

ADDENDUM NO. 3

**CITICO PUMP RELIABILITY IMPROVEMENTS
City of Chattanooga Project W-16-013-201
Burns & McDonnell Project 95307**

CITY OF CHATTANOOGA, TENNESSEE

The following modifications are hereby introduced as part of the Contract Documents:

- 1) Specification Section 26 23 00 – Low-Voltage Switchgear
 - a. Completely replace Section 26 23 00 with the attached Section 26 23 00.
- 2) Specification Section 35 20 16 – Slide Gates
 - a. Delete Paragraph 2.02.B.2.b and replace with the following:

“Gate frame shall be Stainless Steel, ASTM A276/A276M REV A, Type 316.”
- 3) Specification Section 33 01 30.17 – Sewer Sonar Inspection
 - a. Delete Paragraph 2.01.A.1 and replace with the following:

“1. The sonar equipment shall be capable of assessing multiple pipe length and materials in accordance with the following conditions. Contractor shall verify existing pipe conditions prior to execution of testing.

 - a. 48-inch Wastewater Force Main
 - (1) Starting Access: 30-inch Blind Flange in concrete vault to be installed in this contract (Contract No. W-16-013-201)
 - (2) Ending Access: Manhole on existing Junction Chamber No. 2 (Contract No. 40D-1)
 - (3) Length: 2,000 LF (approximate)
 - (4) Pipe Material: 48-inch Class 56 DIP
 - b. 30-inch Wastewater Force Main
 - (1) Starting Access: 24-inch Blind Flange in concrete vault to be installed in this contract (Contract No. W-16-013-201)
 - (2) Ending Access: Manhole on existing Junction Chamber No. 2 (Contract No. 40D-1)
 - (3) Length: 2,100 LF (approximate)
 - (4) Pipe Material:
 - (a) 1,500 LF (approximate) 30-inch Concrete Pressure Pipe (specification unknown)
 - (b) 600 LF (approximate) 30-inch Class 51 DIP”
 - b. Delete Paragraph 2.01.A.5 and replace with the following:

“5. The sonar equipment shall be operable while the pipeline is full but not in operation. Draining of the pipeline shall be at the option of the Contractor. The inspecting equipment shall be capable of inspecting a length of sewer up to at least 2,100 ft. The Contractor shall maintain this equipment in full working order and shall satisfy the Engineer at the commencement of each working shift that all items of equipment have been provided and are in full working order.”

- c. Immediately following Paragraph 3.01.A, add the following:

“B. Contractor shall be responsible for coordinating with the Owner to isolate each force main from pumping service during testing. Force main being assessed shall be valved off from pumping system to allow continual service of Citico Pump Station through the force main which is not being assessed.”

- 4) Specification Appendix B – Permits Provided by City
- a. To Appendix B, add the enclosed Tennessee Department of Environment and Conservation (TDEC) letter of approval for Wastewater Project No. 17.0284
 - b. To Appendix B, add the enclosed SAMPLE Tennessee Valley Authority (TVA) General and Standard Conditions, Section 26a. These SAMPLE conditions shall serve as a place-holder prior to final project acceptance by the TVA in order to inform the nature and scope of the responsibilities of the Contractor. Final approved conditions shall be incorporated into the contract documents upon receipt from TVA.
- 5) Drawing Sheet E107 - Pump Station Instrumentation and Control Plan
- a. Delete “P-PS-HVACCP-01” and “P-PS-HVACCP-02” from note located in Drawing reference grid E5.
- 6) Drawing Sheet M102 – Mechanical Plan Elevation 640’-0”
- a. Delete note “SEE M103 FOR CONTINUATION” in Drawing reference grid C4 and replace with “SEE M301 FOR CONTINUATION.”

The following documents are enclosed herein for reference:

- 1) June 13, 2017 Site Visit Sign-In Sheet
- 2) Question and Response No. 1
- 3) The following selected Record Drawings are provided for reference
 - a. Citico CSO Control Facility (Contract No. CSO-5b-99)
 - i. Sheet 1.0 – Title Sheet
 - ii. Sheet 3.0 – Site Plan
 - iii. Sheet 6.0 – Sewer Lines A, B, C, & D Profiles
 - iv. Sheet 32.0 – Junction Box #3

- b. Interceptor Sewer System Lower Amnicola Parallel Interceptor 1 (Contract No. 37D1)
 - i. Sheet 6967-37D1-1 – Title Sheet
 - ii. Sheet 6967-37D1-2.3 – Plan and Profile
 - iii. Sheet 6967-37D1-3.0 – Junction Chamber Plan and Sections
- c. Interceptor Sewer System North Chattanooga Interceptor II (Contract No. 40D-1)
 - i. Sheet 6709-40D-1-1 – Title Sheet
 - ii. Sheet 6709-40D-1-2.1 – General Plan
 - iii. Sheet 6709-40D-1-3.2 – Plan and Profile
 - iv. Sheet 6709-40D-1-5.1 – Junction Chamber No. 2
- d. Citico II Pumping Station Force Main & River Crossing (Contract No. 37E)
 - i. Sheet 6685-37E-1 – Title Sheet
 - ii. Sheet 6685-37E-2 – Citico II Force Main
 - iii. Sheet 6685-37E-3 – River Crossing Profile
 - iv. Sheet 6685-37E-4 – River Crossing Profile
- e. Upper River Crossing Line No. 8 (Contract No. 134-H)
 - i. Sheet 134-H-3 – Plan and Profile

END OF ADDENDUM NO. 3

June 16, 2017

/s/ Justin C. Holland, Administrator
City of Chattanooga
Department of Public Works

Please acknowledge receipt of all addenda in your submitted Bid Form.

Only questions answered in writing by Addenda will be binding.

Addendum Prepared By
BURNS & MCDONNELL
June 16, 2017

PART 1 - General

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and DIVISION 01 Specification Sections, apply to this Section.

1.02 Summary

- A. This Section includes metal-enclosed, low-voltage power circuit-breaker switchgear rated 1,000V and less for use in AC systems.

1.03 Reference Standards

- A. American National Standards Institute (ANSI):
 1. C37.13 - Low-Voltage AC Power Circuit Breakers Used in Enclosures.
 2. IEEE C37.16 - Preferred Ratings, Related Requirements, and Application Recommendations for Low-Voltage AC (635V and below) and DC (3200V and below) Power Circuit Breakers.
 3. IEEE C37.17 - Trip Systems for Low-Voltage (1000V and below) AC and General Purpose (1500V and below) DC Power Circuit Breakers.
 4. C37.20.1 - Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear.
 5. C37.35 - Application, Installation, Operation, and Maintenance of High-Voltage Air Disconnecting and Load Interrupter Switches.
 6. C39.1 - Requirement for Electrical Analog Indicating Instruments.
 7. C37.90- Relays and Relay Systems Associated with Electric Power Apparatus.
 8. IEEE C37.100 - Standard Definitions for Power Switchgear.
 9. C57.13 - Standard for Requirements for Instrument Transformers.
 10. C62.11 - Metal-Oxide Surge Arresters for Alternating Current Power Circuits.
- B. American Society for Testing and Materials (ASTM):
 1. D877 - Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using Disk Electrodes.
 2. D923 - Method for Sampling Electrical Insulating Liquids.

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C. Institute of Electrical and Electronic Engineers (IEEE):

1. C2 - National Safety Code.
2. C62.33-1982 – Test Specifications for Varistor Surge-Protective Devices.
3. C62.41.1-2002 – Surge Environment in Low-Voltage (1000V and less) AC Power Circuits.
4. C62.41.2-2002 – Characterization of Surges in Low-Voltage (1000V and less) AC Power Circuits.
5. C62.45-2002 – Surge Testing for Equipment Connected to Low Voltage (1000V and less) AC Power Circuits.
6. C62.62-2000 – Test Specification for Surge Protective Devices for Low Voltage AC Power Circuitry.
7. 141 - Recommended Practice for Electric Power Distribution for Industrial Plants.
8. 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.
9. Std 1100-2005 (Emerald Book) – Recommended Practice for Powering and Grounding Electronic Equipment.

D. National Electrical Manufacturers' Association (NEMA):

1. FU 1 - Low Voltage Cartridge Fuses.
2. NEMA C37.50 - Switchgear - Low Voltage AC Power Circuit Breakers Used in Enclosures - Test Procedures.
3. LA 1 - Surge Arresters.
4. NEMA SG 5 - Power Switchgear Assemblies.

E. National Fire Protection Association (NFPA):

1. NFPA 70 - National Electrical Code (NEC).
2. NFPA 70E – Standard for Electrical Safety in the Workplace.
3. NFPA 780 – Standards for the Installation of Lightning Protection Systems.

F. National Electrical Contractors Association (NECA):

1. 400-98 - Recommended Practice for Installing and Maintaining Switchboards.

G. National Electrical Testing Association (NETA):

1. ATS-1999 - Acceptance Testing Specifications for Electrical Power Distribution Equipment.
- H. Underwriters Laboratories (UL): Provide equipment and components which are UL - listed and labeled.
1. UL 467 - Grounding and Bonding Equipment.
 2. UL 489 - Molded-Case Circuit-Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures.
 3. UL 512 - Standard for Fuseholders.
 4. UL 1449 4th Edition, 2009 – Surge Protective Devices
 5. UL 1558 - Metal-Enclosed Low-Voltage Power Circuit-Breaker Switchgear.

1.04 Definitions

- A. ATS: Acceptance testing service.
- B. GFCI: Ground-fault circuit interrupter.

1.05 Submittals

- A. Product Data: For each type of switchgear, circuit breaker, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each type of switchgear and related equipment.
 1. Dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Include the following:
 - a. Tabulation of installed devices with features and ratings.
 - b. Enclosure types and details.
 - c. Outline and general arrangement drawing showing dimensions, shipping sections, and weights of each assembled section.
 - d. Bus configuration with size and number of conductors in each bus run, including phase, neutral, and ground conductors of main and branch buses.
 - e. Current rating of buses.
 - f. Short-time and short-circuit current rating of switchgear assembly.
 - g. Nameplate legends.
 - h. Mimic-bus diagram.

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- i. UL listing for series rating of installed devices.
 - j. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 2. Wiring Diagrams: Power, signal, and control wiring.
 - a. One-line diagram.
 - b. AC three-line diagram.
 - a. Wiring diagrams, including external connections terminals. Separate schematic and wiring drawings shall be submitted for each breaker. "Typical" drawings covering several breakers will not be acceptable.
2. Transfer Control System:
 - a. Wiring diagram.
 - b. System control descriptions.
 - c. Electronic copy of software development after testing and acceptance.
- C. Instrument transformer performance curves and data.
- D. Protective device coordination curves on full-size (9-1/2 inch by 11-1/16 inch) log-log graph paper (similar to K&E No. 48-5258).
- E. Communications protocol information for all data communication devices and systems.
- F. Samples: Representative portion of mimic bus with specified finish. Manufacturer's color charts showing colors available for mimic bus.
- G. Coordination Drawings: Floor plans showing dimensioned layout, required working clearances, and required area above and around switchgear. Show support locations, type of support, and weight on each support. Indicate field measurements.
- H. Field quality-control test reports.
- I. Updated mimic-bus diagram reflecting field changes after final switchgear load connections have been made, for record.
- J. Operation and Maintenance Data: For switchgear and components to include in emergency, operation, and maintenance manuals. In addition to items specified in DIVISION 01, Section "Operation and Maintenance Data," include the following:
 1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.

2. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.06 Maintenance Material Submittals

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Fuses: Six of each type and rating used. Include spares for potential transformer fuses, control power fuses, and fuses and fusible devices for fused circuit breakers.
 2. Indicating Lights: Six of each type installed.
 3. Touchup Paint: 3 containers of paint matching enclosure finish, each 0.5 pint (250 mL).

1.07 Quality Assurance

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
 1. Testing Agency's Field Supervisor: Person currently certified by the International Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- B. Source Limitations: Obtain switchgear through one source from a single manufacturer.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of switchgear and are based on manufacturer's preliminary layout. Contractor shall provide switchgear that meets space allocation indicated and available based on project conditions.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- E. Comply with NFPA 70.

1.08 Delivery, Storage, and Handling

- A. Deliver switchgear in sections of length, width and height that can be moved past obstructions in delivery path. All necessary hardware for reconnecting shipping splits shall be provided.

- B. If stored in areas subjected to weather, cover switchgear to provide protection from weather, dirt, dust, corrosive substances, and physical damage. Remove loose packing and flammable materials from inside switchgear; install electric heating (250 W per section) to prevent condensation.

1.09 Project Conditions

- A. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
 - 1. Notify Owner no fewer than five days in advance of proposed interruption of electric service.
 - 2. Do not proceed with interruption of electric service without Owner's written permission.
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for switchgear, including clearances between switchgear, and adjacent surfaces and other items. Comply with indicated maximum dimensions. Furnish equipment with shipping splits that will enable movement of equipment into interior space of existing facility without structural modifications to the existing facility.
- C. Do not install the switchgear equipment specified herein until designated installation spaces are suitable for intended service.
- D. Final or temporary HVAC systems shall be in place and operational to maintain the ambient temperatures and humidity conditions at occupancy levels prior to energizing the switchboard and shall be maintained for the remainder of the construction period.
- E. Environmental Limitations: Rate equipment for continuous operation under the following conditions, unless otherwise indicated:
 - 1. Ambient Temperature: Not exceeding 40°C.
 - 2. Altitude: Not exceeding 6,600 feet (2,010 m).

1.10 Coordination

- A. Coordinate layout and installation of switchgear and components with other construction. Maintain required clearances for workspace and equipment access doors and panels.
- B. Coordinate size and location of openings through concrete vault slab. Concrete, reinforcement, and formwork requirements are specified in DIVISION 03.

PART 2 - Products

2.01 Manufacturers

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- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. ABB Inc.
 - 2. Cutler-Hammer, Inc.; Eaton Corporation.
 - 3. General Electric Company.
 - 4. Siemens Energy & Automation, Inc.
 - 5. Square D; Schneider Electric.

2.02 Ratings

- A. Nominal System Voltage: 480V, 3 wire with neutral pad, 60 Hz.
- B. Main-Bus Continuous: 3,200 A or as indicated.
- C. Short-Time and Short-Circuit Current: Match rating of highest-rated circuit breaker in switchgear assembly.

2.03 Fabrication

- A. Factory assembled and tested and complying with IEEE C37.20.1.
- B. Enclosure Material: Steel.
- C. Switchgear shall accommodate bottom entry for all incoming and feeder circuit cables and conduits.
- D. Outdoor Enclosure Material: Galvanized steel.
- E. Outdoor Enclosure Fabrication Requirements: Weatherproof; integral structural-steel base frame with factory-applied asphaltic undercoating; and each compartment equipped with the following features:
 - 1. Structural design and anchorage adequate to resist loads imposed by 120-mph wind.
 - 2. Space heater operating at one-half or less of rated voltage, sized to prevent condensation.
 - 3. Louvers equipped with insect and rodent screen and filter; arranged to permit air circulation while excluding insects, rodents, and exterior dust.
 - 4. Common internal aisle of sufficient width to permit protective-device withdrawal, disassembly, and servicing in aisle.
 - 5. Aisle access doors with outside padlocking provisions and interior panic latches.

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6. Aisle space heaters operating at one-half or less of rated voltage, thermostatically controlled.
 7. Vaporproof LED aisle lights, controlled by wall switch at each entrance.
 8. GFCI duplex receptacles, a minimum of two, located in aisle.
- F. Aisle ventilation louvers equipped with insect and rodent screen and filter and arranged to permit air circulation while excluding insects, rodents, and exterior dust. Finish: IEEE C37.20.1, manufacturer's standard gray finish over a rust-inhibiting primer on phosphatizing-treated metal surfaces.
- G. Section barriers between main and tie circuit-breaker compartments shall be extended to rear of section.
- H. Bus isolation barriers shall be arranged to isolate line bus from load bus at each main and tie circuit breaker.
- I. Circuit-breaker compartments shall be equipped to house drawout-type circuit breakers and shall be fitted with hinged outer doors. All breaker compartments, including those indicated as equipped spaces, shall be complete with rails, guides, interlocks, primary and secondary disconnecting devices, and all other features as required for installation of a breaker to serve a circuit by connection of power cables to rear load terminals and connection of control cables to terminal blocks.
- J. Fabricate enclosure with removable, hinged rear cover panels to allow access to rear interior of switchgear.
- K. Auxiliary Compartments: Match and align with basic switchgear assembly. Include the following:
1. Bus transition sections.
 2. Hinged front panels for access to metering, accessory, and blank compartments.
- L. Bus bars connect between vertical sections and between compartments. Cable connections are not permitted.
1. Main Phase Bus: Uniform capacity the entire length of assembly.
 2. Neutral Pad: 100 % of phase-bus ampacity, except as indicated. Equip bus with pressure-connector terminations for service neutral and bonding conductors.
 3. Vertical Section Bus Size: Comply with IEEE C37.20.1, including allowance for spare circuit breakers and spaces for future circuit breakers.
 4. Phase-bus and Neutral-pad Material: Hard-drawn copper of 98% minimum conductivity, with copper feeder circuit-breaker line connections.
 5. Use copper for connecting circuit-breaker line to copper bus.

6. Contact Surfaces of Buses: Tin plated.
7. Feeder Circuit-Breaker Load Terminals: Tin-plated copper bus extensions equipped with pressure connectors for outgoing circuit conductors.
8. Ground Bus: Hard-drawn copper of 98% minimum conductivity, with pressure connector for feeder and branch-circuit ground conductors, minimum size 1/4 by 2 inches.
9. Supports and Bracing for Buses: Adequate strength for indicated short-circuit currents.
10. Provide for future extensions from either end of main phase and ground bus by means of predrilled bolt-holes and connecting links.
11. Bus-Bar Insulation:
 - a. Individual bus bars wrapped with factory-applied, flame-retardant insulation.
 - b. Bolted Bus Joints: Insulate with secure joint covers that can easily be removed and reinstalled.

2.04 Components

- A. Instrument Transformers: Comply with IEEE C57.13.
 1. Potential Transformers: Secondary-voltage rating of 120V and NEMA accuracy class of 0.3 with burdens of W, X, and Y.
 2. Current Transformers: Ratios as indicated; burden and accuracy class suitable for connected relays, meters, and instruments.
- B. Multifunction Digital-Metering Monitor: UL-listed or -recognized, microprocessor-based unit suitable for three- or four-wire systems and with the following features:
 1. Inputs from sensors or 5-A current-transformer secondaries, and potential terminals rated to 600V.
 2. Switch-selectable digital display of the following:
 - a. Phase Currents, Each Phase: $\pm 1\%$.
 - b. Phase-to-Phase Voltages, Three Phase: $\pm 1\%$.
 - c. Phase-to-Neutral Voltages, Three Phase: $\pm 1\%$.
 - d. Three-Phase Real Power: $\pm 2\%$.
 - e. Three-Phase Reactive Power: $\pm 2\%$.
 - f. Power Factor: $\pm 2\%$.

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- g. Frequency: $\pm 0.5\%$.
 - h. Integrated Demand, with Demand Interval Selectable from 5 to 60 Minutes: $\pm 2\%$.
 - i. Accumulated energy, in megawatt hours (joules), $\pm 2\%$; stored values unaffected by power outages for up to 72 hours.
 - 3. Mounting: Display and control unit flush or semiflush mounted in instrument compartment door.
- C. Relays: Comply with IEEE C37.90, types and settings as indicated; with test blocks and plugs.
- D. Service Entrance Surge Protective Devices:
 - 1. UL 1449 Fourth Edition, listed and labeled.
 - 2. Shall be UL labeled as a Type 1 or Type 2 device, shall be intended to be installed on the load side of the service entrance equipment and shall not require external or supplemental overcurrent safety controls to meet UL 1449 4th Edition.
 - 3. The surge protective device (SPD) shall be of a modular design using fast-acting transient energy protection that will divert and dissipate the surge energy.
 - 4. Shall provide independent, directly-connected suppression components on each mode in the electrical distribution system, at least seven modes in Wye systems (L-N, L-G, N-G) and six modes (L-L, L-G) in Delta and impedance grounded Wye systems.
 - 5. Shall be an internally-mounted device.
 - 6. Shall use metal oxide varistor or MOV-hybrid technology as necessary. Spark gaps, selenium cells and SCRs shall not be acceptable.
 - 7. Shall include internal fuses and thermally protection over every suppression component of every mode, including N-G unless protecting the service entrance.
 - 8. Shall have integral, panel front status monitors or remote status panel ability as a minimum to indicate a continuous positive status of all protected modes, including N-G mode where applicable. Diagnostics shall be electrically isolated to prevent damage by surges.
 - 9. Shall be UL labeled with a short circuit current rating of 200kA.
 - 10. The maximum continuous operating voltage at 60 Hz shall be capable of sustaining at least 115% of the peak voltages continuously without degrading.
 - 11. The maximum UL 1449 Fourth Edition Voltage Protection Ratings (VPR) for the device must not exceed the following:

Service	L-N	L-G	N-G	L-L	MCOV
480/277 Vac 3-phase, 3-wire or 4-wire	1200V	1200V	1200V	2000V	550/320

12. Type 1 and Type 2 SPDs shall be UL labeled with 20kA I-n for compliance to UL 96A Lightning Protection Master Label and NFPA 780.
13. The SPD shall be suitable for 480/277V, 3-phase, 4-wire 60 Hz, service-entrance equipment.
14. Service entrance units shall be tested and demonstrated suitable for application within ANSI/IEEE C62.41 Category C environments.
15. Shall have a peak surge current of 150 kA per phase.
16. Warranty: SPD manufacturer shall provide free replacement of the entire model with a minimum warranty period of 10 years from date of shipment. This warranty shall be limited only by failure to comply with manufacturer's installation instructions and applicable national or local code and may not exclude lightning or temporary overvoltage.
17. Monitoring Diagnostics/Accessories:
 - a. Protection Status Indicators - Each unit shall have a green/red solid-state indicator light that reports the status of the protection element on each phase.
 - b. Wye configured units, shall have indication in the L-N and L-G modes.
 - c. The absence of a green light and the presence of a red light shall indicate that damage has occurred on the respective phase or mode. All protection status indicators must indicate the actual status of the protection on each phase or mode. If power is removed from any one phase, the indicator lights must continue to indicate the status of the protection on all other phases and protection modes. Diagnostics packages that simply indicate whether power is present on a particular phase shall not be accepted.
 - d. Remote Status Monitor: The SPD must include Form C dry contacts (one NO and one NC) for remote annunciation of its status. Both the NO and NC contacts shall change state under any fault condition.
 - e. Audible Alarm and Silence Button: The SPD shall contain an audible alarm that will be activated under any fault condition. There shall also be an audible alarm silence button used to silence the audible alarm after it has been activated.

- f. Surge Event Counter: The SPD shall be equipped with an LCD display that indicates to the user how many surges have occurred at the location.
 - g. The surge counter shall trigger each time a surge event with a peak current magnitude of a minimum of $50 \pm 20A$ occurs. A reset pushbutton shall also be standard, allowing the surge counter to be zeroed. The reset button shall contain a mechanism to prevent accidental resetting of the counter via a single, short-duration button press. In order to prevent accidental resetting, the surge counter reset button shall be depressed for a minimum of 2 seconds in order to clear the surge count total.
 - h. The ongoing surge count shall be stored in non-volatile memory. If power to the SPD is completely interrupted, the ongoing count indicated on the surge counter's display prior to the interruption shall be stored in non-volatile memory and displayed after power is restored. The surge counter's memory shall not require a backup battery in order to achieve this functionality.
- E. Provision for Future Devices: Equip compartments with rails, mounting brackets, supports, necessary appurtenances, and bus connections.
- F. Control Power Supply: Control power transformer supplying 120V control circuits through secondary disconnect devices. Include the following features:
- 1. Dry-type transformers, in separate compartments for units larger than 3 kVA, including primary and secondary fuses.
 - 2. Two control power transformers in separate compartments with necessary interlocking relays; each transformer connected to line side of associated main circuit breaker.
 - a. Secondary windings connected through an internal automatic transfer switch to switchgear control power bus.
 - 3. Control Power Fuses: Primary and secondary fuses with current-limiting and overload protection.
- G. Control Wiring: Factory installed, complete with bundling, lacing, and protection; and complying with the following:
- 1. Flexible conductors for No. 8 AWG and smaller, for conductors across hinges and for conductors for interconnections between shipping units.
 - 2. Conductors sized according to NFPA 70 for duty required.

