COLLEGE AND 11TH WATER MAIN REPLACEMENT

WATER MAIN IMPROVEMENTS

PROJECT LOCATION: BOUNDED TO THE NORTH BY WEST COLLEGE STREET, TO THE EAST BY LANGFORD

HALL, TO THE SOUTH BY WEST HARRISON STREET, AND WEST BY 11TH AVENUE IN

THE CITY OF BOZEMAN, MONTANA.

LEGAL DESCRIPTION: LOCATED IN THE NE 1/4 OF SECTION 13, TOWNSHIP 02S, RANGE 05E, P.M.M., GALLATIN COUNTY, MT

FEBRUARY 19, 2025

OWNER: MONTANA STATE UNIVERSITY - BOZEMAN

UNIVERSITY FACILITIES MANAGEMENT

PO BOX 172760

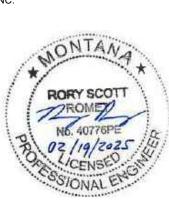
BOZEMAN, MT 59717-2760 PHONE: 406-997-2001

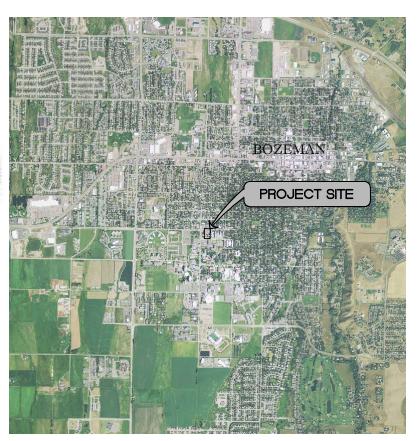
ALLIED ENGINEERING SERVICES, INC. **CIVIL ENGINEER:**

32 DISCOVERY DRIVE BOZEMAN, MT 59718

SHEET INDEX

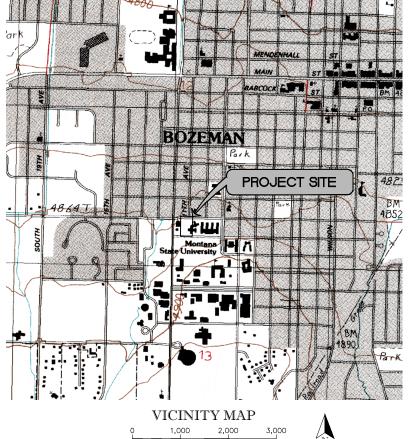
SHEET NO.				
C0.1	COVER			
C0.2	PROJECT NOTES & GENERAL INFORMATION			
C0.3	SPECIFICATIONS			
C1.1	EXISTING CONDITIONS			
C1.2	EXISTING CONDITIONS WITH ORTHO IMAGE			
C1.3	DESIGN PLAN			
C2.1	WATER MAIN REPLACEMENT - PLAN & PROFILE			
C2.2	METER PIT - PLAN & PROFILE			
C2.3	COLLEGE STREET HYDRANT - PLAN & PROFILE			
C3.1	DETAILS			
C3.2	PRECAST VAULT DETAILS			
C3.3	PRECAST VAULT INTERNAL DETAILS			
C3.4	DETAILS			
C3.5	DETAILS			

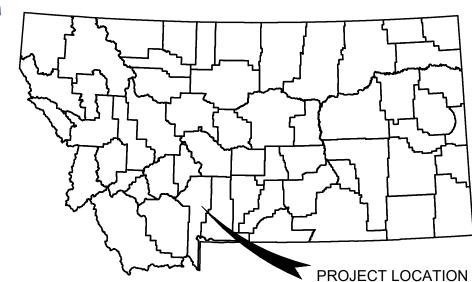


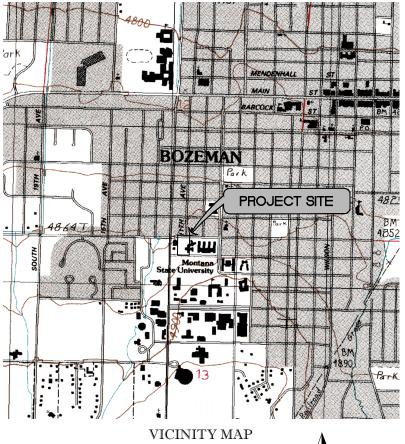












PROJECT ENGINEER: RORY S. ROMEY, PE

DESIGN ENGINEER: ERIC FOSS, PE

COLE OSHIRO-LEAVITT, EI

PROJECT SURVEYOR: GREG FINK, PLS

MSU-CPDC

MONTANA STATE UNIVERSITY BOZEMAN, MONTANA PHONE: 406.994.5413 FAX: 406.994.5665

11TH AND

REPLACEMENT WATER COLLEGE CONSTRUCTION PLANS



DRAWN BY: EJF, COL REVIEWED BY: RSR REV. DESCRIPTION DATE



PPA#22-0543 A/E#00-00-00 **AESI # 22-121**

> SHEET TITLE CO.1

> > SHEET

COVER

LEGEND

4690	INDEX CONTOUR - FG (5' INTERVAL)
4691	CONTOUR MINOR - FG (1' INTERVAL)
4705	INDEX CONTOUR - EG (5' INTERVAL)
4704	CONTOUR MINOR - EG (1' INTERVAL)
OHP	OVERHEAD POWER - EXISTING
— G — G —	UTILITY GAS - EXISTING
TEL	UTILITY PHONE - EXISTING
— E — E —	UTILITY ELECTRIC - EXISTING

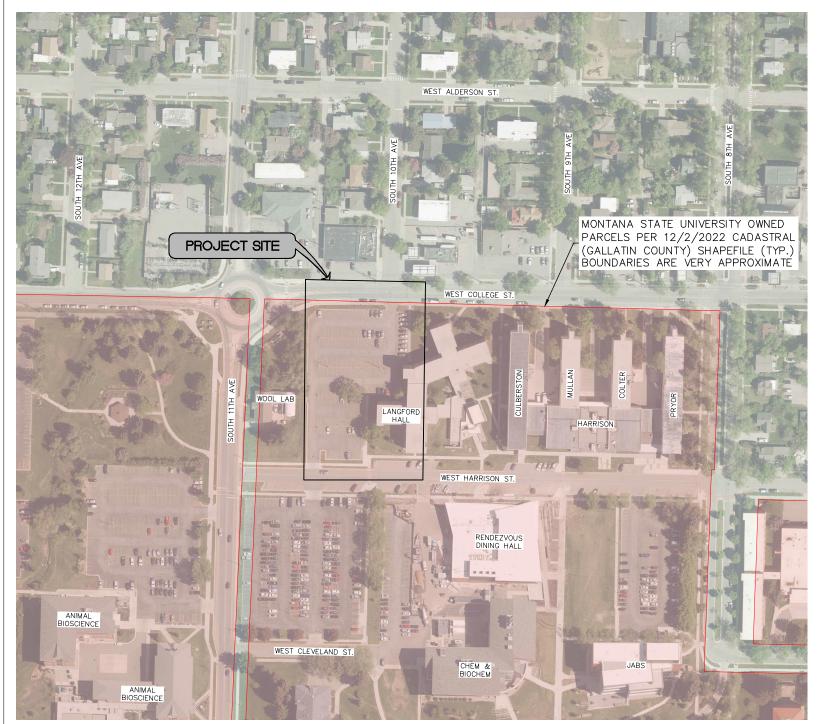
- F - F UTILITY FIBER - EXISTING

s	SEWER MAIN - EXISTING
——— w———	WATER MAIN -EXISTING
SD	STORM DRAIN - EXISTING
wswsws	WATER SERVICE - EXISTING
\mathbf{x}	FIRE HYDRANT - EXISTING
***	WATER VALVE - EXISTING
	EASEMENT LINE
	BOUNDARY/ LOT LINE

SANITARY SEWER MANHOLE - EX

Ф	SEWER MAIN - EXISTING
E	ELECTRICAL PEDESTAL - EXISTING
TEL	TELEPHONE PEDESTAL - EXISTING
₽-	GUY ANCHOR - EXISTING
-	SIGN - EXISTING
@	WELL - EXISTING
•	FOUND MONUMENT AS NOTED
0	SET MONUMENT

CONTROL POINT





SPECIFICATIONS & NOTES:

