

Texas Department of Transportation

TECHNICAL PROVISIONS

STATE HIGHWAY 360

DESIGN-BUILD PROJECT

Attachment 21-1

Toll Facility Responsibility Matrix

**TOLL FACILITY RESPONSIBILITY MATRIX
SH 360 Project**

Responsibility Assignment Legend							
Primary Responsibility: P	Support Responsibility: S		Coordination Responsibility Only: C			No Responsibility: N	
Element/Task/Component/ Sub-system	DB 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	DB Contractor must accommodate and incorporate the SI scheduled activities into DB Contractor schedule. All schedule changes or updates which impact the SI tasks must be agreed to by the SI prior to submittal to the 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 RFDP.
Design Package – Installation and Electrical Design and Plans	P	P	P	C	N	C	DB Contractor 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. DB Contractor to incorporate into toll facilities design and construct power utilities interface, and all power infrastructure.
Traffic Control/Safe work zone	P	P	P	S	N	C	SI to provide DB Contractor detailed lane closure requirements and schedule for installation and testing. DB Contractor to provide traffic control including all devices and safe working conditions for SI to perform Toll Zone Work.
Signing	P	P	P	C	N	N	All toll signing must be coordinated with and approved by the Authority. If toll price signs utilize changeable electronic signs, DB 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 provided by DB Contractor. SI to provide lighting requirements in vicinity of toll locations and locations of other Toll System equipment. DB Contractor to confirm that lighting does not obstruct toll related signing or impede the Toll System.
Landscaping	P	P	P	C	N	N	

**TOLL FACILITY RESPONSIBILITY MATRIX
SH 360 Project**

Responsibility Assignment Legend							
Primary Responsibility: P	Support Responsibility: S		Coordination Responsibility Only: C			No Responsibility: N	
Element/Task/Component/ Sub-system	DB Contractor			Systems Integrator (SI)			Comments Other Responsibility/Information
	Design	Procure	Install/ Construct	Design	Procure	Install / Construct	
Fencing/Guardrail/Bollards/Concrete Barrier	P	P	P	S	C	C	SI to provide requirements for specific equipment clearances for Toll System. DB Contractor 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. DB Contractor 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. DB Contractor to incorporate into structural design, including electrical grounding, bonding. DB Contractor to provide and install junction boxes and conduit pull strings and bell ends for all conduits up to one foot above pole and gantry foundation. DB Contractor will require SI to sign off on below-ground conduits for the loops prior to installation of special pavement structure.
Gantries/Foundation/Trusses/Junction boxes/Conduits/Grounding	S	C	S	P	P	P	SI to install conduits from one foot above grade to all Toll System components.
Equipment Mounts on 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 and frames needed to attach SI procured equipment to DB Contractor provided truss.

**TOLL FACILITY RESPONSIBILITY MATRIX
SH 360 Project**

Responsibility Assignment Legend							
Primary Responsibility: P	Support Responsibility: S		Coordination Responsibility Only: C			No Responsibility: N	
Element/Task/Component/ Sub-system	DB Contractor			Systems Integrator (SI)			Comments Other Responsibility/Information
	Design	Procure	Install/ Construct	Design	Procure	Install / Construct	
Equipment Brackets/Frames on Gantries	P	P	P	S	N	C	DB Contractor to provide and install all frames needed to attach all SI procured equipment. SI to provide locations for installation to DB Contractor. SI to provide and install all mounting brackets required for tolling equipment.
Pavement structure, including special nonferrous zones and conduit stub-outs for in-pavement sensors/loops	P	P	P	S	N	C	SI to provide requirements for special pavement 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. DB Contractor to assure ferrous objects (i.e. rebar, grates, pipes, etc.) are not in toll revenue collection detection system(s) zone of influence. DB 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. DB Contractor 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. DB Contractor to provide traffic control devices and safe working conditions for SI during installation of all toll equipment.
Toll Equipment Cabinet 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 DB Contractor. DB Contractor to incorporate into Roadway Design. DB 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. DB Contractor to incorporate into the Roadway Design.

**TOLL FACILITY RESPONSIBILITY MATRIX
SH 360 Project**

Responsibility Assignment Legend								
Primary Responsibility: P		Support Responsibility: S			Coordination Responsibility Only: C			No Responsibility: N
Element/Task/Component/ Sub-system	DB Contractor			Systems Integrator (SI)			Comments Other Responsibility/Information	
	Design	Procure	Install/ Construct	Design	Procure	Install / Construct		
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 Detection (AVC) and (AVD)	N	N	S	P	P	P	SI to install, connect and terminate AVC and/or AVD System mounted on the gantries and/or installed in 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. DB Contractor 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	DB Contractor to provide power requirements and special requirements for construction of utilities near each Toll System. DB Contractor to provide and install necessary conduit & junction/pull boxes.	
Metered 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	DB Contractor to provide generators, ATS, generator cabinets, wiring, connect and terminate all power at the Toll System sites.	

