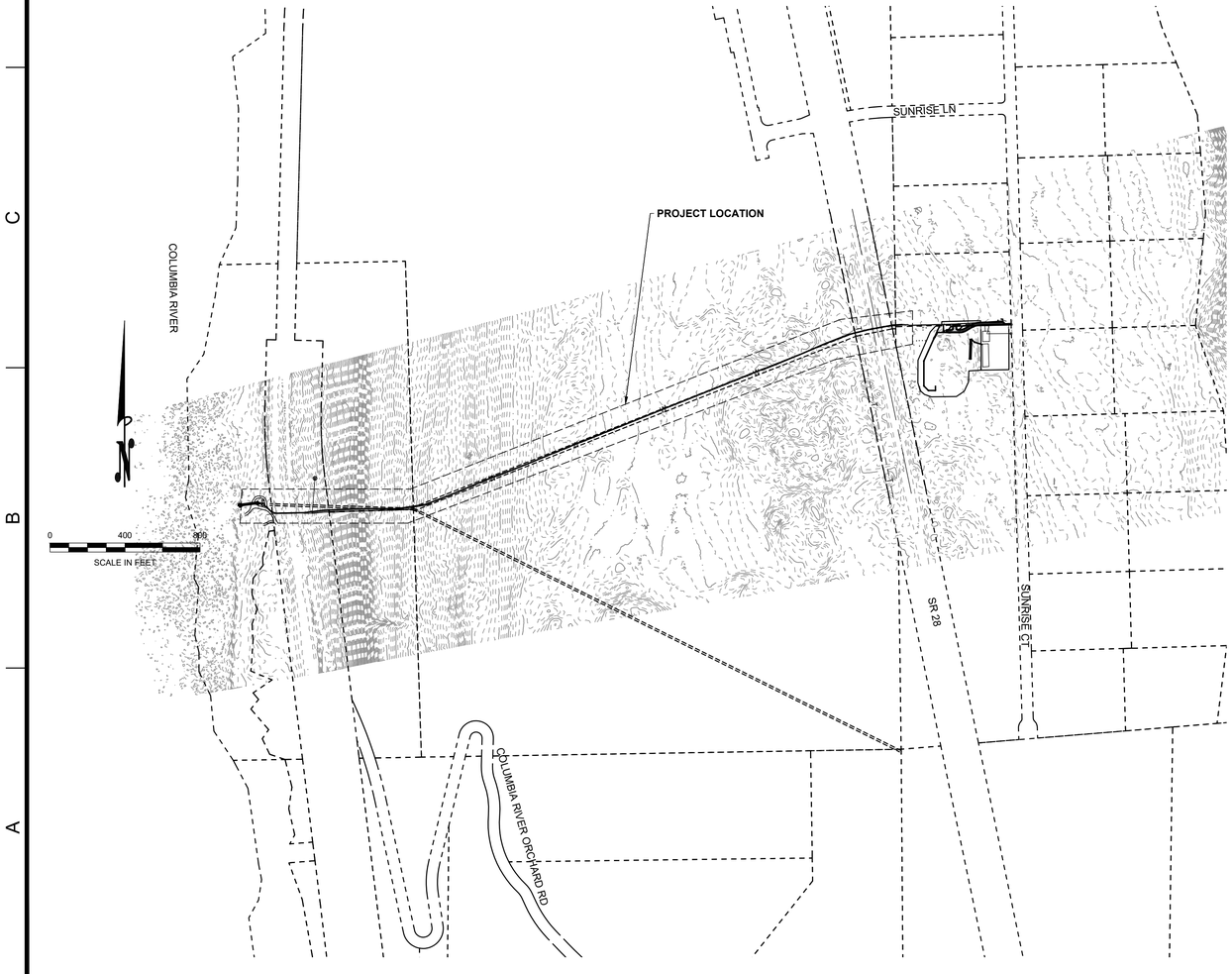
WSU SUNRISE ORCHARD
INSTALL IRRIGATION MAINLINE

SECTION 15 & 16, T. 21 N., R. 22 E.W.M.
DOUGLAS COUNTY, WA

TOPOGRAPHY NOTES

CONTOUR INTERVAL: 2 FOOT
VERTICAL DATUM: NAVD 88
HORIZONTAL DATUM: NAD 83/1991

ELEVATIONS DERIVED FROM GPS OBSERVATIONS



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ENGINEER

ERLANDSEN

DAVE DORMIER, PE

250 SIMON STREET
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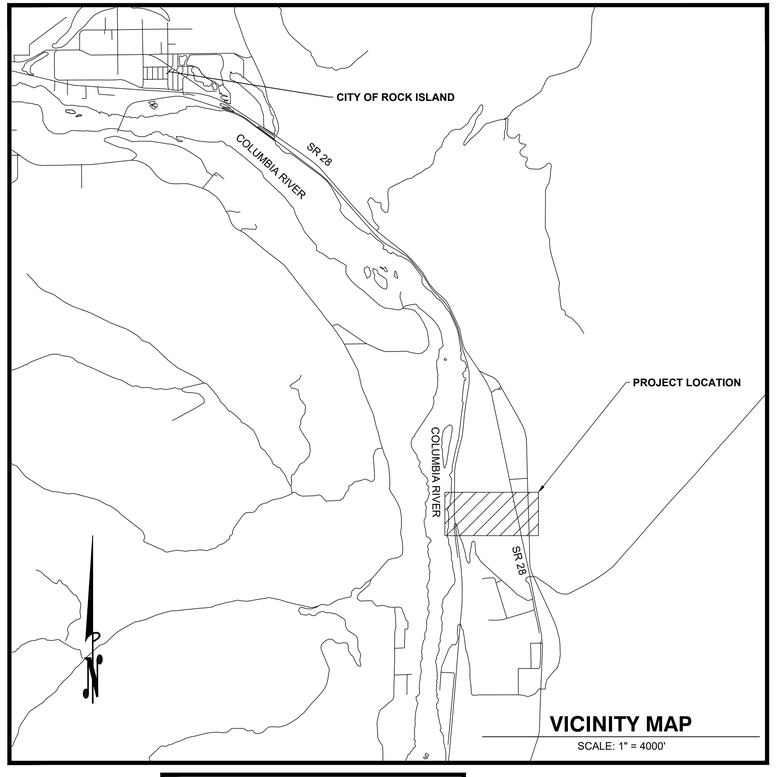
DOUGLAS COUNTY SHALL NOT BE RESPONSIBLE FOR THE MAINTENANCE OF ROADWAY AND APPURTENANT IMPROVEMENTS, INCLUDING STORM DRAINAGE STRUCTURES AND PIPES, FOR THE FOLLOWING PRIVATE ROADS: JOINT USE DRIVEWAY.

THE ENGINEER WHO HAS PREPARED THESE PLANS, BY EXECUTION AND/OR SEAL HEREOF DOES HEREBY AFFIRM RESPONSIBILITY TO THE COUNTY, AS A BENEFICIARY OF SAID ENGINEER'S WORK, FOR ANY ERRORS AND OMISSIONS CONTAINED IN THESE PLANS, AND APPROVAL OF THESE PLANS BY THE COUNTY ENGINEER SHALL NOT RELIEVE THE ENGINEER WHO HAS PREPARED THESE PLANS OF ANY SUCH RESPONSIBILITY.

SHEET INDEX

Sheet List Table

CONSTRUCTION HOURS OF WORK
MONDAY THROUGH FRIDAY 6:00 AM TO 7:00 PM



VICINITY MAP
SCALE: 1" = 4000'

THESE PLANS HAVE BEEN REVIEWED BY DOUGLAS COUNTY DEPARTMENT OF TRANSPORTATION AND LAND SERVICES AND HAVE BEEN ACCEPTED FOR COMPLYING WITH THE REQUIREMENTS OF DOUGLAS COUNTY ROAD STANDARDS. THESE PLANS ARE VALID FOR THREE YEARS FROM THE ACCEPTANCE DATE.

COUNTY ENGINEER _____ DATE _____

BID SET

DESIGN FIRM:

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PROVISIONAL STAMP:

DAVID E. DORMIER · STATE OF WASHINGTON · 31741 · REGISTERED PROFESSIONAL ENGINEER · 11/17/24

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WSU SUNRISE ORCHARD

INSTALL IRRIGATION MAINLINE

FACILITY NO. 3300

MARK	DATE	DESCRIPTION
	04/04/24	BID SET

CAD DWG FILE: 20210257.0000-E2 Pipeline 24.dwg	
DESIGN BY: DD	
DRAWN BY: NM	CHECKED BY: DD
PROJECT No. 2233-2024	FILE No. 3300-G-003
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SHEET TITLE

COVER

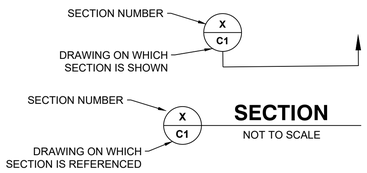
C-000

SHEET 1 OF 16 SHEETS

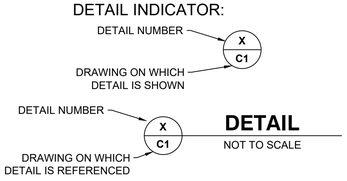
EXISTING		PROPOSED	
	ASPHALT		ASPHALT
	CONCRETE		CONCRETE
	GRAVEL		GRAVEL
	DIRT		DEMOLITION AREA
	LANDSCAPING/VEGETATION		PEDESTRIAN CURB
			TRUNCATED DOMES
	ASPHALT EDGE		ASPHALT EDGE
	CONCRETE EDGE		CONCRETE EDGE
	GRAVEL EDGE		GRAVEL EDGE
	CURB TOP BACK		CURB TOP BACK
	CURB FLOWLINE		CURB FLOWLINE
	DITCH CENTERLINE		DITCH CENTERLINE
	LANDSCAPE EDGE		LANDSCAPE EDGE
			NEW SITE FEATURE
X	FENCING	X	FENCING
	MAJOR CONTOUR		MAJOR CONTOUR
	MINOR CONTOUR		MINOR CONTOUR
OHP	OVERHEAD ELECTRICAL LINE		
P	UNDERGROUND ELECTRICAL	P	ELECTRICAL LINE
OHFO	OVERHEAD FIBER OPTIC LINE		
FO	UNDERGROUND FIBER OPTIC	FO	FIBER OPTIC LINE
G	GAS LINE	G	GAS LINE
I	IRRIGATION LINE	I	IRRIGATION LINE
SS	SANITARY SEWER LINE	SS	SANITARY SEWER LINE
SD	STORM DRAIN LINE	SD	STORM DRAIN LINE
	STORM DRAIN CULVERT		STORM DRAIN CULVERT
OHT	OVERHEAD TELECOM LINE		
T	TELECOM LINE	T	TELECOM LINE
		F	FIRE MAIN
W	POTABLE WATER MAIN	W	POTABLE WATER MAIN
D	STORM DRAIN MANHOLE		STORM DRAIN MANHOLE
	STORM DRAIN CATCH BASIN		STORM DRAIN CATCH BASIN
	STORM DRAIN CLEANOUT		STORM DRAIN CLEANOUT
	SANITARY SEWER CLEANOUT		SANITARY SEWER CLEANOUT
S	SANITARY SEWER MANHOLE		SANITARY SEWER MANHOLE
	ELECTRICAL TRANSFORMER		ELECTRICAL TRANSFORMER
	ELECTRICAL HANDHOLE		ELECTRICAL HANDHOLE
	LUMINAIRE		LUMINAIRE
	UTILITY POLE		
	WATER METER		WATER METER
	WATER MAIN VALVE		WATER MAIN VALVE
	FIRE HYDRANT		FIRE HYDRANT
	BLOWOFF		WATER MAIN FITTINGS
			BLOWOFF
			AIR/VAC
			COUPLER
			CONCRETE BLOCKING
			REDUCER
			ADAPTER
	TRAFFIC SIGN		TRAFFIC SIGN
	GUARDRAIL FACE		ROCK WALL
	ROCK EXPOSED		PROPOSED EASEMENT LINE
	EDGE OF WATER		PROPOSED LOT LINE
	EASEMENT LINE		
	EASEMENT CENTERLINE		
	LOT BOUNDARY		
	R/W LINE		

EXISTING	
T	TELEPHONE MANHOLE
T	TELEPHONE PEDESTAL
G	GAS MANHOLE
	GAS VALVE
	GAS METER
	GAS RISER
E	ELECTRICAL MANHOLE
P	ELECTRICAL VAULT CENTER
	ELECTRICAL TRANSFORMER
	ELECTRICAL OUTLET
E	ELECTRICAL HANDHOLE
	ELECTRICAL METER
V	TV MANHOLE
V	TV PEDESTAL
	TV POLE
W	WATER MANHOLE
	WATER VALVE
	WATER BLOWOFF
	WATER METER
	FIRE HYDRANT
	WELL
I	IRRIGATION MANHOLE
	IRRIGATION AIR RELEASE
	IRRIGATION RISER
	IRRIGATION VALVE
F	FIBER OPTIC MANHOLE
F	FIBER OPTIC PEDESTAL
	ELECTRICAL POLE
	ELECTRICAL POLE WITH TRANSFORMER
	GUY POLE
	GUY ANCHOR
	RAILROAD CONTROL BOX
	DECIDUOUS TREE
	CONIFEROUS TREE
	DECIDUOUS BUSH
	CONIFER BUSH
	MAILBOX
	SURVEY MONUMENT

SECTION INDICATOR:



DETAIL INDICATOR:



ABBREVIATIONS

AAF	AVERAGE ANNUAL FLOW	E	EAST	L	LENGTH	S	SOUTH
AB	ANCHOR BOLT	EA	EACH	LB	POUND	SC	SCUM
AC	ASPHALT CONCRETE	ECC	ECCENTRIC	LB/HR	POUNDS PER HOUR	SCH	SCHEDULE
ACP	ACOUSTIC PANEL	EFF	EFFLUENT	LF	LINEAR FEET	SDG	SMALL DIAMETER GRAVITY
ADJ	ADJUSTABLE	EG	EXISTING GRADE			SF	SQUARE FEET
AFF	ABOVE FINISHED FLOOR	EL	ELEVATION	MAG	MAGNETIC	SHT	SHEET
AFN	AUDITOR FILE NUMBER	ELL	ELBOW OR BEND	MATL	MATERIAL	SL	SLOPE
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION	ELEC	ELECTRICAL	MAH	METAL ACCESS HATCH	SOC	SOCKET
ALTR	ALTERNATE	EMBD	EMBEDMENT	MAX	MAXIMUM	SP	STATIC PRESSURE
ALUM	ALUMINUM	EMERG	EMERGENCY	MECH	MECHANICAL	SPECS	SPECIFICATIONS
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE	EX	EXISTING	MRF	MANUFACTURER	SQ	SQUARE
AP	ACCESS PANEL	EXP	EXPANSION	MGD	MILLION GALLONS PER DAY	SS	STAINLESS STEEL
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS	EW	EACH WAY	MG/L	MILLIGRAM PER LITER	STA	STATION
ASPH	ASPHALT	EVCS	END VERTICAL CURVE STATION	MH	MANHOLE	STD	STANDARD
ASTM	AMERICAN SOCIETY OF TESTING AND MATERIALS			MIN	MINIMUM	STL	STEEL
ASSY	ASSEMBLY	FAB	FABRICATED	MMF	MAXIMUM MONTH FLOW	STM	STORM
AVE	AVENUE	FCA	FLANGED COUPLING ADAPTER	MD	MID ORDINATE	STRG	STRONG
		FCO	FLOOR CLEANOUT	MDV	MOTOR OPERATED VALVE	SUC	SUSPENDED CEILING
BI	BLACK IRON	FD	FLOOR DRAIN			SWD	SIDE WATER DEPTH
BLD FLG	BLIND FLANGE	FF	FACTORY FINISH, FINISHED FLOOR	N	NORTH		
BLDG	BUILDING	FG	FINISHED GRADE	NO.	NUMBER	TAPD	TAPERED
BLK	BLOCK	FIG	FIGURE	NPW	NON-POTABLE WATER	TB	TOP AND BOTTOM
BLKING	BLOCKING	FIN	FINISHED	NTS	NOT TO SCALE	TC	TOP OF CURB
BOD	BOTTOM OF DUCT, BIOCHEMICAL OXYGEN DEMAND	FIPT	FEMALE INTERNATIONAL PIPE THREAD			TDH	TOTAL DYNAMIC HEAD
BOT	BOTTOM	FL	FLANGE	OBD	OPPOSED BLADE DAMPER	TEL	TELEPHONE
BOW	BOTTOM OF WALL	FLN	FLOW LINE	OC	ON CENTER	TFE	TOE FACE EXPOSED OF WALL
BRG	BRIDGE	FLEX	FLEXIBLE	OD	OUTSIDE DIAMETER	THK	THICK
BTWN	BETWEEN	FLR	FLOOR	OF	OUTSIDE FACE	THRD	THREADED
BVC	BEGIN VERTICAL CURVE	FPM	FEET PER MINUTE	OPNG	OPENING	THRU	THROUGH
		FT	FEET	OPP	OPPOSITE	TK	TANK
C	CONDUIT	FT2	SQUARE FEET	OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION	TO	TOP
CAP	CORRUGATED ALUMINUM PIPE	FTG	FOOTING			TOC	TOP OF CONCRETE
CB	CATCH BASIN			OHP	OVERHEAD POWER	TOF	TOP OF FOOTING
CCP	CONCRETE CYLINDER PIPE	GA	GAUGE	OZ	OUNCE	TOG	TOP OF GROUT
CD	CEILING DIFFUSER	GALV	GALVANIZED			TOP	TOP OF PAD
CDF	CONTROLLED DENSITY FILL	GEN	GENERAL	PE	PLAIN END	TOS	TOP OF SLAB
CFM	CUBIC FEET PER MINUTE	GI	GALVANIZED IRON	PERF	PERFORATED	TOW	TOP OF WALL
CI	CAST IRON	GOVT	GOVERNMENT	PG	PERFORMANCE GRADE	TS	TOTAL SOLIDS
CL	CLASS	GPD	GALLONS PER DAY	PHF	PEAK HOUR FLOW	TSS	TOTAL SUSPENDED SOLIDS
CLAR	CLARIFIER	GPM	GALLONS PER MINUTE	PL	PLATE	TYP	TYPICAL
℄	CENTER LINE	GRD	GRADE	PLYWD	PLYWOOD	UHMW	ULTRA HIGH MOLECULAR WEIGHT, POLYETHYLENE
CLR	CLEARANCE	GRT	GROUT	PRV	PRESSURE REDUCING VALVE		
CMP	CORRUGATED METAL PIPE	GRV	GROOVED PIPE OR COUPLING	PS	PUMP STATION, PRIMARY SLUDGE OR PIPE SUPPORT	UV	ULTRAVIOLET
CMU	CONCRETE MASONRY UNIT	GSM	GALVANIZED SHEET METAL				
CO	CLEANOUT	GV	GATE VALVE	PSF	POUNDS PER SQUARE FOOT	VC	VERTICAL CURVE
CONC	CONCRETE	GWB	GYPSUM WALL BOARD	PSI	POUNDS PER SQUARE INCH	VERT	VERTICAL
CONN	CONNECTION			PSIG	POUNDS PER SQUARE INCH GAUGE	VFD	VARIABLE FREQUENCY DRIVE
CONT	CONTRACTOR, CONTINUOUS	H	HEIGHT, HOLLOW	PVC	POLYVINYL CHLORIDE	VIS	VINYL SHEET
CONV	CONVEYOR	HB	HOSE BIB	PVI	POINT OF VERTICAL INTERSECTION	VS	VOLATILE SOLIDS
CPLG	COUPLING	HEX	HEXAGONAL	PVMT	PAVEMENT	VTR	VENT THROUGH ROOF
CONTIN	CONTINUED	HORIZ	HORIZONTAL				
CP	CORNER POST	HP	HORSEPOWER	QT	QUARTER	W	WIDTH, WEST
CPEP	CORRUGATED POLYETHYLENE PIPE	HMA	HOT MIX ASPHALT	QUAD	QUADRANT	W/	WITH
CSBS	CRUSHED SURFACING BASE COURSE	HDG	HOT DIPPED GALVANIZED			WAS	WASTE ACTIVATED SLUDGE
CSH	CONCRETE SURFACE HARDENER	HR	HOUR	RAG	RETURN AIR GRILLE	WCO	WALL CLEANOUT
CSTC	CRUSHED SURFACING TOP COURSE	HDPE	HIGH DENSITY POLYETHYLENE	RAS	RETURN ACTIVATED SLUDGE	WD	WIDE
CTR	CENTER			RD	ROOF DRAIN	W/O	WITHOUT
CU	COPPER	ID	IDENTIFICATION, INSIDE DIAMETER	RED	REDUCER	WRF	WATER RECLAMATION FACILITY
CX	CONNECT TO EXISTING	IE	INVERT ELEVATION	REINF	REINFORCE	WSL	WATER SURFACE LEVEL
		IN	INCH	REQD	REQUIRED	WWF	WELDED WIRE FABRIC
D	DRAIN	INF	INFLUENT	RESTL	REINFORCING STEEL	WWM	WELDED WIRE MESH
DI	DUCTILE IRON	INV	INVERT	RGF	RECIRCULATING GRAVEL FILTER	WWTF	WASTEWATER TREATMENT FACILITY
DIA	DIAMETER			RLX	RELOCATE EXISTING		
DIR	DIRECTION	J BOX	JUNCTION BOX	RM	ROOM	YH	YARD HYDRANT
DISCH	DISCHARGE			RO	ROUGH OPENING		
DIV	DIVISION			RS	RAW SEWAGE		
DN	DOWN			R/W	RIGHT-OF-WAY		
DO	DISSOLVED OXYGEN			RX	REMOVE EXISTING		
DP	DIFFERENTIAL PRESSURE						

BID SET

DESIGN FIRM:

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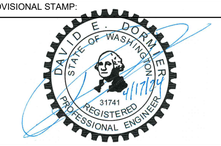

WASHINGTON STATE UNIVERSITY

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PH 509-335-5571
FAX 509-335-6875

WSU SUNRISE ORCHARD

INSTALL IRRIGATION MAINLINE

FACILITY NO. 3300

MARK	DATE	DESCRIPTION
	04/04/24	BID SET

CAD DWG FILE:	20210257.0000-E2 Pipeline 24.dwg
DESIGN BY:	DD
DRAWN BY: NM	CHECKED BY: DD
PROJECT No. 2233-2024	FILE No. 3300-G-003
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SHEET TITLE

LEGEND

C-001

SHEET 2 OF 16 SHEETS

FILE: M:\1jobs\2021\20210257.0000\Dwg\Final\20210257.0000-E2 Pipeline 24.dwg PLOT DATE: February 28, 2023, 3:01 PM ORIGINAL PAPER SIZE: 22" x 34"

HDPE INSTALLATION NOTES:

COILED LENGTHS AND LONG STRINGS OF PE FUSED PIPE MAY BE COLD BENT IN THE FIELD. THE ALLOWABLE BEND RATIO IS DETERMINED BY THE PIPE DIAMETER AND THE DIMENSION RATIO. SEE FIGURE 8 AND TABLE 4. BECAUSE FITTINGS AND FLANGE CONNECTIONS ARE RIGID COMPARED TO THE PIPE, THE MINIMUM BEND RADIUS IS 100 TIMES THE PIPE'S OUTSIDE DIAMETER (OD), WHEN A FITTING OR FLANGE CONNECTION IS PRESENT IN THE BEND. THE BEND RADIUS SHOULD BE LIMITED TO 100 X OD FOR A DISTANCE OF ABOUT 5 TIMES THE PIPE DIAMETER ON EITHER SIDE OF THE FITTING LOCATION.

UNDERGROUND INSTALLATION OF PE PIPING
MINIMUM BEND RADIUS FOR PE PIPE INSTALLED IN OPEN CUT TRENCH

DIMENSION RATION, DR	MINIMUM COLD BEND RADIUS
7, 7.3, 9	20 X PIPE OD
11, 13.5	25 X PIPE OD
17, 21	27 X PIPE OD
26	34 X PIPE OD
32.5	42 X PIPE OD
41	52 X PIPE OD

FITTING OR FLANGE PRESENT IN BEND 100 X PIPE OD

FIELD BENDING INVOLVES EXCAVATING THE TRENCH TO THE DESIRED BEND RADIUS, THEN SWEEPING OR PULLING THE PIPE STRING INTO THE REQUIRED BEND AND PLACING IT IN THE TRENCH. TEMPORARY RESTRAINTS MAY BE REQUIRED TO BEND THE PIPE, AND TO MAINTAIN THE BEND WHILE PLACING THE PIPE IN THE TRENCH AND PLACING INITIAL BACKFILL. TEMPORARY BLOCKS OR RESTRAINTS MUST BE REMOVED BEFORE INSTALLING FINAL BACKFILL, AND ANY VOIDS MUST BE FILLED WITH COMPACTED INITIAL BACKFILL MATERIAL. CONSIDERABLE FORCE MAY BE REQUIRED TO FIELD BEND THE PIPE, AND THE PIPE MAY SPRING BACK FORCIBLY IF THE RESTRAINTS SLIP OR ARE INADVERTENTLY RELEASED WHILE BENDING. OBSERVE APPROPRIATE SAFETY PRECAUTIONS DURING FIELD BENDING.
THE HEAT FUSION JOINT USED FOR PE PIPE CREATES AN ESSENTIALLY CONTINUOUS LENGTH OF PIPE. WHEN THE PIPE IS PRESSURIZED TWO SIGNIFICANT INTERNAL FORCES ARE PRESENT IN THE PIPE. END THRUST FROM BENDS OR END CAPS IS TRANSMITTED THROUGH THE PIPE AS A LONGITUDINAL FORCE. HOOP STRESS (HOOP THRUST) OCCURS DUE TO THE INTERNAL PRESSURE. THE LONGITUDINAL FORCE TENDS TO GROW THE PIPE LENGTH WHILE THE HOOP THRUST EXPANDS THE DIAMETER (EVER SO SLIGHTLY) AND TENDS TO CONTRACT THE PIPE'S LENGTH IN PR PORTION TO POISSON'S RATIO. IN AN ALL PE PIPE SYSTEM THE LENGTH EFFECTS FROM THESE TWO FORCES TEND TO CANCEL EACH OTHER OUT. AS A RESULT, BURIED PE PIPES ARE SELF-RESTRAINED AND REQUIRE NO THRUST BLOCKING. A DIFFERENT SITUATION OCCURS WHEN PE PIPE TRANSITIONS TO A TYPE OF PIPE MATERIAL THAT IS JOINED BY NON-RESTRAINED GASKET JOINTS. THE LONGITUDINAL FORCE MAY BE NO LONGER PRESENT. THE RESULT IS THAT HOOP EXPANSION IS UNBALANCED AND WILL CAUSE CONTRACTION OF THE PE PIPE. THIS CONTRACTION CAN RESULT IN PULLING APART OF GASKET JOINTS IN LINE WITH THE PE PIPE. GENERALLY, IT IS NECESSARY TO ANCHOR THE ENDS OF A PE PIPELINE THAT TRANSITIONS INTO AN UNRESTRAINED GASKET JOINTED PIPE SYSTEM. IF THE GASKET JOINTS ARE RESTRAINED ANCHORING IS UNNECESSARY.

