

**GENERAL MEETING OF THE BOARD OF DIRECTORS
OF THE
CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY**

RESOLUTION NO. 17-026

**APPROVING A WORK AUTHORIZATION NO. 15 WITH
KAPSCH TRAFFICCOM USA FOR TOLL SYSTEMS INTEGRATION SERVICES
FOR THE MANOR EXPRESSWAY (290E) PHASE III PROJECT**

WHEREAS, the Central Texas Regional Mobility Authority (“Mobility Authority”) entered into a contract with Caseta Technologies, Inc. dated April 27, 2005, for the design, procurement, and installation of a toll collection system on the Authority’s turnpike system (the “Contract”); and

WHEREAS, Kapsch TrafficCom USA (formerly Schneider Electric Mobility NA) is the successor in interest to the Contract with Caseta Technologies, Inc., and all rights and obligations of Caseta Technologies, Inc. under the Contract are now the rights and obligations of Kapsch TrafficCom USA (“Kapsch”); and

WHEREAS, the Executive Director and Kapsch have discussed and agreed to a proposed work authorization for Kapsch to provide toll system integration services and intelligent transportation system services for development of the Manor Expressway (290E) Phase III project (the “Project”); and


WHEREAS, the Executive Director recommends that the Board approve proposed Work Authorization No. 15, a copy of which is attached to this resolution as Exhibit A.

NOW THEREFORE, BE IT RESOLVED that the proposed work authorization with Kapsch for toll system integration services and intelligent transportation system services for the Project is hereby approved; and

BE IT FURTHER RESOLVED that the Board authorizes the Executive Director to finalize and execute the proposed Work Authorization No. 15 with Kapsch in the form or substantially the same form as Exhibit A.

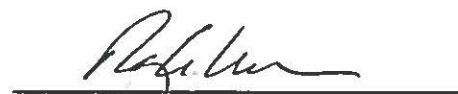
Adopted by the Board of Directors of the Central Texas Regional Mobility Authority on the 31st day of May 2017.

Submitted and reviewed by:



Geoff Petrov, General Counsel

Approved:



Ray A. Wilkerson
Chairman, Board of Directors

Exhibit A

CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

WORK AUTHORIZATION

WORK AUTHORIZATION NO. 15

**TOLL COLLECTION AND INTELLIGENT TRANSPORTATION
SYSTEMS IMPLEMENTATION**

Manor Expressway (290E) Phase III Project

THIS WORK AUTHORIZATION is made this, ____ day of May, 2017, pursuant to the terms and conditions of Article 1 of the GENERAL PROVISIONS, Attachment A to the original Contract for Toll System Implementation, dated April 27, 2005 (the Contract) entered into by and between the Central Texas Regional Mobility Authority (the “Mobility Authority”), and Kapsch TrafficCom USA Inc., a.k.a. Schneider Electric Mobility NA (the Contractor).

PART I. The Contractor will perform toll collection and traffic management system integration services generally described in the Scope of Work attached hereto as **Attachment A** and illustrated in the Project Layout attached hereto as **Attachment B**. The Contractor’s duties and responsibilities to coordinate with the CTRMA’s contracted designer and roadway contractor is detailed in the Responsibilities Matrix attached hereto as **Attachment C**. The Contractor’s duties are further described in the CTRMA Fixed Price Tolling Standard attached hereto as **Attachment D**.

PART II. The maximum amount payable under this Work Authorization No. 15 is \$ 1,735,364.18. This amount is based generally upon the estimated fees set forth in Schedule 1 of the Contract, as superseded by the fee schedule set forth in **Attachment E** hereto which is incorporated herein and made a part of this Work Authorization.

PART III. Payment to the Contractor for the services established under this Work Authorization shall be made in accordance with Article 12 of the Contract, and **Attachment A**, Article 1 of the GENERAL PROVISIONS.

PART IV. This Work Authorization shall become effective on the date of execution by the parties hereto and shall terminate one (1) year after final acceptance, unless extended by a supplemental Work Authorization as provided in **Attachment A**, Article 1 of the GENERAL PROVISIONS. The work shall be performed in accordance with the Project Schedule and Milestones as set forth in **Attachment F**.

PART V. This Work Authorization No. 15 does not waive any of the parties' responsibilities and obligations provided under the Contract, and except as specifically modified by this Work Authorization, all such responsibilities and obligations remain in full force and effect.

IN WITNESS WHEREOF, this Work Authorization No. 15 is executed in duplicate counterparts and hereby accepted and acknowledged below.

THE CONTRACTOR:

Signature

Date

Typed/Printed Name and Title

CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

Executed for and approved by the Central Texas Regional Mobility Authority for the purpose and effect of activating and/or carrying out the orders, established policies or work programs heretofore approved and authorized by the Texas Transportation Commission.

Signature

Date

Typed/Printed Name and Title

LIST OF ATTACHMENTS

- Attachment A Scope of Work
- Attachment B Project Layout
- Attachment C Toll Facility Responsibility Matrix
- Attachment D Fixed Price Tolling Standards
- Attachment E Fee Schedule/Budget
- Attachment F Project Schedule and Milestones

ATTACHMENT A

CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY
**TOLL COLLECTION AND INTELLIGENT TRANSPORTATION SYSTEMS
IMPLEMENTATION**
Manor Expressway (290E) Phase III Project

SCOPE OF WORK for SYSTEMS INTEGRATOR

A1.0 General

A1.01. Background

The Capital Area Metropolitan Planning Organization (CAMPO) approved the implementation of the proposed Toll Implementation Plan to construct additional capacity on various segments of highway network in the CAMPO Long-Range Plan as toll road facilities in conjunction with plans for development of the Central Texas Turnpike Project. Several of the toll road segments are in various stages of project development, design or construction by the Mobility Authority. It is intended that these proposed segments will be implemented by the Mobility Authority as parts of the Turnpike System.

The Manor Expressway (290E) Phase III project (“Project”) includes the construction of two (2) tolled direct connectors (SH 130 SB to 290E WB and SH 130 NB to 290E WB) and one (1) non-tolled direct connector (290E EB to SH 130 SB) at the 290E/SH130 interchange. In addition, ramp improvements/modifications on 290E and SH130 are required as a part of the project. Construction is expected to begin in 2018 with an open-to-traffic date anticipated for 2020. The Toll Collection System (TCS) for the Manor Expressway (290E) Phase III project will be all Electronic Toll Collection (ETC). Additionally, the Project will require the implementation of an Intelligent Transportation System (ITS). The ITS will be designed as an extension of the existing CTRMA ITS network. An ITS conceptual plan is required to confirm all components required for the proposed extension under this WA are addressed properly. This necessitates the timely completion of a complete ITS Plan.

A1.02. Summary Scope of Work

The Scope of Work for Work Authorization No. 15 includes, but is not limited to, procurement, installation, testing, and implementation of a complete and fully operational Toll Collection System (TCS) and Intelligent Transportation System (ITS). Services will also include communications and system interfaces design, coordination, and project interface activities to facilitate the design and construction of the infrastructure facilities by others on the Project.

This Work Authorization authorizes the SI to establish and maintain relationships with a wide variety of third parties, and to coordinate the designs for the proposed TCS and ITS, with the entire Project to ensure that the construction of the system infrastructure facilities will be fully compatible and will meet the Mobility Authority’s requirements. In this role, the SI will work closely with the Mobility Authority, TxDOT, and various designers and roadway contractors in developing the required complete TCS, ITS, and network infrastructure.

A2.0 General Description – Toll Road Infrastructure and Site

The Project includes the construction of two tolled direct connectors (SH 130 SB to 290E WB and SH 130 NB to 290E WB) and one non-tolled direct connector (290E EB to SH 130 SB) at the 290E/SH130 interchange and ramp improvements/modifications on 290E and SH130. The proposed improvements are to be designed with allowance for the ultimate planned improvements to SH130 including frontage roads, ramps and additional mainlines. In the event the non-tolled direct connector (290E EB to SH 130 SB) becomes tolled, the SI shall perform work necessary, in accordance with this Work Authorization, to facilitate the collection of additional tolls. Fee for this additional scope can be found in *Attachment E – Fee Estimate*.

The existing Manor Expressway is a toll facility owned and operated by the CTRMA. The highway consists of three tolled main lanes in east and west directions separated by a grass median. Three lane non-tolled frontage roads, owned and operated by the Texas Department of Transportation (TxDOT), parallel the main lanes in each direction.

The existing SH 130 is a toll facility owned and operated by TxDOT. SH 130 consists of two tolled main lanes in each direction, north and south, separated by a wide grassy median. The median on SH 130 is reserved for future expansion of the main lanes as well as potential transit through the corridor.

Table 1: Gantry Locations and Lane Counts

Approximate Station Location	Direction of Travel	No. of Lanes	No. of Shoulders (6' or greater)	Gantry Type	Comments
109+00	290EB - 130SB DC	2	1	Direct Connector	Preliminary schematic typical sections include one 4-foot and one 8-foot shoulder.
113+00 ¹	130NB – 290WB DC	2	1	Ramp	Preliminary schematic typical sections include one 4-foot and one 8-foot shoulder.
TOTAL		2	1		

¹ Potential future gantry location.

Refer to the Manor Expressway (290E) Phase III Project Layout included as *ATTACHMENT B – Project Layout* for the general project layout.

A3.0 General Requirements

A3.01. General Requirements - Toll Collection System (TCS)

The TCS for the Project, will be an expansion of the TCS which has been designed and implemented for the 183A Toll Road and the Manor Expressway Projects, using automatic vehicle identification and classification technology, a Video Capture System (VCS) with an integrated camera and triggering system to capture referenced digital images of license plates, a Digital Video Auditing System (DVAS), and a Remote Online

Management System (ROMS). It is required that the TCS be interoperable with the other Texas ETC systems.

The Mobility Authority contracts with the members of the Texas Statewide Interoperability Agreement for CSC services for its customers. The Pay By Mail (PBM) Processing Center is located in a separate facility, and is being administered by a third party under contract to the Mobility Authority.

Expansion of the Mobility Authority's TCS to serve the Project will include coordination and design of appropriate interfaces with the IOPHub and PBM Processing Center. Appropriate communications links between the various toll facilities on the Project and the Mobility Authority's Administrative Offices, the Mobility Authority's TMC, the IOPHub, and the PBM Processing Center are part of the requirements of the design/implementation work.

A3.02. General Requirements - Intelligent Transportation System

The proposed field network will consist of a fiber optic communication network that facilitates communication to various ITS field devices along the Project back to the Mobility Authority's TMC. The ITS devices to be installed on the Project network include 2 closed circuit television (CCTV) cameras and 5 radar vehicle sensing detectors (RVSD).

The general locations, layouts, and implementation schedule for the ITS for the Manor Expressway (290E) Phase III project, as currently proposed, are based on the latest information currently available, and they are intended for informational purposes only. The locations are subject to change, and it should be anticipated that refinements and adjustment to the locations and layouts indicated will be required as designs for the ITS are further developed.

For Advanced Transportation Management System (ATMS) implementation, the SI is proposing to utilize the Kapsch proprietary ATMS.

The proposed ITS network for the Manor Expressway (290E) Phase III project should be fully integrated with both the Mobility Authority and TxDOT TMC software. TxDOT will have a dedicated connection to Mobility Authority, and will be provided bandwidth on the Mobility Authority's network sufficient to allow for shared video and data between the two agencies' systems. The terms of device and data sharing on the Manor Expressway (290E) Phase III project is outlined in the existing "Agreement for Sharing Intelligent Transportation Systems (ITS) Data", a user agreement specifically between TxDOT and the Mobility Authority. Specifically, it addresses the use of TxDOT's Center-to-Center protocol and an application programming interface (API) for access to the Mobility Authority's traffic database.

The SI shall design and install a system that is compatible with the Austin Regional ITS Architecture for both control of devices and reception of images and data. The proposed system shall be an extension of field devices to the already existing TxDOT Austin District System. The database administrator at the TxDOT Austin District TMC will add the new device addresses to the already functioning tables.

All duct banks will be designed, constructed and implemented in accordance with guidelines included in the *Austin District Guidelines for Developing Freeway Corridor Traffic Management System*.

A4.0 General Description – Equipment and Installation

A4.01. Equipment and Installation – Toll Collection System

For all TCS field installations on the various segments of the Project, the SI will be required to provide and install the toll equipment systems and hardware for a complete, tested, and operating TCS under this Work Authorization. The principle items of work and primary components of the TCS at each toll location will include, but are not limited to:

- Furnish and install Lane-side equipment and ancillary devices.
- Furnish and install ETC lane components, including automatic vehicle detection system (AVDS), automatic vehicle classification (AVC), VCS, and automatic vehicle identification (AVI) systems and hardware. Saw cut pavement for any in-pavement sensors.
- Furnish and install all ETC lane equipment wiring and cable, hardware, mounts, and fasteners required to attach the ETC equipment to the gantries provided by others.
- Furnish and install ROMS monitoring for all ETC site equipment (i.e. Lane-side equipment, AVDS, AVC, AVI, VCS, HVAC, generators, power, communications equipment, etc.).
- Furnish and install a fault tolerant, single mode fiber optic IP-based communication system including fiber optic cables, terminations, switches, routers, firewalls, hubs, patch panels, and other network devices.
- Furnish and install master ground system connected to the master ground bus bar provided by others.
- Furnish and install backup electrical power including emergency generators, fuel tanks, and automatic transfer switches.
- Furnish and install UPS, including wiring and cable, hardware, and ROMS interface.
- Furnish and install Toll Equipment Cabinet (TEC), with HVAC for appropriate environmental protection and climate controls for electronic equipment.
- Furnish and install site surveillance cameras and security systems and communications to monitor each Toll Equipment Cabinet and gantry.
- Provide power from the electrical service to the toll locations.
- Prepare and submit all required documents to acquire Federal Communication Commission (FCC) Licensing.
- Provide complete testing, certification and acceptance of all systems for complete, fully operational TCS, furnished and installed.

The procurement, fabrication and installation of all gantries, conduit, ground boxes and toll related infrastructure for the TCS will be completed by others. It is the responsibility of the SI, nevertheless, to work closely with the Mobility Authority, TxDOT, and the various designers and roadway contractors to establish the precise locations for each of the tolling related infrastructure, conduit, ground boxes, pads, access walkways and loop stub-outs and to provide the Roadway Contractor(s) with detailed installation information for the TCS equipment at each location.

A4.02. Equipment and Installation – Intelligent Transportation System

For all ITS field installations on the various segments of the Project, the SI will be responsible for the final ITS design, and the purchase and installation of the ITS equipment for a complete, tested, and operational system under this Work Authorization. The principle items of work and primary components of the system at each location will include, but are not limited to:

- Furnish and install the fiber optic cabling required for the ITS.
- Furnish and install CCTV cameras, communications, and equipment enclosures.
- Furnish and install the DMS, communications, and equipment enclosures.
- Furnish and install RVSD, communications, and equipment enclosures.
- Connect to the existing communication hub at the US 290/SH130 interchange.
- Provide complete testing, certification and acceptance of all systems for complete, fully operational ITS, furnished and installed.

Elements of the ITS infrastructure will be the responsibility of others. Nevertheless, it is the responsibility of the SI to work closely with the Mobility Authority and the various designers and roadway contractors to establish the precise locations for the elements above and to provide the Roadway Contractor(s) with detailed information as needed.

A5.0 Coordination and Project Interface

The SI is to participate in the process for coordination which will enable the contractors and designers of the Project to obtain specific, detailed information regarding the proposed system components, which includes the TCS and ITS, in order to complete the design/construction of the appropriate infrastructure. The SI will be responsible for maintaining relationships with a wide variety of third parties, including designers, roadway contractors, and various suppliers. In this role, the SI will work closely with the Mobility Authority and TxDOT in developing the required network. The work related to this Work Authorization No. 15 generally will include, but not be limited to:

- Provide design input and detailed information, including toll system component details, dimensions, layout configurations, locations and specific technical requirements for elements of the proposed TCS and ITS.
- Prepare construction/installation guidelines for various components of the Mobility Authority's TCS and ITS.
- Review of construction documents prepared by others.
- Attend and participate in coordination meetings as determined by project schedule and/or as requested by the Mobility Authority. This includes attending design coordination meetings, construction meetings, and issue resolution meetings as necessary to resolve outstanding comments.
- Provide "over the shoulder" reviews, as necessary.
- Submit Installation Plan and Installation Drawings to the Mobility Authority for review and approval.
- Provide input in the development of the project schedule as it relates to the installation and testing of the TCS and ITS. The SI shall review the project baseline schedule prepared by the Roadway contractor for acceptance.

All infrastructure facilities for the Project will be provided by others as indicated in **Section A6.0 and Section A7.0** hereof. The SI shall fully coordinate the designs for the TCS and ITS with others and provide the required details and technical requirements to ensure that the construction of the toll system infrastructure facilities will be fully compatible and meet the requirements for the two systems.

The SI is responsible for coordinating with others and for providing all necessary details, system requirements, and reviews of construction documents to ensure that the gantries are located and configured to properly accommodate the SI's own system components as required to meet the Mobility Authority TCS performance and accuracy requirements.

Prior to deploying any toll collection equipment or technology, the SI shall certify to the Mobility Authority that the technology complies with the most current interoperability rules.

A6.0 Work by Others – Civil/Roadway Construction

A6.01. Civil/Roadway Construction - Toll Collection System

The Mobility Authority, through its roadway construction contracts, will provide jointed concrete pavement in each of the areas designated for toll collection facilities. The pavement will be reinforced with glass fiber reinforced polymer (GFRP) bars, if required. Transverse joints and longitudinal joints will be placed at positions equal to lane widths and as shown on the Mobility Authority details. Power and communication lines to support the wide area network (WAN) will be provided by others and terminated at a TEC enclosure in an area within 500 feet of the gantry. The SI is responsible for the communication links between the Host, IOPHub, PBM Processing Center, the Mobility Authority's TMC, TxDOT's TMC, and all toll facilities via a communication trunk line and WAN.

Except as may be expressly indicated elsewhere, all toll system infrastructure required for the TCS at the designated toll locations will be provided and installed by others. The principle items of work and primary components of the TCS infrastructure to be provided by others at each location shall include, but are not limited to:

- GFRP bar reinforced pavement section.
- Retaining walls and coping details.
- Drainage features.
- Civil site work, including grading, access driveways, and fencing.
- All toll gantry procurement and installation, including foundations and gantry structures.
- TEC concrete foundation slab
- Conduit and ground boxes providing connections between the TEC's and the ETC lane equipment installations. NOTE: It is the responsibility of the SI to coordinate with the Roadway Contractor(s) for the placement and installation of these elements to ensure that the construction is acceptable for the TCS as designed.
- Gantry and TEC enclosure lightning protection air terminals, down conductors. TEC system will be consolidated at the TEC and connected to the service ground per NEC. Equipment connection to the ground electrode for the TEC enclosure master ground bus bar will be provided by others.
- Power and WAN communication services up to the location of the TEC enclosures.
- Provide, install, and incorporate natural gas lines, if available. NOTE: SI is to coordinate and provide generator requirements including locations for gas feeds for the emergency generators.
- Concrete foundations for emergency generators and associated fuel tanks.
- All signing, pavement markings, traffic barriers and other roadway appurtenances required at each location.

