CITY of OWOSSO, MICHIGAN

PART ONE:

WASHINGTON PARK UTILITY AND ROADWAY IMPROVEMENTS

The specifications that follow are to be used only for the portion of the work related to the Washington Park Utility and Roadway Improvements (Part One) as documented on the following Drawings as included in this Project:

Prepared by

2025

SPECIAL PROVISION
FOR
TECHNICAL SPECIFICATIONS

CW/City of Owosso **1 OF 1** **April 2025**

General Requirement

The MDOT 2020 STANDARD SPECIFICATIONS FOR CONSTRUCTION shall govern all technical specifications for PART ONE of this project. The following parts of the Contract will prevail over all other parts in the following order:

1. Special Provisions.
2. Supplemental Specifications.
3. Project Plans and Drawings.
4. MDOT Standard Plans.
5. 2020 Standard Specifications
6. City of Owosso Standard Specifications.

The Contractor shall not take advantage of any apparent error or omission in the contract documents. If any uncertainty, inconsistency, omission, or conflict is discovered within the contract documents, the Engineer will solely decide as to the true intent of the language.

CITY OF OWOSSO
SPECIAL PROVISION
FOR
AUDIO VISUAL FILMING

City of Owosso/CW 1 of 2 October 2024

a. Description. Provide a film record of physical, structural and aesthetic conditions of the area described in this special provision as it exists prior to the beginning of any construction activities. The film must be professional quality, providing a clear and accurate visual record of existing condition.

Complete pre-construction filming, under the supervision of the Engineer, before any construction activity is started. Furnish the completed pre-construction tape to the Engineer one week prior to placement of any materials or equipment in the construction area. Any portion of the tape determined by the Engineer to be unacceptable for the documentation of existing conditions must be re-filmed prior to the start of any construction activity. All costs associated with the need to re-film will be borne by the Contractor.

b. Audio-Video Production. Provide the name of the videotaping services company to the Engineer a minimum of 5 work days prior to the start of taping.

Use color DVD video and equipment which allows audio and video information to be recorded. Do not splice or edit the video. Speed and electronics of the video equipment and DVD must conform to video taping industry standards. Film in the general direction of vehicular travel and do not exceed 45 feet per minute (approximately 0.5 miles per hour). Control pan and zoom rates to ensure playback clarity of the subject matter being filmed.

Use audio and video cues to identify location, relative to project limits and landmarks, at intervals of not more than 100 feet along the filming route. Provide audio commentary as necessary during filming to describe streets, buildings, landmarks and other details which will enhance the documentation of existing conditions.

Conduct filming during a time of good visibility and not during periods of precipitation, or when snow, leaves, or other natural debris obstruct the area being filmed.

Use video equipment with date/time stamp and digital annotation capabilities. The final video recording must display the date (month, day and year) and the time (hours, minutes, and seconds). This transparent information is to appear on the upper left hand corner of the frame.

The project station numbers must appear in the lower half of the frame. This stationing must use MDOT standard engineering symbols (i.e., 3+50). If there is no project stationing in an area being filmed, assign assumed stationing to each street or other discrete area being filmed. Start the assumed stationing at 0+00 and increase from west to east or from south to north.

Include periodic, transparent alpha/numeric information below the station numbers consisting of the name of the project, name of area shown, direction of travel, viewing direction, etc.

c. Area to be Filmed. Film all existing driveways, sidewalks, fences, trees, shrubbery and other structures and landscaping located up to 50 feet outside of the proposed right-of-way line shown on the plans and within the limits of construction. The limits of construction consist of Washington Street from south of North Street to Wesley Drive and Wesley Drive from Water Street to Washington Street. Also film all existing driveways, sidewalks, fences, trees, shrubbery and other structures and landscaping located up to 50 feet outside of the proposed right-of-way line on Water Street from North Street to Wesley Drive. The tape coverage must include the exterior of all buildings within the above described limits.

d. Measurement and Payment. The completed work as documented by the DVD(s) will be paid for at the contract unit price for the following pay item.

Pay Item	**Pay Unit**
Audio Visual Filming……..	Lump Sum

Payment for the item **Audio Visual Filming** includes all labor, equipment and materials required to perform the filming and to provide the finished video(s) to the Engineer.

CITY OF OWOSSO
SPECIAL PROVISION
FOR
AGGREGATE BASE, _ INCH, MODIFIED
AGGREGATE BASE, LM, MODIFIED

a. Description. This work shall consist of placing and compacting an aggregate base course on a prepared subbase.

b. Materials. The material shall meet the gradation requirements of the Michigan Department of Transportation (MDOT) Standard Specifications for Construction, Section 902, for Dense-Graded Aggregate, 21AA, except all material shall be 100% crushed limestone.

c. Construction Methods. The material shall be placed and compacted in accordance with the MDOT Standard Specifications for Construction, Section 302.03.

d. Measurement and Payment. The completed work, Aggregate Base, _ inch, Modified including all materials, labor, and equipment, as measured will be paid for at the Contract Unit Price for the following Pay Item.

Pay Item	**Pay Unit**
Aggregate Base, _ inch, Modified	Square Yard
Aggregate Base, LM, Modified	Cubic Yard

Aggregate Base, _ inch, Modified will be measured in place by the square yard.

Aggregate Base, LM, Modified will be measured in place by the cubic yard.

The maximum pay width will be as shown on the plans.

SPECIAL PROVISION
FOR
ASPHALT CEMENT STABILIZED AGGREGATE BASE COURSE

CITY OF OWOSSO/CW 1 OF 4 February, 2020

DESCRIPTION

This work will be done in accordance with the requirements of Section 305, 501, 902, and 904 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, except as herein specified.

This work shall be accomplished in place and shall consist of blending crushed material with hot asphalt cement at the specified rate and depth, shaping to specified elevation and slope, and compacting to specified density.

MATERIALS

Materials shall meet the following requirements:

Asphalt Cement PG 52-28 904
Fog Coat SS - 1H 904

The asphaltic material for stabilizing shall be applied at the rate and temperature (minimum 350° F) as determined by the Engineer, so that the residual bitumen added will be between two (2) and five (5) per cent by weight of the asphaltic material.

EQUIPMENT REQUIREMENTS

1. Compaction Equipment - Rollers. Rollers must meet the requirements as specified under Section 501.03 for rollers, except that combination pneumatic-steel wheel and vibratory rollers will be permitted. A minimum of three (3) rollers in operating condition will be required on the project and shall be of the following types:
   Minimum of (2) shall be steel drum vibratory type;
   Minimum of (1) shall be pneumatic - tire type.
   All rollers are to be approved by the Engineer prior to beginning construction.

2. Stabilizing Equipment - All equipment to be approved by the Engineer prior to beginning construction. The stabilizing plant shall be a single-pass, multi-drum, self-propelled rotary mixer combining a cutter rotor, a blending rotor, and two mixing rotors in the mixing chamber. The mixing chamber shall have a positive depth control to insure a uniform depth of stabilized material and must be capable of loosening the base materials to the depth called for without disturbing the subbase. The stabilizing plant shall add the asphalt in predetermined and accurately metered quantities, while maintaining a constant and fixed rate of forward motion, thoroughly blend the asphalt with the road materials, and spread

the mixture uniformly on the roadway.

A spray bar for distribution of the liquid asphalt shall be mounted inside the mixing chamber and shall have nozzles spaced at increments not to exceed six (6) inches and shall operate in such a manner that all asphalt will be uniformly applied throughout the mixing chamber at the time of injection. The asphalt additive system shall consist of a positive displacement pump and shall display the temperature, pressure and flow rate to accurately check the rate of application of the asphalt at any time. Note - Full width processing is required to eliminate longitudinal joints in the stabilizing material necessitating the use of two (2) or more stabilizing machines; depending on the width of road to be processed. The system for distributing the asphalt material shall be adjustable for the rate of asphalt application and shall measure accurately the amount of asphalt material being applied. A foot per minute meter and a gallon per minute meter shall be in clear view of the operator and both shall be controlled by the operator from the operator's station.

CONSTRUCTION METHODS

1. Mixing with Asphalt Materials - Prior to adding the asphaltic material, the moisture content of the crushed material shall be adjusted by aerating or by adding water. The asphaltic material shall be added only to that material which can be completely mixed and compacted in one day. The asphaltic material shall be added through the mixer at the rate and within the temperature range directed by the Engineer. The temperature shall be kept below the flash point of the asphalt cement but shall not fall below 350° F. The mixed material shall be laid directly from the multi-drum mixer to the surface. Conveying the mixed material by belt system from drum to surface will not be allowed.

2. Shaping, Rolling and Compacting - Shaping and compacting shall be done while the asphalt material is in a workable state. The final shaping and compaction shall be accomplished as soon as possible after addition of the asphaltic material. The mixed material shall be so shaped that when compacted it shall be in a reasonably close conformity with lines, grades, and cross-sections shown on the plans or as directed by the Engineer. Stabilized material trimmed from the grade shall be used adjacent to the shoulder to complete the cross section as shown on the plans. Material in excess of the quantity required to complete the cross section shall become the property of the Contractor.

Initial rolling shall be done with one or more pneumatic-tired rollers. The aggregate-asphalt mixture shall be compacted to not less than 98 percent of the unit weight obtained by the Michigan Modified T 180 Test as described in the Density Control Handbook. Such test shall be made on the aggregate-asphalt mixture at the filled moisture content existing during the compacting operation. Required density shall be maintained until the material has been surfaced. Density testing requirements are hereby waived for this project, but may be used, as directed by the Engineer, to assure density is being maintained. After final rolling, the Engineer will test the surface using a 10-foot straightedge at selected locations. The variation of the surface from the testing edge of the straightedge between any two contacts with the surface shall at no point exceed ±⅜ inch.

3. Curing - The base may be opened to traffic for a period of time to be determined by the Engineer prior to placing of the surface. Any areas which show evidence of cracking or instability will be investigated and corrected within 48 hours, before any work proceeds. If the stabilized asphalt aggregate pavement is to be left unsurfaced for more than seven (7) days, a fog coat of SS-1H shall be applied at the rate of 0.20 to 0.30 gallons per square yard, at the Contractor's expense.

4. Weather Limitations - Asphaltic material shall not be applied to the grade or to the aggregate when rain is threatening or when the air temperature is lower than 50° F.

   The Stabilization work shall be performed in the accordance with weather limitations in Section 501.03.I, unless otherwise authorized by the Engineer.

MEASUREMENT AND PAYMENT

The completed work as measured for asphaltic stabilized aggregate base course will be paid for at the contract unit prices for the following contract items (Pay Items).

Pay Item	Pay Unit
Asphalt Cement Stabilized Base Course, 4 Inch	Square Yard
Asphalt Cement Binder	Gallon

Payment for Asphalt Cement Stabilized Base Course, 4 Inch includes the furnishing, hauling, placing, mixing of the asphalt cement into the crushed base material, shaping, and compacting of the mixture. This item will be measured by completed width and length required in the plans to a maximum depth of four (4) inches.

Payment for Asphalt Cement Binder shall be paid for by the gallon applied to the base course.

Payment for Asphalt Emulsion Fog coat SS-1H will not be paid for separately but will be included as part of the work of Asphalt Cement Stabilized Base Course.

Any aerating or adding water necessary to achieve proper moisture will not be paid for separately but will be included as part of the work of Asphalt Cement Stabilized Base Course.

SPECIAL PROVISION
FOR
HMA BASE CRUSHING AND SHAPING, MODIFIED

CITY OF OWOSSO/CW 1 OF 1 February, 2021

DESCRIPTION:
All work shall consist of crushing and shaping the existing pavement section and gravel base to the depth and width as shown on the plans, or as directed by the Engineer, in accordance with Sections 305 and 501 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction and as modified herein.

CONSTRUCTION:
Crush and shape HMA and gravel base at a depth of 6 inches. Use a water sprinkling system as approved by the Engineer. After crushing, 100 percent (100%) of the crushed material shall have a maximum particle size of 1-½ inches (1.5”). Particles exceeding 1-½ inches shall be removed by the Contractor at the Contractors expense. The crushed material shall be initially shaped immediately after the crushing operation to established grade and cross section within a tolerance of ¾ inches and be opened to local traffic at end of same workday. Sufficient material shall be graded along edges (wind rowed) for final grading and blending shoulder after HMA placement. The crushed surface shall be left to cure in place for a period of time not exceeding three calendar days.

Rolling equipment shall be furnished in accordance with Section 501.03, except that combination of pneumatic tired (1 minimum) and steel vibratory (2 minimum) rollers will be used to properly compact the crushed material to achieve density requirements of Section 305.

MEASUREMENT AND PAYMENT:
The completed work as measured for the following Pay Items will be paid for at the Contract Unit Price for the following Contract Item (Pay Item):

Contract Item (Pay Item)	**Pay Unit**
HMA Base Crushing and Shaping, Modified	Square Yard

HMA Base Crushing and Shaping, Modified will be measured in area by square yard; and will be paid for at the contract unit price per square yard, which price shall be payment in full for all labor, material, and equipment needed to accomplish this work. Shaping includes initial, intermediate, and final shaping of the prepared crushed material.

The Department shall pay separately for additional aggregate as Aggregate Base, LM, Modified if additional aggregate is needed to construct the proposed cross section.

SPECIAL PROVISION
FOR
TRENCHING, MODIFIED

CITY OF OWOSSO/RC 1 OF 1 October, 2018

DESCRIPTION:

This work item shall consist of trenching either one or both sides of the existing pavement section so as to accommodate the widening for proposed pavement, to the depth as shown on the plans, or as directed by the Engineer. All work shall be done in accordance with Section 307 of the Michigan Department of Transportation (MDOT) 2020 Specifications for Construction and as modified herein.

METHOD OF CONSTRUCTION

The Contractor shall trench along the existing pavement edge at varying widths and varying depths as shown on the plans. The trench shall be excavated to the proposed width and depth. Any disturbed underlying soil shall be properly compacted, as directed by the Engineer. Some select excavated material may be leveled as embankment on-site, adjacent to the proposed pavement edge, as directed by the Engineer. Excess excavated material shall become responsibility of the Contractor for proper disposal.

METHOD OF MEASUREMENT AND PAYMENT

The completed work as measured for Trenching, Modified will be paid for at the Contract Unit Price for the following Contract Item (Pay Item).

CONTRACT ITEM (Pay Item)	Pay Unit
Trenching, Modified	Station

Trenching, Modified will be measured in length by stations; separately along each side of existing pavement; and will be paid for at the Contract unit price per station, which price shall be payment in full for all labor, material, and equipment needed to accomplish this work. Disposal of all excess material is included as part of the pay item Trenching, Modified.

CITY OF OWOSSO
SPECIAL
PROVISION FOR
SEWER SDR-26

City of Owosso/CW **1 of 1** **March 2025**

a. Description. The work of Sewer, SDR-26, _ inch, Tr Det _, Modified, shall consist of excavation, furnishing and placing plastic sewer pipe, and trench backfill, in accordance with section 402 of the Michigan Department of Transportation (MDOT) Standard Specifications for Construction, Michigan Department of Transportation Standard Plan R-83 series and the details within the construction plans, except as modified herein.

b. Materials. Materials for sewer pipe shall meet or exceed ASTM D-3034 SDR-26 or ASTM D-2241 SDR-26 specifications for PVC integral gasket sewer pipe, depending on pipe diameter. Material for backfill shall be in accordance with the details within the standard plan R-83 series. FERNCO couplers shall be Strong Back RC 6000 Series Couplings.

When called for on the plans, Type IV Styrofoam Brand - "Square Edge" or "Score Edge" as manufactured by Dupont/Dow Chemical Company or approved equal shall be used for insulating sewer pipes. The total thickness and dimensions shall be specified on the plans or in the specifications. The minimum insulation thickness however shall not be less than 4 inches.

c. Construction. The extensions/connections to existing culverts/sewers on this project will require a FERNCO coupler to obtain a tight seal at the joint connecting new pipe to existing pipe. The joint between the existing and new pipes shall be constructed according to the MDOT Standard Specifications for Construction and as directed by the Engineer. Any extra work required to obtain tight joints will not be paid for separately but will be included in compensation for new pipe. Sewer trench shall meet requirements of Trench Detail B, Modified, as shown on the plans.

Sewer laterals shall be reconnected with a SDR-26 sewer wye, SDR-26 pipe, and FERNCO coupler meeting the size of the existing lateral.

d. Measurement and Payment. The completed work as measured for Sewer, SDR-26, _ inch, Tr Det _, Modified and Sewer, SDR-26, _ inch, Tr Det _, Insulated, Modified will be paid for at the contract unit price for the following contract item (pay item).

Contract Item (Pay Item)	**Pay Unit**
Sewer, SDR-26, _ inch, Tr Det _, Modified	Foot
Sewer, SDR-26, _ inch, Tr Det _, Insulated, Modified	Foot

Sewer, SDR-26, _ inch, Tr Det _, Modified will be measured in place by length in feet and will be paid for at the contract unit price per foot which price shall be payment in full for any Fernco fittings, wyes, bends, connecting to existing sewers and laterals, neoprene gaskets, couplers, sheeting or shoring trench walls, backfill as required.

CITY OF OWOSSO
SPECIAL PROVISION
FOR
DR STRUCTURE COVER, TYPE EJ ____

City of Owosso/CW 1 OF 1 May, 2022

a. Description. Dr Structure Cover, Type EJ ____, shall consist of materials and work meeting requirements of Section 403 of the MDOT 2020 Standard Specifications for Construction, and as modified herein.

b. Materials. All covers will be manufactured and supplied by East Jordan Iron Works. Cover types shall match with the pay item cover number.

d. Measurement and Payment. The completed work as measured for Dr Structure Cover, Type EJ ___ will be paid for at the Contract Unit Price for the following Pay Item:

Pay Item	**Pay Unit**
Dr Structure Cover, Type EJ 1040 w/ Solid Gasket Sealed Cover	Each
Dr Structure Cover, Type EJ 1040 w/ Vented Cover	Each
Dr Structure Cover, Type EJ 1040 w/ Type N Oval Grate	Each
Dr Structure Cover, Type EJ 1040 w/ Type O2 Beehive	Each
Dr Structure Cover, Type EJ 7000	Each
Dr Structure Cover, Type EJ 6517 Ditch Grate	Each

Dr Structure Cover, Type EJ ____will be measured in place by count of Each; and will be paid for at the contract unit price per Each.

CITY OF OWOSSO
SPECIAL PROVISION
FOR
DR STRUCTURE, MODIFIED

City of Owosso/CW 1 of 2 January, 2022

a. Description. The Contractor shall construct **Dr Structure,_ inch dia, Modified** of the size and at the locations as shown on the plans or as directed by the Engineer. Work shall be in accordance with Section 403 & 913 of the Michigan Department of Transportation (MDOT) Standard Specifications for Construction, or as modified herein.

b. Materials. Drainage Structures shall be precast reinforced concrete units manufactured to American Society for Testing Materials (ASTM) C-478 specifications and Section 913 of the Michigan Department of Transportation (MDOT) Standard Specifications for Construction, with either a cast in place bottom or precast concrete base as detailed on the plans.

The Contractor shall place the drainage structure cover as shown on the plans or as directed by the Engineer.

Provide 4"-12" adjustment area (chimney) above the structure's cone.

Masonry structures will not be allowed to be used on this project, unless approved by the Engineer for special circumstances, or where specifically called for on the Plans.

Thirty-six inch diameter drainage structures (catch basins or inlets) will be allowed to be used on this project, where called for on the plans or where directed by the Engineer.

The Contractor shall provide flexible connectors meeting ASTM C-923 requirements and 'as manufactured' by:

1. Trelleborg - Kor-N-Seal 106-406 and 206 series or approved equal.
2. Press-Seal Corporation's – Direct Drive
3. A-Lok Products, INc. – A-LOK or Z-LOK Connector

c. Measurement and Payment. The completed work as measured for Dr **Structure, __ inch dia, Modified** will be paid for at the contract unit price for the following contract item (pay item).

Contract Item (Pay Item)	**Pay Unit**
Dr Structure, __ inch dia, Modified	Each

The work of **Dr Structure,_ inch dia, Modified** includes the concrete footing, and up to 8' of drainage structure depth. The unit price for **Dr Structure, __ inch dia, Modified** incudes the cost of temporary or final grade adjustments of the structure. **Dr Structure, __ inch dia, Modified** will be measured by the unit each and will be paid for at the contract unit price per each.

If during construction, due to utility conflicts or plan revisions, modifications are required to the piping connection holes or additional taps are required to precast concrete sections, this work will be paid for separately, in the Pay Item for the **Dr Structure, Tap, _ inch**.

CITY OF OWOSSO
SPECIAL PROVISION
FOR
Dr Structure, __ inch dia, Sanitary, Modified

City of Owosso/CW 1 of 2 February, 2021

a. Description. The Contractor shall construct **Dr Structure,_ inch dia, Sanitary, Modified** of the size and at the locations as shown on the plans or as directed by the Engineer. Work shall be in accordance with Section 403 & 913 of the Michigan Department of Transportation (MDOT) Standard Specifications for Construction, or as modified herein.

b. Materials. Drainage Structures shall be precast reinforced concrete units manufactured to American Society for Testing Materials (ASTM) C-478 specifications and Section 913 of the Michigan Department of Transportation (MDOT) Standard Specifications for Construction, with either a cast in place bottom or precast concrete base as detailed on the plans.

