

WEST BOUNTIFUL CITY

ORDINANCE 416-19

AN ORDINANCE UPDATING CONSTRUCTION STANDARDS AND SPECIFICATIONS FOR WEST BOUNTIFUL CITY

WHEREAS, the West Bountiful City Council desires to maintain current standards and specifications for construction, design, and on-site review of all public improvements such that the health, safety and welfare of the community is preserved; and

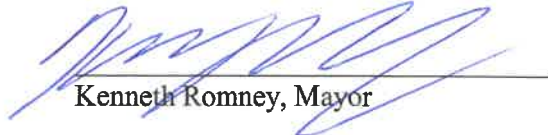
WHEREAS, the Utah Legislature adopted House Bill 322 in 2017 stating that Land Use Regulations, including Construction Standards and Specifications, be adopted by Ordinance; and

WHEREAS, the City Engineer is recommending updates and modifications to the previously adopted City design standards, which provide requirements specific to West Bountiful for the construction of municipal infrastructure such as streets, water, and storm drain systems, and

WHEREAS, the planning commission held a public hearing on July 9, 2019 and voted unanimously to recommend approval of the proposed updates to the West Bountiful Minimum Construction Standards.

NOW, THEREFORE, BE IT ORDAINED BY THE WEST BOUNTIFUL CITY COUNCIL THAT THE UPDATES PROPOSED BY THE CITY ENGINEER AND RECOMMENDED BY THE PLANNING COMMISSION BE MODIFIED AS SHOWN IN EXHIBIT A.

ADOPTED this 16th day of July, 2019. This Ordinance will become effective upon signing and posting.


Kenneth Romney, Mayor

Voting by the City Council:	Aye	Nay
Councilmember Ahlstrom	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Councilmember Bruhn	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Councilmember Enquist	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Councilmember Preece	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Councilmember Williams	<input checked="" type="checkbox"/>	<input type="checkbox"/>

ATTEST:


Cathy Brightwell, City Recorder



West Bountiful City Minimum Construction Standards

This policy defines the general requirements for improvements to be constructed by any developer, sub-divider, owner, or contractor for construction, including residential, commercial, industrial, institutional, governmental entities. All improvements which are in areas that are or will become public rights-of-way and/or easements, or that will be under the responsibility of a homeowner's association shall meet these requirements.

The Utah Chapter, American Public Works Association (APWA) Manual of Standard Specifications and Standard Plans, latest addition with all approved supplements is the City's general construction standard. The City has some local standards that deviate from the APWA standards. City Municipal Code and the standards included in this policy shall supersede APWA and other standards whenever they conflict. Any variation, substitution or exception from the standards in this policy must be authorized by the City Engineer or his/her designee. Any item of construction not covered by the provided standards must have plans and specifications approved by the City Engineer or his/her designee.

1. Storm drainage system
 - a. Inlet boxes
 - i. Installed at intersections to eliminate waterways (cross gutters) wherever possible
 - ii. Installed at 800± foot spacing along curb & gutter streets
 - iii. Max. gutter flow is 1.6 CFS for 25-year recurrence frequency
 - iv. Standard box is 18" X 42" with bicycle safe inlet grate
 - v. Wood shims and similar materials are not permitted to adjust frame elevations
 - b. Cleanout boxes
 - i. Installed at all pipe junctions with pipes 8 inch or larger
 - ii. Installed at change in grade or change in alignment
 - iii. Standard box is 18 X 48 solid cover
 - iv. May be 60-inch manholes
 - c. Line size, type and capacity
 - i. Minimum size shall be 15" in street right of ways
 - ii. Pipe material is RCP
 - iii. The rational formula may be used to determine line capacity within each drainage sub-basin.
 - iv. Minimum slope shall provide for 3 fps at 80% capacity
 - d. A site drainage plan will show existing and finish grades for the entire property being considered as well as information relating to upstream and downstream contributing areas, flow rates, existing infrastructure capacity, proposed infrastructure design capacities and specifications.

- e. Video inspection of pipelines is required prior to acceptance.
- f. Minimum cover and placement
 - i. The pipe, including the bell, shall be placed at least 15 inches below the lip of the curb & gutter.
 - ii. Additional depth as required to accommodate area drain systems.
 - iii. Storm drain line installed with the centerline of the pipe 24 inches into the street from the lip of the gutter.
 - iv. Tangent lines may not cross behind curb & gutter on curve streets.
- g. UPDES permit
 - i. Comply with the City's Storm Water Management Plan requirements
 - ii. Prepare SWPPP with BMPs incorporated
 - iii. Rear yard drains with an 8" minimum pipe size, are required whenever the average ground running slope is less than 2%.

2. Culinary Water System

- a. Isolation valves
 - i. Installed at each intersection, all directions
 - ii. Installed not to exceed 800 feet between valves
 - iii. Placed at logical locations (fence lines, property corners, near fire hydrants)
 - iv. Concrete collar is required
- b. Fire hydrants
 - i. Installed not to exceed 400 feet spacing (residential)
 - ii. Installed not to exceed 300 feet spacing (commercial)
 - iii. Installed at property line projections
 - iv. Installed at every dead-end line. These hydrants are for flushing purposes and are not considered part of the fire protection system.
 - v. Installed at the intersection entrance to cul-de-sacs.
 - vi. Auxiliary valve for hydrant installed at the mainline.
- c. Main Line size and placement
 - i. Approved material is C-900 PVC class 200 w/#12 locator wire
 - ii. Minimum line size is 8 inches or as per City Master Plan
 - iii. Minimum depth is 48 inches of cover
 - iv. Placed 10 feet north or east from the street centerline
 - v. Waterline shall parallel street centerline, with bends as required.
 - vi. All trace wire shall be tested for continuity in the presence of the inspector
- d. Culinary water service lines
 - i. 3/4" minimum size for residential, 1" allowed
 - ii. Commercial / industrial service and meter size determined by anticipated fixture unit demand
 - iii. Residential meter vaults shall be 20" white PVC with 21" risers
 - iv. Services placed to the center of the residential lot unless otherwise approved
 - v. The property owner is responsible for concrete maintenance where water meters are in driveways.
 - vi. Relocation of water meters which require splicing the service line between the

water main and the meter setter are not permitted.

- vii. Service lateral extended 10 feet beyond property line and marked with a 2X4 or other full-depth marker

3. Street design

- a. Minimum street right-of-way width is 50 feet.
- b. Maximum length of cul-de-sac, 400 feet from the center of the intersecting street to the center of the cul-de-sac circle, as measured along the centerline.
- c. The maximum length of a dead-end street which is to extend in the future is 1000 feet from the center of the nearest through cross street intersection to the street end. A temporary turn around is required on the dead end if the street is more than 150 feet long.
- d. A second means of access is required for all development with a permanent dead end exceeding 400 feet and a temporary dead end exceeding 1000 feet, measured as described above.
- e. Minimum street curve radius is 150 feet.
- f. Cul-de-sac right-of-way radius is 50 feet.
- g. Street intersections at right angles preferred, with 10 degree approach angle allowance.
- h. "T" intersections preferred with centerline to centerline spacing of 295 foot offset between intersections.
- i. The approach to an intersection shall have at least 100 feet of tangent (perpendicular) approach.
- j. Standard street section
 - i. 30" wide, 6" high back style curb & gutter
 - ii. 48" park strip
 - iii. 48" wide 6" thick concrete sidewalk (6" thick concrete & 6" base thru residential driveway). Sidewalks approved without an adjacent 4' wide park strip shall be a minimum 6" thick with 6" base course.
 - iv. 29' wide asphalt surface (residential)
 - (1) 4" asphalt
 - (2) 8" roadbase
 - (3) 12" subbase
 - (4) Mirafi 160N geotextile fabric or equal
 - v. Streets with right of ways greater than fifty feet wide
 - (1) 5" asphalt
 - (2) 8" road base
 - (3) 12" subbase
 - (4) Mirafi 160N geotextile fabric or equal
 - vi. 20' back-of-curb radius at corners for 50' right of ways and 30' back-of curb radius if intersecting with a 60' or larger right of way.
 - vii. Construction of public improvements which does not meet the minimum required standard is to be removed and replaced at no cost to the city.
 - viii. One compaction test per lift of imported granular base and sub-base material is

required for every 500 square yards

- ix. In addition to the compaction test requirements, subbase and base course layers will be proof rolled by a loaded water truck or equivalent. Any noticeable deflection in base materials is to be removed and remediated.

