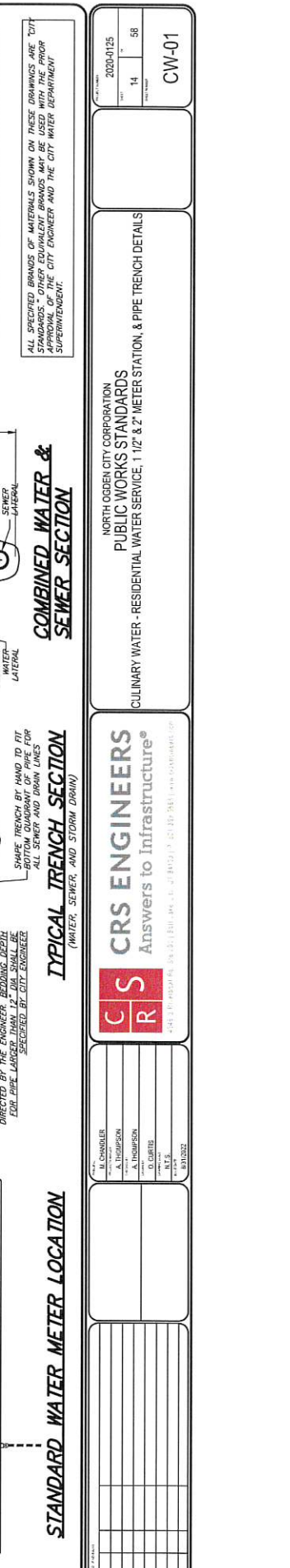
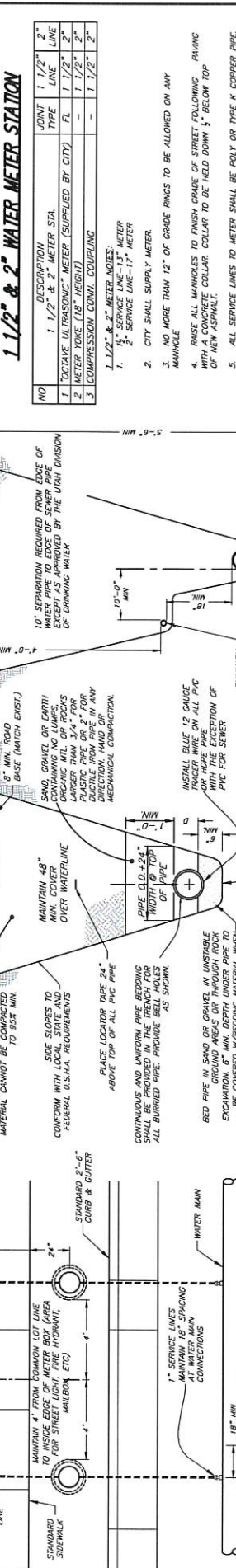
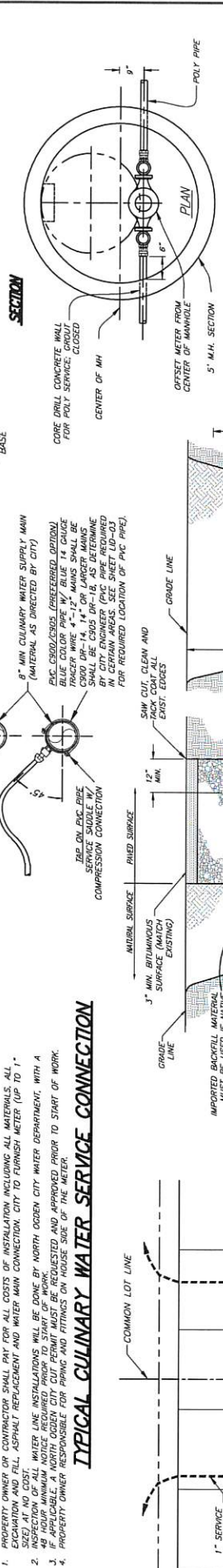
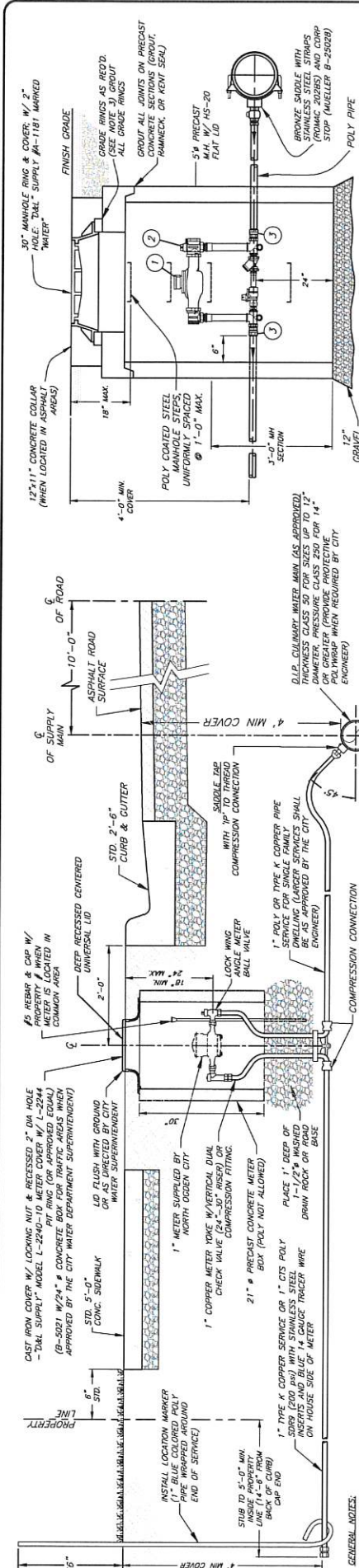




Engineering Standards and
Drawings for:

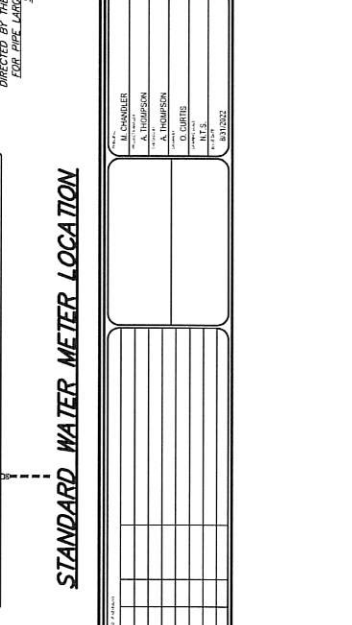
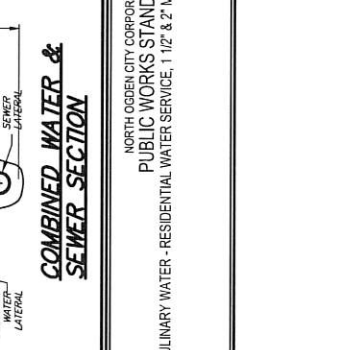
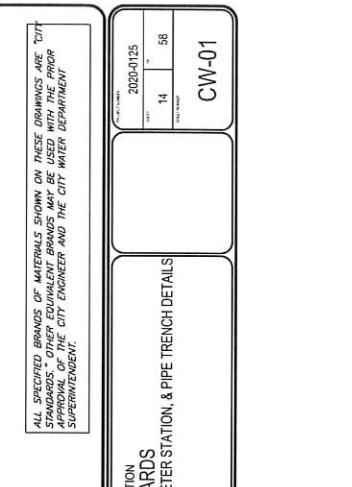
Water Projects



NO	DESCRIPTION	QUANTITY	UNIT
1	1 1/2" & 2" METER STA.	1	EA
2	1" OCTAVE ULTRASONIC METER (SUPPLIED BY CITY)	1	EA
3	COMPRESSION DOWN COUPLING	1	EA

1 1/2" & 2" METER NOTES:

- 1 1/2" SERVICE LINE-13" METER
- 2" SERVICE LINE-17" METER
- CITY SHALL SUPPLY METER
- NO MORE THAN 12" OF GRADE RINGS TO BE ALLOWED ON ANY MANHOLE
- RAISE ALL MANHOLES TO FINISH GRADE OF STREET FOLLOWING FINISH OF NEW ASPHALT. THE COLLAR COLLAR TO BE FIELD DOWN 5" BELOW TOP OF NEW ASPHALT.
- ALL SERVICE LINES TO METER SHALL BE POLY OR TYPE K COPPER PIPE.