- ALL CONSTRUCTION WILL CONFORM TO THE MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS), SEVENTH EDITION, AND THE CITY OF BOZEMAN (COB) MODIFICATIONS TO MPWSS AND THE PROJECT
- CONTRACTOR SHALL FIELD-VERIFY LINE AND GRADE OF EXISTING CONNECTIONS. CONTRACTOR MUST NOTIFY ENGINEER IF EXISTING CONNECTION LOCATIONS AND ELEVATIONS ARE DIFFERENT THAN THOSE SHOWN ON THE PLANS.
- 3. ANY EXISTING OR NEW VALVES WHICH CONTROL THE COB's WATER SUPPLY OR MSU WATER SYSTEM SHALL BE OPERATED BY COB PERSONNEL ONLY OR MSU PERSONNEL ONLY RESPECTIVELY
- 4. THE CONTRACTOR SHALL NOTIFY THE WATER DEPARTMENT A MINIMUM OF 24—HOURS PRIOR TO BEGINNING ANY WORK.
- CONSTRUCTION INSPECTION AND TESTING MUST BE PERFORMED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF MONTANA. THE ENGINEER SHALL BE NOTIFIED AT LEAST TWO DAYS PRIOR TO ANY WORK COMMENCING. THE CONTRACTOR AND THE ENGINEER WILL NEED TO COMMUNICATE DAILY SUCH THAT ALL CONSTRUCTION INSPECTION AND TESTING REQUIREMENTS CAN BE CORDINATED. INSPECTION AND TESTING SHALL MEET MPWSS, MDEQ, AND COB REQUIREMENTS.
- THE CONTRACTOR IS REQUIRED TO CALL THE NATIONAL ONE CALL NUMBER FOR UTILITY LOCATES. NOT ALL EXISTING UTILITIES MAY BE SHOWN ON THE PLANS AND/OR THE DEPICTED LOCATIONS MAY NOT REPRESENT ACTUAL FIELD CONDITIONS. THEREFORE, THE CONTRACTOR SHALL ONLY USE THE UTILITY INFORMATION THAT IS SHOWN ON THE PLANS AS A GENERAL GUIDELINE AND MUST NOT DEPEND ON ITS ACCURACY. PRIOR TO PERFORMING ANY EXCAVATION, A UTILITY REQUEST SHALL BE MADE AND ALL UTILITIES SHALL BE MARKED BY THE UTILITY LOCATING COMPANY. THE CONTRACTOR IS RESPONSIBLE FOR GIVING THIS NOTICE BY CALLING (2001) 424-5555 (OR CALL STILL) AT LEAST 2 PUISINESS DAYS PRIOR TO THE CONTRACTOR IS RESPONSIBLE FOR GIVING THIS NOTICE BY CALLING (800) 424-5555 (OR CALL 811) AT LEAST 2 BUSINESS DAYS PRIOR TO ANY EXCAVATION. UNDERGROUND UTILITIES MUST BE FLAGGED OFF BEFORE ANY EXCAVATION CAN BEGIN. THE ENGINEER HAS NOT PHYSICALLY LOCATED OR FIELD VERIFIED ANY OF THE UNDERGROUND UTILITY LOCATIONS AND THEREFORE IS NOT RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF THE PLAN INFORMATION.
- CONTRACTOR SHALL FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES WHERE NEW FACILITIES CROSS OR CONNECT. CONTRACTOR SHALL BE RESPONSIBLE FOR EXPOSING POTENTIAL UTILITY CONFLICTS FAR ENOUGH AHEAD OF CONSTRUCTION TO MAKE NECESSARY MODIFICATIONS WITHOUT DELAYING THE WORK. ALL UTILITY CROSSINGS SHALL BE POTHOLED AS NECESSARY PRIOR TO EXCAVATING OR BORING TO ALLOW THE CONTRACTOR TO DEPEND OF ALLOWED TO CONFIDENT CONFIDENT. TO PREVENT GRADE OR ALIGNMENT CONFLICTS.
- 8. ALL ELEVATIONS SHOWN ARE IN DECIMAL FEET. MOST DIMENSIONS ARE SHOWN IN DECIMAL FEET AND OCCASIONALLY SHOWN IN INCHES.
- PIPE BEDDING (TYPE 1) AND TRENCH BACKFILL (SEE CITY OF BOZEMAN STANDARD DRAWINGS # 02221-1 AND # 02221-2) SHALL BE UTILIZED IN ACCORDANCE WITH MPWSS SECTIONS 02221, 02225, 02234, 02235, 02510 AND THE ASSOCIATED STANDARD DRAWINGS AND THE ASSOCIATED COB MODIFICATIONS TO MPWSS, UNLESS NOTED OTHERWISE IN THE PLANS.
- 10. CONTRACTOR SHALL PROVIDE WATER AND OTHER MEASURES AS NECESSARY TO CONTROL DUST TO AN EXTENT ACCEPTABLE TO THE UNDERLYING PROPERTY OWNERS.
- 11. IN ACCORDANCE WITH THE COB DESIGN STANDARDS AND SPECIFICATIONS POLICY, A PRE-CONSTRUCTION MEETING SHALL BE SCHEDULED BY THE ENGINEER PRIOR TO BEGINNING CONSTRUCTION. THE CITY OF BOZEMAN, CONTRACTOR, ENGINEER, AND OTHER AFFECTED UTILITIES OR GOVERNMENT AGENCIES (IF APPLICABLE) SHALL BE PRESENT
- 12. ALL CONSTRUCTION MATERIALS THAT ARE INSTALLED ON THIS PROJECT
- 13. SHOP/FABRICATION DRAWINGS WILL BE REQUIRED FOR ALL INSTALLED CONSTRUCTION MATERIALS. THEY MUST BE SUBMITTED BY THE CONTRACTOR TO THE ENGINEER PER THE PROCEDURES SET FORTH IN SPECIFICATIONS FOR REVIEW PRIOR TO THE PRE—CONSTRUCTION MEETING.
- 14. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING AND MAINTAINING ALL NECESSARY PROJECT SITE ACCESS CONTROL DURING THE COURSE OF THE PROJECT.
- 15. THE CONTRACTOR WILL BE REQUIRED TO MAINTAIN A CLEAN JOB SITE.
- 16. THE CONTRACTOR WILL BE RESPONSIBLE FOR RESTORING THE GROUND SURFACE TO A PRE-PROJECT DISTURBANCE LEVEL INCLUDING BUT NOT LIMITED TO RESTORING VEGETATION, GROUND COVER, AND STREET AND SIDEWALK RESTORATION AND REPAIR.
- 17. REFER TO SPECIAL PROVISIONS FOR PERMITTING REQUIREMENTS.
- 18. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING AND MAINTAINING CONSTRUCTION SAFETY AND SANITATION FACILITIES.
- 19. ALL THRUST BLOCKING FOR WATER MAIN FITTINGS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF BOZEMAN STANDARD DRAWINGS # 02660-1 AND 02660-3.
- 20. ALL WATER MAINS MUST BE TESTED IN ACCORDANCE WITH MPWSS AND COB MODIFICATIONS PRIOR TO BEING PLACED INTO SERVICE.
- 21. CONTRACTOR SHALL PROVIDE ALL MATERIALS, EQUIPMENT AND FACILITIES REQUIRED FOR TESTING ALL UTILITY PIPING IN ACCORDANCE WITH MPWSS, MDEQ, AND COB SPECIFICATIONS. COST OF ALL INITIAL AND RETESTING SHALL BE BORNE BY THE CONTRACTOR.
- 22. THE CONTRACTOR SHALL PROVIDE A SET OF AS-BUILT DRAWINGS TO THE RPR PRIOR TO THE FINAL ACCEPTANCE.
- 23. WATER MAINS SHALL HAVE A MINIMUM OF 6.5—FT OF COVER. INSULATE OVER THE WATER MAINS WHERE MINIMUM COVER CANNOT BE MET.

ALLIED ENGINEERING SERVICES, INC. AUX AUXILIARY

BENCHMARK REGINNING POINT BEGIN VERTICAL CURVE

CL, & CMP COB CONC CENTERLINE CORRUGATED METAL PIPE CITY OF BOZEMAN CONCRETE COPPER CUBIC YARD

DUCTILE IRON DIAMETER DRAWING DIA DWG DWGS DRAWINGS

EACH EXISTING GRADE ELEV, EL EOP EST ELEVATION EDGE OF PAVEMENT ESTIMATED END VERTICAL CURVE EXISTING

FDN FETS FG FHYD FOUNDATION FLARED END TERMINAL SECTION FINISHED GRADE FIRE HYDRANT FL FLR FT FTG FLANGE FLOOR FEET FOOTING

GPM GV GALLONS PER MINUTE GATE VALVE

HORIZONTAL INVERT ELEVATION ΪΝV INVERT

LINEAR FEET

MATERIAL MANUFACTURER MANHOLE MID POINT MINIMUM MECHANICAL JOINT MODIFICATIONS MODS MONTANA PUBLIC WORKS

MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS
MONTANA STATE UNIVERSITY
MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES

NORTH OFF OFFSET

OHP OVERHEAD POWER POINT OF CURVATURE POINT OF INTERSECTION PROPERTY LINE

POUNDS PER SQUARE INCH POUNDS PER SQUARE INCH GAUGE POINT OF TANGENCY PVC PRV POLYVINYL CHLORIDE PRESSURE REDUCING VALVE

Q FLOW

RCP

RADIUS REINFORCED CONCRETE PIPE REDUCER

RIGHT OF WAY ROW RPR RESIDENT PROJECT REPRESENTATIVE

SOUTH SCH SD SECT SCHEDULE STORM DRAIN SECTION SANITARY SEWER SANITARY SEWER MAN HOLE STA STD STANDARD ТВМ

TEMPORARY BENCHMARK TOP BACK OF CURB TBC TDH TOTAL DYNAMIC HEAD TEST PIT TOP OF WALL

UNIFORM BUILDING CODE UNIFORM PLUMBING CODE UNDERGROUND

VERT VERTICAL

> WEST WITHOUT

MONTANA STATE UNIVERSITY

MSU-CPDC

MONTANA STATE UNIVERSITY BOZEMAN, MONTANA PHONE: 406.994.5413 FAX: 406.994.5665

11T CEMEN AND AI

Z

ATER OLLEGE REPLA Ŭ

PLANS

CONSTRUCTION



DRAWN BY: EJF, COL REVIEWED BY: RSR REV. DESCRIPTION DATE



PPA#22-0543 A/E#00-00-00

AESI # 22-121 SHEET TITLE

C_{0.2}

SHEET **PROJECT NOTES &** GENERAL INFORMATION

SPECIFICATIONS:

