



# RIVERTON

## UTAH

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# STANDARD SPECIFICATIONS AND PLANS MANUAL

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# **CHAPTER**

# **1**

# **General**

# GENERAL

## CHAPTER 1

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- 1.1 Adoption of Riverton City Standard Specifications and Plans Manual
- 1.2 Changes and Modifications to the current APWA Manual of Standard Specifications and Manual of Standard Plans
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### ABBREVIATIONS & ACRONYMS

AGC	Associated General Contractors
APWA	American Public Works Association
ATSSA	American Traffic Safety Services Association
BMP	Best Management Practice
MUTCD	Manual of Uniform Traffic Control Devices



## GENERAL

### 1.1 ADOPTION OF RIVERTON CITY STANDARD SPECIFICATIONS AND PLANS MANUAL

Riverton City has adopted the following standards specifications and plans as the basis for the Riverton City Standard Specifications and Plans:

- Riverton City Standard Specifications and Plans Manual as included herein.
- American Public Works Association (APWA) Manual of Standard Specifications, Current Edition of the Utah Chapter of APWA and the Associated General Contractors (AGC) of America.
- APWA Manual of Standard Plans, Current Edition of the Utah Chapter of APWA and the Associated General Contractors of America.

The Riverton City Standard Specifications and Plans Manual is available for download at [www.rivertonutah.gov](http://www.rivertonutah.gov) The APWA Manual of Standard Specifications and Manual of Standard Plans are available for purchase from Utah T2 Center (1-800-822-8878), and at select cities within the State of Utah (see <http://utah.apwa.net/> for more information).

Contract Documents and Conditions of the Contract as found in the Current APWA Manual of Standard Specifications and Plans Manual are to be used as the basis for City contracts. Modifications to these specifications may apply to specific projects. The following sections (General, 1.2-1.4) reflect Riverton City Standard Specifications and Plans that may clarify, differ with, or be in addition to APWA Standard Specifications and Plans. Additional modifications may apply to specific projects.

#### NOTE:

1. All construction within the city of Riverton must comply with the Standard Specifications and Plans Manual contained herein.
2. The City Engineer reserves the right to modify these Standard Specifications and Plans at their discretion.
3. Riverton City Standard Specifications and Plans supersede APWA Standard Specifications and Plans.



# GENERAL

## 1.2 RIVERTON CITY CHANGES AND MODIFICATIONS TO THE CURRENT APWA MANUAL OF STANDARD SPECIFICATIONS AND STANDARD PLANS

The following changes and modifications to the **current APWA Manual of Standard Specifications and Manual of Standard Plans** apply in Riverton City:

### A. APWA SPECIFICATIONS:

- a. None

### B. APWA PLANS:

- *APWA Plan No. 205.1*: Riverton City standard to be "Type A" unless specified otherwise.
- *APWA Plan No. 225*: Replace Table in "Oblique" with the following table:

Street Type	LENGTH		
	Y	T	R
Residential	6"	6"	5 Ft.
Other	24"	8"	<b>10 Ft. min.</b>

- *APWA Plan No. 235.1 through 235.4*:
  1. Replace Section "2. Products C" with the following:
    - A. **ADA-compliant cast iron plates**, w/non-slip surface and natural finish. Two 24" x 24" plates are required per ramp.
  2. Add to Section 3, Execution, the following:
    - Set two 24"x24" plates together in wet concrete with a smooth even seam in accordance with ADA guidelines and manufacture's recommendations.
- *APWA Plan No. 274*: Replace all Sections (1-3) and Drawings (A, B, Detail 1) with the following:
  1. General
    - A. Survey monuments must be installed in accordance with the latest Salt Lake County Surveyor requirements. A permit must be obtained from the Salt Lake County Surveyor prior to the disturbance or installation of any monuments.

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- *APWA Plan No. 381*: For all trenches cut into existing roadways and hard surface Right of Way:
  1. Remove Part 3.A, "Trench Backfill Above the Pipe Zone".
  2. Replace Part 3.B with the following:
    - B. Flowable Fill (controlled low strength material) is **REQUIRED** above the pipe zone per Section 31 05 15, Part 2.1. Plate trench per Riverton City Plating Detail ENG-9, and cure the material before placing surface restorations.
- *APWA Part 3 Storm Drains*: Add the following to all Box/Manhole Plans in this Chapter (catch basins (315, 317), combination boxes (316), cleanout boxes (331, 332) and manholes (341)):
  1. General  
Structure shall not have dead volume (sump) below the flow line, except when necessary to accommodate a specific Best Management Practice (BMP).
  2. All storm drain structures will need to have compaction testing completed on each lift for all sides.

### 1.3 RIVERTON CITY SPECIAL REQUIREMENTS

1. As-built DRAWINGS:
  - A. Submit a Record Drawing of the Grading and Drainage which complies with Riverton City As-built drawing requirements.
  - B. Submit a letter stamped and signed by the Project Civil Engineer, which states they have reviewed the survey point drawings prepared by the Land Surveyor, and certify that the site improvements shown on the as-built drawings conform to the approved design plans and drainage report.

### 1.4 CONSTRUCTION NOTES

#### TYPICAL

1. Contractor assumes all responsibility for job site conditions during construction of this project, including the safety and well-being of all persons and property. This responsibility shall apply continuously and not be limited to normal working hours.
2. Contractor shall obtain all applicable permits and/or written agreements necessary to complete the work.
3. Contractor shall schedule a pre-construction meeting with Riverton City's Engineering Division at least 5 business days prior to the start of construction. Contractor must attend and bring one set of the approved construction plans and a copy of the current Riverton City Standard Specifications and Plans Manual (available at [rivertonutah.gov](http://rivertonutah.gov)).
4. Contractor shall have in possession and on-site at all times one copy of the current approved construction plans stamped, signed and dated by the Contractor's Civil Engineer and Riverton City.
5. Developer's Engineers (Civil and Geotechnical) shall perform sufficient inspections and surveys during grading and construction to render an opinion in writing as to adherence to the approved plans and compliance with Riverton City Standard Specifications and Plans Manual.
6. Survey monuments must be installed in accordance with the current Salt Lake County Surveyor's Office requirements.



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7. All disturbed property survey markers shall be reset in their original locations upon completion of all construction activities.
8. Contractor shall provide all traffic control which must conform to current Manual of Uniform Traffic Control Devices (MUTCD) standards. Provide site specific Traffic Control Plans (prepared by an American Traffic Safety Services Association (ATSSA) or AGC Certified Individual) prior to installation of any Traffic Control Device.

## TRENCHES AND UTILITIES

9. Trenches restored per APWA Plan #381 modification (flow fill required; see “Changes and Modifications to Current APWA Manual of Standard Plans and Specifications” in the Riverton City Standard Specifications and Plans Manual).
10. Pothole existing utilities in accordance with Riverton City Standard Specifications and Plans, ENG-10.
11. Contractor is responsible to locate, avoid, protect, and repair all utilities encountered during construction whether or not they are shown on the plans. Locations of underground utilities shown on plans are approximate and require field verification by Contractor.
12. All trenches within public right-of-way must be backfilled or securely plated (per Riverton City Standard Specifications and Plans Manual, ENG-9) during non-working hours. Trenches outside these areas shall be back-filled or protected by approved temporary fencing and/or barricades during non-working hours. Trenches in roadway must be backfilled, compacted and asphalted (per Riverton City Standard Specifications and Plans Manual) within 48 hours of road-cut. Paint striping shall be replaced in accordance to City Standards within 48-hours of restoration of pavement.

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### ROADWAY CONSTRUCTION AND RESTORATION

13. Subgrade must be approved prior to construction of asphalt and untreated base course pavement sections. Subgrade approval requires that all utilities be installed, connections to main lines completed, inspected, and accepted by Riverton City.
14. Asphalt patching to roads between October 15 and March 1 will be considered temporary only, and must be replaced according to APWA Standards and Specifications between the following April 1 and June 1.
15. Material Submittals are required for all items placed within the City Right of Way. All submittals must be dated within 90 days of Construction Date (unless specified otherwise) and be submitted prior to the start of construction activities.
16. Moratorium Standard (New, Reconstructed, and Overlaid Streets): No cuts permitted for two (2) years from the time of construction/ reconstruction/overlay)
17. Special Restoration Standard: This standard applies to new, reconstructed, overlaid, and slurried streets:
  - a. *New, Reconstructed, and Overlaid Streets (for 5 years after end of moratorium)*: The asphalt surface shall be milled a minimum depth of two (2) inches, and fifteen (15) feet each way from the edge of the cut. Milling shall be done in widths equivalent to existing striped traffic lanes. The City Engineer reserves the right to require additional area and/or depth if deemed appropriate to restore roadway to original condition. Approved fabric is required when existing pavement included a fabric prior to the permitted cut.
  - b. *Slurried Streets (for one year after slurry application)*: The asphalt surface shall be re-slurried a minimum of fifteen (15) feet each way from the edge of the cut, in widths equivalent to existing striped traffic lanes.
18. Roads shall be opened for traffic during peak hours. Lane closures may only be in effect from 9am-3pm, and 7pm-7am.
19. Paint striping shall be replaced in accordance to City Standards within 48-hours of restoration of pavement.

# CHAPTER

# 2

# Stormwater

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### ABBREVIATIONS & ACRONYMS

FEMA	Federal Emergency Management Agency
FHWA	The Federal Highway Administration
FIRM	Flood Insurance Rate Maps
LID	Low Impact Development
ROW	Right of Way
SCS	Soil Conservation Service
UCEA	Utah City Engineers Association
UIC	Underground Injection Control
WQV	Water Quality Volume
WQCV	Water Quality Capture Volume
WQD	Water Quality Device



## 2.1 DEFINITIONS

To shorten this document, unless stated otherwise, certain words or phrases are defined as follows:

- A. **Detention Storage:** The storage of stormwater runoff for controlled release during a storm event.
- B. **Discharge Point:** A location where surface or pipe storm water runoff is released from the project area, to another drainage way or the ground.
- C. **Easement:** The right to use land owned by another party for a specific purpose.
- D. **City Engineer:** Riverton City Engineer or authorized representative.
- E. **Emergency:** Unforeseen circumstance that presents immediate danger to persons or property. This also includes loss of utility services.
- F. **FEMA:** Federal Emergency Management Agency.
- G. **FIRM:** Flood Insurance Rate Map.
- H. **Flood Route:** Where runoff will flow over the surface of the ground.
- I. **Groundwater:** Water held underground in soil or pores and crevices in rock.
- J. **Infiltration:** That portion of the rainfall, which percolates into the ground surface.
- K. **Open Maintainable Space:** Space that can be cleared of sediments, silt and debris to restore its regulated retention and flood control volume without tear-out and replace operations.
- L. **Percolation:** The process by which fluid passes through soils.
- M. **Predevelopment Hydrology:** The way that naturally vegetated land handles precipitation. With respect to flood control design in Riverton, predevelopment hydrology is the undisturbed natural hydrology that existed before the Jordan River Valley was settled in 1847.
- N. **PC:** Point of Connection. In context of this standard where road or ROW tangent infrastructure intersect with curved infrastructure.
- O. **Pocket Pond:** Above or below ground stormwater detention or retention systems, where the land for the ponds are dedicated to flood and water quality control with no other substantial public use.
- P. **Public Infrastructure:** Infrastructure owned or available for use by the public
- Q. **Retention Storage:** The storage of stormwater runoff where the only outlet is infiltration, evaporation, evapotranspiration, or local reuse.
- R. **First Flush:** The initial surface runoff from a rainstorm with the highest concentration of pollution.
- S. **Runoff Volume:** The total volume of runoff from the surface of land. Regarding flood control design in Riverton it is usually runoff from the surface that is collected by a man-made conveyance and storage systems above or below ground.

- T. **Spillway:** Hydraulic structure, or low point in embankment, for the release of excess runoff from a flood control system.
- U. **Storm Water Runoff:** Precipitation running off the surface of a drainage basin during and immediately following a storm event.
- V. **Tributary Watershed:** The entire catchment area that receives storm water precipitation runoff.
- W. **Waters of the State:** All streams lakes, ponds, marshes, watercourses, wells, springs, irrigation systems, drainage systems, and all other bodies of water, surface and underground, natural or artificial, public or private, which are contained within, flow through, or border upon this State or any portion thereof, except those bodies of water confined to and retained within the limits of private property, and which do not develop into or constitute a nuisance, or a public health hazard.
- X. **10 Year Storm:** 10% annual chance storm
- Y. **100 Year Storm:** 1% annual chance storm

2.2

PRECIPITATION



**POINT PRECIPITATION  
FREQUENCY ESTIMATES  
FROM NOAA ATLAS 14**



**Utah 40.5223 N 111.9578 W 4442 feet**

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 4  
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M. Yekta, and D. Riley  
NOAA, National Weather Service, Silver Spring, Maryland, 2006  
Extracted: Mon Jun 25 2007

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
<b>5-min</b>	0.124	0.157	0.216	0.270	0.358	0.440	0.536	0.648	0.831	0.997
<b>10-min</b>	0.189	0.240	0.329	0.411	0.545	0.669	0.815	0.987	1.26	1.52
<b>15-min</b>	0.235	0.297	0.408	0.510	0.675	0.829	1.01	1.22	1.57	1.88
<b>30-min</b>	0.316	0.400	0.549	0.687	0.909	1.12	1.36	1.65	2.11	2.53
<b>60-min</b>	0.391	0.495	0.679	0.850	1.13	1.38	1.68	2.04	2.61	3.13
<b>2-hr</b>	0.488	0.608	0.794	0.968	1.25	1.51	1.82	2.19	2.78	3.33
<b>3-hr</b>	0.561	0.691	0.873	1.04	1.31	1.55	1.84	2.19	2.81	3.36
<b>6-hr</b>	0.721	0.883	1.08	1.25	1.51	1.72	1.97	2.27	2.83	3.39
<b>12-hr</b>	0.890	1.09	1.31	1.51	1.80	2.03	2.28	2.56	3.00	3.43
<b>24-hr</b>	1.02	1.25	1.49	1.68	1.95	2.15	2.36	2.57	3.03	3.46
<b>2-day</b>	1.17	1.43	1.69	1.91	2.20	2.41	2.63	2.85	3.12	3.50
<b>3-day</b>	1.25	1.53	1.81	2.05	2.36	2.60	2.85	3.09	3.40	3.73
<b>4-day</b>	1.34	1.63	1.94	2.19	2.53	2.79	3.06	3.33	3.69	3.96
<b>7-day</b>	1.54	1.88	2.22	2.50	2.87	3.14	3.42	3.68	4.03	4.27
<b>10-day</b>	1.72	2.10	2.47	2.77	3.14	3.42	3.68	3.93	4.23	4.44
<b>20-day</b>	2.22	2.72	3.19	3.54	3.99	4.30	4.59	4.85	5.16	5.36
<b>30-day</b>	2.65	3.23	3.76	4.17	4.68	5.04	5.38	5.69	6.05	6.28
<b>45-day</b>	3.28	3.99	4.64	5.13	5.74	6.16	6.54	6.87	7.22	7.41
<b>60-day</b>	3.86	4.70	5.45	6.03	6.74	7.23	7.68	8.07	8.49	8.74

Also online at: [https://hdsc.nws.noaa.gov/hdsc/pfds/pfds\\_map\\_cont.html](https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html)



## 2.3 REGULATION RETENTION VOLUME DESIGN REQUIREMENTS

### Regulation Retention Volume

1. MS4 Permit Retention Standard, Permit 80<sup>th</sup> Percentile Event.
2. The State's publication, "A Guide to Low Impact Development within Utah" recommends (3) equations. Riverton selected the following equation to determine the Regulation Retention Volume.

Equation:

$$WQV = R_v dA$$

Where:

WQV= Water Quality Volume (Regulation Retention Volume), [Cubic Feet]

$R_v$ = Volumetric runoff coefficient, [unitless]

$d$  = 80<sup>th</sup> percentile precipitation depth, [feet], (Riverton City retention standard,  $d=0.5"/12$ )

$A$  = Tributary drainage area, [square feet]

NRCS Soil Group		
A	B	C/D
$R_{V_A} = 0.84i^{1.302}$	$R_{V_B} = 0.84i^{1.169}$	$R_{V_{C/D}} = 0.83i^{1.122}$

(i): the percent of imperviousness of the tributary drainage area in decimal form

## 2.4 FLOOD CONTROL VOLUME DESIGN REQUIREMENTS

### Flood Control

1. \*SCS Method
2. WQV may be included with the flood control volume

### Submittals

All engineering to support flood and quality calculations, including but not limited to:

- Field determined soil type and hydrologic soil group
- Field measured critical groundwater levels
- Field measured percolation rate (in/hour) at project retention locations
- Stormwater Quality Report. Find form with Riverton LID Program.
- Regulation retention volume depth reductions require engineering. Use the SCS method for determining the predevelopment hydrology inconsistent with the regulation retention depth. Provide all supporting predevelopment site condition investigation and hydrologic calculations with the Stormwater and Geotechnical Reports

### Other Flood Control and Retention Basin Considerations

- Rear residential yards equaling predevelopment hydrology runoff rates may be separated from basins tributary to directly connected high impervious area basins when runoff from these rear yards pose not significant flood risk.
- Commercial, industrial, institutional, and dense multifamily residential development basins are required to drain into themselves and not allowed basin reduction methods.
- Consider weir designs, underdrains, or equal type systems for basins requiring flow restrictions resulting small diameter orifice sizes that are more susceptible to clogging.

- **Hydrograph routing methods.** A hydrograph routing method approved by the City Engineer is required when modeling multiple connected ponds and for water-sheds greater than 160 acres. (When using computer software for design approval, the applicant must provide the City with pdf copies of all input and output files in sufficient detail and format to perform a design review.)
- The latest edition of the applicable FHWA Hydraulic Engineering Circular shall be used when hydraulic aspect of a project is not addressed in these standards.
- <https://www.fhwa.dot.gov/engineering/hydraulics/>

*\*SCS Method required – For the purpose of implementing varying feasibility levels regarding existing hydrology the Hydrologic Soil Group method for calculating runoff volumes is most compatible with SCS Method.*

**a. DESIGN STORM**

Use the following criteria or as directed by the City Engineer. Developments are responsible for their own project impacts in accordance with Table 1. Non project impacts must be addressed on a case by case basis in accordance with Master Plans, or the Capital Facilities Plan, all minimums shall conform to the intent of the design criteria by this document.

<b>Table 1 - Storm Frequencies for Design</b>	
<b>Type of Structure</b>	<b>Minimum Design Storm Frequency</b>
Storm Drain (gutters, street, inlets, MHs, pipes, etc.)	10 Year Storm; Peak intensity
Streets, channels, swales, creeks, and other surface routes	100-year Storm; Peak intensity
Bridges and Culverts	100 Year Storm; Peak intensity
Detention Systems	10 Year 24-hour Storm; Tributary basin
Retention Systems	100 Year 24-hour Storm; Tributary basin
Regional Detention/Retention Systems	Per Stormwater Master Plans, Capital Facility Plan and as allowed by City Engineer
Temporary Retention System	100 Year 24 hr. Storm; Tributary basin
Spillway Structures	100 Year Storm; Peak intensities

<b>Table 2 – Runoff Coefficients for Use with the Rational Method</b>		
<b>Surface Type</b>	<b>10 Year Storm</b>	<b>100 Year Storm</b>
Paved	0.92	0.96
Roof	0.75	0.81
Landscaped	0.15	0.35
Other	As Determined by the City Engineer	

**b. FLOOD CONTROL CONVEYANCE DESIGN**

**A. Primary System:**

1. Design to drain vehicle and pedestrian paths for flood control, safety and public convenience, e.g. the road, pipe and gutter system.
2. Design primary system for 10-year storm.

**B. Secondary System - Flood Route:**

1. Design for 100 Year Storm for the entire basin.
2. Design the flood route to convey flows to a safe termination point, e.g. detention/retention areas, creeks, canals, rivers, ROW, City property, swales, open space, parkways and approved private property locations, etc.
3. The flood route shall be contained within the ROW or approved stormwater drainage easements. Flood waters generated on or passing through public ROW must remain in public ROW unless special approval is granted for conveying runoff under and over ground through private property. Non-project flows that pass through the development must be designed to not cause runoff impacts greater than those that existed prior development.



4. The cost of the flood route is the responsibility of the development.

C. Gutter grades are 0.5% minimum.

## 2.7 REGULATION DOCUMENTS

- A. Municipal Separate Storm Sewer System (MS4) Permit.
- B. City Stormwater Master Plans, Riverton City Stormwater Restriction Map and as regulated by City Design Standards. Adjust to conform with the intent of the “General Permit for Discharges from Small Municipal Separate Storm Sewer System”
- C. Riverton City Master Plans Webpage Address: Found by going to Rivertonutah.gov: Departments/ Public Works/ Stormwater Division/ Stormwater Master Plans.

## 2.8 LOW IMPACT DEVELOPMENT(LID)

- A. Development shall conform to the current “Municipal Separate Storm Sewer System (MS4) Permit. Treat the permit as an extension of Chapter 2 of the Riverton City Standard Specifications and Plans Manual.
- B. LID systems shall satisfy the requirements MS4 permit.
- C. Distribute runoff retention regulation requirement across the project site as evenly as possible, e.g. adjacent to roadways, driveways, miscellaneous pavements and within various site pavements and parking areas as necessary to conform to the LID intent.
  - 1. Non-conforming LID systems must justify the differences per MS4 Permit regulation and approved by the City.
- D. Treat all runoff containing solid and dissolved pollutants using natural processes.
  - 1. Treat runoff prior to discharging to subsurface and surface drainage systems, e.g. project local vegetation, project local wet pond biologic approaches.
    - a. Treat first flush of 0.1” of precipitation.
    - b. Other treatment variations as approved on case by case basis must be engineered to treat pollutants to the same level as natural systems.
- E. Public LID systems must conform to City standard details.
- F. Private LID systems may include variations of all the options listed in the State LID Manual “A Guide to Low Impact Development within Utah” but the options must also conform to the same pretreatment and flood control criteria as public systems. System structure design must foster preservation of grade, conveyance, volume, and form with equal intent implied by City standard details.
- G. Determine the percolation rate at the floor of each above and below ground retention system, using a down hole percolation test or approved equal. Include but not limited to: bore log locations, soil group, percolation rates, highest seasonal groundwater table, risk to adjacent structures, subsurface transmissivity, utility trench conveyance risks, etc.
- H. Show foundation risk and design protection controls, including but not limited to: utility trench dams, limiting foundation depths, etc.
- I. Subsurface detention and retention systems must be located within open maintainable space and have adequate maintenance access. Detention and retention volume is not allowed in gravel pore space or other inaccessible space.
- J. Low Impact Development Program is found on Riverton City Webpage:  
*Departments/ Public Works/ Stormwater Division/ Low Impact Development Standards*
- K. Find Low Impact Development Standard Details in Engineering Chapter 4 under Stormwater:
- L. Other related documents:
  - 1. City SWMP Program 5.6 New Development LID Incentive
  - 2. EPA 901-F-09-003 Managing Stormwater with Low Impact Development



## 2.9 FLOOD CONTROL REQUIREMENTS

- A. Detention/Retention systems shall capture required tributary basins peak flow rates and volumes
  1. Design storage at lowest topographic grade.
  2. Infiltration rates are not allowed to be factored in flood control storage volume calculation.
  3. 80<sup>th</sup> Percentile retention volume may be included in the flood control volume.
  4. Pretreatment is required for full retention systems.
  5. Determine the percolation rate at the floor of each above and below ground retention system, using a down hole percolation test or approved equal. Include but not limited to: bore log locations, soil group, percolation rates, highest seasonal groundwater table, risk to adjacent structures, subsurface transmissivity, utility trench conveyance risks, etc.
  6. Show foundation risk and design protection controls, including but not limited to: utility trench dams, and limiting foundation depths, etc.
  7. All flood control structures and facilities must have adequate maintenance access. Flood control volume is not allowed in gravel pore space.
  
- B. Residential systems:
  1. Public and private systems may include but is not limited to: Surface and subsurface storage, swales, tanks, drywells, etc. Public systems shall conform to City Standard Details.
  2. Design retention ponds to drain within 48 hours the storm event. Use minimum guidance criteria from UCEA Saturated Hydraulic Conductivity Rate According to Soil Types standard minimum.
  
- C. Commercial, Institutional, and Industrial systems:
  1. May include but is not limited to: Surface and subsurface storage, swales, tanks, drywells, etc.
  2. Flood control systems must include a visible means to alert the property owner of failure.
  
- D. Public system detention/retention pond grading.
  1. Above ground water depth: 4 feet maximum
  2. Freeboard: 1 foot minimum. Freeboard intent is to direct runoff to the required spillway location.
  3. Side slopes: 3H:1V maximum
  4. Bottom of pond cross slope: 2% minimum
  5. Corner radii: 10' minimum
  6. Grade surfaces to drain toward pond.
  7. Design spillway structures at safe locations to pass peak flows from the entire tributary area.
  
- E. Public outfall and inlet structures: Cast in place box shall match slope of pond embankment and be constructed flush to grade.
  1. Option 1:
    - a. Grate designs shall be submitted with the stamp of a Professional Engineer (P.E.) for approval by the City Engineer prior to fabrication.
    - b. Grate bar orientation shall be parallel to slope and less than or equal to 2" apart with sufficient cross supports.
    - c. Grates shall be fabricated from galvanized steel.
  2. Option 2:
    - a. Outfall box shall be surrounded by 8' wrought iron fence, 6" mow strip and gate with locking mechanism for 3/8" padlock.
    - b. Slope splash pad sloping back into box with low flow or infiltration system, e.g. drywell or subsurface system, etc. Systems shall minimize standing water to prevent mosquito hazards unless approved with water quality device/system designed to hold water.
  
- F. Public Access Ramp Criteria
  1. Road & ramp 15' wide.

2. Ramp slopes per APWA driveway approach break over angles at top and bottom per 216, 221, 222, 225 conforming to the subdivision standard.
3. Road & ramp shall be all-weather access for 40,000lb load that is compatible with the pond use. Including but not limited to: Reinforced sod, traversable architectural rock, or other traversable pervious surfaces, etc.
4. Jet Truck work zone.
  - a. Work zone shall not block vehicle lane.
  - b. Jet Truck front access: Work zone edge no more than 7' to farthest box inside wall.
  - c. Jet Truck side access: Work zone edge no more than 15' to farthest box inside wall.

## **2.10 CREEKS**

- A. Development impacting creeks shall conform to master plans.
- B. Property owner is responsible for creek maintenance in accordance with the terms of the Long-Term Stormwater Management Plan Agreement.
- C. Developments dedicating streams and creeks to the City require adequate access including top-of-bank durable traversable surface and grades for excavation and haul truck equipment, e.g. driveway, parking lot, dedicated maintenance road dirt or paved, etc.

## **2.11 DRAWINGS: PRELIMINARY STAGE**

- A. Provide adequate information to determine site drainage patterns affecting the entire project area. Drawings shall include but not be limited to:
  1. Existing topography showing all existing drainage features within 100 feet (City Engineer may increase this amount) of the project site including but not limited to: existing watercourses, storm drains, canals, irrigation ditches, springs, culverts, etc.
  2. Any areas outside the project site that influence the project drainage infrastructure, upstream or downstream.
  3. Detention/Retention locations, volume and area required.
  4. Flood route.
  5. Delineate the FEMA 100-year flood plain, label FIRM panel and date.
  6. Existing structures of any kind.

## **2.12 DRAWINGS: FINAL STAGES**

- A. Provide adequate information to determine the site drainage patterns affecting the entire project area. Drawings shall include but not limited to:
  1. Topography at 1-foot minimum contour intervals (proposed and existing).
    - c. Existing topography describing all existing drainage features within 100 feet (City Engineer may increase this amount) of the project boundary including, but not limited to: location of existing watercourses, storm drains, canals, irrigation ditches, springs, and culverts etc.
    - d. Proposed topography, including but not limited to watercourses, storm drains, canals, irrigation ditches, springs and culverts etc.
  2. Tributary drainage areas, flow directions, inlets, conveyance system, outlets, catch basins, waterways, culverts, detention basins, elevations, grades, capacities, orifice plates etc.
  3. The flood route and termination point.
  4. Delineate and label the 100-year flood plain as designated by the current FIRM panel and date.
  5. Detention or retention volume and area, high flood mark, and freeboard noted, including max depth, side slopes, and spillways.
  6. Any areas outside the project site that influence the project drainage infrastructure, upstream or downstream.
  7. Plan and profile drawings.

8. Existing structures
9. Previously redlined plan sets

### **2.13 PIPE DESIGN, MATERIAL, SIZE, AND CONSTRUCTION**

- A. Pipe Installation per APWA Standard Specifications, Section 33 05 02
- B. Pipe type to be reinforced concrete pipe for city-maintained infrastructure.
- C. Pipe size to be 15" minimum pipe diameter or as dictated on Stormwater Master Plan.
- D. Install storm drainpipe per APWA Plan No. 381-382.
- E. Minimum depth: 2-foot cover. May include asphalt.
- F. Minimum slope requirements: Design pipes with slopes that produce minimum flow velocities of 2.0 fps.
- G. Match pipe crowns.
- H. Testing requirement: video inspection of the entire system including joints prior to acceptance.
- I. Install pipe within roadway between top back of curbs.

### **2.14 MANHOLES (CLEAN-OUT BOXES)**

- A. Design per APWA Plan No. 302.1, 331, 341, or approved equivalent.
- B. Place manholes, at all changes in pipe size, alignment, and slope. Typical spacing to be 400 feet maximum.
- C. Design boxes to be self-cleaning.

### **2.15 INLET AND COMBINATION BOXES**

- A. Design per APWA Plan No. 315 through APWA Plan No. 316. Provide hooded grate casting with water quality markings that either by word or symbol prohibits pollutants to be discharged into drain.
- B. Design spacing is determined by time of concentration calculations for the 10-year storm intensity with spread not exceeding ½ the driving lane.
- C. Double inlet catch basins are required at low points in vertical curves, and at the low points of downgrade cul-de-sacs or dead ends. Where possible, force the sag points in curb and gutter to property boundaries.
- D. Locate inlet boxes at upstream PC of intersections.
- E. Locate inlet boxes at property lines to prevent conflict with driveway access.
- F. Design boxes to be self-cleaning, unless otherwise approved by the City Engineer.
- G. Position inlets to eliminate waterways in roadways.

### **2.16 EASEMENTS**

- A. Public stormwater systems, including but not limited to: pipe, manholes, ditches, swales, flood routes etc. are not allowed on private property unless approved by the City Engineer.
- B. Provide easements in favor of the City for all public storm drain facilities on private property. All easements shall be submitted and approved by City Council. Easement templates are available from the Stormwater Division.
- C. Storm drain easements shall be 20' min. centered on the pipe or system. However, additional width may be required for adequate vehicular access for all manholes, storm drainpipe, ditches, swales etc.
- D. Manhole lids allowed on private property shall be bolt down lids with PENTA-HEAD bolts.

### **2.17 WATER QUALITY MANAGEMENT**

- A. Pre-treatment of underground infiltration retention systems is required.
- B. Water quality devices are required for all sites discharging stormwater offsite.

- C. Provide shop drawings and the maintenance requirements necessary to maintain the designed water quality device.

**2.18 CLASS V UNDERGROUND INJECTION WELLS**

- A. Obtain Underground Injection Control (UIC) authorization for discharging stormwater into the ground.

Applications are available from the Department of Environmental Quality, Utah Ground Water Quality Protection Program. Groundwater Program Phone: 801-536-4351.

**2.19 EAST RIVERTON DRAINAGE SYSTEM**

- A. Design MH per APWA Plan No. 341, Riverton City Standards, or approved equivalent.
- B. Manhole lid label to be marked East Riverton Drain.
- C. Use RCP gasketless pipe, match existing size, 12" minimum. Install with gap ranges between 0.5"-0.75", Section 33-05-02.
- D. Install storm drainpipe per APWA Plan No. 381-382. Full pipe zone, 1" to 1/2" crushed gravel completely fully wrapped with GEOTEX 451 or approved equivalent, Section 31-05-19.
- E. No stormwater connections allowed.
- F. Easement 20' wide minimum.

**2.20 LONG-TERM STORMWATER MANAGEMENT PLANS**

- A. Long-Term Stormwater Management Program is found on Riverton City Webpage:  
*Departments/ Public Works/ Stormwater Division/ Long-Term Stormwater Management Plan Documents*

**2.21 LAND DISTURBANCE PERMIT**

- A. Land Disturbance Program is found on Riverton City Webpage:  
*Departments/Public Works/Stormwater Division/Land Disturbance Documents*

**2.22 WETLANDS**

- A. Riverton City follows State Code, 10-9a-521.

**2.23 MOSQUITO MANAGEMENT**

- A. Retention systems shall minimize mosquito habitat by infiltrating all storm events of 0.5" of rainfall within 48 hours.  
Reference EPA Publication: EPA-833-F-05-003 Mosquitoes  
Reference EPA Publication: EPA-901-F-09-003 Addressing Barriers to LID

**2.24 SPECIAL FLOOD HAZARD**

- A. Reference the FEMA Program found on Riverton City Webpage;  
*Departments/Public Works/Stormwater Division/Riverton City FEMA Program, Riverton City FEMA Program*
- B. Comply with SECTION 15.45 of Riverton City Code: AREAS OF SPECIAL FLOOD HAZARDS GENERAL PROVISIONS.

**2.25 SALT LAKE COUNTY CREEKS AND CANAL FACILITIES**

- A. The latest version of Salt Lake County ordinances and/or canal design standards apply to design and construction activities, for the following systems under Salt Lake County Control: Jordan River, Midas Creek, Rose Creek, Beckstead Ditch, South Jordan Canal, Utah and Salt Lake Canal, and Utah Lake Distributing Canal.
- B. A copy of the construction/discharge permit from the appropriate Canal Company and Salt Lake County Flood Control, where applicable, is required to release stormwater runoff into creeks and canals.



## 2.26 IRRIGATION DITCHES

- A. Pipe open irrigation ditch within or adjacent to the boundary of the development.
- B. Irrigation ditches are not allowed to discharge to City stormwater systems, unless approved by City Engineer.
- C. Irrigation systems shall conform to Riverton City Code. Coordinate with affected shareholders or representative and provide a written document of agreements between the developer and shareholders. Include pipe sizes, type, known flows and any other relevant information.
- D. Design piping of sufficient size to handle the anticipated flow in existing ditch minimum.
- E. Design appropriate boxes, diversions, gratings, and covers to minimize irrigation hazards.
- F. Grate opening shall be 2" maximum.
- G. Irrigation lids shall be bolted.
- H. Provide easements per agreements with shares holders. On plat identify as "Irrigation Easement".
- I. Special authorization for Irrigation connections to City systems, requires a water quality device to pre-treat water. Minimum design parameters:
  - 1. System shall trap sediment and debris.
  - 2. System shall be maintainable and include failure indicator so the water user will recognize when maintenance is necessary. Usually a mechanism to back water into property.
  - 3. Safety systems preventing child injury and drowning.
  - 4. Include a permit and terms of discharge, including but not limited to: maintenance agreement and plan, inspection reports, easement for City inspection access.

## 2.27 QUALITY ASSURANCE

- A. Perform work in accordance with City requirements as described herein. Design work shall be accomplished under the direct supervision of a Utah Registered Professional Engineer and shall carry the seal of the same supervising Professional Engineer.
- B. Comply with Engineering as-built checklist

## 2.28 VALUE ENGINEERING

- A. Riverton City promotes concepts and designs that may improve the overall performance, life and aesthetics of the City as a whole. All Value Engineering concepts and designs require review and approval by the City Engineer.

## 2.29 INSPECTIONS

- A. Video inspection:
  - 1. All public Stormwater pipe and joints shall be camera inspected to demonstrate the pipe and joints meet the pipe manufacturer's installation tolerances. Inspection(s) shall be completed prior to the release of the performance bond. City crews will inspect the system again prior to warranty release with City camera. Developer may contract with City crews or hire a private pipe camera inspection company.
  - 2. Generally private systems do not require camera unless City Inspector determines camera is necessary for verification of flood control or water quality purposes.

## 2.30 SUBMITTALS *(pertaining to stormwater management)*

- A. Stormwater Report: Provide pdf formatted for an 8 ½" x 11" and 11"x 17" size paper. Include all calculations, support data, methodologies, and explanations necessary to demonstrate the site stormwater system is adequate to manage stormwater onsite, upstream runoff sources and its impact to the existing City conveyance system. Also determine water tables, and design for horizontal water travel of saturated ground to protect foundations.
- B. Include analysis determining the pre-development hydrology for infiltration volumes and runoff volumes and rates relative to the pre-settled condition.



- C. Include the LID/runoff retention analysis describing the selection of the retention system or support of City standard retention system used. Provide calculations supporting the selected LID/retention system performance of water quality control and pollution containment. Include maintenance instruction or refer to the Long-Term Stormwater Management Plan for the maintenance necessary to ensure the LID/retention system will perform long term.
- D. Include any system(s) and maintenance calculations for mosquito suppression.
- E. Provide permits governing the stormwater system and supporting engineering for permit compliance. This may include but not be limited to: County Flood Control, Stream Alterations, Army Corp of Engineer permits, etc.

## 2.31 REFERENCES

- A. American Society of Civil Engineers, 1992. Design and Construction of Urban Stormwater Management Systems.
- B. Soil Conservation Service, 1986. Urban Hydrology for Small Watersheds. Technical Release No. 55, U.S. Department of Agriculture.
- C. TRC North American Weather Consultants, 1999. Rainfall Intensity Duration Analysis Salt Lake County, Utah.
- D. Federal Emergency Management Agency. Flood Insurance Study Guidelines and Specifications for Study Contractors. Washington, D.C., Federal Emergency Management Agency.
- E. Salt Lake County Flood Control. Best Management Practices.
- F. U.S. Department of Transportation, Federal Highway Administration, 1985. Hydraulic Design of Highway Culverts. Washington D.C., U.S. Department of Transportation.
- G. Virginia Department of Conservation and Historic Resources, 1992. Virginia Erosion and Sediment Control Handbook. 3rd ed. Richmond, Virginia. Virginia Department of Conservation and Historic Resources.
- H. U.S. Department of Transportation, Federal Highway Administration, 1996. Urban Drainage Design Manual. Washington D.C., U.S. Department of Transportation.
- I. Guo, James C.Y., 1999. Detention Basin Sizing For Small Urban Catchments, ASCE Journal of Water Resources Planning and Management, Volume 125, No. 6, November.

# CHAPTER

# 3

# Culinary Water

# CULINARY WATER

## CHAPTER 3

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### ABBREVIATIONS & ACRONYMS

ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
DIP	Ductile Iron Pipe
HDPE	High Density Polyethylene Pipe
MSS	Manufacturers Standardization Society
PE	Polyethylene Pipe
PVC	Polyvinyl Chloride

# CULINARY WATER

## SECTION 22 11 13

### FACILITY WATER DISTRIBUTION PIPING

#### **PART 1: GENERAL**

##### **1.01 SECTION INCLUDES**

- A. Pipe, pipe fittings, valves, and connections for piping systems.
  - 1. Sanitary sewer.
  - 2. Culinary water.
  - 3. Storm water.

##### **1.02 RELATED SECTIONS**

- A. Section 31 41 00 - Shoring
- B. Section 31 23 16 - Excavation
- C. Section 33 05 20 - Backfilling Trenches
- D. Section 33 13 00 - Disinfection
- E. Section 09 91 00 - Painting
- F. Section 26 05 00 - Electrical General Requirements

##### **1.03 REFERENCES**

- A. ANSI Z21.22b-2001 - Relief Valves for Hot Water Systems
- B. ASME B16.1-1998 - Cast Iron Pipe Flanges and Flanged Fittings.
- C. ASME B16.3-1998 - Malleable Iron Fittings.
- D. ASME B16.4-2002 - Gray Iron Threaded Fittings.
- E. ASME B16.18-2002 - Cast Copper Alloy Solder Joint Pressure Fittings.
- F. ASME B16.22-2001 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- G. ASME B16.26-1988 - Cast Copper Alloy Fittings for Flared Copper Tubes.
- H. ASME B31.9-1996 - Building Services Piping.
- I. ASME (BPV IX-2001) - Boiler and Pressure Vessel Title IX - Welding and Brazing Qualifications.
- J. ASTM A47-04 - Standard Specifications for Ferritic Malleable Iron Castings.
- K. ASTM A53-04a - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

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- L. ASTM A234M-04 - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
- M. ASTM B32-04 - Standard Specification for Solder Metal.
- N. ASTM B42-02e1 - Standard Specification for Seamless Copper Pipe, Standard Sizes.
- O. ASTM B88-03 - Standard Specification for Seamless Copper Water Tube.
- P. ASTM B88M-03 - Standard Specification for Seamless Copper Water Tube (Metric).
- Q. ASTM C14-03 - Standard Specification for Concrete Sewer, Storm Drain and Culvert Pipe.
- R. ASTM C14M-03 - Standard Specification for Concrete Sewer, Storm Drain and Culvert Pipe (Metric).
- S. ASTM C76-04 - Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
- T. ASTM C76M-04 - Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe (Metric).
- U. ASTM C443-05 - Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
- V. ASTM D1785-04a - Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120.
- W. ASTM D2235-04 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
- X. ASTM D2239-03 - Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.
- Y. ASTM D2241-00 - Standard Specification for Polyvinyl Chloride (PVC) Pressure-Rated Pipe.
- Z. ASTM D2447-02 - Standard Specification for Polyethylene (PE) Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter.
- AA. ASTM D2466-02 - Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe, Schedule 40.
- AB. ASTM D 2564-04 - Standard Specification for Solvent Cements for Polyvinyl Chloride (PVC) Plastic Piping Systems.
- AC. ASTM D 2609-02 - Standard Specification for Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe.
- AD. ASTM D 2665-04ae1 - Standard Specification for Polyvinyl Chloride (PVC) Plastic Drain, Waste and Vent Pipe and Fittings.
- AE. ASTM D 2683-04 - Standard Specification for Socket -Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing.
- AF. ASTM D2855-02 - Standard Practice for Making Solvent-Cemented Joints with Polyvinyl Chloride (PVC) Pipe and Fittings.

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- AG. ASTM D3034-04 - Standard Specification for Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings.
- AH. ASTM F477-02 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
- AI. ASTM F679 - Standard Specification for Polyvinyl Chloride (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings.
- AJ. AWWA C110/A21.10-03 - Ductile-Iron and Gray-Iron Fittings, 3 inch through 48 inch, for Water and Other Liquids.
- AK. AWWA C111/A21.11-00 - Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- AL. AWWA C151/A21.51-02 - ANSI Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.
- AM. AWWA C651-99 - Disinfecting Water Mains.
- AN. AWWA C900-02 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 inch through 12 inch, for Water Distribution.
- AO. AWWA C901-02 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 inch through 3 inch, for Water Service.
- AP. AWWA C905-97 - Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14 inch through 36 inch.
- AQ. MSS SP-58-2002 - Pipe Hangers and Supports - Materials, Design and Manufacture.
- AR. MSS SP-67-2002 - Butterfly Valves.
- AS. MSS SP-70-2003 - Pipe Hangers and Supports - Selection and Application.
- AT. MSS SP-70-1998 - Cast Iron Gate Valves, Flanged and Threaded Ends.
- AU. MSS SP-71-1997 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.
- AV. MSS SP-78-1998 - Cast Iron Plug Valves, Flanged and Threaded Ends.
- AW. MSS SP-80-2003 - Bronze Gate, Globe, Angle and Check Valves.
- AX. MSS SP-85-2002 - Cast Iron Globe & Angle Valves, Flanged and Threaded Ends.
- AY. MSS SP-89-2003 - Pipe Hangers and Supports - Fabrication and Installation Practices.
- AZ. MSS SP-110-1996 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

### 1.04 SUBMITTALS

- A. See Section 01 33 00 – Submittal Procedure, for submittal procedures.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

## CULINARY WATER

- C. Project Record Documents: Record actual locations of valves.

### 1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with City of Riverton, standards.
  - 1. Maintain one copy on project site.
- B. Valves: Manufacturer's name and pressure rating marked on valve body.
- C. Welding Materials and Procedures: Conform to ASME (BPV IX-2001) - Boiler and Pressure Vessel Title IX - Welding and Brazing Qualifications and applicable labor regulations.
- D. Welders Certification: In accordance with ASME (BPV IX-2001).
- E. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

### 1.06 REGULATORY REQUIREMENTS

- A. Perform Work in accordance with State of Utah plumbing code.
- B. Conform to applicable code for installation of backflow prevention devices.
- C. Provide certificate of compliance from authority having jurisdiction indicating approval of installation of backflow prevention devices.

### 1.07 DELIVERY, STORAGE, AND PROTECTION

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

### 1.08 ENVIRONMENTAL REQUIREMENTS

- A. Do not install underground piping when bedding is wet or frozen.

## PART 2: PRODUCTS

### 2.01 SANITARY SEWER PIPING, BURIED BEYOND 5 FEET OF BUILDING

- A. PVC Pipe: ASTM D3034-04
  - 1. Fittings: PVC.
  - 2. Joints: Push-on, using ASTM F 477-02 Elastomeric Gaskets.
- B. Concrete Pipe: ASTM C14-04 Class 3 Non-reinforced or ASTM C76-04 Reinforced.
  - 1. Fittings: ASTM C14-04 Class 3 Non-reinforced or ASTM C76-04 Reinforced.
  - 2. Joints: Elastomeric Gaskets.



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## 2.02 WATER PIPING, BURIED BEYOND 5 FEET OF BUILDING

- A. Ductile Iron Pipe: AWWA C151/A21.51-02
  - 1. Fittings: AWWA C110/A21.10-03, ductile or gray iron, standard thickness.
  - 2. Joints: AWWA C111/A21.11-00, rubber gaskets with 3/4 inch diameter rods.
- B. Copper Pipe: ASTM B42-02, hard drawn.
  - 1. Fittings: ASME B16.18-2002, cast copper alloy or ASME B16.22-2001, wrought copper and bronze.
  - 2. Joints: ASTM B32-04, alloy Sn95 solder.
- C. PE Pipe: AWWA C901-02.

## 2.03 WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. Copper Pipe: ASTM B42-02, hard drawn.
  - 1. Fittings: ASME B16.18-2002, cast copper alloy or ASME B16.22-2001, wrought copper and bronze.
  - 2. Joints: ASTM B32-04, alloy Sn95 solder.
- B. Ductile Iron Pipe: AWWA C151/A21.51-02
  - 1. Fittings: Ductile or gray iron, standard thickness.
  - 2. Joints: AWWA C111/A21.11-00, rubber gaskets with 3/4 inch diameter rods.
- C. PE Pipe: ASTM D2239-03, or ASTM D2447-03 Schedule 40.
  - 1. Fittings: ASTM D2609, PE.
  - 2. Joints: Mechanical with stainless steel clamp.

## 2.04 WATER PIPING, ABOVE GRADE

- A. Copper Tube: ASTM B88-03, Type K, Drawn.
  - 1. Fittings: ASME B16.18-2002, cast copper alloy or ASME B16.22-2001, wrought copper and bronze.
  - 2. Joints: ASTM B32-04, alloy Sn95 solder.
- B. Steel Pipe: ASTM A53-04 Schedule 40, galvanized.
  - 1. Fittings: Cast iron.
  - 2. Joints: Grooved mechanical couplings.

## 2.05 FLANGES, UNIONS, AND COUPLINGS

- A. Pipe Size 3 Inches and Under:
  - 1. Ferrous pipe: Class 150 malleable iron threaded unions or forged steel slip-on flanges; preformed neoprene gaskets.
  - 2. Copper tube and pipe: Class 150 bronze unions with soldered joints or Class 150 slip-on bronze flanges; preformed neoprene gaskets
- B. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, and water impervious isolation barrier.

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## 2.06 PIPE HANGERS AND SUPPORTS

- A. Plumbing Piping - Drain, Waste, and Vent:
  - 1. Conform to ASME B31.9-1996.
  - 2. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, and split ring.
  - 3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
  - 4. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
  - 5. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
  - 6. Vertical Support: Steel riser clamp.
  - 7. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
  
- B. Plumbing Piping - Water:
  - 1. Conform to ASME B31.9-1996.
  - 2. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, and split ring.
  - 3. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
  - 4. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
  - 5. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
  - 6. Vertical Support: Steel riser clamp.
  - 7. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

## 2.07 GATE VALVES

- A. Up To and Including 3 Inches:
  - 1. MSS SP-80-2003, Class 125, iron body, bronze trim, rising stem, hand-wheel, inside screw, solid wedge disc, solder ends.
  
- B. 2 Inches and Larger:
  - 1. MSS SP-70-1998, Class 125, iron body, bronze trim, outside screw and yoke, hand-wheel, solid wedge disc, flanged ends. Provide chain-wheel operators for valves 6 inches and larger mounted over 8 feet above floor.

## 2.10 GLOBE VALVES

- A. Up To and Including 3 Inches:
  - 1. MSS SP-80-2003, Class 125, bronze body, bronze trim, hand-wheel, bronze disc, solder ends.
  
- B. 2 Inches and Larger:
  - 1. MSS SP-85-2002, Class 125, iron body, bronze trim, hand-wheel, outside screw and yoke, renewable bronze plug-type disc, renewable seat, flanged ends. Provide chain-wheel operators for valves 6 inches and larger mounted over 8 feet above floor.

## 2.11 BALL VALVES

- A. Construction, 4 inches and smaller: MSS SP-110-1996, Class 150, 400 psi CWP, bronze, two piece body, chrome plated brass ball, regular port, Teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, threaded ends.

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### 2.12 PLUG VALVES

- A. Construction 2-1/2 inches and larger: MSS SP-78-2002, 200 psi CWP, cast or ductile iron body, nickel-plated ductile iron disc, resilient replaceable EDPM or Buna N seat, wafer ends, extended neck, infinite position lever handle with memory stop.

### 2.13 BUTTERFLY VALVES

- A. Construction 1-1/2 inches and larger: MSS SP-67-2002, 200 psi CWP, cast or ductile iron body, nickel-plated ductile iron disc, resilient replaceable EPDM or Buna N seat, wafer ends, extended neck, infinite position lever handle with memory stop.
- B. Provide gear operators for valves 8 inches and larger, and chain-wheel operators for valves mounted over 8 feet above floor.

### 2.14 SWING CHECK VALVES

- A. Up To and Including 3 Inches:
  - 1. MSS SP-80-2003, Class 125, bronze body and cap, bronze swing disc with rubber seat, threaded ends.
- B. 2 inches and larger:
  - 1. MSS SP-71-1997, Class 125, iron body, bronze swing disc, renewable disc seal and seat, flanged ends and outside lever and weights.

### 2.15 SPRING LOADED CHECK VALVES

- A. Class 125, iron body, bronze trim, stainless steel springs, bronze disc, Buna N seals, flanged ends.

### 2.16 WATER PRESSURE REDUCING VALVES

- A. Up to 2 inches:
  - 1. MSS SP-80-2003, bronze body, stainless steel and thermoplastic internal parts, fabric reinforced diaphragm, strainer, threaded single union ends.
- B. Over 2 inches:
  - 1. MSS SP-85-2002, cast iron body, bronze fitted, elastomeric diaphragm and seat disc, flanged.

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## 2.17 RELIEF VALVES

- A. Pressure Relief:
  - 1. AGA Z21.22 certified, bronze body, Teflon seat, steel stem and springs, automatic, direct pressure actuated.

## 2.18 STRAINERS

- A. Size 2 inch and under:
  - 1. Threaded brass body for 175 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.
  - 2. Class 150, threaded bronze body 300 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.
- B. Size 1-1/2 inch to 4 inch:
  - 1. Class 125, flanged iron body, Y pattern with 1/16 inch stainless steel perforated screen.
- C. Size 5 inch and Larger:
  - 1. Class 125, flanged iron body, basket pattern with 1/8 inch stainless steel perforated screen.

## PART 3: EXECUTION

### 3.01 EXAMINATION

- A. Verify that excavations are to required grade, dry, and not over-excavated.

### 3.02 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

### 3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

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- H. Buried piping (outside of building) shall have a minimum of four (4) feet and a maximum of six (6) feet of cover over pipe unless approved otherwise by City Engineer.
- I. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Section 09 91 00.
- J. Excavate in accordance with Sections 31 41 00, 31 23 16 and 31 23 17.
- K. Backfill in accordance with Sections 33 05 20, 31 23 23 and 32 05 10.
- L. Install bell and spigot pipe with bell end upstream.
- M. Install valves with stems upright or horizontal, not inverted.
- N. Install water piping to ASME B31.9-1996.
- O. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855-2002.
- P. Sleeve pipes passing through partitions, walls and floors.
- Q. Inserts:
  - 1. Provide inserts for placement in concrete formwork.
  - 2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
  - 3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
  - 4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
- R. Pipe Hangers and Supports:
  - 1. Install in accordance with ASME B31.9-1996.
  - 2. Support horizontal piping as scheduled.
  - 3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
  - 4. Place hangers within 12 inches of each horizontal bend.
  - 5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
  - 6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
  - 7. Provide copper plated hangers and supports for copper piping.
  - 8. Provide hangers adjacent to motor driven equipment with vibration isolation.

### 3.04 APPLICATION

- A. Install unions downstream of valves and at equipment or apparatus connections.
- B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
- C. Install gate valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- D. Install globe valves for throttling, bypass, or manual flow control services.

### 3.05 ERECTION TOLERANCES

- A. Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/4 inch per foot slope.



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- B. Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

### 3.06 DISINFECTION OF CULINARY WATER PIPING SYSTEM

- A. Disinfect water distribution system in accordance with Section 33 13 00.
- B. Prior to starting work, verify system is complete, flushed and clean.
- C. Ensure Ph of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
- D. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.
- E. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
- F. Maintain disinfectant in system for 24 hours.
- G. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
- H. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
- I. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651-99.

### 3.07 SERVICE CONNECTIONS

- A. Provide new sanitary sewer services. Before commencing work check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.
- B. Provide new water service complete with approved reduced pressure backflow preventer and water meter with by-pass valves.

### 3.08 SCHEDULES

- A. Pipe Hanger Spacing:
  - 1. Metal Piping:
    - a. Pipe size: 1/2 inches to 1-1/4 inches:
      - 1) Maximum hanger spacing: 6.5 ft.
      - 2) Hanger rod diameter: 3/8 inches.
    - b. Pipe size: 1-1/2 inches to 2 inches:
      - 1) Maximum hanger spacing: 10 ft.
      - 2) Hanger rod diameter: 3/8 inch.
    - c. Pipe size: 2-1/2 inches to 3 inches:
      - 1) Maximum hanger spacing: 10 ft.
      - 2) Hanger rod diameter: 1/2 inch.

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- d. Pipe size: 4 inches to 6 inches:
    - 1) Maximum hanger spacing: 10 ft.
    - 2) Hanger rod diameter: 5/8 inch.
  - e. Pipe size: 8 inches to 12 inches:
    - 1) Maximum hanger spacing: 14 ft.
    - 2) Hanger rod diameter: 7/8 inch.
  - f. Pipe size: 14 inches and Over:
    - 1) Maximum hanger spacing: 20 ft.
    - 2) Hanger rod diameter: 1 inch.
2. Plastic Piping:
- a. All Sizes:
    - 1) Maximum hanger spacing: 6 ft.
    - 2) Hanger rod diameter: 3/8 inch.

**END OF SECTION**

# CULINARY WATER

## SECTION 33 11 00

### WATER DISTRIBUTION AND TRANSMISSION

#### PART 1: GENERAL

##### 1.01 SECTION INCLUDES

- A. Pipe and fittings for project water lines, to include domestic water lines, fire water lines, and culinary water lines.
- B. Valves, Fire hydrants, and appurtenant items.

##### 1.02 RELATED SECTIONS

- A. Section 31 41 00 - Shoring
- B. Section 31 23 16 - Excavation
- C. Section 31 23 17 - Rock Removal
- D. Section 33 05 20 - Backfilling Trenches
- E. Section 31 23 23 - Backfilling For Structures
- F. Section 32 05 10 - Backfilling Roadways
- G. Section 31 23 26 - Compaction
- H. Section 33 11 00 - Water Distribution and Transmission
- I. Section 33 12 19 - Hydrants
- J. Section 33 13 00 - Disinfection
- K. Section 33 47 00 - Ponds
- L. Section 32 84 23 - Underground Irrigation Systems
- M. Section 33 11 11 - Relocate Water Meters and Fire Hydrants
- N. Section 03 30 04 - Concrete

##### 1.03 REFERENCES

- A. ASME B16.18-2002 - Cast Copper Alloy Solder Joint Pressure Fittings.
- B. ASME B16.22-2001 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- C. ASTM B88-99 - Standard Specification for Seamless Copper Tube for Water.
- D. ASTM D3139-98 - Standard Specification for Joints for Plastic Pressure Pipes using Flexible



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Elastomeric Seals.

- E. AWS A5.8-2004 - Specification for Filler Metals for Brazing and Braze Welding.
- F. AWWA C104-03 - Ductile-Iron Pipe and Fittings for Water.
- G. AWWA C105/A21.5-99 - ANSI Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.
- H. AWWA C111/A21.11-00 - ANSI Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- I. AWWA C151/A21.51-02 - ANSI Standards for Ductile-Iron Pipe, Centrifugally Cast, for Water or other liquids.
- J. AWWA C500-02 - Metal-Seated Gate Valves for Water Supply Service.
- K. AWWA C502-94 - Dry Barrel Fire Hydrants.
- L. AWWA C504-00 - Rubber Seated Butterfly Valves.
- M. AWWA C508-01 - Swing-Check Valves for Waterworks Service, 2 inch through 24 inch, NPS.
- N. AWWA C509-01 - Resilient-Seated Gate Valves for Water Supply Service.
- O. AWWA C600-99 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
- P. ASTM D2774 - Standard Recommended Practice for Underground Installation of Thermoplastic Pressure Piping, Latest Edition.
- Q. AWWA C900-97 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 inch through 12 inch, for Water Distribution.
- R. AWWA C200-97 - Steel Water Pipe, 6 inches and larger.
- S. ASTM A36/A36M-05 - Standard Specification for Carbon Structural Steel.
- T. ASTM A500-03a - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- U. ASTM A307-04 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- V. ASTM A123/A123M-02 - Standard Specification for Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products.
- W. ASTM A153/A153M-05 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

### 1.04 SUBMITTALS

- A. See Section 01 33 00 – Submittal Procedure, for submittal procedures.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.



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- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Project Record Documents: Record actual locations of pipe lines, valves, connections, thrust restraints, and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

### 1.05 QUALITY INSURANCE

- A. Perform work in accordance with owner's requirements as described herein.

### 1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store valves in shipping containers with labeling in place.

## PART 2: PRODUCTS

### 2.01 WATER PIPE

- A. Ductile Iron Pipe: AWWA C151-02:
  - 1. Fittings: Ductile iron, standard thickness.
  - 2. Joints: AWWA C111-00, push-on type with rubber gasket.
  - 3. Joints: AWWA C111-00, mechanical joint type with gasket, bolts and nuts.
  - 4. Joints: AWWA C110-03, flange type with gasket, bolts, and nuts.
  - 5. Jackets: AWWA C105-99 polyethylene jacket.
- B. Copper Tubing: ASTM B 88-03, Type K, annealed:
  - 1. Fittings: ASME B16.18-2002, cast copper, or ASME B16.22-2001, wrought copper.
  - 2. Joints: Compression connection or AWS A5.8, BcuP silver braze.
  - 3.  $\frac{3}{4}$  - 1 inch flare, anything larger than 1 inch will be compression (Mueller 110).
- C. PVC Pipe: AWWA C900-97 Class 150 or 200, as indicated:
  - 1. Fittings: AWWA C111-00, cast iron.
  - 2. Joints: ASTM D3139-98, compression gasket rings.
- D. Tape: Magnetic detectable conductor, clear plastic covering, imprinted with "WATER SERVICE" in large letters.

### 2.02 VALVES

- A. Valves: Manufacturer's name and pressure rating marked on valve body.
- B. Gate Valves Up To 3 Inches:
  - 1. Brass or Bronze body, non-rising stem, inside screw, single wedge or disc, IPS ends, and hand-wheel.
  - 2. Product: Powell U.S. Bronze Gate Valves, or accepted equal.
  - 3. Substitutions: only by permission of the Riverton City Water Director.
- C. Gate Valves 3 Inches and Over:
  - 1. AWWA C500-02, iron body, bronze trim, and non-rising stem with square nut, single wedge and mechanical joint or flanged ends as indicated.
  - 2. AWWA C509-01, iron body, bronze trim, and non-rising stem with square nut, single wedge, resilient seat and mechanical joint or flanged ends as indicated.
  - 3. Product: Mueller Gate Valve or Resilient Seat Gate Valve.



