

**2020 WATER MAIN  
REPLACEMENT  
BUTTE-SILVER BOW  
DEPARTMENT OF PUBLIC WORKS**

BUTTE-SILVER BOW COUNTY, MONTANA

PREPARED BY

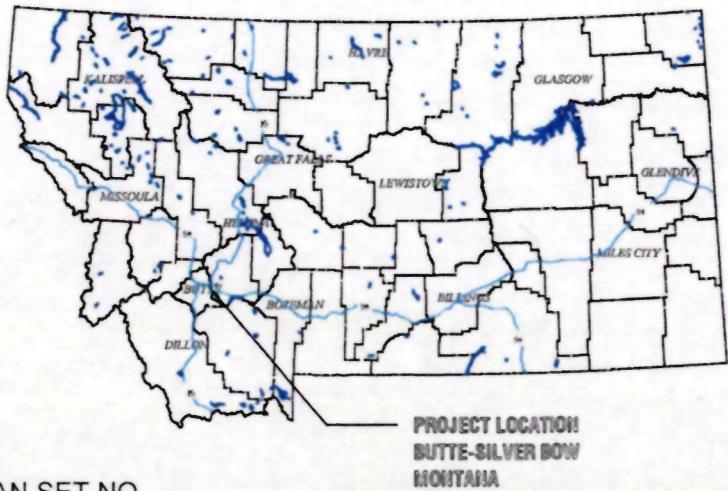


AUGUST 2020

SHEET INDEX

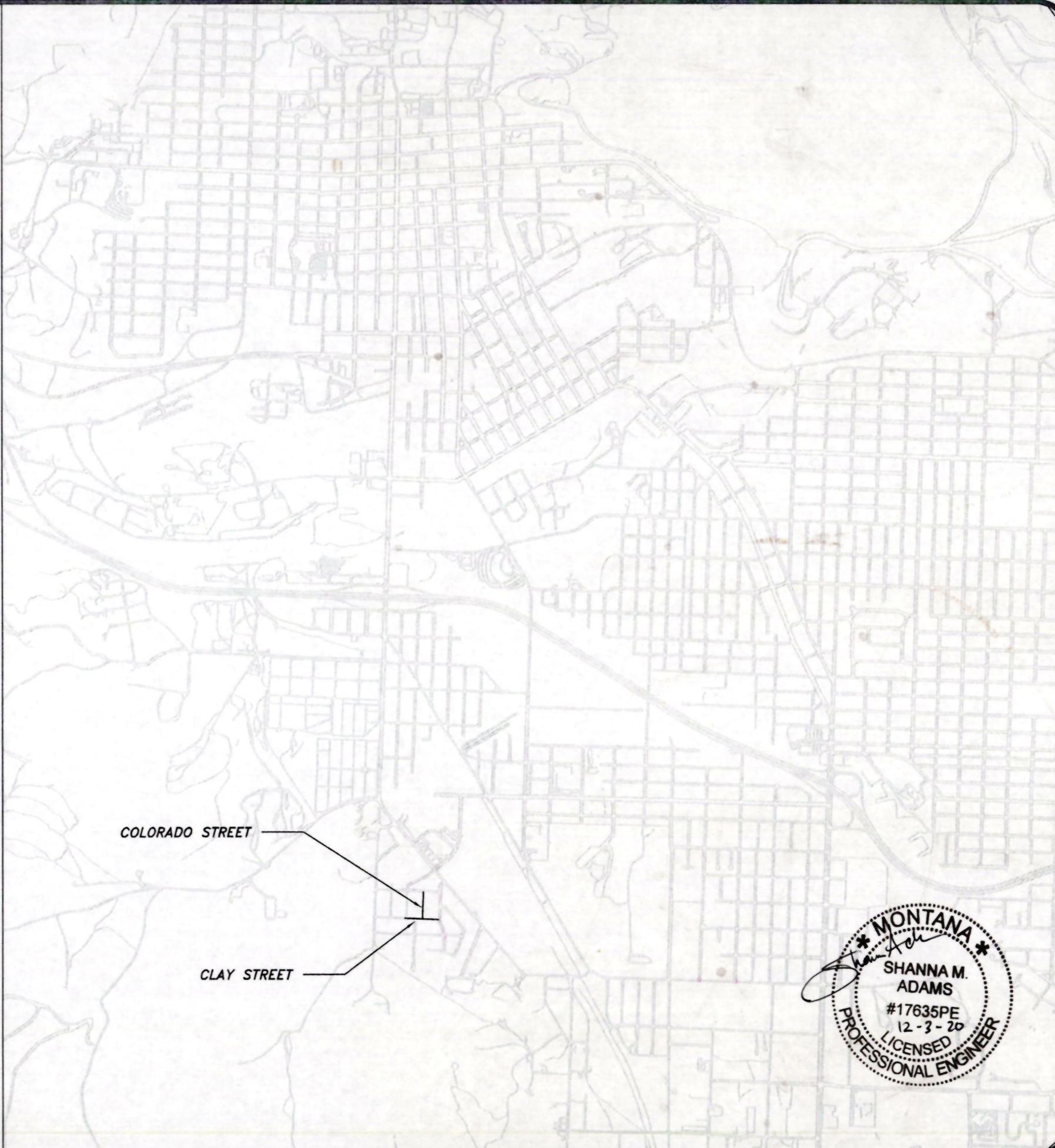
SHEET NO.	DESCRIPTION
G1	COVER SHEET, PROJECT LOCATION MAP
G2	LEGEND AND GENERAL NOTES
D1	DETAILS
D2	DETAILS
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D5	DETAILS
PP1	CLAY STREET (STA. 0+00 THRU 6+16 6+32.01)
PP2	COLORADO ST. (STA. 6+00 0+00 THRU 4+82)

RECORD DRAWING  
OCTOBER 2020



PLAN SET NO. \_\_\_\_\_

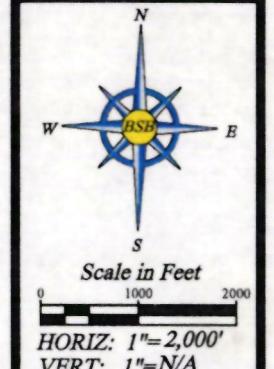
8/18/2020 2020 watermain designs.dwg



REVISION:		
DATE	BY	DESC:



Drawn byBB  
Designed bySA  
Checked bySA  
Approved bySA  
Project NO.EQ21-1265  
Date: 8/21/2020