- 1. <u>PROJECT SCHEDULE:</u> TO BE COMPLETED DURING THE SPRING/SUMMER OF 2025.
- 2. <u>CONSTRUCTION INSPECTION AND TESTING:</u> CONSTRUCTION INSPECTION AND TESTING WILL BE PERFORMED BY ALLIED ENGINEERING. THE ENGINEER SHALL BE NOTIFIED AT LEAST TWO DAYS PRIOR TO CONSTRUCTION IN ORDER TO PROVIDE INSPECTION OF THESE ELEMENTS. THE CONTRACTOR SHALL MAINTAIN AS-BUILT RECORDS FOR FUTURE USE IN DEVELOPING RECORD DRAWINGS.
- 3. <u>COORDINATION:</u> THE CONTRACTOR SHALL COORDINATE WITH MONTANA STATE UNIVERSITY AND ALLIED ENGINEERING. AESI WILL BE REQUIRED TO INSPECT AND TEST CERTAIN ELEMENTS OF THIS PROJECT. THE CONTRACTOR SHALL ENSURE THAT ALL ENGINEER REQUIRED INSPECTIONS ARE ACCOMMODATED. SEE THE GENERAL NOTES FOR ADDITIONAL ITEMS PERTAINING TO COORDINATION, INSPECTION, AND AS—BUILTS.
- 4. PROJECT SUPERINTENDENT OR FOREMAN: THE CONTRACTOR SHALL HAVE EITHER A PROJECT SUPERINTENDENT OR FOREMAN THAT IS ON—SITE THE MAJORITY OF THE TIME. THIS INDIVIDUAL IS RESPONSIBLE FOR REVIEWING/UNDERSTANDING THE PLANS AND FOR DIRECTING THE WORK. FIELD CHANGES THAT ARE DIRECTED BY THE ENGINEER WILL BE CONVEYED TO THIS INDIVIDUAL FOR IMPLEMENTATION.
- 5. <u>OPEN TRENCHES/HOLES:</u> NO TRENCHES OR HOLES SHALL BE LEFT IN AN OPEN CONDITION OVERNIGHT. ALL SUCH TRENCHES AND HOLES SHALL BE BACKFILLED, COMPACTED, AND CLOSED BEFORE THE END OF EACH WORK DAY.
- 6. TRAFFIC CONTROL: THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING AND MAINTAINING ALL NECESSARY TRAFFIC CONTROL DURING THE COURSE OF THE PROJECT. ALL ANTICIPATED TRAFFIC CONTROL MEASURES SHALL BE SUBMITTED BY THE CONTRACTOR TO THE PROJECT TEAM AND MUST BE APPROVED BY MSU AND THE PROJECT ENGINEER PRIOR TO ANY CONSTRUCTION ACTIVITY. COORDINATE AS NOTED ABOVE FOR SITE ACCESS.
- 7. <u>SHOP DRAWINGS:</u> SHOP DRAWINGS WILL BE REQUIRED FOR ALL WET UTILITY, GRAVEL, CONCRETE, AND ASPHALT MATERIALS. THEY SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL. DRY UTILITY WORK WILL BE COMPLETED BY THE SERVICE PROVIDERS AND WILL NOT REQUIRE SHOP DRAWING SUBMITTALS.
- 8. <u>CLEAN-UP:</u> THE CONTRACTOR WILL BE REQUIRED TO MAINTAIN A CLEAN JOB SITE
- 9. <u>FITTINGS:</u> CONTRACTOR TO VERIFY SIZES AND TYPES OF EXISTING FITTINGS AND PIPES, AND MAKE APPROPRIATE TRANSITIONS AND CONNECTIONS. INSTALL ALL FITTINGS PER MANUFACTURER RECOMMENDATIONS.
- 10. <u>RESTRAINTS:</u> ALL BURIED VALVES AND FITTINGS SHALL BE RESTRAINED WITH THRUST BLOCKS OR MECHANICAL JOINT RESTRAINTS IN ACCORDANCE WITH THE PLAN DETAILS.
- 11. WATER MAIN MATERIAL: ZINC COATED PIPE WITH V-BIO ENHANCED POLYETHYLENE ENCASEMENT IS THE PREFERRED MATERIAL. COORDINATE WITH MSU AND THE ENGINEER FOR AVAILABILITY AND TIMING. IF NECESSARY DUE TO TIMING AND PRODUCT AVAILABILITY, STANDARD DUCTILE IRON PIPE WITH V-BIO ENHANCED POLYETHYLENE ENCASEMENT MAY BE USED. ALL DUCTILE PIPE AND FITTINGS ARE TO BE WRAPPED WITH V-BIO ENHANCED POLYETHYLENE.
- 12. <u>IRRIGATION:</u> THERE ARE MULTIPLE IRRIGATION LINES AND CONDUITS IN THE VICINITY OF THE PROJECT SITE. IRRIGATION CONTROL VALVE BOXES ARE

- SHOWN ON THE PLANS; HOWEVER, ASSOCIATED IRRIGATION LINES AND CONDUITS ARE NOT SHOWN. CONTRACTOR TO MARK IRRIGATION LINES AND COORDINATE WITH MSU ON REPLACEMENT/ROUTING OF IRRIGATION LINES AND CONDUITS WHICH MAY BE DAMAGED DURING CONSTRUCTION. ANY IRRIGATION DAMAGE WILL BE BILLED TO THE CONTRACTOR WITH WORK BEING PERFORMED BY MSU.
- 13. <u>UTILITY CONFLICTS AND IMPROVEMENTS:</u> THERE ARE MULTIPLE UTILITIES (WET AND DRY) IN THE VICINITY OF THE PROJECT SITE. IN ADDITION TO THE STANDARD ONE—CALL UTILITY LOCATE SERVICE, CONTRACTOR SHALL COORDINATE WITH MSU FACILITIES MANAGEMENT FOR ADDITIONAL UTILITY LOCATES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING OR REPLACING ANY DAMAGED OR DISTURBED UTILITY LINES. COORDINATE WITH MSU FACILITY SERVICES FOR OPERATION OF SYSTEM VALVES AND UTILITY CONNECTIONS.
- 14. <u>CONSTRUCTION STAKING:</u> THE CONTRACTOR SHALL COORDINATE STAKING NEEDS WITH ALLIED ENGINEERING. CONTROL POINTS WILL BE PROVIDED FOR USE NEAR THE PROJECT SITE. STAKING FOR WATER IMPROVEMENTS SHALL BE PROVIDED BY THE OWNER. WE ANTICIPATE UP TO 2 TRIPS FOR STAKING ITEMS REQUESTED BY THE CONTRACTOR. ADDITIONAL STAKING TRIPS WILL BE AT THE COST OF THE CONTRACTOR.
- 15. <u>HYDRANT BURY DEPTH:</u> CONTRACTOR TO VERIFY ELEVATION OF HYDRANT LEAD AND TO DETERMINE APPROPRIATE HYDRANT ASSEMBLY HEIGHT TO MATCH FG AT THE PROPOSED LOCATION. BURY LINE OF NEW HYDRANTS TO MATCH FG OR EXTEND A MAXIMUM OF 5" ABOVE FG.
- 16. <u>HYDRANT LEAD INSULATION:</u> CONTRACTOR TO INSULATE HYDRANT LEAD IN ALL LOCATIONS WHERE 6.5' OF COVER IS NOT MET. INSULATION TYPE TO SATISFY COB MODS TO MPWSS IN SECTION 02660, 2.15.A. INSULATION TO BE INSTALLED PER DETAIL 3/C3.1.



MSU-CPDC

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FAX: 406.994.5665

COLLEGE AND 1
WATER MAIN
REPLACEMEN

ALLIED MARKET

CONSTRUCTION PLANS

DRAWN BY: EJF, COL
REVIEWED BY: RSR
REV. DESCRIPTION DATE



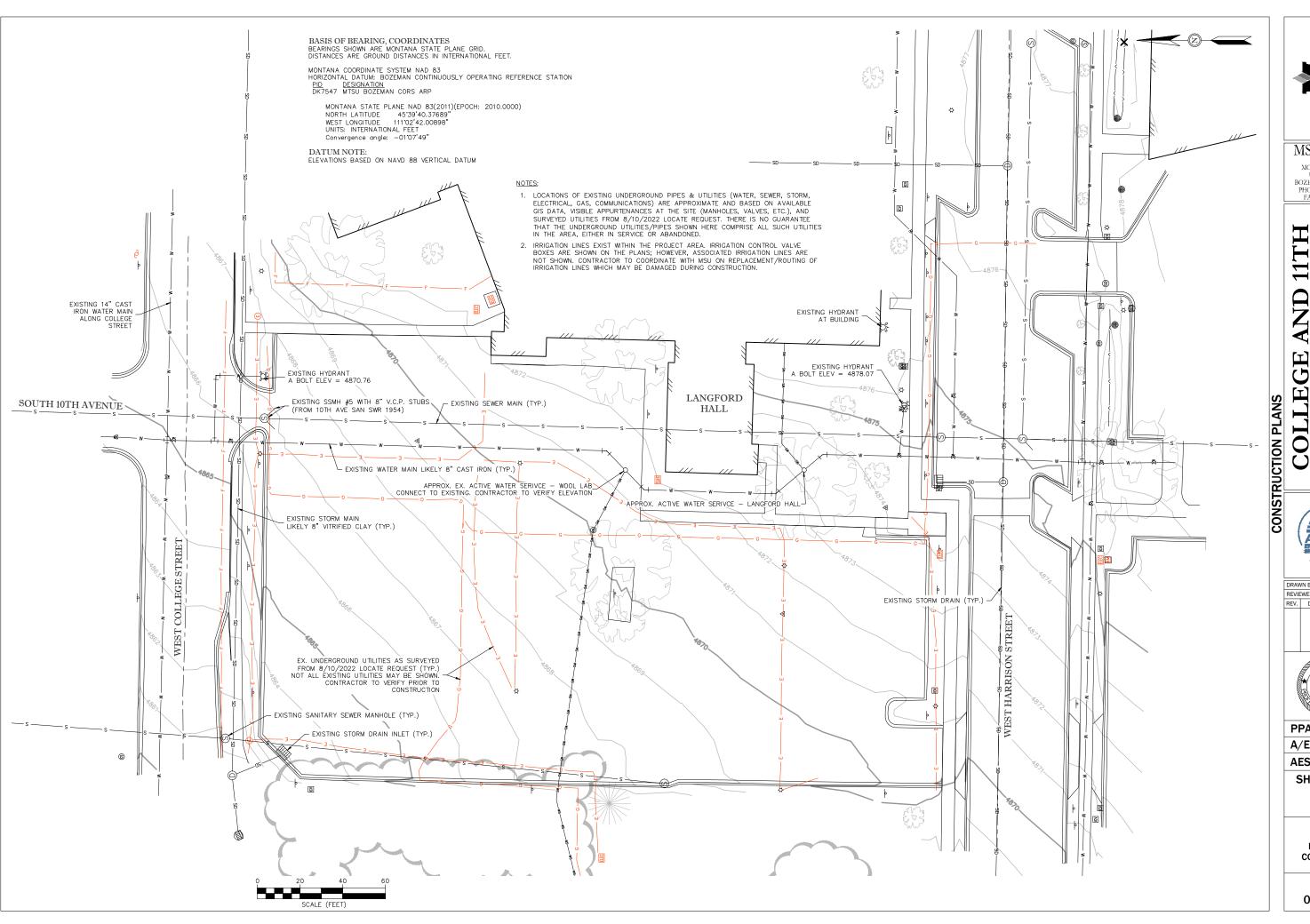
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SHEET TITLE

