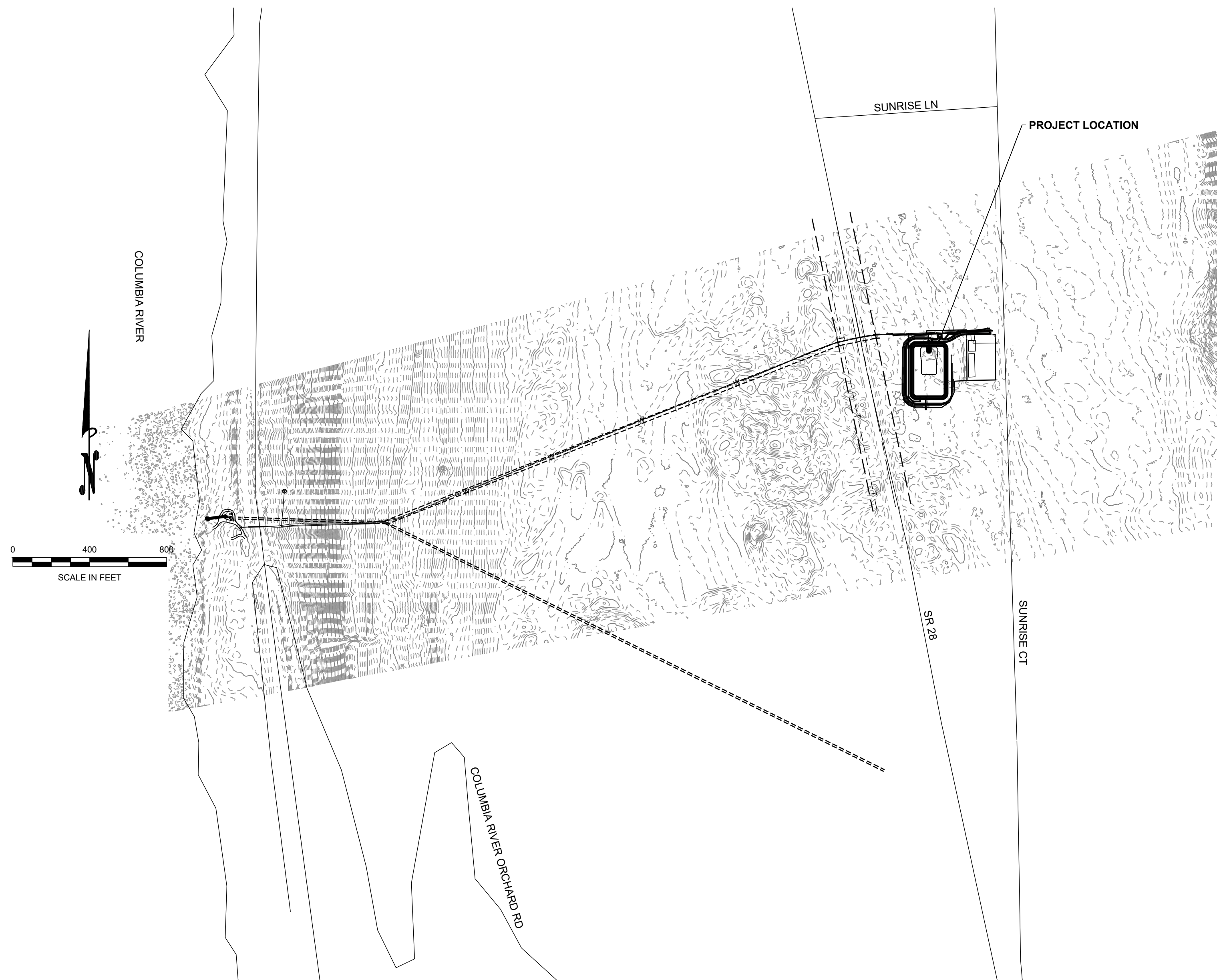


WSU SUNRISE ORCHARD IRRIGATION LINE AND POND

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



CONTACT

ADAM FERRY
110 9TH AVE SW
PUYALLUP, WA 98371
(509) 335-9028

ENGINEER

ERLANDSEN
DAVE DORMIER, PE
250 SIMON STREET
EAST WENATCHEE, WA 98802
(509) 884-2562

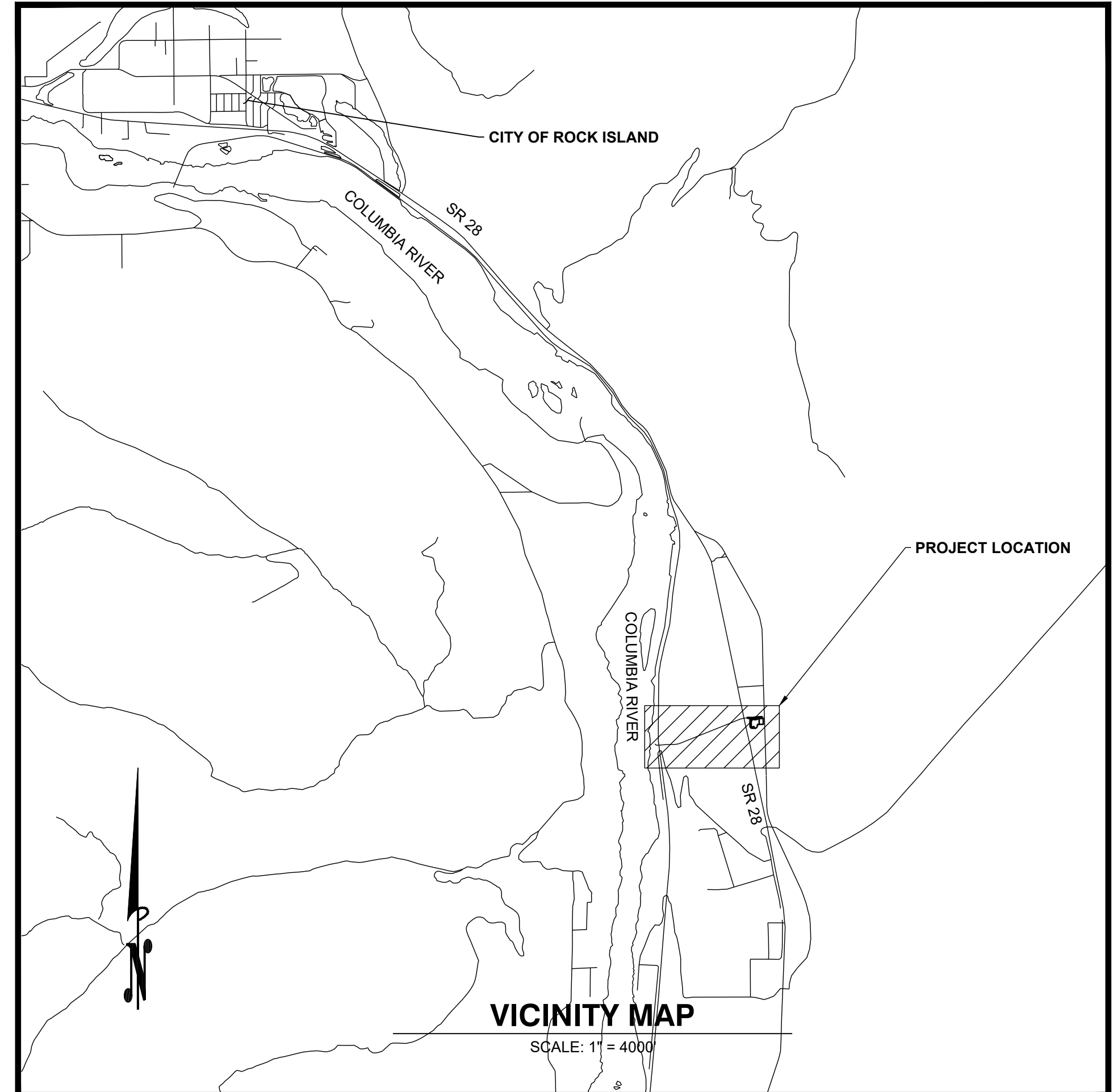
DOUGLAS COUNTY SHALL NOT BE RESPONSIBLE FOR THE MAINTENANCE OF ROADWAY AND APPURTENANT IMPROVEMENTS, INCLUDING STORM DRAINAGE STRUCTURES AND PIPES, FOR THE FOLLOWING PRIVATE ROADS: JOINT USE DRIVEWAY.

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 Number	Sheet Title
C-000	COVER
C-001	LEGEND
C-002	CIVIL NOTES
C-300	SITE PLAN
C-320	POND SITE PLAN
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C-351	POND SECTIONS
C-315	IRRIGATION POND DETAILS - II
C-950	IRRIGATION PIPELINE DETAILS-I
C-951	IRRIGATION PIPELINE DETAILS-II
C-990	CROP AREA PLAN

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



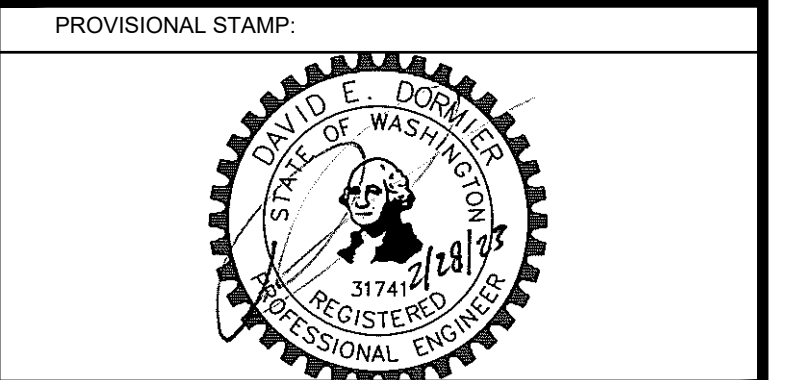
THESE PLANS HAVE BEEN REVIEWED BY DOUGLAS COUNTY DEPARTMENT OF TRANSPORTATION AND LAND SERVICES AND HAVE BEEN ACCEPTED FOR COMPLYING WITH THE REQUIREMENTS OF DOUGLAS COUNTY ROAD STANDARDS. THESE PLANS ARE VALID FOR THREE YEARS FROM THE ACCEPTANCE DATE.

COUNTY ENGINEER _____ DATE _____

BID SET



ERLANDSEN
250 SIMON ST. SE
EAST WENATCHEE, WA 98802
PH: 509.884.2562
TOLL FREE (800) 732-7442
<http://www.erlandsen.com>



Facilities Services PH 509-335-5571
225 SE Idaho Street FAX 509-335-6875
Pullman, Wa. 99164-3611

WSU SUNRISE ORCHARD

NEW IRRIGATION POND AND PUMP SYSTEM

FACILITY NO. 3300

MARK	DATE	DESCRIPTION
	02/28/23	BID SET

CAD DWG FILE: 20210257.0000-E2 Pump & Pond 23.dwg
DESIGN BY: DD
DRAWN BY: NM CHECKED BY: DD
PROJECT No. 1262-2020 FILE No. 3300-G-001
COPYRIGHT: WASHINGTON STATE UNIVERSITY

SHEET TITLE
COVER

C-000
SHEET 1 OF 11 SHEETS

FILE: M:\jobs\2021\10257.0000\Drawings\Final\20210257.0000-E2 Pump & Pond 23.dwg PLOT DATE: February 28, 2023, 3:01 PM ORIGINAL PAPER SIZE: 22" x 34"

FILE: M:\Jobs\2021\10257.00000\Drawings\20210257.0000-E2 Pump & Pond 23.dwg PLOT DATE: February 28, 2023, 3:01 PM ORIGINAL PAPER SIZE: 22" x 34"

EXISTING	PROPOSED	EXISTING
		Ⓣ TELEPHONE MANHOLE
		Ⓜ TELEPHONE PEDESTAL
		Ⓞ GAS MANHOLE
		Ⓧ GAS VALVE
		Ⓝ GAS METER
		Ⓠ GAS RISER
		Ⓟ ELECTRICAL MANHOLE
		Ⓟ ELECTRICAL VAULT CENTER
		Ⓡ ELECTRICAL TRANSFORMER
		Ⓢ ELECTRICAL OUTLET
		Ⓣ ELECTRICAL HANDHOLE
		Ⓤ ELECTRICAL METER
		Ⓥ TV MANHOLE
		Ⓦ TV PEDESTAL
		Ⓧ TV POLE
		Ⓨ WATER MANHOLE
		Ⓩ WATER VALVE
		ⓐ WATER BLOWOFF
		ⓑ WATER METER
		ⓓ FIRE HYDRANT
		ⓔ WELL
		Ⓠ IRRIGATION MANHOLE
		Ⓡ IRRIGATION AIR RELEASE
		Ⓢ IRRIGATION RISER
		Ⓣ IRRIGATION VALVE
		Ⓤ FIBER OPTIC MANHOLE
		Ⓧ 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