BSB DEPARTMENT OF PUBLIC WORKS  
2020 WATER MAIN REPLACEMENT

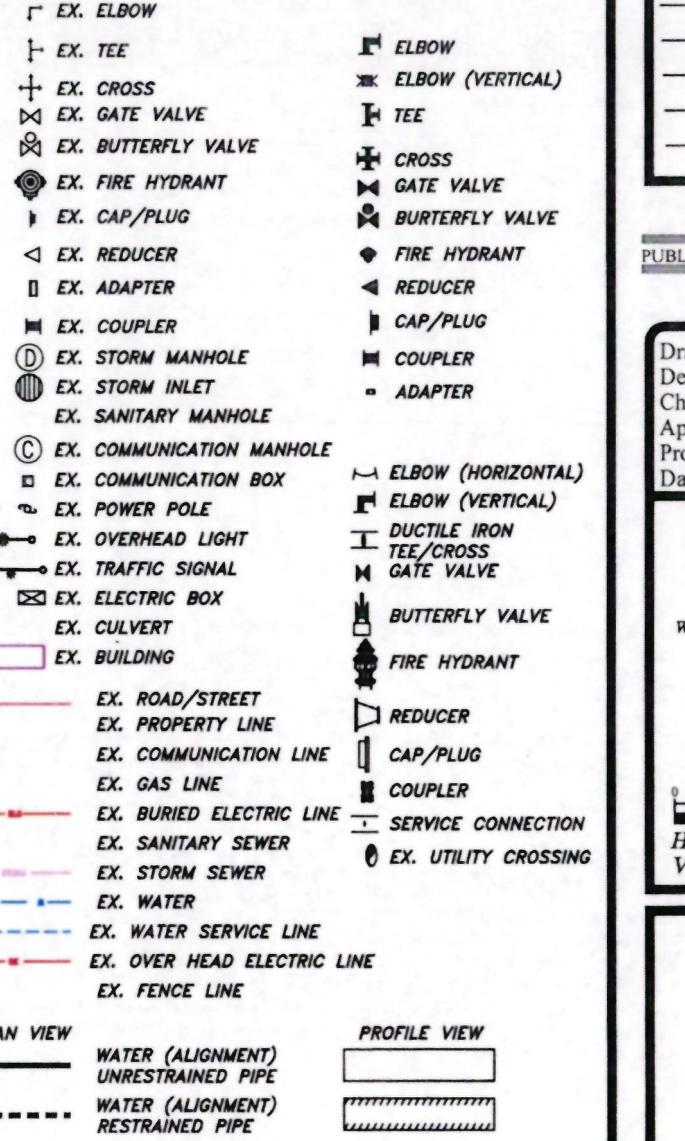
RECORD DRAWING

SITE MAP

Sheet  
G-1

## GENERAL NOTES:

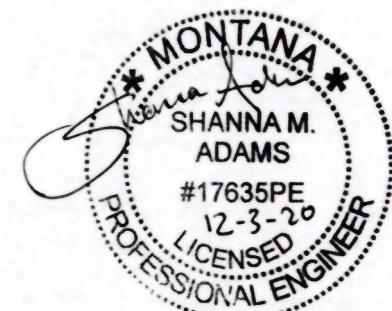
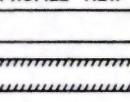
1. CONTRACTOR SHALL NOTIFY IN WRITING ALL UTILITY COMPANIES AND UTILITY OWNERS AND DETERMINE EXACT LOCATION OF ALL UNDERGROUND UTILITIES BEFORE COMMENCING WORK. NOTICE TO UTILITIES SHALL BE SUBMITTED TO OWNER; 48-HOUR NOTICE IS REQUIRED. CONTRACTOR IS RESPONSIBLE FOR PROTECTING AND REPAIRING ANY DAMAGED UTILITIES. CONTRACTOR SHALL NOTIFY ONE-CALL UTILITY LOCATE AT (800) 424-5555 AT LEAST 48-HOURS PRIOR TO CONSTRUCTION.
2. UTILITY LOCATIONS SHOWN ON THE DRAWINGS ARE APPROXIMATED BASED ON RECORDS PROVIDED BY THE UTILITY OWNERS. ALL UTILITY LOCATIONS SHOWN ARE SUBJECT TO THE ACCURACY OF THE LOCATION METHODS AND RECORDS EMPLOYED BY THE UTILITY OWNERS. UTILITIES ARE ALSO SUBJECT TO RELOCATION SINCE THE DRAWINGS WERE PREPARED. NO EXCAVATION WAS PERFORMED IN LOCATING THESE UTILITIES. UTILITY LOCATIONS SHOWN SHOULD BE CONSIDERED APPROXIMATE AND ACTUAL DEPTHS MAY VARY.
3. CONTRACTOR SHALL PERFORM A PRE-CONDITION SURVEY SINCE WORK WILL BE CLOSE TO PROPERTY BOUNDARIES.
4. CONTRACTOR SHALL CONTACT UTILITY COMPANIES 48 HOURS PRIOR TO TRENCHING WITHIN 15 FEET OF ALL OVERHEAD POLES TO ALLOW FOR THE UTILITY COMPANY TO SECURE POLES. ANY FEES CHARGED BY UTILITY OWNERS FOR PROTECTION AND ANCHORING WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
5. CONTRACTOR SHALL NOTIFY ENGINEER OF ALL UTILITIES ENCOUNTERED DURING CONSTRUCTION AND SHALL NOT BACK FILL UNTIL THE CONTRACTOR HAS MADE A RECORD OF ITS TYPE, SIZE, AND LOCATION. CONTRACTOR SHALL BACK FILL AND COMPACT FILL SOIL AROUND UTILITIES SO THAT UTILITIES WILL NOT BE DAMAGED DURING COMPACTION OR FROM FUTURE SOIL SETTLING.
6. CONTRACTOR SHALL BE AWARE THAT UTILITY LOCATIONS ARE APPROXIMATE. EXACT LOCATION AND DEPTH WILL NEED TO BE VERIFIED BY THE CONTRACTOR. EXPLORATORY DIGGING MAY BE REQUIRED AHEAD OF THE WATER LINE TRENCH TO VERIFY LOCATION AND ALLOW FOR DEFLECTION IF REQUIRED.
7. ANY UNDERGROUND WIRING FOR STREET LIGHTS OWNED BY BUTTE-SILVER BOW WILL NOT BE LOCATED BY THE OWNER. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING THESE LINES. CONTRACTOR IS ALSO RESPONSIBLE FOR ANY REPAIRS REQUIRED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE ALL UTILITIES LOCATED PRIOR TO BEGINNING CONSTRUCTION, AS DESCRIBED ABOVE AND IN THE SPECIFICATIONS.
8. WHERE EXISTING UTILITY (TELEPHONE, GAS, ELECTRICAL, ETC.) RELOCATES ARE REQUIRED ON THE DRAWINGS, THE CONTRACTOR IS TO ARRANGE FOR AND PAY THE COST OF SUCH RELOCATION'S, BUT THE ACTUAL WORK IS TO BE PERFORMED BY THE APPROPRIATE UTILITY COMPANY.
9. WHEN EXISTING UTILITY LINES ARE TEMPORARILY SHUT DOWN, THE TIMES MUST BE APPROVED BY THE UTILITY OWNER.
10. PROPERTY (RIGHT-OF-WAYS) LINES ARE GRAPHICALLY SHOWN BASED INFORMATION CONTAINED IN THE BUTTE-SILVER BOW GEOGRAPHIC INFORMATION SYSTEM DATABASE AND ARE NOT TO BE USED TO REESTABLISH BOUNDARIES. THEIR TRUE LOCATIONS MAY NOT BE EXACTLY SHOWN ON THE DRAWINGS. MINOR ALIGNMENT ADJUSTMENTS MAY BE NEEDED IN THE FIELD.
11. CONTRACTORS SHALL RESPECT ALL RIGHT-OF-WAY BOUNDARIES. ALL CONSTRUCTION WORK SHALL BE DONE WITHIN THESE AREAS. ANY WORK OUTSIDE THE RIGHT-OF-WAY SHALL ONLY BE DONE AFTER RECEIVING WRITTEN PERMISSION FROM THE LANDOWNER.
12. EXCAVATION:
  - A. GENERAL: THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DESIGNING AND CONSTRUCTING STABLE, TEMPORARY EXCAVATIONS AND SHOULD SHORE, SLOPE, OR BENCH THE SIDES OF THE EXCAVATIONS AS REQUIRED TO MAINTAIN STABILITY OF THE EXCAVATION SIDES AND BOTTOM. ALL EXCAVATIONS SHOULD COMPLY WITH APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS INCLUDING THE CURRENT OSHA EXCAVATION AND TRENCH SAFETY STANDARDS. CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR, WHO SHALL ALSO BE RESPONSIBLE FOR THE MEANS, METHODS, AND SEQUENCING OF CONSTRUCTION OPERATIONS.
  - B. EXCAVATION AND SLOPES: IN NO CASE SHOULD SLOPE HEIGHT, SLOPE INCLINATION, OR EXCAVATION DEPTH INCLUDING TRENCH EXCAVATION DEPTH, EXCEED THOSE SPECIFIED IN LOCAL, STATE, OR FEDERAL REGULATIONS. SPECIFICALLY, IN THE CURRENT OSHA HEALTH AND SAFETY STANDARDS FOR EXCAVATIONS, 29 CFR PART 1926, SHOULD BE FOLLOWED.
13. CONTRACTOR SHALL REMOVE ANY CULVERTS ENCOUNTERED DURING WATER MAIN REPLACEMENT AND REPLACE THEM TO THE PRE-EXISTING CONDITION AND GRADE.
14. CONTRACTOR SHALL REMOVE AND REPLACE ALL EXISTING FEATURES DISTURBED DURING WATER MAIN REPLACEMENT CONSTRUCTION TO ORIGINAL CONDITION.
15. ANY FENCES REMOVED TO ALLOW FOR CONSTRUCTION SHALL ONLY BE REMOVED AFTER RECEIVING PERMISSION FROM THE AFFECTED LANDOWNER. IF REQUIRED BY THE LANDOWNER, THE CONTRACTOR SHALL INSTALL TEMPORARY OFFSET FENCING. REMOVED FENCES SHALL BE REINSTALLED TO A CONDITION THAT IS EQUAL TO OR BETTER THAN THE ORIGINAL.
16. ALL AREAS OF DISTURBANCE SHALL BE RECLAIMED TO A CONDITION THAT IS EQUAL TO OR BETTER THAN THE ORIGINAL. SIX TO EIGHT INCHES OF TOPSOIL IS TO BE SAVED AND REPLACED IN VEGETATED AREAS; THESE AREAS SHALL BE RE-SEEDED OR SODDED WITH A SEED MIX APPROVED BY THE ENGINEER. ASPHALT PAVEMENT SHALL BE REPLACED AS REQUIRED IN THE SPECIFICATIONS. CONCRETE CURB, SIDEWALK AND PAVING SHALL BE REPLACED AS REQUIRED IN THE SPECIFICATIONS.
17. ALL STREETS ARE PAVED, UNLESS OTHERWISE NOTED. PAVEMENT SHALL BE SAW CUT AND REMOVED PER THE SPECIAL PROVISIONS AND THE LATEST EDITION OF THE MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS.
18. ALL EXISTING WATER LINES ARE KALAMAIN STEEL UNLESS OTHERWISE NOTED.
19. A MINIMUM COVER OF 6 FEET, 6 INCHES IS TO BE MAINTAINED OVER ALL WATER LINES UNLESS SHOWN ON THE DRAWINGS. THE WATER LINES SHALL BE LAID IN SUCH A MANNER AS TO AVOID HIGH POINTS IN THE LINE NOT SHOWN ON THE DRAWING.
20. THE 6-FOOT, 6 INCH DEPTH OF BURY SHOWN ON THE DRAWINGS IS A MINIMUM REQUIRED DEPTH OF BURY.
21. THE INSTALLATION AND TESTING OF ALL WATER LINES, FITTINGS, AND APPURTENANCES SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE BUTTE-SILVER BOW WATER MAIN MATERIALS SPECIFICATIONS, THE MONTANA PUBLIC WORKS SPECIFICATION AND THE PROJECT SPECIFICATIONS.
22. LOCATIONS OF VALVES, TEES, FITTINGS, HYDRANTS, CONNECTIONS TO EXISTING MAINS AND OTHER FEATURES SHOWN ON THE DRAWINGS SHALL BE CONSIDERED APPROXIMATE FOR BIDDING PURPOSES. FINAL LOCATIONS ARE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
23. DEFLECTIONS OF THE PIPE AT THE JOINTS ARE NOT TO EXCEED MANUFACTURER'S REQUIREMENT.
24. GROUND WATER MAY BE ENCOUNTERED THAT WILL EFFECT THE PIPE INSTALLATION PROCESS. THE CONTRACTOR MUST UTILIZE AN EFFECTIVE Dewatering PLAN TO INSTALL MATERIALS IN COMPLIANCE WITH THE SPECIFICATIONS.
25. THE CONTRACTOR SHALL FIELD VERIFY EXISTING PIPE DIMENSIONS BEFORE ORDERING TRANSITION COUPLINGS, TEES, ELBOWS, MECHANICAL COUPLINGS, FLANGED AND/OR MECHANICAL JOINT FITTINGS, APPURTENANCES, VALVES, ETC.. THE CONTRACTOR IS SOLELY RESPONSIBLE TO MAKE SURE NEW FITTINGS, COUPLINGS, VALVES, ETC., ARE COMPATIBLE WITH AND PROVIDE A PROPER FIT TO EXISTING FACILITIES.
26. PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES THAT WILL INTERRUPT THE EXISTING WATER SYSTEM, ALL MATERIALS AND PRODUCTS NECESSARY TO MAKE THE INTENDED CONNECTION SHALL BE ON SITE.
27. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY WATER SERVICE TO EACH RESIDENCE OR OTHER STRUCTURE WHOSE WATER SERVICE SHALL BE INTERRUPTED BY CONSTRUCTION ACTIVITIES FOR OVER 6 HOURS. SERVICE TO COMMERCIAL BUSINESSES SHALL NOT BE INTERRUPTED, AS REQUIRED IN THE SPECIAL PROVISIONS. ALL Affected USERS, BUTTE SILVER BOW, AND THE ENGINEER SHALL BE NOTIFIED AT LEAST 24 HOURS PRIOR TO ANY WATER SERVICE INTERRUPTION.
28. CONTRACTORS MAY USE SHORTER LENGTHS OF PIPE AS NECESSARY FOR PROPER PLACEMENT OF PIPE.
29. ALL METAL IN CONTACT WITH THE SOIL SHALL BE EITHER POLY-WRAPPED(DOUBLE WRAPPED) OR BITUMINOUS COATED.
30. ONLY BUTTE-SILVER BOW PERSONNEL SHALL OPERATE EXISTING WATER LINE VALVES.
31. UNLESS OTHERWISE SPECIFIED, THE CONTRACTOR MAY USE DUCTILE IRON CLASS 350 PUSH-ON, MECHANICAL JOINT, OR FLANGE FITTINGS. JOINTS WILL UTILIZE TYTON JOINT. GASKETS ALL FITTINGS SHALL MEET OR EXCEED AWWA C153/A21.33 REQUIREMENTS. SEE MATERIAL SPECIFICATIONS.
32. TRAFFIC CONTROL:
  - A. GENERAL: CONSTRUCTION SHALL NOT COMMENCE ON THE PROJECT UNTIL NECESSARY CONSTRUCTION WARNING SIGNS AND TRAFFIC CONTROL ARE IN PLACE AND APPROVED BY THE ENGINEER.
  - B. TRAFFIC PLAN: CONTRACTOR SHALL PREPARE AND SUBMIT FOR REVIEW BY THE MONTANA DEPARTMENT OF TRANSPORTATION A TRAFFIC CONTROL PLAN (WHERE APPLICABLE). ALL TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
  - C. STREET CLOSURES: AT LEAST ONE-WAY TRAFFIC SHALL BE MAINTAINED AT ALL TIMES ON ALL ROADS UNLESS SPECIAL PERMISSION IS OBTAINED FROM BUTTE-SILVER BOW. FOR STREETS UNDER THEIR JURISDICTION, PERMISSION FOR TEMPORARY ROAD CLOSURES MUST ALSO BE OBTAINED FROM THE MONTANA DEPARTMENT OF TRANSPORTATION.
  - D. LOAD LIMITS: LEGAL LOAD LIMIT REQUIREMENTS SHALL BE ENFORCED ON ALL STATE HIGHWAYS, CITY STREETS, AND COUNTY ROADS.
33. CONTRACTOR IS TO PROVIDE THEIR OWN WATER FOR DUST CONTROL AND COMPACTION.
34. ANY DISTURBED PROPERTY OR SECTION CORNERS ARE TO BE RESET BY A PROFESSIONAL LAND SURVEYOR LICENSED IN THE STATE OF MONTANA AT THE CONTRACTOR'S EXPENSE.
35. SOME STREETS AND ALLEYS WITHIN THESE PLANS WILL REQUIRE THE CONTRACTOR TO WORK WITHIN RESTRICTIVE STREET WIDTHS AND RESTRICTIVE HEIGHT CLEARANCES DUE TO OVER HEAD UTILITIES. CONTRACTOR IS ADVISED THAT IT MAY BE NECESSARY TO EXCAVATE SOILS THEN TRANSPORT TO AND FROM THE SITE.
36. BUTTE SILVER BOW RESERVES THE RIGHT OF REFUSAL ON ANY AND ALL MATERIALS ASSOCIATED WITH EXCAVATION AND REPLACEMENT OF THE WATER MAINS. ITEMS MAY INCLUDE, BUT NOT NECESSARY LIMITED TO, MATERIALS SUCH AS ANTIQUE BOTTLES, QUARRIED STONE, AND FIRE HYDRANTS.



