Texas Department of Transportation

BOOK 2 - TECHNICAL PROVISIONS

FOR

US 77

KINGSVILLE TO DRISCOLL

Design-Build Project

November 20, 2012

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1 GENERAL

1.1 Project Scope

The Project scope components include the design, construction, and maintenance of US 77 from just north of E. Corral Avenue/FM 1898 in the northern portion of Kingsville in Kleberg County to just south of County Road 16 located south of the City of Driscoll in Nueces County.

1.2 Facility Description

The US 77 Project is a proposed reconstruction and upgrade of an existing facility comprised generally of the construction and overlay of mainlanes and frontage roads, construction of at-grade ramps and intersection improvements as shown on the Schematic Design in the Reference Information Documents. A description of the proposed Work for the facility is provided below:

- Location: From north end of E. Corral Ave mainlane bridges to just south of CR 16
- Length: Approximately 10 miles
- Number of mainlanes: 2 in each direction
- Frontage Roads: Discontinuous frontage roads (2 lanes in each direction or as indicated on the Schematic Design)
- Mainlane Bridges:
    - SB over Carreta Creek (bridge widening)
    - NB and SB over CR 4
    - NB and SB over E. 6th Street
    - NB and SB over FM 257/E. 4th Street
    - NB and SB over Bishop Channel
    - NB and SB over CR 10
    - NB and SB over CR 12
    - NB and SB over turnaround just north of San Fernando Creek
- Frontage Road Bridges
    - SB Frontage Road over San Fernando Creek
- Ramps
    - NB entrance ramp north of E. Corral Ave
    - NB entrance and SB exit ramps north of San Fernando Creek
    - NB exit and SB entrance ramps south of CR 4
    - NB entrance and SB exit ramps south of FM 70
    - NB entrance and SB exit ramps north of FM 70
    - NB exit and SB entrance ramps south of CR 10
    - NB entrance ramp north of CR 10
    - NB exit and SB entrance ramp south of CR 12

- NB entrance and SB exit ramp north of CR 12
- Temporary NB transition ramp from mainlanes to existing US 77
- Temporary SB transition ramp from existing US 77 to mainlanes

- Intersections:
  - CR 4
  - CR 10 and access road to FM 428/US 77 Business
  - CR 12
- Intersection Removals
  - E. Sage Road
  - CR 14
  - Meadowbrook Road
- Turnarounds
  - NB to SB just north of San Fernando Creek
  - NB to SB at E. 6th Street
  - SB to NB at FM 257/E. 4th Street
- Access drive at Carrreta Creek

1.2.1 Mandatory Scope

1.2.1.1 Limits of Works Description for Mandatory Scope

Design and construction, from FM 1898 to CR16, of two mainlanes in each direction and frontage roads as shown on the Schematic Design and defined by the following limits of work:

a. Southbound frontage road – from the FM 1898 exit ramp to approximately Sta. 7058+00.00

b. Northbound frontage road – from the northbound U-turn exit ramp to to approximately Sta. 7058+00.00

c. Southbound mainlanes – from the exit ramp of Sta. 7040+00.00 through the U-turn and retaining wall section

d. Northbound mainlanes – from the exit ramp through the U-turn and retaining wall section

e. Southbound mainlanes – from south of Carreta Creek to south of FM 70

f. Northbound mainlanes – from north of Carreta Creek to south of FM 70

g. Southbound frontage road – from north of CR 4 to southbound entrance ramp

h. Northbound frontage road – from northbound exit ramp to north of CR 4

i. Southbound mainlanes – from exit ramp to FM 70 north of FM 70 to approximately Sta. 8276+00.00 except for the overlay area noted in Section 1.2.1.2.g

j. Northbound mainlanes – from entrance ramp north of FM 70 to to approximately Sta. 8343+00.00

k. Southbound frontage road – from exit ramp north of FM 70 to approximately Sta. 8228+00.00

l. Northbound frontage road – from entrance ramp north of FM 70 to approximately Sta. 8177+00.00

m. Northbound frontage road – from off ramp south of CR 10 to CR 16

1.2.1.2 Limits of Overlay Construction Description for Mandatory Scope

Part of this project, from FM 70 to CR 16, will be constructing an overlay on existing pavement for the mainlanes as shown on the Schematic Design and defined by the following limits of work:

a. Northbound mainlanes – from FM 1898 to San Fernando Creek.

b. Southbound mainlanes – from FM 1898 to San Fernando Creek.

c. Northbound mainlanes – from Sta 7075+00 to Carreta Creek

d. Southbound mainlanes – from Sta 7076+90 to Sta 8018+50

e. Northbound mainlanes – from Sta 8142+80 to FM 70

f. Southbound mainlanes – from Sta 8142+25 to FM 70

g. Northbound mainlanes – from FM 70 to entrance ramp north of FM 70 (approximately Sta. 8160+50.00)

h. Southbound mainlanes – from FM 70 to exit ramp north of FM 70 (approximately Sta. 8159+50.00)

i. Southbound mainlanes – from Sta. 8224+00.00 to 8244+75.00

j. Northbound frontage road – from FM 1898 to entrance ramp

k. Southbound frontage road – from FM 1898 to Sta 7002+00

l. Northbound frontage road – from CR 4 to FM 70

m. Southbound frontage road – from CR 4 to FM 70

1.2.1.3 Limits of Seal Coat Construction Description for Mandatory Scope

Part of this project, from FM 70 to CR 16, will be constructing a seal coat on existing pavement for the frontage road as shown on the Schematic Design and defined by the following limits of work:

a. Southbound frontage road – from Sta 8227+90 to CR 12

b. Northbound frontage road – from approximately Sta. 8177+00.00 to off ramp south of CR 10

1.3 Project Requirements

1.3.1 Compatibility with Existing Configuration

The design documents furnished by DB Contractor shall provide for a smooth transition from the Project's scope of Work to the existing configuration. The Project scope of work shall be designed and built to minimize the cost of throw-way construction associated with providing for the transitions to the existing configuration. DB Contractor shall also provide for minimal disruption to traffic operations throughout the performance of the Work.

1.3.2 Specific Project Requirements

The DB Contractor shall provide a minimum of 16' wide all weather surfaced farm access road at Carreta Creek with a minimum vertical clearance of 12' and minimum horizontal clearance of 20'. Turning radiuses will need to accommodate a WB-53.

2 PROJECT MANAGEMENT

DB Contractor shall establish and maintain an organization that effectively manages all Elements of the Work. This project management effort shall be defined by and follow the Project Management Plan (PMP), which is a collection of several management plan Elements (PMP Elements) describing discrete Elements of the Work as described in Table 2-1 below. The Project Management Plan is an umbrella document that describes DB Contractor's managerial approach, strategy, and quality procedures to design and build the Project and achieve all requirements of the Contract Documents. Within the timelines for implementing each Element of the PMP, the plan shall include details of external auditing procedures.

Table 2-1: Elements of the Project Management Plan

Chapter Title	Section of Book 2 That Defines the Chapter Requirements
Project Administration	Section 2
Quality Management Plan • **Design Quality Management** • **Construction Quality Management** • **Maintenance Management**	Sections 2 and 19
Safety Plan	Section 2
TxDOT – DB Contractor Communications Plan	Section 2
Comprehensive Environmental Protection Program	Section 4

A listing of documents to be included in the Project Management Plan is contained in Attachment 2-1, Project Management Plan Contents, which also indicates when each document must be submitted to TxDOT.

TxDOT shall audit and monitor the activities described in the management plans to assess DB Contractor performance. All commitments and requirements contained in the PMP shall be verifiable.

2.1 Administrative Requirements

2.1.1 Project Schedule

2.1.1.1 General Requirements

The Project Schedule shall define the timeframe for completion of the Project and achievement of milestones, and be used to monitor progress and denote changes that occur during design, construction and maintenance as well as serving to determine the amount due to DB Contractor for a progress payment.

Before the commencement of any Schedule Activity, DB Contractor shall submit a Project Baseline Schedule (PBS) in accordance with the Work Breakdown Structure.

The scheduling software employed by DB Contractor shall be compatible with the current and any future scheduling software employed by TxDOT (currently Primavera 6.2). Compatible shall mean that the DB Contractor-provided electronic file version of a schedule may be loaded or imported by TxDOT using TxDOT's scheduling software with no modifications, preparation, or adjustments to do so.

2.1.1.2 Project Baseline Schedule

DB Contractor shall use the preliminary schedule submitted with the Proposal to prepare a PBS and shall submit a draft of the PBS to TxDOT for review and approval. Approval of the PBS shall be a condition of NTP2.

DB Contractor shall submit a single hardcopy of the PBS on full-size (24" x 36") color plot sheets, along with an electronic version of the schedule in its native format.

The PBS shall include a separate narrative report which describes, in general fashion, DB Contractor's proposed methods of operation for designing and constructing the major portions of the Work in accordance with the Contract Documents. The schedule narrative shall describe the general sequence of design and construction, the proposed Critical Path of the Project, and all Milestone Schedule Deadlines.

The PBS shall include all major Work activities required under the Contract Documents, in sufficient detail to monitor and evaluate design and construction progress, from commencement of the Work to Final Acceptance of the Work.

The PBS shall also include activities for property acquisition, Utility Adjustments, permit acquisitions, and interfaces with other projects, localities, municipalities and other Governmental Entities. For each major activity, DB Contractor shall indicate the duration (in Days) required to perform the activity and the anticipated beginning and completion date of each activity. In addition, the PBS shall indicate the sequence of performing each major activity and the logical dependencies and inter-relationships among the activities.

The PBS shall include a listing of all submittals as called out in the Contract Documents. Submittal activity durations shall include specific durations for TxDOT review and/or approval of DB Contractor's submittals as called out elsewhere in the Development Agreement and these Technical Provisions.

With the exception of activities relating to Environmental Approvals by Governmental Entities, each activity depicting DB Contractor's operations shall have duration of not more than 20 Days, and not less than one Day, except as otherwise approved by TxDOT. All activities shown in the schedule, with the exception of the first and last activities, shall have a minimum of one predecessor and a minimum of one successor activity.

Float shall not be considered as time for the exclusive use of or benefit of either TxDOT or DB Contractor but shall be considered as a jointly owned, expiring resource available to the Project and shall not be used to the financial detriment of either party. Any method utilized to sequester Float calculations will be prohibited without prior approval of TxDOT. Any schedule, including the PBS and all updates thereto, showing an early completion date shall show the time between the scheduled completion date and the applicable Milestone Schedule Deadline as "Project Float."

DB Contractor shall allocate the total contract price and quantities throughout the Project activities in the Project Schedule. Such allocation shall accurately reflect DB Contractor's cost for each Project activity and shall not artificially inflate, imbalance, or front-load line items. The price of each Project activity shall be all-inclusive and shall include all direct and indirect costs, overhead, risks, and profit. Note that cost information will be suppressed on the Proposal submission, but shall be included with DB Contractor's first monthly Project Schedule Update(s) and submitted with DB Contractor's first Draw Request.

Percent complete shall be used to show activity progress as of the status date. The definition of percent complete for activities shall be made in consultation with TxDOT prior to beginning of scheduled Work. It should only be altered with TxDOT's consent.

DB Contractor shall establish a WBS in line with the WBS shown in Attachment 2-2 with clearly identifiable linkage between the Price Proposal and DB Contractor-designated Project activities, and phases represented in the Project Schedule. The WBS for each Work element shall indicate the duration, timing, and logical relationship to other Work Elements, including relationships to Project activities other than the parent Project activity of the particular Work Element. The WBS for each Project activity shall be defined in terms of Work Elements reflecting the types of Work shown in the Price Elements (see DBA). Project activities shall be broken down at a minimum to Work Elements (e.g., bridges may be broken down into foundations, substructure, superstructure, and decks). All Work shall be broken down to similar manageable Work Elements. For Utility Adjustment Work, if Work is not shown as a Project activity itself, such Work shall be shown as a Work Element, where applicable. For mobilization, DB Contractor shall provide a list of Work items that are included in each Project activity or Work Element.

2.1.1.3 Project Status Schedule Updates

DB Contractor shall update, on at least a monthly basis, the approved PBS to reflect the current status of the Project, including approved Change Orders.

Each Project Status Schedule Update shall accurately reflect the status of all activities as of the effective date of the updated Project Baseline Schedule. Each Project Status Schedule Update shall indicate the overall completion percentage of the Project.

No changes in activity durations, calendar assignments, logic ties, or constraints will be allowed in the Project Status Schedule Update without the written approval of TxDOT.

The Project Status Schedule Update shall include a schedule narrative report which describes the status of the Project in detail, including progress made that period, plans for the forthcoming period, all potential delays and problems, their estimated effect on the Project Schedule and an overall completion, and whether on, ahead of, or behind schedule.

2.1.1.4 Project Schedule Revisions

Until TxDOT approves a schedule revision, all Project Schedule submittals shall be tracked against the previously approved Project Schedule. Accepted revisions shall be incorporated into the Project Schedule at the next monthly schedule update.

2.1.2 Document Management

All electronic information submitted to TxDOT shall be searchable and legible.

2.1.2.1 Document Storage and Retrieval Requirements

DB Contractor shall establish and maintain an Electronic Document Management System (EDMS), compatible with TxDOT's EDMS system, to store, catalog, and retrieve all Contract Documents using the applicable control section job (CSJ) numbers. Unless otherwise directed by TxDOT, record retention shall comply with the requirements of the *Texas State Records Retention Schedule*, and shall be provided to TxDOT at the time of the expiration or earlier termination of the Agreement.

Maintenance records shall utilize the same format as TxDOT utilizes for its statewide asset inventory and condition assessments and shall be capable of being integrated into TxDOT's maintenance management systems.

Construction quality acceptance test results shall be automatically transmitted to TxDOT's I2MS system using TxDOT's extensible markup language (XML) web service. A sample is shown in Attachment 2-3, I2MS Test Form Fields. DB Contractor shall coordinate with TxDOT to obtain the most current version

prior to commencing construction quality acceptance testing. The responsible technician and his/her supervisor shall sign the daily test reports and the results of the daily tests shall be provided to TxDOT within 48-hours after test completion.

In the provision of a document management system, the DB Contractor shall:

a) Use data systems, standards and procedures compatible with those employed by TxDOT and implement any new operating practices required as a result of TxDOT's amendments to any such systems, standards and procedures.
b) Provide a secure location for any interface as may be provided by TxDOT, such that only authorized users have access and that it is protected from loss, theft, damage, unauthorized or malicious use.
c) Employ appropriate standards and procedures, and train DB Contractor personnel to operate any TxDOT data management system which TxDOT may require in connection with the Project.
d) Provide a mechanism for the electronic transfer of meta data along with the associated portable document format (PDF) images for uploading into an EDMS employed by TxDOT.

To allow for disaster recovery, the DB Contractor shall back-up all Project-related documents on a nightly basis and store all Project-related documents in a secure off-site area on a weekly basis.

DB Contractor shall provide TxDOT at DB Contractor's expense, sufficient access to DB Contractor's document control database as deemed necessary by TxDOT.

2.1.3 Design Visualization

DB Contractor shall provide three-dimensional design files to TxDOT for use during the design and construction process.

2.1.3.1 Services to be Provided by TxDOT

The type of available data may vary dependent on the level of project development. Typical types of data TxDOT will provide to the DB Contractor, if available, are:

1. Data that TxDOT has on file concerning the project. Examples include as-built plans, field notes, etc.)
2. Electronic data of topography, roadway alignments and edge lines, pavement markings, criteria files, cross sections, and Digital Terrain Models that TxDOT or their consultant contractor have concerning the Project.
3. Drawings, sketches, renderings and/or photographs of special design elements such as, sidewalk paving materials, crosswalk details, landscaping, and any architectural treatments.
4. Elevation data that may be needed in some areas where the terrain changes abruptly and special design features are required, such as retaining walls or elevated structures.

2.1.3.1.1 Services to be Provided by the DB Contractor

DB Contractor shall provide photo renderings and accurate three-dimensional models that depict the Project. Photo renderings and completed models will represent realism and aesthetic attributes of the existing conditions and the proposed Project. The DB Contractor will add roadway design details to the photo renderings and the three-dimensional model that are not normally provided at the stage of schematic design and verify that the schematic design complies with design guidelines presented in the TxDOT Roadway Design Manual, Texas MUTCD, and the AASHTO Green Book.

The design visualization models and renderings shall show existing and proposed design conditions either separately or combined in the same display. Based on specific project requirements the final design visualization deliverables may include photo-matched renderings, rendered plan view layouts, and

animated sequences. DB Contractor shall provide a three dimensional CADD model of the completed project and any work product generated during the modeling process such as site photographs, textures, material assignments, and additional terrain information. All CADD data should be in electronic format and native to TxDOT's CADD architecture using Bentley Systems, Inc.'s MicroStation to provide complete compatibility between the contractor and TxDOT. The current CADD architecture and standards can be viewed at http://www.txdot.gov/business/contractors_consultants/v8.htm.

The DB Contractor shall collect, review, and evaluate all of the available existing data pertaining to the Project and prepare the design visualization models to reflect current design requirements. The data will include MicroStation design files, GEOPAK geometry files, existing terrain models, and digital ortho photography. The DB Contractor shall field verify the existing and proposed condition of design visualization models for dimensional accuracy and realism.

2.1.3.2 Design Visualization Services - Photo Renderings and Exhibits

The DB Contractor shall provide photo renderings of the following three (3) locations:

- 4th Street in Bishop,
- 6th Street in Bishop, and
- Turn-around near San Fernando Creek.

The DB Contractor shall coordinate with TxDOT the location of the photographs. The DB Contractor shall take a minimum of two existing condition photographs at each of the three (3) locations. These photographs will serve as the basis for the photo-renderings.

The DB Contractor shall provide one (1) mounted "before" image and one (1) mounted "after" static 3D photo matched image of proposed design elements at each of the three (3) locations.

The computer model shall accurately depict the geometric design of the proposed improvements at each of the three (3) locations that would cover the limits of the existing condition photographs. Engineering judgment will be used for definition of slope, retaining wall, bridge abutment placement, and other physical features that may not be readily apparent from the design schematic. The computer model is intended to be used by TxDOT for public information purposes.

DB Contractor shall provide the following:

- Project Management
  - Coordinate with TxDOT and interested parties on development of content, sequences and text placement.
- Project Set-Up / CADD Data Conversion
  - The DB Contractor shall provide 3D roadway and ramp centerlines, striping, typical sections, planimetrics, base digital ortho aerial photography, and 3D contour data for the proposed roadway design at the identified locations.
  - Planimetric creation for additional corridor buildings at the identified locations.
- Modeling and Animation
  - The DB Contractor shall model in 3D.
  - Landscape creation (existing features).
  - Modeling of notable buildings at the identified locations.
  - Modeling of proposed grading along the roadway at the identified locations.
- Texture Development
  - Color aerial photography field digital photography (including building textures around major interchanges)
- Location Development
  - Still camera development and photo location matching

- Deliverables
    - Final Imagery Editing Development
        - Provide three (3) scheduled deliveries: 60% draft, 95% draft and final delivery
        - Provide the final delivery on one (1) foam-core mounted before image and one (1) foam-core mounted after image limited in size to 11" x 14" for each of the three (3) locations.
        - Minimum resolution on final imagery shall be 300 dpi.
        - Provide the final delivery in three (3) digital formats: JPG, TIF, and PDF

2.1.3.3 Design Visualization Services - 3-D Computer Model

The DB Contractor shall prepare topographically accurate 3D computer models for no more than two (2) locations as determined by TxDOT.