ABBREVIATIONS	
AAF	AVERAGE ANNUAL FLOW
AB	ANCHOR BOLT
AC	ASPHALT CONCRETE
ACP	ACOUSTIC PANEL
ADJ	ADJUSTABLE
AFN	ABOVE FINISHED FLOOR
AFN	AUDITOR FILE NUMBER
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
ALTR	ALTERNATE
ALUM	ALUMINUM
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
AP	ACCESS PANEL
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS
ASPH	ASPHALT
ASTM	AMERICAN SOCIETY OF TESTING AND MATERIALS
ASSY	ASSEMBLY
AVE	AVENUE
BI	BLACK IRON
BLD FLG	BLIND FLANGE
BLDG	BUILDING
BLK	BLOCK
BLKING	BLOCKING
BOD	BOTTOM OF DUCT, BIOCHEMICAL OXYGEN DEMAND
BOT	BOTTOM
BOW	BOTTOM OF WALL
BRM	BRIDGE
BTWN	BETWEEN
BVC	BEGIN VERTICAL CURVE
C	CONDUIT
CAP	CORRUGATED ALUMINUM PIPE
CB	CATCH BASIN
CCP	CONCRETE CYLINDER PIPE
CD	CEILING DIFFUSER
CDF	CONTROLLED DENSITY FILL
CFM	CUBIC FEET PER MINUTE
CI	CAST IRON
CL	CLASS
CLAR	CLARIFIER
CL	CENTER LINE
CLR	CLEARANCE
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CO	CLEANOUT
CONC	CONCRETE
CONN	CONNECTION
CONT	CONTRACTOR, CONTINUOUS
CONV	CONVEYOR
CPLG	COUPLING
CONTIN	CONTINUED
CP	CORNER POST
CPEP	CORRUGATED POLYETHYLENE PIPE
CSBS	CRUSHED SURFACING BASE COURSE
CSH	CONCRETE SURFACE HARDENER
CSTC	CRUSHED SURFACING TOP COURSE
CTR	CENTER
CU	COPPER
CX	CONNECT TO EXISTING
D	DRAIN
DI	DUCTILE IRON
DIA	DIAMETER
DIR	DIRECTION
DISCH	DISCHARGE
DIV	DIVISION
DN	DOWN
DO	DISSOLVED OXYGEN
DP	DIFFERENTIAL PRESSURE
E	EAST
EA	EACH
ECC	ECCENTRIC
EFF	EFFLUENT
EG	EXISTING GRADE
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FCO	FLOOR CLEANOUT
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FIG	FIGURE
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HMA	HOT MIX ASPHALT
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HR	HOUR
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IE	INVERT ELEVATION
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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 RATIO IS 100X THE PIPE'S OUTSIDE DIAMETER (OD), WHEN A FITTING OR FLANGE CONNECTION IS PRESENT IN THE BEND, THE BEND RATIO 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 RATIO, DR MINIMUM COLD BEND RADIUS

FIELD BENDING INVOLVES EXCAVATING THE TRENCH TO THE DESIRED BEND RADIUS, THEN SWEEPING OR PULLING THE PIPE STRINGS 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 BEND THE PIPE, AND THE PIPE SYSTEM THE SPRING BACK FORCEFULLY 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 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 PROPORTION 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 TRANSITION 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 (3.000" 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 THE CODES AND STANDARDS APPLICABLE TO THE PE 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: CLEAN, CLAMP AND ALIGN THE PIPE ENDS TO BE JOINED FACE THE PIPE ENDS TO ESTABLISH CLEAN, PARALLEL SURFACES, PERPENDICULAR TO THE CENTER LINE ALIGN THE PIPE ENDS MELT THE PIPE INTERFACES JOIN THE TWO PIPE ENDS TOGETHER BY APPLYING THE PROPER FUSION FORCE 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.

POND LINER SUBGRADE PREPARATION NOTES:

THE INTEGRITY OF A LINING SYSTEM DEPENDS LARGELY ON THE CONDITION OF THE PREPARED SUBGRADE HDPE LINER ON SLOPED HILL. FOR SUBGRADE PREPARATION

EARTHWORKS CAN BE USED TO SUPPORT, COVER, PROTECT, DRAIN AND SEPARATE COMPONENTS OF A GEOSYNTHETIC LINING SYSTEM. ONE OF THE MOST CRITICAL EARTHWORKS FOR LINING SYSTEMS IS THE PREPARED SUBGRADE, SINCE IT FORMS THE FOUNDING SURFACE FOR THE LINING SYSTEM. THE SHORT AND LONG TERM INTEGRITY OF THE LINING SYSTEM DEPENDS ON THE CONDITION OF THE PREPARED SUBGRADE. THIS TECH NOTE DISCUSSES SOME KEY ITEMS TO CONSIDER WHEN EVALUATING THE ACCEPTABILITY OF A PREPARED SUBGRADE.

MOST SOIL MATERIALS CAN BE USED IN A PREPARED SUBGRADE. BOTH LOCALLY AVAILABLE FILL MATERIALS AS WELL AS IMPORTED PROCESSED MATERIALS CAN BE USED. FINE GRAINED, NON-COHESIVE SOILS, SUCH AS SAND OR SILTY SAND AND MOST COHESIVE SOILS, SUCH AS CLAYEY-SILT GLACIAL TILL, CAN BE USED AS SUBGRADE CONSTRUCTION MATERIALS.

THE PREPARED SURFACE SHOULD BE UNIFORM, WELL COMPACTED, AND FREE OF SHARP ROCK FRAGMENTS OR STONES, LARGE STONES AND OTHER DELETERIOUS MATTER SUCH AS TREE ROOTS, CONSTRUCTION DEBRIS AND METALLIC OBJECTS. THE SURFACE SHOULD NOT HAVE ANY NATURAL OR FOREIGN OBJECT THAT PROTRUDES ABOVE THE SURFACE OF THE SUBGRADE.

IN A NUMBER OF INSTANCES, THE LOCALLY AVAILABLE SOURCE OF FILL IS LIMITED TO COARSE GRAINED, NON-COHESIVE SOIL SUCH AS PIT RUN GRAVEL. IN ADDITION, SOMETIMES THE AREA TO BE LINED LIES WITHIN A COARSE GRAINED DEPOSIT. ALTHOUGH THESE MATERIALS CAN BE GRADED AND COMPACTED TO A UNIFORM AND LEVEL SUBGRADE SURFACE, THIS SURFACE SHOULD RECEIVE FURTHER TREATMENT BY THE APPLICATION OF A FINER MATERIAL, SUCH AS SAND, TO FORM A CUSHION OR BEDDING FOR THE LINING SYSTEM. THE BEDDING MATERIAL SHOULD BE A MINIMUM OF 150 MM (6") THICK AND SHOULD BE COMPACTED. THIS BEDDING THICKNESS MAY HAVE TO BE INCREASED DEPENDING ON LOCAL SITE CONDITIONS. WHERE BEDDING SAND IS NOT AVAILABLE, A NON-VOYON GEOTEXTILE MAY BE USED AS AN ALTERNATIVE.

FINE GRAINED, COHESIVE CLAY SOILS CAN ALSO BE USED AS A SUBGRADE CONSTRUCTION MATERIAL. NATIVE CLAYEY-SILT OR SILTY CLAY GLACIAL TILLS ARE OFTEN FOUND IN LINING SUBGRADES. THESE MATERIALS CAN BE WORKED, GRADED, COMPACTED AND TRIMMED TO CREATE A SMOOTH, LEVEL AND COMPETENT SURFACE. HOWEVER, ALL ANGULAR AND SHARP ROCKS OR STONES SHOULD BE REMOVED FROM THE SURFACE OR PICKED OUT OF THE PREPARED SUBGRADE. SMOOTH, ROUNDED STONES LESS THAN 50 MM (2") MAY REMAIN WITHIN THE PREPARED SUBGRADE. HOWEVER, THESE SHOULD BE DRIVEN INTO THE CLAY SUBGRADE BY APPLYING A COMPACTIVE EFFORT SO THAT THESE DO NOT PROTRUDE ABOVE THE FINISHED SURFACE. THE GENERAL RULE OF THUMB IS THAT ALL STONES AND ROCKS, REGARDLESS OF SHAPE AND SIZE, AND CLAY LUMPS THAT LIE ABOVE THE SUBGRADE SURFACE SHOULD BE REMOVED.

THE PREPARED SUBGRADE SHOULD BE COMPACTED IN ACCORDANCE WITH DESIGN SPECIFICATIONS AND STANDARD ENGINEERING PRACTICE. GENERALLY THIS MEANS THAT THE SUBGRADE SHOULD BE COMPACTED TO A MINIMUM 95% OF MAXIMUM DRY DENSITY ACCORDING TO THE STANDARD PROCTOR TEST (ASTM D698). THE DESIGN OF A PREPARED SUBGRADE SHOULD CAREFULLY CONSIDER LOAD BEARING REQUIREMENTS, THE AMOUNT OF SUBGRADE DEFORMATION EXPECTED, AND WHETHER OR NOT LOCAL DIFFERENTIAL SETTLEMENT MAY OCCUR. DEFORMATION OF A SUBGRADE BENEATH A LINING SYSTEM CAN RESULT IN EXCESSIVE STRESSES IN THE LINER MATERIAL, WHICH, IN TURN, MAY CAUSE THE LINING SYSTEM TO FAIL AND LEAK. AS A MINIMUM, THE SUBGRADE SHOULD BE FIRM AND UNYIELDING, AND SHOULD BE COMPACTED TO A LEVEL THAT PERMITS THE MOVEMENT OF CONSTRUCTION EQUIPMENT, LINER DEPLOYMENT EQUIPMENT, AND OTHER RELATED TRAFFIC WITHOUT CAUSING RUTTING AND/OR DEFORMATION OF THE SURFACE.

COMPACTION IS ESPECIALLY IMPORTANT AROUND PIPE PENETRATIONS AND CONCRETE APPURTENANCES. OFTEN THE PIPING IS ADDED AFTER THE EARTHWORKS ARE COMPLETED AND COMPACTION AROUND THE PIPING IS DONE BY A DIFFERENT METHOD THAN THAT OF THE OVERALL EARTHWORKS. THE USE OF DIFFERENT COMPACTION TECHNIQUES CAN LEAD TO DIFFERENTIAL SETTLEMENT AT THE PIPE PENETRATION WHICH CAN CAUSE LINING SYSTEM FAILURE.

FINAL GRADING AND THE FINISHED CONDITION OF THE PREPARED SUBGRADE IS ANOTHER IMPORTANT ISSUE. THE SURFACE SHOULD BE LEVELLED AND PREPARED TO A UNIFORM FINISH FREE OF ABRUPT OR SHARP CHANGES IN GRADE. THE FINISH SHOULD NOT INCLUDE DEPRESSIONS OR VOIDS OF ANY KIND AND SHOULD NOT BE RUTTED OR CONTAIN SOIL WINDROWS ALONG THE SURFACE. IN ADDITION, THE SURFACE SHOULD BE FREE OF FROST LUMPS AND ICE. THE USE OF A CUSHION OF BEDDING SAND OR A GEOTEXTILE CUSHION SHOULD BE CONSIDERED IF OTHER METHODS ARE NOT FEASIBLE. THE PREPARED SUBGRADE SHOULD ALSO BE SHAPED AND GRADED TO FACILITATE SURFACE DRAINAGE BOTH PRIOR TO, AND DURING THE INSTALLATION OF THE LINING SYSTEM.

CARE MUST BE TAKEN TO MAINTAIN THE PREPARED SUBGRADE FOLLOWING COMPLETION. VEHICULAR TRAFFIC ON THE COMPLETED SUBGRADE SHOULD BE LIMITED. MARKS OR RUTS LEFT IN THE SUBGRADE BY VEHICULAR TRAFFIC SHOULD BE REPAIRED AS SOON AS POSSIBLE. THE SUBGRADE SHOULD BE PROTECTED FROM DESICCATION, FLOODING AND FROST. STANDING WATER SHOULD BE REMOVED SO THAT THE EARTHWORK DOES NOT BECOME SATURATED (OR FROZEN IN COLD WEATHER). A FROZEN SUBGRADE, WHICH IS NOT UNSUITABLE IN ITSELF, CAN BE COVERED WITH A BEDDING LAYER IF THE REMOVAL OF SMALL FROST LUMPS IS NOT PRACTICAL. AGAIN A GEOTEXTILE CUSHION LAYER COULD BE USED TO CORRECT AN IMPERFECT SURFACE.

ON PROJECTS THAT INVOLVE THE LAYFIELD CONSTRUCTION GROUP, THE SUBGRADE WILL BE INSPECTED UPON ARRIVAL AT SITE. OUR PROJECT SUPERVISORS WILL INSPECT THE CONDITION OF THE SUBGRADE AND WILL ISSUE A "CERTIFICATE OF ACCEPTANCE OF SOIL SUBGRADE SURFACE" IF SUITABLE. CORRECTIVE ACTIONS AND ACTIVITIES TO MAINTAIN THE SUBGRADE IN A SUITABLE CONDITION FOR LINING (INCLUDING DEWATERING) ARE THE RESPONSIBILITY OF THE OWNER OR THE GENERAL CONTRACTOR.

IN SOME LOCATIONS A CLAY SUBGRADE CAN BE PREPARED AND COMBINED WITH A SYNTHETIC LINER TO CREATE A COMPOSITE LINING SYSTEM. WHEN A LOW PERMEABILITY SUBGRADE IS PLACED IN INTIMATE CONTACT WITH A GEOMEMBRANE, THEN THE COMBINATION OF THESE TWO COMPONENTS FORMS A COMPOSITE LINING SYSTEM. COMPOSITE LINERS ARE NOT DOUBLE LINERS. THE PURPOSE OF A COMPOSITE LINER IS TO COMBINE THE ADVANTAGES OF TWO MATERIALS, SUCH AS A GEOSYNTHETIC LINER AND COMPACTED CLAY SOIL, SO THAT THEY COMPLEMENT EACH OTHER. COMPOSITE LINERS ARE MORE EFFECTIVE IN REDUCING THE RATE OF LEAKAGE THAN EITHER A GEOSYNTHETIC OR A SOIL LINER ALONE.

