

## **SECTION 02645 – HYDRANTS AND FLUSHING ASSEMBLIES**

### **PART 1 - GENERAL**

#### **1.01 SUMMARY**

- A. This section provides requirements for the furnishing and installation of hydrants and flushing assemblies.

#### **1.02 SPECIFICATION MODIFICATIONS**

- A. It is understood that throughout this section these Specifications may be modified by appropriate items in Section 01015 – Specific Project Requirements or as otherwise indicated on the Contract Drawings.

#### **1.03 RELATED SECTIONS**

- A. Section 01000 – General Project Requirements.
- B. Section 01015 – Specific Project Requirements.
- C. Section 01300 – Submittals.
- D. Section 02250 – Trenching, Pipe Embedment and Backfill.
- E. Section 02618 – Ductile Iron Pipe Water Mains.
- F. Section 02669 – Thrust Restraints.
- G. Section 05012 – Water Casting

#### **1.04 CODES AND STANDARDS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.
- B. American Water Works Associations (AWWA):
  - AWWA C111/A21.11-17 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
  - AWWA C502 Dry-Barrel Fire Hydrants.
- C. Federal Screw Thread Standard H28

#### **1.05 DEFINITIONS**

- A. Bury line: The location on the lower barrel of the hydrant that intersects with the finished grade.
- B. Cover: The distance from the ground line to the top of the connecting pipe.
- C. Hydrant Trench Depth: The distance from the bottom of the hydrant base to the finished grade (bury line).

#### **1.06 MATERIALS PROVIDED BY THE CITY**

- A. City shall provide Kupferle Foundry Eclipse #88 drinking water sampling station.
- B. Additional materials provided by the City shall be as indicated in Section 01015 – Specific Project Requirements.

#### **1.07 SUBMITTALS**

- A. Submit as specified in Section 01300 – Submittals and as required herein.
- B. Shop Drawings:
  - 1. Hydrants.

- C. Product Data:
  - 1. Submit catalog cuts and dimension data.
- D. Other Submittals:
  - 1. Manufacturer's experience as requested by City.

#### 1.08 QUALITY ASSURANCE

- A. The Contractor is responsible for the quality assurance and quality control of the Work as per Section 01000 – General Project Requirements.
- B. Manufacturer:
  - 1. The manufacturer shall be a company specializing in manufacturing the Products specified in this Section with a minimum of five (5) years manufacturing experience of the specified Products.
  - 2. Manufacturer shall prove that their Products have been in reliable service for at least five (5) years.

#### 1.09 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Follow the provisions for delivery, storage, protection, and handling Products to the site and on site as provided in Section 01000 – General Project Requirements.
- B. After the units on site, inspect for damage and inventory.
- C. Packaging:
  - 1. All hydrants shall be bundled in a group no larger than three (3) hydrants wide by three (3) hydrants high. All hydrants shall be shipped with the hydrant base inlet pointing down. All hydrants shall be separated wood framing adequate to prevent the hydrants from touching the ground or each other. Binding the hydrants together shall be a band or wrap adequate to per handling of the hydrant bundles with a crane truck or a forklift. All hydrants shall be delivered with the hydrant nozzle cap installed.
- D. Delivery:
  - 1. The Yard Store shall receive a notice of shipping at least 2 days prior to shipping the hydrants. All hydrants shall be delivered to the Yard Store, 2409 E. 18<sup>th</sup> Street, Kansas City, Missouri, 64127. Before payment is made on all deliveries, Engineering may be notified and the shipment inspected by Engineering or their designee for compliance with this specification.

### PART 2 - PRODUCTS

#### 2.01 APPROVED HYDRANT MANUFACTURERS AND MODEL

- A. Medallion Hydrant, as manufactured by Clow Valve Company.
- B. Regent 129i, as manufactured by M&H Valve Company.
- C. Super Centurion 200, as manufactured by Mueller Company.
- D. QPL245 Nostalgic Style Fire Hydrant – Model 2760, as manufactured by American AVK Company.
- E. WaterMaster as manufactured by EJ Company.

#### 2.02 HYDRANTS

- A. Hydrants shall be the current Kansas City, Missouri pattern hydrants manufactured specifically for the City of Kansas City, Missouri.