SHEET

C0.3

SPECIFICATIONS





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PHONE: 406.994.5413 FAX: 406.994.5665

COLLEGE AND 11
WATER MAIN
REPLACEMEN



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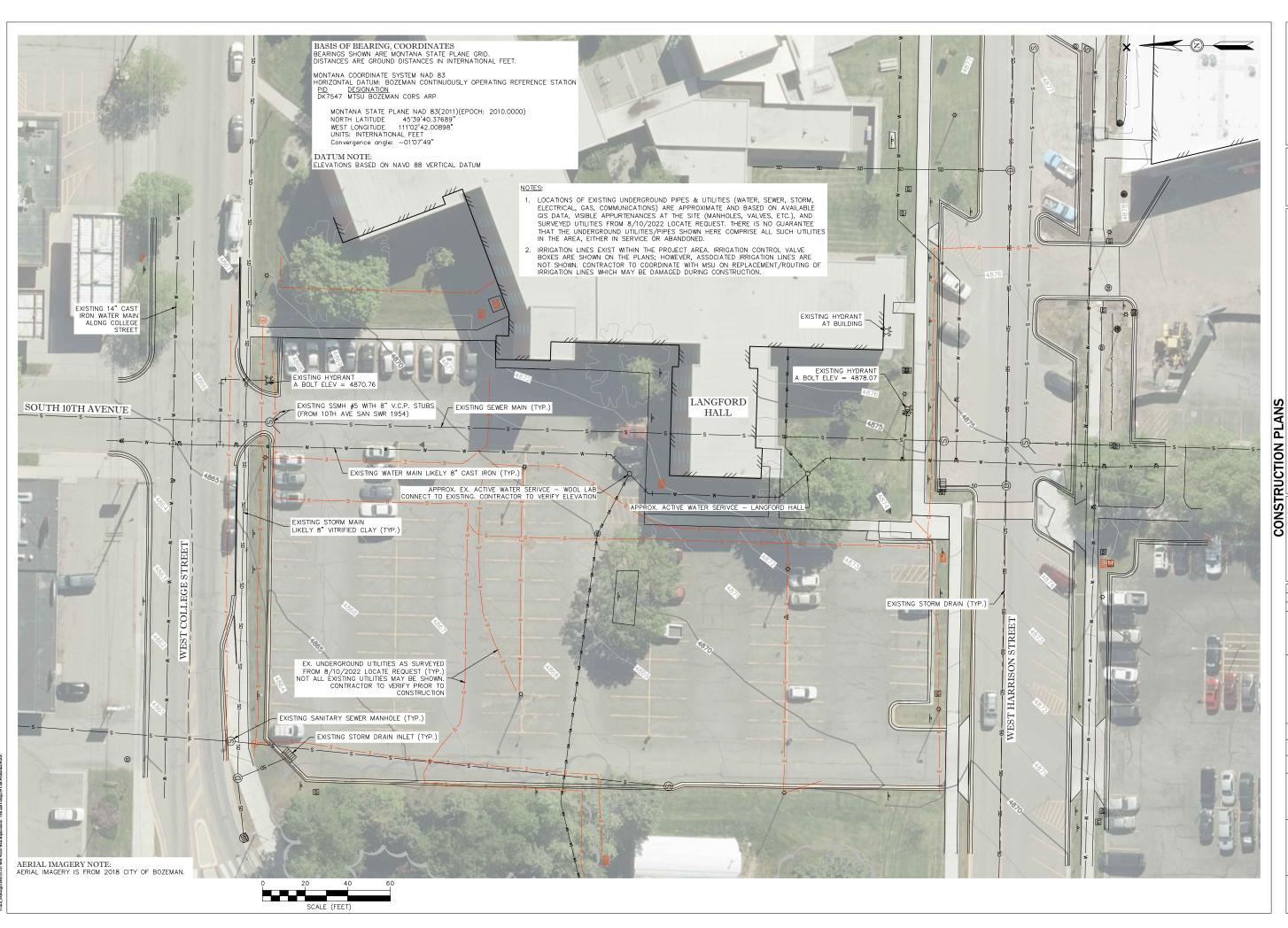
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AESI # 22-121 SHEET TITLE

C1.1

SHEET

EXISTING CONDITIONS





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11TH REPLACEMENT WATER MAIN AND

COLLEGE



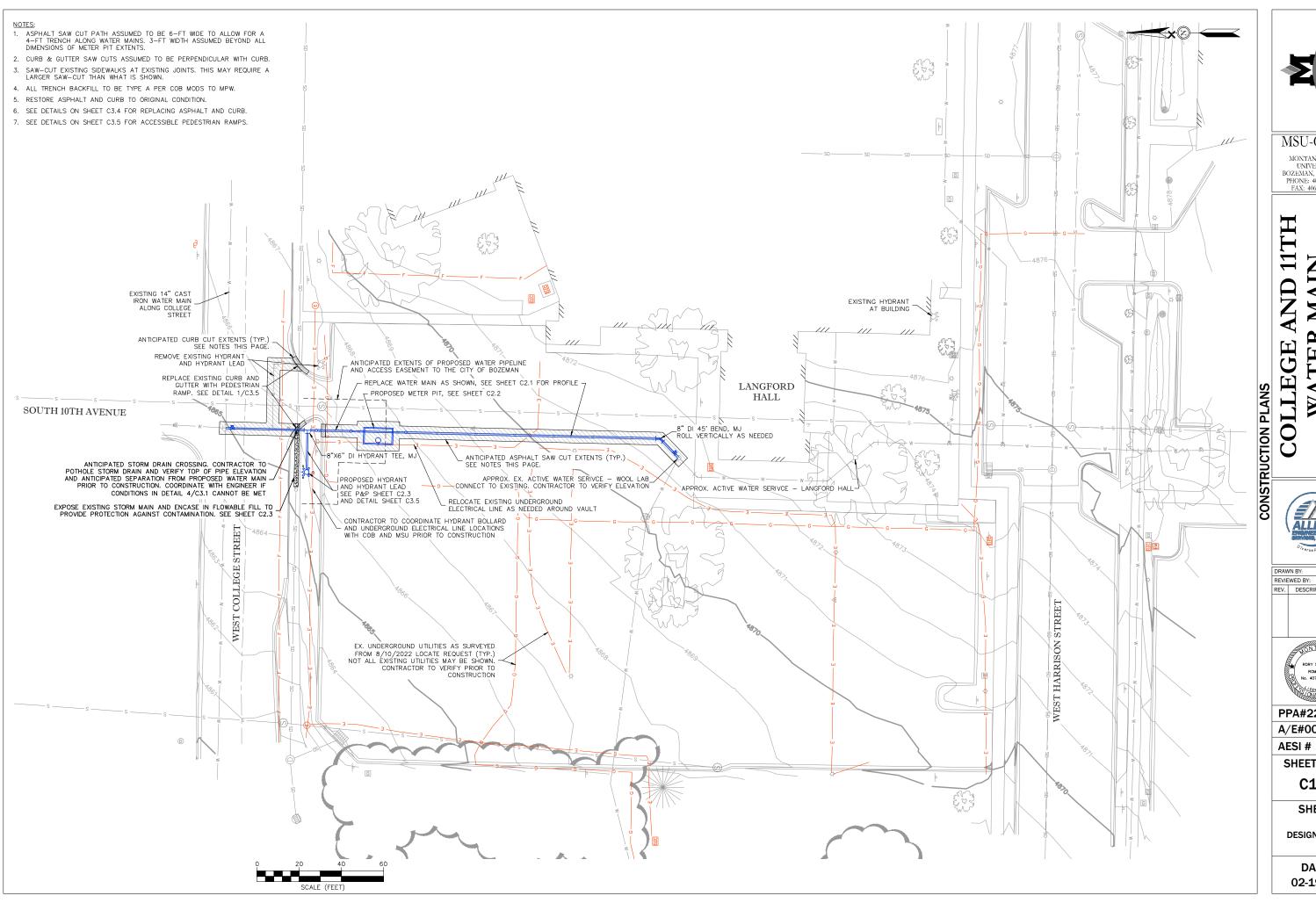
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PPA#22-0543 A/E#00-00-00 **AESI # 22-121**

