



**WATER MAIN ALONG ENTRANCE TO ENCINO PS / HWY 281 TO ENCINO TANK**

**Solicitation Number: CO-00111**

**Job No.: 16-7003**

**ADDENDUM 2**

**July 5, 2017**

To Respondent of Record:

This addendum, applicable to work referenced above, is an amendment to the proposal and plans and specifications and as such will be a part of and included in the Contract Documents. Acknowledge receipt of this addendum by entering the Addendum number and issue date on the space provided in submitted copies of the bid proposal.

**RESPONSES TO QUESTIONS RECEIVED**

1. **Specification 01 78 23 is missing on the Water Main Along Entrance to Encino PS/Hwy. 281 to Encino Tank per the Table of Contents.**

Response: Section 01 78 23 – Operations and Maintenance Data has been included with this Addendum.

**CLARIFICATIONS TO BIDDERS**

1. A portion of the proposed water line is located within Texas Department of Transportation (TXDOT) right of way (ROW). As a condition for approval of a TXDOT utility permit, TXDOT has special provisions for trench backfill requirements. Special Provisions for TxDOT – San Antonio District Utility Permits (Revised September 9, 2016) is being added to the Contract Documents for the Contractor’s use. No additional payment will be made as backfill is considered subsidiary to the cost of the installation of the water line.

**MODIFICATIONS TO THE SPECIFICATIONS**

1. Special Conditions - **Add** Item 1.6 as follows, including attached TxDOT Special Provision and associated documents.  
  
“1.6 **SAWS will obtain the Texas Department of Transportation (TxDOT) Permit for work in the Highway 281 Right of Way prior to commencement of construction. As a condition for approval of a TxDOT utility permit, TxDOT has special provisions for trench backfill requirements. Special Provisions for TxDOT – San Antonio District Utility Permits (Revised September 9, 2016) is attached to the Special Conditions for inclusion in the Contract Documents. No additional payment will be made as backfill is considered subsidiary to the cost of the installation of the water line.**”
2. **Add** Section 01 78 23 – Operations and Maintenance Data.



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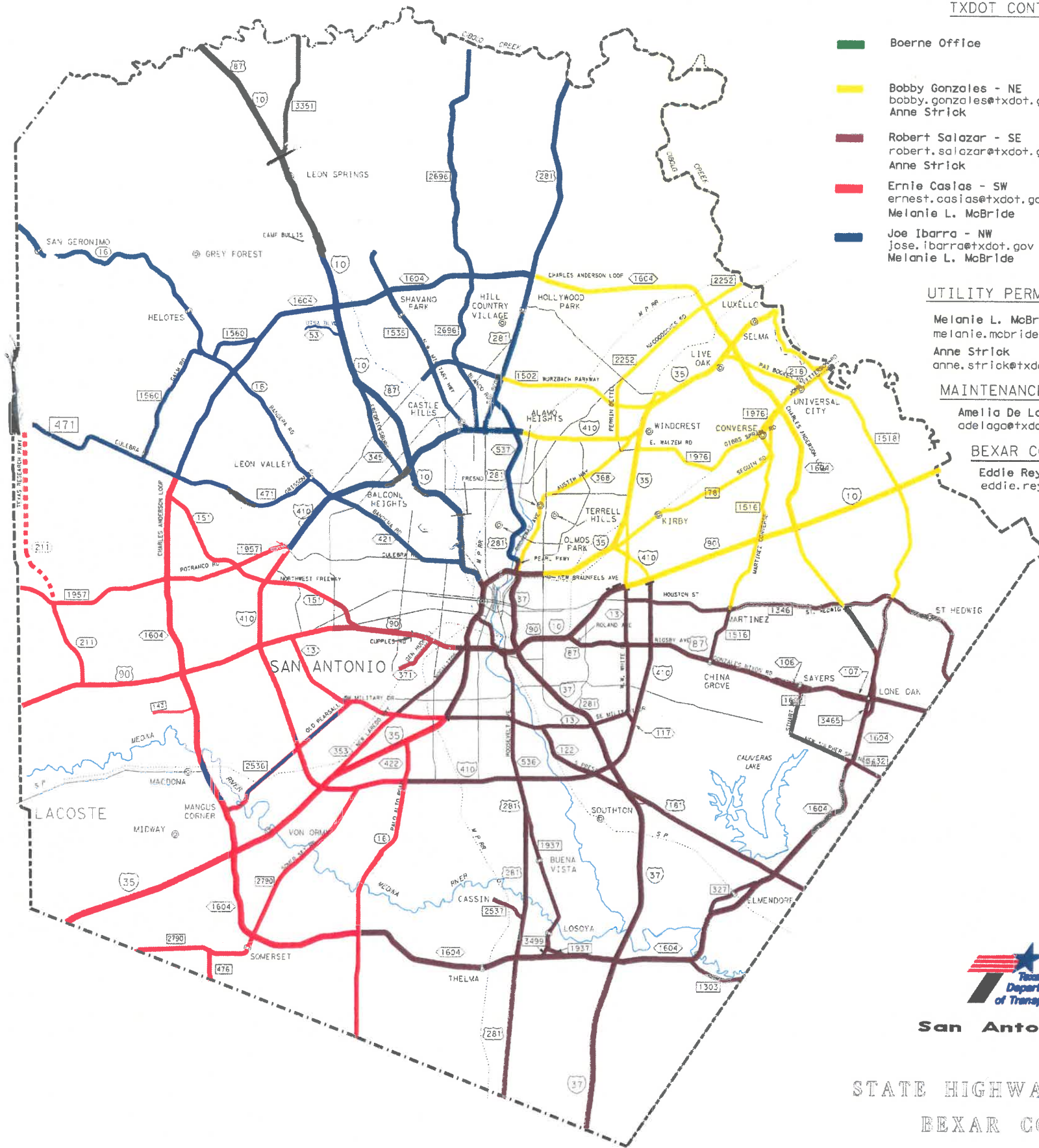
Arcadis U.S., Inc.  
Texas Firm No. F-533

This Addendum, including these two (2) pages, is nineteen (19) pages with attachments in its entirety.