- B. No changes or modifications to an approved hydrant shall be made by the hydrant manufacturer without prior written approval from the City.
- C. All hydrants shall be designed and manufactured in strict compliance with AWWA C502 unless otherwise approved.
- D. All hydrants shall be the traffic model type that incorporates a breakaway or traffic flange.
- E. Pump nozzle: hydrants shall have one (1) pumper nozzle located in the horizontal plane.
- F. The upper barrel and lower barrel shall be sealed by an EPDM rubber gasket or O-ring.
- G. Hydrant base:
  - 1. The hydrant base shall be provided with a mechanical joint inlet to accommodate 6-inch diameter ductile iron pipe, in accordance with AWWA C111.
  - 2. The hydrant shall be supplied with necessary accessories for the mechanical joint.
- H. Main valve of the hydrant shall be 5-1/4-inch diameter compression type, which closes with water pressure.
- I. Operating nut:
  - 1. The operating nut shall be a truncated pentagon, 1-1/2 inches on the bottom, 1-7/16 inches on the top, with a finished height of 1-1/8 inches. See Detail 02645-5 – Operating Nut (Stem Nut).
- J. Bonnet:
  - 1. The bonnet shall be so constructed that the opening nut shall not travel during opening and closing the hydrant.
  - 2. The bonnet shall house a Viton gasket or O-ring seal between the opening nut and the bonnet to prevent moisture and foreign material from entering the lubricant reservoir.
  - 3. The bonnet shall also house Viton gasket or O-ring seal between the bonnet and the upper stem to retain the lubricant in the reservoir.
- K. Tamper proof shield: the hydrant shall be supplied with a tamper resistant shield for the operating nut. The shield shall be in accordance with the detail, 02645-6 – Security Style Hold Down Nut.
- L. Direction of operation: the hydrant shall open by turning the operating nut to the right (in a clockwise direction when viewing the hydrant from above).
- M. Pumper nozzle threads:
  - 1. The pumper nozzle threads shall be in accordance with the Federal Screw Thread Standard H28, Section 10, American National Hose Coupling and Fire Hose Coupling Threads.
  - 2. The pumper nozzle shall have right-hand threads and have a 4-inch nominal diameter with 4 (four) threads per inch.
  - 3. The nozzle threads shall be lightly greased from factory with a suitable food grade lubricant.
- N. Nozzle Cap:
  - 1. Nozzle cap shall be cast iron and shall be furnished with a synthetic rubber installed in a retaining groove in the inside of the cap.
  - 2. The dimensions and shape of the nozzle cap nut shall be the same as the operating nut as shown on Detail 02645-5 – Operating Nut (Stem Nut), except with a finished height of 1-inch.

O. Exterior Coatings:

1. The exterior of the hydrant above the bury line, nozzle caps, the bonnet, hydrant extensions and the hydrant base shall be powder coated with epoxy or Triglycidyl Isocyanurate (TGIC) polyester.
2. If epoxy powder is used, it shall be top-coated with a UV resistant, high-gloss acrylic polyurethane paint.
3. The exterior of the hydrant below the bury line shall be coated with an asphalt varnish with a film thickness of at least 10 mils.

P. Hydrant Color Coding:

1. Manufacturer applied coatings shall comply with paragraph EXTERIOR COATINGS.
2. Barrel section of the hydrant:
  - (a) Manufacturer-applied.
  - (b) International Orange.
  - (c) Gloss finish.
3. Hydrant extensions:
  - (a) Manufacturer-applied.
  - (b) International Orange.
  - (c) Gloss finish.
4. Nozzle caps:
  - (a) Manufacturer applied.
  - (b) Black.
  - (c) Gloss finish.
5. Bonnet sections:
  - (a) Manufacturer applied:
    - (i) Black.
    - (ii) Gloss finish.
  - (b) Field painted bonnet sections:
    - (i) Reference paragraph HYDRANT INSTALLATION.
    - (ii) Hydrants connected to mains less than 6-inches.:
      - a. Contractor applied.
      - b. Red (Krylon 5814 or approved equal).
      - c. Gloss finish.
    - (iii) Hydrants connected to mains equal to 6-inches and less than 12-inches:
      - a. Manufacturer applied black, gloss finish.
    - (iv) Hydrants connected to mains 12-inches or larger mains:
      - a. Contractor applied.
      - b. Green (Krylon 5816 or approved equal).
      - c. Gloss finish.
6. This color-coding is intended to provide firefighters and other emergency workers a permanent, quick visual reference to indicate the size of water main connected to each hydrant.

Q. Interior Coatings:

1. All non-thread, non-machines interior surfaces of the hydrant base shall be coated with a wet-applied NSF/ANSI/CAN 61 certified white potable epoxy or powder coated with an NSF/ANSI/CAN 61 certified white epoxy.

R. Hydrant Extensions:

- (a) Hydrant extensions (spool pieces), if shown on the Drawings or requested and approved by the City, shall be a complete assembly allowing for the hydrant's height to be adjusted in six (6) inch increments.
- (b) The assembly shall be furnished with instructions and all required accessories necessary to adjust the height of the hydrant and maintain the hydrant's traffic feature.
- (c) Hydrant extensions shall be coated in accordance with paragraphs EXTERIOR COATINGS and HYDRANT COLOR CODING.

S. External Hardware:

1. All external hardware shall be 304 or 316 stainless steel.
2. The lower hydrant stem from the break-away coupling to the main valve and any attaching hardware securing the main valve assembly to the lower stem shall be 304 or 316 stainless steel. Any cross pins securing any part of the main valve assembly or break away stem coupler shall be 420 stainless steel. The lower stem nut may be integral to the lower valve plate or main valve assembly.
3. Main Valve Assemblies:
  - (a) Main valve assemblies shall be of either three-piece (upper valve plate, main valve seat, lower valve plate) or one-piece EPDM encapsulated ductile iron design.
  - (b) The lower valve plate of three-piece design main valve assemblies shall be powder coated with an NSF/ANSI/CAN 61 certified epoxy.
4. Seat Ring:
  - (a) The upper surface of the seat ring shall have raised lugs allowing for positive engagement of a hydrant disassembly tool.
  - (b) The raised lugs shall be of sufficient design to allow for the removal of the seat ring.