NO	DESCRIPTION	QUANTITY	UNIT
1	1 1/2" & 2" METER STA.	1	EA
2	1" OCTAVE ULTRASONIC METER (SUPPLIED BY CITY)	1	EA
3	COMPRESSION DOWN COUPLING	1	EA

1 1/2" & 2" METER NOTES:

- 1 1/2" SERVICE LINE-13" METER
- 2" SERVICE LINE-17" METER
- CITY SHALL SUPPLY METER
- NO MORE THAN 12" OF GRADE RINGS TO BE ALLOWED ON ANY MANHOLE
- RAISE ALL MANHOLES TO FINISH GRADE OF STREET FOLLOWING FINISH OF NEW ASPHALT. THE COLLAR COLLAR TO BE FIELD DOWN 5" BELOW TOP OF NEW ASPHALT.
- ALL SERVICE LINES TO METER SHALL BE POLY OR TYPE K COPPER PIPE.

THRUST PER PSI OF WATER PRESSURE AT VARIOUS FITTINGS			
PIPE SIZE (IN.)	90° ELBOW (LB.)	45° ELBOW (LB.)	22-1/2° ELBOW (LB.)
4	19	27	15
6	39	55	30
8	67	94	51
10	109	154	84
12	155	218	119
14	210	296	161
16	272	383	209
18	351	494	269
20	434	611	333
24	623	878	487
30	947	1,332	722
36	1,356	1,905	1,032

THRUST BLOCK TABLE NOTES:

- IN USING THE ABOVE TABLE, USE THE MAXIMUM PERMISSIBLE WATER PRESSURE AS SPECIFIED (I.E. HYDROSTATIC TEST PRESSURE, POSSIBLE SURGE PRESSURE DUE TO PUMP SHUT OFF, ETC.).
- SEE SOILS REPORT FOR BEARING STRENGTH OF SOIL IN THE ABSENCE OF A SOILS REPORT, AN AVERAGE SOIL (SPRINKLE MEDIUM CLAY) CAN BE ASSUMED TO HAVE A BEARING STRENGTH OF 2000 P.S.F.

EXAMPLE:

8-INCH DIA. ELBOW PRESSURE 200 LB./SQ. IN. FROM TABLE: THRUST = 84 x 200 = 16,800 LB. ASSUME BEARING STRENGTH = 2,000 LB./SQ. FT. 16,800 / 2,000 = 8.4 SQ. FT. AREA OF BEARING REQUIRED FOR THRUST BLOCK.

* ALL "ELBOWS" MUST BE INSTALLED IN PERMANENT CUL-DE-SACS

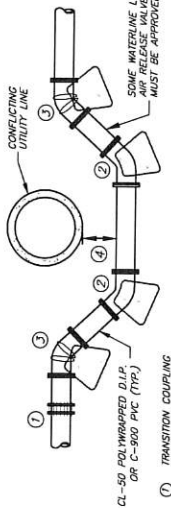
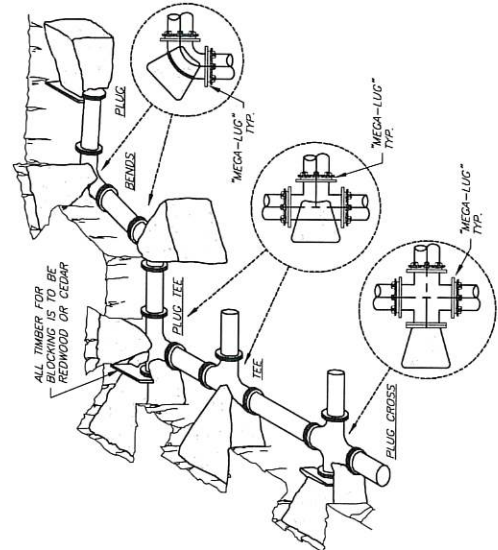
2" BLOW-OFF HYDRANT W/ 2" POLY W/ 2" POLY NEAR END OF LINE ON TEMPORARY BLOW-OFFS.

PIPE RESTRAINT

- ALL BENDS, CROSSES, TEES, REDUCERS, AND VALVES SHALL BE INSTALLED WITH RESTRAINING JOINTS (MEGA-LUG OR APPROVED EQUAL).
- DESIGN SHALL ALSO BE REQUIRED TO ENSURE ADEQUATE BEARING CAPACITY OF JOINTS NEAR FITTINGS BASED ON PIPE DIAMETER AND PIPE PRESSURE.
- BELL RESTRAINTS MAY BE USED AND/OR REQUIRED BY NORTH OGDEN CITY.

THRUST BLOCKING NOTES:

- CONCRETE SHALL NOT BE PLACED WITHIN 1-1/2" OF JOINTS AND BOLTS. COVER ALL METAL CONCRETE CURING.
- IN THE ABSENCE OF A SOILS REPORT, AN AVERAGE SOIL (SPRINKLE MEDIUM CLAY) CAN BE ASSUMED TO HAVE A BEARING STRENGTH OF 2000 P.S.F. AND A THRUST BEARING VALUE FOR 200% OF THE WATER LINE STATIC LINE TEST.
- THRUST BLOCKS ARE REQUIRED AT ALL BENDS OF 24-1/2" OR MORE.
- CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF NOT LESS THAN 2500 PSI IN 28 DAYS.



- TRANSITION COUPLING
- MJ 45° BEND W/ RETAINER CLANOS
- CONSTRUCT THRUST BLOCKS AT EACH 45° BEND W/ (3) #6 REBARS SECURING BLOCK TO FITTING (EPOXY COATING)
- MAINTAIN A MINIMUM OF 12" SEPARATION BETWEEN THE WATERLINE AND CONFLICTING UTILITY LINE TO BE CROSSED. HOWEVER, WATERLINE LOOPS MUST CROSS OVER SEWER LINES WITH A MINIMUM OF 18" SEPARATION. IF CROSSING CANNOT BE MAINTAINED THEN AN EXCEPTION MUST BE OBTAINED FROM THE UTAH DIVISION OF DRAWING WATER.