Attachments included:

- Special Provisions for TxDOT – San Antonio District Utility Permits (Revised September 9, 2016)
- Section 01 78 23 – Operations and Maintenance Data

**END OF ADDENDUM**



**TXDOT CONTACT**

- Boerne Office**                      830-816-2430(Office)
- Bobby Gonzales - NE**            210-218-2371(Cell)  
bobby.gonzales@txdot.gov        210-633-1401(Office)  
Anne Strick                            210-615-5866
- Robert Salazar - SE**            210-213-9421(Cell)  
robert.salazar@txdot.gov        210-633-1402(Office)  
Anne Strick                            210-615-5866
- Ernie Casias - SW**                210-669-2649(Cell)  
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**UTILITY PERMIT COORDINATORS**

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**MAINTENANCE CONTRACT MANAGER**

- Amelia De La Garza**                210-633-1401  
adelaga@txdot.gov

**BEXAR COUNTY AREA ENGINEER**

- Eddie Reyes, P.E.**                  210-633-1424  
eddie.reyes@txdot.gov



**San Antonio**

**STATE HIGHWAY SYSTEM  
BEXAR COUNTY**

UTILITY AND DRIVEWAY PERMITS, Rev. 6/23/15

**Network limits by Highway**

- IH 10 - from Old Camp Bullis Rd. to Roland Ave. (US 87)
- IH 35 - from Southcross to FM 1518 in Comal County
- IH 37 - from IH 35 to US 181
- IH 410 - from Leon Creek/Culebra to IH 35
- US 90 - from IH 10/IH 35 to Medio Creek
- US 281 - from IH 35/37 to Bitters Rd.
- Loop 1604 - from Tradesman to Bandera Rd (SH 16)

**IF YOU HAVE QUESTIONS CONCERNING THE LOCATION OF THE TRANSGUIDE NETWORK PLEASE CONTACT:**

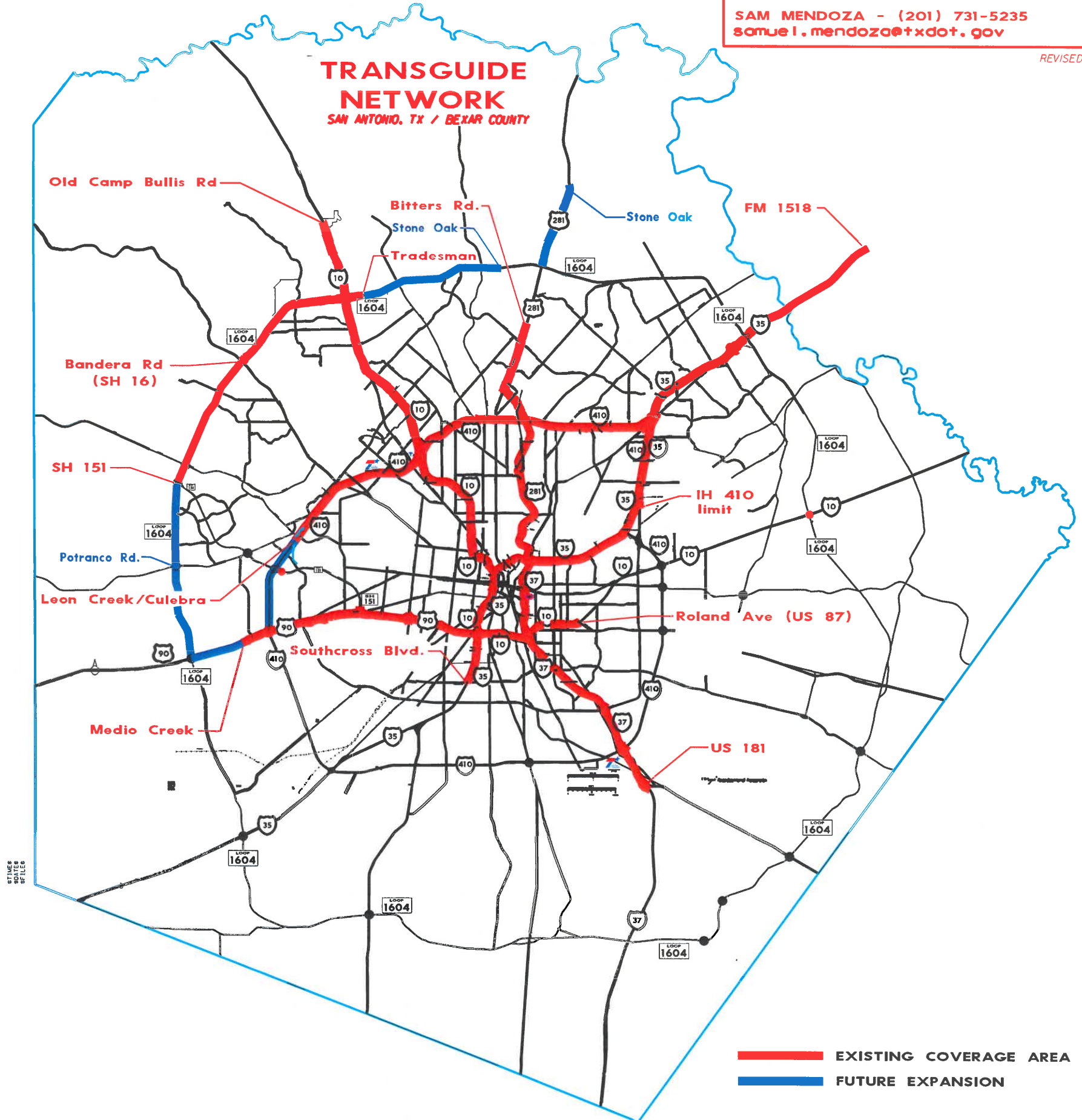
**BRAD ADAMI - (210) 731-5109  
brad.adami@txdot.gov**