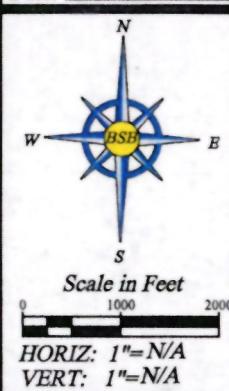
## PLAN VIEW

WATER (ALIGNMENT)  
UNRESTRAINED PIPE  
WATER (ALIGNMENT)  
RESTRAINED PIPE

## PROFILE VIEW



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Checked bySA  
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2020 WATER MAIN REPLACEMENT

RECORD DRAWING

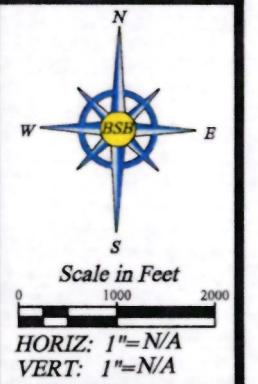
LEGEND &  
GENERAL NOTES

Sheet  
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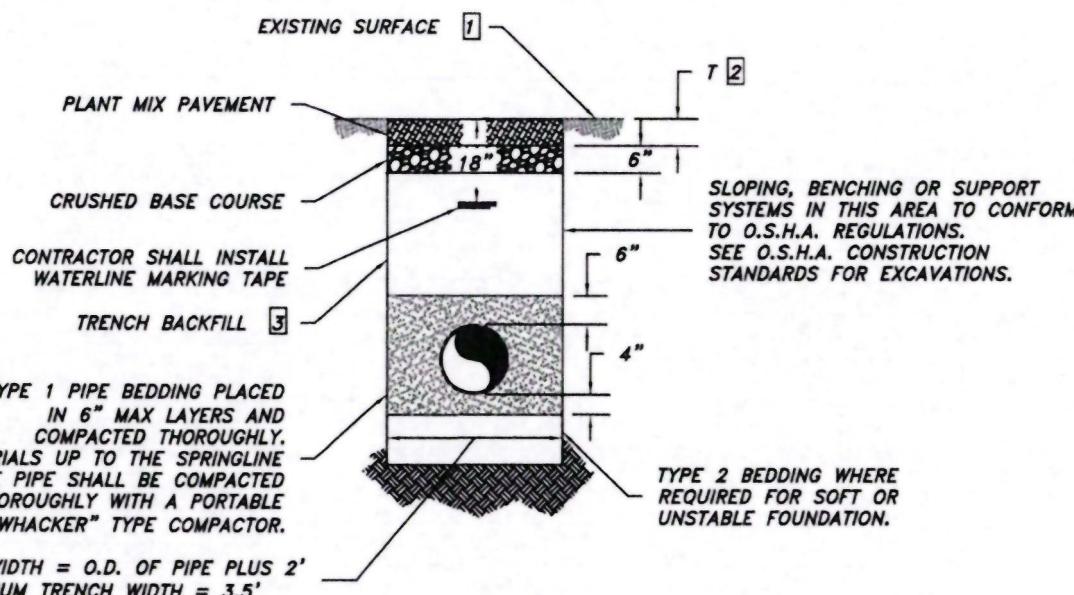
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2020 WATER MAIN REPLACEMENT