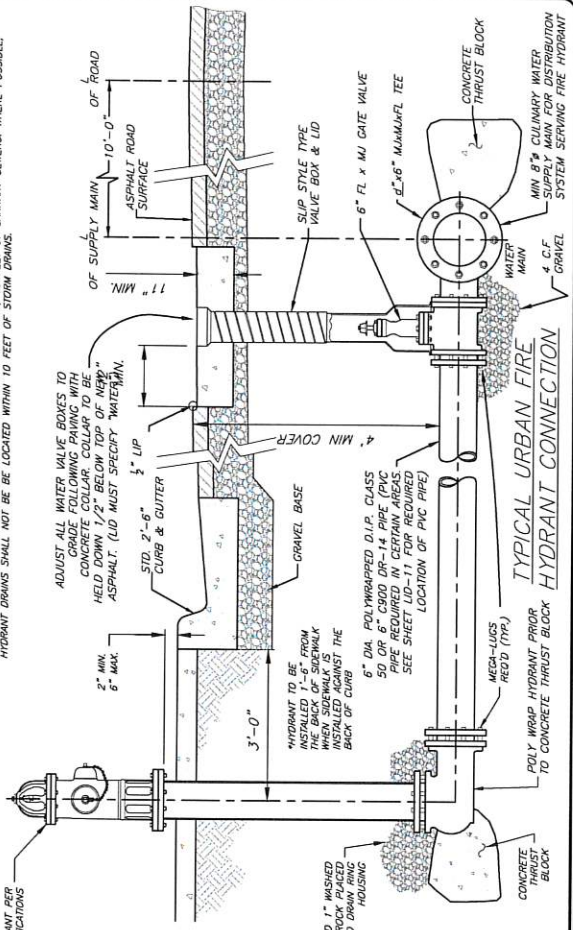
TYPICAL WATERLINE LOOP

- PIPE LINE NOTES:**
- NO WATER SERVICE OR FIRE LINES TO BUILDINGS ARE PERMITTED TO CONNECT TO AUXILIARY LINES SERVING FIRE HYDRANTS.
 - COMMERCIAL FIRE LINES FROM THE MAIN TO BUILDINGS SHALL BE SEPARATE LINES AND NOT PART OF THE WATER SERVICE LATERAL.
 - FIRE LINES ARE TO BE MAINTAINED BY THE PROPERTY OWNER UP TO THE VALVE AT THE MAIN. THE CITY SHALL OWN AND MAINTAIN THE FIRE SUPPRESSION LINE VALVE AT THE MAIN.
 - RESIDENTIAL FIRE LINES ON PRIVATE PROPERTY SHALL BE OWNED AND MAINTAINED BY THE PROPERTY OWNER UNLESS OTHERWISE SPECIFIED.
 - FIRE HYDRANTS ARE TO BE INSTALLED IN LOCATIONS AS REQUIRED BY THE FIRE CODE AND APPROVED BY THE FIRE CHIEF AND CITY ENGINEER.
 - FIRE HYDRANTS SHALL NOT BE CONNECTED TO, OR LOCATED WITHIN, 10 FEET OF SANITARY SEWERS. WHERE POSSIBLE, HYDRANT DRAINS SHALL NOT BE LOCATED WITHIN 10 FEET OF STORM DRAINS.

TYPICAL RETAINER GLANDS & THRUST BLOCKING

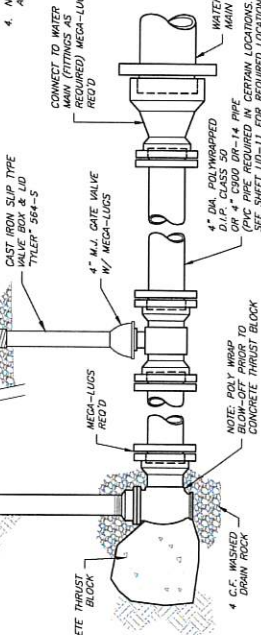
- BLOW-OFF NOTES:**
- PERMANENT BLOW-OFFS SHALL BE 4" AS SHOWN BELOW. TEMPORARY BLOW-OFFS MAY BE 2" WITH 2" POLY AND 2" GATE VALVE WITH VALVE BOX AT MAIN.
 - WHEN TEMPORARY BLOW-OFFS ARE REMOVED THE MAIN CONNECTED TO BE REMOVED WHERE THE BLOW-OFF IS A STREET LINE.
 - NO BARS ARE ALLOWED ON THE MAIN. USE A CAP W/ THREADED COPR STOP CONNECTION.
 - NO FLUSHING DEVICE SHALL BE DIRECTLY CONNECTED TO A STREET LINE.

ADJUST ALL WATER VALVE BOLVES TO GRADE FOLLOWING PAVING WITH WOODS. COLLAR TO BE HELD DOWN 1/2" BELOW TOP OF NEW ASPHALT SURFACE.



TYPICAL FLUSH VALVE CONNECTION

FLUSH VALVES AND CONNECTION MAY BE 2" FOR TEMPORARY INSTALLATIONS.



- GENERAL NOTES:**
- THE USE OF "BLUE" BOLTS AND NUTS IS APPROVED BY THE CITY.
 - ALL WATER MAIN AND HYDRANT GATE VALVES TO BE 350 PSI RESILIENT WEDGE VALVES.
 - 1.5 CU. YD. 1" WASHED DRAIN ROCK PLACED AROUND DRAIN RISING HOUSING.
 - ALL SPECIFIED BRANDS OF MATERIALS SHALL BE USED UNLESS OTHERWISE SPECIFIED. OTHER EQUIVALENT BRANDS MAY BE USED WITH THE PRIOR APPROVAL OF THE WATER DEPARTMENT SUPERINTENDENT.
 - IRON PIPE SHALL BE TO BE STAINLESS STEEL ON ALL FITTINGS OR BLACK STEEL. NO BRASS, GALVANIZED, OR BLACK STEEL.
 - ONLY BRASS, BRONZE OR METAL SETTERS, CORPORATION STOPS.

CRS ENGINEERS
Answers to Infrastructure®

NORTH OGDEN CITY CORPORATION
PUBLIC WORKS STANDARDS
CULINARY WATER - THRUST BLOCK, WATERLINE LOOP, FLUSH VALVE, & FIRE HYDRANT DETAILS

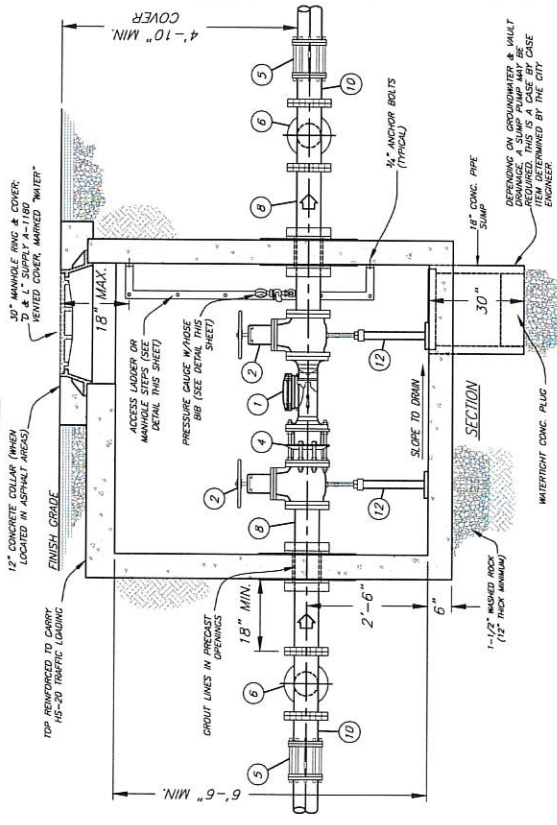
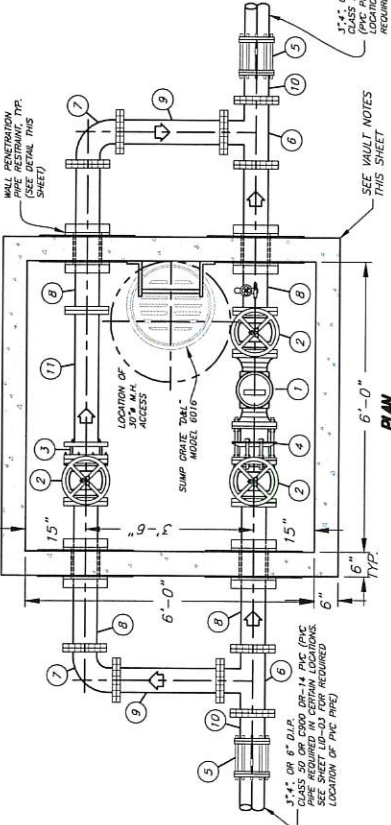
PIPE & FITTING SCHEDULE

NO	DESCRIPTION (3", 4" & 6" METER STA.)	JOINT TYPE	3" LINE	4" LINE	6" LINE	△ SYMBOL
1	MASTER METER OCTAVE ULTRASONIC METER	FL	3"	4"	6"	
2	GATE VALVE W/ HANDWHEEL	FL	3"	4"	6"	
3	FLANGED COUPLING ADAPTER	FL	3"	4"	6"	
4	DISMANTLING JOINT	FL	3"	4"	6"	
5	FLEXIBLE PIPE COUPLING	FL	3"	4"	6"	
6	TEE	MJ	3"	4"	6"	
7	90° ELBOW	MJ	3"	4"	6"	
8	NIPPLE	PE	3"	4"	6"	
9	PIPE SECTION	PE	3"	4"	6"	
10	PIPE SECTION	PE	3"	4"	6"	
11	NIPPLE	PE	3"	4"	6"	
12	GALV. PIPE SUPPORT W/ COMPANION FLANGE & VARIABLE HEIGHT NIPPLE (3 EA REQ'D)	FLAPE	3"	4"	6"	

GENERAL ASSEMBLY NOTES:
 THE USE OF "BLUE" BOLTS AND NUTS IS APPROVED BY THE CITY.