k. Street elevations

- i. 0.50% minimum gutter slope
- ii. 1.0% minimum and 4% maximum cross slope
- iii. Sidewalk installed 0.10' above top of curb

l. Street Lights

- i. Lights shall be installed at street intersections, dead ends, group mailboxes, a maximum 350 feet spacing or as otherwise approved by the City.
- ii. Poles in residential areas shall be 14' fiberglass with 100 Watt HPS equivalent LED fixtures with IES Type III distribution.
- iii. Street light installations shall include a concrete base per approved details
- iv. Fixtures shall be Granville or American Revolution unless otherwise approved by the City.
- v. All construction shall be in accordance with Rocky Mountain Power's installation requirements

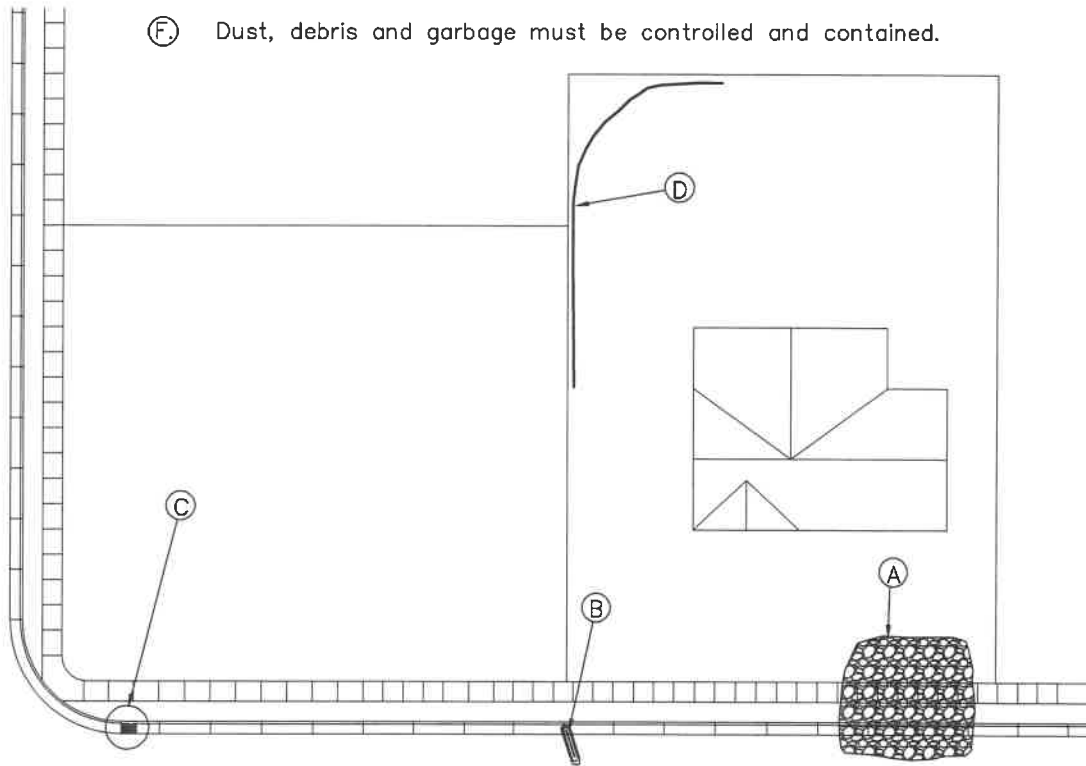
4. Other items

- a. Group mailboxes are to be located off main streets whenever possible and a 100' minimum from the center of a street intersection.
- b. Extend all stub streets to property boundary, including extensions to future development as directed by the City.
- c. End of construction inspection shall be free of defects, damage and debris.
- d. Landscaped areas shall not be graded with a slope steeper than 30% without mechanical stabilization.
- e. Storm water basins which are designed to hold water deeper than 24" are to have slopes no steeper than 30% without mechanical stabilization and fenced with a 6' high chain link fence unless an exception is granted by the City.
- f. Inspections to release residential and commercial construction bonds will not be completed until after all landscaping which may negatively impact public improvements is completed.
- g. Residential drive approaches shall be located a minimum of 50 feet from the center of a street intersection
- h. Extraordinary repairs, as defined by the city code, as well as any new damage to public improvements are required to be repaired as a condition of a building permit for properties with existing main structures (as defined by municipal code).
- i. Concrete and other public improvements will be held to the same standard as newly constructed improvements for properties with a building permit for the original

EXHIBIT A

- construction of a main structure (as defined by municipal code).
- j. All trenches in street right of way shall be backfilled with imported granular material as directed and approved by the public works department
- k. Required soils report shall include
 - i. Subsurface water level fluctuations
 - ii. Bearing capacity and foundation design requirements
 - iii. Pavement design recommendation including subgrade CBR value (as applicable)
 - iv. Slope stability
 - v. Special considerations such as geologic hazards, collapsible or expansive soils
- 5. Water, secondary water, storm drain, sewer utility improvements are to be shown in plan and profile drawings for new construction.

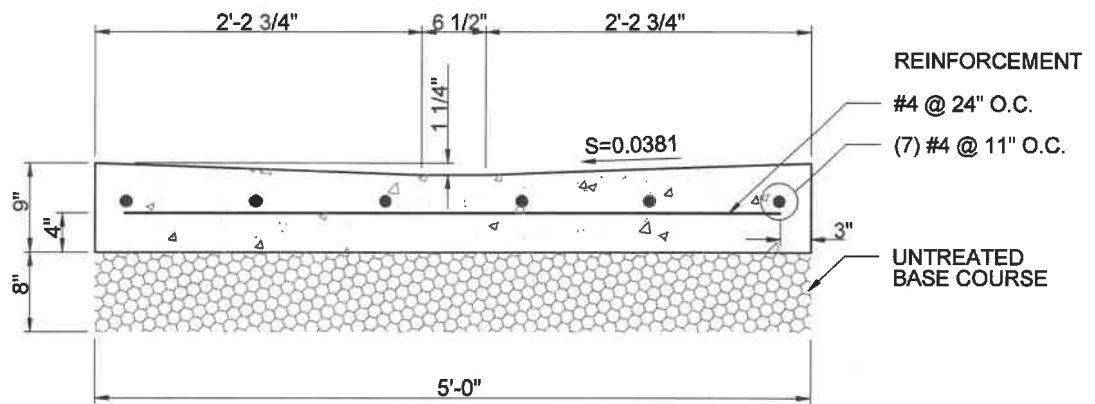
- (A) Clean, free draining material (gravel 1/2" diameter or larger) is required for concrete protection. No native or imported soil is allowed.
- (B) Gravel sock or equivalent silt barrier is required at the property line.
- (C) Inlet protection such as a filter fabric under the grate is required if storm drain inlet is within 250 feet of lot line.
- (D) Silt fence is required on the down hill side of lot as necessary to prevent the discharge of soil material from the site.
- (E) Inspection will not occur if site is not in SWPPP compliance. Fines for tracking mud or the discharge of soil materials is \$299 per occurrence.
- (F) Dust, debris and garbage must be controlled and contained.



