

CITY OF KALAMAZOO

PUMP STATION 5 & 14 WATER AND TRANSMISSION MAIN CONTRACT 1

1136 OAK VALLEY DRIVE, SUITE 100
ANN ARBOR, MI 48108
PHONE: (734) 665-6000 FAX (734) 213-3003

www.tetratech.com



DWSRF NO. 7866-01



PROJECT LOCATION:
2045 EAST MICHIGAN AVENUE,
KALAMAZOO, MI 49048

CLIENT INFORMATION:
CITY OF KALAMAZOO

Tt PROJECT No.:
200-19743-24012

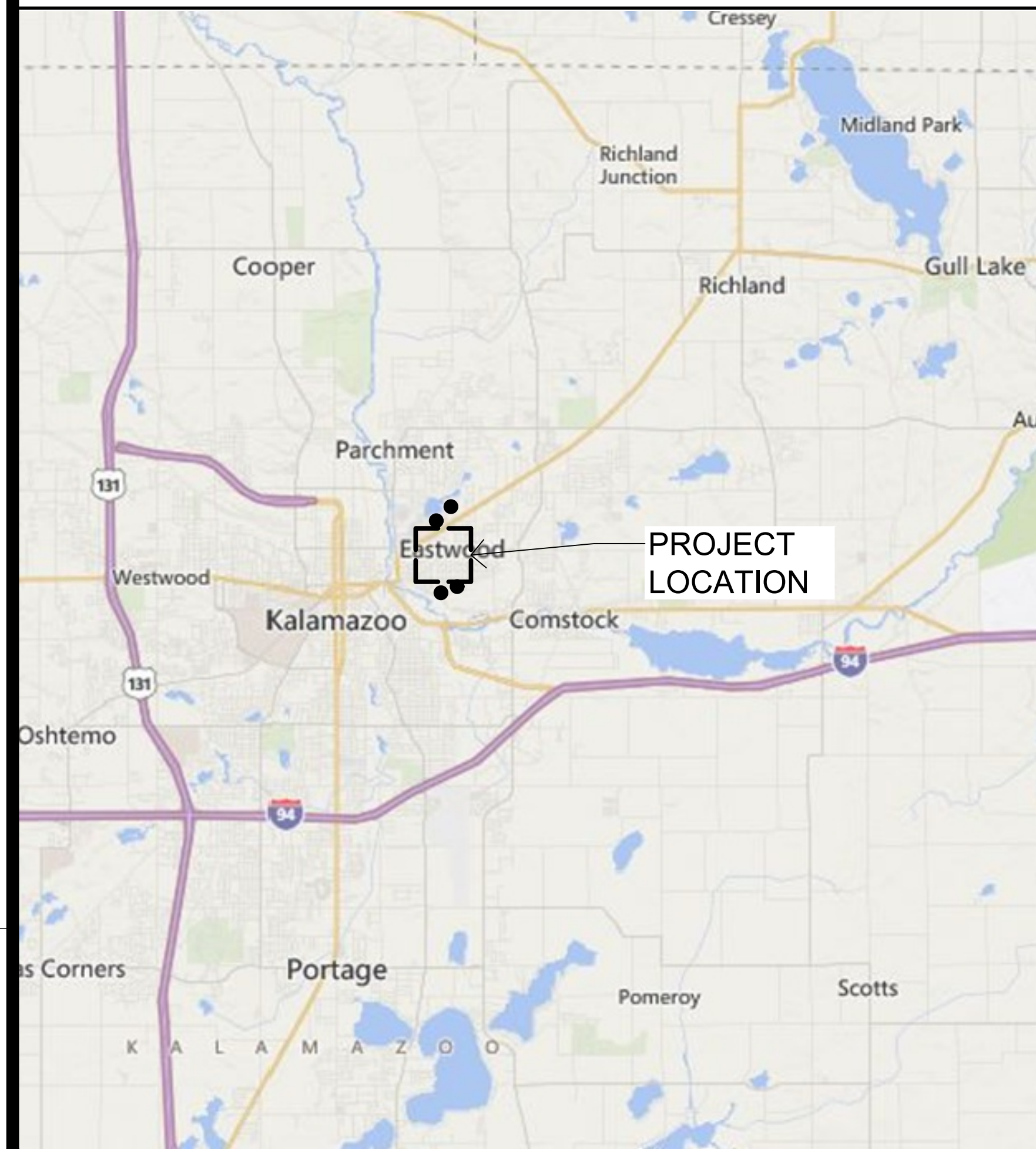
CLIENT PROJECT No.:

PROJECT DESCRIPTION / NOTES:
PUMP STATION 5 & 14 WATER AND TRANSMISSION MAIN, CONTRACT 1
WATER MAIN UPDATES AND FIBER INSTALLATION.

ISSUED:

ISSUED FOR BIDS - 05/01/25

VICINITY MAP:



**CALL MISS DIG
(800) 482-7171**

FOR PROTECTION OF UNDERGROUND UTILITIES AND IN CONFORMANCE WITH PUBLIC ACT 53, 1974, THE CONTRACTOR SHALL CALL (800) 482-7171 A MINIMUM OF THREE (3) FULL WORKING DAYS (EXCLUDING SATURDAYS, SUNDAYS AND HOLIDAYS) PRIOR TO EXCAVATING IN THE VICINITY OF UTILITY LINES. ALL "MISS DIG" PARTICIPATING MEMBERS WILL BE ROUTINELY NOTIFIED. THIS DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF NOTIFYING UTILITY OWNERS WHO MAY NOT BE A PART OF THE "MISS DIG" ALERT SYSTEM.

NOTES

GENERAL NOTES (ALL DRAWINGS):

- THESE GENERAL NOTES PRESENT AND/OR SUMMARIZE KEY PROJECT INFORMATION FOR THE DRAWINGS. FOR ADDITIONAL INFORMATION REFER TO DRAWING NOTES AND PROJECT SPECIFICATIONS FOR FURTHER DETAILS AND REQUIREMENTS.
- ALL EXISTING DIMENSIONS SHOWN WITH THE (+/-) SYMBOL ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR BEFORE FABRICATION AND CONSTRUCTION. FIELD VERIFY UTILITY LOCATIONS.
- THE INTENT OF THE DRAWINGS IS THAT THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, TOOLS, EQUIPMENT AND TRANSPORTATION NECESSARY FOR THE PROPER EXECUTION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND ALL INCIDENTAL WORK NECESSARY TO COMPLETE THE PROJECT IN AN ACCEPTABLE MANNER, READY FOR USE BY THE OWNER.
- THE CONTRACTOR SHALL REVIEW AND COORDINATE THE SCHEDULING OF ALL CONSTRUCTION WITH THE OWNER AND SUBMIT DETAILED CONSTRUCTION SCHEDULE PRIOR TO BEGINNING WORK.
- ALL GENERAL NOTES APPLY TO THE SCOPE OF THIS PROJECT.
- THE GENERAL CONTRACTOR SHALL ENSURE THAT ALL CONSTRUCTION MEETS OR EXCEEDS APPLICABLE CODES AND STANDARD PRACTICES, INCLUDING ALL FEDERAL, STATE AND LOCAL BUILDING AND ACCESSIBILITY REQUIREMENTS AND REGULATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY VIOLATION OF THE SAME AND SHALL MAKE ALL WORK ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION INVOLVED WITHOUT EXTRA CHARGE.
- EACH TRADE SHALL VERIFY ALL REQUIREMENTS PERTAINING TO WORK PERFORMED IN THE PROJECT AND ANY REQUIRED PERMITS. ALL SUBCONTRACTORS SHALL DIRECT QUESTIONS, CHANGES OR REQUESTS THROUGH THE GENERAL CONTRACTOR. THE GENERAL CONTRACTOR SHALL SUBMIT ALL REQUESTS, CHANGES OR QUESTIONS TO THE OWNER'S REPRESENTATIVE IN WRITING.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL FEDERAL, STATE, AND LOCAL CODE REVIEW, PERMITTING AND ASSOCIATED FEES.
- THE CONTRACTOR SHALL MEET ALL OCCUPATIONAL SAFETY AND HEALTH STANDARDS (OSHA), PART 1910 AND EQUIVALENT OSHA AND FEDERAL STANDARDS.
- THE CONTRACTOR SHALL FOLLOW OWNER SOIL EROSION AND SEDIMENTATION CONTROL REQUIREMENTS (SESC).
- CONTRACTOR TO PROVIDE ANY AND ALL NECESSARY FENCES, BARRICADES, OR TRAFFIC CONTROLS TO ENSURE VEHICLE AND PERSONNEL SAFETY AND ADEQUATELY PROTECT THE SITE AT ALL TIMES.
- PROVIDE ADEQUATE PROTECTION TO PREVENT DAMAGE TO ADJACENT STRUCTURES.
- CONTRACTOR SHALL COORDINATE WITH OWNER AND ENGINEER FOR ALL RELOCATING AND REROUTING OF EQUIPMENT, PIPING, CONDUIT, ETC.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR TRAFFIC CONTROL AND WORK SITE SAFETY ON THIS PROJECT, INCLUDING SHEETING, BRACING, SIGNAGE, AND MEETING ALL STATE, FEDERAL AND LOCAL SAFETY CODES.
- ALL HARDWARE SHALL BE 304 STAINLESS STEEL INCLUDING NUTS, BOLTS, WASHER, ANCHORS, STRUTS, ETC. FOR ALL DRAWINGS. ANY REFERENCES IN ANY SPECIFICATION OR ANY DRAWING REFERRING TO 304 STAINLESS STEEL SHALL HAVE PRECEDENCE OVER STANDARD DETAILS, AND PROJECT MANUAL/SPECIFICATIONS.
- ALL EXISTING SITE CONDITIONS SHOWN ON THE PLANS ARE FOR REFERENCE ONLY.
- NO PIPES, CONDUIT, ETC. MAY BE EMBEDDED IN CONCRETE FLOORS, WALLS, OR CEILING UNLESS APPROVED BY ENGINEER.
- UNDERGROUND UTILITIES ARE APPROXIMATE LOCATIONS ONLY. UNDERGROUND UTILITY LOCATIONS HAVE NOT BEEN FIELD VERIFIED. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF ALL UNDERGROUND UTILITIES. ALL EX. UTILITIES MAY NOT BE SHOWN.
- CONTRACTOR SHALL NOT UTILIZE ANY PAVED ROADWAYS FOR TRACK EQUIPMENT OPERATION OR STORAGE. ALL DAMAGED ROADWAYS CAUSED BY CONTRACTOR TO BE REPAIRED AT CONTRACTORS EXPENSE.
- THE CONTRACTOR AND SUBCONTRACTOR SHALL MAKE A PERSONAL INVESTIGATION OF THE SITE AND EXISTING SURFACE AND SUBSURFACE CONDITIONS. THE CONTRACTOR IS RESPONSIBLE TO ACQUAINT THEMSELVES WITH CONDITIONS OF THE WORK AREA. THE CONTRACTOR IS ADVISED TO DETERMINE THE SUBSURFACE SOIL AND GROUND WATER CONDITIONS. DEWATERING, IF DETERMINED NECESSARY BY THE CONTRACTOR AND IF NOT SPECIFICALLY CALLED OUT IN THE CONTRACT DOCUMENTS, WILL BE INCIDENTAL TO THE COST OF INSTALLATION.
- ALL DISTURBED AREAS SHALL BE RESTORED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE PROPERTY, INCLUDING EXISTING FENCING, LAWN, TREES AND SHRUBBERY.
- CONTRACTOR TO PROVIDE DEWATERING AS REQUIRED FOR THE WORK.
- DO NOT LEAVE ANY OPENINGS UNCOVERED AT END OF WORKING DAY.
- THE ELEVATIONS SHOWN ON THE CIVIL DRAWINGS ARE BASED ON NAVD88 DATUM. ELEVATIONS ON ALL OTHER SHEETS ARE BASED ON NGVD29 DATUM. NGVD29 ELEVATIONS ARE 0.436' HIGHER THAN NAVD88 ELEVATIONS.

GENERAL DEMOLITION NOTES (ALL DRAWINGS):

- DEMOLITION DRAWINGS MAY NOT SHOW ALL DEMOLITION WORK REQUIRED UNDER THIS CONTRACT. OTHER CONTRACT DRAWINGS MAY ALSO SHOW DEMOLITION WORK. COORDINATE DEMOLITION WITH REQUIREMENTS LISTED IN SECTION 01110 OF THE PROJECT MANUAL.
- SITE INVESTIGATION PRIOR TO BIDS IS STRONGLY RECOMMENDED TO DETERMINE THE COMPLETE EXTENTS OF DEMOLITION REQUIRED. THESE DRAWINGS DO NOT INDICATE ALL MATERIALS THAT ARE TO BE REMOVED OR REROUTED IN AREA OF PROPOSED WORK.
- PRIOR TO STARTING WORK THE DEMOLITION CONTRACTOR IS TO FIELD VERIFY NOTED AREAS OF DEMOLITION TO DETERMINE ACTUAL SCOPE OF DEMOLITION, AND TO REVIEW SCOPE WITH THE OWNER'S REPRESENTATIVE TO CONFIRM SPECIFIC ITEMS TO BE SALVAGED AND STORED FOR REUSE.
- COORDINATE WITH OWNER DURING ANY INTERRUPTION OF SERVICE, SO THAT THAT OPERATION OF THE PROCESS EQUIPMENT IS NOT EFFECTED. SEE SPECIFICATIONS 01110 - SUMMARY OF WORK FOR ADDITIONAL REQUIREMENTS. REVIEW WORK ITEMS WITH ENGINEER PRIOR TO PERFORMING WORK.
- PRIOR TO THE START OF ANY DEMOLITION WORK, COORDINATE WITH PLANT OPERATORS THE LOCATION OF ALL UTILITIES. PLANT LOCK OUT/TAG OUT PROCEDURES SHALL BE STRICTLY FOLLOWED.
- EXPANSION AND ANCHOR BOLTS REMAINING IN WALL, CEILINGS OR FLOORS SHALL BE POUNDED OR CUT FLUSH WITH SURFACE. IN FINISHED AREAS THEY SHALL BE RECESSED AND PATCHED TO MATCH EXISTING FINISH.
- ALL OPENINGS REMAINING IN FLOORS, WALLS, OR CEILINGS, INCLUDING SLEEVES, AFTER PIPING AND DUCT DEMOLITION SHALL BE PATCHED TO MATCHING EXISTING FINISH AND AS DETAILED ON DRAWINGS.
- CAP AND BLIND FLANGE MATERIAL TO BE SAME AS PIPE BEING CAPPED.
- PROMPTLY PATCH AND REPAIR DAMAGE CAUSED TO ADJACENT BUILDING ELEMENTS BY DEMOLITION WORK. RESTORE EXPOSED FINISHES OF PATCHED AREAS IN A MANNER THAT ELIMINATES EVIDENCE OF PATCHING AND REFINISHING.
- OWNER RESERVES RIGHT TO RETAIN ANY EQUIPMENT OR MATERIALS REMOVED UNDER THIS CONTRACT. CONTRACTOR IS RESPONSIBLE TO HAUL AND DISPOSE OF OFFSITE ALL REMAINING REMOVED EQUIPMENT, MATERIAL, PIPING, CONDUIT, SOILS AND DEBRIS, NOT RETAINED BY OWNER, IN ACCORDANCE WITH ALL APPLICABLE CODES, LAWS, AND ORDINANCES.
- CONTRACTOR IS RESPONSIBLE TO PROVIDE AND MAINTAIN SHORING, BRACING, OR STRUCTURAL SUPPORT TO PRESERVE STABILITY AND PREVENT MOVEMENT, SETTLEMENT, OR COLLAPSE OF ITEMS TO BE SELECTIVELY DEMOLISHED OR STABILIZED AND ITEMS WHICH ARE IMMEDIATELY ADJACENT TO THOSE BEING REMOVED. CONTRACTOR SHALL HIRE A LICENSED STRUCTURAL ENGINEER TO PROPERLY DESIGN ANY SHORING OR TEMPORARY SUPPORTS THAT MAY BE REQUIRED DURING THE DEMOLITION PHASE.
- NO BURNING SHALL BE PERMITTED ON THIS PROJECT.
- BLASTING IS PROHIBITED ON THIS PROJECT.
- WHEN EQUIPMENT ITEMS ARE INDICATED FOR DEMOLITION, ALL ANCILLARY UTILITIES, ELECTRICAL ITEMS, CONCRETE SUPPORTS AND STRUCTURAL STEEL SUPPORTS SHALL BE COMPLETELY REMOVED UNLESS INDICATED OTHERWISE. ALL THE ABOVE MENTIONED ITEMS MAY NOT BE INDICATED ON THE DRAWINGS. SITE VISIT PRIOR TO BID DATE IS RECOMMENDED TO QUANTIFY COMPLETE EXTENT OF EQUIPMENT DEMOLITION.
- CONCRETE FLOOR SLABS UNDER DEMOLISHED CONCRETE EQUIPMENT PADS, THAT WILL BE EXPOSED IN THE FINISHED CONSTRUCTION SHALL BE PATCHED SMOOTH AND ANY DOWELS OR ANCHORS SHALL BE CUT OFF 2" BELOW THE SURFACE AND PATCHED SMOOTH. IF REQUIRED, EXISTING FLOOR SURFACE SHALL BE CHIPPED OR ROUGHENED AND PATCH APPLIED OVER BONDING AGENT.
- ALL PIPING SHOWN AS BEING DEMOLISHED SHALL BE COMPLETELY REMOVED INCLUDING INSULATION, HANGERS, EXPANSION AND ANCHOR BOLTS AND PIPE SUPPORTS. CAP PIPES LEFT IN PLACE AS REQUIRED. CONTRACTOR SHALL REMOVE PIPE CONTENTS AS WELL WHICH MAY CONTAIN WATER, SLUDGE, WASTEWATER, ETC.
- FLOORS, WALLS, AND CEILING SURFACES ARE TO BE CLEANED IN EACH AREA AFTER DEMOLITION IS COMPLETE. THE WALLS SHALL BE WET BRUSHED, SCRAPPED, SWEEP, ETC. AS REQUIRED TO REMOVE DIRT, LOOSE CRYSTALL, SCALE, RUST, AND DUST FROM SURFACES PRIOR TO PAINTING OF PIPING. FLOORS ARE TO BE POWER WASHED.
- FLOOR DRAINS SHALL BE PROTECTED FROM DIRT AND DEBRIS.
- PIPE, CONCRETE, ASPHALT, ETC. TO BE REMOVED AND REPLACED IS TO BE REPLACED IN KIND UNLESS NOTED OTHERWISE.
- CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL MATERIALS GENERATED DURING DEMOLITION WORK CONFIRM WITH OWNER DEMOLITION ITEMS, PER NOTE 10.

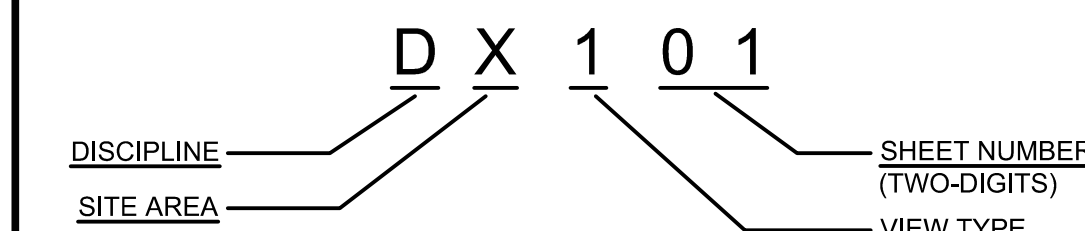
WATER MAIN GENERAL NOTES:

- WATER MAIN AND SERVICE INSTALLATIONS SHALL BE PERFORMED IN ACCORDANCE WITH CITY OF KALAMAZOO STANDARD SPECIFICATIONS FOR WATER MAIN AND SERVICE INSTALLATION 2021.
- WATER MAIN SHALL BE DUCTILE IRON PIPE (DIP), CLASS 52 TR FLEX WITH V-BIO ENCASEMENT BY CENTERING ON A FULL STICK OF PIPE.
- MAXIMIZE DISTANCE BETWEEN WATER MAIN JOINTS AT ALL SEWER CROSSING AND STRUCTURES. CENTER FULL STICK PIPE AT ALL CROSSINGS.
- PROVIDE A MINIMUM OF 18-INCHES OF SEPARATION VERTICALLY AT ALL SEWER CROSSINGS. A HORIZONTAL DISTANCE OF 10-FEET SHALL BE MAINTAINED FROM ALL SEWER MAIN.
- INSTALL 2-INCH INSULATION IN BETWEEN WATER MAIN AND STORM SEWER AT ALL STORM CROSSINGS; 2-INCH INSULATION WHENEVER WATER MAIN IS IN BETWEEN 4 AND 5-FOOT BURY; 4-INCH INSULATION WHENEVER WATER MAIN IS IN BETWEEN 3 AND 4-FOOT BURY. DO NOT BURY WATER MAIN LESS THAN 3 FEET BELOW GRADE.
- WATER MAIN AND/OR SERVICE ENCASEMENT IS REQUIRED WHENEVER CROSSING OR WITHIN 10-FEET OF CATHOLICALLY PROTECTED GAS MAIN(S) (AT ALL CROSSINGS ENCASE MINIMUM 10-FEET EACH SIDE OF CROSSING)

ABBREVIATIONS

A	ANCHOR BOLT	GRGT	GRATING	PRESS	PRESSURE REDUCING VALVE
AB	ABANDONED			PRW	PROCESS WATER
ABBREV	ABBREVIATION	H	HYDRAULIC	PSF	POUNDS PER SQUARE FOOT
ABRSV	ABRASIVE	HDR	HANGER	PSI	POUNDS PER SQUARE INCH
ADDM	ADDENDUM	HGT	HEIGHT	PSIA	ABSOLUTE POUNDS PER SQUARE INCH
ADH	ADHESIVE	HORIZ	HORIZONTAL	PSIG	ABSOLUTE POUNDS PER SQUARE INCH
AFF	ABOVE FINISHED FLOOR	HP	HORSEPOWER	PVMT	PAVEMENT
AFG	ABOVE FINISHED GRADE	HVAC	HEATING, VENTILATION, AND AIR CONDITIONING	PWR	POWER
AFS	ABOVE FINISHED SLAB			Q	FLOW
AHD	AHEAD			QTY	QUANTITY
AL	ALUMINIUM	I	INSIDE DIAMETER	R	RADIUS
ALT	ALTERNATE	ID	INCH(ES)	RAS	RETURN ACTIVATED SLUDGE
AMP	AMPERE	IN	INFLUENT	RC	REINFORCED CONCRETE
AMT	AMOUNT	INT	INTERSECTION	RCB	REINFORCED CONCRETE BOX
APRX	APPROXIMATE(LY)	INTR	INTERIOR	RCP	REINFORCED CONCRETE PIPE
ARCH	ARCHITECT(URAL)	INV	INVERT	RD	ROAD
ASPH	ASPHALT	IP	IRON PIPE	REBAR	REINFORCING STEEL
ASSY	ASSEMBLY	IPS	INTERNATIONAL PIPE STANDARD	REF	REFERENCE
A/C	AIR CONDITIONING	IR	INTERNAL RECYCLE	REINF	REINFORCE(D)(ING)(MENT)
		IW	IRRIGATION WATER	REQD	REQUIRED
				RF	RAISED FACE
B	BLACK IRON	J	JUNCTION BOX	RM	ROOM
BITUM	BITUMINOUS OR BITUMASTIC	JB	JOINT	RPM	REVOLUTIONS PER MINUTE
B/L	BASELINE	JT		RR	RAILROAD
BLDG	BUILDING			RVT	RIVETED
BLK	BLOCK	K	KIP (1,000 LB)	RW	RIGHT-OF-WAY
BM	BENCH MARK	KV	KILOVOLT		
BOT	BOTTOM	KVA	KILOVOLT-AMPERE		
BP	BASE PLATE	KW	KILOWATT		
BRG	BEARING	KWH	KILOWATT-HOUR		
				S	STANDARD CUBIC FEET PER MINUTE
C	CUBIC FEET PER MINUTE	L	LEFT	SD	STORM DRAIN
CFM	CUBIC FEET PER SECOND	LAT	LATERAL	SF	SQUARE FOOT OR FEET
CFS	CUBIC FEET PER SECOND	LAV	LAVATORY	SIG	SIGNAL
CI	CAST IRON	LEN	LENGTH	SIM	SIMILAR
CJ	CONSTRUCTION JOINT	LB	POUND(S)	SMH	SEWER MANHOLE
CKT	CIRCUIT	LF	LINEAR FEET	SPEC	SPECIFICATION
C/L	CENTER LINE	LP	LIGHT POLE	SUPRT	SUPPORT
CLF	CHAIN LINK FENCE	LVR	LOW WATER LEVEL	SQ	SQUARE
CLR	CLEAR OR CLEARANCE	LWL	LOW WATER LEVEL	SST	STAINLESS STEEL
CMU	CONCRETE MASONRY UNIT			STA	STATION
CND	CONDUIT	M	METER	STD	STANDARD
CNR	CORNER	MAINT	MAINTAIN OR MAINTENANCE	STK	STAKE
CO2	CARBON DIOXIDE	MAN	MANUAL(LY)	STL	STEEL
COL	COLUMN	MAS	MASONRY	STR	STRAIGHT
COM	COMMON	MATL	MATERIAL	STRUCT	STRUCTURAL
CONC	CONCRETE	MAX	MAXIMUM	SURF	SURFACE
CONN	CONNECTION	ME	MITERED END	SYM	SYMBOL
CONSTR	CONSTRUCT(ION)	MECH	MECHANICAL	SYMM	SYMMETRICAL
CONT	CONTINUOUS	MEG	MATCH EXISTING GRADE	S/W	SIDEWALK
CONTR	CONTRACT(OR)	MFR	MANUFACTURE(R)		
COORD	COORDINATE	MG	MILLION GALLONS	T	TANGENT
CSG	CASING	MGD	MILLION GALLONS PER DAY	TAN	TANGENT
CY	CUBIC YARD	MH	MANHOLE	TB	TOP OF BEAM
CYL	CYLINDER	MI	MILE(S)	TBM	TEMPORARY BENCH MARK
CURB	CURB AND GUTTER	MIN	MINIMUM, MINUTE(S)	TB-xx	TEST BORING-xx (e.g. TB-1)
C/C	CENTER TO CENTER	MISC	MISCELLANEOUS	TD	TRENCH DRAIN
		MJ	MECHANICAL JOINT	TDH	TOTAL DYNAMIC HEAD
		ML	MIXED LIQUOR	TE	TOTALLY ENCLOSED
D	DATUM	MO	MASONRY OPENING	TEFC	TOTALLY ENCLOSED FAN COOLED
DBL	DOUBLE	MON	MONUMENT	TEL	TELEPHONE
DC	DIRECT CURRENT	MPH	MILES PER HOUR	TENV	TOTALLY ENCLOSED NON-VENTILATED
DEMO	DEMOLITION	MPT	MALE PIPE THREAD	THD	THREADED
DESC	DESCRIPTION	MS	MOTOR STARTER	THK	THICK(NESS)
DET	DETAIL	MSP	MOTOR STARTER PANEL	THM	THEMISTRY
DI	DUCTILE IRON	MW	MANWAY	TOB	TOP OF BANK
DIA	DIAMETER	MWL	MEAN WATER LEVEL	TOC	TOP OF CURB
DIM	DIMENSION	MWP	MAXIMUM WORKING PRESSURE	TOS	TOE OF SLOPE
DIP	DUCTILE IRON PIPE			TOT	TOTAL
DIR	DIRECTION	N	NORTH	TP	TELEPHONE POLE
DMH	DROP MANHOLE	NE	NORTHEAST	TYP	TYPICAL
DW	DRAIN	NIC	NOT IN CONTRACT	T&B	TOP AND BOTTOM
DWG	DRAWING	NO	NUMBER		
		NOM	NOMINAL	U	UNDERDRAIN
		NPF	NATIONAL PIPE THREAD	UG	UNDERGROUND
		NPT	NATIONAL PIPE TAPER (THREAD)	ULT	ULTIMATE
E	EACH	NPW	NON-POTABLE WATER	UON	UNLESS OTHERWISE NOTED
EA	ECCENTRIC	NRS	NON-RISING SYSTEM	UGE	UNDERGROUND ELECTRIC
ECC	EACH FACE	NTS	NOT TO SCALE	UTC	UNDERGROUND TELEPHONE CABLE
EF	EFFLUENT	NW	NORTHWEST	UTIL	UTILITY
EFF	EFFLUENT LINE	N/A	NOT APPLICABLE		
EL	ELEVATION	O	ON CENTER	V	VOLT(S)
ELAST	ELASTOMERIC	OC	OUTSIDE DIAMETER	V	VOLTS
ELEC	ELECTRICAL	OD	OUTSIDE DIAMETER	VAR	VARIES
EMER	EMERGENCY	ODP	OPEN DRIP PROOF	VEL	VELOCITY
EP	EDGE OF PAVEMENT	OF	OUTSIDE FACE	VFD	VARIABLE FREQUENCY DRIVE
EPDM	ETHYLENE PROPYLENE DIENE MONOMER	OH	OVER HEAD	VOL	VOLUME
EQUIP	EQUIPMENT	OHW	OVER HEAD WIRE		
ESTM	EASEMENT	OPP	OPPOSITE	W	OPTIONAL
EW	EACH WAY	OR	OFFICIAL RECORDS	WH	WALL HYDRANT
EXC	EXCAVATE	OSY	OUTSIDE SCREW AND YOKE OPERATION AND MAINTENANCE	WL	WATER LINE
EXP	EXPANSION	O&M		WM	WATER MAIN
EXST	EXISTING			WS	WATER SURFACE
EXST GR	EXISTING GRADE	P	PROCESS AIR	WSP	WELDED STEEL PIPE
EXT	EXTERIOR	FA	FORCE MAIN	WTP	WATER TREATMENT PLANT
		PC	POINT OF CURVE	W	WITH
		PCM	PERMANENT CONTROL MONUMENT	W/O	WITHOUT
		PI	POINT OF INTERSECTION	X	TRANSFER
		PL	PLATE	XFER	
		P/L	PROPERTY LINE		
		PNV	PINCH VALVE	Y	YARD(S)
		POB	POINT OF BEGINNING	YD	YARD
		POJ	PUSH-ON JOINT	YH	YARD HYDRANT
		POL	POLYMER	YR	YEAR(S) YR
		PP	POWER POLE		
		PPD	POUNDS PER DAY		
		PPM	PARTS PER MILLION		
		PREFAB	PREFABRICATED		

SHEET NUMBERING & STRUCTURE DESIGNATION



SEE LISTS BELOW FOR SHEET ORDER BY: DISCIPLINE, AREA DESIGNATION, AND VIEW TYPE.

DISCIPLINE		DESCRIPTION
G		GENERAL
V		SURVEY
C		CIVIL
L		LANDSCAPING
S		STRUCTURAL
A		ARCHITECTURAL
F		FIRE PROTECTION
P		PLUMBING
D		PROCESS
M		MECHANICAL
E		ELECTRICAL
I		INSTRUMENTATION

AREA		
DESIGNATION	SHEET SERIES	DESCRIPTION (SEE SITE AREA KEY FOR LOCATION)
-	X-000	GENERAL DRAWINGS SCHEMATIC DRAWINGS SITE DRAWINGS YARD PIPING DRAWINGS
A	XA000	EXISTING PUMP STATION 14
B	XB000	EXISTING PUMP STATION 5
C	XC000	PUMP STATION 5 & 14 BUILDING
D	XD000	BACKWASH TANK
E	XE000	CHEMICAL BUILDING
F	XF000	WELL CONDOS
Z	XZ000	DETAILS

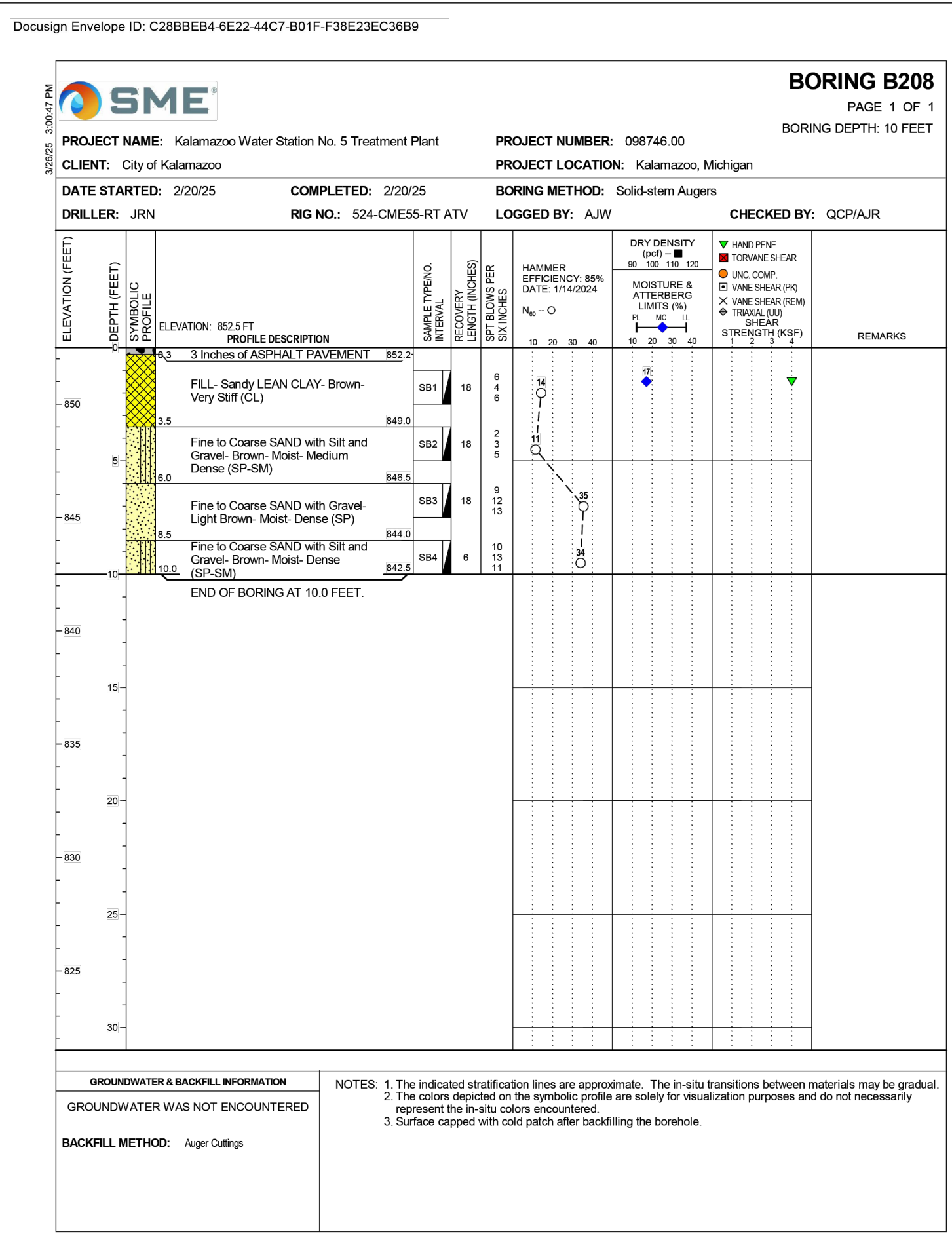
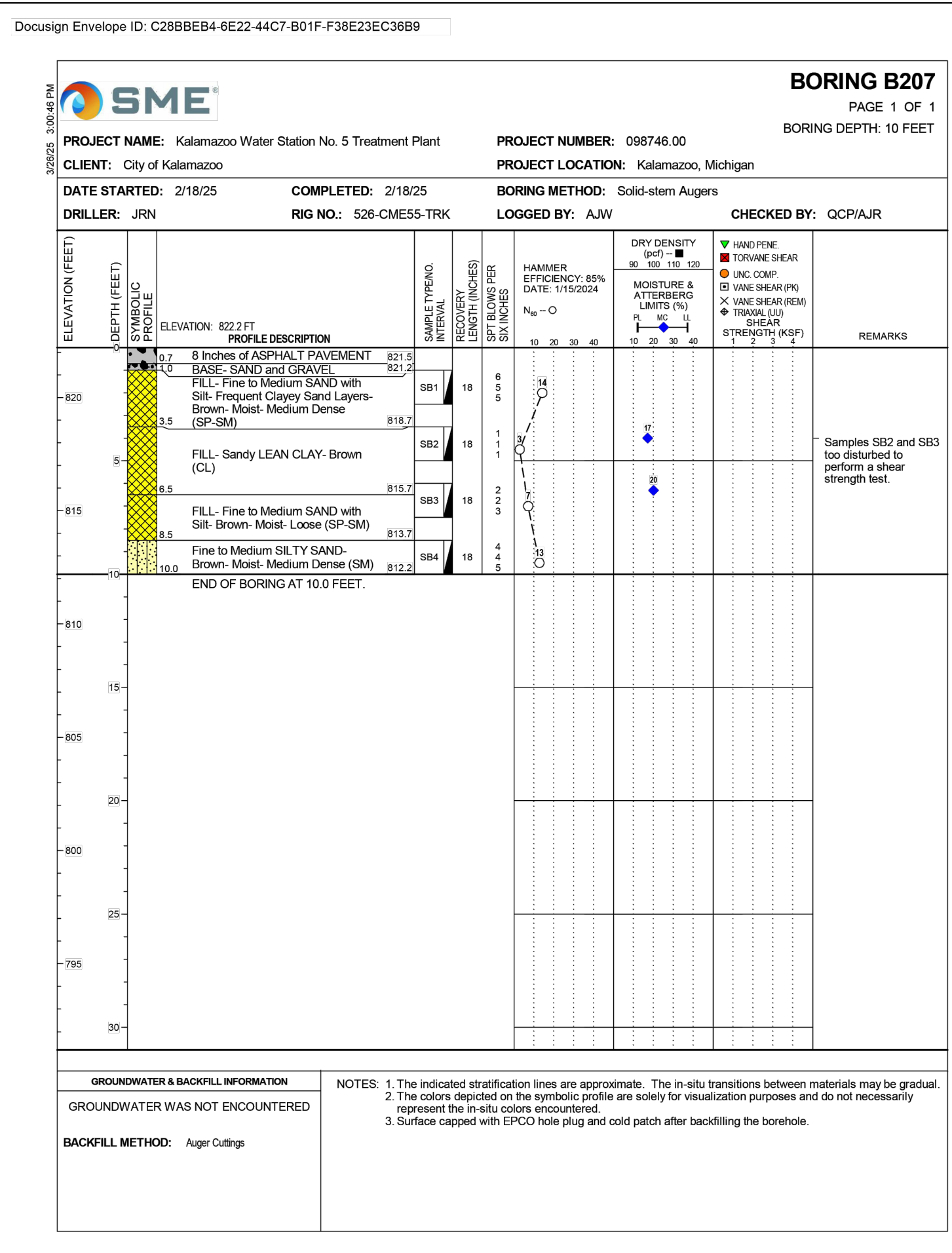
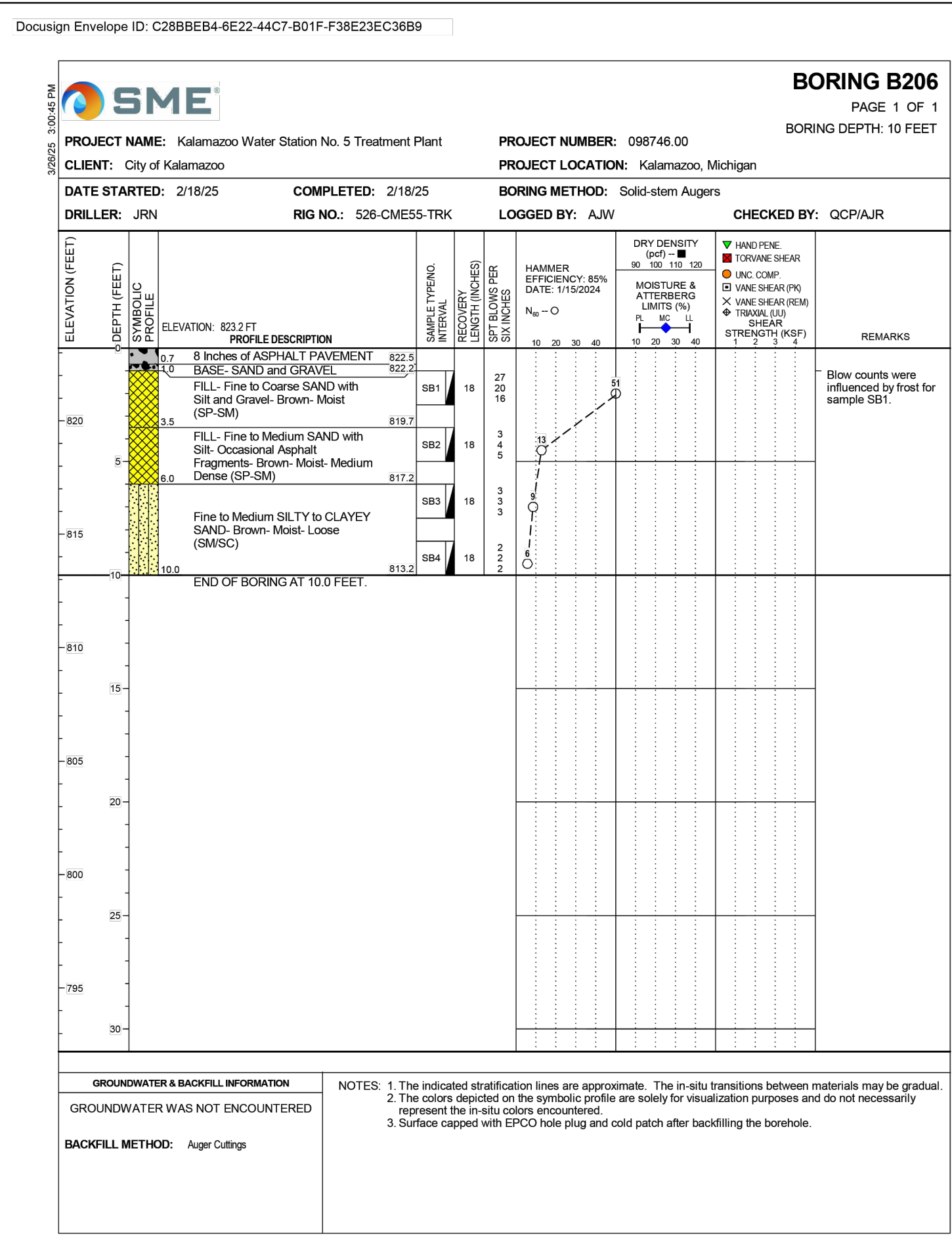
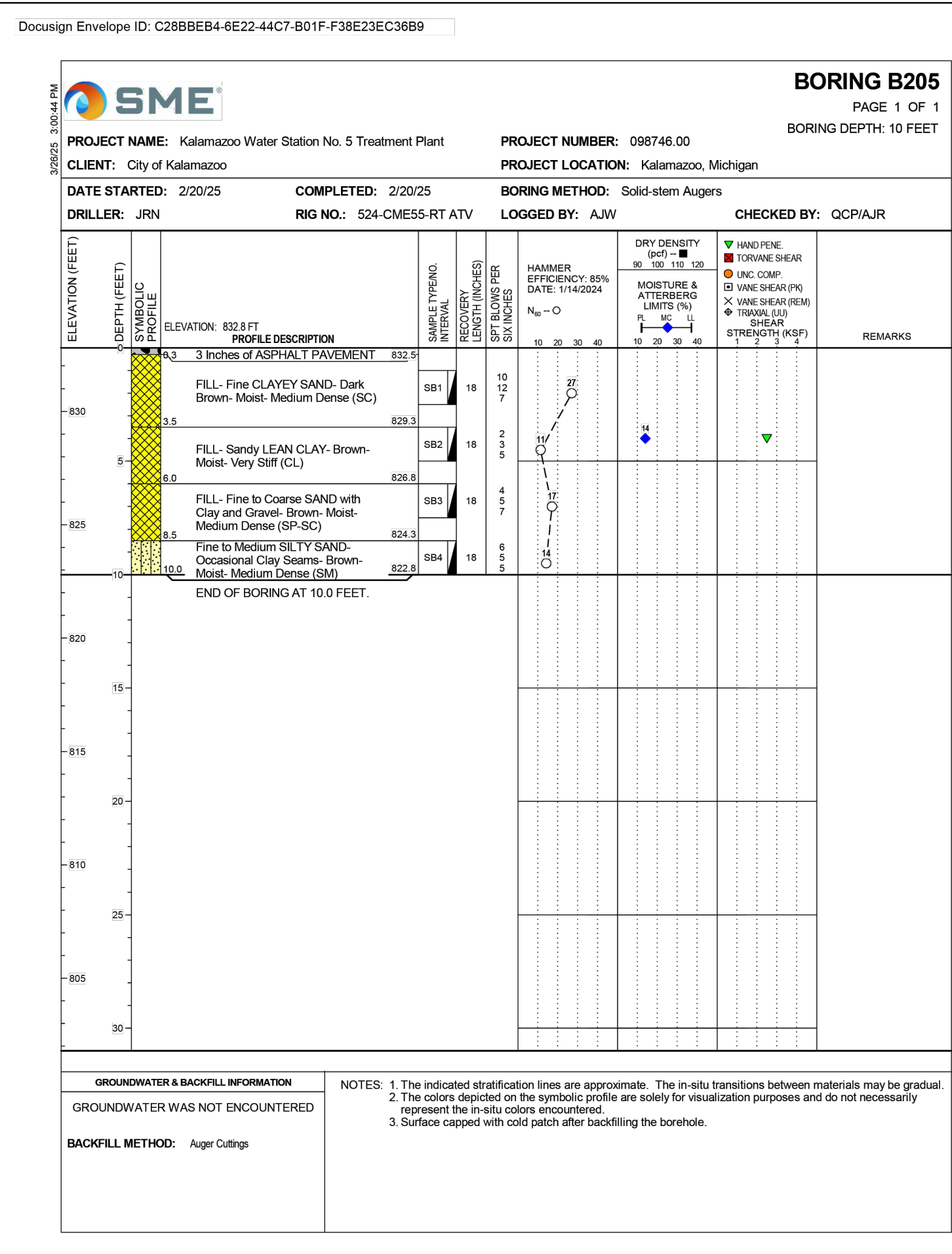
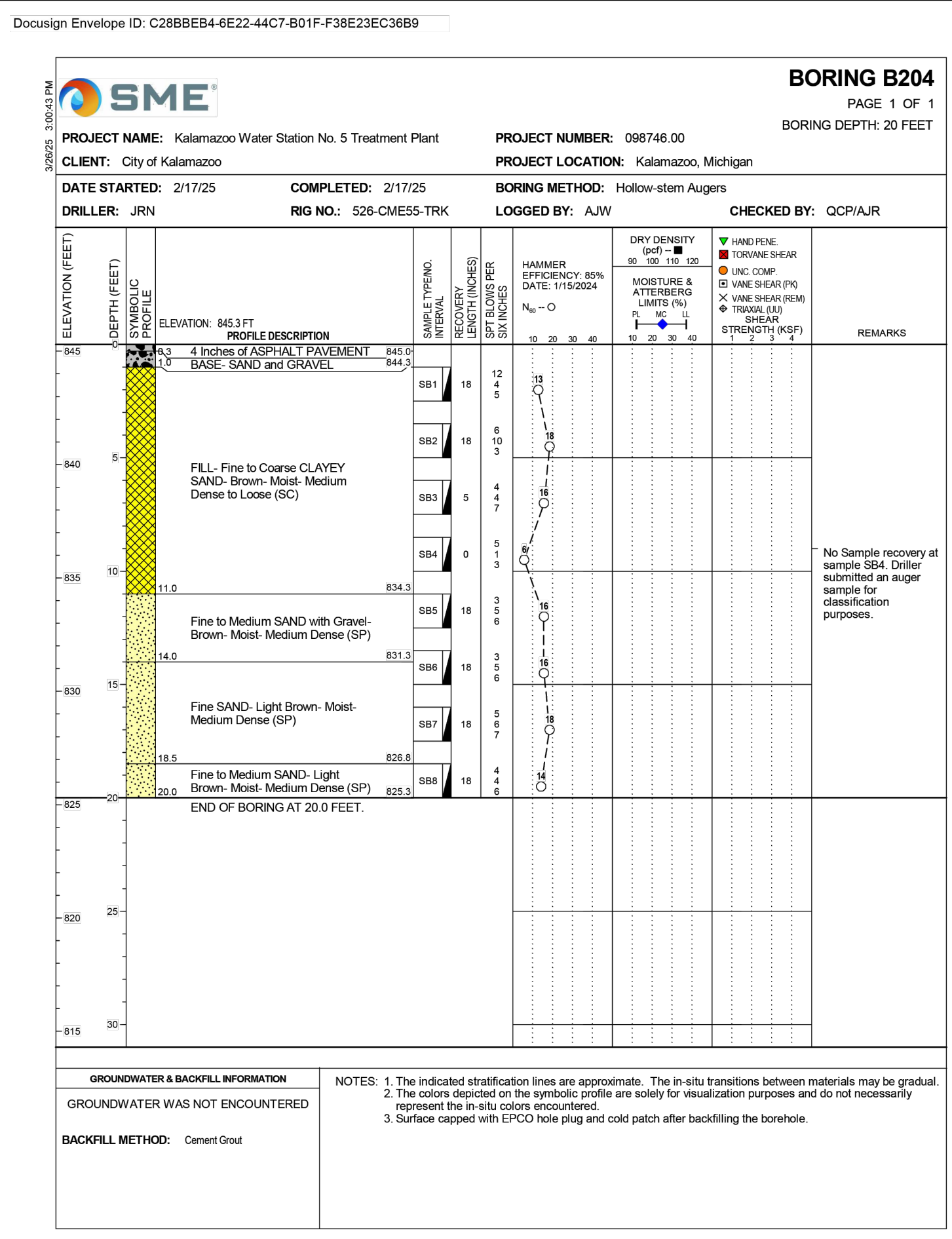
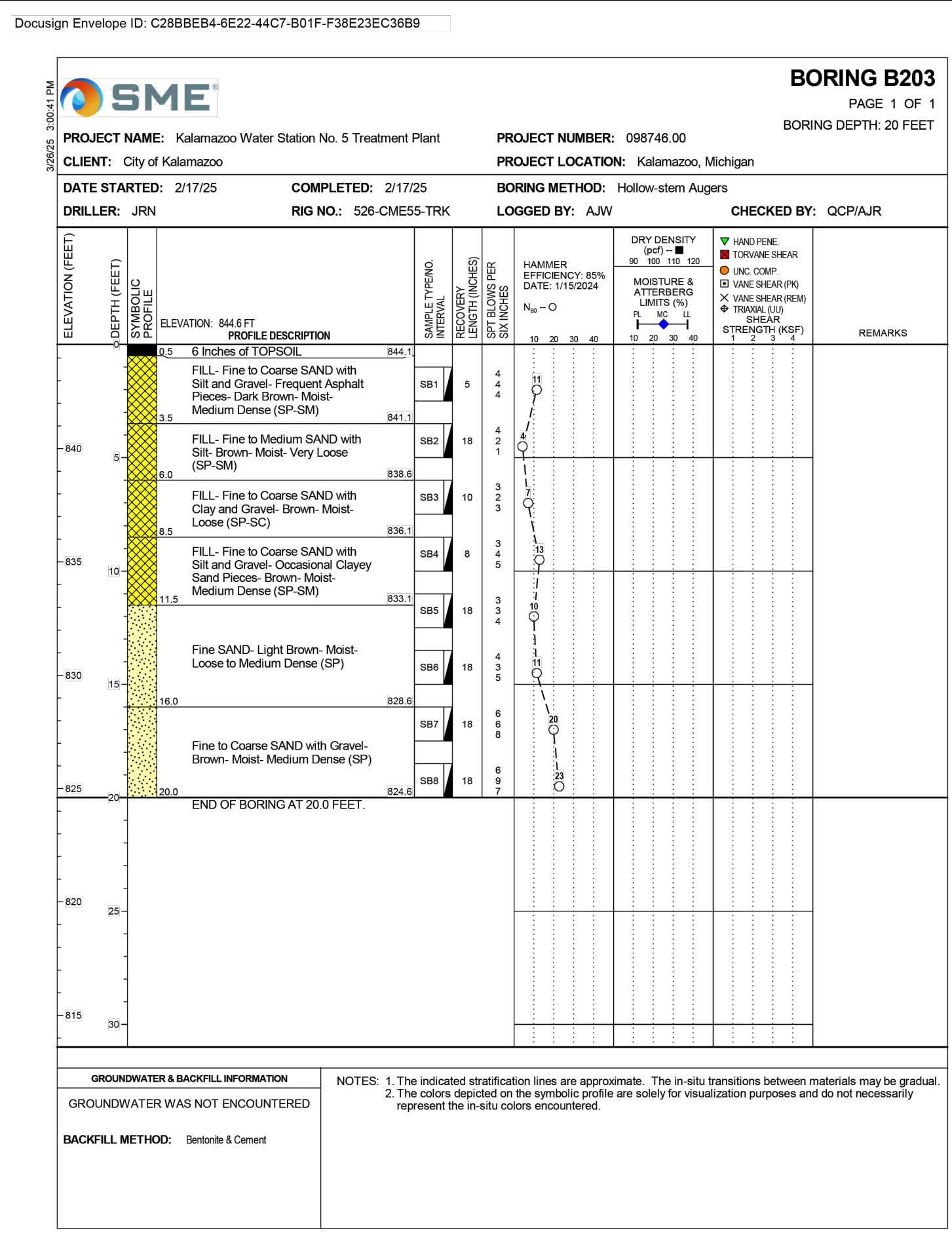
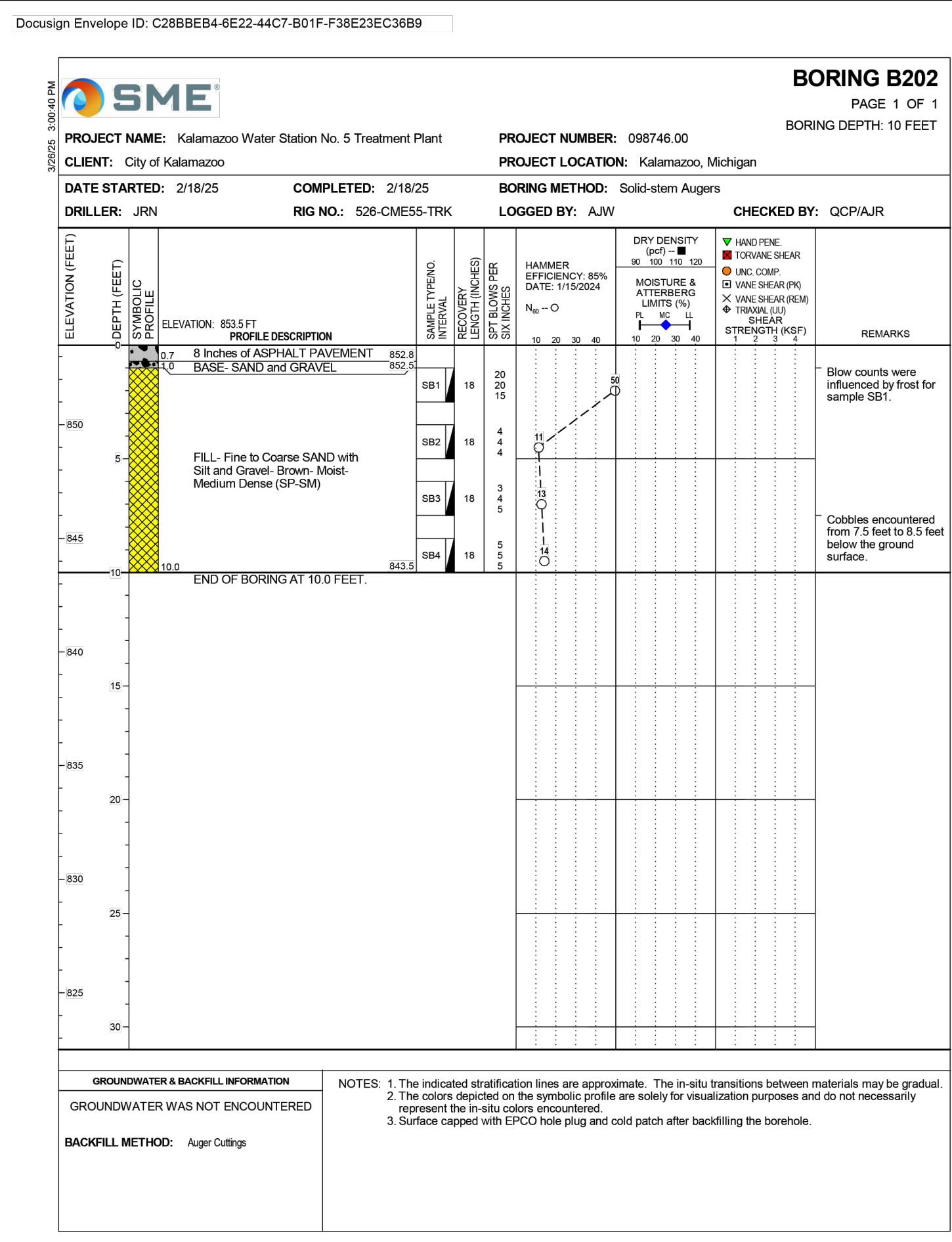
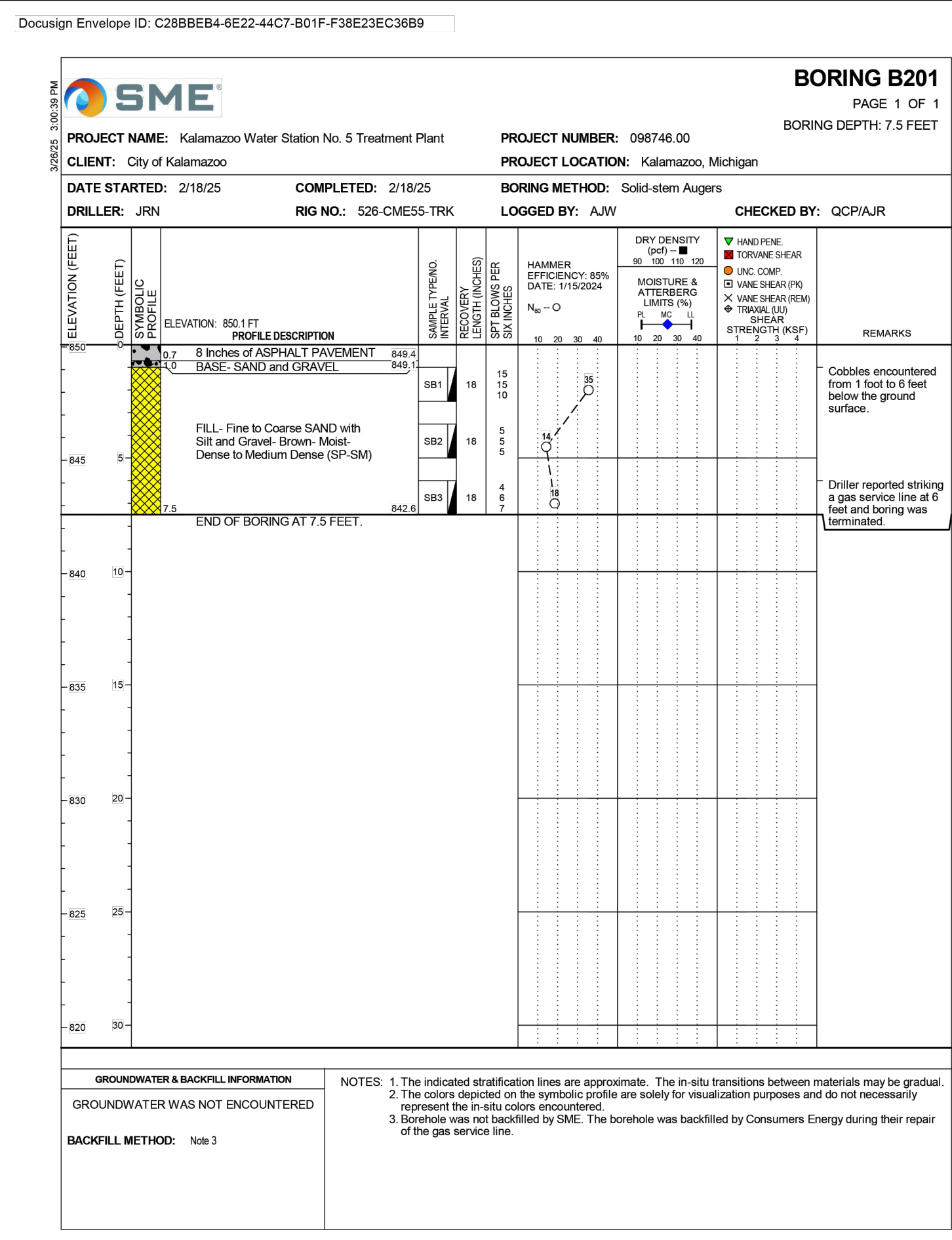
VIEW TYPE		
TYPE	SHEET SERIES	DESCRIPTION
0	000	GENERAL
1	100	PLAN VIEWS
2	200	ELEVATIONS
3	300	SECTIONS
4	400	LARGE-SCALE VIEWS
5	500	DETAILS
6	600	SCHEDULES, DIAGRAMS, AND CONTROLS
8	800	3D PERSPECTIVES, ISOMETRICS, AND PHOTOGRAPHS
9	900	DEMOLITION