T. Shop Drawings:

1. Prior to manufacturing the hydrants, the manufacture shall submit shop drawings for approval in accordance with paragraph SUBMITTALS.

## 2.03 FLUSHING ASSEMBLIES

- A. See detail 02645 4.
- B. Mechanical joint plug: Drilled and tapped for 2-inch standard pipe threads.
- C. Elbows and outlet pipe: standard weight galvanized pipe and fittings.
- D. All discharge piping shall have a 2-inch PVC cap on top.

## 2.04 POLYETHYLENE ENCASEMENT

- A. As specified in Section 02618 – Ductile Iron Pipe Water Mains.

## PART 3 - EXECUTION

### 3.01 EXCAVATION

- A. Excavation shall be in conformance with Section 02250 – Trenching, Pipe Embedment and Backfill.

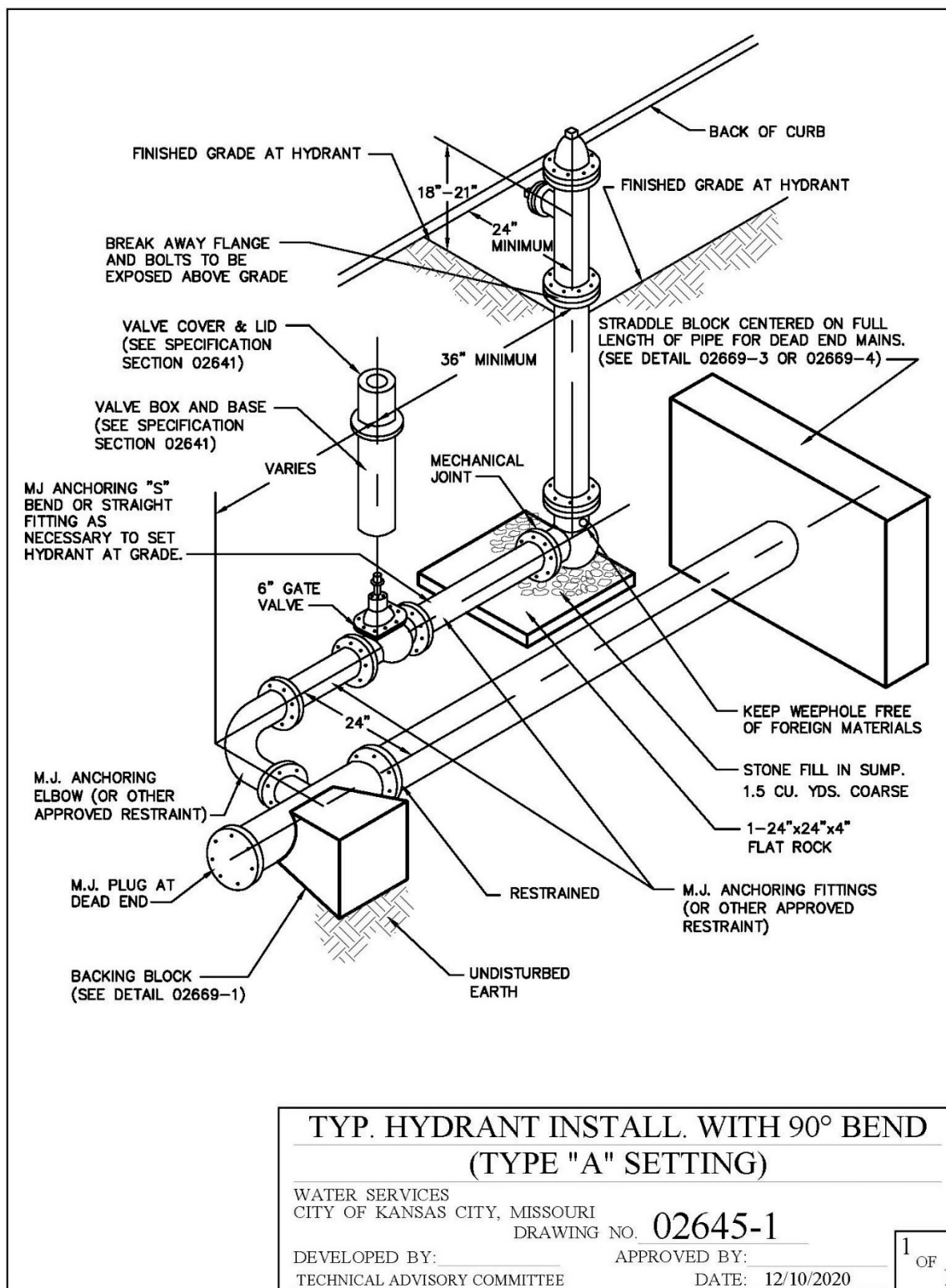
### 3.02 HYDRANT INSTALLATION

- A. Layout:
  - 1. The Contractor shall locate the installation point of each hydrant as shown on the Drawings.
  - 2. Hydrants shall be installed so that there is a minimum clear area of 5 feet in all directions to allow for operation of hydrant. Notify City's representative if the minimum clear distance cannot be met.
  - 3. The Contractor shall furnish all labor and material in laying out the work.
  - 4. The Contractor shall be responsible for setting all offset stakes that may be required.
  - 5. If it is necessary to change the location of a hydrant from that shown on the Drawings, then the City shall approve the staked location of each hydrant before its installation.
- B. The weep holes of the hydrant shall be kept clear and free to drain.
- C. Place 1-½ cubic yards of stone fill as indicated on the standard details 02645-1 & 2.
- D. Hydrant Trench Depth: Five (5) feet unless otherwise indicated.
- E. Hydrants shall stand plumb.
- F. When placed along roadways the centerline of the hydrant shall be as follows:
  - 1. A minimum of twenty-four (24) inches from the back of the curb.
  - 2. A minimum of 4 feet from the edge of pavement where no curb exists.
- G. Setting of Hydrants:
  - 1. Hydrants shall be set so that the breakaway (traffic) flange is installed at the manufacturer's recommend height above finished grade (which is the top of the pavement in paved areas).
  - 2. Unless otherwise indicated on the Drawings the Contractor shall set the height of the traffic flange as follows:
    - (a) Using an offset fitting or other combination of fittings between the valve and hydrant base.
  - 3. Fittings shall be as specified in Section 02618 – Ductile Iron Pipe Water Mains.
- H. Hydrants shall not be set in a drainage ditches.