TYPICAL EROSION PREVENTION

REVISED 2/13

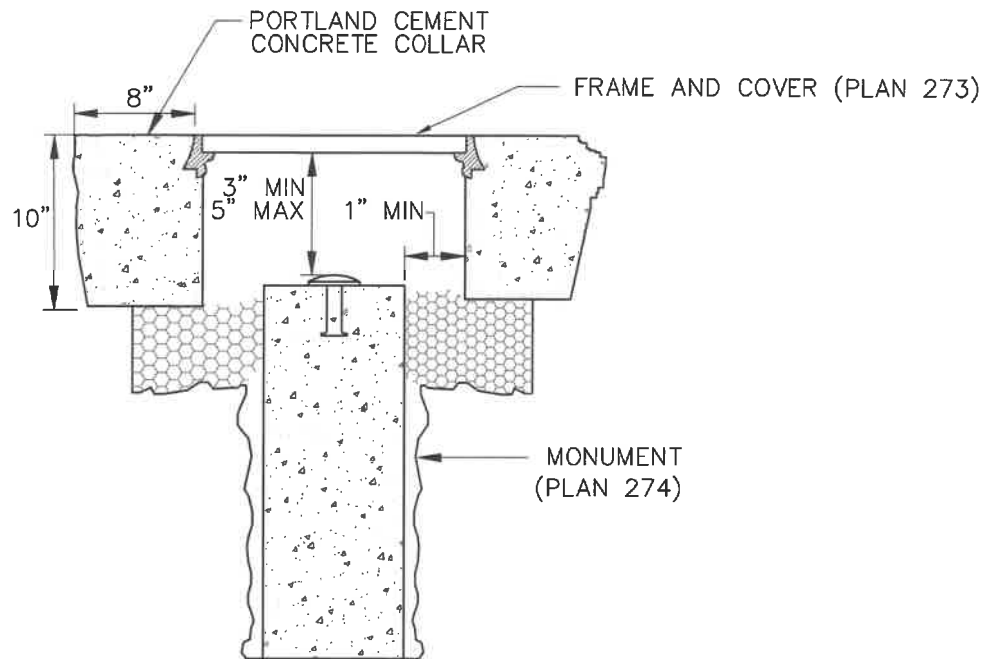
PLAN 126 SP



TYPICAL WATERWAY

REVISED 2/11

PLAN 211 SP

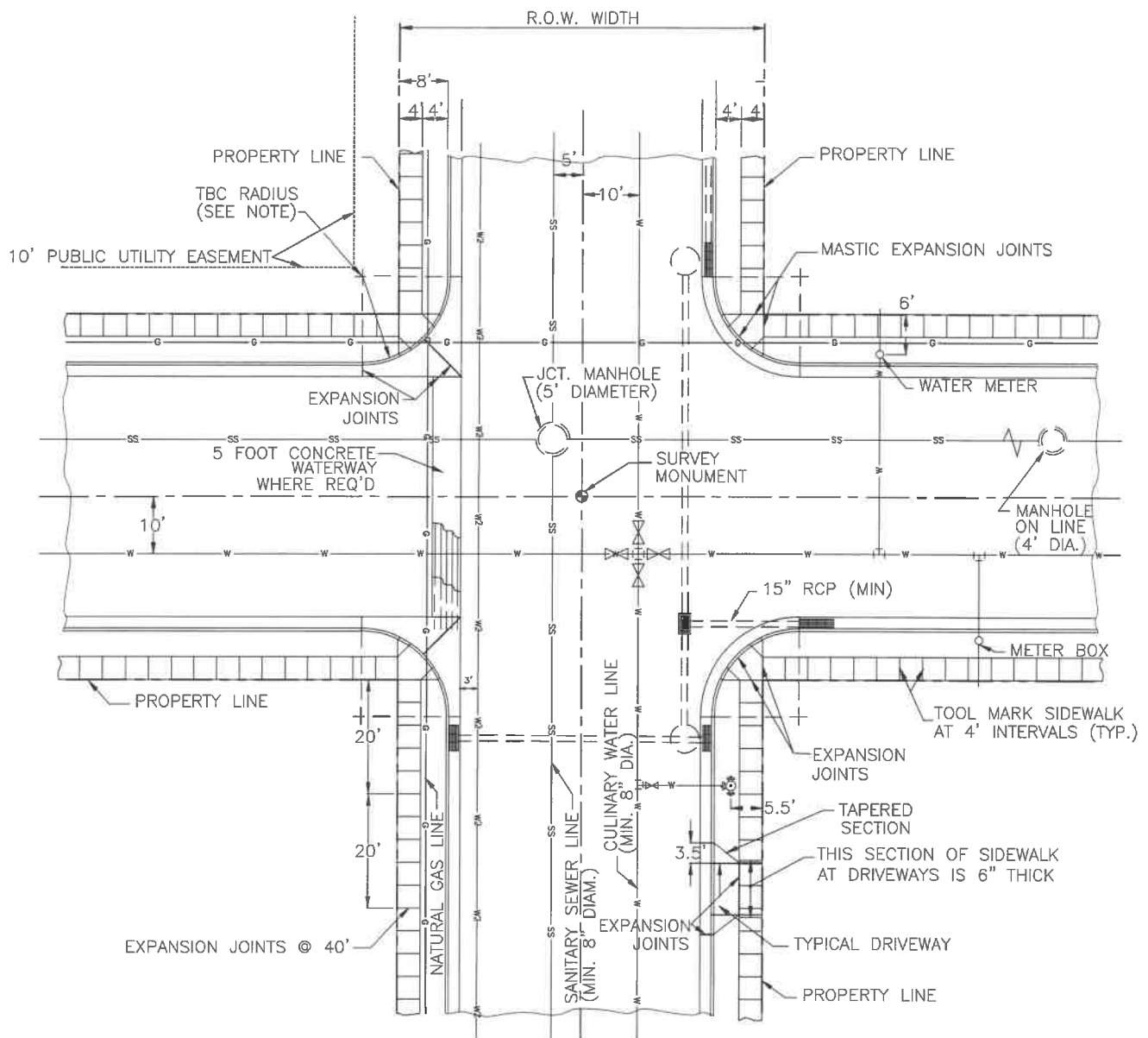


SECTION



CONCRETE COLLAR FOR SURVEY MONUMENT PLAN 275 SP

REVISED 8/17



NOTES

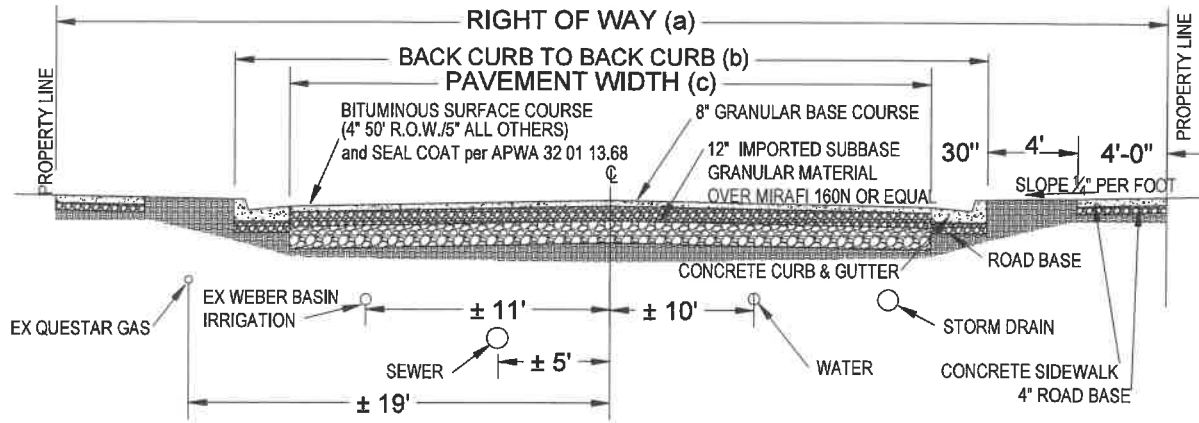
1. TBC RADIUS SHALL BE 20' WHEN BOTH STREETS ARE 50' R.O.W., 30' RADIUS FOR ALL OTHER SITUATIONS.