HDPE FUSING NOTES:

GENERAL PROVISIONS
PE PIPE OR FITTINGS ARE JOINED TO EACH OTHER BY HEAT FUSION OR WITH MECHANICAL FITTINGS. PE PIPE MAY BE JOINED TO OTHER PIPE MATERIALS BY MEANS OF COMPRESSION FITTINGS, FLANGES, OR OTHER QUALIFIED TYPES OF MANUFACTURED TRANSITION FITTINGS. THERE ARE MANY TYPES AND STYLES OF FITTINGS AVAILABLE FROM WHICH THE USER MAY CHOOSE. EACH OFFERS ITS PARTICULAR ADVANTAGES AND LIMITATIONS FOR EACH JOINING SITUATION THE USER MAY ENCOUNTER. CONTACT WITH THE VARIOUS MANUFACTURERS IS ADVISABLE FOR GUIDANCE IN PROPER APPLICATIONS AND STYLES AVAILABLE FOR JOINING AS DESCRIBED IN THIS DOCUMENT. THE JOINING METHODS DISCUSSED IN THIS CHAPTER COVER BOTH LARGE AND SMALL DIAMETER PIPE. LARGE DIAMETER PE PIPE IS CONSIDERED TO BE SIZES 3" IPS (3.500" OD, IRON PIPE SIZE) AND LARGER. ALL INDIVIDUALS INVOLVED IN THE JOINING PE PIPE SYSTEMS, WHETHER IT BE USING THE TYPICAL HEAT FUSION METHODS OR EMPLOYING MECHANICAL CONNECTIONS, SHOULD BE FULLY TRAINED AND QUALIFIED IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS AND/OR AS RECOMMENDED BY THE PIPE OR FITTING MANUFACTURER. THOSE ASSIGNED TO MAKING JOINTS IN PE PIPE FOR GAS APPLICATIONS MUST MEET THE ADDITIONAL REQUIREMENT OF COMPLIANCE WITH U.S. DEPARTMENT OF TRANSPORTATION PIPELINE SAFETY REGULATIONS(10). THE EQUIPMENT USED IN THE PROCESS OF MAKING HEAT FUSED JOINTS MUST BE DESIGNED TO OPERATE FOR THE SELECTED PIPE AND FUSION PROCEDURES. ADDITIONALLY, THE EQUIPMENT SHOULD BE WELL MAINTAINED AND CAPABLE OF OPERATING TO SPECIFICATION.

THERMAL HEAT FUSION METHODS
THERE ARE THREE TYPES OF CONVENTIONAL HEAT FUSION JOINTS CURRENTLY USED IN THE INDUSTRY; BUTT, SADDLE, AND SOCKET FUSION. ADDITIONALLY, ELECTROFUSION (EF) JOINING IS AVAILABLE WITH SPECIAL EF COUPLINGS AND SADDLE FITTINGS.
THE PRINCIPLE OF HEAT FUSION IS TO HEAT TWO SURFACES TO A DESIGNATED TEMPERATURE, THEN FUSE THEM TOGETHER BY APPLICATION OF A SUFFICIENT FORCE. THIS FORCE CAUSES THE MELTED MATERIALS TO FLOW AND MIX, THEREBY RESULTING IN FUSION. WHEN FUSED ACCORDING TO THE PIPE AND/OR FITTING MANUFACTURERS' PROCEDURES, THE JOINT AREA BECOMES AS STRONG AS, OR STRONGER THAN, THE PIPE ITSELF IN BOTH TENSILE AND PRESSURE PROPERTIES AND PROPERLY FUSED JOINTS ARE ABSOLUTELY LEAK PROOF. AS SOON AS THE JOINT COOLS TO NEAR AMBIENT TEMPERATURE, IT IS READY FOR HANDLING. THE FOLLOWING SECTIONS OF THIS CHAPTER PROVIDE A GENERAL PROCEDURAL GUIDELINE FOR EACH OF THESE HEAT FUSION METHODS.

BUTT FUSION
THE MOST WIDELY USED METHOD FOR JOINING INDIVIDUAL LENGTHS OF PE PIPE AND PIPE TO PE FITTINGS IS BY HEAT FUSION OF THE PIPE BUTT ENDS. THIS TECHNIQUE PRODUCES A PERMANENT, ECONOMICAL AND FLOW-EFFICIENT CONNECTION. QUALITY BUTT FUSION JOINTS ARE PRODUCED BY USING TRAINED OPERATORS AND QUALITY BUTT FUSION MACHINES IN GOOD CONDITION.
THE BUTT FUSION MACHINE SHOULD BE CAPABLE OF:

- ALIGNING THE PIPE ENDS
- CLAMPING THE PIPES
- FACING THE PIPE ENDS PARALLEL AND SQUARE TO THE CENTERLINE
- HEATING THE PIPE ENDS
- APPLYING THE PROPER FUSION FORCE

THE SIX STEPS INVOLVED IN MAKING A BUTT FUSED JOINT ARE:

1. CLEAN, CLAMP AND ALIGN THE PIPE ENDS TO BE JOINED
2. FACE THE PIPE ENDS TO ESTABLISH CLEAN, PARALLEL SURFACES, PERPENDICULAR TO THE CENTER LINE
3. ALIGN THE PIPE ENDS
4. MELT THE PIPE INTERFACES
5. JOIN THE TWO PIPE ENDS TOGETHER BY APPLYING THE PROPER FUSION FORCE
6. HOLD UNDER PRESSURE UNTIL THE JOINT IS COOL

PLAN NOTES:

1. THE EXISTING UTILITY LOCATIONS SHOWN ARE TO BE USED AS APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY LOCATION PRIOR TO CONSTRUCTION. CONTACT THE UTILITIES UNDERGROUND LOCATION CENTER 811.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE PUBLIC/PRIVATE UTILITIES THAT ARE NOT THE RESPONSIBILITY OF THE UTILITIES UNDERGROUND LOCATION CENTER.
3. CAUTION - EXTREME HAZARD - OVERHEAD ELECTRICAL SERVICE LINES ARE GENERALLY NOT SHOWN ON THE DRAWINGS. ELECTRICAL LINES IF SHOWN ARE LOCATED POINT-TO-POINT, POWER POLE-TO-POWER POLE CONNECTION. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXTENT OF THE HAZARD CREATED BY THE OVERHEAD ELECTRICAL POWER IN ALL AREAS AND SHALL FOLLOW PROCEDURES DURING CONSTRUCTION AS REQUIRED BY LAW AND REGULATION. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL MEET WITH THE RESPECTIVE UTILITY OWNER(S) AND DETERMINE THE EXTENT OF HAZARD AND REMEDIAL MEASURES AND SHALL TAKE WHATEVER PRECAUTIONS THAT MAY BE REQUIRED.
4. ADJACENT PROPERTY LINES WERE OBTAINED FROM VARIOUS PUBLIC SOURCES AND SHOULD NOT BE RELIED ON AS FORMAL OR LEGAL BOUNDARIES.
5. REMOVE ALL E.S.C. ITEMS AND LEGALLY DISPOSE OF WASTE AND DEBRIS IN APPROVED AND PERMITTED LOCATIONS AFTER THE SITE IS PERMANENTLY STABILIZED AND WITH COUNTY APPROVAL.
6. THE CONTRACTOR AND OWNER SHALL COORDINATE ALL INSPECTIONS. ALL COSTS INCURRED SHALL BE THE CONTRACTOR RESPONSIBILITY.
7. OPERATION OF EQUIPMENT AND ASSOCIATED MATERIALS IN THE CONSTRUCTION OF THE APPROVED PROJECT HAS THE POTENTIAL TO RESULT IN GENERATING DUST. PURSUANT TO COUNTY REGULATIONS, IMPACTS TO NEIGHBORING PROPERTIES SHALL BE CONTROLLED BY FREQUENTLY WATERING THE SITE AS NECESSARY TO PREVENT THE TRAVEL OF DUST. DO NOT SOAK THE SITE.

ECOLOGY CONSTRUCTION SWPPP CONTRACTOR REQUIREMENTS FOR CENTRAL BASIN:

1. CLEARING, GRADING AND/OR EXCAVATION THAT RESULTS IN THE DISTURBANCE OF ONE OR MORE ACRES (INCLUDING OFF-SITE DISTURBANCE ACREAGE) AND DISCHARGES STORMWATER TO SURFACE WATERS OF THE STATE MUST SEEK ECOLOGY SWPPP CONSTRUCTION STORMWATER GENERAL PERMIT (CSWGP) THAT COVERS ALL AREAS OF WASHINGTON STATE.
2. CONSTRUCTION ACTIVITIES ARE NOT REQUIRED TO SEEK COVERAGE UNDER THIS CSWGP CONSTRUCTION ACTIVITIES THAT DISCHARGE ALL STORMWATER AND NON-STORMWATER TO GROUND WATER, SANITARY SEWER, OR COMBINED SEWER, AND HAVE NO POINT SOURCE DISCHARGE TO EITHER SURFACE WATER OR A STORM SEWER SYSTEM THAT DRAINS TO SURFACE WATERS OF THE STATE
3. CONSTRUCTION SITE OPERATORS THAT DISCHARGE STORMWATER TO SURFACE WATER OR A STORM SEWER SYSTEM THAT DRAINS TO SURFACE WATERS OF THE STATE MAY QUALIFY FOR AN EROSIVITY WAIVER FROM THE CSWGP IF THE FOLLOWING CONDITIONS ARE MET:
   a. THE SITE WILL RESULT IN THE DISTURBANCE OF FEWER THAN 5 ACRES AND THE SITE IS NOT A PORTION OF A COMMON PLAN OF DEVELOPMENT OR SALE THAT WILL DISTURB 5 ACRES OR GREATER.
   b. THE PROJECT'S RAINFALL EROSIVITY FACTOR ("R" FACTOR) MUST BE LESS THAN 5 DURING THE PERIOD OF CONSTRUCTION ACTIVITY, AS CALCULATED (SEE THE CSWGP HOMEPAGE HTTPS://WWW.EPA.GOV/NPDES/RAINFALL-EROSIVITY-FACTOR-CALCULATOR-SMALL-CONSTRUCTION-SITES#GETTOOL . THE PERIOD OF CONSTRUCTION ACTIVITY STARTS WHEN THE LAND IS FIRST DISTURBED AND ENDS WITH FINAL STABILIZATION. FOR A LINK TO THE EPA'S CALCULATOR AND STEP BY STEP INSTRUCTIONS ON COMPUTING THE "R" FACTOR IN THE EPA EROSIVITY WAIVER FACT SHEET AT HTTPS://WWW.EPA.GOV/SITES/PRODUCTION/FILES/2015-10/DOCUMENTS/FACT3-1.PDF
   c. FOR SITES WITHIN THE CENTRAL BASIN: NO TIMEFRAME FOR CONSTRUCTION ACTIVITY RESTRICTIONS APPLY. THE CENTRAL BASIN IS DEFINED AS THE PORTIONS OF EASTERN WASHINGTON WITH MEAN ANNUAL PRECIPITATION OF LESS THAN 12 INCHES. FOR A MAP OF THE CENTRAL BASIN (AVERAGE ANNUAL PRECIPITATION REGION 2), REFER TO HTTP://WWW.ECY.WA.GOV/PROGRAMS/WQ/STORMWATER/CONSTRUCTION/EROSIVITYMAP.PDF
4. CONSTRUCTION SITE OPERATORS MUST SUBMIT A COMPLETE EROSIVITY WAIVER CERTIFICATION FORM AT LEAST ONE WEEK BEFORE DISTURBING THE LAND. CERTIFICATION MUST INCLUDE:
   a. STATEMENTS THAT THE OPERATOR WILL COMPLY WITH APPLICABLE LOCAL STORMWATER REQUIREMENTS AND IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL BMPS TO PREVENT VIOLATIONS OF WATER QUALITY STANDARDS. HTTPS://FORTRESS.WA.GOV/ECY/PUBLICATIONS/DOCUMENTS/ECY070202.PDF
5. THE EROSIVITY WAIVER DOES NOT APPLY TO CONSTRUCTION ACTIVITIES WHICH INCLUDE NONSTORMWATER DISCHARGES LISTED IN SPECIAL CONDITION S1.C.3. SITES WITH NON-STORMWATER DISCHARGES. SOME EXAMPLES OF NON-STORMWATER DISCHARGES INCLUDE EXCAVATION DEWATERING, WASH WATERS, IRRIGATION WATER, AND HYDROSTATIC TEST WATERS. YOU MUST GET NPDES PERMIT COVERAGE FOR NON-STORM WATER DISCHARGES.
6. THESE NOTES ARE OF A GENERAL BASES, AND ECOLOGY SHOULD BE CONSULTED REGARDING THERE FULL CONSTRUCTION SWPPP COVERAGE REQUIREMENTS.

HYDROSEEDING:

1. PASTURE MIX, OF THE FOLLOWING COMPOSITION, PROPORTION, AND QUALITY OR OTHER ENGINEER APPROVED MIX SHALL BE APPLIED AT THE RATES SHOWN BELOW ON ALL AREAS REQUIRING SEEDING WITHIN THE PROJECT (COVER WITH STRAW):

PROPOSED KIND AND VARIETY OF SEED IN MIXTURE BY COMMON NAME AND (BOTANICAL NAME)	POUNDS PURE LIVE SEED (PLS) PER ACRE
• PERENNIAL RYEGRASS	17.5
• TALL FESCUE	26
• NEW ZEALAND WHITE CLOVER	6.5
TOTAL POUNDS PLS PER ACRE	50

2. SOURCE IDENTIFIED SEED SHALL BE FOURTH GENERATION OR EARLIER. NON-SOURCE IDENTIFIED SEED SHALL MEET OR EXCEED WASHINGTON STATE DEPARTMENT OF AGRICULTURE CERTIFIED SEED STANDARDS AND BE FROM WITHIN THE COLUMBIA BASIN ECO-REGION, AS DEFINED BY THE US ENVIRONMENTAL PROTECTION AGENCY (EPA).
3. SEEDS SHALL BE CERTIFIED "WEED FREE," INDICATING THERE ARE NO NOXIOUS OR NUISANCE WEEDS IN THE SEED.

   SEED BED PLANTED SHALL REQUIRE IRRIGATION AND OTHER MAINTENANCE MEASURES AS NECESSARY TO FOSTER AND PROTECT THE ROOT STRUCTURE AND GRASS IS ESTABLISHED WITH OVER 80% COVERAGE.
4. THE SEEDBED SHALL BE FIRM WITH A FAIRLY FINE SURFACE, FOLLOWING SURFACING ROUGHING.
5. A COMMERCIAL FERTILIZER APPLIED AT 250 LBS/ACRE OF THE FOLLOWING FORMATION OR ENGINEER APPROVED EQUAL:

NITROGEN (N)	18%
AVAILABLE PHOSPHORIC ACID	10%
SOLUBLE POTASH	10%
SULPHUR	8%

6. MULCHING SHALL BE LONG TERM MULCH MEETING WSDOT STANDARD SPECIFICATION 9-14.4(2) APPLIED AT 1 TON/ACRE WITH TACKIFIER APPLIED AT 1 TON/ACRE.

- INSTALL EROSION CONTROL BLANKET NETTING TO ANCHOR MULCH MEETING WSDOT STANDARD SPECIFICATION 9-14.5(2) ON ALL SEEDED SLOPES GREATER THAN 3H:1V PER MANUFACTURER RECOMMENDATIONS.
- WATTLES ARE REQUIRED FOR SLOPES 2H:1V OR GREATER WHERE DISTURBED SLOPE LENGTH IS GREATER THAN 10' AS MEASURED PERPENDICULAR TO CONTOURS.

INSPECTION SCHEDULE:

1. EROSION AND SEDIMENT CONTROL (ESC) FACILITIES SHALL NOT BE ALLOWED TO FALL INTO DISREPAIR. THE PROPONENT OR DESIGNEE SHALL INSPECT FACILITIES DURING AND AFTER RAINFALL EVENTS TO ENSURE PROPER OPERATION. NEEDED REPAIRS SHALL BE MADE WITHIN 24 HOURS OR IMMEDIATELY IF POSSIBLE. INSPECTIONS SHALL BE PERFORMED BY THE PROJECT CESCL. AT MINIMUM SEDIMENT SHOULD BE REMOVED FROM ALL FACILITIES WHEN 6" OF SEDIMENT HAS ACCUMULATED. CATCH BASIN INSERTS AND FILTER FABRIC SHALL BE REPLACED SHOULD THEY BECOME DAMAGED OR ARE NO LONGER FILTERING RUNOFF.
2. IF NECESSARY, THE PROJECT ENGINEER, COUNTY INSPECTOR, OR PROJECT CESCL SHALL INSTRUCT CONTRACTOR TO INSTALL ADDITIONAL FACILITIES AS WARRANTED DURING FILED INSPECTIONS.
3. INSPECTIONS WILL BE PERFORMED AT THE FOLLOWING TIMES. CONTRACTOR SHALL NOTIFY CIOUNTY INSPECTOR AND PROJECT ENGINEER 48 HOURS IN ADVANCE OF THE REQUIRED INSPECTION.
   A. AFTER COMPLETION OF STAKING OF LIMITS OF CLEARING AND GRADING.
   B. AFTER COMPLETION OF CLEARING AND TESC MEASURES.
   C. AFTER COMPLETION OF EARTHWORK
   D. AFTER STORM DRAIN TRENCHING/PIPING IS COMPLETE BUT PRIOR TO BACKFILL. EACH TRENCH SHALL BE INSPECTED PRIOR TO BACKFILL.
   E. DURING BACKFILLING OF ALL UTILITIES.
   F. AS NEEDED TO DETERMINE COMPLIANCE WITH APPROVED PLANS AND/OR SPECIFICATIONS
   G. FINAL INSPECTION AFTER SYSTEM ARE CLEANED AND FINAL INSTALL.

DOUGLAS COUNTY
STANDARD PLAN NOTES:

1. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE MOST CURRENT EDITION OF THE STATE OF WASHINGTON, DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS OF ROAD AND BRIDGE CONSTRUCTION AND DOUGLAS COUNTY ROAD STANDARDS.
2. CATCH BASINS SHALL BE TYPE 1 OR TYPE 2, WSDOT STANDARD PLANS, WITH STANDARD, VANED OR HERRINGBONE FRAME AND GRATE UNLESS OTHERWISE NOTED. THE OUTSIDE EDGE OF THE CATCH BASIN SHALL BE PLACED AT THE INTERSECTION OF THE CURB AND GUTTER AND 0.010' TO 0.015' BELOW FINISHED GRADE, OR IN THE GUTTER LINE OF THE ROLLED EDGE SECTION.
3. IF ADEQUATE INSPECTION IS NOT COMPLETED AND DOCUMENTED BEFORE COMPLETION OF THE ROADWAY CONSTRUCTION, IT MAY BE NECESSARY FOR CORE DRILLING AND TESTING TO BE PERFORMED TO ASSURE AN ACCEPTABLE QUALITY OF ROADWAY. WHEN CORE DRILLING IS FOUND TO BE NECESSARY, THE APPLICANT WILL BE HELD RESPONSIBLE FOR ALL COSTS INCURRED.
4. IT WILL BE THE APPLICANT'S RESPONSIBILITY TO CONTACT ALL UTILITY COMPANIES IN ORDER TO ASSURE THAT ALL LINES, PIPES, POLES AND OTHER APPURTENANCES ARE PROPERLY LOCATED AND THEIR INSTALLATION IS COORDINATED WITH THE ROAD CONSTRUCTION. ALL UTILITY RELOCATION WORK SHALL BE AT THE EXPENSE OF THE APPLICANT AND MUST BE IN ACCORDANCE WITH DOUGLAS COUNTY ROAD STANDARDS PRIOR TO ROAD ACCEPTANCE.
5. CULVERT PIPE SHALL BE GALVANIZED STEEL OR PLASTIC (ADS SMOOTH WALL) 12-INCH DIAMETER MINIMUM PIPE WITH BEVELED ENDS UNLESS OTHERWISE NOTED. BEVELED ENDS SHALL MATCH THE IN-SLOPE IN THE DITCH LINE OR MATCH THE SLOPE IN A CUT OR FILL SECTION.
6. BURIED UTILITIES ARE SHOWN IN THEIR APPROXIMATE LOCATION. THE APPLICANT SHALL HAVE THE UTILITIES VERIFIED ON THE GROUND PRIOR TO ANY CONSTRUCTION.
7. ONSITE EROSION CONTROL MEASURES SHALL BE THE RESPONSIBILITY OF THE APPLICANT AND BE IN PLACE PRIOR TO CONSTRUCTION. ANY PROBLEMS OCCURRING BEFORE FINAL ACCEPTANCE BY DOUGLAS COUNTY AND WITHIN 18 MONTHS THEREAFTER SHALL BE CORRECTED BY THE APPLICANT. AT THE END OF THE 18 MONTH PERIOD, OR AS OTHERWISE DIRECTED BY THE COUNTY ENGINEER, THE APPLICANT SHALL REMOVE ALL TEMPORARY, NON-DEGRADABLE EROSION CONTROL MEASURES.
8. IN ACCORDANCE WITH THE DEPARTMENT OF ECOLOGY AIR QUALITY STANDARDS, THE APPLICANT SHALL BE RESPONSIBLE FOR CONTROLLING ALL FUGITIVE DUST THAT MAY BE GENERATED BY THE CONSTRUCTION PROJECT.
9. ANY REVISIONS TO PLANS MUST BE MADE BY THE APPLICANT'S ENGINEER AND APPROVED BY THE COUNTY ENGINEER PRIOR TO ANY IMPLEMENTATION IN THE FIELD.
10. ALL PAVEMENT MARKINGS SHALL CONFORM TO THE REQUIREMENTS OF THE MUTCD.
11. BEFORE STRIPING TAKES PLACE THE APPLICANT SHALL CONTACT THE DOUGLAS COUNTY TRANSPORTATION AND LAND SERVICES OFFICE FOR COORDINATION OF THE STRIPING.
12. A COPY OF THE APPROVED PLANS MUST BE ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS.
13. SLOPES SHALL BE STABILIZED TO PREVENT EROSION. IN CASE EROSION OCCURS IN DITCHES, DITCH LINING IS TO BE PROVIDED AS REQUESTED AND SPECIFIED BY THE COUNTY.
14. WHERE NEWLY CONSTRUCTED PAVING MEETS EXISTING PAVING, THE APPLICANT SHALL SAW CUT AND OVERLAY AND FEATHER NEW PAVEMENT TO PROVIDE A SMOOTH TRANSITION FROM EXISTING TO PROPOSED PAVING. APPLICATION OF A THICK TACK COAT OF EMULSIFIED ASPHALT SHALL BE APPLIED TO ENSURE PROPER BONDING.
15. THE COMPLETED SURFACE OF ALL COURSES SHALL BE OF UNIFORM TEXTURE, SMOOTH, UNIFORM AS TO CROWN AND GRADE, AND FREE FROM DEFECTS OF ALL KINDS. THE COMPLETED SURFACE OF THE WEARING COURSE SHALL NOT VARY MORE THAN 1/8 INCH FROM THE LOWER EDGE OF A 10-FOOT STRAIGHTEDGE PLACED ON THE SURFACE PARALLEL TO THE CENTERLINE. THE TRANSVERSE SLOPE OF THE COMPLETED SURFACE OF THE WEARING COURSE SHALL NOT VARY MORE THAN A 1/4 INCH IN 10- FEET FROM THE RATE OF TRANSVERSE SLOPE SHOWN ON THE PLANS.
16. MATERIALS SAMPLING AND TESTING SHALL BE AT A FREQUENCY AND MAGNITUDE AS SPECIFIED IN THE STANDARD SPECIFICATIONS OR DETERMINED BY THE COUNTY ENGINEER. A PRIVATE AND INDEPENDENT TESTING LABORATORY SHALL PERFORM TESTING AND SAMPLING. CERTIFIED TEST REPORTS SHALL BE FURNISHED FOR ALL TESTS PERFORMED BY PRIVATE TESTING LABORATORIES.