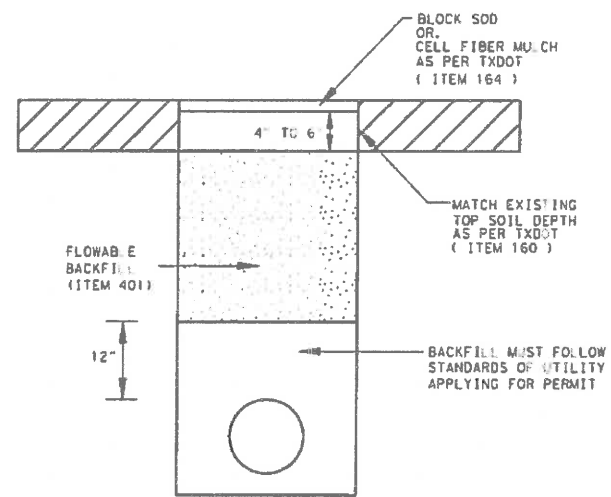
**JOHN GIANOTTI - (210) 731-5240  
john.gianotti@txdot.gov**

**SAM MENDOZA - (201) 731-5235  
samuel.mendoza@txdot.gov**

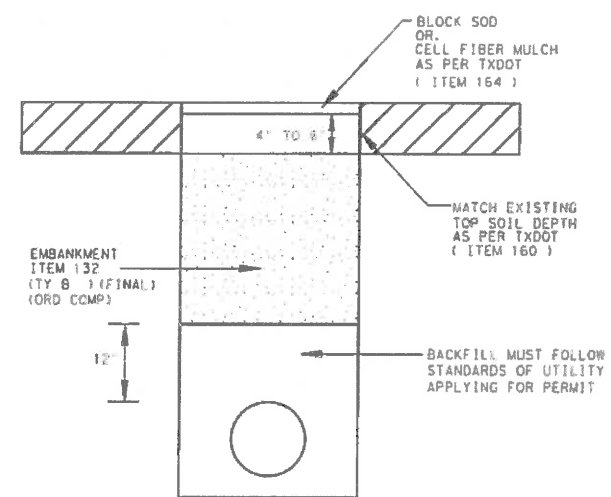
REVISED 8/15/16

**TRANSGUIDE NETWORK**  
SAN ANTONIO, TX / BEXAR COUNTY






TRENCH DETAIL ( NON PAVEMENT )  
 < 10' FROM CURB/OR EDGE OF PAVEMENT



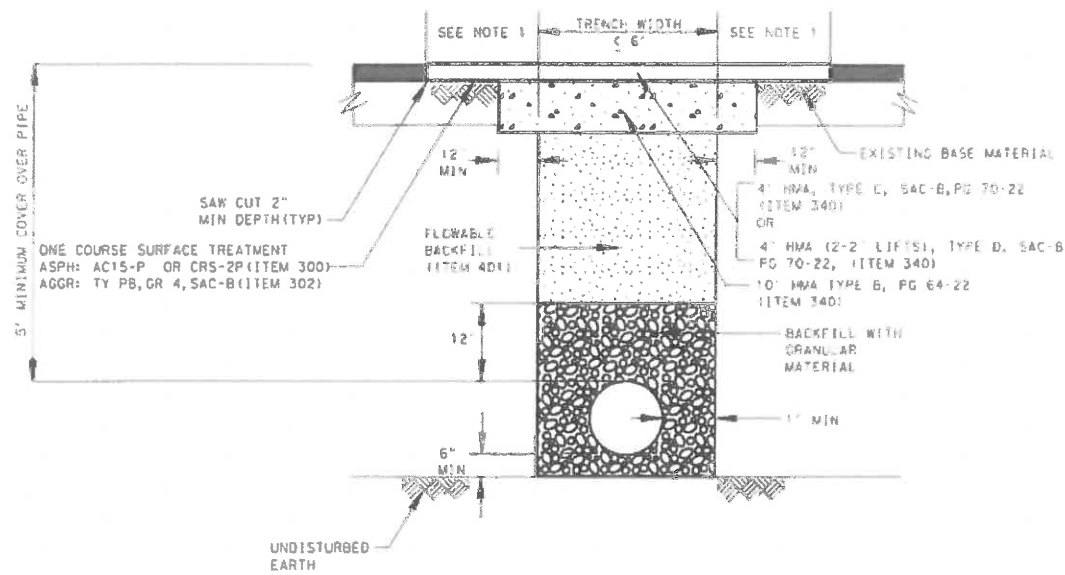
TRENCH DETAIL ( NON PAVEMENT )  
 >10' FROM CURB/OR EDGE OF PAVEMENT

NOTES:

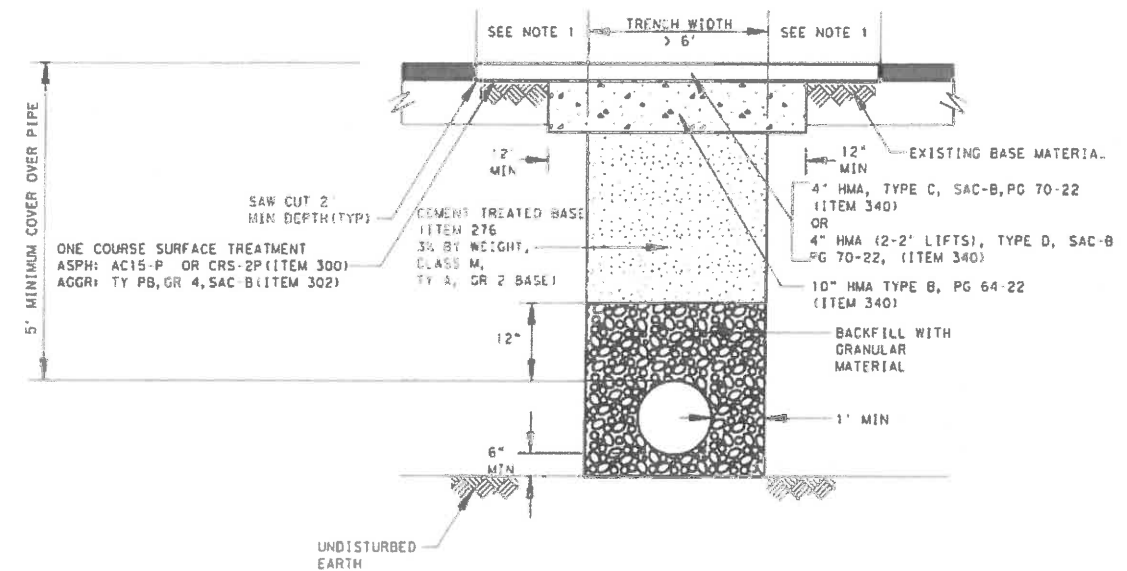
- PIPE 24" OR LESS USE 1' FROM O/D OF PIPE TO EXCAVATED WALLS
- PIPE 24" OR GREATER USE 2' FROM O/D OF PIPE TO EXCAVATED WALLS