TYPICAL STREET SECTION

REVISED 1/17

PLAN 295 SP



R.O.W. (a)	(b)	(c)
50'	34'	29'
66'	50'	45'

**CRUSHED AGGREGATE
SUB BASE COURSE MATERIAL**

SIEVE (inch)	% PASSING
3"	100
1"	81-91
1/2"	67-77
NO. 4	40-50
NO. 16	20-26
NO. 200	6-10

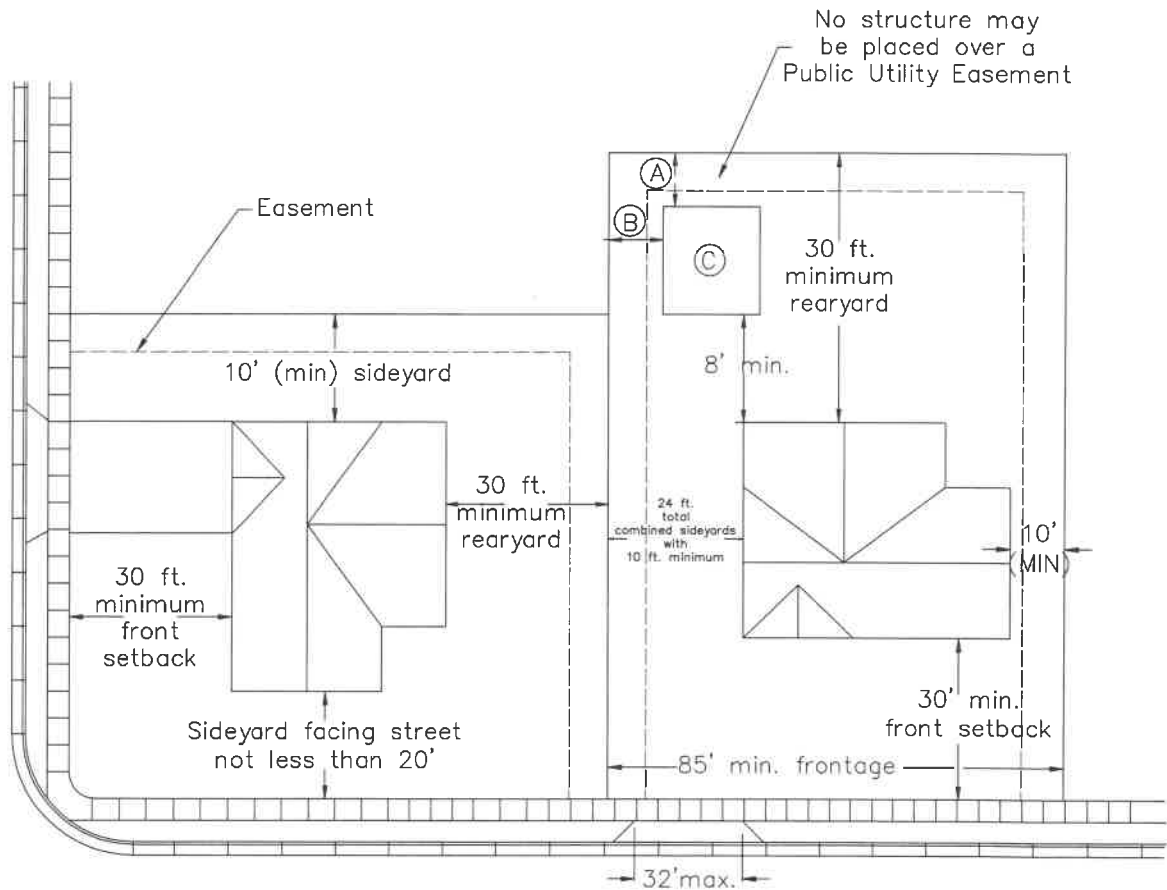


TYPICAL STREET CROSS SECTION

REVISED 6/19

PLAN 296 SP

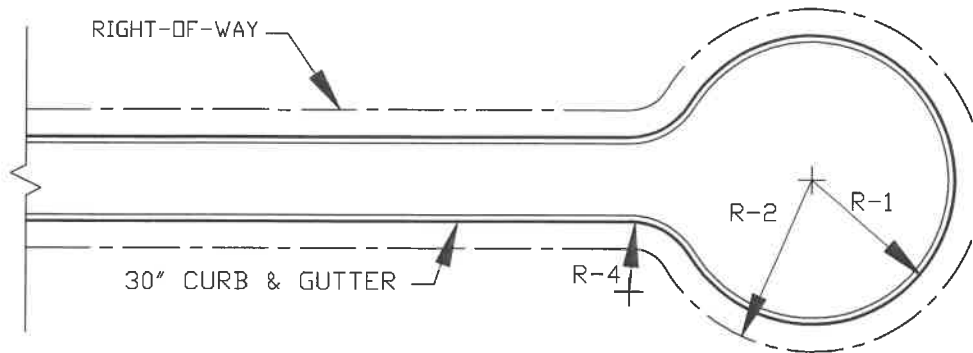
- Ⓐ Rear yard setback for an accessory building is 6' minimum or 3' if the structure is fire rated.
- Ⓑ Side yard setback for an accessory building is 6' minimum or 3' if the structure is fire rated.
- Ⓒ Accessory building cannot cover more than 35% of the rear yard.



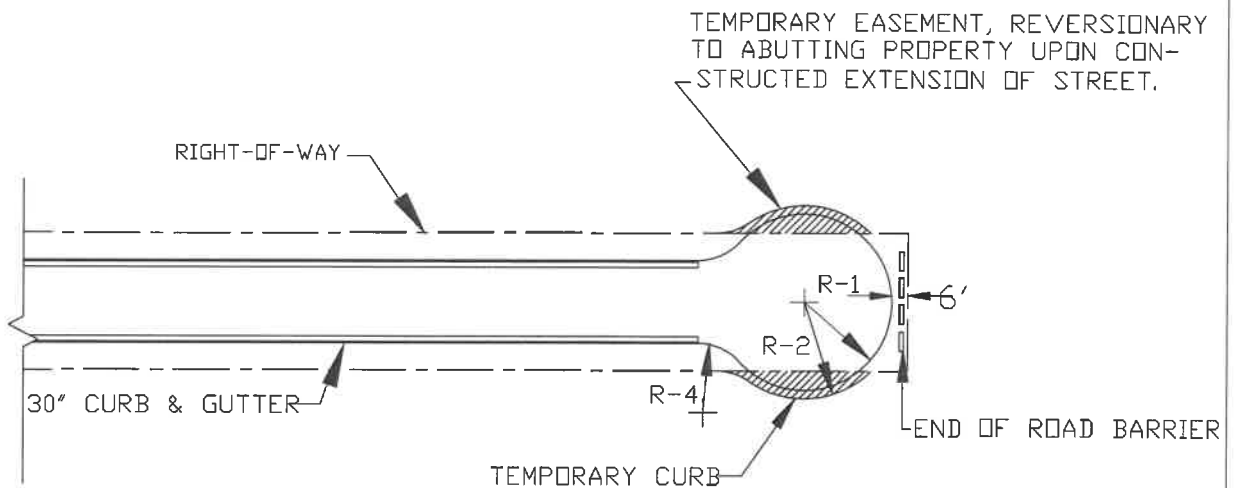
TYPICAL LOT LAYOUT

REVISED 6/19

PLAN 297 SP



STANDARD CUL-DE-SAC



TEMPORARY CUL-DE-SAC

NOTE: ALL TEMPORARY CUL-DE-SAC VARIATIONS
MUST HAVE APPROVAL OF THE CITY ENGINEER
PRIOR TO CONSTRUCTION.