REFERENCE SYMBOLS

SECTION REFERENCE		DENOTES SECTION LETTER IDENTIFICATION
SECTION/DETAIL REFERENCE		DENOTES SECTION/DETAIL LETTER IDENTIFICATION
DETAIL REFERENCE		DENOTES SECTION/DETAIL IS LOCATED
SECTION REFERENCE		DENOTES SHEET NUMBER WHERE SECTION IS LOCATED
SECTION/DETAIL REFERENCE		DENOTES SHEET NUMBER WHERE SECTION/DETAIL IS LOCATED
DETAIL REFERENCE		DENOTES SHEET NUMBER WHERE DETAIL IS LOCATED
SECTION REFERENCE		DENOTES SECTION NUMBER IDENTIFICATION
SECTION/DETAIL REFERENCE		DENOTES SECTION/DETAIL IS LOCATED
DETAIL REFERENCE		DENOTES SHEET NUMBER WHERE DETAIL IS LOCATED

TETRA TECH
www.tetra.tech.com
1136 OAK VALLEY DRIVE, SUITE 100
ANN ARBOR, MI 48108
PHONE: (734) 665-6000

4/28/2025 9:58:29 AM - C:\ADACCC\SETTECH\INC\200-19743-24012\KZOO\PS5 AND PS4\PROJECT FILES\CAD\SHEETFILES\CONTRACT 1G-003 SOIL BORINGS DWG - HOLLENBECK, TODD



TETRA TECH
www.tetra-tech.com
1136 OAK VALLEY DRIVE, SUITE 100
ANN ARBOR, MI 48108
PHONE: (734) 665-6000 FAX: (734) 213-3003

CITY OF KALAMAZOO, MICHIGAN
PUMP STATION 5 & 14
WATER AND TRANSMISSION MAIN, CONTRACT 1
SOIL BORINGS

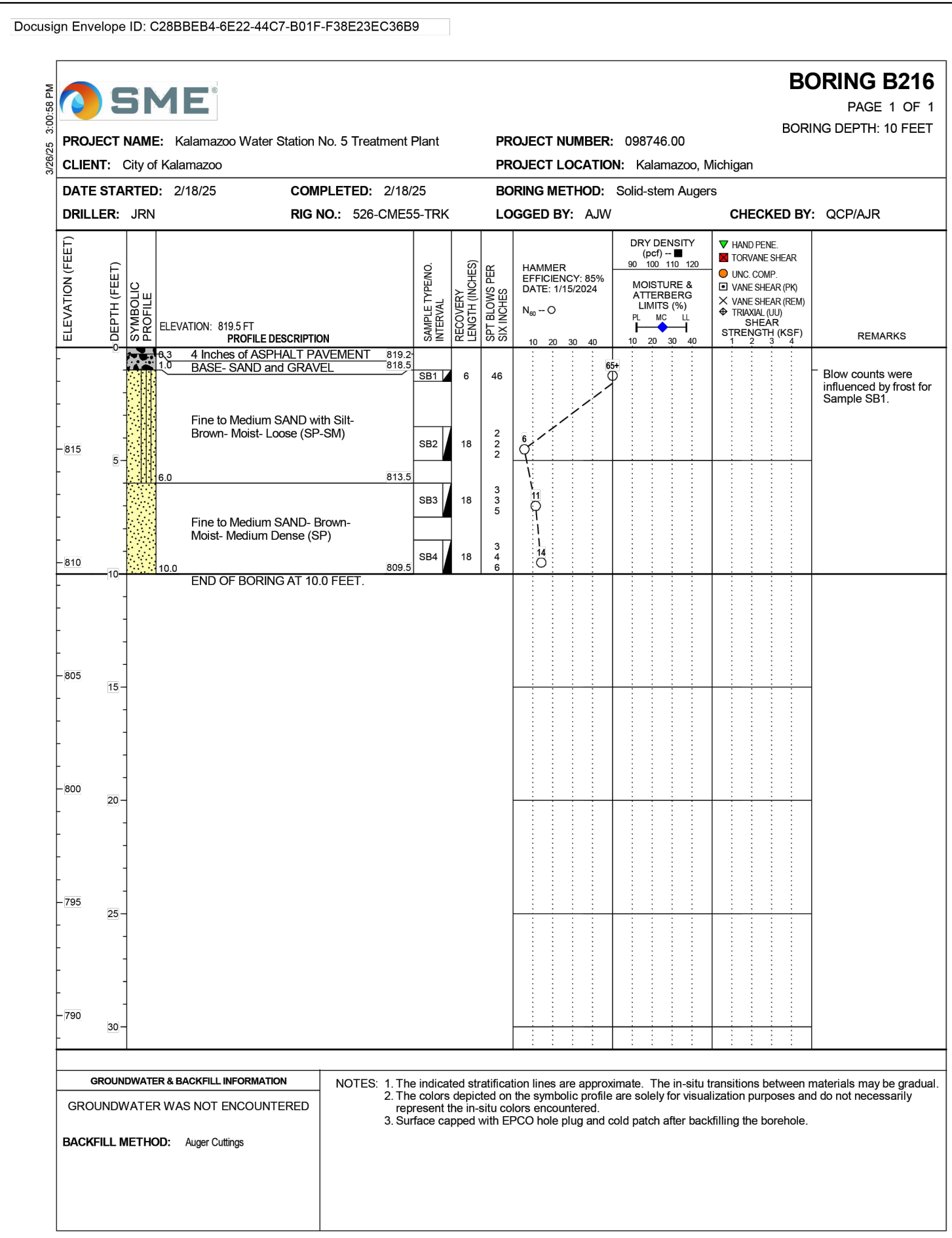
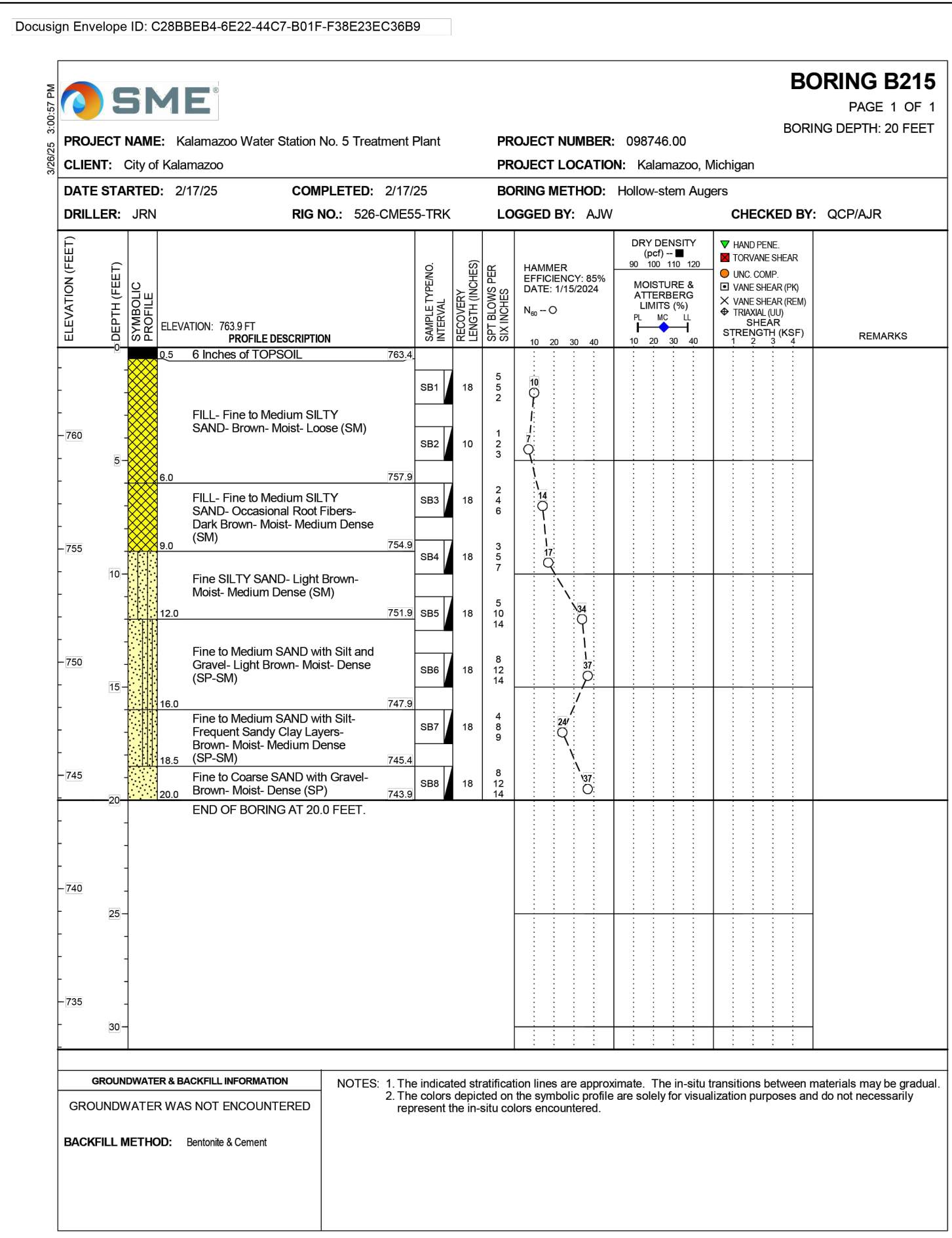
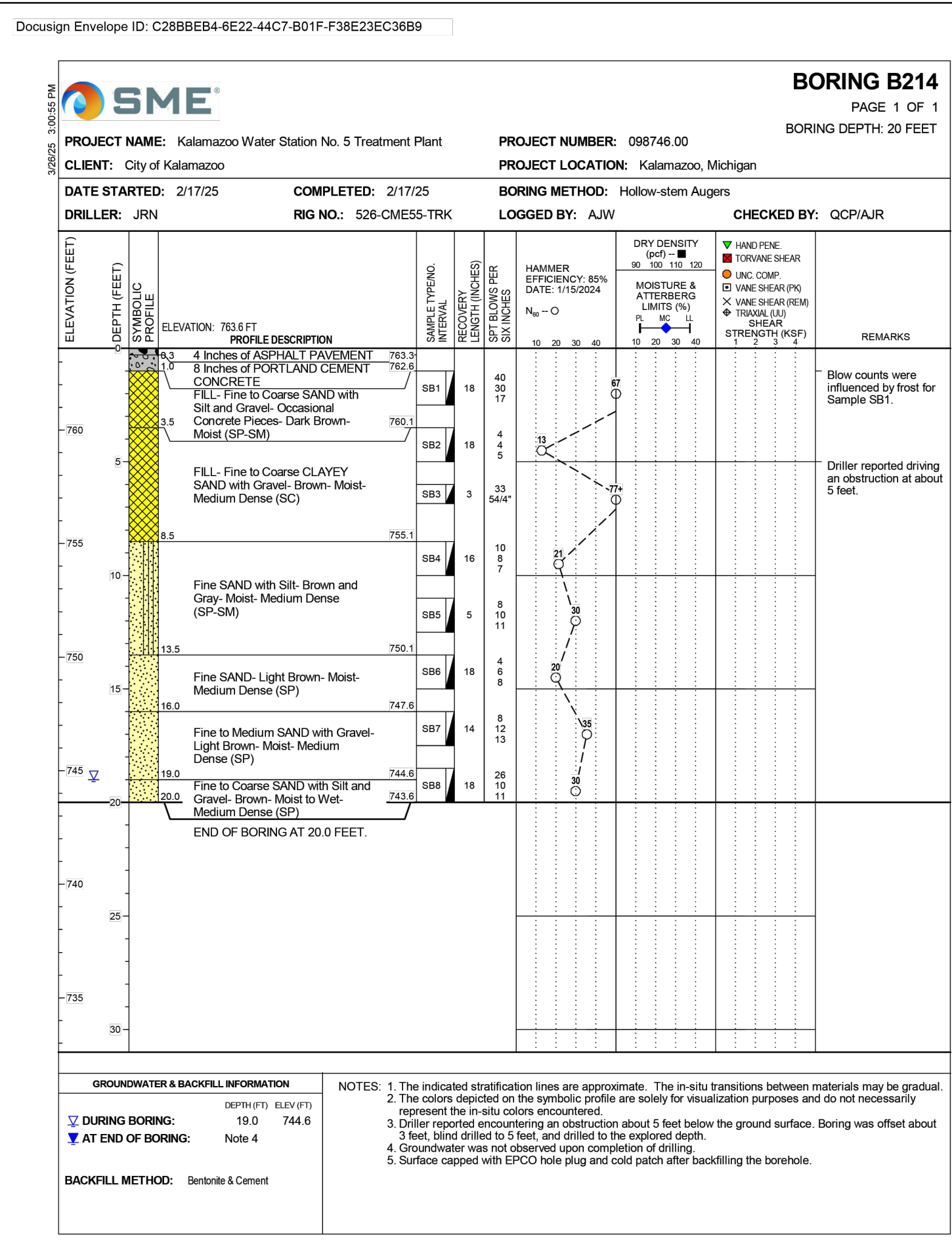
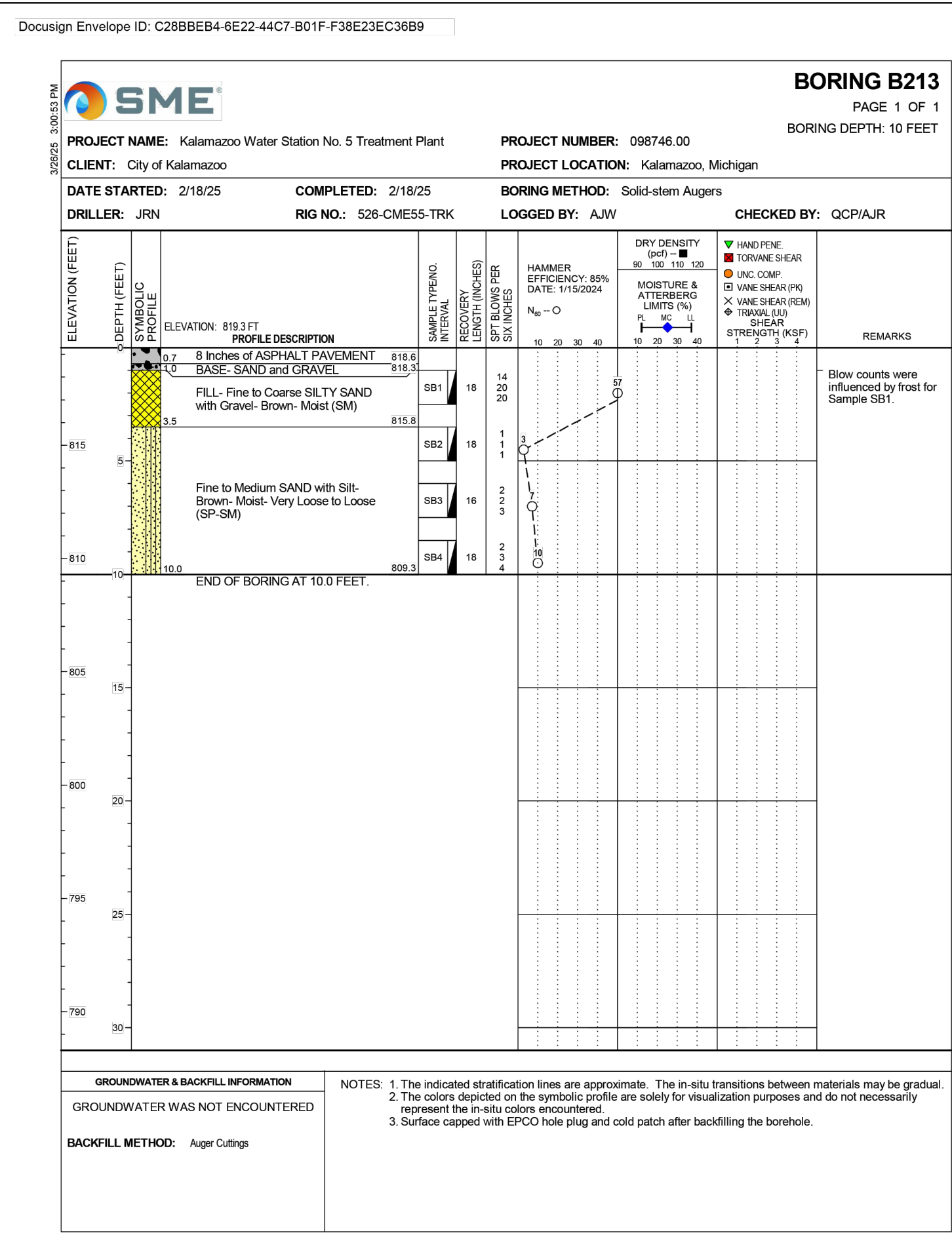
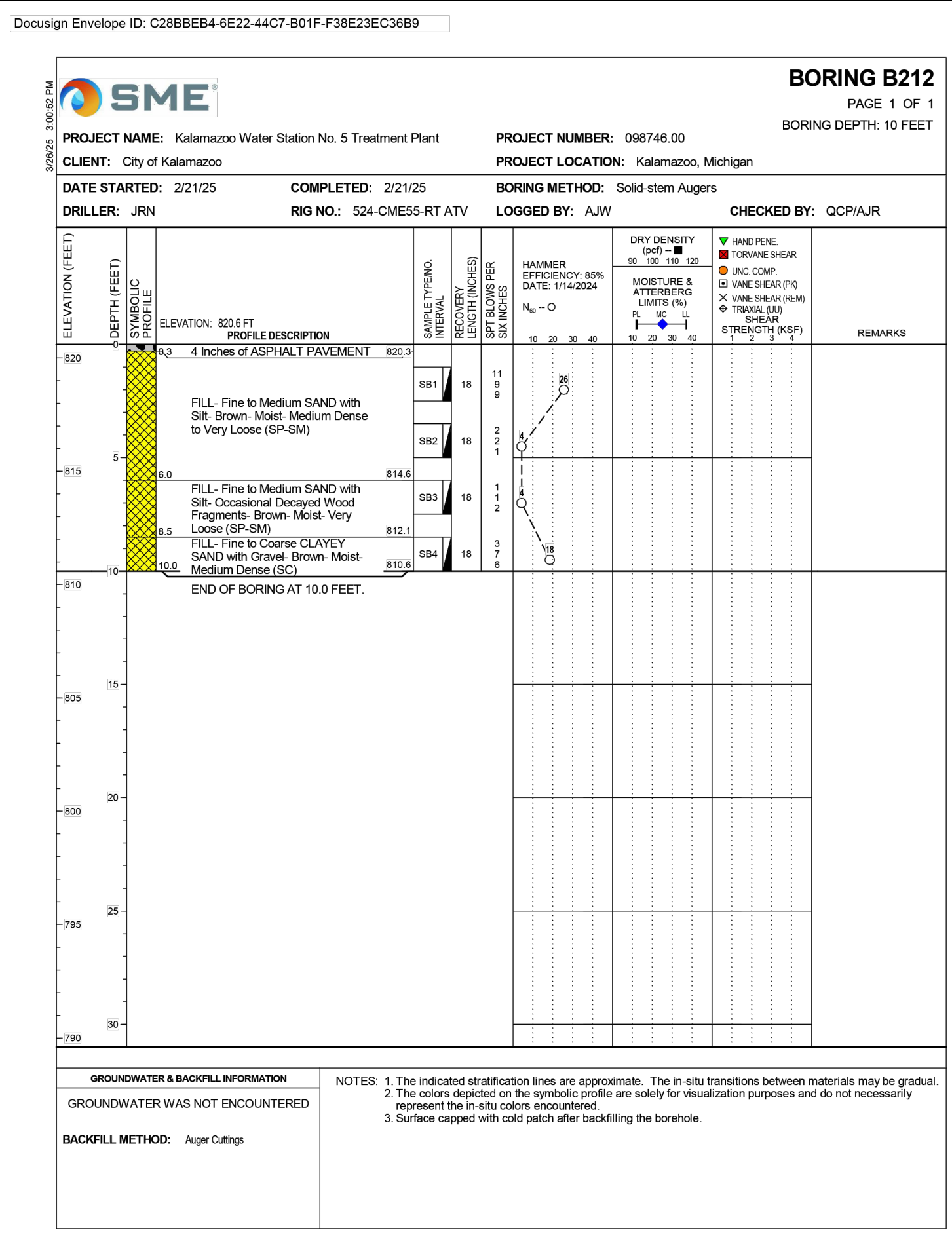
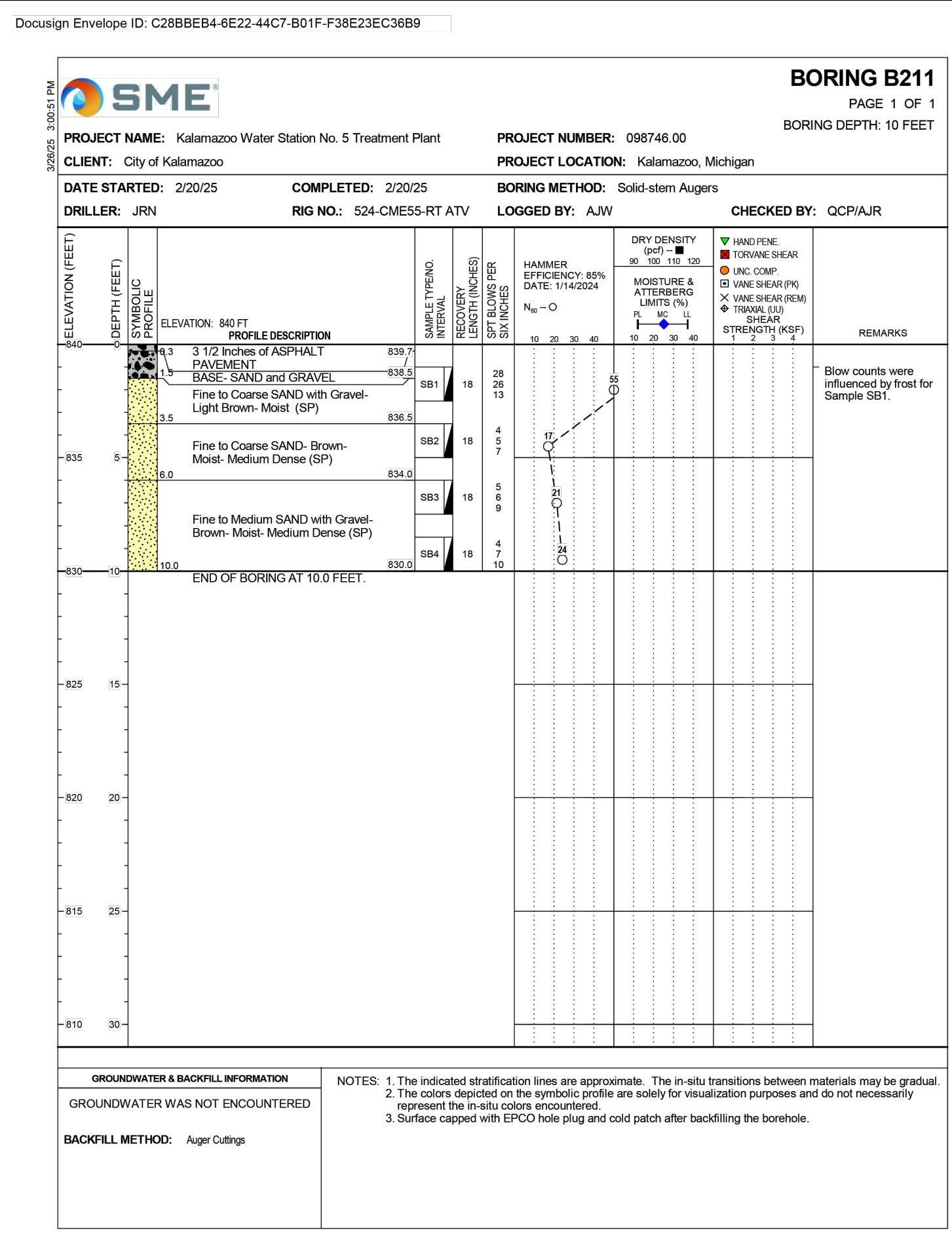
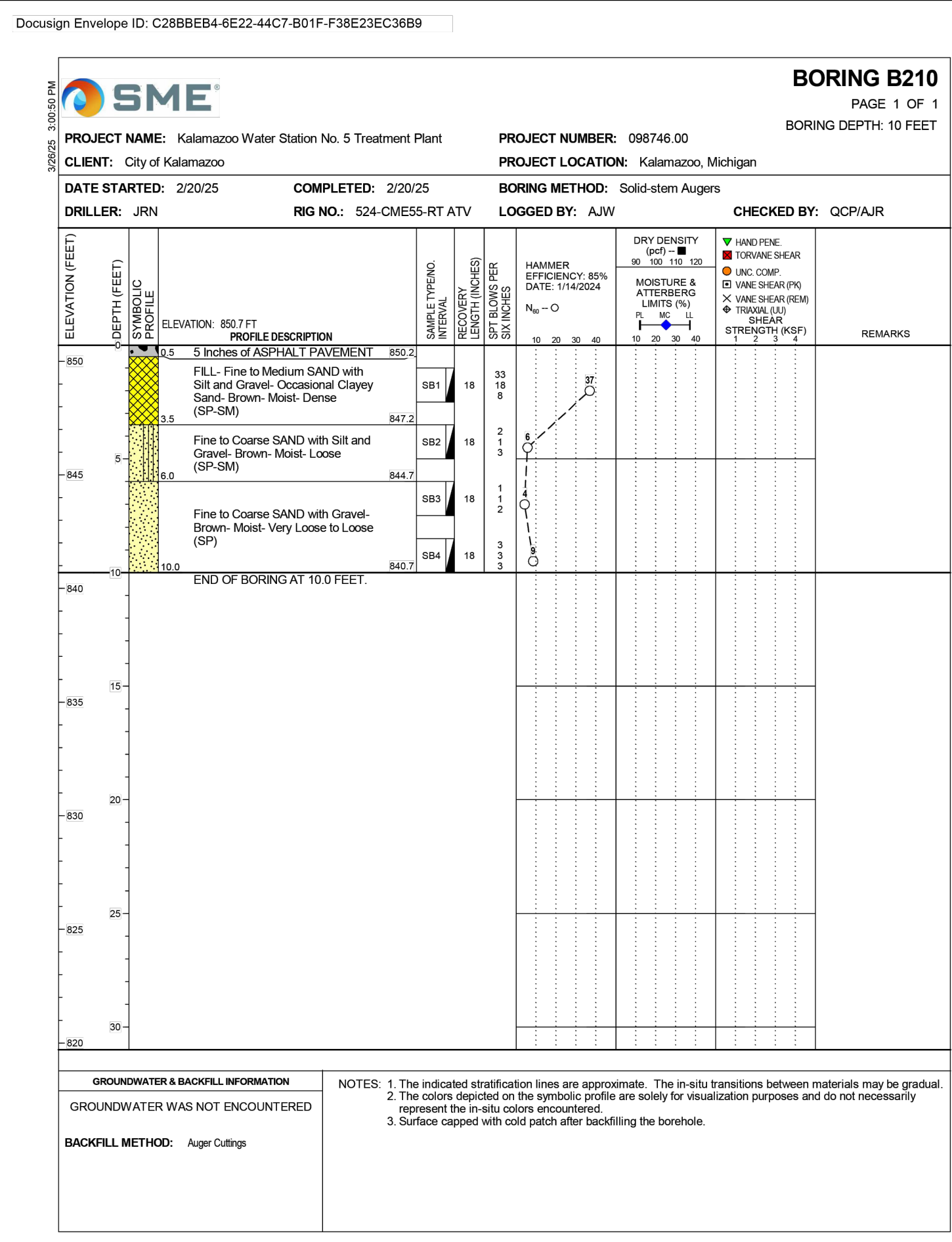
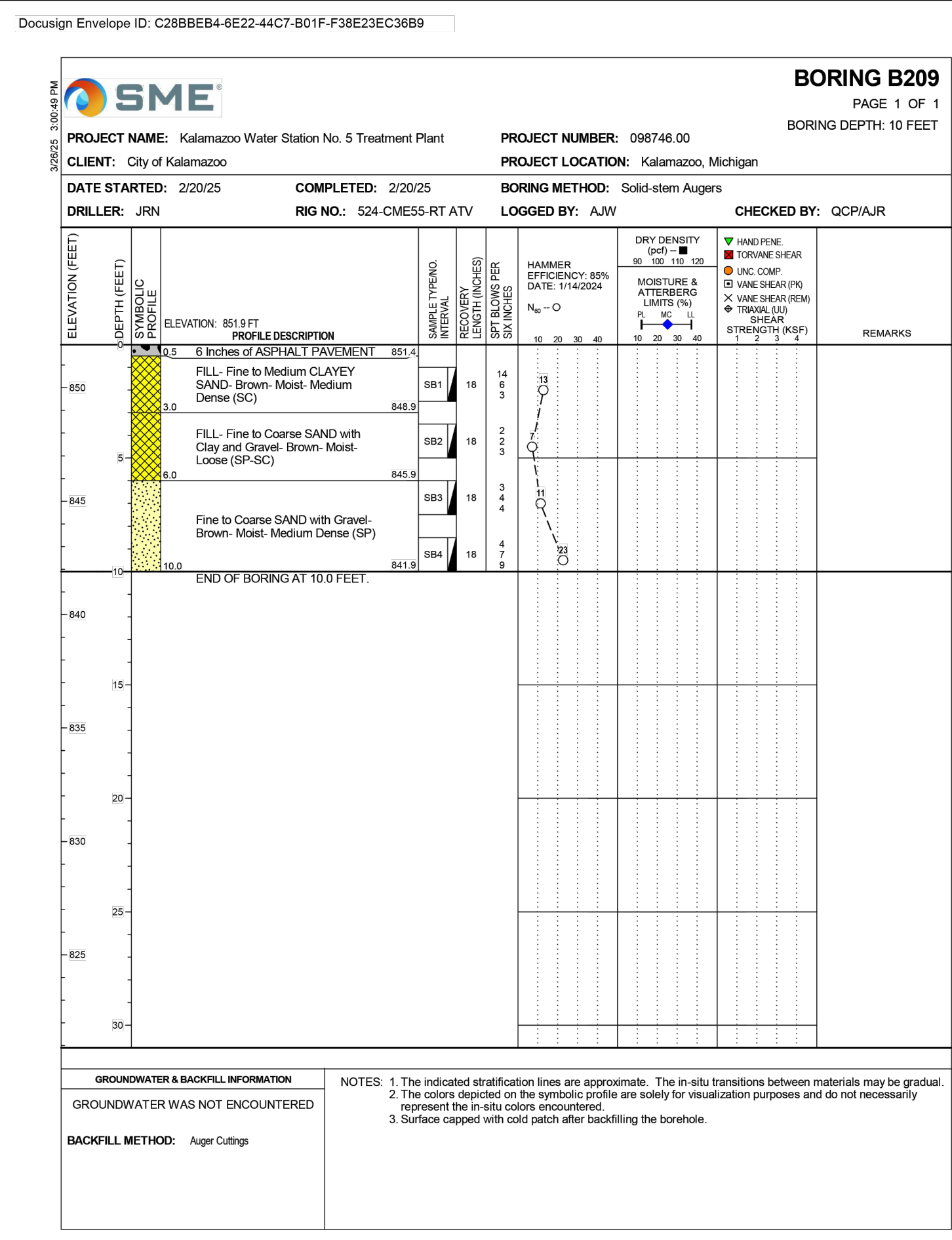
MARK	DATE	DESCRIPTION
	05/01/25	ISSUED FOR BIDS

PROJ: 200-19743-24012
DES: M. TEITSMA
DRWN: N. KARLL
CHKD:

G-004

Copyright: Tetra Tech

4/28/2025 9:58:44 AM - C:\ADACCDC\TETRA TECH INC\200-19743-24012 KZOO PSS AND PS\4\PROJECT FILES\CAD\SHETS\CONTRACT 1G-003 SOIL BORINGS DWG - HOLLENBECK, TODD



TETRA TECH
www.tetra.tech.com
1136 OAK VALLEY DRIVE, SUITE 100
ANN ARBOR, MI 48108
PHONE: (734) 665-6000 FAX: (734) 213-3003

BY: _____

MARK DATE DESCRIPTION
05/01/25 ISSUED FOR BIDS

CITY OF KALAMAZOO, MICHIGAN
PUMP STATION 5 & 14
WATER AND TRANSMISSION MAIN, CONTRACT 1
SOIL BORINGS

PROJ: 200-19743-24012
DES: M. TEITSMA
DRWN: N. KARLL
CHKD: _____

G-005

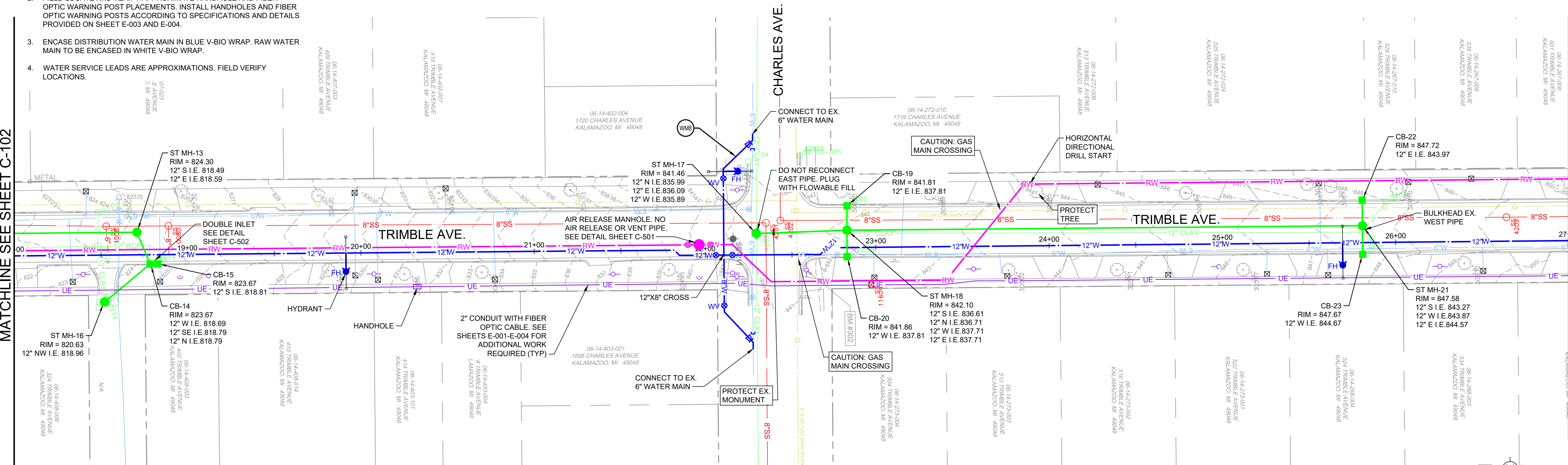
Copyright: Tetra Tech

4/28/2025 9:28:19 AM - C:\ADACDC\DCS\TETRA TECH\INC\200-19743-24012\KZOO\PS5 AND PS4\PROJECT FILES\CAD\DWG\CONTRACT 1C-10X PLAN PROFILE.DWG - HOLLENBECK, TODD

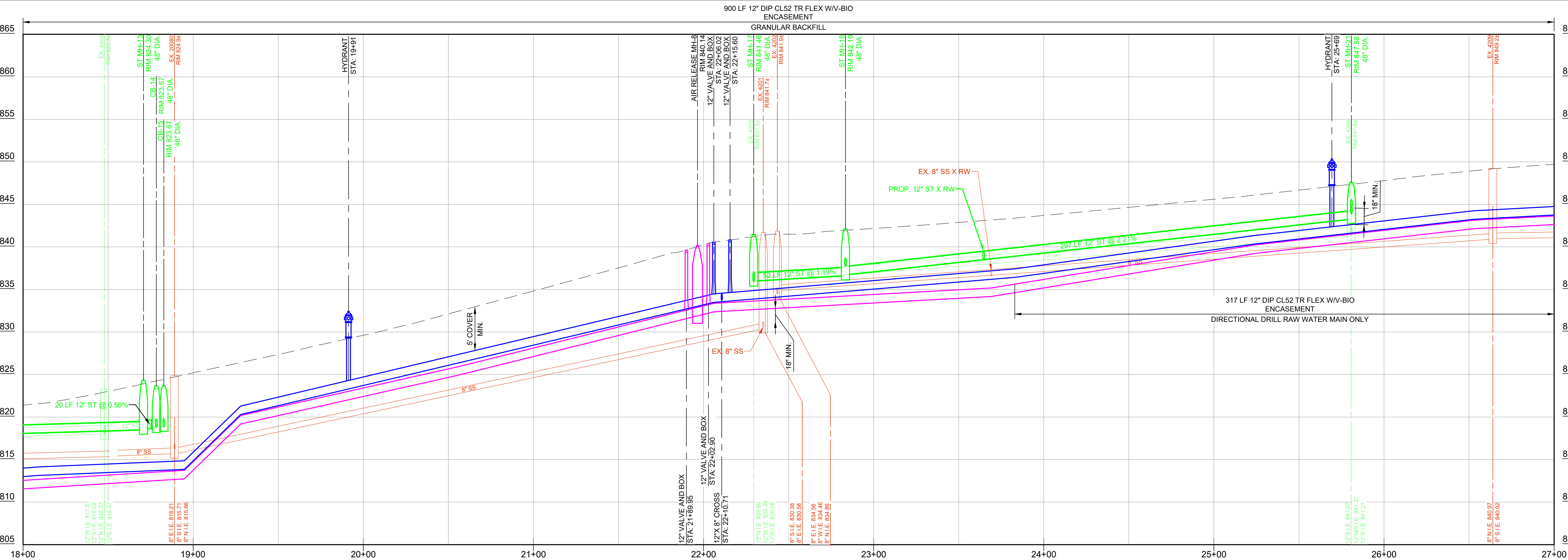
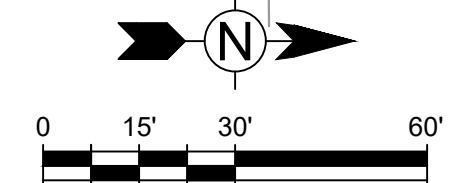
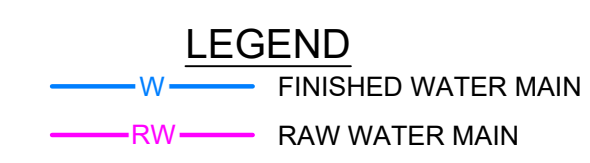
- NOTES:
1. INSTALLATION OF 2-INCH CONDUIT SHALL FOLLOW SPECIFICATIONS AND INSTRUCTIONS PROVIDED IN ELECTRICAL SHEETS.
 2. FIELD LOCATE AND VERIFY APPROXIMATE HANDHOLE AND FIBER OPTIC WARNING POST PLACEMENTS. INSTALL HANDHOLES AND FIBER OPTIC WARNING POSTS ACCORDING TO SPECIFICATIONS AND DETAILS PROVIDED ON SHEET E-003 AND E-004.
 3. ENCASE DISTRIBUTION WATER MAIN IN BLUE V-BIO WRAP. RAW WATER MAIN TO BE ENCASED IN WHITE V-BIO WRAP.
 4. WATER SERVICE LEADS ARE APPROXIMATIONS. FIELD VERIFY LOCATIONS.

