

**WATER MAIN MATERIALS**

- 1.) All Pipe Provided For Use In The City Of Lebanon Water System Shall Be Manufactured By Griffith, U.S. Pipe, Or City Approved Equal. All Fittings Provided For Use In The City Of Lebanon Water System Shall Be Manufactured By Clow, Tyler, Union Foundry, Mueller, Or As Approved By Lebanon Utilities Water Department. No SIGMA Or Foreign Materials Shall Be Allowed.
- 2.) Ductile Iron Pipe For Water Mains Shall Be Centrifugally Cast And Shall Conform To The Latest Revision Of ANSI Specification A21.5 And AWWA C151. Ductile Iron Pipe, 10 Inches In Diameter Or Less, With Push-On Or Mechanical Joints Shall Be Special Thickness Class 50. Ductile Iron Pipe, 12 Inches In Diameter Or Larger, With Push-On Or Mechanical Joints Shall Be Pressure Class 350. The Pipe Shall Be Provided With A Minimum Laying Length Of 18 Feet.
- 3.) Ductile Iron Fittings, 3 Inches Through 48 Inches, Shall Conform To The Latest Revision Of ANSI Specification A21.10 And AWWA C110. Ductile Iron Compact Fittings, 3 Inches Through 16 Inches Shall Conform To The Latest Revision Of ANSI Specification A21.53 And AWWA C153. Fittings In And Within 2 Feet Of Structures Shall Be Flanged. All Other Fittings Shall Be Mechanical Joint Type.
- 4.) Ductile Iron Pipe Coatings Shall Conform To The Latest Revision Of ANSI A21.51, AWWA C-151, And ANSI A21.4, AWWA C-104. Interior Pipe Lining Shall Be Cement-Mortar With Asphaltic Seal Coat. Exterior Pipe Coating Shall Be Standard Asphaltic Coating, Except Exposed Piping Within Structures Shall Receive Shop Priming Compatible With Finish Painting.
- 5.) Mechanical Joints And Accessories Shall Conform To The Latest Revision Of ANSI Specification A21.10 And AWWA C110. Rubber Gaskets Shall Be Vulcanized Synthetic Rubber And Shall Conform To The Latest Revision Of ANSI Specifications A21.11 And AWWA C111.
- 6.) Flanged Ductile Iron Pipe Shall Conform To The Latest Revision Of ANSI Specification A21.15 And AWWA C-115. Rubber Gaskets Shall Be Either Ring Or Full Face And Shall Be 1/8" Thick. Bolts And Nuts Shall Conform To ANSI B18.2.1 And ANSI B18.2.2.
- 7.) Push-On Joints Shall Conform To The Latest Revision Of ANSI Specification A21.11 And AWWA C111. Rubber Gaskets Shall Be Vulcanized Synthetic Rubber And Shall Conform To The Latest Revision Of ANSI Specifications A21.11 And AWWA C111.
- 8.) Service Tubing From Main To Customer Shall Be Copper Water Tube, Type K, Soft Temper For 3/4" & 1", Hard Temper For Greater Than 1", For Underground Service, Conforming To ASTM B-88, ASTM B-251, And AWWA C-800. The Pipe Shall Be Marked With The Manufacturer's Name Or Trademark And Mark Indicative Of The Type Of Pipe. The Outside Diameter Of The Pipe And Minimum Weight Per Foot Of Pipe Shall Not Be Less Than That Listed In ASTM B-251, Table II.
- 9.) All Water Main Material Shall Be Installed In Accordance With AWWA C600, And With A Minimum Depth Of Cover Of 54 Inches.

**WATER MAIN PRESSURE AND LEAKAGE TESTING**

- 1.) Lebanon Utilities Water Department (765-482-8824) Shall Be Given 48 Hours Written Notice Of The Required Pressure And Leakage Test To Be Performed By The Contractor. The Pressure And Leakage Test Shall Be Performed In Accordance With The Basic Provisions Of AWWA C600. The Testing Procedure Shall Assume A 100 PSIG Working Pressure. The Test Pressure Shall Not Be Less Than 1.25 Times The Working Pressure At The Highest Point Along The Test Section But Not Less Than 150 PSIG At The Point Of Testing. Test Pressure Shall Not Exceed Pipe Or Thrust-Restraint Design Pressures Or Rated Pressure Of The Valves. The Test Pressure Shall Not Vary By More Than ±5 PSI For The 2 Hour Test Duration.
- 2.) Valves Shall Not Be Operated In Either Direction At Differential Pressures Exceeding The Rated Valve Working Pressure.
- 3.) The Pressure And Leakage Test Shall Be Performed Following The General Form Of The Following:
  - A. Record Time And Line Pressure Prior To Start Of Test.
  - B. Pump Water Into New Main Until Pressure Reaches 150 PSIG, Stop Pumping When Pressure Reaches 150 PSIG, Record Time And Line Pressure.
  - C. Contractor Shall Remain At Site For One Hour. The Test Shall Be Voided If Any Adjustments Are Made To The Main, Test Equipment Or Appurtenances. Tightening Of Fittings On Test Equipment Is Allowed. Following The One Hour Period, Record Time And Line Pressure.
  - D. Pump Water Into New Main From A Calibrated Container Of Water Until Pressure Reaches 150 PSIG, Stop Pumping When Pressure Reaches 150 PSIG, Record Time, Line Pressure, And Amount Of Water Pumped To The Nearest 1/100 Gallon. The Calibrated Container Shall Have Markings At 1/10 Gallon Increments.
  - E. Repeat Steps C And D One Additional Time.
- 4.) A Test Section Of Water Main Is Considered Satisfactory If It Meets The Following:
 