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- D. Swing Check Valves From 2 inches to 24 inches:
  - 1. AWWA C508-01, iron body, bronze trim, 45-degree swing disc, renewable seat and flanged ends.
  - 2. Product: Mueller Swing-Type Check Valve, or accepted equal.
- E. Butterfly Valves From 2 inches to 24 inches:
  - 1. AWWA C504-00, iron body, bronze disc, resilient replacement seat, mechanical joint or flanged ends as indicated and manual worm gear operator.
  - 2. Underground manual operators shall be totally enclosed, factory grease packed and sealed, bronze worm gear operators with self-locking gearing; stops shall be provided to prevent over travel of valve disc.
  - 3. Valve operator shall be geared to close valves slowly. Number of turns to close valve from full open position shall be: 32 for 10-inch and smaller valves, 52 for 12-inch thru 16- inch valves, and 76 for 18-inch thru 24-inch valves. Closing times for larger valves shall be accepted by the Engineer.
  - 4. Product: Mueller "Lineseal III" Butterfly Valve.
- F. Corporation Stops: shall be type for connecting to copper or polyethylene pipe; Mueller No. H-15000, or acceptable equal, for up to 2-inch service line.

### 2.03 HYDRANTS

- A. Hydrants: AWWA C502-94, UL 246, dry barrel type.
  - 1. Inside dimension: 7 inches minimum, with minimum 5 inches diameter valve seat opening.
  - 2. Minimum net water area of barrel not less than 190 percent of valve opening.
  - 3. 6 inch flanged inlet connection with accessories, gland bolts, and gaskets.
  - 4. Product: Mueller "Super Centurion 200" Fire Hydrants.
- B. Hydrant Extensions: Fabricate in multiples of 6 inches with rod and coupling to increase barrel length.
- C. Hose and Streamer Connection: Two hose nozzles, 2 1/2-inch size, one pumper nozzle, 4 1/2 inch size.
- D. Finish: Buried portion of hydrant shall be painted with two coats of CA50 coal tar enamel. Exposed portion shall be painted with Primer and two coats of enamel in acceptable red color.

### 2.04 BEDDING AND COVER MATERIALS

- A. Bedding and Backfill: As specified in Sections 33 05 20, 31 23 23 and 32 05 10.

### 2.05 ACCESSORIES

- A. Service Clamps: shall be bronze, double-strap type; Mueller No. H-16134, or acceptable equal, for up to 2 inch service lines.
- B. Concrete for Thrust Restraints: Concrete type specified in Section 03 30 40.
- C. Culinary Water Valve Box: D&L #M-8040 Complete Assembly (36" base, 16" top, lid marked "WATER").

### 2.06 AIR VAC STAND PIPES (2 INCH AND 3 INCH)

Air Vac stand pipes shall be Model #SP12X6 for 2 inch or Model #SP14X8 for 3 inch as manufactured by



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Utility Coatings & Fabrication, or approved equal. Standpipes shall meet the following qualifications.

## A. Design

1. Stand pipe shall be of adequate size to accommodate a 2 inch or 3 inch riser with a 180 degree return on top.
2. Standpipe shall have 1/2 inch holes equally spaced around top sides such that the area is 2 times greater than the area of the standpipe riser.
3. Standpipe shall have a 1 inch weep hole at grade level.
4. Standpipe shall be 2-piece construction.

## B. Quality Assurance

1. Fabricator Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this project and with a record of successful in-service performance, as well as sufficient capacity to produce required units.
2. Welding: Qualify procedures and personnel according to the following:
  - a. AWS D1.1 - Structural Welding Code - Steel (current edition)
  - b. AWS D1.3 - Structural Welding Code - Sheet Steel (current edition)
    - c. Certify that each welder has recently (prior 12 months) satisfactorily passed AWS qualification test for welding processes involved and, if pertinent, has undergone re-certification.
3. Metal Surfaces: For metal fabrications exposed to view in the completed work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

## C. Metals

1. Steel Plates, Shapes, and Bars: ASTM A36/A36M-05. Steel Plate shall be 3/16 inch minimum thickness.
2. Tube Steel: ASTM A500-03a Grade B.
3. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded: E70-97 for ASTM A36/A36M-05.
4. Lifting eye shall be capable of lifting 2 times the weight of the vent cover and shall rotate flat so as not to protrude more than 1/2 inch above the cover.

## D. Fasteners

1. Bolts

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- a. Flange bolts shall be A307-04 zinc plated.
- b. Headed stud anchors: C1008/C1010.

### E. Fabrication

1. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for re-assembly and coordinated installation.
2. Shear, punch and drill metals cleanly and accurately. Remove burrs. No burning of holes shall be allowed.
3. Ease exposed edges to a radius of approximately 1/32 inch (1mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impair work.
4. Weld corners and seams continuously to comply with the following:
  - a. Use materials and methods which minimize distortion and develop strength and corrosion resistance of base metals.
  - b. Obtain fusion without undercut or overlap.
  - c. Remove welding flux immediately.
  - d. At exposed connections, finish exposed welds and surfaces smooth and blend so that no roughness shows. Contour of welded surface shall match that of adjacent surface.
5. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
6. Cut, reinforce, drill and tap metal fabrications as indicated to receive finish hardware, screws and similar items.
7. Joints which may be exposed to weather, shall be made water tight or weep holes shall be provided where water may accumulate.
8. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.

### F. Steel Finishes

1. Galvanizing: Hot-dip galvanize items as indicated to comply with the following applicable standards:
  - a. ASTM A123/A123M-02.
  - b. ASTM A153/A153M-05.

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## **PART 3: EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that water main and main line tee size, location, and invert are as indicated.

### **3.02 PREPARATION**

- A. Cut pipe ends square, ream pipe ends to full pipe diameter, remove burrs.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare pipe connections to equipment with flanges or mechanical joints.

### **3.03 TRENCHING**

- A. See Sections 31 41 00, 31 23 16 and 31 23 17 for additional requirements.
- B. Hand trim excavation for accurate placement of pipe to elevations indicated.
- C. Form and place concrete for pipe thrust restraints at each change of pipe direction. Place concrete to permit full access to pipe and pipe accessories. Provide required sq ft of thrust restraint bearing on subsoil as indicated on the drawings.
- D. Backfill around sides and to top of pipe with backfill material, tamp in place and compact, then complete backfilling.

### **3.04 INSTALLATION - PIPE**

- A. Maintain separation of water main from sewer piping in accordance with State code.
- B. Buried piping shall have a minimum of four (4) feet and a maximum of six (6) feet of cover over pipe unless approved otherwise by City Engineer.
- C. Install pipe to indicated elevation to within tolerance of one inch.
- D. Install ductile iron piping and fittings to AWWA C600-99.
- E. Install PVC pressure pipe and fittings to ASTM D2774-04.
- F. Install pipe lines to line and grade indicated.
- G. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- H. Install access fittings to permit disinfection of water system performed under Section 33 13 00.
- I. Install trace wire above top of PVC pipe; coordinate with Section 33 05 20.

### **3.05 INSTALLATION - VALVES AND HYDRANTS**

- A. Set valves on concrete block or other acceptable solid bearing.
- B. Center and plumb valve box over valve operating nut. Set box cover flush with finished grade.

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- C. Set hydrants plumb; locate pumper nozzle perpendicular to and facing roadway.
- D. Set hydrants to grade, with nozzles at least 20 inches above ground.
- E. Locate hydrant control valve as indicated on the drawings and as directed by the Engineer.
- F. Provide a drainage pit 24 inches square by 12 inches deep filled with one inch washed gravel. Encase elbow of hydrant in gravel to 6 inches above drain opening. Do not connect drain opening to sewer.
- G. Paint hydrants in accordance with manufacturer's standards.

### 3.06 SERVICE CONNECTIONS

- A. Provide water service as indicated with meter box, meter yoke, reduced pressure backflow preventer and water meter.

### 3.07 CONNECTIONS TO EXISTING WATER LINES

- A. Connection to existing water lines shall be made where and as indicated on the drawings and as directed by the Engineer. The sizes of pipe, fittings, valves and appurtenant items required to make connection shall correspond to the sizes of existing pipe and of project pipe.
- B. Excavate to existing pipe line at point of connection; determine actual conditions of existing pipe and all fittings and appurtenant items required to make the connection; and have all materials needed on site prior to any shut down or cutting into existing pipe lines.
- C. Connection which involve cutting into existing pipe lines include: cutting and removing sections of existing pipe and fittings as required; cleaning and preparing ends of existing pipe as required for connection; furnishing and installing all new pipe, fittings and valves required to make the connection of project pipe to the existing pipe as indicated; and all appurtenant work required to complete the connection.
- D. Connection into existing pipe lines under pressure include: furnishing and installing mechanical joint tapping sleeve of the appropriate size on the existing pipe at point of connection; furnishing and installing tapping valve, with valve box, on sleeve; tapping existing pipe with acceptable type drilling machine and equipment, without interrupting flow in existing pipe line; and all appurtenant work required to complete the connection.
- E. Connection to existing pipe line shall be made at such times and within the time limits and according to the directions as agreed to between the Contractor and the Owner.
- F. Cut and plug existing pipe lines where indicated and as directed by the Engineer. Excavate as required to locate existing pipe lines to be abandoned in place; cut the existing pipe, as required; and install permanent plug in end of pipe to be abandoned.

### 3.08 RECONNECT EXISTING WATER SERVICE LINES

- A. Reconnect existing water service lines where and as indicated on the drawings and as directed by the Engineer. The sizes of pipe, fittings, saddles, corporation stops, and appurtenant items required to make reconnections shall correspond to the sizes of existing service lines and of project pipe.
- B. Excavate as required to locate the existing service line; determine actual conditions of existing service line and all fitting and appurtenant items needed to make the reconnections; and have all materials needed on site prior to any shut down of existing service line.



## CULINARY WATER

- C. After project pipe line has been thoroughly tested, disinfected and put into operation, disconnect existing water service lines from the existing water line. Excavate as required to expose the existing service line; cut the existing service line and remove a section of the line as required and as directed; and remove the existing corporation stop from the existing pipe and install a permanent plug in the tap in the existing water line which is to be abandoned.
- D. Tap the project pipe line with the appropriate size tapping machine and install a double strap service saddle, with corporation stop, on the project pipe. New copper tubing shall be furnished and installed to make the connection from the end of the existing service line to the new corporation stop. The new copper tubing shall be connected to the end of the existing service line with the appropriate type coupling and to the new corporation stop. In all reconnections, at least five feet of new tubing shall be installed, as indicated. Insulating couplings or adapters shall be used to connect pipe of dissimilar material.
- E. After the existing water service line has been disconnected from the existing water line, the reconnection work shall be pursued diligently so that the service line is reconnected to the project water line and put back into service in the shortest possible time.

### 3.09 REMOVING EXISTING FIRE HYDRANTS

- A. Existing fire hydrant installations shall be removed and delivered to the Owner as indicated and as directed by the Engineer.
- B. Excavate as required to locate the existing hydrant supply line and control valve; determine actual conditions of existing supply line and all fitting required to complete the removal; and have all material needed at the job site prior to any shut down or cutting into existing pipe.
- C. After project pipe line has been thoroughly tested, disinfected and put into operation, cut the existing hydrant supply line and remove a section of the existing pipe from the cut the hydrant and install a plug in the end of the pipe to be abandoned. Remove the existing hydrant, control valve and valve box and deliver the material to the Owner as directed.
- D. After the hydrant installation has been completely removed and the existing pipe plugged, backfill the excavation to match adjacent ground surfaces; and compact material as described herein.

### 3.10 FIELD QUALITY CONTROL

- A. Perform field inspection and testing in accordance with Section 01 45 00.
- B. Pressure test water piping to 1.5 times pipe line working pressure in psi.
- C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

**END OF SECTION**



# CULINARY WATER

## SECTION 33 12 33

### WATER METERS AND GAUGES

#### PART 1: GENERAL

##### 1.01 SECTION INCLUDES

- A. Positive displacement meters.
- B. Flow meters.
- C. Pressure gauges and pressure gauge taps.
- D. Static pressure gauges.

##### 1.02 REFERENCES

- A. ASME B40.100-1998 - Pressure Gauges and Gauge Attachments.
- B. AWWA C700-02 - Cold Water Meters -- Displacement Type, Bronze Main Case.
- C. AWWA C701-02 - Cold Water Meters -- Turbine Type, for Customer Service.
- D. AWWA C702-01 - Cold Water Meters -- Compound Type.
- E. AWWA C706-96 - Direct-Reading, Remote-Registration Systems for Cold Water Meters.
- F. AWWA M6-1999 - Water Meters -- Selection, Installation, Testing, and Maintenance.
- G. UL 393 - Indicating Pressure Gauges for Fire-Protection Service; Underwriters Laboratories Inc.; 1996.
- H.

##### 1.03 SUBMITTALS

- A. See Section 01 33 00 – Submittal Procedure, for submittal procedures.
- B. Product Data: Provide list that indicates use, operating range, total range and location for manufactured components.
- C. Project Record Documents: Record actual locations of components and instrumentation.

##### 1.04 ENVIRONMENTAL REQUIREMENTS

- A. Do not install instrumentation when areas are under construction, except for required rough-in, taps, supports and test plugs.

# CULINARY WATER

## PART 2: PRODUCTS

### 2.01 POSITIVE DISPLACEMENT METERS (LIQUID)

- A. Manufacturer: Neptune Model as required.
- B. AWWA C700-02, positive displacement disc type suitable for fluid with bronze case and cast iron frost-proof, breakaway bottom cap, hermetically sealed register, remote reading to AWWA C706-96.
- C. Meter: Brass body turbine meter with magnetic drive register.

### 2.02 PRESSURE GAUGES

- A. Gauge: ASME B40.100-1998, UL 393 drawn steel case, phosphor bronze bourdon tube, rotary brass movement, brass socket, with front recalibration adjustment, black scale on white background.
  - 1. Case: Steel with brass bourdon tube.
  - 2. Size: 3-1/2 inch diameter.
  - 3. Mid-Scale Accuracy: One percent.
  - 4. Scale: Psi.

### 2.03 PRESSURE GAUGE TAPPINGS

- A. Gauge Cock: Tee or lever handle, brass for maximum 150 psi, as manufactured by US Gauge, Model as required.

### 2.04 STATIC PRESSURE GAUGES

- A. 3-1/2 inch diameter dial in metal case, diaphragm actuated, black figures on white background, front recalibration adjustment, 2 percent of full-scale accuracy.

## PART 3: EXECUTION

### 3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install positive displacement meters with isolating valves on inlet and outlet to AWWA M6-99. Provide full line size valve bypass with globe valve for liquid service meters.
- C. Provide one pressure gauge per pump, installing taps before strainers and on suction and discharge of pump. Pipe to gauge.
- D. Install pressure gauges with pulsation dampers. Provide gauge cock to isolate each gauge. Extend nipples to allow clearance from insulation.
- E. Provide instruments with scale ranges selected according to service with largest appropriate scale.

END OF SECTION



# CULINARY WATER

## SECTION 33 13 00

### DISINFECTION

#### PART 1: GENERAL

##### 1.01 SECTION INCLUDES

- A. Disinfection of project pipe lines specified in Section 33 11 00.
- B. Disinfection of site domestic water lines, site fire water lines, and hydrant supply lines and water service lines specified in Section 33 11 00.
- C. Testing and reporting results.

##### 1.02 RELATED SECTIONS

- A. Section 33 11 00 - Water Distribution and Transmission

##### 1.03 REFERENCES

- A. AWWA B300-04 - Hypochlorites
- B. AWWA B301-04 - Liquid Chlorine
- C. AWWA B302-00 - Ammonium Sulfate
- D. AWWA B303-00 - Sodium Chlorite
- E. AWWA C651-99 - Disinfecting Water Mains

##### 1.04 SUBMITTALS

- A. See Section 01 33 00 – Submittal Procedure, for submittal procedures.
- B. Test Reports: Indicate results comparative to specified requirements.
- C. Certificate: Certify that cleanliness of water distribution system meets or exceeds specified requirements.
- D. Disinfection report:
  - 1. Type and form of disinfectant used.
  - 2. Date and time of disinfectant injection start and time of completion.
  - 3. Test locations.
  - 4. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
  - 5. Date and time of flushing start and completion.
  - 6. Disinfectant residual after flushing in ppm for each outlet tested.
- E. Bacteriological report:
  - 1. Date issued, project name, and testing laboratory name, address, and telephone number.
  - 2. Time and date of water sample collection.
  - 3. Name of person collecting samples.
  - 4. Test locations.
  - 5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.

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6. Coliform bacteria test results for each outlet tested.
7. Certification that water conforms, or fails to conform, to bacterial standards of State.

### 1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with AWWA C651-99.
- B. Testing Firm: Company specializing in testing potable water systems, certified by governing authorities of Utah.
- C. Submit bacteriologist's signature and authority associated with testing.

### 1.06 REGULATORY REQUIREMENTS

- A. Conform to applicable code or regulation for performing the work of this Section.
- B. Provide certificate of compliance from authority having jurisdiction indicating approval of water system.

# CULINARY WATER

## PART 2: PRODUCTS

### 2.01 DISINFECTION CHEMICALS

- A. Chemicals: AWWA B300-04 for Hypochlorite, AWWA B301-04 for Liquid Chlorine, AWWA B302-00 for Ammonium Sulfate and AWWA B303-00 for Sodium Chlorite.

## PART 3: EXECUTION

### 3.01 EXAMINATION

- A. Verify that piping system has been cleaned, inspected, and pressure tested.

### 3.02 EXECUTION

- A. Provide and attach required equipment to perform the work of this Section.
- B. Introduce treatment into piping system.
- C. Maintain disinfectant in system for 24 hours.
- D. Flush, circulate, and clean until required cleanliness is achieved; use municipal domestic water.
- E. Replace permanent system devices removed for disinfection.
- F. Pressure test system to 1.5 times the system working pressure, in psi. Repair leaks and re test.

### 3.03 QUALITY CONTROL

- A. Perform field inspection and testing in accordance with Section 01 45 00.
- B. Test samples in accordance with AWWA C651-99.

**END OF SECTION**

# CULINARY WATER

## PLUMBING SPECIALTIES

### PART 1: GENERAL

#### 1.01 SECTION INCLUDES

- A. Floor drains.
- B. Cleanouts.
- C. Hose bibs.
- D. Backflow preventers.

#### 1.02 RELATED SECTIONS

- A. Section 22 11 13 – Facility Water Distribution Piping.

#### 1.03 REFERENCES

- A. ASME A112.21.1M-1991 - Floor Drains.
- B. ASME A112.21.2M-1983 - Roof Drains.
- C. ASSE 1011-2004 - Hose Connection Vacuum Breakers.
- D. ASSE 1012-2002 - Backflow Preventer with Intermediate Atmospheric Vent.
- E. ASSE 1013-1999 - Reduced Pressure Principle Backflow Preventers.
- F. PDI-G101-1996 - Standard Testing and Rating Procedure for Grease Interceptors.
- G. PDI-WH 201-1992 - Water Hammer Arresters.

#### 1.04 SUBMITTALS

- A. See Section 01 33 00 – Submittal Procedure, for submittal procedures.
- B. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
- C. Shop Drawings: Indicate dimensions, weights, and placement of openings and holes.
- D. Certificates: Certify that grease interceptors meet or exceed specified requirements.
- E. Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.
- F. Project Record Documents: Record actual locations of equipment, cleanouts, backflow preventers, and appurtenant items.
- G. Operation Data: Indicate frequency of treatment required for interceptors.
- H. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

# CULINARY WATER

## 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

## 1.06 DELIVERY, STORAGE, AND PROTECTION

- A. Accept specialties on site in original factory packaging. Inspect for damage.

## PART 2: PRODUCTS

### 2.01 DRAINS

- A. Floor Drain (FD-1):
  - 1. ASME A112.21.1M-1991, lacquered cast iron two piece body with double drainage flange, weep holes, reversible clamping collar and round, adjustable nickel-bronze strainer.
- B. Floor Drain (FD-2):
  - 1. ASME A112.21.1M-1991, lacquered cast iron two piece body with double drainage flange, weep holes, reversible clamping collar and round, adjustable round nickel-bronze strainer with removable perforated sediment bucket.

### 2.02 HOSE BIBBS, VALVES, AND WATER HAMMER ARRESTORS

- A. Interior Hose Bibbs:
  - 1. Bronze or brass with integral mounting flange, replaceable hexagonal disc, hose thread spout, with hand-wheel and integral vacuum breaker in conformance with ASSE 1011-2004.
- B. Back Water Valves: Cast Iron.
  - 1. ANSI A112.21.2M-1983, lacquered cast iron body and cover, brass valve, extension sleeve, and access cover.
- C. Reduced Pressure Backflow Preventers:
  - 1. ASSE 1013-1999: bronze body with bronze internal parts and stainless steel springs; two independently operating, spring loaded check valves; diaphragm type differential pressure relief valve located between check valves; third check valve that opens under back pressure in case of diaphragm failure; non-threaded vent outlet; assembled with two gate valves, strainer, and four test cocks.
- D. Double Check Valve Assemblies:
  - 1. ASSE 1012-2002; Bronze body with corrosion resistant internal parts and stainless steel springs; two independently operating check valves with two full port shut-off valves and four test cocks.
- E. Water Hammer Arrestors:
  - 1. Stainless steel construction, bellows type sized in accordance with PDI-WH 201-1992, pre-charged suitable for operation in temperature range of 100 to 300 degrees F and maximum 250 psi working pressure.

### 2.03 INTERCEPTORS

- A. Grease Interceptors:



## CULINARY WATER

1. Construction:
  - a. Material: Precast concrete.
  - b. Accessories: Multi-weir baffle assembly, integral deep seal trap, removable integral flow control, and sediment bucket.
  - c. Cover: Steel, epoxy coated, non-skid with gasket, securing handle, and enzyme injection port, recessed for floor finish.

### PART 3: **EXECUTION**

#### 3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install approved potable water protection devices on plumbing lines where contamination of domestic water may occur, on irrigation systems, flush valves, interior and exterior hose bibs.
- C. Pipe relief from backflow preventer to nearest drain.

**END OF SECTION**

# **CHAPTER**

# **4**

# **Secondary Water**

# CULINARY WATER

## CHAPTER 4

### TABLE OF CONTENTS

33 11 00A Water Distribution and Transmission (Secondary Water System)

**NOTE: See Chapter 3 for the following Specifications that also apply to Secondary Water.**

22 11 13	Facility Water Distribution Piping
33 11 00	Water Distribution and Transmission
33 12 33	Water Meters and Gauges

### ABBREVIATIONS & ACRONYMS

ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
DIP	Ductile Iron Pipe
HDPE	High Density Polyethylene Pipe
MSS	Manufacturers Standardization Society
PE	Polyethylene Pipe
PVC	Polyvinyl Chloride

# SECONDARY WATER

## SECTION 33 11 00A

### WATER DISTRIBUTION AND TRANSMISSION (SECONDARY WATER SYSTEM)

#### PART 1: GENERAL

##### 1.01 SECTION INCLUDES

- A. Pipe and fittings for project water lines, to include secondary water lines.
- B. Valves and appurtenant items.
- C. Water Service Connections.

##### 1.02 RELATED SECTIONS

- A. Section 31 41 00 - Shoring
- B. Section 31 23 16 - Excavation
- C. Section 31 23 17 - Rock Removal
- D. Section 33 05 20 - Backfilling Trenches
- E. Section 31 23 23 – Backfilling for Structures
- F. Section 32 05 10 - Backfilling Roadways
- G. Section 31 23 26 - Compaction
- H. Section 33 11 00 - Water Distribution and Transmission
- I. Section 33 47 00 - Ponds
- J. Section 32 84 23 - Underground Irrigation Systems

##### 1.03 REFERENCES

- A. ASTM D 3139-98 - Standard Specification for Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.
- B. ASTM D3035-03a - Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
- C. AWWA C104-03 - Ductile-Iron Pipe Fittings for Water.
- D. AWWA C105-99 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
- E. AWWA C111/A21.11-00 - ANSI Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- F. AWWA C151/A21.51-04 - ANSI Standard for Ductile-Iron Pipe, Centrifugally Cast.

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- G. AWWA C500-02 - Metal-Seated Gate Valves for Water Supply Service.
- H. AWWA C504-00 - Rubber Seated Butterfly Valves.
- I. AWWA C508-01 - Swing-Check Valves for Waterworks Service, 2 inch through 24 inch, NPS.
- J. AWWA C509-01 - Resilient-Seated Gate Valves for Water Supply Service.
- K. AWWA C600-99 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
- L. ASTM D2774-04 - Standard Recommended Practice for Underground Installation of Thermoplastic Pressure Piping.
- M. AWWA C900-97 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 inch through 12 inch for Water Distribution.
- N. AWWA C901-02 - Polyethylene (PE) Pressure Pipe and Tubing, 4 inch through 63 inch, for Water Distribution.
- O. AWWA C200-97 - Steel Water Pipe, 6-inches and Larger.
- P. ASTM A36/A36M-05 - Standard Specification for Carbon Structural Steel.
- Q. ASTM A500-03a - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- R. ASTM A307-04 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- S. ASTM A123/A123M-02 - Standard Specification for Zinc (Hot Dipped Galvanized) Coatings on Iron and steel products.
- T. ASTM A153/A153M-05 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

### 1.04 SUBMITTALS

- A. See Section 01 33 00 – Submittal Procedure, for submittal procedures.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Project Record Documents: Record actual locations of pipe lines, valves, connections, thrust restraints, and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

### 1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with Owner's requirements as described herein.

### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store valves in shipping containers with labeling in place.



# SECONDARY WATER

## PART 2: PRODUCTS

### 2.01 WATER PIPE

- A. Ductile Iron Pipe: AWWA C151-02:
  - 1. Fittings: Ductile iron, standard thickness.
  - 2. Joints: AWWA C111-00, push-on type with rubber gasket.
  - 3. Joints: AWWA C111-00, mechanical joint type with gasket, bolts, and nuts.
  - 4. Joints: AWWA C110-03, flange type with gasket, bolts, and nuts.
  - 5. Jackets: AWWA C105-99 polyethylene jacket.
  
- B. PVC Pipe: AWWA C900-97 Class 150 or 200, as indicated:
  - 1. Fittings: AWWA C111-00, cast iron.
  - 2. Joints: ASTM D 3139-98 compression gasket ring.
  
- C. Polyethylene Pipe: ASTM D305-03a, for 160 psi pressure rating:
  - 1. Fittings: AWWA C901-02, molded or fabricated.
  - 2. Joints: Compression (shall use Mueller 110 when greater than 1 inch).
  
- D. High Density Polyethylene Pipe: AWWA C906-99:
  - 1. Material: PE 3408 High Density Polyethylene (HDPE) meeting ASTM D3350-04 cell classification of 345434C.
  - 2. Fittings: AWWA C906-99, molded or fabricated; or mechanical joint ductile iron fittings.
  - 3. Joints: Butt fusion.
  
- E. Tape: Magnetic detectable conductor, clear plastic covering, imprinted with "WATER SERVICE " in large letters.

### 2.02 VALVES

- A. Valves: Manufacturer's name and pressure rating marked on valve body.
  
- B. Gate Valves Up To 3 Inches:
  - 1. Brass or Bronze body, non-rising stem, inside screw, single wedge or disc, IPS ends, and handwheel.
  - 2. Product: Powell U.S. Bronze Gate Valves, or accepted equal.
  - 3. Substitutions: See Section 01630 - Product Requirements.
  
- C. Gate Valves 3 Inches and Over:
  - 1. AWWA C500-02, iron body, bronze trim, non-rising stem with square nut, single wedge, mechanical joint or flanged ends as indicated.
  - 2. AWWA C509-01, iron body, bronze trim, non-rising stem with square nut, single wedge, resilient seat, mechanical joint or flanged ends as indicated.
  - 3. Product: Mueller Gate Valve or Resilient Seat Gate Valve.
  
- D. Ball Valves Up To 2 Inches:
  - 1. Brass body, teflon coated brass ball, rubber seats and stem seals, Tee stem pre-drilled for control rod, compression inlet end, compression outlet, with control rod, valve key, and extension box.

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- E. Swing Check Valves From 2 Inches to 24 Inches:
  - 1. AWWA C508-01, iron body, bronze trim, 45-degree swing disc, renewable seat and flanged ends.
  - 2. Product: Mueller Swing-Type Check Valve, or accepted equal.
- F. Butterfly Valves From 2 inches to 24 inches:
  - 1. AWWA C504-00, iron body, bronze disc, resilient replacement seat, mechanical joint or flanged ends as indicated and manual worm gear operator.
  - 2. Underground manual operators shall be totally enclosed, factory grease packed and sealed, bronze worm gear operators with self-locking gearing; stops shall be provided to prevent over travel of valve disc.
  - 3. Valve operator shall be geared to close valves slowly. Number of turns to close valve from full open position shall be: 32 for 10-inch and smaller valves, 52 for 12-inch thru 16-inch valves, and 76 for 18-inch thru 24-inch valves. Closing times for larger valves shall be accepted by the Engineer.
  - 4. Product: Mueller "Lineseal III" Butterfly Valve.
- G. Corporation Stops: shall be type for connecting to copper or polyethylene pipe; Mueller No. H-15000, or acceptable equal, for up to 2-inch service line.
- H. Air Release Valves: shall be combination air release valves; APCO Combination Air Release Valves, or acceptable equal, of size indicated on the drawings.
- I. Stop & Waste – Mueller – MUH 10288-010 w/PVC valve box and weathermatic lid

### 2.03 BEDDING AND COVER MATERIALS

- A. Bedding and Backfill: As specified in Sections 33 05 20, 31 23 23 and 32 05 10.

### 2.04 ACCESSORIES

- A. Service Clamps: shall be bronze, double-strap type; Mueller No. H-16134, or acceptable equal, for up to 2 inch service lines.
- B. Concrete for Thrust Restraints: Concrete type specified in Section 03 30 40.
- C. Manhole and Cover: Pre-cast with "IRRIGATION" stamped on the lid.
- D. Irrigation Service Valve Box: Carson Industries brand, model number 1419-12 and 1419-4 cover in color green.
- E. Secondary Water Valve Box: D&L #M-8064 slip base, #M-8058 slip top and #M-9009 lid marked "IRRIGATION".

### 2.05 AIR VAC STAND PIPES (2 INCH AND 3 INCH)

Air vac stand pipes shall be Model #SP12X6 for 2 inch or Model #SP14X8 for 3 inch as manufactured by Utility Coatings & Fabrication, or approved equal. Standpipes shall meet the following qualifications.

- A. Design



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1. Stand pipe shall be of adequate size to accommodate a 2 inch or 3 inch riser with a 180 degree return on top.
  2. Standpipe shall have 1/2 inch holes equally spaced around top sides such that the area is 2 times greater than the area of the standpipe riser.
  3. Standpipe shall have a 1 inch weep hole at grade level.
  4. Standpipe shall be 2-piece construction.
- B. Quality Assurance
1. Fabricator Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this project and with a record of successful in-service performance, as well as sufficient capacity to produce required units.
  2. Welding: Qualify procedures and personnel according to the following:
    - a. AWS D1.1 - Structural Welding Code - Steel (current edition)
    - b. AWS D1.3 - Structural Welding Code - Sheet Steel (current edition)
    - c. Certify that each welder has recently (prior 12 months) satisfactorily passed AWS qualification test for welding processes involved and, if pertinent, has undergone re-certification.
  3. Metal Surfaces: For metal fabrications exposed to view in the completed work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Metals
1. Steel Plates, Shapes, and Bars: ASTM A36/A36M-05. Steel Plate shall be 3/16 inch minimum thickness.
  2. Tube Steel: ASTM A500-03a Grade B.
  3. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded: E70-97 for ASTM A36/A36M-05.
  4. Lifting eye shall be capable of lifting 2 times the weight of the vent cover and shall rotate flat so as not to protrude more than 1/2 inch above the cover.
- D. Fasteners
1. Bolts
    - a. Flange bolts shall be A307-04 zinc plated.
    - b. Headed stud anchors: C1008/C1010.

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### E. Fabrication

1. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for re-assembly and coordinated installation.
2. Shear, punch and drill metals cleanly and accurately. Remove burrs. No burning of holes shall be allowed.
3. Ease exposed edges to a radius of approximately 1/32 inch (1mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impair work.
4. Weld corners and seams continuously to comply with the following:
  - a. Use materials and methods which minimize distortion and develop strength and corrosion resistance of base metals.
  - b. Obtain fusion without undercut or overlap.
  - c. Remove welding flux immediately.
  - d. At exposed connections, finish exposed welds and surfaces smooth and blend so that no roughness shows. Contour of welded surface shall match that of adjacent surface.
5. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
6. Cut, reinforce, drill and tap metal fabrications as indicated to receive finish hardware, screws and similar items.
7. Joints which may be exposed to weather, shall be made water tight or weep holes shall be provided where water may accumulate.
8. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.

### F. Steel Finishes

1. Galvanizing: Hot-dip galvanize items as indicated to comply with the following applicable standards:
  - a. ASTM A123/A123M-02.
  - b. ASTM A153/A153M-05.

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## PART 3: EXECUTION

### 3.01 EXAMINATION

- A. Verify that water main and main line tee size, location, and invert are as indicated.

### 3.02 PREPARATION

- A. Cut pipe ends square, ream pipe ends to full pipe diameter, remove burrs.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare pipe connections to equipment with flanges or mechanical joints.

### 3.03 TRENCHING

- A. See Section 31 41 00 and Sections 31 23 16 and 31 23 17 for additional requirements.
- B. Hand trim excavation for accurate placement of pipe to elevations indicated.
- C. Form and place concrete for pipe thrust restraints at each change of pipe direction. Place concrete to permit full access to pipe and pipe accessories. Provide required sq. ft. of thrust restraint bearing on subsoil as indicated on the drawings.
- D. Backfill around sides and to top of pipe with backfill material, tamp in place and compact, then complete backfilling.

### 3.04 INSTALLATION - PIPE

- A. Group piping with other piping work whenever practical.
- B. Buried piping shall have a minimum of three (3) feet and a maximum of five (5) feet of cover over pipe unless approved otherwise by City Engineer.
- C. Install pipe to indicated elevation to within tolerance of one inch.
- D. Install ductile iron piping and fittings to AWWA C600-99.
- E. Install PVC pressure pipe and fittings to ASTM D2774-04.
- F. Install pipe lines to line and grade indicated.
- G. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- H. Slope water pipe and position drains at low points.
- I. Install trace wire above top of PVC and PE pipe; coordinate with Section 33 05 20.

### 3.05 INSTALLATION - VALVES

- A. Set valves on concrete block or other acceptable solid bearing.
- B. Center and plumb valve box over valve operating nut. Set box cover flush with finished grade.

### 3.06 INSTALLATION - AIR RELEASE STATIONS



## SECONDARY WATER

- A. Locate air release stations as indicated on the drawings and as directed by the Engineer.
- B. Set air valve and piping plumb according to manufacturer's written instructions and recommendations; set vault plumb on solid foundation.
- C. Set top of valve box to grade, with cover matching finish grade.

### 3.07 SERVICE CONNECTIONS

- A. Provide water service lines, as indicated on the drawings, with stop and waste valve, ball valve and valve box.
- B. Water service lines shall extend to locations designated by the City Engineer, which will be near property lines of property being served, as indicated.
- C. All pipe, fittings and valves shall conform to the specifications found elsewhere in this Section.
- D. Pipe, fittings and valves shall be installed as described herein and as directed by the Engineer.
- E. Service lines shall be installed at uniform grades and alignments; and shall be free of low spots or adverse grades.
- F. Service lines shall be cleaned, flushed and tested in accordance with applicable requirements of these specifications.

### 3.08 CONNECTIONS TO EXISTING WATER LINES

- A. Connection to existing water lines shall be made where and as indicated on the drawings and as directed by the Engineer. The sizes of pipe, fittings, valves and appurtenant items required to make connection shall correspond to the sizes of existing pipe and of project pipe.
- B. Excavate to existing pipe line at point of connection; determine actual conditions of existing pipe and all fittings and appurtenant items required to make the connection; and have all materials needed on site prior to any shut down or cutting into existing pipe lines.
- C. Connection which involve cutting into existing pipe lines include: cutting and removing sections of existing pipe and fittings as required; cleaning and preparing ends of existing pipe as required for connection; furnishing and installing all new pipe, fittings and valves required to make the connection of project pipe to the existing pipe as indicated; and all appurtenant work required to complete the connection.
- D. Connection into existing pipe lines under pressure include: furnishing and installing mechanical joint tapping sleeve of the appropriate size on the existing pipe at point of connection; furnishing and installing tapping valve, with valve box, on sleeve; tapping existing pipe with acceptable type drilling machine and equipment, without interrupting flow in existing pipe line; and all appurtenant work required to complete the connection.
- E. Connection to existing pipe line shall be made at such times and within the time limits and according to the directions as agreed to between the Contractor and the Owner.
- F. Cut and plug existing pipe lines where indicated and as directed by the Engineer. Excavate as required to locate existing pipe lines to be abandoned in place; cut the existing pipe, as required; and install permanent plug in end of pipe to be abandoned.

## SECONDARY WATER

### 3.09 QUALITY CONTROL

- A. Perform field inspection and testing in accordance with Section 01 45 00.
- B. Pressure test water piping to 1.5 times pipe line working pressure in psi or 200 psi, whichever comes first.
- C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

END OF SECTION

# **CHAPTER 5**

## **Irrigation and Landscaping**

# IRRIGATION AND LANDSCAPING

## CHAPTER 5

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5.1	General Conditions
5.2	Sprinkler Specifications
5.3	Planting Specifications

# IRRIGATION AND LANDSCAPING

## 5.0 INTRODUCTION

The following standard specifications define the minimum requirements for the design and construction of streetscapes and other publicly owned landscaping within Riverton City.

All work to be performed by Utah licensed landscape contractors (with minimum five years commercial experience) and Utah certified irrigation installers only.

The Parks Division can clarify any questions regarding these standard specifications, but will not design or engineer the project.

The following items must be completed in order to receive a bond release on the project.

1. The Parks Division must receive a set of detailed plans and approve them before any construction begins. The plans need to include (when applicable): P.S.I., flow rates, head spacing, controller location (including power source) and plant locations.
2. As per General Conditions 5.0, burying un-inspected work will require reopening or exposing items to be inspected at the contractor's expense.
3. Trees that do not meet planting specification 5.1, will require replacement at contractor's expense with an acceptable tree.
4. Any changes must be applied for in writing, and receive approval in writing, prior to installation.

# IRRIGATION AND LANDSCAPING

## 5.1 GENERAL CONDITIONS

- A. **Streetscape Size and Location:** Streetscapes shall be constructed to the sizes, grades and locations stated herein. Locations of all Sprinkler heads, shrub heads, etc., are subject to approval by the Riverton City Parks Division.
- B. **Construction Specifications:** The landscaping of streetscapes shall include, but are not limited to, furnishing, installing and testing of irrigation mains (to 150 PSI of one hour), backflow device(s), water meter(s), sprinkler heads, gate valves, control valves, automatic valves, automatic controllers, topsoil, turf, trees, shrubs, a metered electrical connection, removal and/ or restoration of existing improvements, excavation and backfill, and all other appurtenant work in accordance with Riverton City Standards and Specifications.
- C. **Liability:** The contractor shall adequately protect the job site, adjacent property, and the public. The developer/contractor is responsible for any damage, injury, or loss resulting from their actions and/or neglect.
- D. **Signs, Fences, Barricades:** The contractor shall, at all times during construction, maintain safe traffic and pedestrian routes around all construction areas. This may require proper and adequate signage, fences, barricades or other approved devices as required by the Streets Department or Parks Division.
- E. **Failure to Have Inspections:** The contractor shall not allow or cause any of the work to be buried or enclosed until after it has been inspected, tested and approved by the Parks Division. If any work is buried or enclosed before it has been inspected and/or tested, the developer/contractor must uncover the work at their expense, meet the requirements to pass inspection/testing, and re-bury/enclose the work to the satisfaction of the Parks Division and the Riverton City Standard Specifications & Plans.
- F. **Ordinances and Regulations:** All design and construction must be in compliance with all Local, Municipal, State and Federal laws, rules and regulations. All design and construction must comply with Riverton City Standard Specifications & Plans, Ordinances and Regulations.
- G. **Bonding and Inspection:** The irrigation system and landscaping will be bonded as part of the entire development project. Bond releases are administered by the Engineering Department. Construction of irrigation and landscaping must meet the approval of the Parks Division prior to any bond releases.
- H. **Materials:** Whenever a material is specified by name and/or number, such specifications shall be used for the purpose of describing materials, and establishing quality. No substitution will be permitted unless approved by the Parks Division.
- I. **Inspections and Procedures:**
1. Due to Utah having a limited growing season, no construction or inspections will be allowed from October 31 to March 31.
  2. The contractor shall set up an inspection schedule with the Parks Division. Prior to each inspection date, the contractor shall give twenty-four (24) hours' notice to the Department. There is to be a minimum of six (6) inspections. The contractor may not proceed to the next phase of construction until the previous phase is inspected and approved. The Inspections are as follow:
    - a. First inspection                      Open Main Line
    - b. Second inspection                    Final Irrigation system
    - c. Third inspection                      Plant material & Location
    - d. Fourth inspection                    Start of maintenance

## IRRIGATION AND LANDSCAPING

- e. Fifth inspection                      Start of guarantee Period
  - f. Sixth inspection                      End of Guarantee Period
- 
- 3. In the event the contractor requests inspection of work and said work is substantially incomplete, the contractor shall be responsible for inspection fees at the rate of \$25.00 per re-inspection.
  - 4. The developer, after installing the irrigation main line, shall request from the City, the first inspection and approval.
  - 5. From the date the project is termed "satisfactory" by the inspector, the developer shall maintain the streetscape for a period of 1 year. At the beginning of the 1-year period, the developer shall schedule a final inspection. If at this inspection, the City deems the project acceptable, the one-year guarantee period will start and the Parks Division will inform the City Engineer that the Parks Division bond requirements have been met for "acceptance" by the city and any associated bond release.
  - 6. At the end of one (1) year the City Parks Division will, upon satisfactory inspection, release the contractor and developer from the one (1) year guarantee of the irrigation system and any other landscape items on the project. The Parks Division will inform the City Engineer that the Parks Division bond requirements have been met for the "warranty" release.
  - 7. The developers shall obtain written approval from the Parks Division that the City has officially assumed maintenance and that all work has been performed satisfactorily.
- 
- J. **Record Drawing:** The Landscape Architect will furnish the Parks Division with two (2) preliminary sets of drawings for review, showing all sprinkler and landscaping work required. After initial review by the City, the Landscape Architect shall make all noted corrections as discussed with staff. The Landscape Architect shall submit two (2) final sets of drawings to be signed and approved by the Parks Division. Upon completion of construction, the developer/contractor must submit record drawings to the Parks Division for approval before any bond releases.

# IRRIGATION AND LANDSCAPING

## 5.2 SPRINKLER SPECIFICATIONS

### A. Excavation and Backfill:

1. Trenches for irrigation pipe (plastic, brass, and/or galvanized) sprinkler lines shall be excavated either by hand or machine to a minimum depth of 24 inches and shall be of sufficient width to permit proper handling and installation of the pipe and fittings. The backfill shall be thoroughly compacted and level with the adjacent ground. Selected fill dirt or sand shall be used if soil conditions are rocky or obstructive. Trenching depth shall be two (2) inches below normal trench depth to allow for proper bedding.
2. Fill dirt or sand shall be used for the first four (4) inches above the pipe. The remainder of the backfill shall contain no lumps or rocks larger than two (2) inches. The top six (6) inches on main lines and 12-18 inches on lateral lines with the appropriate fill as above.
3. Detectable tape or wire shall be placed one (1) foot above pipe.
4. Any excavation, in or under the roadway curb, gutter and/or sidewalk, shall conform to the "Specification for Excavation in Riverton City Right of Ways". This is obtainable from the Engineering Department.

### B. Pipe and Tube:

1. General Requirements: All piping under paving shall be installed in Schedule 40 PVC sleeves (see Detail 1 & 2). Piping under the road to the water meter box must be copper.
2. Piping under paving shall be installed by jacking, boring or hydraulic driving. Cutting or breaking of sidewalks and/or concrete work is not permitted unless no other alternative is possible. Piping shall be located in such a way that a minimum of pipe will be located under paving.
3. Plastic Pipe and Tubing: Plastic pipe shall be extruded from PVC 1120-1220 compound and shall be so labeled. All PVC pipe shall be Schedule 40.
4. Plastic pipefitting and Connections: All plastic pipefitting shall be suitable for either solvent weld or screwed connection. Fittings shall be Lasco, Dura or Spears factory assembled fittings or approved equivalent. All fittings shall be Schedule 40 PVC except for mainline fittings, which shall be Schedule 80 PVC.
5. When connection is plastic to metal, Schedule 80 female adapters shall be used. The female adapter shall be hand tightened, plus one turn, with a strap wrench. All threaded joints are to be wrapped with Teflon tape.
6. **All PVC slip joints shall be primed prior to being glued.** Primer shall be Weldon P-70 or approved equivalent. Glue shall be Weldon 711, gray heavy bodied fast seal or approved equivalent. Burrs at cut ends shall be removed prior to installation to necessitate a smooth unobstructed water flow.
7. Flushing and Testing: Prior to the installation of sprinkler heads, control valves shall be opened with a full head of water to flush out the system. Sprinkler main lines shall be tested before backfilling for a period of not less than one hour, and shall show no leakage or loss of pressure.
8. Wiring: All wiring and pull boxes must be in accordance with the following:

## IRRIGATION AND LANDSCAPING

- a. National Electric Code
- b. Utah State Uniform Building Code
- c. Recommendations by the Parks Division or Building Department
- d. All wiring is to be continuous
- e. If splices are necessary they are to be in a minimum of ten-inch (10) round valve box with a 3M "DBR" or "DBY" dry splice or approved equivalent.
- f. All wiring under pavement or asphalt must be in conduit.

### C. Sprinkler Heads, Gate Valves and Quick Couplers

1. For standardization purposes and inventory control, all sprinkler heads, valves and quick couplers shall be commercial grade Rain Bird or Hunter brand products. All Products must be approved prior to installation.
2. Sprinkler Heads: All sprinkler heads shall be set to grade and perpendicular to the finished grades unless otherwise specified. Heads adjacent to curbs and walks shall be ½" to 1" away from the curb or walkway. All nozzles shall be tightened and adjusted for the proper radius, arc, and flow rate.
3. Gate Valves: All gate valves shall be resilient wedge with square key of domestic manufacture with non-rising stem; 200 lb. water, oil, gas rated (i.e. Milwaukee series 105 gate valve or equivalent). All gate valves shall be installed with valve boxes. Six (6) inch or twelve (12) inch extensions shall be added when necessary to bring the valve boxes level with finish grade.
4. Quick Coupling Valves: A quick coupling valve shall be installed on all main lines immediately after the backflow prevention device. In addition a quick coupling valve shall be installed at every valve box or valve box cluster (See details). All quick coupler valves shall be RainBird #44RC or 33DRC and installed in a 10" round valve box.
5. Quick Coupling Valve Keys: All quick coupling valve keys shall be RainBird 44K or 33DK and shall have a hose swivel attached to the key. Two (2) keys are to be turned over to the Parks Division at completion of the project.
6. Sprinkler Risers: All rotor pop-up sprinklers shall have an adjustable riser assembly (double swing joint). Spray pop-up sprinkler heads shall have double swing joint risers constructed of funny pipe, barbed fittings and marlex street ells on the head side.

### D. Irrigation Controller

1. Irrigation controller shall be RainBird, Esp, or Hunter. All controllers shall be mounted on a stable wall, power rack, or formed and constructed concrete based pedestal mount. All controllers shall be mounted in vandal proof and weatherproof boxes. **Controller type and locations must be approved by the Parks Division prior to installation.**
2. The contractor /developer is responsible for providing metered 110 volt (20 AMP minimum) electrical service, breaker, meter base and power disconnect. This connection must be inspected and approved by the City Building Department. All 110 wire must be in conduit and buried at least 24 inches deep.
3. All control wires must be 14 gauge solid core (minimum), run in the main line trench and be taped to the main line every ten (10) feet. Where it is not possible to run the controller wire in the main line trench the wires are to be buried 24 inches deep in conduit. Spare wire and a tracer wire must run to every valve along the entire mainline. Controller wire colors are as follows:

## IRRIGATION AND LANDSCAPING

a. Common	<i>White</i>
b. Valve wire	<i>Red</i>
c. Spare	<i>Orange</i>
d. Tracer	<i>Yellow</i>

4. Installation and connection of the 110-volt electrical service to the controller must comply with all local, state and national codes.

### **E. Electric Remote-Control Valve**

1. Valves shall be as specified on drawings and approved as per the Parks Division. Remote-control valves shall be installed in a 17" x 11.75" (minimum) valve box (i.e. Carson Brooks standard or approved equivalent). A maximum of two (2) valves per box positioned such that the valve tops can be removed without removing the valve box.
2. Connection Fee: The Contractor/Developer shall pay the appropriate Riverton City connection fee for the water meter, prior to any construction.
3. Connection to Mainline: Developer/contractor shall be responsible for all construction costs involved with tapping into the City main line, including labor, materials, road cuts and roadcut permits. Prior to making such connections, the developer/contractor must have written approval from the Water Department.
4. General Requirements: To comply with State of Utah regulations, which prohibit unprotected cross connections between a public water supply and an unapproved source or connection, the Water Department requires the installation of approved backflow prevention devices and at the contractor's expense. The type of backflow prevention device required shall be determined by the Water Department.
5. Backflow Requirements, Inspections and Tests: Back flow prevention devices shall be selected from a list of approved devices set forth by the Utah Division of Public Water Supplies. Double Check Valve Assemblies (DCA) and Reduced Pressure Assemblies (RP) will be the only accepted styles of backflow prevention devices. This selection shall be approved by the Riverton City Water Department and the Riverton City Parks Division prior to installation.
  - a. Each device shall be installed in compliance with Utah State Plumbing codes and Utah Division of Public Water Supply regulations.
  - b. Each device shall be tested within ten (10) days of installation and at least once yearly thereafter by a backflow technician licensed by the State of Utah. The locations of each device shall be reported to the Riverton City Water Department and Riverton Parks Division in writing within ten (10) days of installation.
6. Backflow Prevention Location: Location of backflow prevention installation shall be approved by Riverton City Parks Division prior to installation.
7. Double Check Valve Assembly (DCA) (See Details)
  - a. The DCA shall be readily accessible for testing, repair, and maintenance
  - b. DCA's are to be installed in a pit, the DCA shall be installed with a minimum of 12-inch clearance between all sides of the vault including the floor, and roof, or ceiling and must be approved by the Riverton City Cross Connection Compliance Supervisor.
  - c. The DCA shall be maintained as assembled.

## IRRIGATION AND LANDSCAPING

- d. The DCA shall be installed in a horizontal position only.
8. Reduced Pressure Assembly (RP)
- a. The assembly shall be protected from freezing and vandalism.
  - b. The bottom of the RP assembly shall be a minimum of 12 inches above the ground or floor.
  - c. The body of the RP shall be a minimum of 12 inches from any walls, ceilings, or encumbrances and shall be readily accessible for testing, repair, and maintenance.
  - d. RP's shall not be installed in a pit
  - e. The relief valve on the RP shall not be directly connected to any waste disposal line, including sanitary sewer, storm drains or vents.
  - f. The RP shall be maintained as assembled.
  - g. The RP shall be installed in horizontal position only.
  - h. All outlets on potentially contaminated systems shall be posted: **DANGER – UNSAFE WATER**

# IRRIGATION AND LANDSCAPING

## 5.3 PLANTING SPECIFICATIONS

**Note:** All constructed irrigation systems must be inspected and approved by the parks division before any landscaping commences. Approval shall be obtained by the developer/contractor in writing from the parks division.

### A. Scope of Work

1. The work consists of furnishing all equipment, labor and materials needed to complete all landscaping as per approved plans.
2. The Parks Division must approve all Plant quantities and sizes.

### B. Design Changes

1. In the event of any changes in plant locations, the developer/contractor must notify the Parks Division and submit amended design drawings to the Parks Division for approval prior to any planting.

### C. Obstructions Below Ground

1. Prior to excavation for planting, the contractor shall locate all electrical cables, conduits and other utility lines so that proper precautions may be taken not to disturb or damages such improvements. In the event of a conflict between such lines and plant locations, promptly notify the Parks Division. Failure to follow this procedure places the responsibility and expense upon the contractor for making any and all repairs.
2. Remove rock, road base, and other underground obstructions to a minimum depth of 1 foot to permit proper installation of lawns and plants.

### D. Spacing

When applicable, plant material within a row, shall be equally spaced. Otherwise, plants shall be installed in the locations shown on the approved plans. Ground cover material shall be at the spacing indicated (maximum distance of 8" on center).

### E. Plants to Be Furnished

1. The developer/contractor shall furnish and install plants as listed on the approved plans. Quantities and sizes are as follows:
2. All shrubs shall be five (5) gallon minimum, unless written approval is obtained from the Parks Division.
3. All trees shall be a minimum of 2 inch caliper as per American National Standards Institute, standard Z60.1-1986 American Standard for nursery stock. Any variation requires written approval of the Park Division. The location of all trees shall be approved by the Parks Division prior to installation.
4. The developer is required to install parkway trees. Parkway trees shall be installed in accordance with the Riverton City Street Tree Master Plan.
5. All plants delivered to the site must be first class representatives of their species or varieties, free from disfiguration, with well-developed branch systems and vigorous and fibrous root systems. Plants not conforming to these requirements, must be removed, whether in place or

## IRRIGATION AND LANDSCAPING

not and replaced with acceptable plant material. Plants must be planted within 24 hours of arrival at the site.

6. All plant material must meet Federal, State, and County laws requiring inspection for plant disease and insect infestation. Tag all plants identifying type and size in accordance with standard of practice recommended by the American Association of Nurserymen.
7. Root conditions of plants furnished in containers may be determined by the Parks Division and any plant rendered unsuitable must be replaced at the developer/contractor's expense.

### F. Substitutions

No substitutions for the indicated plant material will be permitted unless approved in advance by the Planning Department and Parks Division. Any substitutions shall be of a quality and size equal to that specified on the plans.

### G. Finish Grading And Soil Preparation: Finish grading shall consist of the following:

1. No slope greater than 3:1 will be accepted. All pond corners must be rounded with a minimum radius of 10 feet.
2. It shall be the responsibility of the landscape contractor to insure proper drainage. Surface drainage shall be modeled to facilitate the natural runoff of water. Low spots and pockets must be graded to drain properly.
3. Subsoil shall be clear of all debris, road base and rocks (larger than 1 inch) to a depth of 12 inches. Subsoil shall consist of clean water retention soil and must be accepted by the Parks Department.
4. Import a minimum of 6" of screened sandy loam topsoil.
5. Planting areas shall conform to the uniform grade by floating or hand raking.
6. Finish grade of all lawn areas shall be 1" below grade of adjacent pavement of any kind. Roll all lawn areas with a water filled roller to obtain uniform compaction and level surfaces (50 pounds minimum weight).

### H. Planting

1. Seed:
  - a. Seed mix to be determined by the Parks Department Supervisor.
  - b. Soil preparations to be the same as for sod installation.
  - c. Seeding may not be acceptable in Park strips.
2. Sod:
  - a. Prepare lawns areas as specified under soil preparation. Slope all areas to drain according to the approved plan drawings.
  - b. Rake these areas as specified under soil preparations, until the surfaces are smooth and of uniformly fine texture immediately prior to planting the turf.
  - c. Roll sod bed after grading with a water roller (50 pounds minimum weight).
  - d. Apply 16-16-8 commercial fertilizer at the rate of 10 pounds per 1,000 square feet.

## IRRIGATION AND LANDSCAPING

- e. Lay sod with staggered seams.
  - f. After sod has been laid and watered, roll sod with 50 pound (min.) water roller to level sod and insure positive contact with soil.
3. Ground Cover:
- a. Prepare ground cover areas as specified under soil preparations, including commercial fertilizer (16-16-8) at the rate of 15 pounds per 1,000 square feet.
  - b. Spacing of ground cover shall be no greater than 8" on center.
  - c. All areas adjacent to plants shall have a weed barrier installed.
  - d. All areas adjacent to plants shall be covered with 4" of bark over weed barrier. Parks Department will specify type and size of bark.
4. Trees and Shrubs:
- a. Plant, stake and water trees as shown on the standard tree staking detail.
  - b. The spacing and species of trees shall conform to the Streetscapes Master Plan.
  - c. Location: Trees shall be kept not less than:
    - d. Forty (40) feet back of beginning of curb returns at any street intersection
    - e. Twenty (20) feet from lamp standards and power poles.
    - f. Ten (10) feet from fire hydrants.
    - g. Five (5) feet from service walks and driveways
    - h. Five (5) feet from water meters.
  - i. All containers, wire baskets etc. shall be removed from trees and shrubs prior to planting. All B & B stock shall have the bailing twine removed and burlap folded down below ground level.
  - j. Incorrectly planted trees will not be accepted and will have to be replanted at developer/contractor's expense.

### I. Staking

Stake all trees at the time of planting, by placing two (2) T stakes 1' to 2' from the center and driving stake 24" into solid ground. Fasten the tree to the upper end of the stake in at least two (2) places using "cinch ties" or equivalent.

### J. Maintenance

Plant maintenance work shall consist of watering, weeding, mowing, edging, fertilizing, and performing the following plant establishment work:

- 1. The entire project shall be satisfactorily maintained for a period of 1-year (once every 7 days). The maintenance period will begin when all items of work have been completed as specified



## IRRIGATION AND LANDSCAPING

in the foregoing articles and to the satisfaction of the Parks Division and Planning Department. If project is not accepted, the developer/contractor is required to perform maintenance until the project is accepted. October 31 to March 31 is not considered part of the one (1) year maintenance period.

2. Lawn and plants shall be properly watered by the irrigation system to maintain a healthy, green, growing condition.
3. If the project has been accepted at the end of the 1 year maintenance period, an application of fertilizer, 16-16-8 1% Fe. Shall be applied as directed.
4. At completion of the maintenance period, all areas, including sidewalks, streets and gutters, shall be clean and free of debris and weeds. All plant materials shall be live, healthy, free of infestations or weeds, and be of acceptable growth for the current time of year. The contractor must obtain written release from the Parks Division before ending maintenance obligations.

# **CHAPTER**

# **6**

# **Street Lights**

# STREET LIGHTING

## CHAPTER 6

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## STREET LIGHTING

All work shall be installed in accordance with the most current Riverton City Standards, Utah APWA, Rocky Mountain Power Standards and N.E.C. (National Electric Code). A streetlight plan showing wiring location, wiring type, voltage, power source location, conduit size and location shall be submitted to Riverton City and be approved prior to construction. No deviation to location of streetlight, pull boxes, conduits, etc., shall be permitted without prior written approval from the City Engineer or his/her representative.

### 6.1 LOCATION AND SPACING

- A. Spacing. All spacing requirements shall follow current Riverton City Master Transportation Plan.
1. Major and Minor Streets: 200-ft maximum spacing on alternate sides (400-ft max on same side). Where a new light interfaces with existing city streetlights, the new light may be spaced from 150-ft to 250-ft with alternating sides or other arrangements as approved by the city engineer.
  2. Residential Streets: 250-ft maximum spacing on alternate sides (500-ft max on same side). Where a new light interfaces with existing city streetlights, the new light may be spaced from 200-ft to 300-ft with alternating sides or other arrangements as approved by the city engineer.
- B. The Locations of Street light poles.
1. At every intersection, corner and any bends in road shall have a street light. The spacing requirements shall be met accordingly once these areas are developed.
  2. Shall be installed along property lines where attainable
  3. Shall not be installed within 5 feet of a fire hydrant. The location shall be such that it does not hinder the operation of the fire hydrant and water line operation valves
  4. Shall be a minimum of 5 feet from any tree, unless written approval is received from the City Engineer. Branches may need to be pruned as determined by the Engineering Inspector in the field at the time of installation
  5. Shall not be installed within 5 feet from the edge of any driveway
  6. Any structure such as block walls, chain link fences, retaining walls, etc., shall leave a minimum of eighteen (18) inches to the face of the street light pole on all sides.
  7. Wherever there is an overhead utility that may conflict with the installation of the street light circuits and/or street light poles, those conflicts must be resolved between the developer and the utilities involved before the street light bases are constructed at no expense to Riverton City or Rocky Mountain Power. The resolution must be approved by Riverton City and Rocky Mountain Power.

### 6.2 VOLTAGE

- A. All streetlights shall have 120 volt input Voltage (nominal).