Refer to the Fixed Price Tolling Standards that were issued by the Mobility Authority on November 2015, which is included as *ATTACHMENT D – Fixed Price Tolling Standards*.

A6.02. Civil/Roadway Construction - Intelligent Transportation System

Except as may be expressly indicated elsewhere, all ITS infrastructure required will be provided and installed by others. The principle items of work and primary components of the ITS infrastructure to be provided by others shall include, but are not limited to:

- ITS layouts
- Duct bank
- Conduits – each conduit to have dedicated pull string, continuous between ground boxes/vaults and stub-ups.
- Electrical services
- Grounding circuits
- Support structures and associated foundations

A7.0 Toll Facilities Responsibility Matrix

For this work authorization, the SI is responsible for design and coordination of the various aspects of the TCS, and ITS, as identified in *ATTACHMENT C - Toll Facilities Responsibility Matrix*, and shall work with the Mobility Authority, TxDOT, roadway designers and contractors, and others as described herein.

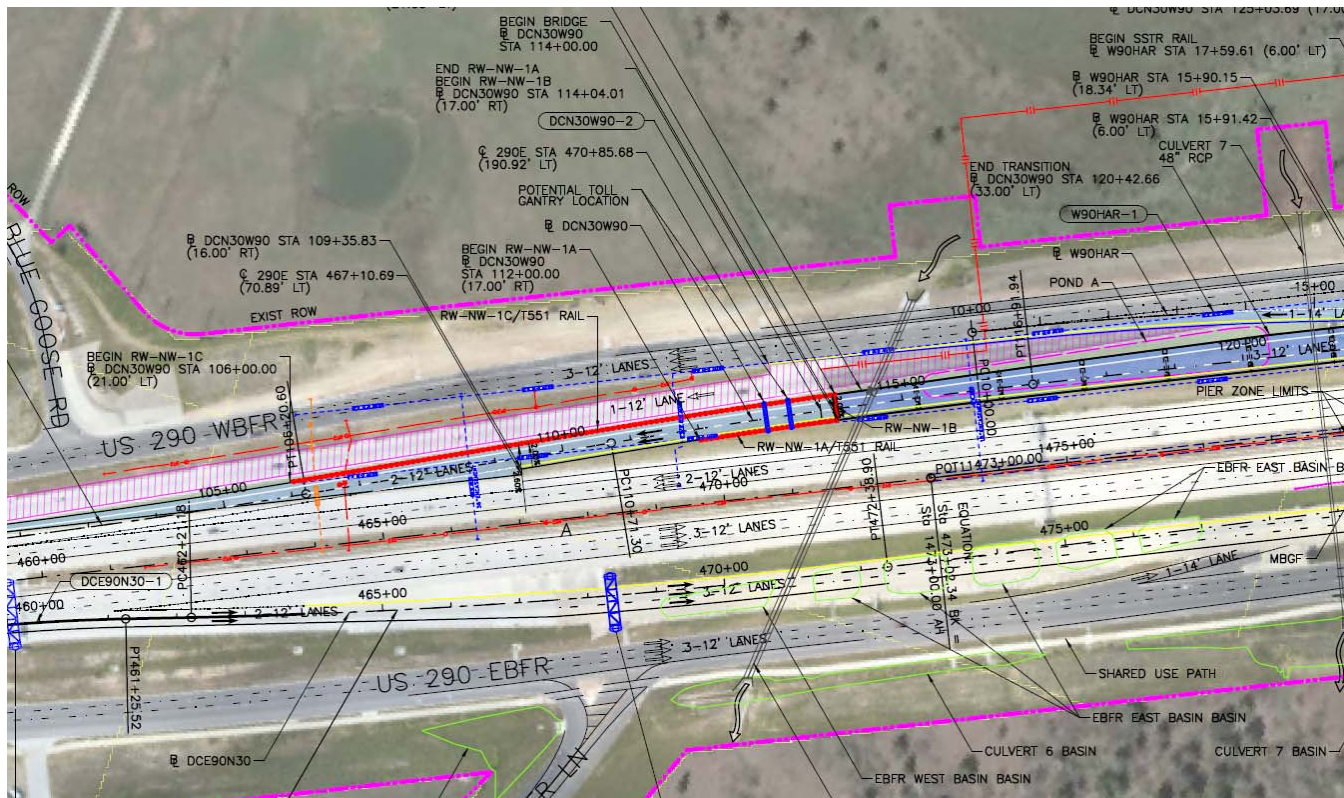
A8.0 Project Schedule

The Project Schedule shall be developed to incorporate the milestone dates established for this Work Authorization No. 15 as presented in *ATTACHMENT F – Project Schedule and Milestones*.

ATTACHMENT B

PROJECT LAYOUT Manor Expressway (290E) Phase III Project Toll Gantry Location

Toll Gantry Location* – WB 290E to NB SH130



* Toll Gantry Locations are approximate and subject to change

**ATTACHMENT – C
TOLL FACILITY RESPONSIBILITY MATRIX
CTRMA - Fixed Priced Tolling Projects**

Responsibility Assignment Legend							
Primary Responsibility: P	Support Responsibility: S		Coordination Responsibility Only: C			No Responsibility: N	
Element/Task/Component/ Sub-system	Designer/Contractor			Systems Integrator (SI)			Comments Other Responsibility/Information
	Design	Procure	Install/ Construct	Design	Procure	Install / Construct	
GENERAL REQUIREMENTS							
Schedule	P	P	P	S	C	S	Contractor must accommodate and incorporate the SI scheduled activities into the Contractor schedule. All schedule changes or updates which impact the SI tasks must be agreed to by the SI prior to submittal to the Mobility Authority. A weekly schedule must be distributed and incorporate any SI updates or changes.
Request for Early Opening	P	P	P	S	S	S	SI must be able to match schedule request for early opening to conform to requirements in construction contract documents.
Design Package – Installation and Electrical Design and Plans	P	P	P	C	N	C	Designer to incorporate all SI requirements and specifications into Structural and Electrical Design Packages. SI to provide approval prior to issuance of Released For Construction (RFC) plans.
Grading	P	P	P	C	N	C	
Drainage	P	P	P	C	N	C	No culverts or pipes under tolling zones.
Utilities/Electrical Services	P	P	P	S	C	C	SI to provide specific power requirements for the Toll System. Designer to incorporate into toll facilities design. Contractor to construct power utilities interface, and all power infrastructure.
Traffic Control/Safe work zone	P	P	P	S	N	C	SI to provide Contractor detailed lane closure requirements and schedule for installation and testing.
Signing	P	P	P	C	N	N	All toll signing must be coordinated with and approved by the Mobility Authority. If toll price signs utilize changeable electronic signs, the Contractor will provide the static sign and the SI will provide the electronic insert.
Striping	P	P	P	S	N	C	SI to coordinate striping with pavement loop locations.
Lighting	P	P	P	S	C	S	Roadway and toll location lighting designed by Designer and Provided by contractor. SI to provide lighting requirements in vicinity of toll locations and locations of other Toll System equipment. Designer to confirm that lighting does not obstruct

**ATTACHMENT – C
TOLL FACILITY RESPONSIBILITY MATRIX
CTRMA - Fixed Priced Tolling Projects**

Responsibility Assignment Legend							
Primary Responsibility: P	Support Responsibility: S		Coordination Responsibility Only: C			No Responsibility: N	
Element/Task/Component/ Sub-system	Designer/Contractor			Systems Integrator (SI)			Comments Other Responsibility/Information
	Design	Procure	Install/ Construct	Design	Procure	Install / Construct	
							toll related signing or impede the Toll System.
Landscaping	P	P	P	C	N	N	
Fencing/Guardrail/Bollards/Concrete Barrier	P	P	P	S	C	C	SI to provide requirements for specific equipment clearances for Toll System. Designer to incorporate into roadway design. SI to confirm that design plans meet requirements.
TOLL SYSTEM: LOCATIONS, LAYOUTS, STRUCTURES, MOUNTS/BRACKETS							
Locations and Layouts	P	P	P	S	C	C	SI to provide specific locations for the Toll System, SI to provide requirements for specific lane and facility layouts. Designer to incorporate into Design Packages. SI to review and approve.
Gantries/Foundation/Trusses/Junction boxes/Conduits/Grounding	P	P	P	S	C	S	SI to provide requirements for conduits (for SI installed power and communications cables, including specific requirement for below ground conduits for the loops), junction boxes, and power needs for the Toll System. Designer to incorporate into structural design, including electrical grounding, bonding. Contractor to provide and install junction boxes and conduit pull strings and bell ends for all conduits including conduits going up gantry columns. The Contractor will require SI to sign off on belowground conduits for the loops prior to installation of special pavement structure.
Equipment Mounts on Equipment Brackets/Frames	S	N	C	P	P	P	SI to procure and install all Toll System equipment, and related cable & wiring, including communications from roadside cabinets to the equipment mounted on the gantries. SI to provide requirements for all brackets to designer and frames needed to attach SI procured equipment to Contractor provided truss.
Equipment Brackets/Frames on Gantries	P	P	P	S	N	C	Contractor to provide and install all brackets and frames needed to attach all SI procured equipment. SI to provide locations for installation to the designer. SI to provide requirements for hanger and orientation of hanger mount to gantries.
Pavement structure, including special	P	P	P	S	N	C	SI to provide requirements for special pavement

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CTRMA - Fixed Priced Tolling Projects**

Responsibility Assignment Legend							
Primary Responsibility: P	Support Responsibility: S		Coordination Responsibility Only: C			No Responsibility: N	
Element/Task/Component/ Sub-system	Designer/Contractor			Systems Integrator (SI)			Comments Other Responsibility/Information
	Design	Procure	Install/ Construct	Design	Procure	Install / Construct	
nonferrous zones and conduit stub-outs for in-pavement sensors/loops							structure at toll gantry areas. SI shall coordinate joint spacing to avoid conflicts with loop placement and sign off on riser locations before concrete pour. Designer to assure ferrous objects (i.e. rebar, grates, pipes, etc.) are not in toll revenue collection detection system(s) zone of influence. Contractor to locate loop risers after pavement is poured.
EQUIPMENT CABINETS							
Toll Equipment Cabinets	C	N	S	P	P	P	SI to provide size and number of cabinets needed for Toll System. Designer shall incorporate location into site grading and drainage. SI to procure and install environmentally controlled cabinets. The environmentally controlled enclosures provided by SI must comply with the America Society of Heating, Refrigeration, and Air Conditioning Engineers: Thermal Guidelines for Data Processing Environments. Contractor to provide traffic control devices and safe working conditions for SI during installation of all toll equipment.
Toll Equipment Cabinets Site (TEC) and Roadside Equipment Cabinet Base Slabs	P	P	P	S	N	C	SI to provide requirements for specific equipment weight and anchorages for cabinets to the Designer. Designer to incorporate into Roadway Design. Contractor to install slabs with conduit plumbing.
Facility Security and Security Communications at Toll System locations	C	N	C	P	P	P	SI to provide security communications for all toll system equipment. Designer to incorporate into the Roadway Design. Contractor to provide physical security fence as required by SI around TEC/generators and auxiliary fuel tanks.
TOLL SUB-SYSTEMS							
Automatic Vehicle Identification (AVI) Antennas and Readers	N	N	S	P	P	P	SI to provide AVI System Mounts, Wiring and Cables. SI will perform all AVI system installation and terminations, and to make the connections to the electronics in the cabinets.
Automatic Vehicle Classification and	N	N	S	P	P	P	SI to connect and terminate AVC and/or AVD System mounted on the gantries and/or installed in

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CTRMA - Fixed Priced Tolling Projects

Responsibility Assignment Legend							
Primary Responsibility: P	Support Responsibility: S		Coordination Responsibility Only: C			No Responsibility: N	
Element/Task/Component/ Sub-system	Designer/Contractor			Systems Integrator (SI)			Comments Other Responsibility/Information
	Design	Procure	Install/ Construct	Design	Procure	Install / Construct	
Detection (AVC) and (AVD)							the pavement to the electronics in the cabinets.
In-Pavement Sensors/Loops	N	N	S	P	P	P	SI to saw cut pavement, procure, install, and seal pavement sensors with approved sealant. Designer to assure ferrous objects (i.e. rebar, grates, etc.) are not in toll revenue collection detection system(s) zone of influence.
Video Capture Sub-System (VCS/VES) Cameras, Illumination, Sensors and Servers	N	N	S	P	P	P	SI to provide, install, terminate all Video Capture Sub-System (VCS/VES) equipment.
In-Lane Processing Servers and Electronics	N	N	N	P	P	P	SI to provide, install, connect, and terminate all electronics in the cabinet and assures proper communications to the devices on the gantry and/or in the pavement.
POWER DISTRIBUTION SUB-SYSTEM							
Metered power service at each location:	P	P	P	C	N	C	SI to provide power requirements and special requirements for construction of utilities near each Toll System. Designer should incorporate requirements into roadway design. Contractor to provide and install necessary conductors, ducts & junction/pull boxes, bell ends/pull strings and disconnect switch/fuse at the meter.
Power service at each toll location:	C	N	C	P	P	P	The SI shall provide and install all other wiring, switches, surge protection/suppression, etc. for power from the meter for the Toll System equipment. SI will terminate all power wiring from ATS at Toll System
Generators & Automatic Transfer Switches (ATS)	S	N	C	P	P	P	SI to provide generators, ATS, generator cabinets, wiring, connect and terminate all power at the Toll System sites.
Generator Power Source is Natural Gas	P	P	P	S	N	C	If natural gas is available, the Designer shall incorporate the gas lines into the roadway design. Contractor shall provide and install gas lines for incorporation into generator systems. SI to coordinate and provide generator requirements including location for gas feed including location of

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Primary Responsibility: P	Support Responsibility: S		Coordination Responsibility Only: C			No Responsibility: N	
Element/Task/Component/ Sub-system	Designer/Contractor			Systems Integrator (SI)			Comments Other Responsibility/Information
	Design	Procure	Install/ Construct	Design	Procure	Install / Construct	
							gas cut-off valve adjacent to Toll Pad. SI to install feed from generator to cut-off valve.
Generator Power Source is propane or diesel	S	S	S	P	P	P	The SI shall provide and install the propane/diesel tank for the generator if natural gas is not a viable option for the project. If propane is used, contractor will provide pad and conduit feed from the pad to the cut-off valve. Feeder line cut-off valve to be no further than 10' from the toll pad.
Uninterruptible Power Supplies (UPS)	S	N	C	P	P	P	SI to provide and install Uninterruptible Power Supply Systems (UPS) in the cabinets. UPS will be required for the Toll System,
Lightning Protection & Grounding	P	P	P	S	C	C	SI to provide specific requirements for equipment lightning protection and grounding. Designer should incorporate into plans. Contractor to furnish and install required lightning protection and grounding.
COMMUNICATIONS SUB-SYSTEMS							
Conduits/Ducts & Junction/Pull Boxes/Outlets	P	P	P	S	C	S	SI to provide specific Communications design requirements including location of long-radius sweep conduit bends. Designer to incorporate into the roadway design and contractor to install including conduits, junction boxes and bell ends with pull strings. The Contractor shall verify that all duct banks and conduits are clear/proofoed and have pull strings prior to the beginning of the Toll System installation.
Fiber Optic cabling in conduits for Toll System	S	S	S	P	P	P	SI to provide fiber requirements for Toll System. Designer to incorporate into design of backbone and laterals. SI to furnish and install along the corridor from communication hub to cabinets.
Toll Hardware in Cabinets	C	N	C	P	P	P	SI to provide and install all toll hardware within the cabinets. Equipment must be installed in a clean and organized manner and must not be affected by the environmental controls. The SI must provide and install the redundant environmental controls.

**ATTACHMENT – C
TOLL FACILITY RESPONSIBILITY MATRIX
CTRMA - Fixed Priced Tolling Projects**

Responsibility Assignment Legend								
Primary Responsibility: P		Support Responsibility: S			Coordination Responsibility Only: C			No Responsibility: N
Element/Task/Component/ Sub-system	Designer/Contractor			Systems Integrator (SI)			Comments Other Responsibility/Information	
	Design	Procure	Install/ Construct	Design	Procure	Install / Construct		
Routers	C	N	C	P	P	P	SI to provide, install and configure the routers for connection from hub locations to the Mobility Authority's Traffic Management Center. (TMC)	
Hubs	N	N	C	P	P	P	If applicable.	
Switches	N	N	C	P	P	P	SI to provide, install and configure the switches for connection from hub locations to the Mobility Authority's Traffic Management Center. (TMC)	
Firewalls	N	N	C	P	P	P	SI to provide, install and configure the necessary firewall for the toll system	
Patch/Distribution Panels	N	N	C	P	P	P	SI to provide and install all the necessary patch and distribution panels to provide Fault Tolerant Single Mode Fiber Optic IP-Based Communication System.	
Corridor Communications System	S	N	C	P	P	P	SI to provide Fault Tolerant Single Mode Fiber Optic IP-Based Communication System for Toll Revenue Collection Systems.	
Corridor Communications Conduits	P	P	P	C	N	S	Designer to design for any branch off existing duct bank system including conduit, ground boxes and terminations. Contractor to furnish and install.	
Corridor to Traffic Management Center(TMC)	N	N	N	P	P	P	SI to provide Fault Tolerant IP-Based Communication System to the TMC for Toll Revenue Collection Systems.	
Data/Communications Service to each Tolling Location	N	N	N	P	P	P	SI to install any power and communications cable required to interface between the TEC and the service provider's POI. Contractor responsible for conduit, ground boxes and infrastructure terminations.	
SYSTEMS SERVERS AND SPACE								
Toll Collection Systems Computer(s)	N	N	N	P	P	P		
Support Equipment at CTRMA Offices	N	N	N	P	P	P	SI to provide data and power wiring schematics, equipment rack/cabinet requirement, and elevations, layouts, floor plans, air flow diagrams,	

ATTACHMENT – C
TOLL FACILITY RESPONSIBILITY MATRIX
CTRMA - Fixed Priced Tolling Projects

Responsibility Assignment Legend							
Primary Responsibility: P	Support Responsibility: S		Coordination Responsibility Only: C			No Responsibility: N	
Element/Task/Component/ Sub-system	Designer/Contractor			Systems Integrator (SI)			Comments Other Responsibility/Information
	Design	Procure	Install/ Construct	Design	Procure	Install / Construct	
							and environmental controls load calculations, electrical power distribution, including grounding, bonding, lightning protection, panel boards, TVSS, circuit breakers conduit, conductors, j-boxes, receptacles.
Systems Servers & Workstations	N	N	C	P	P	P	SI to provide, install and configure all system servers and workstations required at the TMC to support the operations and management of the Project.
Federal Communication Commission License Preparation and Submission	C	N	N	P	P	P	SI to provide all information necessary to acquire FCC Licensing to the Mobility Authority.
DUCT BANK & INTELLIGENT TRANSPORTATION SYSTEMS (ITS) – TXDOT OWNED							
Duct Bank Adjustment & ITS relocations design	P	P	P	N	N	N	Designer is responsible for the design of any necessary ITS relocations including, foundations, conduits, electrical services, grounding circuits, and support structures. Contractor responsible for notifying designer of adjustments needed to any existing duct bank manholes and providing new junction/boxes and manholes if in conflict with the project. Coordination with TxDOT will be required. SI responsible for adjustments to 290E fiber.
Duct Bank Adjustments/new connections	P	P	P	S	N	C	Designer is responsible for designing all manhole adjustments and new manhole ties. Contractor responsible to furnish/install.
Fiber optic cables	N	N	N	P	P	P	Any adjustments to existing 290E cables are SI responsibility.

