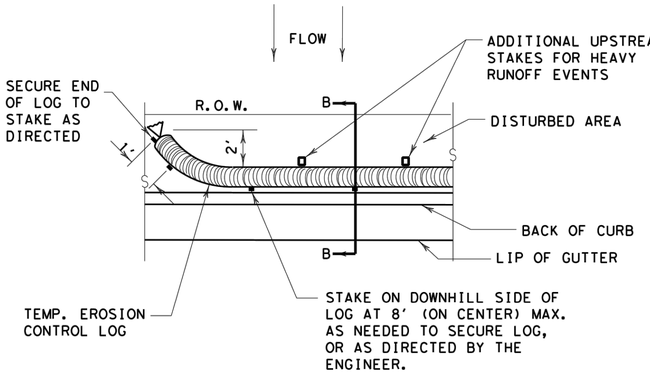
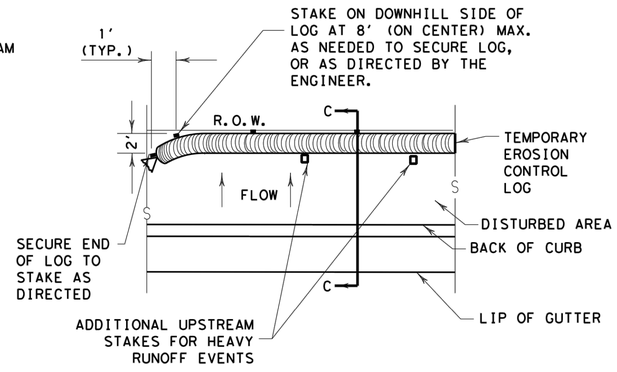


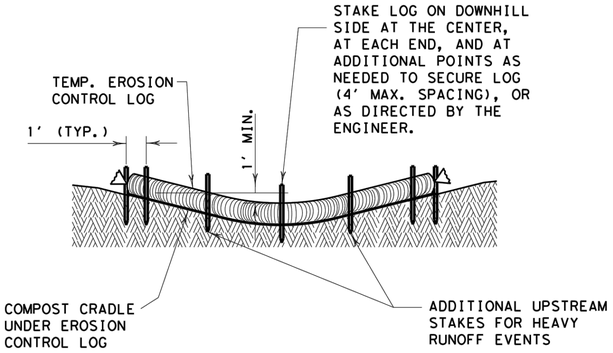
PLAN VIEW



PLAN VIEW



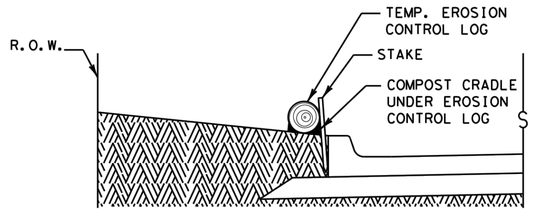
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

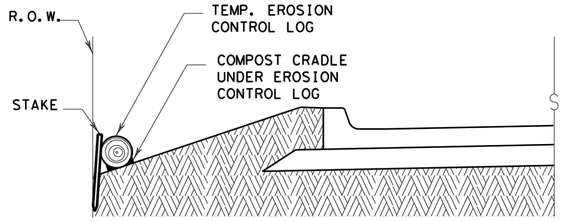
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

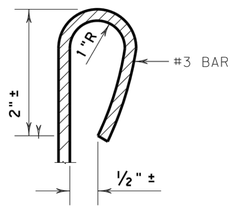
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

LEGEND

CL-D	EROSION CONTROL LOG DAM
CL-BOC	EROSION CONTROL LOG AT BACK OF CURB
CL-ROW	EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
CL-SST	EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
CL-SSL	EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
CL-DI	EROSION CONTROL LOG AT DROP INLET
CL-CI	EROSION CONTROL LOG AT CURB INLET
CL-GI	EROSION CONTROL LOG AT CURB & GRATE INLET

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

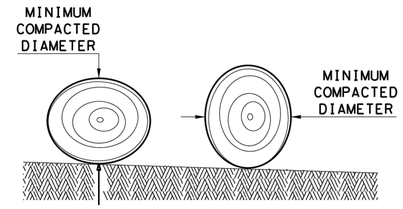
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM	DW: LS/PT		CK: LS
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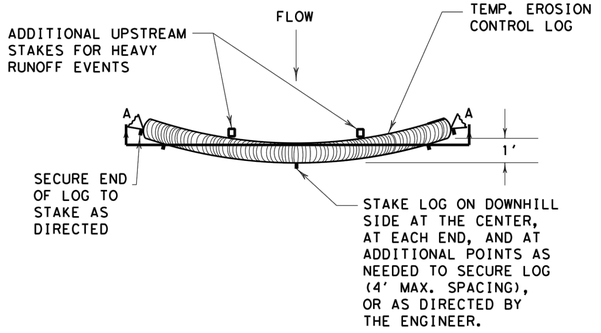
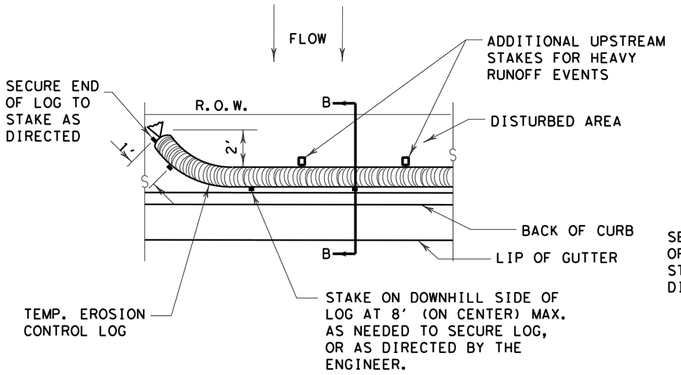
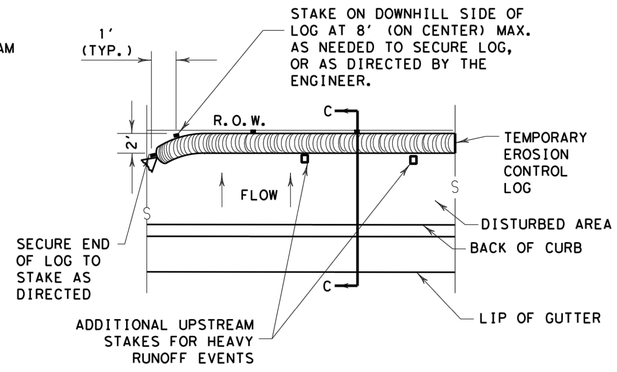


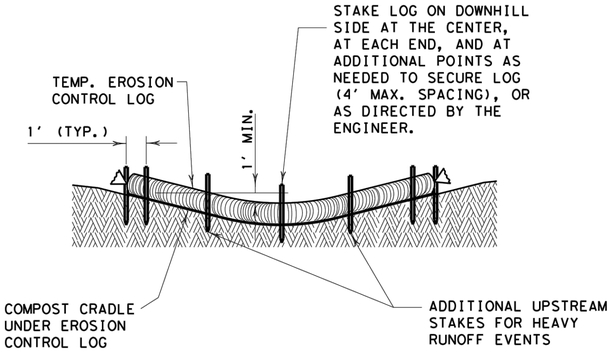
PLAN VIEW



PLAN VIEW



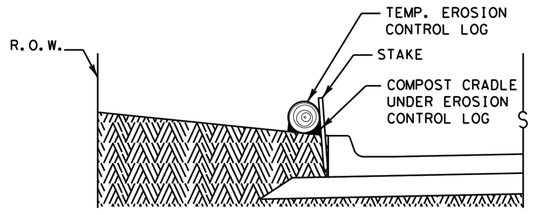
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

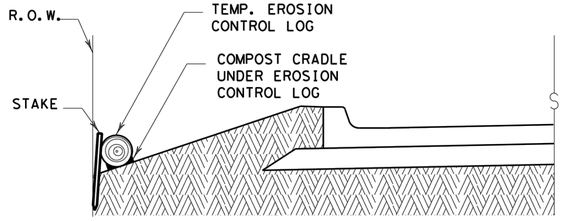
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

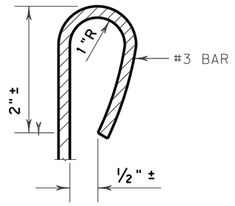
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
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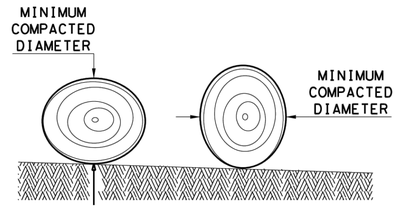

DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM	DW: LS/PT		CK: LS
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	DIST	COUNTY				SHEET NO.
						184

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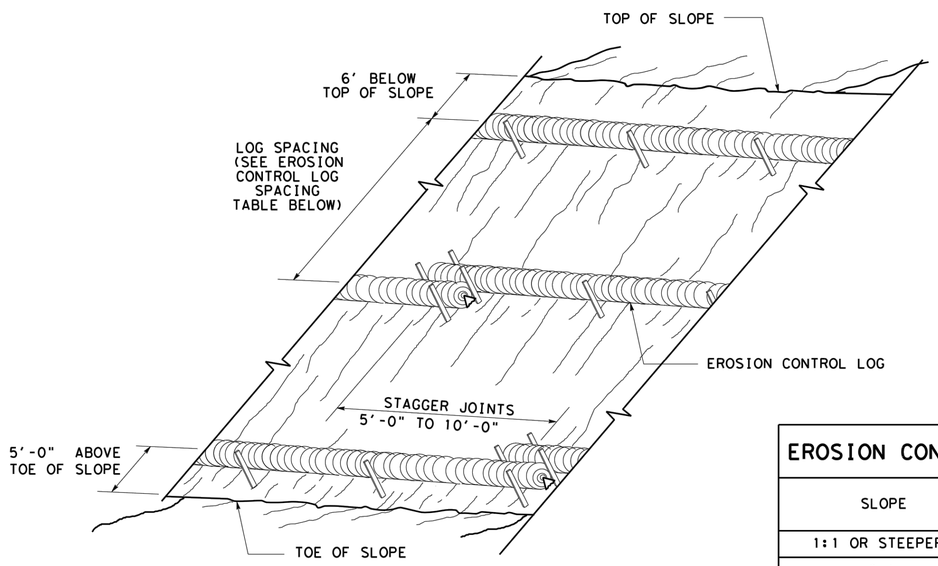
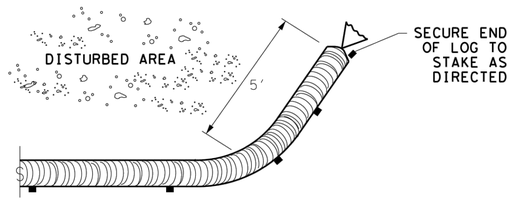


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

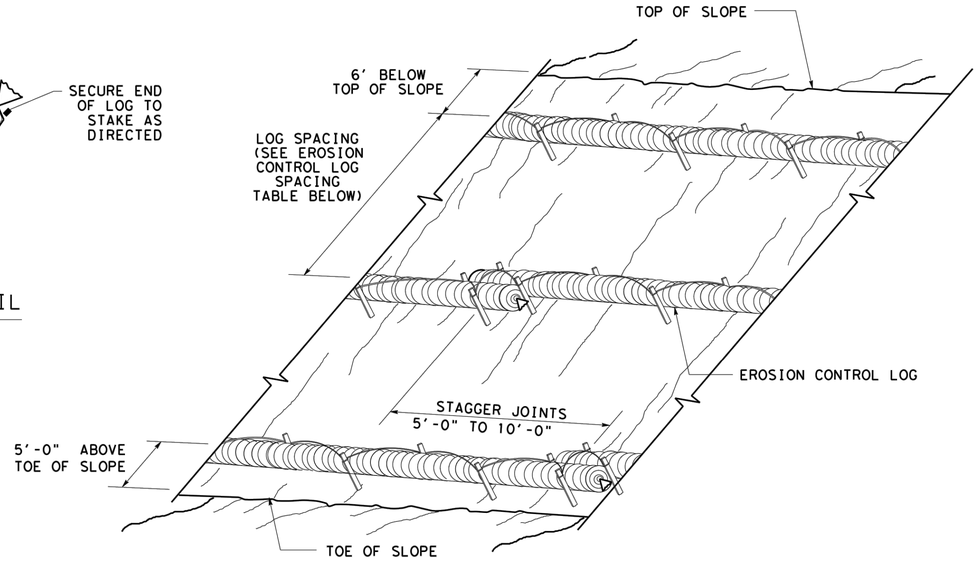
CL-SST



END SECTION RAP DETAIL

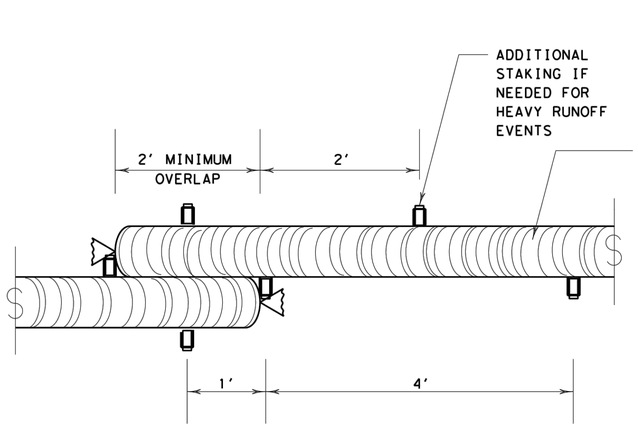
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

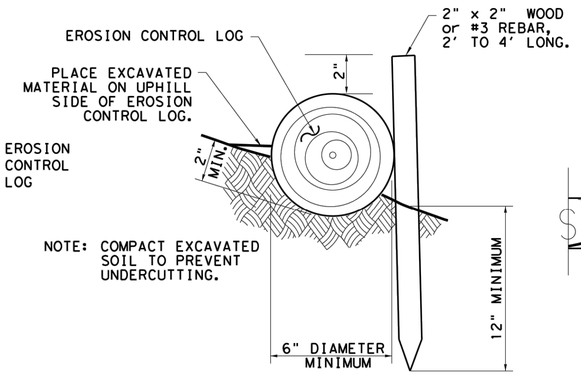
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

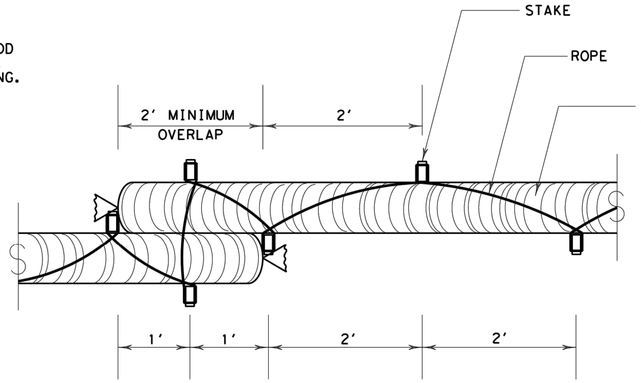


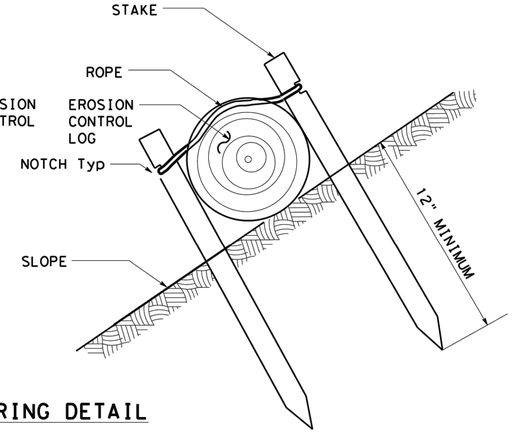


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

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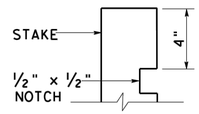

STAKE NOTCH DETAIL

SHEET 2 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

FILE: ec116	DN: TxDOT		CK: KM	DW: LS/PT		CK: LS
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REVISIONS						
	DIST	COUNTY				SHEET NO.
						185

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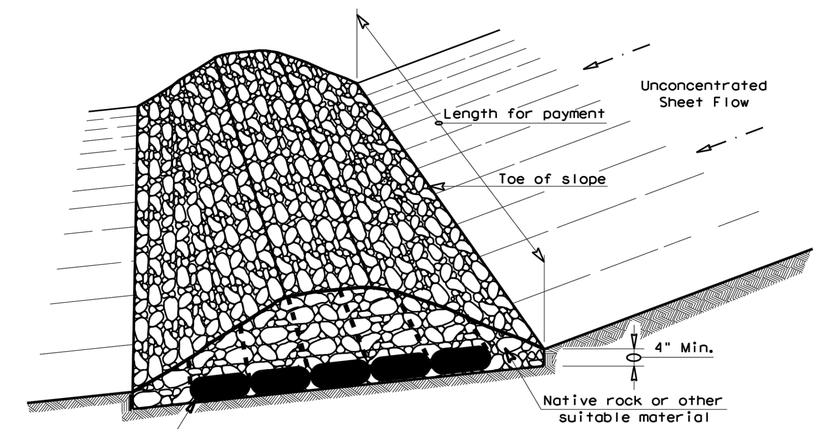
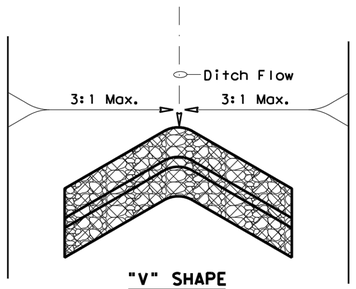
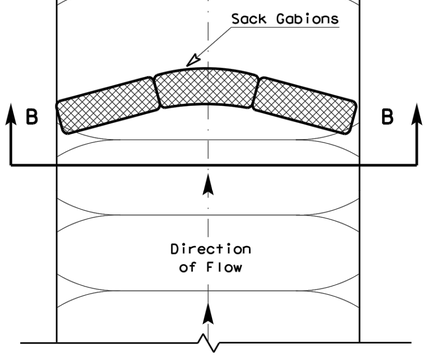


FILTER DAM AT TOE OF SLOPE

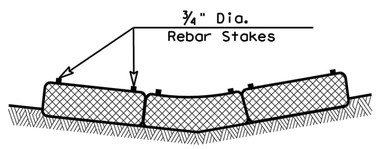
RFD1



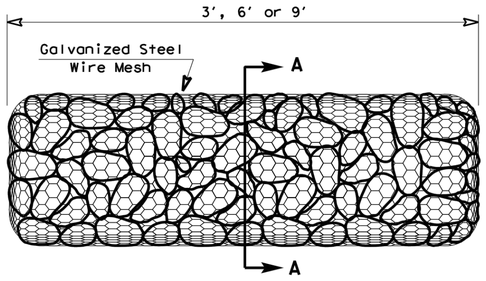
"V" SHAPE PLAN VIEW



PLAN VIEW

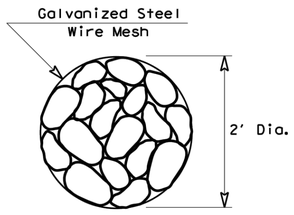


SECTION B-B

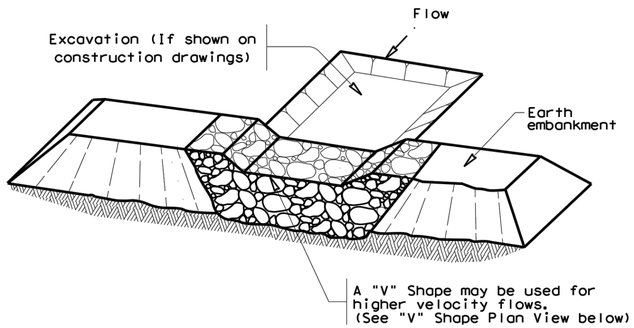


TYPE 4 (SACK GABIONS)

RFD4

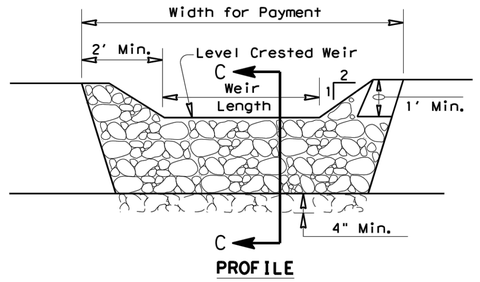


SECTION A-A

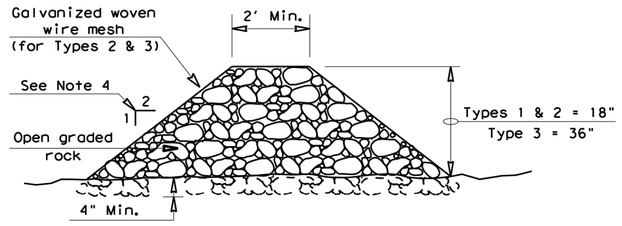


FILTER DAM AT SEDIMENT TRAP

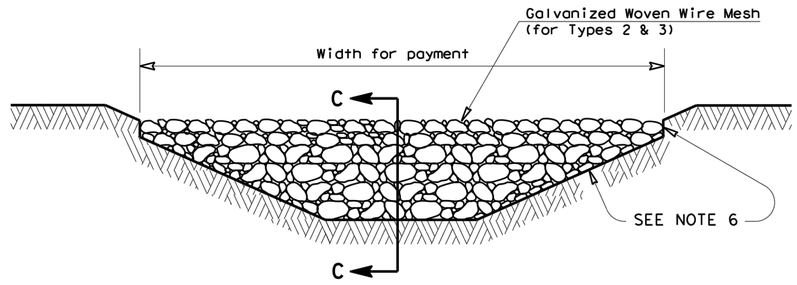
RFD1 — OR — RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 — OR — RFD2 — OR — RFD3

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS	
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REVISIONS					
	DIST	COUNTY		SHEET NO.	
				186	

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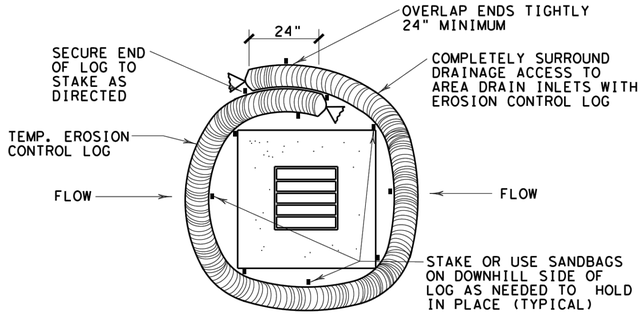
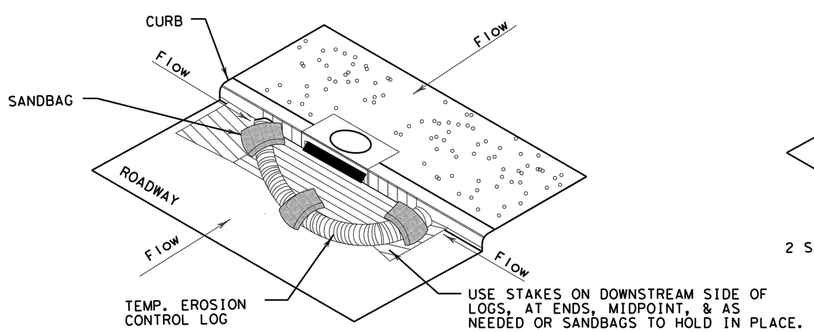


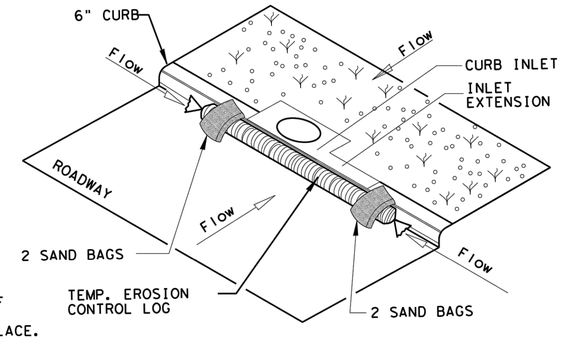
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

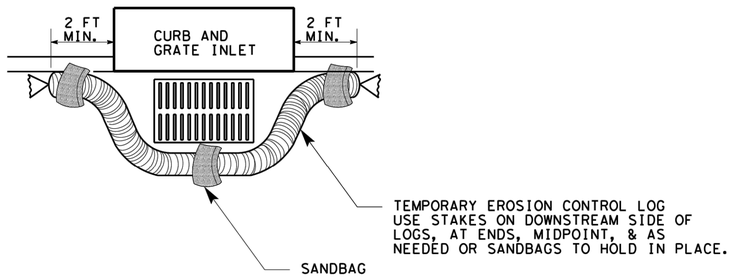
CL-CI



EROSION CONTROL LOG AT CURB INLET

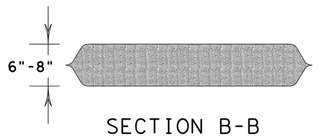
CL-CI

NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.