DETAILS

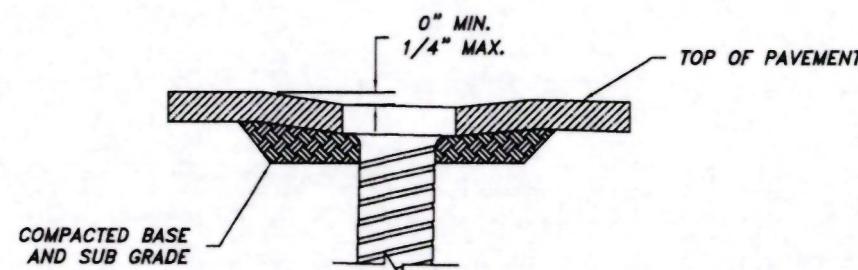
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**NOTES:**

1. BACKFILL TRENCH TO MATCH EXISTING SURFACE.
2. T=4" MIN. ON ALL PAVED STREETS. PLANT MIX PAVEMENT SHALL BE OF 2 LIFTS. WHERE EXISTING SURFACE IS NOT ASPHALT PAVEMENT, INSTALL SURFACING TO MATCH EXISTING CONDITIONS.
3. BENEATH PAVED AREAS, TRENCH BACKFILL SHALL BE COMPAKTED TO 95% OF MAXIMUM DRY DENSITY (AS DETERMINED VIA ASTM D698) AT  $\pm 3\%$  OF OPTIMUM MOISTURE CONTENT.



### 1 WATER MAIN TYPICAL TRENCH SECTION



**NOTES:**

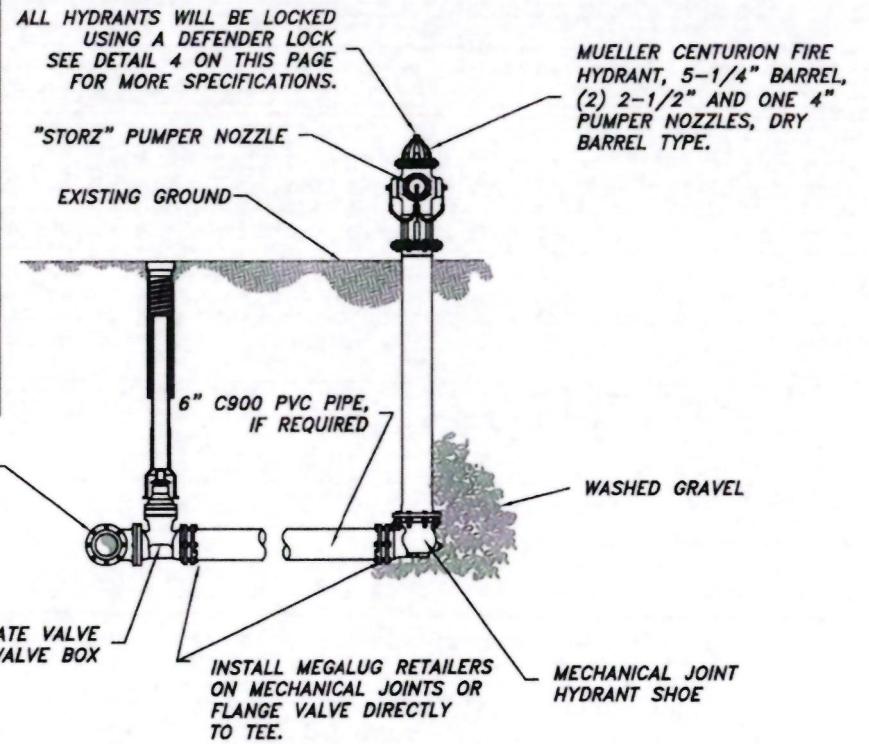
1. ADJUST WATER VALVES UPWARD OR DOWNWARD AS REQUIRED.
2. FINAL ADJUSTMENT SHALL BE MADE BEFORE PAVING.

### 3 WATER VALVE ADJUSTMENT DETAIL

**NOTES:**

1. INSTALL HYDRANT WITH PUMPER NOZZLE FACING STREET.
2. IF MEGALUG RETAINER GLANDS ARE NOT USED, THRUST RESTRAINT WILL BE PROVIDED IN THE FORM OF CONVENTIONAL CONCRETE THRUST BLOCKS ON THE TEE, VALVE, AND HYDRANT AS PER MPW SPECIFICATIONS.
3. HYDRANTS SHALL BE INSTALLED A MINIMUM OF 2' BEHIND THE BACK OF CURB, EDGE OF SIDEWALK OR EDGE OF PAVEMENT.
4. THE HYDRANT VALVE SHALL BE INSTALLED AS CLOSE TO THE WATER MAIN AS THE DIMENSIONS OF THE HYDRANT TEE AND VALVE ALLOW.

\* FIRE HYDRANT REPLACEMENT REQUIRES CONCRETE SURFACING REMOVAL AND REPLACEMENT



### 2 HYDRANT INSTALLATION DETAIL



HYDRANT DEFENDER SECURITY DEVICE  
"STORZ" PUMPER NOZZLE  
FRONT AND SIDE VIEW

HYDRANT DEFENDER SECURITY DEVICE  
4" PUMPER NOZZLE  
FRONT AND SIDE VIEW

**NOTES:**

1. USE MUELLER HYDRANT DEFENDER SECURITY DEVICE (PART NO. HSZ00100) OR EQUIVALENT ON ALL HYDRANTS WITH REGULAR 4" NOZZLE.
2. USE MUELLER HYDRANT "STORZ" DEFENDER SECURITY DEVICE (PART NO. HSZ04000) EQUIVALENT ON ALL HYDRANTS WITH "STORZ" PUMPER NOZZLE.

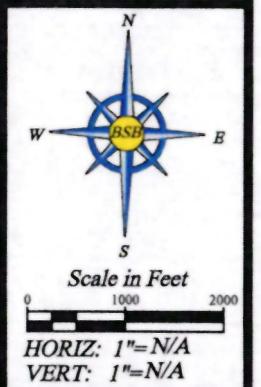
### 4 HYDRANT SECURITY DEVICE DETAIL



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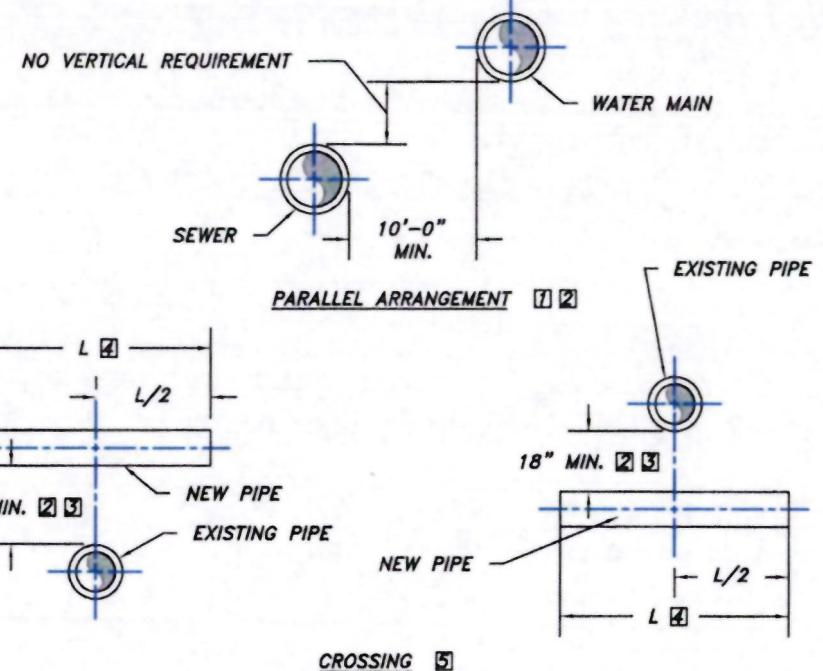
BSB DEPARTMENT OF PUBLIC WORKS  
2020 WATER MAIN REPLACEMENT  
**RECORD DRAWING**