The computer model will accurately depict the geometric design of the proposed improvements at each of the two (2) locations and associated interchanges. Engineering judgment will be used for definition of slope, retaining wall, bridge abutment placement, and other physical features that may not be readily apparent from the design schematic. The computer model will also incorporate existing features in the corridor out to a distance of approximately 500-feet either side of the roadway centerline, but up to 750 feet as needed.

The DB Contractor shall provide still-shot 3D views from various perspectives, and full-motion animated sequences recorded to DVD. The content of the stills and animated sequences is to be determined collaboratively with the TxDOT.

DB Contractor shall provide the following:

- Project Management
    - Provide three scheduled deliveries: 60% draft, 95% draft, and final delivery.
    - Coordinate with TxDOT and interested parties (up to two meetings) on development of content, sequences and text placement.
- Modeling and Animation
    - The DB Contractor shall model 3D topography based on provided CADD data/standards
    - Generic creation of surrounding neighborhoods
    - Landscape creation (existing features)
    - Modeling of notable buildings
    - Modeling of proposed grading along the roadway.
- Texture Development
    - Color aerial photography
    - Field digital photography (building textures around major interchanges)
    - Surrounding vegetation
- Animation
    - Camera development (i.e. interchange overviews, "helicopter view" flight of modeled roadway, and various stills)
    - Passively animated traffic
- Editing/Compositing
    - Compositing final footage
    - Format preparation for DVD
- DVD Authoring
    - Interactive menu development
    - Graphic design of packaging and menus
    - Master DVD creation
- Orthographic Plots

- Creation of orthographic cameras for high resolution plots of the identified locations.

2.2 Quality Management Plan

DB Contractor shall submit a comprehensive Quality Management Plan to TxDOT for approval that is consistent with and expands upon the preliminary Quality Management Plan submitted with the Proposal. The Quality Management Plan shall comply with ISO 9001:2000 for quality systems, quality plans and quality audits, or most current version, as updated by the International Standards Organization. DB Contractor may elect to obtain formal ISO 9001 certification, but will not be required to do so. DB Contractor Quality Management Plan shall comply with the requirements of current *TxDOT Design-Build Quality Assurance Program Implementation Guide*.

2.2.1 General Requirements

DB Contractor shall develop, implement, and maintain the Quality Management Plan for the Term. The Quality Management Plan shall describe the system, policies, and procedures that ensure the Work meets the requirements of the Contract Documents and provides documented evidence of same.

The complete Quality Management Plan shall incorporate the following features:

a) DB Contractor shall make all quality records immediately available to TxDOT for review. DB Contractor shall provide TxDOT with a copy of any and/or all quality records when requested.
b) The Quality Management Plan shall encompass all Work performed by DB Contractor and Contractors of all tiers.
c) DB Contractor shall submit to TxDOT the results of all Project quality audits within seven Days of their completion**.**
d) DB Contractor shall promptly submit to TxDOT non-conformance reports both upon issuance and resolution.

The Quality Management Plan shall contain detailed procedures for DB Contractor's quality control and quality assurance activities. DB Contractor's quality process shall incorporate planned and systematic verifications and audits undertaken by an independent party. DB Contractor shall conduct all quality control, quality assurance, performance verification, and design overlay and coordination among design disciplines, all in accordance with the Quality Management Plan and the requirements of the Contract Documents.

Inspections, reviews, and testing shall only be performed by personnel with appropriate training and qualifications, for each appropriate item of Work (items produced on and off the Project site) using appropriate equipment that is accurately calibrated and maintained in good operating condition at an AASHTO (AASHTO R18-10, *Establishing and Implementing a Quality System for Construction Materials Testing Laboratories*) accredited facility, or at a facility with comparable accreditation (e.g., ISO 17025, *General Requirements for the Competence of Testing and Calibration Laboratories*).

2.2.2 Quality Terminology

Quality terminology, unless defined or modified elsewhere in the Contract Documents, shall have the meaning defined in ISO 9001. Terms used in ISO 9001 shall have the meanings defined below:

a) Organization: DB Contractor's organization, including any Affiliates and Contractors.
b) Customers: the Users of the roadways, TxDOT, Customer Groups, and key stakeholders that have an adjacent property interest or connecting roadway.
c) Product: the Work.

2.2.3 Quality Management Organization

DB Contractor shall regularly maintain the Quality Management Plan to contain current versions of the following information:

a) The organizational chart that identifies all quality management personnel, their roles, authorities and line reporting relationships.

b) Description of the roles and responsibilities of all quality management personnel and those who have the authority to stop Work.

c) Identification of testing agencies, including information on each agency's capability to provide the specific services required for the Work, certifications held, equipment and location of laboratories for products produced both on and off the Project site.

d) Resumes for all quality management personnel.

2.2.4 Quality Policy

The Quality Management Plan shall contain a complete description of the quality policies and objectives that DB Contractor will implement throughout its organization. The policy shall demonstrate DB Contractor senior management's commitment to implement and continually improve the quality management system for the Work.

2.2.5 Inspection and Testing

The Quality Management Plan shall contain detailed descriptions of the inspection and test plans, including the timing, quantities represented and frequency of testing, that DB Contractor will use to meet quality control and quality assurance requirements of the Work

DB Contractor shall revise its Quality Management Plan when its own quality management organization detects a systemic or fundamental non-conformance in the work performed or in the manner the Work is inspected or tested, or when TxDOT advises DB Contractor of such a problem.

2.2.5.1 TxDOT Construction Notices

On a weekly basis, DB Contractor shall provide TxDOT with a rolling three-week inspection notice. The inspection notification shall include the fabrication schedule and planned construction activities for items where TxDOT is performing the fabrication inspection.

2.2.5.2 Reporting, Recordkeeping, and Documentation

DB Contractor shall develop and maintain inspection and testing records that include, but are not limited to:

a) Quality control inspection reports and process control material sampling/testing results and control charts shall be submitted to TxDOT within twenty-four (24) hours following the inspection or test.

b) The Construction Quality Acceptance Firm (CQAF) shall maintain, electronically, a daily log of all inspections performed for both DB Contractor and Subcontractor operations in a format acceptable to TxDOT and transmitted to TxDOT daily. The daily inspection reports shall identify inspections conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed. The responsible technician and supervisor shall sign the daily inspection reports. The results of the daily inspections shall be provided to TxDOT in an electronic format within twenty-four (24) hours after the work shift.

c) The CQAF shall be responsible for establishing an electronic system for recording all material test results. The responsible technician and his/her supervisor shall sign the daily test reports. The results of the daily test shall be provided within one (1) Day of test completion.

d) The CQAF's inspection and materials quality program shall electronically deliver the laboratory and field test results to TxDOT in the database format provided in Attachment 2-3. This electronic reporting is intended to allow the DB Contractor and TxDOT to make timely and accurate decisions on workmanship and material quality issues.

2.2.5.3 Laboratory Requirements

DB Contractor shall perform testing in accordance with, but not limited to:

a) Quality acceptance tests shall be conducted by the CQAF's testing laboratory identified in the CQMP that complies with the requirements of the AASHTO Accreditation Program (AAP) or other appropriate accreditation acceptable to TxDOT for the pertinent test. A copy of AAP accreditation certificate(s) shall be transmitted to TxDOT upon their receipt by the testing laboratory.

b) Equipment in all laboratories shall be certified prior to commencing any construction activities and shall retain the certification by AASHTO, or TxDOT, as applicable for the duration of the Work.

2.2.5.4 Supply Source and Material Quality

Quality of all materials shall conform to requirements contained in the Contract Documents and to any requirements of affected Utility Owners. The CQAF shall provide plant inspection and aggregate sampling and testing at concrete and asphalt plants. Manufacturers' test reports may supplement, but not replace, the QA inspections, sampling, testing and certification provisions.

2.2.6 Responsibility and Authority of DB Contractor Staff

Personnel assigned to perform inspection, testing, or monitoring of characteristics for acceptance shall not be those personnel performing or directly supervising the Work being accepted.

DB Contractor's Construction Quality Control Manager and Construction Quality Acceptance Manager and quality staff shall have no responsibilities in the production of the Work. Quality acceptance staff shall remain independent of the quality control staff.

The Construction Quality Control Manager shall prepare a monthly report of the quality inspections and tests performed, results of such inspections and tests, and occurrences and resolution of non-conformance discoveries. DB Contractor shall submit the monthly reports to TxDOT for review.

DB Contractor's Construction Quality Control Manager and Construction Quality Acceptance Manager shall have the authority to stop Work for quality-related issues.

2.2.7 Design Quality Management Plan

DB Contractor shall prepare and submit to TxDOT for review and approval a Design Quality Management Plan (DQMP) that describes its policies, procedures, and staffing to manage design quality in accordance with the requirements of this Section 2.2.7.

2.2.7.1 Released for Construction Documents

DB Contractor shall submit to TxDOT all Released for Construction Documents in accordance with the submittal requirements of the Design Quality Management Plan. DB Contractor's Released for Construction Documents shall comply with the requirements of the Contract Documents, and shall be detailed, complete, constructible, and shall allow verification of the design criteria and compliance with Contract Documents.

Not later than two Business Days after DB Contractor has completed design of any particular Released for Construction Document, DB Contractor shall submit the signed and sealed document to TxDOT.

The DB Contractor shall prepare and provide all Project related Submittals and documents using English units of measure.

The DB Contractor shall furnish all Submittals by electronic copy in accordance with Section 2.1.2. Unless otherwise stated in the Contract Documents, the DB Contractor shall provide TxDOT and the Design Quality Assurance Manager each with four paper copies and a single electronic copy of each Submittal. Each Submittal shall have the signature of an authorized representative of the DB Contractor, unless otherwise expressly stated for a particular Submittal. The electronic copy shall be in a suitable format (e.g. PDF) or in the format in which the Work was originally created unless stated otherwise in the Contract Documents.

The DB Contractor shall include with each Submittal a transmittal cover sheet in a form acceptable to TxDOT.

The minimum sheet size for the Submittals shall be 8.5 inches by 11 inches. The maximum sheet size shall be 36 inches by 120 inches. Every page in a Submittal shall be numbered in sequence.

Each Submittal shall be full and complete and shall be assigned a unique, sequential number, clearly noted on the transmittal cover sheet. Original Submittal shall be assigned a unique numeric Submittal number. Revised Submittals shall bear an alphanumeric designation which consists of the unique Submittal number assigned to the original Submittal followed by a letter of the alphabet to represent that it is a subsequent Submittal of the original.

Any changes made on a revised Submittal, other than those made or requested by TxDOT, shall be identified and noted on the revised Submittal.

Design deliverables shall include a title block, consistent with the standard Project drawing format established as part of the Quality Management Plan, with the following information:

a) Date of issuance and including all prior revision dates.

b) Contract title and number.

c) The names of the DB Contractor and applicable Affiliates.

d) Stage of development.

e) Reference to applicable Technical Documents and amendments.

f) If required, review and acceptance or approval from a Governmental Entity, prior to submission to TxDOT.

g) Review stamp.

h) Action block space – All deliverables shall include a sufficient blank space in which the DB Contractor may list required actions to be taken.

i) When calculations accompany drawings in a Submittal, cross-references from the body of the calculations to the individual drawing to which the pages of the calculations pertain.

j) Organization of the CAD drawings and associated documents in a logical manner, having a uniform and consistent appearance, and clearly depicting the intention of the design.

2.2.7.2 Record Drawings and Documentation

Within 90 Days of Final Acceptance of all or part of the Project, DB Contractor shall submit to TxDOT a complete set of Record Drawings in hard copy and native electronic format for the portion of the Project actually opened to traffic. The Record Drawings and Documentation shall be an organized, complete record of Plans and supporting calculations and details that accurately represent what DB Contractor constructed.

DB Contractor shall ensure that the Record Drawings reflect the actual condition of the constructed Work. DB Contractor shall submit to TxDOT the electronic files used to prepare the Record Drawings and documentation.

2.2.7.3 DQMP General Requirements

The DQMP shall describe and include the following general requirements:

a) The quality control and quality review procedures for Professional Services products shall be organized by discipline (such as structural, civil, utilities). These procedures shall specify measures to ensure that appropriate quality requirements are specified and included in the Professional Services product and to control deviations from such requirements.

b) Specific quality control and quality review procedures, including all required forms and checklists, shall be specified for preparing, verifying and checking all Professional Services products to ensure that they are independently checked and back-checked in accordance with generally accepted engineering practices in the State of Texas and the requirements of the Contract Documents. The checking of structural design shall include a set of independent calculations, performed by the DB Contractor's Design Firm for all structural elements.

c) The designer and checker shall be clearly identified on the face of all Final Design Documents. The DQMP shall also include specific procedures for verifying the Professional Services product along with any computer programs being used for such purposes. Design Documents shall be stamped, signed and dated by the engineer in responsible charge for that item, element, or phase of the Work.

d) Procedures shall be described for coordinating Professional Services performed by different individuals or firms working in the same area, in adjacent areas, or on related tasks to ensure that conflicts, omissions or misalignments do not occur between drawings or between the drawings and the specifications. This shall also include the coordination of the review, approval, release, distribution and revision of documents involving such parties.

e) Procedures shall: (1) ensure that DB Contractor personnel are familiar with all the provisions of the Contract Documents concerning their respective responsibilities; (2) provide for the education, training and certification, as appropriate, of personnel performing activities affecting or assessing the quality of the Work to assure that such personnel achieve and maintain reasonable proficiency; and (3) ensure that the Work is performed according to the DQMP, generally accepted engineering practices in the State of Texas and the Contract Documents.

f) Procedures shall be established for meeting documentation requirements; the filing of design criteria, reports and notes, calculations, plans, specifications, schematics and supporting materials needed during the Final Design; and the specific responsibilities of personnel to satisfy these requirements. All Design Documents shall be maintained, organized and indexed by DB Contractor and copies made available to TxDOT upon request.

g) Procedures and schedules for the DQAM to perform audits of the design firm's quality control procedures under the DQMP.

2.2.7.4 Personnel and Staffing

2.2.7.4.1 Professional Services Quality Control Manager

DB Contractor shall assign a Professional Services Quality Control Manager (PSQCM) who shall be responsible for management of quality control program for the design, environmental, ROW, Utilities and survey. The PSQCM shall not be involved with direct scheduling or production activities; and shall report directly to DB Contractor's management team. The PSQCM shall see that the methods and procedures

contained in the approved DQMP are implemented and followed by DB Contractor design staff in the performance of the Work. The PSQCM shall be a Registered Professional Engineer.

2.2.7.4.2 Design Quality Assurance Manager

DB Contractor shall assign an independent Design Quality Assurance Manager (DQAM) who shall be responsible for management of the quality assurance program for the design, environmental, ROW, Utilities and survey. The DQAM shall work for an independent Design Quality Assurance Firm (DQAF) hired by the DB Contractor; and shall report jointly to TxDOT and the DB Contractor's management team. The DQAM shall carry out assurance and audit functions as outlined in the DQMP. The DQAM shall be a Registered Professional Engineer. The DQAM shall not report to any person or party directly responsible for design or construction production.

2.2.7.4.3 Personnel in Responsible Charge

DB Contractor shall designate (by name) the personnel in responsible charge for each item, element, or phase of the Work. The personnel in responsible charge shall possess the necessary registrations in the State of Texas and shall be personally responsible for directly supervising the Work and who will stamp, sign and date the Professional Services product for a given item, element, or phase of the Work as applicable.

2.2.7.4.4 Reviewing Professional Services

The DB Contractor personnel performing the quality control check of the Professional Services shall not be directly involved with the original development of the item, element, or phase being checked.

2.2.7.4.5 Design Quality Assurance Staff

A quality assurance staff shall be provided under the direction of the DQAM to perform oversight and review of all design, environmental, ROW, Utilities and survey performed by any member of DB Contractor's group.

The quality assurance staff shall be employees of the DQAF. The quality assurance staff shall be experienced in the various aspects of roadway design undertaken by the DB Contractor. The training and experience of the quality assurance staff shall be commensurate with the scope, complexity, and nature of the design work to be reviewed. Qualifications shall include appropriate experience, certifications, training and licensure. Design quality assurance staff shall report to the DQAM.

2.2.7.4.6 Design Quality Assurance Staff Levels

The size of the quality assurance staff shall reflect the volume of quality assurance activities necessary for the Work in progress and shall be maintained in accordance with the approved DQMP. The DQAF staff will perform quality assurance oversight and review typically performed by TxDOT on traditional projects.

The design quality assurance staffing requirements shall be updated as necessary throughout the Term of Work to reflect changes in the actual design schedule. DB Contractor shall ensure that adequate design quality assurance staff is available and that DQMP activities are undertaken in a manner consistent with the Project Schedule and in a manner that will enable DB Contractor to achieve the Substantial Completion and Final Acceptance deadlines.

Should TxDOT determine that DB Contractor is not complying with the DQMP because of lack of staff or ethical standards, TxDOT shall have the right, without penalty or cost, including time extensions or delay damages, to restrict Work efforts until appropriate levels of staffing consistent with the DQMP and satisfactory to TxDOT are obtained or TxDOT may contract with a separate firm to perform these services and withhold payment to DB Contractor for such services.

2.2.7.5 Professional Services Submittal Review Process

DB Contractor shall conduct a series of working meetings with its Professional Services staff, the internal quality control of DB Contractor staff, the DQAM and TxDOT to establish workflow processes and procedures to be utilized during the design review process that are consistent with the Contract Documents. The working meetings are also to develop an understanding on general design concepts such as geometrics, aesthetics, drainage, traffic control, and structures.

DB Contractor and TxDOT shall collaborate and mutually agree upon (i) a list of proposed sections (i.e., Station x+xx to Station y+yy) for the Work; (ii) Professional Services packaging and content (such as drainage, individual structures, roadway, traffic sequencing, and others); (iii) a list of mandatory submittals; and (iv) a proposed submittal schedule. The Professional Services reviews shall be evenly scheduled over the duration of the Professional Services phase of the Work. Sections and packages shall be logically organized into manageable pieces and shall contain sufficient information and details to confirm DB Contractor intent and to validate conditions. DB Contractor shall obtain TxDOT's written approval of the sections, packages and contents, the schedule, and the methodology prior to making the first submittal.

The PSQCM shall chair the submittal reviews with TxDOT and the DQAM, and DB Contractor shall maintain formal documentation of these meetings for TxDOT's audit.

The purpose of the submittal reviews is for TxDOT and the DQAM to review Professional Services products for general compliance with Project requirements, sound engineering practice, applicable Law, the Governmental Approvals and the Contract Documents. All submittals are subject to review and comment by persons designated in the Technical Provisions.

If the DB Contractor and TxDOT cannot come to an agreement on the list of mandatory submittals, the following list shall be provided at minimum:

- Corridor Structure Type Study and Report submittals
- Preliminary Bridge Layout submittals
- Preliminary Design submittal
- Final Design Submittal
- Any deliverables described in the Technical Provisions
- Exhibits Supporting Railroad Agreements
- Design Exceptions and Design Waiver Requests

2.2.7.5.1 Final Design Submittal

The Final Design Submittal shall be submitted to TxDOT and the DQAM for general review, and the PSQCM shall provide certification of compliance. Construction packages for individual Work items, elements or phases shall be organized such that the final document package can be assembled in a manner similar to the standard construction documentation typically provided to TxDOT for conventional project letting, as mutually agreed upon by DB Contractor and TxDOT.

When DB Contractor has completed the Final Design Submittal for an item, element, or phase and wishes to obtain TxDOT and the DQAM's concurrence of such a design, the PSQCM shall certify that:

a) The design meets all applicable requirements of the Contract Documents, applicable Law and the Governmental Approvals.

b) The design has been checked in accordance with DB Contractor's approved DQMP.

c) The item or element is ready for construction.

d) DB Contractor has obtained all required Final ROW, Governmental Approvals, and Utility Owner approvals.