### 6.3 WIRE/CONDUCTORS



## STREET LIGHTING

- A. The minimum wire size shall be #6 AWG RHW-2 copper lines from power source to the ground boxes.
- B. From pole base or (hand hole) to the fixture head #10 or #12 THHN copper will be only allowed.
- C. No aluminum wire allowed.
- D. Wire to be black, white, green or phased taped at both ends.
- E. Run conduit to the lock side of transformer. Leave 8 feet excess wire to transformer or 6 feet excess wire to secondary box as per Rocky Mountain Power ("RMP") requirements, so that RMP will make the connection. Contractor is able to use HDPE conduit so long as it is schedule 40, grey in color, the wire is the correct size and listed for this use. All installations of HDPE shall be installed according to the current edition of the NEC Section 353 and UL labeled and listed.
- F. Multiple Pole Installation: Wire size shall be designed by an electrical engineer with no more than a 3% of a drop in the nominal voltage at the base of each pole. The minimum wire size shall be a #6 AWG RHW copper wire suitable for wet conditions. Electrical engineer to submit design drawings to the City for review.
- G. It shall be required that in the absence of an existing workable circuit to attach to, that all installations shall require new service for operation of the circuits in this case developer and/or his engineer shall contact Rocky Mountain Power. The new service shall be located within the utility right of way and shall be provided at the developers cost.
- H. All electrical work must be performed by a licensed electrician.
- I. All service point(s) shall be coordinated with Rocky Mountain Power and whenever possible be located near the center of the circuit. Service point(s) shall be shown on the plans.
- J. Photo cells must face north.

### 6.4 CONDUIT

- A. All conduits shall be a minimum of 1-1/2 inch PVC, Schedule 40 and grey in color. Contractor is able to use HDPE conduit so long as it is 1-1/2 inch, schedule 40, grey in color, and the wire is the correct size and listed for this use. All installations of HDPE shall be installed according to the current edition of the NEC Section 353 and UL labeled and listed.
- B. 90° sweeps/bends shall have a maximum of 24 inch radius and a minimum of 18 inch radius.
- C. Conduit shall have a minimum of 18 inches of cover in a utility trench and a maximum of 30 inches of cover (refer to details – diagram sheet.)\*
- D. All conduits shall have an approve cap or duct seal on ends to prevent debris from entering conduit during construction.
- E. All empty conduits shall have a pull string.
- F. Conduit shall extend a maximum of 3 inches and a minimum of 1 inch above the finished streetlight concrete base.

## STREET LIGHTING

- G. Multiple Pole Installations: Conduits will be allowed to be of a larger size as required to accommodate the larger wire sizes.
- H. Mark all buried conduits by placing plastic marker tape (minimum 6" wide) along the entire length of run 12-inches below grade.
- I. Inspection. Prior to backfilling, buried conduit shall be inspected and recorded by a Riverton City GIS Technician.

### 6.5 BASES

- A. All bases shall be a maximum of 2 inches above sidewalk or top back of curb grade or whichever is higher.
- B. Bases shall be located in the park strip as indicated on Riverton City Standard Plan ENG-6.
- C. Where approved; heli-coils (stingers) will be placed with verification of placement from City representative.
- D. Allow the concrete pole base to cure for at least 7-days prior to installing the street light.

### 6.6 GROUND BOX

- A. Known as box, vault, flush mount, pull box, enclosure, and junction box.
- B. Box and cover shall be Oldcastle Precast, Carson H Series #H1118-12 (11"W X 18" L 12" D) or approved equivalent with the words "Street Lighting" on the cover.
- C. Lid must be secured with the proper stainless steel bolts.
- D. 6" of gravel (3/4 minus) shall be placed prior to setting the ground box.
- E. Top of ground box shall be placed at finished grade.
- F. Conduit shall extend a maximum of 3 inches above the gravel in the base of the ground box and a minimum of 2 inches above gravel in the base of the ground box.
- G. One ground box shall be installed within 4 to 10 feet of the power sources (as per Rocky Mountain Power specifications).
- H. One ground box shall be installed within 2 feet of street light pole base. This item may be modified or deleted as determined by the Engineering Inspector in the field during construction, with input from the City Street Light Manager.
- I. Wire must extend 18 inches above grade to splice in ground box.

### 6.7 CONNECTIONS

- A. Wire nuts will be allowed in the pole base only.



## STREET LIGHTING

- B. Mechanical lugs NSi ESSLK – 2/0 Gel packs or equivalent may only be used in the ground box and shall meet NEC specifications, be UL labeled & listed and be designed for this purpose.
- C. A Littelfuse LEBJJ fuse holder (or equivalent) with weatherproof rubber boots, mechanical connection, 600 volt rated and 30 AMP rated shall be used.
- D. Fuse shall be 10 AMP BLF, 20 AMP BLN and 30 AMP BLN or equivalent one time fuse.
- E. Fuse holder shall be placed on all hot leads.
- F. No crimp connections will be allowed.

### 6.8 GROUNDING

- A. All grounding shall be installed according to the current Edition of the NEC Section 250 and UL labeled and listed.
- B. When non-metered street lights are installed, article 250.24 shall be applied for bonding & grounding applications for service supplied AC systems.
- C. Conductor: Solid, cu, bare, soft drawn.
- D. Ground Rod or Ground Ring:
  - 1. Ground Rod – 8 feet x 5/8 inch diameter Copper weld/bonded, cu.
  - 2. Ground Ring - #6 AWG copper clad per NEC Section 250.
  - 3. At any time the City may require third party testing at the expense of contractor in addition to any costs to remedy deficiency.
- E. Clam: 5/8 inch cu clad.
- F. Burndy KA24U 14 – 1/10 AWG AL/CU mechanical lugs or equivalent shall be used to connect the ground wire to the group clip inside the street light pole.
- G. Ground rod shall be a minimum of 2 inches above finished concrete grade for the street light base and a maximum of 3 inches above finished concrete grade for street light base. See detail sheet.

# **CHAPTER**

# **7**

# **Engineering**

# ENGINEERING

## CHAPTER 7

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- 7.3 Engineering Checklists/Templates/Standards
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  - Subdivision Plat Template
  - As-Built Drawings Requirement Checklist
  - Traffic Impact Study
  - Street Design Standards

# ENGINEERING

## 7.1 STANDARD ENGINEERING NOTES

1. Storm drain video inspection required at the time of Warranty Release.
2. A type II slurry seal (or approved equal) shall be placed per APWA 32 01 13.61 at the conclusion of the Warranty Period and prior to Warranty Release.
3. Slurry seal may not be placed until storm system video has been submitted to City and all latent defects have been corrected.
4. Essential Infrastructure: The intent of Title 10-91-802-2-3(i) was clarified by the Legislature, and supported by the League of Cities and Towns and Riverton City. Essential infrastructure does not mean paved roads of asphalt or concrete for temporary access during construction, curb and gutter, signs, etc. Essential infrastructure during construction does include temporary all weather surface roads and fire hydrants. Temporary roads are required to be capable of supporting vehicle loading under all weather conditions, and must meet the following criteria:
  - a. The surface of the road should be capable of carrying the load of the anticipated emergency response vehicles and be drivable in all kinds of weather.
  - b. Compacted road base to APWA standards with a minimum thickness of 8 inches is acceptable.
  - c. Access roads shall be maintained for emergency and fire access throughout the duration of the project.
  - d. Fire hydrants must be installed and functional prior to combustible construction arriving on site.
  - e. The access requirements of IFC Chapter 5 and Appendix D must be installed and approved prior to final inspection and the issuance of a Certificate of Occupancy.

# ENGINEERING

## 7.2 RIVERTON CITY - TRAFFIC CALMING PROGRAM

### 1. OBSERVED TRAFFIC PROBLEM – TRAFFIC ASSESSMENT REQUEST

- a. Upon identifying a potential traffic problem, the concerned party submits a formal request for a traffic assessment. This request can come from any concerned individual or group who sees a possible need for traffic calming.
- b. For existing neighborhoods, the concerned party should make their concern known to the Riverton City Engineering Division. The concerned party should identify the location and exact nature of their primary concern such as speeding, traffic volume, vehicle safety, pedestrian safety, congestion, noise, or parking. This information should be submitted in written form via the **TRAFFIC ASSESSMENT REQUEST FORM** available at the Engineering Division's website or at the Public Works Building located at 12526 south 4150 west.
- c. For new developments, Riverton City will review development plans to identify potential traffic problems by assessing the horizontal and vertical alignment. Often traffic problems can be predicted and prevented by properly reviewing roadway and lot plans for new developments.

### 2. RIVERTON CITY STAFF RESPONSE

- a. Upon receipt of a traffic assessment request, Riverton City staff will have five (5) business days to respond to the applicant. During this time, staff will identify the study area and determine whether a request has already been submitted. If this is the case, the applicant will be notified of the results or that a study is already underway.
- b. If a study hasn't been conducted, staff will identify the limits of the study based upon roadways, topography and land use destinations. The study area shall include all streets that have an influence on the observed traffic problem.

### 3. TRAFFIC ASSESSMENT BY RIVERTON CITY ENGINEERING STAFF

- a. If a traffic assessment is warranted, Riverton City staff will conduct a traffic assessment to identify the extent of the problem and determine the appropriate traffic calming measure.

#### b. TRAFFIC ASSESSMENT

- Study Duration: 7 days minimum
- Speed: 85<sup>th</sup> Percentile
- Volume: Average Daily Traffic (ADT)
- Roadway Properties: Width, Length, Side Treatment, Sight Distance, etc.
- Crash History: Speed Related Crashes
- Sensitive Facilities: Schools, Hospitals, etc.

- c. Using the data collected from the traffic assessment, engineering staff will use a "Point's based scoring system" to; evaluate the traffic condition, determine if a traffic calming measure is warranted and determine appropriate traffic calming measure.

### 4. IMPLEMENT NON-PHYSICAL TRAFFIC CALMING MEASURE

- a. When possible, inexpensive non-physical measures, determined by the City, should be installed to ensure traffic calming measures will achieve the intended results prior to constructing permanent measures. A non-physical measure also provides an opportunity to assess the effectiveness of the correction. Non-Physical Traffic Calming Measures are measures such as signage or speed enforcement that do not require any construction or physical modifications to the roadway. These items shall be implemented first since they can be economical and easy to remove if they do not solve the problem.



## ENGINEERING

### **Riverton City staff will determine the Non-Physical Traffic Calming Measure.**

- b. Non-Physical measures will only be allowed if the approval is obtained from the following:
  - City Engineer
  - Transportation Committee as recommended by the City Engineer
  - City Council
- c. **Non-Physical Speed Control Measures**
  - Increased Police Enforcement
  - Radar Speed Boards (Funding Required)
  - Lane Striping
  - Signage
- d. **Non-Physical Volume Control Measures**
  - Narrowing Lane Striping
  - Signage

## 6. EVALUATE EFFECTIVENESS

- a. Once the non-physical measure has been in place for a minimum of 6 months, the Engineering Division will assess the effectiveness by conducting a follow-up traffic assessment. If the results are deemed successful, the request will be closed and summarized for future reference.
- b. If traffic concerns persist, a physical traffic calming measure determined by the City will be implemented.

## 7. AFFECTED RESIDENT PETITION

- a. After staff has determined that a traffic calming measure is necessary, the applicant will be required to distribute an **AFFECTED RESIDENT PETITION** to the residents in the study area. At least two-thirds or 67% of the affected residents in the study area must sign the petition for Riverton City to proceed with implementing the traffic calming measure.

## 8. IMPLEMENT PHYSICAL TRAFFIC CALMING MEASURE

- a. Physical Traffic Calming Measures are measures that require physical modifications to the roadway. These items shall only be attempted if the non-physical measure are deemed ineffective.

### **Riverton City staff will determine the Physical Traffic Calming Measure.**

- b. Physical measures will only be allowed if the approval is obtained from the following:
  - 67% Affected Residents Petition
  - City Engineer
  - Transportation Committee
  - Riverton City Council
- c. **Physical Speed Control Measures (Funding Required)**
  - Traffic Circle
  - Chicane
  - Lateral Shift
- d. **Physical Volume Control Measures (Funding Required)**
  - Lane Closure
  - Median Barrier
  - Narrowing



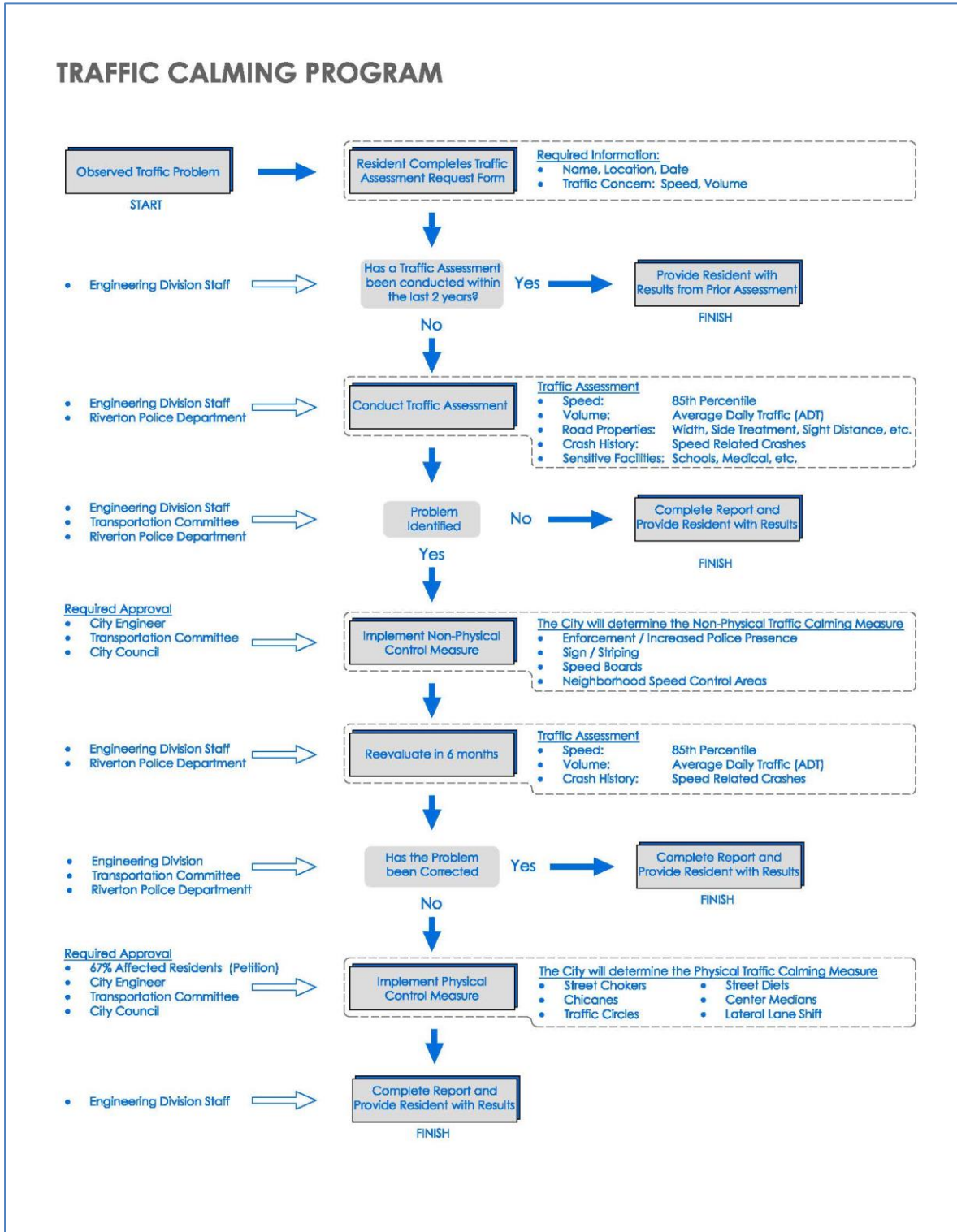
# ENGINEERING

## 9. REEVALUATE THE EFFECTIVENESS OF CHOSEN MEASURE

- a. Once the physical measure has been in place for a minimum of 6 months, the Engineering Division will assess the effectiveness by conducting a follow-up traffic assessment.

### ADDITIONAL NOTES:

- a. Community Funding
  - If the traffic calming measure requires funding, the affected community can provide the necessary funding through a community fund.
- b. Removal of existing traffic calming measure
  - Two-Thirds or 67% of the affected residents are required for the removal of an existing feature such as speed bumps.



# ENGINEERING

## 7.3 ENGINEERING CHECKLISTS/TEMPLATES/STANDARDS

The following checklists, templates, and standards are included in this chapter:

- Engineering Plan Review Checklist
- Subdivision Plat Template
- As-built Drawings Requirement Checklist
- Traffic Impact Study
- Street Design Standards

These Checklists and Templates are designed to help developers and their consultants through the Riverton Land Development Process. Proper completion of all checklists will expedite the approval process. These checklists, particularly the Engineering Plan Review Checklist, are not all-inclusive. Consult with the Engineering Division for site-specific issues. The applicant is responsible to comply with the latest edition of Riverton City Standard Specifications and Plans Manual, and to obtain all necessary permits and approvals.

Riverton City Standard Specifications and Plans Manual can be viewed and downloaded online at: [www.rivertonutah.gov](http://www.rivertonutah.gov)



# ENGINEERING PLAN REVIEW CHECKLIST

DEVELOPMENT NAME: \_\_\_\_\_

This Engineering Plan Review Checklist is a list of typical Engineering Division review criteria for final subdivisions, multifamily developments and commercial site plans. The checklist is not all-inclusive, consult with the Engineering Division for site-specific issues. The checklist is meant to summarize parts of the Riverton City Standards and Ordinance; in case of ambiguity or conflict Riverton City Ordinance and Standards shall rule over the checklist. If you question whether an item is applicable to your development please contact the Engineering Department.

Unless otherwise directed by the City Engineer, Each application shall include the following:

- Full sized Plan Set (D-sized sheets)
- Engineering Plan Review Checklist
- Title Report
- Geotechnical Report
- Drainage Report (*a separate report on 8.5x11 showing calculations, a narrative describing the system, and the Engineer's assumptions and conclusions.*)
- Traffic Impact Study (*as required by City Engineer*)
- Long-Term Stormwater Management Plan (*for long term maintenance of private drainage systems*)
- Approval Letters from outside agencies (SVSD, UDOT, canal company, ditch master, etc.)

Plan Sets submitted to the Engineering Division shall be organized according to the following general format:

1. Title Sheet (project name, vicinity map, sheet index, etc.).
2. Notes (FOR CUSTOM NOTES ONLY). Do not show City General Notes. Incorporate City General Notes by reference only.
3. Subdivision Plat
4. Boundary and Topographical Survey
5. Site Plan
6. Grading/Drainage Plan
7. Utility Plan
8. Striping and Signage Plan
9. Plan and Profile Sheet(s)
10. Detail Sheet(s) (FOR CUSTOM DETAILS ONLY. Otherwise, refer to standard details)
11. Landscape plans.

Upon first submittal for plan review, the Responsible Engineer must sign the verification on the Engineering Plan Review Checklist indicating he/she has personally inspected and initialed the Checklist. **A copy of the Checklist must accompany the plans with all subsequent reviews.**

All plans, reports and other engineering related support documents must be stamped and signed with each submittal. This checklist is intended to facilitate development design QA/QC but not replace City Design Standards and Specifications.

In providing approvals, Riverton City assumes applicants have not made any errors and have complied with all applicable standards, codes and ordinances. If, after an approval, an error is discovered or it is discovered that some aspect of approved drawings does not comply with applicable standards, codes and ordinances, the applicant shall, at his own expense, revise the drawings and modify any infrastructure as necessary to correct the problem. Applicants and their design professionals shall remain responsible for their projects at all times.



# ENGINEERING PLAN REVIEW CHECKLIST

DEVELOPMENT NAME: \_\_\_\_\_

**Other Permits:** Please note, the above requirements are for City approval of the civil site plan sets only. Before proceeding with site construction, developers may also be required to obtain a Land Disturbance permit and/or a Right of Way Encroachment permit from Riverton City. Please contact the Engineering Department to learn how and when to apply for these permits.

(Application will not be accepted unless responsible engineer initials all applicable items as submitted)

REQUIRED SUBMITTALS:		CITY USE ONLY	
Submitted		ACCEPTED	N/A
Initial: ____	<b>Title Report.</b> A finalized title report of the affected parcel(s).	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	<b>Geotechnical Report.</b> Provide engineering and support for all necessary infrastructure, including but not limited to: minimum pavement section, flood and water quality control (e.g. percolation rate, soil type, 80 <sup>th</sup> percentile retention and LID performance and feasibility)	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	<b>Drainage Report.</b> Provide separate report (not on drawings). The report shall include the engineering and support for all flood and water quality control systems, including but not limited to: site hydrology and hydraulics, runoff storage systems (design and provided volume and HWL), 80 <sup>th</sup> percentile &, LID systems, percolation rates (at retention systems), water quality control devices, foundation placement relative to retention ponds, surface flood routes, spillway locations, also list of urban pollutants generated at site  Report must be stamped and certified by a Utah-licensed professional engineer	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	<b>Traffic Impact Study</b> (as required by City Engineer).	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Letter of approved street names from Salt Lake County	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	<b>UDOT permit</b> for vehicular access and/or storm drain connection to Redwood Road (1700 W) or 12600 South.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	<b>South Valley Sewer District</b> permit for sanitary sewer connection.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Floodplain Development Permit or Flood Control Encroachment Permit Application depending upon FEMA or City jurisdiction of Creek respectively.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	CLOMR / LOMR as applicable.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>



# ENGINEERING PLAN REVIEW CHECKLIST

DEVELOPMENT NAME: \_\_\_\_\_

Initial: ____	Creek Encroachment / Stream Alteration Permits: Utah Division of Water Rights, USACE, other regulating entities	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Salt Lake County Flood Control Permit. Applicable for encroachment of Midas Creek, Rose Creek, Jordan River, Utah Lake Distribution Canal, Utah & Salt Lake Distributing Canal, and South Jordan Canal.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Canal Company Permit	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Pothole Data. All critical underground utilities. City is not responsible for conflict cost both time and monetarily.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Private and public easements and/or covenant documents.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>

ALL SHEETS MUST CONTAIN:		CITY USE ONLY	
Submitted		<u>ACCEPTED</u>	<u>N/A</u>
Initial: ____	Project name.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Sheet number and title.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	“Call Before You Dig” logo.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	North arrow and drawing scale.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Abbreviations and Legend.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	References to specific Standard Plans as applicable.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Construction Plans on D-size sheets, stamped and signed by a Utah-licensed professional engineer. (Surveys and Plats signed and stamped by a Utah-licensed professional land surveyor.)	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>

PROJECT TITLE SHEET:		CITY USE ONLY	
Submitted		<u>ACCEPTED</u>	<u>N/A</u>
Initial: ____	Project name, address and type of development.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Reference to Riverton City General Notes on Title Sheet or on other dedicated notes sheet.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Owner’s name, address and contact information.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Contact information for all project team members.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Vicinity map with north arrow.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Sheet index for all sheets and index figure.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>



# ENGINEERING PLAN REVIEW CHECKLIST

DEVELOPMENT NAME: \_\_\_\_\_

<b>NOTES: <i>Include these on cover sheet or other appropriate location in the plan set.</i></b>			
Initial: ____	Riverton City Standard Engineering Notes (Section 7.1) incorporated by reference.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Include the note: "All work to be constructed per Riverton City Standard Specifications and Plans Manual."	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Include the note: "A Land Disturbance Permit must be obtained from Riverton City prior to disturbing any vegetation or moving any soil. Contact Riverton City Stormwater Division at 801-208-3152."	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Include the note: "A Right-of-Way Encroachment Permit must be obtained from Riverton City prior to doing any work in the right- of-way. Contact Riverton City Permits/Utility Manager at 801-208-3172."	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Include this Note for new public streets: A type II Slurry Seal (or approved equal) shall be placed per APWA 32 01 13.61 at the conclusion of the warranty period and prior to Warranty Release.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>

<b>SUBDIVISION PLAT: (See City Standard Plat Template)</b>		<b>CITY USE ONLY</b>	
Submitted		<u>ACCEPTED</u>	<u>N/A</u>
Initial: ____	Subdivision name, location and phase.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Location of survey by Quarter Section, Township and Range	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Signature blocks as shown on the City Standard Plat Template.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Signed, stamped, and dated Surveyor's Certificate.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Scale of drawing and north arrow.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Written legal description of the subdivision boundary. Below the legal description, include the total acreage and lot count.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Each lot and parcel numbered, addressed and labeled with dimensions and area in square feet.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Proposed streets (names and coordinates) and adjacent streets. Label each street at public or private.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Proposed street names have been approved with Salt Lake County.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Point of beginning and basis of bearing.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	The distance and course to two (2) or more Section or Quarter Corners, including Township and Range, or to identified monuments within a recorded subdivision.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Geotechnical Note from the City Standard Plat Template	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>



# ENGINEERING PLAN REVIEW CHECKLIST

DEVELOPMENT NAME: \_\_\_\_\_

Initial: ____	Names of adjacent property owners.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Exterior boundary labeled to match legal description and closes to acceptable surveying standards.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Existing Easements shown and labeled with Entry # or Book and Page.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Easements created by the plat shown and labeled with sufficient information to identify the owner and the use of the easement.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Existing and proposed easements, R-O-Ws, buffer zones and public spaces shown with references to Salt Lake County Recorder's book & page.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	FIRM Insurance Zone and Map number.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Survey monuments shown at all intersections, centers of cul-de-sacs and points of centerline curvature where necessary to maintain line of sight.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>

TOPOGRAPHIC AND BOUNDARY SURVEY:		CITY USE ONLY	
Submitted		<u>ACCEPTED</u>	<u>N/A</u>
Initial: ____	A current boundary survey of the subject property.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	A current boundary survey showing the existing easements and encumbrances listed in the title report, identified with recording information (i.e. Bk__ & Pg__ or Entry#).	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	A topographic survey showing all relevant information to the design, including but not limited to the following: structures, contours, existing trees, signs, striping, fencing, FEMA info, and utilities including the next closest utilities as needed.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>

LONG-TERM STORMWATER MANAGEMENT PLAN:		CITY USE ONLY	
Long-Term Stormwater Management Plan templates are available online			
Submitted		<u>ACCEPTED</u>	<u>N/A</u>
Initial: ____	Exhibit A: Legal Description or a reference to the Lot on the plat.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Description of site infrastructure, including but not limited to site system and operations, limitation of urban pollutants containment. The description is intended for the property owner understanding of system.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Appendix A: Site plans	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Appendix B: Standard Operations Procedures to contain and control urban pollutants generated on site by operations and maintenance.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Site Owner Inspections Forms	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>



# ENGINEERING PLAN REVIEW CHECKLIST

DEVELOPMENT NAME: \_\_\_\_\_

<b>SITE PLAN:</b>		<b>CITY USE ONLY</b>	
Submitted		<u>ACCEPTED</u>	<u>N/A</u>
Initial: ____	Show existing off-site improvements on opposite and adjacent frontages, including drive approaches, existing utilities, storm drain, sewer, water, and proposed improvements	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	All above ground improvements shall be labeled and identified. ADA Accessible Route, ramps, etc.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Streetlights placed per Riverton City Street Light Standards.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Site dimensions: Street widths, parking stall widths, curb return radii, sidewalk and park strip widths, setbacks, approach widths, throat length, etc.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Site information table: Current zoning, proposed use, % landscape/open, % imperviousness, parking stall count	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Site triangles: Ensure that there are no sight obstructions within the sight triangle.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	References to appropriate specifications: Riverton City, APWA, UDOT, etc.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>

<b>GRADING / DRAINAGE PLAN: (Flood Control Water Quality Systems)</b>		<b>CITY USE ONLY</b>	
Review Stormwater Design Standards Chapter 2			
Submitted		<u>ACCEPTED</u>	<u>N/A</u>
Initial: ____	A conspicuous note stating, "A Land Disturbance Permit must be obtained from Riverton City prior to disturbing any vegetation or moving any soil. Contact Riverton City Stormwater Division at 801-208-3152."	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Existing contour lines (in gray scale) at one-foot (1') intervals.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	FEMA Flood Zone delineation and Salt Lake County 100-year flood elevation limits.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Proposed contour lines at one-foot (1') intervals.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Salt Lake County benchmark elevation relative to identified Section Corner.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	80 <sup>th</sup> percentile systems including but not limited to: Structures, hydrology calculations, percolation rates at system location, manufactures information. Reference MS4 Permit 4.2.5.1.2, Design Standards Ch2 methodology.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	LID system (i.e. Imitate natural processes to manage urban impacts, such as runoff rates, volumes and urban pollutants.). Generally this means decreasing impervious surfaces and using vegetation to treat urban pollutants. Reference MS4 Permit 4.2.5.1.3, Design Standards Ch2 and DEQ LID Manual, "A Guide to Low Impact Development within Utah"	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>



# ENGINEERING PLAN REVIEW CHECKLIST

DEVELOPMENT NAME: \_\_\_\_\_

Initial: ____	Pretreat of subsurface retention systems, particularly subsurface retention standard and flood control system volume. Treat for the urban pollutants anticipated at the site. Include list of pollutants with the Drainage Report. Reference Design Standards Ch2 for pretreatment detail.	Date: __/__/__	<input type="checkbox"/>
Initial: ____	Percolation Measurement. Design retention systems for draining within 48 hours. Provide engineering (field measurements) with geotechnical and or drainage report.	Date: __/__/__	<input type="checkbox"/>
Initial: ____	Storm Drain Ponds located at the lowest topographic point. Design minimum maintenance/failure indicator. Pond runoff on the surface 7" prior to spilling offsite, e.g. pond water in parking lots, roads, and applicable flood control systems (not same as freeboard)	Date: __/__/__	<input type="checkbox"/>
Initial: ____	Ponds must have 1-ft of freeboard, 4-ft maximum water depth and a maximum of 3:1 slopes. Ponds must meet other requirements of the Stormwater Management Standards	Date: __/__/__	<input type="checkbox"/>
Initial: ____	Ponds to be owned by the City will have 2% running slope in the bottom, 10-ft minimum radius corners, and a landscape plan approved by the Planning Department.	Date: __/__/__	<input type="checkbox"/>
Initial: ____	For ponds or structures that will be maintained by the city, an all-weather access must be provided according to the Stormwater Design Standards.	Date: __/__/__	<input type="checkbox"/>
Initial: ____	100-year flood overland route clearly shown terminating at storm water facility and spilling at a safe location (usually the street, canal, creek, river, park...).	Date: __/__/__	<input type="checkbox"/>
Initial: ____	Overland runoff route for stormwater at all sag points. (Shown with distinct arrows)	Date: __/__/__	<input type="checkbox"/>
Initial: ____	Lot grading arrows with final grading and onsite structures (buildings).	Date: __/__/__	<input type="checkbox"/>
Initial: ____	2 percent maximum slope in all directions in ADA parking areas, and an ADA accessible route from commercial buildings to the public ROW. <i>For site plans, the Engineering Department performs a review of the Engineering Grading Plan for basic ADA compliance. The Building Official will complete a more thorough review of ADA access with the building permit. The developer is responsible to ensure the Engineering Site plan match any Architectural Site plan submitted with the building permit.</i>	Date: __/__/__	<input type="checkbox"/>
Initial: ____	Curb and storm drain lines run at minimum of 0.5%	Date: __/__/__	<input type="checkbox"/>
Initial: ____	Cul-de-sacs graded to drain away from the bulb.	Date: __/__/__	<input type="checkbox"/>
Initial: ____	2 percent maximum slope along curb returns	Date: __/__/__	<input type="checkbox"/>
Initial: ____	Storm drain system showing pipe sizes, clean-out boxes, combination boxes and catch basins.	Date: __/__/__	<input type="checkbox"/>

# ENGINEERING PLAN REVIEW CHECKLIST

DEVELOPMENT NAME: \_\_\_\_\_

Initial: ____	Minimum 15" RCP for all public drainage systems, or private systems in public ROW or crossing public property.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Catch basins provided at all intersections and doublewide catch basins with two grates at sag points. Locate catch basins on lot lines where possible.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Call out catch basins and manholes as self-cleaning (zero sump).	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Details showing detention/retention ponds, sized orifice design, spillways, WQD, BMPs, retention systems, LIDs, etc. Provide design and include pollutant removal performance with Drainage Report.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Water quality device and orifice for private system connections to public systems. Include custom detail on plans.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>

IRRIGATION PLAN:		CITY USE ONLY	
Submitted		<u>ACCEPTED</u>	<u>N/A</u>
Initial: ____	Open Irrigation ditches must be piped.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Ditch-master's name, contact information, and written evidence of coordination if altering existing irrigation ditches.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	<p>Irrigation plan of gravity conveyances before / after development, (if this is an extensive plan it may be created on a dedicated sheet). The Irrigation plan shall include the following certification language:</p> <p>"As the developer of this property, I hereby certify that I understand: (1) how the existing gravity irrigation system works in the vicinity of this property, (2) how my development of this property will affect this system and associated stakeholders, (3) that I take full responsibility for the changes I am making to this system, (4) Riverton City does not and will not assume liability for changes I make to this system."</p> <p>The owner must sign this certification.</p>	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>



# ENGINEERING PLAN REVIEW CHECKLIST

DEVELOPMENT NAME: \_\_\_\_\_

<b>UTILITY PLAN:</b> <i>Note: Include sewer and water on utility plans to be reviewed by others. In addition, Riverton City Engineering requires the items below.</i>		<b>CITY USE ONLY</b>	
Submitted		<u>ACCEPTED</u>	<u>N/A</u>
Initial: ____	Stamped and signed by a Utah-licensed Professional Engineer.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	A conspicuous note stating, "A Right-of-Way Encroachment Permit must be obtained from Riverton City prior to doing any work in the right-of-way. Contact Riverton City Permits/Utility Manager at 801-208-3172."	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Survey monuments provided at all intersections, centers of cul-de-sacs and points of center line curvature where necessary to maintain line of sight.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Utility locations (i.e. manholes) don't conflict with other utilities or survey monuments.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Show locations of existing and proposed power poles. With new development, power poles must be buried. Coordinate with Rocky Mountain Power	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Show sewer, storm drain, and irrigation systems to the next manhole beyond subdivision boundary.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Existing and proposed streetlights shown including power sources, wiring and utility boxes.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Streetlights placed per Riverton City Street Light Standards.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>

<b>STRIPING &amp; SIGNAGE PLAN: Required for Collector &amp; Arterial Roads</b>		<b>CITY USE ONLY</b>	
Submitted		<u>ACCEPTED</u>	<u>N/A</u>
Initial: ____	Street names and traffic control signage with references to MUTCD designations.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Street signs identified as public or private per Riverton City Standard.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Pavement markings with references to MUTCD and FHWA "Standard Highway Signs" designations.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Traffic calming on street segments longer than 1000' without a minimum 45 degree turn.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Coordinate with landscape plan to ensure there are no tree conflicts.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>



# ENGINEERING PLAN REVIEW CHECKLIST

DEVELOPMENT NAME: \_\_\_\_\_

PLAN AND PROFILE SHEETS:		CITY USE ONLY	
Submitted		ACCEPTED	N/A
Initial: ____	Stamped and signed by a Utah-licensed Professional Engineer.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Vicinity map within subdivision for each sheet.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Typical road sections per Riverton Standards (ENG-4).	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	1:30 max. Horizontal scale, 1:10 max. Vertical scale.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Road profile section per Geotechnical Report or Riverton City Standard (min. 3"-asphalt on 8"-UTBC for local streets, min. 6"- asphalt on 8"-UTBC asphalt on all others)	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Storm drain pipe size, type, length and slope between manholes.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Storm drain boxes with rim and flow-line elevations. (Publicly maintained boxes must be self-cleaning)	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Minimum 15" RCP when placed within City right-of-way or owned by City.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Catch basins provided at all intersections and doublewide catch basins with two grates at sag points.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Sewer and irrigation systems.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Vertical alignment of street tying into existing improvements.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Label TBC Elevations at 100-ft stations.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>
Initial: ____	Horizontal alignment labeled: radius, length, design speed, etc.	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>

DETAIL SHEETS:		CITY USE ONLY	
Submitted		ACCEPTED	N/A
Initial: ____	Custom details as applicable. (Please do not include copies of APWA or Riverton City Standard Details on the plan sheets)	<input type="checkbox"/> Date: __/__/__	<input type="checkbox"/>

*I have personally reviewed this submittal and verify that it is complete and that all items have been addressed, initialed, and comply with current Riverton City Standard Specifications and Plans.*

\_\_\_\_\_  
Responsible Engineer's Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Responsible Engineer's Printed Name



ENGINEERING

Subdivision Plat Template

**SUBDIVISION NAME**

A SUBDIVISION LOCATED IN THE        <sup>1</sup>/<sub>4</sub> OF SECTION       ,  
TOWNSHIP        SOUTH, RANGE        WEST, SALT LAKE BASE AND MERIDIAN,  
RIVERTON CITY, SALT LAKE COUNTY, UTAH

**CONTACT RIVERTON CITY ENGINEERING  
DEPARTMENT FOR THE LATEST  
AUTOCAD VERSION OF THE PLAT  
801-208-3162**

Scale: 1" = 50'

N

LEGEND

- Your symbol and description
- Your symbol and description
- Your symbol and description
- Your symbol and description

General Approval \_\_\_\_\_ Date \_\_\_\_\_

Quarter \_\_\_\_\_ Date \_\_\_\_\_

Rocky Mountain Power \_\_\_\_\_ Date \_\_\_\_\_

Century Link(Centel) \_\_\_\_\_ Date \_\_\_\_\_

Concept \_\_\_\_\_ Date \_\_\_\_\_

South Valley Sewer District \_\_\_\_\_ Date \_\_\_\_\_

APPROVED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_  
A.S. BY \_\_\_\_\_

TURBINE MANAGER \_\_\_\_\_

County Health Department \_\_\_\_\_ Date \_\_\_\_\_

APPROVED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_  
A.S. BY \_\_\_\_\_

TURBINE \_\_\_\_\_

Riverton City Water \_\_\_\_\_ Date \_\_\_\_\_

APPROVED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_  
A.S. BY \_\_\_\_\_

TURBINE \_\_\_\_\_

Riverton City Planning \_\_\_\_\_ Date \_\_\_\_\_

APPROVED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_  
A.S. BY \_\_\_\_\_

TURBINE \_\_\_\_\_

Riverton City Engineer \_\_\_\_\_ Date \_\_\_\_\_

APPROVED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_  
A.S. BY \_\_\_\_\_

TURBINE \_\_\_\_\_

Riverton City Attorney \_\_\_\_\_ Date \_\_\_\_\_

APPROVED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_  
A.S. BY \_\_\_\_\_

TURBINE \_\_\_\_\_

City Engineer \_\_\_\_\_ Date \_\_\_\_\_

APPROVED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_  
A.S. BY \_\_\_\_\_

TURBINE \_\_\_\_\_

GeoTechnical Report \_\_\_\_\_ Date \_\_\_\_\_

APPROVED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_  
A.S. BY \_\_\_\_\_

TURBINE \_\_\_\_\_

Flood Zone Designation \_\_\_\_\_ Date \_\_\_\_\_

APPROVED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_  
A.S. BY \_\_\_\_\_

TURBINE \_\_\_\_\_

Approval as to Form \_\_\_\_\_ Date \_\_\_\_\_

APPROVED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_  
A.S. BY \_\_\_\_\_

TURBINE \_\_\_\_\_

Subdivision Name, Location, Address and Home Number \_\_\_\_\_

GeoTechnical Report \_\_\_\_\_

A GENERAL REPORT AND RECOMMENDATIONS FOR THE SUBDIVISION AS SHOWN ON THE PLAT AND ALSO AT THE OFFICE OF THE SURVEYOR.

Recorded # \_\_\_\_\_

STATE OF UTAH, COUNTY OF SALT LAKE, RECORDED AND FILED AT THE REC'D. \_\_\_\_\_

DATE \_\_\_\_\_

BY \_\_\_\_\_

FILE \_\_\_\_\_

SALT LAKE COUNTY, UTAH

SURVEYOR'S CERTIFICATE \_\_\_\_\_

BOUNDARY DESCRIPTION \_\_\_\_\_

OWNER'S DEDICATION \_\_\_\_\_

ACKNOWLEDGEMENT \_\_\_\_\_

**SUBDIVISION NAME**

A SUBDIVISION LOCATED IN THE        <sup>1</sup>/<sub>4</sub> OF SECTION       ,  
TOWNSHIP        SOUTH, RANGE        WEST, SALT LAKE BASE AND MERIDIAN,  
RIVERTON CITY, SALT LAKE COUNTY, UTAH

Recorded # \_\_\_\_\_

STATE OF UTAH, COUNTY OF SALT LAKE, RECORDED AND FILED AT THE REC'D. \_\_\_\_\_

DATE \_\_\_\_\_

BY \_\_\_\_\_

FILE \_\_\_\_\_

SALT LAKE COUNTY, UTAH



## ENGINEERING

# AS-BUILT DRAWINGS REQUIREMENT CHECKLIST

Project Name: \_\_\_\_\_

Submittal # \_\_\_\_\_ Date: \_\_\_\_\_ Submitted by: \_\_\_\_\_

Received by: \_\_\_\_\_

Drawings shall include only the following information on two (2) D size (22"x34") sheets in plan view as indicated at a clearly readable scale (maximum 1"=60'). Multiple sheets of each type may be necessary to provide clearly readable drawings. Do not submit plan/profile sheets. Remove all unnecessary information from the drawings. Drawings must be field checked for completeness and accuracy.

AutoCad record electronic drawing files must be submitted and approved following approval of paper record drawings.

<b><i>As-built Drawing Plan Sheets: <u>GENERAL REQUIRMENTS</u></i></b>	<b>CITY USE ONLY</b>	
	ACCEPTED	
<b>The following must be shown on each sheet:</b>	YES	NO
Title block including project/subdivision name, drawing title and sheet number, date, engineering firm's name and address	<input type="checkbox"/>	<input type="checkbox"/>
Developer and Contractor signature blocks stating "I have field verified that these record drawings are complete and accurately represent what was constructed for this project".	<input type="checkbox"/>	<input type="checkbox"/>
North arrow and drawing scale	<input type="checkbox"/>	<input type="checkbox"/>
Legend of symbols and abbreviations	<input type="checkbox"/>	<input type="checkbox"/>
Benchmark location and elevation	<input type="checkbox"/>	<input type="checkbox"/>
Subdivision boundary and lots (labeled)	<input type="checkbox"/>	<input type="checkbox"/>
Roadway improvements (curb & gutter, sidewalk, driveways). Label streets names.	<input type="checkbox"/>	<input type="checkbox"/>

<b><i>As-built Drawing Plan Sheet 1: <u>OVERALL</u></i></b>	<b>CITY USE ONLY</b>	
	ACCEPTED	
<b>The following must be shown: (when applicable)</b>	YES	NO
<b>Street lights</b> Indicate type: RLP-1, RLP-2, RLP-4, RLP-5 Show wiring to power source	<input type="checkbox"/>	<input type="checkbox"/>
<b>Signage</b> Indicate type ENG-1, ENG-2 or description	<input type="checkbox"/>	<input type="checkbox"/>
<b>Future use telecommunications</b> <b>conduit:</b> <u>Conduit:</u> indicate size and type <u>Service boxes</u>	<input type="checkbox"/>	<input type="checkbox"/>



## ENGINEERING

<b>Asphalt striping and markings</b>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Fencing</b> Indicate size and type	<input type="checkbox"/>	<input type="checkbox"/>
<b>Traffic calming devices</b>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Pedestrian sidewalk ramps</b> Indicate ADA truncated dome material type	<input type="checkbox"/>	<input type="checkbox"/>
<b>Irrigation system (gravity)</b> Pipe: indicate size, type and slope Structures: indicate rim (grate) and invert elevations	<input type="checkbox"/>	<input type="checkbox"/>
<b>Removal of unnecessary information</b>	<input type="checkbox"/>	<input type="checkbox"/>

<b><i>As-built Drawing Plan Sheet 2: <u>GRADING AND DRAINAGE</u></i></b>	<b>CITY USE ONLY</b>	
	ACCEPTED	
	YES	NO
<b>Finish contours</b> – One foot intervals (labeled) and including all related flood and low impact infrastructure grades. Including but not limited to grades and measurements for Detention-retention storage, swales, channels, storage capacity, spillway, high-water levels, free -board, flood route, etc.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Drain Structures:</b> Provide all drainage structure elevations and dimensions for, including but limited to: Pipes, inlets, outlets, manholes, water quality devices, etc.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Storm Drain Ponds, swales, spillways channels, etc</b> - show contours, high-water mark, overflow and/or outfall structures, and as-built storage capacity.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Field Survey Drawing:</b> The project engineer shall review as-built survey points and verify conformity to the constructed flood and water quality requirements. Provide a PDF copy of the site survey points and any linework.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Project As-built Drawing:</b> Provide 11x17 PDF of project engineer's as-built, stamped and signed. Project engineer shall oversee and insure correction of all design plan non-conforming items prior to as-built submission. All minor constructed differences must be justified by project engineer. Justifications shall be explained in a stamped and signed PDF letter.	<input type="checkbox"/>	<input type="checkbox"/>
Removal of unnecessary information.	<input type="checkbox"/>	<input type="checkbox"/>

## ENGINEERING

<b>As-built Drawing Plan Sheet 3: <u>CULINARY WATER</u></b>	<b>CITY USE ONLY</b>	
<b>All valves, meters, air-vacs and drains must show measured dimensions from two stationary locations. Acceptable locations are: top back of curb @ property line, subdivision monument, manhole (sewer or storm drain), catch basin, street light, fire hydrant or corner of permanent building or structure.</b>	ACCEPTED	
	YES	NO
Main culinary water lines. Label size and type.	<input type="checkbox"/>	<input type="checkbox"/>
Fire hydrants, Tees, crosses, bends and elbows.	<input type="checkbox"/>	<input type="checkbox"/>
Valves (gate, butterfly, blow-off, stop & waste, check).	<input type="checkbox"/>	<input type="checkbox"/>
Service lines and water meters.	<input type="checkbox"/>	<input type="checkbox"/>
Pressure reducing stations.	<input type="checkbox"/>	<input type="checkbox"/>
Air-vacs. Label size and type.	<input type="checkbox"/>	<input type="checkbox"/>
Removal of unnecessary information.	<input type="checkbox"/>	<input type="checkbox"/>

<b>As-built Drawing Plan Sheet 4: <u>SECONDARY WATER</u></b>	<b>CITY USE ONLY</b>	
<b>All valves, meters, air-vacs and drains must show measured dimensions from two stationary locations. Acceptable locations are: top back of curb @ property line, subdivision monument, manhole (sewer or storm drain), catch basin, street light, fire hydrant or corner of permanent building or structure.</b>	ACCEPTED	
	YES	NO
<b>The following must be shown: (when applicable)</b>		
Main secondary water lines. Label size and type.	<input type="checkbox"/>	<input type="checkbox"/>
Tees, crosses, bends and elbows.	<input type="checkbox"/>	<input type="checkbox"/>
Control boxes.	<input type="checkbox"/>	<input type="checkbox"/>
Valves (gate, butterfly, blow-off, stop & waste, check).	<input type="checkbox"/>	<input type="checkbox"/>
Service lines and water meters.	<input type="checkbox"/>	<input type="checkbox"/>
Pressure reducing stations.	<input type="checkbox"/>	<input type="checkbox"/>
Air-vacs. Label size and type.	<input type="checkbox"/>	<input type="checkbox"/>
Drains. Label size and type.	<input type="checkbox"/>	<input type="checkbox"/>
Removal of unnecessary information.	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

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Drawings Approved By: \_\_\_\_\_

Date: \_\_\_\_\_



# ENGINEERING

## TRAFFIC IMPACT STUDY

All traffic impact studies submitted to Riverton City shall include, at a minimum, the following contents:

### A. EXECUTIVE SUMMARY

### B. TABLE OF CONTENTS

1. List of Figures (Maps)
2. List of Tables

### C. INTRODUCTION

1. Description of the proposed project
2. Location of project
3. Site plan including all accesses to public rights-of-way (site plan, map)
4. Circulation network including all accesses to public rights-of-way (vicinity map)
5. Land use and zoning
6. Phasing plan including proposed dates of project (phase) completion
7. Project sponsor and contact person(s)
8. References to other relevant traffic impact studies

### D. TRAFFIC ANALYSIS

1. Clearly stated assumptions
2. Existing and projected traffic volumes (including turning movements), facility geometry (including storage lengths), and traffic controls (including signal
3. Phasing and multi-signal progression where appropriate) (figure)
4. Project trip generation including references (table)
5. Project generated trip distribution and assignment (figure)
6. LOS and warrant analyses - existing conditions, cumulative conditions, and full build of general plan conditions with and without project

### E. CONCLUSIONS AND RECOMMENDATIONS

1. LOS and appropriate MOE quantities of impacted facilities with and without mitigation measures
2. Mitigation phasing plan including dates of proposed mitigation measures.
3. Define responsibilities for implementing mitigation measures



# ENGINEERING

4. Cost estimates for mitigation measures and financing plan

## **F. APPENDICES**

1. Description of traffic data and how data was collected
2. Description of methodologies and assumptions used in analyses
3. Worksheets used in analyses (i.e., signal warrant, LOS, traffic count information, etc.)

## **G. EXECUTIVE SUMMARY**

## **H. TABLE OF CONTENTS**

1. List of Figures (Maps)
2. List of Tables

## **I. INTRODUCTION**

1. Description of the proposed project
2. Location of project
3. Site plan including all accesses to public rights-of-way (site plan, map)
4. Circulation network including all accesses to public rights-of-way (vicinity map)
5. Land use and zoning
6. Phasing plan including proposed dates of project (phase) completion
7. Project sponsor and contact person(s)
8. References to other relevant traffic impact studies

## **J. TRAFFIC ANALYSIS**

1. Clearly stated assumptions
2. Existing and projected traffic volumes (including turning movements), facility geometry (including storage lengths), and traffic controls (including signal)
3. Phasing and multi-signal progression where appropriate) (figure)
4. Project trip generation including references (table)
5. Project generated trip distribution and assignment (figure)
6. LOS and warrant analyses - existing conditions, cumulative conditions, and full build of general plan conditions with and without project

## **K. CONCLUSIONS AND RECOMMENDATIONS**

1. LOS and appropriate MOE quantities of impacted facilities with and without mitigation measures



## **ENGINEERING**

2. Mitigation phasing plan including dates of proposed mitigation measures.
3. Define responsibilities for implementing mitigation measures
4. Cost estimates for mitigation measures and financing plan

### **L. APPENDICES**

1. Description of traffic data and how data was collected
2. Description of methodologies and assumptions used in analyses
3. Worksheets used in analyses (i.e., signal warrant, LOS, traffic count information, etc.)

# ENGINEERING

## STREET DESIGN STANDARDS

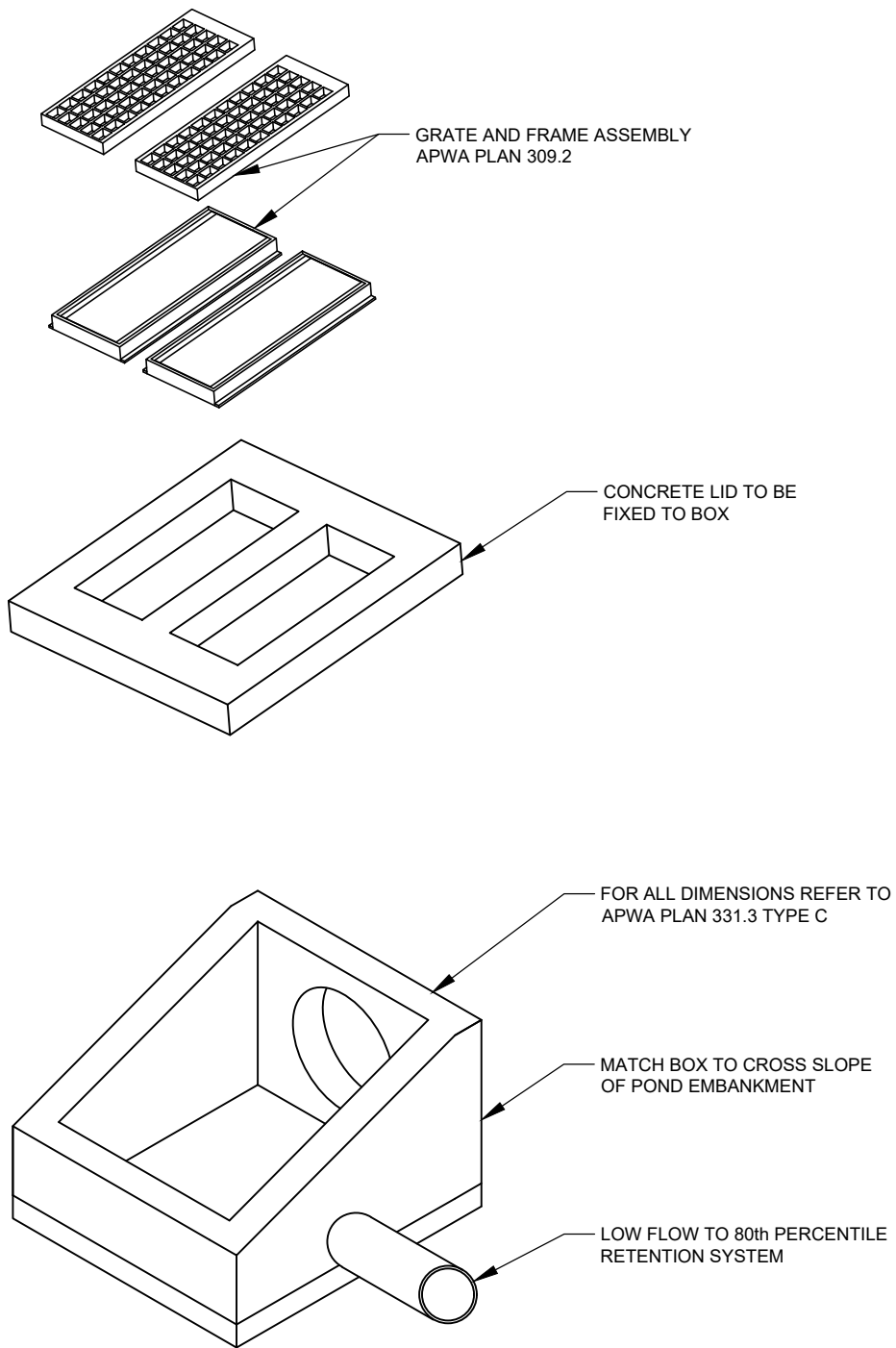
The following table serves as a guide to design professionals by providing a summary of the Riverton City Street Design Standards. These Standards are required unless specifically approved otherwise by the Riverton City Council. In addition to and in the absence of standards specified by the City, street design shall conform to the latest edition of the American Association of State Highway and Transportation Officials (AASHTO) "A Policy on Geometric Design of Highways and Streets." Other published professional standards, i.e. ITE, ASCE, may be considered at the sole discretion of the City Engineer.

DESIGN ELEMENT	FUNCTIONAL CLASSIFICATION		
	Major Collector	Minor Collector	Local
Minimum Design Speed (V)	Varies with terrain and volume		
Typical Section Elements			
Right-of-Way Width	66 ft.	60 ft.	54 ft.
Pavement Width	42 ft.	35 ft.	29 ft.
Side Cut/Fill Slopes	3H:1V or flatter		
Horizontal Design Elements			
Minimum Mid-Block Centerline Curve Radius	Varies with V and Superelevation		AASHTO
Minimum Tangent Distance Between Reverse Centerline Curves	Varies with V and Superelevation		AASHTO
Maximum Cul-de-Sac Length	See Unified Fire Authority Requirements		
Cul-de-Sac Paved Turnaround Diameter	Not Allowed		80 ft.
Maximum Superelevation Rate	6%		2%
Vertical Design Elements			
Minimum Centerline Grade	0.50%		
Maximum Centerline Grade	8%	10%	12%
Maximum Centerline Grade Across Designated Crosswalks	4%		5%
Maximum Grade in Cul-de-Sacs	Not Allowed		5%
Maximum Grade Break w/o Vertical Curve	0.50%		1.00%
Minimum Crest Vertical Curve "K" Value <sup>1</sup>	Varies with V		19
Minimum Sag Vertical Curve "K" Value <sup>1</sup>	Varies with V		37
Minimum Length of a Vertical Curve	3V	100 ft.	60 ft.
Intersections			
Minimum Angle of Intersection	80°	80°	60°
Minimum Offset Between Intersections	Study Required		150 ft.
Maximum Centerline Offset	5 ft.		
Maximum Centerline Grade <sup>2</sup>	4%		5%
Minimum Corner Radius at TBC	30 ft.		25 ft.

1. Design speed shall be 5 mph greater than the posted speed limit.
2. Grade must extend at least 50 feet beyond the edge of the outside lane of the intersecting street.

# **Standard Plans**

# Storm Drain



NOTES:

1. DESIGN SLOPE STRUCTURE REINFORCEMENT PER APWA PLAN 331.3 TYPE C.
2. SUBMIT SHOP DRAWINGS



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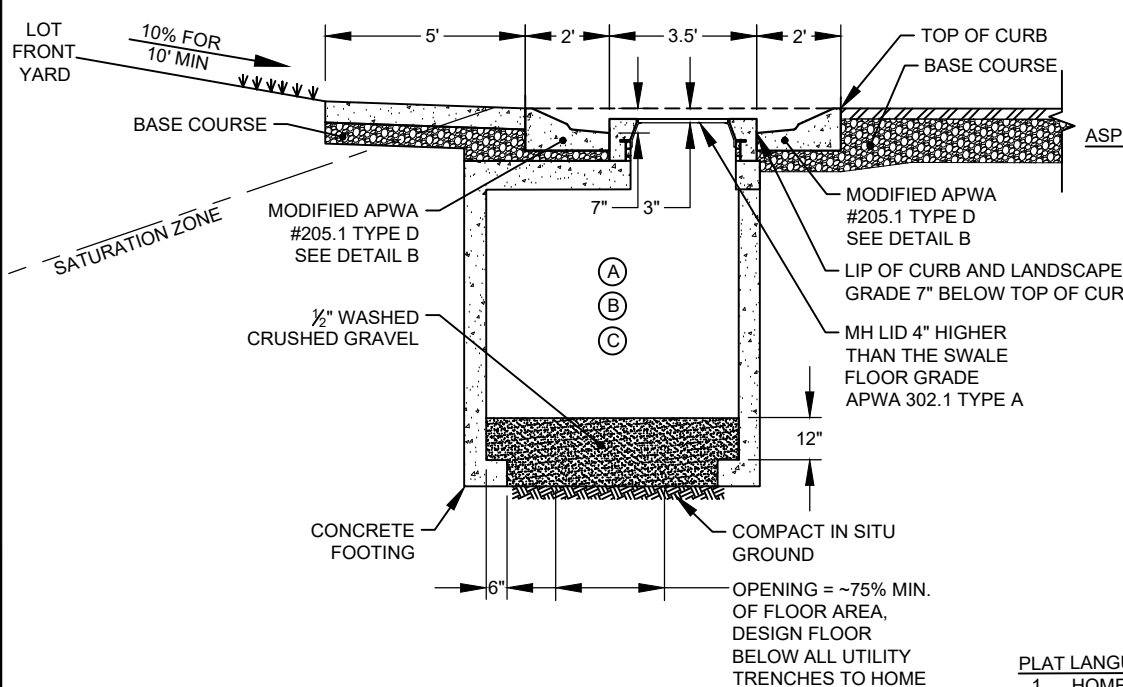
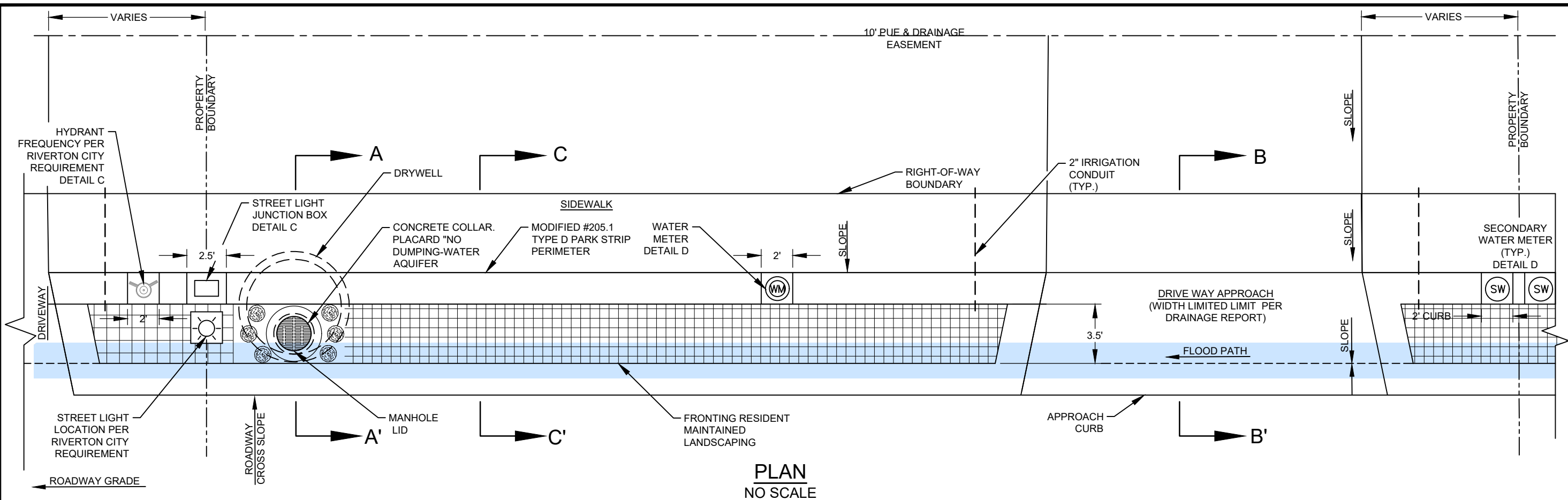
**DETENTION POND**  
**BUBBLE-UP BOX**

DRAWN NOV/21

REVISIONS

#	BY	DATE

**PLAN**  
  
**SD-1**



- PLAT LANGUAGE:**
- HOME LOWEST FINISH GRADE OPENING TO BE, TOP BACK OF SIDEWALK + 12" MINIMUM. INCLUDING BUT NOT LIMITED TO, TOP OF WINDOW WELL, DOOR, GARAGE, ETC.
  - SET HOUSE FOUNDATION ABOVE SATURATION ZONE PER GEOTECH REPORT.
  - FRONTING RESIDENT IS RESPONSIBLE TO MAINTAIN LANDSCAPING AND GRADE OF ENTIRE 3.5' WIDE LANDSCAPE STRIP INCLUDING BUT NOT LIMITED TO: MAINTAINING 7" DEPTH FROM TOP OF CURB TO LANDSCAPE STRIP. REMOVAL OF TRASH, LOOSE VEGETATION AND DEBRIS.
  - LANDSCAPING MATERIAL MUST BE PERVIOUS AND NOT FLOAT. DENSE VEGETATION IS RECOMMENDED, TO IMPROVE INFILTRATION, NO TREES ARE PERMITTED.