ATTACHMENT – C
TOLL FACILITY RESPONSIBILITY MATRIX
CTRMA - Fixed Priced Tolling Projects

Responsibility Assignment Legend							
Primary Responsibility: P	Support Responsibility: S		Coordination Responsibility Only: C			No Responsibility: N	
Element/Task/Component/ Sub-system	Designer/Contractor			Systems Integrator (SI)			Comments Other Responsibility/Information
	Design	Procure	Install/ Construct	Design	Procure	Install / Construct	
Relocation of existing CCTV & DMS foundations, conduits, grounding, camera poles, and electrical services	P	P	P	C	N	C	Designer is responsible for designing the relocation of any existing CCTV and DMS structures and services impacted by the Project Design, including communications and power. Contractor shall be responsible for relocating aforementioned structures/services. Damaged or inoperable equipment shall be moved but not repaired. Coordinate with TxDOT in regards to proper storage of existing devices until time of reinstall.
Relocation of RVSD Stations	P	P	P	C	C	C	Contractor to coordinate with SI for relocation of CTRMA devices and infrastructure related to RVSD.
Relocation of vehicle detector foundations, conduits, loops, grounding, vehicle detector support structures, and electrical services	P	P	P	C	N	C	Designer to coordinate with TxDOT regarding any existing vehicle detectors/loops within the pavement to determine if they will need to be replaced/relocated. The Contractor will replace/relocate detectors/loops unless TxDOT prefers to do the work. Any damaged detectors/loops that are to remain must be replaced by the Contractor. Coordinate with TxDOT in regards to proper storage of existing devices until time of reinstall.

ATTACHMENT – C
TOLL FACILITY RESPONSIBILITY MATRIX
CTRMA - Fixed Priced Tolling Projects

Responsibility Assignment Legend							
Primary Responsibility: P	Support Responsibility: S		Coordination Responsibility Only: C			No Responsibility: N	
Element/Task/Component/ Sub-system	Designer/Contractor			Systems Integrator (SI)			Comments Other Responsibility/Information
	Design	Procure	Install/ Construct	Design	Procure	Install / Construct	
DUCT BANK & INTELLIGENT TRANSPORTATION SYSTEMS (ITS) – PROPOSED							
Duct Bank	P	P	P	S	N	C	Designer responsible for the design of any new duct bank.
Conduit/Ducts & Junction/Pull Boxes/Outlets	P	P	P	S	C	S	
CCTV Poles and foundations	P	P	P	S	N	C	CCTV poles shop drawing to be reviewed by SI prior to release for fabrication. Design to provide all elements of lightning protection as noted in TxDOT CCTV Pole details. Drilled shafts for CCTV pole to be confirmed in the field by SI prior to being set.
RVSD Poles and foundations	P	P	P	S	N	C	RVSD poles shop drawing to be reviewed by SI prior to release for fabrication.
DMS Support Structures	P	P	P	S	N	C	DMS support structure shop drawings to be reviewed by SI prior to release for fabrication. Designer to provide all elements of lightning protection as noted in TxDOT DMS details.
Fiber Optic Cable	N	N	S	P	P	P	
CCTV Cameras and control equipment	N	N	S	P	P	P	
RVSD and control equipment	N	N	S	P	P	P	
DMS and control equipment	N	N	S	P	P	P	
Metered power service at each location	P	P	P	C	N	C	ITS devices that cannot be pulled off a toll power panel (Generator Backup) will require a dedicated service drop. SI to provide a list of ITS devices which can be fed from proposed or existing toll power panels.

ATTACHMENT D

**Fixed Price Tolling Guidelines
Manor Expressway (290E) Phase III Project**



CENTRAL TEXAS
Regional Mobility Authority

FIXED PRICE TOLLING GUIDELINES
2 - 4 LANES

ISSUED: APRIL 2015

CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY - NOVEMBER 2013 ALL RIGHTS RESERVED

STANDARD PLANS & GUIDELINES

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8	ETC-2	EXAMPLE ETC CONFIGURATION
9	ETC-3	EXAMPLE ETC CONFIGURATION
10	TES-1	TOLL EQUIPMENT SITE PLACEMENT DETAILS
11	P1-ML	MAIN LANE PAVEMENT JOINTING PLAN AND GROUND BOX LAYOUT
12	P1-RMP	RAMP PAVEMENT JOINTING PLAN AND GROUND BOX LAYOUT
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23	CATD-1	CONCRETE TO ASPHALT TRANSITION DETAIL
24	JC-1	JOINTED CONCRETE PAVEMENT

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**FIXED PRICE
 TOLLING GUIDELINES
 INDEX OF
 SHEETS**

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KK				

GENERAL NOTES

- 1 REFERENCE SHEET: THE SYSTEM INTEGRATOR SHALL PROVIDE A SUMMARY STATION AND OFFSET TABLE FOR ALL OF THE FOLLOWING FOR EACH GANTRY LOCATION:
 AVDS & AVC ENTRY, MIDDLE, EXIT, AND AXLE CONDUIT RISERS (IF NECESSARY)
 AVDS & AVC ENTRY, MIDDLE, EXIT, AND AXLE LOOPS (IF NECESSARY)
- 2 REFERENCE SHEET: THE DESIGN BUILDER SHALL PROVIDE A SUMMARY STATION AND OFFSET TABLE FOR ALL OF THE FOLLOWING FOR EACH GANTRY LOCATION:
 GANTRY COLUMNS & TRUSSES
 PAVEMENT SECTION JOINTS (JOINTS SHALL BE DESIGNED SO THAT NO LOOP CROSSES ANY JOINT)
- 3 TXDOT ELECTRICAL DETAIL SHEETS SHALL APPLY.
- 4 NATIONAL ELECTRIC CODE (NEC), NFPA 780, NESC REQUIREMENTS SHALL APPLY
- 5 TXDOT ITEM 618 SHALL GOVERN FOR ALL CONDUIT REQUIREMENTS
- 6 TXDOT ITEM 620 SHALL GOVERN FOR ALL ELECTRICAL CONDUCTOR REQUIREMENTS
- 7 TXDOT ITEM 624 SHALL GOVERN FOR ALL GROUND BOXES. HS-20 LOAD RATING REQUIREMENTS SHALL GOVERN IN ALL LOCATIONS SUBJECT TO TRAFFIC LOADING.
- 8 TXDOT ITEM 628 SHALL GOVERN FOR ALL ELECTRICAL SERVICES. THE DESIGN BUILDER SHALL CONTACT RESPECTIVE UTILITY FOR LOCATION OF ELECTRICAL SERVICE.
- 9 SITE CONDITIONS MAY REQUIRE MODIFICATION TO THE JCP TO EXISTING PAVEMENT TRANSITION.
- 10 DETAILS ARE SUBJECT TO REVISIONS PERIODICALLY AS REQUIRED BY SYSTEM INTEGRATOR TECHNOLOGIES.

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**FIXED PRICE
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 GENERAL NOTES**

GN-1

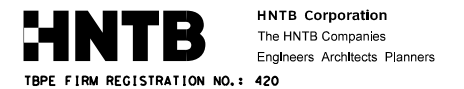
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ABBREVIATIONS

ACI	AMERICAN CONCRETE INSTITUTE	LPS	LIGHTNING PROTECTION SYSTEM
ANT	AVI ANTENNA	LO"X"	LANE "NUMBER X"
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	MSE	MECHANICALLY STABILIZED EARTH
ATS	AUTOMATIC TRANSFER SWITCH	NEC	NATIONAL ELECTRICAL CODE: NFPA 70
AVC	AUTOMATIC VEHICLE CLASSIFICATION	NESC	NATIONAL ELECTRIC SAFETY CODE
AVDS	AUTOMATIC VEHICLE DETECTION	NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
AVI	AUTOMATIC VEHICLE IDENTIFICATION	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
AWG	AMERICAN WIRE GAUGE	N.T.S.	NOT TO SCALE
CCTV	CLOSED CIRCUIT TV	OSB	OVERHEAD SIGN BRIDGE
COMM	COMMUNICATIONS	PVC	POLYVINYL CHLORIDE CONDUIT
COSS	CANTILEVER OVERHEAD SIGN SUPPORT	RCP	REINFORCED CONCRETE PAVEMENT OR PIPE
C&G	CURB & GUTTER	RMC	RIGID METAL CONDUIT; SHD 40; GALVANIZED
CRCP	CONTINUOUSLY REINFORCED CONCRETE PAVEMENT	S1	LEFT SHOULDER LANE
EPEC40	EXTRUDED POLYETHYLENE ELECTRICAL CONDUIT NEMA TC-7 SCHEDULE 40	SCH 40	NEMA TC-2 NOMINAL PIPE SIZE SCHEDULE 40 CONDUIT
EPEC80	EXTRUDED POLYETHYLENE ELECTRICAL CONDUIT NEMA TC-7 SCHEDULE 80	SCH 80	NEMA TC-2 NOMINAL PIPE SIZE SCHEDULE 80 CONDUIT
GAL	GALVANIZED	SSTB	SINGLE SLOPE TRAFFIC BARRIER
GB	GROUND BOX	STA	CHAIN BASE ALIGNMENT STATION
GB"X"	GROUND BOX "X"	TEC	TOLL ELECTRONICS CABINET
GEN	GENERATOR	TDS	TRAFFIC DETECTION SYSTEM
GFRP	GLASS FIBER REINFORCED POLYMER	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
ETC	ELECTRONIC TOLL CONFIGURATION	UL	UNDERWRITER LABORATORY
FOC	FIBER OPTIC CABLE	UPS	UNINTERUPTABLE POWER SUPPLY
HDPE	HIGH DENSITY POLYETHYLENE CONDUIT	VES	VIOLATION ENFORCEMENT SYSTEM / VIDEO TOLLING
HMAC	HOT MIX ASPHALTIC CONCRETE		
HS-20	AASHTO TRUCK LOADING REFERENCE MODEL		
HSS	HIGH STRENGTH STEEL		
KW	KILOWATT		
JCP	JOINT REINFORCED CONCRETE PAVEMENT		
LP	LIQUEFIED PETROLEUM (GAS) / NATURAL GAS OR DIESEL MAY BE SUBSTITUTED FOR PROPANE (250 GALLON TANK)		

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FIXED PRICE TOLLING GUIDELINES
ABBREVIATIONS

ABB-1

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GROUND/PULL BOX	<input checked="" type="checkbox"/>	CONDUIT	-----
GENERATOR	<input type="checkbox"/> GEN	PROPANE TANK (250 GALLON TANK)	<input type="checkbox"/> LP
COMMUNICATIONS	<input type="checkbox"/> C	ENCASED CONDUIT	-----
ELECTRICAL SERVICE	<input type="checkbox"/> P	BLACK VINYL FENCE (6' TALL)	-----x-----
SUPPORTING COLUMN	<input type="checkbox"/> O	TOLL ELECTRONICS CABINET	<input type="checkbox"/> TEC
JUNCTION BOX	<input type="checkbox"/> J		
DISCONNECT SWITCH	<input type="checkbox"/> DS		
AUTOMATIC TRANSFER SWITCH	<input type="checkbox"/> ATS		
AUTO VEHICLE CLASSIFICATION LOOP	<input type="checkbox"/> E		
AUTO VEHICLE DETECTION LOOP	<input type="checkbox"/> D		

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**FIXED PRICE
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 SYMBOLS USED**

S-1

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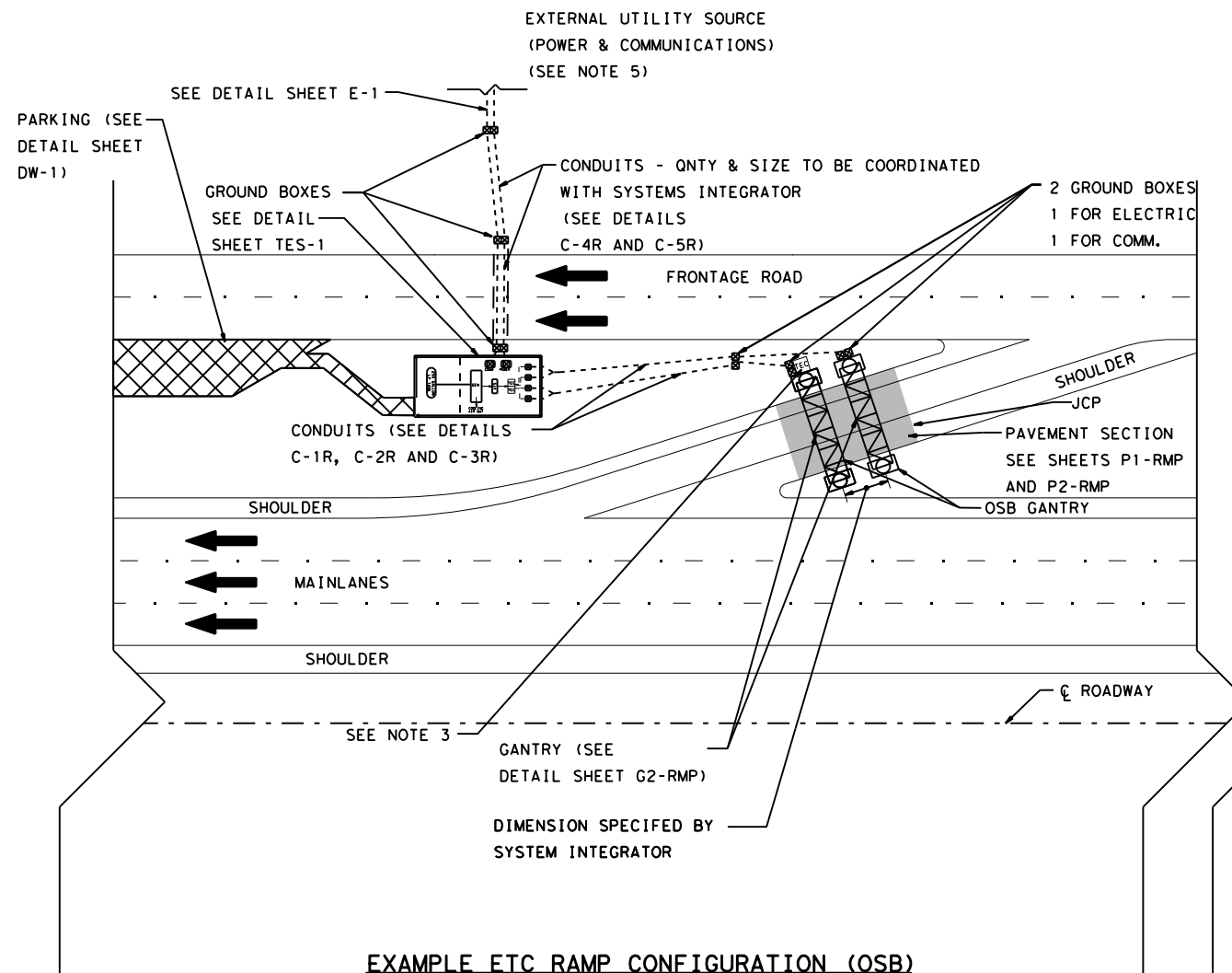
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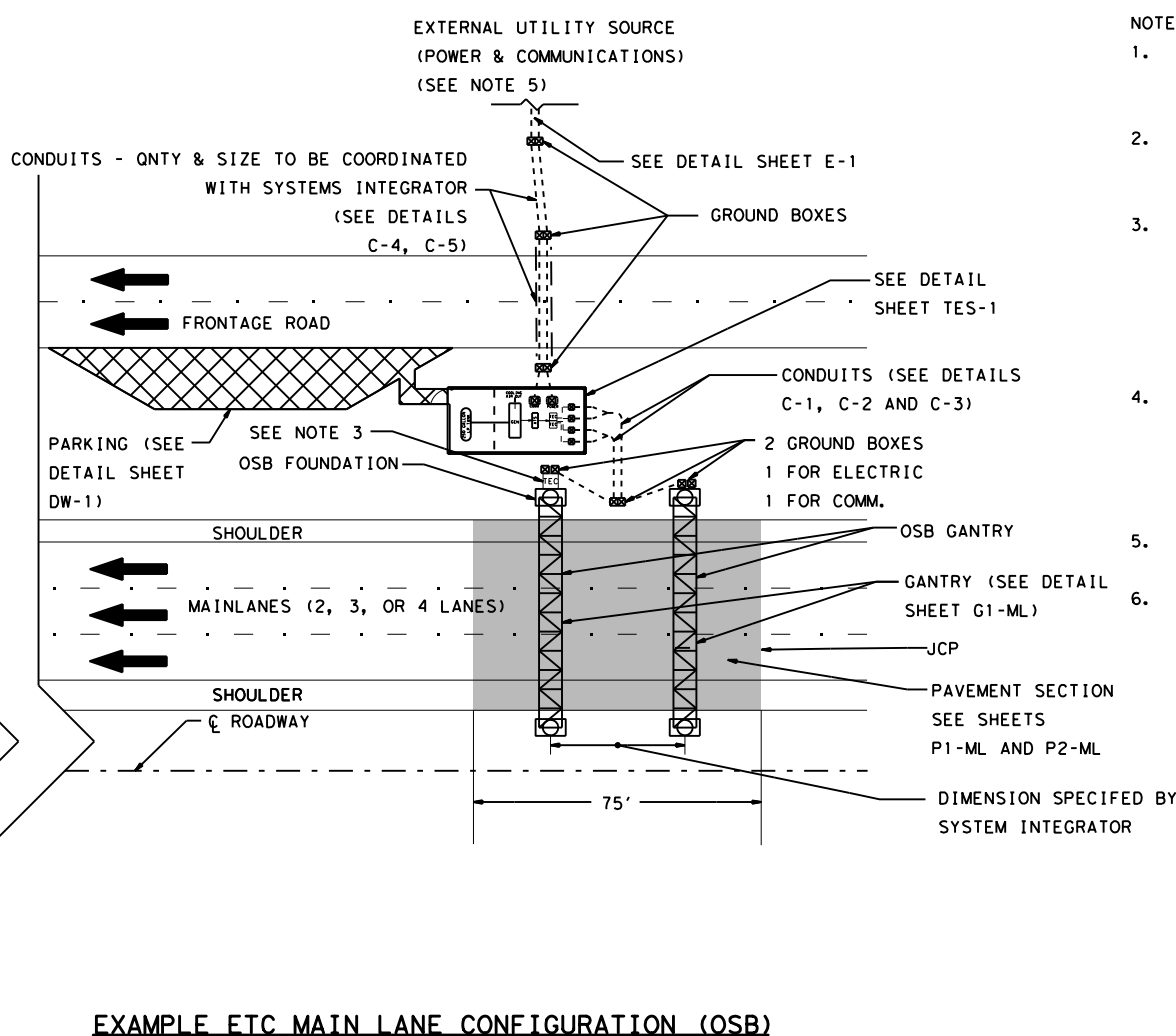
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EXAMPLE ETC RAMP CONFIGURATION (OSB)



EXAMPLE ETC MAIN LANE CONFIGURATION (OSB)

- NOTES:
- 1. CONDUIT BENDS SHALL NOT EXCEED 180° WITHOUT A PULL BOX UNLESS APPROVED BY ENGINEER.
 - 2. MAXIMUM LENGTH OF RUN FROM COMMUNICATION CABINET TO FURTHEST AVI/AVDS IS 125'.
 - 3. TEC TO BE MOUNTED ON COLUMN FOR STANDARD TXDOT STEEL COLUMNS. TEC TO BE MOUNTED ON CONCRETE PAD ADJACENT TO COLUMN FOR AESTHETIC COLUMNS. DESIGN BUILDER TO VERIFY LOCATION WITH MOBILITY AUTHORITY AND SYSTEM INTEGRATOR.
 - 4. THE DESIGN BUILDER MUST PROVIDE DRAWINGS SHOWING THE LOCATION OF GANTRY, PROFILES OF ROADWAY, AND SUGGESTED GENERATOR LOCATIONS TO MOBILITY AUTHORITY FOR APPROVAL.
 - 5. COMMUNICATIONS SHALL TIE INTO EXISTING OR PROPOSED DUCT BANK.
 - 6. MAXIMUM LENGTH OF RUN FROM COMMUNICATION CABINET TO FURTHEST VES/TDS EQUIPMENT IS 300'.