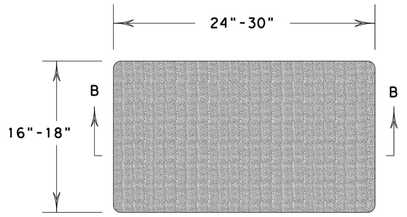


EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
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				187

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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 Manual on Uniform Traffic Control Devices" (TMUTCD).

2. The development and design of the Traffic Control Plan (TCP)is the responsibility of the Engineer.

3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.

4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.

5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.

7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.

8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.

10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.

11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY 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.

2. Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.

2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

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

SHEET 1 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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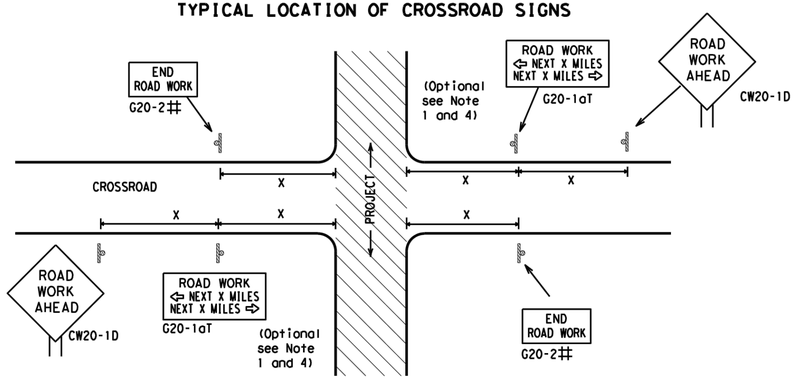
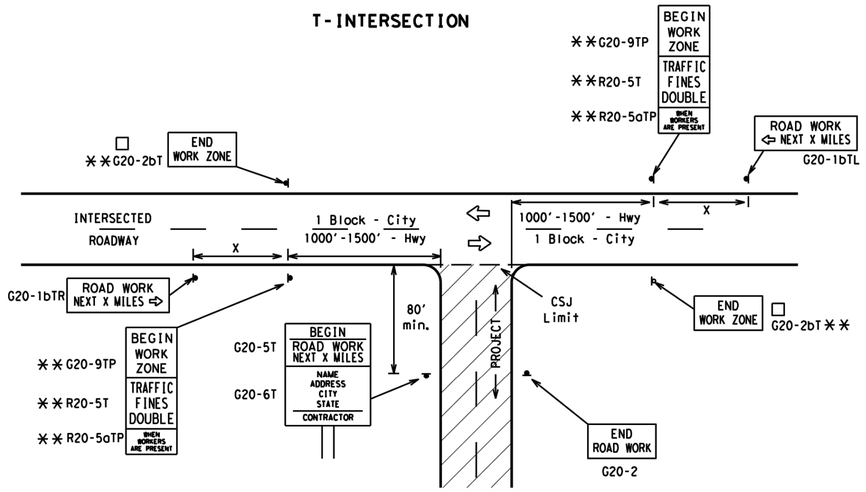
TYPICAL LOCATION OF CROSSROAD SIGNS



May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of Engineer. (See note 2 below)

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume as per TMUTCD Part 5. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES"(G20-1aT)sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING[1,5,6]

SIZE

Sign Number or Series	Conventional Road	Expressway/ Freeway
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING

Posted Speed	Sign △ Spacing "X"
MPH	Feet (Apprx.)
30	120
35	160
40	240
45	320
50	400
55	500[2]
60	600[2]
65	700[2]
70	800[2]
75	900[2]
80	1000[2]
*	*[3]

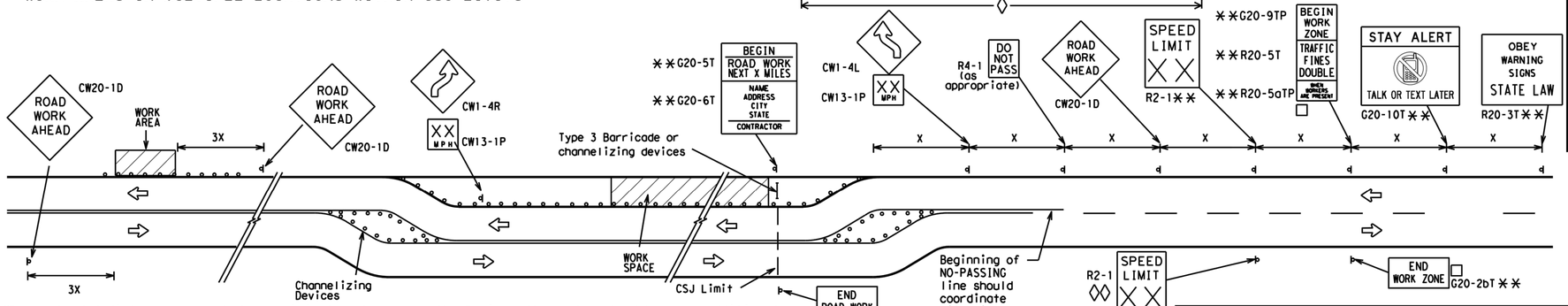
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

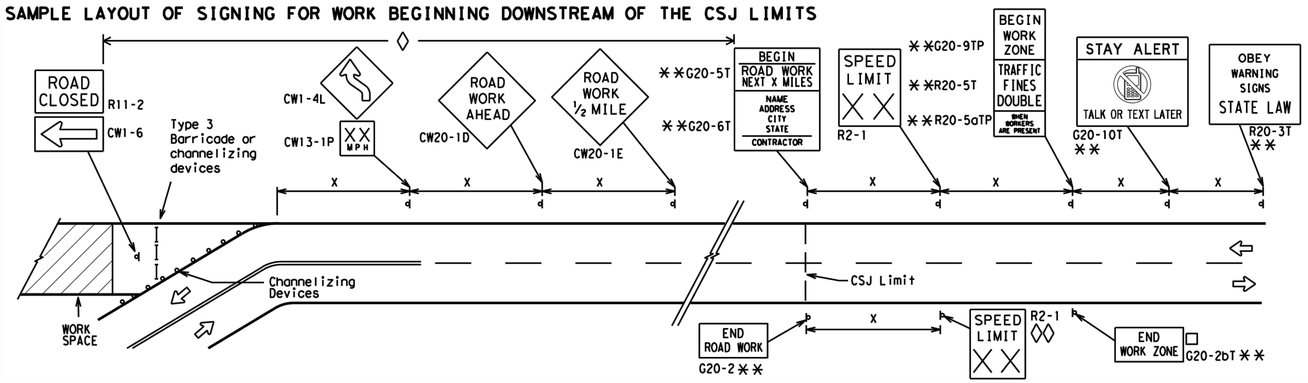
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

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



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES"(G20-5T)sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

□ The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

** CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.

◊ Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

◊◊ Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND

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

SHEET 2 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				
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7-13 5-21				189

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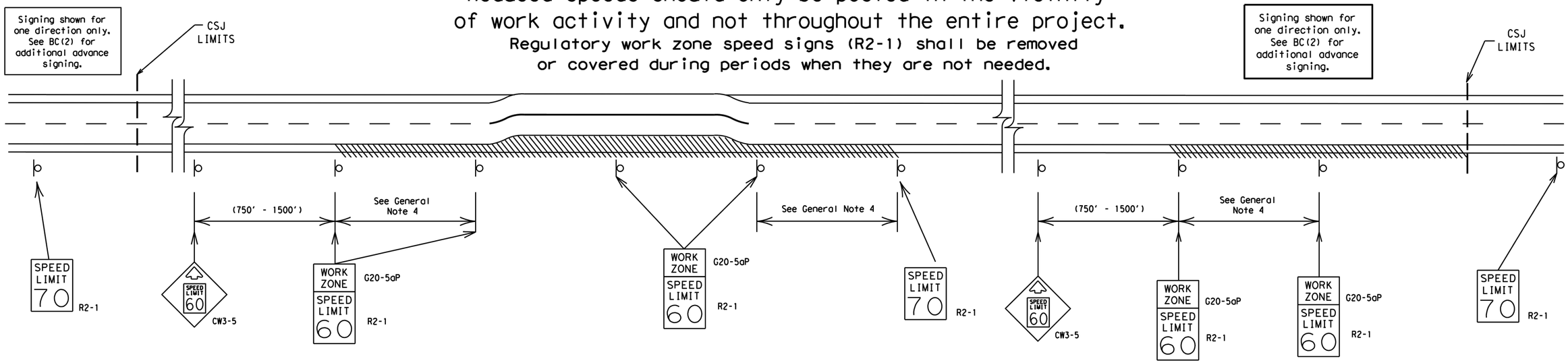
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) other conditions readily apparent to the driver

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. Frequency of work zone speed limit signs should be:
   40 mph and greater 0.2 to 2 miles
   35 mph and less 0.2 to 1 mile
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. Fabrication, erection and maintenance of the"ADVANCE SPEED LIMIT"(CW3-5)sign, "WORK ZONE"(G20-5aP) plaque and the "SPEED LIMIT"(R2-1)signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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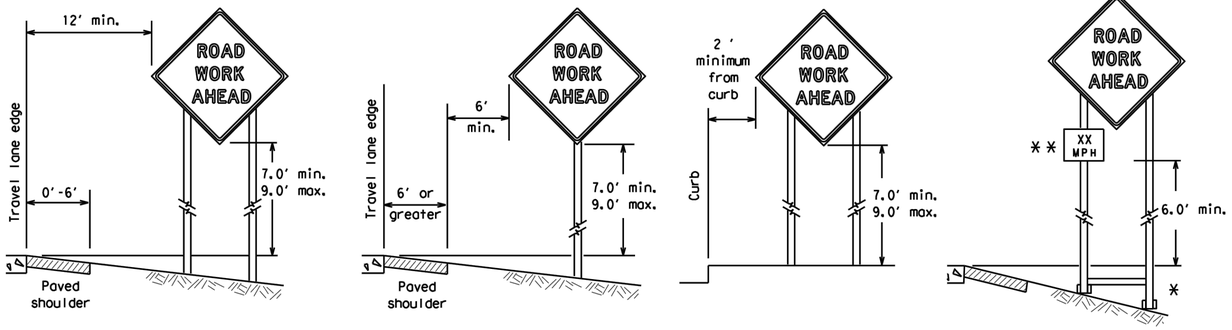
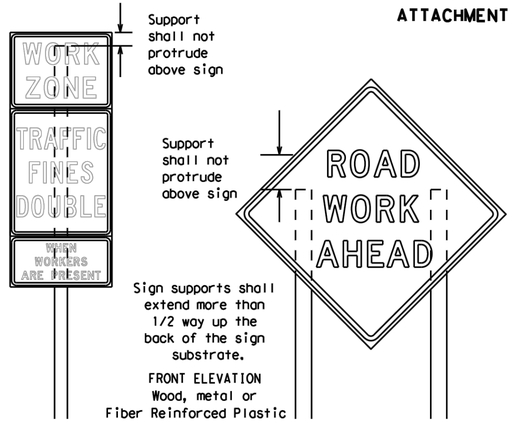
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

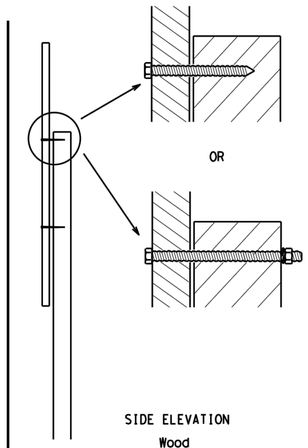


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





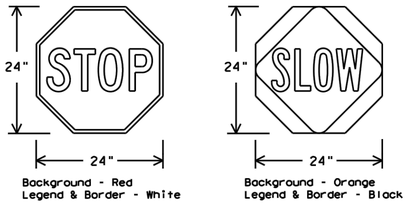
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
5. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets. The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

1. The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
   a. Long-term stationary - work that occupies a location more than 3 days.
   b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
   c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration - work that occupies a location up to 1 hour.
   e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT
RIGHT X LANES CLOSED	RIGHT X LANES OPEN
CENTER LANE CLOSED	DAYTIME LANE CLOSURES
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE
EXIT CLOSED	RIGHT LN TO BE CLOSED
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI
XXXXXXXX BLVD CLOSED	

Other Condition List

ROADWORK XXX FT	ROAD REPAIRS XXXX FT
FLAGGER XXXX FT	LANE NARROWS XXXX FT
RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
DETOUR X MILE	ROUGH ROAD XXXX FT
ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
BUMP XXXX FT	US XXX EXIT X MILES
TRAFFIC SIGNAL XXXX FT	LANES SHIFT *

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

MERGE RIGHT	FORM X LINES RIGHT
DETOUR NEXT X EXITS	USE XXXXX RD EXIT
USE EXIT XXX	USE EXIT I-XX NORTH
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N
TRUCKS USE US XXX N	WATCH FOR TRUCKS
WATCH FOR TRUCKS	EXPECT DELAYS
EXPECT DELAYS	PREPARE TO STOP
REDUCE SPEED XXX FT	END SHOULDER USE
USE OTHER ROUTES	WATCH FOR WORKERS
STAY IN LANE *	

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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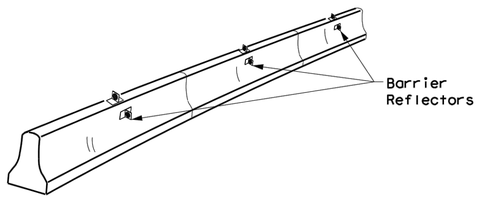
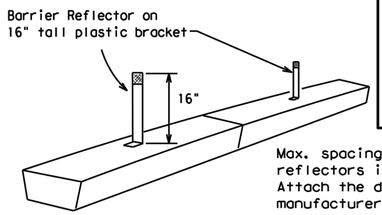
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

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

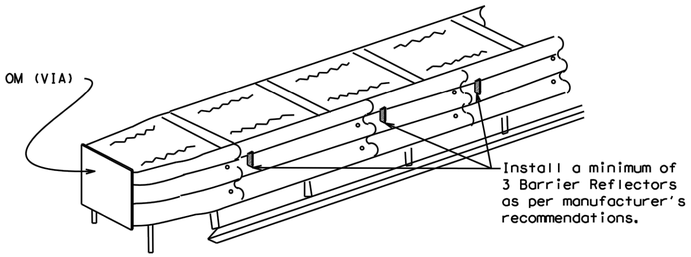


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

LOW PROFILE CONCRETE BARRIER (LPCB)

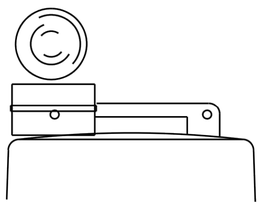


DELINEATION OF END TREATMENTS

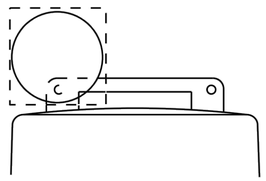
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the apppropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

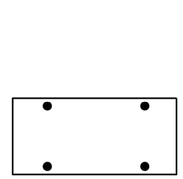
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

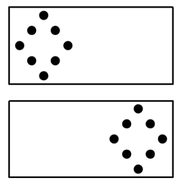
Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

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

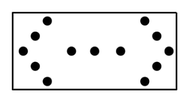


4 CORNER CAUTION

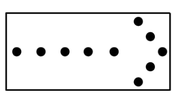
OR



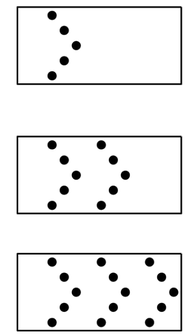
ALTERNATING DIAMOND CAUTION



DOUBLE ARROW



RIGHT/LEFT ARROW
(right arrow shown; left is similar)



RIGHT/LEFT SEQUENTIAL CHEVRON
(right chevron shown; left is similar)

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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

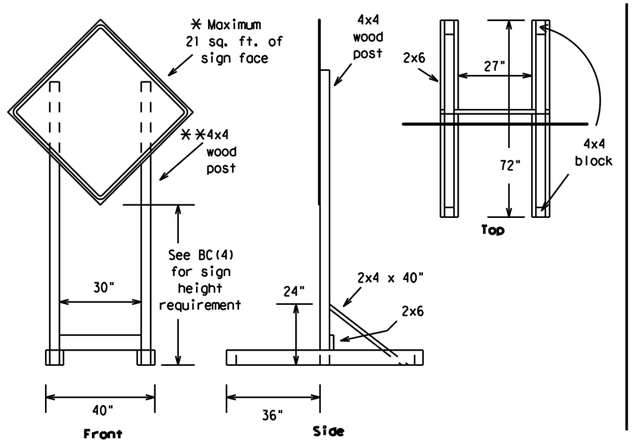
Traffic Safety Division Standard

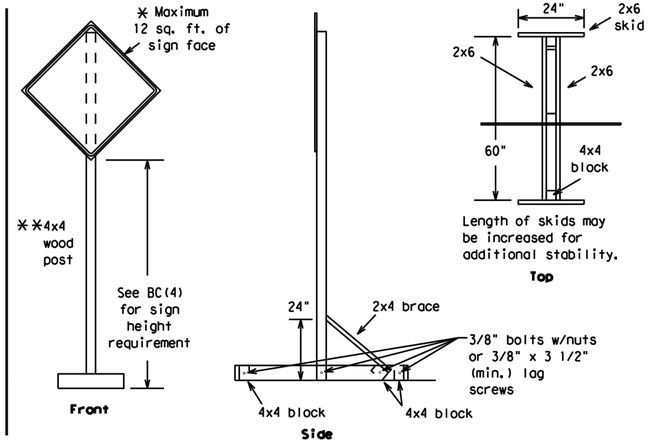
BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21				193

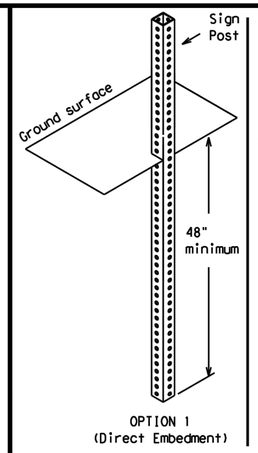
DATE:
FILE:

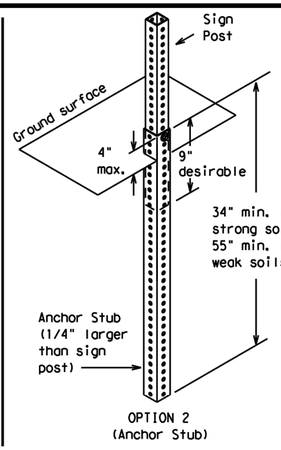


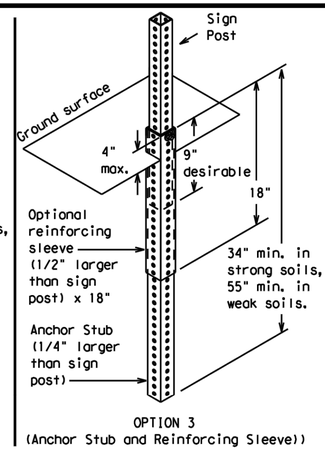


SKID MOUNTED WOOD SIGN SUPPORTS

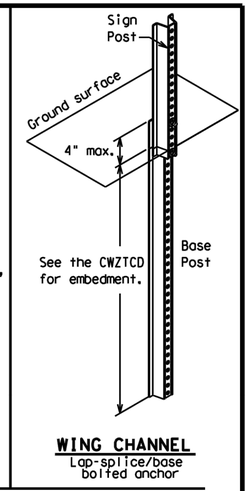
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







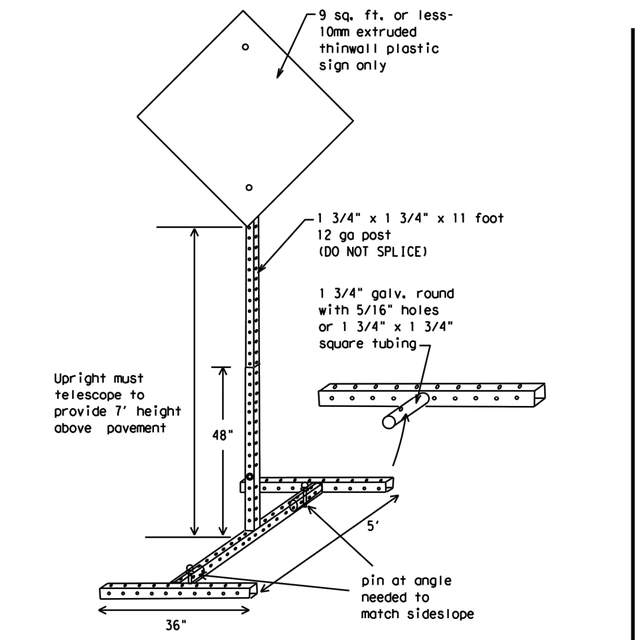
PERFORATED SQUARE METAL TUBING

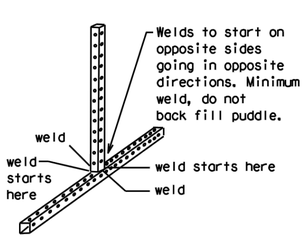


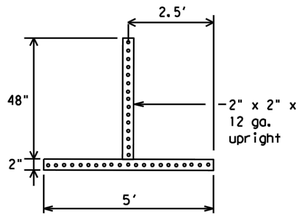
WING CHANNEL
Lap-splice/base bolted anchor

GROUND MOUNTED SIGN SUPPORTS

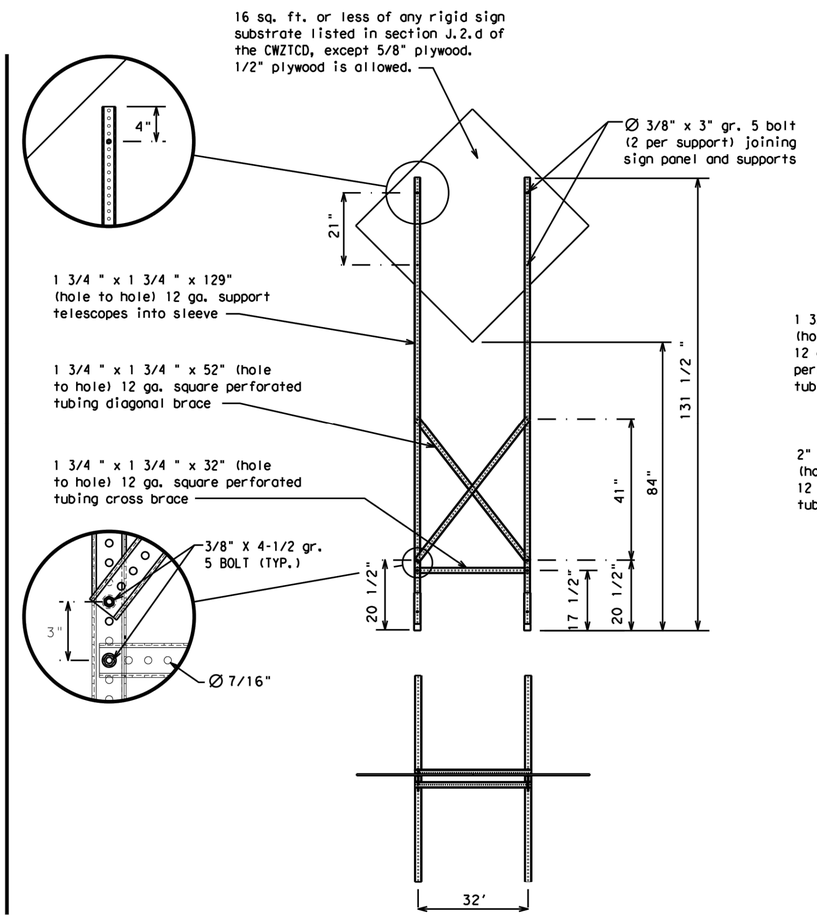
Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support.
The maximum sign square footage shall adhere to the manufacturer's recommendation.
Two post installations can be used for larger signs.

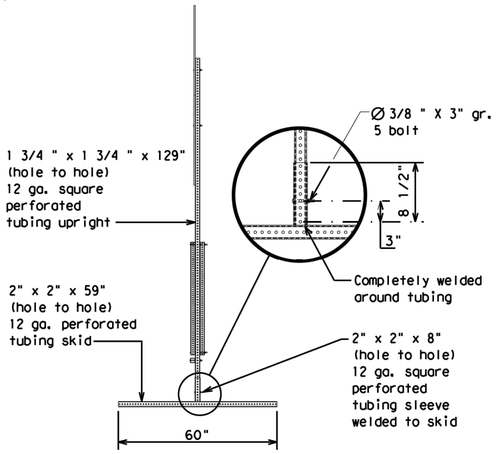






SINGLE LEG BASE
Side View





SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

* See BC(4) for definition of "Work Duration."

** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

☐ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				
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7-13 5-21				194

DATE:
FILE:

GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

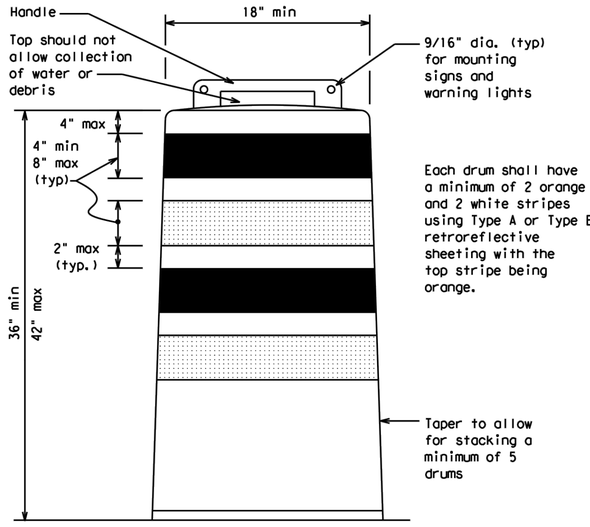
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

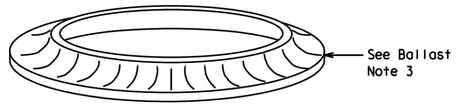
RETROREFLECTIVE SHEETING

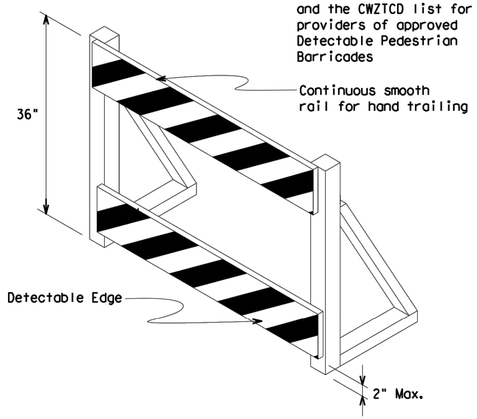
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

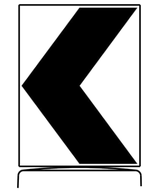




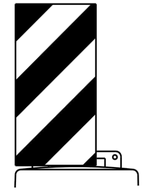


DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer



12" x 24"
Vertical Panel
mount with diagonals sloping down towards travel way

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

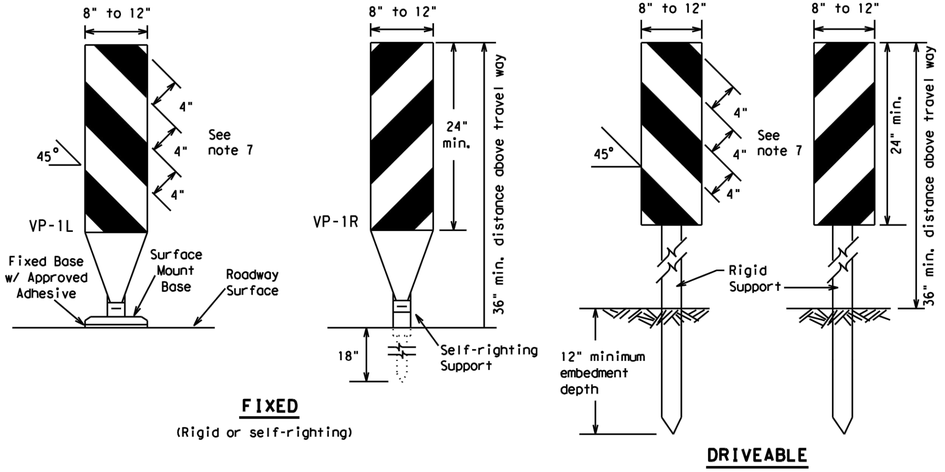
Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 8-14 9-07 5-21 7-13	DIST	COUNTY		SHEET NO. 195



FIXED
(Rigid or self-righting)

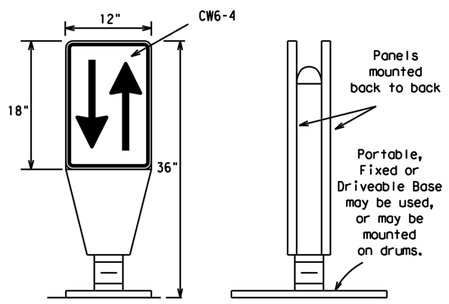
DRIVEABLE

(Rigid or self-righting)

PORTABLE

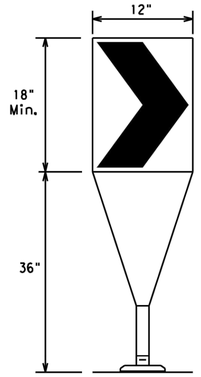
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



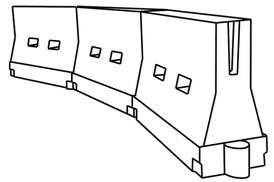
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

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.



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting 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 Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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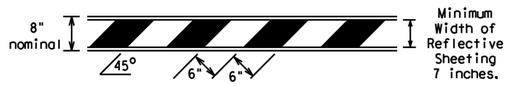
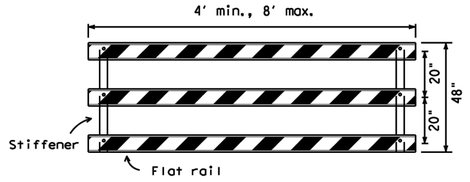
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



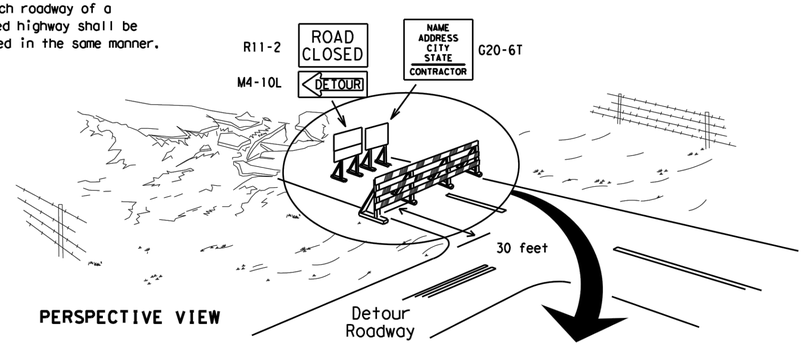
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

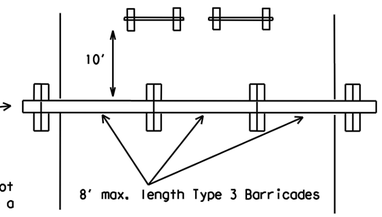
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

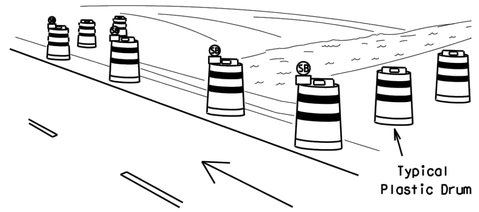
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

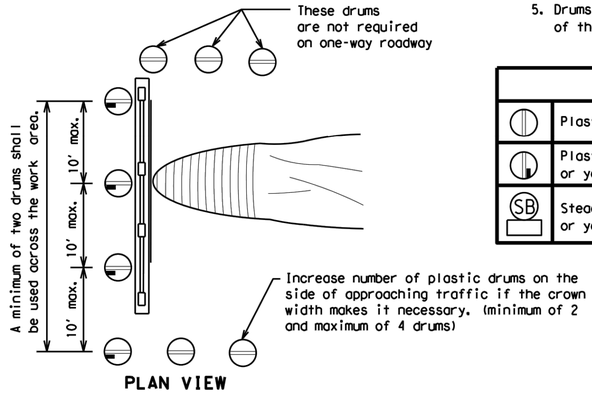
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

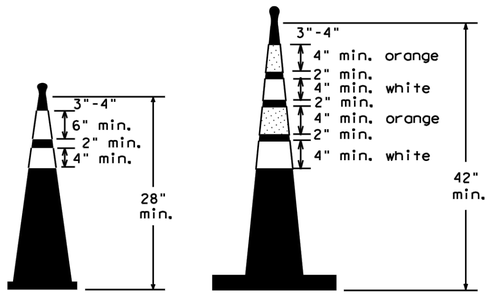
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



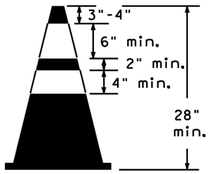
PLAN VIEW

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

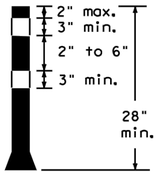
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

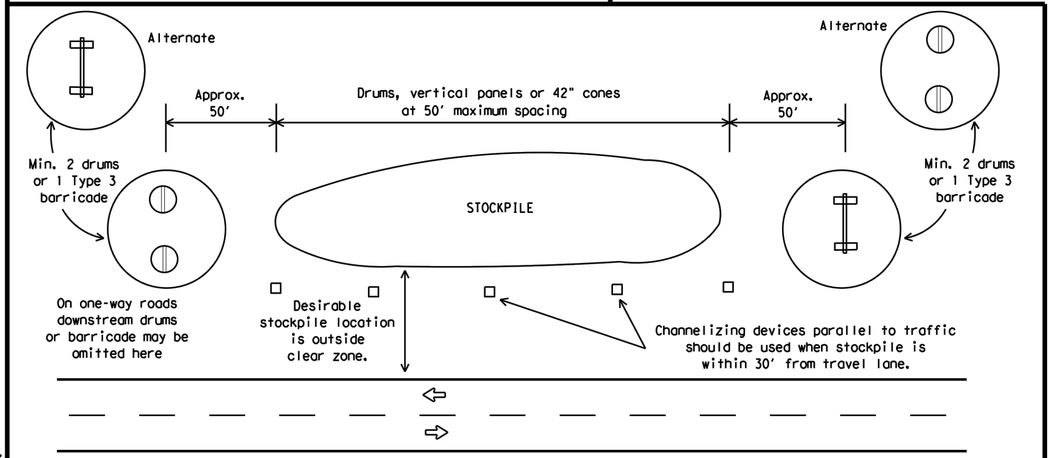


Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.

42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

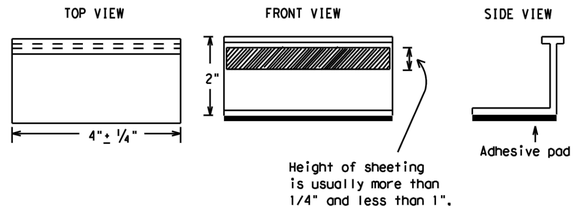
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

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Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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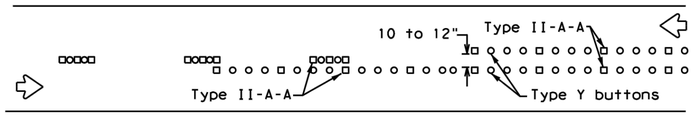
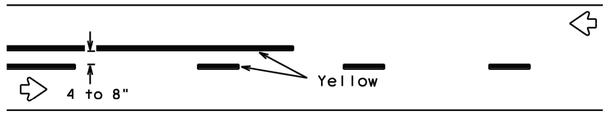
PAVEMENT MARKING PATTERNS

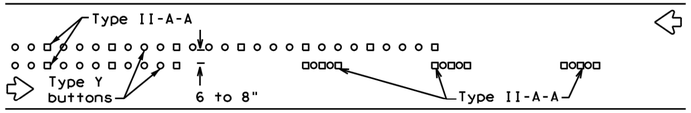
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



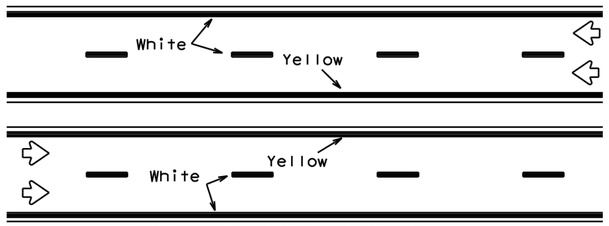
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



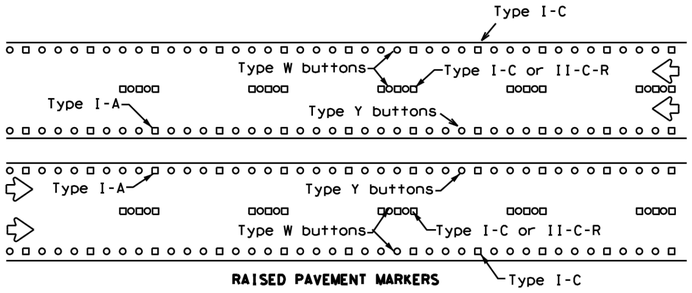
RAISED PAVEMENT MARKERS - PATTERN B

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

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



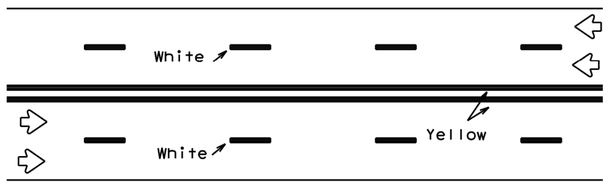
REFLECTORIZED PAVEMENT MARKINGS



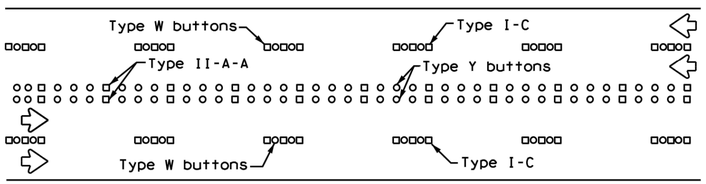
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



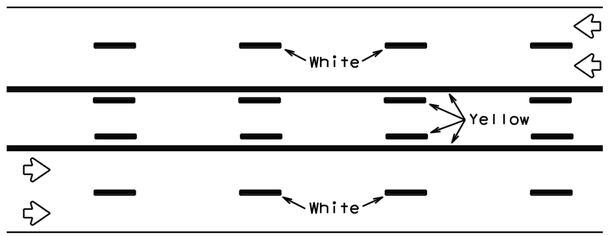
REFLECTORIZED PAVEMENT MARKINGS



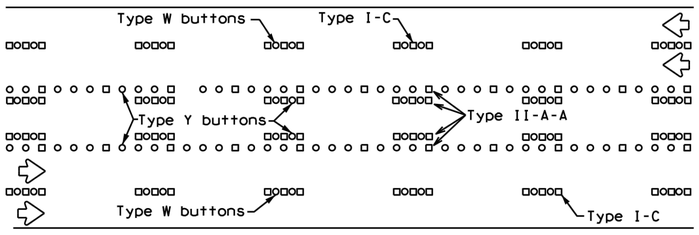
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

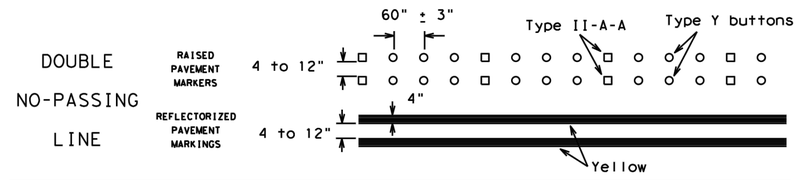
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

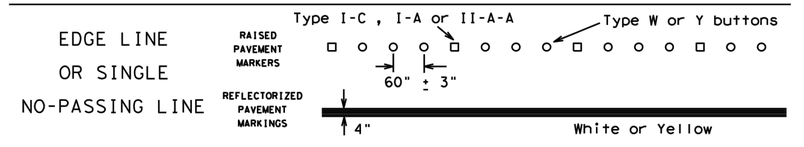
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

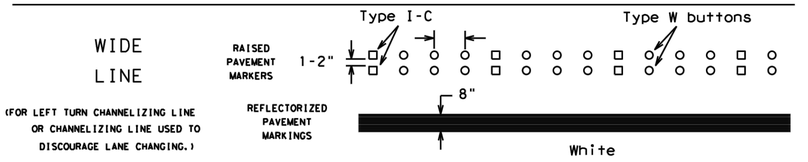


EDGE LINE OR SINGLE NO-PASSING LINE



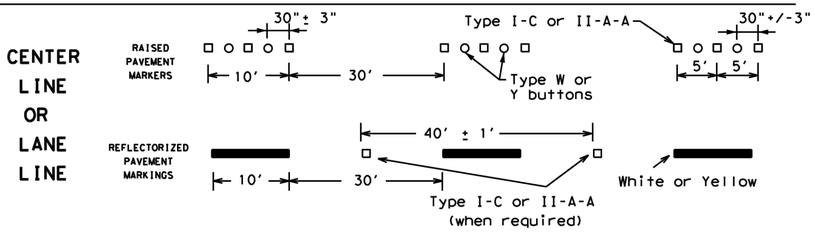
WIDE LINE

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

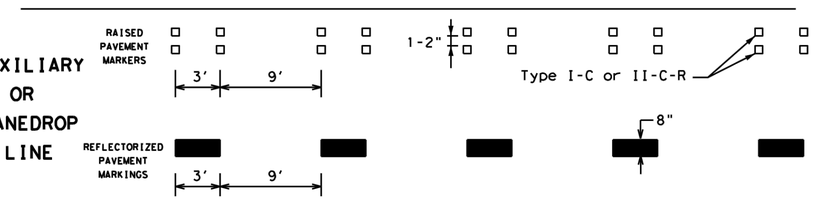


BROKEN LINES

CENTER LINE OR LANE LINE

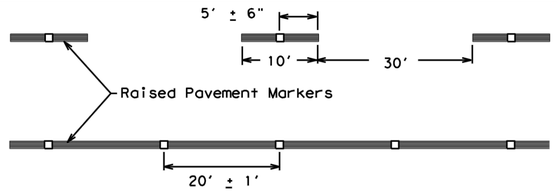


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

SHEET 12 OF 12

Texas Department of Transportation

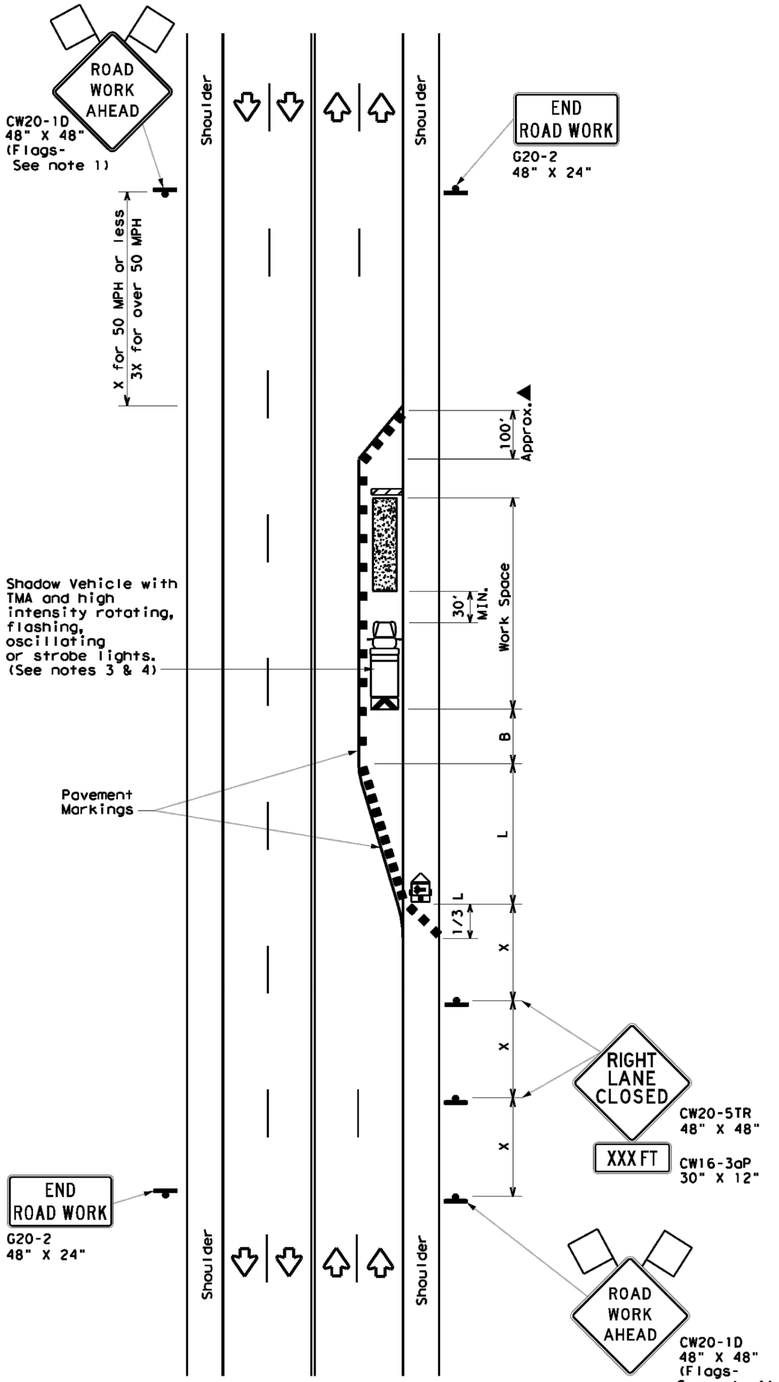
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

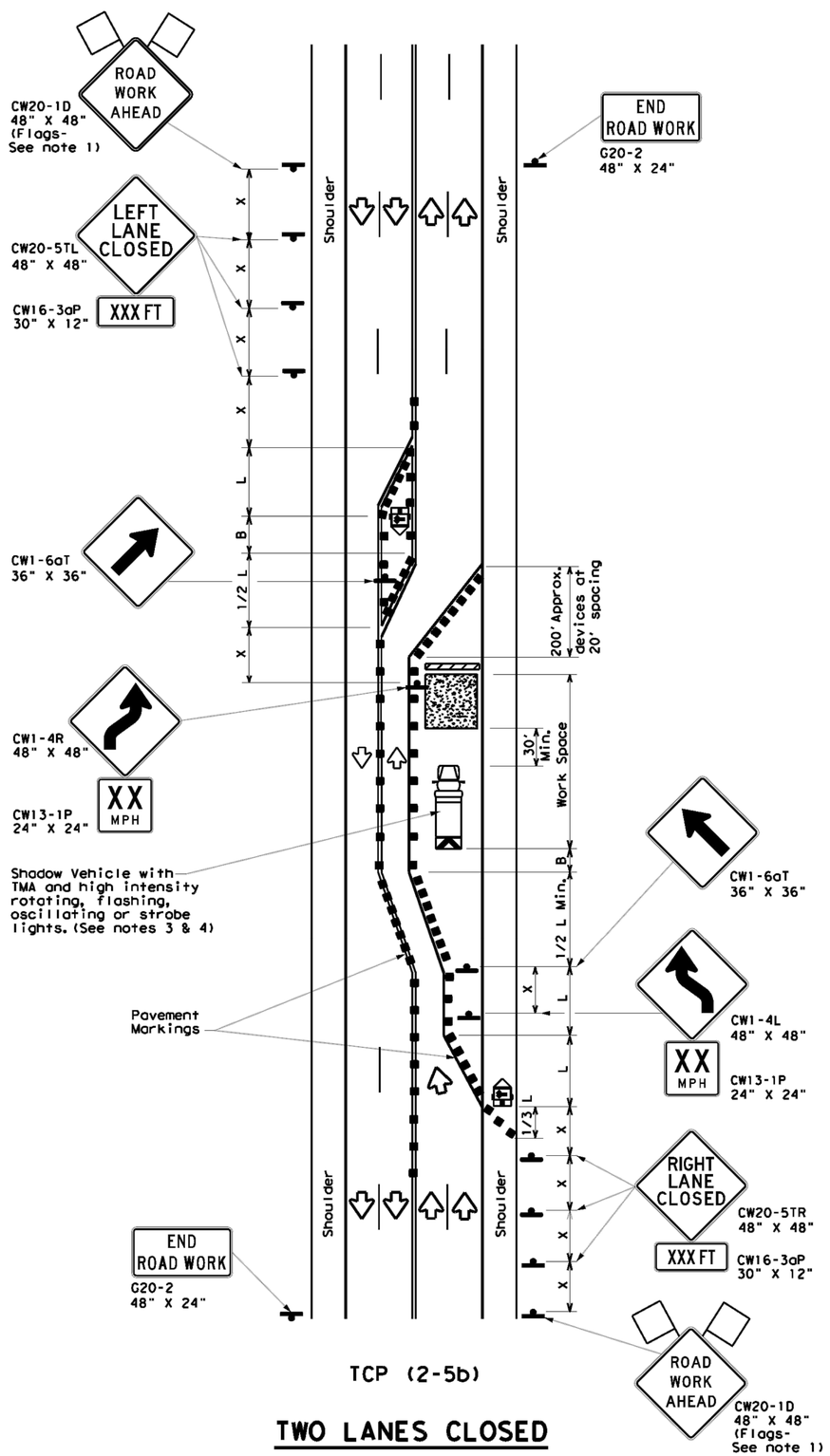
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	DIST	COUNTY		SHEET NO. 199

106



TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew eposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substitutued for the Shadow Vehicle and TMA.
4. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.
5. The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

6. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic, with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-5b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
LONG TERM LANE CLOSURES
MULTILANE CONVENTIONAL RDS.