- DRYWELL KEYED NOTES:**
- (A) FLOOD CONTROL VOLUMES: DRYWELL + RETENTION SWALE VOLUME IN OPEN MAINTAINABLE SPACE REQUIRED. PERCOLATION CALCULATIONS NOT ALLOWED.
  - (B) CITY MAY CONSIDER DEVELOPER CHOICE TO WIDEN SWALE, RIGHT-OF-WAY, AND SHIFT SETBACKS TO REDUCE DRYWELL SIZE AT DEVELOPER COST.
  - (C) SEPERATE RETENTION/FLOOD CONTROL VOLUME REQUIRES CITY APPROVAL

**PLAN**  
SD-2

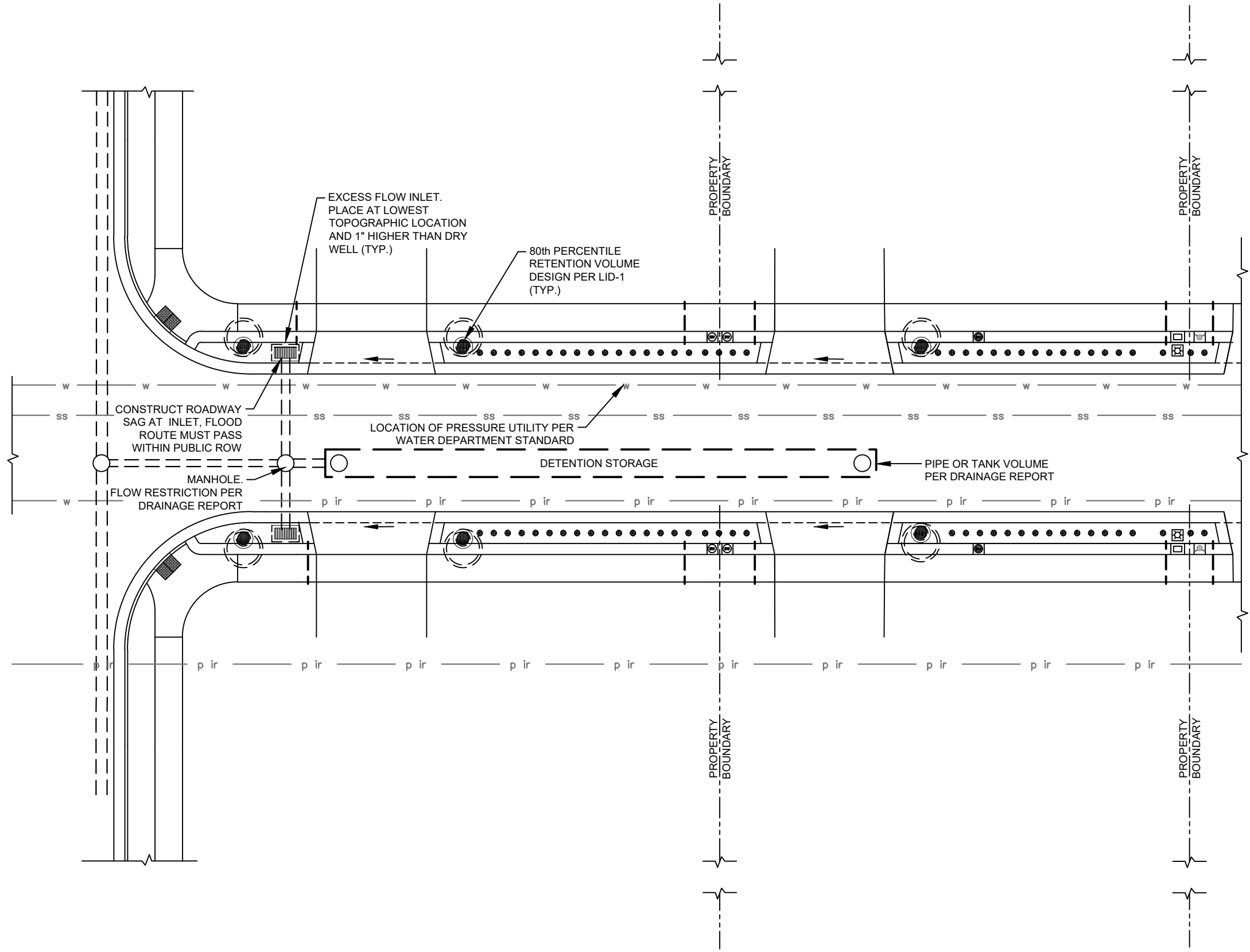
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#	BY	DATE	BY	DATE
01	SWF	11/01/22		

DRAWN 12/01/20

**LOW IMPACT DEVELOPMENT 1**  
URBAN SWALE DRYWELL

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**RIVERTON**  
UTAH



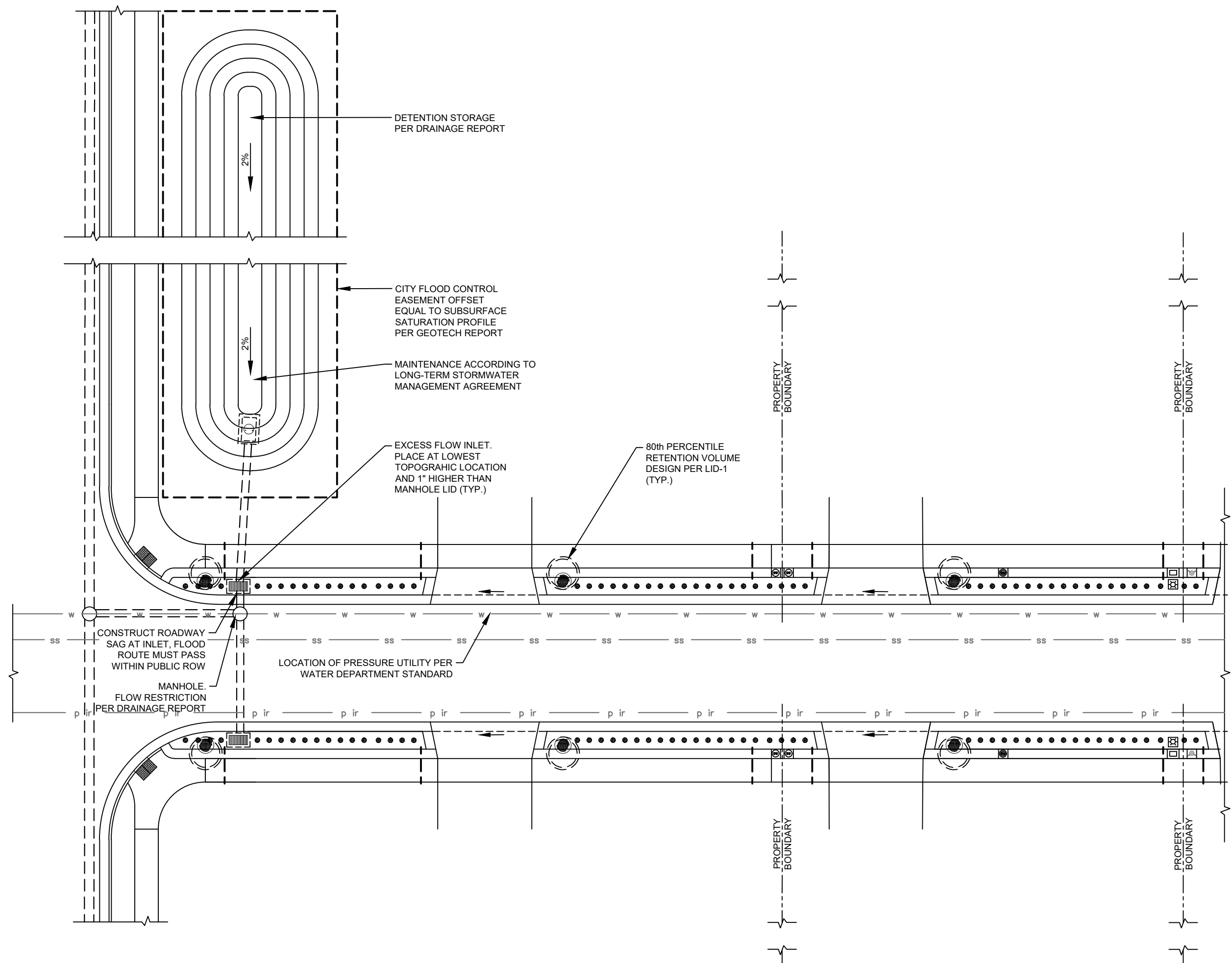
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**LOW IMPACT DEVELOPMENT 2**  
**URBAN SWALE DETENTION TANK**

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**PLAN**  
**SD-4**

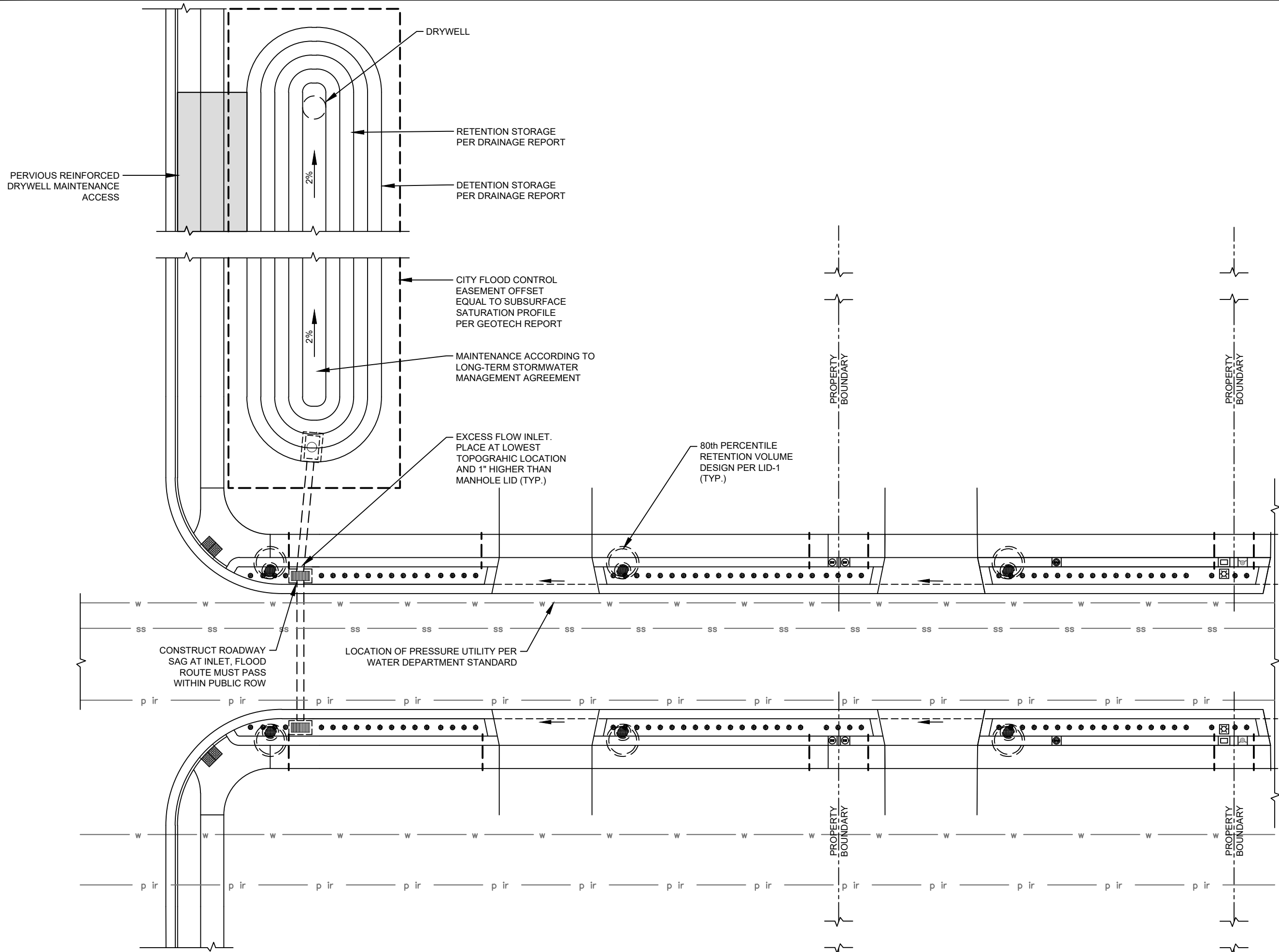
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REVISIONS			
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01	SWF	11/01/22	01 SWF 04/04/22

**LOW IMPACT DEVELOPMENT 3**  
**URBAN SWALE POCKET**  
**DETENTION POND**

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PLAN  
SD-5

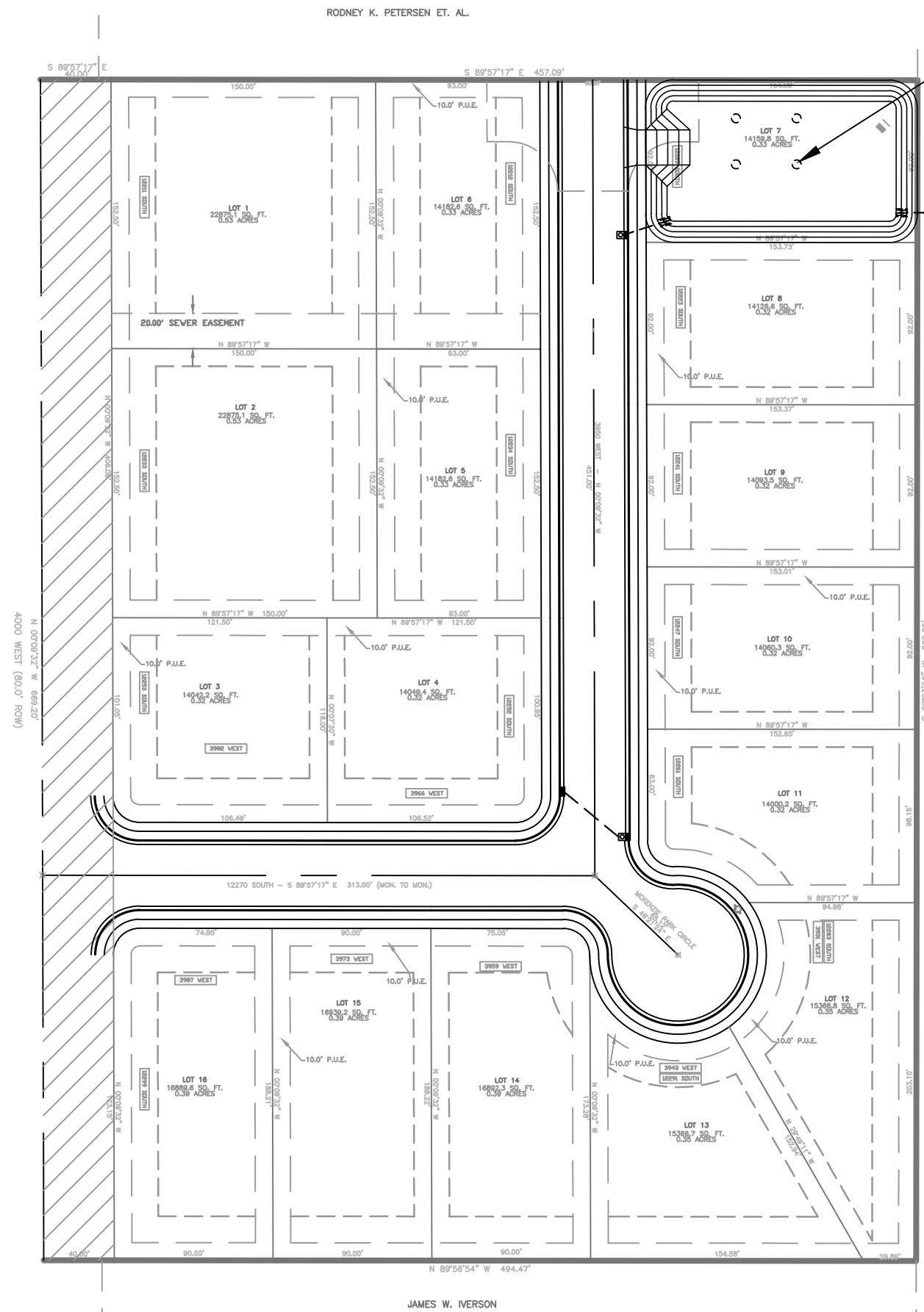
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01	11/01/22	SWF	

LOW IMPACT DEVELOPMENT 4  
URBAN SWALE  
POCKET RETENTION POND

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RODNEY K. PETERSEN ET. AL.

JAMES W. IVERSON

DRYWELL(S)  
80th PERCENTILE RETENTION VOLUME  
PER DRAINAGE REPORT. WQCV MUST  
CONFORM TO PRETREATMENT MINIMUM  
STANDARDS

DETENTION PER AVAILABILITY  
AND ALLOWANCES

PLAN  
SD-6

DRAWN 12/01/20

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LOW IMPACT DEVELOPMENT 5  
HIGHBACK CURB DRYWELL  
DETENTION-RETENTION POND

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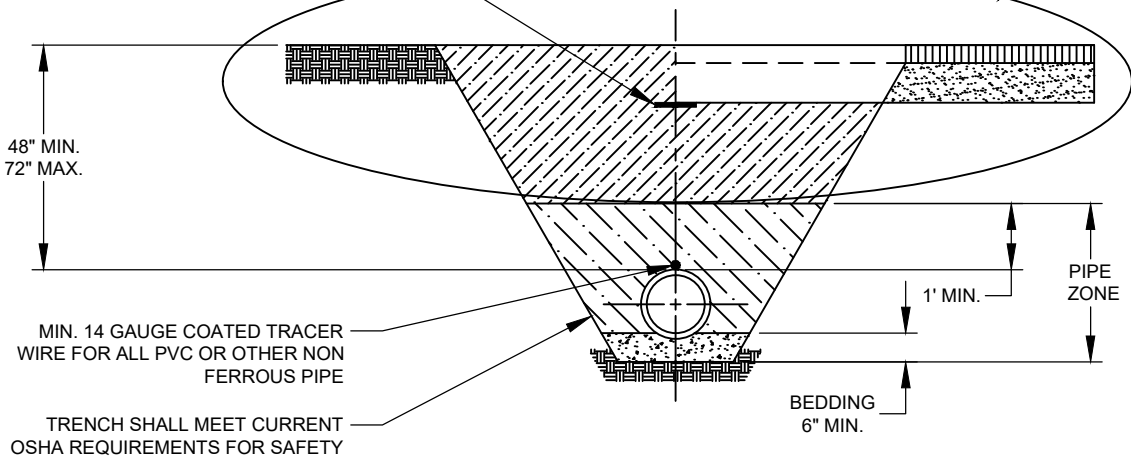


# **Drinking Water**



MAGNETIC MARKING TAPE FOR PVC OR OTHER NON FERROUS PIPE MAX. DEPTH = 18" BELOW FINAL SURFACE

TYPICAL TRENCH AND BACKFILL PER APWA PLAN NO. 381



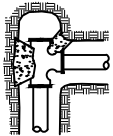
**CROSS-SECTION: TYPICAL TRENCH**  
NOT TO SCALE

SAFE BEARING LOADS	
SOIL TYPE	SAFE BEARING LOAD (lb/ft <sup>2</sup> )
SAND	1000
SAND & GRAVEL	1500
SAND & GRAVEL CEMENTED WITH CLAY	2000
SHALE	5000

THRUST ON FITTINGS IN POUNDS @ 1 POUND PER SQUARE INCH OF WATER PRESSURE *				
PIPE SIZE	TEES	90° BENDS	45° BENDS	22.5° BENDS
4"	18.5	26.1	14.2	7.2
6"	38	53.7	29.1	14.7
8"	65.8	93	50.4	25.5
10"	107.5	152	82.4	41.7
12"	153.1	216.4	117.2	59.4

\*MULTIPLY THRUST BY MAXIMUM WATER TEST PRESSURE OF 200 psi.

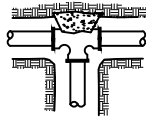
$$\text{THRUST BLOCK AREA AGAINST TRENCH WALL (SQUARE FEET)} = \frac{\text{THRUST ON FITTING}}{\text{SAFE BEARING LOAD OF SOIL}}$$



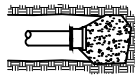
TEE WITH CAP



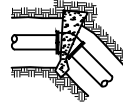
90° ELBOW



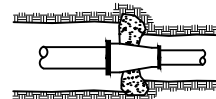
TEE



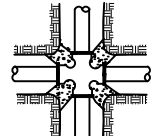
CAP OR PLUG



ELBOW



REDUCER



CROSS

**CONCRETE THRUST BLOCK DETAILS**  
NOT TO SCALE

NOTES:

1. WATER LINES LARGER THAN 10" SHALL BE DUCTILE IRON CLASS-52. WATER LINES 10" AND SMALLER SHALL BE PVC C900 CLASS 150.
2. VALVES LARGER THAN 10" SHALL BE BUTTERFLY VALVES.
3. WHENEVER POSSIBLE "HOT TAP" CONNECTIONS REQUIRED. HOT TAP VALVE TO BE SUPPORTED DURING CONNECTION. CONTRACTOR TO NOTIFY CITY 24 HOURS IN ADVANCE OF MAKING CONNECTION.
4. PIPE ZONE SHALL BE BACKFILLED WITH SAND(TYPE IV MATERIAL).
5. TRACING WIRE TO BE BROUGHT OUTSIDE OF BOTTOM PORTION OF VALVE BOX AND INSIDE TOP TO SURFACE.
6. VALVE BOXES SHALL BE TYLER 564-A SLIP TYPE OR EQUAL.



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TRENCH

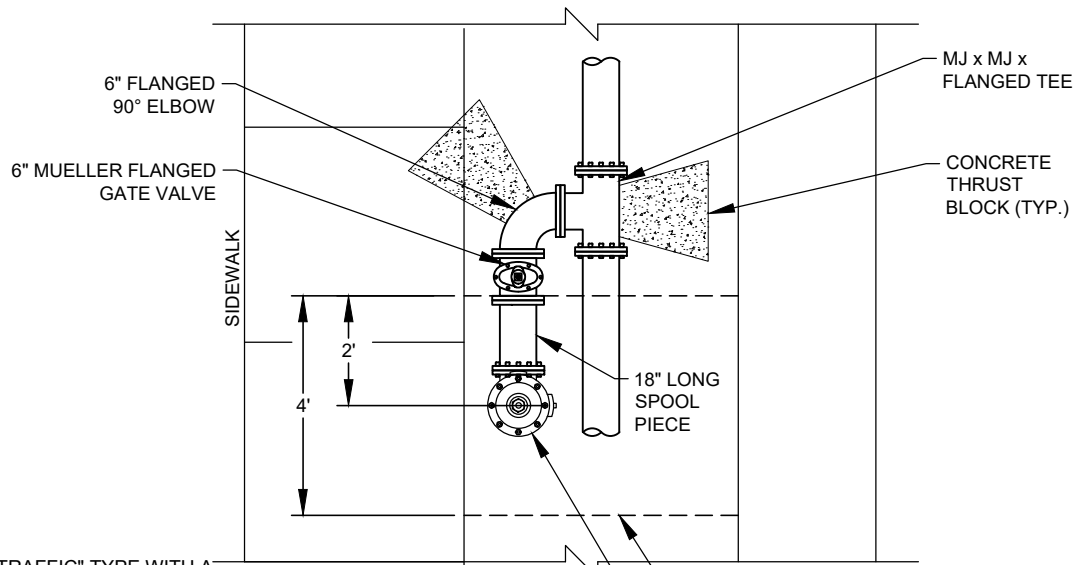
DRAWN 10/18/17

REVISIONS

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PLAN

DW-1



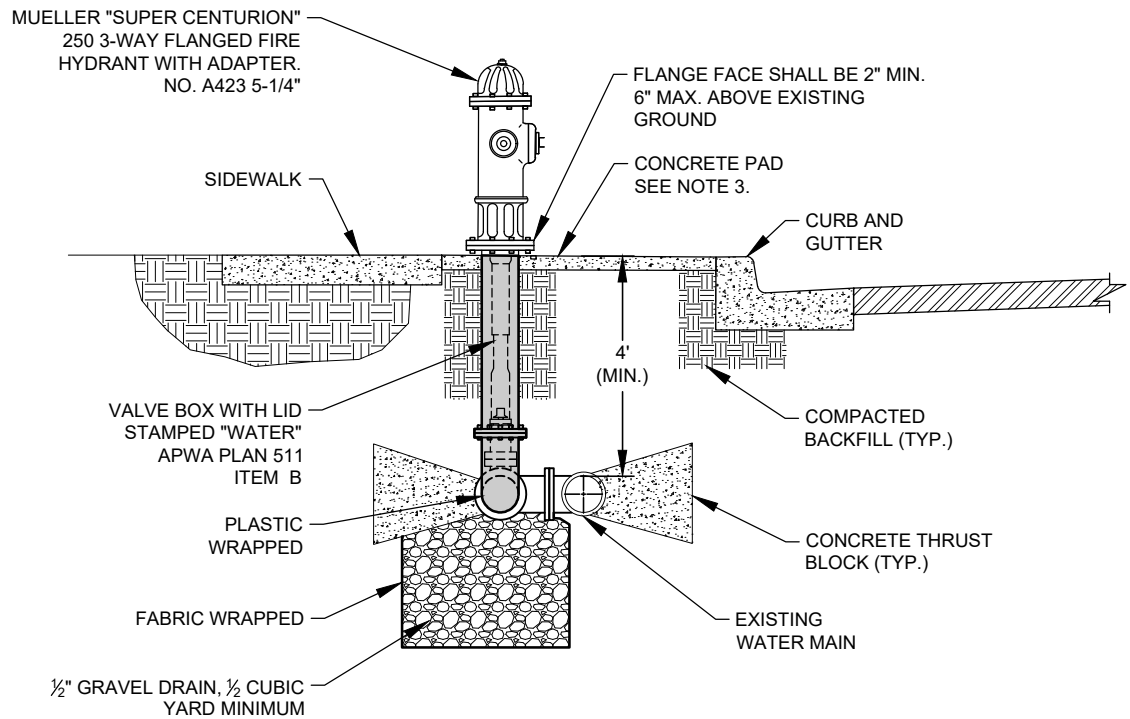
**NOTES:**

1. HYDRANT SHALL BE "TRAFFIC" TYPE WITH A REPLACEABLE BREAK-AWAY UNIT IMMEDIATELY ABOVE GROUND.
2. 18" LONG SPOOL PIECE FLANGED BETWEEN HYDRANT AND 6" GATE VALVE.
3. CONCRETE PAD FOR FIRE HYDRANT. 4' WIDE x 4" THICK WITH 4" THICK BASE COURSE AND Poured FROM TOP BACK OF CURB TO THE SIDEWALK.
4. NO CONCRETE PAD NEEDED FOR MONOLITHIC APPLICATIONS.
5. ALL MJ FITTINGS MUST HAVE MEGALUGS.

CONCRETE PAD  
SEE NOTE 3.

MUELLER "SUPER CENTURION"  
250 3-WAY FLANGED FIRE  
HYDRANT WITH ADAPTER.  
NO. A423 5-1/4"

**PLAN VIEW**  
NOT TO SCALE



**SECTION VIEW**  
NOT TO SCALE



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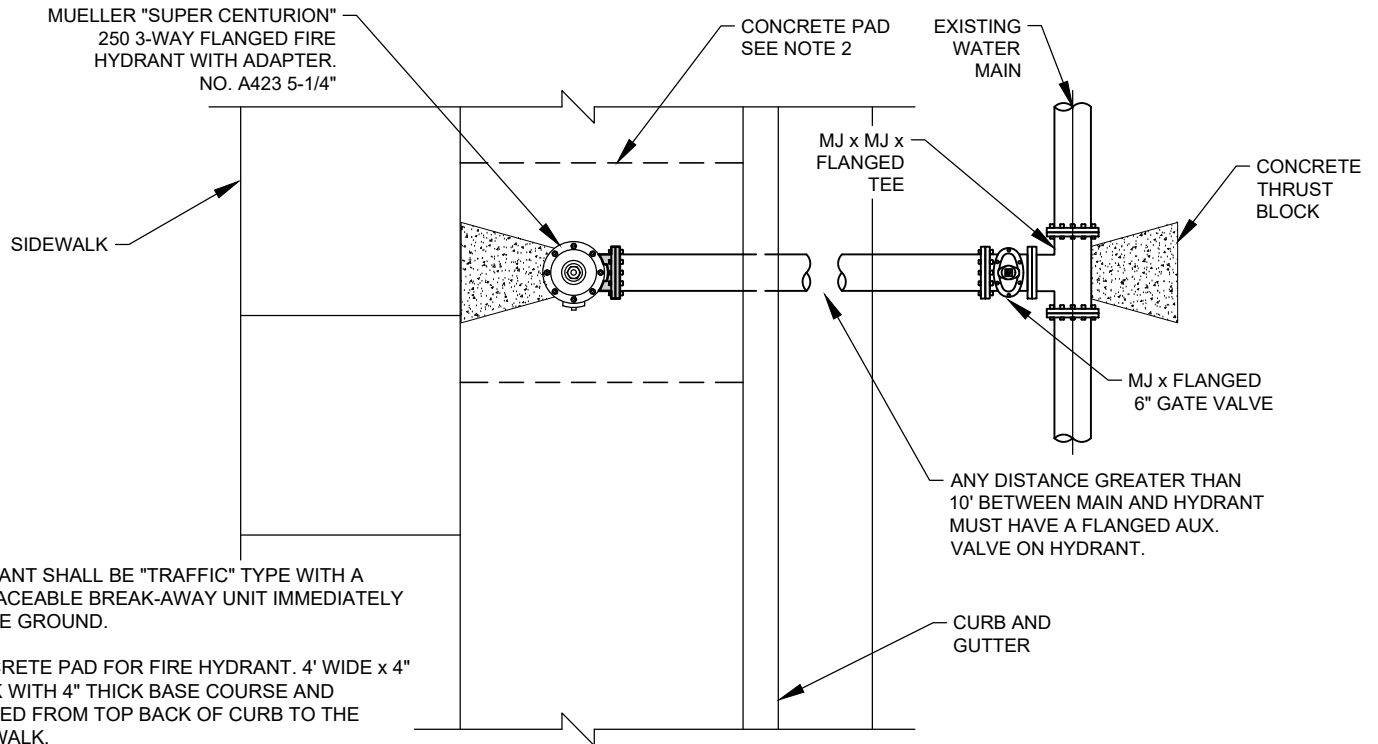
**FIRE HYDRANT  
CONNECTION IN  
PARK STRIP (TYPICAL)**

DRAWN 10/18/17

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01	SWF	12/01/20
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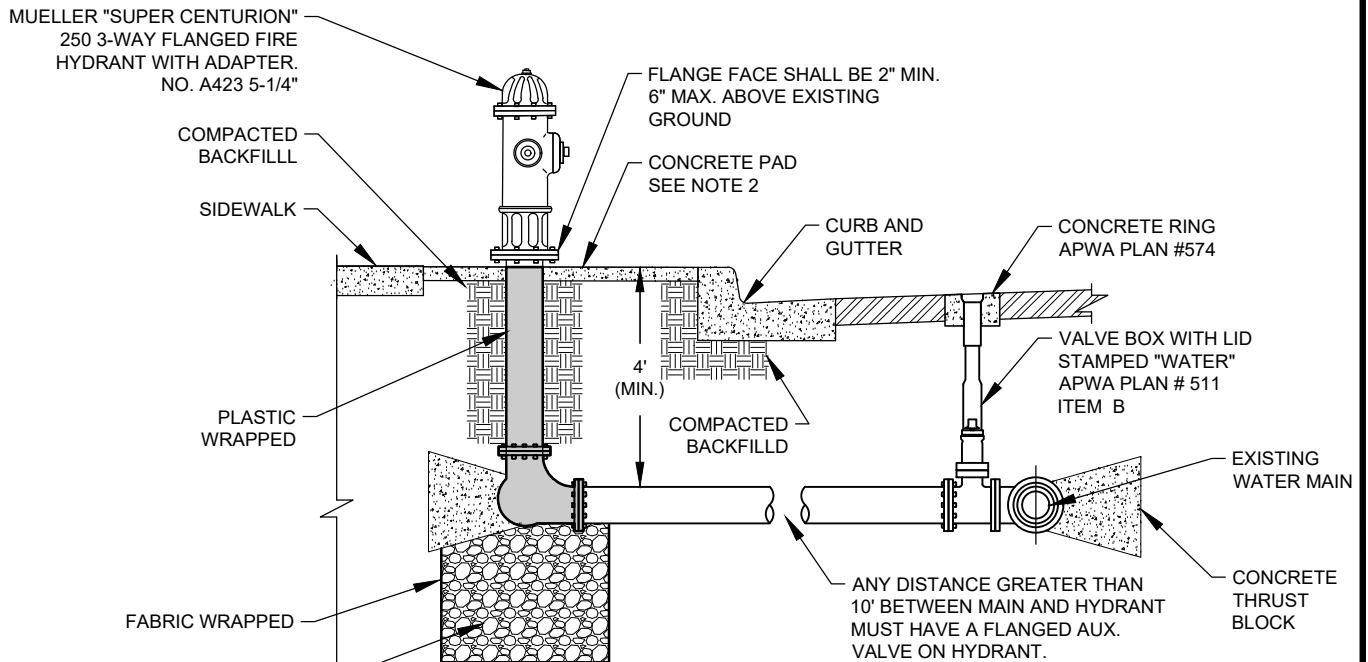
**PLAN**  
**DW-2**



**NOTES:**

1. HYDRANT SHALL BE "TRAFFIC" TYPE WITH A REPLACEABLE BREAK-AWAY UNIT IMMEDIATELY ABOVE GROUND.
2. CONCRETE PAD FOR FIRE HYDRANT. 4' WIDE x 4" THICK WITH 4" THICK BASE COURSE AND Poured FROM TOP BACK OF CURB TO THE SIDEWALK.
3. NO CONCRETE PAD NEEDED FOR MONOLITHIC APPLICATIONS.
4. ALL MJ FITTINGS MUST HAVE MEGALUGS.

**PLAN VIEW**  
NTS



**SECTION VIEW**  
NTS



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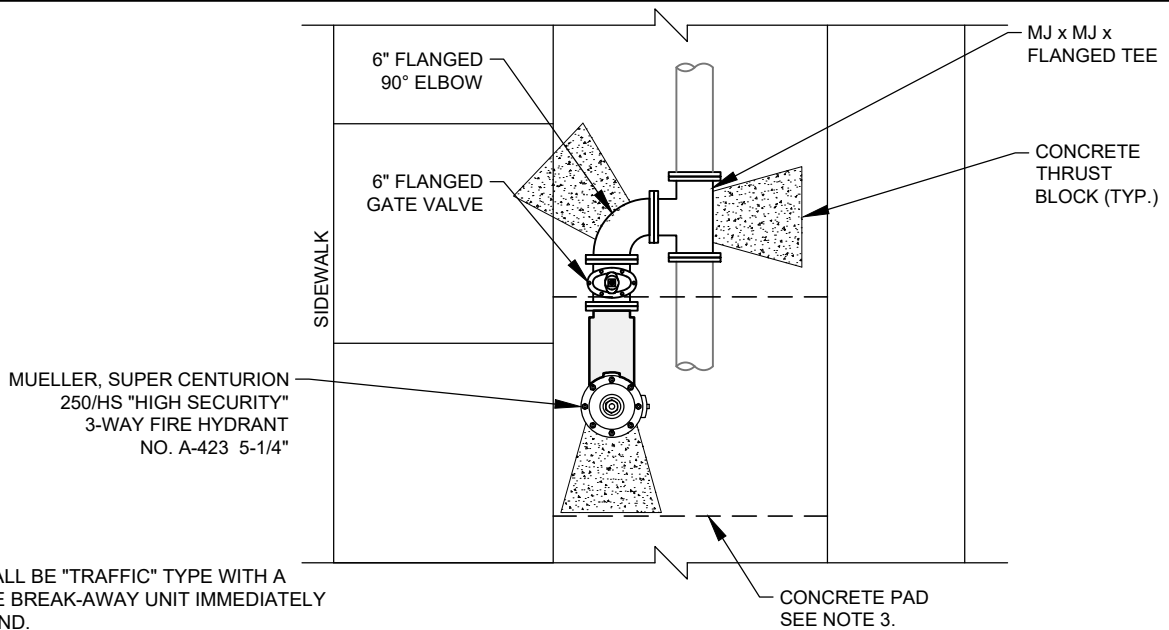
**FIRE HYDRANT  
CONNECTION IN  
ROADWAY (TYPICAL)**

DRAWN 10/18/17

REVISIONS

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01	SWF	12/01/20
02	SWF	11/02/22

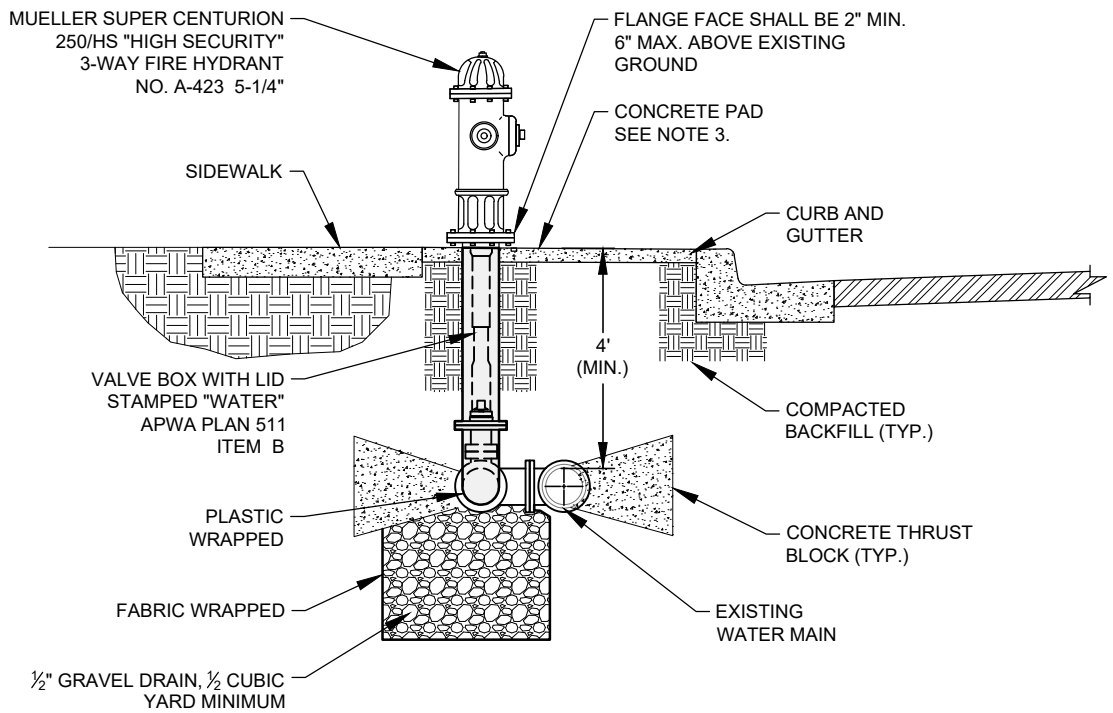
**PLAN**  
**DW-2A**



**NOTES:**

1. HYDRANT SHALL BE "TRAFFIC" TYPE WITH A REPLACEABLE BREAK-AWAY UNIT IMMEDIATELY ABOVE GROUND.
2. 6" GATE VALVE SHALL BE FLANGED DIRECTLY TO HYDRANT.
3. CONCRETE PAD FOR FIRE HYDRANT. 4' WIDE x 4" THICK WITH 4" THICK BASE COURSE AND POURED FROM TOP BACK OF CURB TO THE SIDEWALK.
4. NO CONCRETE PAD NEEDED FOR MONOLITHIC APPLICATIONS
5. ALL MJ FITTINGS MUST HAVE MEGALUGS.

**PLAN VIEW**  
NOT TO SCALE



**SECTION VIEW**  
NOT TO SCALE



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**FIRE HYDRANT**  
**CONNECTION**  
**(HIGH SECURITY)**

DRAWN 10/18/17

**REVISIONS**

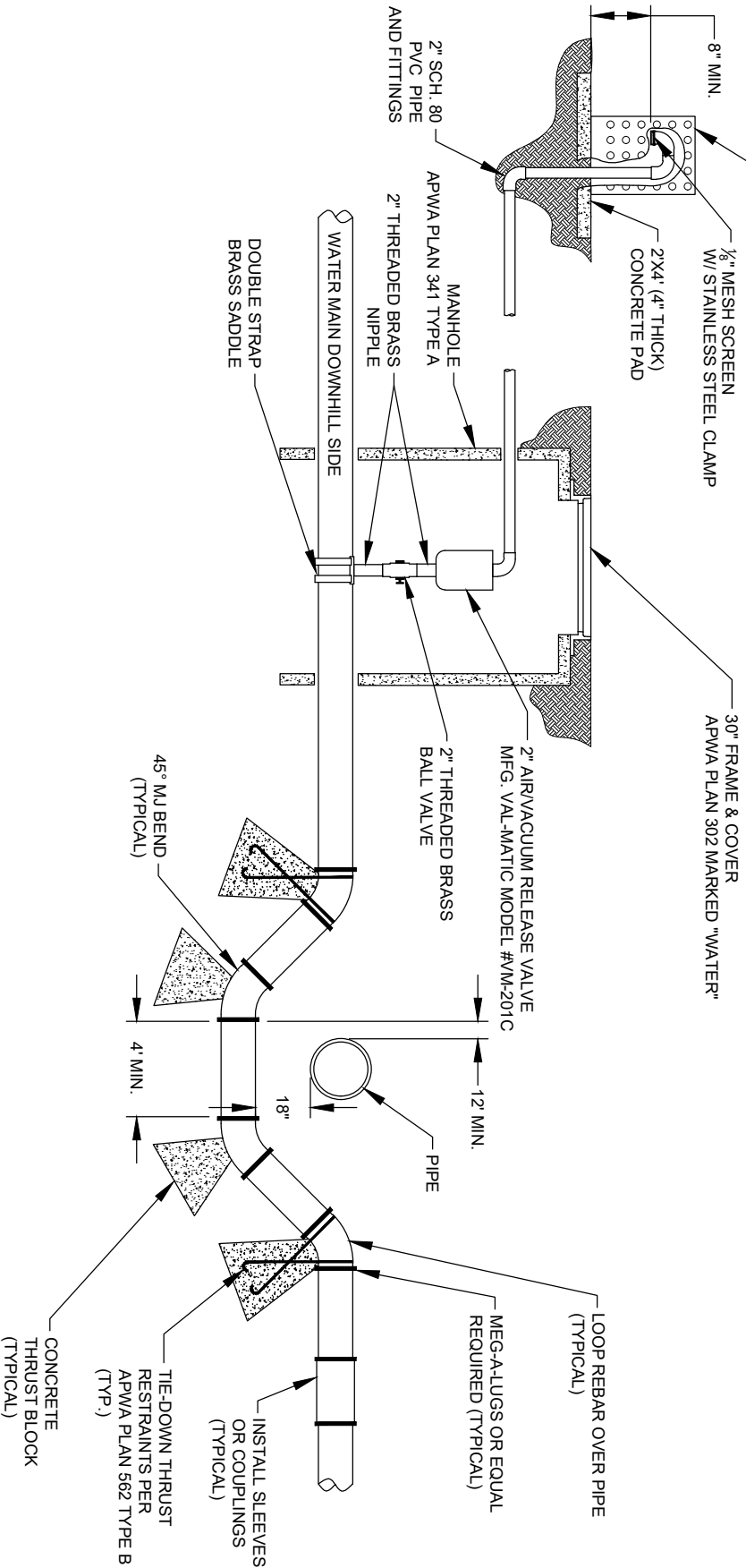
#	BY	DATE
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02	SWF	11/02/22

**PLAN**  
**DW-2B**

**PARK STRIP**

**ROADWAY**

INSTALL COVER  
(BOLT TO CONCRETE PAD)  
CONTACT RIVERTON CITY WATER DEPT.  
FOR COVER SPECIFICATIONS



**NOT TO SCALE**

**NOTES:**

1. CITY MUST BE GIVEN 24 HOUR NOTICE PRIOR TO LOOPING ANY WATERLINE.
2. INSTALL AIR VENT/VACUUM RELEASE VALVE ON LOW SIDE OF LOOP.

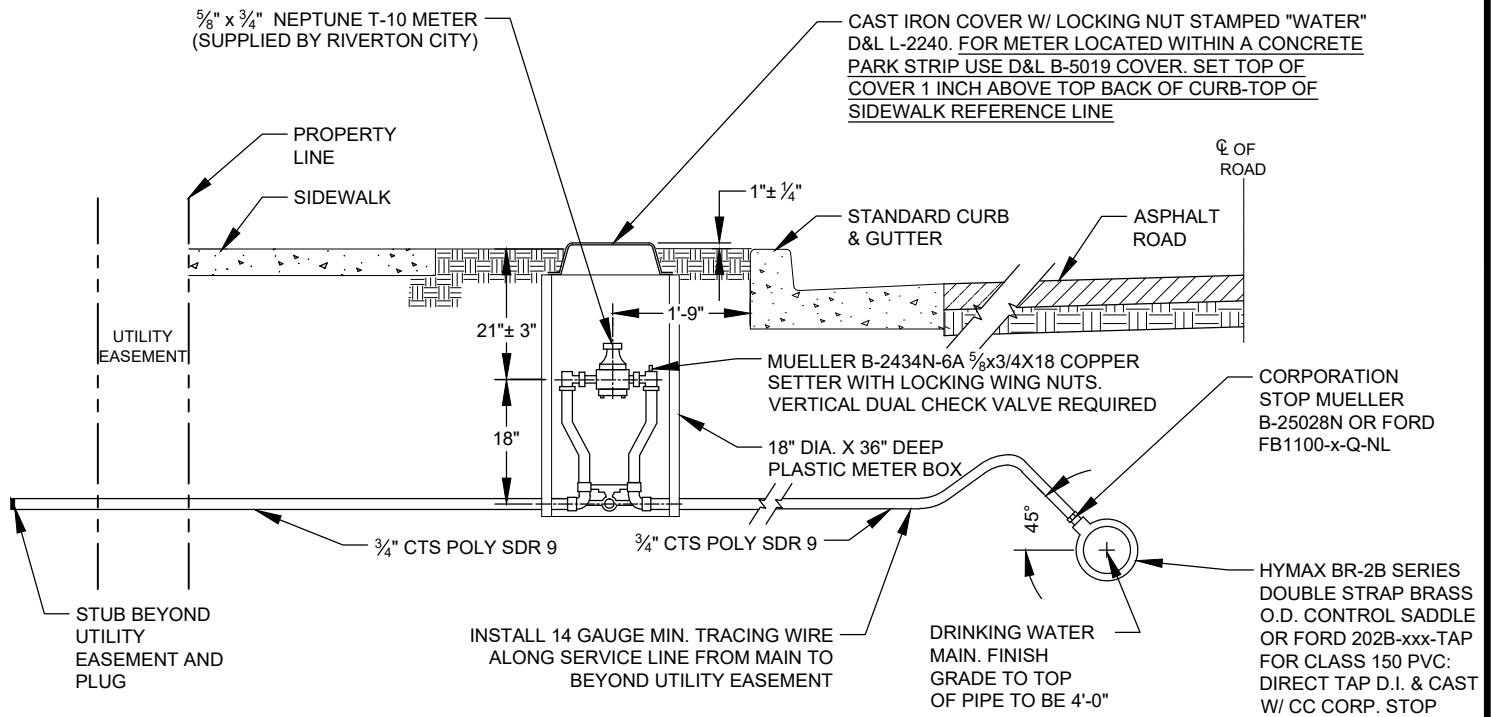


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**DRINKING MAIN LINE LOOP  
2" AIR/VACUUM  
RELEASE VALVE**

DRAWN 10/18/17		
REVISIONS		
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**PLAN  
DW-3**



**TYPICAL WATER CONNECTION**  
**NOT TO SCALE**

**NOTES:**

1. INSPECTION: METER BOX AND SERVICE LINE SHALL BE INSPECTED BY CITY PRIOR TO BACKFILLING.
2. BACKFILL: INSTALL BACKFILL IN LIFTS NOT EXCEEDING 8" AFTER COMPACTION. COMPACT EACH LIFT TO AN AVERAGE DRY DENSITY OF 97% WITH NO DENSITY TEST RESULT LESS THAN 95%.
3. WATER METER SHALL BE PROVIDED BY CITY.
4. PLACEMENT: ALL METERS ARE TO BE INSTALLED IN THE PARK STRIP OR WITHIN 7 FEET OF THE PROPERTY LINE (STREET SIDE) AND MUST BE PLACED NEAR MIDPOINT OF THE LOT AND MUST NOT BE LOCATED IN A DRIVEWAY, OR IN A SIDEWALK.
5. PIPE SPLICES SHALL BE MADE USING A FLARED OR COMPRESSION FITTING.
6. CONTRACTOR SHALL SUPPLY ALL MATERIALS AND LABOR, EXCLUDING THE WATER METER.
7. NEW SUBDIVISIONS SHALL HAVE WATER SERVICE STUBBED TO A POINT APPROXIMATELY 1 (ONE) FOOT BEYOND UTILITY EASEMENT.
8. NO MAIL BOX OR ANY OTHER OBSTRUCTION WITHIN 3 FEET OF METER.
9. METERS LOCATED WITHIN A CONCRETE PARKSTRIP SHALL HAVE A D&L #B-5019-03 NEPTUNE STYLE LID.
10. ALL BRASS FITTINGS & SETTERS MUST BE NO LEAD.



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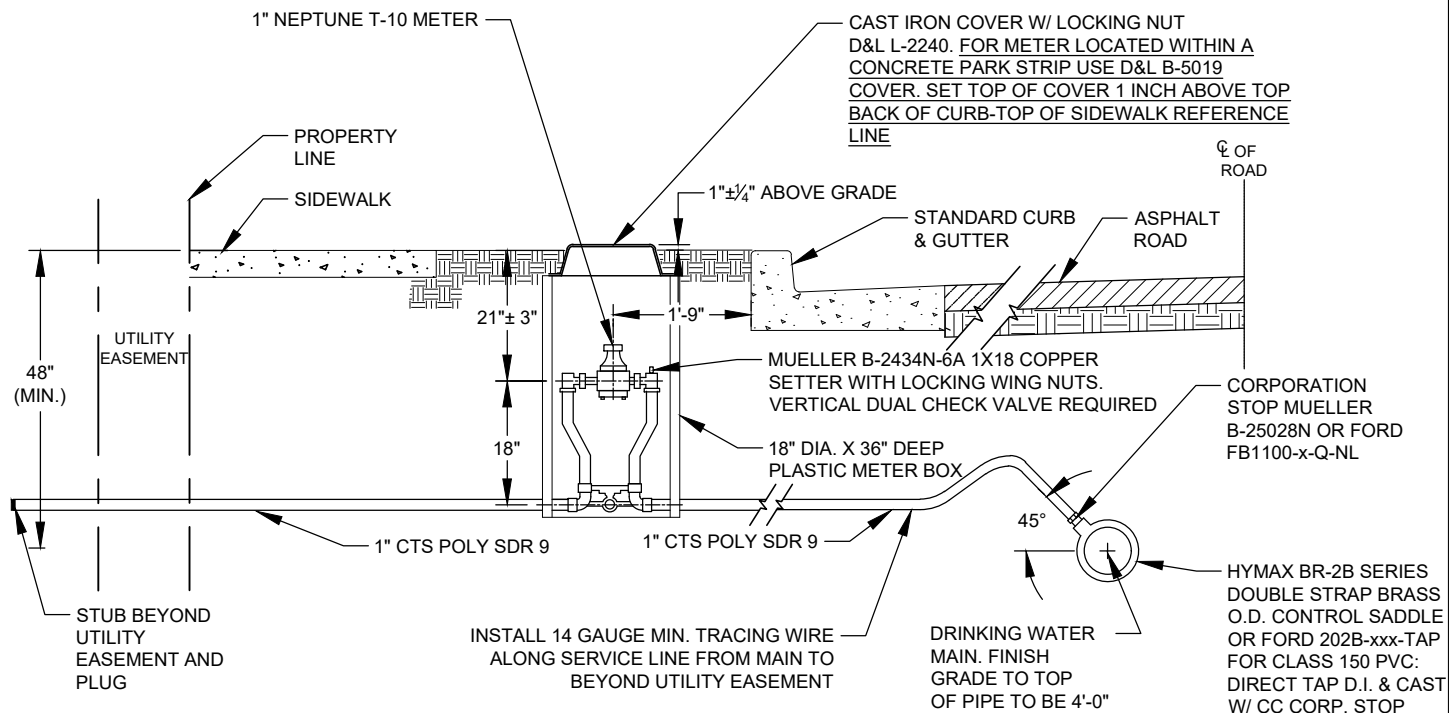
**RESIDENTIAL METER**  
**CONNECTION**  
**3/4-INCH**

DRAWN 10/18/17

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02	SWF	11/16/22

**PLAN**  
  
**DW-4**



**TYPICAL WATER CONNECTION  
NOT TO SCALE**

**NOTES:**

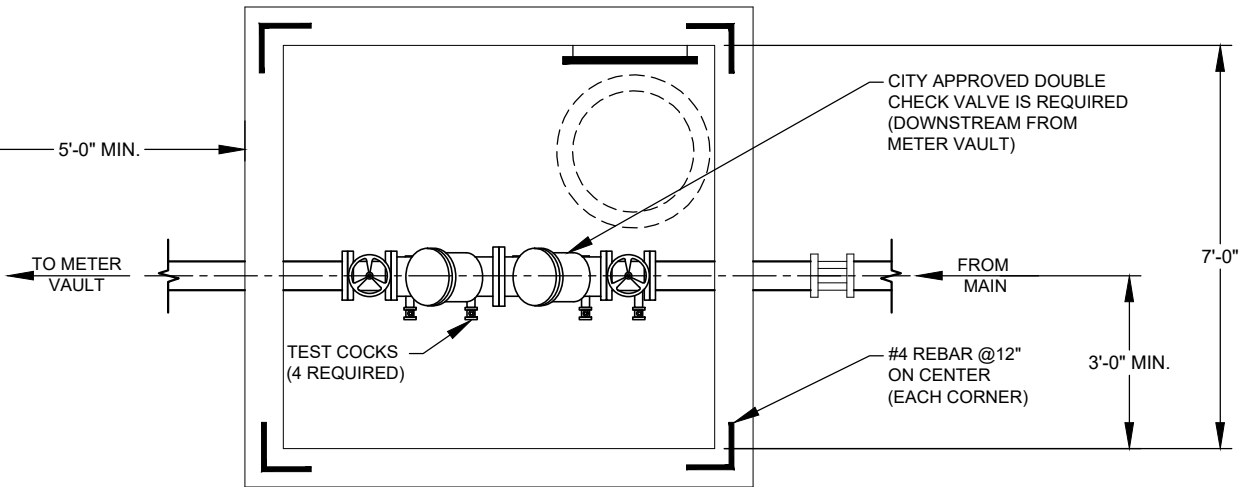
1. INSPECTION: METER BOX AND SERVICE LINE SHALL BE INSPECTED BY CITY PRIOR TO BACKFILLING.
2. BACKFILL: INSTALL BACKFILL IN LIFTS NOT EXCEEDING 8" AFTER COMPACTION. COMPACT EACH LIFT TO AN AVERAGE DRY DENSITY OF 97% WITH NO DENSITY TEST RESULT LESS THAN 95%.
3. WATER METER SHALL BE PROVIDED AND INSTALLED BY CITY.
4. PLACEMENT: ALL METERS ARE TO BE INSTALLED IN THE PARK STRIP OR WITHIN 7 FEET OF THE PROPERTY LINE (STREET SIDE) AND MUST BE PLACED NEAR MIDPOINT OF THE LOT AND MUST NOT BE LOCATED IN A DRIVEWAY, OR IN A SIDEWALK.
5. PIPE SPLICES SHALL BE MADE USING A FLARED OR COMPRESSION FITTING.
6. CONTRACTOR SHALL SUPPLY ALL MATERIALS AND LABOR, EXCLUDING THE WATER METER.
7. NEW SUBDIVISIONS SHALL HAVE WATER SERVICE STUBBED TO A POINT APPROXIMATELY 1 (ONE) FOOT BEYOND UTILITY EASEMENT.
8. NO MAIL BOX OR ANY OTHER OBSTRUCTION WITHIN 3 FEET OF METER.
9. METERS LOCATED WITHIN A CONCRETE PARKSTRIP SHALL HAVE A D&L #B-5019-03 NEPTUNE STYLE LID.
10. ALL BRASS FITTINGS & SETTERS MUST BE NO LEAD.