2.05 Circuit Breakers

- A. Description: Comply with IEEE C37.13.
- B. Ratings: As indicated for continuous, interrupting, and short-time current ratings for each circuit breaker; voltage and frequency ratings same as switchgear.

- C. Operating Mechanism: Mechanically and electrically trip-free, stored-energy operating mechanism with the following features:
1. Normal Closing Speed: Independent of both control and operator.
 2. Stored-Energy Mechanism: Electrically charged, with optional manual charging.
 3. Operation counter.
- D. Trip Devices: Solid-state, overcurrent trip-device system consisting of one or two current transformers or sensors per phase, a release mechanism, and the following features.
1. Functions: Long-time-delay, short-time-delay, instantaneous, and ground fault-trip functions, independent of each other in both action and adjustment.
 2. Temperature Compensation: Ensures accuracy and calibration stability from -5 to +40°C.
 3. Field-adjustable, time-current characteristics.
 4. Current Adjustability: Dial settings and rating plugs on trip units or sensors on circuit breakers, or a combination of these methods.
 5. Three bands, minimum, for long-time- and short-time-delay functions; marked "minimum," "intermediate," and "maximum."
 6. Pickup Points: Five minimum, for long-time- and short-time-trip functions. Equip short-time-trip function for switchable I²t operation.
 7. Pickup Points: Five minimum, for instantaneous-trip functions.
 8. Ground-fault protection with at least three short-time-delay settings and three trip-time-delay bands; adjustable current pickup. Arrange to provide protection for the following:
 - a. Three-wire circuit or system.
 9. Trip Indication: Labeled, battery-powered lights or mechanical targets on trip device to indicate type of fault.
- E. Auxiliary Contacts: For interlocking or remote indication of circuit-breaker position, with spare auxiliary switches and other auxiliary switches required for normal circuit-breaker operation, quantity as indicated. Each consists of two Type "a" and two Type "b" stages (contacts) wired through secondary disconnect devices to a terminal block in stationary housing.
- F. Drawout Features: Circuit-breaker mounting assembly equipped with a racking mechanism to position circuit breaker and hold it rigidly in connected, test, and disconnected positions without opening the door. Include the following features:

1. Interlocks: Prevent movement of circuit breaker to or from connected position when it is closed, and prevent closure of circuit breaker unless it is in connected, test, or disconnected position.
2. Circuit-Breaker Positioning: An open circuit breaker may be racked to or from connected, test, and disconnected positions only with the associated compartment door closed unless live parts are covered by a full dead-front shield. An open circuit breaker may be manually withdrawn to a position for removal from the structure with the door open. Status for connection devices for different positions includes the following:
 - a. Test Position: Primary disconnect devices disengaged, and secondary disconnect devices and ground contact engaged.
 - b. Disconnected Position: Primary and secondary devices and ground contact disengaged.
- G. Arc Chutes: Readily removable from associated circuit breaker when it is in disconnected position, and arranged to permit inspection of contacts without removing circuit breaker from switchgear.
- H. Padlocking Provisions: For installing at least three padlocks on each circuit breaker to secure its enclosure and prevent movement of drawout mechanism.
- I. Operating Handle: One for each circuit breaker capable of manual operation.
- J. Electric Close Button: One for each electrically operated circuit breaker.
- K. Undervoltage Trip Devices: Adjustable time-delay and pickup voltage.
- L. Indicating Lights: To indicate circuit breaker is open or closed, for main and bus tie circuit breakers interlocked either with each other or with external devices.
- M. Provide arc reduction maintenance mode switch on all main breakers and feeders to comply with NEC.
- N. Provide remote racking for breakers and 120V remote racking device.

2.06 Automatic Transfer Controls

- A. An automatic transfer system shall be provided in the switchgear assembly and serve as the main transfer control system for the incoming utility services and the emergency stand-by generator service.
- B. Features:
 1. The transfer control system shall consist of a programmable logic controller and a touchscreen operator interface panel mounted on the face of the switchgear. Control power for all transfer operations shall be derived from the line side of the source to which the load is being transferred.

2. The transfer control system shall provide for positive interlocks both mechanically and electrically to prevent simultaneous closing of both sources under either automatic or manual operation. Main contacts shall be mechanically locked in position in both normal and positions.
 3. The transfer control system shall be capable of being operated manually under full rated load conditions. Manual operation shall be accomplished by touchscreen operation on an operator interface, and by integrally mounted selector switches and/or pushbuttons. Removable manual operating handles, and handles that may move in the event of an electrical operation during the manual operation, are not acceptable. Manual operators requiring source or load disconnection prior to manual operation are not acceptable.
 4. Indicators shall be provided to show the availability of each source as well as breakers in a tripped or disconnected position.
 5. Normal operation will be with the primary utility main breaker closed, and the generator and secondary utility main breaker open. The tie breaker will be normally closed and will only be opened manually for maintenance purposes. A status contact off the tie breaker shall be wired to the controller. Whenever the tie breaker is open, the controller shall inhibit the automatic transfer between sources in auto mode. The transfer system must be placed in manual mode before the tie breaker is allowed to be opened.
 6. The transfer system shall be controlled by a microprocessor-based controller. The controller shall be hardened against potential problems from transients and surges. Operation of the transfer system, monitoring of all sources, and input and output functions shall be managed by the controller.
- C. Microprocessor-based Controller:
1. The microprocessor-based logic controller shall be mounted in the switchgear and the touchscreen interface shall provide the operator with an overview of the transfer system status, system parameters, and diagnostic data. The controller shall have a voltage range of 0-790V (50/60 Hertz) and an accuracy of ± 3 Hertz. Control power input range shall be from 65Vac - 145Vac rms 50/60 Hertz.
 2. The microprocessor-based controller shall include a touchscreen LCD display for operator interface, and shall display the follow:
 - a. Line-to-line voltages for each source and the load.
 - b. Line frequency for each source.
 - c. Timer countdown for each time while functioning.
 - d. Real-time clock.
 - e. Set points.
 - f. Transfer system status

Low-Voltage Switchgear

3. The microprocessor-based controller shall include individual LEDs or touchscreen indicating the following:
 - a. Primary main circuit breaker status.
 - b. Secondary main circuit breaker status.
 - c. Generator main circuit breaker status.
 - d. Tie breaker status.

- D. The microprocessor-based controller shall contain the following features:
 1. Password programming protection.
 2. Set points shall be stored in Non-Volatile memory, and the use of an external battery source to maintain operation during "dead" periods shall not be required.
 3. Provision shall be made for manual transfer capabilities in the event of a touchscreen or LCD display failure.
 4. The voltage of each phase of the primary source, the secondary source, and the generator source shall be monitored, with undervoltage dropout adjustable from 50% to 97% of nominal and pickup adjustable from dropout setting $\pm 2\%$ to 99% of nominal.
 5. The voltage of each phase of the sources shall be monitored, with overvoltage dropout adjustable from 105% to 120% of nominal and pickup adjustable from dropout setting +2% to 103% of nominal.
 6. The frequency of the sources shall be monitored, with underfrequency dropout adjustable from 90% to 97% of nominal and pickup adjustable from dropout setting +1 Hertz to 99% of nominal.
 7. The frequency of the sources shall be monitored, with overfrequency dropout adjustable from 103% to 110% of nominal and pickup adjustable from dropout setting +1 Hertz to 101% of nominal.
 8. A time delay shall be provided to override a momentary power outage or voltage fluctuation, adjustable from 0 to 120 seconds.
 9. A time delay shall be provided on transfer from primary utility source to generator source, adjustable from 1 to 1800 seconds.
 10. A time delay shall be provided on retransfer from generator source to primary source, adjustable from 0 to 1800 seconds. This time delay shall be bypassed if generator source fails and primary source is available.
 11. The secondary utility main breaker shall initially be excluded from automatic or manual transfer control, however, wiring interface shall be provided and

programming provisions shall be available to enable future control of the secondary source by the transfer control system.

12. A time delay shall be provided for the neutral position, adjustable from 0 to 120 seconds.
 13. All delays shall be field adjustable from the operator touchscreen interface without the use of special software or tools.
 14. Pre-transfer signal, range 0-120 seconds.
 15. Transfer exerciser, selectable - disabled, daily, or 7, 14, 28 day interval, 0-600 minutes. Shall be operator programmable.
 16. Retransfer mode - manual or automatic.
 17. Test pushbutton mode - disabled or enabled.
- E. The microprocessor-based controller shall be able to communicate on an Ethernet/IP network. The microprocessor controller shall function as indicated on drawings and be able to communicate the following signals to and from a remote PLC through the local area network.
1. Loss of primary utility source.
 2. Transfer system fail.
 3. Primary main circuit breaker is closed.
 4. Secondary main circuit breaker is open.
 5. Generator main circuit breaker is open.
 6. Tie breaker is closed.

2.07 Accessories

- A. Accessory Set: Furnish tools and miscellaneous items required for circuit-breaker and switchgear test, inspection, maintenance, and operation.
1. Racking handle to manually move circuit breaker between connected and disconnected positions.
 2. Portable test set for testing all functions of circuit-breaker, solid-state trip devices without removal from switchgear.
 3. Relay and meter test plugs suitable for testing switchgear meters and switchgear class relays.
- B. Circuit-Breaker Removal Apparatus: Portable, floor-supported, roller-base, elevating carriage arranged for moving circuit breakers in and out of compartments.

- C. Storage for Manual: Include a rack or holder, near the operating instructions, for a copy of maintenance manual.

2.08 Identification

- A. Mimic Bus: Continuous mimic bus, arranged in single-line diagram format, using symbols and lettered designations consistent with approved mimic-bus diagram.
 - 1. Mimic-bus segments coordinated with devices in switchgear sections to which applied, to produce a concise visual presentation of principal switchgear components and connections.
 - 2. Medium: Painted graphics, as selected by Architect.
 - 3. Color: Contrasting with factory-finish background; as selected by Architect from manufacturer's full range.
- B. Operational Description: Provide type-written instructions and sequences for transferring from normal to generator and from generator back to normal. Provide laminated hard copy for attachment to the front of the switchgear and electronic version submitted with instruction manuals.
- C. System Power Riser Diagrams: Depict power sources, feeders, distribution components, and major loads. Include as-built data for low-voltage power switchgear and connections as follows:
 - 1. Frame size of each circuit breaker.
 - 2. Trip rating for each circuit breaker.

PART 3 - Execution

3.01 Examination

- A. Examine elements and surfaces where switchgear will be installed for compliance with installation tolerances, required clearances, and other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 Installation

- A. Comply with applicable portions of NECA 400 and NEMA PB 2.1.
- B. Anchor switchgear assembly to 4-inch, channel-iron floor sill embedded in concrete base and attach by bolting.
 - 1. Sills: Select to suit switchgear; level and grout flush into concrete base.

2. Concrete Bases: Refer to Structural drawings for concrete base detail.
- C. Tighten electrical connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A.
- D. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, brackets, and temporary blocking of moving parts from switchgear units and components.
- E. SPD Installation Requirements:
 1. The installation of the surge suppression system shall be installed in strict accordance with the manufacturer's recommended practices and in compliance with the NEC.
 2. The Contractor shall verify the proper application of the SPD (i.e. voltage, phases, etc.)
 3. The Contractor shall verify that all neutral conductors are bonded to the system ground at the service entrance or at the serving transformer prior to installation of the SPD.
 4. The phase, neutral and grounding conductors serving the SPD shall be gently twisted to reduce the SPD system inductance and shall be kept at the minimum length. Avoid any sharp bends and coils in the conductors.
 5. Do not perform insulation resistance tests on a piece of electrical equipment with an SPD installed. SPDs are not designed to withstand the relatively high voltages applied for the duration of a megger test measured in seconds. Disconnect the SPD during insulation testing and reconnect immediately after testing is over.

3.03 Identification

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in DIVISION 26, Section "Electrical Identification."
- B. Diagram and Instructions:
 1. Frame and mount under clear acrylic plastic on the front of switchgear.
 - a. Operating Instructions: Printed basic instructions for switchgear, including control and key-interlock sequences and emergency procedures.
 - b. System Power Riser Diagrams: Depict power sources, feeders, distribution components, and major loads.
 2. Storage for Maintenance: Include a rack or holder, near the operating instructions, for a copy of maintenance manual.

3.04 Connections

- A. Ground equipment according to DIVISION 26, Section "Grounding and Bonding for Electrical Systems."
- B. Connect wiring according to DIVISION 26, Section "Low-Voltage Electrical Conductors and Cables."

3.05 Field quality control

- A. Prepare for acceptance tests as follows:
 - 1. Test insulation resistance for each switchgear bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to perform the following:
 - 1. Inspect switchgear installation, including wiring, components, connections, and equipment. Test and adjust components and equipment.
 - 2. Verify that electrical control wiring installation complies with manufacturer's submittal by means of point-to-point continuity testing. Verify that wiring installation complies with requirements in DIVISION 26 Sections.
 - 3. Complete installation and startup checks according to manufacturer's written instructions.
 - 4. Assist in field testing of equipment including pretesting and adjusting of equipment and components.
 - 5. Report results in writing.
- C. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- D. Perform the following field tests and inspections and prepare test reports:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA ATS. Certify compliance with test parameters. Perform NETA tests and inspections for each of the following NETA categories:
 - a. Switchgear.
 - b. Circuit breakers.
 - c. Protective relays.
 - d. Instrument transformers.

- e. Metering and instrumentation.
 - f. Ground-fault systems.
 - g. Surge arresters.
 - h. Surge Protection Devices.
2. Remove and replace malfunctioning units and retest as specified above.
- E. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switchgear. Remove front and rear panels so joints and connections are accessible to portable scanner.
1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switchgear 11 months after date of Substantial Completion.
 2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 3. Record of Infrared Scanning: Prepare a certified report that identifies switchgear checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.06 Training

- A. Provide a minimum of 8 hours of training for the switchgear components and accessories provided at the customer's facility for operations, maintenance and service personnel.
1. The training session shall include classroom discussion on the theory of operation of the equipment, as well as maintenance and service methods for the purchased equipment.
 2. Topics covered shall include safety, hardware layout and functions, power and control wiring, diagnostic indicators, keypad/display interface, faults, diagnostic tools, troubleshooting, and preventive maintenance.
 3. Hands-on training shall be provided on equipment.
 4. Documentation shall be provided which shall include actual manuals for the equipment and drawings and schematics of equipment supplied for this project.
- B. The Owner at their option shall be allowed to video record all training sessions for future reference.

3.07 Grounding

Low-Voltage Switchgear

- A. Provide equipment grounding connections for switchgears as indicated. Tighten connections to comply with tightening torques specified in UL 486A to assure permanent and effective grounding.

3.08 Adjusting

- A. Set field-adjustable, protective-relay trip characteristics according to results in DIVISION 26, Section "Overcurrent Protective Device Coordination Study."

3.09 Cleaning

- A. On completion of installation, inspect interior and exterior of switchgear. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

3.10 Protection

- A. Temporary Heating: Apply temporary heat to switchgear, according to manufacturer's written instructions, throughout periods when switchgear environment is not controlled for temperature and humidity within manufacturer's stipulated service conditions.

3.11 Demonstration

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain switchgear. Refer to DIVISION 01, Section "Manufacturer Services."
- B. Upon completion of installation of SPDs and associated electrical circuitry, energize circuitry and demonstrate functioning of equipment in accordance with manufacturer's requirements. Where possible, correct any malfunctioning units at the project site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and retest to demonstrate compliance.

END OF SECTION



City of Chattanooga Waste Resources Division
 Citico Pump Station Reliability Improvements
 Site Visit
 June 13, 2017

NAME	ORGANIZATION	ROLE	PHONE NO.	E-MAIL
Jesse Sutphin	John Bouchard	Electrical Estimator	615-405-4413	Jesse.Sutphin
Chris Jenkins	Nabeo Electric	Electrical	423-624-0073	cjenkins@nabeoelectric.com
T.J. Ackerman	Ruby Collins	GC	404-576-4982	tjackerman@ruby-collins.com
Mark Ramey	Ruby-Collins	GC	770-432-2900	mramey@ruby-collins.com
KEVIN SHEMWELL	REYNOLDS	GC	770.969.4040	KEVIN.SHEMWELL@REYNOLDSCON.COM
OWEN S. YOCUM	JUDY CONST. CO.	GC	859-234-6900	OWEN@JUDYCONSTRUCTIONCO.COM

QUESTION AND RESPONSE NO. 1

**CITICO PUMP RELIABILITY IMPROVEMENTS
City of Chattanooga Project W-16-013-201
Burns & McDonnell Project 95307**

CITY OF CHATTANOOGA, TENNESSEE

The following responses are provided to bidder requests for information:

- 1) Specification Section 00 11 16 – Advertisement for Bids

Question: Based on the proximity of the current bid date (June 29, 2017) to the July 4th holiday and other jobs bidding, we request the bid due date be extended until the week of July 10, 2017.

Response: No Change.

- 2) Specification Section 01 51 43 – Temporary Bypass Pumping

Question: Please confirm the design of the temporary bypass pumping of the existing wastewater flows should be based on a maximum 45 MGD.

Response: See Future Addendum.

- 3) Specification Section 09 67 23 – Resinous Flooring

Question: Request to add FloRock FloroQuartz BC & FloroThane MC100 to approved manufacturers.

Response: FloRock product presented does not meet specified required compressive strength and will not be approved.

- 4) Specification Section 23 42 00 – Air Phase Filtration

Question: Request to add Perry Fiberglass Products to approved manufacturers.

Response: "Or Equal" submittal did not conform to Section 01 25 00 Paragraph 1.05.B.4

- 5) Specification Section 26 05 36 – Cable Trays for Electrical Systems

Question: Are there any specifics for the cable tray PS-CT-003 exterior supports?

Response: Cable tray supports shall conform to Paragraph 3.01 with other requirements for supports as specified in Section 26 05 33 Paragraph 2.10, and as applicable by reference.

- 6) Specification Section 33 01 30.17 – Sonar Sewer Inspection

Question: Can further information be provided regarding the work associated with Sonar Sewer Inspection, including length of pipe to be inspected for both diameters, confirm pipe

QUESTION AND RESPONSE NO. 1

material is DIP, and are there current locations to receive equipment on the other end, if so, please provide details.

Response: Contractor shall be responsible for performing condition assessment of the existing 30- and 48-inch wastewater force mains which cross the Tennessee River from south to north, originating at the Citico Pump Station. Blind-flange access points shall be installed adjacent to Citico Pump station in accordance with the Drawings, refer to Sheets C107 and C301. Contractor shall execute testing and submit report of condition assessment in accordance with Section 33 13 30.17. Existing 30-inch force main is approximately 2,100-feet in length from the new access point to the existing junction box on the north side of the river, of which approximately 600 LF is 30-inch Class 51 DIP and approximately 1,500 LF is 30-inch concrete pressure pipe of unknown specification. The concrete pressure pipe section is centered on the river, with DIP on either end. The existing 48-inch force main is Class 56 DIP and is approximately 2,000-feet in length from the new access point to the junction box on the north side of the river. Both force mains terminate at the same existing junction box on the north side of the river, where the flow transitions to gravity interceptor. Refer to Addendum 3 Item 3. Record drawings of existing river crossing force mains have been attached to Addendum 3 for reference.

7) Specification Section 33 23 22.01 – Sump Pump

Question: Request to add ABS to approved manufacturers for sump pumps.

Response: “Or Equal” submittal did not conform to Section 01 25 00 Paragraph 1.05.B.5

8) Specification Section 33 32 23 – Grinders

Question: Request to add Franklin Miller to approved manufacturers.

Response: “Or Equal” submittal did not conform to Section 01 25 00 Paragraph 1.05.B.5

9) Specification Section 35 20 16 – Slide Gates

Question: Request to add Coldwell-Wilcox Technologies to approved manufacturers.

Response: “Or Equal” submittal did not conform to Section 01 25 00 Paragraph 1.05.B.5

Question: Request to clarify requirement in Paragraph 2.02.B.2.b regarding material of internal gate frame for non-metal gates.

Response: Only exposed steel is required to be stainless steel. Internal reinforcing for non-metal gates is not required to be stainless steel. Refer to Addendum 3 Item 2.

10) Sheet C107 – Utility Plan

Question: Can the City of Chattanooga or the Engineer provide the class of pipe and pipe lengths (between joints) for the existing 72” RCP line between the existing junction box and existing Citico Pump Station?

QUESTION AND RESPONSE NO. 1

Response: Record Drawings and construction photos indicate the gravity interceptor entering Citico Pump Station from the north is tongue-and-groove 72-inch RCP. Specifications of this pipe are not known. Construction photos indicate first length of pipe north of the pump station may be approximately 20-feet long. Lay-lengths between joints north of this first segment are unknown. Refer to Figure 1 below.

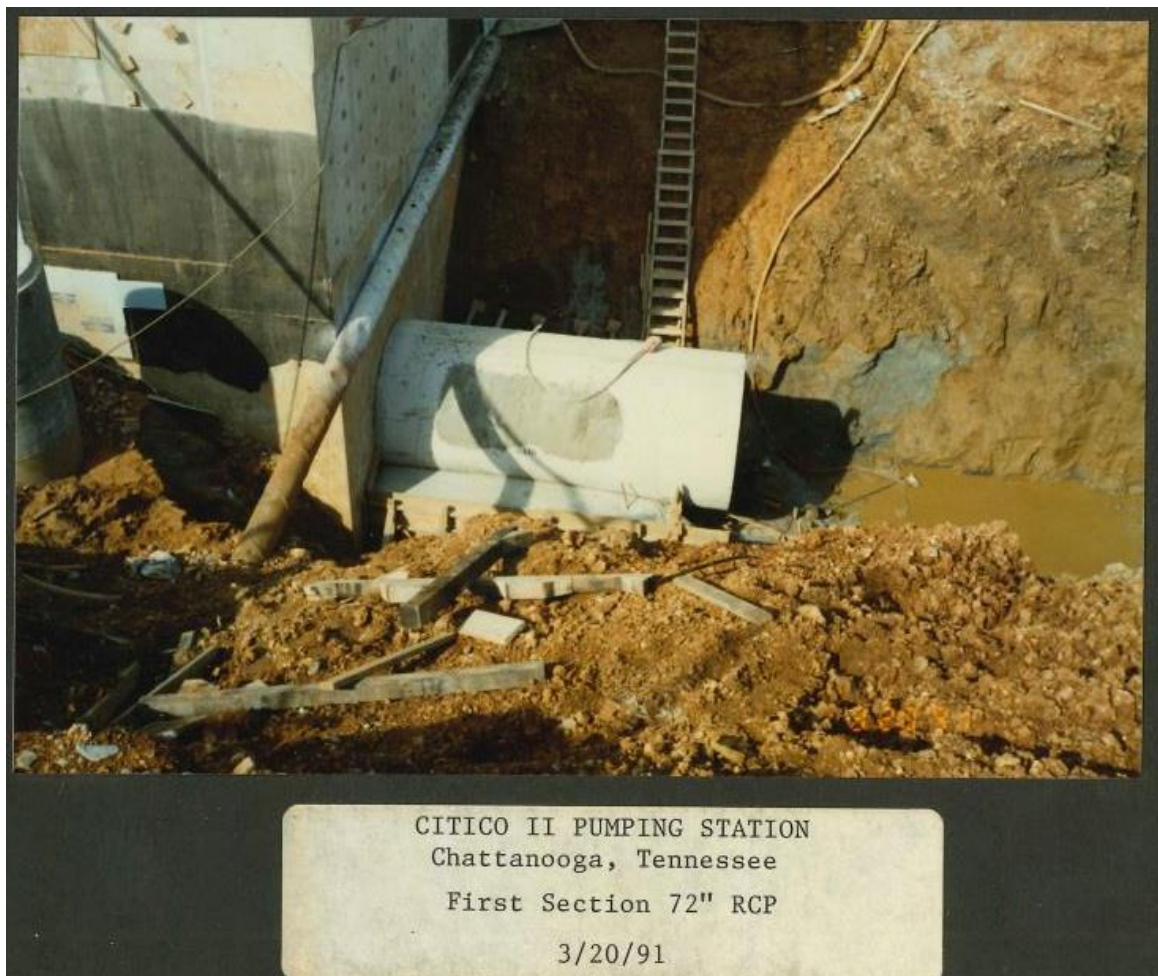


Figure 1 - 72-inch RCP Construction Photograph

11) Sheet E103 – Pump Station Power Plan

Question: Sheet E103 and E602 indicate an existing 800-Amp switch, CSO-DSW-002. This switch does not appear to be existing.