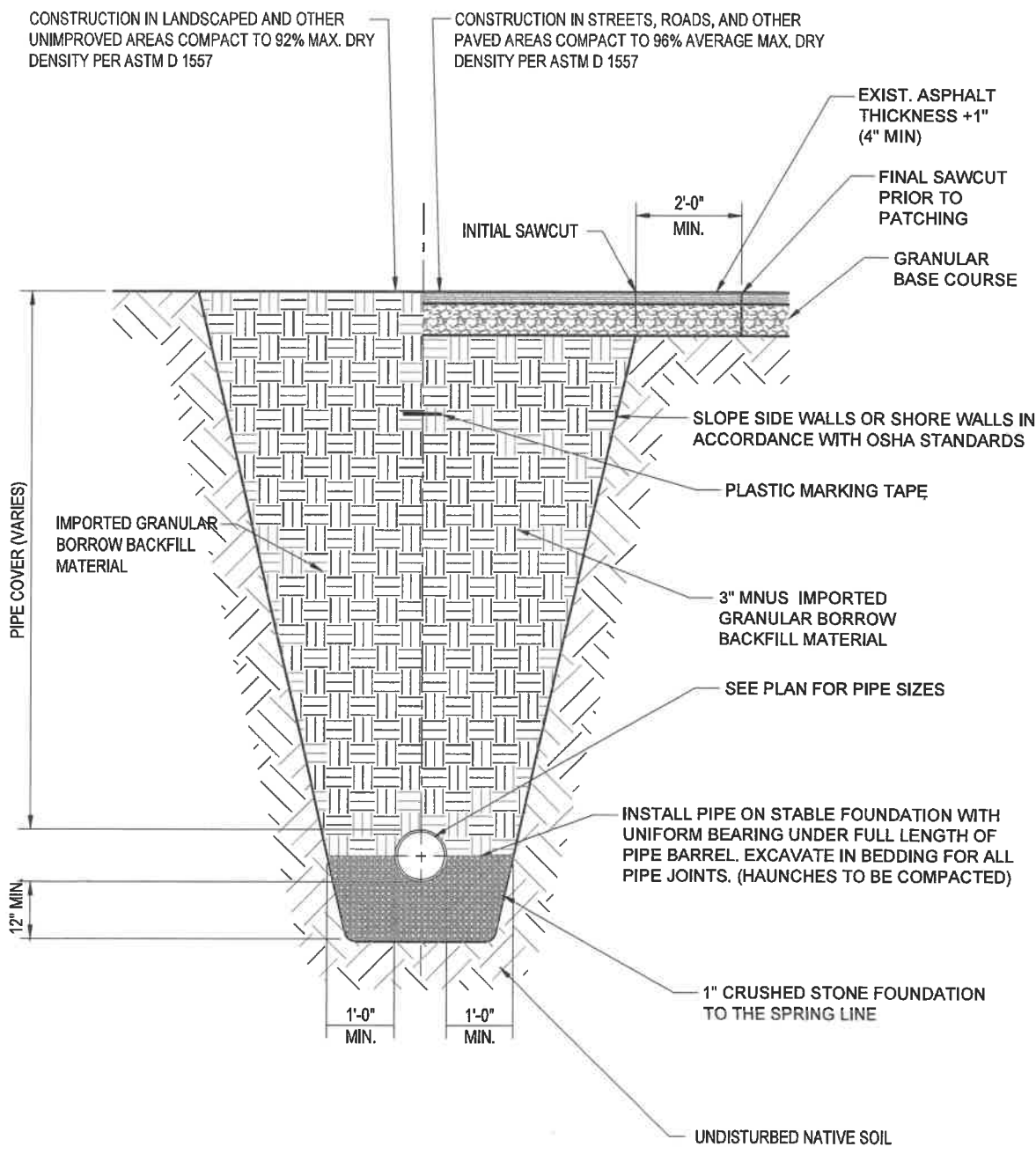
STANDARD	
R-1	42'
R-2	50'
R-4	25'



TYPICAL CUL-DE-SAC

REVISED 9/17

PLAN 298 SP



TYPICAL CONCRETE PIPE TRENCH SECTION

REVISED 4/18

PLAN 385 SP

GENERAL WATER SYSTEM REQUIREMENTS:

1. 10'-0" MIN. EDGE TO EDGE HORIZONTAL CLEARANCE IS REQUIRED BETWEEN WATER AND SEWER PIPE LINES.
2. WHERE WATER AND SEWER LATERALS MUST CROSS, WATER LATERAL SHALL BE 18" ABOVE THE SEWER LATERAL AS MEASURED FROM THE BOTTOM TO TOP OF PIPES. THIS SEPARATION SHALL BE MAINTAINED FOR AT LEAST 10'-0" EITHER SIDE OF CROSS POINT.
3. UTAH DIVISION OF DRINKING WATER APPROVAL IS REQUIRED TO LOOP ANY WATER PIPE LINE UNDER A SANITARY SEWER PIPE LINE.
4. ALL THRUST BLOCKS MUST BE INSPECTED BY WEST BOUNTIFUL CITY PUBLIC WORKS PRIOR TO CONCRETE PLACEMENT.
5. ALL FITTINGS MUST BE INSPECTED BY WEST BOUNTIFUL CITY PUBLIC WORKS PRIOR TO BACKFILL.
6. A THREE (3') FOOT SEPARATION IS REQUIRED BETWEEN WATER SERVICE LATERAL TAPS.
7. ALL BENDS, TEES VALVES AND OTHER FITTINGS SHALL BE INSTALLED WITH CONCRETE AND MEGALUG OR ALPHAGRIP TYPE RESTRAINT AND SHALL BE GREASED AND WRAPPED WITH 8 MIL POLYETHYLENE.
8. BACKFILL: PROVIDE AND PLACE PER APWA SECTION 33 05 20. COMPACT PER APWA SECTION 31 23 26 TO A MODIFIED PROCTOR DENSITY OF 96-PERCENT OR GREATER. MAXIMUM LIFT THICKNESS IS 8-INCHES BEFORE COMPACTION. ALL BEDDING BACKFILL SHALL BE CONTINUOUS AND UNIFORM IMPORTED ENGINEERED $\frac{3}{4}$ " MINUS GRANULAR MATERIAL.
9. PRESSURE TEST ALL WATER LINES FOR A MINIMUM OF 2 HOURS AT 200 PSI PRESSURE WITH ZERO LOSS.
10. ALL NEW HYDRANTS SHALL BE MUELLER SUPER CENTURION
11. STAINLESS STEEL BOLTS ARE REQUIRED FOR ALL BURIED APPURTENANCES AND "COR-BLUE" OR EQUAL BOLTS ON ALL BURIED FITTINGS.
12. DISINFECTION SHALL BE IN ACCORDANCE WITH APWA STANDARD SPECIFICATIONS, STATE OF UTAH RULE 309-520, AWWA A100 WATER WELLS, AWWA C651 DISINFECTION OF WATER MAINS, AWWA C652 DISINFECTION OF WATER STORAGE FACILITIES AND AWWA C654 DISINFECTION OF WELLS
13. A MINIMUM FOUR FOOT DEPTH OF BURY FROM TOP OF PIPE TO GROUND SURFACE IS REQUIRED UNLESS SPECIFICALLY STATED OTHERWISE.
14. ALL 14" AND LARGER VALVES SHALL BE MUELLER LINESEAL III SERIES BUTTERFLY VALVES CLASS 250 WITH BURIED SERVICE ACTUATORS. VALVES 12" AND SMALLER SHALL BE MUELLER A-2360 SERIES, AMERICAN FLOW SERIES 2500 OR APPROVED EQUAL GATE VALVES.
15. PIPE LENGTHS SHOWN IN PROFILE ARE HORIZONTAL LENGTHS. NO ADJUSTMENT FOR VERTICAL COMPONENT HAVE BEEN MADE.
16. DISCHARGING SUPER CHLORINATED WATER INTO THE SANITARY SEWER SYSTEM REQUIRES ADVANCE WRITTEN PERMISSION FROM SOUTH DAVIS SEWER DISTRICT.
17. ALL MATERIALS INCLUDING PIPE, GASKETS, LUBRICANTS AND O-RINGS SHALL BE ANSI-CERTIFIED AS MEETING THE REQUIREMENTS OF NSF STANDARD 61 AND STAMPED WITH THE NSF LOGO.
18. PIPES AND PIPE FITTINGS CONTAINING MORE THAN 8% LEAD AND LEAD-TIP GASKETS SHALL NOT BE USED. REPAIRS TO LEAD-JOINT PIPE SHALL BE MADE USING ALTERNATIVE METHODS.
19. PIPE, PIPE JOINTS, FITTINGS, VALVES AND HYDRANTS SHALL CONFORM TO NSF STANDARD 61 OR STANDARD 14, AND APPLICABLE ANSI/AWW STANDARDS C104-A21.4-03 THROUGH C550-05 AND C900-7 THROUGH C950-07.
20. DO NOT DROP PIPE INTO TRENCH. PIPE ACCIDENTALLY OR INTENTIONALLY DROPPED SHALL BE REMOVED FROM THE JOBSITE REGARDLESS WHETHER THERE IS VISIBLE DAMAGE OR NOT.
21. OPEN ENDS OF ALL PIPELINES UNDER CONSTRUCTION SHALL BE SEALED AND SAFELY SECURED AT THE END OF EACH WORK DAY.
22. ALL WATER SERVICE LATERALS INCLUDING PIPING, METER, METER SETTER AND CONNECTION TO PRIVATE PROPERTY OWNER'S SYSTEM SHALL CONFORM TO THE CURRENT PLUMBING CODE ADOPTED BY THE STATE OF UTAH. PLUMBING PIPES AND FITTINGS SHALL BE CERTIFIED TO MEET NSF/ANSI 372 OR NSF/ANSI 61, ANNEX G. CAP SERVICE FUTURE SERVICE LINES IF NOT IMMEDIATELY CONNECTED.
23. PVC PIPE SHALL BE INSTALLED PER ASTM D2774 RECOMMENDED PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PRESSURE PIPING AND PVC PIPE, AND AWWA MANUAL OF PRACTICE M23, 2002.
24. TRACE WIRE SHALL BE 12 GAUGE SHIELDED COPPER WITH WATERTITE CONNECTORS. TRACE WIRE TO BE RUN WITH ALL WATER MAINS, HYDRANT LATERALS AND SERVICE LATERALS TO THE METER BOX. WIRES ARE TO BE TERMINATED INSIDE VALVE AND METER BOXES AND AT HYDRANT BASES.