Main Size (Inches)	Allowable Leakage (Gal./Hr./1000 Ft.)
6	0.55
8	0.74
10	0.92
12	1.10
- 5.) If The Leakage From A Test Section Is Greater Than Permitted Under These Specifications, The Contractor Shall Locate And Repair The Defective Joints, Mains, And Appurtenances. The Pressure And Leakage Test Shall Then Be Repeated Until Satisfactory Results Are Obtained. All Labor And Materials Required To Meet The Requirements Of The Pressure And Leakage Test Shall Be At The Expense Of The Contractor.
- 6.) The Operation Of The City Of Lebanon Water System Valves And Hydrants Shall Only Be Conducted By Authorized Lebanon Utilities Water Department Personnel.

**WATER MAIN DISINFECTION AND BACTERIOLOGICAL TESTING**

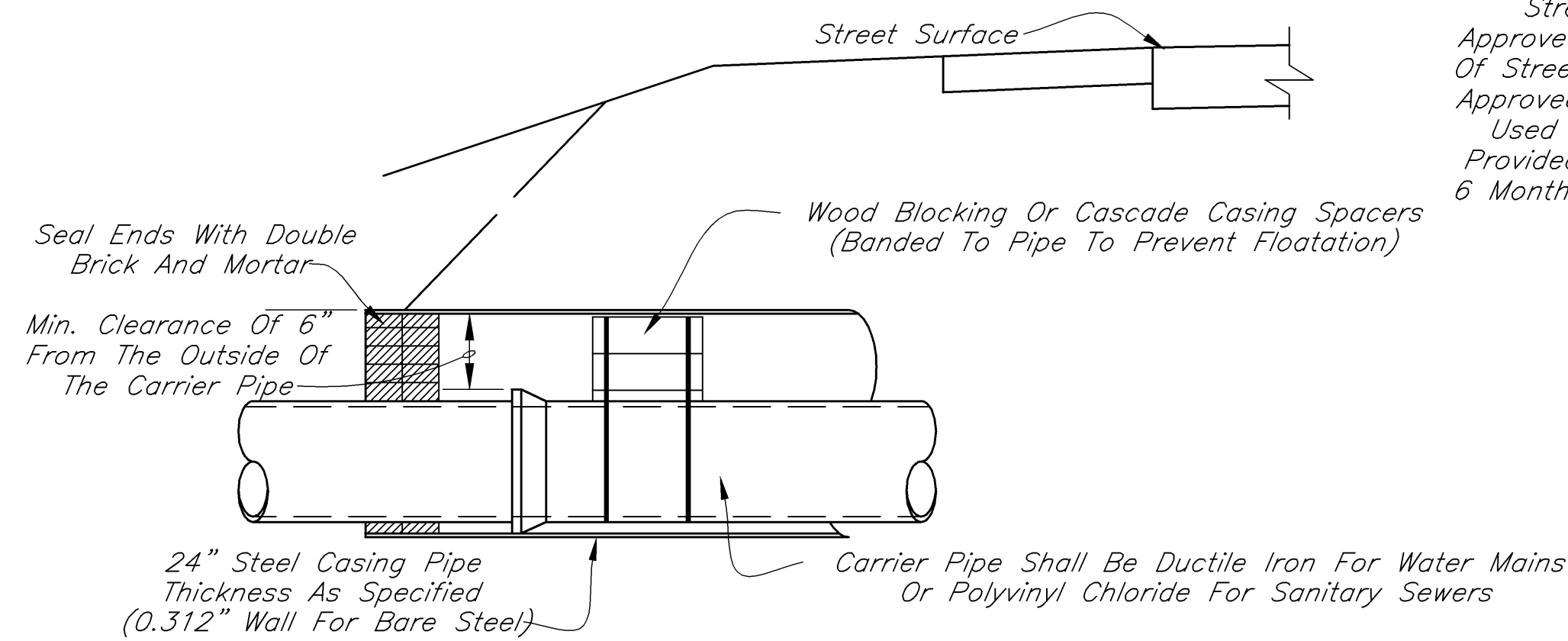
- 1.) Lebanon Utilities Water Department (765-482-8824) Shall Be Given 48 Hours Written Notice Of The Required Disinfection, Flushing And Testing Procedures To Be Performed By The Contractor. All Newly Installed Water Mains Shall Be Disinfected In Accordance With ANSI/AWWA C-651. Liquid Chlorine, High-Test Calcium Hypochlorite (70 Percent Chlorine), Or High-Test Sodium Hypochlorite (14.7 Percent Chlorine) May Be Used To Provide An Initial Minimum Concentration Of 25 MG/L Of Free Chlorine In All Newly Installed Mains.
- 2.) A Minimum Concentration Of 10 MG/L Of Free Chlorine Shall Be Maintained In All Parts Of The Newly Installed Mains For 24 Hours Of Contact Time.
- 3.) Following The Initial 24 Hour Contact Time But Prior To 48 Hours Of Contact Time, All Treated Water Shall Be Thoroughly Flushed From The Newly Laid Pipe At Its Extremity Until The Replacement Water Has A Chlorine Residual Equal To Distribution System Residual.
- 4.) After Flushing, Two Consecutive Water Samples Shall Be Collected On Successive Days From The Treated Piping System As Directed By Lebanon Utilities Water Department. Each Sample Shall Show Satisfactory Bacteriological Results.
- 5.) The Taking Of Samples And The Testing Of Chlorine Residual Shall Be Carried Out By The Contractor At The Direction Of Lebanon Utilities Water Department. A Copy Of The Test Results Shall Be Provided To Lebanon Utilities Water Department.