	<b>RIVERTON CITY</b> <b>ENGINEERING DIVISION</b> 12526 SOUTH 4150 WEST RIVERTON, UTAH 84096 (801) 208-3162	<b>RESIDENTIAL METER CONNECTION</b> <b>1-INCH</b>	DRAWN 10/18/17 <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3">REVISIONS</th> </tr> <tr> <th>#</th> <th>BY</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>01</td> <td>SWF</td> <td>12/01/20</td> </tr> <tr> <td>02</td> <td>SWF</td> <td>11/16/22</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS			#	BY	DATE	01	SWF	12/01/20	02	SWF	11/16/22							<b>PLAN</b>  <b>DW-5</b>
	REVISIONS																					
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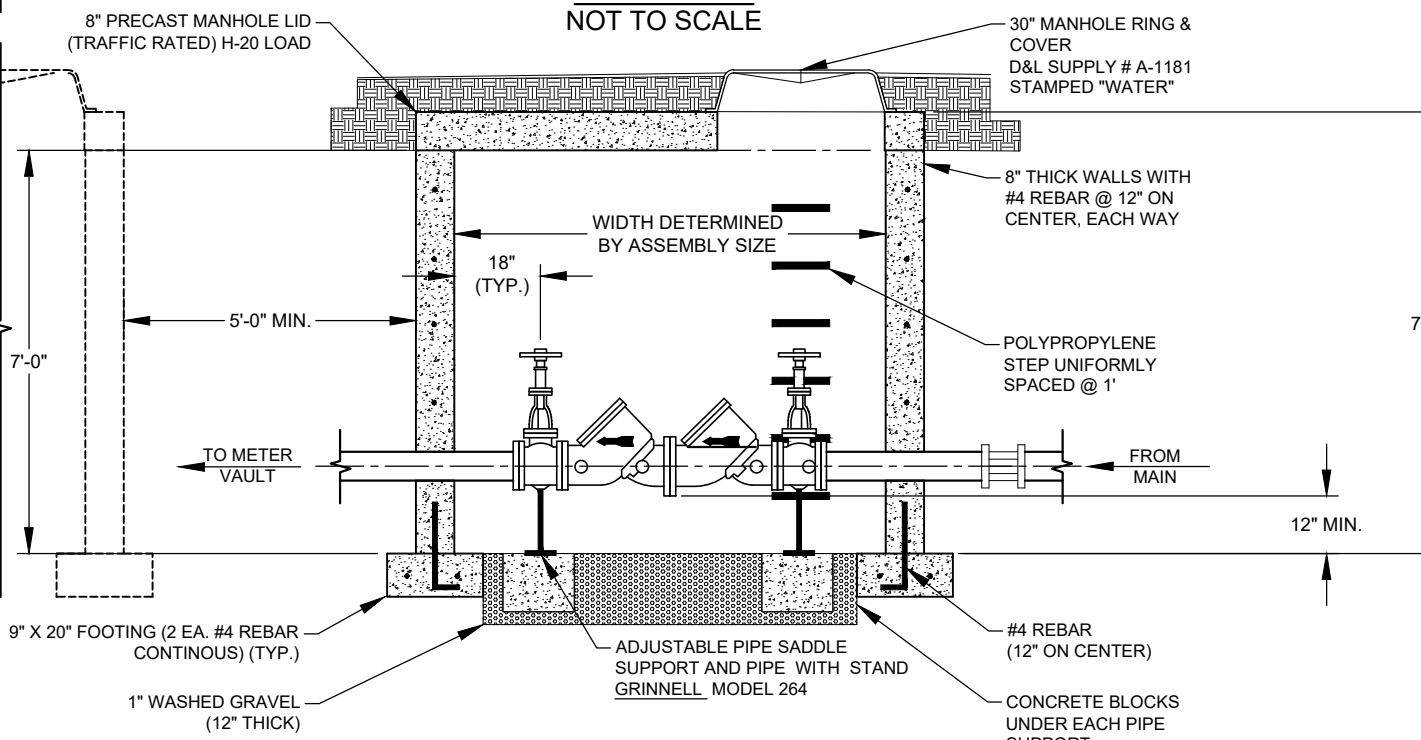




SEE PLANS DW-7, DW-8, DW-9 AND DW-10 FOR METER VAULT CONNECTIONS



**PLAN VIEW**  
NOT TO SCALE



**SECTION VIEW**  
NOT TO SCALE

**NOTES:**

1. CITY APPROVED DOUBLE CHECK VALVE ASSEMBLY TO LAY HORIZONTAL WITH THE GROUND. DESIGNED FOR BACK SIPHONAGE AND BACK PRESSURE.
2. THE WATER LINE SHALL BE DISINFECTED, FLUSHED AND PRESSURE TESTED PRIOR TO INSTALLING THE DOUBLE CHECK VALVE ASSEMBLY. THE DOUBLE CHECK VALVE SHALL BE PROTECTED FROM FREEZING AND FLOODING.
3. ALL PIPE, VALVE AND FITTING JOINTS FROM THE SUPPLY MAIN SHALL BE FLANGED AND RESTRAINED.
4. LINK SEAL PIPE ENTRANCE AND EXIT.
5. BACKFLOW ASSEMBLY TO BE TESTED BY A CERTIFIED BACKFLOW ASSEMBLY TESTER WITH A CURRENT UTAH TESTER CERTIFICATION WITHIN 10 DAYS OF INSTALLATION/BROUGHT INTO SERVICE, AND ANNUALLY THERE AFTER. BACKFLOW TEST REPORTS TO BE EMAILED TO [BACKFLOW@RIVERTONUTAH.GOV](mailto:BACKFLOW@RIVERTONUTAH.GOV) FOR MORE INFORMATION CALL 801-208-3112.

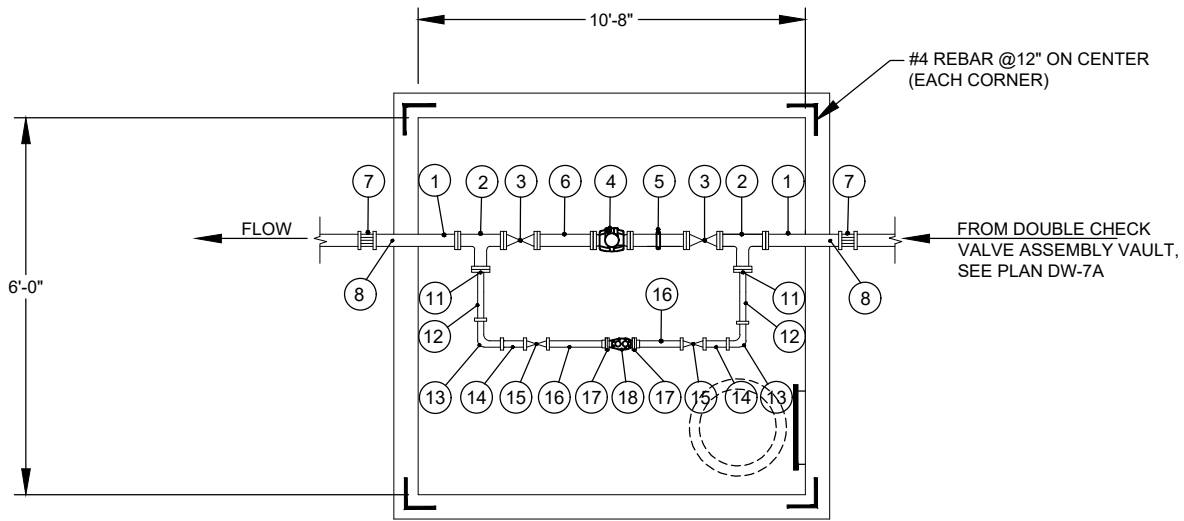


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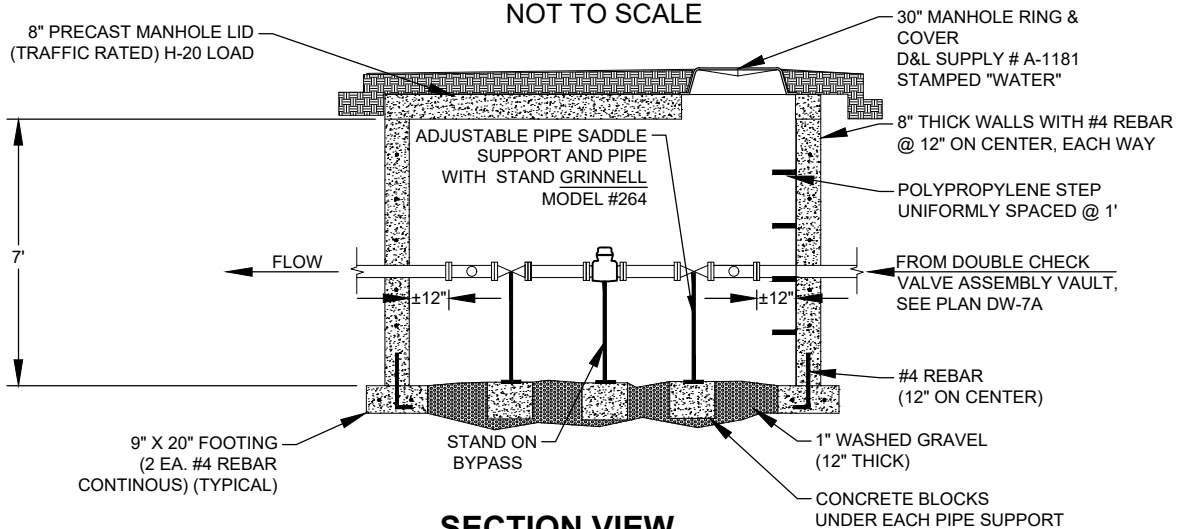
**3"-12"**  
**DOUBLE CHECK VALVE**  
**ASSEMBLY VAULT**

DRAWN 08/12/22		
REVISIONS		
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01	SWF	11/3/22

**PLAN**  
**DW-7A**



**PLAN VIEW**  
NOT TO SCALE



**SECTION VIEW**  
NOT TO SCALE

**NOTES:**

1. INSPECTION: METER BOX AND SERVICE LINE SHALL BE INSPECTED BY CITY PRIOR TO BACKFILLING.
2. BACKFILL: INSTALL BACKFILL IN LIFTS NOT EXCEEDING 8" AFTER COMPACTION. COMPACT EACH LIFT TO AN AVERAGE DRY DENSITY OF 97% WITH NO DENSITY TEST RESULT LESS THAN 95%.
3. ALL 4" INTERIOR FITTINGS TO BE FLANGED AND ALL 2" INTERIOR FITTINGS TO BE COPPER/BRASS, SCHEDULE 40 (THREADED).
4. PLACEMENT: ALL METERS ARE TO BE INSTALLED IN THE PARK STRIP OR WITHIN 7 FEET OF THE PROPERTY LINE (STREET SIDE) AND MUST BE PLACED NEAR MIDPOINT OF THE LOT AND MUST NOT BE LOCATED IN A DRIVEWAY, OR IN A SIDEWALK.
5. CONTRACTOR SHALL SUPPLY ALL MATERIALS AND LABOR, INCLUDING 4" METER.
6. NO MAIL BOX OR ANY OTHER OBSTRUCTION WITHIN 3 FEET OF METER.
7. ALL BRASS FITTINGS AND SETTERS MUST BE LOW LEAD.
8. EVERY FEED INTO A PRIVATE DEVELOPMENT MUST BE METERED.

2" PIPE SCHEDULE		
#	QTY	DESCRIPTION
11	2	4" BLIND FLANGE W/2" TAP
12	2	±23" NIPPLE
13	2	2" 90° ELBOW
14	2	2"x6" NIPPLE
15	2	2" GATE VALVE (MUELLER) A-2362**
16	2	2"x ±21.5" NIPPLE
17	2	2" SCREW-ON FLANGE
18	1	2" NEPTUNE MACH 10 METER

4" PIPE SCHEDULE		
#	QTY	DESCRIPTION
1	2	FLxPE D.I. SPOOL LENGTH = ±48"
2	2	4"x4"x4" FLGD. TEE
3	2	4" FLxFL GATE VALVE (MUELLER) **
4	1	4" MACH 10 METER MUST BE COMPOUND LAY LENGTH, TURBINE LAY LENGTH NOT ACCEPTABLE
5	2	ISOLATION VICTAULIC FLANGE
6	1	FLxFL D.I. SPOOL
7	2	4" MECHANICAL COUPLING ADAPTER
8	2	LINK SEAL(S) WITH NON SHRINK GROUT



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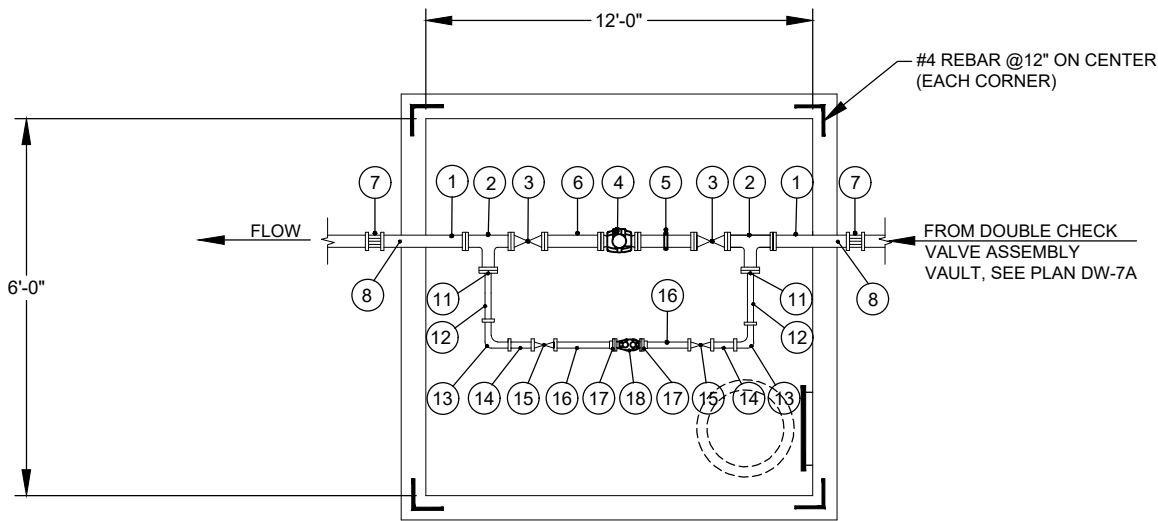
**METER VAULT**  
4-INCH

DRAWN 10/18/17

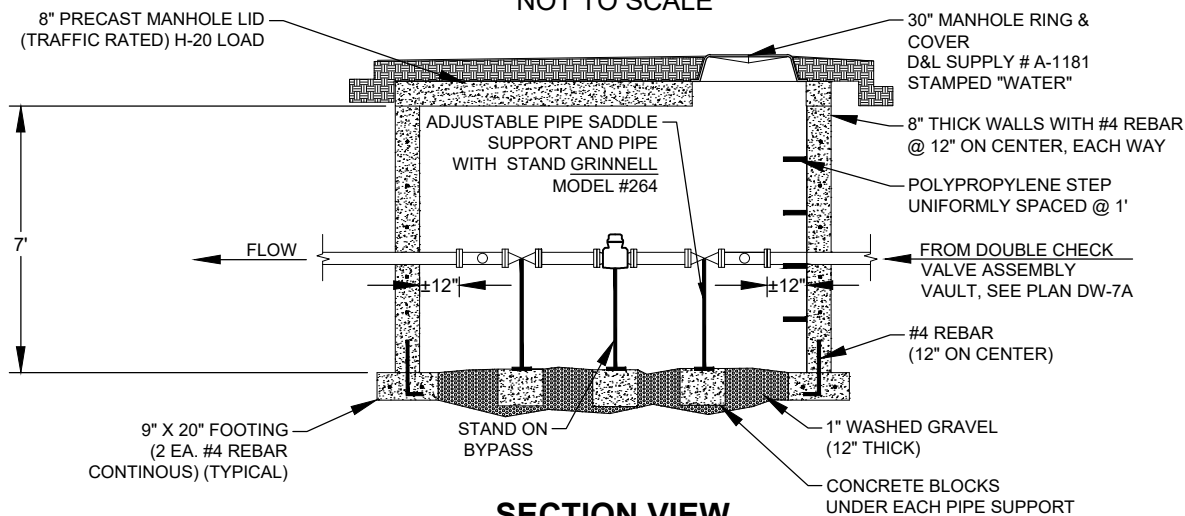
**REVISIONS**

#	BY	DATE
01	SWF	12/01/20
02	SWF	11/16/22

**PLAN**  
**DW-8**



**PLAN VIEW**  
NOT TO SCALE



**SECTION VIEW**  
NOT TO SCALE

**NOTES:**

1. INSPECTION: METER BOX AND SERVICE LINE SHALL BE INSPECTED BY CITY PRIOR TO BACKFILLING.
2. BACKFILL: INSTALL BACKFILL IN LIFTS NOT EXCEEDING 8" AFTER COMPACTION. COMPACT EACH LIFT TO AN AVERAGE DRY DENSITY OF 97% WITH NO DENSITY TEST RESULT LESS THAN 95%.
3. ALL 6" INTERIOR FITTINGS TO BE FLANGED AND ALL 2" INTERIOR FITTINGS TO BE COPPER/BRASS, SCHEDULE 40 (THREADED).
4. PLACEMENT: ALL METERS ARE TO BE INSTALLED IN THE PARK STRIP OR WITHIN 7 FEET OF THE PROPERTY LINE (STREET SIDE) AND MUST BE PLACED NEAR MIDPOINT OF THE LOT AND MUST NOT BE LOCATED IN A DRIVEWAY, OR IN A SIDEWALK.
5. CONTRACTOR SHALL SUPPLY ALL MATERIALS AND LABOR, INCLUDING 6" METER.
6. NO MAIL BOX OR ANY OTHER OBSTRUCTION WITHIN 3 FEET OF METER.
7. ALL BRASS FITTINGS AND SETTERS MUST BE LOW LEAD.
8. EVERY FEED INTO A PRIVATE DEVELOPMENT MUST BE METERED.

2" PIPE SCHEDULE		
#	QTY	DESCRIPTION
11	2	4" BLIND FLANGE W/2" TAP
12	2	±23" NIPPLE
13	2	2" 90° ELBOW
14	2	2"x6" NIPPLE
15	2	2" GATE VALVE (MUELLER) A-2362**
16	1	2"x ±33.5" NIPPLE
17	2	2" SCREW-ON FLANGE
18	1	2" NEPTUNE T-10 METER

6" PIPE SCHEDULE		
#	QTY	DESCRIPTION
1	2	FLXPE D.I. SPOOL LENGTH = ±48"
2	2	6"x6"x2" FLGD. TEE
3	2	6" FLxFL GATE VALVE (MUELLER)
4	1	6" NEPTUNE MACH 10 METER MUST BE COMPOUND LAY LENGTH, TURBINE LAY LENGTH NOT ACCEPTABLE
5	2	ISOLATION VICTAULIC FLANGE
6	2	FLxFL D.I. SPOOL
7	2	6" FLANGED COUPLING ADAPTER
8	2	LINK SEAL(S) WITH NON SHRINK GROUT



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**METER VAULT**  
6-INCH

DRAWN 10/18/17

**REVISIONS**

#	BY	DATE
01	SWF	12/01/20
02	SWF	11/16/22

**PLAN**  
**DW-9**



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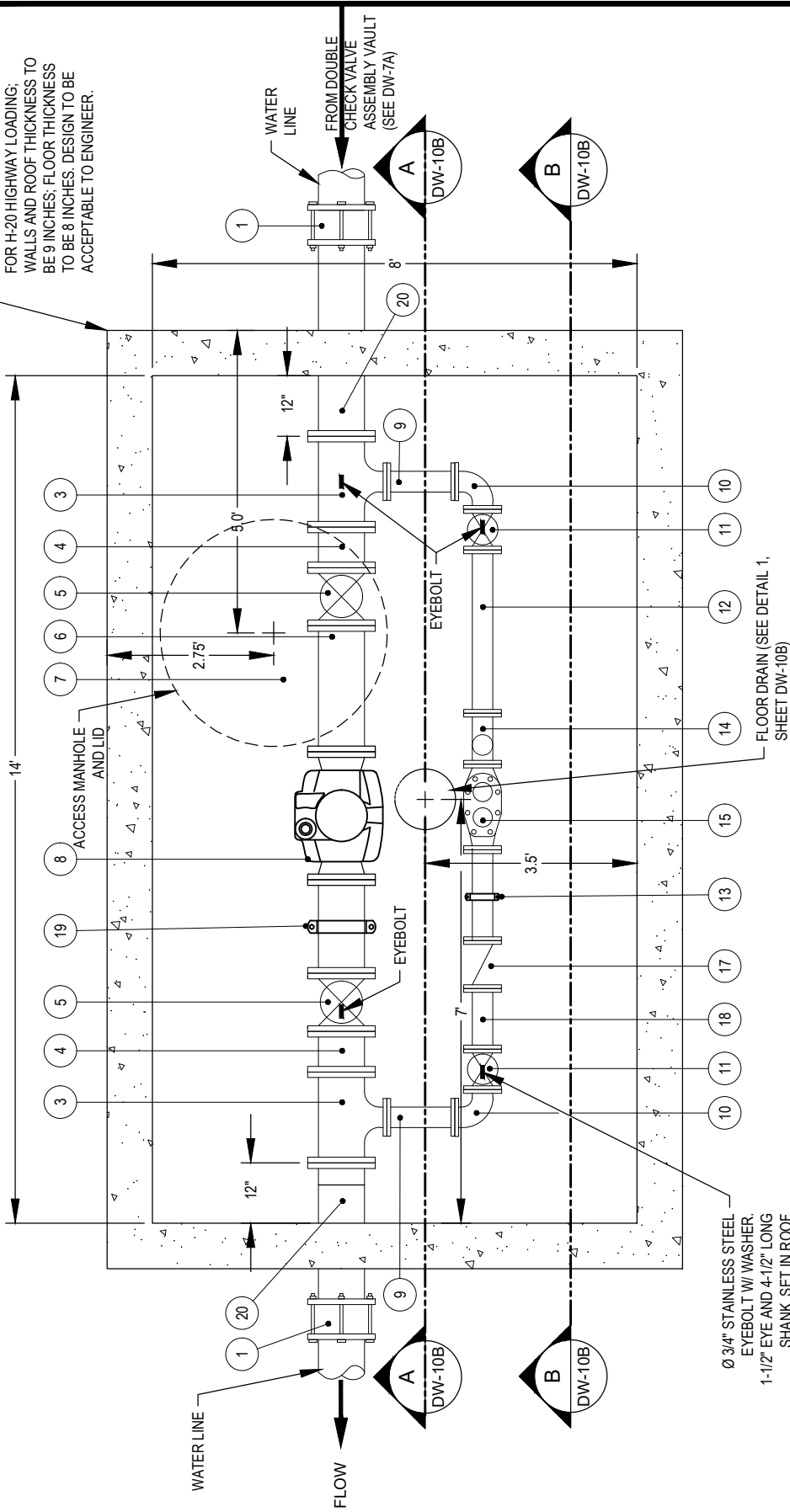
**METER VAULT**  
**8-12-INCH**  
**PLAN VIEW**

DRAWN 10/18/17

REVISIONS		
#	BY	DATE
01	SWF	12/01/20
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**PLAN**  
**DW-10A**

PRECAST REINFORCED CONCRETE VAULT. CAST-IN-PLACE VAULT MAY BE USED; DESIGNED FOR H-20 HIGHWAY LOADING; WALLS AND ROOF THICKNESS TO BE 9 INCHES; FLOOR THICKNESS TO BE 8 INCHES. DESIGN TO BE ACCEPTABLE TO ENGINEER.



NOTES:

1. ALL INTERIOR FITTINGS TO BE FLANGED UNLESS OTHERWISE INDICATED.
2. MULTIPLE FEED DEVELOPMENTS CAN ELIMINATE THE BYPASS IN THE METER VAULT.
3. CONCRETE VAULT FLOOR SHALL SLOPE AT 2% TOWARDS FLOOR IN ALL DIRECTIONS.
4. NO REDUCERS WILL BE ACCEPTED.
5. EVERY FEED INTO A PRIVATE DEVELOPMENT MUST BE METERED.

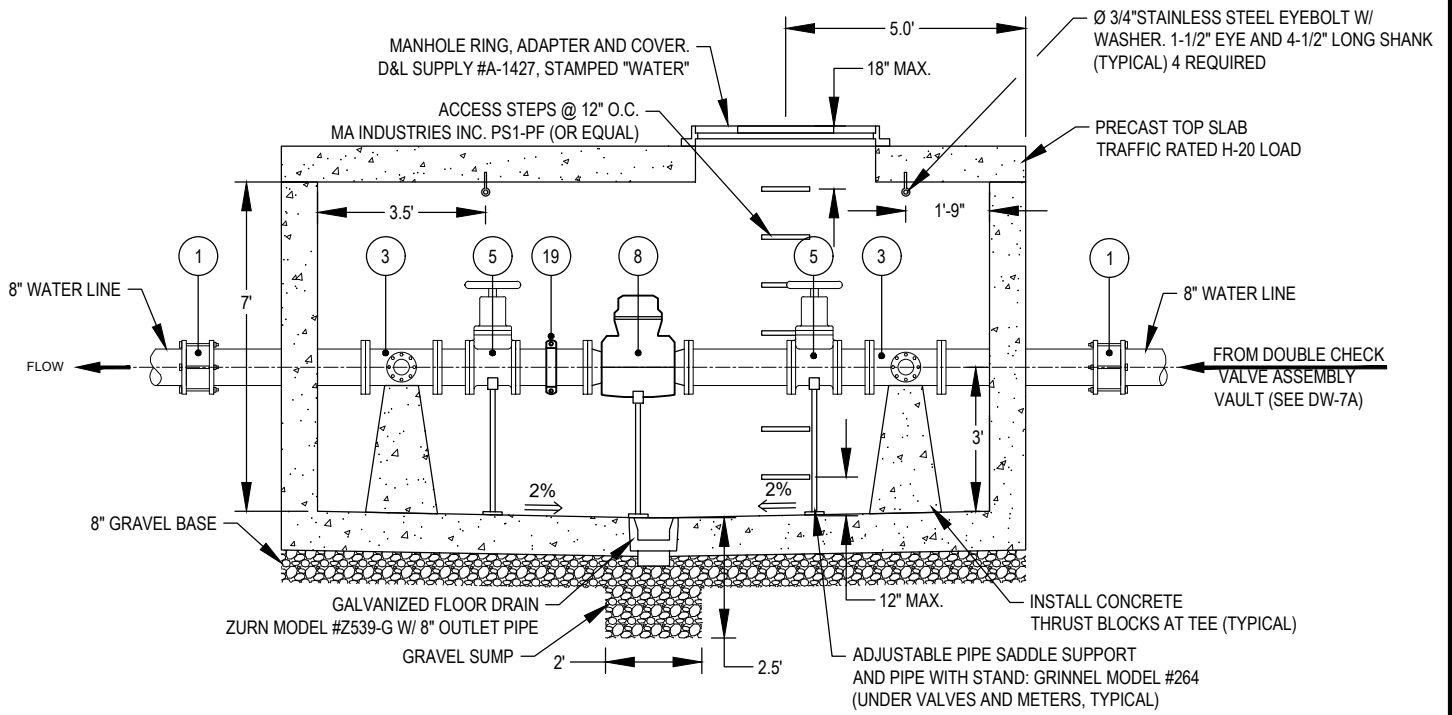
**SCHEDULE OF PLUMBING MATERIALS:**

①	4" FLANGED MUELLER GATE VALVE W/ HAND WHEEL
②	4" FLANGED X P.E. DUCTILE IRON PIPE (±18" LONG)
③	4" VICTAULIC FLANGE
④	4" FLANGED STRAINER
⑤	4" FLANGED NEPTUNE COMPOUND METER
⑥	4" DIAMETER CL150 P.E. FLANGED DUCTILE IRON PIPE SPOOL - ±14'-1/2" LONG
⑦	4" FLANGED MUELLER CHECK VALVE W/ LEVER AND WEIGHT
⑧	4" DIAMETER FLANGED DUCTILE IRON PIPE SPOOL - ±10' LONG
⑨	ISOLATION VICTAULIC FLANGE
⑩	LINK SEAL(S) WITH NON SHRINK GROUT
⑪	M.J. SLEEVE
⑫	FLANGED X P.E. CL150 DUCTILE IRON PIPE (±3'-3" LONG MOL) W/ SEEP RING
⑬	3" X 4" FLANGED TEE
⑭	FLANGED SPOOL
⑮	FLANGED MUELLER GATE VALVE W/WHEEL
⑯	FLANGED X P.E. SPOOL - ±7" LONG
⑰	FLANGED COUPLING ADAPTER W/ ANCHOR STUDS
⑱	FLANGED NEPTUNE MACH 10 METER
⑲	4" DIAMETER FLANGED DUCTILE IRON PIPE SPOOL - ±12.5" LONG
⑳	4" FLANGED 90 DEGREE BEND

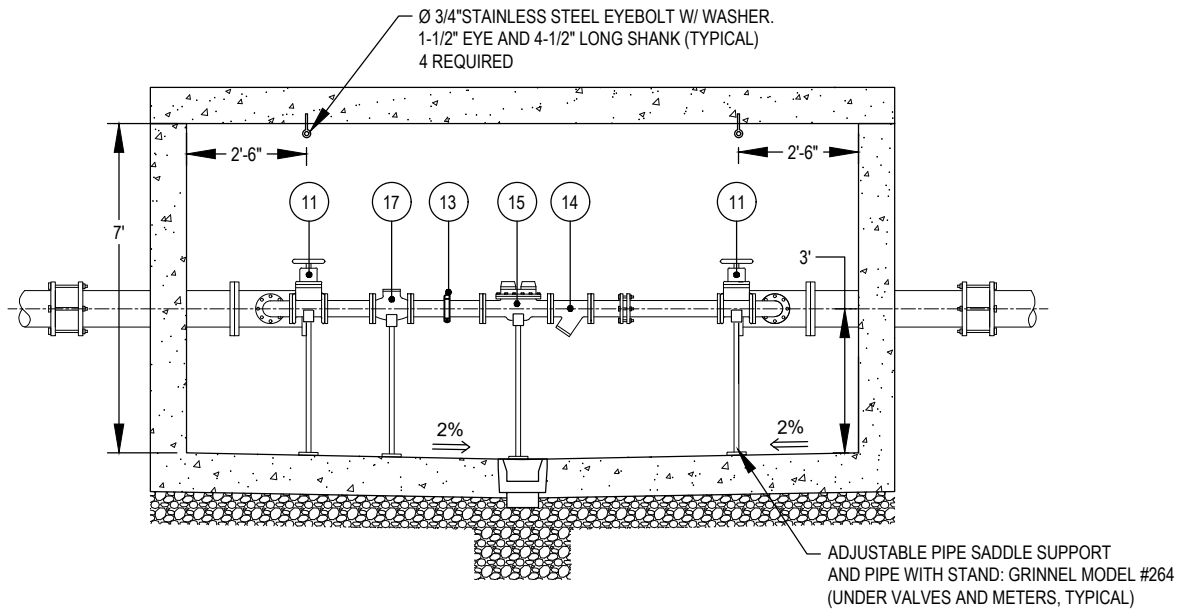
- ① 4" FLANGED MUELLER GATE VALVE W/ HAND WHEEL
- ② 4" FLANGED X P.E. DUCTILE IRON PIPE (±18" LONG)
- ③ 4" VICTAULIC FLANGE
- ④ 4" FLANGED STRAINER
- ⑤ 4" FLANGED NEPTUNE COMPOUND METER
- ⑥ 4" DIAMETER CL150 P.E. FLANGED DUCTILE IRON PIPE SPOOL - ±14'-1/2" LONG
- ⑦ 4" FLANGED MUELLER CHECK VALVE W/ LEVER AND WEIGHT
- ⑧ 4" DIAMETER FLANGED DUCTILE IRON PIPE SPOOL - ±10' LONG
- ⑨ ISOLATION VICTAULIC FLANGE
- ⑩ LINK SEAL(S) WITH NON SHRINK GROUT

Ø 3/4" STAINLESS STEEL EYEBOLT W/ WASHER, 1-1/2" EYE AND 4-1/2" LONG SHANK SET IN ROOF (TYP.) REQUIRED

FLOOR DRAIN (SEE DETAIL 1, SHEET DW-10B)



**SECTION A-A**  
NOT TO SCALE



**SECTION B-B**  
NOT TO SCALE



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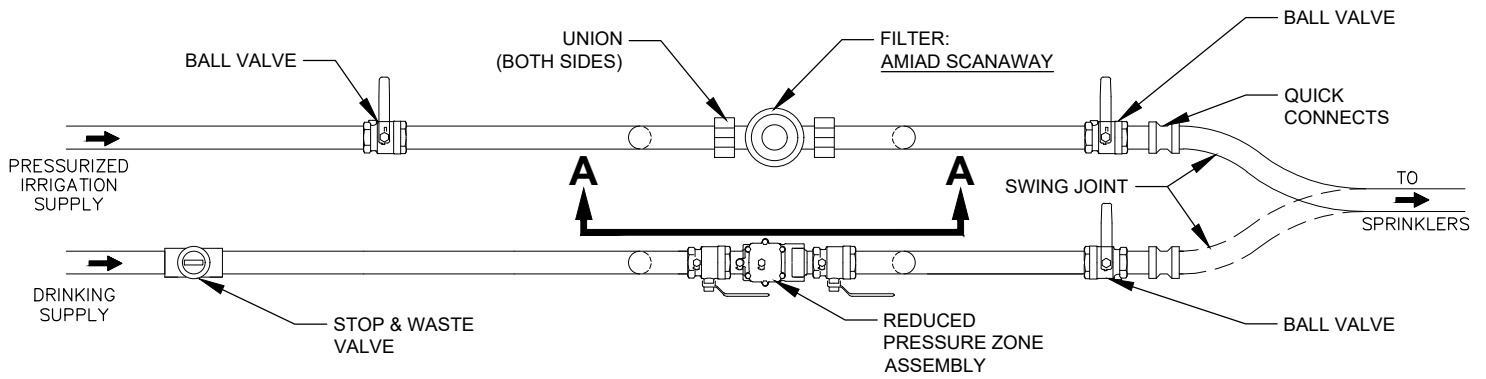
**METER VAULT**  
**8-12-INCH**  
**SECTION VIEWS**

DRAWN 10/18/17

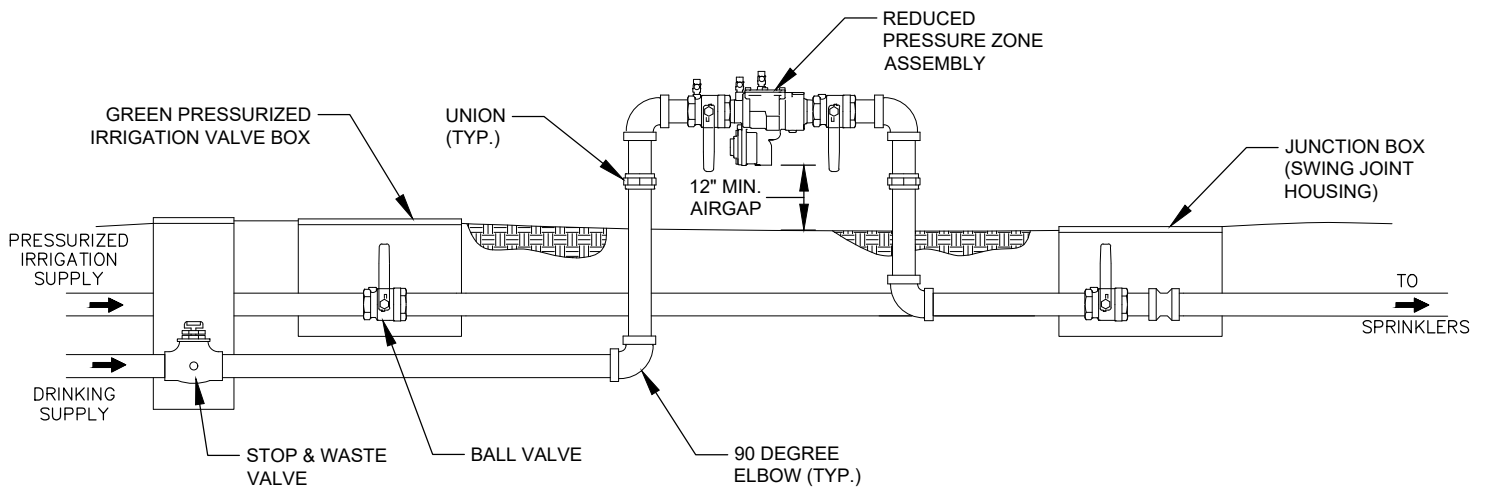
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01	SWF	12/01/20
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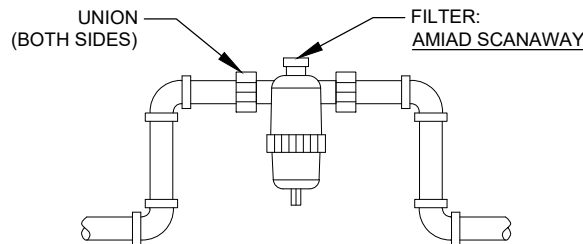
**PLAN**  
**DW-10B**



**TOP VIEW**  
NOT TO SCALE



**FRONT VIEW**  
NOT TO SCALE



**SECTION A-A**  
NOT TO SCALE



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**DUAL DRINKING AND  
PRESSURIZED IRRIGATION  
CONNECTION**

DRAWN 10/18/17

REVISIONS

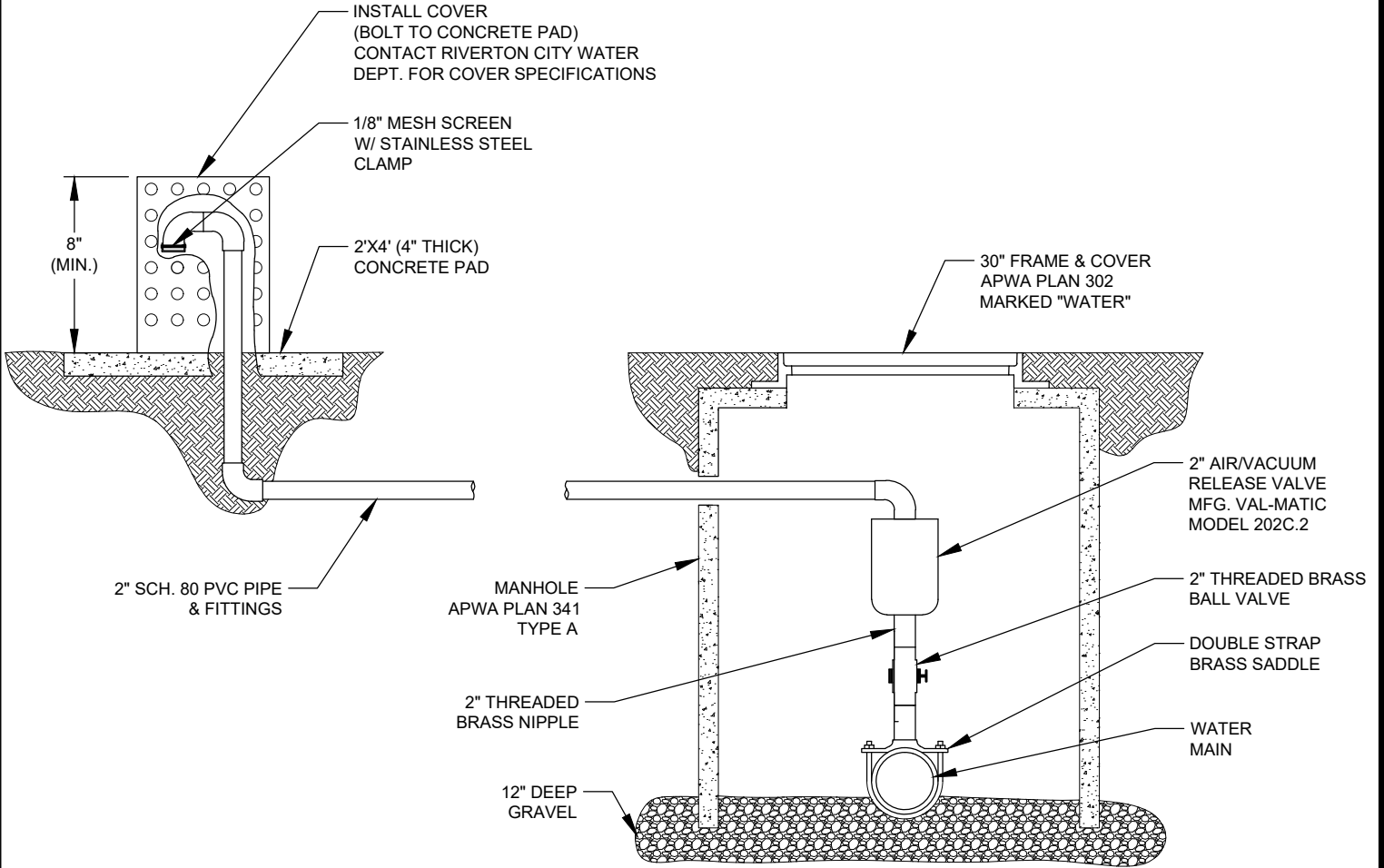
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02	SWF	04/04/22

**PLAN**

**DW-11**

**PARK STRIP**

**ROADWAY**



NOT TO SCALE



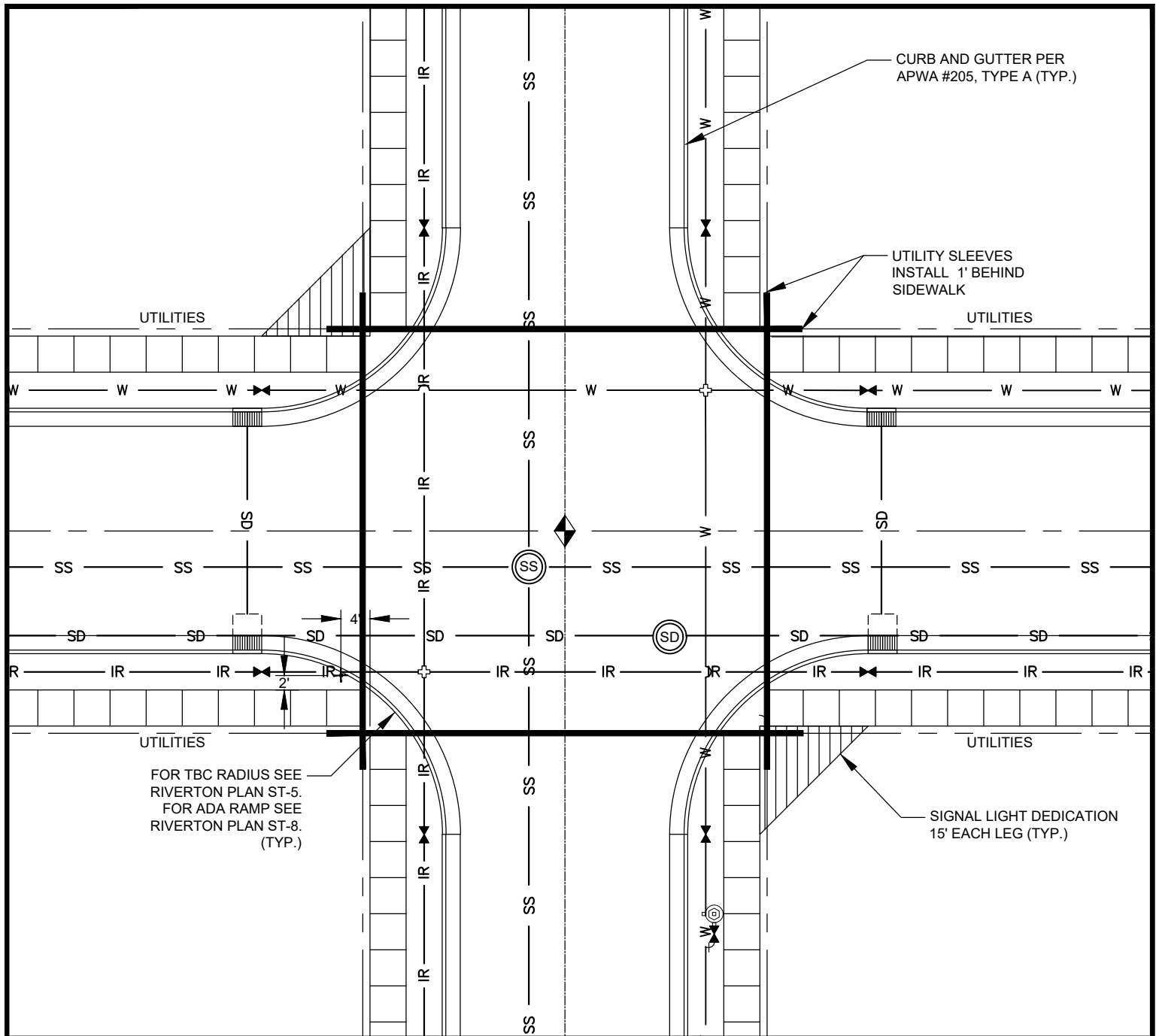
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**AIR/VACUUM  
 RELEASE VALVE**

DRAWN 10/18/17

REVISIONS		
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01	SWF	12/01/20
02	SWF	04/04/22

**PLAN**  
  
**DW-12**



UTILITIES

CURB AND GUTTER PER APWA #205, TYPE A (TYP.)

UTILITY SLEEVES INSTALL 1' BEHIND SIDEWALK

UTILITIES

UTILITIES

SIGNAL LIGHT DEDICATION 15' EACH LEG (TYP.)

FOR TBC RADIUS SEE RIVERTON PLAN ST-5.  
FOR ADA RAMP SEE RIVERTON PLAN ST-8.  
(TYP.)

LEGEND



SURVEY MONUMENT PER S.L.CO. REQUIREMENTS



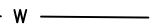
STORM DRAIN MANHOLE PER APWA #331B, 341



IR PRESSURIZED IRRIGATION LINE TO BE INSTALLED ON SOUTH AND WEST SIDES OF STREET. ALL DUCTILE IRON PIPE MUST BE WRAPPED IN POLYETHYLENE ENCASEMENT AWWA C105/A21.99



COMBO BOX PER APWA #316



W DRINKING WATER LINE TO BE INSTALLED ON NORTH AND EAST SIDES OF STREET. ALL DUCTILE IRON PIPE MUST BE WRAPPED IN POLYETHYLENE ENCASEMENT AWWA C105-99



CURB INLET PER PWA #315



SS SANITARY SEWER



STREET/STOP SIGN LOCATION TYPICAL PLACEMENT (ENG-1, ENG-2, ENG-3)



SS SEWER MANHOLE



FIRE HYDRANT



DRINKING/PRESSURIZED IRRIGATION WATER VALVE. ALL VALVES TO BE PLACED ON CURB AND GUTTER PC (POINT OF CURVATURE)



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WATER LINES

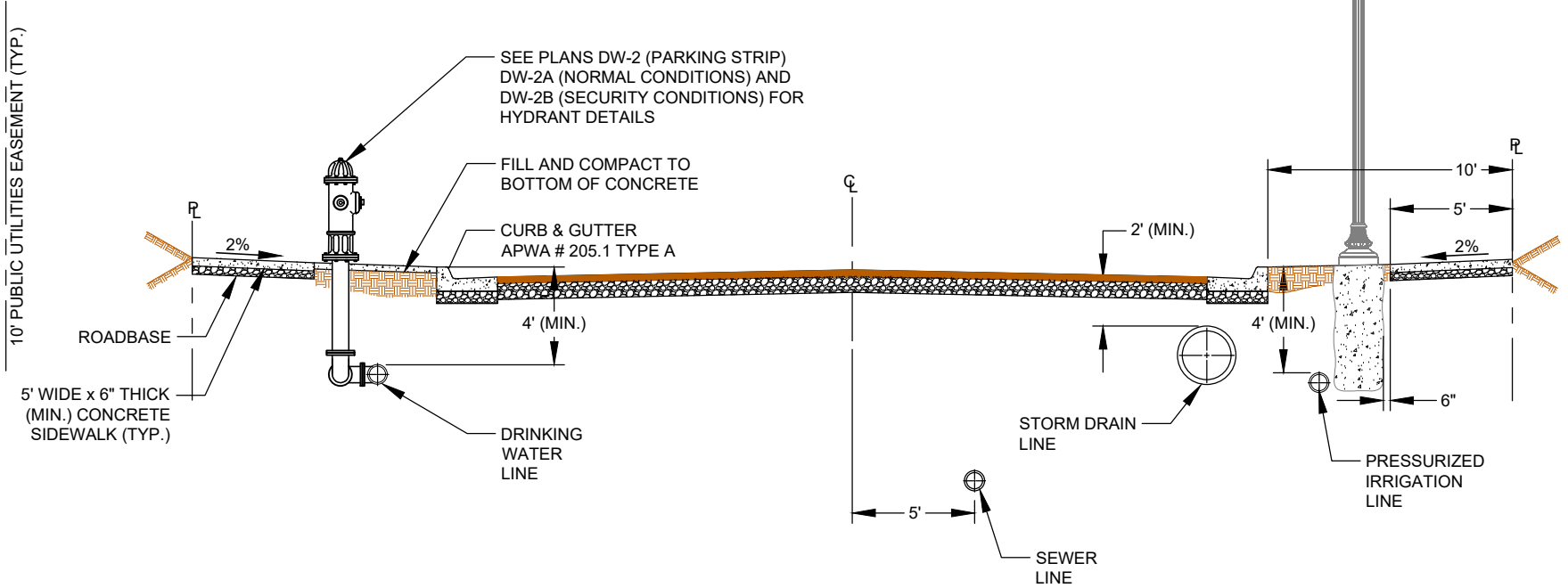
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01	SWF	12/01/20
02	SWF	11/07/22

PLAN

DW-13



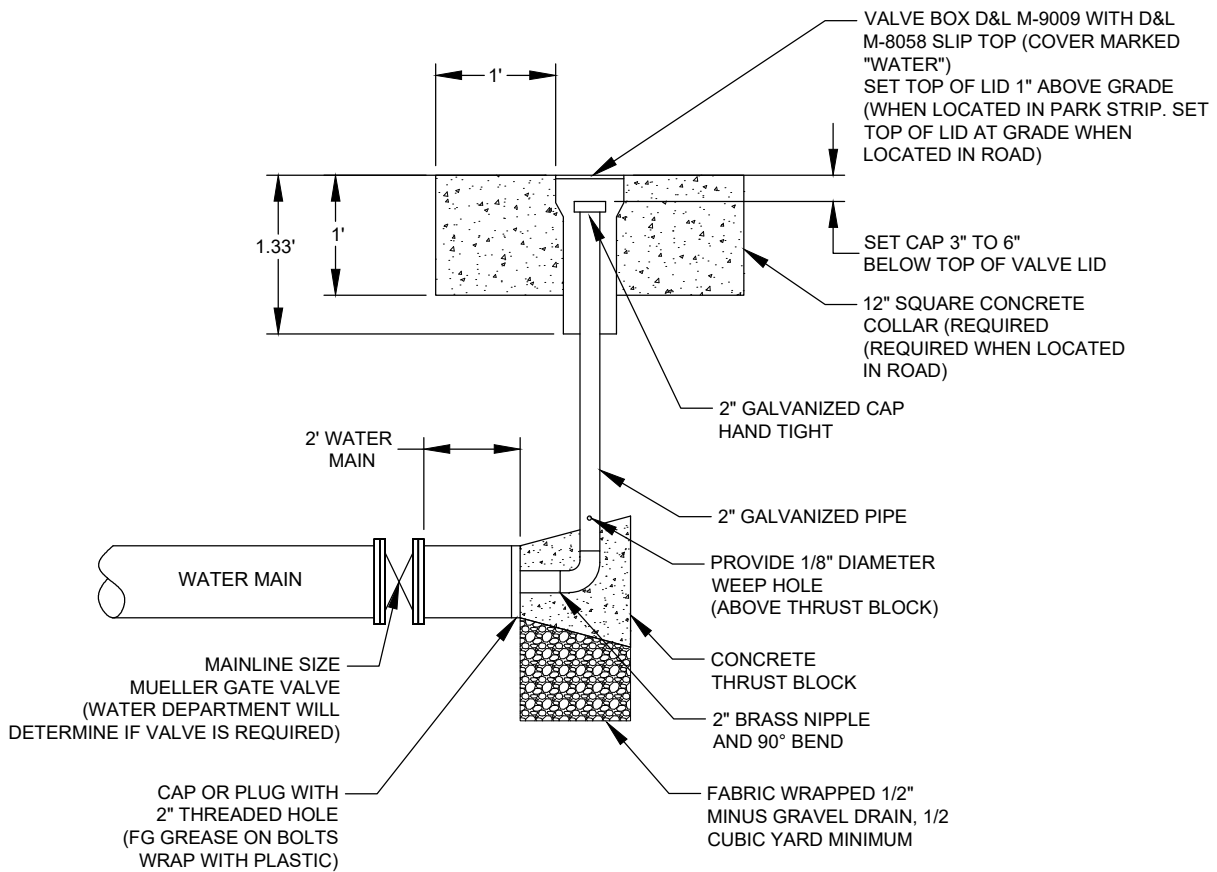
**NOTES:**

1. INSTALL DRINKING WATER ON NORTH AND EAST SIDES OF STREET.
2. INSTALL PRESSURIZED IRRIGATION ON SOUTH AND WEST SIDES OF STREET.
3. ALL DUCTILE IRON PIPE MUST BE WRAPPED IN POLYETHYLENE ENCASEMENT AWWA C105/A21.99

NOT TO SCALE

DRAWN 10/18/17

REVISIONS			
#	BY	DATE	
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02	SWE	11/17/22	



NOT TO SCALE



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**MAIN LINE DEAD END  
 2-INCH CAP**

DRAWN 10/18/17

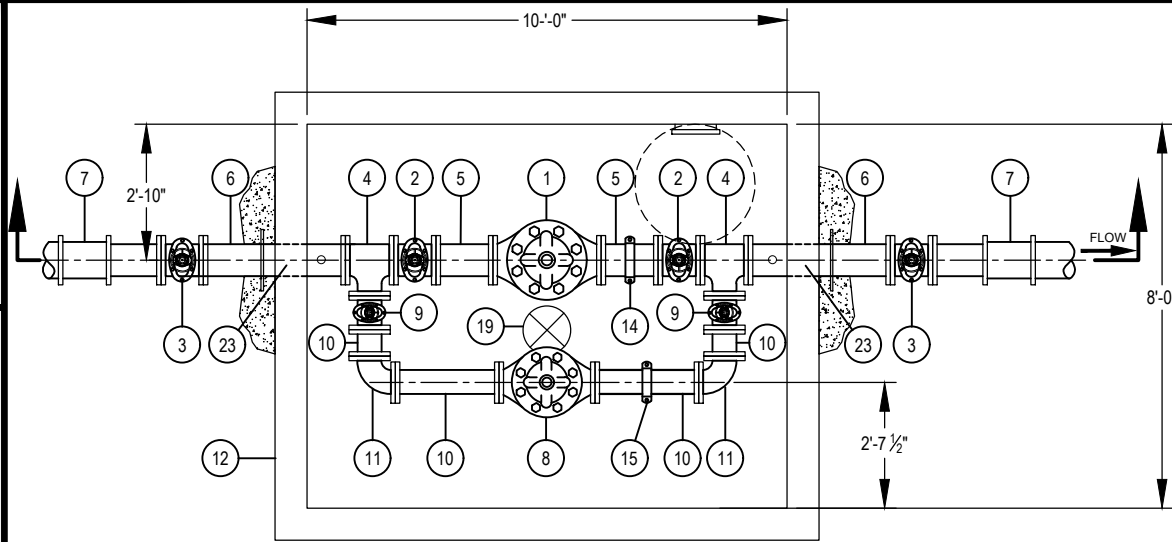
**REVISIONS**

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02	SWF	11/7/22

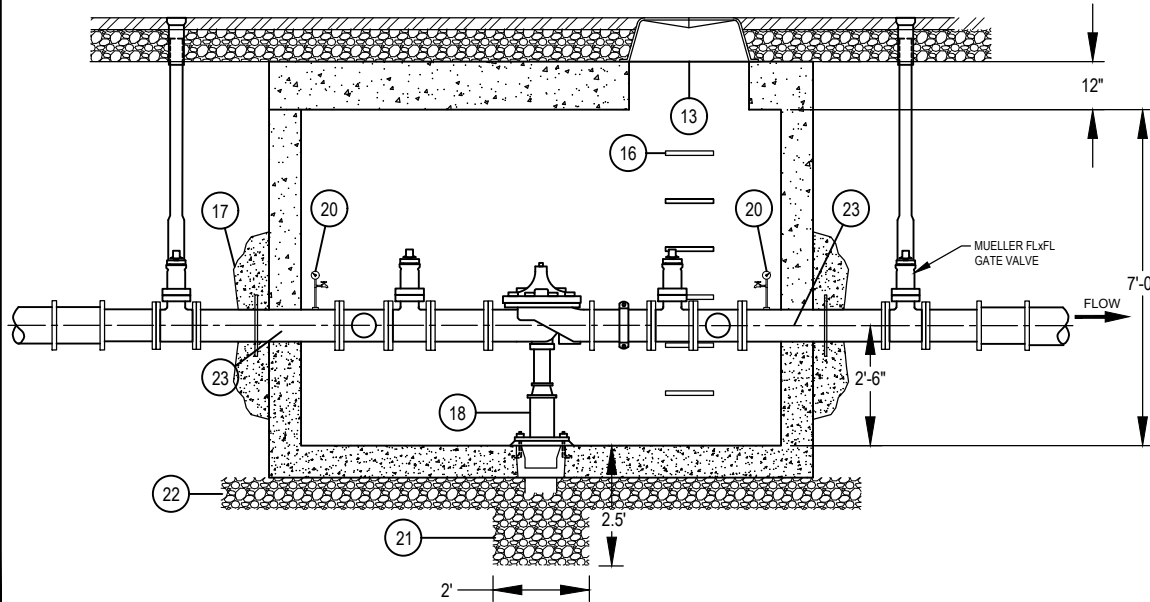
**PLAN**

**DW-15**

#	BY	DATE
01	SMF	04/04/22
01	SMF	11/09/22



**PLAN**  
NTS

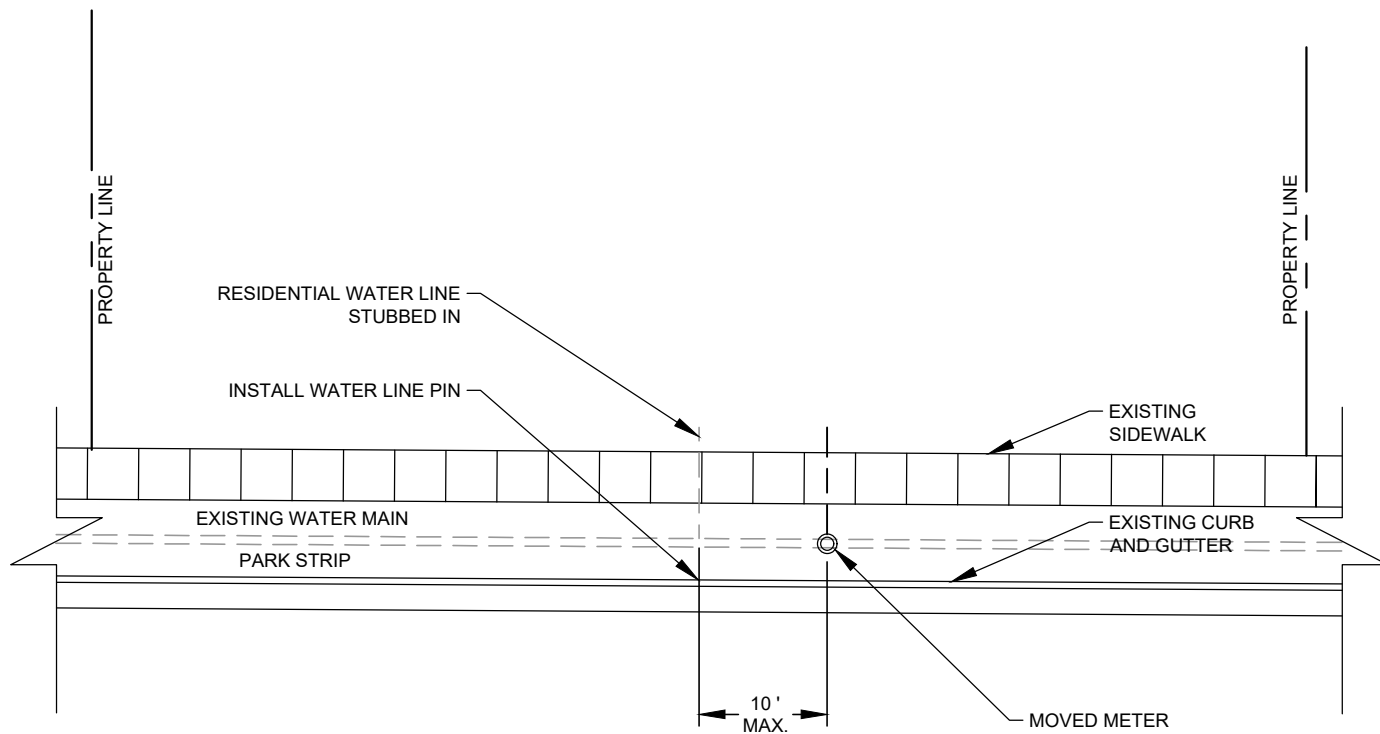


**SECTION**  
NTS

**GENERAL NOTES**

1. THE PRV ASSEMBLY SHALL BE VERIFIED PER MANUFACTURE RECOMMENDATIONS.
2. ALL VALVES SHALL HAVE 125 LB FLG'S, DUCTILE IRON BODY, BRONZE INTERNAL TRIM, EPOXY COATED, AND STAINLESS STEEL TUBES AND FITTINGS.
3. PRECAST BOX AS SHOWN, H-20 LOADING, NO HORIZONTAL JOINTS THROUGH THE PIPE OPENINGS AND FLOOR SHALL SLOPE 2% TOWARDS DRAIN SUMP. (CONTRACTOR TO SUBMIT STRUCTURAL DRAWINGS FOR CAST IN PLACE VAULT).
4. ALL PIPE TO BE EPOXY COATED. EPOXY SPEC TO BE DETERMINED BY WATER DIVISION.