The Contractor shall place the drainage structure cover as shown on the plans or as directed by the Engineer.

Provide 4"-12" adjustment area (chimney) above the structure's cone.

Masonry structures will not be allowed to be used on this project, unless approved by the Engineer for special circumstances, or where specifically called for on the Plans.

The minimum inside diameter of a sanitary sewer manhole for sewers up to 21 inches in diameter shall be 48 inches. For sanitary sewer 24 to 36 inches in diameter, the minimum inside diameter of the sanitary manholes shall be 60 inches. A larger diameter manhole may be required for right angle installation of sewers at the upper limit (i.e. 60 inch diameter manhole for 21 inch sewers at a right angle). Manholes shall be upsized to accommodate multiple pipes and maintain the structural integrity of the manhole between cored openings. Internal drops shall be provided on newly constructed manholes. The minimum inside diameter for manholes containing inside drop pipes shall be 60 inches. Diameters for manholes containing multiple internal drops shall be approved by the Municipal Engineer and the City. In general, a four foot diameter clear opening should be provided in manholes containing internal drop structures. External drops may be required for connections to existing manholes and shall be approved by the Municipal Engineer and the City.

Flow channels shall be constructed in manhole bottoms with mechanically mixed concrete. Precast flow channels shall not be used. Prior to placement of concrete, a bonding compound, Sealtight INTRALOK, Sika SIKABOND, ACRYL 60, or equal, herein shall be applied per manufacturers' recommendations to the manhole base. Flow channel depth shall not exceed 1/2 the pipe diameter and concrete thickness shall be a minimum of 4 inches measured from the top of the base to the bottom of the flow channel. Flow channels shall be a minimum ID same as the largest pipe on the downstream side of the manhole.

The Contractor shall provide flexible connectors meeting ASTM C-923 requirements and ‘as manufactured’ by:

1. Trelleborg - Kor-N-Seal 106-406 and 206 series or approved equal.

2. Press-Seal Corporation’s – Direct Drive

3. A-Lok Products, INc. – A-LOK or Z-LOK Connector

c. Measurement and Payment. The completed work as measured for **Dr Structure, __ inch dia, Sanitary Modified** will be paid for at the contract unit price for the following contract item (pay item).

Contract Item (Pay Item)	**Pay Unit**
Dr Structure, __ inch dia, Sanitary, Modified	Each

The work of **Dr Structure,_ inch dia, Sanitary, Modified** includes the concrete footing, and up to 8' of drainage structure depth. The unit price for **Dr Structure, ___ inch dia, Sanitary, Modified** incudes the cost of temporary or final grade adjustments of the structure. **Dr Structure, __ inch dia, Sanitary, Modified** will be measured by the unit each and will be paid for at the contract unit price per each, which price shall be payment in full for all labor, material, and equipment necessary to accomplish this work.

If during construction, due to utility conflicts or plan revisions, modifications are required to the piping connection holes or additional taps are required to precast concrete sections, this work will be paid for separately, in the Pay Item for the **Dr Structure, Tap, inch**.

CITY OF OWOSSO
SPECIAL PROVISION FOR
SANITARY SEWER TESTING

In general, all sanitary sewers and all building connections shall be tested by applying an air pressure test described in the following paragraphs. The Contractor shall be responsible for furnishing all equipment and labor for the air testing. The Municipal Engineer may, as an alternative to or in addition to air testing, require an infiltration test of the sanitary sewers in certain instances.

1. Air Testing: The following described air test is required to be performed on all sanitary sewers.

A. General: The following described test procedure shall be used to determine the adequacy of the pipe joint to hold water and to check for structural defects (such as bell cracks, broken pipe) after completion of backfilling operations. Final air testing shall not be performed until all storm sewer and water main utilities are constructed.

B. Equipment Required: Portable air compressor, standard air hose and connections, minimum of 50 feet of single and triple air hose, 1 single and 1 triple connection pneumatic sewer plug, 1 hand air pump, stopwatch, and 1 air gauge, range 0-30 psi graduated in 1/10's from 0 to 10 psi. All test gages shall be mounted above ground in a suitable test stand.

C. Preliminary Requirements: After all sewer, lateral, and manhole construction and backfilling operations have been completed, the sewer shall be cleaned by the Contractor as follows:

(1) Cleaning: The new sewer shall be cleaned prior to air testing. The Contractor shall clean the sewer by jet rodding and vactoring the debris.

(2) Preliminary Test: Before actual line testing starts, the pneumatic plugs shall pass the following qualifying test in the presence of the engineer and Contractor. One (1) length of sewer pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked; air shall be introduced into the pipe until the pipe pressure reaches 15 psi. The pneumatic plugs being checked shall hold against this pressure without bracing being needed, and without movement of the plugs out of the pipe. All pneumatic plugs shall pass the aforementioned qualifications before being used to the actual installation.

(3) Sealing: All tees and lateral stubs shall be suitably capped, sealed and blocked to withstand the internal test pressures. The Municipal Engineer shall determine if additional test pressure is required over the standard 3 psi due to the presence of groundwater.

D. Test Procedures: Immediately following the pipe cleaning described, low pressure air shall be introduced into the sealed line until the internal air pressure reaches 4.0 psi greater than the average back pressure of any groundwater pressure that may be over the pipe. At least two (2) minutes shall be allowed for the air pressure to stabilize. Adequate prior notification shall be given the engineer before running the air test procedure.

(1) Acceptance: The portion of the line being tested shall be accepted if the portion under the test meets or exceeds the requirements of UNI-BELL Specifications. This requirement shall be accomplished by performing the test as follows: The time required in minutes for the pressure to decrease from 3.5 to 2.5 psi (greater than the average back pressure of any groundwater than may be over the pipe) shall not be less than the time shown for the given diameters in the table following this paragraph. If the system does not meet the foregoing requirements, the Contractor will be required to locate and repair the leaks and repeat the tests until the allowable leakage is obtained.

AIR TEST TABLE

NOTE: If the section of line to be tested includes more than 1 pipe size (i.e... lateral connections), calculate the test time for each size and add the test times to arrive at the total test time for the section.

UNI-BELL SPECIFICATIONS MINIMUM TEST TIME FOR VARIOUS PIPE SIZES

PIPE SIZE TIME-PER (INCHES)	100' MIN:SEC.	200' MIN:SEC.	300' MIN:SEC.	400' MIN:SEC.
4	3:46*	3:46	3:46	3:46
6	5:40*	5:40	5:40	5:00
8	7:34*	7:34	7:36	10:00
10	9:26*	9:26	11:52	15:00
12	11:20*	11:24	17:05	22:00
15	14: 10*	17:48	26:42	35:36
18	17: 00*	25:38	38:27	51:00

* denotes minimum test time for low air pressure requirements

E. Test Acceptance: The method of testing and measurement shall be approved by the Municipal Engineer.

2. Manhole Test: Vacuum manhole tests shall be used as the preferred test method as approved by the municipal engineer. This type test typically takes about an hour to perform by pulling a vacuum to 10-inches of mercury and holding to no less than 9-inches of mercury.

An exfiltration test may be performed as an alternate method, if conditions warrant such method. All pipes for this method shall be plugged and the manhole filled with water to the bottom of the casting. After a stabilization period, the fall of water will be measured to determine the exfiltration rate. The maximum allowable exfiltration shall not exceed 0.5 gallons per foot of depth per foot of diameter per 24 hour day. All materials, labor, and water shall be furnished by the Contractor. One or both test methods, as determined by the municipal engineer, shall be performed by the contractor at each manhole if conditions dictate.

3. PVC/GRP Deflection Tests: The completed installation of PVC or GRP sewers shall at no point have out-of-round pipe deflections greater than 5.0%. Deflectometer or go no-go gauging tests shall be performed prior to acceptance on all PVC and GRP sewers. The test shall be conducted after the final backfill has been in place at least **30 days.**

4. Post Construction Infiltration: Following complete construction and prior to connection of services to the sewer, the engineer shall have the option of requiring retesting of any section of sewer where excessive infiltration is observed or suspected. Any of the above tests may be utilized per the engineer's requirements.

5. Cleaning Pipe and Fittings: All lumps, blisters, and excess coal tar, or other material shall be removed from the bell and spigot end of each pipe and fitting. The outside of the spigot and the inside of the bell shall be brushed and wiped clean, dry, and free from oil or grease prior to laying. The inside of the pipe shall be brushed in order to remove all dirt and debris. Any damage to exterior pipe coating shall be repaired with an approved coating before the pipe is laid.

6. TV Inspection: A Closed Circuit Television (CCTV) inspection of all newly constructed sanitary sewer shall be completed a minimum of 30 days after completion of all backfill. This will be used for signs of structural damage, joint leaks, lead verifications or infiltration before final acceptance. City shall be contacted for any additional specific requirements prior to televising. In general, televising shall be in accordance with National Association of Sewer Service Companies (NASSCO) requirements. All televising shall be completed in an upstream direction using the correct City manhole numbers for identification. All laterals shall be televised using a pan and tilt camera to verify any defects. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. All television inspection shall be recorded in digital format and provided on DVD or an alternate format accepted by the City. The recording must contain a continuous record of each sewer section, from manhole to manhole and include both video and audio inspection comments. All items noted in the inspections shall be documented utilizing the Pipeline Assessment and Certification Program (PACP) developed by NASSCO and based on the Water Research Center System (WRc) to standardize the coding of pipe defects in wastewater collections systems. The camera shall be moved through the line in either direction at a moderate rate, stopping when necessary to document any defects, service connections, or other points of interest noted during the inspection. In no case shall the television camera be moved at a speed greater than 30 feet per minute. If the camera encounters a dip in the sewer such that water is standing above the spring line of the sewer pipe, and if the camera lens becomes submerged because of this condition, the camera rig shall be withdrawn from the sewer and inserted from the other end as far as possible. The camera shall be adjusted to a height such that it is above the level of the flow. Two copies of a complete bound report of the television inspection shall be provided. The report shall include written logs of each section of sewer televised, giving specific details as to service connections and any defects, or other points of interest noted during the inspection. All media recordings shall be labeled to describe the reaches of sewer contained in the files, including street location and manhole numbers.

7. Correction of Defective Work: In the event that any of the above tests or inspections indicates defective material or installation, the Contractor shall repair and retest the section to the satisfaction of the Municipal Engineer. The use of chemical grouts shall be limited to the repair of minor joint leaks and shall not be used without the specific written approval of the engineer. Any pipe or fitting having structural damage shall be removed and replaced. Any PVC sewer with deflection in excess of the 5.0% limitation shall be re-excavated, inspected for structural damage, and then re-bedded, backfilled, and retested. The corrective work shall be done immediately after the defective work is discovered.

Measurement and Payment. All equipment, material, and labor required to test sanitary sewer shall not be paid for separately, but will be included in the costs for sanitary sewer pay items.

CITY OF OWOSSO
SPECIAL PROVISION
FOR
CURB AND GUTTER, CONC, DET F4, MODIFIED

City of Owosso/RC/CW 1 OF 1 October 2024

a. Description. This work shall consist of constructing concrete curb and gutter. Complete this work according to the standard specifications, standard detail in the plans, and this special provision.

b. Materials. The materials shall meet the requirements of the Michigan Department of Transportation (MDOT) Standard Specifications for Construction, Section 802, for concrete curb and gutter.

c. Construction. Construct concrete curb and gutter according to Section 802 of the MDOT Standard Specifications for Construction and the standard detail in the plans.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following Pay Item:

Pay Item	**Pay Unit**
Curb and Gutter, Conc, Det F4, Modified…….	Foot

Curb and Gutter, Conc, Det F4, Modified will be measured in place by length per foot and paid for per foot. Payment includes all labor, materials, and equipment to install concrete curb and gutter.

CITY OF OWOSSO
SPECIAL PROVISION
FOR
MAINTAINING TRAFFIC

a. Description. The project will consist of 0.13 miles of road rehabilitation, including storm sewer, sanitary sewer, and water main on Washington Street and Wesley Drive in the City of Owosso, Shiawassee County.

b. General. Traffic shall be maintained in accordance with Sections 104.07C, 104.11. 812, and 922 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, including any typicals or supplemental specifications and as specified herein.

The Contractor shall coordinate their operations with other Contractors, City of Owosso forces, and private utilities within the CIA to eliminate conflicts in traffic control. No additional payment will be made to the Contractor for the joint use of traffic control items.

The Contractor shall notify the Engineer, City of Owosso (989-725-0550), Shiawassee County Central Dispatch (989-743-9111), and Local Fire Department(s) (989-725-0580) that service the area a minimum of three full working days prior to the implementation of any detours or road closures.

c. Construction Influence Area (CIA). The Construction Influence Area shall include the Washington Street project and Wesley Drive project right-of-way and extend a distance of 1 mile north and south from the project limits and include the right-of-way of all intersecting streets within the project limits for a distance of 1,000 feet laterally from the Washington Street and Wesley Drive centerline.

The CIA shall also include the rights-of-way of any designed detour routes within the limits of the construction and detour signing.

d. Traffic Restrictions. Washington Street shall be closed to through traffic from North Street to Wesley Drive. Wesley Drive shall be closed to through traffic between Water Street and Washington St. Residents shall be allowed to access their homes on Washington Street and Wesley Drive at all times. When one lane in each direction cannot be maintained, at least one lane of traffic shall be maintained on Washington Street and Wesley Drive by using traffic regulators during day light hours and one lane of traffic in each direction shall be available at night.

The Contractor shall use the City of Owosso Truck Route System. The Contractor will be allowed to use North Street from M-52 to the work site. The Contractor shall not use Water Street from North Street to Wesley Drive.

The intersection at Washington St and Wesley Dr may be intermittently closed during the day, but shall be opened at night. Residents living on E Wesley Drive shall be allowed to access their homes at all times.

Reasonable access to intersecting roads/streets and residential/commercial drives shall be maintained at all times. The Contractor may temporarily close alternate drives if a business or residence has multiple drives on the same roadway, except for drives that operate directionally (i.e. one way drives).

The Contractor shall notify the Engineer a minimum of one week prior to changing traffic patterns on Washington Street and Wesley Drive.

All traffic regulators assigned to traffic control must receive all necessary instruction and training prior to starting operations.

The Contractor shall work between the hours of 7:00 a.m. and 7:00 p.m., Monday through Saturday. No work is allowed outside these time periods. The Contractor must provide 24-hour notice for Saturday work. The Contractor shall coordinate work so that any necessary preliminary or closing operations are also done within these time periods.

No work shall be allowed during the holiday periods as established by the Michigan Department of Transportation (MDOT).

The Contractor shall place maintenance gravel the same workday that the pavement is removed in all locations of the project to maintain access to adjacent properties. Any damage occurring to the subgrade from exposure to the elements will be undercut and replaced in accordance with Subgrade Undercutting, Type II, at the Contractor's expense.

The Contractor shall place aggregate base the same workday that the earth is excavated in all locations of the project. Any damage occurring to the subgrade from exposure to the elements will be undercut and replaced in accordance with Subgrade Undercutting, Type II, at the Contractor's expense.

Rubbish collection is done by private contractors between the hours of 7:00 a.m. and 7:00 p.m. according to the following schedule: All residential customers north of Main Street are serviced on Thursdays. All residential customers south of Main Street are serviced on Tuesdays. Rubbish collected at commercial properties is collected any time/date. The Contractor shall schedule work to allow and provide for rubbish collectors to provide their service to residential and commercial properties. If the rubbish collectors are unable to collect materials due to construction operations, then the Contractor shall coordinate with the rubbish collectors the moving of containers to the collection site and returning same containers to the property owners.

Current mail delivery is both via mailbox and doorstep. The Contractor shall conduct work so that the mail person may drive and walk unimpeded around construction work to make their delivery.

e. Traffic Control Devices. All signs, barricades, warning lights, and other traffic control devices shall be in accordance with the 2011 Edition of the Michigan Manual on Uniform Traffic Control Devices (MMUTCD) and conform to MDOT Special Detail WZD-125-E.

All diamond shaped warning signs shall be 48" x 48". All temporary signs shall be mounted at a minimum seven-foot bottom height. All temporary signs used for detour, except those at Type III Barricades, shall be installed on driven posts.

Temporary signs that are to remain in place for fourteen (14) days or more shall be installed on driven posts as directed by the Engineer. All other temporary signs (excluding detour signs) may be installed on portable supports.

Ground driven sign supports for temporary signs shall be installed in accordance with MDOT Special Detail WZD-100-A.

Advance work zone signing is revised to include R5-18c (Work Zone Begins) signs. Install signs at locations shown in the plans or as directed by the Engineer.

For construction signing, layout as shown on MDOT typicals minimum Merging Taper Length "L", distances between Traffic Control Devices "D", and length of Longitudinal Buffer Length "B" shall be in accordance with Typical Sign Sequence M0020a.

If required, for a single daytime closure on Washington Street and Wesley Drive, local traffic shall be maintained utilizing traffic regulators (flaggers). Signing and traffic control devices shall be placed in accordance with the Typical Sign Sequence M0140a, or as directed by the Engineer.

During paving operations, traffic regulators (flaggers) shall be utilized, and intermediate traffic regulators (flaggers) shall be established at intersecting roads, streets, and at other traffic generators as directed by the Engineer.

W20-1 "Road Work Ahead" signs shall be placed on all intersecting roads at a minimum distance shown on the plans, or as directed by the Engineer.

Signs placed at Type III barricades shall be placed above and behind the barricade on their own supports.

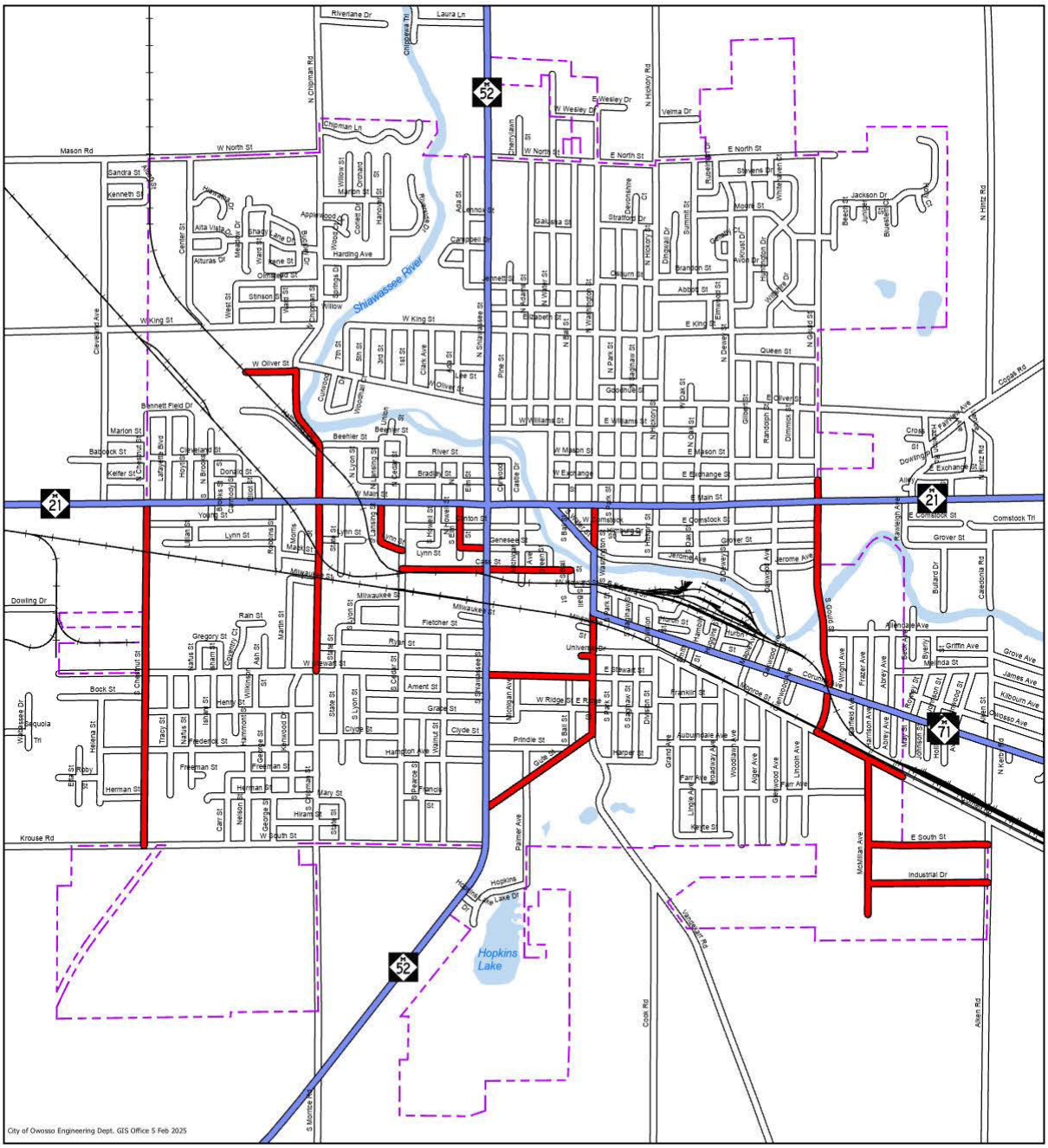
A quantity of plastic drums with fluorescent sheeting has been established for lane closures and to be used adjacent to work areas.

g. Measurement and Payment. The Maintaining Traffic Pay Items will be paid for at the Contract Unit Price in accordance with MDOT 2012 Standard Specifications for Construction, with the exception by other Special Provisions, which shall be payment in full for all labor, material, and equipment needed to accomplish this work.