DETAILS

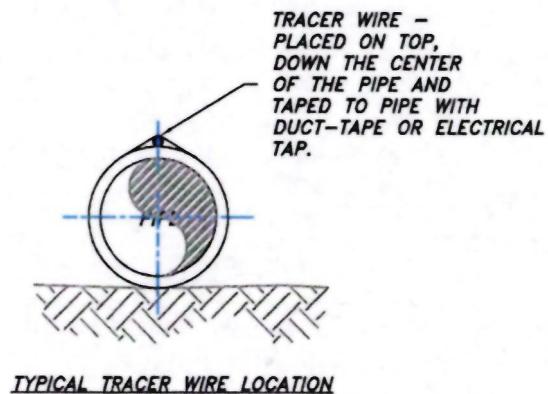
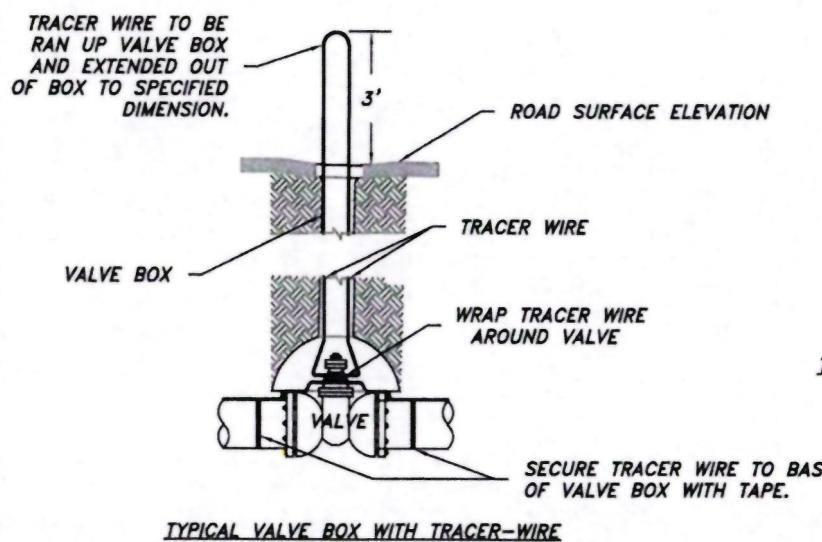
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NOTES:

- 1. SPECIFIC MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY APPROVAL (DEVIATION) IS REQUIRED FOR WATER MAINS INSTALLED WITH LESS THAN 10' EDGE-TO-EDGE SEPARATION FROM SANITARY OR STORM SEWERS.
- 2. NO EXCEPTIONS TO THE MIN. SEPARATION REQUIREMENT IS PERMITTED WHEN THE SEWAGE-CARRYING PIPE IS A FORCE MAIN. AT CROSSINGS, ONE FULL LENGTH OF WATER MAIN SHALL BE LOCATED SO THAT BOTH JOINTS WILL BE AS FAR FROM THE FORCE MAIN AS POSSIBLE.
- 3. LESS THAN 18 INCHES OF SEPARATION IS PERMITTED WHEN THE GRAVITY SEWER AT THE CROSSING IS MADE FROM A SINGLE 20 FOOT LENGTH OF AWWA PRESSURE PIPE AND THE CROSSING ANGLE IS APPROXIMATELY 90 DEGREES. SPECIFIC MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY APPROVAL (DEVIATION) IS REQUIRED FOR A VERTICAL SEPARATION OF LESS THAN 18 INCHES EDGE-TO-EDGE BETWEEN WATER MAINS AND SANITARY OR STORM SEWERS.
- 4. 'L' IS A STANDARD LENGTH OF PIPE AS SUPPLIED BY THE PIPE MANUFACTURER.
- 5. ADEQUATE STRUCTURAL SUPPORT FOR PIPES AT CROSSINGS SHALL BE PROVIDED.

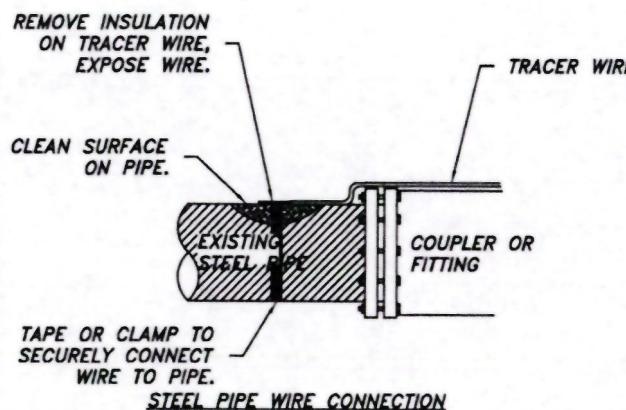


6) **SEPARATION REQUIREMENTS**



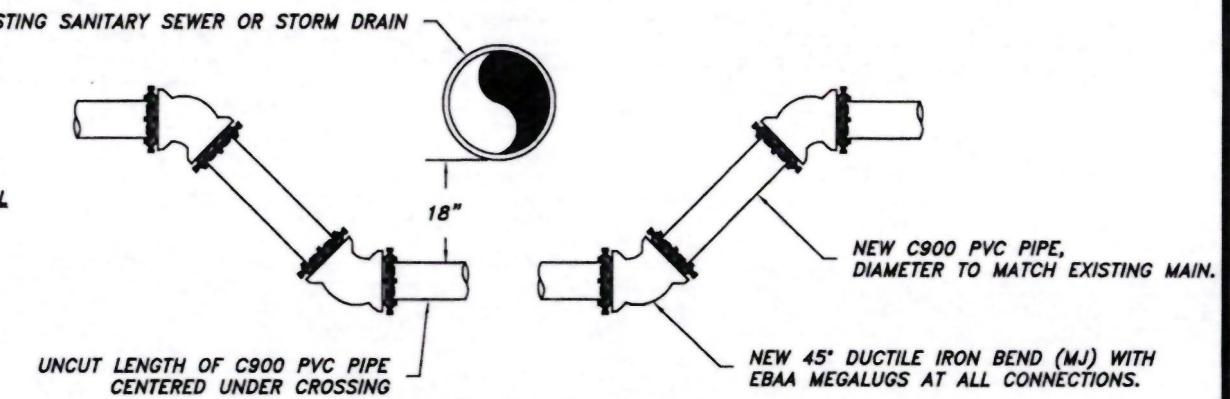
NOTES / BUTTE-SILVER BOW WATER DIVISION APPROVAL:  
TRACER WIRE IS EXTREMELY IMPORTANT FOR LOCATION PURPOSES FOR BUTTE-SILVER BOW. EVERY VALVE BOX WILL BE INSPECTED VISUALLY AND ELECTRICALLY TO ENSURE PROPER INSTALLATION.

USE TYPE EPR/HYPOALON RH/RHW-2 USE (VW-1)  
COPPER CONDUCTOR 600V 90°C UL  
OR EQUIVALENT.

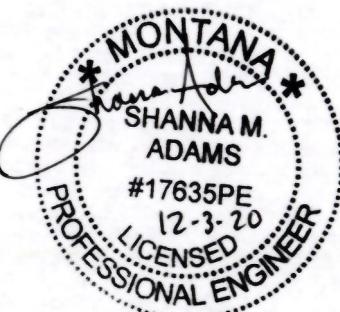


1. TIE-OFF ON MECHANICAL COUPLERS.
2. PLACE WIRE ON TOP, CENTER OF PIPE.
3. REFER TO SPECIFICATIONS FOR TRACER WIRE AND DIRECT BURY SPLICE KIT SPECIFICATIONS.
4. INSTALL TRACER WIRE ON THE MAIN LINE, INCLUDING HYDRANTS FROM VALVE BOX TO VALVE BOX, EXTEND WIRE 3' OUT OF EVERY VALVE BOX.
5. INSTALL EXISTING TRACER WIRE ON EXISTING COUPLERS INTO THE NEW TRACER WIRE BEING INSTALLED WITH A DIRECT BURY SPLICE KIT.
6. ALL TRACER WIRE MUST BE CONNECTED TO ONE LINE AND OTHERS TO FORM ONE CONTINUOUS LOOP FOR LOCATING PURPOSES.
7. SECURE TRACER WIRE TO MAIN WITH DUCT TAPE OR ELECTRICAL TAPE IN TEN FOOT INTERVALS.
8. ALL SPLICES WILL BE DONE WITH A DIRECT BURIAL SPLICE KIT, UNDERGROUND.