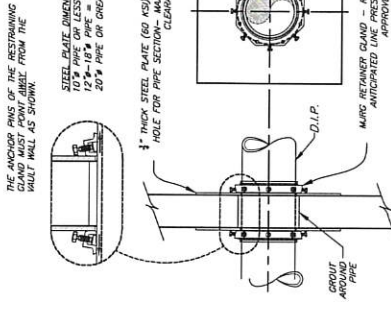
1. 3" OR 4" OR 6" DR-14 PVC CLASS 30 OR C900 DR-14 PVC PIPE REQUIRED IN CERTAIN LOCATIONS. SEE SHEET 10-00 FOR REQUIRED LOCATION OF PVC PIPE.

2. 3" OR 4" OR 6" DR-14 PVC CLASS 30 OR C900 DR-14 PVC PIPE REQUIRED IN CERTAIN LOCATIONS. SEE SHEET 10-00 FOR REQUIRED LOCATION OF PVC PIPE.



3" 4" & 6" WATER METER STATION

- VAULT NOTES:**
- ALL FITTINGS OUTSIDE OF THE VAULT ARE TO BE DUCTILE IRON (DI) WITH THRUST RESTRAINT RETAINER GLANDS.
 - ALL FITTINGS INSIDE OF THE VAULT ARE TO BE DUCTILE IRON (DI) WITH THRUST RESTRAINT RETAINER GLANDS.
 - THE PRECAST WALL MANUFACTURER IS RESPONSIBLE FOR DESIGN RELATED TO TRAFFIC LOADING AND THRUST. VERIFICATION OF PROPER DESIGN MUST BE PROVIDED TO THE CITY BY THE DEVELOPER, CONTRACTOR, OR PROPERTY OWNER AS THE CASE MAY BE.
 - USE 7000 GRADE ANTI-SIZE ON ALL THREADED FITTINGS.
 - USE 7000 GRADE ANTI-SIZE ON ALL THREADED FITTINGS.



WALL PENETRATION DETAIL

FOR PRECAST VAULT (TP)

ALL SPECIFIED BRANDS OF MATERIALS SHOWN ON THESE DRAWINGS ARE CITY STANDARDS. USE THE BRANDS AND MANUFACTURERS LISTED WITH THE PRECAST WALL MANUFACTURER. MATERIALS MUST BE APPROVED BY THE CITY WATER DEPARTMENT SUPERINTENDENT.

1. 3" OR 4" OR 6" DR-14 PVC CLASS 30 OR C900 DR-14 PVC PIPE REQUIRED IN CERTAIN LOCATIONS. SEE SHEET 10-00 FOR REQUIRED LOCATION OF PVC PIPE.

2. 3" OR 4" OR 6" DR-14 PVC CLASS 30 OR C900 DR-14 PVC PIPE REQUIRED IN CERTAIN LOCATIONS. SEE SHEET 10-00 FOR REQUIRED LOCATION OF PVC PIPE.

3. 3" OR 4" OR 6" DR-14 PVC CLASS 30 OR C900 DR-14 PVC PIPE REQUIRED IN CERTAIN LOCATIONS. SEE SHEET 10-00 FOR REQUIRED LOCATION OF PVC PIPE.

4. 3" OR 4" OR 6" DR-14 PVC CLASS 30 OR C900 DR-14 PVC PIPE REQUIRED IN CERTAIN LOCATIONS. SEE SHEET 10-00 FOR REQUIRED LOCATION OF PVC PIPE.

5. 3" OR 4" OR 6" DR-14 PVC CLASS 30 OR C900 DR-14 PVC PIPE REQUIRED IN CERTAIN LOCATIONS. SEE SHEET 10-00 FOR REQUIRED LOCATION OF PVC PIPE.

6. 3" OR 4" OR 6" DR-14 PVC CLASS 30 OR C900 DR-14 PVC PIPE REQUIRED IN CERTAIN LOCATIONS. SEE SHEET 10-00 FOR REQUIRED LOCATION OF PVC PIPE.

7. 3" OR 4" OR 6" DR-14 PVC CLASS 30 OR C900 DR-14 PVC PIPE REQUIRED IN CERTAIN LOCATIONS. SEE SHEET 10-00 FOR REQUIRED LOCATION OF PVC PIPE.

8. 3" OR 4" OR 6" DR-14 PVC CLASS 30 OR C900 DR-14 PVC PIPE REQUIRED IN CERTAIN LOCATIONS. SEE SHEET 10-00 FOR REQUIRED LOCATION OF PVC PIPE.

9. 3" OR 4" OR 6" DR-14 PVC CLASS 30 OR C900 DR-14 PVC PIPE REQUIRED IN CERTAIN LOCATIONS. SEE SHEET 10-00 FOR REQUIRED LOCATION OF PVC PIPE.

10. 3" OR 4" OR 6" DR-14 PVC CLASS 30 OR C900 DR-14 PVC PIPE REQUIRED IN CERTAIN LOCATIONS. SEE SHEET 10-00 FOR REQUIRED LOCATION OF PVC PIPE.

THE ANCHOR RING OF THE RESTRAINING WALL SHALL BE WELDED TO THE WALL AS SHOWN.

STEEL PLATE DIMENSIONS:
 10" WIDE OR LESS = 2" X 24" PLATE
 12" WIDE PIPE = 36" X 36" PLATE
 20" WIDE PIPE OR GREATER = BY CITY ENGINEER

3" THICK STEEL PLATE (60 KSI) W/ CLEARANCE

MARG. RETAINER GLAND - MATED FOR ANTICIPATED UNAPPROVED (REQ'D)

D.I.P.

GROUT AND PIPE

12"

1"

2 1/2" DIA.

3"

12"

1"

12"

1"

12"

1"

12"

1"

12"

1"

12"

1"

12"

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12"

1"

12"

1"

12"

LADDER DETAIL

NOT DIP CALIBRATE AFTER FABRICATION

12"

1"

12"

1"

12"

1"

12"

1"

12"

1"

12"

1"

12"

1"

12"

1"

AIR/VACUUM RELIEF STATION FITTING SCHEDULE

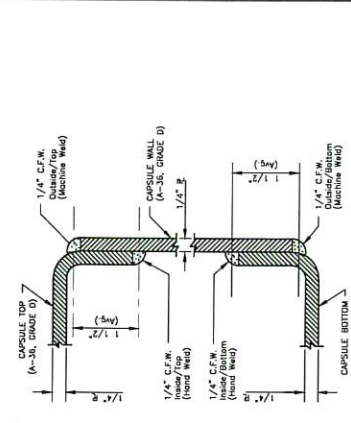
NO.	DESCRIPTION	FITTING	THR.
A	2" HEAVY-DUTY COMBINATION AIR-VACUUM RELIEF VALVE	THR.	THR.
B	2" GATE VALVE	THR.	THR.
C	2" NYLON COATED W/ DOUBLE S.S. STRAPS SERVICE SADDLE	THR.	THR.
D	2" STAINLESS STEEL PIPE	THR.	THR.
E	2" STAINLESS STEEL 90° ELBOW	THR.	THR.
F	2" STAINLESS STEEL UNION	THR.	THR.
G	2" STAINLESS PIPE	THR.	THR.
H	2" STAINLESS STEEL FEE	THR.	THR.