The Final Design Submittal shall be complete Design Documents incorporating all of the design submittal review comments. All documentation, including copies of TxDOT's approval of deviations for design standards and/or Design Exceptions shall be provided with the Final Design Submittal.

Prior to certifying the above items, elements, or phases, and upon review and comment of the Final Design Submittal by TxDOT and the DQAM, the PSQCM shall schedule a formal review with TxDOT and the DQAM.

2.2.7.5.2 Formal Review

The PSQCM will conduct a formal review presentation to TxDOT and the DQAM at a location acceptable to TxDOT. The formal review presentation will be held following TxDOT and the DQAM's review of and comment on the mandatory submittals.

At least five (5) Business Days prior to the applicable formal review presentation dates, DB Contractor will assemble and submit drawings or other documents to TxDOT and the DQAM for information and review.

Draft minutes of formal review presentations shall be submitted to TxDOT and the DQAM by the PSQCM within five (5) Business Days after completion of each review.

2.2.7.6 Resubmittal Process

Resubmittals of any design submittal may be required if deemed necessary by TxDOT or any Governmental Entities with jurisdiction over the Project. Each resubmittal must address all comments received from a prior submittal in a manner satisfactory to the commenting party. Submittals shall be resubmitted as many times as necessary to address comments from TxDOT or any Governmental Entity with jurisdiction over the project.

If TxDOT had requested additional information during the final formal review, the PSCQM will conduct an additional formal review of the resubmitted items, elements, or phases. A copy of all correspondence relating to each submittal made to any Governmental Entity with jurisdiction over the project shall be concurrently provided to TxDOT.

2.2.7.7 Certification of Compliance

The PSQCM shall verify that DB Contractor obtained approval from applicable Governmental Entities and Utility Owners prior to the issuance of a "Certification of Compliance" designation of the Design Documents by the PSQCM. Following issuance of a "Certification of Compliance" by the PSQCM, TxDOT and the DQAM shall review and provide written concurrence.

After DB Contractor has incorporated the Final Design Submittal and/or the resubmittal of formal review comments into its design and all concerns and questions have been resolved to the satisfaction of TxDOT, DB Contractor shall provide Final Design package to TxDOT and the DQAM. DB Contractor as part of its Final Design package shall include all:

a) Design drawings

b) Design calculations

c) Design reports

d) Specifications

e) Electronic files

f) Documentation required for all Final ROW

g) Governmental Approvals

h) Utility Owner approvals

TxDOT and the DQAM's concurrence with the PSQCM's certification of compliance will not constitute approval of the design or subsequent construction, nor relieve DB Contractor of its responsibility to meet the requirements hereof. Irrespective of whether TxDOT provides DB Contractor with the authority to begin construction on items, elements, or phases of the Work prior to completion of the design for the entire Project, DB Contractor shall bear the responsibility to assure that construction meets the requirements of the Contract Documents, applicable Law and Governmental Approvals.

Construction on any item, element or phase covered by the PSQCM's certification of compliance of said item, element, or phase shall only progress to the extent covered by the Design Documents included in that statement except for the Work performed in accordance with Section 2.2.7.9 (Early Start of Construction). Prior to progressing further with construction of a certified package, DB Contractor shall complete the next item, element or phase of design or complete the Final Design, and obtain TxDOT and the DQAM's concurrence, except for the Work performed in accordance with Section 2.2.7.9. Any items, elements or phases of design, subsequent to the certification of compliance from the PSQCM, shall be checked and certified by the PSQCM in the same manner indicated above.

If TxDOT or the DQAM determines that the Final Design Documents do not meet the requirements of the Contract Documents, applicable Law and/or the Governmental Approvals, TxDOT or the DQAM will notify DB Contractor in writing of any specific deficiencies in the Final Design Documents. DB Contractor shall correct such deficiencies; modify the Final Design Documents; and, if necessary, modify construction upon receipt of TxDOT's comments.

If there is evidence that the DQMP procedures are not adequate, as evidenced by TxDOT or the DQAM's oversight reviews or problems during construction, TxDOT may, at its sole discretion, withhold payment for design and construction until sufficient DQPM procedures are in place. If construction is in progress, TxDOT may suspend ongoing Work represented by the deficient design and require correction of design and/or construction defects.

DB Contractor shall provide quantity estimates for Work covered by Final Design Documents. The quantity estimates shall be in units consistent with the quality acceptance and quality review sampling and testing requirements in the DQMP.

2.2.7.8 Design Changes

DB Contractor or TxDOT may initiate design changes. Design changes may occur either on items, elements, or phases undergoing construction or after Final Design. In order to process these types of changes, DB Contractor shall submit, when the problem or change occurs, a Request for Information (RFI) for TxDOT's approval.

All design changes submitted under the RFI procedure shall undergo the same DQMP checks as the original design.

The designer responsible for the original design shall approve design changes during construction, or design changes to Final Design Documents in writing. If the original designer is no longer available, then after notification to the original designer, an experienced Registered Professional Engineer shall provide documentation of design changes. All plans, final submittals, specifications, calculations, and reports for design changes shall be stamped, signed and dated by a Registered Professional Engineer. In all cases, the PSQCM shall certify in writing that the design change has been:

a) Designed in accordance with the requirements of the Contract Documents, applicable Law and the Governmental Approvals,

b) Checked in accordance with DB Contractor's approved DQMP, and

c) Prepared consistently with other elements of the original design.

DB Contractor shall request and schedule interim and final RFI formal design review(s) by TxDOT and the DQAM for all design changes made during construction or to the Final Design Plans. Design changes submitted under an RFI that are minor may not warrant interim review in addition to final formal design review(s) by TxDOT and the DQAM. Design changes eligible for a single review shall be defined in the DQMP and approved by TxDOT and the DQAM. All changes made through the RFI process shall be documented in the As-Built drawings.

2.2.7.9 Early Start of Construction

The following will set forth the circumstances under which certain items, elements, or phases of the Work may be packaged by DB Contractor to initiate an Early Start of Construction prior to obtaining TxDOT's concurrence of the Final Design for the item, element or phase. The "Early Start of Construction" requirements shall apply to any Work that is performed by DB Contractor prior to receiving TxDOT and the DQAM's written concurrence with the PSQCM's certification of compliance of the Final Design Submittal for the Work. All such Work is performed at the sole risk of DB Contractor. TxDOT does not consider any items as satisfying the DQMP requirements until the PSQCM has issued a certification of compliance and TxDOT and the DQAM have issued a written concurrence therewith.

TxDOT, at its sole discretion, may defer Early Start of Construction for any portions of the Work as requested by DB Contractor.

Any Work constructed by DB Contractor prior to receiving TxDOT's concurrence of the Final Design Submittal for the Work, and later determined to be unacceptable by TxDOT, in its sole discretion, shall be revised, removed or otherwise reconfigured to the satisfaction of TxDOT at DB Contractor's sole cost and expense and without any consideration given to an extension of the Completion Deadline.

TxDOT and DB Contractor shall agree on procedures for Early Start of Construction, which procedures shall among other things, include a process for distributing construction documents signed and sealed by a Registered Professional Engineer to TxDOT and DB Contractor's field staff. In order for DB Contractor to proceed with early phases of construction of a portion of the Work, specific pertinent items of the design shall have been previously reviewed by TxDOT and comments from TxDOT shall have been transmitted to the DB Contractor. For example, Early Start of Construction may be rough grading of a specific portion of the Project, for which specific pertinent items of the design may include:

a) Horizontal and vertical drainage system

b) Typical sections

c) Related elements of the drainage system

d) Related elements of the Traffic Control Plan specifically applicable during the term of the Early Start of Construction scope

e) Subsurface geotechnical investigations and recommendations

f) Slope stability analysis and recommendations

g) Preliminary structure general plans (if a structure is within the element or portion of the nonstructural Work)

h) Settlement monitoring program

i) Construction specifications

An Early Start of Construction shall be at the sole and complete risk of DB Contractor, and does not release DB Contractor from any of the requirements described in Section 2.2.8 (Construction Quality Management Plan). If, as a result of the review process, construction modification or changes to already

completed Work elements performed under the Early Start of Construction are required, DB Contractor shall make any and all construction modifications to already completed construction activities at its sole cost and expense without any entitlement to time extensions or adjustments in the Price.

2.2.8 Construction Quality Management Plan

DB Contractor shall construct the Work in accordance with the Released for Construction Documents, following a reasonable timeframe for TxDOT and DQAM review and comment, together with the relevant requirements and specifications of the Contract Documents.

DB Contractor's Construction Quality Management Plan (CQMP) shall contain detailed procedures for the DB Contractor's quality control and quality assurance activities for construction activities. The CQMP shall be consistent with the applicable procedures contained in the current TxDOT *Contract Administration Handbook for Construction* and establish a clear distinction between quality control and quality acceptance activities and persons performing them. At a minimum, the CQMP shall specify:

a) Methods and procedures that clearly define the distinction/authority/responsibility for the administration of DB Contractor's CQMP.

b) That DB Contractor, Supplier, and Subcontractors designate an individual on each crew to be responsible for performing daily field inspections of their own Work and for preparing a daily QC report to document the inspection performed.

c) The review and approval of all Portland cement concrete and hot mix asphaltic concrete mix designs by a CQAF Registered Professional Engineer.

d) Methods and procedures to be utilized by DB Contractor to obtain active participation of the work force in quality control operations to achieve a quality project; reporting forms to be used by the responsible quality control personnel shall be included.

e) A construction quality control organization and staffing plan. The period of time that the quality control staff member will be present on the site shall be shown, resumes of the Key Personnel shall be included, and the experience/knowledge/skill levels of the quality control support staff shall be stated.

f) CQAF organizational and staffing plans. The period of time that the quality acceptance staff member will be present on the site shall be shown; resumes of key staff members shall be included; and the required minimum knowledge, technical skills, and experience level of the personnel related to the various inspection functions, such as grading, drainage, pile-driving and structures inspections, that will occur on the Work shall be stated. The administrative/clerical support staff for maintenance and management of records/documents pertinent to quality acceptance for the CQMP activities shall be identified.

g) Procedures for inspecting, checking, and documenting the Work. Inspection, examinations and measurements shall be performed for each operation of the Work to assure quality.

h) Procedures to ensure that all activities affecting the quality of the Work are accomplished under controlled conditions, using appropriate equipment for the task being performed.

i) Procedures to ensure that the education, training, and certification of personnel performing CQMP activities are achieved and maintained and that all Work is performed in accordance with the approved designs, plans, and specifications.

j) Procedures to ensure that critical elements of the Work are not started or continued without inspection and testing by the quality acceptance personnel on site. Inspection or hold points shall be identified and communicated to the CQAF, Construction Quality Acceptance Manager (CQAM), and TxDOT. Procedures to proceed beyond inspection points shall be developed.

k) Description of specific procedures to ensure that all Work conforms to the requirements of the Contract Documents, Governmental Approvals and applicable Law, and the Design Documents, as well as that all materials, equipment, and elements of the Work will perform satisfactorily for the purpose intended.

l) Documents specify that all activities undertaken by or on behalf of DB Contractor affecting the quality of the Work shall be prescribed and accomplished by documented instructions, procedures, and appropriate drawings. Such instructions, procedures and drawings shall include quantitative and qualitative criteria to be used to determine compliance.

m) Measures to ensure that purchased materials, equipment, and services conform to the Contract Documents, and Governmental Approvals, applicable Laws, Rules, and the Design Documents. These measures shall be consistent with Good Industry Practice and shall include provisions for source evaluation and selection, objective evidence of quality furnished by Subcontractors and Suppliers, inspection at the manufacture or vendor source, and examination of products upon delivery.

n) Procedures for identification and control of materials, equipment, and elements of the Work. These procedures shall be consistent with the Good Industry Practice to ensure that identification of the item is maintained by appropriate means, either on the item or on records traceable to the item, as necessary, throughout fabrication, erection, installation and use of the item.

o) Procedures to ensure that materials, equipment or elements of the Work that do not conform to requirements of the Contract Documents, the Governmental Approvals, applicable Law or the Design Documents are not used or installed. These procedures shall include identification, documentation, segregation, disposition and notification to TxDOT and, if appropriate, Governmental Entities and other affected third parties, as well as procedures for TxDOT to review Nonconforming Work.

p) Procedures for processing a RFI to resolve discrepancies and/or questions in the plans and specifications so that all changes are documented and approved by DB Contractor's design engineers, TxDOT and the DQAM.

q) Procedures to indicate, by the use of markings such as stamps, tags, labels, routing cards, or other suitable means, the status of inspections and tests performed upon individual items of the Work.

r) A program for inspection for each operation of all Work examinations, measurement and test of materials or elements of the Work to assure quality.

s) A program for coordination of all inspection and testing with the inspections and tests of Governmental Entities and Utility Owners.

t) A program to ensure performance of all testing required to demonstrate that all materials, equipment and elements of the Work will perform satisfactorily for the purpose intended and meet the standards specified in the Contract Documents. It shall specify written test procedures which include provision for ensuring that all prerequisites for the given test have been met and that adequate test instrumentation is available and used. The CQMP shall require test results be documented and evaluated to ensure that test requirements have been satisfied. The CQMP shall also demonstrate how the CQAF will track its testing frequencies to ensure compliance with the Contract Documents.

u) Procedures for reviewing and approving acceptance test results, categorizing test results in a manner acceptable to TxDOT, transmitting acceptance test results to TxDOT in a format acceptable to TxDOT for use in fulfilling its statistical validation requirements, and working

collaboratively with TxDOT to resolve statistical non-validation between CQAF and TxDOT test results.

v) Measures to ensure that tools, gauges, instruments, and other measuring and testing devices used in activities affecting quality are properly maintained, controlled, calibrated, certified and adjusted at specified periods to maintain accuracy within industry standards.

w) Procedures to control the handling, storage, shipping, cleaning and preservation of materials and equipment to prevent damage or deterioration.

x) Procedures to ensure that conditions adverse to quality, such as failures, malfunctions, deficiencies, defective material and equipment, deviations and other Nonconforming Work are promptly identified and corrected. The procedures shall ensure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition and the corrective action taken shall be documented and reported to TxDOT in writing and to appropriate levels of DB Contractor's management to ensure corrective action is promptly taken.

y) A comprehensive system of planned and periodic audits of DB Contractor's CQMP to determine adherence to and the effectiveness of the CQMP. CQAF personnel shall perform the audits in accordance with the written procedures or checklists. Audit results shall be documented, reviewed, and acted upon by DB Contractor. Follow-up action, including re-audit of deficient areas following corrective action, shall be taken where indicated.

z) Measures to control the receipt and issuance of documents, such as instructions, procedures, training manuals and drawings, including changes thereto, which prescribe activities affecting quality. These measures shall ensure that approved documents, including authorized changes thereto, are reviewed for adequacy and approved for release by authorized personnel of DB Contractor and are distributed to and used at the location where the prescribed activity is performed. Changes to documents shall be reviewed and approved by the same organizations that performed the original review and approval unless TxDOT consents, in writing, to another responsible organization.

aa) The requirements and methods for controlling documents. DB Contractor's document control system shall be compatible with TxDOT's.

bb) Procedures and personnel to be used to assure that specified instrumentation is installed and monitored in accordance with applicable specification.

cc) The form and distribution of certificates of compliance.

dd) Procedures for quality acceptance in the CQMP with respect to checking and verifying the accuracy and adequacy of construction stakes, lines, and grades established by DB Contractor.

2.2.8.1 Personnel and Staffing

2.2.8.1.1 Construction Quality Control Manager

DB Contractor shall assign an on-site Construction Quality Control Manager (CQCM) who shall be responsible for management of the quality control aspect of the CQMP. The CQCM shall not be involved with scheduling or production activities, and shall report directly to DB Contractor's management team. The CQCM shall see that the methods and procedures contained in approved CQMP are implemented and followed by DB Contractor and Subcontractors in the performance of the Work. The CQCM shall be a Registered Professional Engineer.

2.2.8.1.2 Construction Quality Control Staff

DB Contractor's and Subcontractors' construction work force are all considered to be members of DB Contractor's quality control staff as each and everyone is responsible for the quality of the Work. Personnel performing QC inspection shall ensure quality of workmanship and QC sampling/testing shall ensure that materials meet the required specifications prior to acceptance testing performed by the CQAF. Personnel responsible for performing quality control inspection shall be knowledgeable and receive training to perform their quality control duties. Personnel performing quality control sampling/testing shall be knowledgeable in the testing methods and procedures and do not need to be certified or direct employees of the DB Contractor, but cannot be employees of the CQAF.

2.2.8.1.3 Construction Quality Acceptance Manager (CQAM)

DB Contractor's CQAF shall assign an on-site Construction Quality Acceptance Manager (CQAM) who shall be responsible for management of the quality acceptance aspect of the CQMP. The CQAM shall be a Registered Professional Engineer and shall be an employee of the CQAF. The CQAM shall report jointly to DB Contractor's management team and TxDOT. The CQAM shall not report to any person or party directly responsible for design or construction production.

The CQAM shall review, approve, authorize, examine, interpret and confirm any methods or procedures requiring the "Engineers' review, approval, authorization, examination, interpretation, confirmation, etc." which are contained in the TxDOT Standards.

2.2.8.1.4 Construction Quality Acceptance Staff

A quality acceptance inspection and material sampling/testing staff shall be provided under the direction of the CQAM to perform inspection and material sampling/testing of all Work performed and materials incorporated into the Project by any member of DB Contractor's group. If approved in writing in advance by TxDOT, qualified individuals who are employees of or retained by manufacturers, vendors or Suppliers may inspect certain portions of Work.

The quality acceptance inspection and testing staff shall be employees of the CQAF and shall have been trained in the applicable inspection and material sampling and testing procedures. The quality acceptance staff shall be experienced in highway inspection and material testing. The training and experience of the quality acceptance staff shall be commensurate with the scope, complexity, and nature of the activity to be controlled and tested. Qualifications shall include appropriate TxDOT or State Highway Agency certification for testing and inspection as well as nationally recognized certifications such as ACI certification in applicable inspection or testing activities. Construction quality acceptance staff shall report to the CQAM.

The quality acceptance staff shall provide oversight and perform audits of the quality control inspection and material sampling/testing operation.

The quality acceptance inspection staff shall check compliance of all material, equipment, construction, installations, and operations. Construction activities requiring continuous field quality acceptance inspection or sampling and testing, in the sole discretion of TxDOT, shall proceed only in the presence of assigned QA personnel. The CQMP shall identify those activities.

2.2.8.1.5 Construction Quality Acceptance Staff Levels

The size of the quality acceptance staff shall reflect the volume of quality acceptance activities necessary for the Work in progress and shall be maintained in accordance with the approved CQMP. The CQAF staff will perform quality acceptance oversight, inspection, and testing services typically performed by TxDOT on traditional projects, with the exception of monitoring testing.

The Construction quality acceptance staffing requirements shall be updated as necessary throughout the Term of Work to reflect changes in the actual construction schedule. DB Contractor shall ensure that adequate Construction quality acceptance staff is available and that CQMP activities are undertaken in a

manner consistent with the Project Schedule and in a manner that will enable DB Contractor to achieve the Substantial Completion and Final Acceptance deadlines.

Should TxDOT determine that DB Contractor is not complying with CQMP because of lack of staff, TxDOT shall have the right, without penalty or cost, including time extensions or delay damages, to restrict Work efforts until appropriate levels of staffing consistent with the CQMP and satisfactory to TxDOT are obtained or TxDOT may contract with a separate firm to perform these services and withhold payment to DB Contractor for such services.

2.2.9 Maintenance Management Plan

Section 19 (Maintenance) includes requirements for maintenance management.