MATCHLINE SEE SHEET C-102

MATCHLINE SEE SHEET C-104



PLAN VIEW
SCALE: 1" = 30' H



PROFILE VIEW
SCALE: 1" = 30' H 1" = 6" V



MARK	DATE	DESCRIPTION
	05/01/25	ISSUED FOR BIDS

CITY OF KALAMAZOO, MICHIGAN
PUMP STATION 5 & 14
WATER AND TRANSMISSION MAIN, CONTRACT 1
**PROPOSED WATER MAIN
PLAN AND PROFILE
STA. 18+00 TO 27+00**

PROJ:	200-19743-24012
DESIGN:	D. WARREN
DRWN:	T. HOLLENBECK
CHKD:	S. BYRNE

C-103

Bar Measures 1 inch, otherwise drawing not to scale

Copyright: Tetra Tech

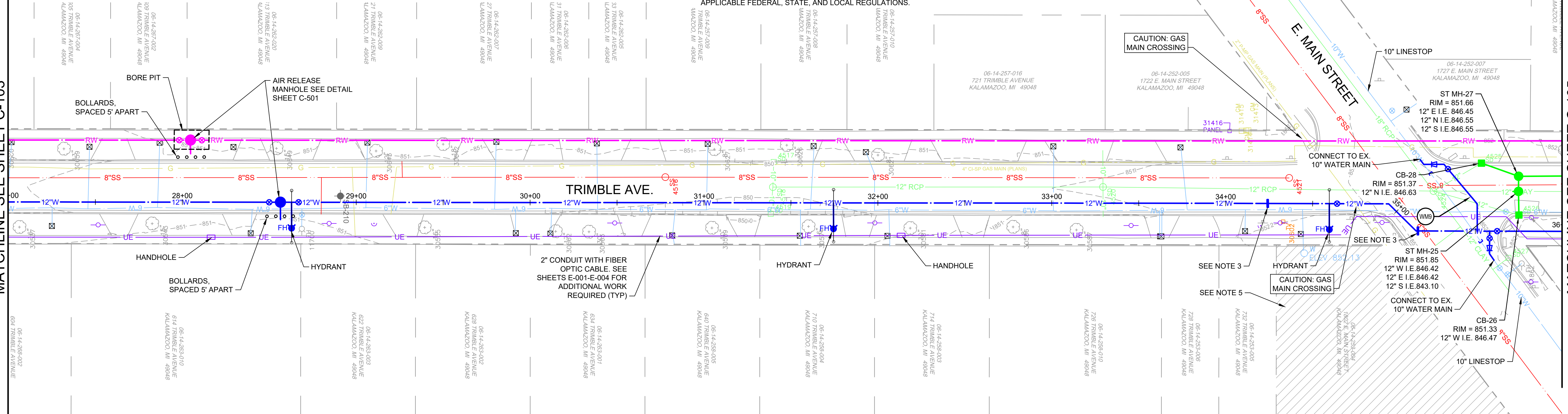
4/28/2025 9:28:40 AM - C:\ADACDC\TETRA TECH\INC\200-19743-24012\KZOO PSS AND PS14\PROJECT FILES\CADD\SHEETFILES\CONTRACT 1C-10X PLAN PROFILE.DWG - HOLLENBECK, TODD

- NOTES:
- INSTALLATION OF 2-INCH CONDUIT SHALL FOLLOW SPECIFICATIONS AND INSTRUCTIONS PROVIDED IN ELECTRICAL SHEETS.
 - FIELD LOCATE AND VERIFY APPROXIMATE HANDHOLE AND FIBER OPTIC WARNING POST PLACEMENTS. INSTALL HANDHOLES AND FIBER OPTIC WARNING POSTS ACCORDING TO SPECIFICATIONS AND DETAILS PROVIDED ON SHEET E-003 AND E-004.
 - 1802 E. MAIN STREET IS A CONTAMINATED SITE, CLASSIFIED AS ELEMENTS/METALS/OTHER INORGANICS, PETROLEUM VOLATILE AND SEMI VOLATILE ORGANIC COMPOUNDS. USE WATER MAIN TRENCH DAM. SEE DETAIL. PROVIDE ENVIRONMENTAL JOINTS ON WATER MAIN LENGTHS BETWEEN TRENCH DAMS AS DIRECTED BY ENGINEER, STA. 34+26 TO 35+20
 - ENCASE DISTRIBUTION WATER MAIN IN BLUE V-BIO WRAP. RAW WATER MAIN TO BE ENCASED IN WHITE V-BIO WRAP.
 - WATER SERVICE LOCATIONS ARE APPROXIMATIONS. FIELD VERIFY LOCATIONS.

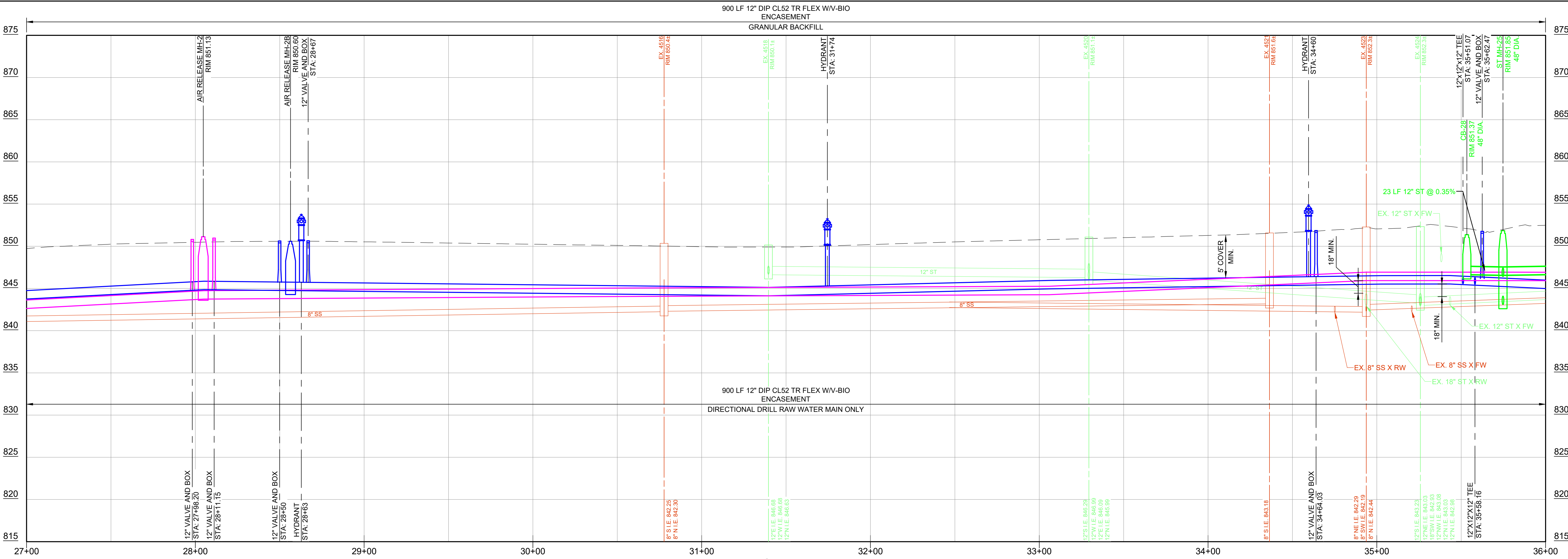
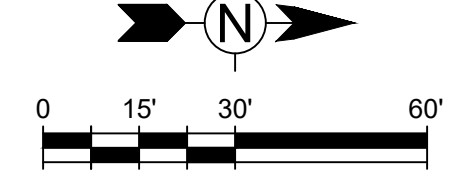
- NECESSARY PRECAUTIONS SHALL BE TAKEN WHILE WORK IS BEING PERFORMED TO ENSURE APPROPRIATE DUE CARE MEASURES ARE PURSUANT TO SECTION 20107A AND/OR 21304C OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT (NREPA), ACT 451, AS AMENDED. IN AREAS OF SOIL OR GROUNDWATER CONTAMINATION, THE USE OF PLASTIC PIPING FOR WATERMAIN AND ASSOCIATED FITTINGS ARE NOT PERMITTED. DUCTILE IRON PIPE IS THE PREVAILING MATERIAL. HYDRANT ASSEMBLIES SHALL HAVE PLUGGED WEEP HOLES TO ELIMINATE POSSIBLE CONTAMINATION SEEPAGE. ANY CONTAMINATED SOIL OR GROUNDWATER ENCOUNTERED DURING THE CONSTRUCTION OF THIS PROJECT SHALL BE MANAGED AND/OR DISPOSED OF IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.

MATCHLINE SEE SHEET C-103

MATCHLINE SEE SHEET C-105



PLAN VIEW
SCALE: 1" = 30' H



PROFILE VIEW
SCALE: 1" = 30' H 1" = 6' V



www.tetratech.com
1136 OAK VALLEY DRIVE, SUITE 100
ANN ARBOR, MI 48108
PHONE: (734) 665-6000 FAX: (734) 219-3003

MARK	DATE	DESCRIPTION
	05/01/25	ISSUED FOR BIDS

CITY OF KALAMAZOO, MICHIGAN
PUMP STATION 5 & 14
WATER AND TRANSMISSION MAIN, CONTRACT 1
**PROPOSED WATER MAIN
PLAN AND PROFILE**
STA. 27+00 TO 36+00

PROJ: 200-19743-24012
DESN: D. WARREN
DRWN: T. HOLLENBECK
CHKD: S. BYRNE

C-104

Copyright Tetra Tech

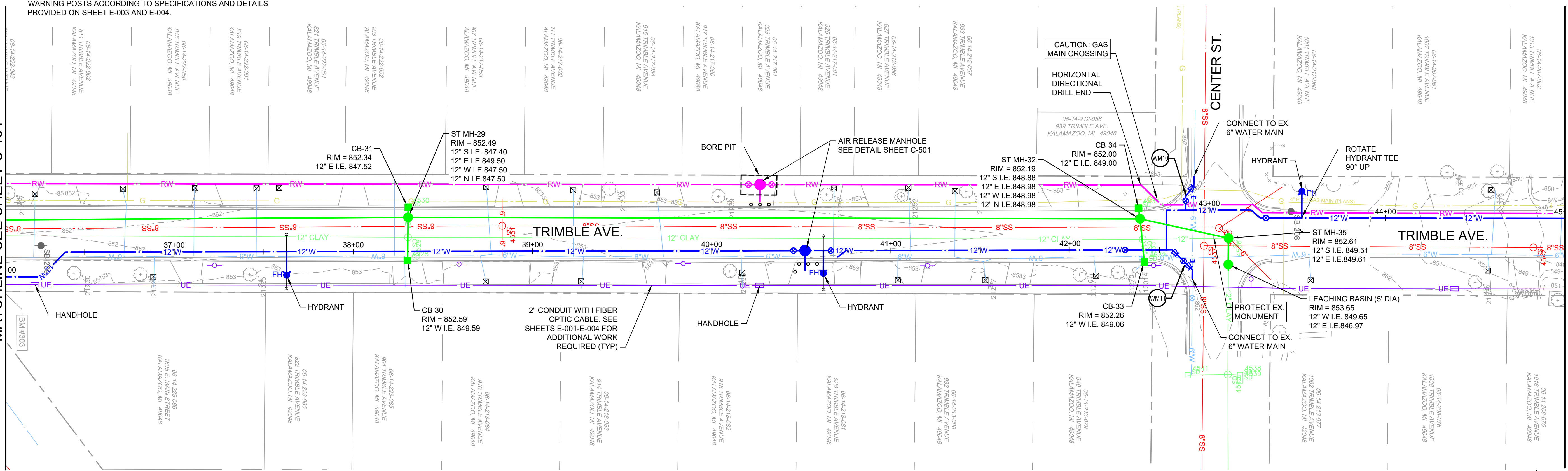
Bar Measures 1 inch, otherwise drawing not to scale

4/28/2025 9:29:01 AM - C:\ADACCD\CCSTETRA\TECH\INC\200-19743-24012\KZOO PSS AND PS14\PROJECT FILES\CADD\SHEETFILES\CONTRACT 1C-10X PLAN PROFILE.DWG - HOLLENBECK, TODD

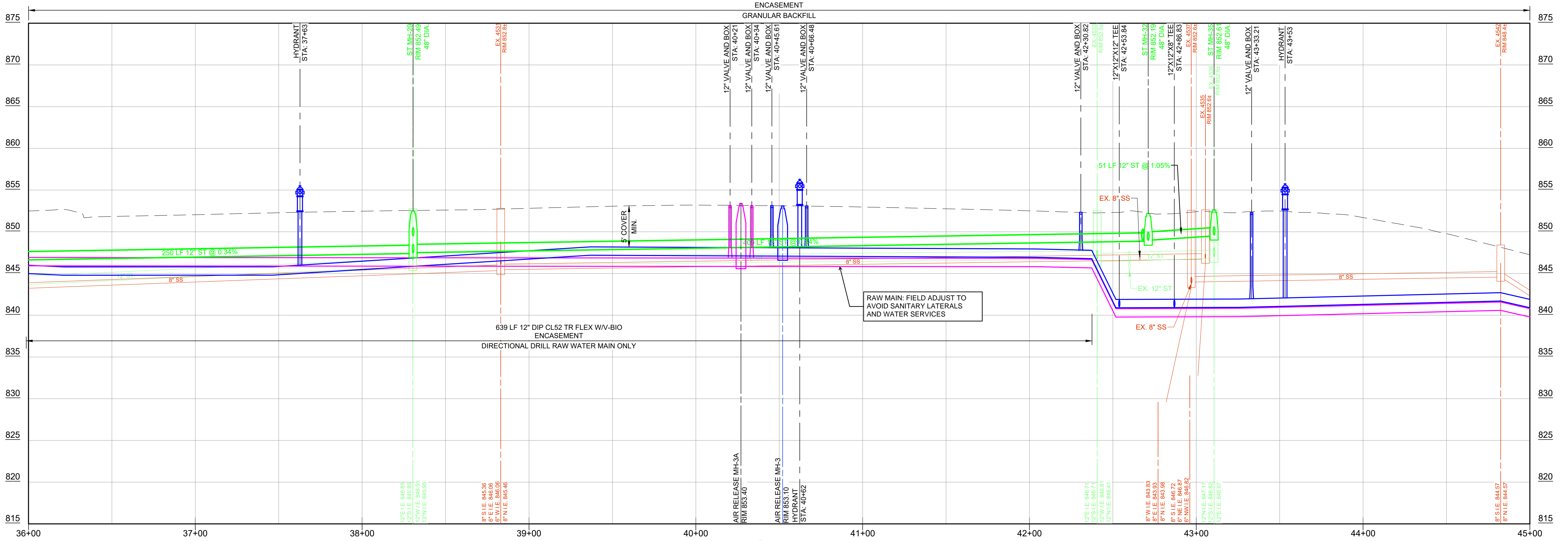
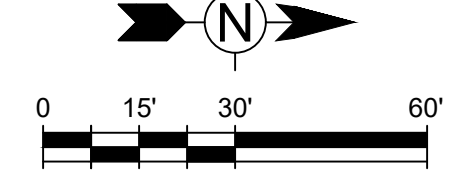
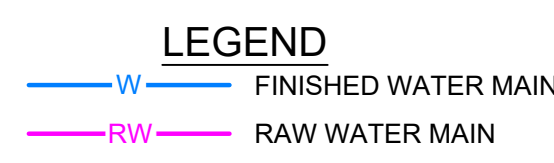
- NOTES:
- INSTALLATION OF 2-INCH CONDUIT SHALL FOLLOW SPECIFICATIONS AND INSTRUCTIONS PROVIDED IN ELECTRICAL SHEETS.
 - FIELD LOCATE AND VERIFY APPROXIMATE HANDHOLE AND FIBER OPTIC WARNING POST PLACEMENTS. INSTALL HANDHOLES AND FIBER OPTIC WARNING POSTS ACCORDING TO SPECIFICATIONS AND DETAILS PROVIDED ON SHEET E-003 AND E-004.
 - ENCASE DISTRIBUTION WATER MAIN IN BLUE V-BIO WRAP. RAW WATER MAIN TO BE ENCASED IN WHITE V-BIO WRAP.
 - WATER SERVICE LOCATIONS ARE APPROXIMATIONS. FIELD VERIFY LOCATIONS.

MATCHLINE SEE SHEET C-104

MATCHLINE SEE SHEET C-106



PLAN VIEW
SCALE: 1" = 30' H



PROFILE VIEW
SCALE: 1" = 30' H 1" = 6' V



www.tetratech.com
1136 OAK VALLEY DRIVE, SUITE 100
ANN ARBOR, MI 48108
PHONE: (734) 665-6000 FAX: (734) 219-3003

MARK	DATE	DESCRIPTION
	05/01/25	ISSUED FOR BIDS

CITY OF KALAMAZOO, MICHIGAN
PUMP STATION 5 & 14
WATER AND TRANSMISSION MAIN, CONTRACT 1
**PROPOSED WATER MAIN
PLAN AND PROFILE
STA. 36+00 TO 45+00**

PROJ: 200-19743-24012
DES: D. WARREN
DRWN: T. HOLLENBECK
CHKD: S. BYRNE

C-105

Copyright: Tetra Tech

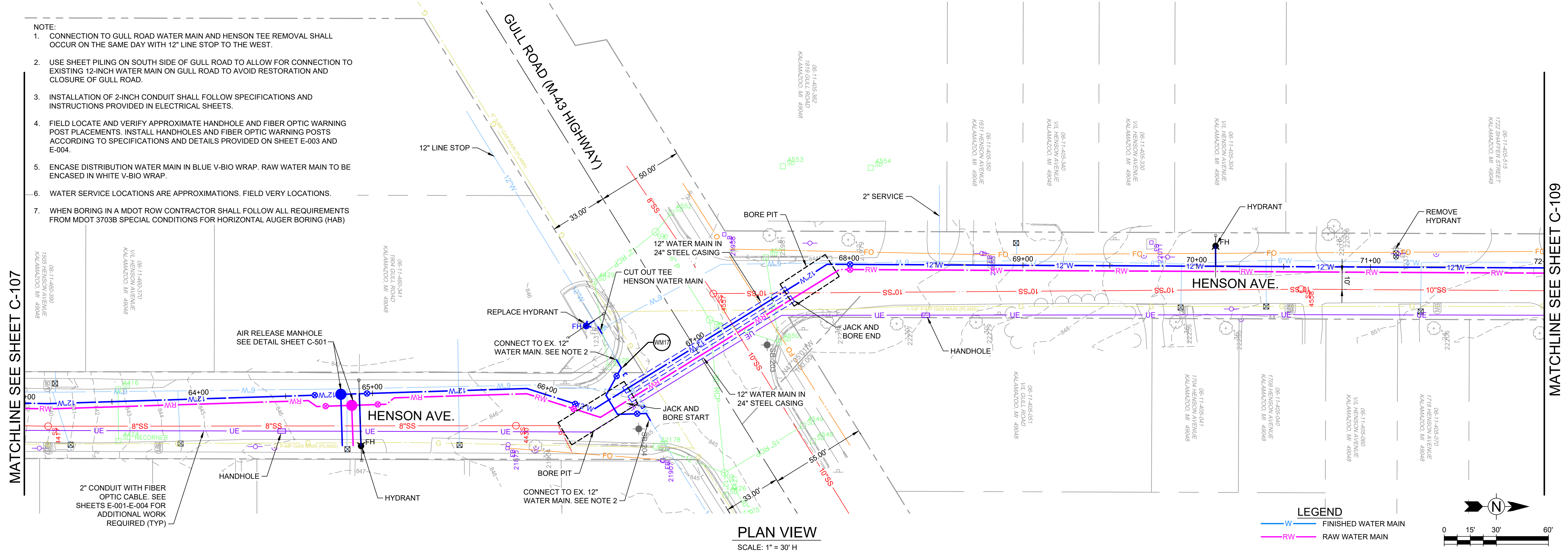
Bar Measures 1 inch, otherwise drawing not to scale

4/28/2025 9:30:07 AM - C:\ADACDC\TETRA TECH\INC\200-19743-24012\KZOO PSS AND PS14\PROJECT FILES\CAD\DWG\C-108\PLAN PROFILE.DWG - HOLLENBECK, TODD

- NOTE:
1. CONNECTION TO GULL ROAD WATER MAIN AND HENSON TEE REMOVAL SHALL OCCUR ON THE SAME DAY WITH 12" LINE STOP TO THE WEST.
 2. USE SHEET PILING ON SOUTH SIDE OF GULL ROAD TO ALLOW FOR CONNECTION TO EXISTING 12-INCH WATER MAIN ON GULL ROAD TO AVOID RESTORATION AND CLOSURE OF GULL ROAD.
 3. INSTALLATION OF 2-INCH CONDUIT SHALL FOLLOW SPECIFICATIONS AND INSTRUCTIONS PROVIDED IN ELECTRICAL SHEETS.
 4. FIELD LOCATE AND VERIFY APPROXIMATE HANDHOLE AND FIBER OPTIC WARNING POST PLACEMENTS. INSTALL HANDHOLES AND FIBER OPTIC WARNING POSTS ACCORDING TO SPECIFICATIONS AND DETAILS PROVIDED ON SHEET E-003 AND E-004.
 5. ENCASE DISTRIBUTION WATER MAIN IN BLUE V-BIO WRAP. RAW WATER MAIN TO BE ENCASED IN WHITE V-BIO WRAP.
 6. WATER SERVICE LOCATIONS ARE APPROXIMATIONS. FIELD VERY LOCATIONS.
 7. WHEN BORING IN A MDOT ROW CONTRACTOR SHALL FOLLOW ALL REQUIREMENTS FROM MDOT 3703B SPECIAL CONDITIONS FOR HORIZONTAL AUGER BORING (HAB)

MATCHLINE SEE SHEET C-107

MATCHLINE SEE SHEET C-109

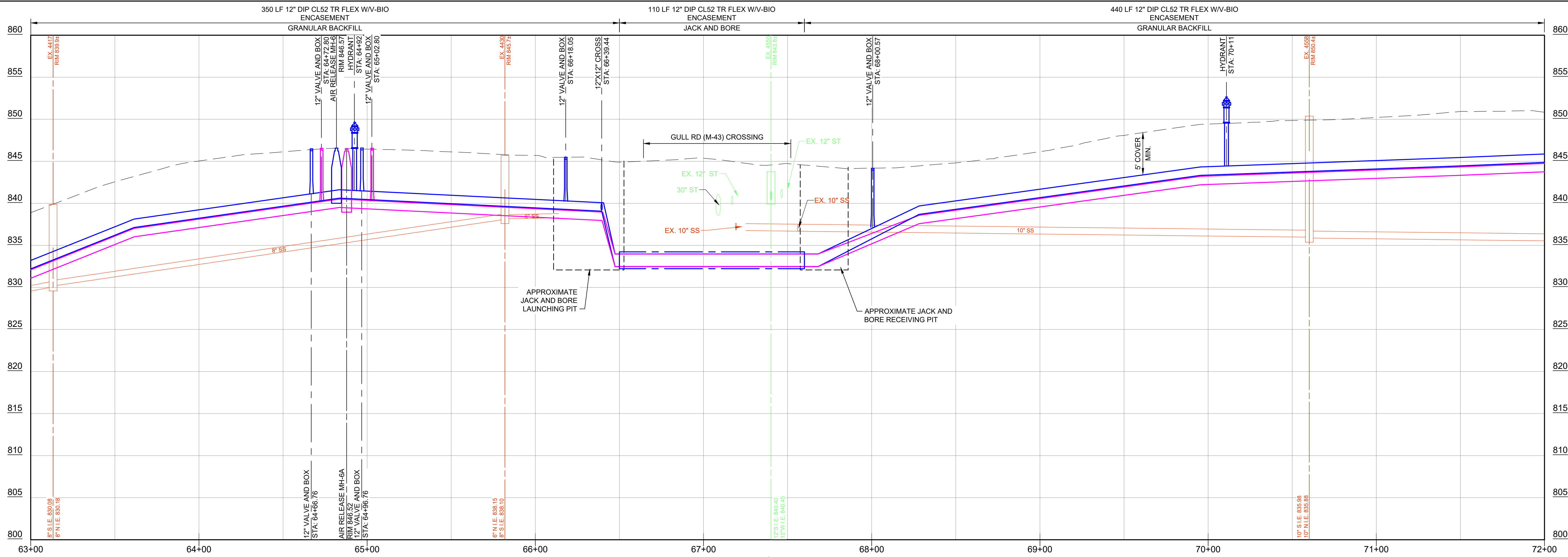
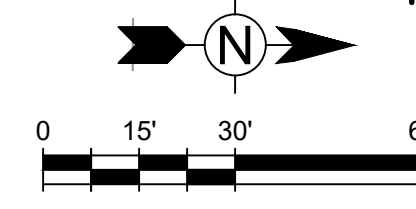


PLAN VIEW

SCALE: 1" = 30' H

LEGEND

- W — FINISHED WATER MAIN
- RW — RAW WATER MAIN



PROFILE VIEW

SCALE: 1" = 30' H 1" = 6' V



www.tetratech.com
1136 OAK VALLEY DRIVE, SUITE 100
ANN ARBOR, MI 48108
PHONE: (734) 665-6000 FAX: (734) 219-3003

MARK	DATE	DESCRIPTION
05/01/25		ISSUED FOR BIDS

CITY OF KALAMAZOO, MICHIGAN
PUMP STATION 5 & 14
WATER AND TRANSMISSION MAIN, CONTRACT 1
**PROPOSED WATER MAIN
PLAN AND PROFILE
STA. 63+00 TO 72+00**

PROJ: 200-19743-24012
DES: D. WARREN
DRWN: T. HOLLENBECK
CHKD: S. BYRNE

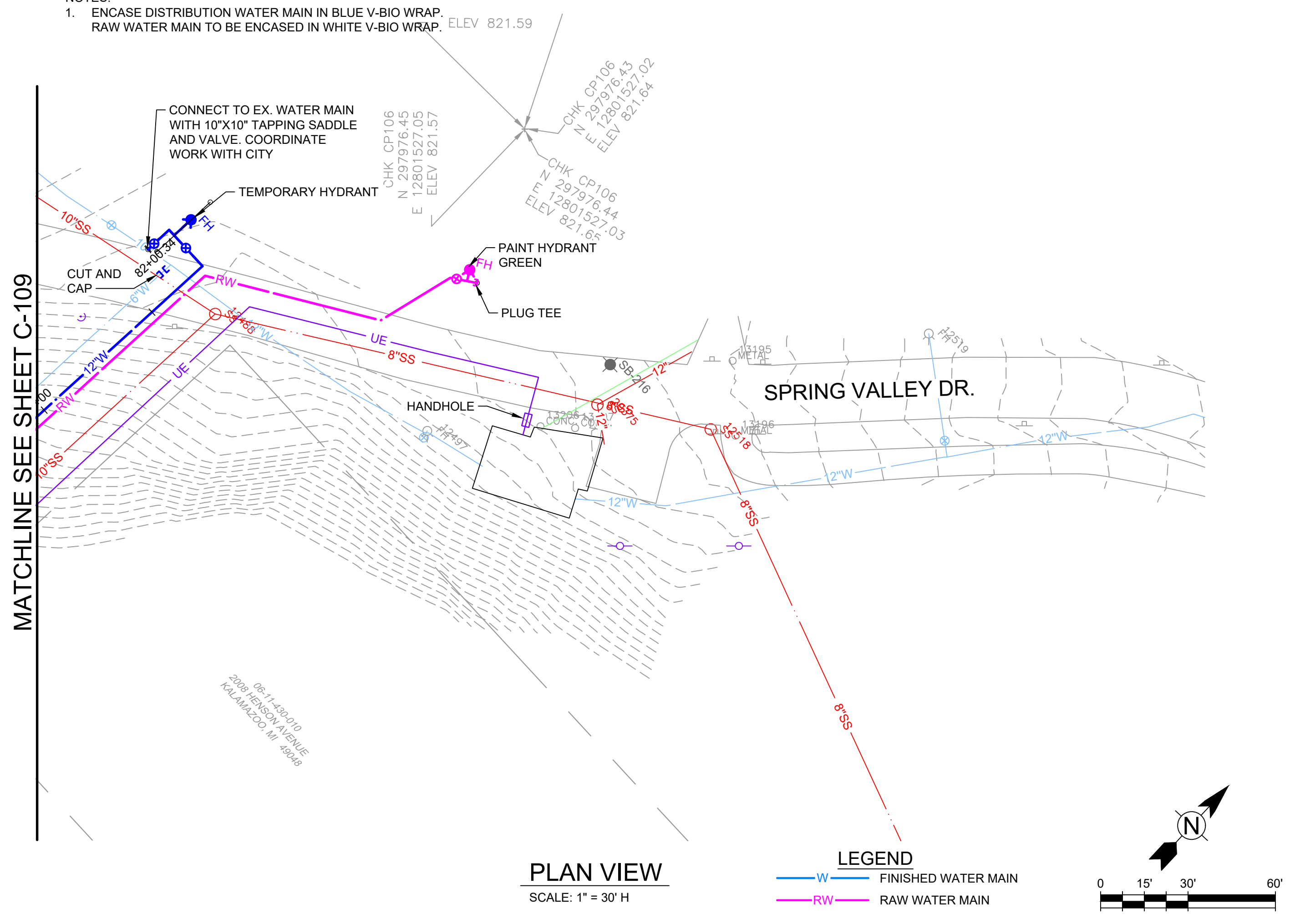
C-108

Copyright: Tetra Tech

Bar Measures 1 inch, otherwise drawing not to scale

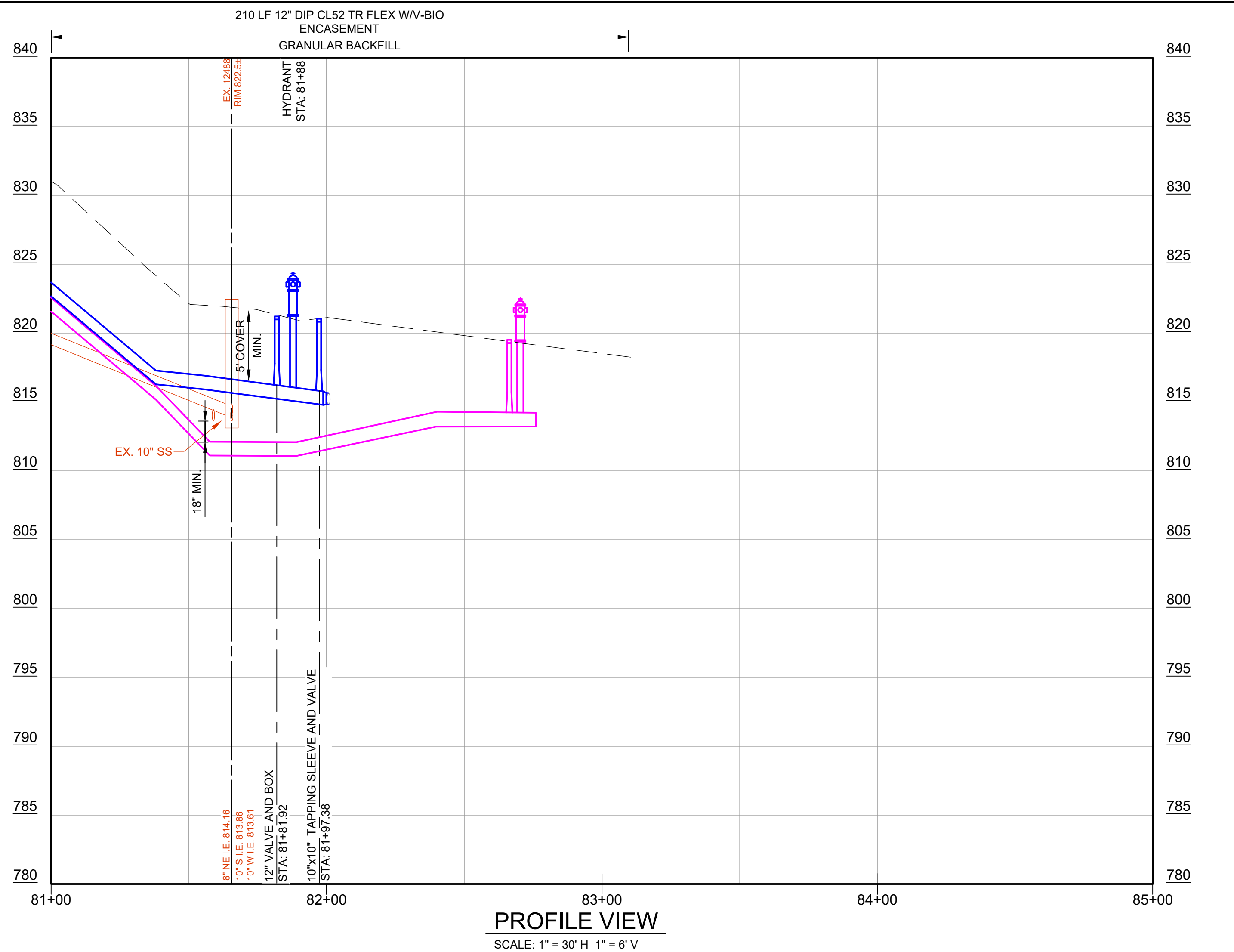
4/29/2025 9:15:21 AM - C:\USERS\MIKE.SCHUMACHER\DRAWINGS\PROJECT FILES\CAD\DWG\CONTRACT 1C-10X PLAN PROFILE.DWG - SCHUMACHER, MIKE

NOTES:
1. ENCASE DISTRIBUTION WATER MAIN IN BLUE V-BIO WRAP.
RAW WATER MAIN TO BE ENCASED IN WHITE V-BIO WRAP.



PLAN VIEW
SCALE: 1" = 30' H

LEGEND
— W — FINISHED WATER MAIN
— RW — RAW WATER MAIN



PROFILE VIEW
SCALE: 1" = 30' H 1" = 6' V

WATER SERVICES

Address	Street Side	Yard Side	Material	Tap Location	Prop. Lead Length (ft)
Sheet C-101					
2000	E MICHIGAN	8"	8"	DIP	E MICHIGAN 50
2003	E MICHIGAN	1.25"	0.75"	C/C	WALLACE 13
195	WALLACE	1.25"	1.25"	C/C	WALLACE 43
201	WALLACE	1.25"	0.75"	C/C	WALLACE 40
205	WALLACE	1.25"	0.75"	C/C	WALLACE 39
209	WALLACE	1.25"	0.75"	C/C	WALLACE 39
213	WALLACE	1.25"	0.75"	C/C	WALLACE 39
217	WALLACE	1.25"	0.75"	C/C	WALLACE 39
Sheet C-102					
221	WALLACE	1.25"	0.75"	C/C	WALLACE 39
225	WALLACE	1.25"	0.75"	C/C	WALLACE 38
231	WALLACE	1.25"	0.75"	C/C	WALLACE 39
235	WALLACE	1.25"	0.75"	C/C	WALLACE 38
239	WALLACE	1.25"	0.75"	C/C	WALLACE 38
233	CHICAGO	1.25"	0.75"	C/C	WALLACE 14
1804	ELDER ST	1.25"	0.75"	C/C	ELDER 23
1808	ELDER ST	1.25"	0.75"	C/C	ELDER 15
1812	ELDER ST	1.25"	0.75"	C/C	ELDER 21
1815	ELDER ST	1.25"	0.75"	C/C	ELDER 30
1816	ELDER ST	1.25"	0.75"	C/C	ELDER 21
1819	ELDER ST	1.25"	0.75"	C/C	ELDER 34
1820	ELDER ST	1.25"	0.75"	C/C	ELDER 32
1823	ELDER ST	1.25"	0.75"	C/C	ELDER 32
1824	ELDER ST	1.25"	0.75"	C/C	ELDER 21
1900	ELDER ST	1.25"	0.75"	C/C	ELDER 21
1901	ELDER ST	1.25"	0.75"	C/C	ELDER 30
1904	ELDER ST	1.25"	0.75"	C/C	ELDER 21
311	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 17
316	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 15
319	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 36
320	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 14
321	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 36
Sheet C-103					
323	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 37
324	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 16
402	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 16
409	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 35
410	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 13
414	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 16
415	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 37
418	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 16
1719	CHARLES	1.25"	0.75"	C/C	TRIMBLE 34
504	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 18
510	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 18
513	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 35
516	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 18
522	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 18
524	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 19
525	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 35
529	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 35
534	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 17
535	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 37
Sheet C-104					
601	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 35
604	TRIMBLE	1.25"	1.25"	C/C	TRIMBLE 14
605	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 32
609	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 35
613	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 32
614	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 18
621	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 36
622	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 18
627	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 35
628	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 18
631	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 35
633	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 34
634	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 18
640	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 19
701	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 34
707	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 34
710	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 19
711	TRIMBLE	1.25"	1.25"	C/C	TRIMBLE 30
714	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 19
721	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 33
726	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 20
728	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 20
732	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 16
1726	E MAIN	1.25"	0.75"	C/C	TRIMBLE 33
1802	E MAIN	1.25"	1.25"	C/C	TRIMBLE 15
Sheet C-105					
1805	E MAIN	1.25"	0.75"	C/C	TRIMBLE 15
807	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 47
811	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 36

815	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 36
819	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 36
821	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 36
903	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 36
904	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 20
907	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 37
910	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 17
911	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 35
914	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 17
915	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 33
918	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 13
925	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 35
927	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 36
928	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 17
932	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 17
933	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 34
940	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 15
1002	TRIMBLE	1.25"	1.25"	C/C	TRIMBLE 35
1007	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 16
1013	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 6
Sheet C-106					
1016	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 33
1017	TRIMBLE	1.25"	0.75"	C/C	TRIMBLE 27
1106	TRIMBLE	2"	2"	C/C	TRIMBLE 22
1722	HUMPHREY	1.25"	0.75"	C/C	HUMPHREY 5
1809	HUMPHREY	2"	2"	C/C	HUMPHREY 5
Sheet C-107					
1302	BIXBY	1.25"	0.75"	C/C	JUNCTION 15
1809	JUNCTION	1.25"	0.75"	C/C	JUNCTION 37
1806	JUNCTION	1.25"	0.75"	C/C	JUNCTION 9
1812	JUNCTION	1.25"	0.75"	C/C	JUNCTION 10
1818	JUNCTION	1.25"	0.75"	C/C	JUNCTION 10
1824	JUNCTION	1.25"	0.75"	C/C	JUNCTION 7
1825	JUNCTION	1.25"	0.75"	C/C	JUNCTION 51
1904	JUNCTION	1.25"	0.75"	C/C	JUNCTION 12
1901	JUNCTION	1.25"	0.75"	C/C	JUNCTION 16
1423	HENSON	1.25"	0.75"	C/C	HENSON 7
Sheet C-108					
1505	HENSON	1.25"	0.75"	C/C	HENSON 17
1514	HENSON	1.25"	0.75"	C/C	HENSON 34
1520	HENSON	1.25"	0.75"	C/C	HENSON 26
1524	HENSON	1.25"	1.25"	C/C	HENSON 32
1536	HENSON	1.25"	1.25"	C/C	HENSON 32
1904	GULL	1.25"	0.75"	C/C	HENSON 12
1819	GULL	2"	2"	C/C	HENSON 17
1631	HENSON	1.25"	0.75"	C/C	HENSON 11
1704	HENSON	1.25"	0.75"	C/C	HENSON 27
1708	HENSON	1.25"	0.75"	C/C	HENSON 26
1718	HENSON	1.25"	0.75"	C/C	HENSON 28
Sheet C-109					
1800	HENSON	4"	4"	DIP	HENSON 15
1815	HENSON	4"	4"	DIP	HENSON 15
2008	HENSON	1.25"	1.25"	C/C	HENSON 4

www.tetratech.com
1136 OAK VALLEY DRIVE, SUITE 100
ANN ARBOR, MI 48108
PHONE: (734) 665-6000 FAX: (734) 219-3003

MARK	DATE	DESCRIPTION
	05/01/25	ISSUED FOR BIDS

CITY OF KALAMAZOO, MICHIGAN
PUMP STATION 5 & 14
WATER AND TRANSMISSION MAIN, CONTRACT 1
**PROPOSED WATER MAIN
PLAN AND PROFILE
STA. 81+00 TO END**

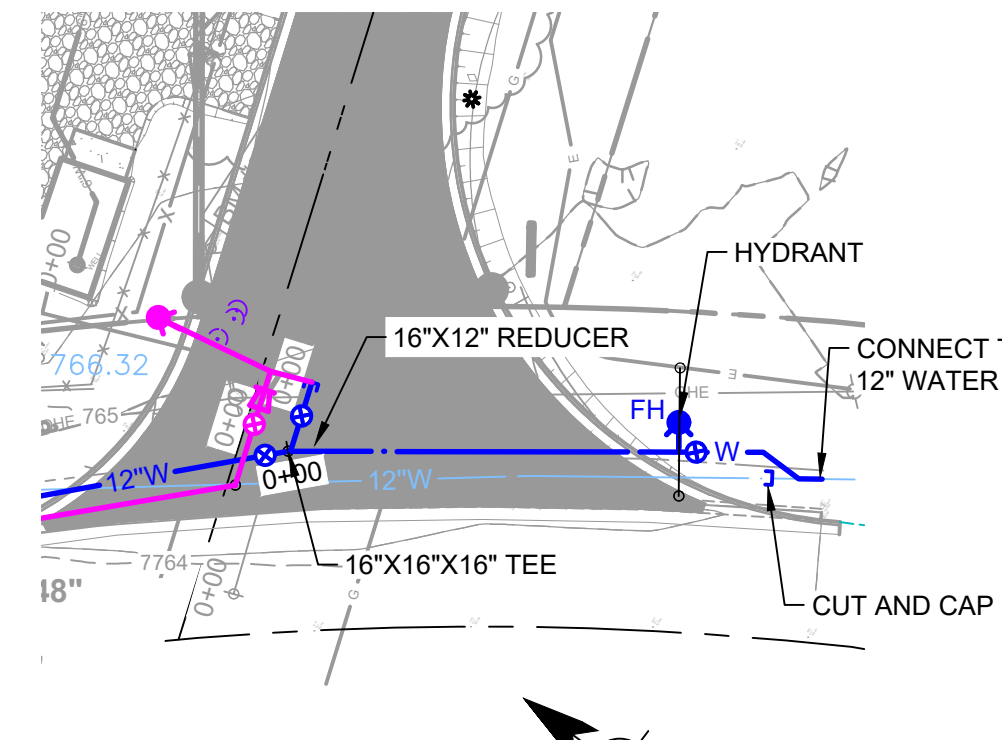
PROJ:	200-19743-24012
DESN:	
DRWN:	T. HOLLENBECK
CHKD:	

C-110

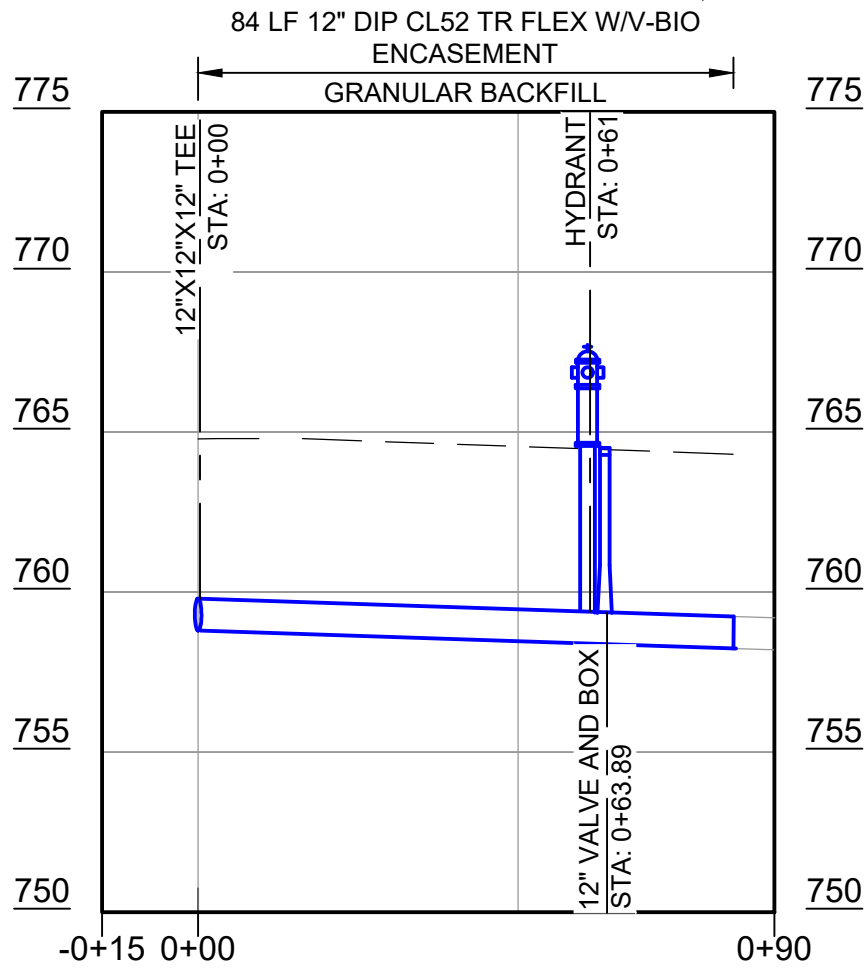
Copyright: Tetra Tech

Bar Measures 1 inch, otherwise drawing not to scale

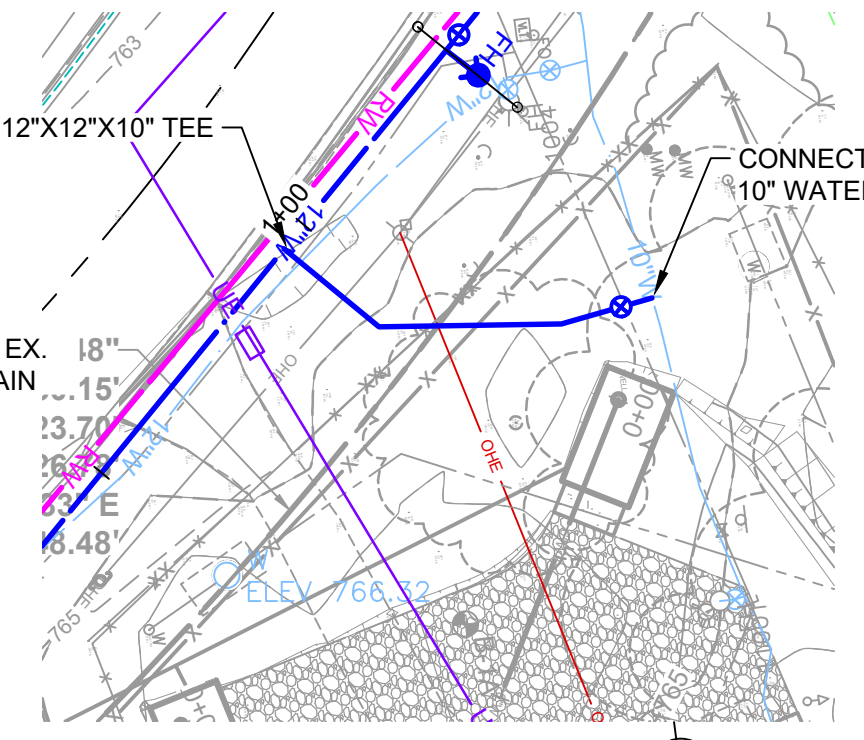
4/28/2025 9:36:11 AM - C:_AD\ADDOCS\TETRA TECH\INC\10X PLAN PROFILE DWG - HOLLENBECK, TODD