Payment for temporary signs will be made based on the maximum square feet of dissimilar sign legends in use at any one time during the project.

Payment for barricades, lighted arrows, and plastic drums will be made based on the maximum number in use at any one time during the project.

Payment for barricades, lighted arrows, and plastic drums will be made based on the maximum number in use at any one time during the project.



Truck Route Map

- Designated Truck Routes
- State Highway
- Other Streets & Roads
- Railroads
- City Limit

N
W E
S

0 0.25 0.5 0.75 1
Miles

City of Owosso, Michigan

Pursuant to
Traffic Control Order
Effective 22 February, 2005

SIGN MATERIAL SELECTION TABLE

	SIGN MATERIAL TYPE		
SIGN SIZE	TYPE I	TYPE II	TYPE III
≤ 36" X 36"		X	X
>36" X 36" ≤ 96" TO WIDE		X	
> 96″ WIDE TO 144″ WIDE	X	X	
> 144″ WIDE	X		

TYPE I ALUMINUM EXTRUSION
TYPE II PLYWOOD
TYPE III ALUMINUM SHEET

ROUNDING OF CORNERS IS NOT REQUIRED FOR TYPE I OR II SIGNS.
VERTICAL JOINTS ARE NOT PERMITTED.
HORIZONTIAL JOINTS THROUGH SIGN LEGEND OR SYMBOLS ARE NOT PERMITTED.

POST SIZE REQUIREMENTS TABLE

	POST TYPE		
SIGN AREA (ft^2)	U-CHANNEL STEEL	SQUARE TUBULAR STEEL	WOOD
≤9	1 - 3 lb/ft*	1 - 2" 12 or 14 GA*	N/A
9 ≤ 20	2 - 3 lb/ft	2 - 2" 12 or 14 GA	1 - 4" X 6"*
> 20 ≤ 30	N/A	N/A	2 - 4" X 6"
> 30 ≤ 60	N/A	N/A	2 - 6" X 8"
> 60 ≤ 84	N/A	N/A	3 - 6" X 8"

*SIGNS 4 FEET AND GREATER IN WIDTH REQUIRE 2 POSTS.
SIGNS GREATER THAN 8 FEET IN WIDTH REQUIRE 2 OR 3 WOOD POSTS DEPENDING ON AREA OF SIGN.
A MAXIMUM OF 2 POSTS WITHIN A 7' PATH IS PERMITTED.

MDOT Michigan Department of Transportation

PREPARED BY OPERATIONS FIELD SERVICES

DRAWN BY: CON/ECH
CHECKED BY: AUG

DEPARTMENT DIRECTOR
Kirk T. Steudle

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

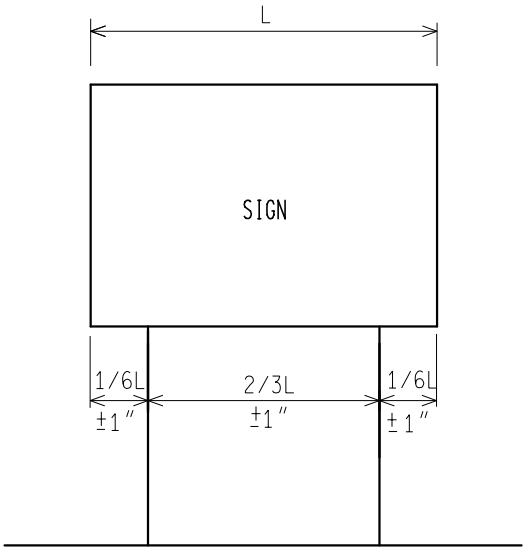
APPROVED BY: _____
DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF FIELD SERVICES SPECIAL DETAIL FOR

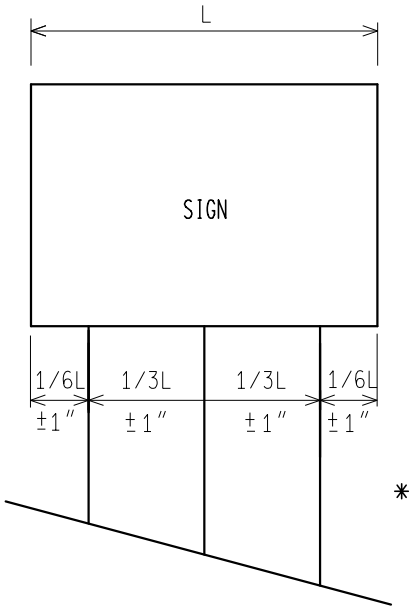
GROUND DRIVEN SIGN SUPPORTS FOR TEMP SIGNS

F.H.W.A. APPROVAL	PLAN DATE		SHEET
	7/20/2016	WZD-100-A	1 OF 11

2 POST SIGN SUPPORT SPACING



3 POST SIGN SUPPORT SPACING

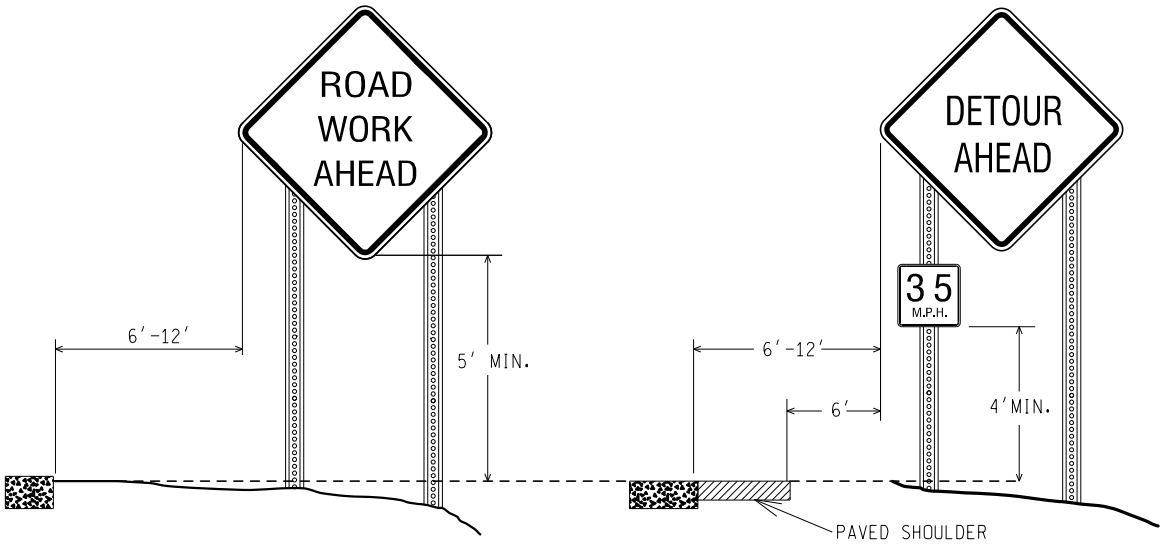


* FOR ALL 11' AND 12' LONG SIGNS ON 3 WOOD SUPPORTS, SPREAD POSTS SO AS TO HAVE A 8' MIN. TO 9' MAX. DISTANCE BETWEEN OUTSIDE POSTS.

NOT TO SCALE

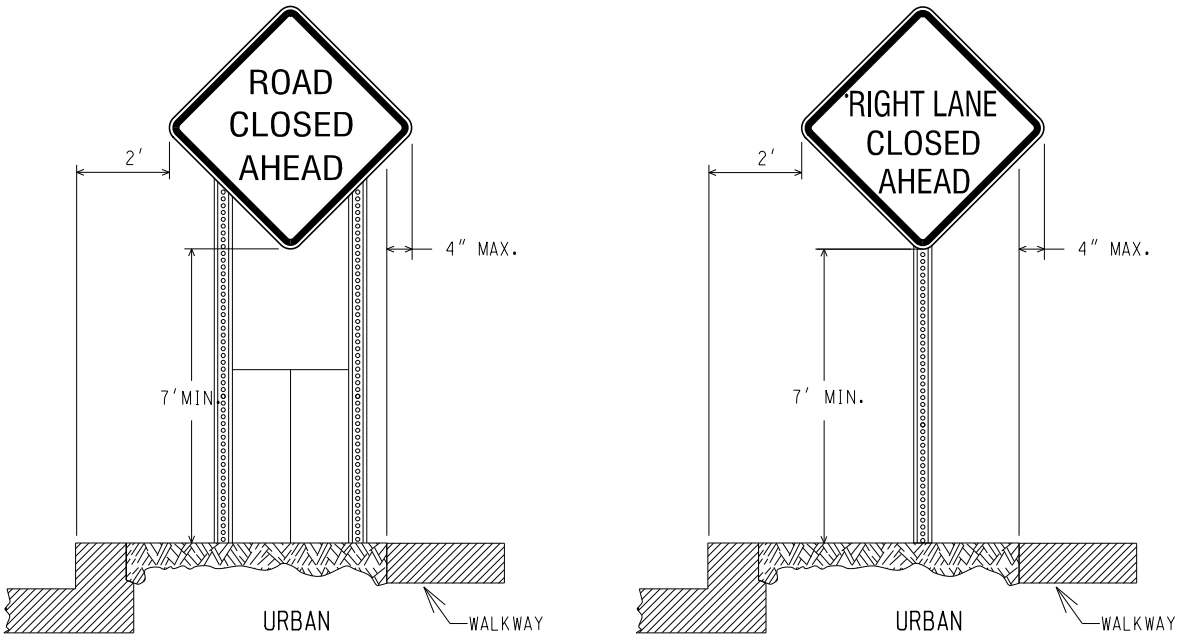
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL	F.H.W.A. APPROVAL	7/20/2016 PLAN DATE	WZD-100-A	SHEET 2 OF 11

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



RURAL

RURAL WITH ADVISORY
SPEED PLATE



(CURBED AREAS OR WHERE
WALKWAYS ARE PRESENT)

(CURBED AREAS OR WHERE
WALKWAYS ARE PRESENT)

BOTTOM HEIGHT AND OFFSET

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL	F.H.W.A. APPROVAL	7/20/2016 PLAN DATE	WZD-100-A	SHEET 3 OF 11

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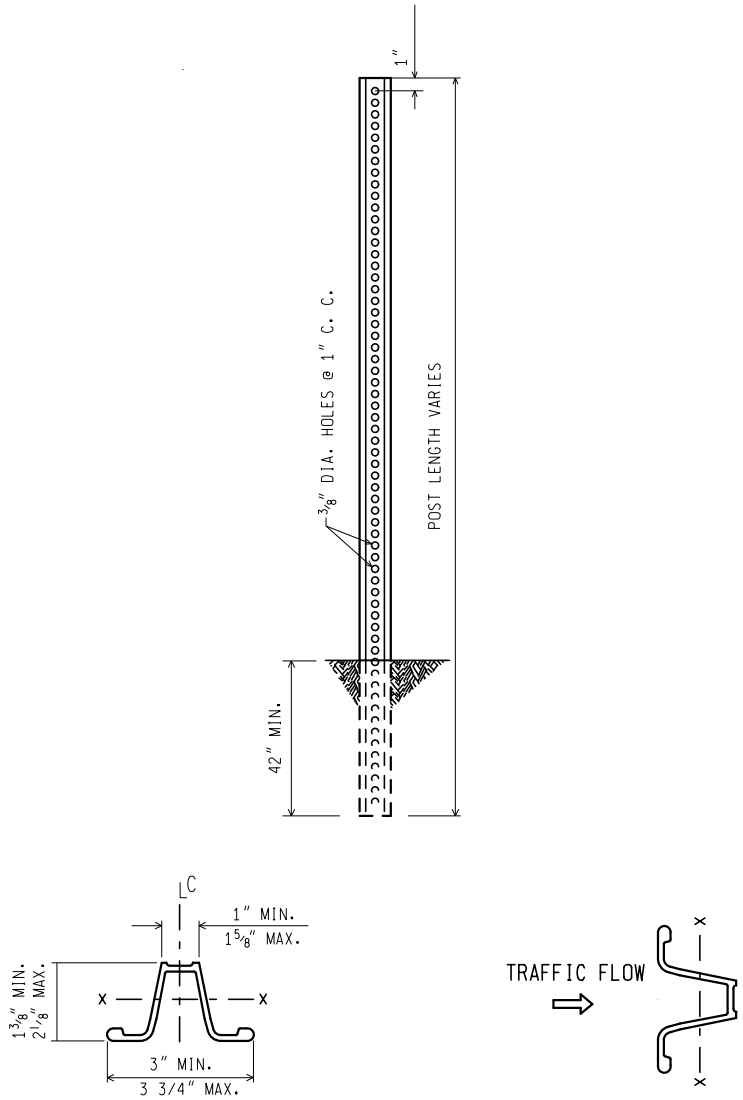

WEIGHT = 3 lbs/ft
SECT. MOD. X.-X. = 0.31 CUBIC INCHES MIN.

3 lb. U - CHANNEL STEEL POST
(NO SPLICE)

MOUNT SIGN ON OPEN FACE OF
U - CHANNEL STEEL POST

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL	F.H.W.A. APPROVAL	7/20/2016 PLAN DATE	WZD-100-A	SHEET 4 OF 11

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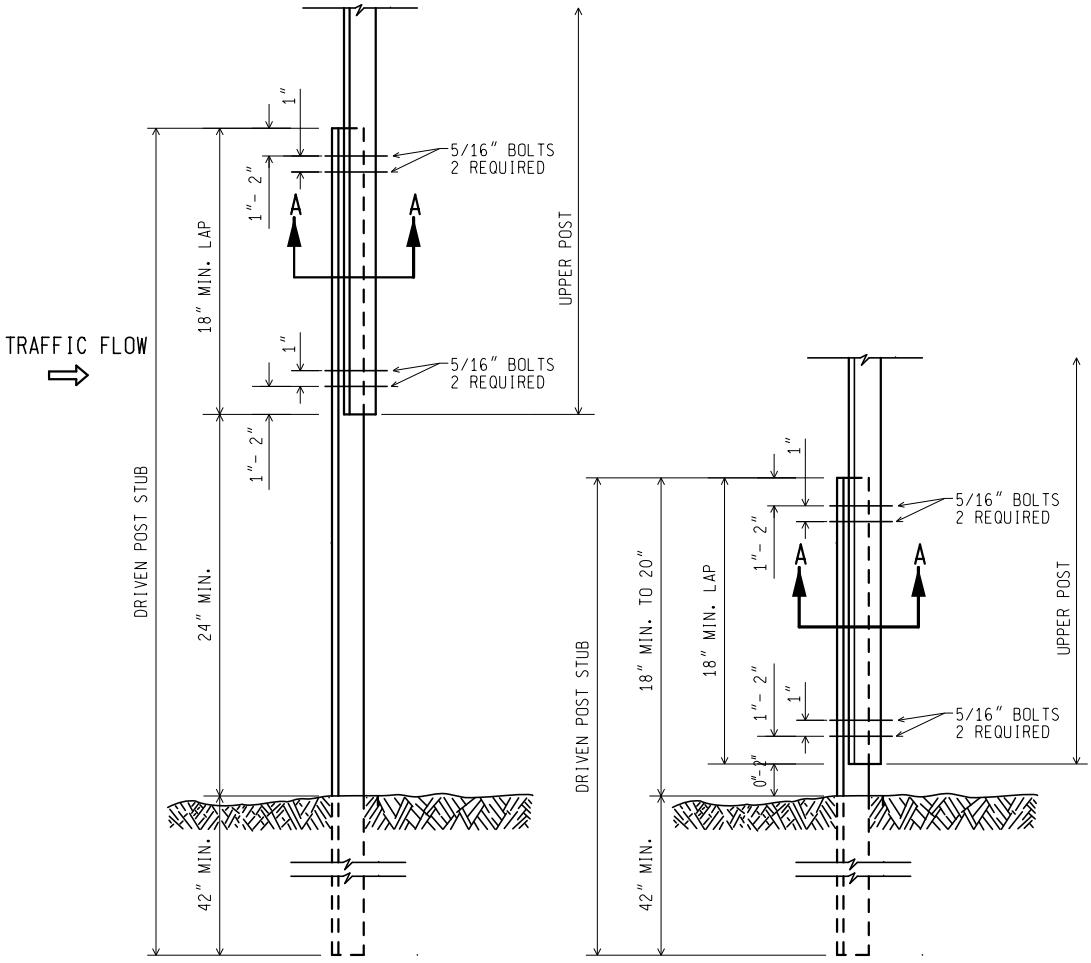

UPPER SPLICE

LOWER SPLICE

3 lb. U - CHANNEL STEEL POST
(WITH SPLICE)

MOUNT SIGN ON OPEN FACE OF
UPPER U - CHANNEL STEEL POST

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL	F.H.W.A. APPROVAL	7/20/2016 PLAN DATE	WZD-100-A	SHEET 5 OF 11

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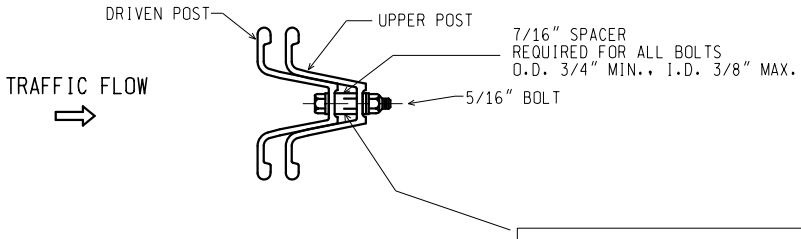
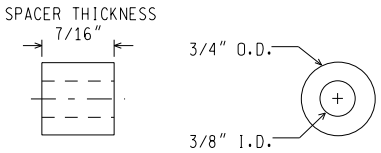


SECTION A-A

SPACER DETAIL



NOTES:

1. THE SPACER THICKNESS SHALL BE 1/16" LESS THAN THE GAP BETWEEN THE POST WHEN POSITIONED IN THE UNBOLTED CONFIGURATION.

2. THE EXTERIOR BOLT (CLOSEST TO LAP), SPACER, WASHER, AND NUT SHALL BE INSTALLED IN A PREPUNCHED HOLE 1" to 2" FROM THE END OF THE LAP.

3. THE INTERIOR BOLT (FARTHEST FROM LAP), SPACER, WASHER, AND NUT SHALL BE INSTALLED IN THE NEXT PREPUNCHED HOLE.

4. THE DRIVEN POST SHALL ALWAYS BE MOUNTED IN FRONT OF THE UPPER POST WITH RESPECT TO THE ADJACENT ONCOMING TRAFFIC, REGARDLESS OF THE DIRECTION THE SIGN IS FACING.

5. THE SPLICE LAP SHALL BE FASTENED BY FOUR-5/16" DIA. GALVANIZED A449 BOLTS (SAE J429 GRADE 5) OR GALVANIZED A325 BOLTS.