**WATER MAIN GENERAL NOTES**

- 1.) Provide A Valve On All Runs And Branches Per The Connection Details On Sheet 10 Of The Lebanon Standards Even When Such Runs Or Branches Are Stubs For Future Extensions.
- 2.) Water Mains Shall Follow The Alignment Of The Road And Remain 2 Feet Behind The Back Of Curb On One Side Of The Street W/Out Alternating From Such Side.
- 3.) All Water Pipe Shall Be Installed In Accordance With AWWA C600 And With A Minimum Depth Of Cover Of 54 Inches.
- 4.) For Cul-De-Sacs Run Main Straight-Thru To Back Of Cul-De-Sac, Set Reducer As Required And Provide 6" Valve And Fire Hydrant Per Typical Hydrant Installation Detail On Sheet 10. For Intended Temporary Ends Of Projects, (i.e. Phases Of Development), Terminate With Main Valve Followed By 60' To 80' Of Main With PE-PE Reducer As Required, And Provide Fire Hydrant With Hydrant Shoe Connected To Pipe/Reducer Directly.

**STEEL CASING REQUIREMENTS FOR WATER MAINS**

- 1.) All Water Mains That Are At Least Two Inches In Diameter And That Are To Be Placed Under An Existing Or Proposed Street Other Than Local Residential Street Must Be Placed Inside A Casing Pipe. The Casing Pipe Must Be Sized Appropriately And Installed In A Way That Is Acceptable To The Lebanon Utilities Water Department.