CULTURAL RESOURCES:

THE INTENT IS TO FOLLOW THE PREVIOUSLY EXCAVATED TRENCH OF AN EXISTING IRRIGATION LINE. IF IT IS POSSIBLE TO STAY WITHIN THE PREVIOUS DISTURBANCE OF THIS TRENCH, THAT WOULD CREATE LESS RISK OF ENCOUNTERING CULTURALLY SENSITIVE MATERIALS. A DEPARTMENT OF ARCHAEOLOGY AND HISTORIC PRESERVATION (DAHP) PERMIT WILL STILL BE REQUIRED THAT INCLUDES PROJECT PLANS SHOWING HOW INTACT SOILS CAN BE AVOIDED. ARCHAEOLOGY FIELDWORK CAN BE USED IN LOCATIONS WHERE EXCAVATIONS MUST EXCEED THE EXISTING TRENCH WIDTH & DEPTH. OTHER REQUIREMENTS OR RECOMMENDATIONS MAY BE INCLUDED IN THE ARCHAEOLOGICAL PERMIT ISSUED BY DAHP.

DUST ABATEMENT:

1. SITE RECOMMENDATIONS
   THE PROJECT WILL REQUIRE THE CONTRACTOR TO BE RESPONSIBLE FOR THE FOLLOWING METHODS OF DUST SUPPRESSION:

   TEMPORARY
   - WATERING AS DESCRIBED BELOW
   - SITE TRAFFIC CONTROL AS DESCRIBED BELOW

   PERMANENT
   - VEGETATIVE COVERINGS AS DESCRIBED IN THE REVEGETATION PLAN
   - PAVE OR GRAVEL ACCESS ROAD AS DESCRIBED BELOW
2. GENERAL DESIGN CRITERIA
   THE DESIGN OF ANY DUST CONTROL PROJECT SHOULD LIMIT THE AMOUNT OF SOIL OR DUST PARTICULATES EXPOSED AT ONE TIME, AND REDUCE THE POTENTIAL FOR DUST GENERATION. THE PERFORMANCE OBJECTIVES ESTABLISHED FOR THE PARTICULAR PROJECT SHOULD ALSO BE CONSIDERED. SOME PROJECT SITES MAY REQUIRE MULTIPLE SOLUTIONS TO BOTH INDUSTRIAL AND LAND DISTURBANCE DUST CONTROL PROBLEMS. THEREFORE IT MAY BE APPROPRIATE TO DEVELOP A PHASED DESIGN APPROACH THAT UTILIZES A COMBINATION OF TEMPORARY AND PERMANENT MEASURES FOR DUST CONTROL ON A SITE BY SITE BASIS. THE FOLLOWING SECTIONS WILL EXPLAIN THESE ALTERNATIVES FURTHER.

<u>TEMPORARY MEASURES</u>

3. WATERING - TO SUPPRESS FUGITIVE DUST EMISSIONS FROM UNPAVED ROADS DUE TO WIND AND/OR TRAFFIC.
   COMMENT/RECOMMENDATIONS ON WATERING
   - APPLY WITH SPRINKLERS, WATER TRUCKS, AND/OR ANY OTHER SUITABLE MEANS.
   - MOST SUITABLE FOR SHORT DISTANCES OR ON A TEMPORARY BASIS.
4. SITE TRAFFIC CONTROL - TO DECREASE DISTURBANCE OF SOIL AND FUGITIVE DUST GENERATED FROM UNNECESSARY VEHICLE TRAFFIC.
   COMMENT/RECOMMENDATIONS ON SITE TRAFFIC CONTROL
   - POST SIGNS, ERECT FENCING, AND/OR PLACE BARRIERS TO DIRECT TRAFFIC.
   - DESIGNATE SPECIFIC HAUL AND/OR ACCESS ROADS
   - DESIGNATE OFF-SITE OR LIMITED ACCESS ON-SITE PARKING FOR WORKERS.
   - LIMIT PUBLIC VEHICLE ACCESS.
   - LIMIT NECESSARY VEHICLE SPEEDS TO LESS THAN 10 MPH.
5. CHEMICAL STABILIZERS (TEMPORARY) - THOSE STABILIZERS THAT ARE COMMERCIALLY AVAILABLE AND APPROVED CHEMICAL SOIL BINDING AGENTS TO ARTIFICIALLY CRUST SOIL AND PREVENT SOIL MOVEMENT DURING WINDY CONDITIONS FOR A TEMPORARY PERIOD CAN BE USED. CHEMICAL STABILIZERS (EXTENDED ACTION) - ARE SIMILAR TO TEMPORARY BUT DIFFERENT APPLICATIONS RATES AND/OR MATERIALS MAY BE USED THAT EXTEND THE DURABILITY AND LONGEVITY OF THE ARTIFICIAL SOIL CRUST.

   COMMENT/RECOMMENDATIONS ON CHEMICAL STABILIZERS
   - BEST SUITED TO AREAS NOT SUBJECT TO DAILY DISTURBANCE.
   - APPLY ACCORDING TO MANUFACTURERS/VENDORS RECOMMENDATIONS.
   - MANAGE TO PROTECT STABILIZED AREA.
   - EXTENDED ACTION APPLICATIONS MAY STAND UP TO MODERATE TRAFFIC.
6. VEGETATIVE COVERINGS - USE ESTABLISHED COVER TO TEMPORARILY OR PERMANENTLY STABILIZE SOIL AGAINST WIND EROSION AND EMISSION OF FUGITIVE DUST.
   COMMENT/RECOMMENDATIONS ON VEGETATIVE COVERINGS
   - EITHER TEMPORARY OR PERMANENT COVER CAN BE ESTABLISHED USING STANDARD AGRICULTURAL METHODS, HYDROSEEDING, OR HAND SEEDING.
   - MAINTENANCE OF ORIGINAL VEGETATIVE COVER IS AN OPTION
   - PERMANENT RESTORATION THAT APPROXIMATES NATIVE COVER CAN BE ACHIEVED USING LOCALLY RECOMMENDED VARIETIES AND SEEDING RATES AS APPROPRIATE FOR THE SITE.
   - THE SOIL MUST BE KEPT MOIST TO ESTABLISH COVER.

<u>PERMANENT MEASURES</u>

7. PAVE OR GRAVEL - TO STABILIZE SURFACE TO REDUCE POTENTIAL FOR FUGITIVE DUST EMISSIONS.
   COMMENT/RECOMMENDATION ON PAVING OR GRAVEL
   - PAVING IS A PERMANENT SOLUTION AND CAN BE LIMITED TO TROUBLE SPOTS.
   - APPLY GRAVEL ACCORDING TO WSDOT OR COUNTY GUIDELINES AND REGULATIONS.
   - GRAVEL WILL REQUIRE SOME MAINTENANCE AND GRAVEL DUST SUPPRESSION.
   - REDUCE SPEEDS ON GRAVEL ROADS FOR LESS WEAR AND FUGITIVE DUST GENERATION.
8. PHYSICAL BARRIER - TO SURROUND, COVER, OR STRATEGICALLY PLACE A PHYSICAL BARRIER TO PREVENT EMISSION OF FUGITIVE DUST FROM MATERIAL PILES.
   COMMENT/RECOMMENDATIONS ON PHYSICAL BARRIER
   - A VARIETY OF METHODS INCLUDE TARPS, HAY/STRAW BALES, WIND FENCING, AND SPECIALTY BARRIERS.
   - ENCLOSE PILE WITHIN A STRUCTURE.
   - UTILIZE NATURAL TOPOGRAPHICAL OR TREE WIND BREAKS ON UPWIND SIDE.
9. RESTRICT ACCESS - TO PREVENT OTHERWISE UNDISTURBED AREA FROM BECOMING DISTURBED BY "DUNE BUGGIES," DIRT BIKES, FOUR-WHEEL DRIVE VEHICLES AND OTHER OF-ROAD MOTORIZED VEHICLES.
   COMMENT/RECOMMENDATIONS ON RESTRICTING ACCESS
   - INSTALL CURB BUT NO DRIVEWAY RAMP.
   - OTHER METHODS INCLUDE POSTING SIGNS, PHYSICAL BARRIERS SUCH AS FENCES, TAPE AND HAY BALES.
10. VEGETATIVE COVERINGS - USE ESTABLISHED COVER TO TEMPORARILY OR PERMANENTLY STABILIZE SOIL AGAINST WIND EROSION AND EMISSION OF FUGITIVE DUST.
    COMMENT/RECOMMENDATIONS ON VEGETATIVE COVERINGS
    - EITHER TEMPORARY OR PERMANENT COVER CAN BE ESTABLISHED USING STANDARD AGRICULTURAL METHODS, HYDROSEEDING, OR HAND SEEDING.
    - MAINTENANCE OF ORIGINAL VEGETATIVE COVER IS AN OPTION
    - PERMANENT RESTORATION THAT APPROXIMATES NATIVE COVER CAN BE ACHIEVED USING LOCALLY RECOMMENDED VARIETIES AND SEEDING RATES AS APPROPRIATE FOR THE SITE.
    - THE SOIL MUST BE KEPT MOIST TO ESTABLISH COVER.

BID SET

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WSU SUNRISE ORCHARD

INSTALL IRRIGATION MAINLINE

FACILITY NO. 3300

MARK	DATE	DESCRIPTION
	04/04/24	BID SET

CAD DWG FILE: 20210257.0000-E2 Pipeline 24.dwg
DESIGN BY: DD
DRAWN BY: NM CHECKED BY: DD
PROJECT No. 2233-2024 FILE No. 3300-G-003

SHEET TITLE
CIVIL NOTES

C-002

A. POLICY APPLICATION

1. PURPOSE

THIS POLICY IS TO PRESCRIBE THE ACCOMMODATION, LOCATION AND METHOD OF INSTALLATION, ADJUSTMENTS, REMOVAL, RELOCATION, AND MAINTENANCE OF UTILITY FACILITIES WITHIN THE PROPERTY OF BNSF. THE POLICY WAS DEVELOPED IN THE INTEREST OF SAFETY, PROTECTION, UTILIZATION, AND FUTURE DEVELOPMENT OF BNSF WITH DUE CONSIDERATION GIVEN TO PUBLIC AND PRIVATE SERVICE AFFORDED BY ADEQUATE AND ECONOMICAL UTILITY INSTALLATIONS.

2. APPLICATION

THE POLICY CONCERNING UTILITY ACCOMMODATIONS SHALL APPLY TO ALL:

a. NEW UTILITY INSTALLATIONS

b. ADDITIONS TO EXISTING UTILITY INSTALLATIONS

c. ADJUSTMENT AND RELOCATION OF UTILITIES

d. EXISTING OR PLANNED UTILITY INSTALLATIONS FOR WHICH AGREEMENTS WITH BNSF WERE ENTERED PRIOR TO THE DATE OF THE ADOPTION OF THIS POLICY.

e. EXISTING UTILITY INSTALLATIONS THAT DO NOT MEET THE CURRENT LICENSE REQUIREMENTS MAY REMAIN AT THE DISCRETION OF **BNSF.**

VARIOUS TYPES OF UTILITY LINES NOT SPECIFICALLY DISCUSSED HEREIN SHALL BE CONSIDERED WITHIN THE PROVISIONS OF THIS POLICY. IT SHALL BE THE GENERAL PRACTICE TO CONSIDER ALL LINES CARRYING CAUSTIC, FLAMMABLE, OR EXPLOSIVE MATERIALS UNDER THE PROVISIONS FOR HIGH-PRESSURE GAS AND LIQUID FUEL LINES.

3. SCOPE

UTILITIES INCLUDE LINES, FACILITIES, AND SYSTEMS FOR PRODUCING, TRANSMITTING, OR DISTRIBUTING COMMUNICATIONS, POWER, ELECTRICITY, LIGHT, HEAT, GAS, OIL, CRUDE PRODUCTS, WATER, STEAM, WASTE, STORM WATER AND OTHER SIMILAR COMMODITIES WHICH ARE PRIVATELY, PUBLICLY, OR COOPERATIVELY OWNED AND WHICH SERVE DIRECTLY OR INDIRECTLY THE PUBLIC OR ANY PART THEREOF.

A UTILITY AGREEMENT LICENSE ALLOWING A UTILITY OWNER THE PRIVILEGE OF PLACING ITS FACILITIES IN OR ON RAILROAD PROPERTY DOES NOT CONSTITUTE PERMANENT RIGHT FOR SUCH USAGE. WHETHER REQUIRED BY BNSF OR NOT, ANY REMOVAL, REMODELING, MAINTENANCE,OR RELOCATION OF THE FACILITIES, WILL BE ACCOMPLISHED PROMPTLY BY THE UTILITY OWNER AT NO COST TO BNSF.

4. EXCEPTIONS

EXCEPTIONS TO ANY DESIGN, LOCATION OR METHODS OF INSTALLATION PROVISIONS CONTAINED IN THIS POLICY MUST BE AUTHORIZED BY BNSF. REQUESTS FOR EXCEPTIONS WILL BE CONSIDERED ONLY WHERE IT IS SHOWN THAT EXTREME HARDSHIP AND/OR UNUSUAL CONDITIONS PROVIDE JUSTIFICATION AND WHERE ALTERNATE MEASURES CAN BE PRESCRIBED IN KEEPING WITH THE INTENT OF THIS POLICY. ALL REQUESTS FOR EXCEPTIONS SHALL BE FULLY DOCUMENTED BY IDENTIFYING WHAT VARIANCE IS NEEDED, AND WHY, INCLUDING DESIGN DATA, COST COMPARISONS AND OTHER PERTINENT INFORMATION. PLEASE NOTE: BNSF AUTHORIZATION MAY ADD UP TO 60 DAYS ADDITIONAL PROCESSING TIME FOR THE APPLICATION.

5. LIABILITY

THE UTILITY OWNER, ITS SUCCESSOR(S), OR ASSIGNEES SHALL ASSUME ALL RISK AND LIABILITY FOR ACCIDENTS AND DAMAGES THAT MAY OCCUR TO PERSONS OR PROPERTY ON ACCOUNT OF THIS WORK, AND SHALL INDEMNIFY AND HOLD BNSF HARMLESS FROM ANY AND ALL COSTS, LIABILITIES, EXPENSES, SUITS, JUDGMENTS OR DAMAGES TO PERSONS OR PROPERTY, OR CLAIMS OF ANY NATURE WHATSOEVER, ARISING OUT OF OR IN CONNECTION WITH THE PERMIT, OR THE OPERATION AND PERFORMANCE THEREUNDER BY THE UTILITY, ITS AGENTS, EMPLOYEES OR SUBCONTRACTORS. IN THIS REGARD, IT IS FURTHER UNDERSTOOD AND AGREED THAT THE UTILITY MAY BE REQUIRED TO OBTAIN INSURANCE COVERAGE AS DETERMINED BY BNSF. THE UTILITY OWNER AGREES THAT IF LIABILITY INSURANCE IS REQUIRED, IT WILL FILE WITH THE DESIGNATED OFFICE, PRIOR TO GRANTING OF THE LICENSE, "CERTIFICATES OF INSURANCE" OR OTHER EVIDENCE TO SHOW THAT THE APPROPRIATE INSURANCE IS CARRIED. INSURANCE, AS MAY BE REQUIRED, SHALL BE MAINTAINED IN FORCE UNTIL THE FINAL RELEASE OF THE UTILITY OWNER BY BNSF FROM ALL OBLIGATIONS UNDER THE TERMS OF THE LICENSE. THE INSURANCE CONTRACT SHALL COVER CLAIMS FOR SUCH LENGTH OF TIME AS LAW PERMITS SAID CLAIMS. THE INSURANCE DOCUMENT SHALL INCLUDE A CLAUSE REQUIRING THE INSURER TO NOTIFY BNSF AT LEAST TEN (10) DAYS IN ADVANCE OF ANY CANCELLATION OR CHANGE IN INSURANCE CONTRACTS. THE UTILITY OWNER IS RESPONSIBLE FOR ANY SUBCONTRACTOR TO BE KNOWLEDGEABLE OF THIS POLICY AND REQUIRE ALL WORK TO BE CONDUCTED IN COMPLIANCE WITH IT. SUBCONTRACTORS MUST CARRY A LIABILITY INSURANCE POLICY UNLESS THE SUBCONTRACTOR IS COVERED BY THE UTILITY OWNER'S INSURANCE.

6. REPLACEMENT/RELOCATION OF FACILITY

REPLACEMENT OR RELOCATION OF AN EXISTING FACILITY WITH THE SAME FACILITIES OR FACILITIES OF A DIFFERENT TYPE, OR DESIGN, IS TO BE CONSIDERED AS A NEW UTILITY INSTALLATION AND ALL WORK SHALL ADHERE TO THIS POLICY. THIS INCLUDES SUCH THINGS AS EXTENSION OF AN EXISTING CASING, REPLACING WITH A LARGER / SMALLER PIPE DIAMETER, ETC.

7. CHANGE IN OWNERSHIP

IT IS THE UTILITY OWNER'S RESPONSIBILITY TO INFORM BNSF, IN WRITING, OF ANY NAME, OWNERSHIP OR ADDRESS CHANGES.

8. NON-COMPLIANCE

NON-COMPLIANCE WITH ANY TERMS OF THIS UTILITY ACCOMMODATION POLICY OR UTILITY LICENSE AGREEMENTS MAY BE CONSIDERED AS CAUSE FOR DISCONTINUANCE OF CONSTRUCTION OR OPERATIONS UNTIL COMPLIANCE IS ASSURED. CONTINUED NONCOMPLIANCE WILL RESULT IN THE REVOCATION OF THE LICENSE. THE COST OF ANY WORK REQUIRED BY BNSF IN THE REMOVAL OF NON-COMPLYING CONSTRUCTION WILL BE ASSESSED AGAINST THE UTILITY OWNER.

9. DISCHARGE OF WASTE MATERIAL

APPLICATIONS FOR A UTILITY LICENSE AGREEMENT FOR THE INSTALLATION OF UTILITY FACILITIES WHICH WILL DISCHARGE MATERIALS INTO THE NATION'S WATERS, MUST COMPLY WITH ALL APPLICABLE REQUIREMENTS OF THE CORPS OF ENGINEERS, AND OTHER FEDERAL, STATE, OR LOCAL ENVIRONMENTAL PROTECTION AGENCIES. IDENTIFICATION OF APPLICABLE REQUIREMENTS AND ADMINISTRATION OF COMPLIANCE PROCEDURES ARE THE RESPONSIBILITY OF THE UTILITY OWNER.

B. UTILITY LICENSE AGREEMENT REQUIREMENTS

1. GENERAL

UTILITY LICENSE AGREEMENTS ARE REQUIRED WHEN UTILITY FACILITIES ARE INSTALLED, RELOCATED, REMOVED, OR MAINTAINED ALONG OR ACROSS ALL BNSF PROPERTY. IF LIABILITY INSURANCE IS REQUIRED, THEN EVIDENCE OF ADEQUATE LIABILITY INSURANCE IS TO BE ON FILE WITH BNSF FOR EACH AGREEMENT PRIOR TO ANY CONSTRUCTION ACTIVITY.

2. APPLICATIONS

APPROVED REQUESTS TO INSTALL, MAINTAIN, RELOCATE, OR REMOVE A UTILITY WITHIN THE PROPERTY OF BNSF SHALL BE AUTHORIZED BY A UTILITY LICENSE AGREEMENT. ALL APPLICATIONS FOR UTILITY LICENSE AGREEMENTS ALONG WITH PLANS FOR THE PROPOSED INSTALLATION SHALL BE SUBMITTED TO BNSF AND APPROVED BEFORE CONSTRUCTION HAS COMMENCED. ANY EXCEPTIONS TO THIS POLICY WILL REQUIRE THE COMPLETION OF AN EXCEPTION FORM AND MAY ADD UP TO 60 DAYS ADDITIONAL PROCESSING TIME.

3. PLANS AND APPROVALS

a. APPROVAL OF PLANS AND APPLICATION FORMS ARE REQUIRED FOR ALL INSTALLATIONS OF UTILITIES PRIOR TO INITIATION OF WORK ON RAILROAD PROPERTY.

b. IF SURVEYING IS NECESSARY FOR THE COMPLETION OF AN APPLICATION, A "RIGHT OF ENTRY" OR "TEMPORARY OCCUPANCY PERMIT" MUST BE EXECUTED AND REFERENCED.

c. WHEN A GEOTECHNICAL STUDY IS REQUIRED, THE FINDINGS AND PROTECTION PLAN SHALL BE SEALED BY A PROFESSIONAL ENGINEER AND INCLUDED WITH THE PLANS. THE GEOTECHNICAL CREW WILL NEED A RIGHT OF ENTRY PERMIT TO ENTER BNSF RIGHT-OFWAY AND A BNSF QUALIFIED FLAGMAN WILL BE REQUIRED WHEN WORKING WITHIN TWENTY-FIVE (25) FEET OF THE TRACK.

1. LICENSE PROCEDURES:

a. SUBMIT APPLICATIONS ONLINE BY GOING TO BNSF.RAILPERMITTING.COM AND COMPLETE THE APPLICATION PROCESS AND PAY THE APPLICATION FEE.

b. UPON RECEIPT OF THE APPLICATION, AN EMAIL CONFIRMATION WILL BE FORWARDED ACKNOWLEDGING RECEIPT AND ADVISING OF THE PERMIT & CONTRACT FILE REFERENCE NUMBER THAT HAS BEEN ASSIGNED AND THE PERSON AT JONES LANG LASALLE (JLL), BNSF'S PERMIT MANAGER, WHO SHOULD BE CONTACTED FOR FURTHER INQUIRIES.

c. OFFICE HOURS: 8:00 A.M. TO 5:00 P.M. MONDAY THROUGH FRIDAY, CT PHONE NUMBER: (TOLL FREE) 866-498-6647. FAX: 817-306-8265

d. AGREEMENTS WILL BE REQUIRED FOR ALL ENCROACHMENTS ON RAILROAD PROPERTY.

e. GENERALLY, AGREEMENT-PROCESSING TIME WILL BE THIRTY TO SIXTY DAYS. PLEASE ALLOW SUFFICIENT LEAD-TIME FOR DOCUMENT HANDLING PRIOR TO DESIRED CONSTRUCTION DATE. BEFORE CONSTRUCTION BEGINS, AGREEMENTS MUST BE EXECUTED BY UTILITY OWNER AND RETURNED. VERBAL AUTHORIZATIONS WILL NOT BE GRANTED OR PERMITTED. ALL WORK MUST BE SET UP, IN ADVANCE, WITH THE BNSF UTILITY COORDINATOR TO COORDINATE THE CONSTRUCTION INSPECTOR AND FLAGGER.

f. LICENSE FEES MUST BE PAID ONLINE THROUGH HTTPS://WWW.BNSFRAILPERMITTING.COM FOR THE AGREEMENT TO BE FULLY EXECUTED.

2. LOCATION

a. UTILITY LINES SHALL BE LOCATED TO AVOID, OR MINIMIZE, THE NEED FOR ADJUSTMENTS FOR FUTURE RAILROAD IMPROVEMENTS AND TO PERMIT ACCESS TO THE UTILITY LINES FOR THEIR MAINTENANCE WITH MINIMUM INTERFERENCE TO RAILROAD TRAFFIC.

b. PIPELINES SHALL BE INSTALLED UNDER TRACKS BY BORING, JACKING, OR IN SOME CASES, OPEN TRENCHING (MUST BE PRE-APPROVED BY BNSF). WATER JETTING IS NOT PERMITTED.

c. WHERE PRACTICAL, PIPELINES CARRYING LIQUEFIED PETROLEUM GAS SHALL CROSS THE RAILWAY WHERE THE TRACKS ARE CARRIED ON AN EMBANKMENT.

d. ALL HIGH-PRESSURE PIPELINES (GREATER THAN 60-PSI INTERNAL PRESSURE), EXCEPT THOSE IN PUBLIC ROADS, SHALL BE PROMINENTLY MARKED AND MAINTAINED AT THE PROPERTY LINE (ON BOTH SIDES OF THE TRACK FOR UNDER CROSSINGS) BY SIGNS WHICH STATE THE UTILITY OWNER, SIZE OF THE LINE AND ITS DEPTH AS WELL AS A 24-HOUR EMERGENCY CONTACT NUMBER, WHICH WILL BE MAINTAINED IF THE UTILITY IS IN SERVICE. THESE SIGNS WILL BE INSPECTED ANNUALLY AND REPLACED SHOULD THEY BECOME UNREADABLE.

EXAMPLE:

CAUTION: BOB'S GAS SERVICE, 1-800-123-4567, 30-INCH DIAMETER HIGHPRESSURE GAS MAIN 7 FEET DEEP.

6. DESIGN CONSIDERATIONS

a. THE DESIGN OF ANY UTILITY INSTALLATION WILL BE THE RESPONSIBILITY OF THE UTILITY OWNER. ANY PROPOSED INSTALLATION WITHIN THE RAILROAD PROPERTY MUST BE REVIEWED AND APPROVED BY THE RAILROAD REGARDING LOCATION AND THE METHOD OF CONSTRUCTION, INSTALLATION, AND REPLACEMENT. THIS INCLUDES THE MEASURES TO BE TAKEN TO PRESERVE THE SAFETY AND FLOW OF RAIL TRAFFIC, INSURE IT DOES NOT OBSTRUCT RIGHT OF WAY ACCESS FOR BNSF, STRUCTURAL INTEGRITY OF THE ROADWAY OR STRUCTURE, EASE OF MAINTENANCE AND THE INTEGRITY OF THE UTILITY FACILITY. UTILITY INSTALLATIONS, ON, OVER OR UNDER BNSF PROPERTY SHALL CONFORM WITH THE REQUIREMENTS CONTAINED HEREIN, OR THE APPROPRIATE REQUIREMENTS OUTLINED IN THE FOLLOWING, WHICHEVER IS DEEMED MOST SAFE:

(1) SAFETY RULES FOR THE INSTALLATION AND MAINTENANCE OF ELECTRIC SUPPLY AND COMMUNICATION LINES-NATIONAL ELECTRIC SAFETY CODE.

(2) TITLE 49 C.F.R. PART 192, TRANSPORTATION OF NATURAL AND OTHER GAS BY PIPELINE: MINIMUM FEDERAL SAFETY STANDARDS.