2020-0125	17	50
CW-04		

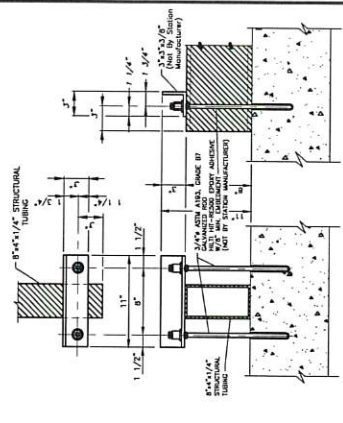
NORTH OGDEN CITY CORPORATION
 PUBLIC WORKS STANDARDS
 CULINARY WATER - 3" 4" 6" WATER METER STATIONS & AIR/VACUUM RELIEF STATION DETAILS

CRS ENGINEERS
 Answers to Infrastructure®

DATE: 10/20/2020
 DRAWN BY: A. THOMPSON
 CHECKED BY: A. THOMPSON
 PROJECT: 2020-0125
 FILE: CW-04
 10/20/2020



LAP JOINT CONNECTION OF CAPSULE WALL PLATE WITH FLANGE TOP AND BOTTOM

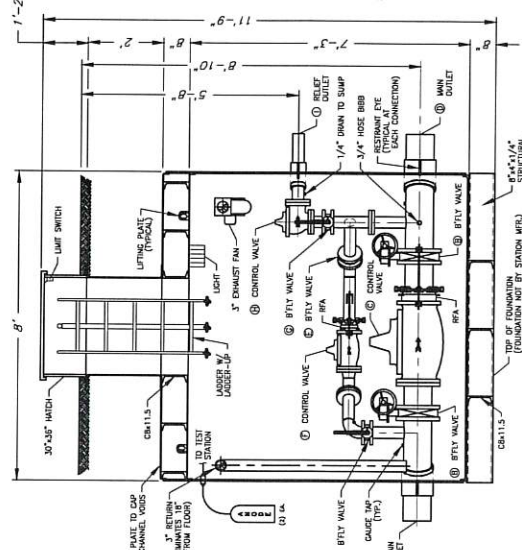


TYPICAL ANCHOR DETAIL
 NOTES: ANCHOR ANGLE BOLTS, NUTS, & ADHESIVE CAPSULE NOT BY STATION MFR. CONCRETE MUST HAVE A MINIMUM FC OF 3000 PSI FOR PROPER ANCHORAGE.

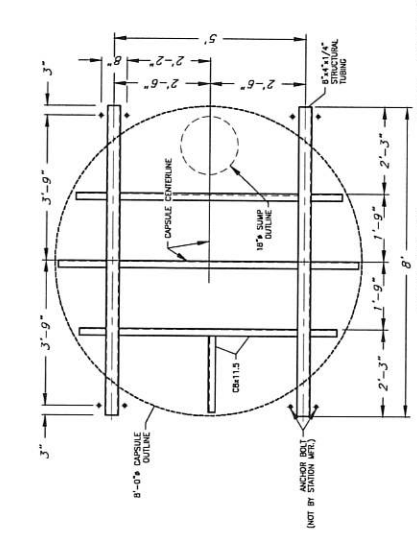


CONTROL VALVE STATION
 NORTH OGDEN, UTAH
 JOB REF. NO. _____
 DRAWING NO. TYPNORTHOGDEN05

DATE	2020-01-25
BY	18
CHECKED	58
SCALE	CW-05

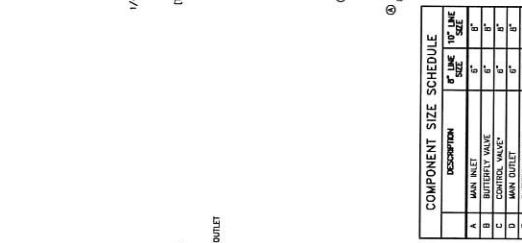


SECTION A-A

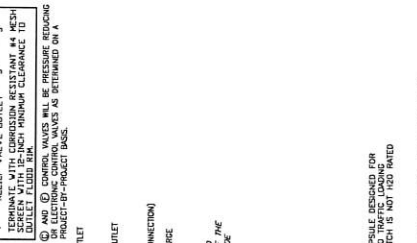


SKID PLAN

NOTE: SIDE RFA IS RESTRAINED FLANGE ADAPTER. THIS DRAWING IS UNCORRECTED AND DOES NOT REFLECT ANY CHANGES MADE TO THE ORIGINAL DESIGN. THE USER SHALL BE RESPONSIBLE FOR VERIFYING THE ACCURACY OF THIS DRAWING FOR THEIR APPLICATION. THE USER SHALL BE RESPONSIBLE FOR VERIFYING THE ACCURACY OF THIS DRAWING FOR THEIR APPLICATION.



EXTERIOR PLAN



INTERIOR PLAN

COMPONENT SIZE SCHEDULE

DESCRIPTION	1\"/>
A. MAIN INLET	6\"/>
B. BUTTERFLY VALVE	6\"/>
C. CONTROL VALVE	6\"/>
D. MAIN OUTLET	6\"/>
E. BUTTERFLY VALVE	3\"/>
F. CONTROL VALVE	3\"/>
G. BUTTERFLY VALVE	3\"/>
H. RELIEF VALVE	3\"/>
I. RELIEF VALVE OUTLET	3\"/>

TERMINATE WITH CORROSION RESISTANT 4x HESH-3000 (18\"/>

NOTES:
 1. ENGINEER'S STAMP AFFIXED HERETO IS ONLY FOR THE PURPOSE OF IDENTIFYING THIS PRODUCT AS THE CITY STANDARD.
 2. THE USER SHALL BE RESPONSIBLE FOR VERIFYING THE MANUFACTURER AT THEIR DISCRETION OR UNDER THE DIRECTION OF THE CITY ENGINEER OR PUBLIC WORKS SUPERVISOR.
 3. CONCRETE FOUNDATION SLAB DETAILS TO BE PROVIDED BY THE CONTRACTOR AND APPROVED BY THE CITY ENGINEER.

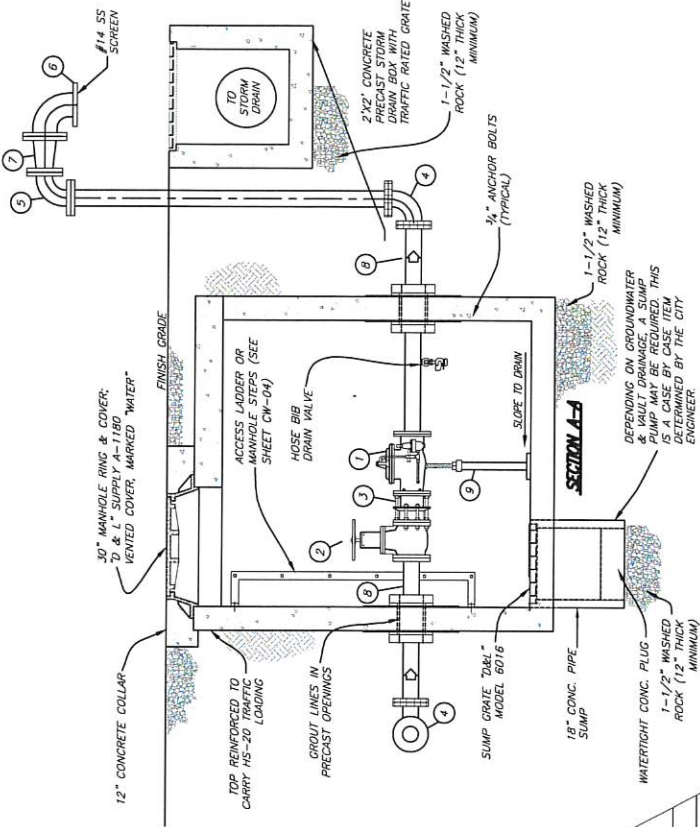
NORTH OGDEN CITY CORPORATION
 PUBLIC WORKS STANDARDS
 CULINARY WATER - PRESSURE REDUCTION STATION

CRS ENGINEERS
 Answers to Infrastructure®
 444 EAST 1000 SOUTH, SUITE 100 • OGDEN, UT 84403 • 801-466-4444

DATE	1/25/20
BY	A. THOMPSON
CHECKED	G. GORTNER
SCALE	N.T.S.
PROJECT	1912022

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ALL SPECIFIED BRANDS OF MATERIALS SHOWN ON THIS SHEET ARE TO BE USED UNLESS OTHERWISE NOTED. OTHER EQUIVALENT BRANDS MAY BE USED WITH THE PRIOR APPROVAL OF THE CITY ENGINEER AND THE WATER DEPARTMENT SUPERINTENDENT.