ECOLOGICAL 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 EROSION 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 EROSIONITY FACTOR ("R" FACTOR) MUST BE LESS THAN 5 DURING THE PERIOD OF CONSTRUCTION ACTIVITY. AS CALCULATED (SEE THE CSWGP HOMEPAGE https://www.epa.gov/waters/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 EROSION 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 EROSION 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 EROSION 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 THESE FULL CONSTRUCTION SWPPP COVERAGE REQUIREMENTS.

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.

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

- 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.
7. 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.
8. WATTLERS ARE REQUIRED FOR SLOPES 2H:1V OR GREATER WHERE DISTURBED SLOPE LENGTH IS GREATER THAN 10' AS MEASURED PERPENDICULAR TO CONTOURS.

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.
TEMPORARY MEASURES
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 WINDING DURING WINDY CONDITIONS FOR A TEMPORARY PERIOD CAN BE USED. CHEMICAL STABILIZERS (EXTENDED ACTION) - ARE SIMILAR TO TEMPORARY BUT DIFFERENT APPLICATION 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.

PERMANENT MEASURES

- 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 OFF-ROAD MOTORIZED VEHICLES. COMMENT/RECOMMENDATIONS ON RESTRICTING ACCESS
• INSTALL CURB BUT NO DRIVEWAY RAMPS.
• 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.

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 COUNTY 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 STORMWATER 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.

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.

WOVEN WIRE ELK FENCE:

THIS FENCE IS RECOMMENDED WHERE A LONG-TERM SOLUTION TO ELK DAMAGE

TOTAL HEIGHT OF THE FENCE SHOULD BE AT LEAST 84 INCHES. USE WOODEN POSTS OF AT LEAST 10 FEET IN LENGTH AND AT LEAST 5 INCHES IN DIAMETER AT THE TOP FOR CORNERS. WOODEN POSTS WITH 3 INCH DIAMETER OR APPROPRIATE LENGTH #133STUDDED "T" STEEL POSTS ARE GOOD FOR LINE POSTS. IF STEEL POSTS ARE USED FOR LINE POSTS, EVERY SEVENTH POST SHOULD BE OF WOOD. WOODEN POSTS SHOULD BE OF GOOD QUALITY AND, EXCEPT YEW WOOD, TREATED WITH PRESERVATIVE FOR AT LEAST THE BOTTOM THREE FEET (DO NOT USE POSTS TREATED WITH COPPER-TYPE WOOD PRESERVATIVES). WOODEN POSTS SHOULD BE SUNK APPROXIMATELY 2 1/2 FEET IN THE GROUND AND SET ABOUT 15 FEET APART. THE FENCE SHOULD BE SECURELY BRACED AT THE CORNERS, ANGLES, AND AT INTERVALS ALONG LONGER SECTIONS.

WOVEN WIRE FENCING WITH AT LEAST 10 GAUGE TOP AND BOTTOM WIRES AND 12 1/2 GAUGE FILLER WIRE SHOULD BE USED. THE FENCE SHOULD BE CONSTRUCTED OF TWO 39 INCH WIDTHS OF WOVEN WIRE WITH THE BOTTOM PORTION HAVING STAYS NO MORE THAN 6 INCHES APART AND THE TOP WIDTH HAVING STAYS NO MORE THAN 12 INCHES APART. STRETCH THE WIRE TIGHT AND FIRMLY STAPLE TO POSTS WITH 1 1/2 INCH STAPLES AT THE RATE OF AT LEAST 12 STAPLES PER POST. THE TWO WIDTHS OF WOVEN WIRE SHOULD BE SECURED TOGETHER WITH HOG RINGS AT APPROXIMATELY 18 INCH INTERVALS. AT LEAST ONE STRAND OF BOUNDARY WIRE SHOULD BE PLACED ABOVE THE WOVEN WIRE TO ATTAIN THE HEIGHT OF 84 INCHES. THE BOTTOM OF THE FENCE SHOULD BE AT GROUND LEVEL. FILL DIPS WITH GRAVEL, ROCKS, LOGS, OR OTHER SUITABLE MATERIAL.

GATES CAN BE CONSTRUCTED IN A NUMBER OF WAYS AND CAN BE MADE OF DIFFERENT MATERIALS AS LONG AS THE HEIGHT AND "TIGHTNESS" IS MAINTAINED. ADDITIONAL INFORMATION ON CORNER BRACING, STRETCHING WIRE, AND OTHER ASPECTS OF FENCE BUILDING CAN BE OBTAINED FROM SUPPLIERS OF FENCING MATERIALS.

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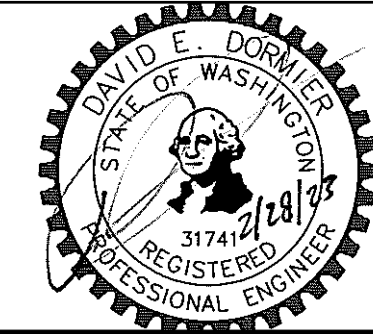


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WSU SUNRISE ORCHARD

NEW IRRIGATION POND AND PUMP SYSTEM

FACILITY NO. 3300

Table with 2 columns: Date, Description. Row 1: 02/28/23, BID SET

Table with 2 columns: MARK, DATE, DESCRIPTION

CAD DWG FILE: 20210257.0000-E2 Pump & Pond 23.dwg

DESIGN BY: DD

DRAWN BY: NM CHECKED BY: DD

PROJECT NO. 1262-2020 FILE NO. 3300-G-001

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SHEET TITLE

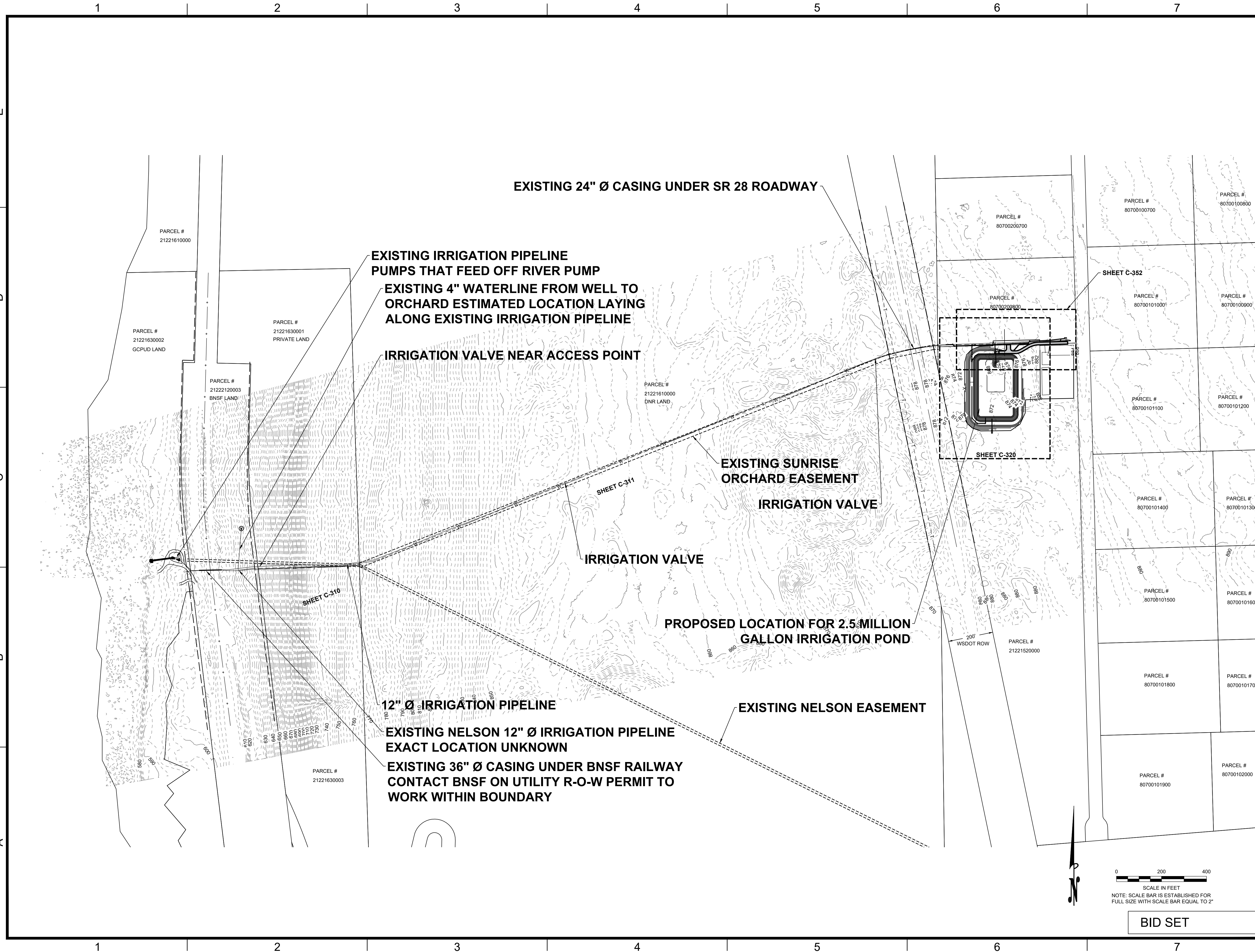
CIVIL NOTES

C-002

SHEET 3 OF 11 SHEETS

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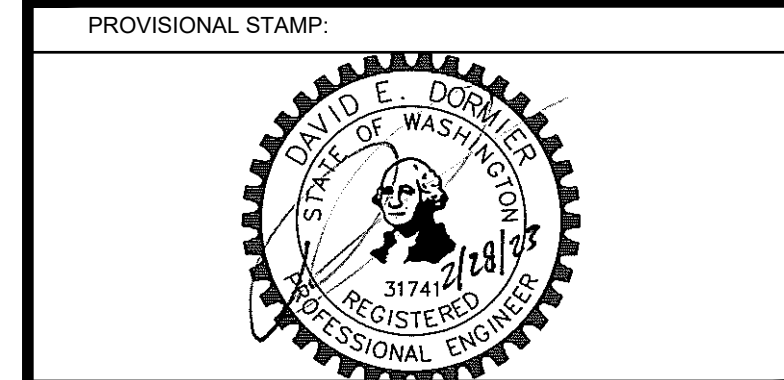
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WSU SUNRISE ORCHARD
NEW IRRIGATION POND AND PUMP SYSTEM
FACILITY NO. 3300

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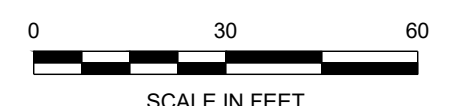
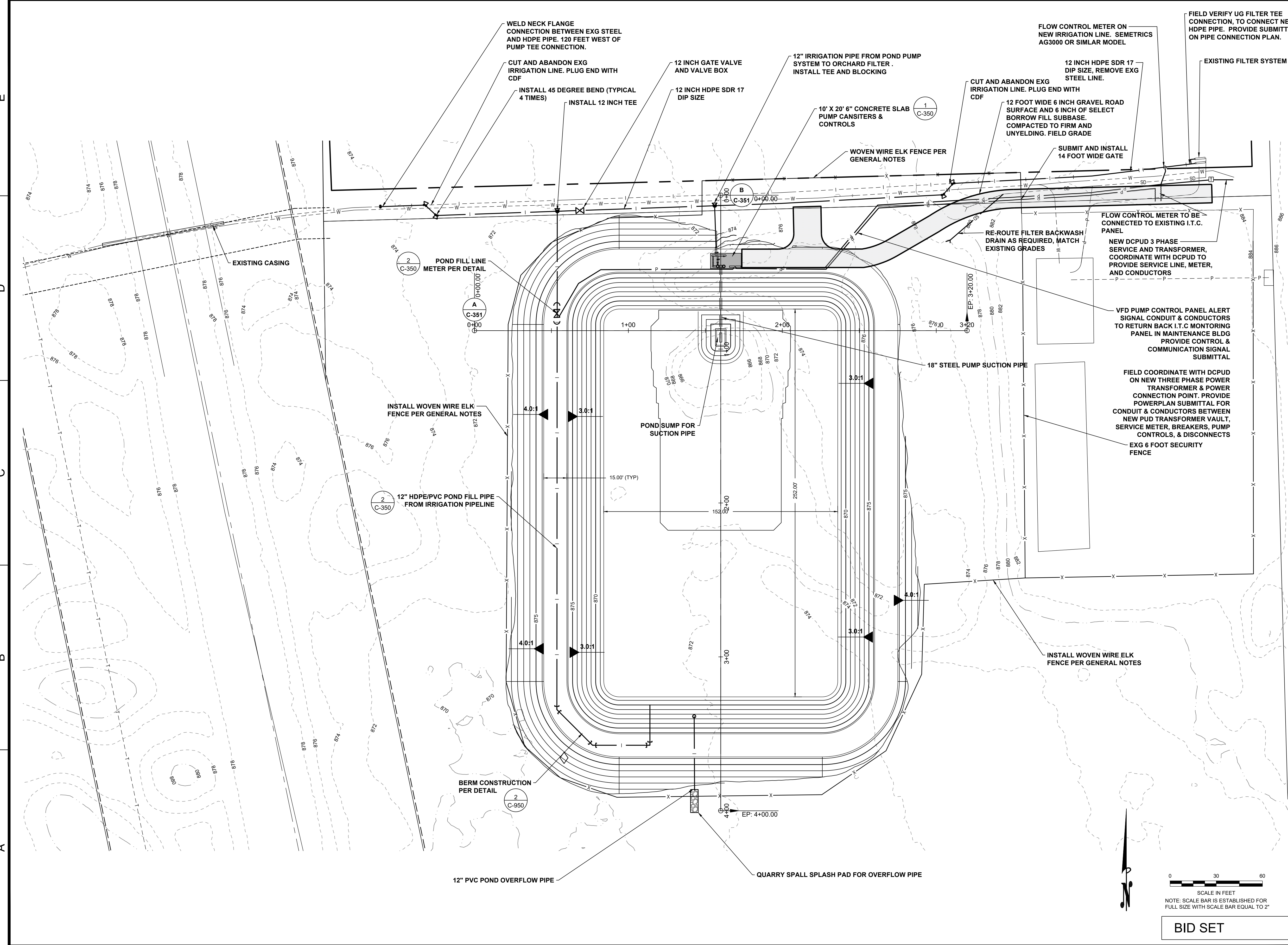
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SHEET TITLE
PIPELINE SITE PLAN