 Texas Department of Transportation  
 SAN ANTONIO DISTRICT  
 TRENCH BACKFILL DETAIL  
 NON PAVEMENT

REVISED: JUNE 28, 2016



TRENCH BACKFILL WITH PAVED SURFACE DETAIL  
(FOR TRENCHES EQUAL OR LESS THAN 6' WIDE)



TRENCH BACKFILL WITH PAVED SURFACE DETAIL  
(FOR TRENCHES WIDER THAN 6')

NOTES:

- 1 - DISTANCE OF HMA TYPE C OVERLAY SHALL BE AS SHOWN ON PLANS BUT NOT LESS THAN 2' MIN.

Texas Department of Transportation  
SAN ANTONIO DISTRICT

TRENCH BACKFILL DETAIL  
WHEN OPEN-CUTTING OF  
PAVEMENT IS ALLOWED

REVISED: JUNE 28, 2016

**SPECIAL PROVISION FOR  
TxDOT – SAN ANTONIO DISTRICT  
UTILITY PERMITS  
(Revised September 9, 2016)**

1. **Effective Period of Permit Approval.** A TxDOT utility permit is void if installation does not begin within the 91<sup>st</sup> calendar day from date of issuance/approval. Unless otherwise extended, TxDOT approval of this Request will automatically expire and the utility company will be required to resubmit the Request.
2. **Minimum Depth of Cover.** Refer to the attached, MINIMUM DEPTH OF COVER TABLE.
3. **Locating Existing Utilities.** Before beginning work, refer to the attached, LOCATING PUBLIC AND TxDOT UTILITIES.
4. **Aerial Electric Lines.** Aerial electric power lines crossing over the highway shall be installed and maintained a minimum of twenty-two feet (22') above the surface of the traffic lanes. For electric power lines with greater than 50,000 volts, the clearance shall be increased in accordance with the National Electric Safety Code as published in the National Bureau of Standards, Handbook 30.
5. **Aerial Communication Lines.** Aerial communication lines crossing over the highway shall be installed and maintained a minimum of eighteen feet (18') above the surface of the traffic lanes.
6. **Utility Poles.** Poles installed to accommodate aerial utilities shall be located within three feet (3') of the right of way (ROW) line. Poles with bases greater than thirty-six inches (36") in diameter shall not be placed within the ROW.
7. **Active Underground Utility Work.** To insure that disturbed areas are restored and revegetated properly and in a reasonable period as the utility work progresses, the following requirements shall apply:

Unless otherwise approved or directed by TxDOT, the length of "active utility work" shall not exceed one mile in length. "Active utility work" shall be defined as the total disturbed area measured from the beginning of open trenching to the point where backfill has been compacted, the ROW has been restored to its original line and grade, any structures damaged by the utility work have been repaired, erosion control measures have been placed and are being properly maintained, approved topsoil, seed and compost have been placed uniformly, and watering for revegetation has begun. "Active utility work" also includes areas of bore pits and receiving pits; however, it does not include the underground boring length. When any area of "active utility work" is substantially complete (ie, watering of seeded areas has begun), that area is no longer considered to be "active utility work", and "active utility work" can proceed further within the ROW as long as it does not exceed the above appropriate limits. An area where TxDOT determines that the "active utility work" is substantially complete does not mean that TxDOT considers that area totally acceptable and complete.

8. **Trench Backfill.** Refer to attached, TRENCH BACKFILL DETAIL WHEN OPEN-CUTTING OF PAVEMENT IS ALLOWED and to TRENCH BACKFILL DETAIL NON PAVEMENT. All excavations within ten feet (10') of the edge of pavement shall be backfilled to within six inches (6") of natural ground with flowable backfill in accordance with TxDOT Standard Specification Item 401. Excavations not within ten feet (10') of the pavement shall be backfilled by tamping in six inch (6") horizontal layers to the density of the surrounding soil or as directed by a TxDOT inspector.

**SPECIAL PROVISION FOR  
TxDOT – SAN ANTONIO DISTRICT  
UTILITY PERMITS  
(Revised September 9, 2016)**

9. **Erosion Control and Revegetation.** This work shall be done in accordance with the Texas Department of Transportation (TxDOT) “Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges”. Following all required filling and compaction of trenches, all surplus material shall be removed and the ROW shall be reshaped to its original condition or better. Four inches (4”) of topsoil shall be spread over all disturbed areas and the area shall be seeded. One inch (1”) of General Use Compost, Item 161, Compost, shall be uniformly applied over all disturbed areas after seeding is complete. The seeded area shall be irrigated as required to establish vegetation. Block sod shall be installed on slopes steeper than 4:1. For sodded areas, apply one inch (1”) of General Use Compost on top of the sod following installation. Temporary erosion control devices (such as silt fences, rock berms, soil retention blankets, etc.) should be shown on the utility construction plans in areas where utility work will leave disturbed or loose soil across or along creeks and streambeds, on steep slopes, or in environmentally sensitive areas such as the Edwards Aquifer Recharge Zone. A TxDOT utility inspector may direct that such devices be installed even when and where they are not shown on the plans. These areas must be protected from erosion. Unless otherwise directed or approved by the TxDOT inspector, permanent vegetation (at least 70% of normal vegetation cover of the surrounding undisturbed area) must be established by the utility company/contractor before the utility work is considered acceptable and completed by TxDOT.
  