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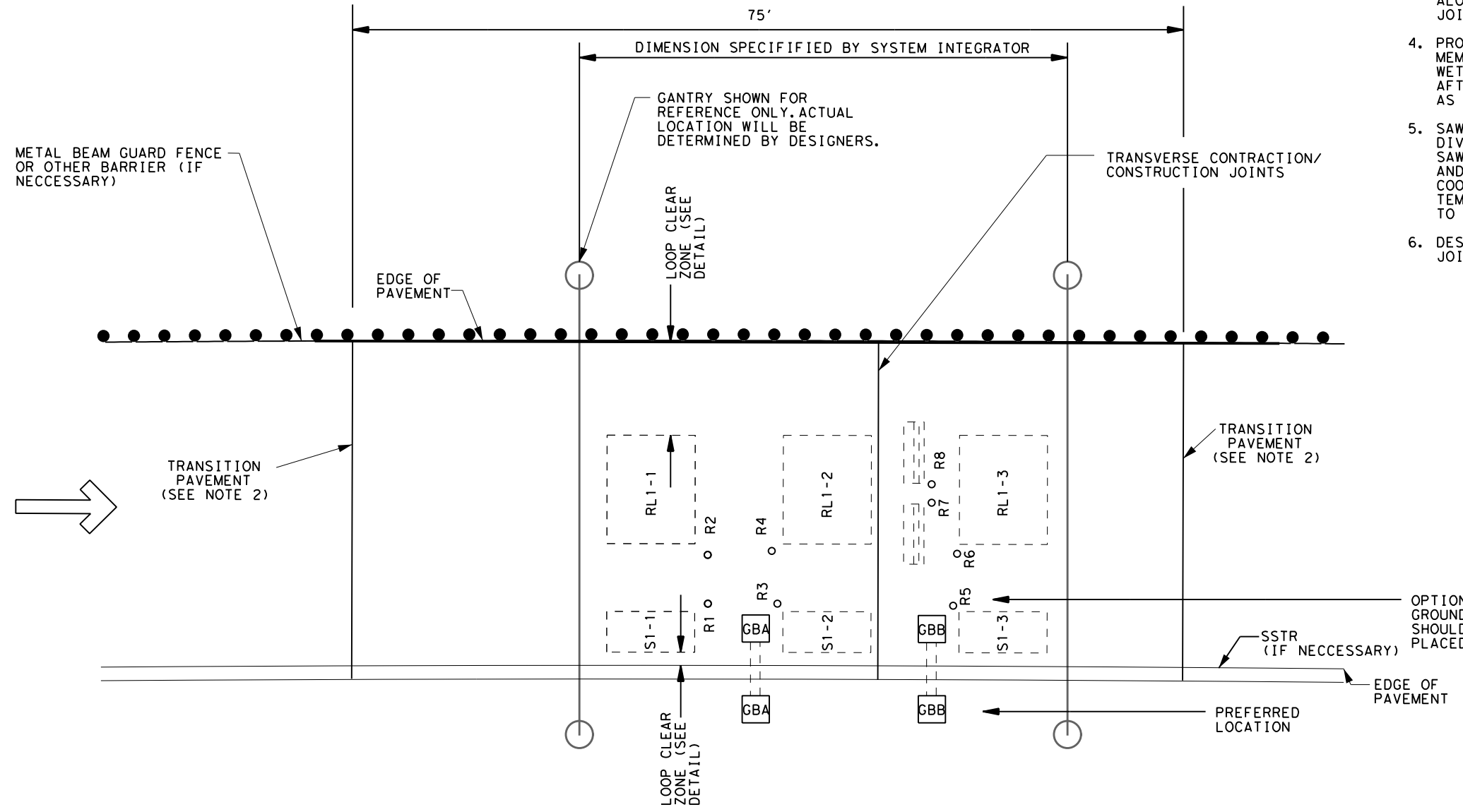
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EXAMPLE ETC CONFIGURATIONS**

ETC-1

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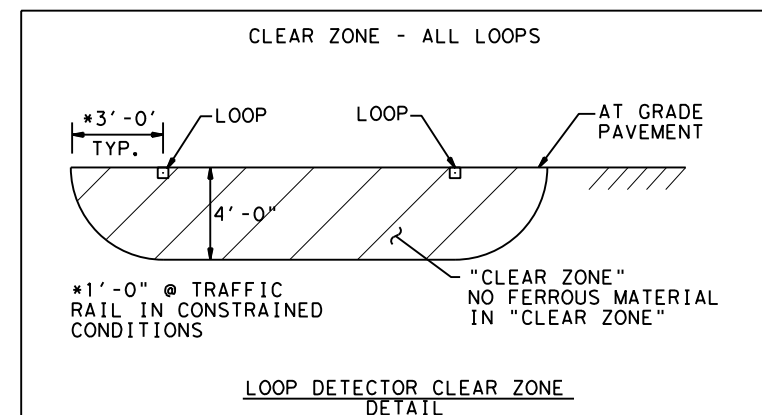


GENERAL NOTES

1. JOINT DETAILS ARE PROVIDED ON THE JOINED CONCRETE PAVEMENT (JC-1) STANDARD DETAIL SHEET.
2. SEE TERMINAL ANCHOR JOINT DETAIL FOR CRCP TO JCP PAVEMENT DETAIL ON SHT.22. SEE CATD-1 FOR JCP TRANSITION TO ASPHALT.
3. TRANSVERSE JOINT SPACINGS SHOWN ARE MEASURED ALONG THE OUTSIDE EDGE OF PAVEMENT. TRANSVERSE JOINTS SHALL BE RADIAL TO THE BASELINE.
4. PROVIDE BOTH MEMBRANE AND WET MAT CURING. PLACE MEMBRANE CURING IMMEDIATELY AFTER TEXTURING. PROVIDE WET MAT CURING IN ACCORDANCE WITH TXDOT ITEM 420.20(A), AFTER MEMBRANE CURING HAS BEEN APPLIED AND AS SOON AS PRACTICAL SO AS NOT TO DAMAGE THE SURFACE FINISH.
5. SAW JOINTS TO A DEPTH OF 3" OR THE PAVEMENT THICKNESS DIVIDED BY FOUR (4), WHICHEVER IS GREATER, AS SOON AS SAWING CAN BE ACCOMPLISHED WITH ONLY MINOR RAVELING AND COMPLETE SAWING BEFORE THE PAVEMENT BEGINS TO COOL. FOR EACH CONCRETE PLACEMENT INSTALL ONE OR MORE TEMPERATURE SENSORS, 1" BELOW THE SURFACE AND MONITOR TO INSURE TEMPERATURE REQUIREMENTS ARE MET.
6. DESIGN-BUILDER TO COORDINATE LOCATION OF CONSTRUCTION JOINTS WITH SYSTEM INTEGRATOR.

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Date: 26-MAY-2015

OPTIONAL LOCATION:
GROUND BOXES SHALL BE PLACED IN SHOULDER WHEN THEY CANNOT BE PLACED OUTSIDE OF THE PAVEMENT.



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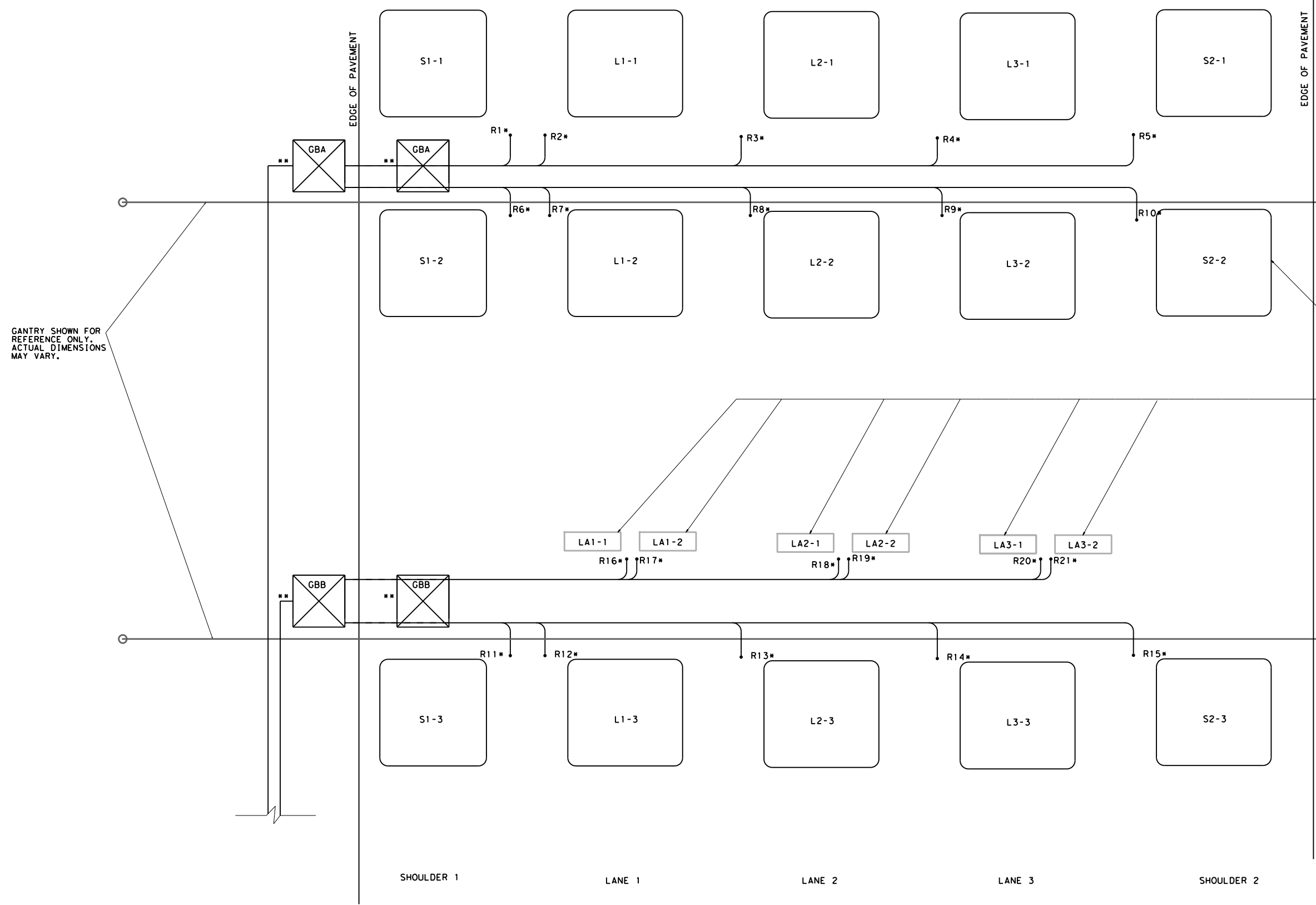
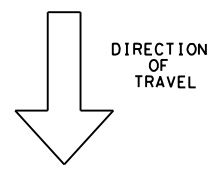
CENTRAL TEXAS
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FIXED PRICE TOLLING GUIDELINES
RAMP PAVEMENT JOINTING PLAN AND GROUND BOX LAYOUT
P1-RMP

DESIGNED BY:	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
	6		12
DRAWN BY:	STATE	DIST.	COUNTY
DW	TEXAS	AUS	
CHECKED BY:	CONT.	SECT.	JOB HIGHWAY NO.
KK			

Scale: 1:40,000
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 Design Filename: \\ousw00\pmwork\Jobs\46837*CTRNA\183A Operations and Maintenance\Tolling New Fixed Price Tolling Standards\GroundBoxPlacementConduit.rvt

SAMPLE LOOP LAYOUT



- GENERAL NOTES:
- 1) THE NUMBER AND LOCATION OF LOOPS AND RISERS TO BE SPECIFIED BY SYSTEM INTEGRATOR.
 - 2) NOT TO BE USED FOR LOOP PLACEMENT MARK RISER LOCATION TO BE VERIFIED BY ENGINEER.
 - 3) PVC SEE DETAIL A2 "CONDUIT RISER DETAIL LOOP TAIL TO GROUND BOX CONDUIT TRENCH DETAIL."
 - 4) ADDITIONAL GBC'S MAY BE REQUIRED. COORDINATE NUMBER AND LOCATION WITH SYSTEMS INTEGRATOR.
 - 5) FOR 2 MAIN LANES, REMOVE L3. FOR 4 MAIN LANES, ADD L4.
 - 6) ALL GROUND BOX SIZES AND MODELS MUST BE APPROVED BY THE MOBILITY AUTHORITY OR SYSTEMS INTEGRATOR.
- * SEE DETAIL A3 ON CONDUIT RISER DETAIL SHEET. RISER LOCATIONS TO BE SPECIFIED BY SYSTEMS INTEGRATOR.
- ** SEE DETAIL A1, A4, ON CONDUIT RISER DETAIL SHEET. PREFERRED LOCATION FOR GROUND BOXES IS OUTSIDE OF PAVEMENT. IF INSUFFICIENT ROOM IS AVAILABLE OUTSIDE OF PAVEMENT, GROUND BOX SHALL BE HS-20 TRAFFIC RATED. IF GROUND BOX IS IN PAVEMENT, IT MUST BE NON-FERROUS.

AUTO VEHICLE DETECTION (AVDS) (LOOP FRAMING)

AUTO VEHICLE CLASSIFICATION (AVC)

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 P.E. Serial No.: 93753
 Date: 26-MAY-2015

NOT TO SCALE

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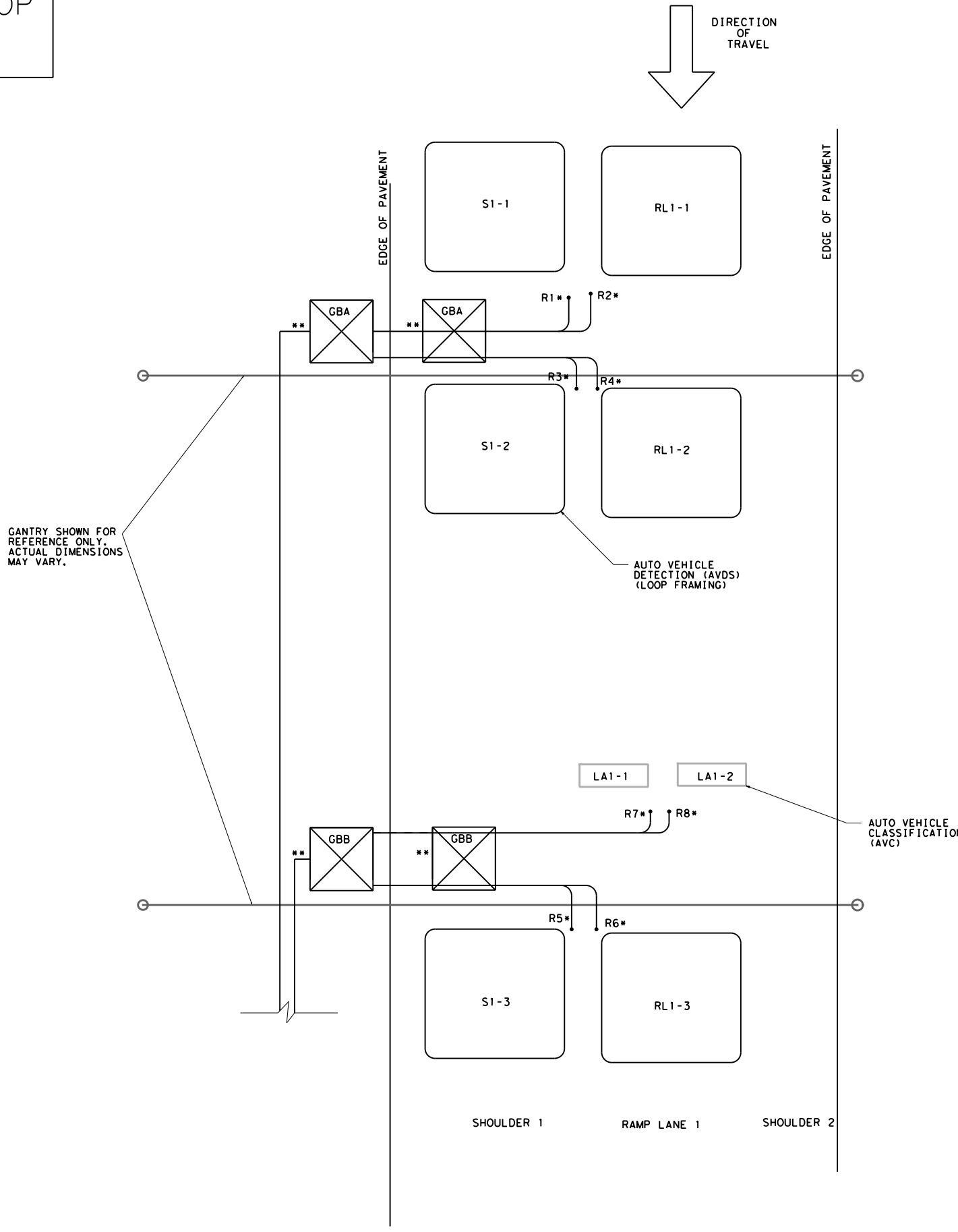
FIXED PRICE TOLLING GUIDELINES GROUND BOX PLACEMENT AND CONDUIT RISER LOCATION (MAIN LANES) P2-ML

DESIGNED BY:	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
	6		13
DRAWN BY:	STATE	DIST.	COUNTY
DW	TEXAS	AUS	
CHECKED BY:	CONT.	SECT.	JOB
KK			HIGHWAY NO.