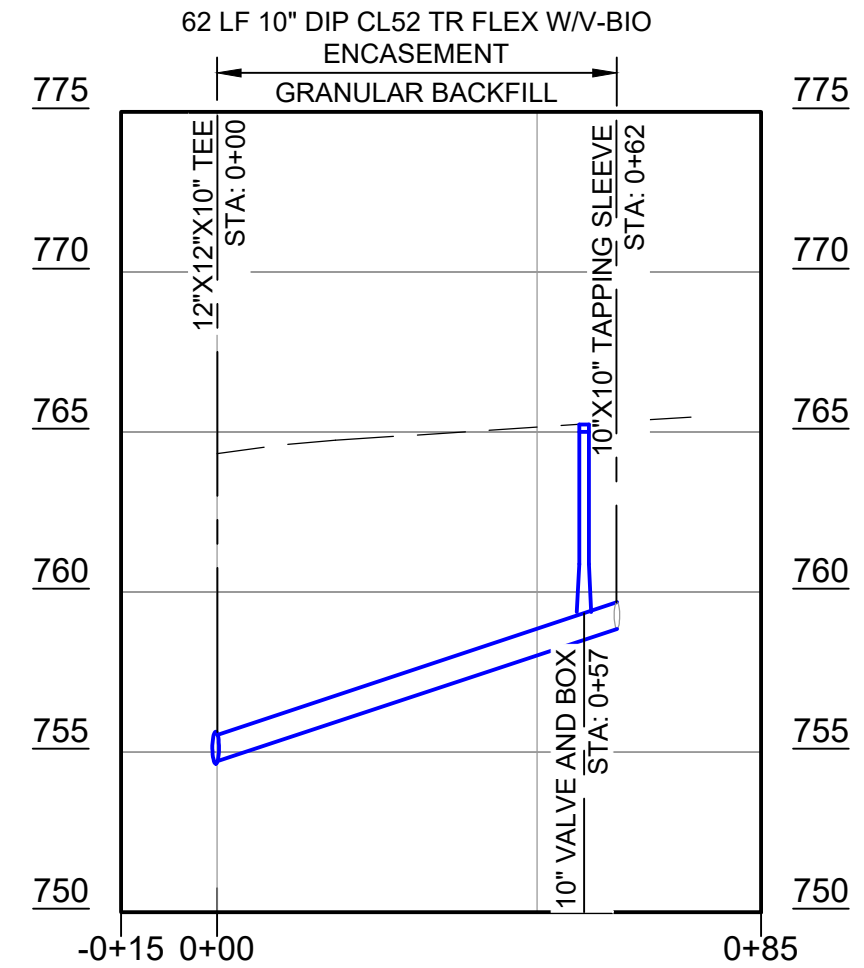
PLAN VIEW
SCALE: 1" = 30' H



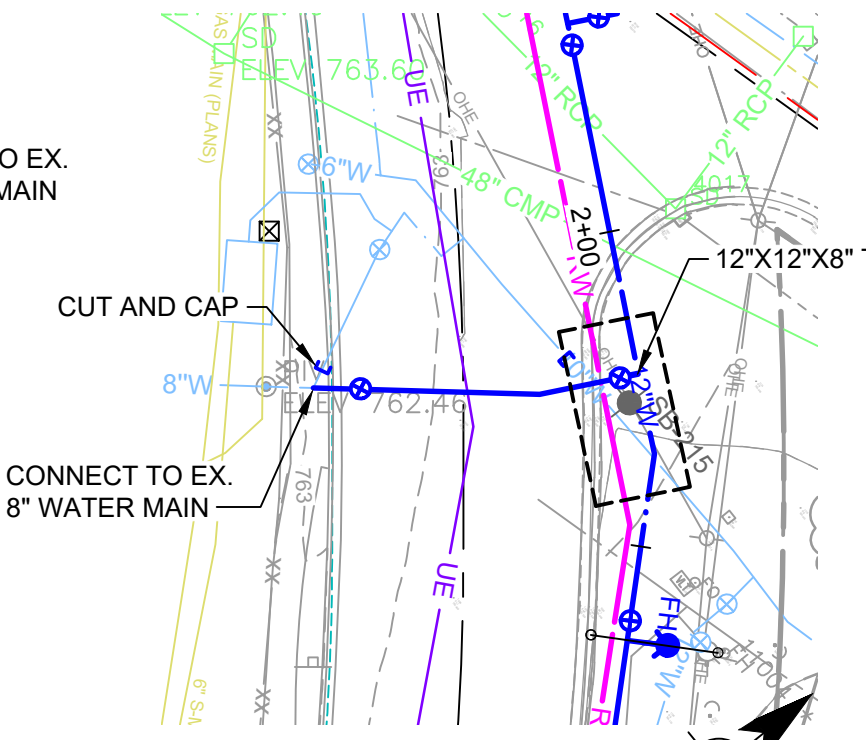
PROFILE WM 1 - STA. 0+00
SCALE: HORIZ. 1" = 30' VERT. 1" = 6'



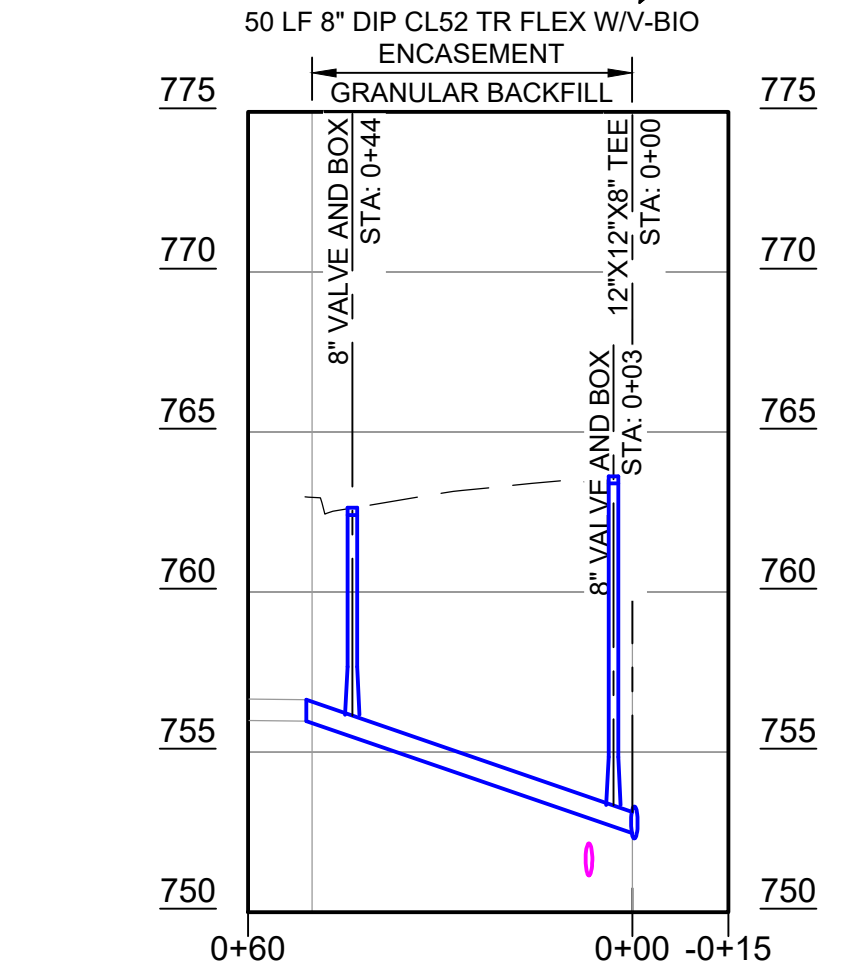
PLAN VIEW
SCALE: 1" = 30' H



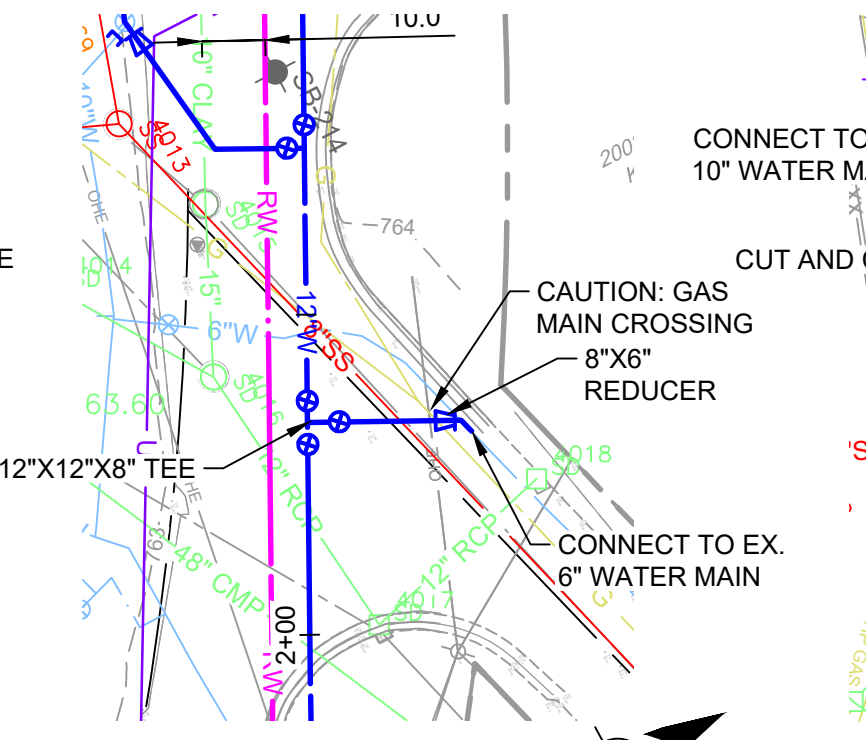
PROFILE WM 2 - STA. 0+95
SCALE: HORIZ. 1" = 30' VERT. 1" = 6'



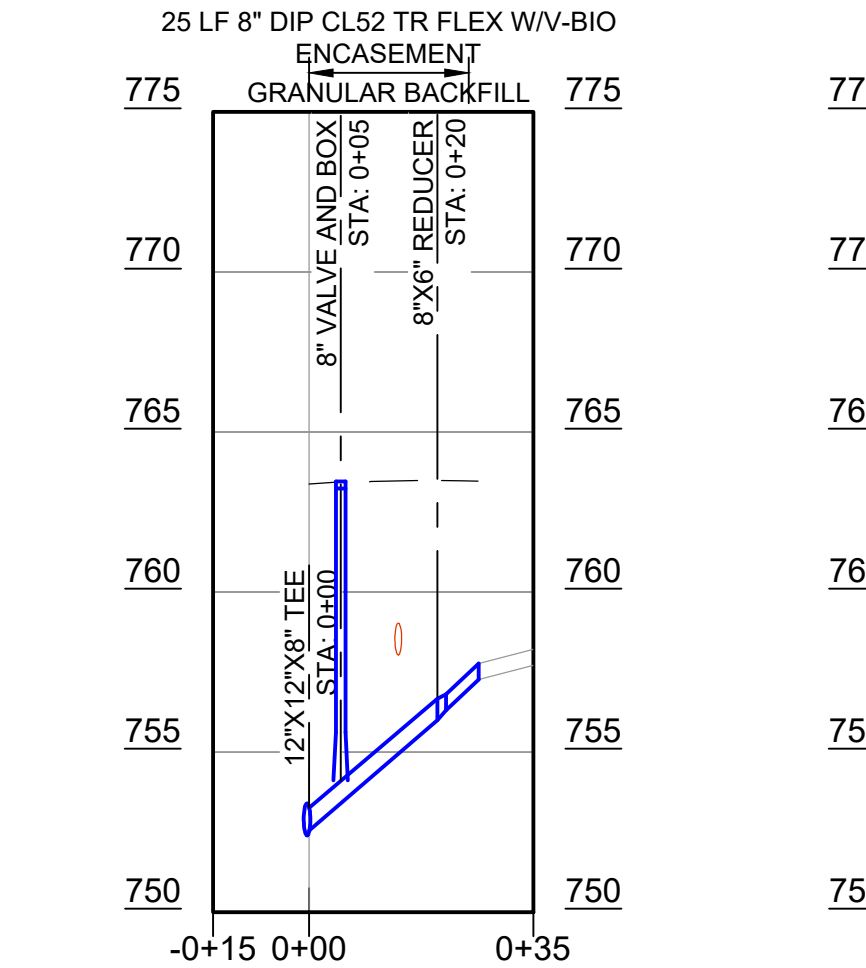
PLAN VIEW
SCALE: 1" = 30' H



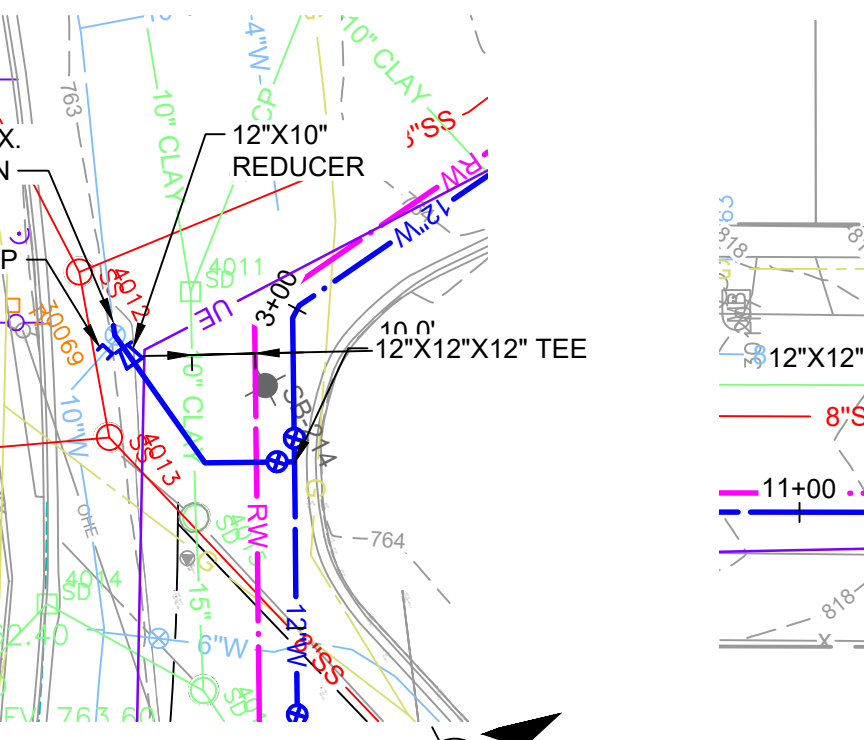
PROFILE WM 3 - STA. 1+77
SCALE: HORIZ. 1" = 30' VERT. 1" = 6'



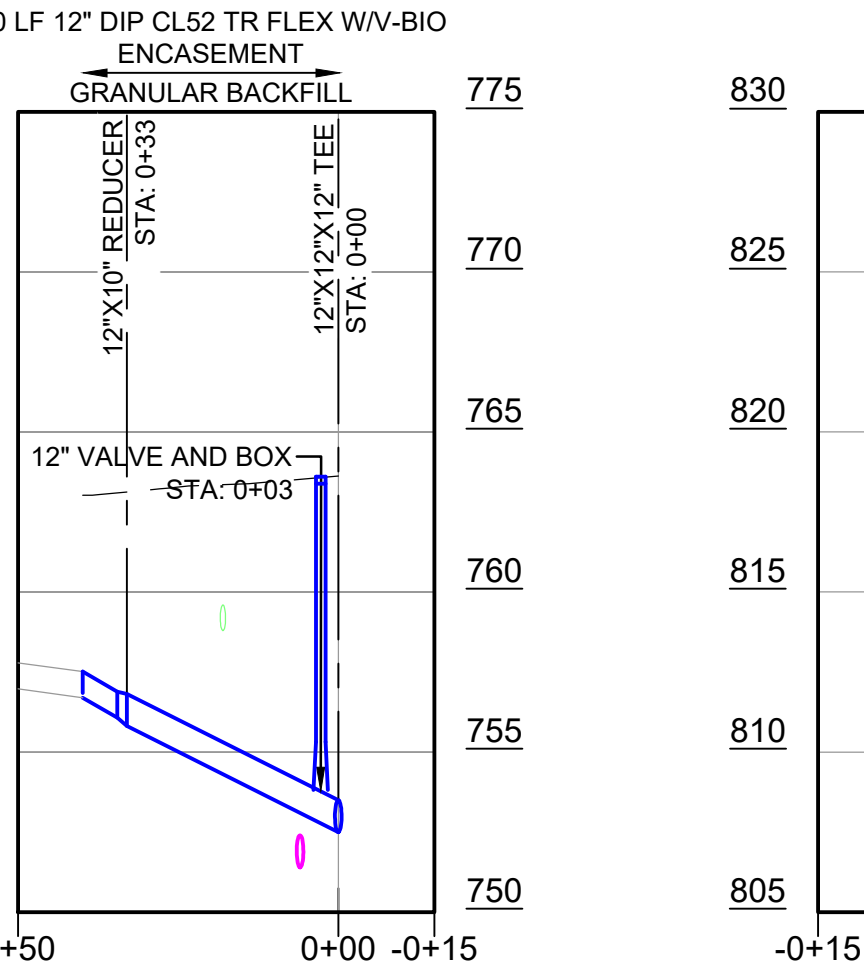
PLAN VIEW
SCALE: 1" = 30' H



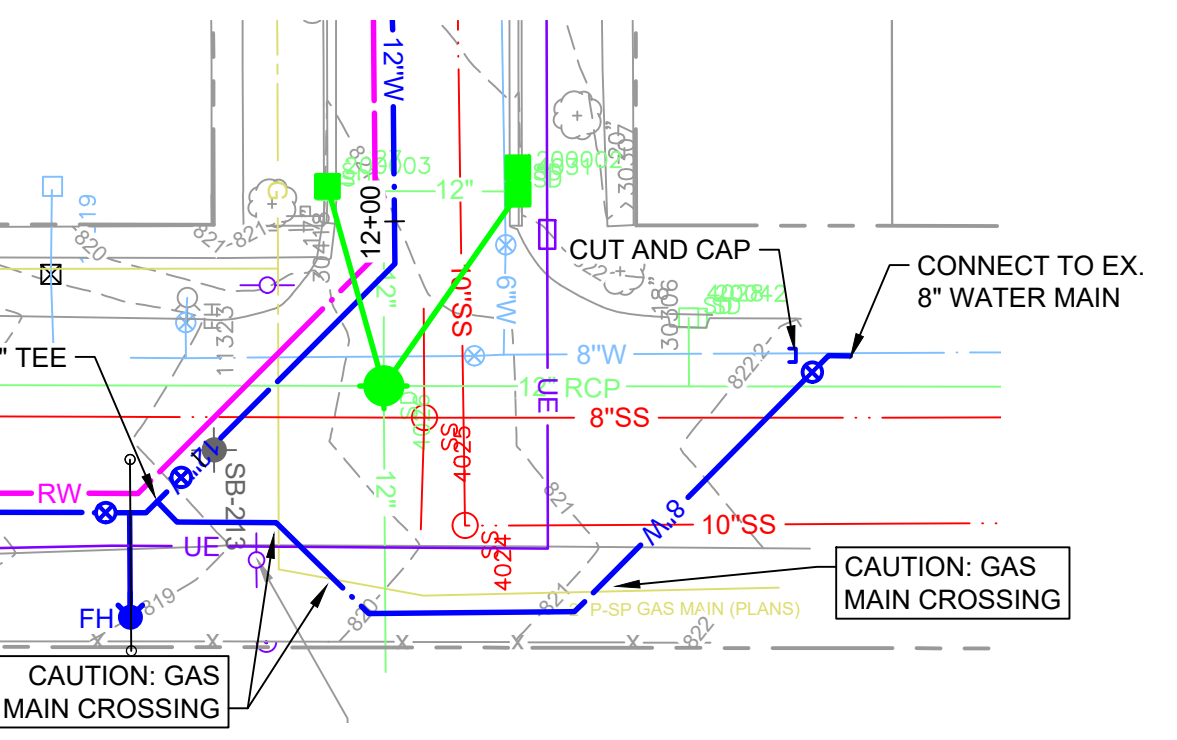
PROFILE WM 4 - STA. 2+33
SCALE: HORIZ. 1" = 30' VERT. 1" = 6'



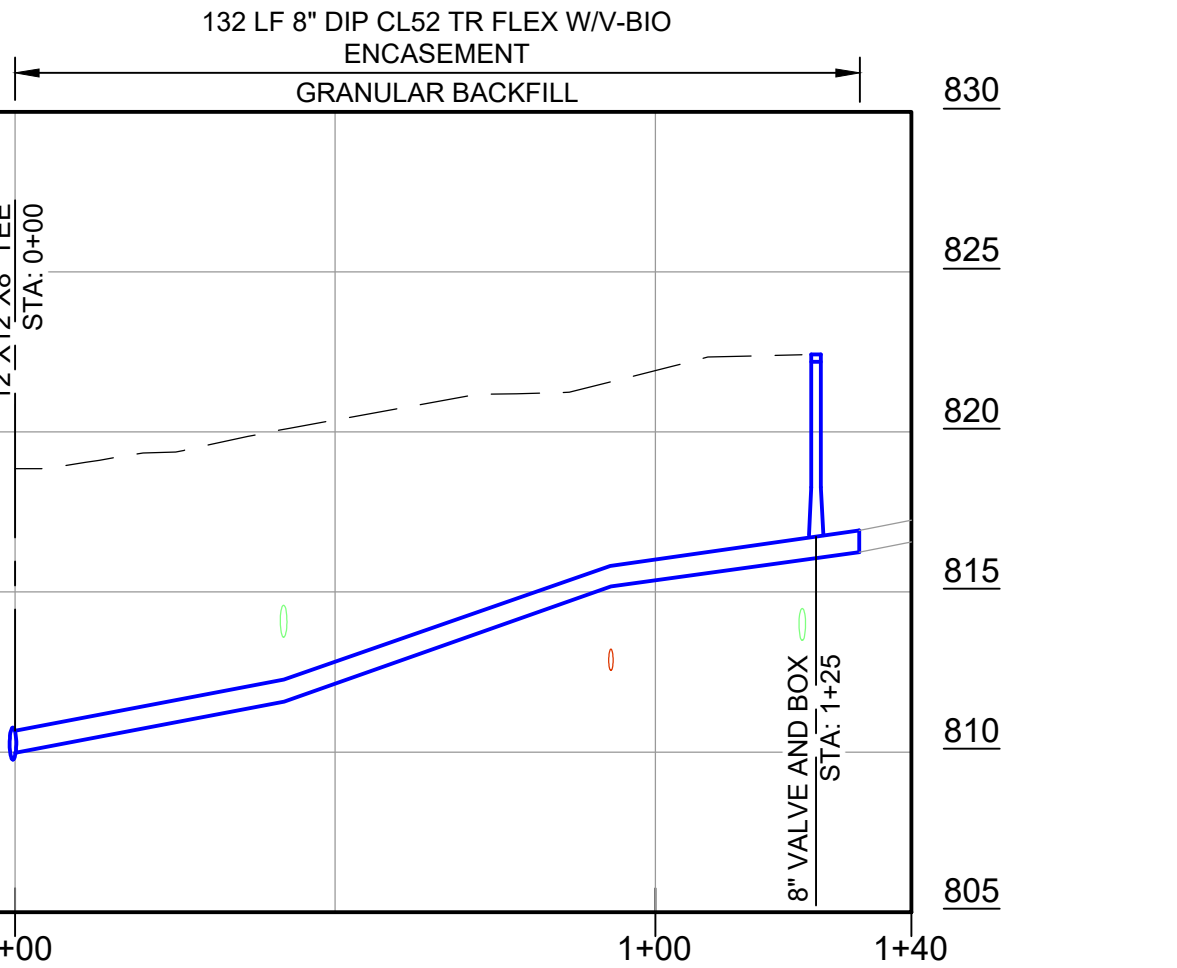
PLAN VIEW
SCALE: 1" = 30' H



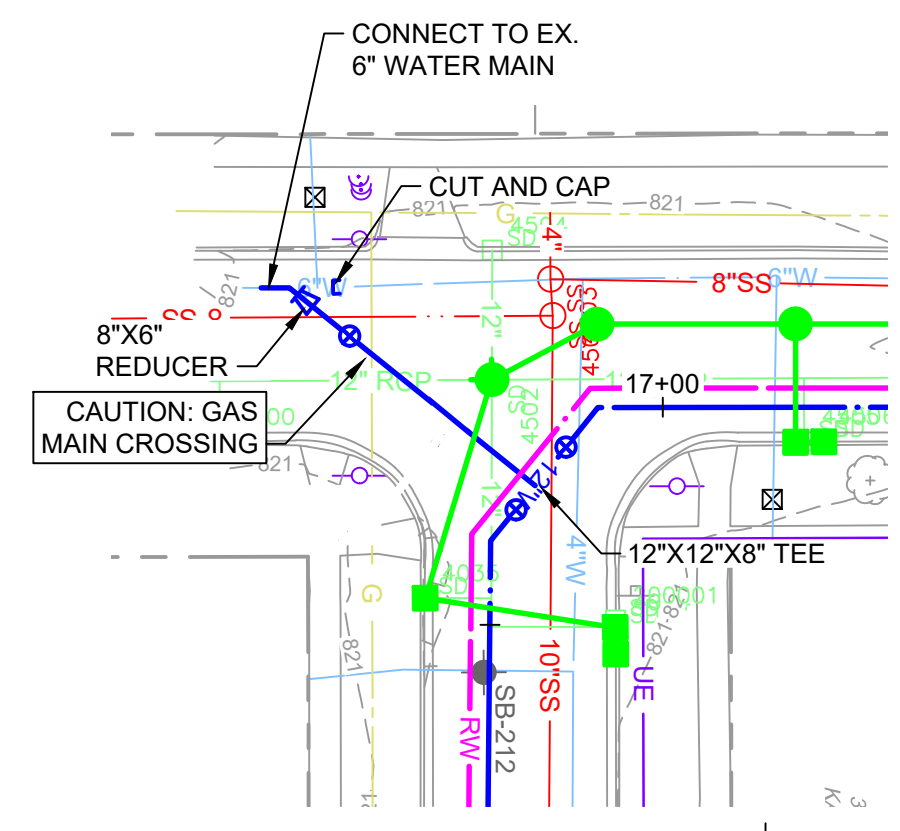
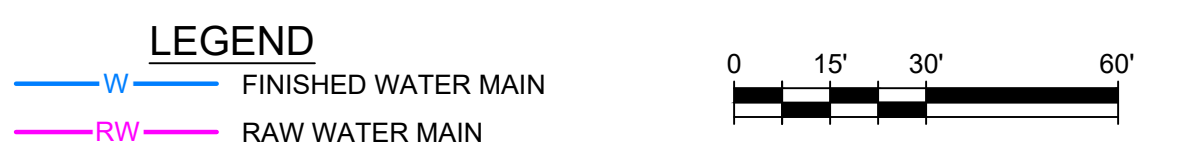
PROFILE WM 5 - STA. 2+76
SCALE: HORIZ. 1" = 30' VERT. 1" = 6'



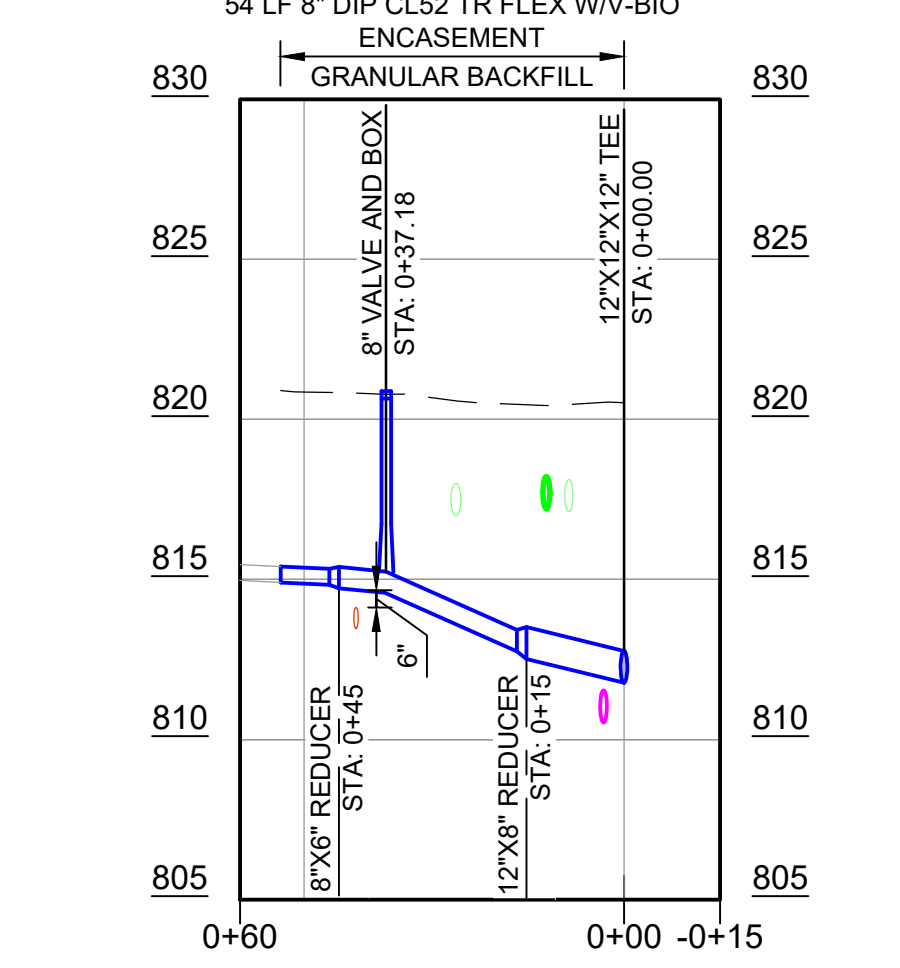
PLAN VIEW
SCALE: 1" = 30' H



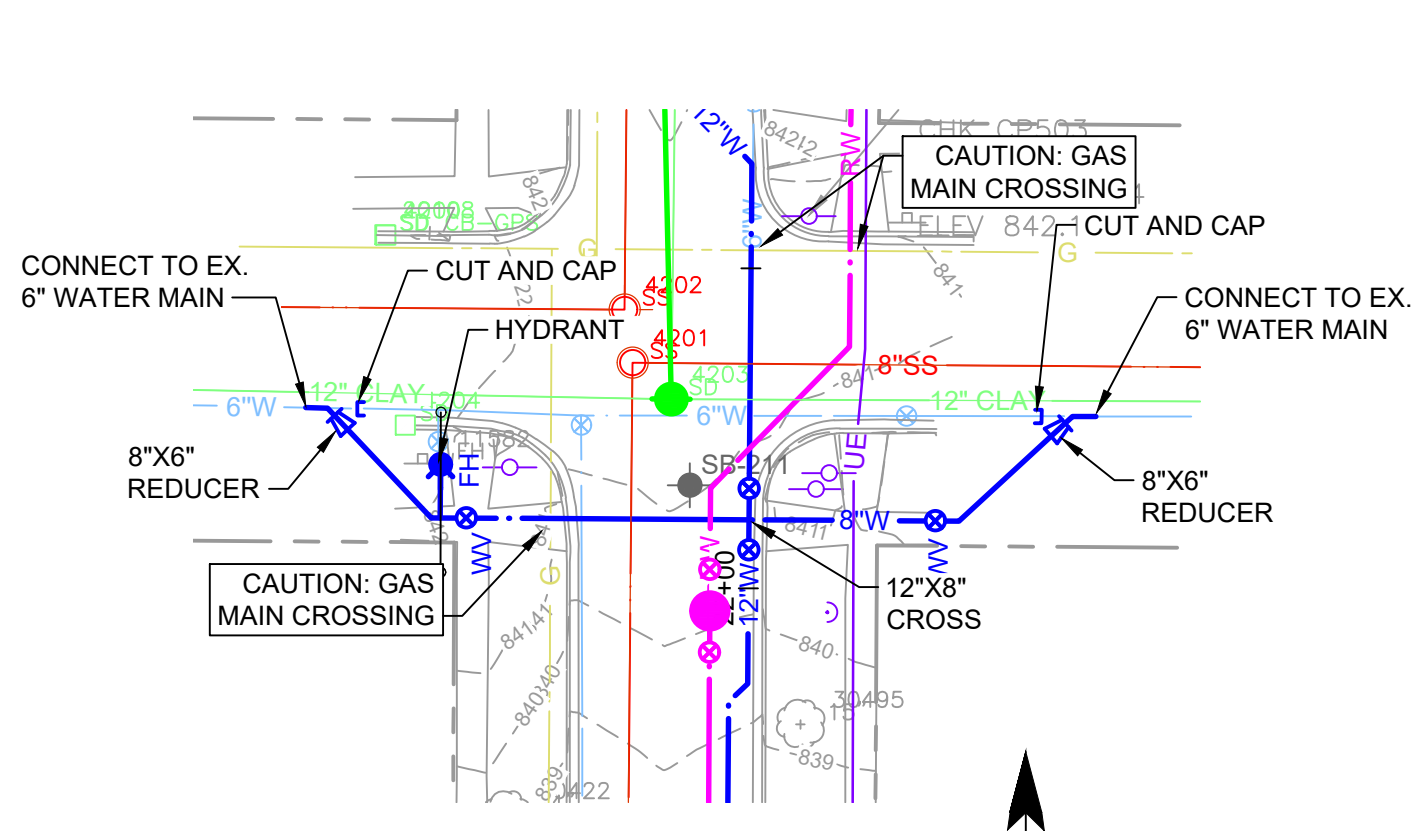
PROFILE WM 6 - STA. 11+43
SCALE: HORIZ. 1" = 30' VERT. 1" = 6'



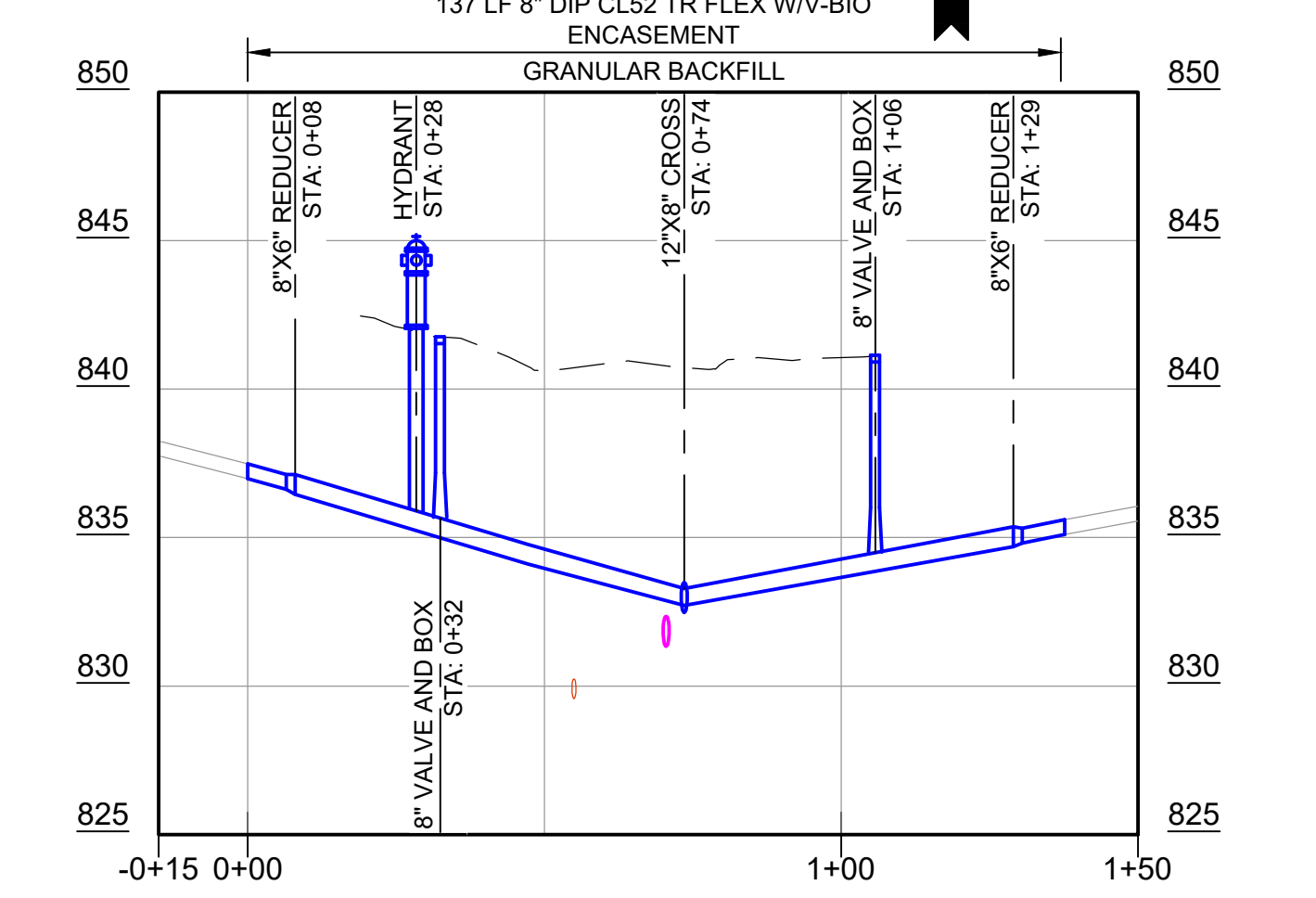
PLAN VIEW
SCALE: 1" = 30' H



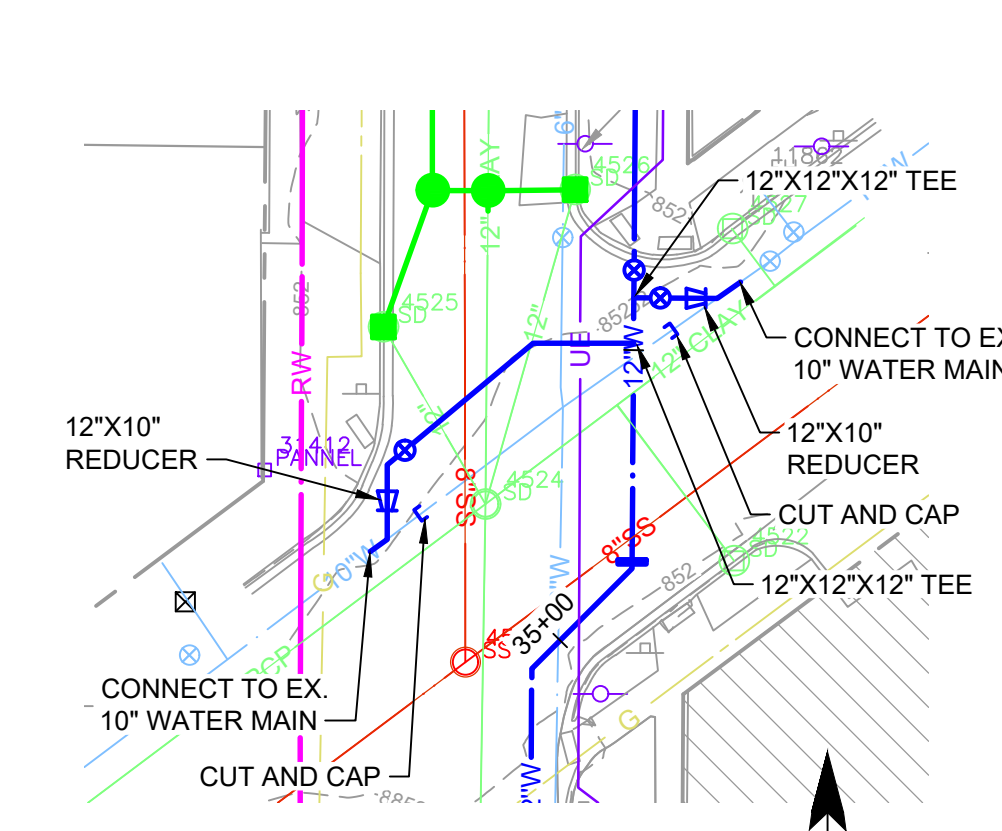
PROFILE WM 7 - STA. 16+76
SCALE: HORIZ. 1" = 30' VERT. 1" = 6'



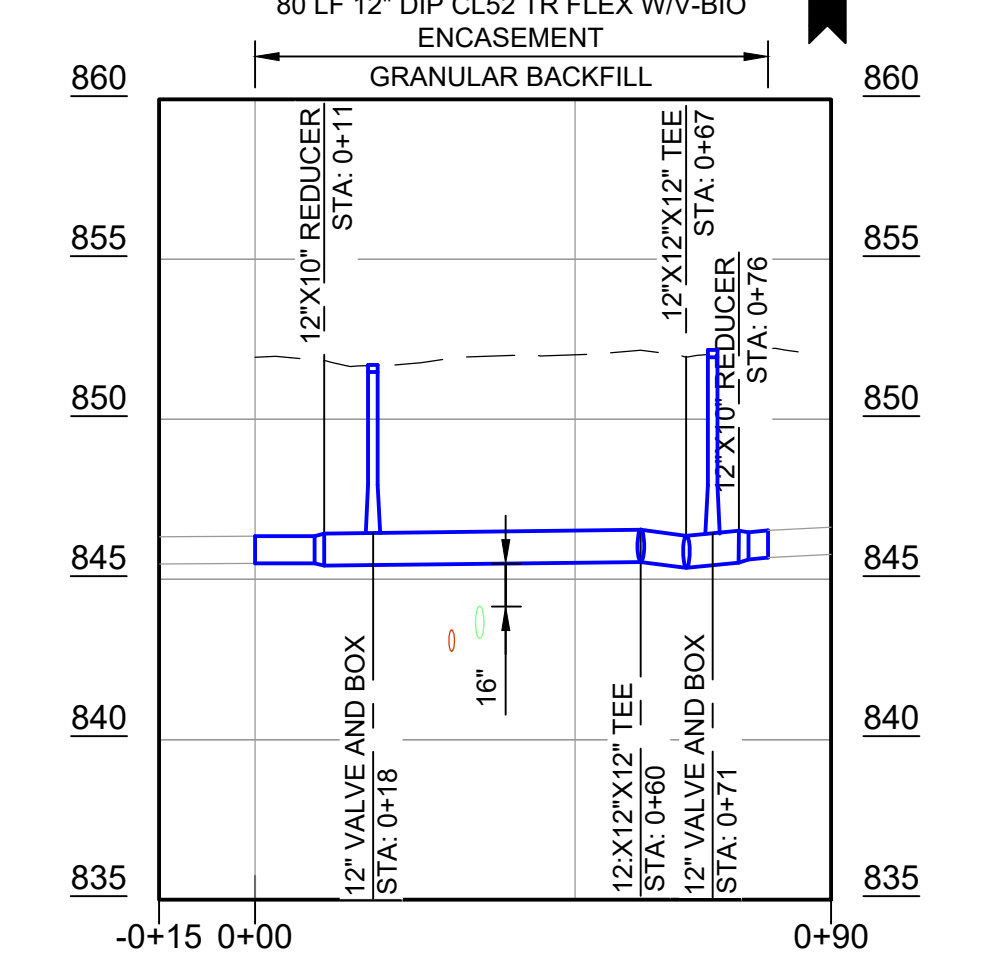
PLAN VIEW
SCALE: 1" = 30' H



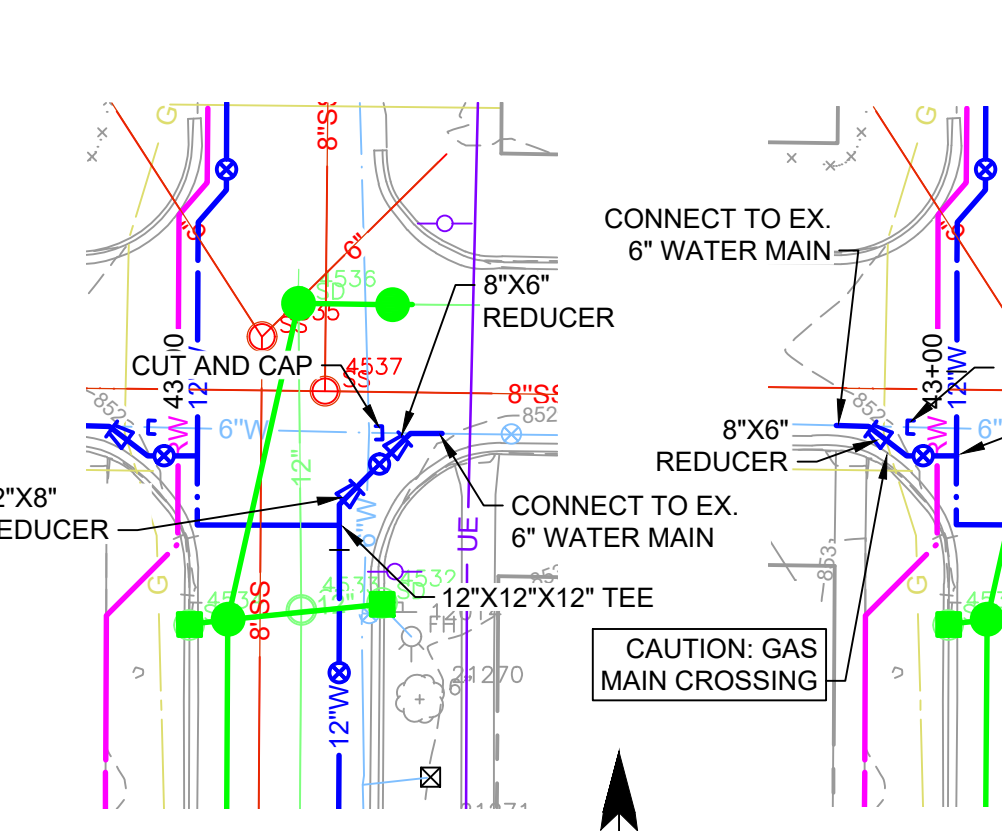
PROFILE WM 8 - STA. 22+10
SCALE: HORIZ. 1" = 30' VERT. 1" = 6'