(3) TITLE 49 C.F.R. PART 195, TRANSPORTATION OF HAZARDOUS LIQUIDS BY PIPELINES AND.

(4) AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) SPECIFICATIONS - LATEST EDITION.

(5) MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS - LATEST EDITION, PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION (FHWA) OF THE UNITED STATES DEPARTMENT OF TRANSPORTATION (USDOT).

(6) RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS - LATEST EDITION, PUBLISHED BY THE APPROPRIATE STATE HEALTH DEPARTMENT.

(7) OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) TITLE 29 C.F.R. STANDARD 1926 – SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION.

b. ALL UTILITY INSTALLATIONS ON, OVER OR UNDER BNSF PROPERTY SHALL BE OF DURABLE MATERIALS DESIGNED FOR LONG SERVICE LIFE AND RELATIVELY FREE FROM ROUTINE SERVICING AND MAINTENANCE REQUIREMENTS. CONFORMANCE WITH CURRENT APPLICABLE MATERIAL SPECIFICATIONS AND CODES IS MANDATORY.

c. REFERENCES GIVEN TO ANY MANUAL, PUBLICATION OR SPECIFICATION ARE INTENDED TO BE THE MOST CURRENT EDITION. IF A CONFLICT OCCURS BETWEEN ANY PUBLICATION AND THIS MANUAL, THE SPECIFICATION DEEMED MOST SAFE WILL BE USED.

d. GEO-TECHNICAL STUDY – BNSF WILL NO LONGER REQUIRE A GEO-TECH STUDY FOR PIPELINE INSTALLATIONS CROSSING UNDER THE TRACKS PROVIDED THE METHOD OF INSTALLATION IS JACK-AND-BORE. ANY OTHER METHOD OF INSTALLATION THAT IS GREATER THAN TWENTY-SIX (26) INCHES IN DIAMETER, AND WITHIN THE SIX (6) FOOT TO TWELVE (12) FOOT DEPTH WILL REQUIRE THIS STUDY. REFER TO PART B.3.C., FOUND ON PAGE 1-4 OF THIS DOCUMENT FOR REQUIREMENTS OF THE STUDY AND REVIEW.

C. CONSTRUCTION

1. COORDINATION WITH THE CONSTRUCTION INSPECTOR AND/OR FLAGGING COMPANY, ALONG WITH ANY REQUIRED DEPOSITS, WILL BE ARRANGED PRIOR TO ANY CONSTRUCTION ON BNSF PROPERTY.

2. THE EXECUTION OF THE WORK ON RAILROAD PROPERTY SHALL BE SUBJECT TO THE INSPECTION AND DIRECTION OF THE CONSTRUCTION INSPECTOR.

3. A REPRESENTATIVE OF BNSF SIGNAL DEPARTMENT MUST BE PRESENT DURING INSTALLATION IF RAILROAD SIGNALS ARE IN THE VICINITY OF THE PROPOSED CONSTRUCTION.

4. ANY DIRT THAT IS EXCAVATED FOR PITS, POLES, BORES, ETC. WILL REMAIN ON BNSF PROPERTY. BNSF ENVIRONMENTAL WILL BE CONSULTED BEFORE ANY SOILS ARE REMOVED FROM BNSF PROPERTY WHICH CAN BE COORDINATED THROUGH THE CONSTRUCTION INSPECTOR.

5. SPILLS, OF ANY QUANTITY, MUST BE REPORTED TO THE SERVICE INTERRUPTION DESK. THIS CAN BE COORDINATED THROUGH THE CONSTRUCTION INSPECTOR.

6. A PLAN TO MONITOR FOR SETTLEMENT OR HEAVE OF THE RAILROAD FACILITIES MUST BE DEVELOPED, ACCEPTED, AND IMPLEMENTED TO ASSURE NO ADVERSE EFFECT ON THE RAILROAD'S ACTIVITIES BECAUSE OF THE WORK. THE PLAN SHOULD DETAIL THE TYPES OF SETTLEMENT POINTS THAT WILL BE INSTALLED AND MONITORED AS WELL AS THE FREQUENCY OF MONITORING AND THE REPORTING MECHANISM. BECAUSE THE TRACK WILL TEND TO BRIDGE OVER THE AREA AFFECTED BY THE DRILLING / BORING / TRENCHING OPERATION, THE MONITORING PLAN SHOULD INCLUDE CHECKING FOR SETTLEMENT OR HEAVE AT A DEPTH BELOW THE TRACK. SURVEYING OF THE MONITORING POINTS MAY BE ACCOMPLISHED BY TRADITIONAL MEANS OR AN AUTOMATED SYSTEM. A BASELINE SURVEY SHOULD BE CONDUCTED BEFORE THE START OF CONSTRUCTION. MOST SETTLEMENT PLANS INCLUDE A TWO-STEP PROCESS AGAINST WHICH THE MONITORING DATA IS MEASURED. THE ALERT THRESHOLD LIMIT IS THE VALUE INTENDED TO BRING ATTENTION TO THE MOVEMENT SO THAT IT CAN BE MANAGED WITHOUT REACHING THE MAXIMUM LEVEL. THE MAXIMUM LEVEL IS THE HIGHEST ALLOWABLE MOVEMENT VALUE AND SHOULD BE LESS THAN THE VALUE THAT COULD RESULT IN DAMAGE TO THE RAILROAD FACILITIES.

REACHING THE THRESHOLD LIMIT MAY TRIGGER THE FOLLOWING ACTIONS:

(1) DISCUSSION OF THE DATA AND ITS IMPLICATIONS

(2) INCREASE IN THE FREQUENCY OF MONITORING.

(3) INDEPENDENT CONFIRMATION OF THE MONITORING DATA

(4) A REVIEW OF CONSTRUCTION METHODS TO DETERMINE IF CHANGES ARE REQUIRED TO MITIGATE FURTHER MOVEMENT. REACHING THE MAXIMUM LIMIT MAY TRIGGER THE FOLLOWING ACTIONS:

(1) IMMEDIATE STOPPAGE OF CONSTRUCTION AND NOTIFICATION TO THE RAILROAD

(2) INDEPENDENT CONFIRMATION OF MOVEMENT

(3) REVIEW OF CONSTRUCTION METHODS AND IMPLEMENTATION OF CONTINGENCY PLANS, IF NEEDED

(4) RE-EVALUATION OF CRITICAL STRUCTURES IN THE AREA AND INSTALLATION OF ADDITIONAL MONITORING DEVICES IF NEEDED.

ALERT THRESHOLD VALUES ARE FROM ¼ TO ¾ INCH WITH MAXIMUM VALUES FROM ½ TO 1 INCH.

7. THE UTILITY INSTALLATION IS NOT CONSIDERED COMPLETE UNTIL AS-BUILT DRAWINGS ARE SUBMITTED AND VERIFIED AS CORRECT BY THE CONSTRUCTION INSPECTOR.

D. SAFETY

THE BNSF CONTRACTOR ORIENTATION COURSE MUST BE COMPLETED BY ALL WORKERS PRIOR TO ENTERING BNSF PROPERTY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO IMPLEMENT A SAFETY PROGRAM FOR ITS EMPLOYEES. TRAINING MATERIALS ARE AVAILABLE ON THE WEB SITE: WWW.BNSFCONTRACTOR.COM. THE CONTRACTOR MUST COMPLY WITH ALL FEDERAL, STATE, AND LOCAL SAFETY REGULATIONS.

1. CONSTRUCTION INSPECTOR

a. A CONSTRUCTION INSPECTOR SHALL BE REQUIRED FOR ALL UTILITY INSTALLATIONS ON BNSF RIGHT OF WAY AND THE TOTAL COST BORNE BY THE UTILITY OWNER.

b. THE CONSTRUCTION INSPECTOR WILL BE NOTIFIED OF THE CONSTRUCTION MONITORING METHODS AND FREQUENCY TO BE USED.

c. ONCE CONSTRUCTION IS COMPLETE, THE UTILITY OWNER WILL PROVIDE THE CONSTRUCTION INSPECTOR WITH AS-BUILT DRAWINGS NOTING ANY CHANGES FROM THE ORIGINAL SPECIFICATIONS APPROVED WHEN THE PERMIT WAS ISSUED. THESE AS-BUILT DRAWINGS MUST BE VERIFIED BY THE CONSTRUCTION INSPECTOR AND SUBMITTED TO BNSF FOR THEIR RECORDS.

2. FLAGGING

a. WHEN WORK IS PERFORMED WITHIN BNSF RIGHT-OF-WAY, RAILROAD FLAGGING AND CONSTRUCTION INSPECTION WILL BE REQUIRED.

b. RAILROAD FLAGGING WILL BE REQUIRED:

i. DURING THE PERIOD OF CONSTRUCTION WHEN IT IS NECESSARY FOR THE CONTRACTOR TO OPERATE EQUIPMENT IN THE VICINITY OF, UNDER, OR OVER, BNSF PROPERTY WHICH MAY ENDANGER RAILROAD OPERATIONS, OR

ii. TWO OR MORE RAILROAD FLAGMEN MAY BE REQUIRED AT OTHER TIMES THAT THE RAILWAY COMPANY'S SOLE DISCRETION SHALL DEEM NECESSARY.

c. FLAGGING SERVICES SHALL BE PERFORMED BY A BNSF QUALIFIED FLAGGER AND THE TOTAL COST BORNE BY THE UTILITY OWNER.

d. THE UTILITY OWNER WILL BE BILLED MONTHLY, OR AS REQUIRED TO MAINTAIN REQUIRED SERVICES, AT A RATE TO BE DETERMINED BY BNSF TO INCLUDE LABOR AND ASSOCIATED COSTS PLUS ANY EXPENSES INCURRED FOR INSPECTION AND/OR FLAGGING SERVICES.

e. A WRITTEN REQUEST FOR INSPECTION AND FLAGGING SERVICES WILL BE REQUIRED AT LEAST TWO

(2) WEEKS PRIOR TO THE TIME WHEN SUCH SERVICES ARE NEEDED. THIS REQUEST IS MADE TO THE BNSF SCHEDULING AGENT, AS NOTED IN EXECUTED AGREEMENT.

E. MATERIAL STORAGE

STORAGE OF MATERIALS, PARKING OF EQUIPMENT AND VEHICLES WHEN NOT BEING USED IN ACTUAL UTILITY WORK, WILL NOT BE PERMITTED ON RAILROAD PROPERTY WITHOUT AN EXECUTED TEMPORARY EASEMENT.

F. **CALL BEFORE YOU DIG!**

CALL 811 TO SCHEDULE A UTILITY LOCATE AND CALL 1-800-533-2891 TO ARRANGE FOR A BNSF UNDERGROUND CABLE LOCATE. BNSF FORM "UNDERGROUND CABLE LOCATION & ACKNOWLEDGEMENT" WILL BE COMPLETED BY A BNSF REPRESENTATIVE WITH A COPY PROVIDED TO THE CONTRACTOR. THE CONTRACTOR MUST ALWAYS HAVE THIS COMPLETED FORM AVAILABLE FOR REVIEW AT THE JOB SITE.

G. MAINTENANCE AND SERVICING UTILITIES

1. UTILITY OWNER'S RESPONSIBILITY

a. MAINTENANCE OF THE UTILITY IS THE RESPONSIBILITY OF THE UTILITY OWNER.

b. MAINTENANCE MUST BE PERFORMED TO KEEP THE FACILITY IN AN AS-CONSTRUCTED CONDITION, AND IN A GOOD STATE OF REPAIR IN ACCORDANCE WITH THE REQUIREMENTS OF FEDERAL, STATE AND LOCAL LAWS, REGULATORY STANDARDS, AND UTILITY CODES.

c. IT IS THE UTILITY OWNER'S RESPONSIBILITY TO REPLACE AND STABILIZE ALL EARTH COVER AND VEGETATION WHEN IT HAS ERODED OVER AN UNDERGROUND UTILITY FACILITY WHERE SUCH EROSION IS DUE TO, OR CAUSED BY, THE PLACEMENT OR EXISTENCE OF THE UNDERGROUND UTILITY FACILITY.

d. THE UTILITY OWNER SHALL BE RESPONSIBLE FOR ANY SETTLEMENT OF BACKFILL, FILLS, AND EMBANKMENTS THAT MAY OCCUR.

2. EMERGENCY MAINTENANCE

a. EMERGENCY MAINTENANCE OF UTILITIES LOCATED ON RAILROAD PROPERTY IS PERMISSIBLE WITHOUT OBTAINING A UTILITY LICENSE AGREEMENT IF AN EMERGENCY EXISTS THAT IS DANGEROUS TO THE LIFE, SAFETY, OR WELFARE OF THE PUBLIC AND WHICH REQUIRES IMMEDIATE REPAIR. THE UTILITY OWNER SHALL TAKE ALL NECESSARY AND REASONABLE SAFETY MEASURES TO PROTECT THE PUBLIC AND THE RAILROAD.

b. THE UTILITY OWNER, IN SUCH AN EVENT, WILL ADVISE THE RAILWAY AS SOON AS POSSIBLE. DAMAGE TO THE RIGHT-OF-WAY AND FACILITIES WILL BE RESTORED TO ITS ORIGINAL CONDITION. A UTILITY LICENSE AGREEMENT SHOULD BE REQUESTED BY THE UTILITY OWNER WITHIN THE SECOND WORKING DAY PROVIDED THE WORK IS NOT COVERED UNDER ANY PREVIOUSLY GRANTED LICENSE. FLAGGING REQUIREMENTS DESCRIBED EARLIER APPLY IN ALL SITUATIONS.

H. PRESERVATION, RESTORATION AND CLEANUP

1. DISTURBED AREAS

a. AREAS OF RAILROAD PROPERTY DISTURBED BY THE INSTALLATION, MAINTENANCE, REMOVAL, AND RELOCATION OF UTILITIES SHALL BE KEPT TO A MINIMUM.

b. AFTER REVIEW AND CONCURRENCE FROM THE BNSF ENVIRONMENTAL GROUP, DISTURBED AREAS SHALL BE RETURNED TO NORMAL GRADE AND ELEVATION, WITH COMPACTION OF BACKFILL MATERIAL AND ALL EXCESS OR UNDESIRABLE MATERIAL REMOVED BY THE UTILITY OWNER. THE UTILITY OWNER SHALL REPLACE DESTROYED VEGETATION BY SODDING, OR SEEDING, FERTILIZING, AND MULCHING, OR A COMBINATION THEREOF.

c. THE UTILITY OWNER SHALL PROVIDE PROTECTION AGAINST EROSION IN DISTURBED AREAS THAT ARE SUBJECT TO EROSION. SUCH PROTECTION MAY BE IN THE FORM OF ROCK RIPRAP, WASH CHECKS, HAY OR STRAW COVER, OR OTHER MATERIAL THAT IS APPROVED AND DOES NOT INTERFERE WITH RAILROAD MAINTENANCE.

2. DRAINAGE FACILITIES

a. CARE SHALL BE TAKEN TO AVOID DISTURBING EXISTING DRAINAGE FACILITIES. UNDERGROUND UTILITY FACILITIES SHALL BE BEDDED WITH PERVIOUS MATERIAL AND OUTLETS PROVIDED FOR ENTRAPPED WATER. UNDERDRAINS SHOULD BE PROVIDED WHERE NECESSARY.

b. GRADES SHALL BE SLOPED AWAY FROM THE TRACK ROADBED AND TOWARDS THE DITCH WHEN POSSIBLE WITH THE GOAL OF NO STANDING WATER ON RAILROAD PROPERTY.

3. CLEANUP

UNUSED MATERIAL OR DEBRIS SHALL BE REMOVED FROM THE WORK SITE AREA. AT THE END OF EVERY CONSTRUCTION DAY, CONSTRUCTION EQUIPMENT AND MATERIALS SHALL BE REMOVED AS FAR FROM THE OPERATING RAILROAD TRACKS AS POSSIBLE (MINIMUM TWENTY-FIVE (25) FEET FROM CENTERLINE). ALL MACHINES WILL BE DISABLED WHEN NOT IN USE TO PREVENT UNAUTHORIZED OPERATION. NO EQUIPMENT OR MATERIALS WILL BE ALLOWED TO BE STAGED ON BNSF PROPERTY WITHOUT AN EXECUTED TEMPORARY EASEMENT.

I. PROTECTION OF VEGETATION

1. TRIMMING, CLEARING OR REMOVAL OF VEGETATION

a. CONSISTENT WITH THE PRESERVATION OF PLANTED VEGETATION, CONSIDERATION WILL BE GIVEN TO UTILITY OWNERS FOR THE NECESSARY TRIMMING, CLEARING OR REMOVAL OF VEGETATION TO PROVIDE ADEQUATE CLEARANCE OF OVERHEAD WIRES. SUCH WORK WILL BE DONE IN ACCORDANCE WITH ESTABLISHED PRACTICES AND STANDARDS; HOWEVER, APPROVAL WILL NOT BE GRANTED FOR WASTEFUL OR WANTON TRIMMING, OR REMOVAL TO PROVIDE EASY SOLUTIONS TO A DIFFICULT SITUATION.

b. NO TREES, SHRUBS, BUSHES, VINES, OR GROUND COVER ON RAILROAD PROPERTY SHALL BE SPRAYED, TRIMMED, CUT DOWN, ROOTED UP, REMOVED, OR MUTILATED IN ANY MANNER UNLESS A PERMIT IS GRANTED BY BNSF TO DO SUCH WORK.

2. CHEMICAL BRUSH CONTROL

a. SPRAYING BRUSH AND SEEDLING TREE GROWTH TO PREVENT RE-SPROUTING MAY BE PERMITTED, AND WHEN PERMITTED, SHALL BE CARRIED OUT WITH EXTREME CAUTION AND CAREFUL PERFORMANCE. THE UTILITY OWNER SHALL BE RESPONSIBLE FOR THE PERFORMANCE OF THEIR EMPLOYEES OR CONTRACTORS IN THE APPLICATION OF BRUSH CONTROL WITH METHODS AND PROPOSED CHEMICALS APPROVED BY BNSF ENVIRONMENTAL DEPARTMENT.

b. ALL SPRAYING SHALL BE DONE BY AN HERBICIDE APPLICATOR THAT IS LICENSED IN THE STATE WHERE THE WORK IS TO BE PERFORMED.

c. PERMIT APPLICATIONS FOR SPRAYING SHALL LIST THE KINDS OF CHEMICAL WEED AND BRUSH KILLERS THAT WILL BE USED. WHEN LIABILITY INSURANCE IS REQUIRED, IT SHALL BE PROVIDED BY THE HERBICIDE APPLICATOR, OR BE INSURED UNDER THE LIABILITY INSURANCE OF THE UTILITY OWNER.

d. PLANTS OVER FIVE (5) FEET IN HEIGHT SHOULD NOT BE SPRAYED FOR CONTROL. BRUSH OVER FIVE (5) FEET IN HEIGHT, WHICH IS TO BE REMOVED, SHOULD BE CUT AND THE STUMPS TREATED TO PREVENT GROWTH. SHRUBBERY TYPE GROWTH SUCH AS DOGWOOD, SUMAC, REDBUD, PLUM, ETC., SHOULD NOT BE SPRAYED AS A RULE. STEEP SLOPES, WHERE BRUSHY GROWTH IS A MAJOR FACTOR IN PREVENTING EROSION, SHOULD NOT BE SPRAYED.

3. TREE PRUNING

a. TREE PRUNING ON RAILROAD PROPERTY FOR UTILITY LINES WILL UTILIZE THE BEST HORTICULTURAL PRACTICES. ALL CUT BRANCHES, DEAD LIMBS, ETC., SHALL BE REMOVED. SUCH MATERIALS SHALL NOT BE BURNED OR DISPOSED OF ON RAILROAD PROPERTY UNLESS PERMISSION IS GRANTED BY THE UTILITY LICENSE AGREEMENT.

b. SHOULD BURNING BE PERMITTED, THE UTILITY OWNER WILL BE HELD LIABLE FOR ANY DAMAGE TO GRASS, CROPS, NATIVE SHRUBS, AND TREES ARISING FROM CARELESS BURNING OF SUCH BRUSH.

c. ALL LIMBS TRIMMED SHALL BE REMOVED WITH A CLEAN CUT AND ALL LIMB SCARS OVER ONE (1) INCH IN DIAMETER SHALL BE TREATED WITH APPROPRIATE TREE PAINT.

A. GENERAL PROVISIONS

THIS SECTION OF THE POLICY APPLIES TO ALL PUBLIC AND PRIVATE UTILITIES, INCLUDING ELECTRIC POWER, TELEPHONE, FIBER OPTICS, TELEGRAPH, CABLE TELEVISION, WATER, GAS, OIL, PETROLEUM PRODUCTS, STEAM, CHEMICALS, SEWAGE, DRAINAGE, IRRIGATION, AND SIMILAR LINES THAT ARE LOCATED, ADJUSTED, OR RELOCATED WITHIN THE PROPERTY UNDER THE JURISDICTION OF BNSF. SUCH UTILITIES MAY INVOLVE UNDERGROUND, SURFACE, OR OVERHEAD FACILITIES.

INSTALLATIONS CROSSING THE PROPERTY OF THE RAILROAD, TO THE EXTENT FEASIBLE AND PRACTICAL, ARE TO BE PERPENDICULAR TO THE RAILROAD ALIGNMENT AND PREFERABLY AT NOT LESS THAN FORTY-FIVE (45) DEGREES TO THE CENTERLINE OF THE TRACK. UTILITIES SHALL NOT BE PLACED WITHIN CULVERTS OR UNDER RAILROAD BRIDGES, BUILDINGS, OR OTHER IMPORTANT STRUCTURES. UTILITIES WILL BE LOCATED TO PROVIDE A SAFE ENVIRONMENT AND SHALL CONFORM TO THE CURRENT "NATIONAL ELECTRICAL SAFETY CODE," "AMERICAN WATERWORKS ASSOCIATION SPECIFICATIONS," "FEDERAL PIPELINE SAFETY REGULATIONS," AND "THE AMERICAN RAILWAY ENGINEERING AND MAINTENANCE ASSOCIATION (AREMA) RECOMMENDATIONS." WHERE LAWS OR ORDERS OF PUBLIC AUTHORITY PRESCRIBE A HIGHER DEGREE OF PROTECTION, THEN THE HIGHER DEGREE OF PROTECTION PRESCRIBED SHALL SUPERSEDE THE PROVISIONS OF THIS MANUAL.