- I. Hydrant shall be rotated so as to have the nozzle facing the street. If site conditions dictate, at the direction of the City, the hydrant shall be rotated to face another direction.
- J. Hydrants are to be installed with mechanical joint anchoring fittings or approved restraint devices. Refer to Section 02669 – Thrust Restraints.
- K. Hydrants are to be installed in accordance with the following standard Construction Detail Drawings:
  - 1. 02645-1 – Typical Hydrant Installation with 90 Degree Bend (Type "A" Setting).
  - 2. 02645-2 – Straight Set Hydrant Installation (Type "B" Setting).
  - 3. 02645-3 – Typical Hydrant Set in Back-slope.

- L. After installation and before hydrants are placed in service, Contractor shall field apply two separate coats of all surface spray enamel paint, in accordance with paint manufacturers recommendations, to completely cover each hydrant bonnet in accordance with paragraph HYDRANT COLOR CODING.
  - M. After installation and before hydrants are placed in service, Contractor shall temporarily cover each hydrant with polyethylene encasement. Polyethylene encasement shall be securely attached to the hydrant. Inactive hydrants are to be covered so that the Fire Department knows the hydrants are not in service.
- 3.03 FLUSHING ASSEMBLIES
- A. Flushing assemblies shall be installed in accordance with the following standard Construction Detail Drawings:
    - 1. 02645-4 – Typical Flushing Assembly, 12-inch Mains and Smaller.
- 3.04 DRINKING WATER SAMPLING STATION
- A. Drinking water sampling stations shall be installed in accordance with the following standard Construction Detail Drawing:
    - 1. 02645-7 – Drinking Water Sampling Station.
- 3.05 POLYETHYLENE ENCASMENT
- A. Polyethylene encasement shall be installed on all ductile iron pipe, fittings, valves and other appurtenances including the hydrant sets.
  - B. Install polyethylene encasement in accordance with Section 02618 – Ductile Iron Pipe Water Mains, paragraph POLYETHYLENE ENCASEMENT.
  - C. Install polyethylene encasement to the bury line of fire hydrants.
  - D. Cut holes in the polyethylene encasement at the base of fire hydrants to allow drainage from the weep holes into the underlying stone fill.
- 3.06 BACKFILL AND COMPACTION
- A. The areas around each hydrant, valve and drinking water sampling station shall be thoroughly compacted to prevent settlement of these areas.
  - B. Backfill and compaction shall be in accordance with Section 02200 – Earthwork and Section 02250 – Trenching, Pipe Embedment and Backfill.