MATERIAL SCHEDULE		
#	QTY	DESCRIPTION
1	1	8" CLA-VAL 90-01YUBKC WITH STAINLESS STEEL TUBING AND PILOT SYSTEM.
2	2	8" MUELLER FLxFL GATE VALVE WITH WHEEL.
3	2	8" MUELLER FLxMJ GATE VALVE WITH VALVE BOX: D&L M-9009 W/M-8058 SLIP TOP AND M-8062 SLIP BASE (COVER MARKED "WATER") SET TOP OF COLLAR FLUSH WITH ASPHALT
4	2	8"x6" D.I. TEE FLANGE SPOOL.
5	2	8" D.I. x 1' SPOOL.
6	2	8" D.I. SPOOL. FL. ANGE x PLAIN END.
7	2	8" COUPLING OR MECHANICAL COUPLING MEGALUG.
8	1	6" CLA-VAL 90-01YUBKC WITH STAINLESS STEEL TUBING AND PILOT SYSTEM.
9	2	6" MUELLER FLxFL GATE VALVE WITH WHEEL.
10	4	6" D.I. SPOOL
11	2	6" 90° D.I. ELBOW FLANGED.
12	1	PRE-CAST TRAFFIC RATED CONCRETE BOX DIMENSIONS AS SHOWN AND SLOPE FLOOR 2% TOWARD DRAIN.
13	1	30" TRAFFIC RATED MANHOLE COVER AND RING. GRADE RINGS AS NEEDED "STAMPED WATER".
14	1	8" ISOLATION VICTAULIC FLANGE
15	1	6" ISOLATION VICTAULIC FLANGE
16		ACCESS STEPS @ 12" O.C. MA INDUSTRIES INC. OR EQUAL.
17	2	THRUST RESTRAINT W/WELDED SEEP RING AND THRUST BLOCK
18	2	ADJUSTABLE PIPE SADDLE SUPPORT AND PIPE W/STAND: GRINNEL MODEL #264 (UNDER 6" PIPE AND 8" PRVS).
19	1	GALVANIZED FLOOR DRAIN. ZURN MODEL Z539-G W/8" OUTLET PIPE
20	2	PRESSURE GAUGE TREE (THREADED HOSE BIB) AND VALVE
21		3/4" GRAVEL FOR DRAIN
22		3/4" GRAVEL BASE
23		LINK SEAL(S) WITH NON SHRINK GROUT



**PLAN VIEW**  
NOT TO SCALE

**NOTES:**

1. 10' MAX. METER MOVE ALLOWED. FURTHER THAN 10' HAS TO BE ABANDONED AND RETAPPED ON MAIN.
2. CURB MUST BE PINNED WITH SERVICE LINE LOCATION.
3. MIN. 14 GAUGE TRACER WIRE TO BE INSTALLED WITH METER MOVE.
4. METER MOVE NEEDS TO BE TOWARDS THE HOUSE SIDE OF DRIVEWAY NOT AWAY FROM THE HOUSE.
5. CONTRACTOR SHALL RUN NEW SERVICE LINE FROM THE HOUSE SIDE OF THE METER BARREL DIRECTLY INTO THE HOUSE AND MAY NOT CONNECT BACK INTO EXISTING WATERLINE.
6. METER MOVED CAN BE DONE IN POLY OR TYPE K COPPER PIPING.
7. PIPE SPLICES SHALL BE MADE USING A MUELLER 110 COMPRESSION FITTING H-15403N AND SHALL HAVE CTS INSERTS.



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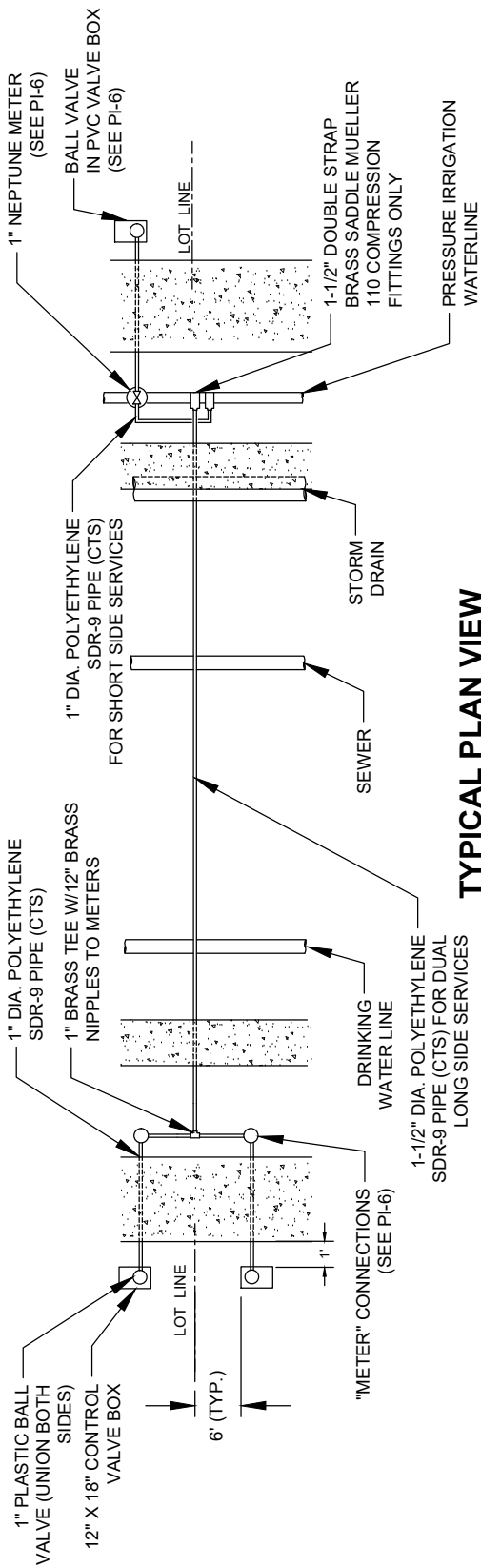
METER MOVE

DRAWN 06/18/22		
REVISIONS		
#	BY	DATE
01	SWF	11/18/22

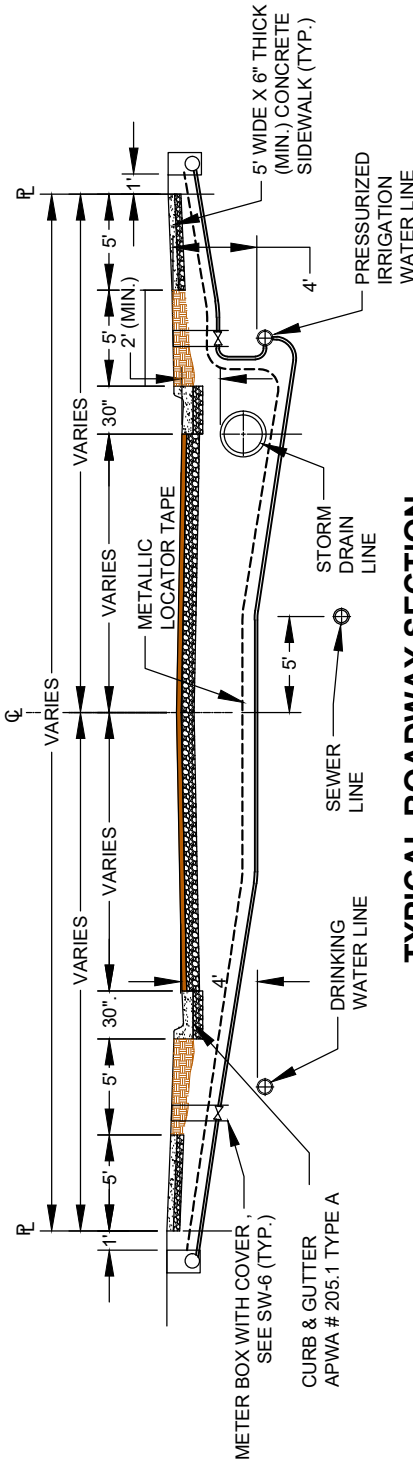
**PLAN**  
**DW-17**

# **Pressurized Irrigation**





**TYPICAL PLAN VIEW**  
NOT TO SCALE



**TYPICAL ROADWAY SECTION**  
NOT TO SCALE

**NOTES:**

1. MINIMUM ASPHALT SURFACE RESTORATION SHALL BE 3" (OR EXISTING + 1" IF GREATER) BITUMINOUS OVER 8" ROADBASE COMPACTED TO 95%. AT MAJOR STREETS CONTRACTOR HAVE A GEOTECHNICAL REPORT COMPLETED OR MATCH EXISTING THICKNESS (PREFERRED).
2. SERVICES MAY BE TUNNELED UNDER CURB AND GUTTER, DRIVEWAYS, OR SIDEWALKS. OTHER STRUCTURES SHALL BE OPEN CUT WITH SURFACE RESTORATION AT THE CITY ENGINEER'S DIRECTION. IF TAPPING SADDLES ARE USED, METHOD OF SAWING/DRILLING TAP HOLES, TYPE OF SADDLE, PROCEDURES MUST BE APPROVED BY THE CITY ENGINEER PRIOR TO INSTALLATION.
3. POLYETHYLENE PIPE SHALL BE SDR-9-PE 3408 MANUFACTURED TO MEET THE REQUIREMENTS OF ASTM D-2737.
4. MAIN PRESSURIZED IRRIGATION LINES 6" OR 8" DIA. SHALL BE P.V.C. PURPLE C-900. MAIN IRRIGATION LINES 10" AND LARGER SHALL BE DUCTILE IRON WITH PURPLE POLYETHYLENE WRAP.
5. ALL CONNECTIONS SHALL BE MADE WITH MUELLER 110 COMPRESSION CONNECTIONS.
6. MINIMUM DISTANCE BETWEEN TAPS SHALL BE 24".
7. ALL PVC OR HDPE PIPE SHALL BE BURIED WITH METALLIC LOCATOR TAPE 6" MIN. ABOVE THE PIPE.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING ALL OF THE REQUIREMENTS ESTABLISHED FOR SAFE TRENCHING. (SEE OSHA REQUIREMENTS).
9. ALL CONSTRUCTION SHALL MEET CURRENT RIVERTON CITY STANDARDS, SPECIFICATIONS, & ORDINANCES.
10. NO MAIL BOX OR ANY OTHER OBSTRUCTION SHALL BE ALLOWED WITHIN 3 FEET OF ANY WATER METER OR VALVE (INCLUDING STOP & WASTE).
11. ALL DUCTILE IRON PIPE MUST BE WRAPPED IN POLYETHYLENE ENCASUREMENT AWAA C-105-99.
12. SINGLE LONG SIDE SERVICES SHALL BE 1 INCH.



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**SERVICE LINES**

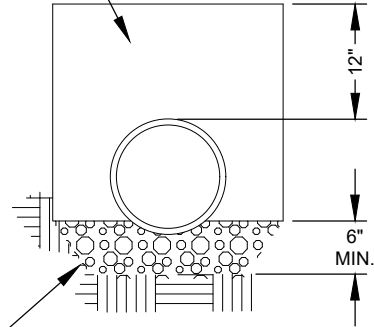
DRAWN 10/18/17		
REVISIONS		
#	BY	DATE
01	SWF	12/01/20
02	SWF	11/08/22

**PLAN**  
  
**PI-1**

**CONSTRUCTION NOTES:**

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING ALL OF THE REQUIREMENTS ESTABLISHED FOR SAFE TRENCHING. (SEE OSHA AND UOSH REQUIREMENTS, LATEST EDITIONS).
2. MINIMUM COVER OVER TOP OF PIPE SHALL BE 36 INCHES BELOW THE FINISHED GRADE. THIS DEPTH MAY BE INCREASED AS REQUIRED TO MISS UNDERGROUND UTILITIES STORM DRAINS, OR OTHER OBSTRUCTIONS, OR WHERE INDICATED ON THE DRAWINGS.
3. CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES BEFORE LAYING PIPE WITHIN 200 FEET OF UTILITY CROSSINGS SHOWN ON THE DRAWINGS. OR AS "BLUE-STAKED."
4. SEWER MAINS, WATER MAINS, GAS MAINS AND OTHER UTILITIES ARE SHOWN ON THE PLANS IN A GENERAL SCHEMATIC WAY ACCORDING TO INFORMATION RECEIVED FROM OTHERS AND SOMETIMES FROM FIELD MEASUREMENTS. THE ACCURACY OR COMPLETENESS OF THE LOCATIONS SHOWN IS NOT GUARANTEED. THE CONTRACTOR SHALL DETERMINE THE ACTUAL LOCATION OF EXISTING SERVICE CONNECTIONS AND UTILITIES AND TAKE THE NECESSARY STEPS TO AVOID THEM.
5. ANY DAMAGE TO EXISTING UTILITIES SHALL BE REPAIRED AT THE CONTRACTOR'S SOLE EXPENSE.
6. THE CONTRACTOR MAY, AT HIS DISCRETION, USE SLOPING WALLS IN UNIMPROVED TERRAIN.
7. VERTICAL WALLS SHOWN FOR THE TRENCH SECTION WILL BE USED TO COMPUTE ALL QUANTITIES.
8. PAVEMENT FOR BITUMINOUS RESTORATION SHALL BE FOR WIDTH OF ACTUAL RESTORATION NOT TO EXCEED THE MAXIMUM PAVEMENT WIDTH.

BACKFILL MATERIAL AT NEAR OPTIMUM MOISTURE AND WITH 3/4" MAX ROCK, SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED 8" AND COMPACTED TO 90% DENSITY AS DESCRIBED IN THE SPECIFICATIONS. SERVICE LINES MUST BE BEDDED IN SAND.



SELECT BACKFILL FOR BEDDING COMPACTED TO 90% DENSITY AS DESCRIBED IN THE SPECIFICATIONS

**TRENCH QUANTITIES FOR PAVEMENT**

PIPE DIAMETER (INCHES)	MAXIMUM TRENCH WIDTH AT TOP OF PIPE, VERTICAL WALL (INCHES)	MAXIMUM PAVMENT WIDTH FOR SURFACE RESTORATION (INCHES)
LESS THAN 3"	18	30
4	18	30
6	18	30
8	24	36
10	24	36
12	30	42
16	33	45
18	36	48
21	39	51
24	42	54
30	48	60
36	54	66
42	60	72
48	66	78

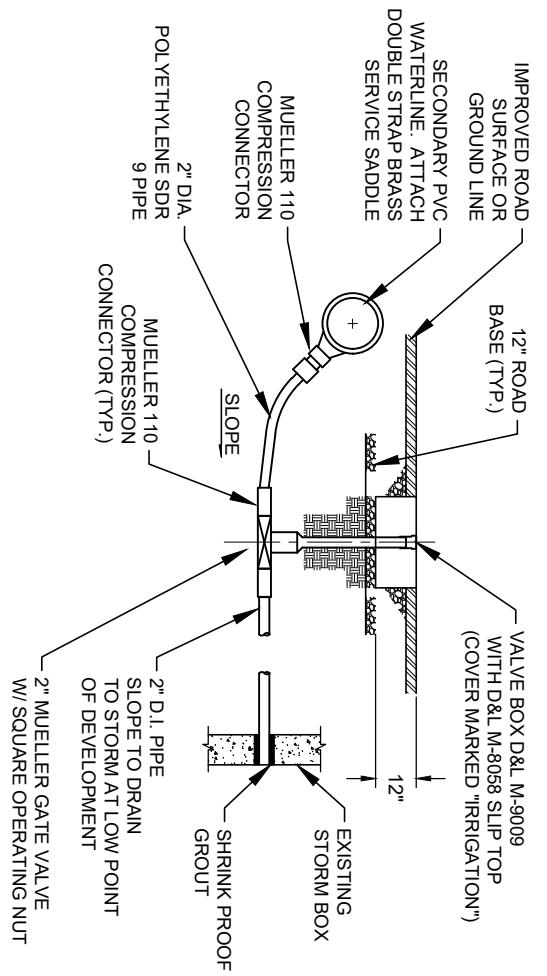


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**SERVICE CONNECTION**

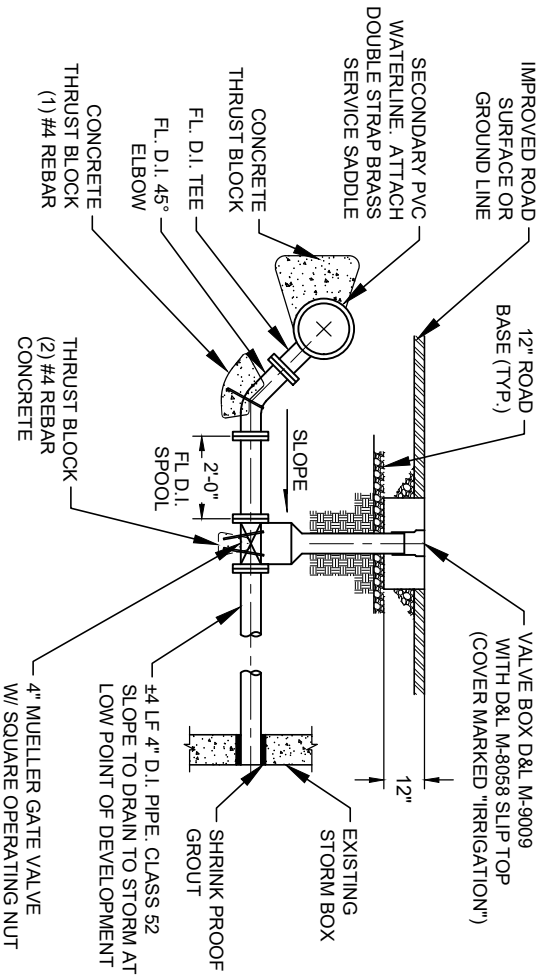
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REVISIONS		
#	BY	DATE
01	SWF	12/01/20
02	SWF	11/14/22

**PLAN**  
  
**PI-2A**



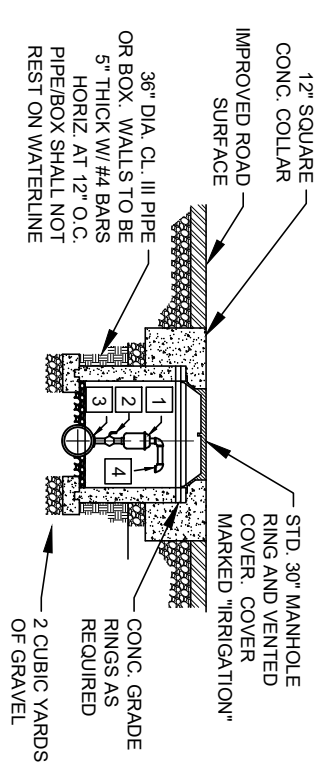
**2" DRAIN VALVE DETAIL**

NOT TO SCALE



**4" DRAIN VALVE DETAIL**

NOT TO SCALE

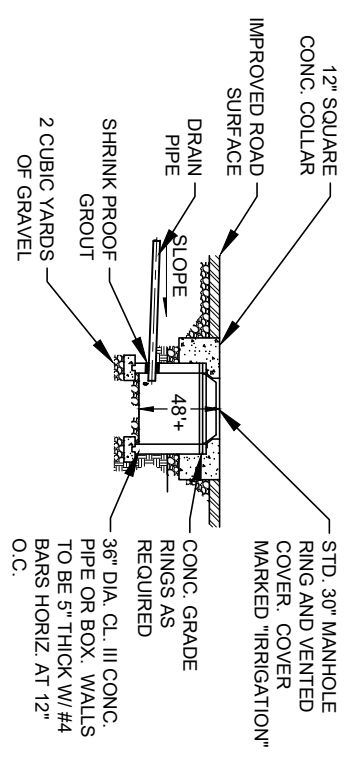


**1" AND 2" AIR VACUUM RELIEF VALVE DETAIL**

NOT TO SCALE

- 1 OR 2" AIR VACUUM RELIEF VALVE
- 1" OR 2" BALL VALVE W/HAND VALVE OPERATOR, 3" LONG BRASS NIPPLE
- APPROVE TAP OR SADDLE TEE.
- 1" GALV. PIPE W/ SCREEN

1. WHERE 1" AIR VACUUM RELIEF VALVE IS SHOWN USE 1" THR. BRASS FITTINGS AND A 1" PLUG OR GATE VALVE. MAIN LINE IS TO BE TAPPED IN A MANNER APPROVED BY THE ENGINEER.
2. WHERE 2" AIR VACUUM RELIEF VALVE SHOWN USE 2" THR. BRASS FITTINGS AND A 2" PLUG VALVE. MAIN LINE CONNECTION TO BE MADE WITH A STANDARD TEE.



**TEMPORARY GRAVEL DRAIN SUMP DETAIL**

NOT TO SCALE

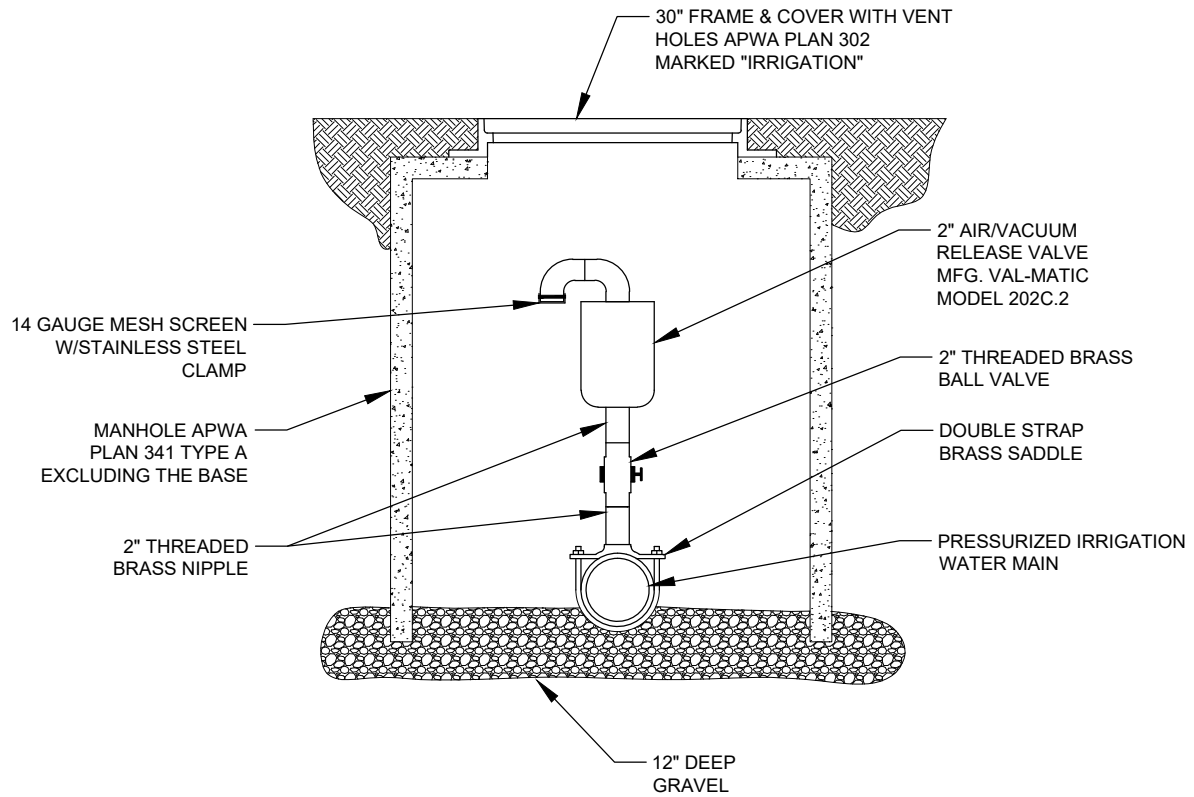
PLAN  
PI-2B

DRAWN 10/18/17		
REVISIONS		
#	BY	DATE
01	SWF	12/01/20
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DRAIN VALVE AND  
AIR-VACUUM CONNECTION

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NOT TO SCALE



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**2-INCH AIR/VACUUM  
 RELEASE VALVE**

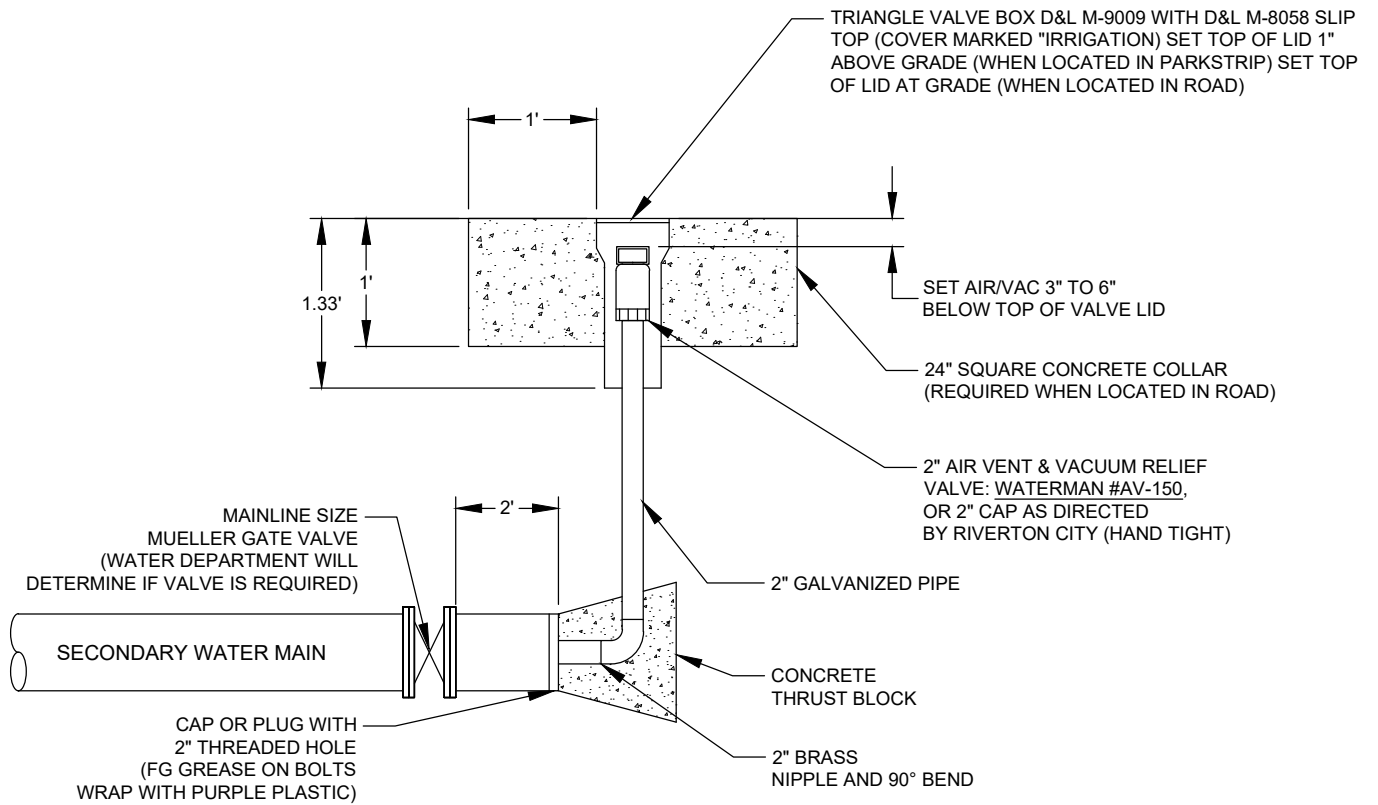
DRAWN 10/18/17

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#	BY	DATE
01	SWF	12/01/20
02	SWF	11/14/22

PLAN

PI-3



NOT TO SCALE



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**MAIN LINE DEAD END**  
**2-INCH AIR/VACUUM**  
**RELEASE VALVE**

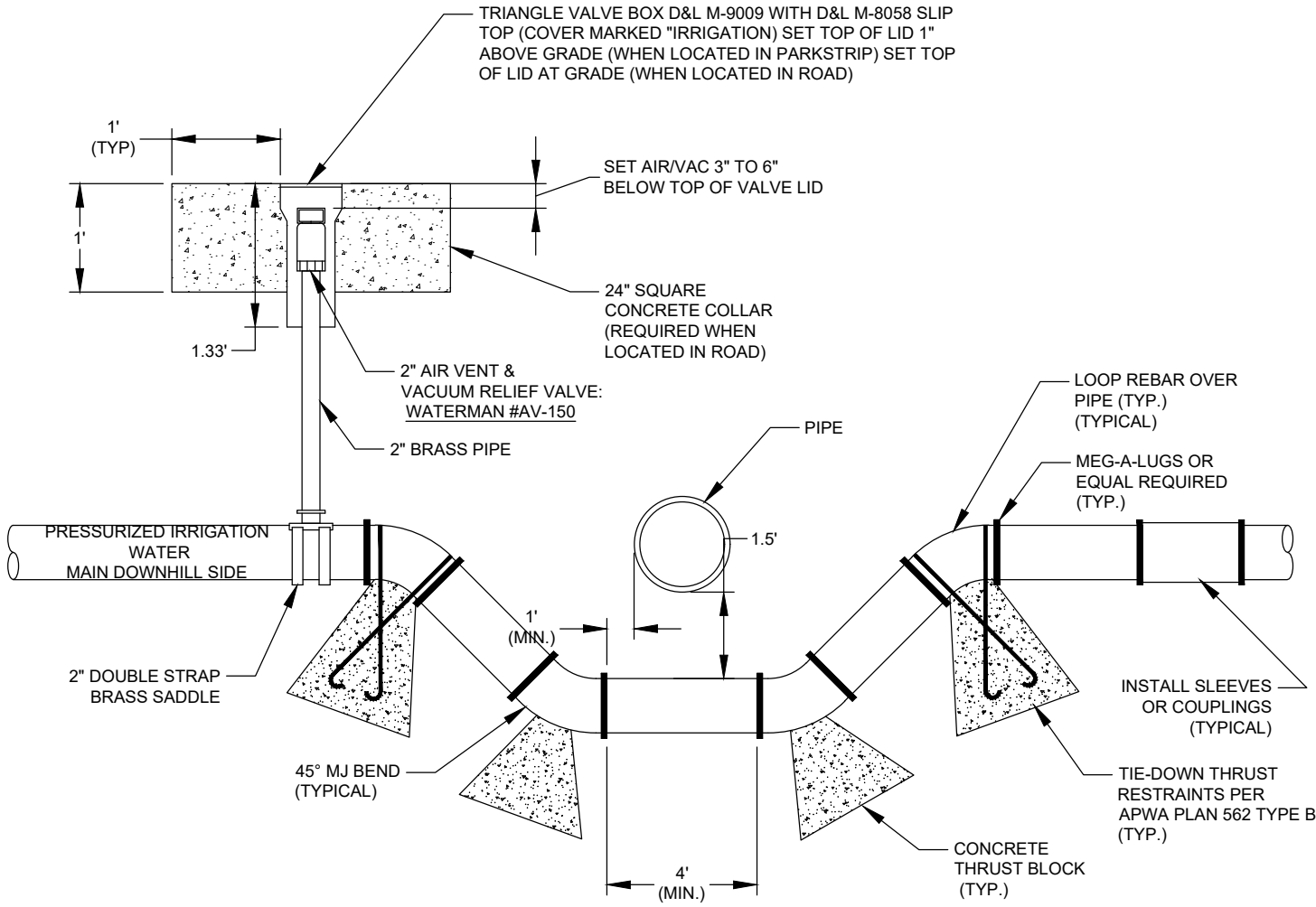
DRAWN 10/18/17

REVISIONS

#	BY	DATE
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02	SWF	04/04/22

**PLAN**

**PI-4**



NOT TO SCALE

NOTES:

1. CITY MUST BE GIVEN 24 HOUR NOTICE PRIOR TO LOOPING ANY WATER LINE.
2. INSTALL AIR VENT/VACUUM RELEASE VALVE ON LOW SIDE OF LOOP.

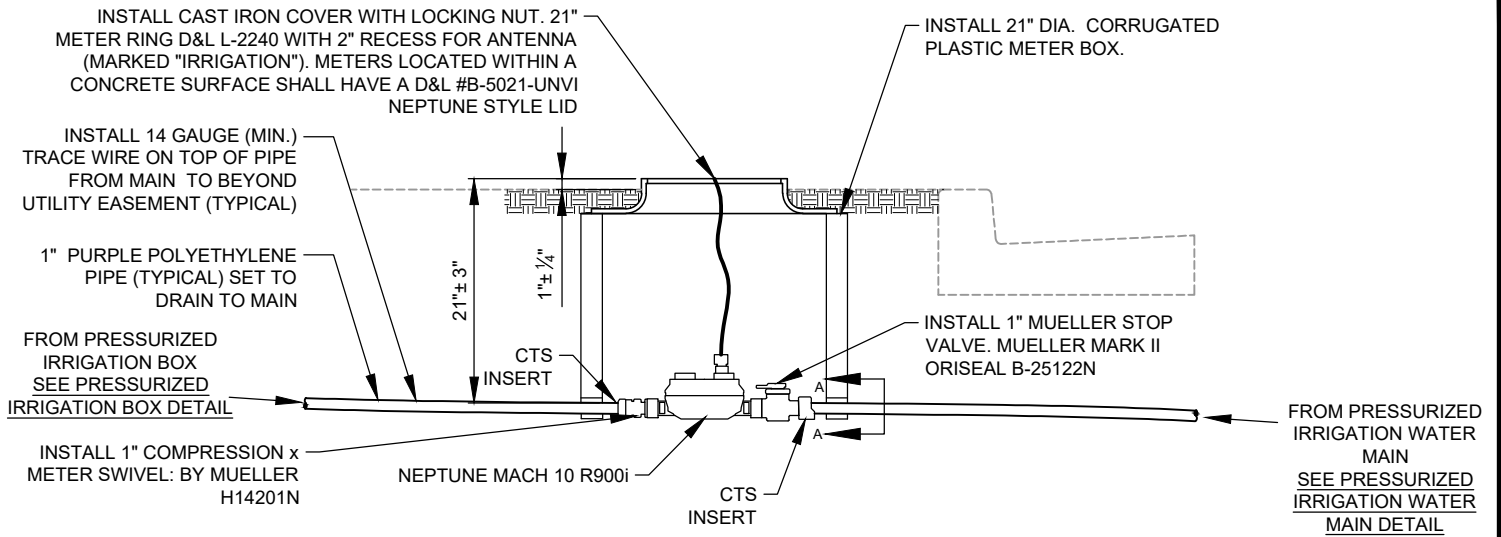


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**MAIN LINE LOOP**  
**2-INCH AIR/VACUUM**  
**RELEASE VALVE**

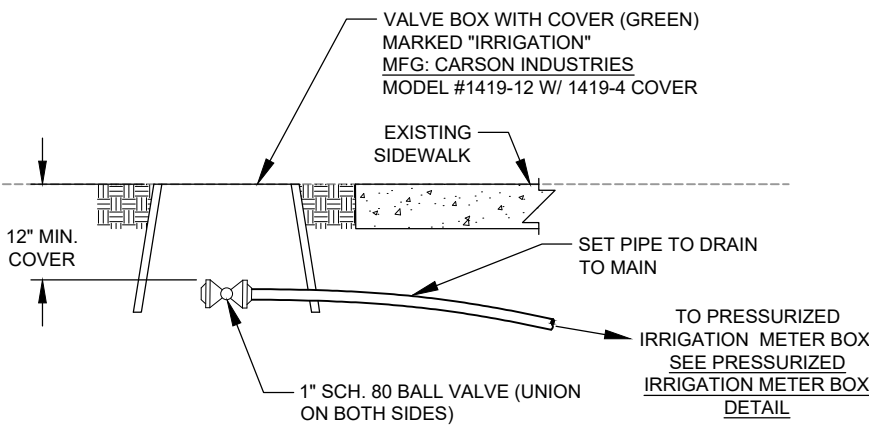
DRAWN 10/18/17		
REVISIONS		
#	BY	DATE
01	SWF	12/01/20
02	SWF	04/04/22

**PLAN**  
  
**PI-5**



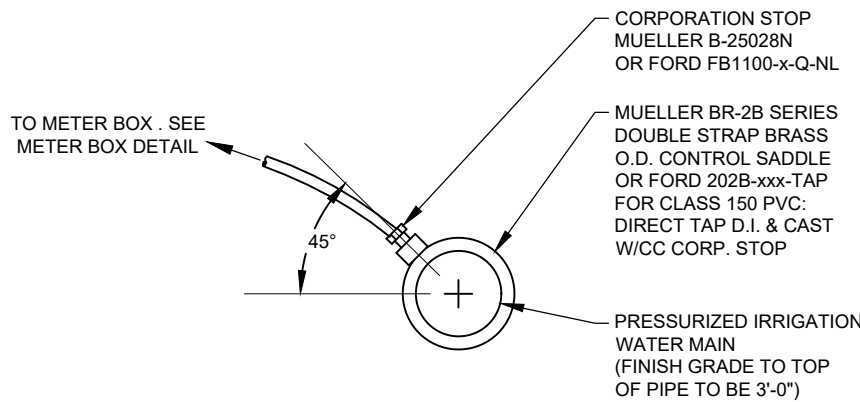
**PRESSURIZED IRRIGATION WATER METER BOX DETAIL**

NOT TO SCALE



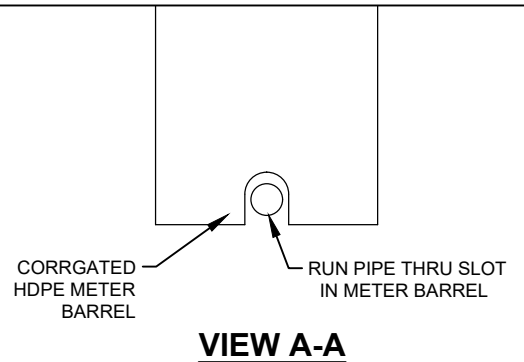
**IRRIGATION BOX DETAIL**

NOT TO SCALE



**PRESSURIZED IRRIGATION WATER MAIN DETAIL**

NOT TO SCALE



**NOTES:**

1. INSPECTION: METER BOX AND SERVICE LINE SHALL BE INSPECTED BY CITY PRIOR TO BACKFILLING.
2. BACKFILL: INSTALL BACKFILL IN LIFTS NOT EXCEEDING 8" AFTER COMPACTION. COMPACT EACH LIFT TO AN AVERAGE DRY DENSITY OF 97% WITH NO DENSITY TEST RESULT LESS THAN 95%.
3. PRESSURIZED IRRIGATION WATER METER SHALL BE PROVIDED BY CITY AND INSTALLED BY CITY.
4. PIPE SPLICES SHALL BE MADE USING A MUELLER 110 COMPRESSION FITTING H-15403N AND SHALL HAVE CTS INSERTS.
5. CONTRACTOR SHALL SUPPLY ALL MATERIALS (EXCLUDING THE PRESSURIZED IRRIGATION WATER METER) AND LABOR TO MAKE METERING ASSEMBLY WHOLE AND FUNCTIONING. CONTRACTOR TO VERIFY DISTANCE BETWEEN METER FLANGES FOR PROPER DISTANCE. CONTRACTOR SHALL INSTALL 1 1/4" x 11" METER NIPPLE.
6. PROTECT MAIL BOX, FIRE HYDRANTS, TREES OR ANY OTHER OBSTRUCTION WITHIN 3 FEET OF METER.
7. ALL POLY PIPE SHALL BE CTS PURPLE POLY.



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**RESIDENTIAL METER**  
**CONNECTION**  
**1-INCH SERVICE**

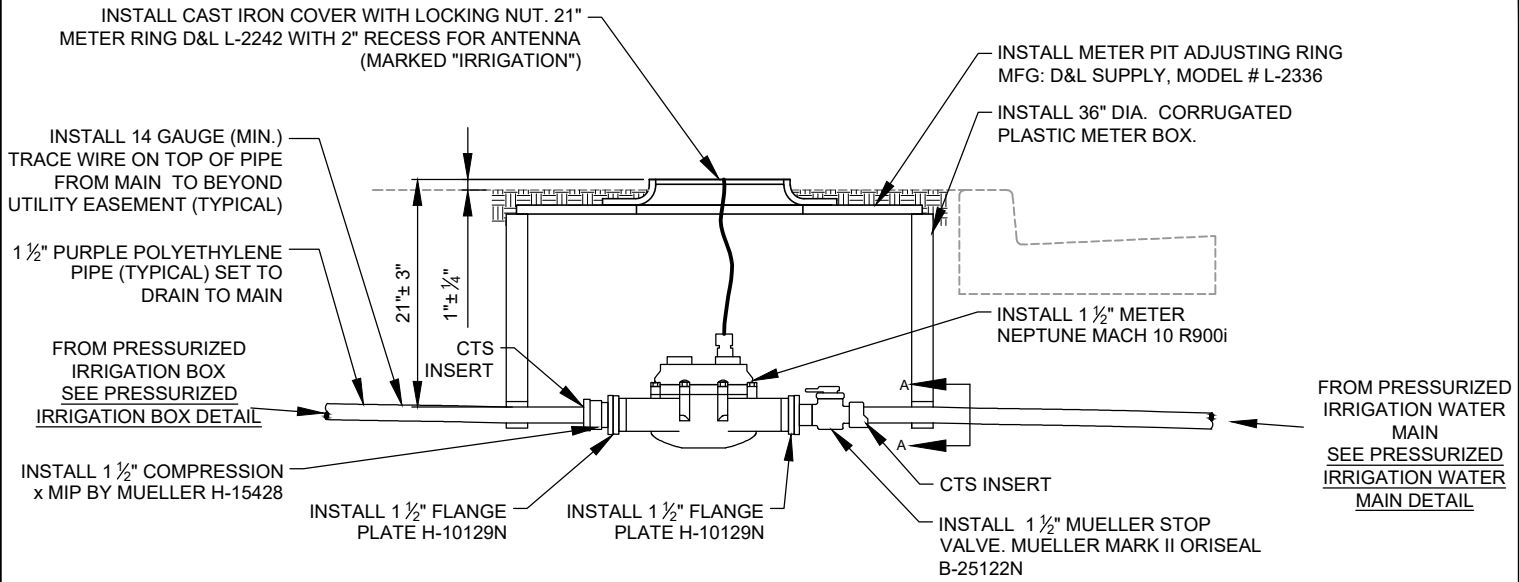
DRAWN 10/18/17

**REVISIONS**

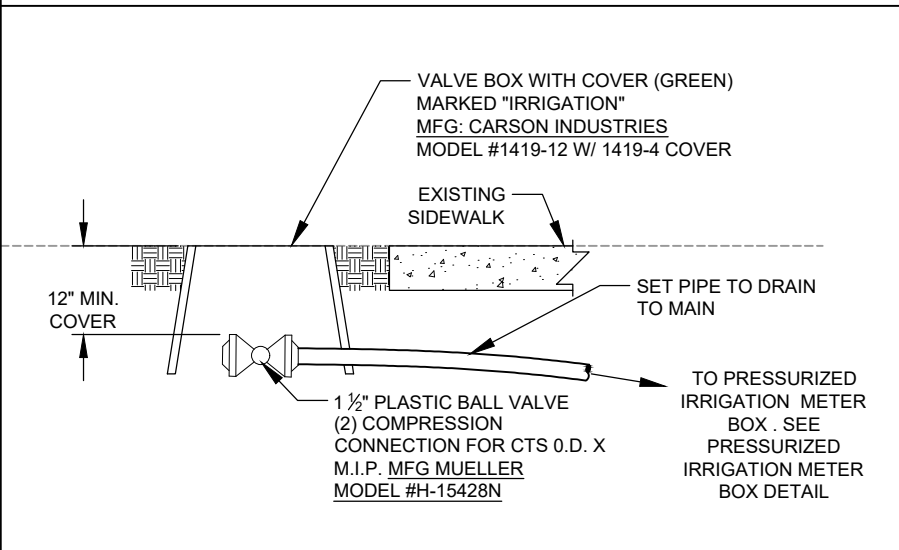
#	BY	DATE
01	SWF	12/01/20
02	SWF	08/17/22

**PLAN**

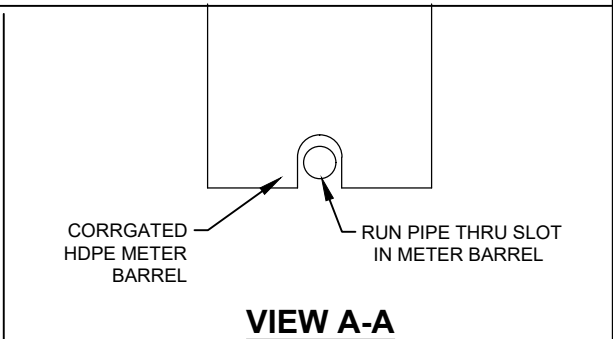
**PI-6**



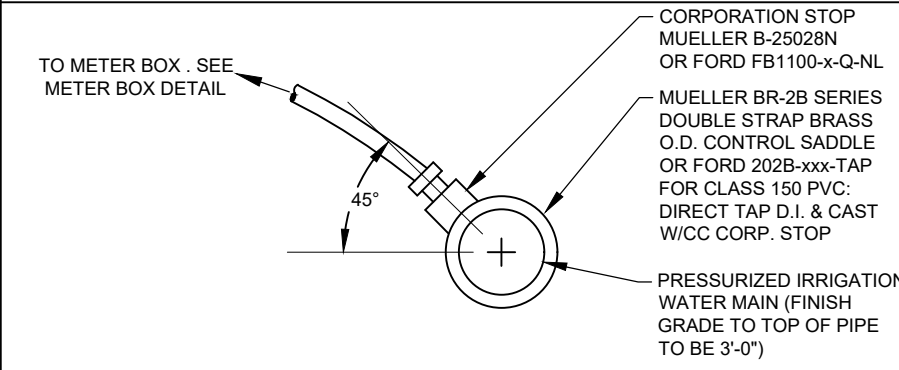
**PRESSURIZED IRRIGATION METER BOX DETAIL**  
NOT TO SCALE



**PRESSURIZED IRRIGATION BOX DETAIL**  
NOT TO SCALE



- NOTES:**
- INSPECTION: METER BOX AND SERVICE LINE SHALL BE INSPECTED BY CITY PRIOR TO BACKFILLING.
  - BACKFILL: INSTALL BACKFILL IN LIFTS NOT EXCEEDING 8" AFTER COMPACTION. COMPACT EACH LIFT TO AN AVERAGE DRY DENSITY OF 97% WITH NO DENSITY TEST RESULT LESS THAN 95%.
  - PRESSURIZED IRRIGATION WATER METER SHALL BE PROVIDED BY CITY AND INSTALLED BY CITY.
  - PIPE SPLICES SHALL BE MADE USING A MUELLER 110 COMPRESSION FITTING #H15451N AND SHALL HAVE CTS INSERTS.
  - CONTRACTOR SHALL SUPPLY ALL MATERIALS (EXCLUDING THE PRESSURIZED IRRIGATION WATER METER) AND LABOR TO MAKE METERING ASSEMBLY WHOLE AND FUNCTIONING. CONTRACTOR TO VERIFY DISTANCE BETWEEN METER FLANGES FOR PROPER DISTANCE.
  - PROTECT MAIL BOX, FIRE HYDRANTS, TREES OR ANY OTHER OBSTRUCTION WITHIN 3 FEET OF METER.
  - ALL POLY PIPE SHALL BE CTS PURPLE POLY.



**PRESSURIZED IRRIGATION WATER MAIN DETAIL**  
NOT TO SCALE

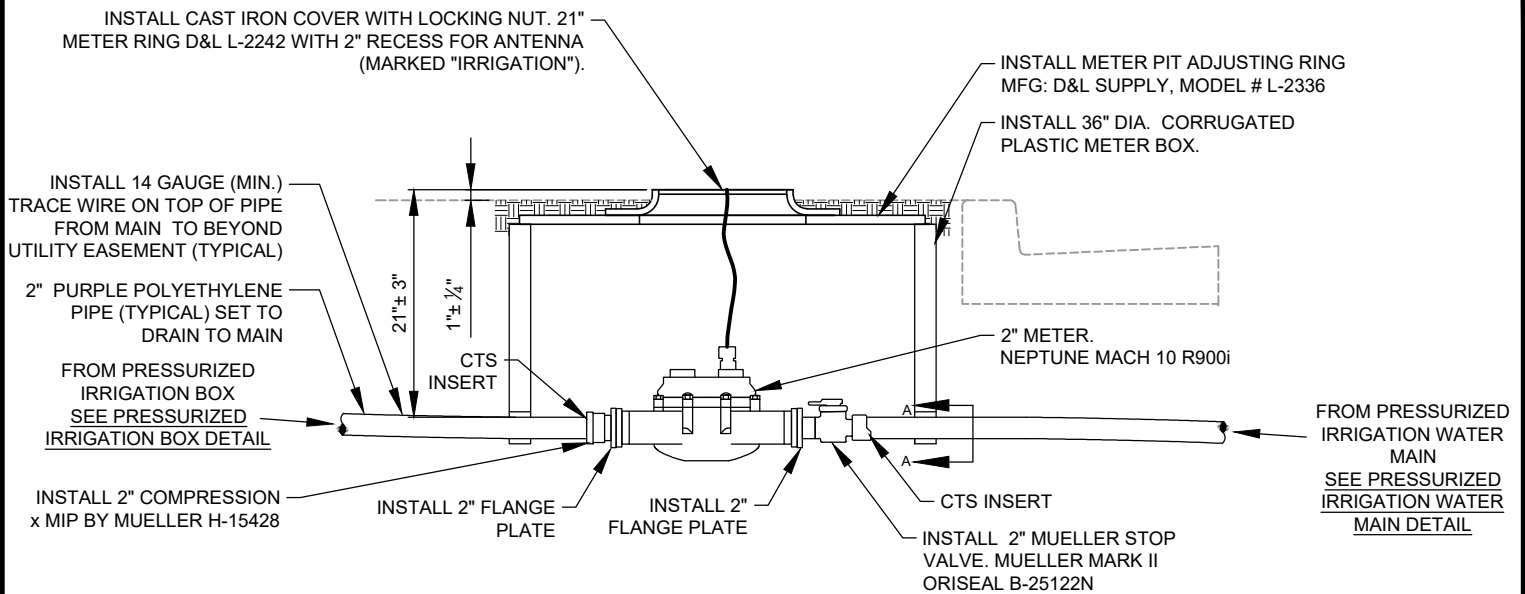


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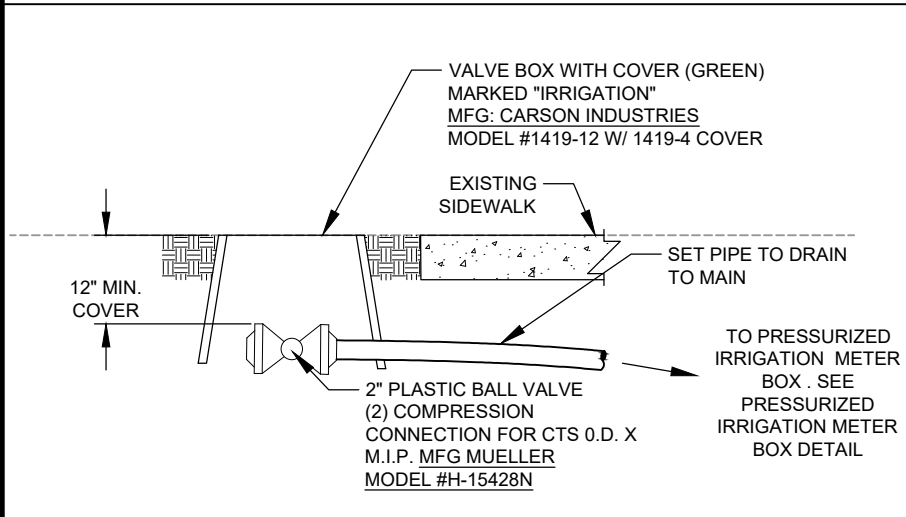
**METER CONNECTION**  
**1-1/2-INCH SERVICE**

DRAWN 10/18/17		
REVISIONS		
#	BY	DATE
01	SWF	12/01/20
02	SWF	11/18/22

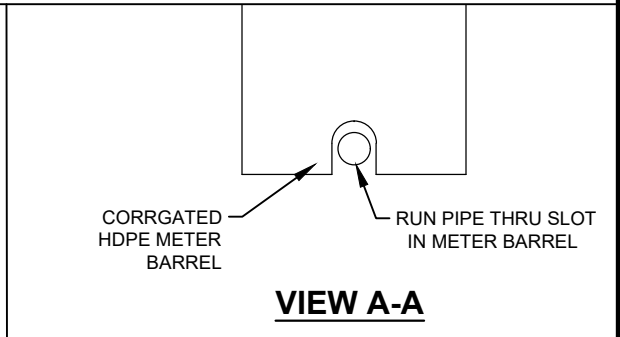
**PLAN**  
  
**PI-7**



**PRESSURIZED IRRIGATION METER BOX DETAIL**  
NOT TO SCALE

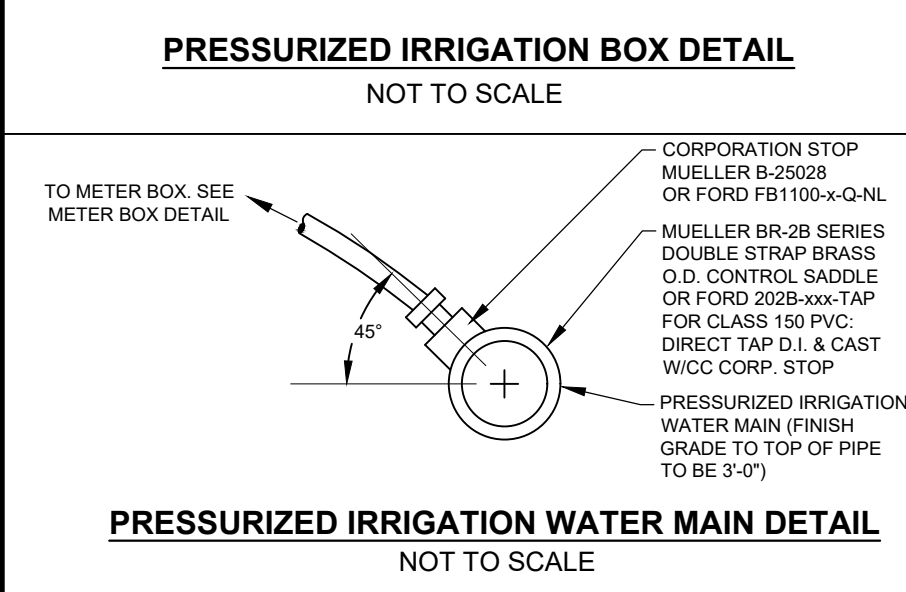


**PRESSURIZED IRRIGATION BOX DETAIL**  
NOT TO SCALE



NOTES:

- INSPECTION: METER BOX AND SERVICE LINE SHALL BE INSPECTED BY CITY PRIOR TO BACKFILLING.
- BACKFILL: INSTALL BACKFILL IN LIFTS NOT EXCEEDING 8" AFTER COMPACTION. COMPACT EACH LIFT TO AN AVERAGE DRY DENSITY OF 97% WITH NO DENSITY TEST RESULT LESS THAN 95%.
- PRESSURIZED IRRIGATION WATER METER SHALL BE PROVIDED BY CITY, INSTALLED BY CITY.
- PIPE SPLICES SHALL BE MADE USING A MUELLER 110 COMPRESSION FITTING #H15451N AND SHALL HAVE CTS INSERTS.
- CONTRACTOR SHALL SUPPLY ALL MATERIALS (EXCLUDING THE PRESSURIZED IRRIGATION WATER METER) AND LABOR TO MAKE METERING ASSEMBLY WHOLE AND FUNCTIONING. CONTRACTOR TO VERIFY DISTANCE BETWEEN METER FLANGES FOR PROPER DISTANCE.
- PROTECT MAIL BOX, FIRE HYDRANTS, TREES OR ANY OTHER OBSTRUCTION WITHIN 3 FEET OF METER.
- ALL POLY PIPE SHALL BE CTS PURPLE POLY.