10. **Boring, Tunneling and Jacking.** Boring and jacking of utility lines shall be provided as specified below.
  - a. **Under Highways.** Underground utilities crossing the highway shall be encased. Casing shall consist of a pipe or other separate structure around and outside the carrier line. The utility must demonstrate that the casing will be adequate for the expected loads and stresses. Casing pipe shall be steel, concrete, or plastic pipe as approved by the district, except that if horizontal directional drilling is used to place the casing, high-density polyethylene (HDPE) pipe must be used in place of plastic pipe. Utility lines to be constructed under any TxDOT highway shall be installed by boring and jacking with steel casing. Boring shall extend a minimum of ten feet (10’) from the edge of pavement or curb. Use of water or other fluids in connection with boring operations will be permitted only in sufficient quantity to lubricate the boring bit and provide a smooth flow of cuttings. Jetting will not be permitted.
  - b. **Under Paved County Roads and City Streets.** Utility lines to be constructed under an existing paved (asphalt pavement or concrete pavement) county road or city street intersection at a TxDOT highway, shall be installed by boring and jacking with steel casing.
  - c. **Under Paved Driveways.** Utility lines to be constructed under an existing paved driveway, asphalt or concrete, shall be installed by boring and jacking, unless the utility company furnishes TxDOT with a “Letter of No Objection” signed by the driveway owner allowing open cutting of their driveway.
  - d. **Under Unpaved County Roads, City Streets, and Driveways.** Utility lines to be constructed under an existing unpaved county road, city street intersection at a TxDOT Highway, or unpaved driveway may be open cut. Open cutting of an unpaved driveway requires prior notification to the driveway owner.
  - e. **Under Desirable Trees.** Desirable trees generally include, but are not limited to, trees with a minimum trunk diameter of six inches (6”) that TxDOT determines to be of environmental or



**SPECIAL PROVISION FOR  
TxDOT – SAN ANTONIO DISTRICT  
UTILITY PERMITS  
(Revised September 9, 2016)**

aesthetic value. TxDOT may also identify small trees, groups of trees, shrubs or other significant features on the ROW that will require protection. Boring or tunneling is required when underground utility lines are to be placed within the “critical root zone” (CRZ) of “desirable trees” located within highway ROW or on adjacent property. The CRZ is defined as the area between the tree trunk to five feet (5’) from the tree trunk or the distance from the tree trunk to the drip line, whichever is greater. Bores shall be at a minimum depth of three feet (3’) through the CRZ.

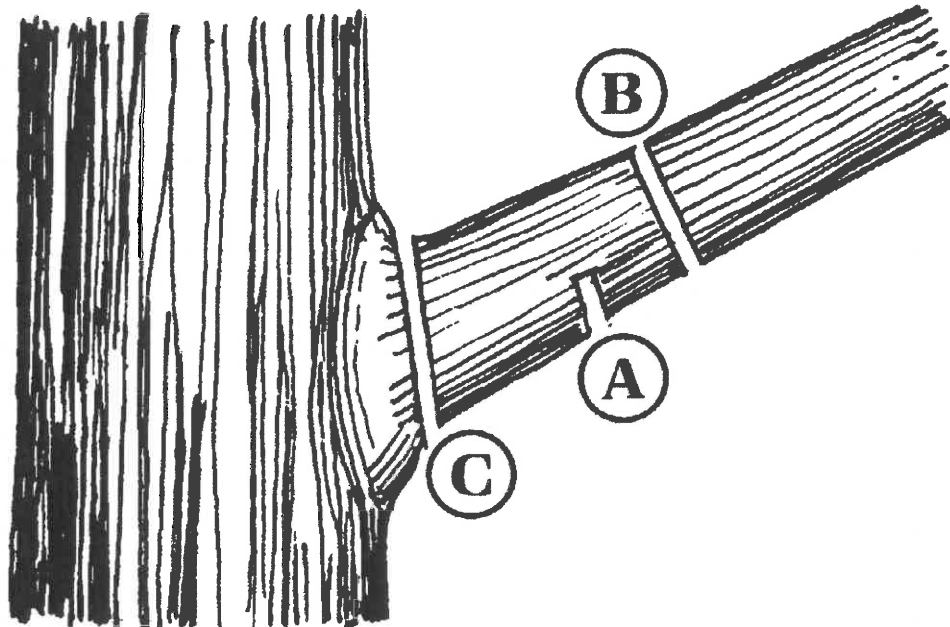
Boring or tunneling under all “desirable trees” is required except in areas where TxDOT determines that planned highway construction/maintenance work would require tree removal in the near future or when the TxDOT inspector approves of open trenching or complete removal of the tree.

11. **Protection of Trees and Landscaping.** Existing trees and landscaping within the ROW shall be protected as specified below. Removal of trees from the ROW will require prior TxDOT approval. Contractor/Utility Company shall install protective fencing around the CRZ of trees or plants as directed by TxDOT before beginning work. Fencing must be at least four feet (4’) in height and be supported by eight feet (8”) steel T-posts spaced six feet (6’) on center and driven a minimum of twenty inches (20”) into existing grade. Place the fencing continuously between posts and attach it to the posts with a minimum of four (4) wire ties per post. No access, trenching, excavating, filling or compaction is allowed within the fenced area. Maintain fencing in place until completion of work or until removal is approved or directed by TxDOT. Work under this permit may be suspended due to failure to install or maintain the protective fencing. Encroachment into the fenced area may also result in additional mitigation requirements to be determined by TxDOT.
  - a. **Tree Pruning.** All tree pruning within the ROW will require prior TxDOT approval. Refer to the attached, TREE PRUNING SPECIFICATIONS. All oak trees shall be treated with an approved tree wound dressing within 20 minutes of causing damage to a trunk or limb or making a pruning cut.
  - b. **Landscaping.** When existing landscaping is located near the proposed utility alignment, the utility contractor shall notify TxDOT and the owner of the landscaping prior to the proposed utility installation. TxDOT may require underground utilities to be installed by boring under such landscaping or by replacement of specific landscape items. Landscaping is defined as, but not limited to, trees, shrubs, grass, irrigation lines, landscape pavers, sidewalks, and other ROW improvements.
12. **Manholes.** All manhole covers shall be installed flush with the ground surface. Manholes shall be straight, inline installations.
13. **Traffic Control.** Traffic control in utility work zones shall conform to applicable requirements of the “Texas Manual on Uniform Traffic Control Devices for Streets and Highways, Part VI”. Adequate signs, barricades, flag personnel, etc. shall be used to insure complete compliance with the Manual as deemed necessary by the TxDOT inspector. Travel lane closures are permitted only after a traffic control plan is approved by TxDOT prior to beginning any construction activities. **Saturday, Sunday or Holiday Work.** Work on these days will not be permitted unless directed or approved by TxDOT. Work hours shall be from 8:00 am to 5:00 pm unless otherwise directed or approved by TxDOT.