C. UNDERGROUND INSTALLATIONS

1. **GENERAL**

a. MUST COMPLY WITH ALL REQUIREMENTS OF PART 1 – GENERAL POLICY OF THIS MANUAL.

b. THE DESIGN OF ALL UTILITY INSTALLATIONS WILL BE THE RESPONSIBILITY OF THE UTILITY OWNER. PLANS SHALL BE DRAWN TO SCALE SHOWING THE RELATIONSHIP OF THE PROPOSED UTILITY LINE TO THE RAILROAD TRACKS, THE ANGLE OF CROSSING, LOCATION OF VALVES AND VENTS, THE RAILROAD MILE POST AND ENGINEERING STATION, RAILROAD PROPERTY LINES AND GENERAL LAYOUT OF TRACKS AND OTHER RAILROAD FACILITIES. THE PLANS SHOULD INCLUDE A CROSS-SECTION (OR SECTIONS) FROM THE FIELD SURVEY THAT WILL SHOW UTILITY PLACEMENT IN RELATION TO ACTUAL PROFILE OF GROUND AND TRACKS.

c. APPLICATIONS CAN BE FOUND AT HTTPS://WWW.BNSF.RAILPERMITTING.COM AND MUST BE COMPLETED AND SUBMITTED ALONG WITH PLANS, STAMPED BY A PROFESSIONAL ENGINEER, DETAILING LOCATION, BOTH HORIZONTAL AND VERTICAL, OF PROPOSED UTILITY WITH DIMENSIONS FROM TRACK AND/OR RIGHT-OF WAY BOUNDARIES.

d. THE PLANS SHOULD CONTAIN THE FOLLOWING DATA FOR CARRIER AND CASING PIPE:

- CONTENTS TO BE CARRIED
- INSIDE DIAMETER
- PIPE MATERIAL
- SPECIFICATIONS AND GRADE OF PIPE MATERIAL
- WALL THICKNESS OF PIPE
- ACTUAL WORKING PRESSURE
- TYPE OF JOINTS
- LONGITUDINAL JOINT FACTOR
- COATING
- METHOD OF INSTALLATION
- VENTS-NUMBER, SIZE, LOCATION AND HEIGHT ABOVE GROUND
- SEALS-BOTH ENDS, ONE END
- COVER (TOP OF TIE TO TOP OF PIPE CASING)
- COVER (OTHER THAN UNDER TRACKS)
- COVER (AT DITCHES)
- CATHODIC PROTECTION
- TYPE, SIZE AND SPACING OF INSULATORS OR SUPPORTS

e. ALL UNDERGROUND UTILITY CROSSINGS OF RAILROAD TRACKAGE SHALL BE DESIGNED TO CARRY COOPER'S E-80 RAILROAD LIVE LOADING WITH DIESEL IMPACT (DESIGN LOADS SECTION FOUND IN AREMA MANUAL FOR RAILWAY ENGINEERING, CHAPTER 8 SECTION 2.2.3). THIS 80,000-LB. AXLE LOAD MAY BE DISTRIBUTED LATERALLY A DISTANCE OF THREE (3) FEET, PLUS A DISTANCE EQUAL TO THE DEPTH FROM STRUCTURE GRADE LINE TO BASE OF RAIL, ON EACH SIDE OF CENTERLINE OF SINGLE TRACKS, OR CENTERLINE OF OUTER TRACK WHERE MULTIPLE TRACKS ARE TO BE CROSSED. IN NO CASE SHALL RAILROAD LOADING DESIGN EXTEND LESS THAN TEN (10) FEET LATERALLY FROM CENTERLINE OF TRACK. LONGITUDINALLY, THE LOAD MAY BE DISTRIBUTED BETWEEN THE FIVE FOOT AXLE SPACING OF THE COOPER CONFIGURATION. RAILROAD LOADING CRITERIA WILL ALSO APPLY WHERE FUTURE TRACKS ON BNSF ARE CONTEMPLATED, TO THE EXTENT THIS INFORMATION IS AVAILABLE.

f. ALL UTILITIES CROSSING UNDER DITCHES AND RAILROAD TRACKAGE USING JACKING AND DRY BORING INSTALLATION SHOULD HAVE A MINIMUM DEPTH OF COVER OF SIX (6) FEET BELOW THE FLOWLINE OF THE DITCH OR GROUND SURFACE AND EIGHT (8) FEET – THREE (3) INCHES FROM BASE OF RAIL. IN FILL SECTIONS, THE NATURAL GROUND LINE AT THE TOE OF SLOPE WILL BE CONSIDERED AS DITCH GRADE.

i. JACKING/BORING PITS SHALL BE LOCATED OUTSIDE RAILROAD PROPERTY WHEN POSSIBLE AT A MINIMUM OF THIRTY (30) FEET FROM THE CENTERLINE OF TRACK AND KEPT TO THE MINIMUM SIZE NECESSARY. DO NOT LOCATE THE BORE PITS IN THE SLOPE OF A CUT OR FILL SECTION OF THE ROADBED. KEEP THE BORE PIT SIZE TO A MINIMUM. USE SHORING, TEMPORARY OR PERMANENT, CONFORMING TO THE MOST RESTRICTIVE OF STATE, OSHA, OR AREMA RECOMMENDED PRACTICES IN ALL EXCAVATIONS, WHERE REQUIRED. SUBMIT SHORING PLANS AND CALCULATIONS, SEALED BY A PROFESSIONAL ENGINEER, WITH APPLICATION FOR APPROVAL PRIOR TO CONSTRUCTION. NOTE: SHORING PLANS WITHIN ZONE A WILL REQUIRE ADDITIONAL REVIEW TIME.

ii. ALL EXCAVATIONS WILL BE ATTENDED OR PROTECTED. FENCE, FILL OR GUARD EACH SITE PRIOR TO LEAVING. MONITOR SHORED EXCAVATIONS CONTINUOUSLY DURING WORK FOR SIGNS OF INSTABILITY AND FAILURE.

iii. UNDER-TRACK BORES SHALL BE LOCATED GREATER THAN 150 FEET FROM THE NEAREST BRIDGE, CULVERT, TRACK SWITCH, BUILDING OR OTHER MAJOR STRUCTURE, REGARDLESS OF COMMODITY OR INSTALLATION METHOD.

iv. FOR ANY INSTALLATION OTHER THAN JACK AND BORE UNDER MAIN AND SIDING TRACKS GREATER THAN TWENTY-SIX (26) INCHES IN DIAMETER, AND AT A DEPTH OF TWELVE (12) FEET BELOW TOP OF TIE, A GEOTECHNICAL STUDY WILL NEED TO BE PERFORMED TO DETERMINE THE PRESENCE OF GRANULAR MATERIAL AND/OR HIGH-WATER TABLE ELEVATION, AT THE SOLE EXPENSE OF THE PERMITTEE. THE STUDY WILL INCLUDE RECOMMENDATIONS AND A PLAN FOR A PROCEDURE TO PREVENT FAILURE AND A POTENTIAL COLLAPSE OF THE BORE. GENERALLY, CORE SAMPLES ARE TO BE TAKEN NEAR THE ENDS OF TIE AT THE PROPOSED LOCATION, AT LEAST AS DEEP AS THE BOTTOM OF THE PROPOSED HORIZONTAL BORE. TEST RESULTS MUST BE REVIEWED AND APPROVED BY BNSF, OR ITS AGENT, PRIOR TO BORING ACTIVITIES COMMENCING. BNSF RESERVES THE RIGHTS, BASED ON TEST RESULTS, TO REQUIRE THE PERMITTEE TO SELECT AN ALTERNATE LOCATION, OR TO REQUIRE ADDITIONAL ENGINEERING SPECIFICATIONS BE IMPLEMENTED, AT THE SOLE EXPENSE OF THE PERMITTEE, TO UTILIZE EXISTING LOCATION.

v. BNSF ENGINEERING WILL NOT NEED TO REVIEW PROJECTS INVOLVING UNDERGROUND CROSSINGS OF UNCASED GRAVITY-FLOW SEWER PIPELINES PROVIDED THE MATERIAL IS ONE OF THE FOLLOWING:

1) CLASS V REINFORCED CONCRETE PIPE (RCP).

2) STEEL PIPE WITH PROPER WALL THICKNESS AS PRESCRIBED IN THIS POLICY.

3) HOBAS PIPE.

g. ALL UTILITIES CROSSING UNDER DITCHES AND RAILROAD TRACKAGE USING HORIZONTAL DIRECTIONAL DRILLING (HDD) INSTALLATION SHOULD HAVE A MINIMUM DEPTH OF COVER OF SIX (6) FEET BELOW THE FLOWLINE OF THE DITCH OR GROUND SURFACE AND TWELVE (12) FEET FROM BASE OF RAIL. IN FILL SECTIONS, THE NATURAL GROUND LINE AT THE TOE OF SLOPE WILL BE CONSIDERED AS DITCH GRADE. DETAILED DRAWINGS SHOULD BE INCLUDED WITH THE APPLICATION. UNDERGROUND INSTALLATIONS MAY BE MADE BY OPEN TRENCHING FROM THE PROPERTY LINE TO THE TOE OF THE FILL SLOPE IN FILL SECTIONS AND TO THE TOE OF THE SHOULDER SLOPE IN CUT SECTIONS BUT TO NO CLOSER THAN THIRTY (30) FEET OF THE CENTERLINE OF TRACK.

i. UNDERGROUND INSTALLATIONS CROSSING OR PARALLELING BNSF WILL NEED TO BE A MINIMUM OF SIX (6) FEET BELOW NATURAL GROUND / DITCHES REGARDLESS OF INSTALLATION METHOD.

j. THE USE OF PLASTIC CARRIER PIPE FOR SEWER, WATER, NATURAL GAS, AND OTHER LIQUIDS IS ACCEPTABLE UNDER SPECIFIC CIRCUMSTANCES. THE USE OF PLASTIC PIPE IS SATISFACTORY IF THE PIPE IS DESIGNED TO MEET ALL APPLICABLE FEDERAL AND STATE CODES, AND IF THE CARRIER PIPE IS PROPERLY ENCASED WITHIN A STEEL CASING PIPE PER AREMA STANDARDS. THIS CASING MUST EXTEND THE FULL WIDTH OF THE RIGHT OF WAY.

k. IF THE MINIMUM DEPTH IS NOT ATTAINABLE BECAUSE OF EXISTING UTILITIES, WATER TABLE, ORDINANCES, OR SIMILAR REASONS, THE LINE SHALL BE REROUTED.

l. LOCATIONS THAT ARE CONSIDERED UNSUITABLE OR UNDESIRABLE ARE TO BE AVOIDED. THESE INCLUDE DEEP CUTS AND IN WET OR ROCKY TERRAIN OR WHERE IT WILL BE DIFFICULT TO OBTAIN MINIMUM DEPTH.

m. MANHOLES SHOULD BE LOCATED OUTSIDE RAILROAD PROPERTY, WHEN POSSIBLE. NO MANHOLE MAY BE IN THE SHOULDER, SHOULDER SLOPE, DITCH OR BACKSLOPE, OR WITHIN TWENTY-FIVE (25) FEET OF THE CENTERLINE OF TRACK AND SHALL NOT PROTRUDE ABOVE THE SURROUNDING GROUND WITHOUT APPROVAL OF BNSF.

n. UTILITIES, EXCEPT TEMPORARY WATER LINES, WILL NOT BE ATTACHED TO OR ROUTED THROUGH DRAINAGE STRUCTURES OR CATTLE PASSES. UTILITIES ARE NOT TO BE ATTACHED TO OTHER RAILROAD STRUCTURES WITHOUT WRITTEN APPROVAL OF THE BNSF STRUCTURES DEPARTMENT.

o. CROSSINGS SHALL NOT BE INSTALLED UNDER OR WITHIN ONE-HUNDRED AND FIFTY (150) FEET OF ANY RAILROAD BRIDGE, TRACK SWITCH OR THE CENTERLINE OF ANY CULVERT.

p. A BNSF SIGNAL REPRESENTATIVE MUST BE PRESENT DURING INSTALLATION IF RAILROAD SIGNALS ARE IN THE VICINITY OF WIRELINE CROSSINGS UNLESS SIGNAL REPRESENTATIVE AUTHORIZES OTHERWISE.

q. MARKERS THAT IDENTIFY THE UTILITY OWNER SHALL BE PLACED AT BOTH PROPERTY LINES FOR UTILITIES CROSSING THE RAILROAD PROPERTY. FOR PARALLEL LINES MARKERS SHALL BE PLACED ABOVE THE CABLE AT INTERVALS NO LESS THAN THREE HUNDRED (300) FEET APART. THE MARKERS SHOULD IDENTIFY THE OWNER, TYPE OF CABLE AND EMERGENCY TELEPHONE NUMBER. A SIX (6) INCH WIDE WARNING TAPE WILL BE INSTALLED ONE (1) FOOT BNG DIRECTLY OVER THE UNDERGROUND POWER LINE WHERE LOCATED ON RAILROAD RIGHT-OF-WAY AND OUTSIDE THE TRACK BALLAST SECTIONS.

r. ABOVE-GROUND UTILITY APPURTENANCES INSTALLED AS A PART OF AN UNDERGROUND INSTALLATION SHALL BE LOCATED AT OR NEAR THE RAILROAD PROPERTY LINE AND SHALL NOT BE ANY CLOSER THAN TWENTY-FIVE (25) FEET TO THE CENTERLINE OF TRACK.

2. **PIPELINE REQUIREMENTS**

a. PIPELINE DESIGNS ARE TO SPECIFY THE TYPE AND CLASS OF MATERIAL, MAXIMUM WORKING PRESSURES, TEST, AND DESIGN PRESSURE. ALL PIPES ARE TO BE CONSTRUCTED PER MOST RECENTLY PUBLISHED OR REGULATED STANDARD OF THE USDOT HAZARDOUS MATERIAL REGULATION BOARD.

b. PIPELINES CARRYING OIL, LIQUEFIED PETROLEUM GAS, NATURAL OR MANUFACTURED GAS AND OTHER FLAMMABLE PRODUCTS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT AREMA, ANSI/ASME B 31.4 CODE FOR PRESSURE PIPING - LIQUID PETROLEUM TRANSPORTATION PIPING SYSTEMS; ANSI B 31.8 CODE FOR PRESSURE PIPING - GAS TRANSMISSION AND DISTRIBUTION PIPING SYSTEMS; OTHER APPLICABLE ANSI CODES AND 49 C.F.R. PART 192 – TRANSPORTATION OF NATURAL AND OTHER GAS BY PIPELINE: MINIMUM FEDERAL SAFETY STANDARDS OR PART 195 - TRANSPORTATION OF HAZARDOUS LIQUIDS BY PIPELINE, EXCEPT THAT THE MAXIMUM ALLOWABLE STRESS OF DESIGN OF STEEL PIPE SHALL NOT EXCEED THE SPECIFIED MINIMUM YIELD STRENGTH (MULTIPLIED BY LONGITUDINAL JOINT FACTOR) OF THE PIPE AS DEFINED IN THE ANSI CODES.

c. NEW AND RELOCATED SEWER LINES SHALL BE CONSTRUCTED WITH SATISFACTORY JOINTS, MATERIALS AND DESIGNS WHICH WILL PROVIDE PROTECTION AND RESISTANCE TO DAMAGE FROM SULFIDE GASES AND OTHER CORROSIVE ELEMENTS TO WHICH THEY MAY BE EXPOSED. WHERE NONMETALLIC PIPE IS PERMITTED AND INSTALLED, A DURABLE METAL WIRE SHALL BE CONCURRENTLY INSTALLED; OR OTHER MEANS SHALL BE PROVIDED FOR DETECTION PURPOSES.

d. PIPELINES UNDER RAILROAD TRACKS AND ACROSS RAILROAD PROPERTY SHALL BE ENCASED IN A LARGER PIPE OR CONDUIT CALLED "CASINGS." GENERALLY, CASINGS SHALL EXTEND FROM RIGHT-OF-WAY LINE TO RIGHT-OF-WAY LINE, UNLESS OTHERWISE APPROVED.

e. PIPELINES AND CASING PIPES SHALL BE SUITABLY INSULATED FROM UNDERGROUND CONDUITS CARRYING ELECTRIC WIRES ON RAILROAD PROPERTY.

f. REINFORCED CONCRETE PIPE, WITH STORM WATER AND SEWER BEING THE EXCEPTION, WILL NEED TO BE ENCASED FOR A DISTANCE AS WIDE AS THE EMBANKMENT AT THE UTILITY CROSSING. THIS IS TO PROTECT AGAINST TRACK FAILURE DUE TO JOINT SEPARATION.

3. **ENCASEMENT OF UTILITIES**

a. CASINGS ARE OVERSIZED LOAD-BEARING CONDUITS OR DUCTS THROUGH WHICH A UTILITY IS INSERTED:

i. TO PROTECT THE RAILROAD FROM DAMAGES AND TO PROVIDE FOR REPAIR, REMOVAL, AND REPLACEMENT OF THE UTILITY WITHOUT INTERFERENCE TO RAILWAY TRAFFIC.

ii. TO PROTECT THE CARRIER PIPE FROM EXTERNAL LOADS OR SHOCK, EITHER DURING OR AFTER CONSTRUCTION.

iii. TO CONVEY LEAKING FLUIDS OR GASES AWAY FROM THE AREA DIRECTLY BENEATH THE RAILROAD TRACKAGE TO A POINT OF VENTING AT THE RAILROAD PROPERTY LINE.

iv. CASING MAY BE OMITTED FOR **GASEOUS PRODUCTS ONLY** IF THE CARRIER PIPE IS STEEL, THE WALL THICKNESS CONFORMS TO E-80 LOADING SHOWN IN THE TABLE ON PAGE 3-10, THE PIPE IS COATED AND CATHODICALLY PROTECTED, AND IS PLACED TWELVE (12) FEET MINIMUM BELOW THE BASE OF RAIL PER AREMA STANDARDS.

v. UNDERGROUND ELECTRIC AND FIBER INSTALLATIONS MUST BE ENCASED COMPLETELY ACROSS THE RAILROAD RIGHT-OF-WAY WITH A RIGID CONDUIT. THE CONDUIT CAN BE STEEL, HDPE SCH 80, HDPE SDR-11, OR HDPE SDR-9 (WITH NO CASING PIPE FOR A SINGLE CONDUIT). ANY INSTALLATIONS CROSSING BNSF WITH MULTIPLE DUCT INSTALLATIONS MUST BE IN A SINGLE CASING UNLESS THEY ARE PLACED 5' OR MORE APART. A METALLIC RIBBON OR WIRE MUST BE INCLUDED IN THE PIPE TO ALLOW FOR RADIO LOCATING LATER.

vi. CASING MAY BE OMITTED FOR OTHER PRODUCTS UNDER THE FOLLOWING CIRCUMSTANCES:

(a) WHEN CARRIER PIPE IS STEEL, AND THE WALL THICKNESS CONFORMS TO E-80 LOADING FOR CASING PIPE SHOWN IN THE TABLE ON PAGE 3-10 AND AS INCLUDED IN AREMA MANUAL CHAPTER 1, PART 5 FOR UTILITY CROSSINGS. THE LENGTH OF THICKER-WALLED PIPE SHALL EXTEND FROM RAILROAD RIGHT-OF-WAY LINE TO RIGHT-OF-WAY LINE.

(b) WHEN STEEL CARRIER PIPE IS COATED AND CATHODICALLY PROTECTED.

(c) WHEN THE DEPTH FROM BASE OF RAIL TO TOP OF PIPE IS GREATER THAN THIRTY (30) FEET AND MINIMUM DEPTH OF COVER IS SIX (6) FEET BELOW THE FLOWLINE OF THE DITCH OR GROUND SURFACE.

b. IN CIRCUMSTANCES WHERE IT IS NOT FEASIBLE TO INSTALL ENCASEMENT FROM RIGHT-OF-WAY LINE TO RIGHT-OF-WAY LINE, CASING PIPE UNDER RAILROAD TRACKS AND ACROSS RAILROAD PROPERTY SHALL EXTEND TO THE GREATER OF THE FOLLOWING DISTANCES, MEASURED AT RIGHT ANGLES TO THE CENTERLINE OF TRACK:

i. TWO (2) FEET BEYOND TOE OF SLOPE.

ii. THREE (3) FEET BEYOND DITCH LINE.

iii. TWENTY-FIVE (25) FEET FROM CENTERLINE OF OUTSIDE TRACK WHEN CASING IS SEALED AT BOTH ENDS.

iv. FORTY-FIVE (45) FEET FROM CENTERLINE OF OUTSIDE TRACK WHEN CASING IS OPEN AT BOTH ENDS.

v. IF ADDITIONAL TRACK IS PLANNED FOR FUTURE CONSTRUCTION, CASING MUST EXTEND FAR ENOUGH TO MEET ABOVE DISTANCES GIVEN THE ADDITIONAL TRACK REQUIREMENT.

c. PIPELINES AND CASING PIPE SHALL BE SUITABLY INSULATED FROM UNDERGROUND CONDUITS CARRYING ELECTRIC WIRES ON RAILROAD PROPERTY.

d. CASING PIPE AND JOINTS SHALL BE MADE OF METAL, AND OF LEAKPROOF CONSTRUCTION. CASINGS SHALL BE CAPABLE OF WITHSTANDING THE RAILROAD LOADINGS AND OTHER LOADS SUPERIMPOSED UPON THEM.

e. WALL THICKNESS DESIGNATIONS FOR STEEL CARRIER AND CASING PIPE FOR E-80 LOADING (INCLUDING IMPACT).

i. STEEL PIPE SHALL BE IN CONFORMANCE WITH ASTM A1097 AND OF LEAKPROOF CONSTRUCTION, SUCH AS BUTT WELDED OR INTERLOCKING JOINTS WHICH ARE CAPABLE OF WITHSTANDING RAILROAD LOADING. PIPE SHALL HAVE A SPECIFIED MINIMUM YIELD STRENGTH, SMYS, OF AT LEAST 35,000 PSI (POUNDS PER SQUARE INCH / 241.317KPA).

ii. ALL METALLIC CASING PIPES ARE TO BE DESIGNED FOR EFFECTIVE CORROSION CONTROL, LONG SERVICE LIFE AND RELATIVELY FREE FROM ROUTINE SERVICING AND MAINTENANCE. CORROSION CONTROL MEASURES FOR METALLIC CASING PIPING MUST INCLUDE CATHODIC PROTECTION OR COATING, SUCH AS FUSION BONDED EPOXY COATING (FBE) WITH AN ABRASION RESISTANT OVERCOATING (ARO).

iii. CAST IRON MAY BE USED FOR CASING. IT SHALL CONFORM TO ANSI A21. THE PIPE SHALL BE CONNECTED BY MECHANICAL-TYPE JOINTS. PLAIN-END PIPE SHALL BE CONNECTED BY COMPRESSION-TYPE COUPLINGS. THE STRENGTH OF THE CAST IRON PIPE TO SUSTAIN EXTERNAL LOADS SHALL BE COMPUTED IN ACCORDANCE WITH THE MOST CURRENT ANSI A21.1 "MANUAL FOR THE COMPUTATION OF STRENGTH AND THICKNESS OF CAST IRON PIPE."

f. THE INSIDE DIAMETER OF THE CASING PIPE SHALL BE SUCH THAT THE CARRIER PIPE CAN BE REMOVED WITHOUT DISTURBING THE CASING. ALL JOINTS OR COUPLINGS, SUPPORTS, INSULATORS OR CENTERING DEVICES FOR THE CARRIER PIPE SHALL BE CONSIDERED IN THE SELECTION OF THE CASING DIAMETER.

g. FOR FLEXIBLE CASING PIPE, A MAXIMUM VERTICAL DEFLECTION CLEARANCE OF THE CASING PIPE SHALL BE THREE PERCENT (3%) OF ITS DIAMETER PLUS ONE-HALF (1/2) INCH SO THAT NO LOADS FROM THE ROADBED, TRACK, RAILROAD TRAFFIC OR CASING PIPE ARE TRANSMITTED TO THE CARRIER WHEN INSULATORS ARE USED ON THE CARRIER PIPE, THE RELATIONSHIP OF THE CASING SIZE TO THE SIZE OF THE CARRIER PIPE IS:

DIAMETER OF CARRIER PIPE	INSIDE DIAMETER OF CASING PIPE EQUALS OUTSIDE DIAMETER OF CARRIER PIPE PLUS
0" – 7.9"	2"
8" - 16"	3-1/4"
OVER 16"	4-1/2"

4. **CASING AND PIPELINE INSTALLATION**

a. CASING AND PIPELINE INSTALLATIONS SHOULD BE ACCOMPLISHED BY HORIZONTAL DIRECTIONAL DRILLING (HDD), DRY JACK-AND-BORE, TUNNELING OR OTHER APPROVED METHODS. TUNNELING CONSTRUCTION UNDER TRACKS WILL BE PERMITTED ONLY UNDER DIRECT SUPERVISION OF A BNSF ENGINEER. TUNNELING PROCEDURES AND EQUIPMENT, AS WELL AS STRUCTURAL DESIGN, MUST HAVE BNSF ENGINEERING APPROVAL PRIOR TO STARTING ANY WORK ON BNSF PROPERTY. GENERALLY, TUNNELING SHALL NOT BE CONSIDERED WHERE LESS THAN SIX (6) FEET OF COVER EXISTS, OR WHERE EXCESSIVELY SANDY, LOOSE, OR ROCKY SOILS ARE ANTICIPATED. ALL UTILITIES CROSSING UNDER DITCHES AND RAILROAD TRACKAGE USING JACKING AND DRY BORING INSTALLATION SHOULD HAVE A MINIMUM DEPTH OF COVER OF SIX (6) FEET BELOW THE FLOWLINE OF THE DITCH OR GROUND SURFACE AND EIGHT (8) FEET – THREE (3) INCHES FROM BASE OF RAIL. IN FILL SECTIONS, THE NATURAL GROUND LINE AT THE TOE OF SLOPE WILL BE CONSIDERED AS DITCH GRADE. JACKING/BORING PITS SHALL BE LOCATED OUTSIDE RAILROAD PROPERTY WHEN POSSIBLE AT A MINIMUM OF THIRTY (30) FEET FROM THE CENTERLINE OF TRACK AND KEPT TO THE MINIMUM SIZE NECESSARY. DO NOT LOCATE THE BORE PITS IN THE SLOPE OF A CUT OR FILL SECTION OF THE ROADBED. KEEP THE BORE PIT SIZE TO A MINIMUM. USE SHORING, TEMPORARY OR PERMANENT, CONFORMING TO THE MOST RESTRICTIVE OF STATE, OSHA, OR AREMA RECOMMENDED PRACTICES IN ALL EXCAVATIONS, WHERE REQUIRED. SUBMIT SHORING PLANS SEALED BY A PROFESSIONAL ENGINEER WITH APPLICATION FOR APPROVAL PRIOR TO CONSTRUCTION. UNDER-TRACK BORES SHALL BE LOCATED GREATER THAN 150 FEET FROM THE NEAREST BRIDGE, CULVERT, TRACK SWITCH, BUILDING OR OTHER MAJOR STRUCTURE, REGARDLESS OF COMMODITY OR INSTALLATION METHOD. ALL ENCASED UTILITY PIPELINE CROSSINGS UNDER DITCHES AND RAILROAD TRACKAGE USING HORIZONTAL DIRECTIONAL DRILLING (HDD) INSTALLATION SHOULD HAVE A MINIMUM DEPTH OF COVER OF SIX (6) FEET BELOW THE FLOWLINE OF THE DITCH OR GROUND SURFACE AND TWELVE (12) FEET FROM BASE OF RAIL. IN FILL SECTIONS, THE NATURAL GROUND LINE AT THE TOE OF SLOPE WILL BE CONSIDERED AS DITCH GRADE. DETAILED DRAWINGS SHOULD BE INCLUDED WITH THE APPLICATION. RAIL ELEVATIONS OVER THE WORK MUST BE MONITORED AT INTERVALS PRESCRIBED BY BNSF TO DETECT ANY TRACK MOVEMENT. MOVEMENTS OF OVER ONE-QUARTER (1/4) INCH VERTICALLY SHALL BE IMMEDIATELY REPORTED TO THE BNSF ROADMASTER. DUE TO THE DANGER TO RAIL TRAFFIC THAT IS CAUSED BY ONLY SMALL AMOUNTS OF TRACK MOVEMENT, BNSF FORCES MAY HAVE TO BE CALLED TO SURFACE THE TRACK SEVERAL TIMES. THE COST OF ANY WORK REQUIRED BY BNSF IN THE REPAIR OF TRACK CAUSED BY UTILITY INSTALLATION WILL BE ASSESSED AGAINST THE UTILITY OWNER.