Response: CSO-DSW-002 is the 800A switch for the service to the CSO-PDP-020 and will be installed under the current contract for the CSO Effluent Pumps. Thus, this switch will be existing when the Citico Pump Reliability Improvements project begins construction.

Question: Where is the existing pump station main PLC located?

QUESTION AND RESPONSE NO. 1

Response: The existing pump station PLC is located in the Existing Pump Station Control Panel as identified in the Electrical Room on Sheet E103.

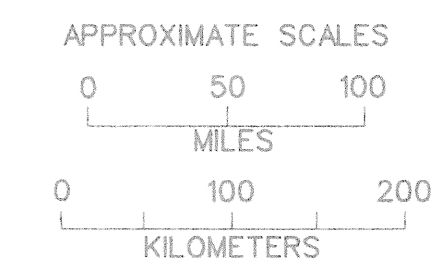
12) Sheet E107 – Pump Station Instrumentation and Control Plan

Question: Circuits P - PS-HVACCP 01, 02 does not appear on the cable schedule.

Response: Circuits P - PS-HVACCP 01 and P - PS-HVACCP 02 have been removed. Refer to Addendum 3 Item 5.

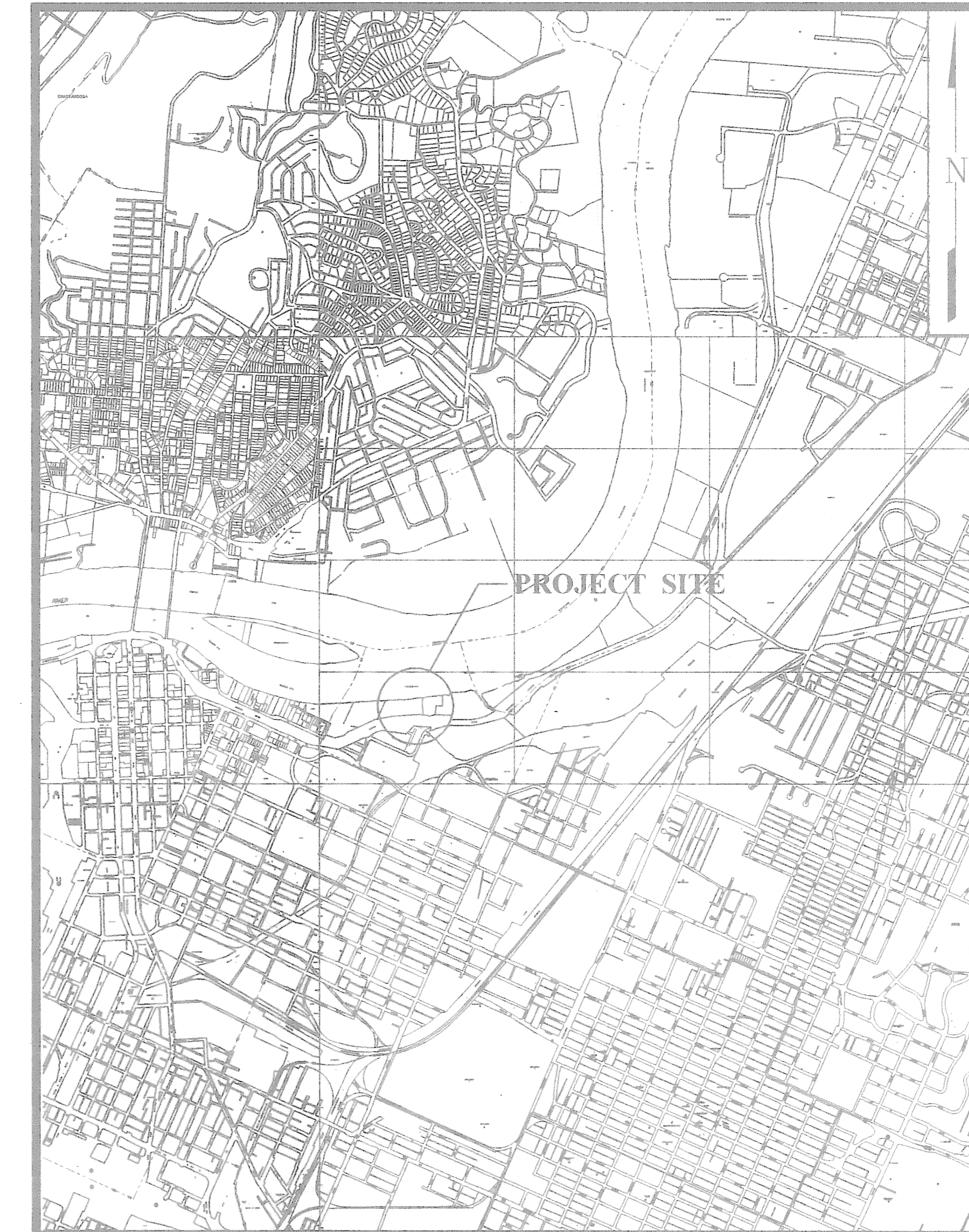
END OF QUESTION AND RESPONSE NO. 1

CITICO CSO CONTROL FACILITY CITY OF CHATTANOOGA, TENNESSEE CONTRACT NO. CSO-5b-99



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BORING LOGS, GRADING DETAILS AND EROSION CONTROL DETAILS	98049 - 5.0
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LOCATION MAP

SCALE: 1" = 200'

JON KINSEY, MAYOR

CITY COUNCIL

JOHN LIVELY, CHAIRMAN
DAVE CROCKETT
DON EAVES
JOHN FRANKLIN, JR.
YUSUF HAKEEM
MAI BELL HURLEY
LEAMON PIERCE
MARTHA "MARTI" RUTHERFORD
JOHN TAYLOR

JACK C. MARCELLIS, ADMINISTRATOR
DEPARTMENT OF PUBLIC WORKS

PHILLIP LYNN, CITY ENGINEER

EUGENE G. WRIGHT, DIRECTOR
WASTE RESOURCES DIVISION

JAMES S. BONEY, FINANCE OFFICER
RANDALL NELSON, CITY ATTORNEY

PREPARED BY:

CTI CONSOLIDATED TECHNOLOGIES, INC.
ENGINEERS IN WATER AND EARTH SCIENCES
401 CHESTNUT STREET, SUITE 220
CHATTANOOGA, TN 37402

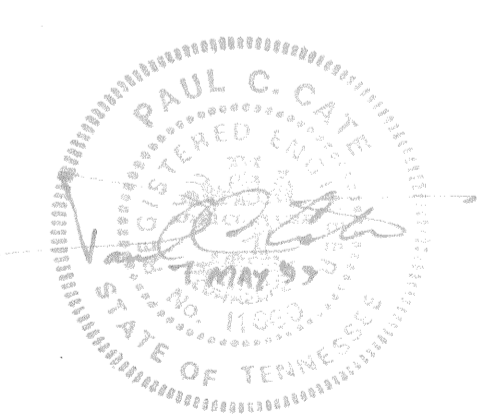
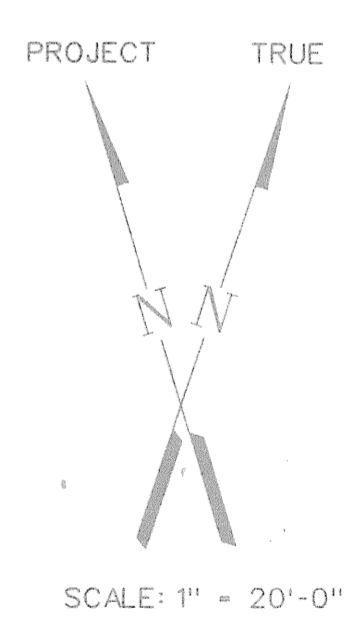
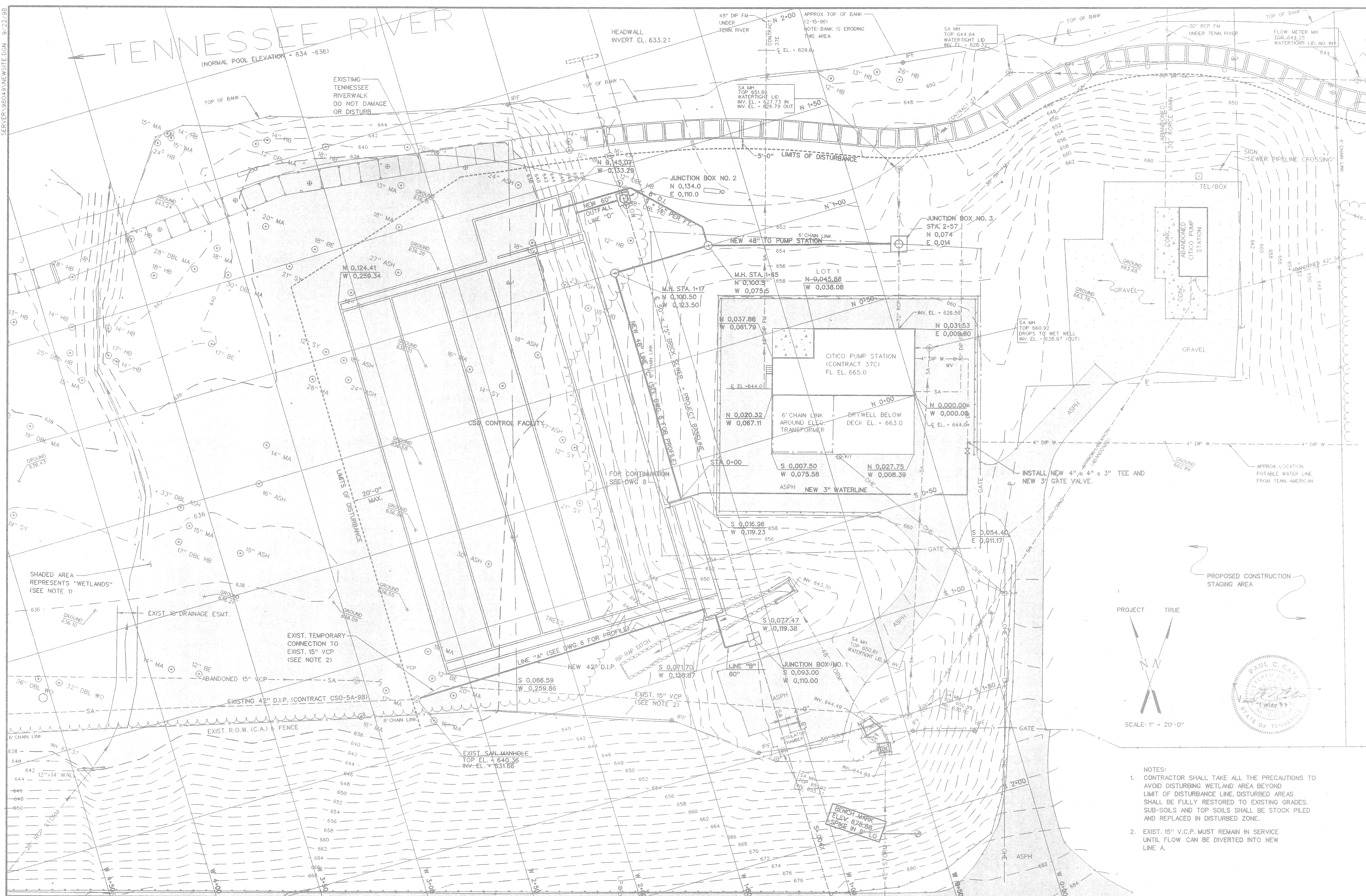

PAUL C. CATE, PE
TENNESSEE LICENSE NO. 11660

MAY 7, 1999
DATE

SERVER 98049 NEW SITE DCN 9/22/98

TENNESSEE RIVER

(NORMAL POOL ELEVATION = 634 -636)



- NOTES:
- CONTRACTOR SHALL TAKE ALL THE PRECAUTIONS TO AVOID DISTURBING WETLAND AREA BEYOND LIMIT OF DISTURBANCE LINE. DISTURBED AREAS SHALL BE FULLY RESTORED TO EXISTING GRADES. SUB-SOILS AND TOP SOILS SHALL BE STOCK PILED AND REPLACED IN DISTURBED ZONE.
 - EXIST. 15" V.C.P. MUST REMAIN IN SERVICE UNTIL FLOW CAN BE DIVERTED INTO NEW LINE A.

ISSUED FOR:	
REVIEW	
APPROVAL	
CONSTRUCTION	

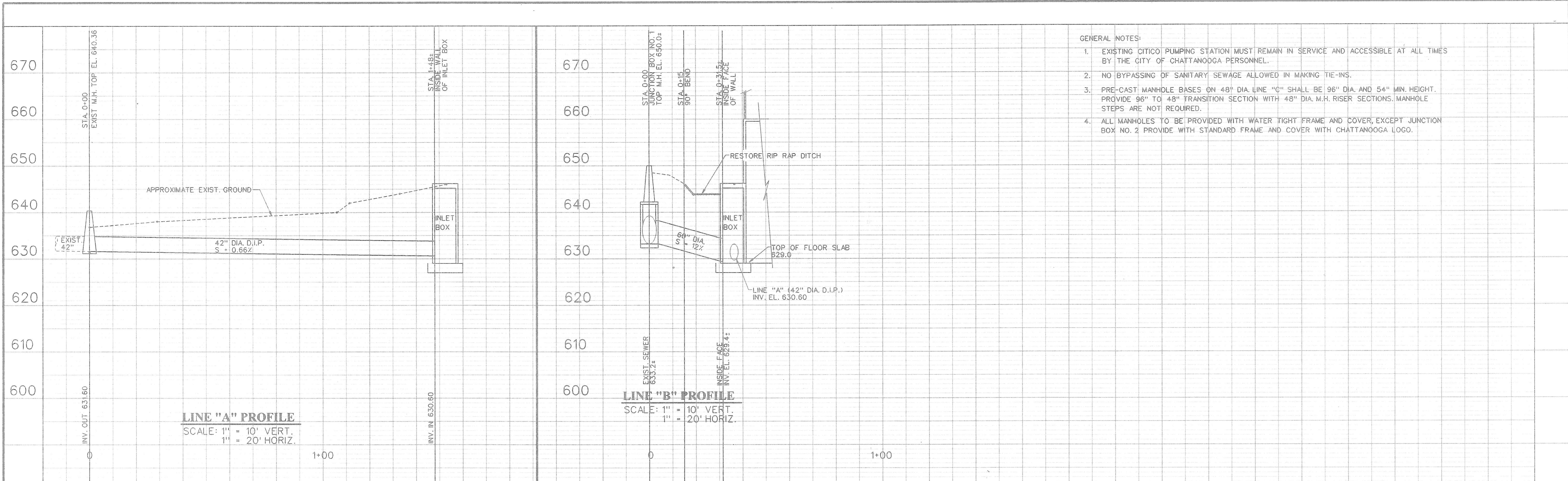
REV. NO.	RELEASED BY:	DATE	DESCRIPTION OF REVISION

CTI CONSOLIDATED TECHNOLOGIES, INC. ENGINEERS IN WATER AND EARTH SCIENCES CHATTANOOGA, TENNESSEE	DSGN:	A.D.S.	5/99
	DRWN:	J.M.D.	5/99
	CHK'D:	A.D.S.	5/99
	APPR:	P.C.C.	5/99

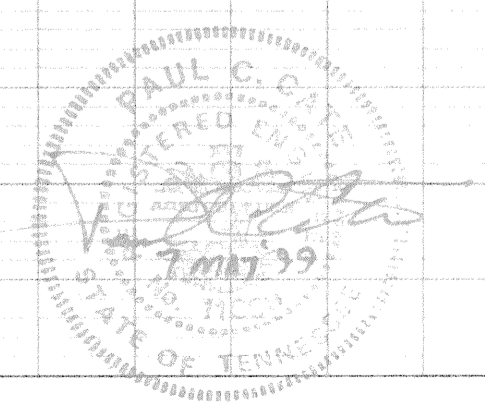
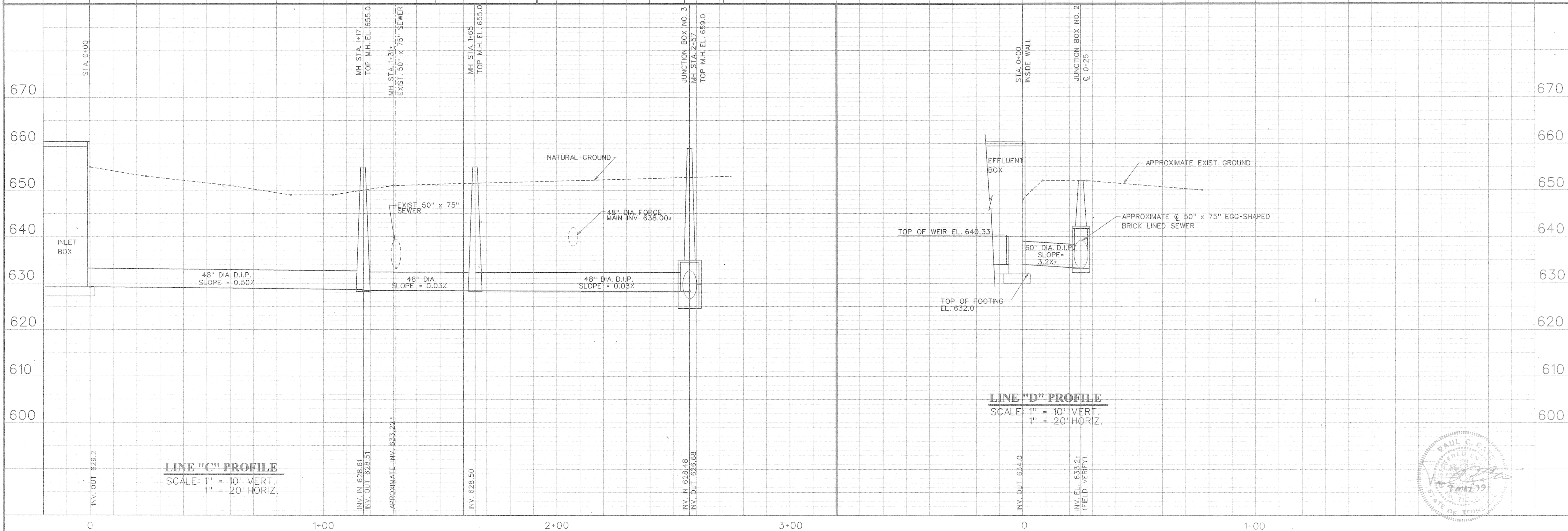
CITICO CSO CONTROL FACILITY
CITY OF CHATTANOOGA, TENNESSEE

SITE PLAN

JOB NUMBER	98049
DRAWING NUMBER	3.0



- GENERAL NOTES:
- EXISTING CITICO PUMPING STATION MUST REMAIN IN SERVICE AND ACCESSIBLE AT ALL TIMES BY THE CITY OF CHATTANOOGA PERSONNEL.
 - NO BYPASSING OF SANITARY SEWAGE ALLOWED IN MAKING TIE-INS.
 - PRE-CAST MANHOLE BASES ON 48" DIA. LINE "C" SHALL BE 96" DIA. AND 54" MIN. HEIGHT. PROVIDE 96" TO 48" TRANSITION SECTION WITH 48" DIA. M.H. RISER SECTIONS. MANHOLE STEPS ARE NOT REQUIRED.
 - ALL MANHOLES TO BE PROVIDED WITH WATER TIGHT FRAME AND COVER, EXCEPT JUNCTION BOX NO. 2 PROVIDE WITH STANDARD FRAME AND COVER WITH CHATTANOOGA LOGO.