C-300
SHEET 4 OF 11 SHEETS

BID SET

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

BID SET

DESIGN FIRM:

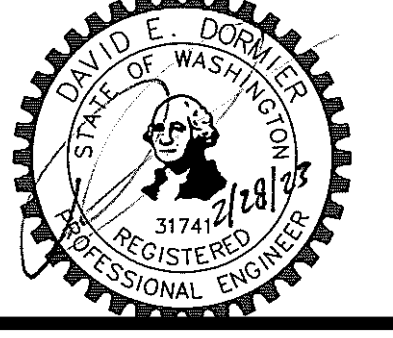


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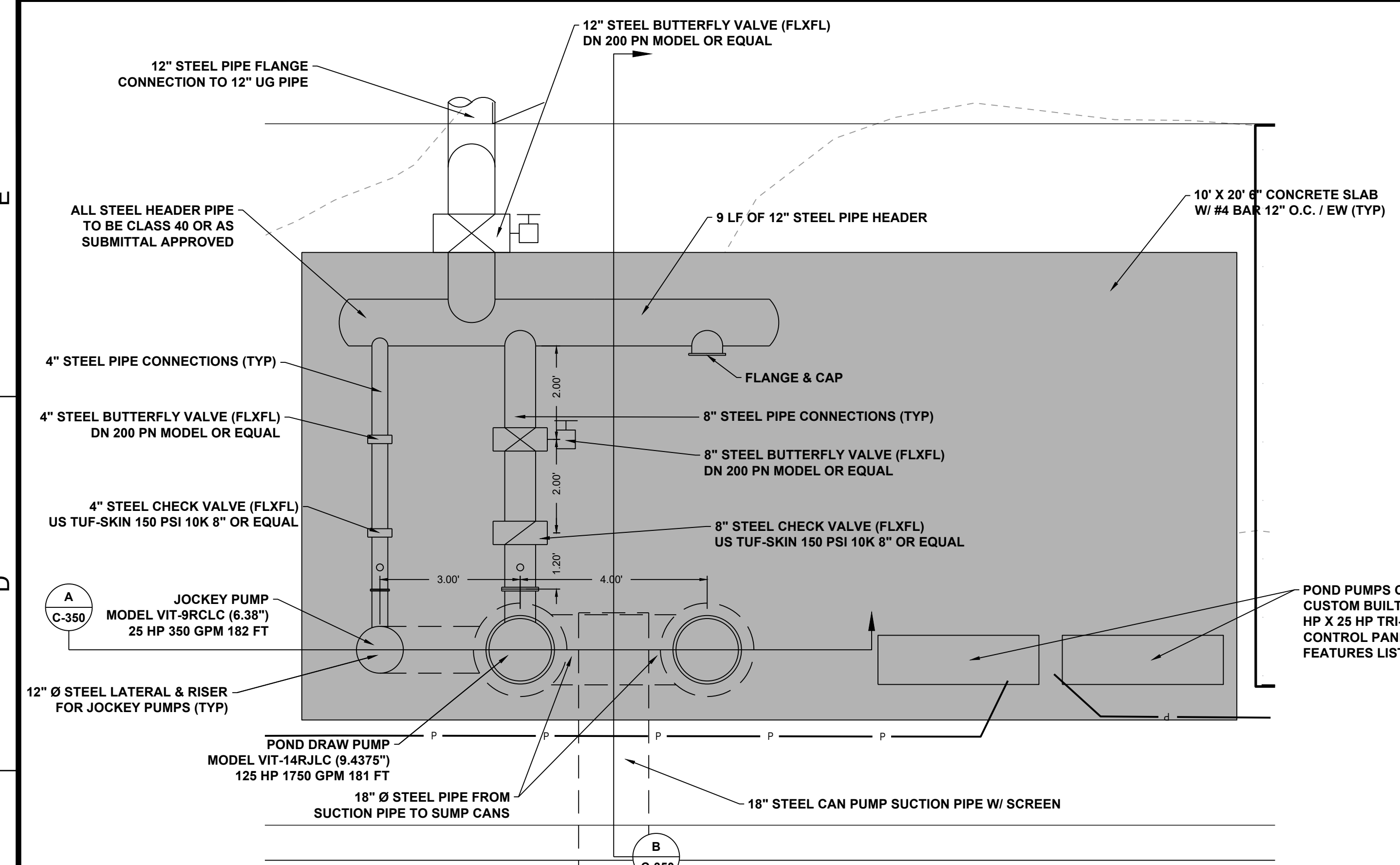
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DRAWN BY: NM	FILE No. 3300-G-001
PROJECT No. 1262-2020	
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POND SITE PLAN

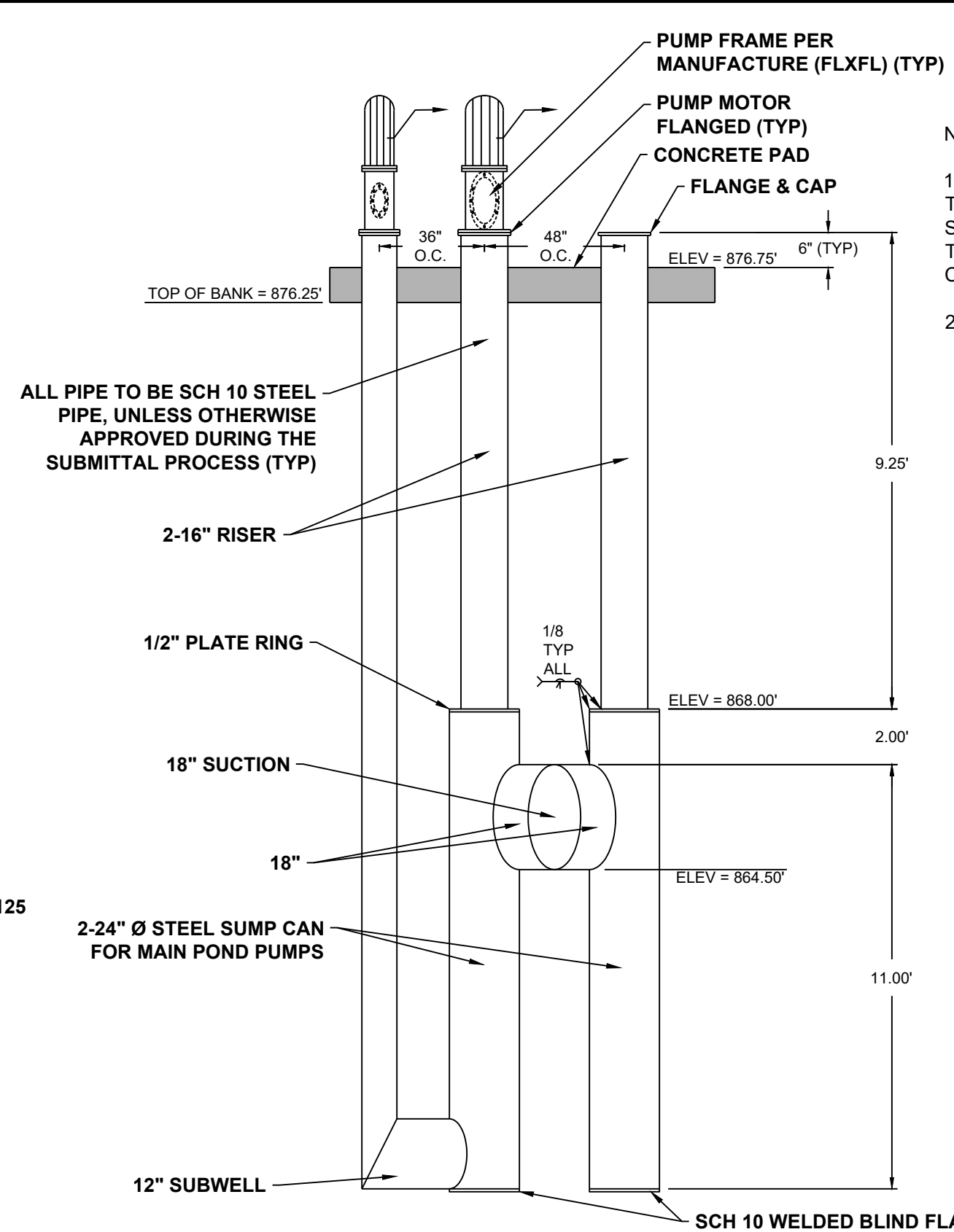
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SHEET 5 OF 11 SHEETS

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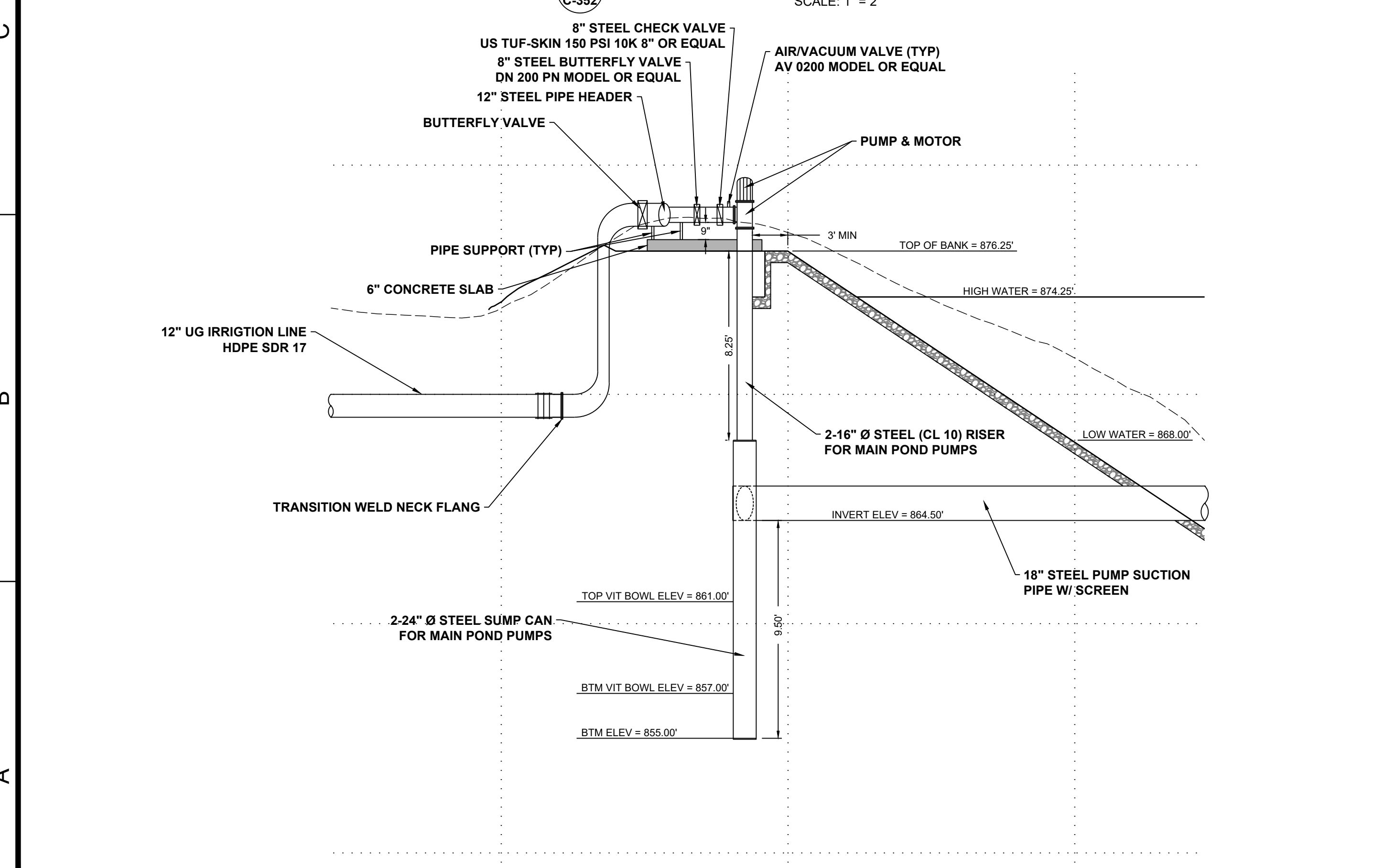