5) **TRACER WIRE INSTALLATION DETAIL**



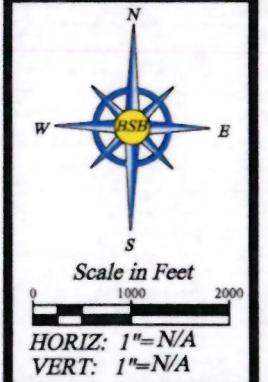
7) **VERTICAL DEFLECTION**



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DETAILS

Sheet  
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REQUIRED LENGTH OF PIPE RESTRAINT (FEET) — PVC PIPE					
FITTING	PIPE DIAMETER	$L_R$	$L_{hs}$	$L_s$	$L_B$
VALVE	6"	28			
	8"	37			
	10"	45	N/A	N/A	N/A
	12"	53			
22.5° BEND	6"	2			
	8"	2			
	10"	3	N/A	N/A	N/A
	12"	3			
45° BEND	6"	4			
	8"	5			
	10"	6	N/A	N/A	N/A
	12"	7			
90° BEND	6"	9			
	8"	12			
	10"	15	N/A	N/A	N/A
	12"	17			
REDUCER	6"	15			
	8"	27			
	10"	15	N/A	N/A	N/A
	12"	26			
CAP	6"	28			
	8"	37	N/A	N/A	N/A
VERTICAL OFFSET (1'-2")	6"	17			
45° ELBOWS	8"	23			
	10"	27			
	12"	32			
			4		
			5		
			6		
			7		
				N/A	
TEE	6"X6"X6"	10			
	8"X8"X6"	10			
	8"X8"X8"	10			
	10"X10"X6"	10			
	10"X10"X8"	10			
	10"X10"X10"	10			
	12"X12"X6"	10			
	12"X12"X8"	10			
	12"X12"X10"	10			
	12"X12"X12"	10			

**NOTES:**  
1. THRUST RESTRAINT SHALL BE PROVIDED AT ALL FITTINGS AND VALVES. THE THRUST RESTRAINT SYSTEM SHALL BE EITHER THE CONVENTIONAL CONCRETE THRUST BLOCK SYSTEM AS DEFINED IN THE MPW SPECIFICATIONS OR A COMBINATION OF MEGALUG RETAINER GLANDS AND BELL RESTRAINTS (AS MANUFACTURED BY EBAA IRON, OR APPROVED EQUAL) AS SHOWN IN THIS DETAIL.

2. ANY REBAR HOOPS SUPPLIED FOR A CONVENTIONAL CONCRETE THRUST RESTRAINT SYSTEM SHALL BE EPOXY COATED.

3. L IS THE PIPE LENGTH THAT SHALL BE RESTRAINED BEFORE AND AFTER THE VALVE OR FITTING, AS SHOWN IN THE ADJACENT DRAWINGS. A BELL RESTRAINT SHALL BE INSTALLED WITH ANY JOINTS LOCATED WITHIN THE REQUIRED RESTRAINED LENGTH FROM THE VALVE OR FITTING. THIS APPLIES ONLY IF THE MEGALUG RESTRAINT SYSTEM IS UTILIZED. THE REQUIRED VALUES OF L ARE LISTED IN THE TABLE BELOW.

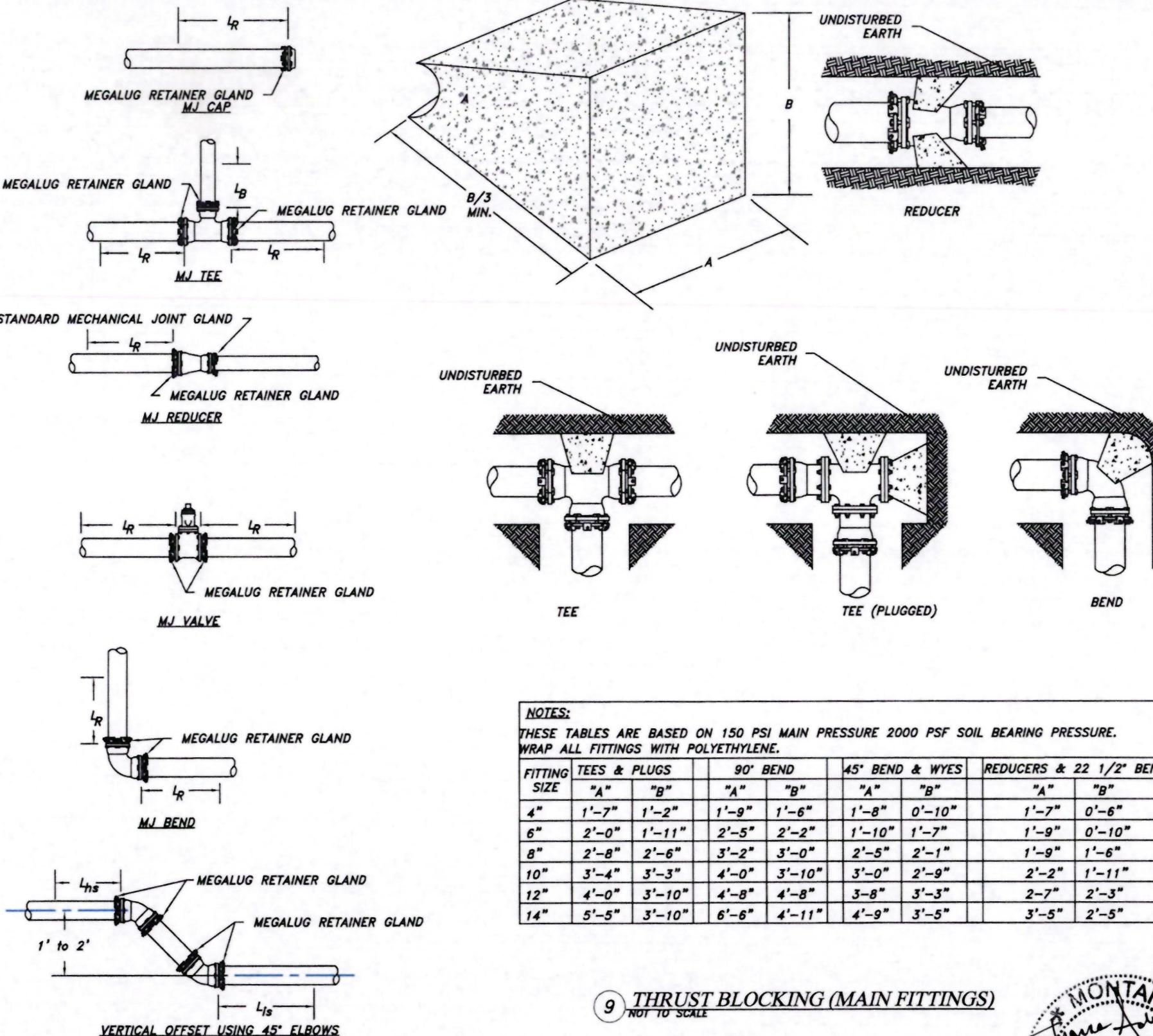
4. ALL MEGALUGS AND BELL RESTRAINTS SHALL BE POLYWRAPPED OR BITUMINOUS COATED TO PROTECT AGAINST CORROSION.

5. WHEN TWO FITTINGS ARE INSTALLED WITHIN THE RESTRAINED LENGTH OF ONE ANOTHER, THE RESTRAINED LENGTH MUST BE CALCULATED FOR THE COMBINATION OF THE TWO FITTINGS, NOT EACH FITTING INDIVIDUALLY.

6. WHEN A VALVE OR FITTING IS ADJACENT TO A CONNECTION BETWEEN NEW AND EXISTING PIPE (I.E. THE CONNECTION TO THE EXISTING PIPE IS WITHIN THE  $L_R$  LENGTH), CONVENTIONAL CONCRETE THRUST BLOCKS SHALL BE USED TO RESTRAIN THE VALVE OR FITTING.

7. L MAY BE INCREASED AT THE ENGINEER'S DISCRETION IF WEAK OR UNSTABLE SOILS ARE ENCOUNTERED.

REQUIRED COMPONENTS OF MEGALUG THRUST RESTRAINT SYSTEMS FOR VARIOUS FITTINGS



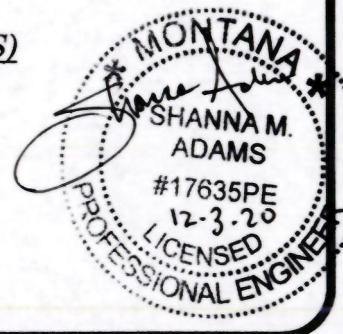
**NOTES:**

THESE TABLES ARE BASED ON 150 PSI MAIN PRESSURE 2000 PSF SOIL BEARING PRESSURE.  
WRAP ALL FITTINGS WITH POLYETHYLENE.