SHEET TITLE C1.2

SHEET **EXISTING** CONDITIONS W/ ORTHO IMAGE





MONTANA STATE UNIVERSITY BOZEMAN, MONTANA PHONE: 406.994.5413 FAX: 406.994.5665

REPLACEMEN WATER MAIN

DRAWN BY: EJF, COL REVIEWED BY: RSR REV. DESCRIPTION DATE

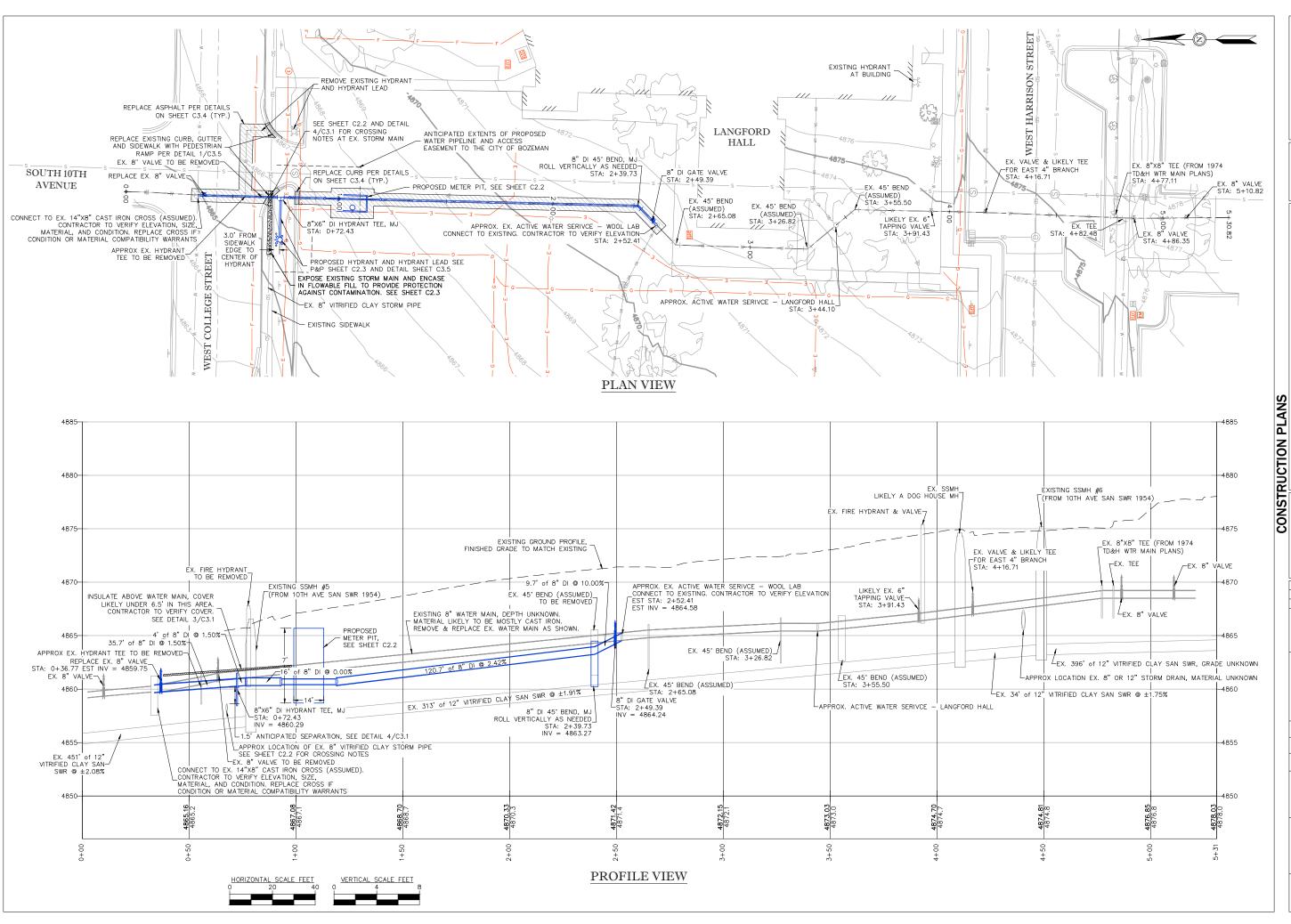


PPA#22-0543 A/E#00-00-00 **AESI # 22-121**

SHEET TITLE C1.3

SHEET

DESIGN PLAN





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H Z Z

COLLEGE AND 11
WATER MAIN
REPLACEMEN



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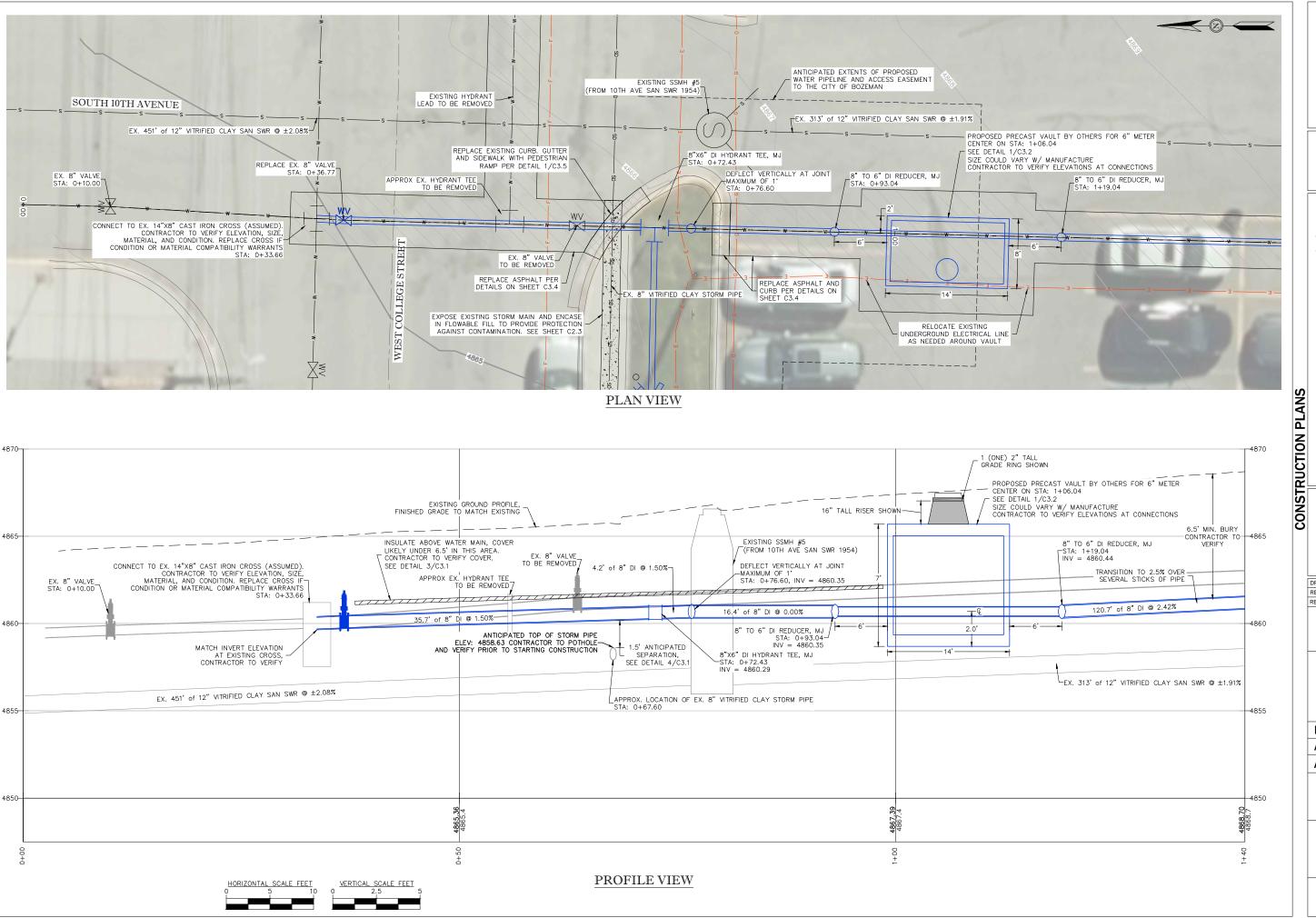
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AESI # 22-121 SHEET TITLE