2.3 Comprehensive Environmental Protection Plan

Section 4 (Environmental) includes requirements for environmental management.

2.4 Public Information and Communications Plan

Not applicable

2.5 Safety Plan

DB Contractor shall be responsible for the safety of its personnel and of the general public affected by the Project.

DB Contractor shall submit to TxDOT for approval a comprehensive safety plan ("Safety Plan") that is consistent with and expands upon the preliminary safety plan submitted with the Proposal. The Safety Plan shall fully describe DB Contractor's policies, plans, training programs, Work Site controls, and Incident response plans to ensure the health and safety of personnel involved in the Project and the general public affected by the Project during the Term of the Agreement.

DB Contractor's Safety Plan shall address procedures for immediately notifying TxDOT of all Incidents arising out of or in connection with the performance of the Work, whether on or adjacent to the Project.

2.6 TxDOT-DB Contractor Communications Plan

DB Contractor shall submit to TxDOT for approval a TxDOT–DB Contractor Communications Plan (Communications Plan) that is consistent with and expands upon the preliminary communications plan submitted with the Proposal. DB Contractor shall maintain and update the Communications Plan throughout the Term.

The Communications Plan shall describe the procedures for communication of Project information between DB Contractor's organization and TxDOT.

The Communications Plan shall describe how DB Contractor's organization will respond to unexpected requests for information, communicate changes or revisions to necessary DB Contractor personnel, and notify affected stakeholders before and after changes are made to the Contract Documents.

2.7 Right of Way Acquisition Plan

Not applicable

2.8 TxDOT Offices, Equipment and Vehicles

Except where noted elsewhere in the Contract Documents, DB Contractor and TxDOT shall co-locate for the term of the Agreement to facilitate Project coordination and daily communication. The definition of

"co-locate" for this Agreement is office space meeting the conditions of this Technical Provision that are near each other along or adjacent to the Project within ten (10) miles of the Project ROW. At a minimum, the following DB Contractactor's personnel shall be co-located with TxDOT:

- Project Manager, Design Manager and at least one CADD technician during the design phase
- Project Manager and Construction Manager during the construction phase.

DB Contractor shall provide TxDOT office space (i.e., available for occupancy) within sixty (60) Days of issuance of Notice To Proceed 1 (NTP1). The location, condition, and amenities of the office space for TxDOT are subject to TxDOT's prior written approval. The office space requirements for the core office and the field offices are provided below.

2.8.1 Computers and Equipment

The DB Contractor shall provide, install, and maintain the following computers, peripherals, and software for the TxDOT office spaces:

- One computer and monitor including all necessary peripherals for each personnel office area and the reception area.
- Desktop computers shall be Dell Optiplex 580 CPU's with a Dell P2012H flat panel monitor or equivalent.
- Laptop computers shall be a Dell E5430 Latitude with a Dell P2012H flat panel monitor or equivalent.
- Peripherals will include at minimum, monitor stand, docking station for laptop computers, mouse, keyboard, extra battery for laptop computers, and a carry bag for laptop computers.
- Necessary software required to perform TxDOT functions for the Project, Microsoft Office Professional, Microsoft Outlook and be compatible with all other Microsoft software products.
- The computers, monitors and peripherals shall be at least equal to the ones used by the DB Contractor's staff.
- The DB Contractor shall provide, install, and maintain the following telephones, servers, copiers and fax equipment, and premise wiring for the TxDOT office space:
- At least one touch-tone telephone for each personal office area, each with a status indicator, access to all outside lines, and conference-call capability; and including speakers for the telephones in the enclosed offices rooms.
- At least one touch-tone conference telephone with satellite microphones for each conference room, each with a status indicator, caller id, access to all outside lines, and conference-call capability.
- Provide AC/DC chargers and other cords as needed for cellular telephones, for each employee.
- Hardware and software will be compatible with that of Good Industry Practice and of the DB Contractor's system interface.
- One high-speed laser computer printer capable of handling 11x17 prints.
- One high-speed color printer capable of handling 11x17 prints.
- One high-speed color photocopy machine capable of handling 11x17 prints.
- One facsimile transmission machine.

- One color scanner capable of handling 11x17 prints.
- A multipurpose piece of equipment capable of meeting multiple parts of the requirements above will be considered to meet the requirements.
- All office supplies including copier paper, toners, pens, pencils, notepads and other miscellaneous office supplies.
- Provide and install the complete voice/data communications cabling system, which includes but is not limited to the EMT conduit, bridle rings, pull boxes, category 5e UTP cable, category 5e "RJ-45" UTP receptacles, category 3 "RJ-11" UTP receptacles, receptacle boxes, cover plates, and fiber optic cable. If the DB Contractor can establish to TxDOTs satisfaction that alternate hardware and cabling can achieve the same level of service as TxDOT deems necessary to effectively manage this project, then the DB Contractor can submit for TxDOT's approval an alternate plan for hardware and cabling. DB Contractor can use fiber optic or copper cable, as long as it is sufficient enough to adequately support the project and field offices. All cable shall be routed, terminated, labeled and tested. Voice and data circuits shall be installed in conjunction with ISD and TxDOT Department of Information Resources staff.
- Certify and state supplied components as functional before installation and will bear all responsibility for replacement of parts at work commencement.
- Prepare test plan and submit before installation, test installed system and supply test results, and will conform to all industry standard testing procedures
- Terminate all category 5e UTP cable in 66M150 punch down blocks for voice cabling and shall terminate all category 5e UTP data cable in data patch panels within the wiring closet.
- Each drop will contain two data ports with RJ45 connectors and two voice ports with RJ11 connectors.
- Provide all materials, as needed and required, to complete the installation of the cable plant which shall include all cable, connectors, patch panels, equipment rack(s), patch cables, face plates, punch down blocks, fiber optic cable and other miscellaneous materials.

2.8.2 Core Office

DB Contractor shall provide all space, facilities, and support elements necessary to design, construct and maintain the TxDOT core office in accordance with the CDA Documents. DB Contractor shall provide office space, not to exceed 2,000 square feet, for TxDOT's design and Project management staff including, the General Engineering Contractor and other contract employees for a maximum of ten (10) persons. If it is necessary to locate any of these elements of the Work off-site or outside of this office, DB Contractor shall obtain TxDOT's prior written consent.

DB Contractor shall provide a preliminary TxDOT facility area layout plan to TxDOT no later than seven (7) Days after NTP1. TxDOT will promptly review and comment on required modifications to the layout within ten (10) days. DB Contractor shall submit a final facility layout plan within ten (10) Days of receipt of TxDOT comments.

DB Contractor shall have the TxDOT facility area available for move-in no later than sixty (60) days from NTP1.

2.8.2.1 TxDOT Facility Area and Items Provided by DB Contractor

DB Contractor shall provide separate office space for the exclusive use of TxDOT's design and Project management staff in the TxDOT facility area as specified herein and subject to TxDOT's prior written approval. This office space shall be located within the same building or complex as DB Contractor's

office staff. TxDOT will be reasonable regarding re-use of existing space within DB Contractor's current office facility, providing the space is contiguous and workable in TxDOT's sole discretion.

Office Condition. The offices shall be in good and serviceable condition, at least of the same quality as those of DB Contractor's counterpart office space, and available for occupancy as specified herein. Both Parties shall participate in a facility condition survey prior to and at the completion of occupancy. TxDOT shall return possession of DB Contractor-provided TxDOT facility area to DB Contractor in essentially the same condition as when TxDOT occupied the facilities, except for reasonable wear and tear and except for alterations, or loss or damage caused by any member of DB Contractor-Related Entity.

Loss or Damage. If office spaces, related facilities or fixtures are destroyed, damaged or stolen during the Work, in the TxDOT facility area, except as a direct result of willful misconduct of TxDOT or its personnel, DB Contractor shall, at its cost and within ten (10) Business Days after the occurrence of such destruction or damage, repair those items to their original condition or replace them. However, in the case of lost, damaged, or stolen office equipment (e.g., computers, fax machines, copy machines, and printers) necessary for normal office operations, replacement shall occur within two (2) Business Days. If loss or damage is caused as a direct result of willful misconduct of TxDOT or its personnel, DB Contractor shall replace the facilities noted herein within the timeframes specified herein, and TxDOT shall reimburse DB Contractor for actual, reasonable and documented costs incurred.

Office Facilities and Equipment. For the TxDOT facility area it provides, DB Contractor shall:

1. General. Secure facility space, obtain all permits, install and pay for all utility services, and maintain the facilities as part of the Work.

2. Access and Security. Provide separate TxDOT entrance/exit(s) from building, which shall be secured with electronic door lock(s) plus a deadbolt lock. DB Contractor shall provide security badge card access with locking doors running on time zone/holiday schedules for entry doors as well as other designated areas (e.g., server room, document storage, offices). DB Contractor shall provide software for maintaining access to these areas, which will be owned and/or maintained by TxDOT's design and Project management staff.

3. Lighting and Electricity. Include with all interior spaces overhead lighting meeting OSHA, building, and electrical and energy code requirements for similar office space (provide nominal 30 foot candles of light at 30 inches above finish floor). Each office space shall have at least four duplex receptacles, with minimum circuit capacity of twenty (20) amperes.

4. Janitorial and Trash Services. Provide daily janitorial service (except Saturdays, Sundays and Holidays) and maintain trash containers and trash pickup service for the building and site areas beyond the TxDOT facility area. This shall include, but not be limited to, sweeping and mopping floors, cleaning restrooms and break room, emptying wastebaskets, and periodic dusting. This service shall be paid for by DB Contractor. DB Contractor will pay for and procure janitorial services for the TxDOT facility area.

5. Exterior Maintenance. Maintain the exterior areas of office spaces, including access to parking areas.

6. Accessibility and Licensing. Meet all access requirements of the Texas Accessibility Standards, the Americans with Disabilities Act Accessibility Guidelines, as amended (42 USC §§12101, et seq.), and the applicable building code. Facility design plans shall be submitted to the Texas Department of Licensing and Regulation (TDLR) for review and approval as required by Section 16, Chapter 68 of the Texas Administration Code.

7. Restrooms, Break Room, and Entry Space. Provide access to women's and men's restrooms, break room space and building entry space, these spaces may be shared with DB Contractor's office space/staff. These spaces and all TxDOT spaces shall have access 24 hours per day, 7 days per week, 365 days per year (24/7/365). In lieu of access to a common break room, DB Contractor may provide a 200

SF break room/kitchen within the TxDOT space, with refrigerator with freezer compartment, ice machine, sink including waste disposer, microwave, and dishwasher. Break room/kitchen will have storage closet (25 sq. ft.) and cabinets with drawers and counter tops. In the event that access to restrooms cannot be accessed from a common building entry/lobby, DB Contractor may provide separate restrooms for the TxDOT facility area. In the event it is necessary to locate a separate break room and/or restrooms within the TxDOT facility area, the 2,000 SF TxDOT space allocation may be required to be increased to accommodate these spaces.

8. HVAC. Provide electrical, heating, ventilation, and air conditioning (HVAC) systems capable of maintaining temperatures between 65 and 75 degrees Fahrenheit in all spaces, 24 hours per day, 7 days per week, 365 days per year (24/7/365), through the year. Server room shall have dedicated air conditioning/cooling system capable of maintaining temperatures between 65 and 70 degrees Fahrenheit, and 15% relative humidity.

9. Code Requirements. Meet all applicable building and fire code requirements.

10. Disposal and Removal. Be responsible for disposal or removal of all DB Contractor-provided facilities and any facility and/or site restoration Work as required.

Space Requirements. Although actual spaces may vary slightly, the following nominal size requirements will apply, and the typical TxDOT facility area shall include the following elements:

1. Offices. Enclosed offices for TxDOT's management staff (nominal 150 square feet each) 5 total with keyed door hardware.

2. Cubicles. Cubicle area spaces for administration staff (nominal 64 square feet each) 8 total; (power supply and data and communication lines to cubicles may be provided through power pole drops).

3. Conference Rooms. One conference rooms at nominal 12'x 25' (300 SF) All shall have dimmable lighting; each conference room shall have one chair for every 24 SF of conference room space and a conference table of sufficient size for each chair.

4. Reception Area. Receptionist space with waiting area with seating for 4 visitors (nominal 200 SF); other furniture to be determined jointly by DB Contractor and TxDOT.

5. Work Room. Work room (nominal 150 SF) with 30-inch high plastic laminate wall-mounted counters (15 lineal feet of counter). Work room shall be located near the center of the facility, and in close proximity to the receptionist space.

6. Storage and Filing. One (1) lockable space for storage and filing, nominal 10'x15' (150 SF).

7. Server Room. One computer server room (100 SF) that has limited access and is locked via security card access. Server room shall be accessible via hallway entry not sharing any walls with the exterior of the building, and have no windows, a nonstatic floor covering, and at least three dedicated 20-amp power circuits and one 30-amp circuit. All patch panels (phone and data) shall be located within the designated server room. Temperature shall be maintained with a dedicated air conditioning/cooling system as defined above.

8. Parking Area. Parking area for at least 20 vehicles (14 staff/6 visitors) that is reasonably level (all-weather surface and all-weather access).

9. Exterior Lighting. Sufficient exterior security lighting that is automatically activated at low light levels to maintain two (2) foot-candles of lighting within the building and parking areas of the site.

10. Corridors. Corridors within the TxDOT facility shall have a nominal width of 54 inches.

Miscellaneous Requirements and Features. The following shall be provided as noted:

1. Flooring. Carpeted flooring (nonstatic in server room).

2. Entry Access. Entry to TxDOT areas by electronic door hardware card access (not keyed), with U.P.S. on locks (fail closed).

3. Electrical Outlets. Each office and conference room shall have two (2 data, 1 com Cat 5E) outlets per room, and one (2 data, 1 com Cat 5E) outlet per cubicle, as well as outlets at designated printer, fax and copier locations and any and all shared areas (i.e., workroom, storage room, etc.). All data/voice outlets shall be installed next to power outlets.

4. HVAC. 24/7/365 HVAC as previously described.

5. Window Coverings. Horizontal mini-blinds (no drapes) for each exterior window.

6. Power Circuits. Provide dedicated electrical power circuits for copiers, and minimum of 6 duplex receptacles with three dedicated 20-amp circuits and one 30-amp circuit for the server room.

7. Fire Extinguishers. DB Contractor shall provide fire extinguishers, per fire code and fire marshal with jurisdiction.

8. Insurance. Insurance (obtained and provided by DB Contractor) covering the use of the Project office by DB Contractor and TxDOT, in accordance with the terms of the underlying property use agreement with the property owner, but in no event shall the insurance be less than that required by the Agreement.

9. Vending Area. DB Contractor shall provide access to general building vending area.

10. Utilities. Initial installation and monthly expense of all utilities paid by DB Contractor except long-distance telephone service.

11. Emergency Contacts. 24-hour emergency contact to DB Contractor.

12. Furniture. DB Contractor-provided allowance of $15,000 in the Price for furniture, which shall be obtained by DB Contractor at the direction of TxDOT, and billed through DB Contractor. At the end of the Project, DB Contractor shall have ownership of the furniture and shall be entitled to the full salvage value of the furniture, with the right to retain or otherwise dispose of the furniture at its sole discretion, without any further accounting to TxDOT.

2.8.3 Field Offices

DB Contractor shall provide field office space for the exclusive use of TxDOT's field construction staff for the Project as specified herein. The field offices can be combined with the core office described in Section 2.8.2 as long as the combined offices meet the requirements of Sections 2.8.2 and 2.8.3.

Subject to TxDOT's prior written approval, DB Contractor shall provide separate facilities for TxDOT's resident engineer staff located within the same complex as DB Contractor's field office. Should DB Contractor elect to construct the Work using field offices other than the one specified, corresponding facilities shall be provided for TxDOT's exclusive use and shall be at least of the same quality as DB Contractor's counterpart management and field staff.

DB Contractor shall provide the field staff facilities at least ten (10) Business Days prior to starting any Work activity involving staff that will occupy the field staff facilities.

Office Condition. The field office(s) shall be in good and serviceable condition, at least of the same quality as those of DB Contractor's counterpart management and field staff, respectively, and available for occupancy as specified herein. Both Parties shall participate in a facility condition survey prior to and at the completion of occupancy. TxDOT shall return possession of DB Contractor-provided facilities to DB Contractor in essentially the same condition as when TxDOT occupied the facilities, except for reasonable wear and tear and except for alterations, loss, or damage caused by any member of DB Contractor-Related Entity.

Loss or Damage. If office space(s) or related facilities are destroyed, damaged or stolen during the Work, except as a direct result of willful misconduct of TxDOT or its personnel, DB Contractor shall, at its cost and within ten (10) Business Days after the occurrence of such destruction or damage, replace those items that it had provided or repair them to their original condition; however, in the case of lost, damaged, or stolen office equipment (e.g., computers, fax machines, copy machines, printers, etc.) necessary for normal office operations, replacement shall occur within two (2) Business Days. If loss or damage is caused as a direct result of willful misconduct of TxDOT or its personnel, DB Contractor shall replace the facilities noted herein within the timeframes specified herein, except that TxDOT shall reimburse DB Contractor for actual, reasonable, and documented costs incurred.

Office Facilities and Equipment. For the facilities it provides, DB Contractor shall:

1. General. Secure sites, obtain all site permits, install and pay for all utility services, and maintain the facilities as part of the Work.

2. Access and Security. Provide separate buildings or trailers for TxDOT staff that include at least two entrances/exits, providing an 8' x 10' (minimum) covered area, from each building or trailer. Each entrance/exit shall be secured with a door lock plus a deadbolt lock.

3. Lighting and Electricity. Include with all interior spaces overhead lighting meeting the requirements of the Occupational Safety and Health Administration (OSHA) and of building and electrical codes for office space. Each office space shall have at least two duplex receptacles. The minimum circuit capacity shall be twenty (20) amperes.

4. Janitorial and Trash Service. Provide daily janitorial service (except Saturdays, Sundays and Holidays) and maintain trash containers and trash pickup service. This will include, but not be limited to, sweeping and mopping floors, cleaning the toilet, and lavatory and emptying wastebaskets.

5. Exterior Maintenance. Maintain the exterior areas of office spaces, including access to parking areas.

6. Accessibility. Meet all access requirements of the Americans with Disabilities Act, as amended (42 USC §§12101, et seq.).

7. Utility Service. Provide potable water, sewer service, and electricity to the office facility.

8. HVAC. Provide heating, ventilation, and air conditioning (HVAC) systems capable of maintaining temperatures between 65 and 70 degrees Fahrenheit in all spaces through the year.

9. Code Requirements. Meet all local building and fire code requirements.

10. Disposal and Removal. Be responsible for disposal or removal of all DB Contractor-provided facilities and any site restoration Work as required.

Space Requirements. Although actual space requirements will depend upon Work schedule and geographic locations of the field offices, a typical field office should include the following elements:

1. Offices. Enclosed offices for TxDOT's construction representative, TxDOT-designated construction manager and three other TxDOT or contract employees (150 square feet each).

2. Offices/Cubicles. Offices or cubicles for up to ten (6) field engineer/inspection/ administration staff (64 square feet each).

3. Conference Rooms. Conference room (enclosed) (200 square feet)

4. Storage and Filing. Two (2) lockable spaces for storage and filing at each field office (a combined space of 150 square feet).

5. Surveying Equipment Storage. Clean inside storage space for surveying equipment (80 square feet).

6. Tool Shed. Shed for small tools and equipment (outside) (150 square feet).

7. Site Amenities. A well-graded site for the office with access road, parking area, and security fence with lockable drive-in gates sufficient to enclose the office and parking area.

8. Staff Parking Area. A parking area for at least ten (10) vehicles that is reasonably level (all-weather surface and all-weather access) within the boundaries of a security fence.