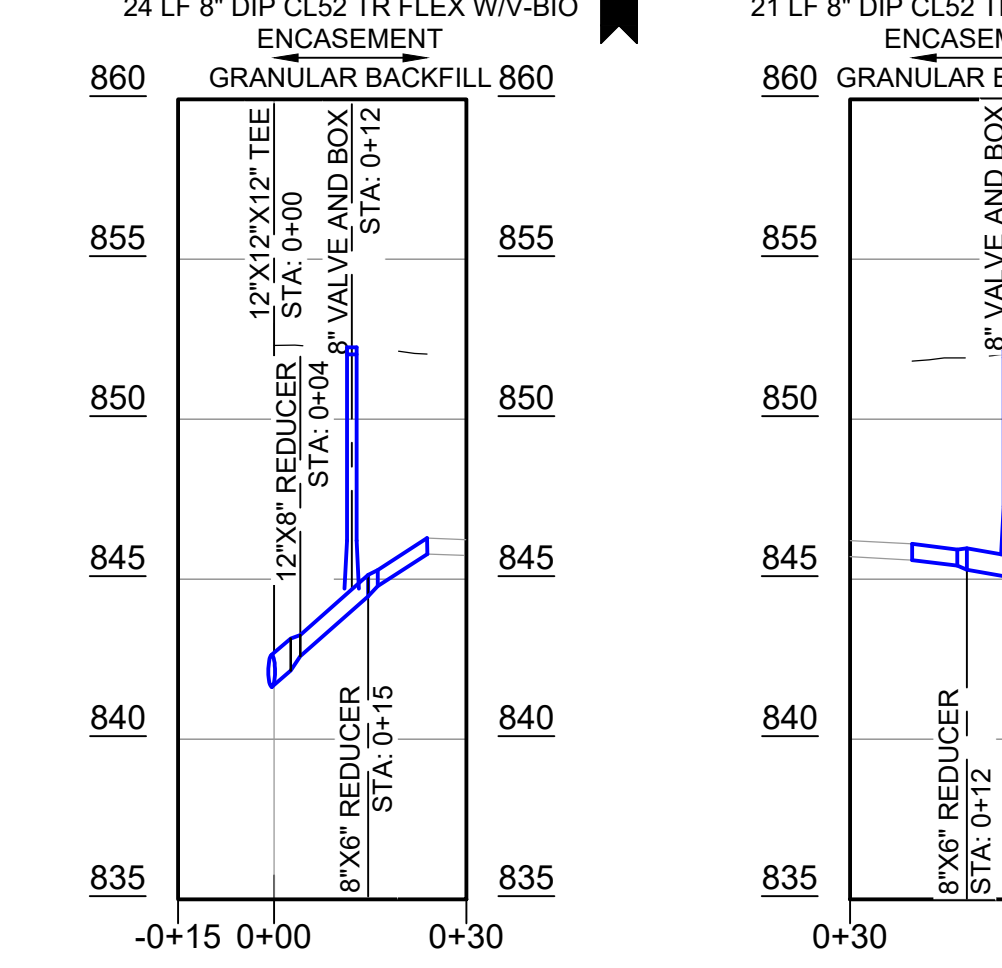
PLAN VIEW
SCALE: 1" = 30' H



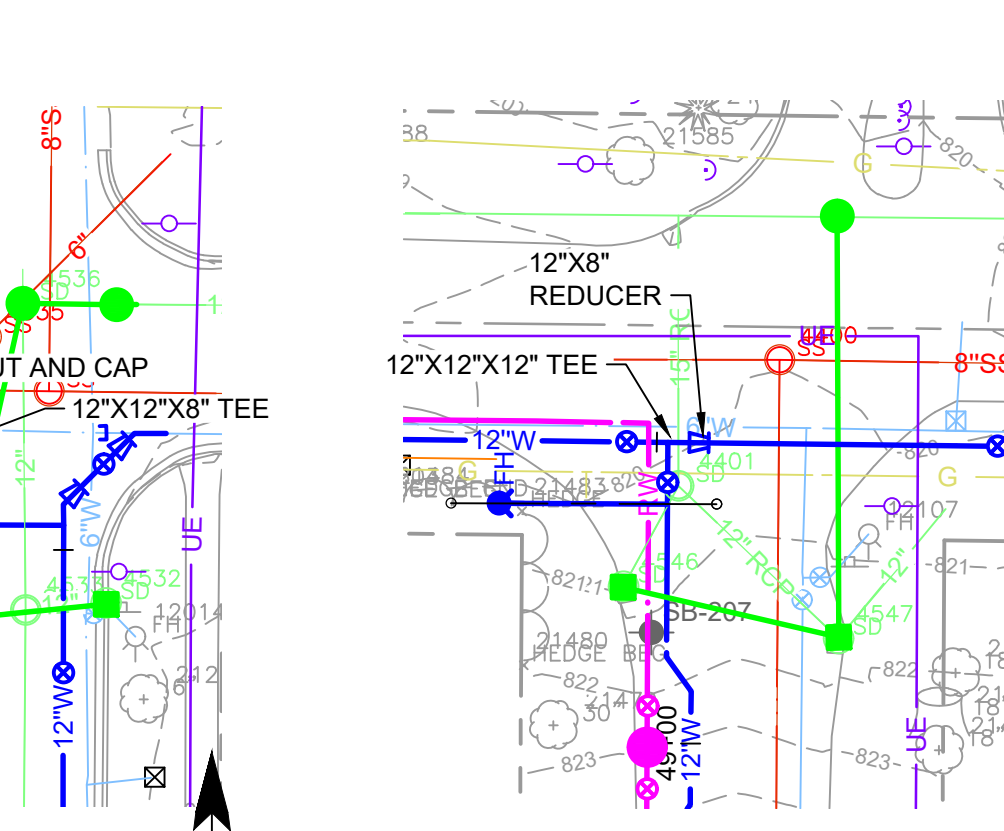
PROFILE WM 9 - STA. 35+53 AND 35+60
SCALE: HORIZ. 1" = 30' VERT. 1" = 6'



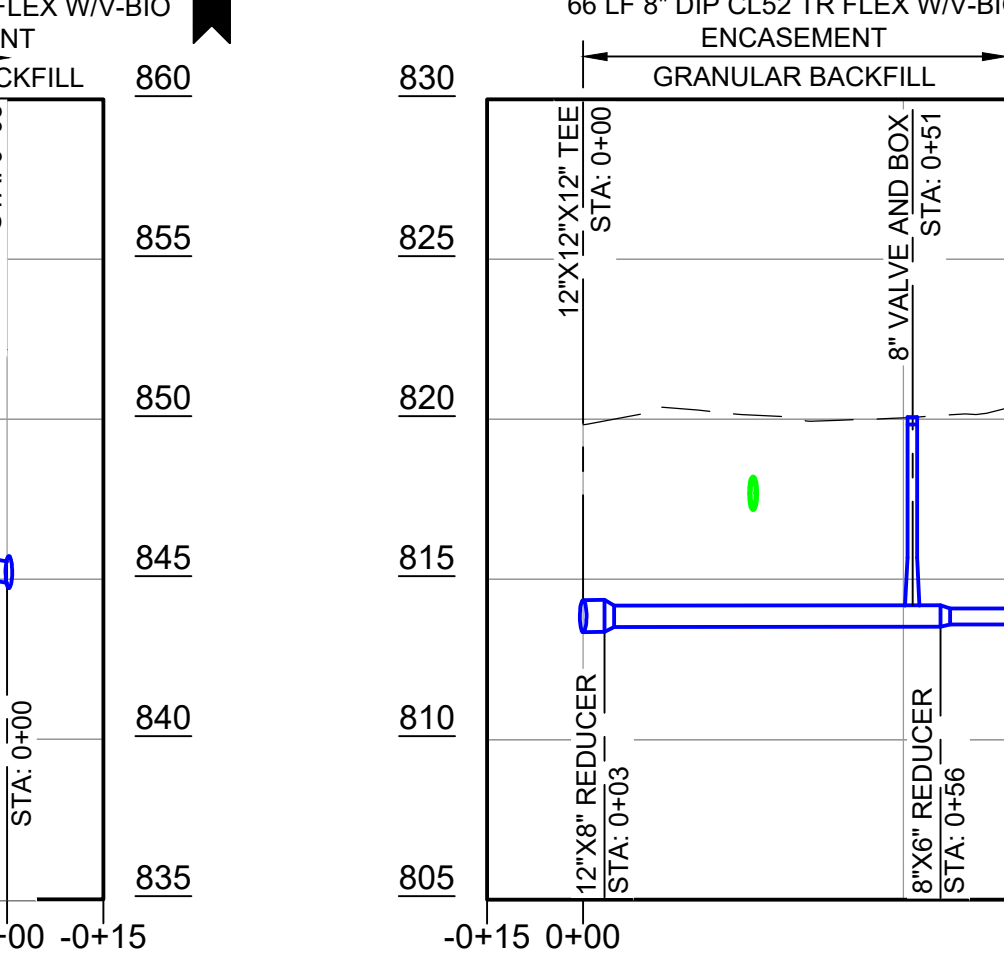
PLAN VIEW
SCALE: 1" = 30' H



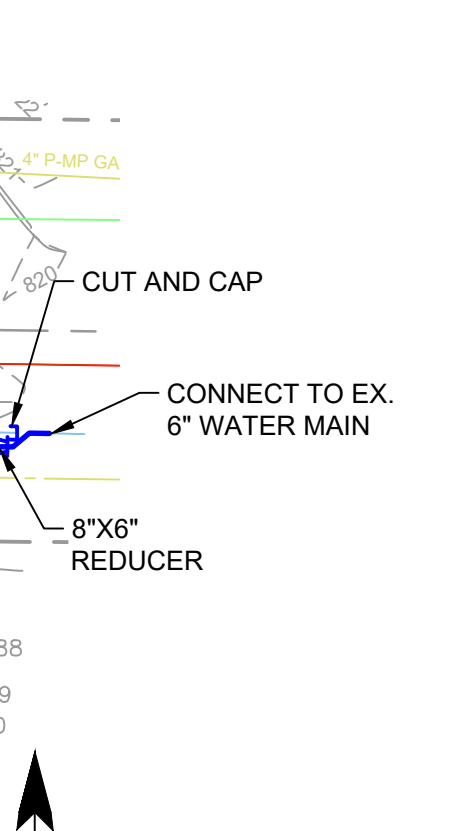
PROFILE WM 10 - STA. 42+58
SCALE: HORIZ. 1" = 30' VERT. 1" = 6'



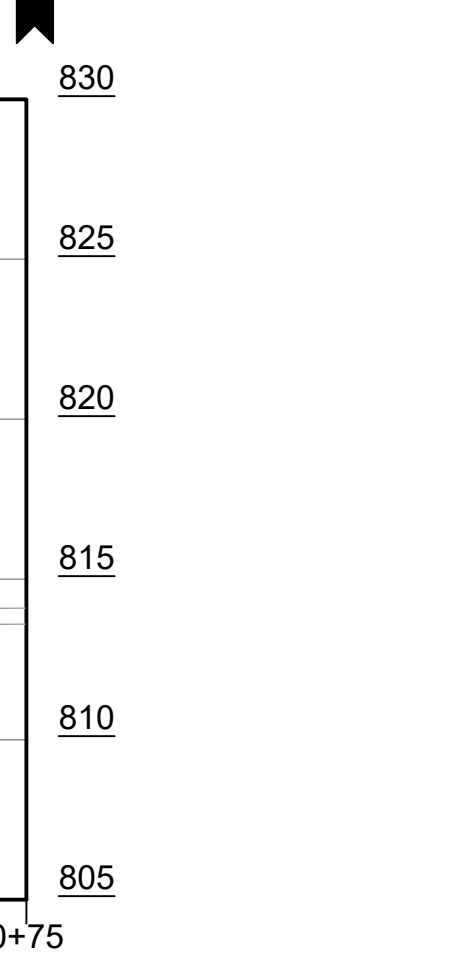
PLAN VIEW
SCALE: 1" = 30' H



PROFILE WM 11 - STA. 49+91
SCALE: HORIZ. 1" = 30' VERT. 1" = 6'



PLAN VIEW
SCALE: 1" = 30' H



PROFILE WM 12 - STA. 49+56
SCALE: HORIZ. 1" = 30' VERT. 1" = 6'



MARK	DATE	DESCRIPTION
	05/01/25	ISSUED FOR BIDS

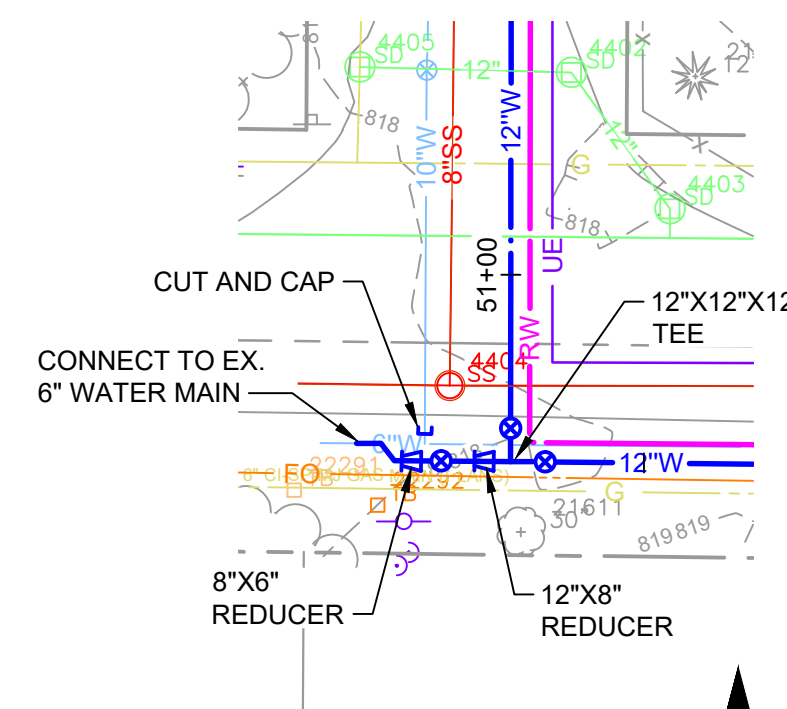
CITY OF KALAMAZOO, MICHIGAN
PUMP STATION 5 & 14
WATER AND TRANSMISSION MAIN, CONTRACT 1
PROPOSED WATER MAIN
PLAN AND PROFILE
INTERSECTION DETAILS

PROJ:	200-19743-24012
DESIGN:	D. WARREN
DRWN:	T. HOLLENBECK
CHKD:	S. BYRNE

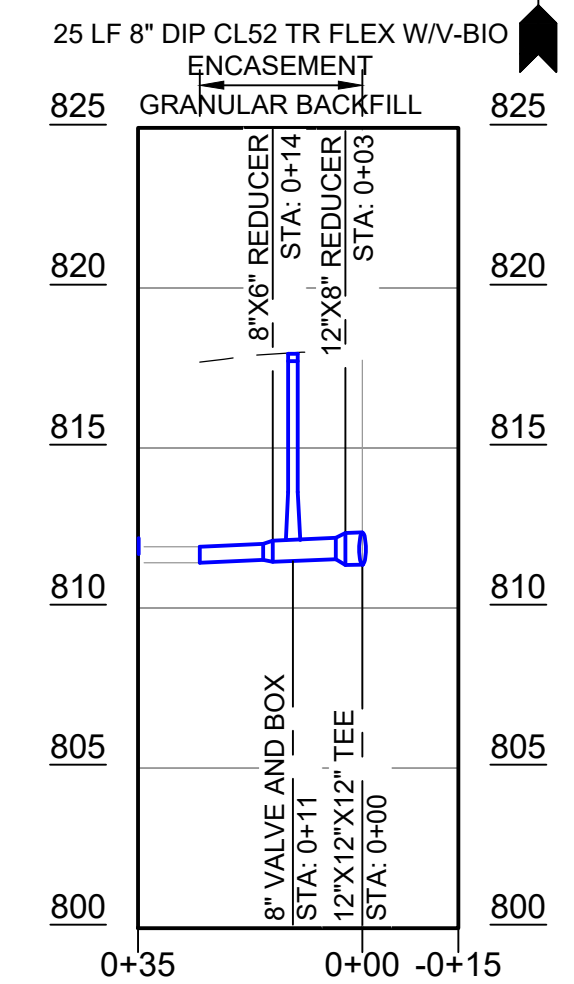
C-111

Bar Measures 1 inch, otherwise drawing not to scale

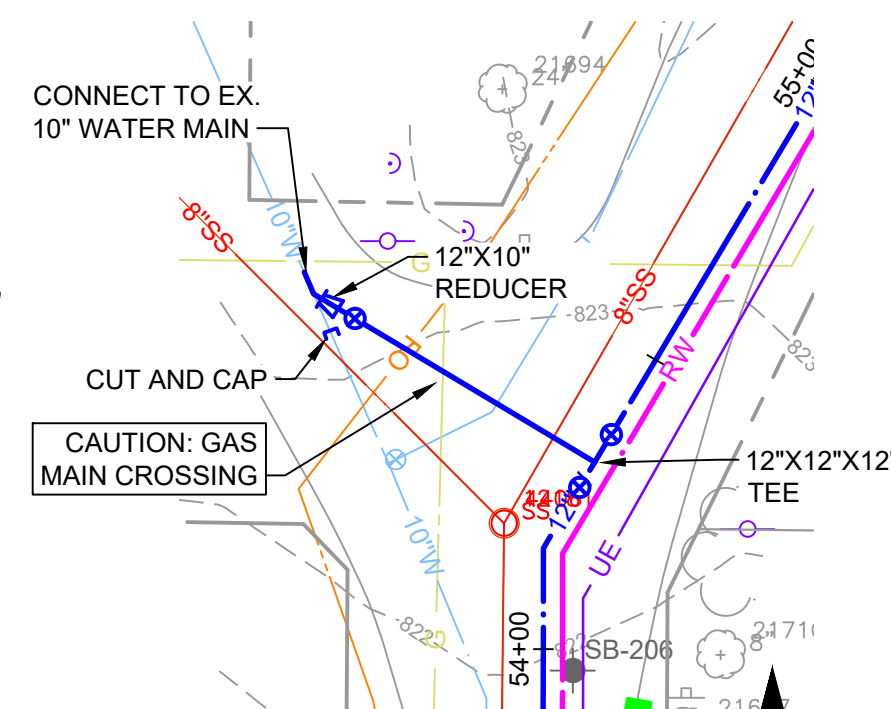
4/28/2025 9:37:38 AM - C:_AD\ACCD\DCS\TETRA TECH INC\200-19743-24012 KZOO PS5 AND PS4\PROJECT FILES\CAD SHEETS\CONTRACT 1C-10X PLAN PROFILE DWG - HOLLENBECK, TODD



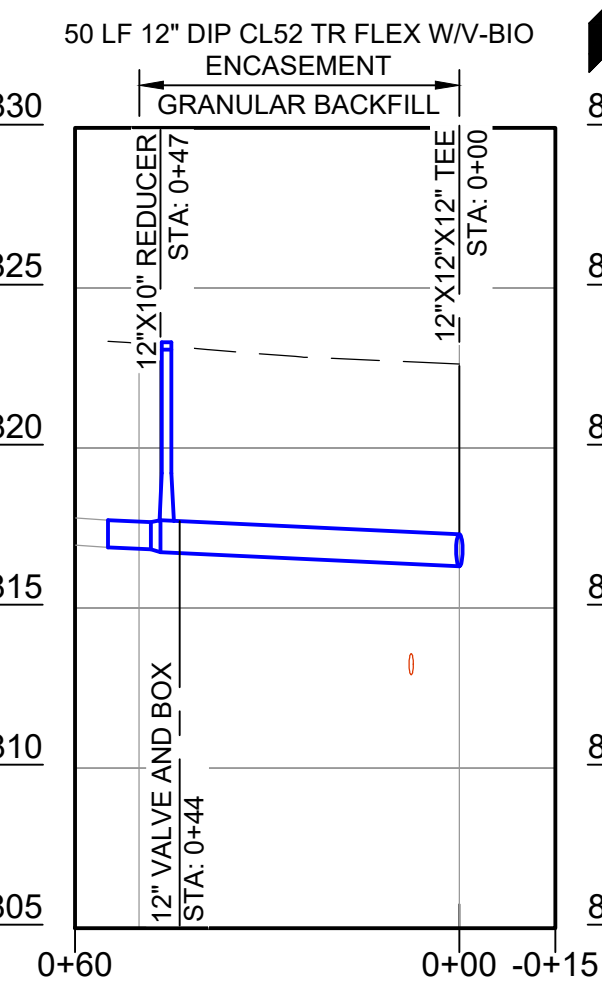
PLAN VIEW
SCALE: 1" = 30' H



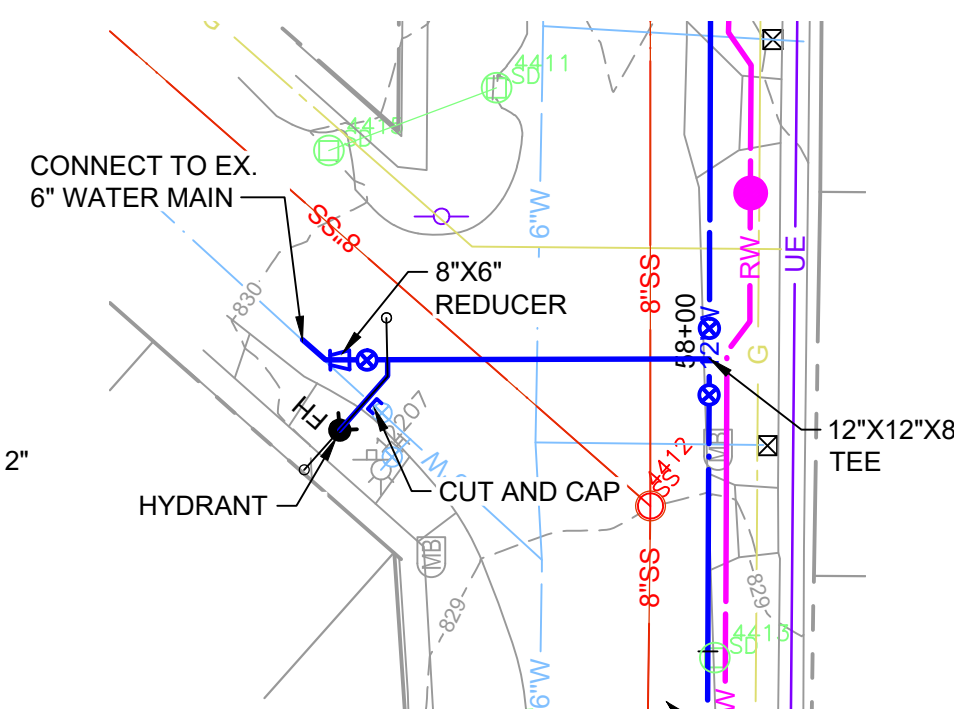
PROFILE WM 13 - STA. 50+78
SCALE: HORIZ: 1" = 30' VERT: 1" = 6'



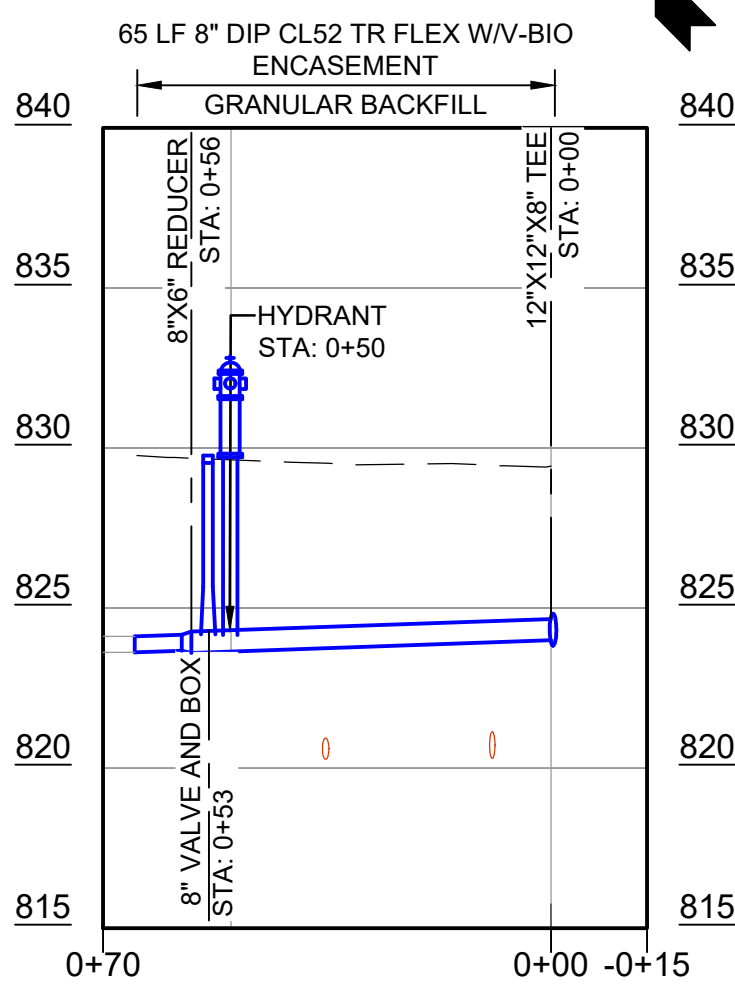
PLAN VIEW
SCALE: 1" = 30' H



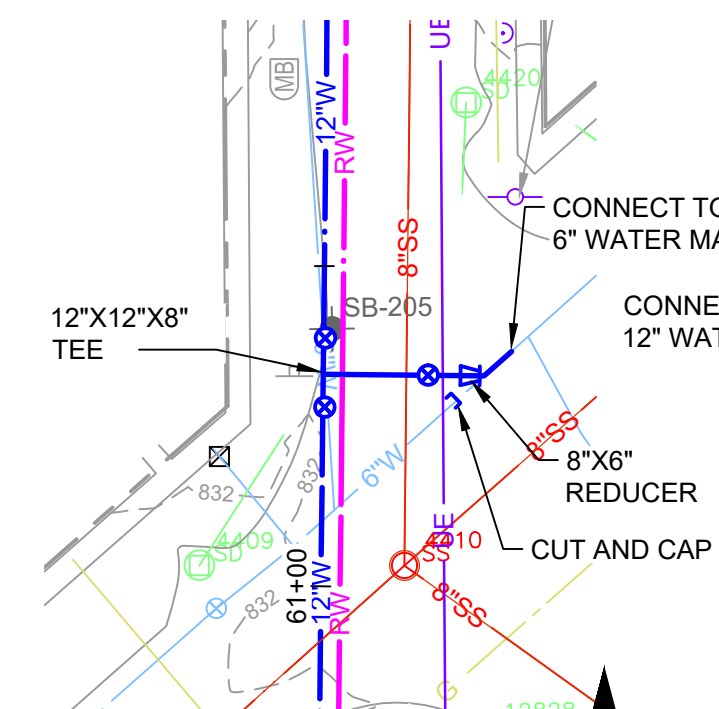
PROFILE WM 14 - STA. 54+38
SCALE: HORIZ: 1" = 30' VERT: 1" = 6'



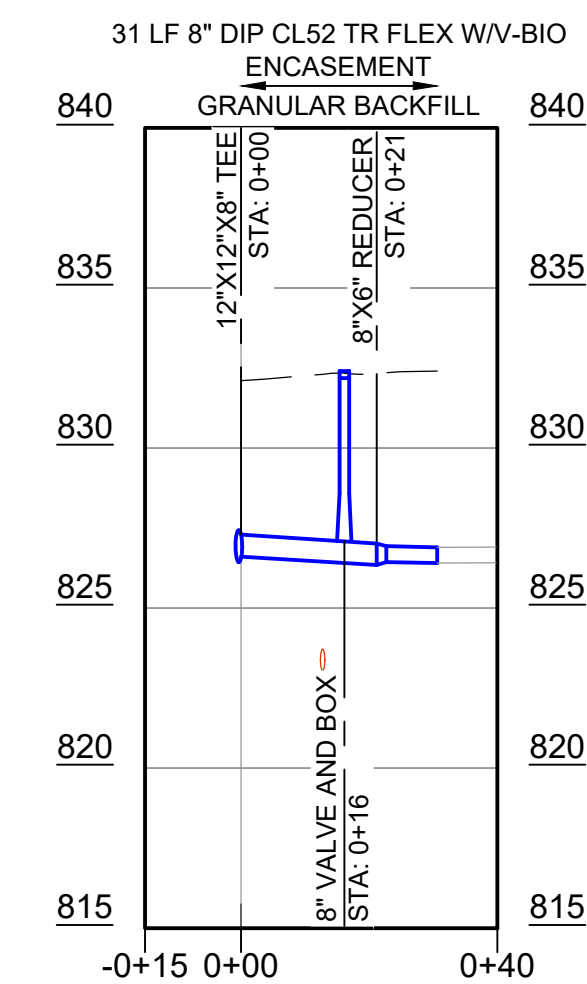
PLAN VIEW
SCALE: 1" = 30' H



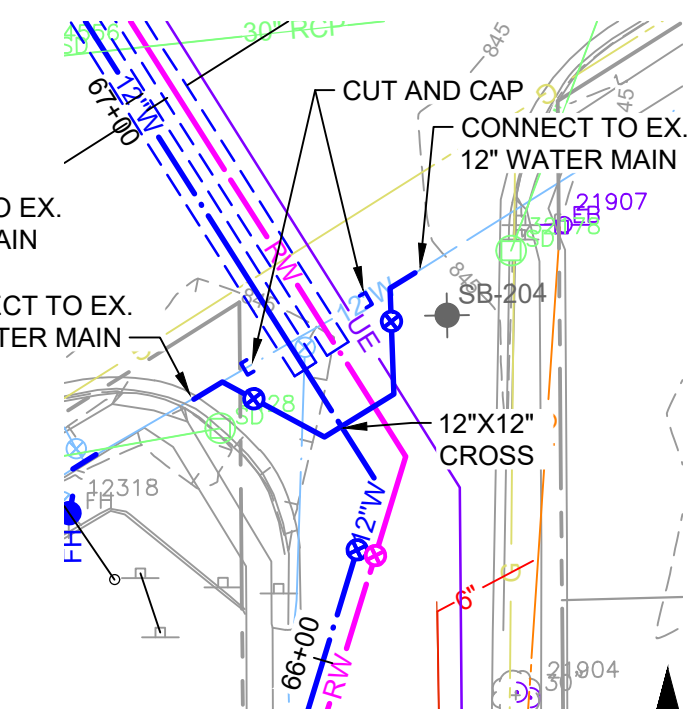
PROFILE WM 15 - STA. 58+03
SCALE: HORIZ: 1" = 30' VERT: 1" = 6'



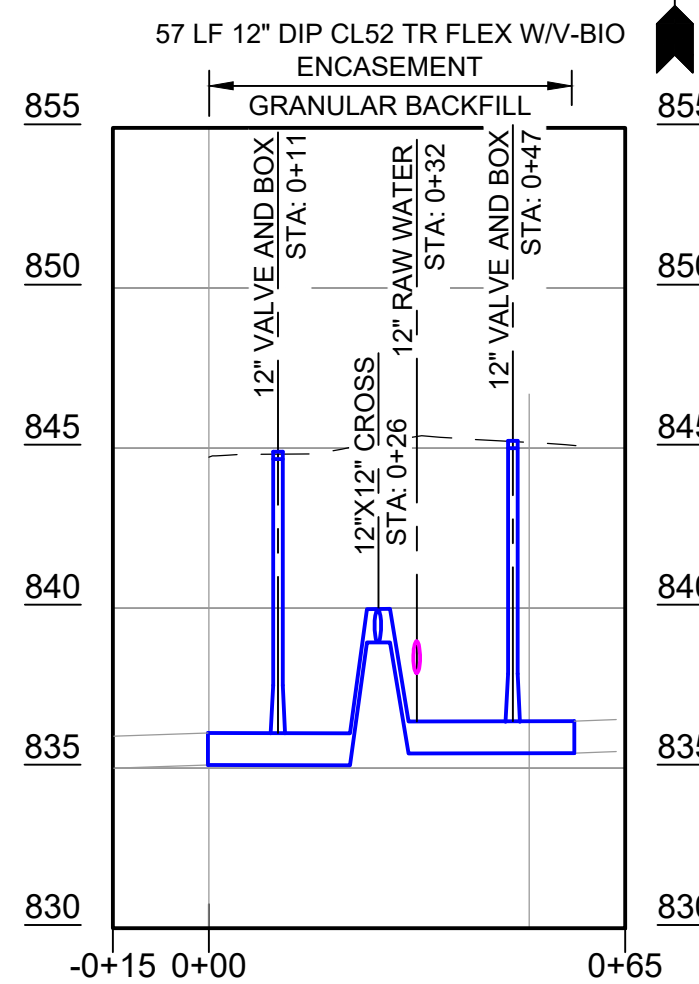
PLAN VIEW
SCALE: 1" = 30' H



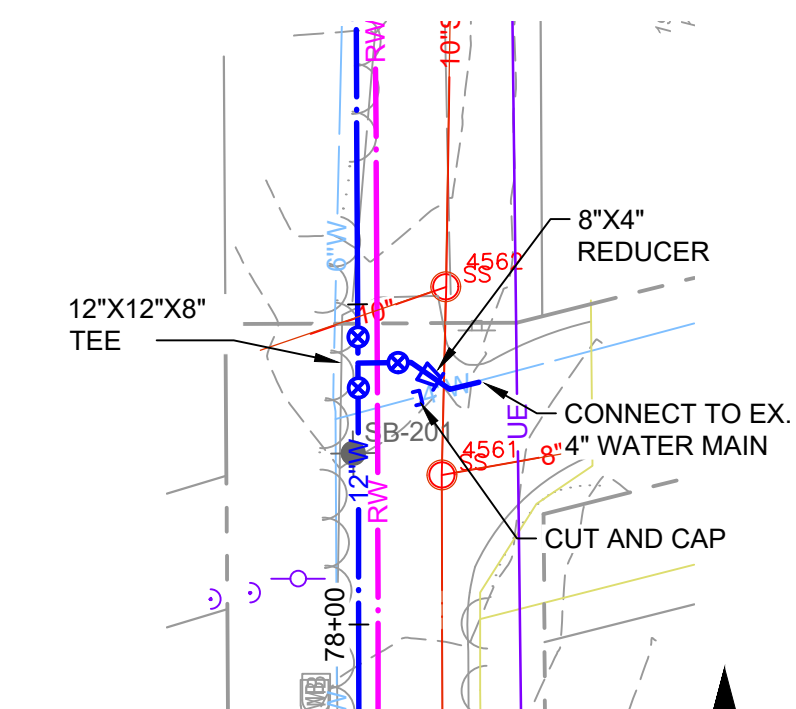
PROFILE WM 16 - STA. 61+40
SCALE: HORIZ: 1" = 30' VERT: 1" = 6'



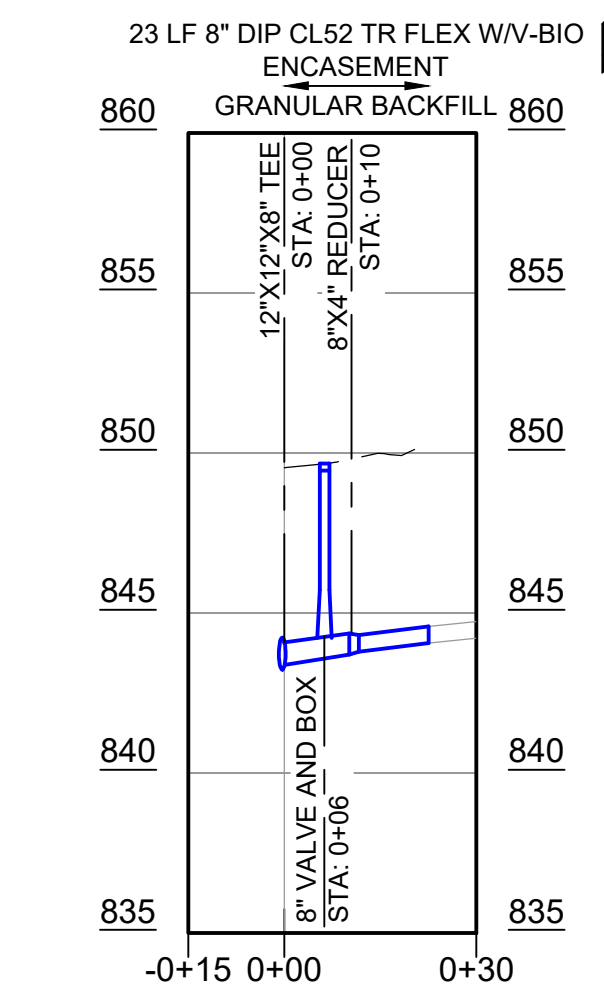
PLAN VIEW
SCALE: 1" = 30' H



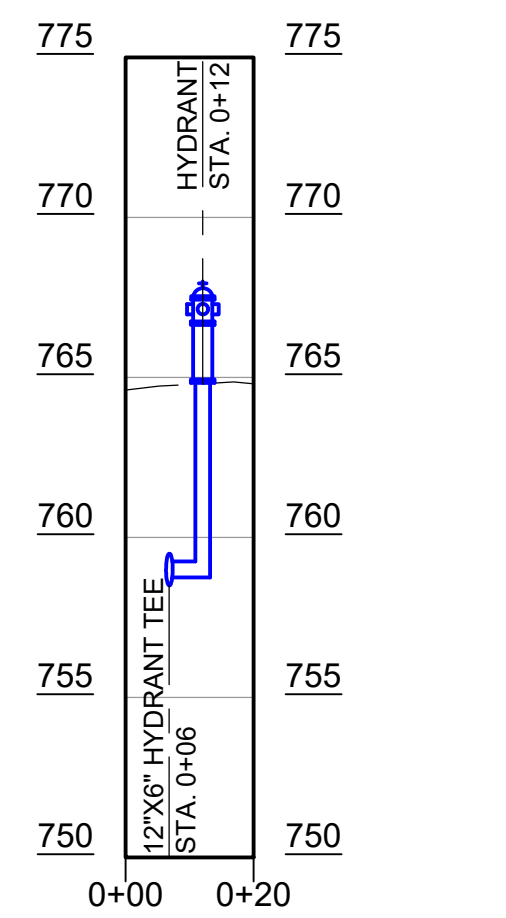
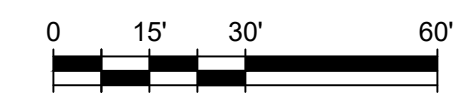
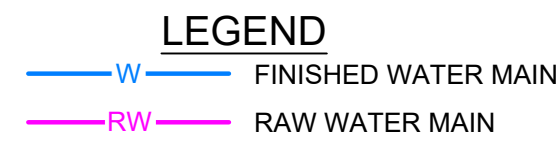
PROFILE WM 17 - STA. 66+50
SCALE: HORIZ: 1" = 30' VERT: 1" = 6'



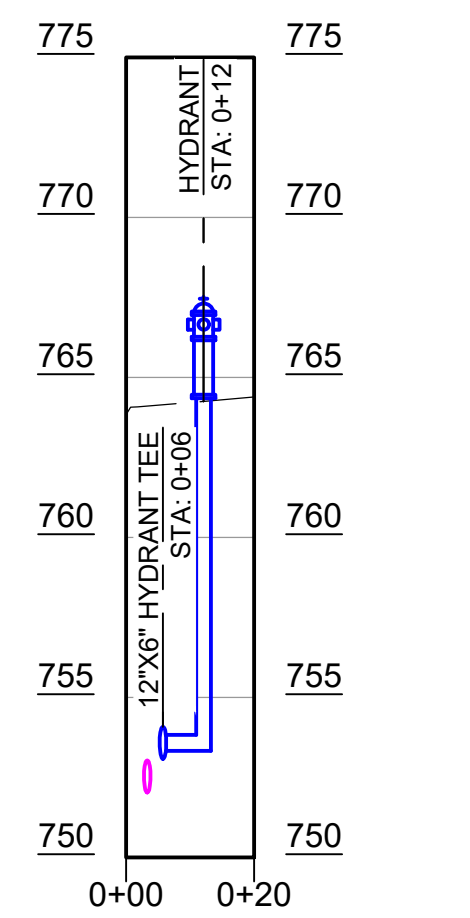
PLAN VIEW
SCALE: 1" = 30' H



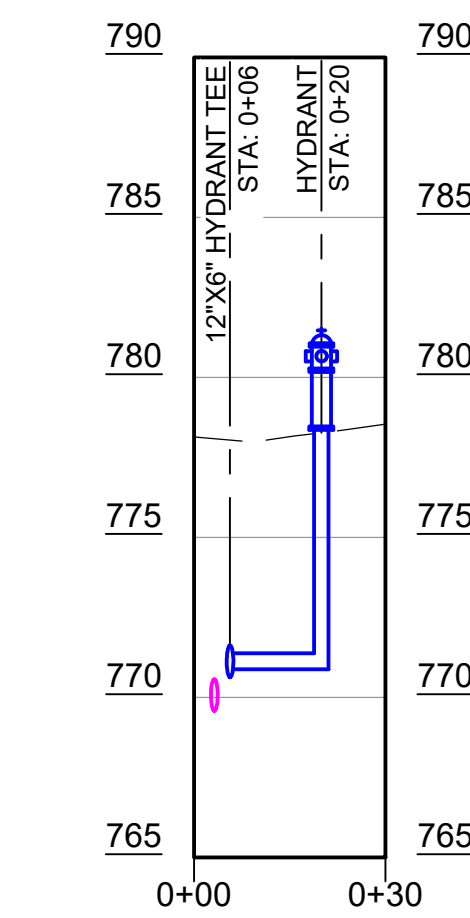
PROFILE WM 18 - STA. 78+45
SCALE: HORIZ: 1" = 30' VERT: 1" = 6'



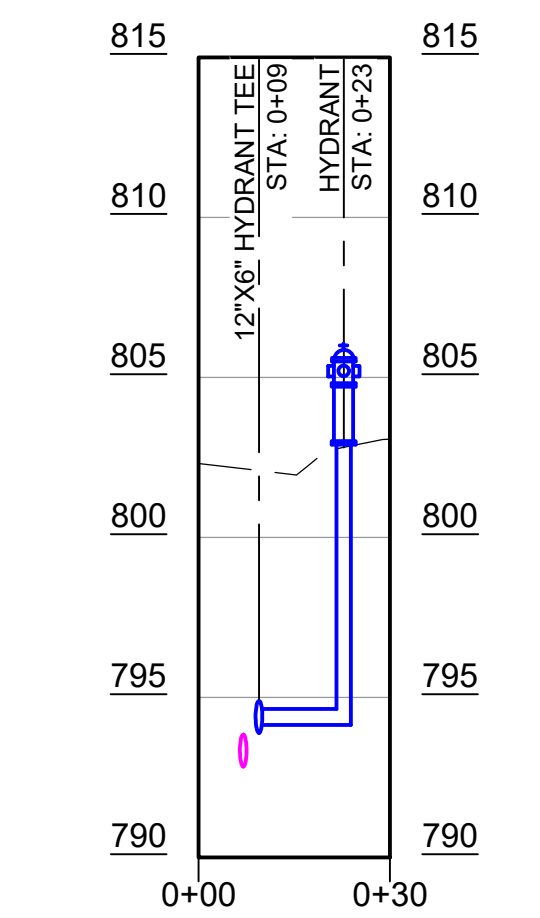
PROFILE HYD 1 - WM 1 STA. 0+61
SCALE: HORIZ: 1" = 30' VERT: 1" = 6'



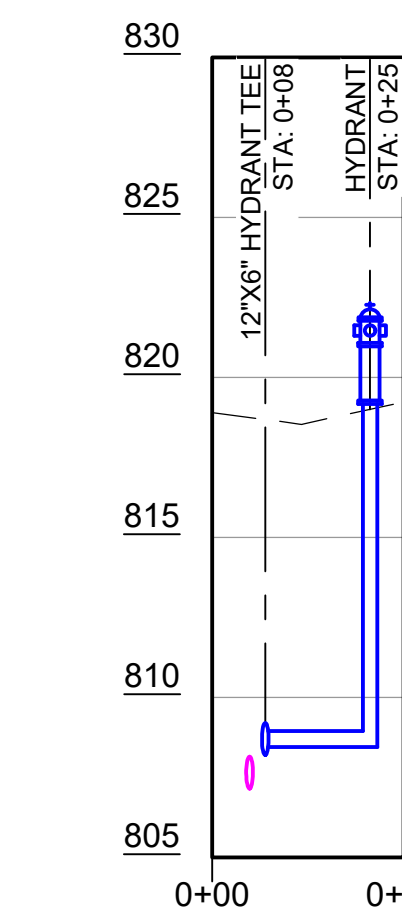
PROFILE HYD 2 - STA. 1+35
SCALE: HORIZ: 1" = 30' VERT: 1" = 6'



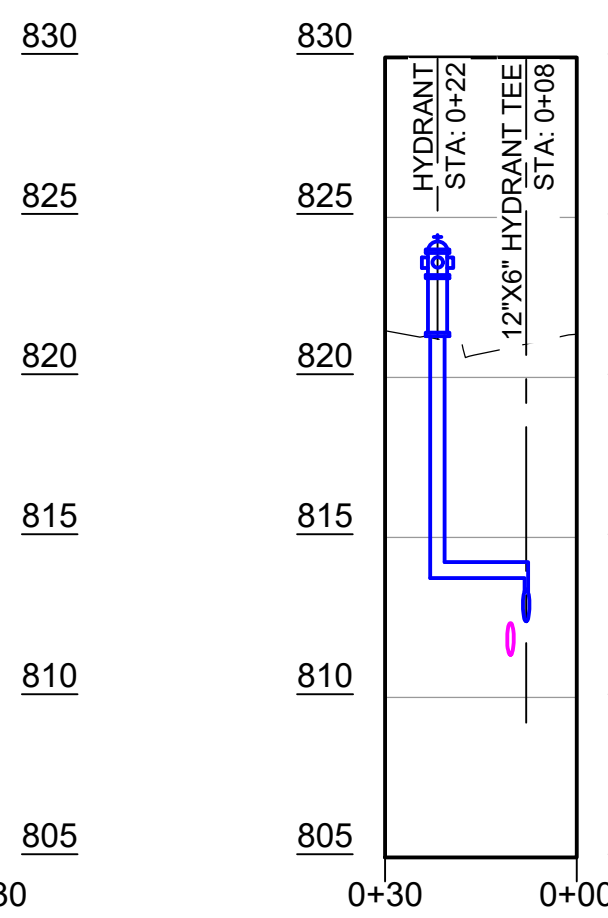
PROFILE HYD 3 - STA. 5+38
SCALE: HORIZ: 1" = 30' VERT: 1" = 6'



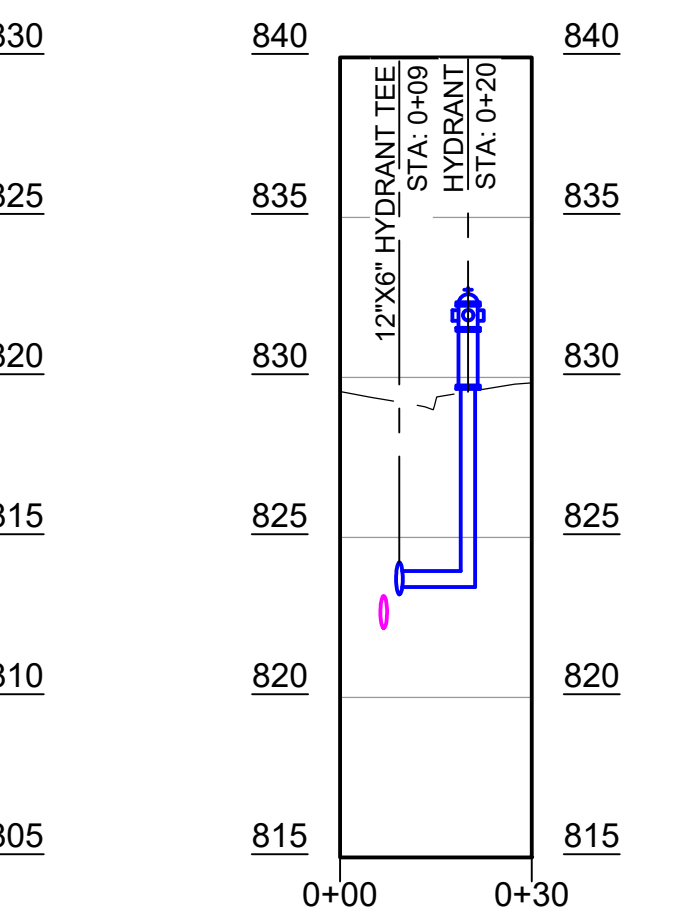
PROFILE HYD 4 - STA. 8+47
SCALE: HORIZ: 1" = 30' VERT: 1" = 6'



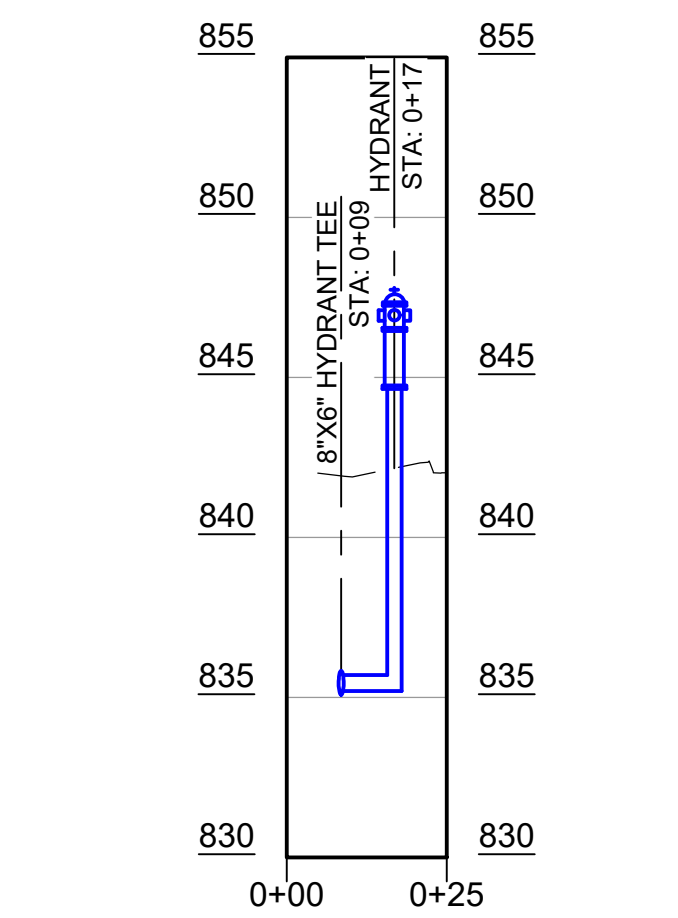
PROFILE HYD 5 - STA. 11+36
SCALE: HORIZ: 1" = 30' VERT: 1" = 6'