PUMP STATION PLAN
SCALE: 1" = 2'

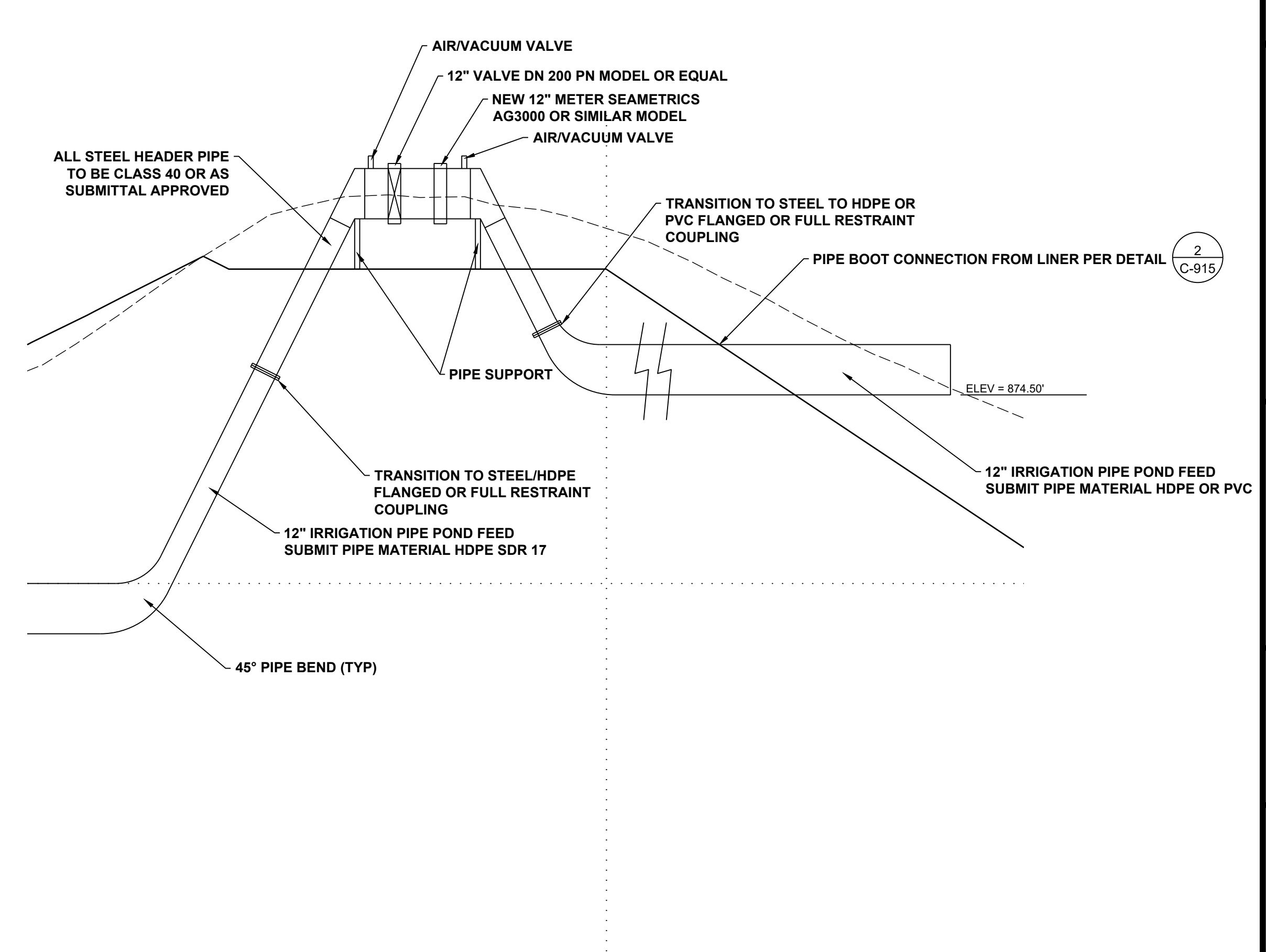


PUMP STATION SECTION
NOT TO SCALE

- NOTES: VFD PUMP CONTROLS
- FIELD COORDINATE W/ DOUGLAS PUD ON NEW THREE PHASE POWER TRANSFORMER & POWER CONNECTION POINT. PROVIDE POWER PLAN SUBMITTAL FOR CONDUIT & CONDUCTORS BETWEEN NEW PUD TRANSFORMER VAULT, 600 AMP SERVICE METER, BREAKERS, PUMP CONTROLS, & DISCONNECTS.
 - MINIMUM PUMP CONTROL FEATURES
 - * MITCHELL LEWIS CONTROLS OR EQUAL, (503) 682-1800 WWW.MITCHELLEWIS.COM, SIMILAR TO WIRE DIAG. 426605 & 432581
 - * 125HP X 125HP X 25 HP TRI-PLEX VFD PUMP CONTROL PANEL
 - * VARIABLE FREQUENCY DRIVE PUMP CONTROLS
 - * UL508A OR UL698A STANDARD
 - * NEMA RATED 4X FOR OUTSIDE USE, FREE STRANDING ON LEGS
 - * COOLING FOR OUTSIDE TEMPERATURES OF 110 DEGREES
 - * HIGH QUALITY DANFOSS/VACON DRIVE OR EQUAL
 - * SOFT START BYPASS
 - * PROGRAMING AND HARDWARE FOR PRESSURE, LEVEL, FLOW
 - * MULTIPLE SET-POINT AND HOA SELECTOR SWITCH
 - * HEAT SINK COOLING FOR HIGH TEMPERATURES
 - * INTERGRATED INPUT AND OUTPUT LINE REACTORS AND FILTERS
 - * REMOTE MONITORING AND RECORDING DATA (CELL OR FIBER)
 - * HAND-OFF-AUTO & SPEED POTENTIOMETER
 - * PROGRAMMABLE LOGIC CONTROLLER
 - * SERVICE ENTRY RATED DISCONNECT
 - * MULTIPLE DRIVE SYSTEMS
 - * TOUCHSCREEN OPERATION
 - * COMMUNICATION WITH EXISTING IRRIGATION TECHNOLOGY & CONNTROL, INC. SYSTEMS AND ELECTRONICS - 509-886-4100



PUMP STATION SECTION
NOT TO SCALE

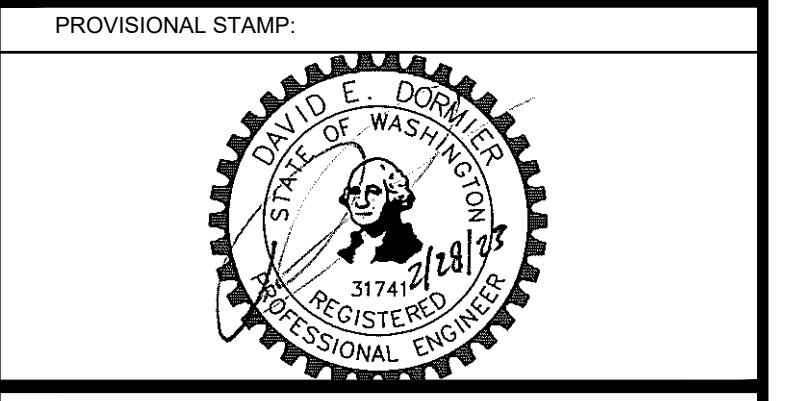


POND FILL PIPELINE SECTION
SCALE: HORZ: 1" = 4' / VERT: 1" = 2'

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WSU SUNRISE ORCHARD

NEW IRRIGATION POND AND PUMP SYSTEM

FACILITY NO. 3300

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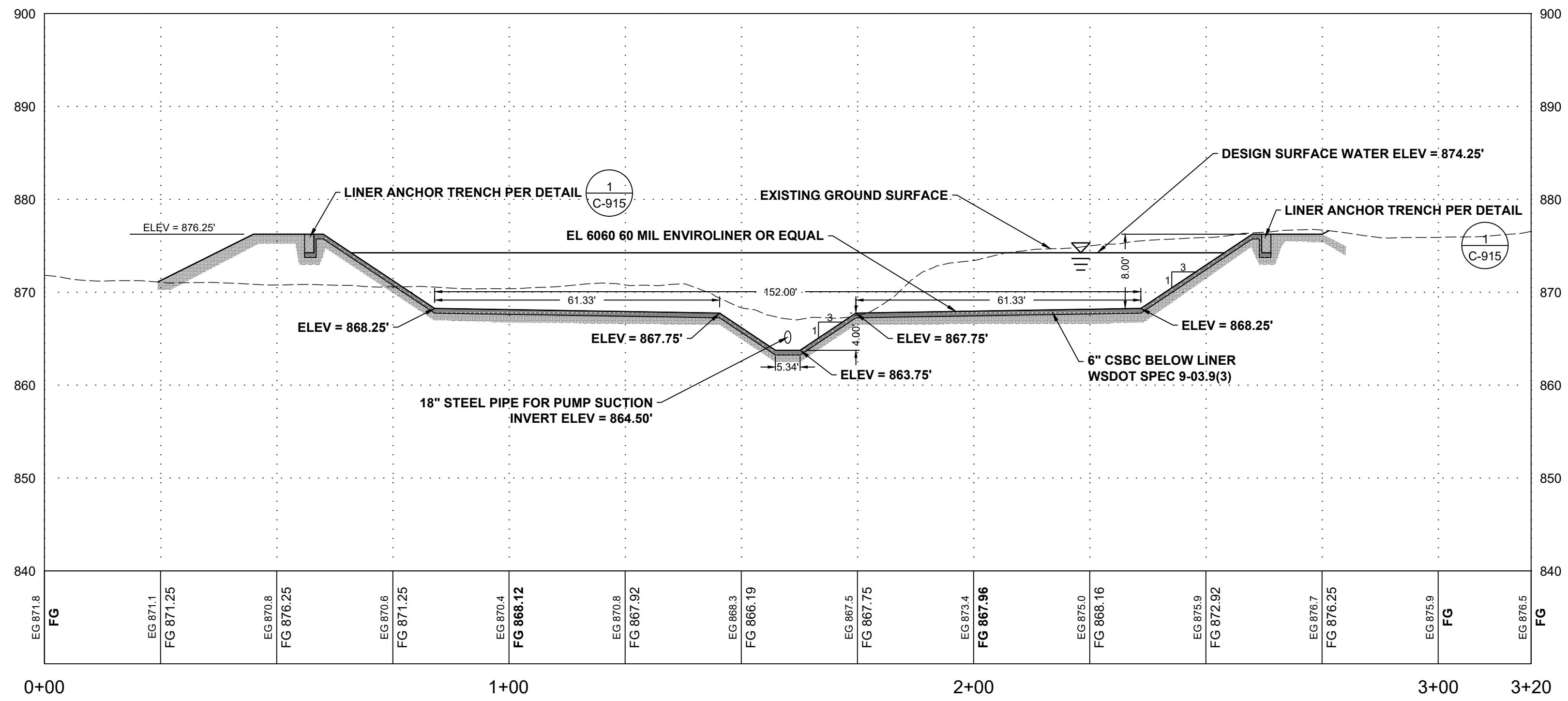
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SHEET TITLE
**IRRIGATION POND
DETAILS - I**

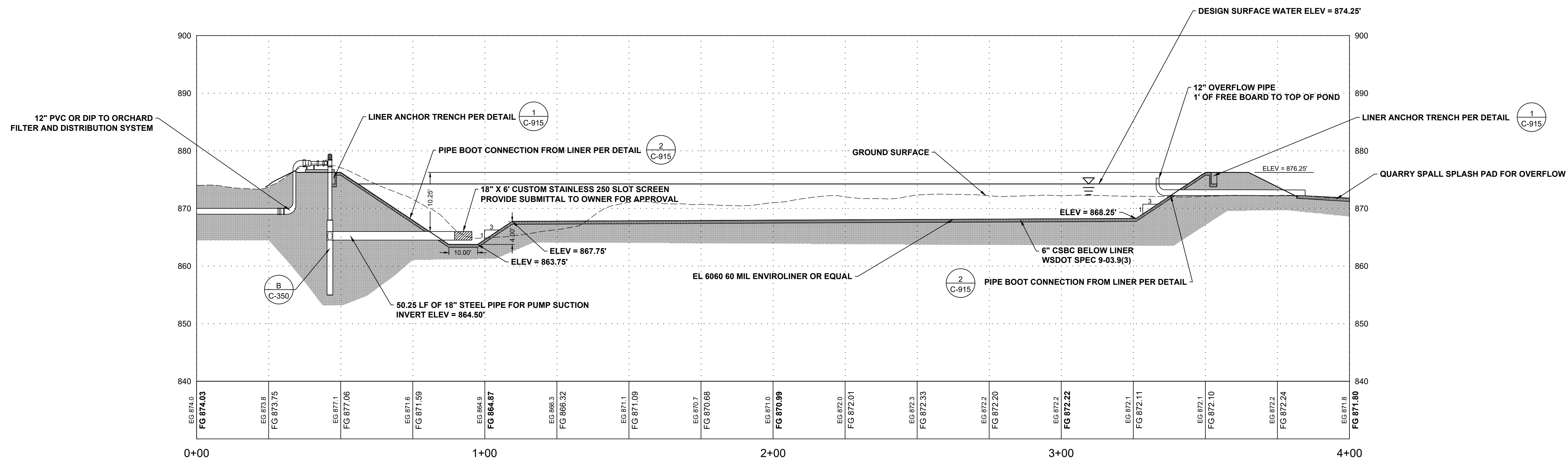
C-350
SHEET 6 OF 11 SHEETS

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FILE: M:\jobs\2021\0257\0000\DWG\Final\20210257.0000-E2 Pump & Pond 23.dwg PLOT DATE: February 28, 2023, 3:01 PM ORIGINAL PAPER SIZE: 22" x 34"