9. Visitor Parking Area. An all-weather level surface outside the security fence to accommodate visitor parking (all-weather surface and all-weather access-minimum of 1,000 square feet).

10. Security. A 24-hour security service or silent watchmen-type security system.

11. Exterior Lighting. Sufficient exterior security lighting that is automatically activated at low light levels to maintain two (2) foot-candles of lighting within the fenced field office site.

12. Window Security. Security bars on all windows.

13. Laboratory Facility. A completed facility suitable to accommodate a functioning portable lab (approximately 1,500 square feet).

14. Cultural Resources Storage. Sufficient space and covered facilities for any archeological or paleontological recovery operations (up to 200 square feet) if needed.

15. Kitchen/Break Room. Each field office shall contain a 200 sq. ft. kitchen with storage closet (25 sq. ft.), cabinets with drawers and counter tops.

16. Restrooms. Two restrooms including toilets and sinks.

17. First Aid Facilities. Emergency first aid facilities.

3 PUBLIC INFORMATION AND COMMUNICATIONS

3.1 General Requirements

DB Contractor shall assist TxDOT with public information activities to ensure that a consistent message is being distributed to the Customer Groups regarding the Project.

DB contractor shall assist TxDOT in working with residents, communities and neighborhoods within the general vicinity of the Project to mitigate construction impacts to the neighborhoods, particularly during Off-Peak Hours.

3.2 Administrative Requirements

3.2.1 Project Manager

The DB Contractor Project Manager shall assist TxDOT with public involvement activities throughout the Term of the Agreement.

3.2.2 Emergency Event Communications

For all Emergency events, such as vehicle collisions, ice/snow conditions, and Hazardous Material spills, the Project Manager shall take timely and appropriate action to inform TxDOT and appropriate Customer Groups of all pertinent details. The Project Manager shall provide these details through the use of appropriate tools to ensure effective communication. These tools include, but are not limited to: dynamic message signs (DMS), TxDOT's Highway Conditions Report, TxDOT Corpus District Office Highway Advisory Report, email/Web alerts, telephone notification, facsimiles, and media releases/interviews, as appropriate. The Project Manager shall continue to provide updated information, as available and on a timely basis, until the Emergency no longer exists.

In the event of an unforeseen Emergency, timely notification shall mean as soon as practicable, but in no event longer than within one hour of the occurrence. If advanced warning is available for an Emergency event such as ice/snow, timely notification shall mean as soon as practicable, but in no event longer than within one hour of the time the information is available. In both situations, the Project Manager shall continue to provide updated information, as available and on a timely basis, until the Emergency no longer exists.

3.2.2.1 Lane Closures

Subject to the lane closure restrictions set forth in Section 18 (Traffic Control), DB Contractor shall provide TxDOT and appropriate Customer Groups a minimum of two weeks advance notice for lane closures and/or traffic switches planned to be in effect longer than 24 hours, and a minimum of 48 hours advance notice for lane closures that are planned to be in effect less than 24 hours, using all appropriate tools as needed. The Project Manager shall input all lane closures (or an event that results in lane closures) into the TxDOT Highway Conditions Report.

For planned lane closures and Emergency event lane closures, as appropriate, DB Contractor shall coordinate lane closures that may affect crossing TxDOT facilities with appropriate TxDOT district and area offices, as needed, to ensure that no conflicts occur. DB Contractor shall provide advance notification of all lane closure notices to the appropriate TxDOT district and area office. TxDOT will provide appropriate contacts and information upon request.

3.2.3 Disseminating Public Information

DB Contractor shall assist TxDOT in preparing and distributing materials regarding Project-related subjects, using all appropriate methods, including, but not limited to: meetings, news releases, telephone correspondence, newsletters, email, hotlines, Highway Conditions Report, dynamic message signs, Web

alerts, maps, displays, renderings, presentations, brochures, pamphlets, highway advisory radio and video news releases.

4 ENVIRONMENTAL

4.1 General Requirements

The DB Contractor shall deliver the environmental commitments required by the RFP, Contract Documents, Environmental Laws, Governmental Entities, Governmental Approvals, and all applicable federal and state Laws and regulations in accordance with Good industry Practice. DB Contractor shall protect the Environment and document the measures taken during the performance of the Work to avoid and minimize impacts on the Environment from the design, construction, maintenance, operation, and rehabilitation activities of the Project.

The DB Contractor shall cause Work to comply with Environmental Approvals and compliance requirements for any additional actions throughout the Term of the Agreement. The DB Contractor shall monitor and document Work activities so that documents providing evidence for compliance are available to TxDOT for inspection at any time.

4.2 Environmental Approvals

4.2.1 New Environmental Approvals and Amended TxDOT-Provided Approvals

TxDOT-Provided Approvals are based on the Project schematic as presented in the Environmental Approvals. Such approvals may require re-evaluation, amendment, or supplement as the Work progresses or in order to accommodate actions not identified in the Environmental Approvals or covered specifically by existing resource agency coordination. Changes to the Project schematic or incorporation of Additional Properties into the Project shall require the validity of existing Environmental Approvals to be reassessed and may require new Environmental Approvals.

The DB Contractor shall be responsible for coordination with Governmental Entities necessary to obtain new Environmental Approvals or amendments to the TxDOT-Provided Approvals except where TxDOT has agreements with Governmental Entities to perform such coordination.

The DB Contractor shall be responsible for ensuring compliance with the conditions and schedules set forth in amendments to any TxDOT-Provided Approvals or new Environmental Approvals. TxDOT may, in its discretion, provide assistance in securing new Environmental Approvals or amendments to TxDOT-Provided Approvals.

4.2.2 Responsibilities Regarding Environmental Studies

DB Contractor shall be responsible for conducting continuing environmental studies based on the Project approved NEPA document and Project schematic.

DB Contractor shall be responsible for conducting environmental studies and re-evaluations caused by actions not identified in the Environmental Approvals, actions not covered specifically by existing resource agency coordination, or incorporation of Additional Properties into the Project. The DB Contractor shall be responsible for all coordination of environmental studies with appropriate Governmental Entities, except where TxDOT has agreements with Governmental Entities to perform such coordination.

4.2.3 TxDOT Review and Approval of DB Contractor Submissions

TxDOT reserves the right to review, comment on, require revisions to, and reject for resubmission documentation submitted for environmental compliance or Environmental Approvals. Documentation shall conform to current TxDOT submission standards and the requirements of all applicable Governmental Entities, laws, and regulations. TxDOT shall return approved documentation to the DB Contractor for submittal to the appropriate Governmental Entity in cases where the DB Contractor

performs coordination. TxDOT, acting reasonably, shall approve those submissions for which TxDOT signature or other approval is required. Documentation not meeting current submission standards or requirements of Governmental Entities will be returned to the DB Contractor, and shall be revised by the DB Contractor to meet standards or requirements.

4.2.4 TxDOT-Provided Approvals

The TxDOT-Provided Approvals are:

- US 77 FONSI dated 7/10/12 (including Biological Opinion dated 6/22/12)

4.3 Comprehensive Environmental Protection Program (CEPP)

As part of the PMP, the DB Contractor shall develop and implement a Comprehensive Environmental Protection Program, applicable throughout the Term of the Agreement to establish the approach, requirements and procedures to be employed to protect the environment. The CEPP shall be developed in the form of a comprehensive environmental management system incorporating all features and guidelines outlined in ISO 14001. All component parts shall reflect in order of priority: impact avoidance, minimization and as last resort mitigation. The CEPP shall satisfy applicable FHWA, TxDOT and resource agency requirements, including hose detailed as commitments in any Environmental Approvals.

The CEPP shall be the overarching system by which the DB Contractor shall cause environmental commitments made during the Environmental Approval and permitting processes, and other environmental requirements to be carried forward and reflected, as appropriate, in the design and implemented throughout the Work. The DB Contractor shall utilize the CEPP to track on-going issues, identify environmental compliances, non-compliances and identify actions required/taken to correct any such non-compliances.

At a minimum, the CEPP shall include the following component parts:

a) Environmental Management System (EMS)

b) Environmental Compliance and Mitigation Plan (ECMP)

c) Environmental Protection Training Program (EPTP)

d) Hazardous Materials Management Plan (HMMP)

e) Communication Plan (CP)

f) Construction Monitoring Plan (CMP)

g) Environmental team resumes

The dates by which component parts comprising the CEPP are to be submitted for TxDOT approval are set forth throughout these Technical Provisions. Amendments and updates to the CEPP as necessary to address changing conditions and environmental requirements shall be in accordance with the procedures for amendments to the PMP.

4.3.1 Environmental Management System (EMS)

The EMS shall be the overarching system by which the DB Contractor shall cause environmental commitments made during the Environmental Approval and permitting processes, and other environmental requirements to be carried forward and reflected, as appropriate, in the design and implemented throughout the Work. The DB Contractor shall utilize the EMS to track on-going issues, identify environmental compliances, non-compliances and identify actions required/taken to correct any such non-compliance.

The EMS shall establish a schedule for periodic CEPP review to ensure it is up to date. The EMS shall provide a means to track the reviews and results. At a minimum, the EMS shall require documents in the following list to be on file at the Site and available at any time for TxDOT review:

a) CEPP component parts

b) Weekly Environmental Monitoring Reports

c) Investigative Work Plans, Site Investigation Reports, and Remedial Action Plans as necessary for hazardous material discovery/remediation

d) Wetlands Delineations and appropriate Section 404 Permit Application if changes to the design or temporary construction impacts are necessary

e) Mitigation or resource monitoring reports, as required by resource-specific mitigation plans

f) Designs for wetland and floodplain mitigation

g) TPDES Construction General Permit (TXR150000), Notice of Intent

h) TPDES Construction General Permit (TXR150000), Notice of Termination for Work completed

i) Storm Water Pollution Prevention Plan (SW3P) and amendments, as required to reflect Project development and staging, including off-site plans, controls and reporting from borrow sites, waste sites, and plant location sites

j) Completed Permit applications and permits as issued

k) Pre-Construction Inspection Report

l) Training Documentation

m) DB Contractor's final noise analysis, if different than that included in the TxDOT-Provided Approvals

n) Environmental Permits, Issues, and Commitments (EPIC) Sheets

4.3.2 Environmental Compliance and Mitigation Plan (ECMP)

The ECMP shall document and fully detail compliance strategies and procedures to be employed to cause Work performance in accordance with requirements of applicable Environmental Laws and Environmental Approvals. This plan shall establish and/or document schedules, protocols, and methodologies to be used in accomplishing Work, with an emphasis on monitoring, reporting, corrective actions and adaptive management. The plan shall include a Compliance Action Plan (CAP). The CAP shall consist of a decision making matrix which will define the triggers for initiating or re-initiating environmental compliance actions for construction and maintenance activities including construction noise mitigation measures and the triggers for initiating mitigation measures. For each trigger, the CAP shall identify the appropriate type or level of environmental study or other compliance action necessary to ensure the ongoing validity of Project Environmental Approvals and commitments. In addition, the ECMP shall detail any mitigation required by Environmental Approvals and the DB Contractor's approach to satisfying mitigation requirements, including mitigation requirements identified after completion of the ECMP.

The ECMP shall include the following components:

- Environmental Permits, Issues, and Commitments (EPIC) Sheets

The DB Contractor shall develop and maintain EPIC construction plan sheets. Applicable permits and environmental commitments shall be identified on EPIC sheets and updated throughout the construction period to identify on-Site conditions.

The State shall ensure that EPIC sheets shall include the Environmental Commitments required to ensure that any discharge from the Project site into a sanitary sewer system complies with appropriate codes and standards of the sanitary sewer owner.

- **Clean Water Act - Sections 404 and 401: Waters and Wetlands of the United States**

The DB Contractor shall document how they will comply with the terms and conditions for Section 404 permit(s) issued to TxDOT by the USACE (U.S. Army Corps of Engineers) and associated Section 401 State Water Quality Certification(s) as administered by the TCEQ (Texas Commission on Environmental Quality) as well as any additional Section 404 permits and 401 certifications issued to the DB Contractor during the life of the Project. The documentation at a minimum shall include:

a) Process for training personnel to recognize Waters of the U.S. that fall under the jurisdiction of the USACE,

b) Process for communicating the terms and conditions of all USACE 404 permits and TCEQ 401 certifications and other permits as necessary,

c) Procedures for carrying out any required mitigation,

d) Procedures for handling off-right-of-way Project Specific Locations (PSL) as required by all Section 404 permit(s) issued to either TxDOT or the DB Contractor by the USACE.

- **Clean Water Act - Sections 402: Texas Pollutant Discharge Elimination System (TPDES)**

The DB Contractor shall document how they will comply with Section 402 of the CWA. The documentation shall include that the DB Contractor has day-to-day operational control over activities necessary to ensure compliance with the Storm Water Pollution Prevention Plan (SW3P) and has the sole responsibility for any potential non-compliance issue. The documentation shall also include that the DB Contractor is responsible for submitting a Notice of Intent (NOI) to TCEQ. The documentation at a minimum shall include:

a) Process for training personnel on the requirements and conditions of the Texas Construction General Permits for Storm Water Discharges from Construction Sites (CGP),

b) Procedures for incorporating Additional Properties outside the original NEPA approved schematic and any off- right-of-way PSL within one linear mile of the project limits to comply with the CGP and the project's SW3P,

c) Procedures for handling non-compliance issues,

d) Escalation procedures for SW3P items.

- **State Listed Species and Unregulated Habitat**

DB Contractor shall document how they will address state listed species and unregulated habitat. The documentation shall be in agreement with all MOU's and MOA TxDOT has with the Texas Parks and Wildlife Department (TPWD) including the requirement for coordination with TPWD to be conducted by TxDOT. The documentation at a minimum shall include:

a) Process for communicating any commitments regarding state listed species and unregulated habitat,

b) Procedures for complying with any commitments addressed in the NEPA Environmental Assessment Document, the MOUs between TxDOT and TPWD and coordination agreements with USFWS.

- **Endangered Species Act and Fish and Wildlife Coordination Act**

DB Contractor shall document how they shall comply with the Endangered Species Act (ESA) and the Fish and Wildlife Coordination Act (FWCA). The documentation shall reflect that coordination with U.S. Fish and Wildlife Service (USFWS) shall be conducted by TxDOT. The documentation at a minimum shall include:

a) Process for training personnel on the requirements of the ESA and FWCA,

b) Process for communicating any commitments regarding ESA and FWCA on the Project,,

c) Procedures for complying with any commitments including mitigation measures or activities.

- Traffic Noise

The DB Contractor shall document how they will address traffic noise mitigation. The documentation at a minimum shall include:

a) Process for carrying out noise mitigation measures as identified and discussed in the approved NEPA document schematic and any supplemental noise studies completed by DB Contractor,

b) Process for carrying out noise mitigation measures determined throughout the life of the project,

c) Process to handle changes that may occur to proposed permanent noise mitigation in the approved NEPA document and schematic.

To fulfill the commitments of the previously mentioned TxDOT-Provided approvals the DB Contractor shall be responsible for implementing all noise mitigation measures to minimize construction and long-term impacts of the Work as prescribed in TxDOT-Provided approvals and subsequent TxDOT-Provided approvals secured by the DB Contractor. The DB Contractor acknowledges that TxDOT-Provided approvals and proposed permanent noise mitigation are based on the schematic design and Schematic ROW; consequently the proposed permanent noise mitigation may require amending by the DB Contractor as the Work progresses. Such amendments shall be submitted to TxDOT for review and approval.

DB Contractor shall be responsible for public notification and involvement per TxDOT Guidelines for Analysis and Abatement of Highway Traffic noise and in accordance with Section 3 of the Technical Provisions. DB Contractor shall allow fifteen (15) Days for adjacent affected property comments after each noise workshop.

DB Contractor shall be responsible for all coordination with adjacent property owners and Governmental Entities necessary to obtain all such amendments to TxDOT-Provided Approvals and for ensuring compliance with the conditions and schedules set forth in the amendment of any TxDOT-Provided Approvals.

- **Water Well Impacts and Requirements**

DB Contractor shall document how they will address wells (such as municipal, domestic, irrigation, oil and gas, or monitoring and observations wells) encountered during the life of the project. The documentation shall include that the DB Contractor is responsible for plugging and abandoning all wells in accordance with Item 103, Disposal of Wells, from TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, as well as the DB Contractor is responsible for any required remediation efforts. The documentation at a minimum shall include:

a) Process for training personnel on recognition of wells,

b) Procedures for handling wells,

c) Procedures for handling contamination of a well that results from the DB Contractor's work. Procedures shall include a requirement to notify TxDOT and with TxDOT's concurrence notify appropriate regulatory agency within 24 hours of the discovery.

- **Cultural Resource Studies**

DB Contractor shall be responsible for ensuring compliance with cultural resource Laws on the Project through the Term of the Agreement. TxDOT shall perform consultation for the Project according to current procedures for implementing Section 106 of the National Historic Preservation Act, and the Antiquities Code of Texas.

Subsequent to issuance of NTP1, DB Contractor shall be responsible for performing any necessary cultural resource surveys, evaluations, testing, and mitigation in those areas outside the footprint of the Project ROW shown on the schematics as defined in the original NEPA Approval and within the area of potential effects. The DB Contractor shall coordinate all necessary Antiquities Permits through TxDOT. Antiquities Permits shall be obtained from the Texas Historical Commission (THC) for archeological surveys, testing, monitoring, and data recovery.

DB Contractor shall document efforts to avoid impacts to cultural resources. that are listed on or determined to meet the eligibility criteria for listing to the National Register of Historic Places (NRHP) as specified in 36 CFR 60.4, or that are designated or determined to meet the criteria for designation as State Archeological Landmarks as specified in 13 TAC 26.8.

If evidence of a possible historic property is encountered during the course of the Work, the DB Contractor shall immediately cease Work in the immediate area and contact TxDOT to initiate post-review discovery procedures under the provisions of the PA among TxDOT, SHPO, FHWA, and ACHP as well as the MOU between TxDOT and the THC. The DB Contractor shall undertake appropriate measures to protect the site from further intrusion to the extent feasible until an appropriate evaluation of the site can be made by a qualified representative. Work shall not be resumed in the area until the DB Contractor receives notification and approval from TxDOT.

- **Public Involvement**

DB Contractor shall document how they will comply with all public involvement requirements, including public involvement requirements specifically related to cultural resources. The documentation shall comply with all applicable requirements including, but not limited to, 43 TAC §2.4, Section 106 of the National Historic Preservation Act (36 CFR 800), Chapter 26 of the Texas Parks and Wildlife Code, the Civil Rights Act of 1964, and the Civil Rights Restoration Act of 1987. The documentation shall include that the DB Contractor is responsible for conducting all public involvement requirements for the life of the project except where TxDOT has agreements with Governmental Entities to perform public involvement requirements. The documentation at a minimum shall include:

a) Process for handling public involvements requirements,

b) Procedures for documenting public involvement.

- **Standard Operating Procedures**

DB Contractor shall develop standard operating procedures for the following activities and include them in the ECMP:

a) Controlling dust during construction;

b) Mitigating vibration during construction;

c) Mitigating light intrusion on adjacent properties; and

d) Complying with jurisdictional waters and wetlands permits.

e) Complying with ESA/FWCA and implementing mitigation measures specified for Ocelots habitat mitigation.

f) Identifying and protecting Slender Rush Pea and South Texas Ambrosia plant communities that occur within the project area in accordance with USFWS coordination requirements..

g) Complying with ESA/FWCA and implementing mitigation measures for protection of Slender Rush Pea and South Texas Ambrosia plant communities necessary for environmental clearance under NEPA EA Document.