TCP(2-5)-18

FILE: tcp2-5-18.dgn	DN:	CK:	DW:	CK:	
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY	
REVISIONS					
8-95 2-12	DIST	COUNTY		SHEET NO.	
1-97 3-03				200	
4-98 2-18					

DATE:
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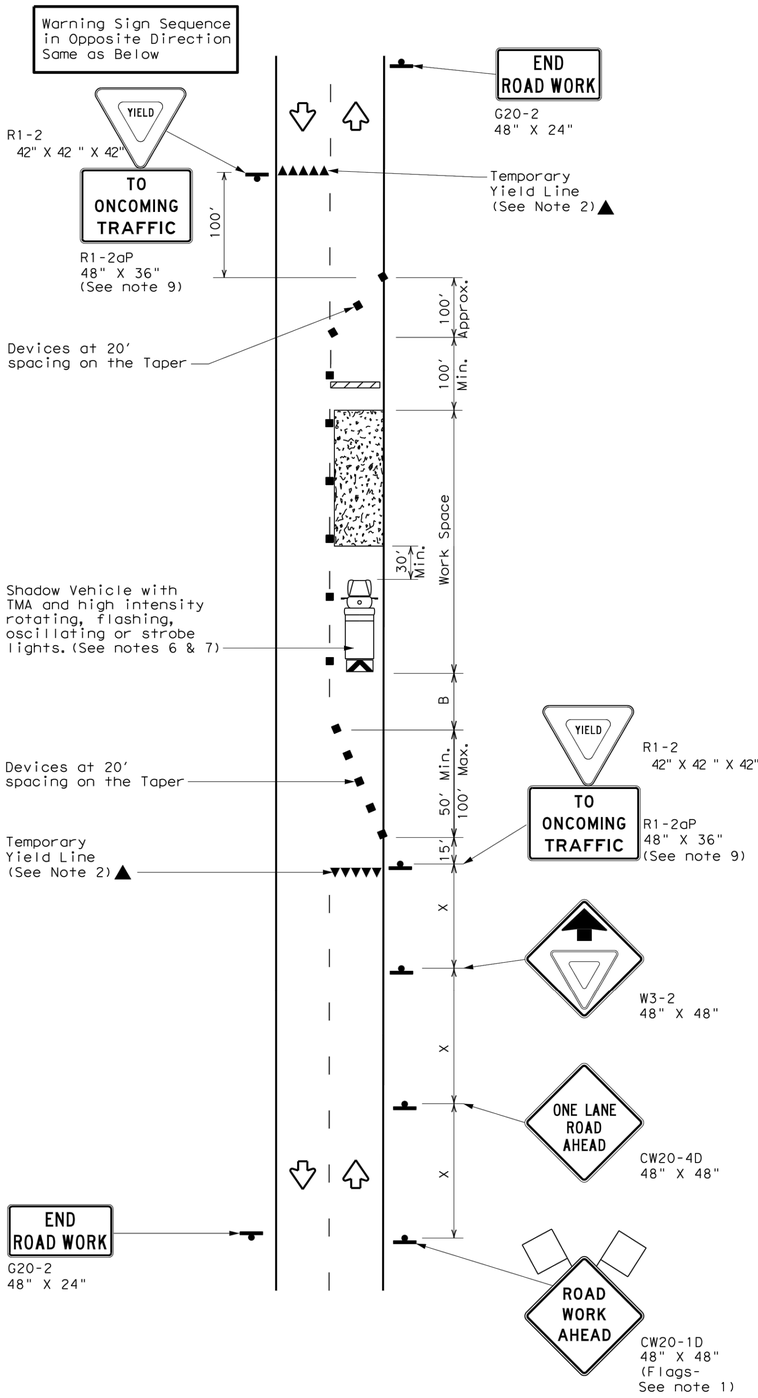
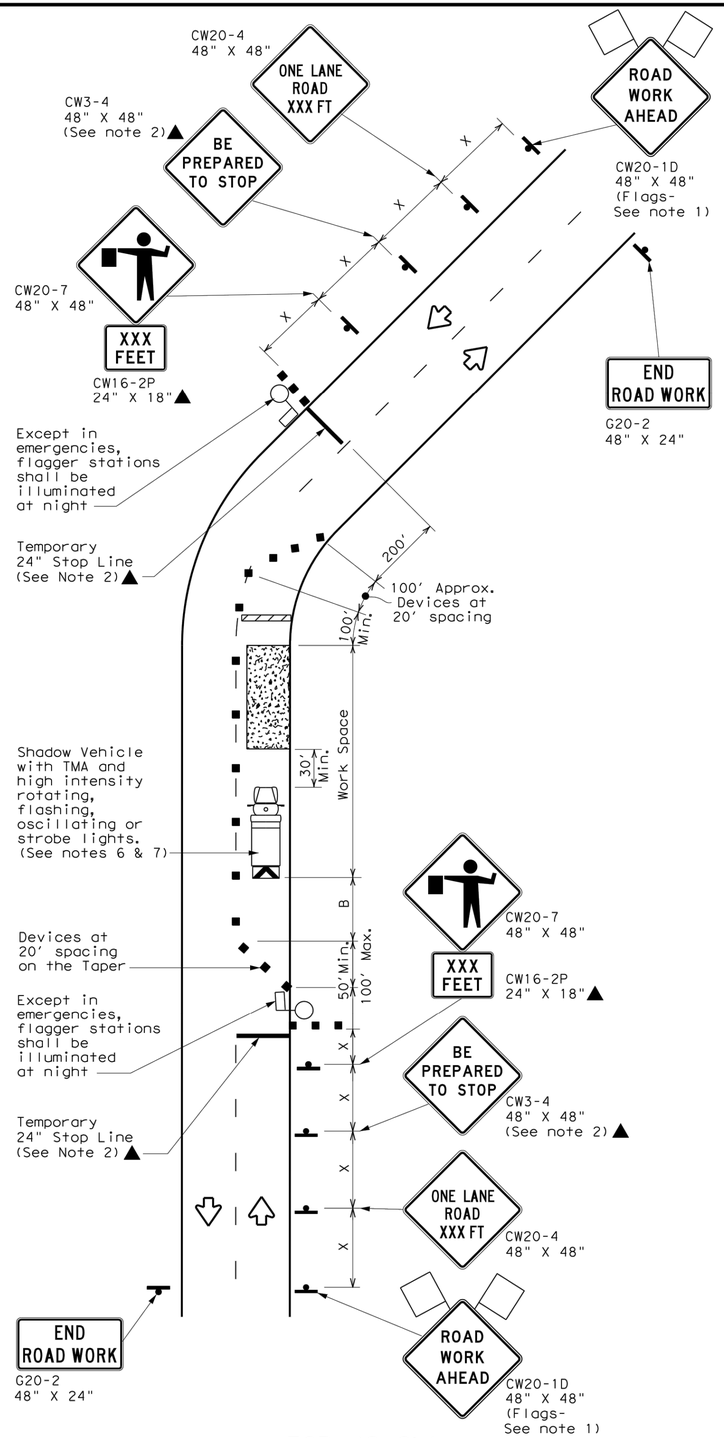
FILE:



TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



TCP (2-2b)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

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

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

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. 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.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

8. The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
9. The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.

TCP (2-2b)

10. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
12. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situtations.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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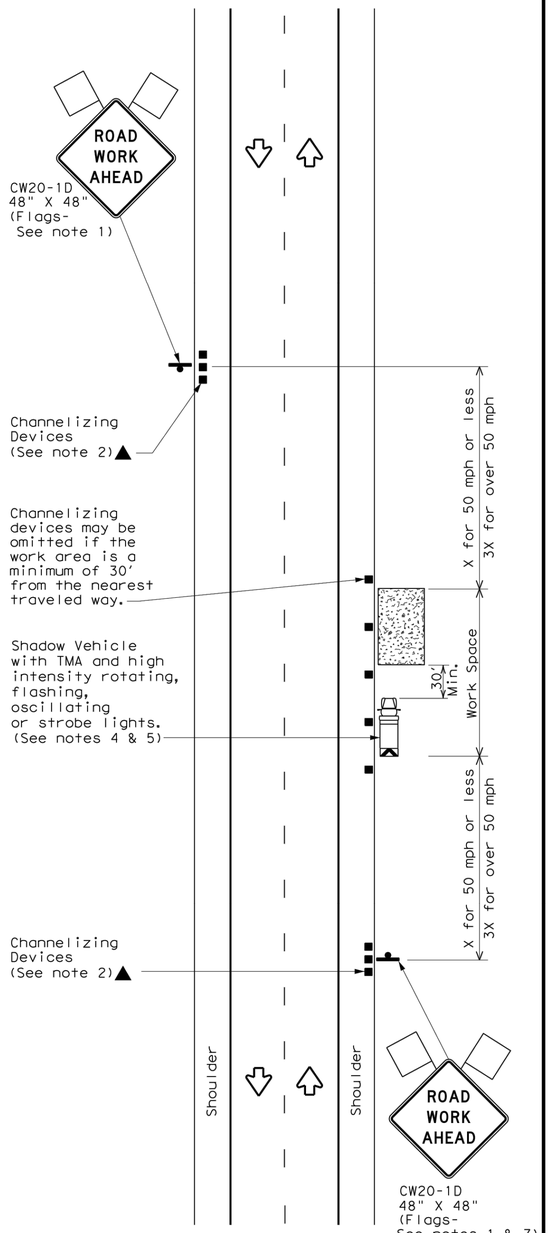
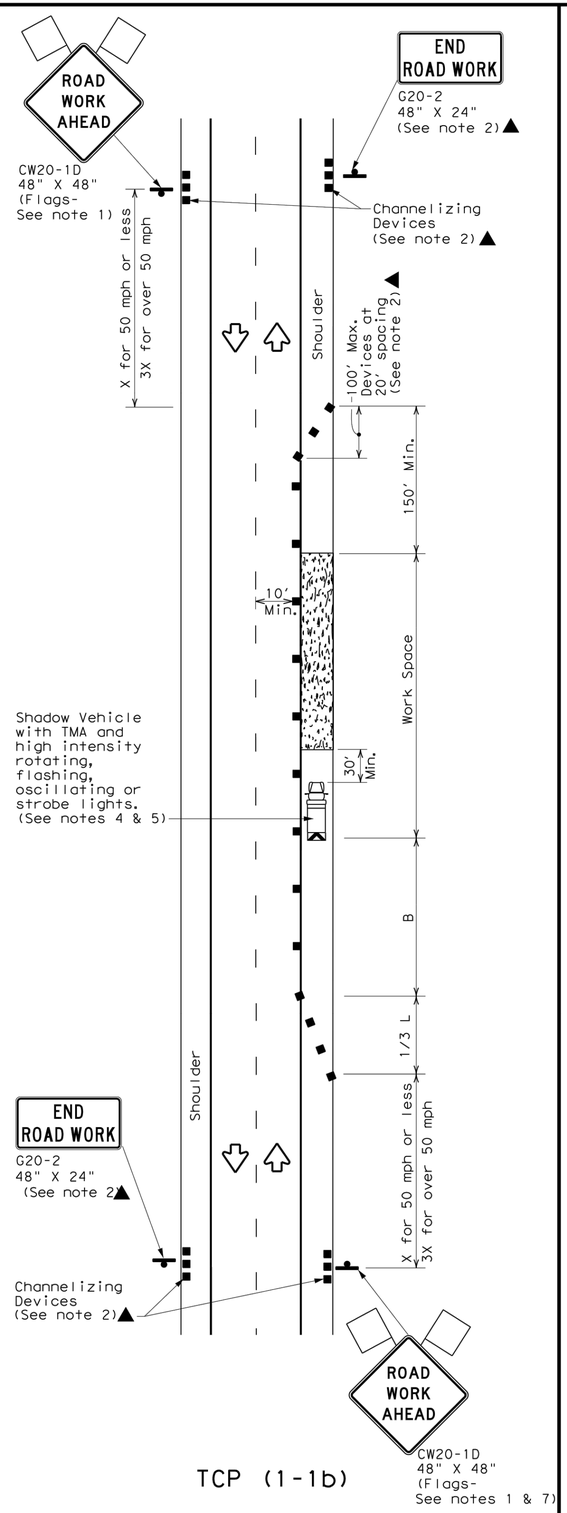
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12				201
4-98 2-18				

DATE:
FILE:



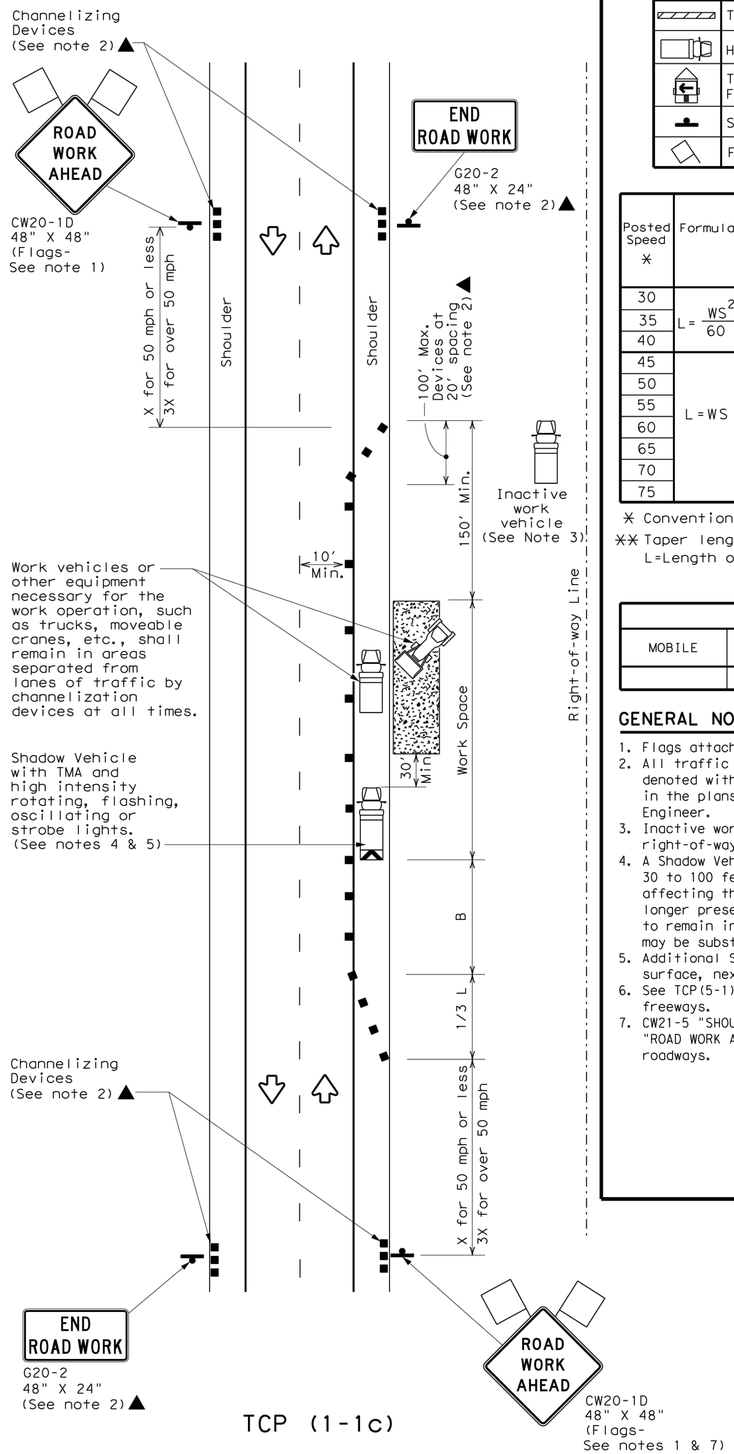
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
4. 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.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

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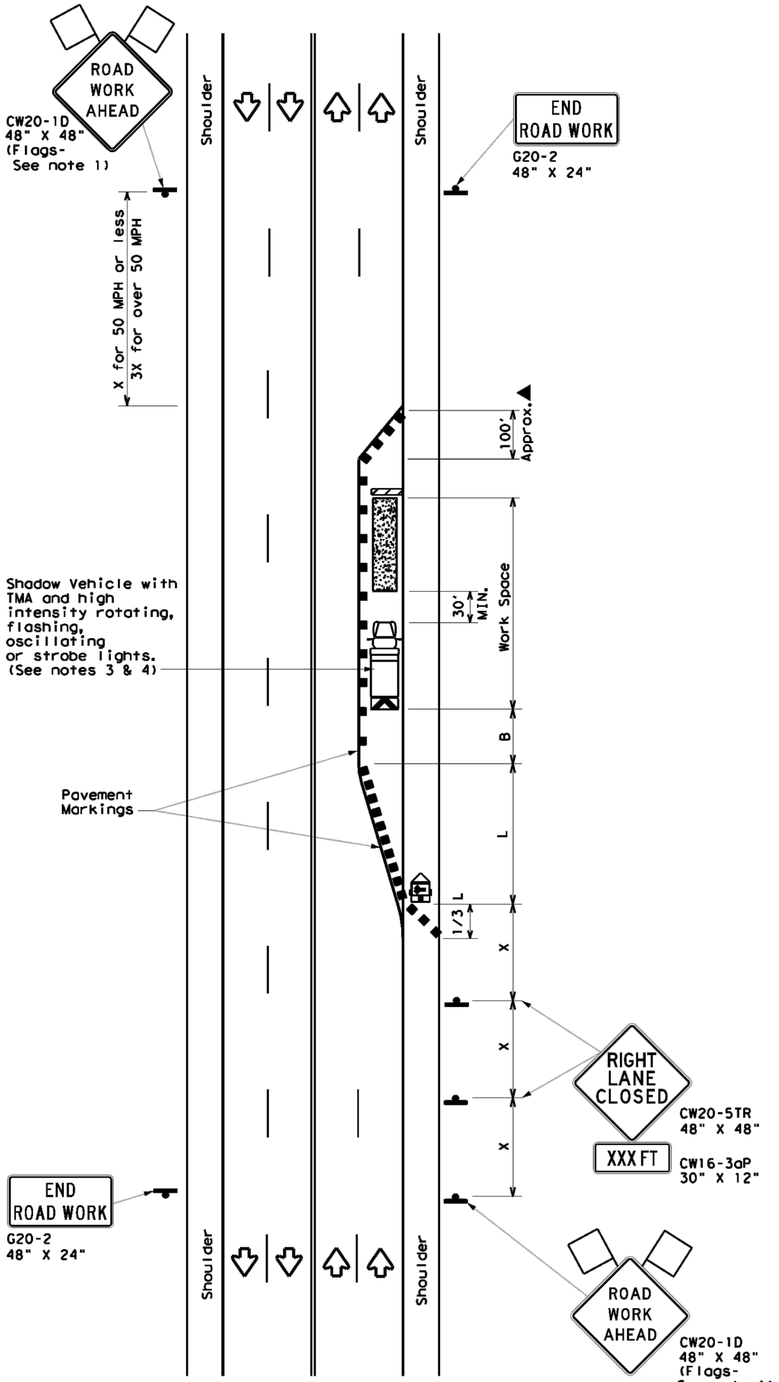
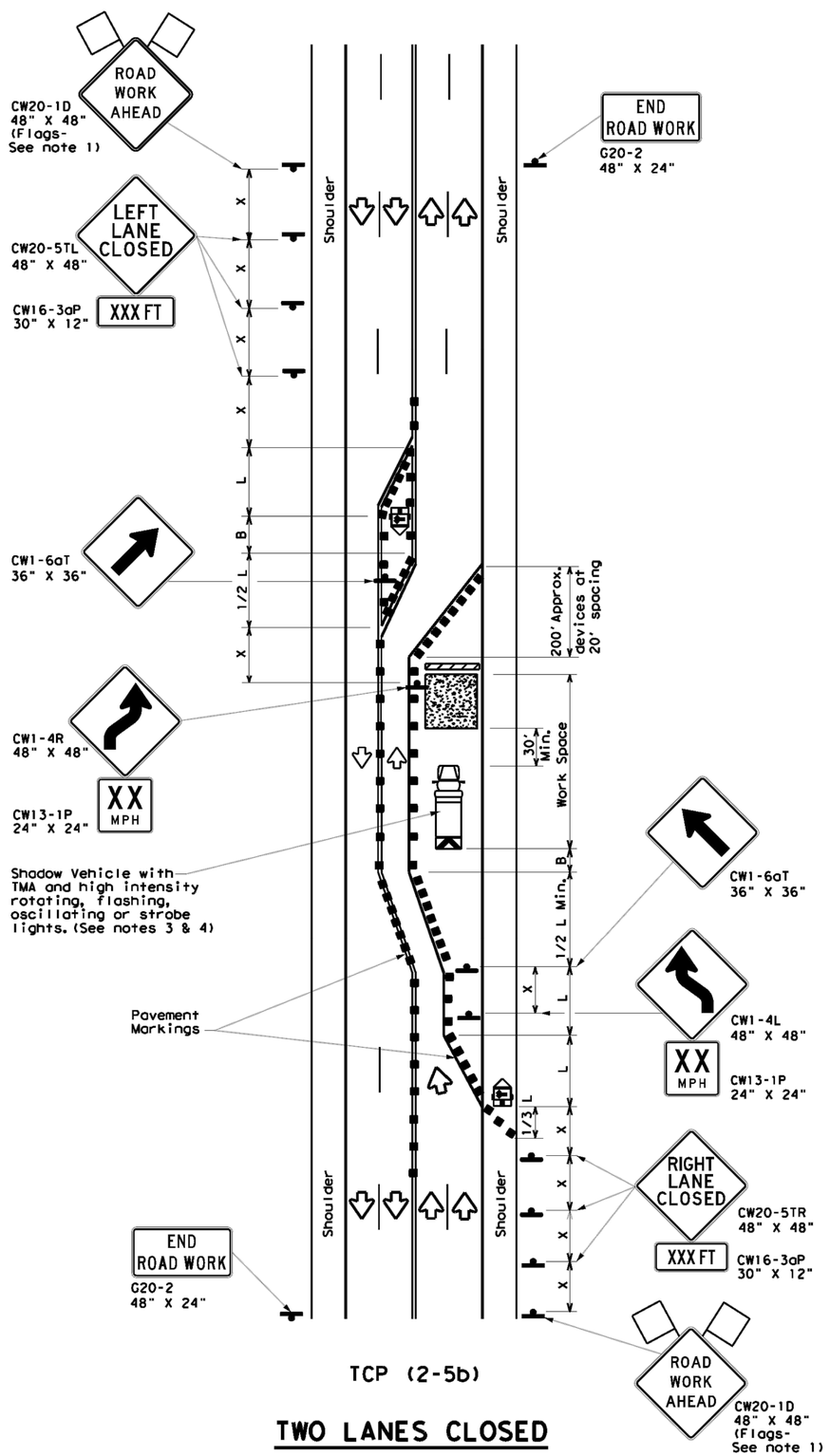
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	DIST	COUNTY		SHEET NO. 202



TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew eposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substitutued for the Shadow Vehicle and TMA.
4. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.
5. The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

6. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic, with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-5b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
LONG TERM LANE CLOSURES
MULTILANE CONVENTIONAL RDS.