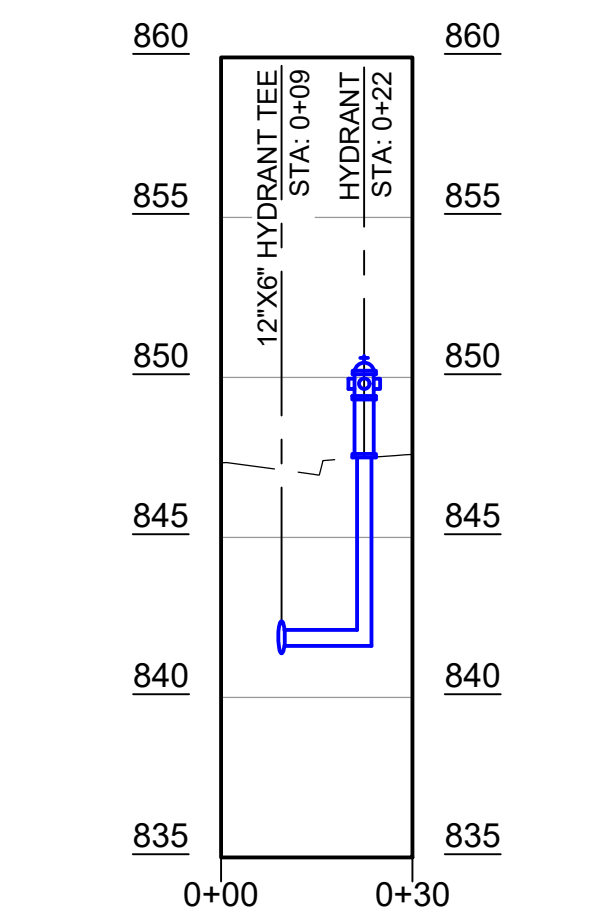
PROFILE HYD 6 - STA. 15+81
SCALE: HORIZ: 1" = 30' VERT: 1" = 6'



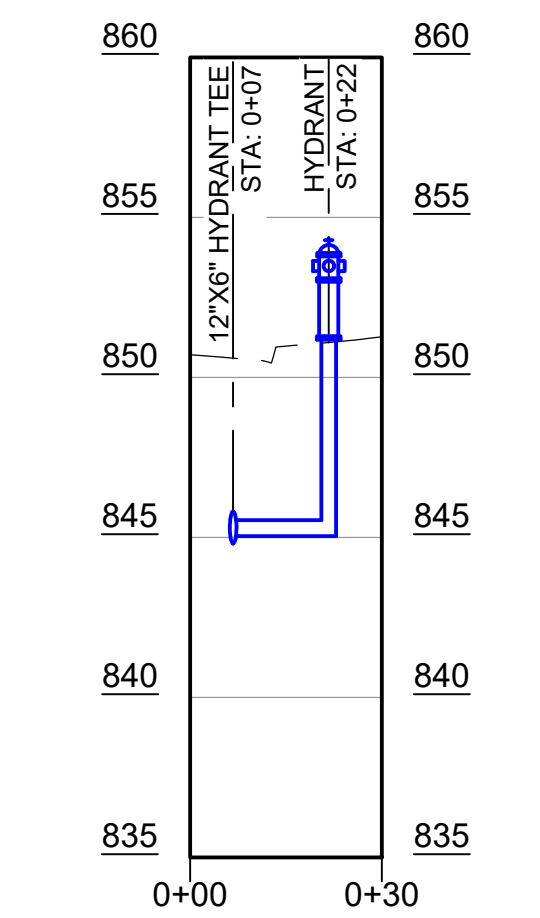
PROFILE HYD 7 - STA. 19+91
SCALE: HORIZ: 1" = 30' VERT: 1" = 6'



PROFILE HYD 8 - WM 8 STA. 0+28
SCALE: HORIZ: 1" = 30' VERT: 1" = 6'

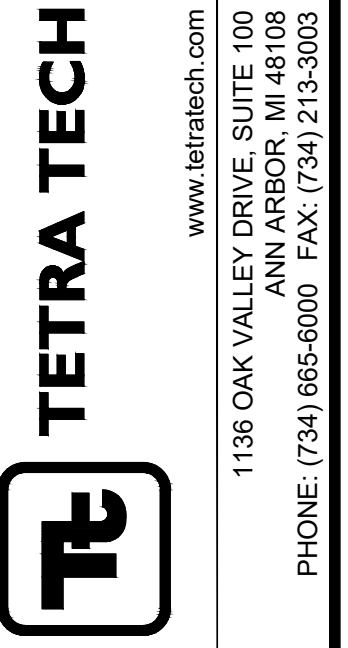


PROFILE HYD 9 - STA. 25+69
SCALE: HORIZ: 1" = 30' VERT: 1" = 6'



PROFILE HYD 10 - STA. 28+63
SCALE: HORIZ: 1" = 30' VERT: 1" = 6'

FIRE HYDRANT PROFILES



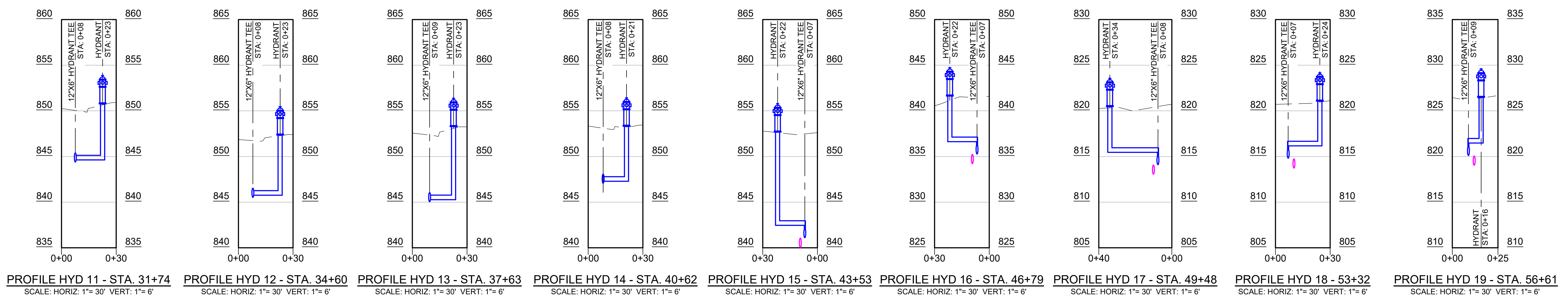
MARK	DATE	DESCRIPTION
	05/01/25	ISSUED FOR BIDS

CITY OF KALAMAZOO, MICHIGAN
PUMP STATION 5 & 14
WATER AND TRANSMISSION MAIN, CONTRACT 1
**PROPOSED WATER MAIN
PLAN AND PROFILE INTERSECTION
DETAILS/HYDRANT PROFILES**

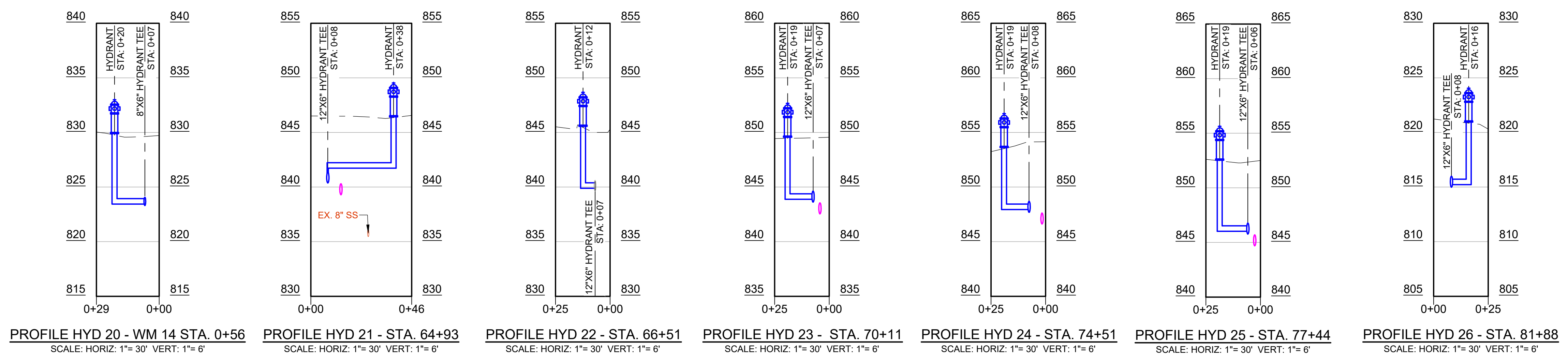
PROJ: 200-19743-24012
DES: D. WARREN
DRWN: T. HOLLENBECK
CHKD: S. BYRNE

C-112

4/28/2025 9:38:59 AM - C:\ADACDDOC\TETRA TECH INC\200-19743-24012 KZOO PS5 AND PS4\PROJECT FILES\CAD SHEET FILES\CONTRACT 1C-10X PLAN PROFILE DWG - HOLLENBECK, TODD



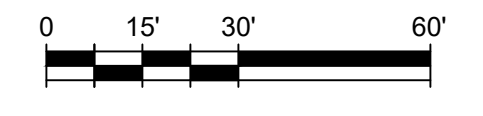
FIRE HYDRANT PROFILES



FIRE HYDRANT PROFILES

LEGEND

— W — FINISHED WATER MAIN
 — RW — RAW WATER MAIN



TETRA TECH

www.tetra-tech.com
 1136 OAK VALLEY DRIVE, SUITE 100
 ANN ARBOR, MI 48108
 PHONE: (734) 665-6000 FAX: (734) 213-3003

MARK	DATE	DESCRIPTION	BY
	05/01/25	ISSUED FOR BIDS	

CITY OF KALAMAZOO, MICHIGAN
 PUMP STATION 5 & 14
 WATER AND TRANSMISSION MAIN, CONTRACT 1
**PROPOSED WATER MAIN
 HYDRANT PROFILES**

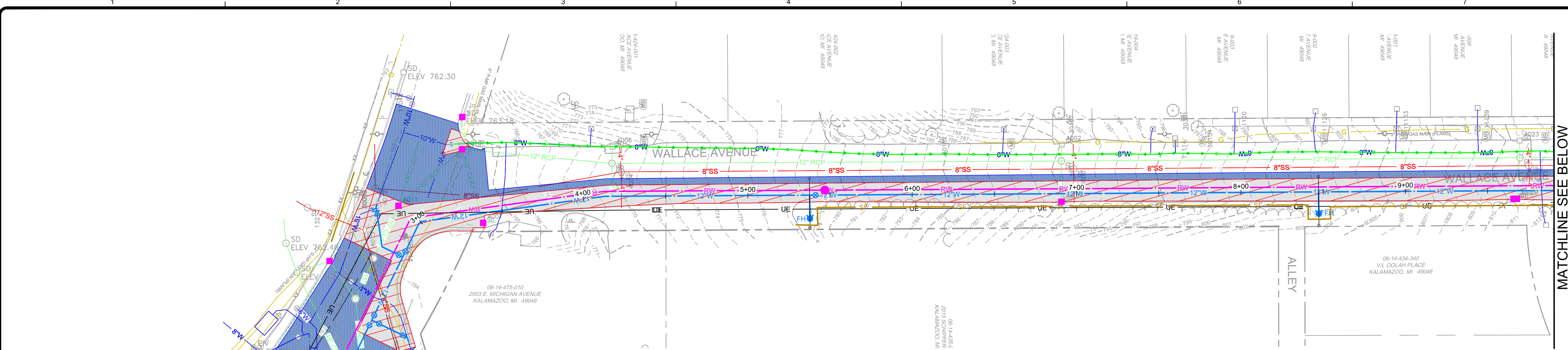
PROJ:	200-19743-24012
DESN:	D. WARREN
DRWN:	T. HOLLENBECK
CHKD:	S. BYRNE

C-113

Bar Measures 1 inch, otherwise drawing not to scale

Copyright: Tetra Tech

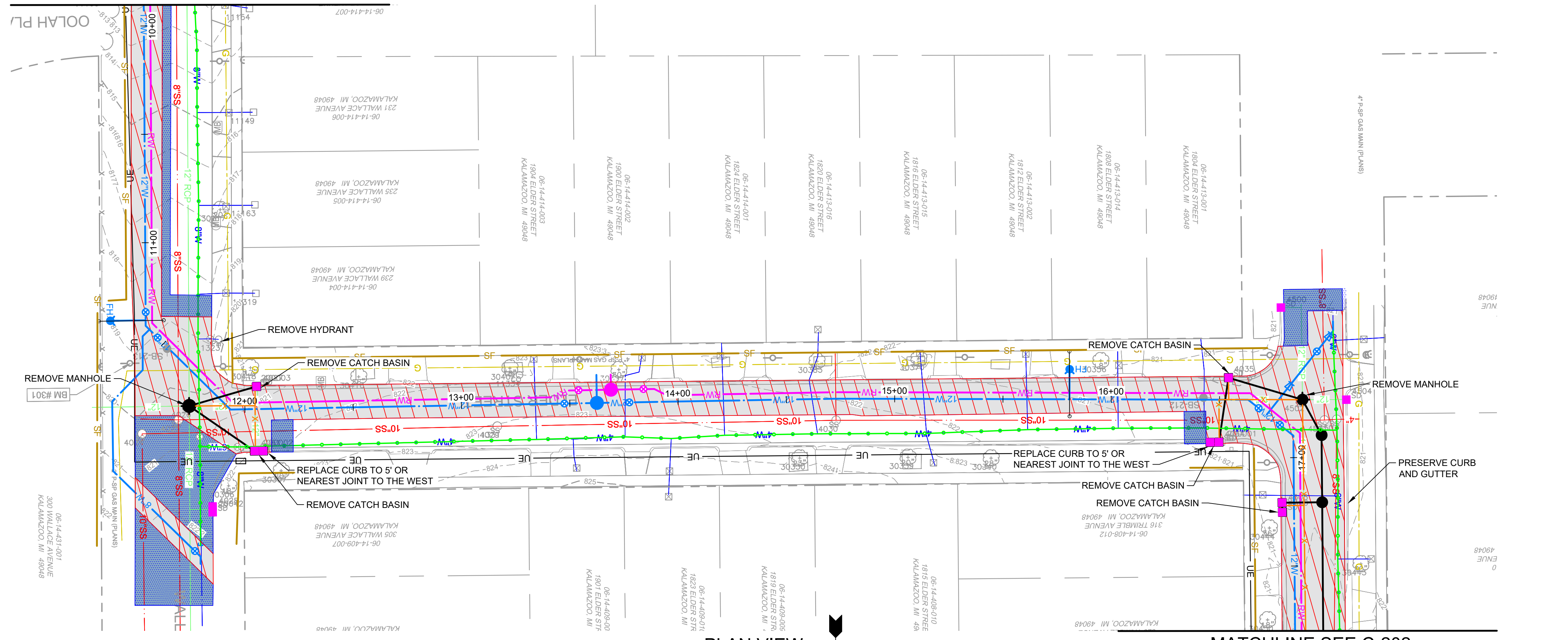
4/28/2025 9:41:28 AM - C:\ADACDC\STETRA TECH INC\200-19743-24012 KZOO PS5 AND PS4\PROJECT FILES\CAD\PROJECT SHEETS\CONTRACT 1C-20X REMOVALS.DWG - HOLLENBECK, TODD



PLAN VIEW
SCALE: 1" = 30' H

- LEGEND:
- REMOVE AND REPLACE FULL DEPTH PAVEMENT
 - 2" COLD MILLING
 - REMOVE AND REPLACE SIDEWALK
 - ABANDON UTILITY
 - REMOVE UTILITY
 - SILT FENCE
 - INLET FILTER

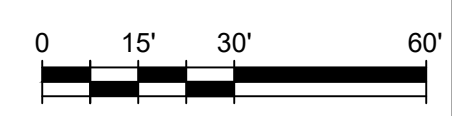
MATCHLINE SEE ABOVE



PLAN VIEW
SCALE: 1" = 30' H

MATCHLINE SEE C-202

- NOTES:
- EXISTING CURB AND GUTTER TO BE REMOVED AND REPLACED ONLY WHEN NECESSARY FOR WATER MAIN INSTALLATION.



MATCHLINE SEE BELOW

TETRA TECH
www.tetratech.com
1136 OAK VALLEY DRIVE, SUITE 100
ANN ARBOR, MI 48108
PHONE: (734) 665-6000 FAX: (734) 213-3003

MARK	DATE	DESCRIPTION	BY
	05/01/25	ISSUED FOR BIDS	

CITY OF KALAMAZOO, MICHIGAN
PUMP STATION 5 & 14
WATER AND TRANSMISSION MAIN, CONTRACT 1
**PROPOSED WATER MAIN
DEMOLITION PLANS**
STA. 0+00 TO 17+80

PROJ: 200-19743-24012
DESN: D. WARREN
DRWN: T. HOLLENBECK
CHKD:

C-201

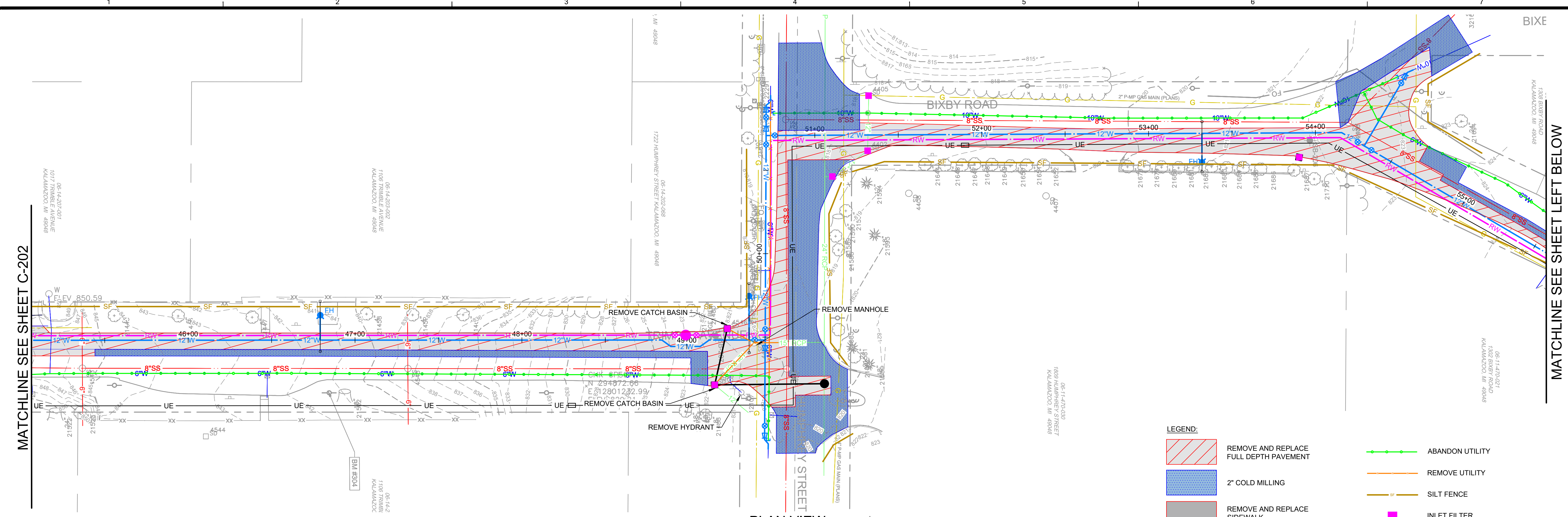
Copyright: Tetra Tech

Bar Measures 1 inch, otherwise drawing not to scale

4/28/2025 9:42:59 AM - C:\AD\ACDDOC\STETRA TECH INC\200-19743-24012 KZOO PS5 AND PS4\PROJECT FILES\CAD\SHEETFILES\CONTRACT 1C-20X REMOVALS.DWG - HOLLENBECK, TODD

MATCHLINE SEE SHEET C-202

MATCHLINE SEE SHEET LEFT BELOW



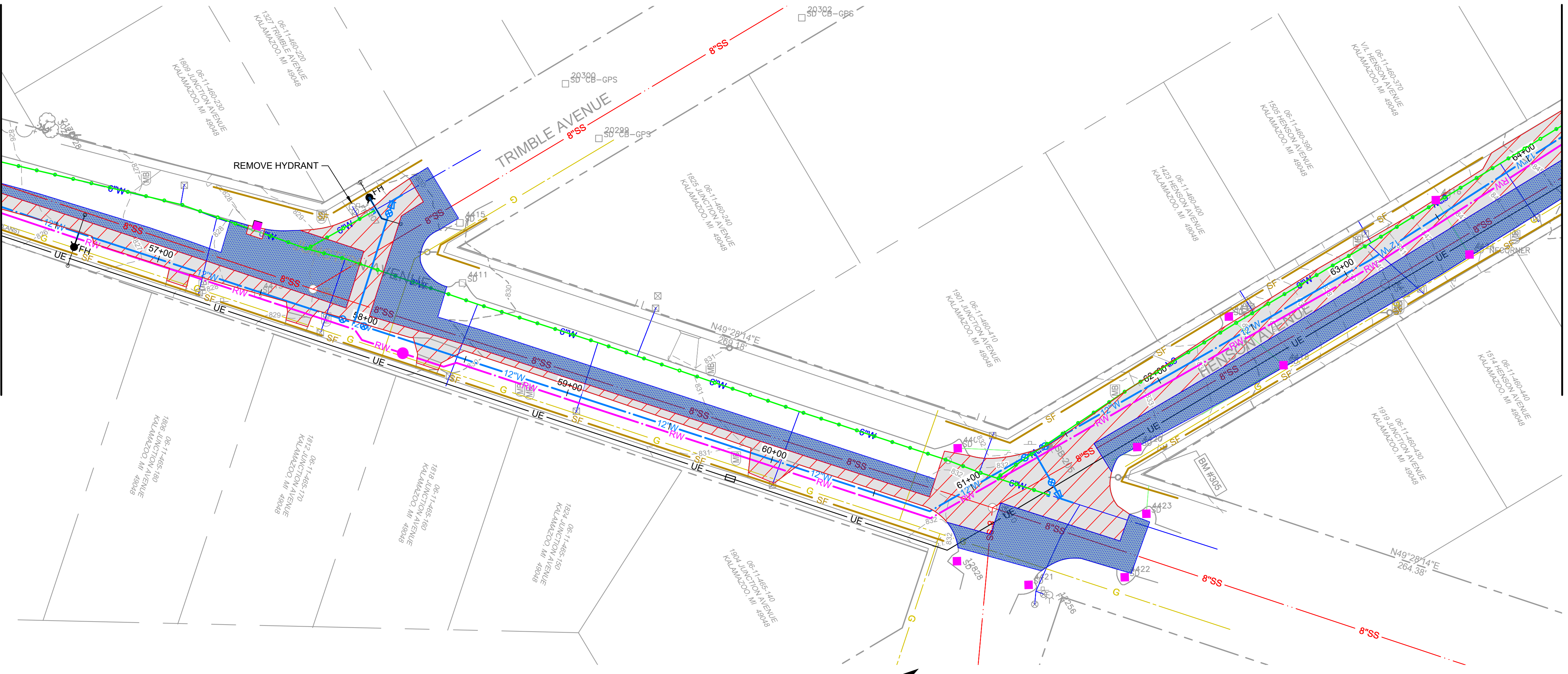
PLAN VIEW
SCALE: 1" = 30' H

LEGEND:

- REMOVE AND REPLACE FULL DEPTH PAVEMENT
- 2" COLD MILLING
- REMOVE AND REPLACE SIDEWALK
- ABANDON UTILITY
- REMOVE UTILITY
- SILT FENCE
- INLET FILTER

MATCHLINE SEE RIGHT ABOVE

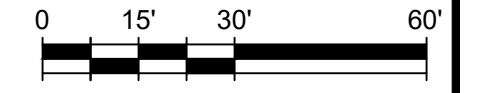
MATCHLINE SEE SHEET C-204



PLAN VIEW
SCALE: 1" = 30' H

NOTES:

1. EXISTING CURB AND GUTTER TO BE REMOVED AND REPLACED ONLY WHEN NECESSARY FOR WATER MAIN INSTALLATION.



TETRA TECH
www.tetra.tech.com
1136 OAK VALLEY DRIVE, SUITE 100
ANN ARBOR, MI 48108
PHONE: (734) 665-6000 FAX: (734) 213-3003

MARK	DATE	DESCRIPTION	BY
	05/01/25	ISSUED FOR BIDS	

CITY OF KALAMAZOO, MICHIGAN
PUMP STATION 5 & 14
WATER AND TRANSMISSION MAIN, CONTRACT 1
**PROPOSED WATER MAIN
DEMOLITION PLANS**
STA. 45+55 TO 64+20

PROJ: 200-19743-24012
DESN: D. WARREN
DRWN: T. HOLLENBECK
CHKD:

C-203

Copyright: Tetra Tech

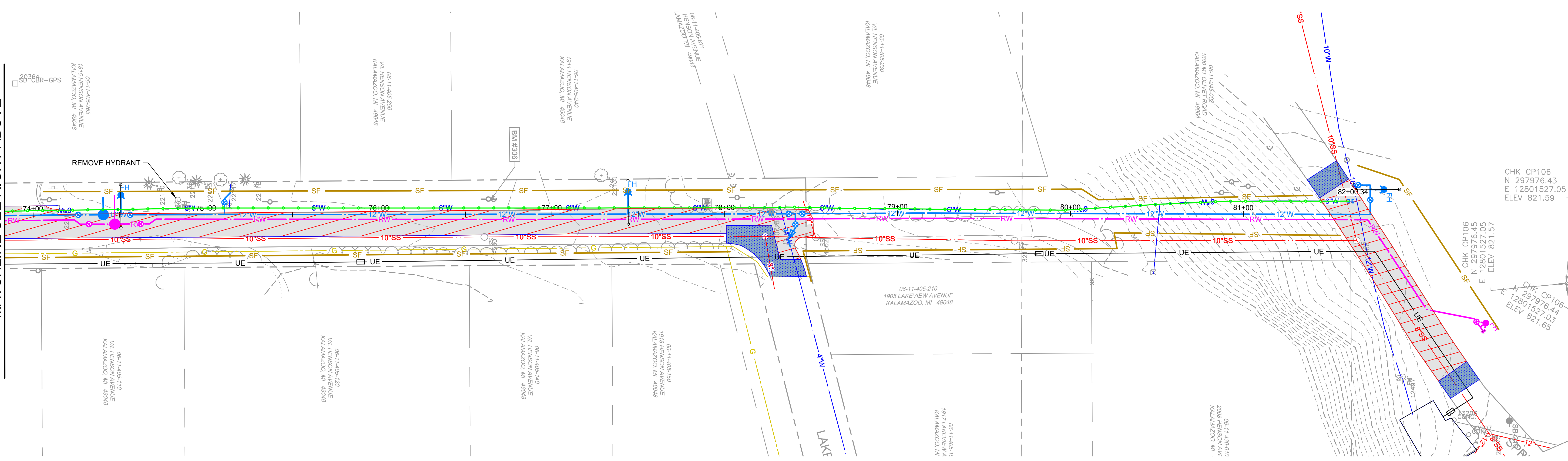
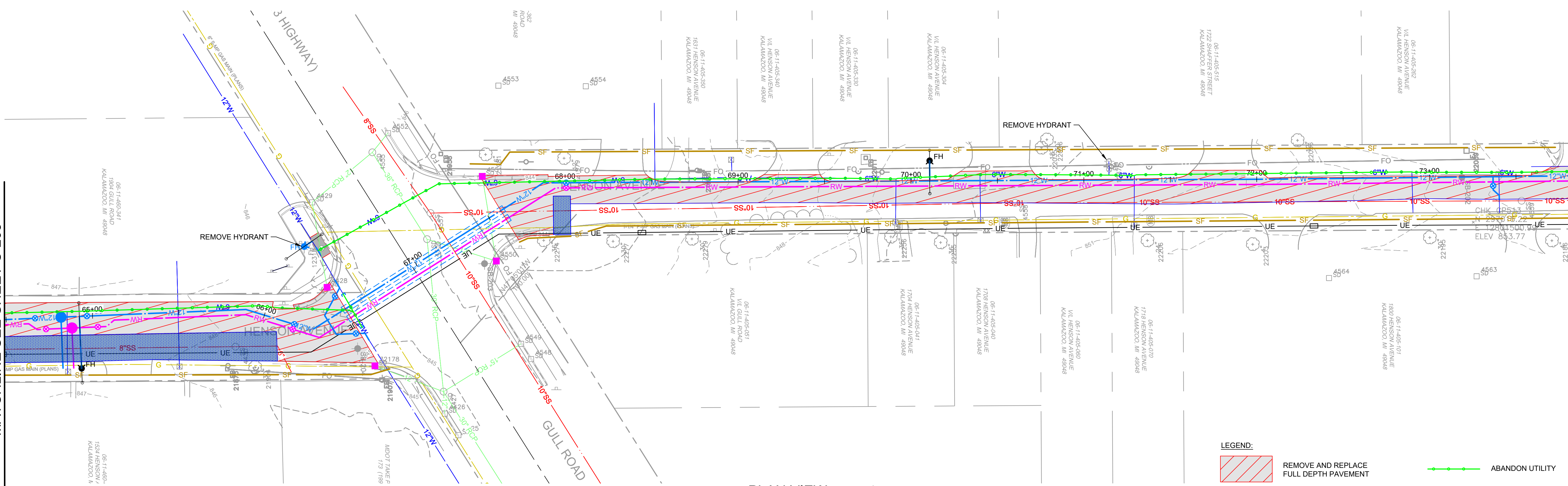
Bar Measures 1 inch, otherwise drawing not to scale

4/28/2025 9:43:30 AM - C:\ADACDDCS\TETRA TECH\INC\200-19743-24012\K200\PS5 AND PS4\PROJECT FILES\CAD\PROJECT FILES\CONTRACT 1C-20X REMOVALS.DWG - HOLLENBECK, TODD

MATCHLINE SEE SHEET C-203

MATCHLINE SEE RIGHT ABOVE

MATCHLINE SEE LEFT BELOW

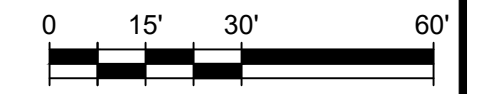


LEGEND:

-  REMOVE AND REPLACE FULL DEPTH PAVEMENT
-  2" COLD MILLING
-  REMOVE AND REPLACE SIDEWALK
-  ABANDON UTILITY
-  REMOVE UTILITY
-  SILT FENCE
-  INLET FILTER

NOTES:

1. EXISTING CURB AND GUTTER TO BE REMOVED AND REPLACED ONLY WHEN NECESSARY FOR WATER MAIN INSTALLATION.



TETRA TECH
www.tetra.tech.com
1136 OAK VALLEY DRIVE, SUITE 100
ANN ARBOR, MI 48108
PHONE: (734) 665-6000 FAX: (734) 213-3003

MARK	DATE	DESCRIPTION	BY
	05/01/25	ISSUED FOR BIDS	

CITY OF KALAMAZOO, MICHIGAN
PUMP STATION 5 & 14
WATER AND TRANSMISSION MAIN, CONTRACT 1
PROPOSED WATER MAIN
DEMOLITION PLANS
STA. 64+20 TO 81+98

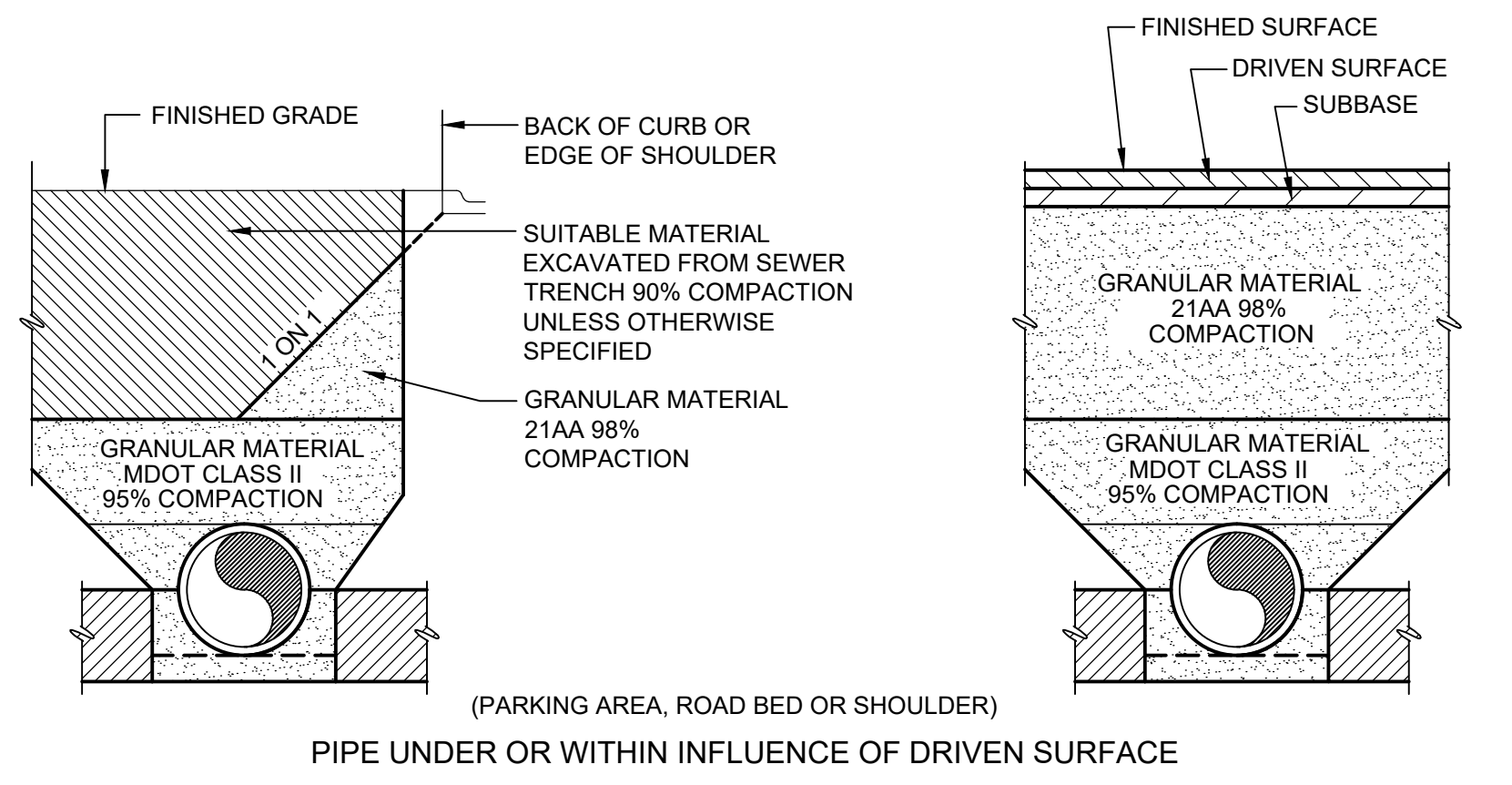
PROJ:	200-19743-24012
DESN:	D. WARREN
DRWN:	T. HOLLENBECK
CHKD:	

C-204

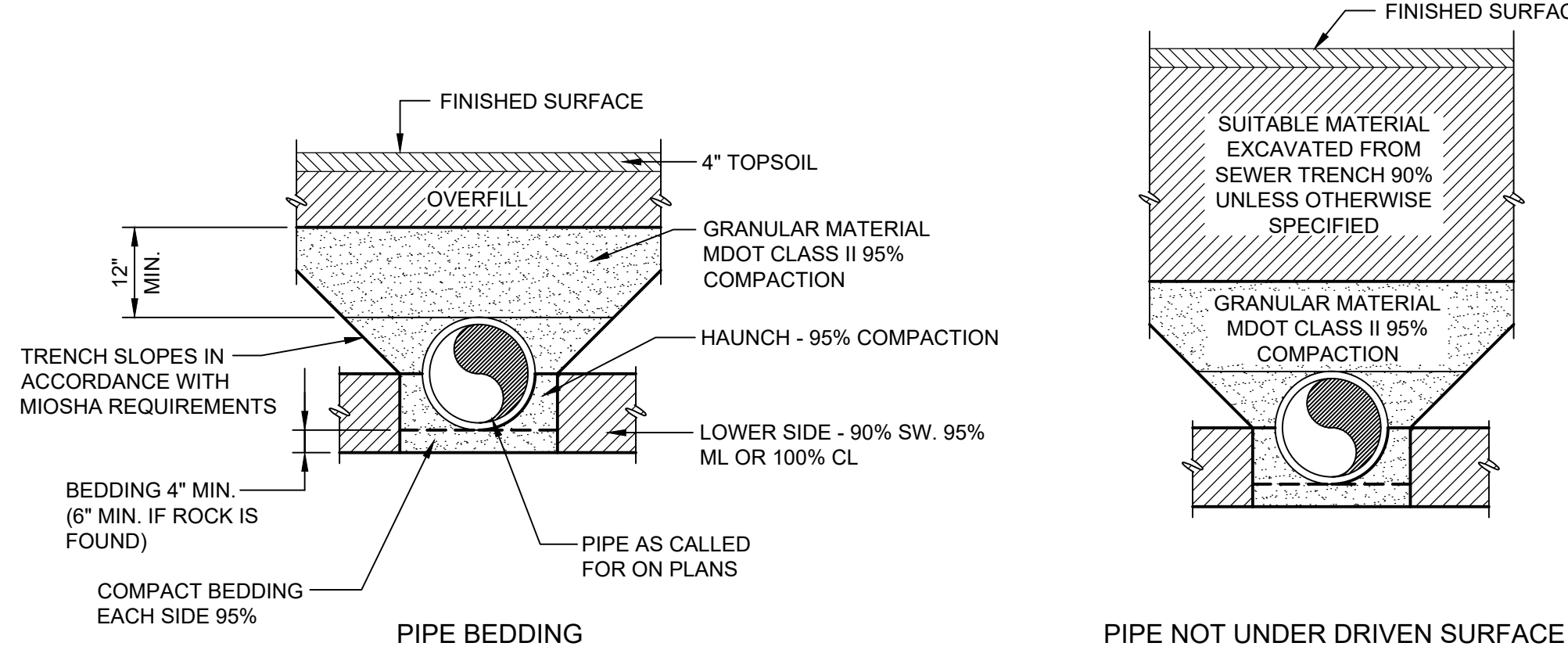
Copyright: Tetra Tech

Bar Measures 1 inch, otherwise drawing not to scale

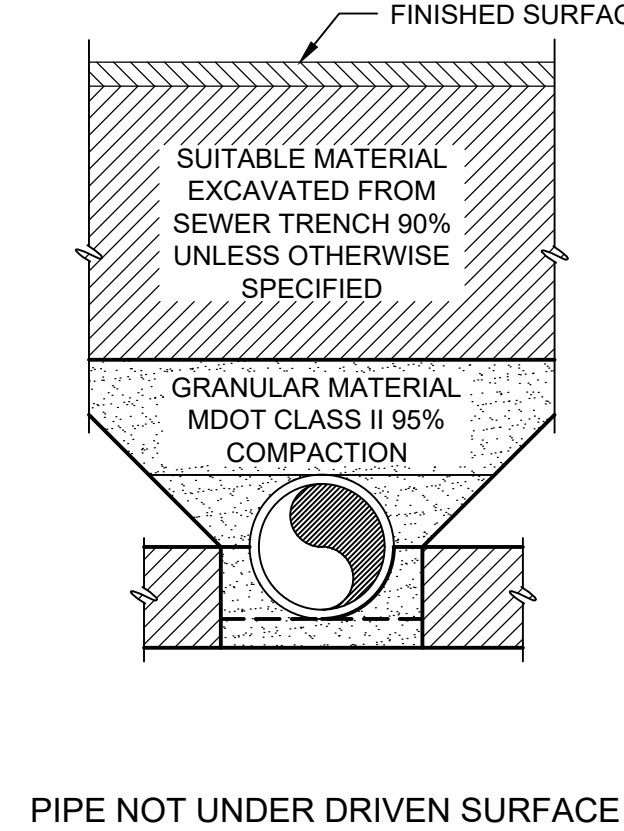
MISCELLANEOUS DETAILS



PIPE UNDER OR WITHIN INFLUENCE OF DRIVEN SURFACE



PIPE BEDDING



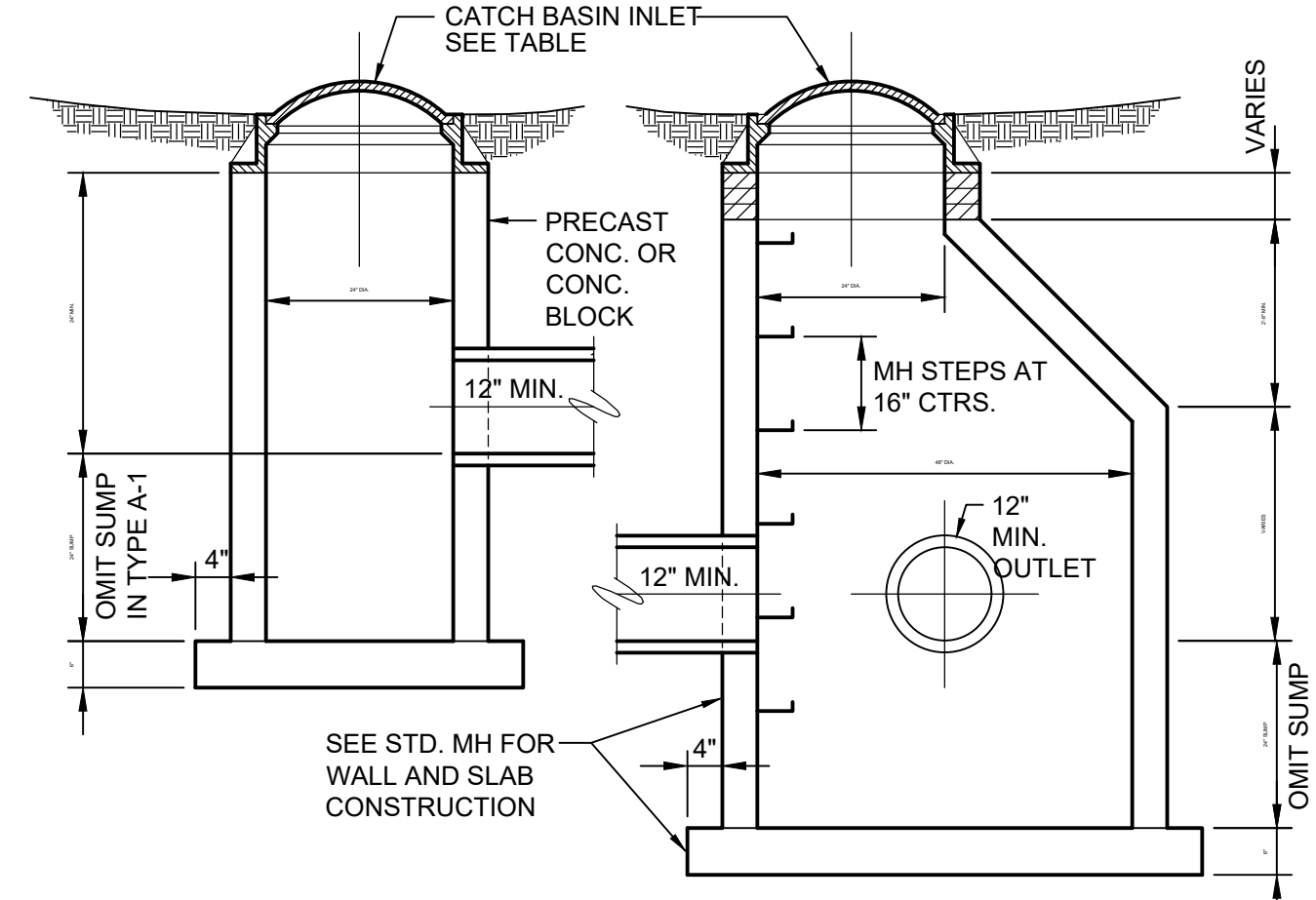
PIPE NOT UNDER DRIVEN SURFACE

- NOTES:
1. COMPACTION PRESENTED AS MINIMUM STANDARD PROCTOR VALUES.
 2. MATERIALS AROUND THERMO PLASTIC PIPE WITH DIAMETER < 6 INCHES SHALL PASS 0.5 INCH SIEVE, MATERIALS AROUND OTHER PIPES SHALL PASS 1.5 INCH SIEVE.
 3. MATERIALS AROUND HDPE PIPE TO BE MDOT 6A OR 21AA.
 4. DRIVEN SURFACE IS DRIVEWAY, PARKING AREA, ROAD BED OR SHOULDER.

TRENCH DETAIL

NO SCALE

MANHOLE FRAME & COVER & CATCH BASIN INLETS				
TYPE	LOCATION	MANUFACTURER OR EQUAL		TYPE OF COVER OR INLET
		EAST JORDAN	NEENAH	
MH	ALL	-	-	SANITARY SOLID SELF-SEALING STORM-VENTED
CB	TYPE A CURB	-	-	FLAT GRATE WITH VERT. OPEN BACK
CB	TYPE B CURB	-	-	FLAT GRATE WITH ROLL BACK
CB	PAVEMENT/ SHOULDER	-	-	FLAT GRATE
CB	OPEN AREA	-	-	BEEHIVE GRATE 4" HIGH
CB	GUTTER	-	-	CONCAVE INLET



TYPE "A"

NOTE: TYPE A-1 EQUAL TO TYPE "A" EXCLUDING 24" SUMP BUT ADD ON BOTTOM CONC. FILLET.

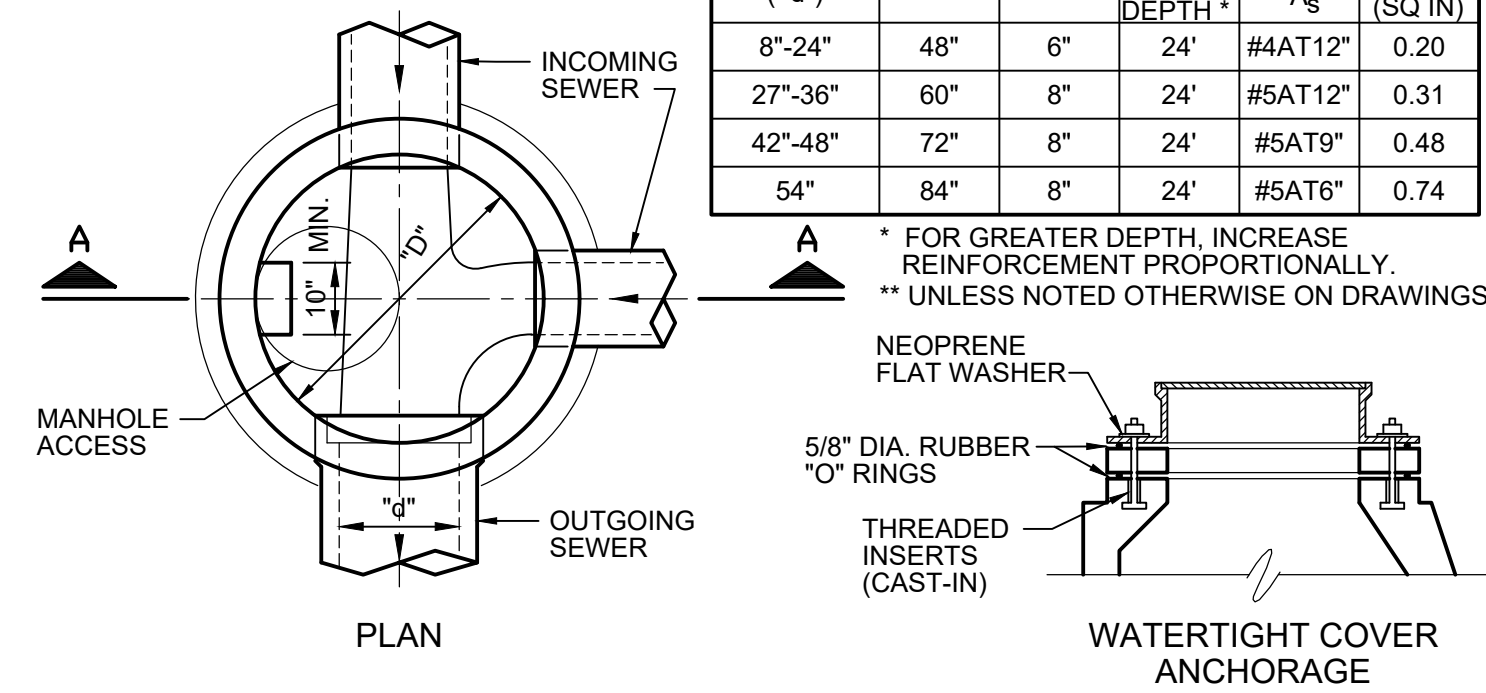
TYPE "B"

NOTE: TYPE B-1 EQUAL TO TYPE "B" EXCLUDING 24" SUMP BUT ADD ON BOTTOM CONC. FILLET.