FITTING SIZE	TEES & PLUGS		90° BEND		45° BEND & WYES		REDUCERS & 22 1/2° BEND	
	"A"	"B"	"A"	"B"	"A"	"B"	"A"	"B"
4"	1'-7"	1'-2"	1'-9"	1'-6"	1'-8"	0'-10"	1'-7"	0'-6"
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"
14"	5'-5"	3'-10"	6'-6"	4'-11"	4'-9"	3'-5"	3'-5"	2'-5"

9 THRUST BLOCKING (MAIN FITTINGS)

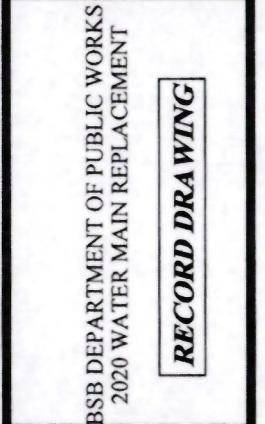
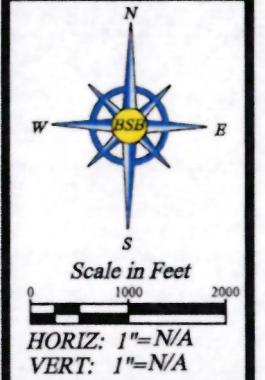
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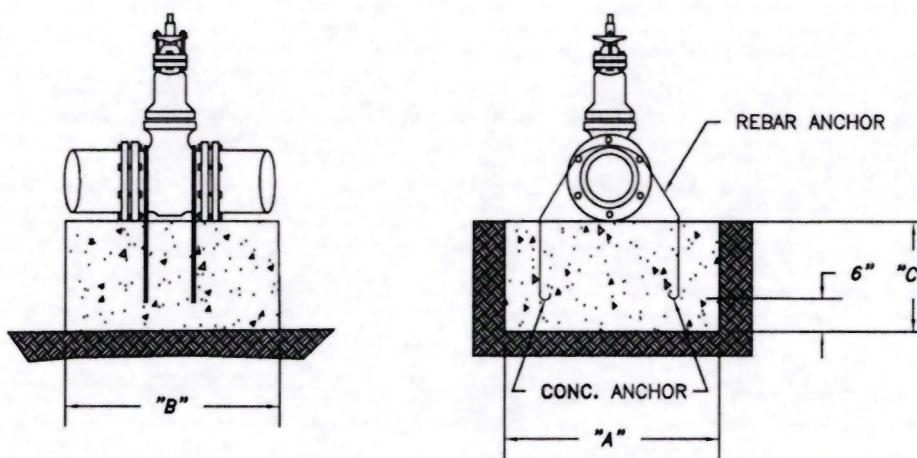



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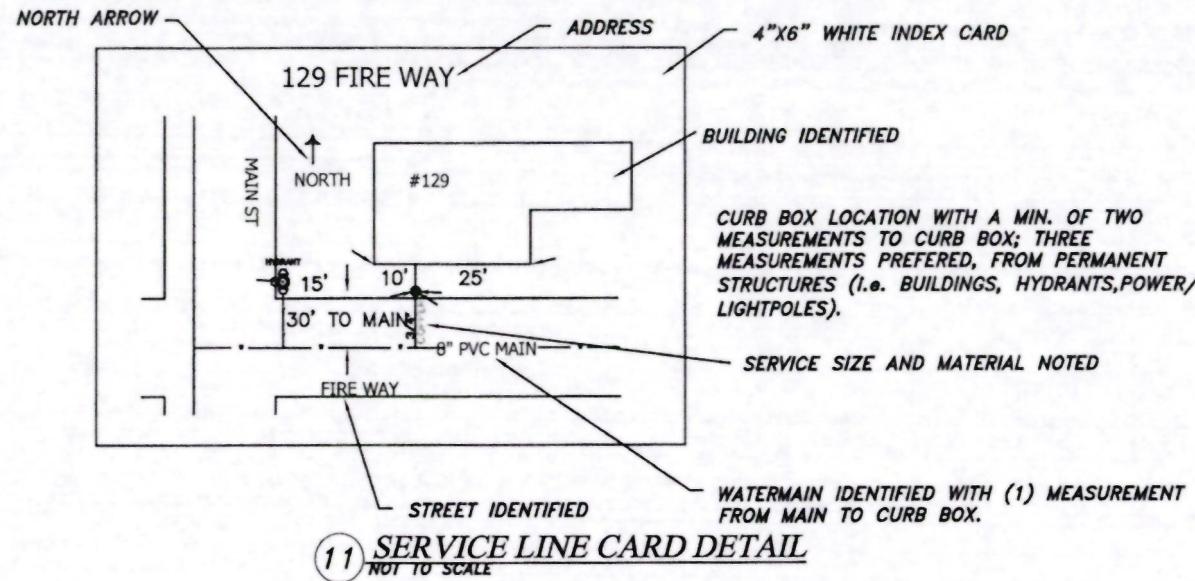


DETAILS

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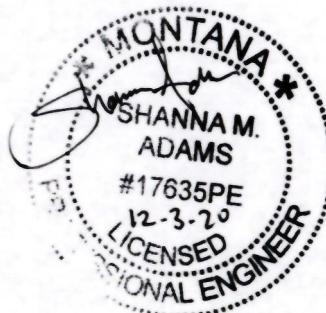
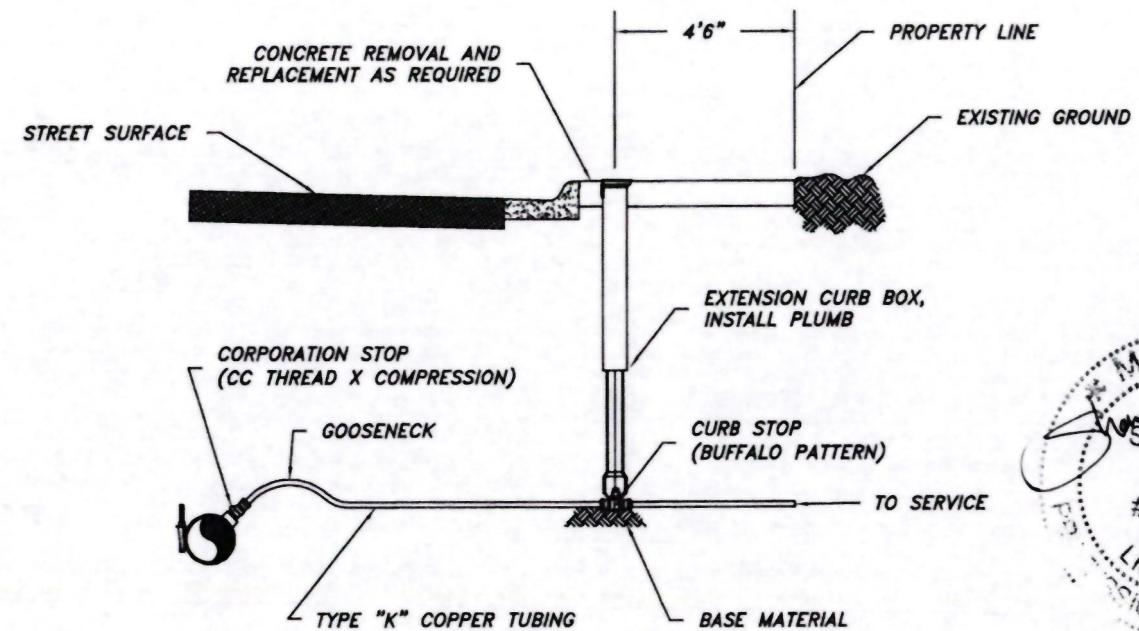


NOTE:  
COAT RODS WITH "KOPPERS"  
BITUMASTIC NO. 50 COATING  
OR EQUAL.



GENERAL NOTES:

1. THE MINIMUM 6' COVER FOR SERVICE LINES SHALL BE MEASURED FROM EXISTING GROUND LINE IF GROUND IS LEVEL OR FALLING AWAY FROM STREET, AND MEASURED FROM TOP OF STREET CURB WHEN IS RISING AWAY FROM STREET.
2. WATER SERVICE LINES SHALL BE INSTALLED WHERE SHOWN ON THE DRAWINGS OR AS SPECIFIED.
3. BEDDING MATERIAL WITHIN SIX INCHES OF THE SERVICE LINE SHALL BE A MAXIMUM OF ONE INCH IN DIAMETER.
4. THE GOOSENECK IN THE SERVICE LINE AT THE CONNECTION TO THE CORPORATION STOP SHALL BE MADE IN THE HORIZONTAL PLANE WHEN POSSIBLE.
5. ASPHALT REMOVAL AND REPLACEMENT SHALL BE PROVIDED AS NECESSARY.