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Scale: 1:40,000

SAMPLE LOOP LAYOUT



- GENERAL NOTES:
- 1) THE NUMBER AND LOCATION OF LOOPS AND RISERS TO BE SPECIFIED BY SYSTEM INTEGRATOR.
 - 2) NOT TO BE USED FOR LOOP PLACEMENT MARK RISER LOCATION TO BE VERIFIED BY ENGINEER.
 - 3) PVC SEE DETAIL A2 "CONDUIT RISER DETAIL LOOP TAIL TO GROUND BOX CONDUIT TRENCH DETAIL."
 - 4) ADDITIONAL GBC'S MAY BE REQUIRED. COORDINATE NUMBER AND LOCATION WITH SYSTEMS INTEGRATOR.
 - 5) ALL GROUND/PULL BOX SIZES AND MODELS MUST BE APPROVED BY THE MOBILITY AUTHORITY OR SYSTEMS INTEGRATOR.
- * SEE DETAIL A3 ON CONDUIT RISER DETAIL SHEET. RISER LOCATIONS TO BE SPECIFIED BY SYSTEMS INTEGRATOR.
- ** SEE DETAIL A1, A4, ON CONDUIT RISER DETAIL SHEET. PREFERRED LOCATION FOR GROUND BOXES IS OUTSIDE OF PAVEMENT. IF INSUFFICIENT ROOM IS AVAILABLE OUTSIDE OF PAVEMENT, GROUND BOX SHALL BE HS-20 TRAFFIC RATED. IF GROUND BOX IS IN PAVEMENT, IT MUST BE NON-FERROUS.

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 P.E. Serial No.: 93753
 Date: 26-MAY-2015

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HNTB

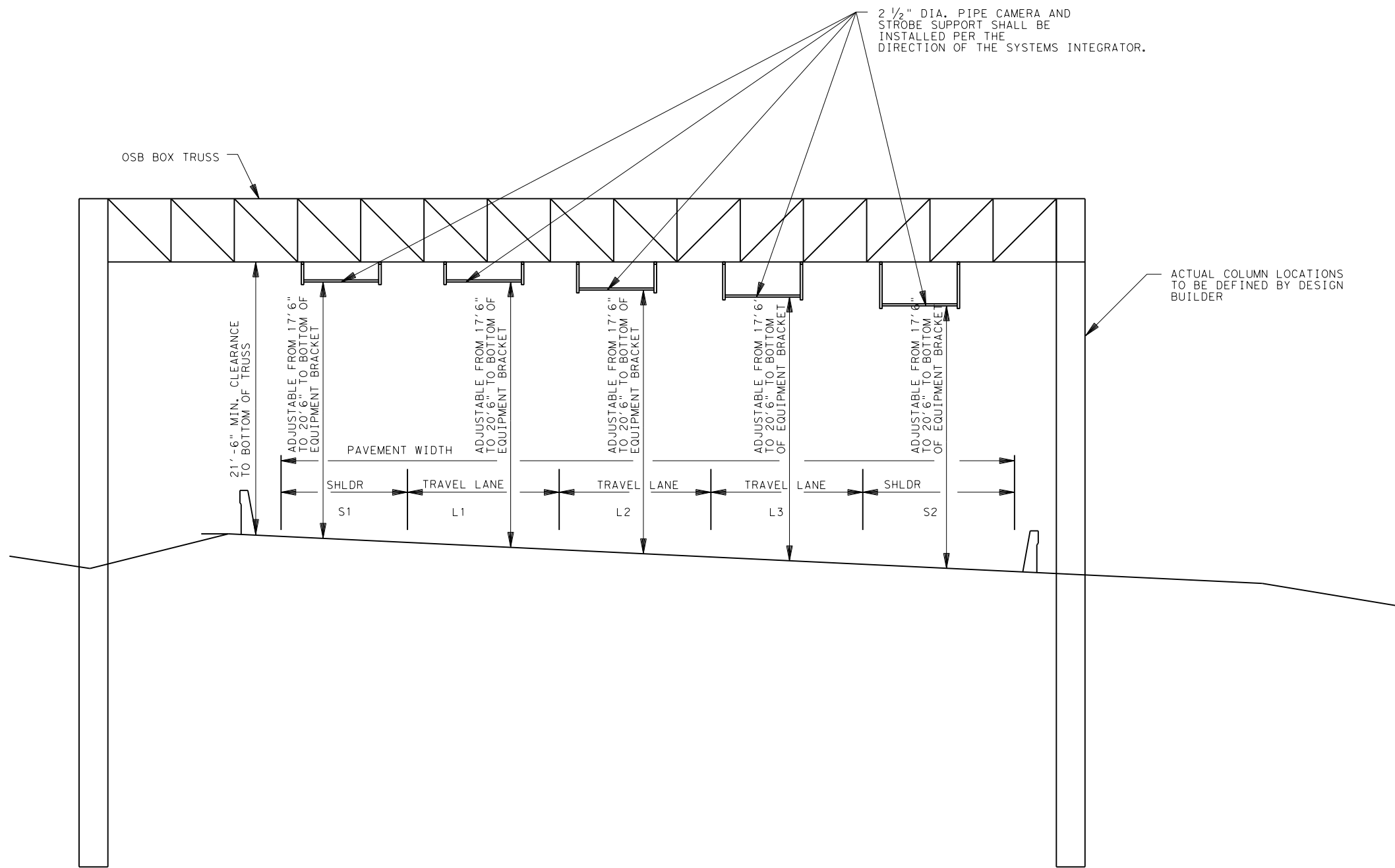
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 Engineers Architects Planners
 TBPE FIRM REGISTRATION NO.: 420



FIXED PRICE
TOLLING GUIDELINES
GROUND BOX PLACEMENT AND
CONDUIT RISER LOCATION
(RAMPS)
P2-RMP

DESIGNED BY:	FED. RD. DIV. NO. 6	FEDERAL AID PROJECT NO.	SHEET NO. 14
DRAWN BY:	STATE TX	DIST. AUS	COUNTY
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NOTES

1. TWO (2) BRACKETS ARE REQUIRED FOR EACH LOCATON SHOWN. BRACKETS SHALL BE ADJUSTABLE TO ALLOW FOR POSITIONING IN ACCORDANCE WITH THE SYSTEMS INTEGRATOR'S SPECIFICATIONS. DESIGN BUILDER MUST COORDINATE INITIAL PLACEMENT LOCATION WITH THE SYSTEMS INTEGRATOR.
2. WALKWAYS ARE REQUIRED TO BE INSTALLED ON ALL GANTRY TRUSSES. LADDERS ARE REQUIRED TO BE INSTALLED ON ALL GANTRY COLUMNS.
3. FOR 2 MAIN LANES, REMOVE L3. FOR 4 MAIN LANES, ADD L4.

QUANTITY OF BRACKETS:
 2 LANES = 16 BRACKETS
 3 LANES = 20 BRACKETS
 4 LANES = 24 BRACKETS

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 P.E. Serial No.: 93753
 Date: 26-MAY-2015

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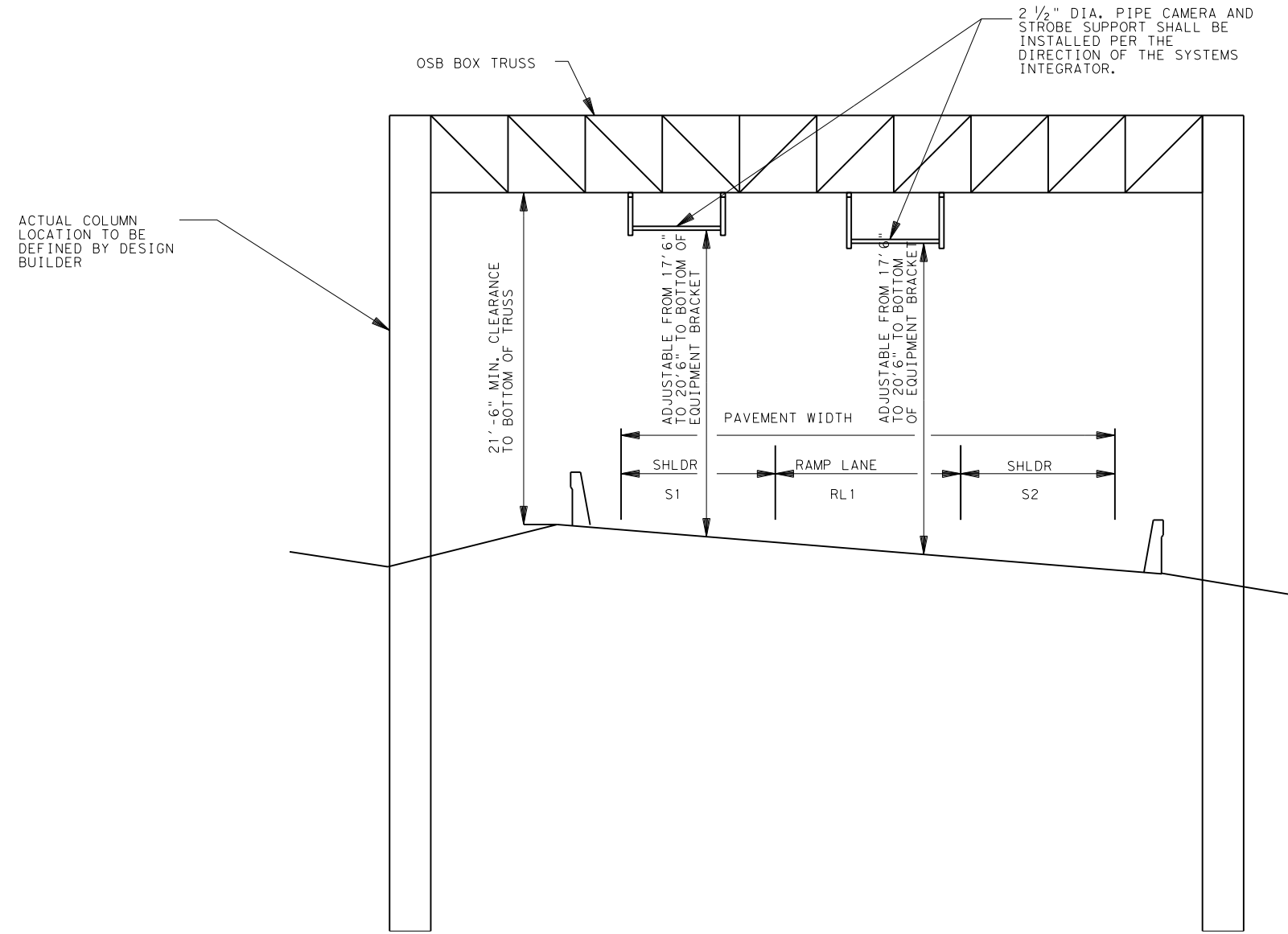


**FIXED PRICE
 TOLLING GUIDELINES
 MAINLANE GANTRY CROSS-LANE
 TANGENT ELEVATION VIEW**

G1-ML

DESIGNED BY:	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
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DRAWN BY:	STATE	DIST.	COUNTY
DW	TEXAS	AUS	
CHECKED BY:	CONT.	SECT.	JOB HIGHWAY NO.
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NOTES

1. TWO (2) BRACKETS ARE REQUIRED FOR EACH LOCATION SHOWN. BRACKETS SHALL BE ADJUSTABLE TO ALLOW FOR POSITIONING IN ACCORDANCE WITH THE SYSTEMS INTEGRATOR'S SPECIFICATIONS. DESIGN BUILDER MUST COORDINATE INITIAL PLACEMENT LOCATION WITH THE SYSTEMS INTEGRATOR.
2. WALKWAYS ARE REQUIRED TO BE INSTALLED ON ALL GANTRY TRUSSES. LADDERS ARE REQUIRED TO BE INSTALLED ON ALL GANTRY COLUMNS.

QUANTITY OF BRACKETS:
 1 RAMP LANE = 8 BRACKETS

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 Date: 26-MAY-2015

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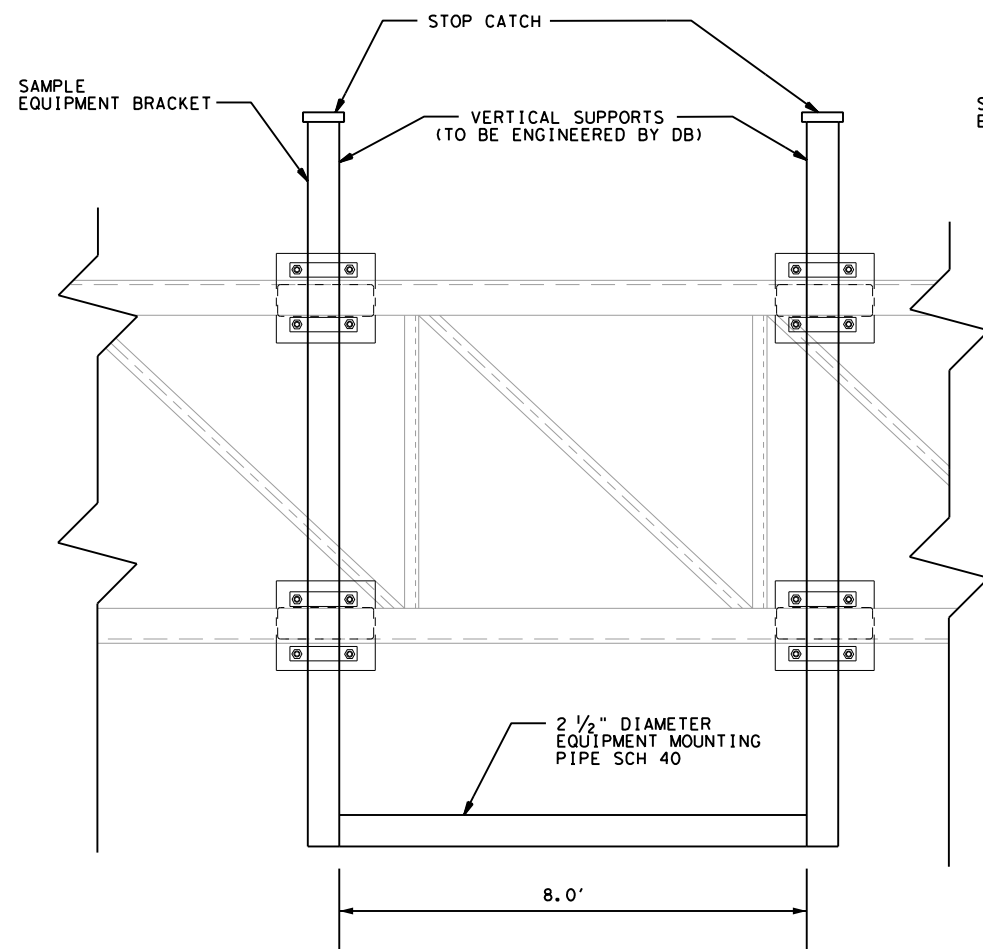
CENTRAL TEXAS
 Regional Mobility Authority

**FIXED PRICE
 TOLLING GUIDELINES
 RAMP CROSS-LANE
 TANGENT ELEVATION VIEW**

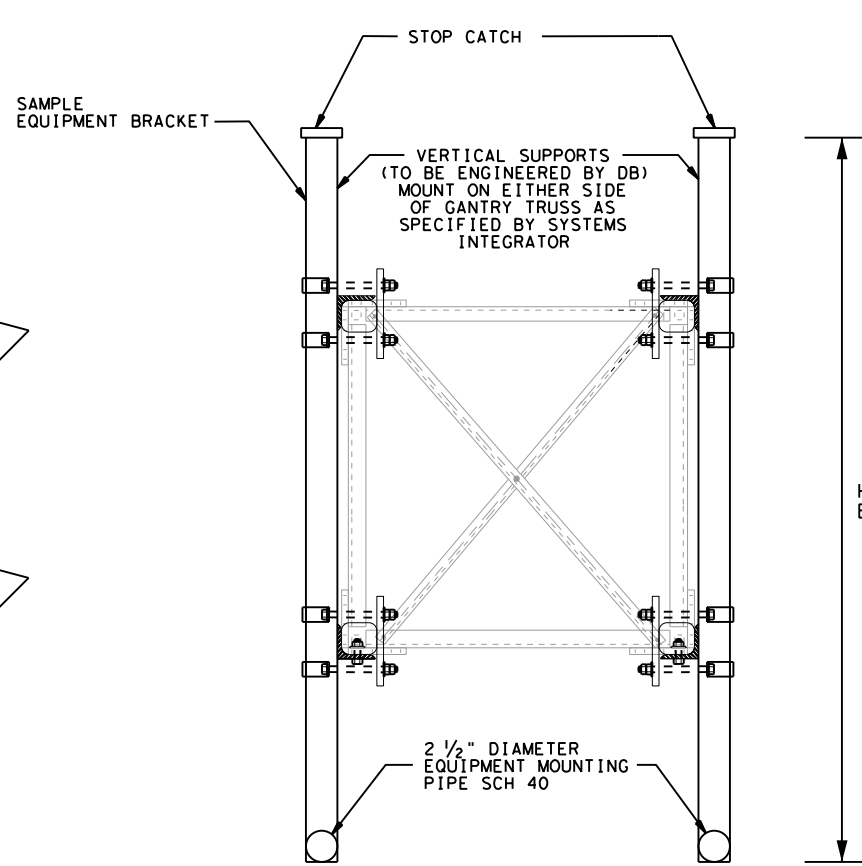
G2-RMP

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DW	TEXAS	AUS		
CHECKED BY:	CONT.	SECT.	JOB	HIGHWAY NO.
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ELEVATION TOLL GANTRY BRACKET