CATCH BASINS

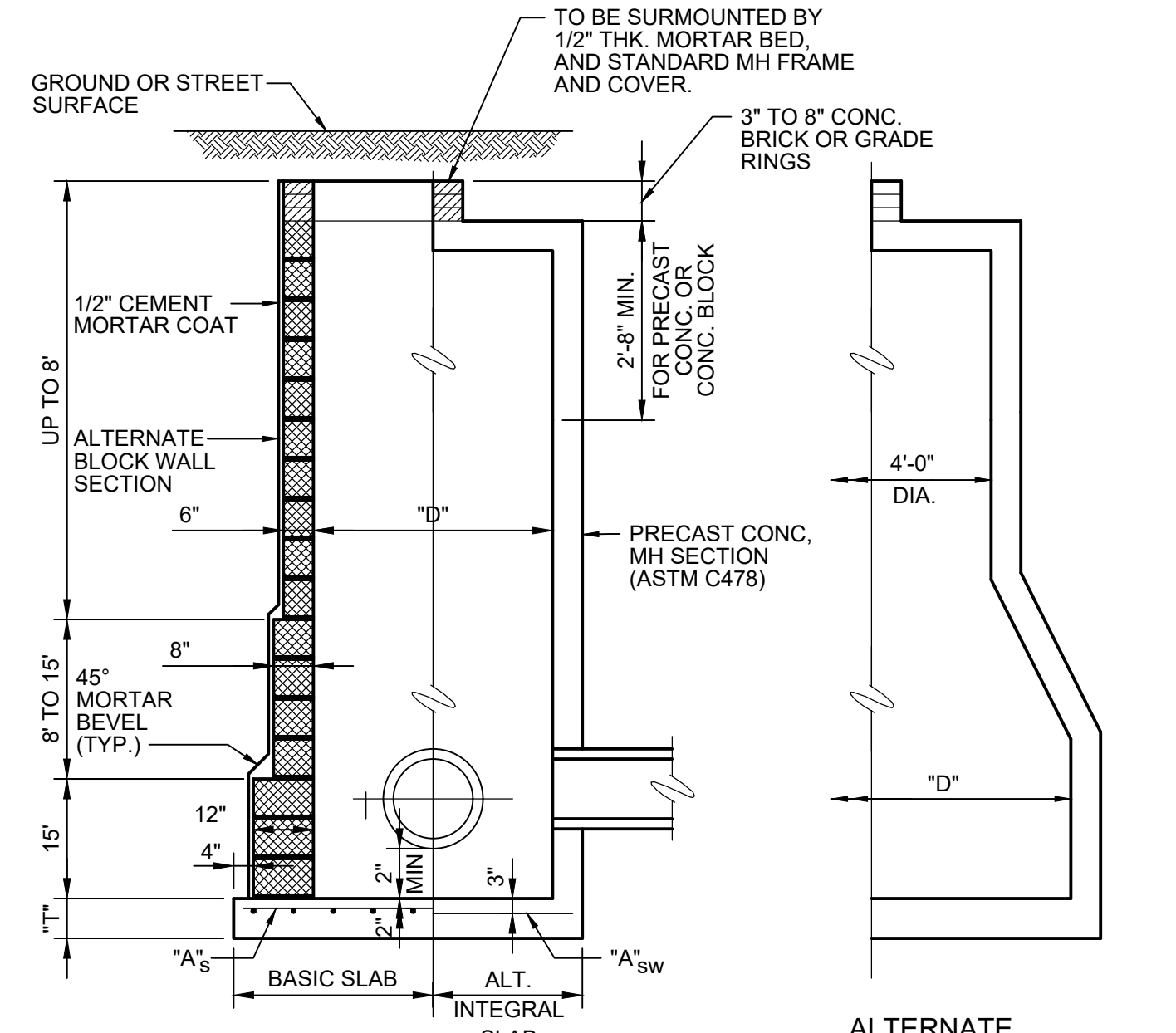
NO SCALE

MANHOLE SCHEDULE					
PIPE SIZE ("d")	D **	T	SLAB REINF (EA WAY)		
			MAX INV DEPTH *	A _s	A _{sw} (SQ IN)
8"-24"	48"	6"	24"	#4AT12"	0.20
27"-36"	60"	8"	24"	#5AT12"	0.31
42"-48"	72"	8"	24"	#5AT9"	0.48
54"	84"	8"	24"	#5AT6"	0.74



PLAN

WATERTIGHT COVER ANCHORAGE

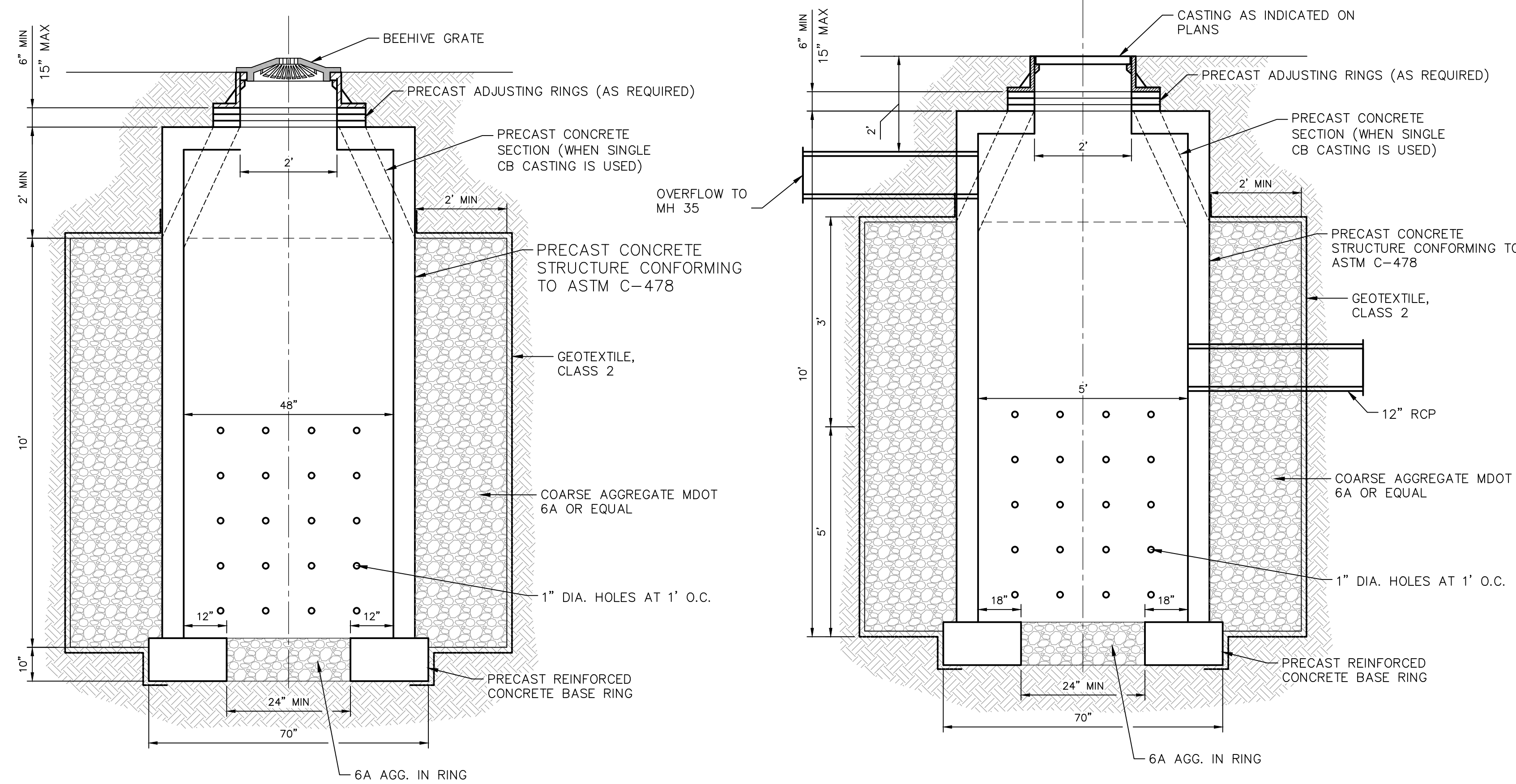


SECTION A-A

- NOTES:
1. MANHOLE CONES SHALL BE THE ECCENTRIC TYPE.
 2. PROVIDE 8" OF COMPACTED GRANULAR MATL UNDER ALL PRECAST CONCRETE BASE SLABS.
 3. STANDARD MH FRAMES AND COVER AS SPECIFIED. USE VENTED COVERS FOR STORM SEWERS.
 4. WATERTIGHT MH FRAME AND COVER AS SPECIFIED.

STANDARD STORM MANHOLE

NO SCALE

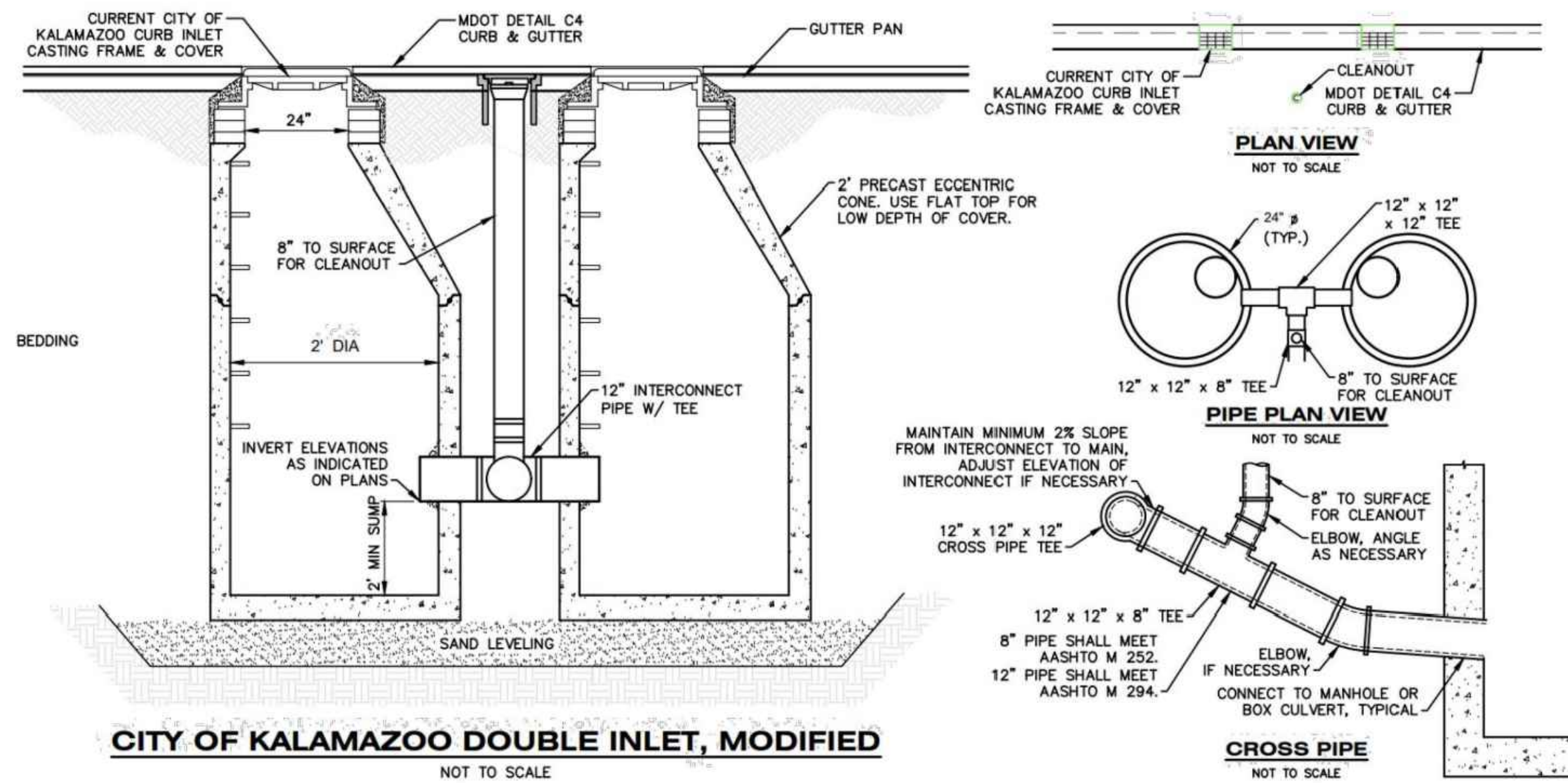


LEECHING BASIN

NO SCALE

LEECHING BASIN MODIFIED

NO SCALE



CITY OF KALAMAZOO DOUBLE INLET, MODIFIED

NOT TO SCALE

CROSS PIPE

NOT TO SCALE

4/28/2025 9:24:04 AM - C:\AD\ADDOCS\TETRA TECH\INC\200-19743-24012 KZOO PSS AND PS\4\PROJECT FILES\CAD\SHEETFILES\CONTRACT 1C-501 DETAILS.DWG - HOLLENBECK, TODD



BY	DATE	DESCRIPTION
	05/01/25	ISSUED FOR BIDS

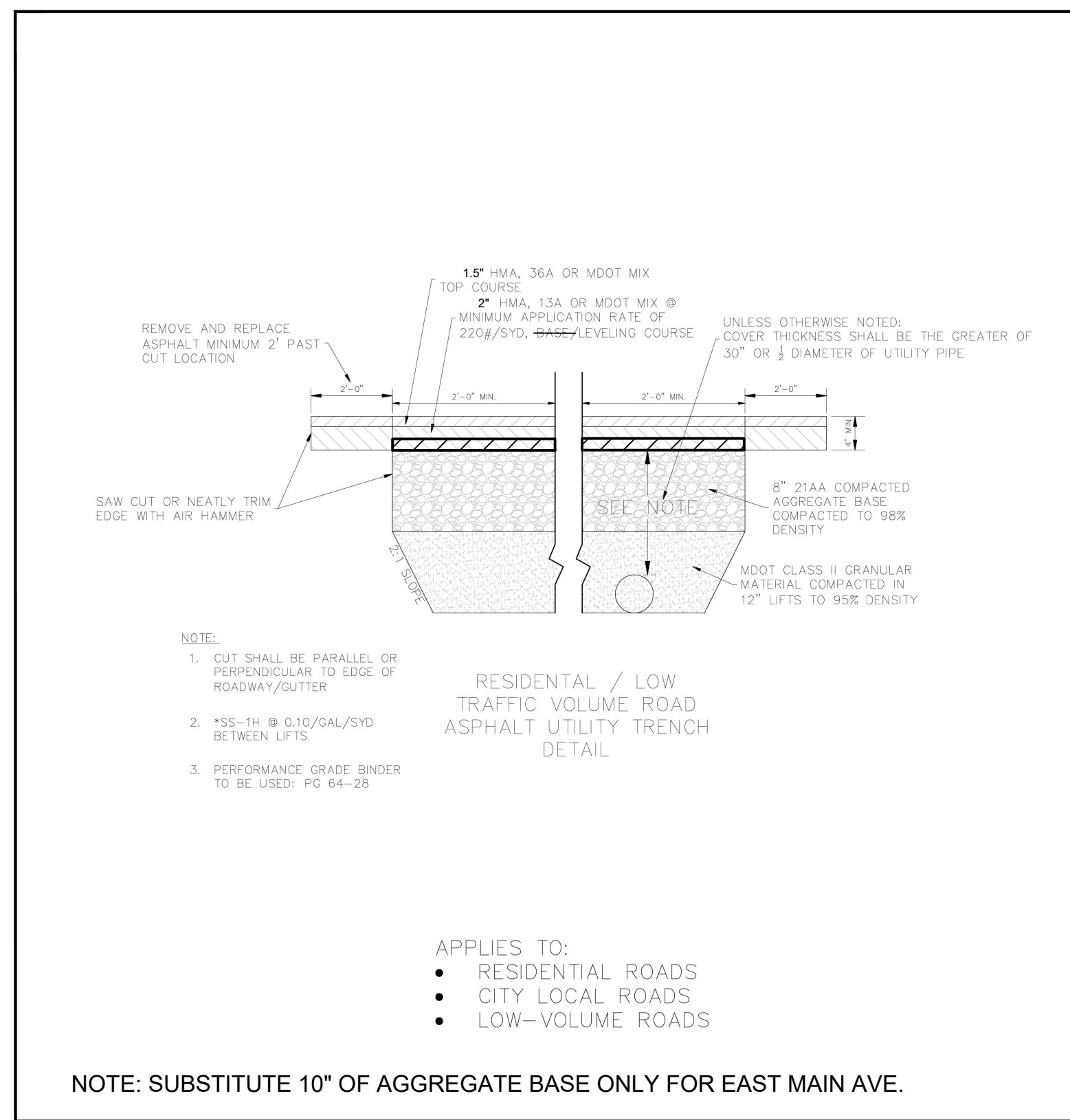
MARK	DATE	DESCRIPTION

CITY OF KALAMAZOO, MICHIGAN
 PUMP STATION 5 & 14
 WATER AND TRANSMISSION MAIN, CONTRACT 1
 MISCELLANEOUS DETAILS

PROJ: 200-19743-24012
 DESN: M. TEITSMA
 DRWN: N. KARLL
 CHKD:

C-502

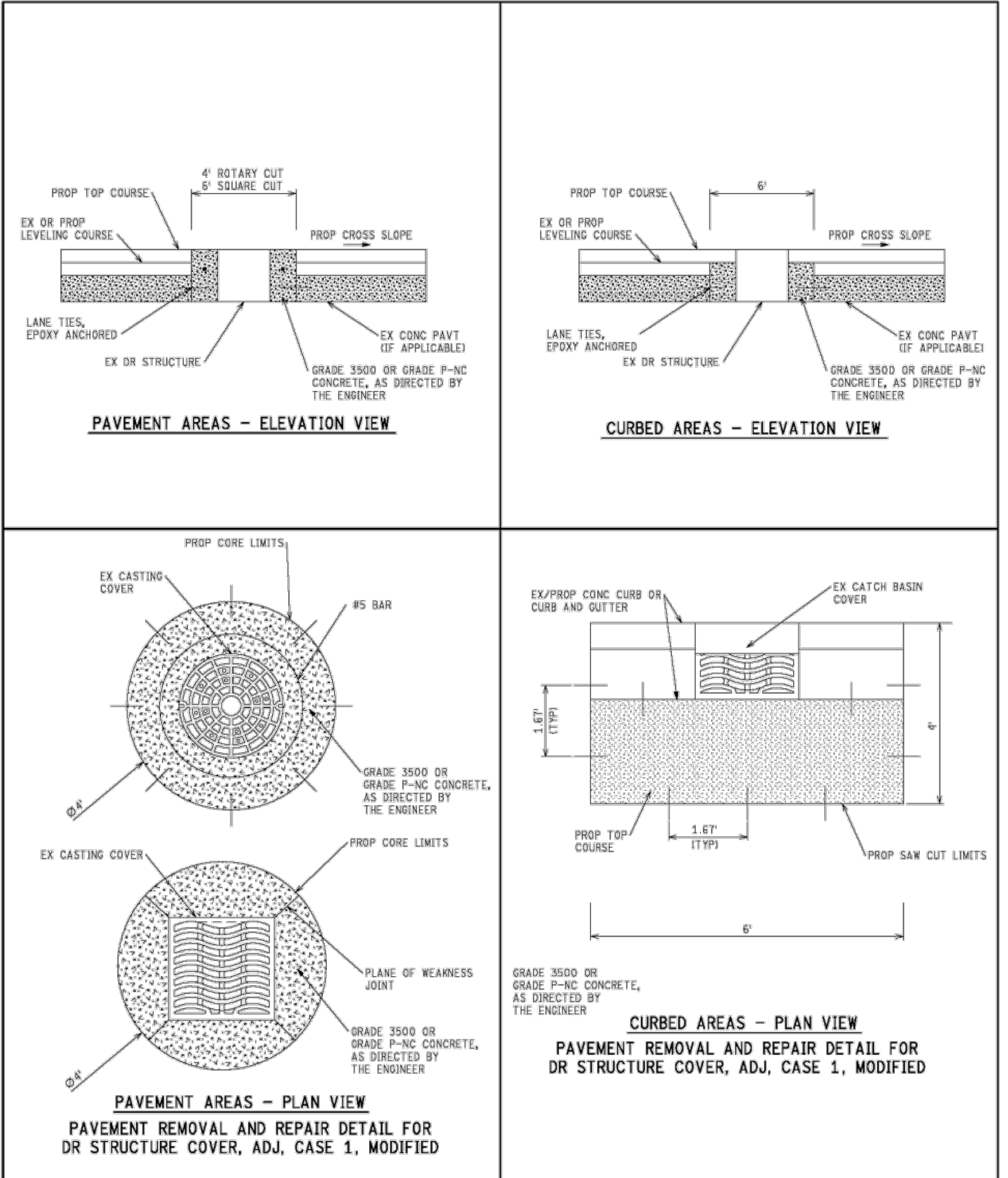
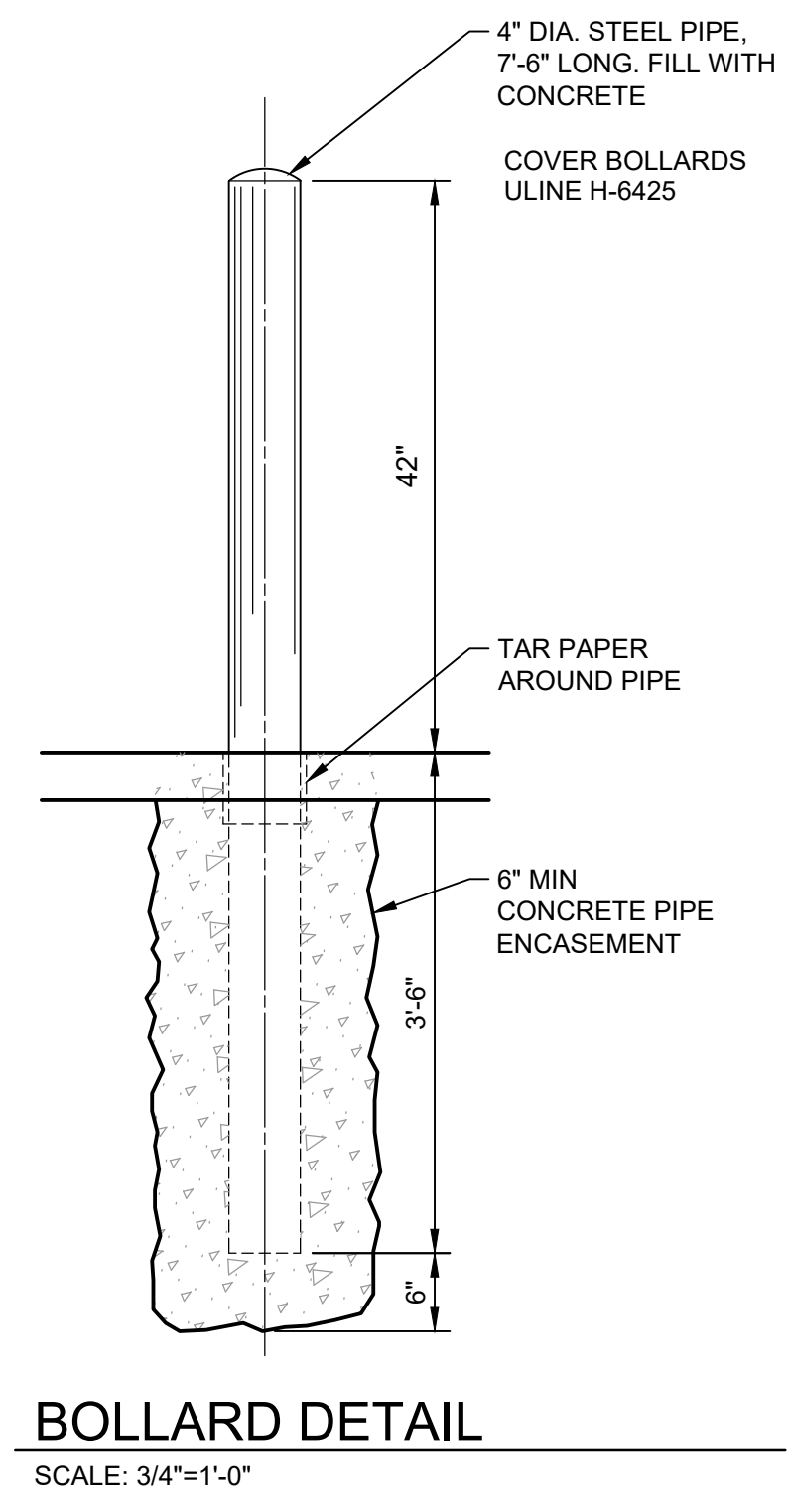
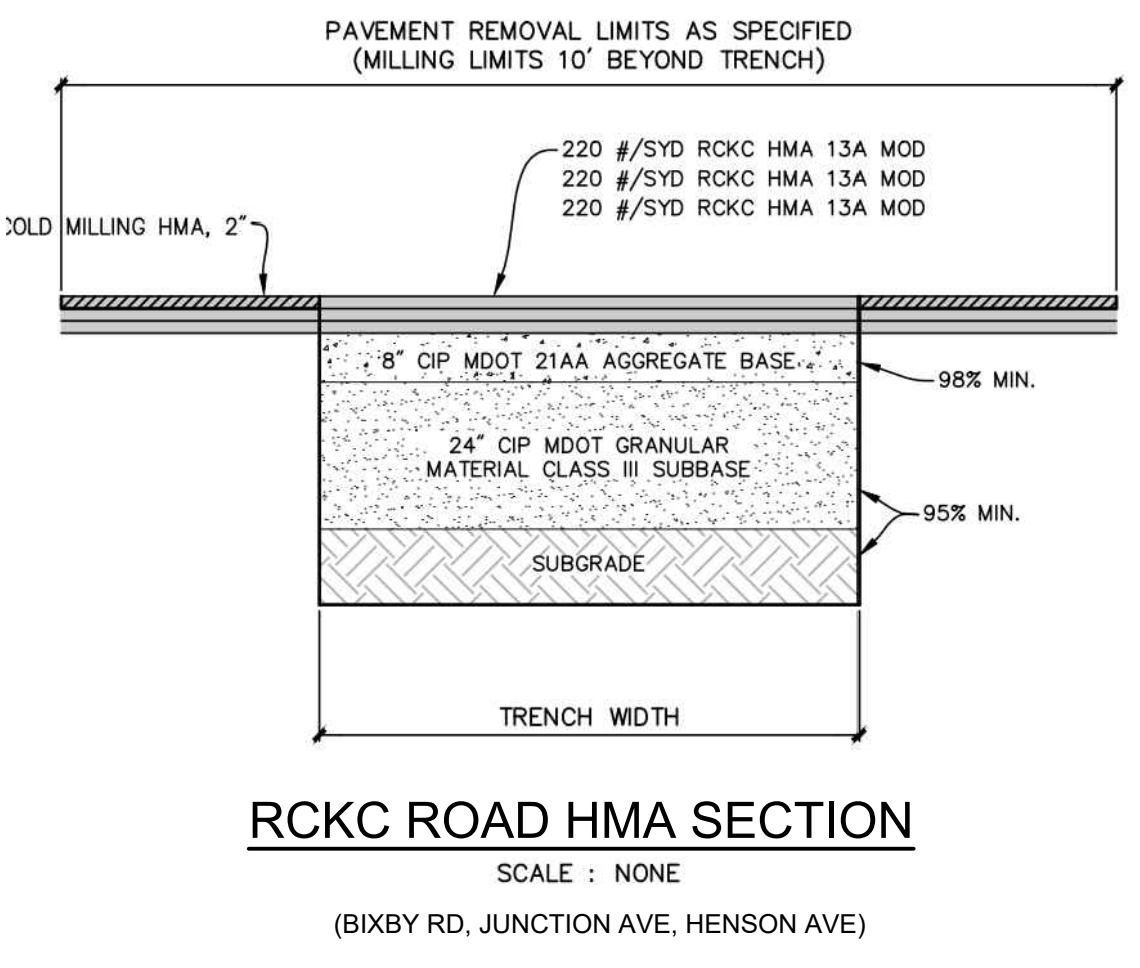
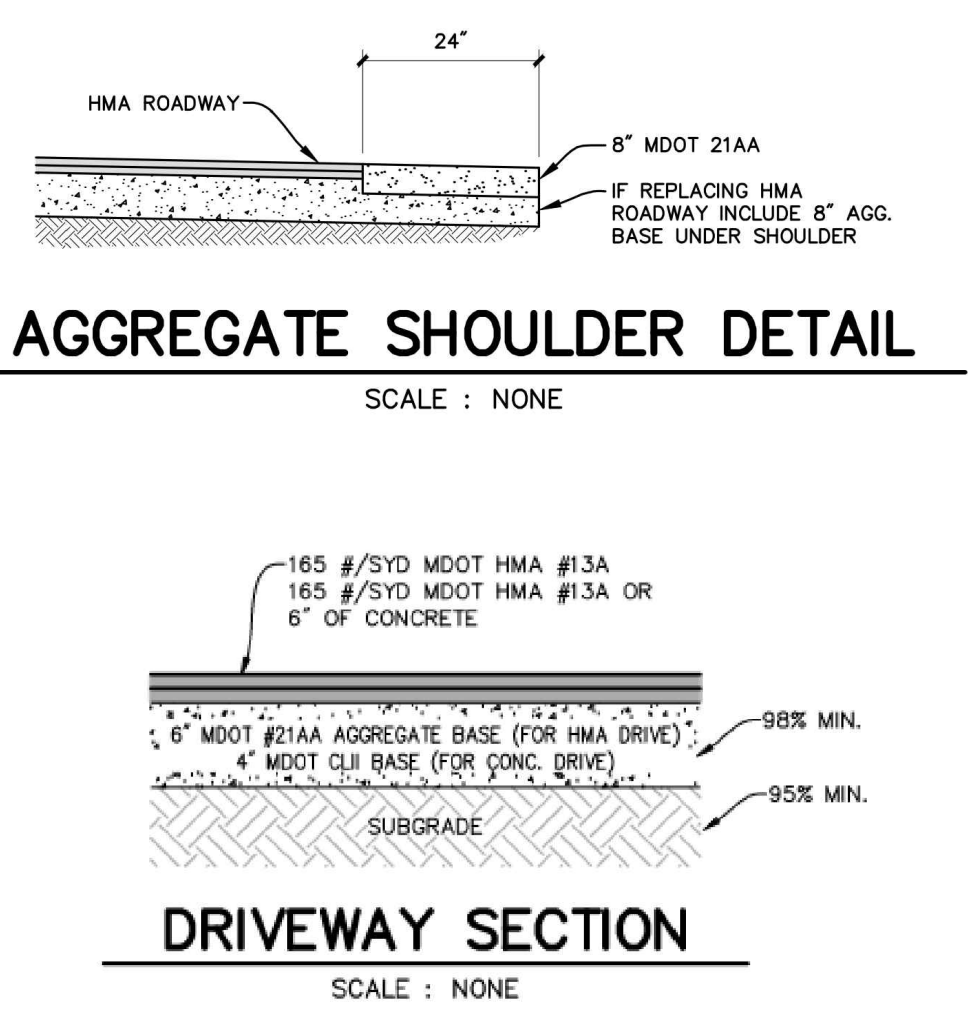
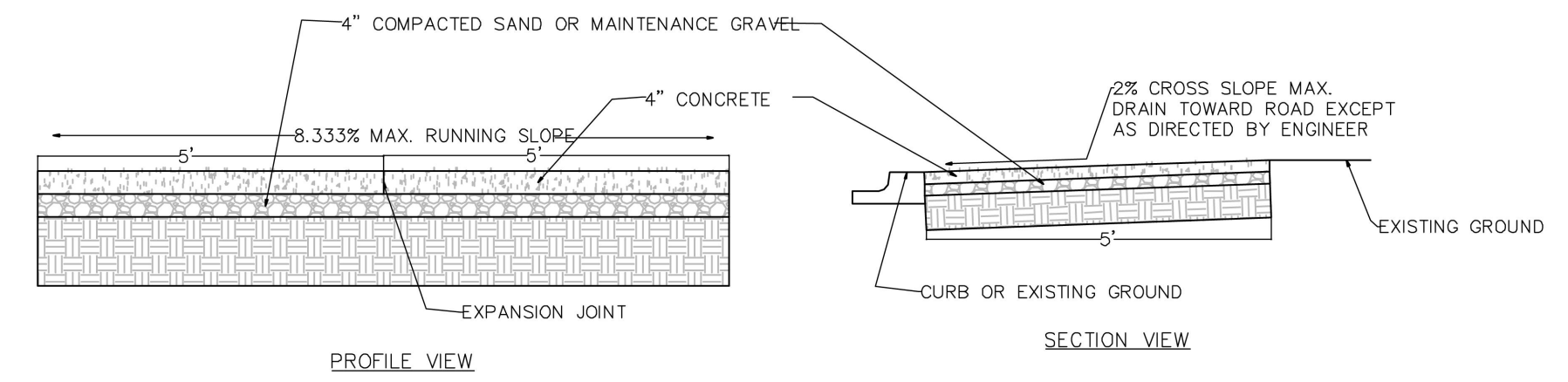
RESTORATION DETAILS



DEPARTMENT OF PUBLIC SERVICES - Engineering
STANDARD DETAILS
 Kalamazoo County
 CITY OF KALAMAZOO

GENERAL NOTES:

- MDOT STANDARD PLANS R-28-K, R-29-J, R-30-G, AND R-44-F SHALL BE FOLLOWED IN CONJUNCTION WITH THESE STANDARD PLANS
- ALL SAW CUTTING SHALL BE DONE PERPENDICULAR AND PARALLEL TO THE DIRECTION OF TRAVEL
- SAW CUTTING SHALL PROVIDE A STRAIGHT, CLEAN, EDGE TO ENHANCE BONDING
- ALL CUTS SHALL BE RECTANGULAR AND NEATLY CUT TO AVOID SPALLING OF PAVEMENT
- IN GENERAL, ALL ROAD/UTILITY CUTS OF AN AREA GREATER THAN 95 FT (315 XFT TYPICAL) SHALL EXTEND THE FULL WIDTH OF THE TRAVEL LANE
- FOR PAVEMENT WITH LOAD TRANSFER DOWEL RODS OR REINFORCEMENT, NEW LOAD TRANSFER DOWELS/REINFORCEMENT SHALL BE PLACED TO MAINTAIN BEARING CAPACITY OF ROADWAY
- CUTS LESS THAN 12" SHALL BE PATCHED WITH PCC. IF GREATER THAN 12", ENSURE CUT IS IN ACCORDANCE WITH STANDARD DETAILS AND MATCHING EXISTING ROADWAY
- BUMPS/CUTS/MILLED AREAS WITH EDGE GREATER THAN 2" DEEP/HIGH MUST BE WEDGED WITH HMA BEFORE OPEN TO TRAFFIC. SEE STANDARD DETAIL.
- MEANDERING SIDEWALK SHALL ONLY BE PLACED IN THE CITY'S ROW OR WHERE AN EASEMENT IS ESTABLISHED
- NEW SIDEWALK CONSTRUCTION SHALL MEET OR EXCEED CURRENT ADA AND ACCESSIBILITY STANDARDS
- REPLACED SIDEWALK SHALL, TO THE EXTENT PRACTICABLE, MEET OR EXCEED ADA AND ACCESSIBILITY STANDARDS
- SIDEWALK, DRIVEWAY OPENINGS & APPROACHES SHALL CONFORM TO MDOT STANDARD PLAN DETAILS R-28-K AND R-29-J
- MARSHALL MIX 36/13A (TOP/LEVELING) MAY BE SUBSTITUTED FOR HMA BASE MIX DESIGNS WITH CITY OF KALAMAZOO APPROVAL, IF DEEMED APPROPRIATE BY THE ENGINEER
- ASPHALT BINDER SHALL BE INCLUDED IN THE PAY ITEM FOR HMA
- MDOT PCC 3500 MIX DESIGN SHALL BE USED FOR ALL CONCRETE UNLESS OTHERWISE STATED OR DIRECTED BY THE ENGINEER
- OPENING TO TRAFFIC STRENGTHS (2020 STANDARD SPECIFICATIONS FOR CONSTRUCTION, TABLE 603-1):
 -- <72 HOURS, GRADE P-NC, 300 psi
 -- 72 HOURS +, GRADE 3500/HP, 550 psi



MARK	DATE	DESCRIPTION
	05/01/25	ISSUED FOR BIDS

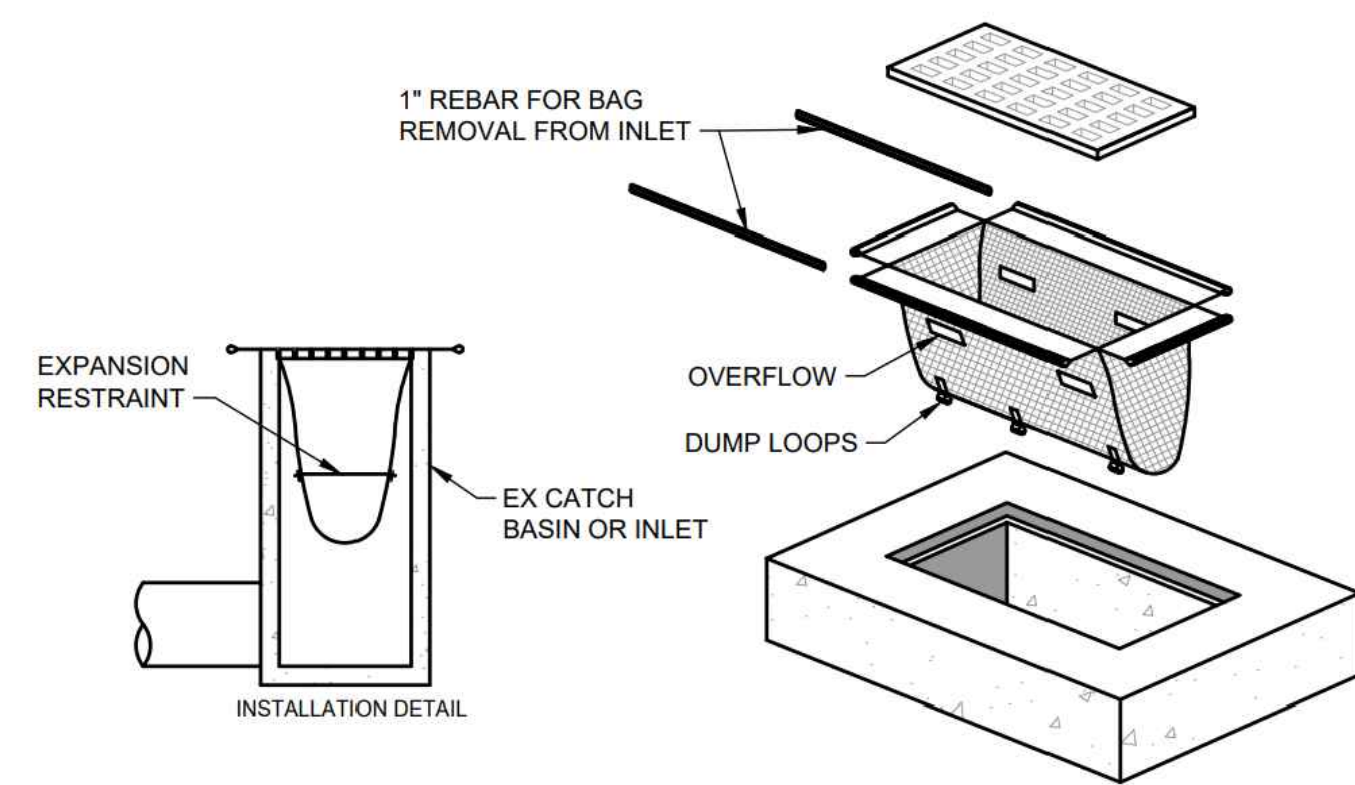
CITY OF KALAMAZOO, MICHIGAN
 PUMP STATION 5 & 14
 WATER AND TRANSMISSION MAIN, CONTRACT 1
RESTORATION DETAILS

PROJ: 200-19743-24012
 DESN: M. TEITSMA
 DRWN: N. KARLL
 CHKD:

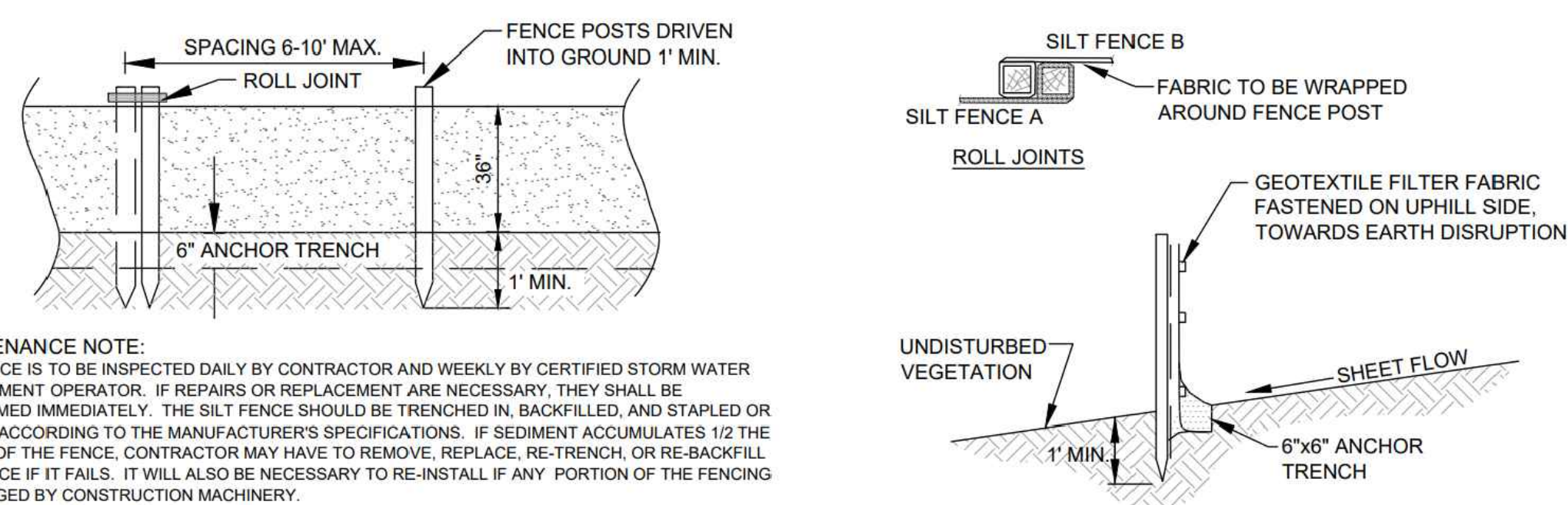
C-503

4/28/2025 9:24:27 AM - C:\AD\ACCD\CSITETRA TECH\INC\200-19743-24012\KZOO\PS5 AND PS4\PROJECT FILES\CAD\CSITETRA\CONTRACT 1\C-501 DETAILS.DWG - HOLLENBECK, TODD

SESC DETAILS AND NOTES

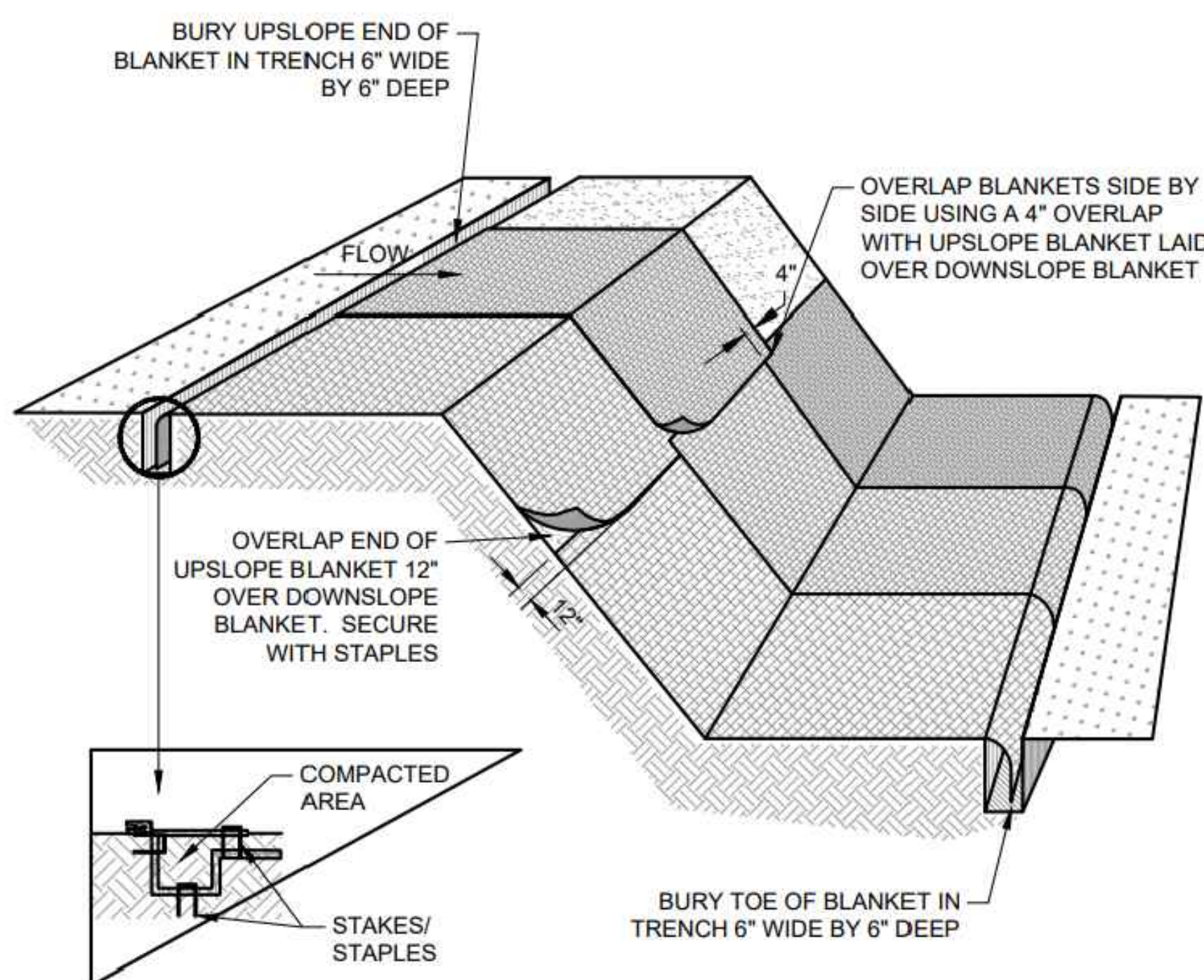


SACK TYPE INLET FILTER



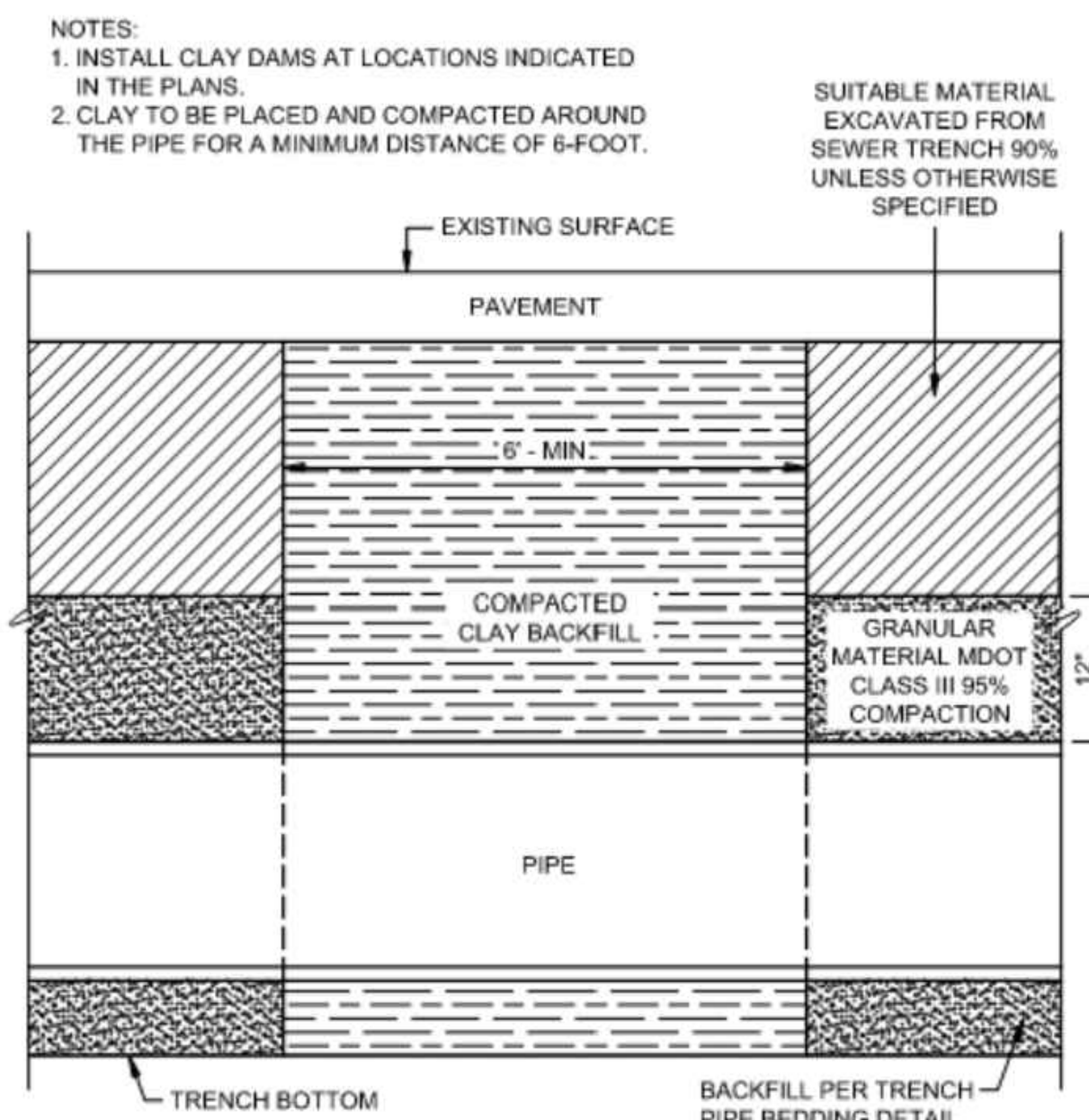
MAINTENANCE NOTE:
SILT FENCE IS TO BE INSPECTED DAILY BY CONTRACTOR AND WEEKLY BY CERTIFIED STORM WATER MANAGEMENT OPERATOR. IF REPAIRS OR REPLACEMENT ARE NECESSARY, THEY SHALL BE PERFORMED IMMEDIATELY. THE SILT FENCE SHOULD BE TRENCHED IN, BACKFILLED, AND STAPLED OR STAKED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS. IF SEDIMENT ACCUMULATES 1/2 THE HEIGHT OF THE FENCE, CONTRACTOR MAY HAVE TO REMOVE, REPLACE, RE-TRENCH, OR RE-BACKFILL THE FENCE IF IT FAILS. IT WILL ALSO BE NECESSARY TO RE-INSTALL IF ANY PORTION OF THE FENCING IS DAMAGED BY CONSTRUCTION MACHINERY.