POND SECTION A
SCALE: HORZ: 1" = 20' / VERT: 1" = 10'



POND SECTION B
SCALE: HORZ: 1" = 20' / VERT: 1" = 10'

BID SET

DESIGN FIRM:



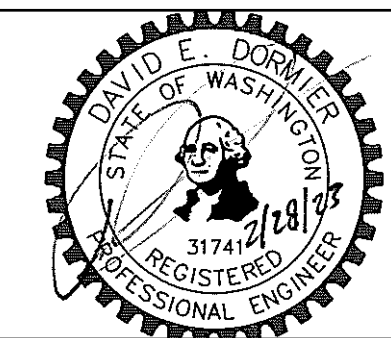
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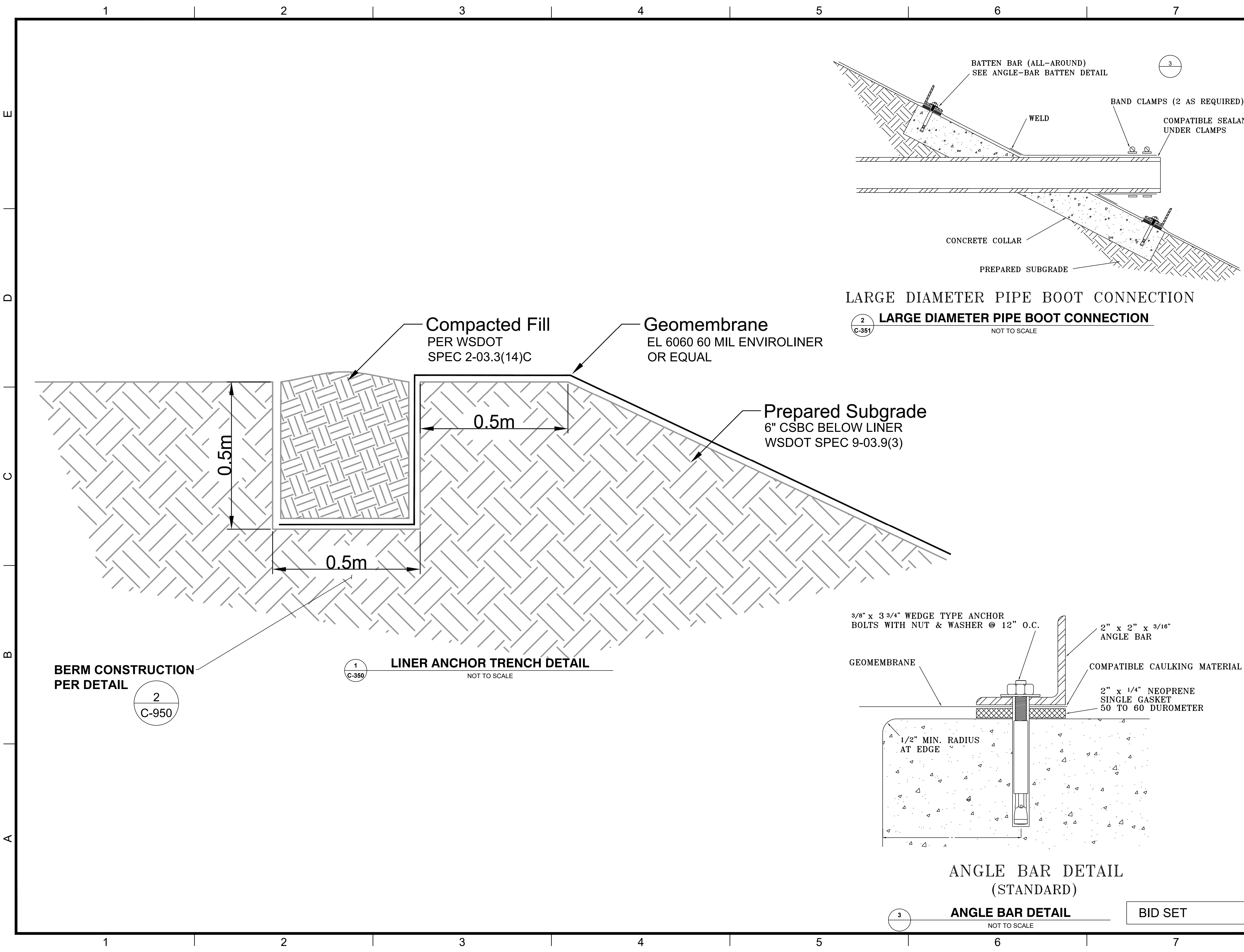
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POND SECTIONS

C-351

SHEET 7 OF 11 SHEETS

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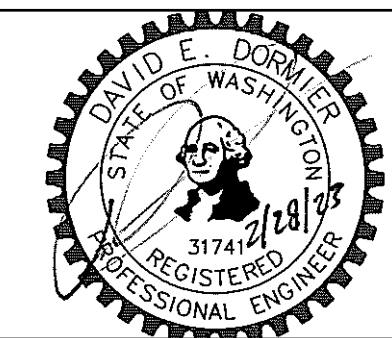
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SHEET TITLE

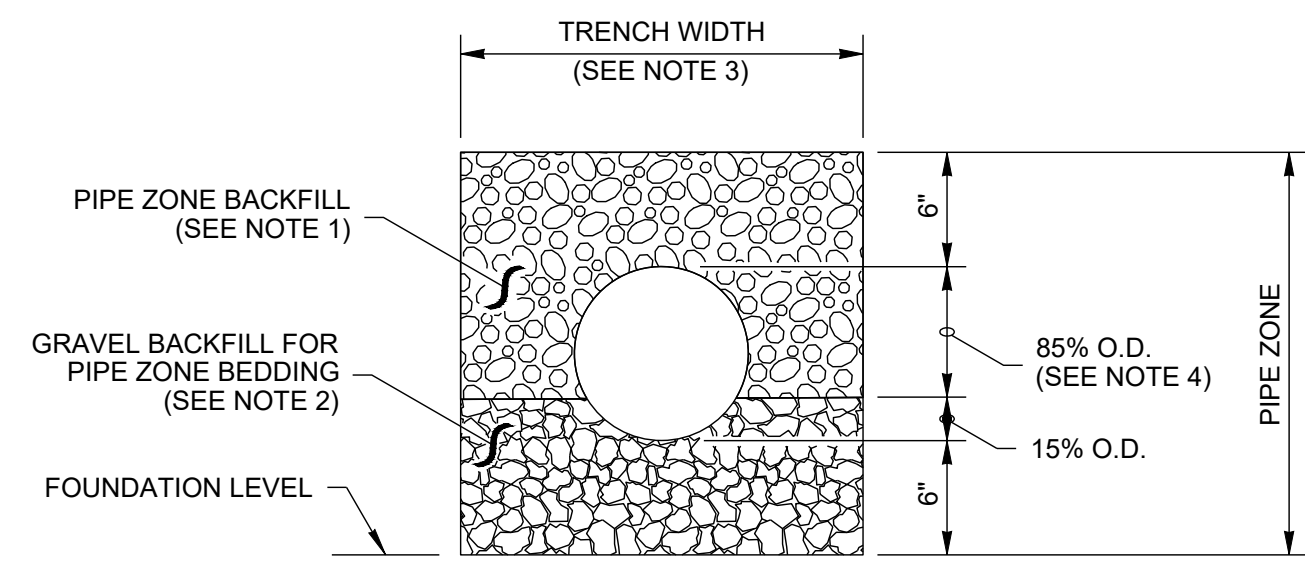
IRRIGATION POND DETAILS - II

C-915

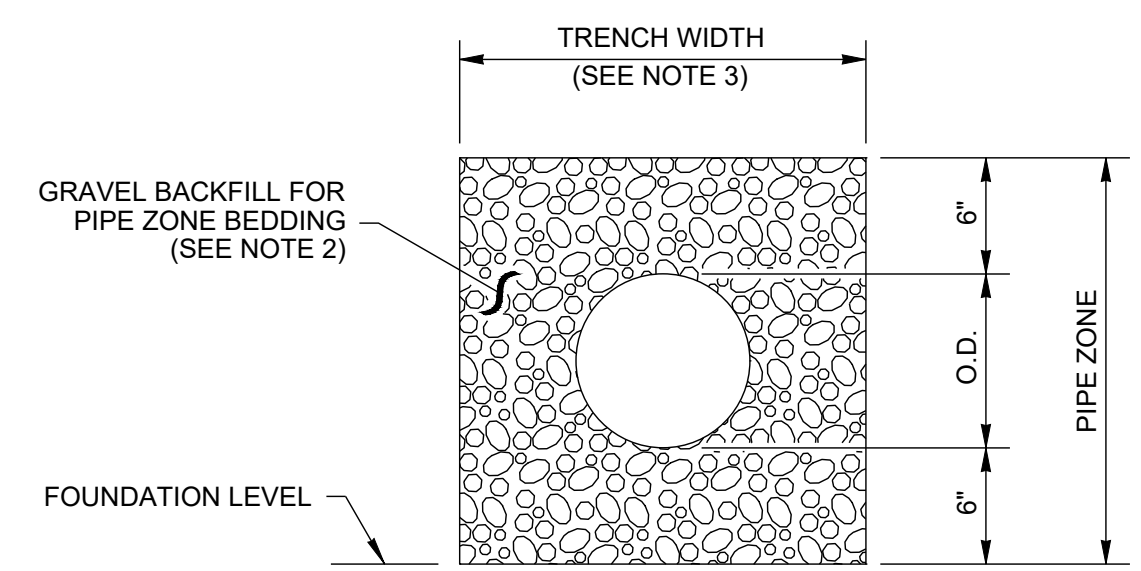
SHEET 8 OF 11 SHEETS

BID SET

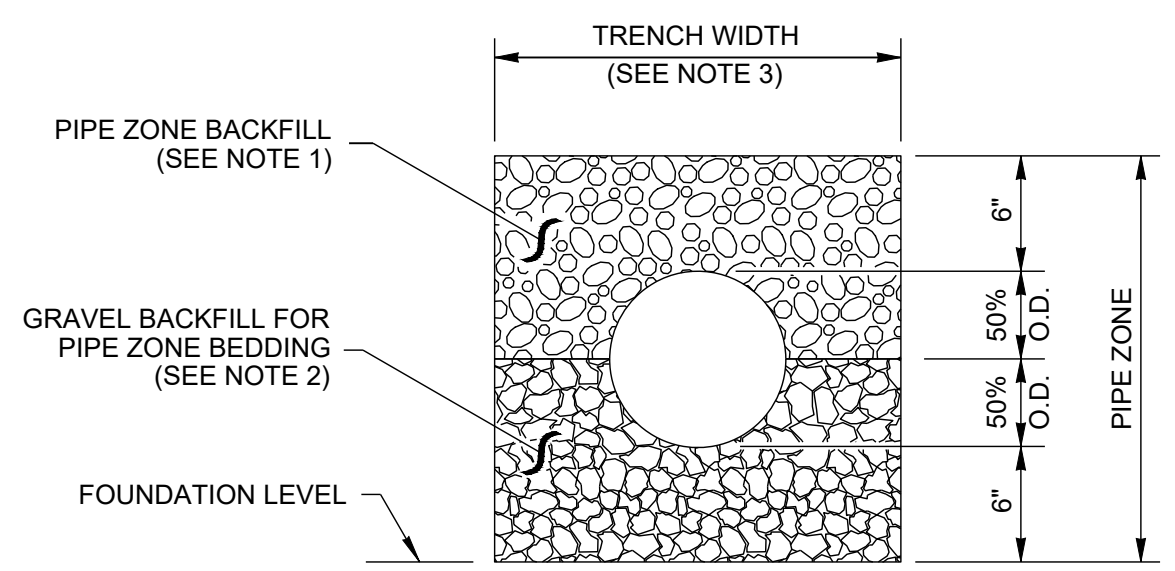
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CONCRETE AND DUCTILE IRON PIPE