**PRESSURIZED IRRIGATION WATER MAIN DETAIL**  
NOT TO SCALE



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**METER CONNECTION  
2-INCH SERVICE**

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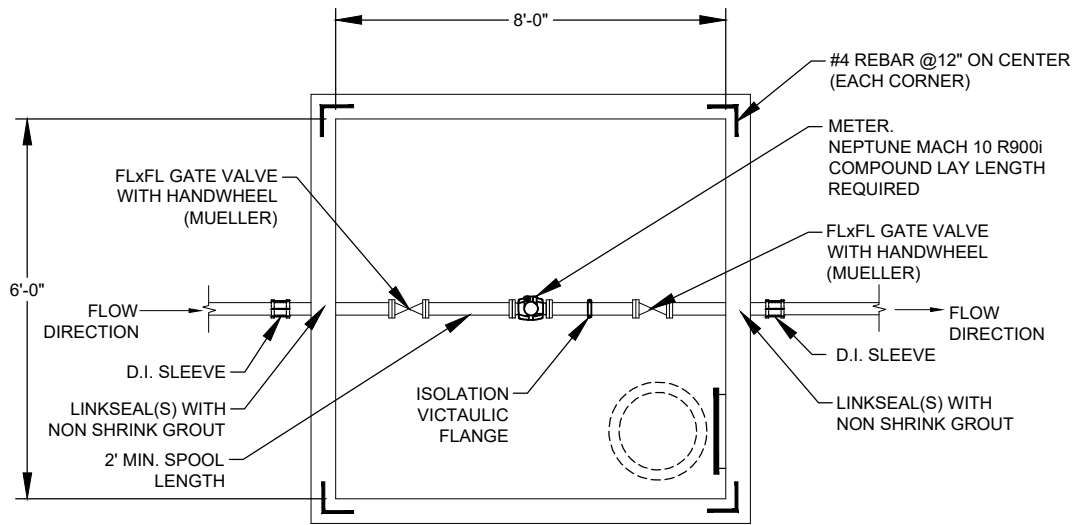
REVISIONS

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01	SWF	12/01/20
02	SWF	08/17/22

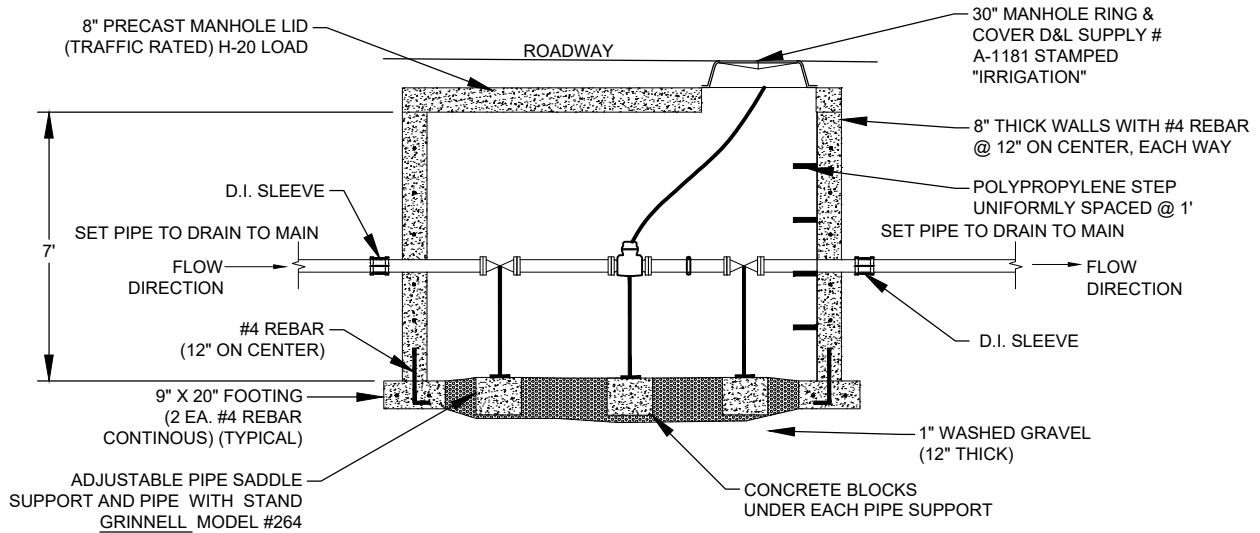
**PLAN**

**PI-8**





**PLAN VIEW**  
NOT TO SCALE



**SECTION VIEW**  
NOT TO SCALE



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**METER VAULT**  
8-12-INCH SERVICE

DRAWN 10/18/17

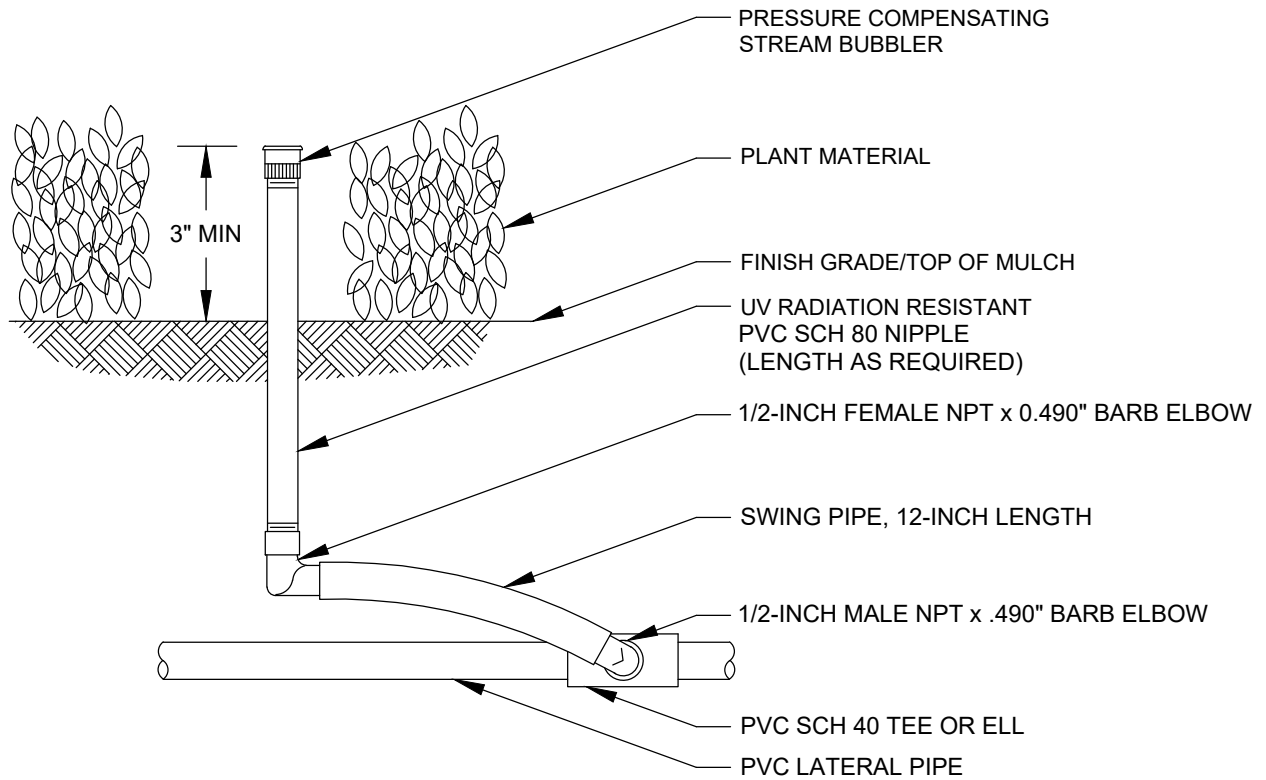
REVISIONS

#	BY	DATE
01	SWF	OCT/21
02	SWF	06/15/22

PLAN

PI-10

# **Irrigation And Landscaping**

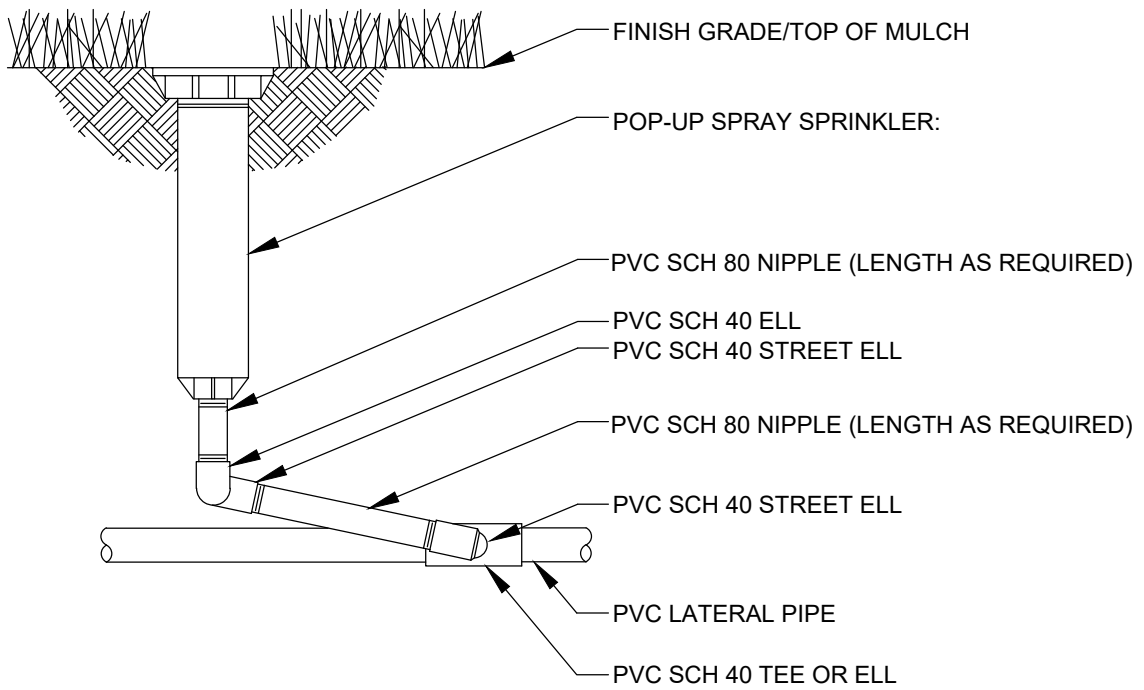


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**BUBBLER**

REVISIONS		
#	BY	DATE
01	SWF	04/04/22

**PLAN**  
  
**LS-1**

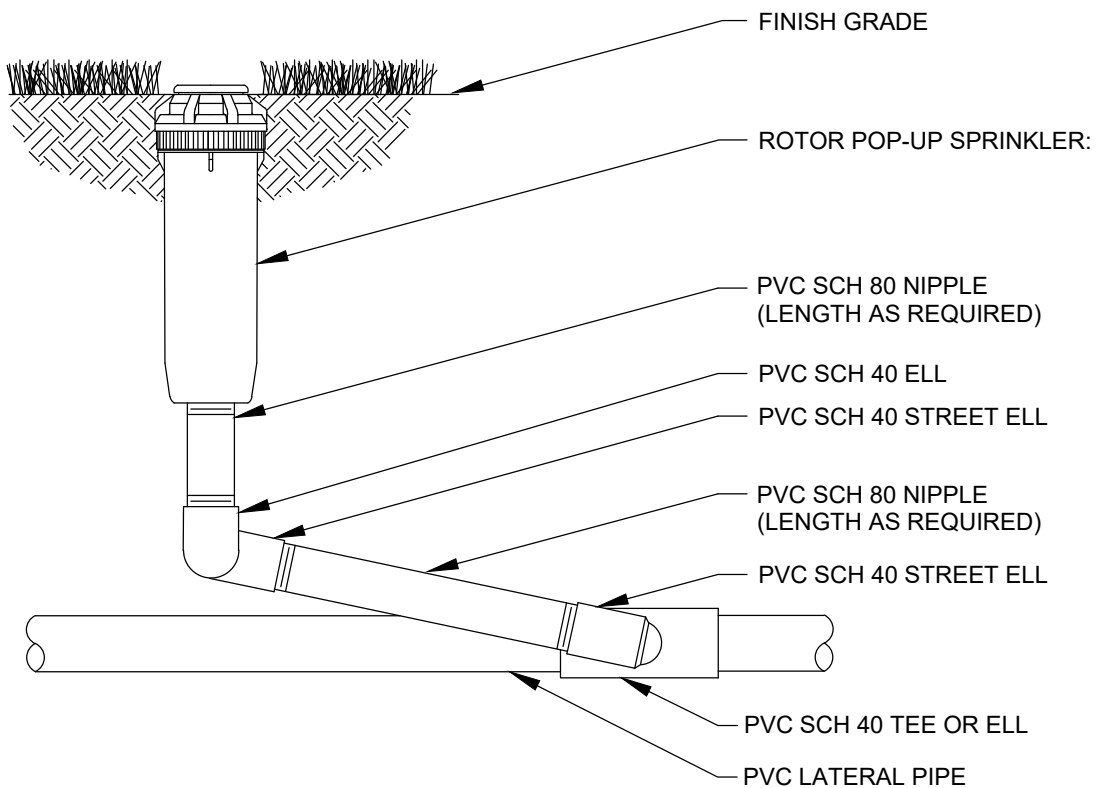


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POP-UP  
 SPRAY SPRINKLER

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PLAN  
 LS-2

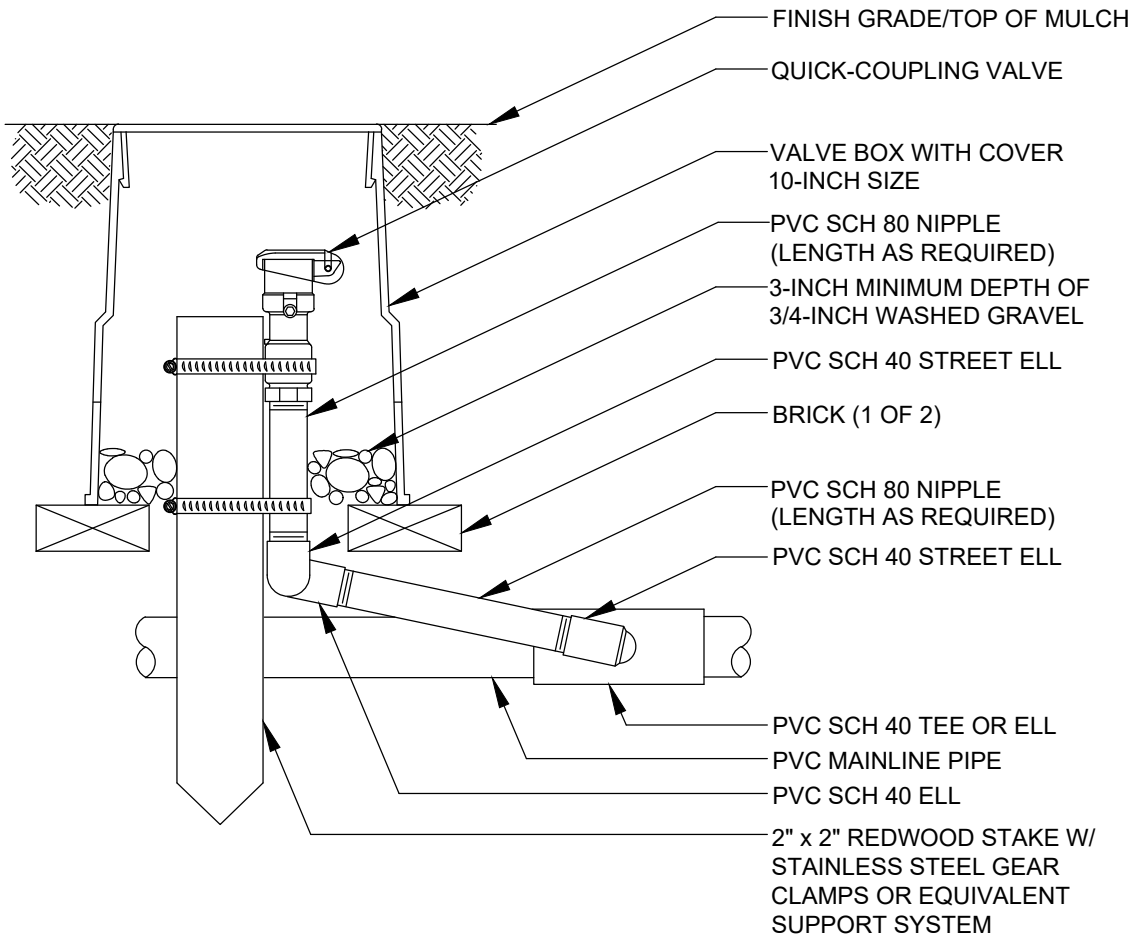


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**ROTOR POP-UP**  
**SPRINKLER**

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**PLAN**  
**LS-3**



NOTE:

1. FURNISH FITTINGS AND PIPING NOMINALLY SIZED IDENTICAL TO NOMINAL QUICK COUPLING VALVE INLET SIZE.



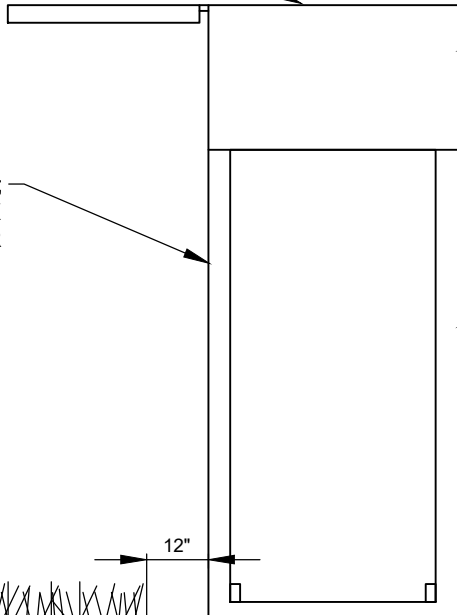
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**QUICK-COUPLING VALVE**

REVISIONS		
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**PLAN**  
  
**LS-4**

FIELD SATELLITE LOCKING  
CONTROLLER, BOX



STAINLESS STEEL STRONG BOX ENCLOSER  
MODEL # SB-18 SS WEATHERTRAK OR  
ACCEPTABLE EQUAL

AUTOMATIC CONTROLLER;  
WEATHER TRAK  
PRO 3 CONTROLLER

INSTALL SMART PORT THROUGH WALL  
OF STRONG BOX

INSTALL WEATHER TRAK PEDESTAL  
PER CITY STANDARDS

4" THICK CONCRETE PAD W/ 6" ROAD BASE

12"

FINISH GRADE

3-INCH PVC SCH 40 CONDUIT,  
FITTINGS AND SWEEP ELL.  
IF INSTALLING 2 WIRE SYSTEM,  
DOWNSIZING TO 2" CONDUIT IS  
APPROPRIATE

DIRECT BURIAL CONTROL WIRES TO  
REMOTE CONTROL VALVES 2 WIRE  
JACKET

1-INCH PVC SHC 40 GREY  
CONDUIT, FITTINGS  
AND SWEEP ELL TO  
POWER SUPPLY

1-INCH PVC SCH 40 CONDUIT,  
FITTINGS AND SWEEP ELL FOR #6  
GROUND WIRE

1-INCH PVC SCH 40 CONDUIT,  
FITTINGS AND SWEEP ELL FOR  
ETHERNET WIRE

NOTE:  
INSTALL WEATHER TRAK PRO 3, WITH ALL  
COMPONENTS FOR CENTRAL CONTROL.



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HYBRID CONTROLLER

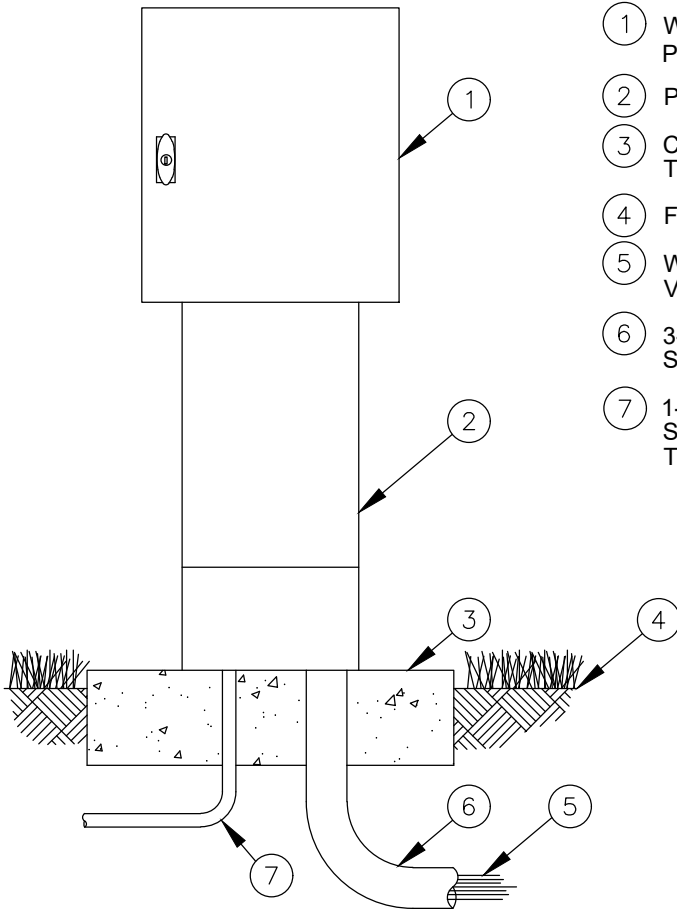
DRAWN 04/04/22

REVISIONS

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PLAN

LS-5



- ① WEATHERTRACK CONTROLLER PRO 3
- ② PEDESTAL KIT
- ③ CONCRETE PAD: 6-INCH MINIMUM THICKNESS
- ④ FINISH GRADE
- ⑤ WIRES TO REMOTE CONTROL VALVES
- ⑥ 3-INCH PVC SCH 40 CONDUIT, SWEEP ELL AND FITTINGS
- ⑦ 1-INCH PVC SCH 40 CONDUIT, SWEEP ELL AND FITTINGS TO POWER SUPPLY



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**ELECTROMECHANICAL  
 CONTROLLER**

REVISIONS		
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**PLAN**  
  
**LS-6**

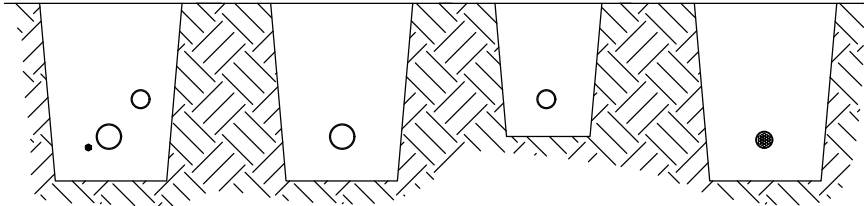
SECTION VIEW

MAINLINE, LATERAL,  
AND WIRING IN THE  
SAME TRENCH

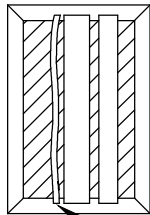
MAINLINE  
PIPE

LATERAL  
PIPE

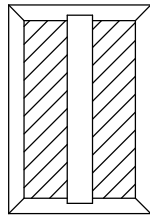
WIRING IN  
CONDUIT



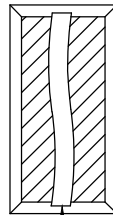
PLAN VIEW



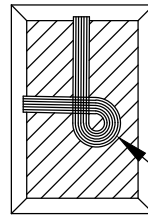
RUN WIRING BENEATH  
AND BESIDE MAINLINE.  
TAPE AND BUNDLE AT  
10-FOOT INTERVALS.



ALL SOLVENT WELD  
PLASTIC PIPING TO  
BE SNAKED IN  
TRENCH AS SHOWN.



WIRE W/O CONDUIT



TIE A 24-INCH LOOP IN ALL  
WIRING AT CHANGES OF  
DIRECTION OF 30° OR  
GREATER. UNTIE AFTER  
ALL CONNECTIONS HAVE  
BEEN MADE.

NOTES:

1. SLEEVE BELOW ALL HARDSCAPE ELEMENTS WITH CLASS 200 PVC TWICE THE DIAMETER OF THE PIPE OR WIRE BUNDLE WITHIN.
2. FOR PIPE AND WIRE BURIAL DEPTHS SEE SPECIFICATIONS.

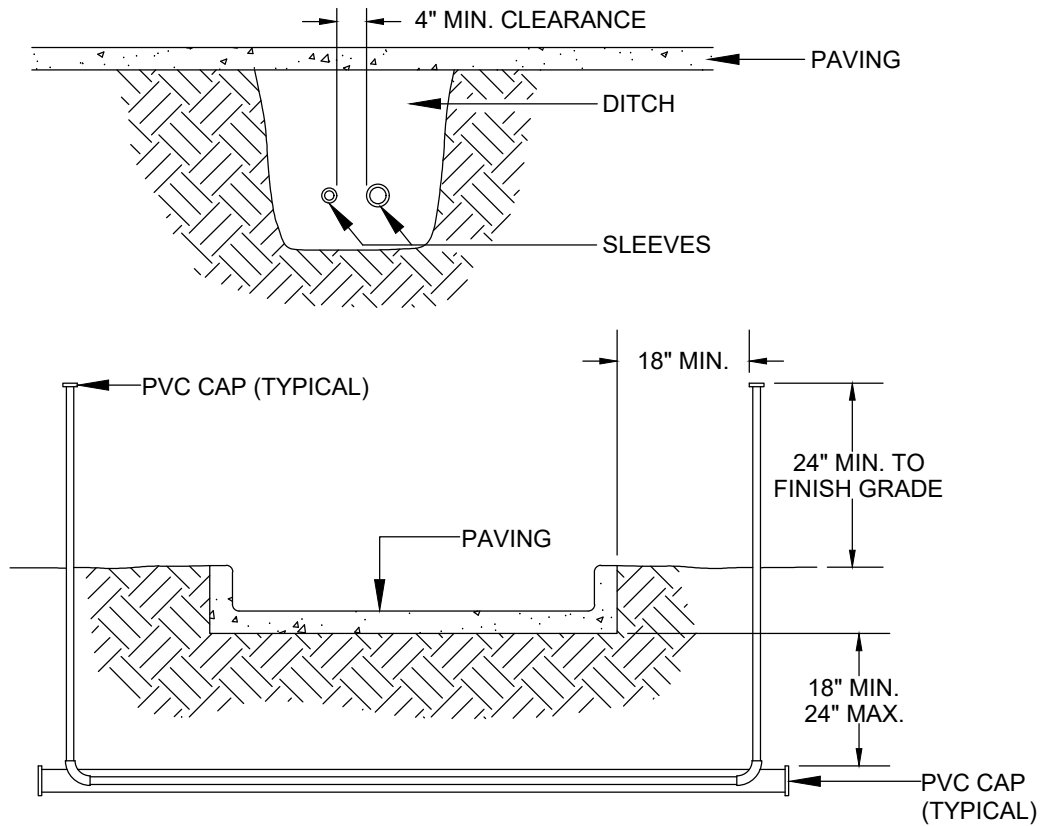


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**PIPE AND WIRE  
TRENCHING**

REVISIONS		
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**PLAN**  
**LS-7**



**NOTES:**

1. ALL PVC IRRIGATION SLEEVES TO BE CLASS 200 PIPE.
2. ALL JOINTS TO BE SOLVENT WELDED AND WATERTIGHT.
3. WHERE THERE IS MORE THAN ONE SLEEVE, EXTEND THE SMALLER SLEEVE TO 24-INCHES MINIMUM ABOVE FINISH GRADE.
4. MECHANICALLY TAMP TO 95% PROCTOR.

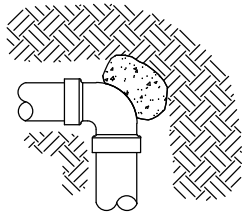


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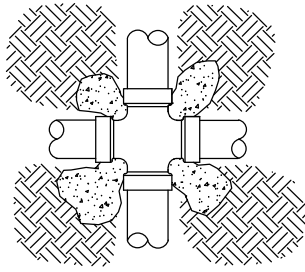
**SLEEVING**

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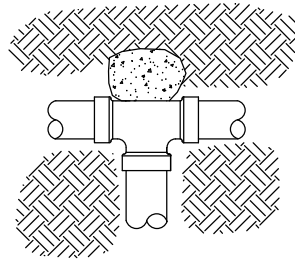
**PLAN**  
  
**LS-8**



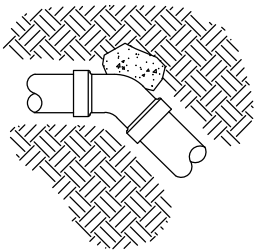
ELL



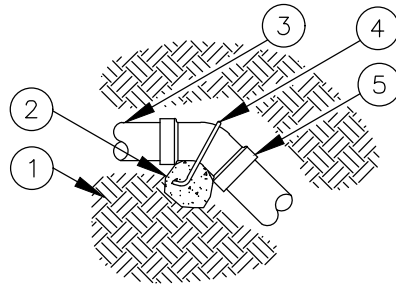
CROSS



TEE

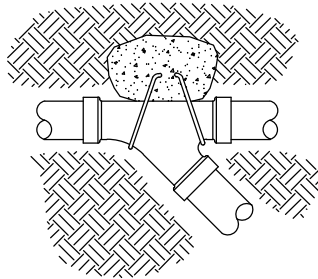


45° ELL



45° ELL

- ① UNDISTURBED SOIL (TYPICAL)
- ② CONCRETE THRUST BLOCK (TYPICAL)
- ③ PIPE (TYPICAL)
- ④ REBAR BENT AROUND FITTING (TYPICAL)
- ⑤ FITTING (TYPICAL)



WYE

NOTES:

1. SUPPLY LINES 3-INCHES IN DIAMETER AND LARGER SHALL RECEIVE CONCRETE THRUST BLOCKS.
2. SEE SPECIFICATIONS FOR AMOUNT OF CONCRETE TO BE USED FOR THRUST BLOCK.



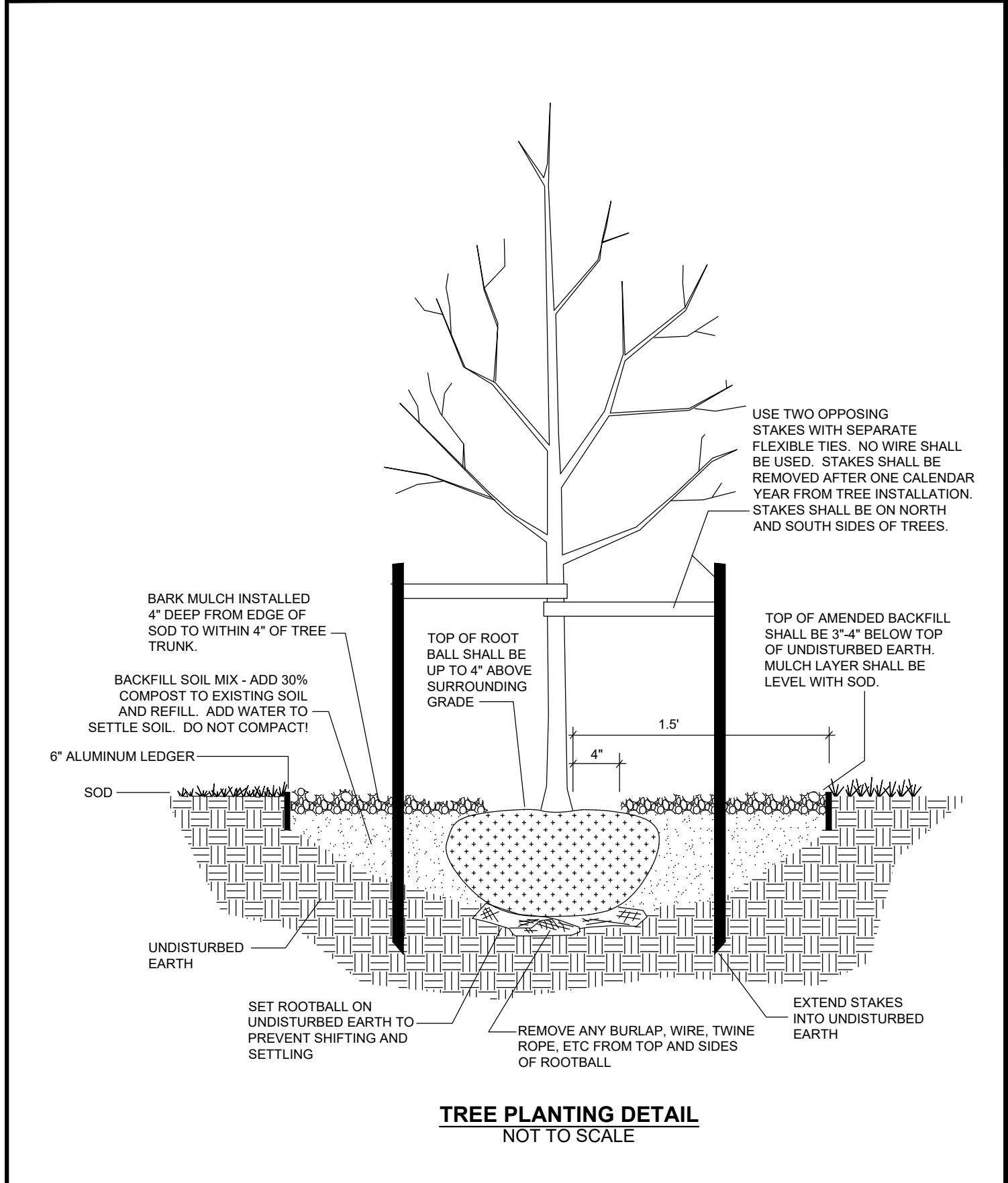
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**THRUST BLOCK**

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PLAN

LS-9

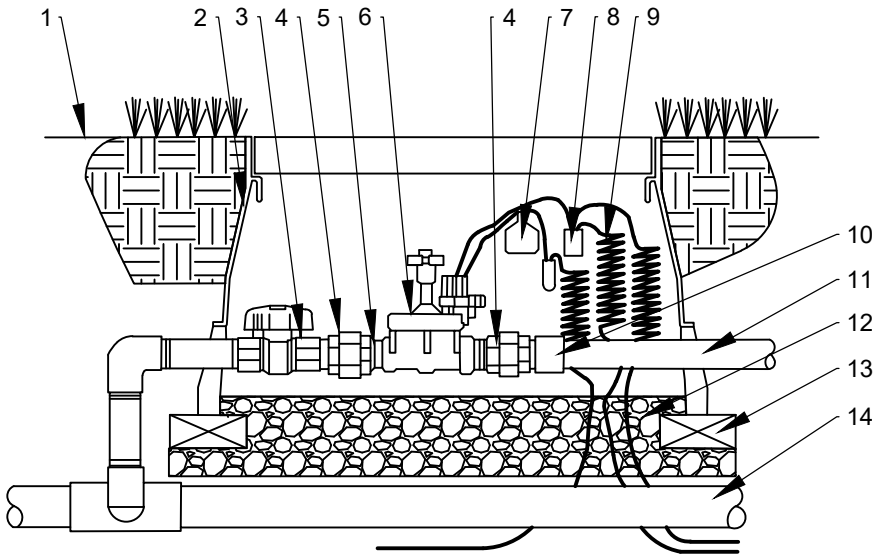


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**TYPICAL TREE**  
**PLANTING**

REVISIONS		
#	BY	DATE
01	SWF	04/04/22

**PLAN**  
  
**LS-10**



1. FINISH GRADE
2. JUMBO VALVE BOX WITH BOLT DOWN LID
3. PVC BALL VALVE
4. UNION
5. PVC SCH 80NIPPLE
6. CONTROL VALVE
7. VALVE ID TAG
8. WATERPROOF WIRE CONNECTOR, 3M DBY
9. 30-INCH LINEAR LENGTH OF WIRE, COILED
10. PVC SCH 40 ADAPTER
11. LATERAL LINE (CIRCUIT PIPE) TO IRRIGATION CIRCUIT
12. 6" MIN, 3/4" WASHED GRAVEL
13. BRICK FOOTING (1 OF 4)
14. MAIN LINE (PRESSURE PIPE )
15. PVC SCH 80 FITTINGS

NOTE;

1. ALL FITTING AND NIPPLES IN THE MANIFOLD SHALL BE SCH.80 THREADED PVC, USING TEFLON TAPE AND #5 RECTOR SEAL
2. VALVE MANIFOLD TO BE INSTALLED 1 FOOT MINIMUM DOWNSTREAM OF MAIN LINE BEFORE CHANGE IN DIRECTION



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**CONTROL VALVE  
 ASSEMBLY**

DRAWN 12/01/20

REVISIONS

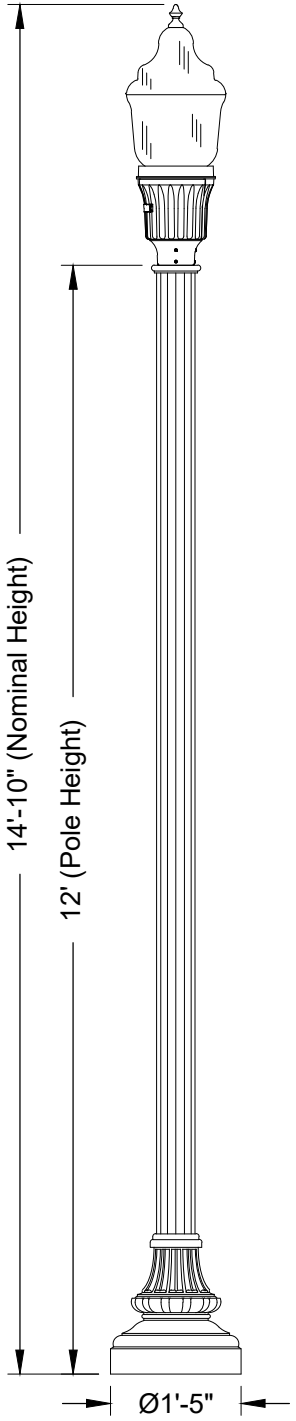
#	BY	DATE
01	SWF	04/04/22

PLAN

LS-11

# Street Lights

# Specifications



**DESCRIPTION**

The lighting post shall be all aluminum, one-piece construction, with a classic double-tapered and fluted base design. The shaft shall be Ø5" fluted.

**MATERIALS**

The base shall be heavy wall, cast aluminum produced from certified ASTM 356.1 ingot per ASTM B-179-95a or ASTM B26-95. The straight shafts shall be extruded from aluminum, ASTM 6061 alloy. All hardware shall be tamper resistant stainless steel. Anchor bolts to be stainless steel.

**CONSTRUCTION**

The shaft shall be double welded to the base casting and shipped as one piece for maximum structural integrity. The shaft shall be circumferentially welded inside the base casting at the top of the access door, and externally where the shaft exits the base. All exposed welds below 8' shall be ground smooth. All welding shall be per ANSI/AWS D1.2-90. All welders shall be certified per Section 5 of ANSI/AWS D1.2-90.

**DIMENSIONS**

The post shall be 12' in height with a 17" diameter base. The shaft diameter shall be 5". At the top of the post, an integral 3" O.D. tenon with a transitional donut shall be provided for luminaire mounting.

**INSTALLATION**

The post shall be provided with four, stainless steel anchor bolts to be installed on a slotted 12" diameter bolt circle. A door shall be provided inside the base for anchorage and wiring access. A grounding screw shall be provided inside the base opposite door.

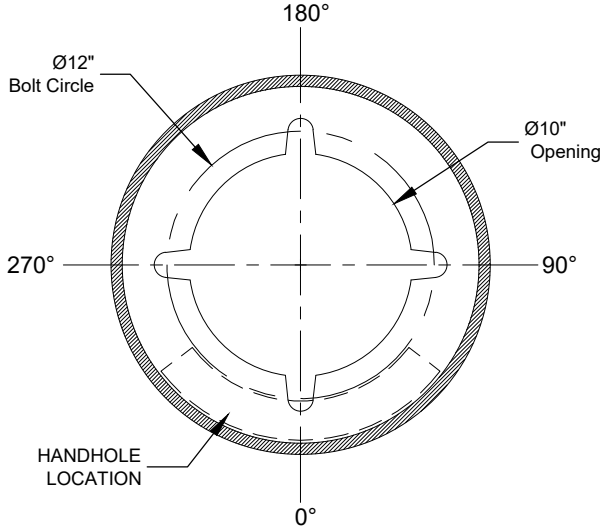
**FINISH**

The entire assembly shall have a Holophane black finish.

**LUMINAIRE**

- Granville LED
- LED Performance Package 10 - 3000 Series CCT - Auto-Sensing 120-277V
- Modern Style, Swing Open housing - Symmetric Type V optics - No Trim
- Clear Acrylic 3" finial - Dimming Photocontrol Receptacle 5-Pin
- 25ft Prewired Leads - Extended Life Option with AS

**Anchorage Detail**



DO NOT USE TO SET ANCHOR BOLTS  
CONTACT CUSTOMER SERVICE FOR TEMPLATE

**Manufacturer: HOLOPHANE**

**Catalog #'s:**

Pole: WDA 12 F5J 17D C03 BK  
Fixture: GVD3 P10 30K MVOLT MS GL5LU BK CL PR7 PCLL L25

**NOTES:**

1. SEE SHEET RLP-A FOR REQUIRED WIRING AND INSTALLATION DETAILS.
2. SEE SHEET RLP-B FOR CONCRETE BASE DETAIL.
3. AS-BUILT WIRING DIAGRAM (11"X17") MUST BE SUBMITTED TO CITY.



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**LOCAL STREET  
LIGHT & POLE  
STANDARD**

REVISIONS		
#	BY	DATE
01	SWF	04/04/22
02	SWF	11/31/22

**PLAN**  
**RLP-1**

# Specifications



**DESCRIPTION**

The lighting post shall be all aluminum, one-piece construction, with a classic double-tapered and fluted base design. The shaft shall be Ø5" fluted.

**MATERIALS**

The base shall be heavy wall, cast aluminum produced from certified ASTM 356.1 ingot per ASTM B-179-95a or ASTM B26-95. The straight shafts shall be extruded from aluminum, ASTM 6061 alloy. All hardware shall be tamper resistant stainless steel. Anchor bolts to be stainless steel.

**CONSTRUCTION**

The shaft shall be double welded to the base casting and shipped as one piece for maximum structural integrity. The shaft shall be circumferentially welded inside the base casting at the top of the access door, and externally where the shaft exits the base. All exposed welds below 8' shall be ground smooth. All welding shall be per ANSI/AWS D1.2-90. All welders shall be certified per Section 5 of ANSI/AWS D1.2-90.

**DIMENSIONS**

The post shall be 14' in height with a 17" diameter base. The shaft diameter shall be 5". At the top of the post, an integral Ø3" x 3" tenon with a transitional donut shall be provided for luminaire mounting.

**INSTALLATION**

The post shall be provided with four, stainless steel anchor bolts to be installed on a slotted 12" diameter bolt circle. A door shall be provided inside the base for anchorage and wiring access. A grounding screw shall be provided inside the base opposite door.

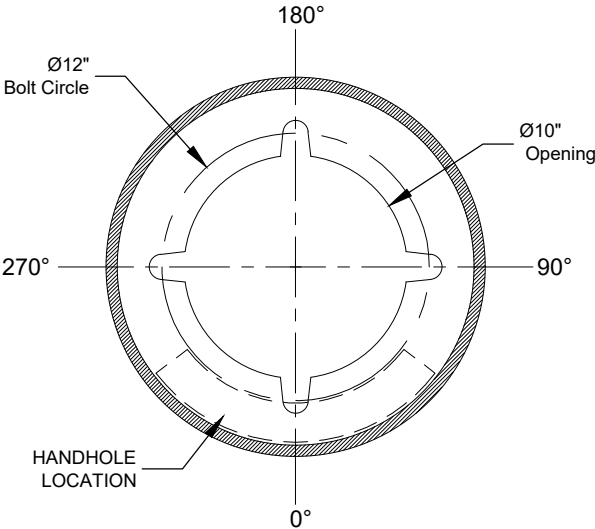
**FINISH**

The assembly shall shipped with a standard Holophane black finish.

**LUMINAIRE**

- Utility Washington Postlite LED
- LED Performance Package 30 - 4000 Series CCT - Auto-Sensing 120-277V
- Asymmetric Type 3 optics, Black finish - Spike Finial, Black finish
- Ribs & Bands, Gold finish - Full Cover, Black finish
- Dimming Photocontrol Receptacle, 7-Pin - 25ft Prewired Leads
- Extended Life Option with AS

**Anchorage Detail**



DO NOT USE TO SET ANCHOR BOLTS  
CONTACT CUSTOMER SERVICE FOR TEMPLATE

**Manufacturer:** HOLOPHANE

**Catalog #'s:**

Pole: WDA 14 F5J 17D C03 BK ABG  
Fixture: WAE3 P30 40K MVOLT MS GL3 BK SBR TGL PR7 AO PCLL FC L25 RFD329088

**NOTES:**

1. SEE SHEET RLP-A FOR REQUIRED WIRING AND INSTALLATION DETAILS.
2. SEE SHEET RLP-B FOR CONCRETE BASE DETAIL.
3. AS-BUILT WIRING DIAGRAM (11"X17") MUST BE SUBMITTED TO CITY.



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**COLLECTOR STREET**  
**LIGHT & POLE**  
**STANDARD**

REVISIONS		
#	BY	DATE
01	SWF	04/04/22
02	SWF	11/31/22

**PLAN**

**RLP-2**

## Specifications

### DESCRIPTION

The lighting post shall be all aluminum, one-piece construction, with a classic tapered and fluted base design. The post shall be provided with (1) GFI receptacle with small, in-use weatherproof cover, (1) bolt-on 24" banner arm, (1) clamp-on eyebolt for Ø5" shaft, (1) breakaway kit that includes bearing plate, skirt, nuts and washers and (1) set of transpo breakaway couplings.

### MATERIALS

The base and fluted tapered cast shaft shall be heavy wall, cast aluminum produced from certified ASTM 356.1 ingot per ASTM B-179-95a or ASTM B26-95. The straight shaft shall be extruded from aluminum, ASTM 6061 alloy. All hardware shall be stainless steel. Anchor bolts to be completely hot dip galvanized.

### CONSTRUCTION

The shaft shall be double welded to the base casting and shipped as one piece for maximum structural integrity. The shaft shall be welded inside the base casting at the top of the access door, and externally where the shaft exits the base. All welding shall be per ANSI/AWS

### DIMENSIONS

The post shall be 16'-0" in height with a 17" diameter base. The shaft diameter shall be 5". At the top of the post, an integral Ø3"x3" tenon with a transitional donut shall be provided for arm mounting.

### INSTALLATION

The post shall use four, hot dip galvanized L-type anchor bolts. A door shall be provided in the base for anchorage and wiring access. A grounding screw shall be provided inside the base opposite the door.

### FINISH

The entire post assembly shall be standard Holophane black.

### LUMINAIRE

- Utility Washington Postlite LED
- LED Performance Package 30 - 4000 Series CCT - Black finish
- Auto-Sensing Voltage (120-277) - Asymmetric Type III optics
- Spike Finial, Band & Ribs, Gold finish - Full Cover, Gold finish
- 7-pin Dimming Photocontrol Receptacle - 25ft Prewired Leads
- Extended Life Option with AS

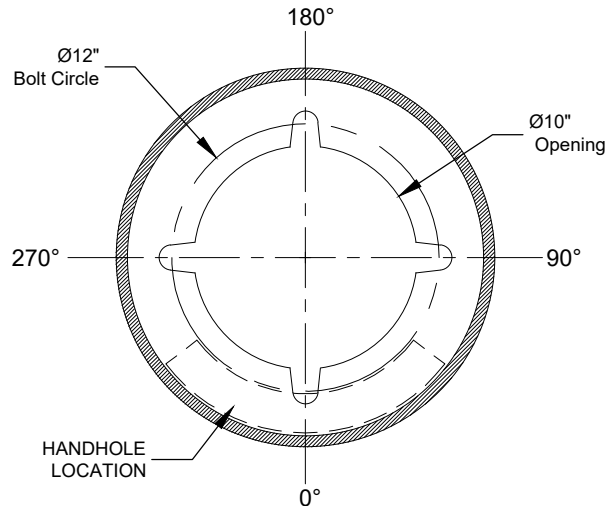
### Accessory Mounting Detail

	Orientation	Height
RECEPTACLE	270°	15'-0"
BANNER ARM	180°	14'-0"

### NOTES:

1. CUSTOMER MUST VERIFY ACCESSORY HEIGHT AND LOCATION IN THE ABOVE TABLE DURING APPROVAL.
2. SOME ACCESSORIES MAY BE ROTATED IN VIEW FOR CLARITY.
3. APPROVED AND COMPLETED SUBMITTAL TO ACCOMPANY PO.

### Anchorage Detail



DO NOT USE TO SET ANCHOR BOLTS  
CONTACT CUSTOMER SERVICE FOR TEMPLATE

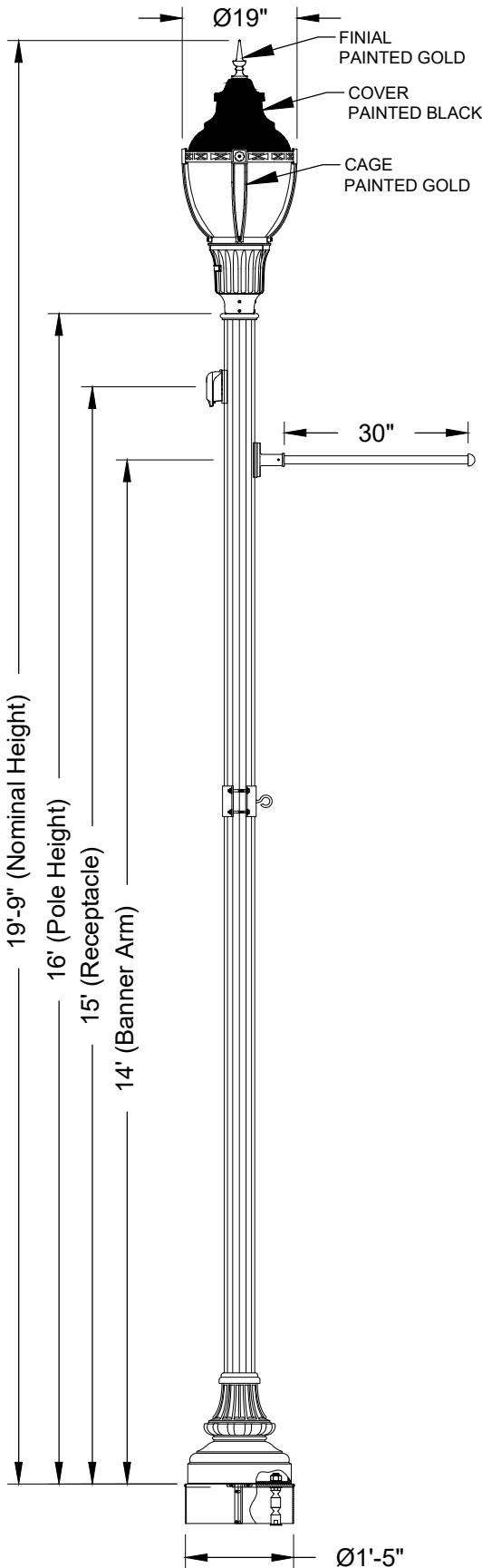
### Manufacturer: HOLOPHANE

### Catalog #'s:

Pole: WDA 16 F5J 17D C03 BK SP168C R180D ASSY10895, Anchor Bolts: AB-31-4, Breakaway Kit: BWKT\_ BK, Banner Arm: BA 100P 30IN IA BO F5J AC BK, Eyebolt: EB 1E CO F5J BK, Fixture: WAE3 P30 40K MVOLT MS GL3 BK SBR TGL PR7 AO PCLL FC L25 RFD329088

### NOTES:

1. SEE SHEET RLP-A FOR REQUIRED WIRING AND INSTALLATION DETAILS.
2. SEE SHEET RLP-B FOR CONCRETE BASE DETAIL.
3. AS-BUILT WIRING DIAGRAM (11"x17") MUST BE SUBMITTED TO CITY.

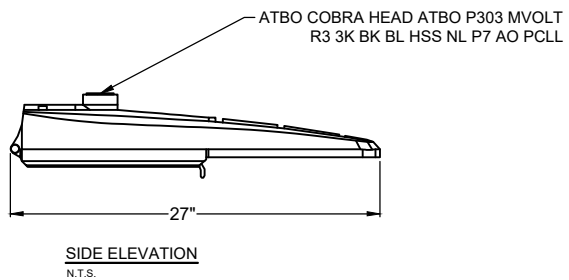
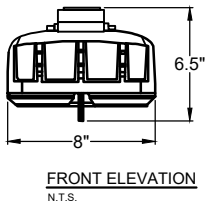
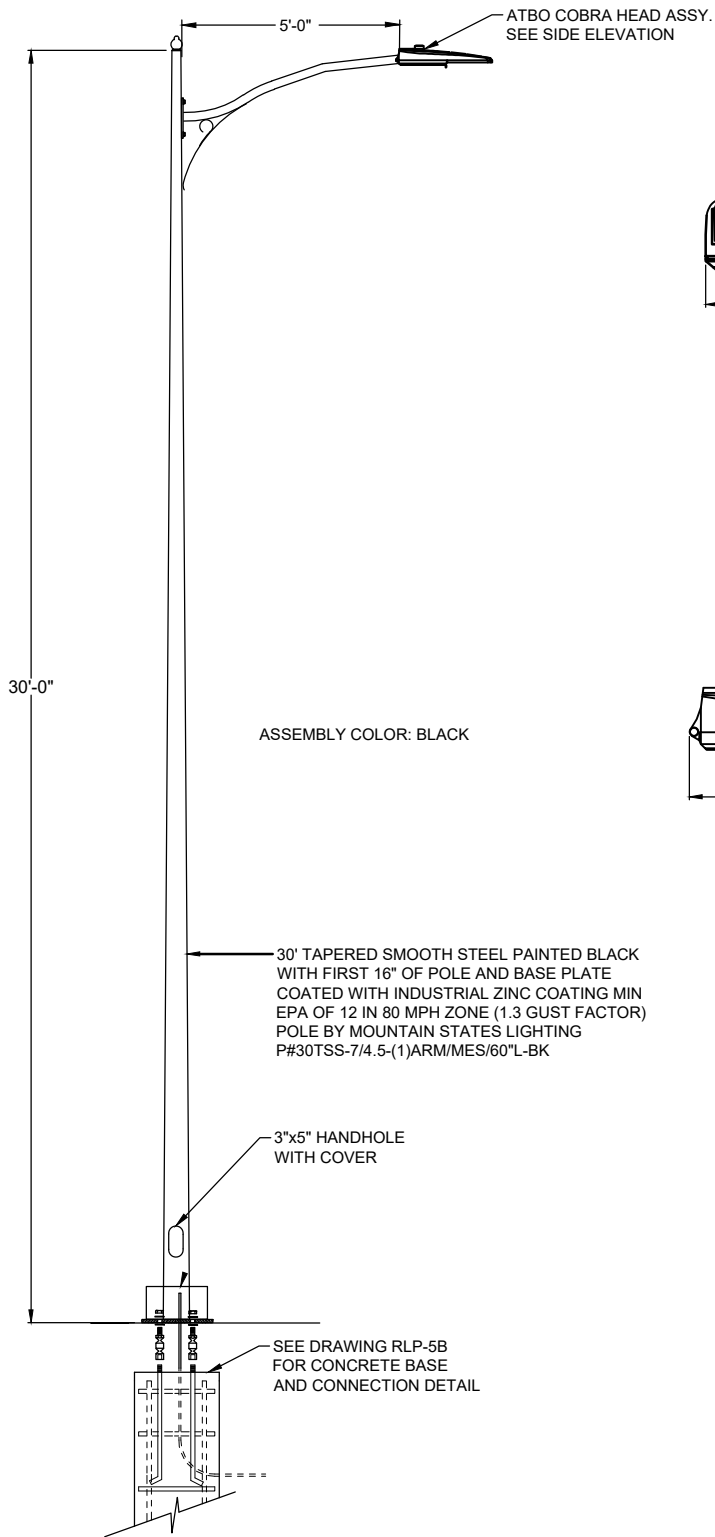


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**ARTERIAL STREET**  
**LIGHT & POLE**  
**STANDARD**

REVISIONS		
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**PLAN**  
**RLP-4**



NOTES:

1. SEE SHEET RLP-A FOR REQUIRED WIRING AND INSTALLATION DETAILS.
2. AS-BUILT WIRING DIAGRAM (11"X17") MUST BE SUBMITTED TO CITY.

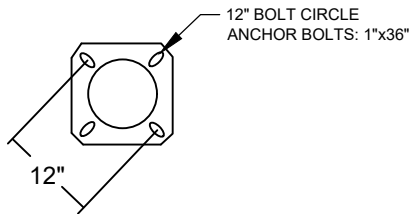


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**30' LED**  
**ARTERIAL STREET**  
**LIGHT AND POLE**  
**STANDARD**

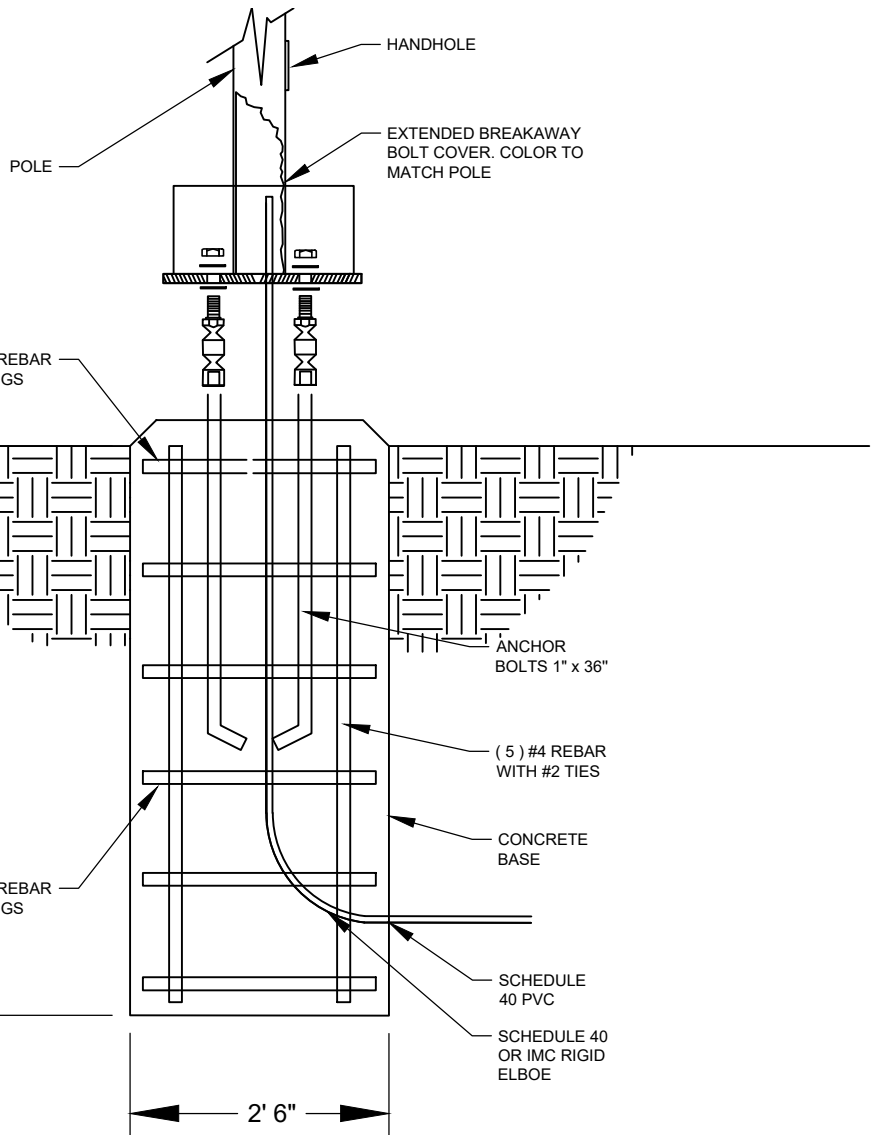
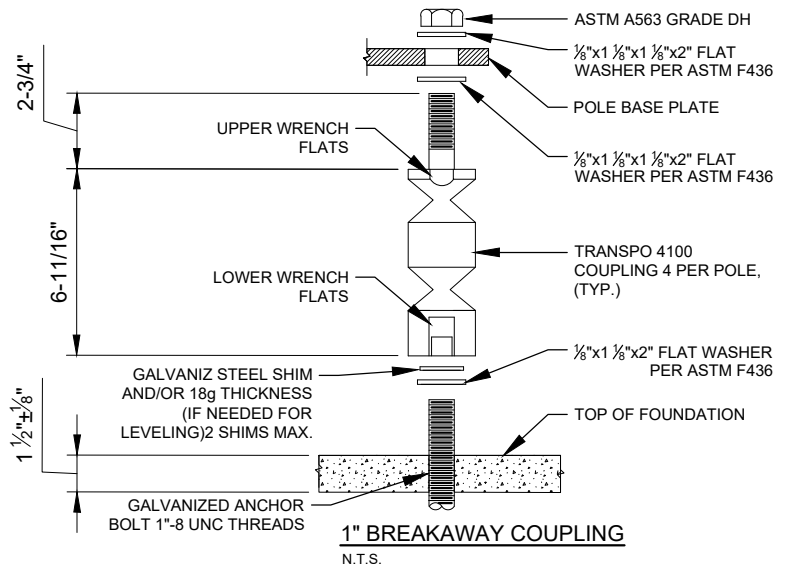
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REVISIONS		
#	BY	DATE
01	SWF	04/04/22
02	SWF	11/29/22

**PLAN**  
**RLP-5**



ANCHOR BASE DETAIL  
12" BOLT CIRCLE  
ANCHOR BOLTS: 1" x 36"

ANCHOR BASE DETAIL  
N.T.S.



NOTE!  
IF DEPTH CANNOT BE MET MASS MUST BE EQUIVALENT TO MASS SHOWN



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30' LED ARTERIAL  
STREET LIGHT  
CONCRETE BASE DETAIL  
STANDARD

DRAWN: ~00/2022

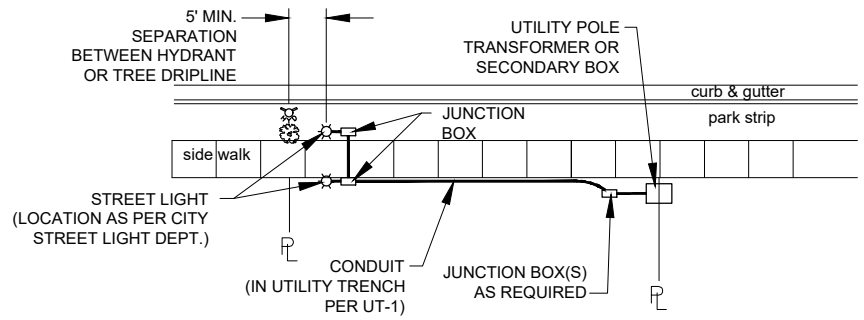
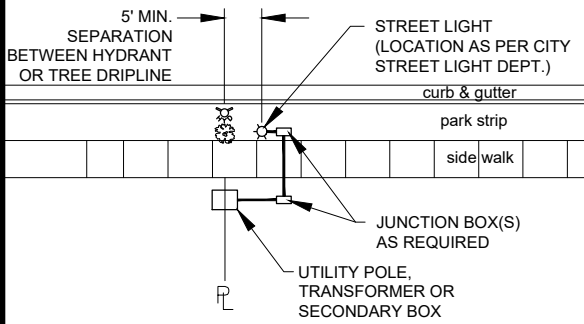
REVISIONS

#	BY	DATE
01	SWF	04/04/22
02	SWF	11/29/22

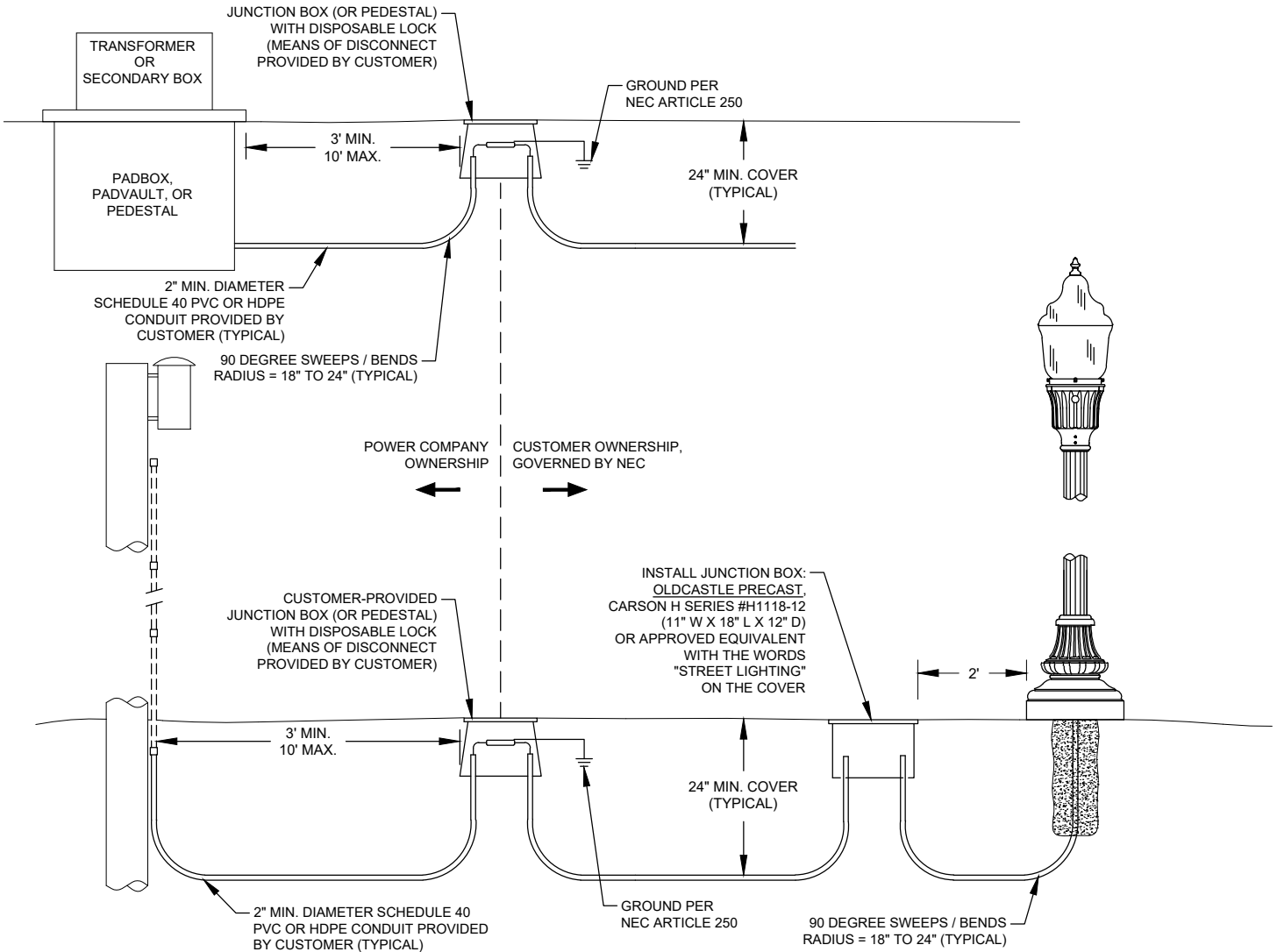
PLAN

RLP-5B

TYPICAL 2



TYPICAL CONNECTION FROM POWER SOURCE



NOTES:

1. The customer shall consult the Power Company on the junction box location, pedestal location, conduit location and digging prior to installation.
2. The customer shall provide and install a junction box or pedestal, conduit, disconnect (fusing), a disposable lock, and customer-owned wire.
3. Any customer-owned metallic equipment within 72 inches (72") of the Power Company's metallic equipment shall be bonded.
4. Streetlight facilities with associated electrical outlets shall be metered.
5. The customer shall provide all conduit from the Power Company source to the customer-provided junction box or pedestal.
6. The customer's junction box or pedestal shall be located as shown.