SILT FENCE DETAIL
SCALE: NONE



NOTES:
1. PLACE MULCH BLANKET PARALLEL TO FLOW AND ANCHOR SECURELY.
2. WHEN BLANKETS ARE USED IN FLOWING DITCH, BLANKETS SHOULD NOT OVERLAP IN DITCH CENTER PARALLEL TO FLOW.
3. STAPLES INSTALLED/SECURED ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
4. WHERE POSSIBLE, CONSTRUCT WITH BIODEGRADABLE MATERIAL.

MULCH BLANKET

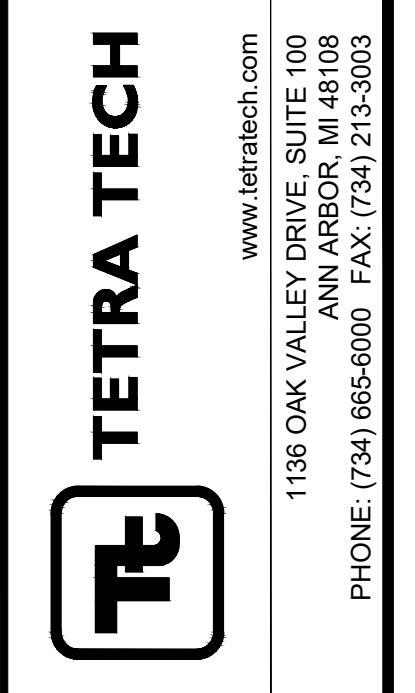


TRENCH DAM DETAIL
NO SCALE

SESC NOTES

1. INSTALL MULCH BLANKETS ON SLOPES GREATER THAN 1.4
2. ALL TOPSOIL OR SOIL STORAGE AREAS ARE REQUIRED TO BE TEMPORARILY STABILIZED AND SHALL BE SEEDED AND MULCHED, OR MATTED WITH STRAW, IMMEDIATELY AFTER THE STRIPPING PROCESS IS COMPLETED, TO PREVENT WIND AND WATER EROSION.
3. PERMANENT SESC MEASURES SHALL BE INSTALLED WITHIN 5 DAYS OF COMPLETION OF FINAL GRADING
4. COMPREHENSIVE DETAILS CAN BE FOUND IN SECTION 7 OF THE MDOT SOIL EROSION AND SEDIMENTATION CONTROL MANUAL
5. STORMWATER FLOW FROM THIS SITE SHALL NOT ADVERSELY IMPACT ADJACENT PROPERTIES
6. PROTECT ALL OPENINGS FROM SEDIMENT AND RUNOFF INCLUDING GATE OPENINGS, WEIR OPENINGS, ETC.
7. CONTRACTOR RESPONSIBLE FOR INSTALLATION AND MAINTENANCE OF ALL TEMPORARY AND PERMANENT SOIL EROSION AND SEDIMENTATION CONTROL (SESC) MEASURES DURING CONSTRUCTION. CONTRACTOR SHALL REMOVE ANY TEMPORARY SESC MEASURES AFTER OWNER'S ACCEPTANCE OF AND SUBSTANTIAL COMPLETION OF THE PROJECT. OWNER WILL BE RESPONSIBLE FOR CONTINUED MAINTENANCE OF ALL PERMANENT SESC CONTROL MEASURES AFTER SUBSTANTIAL COMPLETION OF THE PROJECT. CONTRACTOR RESPONSIBLE FOR OBTAINING, EXERCISING AND PERFORMING ALL WORK IN ACCORDANCE WITH THE CONDITIONS PROVIDED BY THE ISSUER OF THE SOIL EROSION AND SEDIMENTATION CONTROL PERMIT.
8. ENGINEER TO VERIFY PROPER INSTALLATION OF APPROVED SESC MEASURES PRIOR TO COMMENCEMENT OF EARTH DISTURBANCE ON SITE
9. ALL TEMPORARY SEDIMENT CONTROL MEASURES ARE TO BE INSTALLED PRIOR TO EARTH DISTURBANCE ACTIVITY AND CHECKED DAILY FOR EFFECTIVENESS AND REPAIRED AS NEEDED.
10. SITE EARTH CHANGES INCLUDE REMOVAL OF ALL EXISTING SURFACE FEATURES, SITE GRADING FOR THE INSTALLATION OF SANITARY SEWERS, MANHOLES AND JUNCTION CHAMBERS, WATER RESOURCE RECOVERY FACILITY CONSTRUCTION, INCLUDING NEW PROCESS BUILDINGS AND PAVED PARKING AND ACCESS AREAS AND ASSOCIATED SURFACE RESTORATION WORK.
11. ANY DEWATERING REQUIRED SHALL HAVE A DEWATERING PLAN SUBMITTED PRIOR TO STARTING THE ACTIVITY AND MAY REQUIRE EGLE APPROVAL
12. THE DISTANCE FROM THE CONSTRUCTION SITE TO THE NEAREST LAKE (SPRING VALLEY LAKE) IS APPROXIMATELY 175 FEET SOUTHWEST OF THE SITE AT THE CLOSEST POINT
13. AMOUNT OF AREA TO BE DISTURBED IS APPROXIMATELY 5 ACRES

CONSTRUCTION SCHEDULE & SEQUENCING	2025													
	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
PLACE AND MAINTAIN TEMPORARY EROSION CONTROLS														
TOPSOIL STRIPPING & STOCKPILING														
ON-SITE UTILITIES CONSTRUCTION														
SITE GRADING & EARTHWORK														
TOPSOIL SPREADING														
PERMANENT SEEDING														
FINAL INSPECTIONS & REMOVE TEMPORARY EROSION CONTROLS														



MARK	DATE	DESCRIPTION
	05/01/25	ISSUED FOR BIDS

CITY OF KALAMAZOO, MICHIGAN
PUMP STATION 5 & 14
WATER AND TRANSMISSION MAIN, CONTRACT 1
SESC DETAILS AND NOTES

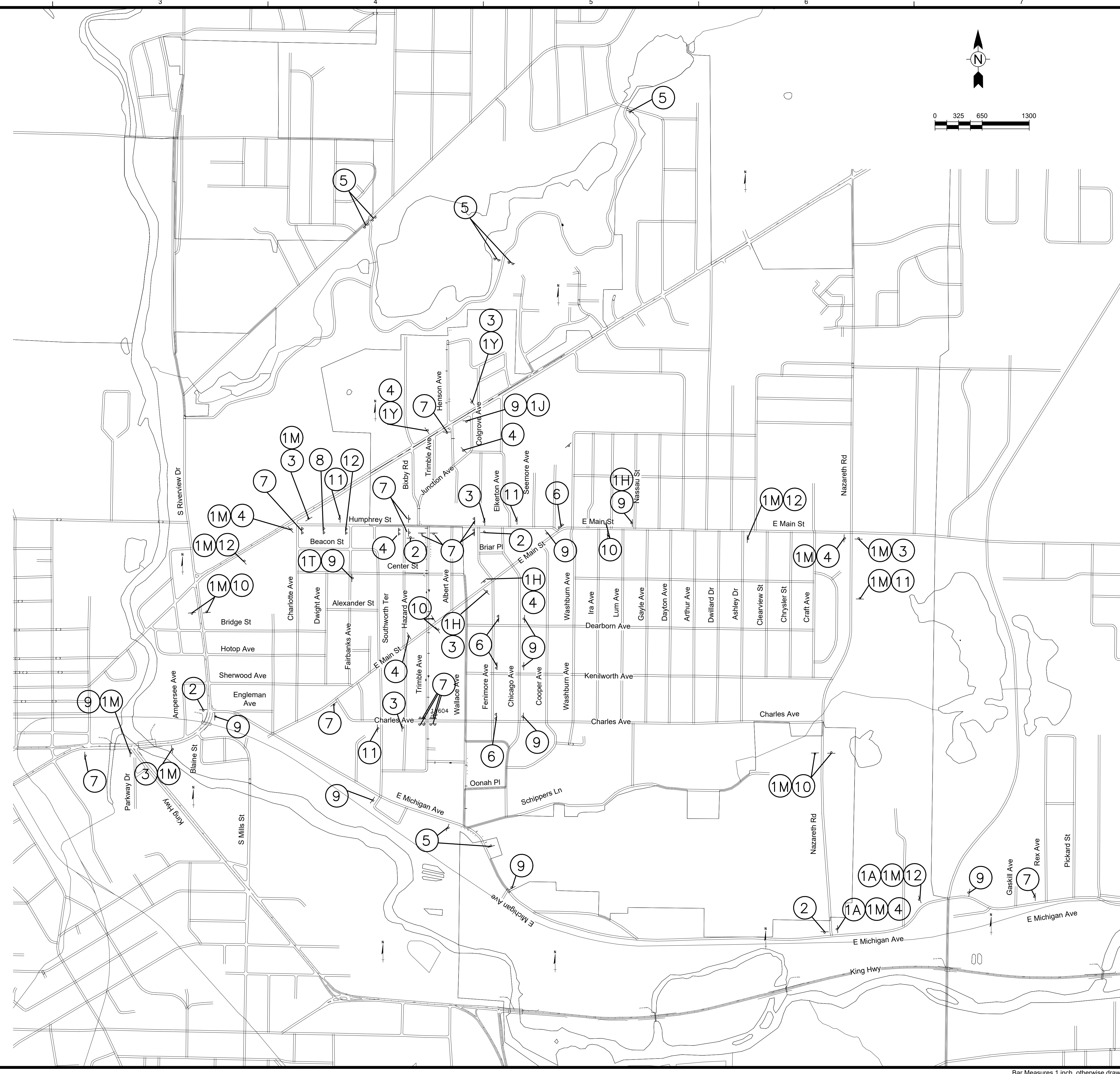
PROJ: 200-19743-24012
DESN: M. TEITSMA
DRWN: N. KARLL
CHKD:

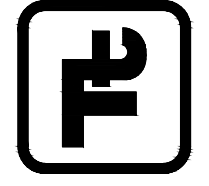
C-504

4/28/2025 9:21:59 AM - C:\AD\ACCD\COCSITETRA\TECH\INC\200-19743-24012\KZOO\PS5 AND PS4\PROJECT FILES\CAD\SHEET FILES\CONTRACT 1\C-501 DETAILS.DWG - HOLLENBECK, TODD

4/28/2025 9:48:24 AM - C:\ADACDDOC\SITETRA TECH INC\200-19743-24012 KZOO PS5 AND PS4\PROJECT FILES\CAD\SHEETFILES\CONTRACT 1C-60X TRAFFIC CONTROL.DWG - HOLLENBECK, TODD

①	HENSON	END DETOUR	②
	D3-1Y	M4-8a	
③	CHARLES	DETOUR ←	③
	D3-1C	M4-9(L)	
④	BIXBY	DETOUR →	④
	D3-1B	M4-9(R)	
⑤	WALLACE	ROAD CLOSED	⑤
	D3-1W	R11-2	
⑥	MICHIGAN	ROAD CLOSED TO THRU TRAFFIC	⑥
	D3-1M	R11-4	
⑦	TRIMBLE	ROAD WORK AHEAD	⑦
	D3-1T	W20-1	
⑧	HUMPHREY	DETOUR AHEAD	⑧
	D3-1H	W20-2	
⑨	JUNCTION	ROAD CLOSED AHEAD	⑨
	D3-1J	W20-3	
⑩	MAIN	DETOUR ↑	⑩
	D3-1X	M4-9	
⑪	CENTER	DETOUR ↙	⑪
	D3-1Z	M4-9(LT)	
⑫	D3-1A	DETOUR ↘	⑫
		M4-9(RT)	





TETRA TECH
www.tetratech.com
1136 OAK VALLEY DRIVE, SUITE 100
ANN ARBOR, MI 48108
PHONE: (734) 665-6000 FAX: (734) 213-3003

PROJ: 200-19743-24012
DESN: D. WARREN
DRWN: T. HOLLENBECK
CHKD: S. BYRNE

MARK	DATE	DESCRIPTION	BY
	05/01/25	ISSUED FOR BIDS	

CITY OF KALAMAZOO, MICHIGAN
PUMP STATION 5 & 14 RECONSTRUCTION, CONTRACT 2
TRAFFIC CONTROL PLAN

C-601

Copyright: Tetra Tech
Bar Measures 1 inch, otherwise drawing not to scale

1. SAFETY PRECAUTIONS

1.1. Confined Space Precaution

WARNING: Follow all OSHA regulations concerning confined space entry and work.

1.2. Lead Exposure Warning

WARNING: Lead dust may be released into the manhole atmosphere any time the sheath of older lead sheath cable is disturbed. When working in manholes, precautions must be taken to limit the amount of exposure to lead. Strictly observe your company's lead handling procedures to eliminate this hazard. Failure to do so may result in serious, long-term health problems.

1.3. Cable Handling Precautions

CAUTION: Care must be taken to avoid cable damage during handling and placing. Fiber optic cable is sensitive to excessive pulling, bending, and crush forces. Any such damage may alter the cable's characteristics to the extent that the cable section may have to be replaced. To ensure all specifications are met, consult the specific cable specification sheet for the cable you are installing.

1.4. Corning Cable Systems' cable specification sheets are available which list the maximum tensile load for various cable types. The maximum pulling tension for stranded loose tube cable and ribbon cable is 600 lbf (2,700 Newtons).

1.5. Corning Cable Systems' cable specification sheets also list the minimum cable bend radius both "Loaded" (during installation) and "Installed" (after installation). If these sheets are not available on the job-site, the following formulas may be used to determine general guidelines for installing Corning Cable Systems' fiber optic cable:

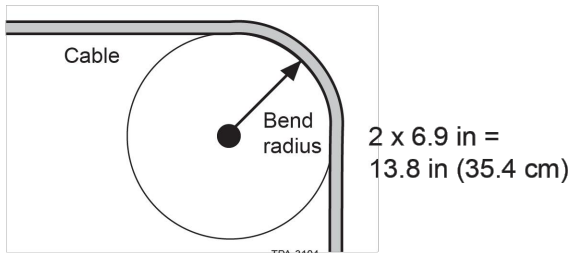
To arrive at a working bend radius for cable installation, multiply 15 times (15x) the cable outside diameter. Example:

Cable Diameter = 0.46 in (11.8 mm)

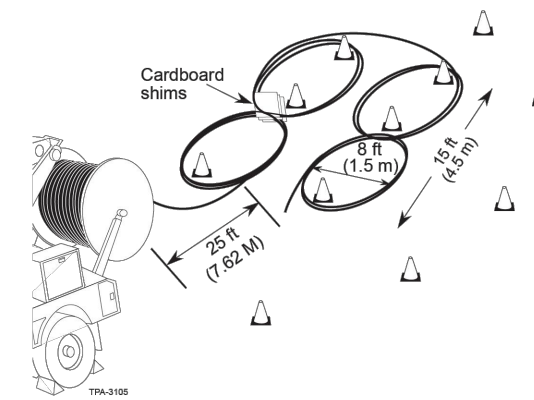
15 x 0.46 in = 6.9 in (177 mm)

Minimum Working Bend Radius = 6.9 in (17.7 cm)

To find the minimum diameter requirement for pull wheels or rollers, simply double the minimum working bend radius.



1.6. Whenever unreeled cable is placed on the pavement or surface above a manhole, provide barricades or other means of preventing vehicular or pedestrian traffic through the area.



1.7. The figure-eight configuration should be used to prevent kinking or twisting when the cable must be unreeled or backed.

Fiber optic cable should not be coiled in a continuous direction except for lengths of 100 ft (30 m) or less. The preferred size for the figure-eight is about 15 ft (4.5 m) in length, with each loop 5 ft (1.5 m) to 8 ft (2.4 m) in diameter.

[PRETERMINATED SYSTEMS | CABLES | CONNECTORS | CABLE ASSEMBLIES | HARDWARE | TOOL KITS AND ACCESSORIES | TEST EQUIPMENT | SPACE EQUIPMENT | FAN-OUT KITS | TRAINING]

Traffic cones spaced 7-8 feet apart are useful as guides during figure-eighting. When figure-eighting long lengths of cable, care should be taken to relieve pressure on the cable at the crossover of the eight. This can be done by placing cardboard shims at the crossover or by forming a second figure-eight.

WARNING: Automated figure-eight machines that coil fiber optic cable on a drum may exceed cable design limits by exceeding torsion, tension, and bend radii limitations. Do not use automated figure-eight machines when installing fiber optic cables with a central tube design or any loose tube cable having one or more layers of corrugated steel armor. Use of these machines may result in the cable's jacket being breached and the armor being exposed.

1.8. Fiber optic cable which passes through manholes containing petroleum-based waste will require special protection. Some petroleum products will deteriorate the cable's polyethylene sheath. Consult your company's practices regarding manholes and petroleum-based waste for specific instructions on how to remove the petroleum. Install innerduct that is impervious to future petroleum exposure.

CAUTION: Never use liquid detergent as a lubricant when placing fiber optic cable. Most detergents will promote stress cracks when used on polyethylene. Use only cable lubricants with manufacturer's approval for polyethylene sheaths.

1.9. At the completion of a day's installation, protect bare cable ends by placing a cable cap on the end of the cable, followed by several wraps of tape around each cap. This will assist the moisture-resisting material in Corning Cable Systems' loose-tube cable in preventing water ingress due to long-term exposure to moisture. If a cap is not available, a few wraps of tape placed on the tip of the cable should prevent water from entering the cable.

NOTE: If the cable ends are not capped while exposed to the environment for long periods of time, the customer may choose (but is not required) to cut off three feet (one meter) of each cable end before splicing. This will ensure that no moisture ingress is present.

2. PLANNING AND PREPARATION

2.1. It is recommended that an outside plant engineer conduct a survey of the cable route. Manholes and ducts should be inspected to determine the optimum splice point locations and duct assignments. Identify potential problems with innerduct and cable placement at this time.

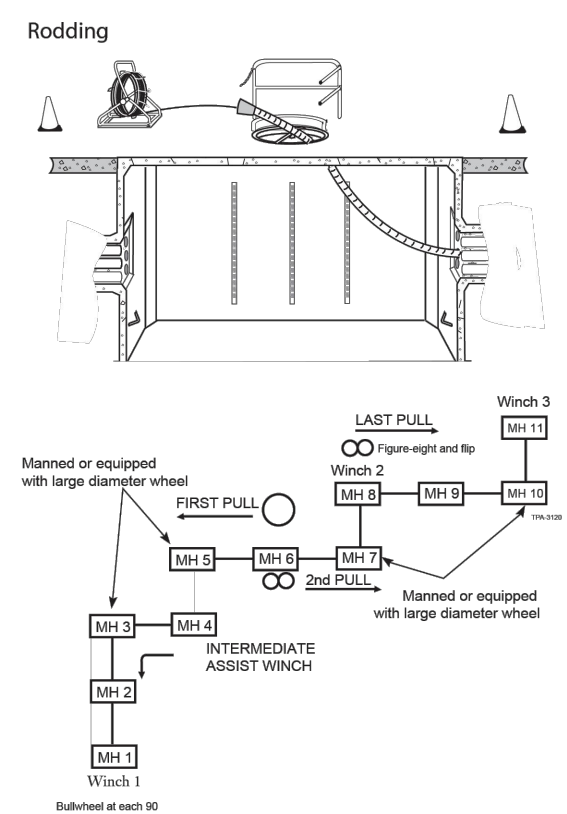
2.2. Rodding or slugging may be required to verify duct suitability and accurate length. Cable cut length is especially critical when installing factory-connectorized cables.

2.3. Inspect manholes in which cables will be spliced and make plans for closure and cable slack racking. Be sure to consider the accessibility of manholes to splicing vehicles.

2.4. Fiber optic cable must be protected in intermediate manholes. Carefully choose racking space so that it will provide maximum protection for the cable and maintain its minimum bend radius.

2.5. Based upon the cable route survey and the equipment/manpower resources available, develop a cable pull plan.

Inspect potential reel and winch locations for their suitability and make plans for installation techniques such as backfeeding or use of intermediate assist winches.



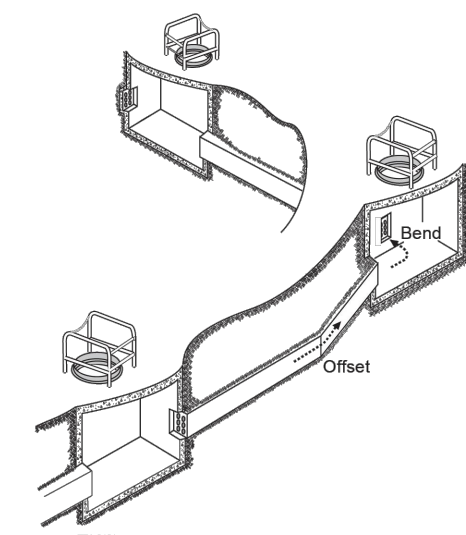
2.6. Factors to consider in developing the pull plan include changes in elevation and the locations of bends and offsets.

- For ease of installation, pull cables from higher elevation manholes to lower ones, whenever possible.
- Bends describe pronounced turns in the routing of a duct system.
- Offsets in a duct system are more gradual variations from the ideal, straight path of a duct section. Offsets can impose greatly increased pulling tension.

For example, a three foot offset in a 10-foot run of duct can add an estimated 120 lb_f of tension to a pull!

To minimize the effect of bends and offsets, begin such pulls at the end of the innerduct section nearest the difficult area.

¹John Anderson, "Assist Device Proves Itself In Long F O Pulls" Outside Plant, March 1986, p. 40.



3. INSTALLATION EQUIPMENT AND ACCESSORIES

Innerduct

3.1. Innerduct is a way to subdivide the duct and to provide for future cable pulls. Three 1.25-inch inside diameter (I.D.) innerducts can usually be pulled into a 4-inch duct. Proper size and installation of the innerduct is critical for ease of cable installation.

3.2. Innerduct is available in ribbed, corrugated, and smooth-walled constructions of polyethylene or PVC material. Corning Cable Systems' fiber optic cable is compatible with all major brands of innerduct. Consult your company's practices for innerduct specifications.



3.3. Fill ratios are calculated by comparing the area of an inner diameter cross-section of the innerduct to the outer diameter cross-section area of the fiber optic cable. Larger diameter innerducts (which result in smaller fill ratios) will normally reduce pulling tension.

To calculate a fill ratio, use the following formulas from the chart. For a quick calculator, see www.corning.com/cablesystems/fillratio

Formulas Used to Calculate Fill Ratio		
First Cable	Second Cable	Third Cable
$\frac{d^2}{D^2} < 65\%$	$\frac{d_1^2 + d_2^2}{D^2} \leq 31\%$	$\frac{d_1^2 + d_2^2 + d_3^2}{D^2} \leq 40\%$
Legend		
d = Cable Diameter	d_1 = First Cable Diameter	d_2 = Second Cable Diameter
d_3 = Third Cable Diameter	D = Innerduct Diameter	

3.4. Multiple cables may be pulled simultaneously into one innerduct. Pulling a new fiber optic cable over an existing one is not recommended due to the possibility of entanglement.

3.5. Should an innerduct become twisted during installation, the twisting (helixing) can dramatically increase pulling tension during cable installation. Corrugated innerduct has less "memory" than other types of innerduct, and may tend to lay flatter in the duct.

3.6. Innerduct often stretches during installation. Allowance must be made for the relaxation of this stretch by planning for extra slack to be pulled into manholes.

3.7. At points where innerduct will be continuous through a manhole, allow sufficient slack so that the innerduct may be secured on the manhole racks and maintain the cable's minimum bend radius.

3.8. At points where the innerduct is not continuous through a manhole, some provision must be made to provide a section to cover the cable in the manhole during and after placement. This may be accomplished through one of the following methods:

- Couplers which "splice" innerduct sections together are available from most innerduct manufacturers. Do not use couplers which reduce the inside diameter of the innerduct.
- Split duct may be applied to the cable during racking.
- A section of innerduct which has an inside diameter greater than the outside diameter of the installed innerduct may be used in a sleeve operation. This section of innerduct must be slid over the innerduct coming from the entrance duct BEFORE the pull-line is installed. The section of larger innerduct must be long enough to reach from the entrance duct to the exit duct while passing around the periphery of the manhole where it will be racked, plus an additional 9 ft (3 m) on each end which will be inside the duct bank after racking.

3.9. After placement, all innerduct must be capped or plugged to prevent moisture or foreign matter from entering until the cable installation starts.

Pull-Line

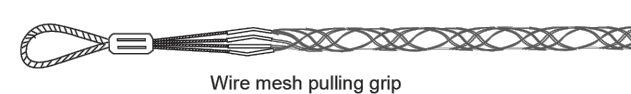
3.10. Various types of pull-line have been used successfully with fiber optic cable. Pull-lines can be of either a round or flat cross section. Selection of a pull-line will depend upon the length and conditions of the pull. Small diameter pull-line may have a tendency to cut innerduct when under tension.

3.11. Available pull-line materials include wire rope, polypropylene, and aramid yarn. For pulls using winches, materials with low elasticity such as wire rope and aramid yarn can minimize surge-induced fluctuation in pull-line tension. Consult your company's standard practices with regards to pull-line materials.

3.12. Some innerduct is available with preinstalled pull tape or line. Otherwise, pull-line can be installed by rodding or blowing. Lubrication of the pull-line may be necessary for ease of installation or to prevent the line from cutting the innerduct.

Pulling Grips

3.13. Corning Cable Systems recommends the use of a factory or field-installed wire mesh pulling grip and swivel during cable pulls. Pulling grips provide effective coupling of pulling loads to the jacket, aramid yarn, and central member of fiber optic cables.

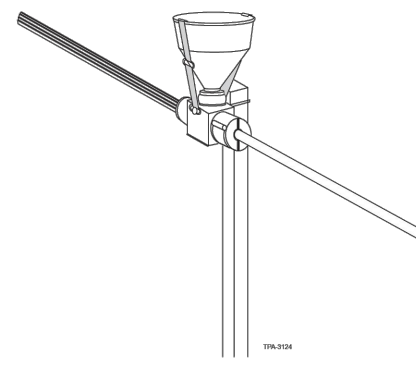


3.14. For instructions on field installation, refer to SRP 004-137, Installing a Wire Mesh Pulling Grip.

3.15. The use of a swivel between the pull-line and pulling grip is required to prevent the pull-line from imparting a twist to the cable. A swivel that contains ball-bearings is recommended to prevent binding at high tensions.

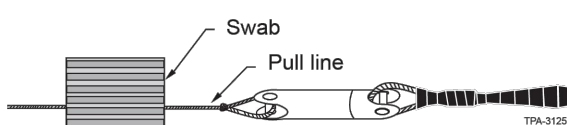
Lubricants

3.16. Cable lubricant is recommended for most fiber optic cable pulls as a means of lowering pulling tension. Short hand-pulls may not require lubricant. Considerations in choosing a lubricant are material compatibility, drying time, temperature performance, and handling characteristics.



3.17. As noted in the cable precautions, cable lubricants must be compatible with the fiber optic cable's outer sheath. Refer to the lubricant manufacturer's specifications. Use of incompatible liquids, such as liquid detergent, for a lubricant can cause long term sheath damage.

3.18. Lubricant should be applied according to the manufacturer's recommendations. Some lubricant vendors recommend an applicator to coat the cable as it enters the innerduct, others suggest distributing lubricant throughout the innerduct by pulling a swab through the innerduct as part of the pull-line placement. Pumps or gravity feed devices can also be used to inject lubricant into the innerduct.



3.19. Additional lubricant should be added before bends and known severe offsets and sections with "uphill" elevation changes.

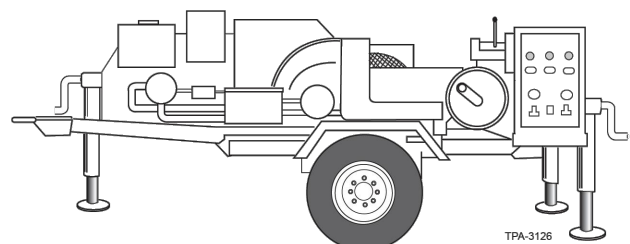
Tension-Monitoring Equipment

3.20. Fiber optic cable is subject to damage if the cable's specified maximum tensile force is exceeded. Except for short runs or hand-pulls, tension must be monitored. Refer to cable specification sheets for maximum tension. Exceeding the specified maximum tension will void the warranty of the cable product.

3.21. The use of a winch with a calibrated maximum tension is an acceptable procedure. The control device on such winches can be hydraulic or in the form of a slip clutch. Such winches should be calibrated frequently.

3.22. The use of a breakaway link (swivel) can be used to ensure that the maximum tension of the cable is not exceeded. Breakaway links react to tension at the pulling eye and should be used as a fail-safe rather than a primary means of monitoring tension.

3.23. A dynamometer or in-line tensiometer may also be used to monitor tension in the pull-line near the winch. This device must be visible to the winch operator or used to control the winch. Special winches are available that monitor the tension remotely at the pulling eye via a wire in the pull-line. Such winches may also provide a record of the tension during pulls.



NOTE: Carefully select equipment that maintains bend radius. Not all outside plant equipment is well-suited for fiber optic cable installation.

Pulling Equipment

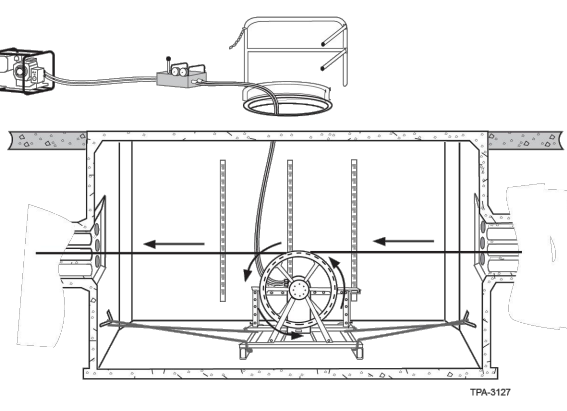
3.24. All pulling equipment and hardware which will contact the cable during installation must maintain the cable's minimum bend radius. Such equipment includes sheaves, capstans, bending shoes, and quadrant blocks designed for use with fiber optic cable.

3.25. Situations that require use of a radius-maintaining device are encountered at feed and pull manholes, at bends, and where entrance and exit ducts in a manhole are offset.

4. INSTALLATION TECHNIQUES

4.1. Various techniques are available to ease the installation of long lengths of fiber optic cable. All have been used extensively in the field.

4.2. The length of cable that can be pulled in one operation will vary with duct conditions, the equipment used, pulling technique selected, and the skill of the craftsmen. Normally, a short pull (less than 3000 ft (913 m)) with two or fewer 90-degree bends may be pulled without an intermediate-assist winch or hand assistance.



4.3. Use of multiple winches requires careful pulling equipment and careful coordination of winch speeds. Consult the equipment manufacturer's instructions for necessary details.

Center-Pulls and Backfeeding

4.4. Longer cable pulls, or those involving many bends, may also use center-pull and "backfeeding" techniques.

4.5. In a center-pull operation, set up the cable reel near the center of the duct run to be pulled. Pull the cable in one direction to the next designated splice point.

4.6. Unreel the remaining cable in a figure-eight configuration.

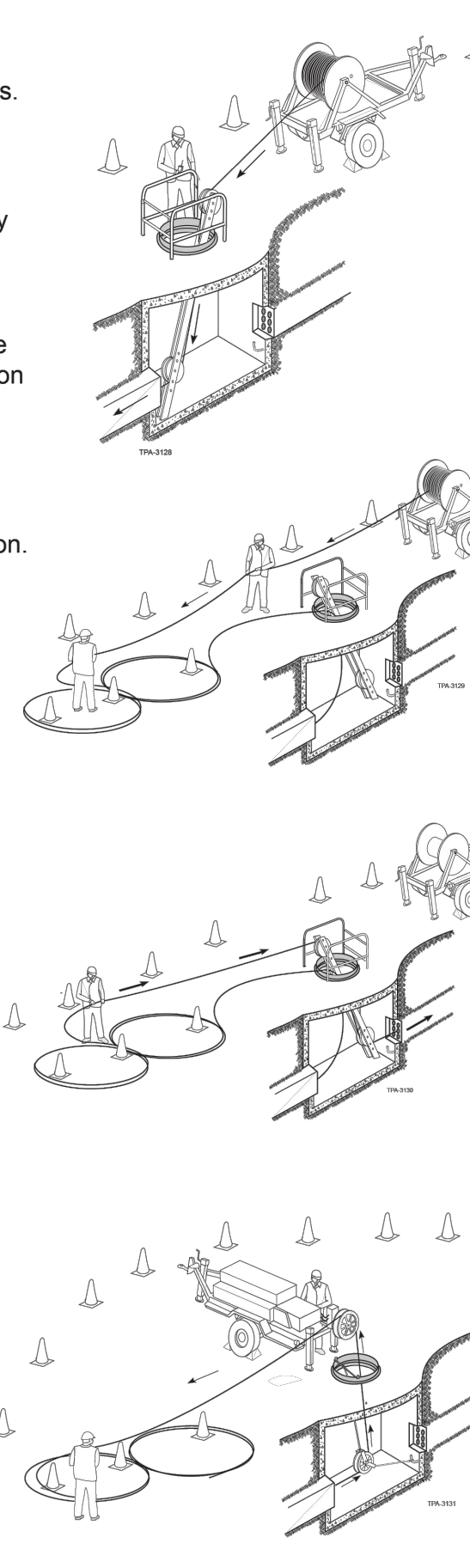
4.7. Flip over the figure-eight so that the pulling-eye end of the cable is on top. This can be easily accomplished by three installers, one at each end of the eight, and one at the center.

4.8. Pull the exposed end of the cable in the opposite direction to complete the pull. Hand tending of the cable paying off from the figure-eight is normally required.

Backfeeding

4.9. "Backfeeding" may be used to provide a series of shorter, lower-tension pulls in one direction. When backfeeding, pull enough cable out of the manhole to reach the intended end point of the pull, plus racking and splicing slack. This cable should be figure-eighted as it emerges from the manhole.

4.10. Flip over the figure-eight so that the pulling-eye end of the cable is on top. This can be easily accomplished by three installers, one at each end of the eight, and one at the center.



NOTE: SHOWN IS AN FIBER OPTIC CABLE INSTALLATION GUIDE FROM CORNING CABLE SYSTEMS. CONTRACTOR SHALL REFERENCE THIS GUIDE AND COORDINATE EXACT INSTALLATION REQUIREMENTS FROM CORNING CABLE SYSTEMS. CABLE TO BE INSTALLED CONTINUOUS WITH NO SPLICES FROM STATION NO. 14 TO STATION NO. 5

TETRA TECH
www.tetrattech.com
1136 OAK VALLEY DRIVE, SUITE 100
ANN ARBOR, MI 48108
PHONE: (734) 665-6000 FAX: (734) 213-3003

BY	DATE	DESCRIPTION
	05/01/25	ISSUED FOR BIDS

CITY OF KALAMAZOO, MICHIGAN
PUMP STATION 5 & 14
WATER AND TRANSMISSION MAIN, CONTRACT 1
FIBER OPTIC CABLE
INSTALLATION GUIDE

PROJ: 200-19743-24012
DESN:
DRWN:
CHKD:

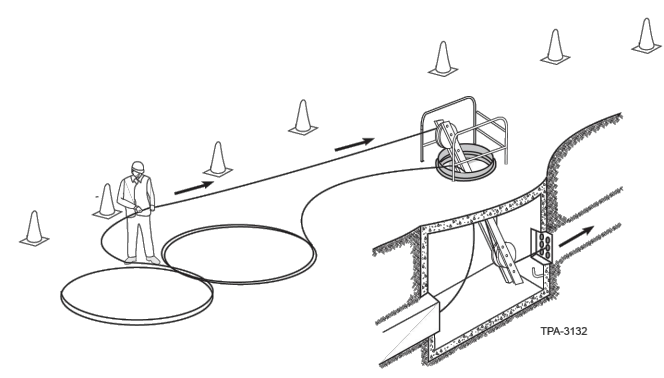
E-001

4/28/2025 10:00:10 AM - C:\ADACCDCS\TETRA TECH INC\200-19743-24012_KZOO PSS AND PS\14\PROJECT FILES\CAD\SHEETFILES\CONTRACT 1\FIBER OPTIC GUIDE.DWG - HOLLENBECK, TODD

Copyright: Tetra Tech

4/28/2025 10:00:36 AM - C:\ADACDCDCSTETRA TECH INC\200-19743-24012 KZOO PSS AND PS14\PROJECT FILES\CAD\SHEETFILES\CONTRACT 1\2 FIBER OPTIC GUIDE.DWG - HOLLENBECK, TODD

4.11. After the pulling eye is connected to the next section of the pull-line, feed the cable by hand back into the manhole and pull it to its next destination. The cable may be pulled directly from a figure-eight by a winch, provided the capstan or sheave used at the entry manhole ensures sufficient bend radius. Hand tending of cable paying off from figure-eights is normally required.



WARNING: Before pulling cable directly from a figure-eight, make sure that the area inside the loops of the cable is clear of personnel and equipment. Failure to do so may result in injury to personnel or damage to the cable.

5. INSTALLATION PROCEDURE

- 5.1. This section will provide an overview of an installation operation. As noted earlier, your company's practices and local conditions may take precedence over these guidelines.
- 5.2. Prepare the manholes in the duct section where the cable is to be placed:
 - a. Place barricades
 - b. Monitor gas
 - c. Establish ventilation
 - d. Pump water
 - e. Inspect ladders, racks, and duct banks
- 5.3. If not already in place, install the innerduct and pull-line. Tie down exposed innerduct in manholes to prevent dragging of innerduct during pulling operations. Relocate existing utilities if necessary.
- 5.4. Set up winches, monitoring devices, lubrication points, bend radius devices (sheaves, capstans, bending shoes, etc.), and means of communications along the route prescribed in the pull plan.
- 5.5. Locate the cable reels at the appropriate points of the route.
- 5.6. Remove reel lagging and retrieve the cable data sheets (if present) from each reel for your company's as-built records.
- 5.7. Inspect the reels and equipment on which they are mounted for any bolts, nails or other protrusions that could damage the cable as it is paid off.
- 5.8. Ensure that the reel trailer or jack stands are stable, and that the reel may turn freely without binding. The reel must be level to allow proper pay off of cable.

NOTE: Jack stands can be unstable if not set up properly. Consult your company's practices if jack stands are going to be used in your installation.
- 5.9. Align the reel at the feed hole so that the cable can be routed from the top of the reel into the duct bank in as straight a path as possible.
- 5.10. If not previously installed, attach the pulling grip to the cable, and attach the grip to a swivel. The swivel should be securely fastened to the pull-line. See the pull-line manufacturer's recommendations for appropriate knots.

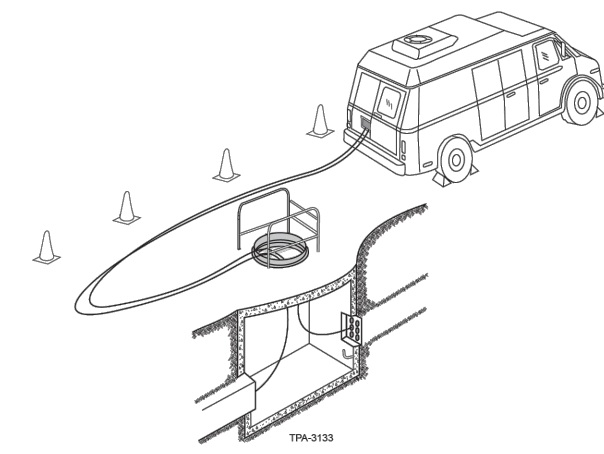
STANDARD RECOMMENDED PROCEDURE 005-011 | ISSUE 11 | SEPTEMBER 2010 | PAGE 7 OF 9

5.11. A warning marker (colored tape or similar material) may be attached to the pull-line several feet in front of the pulling grip to alert observers at manholes that the cable is approaching.

- 5.12. Apply cable lubricant as required.
- 5.13. Verify that communication lines are functional and crews are in place at feed, pull, and intermediate manholes.
- 5.14. Start the pull at a slow speed, passing the pull-line and cable over and around the capstans, sheaves, and other devices required to maintain the minimum bend radius. Begin tension monitoring with a calibrated device as soon as tension is applied to the cable. If necessary, aid the cable feed by turning the reel by hand. Ensure that the cable is fed only as fast as the pull-line is moving. Back tension on the reel will prevent too much cable being fed off.
- 5.15. Once the cable has moved a minimum of 5 ft (1.3 m) into the innerduct, accelerate the pull smoothly to its intended speed [50-100 ft (15.2-30.4 m) per minute is desirable].
- 5.16. Continue the pull at a steady rate. If it is necessary to stop the pull at any point, the winch operator should stop the pull, but NOT release the tension unless instructed to do so. Pulls can be easily resumed if tension is maintained on the pull-line and cable.
- 5.17. The cable should be visually observed during the following situations:
 - a. When it passes through any intermediate manhole in which innerduct continuity is broken.
 - b. Where use of a radius-maintaining device is required due to a bend or offset of entrance and exit ducts.
 - c. At intermediate-assist winches.
- 5.18. Ensure that the bend radius is maintained, and that the cable is properly routed through the sheaves, capstans, bending shoes, etc.. Stop the pull if the cable is misrouted, and correct the problem before resuming. If the innerduct is being pulled along with the cable, stop the pull and secure the innerduct with temporary cable ties.
- 5.19. When the cable end reaches a backfeed point or splice point manhole, pull the cable out of the hole using a setup similar to that at the feed hole to maintain bend radius. After passing around the winch, the cable slack should be figure-eighted in an area where it will not be subject to damage by personnel or traffic. Follow the procedure in Step 4.9 for flipping the figure-eight so that the pulling grip end of the cable will be on top before the pull is resumed.

NOTE: Pulls which have a large number of intermediate manholes will require a large quantity of cable slack. This slack must be pulled from the two end points and backfed to provide racking slack.

5.20. At splice points, pull sufficient slack (typically 40 ft [10 m] of slack from the lip of the manhole) to reach the intended splicing location, plus enough slack to permit closure preparation and splicing.



5.21. Verify and record the distance markings printed on the cable for as-built documentation.

STANDARD RECOMMENDED PROCEDURE 005-011 | ISSUE 11 | SEPTEMBER 2010 | PAGE 8 OF 9

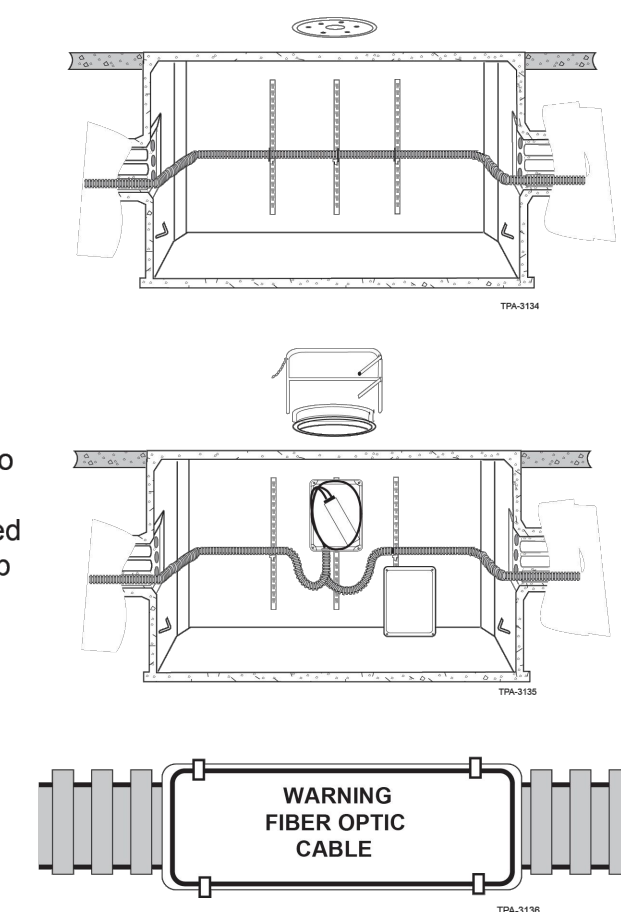
5.22. Once the cable is pulled into place and appropriate slack is available at splice or termination points, begin securing all the innerduct to cable racks on the manhole walls. Begin racking at the center manhole and proceed to the end manholes. Maintain the cable's specific minimum bend radius.

5.23. At points where the innerduct is continuous through the manhole, push the innerduct and cable to the rack and secure with appropriate cable ties. Maintain the cable's minimum bend radius.

5.24. If the innerduct is not continuous, rack the split duct, or the larger outside diameter section of innerduct before the pull.

5.25. Store coiled splicing slack in the splicing manholes so that it is not likely to be damaged during later work in the manhole. If possible, store the slack in an enclosure designed to store splicing slack and a splice closure. Place an end cap on any bare cable ends to prevent moisture or dirt intrusion.

5.26. Fiber optic warning signs should be placed on all innerduct containing fiber optic cable. Warning signs can help prevent damage resulting from the cable being mistaken for something else.



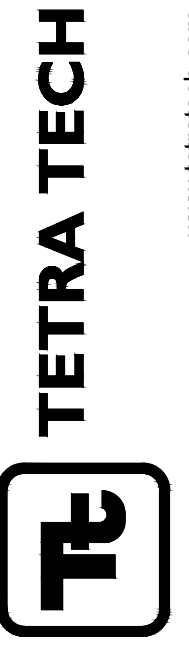
Corning Cable Systems LLC • PO Box 489 • Hickory, NC 28603-0489 USA
1-800-743-2671 • FAX +1-828-325-5060 • International +1-828-901-5000 • <http://www.corning.com/cablesystems>

Corning Cable Systems reserves the right to improve, enhance, and modify the features and specifications of Corning Cable Systems' products without prior notification. Altos is a registered trademark of Corning Cable Systems Brands, Inc. SST-Ribbon and SST-UltraRibbon are trademarks of Corning Cable Systems Brands, Inc. All trademarks are the properties of their respective owners. Corning Cable Systems is ISO 9001 certified.

© 1988, 1998, 2001, 2008, 2010 Corning Cable Systems. All rights reserved. Published in the USA.

STANDARD RECOMMENDED PROCEDURE 005-011 | ISSUE 11 | SEPTEMBER 2010 | PAGE 9 OF 9

NOTE: SHOWN IS AN FIBER OPTIC CABLE INSTALLATION GUIDE FROM CORNING CABLE SYSTEMS. CONTRACTOR SHALL REFERENCE THIS GUIDE AND COORDINATE EXACT INSTALLATION REQUIREMENTS FROM CORNING CABLE SYSTEMS. CABLE TO BE INSTALLED CONTINUOUS WITH NO SPLICES FROM STATION NO.14 TO STATION NO.5



www.tetrattech.com
1136 OAK VALLEY DRIVE, SUITE 100
ANN ARBOR, MI 48108
PHONE: (734) 665-6000 FAX: (734) 213-3003

MARK	DATE	DESCRIPTION	BY
	05/01/25	ISSUED FOR BIDS	

CITY OF KALAMAZOO, MICHIGAN
PUMP STATION 5 & 14
WATER AND TRANSMISSION MAIN CONTRACT 1
FIBER OPTIC CABLE
INSTALLATION GUIDE

PROJ: 200-19743-24012
DESN:
DRWN:
CHKD:

E-002

Copyright: Tetra Tech