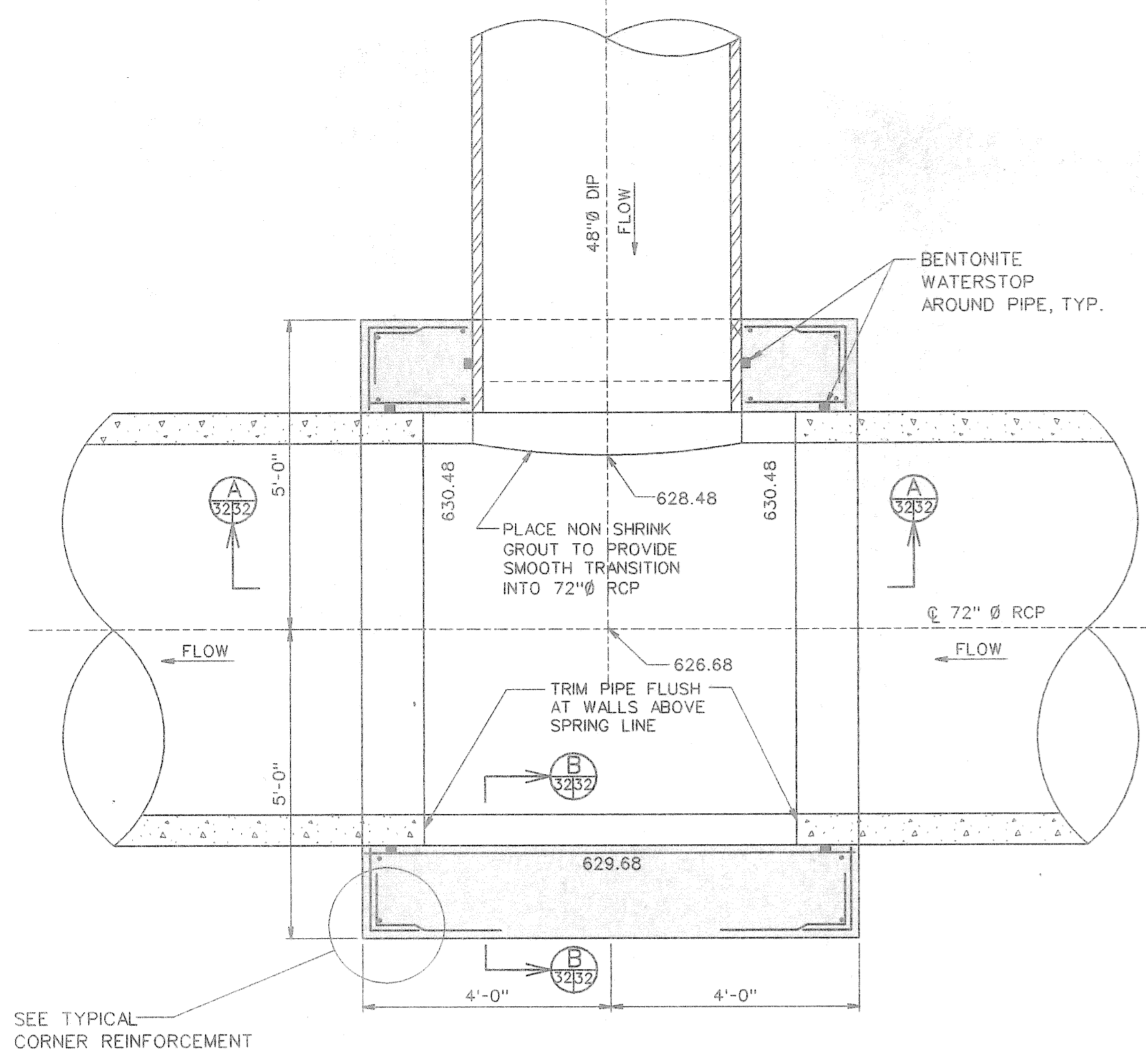
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CITICO CSO CONTROL FACILITY
CITY OF CHATTANOOGA, TENNESSEE

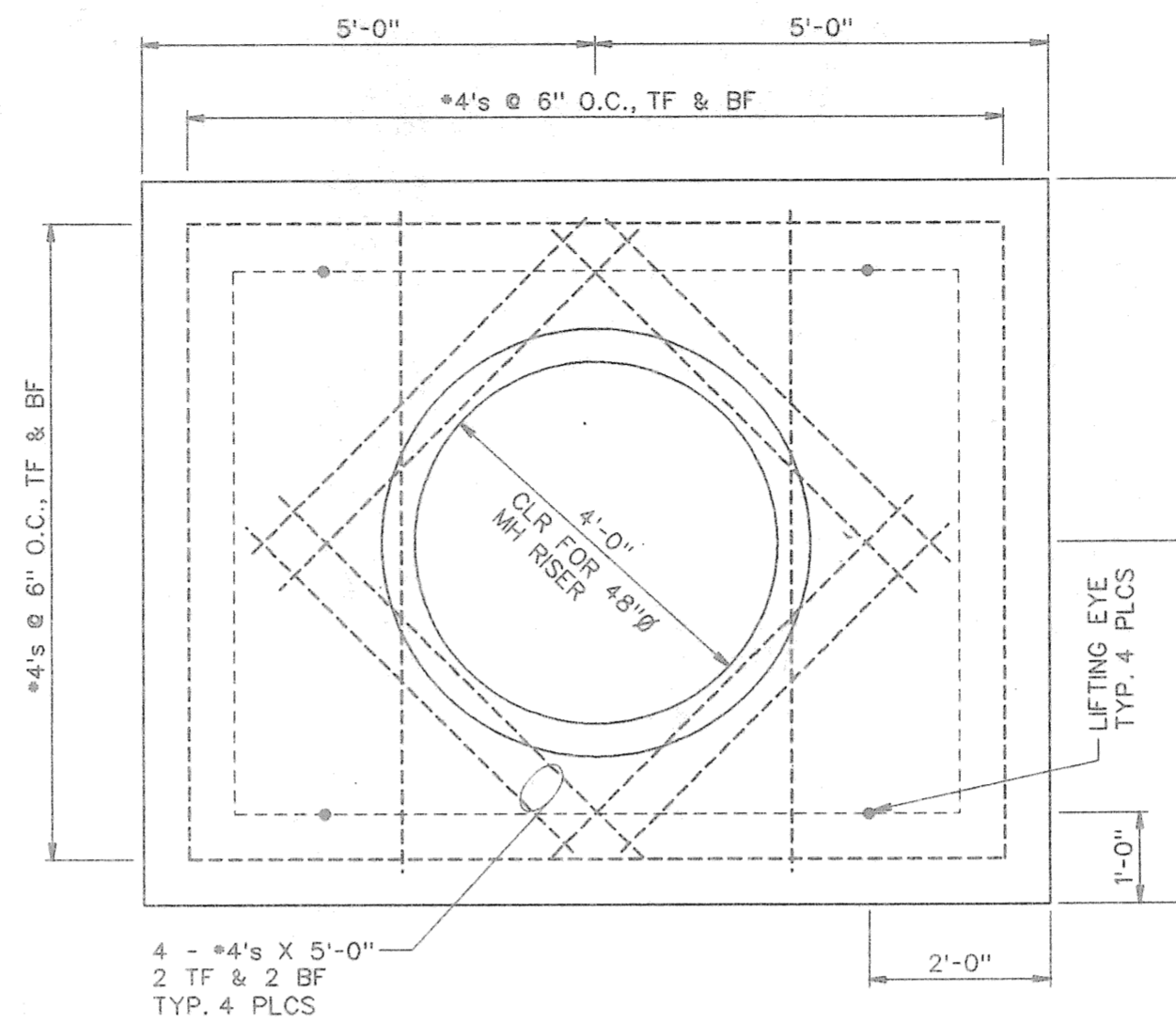
SEWER LINES A,B,C, & D
PROFILES

JOB NUMBER: 98049
DRAWING NUMBER: 6.0

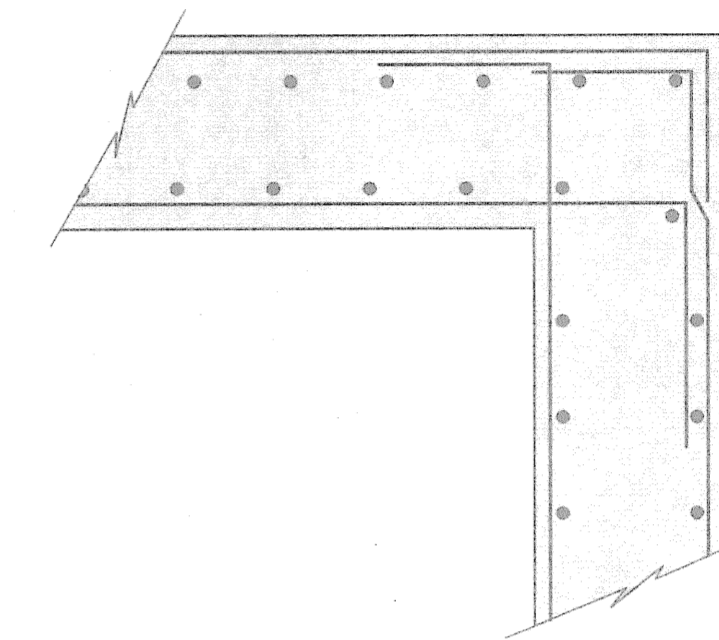


SEE TYPICAL CORNER REINFORCEMENT

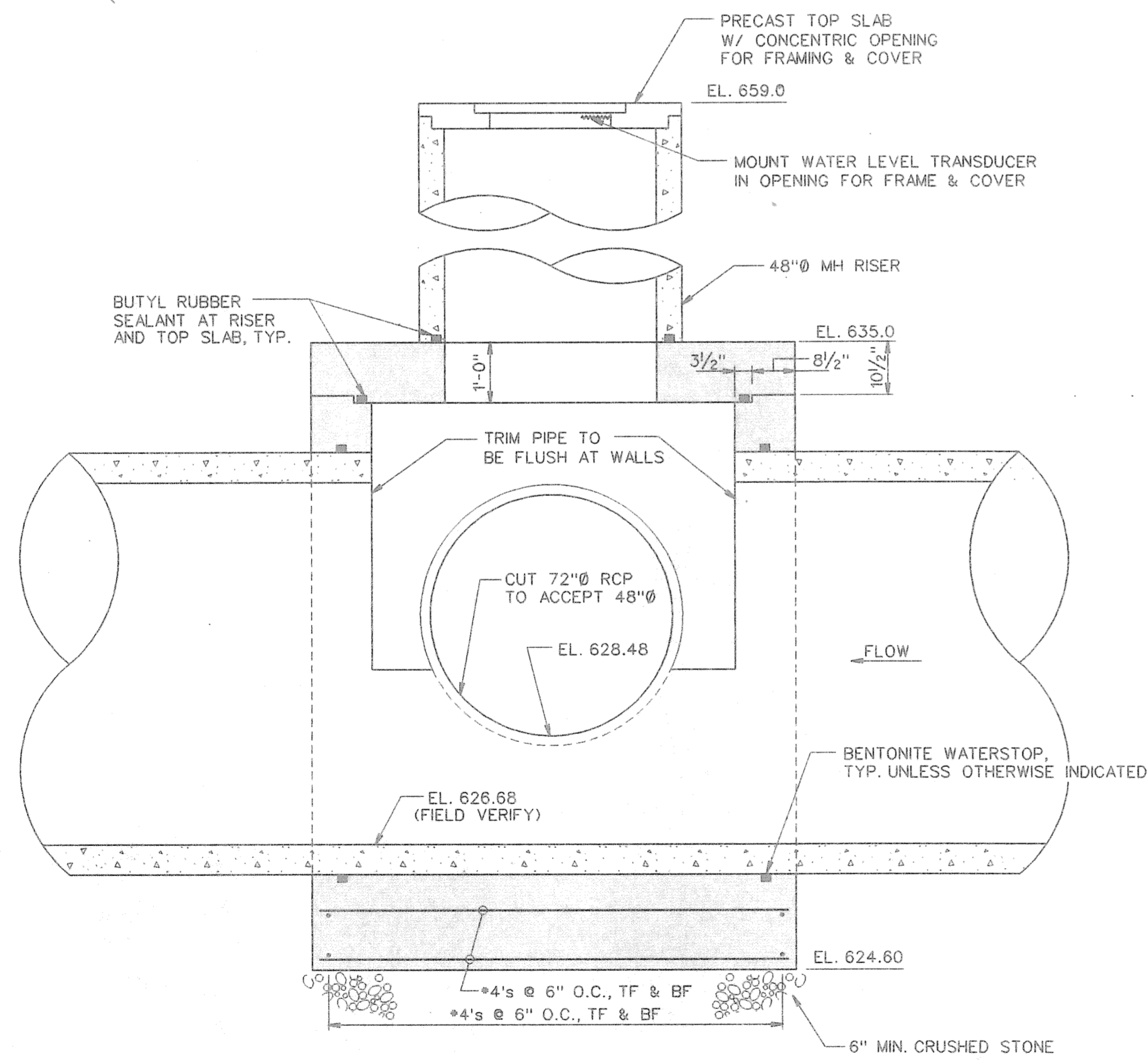
SECTIONAL PLAN
SCALE: 1/2" = 1'-0"



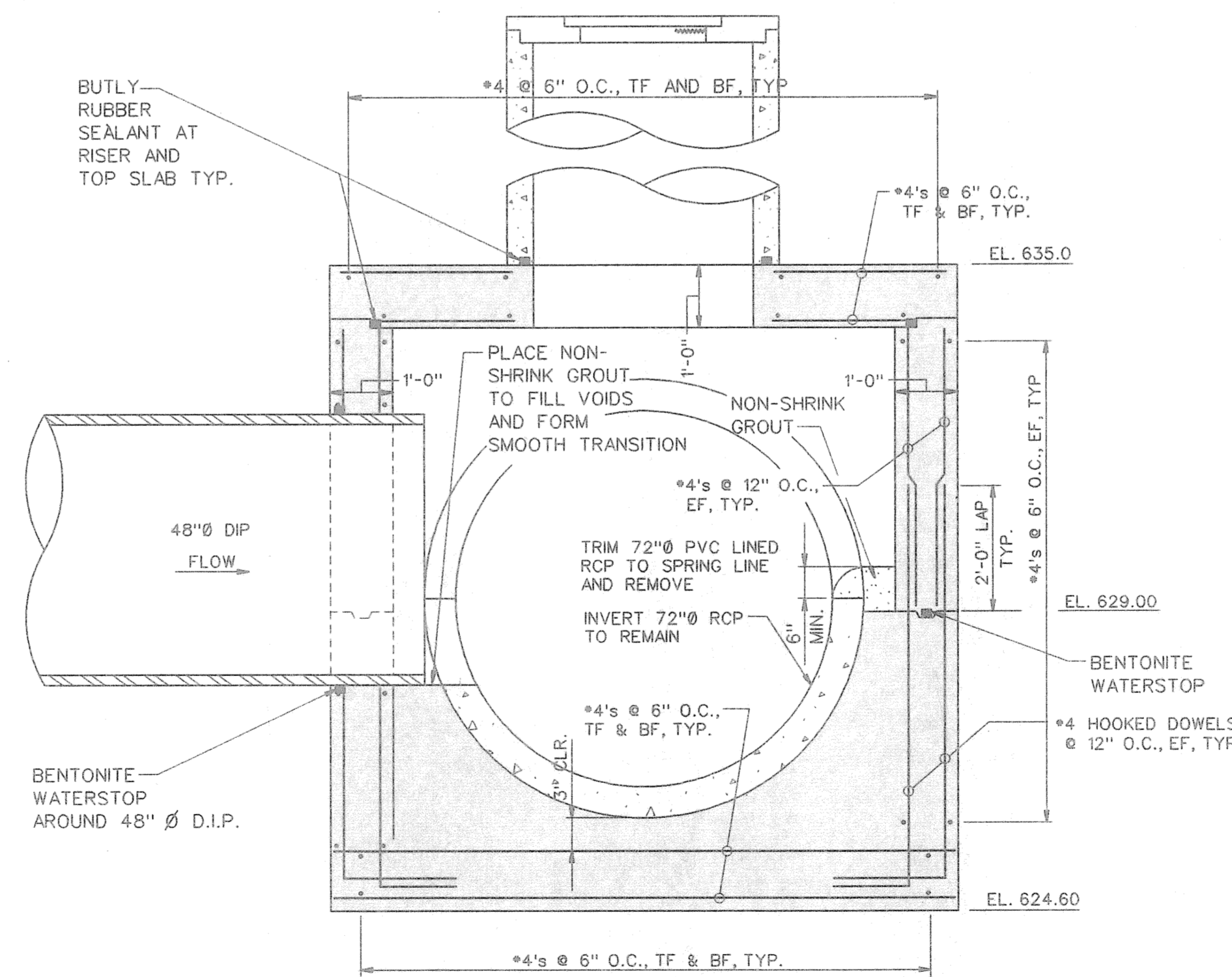
PLAN
SCALE: 1/2" = 1'-0"



TYPICAL CORNER REINFORCEMENT
SCALE: 1" = 1'-0"



SECTION A
SCALE: 1/2" = 1'-0"



SECTION B
SCALE: 1/2" = 1'-0"

PROPOSED CONSTRUCTION SEQUENCE

THE FOLLOWING IS A SEQUENCE PROPOSED FOR THE CONSTRUCTION OF THE JUNCTION BOX. THE CONTRACTOR IS NOT REQUIRED TO ADHERE TO THIS PROCEDURE. USE OF THIS PROCEDURE DOES NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITIES OUTLINED IN THE PROJECT DOCUMENTS. THE CONTRACTOR MUST SUBMIT THE PROCEDURE IN WRITING PRIOR TO BEGINNING WORK. THE 72" RCP CARRIES BOTH SANITARY AND STORM SEWER FLOWS. THE CONTRACTOR SHALL COORDINATE WORK WITH MOCCASSIN BEND WASTEWATER TREATMENT PLANT PERSONNEL.

- UPON EXCAVATING AT THE 72" RCP, PLACE 48" DIP AGAINST OUTER WALL OF THE 72" RCP AT THE PROPER ALIGNMENT AND ELEVATION.
- TRIM PIPE AT SPRING AS SHOWN. TRIM PIPE TO BE FLUSH AT UPSTREAM AND AND DOWNSTREAM WALLS OF JUNCTION BOX.
- LOCALLY REMOVE SIDE OF 72" RCP AT THE OUTLET OF THE 48" DIP. PLACE NONSHRINK GROUT TO FILL ANY VOIDS OR OVERCUTS IN THIS AREA.
- CONSTRUCT REMAINING PORTIONS OF JUNCTION BOX AS SHOWN.

ISSUED FOR:	
REVIEW:	
APPROVAL:	
CONSTRUCTION:	

REV. NO.	RELEASED BY:	DATE	DESCRIPTION OF REVISION

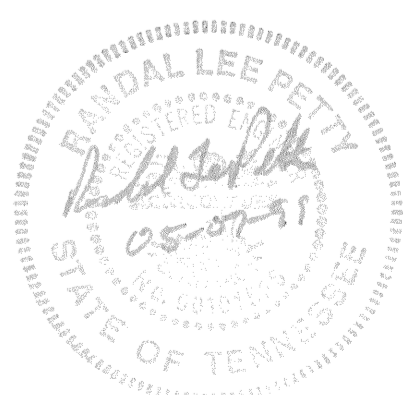
CTI CONSOLIDATED TECHNOLOGIES, INC.
ENGINEERS IN WATER AND EARTH SCIENCES
CHATTANOOGA, TENNESSEE

DSGN:	RLP
DRWN:	SAH
CHK'D:	RLP
APPR:	PCC

CITICO CSO CONTROL FACILITY
CITY OF CHATTANOOGA, TENNESSEE

JUNCTION BOX #3

JOB NUMBER	98049
DRAWING NUMBER	32.0

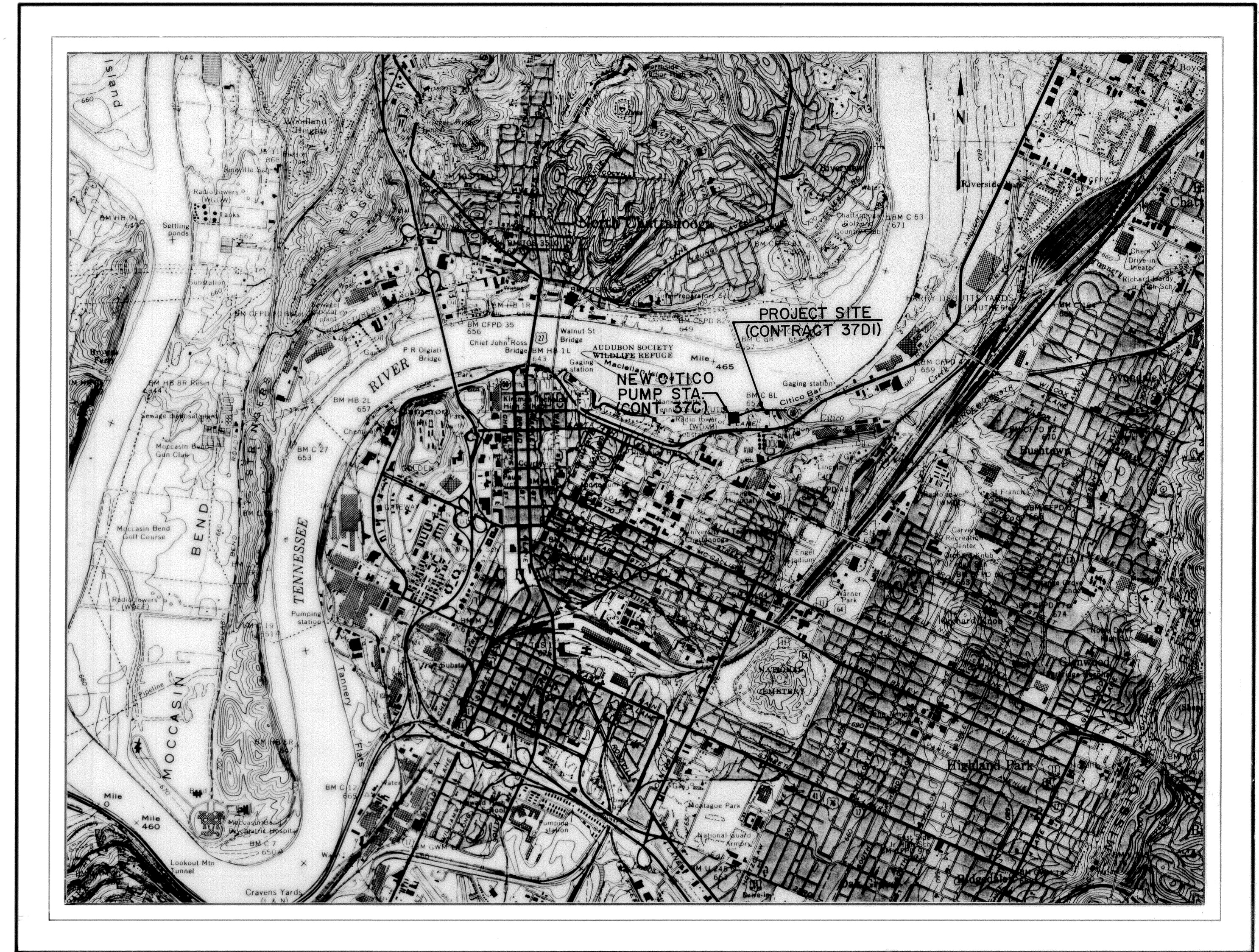


CITY OF CHATTANOOGA, TENNESSEE

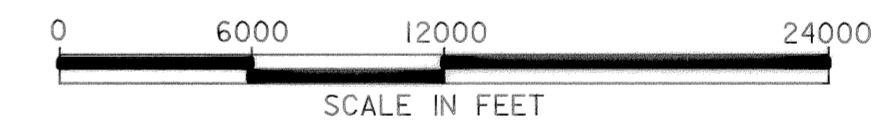
INTERCEPTOR SEWER SYSTEM LOWER AMNICOLA PARALLEL INTERCEPTOR I CONTRACT 37DI

INDEX OF DRAWINGS

<u>NAME OF DRAWING</u>	<u>DRAWING NO.</u>
TITLE SHEET	6967-37D1-1
PLAN & PROFILE	6967-37D1-2
JUNCTION CHAMBER (PLAN & SECTIONS)	6967-37D1-3
EXISTING REGULATOR CHAMBER	6967-37D1-3A
SEWER PIPE BRIDGE (PLAN & DETAILS)	6967-37D1-4 THRU 6
STANDARD SEWER MANHOLES	6967-37D1-7 & 8
PIPE SEWER DATA	6967-37D1-9 THRU 11
CAST-IN-PLACE & PRECAST MANHOLE BASES & ELBOWS	6967-37D1-12
CROSS SECTIONS	6967-37D1-13 & 14



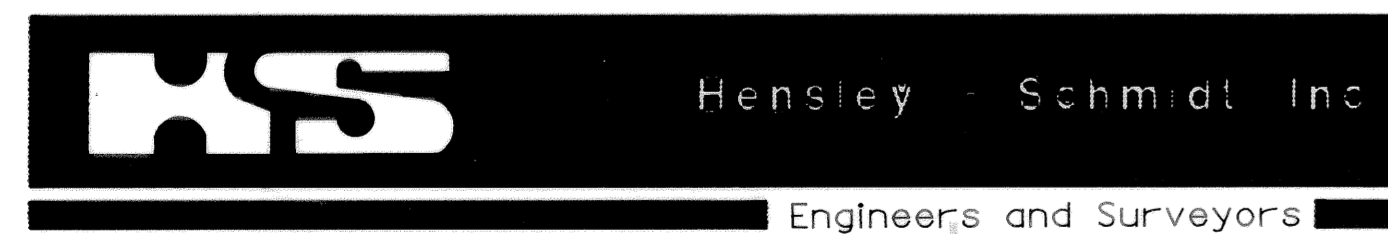
LOCATION MAP



GENE ROBERTS, MAYOR

BILL ALLEN, CITY ENGINEER

PREPARED BY :