TCP(2-5)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY	
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1-97 3-03				203	
4-98 2-18					

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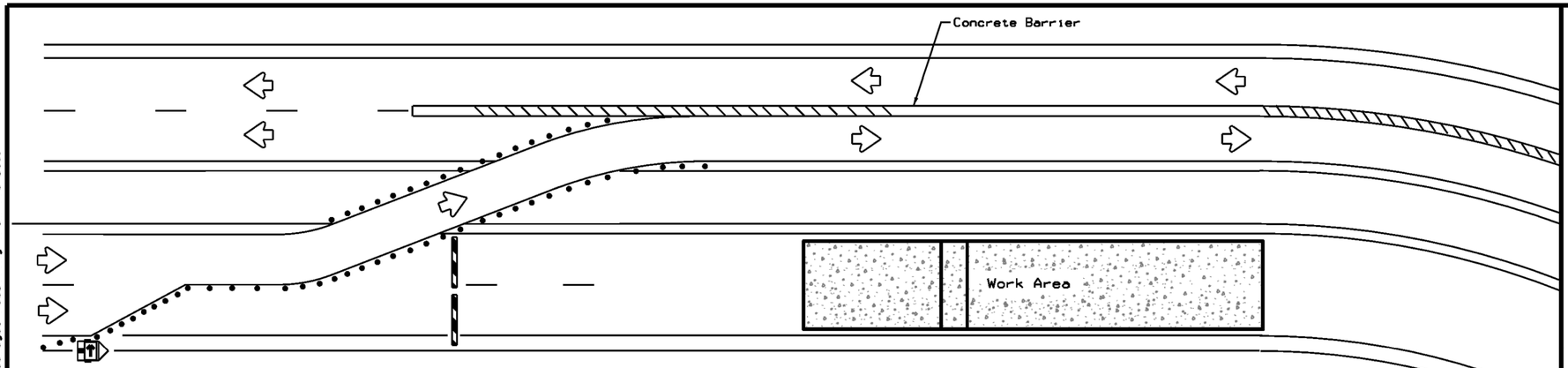


NOTES:

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

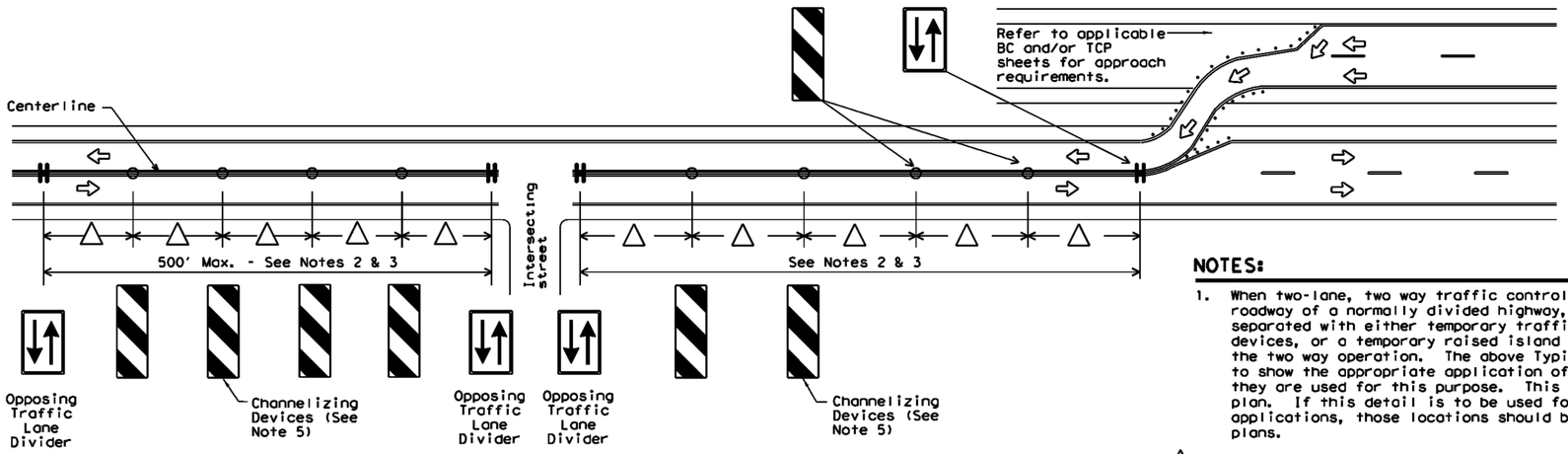
BARRIER DELINEATION WITH MODULAR GLARE SCREENS

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

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

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

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



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

NOTES:

1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application is intended to show the appropriate application of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.

△2. Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100'.

3. Every fifth device should be an OTLD except when spaced closer to accommodate an intersection. An OTLD should be the first device on each side of intersecting streets or roads.
4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain them in their proper position should be noted elsewhere in the plans.
5. Channelizing devices are to be vertical panels, 42" cones or tubular markers that are at least 36" tall. Tubular markers used to separate traffic should have a rubber base weighing at least 30 pounds. Tubular markers that are 42" tall or more shall have four bands of reflective material as detailed for 42" cones on BC(10). Tubular markers less than 42" but at least 36" tall shall have three bands of 3" wide white reflective material spaced 2" apart. Reflective material shall meet DMS-8300, Type A.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TYPICAL DETAILS

WZ(TD)-17

FILE: wztd-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 2-17				
3-03	DIST	COUNTY		SHEET NO.
7-13				204

DATE:
FILE:

110

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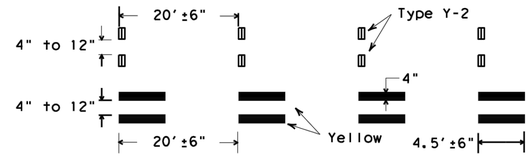
DATE:
FILE:

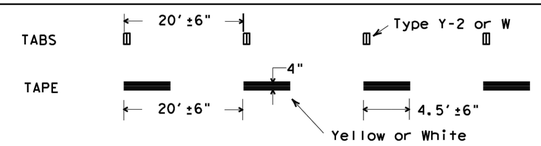
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

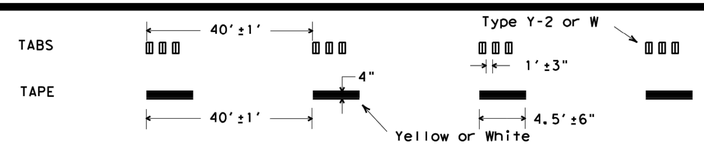


SINGLE NO-PASSING LINE or CHANNELIZATION LINE



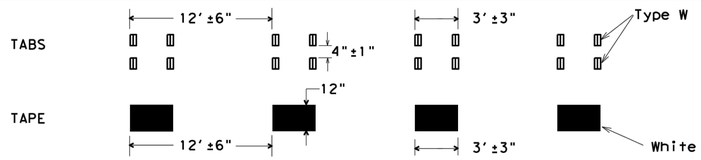
BROKEN LINES

(FOR CENTER LINE OR LANE LINE)

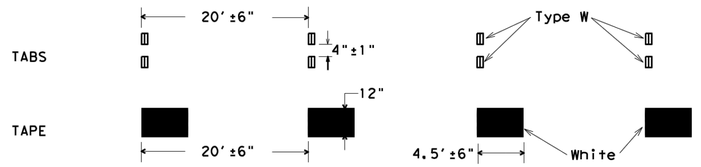


WIDE DOTTED LINES

(FOR LANE DROP LINES)



WIDE GORE MARKINGS



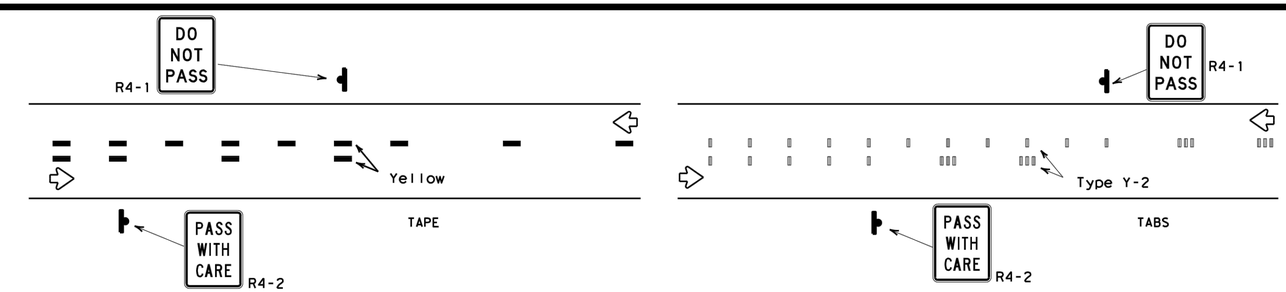
NOTES:

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

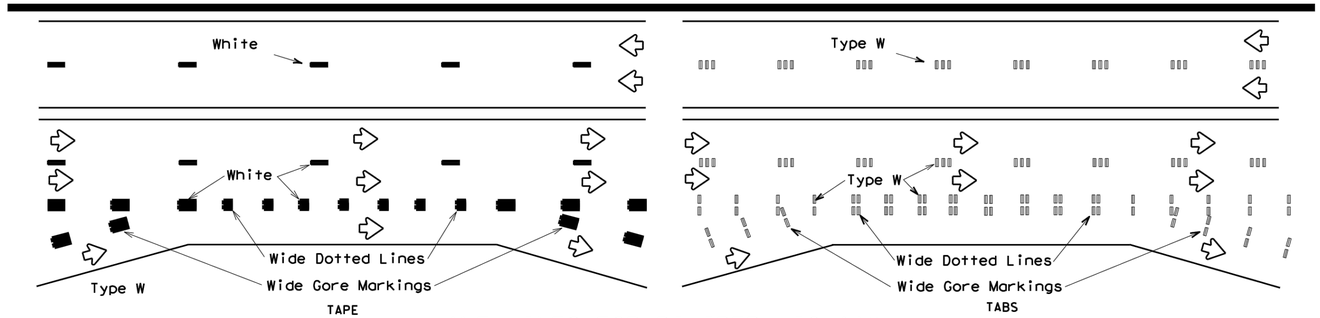
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

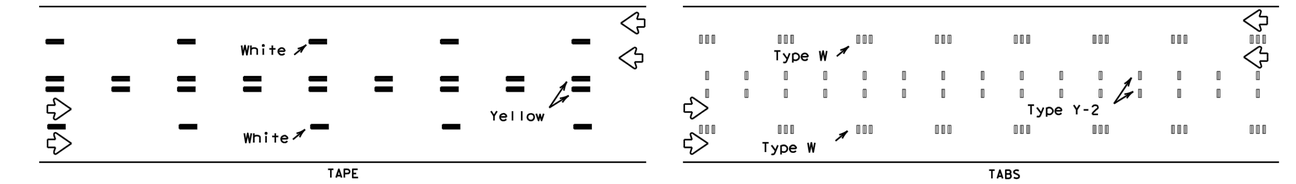
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



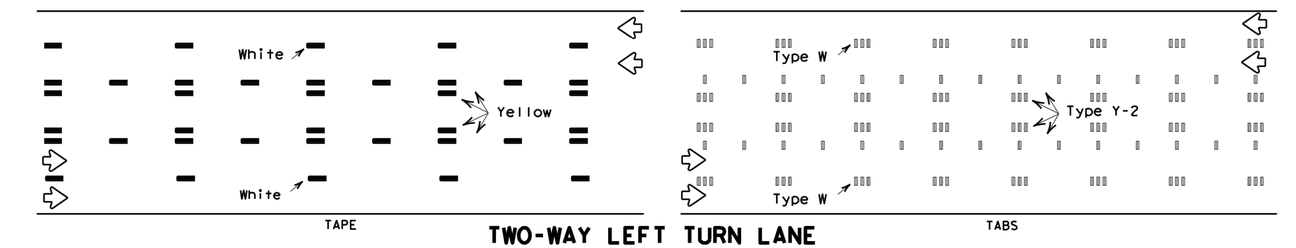
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



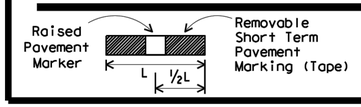
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

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

Texas Department of Transportation

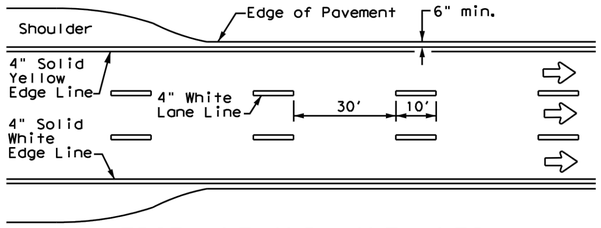
Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

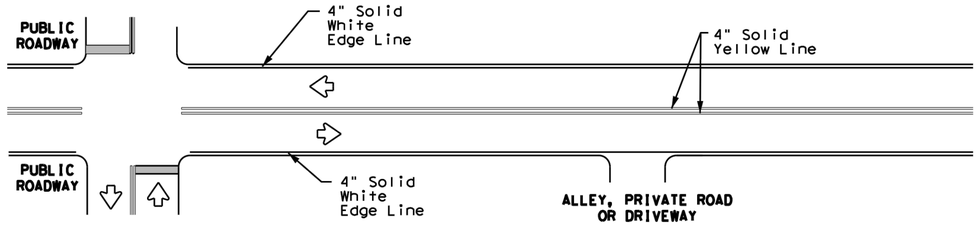
WZ(STPM)-13

FILE:	wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS					
1-97		DIST	COUNTY		SHEET NO.
3-03					205
7-13					

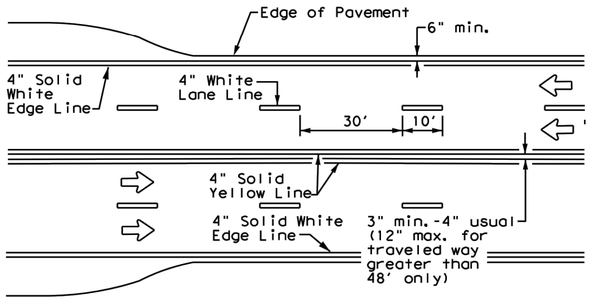
111



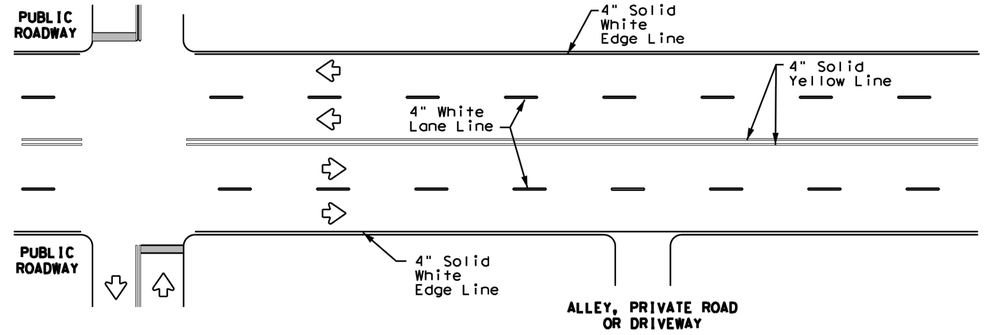
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



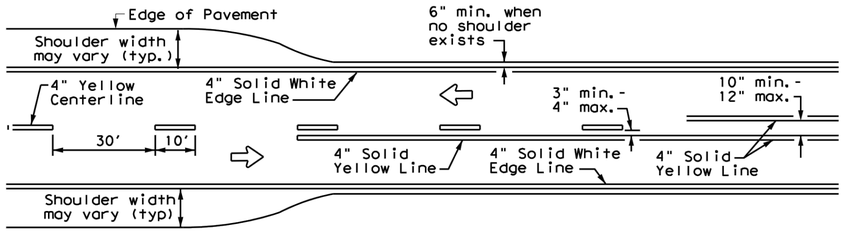
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



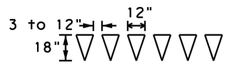
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



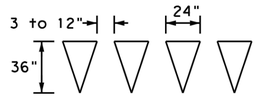
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

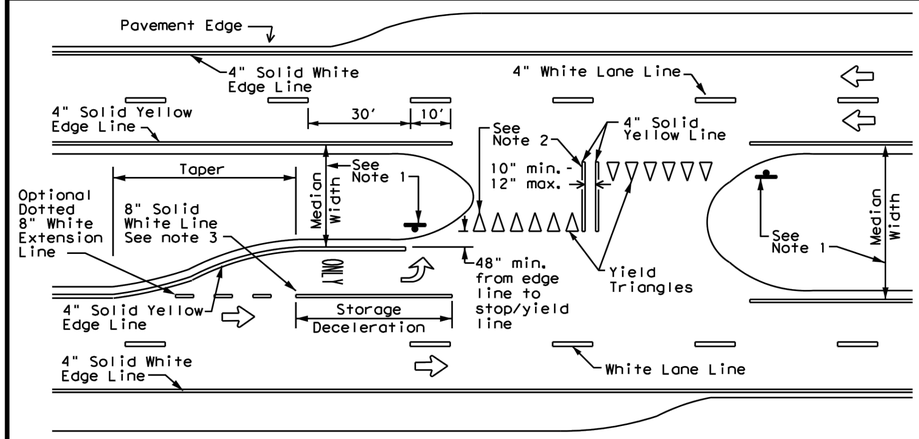


For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

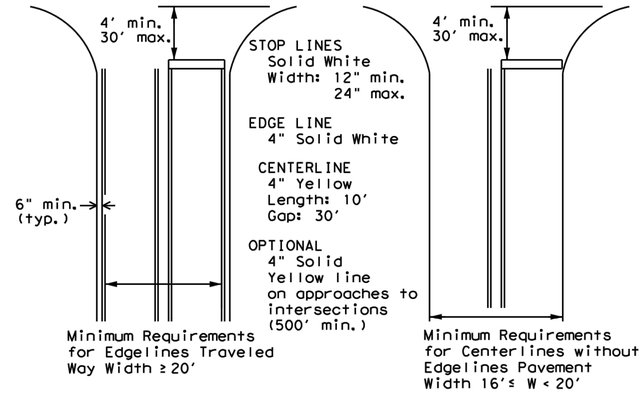
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

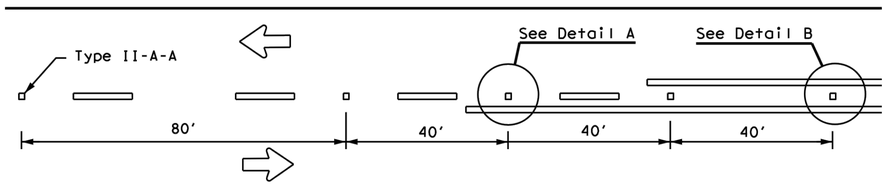
PM(1)-20

FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
©TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS				
8-95 3-03	DIST	COUNTY		SHEET NO.
5-00 2-12				206
8-00 6-20				

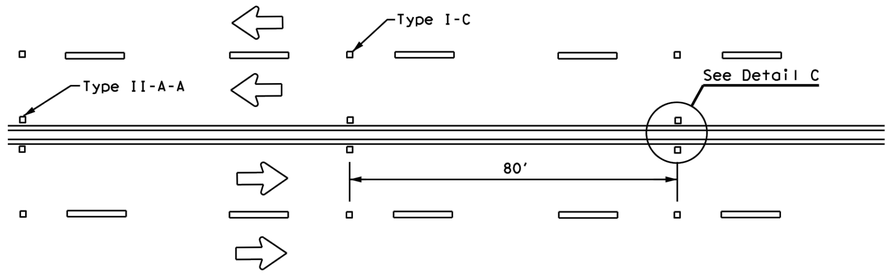
DATE:
FILE:

22A

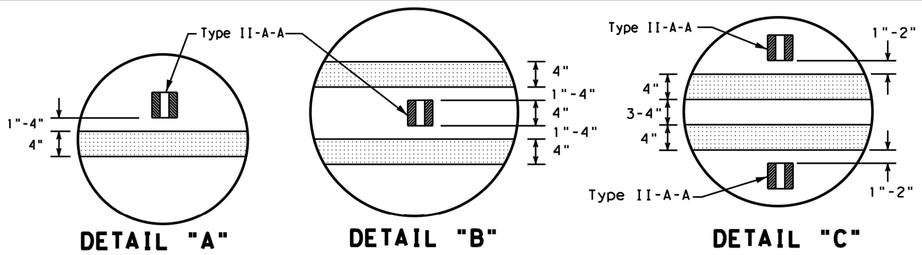
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



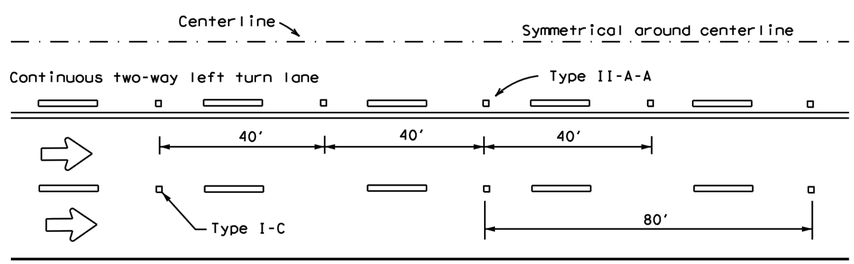
CENTERLINE FOR ALL TWO LANE ROADWAYS



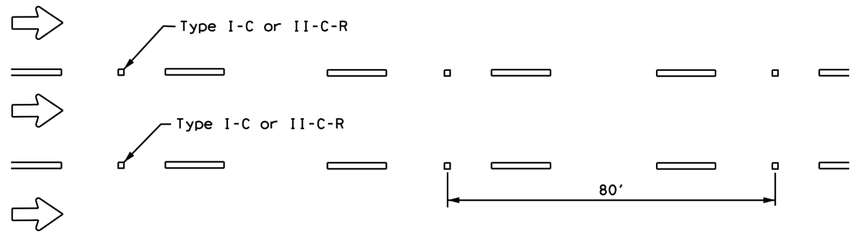
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**

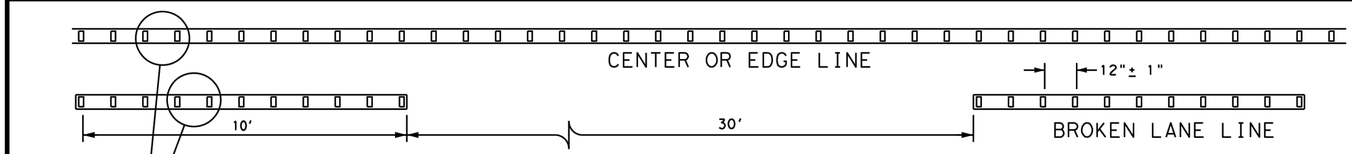


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.