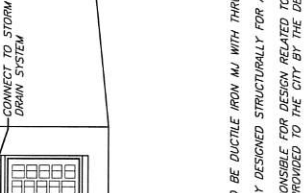


4" PRESSURE RELIEF STATION

PIPE & FITTING SCHEDULE

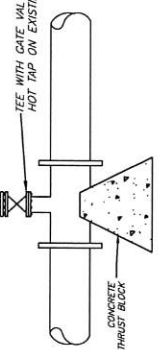
NO.	DESCRIPTION (3" x 4" & 6" PRESSURE RELIEF VALVE)	JOINT TYPE	SIZE
1	PRESSURE RELIEF VALVE	FL	4"
2	GATE VALVE W/ HANDWHEEL	FL	4"
3	DISMOUNTING JOINT	FL	4"
4	90° ELBOW	MJ W/ RESTRAINT	4"
5	90° ELBOW	FL	4"
6	90° ELBOW	FL	4"
7	PIPE SUPPORT W/ COMPANION FLANGE & VARIABLE HEIGHT NIPPLE (1 EA RED'D)	FL	6"
8	NIPPLE	FL	6"
9	PIPE SUPPORT W/ COMPANION FLANGE & VARIABLE HEIGHT NIPPLE (1 EA RED'D)	FL	4"

GENERAL ASSEMBLY NOTE:
USE BLUE BOLTS ON FITTINGS



PLAN

- VAULT NOTES:**
1. ALL FITTINGS OUTSIDE OF THE VAULT ARE TO BE DUCTILE IRON M.J. WITH THRUST RESTRAINT RETAINER GLANDS
 2. PENETRATION WALLS NEED TO BE ADEQUATELY DESIGNED STRUCTURALLY FOR ANTICIPATED THRUST.
 3. THE PRECAST VAULT MANUFACTURER IS RESPONSIBLE FOR DESIGN RELATED TO TRAFFIC LOADING AND THRUST. VERIFICATION OF PROPER DESIGN MUST BE PROVIDED TO THE CITY BY THE DEVELOPER, CONTRACTOR, OR PROPERTY OWNER AS THE CASE MAY BE.
 4. ALL FITTINGS SHALL BE AMWA C-110 WITH 125 LB. FLANGES. ALL PIPING SHALL BE DUCTILE IRON PIPE CLASS 350 P.S.I. MIN.





SECTION 11

CULINARY WATER SYSTEM

PART 1 GENERAL

1 1.1.01 WORK INCLUDED

- A. Inspection
- B. Preparation
- C. Water pipe installation
- D. Valve and fitting installation
- E. Thrust block installation
- F. Corrosion protection
- G. Field quality control
- H. Metered Services
- I. Pressure Reducing Stations
- J. Fire Hydrants
- K. Fire Lines
- L. General

1. The work to be done consists of furnishing all necessary labor, materials, and equipment to provide complete installation and testing of water system facilities. Modifications to existing facilities shall conform to North Ogden City specifications.
2. The construction of water mains shall include excavation, backfill and compaction, construction of concrete structures, anchors, thrust blocks, supports, encasements; furnishing, installing, testing and disinfecting water pipelines, fittings, valves, blow offs, air valves, services, fire hydrants, and all appurtenances; removal and restoration of existing improvements and all work in accordance with the project plans and specifications.

M. Unacceptable Work

1. Unacceptable work as determined by North Ogden City whether the result of poor workmanship, use of defective materials, damage through carelessness or any other cause, found to exist prior to the final acceptance of the work, shall be removed immediately and replaced in an acceptable manner at the contractor's expense.



11.1.02 RELATED WORK

- A. Regulations for Excavation on North Ogden City Rights-of-Way -- Section 2
- B. Excavation and Backfill for Pipelines -- Section 6
- C. Disinfection of Water Distribution Systems -- Section 13

11.1.3 QUALITY ASSURANCE

- A. Comply with federal, state, and local codes and regulations. Underground piping pressure testing shall be witnessed by the North Ogden City Engineer or a designated City representative.
- B. Pipe, valve, and appurtenance materials and workmanship shall be in accordance with current AWWA Standards or other standards as specified herein.

11.1.4 REFERENCES

- A. American Water Works Association (AWWA)
 - 1. C 104, "Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water"
 - 2. C105, "Polyethylene Encasement for Gray and Ductile Cast-Iron Piping for Water and Other Liquids".
 - 3. CI 10, "Ductile-Iron and Gray-Iron Fittings for Water".
 - 4. C 111, "Rubber-Gasket Joints for Ductile-Iron and Gray-iron pressure Pipe and Fittings".
 - 5. C 151, "Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids".
 - 6. C504, "Rubber-Seated Butterfly Valves".
 - 7. C509, "Resilient-Seated Gate Valves for Water and Sewer Systems".
 - 8. C600, "Installation of Gray and Ductile Cast-Iron Water Mains and Appurtenances".
 - 9. C900, C905, C906
- B. American Society for Testing and Materials (ASTM):
 - 1. A126: For valve bodies
 - 2. D3350: Polyethylene Plastic Pipe and Fittings Materials
 - 3. F2620: Standard Practice for Heat Fusion of Polyethylene Pipe and Fittings
 - 4. D2774: Standard Practice for Underground Installation of Thermoplastic Pressure Piping



11.1.5 SUBMITTALS

- A. Submit manufacturer's specifications for all products to North Ogden City for approval.

11.1.6 DELIVERY, STORAGE AND HANDLING

- A. Load and unload pipe, fittings valves, and accessories by lifting with hoists or skidding so as to avoid shock or damage. Do not skid or roll pipe on skid ways against pipe already on the ground.
- B. Each length of pipe shall be unloaded opposite or near the place where it is to be laid in the trench.
- C. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a watertight plug or other means approved by North Ogden City.

PART 2 PRODUCTS

All products and materials shall be new. Used materials shall not be allowed unless specifically approved by the city water system superintendent. If approved, all used materials shall be thoroughly cleaned and restored to their original condition. All materials in contact with drinking water shall conform to NSF Standard 61 and Standard 14, and applicable sections of the most recent publication for ANSI/AWWA Standards C104 through C550 and C900 through C950. The use of asbestos cement pipe is prohibited. All pipe and pipe fittings shall be lead free.

Water main lines may be either PVC or Ductile Iron. Water main lines must be PVC in Pressure Zone 1 or where corrosive soils are present.

11.2.01 DUCTILE IRON PIPE

- A. Buried Applications
 1. Standard: AWWA C151.
 2. Pressure Rating (class) - Pipe Diameters 4" to 12" shall be thickness Class 50, Pipe Diameters 14" and larger shall be pressure Class 250 p.s.i.
 3. Cement lined and bituminous coated in accordance with AWWA C104.
 4. Rubber gasketed slip-on pipe joints in accordance with AWWA C111.
 5. Class 250 psi mechanical joint fittings in accordance with AWWA C110.
 6. Standard: NSF 61 - Drinking Water System Components - Health Effects.
 7. C900, AWWA Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. Through 12 In., for Water Distribution.
 8. C600-10, Standard for the Installation of Ductile-Iron Mains and Their Appurtenances.
- B. Above Ground Applications
 1. Same as below ground except joints and fittings to be flanged in accordance with AWWA C151.
 2. Gaskets to be full faced, 1/16th inch thick rubber.



11.2.2 POLYVINYL CHLORIDE (PVC) PRESSURE PIPE

(Required in Pressure Zone 1 or where corrosive soils are present. May also be used as an option in any area of the city unless otherwise directed by the City Engineer)

A. Buried Applications

1. Pipe Diameter 4"-12": Standard ANSI/AWWA - C900 PVC Pipe, DR-14
2. Pipe Diameter 14" - 24": Standard ANSVAWWA - C905 PVC Pipe, DR-14
3. National Sanitation Foundation: NSF Standard 61
4. Locator Wire: AWG THHN 12 ga. Solid Copper plastic coated wire
5. Locator Tape: Place 2" wide locator tape 24" above PVC Pipe
6. Joints:
 - a. Bell and spigot with flexible elastomeric seals, ASTM D 3139. Use non-toxic lubricant.
 - b. Solvent weld, ASTM D 2564.
7. Pipe color: Blue. Color shall be uniform throughout material.

11.2.3 HIGH DENSITY POLYETHYLENE PIPE (HDPE)

(When recommended by the City Engineer, HDPE pipe can be used on the culinary water system. It is not intended for general applications but may be used if deemed appropriate in pipe bursting, in areas where the terrain may be steep or unstable, to pull through casings, etc.)