3 lb. U - CHANNEL STEEL POST
(WITH SPLICE)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL	F.H.W.A. APPROVAL	7/20/2016 PLAN DATE	WZD-100-A	SHEET 6 OF 11

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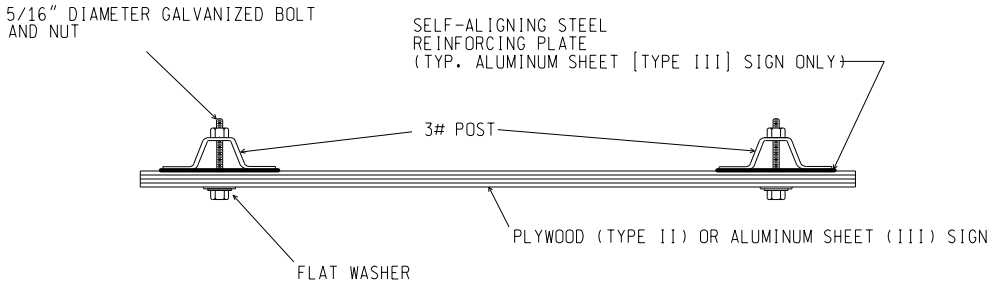
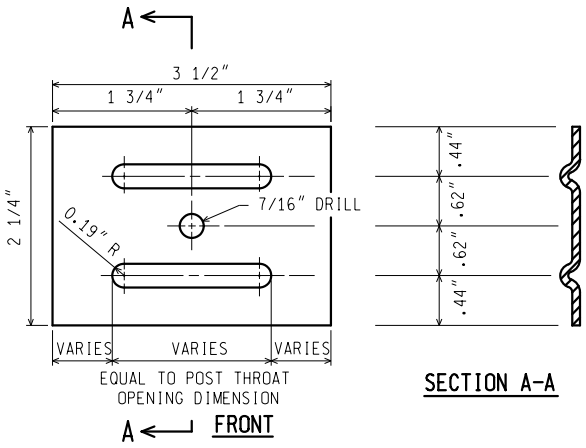


SIGN TO 3 lb. POST CONNECTION



NOTES: (FOR STEEL SIGN REINF' PLATE)

1. MATERIAL: 12 GAUGE CARBON STEEL.
2. TOLERANCE ON ALL DIMENSIONS ± 0.0625"
3. FINISH-AFTER STAMPING AND PUNCHING, GALVANIZE ACCORDING TO CURRENT SPECIFICATIONS FOR ZINC (HOT GALVANIZE) COATINGS ON PRODUCTS FABRICATED FROM PLATES OR STRIPS

STEEL SIGN REINFORCING PLATE
REQUIRED FOR TYPE III SIGNS ONLY

3 lb. U - CHANNEL STEEL POST SIGN CONNECTION

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL	F.H.W.A. APPROVAL	7/20/2016 PLAN DATE	WZD-100-A	SHEET 7 OF 11

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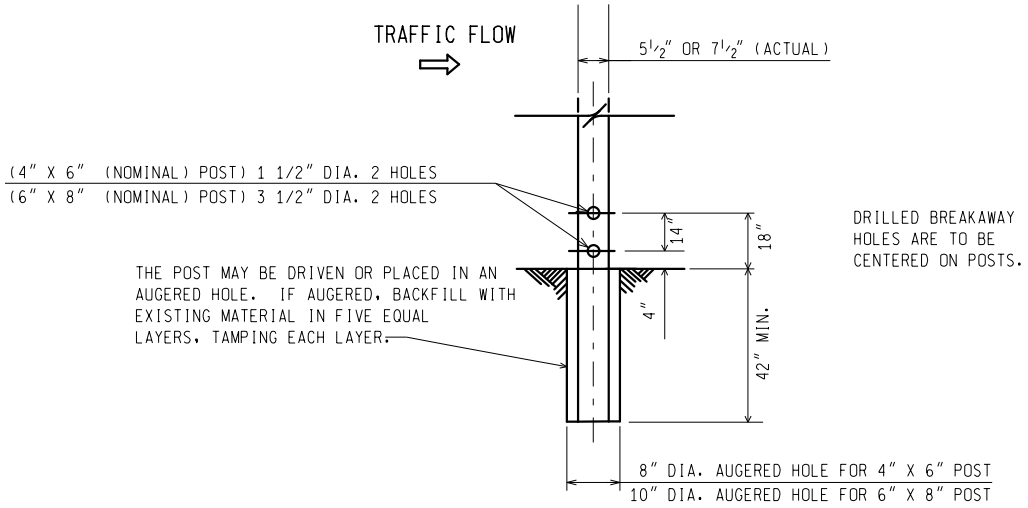
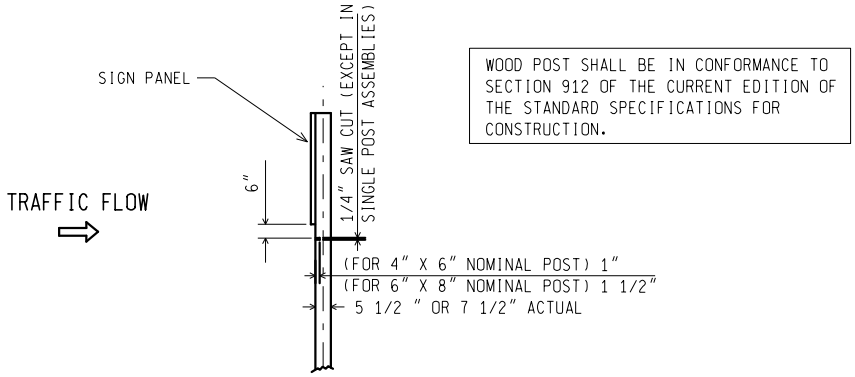


WOOD POST BREAKAWAY HOLES/ DIRECT EMBEDMENT DETAILS



SAW CUT DETAIL (MULTIPLE POST INSTALLATIONS)

WOOD POST DETAILS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL	F.H.W.A. APPROVAL	7/20/2016 PLAN DATE	WZD-100-A	SHEET 8 OF 11

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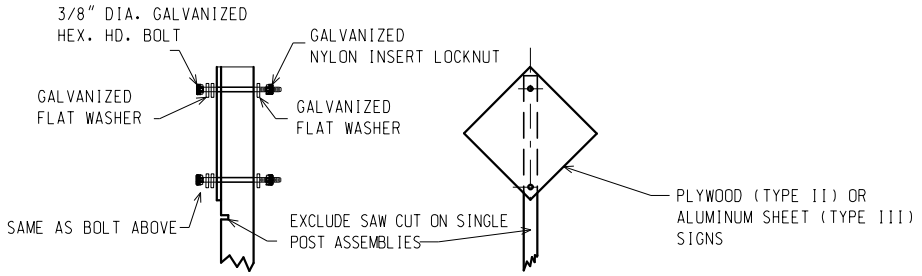
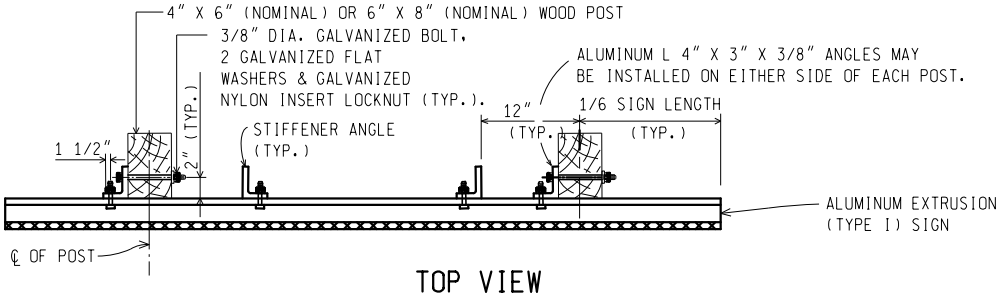
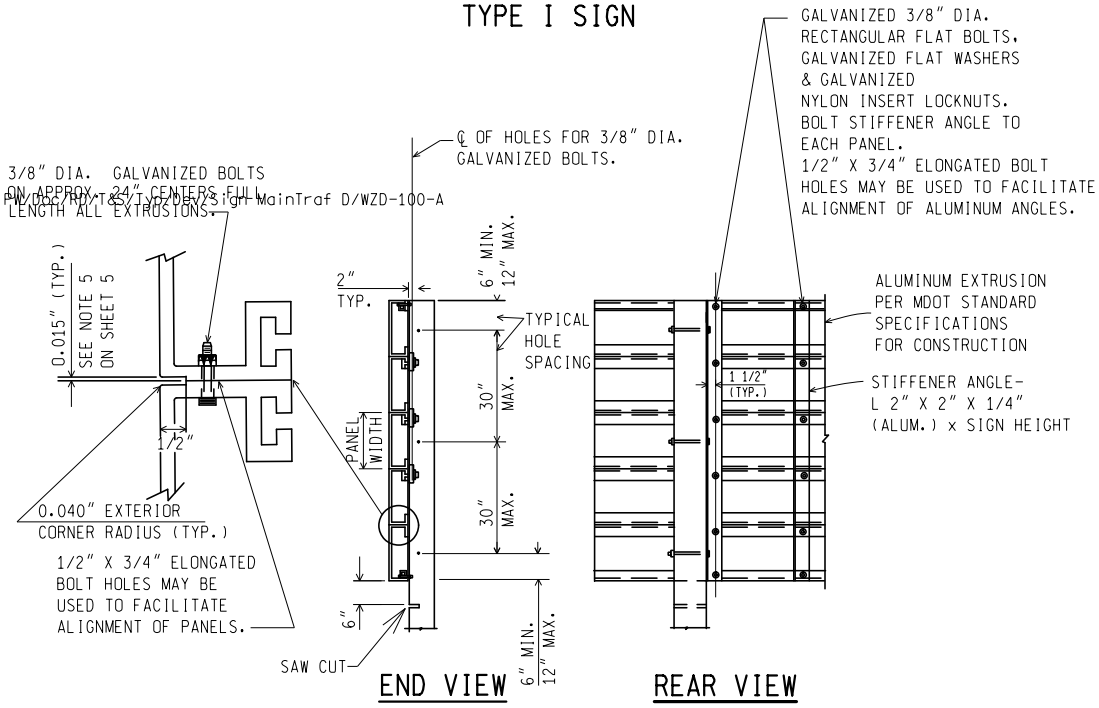


TYPE II AND TYPE III SIGNS



TOP VIEW
TYPE I SIGN



END VIEW
REAR VIEW

TYPE I SIGN - ERECTION DETAILS

WOOD POST CONNECTIONS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL	F.H.W.A. APPROVAL	7/20/2016 PLAN DATE	WZD-100-A	SHEET 9 OF 11

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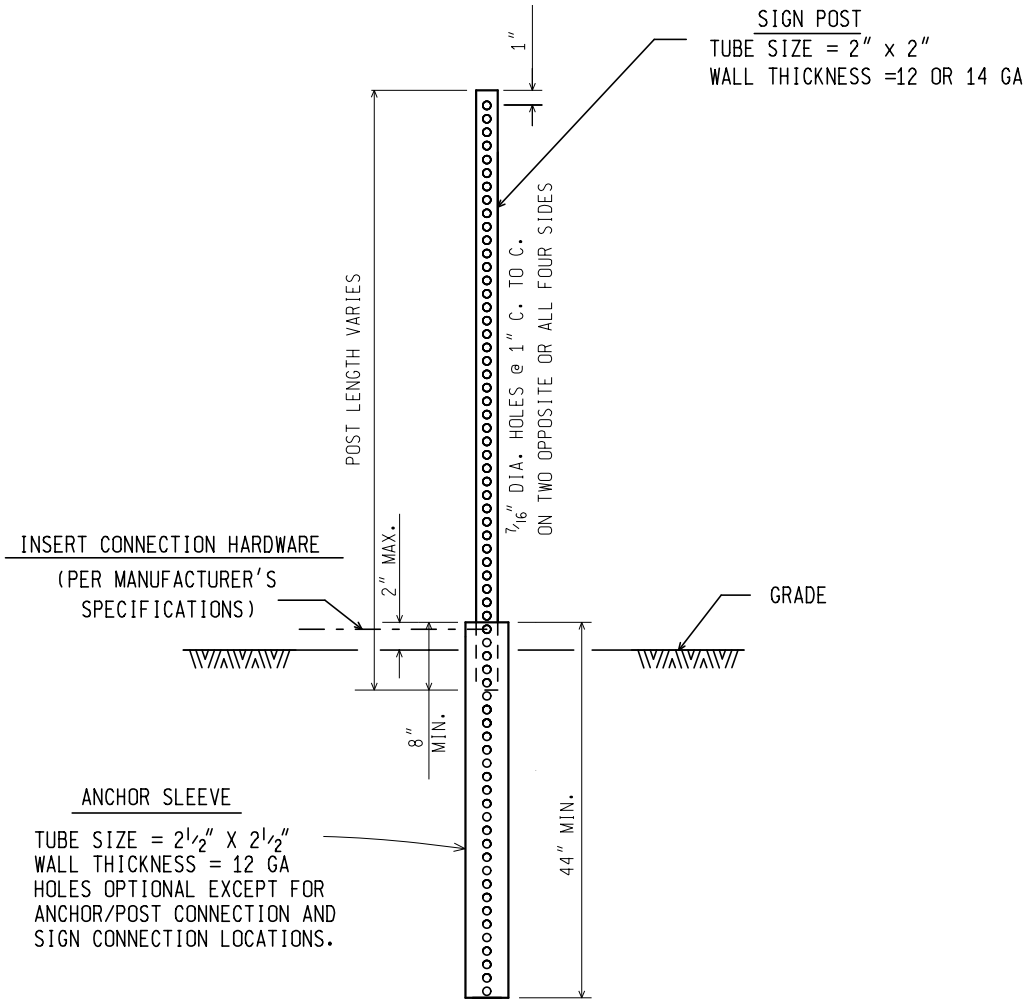

SQUARE TUBULAR STEEL POST

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL	F.H.W.A. APPROVAL	7/20/2016 PLAN DATE	WZD-100-A	SHEET 10 OF 11

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.

GENERAL NOTES:

1. A MAXIMUM OF TWO POSTS WITHIN A 7 FOOT PATH IS PERMITTED.
2. ALL SIGN POSTS SHALL COMPLY WITH NCHRP 350.
3. ALL POSTS SHALL BE EMBEDDED A MINIMUM OF 42".
4. BRACING OF POST IS NOT PERMITTED.
5. SIGN SHALL BE LEVEL, AND UPRIGHT FOR THE DURATION OF INSTALLATION.
6. ERECT POSTS SO THE SIGN FACE AND SUPPORTS DO NOT VARY FROM PLUMB BY MORE THAN 3/16" IN 3'. PROVIDE A CENTER-TO-CENTER DISTANCE BETWEEN POSTS WITHIN 2 PERCENT OF PLAN DISTANCE.
7. NO MORE THAN ONE SPLICE PER POST, AS SHOWN, WILL BE PERMITTED.
8. POST TYPES SHALL NOT BE MIXED WITHIN A SIGN SUPPORT INSTALLATION.
9. NO VERTICAL JOINTS ARE PERMITTED IN SIGN. NO HORIZONTIAL JOINTS THROUGH SIGN LEGEND OR SYMBOLS ARE PERMITTED IN SIGN
10. REMOVE SIGN POSTS AND/OR POST STUBS IN THEIR ENTIRETY WHEN NO LONGER REQUIRED.
11. ALL LABOR, MATERIALS, AND EQUIPMENT, INCLUDING TEMPORARY SUPPORTS REQUIRED TO INSTALL, MAINTAIN, RELOCATE, AND/OR REMOVE THE TEMPORARY SIGN, INCLUDING SUPPORTS, ARE CONSIDERED TO BE INCLUDED IN THE COST OF THE TEMPORARY SIGN.
12. SAW CUTS IN WOOD POSTS ARE TO BE PARALLEL TO THE BOTTOM OF THE SIGN.
13. POSTS SHALL NOT EXTEND MORE THAN 4" ABOVE TOP OF SIGN.
14. TEMPORARY WOOD SUPPORTS DO NOT REQUIRE PRESERVATIVE TREATMENT.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL	F.H.W.A. APPROVAL	7/20/2016 PLAN DATE	WZD-100-A	SHEET 11 OF 11

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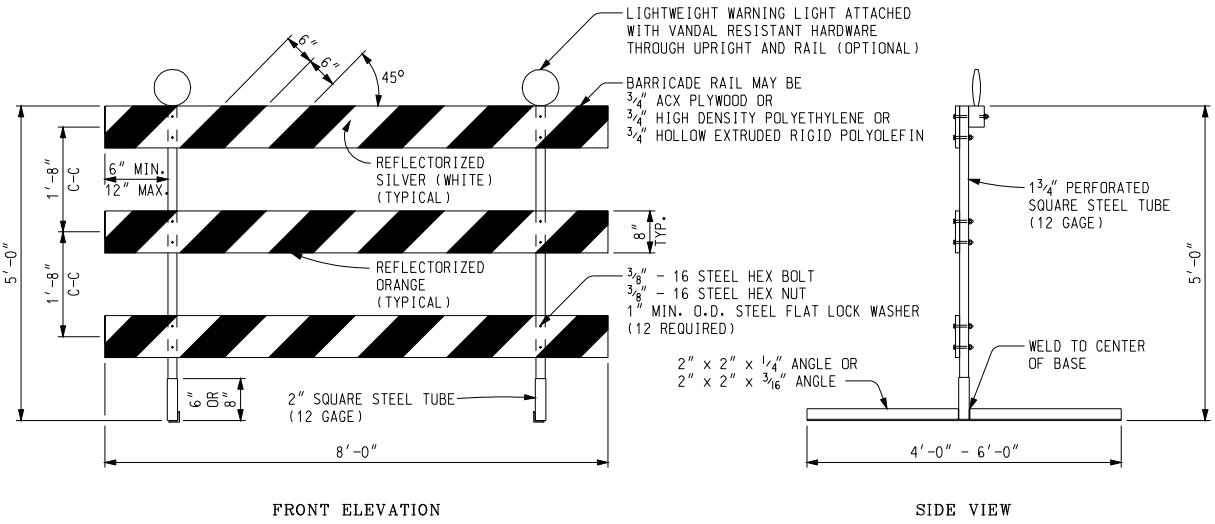
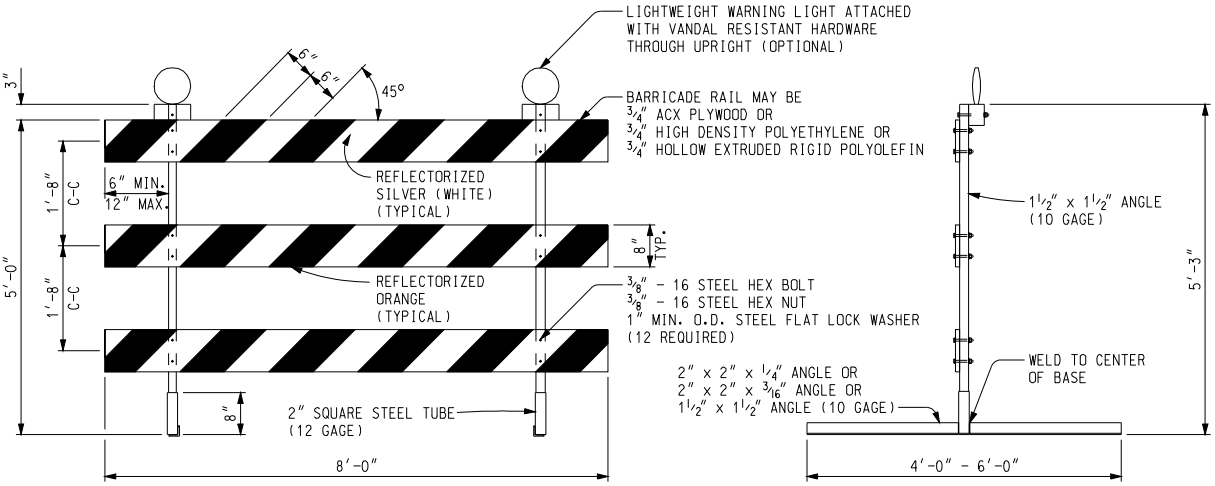
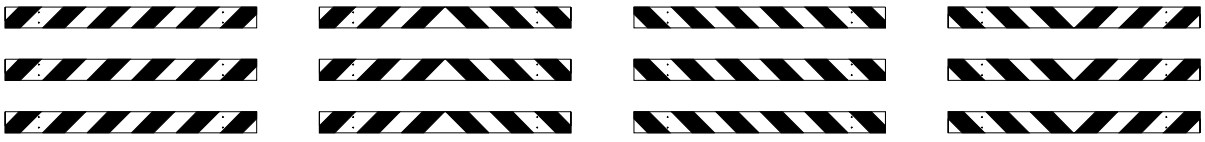


PERFORATED SQUARE STEEL TUBE OPTION



ANGLE IRON OPTION



BARRICADE RAIL SHEETING OPTIONS
TYPE III BARRICADES

Other Type III Barricades meeting current NCHRP crash worthy criteria can be found on the FHWA Safety website at http://safety.fhwa.dot.gov/roadway_dept/road_hardware/wzd.htm

NOT TO SCALE

File: T&S/Typ/Signs/WorkZones/wzd 125 d Rev. 09/22/09 PJ

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: ECH

CHECKED BY: MWB

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

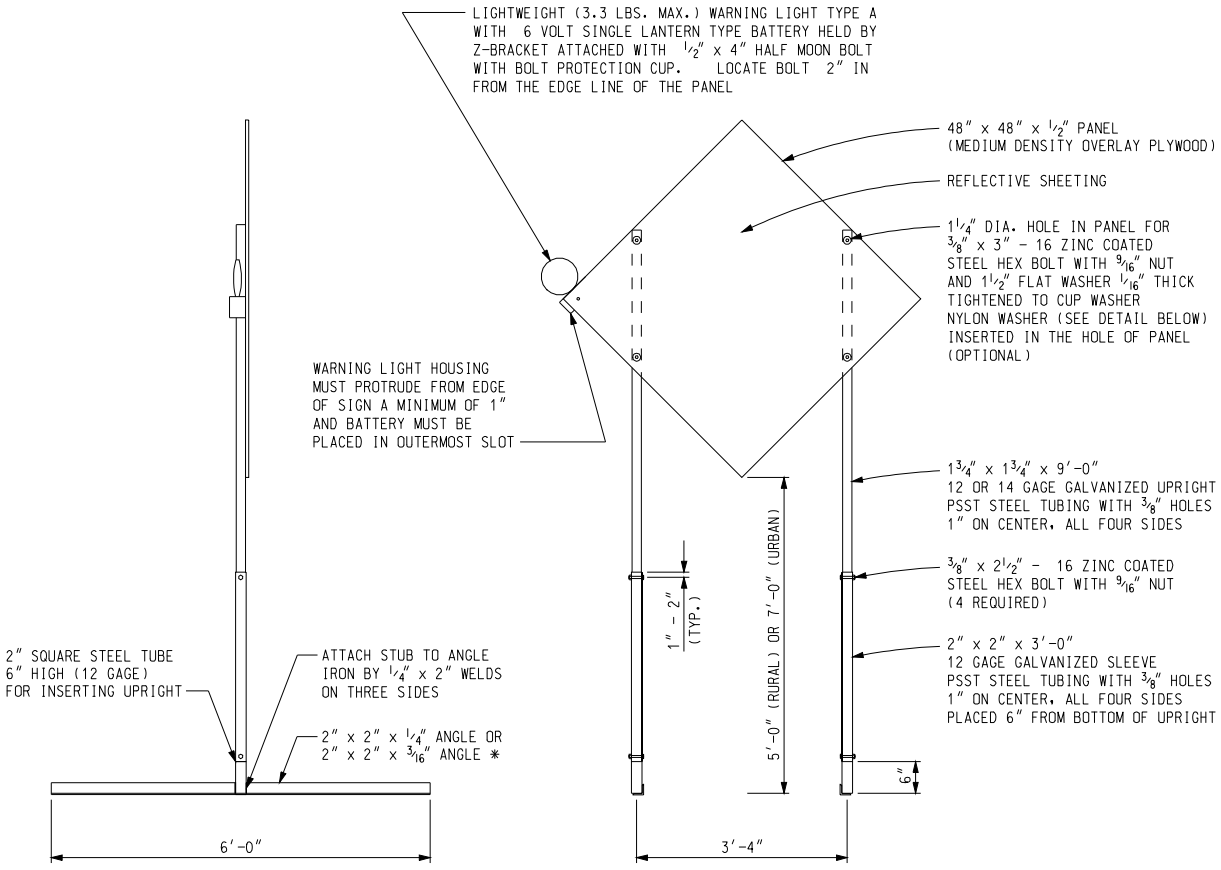
Temporary Traffic Control Devices

9/22/09 PLAN DATE

WZD-125-E

SHEET 1 of 3

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.