C2.1

SHEET

WATER MAIN PLAN & PROFILE





MONTANA STATE

UNIVERSITY BOZEMAN, MONTANA

PHONE: 406.994.5413 FAX: 406.994.5665

11TH MAIN REPLACEMEN AND WATER COLLEGE

ALLIED

DRAWN BY: EJF, COL REVIEWED BY: RSR REV. DESCRIPTION DATE



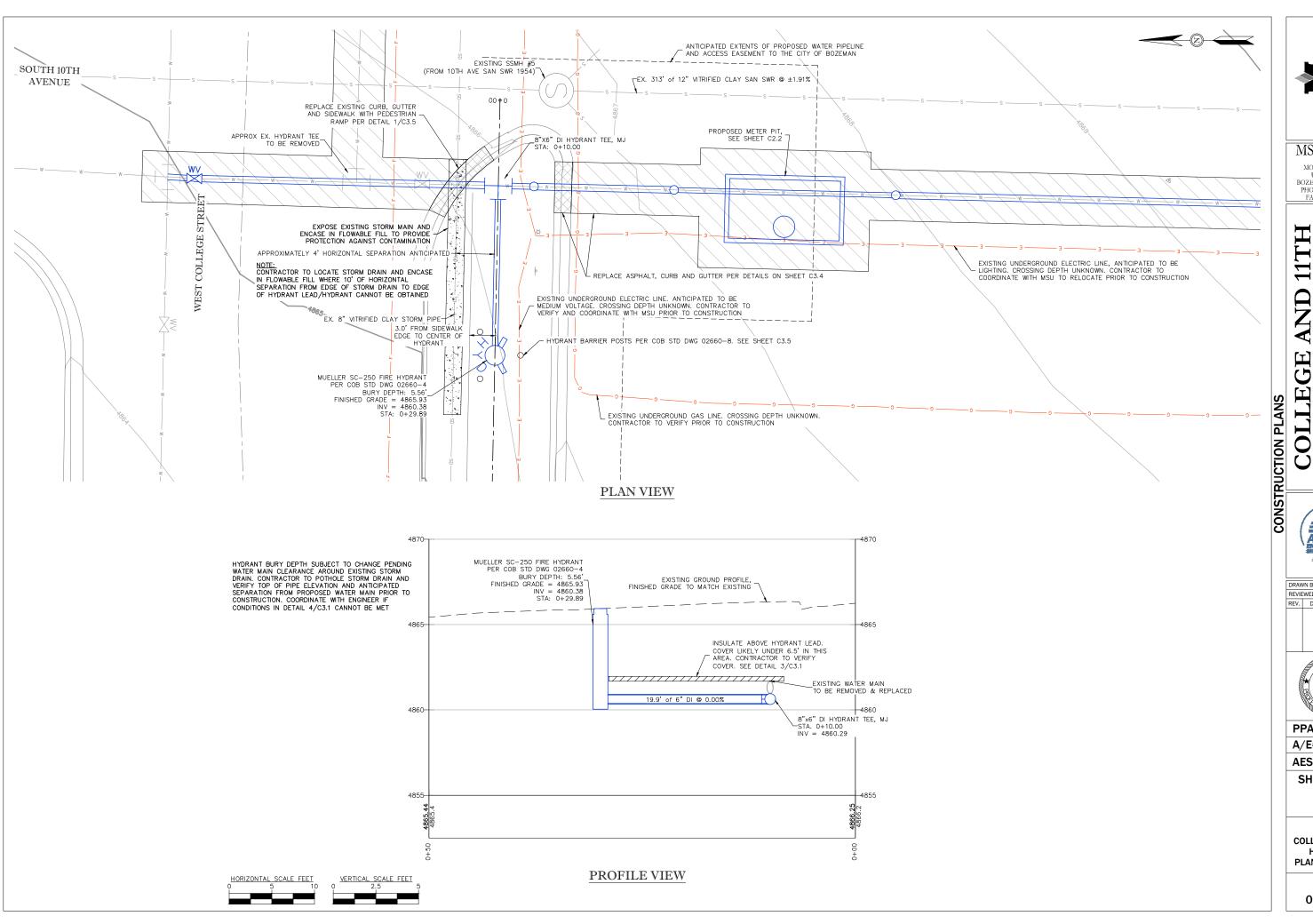
PPA#22-0543 A/E#00-00-00

AESI # 22-121

SHEET TITLE

SHEET

METER PIT PLAN & PROFILE





MONTANA STATE UNIVERSITY BOZEMAN, MONTANA PHONE: 406.004.5645

PHONE: 406.994.5413 FAX: 406.994.5665

COLLEGE AND 117
WATER MAIN
REPLACEMENT

ALLIED ON PROPERTY OF THE PROP

DRAWN BY: EJF, COL
REVIEWED BY: RSR
REV. DESCRIPTION DATE



PPA#22-0543 A/E#00-00-00

AESI # 22-121

SHEET TITLE

C2.3

SHEET
COLLEGE STREET
HYDRANT
PLAN & PROFILE

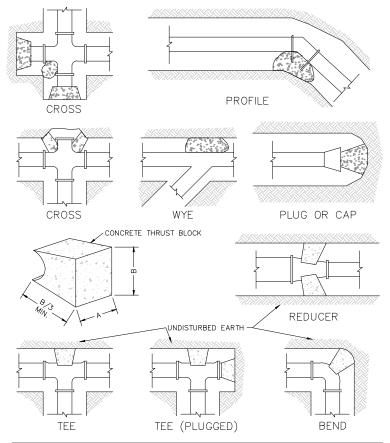
FITTING SIZE (IN)	FITTING	REQUIRED RESTRAINED LENGTH (FT)	COMMENTS *FOR TEE FITTINGS, THE FIRST DIMENSION LISTED IS THE NOMINAL PIPE SIZE, THE SECOND DIMENSION LISTED IS THE BRANCH PIPE SIZE
8"×6"	REDUCER	13'	APPLY TO LARGER SIDE OF REDUCER
8"	45° HORIZONTAL BEND	7'	EACH SIDE OF BEND
6"	90° HORIZONTAL BEND	12'	EACH SIDE OF BEND
8"	GATE VALVE	29'	APPLY TO EITHER SIDE OF IN-LINE VALVES
6"	GATE VALVE	22'	APPLY TO EITHER SIDE OF IN-LINE VALVES
8"×6"	TEE	4'	4-FT MIN. SOLID PIPE ON EACH RUN

NOTES:

- 1. REQUIRED RESTRAINED LENGTHS APPLY TO EACH SIDE OF THE FITTING.
- 2. NO BELL AND SPIGOT JOINTS SHALL BE LOCATED WITHIN THE REQUIRED RESTRAINED LENGTH. INSTALL SOLID PIPE IN THESE AREAS ONLY.
- 3. WHEREVER THE REQUIRED RESTRAINED LENGTH EXCEEDS THE LENGTH OF A FULL STICK OF PIPE, THE BELL AND SPIGOT JOINTS SHALL BE MECHANICALLY RESTRAINED
- WITH A LOCKING GASKET OR PIPE HARNESS.

 4. IF DISTANCE BETWEEN FITTINGS IS LESS THAN OR EQUAL TO THE CALCULATED RESTRAINT LENGTH, RESTRAIN ALL JOINTS BETWEEN THOSE FITTINGS.

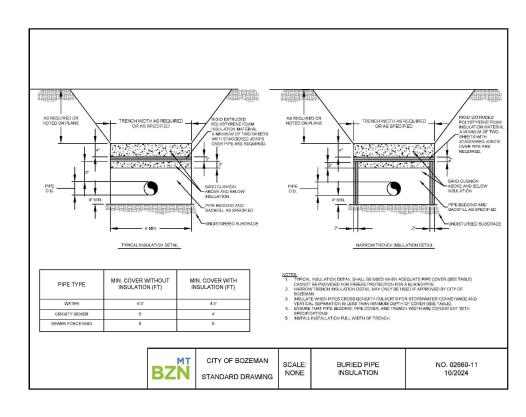




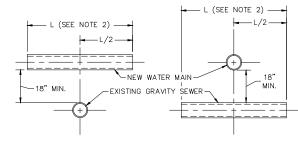
STANDARD DIMENSIONS FOR THRUST BLOCKING								
FITTING	TEES &	PLUGS	90. 1	BEND	45' BEND	& WYES	RED. &: 2	2.5° BEND
SIZES	Α	В	Α	В	Α	В	Α	В
6"	2'-0"	1'-11"	2'-5"	2'-2"	1'-10"	1'-7"	1'-9"	0'-10"
8"	2'-8"	2'-6"	3'-2"	3'-0"	2'-5"	2'-1"	1'-9"	1'-6"
10"	3'-4"	3'-3"	4'-0"	3'-10"	3'-0"	2'-9"	2'-2"	1'-11"
12"	4'-0"	3'-10"	4'-8"	4'-8"	3'-8"	3'-3"	2'-7"	2'-3"

- 1. SOME LOCATIONS MAY REQUIRE CONCRETE THRUST BLOCKS TO BE INSTALLED BECAUSE MECHANICAL JOINT RESTRAINTS MIGHT NOT BE COMPATIBLE WITH EXISTING FITTINGS AND/OR EXISTING PIPE MATERIAL.
- 2. THE USE OF MEGA-LUG JOINT RESTRAINTS ARE RECOMMENDED AT ALL VALVES, FITTINGS, AND HYDRANTS. THRUST BLOCKING IS OPTIONAL AT EACH LOCATION WHERE MEGA-LUG JOINT RESTRAINTS ARE PROPERLY USED.
- 3. THIS TABLE IS BASED ON 150 PSI MAIN PRESSURE AND 2000 PSF SOIL BEARING PRESSURE.
- 4. WRAP ALL FITTINGS WITH POLYETHYLENE ENCASEMENT.









CROSSINGS

NOTES:

- 1. A WATER MAIN CROSSING A GRAVITY SANITARY OR STORM SEWER SHOULD HAVE A MINIMUM 18" OF VERTICAL SEPARATION AND A CROSSING ANGLE OF APPROXIMATELY 90'. MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY SECTION 8.8.3 OF CIRCULAR 1 OUTLINES REQUIREMENTS FOR CROSSINGS WITH LESS THAN 18" (BUT MORE THAN 6") OF VERTICAL SEPARATION. SEE BELOW.
- 2. "L" IS A STANDARD LENGTH OF PIPE AS SUPPLIED BY A PIPE MANUFACTURER.
- 3. ARRANGE CROSSING PIPES SO ALL JOINTS ARE EQUIDISTANT.
- 4. ADEQUATE STRUCTURAL SUPPORT FOR PIPES AT CROSSINGS SHALL BE PROVIDED.

8.8.3 CROSSINGS (DIRECTLY FROM CIRCULAR DEQ-1, 2022 EDITION)

WATER MAINS CROSSING GRAVITY SANITARY OR STORM SEWERS. WHETHER THE WATER MAINS CROSSING GRAVITY SANITARY OR STORM SEWERS, WHETHER THE WATER MAIN IS ABOVE OR BELOW THE SEWER, MUST BE LAID WITH A MINIMUM VERTICAL SEPARATION DISTANCE OF 18 INCHES BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF THE SEWER. THE CROSSING MUST BE ARRANGED SO THAT THE SEWER JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE WATER MAIN JOINTS. WHERE A WATER MAIN CROSSES UNDER A SEWER, ADEQUATE STRUCTURAL SUPPORT MUST BE PROVIDED FOR THE SEWER TO MAINTAIN LINE AND GRADE AND TO PREVENT DAMAGE TO THE WATER MAIN.