CROSS SECTION OF TOLL GANTRY BRACKET

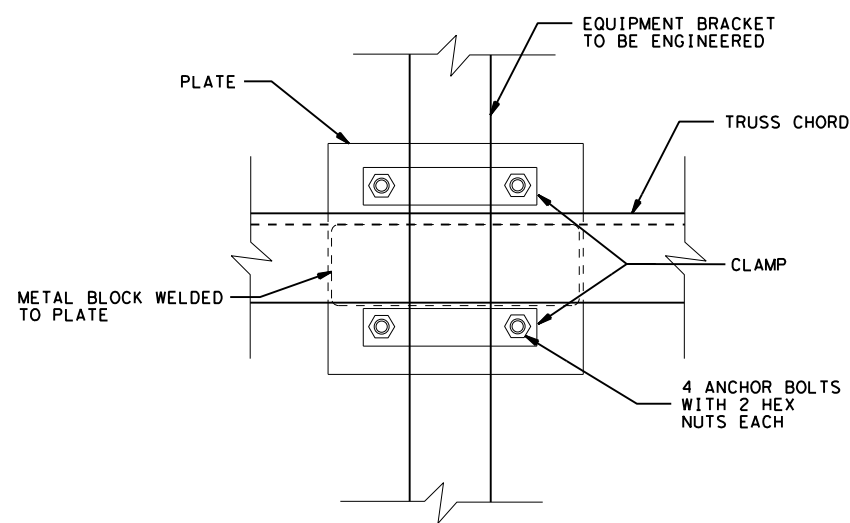
HEIGHT TO BE SPECIFIED BY SYSTEMS INTEGRATOR

GENERAL NOTES:

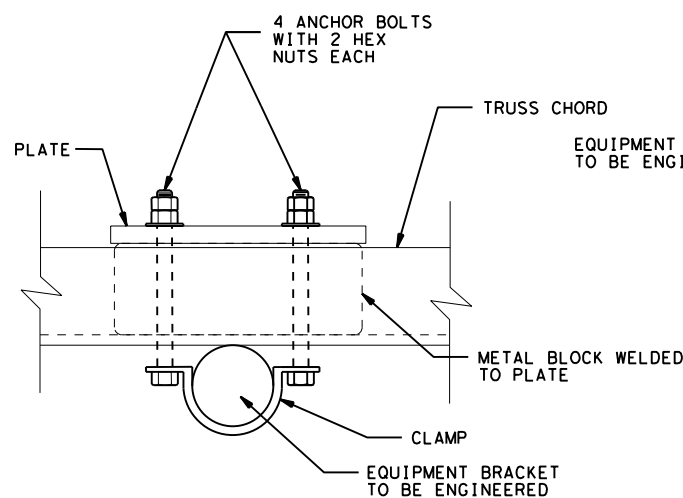
- 1) THESE DETAILS ARE FOR USE WITH TXDOT STANDARD OVERHEAD SIGN BRIDGE (OSB) OR CANTILEVER OVERHEAD SIGN SUPPORT (COSS).
- 2) FOR CONNECTION DETAILS NOT SHOWN SEE OVERHEAD SIGN BRIDGE TRUSS DETAILS (OSBC) OR CANTILEVER OVERHEAD SIGN SUPPORT DETAILS (COSSD).
- 3) MATERIALS SHALL BE COMPATIBLE WITH THE REQUIREMENTS OF THE ASSOCIATED REFERENCE SIGN BRIDGE STANDARDS.
- 4) QUANTITY OF EQUIPMENT BRACKETS AND LOCATION TO BE SPECIFIED BY SYSTEM INTEGRATOR.
- 5) DESIGN OF EQUIPMENT BRACKET AND CONNECTION TO OVERHEAD TRUSS TO BE PROVIDED BY DESIGN BUILDER. AVI ANTENNA AND CAMERA MOUNTING HARDWARE AND CONNECTION DETAILS TO BE PROVIDED BY SYSTEM INTEGRATOR.
- 6) SHOP DRAWINGS FOR AVI ANTENNA AND VES CAMERA SUPPORT SHALL BE PROVIDED FOR ENGINEER'S REVIEW.
- 7) DESIGNER BUILDER TO SPECIFY APPROPRIATE, SPAN, ICE LOADING, AND WIND ZONE. TRUSS DYNAMIC RESPONSE AND DEFLECTION SHALL BE COMPATIBLE WITH TOLL SYSTEM REQUIREMENTS.
- 8) DESIGN OF OSB AND COSS COLUMNS, DRILLED SHAFTS, AND TRUSS TO COLUMN CONNECTION TO BE PROVIDED BY DESIGN BUILDER.
- 9) EQUIPMENT BRACKET AND ALL MOUNTING HARDWARE SHALL BE HOT DIP GALVANIZED.

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 P.E. Serial No.: 93753
 Date: 26-MAY-2015

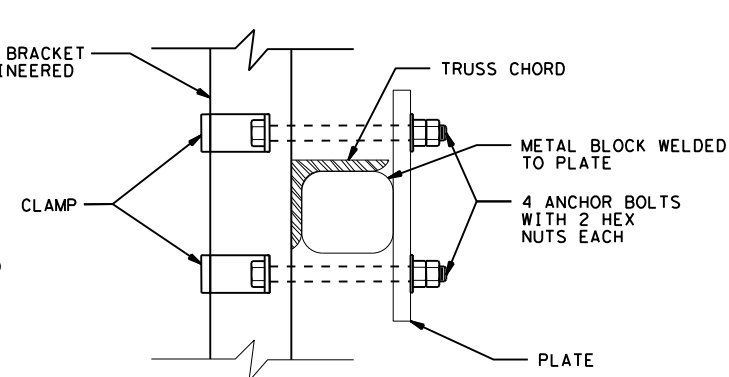
NOT TO SCALE



FRONT VIEW
 (TOP CHORD SHOWN,
 FLIP HORIZ. FOR
 BOTTOM CHORD)



TOP VIEW
 (TOP CHORD SHOWN,
 BOTTOM VIEW FOR
 BOTTOM CHORD)



SIDE VIEW
 (TOP CHORD SHOWN,
 FLIP HORIZ. FOR
 BOTTOM CHORD)

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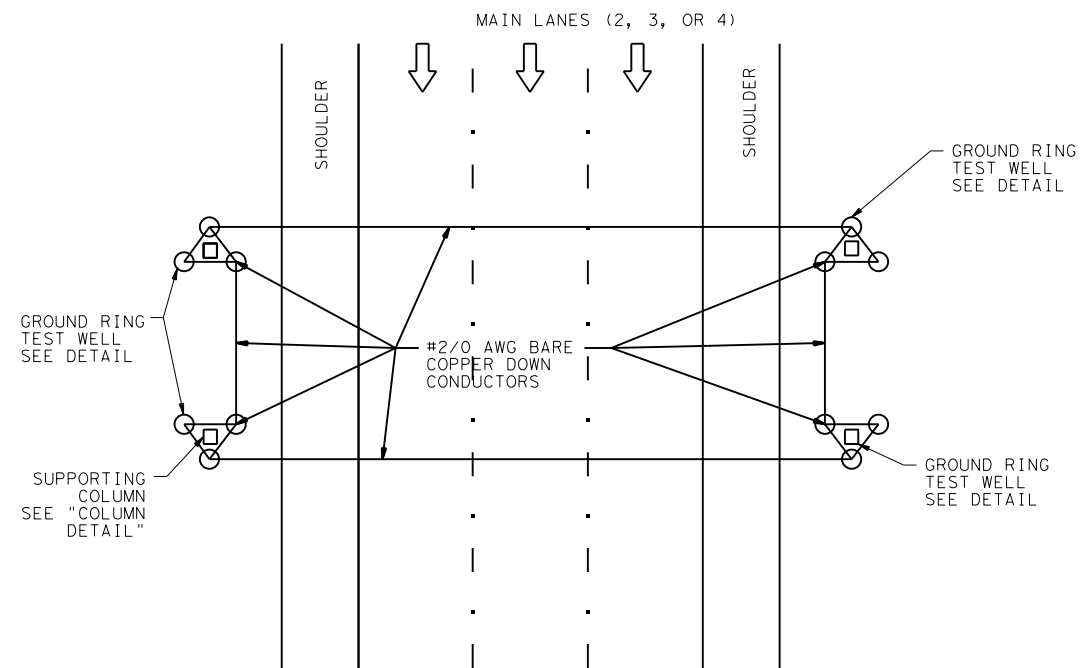
CENTRAL TEXAS
 Regional Mobility Authority

**FIXED PRICE
 TOLLING GUIDELINES
 TOLL GANTRY
 MISCELLANEOUS
 DETAILS**

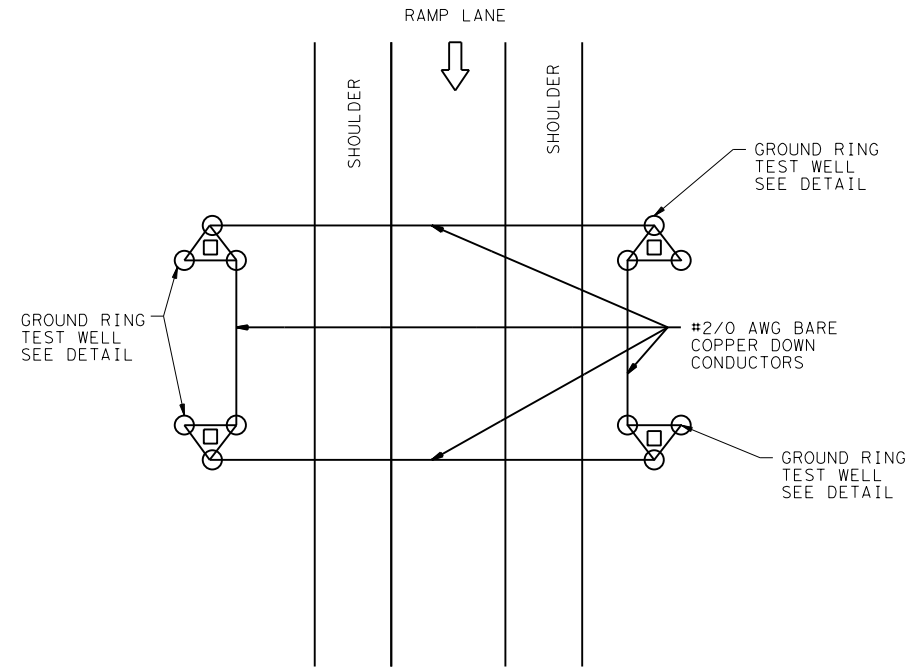
MG-1

DESIGNED BY:	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
	6		17
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DW	TEXAS	AUS.	
CHECKED BY:	CONT.	SECT.	JOB
KK			HIGHWAY NO.

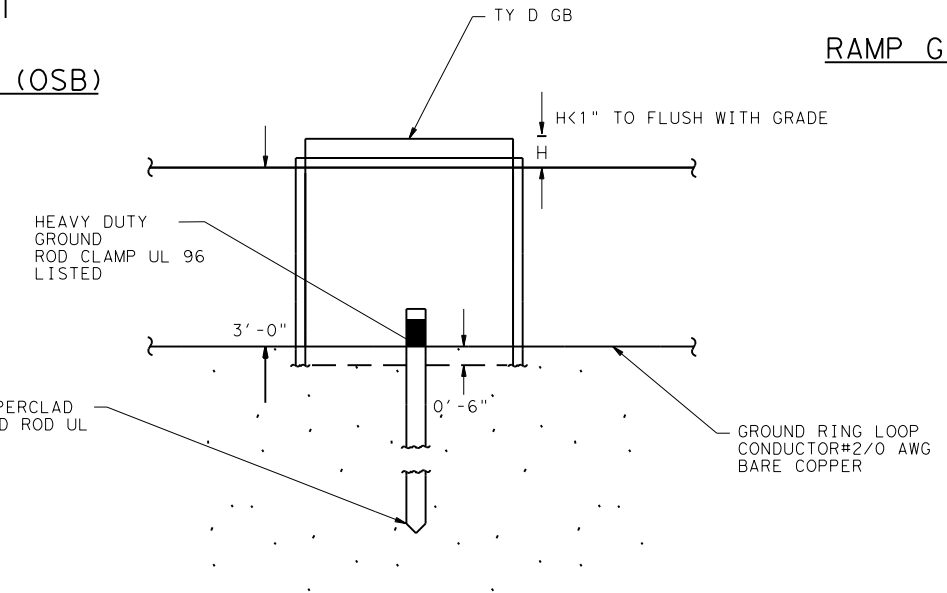
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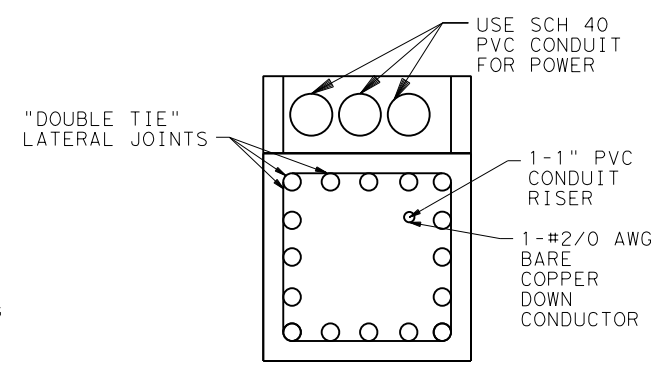
MAINLANE GROUND RING AERIAL VIEW (OSB)



RAMP GROUND RING AERIAL VIEW (OSB)



GROUND RING TEST WELL DETAIL

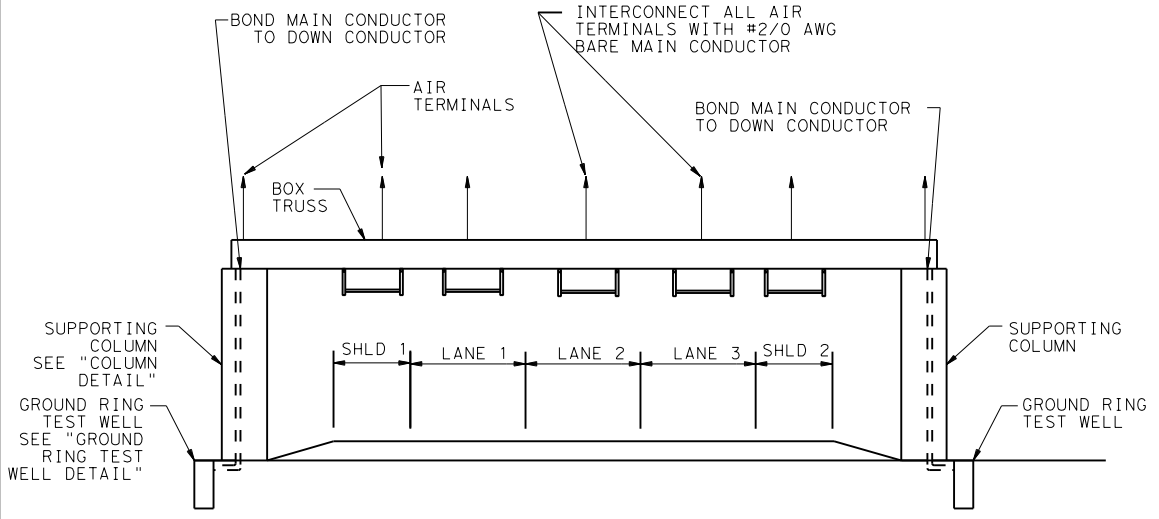


CONCRETE COLUMN DETAIL

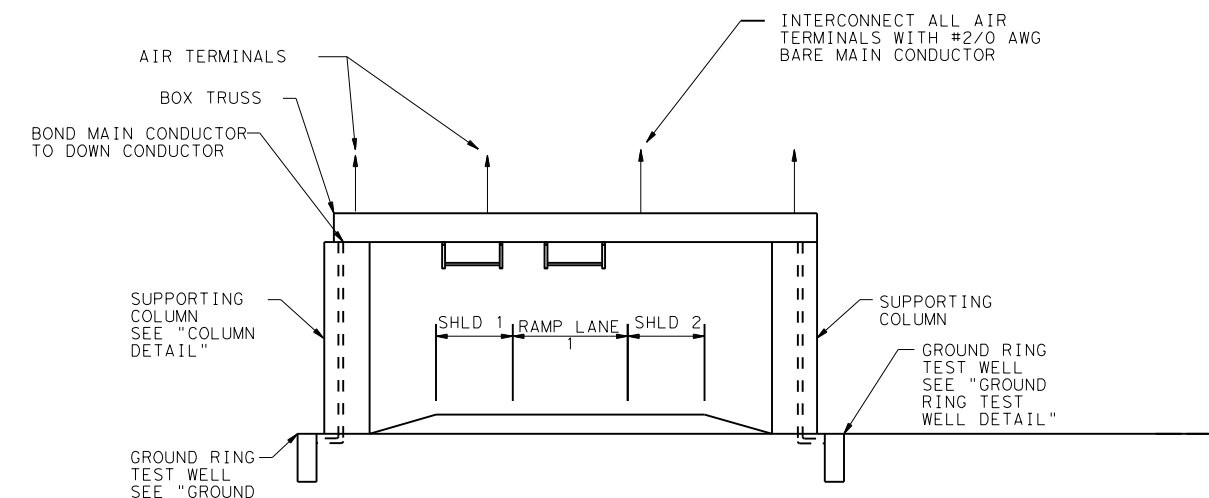
- NOTES:**
- 1) LIGHTNING PROTECTION SYSTEM DESIGN (LPS) IS PROVIDED FOR INFORMATION ONLY. ULTIMATE LPS DESIGN SHALL COMPLY WITH NFPA 780 AND CURRENT NATIONAL ELECTRIC CODE (NEC).
 - 2) ALL STRUCTURAL CONCRETE AND CONDUIT INSTALLATIONS SHALL COMPLY WITH ACI 318 CHAPTER 6.
 - 3) LPS SHALL BE INSTALLED BY A UL LISTED INSTALLER.
 - 4) LPS SHALL BE UL MASTER LABEL CERTIFIED.
 - 5) ALL LPS MATERIALS SHALL MEET NFPA 780 CLASS II REQUIREMENTS.
 - 6) ALL REBAR LATERAL ELEMENTS, LAP JOINTS, AND CONNECTIONS SHALL BE "DOUBLE TIED".
 - 7) FOR DETAILS OF TOLL COLLECTION SYSTEMS CONFIGURATION, COORDINATE WITH SYSTEM INTEGRATOR.
 - 8) AIR TERMINALS SHALL ACCOMODATE A GUIDE EVERY 14'-0" CENTERED ON GANTRY TRUSS.
 - 9) FOR 2 MAIN LANES, REMOVE LANE 3. FOR 4 MAIN LANES, ADD LANE 4.