12 NOT TO SCALE

ANCHOR ROD SIZE	VALVE SIZE	100 PSI			150 PSI			200 PSI			250 PSI			300 PSI		
		"A"	"B"	"C"	"A"	"B"	"C"	"A"	"B"	"C"	"A"	"B"	"C"	"A"	"B"	"C"
3/4"	6" & 8"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-7"	
3/4"	10"	2'-0"	2'-0"	2'-0"	2'-6"	2'-6"	2'-0"	2'-9"	2'-6"	2'-6"	3'-0"	3'-0"	3'-0"	3'-7"	3'-0"	3'-0"
3/4"	12"	2'-3"	2'-0"	2'-0"	3'-0"	3'-0"	2'-8"	3'-5"	3'-0"	3'-0"	4'-3"	3'-0"	3'-0"	5'-1"	3'-0"	3'-0"
1"	14"	2'-3"	2'-0"	2'-4"	3'-5"	3'-0"	3'-0"	4'-6"	3'-0"	3'-0"	4'-0"	4'-0"	4'-0"	4'-9"	4'-0"	4'-0"
1 1/8"	16"	3'-0"	3'-0"	2'-11"	4'-4"	3'-0"	3'-0"	4'-1"	4'-0"	4'-0"	5'-1"	4'-0"	4'-0"	6'-1"	4'-0"	4'-0"
1 1/4"	18"	3'-8"	3'-0"	3'-0"	5'-5"	3'-0"	3'-0"	5'-1"	4'-0"	4'-0"	6'-4"	4'-0"	4'-0"	5'-9"	5'-0"	5'-0"
1 3/8"	24"	4'-4"	4'-0"	4'-0"	6'-5"	4'-0"	4'-0"	6'-6"	5'-0"	5'-0"	6'-5"	6'-0"	6'-0"	7'-8"	6'-0"	6'-0"

NOTE: PRESSURES SHOWN ABOVE ARE MAXIMUM WORKING PRESSURE IN SYSTEM.  
FOR 20" VALVES USE THE 24" DIMENSIONS \*\*

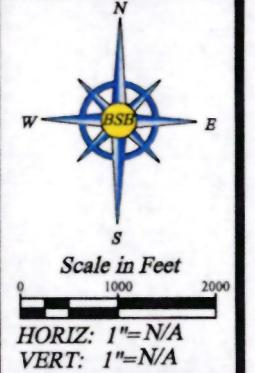
THRUST BLOCKING AND ANCHORS ARE REQUIRED ON VALVES ONLY WHEN  
SPECIFIED ON THE PLANS OR IN THE SPECIAL PROVISIONS.

10 NOT TO SCALE

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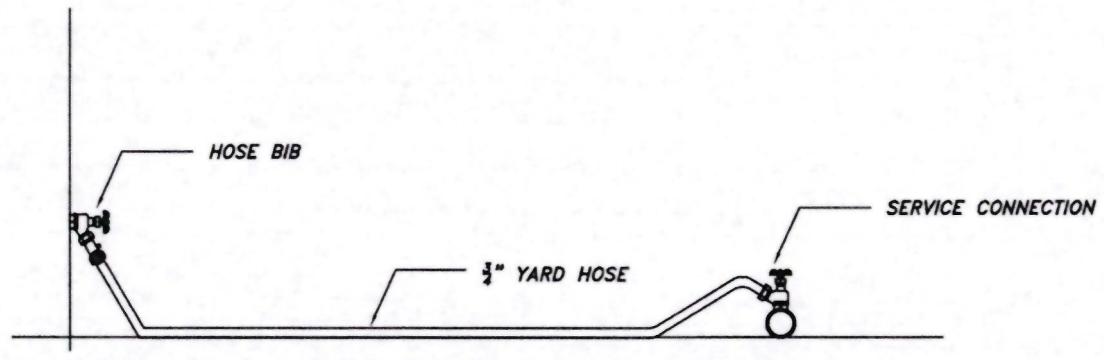
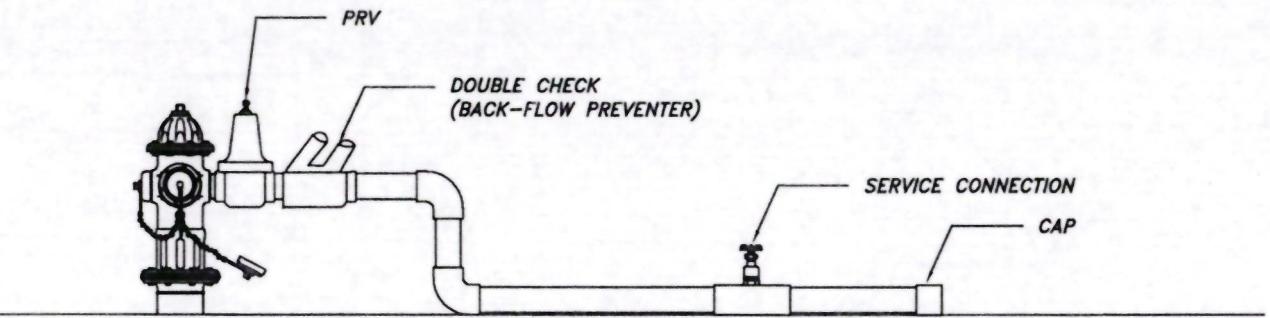
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2020 WATER MAIN REPLACEMENT  
**RECORD DRAWING**

DETAILS

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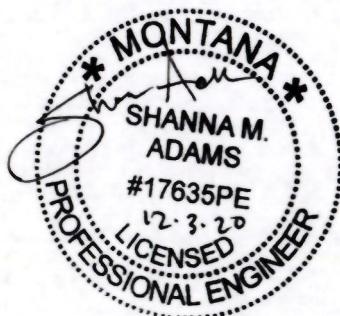
SERVICE CONNECTION CROSS-SECTION

NOTES PROCEDURE:

1. FLUSH SUPPLY HYDRANT.
2. INSTALLMENT OF TEMPORARY WATER SYSTEM
3. DISINFECT TEMPORARY PIPING IN ACCORDANCE AWWA STANDARDS
4. FLUSH, SAMPLE, AND CONDUCT MICROBIOLOGICAL TESTING OF TEMPORARY PIPING.
5. AFTER CLEAN SAMPLE OPEN VALVES TO ESTABLISH A WATER SUPPLY INTO THE ISOLATED AREAS.
6. TEMPORARY PIPES MUST BE PROPERLY RESTRAINED AND PROTECTED FROM DAMAGE.
7. TEMPORARY PIPES MUST BE VISUALLY INSPECTED FOR LEAKS AT FULL PRESSURE PRIOR TO USE, AND INSPECTED DAILY. ANY LEAKS SHALL BE REPORTED TO THE PROJECT ENGINEER AND REPAIRED.

ALL TEMPORARY PIPING AND APPURTENANCES MUST BE NSF CERTIFIED.

**(13) TEMPORARY WATER DETAIL**  
NOT TO SCALE





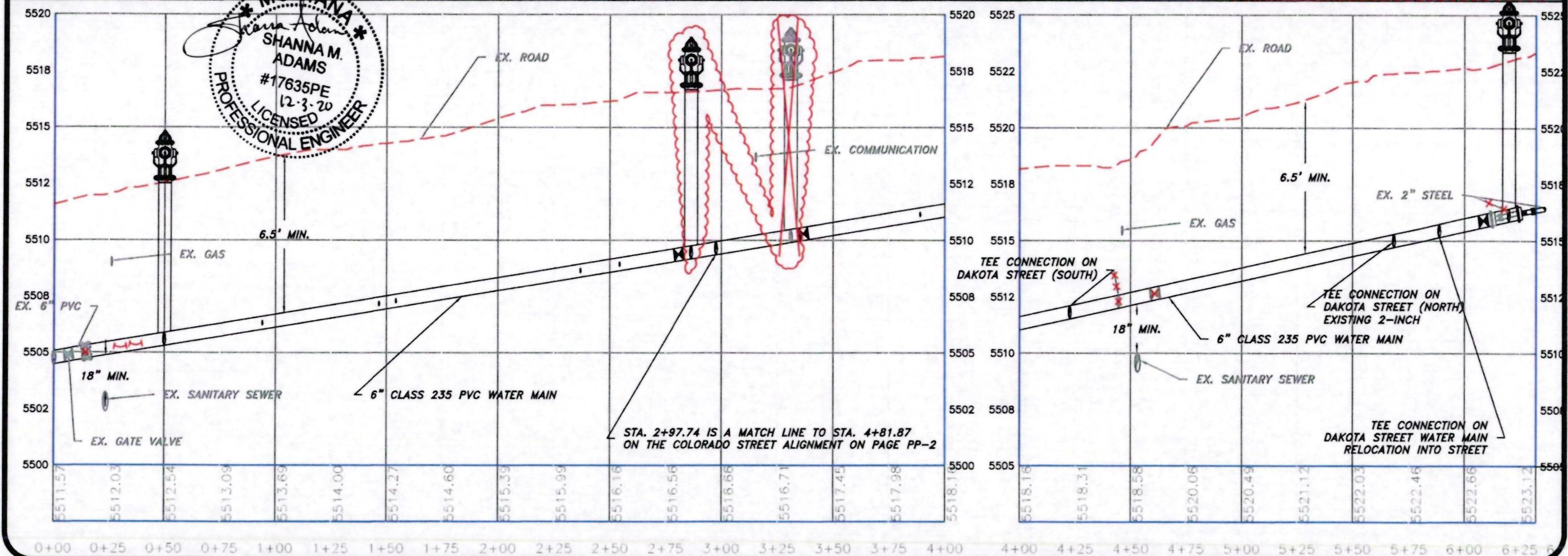
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*Scale in Feet*  
  
 HORIZ:  $1'' = 50'$   
 VERT:  $1'' = 5'$



**BSB DEPARTMENT OF PUBLIC WORKS  
2020 WATER MAIN REPLACEMENT**

RECORD DRAWING

CLAY STREH  
STA. 0+00 TO 6+16

Sheet  
PP-1

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Scale in Feet  
0 25' 50'  
HORIZ: 1" = 50'  
VERT: 1" = 5'