IF THE PROPER VERTICAL SEPARATION AS DESCRIBED ABOVE CANNOT BE OBTAINED, THE DESIGN ENGINEER MUST CLEARLY IDENTIFY THE LOCATIONS OF SUB-MINIMUM SEPARATION ON THE PLANS AND MUST COMPLY WITH THE

- a. VERTICAL SEPARATION AT CROSSINGS BETWEEN WATER AND SEWER MAINS MUST BE AT LEAST SIX (6) INCHES;
- b. SEWERS MUST BE CONSTRUCTED OF SLIP-ON OR MECHANICAL JOINT PIPE COMPLYING WITH PUBLIC WATER SUPPLY DESIGN STANDARDS AND BE PRESSURE TESTED TO A MINIMUM OF 150 PSI TO ASSUME WATERTIGHTNESS;
- c. AT CROSSINGS, ONE STANDARD LENGTH OF NEW PIPE MUST BE CENTERED AT APPROXIMATELY A 90-DEGREE ANGLE IN RESPECT TO THE EXISTING PIPE;
- d. SEWER SERVICES UTILIZING IN—LINE FITTINGS AND EXTENDING TO PROPERTY LINES, OR BEYOND, MUST BE INSTALLED AND TESTED WITHIN 10 FEET OF THE CROSSING. SADDLES ARE NOT ACCEPTABLE; AND
- e. EITHER THE WATER OR SEWER MAIN MUST BE ENCASED IN A WATERTIGHT CARRIER PIPE WHICH EXTENDS 10 FEET ON BOTH SIDES OF THE CROSSING OR THE MAINS MUST BE ENCASED IN A MINIMUM OF SIX INCHES OF FLOWABLE FILL FOR A MINIMUM OF 10 FEET EACH SIDE OF THE CROSSING PIPES. IF THE MINIMUM SIX-INCH SEPARATION IS NOT VIABLE, THE WATER LINE MUST BE RELOCATED AND VERTICAL SEPARATION AT CROSSINGS BETWEEN WATER AND SEWER MAINS MUST BE AT LEAST 18 INCHES.





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11TH CEMEN **MAI** AND

ATER COLLEGE REPLA CONSTRUCTION PLANS



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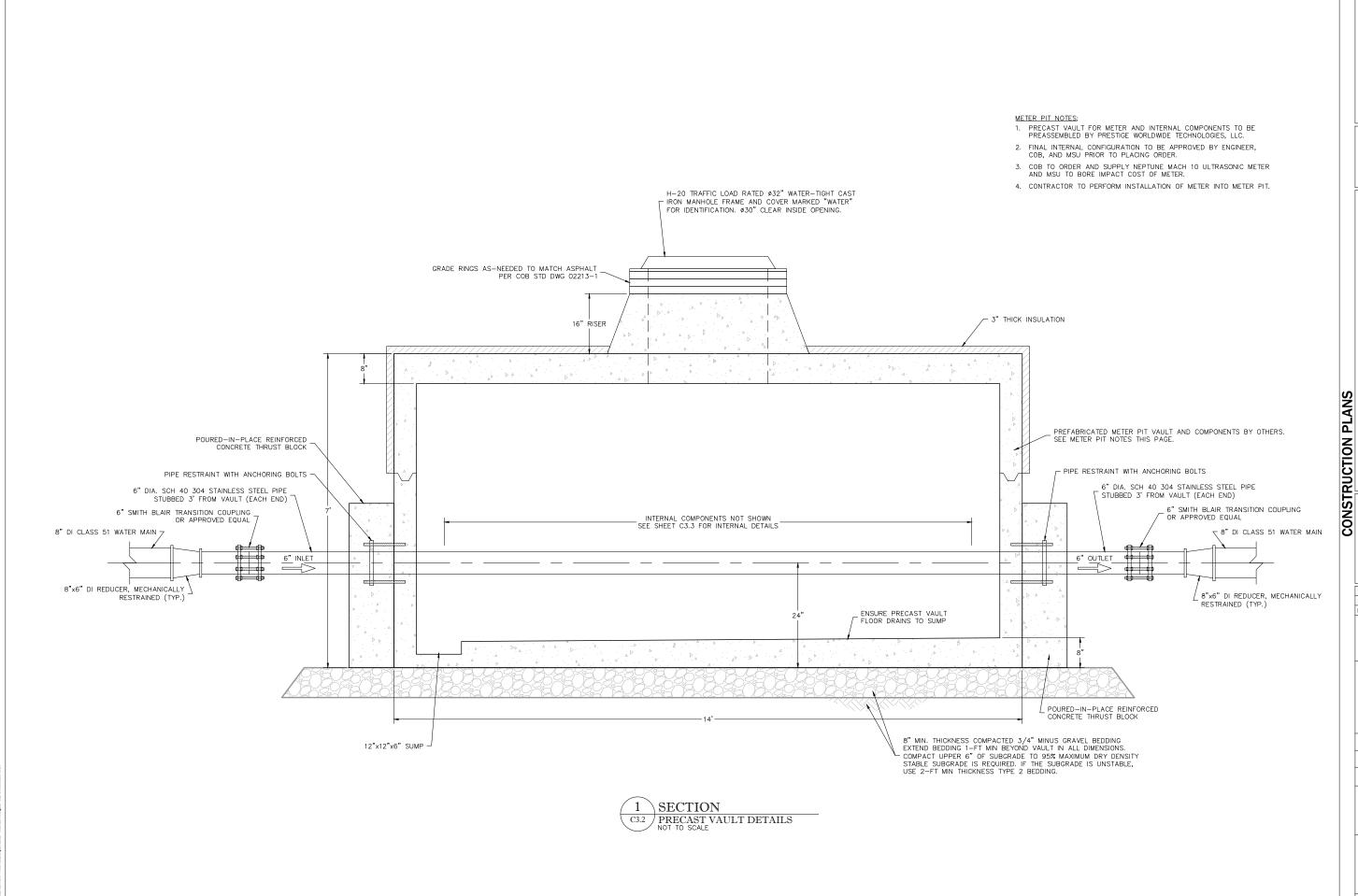


PPA#22-0543 A/E#00-00-00 **AESI # 22-121**

SHEET TITLE C3.1

SHEET

DETAILS





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COLLEGE AND 117 WATER MAIN REPLACEMENT



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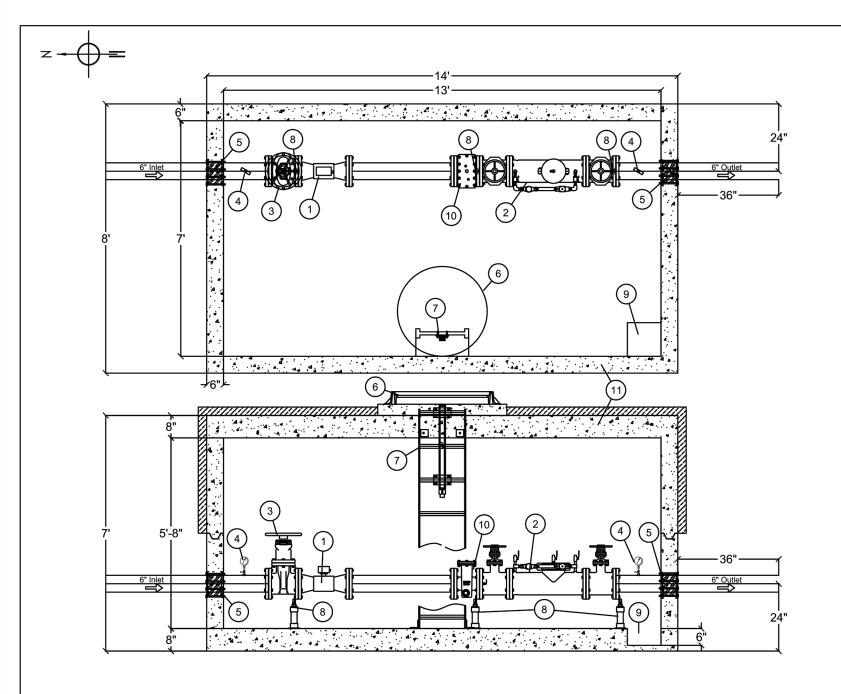
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AESI # 22-121

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PRECAST VAULT DETAILS



BILL OF MATERIALS				
ITEM	QTY	DESCRIPTION		
1	1	6" NEPTUNE MACH 10 ULTRASONIC WATER METER		
2	1	6" AMES SERIES 2000SS W/ OS&Y VALVES		
3	1	6" KENNEDY RESILIENT SEATED GATE VALVE KS RW NRS C515 150LB FLGXFLG W/ HANDWHEEL, ANSI/NSF-61G		
4	2	$2\frac{1}{2}$ " 0-300 PSI GAUGE LIQUID FILLED W/ $\frac{1}{4}$ SST. ISOLATION VALVE		
5	20	6" LINK SEAL ASSEMBLY(QTY= # OF LINKS NEEDED)		
6	1	32" C23 MANHOLE CAST IRON FRAME AND COVER H20 TRAFFIC RATED W/ WATER BADGE		
7	1	ALUMINUM LADDER WITH SAFETY POST AT OPENING		
8	2	6" STANDON FLANGE STYLE PIPE SUPPORT		
9	1	12" x 12" x 6" SUMP		
10	1	6" SINGER IN-LINE STRAINER: 316 SST, LARGE AREA Z PLATE SCREEN, DI BODY, NSF APPROVED FUSION BONDED EPOXY COATING, COMPLIES W/ AWWA C701 & C702		
11	1	PRESTIGE WWT 6" WALLED $\rm H_2O$ RATED PRV VAULT. OD: 14' L x 8' W x 7' T ID: 13' L x 7' W x 5'8" T W/ 3" INSULATION IN TOP HALF OF OUTSIDE OF VAULT		
		•		

ALL PIPING AND EQUIPMENT SUPPLIED BY PRESTIGE WORLDWIDE TECHNOLOGIES. <u>ALL PIPING IS SCHEDULI</u>

- 40 304 SST.
 VAULT SUPPLIER WILL SUPPLY AN INDIVIDUAL WITH AT LEAST 10 YRS EXP. WITH CONTROL VALVE EQUIPME 2. VAULT SUPPLIER WILL SUPPLY AN INDIVIDUAL WITH AT LEAST 10 YRS EXP. WITH CONTROL VALVE EQUIPMEN START-UP AND TROUBLE SHOOTING.