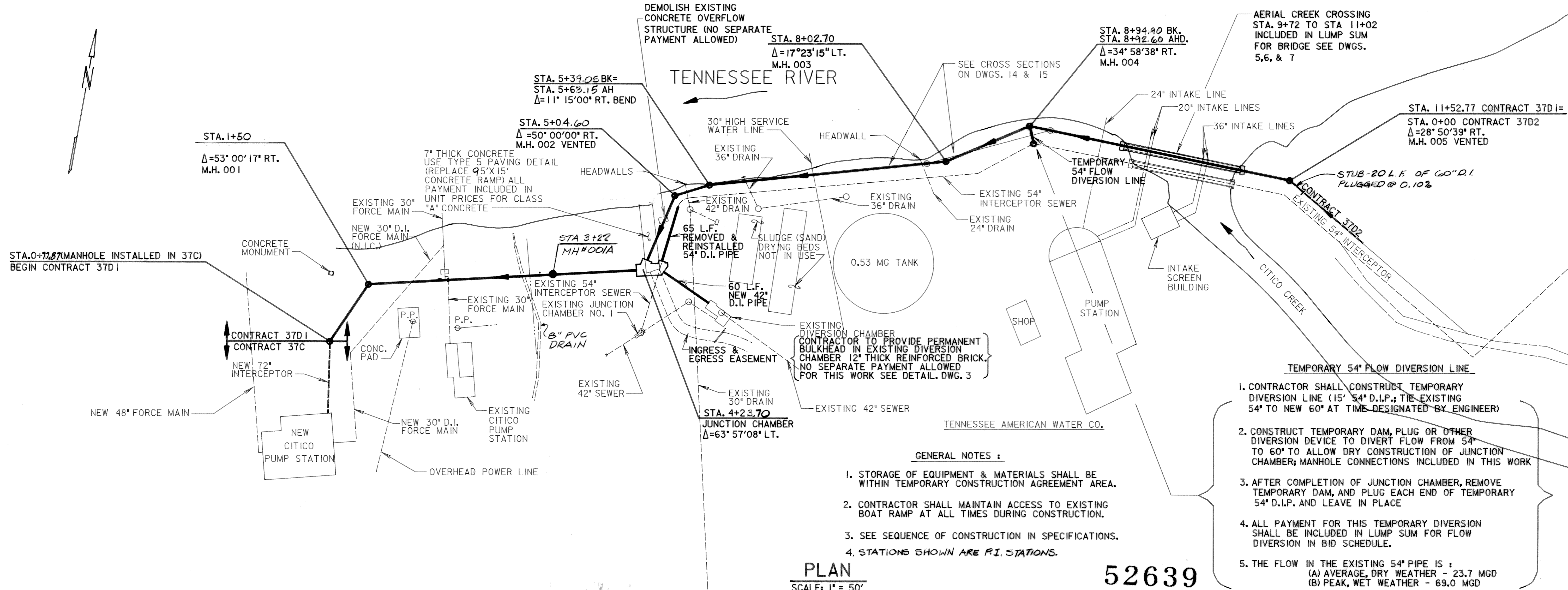
A member of The SNC Group

CHATTANOOGA, TENNESSEE

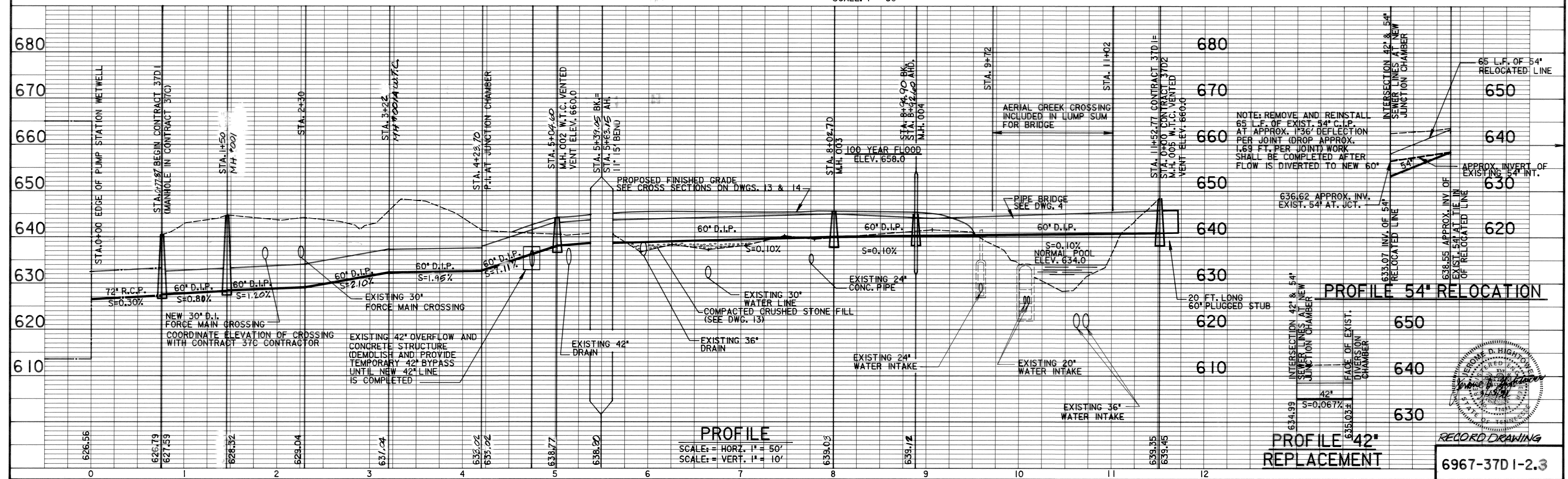
ATLANTA, GEORGIA

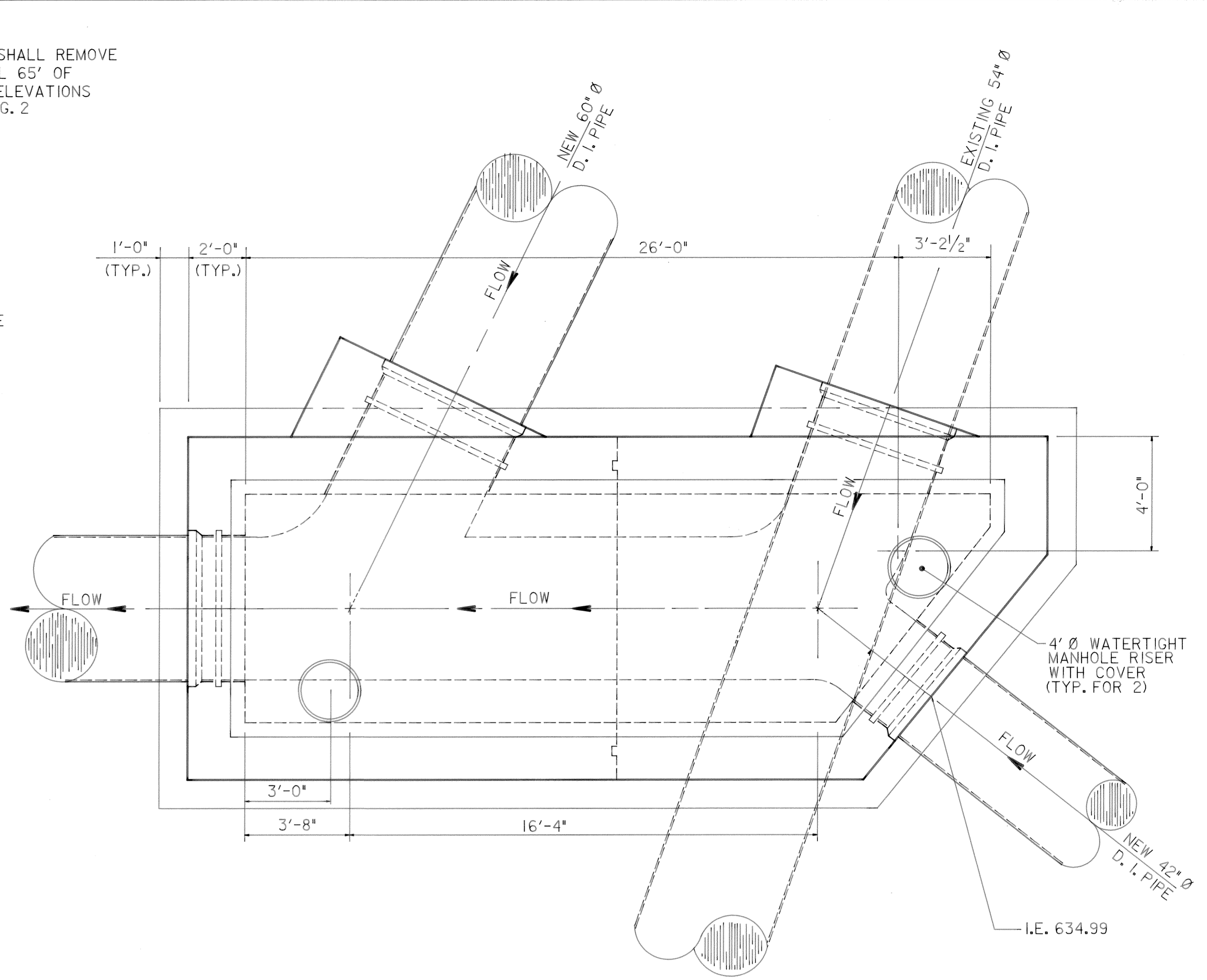
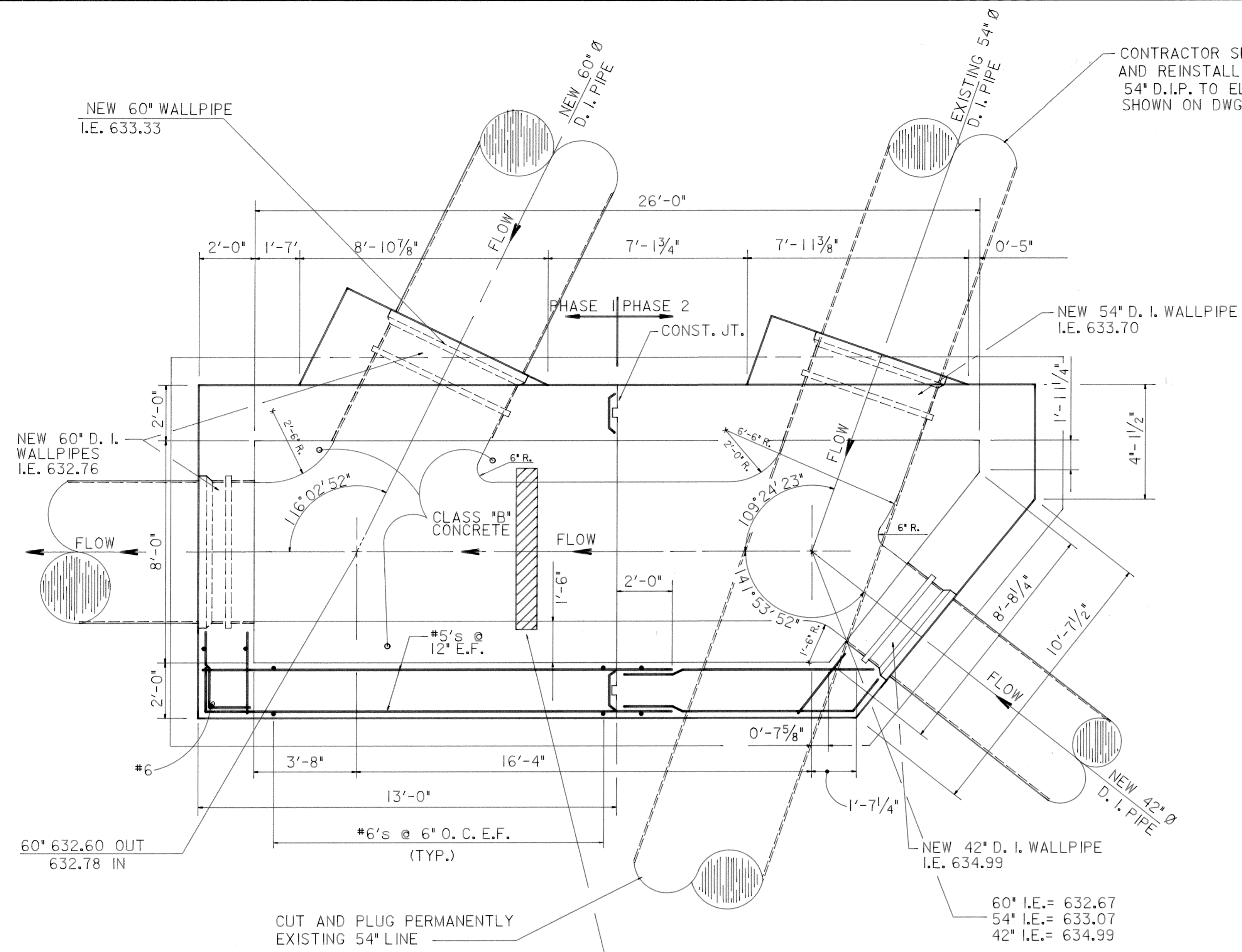
Jerome D. Hightower
JEROME D. HIGHTOWER
TN. LICENSE NO. 11411

7/25/90
DATE



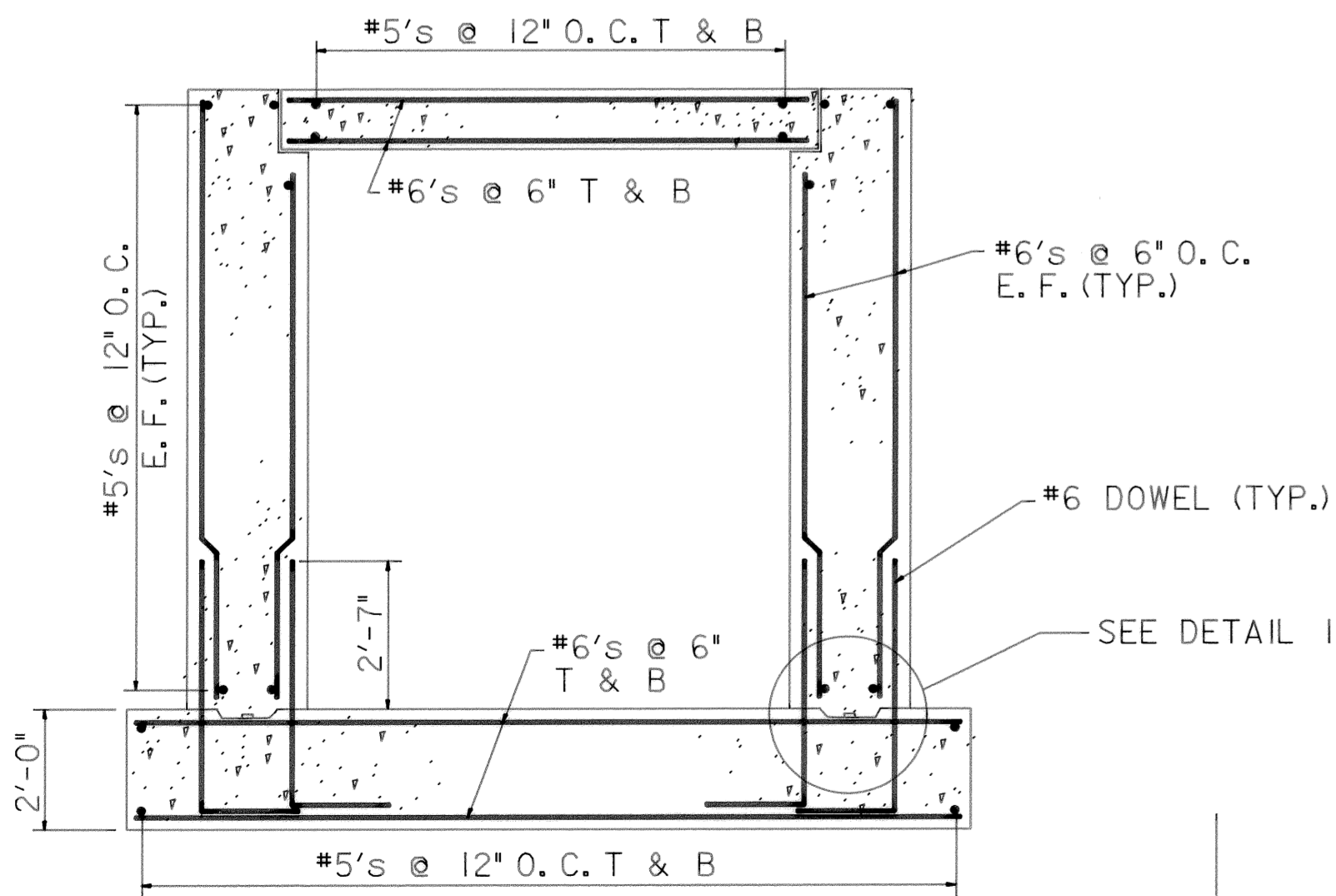
PLAN
SCALE: 1" = 50'
52639





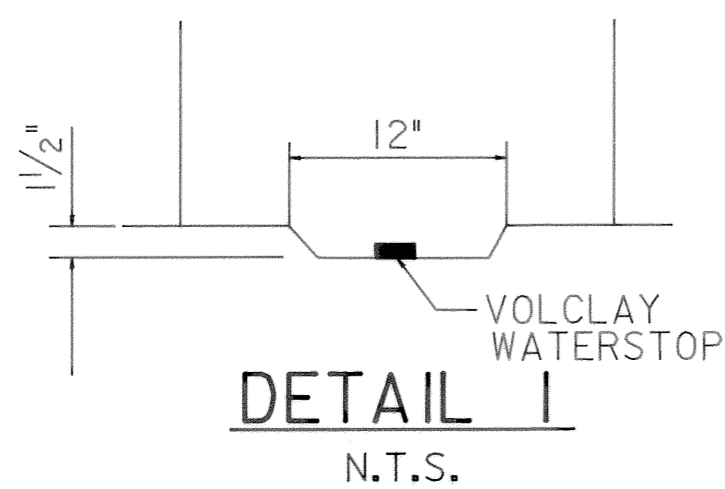
PLAN

SCALE: 3/8" = 1'



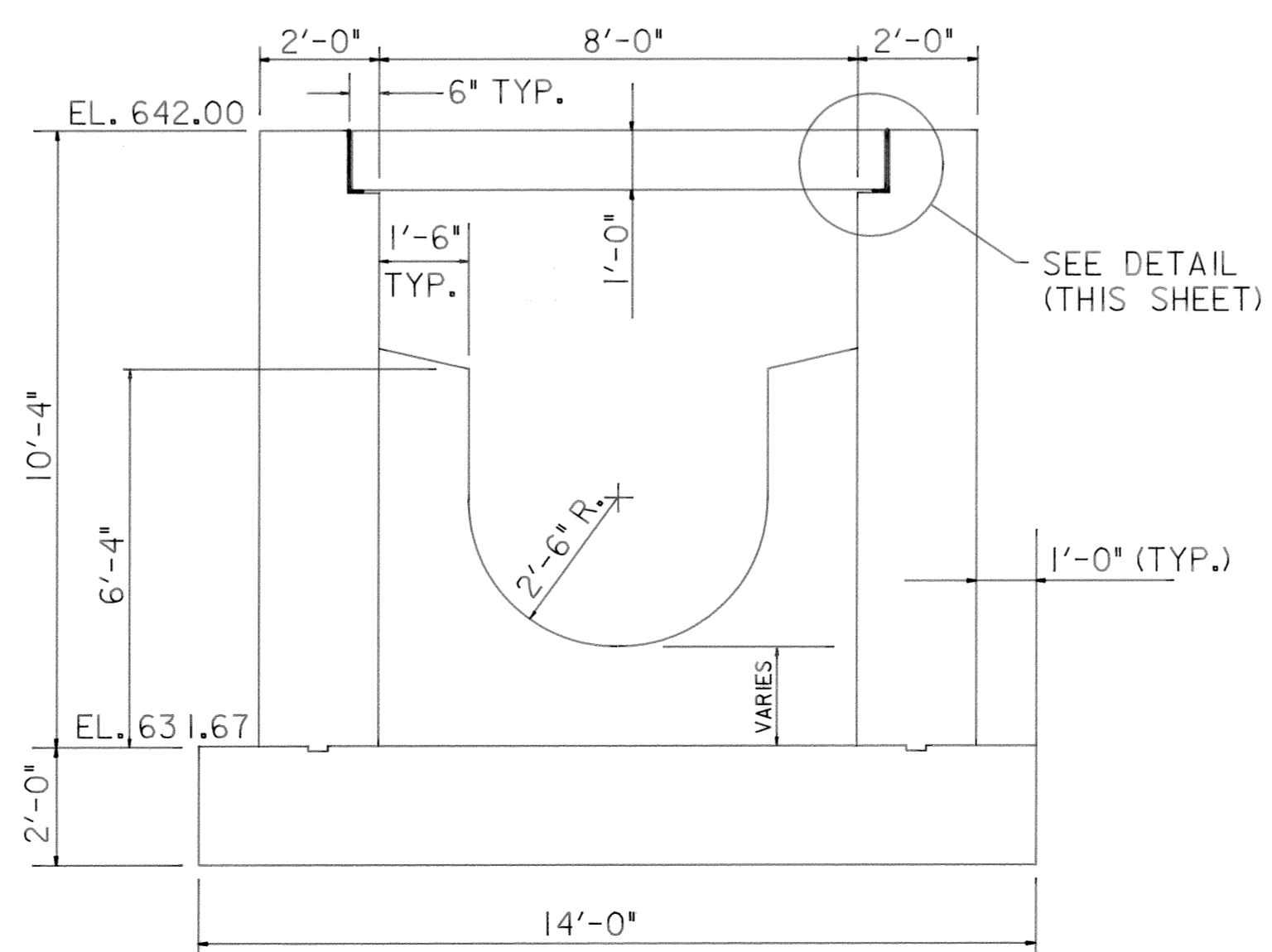
SECTION A-A

SCALE: 3/8" = 1'



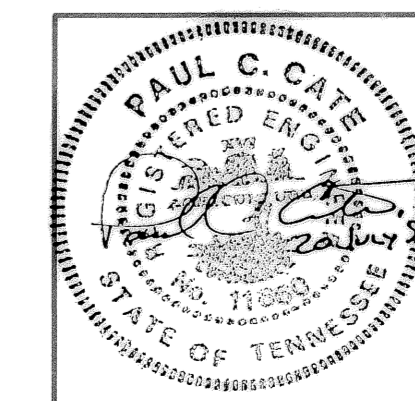
DETAIL I

N.T.S.



JUNCTION CHAMBER CONSTRUCTION SEQUENCE

1. CONTRACTOR SHALL COMPLETE PHASE 1 OF JUNCTION CHAMBER AND INSTALLATION OF ALL PIPE (STA 0+76 TO 11+52). CONSTRUCT 54" FLOW DIVERSION LINE AT STA. 11+52 AND TEMPORARY BYPASS IN 42" OVERFLOW LINE NEAR STA. 4+75.
2. AFTER NEW CITICO PUMPING STATION IS PLACED INTO OPERATION (AT TIME DESIGNATED BY THE OWNER), CONTRACTOR SHALL DIVERT FLOW FROM EXISTING 54" INTO NEW 60" AT STATION 11+52 (SEE DWG. 2)
3. CONTRACTOR SHALL THEN COMPLETE PHASE 2 OF JUNCTION CHAMBER, INCLUDING INSTALLATION OF NEW 42" STUB AND RELOCATION OF PORTION OF EXISTING 54". PROVIDE TEMPORARY PLUG IN 42" STUB AT JUNCTION CHAMBER.
4. AFTER COMPLETION OF ITEM 3, REMOVE TEMPORARY BULKHEAD, THEN REMOVE TEMPORARY FLOW DIVERSION AT STA. 11+52, RESTORING FLOW IN EXISTING 54". PLUG 34" FLOW DIVERSION LINE AS NOTED ON DWG. 2.
5. CONSTRUCT REMAINDER OF NEW 42" LINE BETWEEN JUNCTION CHAMBER AND EXISTING DIVERSION CHAMBER. CONSTRUCT PERMANENT BULKHEAD IN EXISTING DIVERSION CHAMBER AND DIVERT FLOW INTO NEW 42".