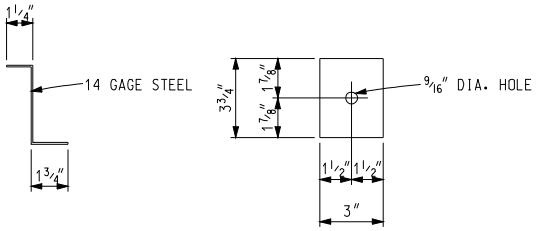


TEMPORARY SIGN SUPPORT

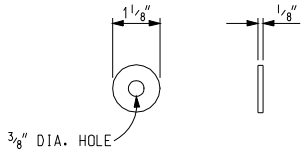
(WARNING LIGHT PLACED ON SIDE CLOSEST TO TRAFFIC)

* SIGN STAND IS BALLASTED WITH FOUR OR MORE 35 LB SANDBAGS. A MINIMUM OF ONE ON EACH END.

UPRIGHTS SHALL NOT EXTEND ABOVE THE SIGN PANEL.



Z-BRACKET DETAIL



OPTIONAL NYLON WASHER

Other temporary sign supports meeting current NCHRP crash worthy criteria can be found on the FHWA Safety website at http://safety.fhwa.dot.gov/roadway_dept/road_hardware/wzd.htm

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	9/22/09 PLAN DATE	WZD-125-E	SHEET 2 of 3
File: T&S/Typ/Signs/WorkZones/wzd 125 d	Rev. 09/22/09 PJ			

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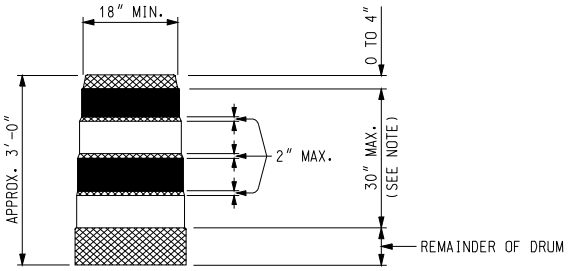
PLASTIC DRUM

PROPOSED TYPE III BARRICADE

EXISTING TYPE III BARRICADE

SYMBOLS TO BE USED ON PLANS



REFLECTORIZED ORANGE

REFLECTORIZED WHITE

NON REFLECTORIZED ORANGE

NOTE:
DRUMS SHALL HAVE AT LEAST 4 HORIZONTAL REFLECTORIZED STRIPES (2 ORANGE AND 2 WHITE) OF 6" UNIFORM WIDTH, ALTERNATING IN COLOR WITH THE TOPMOST REFLECTORIZED STRIPE BEING ORANGE. NON REFLECTORIZED SPACES BETWEEN THE HORIZONTAL REFLECTORIZED ORANGE AND WHITE STRIPES SHALL BE ORANGE IN COLOR AND EQUAL IN WIDTH.

PLASTIC DRUM

NOTES:

2" PERFORATED SQUARE STEEL TUBES MAY BE USED TO FABRICATE THE HORIZONTAL BASE OF THE TYPE III BARICADE.

WARNING LIGHTS SHALL BE PLACED ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION AND ALL OTHER PROVISIONS IN THE CONTRACT WHEN THEY ARE USED ON TYPE III BARRICADES.

SEE ROAD STANDARD PLANS R-113-SERIES FOR TEMPORARY CROSSOVERS FOR DIVIDED ROADWAY, AND R-126-SERIES FOR TYPICAL LOCATION AND SPACING OF PLASTIC DRUMS FOR PLACEMENT OF TEMORARY CONCRETE BARRIER.

SIGNS, BARRICADES, AND PLASTIC DRUMS SHALL BE FACED WITH PRESSURE-SENSITIVE REFLECTIVE SHEETING ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION.

SANDBAGS SHALL BE USED WHEN SUPPLEMENTAL WEIGHTS ARE REQUIRED TO ACHIEVE STABILITY OF THE BARRICADE. THE SANDBAGS SHALL BE PLACED SO THEY WILL NOT COVER OR OBSTRUCT ANY REFLECTIVE PORTION OF THE TRAFFIC CONTROL DEVICE.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	9/22/09 PLAN DATE	WZD-125-E	SHEET 3 of 3
File: T&S/Typ/Signs/WorkZones/wzd 125 d	Rev. 09/22/09 PJ			

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
TEMPORARY PEDESTRIAN TYPE II BARRICADE

OFS:RAL 1 of 2 APPR:CAL:CT:08-02-16

a. Description. This work consists of furnishing, installing, maintaining, relocating, and removing a temporary pedestrian Type II barricade section as identified in the proposal or on the plans. Use temporary pedestrian Type II barricades to close non-motorized facilities including sidewalks, bicycle paths, pedestrian paths, and shared use paths that are not part of the roadway. One pedestrian Type II barricade is defined as a barricade section at least 43 inches wide, including all supports, ballast, and hardware.

b. Materials. Provide a temporary pedestrian Type II barricade that meets the requirements of *National Cooperative Highway Research Program Report 350 (NCHRP 350)* or *Manual for Assessing Safety Hardware* (MASH), in addition to meeting the following requirements:

1. Provide barricade sections at least 43 inches wide, designed to interconnect to ensure a continuous *Americans with Disabilities Act (ADA)* compliant tactile barrier. Ensure the connection includes provisions to accommodate non-linear alignment as well as variations in elevation at the installation area.

2. Ensure the top surface of the barricade is designed to function as a hand-trailing edge, and has a height between 32 and 38 inches. Ensure the lower edge of the barricade is no more than 2 inches above the surface of the non-motorized facility. Ensure the top edge of the bottom rail of the barricade is a minimum of 8 inches above the surface of the non-motorized facility. The barricade may have a solid continuous face. Finally, all features on the front face of the barricade (the face in contact with pedestrians) must share a common vertical plane.

3. Equip both sides of the barricade with bands of alternating 6-inch wide orange and white vertical stripes of reflective sheeting. Two bands of sheeting 6 inches tall and a minimum of 36 inches long containing at least two orange and two white stripes each are required. One band placed near the top and one near the bottom if the barricade section has a solid face. If the barricade consists of two rails, affix one band of sheeting to each rail. Ensure the stripes of reflective sheeting are aligned vertically. Ensure this sheeting meets or exceeds the requirements of *ASTM D 4956* Type IV sheeting.

c. Construction. Construct the temporary pedestrian Type II barricade in accordance with the manufacturer's recommendations, Michigan Manual on Uniform Traffic Control Devices (MMUTCD), the plans, and the following requirements:

1. Install the barricade as shown on the plans and as directed by the Engineer. Interconnect all barricade sections using hinge components if necessary to ensure a continuous detectable edge for the entire installation. Ensure the barricade is ballasted according to the manufacturer's recommendations to ensure stability during wind events and contact with pedestrians.

2. When the barricade is installed near motor vehicle traffic, ensure reflective sheeting is visible to motorists.

3. When pedestrian Type II barricades are used to close a non-motorized facility, ensure a sufficient number of barricade sections are used to block the entire width of the facility. The barricade may extend outside the edge of the non-motorized facility but must not be less than the full width of the facility.

4. If sections of multiple colored barriers are used (i.e. safety orange and white) install the sections such that the colors alternate to increase conspicuity.

5. Ensure pedestrian Type II barricades are not used to close a motor vehicle facility. Ensure these barricades are not used to guide pedestrian traffic on a motor vehicle facility in the presence of active traffic. This prohibition includes bicycle/shared use lanes or shoulders in the presence of active traffic.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item	**Pay Unit**
Pedestrian Type II Barricade, Temp	Each

Pedestrian Type II Barricade, Temp, includes all labor, equipment, and materials to furnish, install, maintain, relocate, and remove one barricade section that is at least 43 inches wide. Additional payment will not be made if wider sections are provided. This includes all rails, supports, ballast, hinge points, reflective sheeting, and miscellaneous hardware needed to install and maintain a barricade section.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
TURF ESTABLISHMENT, PERFORMANCE

RSD:JLB 1 of 6 APPR:DMG:KJS:05-13-20

a. Description. For the work specified in this special provision paid for by the pay item Turf Establishment, Performance only, delete section 816 of the Standard Specifications for Construction and replace it with this special provision. The Contractor is responsible for the performance and quality of turf growth in the areas shown on the plans and as identified by the Engineer. Comply with all local, state and federal laws when completing this work.

Establish a durable, permanent, mature, perennial turf. The work consists of fundamental turf work, including but not limited to topsoiling, seeding, mulching, erosion control, maintenance, watering and repair of turf as described herein during the life of the contract and during the life of any supplemental performance bond which may ensue.

Choose and implement proven turf establishment industry practices; provide all necessary labor and equipment; select and provide all turf establishment materials; and control erosion and any subsequent sedimentation at all times.

Perform a site analysis, interpret the results and implement a turf establishment program to ensure compliance with this specification. The site analysis must take into consideration topsoil needs, fertilizer and pH requirements, seed mix, existing and future soil moisture levels, slopes and grades, required erosion control measures, maintenance requirements, local highway snow removal and deicing practices, and any other characteristics that influence and affect turf establishment.

Subsection 107.11 of the Standard Specifications for Construction is revised relative to the Contractor's responsibility for the repair of turf establishment work as follows. The Contractor is responsible, at no additional cost to the contract, for the repair of turf establishment work occasioned by storm events up to 3 inches of rain in a 24 hour period as documented by local meteorological data submitted to the Engineer for review and approval. All other portions of subsection 107.11 remain unchanged.

1. Contractor Turf Establishment Experience Requirements. Ensure weed control is done by a commercial herbicide applicator, licensed by the State of Michigan and certified by the Michigan Department of Agriculture & Rural Development (MDARD) in the appropriate category to apply herbicides. Use application procedures and materials in accordance with federal, state and local regulations. Use of restricted use chemicals is prohibited. Provide appropriate documentation and secure approval from the Engineer before application of herbicides.

At least 10 work days prior to the start of turf establishment, provide documentation to the Engineer, from the Contractor performing the turf establishment work, that they meet one or both of the following requirements.

A. At least one person employed by the Contractor performing the turf establishment work and assigned to the job site has a degree or certificate in Turf Management, Horticulture or related field.

B. At least one person employed by the Contractor performing the turf establishment work and assigned to the job site has at least 5 years of experience in roadside turf establishment.

b. Materials. Provide topsoil, seed, mulch, pesticide, herbicide, mulch blanket and any other unique erosion control materials as necessary to fulfill this specification, as shown on the plans. Use additional materials, as necessary, to meet the standards set forth for turf establishment in this special provision. The use of sod on the project requires the prior approval of the Engineer and if approved, may be used at limited site locations only.

Selection of all materials is the responsibility of the Contractor with the following minimum conditions.

1. Soil. Provide furnished or salvaged topsoil, which may be blended compost, that will support vigorous growth. Ensure topsoil is humus bearing and placed at least 4 inches deep. Ensure it is free of stones larger than 1/2 inch (2 inches on freeway projects) in diameter and other debris. Trim and grade the finished slope in accordance with subsection 205.03.N of the Standard Specifications for Construction.

2. Seed. Use a seeding mixture that is composed of four or more species of perennial grass. Use only species and their cultivars or varieties which are guaranteed hardy for Michigan.

Recommended species of perennial grasses include Kentucky Bluegrass, Perennial Ryegrass, Hard Fescue, Creeping Red Fescue, Chewings Fescue, Turf-type Tall Fescue, Buffalo grass, and Alkaligrass-Fults Puccinellia distans. Select cultivars or varieties of grasses that are disease and insect resistant and of good color. Ensure that no one species in the mix is less than 5 percent, or more than 25 percent, of the mixture by weight. Do not select grass species considered noxious or objectionable, such as Quack Grass, Smooth Brome, Orchard Grass, Reed Canary Grass and others.

A. Ensure the seed is legally saleable in Michigan. Ensure the seed product does not contain more than 10 percent inert materials. Ensure the seed source is an MDOT approved certified vender.

B. Adapt the species and varieties of seed to the site conditions, to the site use, and to the soils, moisture and local climate. Site use may include, but is not limited to, detention pond, wildlife habitat, playground, wetlands, forested wetland, rural roadside, urban roadside and highly maintained front yard.

C. Ensure at least two of the species in the mixture proposed to be planted within 15 feet behind the curb or the shoulder are salt tolerant.

3. Mulch. Mulch seeded areas with the appropriate materials for the site conditions to promote germination and growth of seed and to mitigate soil erosion and sedimentation.

4. Herbicides. Comply with all federal, state and local laws. As part of the MDARD weed

control application, the Contractor is required to make proper notifications and postings in accordance with the label and MDARD requirements for all locations that will be sprayed. Notify the Engineer at least 48 hours prior to any applications being made. Furnish and apply herbicide(s) as needed. It is the Contractor's responsibility to select the herbicide(s) and the rate at which it is used. Obtain the Engineer's approval of work methods and herbicide(s) selected prior to the application of the herbicide(s). Complete a spray log and submit to the Engineer each day an application is made.

Do not draw water from any waterway (i.e. river, ditch, creek, lake etc.) located on state, county or municipal right-of-way, for mixing with herbicides.

5. Fertilizers. Furnish and apply fertilizer(s) as needed. It is the Contractor's responsibility to select the fertilizer(s) and the rate at which it is used. Phosphorus is allowed for use only at the time of planting and when required by soil conditions. Obtain the Engineer's approval of work methods and fertilizer(s) prior to the application of the fertilizer(s).

6. Water. Furnish and apply water from an approved source at a rate to promote healthy growth.

c. Construction. The Contractor is responsible for all work and all construction methods used in completing this work. Implementation of any part of the standard specifications or standard plans by the Contractor does not relieve the Contractor of responsibility for acceptability of the construction methods or for the quality of the work.

1. Inspection of the Work. The Contractor is responsible for all inspection of turf establishment work.

Use a Contractor's Daily Report, approved by the Engineer, to report inspections made and to document turf establishment work performed on this project. Complete and submit a Contractor's Daily Report to the Engineer when any work performed under this special provision is in progress.

Include all necessary materials documentation including tests slips, certifications, etc. with the associated Contractor's Daily Report.

The Engineer will determine the acceptability of the Contractor's Daily Report in terms of the completeness and accuracy. The Engineer reserves the right to verify all submitted measurements and computations. Failure by the Contractor to submit acceptable and timely reports to the Engineer may result in withholding of progress pay estimates on turf-related items until such time as reports are submitted and deemed acceptable.

The Engineer reserves the right to inspect the project for any reason in accordance with subsection 104.01 of the Standard Specifications for Construction, including the fulfillment of other inspection requirements such as Soil Erosion and Sedimentation Control, NPDES, etc. Inspections made by the Engineer do not relieve the Contractor of the responsibility for inspections required by this special provision or the Contractor's responsibilities for erosion control and turf establishment.

2. Erosion Control. Control erosion at all times in accordance with section 208 of the Standard Specifications for Construction. Control of soil erosion is the responsibility of the Contractor. However, ensure sedimentation controls are placed as shown on the plans or as

directed by the Engineer. Continuously monitor the site for needed erosion repair from any cause as addressed in the contract. Return all eroded areas to original grade as detailed in the contract.

Take immediate corrective action if sedimentation occurs in drainage structures or any watercourse or water containment area and stabilize all disturbed areas contributing to this sedimentation within 24 hours after the erosion occurrence. Remove sediment deposited as a result of the Contractor's inability to control the soil erosion at the Contractor's expense.

Reimburse the Department for any costs levied against the Department, such as fines, environmental costs, costs for remedies required, or any other costs as a result of the Contractor's failure to comply with this special provision and with federal, state and local laws.

3. Erosion Repair. The Contractor is responsible for all repairs and liable for all consequences (legal, monetary or other) associated with erosion or sedimentation damage to finished or unfinished work.

Report all erosion occurrences and the repairs made by the Contractor to the Engineer in the format and at the frequency required by the Engineer. Repair any erosion, displacement or disturbance to ongoing or completed work by any cause at no additional cost to the contract unless otherwise noted herein.

The Contractor is responsible and liable for all traffic control and safety measures required to repair and protect damaged turf areas. Repair any eroded area that may affect the support of the roadbed or safety of the public within 24 hours of the erosion occurrence.

Place protective devices such as barriers, directional signs/signals, temporary fence, or any other safety measures immediately after any erosion damage occurs that has the potential of endangering the public. In these instances, provide the Engineer with a written summary of the immediate action taken describing the repairs made and the safety measures taken, within 24 hours of the occurrence of the damage.

4. Mowing and Weeding. Maintain turf to a visually appealing level, and not more than 8 inches in height at any time, prior to acceptance. Weeds must be controlled to less than 10 percent of the turf establishment area at all times during construction.

5. Final Acceptance and Supplemental Performance Bond.

A. Final Acceptance Parameters. Ensure before final acceptance of the turf establishment work, all of the following minimum parameters are met throughout all exposed areas of the project designated on the plans or identified by the Engineer as turf establishment areas: there must be no exposed bare soil and the turf must be fully germinated, erosion free, weeds less than 10 percent, disease free, dark green in color and in a vigorous growing condition.

The Engineer will notify the Contractor of the dates and times of all acceptance inspections. The Contractor may accompany the Engineer during these inspections. If the Contractor does not agree with the decision made by the Engineer, the Contractor may request an inspection by a mutually agreed upon third party (Michigan State University Extension service or other). A joint inspection, to include the Engineer, the Contractor, and the third party, will be scheduled by the Engineer. Pay all expert fees and

expenses charged by the third party.

B. Supplemental Performance Bond. In the event that all contract items of work are completed, including the placement of all turf establishment items of work, and the final acceptance of the project is delayed because the final acceptance parameters for the turf establishment work have not been fully met; the Contractor may propose to the Engineer the use of a supplemental performance bond.

The bond serves to secure the successful completion of turf establishment work and fulfillment of all final acceptance parameters for the turf establishment work. Ensure the supplemental performance bond, in all respects, is satisfactory and acceptable to the Department and executed by a surety company authorized to do business with the State of Michigan.

Ensure the bond is in an amount equal to 50 percent of the turf establishment work items covered by this special provision. Ensure the bond remains in place for two growing seasons. At the discretion of the Engineer, the bond may be reduced on a prorated basis as portions of the areas designated for turf establishment on the project meet the final acceptance parameters.

Prior to commencement of any work necessary to meet the acceptance parameters during the bonded period, the Contractor must apply for a permit to work within the right-of-way through the MDOT Permit Gateway. The permit fee and an individual permit performance bond will not be required. The permit insurance requirements, however, will be required.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item	**Pay Unit**
Turf Establishment, Performance	Square Yard

Turf Establishment, Performance includes installing, maintaining, inspecting, repairing and meeting the acceptance parameters for turf establishment specified in this special provision, including preparation, updating and submittal of the Contractor's Daily Reports.