**TOLL FACILITY RESPONSIBILITY MATRIX
SH 360 Project**

Responsibility Assignment Legend							
Primary Responsibility: P	Support Responsibility: S		Coordination Responsibility Only: C			No Responsibility: N	
Element/Task/Component/ Sub-system	DB Contractor			Systems Integrator (SI)			Comments Other Responsibility/Information
	Design	Procure	Install/ Construct	Design	Procure	Install / Construct	
Generator Power Source is Natural Gas (if applicable)	P	P	P	S	N	C	If natural gas is available, DB Contractor shall provide, install and incorporate the gas lines into the roadway design. SI to coordinate and provide generator requirements including location for gas feed.
Generator Power Source is propane or diesel	S	N	C	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. The Authority will decide if propane or diesel will be used.
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. DB 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. DB Contractor to incorporate into the roadway design and install including conduits, junction boxes, bell ends with pull strings. DB Contractor shall verify that all duct banks and conduits are clear and have pull strings prior to the beginning of the Toll System installation.
Fiber Optic cabling in conduits for Toll System	P	P	P	S	S	S	SI to provide fiber requirements for Toll System. DB Contractor 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.

**TOLL FACILITY RESPONSIBILITY MATRIX
SH 360 Project**

Responsibility Assignment Legend							
Primary Responsibility: P	Support Responsibility: S		Coordination Responsibility Only: C			No Responsibility: N	
Element/Task/Component/ Sub-system	DB 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 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 tolling to hub locations.
Firewalls	N	N	C	P	P	P	SI to provide, install and configure the necessary firewall for the toll system.
Patch/Distribution Panels	P	P	P	C	C	C	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	DB Contractor to provide branch conduit to the TxDOT duct bank system, including conduit, ground boxes, and terminations
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 provide system design plans indicating power and communications/data requirements. SI to install up to the Toll System locations at demark panel.
SYSTEMS SERVERS AND SPACE							
Toll Collection Systems Computer(s)	N	N	N	P	P	P	
Support Equipment at the Authority's 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, and environmental controls load calculations, electrical power distribution, including grounding, bonding, lightning protection, panel boards, TVSS, circuit breakers conduit, conductors, j-boxes, receptacles.

**TOLL FACILITY RESPONSIBILITY MATRIX
SH 360 Project**

Responsibility Assignment Legend							
Primary Responsibility: P	Support Responsibility: S		Coordination Responsibility Only: C			No Responsibility: N	
Element/Task/Component/ Sub-system	DB Contractor			Systems Integrator (SI)			Comments Other Responsibility/Information
	Design	Procure	Install/ Construct	Design	Procure	Install / Construct	
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 Authority.
DUCT BANK & INTELLIGENT TRANSPORTATION SYSTEMS (ITS)							
Duct Bank Adjustment & ITS relocations design	P	P	P	N	N	N	DB Contractor is responsible for the design of any necessary ITS relocations, including, foundations, conduits, electrical services, grounding circuits, and support structures. DB Contractor responsible for adjusting any existing duct bank manholes and providing new junction/boxes and manholes if in conflict with the project. Coordination with TxDOT will be required.
Duct Bank Adjustments/new connections	P	P	P	S	N	C	DB Contractor is responsible for all manhole adjustments and new manhole ties.
Fiber optic cables	P	P	P	N	N	N	Any adjustments to existing cables are DB Contractor responsibility.
Relocation of existing CCTV & DMS foundations, conduits, grounding, camera poles, and electrical services	P	P	P	N	N	N	DB Contractor is responsible for relocating any existing CCTV and DMS structures and services impacted by the Project Design, including communications and power. Damaged or inoperable equipment shall be removed but not repaired.
Existing and new vehicle detector foundations, conduits, loops, grounding, vehicle detector support structures, and electrical services	P	P	P	N	N	N	DB Contractor to coordinate with TxDOT regarding any existing vehicle detector/ loops within the pavement to determine if they need to be replaced/ relocated. DB Contractor will replace/relocate any detectors/loops unless TxDOT prefers to do the work. Any damaged detectors/loops that are to remain must be replaced by DB Contractor.
Vehicle detectors, communications, and equipment enclosures	P	P	P	N	N	N	