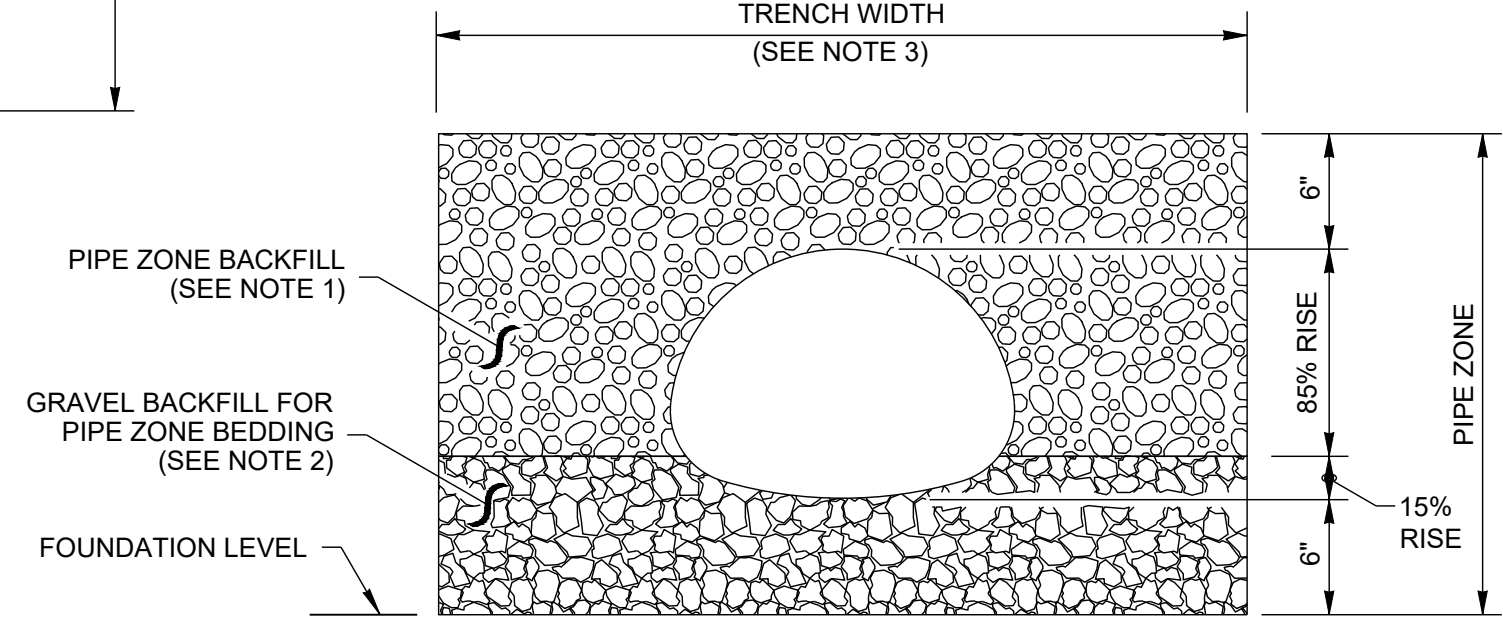


THERMOPLASTIC PIPE



METAL PIPE

- NOTES**
- See Standard Specifications Section 7-08.3(3) for Pipe Zone Backfill.
 - See Standard Specifications Section 9-03.12(3) for Gravel Backfill for Pipe Zone Bedding.
 - See Standard Specifications Section 2-09.4 for Measurement of Trench Width.
 - 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"

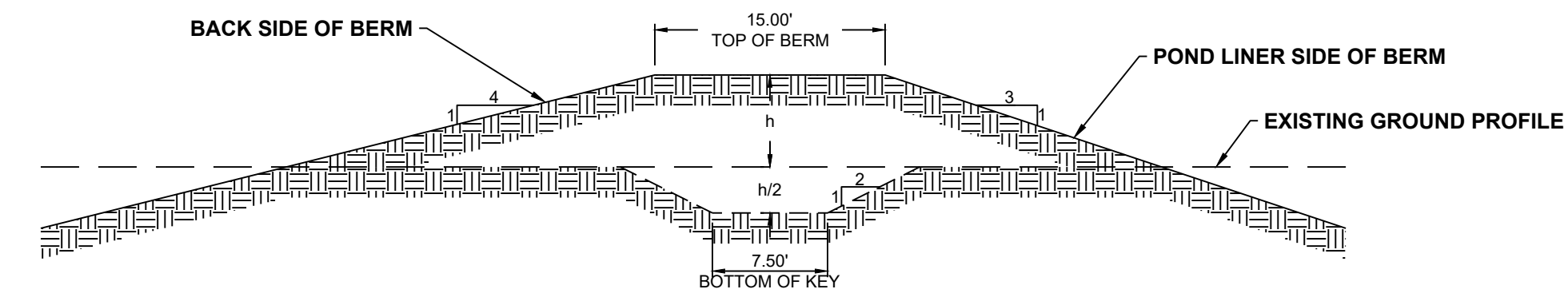
1 PIPE ZONE BEDDING AND BACKFILL
NOT TO SCALE
WSDOT STD PLAN B55.20-00

BERM CONSTRUCTION NOTES:

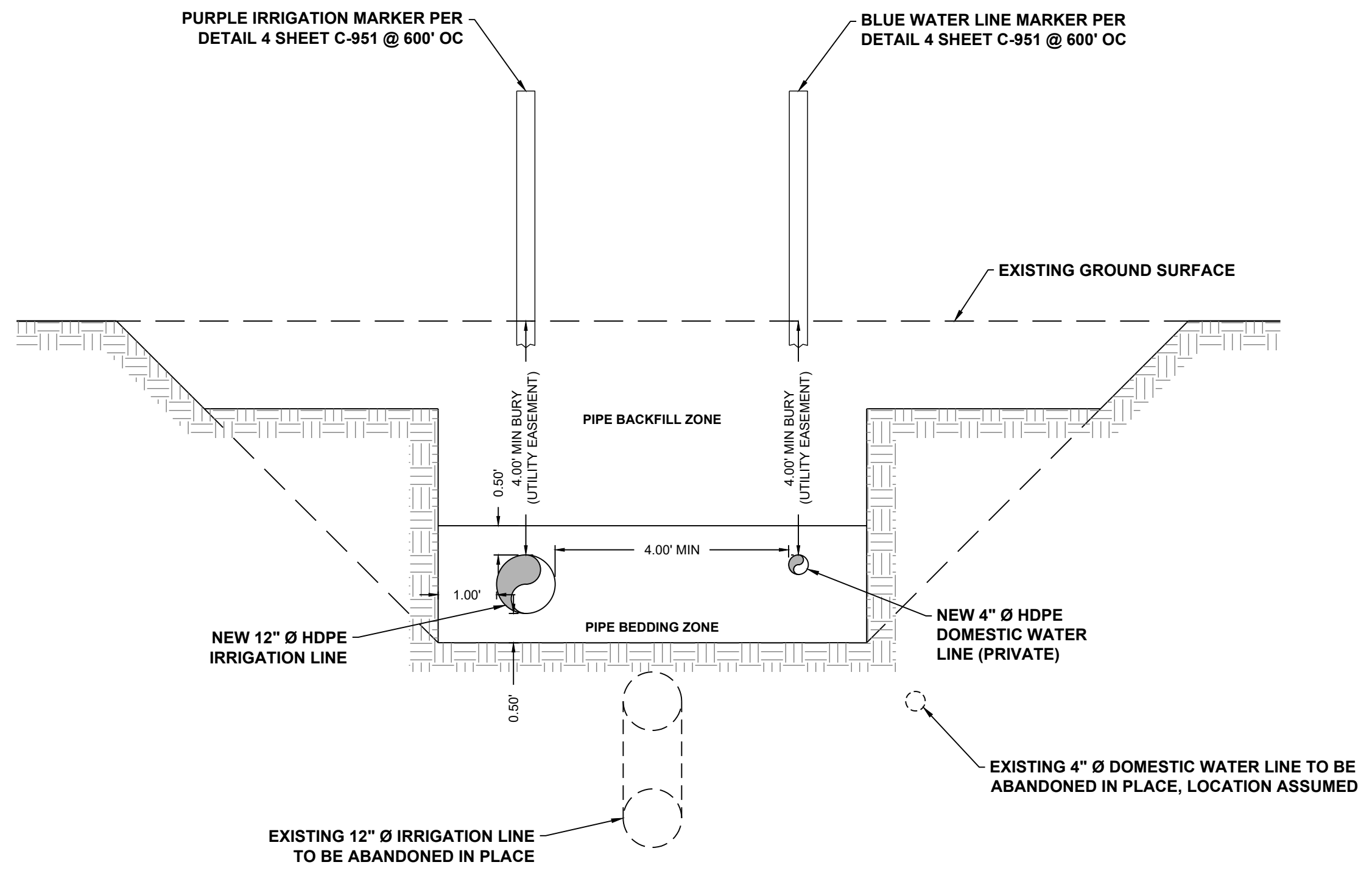
BERM EMBANKMENT MUST BE CONSTRUCTED ON NATIVE SOIL (OR ADEQUATELY COMPACTED AND STABLE FILL SOILS) FREE OF LOOSE SURFACE SOIL MATERIALS, ROOTS, AND OTHER ORGANIC DEBRIS.

POND BERM EMBANKMENTS MUST BE CONSTRUCTED BY EXCAVATING A "KEY" EQUAL TO 50% OF THE BERM EMBANKMENT CROSS-SECTION HEIGHT AND WIDTH (EXCEPT ON SANDY LOAM OR CLAY SOILS WHERE THE "KEY" MINIMUM DEPTH CAN BE REDUCED TO 1 FOOT OF EXCAVATION INTO THE NATIVE SOIL).

THE BERM EMBANKMENT SHALL BE CONSTRUCTED OF COMPACTED SOIL (95% MINIMUM DRY DENSITY, MODIFIED PROCTOR METHOD PER ASTM D-1557), PLACED IN 6" LIFTS, WITH THE FOLLOWING SOIL CHARACTERISTICS PER THE UNITED STATES DEPARTMENT OF AGRICULTURE'S TEXTURAL TRIANGLE: A MINIMUM OF 20% SILT AND CLAY, A MAXIMUM OF 60% SAND, A MAXIMUM OF 60% SILT, WITH NOMINAL GRAVEL AND COBBLE CONTENT).



2 BERM CONSTRUCTION DETAIL
NOT TO SCALE



- NOTES:**
- PIPE BEDDING & BACKFILL PER DETAIL 1 THIS SHEET.
 - DURING EXCAVATION, IF EXISTING IRRIGATION OR WATER LINE IS EXPOSED, THE UNEXPOSED PORTION IS TO BE PLUGGED W/ NON-SHRINK GROUT & EXPOSED LINE REMOVED & DISPOSED.
 - 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.

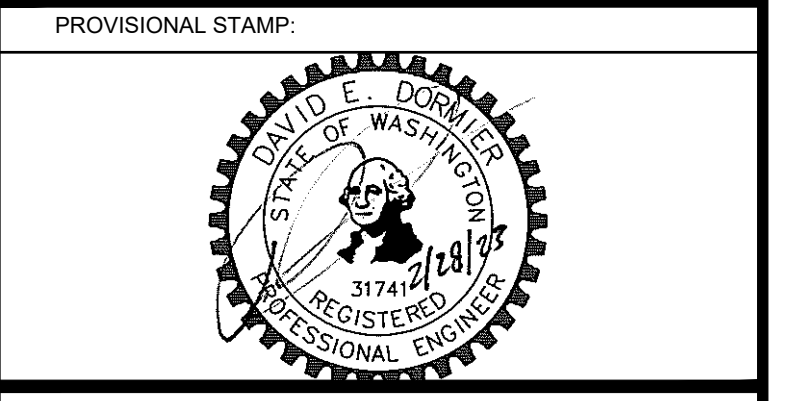
3 TRENCH CORRIDOR CONSTRUCTION - CONDITION C
WAC 296-155 TYPE B SLOPE CONFIGURATION (50CF/FT)
NOT TO SCALE

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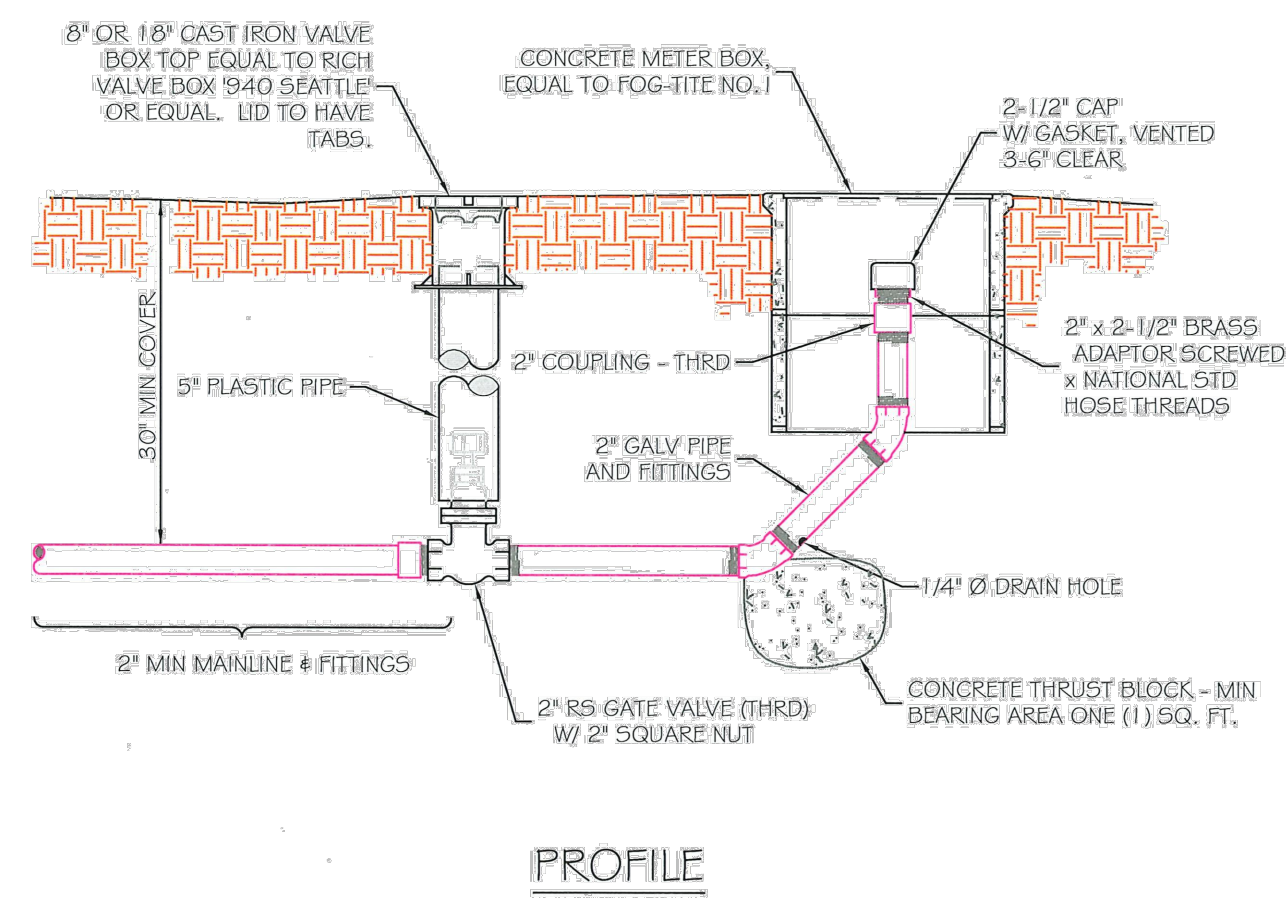
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SHEET TITLE
IRRIGATION PIPELINE DETAILS - I