THE FOLLOWING REQUIREMENTS SHALL APPLY TO THESE CONSTRUCTION METHODS:

i. THE USE OF WATER UNDER PRESSURE JETTING OR PUDDLING WILL NOT BE PERMITTED TO FACILITATE BORING, PUSHING OR JACKING OPERATIONS. SOME BORING MAY REQUIRE WATER TO LUBRICATE CUTTER AND PIPE, AND UNDER SUCH CONDITIONS, IS CONSIDERED DRY BORING.

ii. WHERE UNSTABLE SOIL CONDITIONS EXIST, BORING OR TUNNELING OPERATIONS SHALL BE CONDUCTED IN SUCH A MANNER AS NOT TO BE DETRIMENTAL TO THE RAILROAD BEING CROSSED.

iii. IF EXCESSIVE VOIDS OR TOO LARGE OF A BORED HOLE IS PRODUCED DURING CASING OR PIPELINE INSTALLATIONS, OR IF IT IS NECESSARY TO ABANDON A BORED OR TUNNELED HOLE, PROMPT REMEDIAL ACTION SHOULD BE TAKEN BY THE UTILITY OWNER.

iv. ALL VOIDS OR ABANDONED HOLES CAUSED BY BORING, OR JACKING ARE TO BE FILLED BY PRESSURE GROUTING. THE GROUT MATERIAL SHOULD BE A SAND CEMENT SLURRY WITH A MINIMUM OF TWO (2) SACKS OF CEMENT PER CUBIC YARD AND A MINIMUM OF WATER TO ASSURE SATISFACTORY PLACEMENT.

v. FOR BORED OR TUNNELED INSTALLATIONS LESS THAN SEVENTEEN AND ONE-HALF (17-1/2) FEET DEEP, LESS THAN 300 FEET LONG AND PIPE DIAMETERS LESS THAN OR EQUAL TO 20 INCHES, THE HOLE DIAMETER SHALL NOT EXCEED THE OUTSIDE DIAMETER OF THE UTILITY PIPE, CABLE, OR CASING (INCLUDING COATING) BY MORE THAN ONE AND ONE-HALF (1-1/2) INCHES FOR PIPES WITH AN INSIDE DIAMETER OF TWELVE (12) INCHES OR LESS, OR TWO (2) INCHES ON PIPES WITH AN INSIDE DIAMETER GREATER THAN TWELVE (12) INCHES.

vi. FOR BORED OR TUNNELED INSTALLATIONS SEVENTEEN AND ONE-HALF (17-1/2) FEET DEEP OR DEEPER, 300 FEET LONG OR LONGER, OR GREATER THAN 20 INCHES IN PIPE DIAMETER, THE HOLE DIAMETER SHALL NOT EXCEED ONE AND ONE-HALF (1-1/2) TIMES THE DIAMETER OF THE PIPE.

THIS IS FURTHER CLARIFIED AS FOLLOWS:

HOLE DIAMETER	DEPTH	LENGTH	PIPE OUTSIDE DIAMETER
PIPE OD + 1-1/2"	< 17.5'	<300'	<=12"
PIPE OD + 2"	< 17.5'	<300'	12" <= 20"
PIPE OD X 1.5	> 17.5'	>= 300'	> 20"

b. VENTS. IN CASING PIPE INSTALLATIONS, VENTS ARE APPURTENANCES BY WHICH FLUIDS OR GASES BETWEEN CARRIER AND CASING MAY BE INSPECTED, SAMPLED, EXHAUSTED, OR EVACUATED.

i. VENTS SHALL BE LOCATED AT THE HIGH END OF SHORT CASINGS AND AT BOTH ENDS OF CASINGS LONGER THAN ONE HUNDRED FIFTY (150) FEET.

ii. VENT STANDPIPES SHALL BE LOCATED AND CONSTRUCTED SO AS NOT TO INTERFERE WITH MAINTENANCE OF THE RAILROAD OR TO BE CONCEALED BY VEGETATION. WHERE POSSIBLE, THEY SHALL BE MARKED AND LOCATED AT THE PROPERTY LINE. THE MARKERS SHALL GIVE THE NAME, ADDRESS OF THE OWNER, AND A 24-HOUR PHONE NUMBER TO CONTACT IN CASE OF EMERGENCY.

iii. CASING PIPE, WHEN SEALED, SHALL BE PROPERLY VENTED. VENT PIPES SHALL BE OF SUFFICIENT DIAMETER, BUT IN NO CASE LESS THAN TWO (2) INCHES IN DIAMETER AND SHALL BE ATTACHED NEAR EACH END OF CASING PROJECTING THROUGH GROUND SURFACE AT PROPERTY LINES. VENTING IS NOT REQUIRED FOR ENCASED WATER LINES; HOWEVER, SEALING WILL BE REQUIRED IF THE ENDS OF THE CASING ARE NOT ABOVE THE HIGH-WATER TABLE. WHERE CASING PIPE IS USED ON SEWER LINES, VENTING, AND SEALING OF CASING WILL BE REQUIRED ON PRESSURIZED LINES.

iv. VENT PIPES SHALL EXTEND NOT LESS THAN FOUR (4) FEET ABOVE GROUND SURFACE. TOP OF VENT PIPES SHALL BE FITTED WITH A DOWN-TURNED ELBOW, PROPERLY SCREENED, OR A RELIEF VALVE.

v. FOR PIPELINES CARRYING FLAMMABLE MATERIALS, VENT PIPES ON CASINGS SHALL BE AT LEAST SIXTEEN (16) FEET (VERTICALLY) FROM AERIAL ELECTRIC WIRES. CASINGS SHALL BE SUITABLY INSULATED FROM UNDERGROUND CONDUITS CARRYING ELECTRIC WIRES ON RAILROAD RIGHT-OF-WAY.

c. SHUT-OFF VALVES

i. THE UTILITY OWNER SHALL INSTALL ACCESSIBLE EMERGENCY SHUT-OFF VALVES ON EACH SIDE OF THE RAILROAD. LOCATING A SHUT-OFF VALVE ON RAILROAD PROPERTY SHOULD BE AVOIDED. IF APPROVAL IS ACQUIRED, A GUARDRAIL MUST PROTECT THE SHUT-OFF VALVE.

ii. WHEN A GUARDRAIL IS REQUIRED, ITS HEIGHT SHALL BE FOUR (4) FEET ABOVE THE GROUND LINE. ALL FOUR CORNER POSTS SHALL BE DRIVEN TO A MINIMUM DEPTH OF FOUR (4) FEET BELOW GROUND LINE. THERE SHALL BE A MINIMUM CLEARANCE OF TWO (2) FEET FROM THE VALVE TO THE GUARDRAIL. THE STEEL PIPES FOR THE FOUR CORNER POSTS AND GUARDRAIL SHALL HAVE A MINIMUM DIAMETER OF FOUR (4) INCHES. ALL JOINTS WILL BE WELDED WITH A ONE-QUARTER (1/4) INCH FILLET WELD ALL AROUND.

iii. WHERE PIPELINES ARE PROVIDED WITH AUTOMATIC CONTROL STATIONS, NO ADDITIONAL VALVES WILL BE REQUIRED.

5. **ABANDONMENT / REMOVAL OF FACILITIES**

a. UPON TERMINATION OF LICENSE THE PIPELINE NEEDS TO BE REMOVED FROM BNSF PROPERTY EXCEPT FOR THE PORTION UNDER THE TRACK EMBANKMENT. FOR PIPELINES CROSSING UNDER THE TRACKS THE PIPE AND CASING WILL BE CUT JUST SHORT OF THE TOE OF EMBANKMENT SLOPE, PURGED, AND FILLED WITH A FLOWABLE GROUT.

b. PORTION OF ABANDONED PIPE UNDER TRACK EMBANKMENT TO REMAIN IN PLACE SHALL BE FILLED BY PRESSURE GROUTING. THE GROUT MATERIAL SHOULD BE A SAND CEMENT SLURRY WITH A MINIMUM OF TWO (2) SACKS OF CEMENT PER CUBIC YARD AND A MINIMUM AMOUNT OF WATER TO ASSURE SATISFACTORY PLACEMENT.

BID SET

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225 SE Idaho Street FAX 509-335-6875
Pullman, Wa. 99164-3611

WSU SUNRISE ORCHARD

INSTALL IRRIGATION MAINLINE

FACILITY NO. 3300

MARK	DATE	DESCRIPTION
	04/04/24	BID SET

CAD DWG FILE: 20210257.0000-E2 Pipeline 24.dwg

DESIGN BY: DD

DRAWN BY: NM | CHECKED BY: DD

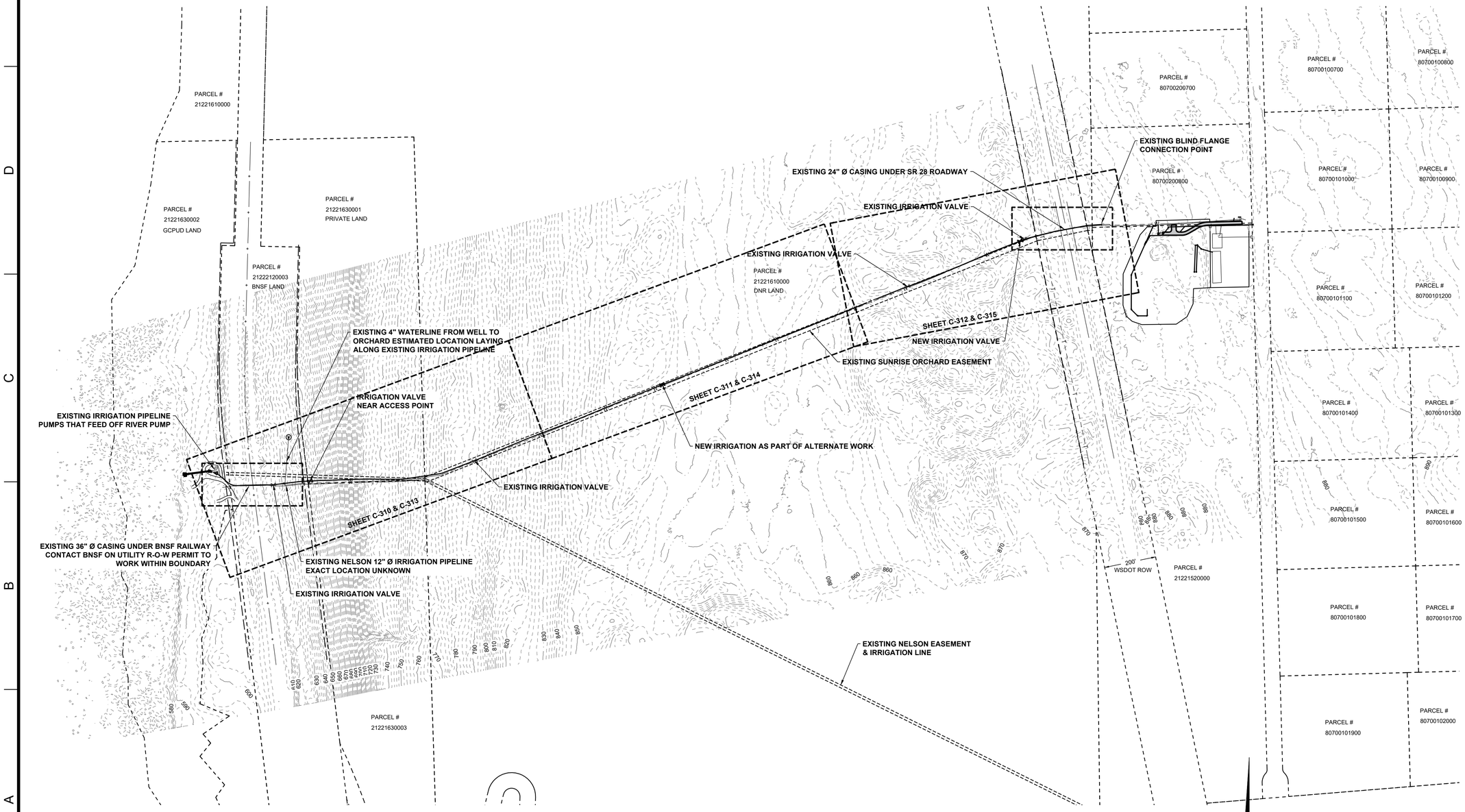
PROJECT No. 2233-2024 | FILE No. 3300-G-003

SHEET TITLE

BNSF NOTES

C-003

FILE: M:\1jobs2021\20210257.0000\Dwg\Final\20210257.0000-E2 Pipeline 24.dwg PLOT DATE: February 28, 2023, 3:01 PM ORIGINAL PAPER SIZE: 22" x 34"



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MARK	DATE	DESCRIPTION
	04/04/24	BID SET

CAD DWG FILE: 20210257.0000-E2 Pipeline 24.dwg	
DESIGN BY: DD	
DRAWN BY: NM	CHECKED BY: DD
PROJECT No. 2233-2024	FILE No. 3300-G-003
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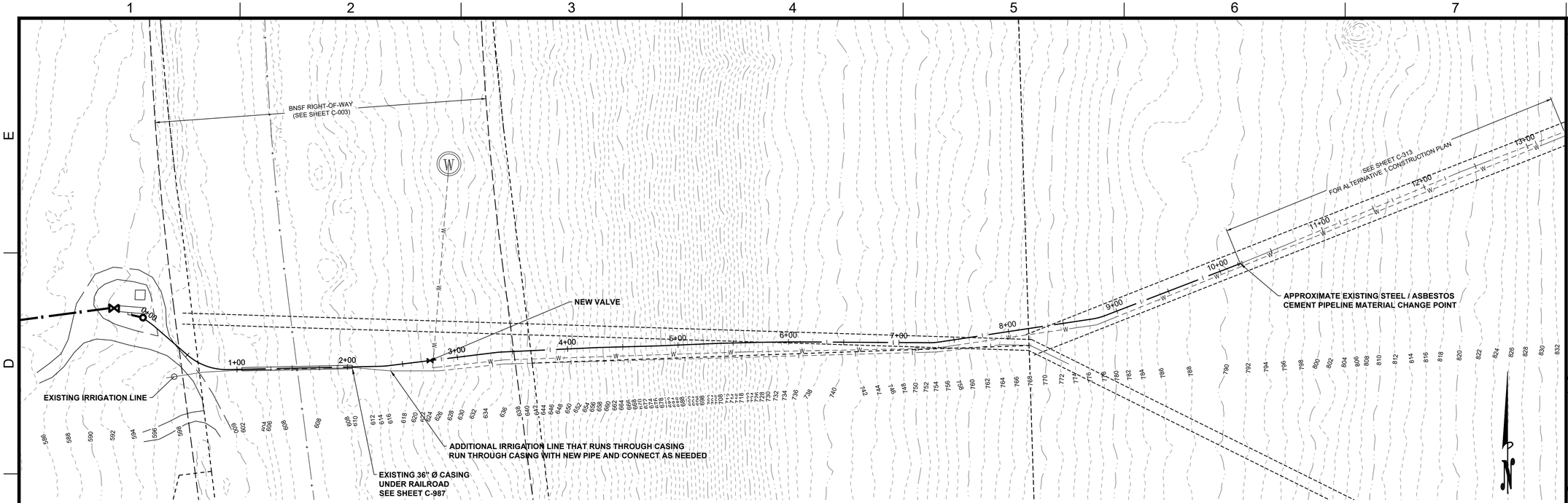
SHEET TITLE

PIPELINE SITE PLAN

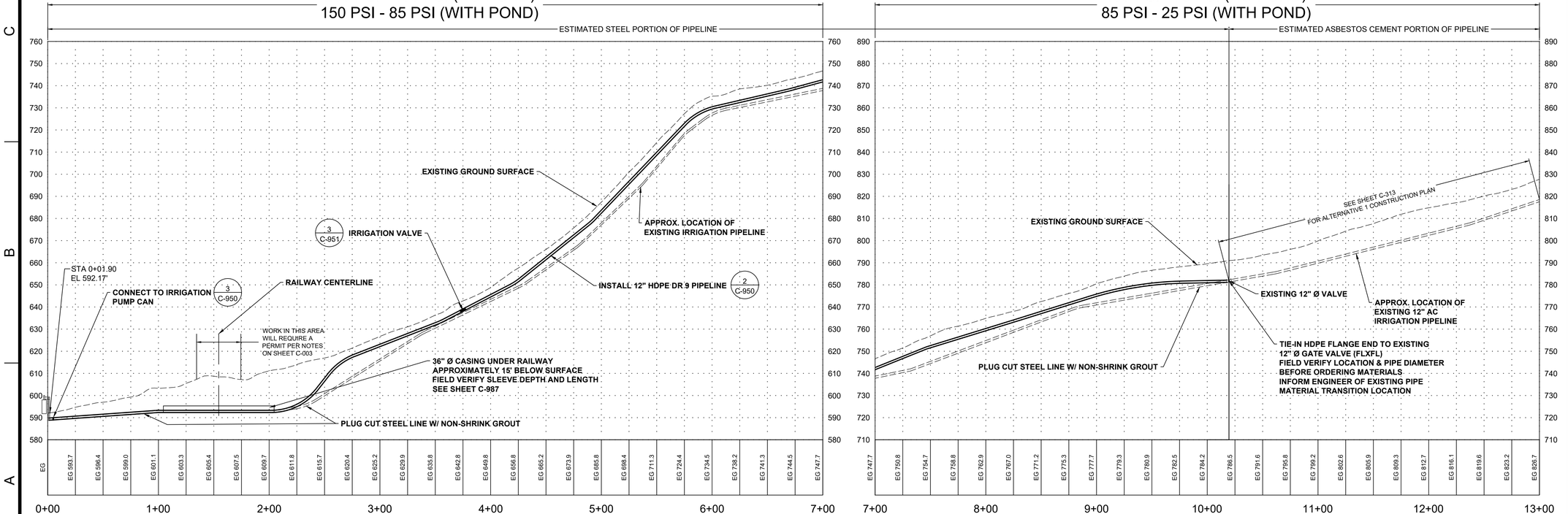
C-300

SHEET 5 OF 16 SHEETS



PIPELINE PLAN 0+00 TO 13+00

SCALE: 1" = 50'



PIPELINE PROFILE 0+00 TO 13+00

SCALE: HORZ: 1" = 50' / VERT: 1" = 25'

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Pullman, Wa. 99164-3611

PH 509-335-5571
FAX 509-335-6875

WSU SUNRISE ORCHARD

INSTALL IRRIGATION MAINLINE

FACILITY NO. 3300

MARK	DATE	DESCRIPTION
	04/04/24	BID SET

CAD DWG FILE: 20210257.0000-E2 Pipeline 24.dwg	
DESIGN BY: DD	
DRAWN BY: NM	CHECKED BY: DD
PROJECT No. 2233-2024	FILE No. 3300-G-003
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SHEET TITLE

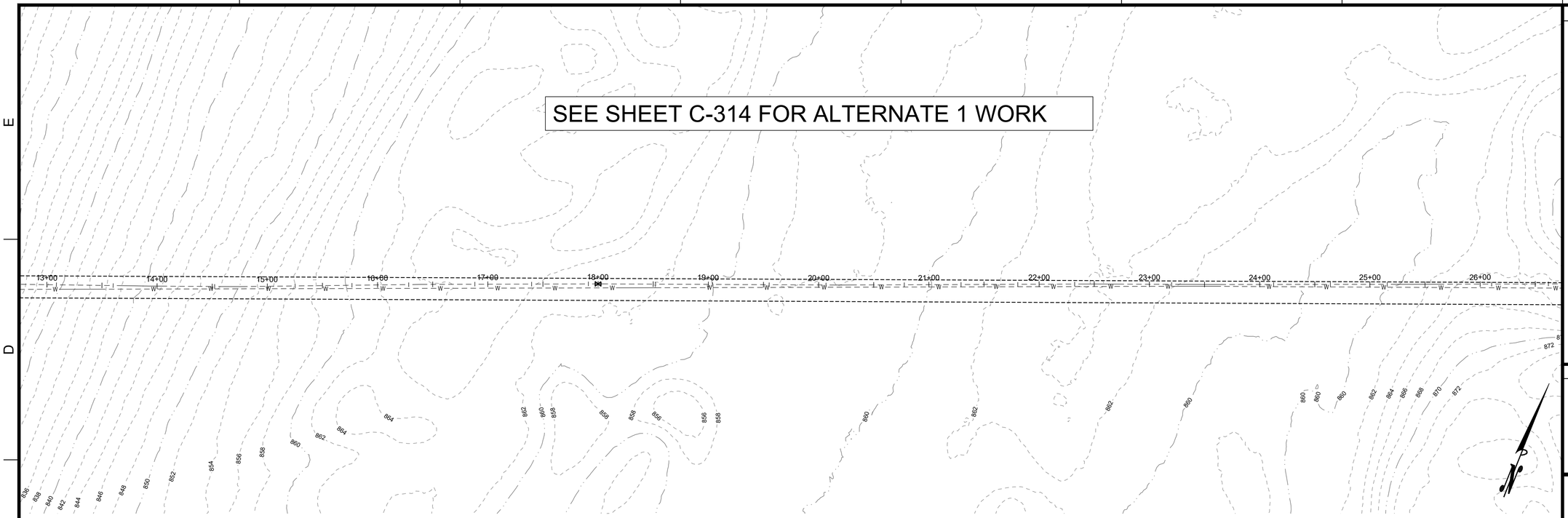
IRRIGATION PIPELINE
PLAN & PROFILE - I

C-310

SHEET 6 OF 16 SHEETS

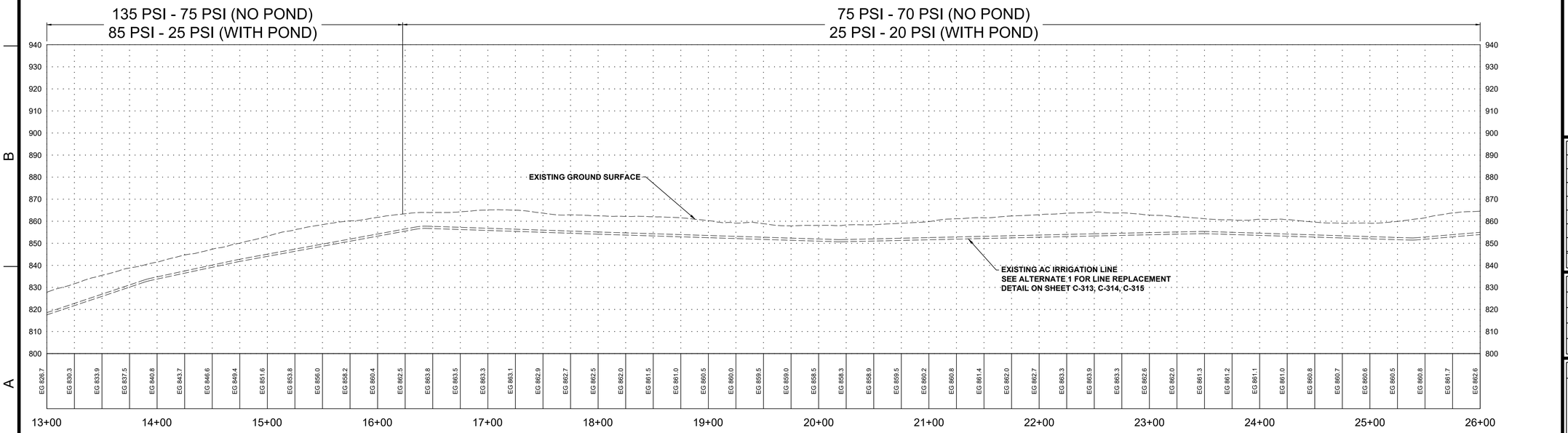
FILE: M:\1jobs\2021\20210257.0000\Dwg\Final\20210257.0000-E2 Pipeline 24.dwg PLOT DATE: February 28, 2023, 3:01 PM ORIGINAL PAPER SIZE: 22" x 34"

SEE SHEET C-314 FOR ALTERNATE 1 WORK



PIPELINE PLAN 13+00 TO 27+00

SCALE: 1" = 50'



PIPELINE PROFILE 13+00 TO 27+00

SCALE: HORZ: 1" = 50' / VERT: 1" = 25'

BID SET

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WSU SUNRISE ORCHARD

INSTALL IRRIGATION MAINLINE

FACILITY NO. 3300

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PROJECT No. 2233-2024	FILE No. 3300-G-003
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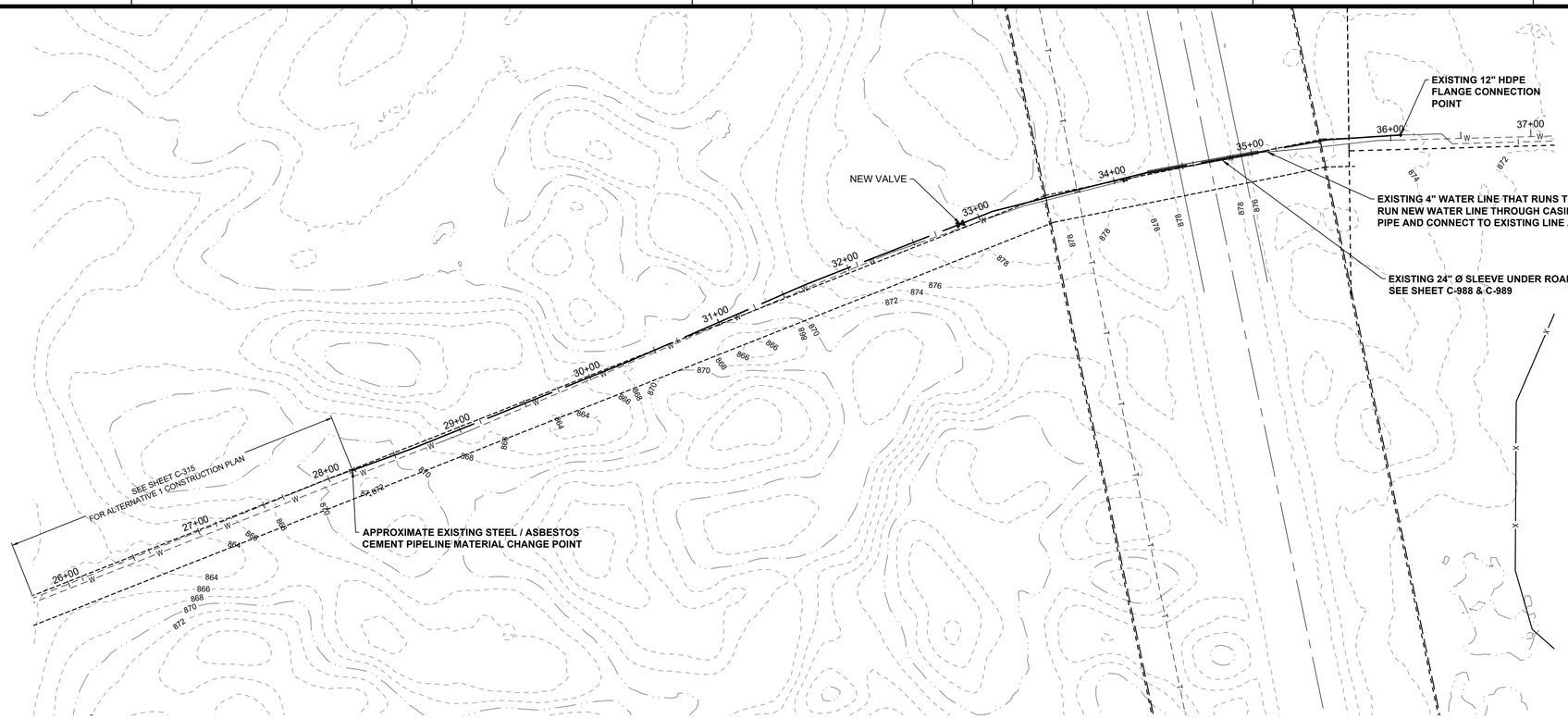
SHEET TITLE