GENERAL WATER SYSTEM REQUIREMENTS

REVISED 1/17

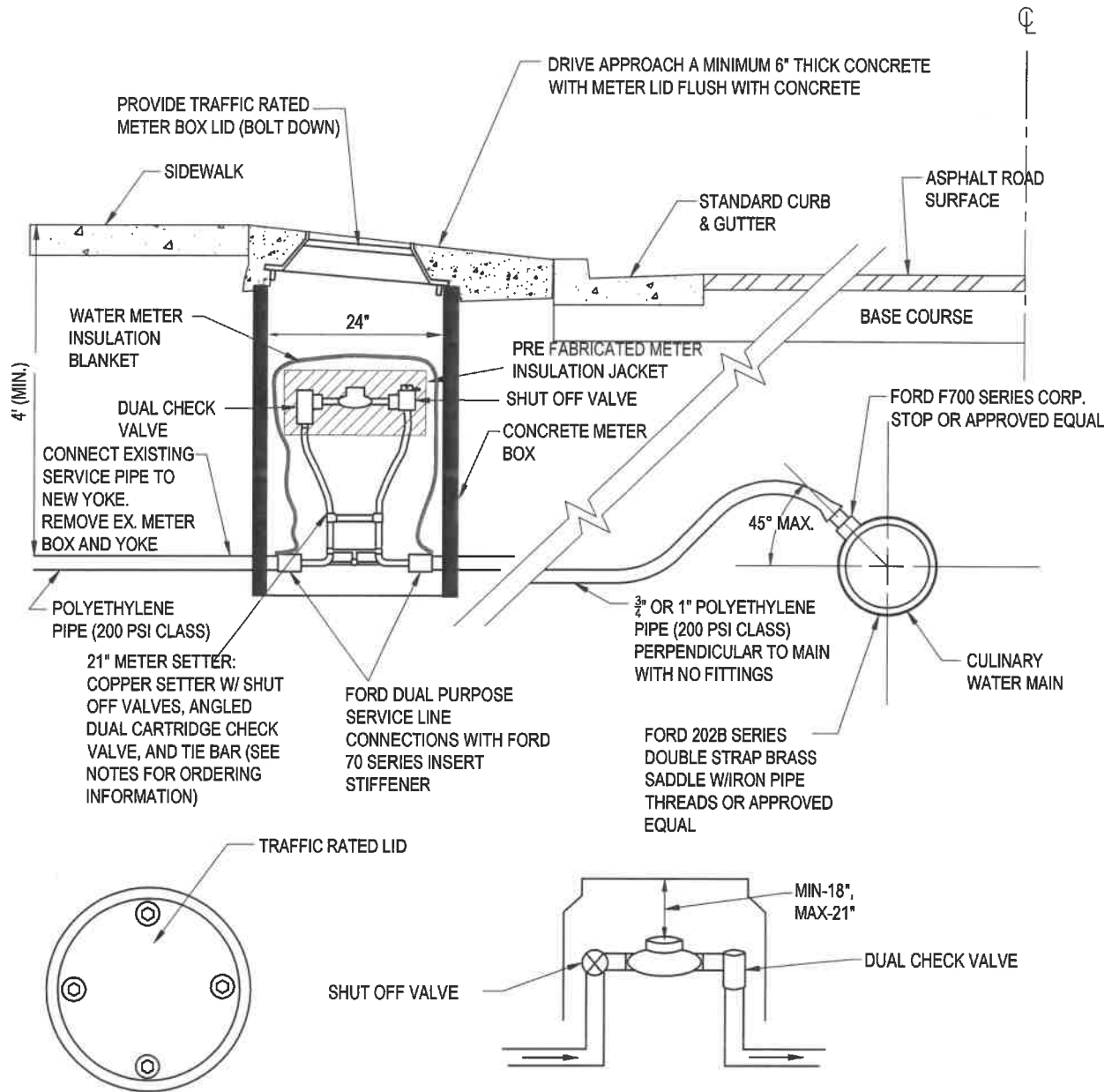
PLAN 500 SP

1 OF 1



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PLAN 511 SP

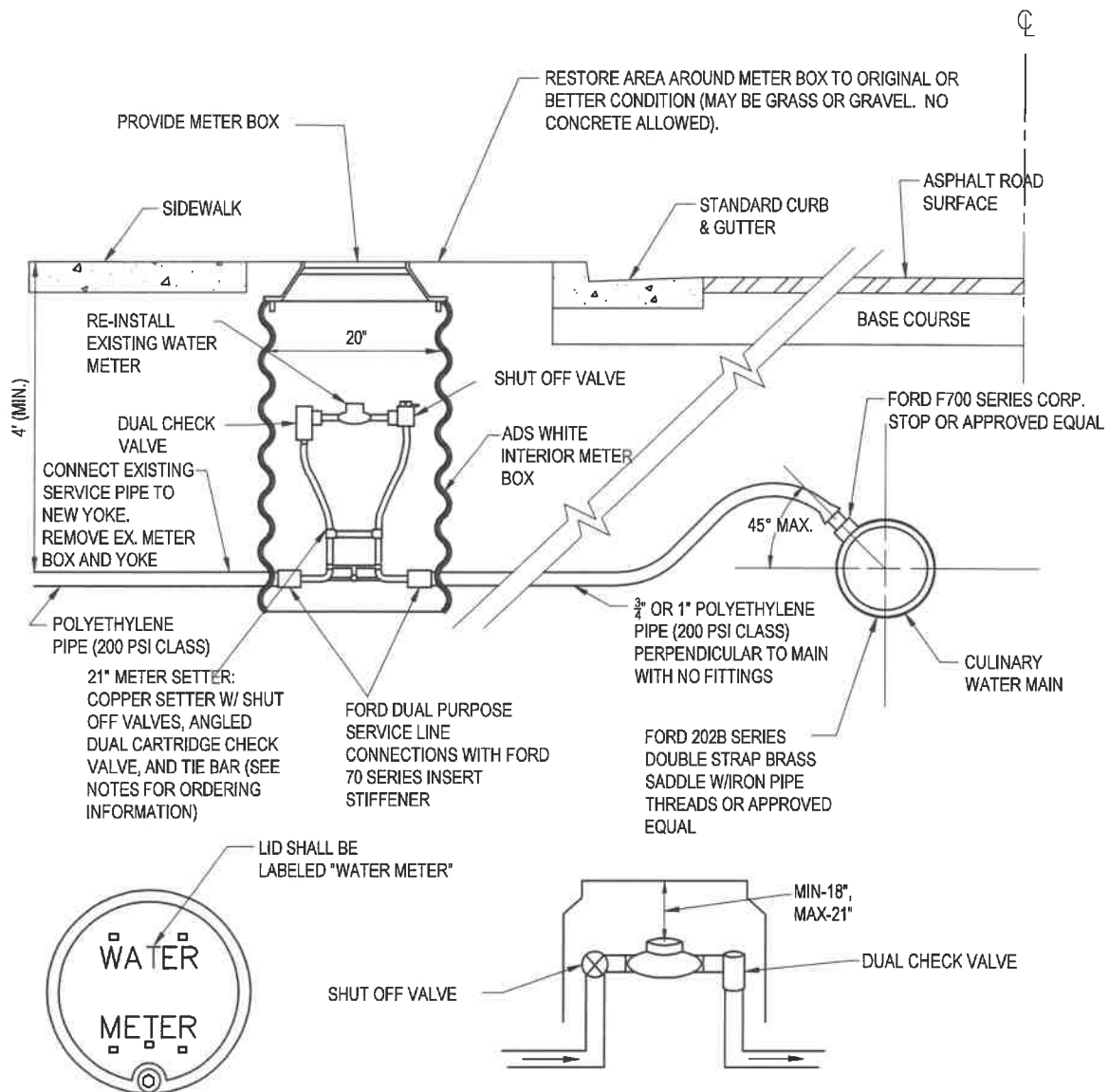


TYPICAL RESIDENTIAL WATER SERVICE IN DRIVEWAY OR CONCRETE

REVISED 10/17

PLAN 521 SP

1 OF 2



TYPICAL RESIDENTIAL WATER SERVICE

REVISED 10/17

PLAN 521 SP

NOTES:

1. 10'-0" MIN. EDGE TO EDGE HORIZONTAL CLEARANCE IS REQUIRED BETWEEN WATER AND SEWER LATERAL SERVICE.
2. WHERE WATER AND SEWER LATERALS MUST CROSS, WATER LATERAL SHALL BE 18" ABOVE THE SEWER LATERAL AS MEASURED FROM THE BOTTOM TO TOP OF PIPES. THIS SEPERATION SHALL BE MAINTAINED FOR AT LEAST 10'-0" EITHER SIDE OF CROSS POINT.
3. NO METER BOXES SHALL BE INSTALLED IN DRIVE APPROACHES OR SIDEWALKS UNLESS APPROVED IN WRITING BY THE CITY ENGINEER AND ONLY AFTER OTHER ALTERNATIVES HAVE BEEN EXHAUSTED. RECORDED NOTICE REQUIRING THE PROPERTY OWNER TO BE RESPONSIBLE FOR CONCRETE REPLACEMENT DUE TO MAINTENANCE IS REQUIRED.
4. MINIMUM LATERAL SIZE 3/4".
5. ALL RESIDENTIAL METERS REQUIRE A MINIMUM 20" METER BOX DIA.