4.3.3 Environmental Protection Training Program (EPTP)

The DB Contractor shall develop and implement an Environmental Protection Training Program that shall meet the minimum requirements set forth herein. The EPTP shall include methods and procedures documented in the ECMP to:

a) Educate every worker to:

- Recognize the overall importance of environmental issues to constructing, operating and maintaining a successful Project.
- Recognition of Federally Listed Species that could occur in the project area.
- Appreciate the various environmental sensitivities of the Project.

b) Train every worker to:

- Recognize environmentally sensitive resources that may be encountered during the Work.
- Avoid or take appropriate action to minimize environmental impacts from the Work.
- Know the required actions, practices, and procedures regarding regulated resources.
- Understand protocols for meeting environmental commitments for post-review discoveries.

c) Foster the DB Contractor's management and supervisory personnel's attitude of commitment to the Project's environmental quality.

d) Convey to all workers, the DB Contractor's management commitment to the Project's environmental quality.

e) Convey to all workers, TxDOT's and the DB Contractor's commitment to zero tolerance for violations.

4.3.3.1 EPTP Scope and Content

The goal of the EPTP is to educate Project personnel about the following:

a) Overall importance of environmental protection to the Project

b) Compliance responsibility and Governmental Entity authority including background and environmental issues regulatory overview.

c) Overview of the DB Contractor’s environmental commitments and responsibilities at the Project level.

d) Worker responsibilities.

e) Wetlands and jurisdictional waters of the U.S. identification.

f) Environmental Approvals terms and conditions including an overview of the provisions of the ESA, Migratory Bird Treaty Act, and Stormwater Pollution Prevention Program (SW3P).

g) BMPs for environmental compliance, including pollution prevention, erosion, sedimentation, post construction controls, and dust control measures to maintain water and air quality.

h) Required mitigation measures for ESA/FWCA compliance.

i) Procedures and precautions in the event of spills of or discovery of Hazardous Materials or unknown chemicals or contamination.

j) Procedures and precautions in the event human skeletal remains or other archeological or paleontological resources are discovered.

k) Procedures regarding the relocation of historical markers (i.e. Texas Historic Commission Subject Markers, Texas Centennial Markers, Texas Highway Department Markers, and local/county markers).

l) Groundwater protection requirements.

m) CWA regulations and surface water protection requirements.

n) Overview of noise and residential impact reduction procedures.

o) Air quality requirements.

p) Penalties and/or fines for violations of and noncompliance with Environmental Approvals and Environmental Laws, including termination of employment.

DB Contractor shall submit to TxDOT for review and approval course outlines containing learning objectives designed to achieve stated goals and suggested staff attendance for all anticipated training requirements through the Term of the Agreement. Course outlines shall be submitted within ninety (90) Days after NTP1.

4.3.4 EPTP Participation

DB Contractor shall require all non-administrative employees to participate in the EPTP and shall keep accurate records documenting attendance, as well as materials presented.

4.3.4.1 EPTP Schedule

DB Contractor shall include activities for implementation of the EPTP in the Project Schedule. The length of training sessions and their frequency shall be sufficient to achieve the goals set forth above. Periodic training sessions at key times (e.g., prior to construction or major maintenance in sensitive areas or construction timing restrictions to protect threatened and/or endangered species) shall be used to update workers on specific restrictions, conditions, concerns, and/or requirements.

4.3.5 Hazardous Materials Management Plan (HMMP)

DB Contractor shall prepare an HMMP for the safe handling, storage, treatment and/or disposal of Hazardous Materials, whether encountered at or brought onto the Project Site by the DB Contractor, encountered or brought onto the Project site by a third party, or otherwise, during the Term of the Agreement. The DB Contractor shall submit the final Hazardous Materials Management Plan to TxDOT for review and approval in its good faith discretion within sixty (60) Days of NTP1; approval of the Plan by TxDOT shall be a condition of commencement of Construction Work.

The Hazardous Materials Management Plan shall include procedures compliant with all applicable Environmental Laws and include, at a minimum:

a) For all chemicals to be used on the Project, the DB Contractor shall keep and update Material Safety Data Sheets (MSDS), per OSHA requirements, for the Term of the Agreement.

b) Designated individuals responsible for implementation of the plan,

c) Procedures for identifying and documenting potential contaminated sites which might impact Project development,

d) Procedures for mitigation of known contaminated sites anticipated to impact construction,

e) Procedures for mitigation of unanticipated contaminated sites encountered during construction,
f) Procedures for mitigation of contamination during the operation and maintenance of the Project,
g) Procedures for developing a detailed Spill Response Plan for the Term of the Project,
h) Process for training personnel for responding to and mitigating Incidents involving contamination or waste
i) Provisions for appropriate storage and disposal of all waste encountered or disposed of on the Project for the Term.
j) Provision for a Hazardous Materials training module as an Element of the EPTP component of the CEPP.
k) Procedures for preparing an Investigative Work Plan (IWP) and Site Investigative Report (SIR) in the event that Hazardous Materials are discovered during construction; operations or maintenance activities.
l) Identification and contact information for designated responsible individuals.
m) Procedure for notifying TxDOT within 2 hours of discovering Hazardous Materials

The HMMP shall include provisions for making all on-Site workers aware of and able to recognize the potential Hazardous Materials to which they may be exposed, limiting Contractors and other Site workers' exposure to Hazardous Materials and providing all necessary personal protection equipment to protect workers from exposure. The HMMP shall require DB Contractor to provide any non-DB Contractor personnel who visit the Project with the appropriate personal protection equipment.

The HMMP shall require that all personnel of DB Contractor-Related Entities handling Hazardous Materials be trained and certified at least to the minimum requirements established under the current guidelines of OSHA 1910.120 (HAZWOPER Training).

Further, the HMMP shall include procedures for ensuring that all applicable certifications, licenses, authorizations and Governmental Approvals for DB Contractor personnel handling Hazardous Materials are current and valid through the duration of the Work.

4.3.5.1 Investigative Work Plans (IWP) and Site Investigation Reports (SIR)

If Hazardous Materials are encountered within any of the Project ROW or Additional Properties used as DB Contractor's staging area, field office site, plant sites, borrow site, or stockpile location, DB Contractor shall prepare an investigation work plan that addresses the methods, techniques, and analytical testing requirements to adequately characterize the extent of the contaminated media (soil and/or groundwater) potentially impacting the Project. DB Contractor shall locate and assess the likely source of contamination.

A Registered Professional Engineer and other qualified professionals, as needed, shall prepare the IWP and other necessary reports in accordance with applicable, relevant or appropriate Laws and guidance.

Upon satisfactorily completing the investigative work, DB Contractor shall summarize the findings within a Site Investigation Report and make recommendations regarding potential response actions necessary for Project development. DB Contractor shall take Hazardous Materials contamination into account during all subsequent phases of Project development, including Additional Properties negotiation and acquisition, property management, design, and construction.

The Site Investigation Report shall address the characterization of the impacted area; sampling efforts and findings; opportunities to avoid the contamination by adjusting the design; level of response action warranted if the contamination cannot be avoided; feasibility of initiating response actions prior to construction; pursuit of cost-reimbursement from responsible parties; the need for completing response actions concurrent with construction and nature of any special specifications and provisions necessary for incorporation into the Project.

DB Contractor may initiate a preventative or corrective action after TxDOT review and approval of the Site Investigation Report from appropriate Federal or State agencies.

4.3.6 Communication Plan (CP)

The DB Contractor shall develop a CP which describes in detail the communication hierarchy for information distribution related to the compliance with the CEPP. The CP will include names and contact information, including emergency contact information, and the preferred methods of routine, and emergency communication distribution.

4.3.7 Construction Monitoring Plan (CMP)

The CMP shall identify times, locations, and other conditions where monitoring of construction activities are to be performed to maintain and cause compliance with Environmental Laws, Environmental Approvals, and the Contract Documents. The CMP shall establish and/or document schedules, protocols and methodologies to be used for monitoring Work with an emphasis on timely reporting, corrective actions and adaptive management. The CMP shall establish reporting procedures, identify reporting requirements and establish controls for report distribution and records retention. All Environmental Monitoring Reports shall be made available for review by TxDOT at TxDOT's request. Should any non-compliance or violation be observed that represents an imminent danger to human health or the environment, the CMP shall include procedures to cause immediate notification of TxDOT.

Prior to NTP2, DB Contractor and TxDOT shall jointly inspect existing facilities, structures, and environmentally sensitive areas in the vicinity of the Site but not included as part of the Work. DB Contractor shall provide a minimum 2-week advance notice to TxDOT of this joint inspection. The inspection shall document the pre-construction condition of vegetation, streets, sidewalks, landscaping, residential and commercial property, creeks, storm drainage and infrastructure. The purpose of the inspection is to provide a point of reference from which TxDOT can determine if any facility, structure and environmentally sensitive area damaged during the Work is restored to its pre-construction condition. DB Contractor shall document the inspection with a report that shall include photographs, sketches, maps, and narratives clearly depicting the pre-construction Site condition.

All photographs shall be archival quality and shall be accompanied by a caption describing the date; time of day; location and direction in photograph was taken. If the photograph shows existing damage, the damage must be clearly shown and noted in the caption. All sketches and maps must be no larger than 11"x17". All photographs must be 4"x6".

The post award inspection shall inspect the municipal separate storm sewer system located within and adjacent to the Site. During the inspection, DB Contractor shall note the following:

a) Storm drains, culverts, swales, and other components of the municipal separate storm sewer system that DB Contractor verified as free of floatable trash, silt, debris, and functioning as originally intended.

b) Storm drains or culverts that do not function or appear not to function as originally intended.

c) Siltation of culverts, concrete swales, and other components of the municipal separate storm sewer system.

d) The presence of construction on adjacent, up-gradient, or down-gradient properties. If construction on other properties is noted, DB Contractor shall photographically document the general condition of these properties and their compliance with storm water regulations.

e) Pre-existing off-site tracking from the Site or surrounding properties.

f) Potential pre-existing contamination (i.e., any areas of soil discoloration or distressed vegetation).

g) Any other pre-existing condition that, by its nature, could be construed as a violation of the TPDES General Construction Permit.

Following construction of the Project, DB Contractor shall conduct a yearly inspection to monitor and repair any of the above mentioned deficiencies in the storm water system.

4.3.8 Recycling Plan

Not Applicable

4.4 Environmental Personnel

DB Contractor, acting through the Environmental Compliance Manager (ECM), shall designate an Environmental Team (ET), as detailed in this section, to prevent, minimize, and/or correct any violation of or noncompliance with Environmental Approvals. The ET shall include, on an as-needed basis, Environmental Training Staff, Environmental Compliance Inspectors (ECIs), a Natural Resource Biologist, a Water Quality Specialist, and a Hazardous Materials Manager. All of the ET shall be deemed other principal personnel. If a cultural background study reveals a high probability of encountering cultural resources, the ET shall also include an archeologist, architectural historian, historian or historical architect on an as-needed basis.

In the CEPP, DB Contractor shall establish a detailed approach, procedures and methods for:

a) Staffing and availability of ECM and all ET personnel.

b) ET staff response times during the Work.

4.4.1 Environmental Compliance Manager (ECM)

DB Contractor shall designate a full-time ECM for the Work. The ECM shall report and coordinate all issues directly with TxDOT and the DB Contractor's Project Manager. In the event the ECM, in consultation with DB Contractor's Project Manager and TxDOT, is unable to reach satisfactory resolution of environmental issues, the ECM shall provide written notification to the DB Contractor and TxDOT outlining the concerns, actions taken in attempt to correct the concerns, and provide a recommendation as to the suggested course of action.

The ECM shall direct the work of the ET and shall monitor, document, and report the current status of environmental compliance for the Work. The ECM shall report immediately to TxDOT and the DB Contractor any violation or non-compliance and shall include with any such report, the appropriate recommendations for corrective action including stoppage of Work.

The ECM shall coordinate with TxDOT, the DB Contractor, and appropriate Governmental Entities. The ECM shall submit all necessary environmental documentation and monitoring reports to the appropriate Governmental Entities and when applicable, through TxDOT, to the extent necessary to maintain compliance with applicable Environmental Approvals.

DB Contractor shall not have the ability to relieve the ECM of his or her duty without the written consent of TxDOT. Should DB Contractor desire to replace ECM, DB Contractor shall submit to TxDOT the resume of a replacement candidate. The replacement candidate shall be available fulltime within thirty (30) Days after delivery of TxDOT's written acceptance. In the absence of the Environmental Compliance Manager, DB Contractor's Hazardous Materials Manager shall act as an interim Environmental Compliance Manager.

The ECM candidate shall have at least five years experience successfully managing environmental compliance of rural freeway construction. The qualifying experience used to evaluate an ECM candidate must include the following experience:

a) Developing and managing a storm water pollution prevention plan;

b) Developing and managing a hazardous substance and petroleum products management plan;

c) Implementing environmental mitigation plans;

d) Providing environmental and personal protection training; and

e) Monitoring compliance with Section 404 Permit conditions.

The Environmental Compliance Manager's qualifying experience must demonstrate the Manager is familiar with:

a) The scope and terminology of ASTM E 1527-05, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*,

b) Provisions of the TPDES Construction General Permit (TXR 150000), and

c) Requirements of Section 404 and permit provisions.

4.4.2 Environmental Training Staff

Under the direction of the ECM, the environmental training staff shall develop, schedule and conduct environmental awareness and environmental compliance training for the DB Contractor's personnel. All training shall be in accordance with the requirements set forth in Section 4.2.3. Environmental Training Staff members shall have at least one year of experience providing environmental compliance inspection for freeway construction.

4.4.3 Environmental Compliance Inspectors (ECI)

The ECM shall designate as needed ECIs, who shall conduct on-Site environmental monitoring, prepare documentation, and report to the ECM daily all violations, compliance, and noncompliance with Environmental Approvals.

The ECIs shall report immediately to the ECM any violation or non-compliance and shall include with any such reports, the appropriate recommendations for corrective action, including, but not limited to stoppage of Work.

The ECIs shall have at least one year operational control experience of Storm Water Pollution Prevention Plan activities.

4.4.4 Cultural Resource Management Personnel

The ECM shall designate as needed an Archeologist, Architectural Historian, Historian, and/or Historical Architect to provide expertise in monitoring impacts to cultural resources during the course of the Work.

The Cultural Resource Management Personnel shall meet the certification requirements of TxDOT Work Category, 2.8.1, "Surveys, Research and Documentation of Historic Buildings, Structures, and Objects", 2.9.1, "Historic Architecture", 2.10.1, "Archeological Surveys, Documentation, Excavations, Testing Reports and Data Recovery Plans", and 2.11.1, "Historical and Archival Research", as applicable.

4.4.5 Natural Resource Biologist

The ECM shall designate as needed a Natural Resource Biologist to provide expertise in identifying and monitoring impacts on USFWS Federally Listed Species and general wildlife and the natural environment during the course of the Work.

The Natural Resource Biologist shall meet the certification requirement of TxDOT Work Category 2.6.1, "Protected Species Determination (Habitat)" and 2.6.3, "Biological Surveys".

4.4.6 Water Quality Specialist

The ECM shall designate as needed a Water Quality Specialist to provide expertise in permitting delineation, stormwater pollution prevention, and the protection of jurisdictional waters during the course of the Work.

The Water Quality Specialist shall have verifiable experience implementing Storm Water Pollution Prevention Plans and be able to demonstrate a working knowledge of the Texas Pollutant Discharge Elimination System and MS4 permit requirements applicable to the Project.

The Water Quality Specialist shall meet the certification requirements of TxDOT Work Category 2.4.1, "Nationwide Permit" and TxDOT Work Category 2.3.1, "Wetland Delineation".

4.4.7 Hazardous Materials Manager

The ECM shall designate as needed a Hazardous Materials Manager to provide expertise in the safe handling of Hazardous Materials required to perform the Work and those that may be discovered/impacted during the duration of the Agreement. The Hazardous Materials Manager shall conduct appropriate activities such as the following:

a) Schedule and/or conduct training for the DB Contractor's employees.

b) Verify all employee certifications prior to and required for any handling of Hazardous Materials.

c) Maintain records of all incidents involving Hazardous Materials and notify the ECM, TxDOT and appropriate authorities in writing of any such incidents.

The Hazardous Materials Manager shall be a qualified professional with 40-hour HAZWOPER certification and at least five years experience in similar projects in the following areas:

a) Experienced in developing IWPs, SIRs, and remedial action plans or equivalent reports necessary and acceptable to the TCEQ in material discovery and remediation efforts of Hazardous Materials.

b) Experienced in TCEQ guidance for the investigation and remediation of Hazardous Materials under the TCEQ Voluntary Cleanup Program and Texas Risk Reduction Program Rules.

The Hazardous Materials Manager shall meet the certification requirements of TxDOT Work Category 2.13.1, "Hazardous Materials Initial Site Assessment."

4.5 Property Access

To fulfill the obligation of the TxDOT-Provided Approvals to maintain current access during and after construction, DB Contractor shall make reasonable efforts to minimize the inconvenience to vehicles, bicycles and pedestrians during the Term of Agreement. The DB Contractor shall maintain access to adjacent properties during construction and ensure that visibility of businesses is maintained.

4.6 Dust Control

DB Contractor shall institute dust control measures to minimize air quality impacts. The measures shall be adjusted as necessary based on construction traffic, forecasted wind speeds, and persistent dry weather conditions.

4.7 Asbestos Containing Material (ACM)

DB Contractor shall identify, inspect, notify, amend notifications as necessary, pay notification fees and abate asbestos found on any existing structure to be modified by DB Contractor, including but not limited to bridges and buildings, in accordance with appropriate or relevant regulations or guidance.

5 THIRD PARTY AGREEMENTS

5.1 General Requirements

TxDOT has existing agreements with local Governmental Entities along the Project corridor that define the requirements for construction, maintenance, and operation of traffic signals, illumination, and roadway maintenance. These agreements specify the local Governmental Entities responsibilities and TxDOT's responsibilities with respect to the requirements and are provided in the Reference Information Documents.

For the purpose of the Agreement, DB Contractor will assume and execute TxDOT's responsibilities and duties as defined in the current and future agreements. DB Contractor is responsible for providing TxDOT and Governmental Entities with all information necessary for it to fulfill TxDOT's responsibilities under these agreements.

In accordance with current and subsequent agreements requiring TxDOT to reimburse the local Governmental Entity for their role in operating and/or maintaining certain facilities, DB Contractor shall reimburse TxDOT the said costs. DB Contractor shall make payment to TxDOT within 30 days from receipt of TxDOT's request for payment.

5.2 Traffic Signals

not applicable

5.2.1 Red Light Cameras

not applicable

5.3 Roadway Illumination

Some local Governmental Entities may request continuous illumination along the frontage roads within the Project limits. Should this occur, additional agreements between TxDOT and the Governmental Entity will be required. DB Contractor shall coordinate with and provide reasonable accommodations to the third party to carry out the installation, operations and maintenance obligations as specified in such agreements.
Design and construction of additional illumination by the DB Contractor will be treated as TxDOT-Initiated Change Order.

For sections of continuous lighting specified by these additional agreements, safety lighting including in that section is considered a component of the overall system and responsibilities for said safety lighting shall be those in the terms of the additional agreement.

New construction or modifications to the existing illumination are defined in Section 16 (Signing, Delineation, Pavement Marking, Signalization, and Lighting).

5.4 Other Affected Third Parties

When Work interfaces with other third party facilities, DB Contractor is responsible for coordinating the Work with all third parties potentially affected by the Work. DB Contractor shall prepare a plan, the Affected Third Parties Plan, which describes how the DB Contractor will mitigate the impact of the Work upon potentially impacted third parties, for TxDOT's review prior to initiating discussions with potentially impacted third parties.