A. Buried Applications

1. Pipe Diameter 4"-20": Standard ANSI/AWWA - C906, PE 3408 3608, DR-7
2. National Sanitation Foundation: NSF Standard 61
3. Locator Wire: AWG THHN 12 ga. Solid Copper plastic coated wire
4. Locator Tape: Place 2" wide locator tape 24" above HDPE Pipe
5. Joints and fittings: butt heat fusion, ASTM D 3261.

11.2.04 ACCESSORIES

- A. All buried fittings shall be provided with corrosion resistant bolts and nuts such as A316 stainless steel or Xylan 1424 polytetrafluoroethylene with zinc (Blue-Bolts).
- B. Gaskets to be 1/8th inch full face rubber.
- C. 8 mil. polyethylene wrap in accordance with AWWA C105.



11.2.5 CORROSION PROTECTION

- A. Encase all buried ductile iron valves, fittings, connections and specialties in minimum 8 mil. polyethylene sheets in accordance with AWWA C105. Black anti-corrosion polyethylene adhesive tape shall be used to secure polyethylene sheets to the pipe, valves, fittings, etc.
- B. Encase buried ductile iron pipe in a minimum 8 mil. polyethylene sheets in accordance with AWWA C105 in selected areas and soil types which required corrosion protection as approved and directed by the City Engineer.

11.2.6 VALVES

- A. Gate valves (10" and smaller):
 - 1. Cast Iron Body, Bronze Mounted: Furnish resilient-seated gate valves 3 inches through 10 inches that conform to the requirements of AWWA C509, non-rising stem design with "O" ring seals.
 - 2. Operating Direction: Open counterclockwise.
 - 3. Buried Valves: Flanged, mechanical joint, or as indicated.
- B. Tapping valves and sleeves:
 - 1. Tapping valves shall have large diameter seat rings to permit entry of tapping machine cutters. Inlet shall be flanged. Outlet shall suit branch piping and shall include the required flange for tapping machine adapter connection. In other details, tapping valves shall conform to the requirements outlined for gate valves in Paragraph 11.2.06 A.
 - 2. Tapping sleeves shall be suitable for assembly around the existing main. Body shall be high strength ribbed construction. End gaskets shall be sized to suit the existing main, and the seals between the pipe and the gaskets shall be formed around the perimeter of the pipe.
 - 3. Tapping valves and sleeves shall be split cast iron or stainless steel fully gasketed.
- C. Butterfly valves (12" and Larger):
 - 1. Shall comply with the requirements of AWWA C504, Class 150 B.
 - 2. Valve bodies shall be cast in conforming to ASTM A126, Class B. Ends shall be flanged unless otherwise specified.



3. Valve discs shall be streamlined and shall have a continuous 360 sealing surface of stainless steel, ASTM A276, type 304.
4. Valve shafts shall be stainless steel ASTM A276, type 304, of stub construction with at least 1-1/2 shaft diameter engagement into the disc and shall be fastened to the disc with upset pins.
5. Valve seats shall be of Buna N material bonded to the valve body.
6. Valve bearings shall be self-lubricating and non-corrosive and shall have a significant difference in hardness from the valve shaft.
7. Valve actuators shall be designed as an integral part of the valve and shall meet all the requirements of AWWA C504. All actuators shall be hermetically sealed and permanently lubricated with no exposed moving parts. All manual actuators will meet the requirements of AWWA C504 for nut input.

11.2.7 VALVE BOXES

- A. Shall be suitable for HS-20 traffic loading.
- B. Shall be furnished and installed over each line valve and over each auxiliary hydrant valve. All buried valves shall be installed complete with a Tyler 564A slip valve box or approved equivalent. Valves over 5' in depth shall have a valve nut extension stem installed.

11.2.8 FITTINGS

- A. Mechanical joint:
 1. Mechanical joint fittings shall be cast iron class 250 and shall conform to AWWA C110 and C111. Mechanical joint fittings shall be coated with a petroleum asphaltic coating 1 mil thick.
 2. All mechanical joint fittings and bends over and including 11 V4 ° shall include thrust restraint joint products as approved by the city water department.
- B. Flanged fittings:
 1. Flanged fittings shall conform to AWWA C110 and C111 Cast Iron Fittings. Flanges shall be faced and drilled and shall be Class 250. Flanged fittings shall be coated with a petroleum asphaltic coating 1 mil thick.



11.2.9 METERED SERVICES

Policy: Ownership of culinary water metered service lines and appurtenances: The City shall own and maintain the culinary water service line from the main in the roadway up to and including the meter. The property owner shall be responsible for all piping and fittings after the meter itself. Where meter boxes must be clustered for multi-dwelling units, mark each meter individually with the unit # on a rebar and cap or as otherwise approved by the water department.

A. 1" Service Laterals (see Standard Details):

1. All supplies, labor, machinery, etc. will be supplied by the contractor. North Ogden City will supply and set the meter for 1" connections. All 1" meters shall be Master Meter with 4G Allegro Automated Meter Reading capabilities.
2. All connections must be made with compression copper fittings made of brass.
3. Brass corporation stops Mueller B-25008 or equivalent shall be used for direct tap applications on ductile iron pipe. All corps shall be CC thread.
4. Stainless steel service saddles shall be used on PVC mains where approved by the City. Romac 202 NS, Mueller DR 2 S or Ford FCD202 service saddles may be used. Threads shall be female iron pipe thread.
5. Type K soft drawn copper pipe installed as one solid piece from main to meter.
6. Meter yokes. Mueller B-2470-6A or equivalent (copper or brass).
7. Meter Boxes: 21" diameter concrete meter box as approved by the City.
8. 21" cast iron ring and lid with locking nut and two inch (2") diameter deep recess hole for radio read equipment (D&L Supply L-2240-10 or City approved equal). If a traffic rated ring and cover is required then a "D&L Supply" B-5021 ring and cover with locking nut and two inch (2") diameter deep recess hole for radio read equipment shall be used.

B. 1-1 1/2" and 2" Service Laterals (see Standard Details):

1. All supplies, labor, machinery, etc. will be supplied by the contractor. North Ogden City will supply and set the meter for 1-1/2" and 2" connections. All 1-1/2" and 2" meters shall be Octave Ultra Sonic Meter with 4G Allegro Automated Meter Reading capabilities.
2. Type K soft drawn copper pipe installed as one solid piece from main to meter.
3. Copper or brass screw type fittings (ball valves, strainers, nipples, tees, bends, etc.).
4. 5 foot diameter precast concrete manhole with 30" cast iron ring and lid suitable for HS-20 traffic loading (D & L Supply 1181 or City approved equal).
5. Meter box to have 12" gravel floor.



- C. 3" Service Laterals (see Standard Details): Specifications for 3" services shall be the same as 2" connections with the following exceptions:
 - 1. North Ogden City will supply the meter for 3" connections. The contractor will need to install it.
 - 2. Where possible flanged fittings may be substituted for screw on type fittings.
 - 3. Master Meter-Octave Ultrasonic Meter with 4G Allegro Automated Meter Reading capabilities.
 - 4. Meter Vault to have concrete floor and 18" diameter concrete drain sump with personnel access manhole and steps. See North Ogden City Standard Details.

- D. 4" and Larger Service Laterals:
 - 1. North Ogden City will supply the meter for 4" connections. The contractor will need to install it.
 - 2. Ductile iron pipe or PVC C-900 DR 14.
 - 3. Cast iron, flanged gate valves and fittings.
 - 4. Concrete meter vault with cast iron lid, concrete floor and 18" diameter drain sump with personnel access manhole and steps.
 - 5. Master Meter-Octave Ultrasonic Meter with 4G Allegro Automated Meter Reading capabilities.
 - 6. Floor supports as needed.

- E. All service laterals are to have 48 inches min. cover and are to be installed using one seamless section of pipe from the water main to the meter.

11.2.10 PRESSURE REDUCING VALVE STATIONS (See Standard Details)

- A. All pressure reducing valves (PRV) shall be Cla-Val brand Pressure Reducing and Sustaining Valves as shown on the Standard Drawings.
- B. Equipment shall be properly supported to reduce stress on water pipes and fittings. supports shall be screw jack type and shall not restrict access to any of the bolts.
- C. PRV stations shall include isolation valves with a bypass line.
- D. PRV stations shall be provided with an electrical connection to run lighting and equipment such as sump pumps, heaters, exhaust fans, de-humidifiers, outlets, and telemetry.
- E. The hatch for PRV stations shall include a standard lock-set for security.
- F. PRV stations shall include an access ladder which will extend above grade for convenient entry.
- G. PRV stations will be supplied with electrical power service. The City will provide and coordinate the installation of a meter base with the power company. The Contractor will need to install and coordinate for the connection of the power service line to the meter base. See Standard Details for PRV general layout and details for electrical conduit information.