6. PRIOR TO BACKFILLING AROUND METER BOX SECURE INSPECTION OF INSTALLATION FROM CITY TO VERIFY INSTALLATION MEETS ALL REQUIREMENTS INCLUDING HEIGHT CLEARANCES.
7. BACKFILL: PROVIDE AND PLACE PER APWA SECTION 33 05 20. COMPACT PER APWA SECTION 31 23 26 TO A MODIFIED PROCTOR DENSITY OF 96-PERCENT OR GREATER. MAXIMUM LIFT THICKNESS IS 8-INCHES BEFORE COMPACTION.
8. PRESSURE TEST ALL WATER LINES AND SERVICES.
9. NO CONCRETE IS ALLOWED AROUND METER BOX PER CITY POLICY.
10. FORD 70 SERIES INSERT STIFFENERS ARE TO BE USED AT ALL CONNECTIONS AND FITTINGS WHERE POLYETHYLENE PIPE OR TUBING IS USED.
11. CITY POLICY PROHIBITS THE USE OF JUMPERS, BYPASS PIPES, OR HOSE TYPE CONNECTIONS TO THE METER SETTER OR SERVICE LINE.
12. METER SETTER: FORD OR MUELLER
13. PROVIDE TRACER WIRE ON ALL WATER LATERALS FROM THE MAIN LINE TO THE METER BOX.
14. WATER METER BOX SHALL BE LOCATED BETWEEN BACK OF CURB AND FRONT OF SIDEWALK, IF CURB AND GUTTER AND SIDEWALK ARE NOT PRESENT, THEN METER BOX SHALL BE LOCATED AS SHOWN ON THE DRAWINGS.
15. WATER METER BLANKET SHALL BE FORD INSULATING BLANKET OR EQUAL
16. PRE MANUFACTURED MOLDED WATER METER INSULATION JACKET