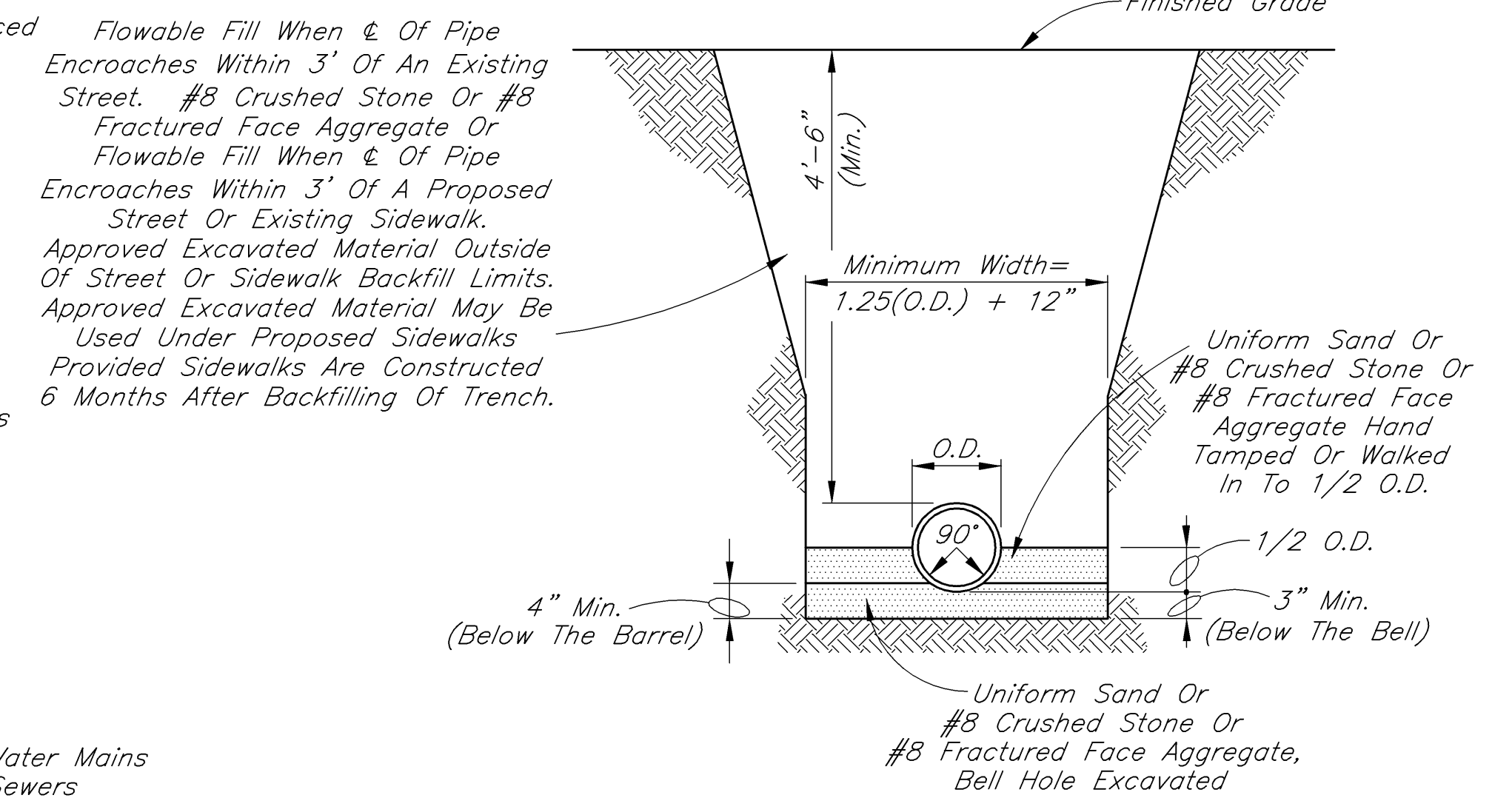
**TYPICAL STREET CASING DETAIL FOR UP TO 12" CARRIERS**

Scale: None

- 1.) Bored Or Jacked Crossings Require Intimate Knowledge Of Site Conditions; Therefore, Construction Is Subject To Certified Special Provisions Prepared By The Design Engineer.
- 2.) Casings Depicted Hereon Do Not Necessarily Comply With INDOT Permit Requirements, But Are Intended To Be Used For Crossings Of Public Roads Under The Jurisdiction Of The City Of Lebanon When Open Cut Of Such Roads Is Not Permitted.
- 3.) Refer To Appropriate Lebanon Standards For Carrier Pipe Requirements.

**AS-BUILT DRAWINGS AND WARRANTIES**

- 1.) As-Built Drawings Shall Be Submitted To Lebanon Utilities Water Department. As-Built Drawings Shall As A Minimum Provide Two Perpendicular Horizontal Measurements And A Vertical Measurement To All Fittings, Valves, And Deflections In Pipe. Where Applicable, Contractor Shall Dimension The Location Of The Water Main From Back-Of-Curb. Contractor Shall Submit As-Built Drawings Within 30 Days Of Successful Completion Of All Testing Requirements.
- 2.) Contractor Is Responsible For All Leaks, Faulty Hydrants, Broken Mains, Etc., For One Year After The Date Of Acceptance By The City.

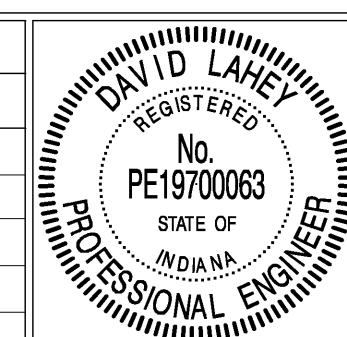


Pipe Size	6" TO 14"	16" And Over
Bedding Below The Pipe Barrel	O.D./4 Min.=4"	O.D./4 Max.=8"

**DI PIPE BEDDING DETAIL**

Scale: None

REVISIONS		
Rev. No.	Description	Date



RECOMMENDED FOR APPROVAL: *David Lane* 5-4-2006  
 DESIGN ENGINEER  
 APPROVED: *Mark Matos* 6-20-2006  
 UTILITIES MANAGER  
 APPROVED: *[Signature]* 5-4-2006  
 WATER/WASTEWATER OPERATIONS MANAGER

CITY OF LEBANON  
**WATER MAIN BEDDING DETAILS AND NOTES**  
 SHEET 9 OF 18

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