IRRIGATION PIPELINE PLAN & PROFILE - II

C-311

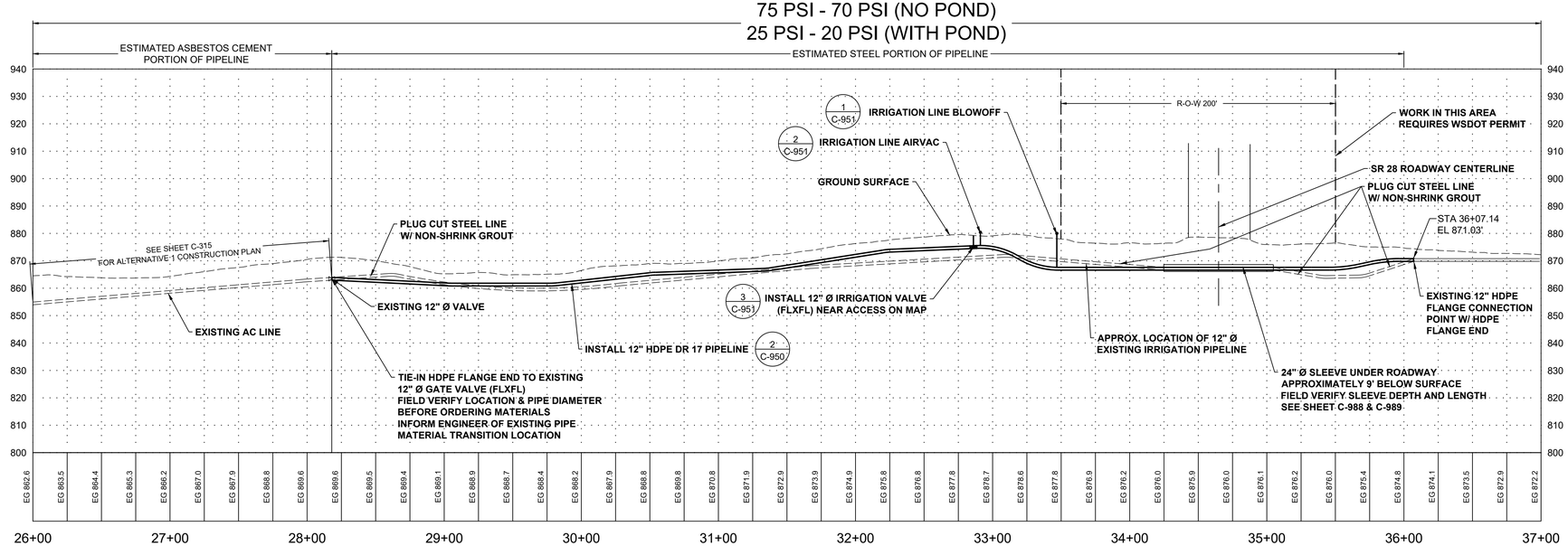
SHEET 7 OF 16 SHEETS

FILE: M:\jobs2021\20210257.0000\Dwg\Final\20210257.0000-E2 Pipeline 24.dwg PLOT DATE: February 28, 2023, 3:01 PM ORIGINAL PAPER SIZE: 22" x 34"



PIPELINE PLAN 26+00 TO 37+00

SCALE: 1" = 50'



PIPELINE PROFILE 26+00 TO 37+00

SCALE: HORZ: 1" = 50' / VERT: 1" = 25'

BID SET

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WSU SUNRISE ORCHARD

INSTALL IRRIGATION MAINLINE

FACILITY NO. 3300

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SHEET TITLE

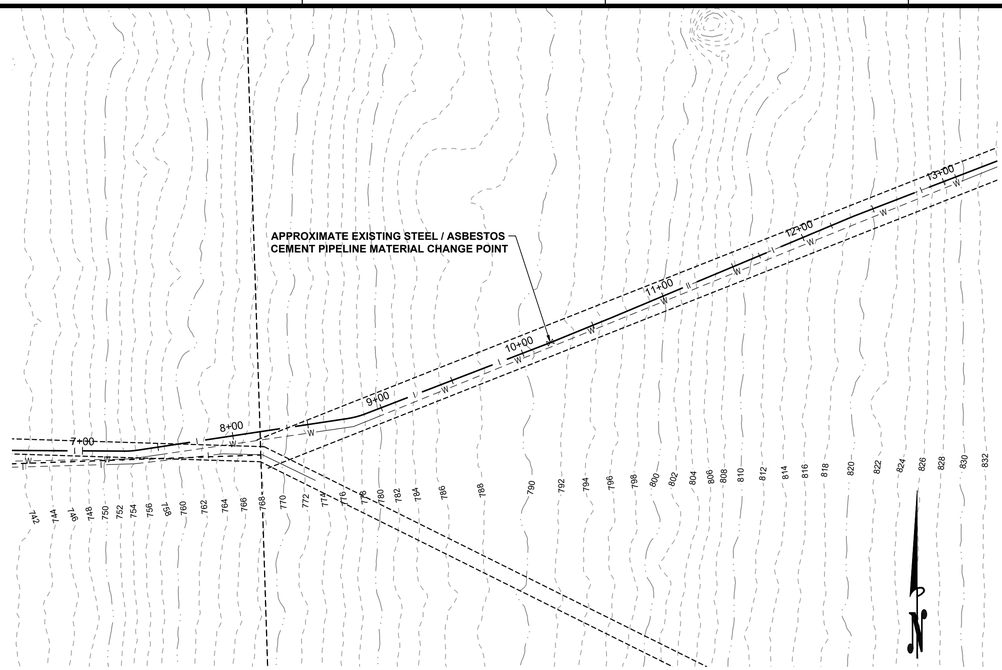
IRRIGATION PIPELINE PLAN & PROFILE - III

C-312

SHEET 8 OF 16 SHEETS

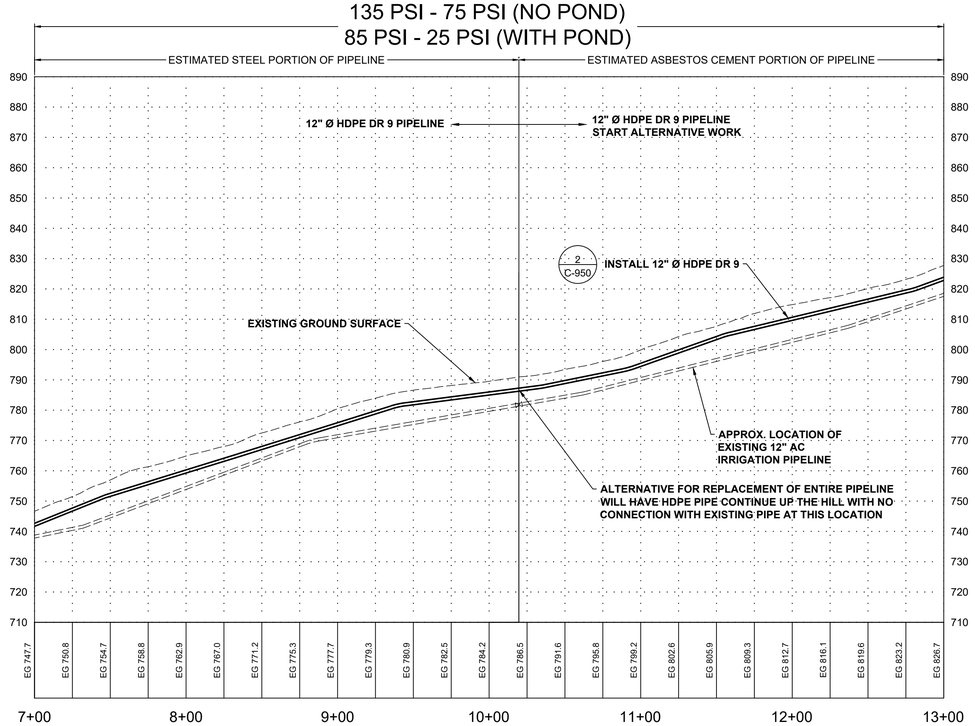
FILE: M:\jobs2021\20210257.0000\Dwg\Final\20210257.0000-E2 Pipeline 24.dwg PLOT DATE: February 28, 2023, 3:01 PM ORIGINAL PAPER SIZE: 22" x 34"

CONTINUATION SHEET C-310



PIPELINE PLAN 0+00 TO 13+00

SCALE: 1" = 50'



PIPELINE PROFILE 0+00 TO 13+00

SCALE: HORZ: 1" = 50' / VERT: 1" = 25'

BID SET

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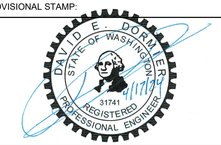

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WSU SUNRISE ORCHARD

INSTALL IRRIGATION MAINLINE
BID ALTERNATE 1

FACILITY NO. 3300

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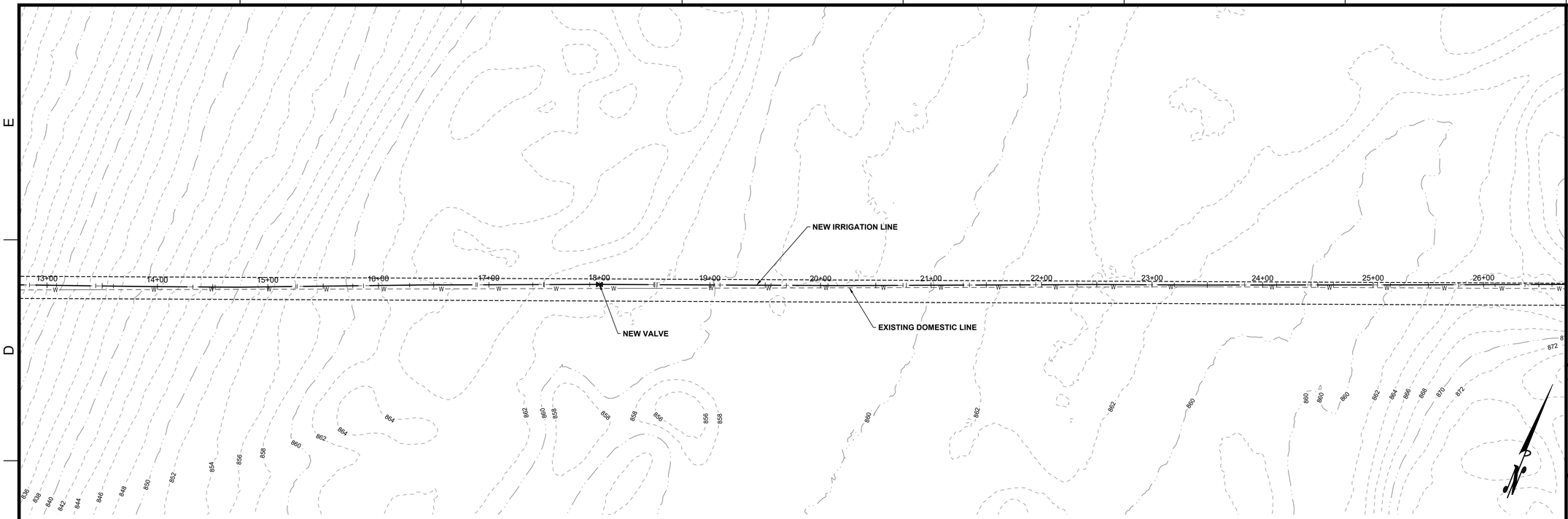
SHEET TITLE

IRRIGATION PIPELINE
PLAN & PROFILE - A I

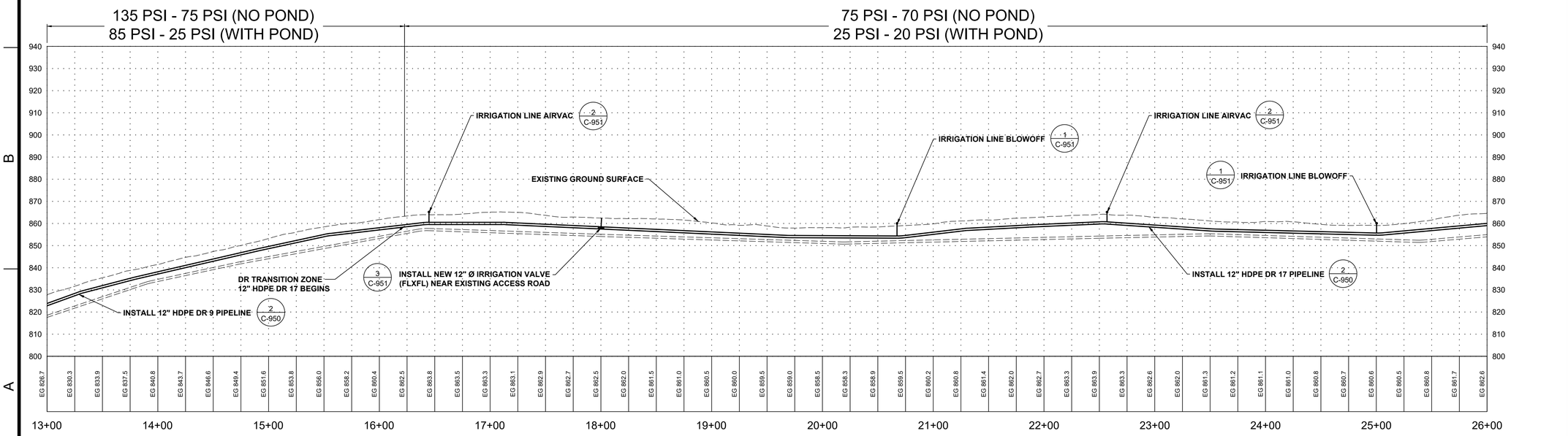
C-313

SHEET 9 OF 16 SHEETS



PIPELINE PLAN 13+00 TO 27+00

SCALE: 1" = 50'



PIPELINE PROFILE 13+00 TO 27+00

SCALE: HORZ: 1" = 50' / VERT: 1" = 25'

BID SET

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WSU SUNRISE ORCHARD

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BID ALTERNATE 1

FACILITY NO. 3300

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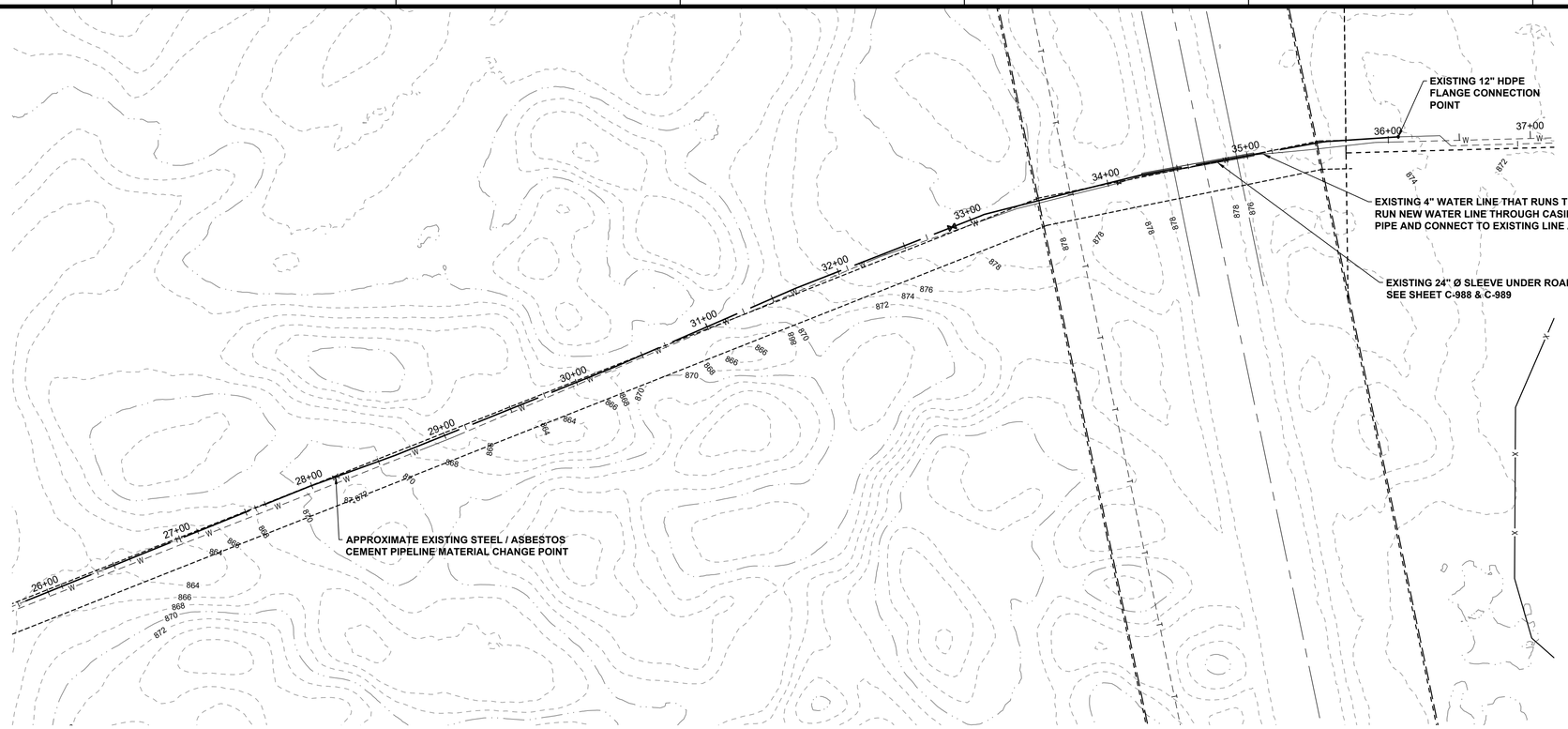
SHEET TITLE

IRRIGATION PIPELINE
PLAN & PROFILE - A II

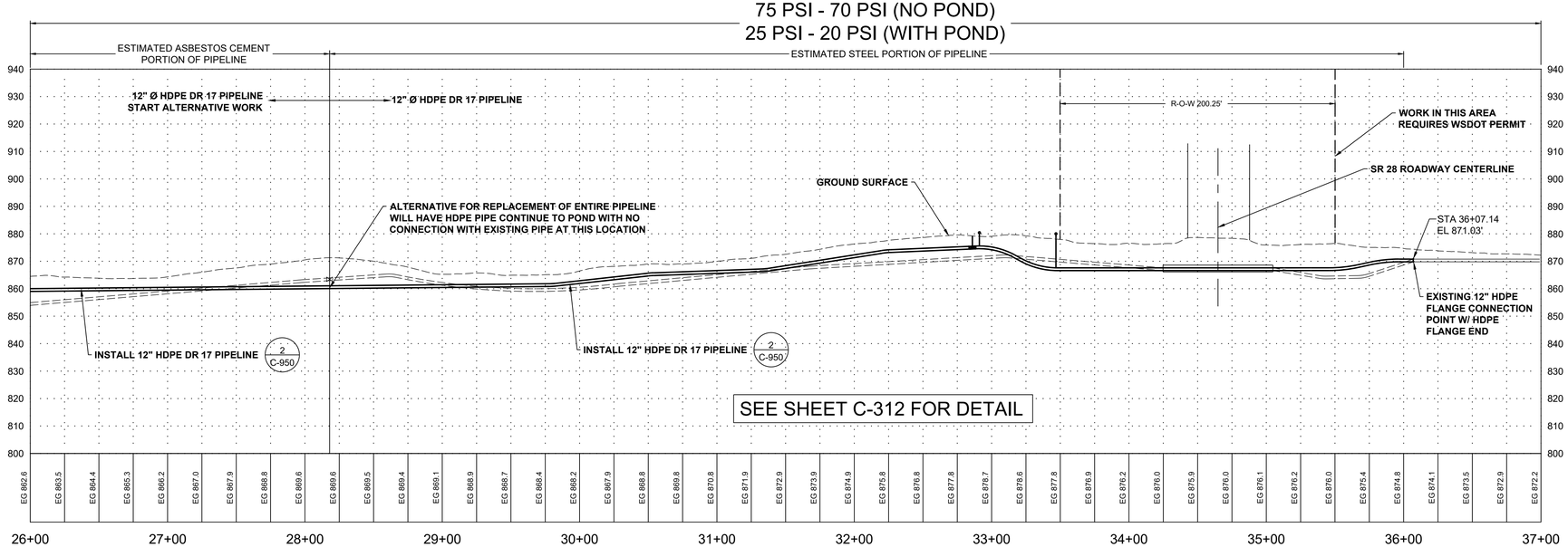
C-314

SHEET 10 OF 16 SHEETS



PIPELINE PLAN 26+00 TO 37+00

SCALE: 1" = 50'



SEE SHEET C-312 FOR DETAIL

PIPELINE PROFILE 26+00 TO 37+00

SCALE: HORZ: 1" = 50' / VERT: 1" = 25'

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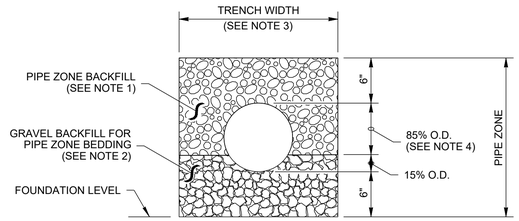
SHEET TITLE

IRRIGATION PIPELINE PLAN & PROFILE - A III

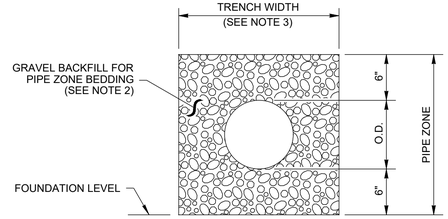
C-315

SHEET 11 OF 16 SHEETS

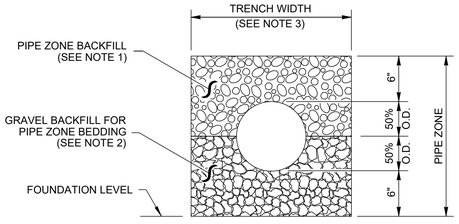
FILE: M:\1jobs\2021\20210257.0000\Dwg\Final\20210257.0000-E2 Pipeline 24.dwg PLOT DATE: February 28, 2023, 3:01 PM ORIGINAL PAPER SIZE: 22" x 34"



CONCRETE AND DUCTILE IRON PIPE



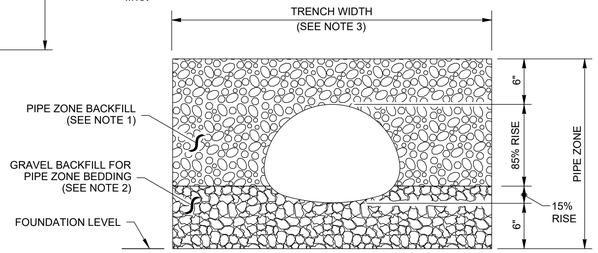
THERMOPLASTIC PIPE



METAL PIPE

NOTES

1. See Standard Specifications Section 7-08.3(3) for Pipe Zone Backfill.
2. See Standard Specifications Section 9-03.12(3) for Gravel Backfill for Pipe Zone Bedding.
3. See Standard Specifications Section 2-09.4 for Measurement of Trench Width.
4. For sanitary sewer installation, concrete pipe shall be bedded to spring line.