4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTE

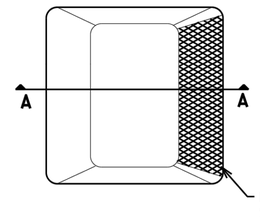
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

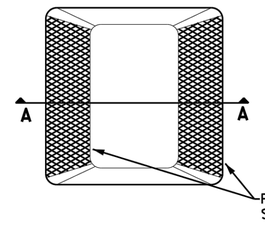
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

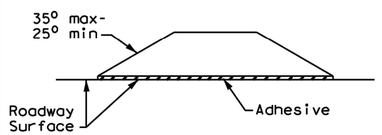
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10				
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20				207

22B

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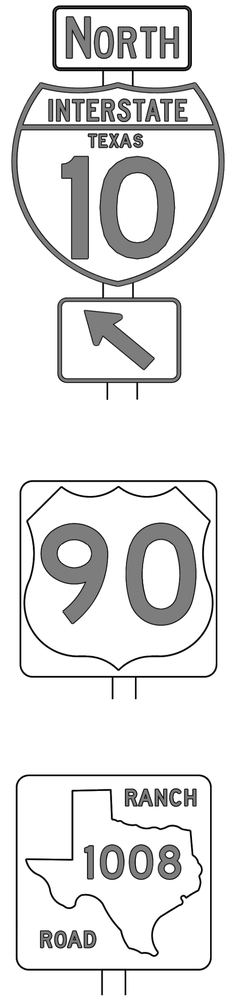
DATE:
FILE:

DATE:
FILE:

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

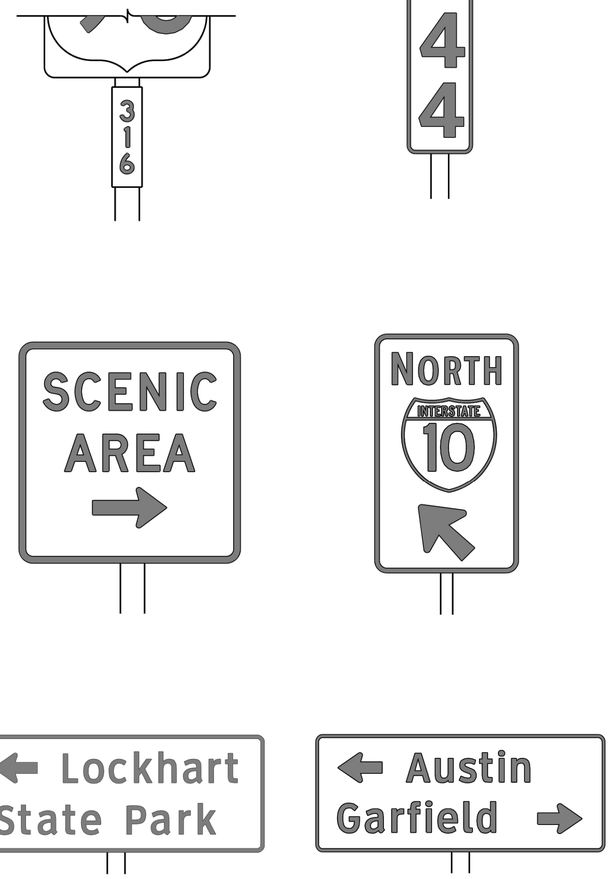
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

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

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

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

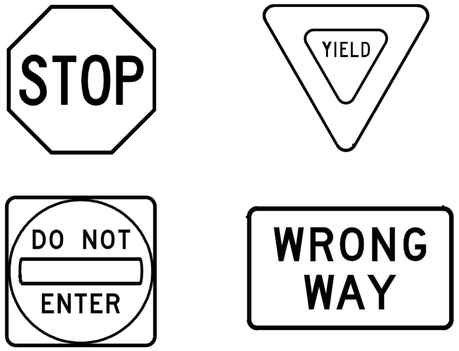
TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS				
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08				208

DATE:
FILE:

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

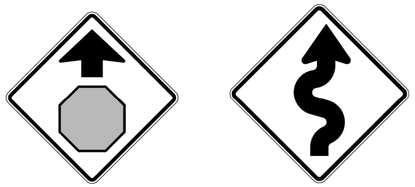
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

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

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

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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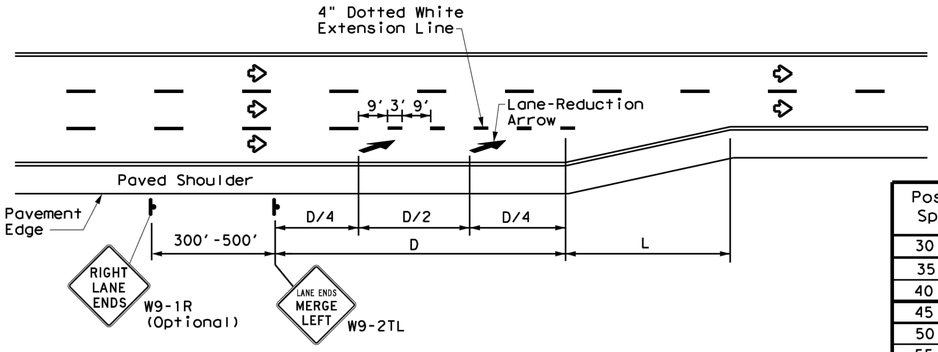
REVISIONS				
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08				209

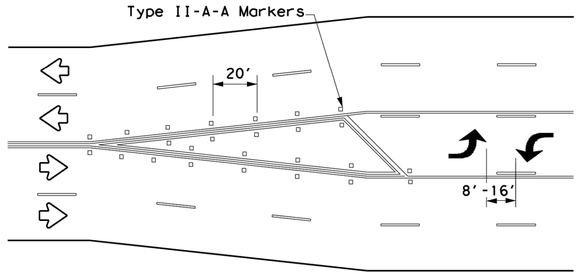


LANE REDUCTION

Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.



A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

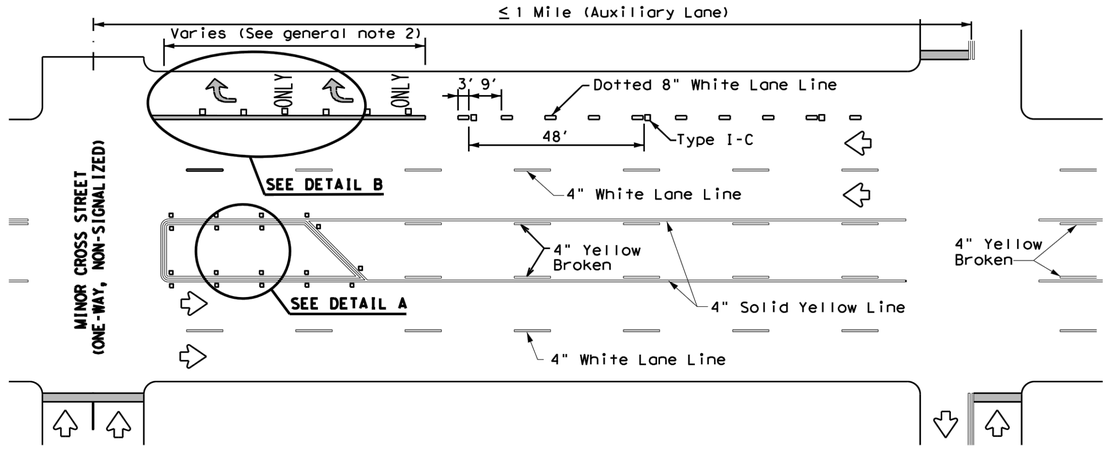
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

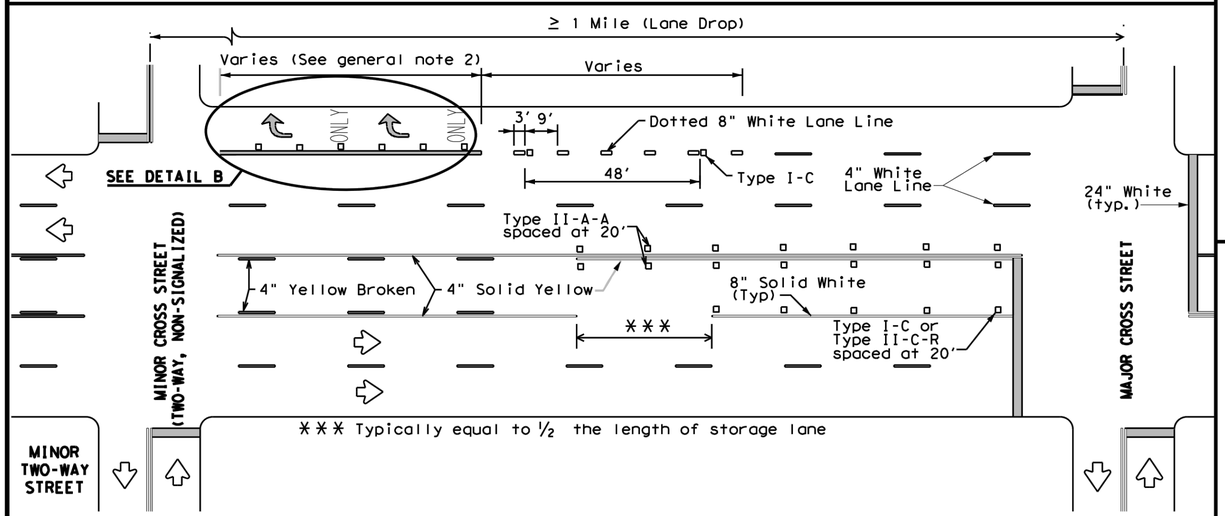
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

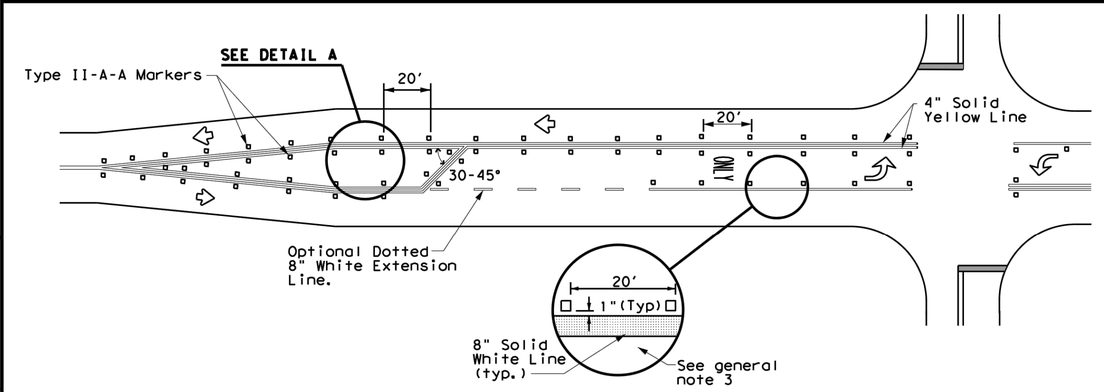
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



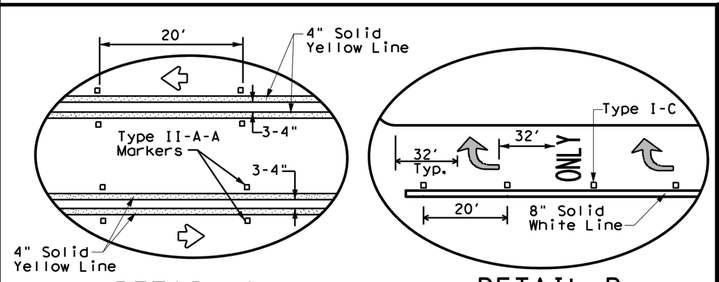
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A DETAIL B

Texas Department of Transportation — Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-20

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
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REVISIONS 5-00 2-10, 8-00 2-12, 3-03 6-20	DIST	COUNTY		SHEET NO. 210

22C

DATE:
FILE:

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

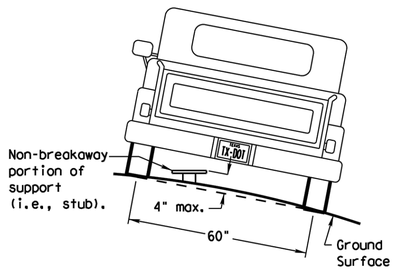
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

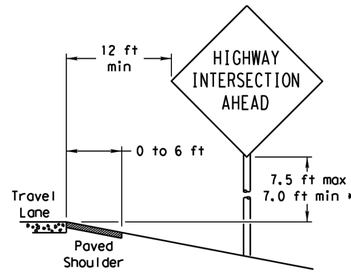
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

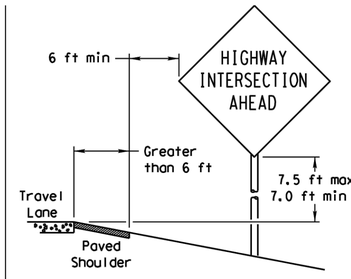
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

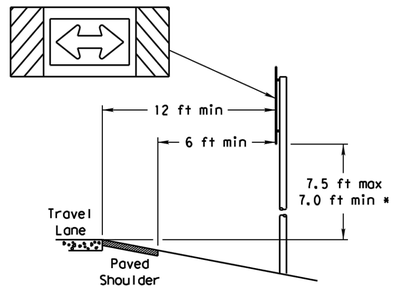
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



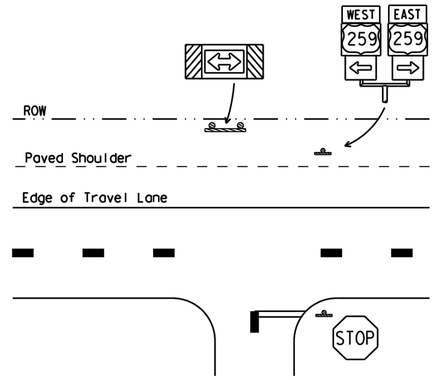
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

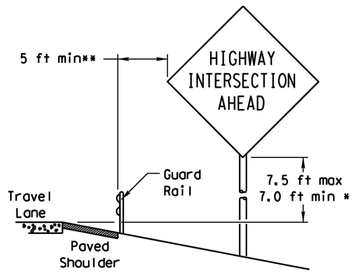
T-INTERSECTION



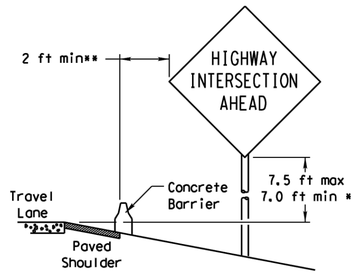
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



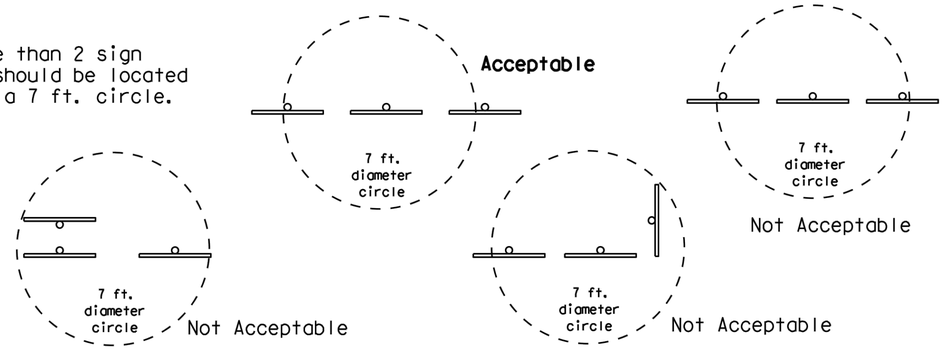
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

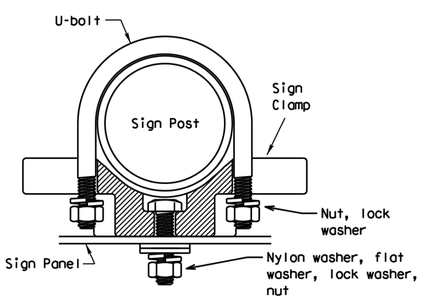
**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

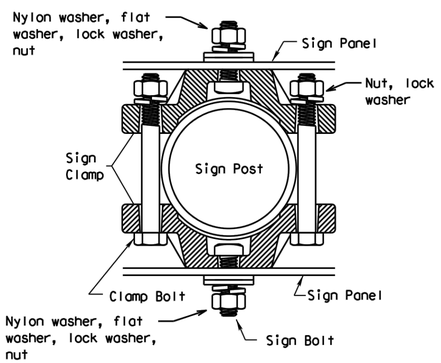


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

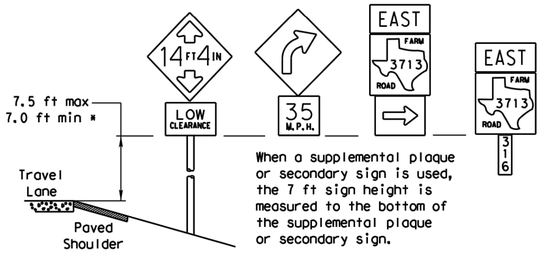
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



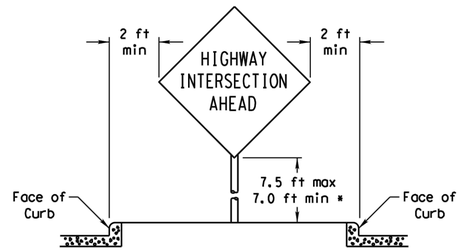
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



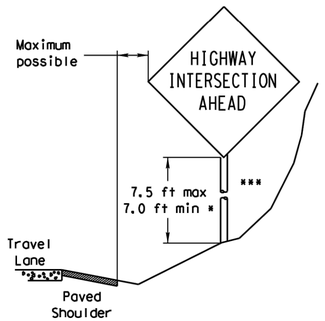
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

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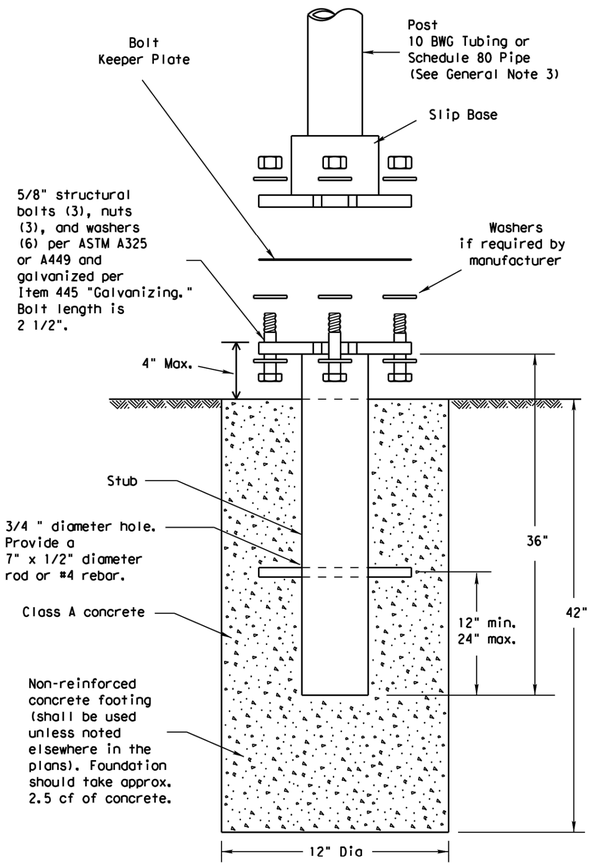
9-08 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.
				211

DATE:
FILE:

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

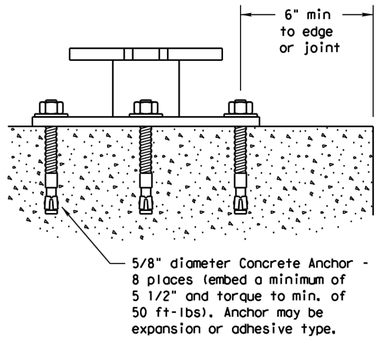
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

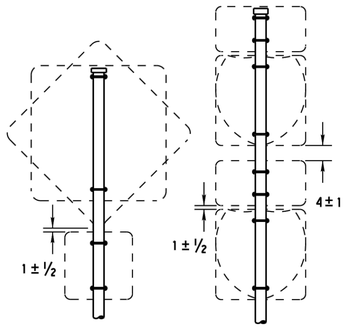
REVISIONS

9-08

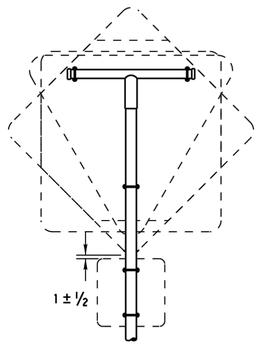
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
		212

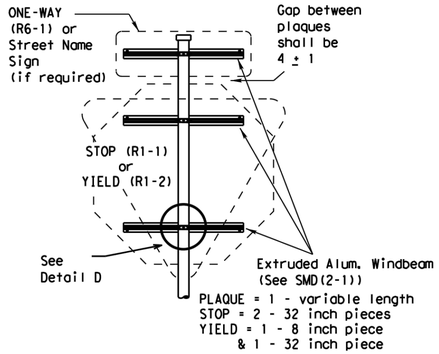
DATE:
FILE:



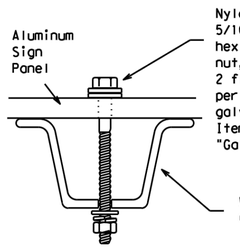
SM RD SGN ASSM TY XXXXX(1)XX(P)



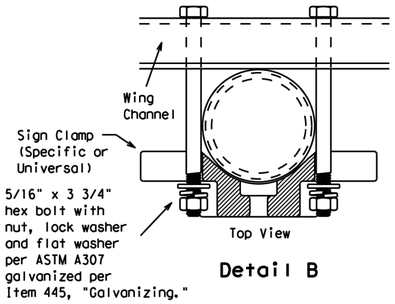
SM RD SGN ASSM TY XXXXX(1)XX(T)



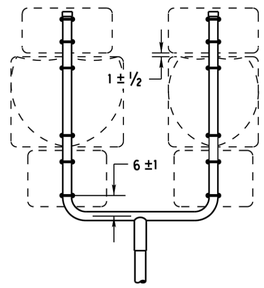
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



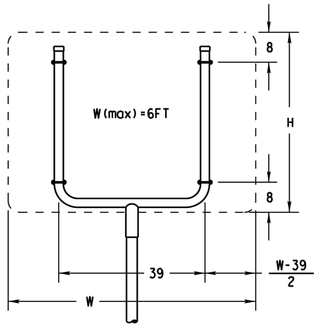
Detail A



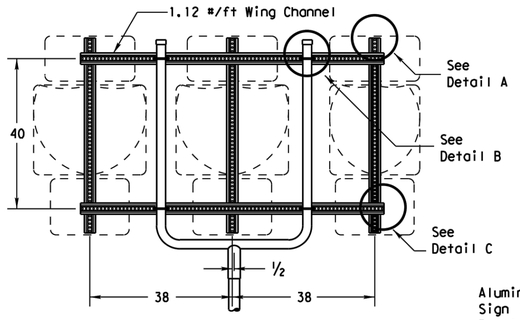
Detail B



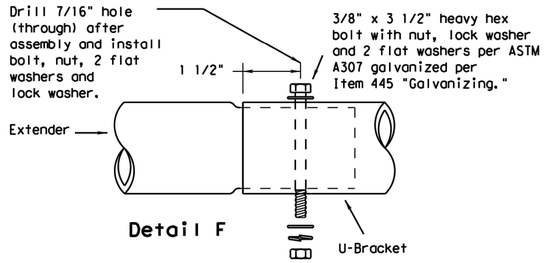
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

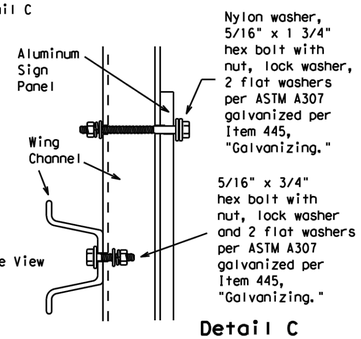


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

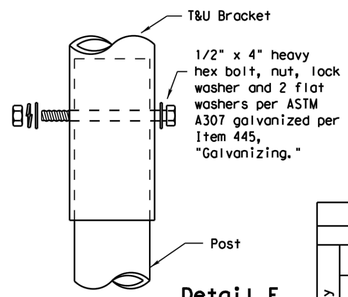


Detail F

Splices shall only be allowed behind the sign substrate.



Detail C



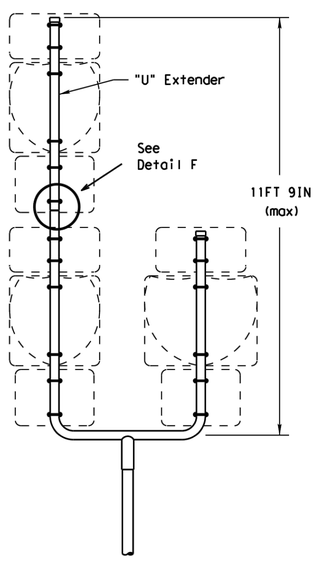
Detail E

GENERAL NOTES:

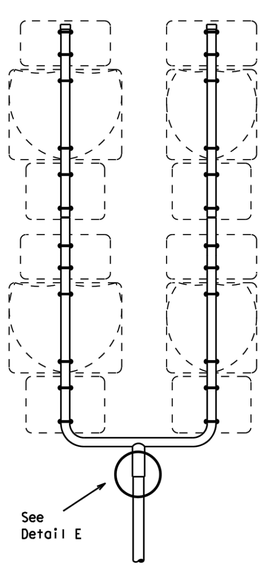
1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

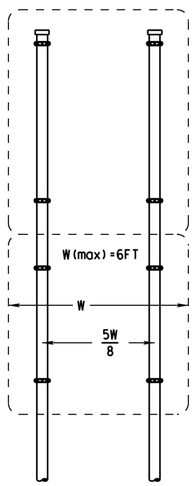
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

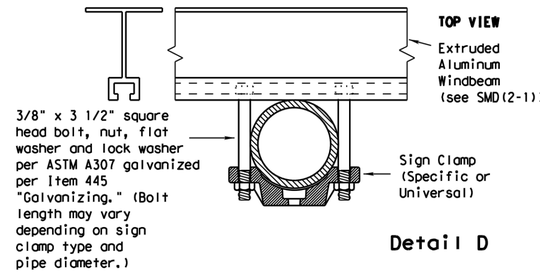


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

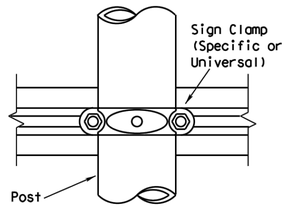


SM RD SGN ASSYM TY XXXXX(2)XX(P)

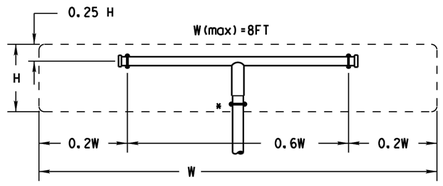
SIDE VIEW



Detail D



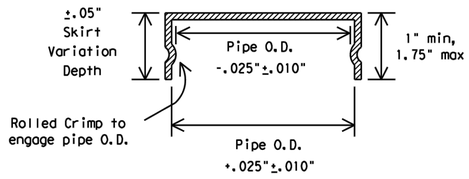
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



All dimensions are in english unless detailed otherwise.

SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

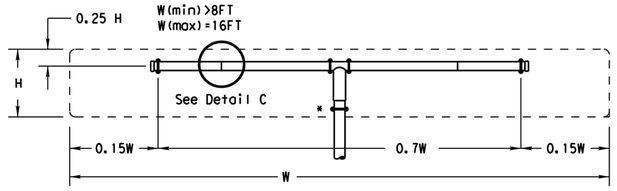
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

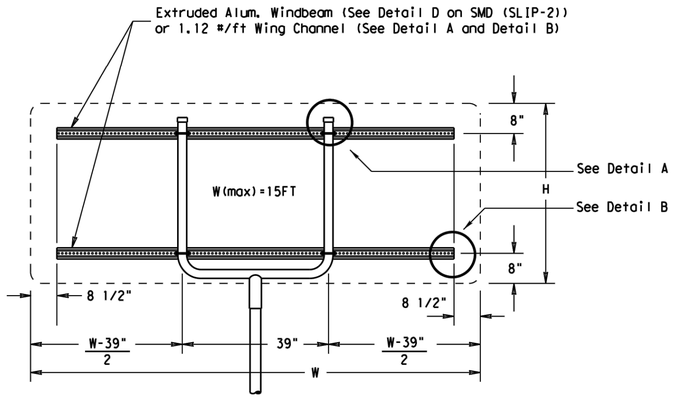
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
			213

9-08 REVISIONS

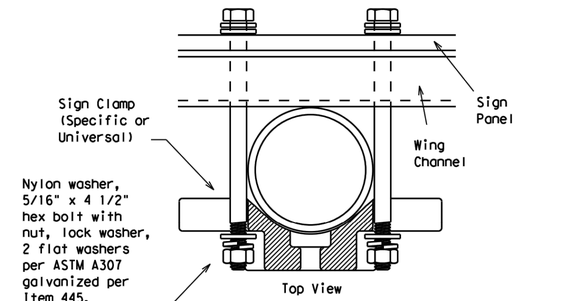
DATE:
FILE:



SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)

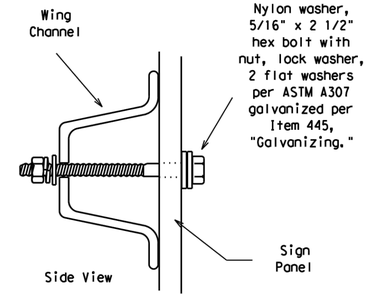


SM RD SGN ASSM TY XXXXX(1)XX(U-XX)

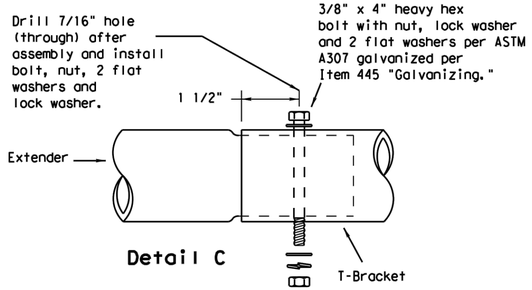


Top View

Detail A



Detail B



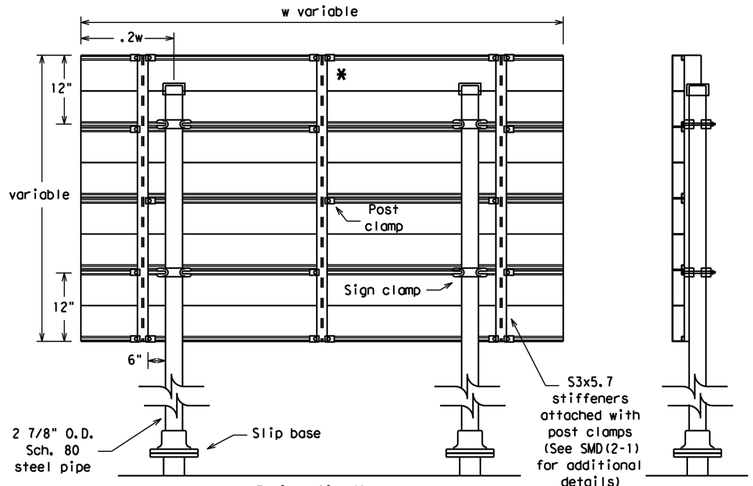
Detail C

Splices shall only be allowed behind the sign substrate.

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

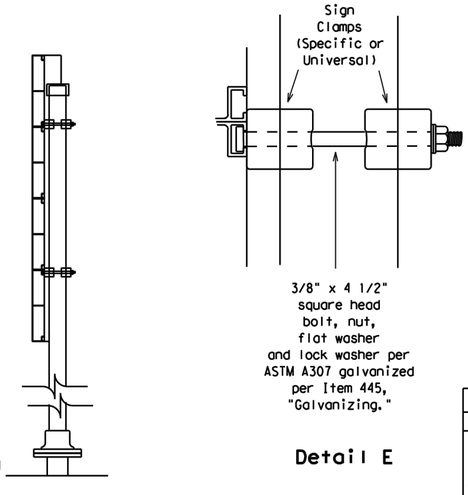
1. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
2. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
3. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
4. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
5. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
6. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
7. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
8. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
9. Sign blanks shall be the sizes and shapes shown on the plans.
10. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
11. Post open ends shall be fitted with Friction Caps.



Typical Sign Mount

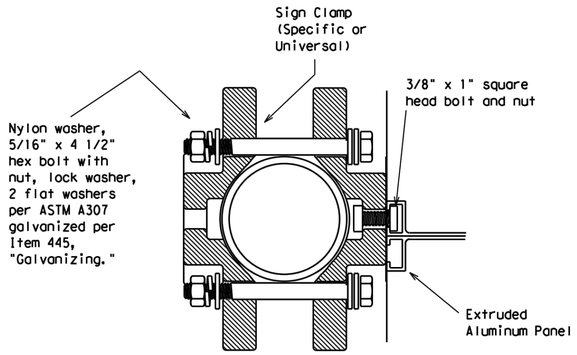
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

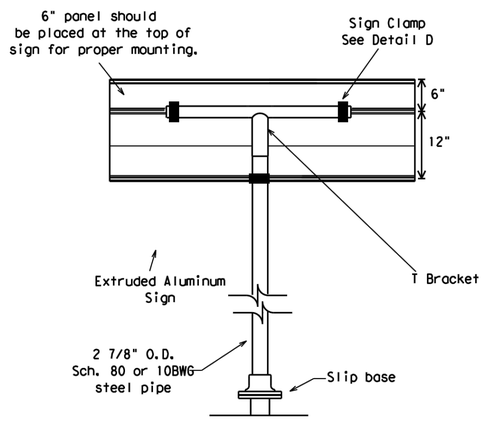


Detail E

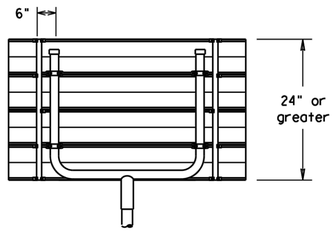
See Detail E
for clamp installation



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

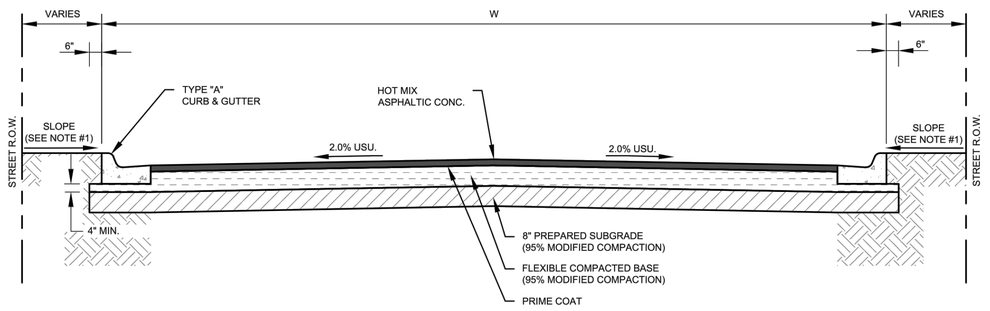
SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
			214

9-08 REVISIONS

DATE:
FILE:

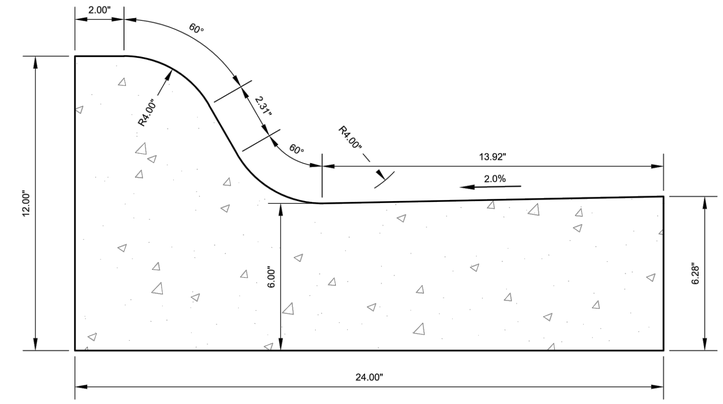


STREET DIMENSIONS			
W (FT)	ASPHALT THICKNESS (IN)	FLEXIBLE COMPACTED BASE THICKNESS (IN)	ASPHALT TYPE
*37	2D	8	TYPE "D"
*41	2D	8	
47	2D & 2C	8	TYPE "D" OVER TYPE "C"
77	2D & 3C	12	
79	2D & 3C	12	
113	2D & 3C	12	
TABLE THICKNESSES SHOWN ARE THE MINIMUM UNLESS OTHERWISE DIRECTED BY THE PLANS.			
* REGARDLESS OF WIDTH, ROADS CLASSIFIED AS COLLECTOR ROADS MUST HAVE 2" TYPE "D" OVER 2" TYPE "C" ASPHALT WITH 8" BASE AND ROADS CLASSIFIED AS ARTERIAL ROADS MUST HAVE 2" TYPE "D" OVER 3" TYPE "C" ASPHALT WITH 12" BASE.			

NOTES:

1. THE MAXIMUM SLOPE OF 1/4" / FT TO BE MEASURED FROM THE TOP OF CURB AND TO APPLY TO THE FULL WIDTH OF THE AREA BETWEEN THE BACK OF CURB AND THE R.O.W.
2. FLEXIBLE COMPACTED BASE TO BE PLACED IN LIFTS NO THICKER THAN 6".
3. WHEN MULTIPLE LAYERS OF ASPHALT ARE PLACED A TACK COAT MUST BE PLACED BETWEEN EACH PAIR OF ASPHALT LAYERS.
4. APPLY TACK COAT TO ALL CONCRETE SURFACES ADJACENT TO ASPHALT SURFACES AND TO ALL EXISTING ASPHALT SURFACES ADJACENT TO NEW ASPHALT SURFACES.
5. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO THE CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
6. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

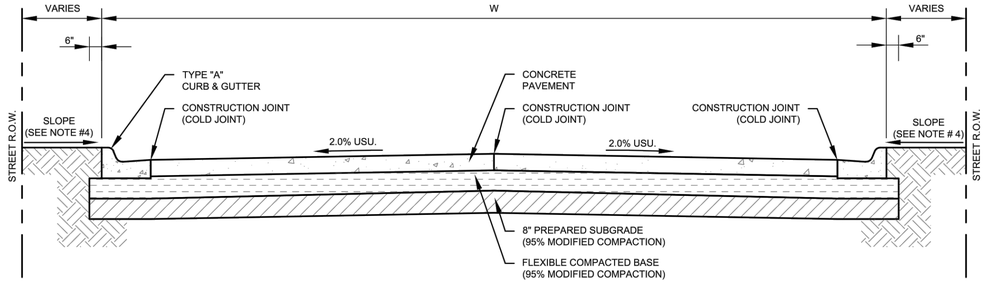
MIDLAND Engineering Services	DRAWN: DPM CHECKED: JCF APPROVED: MCC	EFFECTIVE DATE: 10/01/2018	SCALE: DETAIL:
		STANDARD STREET CROWN CROSS SECTION	201



NOTES:

1. CONCRETE TO BE CITY OF MIDLAND CLASS "C", 3600 PSI. USE FIBER REINFORCED CONCRETE PAVEMENT THROUGHOUT.
2. SEAL CONCRETE JOINT AT FACE OF CURB WHEN ADJACENT TO CONCRETE PAVEMENT AND NOT INTEGRAL WITH THAT PAVEMENT.
3. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
4. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

MIDLAND Engineering Services	DRAWN: DPM CHECKED: JCF APPROVED: MCC	EFFECTIVE DATE: 10/01/2018	SCALE: NTS DETAIL:
		TYPE A STANDARD CURB AND GUTTER	205



STREET DIMENSIONS			
W (FT)	CONCRETE THICKNESS (IN)	FLEXIBLE COMPACTED BASE THICKNESS (IN)	CONCRETE TYPE
37	6	6	CLASS "C" 3600 PSI
41	7	6	
47	7	8	
77	8	12	
79	8	12	
113	8	12	
TABLE THICKNESSES SHOWN ARE THE MINIMUM UNLESS OTHERWISE DIRECTED BY THE PLANS.			

NOTES:

1. CONCRETE TO BE CITY OF MIDLAND CLASS "C", 3600 PSI. USE FIBER REINFORCED CONCRETE PAVEMENT THROUGHOUT.
2. TYPE "A" SAW-CUT JOINTS ARE TO BE LOCATED THROUGHOUT AT EQUIDISTANT SPACING TYPICALLY 10' x 10' OR NO GREATER THAN 15' x 15'. SEAL ALL CONCRETE JOINTS.
3. USE TYPE "B" CURB AND GUTTER WHEN CURB AND PAVEMENT ARE INTEGRAL.
4. THE MAXIMUM SLOPE OF 1/4" / FT TO BE MEASURED FROM THE TOP OF CURB AND TO APPLY TO THE FULL WIDTH OF THE AREA BETWEEN THE BACK OF CURB AND THE R.O.W.
5. FLEXIBLE COMPACTED BASE TO BE PLACED IN LIFTS NO THICKER THAN 6".
6. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO THE CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
7. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

MIDLAND Engineering Services	DRAWN: DPM CHECKED: JCF APPROVED: MCC	EFFECTIVE DATE: 10/01/2018	SCALE: NTS DETAIL:
		CONCRETE PAVEMENT STREET CROWN CROSS SECTION	202

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

halff
2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817)847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

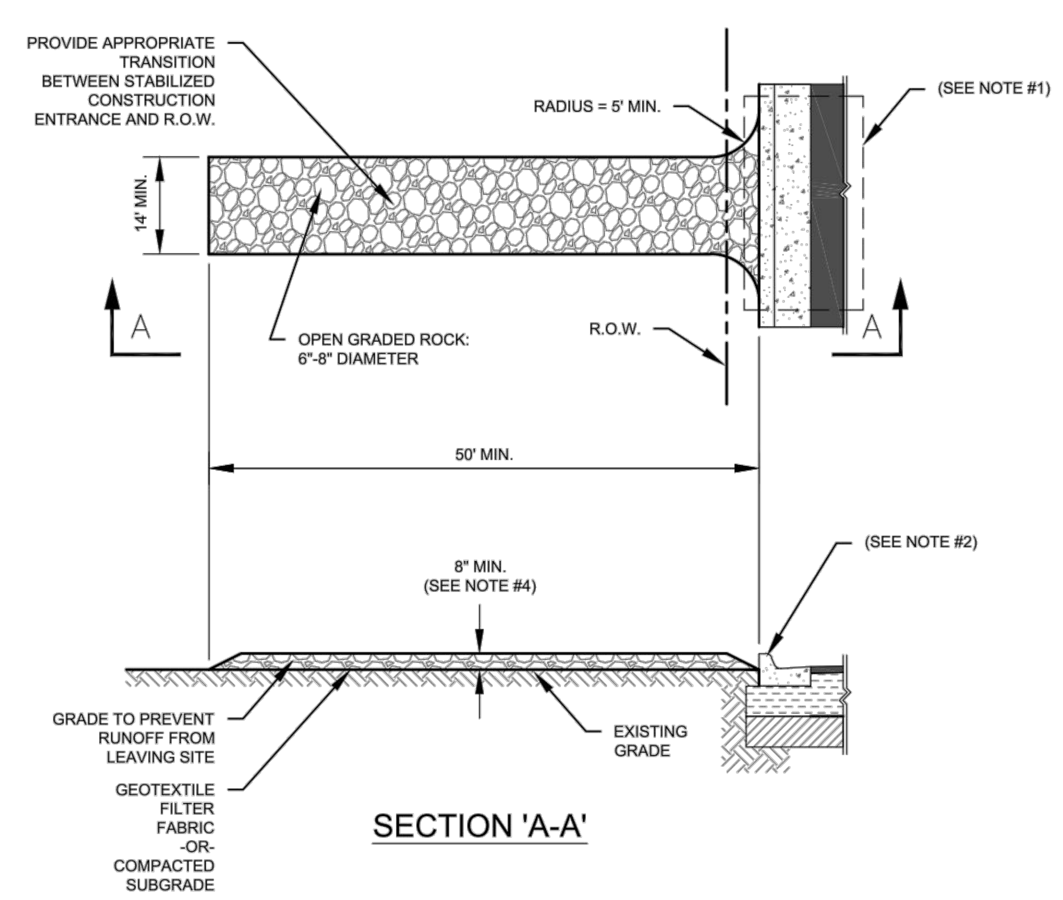
JACOB T. HALFF
127558
LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED
SHEET TITLE	DETAILS MIDLAND

SHEET NUMBER 215 OF 217

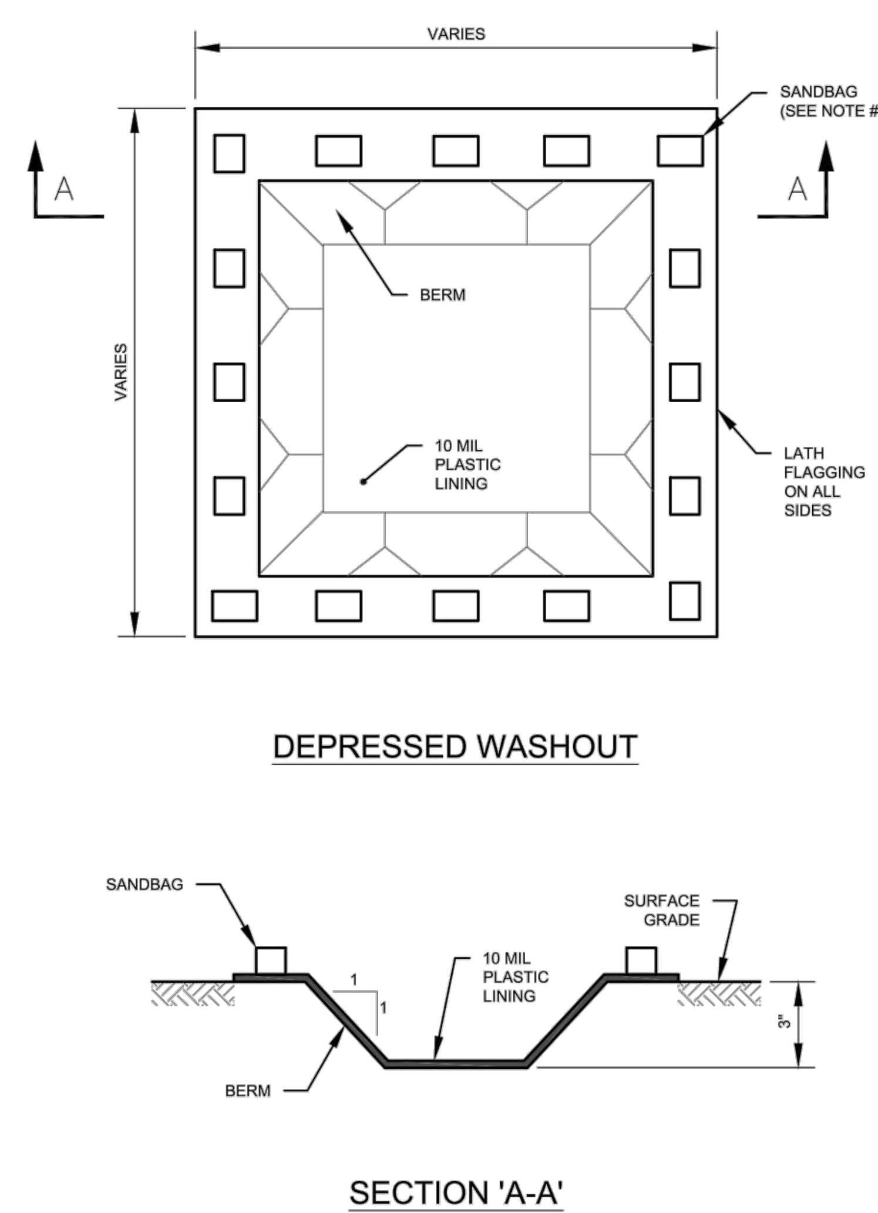
FILE NAME: A:\45000s\45715\006\CADD\Sheets\X-DETAILS-MIDLAND-45715.006.dwg DATE: August 13, 2024, TIME: 4:00 PM, USER: ajh3453, AVO: 45715.006



NOTES:

1. IF CURB DOES NOT EXIST OR IF EXISTING CURB IS REMOVED DURING CONSTRUCTION THEN STABILIZED CONSTRUCTION ENTRANCE IS TO EXTEND TO THE EDGE OF PAVEMENT.
2. IF CURB IS LEFT IN PLACE DURING CONSTRUCTION THEN INSTALL TEMPORARY CURB PROTECTION AS PER CITY DETAIL 713.
3. LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS, BUT NOT LESS THAN FIFTY (50) FEET.
4. THICKNESS OF OPEN GRADED ROCK TO BE NO LESS THAN EIGHT (8) INCHES.
5. WIDTH SHALL BE NO LESS THAN FOURTEEN (14) FEET OR THE FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS, WHICHEVER IS WIDER.
6. STABILIZED CONSTRUCTION ENTRANCE TO BE REMOVED UPON COMPLETION OF CONSTRUCTION.
7. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS
8. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

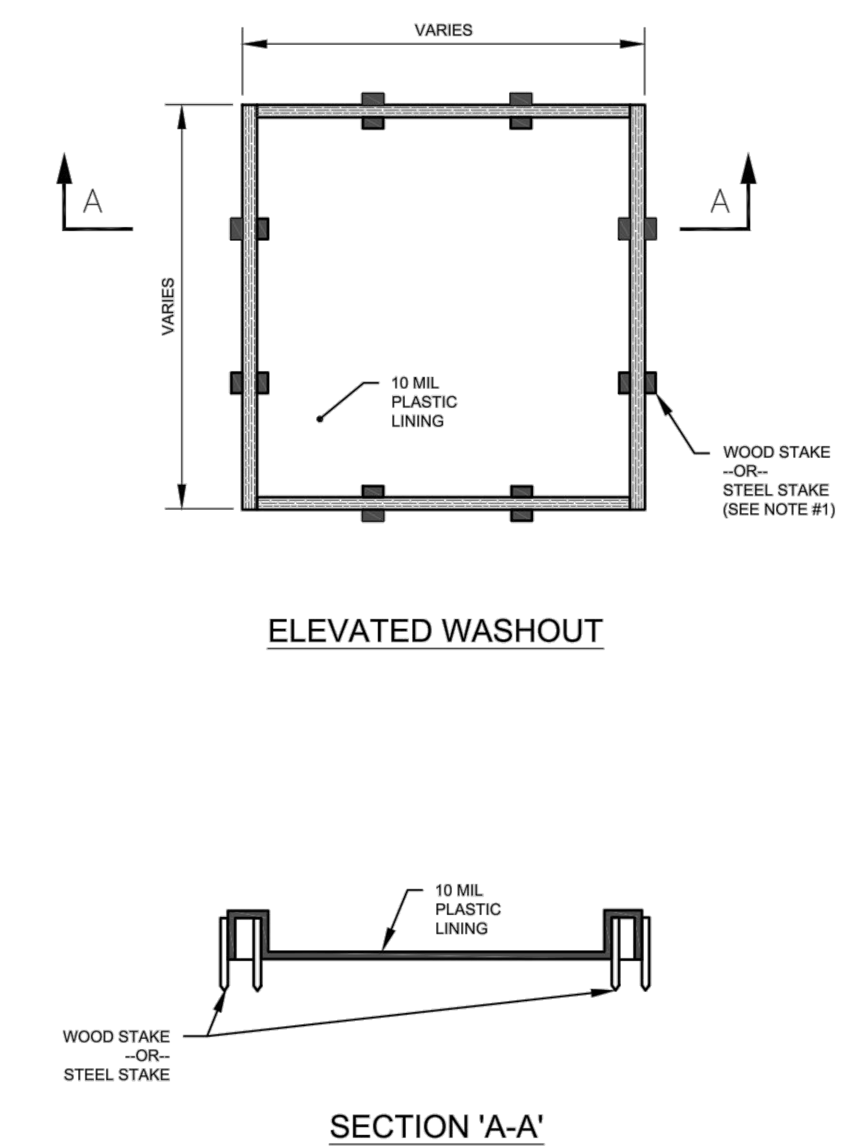
DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
MIDLAND Engineering Services	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
	STABILIZED CONSTRUCTION ENTRANCE OPTION 1		701



NOTES:

1. SECURE WASHOUT STRUCTURES AND LININGS WITH SANDBAGS OR TWO SECURELY FASTENED STAKES AROUND ENTIRE WASHOUT PERIMETER.
2. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
3. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

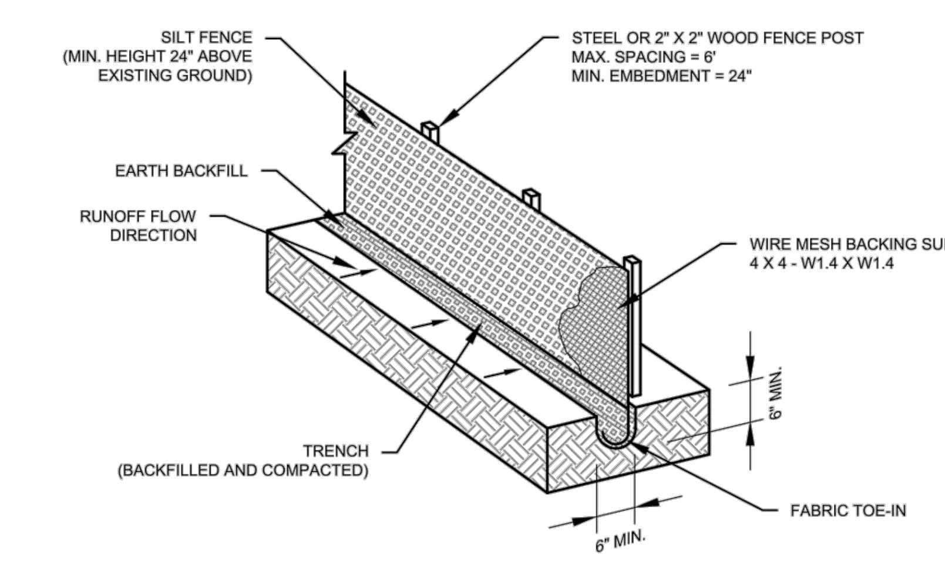
DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
MIDLAND Engineering Services	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
	CONCRETE WASHOUT OPTION 1		704



NOTES:

1. THIS WASHOUT CONFIGURATION MAY NOT BE USED IN PAVED AREAS.
2. WOOD FRAME IS TO BE EQUAL TO OR BETTER THAN TWO-STACKED 2X12 ROUGH WOOD FRAME.
3. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
4. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEERING.