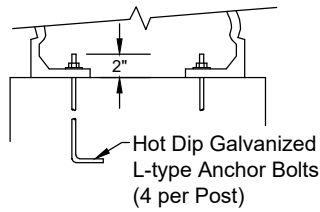
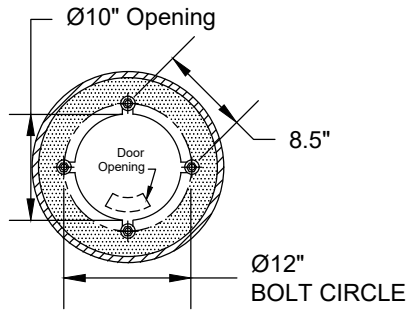


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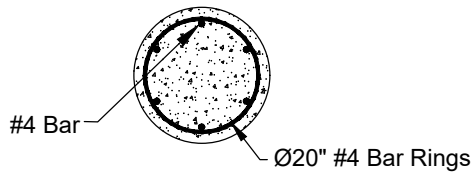
**STREET LIGHT**  
**WIRING & INSTALLATION**  
**DETAILS**

REVISIONS		
#	BY	DATE
01	SWF	04/04/22
02	SWF	12/01/22

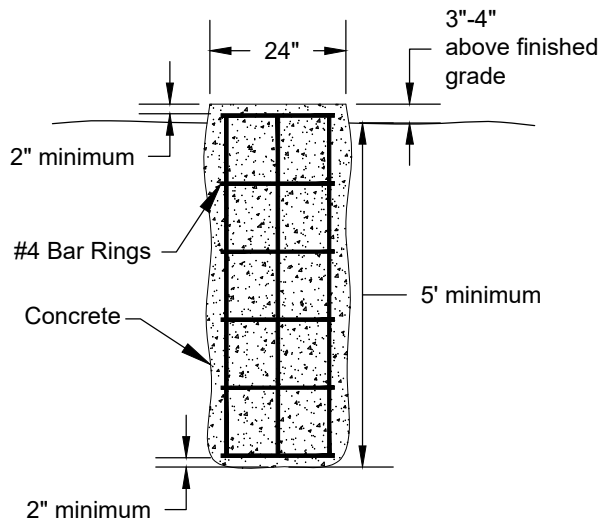
**PLAN**  
**RLP-A**



ANCHOR DETAIL



TOP VIEW



SIDE VIEW

BASE DETAIL

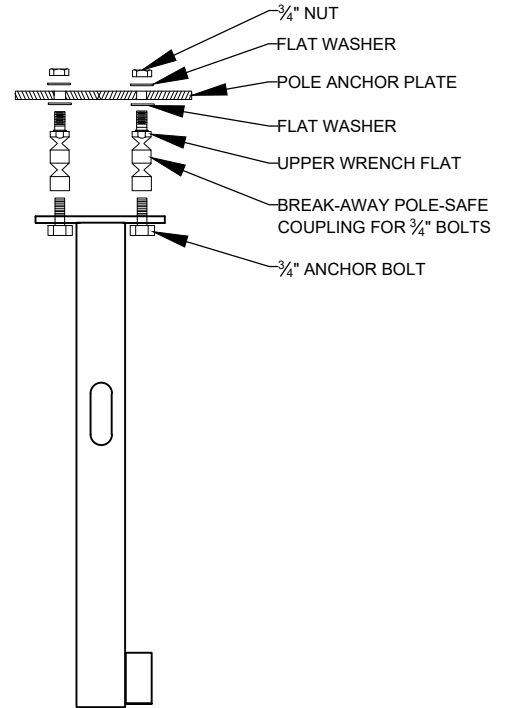
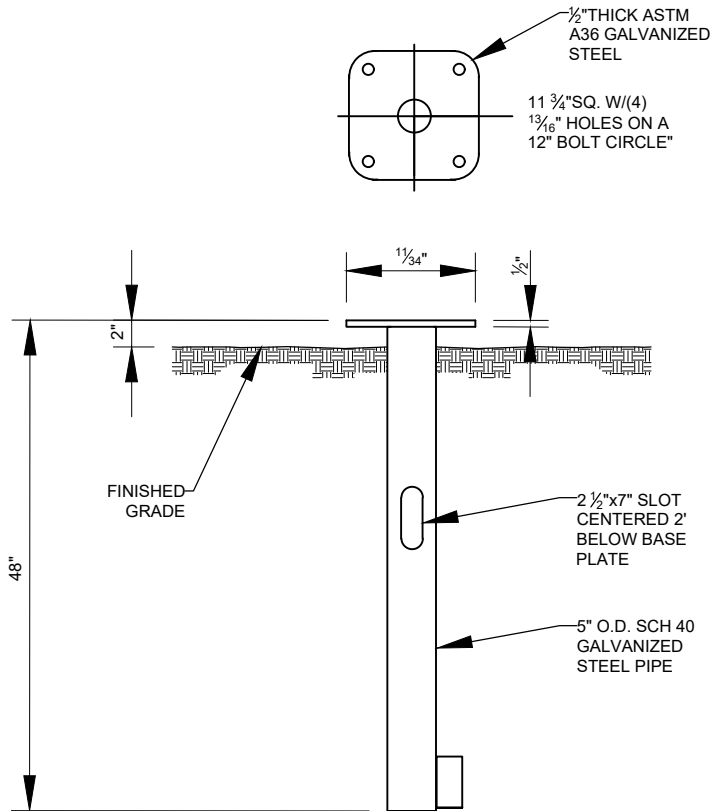


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STREET LIGHT  
CONCRETE POLE BASE  
STANDARD

REVISIONS		
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02	SWF	12/01/22

PLAN  
RLP-B



BREAK-AWAY POLE-SAFE COUPLING DETAIL 1  
NTS



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STINGER BASE WITH  
OPTIONAL BREAK-AWAY  
STANDARD

REVISIONS		
#	BY	DATE
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02	SWF	12/01/22

PLAN  
RLP-C

# Engineering

Minimum Letter and Number Heights				
Speed Limit	Upper Case	Lower Case	Supplemental Letters and Numbers*	
	Upper Case	Lower Case	Upper Case	Lower Case
25 mph or less	4"	3"	3"	2.25"
30 to 40 mph	6"	4.5"	3"	2.25"

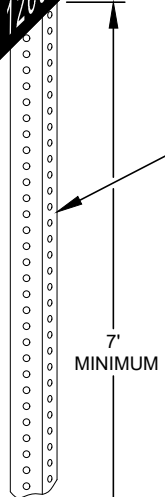
\* Type of street (i.e. Road, Drive, Circle or abbreviation) or street coordinates when not part of the street name.



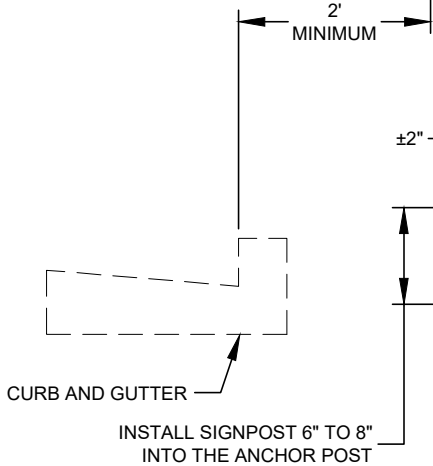
PRIVATE STREET SIGN  
(SEE NOTE 6)



9" HIGH (.080" THICK) 5052-H32 ALUMINUM (MIN.) SIGN BLANK MOUNTED TO POST WITH 3/8" ZINC PLATED STEEL DRIVE RIVETS W/ NYLON BACKING WASHERS (# VCR231 OR APPROVED EQUAL). THE SIGN WIDTH SHALL VARY FROM 38" TO 48" DEPENDING ON THE NUMBER OF CHARACTERS IN THE STREET NAME.



**SIGNPOST:**  
2" X 2", 14 GAUGE, SQUARE GALVANIZED STEEL TUBING, CORNER WELDED WITH 7/16" PRE-PUNCHED OR KNOCKOUT HOLES ON 1" CENTERS ON ALL FOUR SIDES (ALLIED TELES PAR OR APPROVED EQUAL).  
**OPTIONAL:** BLACK POWDER COAT



INSTALL SIGNPOST 6" TO 8" INTO THE ANCHOR POST

**BOLT SIGNPOST TO THE ANCHOR POST WITH A CORNER BOLT**  
(TELES PAR #TLCB516M OR APPROVED EQUAL)

**ANCHOR POST:** (FOR AVERAGE SOIL TYPES)  
2-1/4" X 2-1/4" X 30", 12 GAUGE, SQUARE GALVANIZED STEEL TUBING, CORNER WELDED WITH 7/16" PRE-PUNCHED OR KNOCKOUT HOLES ON 1" CENTERS ON ALL FOUR SIDES (ALLIED TELES PAR OR APPROVED EQUAL).  
**ANCHOR:** (FOR SANDY, LOOSE SOIL OR CLAY)  
2-1/4" X 30" ALLIED TELES PAR OMNI-DIRECTIONAL ANCHOR OR APPROVED EQUAL.

**NOTES:**

1. SECURE CITY'S APPROVAL OF SIGN FORMAT AND INSTALLATION.
2. ALL MOUNTING HARDWARE, POST, AND ANCHOR MAY BE POWDER COATED BLACK (OPTIONAL).
3. INSTALL THE EDGE OF THE SIGN TWO FEET FROM THE VERTICAL EXTENSION OF THE FACE OF THE CURB AS NEAR AS POSSIBLE TO THE APPROACH CURB POINT OF CURVATURE. SIGNS SHOULD NOT OVERHANG SIDEWALK OR CURB & GUTTER.
4. ALL SIGNS SHALL BE 7' MINIMUM FROM GROUND TO BOTTOM OF SIGN.
5. LETTERING AND NUMBERING SHALL BE WHITE ON A BLUE BACKGROUND AND MADE OF HIGH INTENSITY PRISMATIC (HIP) SHEETING, ASTM TYPE III, IV, X. FONT SHALL BE ARIAL. UPPER AND LOWER CASE LETTERS SHALL BE USED. NAMED STREETS ALSO REQUIRE COORDINATES ON THE SIGN. SEE TABLE ABOVE FOR REQUIRED MINIMUM LETTER AND NUMBER HEIGHTS. SIGN SHALL HAVE A 9"X9" RIVERTON CITY LOGO ON THE LEFT SIDE MADE OF HIGH INTENSITY PRISMATIC (HIP) SHEETING ASTM TYPE III, IV, X.
6. PRIVATE STREET SIGN LETTERING SHALL BE BLUE ON A WHITE BACKGROUND, MADE OF HIGH INTENSITY PRISMATIC (HIP) SHEETING, ASTM TYPE III, IV, X, AND SHALL **NOT** INCLUDE THE RIVERTON CITY LOGO. THE LEFT SIDE OF THE SIGN SHALL HAVE THE WORD "PRIVATE" IN WHITE LETTERING (1" MINIMUM, UPPER CASE ARIAL FONT) ON A 9"X9" BLUE BACKGROUND MADE OF HIGH INTENSITY PRISMATIC (HIP) SHEETING ASTM TYPE III, IV, X.



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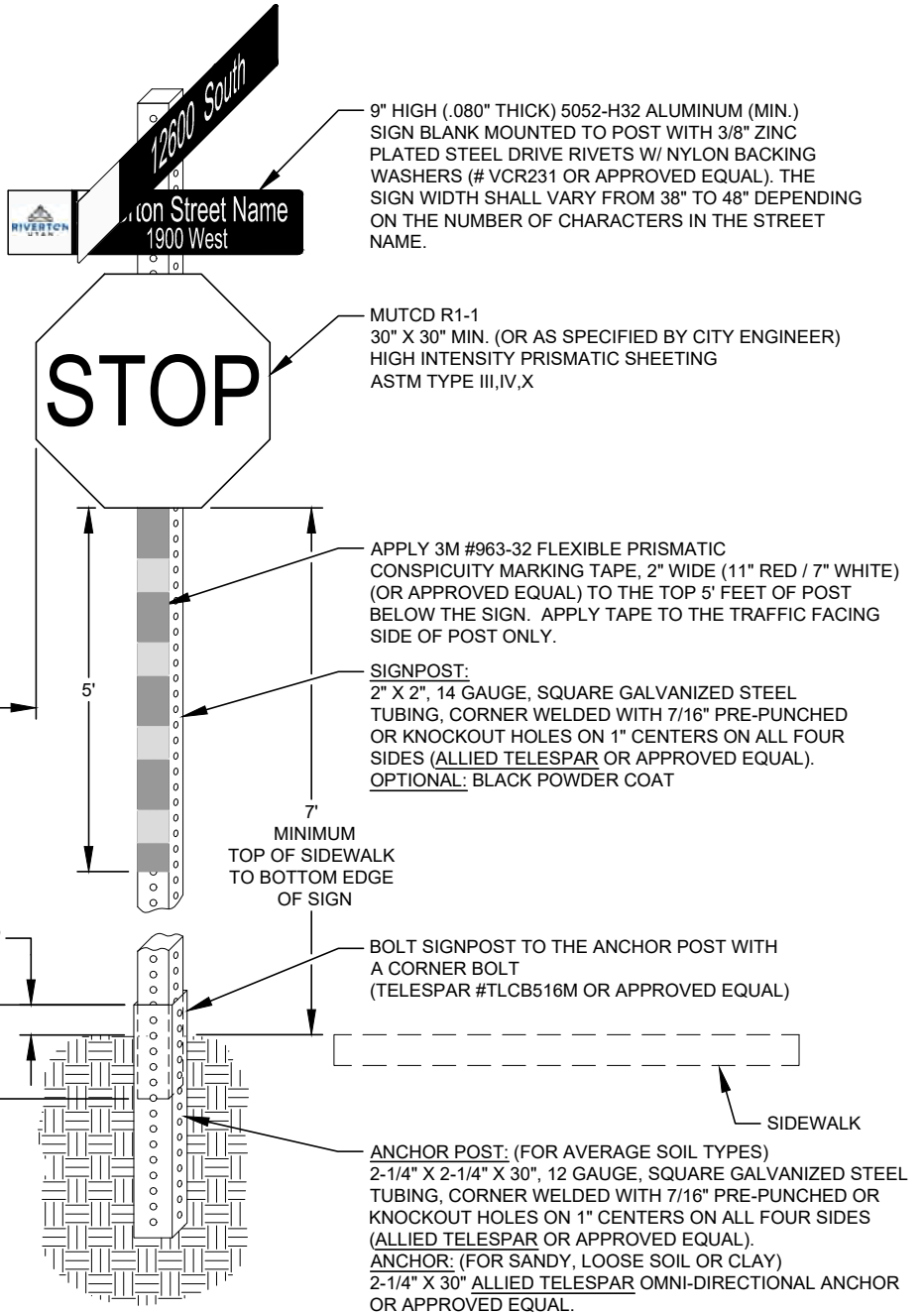
**STREET SIGN**

DRAWN 10/18/17		
REVISIONS		
#	BY	DATE
01	AT	12/01/20
02	SWF	04/04/22

**PLAN**  
  
**ST-1**

Minimum Letter and Number Heights				
Speed Limit	Upper Case	Lower Case	Supplemental Letters and Numbers*	
			Upper Case	Lower Case
25 mph or less	4"	3"	3"	2.25"
30 to 40 mph	6"	4.5"	3"	2.25"

\* Type of street (i.e. Road, Drive, Circle or abbreviation) or street coordinates when not part of the street name.



**NOTES:**

1. SECURE CITY'S APPROVAL OF SIGN FORMAT AND INSTALLATION.
2. ALL MOUNTING HARDWARE, POST, AND ANCHOR MAY BE POWDER COATED BLACK (OPTIONAL).
3. INSTALL THE EDGE OF THE SIGN TWO FEET FROM THE VERTICAL EXTENSION OF THE FACE OF THE CURB AS NEAR AS POSSIBLE TO THE APPROACH CURB POINT OF CURVATURE. SIGNS SHOULD NOT OVERHANG SIDEWALK OR CURB & GUTTER.
4. ALL SIGNS SHALL BE 7' MINIMUM FROM GROUND TO BOTTOM OF SIGN.
5. LETTERING AND NUMBERING SHALL BE WHITE ON A BLUE BACKGROUND AND MADE OF HIGH INTENSITY PRISMATIC (HIP) SHEETING, ASTM TYPE III, IV, X. FONT SHALL BE ARIAL. UPPER AND LOWER CASE LETTERS SHALL BE USED. NAMED STREETS ALSO REQUIRE COORDINATES ON THE SIGN. SEE TABLE ABOVE FOR REQUIRED MINIMUM LETTER AND NUMBER HEIGHTS. SIGN SHALL HAVE A 9"x9" RIVERTON CITY LOGO ON THE LEFT SIDE MADE OF HIGH INTENSITY PRISMATIC (HIP) SHEETING ASTM TYPE III, IV, X.
6. PRIVATE STREET SIGN LETTERING SHALL BE BLUE ON A WHITE BACKGROUND, MADE OF HIGH INTENSITY PRISMATIC (HIP) SHEETING, ASTM TYPE III, IV, X, AND SHALL **NOT** INCLUDE THE RIVERTON CITY LOGO. THE LEFT SIDE OF THE SIGN SHALL HAVE THE WORD "PRIVATE" IN WHITE LETTERING (1" MINIMUM, UPPER CASE ARIAL FONT) ON A 9"x9" BLUE BACKGROUND MADE OF HIGH INTENSITY PRISMATIC (HIP) SHEETING ASTM TYPE III, IV, X.

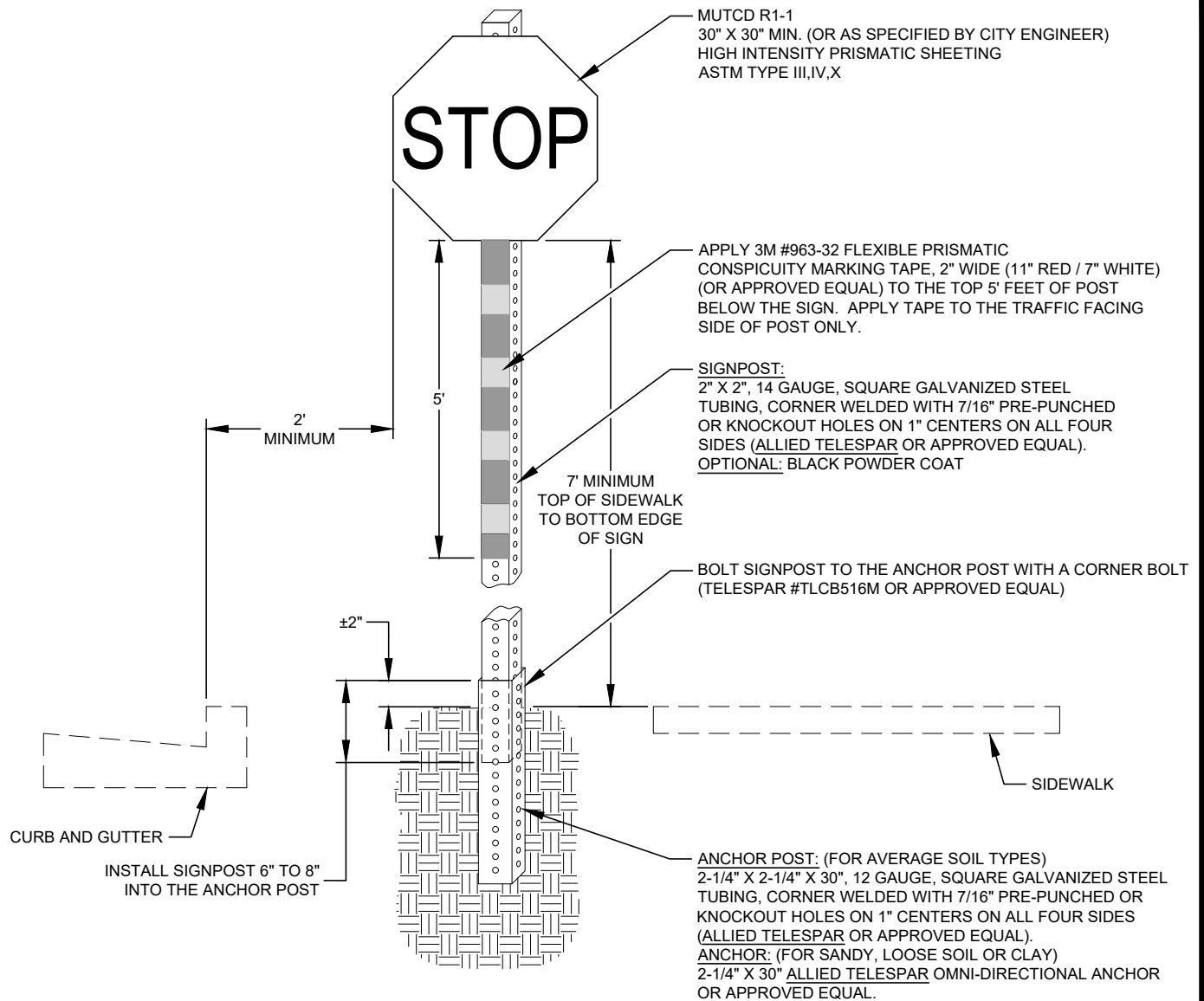


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**COMBINATION  
 STREET AND  
 REGULATORY SIGN**

DRAWN 10/18/17		
REVISIONS		
#	BY	DATE
01	AT	12/01/20
02	SWF	04/04/22

**PLAN**  
  
**ST-2**



**NOTES:**

1. SECURE CITY'S APPROVAL OF SIGN FORMAT AND INSTALLATION.
2. ALL MOUNTING HARDWARE, POST, AND ANCHOR MAY BE POWDER COATED BLACK (OPTIONAL).
3. INSTALL THE EDGE OF THE SIGN TWO FEET FROM THE VERTICAL EXTENSION OF THE FACE OF THE CURB AS NEAR AS POSSIBLE TO THE APPROACH CURB POINT OF CURVATURE. SIGNS SHOULD NOT OVERHANG SIDEWALK OR CURB & GUTTER.
4. ALL SIGNS SHALL BE 7' MINIMUM FROM GROUND TO BOTTOM OF SIGN.



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**REGULATORY SIGN**

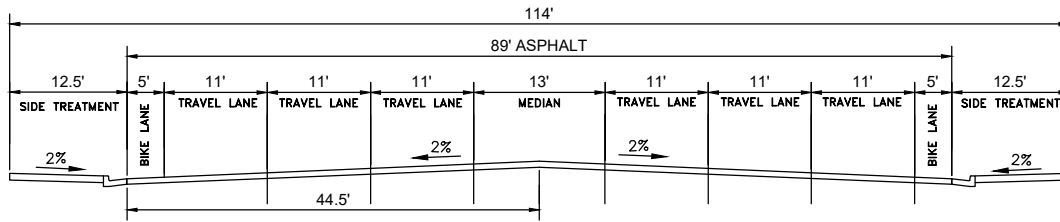
DRAWN 10/18/17

REVISIONS		
#	BY	DATE
01	AT	12/01/20
02	SWF	04/04/22

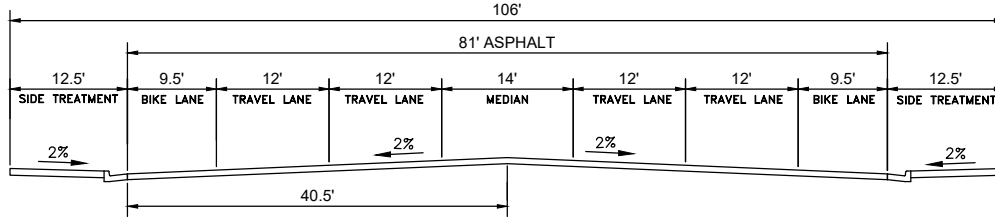
**PLAN**

**ST-3**

## MAJOR ARTERIAL

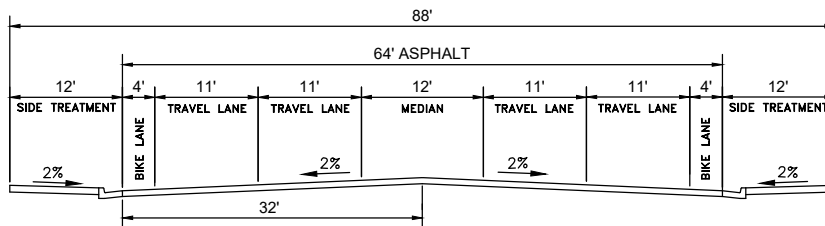


114-FOOT RIGHT-OF-WAY (TYPICAL)



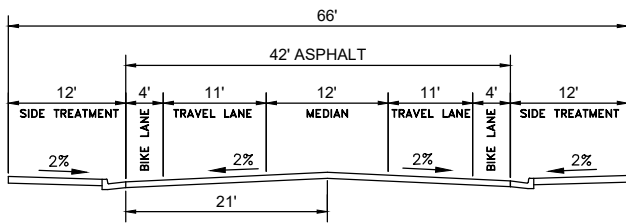
106-FOOT RIGHT-OF-WAY (TYPICAL)

## MINOR ARTERIAL



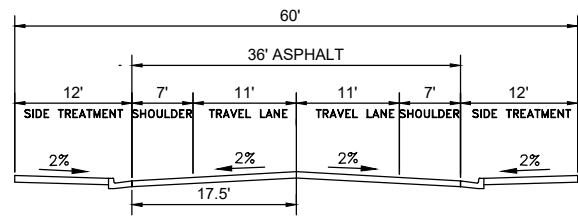
88-FOOT RIGHT-OF-WAY (TYPICAL)

## MAJOR COLLECTOR



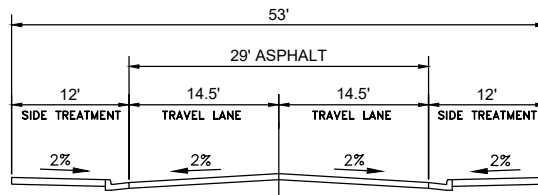
66-FOOT RIGHT-OF-WAY (TYPICAL)

## MINOR COLLECTOR



60-FOOT RIGHT-OF-WAY (TYPICAL)

## LOCAL ACCESS ROAD



53-FOOT RIGHT-OF-WAY (TYPICAL)



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**FUNCTIONAL**  
**CLASSIFICATION**  
**DIMENSIONS**

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REVISIONS

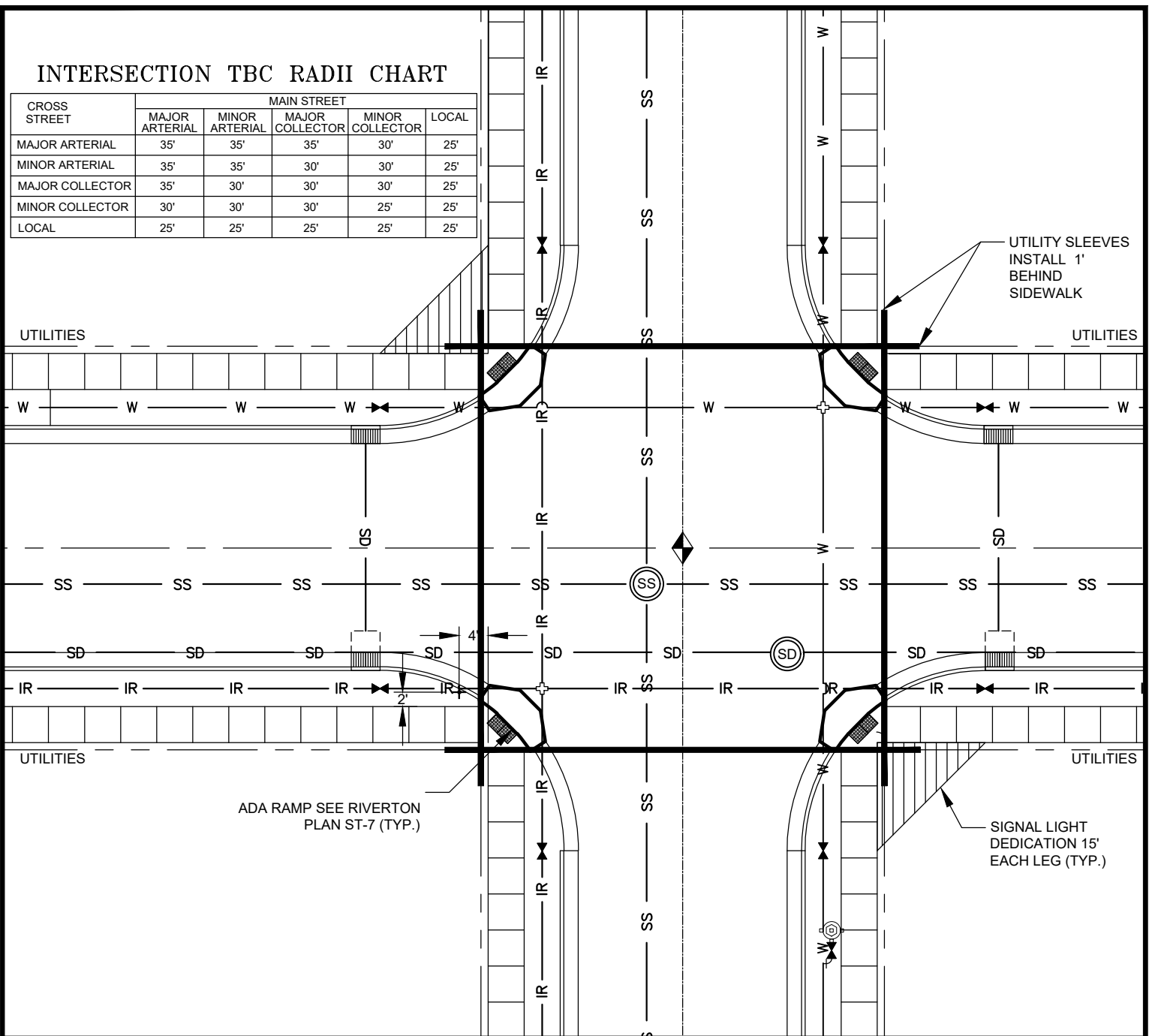
#	BY	DATE
01	AT	12/01/20
02	SWF	04/04/22

PLAN












ST-4

# INTERSECTION TBC RADII CHART

CROSS STREET	MAIN STREET				
	MAJOR ARTERIAL	MINOR ARTERIAL	MAJOR COLLECTOR	MINOR COLLECTOR	LOCAL
MAJOR ARTERIAL	35'	35'	35'	30'	25'
MINOR ARTERIAL	35'	35'	30'	30'	25'
MAJOR COLLECTOR	35'	30'	30'	30'	25'
MINOR COLLECTOR	30'	30'	30'	25'	25'
LOCAL	25'	25'	25'	25'	25'



## LEGEND

-  SURVEY MONUMENT PER S.L.CO. REQUIREMENTS
-  IR ——— PRESSURIZED IRRIGATION WATER LINE TO BE INSTALLED ON SOUTH AND WEST SIDES OF STREET
-  W ——— DRINKING WATER LINE TO BE INSTALLED ON NORTH AND EAST SIDES OF STREET
-  SS ——— SANITARY SEWER
-  (SS) SEWER MANHOLE
-  (SD) STORM DRAIN MANHOLE PER APWA #331B, 341
-  [Hatched Box] COMBO BOX PER APWA #316
-  [Hatched Box] CURB INLET PER PWA #315
-  + STREET/STOP SIGN LOCATION TYPICAL PLACEMENT (ST-1, ST-2, ST-3)
-  (Circle with cross) FIRE HYDRANT
-  (Circle with cross and arrow) DRINKING WATER/PRESSURIZED IRRIGATION WATER VALVE. ALL VALVES TO BE PLACED ON CURB AND GUTTER PC (POINT OF CURVATURE)



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INTERSECTION

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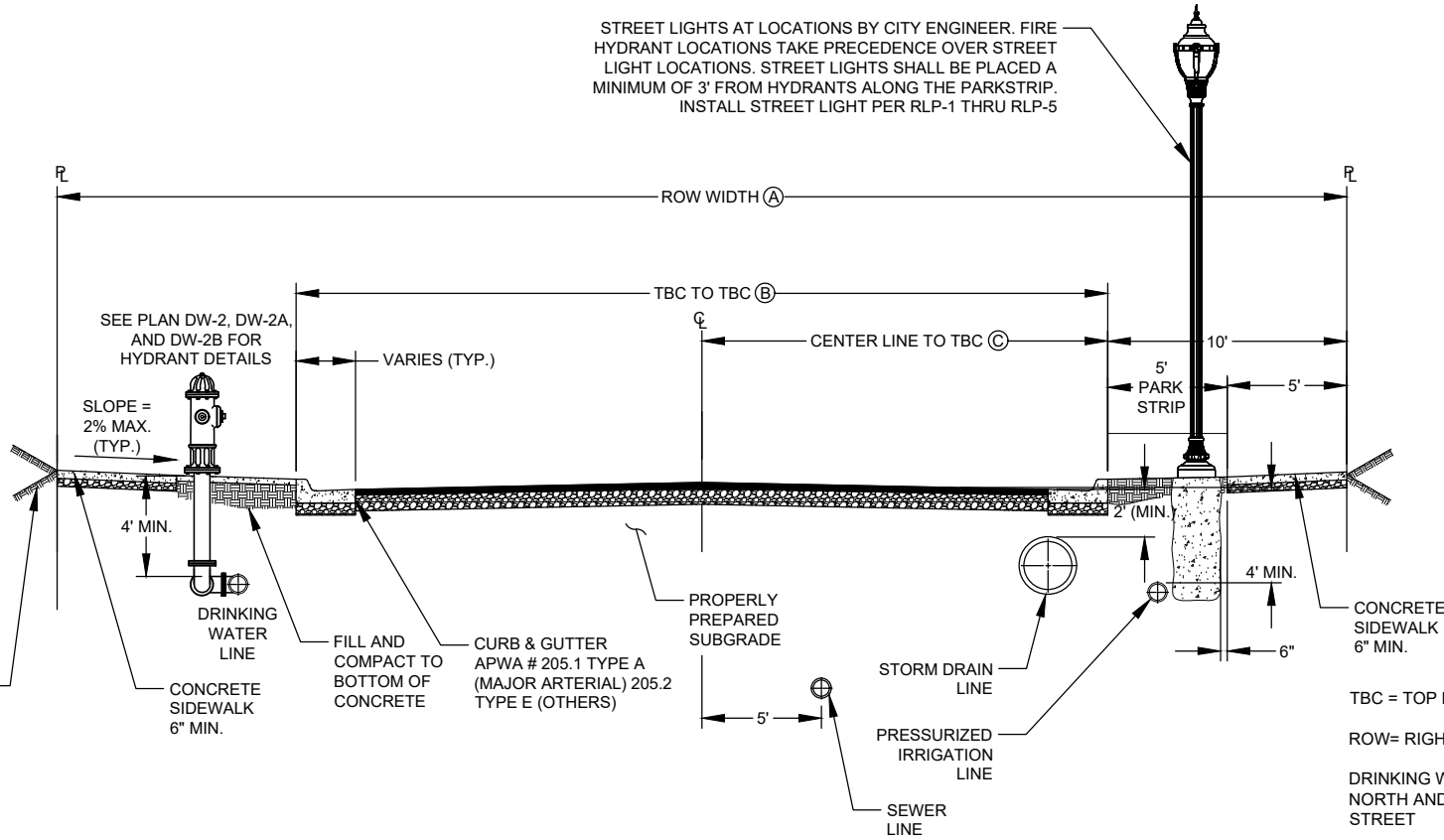
### REVISIONS

#	BY	DATE
01	AT	12/01/20
02	SWF	11/9/22

**PLAN**  
**ST-5**

10' PUBLIC UTILITIES EASEMENT (TYP.)

CUT/FILL TO MATCH EXISTING GROUND AT MAXIMUM 3:1 SLOPE



10' PUBLIC UTILITIES EASEMENT (TYP.)

**STANDARD URBAN ROADWAY SECTION**

STREET DESIGNATION	CLASSIFICATION	ASPHALT-AGGREGATE DESIGNATOR	ROW WIDTH (A)	TBC TO TBC (B)	CL TO TBC (C)	MINIMUM PAVEMENT SECTION (ASPHALT"/UTBC") (SEE NOTE 1)
LOCAL	CLASS II	PG 58-28 DM-1/2"	53'	34'	17'	3" / 8" (SEE NOTE 2)
MINOR COLLECTOR	CLASS III	PG 58-28 DM-1/2"	60'	41'	20.5'	3"/8" RESIDENTIAL, 6"/8" COMMERCIAL (SEE NOTE 2)
MAJOR COLLECTOR	CLASS IV	PG 58-28 DM-3/4"	66'	47'	23.5'	6" / 8" (SEE NOTE 2)
MINOR ARTERIAL	CLASS V	PG 58-28 DM-3/4"	88'	69'	34.5'	6" / 8" (SEE NOTE 2)
MAJOR ARTERIAL	CLASS V	PG 58-28 DM-3/4"	106'	86'	43'	6" / 8" (SEE NOTE 2)
MAJOR ARTERIAL	CLASS V	PG 58-28 DM-3/4"	114'	94'	47'	6" / 8" (SEE NOTE 2)

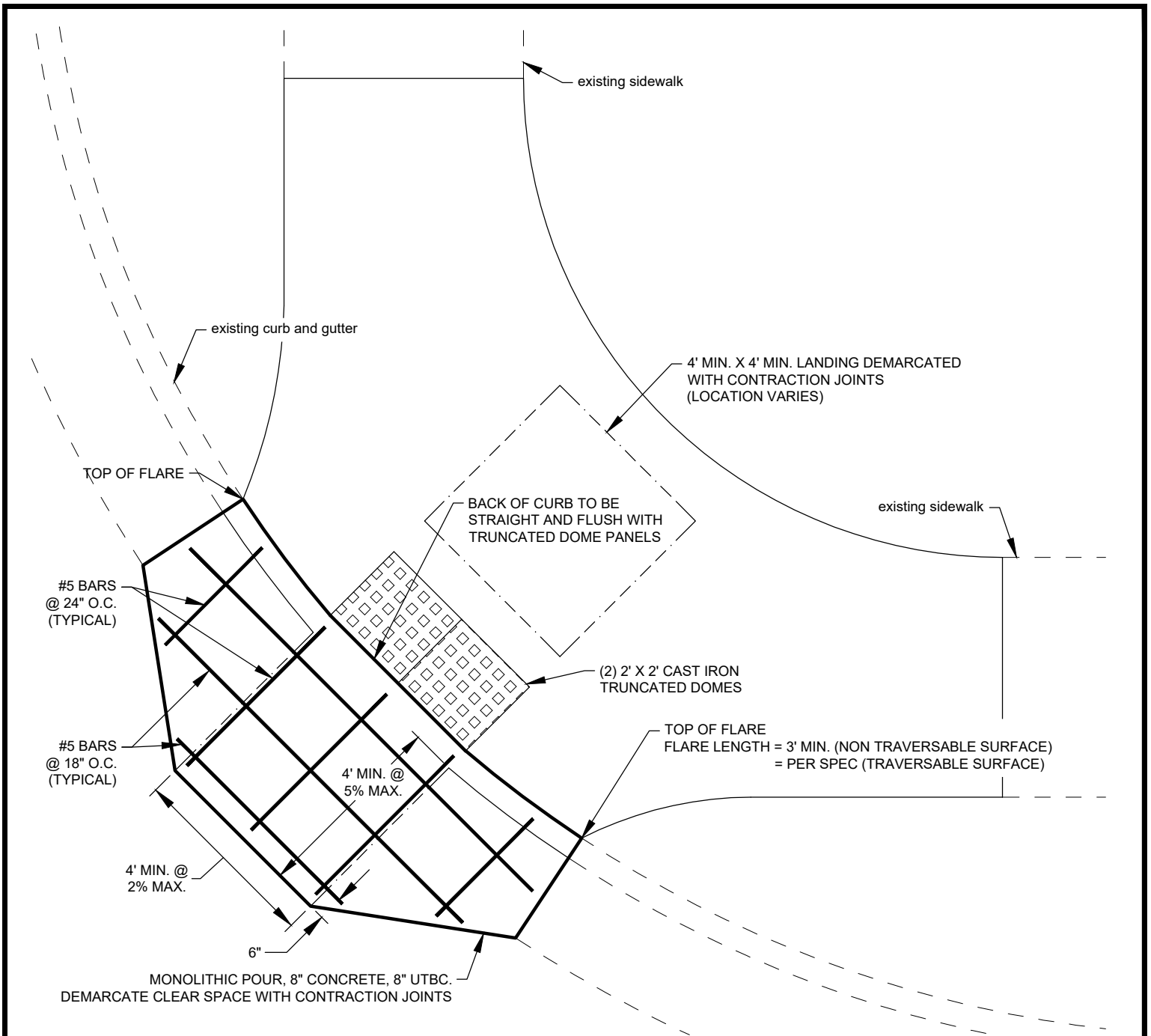
**NOTES:**

- PAVEMENT DESIGN SHALL BE BASED ON THE MAXIMUM DAILY TRAFFIC CAPACITY AND AS RECOMMENDED BY A SOILS REPORT. LOCATION OF SIDEWALK AND CURB & GUTTER MAY VARY ON INDIVIDUAL STREETS PER DIRECTION OF CITY ENGINEER. SEE APWA SECTION 32 12 05 (ASPHALT CONCRETE) FOR SPECIFICATIONS.
- A TYPE II SLURRY SEAL (OR APPROVED EQUAL) SHALL BE PLACED PER APWA 32 01 13.61 AT THE CONCLUSION OF THE WARRANTY PERIOD AND PRIOR TO WARRANTY RELEASE.
- SEE APWA 32 12 05 2.3.D FOR RAP

NOT TO SCALE

DRAWN 10/18/17

#	BY	DATE
01	AT	12/01/20
02	SWF	11/29/22



**NOTES:**

1. THIS STANDARD PLAN SUPPLEMENTS APWA PLAN NUMBERS 235 AND 236. APWA MATERIAL SPECIFICATIONS APPLY EXCEPT FOR THE DETECTABLE WARNING SURFACE.
2. RAMP CONSTRUCTION MUST COMPLY WITH CURRENT ADA STANDARDS FOR ACCESSIBLE DESIGN.

**3. MATERIALS -**

TRUNCATED DOMES: ADA COMPLIANT, CAST IRON PLATES, W/ NON-SLIP SURFACE AND NATURAL FINISH. SET TWO (2) 24"X24" PLATES TOGETHER IN WET CONCRETE WITH SMOOTH, EVEN SEAM IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

REBAR: GALVANIZED OR EPOXY COATED, DEFORMED, 60 KSI YIELD GRADE STEEL, ASTM A 615, WITH 2" MIN. COVER.



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ADA RAMP CLEAR SPACE

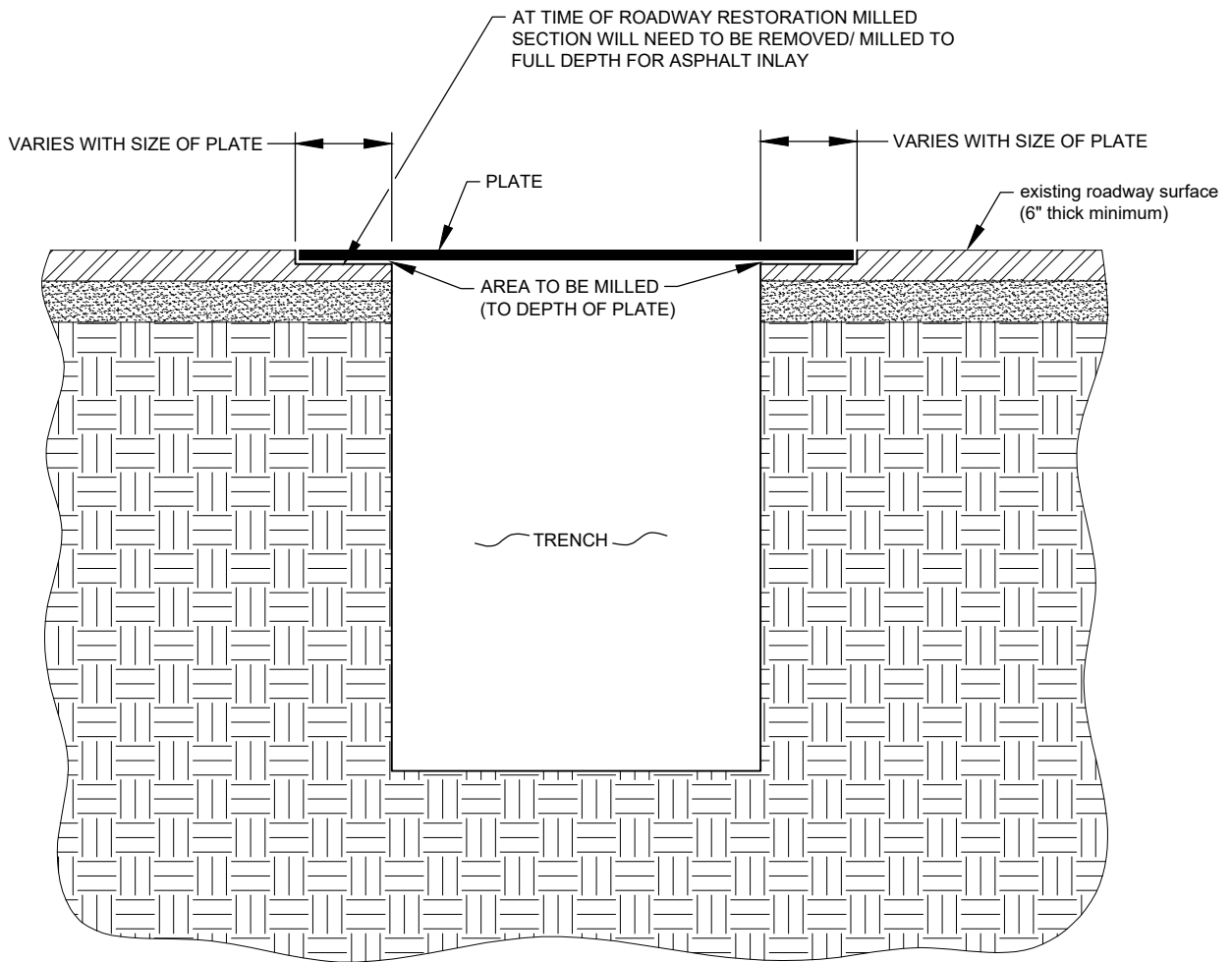
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01	AT	12/01/20
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03	SWF	11/22/22

PLAN

ST-7



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**TRENCH PLATING**

DRAWN 10/18/17

**REVISIONS**

#	BY	DATE
01	AT	12/01/20
02	SWF	04/04/22
03	SWF	11/22/22

**PLAN**

**ST-8**

ASPHALT TO BE CORED, REPLACED,  
AND CRACK SEALED UPON COMPLETION

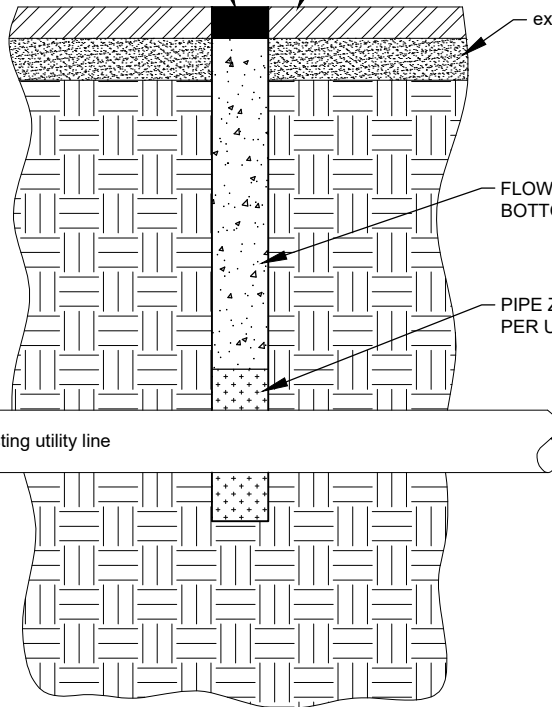
existing asphalt concrete pavement

existing utbc

FLOW FILL POTHOLE TO  
BOTTOM OF ROADWAY SURFACE

PIPE ZONE  
PER UTILITY REQUIREMENTS

existing utility line



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POT HOLE

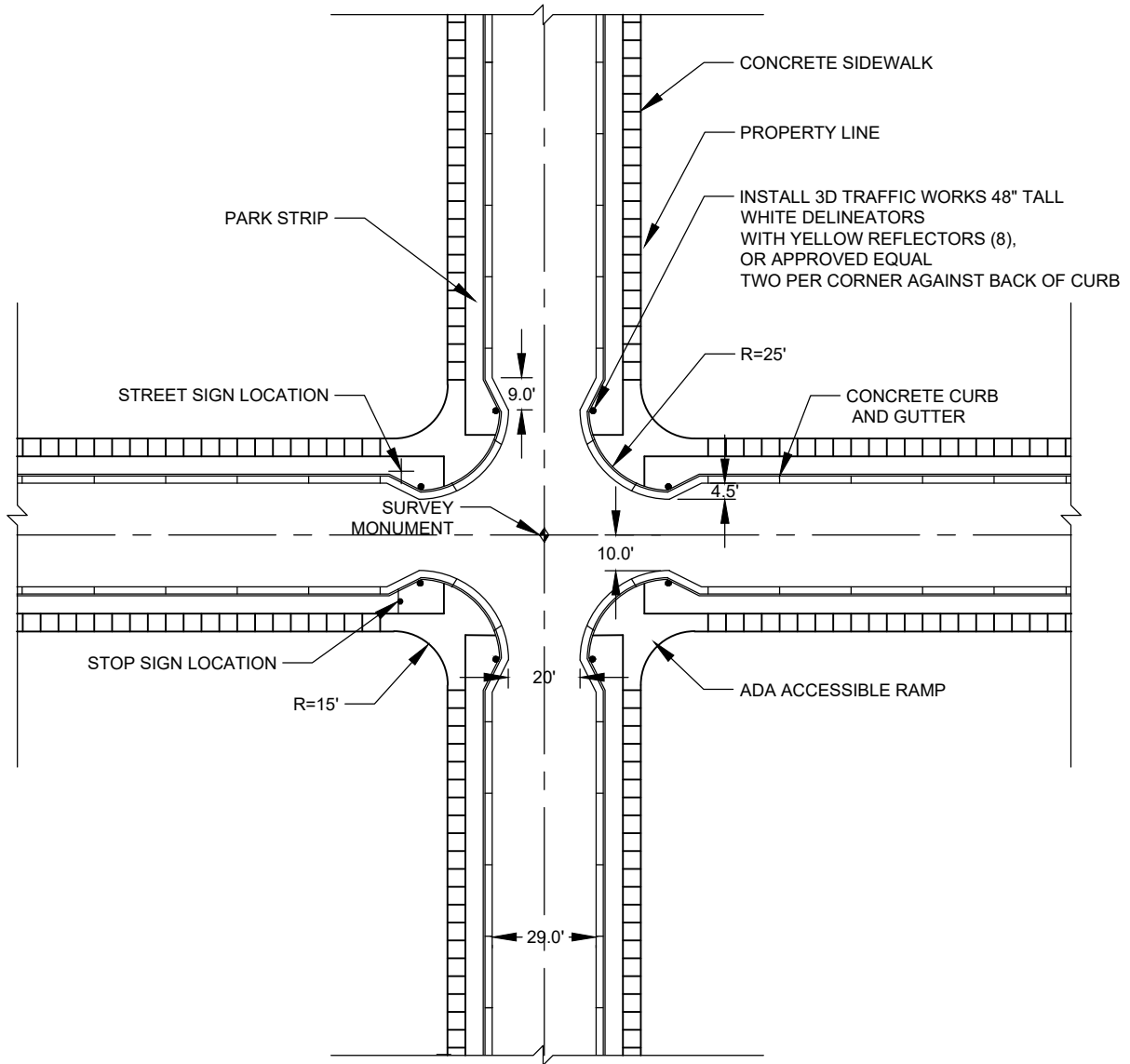
DRAWN 10/18/17

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01	AT	12/01/20
02	SWF	04/04/22
02	SWF	11/22/22

PLAN

ST-9



NOT TO SCALE



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**LOCAL STREET TRAFFIC  
 CALMING INTERSECTION**

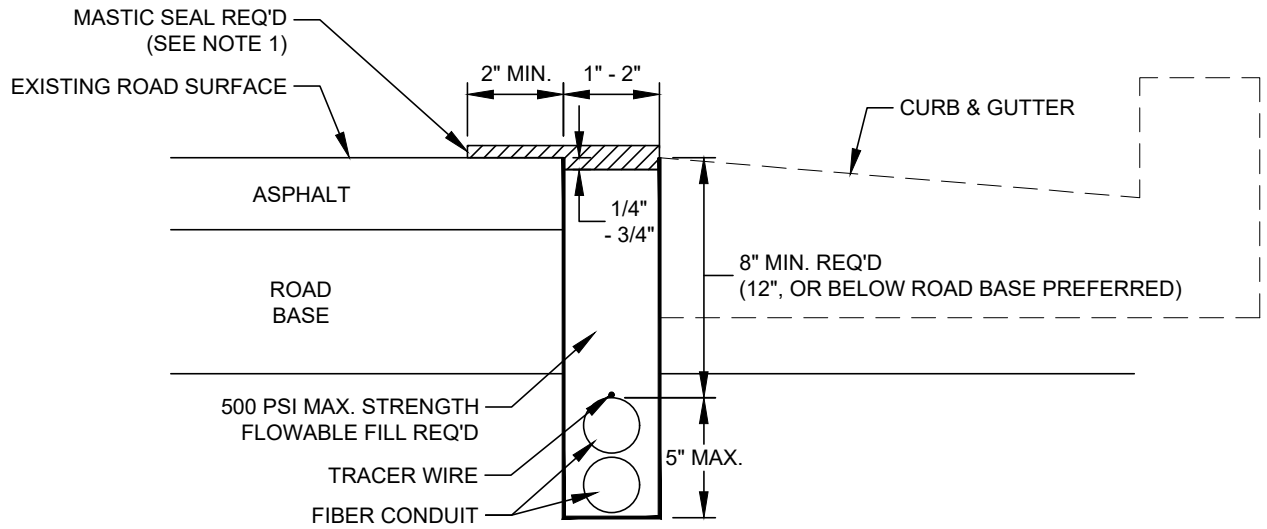
DRAWN 04/04/22

**REVISIONS**

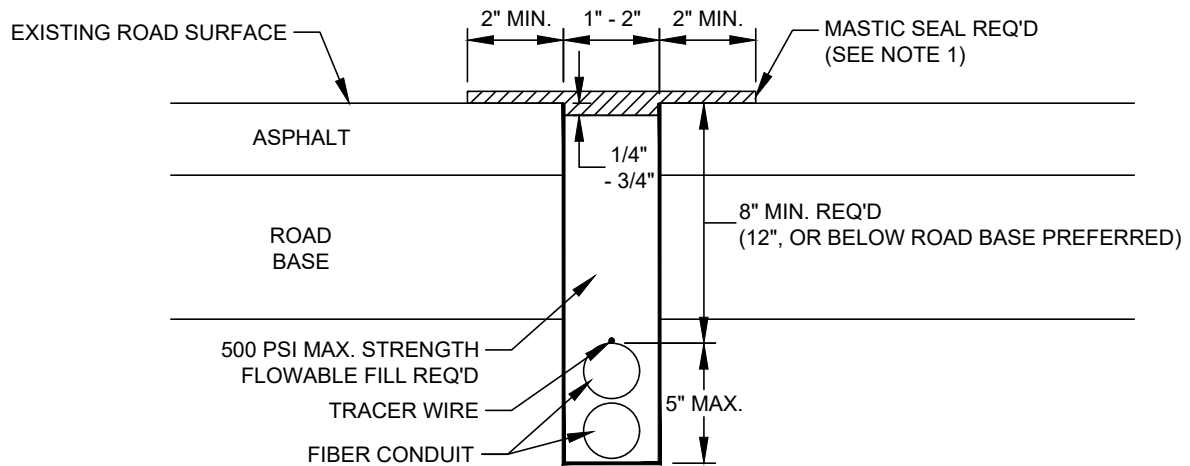
#	BY	DATE
01	SWF	11/22/22

**PLAN**

**ST-10**



**A** NARROW TRENCH EXCAVATION ADJACENT TO CURB (PREFERRED)



**B** NARROW TRENCH EXCAVATION IN ASPHALT

**NOTES:**

1. CRAFCO MASTIC ONE, PART NO. 33339 (OR APPROVED EQUAL)



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**NARROW TRENCH EXCAVATION**

DRAWN 12/3/21

**REVISIONS**

#	BY	DATE
02	KB	04/04/22
03	KB	11/22/22

**PLAN**  
  
**ST-11A**

# Riverton City Narrow Trench Excavation Installation and Construction Standards

1. Narrow trenching will only be approved for " local asphalt streets" within the City owned right-of-way. The City, however, reserves the right to deny any narrow trench request on any local street.
2. Narrow trenching methods will not be allowed on the following concrete streets:
  - Old Liberty Way from 12600 S to 13400 S
  - Majestic Rise Parkway from Mountain View Highway to Old Liberty Way
  - Sentinel Ridge Blvd from 13400 S to 13800 S
  - 13400 S from Bangerter Highway to Mountain View Highway

Conduits in these streets will be placed by methods of trenchless technology. Any open cuts will require full panel replacement in accordance with Riverton City Standards. Placement of conduit along these streets can be in the parkstrip, under the sidewalk, or in the public utility easements (PUEs) behind the sidewalk. Detailed plans showing location of conduits along these streets shall be submitted for review and approval prior to issuance of encroachment permit.

3. The narrow trench excavation in asphalt shall be located and constructed as shown on Riverton City Standard Plan ST-12A entitled "Narrow Trench Excavation". Method "A" of Standard Plan ST-12A is the preferred method of installation.
4. Plan ST-12A Method B will be used on asphalt streets without curb and gutter. Placement of the narrow trench shall be a minimum of five feet (5') from the edge of asphalt.
5. The City will only approve the installation of two (2) narrow trench excavation installations per local street. Conduits must be traceable by locating equipment.
6. The narrow trench shall not be located within five feet (5') horizontally of any public utility asset (manhole, sewer line, water line, fire hydrant, water meter, sewer lateral, storm drain inlet, storm drain line, etc.). If encroachment within five feet (5') is unavoidable, this shall be clearly identified on the plans, and the City will review each occurrence on a case-by-case basis.
7. Where the narrow trench crosses a public utility line, the angle shall not be less than forty-five degrees (45°).
8. The submitted construction plans shall include a detail explaining the process by which the contractor will install conduits under the existing curb & gutter, parkstrip, sidewalk, or PUE. The City will approve this detail on a case-by-case basis through the encroachment permit process.



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## NARROW TRENCH EXCAVATION

DRAWN 12/3/21

**REVISIONS**

#	BY	DATE
01	KB	04/04/22
02	KB	11/22/22

**PLAN**

**ST-11B**