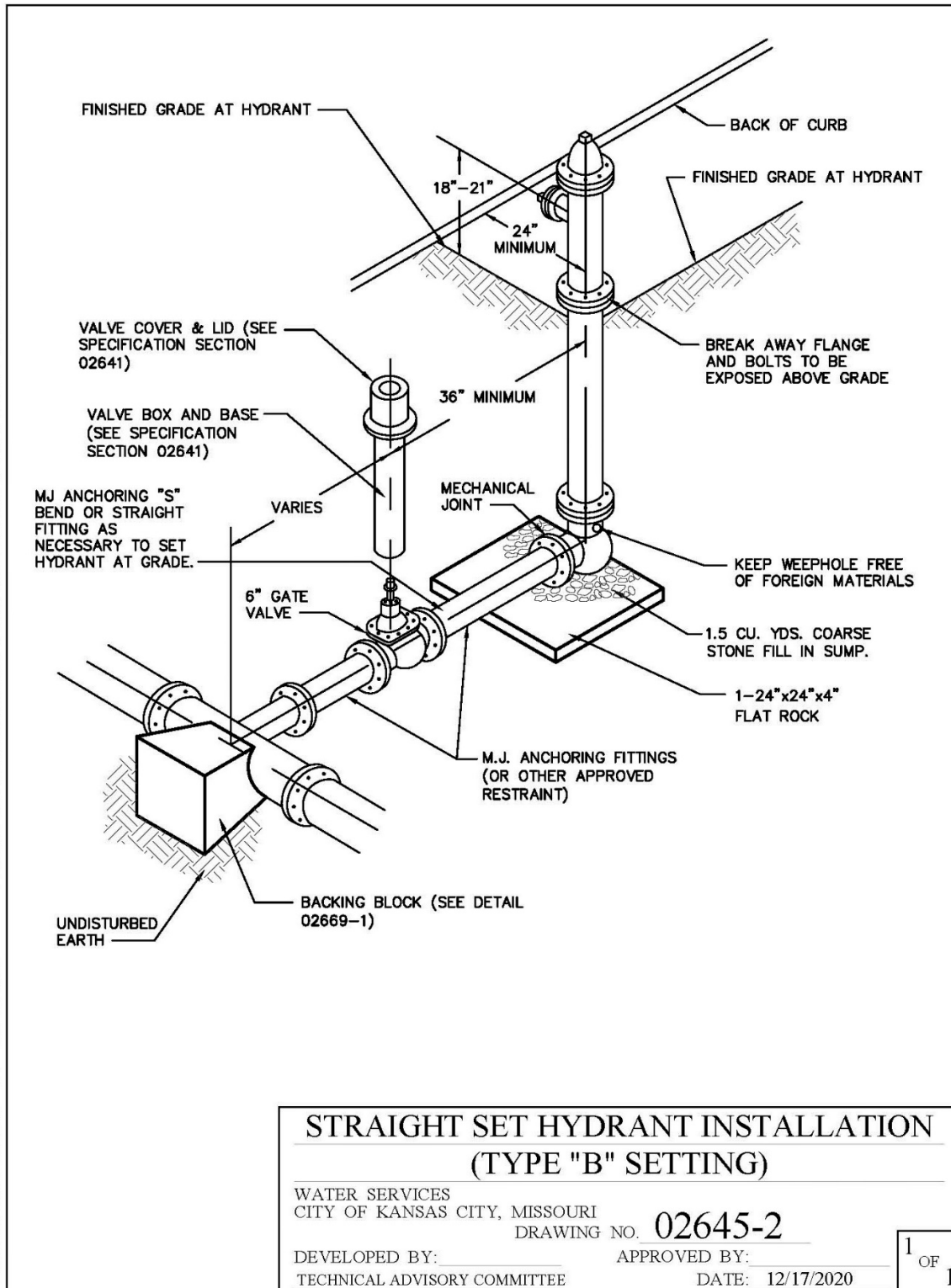
DETAILS ON THE NEXT SEVEN PAGES

# DETAIL 02645-1

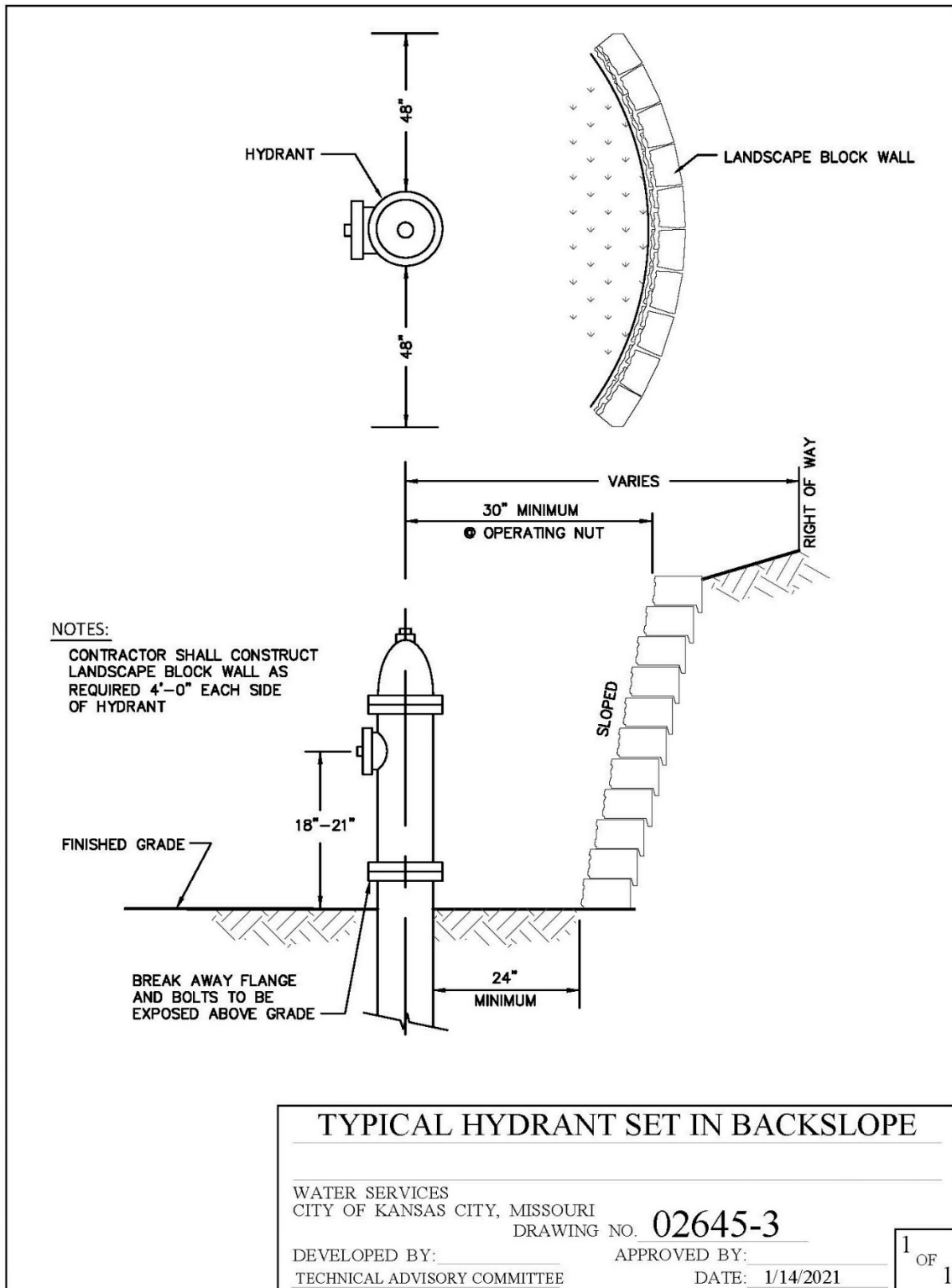




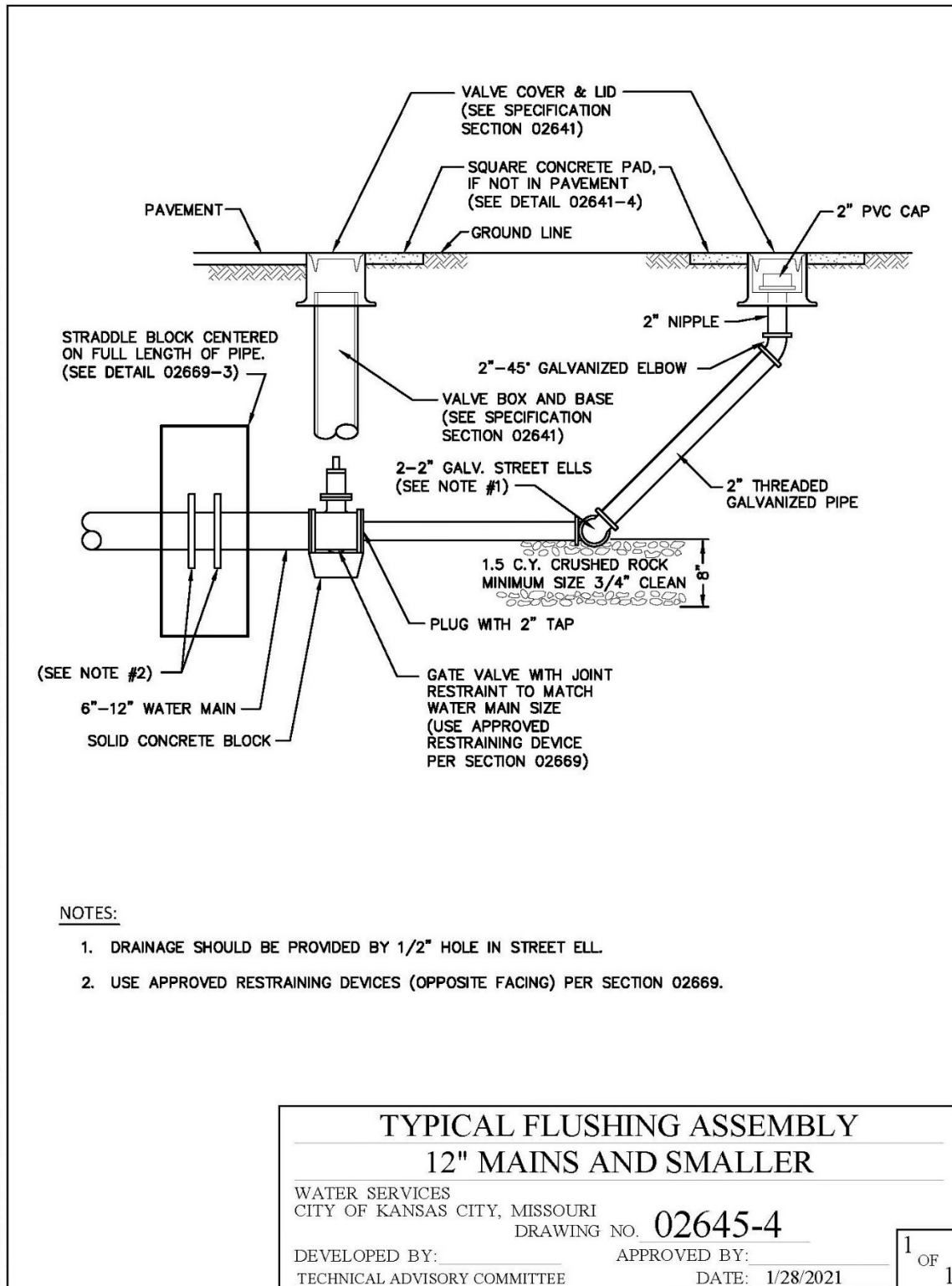
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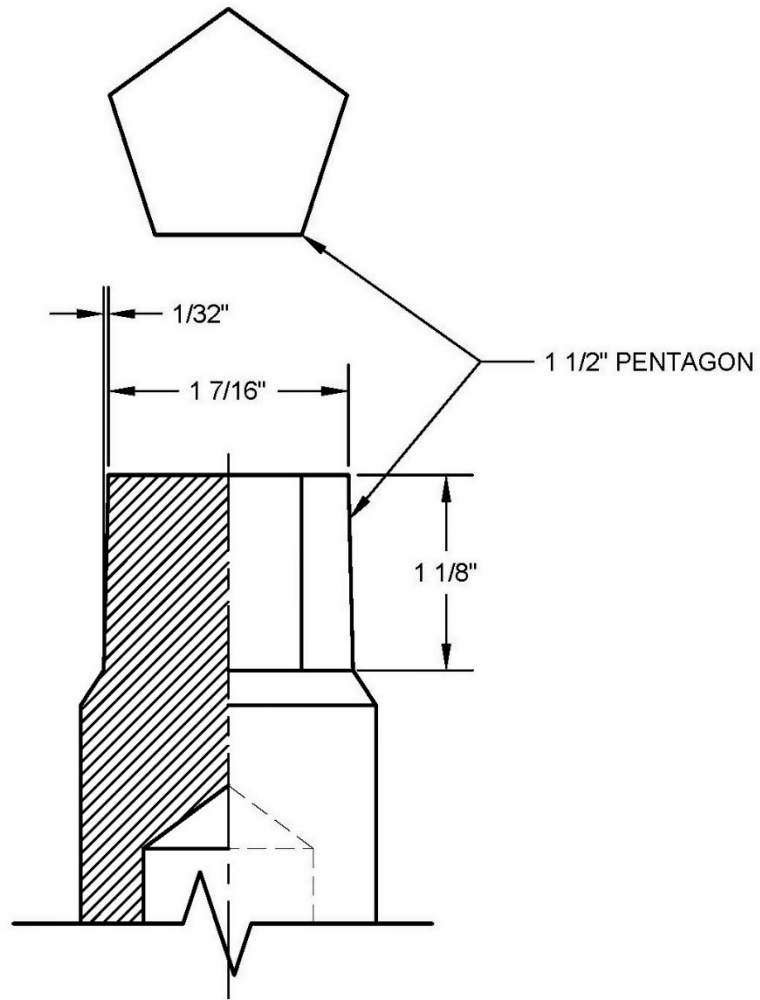