SPECIAL PROVISION FOR  
TxDOT – SAN ANTONIO DISTRICT  
UTILITY PERMITS  
(Revised September 9, 2016)

## Tree Pruning Specifications

Discuss tree pruning with the TxDOT inspector prior to beginning the work. Make cuts at a major fork in the branch or if the entire limb is to be removed, remove the branch at the trunk. This may require the desired cut to be made off of the right of way. **Obtain permission from property owner prior to making pruning cuts on private property.** Make pruning cuts to avoid leaving a stub and without cutting into the branch collar. Generally, the branch collar is visible. If it is not visible, make the final cut approximately ½" from the parent limb or trunk. For branches 2" or larger in diameter, remove the limb using 3 cuts as shown in the diagram to avoid damage to the tree. Treat all wounds and cuts on all oaks with a commercial tree wound dressing or other approved material within 20 minutes of cutting. Disinfect pruning tools with a 10% bleach solution or with isopropyl alcohol before moving from one oak tree to another.



TxDOT San Antonio District Utility Permit Pruning Specification (4-18-13)

**SPECIAL PROVISION FOR  
 TxDOT – SAN ANTONIO DISTRICT  
 UTILITY PERMITS  
 (Revised September 9, 2016)**

**MINIMUM DEPTH OF COVER TABLE**

(FOR UNDERGROUND UTILITIES ON  
 HIGHWAY RIGHT OF WAY)

FOR UTILITY LINES INSTALLED PARALLEL WITH OR ACROSS TxDOT RIGHT OF WAY (ROW):

TYPE OF UTILITY	CROSSING PAVEMENT OR PARALLEL LESS THAN 10' FROM PAVEMENT EDGE (See Note #1, 2, & 3 below)	UNDER DRAINAGE DITCH OR CHANNEL	UNDER NATURAL GROUND & MORE THAN 10' FROM PAVEMENT EDGE
LOW PRESSURE NATURAL GAS (<60 PSI)	60"	48"	48"
HIGH PRESSURE NATURAL GAS (>60 PSI) OR LIQUID PETROLEUM PRODUCTS	60"	48"	48"
TELEPHONE (Copper Cable)	60"	24"	24"
TV CABLE	60"	24"	24"
FIBER OPTIC (Data, Phone or TV)	60"	42"	42"
SANITARY SEWER	60"	30"	30"
WATER	60"	30"	30"
ELECTRIC	60"	BY VOLTAGE 30" (<22,001 volts) 36" (22,001-40,001 volts) 42" (>40,001 volts)	BY VOLTAGE 30" (<22,001 volts) 36" (22,001-40,001 volts) 42" (>40,001 volts)

Based on requirements in the Texas Department of Transportation (TxDOT), Utility Accommodation Policy (UAP). See 43 TAC 1.21C.

Notes:

1. Utility lines installed parallel with TxDOT ROW are not permitted under TxDOT highway pavement.
2. Utility lines installed across TxDOT highway pavement, or intersecting TxDOT highways, city streets, and county roads shall be placed inside a steel casing pipe.
3. Utility lines installed within ten feet (10') of the edge of pavement should be backfilled to within 6" of natural ground with flowable backfill in accordance to TxDOT Standard Specification Item 401.

**SPECIAL PROVISION FOR  
TxDOT – SAN ANTONIO DISTRICT  
UTILITY PERMITS  
(Revised September 9, 2016)**

**LOCATING PUBLIC AND TxDOT UTILITIES**

At least 48 hours before beginning any work under this permit, the contractor shall call the following phone numbers to make arrangements for locating Public and TxDOT underground utilities within the proposed work area:

**Public Utilities:**

It should be understood that not all public utilities are members of the Texas One Call System; and thus, the Texas One Call System will not locate all possible public utilities. The contractor is responsible for contacting all public utility agencies to obtain all utility locations in the proposed work area.

**TxDOT Utilities:**

In Atascosa, Bandera, Bexar, Comal, Frio, Guadalupe, Kendall, Kerr, McMullen, Medina, Uvalde and Wilson Counties.

**TxDOT Electric Office at 210-615-5995 to locate:**

- Underground systems that operate overhead green guide sign lighting systems,
- Underground systems that operate storm water pump stations,
- Underground systems that operate highway illumination systems maintained by TxDOT,
- Underground systems that serve illumination at highway truck weigh stations.

**TxDOT Traffic Signal Office at 210-614-8922 to locate:**

- Underground systems that operate traffic signals maintained by TxDOT,

**TxDOT Transguide Traffic Management Office at 210-731-5109 to locate:**

- Underground systems that operate Transguide traffic management systems

**TxDOT Building Maintenance Office at 210-615-6329 to locate:**

- Underground systems that serve highway rest area facilities

**City of San Antonio, Department of Public Works at #311 to locate:**

- Underground systems that operate traffic signals maintained by the City of San Antonio

**City Public Service Energy One Call Center 1-800-344-8377 to locate:**

- Underground systems that operate the highway illumination system maintained by City Public Service Energy.

SECTION 01 78 23

OPERATIONS AND MAINTENANCE DATA

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:

1. This Section includes requirements for manufacturers' operations and maintenance manuals and related data to be furnished by CONTRACTOR.
2. CONTRACTOR shall submit operation and maintenance data, in accordance with this Section and in accordance with requirements elsewhere in the Contract Documents, as instructional and reference manuals by operations and maintenance personnel at the Site.
3. Required operation and maintenance data groupings are listed in table(s) in Article 1.2 of this Section. At minimum, submit operation and maintenance data for:
  - a. All equipment and systems.
  - b. Valves, gates, actuators, and related accessories.
  - c. Instrumentation and control devices.
  - d. Electrical equipment.
4. For each operation and maintenance manual, submit the following:
  - a. Preliminary Submittal: Printed and bound copy of entire operation and maintenance manual, except for test data, service reports by Supplier, and submit electronic copies.
  - b. Final Submittal: Printed and bound copy of complete operations and maintenance manual, including test data and service reports by Supplier, and submit electronic copies.