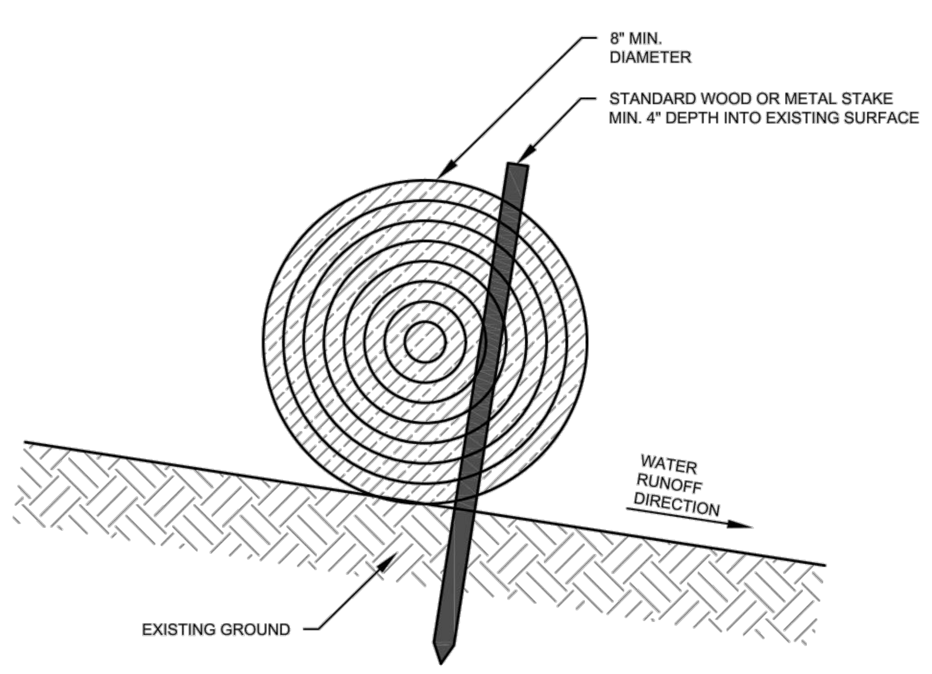
DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
MIDLAND Engineering Services	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
	CONCRETE WASHOUT OPTION 2		705



NOTES:

1. THIS DETAIL IS TO BE USED FOR SHEET FLOW CONDITIONS ONLY. DO NOT USE SILT FENCE FOR POINT FLOW OR CONCENTRATED FLOW CONDITIONS.
2. INSTALL STEEL OR WOOD POSTS, WHICH SUPPORT THE SILT FENCE, WITH A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POSTS MUST BE EMBEDDED A MINIMUM OF ONE (1) FOOT.
3. TRENCH THE TOE OF THE SILT FENCE IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE THE FENCE CANNOT BE TRENCHED IN (E.G.PAVEMENT), WEIGHT DOWN FABRIC FLAP WITH WASHED GRAVEL ON UPHILL SIDE TO PREVENT FLOW UNDER FENCE.
4. THE TRENCH MUST BE A MINIMUM OF SIX (6) INCHES DEEP AND SIX (6) INCHES WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.
5. SECURELY FASTEN SILT FENCE TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IN TURN IS TO BE ATTACHED TO THE STEEL OR WOOD FENCE POST. INCLUDE A SIX (6) INCH DOUBLE OVERLAP, SECURELY FASTENED, WHERE ENDS OF FABRIC MEET.
6. REMOVE SILT FENCE WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
7. REMOVE ACCUMULATED SILT WHEN IT REACHES A DEPTH OF SIX (6) INCHES. DISPOSE OF THE SILT ONSITE IN AN APPROVED LOCATION AND IN SUCH A MANNER AS TO NOT CONTRIBUTE TO ADDITIONAL SILTATION.
8. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
9. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

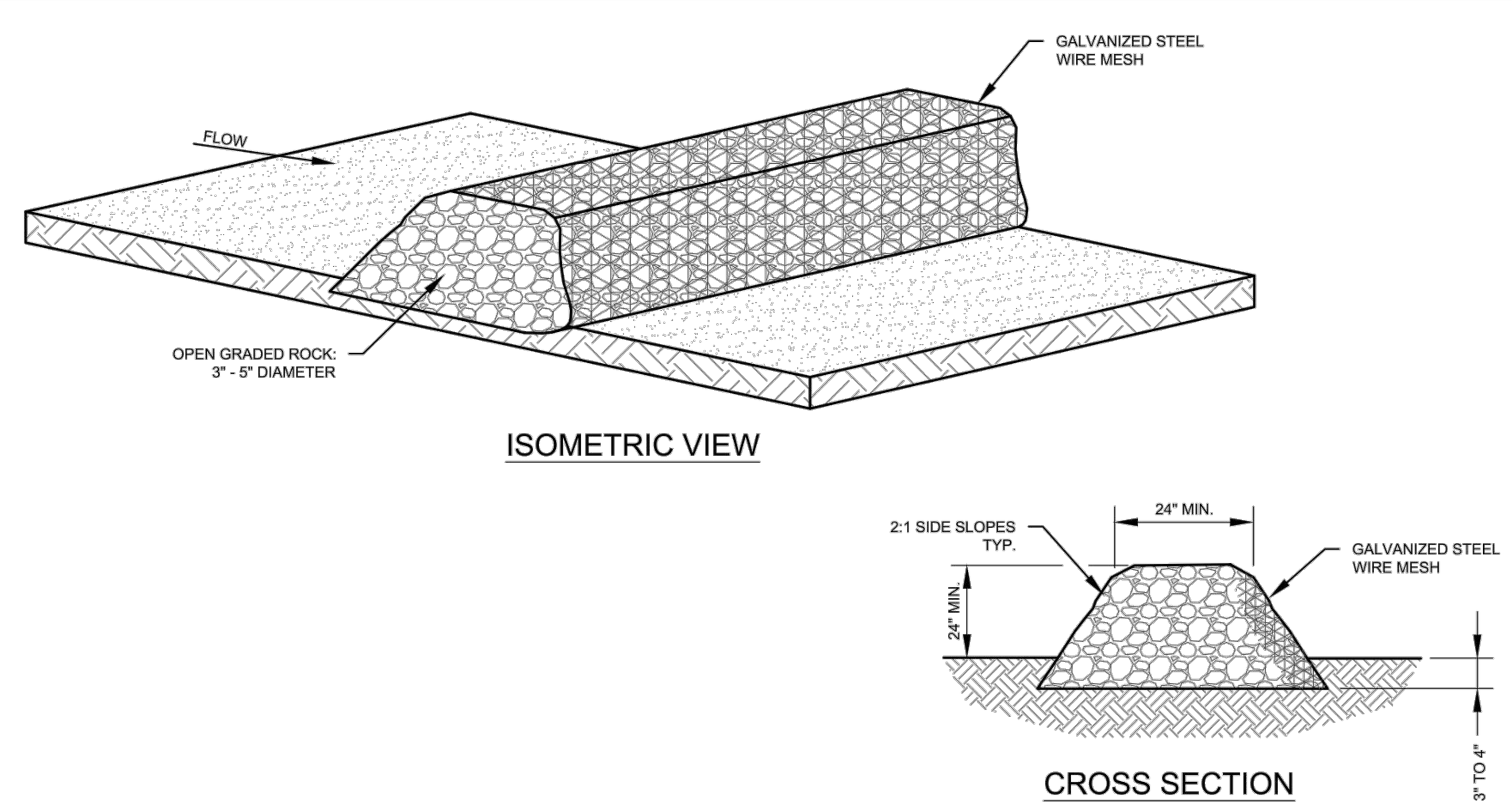
DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
MIDLAND Engineering Services	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
	SILT FENCE		706



NOTES:

1. THIS DETAIL IS TO USED FOR SHEET FLOW CONDITIONS ONLY. DO NOT USE FILTER SOCK FOR POINT FLOW OR CONCENTRATED FLOW CONDITIONS.
2. DO NOT USE FILTER SOCK FOR SHEET FLOW WATERSHEDS LARGER THAN ONE (1) ACRE.
3. USE POLYPROPYLENE NETTING, BURLAP, OR JUTE FABRIC TO CONSTRUCT THE FILTER SOCK.
4. FILL FILTER SOCK WITH STRAW, HAY, COCONUT FIBER, OR COMPOSITE MATERIAL.
5. PLACE STAKING EVERY THREE (3) TO FOUR (4) FEET AT A MINIMUM.
6. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
7. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

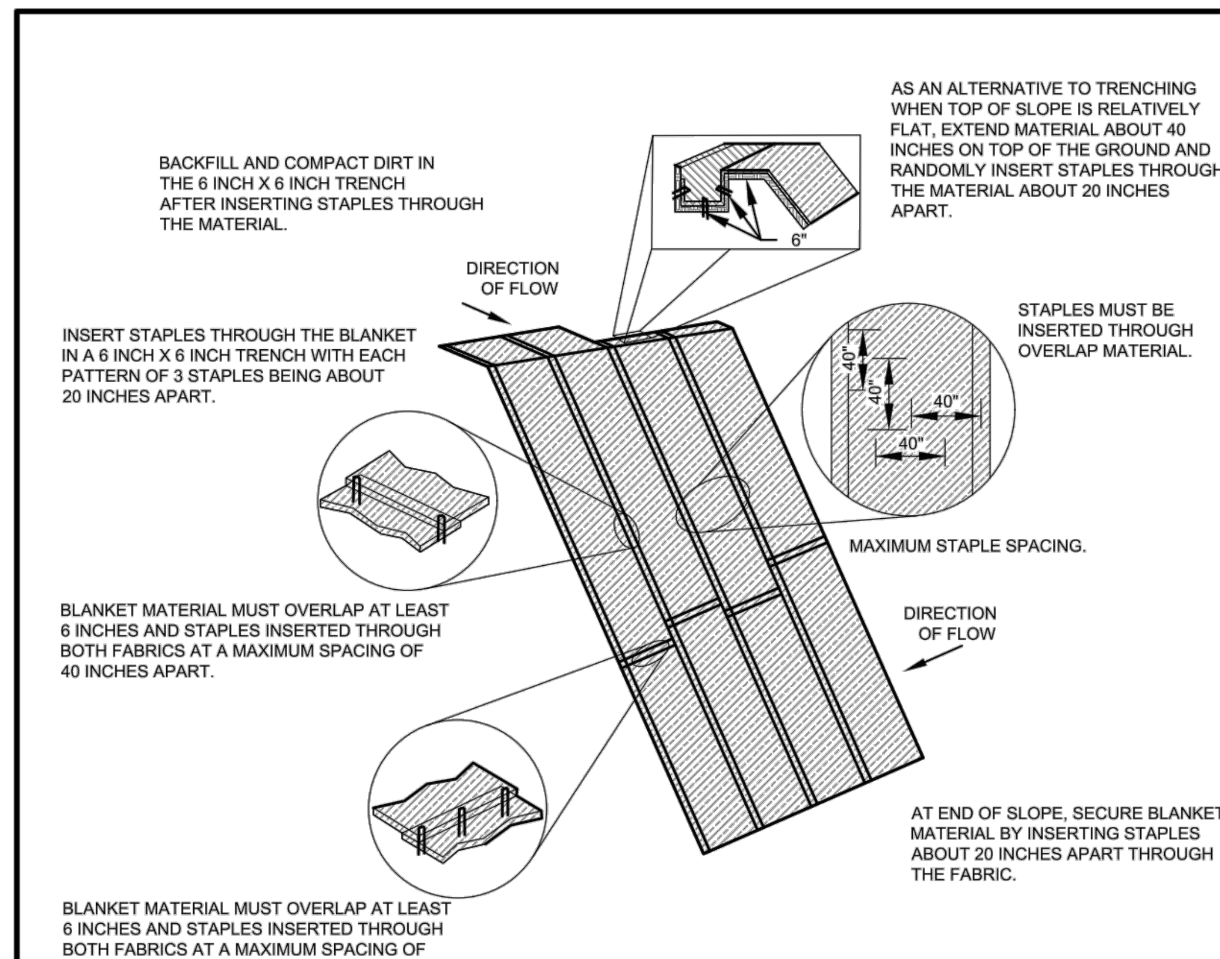
DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
MIDLAND Engineering Services	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
	FILTER SOCK		707



NOTES:

1. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
2. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

MIDLAND Engineering Services	DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
	CHECKED: JCF	ROCK FILTER DAM		708
	APPROVED: MCC			



NOTES:

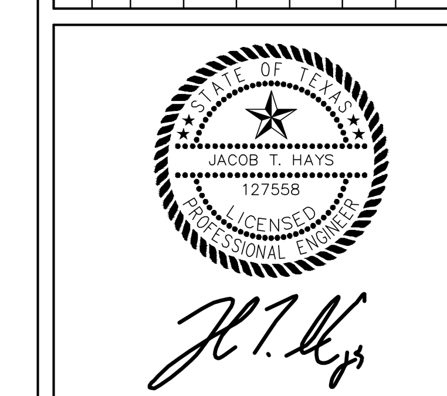
1. THE FOLLOWING PRODUCTS, OR AN EQUAL APPROVED BY THE ENGINEERING SERVICES REPRESENTATIVE MAY BE USED;
   ECS S-1 STANDARD STRAW
   ECS HIGH VELOCITY STRAW
   LANDLOK BON-TERRA S2, ENS2 OR ENCS2
   NORTH AMERICAN GREEN S75, S75BN, S150, S150BN, OR SC150
2. APPLY SEED AS RECOMMENDED BY MANUFACTURER'S SPECIFICATIONS.
3. LAY BLANKETS PARALLEL TO THE DIRECTION OF WATER FLOW. SPREAD BLANKETS EVENLY WITHOUT STRETCHING SO FIBERS ARE IN DIRECT CONTACT WITH THE SOIL.
4. BURY THE UPSLOPE END OF EACH BLANKET AT LEAST 6 INCHES IN A VERTICAL TRENCH WITH THE SOIL PRESSED FIRMLY AGAINST THE EMBEDDED MAT. ADDITIONAL CHECK TRENCHES AT 50 FEET INTERVALS MAY BE DESIRABLE ON STEEP GRADES OR LONG FLOW AREAS.
5. STAPLE STRIP ENDS AND END OVERLAPS WITH NOT MORE THAN 20 INCHES BETWEEN STAPLES. STAPLE ALL OTHER JOINTS AND EDGES AT 40 INCH INTERVALS.
6. USE U-SHAPED STAPLES TO ANCHOR BLANKETS THAT ARE 11 GAUGE OR HEAVIER STEEL WIRE HAVING A SPAN WIDTH OF 1 INCH AND A LENGTH OF 6 INCHES OR MORE FROM TOP TO BOTTOM AFTER BENDING.
7. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
8. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

MIDLAND Engineering Services	DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
	CHECKED: JCF	EROSION CONTROL BLANKET AND VEGETATION		711
	APPROVED: MCC			

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

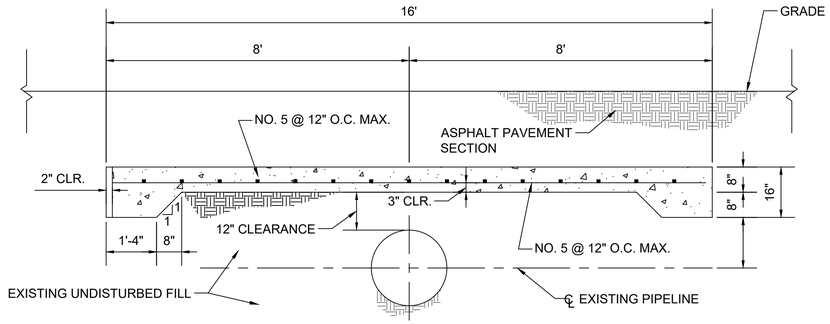
halff
2601 MEACHAM BLVD, STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION		
NO.	DATE	DESCRIPTION



DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED
SHEET TITLE	DETAILS MIDLAND

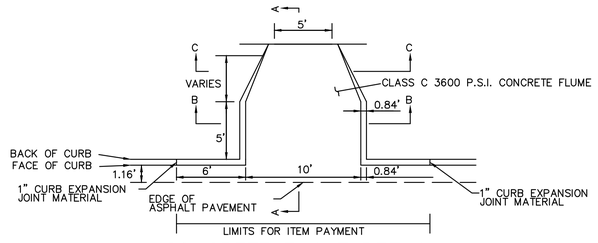


PROTECTION SLAB SECTION

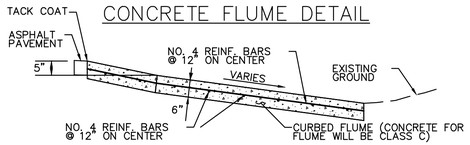
NOTES:

1. CONCRETE SHALL BE AIR-ENTRAINED (6% ±1.5%) AND SHALL POSSESS A MINIMUM 28-DAY COMPRESSION STRENGTH OF 4000 PSI. HIGH-EARLY STRENGTH CONCRETE SHALL BE UTILIZED SUCH THAT THE 3-DAY COMPRESSIVE STRENGTH EQUALS OR EXCEEDS 2800 PSI.
2. DESIGN SOIL PRESSURE = 2700 PSF
3. REINFORCEMENT SHALL BE EPOXY COATED AND SHALL MEET ASTM A615, GRADE 60.
4. ALL REINFORCING SHALL BE DETAILED, FABRICATED & PLACED IN ACCORDANCE WITH CRSI "MANUAL OF STANDARD PRACTICE".
5. CHAIRS AND BOLSTERS SHALL BE PLASTIC OR EPOXY COATED.
6. IF CONCRETE SUPPORT BLOCKS ARE USED, THEIR STRENGTH SHALL BE EQUAL TO OR GREATER THAN THAT OF THE CONCRETE BEING PLACED.
7. PROVIDE SUPPORTS AND SPACERS FOR ALL REINFORCING, INCLUDING WWF.
8. CONSOLIDATE ALL CONCRETE, INCLUDING SLABS, BY VIBRATING.
9. LAP ALL SPLICES 40 BAR DIAMETERS UNLESS NOTED OTHERWISE.
10. SUBMIT PROPOSED CONCRETE MIX DESIGN TO ENGINEER FOR APPROVAL
11. CONCRETE SHALL NOT CONTAIN MORE THAN 0.1% SOLUBLE CHLORIDE.
12. PLACE CONCRETE DIRECTLY ON UNDISTURBED, UNFROZEN SUBGRADE.
13. NOTIFY ENGINEER IMMEDIATELY IF FIELD CONDITIONS DIFFER FROM THAT SHOWN.
14. EPOXY COATED WELDED WIRE MESH OF EQUIVALENT AREA MAY BE SUBSTITUTED FOR REINFORCEMENT BARS. MESH YIELD STRENGTH SHALL NOT BE LESS THAN 60 KSI.

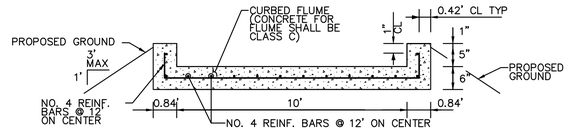
Revision–Description	By	App.
Original Issue	WFS	MAM
"	"	"
"	"	"
"	"	"
"	"	"



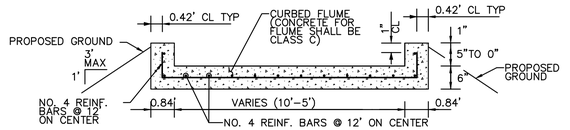
CONCRETE FLUME DETAIL



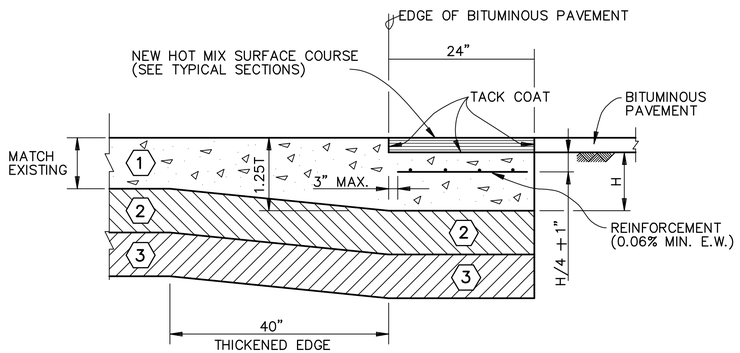
CONCRETE FLUME DETAIL
SECTION A–A



CONCRETE FLUME DETAIL
SECTION B–B



CONCRETE FLUME DETAIL
SECTION C–C



CONCRETE HEADER DETAIL
N.T.S.

PAVEMENT NOTES BY SYMBOL

(1) 3600 P.S.I. PORTLAND CEMENT CONCRETE (MATCH EXISTING DEPTH, MINIMUM 6")

(2) CALICHE FLEX BASE (12")

(3) 8" COMPACTED SUBGRADE COMPACTED TO 95% PROCTOR

OCCIDENTAL PARKWAY
TO ELKINS ROAD
MIDLAND, TEXAS

MIDLAND Engineering Services

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2601 MEACHAM BLVD. STE 600
FORT WORTH, TEXAS 76137-2797
TEL (817) 847-1422
TBPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

JACOB T. HAYS 127558 LICENSED PROFESSIONAL ENGINEER

DATE 8/13/24
TBPELS ENGINEERING FIRM #F-312

PROJECT NO.:	45715.006
ISSUED:	8/13/24
DRAWN BY:	HALFF
CHECKED BY:	JTH
SCALE:	AS NOTED

SHEET TITLE

DETAILS
MISCELLANEOUS

SHEET NUMBER 217 OF 217

FILE NAME: A:\45000s\45715\006\CADD\Sheets\X-DETAILS-MIDLAND-45715.006.dwg DATE: August 13, 2024, TIME: 4:00 PM, USER: ah3453 AYO: 45715.006