# DETAIL 02645-3



## DETAIL 02645-4



DETAIL 02645-5



OPERATING NUT (STEM NUT)

WATER SERVICES  
CITY OF KANSAS CITY, MISSOURI

DRAWING NO. 02645-5

DEVELOPED BY: \_\_\_\_\_  
TECHNICAL ADVISORY COMMITTEE

APPROVED BY: \_\_\_\_\_

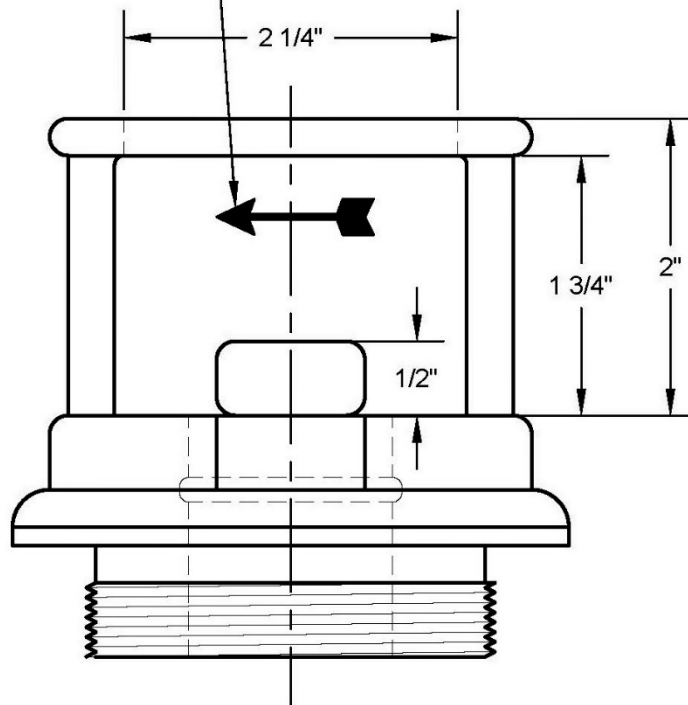
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# Detail 02645-6

RAISED DIRECTION ARROW  
(OPEN-CLOCKWISE)

NOTE:  
MANUFACTURERS NAME SHALL BE  
CAST IN RAISED LETTERS, 1/4" HIGH,  
ON FACE OPPOSITE ARROW



TOLERANCE:  
CAST CORNERS  
ROUND +/- 1/16"  
FILLETS +/- 1/16"

BREAK CORNERS  
APPROX. .005" R (TYP.)