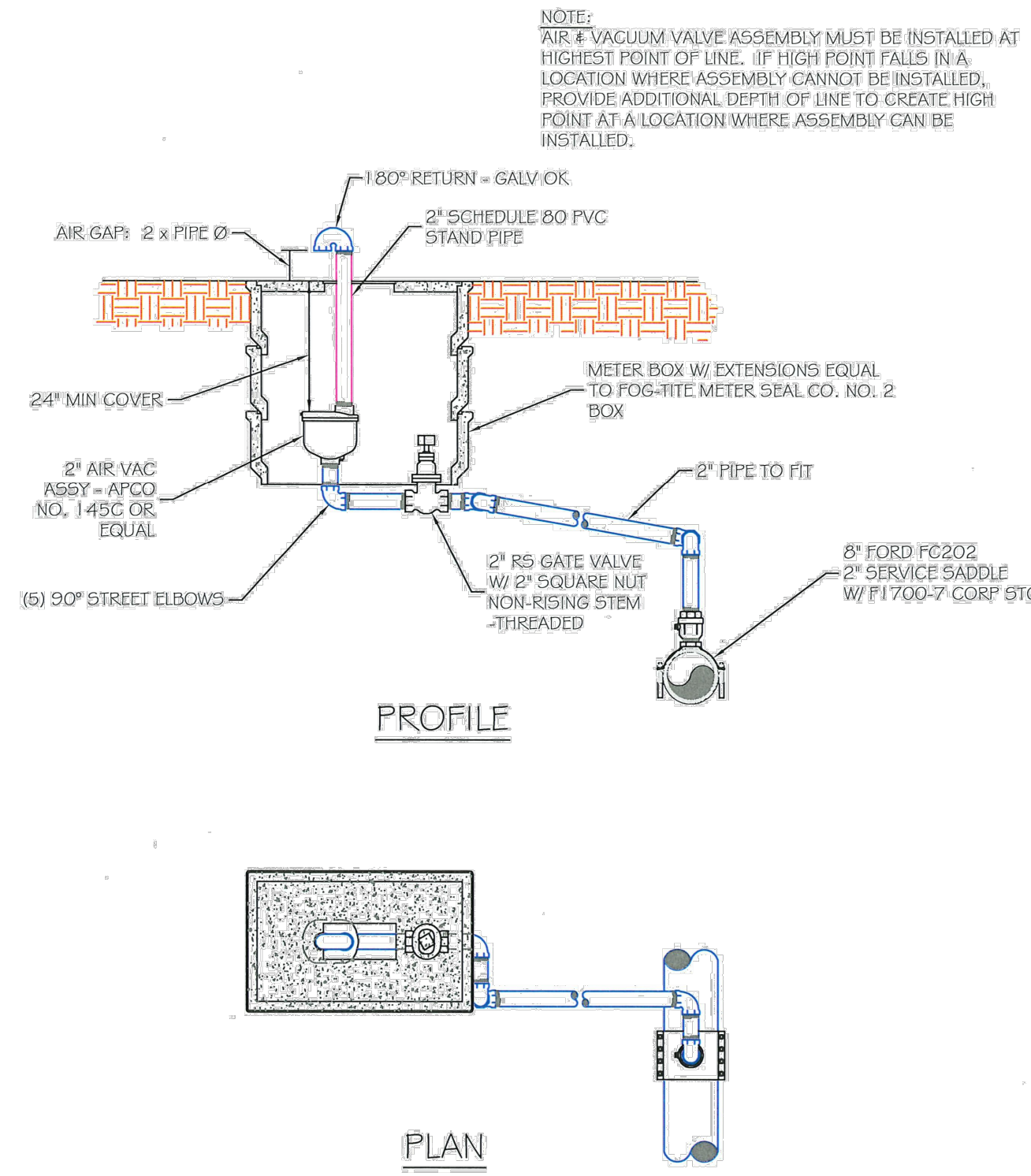
C-950
SHEET 9 OF 11 SHEETS

BID SET

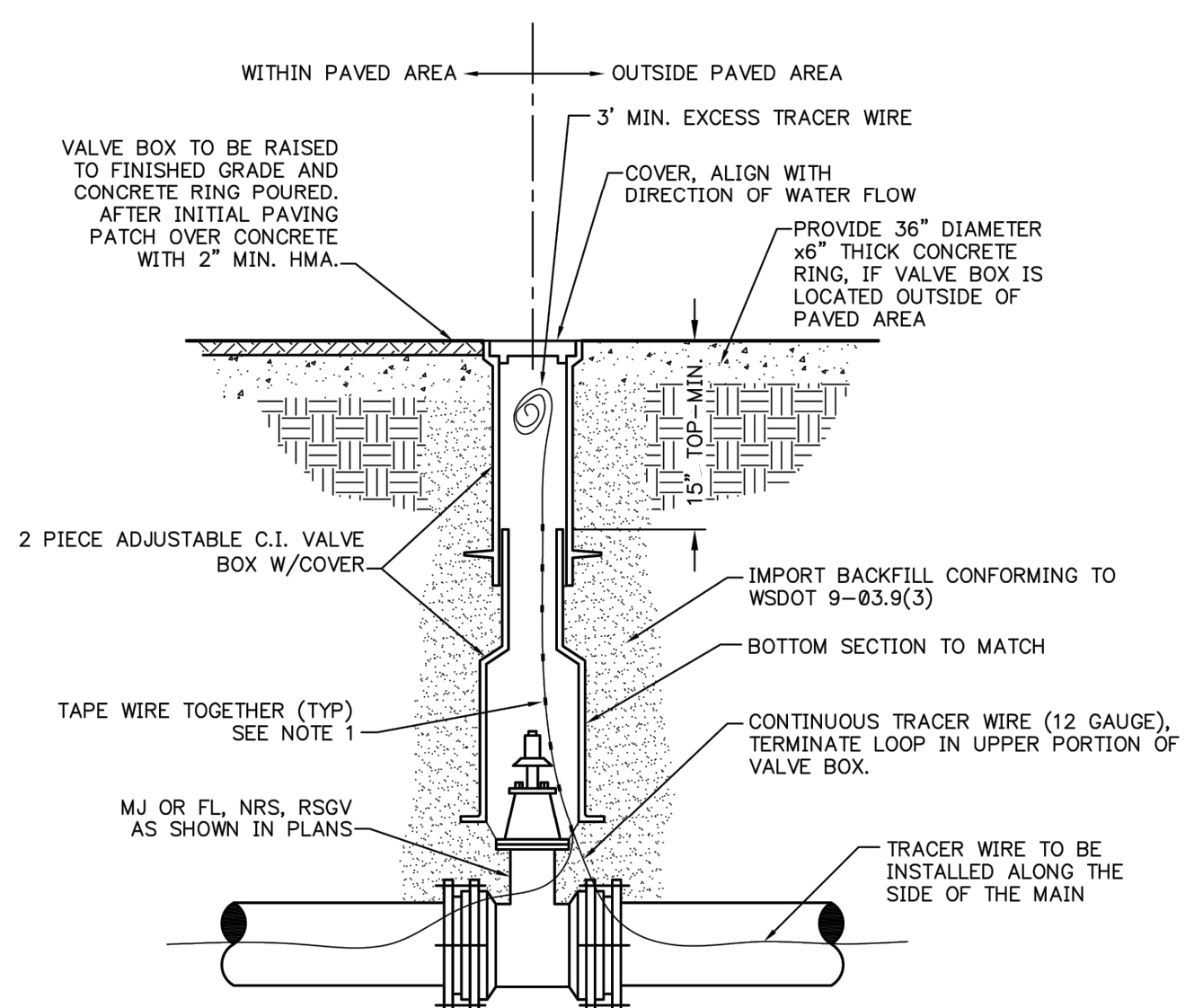
FILE: M:\Jobs\2021\10257.0000\DWG\Final\20210257.0000-E2 Pump & Pond 23.dwg PLOT DATE: February 28, 2023, 3:01 PM ORIGINAL PAPER SIZE: 22" x 34"



1 BLOW-OFF DETAIL
C-311 NOT TO SCALE

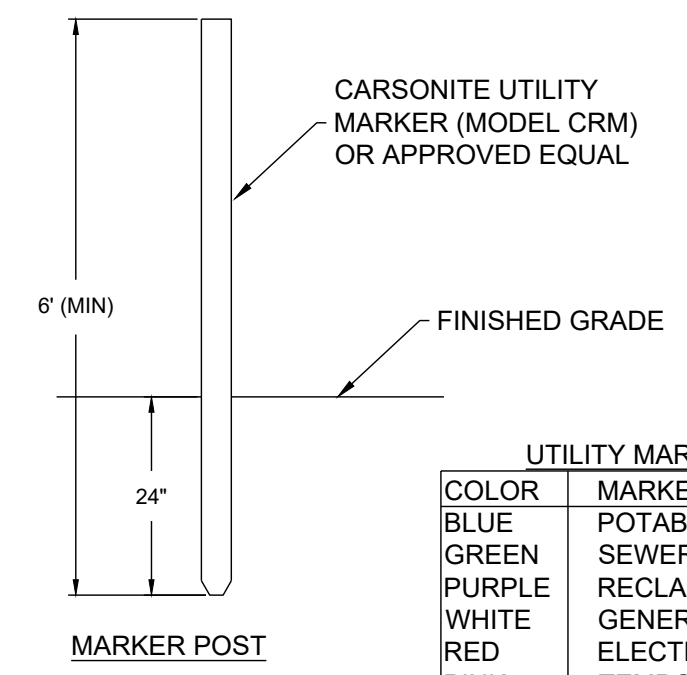


2 AIR-VAC DETAIL
C-311 NOT TO SCALE



- 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 GROUND GATE VALVE DETAIL
C-311 NOT TO SCALE



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 UTILITY MARKER POSTS
C-950 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.

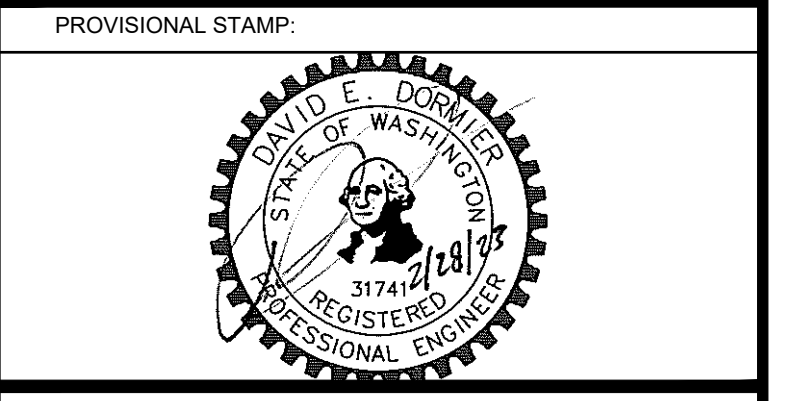
DESIGN FIRM:

Erlandsen
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WASHINGTON STATE UNIVERSITY

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

WSU SUNRISE ORCHARD

NEW IRRIGATION POND AND PUMP SYSTEM

FACILITY NO. 3300

MARK	DATE	DESCRIPTION
	02/28/23	BID SET

CAD DWG FILE: 20210257.0000-E2 Pump & Pond 23.dwg

DESIGN BY: DD

DRAWN BY: NM	CHECKED BY: DD
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PROJECT No. 1262-2020 FILE No. 3300-G-001

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SHEET TITLE

IRRIGATION PIPELINE DETAILS - II

C-951

SHEET 10 OF 11 SHEETS

BID SET