1.2 SUBMITTALS

A. Closeout Submittals: Submit the following:

1. Operation and Maintenance Data:
  - a. Submit the operations and maintenance data indicated in the Contract Documents, grouped into submittals as indicated in Table 01 78 23-A:

**TABLE 01 78 23-A, REQUIRED OPERATIONS AND MAINTENANCE DATA**

<b>Name of O&amp;M Manual/Data</b>	<b>For Materials or Equipment Specified in Section(s)</b>
Instrumentation and Control	40 60 05

B. Quantity Required and Timing of Submittals:

San Antonio Water System  
Water Main Along Entrance to Encino Ps / Hwy. 281 to Encino Tank

1. Preliminary Submittal:
  - a. Electronic Copies: In accordance with Section 01 31 26, Electronic Communication Protocols.
  - b. Submit to ENGINEER by the earlier of: 90 days following approval of Shop Drawings and product data submittals, or 10 days prior to starting training of operations and maintenance personnel, or 10 days prior to field quality control testing at the Site.
  - c. Furnish preliminary operation and maintenance data submittal in acceptable form and content, as determined by ENGINEER, before associated materials and equipment will be eligible for payment.
2. Final Submittal: Furnish final submittal prior to Substantial Completion, unless submittal is specified as required prior to an interim Milestone.
  - a. Printed Copies: 5 copies.
  - b. Electronic Copies: In accordance with Section 01 31 26, Electronic Communication Protocols.

1.3 FORMAT OF PRINTED COPIES

A. Binding and Cover:

1. Bind each operation and maintenance manual in durable, permanent, stiff-cover binder(s), comprising one or more volumes per copy as required. Binders shall be not less than one inch wide and maximum of three inches wide. Binders for each copy of each volume shall be identical.
2. Binders shall be locking three-ring/"D"-ring type, or three-post type. Three-ring binders shall be riveted to back cover and include plastic sheet lifter (page guard) at front of each volume.
3. Do not overfill binders.
4. Covers shall be oil-, moisture-, and wear-resistant, including identifying information on cover and spine of each volume.
5. Provide the following information on cover of each volume:
  - a. Title: "OPERATING AND MAINTENANCE INSTRUCTIONS".
  - b. Name or type of material or equipment covered in the manual.
  - c. Volume number, if more than one volume is required, listed as "Volume \_\_\_ of \_\_\_", with appropriate volume-designating numbers filled in.
  - d. Name of Project and, if applicable, Contract name and number.
  - e. Name of building or structure, as applicable.
6. Provide the following information on spine of each volume:
  - a. Title: "OPERATING AND MAINTENANCE INSTRUCTIONS".
  - b. Name or type of material or equipment covered in the manual.
  - c. Volume number, if more than one volume is required, listed as "Volume \_\_\_ of \_\_\_", with appropriate volume-designating numbers filled in.
  - d. Project name and building or structure name.

B. Pages:

1. Print pages in operations and maintenance manual on 30-pound (minimum) paper, 8.5 inches by 11 inches in size.

San Antonio Water System

Water Main Along Entrance to Encino Ps / Hwy. 281 to Encino Tank

2. Reinforce binding holes in each individual sheet with plastic, cloth, or metal. When published, separately-bound booklets or pamphlets are part of the manual, reinforcing of pages within booklet or pamphlet is not required.
  3. Furnish each page with binding margin not less than one inch wide. Punch each page with holes suitable for the associated binding.
- C. Drawings:
1. Bind into the operation and maintenance manual drawings, diagrams, and illustrations up to and including 11 inches by 17 inches in size, with reinforcing specified for pages.
  2. Documents larger than 11 inches by 17 inches shall be folded and inserted into clear plastic pockets bound into the manual. Mark pockets with printed text indicating content and drawing numbers. Include not more than three drawing sheets per pocket.
- D. Copy Quality and Document Clarity:
1. Contents shall be original-quality copies. Documents in the operations and maintenance manual shall be either original manufacturer-printed documents or first-generation photocopies indistinguishable from originals. If original is in color, copies shall be in color. Manuals that contain copies that are unclear, not completely legible, off-center, skewed, or where text or drawings are cut by binding holes, are unacceptable. Pages that contain approval or date stamps, comments, or other markings that cover text or drawing are unacceptable. Faxed copies are unacceptable.
  2. Clearly mark in ink to indicate all components of materials and equipment on catalog pages for ease of identification. In standard or pre-printed documents, indicate options furnished or cross out inapplicable content. Using highlighters to so indicate options furnished is unacceptable.
- E. Organization:
1. Coordinate with ENGINEER and OWNER to develop comprehensive, practical, and consistent indexing system for operations and maintenance data. ENGINEER will review indexing system before operations and maintenance data is submitted.
  2. Table of Contents:
    - a. Provide table of contents in each volume of each operations and maintenance manual.
    - b. In table of contents and not less than once in each chapter or section, identify materials and equipment by their functional names. Thereafter, abbreviations and acronyms may be used if their meaning is clearly indicated in a table bound at or near beginning of each volume. Using material or equipment model or catalog designations for identification is unacceptable.
  3. Use dividers and indexed tabs between major categories of information, such as operating instructions, preventive maintenance instructions, and other major subdivisions of data in each manual.