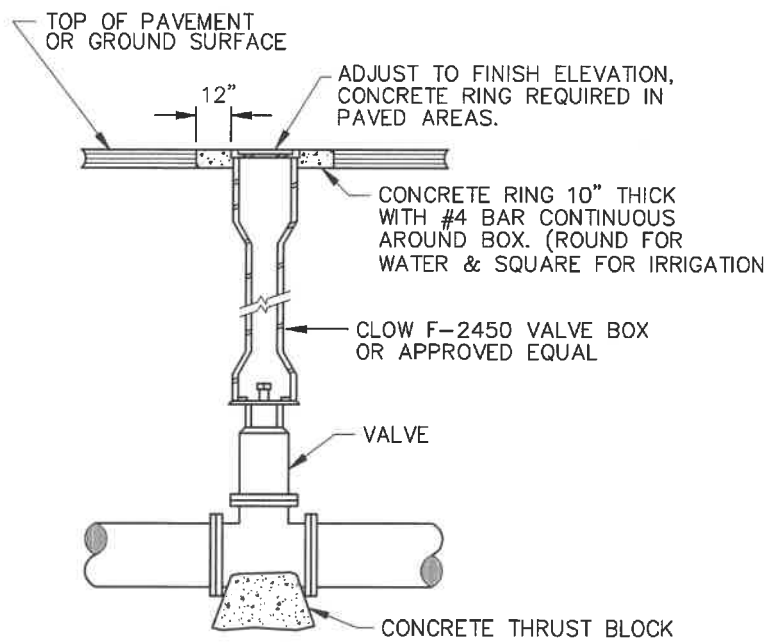


TYPICAL RESIDENTIAL WATER SERVICE IN DRIVEWAY OR CONCRETE

REVISED 12/14

PLAN 521 SP

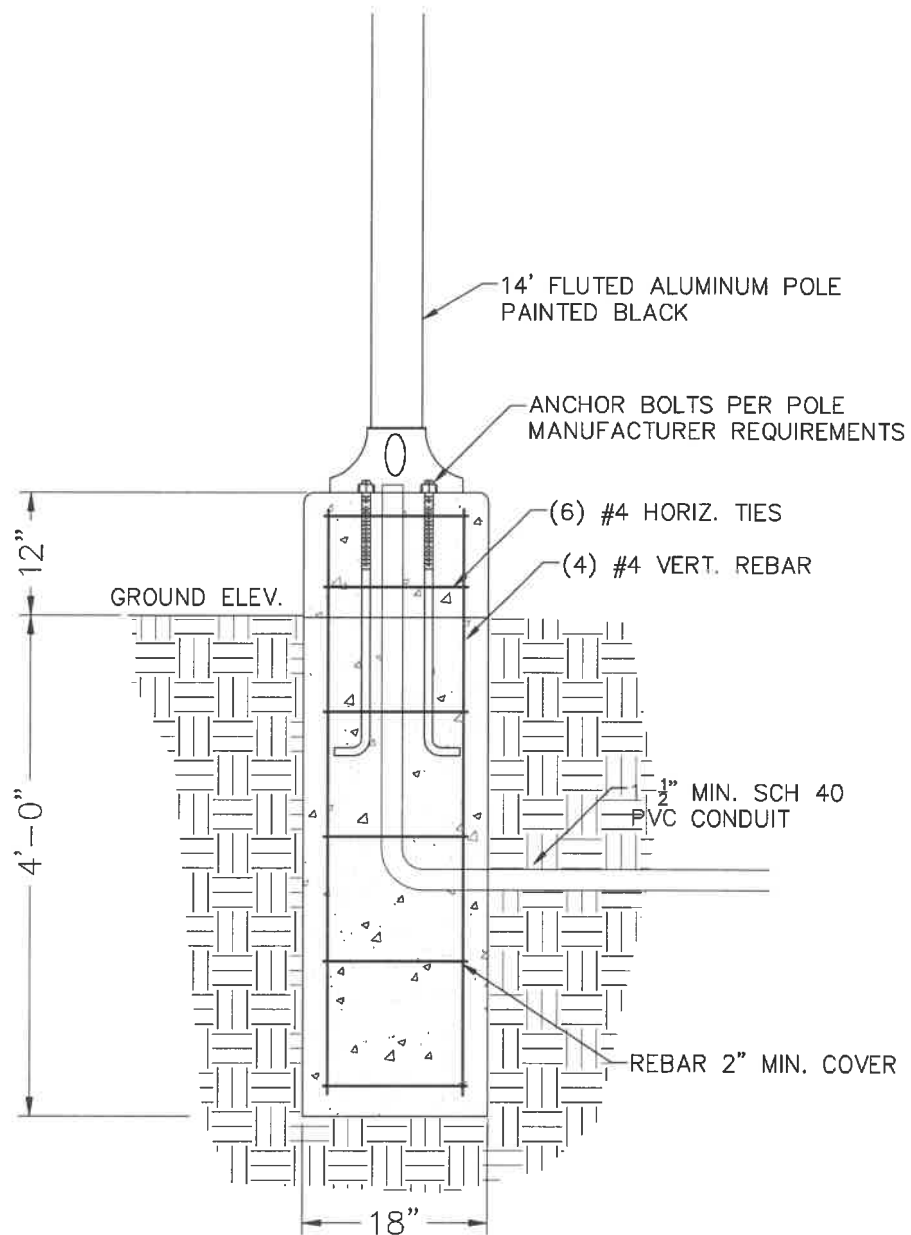
2 OF 2



TYPICAL VALVE BOX

REVISED 1/17

PLAN 562 SP



STREET LIGHT POLE BASE

REVISED 1/19

WEST BOUNTIFUL CITY

SHORT DURATION STORM INTENSITY

Precipitation Frequency Estimates (inches)																		
ARI* (years)	<u>5</u> <u>min</u>	<u>10</u> <u>min</u>	<u>15</u> <u>min</u>	<u>30</u> <u>min</u>	<u>60</u> <u>min</u>	<u>120</u> <u>min</u>	<u>3 hr</u>	<u>6 hr</u>	<u>12</u> <u>hr</u>	<u>24</u> <u>hr</u>	<u>48</u> <u>hr</u>	<u>4</u> <u>day</u>	<u>7</u> <u>day</u>	<u>10</u> <u>day</u>	<u>20</u> <u>day</u>	<u>30</u> <u>day</u>	<u>45</u> <u>day</u>	<u>60</u> <u>day</u>
1	0.13	0.20	0.25	0.34	0.42	0.56	0.65	0.85	1.07	1.34	1.57	1.89	2.27	2.57	3.40	4.17	5.19	6.16
2	0.17	0.26	0.32	0.43	0.53	0.69	0.80	1.04	1.31	1.65	1.92	2.31	2.78	3.16	4.18	5.11	6.34	7.52
5	0.23	0.35	0.44	0.59	0.73	0.90	1.00	1.25	1.58	1.96	2.29	2.77	3.32	3.75	4.94	6.00	7.43	8.81
10	0.29	0.44	0.54	0.73	0.91	1.09	1.19	1.45	1.81	2.23	2.59	3.15	3.77	4.24	5.52	6.68	8.29	9.81
25	0.38	0.58	0.72	0.97	1.20	1.41	1.50	1.75	2.16	2.59	3.00	3.67	4.38	4.86	6.26	7.55	9.38	11.06
50	0.47	0.71	0.88	1.19	1.47	1.70	1.79	1.99	2.45	2.87	3.31	4.08	4.86	5.33	6.79	8.18	10.16	11.96
100	0.57	0.87	1.07	1.45	1.79	2.05	2.13	2.30	2.77	3.15	3.63	4.50	5.34	5.79	7.30	8.78	10.91	12.81
200	0.69	1.05	1.30	1.76	2.17	2.47	2.54	2.65	3.11	3.45	3.95	4.92	5.82	6.24	7.79	9.34	11.63	13.61
500	0.89	1.35	1.68	2.26	2.80	3.14	3.22	3.32	3.67	3.84	4.37	5.50	6.47	6.83	8.38	10.04	12.50	14.58
1000	1.07	1.63	2.02	2.73	3.37	3.77	3.84	3.92	4.15	4.19	4.68	5.94	6.96	7.25	8.80	10.53	13.11	15.26

* These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.

Rainfall Distribution/Unit Hydrograph

<u>Minutes</u>	<u>Unit</u> <u>Hydrograph</u>	<u>Percentage</u>	<u>Minutes</u>	<u>Unit</u> <u>Hydrograph</u>	<u>Percentage</u>
0	0.00000	0.00%	95	0.00726	87.69%
5	0.00724	0.72%	100	0.00724	88.41%
10	0.00724	1.45%	105	0.00724	89.14%
15	0.00724	2.17%	110	0.00724	89.86%
20	0.00724	2.90%	115	0.00724	90.59%
25	0.00724	3.62%	120	0.00724	91.31%
30	0.00724	4.34%	125	0.00724	92.03%
35	0.23533	27.88%	130	0.00724	92.76%
40	0.18609	46.49%	135	0.00724	93.48%
45	0.12961	59.45%	140	0.00724	94.21%
50	0.08255	67.70%	145	0.00724	94.93%
55	0.04924	72.63%	150	0.00724	95.66%
60	0.03765	76.39%	155	0.00724	96.38%
65	0.02824	79.22%	160	0.00724	97.10%
70	0.02172	81.39%	165	0.00724	97.83%
75	0.01665	83.06%	170	0.00724	98.55%
80	0.01521	84.58%	175	0.00724	99.28%
85	0.01303	85.88%	180	0.00724	100.00%
90	0.01086	86.97%			