Repairs made to damaged turf establishment areas as a result of a documented storm by local meteorological data resulting in rainfall amounts of more than 3 inches in a 24 hour period will be paid for as an increase to original quantities in accordance with subsection 109.05 of the Standard Specifications for Construction.

The following schedule of payment applies to work performed in accordance with this special provision. Upon completion of topsoil surfacing stage, 50 percent of the authorized amount for **Turf Establishment, Performance** will be paid to the Contractor. The remaining 50 percent of the authorized amount will be paid upon completion of all other work necessary to comply with this special provision and to meet all final acceptance parameters for **Turf Establishment, Performance** or at such time as the supplemental performance bond is accepted by the Department.

The supplemental performance bond and all costs associated with turf establishment work performed during the duration of the performance bond will not be paid for separately. These

costs which may include, but are not limited to, mobilization, traffic control devices, and the required permit insurance are included in the unit price bid for **Turf Establishment, Performance.**

CITY OF OWOSSO

SPECIAL PROVISION
FOR
WATER MAIN INSTALLATION

DESCRIPTION

This work shall consist of installing water main and appurtenances in accordance with the plans, this special provision, AWWA, EGLE, and the MDOT 2020 Standard Plans and Specifications. This shall include all labor, equipment, and materials to complete the work.

For the protection of underground utilities and in conformance with Public Act 174 of 2013, the Contractor shall contract the Miss Dig system, Inc. by phone at 811 or 800-482-7171 or via the web at either elocate.missdig.org for single address or rte.missdig.org, a minimum of 3 business days prior to excavation, excluding weekends and holidays.

The Department of Public Works can assist the Contractor in locating existing water service leads and mains. All removed valves and hydrants shall be salvaged and returned to the Department of Public Works.

The Contractor shall contact the Engineer to schedule work interfering with existing water service. Temporary shut off of service shall be obtained from the Department of Public Services.

A fee of $1,200 will be required at time of permit application. This fee includes the minimum charge of $75 for 5,000 bulk gallons of water, plus additional charges of $12 per 1,000 gallons consumed in excess of the minimum quantity. Owosso Water System personnel will attach a water meter and RPZ backflow preventer to the hydrant for Contractor use. If the water meter and RPZ is returned in good operating condition, the Contractor will receive a $450 refund, less additional water consumed in excess of minimum quantity.

MATERIALS

All materials supplied by the Contractor shall be new, meeting minimum specifications of American Water Works Association (AWWA) Standards, and special provisions as delineated by the City of Owosso. All materials shall be lead free as defined by the USEPA Safe Drinking Water Act, in that; “All pipes, pipe fittings, plumbing fittings, and fixtures that are used for potable water must comply with the lead free requirement and must bear the mark NSF/ANSI Standard 61, Annex G or NSF 61-G.”

Michigan and United States of America products shall be used whenever possible.

Pipe

Water main constructed of PVC pipe shall conform to AWWA C900/C909 standards. C909 PVC pipe shall be used for open trench cut installations. C900 PVC fused pipe shall be used for

trenchless installations. Pipe shall meet both NSF/ANSI Standard 61 and NSF/ANSI Standard 14. PVC pipe shall have a ratio of diameter to wall thickness of 18, unless noted otherwise on the plans or in the proposal.

Water main constructed of ductile iron pipe shall conform to AWWA C151/C600. Pipe shall meet Thickness Class 52 and Pressure Class 350. Ductile iron pipe shall be lined with a cement mortar and bituminous seal coat in accordance with AWWA C104.

Pipe manufacturer and class shall be marked on each length of pipe.

Pipe, fittings, joints, and fire hydrants in soils contaminated with volatile organic compounds, as determined in the field by the Engineer, shall require the use of Linear Low Density Polyethylene black (8-mil) Poly Wrap ANSI/AWWA C105/A21.5, ASTM D882, for up to one foot of finished grade.

Fittings/Joints

Joints shall be push-on type with elastomeric gaskets meeting the requirements of ASTM D3139/ F477 or AWWA C111 and shall be provided with an electrical conductivity device.

Fittings shall be cast iron or ductile iron with mechanical joints and shall be in accordance with AWWA C153 / ANSI A21.53. Fittings shall be cement lined in accordance with ANSI/AWWA A21.4/C104 and rated for 250 psi, or more.

Following manufacturer's standards, mechanical joint restraint shall be required and shall be MEGALUG by EBAA Iron, or approved equal.

All mechanical joints and fittings requiring bolt-on fasteners shall use Blue Core Bolts.

Corrosion protective material as a barrier encasement in varying soil conditions shall be required. Use 1) Linear Low Density Polyethylene black (8-mil) Poly Wrap ANSI/AWWA C105/A21.5 ASTM D882, or 2) Sanchem, Inc. NO-OXG-ID GG-2 lubricant. Corotech coal tar epoxy is not permitted for use.

Ductile iron water main shall require the use of nitrile gaskets, and used in place of PVC pipe where hazardous soils exist.

Fire Hydrants

This item shall include the fire hydrant, an auxiliary valve (placed no more than 3 feet from hydrant), valve box, connector pieces and the hydrant tee. These items shall be installed in accordance with the standard construction practices and the standard fire hydrant detail. Bends approved by Engineer

and Department of Public Works may be added into the connection, but shall not be paid for separately. Extensions will also not be paid for separately.

All fire hydrants shall be manufacturer by East Jordan Iron Works **(EJIW) Stortz** 5BR250, open right, with 5 1/2 foot depth of bury, and painted yellow, and manufactured in accordance with AWWA C502 specifications. Hydrants shall be provided as outlined in the details within the construction plans and below:

1. Dry-barrel fire hydrant traffic model or traffic flange type and 150 pound working pressure, compression type, and opening with the line pressure, with mechanical joints.
2. Fire hydrants shall be bronze mounted throughout with no iron-to-iron or steel contacts or threads. The operating stem in the base and valve seat shall be bronze.
3. All iron parts shall be of high strength grey iron conforming ASTM A126 Class B.
4. Fire hydrants shall have a 6-inch valve opening with a 6-inch mechanical joint inlet.
5. The minimum inside dimension shall be 8 inches.
6. The operating nut shall turn to the right to open and have a weather shield. The opening direction shall be plainly marked with an arrow near the operating nut showing the opening direction.
7. The operating nuts and nut nozzle caps shall be square and slightly tapered; and it shall be $^{15}/_{16}$" at its base and $^{13}/_{16}$" square at its end and 1- $^{1}/_{8}$" long.
8. Fire hydrants shall be completely assembled at the factory with the drain opening sealed with a threaded plug.
9. Provide two fire hose connections and one pumper connection in accordance with municipality standards.
10. All nozzles shall be on a movable head on the hydrant barrel so that they may be rotated by changing the position of the top flange without removing the barrel.
11. Provide a Spring Cap Style McGard Fire Hydrant Lock for hydrant.
12. Provide proper length for installation at water main depth as indicated on the drawings.
13. When placed in hard surfaces, such as sidewalk, parking areas, and driveway, all fire hydrants shall have a concrete collar around the lower barrel, 12" below the ground line with 1" of expansion joint material between the hydrant barrel and collar, as directed by the Engineer. The collar shall be 6 inches thick with a diameter of at least 24 inches. Diameter will be as wide as necessary to reach undisturbed earth. Fire hydrants shall be tested to 300 pounds hydrostatic pressure from inlet side with valve in both open and closed position.
14. Fire hydrants to be painted yellow above the grade line, and black below the grade line. The 5" cap to be painted to AWWA color code based on municipal GPM flow data.
15. Fire hydrants shall be designed so one man can easily remove or replace the working parts without removing the main valve seat.
16. Fire hydrants flags are optional, and only upon request of municipality.
17. Hydrant valve operating nut shall be 2-inch.
18. Hydrant lead shall be six (6) inch with MEGALUG mechanical joint restraint.
19. Fire Hydrants for private systems shall meet the above requirements, except shall be painted red above the grade line.

Gate Valves & Boxes

All gate valves shall be manufactured by East Jordan Iron Works (EJIW). All valves for use in water distribution systems shall be resilient seat, single wedge valves. The valves shall be in accordance with AWWA Specification C515 and shall also meet any supplemental requirements or specifications of the municipality. Valves used on this project shall have mechanical joints with stainless steel bolts. The valves shall be manually operated with non-rising stems, iron body, bronze trim, and be furnished with a standard AWWA 2 inch square-operating nut. The wrench nut shall turn right (clockwise) to open with red top and shall be indicated by an arrow cast on the operating nut skirt. Valve stem risers are required for depths greater than 6'-6" and will not be paid for separately.

All valve boxes shall be manufactured by EJIW**.** The valve box shall be cast iron, 5-½ inch diameter, and three-piece adjustable screw type. Valve box extensions are required for depths greater than 6'-6" and will not be paid for separately. No. 6 round bases are required for gate valves up 8" in diameter and No. 160 oval bases for gate valves 10" and greater. The drop covers shall be stamped "water".

Curb Stops/Boxes, Taps, and Services

The water service piping shall be copper tubing, 1" minimum, Type K, annealed, in accordance with ASTM B88. The size of tubing shall match the existing size of the water service being replaced. The fittings shall conform to ASTM B16.26, cast bronze. Joints of the copper tubing shall be compression or quick-joint. All water services to be constructed 90 degrees from water main to curb-stop/meter pit.

Taps:

1. For 1 inch residential service tap, a saddle is required. Use Ford #F-1000-4-Q-NL corporation with Ford stainless steel saddle FS300 series.
2. For larger than 1 inch service tap, use Ford #F series corporation and FS300 series saddle as appropriate.

Curb stops/boxes shall follow below:

1. Curb Stops shall be manufactured by Ford, Model #B-44-444-Q-NL for 1 inch ball-stop. Female thread x CTS – QJ or CTS – QJ x CTS – QJ.

2. Curb Stops shall be a maximum 5’ 6” deep.
3. Curb Stop Boxes shall be the Standard Arch Buffalo style patterns and all parts of the same, including extension sections, shall be interchangeable and fit up with corresponding parts of other Standard Arch Buffalo style pattern boxes.
4. Internal diameter of base shaft shall be 2-1/2 inches for 1 inch curb stop.
5. The boxes shall be cast iron, suitable coated to resist corrosion and the casting shall be smooth and free of any imperfections.
6. The covers shall overlap and fit outside the rim of the upper section, and they shall have a horseshoe-shaped groove in them to receive the bolt head and the word “water” embossed on the top surface.
7. All boxes shall be Tyler 6500 (2-1/2” Boxes) Series.
8. Any 360-degree valve curb stops found shall be removed and replaced.

Tracer Wire and Boxes

Tracer wire shall be #10 AWG polyethylene coated steel core copper wire for water main and #12 AWG polyethylene for plastic water service line, attached to pipe by tape or other approved means, and manufactured by Copperhead Industries, LLC – Copperhead Reinforced Tracer Wire, or equal. Tracer wire connectors must contain a dielectric waterproof and corrosion proof sealant, lock shut, and be color coded blue. (See MRWA Detail as in Tracer Wire Special Provision)

Tracer wire boxes shall be magnetized, with a direct connection to tracer wire without removing the cover, be color coded, and have a locking cover. Boxes shall be installed at every fire hydrant isolation valve (separate from the valve riser), and at every distribution water main isolation valve (separate from the valve riser) and shall be Copperhead Industries, LLC – Snake-Pit Magnetized Tracer Box, or equal.

CONSTRUCTION METHODS

Excavation

The Contractor shall excavate all material to the depths necessary to construct the water main as shown on the plans. Excavation shall include the removal of rock, dirt, abandoned pipelines, old foundations, meter pits, stumps and roots and similar materials encountered. Excavation, of whatever material encountered, shall be included in the contract unit prices for water main installation and will not be paid for separately. All excavated material shall be contractor responsibility for removal and disposal. Pavement removal and restoration will be paid for at the contract unit prices for the appropriate item in accordance with the 2020 MDOT Standard Specifications and Special Provisions.

Excavated material that is suitable for backfill material shall be neatly piled adjacent to the excavation so as to prevent cave-ins of the excavation and damage to adjacent trees, shrubs, fences, and other property.

The excavated area shall be kept free of water at all times. Sheeting and shoring shall be provided if necessary for the protection of the workers.

Excavated material that is not to be used as backfill shall be disposed of by the Contractor.

Backfilling shall follow immediately behind trench excavation and pipe laying operations. In no case shall more than 100 ft. of trench excavation be open at any one time. Any excavation left open and unattended shall be protected with lighted Type III barricades and a "snow fence" constructed around the perimeter of the excavation.

The Contractor shall excavate to the depths required to construct the water main and appurtenances as described on the plans. For water main construction, trench excavation shall be to a depth sufficient to provide a 5' 6” cover over the top of the pipe and a minimum four-inch sand cushion below the pipe. Over excavation will be at the Contractor's expense. The trench width at a level of twelve inches above the pipe shall be a minimum of 36 inches in width or as directed by the Director of Public Services or his designee.

In areas where the proposed construction may interfere with existing utilities, additional excavation may be required to determine the exact location of said existing utilities. This work will be included within the water main pay items and no additional compensation will be due to the Contractor for this work.

In some cases, the plans call for removing an existing water main or sewer in order to construct a new water main. All gate valve boxes shall be removed to at least 3 feet below the pavement surface under the road and to at least 12 inches below the planned grade outside the road. When required by construction specifications, the Contractor shall remove said existing pipelines and gate valve boxes and dispose of them at his expense. Old gate valves pulled by Contractor shall be turned over to the City of Owosso for further disposition.

Abandoned Water Mains. Where abandoned in place/ground, open ends of an abandoned pipeline shall be capped with a metallic cap, flowable filled, and bulk headed with one course of brick and mortar. Removal, disposal, flowable filling, and bulk heading of pipelines to be abandoned are included in Water Main, Abandon in Place pay item. The following exceptions apply:

- 4 inch abandoned mains not required for flowable filling material.
- 6 inch and larger abandoned mains will be abandon as shown as the plans

Abandoned Water Service Connections. Services no longer in use shall be abandoned at the curb-stop, with curb-stop in off position and buried. However, during street construction, abandoned services shall be removed back to the water main, with the corporation in the off position and capped, or the corporation removed entirely and replaced with a repair clamp.

Pipe Handling

Pipe shall be handled in such a manner as to prevent the ends from splitting, damages to the protective coatings, and other undesirable conditions. Pipe shall not be dropped, skidded, or rolled into other conditions. Repairs to damaged pipe must be approved by the City Engineer or authorized representative.

Pipe Cutting

Pipe cutting shall be done in a neat and workmanlike manner without damage to the pipe or lining and as to leave a smooth end at right angles to the axis of the pipe. Cutting shall be done by an approved mechanical saw or cutter. Hydraulic squeeze cutters are not acceptable.

Pipe laying

Pipe located inside structures shall be rigidly supported.

Pipe laid underground shall be uniformly supported through its entire length on a minimum four-inch cushion of sand. A depression shall be carved out of the sand cushion to accommodate the pipe bells.

Pipe laid at a depth with less than 5 1/2 foot of cover, shall be wrapped in Linear Low Density Polyethylene black (8-mil) Poly Wrap ANSI/AWWA C105/A21.5 ASTM D882, and encased with minimum 4-inch thick rigid Styrofoam board top and sides of pipe.

Pipe shall be inspected for defects, debris, or dirt while suspended in a sling prior to lowering it into the trench. Defective pipe shall be removed from the project site immediately. Lumps, blisters, and excess coal tar coating shall be removed from inside the bell and outside the spigot. These areas shall be wire brushed and wiped clean with a dry oil-free rag. No debris, tools, clothing, or other materials shall be allowed in the pipe.

Pipe shall be laid in a dry trench with bell ends facing in the direction of laying. After placing a length of pipe in the trench, and after installing the gasket and applying the gasket lubricant, the spigot end shall be centered in the bell and the pipe pushed home and brought to the correct line and grade. The pipe shall be secured in place by tamping granular material Class II around it. Precautions shall be taken to prevent dirt from entering the joint space. A watertight plug shall be inserted in the open end(s) of the pipe to prevent water, dirt, animals, or other foreign matter from entering the pipe.

When it is necessary to deflect pipe from a straight line, either horizontally or vertically, the deflection shall not exceed the following values:

Nominal Pipe Size (In.)	Mechanical Joint Maximum Deflection (In./18 ft. length
6	17
8	19
12	9

Jointing

Mechanical joints shall be installed in accordance with the joint manufacturer's recommendations. Copies of such recommendations shall be furnished to the Engineer prior to the start of construction.

Thrust Blocking

Thrust blocking shall be placed to support water main components as follows:

- at Tee's
- at 90 degree bends
- at 45 degree bends
- at dead end water mains

Backfilling

Backfilling shall be in accordance with the trench detail called for on the plans or as directed by the Engineer in accordance with the following:

Trench Detail G shall be used when part of the trench is within the 1 on 1 influence area of an existing or proposed roadway, sidewalk, driveway, building (or similar structure), or located within the right of way. The trench shall be backfilled with granular material Class II, in lifts of ten inches, and mechanically tamped to 95% of maximum unit weight.

Trench Detail F shall be used when the trench is not within the 1 on 1 influence area of a road or structure. The trench shall be backfilled with granular material Class III to a level of six inches above the top of the pipe and compacted to not less than 95% of maximum weight. The remaining portion of the trench shall be backfilled in twelve-inch lifts with suitable excavated material and compacted to at least 90% of maximum unit weight. Suitable excavated material used for backfill shall be free of rocks, debris, trees, stumps, broken concrete, and organic material. Backfill material shall not be saturated with water.

Where the proposed water main crosses under an existing utility, the proposed water main shall be deflected around the existing utility in accordance with the following:

1. Maintain 5' 6" cover over top of proposed water main.
2. Maintain at least 18" of vertical separation and 10' horizontal separation between the outside of the proposed water main and the outside of a sewer, drain pipe, or catch basin. Where less than 18 inches of vertical separation, encase water main in a concrete or plastic pipe. Where 10 LF of horizontal separation cannot be achieved, a variance shall be requested of the MDEQ/EGLE District Engineer.
3. Maintain at least one foot vertical separation between the outside of the proposed water main and all other utilities other than a sewer, storm drain, or catch basin.
4. When crossing an existing sewer, drain pipe, or catch basin lead, construct the proposed water main so that its joints are equidistant from the utility being crossed.
5. For carrier pipes less than six (6) inches in diameter, the inside diameter of the casing pipe shall be at least two (2) inches greater than the largest outside diameter of the carrier pipe joints or couplings. For carrier pipe six (6) inches or greater in diameter, the inside diameter of the casing pipe shall be at least four (4) inches greater than the largest outside diameter of the carrier pipe joints or couplings.
6. Centering devices shall be used when inserting the carrier pipe into the casing pipe.
7. All casing pipe ends that are below ground level shall be constructed as to prevent leakage of any substance from the casing throughout its length. Each end of the casing shall require a sufficient seal to prevent the potential for leakage of any substance from the casing pipe. Grout fill is an acceptable method installed by pressure grouting. If used, the grout material shall consist of non-shrink sand cement slurry or approved equal, and sufficiently seal the casing pipe ends to the satisfaction of the Engineer.

Hydrants

Hydrants shall be located as shown on the plans and approved by the municipality.
Use of bends in connection shall be approved by Engineer and municipality.
Bury depth shall be a 5 1/2 foot minimum. Six (6) inch hydrant leads shall be ductile iron with MEGALUG mechanical joint restraint.

Valves

Valves shall be located as shown on the plans and approved by the municipality. Valves placed in location without approval will require that the Contractor correct the error at his own expense.

Valve setting shall be examined by the Contractor prior to lowering in the trench. Check all nuts and bolts to assure tightness.

Valves shall be installed with the valve closed, supported on two 2" x 6" x 18" hardwood blocks, and vertically plumb. The valve box shall be set plumb and its axis shall be in line with the stem. Valve boxes shall have the ability for future adjustments of up to 6 inches, above or below grade.

Two isolation gate valves shall be installed at each 3-way intersection, and a three valve configuration at each 4-way intersection.

Isolation/gate valves should be located within each intersection for easy identification for the system operator. Spacing of these valves should be about 6 feet for quick and easy determination of directional isolation. As result, end points of new main/cross overs, shall be plugged, with a blow-off at each end point for appropriate disinfection & pressure testing. The new water main shall not be connected to the existing water main until pressure and disinfection testing has passed city requirements.

Reaction Backing

All tees and 90 degree bends, and other fittings subjected to unequal thrust shall be restrained using mechanical joint fittings with retainer glands on both sides of the bend or tee, and shall also be supported with thrust blocking. All 45 degree bends shall be restrained with mega lug fittings.