#### 1.4 FORMAT OF ELECTRONIC COPIES

- A. Electronic Copies of Operation and Maintenance Manuals:
1. Each electronic copy shall include all information included in the corresponding printed copy.
  2. Submit electronic copies in accordance with Section 01 31 26, Electronic Communications Protocols.
  3. File Format:
    - a. Files shall be in “portable document format” (PDF). Files shall be electronically searchable.
    - b. Submit separate file for each separate document in the printed copy.
    - c. Within each file, provide bookmarks for the following:
      - 1) Each chapter and subsection listed in the corresponding printed copy document’s table of contents.
      - 2) Each figure.
      - 3) Each table.
      - 4) Each appendix.
  4. Also submit drawings and figures in one of the following formats: “.bmp”, “.tif”, “.jpg”, or “.gif”. When files are submitted on CD, submit such files in a separate directory on the CD. When such files are submitted via other means, appropriately transmit them to avoid confusion with other files transmitted.
- B. Copies of Programming and Configuration Files:
1. Furnish on CD or portable USB “thumb drive” copy of all software programming, such as programmable logic controller programs, prepared specifically for the Project. Third-party, licensed, commercially available software is excluded from requirements of this Article; submit copies of commercially-available, licensed, third-party software, where required, in accordance with the Contract Documents.
  2. Submit on CD or portable USB “thumb drive” copies of system configuration prepared specifically for the Project, such as plant monitoring system and SCADA display configurations.
  3. Submit programming and configuration files concurrently with electronic copies of operation and maintenance data.

#### 1.5 CONTENT

- A. General:
1. Prepare each operations and maintenance manual specifically for the Project. Include in each manual all pertinent instructions, as-built drawings as applicable, bills of materials, technical bulletins, installation and handling requirements, maintenance and repair instructions, and other information required for complete, accurate, and comprehensive data for safe and proper operation, maintenance, and repair of materials and equipment furnished for the Project. Include in manuals specific information required in the Specification



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Section for the material or equipment, data required by Laws and Regulations, and data required by authorities having jurisdiction.

2. Completeness and Accuracy:
    - a. Operation and maintenance manuals that include language stating or implying that the manual's content may be insufficient or stating that the manual's content is not guaranteed to be complete and accurate are unacceptable.
    - b. Operations and maintenance manuals shall be complete and accurate.
    - c. Operation and maintenance manuals shall indicate the specific alternatives and features furnished, and the specific operation and maintenance provisions for the material or equipment furnished.
  3. Submit complete, detailed written operating instructions for each material or equipment item including: function; operating characteristics; limiting conditions; operating instructions for start-up, normal and emergency conditions; regulation and control; operational troubleshooting; and shutdown. Also include, as applicable, written descriptions of alarms generated by equipment and proper responses to such alarm conditions.
- B. Submit written explanations of safety considerations relating to operation and maintenance procedures.
- C. Submit complete, detailed, written preventive maintenance instructions including all information and instructions to keep materials, equipment, and systems properly lubricated, adjusted, and maintained so that materials, equipment, and systems function economically throughout their expected service life. Instructions shall include:
1. Written explanations with illustrations for each preventive maintenance task such as inspection, adjustment, lubrication, calibration, and cleaning. Include pre-startup checklists for each equipment item and maintenance requirements for long-term shutdowns.
  2. Recommended schedule for each preventive maintenance task.
  3. Lubrication charts indicating recommended types of lubricants, frequency of application or change, and where each lubricant is to be used or applied.
  4. Table of alternative lubricants.
  5. Troubleshooting instructions.
  6. List of required maintenance tools and equipment.
- D. Submit complete bills of material or parts lists for materials and equipment furnished. Lists or bills of material may be furnished on a per-drawing or per-equipment assembly basis. Bills of material shall indicate:
1. Manufacturer's name, address, telephone number, fax number, and Internet website address.
  2. Manufacturer's local service representative's or local parts supplier's name, address, telephone number, fax number, Internet website address, and e-mail addresses, when applicable.
  3. Manufacturer's shop order and serial number(s) for materials, equipment or

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- assembly furnished.
4. For each part or piece include the following information:
    - a. Parts cross-reference number. Cross-reference number shall be used to identify the part on assembly drawings, Shop Drawings, or other type of graphic illustration where the part is clearly shown or indicated.
    - b. Part name or description.
    - c. Manufacturer's part number.
    - d. Quantity of each part used in each assembly.
    - e. Current unit price of the part at the time the operations and maintenance manual is submitted. Price list shall be dated.
  - E. Submit complete instructions for ordering replaceable parts, including reference numbers (such as shop order number or serial number) that will expedite the ordering process.
  - F. Submit manufacturer's recommended inventory levels for spare parts, extra stock materials, and consumable supplies for the initial two years of operation. Consumable supplies are items consumed or worn by operation of materials or equipment, and items used in maintaining the operation of material or equipment, including items such as lubricants, seals, reagents, and testing chemicals used for calibrating or operating the equipment. Include estimated delivery times, shelf life limitations, and special storage requirements.
  - G. Submit manufacturer's installation and operation bulletins, diagrams, schematics, and equipment cutaways. Avoid submitting catalog excerpts unless they are the only document available showing identification or description of particular component of the equipment. Where materials pertain to multiple models or types, mark the literature to indicate specific material or equipment supplied. Marking may be in the form of checking, arrows, or underlining to indicate pertinent information, or by crossing out or other means of obliterating information that does not apply to the materials and equipment furnished.
  - H. Submit original-quality copies of each approved and accepted Shop Drawing, product data, and other submittal, updated to indicate as-installed condition. Reduced drawings are acceptable only if reduction is to not less than one-half original size and all lines, dimensions, lettering, and text are completely legible on the reduction.
  - I. Submit complete electrical schematics and wiring diagrams, including complete point-to-point wiring and wiring numbers or colors between all terminal points.
  - J. Programmable Logic Controllers: If programmable logic controllers are furnished under the Contract:
    1. Submit complete logic listings in functional block diagram format.
    2. Format Requirements:
      - a. For function block diagram, label each function block with understandable tags or descriptive labels. Describe purpose and action of

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each function block.

3. Submit complete programmable logic controller listing of all input/output address assignments, tag assignments, and pre-set constant values, with functional point descriptions.
  4. Submit complete manufacturer's programming manuals.
- K. Submit copy of warranty bond and service contract as applicable.
- L. When copyrighted material is used in operations and maintenance manuals, obtain copyright holder's written permission to use such material in the operation and maintenance manual.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

++ END OF SECTION ++