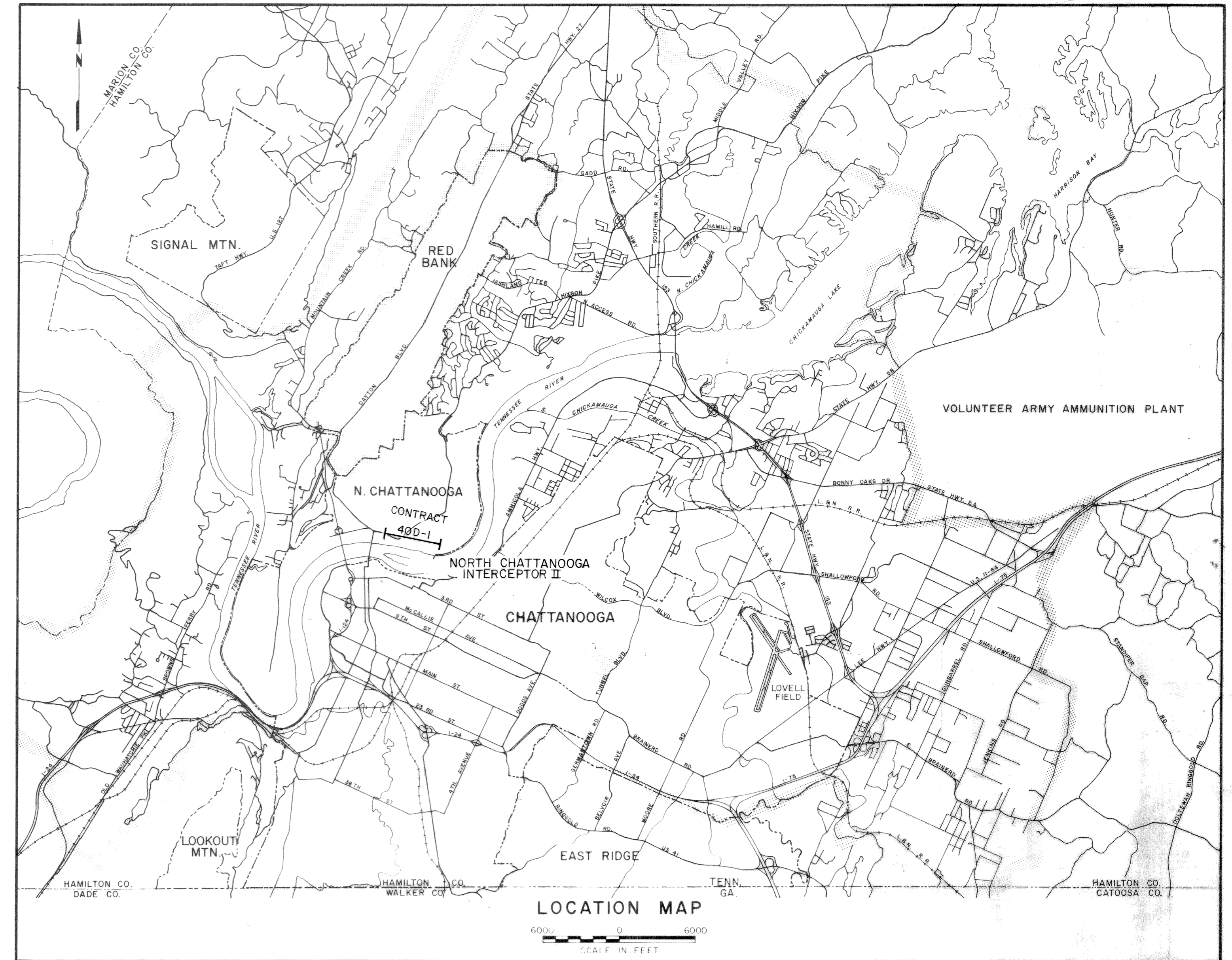
REV. NO.	RELEASED BY	DESCRIPTION OF REVISION
LOWER ANNICOLA PARALLEL INTERCEPTOR I		
JUNCTION CHAMBER PLAN AND SECTIONS		
CITY OF CHATTANOOGA, TENNESSEE		
DSGN	P.C.C.	7/90
DRWN	CADD/GR	7/90
CHKD	J.D.H.	7/90
APPR	G.M.C.	7/90
HENSLY - SCHMIDT, INC. ENGINEERS AND SURVEYORS ATLANTA • CHATTANOOGA RALEIGH • ORLANDO		DRAWING NO. 6967-37D1-3.0

CITY OF CHATTANOOGA, TENNESSEE

INTERCEPTOR SEWER SYSTEM NORTH CHATTANOOGA INTERCEPTOR II CONTRACT 40D-1

DRAWING INDEX

TITLE	DWG. NO.
TITLE SHEET	6709-40D-1-1
GENERAL PLAN	6709-40D-1-2
PLAN & PROFILES	6709-40D-1-3
JUNCTION CHAMBERS	6709-40D-1-4 & 5
EXISTING JUNCTION CHAMBER	6709-40D-1-6
STANDARD SEWER MANHOLES	6709-40D-1-7 & 8
PIPE SEWER DATA	6709-40D-1-9 thru 11
PRECAST AND CAST-IN-PLACE MANHOLES	6709-40D-1-12



BOARD OF COMMISSIONERS

GENE ROBERTS
MAYOR

JOHN P. FRANKLIN
VICE MAYOR

PAUL F. CLARK
COMMISSIONER

JAMES C. EBERLE
COMMISSIONER

L. THOMAS KENNEDY
COMMISSIONER

51787

PREPARED BY
HENSLEY-SCHMIDT, INC.
CHATTANOOGA, TENNESSEE

MELVIN L. DOWNS
TENNESSEE LICENSE NO. 5112

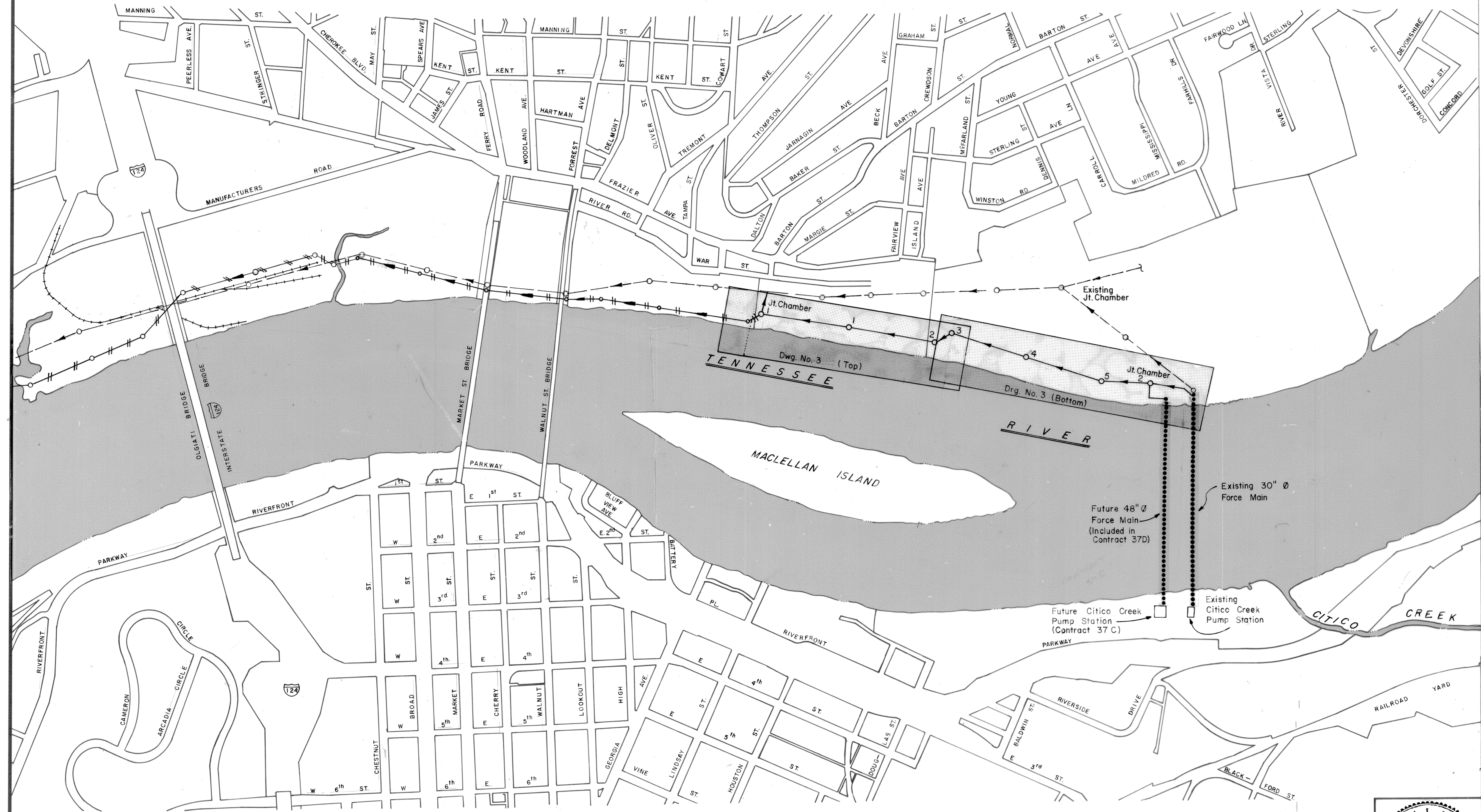
DATE



J. D. WILKINSON, Jr.
CITY ENGINEER

RECORD DRAWING

SCALE: 1" = 400'



LEGEND

- PLAN & PROFILE DWG. NUMBER
- MANHOLE NUMBER
- EXISTING SANITARY SEWER
- FUTURE SANITARY SEWER
- EASEMENT DRAWING NUMBER
- WATER TIGHT COVER
- FORCE MAIN

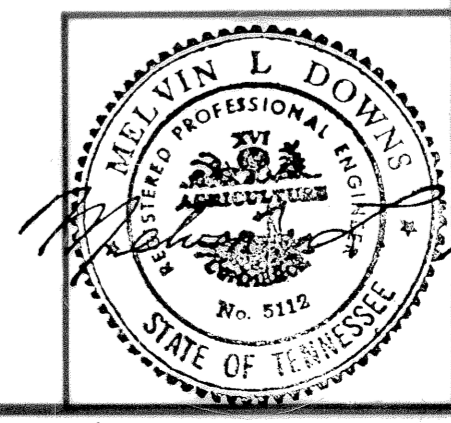
51788

3		
2		
1	1985	RECORD DRAWING
REV. NO.	RELEASED BY	DESCRIPTION OF REVISION

SEWERAGE WORKS PROJECT

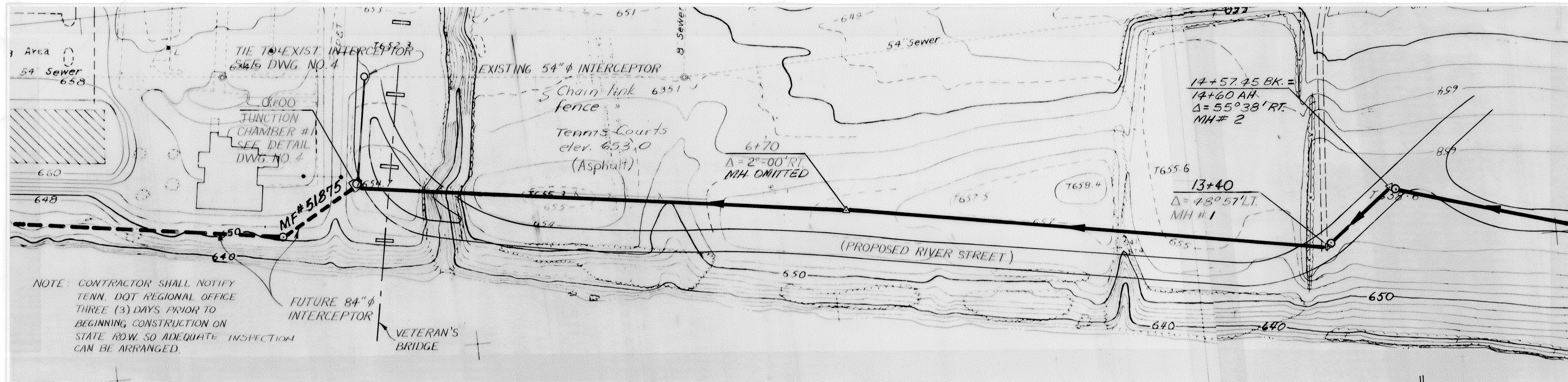
GENERAL PLAN

CITY OF CHATTANOOGA, TENNESSEE



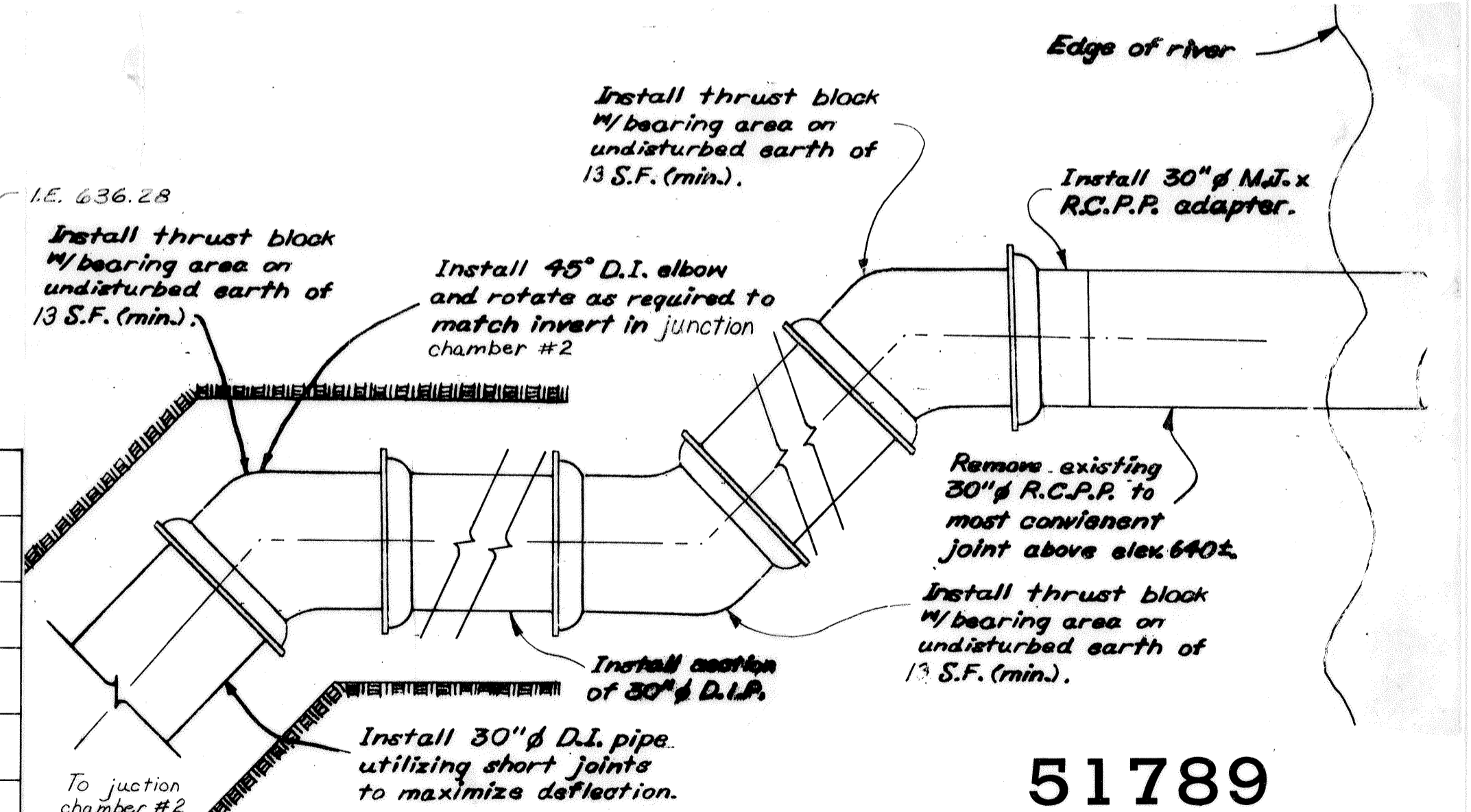
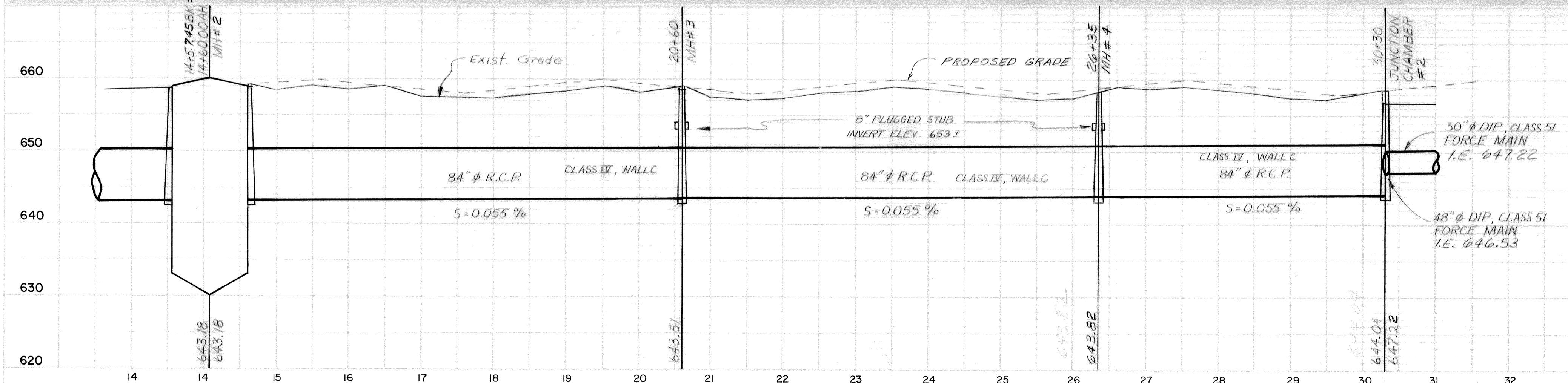
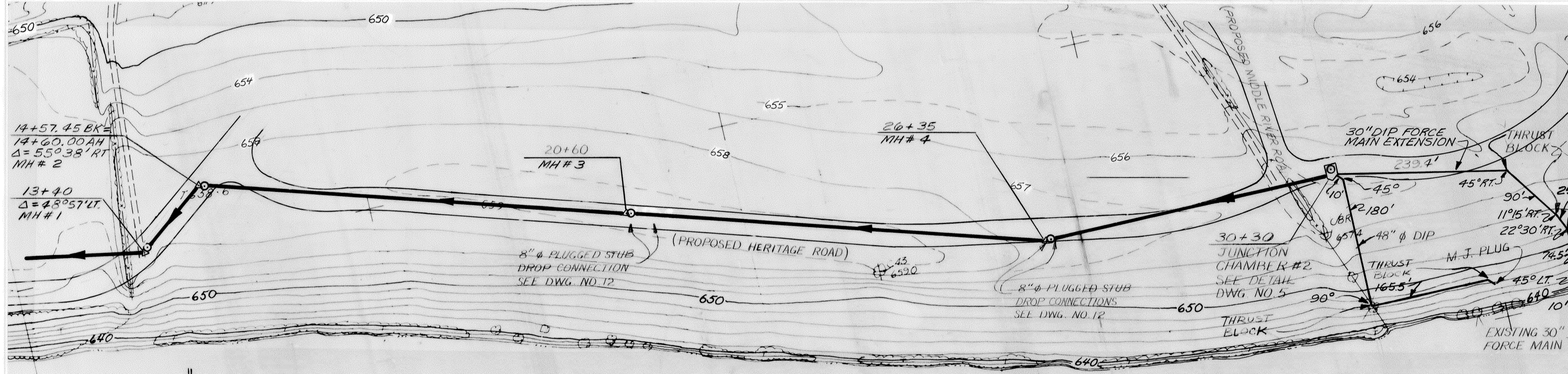
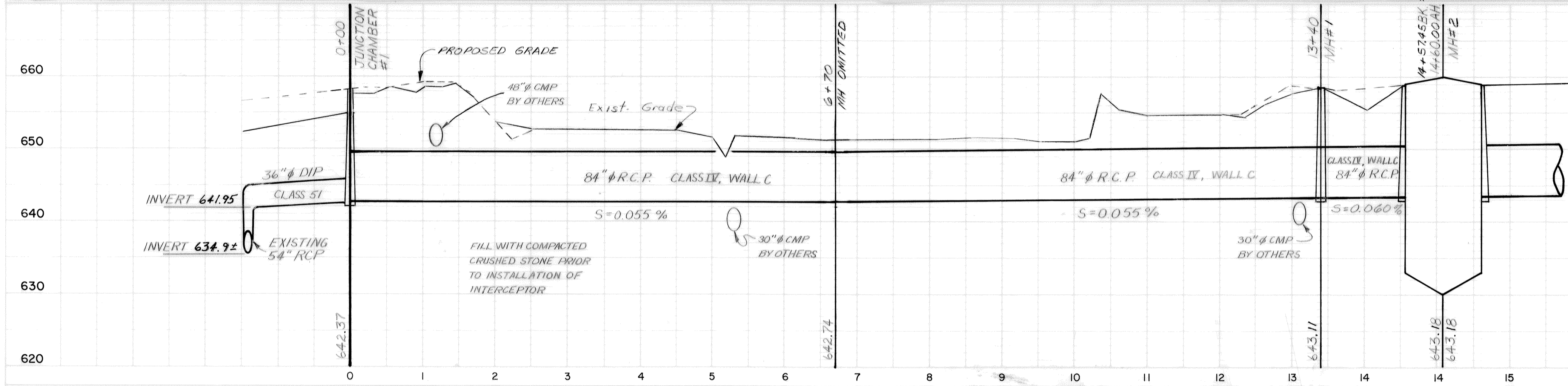
DSGN	J.R.J.	HENSLEY-SCHMIDT, INC.	DRAWING NO.
DRWN	W.B.H. 6-80	CONSULTANTS	6709-40D-1-
CHKD	G.M.C. 1/81	ATLANTA - CHATTANOOGA - JACKSON	2.1
APPR		KNOXVILLE - NASHVILLE	

BRUNING 44-132-327563



NOTES:

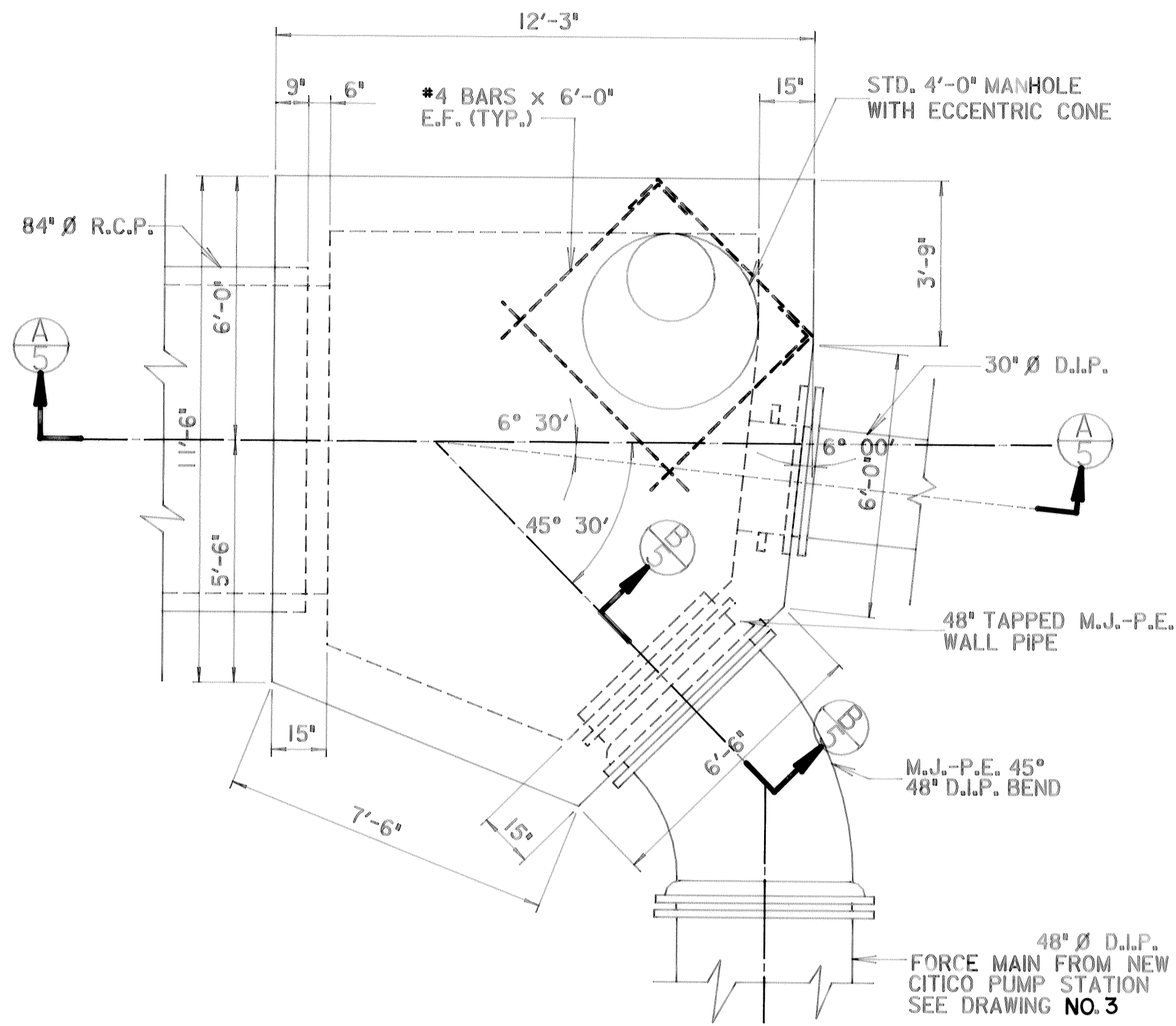
1. ALL EXCESS EXCAVATION SHALL BE DEPOSITED ON THE HERITAGE PLACE PROPERTY IN AREAS AS DIRECTED BY THE ENGINEER.
2. ALL BACKFILL IN PROPOSED ROADWAYS SHALL BE WITH CRUSHED STONE WHICH SHALL BE PLACED AND COMPACTED IN 6-INCH LIFTS.
3. THE ENTIRE INTERCEPTOR SHALL BE INSPECTED AND ACCEPTED BY THE ENGINEER PRIOR TO CONNECTING 30" ϕ FORCE MAIN EXTENSION TO EXISTING 30" ϕ FORCE MAIN.
4. CONTRACTOR SHALL NOT BE ALLOWED TO INTERRUPT SEWAGE FLOW FOR MORE THAN 24 HOURS WHEN CONNECTING THE 30" ϕ FORCE MAIN.
5. THE 30-INCH AND 48-INCH DIP SHALL BE PRESSURE TESTED AT 100 PSI.
6. THRUST BLOCKS SHALL BE SIZED:
 30-INCH DIP - 13 SQ. FT. BEARING AREA
 48-INCH DIP - 33 SQ. FT. BEARING AREA



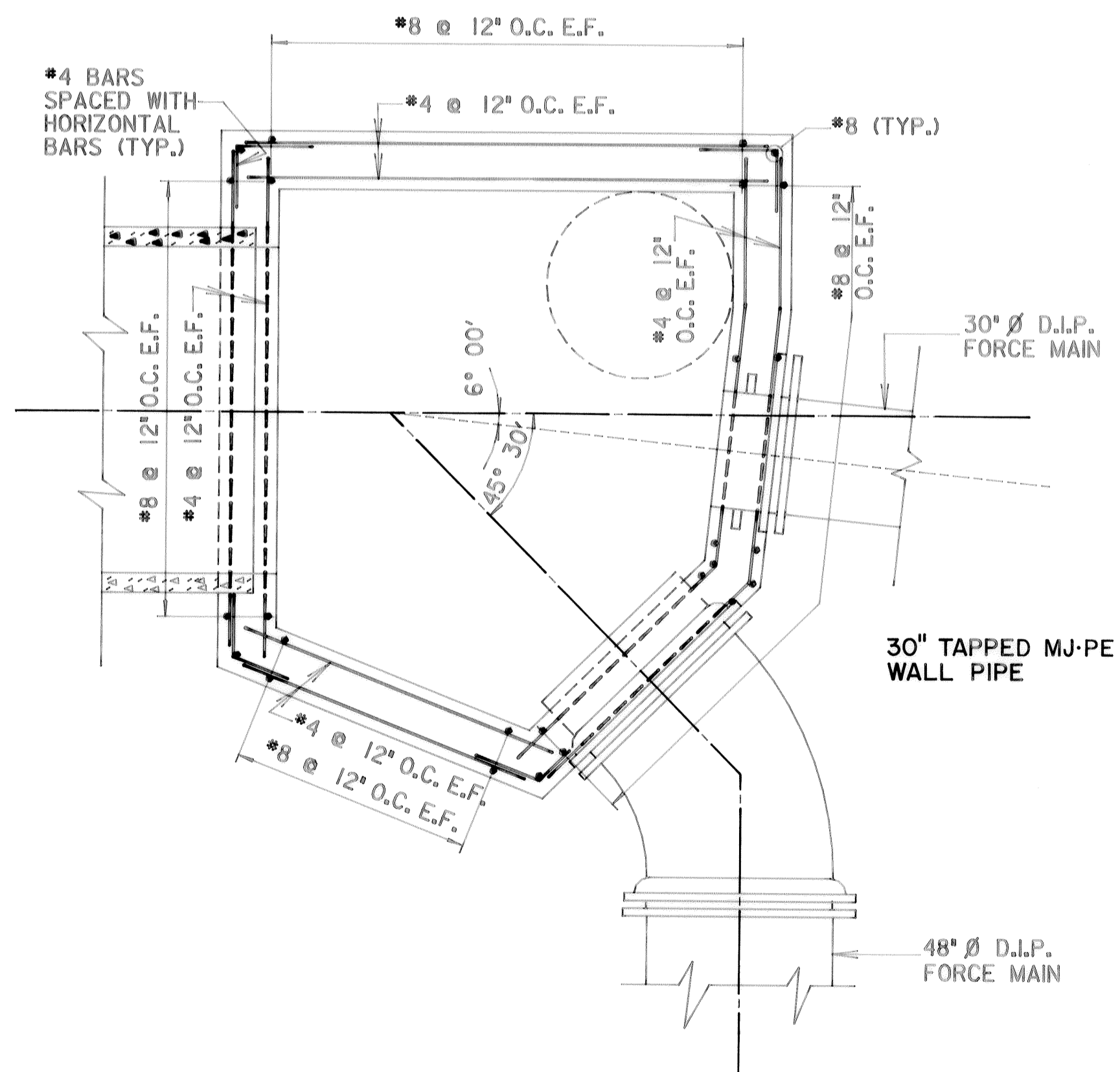
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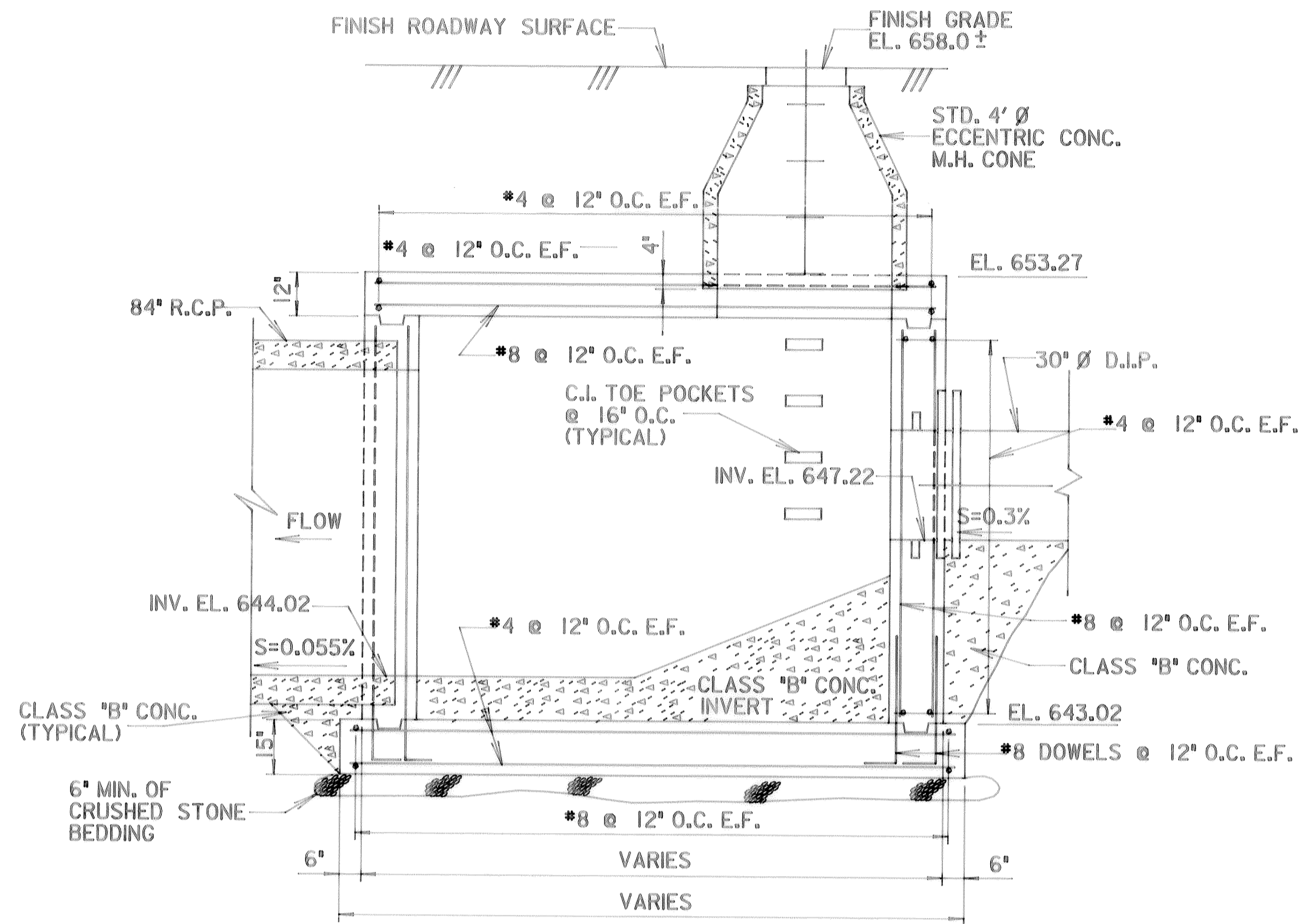
2	10/85	RECORD DRAWING
DR	CS	
HENSLEY-SCHMIDT, INC. GENERAL ENGINEERS ATLANTA CHATTANOOGA JACKSON CHARLOTTE KNOXVILLE NASHVILLE		
PLAN SCALE 1" = 100'	6709-40D-1-32	



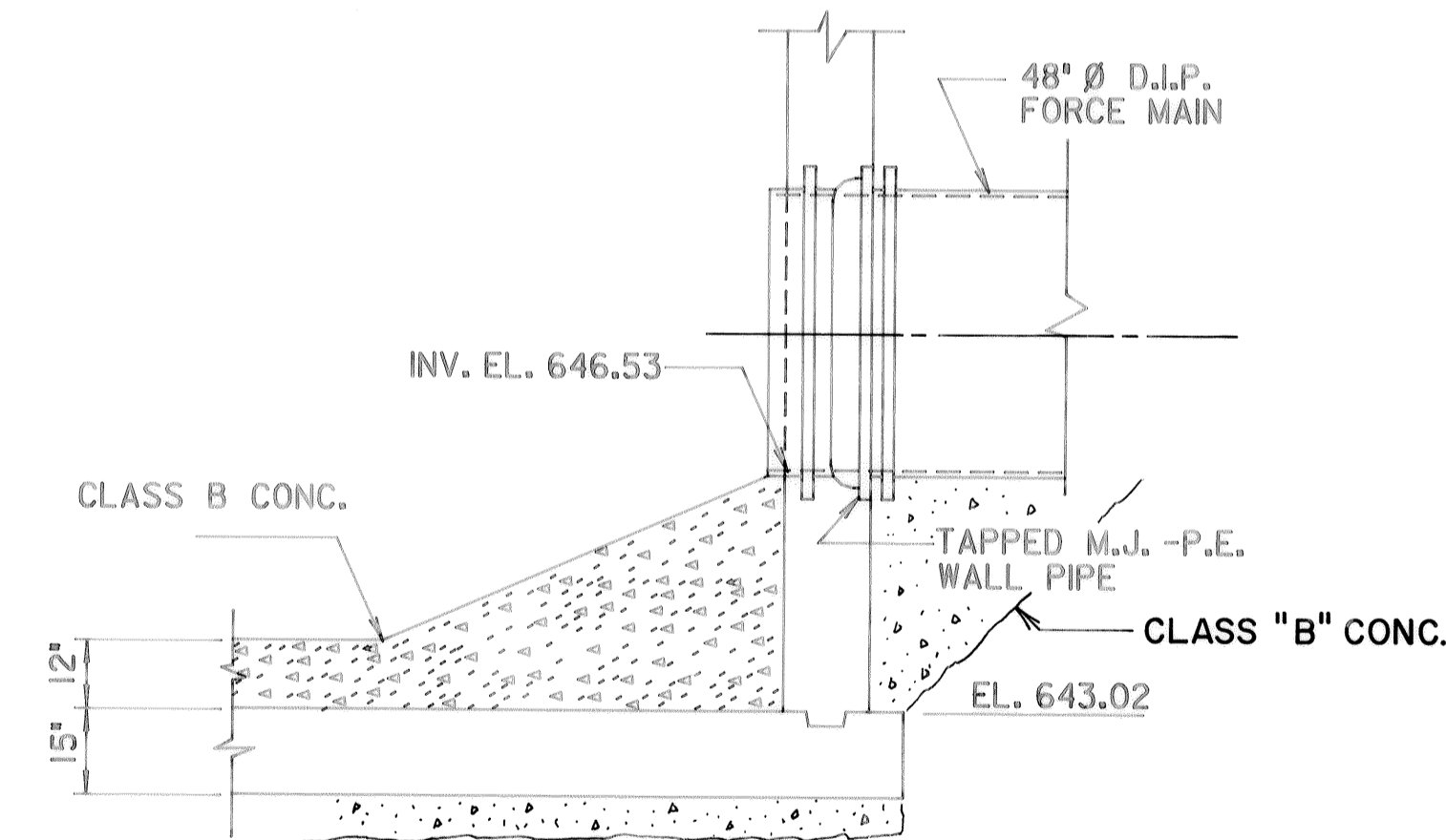
TOP PLAN
SCALE: $\frac{3}{8}'' = 1'-0''$



SECTIONAL PLAN
SCALE: $\frac{3}{8}'' = 1'-0''$



SECTION A-A
SCALE: $\frac{3}{8}'' = 1'-0''$



SECTION B-B
SCALE: $\frac{3}{8}'' = 1'-0''$

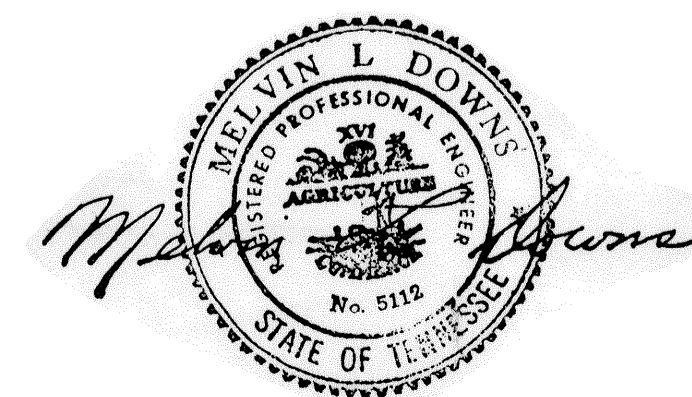
51791

REVISION	RELEASED BY	DESCRIPTION OF REVISION

SEWERAGE WORKS PROJECT

JUNCTION CHAMBER NO.2

CITY OF CHATTANOOGA, TENNESSEE

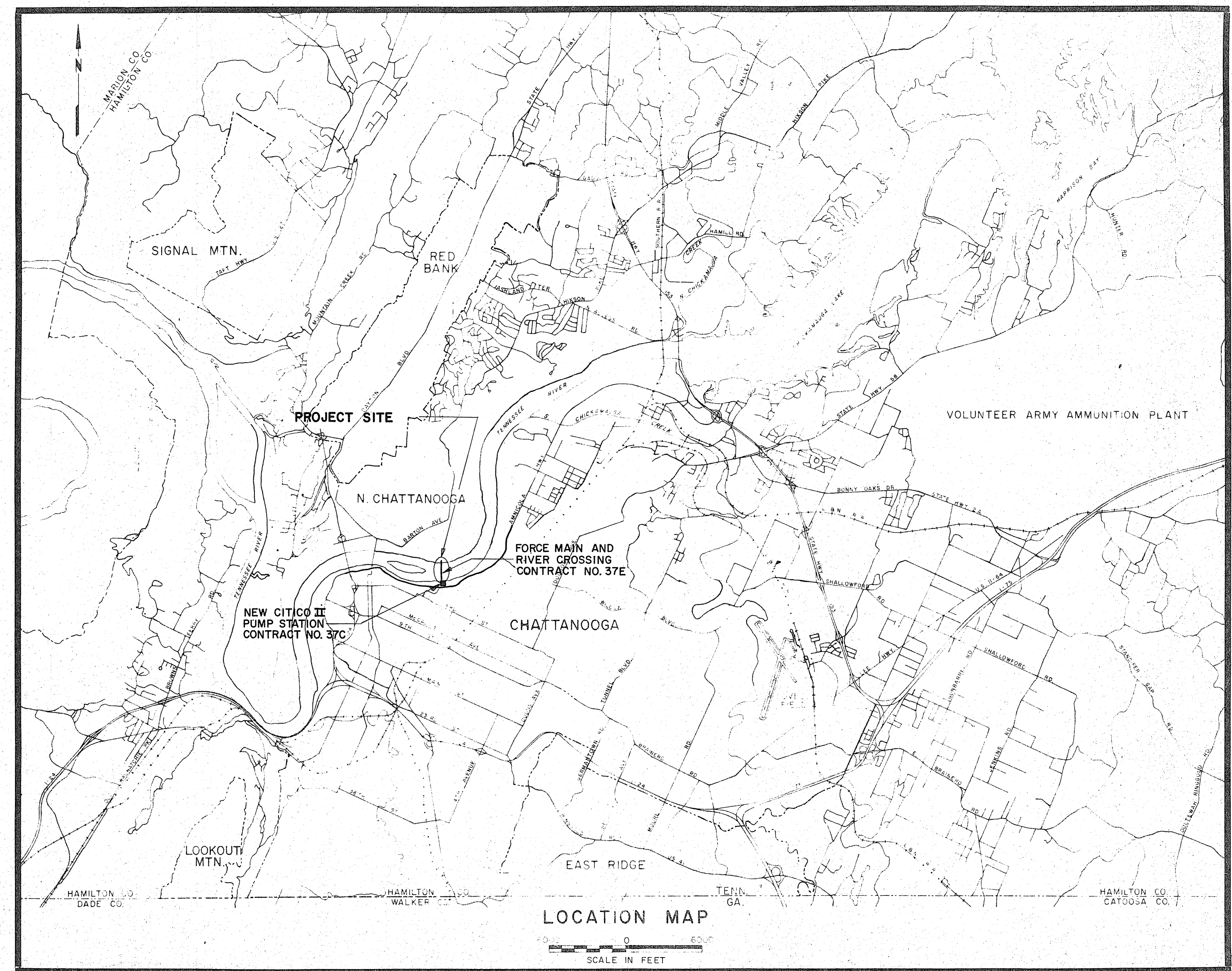


DSGN	E. A. S.	10/84	HENSLEY - SCHMIDT, INC. CONSULTANTS ATLANTA - CHATTANOOGA KNOXVILLE - RALEIGH	DRAWING NO. 6709-400-1-5.1
DRWN	CADD			
CHKD	G. E. H.	11/84		
APPR				

CITY OF CHATTANOOGA, TENNESSEE

CITICO II PUMPING STATION FORCE MAIN AND RIVER CROSSING CONTRACT NO. 37E

DRAWING	INDEX	DWG.
TITLE SHEET		6685-37E-1
CITICO II FORCE MAIN		6685-37E-2
RIVER CROSSING DETAILS		6685-37E-3 thru 4
MISCELLANEOUS DETAILS		6685-37E-5

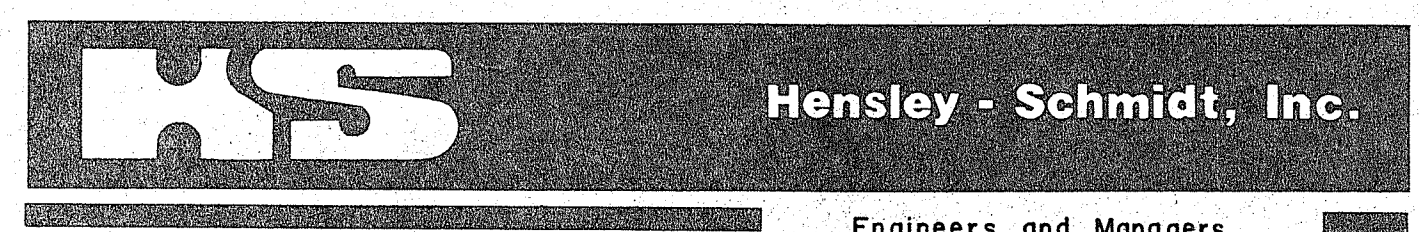


BOARD OF COMMISSIONERS

- GENE ROBERTS
MAYOR
- JOHN P. FRANKLIN
VICE MAYOR
- RON LITTLEFIELD
COMMISSIONER
- CHARLES A. ROSE
COMMISSIONER
- ERVIN DINSMORE
COMMISSIONER

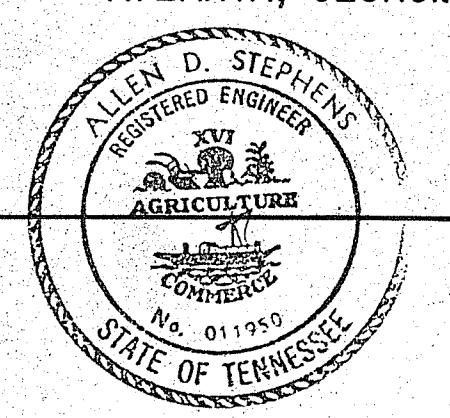
WILLIAM ANDERSON, CITY ENGINEER

PREPARED BY:

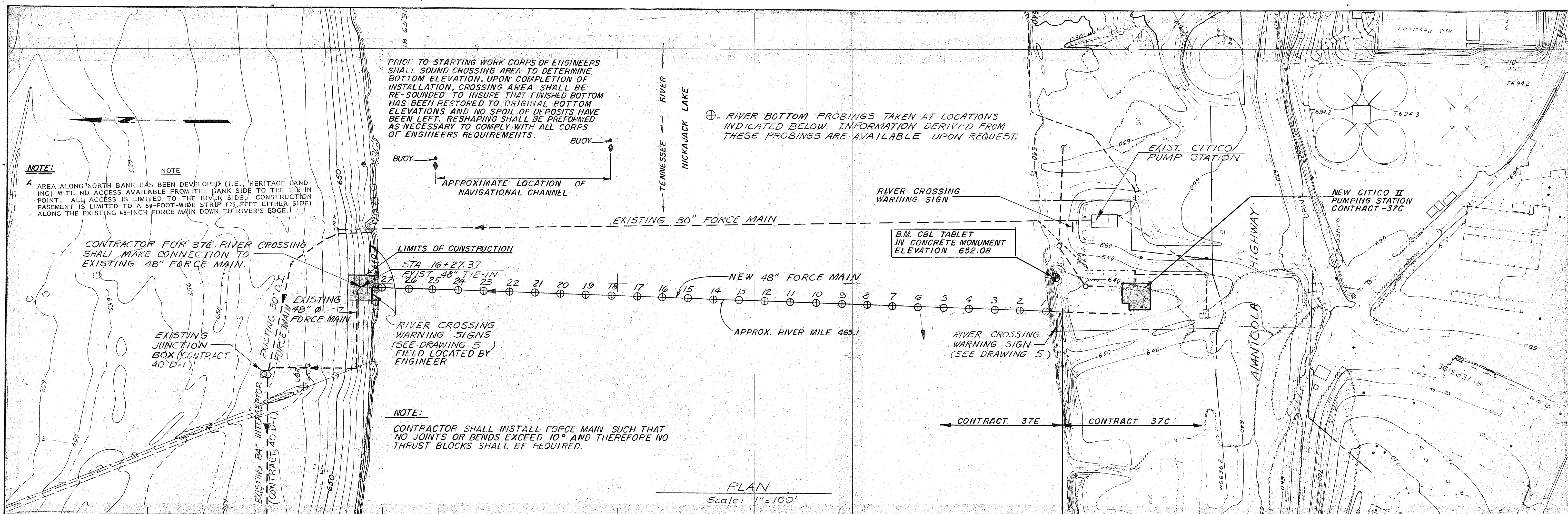


A member of The SNC Group
CHATTANOOGA, TENNESSEE ATLANTA, GEORGIA

Allen D. Stephens 10-6-89
 ALLEN D. STEPHENS, P.E.
 TENNESSEE LICENSE NO. 11950



DATE	
BY	
REVISIONS	
NOTED	
PLAN	
NOTE BOOK	
NO.	
BY	
DATE	
REVISIONS	
NOTED	
PROFILE	
NOTE BOOK	
NO.	
BY	
DATE	
REVISIONS	
NOTED	



PLAN
Scale: 1"=100'

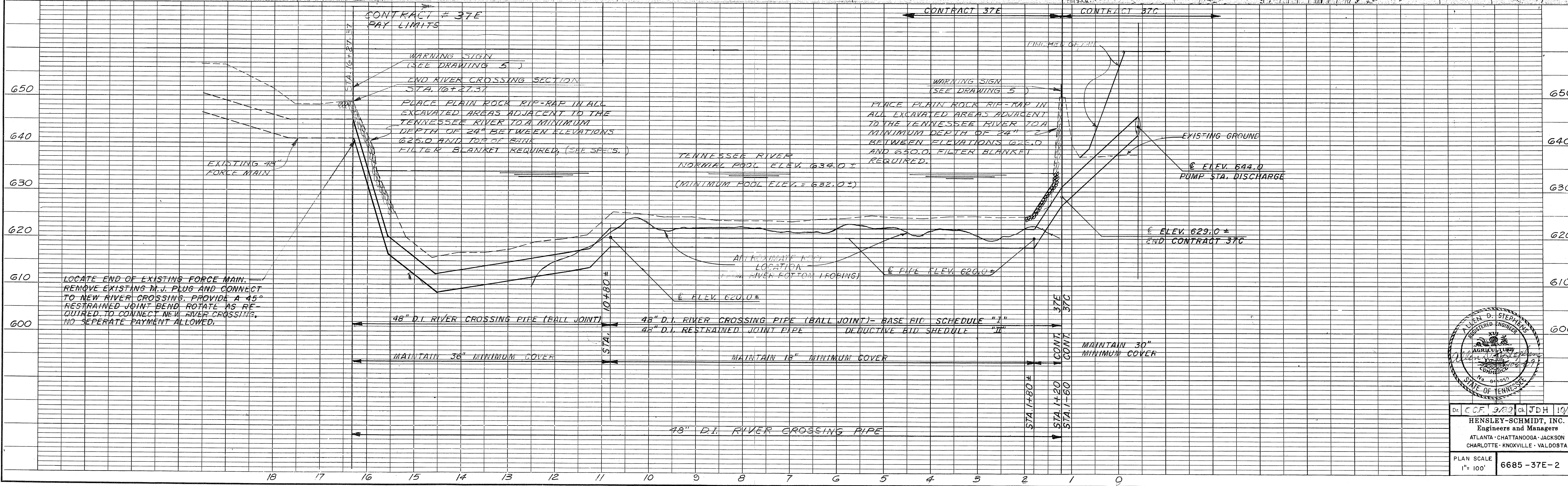
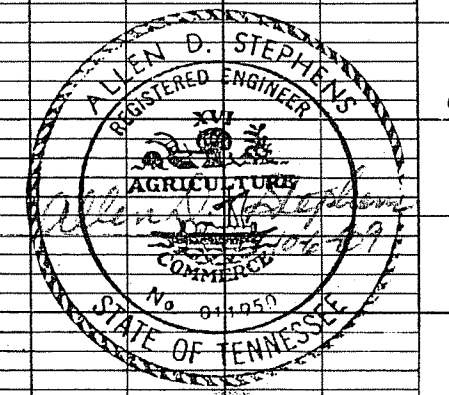


PLATE 1, PLAN-PROFILE
K&E KEUFEL & ESSER CO.



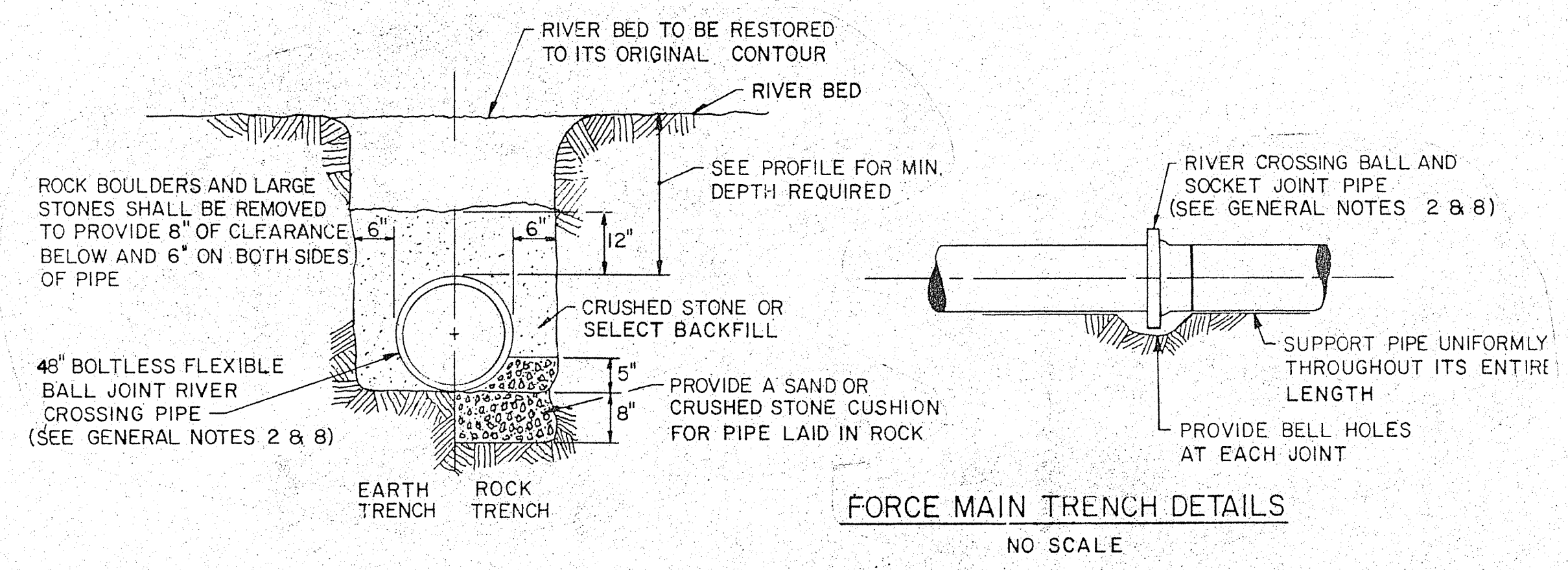
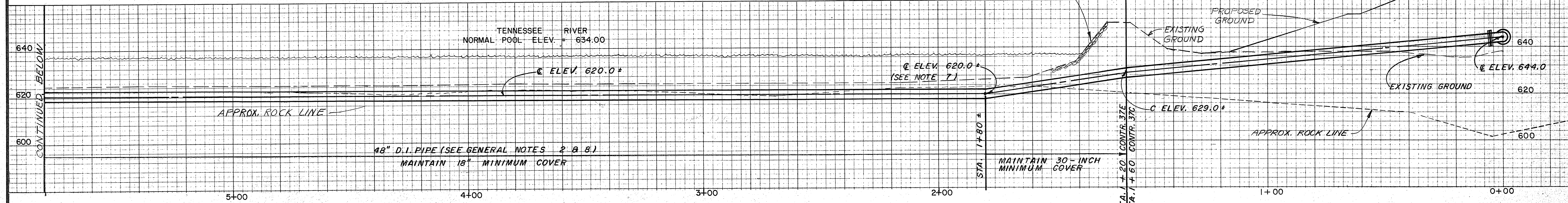
Dr. CCF 37E of JDH 10/83
HENSLEY-SCHMIDT, INC.
 Engineers and Managers
 ATLANTA · CHATTANOOGA · JACKSON
 CHARLOTTE · KNOXVILLE · VALDOSTA
 PLAN SCALE
 1" = 100' 6685-37E-2

CONTRACT 37E
FORCE MAIN & RIVER CROSSING

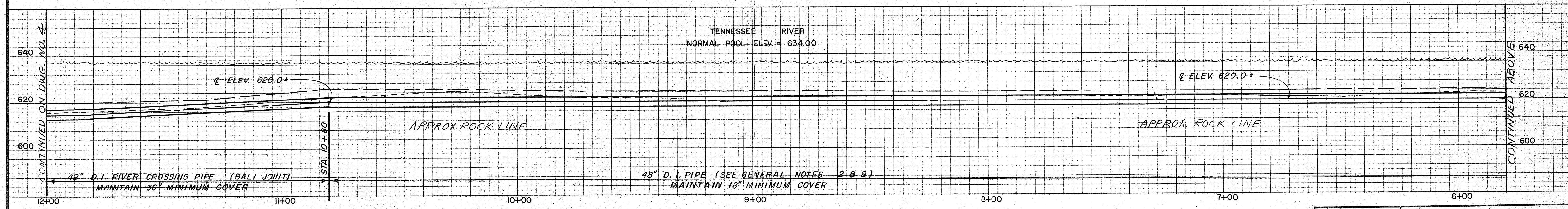
CONTRACT 37C
NEW CITICO PUMPING STATION

PLACE 24" (MIN.) PLAIN ROCK RIP-RAP IN ALL EXCAVATION AREAS ADJACENT TO RIVER BETWEEN ELEVATIONS 625.0 AND 650.0 (FILTER BLANKET REQUIRED)

(SEE NOTE 6)
PAY LIMITS OF LUMP SUM PRICE BID FOR RIVER CROSSING



- GENERAL NOTES
- RIVER CROSSING WARNING SIGNS (FOUR REQUIRED) ARE TO BE INCLUDED IN THE LUMP SUM PRICE BID FOR THE RIVER CROSSING.
 - ALL PIPE SHALL BE 48-INCH-DIAMETER DUCTILE IRON RIVER CROSSING PIPE, CLASS 56 UNDER BASE BID IN SCHEDULE 1.
 - PIPE SHALL BE COVERED A MINIMUM OF 18 INCHES UNLESS OTHERWISE INDICATED.
 - THE CONTRACTOR WILL BE REQUIRED TO SUBMIT A DETAILED PIPE LAYING SCHEDULE FOR APPROVAL PRIOR TO CONSTRUCTION.
 - THE CONTRACTOR MUST SCHEDULE WORK ON THIS RIVER CROSSING SO AS NOT TO OBSTRUCT OR ENDANGER RIVER TRAFFIC.
 - CONNECTION OF PIPE BETWEEN PAY LIMITS IS TO BE MADE BY THE CONTRACTOR. COORDINATE WITH CONTRACTOR FOR CONTRACT 37C.
 - PROVIDE BALL JOINT AT APPROXIMATE STATION 1+80 AND DEFLECT AS REQUIRED TO PROVIDE STRAIGHT RUN TO MATCH ELEVATION AT STATION 1+20 (I.E., END OF CONTRACT).
 - UNDER DEDUCTIVE BID ON SCHEDULE II, RESTRAINED JOINT PUSH-ON PIPE SHALL BE USED FROM APPROXIMATE STATION 1+20 TO STATION 10+80. SEE BID SCHEDULE.
 - CONCRETE PIPE ANCHOR SHALL BE PROVIDED FOR EACH JOINT OF PIPE SUFFICIENT TO OFFSET BUOYANCY OF PIPE WHEN FILLED WITH AIR. CONTRACTOR SHALL SUBMIT PIPE ANCHORAGE DETAIL AND PROPOSED METHOD OF INSTALLATION TO ENGINEER FOR REVIEW AND APPROVAL.



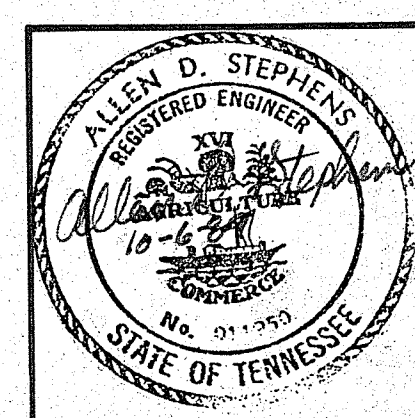
TENNESSEE RIVER CROSSING/ CITICO II PUMPING STATION
SCALE: 1" = 20' HORIZ.
1" = 20' VERT.

REVNO	RELEASED BY	DESCRIPTION OF REVISION

CITICO II PUMPING STATION
FORCE MAIN AND RIVER CROSSING

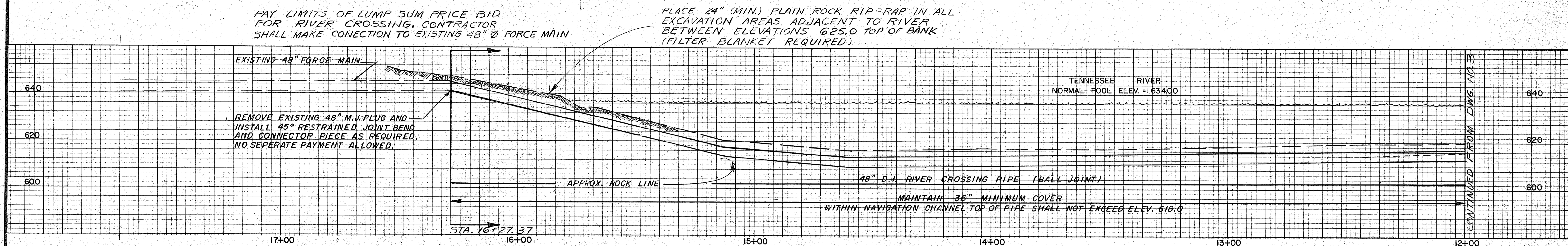
RIVER CROSSING
DETAILS

CITY OF CHATTANOOGA, TENNESSEE



DSGN	ADS	9/89	HENSLY-SCHMIDT, INC. ENGINEERS AND MANAGERS ATLANTA-CHATTANOOGA-KNOXVILLE VALDOSTA	DRAWING NO. 6685-37E-3
DRWN	CCF	9/89		
CHKD	JDM	10/89		
APPR	ADS	10/89		

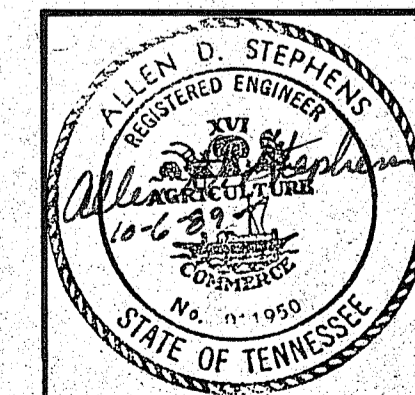
BRUNING 44-132 59140



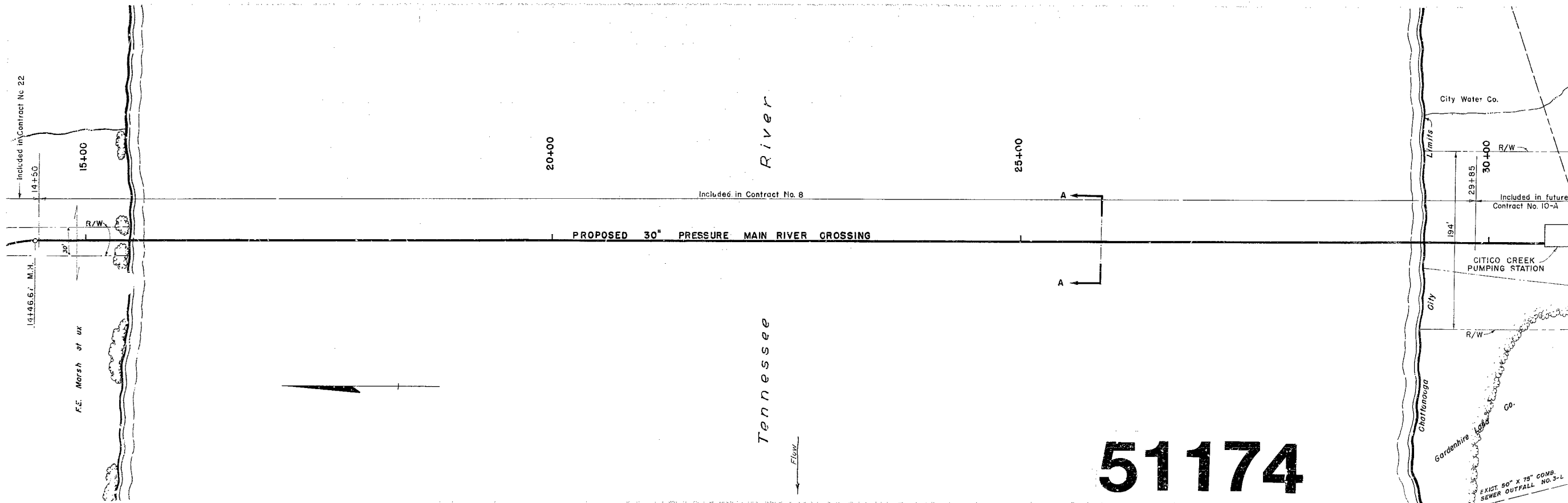
NOTES:
 CONTRACTOR SHALL LOCATE AND MAKE CONNECTION TO EXISTING 48" FORCE MAIN. NO SEPERATE PAYMENT ALLOWED.
 RIP RAP TO EXTEND FULL WIDTH OF EXCAVATION.
 ALL DISTURBED AREAS NOT RIP RAPPED SHALL BE GRADED SMOOTH AND SEEDED PER SPECIFICATIONS.

TENNESSEE RIVER CROSSING/ CITICO II PUMPING STATION
 SCALE: 1" = 20' HORIZ.
 1" = 20' VERT.

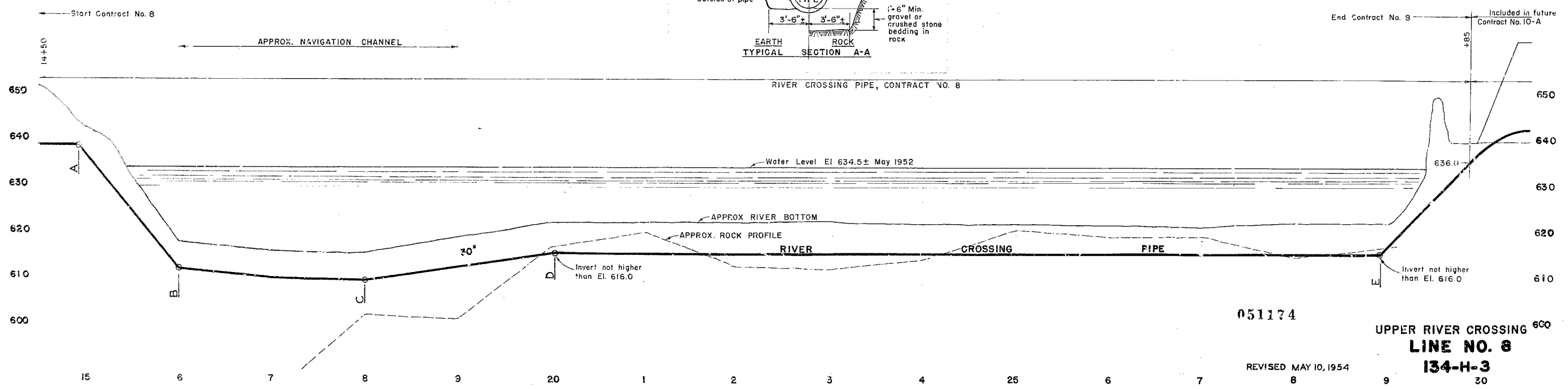
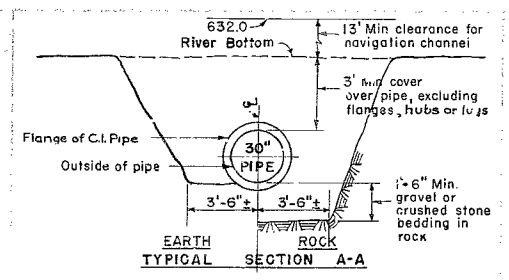
△		
△		
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REV. NO.	RELEASED BY	DESCRIPTION OF REVISION
CITICO II PUMPING STATION FORCE MAIN AND RIVER CROSSING		
RIVER CROSSING DETAILS		
CITY OF CHATTANOOGA, TENNESSEE		
DSGN	ADS	9/88
DRWN	CCF	9/88
CHKD	JDH	10/88
APPR	ADS	10/88
HENSLEY-SCHMIDT, INC. ENGINEERS AND MANAGERS ATLANTA · CHATTANOOGA · KNOXVILLE VALDOSTA		DRAWING NO. 6685-37E-4



BRUNING 44-132 59140



51174



051174

**UPPER RIVER CROSSING
LINE NO. 8
134-H-3**

REVISED MAY 10, 1954

Included in Contract No. 22
14+50
1446.67 M.H.

15+00

20+00

25+00

City Water Co.

30+00 R/W

Included in future Contract No. 10-A

CITIGO CREEK PUMPING STATION

R/W

Gardenhire Labor Co.
EXIST. 80" X 75" COMB. SEWER OUTFALL NO. 3-L

End Contract No. 8

Included in future Contract No. 10-A

14+50

APPROX. NAVIGATION CHANNEL

650

640

630

620

610

600

RIVER CROSSING PIPE, CONTRACT NO. 8

Water Level El. 634.5 ± May 1952

APPROX RIVER BOTTOM

APPROX. ROCK PROFILE

RIVER CROSSING PIPE

Invert not higher than El. 616.0

15

6

7

8

9

20

1

2

3

4

25

6

7

8

9

20