6 UTILITY ADJUSTMENTS

6.1 General Requirements

A number of existing Utilities are located within or in the vicinity of the Project ROW, some pursuant to statutory rights and some pursuant to property rights. Certain of those existing Utilities will need to be relocated or otherwise adjusted in order to accommodate the Project. This Section 6 establishes procedures and requirements for Utility Adjustments including such processes as coordination with Utility Owners, administration of the engineering, construction and other activities necessary for Utility Adjustments, and required documentation. This Section 6 references certain TxDOT forms for DB Contractor's use in Utility Adjustments. Copies of those forms are included in Attachment 6.1, Utility Forms. Except as otherwise provided in this Section 6 or directed by TxDOT, whenever a TxDOT form is provided, DB Contractor shall prepare all forms of the same type using the TxDOT form and is required to notify TxDOT of all changes to the forms for TxDOT's approval prior to execution by the Utility Owner.

DB Contractor shall cause all Utility Adjustments necessary to accommodate construction, operation, maintenance and/or use of the Project. TxDOT will assist DB Contractor in the Utility Adjustment process, to the extent described in the Contract Documents. Some Utility Adjustments may be performed by the Utility Owner with its own forces and/or contractors and consultants (i.e., Owner-Managed); all others shall be performed by DB Contractor with its own forces and/or Contractors and consultants (subject to any approval rights required by the Utility Owner for those working on its facilities) (i.e., DB Contractor-Managed). The allocation of responsibility for the Utility Adjustment Work between DB Contractor and the Utility Owners shall be specified in the Utility Agreements as described in Section 6.1.3.

DB Contractor's obligations regarding reimbursement to Utility Owners for eligible costs of Utility Adjustment Work, and DB Contractor's obligations regarding the accommodation of Utilities from and after the Service Commencement Date, are set forth in Section 6.7 of the Agreement.

This Section 6 does not address Utility services to the Project. Utility services to the Project shall be the subject of separate agreements between DB Contractor and Utility Owners.

6.1.1 When Utility Adjustment is Required

A Utility Adjustment may be necessary to accommodate the Project for either or both of the following reasons: (a) a physical conflict between the Project and the Utility, and/or (b) an incompatibility between the Project and the Utility based on the requirements in Section 6.2.1 (Standards), even though there may be no physical conflict. The physical limits of all Utility Adjustments shall extend as necessary to functionally replace the existing Utility, whether inside or outside of the Project ROW. Section 6.2.4.2 (Acquisition of Replacement Utility Property Interests) contains provisions that address the acquisition of easements for Utilities to be installed outside of the Project ROW.

Utilities may remain in their existing locations within the Project ROW if (a) the requirements of Section 6.2.1 (Standards) are met, and (b) the existing location will not adversely affect the construction, operation, safety, maintenance and/or use of the Project and Utility. The Utility Owner must agree to its facilities remaining in its existing location.

Existing utilities that cross the ROW and are located on an existing compensable property interest may be allowed to occupy the existing compensable property interest and cross at less than 90 degrees, up to 30 degrees, measured from the highway centerline station. The crossing may not bisect or cross through any connecting roadway intersection or other major highway design feature and must meet the requirements of the UAR, other than the 90 degree reference above. The affected Utility Owners must agree and approve all proposed Utility Adjustment plans.

6.1.2 Certain Components of the Utility Adjustment Work

6.1.2.1 Coordination

DB Contractor shall communicate, cooperate and coordinate with TxDOT, the Utility Owners and potentially affected third parties, as necessary for performance of the Utility Adjustment Work. DB Contractor shall be responsible for preparing (unless prepared by the Utility Owner) and securing execution (by DB Contractor and the Utility Owner) of all necessary Utility Agreements.

All Utility Agreements must be approved by TxDOT prior to taking effect.

6.1.2.2 Betterments

Replacements for existing Utilities shall be designed and constructed to provide service at least equal to that offered by the existing Utilities, unless the Utility Owner specifies a lesser replacement. Utility Enhancements are not included in the Work; however, any Betterment work furnished or performed by DB Contractor as part of a Utility Adjustment shall be deemed added to the Work, on the date the Utility Agreement providing for same becomes fully effective. DB Contractor shall perform all coordination necessary for Betterments.

6.1.2.3 Protection in Place

DB Contractor shall be responsible for Protection in Place of all Utilities impacted by the Project as necessary for their continued safe operation and structural integrity and to otherwise satisfy the requirements described in Section 6.2.1 (Standards). The Utility Owner must agree to all Protection in Place work that pertains to Utility Owner's facilities.

6.1.2.4 Abandonment and Removal

DB Contractor shall make all arrangements and perform all work necessary to complete each abandonment or removal (and disposal) of a Utility in accordance with the requirements listed in Section 6.2.1 (Standards), including obtaining Governmental Approvals and consent from the affected Utility Owner and any affected landowner(s), or shall confirm that the Utility Owner has completed these tasks. Abandonment of Utilities in place shall require approval by TxDOT.

6.1.2.5 Service Lines and Utility Appurtenances

Whenever required to accommodate construction, operation, maintenance and/or use of the Project, DB Contractor shall cause Service Line Adjustments and Utility Appurtenance Adjustments. The Service Lines shall have a definitive point of termination such as a meter or point of sale. On completion of these, DB Contractor shall cause full reinstatement of the roadway, including reconstruction of curb, gutter, sidewalks, and landscaping, whether the Utility Adjustment Work is performed by the Utility Owner or by DB Contractor.

6.1.2.6 Early Adjustments

Not applicable

6.1.3 Agreements Between DB Contractor and Utility Owners

Except as otherwise stated in this Section 6 or in the Agreement, each Utility Adjustment shall be specifically addressed in a Project Utility Adjustment Agreement (PUAA) or in a Utility Adjustment Agreement Amendment (UAAA), as described elsewhere in this Section 6. DB Contractor is responsible for preparing, negotiating (to the extent allowed by this Section 6) and obtaining execution by the Utility Owners, of all Utility Agreements, (including preparing all necessary exhibits and information about the Project, such as reports, Plans and surveys). A Utility Agreement is not required for any Utility Adjustment consisting solely of Protection in Place in the Utility's original location within the Project ROW, unless the Utility Owner is being reimbursed for costs incurred by it on account of such Protection in Place. If no reimbursement is required to the Utility Owner in accordance with Transportation Code 203.092, a Utility Joint Use Acknowledgement, certification form and set of plans detailing UAR

compliance is required pertaining to the adjustment or Protection in Place work. However, if a Utility owner requests that the DB Contractor relocate a Utility, and the cost of that Utility Adjustment Work is the Utility Owner's sole responsibility, then the DB Contractor shall enter into a DB Contractor managed PUAA with the Utility Owner providing for the Utility Owner to be responsible for all costs of that Utility Adjustment Work.

6.1.3.1 Project Utility Adjustment Agreements (PUAA)

DB Contractor shall enter into one or more PUAAs with each affected Utility Owner that is reimbursable, or where the Utility Owner has requested the DB Contractor to perform the Utility Adjustment Work at the Utility Owner's cost, to define the design, material, construction, inspection, and acceptance standards and procedures necessary to complete Utility Adjustments, as well as to define DB Contractor's and the Utility Owner's respective responsibilities for Utility Adjustment costs and Utility Adjustment activities such as material procurement, construction, inspection and acceptance. A PUAA may address more than one Utility Adjustment for the same Utility Owner. Additional Utility Adjustments may be added to an existing PUAA by a Utility Adjustment Agreement Amendment (UAAA).

DB Contractor shall prepare each PUAA using the standard form of TxDOT Project Utility Adjustment Agreement (Owner-Managed) or TxDOT Project Utility Adjustment Agreement (DB Contractor-Managed), Attachment 6-1, Utility Forms. DB Contractor shall not modify the standard forms except by approval of TxDOT.

On issuance of NTP1, DB Contractor shall begin negotiations with each affected Utility Owner and reach agreement on one or more PUAAs that are determined to be reimbursable based on the utility owner having a compensable property interest in the land occupied by the facility to be relocated, or that are requested by Utility Owner to be performed by DB Contractor at the Utility Owner's cost. DB Contractor shall finalize the necessary PUAAs with each affected Utility Owner within a reasonable time period after issuance of NTP1. DB Contractor shall include any proposed changes to a standard form (other than filling in blanks specific to a particular Utility Owner) in a Utility Owner-specific addendum. Each PUAA (including the Utility Adjustment Plans attached thereto) shall be subject to TxDOT review and approval as part of a Utility Assembly.

Language modification to a PUAA shall be approved by TxDOT prior to the submission of a Utility Assembly.

6.1.3.2 Utility Adjustment Agreement Amendments

Except where Utility Adjustment Field Modifications are permitted pursuant to Section 6.4.7 (Utility Adjustment Field Modifications), modification of an executed PUAA or any component thereof, after it has been approved by TxDOT as part of a Utility Assembly, shall be stated in a Utility Adjustment Agreement Amendment (UAAA). A UAAA may be used only when the allocation of responsibility for the Utility Adjustment Work covered by that UAAA is the same as in the underlying Utility Agreement; otherwise, an additional PUAA will be required.

Each UAAA (including any Utility Adjustment Plans attached thereto) shall be subject to TxDOT's approval as part of a Supplemental Utility Assembly. Except as otherwise directed by TxDOT or provided in an applicable Utility Agreement, DB Contractor shall prepare all UAAAs using the standard form included in Attachment 6-1, Utility Forms. DB Contractor shall not modify the standard forms except by approval of TxDOT. DB Contractor shall include any proposed changes to a standard form (other than filling in the blanks specific to a particular Utility Owner) in a Utility Owner specific addendum.

Language modification to a UAA shall be approved by TxDOT prior to the submission of the UAAA.

6.1.4 Recordkeeping

DB Contractor shall maintain construction and inspection records in order to ascertain that Utility Adjustment Work is accomplished in accordance with the terms and in the manner proposed on the

approved Utility Adjustment Plans and otherwise as required by the Contract Documents and the applicable Utility Agreement(s).

6.2 Administrative Requirements

6.2.1 Standards

All Utility Adjustment Work shall comply with all applicable Laws, Codes, Regulations, UAR and Technical Provisions of the P3A, including the Utility Adjustment Standards, the TxDOT *Utility Manual*, Section 6 of the Agreement, and the requirements specified in this Section 6.

6.2.2 Communications

6.2.2.1 Communication with Utility Owners

DB Contractor is responsible for holding meetings and otherwise communicating with each Utility Owner as necessary to timely accomplish the Utility Adjustments in compliance with the Contract Documents. TxDOT shall be notified of all meetings and will participate in these meetings if requested by the Utility Owner or DB Contractor, or otherwise as TxDOT deems appropriate.

Before distribution of any mass mailings to Utility Owners, DB Contractor shall submit to TxDOT, 21 Days in advance of distribution, for its review and comment the form, content, and addressees of any such mass mailings. For purposes of this Section 6, the term "mass mailing" means correspondence that is sent to 50 percent or more of Utility Owners within a three-week time period, and contains substantially the same content with respect to each Utility Owner.

6.2.2.2 Meetings

At least three Business Days in advance of each scheduled meeting, DB Contractor shall provide notice and an agenda for the meeting separately to TxDOT and, if necessary, to the appropriate Utility Owner. DB Contractor shall prepare minutes of all meetings and shall keep copies of all correspondence.

DB Contractor shall prepare meeting minutes within five Business Days after the conclusion of such meetings. At a minimum, DB Contractor shall include the following items in the meeting minutes:

- A complete list of attendees (including their affiliations, telephone numbers, and e-mail addresses)
- Documentation of the issues discussed and any associated solutions
- Description of remaining open issues and action items (including the person(s) responsible for follow-up and target date for resolution)

DB Contractor shall submit draft versions of all meeting minutes to TxDOT for review before distributing final versions to the meeting attendees and appropriate Customer Groups.

6.2.3 Utility Adjustment Team

DB Contractor shall provide a Utility Adjustment team with appropriate qualifications and experience for the Utility Adjustment Work. DB Contractor shall provide the names and contact details, titles, job roles, and specific experience of the team members in the PMP. Specifically, DB Contractor shall provide a Utility Manager (UM) and a Utility Design Coordinator (UDC). The UM's primary work responsibility shall be the performance of all DB Contractor's obligations with respect to Utility Adjustments. The Utility Manager shall have a bachelor's degree, and have at least four (4) years of relevant experience in coordinating and solving complex utility adjustments on highway improvement projects. The Utility Manager should be authorized by the DB Contractor to approve all financial and technical modifications associated with utility adjustments, and modifications to the utility agreement.

The UDC shall be a Registered Professional Engineer. The UDC shall be responsible for coordinating the Utility Adjustment design with the overall highway design features during the planning, design, and construction phases of the Work.

6.2.4 Real Property Matters

DB Contractor shall provide the services described below in connection with existing and future occupancy of property by Utilities.

6.2.4.1 Documentation of Existing Utility Property Interests -- Affidavits

For each Existing Utility Property Interest within the Project ROW claimed by any Utility Owner, DB Contractor shall include an Affidavit of Property Interest in the applicable Utility Assembly, with documentation of the Existing Utility Property Interest (e.g., an easement deed) attached. Any such claim shall be subject to TxDOT's review as part of a Utility Assembly approval. Except as otherwise directed by TxDOT, DB Contractor shall prepare all Affidavits of Property Interest using the standard forms included in Attachment 6-1, Utility Forms.

6.2.4.2 Acquisition of Replacement Utility Property Interests

Each Utility Owner will be responsible for acquiring any Replacement Utility Property Interests that are necessary for its Utility Adjustments. DB Contractor shall have the following responsibilities for each acquisition:

1. DB Contractor shall coordinate with, and provide the necessary information to, each Utility Owner as necessary for the Utility Owner to acquire any Replacement Utility Property Interests required for its Utility Adjustments.
2. If any of DB Contractor-Related Entities assists a Utility Owner in acquiring a Replacement Utility Property Interest, such assistance shall be by separate contract outside of the Work, and DB Contractor shall ensure that the following requirements are met:
    a) The files and records must be kept separate and apart from all acquisition files and records for the Project ROW.
    b) The items used in acquisition of Replacement Utility Property Interests (e.g., appraisals, written evaluations and owner contact reports) must be separate from the purchase of the Project ROW.
    c) Any DB Contractor-Related Entity personnel negotiating the acquisition of Replacement Utility Property Interests must be different from those negotiating the acquisition of Project ROW.

DB Contractor is not responsible for Utility Owner condemnation proceedings.

6.2.4.3 Relinquishment of Existing Utility Property Interests

DB Contractor shall cause the affected Utility Owner to relinquish each Existing Utility Property Interest within the Project ROW, unless the existing Utility occupying such interest is either (i) remaining in its original location or (ii) being reinstalled in a new location still subject to such interest.

6.2.4.4 Quitclaim Deeds

Except as otherwise directed by TxDOT, DB Contractor shall prepare a Quitclaim Deed for each relinquishment of an Existing Utility Property Interest using TxDOT's standard form included in Attachment 6-1, Utility Forms. Each Quitclaim Deed shall be subject to TxDOT's approval as part of a Utility Assembly approval as described below.

DB Contractor understands and expects that a Utility Owner will not relinquish any Existing Utility Property Interest until after the Utility Adjustment has been accepted by the Utility Owner in its new

location. Accordingly, instead of an executed Quitclaim Deed, the Utility Assembly for such a Utility Adjustment shall include a letter signed by the Utility Owner's authorized representative confirming that the interest will be quitclaimed upon completion of the Utility Adjustment, and a copy of the unsigned Quitclaim Deed. In these cases, DB Contractor shall obtain the executed Quitclaim Deed within 90 Days of completion of the Utility Adjustment or unless otherwise approved by TxDOT in writing. The Quitclaim Deed must be approved by TxDOT prior to recording.

6.2.4.5 Utility Joint Use Acknowledgements

DB Contractor shall prepare a Utility Joint Use Acknowledgment (UJUA) for:

1. Each Utility proposed to be relocated within the Project ROW
2. Each Utility proposed to remain in its existing location within the Project ROW
3. Any Existing Utility Property Interest located within the Project ROW that is not required to be relinquished pursuant to Section 6.2.4.3 (Relinquishment of Existing Utility Property Interests), and is not addressed in the foregoing clause (a) or clause (b).

DB Contractor shall prepare all Utility Joint Use Acknowledgments using TxDOT's standard form included in Attachment 6-1, Utility Forms. DB Contractor also shall prepare all required documentation to be included with each Utility Joint Use Acknowledgment.

DB Contractor shall arrange for the Utility Owner to execute each Utility Joint Use Acknowledgment. Each Utility Joint Use Acknowledgment (executed by the Utility Owner) shall be subject to TxDOT's approval as part of a Utility Assembly.

6.2.4.6 Documentation Requirements

DB Contractor shall prepare, negotiate (to the extent permitted by this Section 6.2.4 (Real Property Matters), and obtain execution by the Utility Owner of (and record in the appropriate jurisdiction, if applicable) all agreements and deeds described in this Section 6.2.4, including all necessary exhibits and information concerning the Project (e.g., reports, Plans, and surveys). Each agreement or deed shall identify the subject Utility(ies) by the applicable Utility Assembly Number (*[four-digit number beginning with 0001]*)(ex. US77-U-0001), and shall also identify any real property interests by parcel number or highway station number, or by other identification acceptable to TxDOT.

6.3 Design

6.3.1 DB Contractor's Responsibility for Utility Identification

DB Contractor bears sole responsibility for ascertaining, at its own expense, all pertinent details of Utilities located within the Project ROW or otherwise affected by the Project, whether located on private property or within an existing public ROW, and including all Service Lines.

DB Contractor shall prepare and submit to TxDOT, no later than 90 days after NTP2 or 30 days before the first assembly package is submitted, a Utility Strip Map showing the information obtained and/or confirmed pursuant to this Section 6.3.1. DB Contractor's Utility Strip Map shall show in plan view all Utilities within the Project ROW or otherwise impacted by the Project, in each case detailing the type of Utility facility (communication, gas, oil, water, etc.) size, material and the Utility Owner's name and contact information. The scale of the Utility Strip Map shall be 1"=100'. DB Contractor shall update the information provided in the Utility Strip Map with SUE data and shall submit the same to TxDOT in accordance with the PMP.

6.3.2 Technical Criteria and Performance Standards

All design plans for Utility Adjustment Work, whether furnished by DB Contractor or by the Utility Owner, shall be consistent and compatible with the following:

a) The applicable requirements of the Contract Documents, including Section 6.2.1 (Standards)

b) The Project as initially designed

c) Any Utilities remaining in, or being installed in, the same vicinity

d) All applicable Governmental Approvals

e) Private approvals of any third parties necessary for such work

6.3.3 Utility Adjustment Concept Plans

DB Contractor shall prepare a proposed conceptual Utility design (a Utility Adjustment Concept Plan) for the Project (or proposed Utility Adjustment Concept Plans for various segments of the Project, as appropriate), showing the approximate location of each existing Utility, the existing Utilities to remain, proposed location of each Utility and DB Contractor's Utility Adjustment recommendations.

In accordance with the PMP, DB Contractor shall submit the proposed Utility Adjustment Concept Plans(s) to TxDOT for its review. The Utility Adjustment Concept Plan(s) shall be submitted in both tabular and plan formats. The plan(s) shall be color-coded and shall utilize a scale that clearly depicts all of the required information. DB Contractor shall coordinate with the affected Utility Owners as necessary to obtain their respective concurrence with the Utility Adjustment Concept Plan(s) as initially submitted to TxDOT and with any subsequent revisions. The Utility Adjustment Concept Plan is a working document. DB Contractor shall update the Utility Adjustment Concept Plan as the Work progresses.