 3. VAULT SUPPLIER TO PROVIDE 3 COPIES OF 0 & M MANUALS.

 4. VAULT SHOWN INCLUDES ALL EQUIPMENT REQUIRED FOR A FULLY FUNCTIONING PRV STATION. THIS INCLUDES DELIVERY TO SITE.

 5. INSTALLER WILL OFF-LOAD VAULT AND COORDINATE WITH SUPPLIER DELIVERY. INSTALLER MUST PROVIDE.

- ALL EXCAVATION AND FINAL CONNECTIONS.

 DISINFECTIONS: FINAL GRADE AND ANY CONNECTIONS OUTSIDE OF THE VAULT ARE THE INSTALLER'S RESPONSIBILITY.

DISCLAIMER: THIS DRAWING IS THE PROPERTY OF PRESTIGE WORLDWIDE TECHNOLOGIES, LLC. AND EMBODIES CONFIDENTIAL INFORMATION, REGISTERED MARKS, TRADE SECRET INFORMATION, AND/OR KNOW HOW THAT IS PROPERTY OF PRESTIGE WORLDWIDE TECHNOLOGIES, LLC AND SHALL NOT BE DISCLOSED TO ANYONE OUTSIDE THIS PROJECT WITHOUT DIRECT CONSENT FROM PRESTIGE WWT



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DRAWN BY: DATE: SCALE AT AO: TITLE: 2/19/2025 1:40 **6" FLOW METER VAULT** CHECKED BY: DATE: **REVISION:** 2/19/2025 PROJECT: **DRAWING NO:** MONTANA STATE UNIV - 11TH AND COLLEGE





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11TH AND

WATER MAIN REPLACEMEN COLLEGE CONSTRUCTION PLANS



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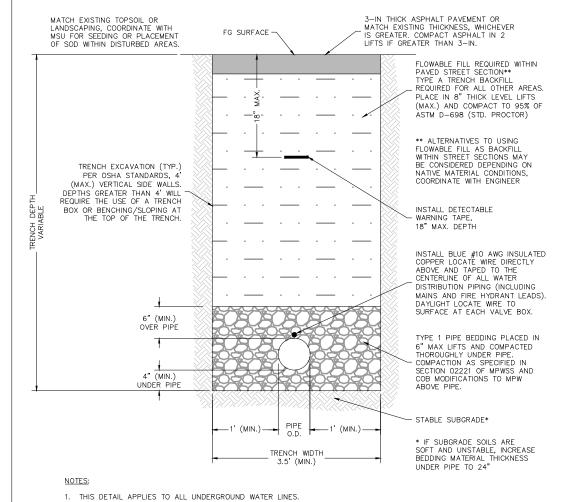
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C3.3

SHEET

PRECAST VAULT **INTERNAL LAYOUT**



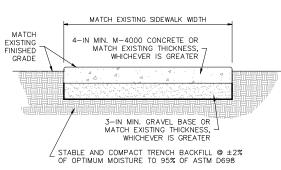
2. INSULATION BOARD SHALL BE INSTALLED ABOVE THE PIPE WHEREVER ANY WATER DISTRIBUTION PIPING (INCLUDING MAINS, SERVICES, AND FIRE HYDRANT LEADS) HAS LESS THAN 6.5' OF COVER. SEE PIPE

3. WHERE TRENCH PASSES THROUGH EXISTING PAVEMENT THE PAVEMENT SHALL BE CUT ALONG A NEAT VERTICAL LINE A MINIMUM OF 12" FROM THE EDGE OF THE TRENCH OPENING, WHERE NEAT LINE IS LESS THAN 3' FROM EDGE OF EXISTING PAVEMENT OR CURB AND GUTTER SECTION, REMOVE AND REPLACE ENTIRE PAVEMENT SECTION BETWEEN TRENCH AND EDGE OF PAVEMENT.

TRENCH EXCAVATION, BEDDING, AND BACKFILL

INSULATION DETAIL 3/C3.1 FOR LOCATION AND WIDTH REQUIREMENTS.

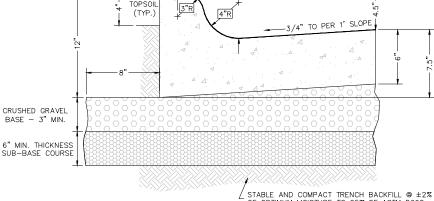
1 DETAIL



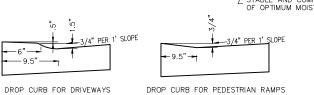
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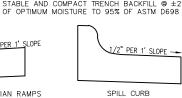
1. SAW CUT SIDEWALKS ALONG EXISTING JOINTS.





5.4" (0.45')





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NOTES:

- MATCH EXISTING CURB & GUTTER PROFILE GEOMETRY. THE EXISTING GEOMETRY WILL LIKELY MATCH THE CITY OF BOZEMAN STANDARD SHOWN ABOVE.
- 2. SAW CUT CURB & GUTTER PERPENDICULAR TO FACE OF CURB.
- 3. SUBGRADE OR BASE COURSE COMPACTION SHALL CONFORM TO SECTION 02230 (M.P.W. SPECS.)
- 4. CONTRACTION JOINTS SHALL BE PLACED AT 10' INTERVALS AND SHALL HAVE A MINIMUM DEPTH OF 3/4" AND MINIMUM WIDTH OF 1/8".
- 5. 1/2" EXPANSION JOINT MATERIAL SHALL BE PLACED AT ALL P.C.S, P.T.S, CURB RETURNS AND AT NOT MORE THAN 300' INTERVALS. THE EXPANSION MATERIAL SHALL EXTEND THROUGH THE FULL DEPTH OF THE CURB & GUTTER.
- 6. CONCRETE SHALL BE CLASS M-4000.
- CRUSHED GRAVEL BASE SHALL MEET THE REQUIREMENTS OF SECTION 02235 (MPW SPECS.) FOR CURB AND GUTTER REPLACEMENT PROJECTS, WASHED ROCK MAY BE USED FOR THE GRAVEL BASE.





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COLLEGE AND 1
WATER MAIN
REPLACEMEN



CONSTRUCTION PLANS

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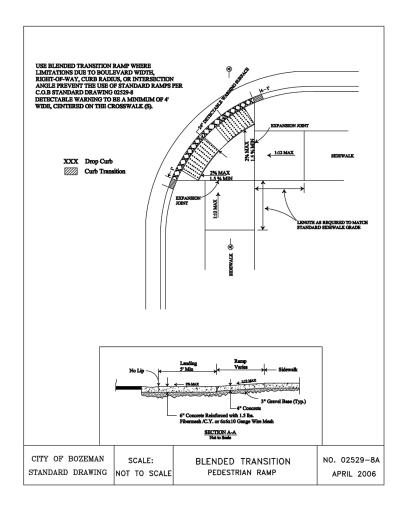
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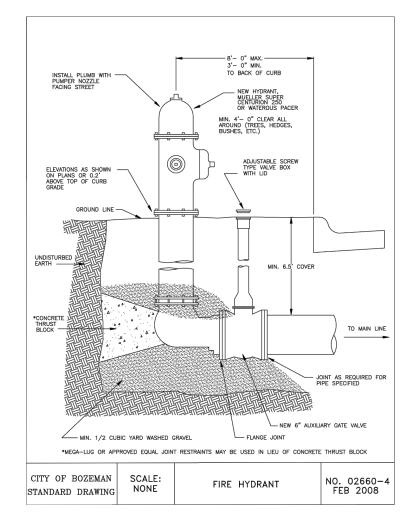
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DETAILS



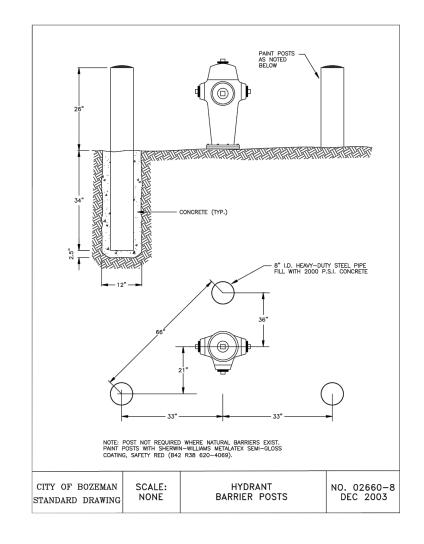




NOTE:

- 1. ALL HYDRANTS TO HAVE BOLLARDS INSTALLED PER DETAIL 3/C3.5
- 2. THRUST BLOCKS MAY BE NECESSARY AT HYDRANTS IF MECHANICAL JOINT RESTRAINTS CANNOT BE PROPERLY FITTED TO EXISTING HYDRANT TEES OR TAPPING VALVES.









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COLLEGE AND 11TH WATER MAIN REPLACEMENT

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C3.5

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