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 Engineer: **FABIAN KALAPACH**
 P.E. Serial No.: 58100
 Date: 26-MAY-2015

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MAINLANE GROUND RING PLAN VIEW (OSB)



RAMP GROUND RING PLAN VIEW (OSB)

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FIXED PRICE TOLLING GUIDELINES LIGHTNING PROTECTION SYSTEM DETAILS

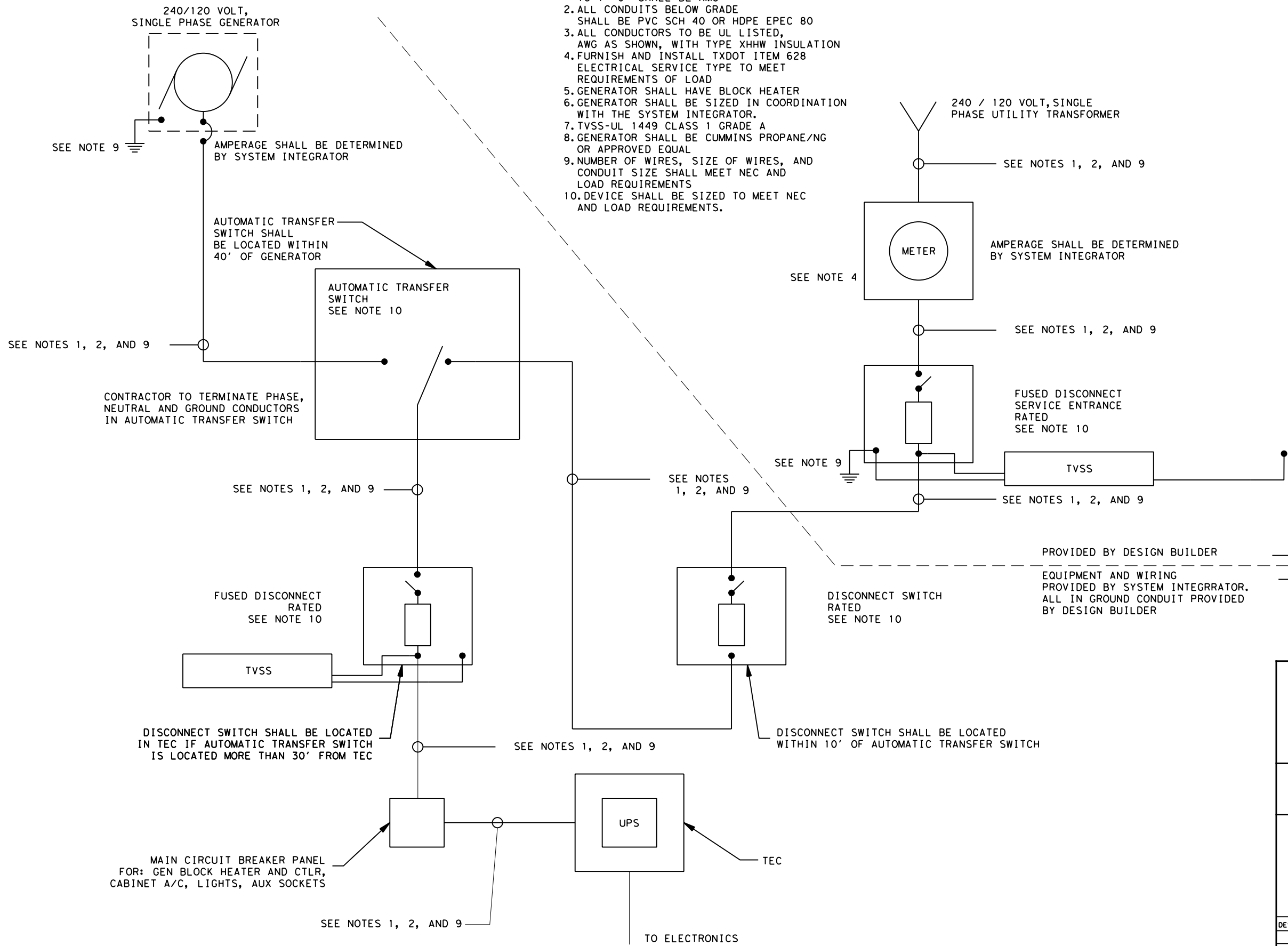
LP-1

DESIGNED BY:	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
	6		18
DRAWN BY:	STATE	DIST.	COUNTY
DW	TEXAS	AUS	
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Design File name: \\ousw00\pmwork\Jobs\46837*CTRNA\183A Operations and Maintenance\Tolling New Fixed Price Tolling Standards\Toll Gantry Electrical Single-Line Drawing.dwg

NOTES:
1) ALL INFORMATION REGARDING EXISTING ITS INFRASTRUCTURE SHOWN HAS BEEN TAKEN FROM RECORD PLANS AND/OR FILES.
2) ALL LOCATIONS SHOWN ARE APPROXIMATE ONLY, FINAL LOCATION TO BE DETERMINED BY DESIGN BUILD CONTRACTOR AND APPROVED BY CTRMA.

- NOTES**
1. ALL CONDUITS ABOVE GRADE TO 1'-0" SHALL BE RMC
 2. ALL CONDUITS BELOW GRADE SHALL BE PVC SCH 40 OR HDPE EPEC 80
 3. ALL CONDUCTORS TO BE UL LISTED, AWG AS SHOWN, WITH TYPE XHHW INSULATION
 4. FURNISH AND INSTALL TXDOT ITEM 628 ELECTRICAL SERVICE TYPE TO MEET REQUIREMENTS OF LOAD
 5. GENERATOR SHALL HAVE BLOCK HEATER
 6. GENERATOR SHALL BE SIZED IN COORDINATION WITH THE SYSTEM INTEGRATOR.
 7. TVSS-UL 1449 CLASS 1 GRADE A
 8. GENERATOR SHALL BE CUMMINS PROPANE/NG OR APPROVED EQUAL
 9. NUMBER OF WIRES, SIZE OF WIRES, AND CONDUIT SIZE SHALL MEET NEC AND LOAD REQUIREMENTS
 10. DEVICE SHALL BE SIZED TO MEET NEC AND LOAD REQUIREMENTS.



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P.E. Serial No.: 93753
Date: 26-MAY-2015

PROVIDED BY DESIGN BUILDER
EQUIPMENT AND WIRING PROVIDED BY SYSTEM INTEGRATOR. ALL IN GROUND CONDUIT PROVIDED BY DESIGN BUILDER

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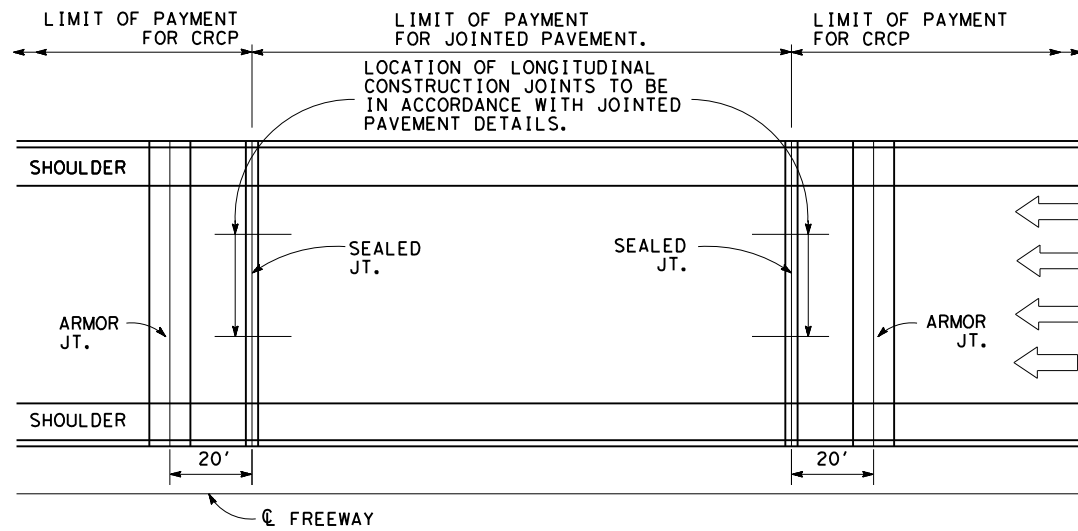
CENTRAL TEXAS
Regional Mobility Authority

FIXED PRICE
TOLLING GUIDELINES
TOLL GANTRY ELECTRICAL
SINGLE-LINE DRAWING

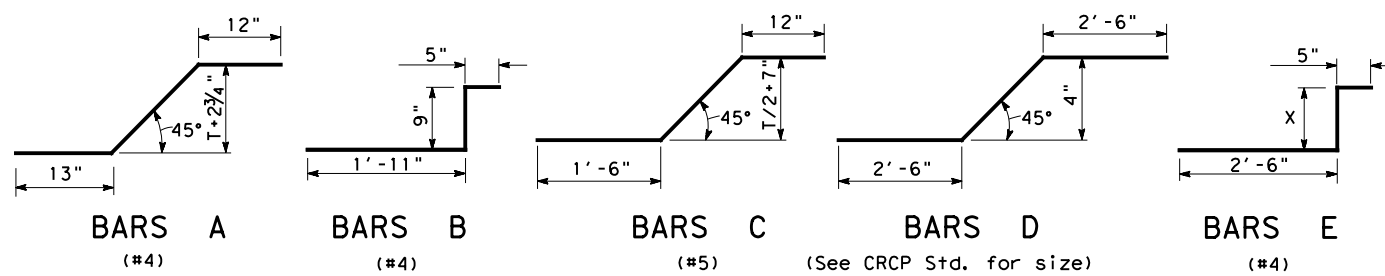
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 Plotted on: \$DATE\$

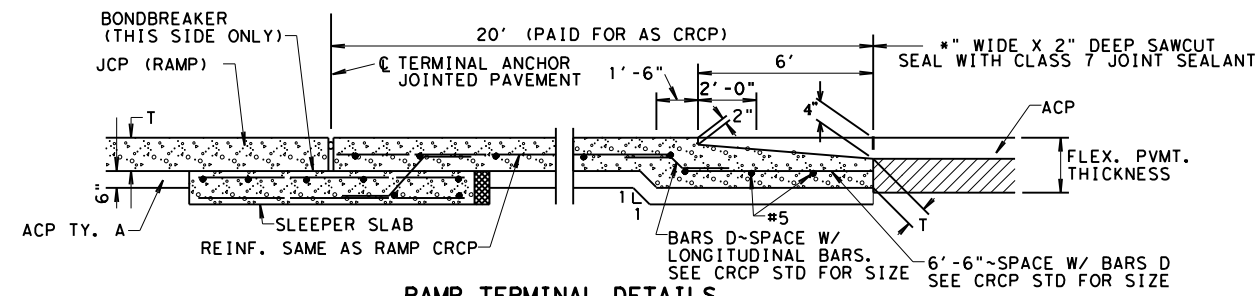
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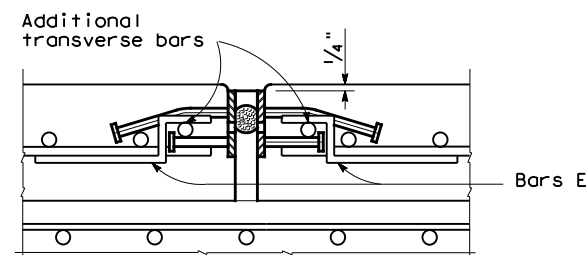
**TYPICAL FREEWAY LAYOUT
 CONCRETE MEDIAN AND SHOULDERS**
 (SHOWING 2 TERMINAL ANCHORS)



ITEM	ESTIMATED QUANTITIES (FOR ONE TERMINAL ANCHOR)								
	PAVEMENT THICKNESS (INCHES)								
	8	9	10	11	12	13	14	15	
SLEEPER SLAB	CONC (TERM ANCH)	0.37 CY/LF	0.37 CY/LF	0.37 CY/LF	0.37 CY/LF	0.37 CY/LF	0.37 CY/LF	0.37 CY/LF	0.37 CY/LF
	REINF STL (TERM ANCH)	49.0 LBS/LF	49.1 LBS/LF	49.2 LBS/LF	49.3 LBS/LF	49.5 LBS/LF	49.6 LBS/LF	49.7 LBS/LF	49.8 LBS/LF
	UNCL EXCAV (TERM ANCH)	0.19 CY/LF	0.19 CY/LF	0.19 CY/LF	0.19 CY/LF	0.19 CY/LF	0.19 CY/LF	0.19 CY/LF	0.19 CY/LF
SUPPORT SLAB	CONC (TERM ANCH)	0.07 CY/LF	0.07 CY/LF	0.07 CY/LF	0.07 CY/LF	0.07 CY/LF	0.07 CY/LF	0.07 CY/LF	0.07 CY/LF
	REINF STL (TERM ANCH)	7.3 LBS/LF	7.4 LBS/LF	7.5 LBS/LF	7.5 LBS/LF	7.6 LBS/LF	7.7 LBS/LF	7.8 LBS/LF	7.9 LBS/LF
	UNCL EXCAV (TERM ANCH)	0.03 CY/LF	0.03 CY/LF	0.03 CY/LF	0.03 CY/LF	0.03 CY/LF	0.03 CY/LF	0.03 CY/LF	0.03 CY/LF

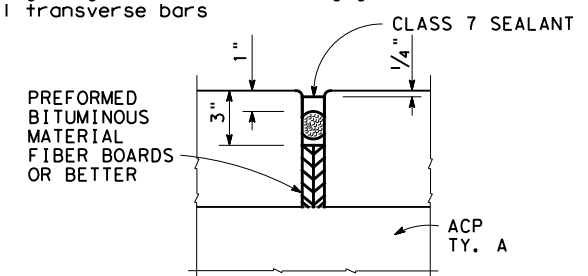


RAMP TERMINAL DETAILS



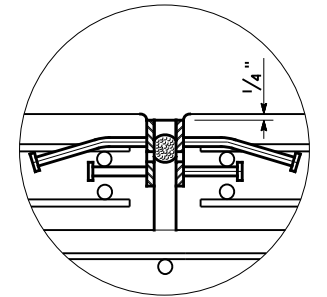
SINGLE LAYER REINFORCEMENT

Two additional transverse bars shall be placed to engage Nelson Studs when single layer of continuous steel is present. Bars E shall be placed along longitudinal bars to engage additional transverse bars



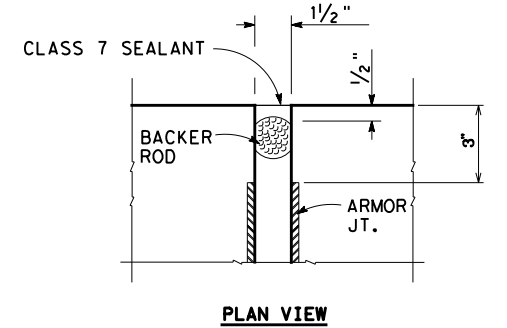
SEALED JOINT

1/4" to 3/8" radius tool to be used at concrete edge. Joint shall be cleaned prior to sealing



OPTIONAL ARMOR JT DESIGN

Note: Armor Joint may be depressed by 1/4" across roadway for construction concerns. 1/4" to 3/8" radius tool to be used at concrete edge. Optional Armor Joint design shall not be used at abutment.



PLAN VIEW

TREATMENT OF VERTICAL EDGE

Vertical edge shall be sealed with backer rod and class 7 sealant flush with pavement edge. Horizontal limits of backer rod along the length of the armor joint shall be extended to the outside of pavement. Joint shall be cleaned prior to sealing.

NOTES:

POLYETHYLENE FOAM (6# DENSITY), SAW CUTS, EXPANSION JOINTS, AND EXPANSION JOINT MATERIALS SUBSIDIARY TO PERTINENT ITEM.

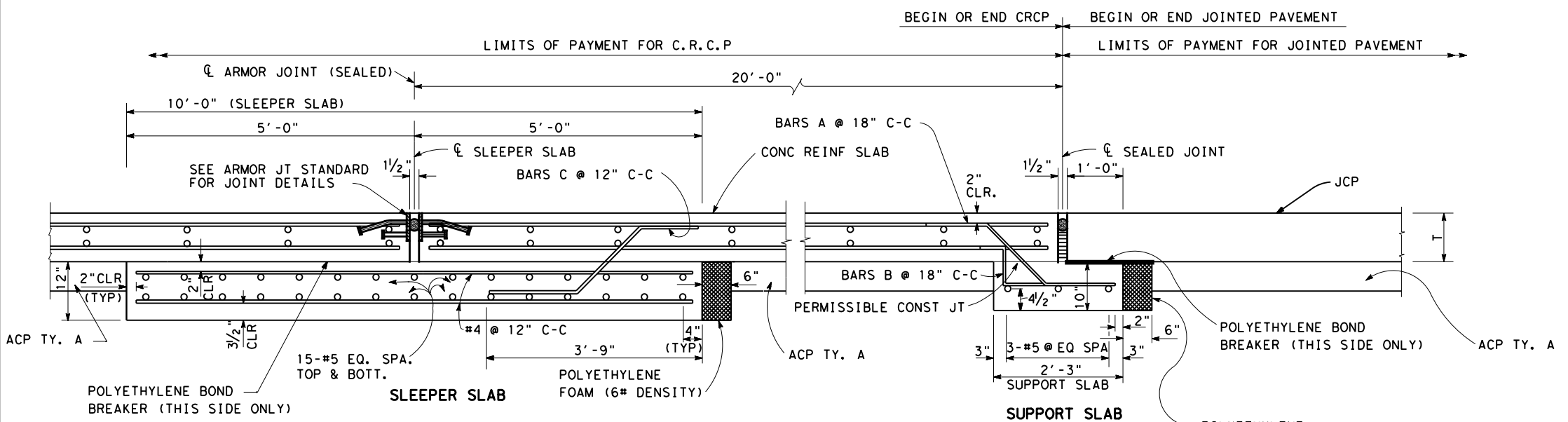
SUPPORT SLAB AND SLEEPER SLAB SHALL BE PAID FOR IN ACCORDANCE WITH SPECIAL SPECIFICATION ITEM "TERMINAL ANCHORAGE SYSTEM".

EXCAVATION OF A.C.P. IN VICINITY OF SLEEPER AND SUPPORT SLABS SUBSIDIARY TO PERTINENT ITEM.