11.2.11 FIRE HYDRANTS (See Standard Details)

- A. All fire hydrants shall be red in color and shall be one of the following 6" compression type hydrants:
 - 1. Mueller Centurion
 - 2. Clow Medallion
 - 3. EJCO
- B. Auxiliary valve complete with valve box.
- C. Gravel for sump.
- D. Concrete for blocking and setting hydrant (Mega-lug connections utilized to replace concrete blocking is acceptable with the prior authorization of the City).
- E. All hydrants shall conform to AWWA Specifications C-502.
- F. Hydrant shall be equipped with two 2 1/2" hose nozzles and one 4 1/2" nozzle, and nozzles shall have the national standard threading.
- G. Each hydrant shall be supplied with O-ring seals and a national standard pentagon operating nut designed for clockwise rotation closing.
- H. Auxiliary valve shall conform to North Ogden City Specification for gate valves. The water line from the main to the hydrant shall be 6" minimum.
- I. Blocking shall conform to North Ogden City Specifications for thrust blocking.

11.2.12 FIRE SPRINKLER/SUPPRESSION LINES AND SYSTEMS

Fire sprinkler systems shall conform to NFPA 13.

A. RESIDENTIAL SYSTEMS

- 1. Residential fire sprinkler systems connected to the City's culinary water supply shall be through a shared metered culinary water service line. The shared service line shall meet all requirements for culinary water systems.
- 2. Sizing of the service line and meter shall be as determined by a licensed professional fire systems engineer and approved by the City.

B. COMMERCIAL SYSTEMS

- 1. All fire lines must be equipped with a gate valve. The valve shall conform to North Ogden City specifications for gate valves.
- 2. All fire lines shall be ductile iron pipe, thickness class 50 or as shown on the City approved site plans. Fire lines shall meet North Ogden City's specifications for main lines.
- 3. Fire line locations shall be approved by North Ogden City.
- 4. Notify North Ogden City Water Inspector 48 hours prior to installation.
- 5. Unless written authorization is given by North Ogden City, no services shall be connected to the fire sprinkler/suppression lines.

Policy: A fire suppression line gate valve shall be located at the main in the street. Fire suppression lines shall be owned and maintained by the property owner from the fire suppression line gate valve at the main to the building. The City shall own and maintain the fire suppression line valve at the main.



PART 3 EXECUTION

11.3.1 INSPECTION

- A. All pipe fittings, valves and other appurtenances shall be examined by Contractor carefully for damage and other defects immediately before installation.
- B. Defective materials shall be marked and held for inspection by the North Ogden City Engineer, who may prescribe corrective repairs or reject the materials.
- C. Prior to installation, valves shall be inspected for direction of opening, freedom of operation, tightness of pressure-containing bolting, cleanliness of valve ports and seating surfaces, handling damage, and cracks. Defective valves shall be connected or held for inspection by the North Ogden City Engineer.

11.3.02 PREPARATION

- A. Furnish temporary support, adequate protection, and maintenance of all underground and surface structures, drains, sewers, and other obstructions encountered in the progress of the work.
- B. The trench bottom and pipe bedding surface shall be prepared in accordance with the approved plans, the excavation and backfill specifications in the North Ogden City Public Works Standards and The Regulations for Excavation on North Ogden City Rights-of-Way prior to pipe installation.
- C. All lumps, blisters, and excess coating shall be removed from the socket and plain ends of each pipe, and the outside of the plain end and the inside of the bell shall be wiped clean and dry and be free from dirt, sand, grit, or any foreign material before the pipe is laid. Bevel and file plain end of pipe to prevent gasket damage during joint assembly.
- D. Proper implements, tools, and facilities shall be provided and used for the safe and convenient performance of the work. All pipe, fittings, and valves shall be lowered carefully into the trench by means of a derrick, ropes, or other suitable tools or equipment, in such a manner as to prevent damage to water-main materials and protective coatings and linings. Under no circumstances shall water system materials be dropped or dumped into the trench.



11.3.3 WATER PIPE INSTALLATION

- A. The water pipe shall be laid and maintained to lines and grades established by the drawings and specifications with fittings and valves at the required locations unless otherwise approved by North Ogden City. Unless otherwise shown, all water lines shall have 4.0' minimum cover to final finish grade. All main lines are to be located 10' off the street centerline as shown on City approved drawings unless otherwise specified. All valves and fire hydrants are to be installed as noted on the approved plans.
- B. When crossing existing pipe lines or other structures, alignment and grade shall be adjusted as necessary, with the approval of the North Ogden City Engineer to provide clearance as required by federal, state, or local regulations or as deemed necessary by North Ogden City to prevent future damage or contamination of either structure.
- C. Lay all water lines on a continuous grade to avoid high points except as shown on the plans.
- D. Prevent foreign material from entering the pipe while it is being placed in the trench. During laying operations, no debris, tools, clothing, or other materials shall be placed in the pipe. If the pipe-laying crew cannot put the pipe into the trench and in place without getting earth into it, the Engineer may require that, before lowering the pipe into the trench, a heavy, tightly woven canvas bag of suitable size shall be placed over each end and left there until the connection is to be made to the adjacent pipe.
- E. Under no circumstances shall the pipe or accessories be dropped into the trench. As each length of pipe is placed in the trench, the joint shall be assembled in accordance with manufacturer's recommendations.
- F. The pipe shall be brought to the correct line and grade, and shall be secured in place with approved backfill material in accordance with the North Ogden City Public Works Standards.
- G. Wherever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, to avoid obstructions or plumb stems or where long-radius curves are permitted, the amount of deflection allowed shall not exceed that recommended by pipe manufacturer and shall be approved by the North Ogden City Engineer.
- H. At times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug or other means approved by North Ogden City. When practical, the plug shall remain in place until the trench is pumped completely dry. Care must be taken to prevent pipe flotation should the trench fill with water.



- I. Cutting pipe for the insertion of valves, fittings, or closure pieces shall be done in a neat, workmanlike manner without creating damage to the pipe or lining.
- J. Cut ends and rough edges shall be ground smooth. For push-on joint connections, the cut end shall be beveled.
- K. Whenever possible, all tie-ins will be made dry. No 11h Ogden City shall turn off the water upon 48 hours minimum advance notice by the contractor. It shall be the contractor's responsibility to advise all affected water users of the interrupted service a minimum of 24 hours prior to any service interruption. In large areas where there is heavy use, where shutting down the line is not feasible in the opinion of the North Ogden City Engineer, the contractor shall be required to tie onto the main by using a wet tap.
- L. All dead-end lines shall be constructed with a 4" blow-off assembly (see Standard Details). For locating purposes blow-off assemblies in cul-de-sacs shall be the above grade style shown in the standard drawings. No flushing device shall be directly connected to a sewer line.
- M. Install tracer wire alongside the water main. Terminate tracer wire in "snake pits" at fire hydrants. Install "snake pit" wire tracer box and cap at fire hydrants per city standard drawings. Test all wiring prior to paving.
- N. Surface Water Crossings:
Above water crossings shall be adequately supported and anchored, protected from damage and freezing, and accessible for repair or replacement.

Underwater crossings shall have a minimum of 2 feet of cover over the pipe. Where high surface water velocities are present the crossing shall be in a steel casing.

Underwater crossings greater than 15 feet in length shall meet the following requirements:

1. Pipe with joints shall be of special construction, having restrained joints for joints within the surface water course and flexible restrained joints at both edges of the water course.
2. Isolating valves shall be provided on both sides of the water crossing at locations not subject to high ground water or flooding, so that the section can be isolated for testing or repair.
3. A means shall be provided, such as a sampling tap, not subject to flooding, to allow for representative water quality testing on the upstream and downstream side of the crossing.
4. A means shall be provided to pressure test the underground water crossing pipe.