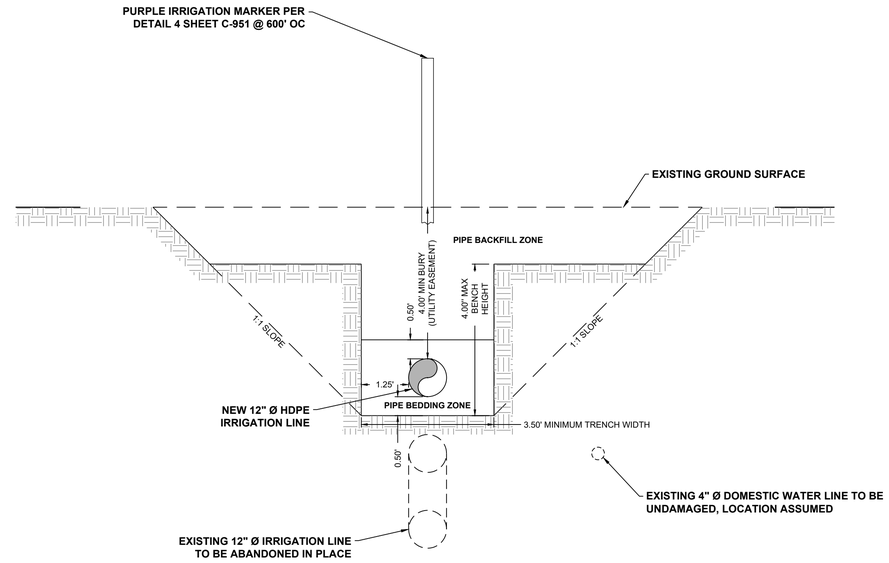
PIPE ARCHES

CLEARANCE BETWEEN PIPES FOR MULTIPLE INSTALLATIONS		
PIPE	SIZE	MINIMUM DISTANCE BETWEEN BARRELS
CIRCULAR PIPE (DIAMETER)	12" to 24"	12"
	30" to 96"	DIAM. /2
	102" to 180"	48"
PIPE ARCH (SPAN) METAL ONLY	18" to 36"	12"
	43" to 142"	SPAN /3
	148" to 200"	48"

1 PIPE ZONE BEDDING AND BACKFILL

NOT TO SCALE

WSDOT STD PLAN B55.20-00



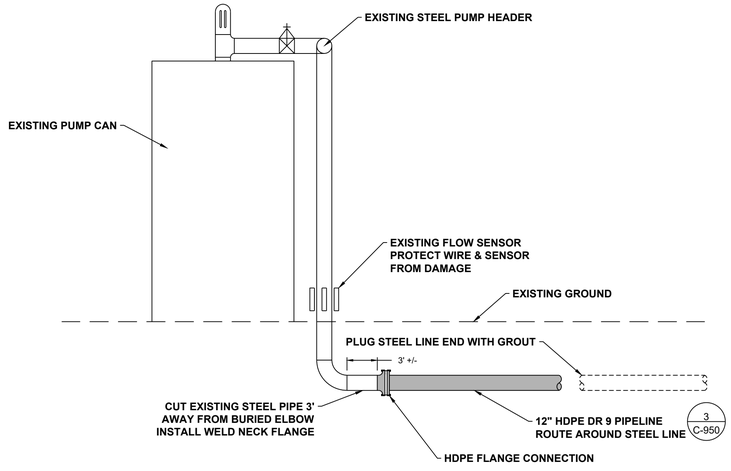
NOTES:

- PIPE BEDDING & BACKFILL PER DETAIL 1 THIS SHEET.
- DURING EXCAVATION, IF EXISTING IRRIGATION OR WATER LINE IS EXPOSED, THE NEW IRRIGATION LINE IS TO BE ROUTED AROUND THE EXISTING LINES SO THEY MAY BE LEFT IN PLACE.
- ALL WORK TO COMPLY WITH WAC 296-155 CONSTRUCTION WORK.
- DETAIL SHOWS WAC 295-155 PART N EXCAVATION, TRENCH, AND SHORING FIGURE N-8 TYPE B SLOPE CONFIGURATION. CAN USE FIGURE N-10 TRENCH SHIELD CONFIGURATION AS WELL.

2 TRENCH CORRIDOR CONSTRUCTION - CONDITION C

WAC 296-155 TYPE B SLOPE CONFIGURATION (50CF/FT)

NOT TO SCALE



3 IRRIGATION PUMP CAN CONNECTION

NOT TO SCALE

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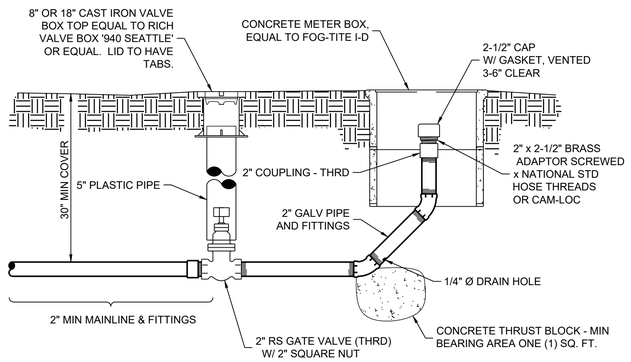
SHEET TITLE

IRRIGATION PIPELINE DETAILS - I

C-950

SHEET 12 OF 16 SHEETS

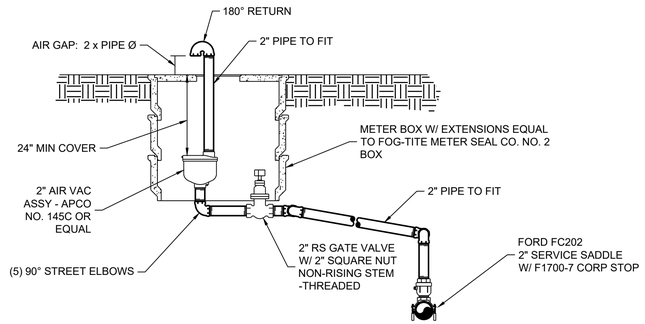


PROFILE

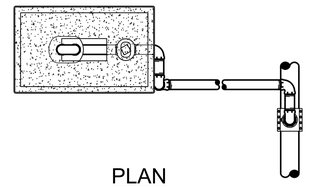
1 C-311 **BLOW-OFF DETAIL**

NOT TO SCALE

NOTE:
AIR & VACUUM VALVE ASSEMBLY MUST BE INSTALLED AT HIGHEST POINT OF LINE. IF HIGH POINT FALLS IN A LOCATION WHERE ASSEMBLY CANNOT BE INSTALLED, PROVIDE ADDITIONAL DEPTH OF LINE TO CREATE HIGH POINT AT A LOCATION WHERE ASSEMBLY CAN BE INSTALLED.



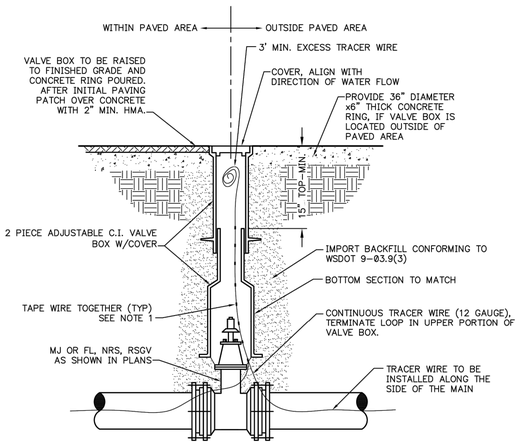
PROFILE



PLAN

2 C-311 **AIR-VAC DETAIL**

NOT TO SCALE

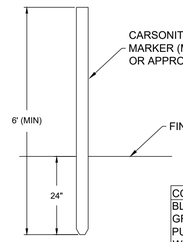


NOTES:

1. TRACER WIRE LOOP TO BE TAPED TOGETHER INSIDE OF THE VALVE BOX EVERY 6 INCHES.
2. PROVIDE 3' OF CLEAR SPACE AROUND VALVE BOX FOR OPERATION.

3 C-311 **GROUND GATE VALVE DETAIL**

NOT TO SCALE



MARKER POST

UTILITY MARKER COLORS

COLOR	MARKER POST USED FOR:
BLUE	POTABLE WATER
GREEN	SEWER/DRAIN LINES
PURPLE	RECLAIMED WATER/IRRIGATION/SLURRY LINES
WHITE	GENERAL PURPOSE
RED	ELECTRIC POWER LINES
PINK	TEMPORARY SURVEY MARKINGS
YELLOW	GAS/OIL/STEAM
ORANGE	COMM LINES/CABLE/CONDUIT

NOTES:

1. EASEMENT/UTILITY MARKER POST SHALL BE INSTALLED WHERE CALLED FOR ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
2. POST SHALL INCORPORATE 1" HIGH LETTERING BRANDED/BURNED INTO THE PADDLE. LETTERING SHALL INCLUDED THE AGENCY OF JURISDICTION ALONG WITH THE UTILITY IDENTIFIED. THE COLOR SHALL BE AS SHOWN ABOVE.
3. INSTALL OVER CENTERLINE OF UTILITY UNLESS NOTED OTHERWISE.
4. EACH POST TO HAVE A SAME COLOR DECAL WITH VERTICAL LETTERS STATING "CAUTION (LINE TYPE) PIPELINE" AND 811 CALL BEFORE YOU DIG INSTRUCTIONS.

4 C-950 **UTILITY MARKER POSTS**

NOT TO SCALE

BID SET

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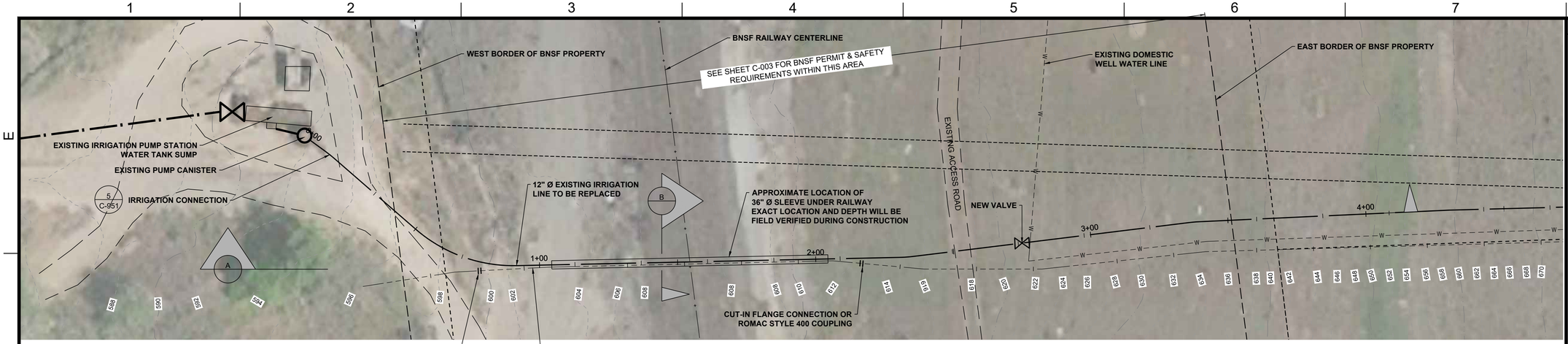
SHEET TITLE

IRRIGATION PIPELINE DETAILS - II

C-951

SHEET 13 OF 16 SHEETS

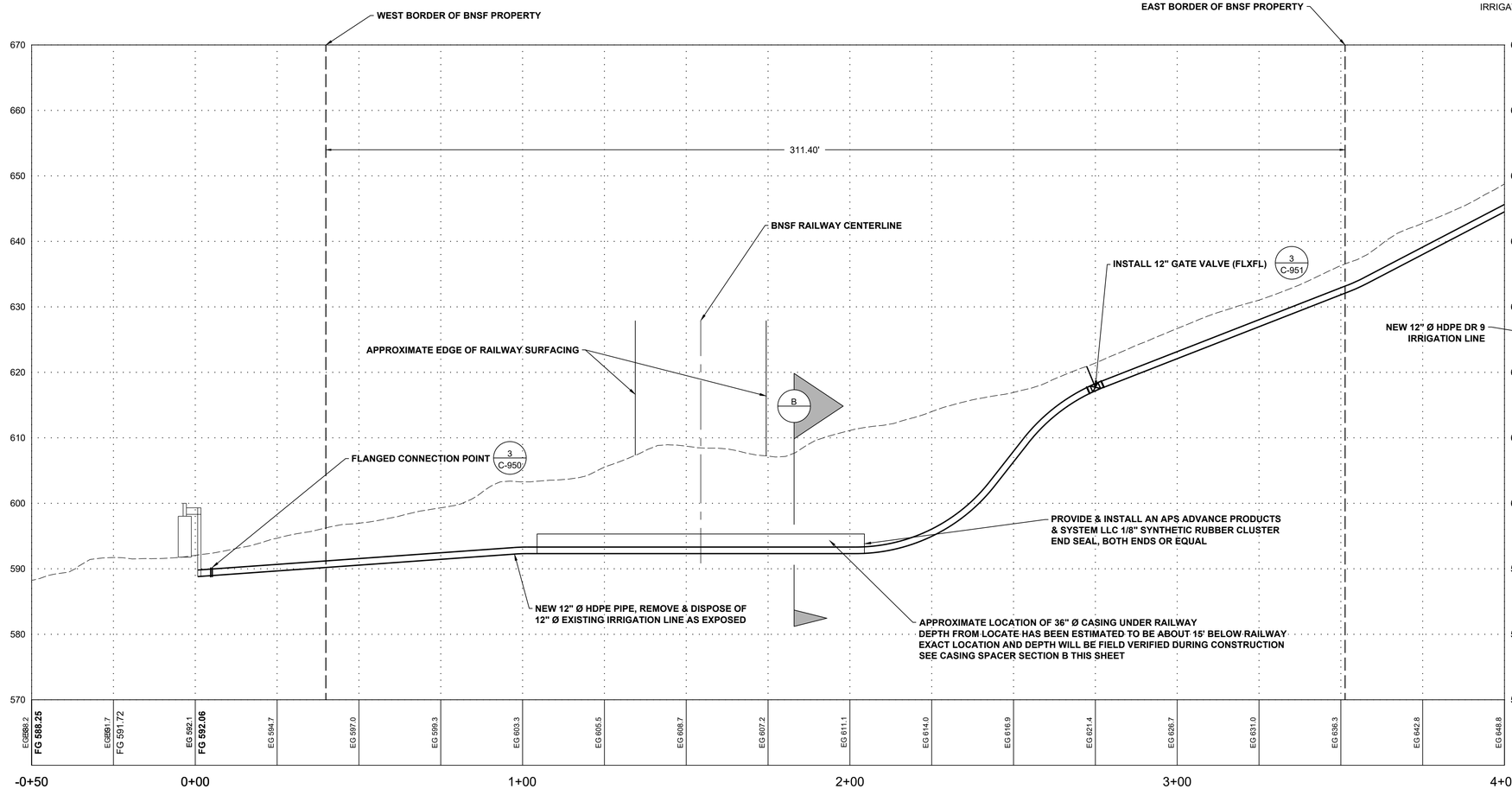


BNSF PROFILE

SCALE: 1" = 20'

NOTE:
CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH BNSF PER THEIR STANDARDS & PERMIT REQUIREMENTS AS PARTIALLY LISTED ON SHEET C-003 FOR ALL WORK WITHIN & AROUND BNSF PROPERTY.

PRIOR TO START OF WORK FIELD LOCATE AND POTHOLE EXISTING CASING ENDS. CASING SIZE & EXISTING CASING SPACER TO BE VERIFIED AND VERIFY LINE SIZE AND SCHEDULE FOR NELSON IRRIGATION LINE REPLACEMENT.



B **CASING SPACER**
NOT TO SCALE

A **BNSF PROFILE**
SCALE: HORZ: 1" = 20' / VERT: 1" = 10'

BID SET

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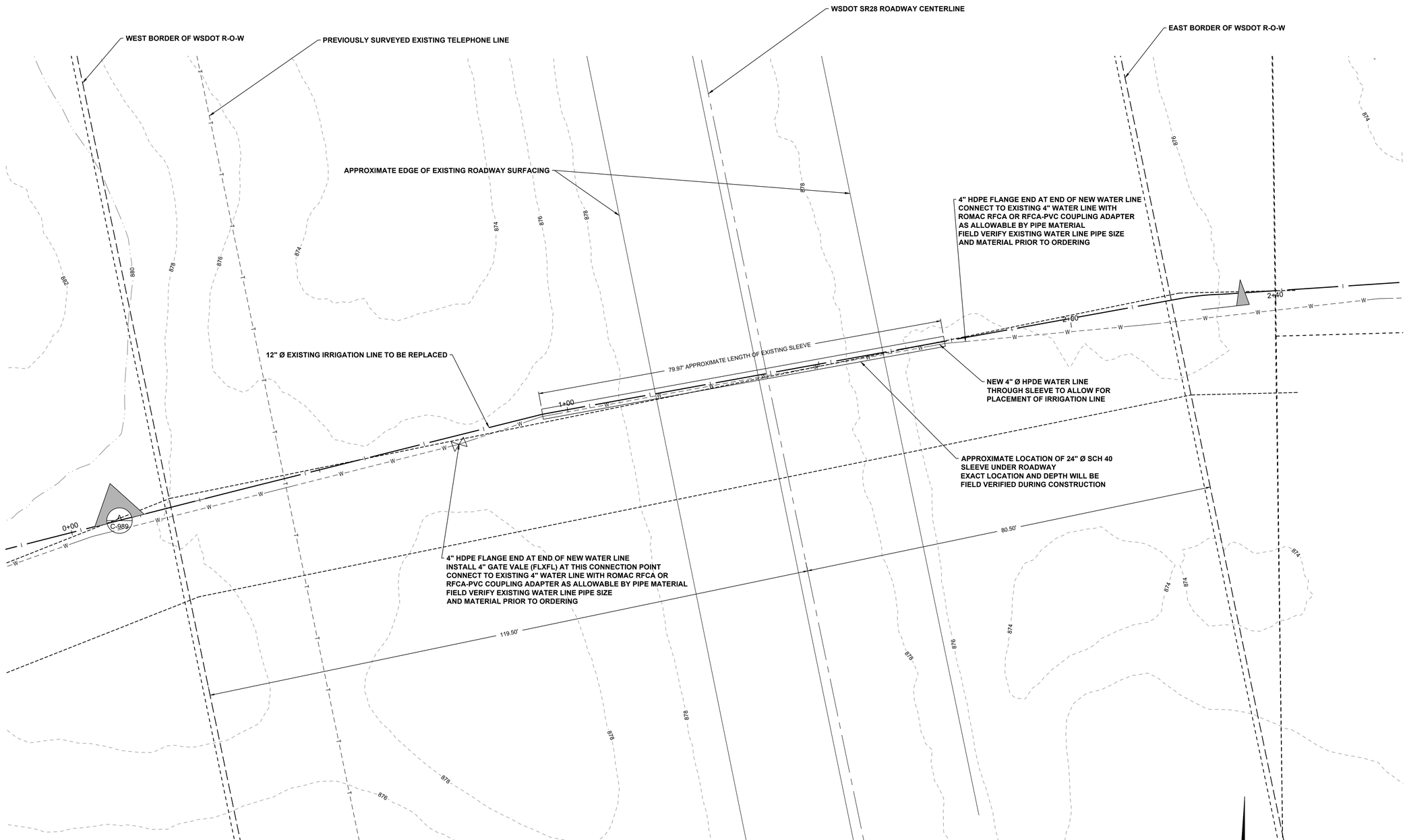
SHEET TITLE

BNSF PLAN & PROFILE

C-987

SHEET 14 OF 16 SHEETS

FILE: M:\1jobs\20211\20210257.0000\Dwg\Final\20210257.0000-E2 Pipeline 24.dwg PLOT DATE: February 28, 2023, 3:01 PM ORIGINAL PAPER SIZE: 22" x 34"



1 C-320 **SR-28 SLEEVE UNDER-CROSSING**

NOTES:

CONTACT WSDOT NORTH DISTRICT FOR UTILITY PERMIT COORDINATION & REQUIREMENT PHONE: (360)-705-7000 CONTRACTOR TO OBTAIN AND COORDINATE PERMIT

PRIOR TO START OF WORK FIELD LOCATE AND POTHOLE EXISTING CASING ENDS. CASING SIZE & EXISTING CASING SPACER TO BE VERIFIED AND VERIFY LINE REPLACEMENT AND SCHEDULE.

0 10 20
SCALE IN FEET
NOTE: SCALE BAR IS ESTABLISHED FOR FULL SIZE WITH SCALE BAR EQUAL TO 2"

BID SET

DESIGN FIRM:

Erlandsen
SURVEYING | PLANNING | ENGINEERING

ERLANDSEN
250 SIMON ST. SE
EAST WENATCHEE, WA 98802

PH: 509.884.2562
TOLL FREE (800) 732-7442

http://www.erlandsen.com

PROVISIONAL STAMP:

DAVID E. DORMEIER
STATE OF WASHINGTON
31741
REGISTERED
PROFESSIONAL ENGINEER

WASHINGTON STATE UNIVERSITY

Facilities Services
225 SE Idaho Street
Pullman, Wa. 99164-3611

PH 509-335-5571
FAX 509-335-6875

WSU SUNRISE ORCHARD

INSTALL IRRIGATION MAINLINE

FACILITY NO. 3300

MARK	DATE	DESCRIPTION
	04/04/24	BID SET

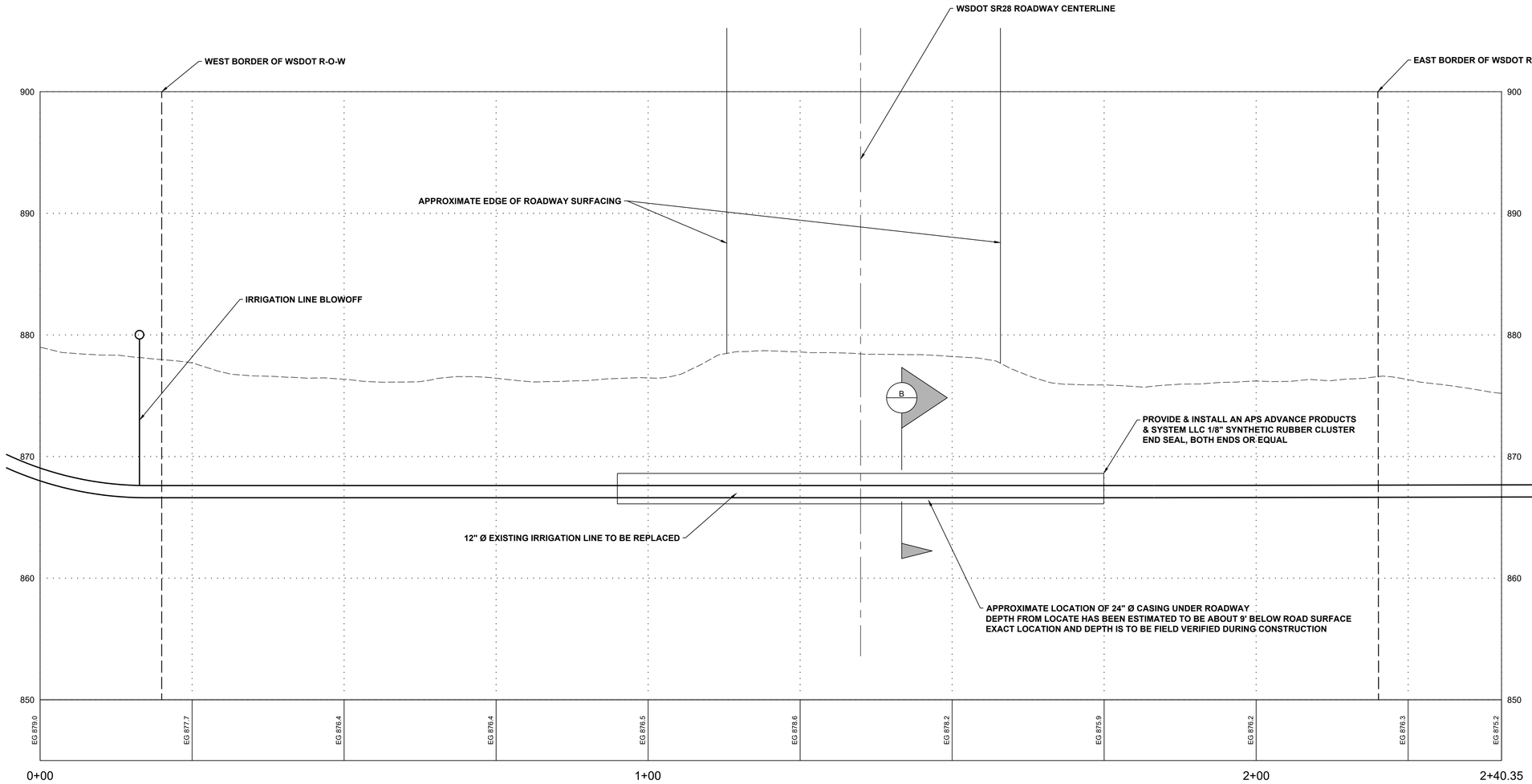
CAD DWG FILE: 20210257.0000-E2 Pipeline 24.dwg	
DESIGN BY: DD	
DRAWN BY: NM	CHECKED BY: DD
PROJECT No. 2233-2024	FILE No. 3300-G-003
COPYRIGHT: WASHINGTON STATE UNIVERSITY	

SHEET TITLE

WSDOT PLAN

C-988

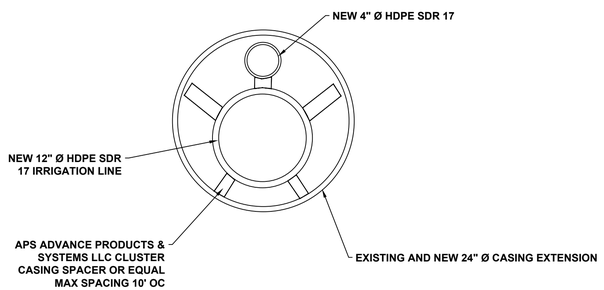
SHEET 15 OF 16 SHEETS



A SR 28 WSDOT PROFILE

SCALE: HORZ: 1" = 10' / VERT: 1" = 5'

NOTE: PRIOR TO START OF WORK FIELD LOCATE AND POTHOLE EXISTING CASING ENDS. CASING SIZE & EXISTING CASING SPACER TO BE VERIFIED AND VERIFY LINE REPLACEMENT AND SCHEDULE.



B CASING SPACER

NOT TO SCALE

BID SET

DESIGN FIRM:

Erlandsen
SURVEYING | PLANNING | ENGINEERING

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250 SIMON ST. SE
EAST WENATCHEE, WA 98802

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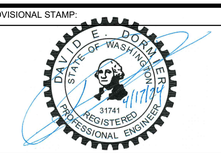
PROVISIONAL STAMP



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SHEET TITLE

WSDOT PROFILE

C-989

SHEET 16 OF 16 SHEETS