Boring and Jacking

1. Construct and maintain jacking/boring pits as required. Adequately clear site required for pits as needed to perform the work. Size pits for boring machine, frames, and reaction blocks, minimum 2 sections of pipe and with sufficient room for working. Provide steel safety ladder.
2. Locate pits such that no damage occurs to trees, poles (not specified for removal) or structures in the immediate area.
3. Construct pits with sheeting and bracing as required for proper support in accordance with O.S.H.A. Standards and as needed to sufficiently support reaction blocks.
4. Place crushed rock or approved bedding to sufficiently support equipment and protect pit floor.
5. A pushing or jacking frame shall be built and furnished to fit or match the end of the pipe to be jacked so that the pressure of the jacks will be evenly distributed over the end of the pipe.
6. The hydraulic jacks shall have sufficient power to apply a smooth and even pressure to move the pipe in place. Hammering or ramming of the pipe will not be allowed.
7. The pipe shall be jacked upgrade where possible.
8. The excavation shall be done within the inside of the pipe and shall not exceed 12” ahead of the pipe being jacked in place.
9. After each pipe section is in place the pipe shall be checked for correct grade and line. Pipe not meeting the correct grade and line shall be rejected and replaced.
10. Excavation at the top and sides may be approximately 1” greater than the outside periphery of the pipe.
11. The bottom of the excavation shall be accurately cut to line and grade.

12. Adjoining sections of pipe sleeve shall be attached with a continuous weld. Connecting steel pipe to concrete shall be completed with a poured in place concrete collar with reinforcement.

HYDROSTATIC PRESSURE TEST

All new construction shall be subjected to a hydrostatic pressure test. Testing should be performed as soon as possible after construction on a section is complete.

The Contractor shall provide all equipment, materials, and labor necessary to perform the tests, including pumps, gauges, plugs, corporations, excavation and backfill, water, miscellaneous piping and fittings, and a means of measuring the volume of water lost.

The Contractor shall fill the main with water through hydrants or corporations. Air shall be bled off at the ends and at highpoints through corporations or hydrants. The Contractor shall plug all taps made solely for the pressure test by inserting brass plugs.

Water shall be added until hydrostatic pressure at highest point of the main is at least 150 psig.

The Engineer shall be notified two hours prior to testing and shall witness the test and determine the leakage over a two hour period.

Water shall be added as necessary throughout the two hour test period to maintain a uniform pressure of 150 psi, plus or minus 5 psi.

At the end of the two hour period, the total volume of water added to maintain the required test pressure will be determined and will be the actual leakage in a two hour period.

The allowable leakage rate will be determined by the following formula:

$$L = \frac{S*D*((P)^{1/2})}{148{,}000}$$

Where:

L = Total allowable leakage rate (gal/hr).
S = **Total length of pipe tested, in feet.**
D = Nominal inside pipe diameter (inches).
P = Actual test pressure (p.s.i.g).
^1/2 = Square Root of P

Maximum leakage for 8 inch pipe = 1.3 gallons per two hours per 100 joints.

If actual leakage rate exceeds the allowable leakage rate, the Contractor at his own expense shall locate and repair the leak(s). Testing shall be repeated until satisfactory results are obtained.

The cost of pressure testing shall be included in the pay item for Water Main Pipe actually constructed.

STERILIZATION

General

1. All pipe and fittings connected to and forming a part of a potable water supply shall be sterilized in accordance with the AWWA Standard C651-14.

2. Generally, sampling taps shall be provided on the water main every five hundred (500) feet, in order to afford representative water testing and sample collection. When long transmission mains are constructed, without side connections, the distance between each tap may, at the discretion of the Engineer, be increased. In addition, blow off connections and sampling taps shall be provided at every endpoint of the water main to be tested. No connection to the existing potable water system will be allowed until the new water main is approved. In all instances, sampling taps shall be provided to collect a source sample and enough representative water samples for laboratory examination. Under no circumstances shall fire hydrants be used for sampling location.

Preliminary Flushing

The main shall be flushed prior to sterilization as thoroughly as possible with water pressure and outlets available. The main shall be flushed from the north gate valve first with the south gate valve closed, the north valve shall then be closed and the south valve opened. After the flushing is completed the plug for the 8 inch tee shall be installed. The minimum velocity in the main shall be 3.0 fps. The flushing operation shall be done after the pressure test has been made.

Disinfecting

1. Before being placed in service, all mains and existing piping disturbed in any manner by the work shall be disinfected in accordance with the AWWA Standard C651-14. Drawing the water from existing piping or even lowering the water pressure more than one-half will constitute disturbances of the piping.

2. The disinfecting of water mains, valves and other appurtenances incorporated into the main construction shall be done in accordance with the AWWA Standard C651-14.

3. During the disinfecting operation, valves, hydrants and other mechanical devices controlling the water shall be operated to permit full effectiveness of the disinfectant. Valves shall be manipulated so that the strong solution within the main being sterilized will not flow back into the supply line nor flow into mains already in service.

4. Dechlorination of chlorinated waters to surface water, storm sewer, or drain from hydrostatic testing and disinfection of new water mains, shall be required unless discharged to a sanitary sewer system with approval from the city of Owosso. ANSI/ AWWA 655 Field Dechlorination provides methods and procedures for dechlorination of chlorinated water discharges.

Final Flushing and Tests

1. After the required period of retention has elapsed, the heavily chlorinated water shall be flushed out completely discharged until the replacement water throughout the length of the main shall, upon test, be proven comparable in quality to the water supply source. Heavy chlorinated water shall be discharged to a nearby sanitary sewer manhole, with approval from the city of Owosso, if available, or a contractor provided holding tank for proper disposal.
2. The water in the treated main shall be proven comparable to that of the source. At least two (2) safe bacteriological samples collected 24 hours apart must be obtained from every 500 feet sections of WM, prior to placing each section WM section into service. In addition, blow off connections and sampling taps shall be provided at every endpoint of the water main to be tested. No connection to the existing potable water system will be allowed until the new water main is approved as properly disinfected and pressure tested. Samples shall be taken in the presence of the Department of Public Services. Under no circumstances shall such samples be collected from a fire hydrant and hose connections. Should the initial disinfecting fail to result in approval, the disinfecting procedure shall be repeated until satisfactory results are obtained.
3. Bacteriological samples must be picked up by the City of Owosso and forwarded to an approved commercial/state/municipal laboratory, and paid for by the Contractor. The city of Owosso may offer to provide this service with its existing laboratory facilities.

Summary of Testing Procedure:

1. Chlorinate the water main to roughly 50ppm chlorine for 24 hours
2. Flush the water main such that chlorine reduces to below 0.4ppm
3. Let water main sit for 24 hours
4. Take first test and wait 24 hours for results.
5. If first test fails, begin process over again. If test passes, take second test and wait 24 hours for results.
6. If second test fails, begin process over again. If test passes, water main can be put into service.

All testing must occur on consecutive days.

No more than three re-tests will be allowed due to high chlorine levels. Water main must be adequately flushed after third failed test.

Notification to Residents of Water Service Shutdowns

1. The City Engineer or designated representative shall notify Contractor of successful water sampling and testing acceptance for connecting to potable water system. Director of Public Services shall give notice to proceed with connection to potable water system.
2. After receiving Notice to Proceed, Contractor shall give a minimum 48 hour notice of planned water supply shut off for connection to potable water system.
3. City will determine affected area of planned water supply service interruption, and send out notices 24 hours prior to planned water service interruption.
4. Prior to planned water supply shut off, Contractor shall have performed a thorough investigation and review of necessary parts and components adequately sized, and available on site at time of connection to the potable water supply, to avoid unnecessary lengthy water service interruptions to residents and businesses.

The completed work of water main installation will be paid for at the contract unit prices for the actual quantity of the following contract items (pay items) actually constructed.

PAY ITEMS	PAY UNIT
_ inch Copper Service Lead, Type "K", Modified	Foot
Water Main, C909 PVC, _ inch, TB Detail _, Modified	Foot
Water Main, DI, _ inch, TB Detail _, Modified	Foot
Water Main, Rem	Foot
Connect to Existing Water Main	Each
Curb Box, Stop, _ inch Corporation Stop and Connection, Modified	Each
Fire Hydrant and Valve Assembly	Each
Gate Valve and Box, _ inch, Modified	Each
Hydrant, Rem	Each
Water Main, _ inch, Cut and Plug, Modified	Each
Testing and Chlorination of Water Main	LSUM
Existing Valve with Valve Box Abandonment	Each
Existing Valve with Valve Box Removal	Each

Water main will be paid for at the contract unit price for the actual length of water main installed in-place, for the various sizes and trench details called for. The contract unit price includes all labor, equipment, and materials necessary for the construction of the water main, including excavation, disposal, pipe, fittings, tees, crosses, hydrant tees, bends, plugs, reducers, thrust blocking, connections to the existing mains, backfill, snow fencing and barricading, locating and protecting existing utilities, repair of defective work, and cleanup.

Water main will be measured horizontally in linear feet along the centerline of the main, including the length of valves, sleeves, and fittings. Measurements will begin and end at connections, plugs, or the centerline of a perpendicular pipeline.

Testing and Chlorination will be paid for at the contract price upon completion and acceptance of the proposed water main and all tie ins. The contract unit price includes all labor, equipment, and materials necessary for hydrostatic pressure testing, disinfecting, and bacteriological testing of the proposed water main and appurtenances.

Connections to Existing Water Main will be paid for at the contract unit price for each connection made. Payment will include all labor, equipment, and materials necessary to connect the proposed water main to existing water mains, including connections to oversized and undersized pipe. Additional payment will not be made for any/all necessary coordination with the Department of Public Services or any exploratory excavation that is required to connect the proposed water main to the existing water mains.

Existing Valve with Valve Box Abandonment and Existing Valve with Valve Box Removal will be paid for at the contract unit price for each valve box abandoned or removed in accordance with the detail on the plans or as directed by the Engineer. Payment shall include all labor, equipment, and materials necessary to abandon or remove the valve box.

Fire hydrant and valve assembly with box will be paid for at the contract unit price for each assembly installed. Payment will include furnishing and installing the hydrant, valve, valve box, connection, and lead. Excavation, thrust blocking, and backfill are all incidental to the contract unit price for hydrant and valve assembly with box.

Gate valves, of the size required will be paid for at the contract unit price for each installed. The price includes excavation, installation of manhole or box, removal of valve and box to be replaced, anchorage, and backfill.

Cutting and Plugging of Water Main will be paid for at the contract unit price for each cut and plug made and flowable fill. Payment will include all labor, equipment, and materials necessary to shore up the existing water main.

_ inch Copper Service Lead, Type "K", Modified will be paid for at the contract unit price per foot of service lead install. The price includes furnishing and installing copper service lines. Installation method shall be open cut for short side service lines and directional boring for long side service lines. Both installation methods shall be included in the contract unit price.

Curb Box, Stop, _ inch Corporation Stop and Connection, Modified will be paid for at the contract price per each and include furnishing and installing a new curb box, stop, corporation stop (including tap into new water main). The price also includes the connection into the existing water service line on the property side of the curb stop.

Glenn M. Chinavare

Director of Public Services & Utilities Effective: 31 January 2018

Last update 27 January 2025

CITY OF OWOSSO
SPECIAL PROVISION
FOR
TRACE WIRE

a. Description. Work consists of the installation of trace wire and access boxes on new water main and water service lines composed of non-metallic materials (such as PVC, PEX, HDPE, etc), as required in the Contract Documents and as directed by the Engineer. This work includes furnishing all labor, materials, and equipment necessary to complete the installation of trace wire and access boxes.

b. Materials. All trace wire and trace wire products shall be domestically manufactured in the U.S.A. All trace wire shall be HDPE insulation intended for direct bury and be color coated per APWA standard for the specific utility being marked.

For open cut and directional drilling/boring water main applications, trace wire shall be #10 AWG Copper Clad Steel, High Strength with minimum 1,150 lb. break load, with minimum 30 mil HDPE insulation thickness.

For water service line applications, trace wire shall be #10 AWG Copper Clad Steel, Extra High Strength with minimum 1,150 lb. break load, with minimum 30 mil HDPE insulation thickness.

For pipe bursting/slip lining applications, trace wire shall be 7 x 7 Stranded Copper Clad Steel, Extreme Strength with 4,700 lb. break load, with minimum 50 ml HDPE insulation thickness.

All mainline trace wires must be interconnected in intersections, at mainline tees and mainline crosses. At tees, the three wires shall be joined using a single 3-way lockable connector. At Crosses, the four wires shall be joined using a 4-way connector. Use of two 3-way connectors with a short jumper wire between them is an acceptable alternative.

Direct bury wire connectors shall include 3-way lockable connectors and mainline to lateral lug connectors specifically manufactured for use in underground trace wire installation. Connectors shall be dielectric silicon filled to seal out moisture and corrosion and shall be installed in a manner so as to prevent any uninsulated wire exposure.

Non-locking friction fit, twist on or taped connectors are prohibited.

All trace wire termination points must utilize an approved trace wire access box (above ground access box or grade level/in-ground access box as applicable), specifically manufactured for this purpose.

All grade level/in-ground access boxes shall be appropriately identified with “water” cast into the cap and be color coded.

A minimum of 2 ft. of excess/slack wire is required in all trace wire access boxes after meeting final elevation.

All trace wire access boxes must include a manually interruptible conductive/connective link between the terminal(s) for the trace wire connection and the terminal for the grounding anode wire connection.

Grounding anode wire shall be connected to the identified (or bottom) terminal on all access boxes.

For service laterals on public property, trace wire must terminate at an approved grade level/in-ground trace wire access box, located at the edge of the road right-of-way, and out of the roadway.

For service laterals on private property, trace wire must terminate at an approved above-ground trace wire access box, affixed to the building exterior directly above where the utility enters the building, at an elevation not greater than 5 vertical feet above finished grade, or terminate at an approved grade level/in-ground trace wire access box, located within 2 linear feet of the building being served by the utility.

For hydrants, trace wire must terminate at an approved above-ground trace wire access box, properly affixed to the hydrant grade flange. (affixing with tape or plastic ties shall not be acceptable).

For long-runs, more than 500 linear feet without service laterals or hydrants, trace wire access must be provided utilizing an approved grade level/in-ground trace wire access box, located at the edge of the road right-of-way, and out of the roadway. The grade level/in-ground trace wire access box shall be delineated using a minimum 48” polyethylene marker post, color coded per APWA standard for the specific utility being marked.

Trace wire must be properly grounded at all dead ends/stubs.

Grounding of trace wire shall be achieved by use of a drive-in magnesium grounding anode rod with a minimum of 20ft of #14 red HDPE insulated copper clad steel wire connected to anode (minimum 0.5 lb.) specifically manufactured for this purpose and buried at the same elevation as the utility.

When grounding the trace wire at dead ends/stubs, the grounding anode shall be installed in a direction 180 degrees opposite of the trace wire, at the maximum possible distance.

When grounding the trace wire in areas where the trace wire is continuous and neither the mainline trace wire or the grounding anode wire will be terminated at/above grade, install grounding anode directly beneath and in-line with the trace wire. Do not coil excess wire from grounding anode. In this installation method, the grounding anode wire shall be trimmed to an appropriate length before connecting to trace wire with a mainline to lateral lug connector.

Where the anode wire will be connected to a trace wire access box, a minimum of 2 ft. of excess/slack wire is required after meeting final elevation.

The following products have been deemed acceptable and appropriate. These products are a guide only to help you choose the correct applications for your tracer wire project.

Trace Wire:

- Copper clad Steel (CCS) trace wire
- Open Trench and Directional Drilling/Boring - Copperhead Extra High Strength part # 1045*EHS
- Pipe Bursting/Slip Lining – Copperhead SoloShot Extreme Strength 7 x 7 Stranded part # PBX-50

Connectors:

- Copperhead 3-way locking connector part # LSC1230*
- DryConn 3- way Direct Bury Lug: Copperhead Part # 3WB-01

Termination/Access Box:

- Non-Roadway access boxes applications at valve boxes, curb stop boxes, and fire hydrants: Trace wire access boxes Grade level Copperhead adjustable lite duty Part # LD14*TP
- Concrete / Driveway access box applications at valve boxes and curb stop boxes: Trace wire access boxes Grade level Copperhead Part # CD14*TP 14”
- At water service line entrance to building: Trace wire access box above ground 2 terminals with jumper – 1 tracer wire connection plus 1 ground connection. Copperhead part #T2-* with T3-STAKE

Grounding:

- Drive in Magnesium Anode: Copperhead Part # ANO-1005 (1.5 lb)

The following products and methods **shall not** be allowed or acceptable

- Uninsulated trace wire
- Trace wire insulations other than HDPE
- Trace wires not domestically manufactured
- Non locking, friction fit, twist on or taped connectors
- Brass or copper ground rods
- Wire connections utilizing taping or spray-on waterproofing
- Looped wire or continuous wire installations, that has multiple wires laid side-by-side or in close proximity to one another
- Trace wire wrapped around the corresponding utility
- Brass fittings with trace wire connection lugs
- Wire terminations within the roadway, i.e. in valve boxes, cleanouts, manholes, etc.
- Connecting trace wire to existing conductive utilities
- Installing trace wire inside valve box or stop box

c. Construction. Trace wire installation shall be performed in such a manner that allows proper access for connection of line tracing equipment, proper locating of wire without loss or deterioration of low frequency (512Hz) signal for distances in excess of 1,000 linear feet, and without distortion of signal caused by multiple wires being installed in close proximity to one another.

Trace wire systems must be installed as a single continuous wire, except where using approved connectors. No looping or coiling of wire is allowed.

Any damage occurring during installation of the trace wire must be immediately repaired by removing the damaged wire, and installing a new section of wire with approved connectors. Taping and/or spray coating shall not be allowed.

Trace wire shall be installed at the bottom half of the pipe and secured (taped/tied) at 5’ intervals.

Trace wire must be properly grounded as specified.

Trace wire on all service laterals/stubs must terminate at an approved trace wire access box located directly above the utility, at the edge of the road right-of-way, but out of the roadway.

At all mainline dead-ends, trace wire shall go to ground using an approved connection to a drive-in magnesium grounding anode rod, buried at the same depth as the trace wire.

Mainline trace wire shall not be connected to existing conductive pipes. Treat as a mainline dead-end, ground using an approved waterproof connection to a grounding anode buried at the same depth as the trace wire.

All service lateral trace wires shall be a single wire, connected to the mainline trace wire using a mainline to lateral lug connector, installed without cutting/splicing the mainline trace wire.

In occurrences where an existing trace wire is encountered on an existing utility that is being extended or tied into, the new trace wire and existing trace wire shall be connected using approved splice connectors and shall be properly grounded at the splice location as specified.

A mainline trace wire must be installed, with all service lateral trace wires properly connected to the mainline trace wire, to ensure full tracing/locating capabilities from a single connection point.

Lay mainline trace wire continuously, by-passing around the outside of valves and fittings on the North or East side.

Trace wire on all water service laterals must terminate at an approved trace wire access box color coded blue and located directly above the service lateral at the edge of road right of way. Trace wire box must be visible above ground.

Above-ground tracer wire access boxes will be installed on all fire hydrants.

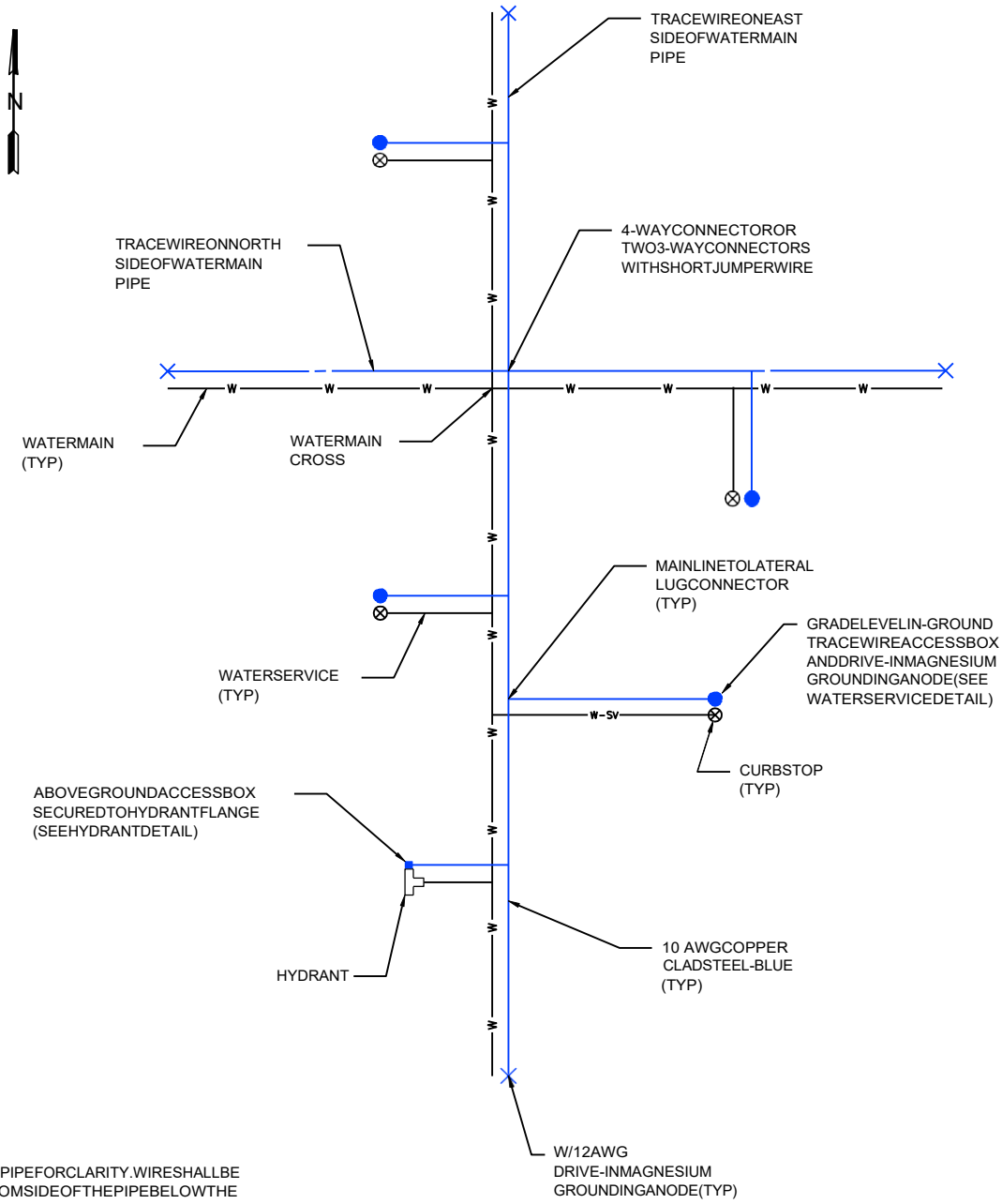
All conductive and non-conductive service lines shall include tracer wire.