MATERIAL:  
DUCTILE IRON A.S.T.M.  
536 GRADE 60-40-18  
OR A.S.T.M. A-445

## SECURITY STYLE HOLD DOWN NUT

WATER SERVICES  
CITY OF KANSAS CITY, MISSOURI  
DRAWING NO.

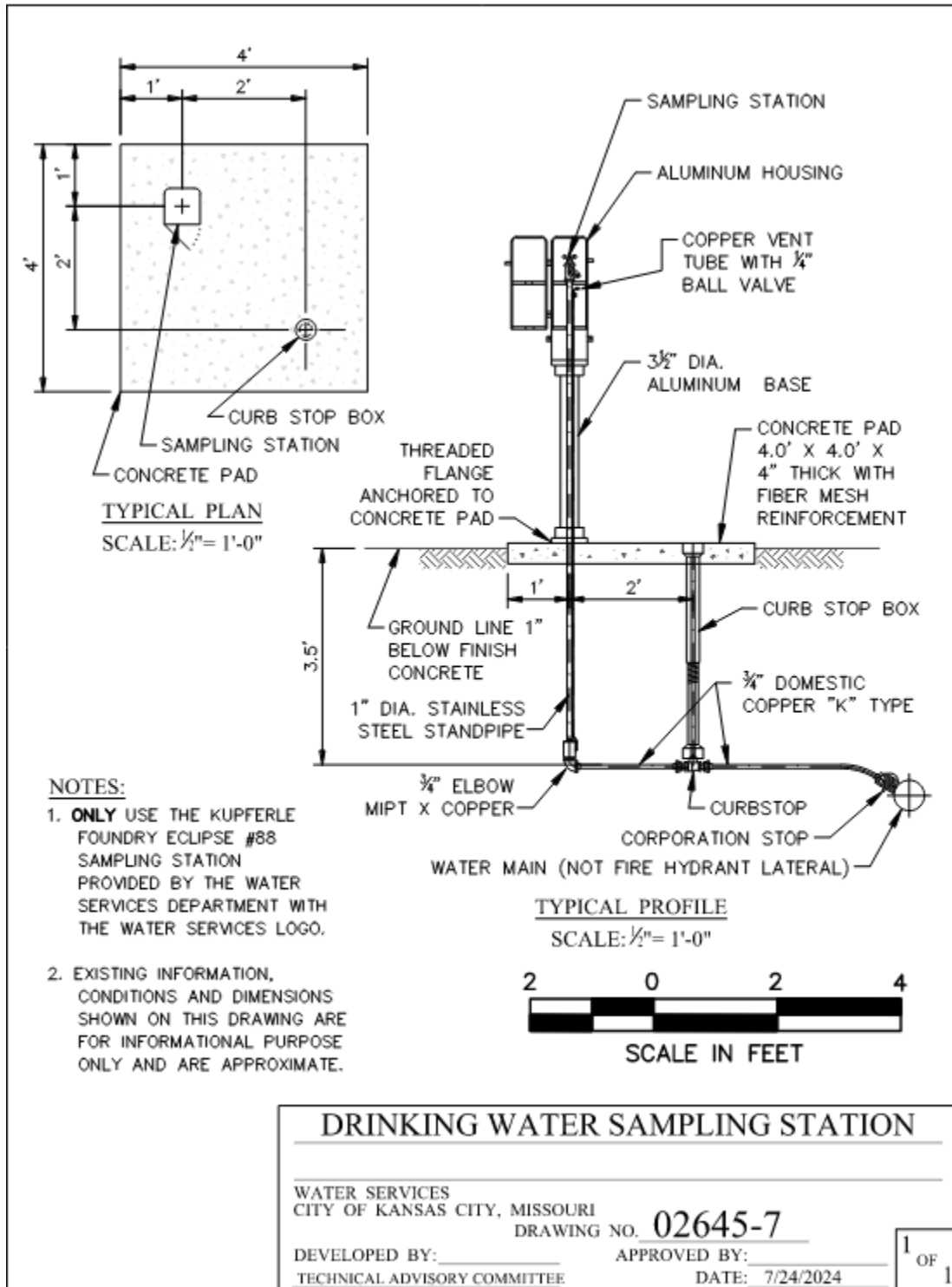
02645-6

DEVELOPED BY:  
TECHNICAL ADVISORY COMMITTEE

APPROVED BY:

DATE: 12/16/2020

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END OF SECTION