SEE C.R.C.P. STANDARD FOR LOCATION OF REINFORCEMENT AND DETAILS. C.R.C.P. IN VICINITY OF SLEEPER AND SUPPORT SLAB TO BE PAID UNDER PERTINENT ITEM

JOINTED CONCRETE PAVEMENT (JCP) DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

DETAILS FOR PAVEMENT WIDTH, AND CROWN CROSS-SLOPE SHALL BE AS SHOWN ELSEWHERE ON THE PLANS.



SECTION THRU TERMINAL ANCHORAGE
 (SHOWING ONE TERMINAL ANCHOR)

Texas Department of Transportation
 Austin District Design

TERMINAL ANCHOR JOINT - JOINTED

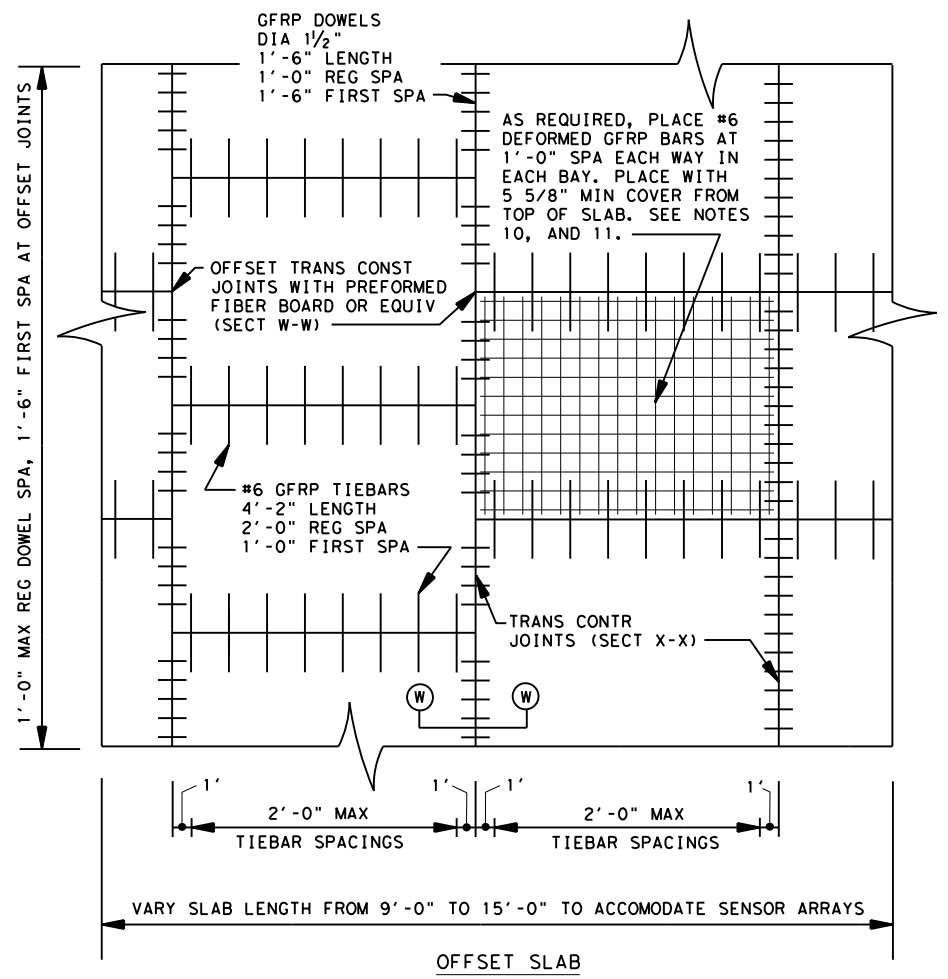
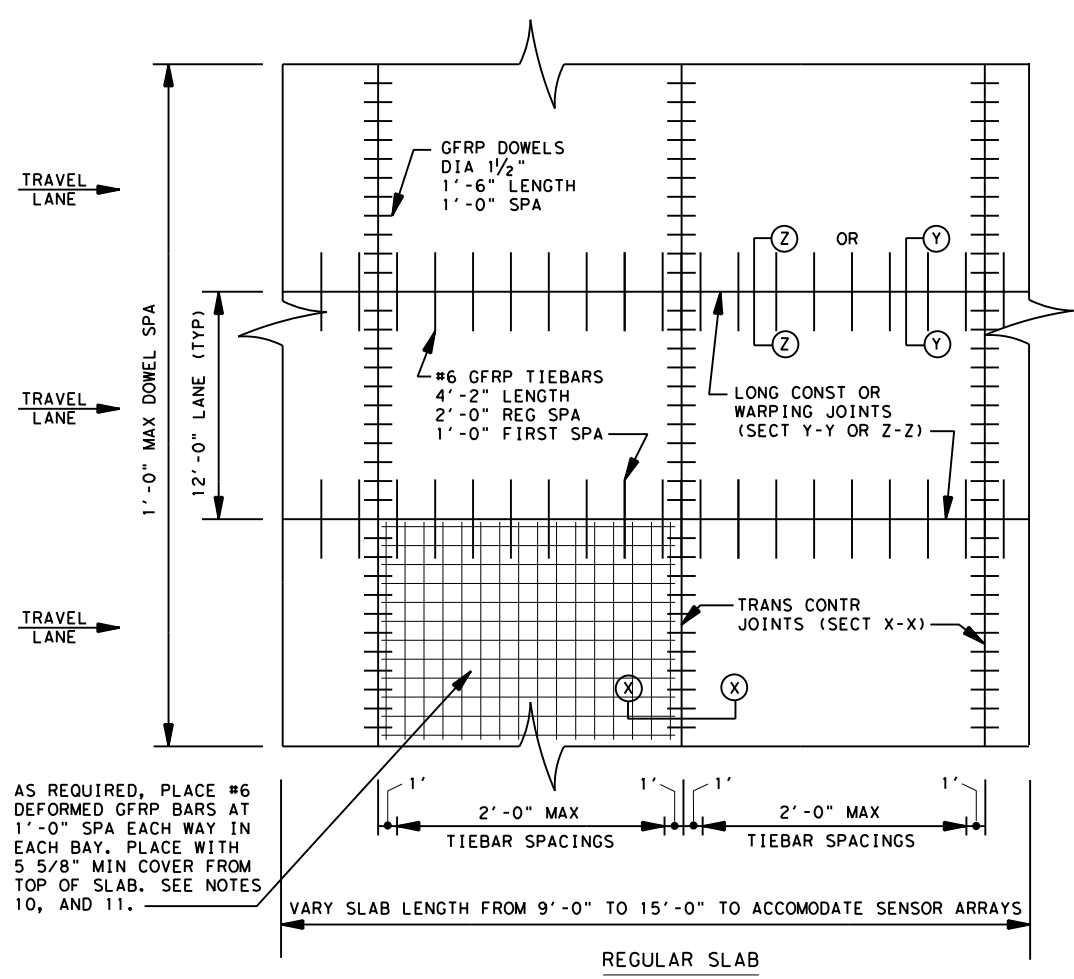
TAJ-1

Austin District Standard

© TXDOT 2006	DIST	FED REG	FEDERAL AID PROJECT	SHEET
REVISIONS	AUS	6		22
	COUNTY	CONTROL	SECT	JOB
				HIGHWAY

Scale: 1:10.1207
 Plotted on: \$DATE\$

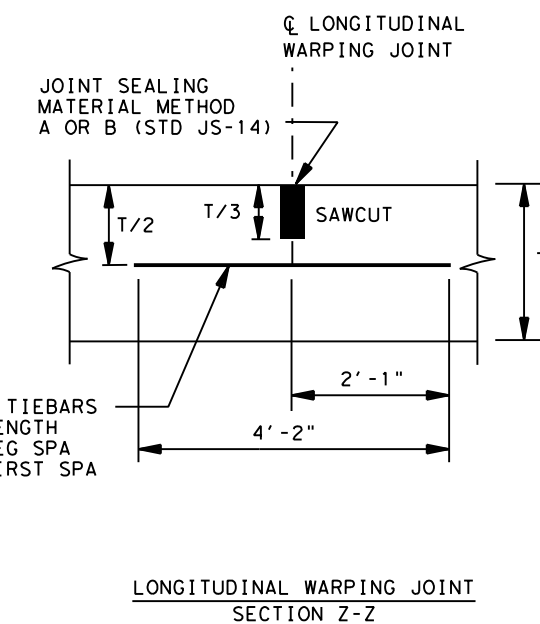
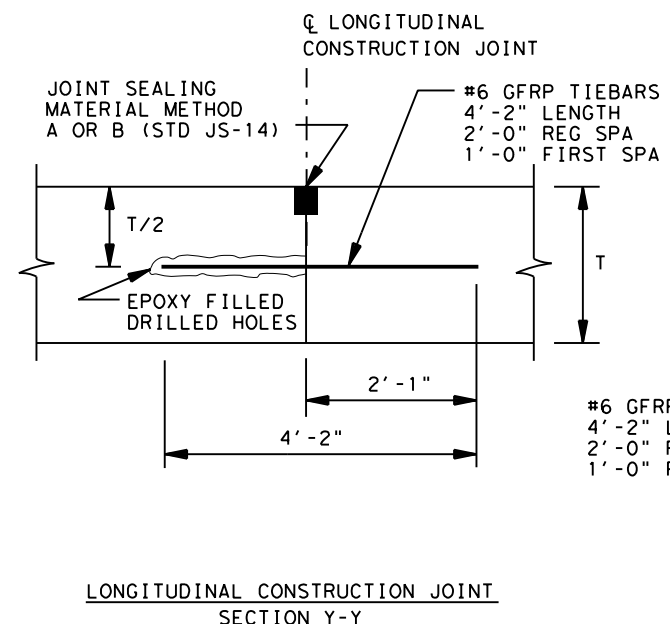
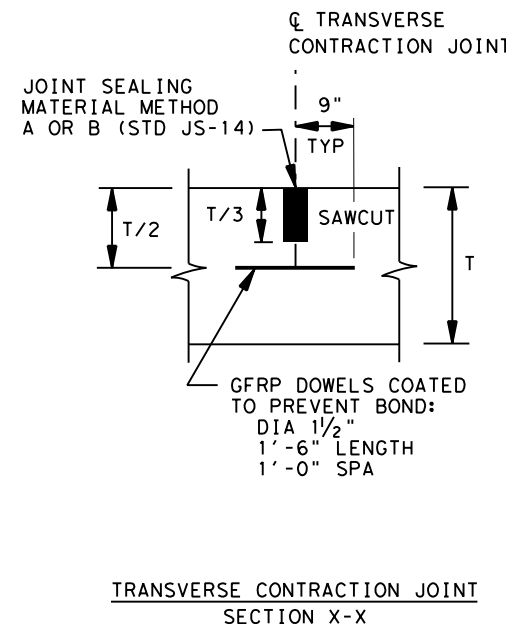
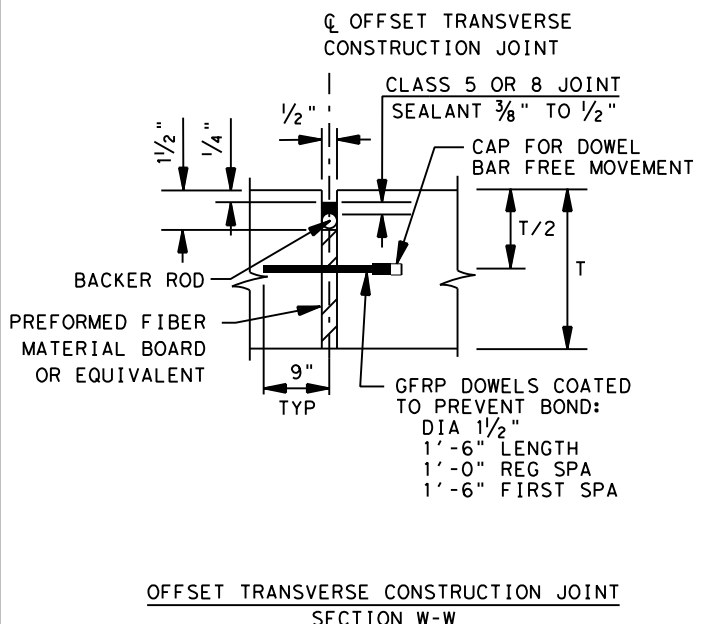
Pen Table: \\ous00\pwwork\Jobs\46837*CTRMA\Loop1\ML\Project Development\Design\CAD Files\PIOT\MOPAC*11X17.dgn
 Design File name: \\ous00\pwwork\Jobs\46837*CTRMA\183A Operations and Maintenance\Tolling\New Fixed Price Tolling Standards\JCOPGFRP*V8.dgn



- GENERAL NOTES**
- WHERE APPLICABLE, TERMINAL ANCHOR SLAB DETAILS OR OTHER ADJOINING PAVEMENT PLANS AND DETAILS ARE AS SHOWN ELSEWHERE IN THE PLANS.
 - DETAILS FOR PAVEMENT SLAB WIDTH, THICKNESS, AND CROWN CROSS-SLOPE ARE SHOWN ELSEWHERE ON THE PLANS.
 - THE DETAIL FOR THE JOINT SEALANT AND RESERVOIR SHALL BE AS SHOWN ON "CONCRETE PAVEMENT DETAIL, JOINT SEALS" STANDARD (JS-14).
 - FOR FURTHER INFORMATION REGARDING THE PLACEMENT OF CONCRETE AND REINFORCEMENT, REFER TO THE GOVERNING SPECIFICATIONS FOR "CONCRETE PAVEMENT" AND "GFRP REINFORCEMENT".
 - PAVEMENT WIDTH OF MORE THAN 16' SHALL HAVE A LONGITUDINAL JOINT (SECTION Z-Z OR Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6" OF THE LANE LINE UNLESS THE JOINT LOCATION IS SHOWN ELSEWHERE ON THE PLANS.
 - SAW CUT DEPTH FOR LONGITUDINAL AND TRANSVERSE CONTRACTION JOINTS MAY BE ONE FOURTH THE SLAB THICKNESS WHEN CRUSHED LIMESTONE IS USED AS THE COARSE AGGREGATE.
 - CONCRETE SLABS WIDER THAN 100' WITHOUT A FREE JOINT, ARE NOT COVERED BY THIS STANDARD.
 - SLAB LENGTHS SHOWN FOR 12' LANE. LONGITUDINAL AND TRANSVERSE SLAB DIMENSIONS FOR OTHER LANE WIDTHS MUST NOT VARY MORE THAN 25% FROM EACH OTHER.
 - DOWEL BASKETS FOR GFRP BARS SHALL BE NON-FERROUS.
 - UNREINFORCED INTERIOR SLAB BAYS INTENDED FOR SUPPORT ON ROCK FOUNDATION OR OTHER SUITABLE SUBGRADE AS DETERMINED BY A GEOTECHNICAL ENGINEER. INSTALL INTERIOR GRID OF GFRP BARS IN EACH SLAB BAY UNLESS OTHER GUIDANCE PROVIDED BY GEOTECHNICAL ENGINEER AND CONCURRENCE HAS BEEN RECEIVED FROM THE MOBILITY AUTHORITY.
 - SUBGRADE TYPE AND DEPTH WILL BE SHOWN ELSEWHERE ON PLANS.

JOINTED PAVEMENT DETAIL LAYOUT
 NOT TO SCALE

INTERIM REVIEW ONLY
 Document incomplete: not intended for permit, bidding or construction.
 Engineer: IAN ANDREW FRASER
 P.E. Serial No.: 88483
 Date: 26-MAY-2015



FIXED PRICE TOLLING GUIDELINES
JOINTED CONCRETE PAVEMENT
 JC-1

DESIGNED BY:	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
	6		24
DRAWN BY:	STATE	DIST.	COUNTY
DW	TEXAS	AUS.	
CHECKED BY:	CONT.	SECT.	JOB
KK			HIGHWAY NO.

ATTACHMENT E

FEE SCHEDULE/BUDGET
Manor Expressway (290E) Phase III Project

290 Phase III Pricing Submittal

PRICE SHEET						
CTRMA 290 Phase III						
Toll System Installation/Integration						
Task No.	Description	Qty	Unit	Unit Price (US \$'s)	Extended Price (US \$'s)	
	System Integration					
1	Toll Zone - Materials / Equipment	1	Lot	569,287.51	569,287.51	
2	Corridor Devices: Equip & Install	1	Lot	99,063.35	99,063.35	
3	Program Management	1	Lot	206,439.34	206,439.34	
4	System Design & Documentation	1	Lot	148,697.31	148,697.31	
5	NVDC	1	Lot	94,834.35	94,834.35	
6	System Integration/Testing	1	Lot	281,465.07	281,465.07	
7	Installation	1	Lot	268,112.65	268,112.65	
8	Fiber	1	Lot	54,922.45	54,922.45	
B	Bonding	1	LS	12,542.14	12,542.14	
TOTAL					1,735,364.18	

- The Pricing shown above Excludes:
- All Recurring Data Communication Costs
 - Lane Closures & MOT (if needed)
 - Recurring 3rd-Party SW/HW Support Agreements & SW Licenses
 - Spares Replenishment Costs
 - System HW/SW Warranty/Maintenance Services & Support

Labor Hours

	TOTAL A&I HOURS (Excl's Optional Items & Warr/Maint)						
	Total Hrs	Program Management	System Design & Documentation	NVDC	System Integration/Testing	Installation	Fiber
Database Administrator	-						
Database Developer	600		200	40	280	80	
Software Engineer - Image Processing	-		-		-		
Software Engineer - Real Time / OCR	840		120	80	520	120	
Software Managers / Leads	400		160	80	120	40	
Software Programmer - Web/Middle Tier	480		80	40	320	40	
Documentation / Technical Writer / CAD	240		80		80	80	
Test / QA Manager	160			80	80		
Test Engineer	320			80	240		
Network / Systems Administrator	80			40	40		
System Engineer	280		80		80	80	40
Sr. Project Manager	-						
Project Manager	1,470	980	160		80	240	10
Field Tech Team Lead	195		40		40	115	
Field Technician	385		55		55	275	
Installation/Field Manager/Supervisors	109	40				69	
Software Support (Maint)	-						
Customer Service Representative/Operator	-						
Other (Exec/Sr Mgmt, Prog Dir, PA, Support)	254	71	68	31	-	80	4
TOTAL HOURS	5,812	1,091	1,043	471	1,935	1,218	54

ATTACHMENT F

PROJECT SCHEDULE AND MILESTONES
Manor Expressway (290E) Phase III Project
(Dates and Durations Subject to Change)

Task	Duration and/or Milestone Date
Begin Construction (Approximate)	2018
Construction Duration (Approximate)	2 years
Open to Traffic (Interim Milestone, Approximate)	2020
Open to Traffic (Full Project, Approximate)	2020

Note: Dates and construction duration are preliminary. Contractor is to review the project baseline schedule prepared by the contractor for acceptance, and provide input in the development of the project schedule as it relates to the installation and testing of the toll collection and intelligent transportation systems.