All new trace wire installations shall be located using typical low frequency (512Hz) line tracing equipment, witnessed by the contractor, engineer and facility owner as applicable, prior to acceptance of ownership.

This verification shall be performed upon completion of rough grading and again prior to final acceptance of the project.

Continuity testing in lieu of actual line tracing shall not be accepted.

d. Measurement and Payment. All equipment, material, and labor required to install trace wire shall not be paid for separately but will be included in the costs for water main pay items.



NOTES:
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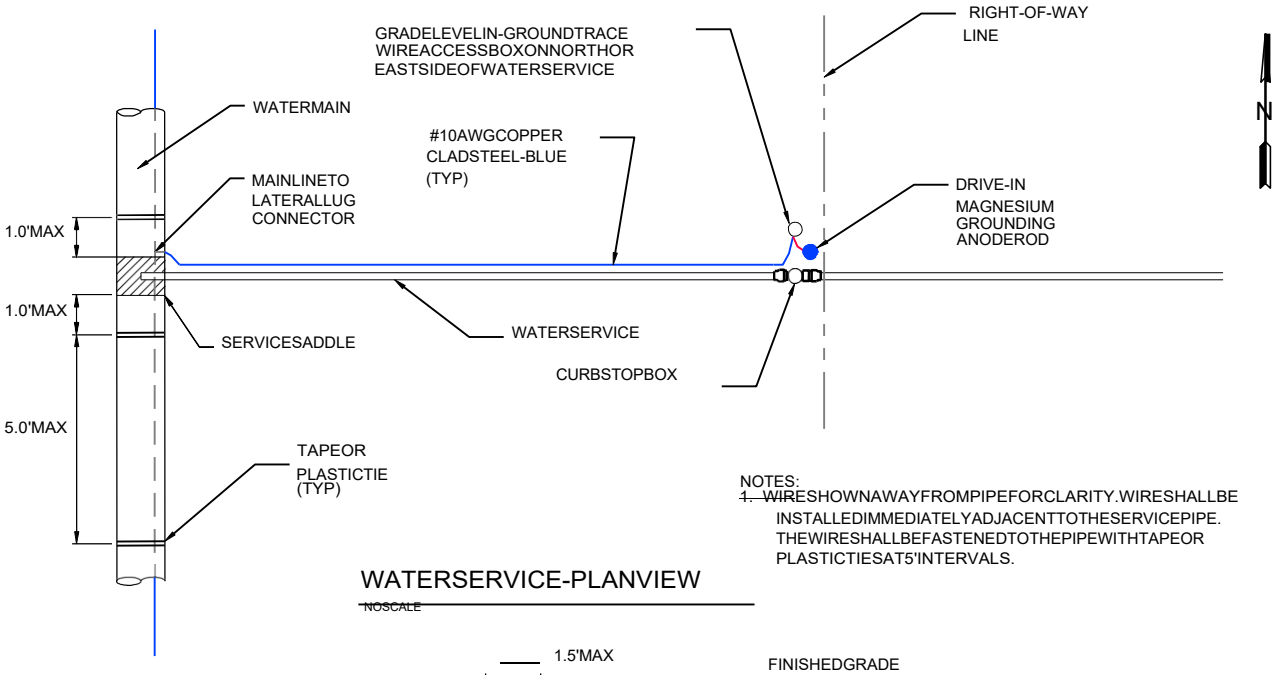
TRACEWIREPLAN(WATER)

NOSCALE

MICHIGAN RURALWATERASSOCIATION
STANDARDDETAIL

TRACEWIRE
SAMPLEWATERPLAN

May, 2022
6 of 8



NOTES:
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WATERSERVICE-PLANVIEW

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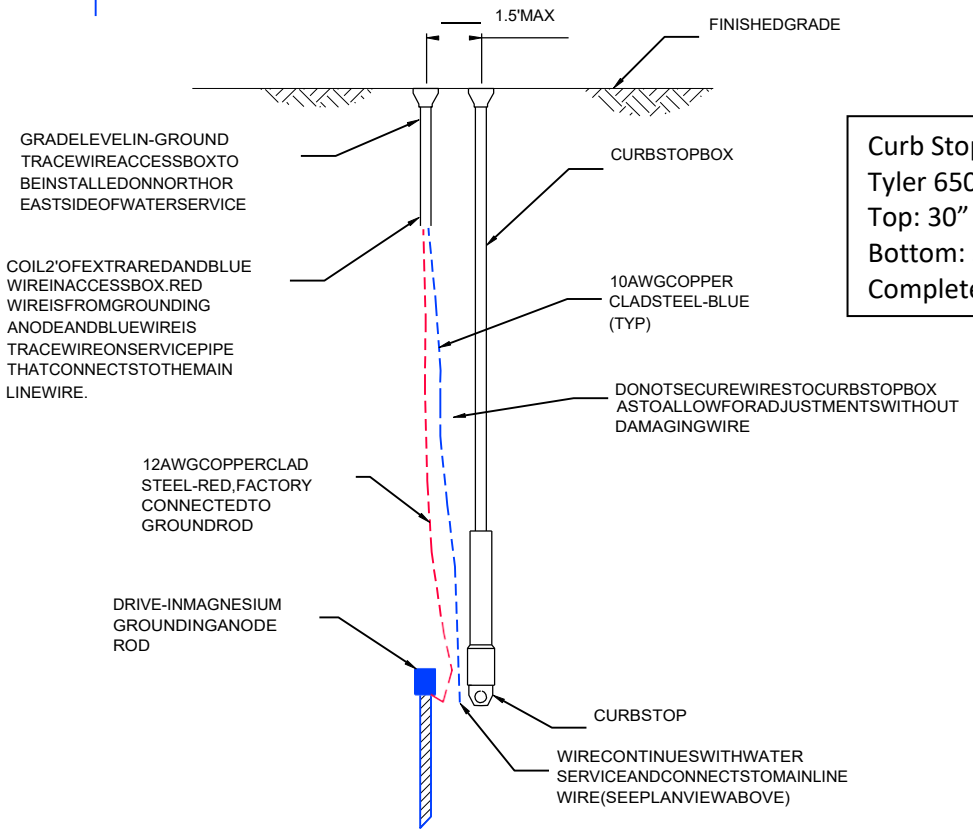


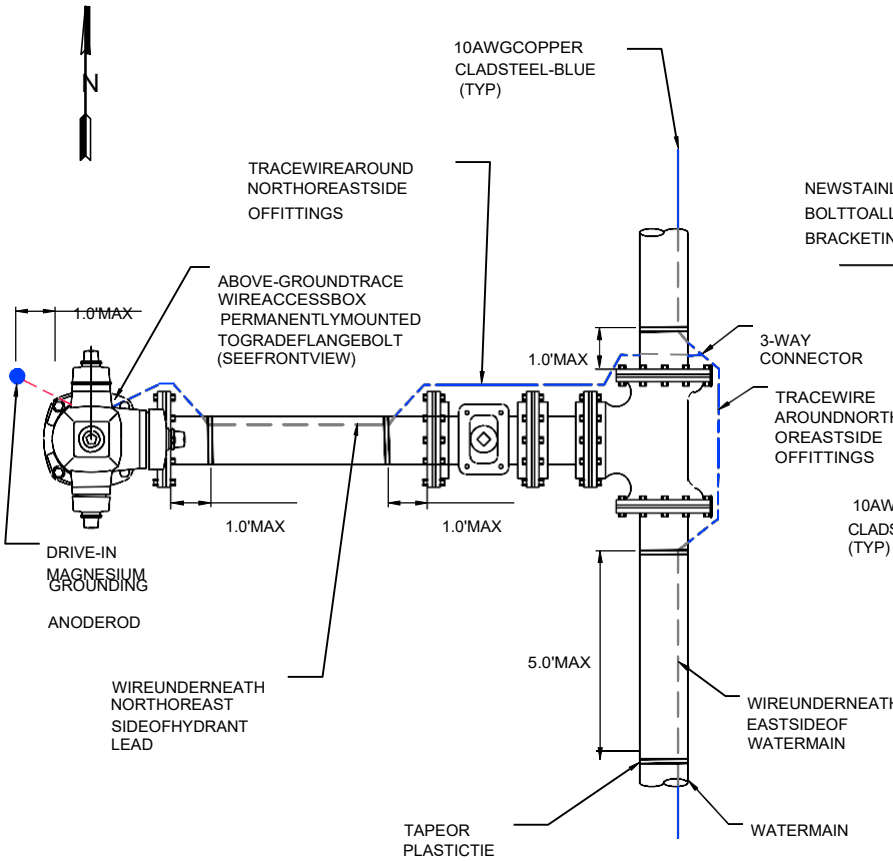
Curb Stop Box Assembly:
Tyler 6500 Domestic Series
Top: 30” Top w/ lid #147763
Bottom: 39” Base #147763
Complete Unit: #147251

WATERSERVICE-SECTIONVIEW

NOSCALE

MICHIGAN RURALWATERASSOCIATION STANDARDDETAIL

TRACEWIRE
WATER SERVICE
DETAIL May, 2022
7 of 8



HYDRANT-PLANVIEW

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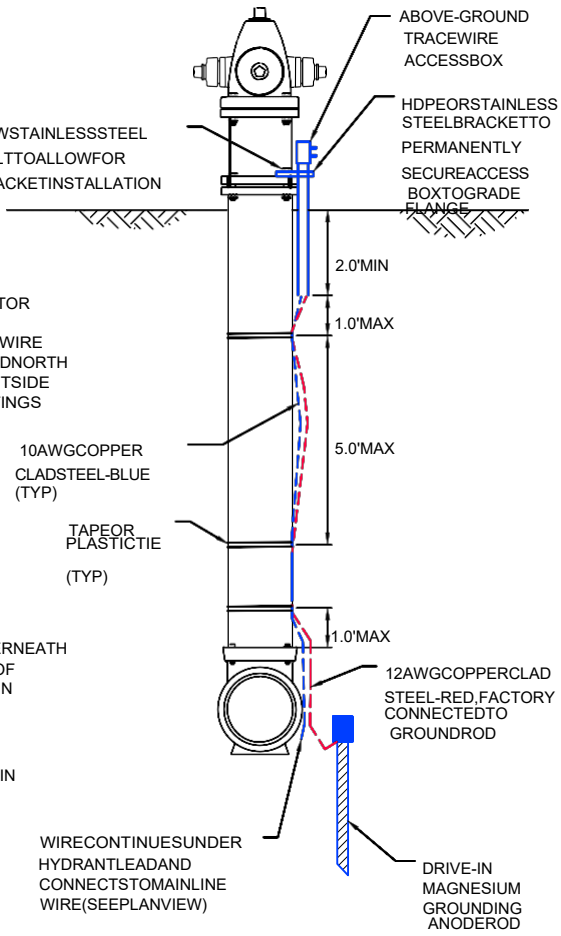


HYDRANT-SECTIONVIEW

NOSCALE

MRWA Quality On Tap!

MICHIGAN
RURALWATERASSOCIATION
STANDARDDETAIL 8 of 8

TRACEWIRE
HYDRANTDETAIL

CITY OF OWOSSO

SPECIAL PROVISION
FOR
INSTALL METER PIT, COMPLETE

a. Description. Work consists of the installation of a new water meter pit or replacement of an existing water meter pit, as required in the Contract Documents and as directed by the City of Owosso and Engineer. This work includes furnishing all labor and equipment required for the excavation, installation, backfilling, and all related work necessary to complete the water meter pit installation.

b. Materials. Water meter pit materials are identified on the Typical Meter Pit Detail on the following page. The City of Owosso will provide all new materials for the installation of the meter pits. Contractor shall claim the value of materials on their taxes and shall pay a 6% use tax on the value of the materials.

c. Construction. Water meter pits are to be installed in lawn areas that are not subject to vehicular traffic. Construct meter pit in accordance with the Typical Meter Pit Detail. The City of Owosso will pull the existing meter from the meter pit to be removed and reinstall the meter in the new pit. The Contractor shall not handle or install the water meter or the meter transmission unit (MTU).

The City of Owosso may assist with the installation of meter pits.

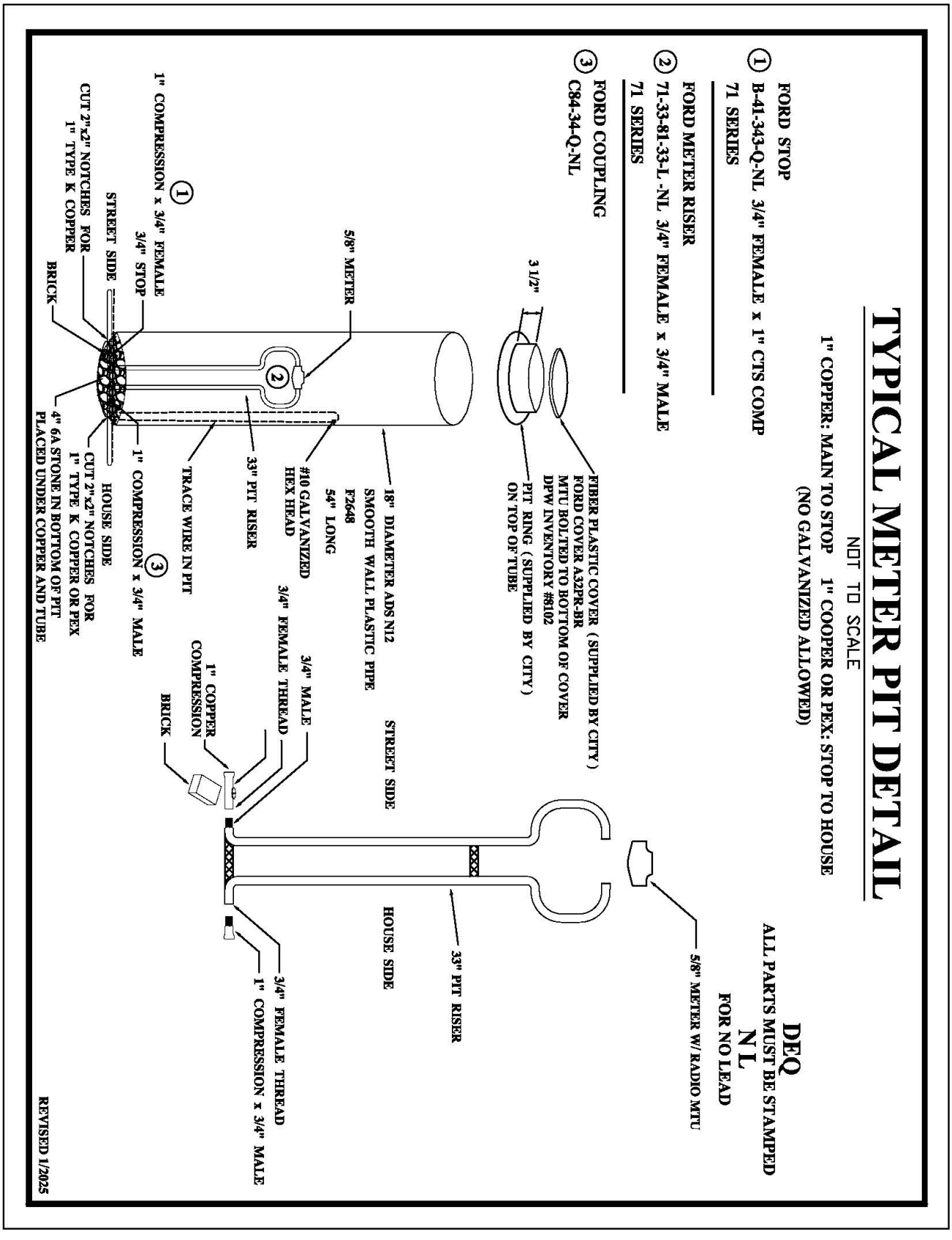
Existing meter pits may be eliminated with the meter being reinstalled inside the dwelling if determined feasible by the City of Owosso. All meter installs will be completed by the City.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following contract pay item:

Pay Item	**Pay Unit**
Install Meter Pit, Complete	Each

Install Meter Pit, Complete will be measured in place by the unit Each and will be paid for at the contract unit price per Each. The unit price shall include verifying location of existing water service; notification of temporary service disruption; coordinating meter install with City of Owosso; picking up new materials from City of Owosso; excavation; bedding, installing meter pit; providing, placing, and compacting backfill; disposal of excess material; and adjustment of meter pit to finished grade. Materials shall be provided by City of Owosso at no charge to Contractor.

Removal of existing meter pit shall be paid for as Water Meter Pit, Rem.


TYPICAL METER PIT DETAIL
NOT TO SCALE
1" COPPER: MAIN TO STOP 1" COOPER OR PEX: STOP TO HOUSE
(NO GALVANIZED ALLOWED)
DEQ
ALL PARTS MUST BE STAMPED
NL
FOR NO LEAD
FORD STOP
① B-41-343-Q-NL 3/4" FEMALE x 1" CTS COMP
71 SERIES
FORD METER RISER
② 71-33-81-33-L -NL 3/4" FEMALE x 3/4" MALE
71 SERIES
FORD COUPLING
③ C84-34-Q-NL
3 1/2"
FIBER PLASTIC COVER (SUPPLIED BY CITY)
FORD COVER A32PR-BR
MTU BOLTED TO BOTTOM OF COVER
DPW INVENTORY #8102
PIT RING (SUPPLIED BY CITY)
ON TOP OF TUBE
5/8" METER W/ RADIO MTU
5/8" METER
18" DIAMETER ADS N12
SMOOTH WALL PLASTIC PIPE
F2648
54" LONG
STREET SIDE
#10 GALVANIZED
HEX HEAD
3/4" MALE
3/4" FEMALE THREAD
33" PIT RISER
33" PIT RISER
HOUSE SIDE
TRACE WIRE IN PIT
1" COPPER
COMPRESSION
BRICK
1" COMPRESSION x 3/4" MALE
3/4" FEMALE THREAD
1" COMPRESSION x 3/4" MALE
1" COMPRESSION x 3/4" FEMALE
3/4" STOP
STREET SIDE
HOUSE SIDE
CUT 2"x2" NOTCHES FOR
1" TYPE K COPPER
BRICK
CUT 2"x2" NOTCHES FOR
1" TYPE K COPPER OR PEX
4" 6A STONE IN BOTTOM OF PIT
PLACED UNDER COPPER AND TUBE
REVISED 1/2025

CITY OF OWOSSO
SPECIAL PROVISION
FOR
CONCRETE PAY ITEMS

City of Owosso/CW 1 OF 1 January, 2022

a, Description. This work shall be done in accordance with section 1004 of the MDOT 2020 Standard Specifications for Construction, except as modified herein. This special provision indicates the type of concrete mixture to be used for pay items related to curb and gutter, drive approaches, and sidewalks.

b. Materials. Cement content for Concrete, Grade 3500, shall be 564 pounds per cubic yard (6 Sack) for all concrete items, in accordance with Sections 1004 of the MDOT 2020 Standard Specifications for Construction. Concrete mix shall not include fly ash.

c. Construction. Construction of concrete related items including but not limited to curb and gutter, driveways, sidewalks, ADA ramps shall be done in accordance with the MDOT 2020 Standard Specifications for Construction, or as directed by the Engineer.

d. Measurement and Payment. Payment for the completed work for the various concrete pay items in this contract using a six full sack mix shall be included as part of their individual unit prices.