6.3.4 Utility Adjustment Plans

Utility Adjustment Plans, whether furnished by DB Contractor or by the Utility Owner, shall be signed and sealed by a Registered Professional Engineer (PE) per governmental regulations and industry practice.

6.3.4.1 Plans Prepared by DB Contractor

Where DB Contractor and the Utility Owner have agreed that DB Contractor will furnish a Utility Adjustment design, DB Contractor shall prepare and obtain the Utility Owner's approval of plans, specifications, and cost estimates for the Utility Adjustment (collectively, "Utility Adjustment Plans") by having an authorized representative of the Utility Owner sign the plans as "reviewed and approved for construction." The Utility Adjustment Plans (as approved by the Utility Owner) shall be attached to the applicable Utility Agreement, which DB Contractor shall include in the appropriate Utility Assembly for TxDOT's approval.

Unless otherwise specified in the applicable Utility Agreement(s), all changes to Utility Adjustment Plans previously approved by the Utility Owner (excluding estimates, if the Utility Owner is not responsible for any costs) shall require written Utility Owner approval. DB Contractor shall transmit any TxDOT comments to the Utility Owner, and shall coordinate any modification, re-approval by the Utility Owner and re-submit to TxDOT as necessary to obtain TxDOT's approval.

6.3.4.2 Plans Prepared by the Utility Owner

For all Utility Adjustment Plans to be furnished by a Utility Owner, DB Contractor shall coordinate with the Utility Owner as necessary to confirm compliance with the applicable requirements as referenced in Section 6.2.1. Those Utility Adjustment Plans shall be attached to the applicable Utility Agreement, which DB Contractor shall include in the appropriate Utility Assembly for TxDOT's approval. DB Contractor shall transmit any TxDOT comments to the Utility Owner, and shall coordinate any modification, review by DB Contractor and re-submittal to TxDOT as necessary to obtain TxDOT's approval.

6.3.4.3 Design Documents

Each proposed Utility Adjustment shall be shown in the Design Documents, regardless of whether the Utility Adjustment Plans are prepared by DB Contractor or by the Utility Owner.

6.3.4.4 Certain Requirements for Underground Utilities

Casing as specified in the Utility Accommodation Rules (UAR) shall be used for all underground Utilities crossing the Project ROW. However, high-pressure gas and liquid petroleum pipelines may be allowed to cross the Project ROW without steel casing as long as the requirements of the Utility Accommodation Rules are met. All high-pressure gas pipelines within the Project ROW shall comply with a design factor "F" = 0.6 or less as required by the class location of the pipeline. The Utility Owner is required to submit or approve the Barlows calculation(s) in writing to be included in the Utility Assembly.

6.3.4.5 Utility Assemblies

Each Utility Adjustment in addition to each Utility remaining in place in the Project ROW and not requiring any Protection in Place or other Utility Adjustment shall be addressed in a Utility Assembly prepared by DB Contractor and submitted to TxDOT for its review and comment, and for TxDOT's approval of any items for which this Section 6 requires TxDOT's approval. Temporary Adjustments that are installed within the final ROW must also be included with an assembly for TxDOT's prior approval unless TxDOT waives or allows other approval methods concerning Temporary Adjustments. Each reimbursable Utility Adjustment shall be addressed in a full Utility Assembly, unless it is appropriate for a Supplemental Utility Assembly or Abbreviated Utility Assembly, as described below. DB Contractor shall coordinate with the Utility Owner to prepare all components of each Utility Assembly. Completion of the review and comment process for the applicable Utility Assembly, as well as issuance of any required TxDOT approvals, shall be required before the start of construction for the affected Utility Adjustment Work.

Provisions governing the procedure for and timing of Utility Assembly submittals are in Section 6.5 (Deliverables).

All Utility Adjustments covered by the same initial PUAA can be addressed in a single full Utility Assembly.

Each set of the required Utility Assembly shall include the following:

a) A transmittal memo recommending approval and detailing any unique characteristics or information pertaining to the adjustment.

b) A completed Utility Assembly Checklist.

c) A TxDOT approved Utility Adjustment Agreement.

d) Plans which:

   1. Show the existing and proposed Utility facilities,
   2. Show existing and proposed grades for all utility crossings,
   3. Show the existing and final ROW lines along with the Control of access denial line,
   4. Show an offset distance from the final ROW line to all longitudinal Utilities within the final ROW.
   5. Present sufficient information to enable TxDOT to verify compliance with the UAR requirements for each Utility located within the final ROW, including highway design features.
   6. Are folded to 8.5" x 11" size unless waived by TxDOT.

e) Estimate(s) from the Utility Owner (and also from DB Contractor, where DB Contractor is furnishing design and/or performing construction), which estimates shall, without limitation, detail material type and quantity (material quantities detailed on the estimates must correlate to the materials shown on the plans described in (d) above. The estimate must list the estimated amount of reimbursement to the Utility Owner, taking into consideration the betterment credit calculation, salvage credit and any applicable eligibility ratio.

f) A proposed Utility Joint Use Acknowledgement

g) Statement of Work form, if applicable

h) Affidavit(s) of Property Interest form (With property interest instrument of conveyance attached), if applicable; and

i) A ROW map showing the existing and proposed utility facilities identified on a plan view. This ROW map will only be required to be included with TxDOT's copy of the Utility Assembly.

j) All utility no conflict sign off forms.

Utility Adjustment Amendment Agreements (UAAA). For each reimbursable UAAA, DB Contractor shall prepare an additional Utility Assembly for the relevant initial PUAA (an Assembly), covering all Utility Adjustments addressed in the UAAA. The UAAA Assembly shall contain a transmittal memo, Utility Assembly Checklist, proposed UAAA cost estimate, a proposed UAAA which has been executed by the Utility Owner and DB Contractor (one original in each of the two original Supplemental Utility Assemblies), including all required attachments, and applicable revisions to the Utility Adjustment Plans, as well as Utility Joint Use Acknowledgement(s) and Affidavit(s) of Property Interest, if applicable. The transmittal memo shall briefly describe the desired amendment and explain why the amendment is necessary including an estimated start date and duration.

Abbreviated Utility Assemblies. DB Contractor shall prepare an Abbreviated Utility Assembly for each Utility proposed to remain at its original location within the Project ROW that is not required to be addressed in a PUAA or UAAA, unless an Adjustment is required pursuant to Section 6.1.1. If DB Contractor is reimbursing the Utility Owner any of its costs, a PUAA or UAAA is required. Each Abbreviated Utility Assembly shall contain a transmittal memo, Utility Joint Use Acknowledgment, certification form and plans detailing UAR compliance. Each of the foregoing items shall comply with the requirements for same described in Attachment 6-1, Utility Forms.

6.4 Construction

6.4.1 Reserved

6.4.2 General Construction Criteria

All Utility Adjustment construction performed by DB Contractor shall conform to the requirements listed below. In addition, DB Contractor is responsible for verifying that all Utility Adjustment construction performed by each Utility Owner conforms to the requirements described below. In case of nonconformance, DB Contractor shall cause the Utility Owner (and/or its contractors, as applicable) to complete all necessary corrective work or to otherwise take such steps as are necessary to conform to these requirements.

a) All criteria identified in Section 6.3.2 (Technical Criteria and Performance Standards)

b) The Utility Adjustment Plans included in the Utility Agreement approved by TxDOT (other than Utility Adjustment Field Modifications complying with Section 6.4.7 (Utility Adjustment Field Modifications)

c) All Project safety and environmental requirements

d) All pre-construction meeting requirements

e) The ROW acquisition schedule described in Section 7 (ROW)

f) Utilities standards provided in the Utility Agreement

6.4.3 Inspection of Utility Owner Construction

DB Contractor shall set forth procedures in the PMP for inspection of all Utility Adjustment Work performed by Utility Owners (and/or their contractors) to verify compliance with the applicable requirements described in Section 6.4.2 (General Construction Criteria). DB Contractor is responsible for Quality Control and Quality Assurance for all Work performed by the Utility Owners and/or their contractors.

6.4.4 Scheduling Utility Adjustment Work

The Utility Adjustment Work (other than construction) may begin at any time following issuance of NTP2. Refer to Section 4.4.1 of the Agreement for the conditions to commencement of Utility Adjustment Construction Work by DB Contractor. DB Contractor shall not arrange for any Utility Owner to begin any demolition, removal, or other construction work for any Utility Adjustment until all of the following conditions are satisfied:

a) The Utility Adjustment is covered by an executed Utility Agreement (and any conditions to commencement of such activities that are included in the Utility Agreement have been satisfied);

b) Pre-construction meeting, in accordance with Section 6.2.2.2, shall be required after execution of the Utility Agreement and prior to commencement of any construction activities, unless otherwise approved by TxDOT.

c) Availability and access to affected Replacement Utility Property Interests have been obtained by the Utility Owner (and provided to DB Contractor, if applicable);

d) If any part of the Utility Adjustment construction work that will affect the Project ROW, availability and access to that portion of the Project ROW has been obtained in accordance with the applicable requirements of the Contract Documents.

e) If applicable, the Alternate Procedure List has been approved by FHWA, and either (a) the affected Utility is on the approved Alternate Procedure List, as supplemented, or (b) the Utility Owner is on the approved Alternate Procedure List, as supplemented.

f) The review and comment process has been completed and required approvals have been obtained for the Utility Assembly covering the Utility Adjustment.

g) All Governmental Approvals necessary for the Utility Adjustment construction have been obtained, and any pre-construction requirements contained in those Governmental Approvals have been satisfied.

h) All other conditions to that Work stated in the Contract Documents have been satisfied.

6.4.5 Standard of Care Regarding Utilities

DB Contractor shall carefully and skillfully carry out all Work impacting Utilities and shall mark, support, secure, exercise care, and otherwise act to avoid damage to Utilities. At the completion of the Work, the condition of all Utilities shall be at least as safe and permanent as before.

6.4.6 Emergency Procedures

DB Contractor shall provide Emergency procedures with respect to Utility Adjustment Work in the PMP. DB Contractor shall obtain Emergency contact information from, and establish Emergency procedures with each Utility Owner in the event of rupture, break or damage to Utility Owner's Utility facilities.

6.4.7 Utility Adjustment Field Modifications

DB Contractor shall establish a procedure to be followed if a Utility Adjustment Field Modification is proposed by either DB Contractor or a Utility Owner, after the Utility Assembly (which includes the Utility Adjustment Plans) has been approved. The procedure shall contain, at minimum, the following processes:

a) The Utility Owner's review and approval of a Utility Adjustment Field Modification proposed by DB Contractor, or DB Contractor's review and approval of a Utility Adjustment Field Modification proposed by the Utility Owner. The UAFM shall have approval prior to commencement of construction. All revisions shall be signed and sealed by a PE and formally submitted to TxDOT for review and approval;

b) Transmittal of Utility Adjustment Field Modifications to the appropriate construction field personnel;

c) Inclusion of any Utility Adjustment Field Modifications in the Record Drawings for the Project.

DB Contractor shall cause the procedure to be followed for all Utility Adjustment Field Modifications, whether the construction is performed by DB Contractor or by the Utility Owner.

6.4.8 Switch Over to New Facilities

After a newly Adjusted Utility has been accepted by the Utility Owner and is otherwise ready to be placed in service, DB Contractor shall coordinate with the Utility Owner regarding the procedure and timing for placing the newly Adjusted Utility into service and terminating service at the Utility being replaced.

6.4.9 Record Drawings

DB Contractor shall provide Record Drawings to each Utility Owner for its Adjusted Utilities, in accordance with the applicable Utility Agreement(s).

DB Contractor shall provide Record Drawings to TxDOT (regardless of whether design and/or construction of the subject Utilities was furnished or performed by DB Contractor or by the Utility Owner). These drawings shall show the location of, and label as such, all abandoned Utilities, shall show and label all other Utilities, whether remaining in place or relocated, located within the Project ROW or otherwise impacted by the Project, and shall otherwise comply with Section 2 (Project Management). DB Contractor shall provide the Record Drawings for each Adjustment to TxDOT not later than 90 Days after Utility Owner acceptance as defined in the Utility Agreement, the Adjustment or before such earlier deadline as is specified elsewhere in the Contract Documents.

DB Contractor shall provide, within 90 days after the final utility adjustment is complete, a complete plan view of all final utility facility locations both Owner Managed and Developer Managed which includes utilities that remained in place, were adjusted in place and/or relocated . The plan must detail the utility facility horizontal alignment with highway stationing, ROW lines, roadway features, Utility owners name, Utility facility type/size and U Number. This overall inventory set of plans is separate from the individual record drawingss required for each utility assembly.

6.4.10 Maintenance of Utility Service

All Utilities shall remain fully operational during all phases of construction, except as specifically allowed and approved in writing by the Utility Owner. DB Contractor shall schedule Utility Adjustment Work in order to minimize any interruption of service, while at the same time meeting the Project

Schedule and taking into consideration seasonal demands. Each Utility Adjustment or remain in place location must allow for adequate access to the Utility Facility that is agreed to by the Utility Owner.

6.4.11 Traffic Control

DB Contractor shall be responsible for the Traffic Management Plan. The Traffic Management Plan shall cover, all traffic control made necessary by for Utility Adjustment Work, whether performed by DB Contractor or by the Utility Owner. Traffic control for Adjustments shall be coordinated with, and subject to approval by, the local agency(ies) with jurisdiction. Traffic control shall comply with the guidelines of the TMUTCD and of Section 18 (Traffic Control).

6.4.12 Ricardo Water Supply Corporation casing

DB Contractor shall be responsible for designing and constructing a new split casing that will extend the currently approved 20" steel casing under the proposed southbound frontage road for a length of approximately 100' to obtain UAR compliance for the waterline shown on attachment 6-2. The line crosses at approximate Highway Station number 7016. DB Contractor shall also be responsible for obtaining a UJUA and plans detailing UAR compliance.

6.5 Deliverables

DB Contractor shall time all submittals described in this section to meet the Project Schedule, taking into account the maximum number of submittals set forth in this Section 6.5 or, if not stated therein, then as stated in Section 3.1.2.3 of the Agreement. All deliverables shall conform to the standards required in the Project Management Plan.

6.5.1 Maximum Number of Submittals

DB Contractor shall coordinate all Submittals required pursuant to this Section 6.5, so as not to overburden TxDOT's staff and consultants. In each calendar week, DB Contractor shall not submit more than:

a) Four Utility Assemblies (excluding Supplemental or Abbreviated Utility Assemblies)

b) Four of any documentation constituting any of the following:

- A modified or additional item submitted in response to TxDOT comments on a particular Utility Assembly
- A Quitclaim Deed
- Any other type of relinquishment document

c) Four Supplemental Utility Assemblies;

d) Four Utility Adjustment Agreements, Amendment Assemblies.

Where the number of Submittals exceeds these limits, the Submittals shall be considered excess and TxDOT may defer its review of any such excess Submittals to a subsequent calendar week (or weeks), as necessary.

6.5.2 DB Contractor's Utility Tracking Report

DB Contractor shall maintain a Utility Tracking Report (UTR) in tabular form, listing all Utilities located within the Project ROW or otherwise potentially affected by the Project. DB Contractor shall submit the Utility Tracking Report to TxDOT on a monthly basis in the format described below unless otherwise approved by TxDOT. The Utility Tracking Report shall, at a minimum, contain the following information for each utility:

a) The name of the Utility Owner and a unique tracking number starting with the prefix "Highway U-" followed by a four digit number starting with 0001- to be assigned by the DB Contractor;

b) Utility size and type;

c) Location of the Utility based upon station and offset;

d) The proposed method of treatment;

e) State whether the adjustment will be Owner or DB Contractor Managed;

f) Dates on which the PUAA/UAAA was executed by TxDOT, Utility Owner, Design-Build Contractor, DB Contractor;

g) Dates on which the UJUA was executed by the Utility Owner and TxDOT;

h) The Utility Owner's existing right of occupancy of the right of way for each Utility (e.g. UJUA, permit, easement or combination);

i) Whether any Replacement Utility Property Interest will be necessary;

j) Estimated cost approved in the PUAA or UAAA;

k) Amounts and dates of payments made by the DB Contractor to the Utility Owner, listing in each case the type of payment (final, partial or lump sum);

l) Scheduled start and completion date for construction of each adjustment;

m) Percent complete of construction;

n) Whether any betterment is included in the adjustment

The Utility Tracking Report shall also include a separate section for Replacement Utility Property Interest including each necessary Replacement Utility Property Interest with the names of property owners or parcel number(s), Utility Assembly Numbers, status of the acquisition, acquisition cost, and other information as necessary. DB Contractor shall maintain this section of the Utility Tracking Report and submit to TxDOT in the same manner as all other portions of the Utility Tracking Report.

6.5.3 Utility Assembly Submittals

The following procedure shall govern submittal and review of each Utility Assembly, including Supplemental and Abbreviated Utility Assemblies:

a) Before submitting a Utility Assembly to TxDOT, DB Contractor shall:

- Verify that each subject Utility (or the Utility Owner) is on the approved Alternate Procedure List, if applicable;
- Submit the complete Utility Assembly to the quality control/quality assurance entity designated by DB Contractor in accordance with the PMP; and
- Resolve all comments made by the quality control/quality assurance entity, coordinating with the Utility Owner as appropriate.

b) DB Contractor shall submit to TxDOT three identical and complete originals of each Utility Assembly, each of which shall be bound and labeled "DB Contractor Copy," "TxDOT Copy," or "Utility Owner Copy," as appropriate. The "TxDOT Copy" shall be color coded and shall include the Project ROW map with the existing and proposed Utility facilities identified on a plan view. These submittals shall be for TxDOT's review and comment, except for any components of the Utility Assembly for which TxDOT's approval is required by this Section 6.5.

TxDOT will review the Utility Assembly for compliance with the requirements of this Section 6.5.3, and within ten (10) Business Days will return the Utility Assembly to DB Contractor with the appropriate notations pursuant to Section 3.1.3 of the Agreement to reflect its responses. DB Contractor shall transmit any TxDOT comments to the Utility Owner, and shall coordinate any modification, review and approval by the Utility Owner and re-submittal to TxDOT, as necessary to resolve all TxDOT comments and/or obtain TxDOT's approval, as applicable. Upon (a) TxDOT's approval of any Utility Assembly components for which TxDOT's approval is required, and (b) completion of the review and comment process for all other Utility Assembly components, TxDOT will sign three originals of any approved UJUA and of any other components of the Utility Assembly for which this Section 6 requires TxDOT's signature.

6.5.4 FHWA Alternate Procedure

The DB Contractor will develop the Alternate Procedure List that includes the utility owner's name, approximate station numbers and estimated cost. TxDOT will then submit to the FHWA the Alternate Procedure List in order to obtain FHWA authorization for federal reimbursement Promptly upon determining that any additional Utility Owner not referenced on the Alternative Procedure List is impacted by the Project, DB Contractor shall submit to TxDOT all documentation as referenced above in order to update the Alternative Procedure List.

TxDOT will forward the approved Alternate Procedure List (and any amendments thereto) to DB Contractor, promptly upon receipt of same from the FHWA.

7 RIGHT OF WAY (ROW)

Not used.

8 GEOTECHNICAL

8.1 General Requirements

DB Contractor shall perform all geotechnical investigations, testing, research, and analysis necessary to effectively determine and understand the existing surface and subsurface geotechnical conditions of the Project ROW to be used by DB Contractor to carry out the Work. DB Contractor shall ensure the geotechnical investigations and analyses are both thorough and complete, so as to provide accurate information for the design of roadways, pavements, foundations, structures, and other facilities that result in a Project that is safe, and meets the Development Agreement requirements.

8.2 Design Requirements

8.2.1 Subsurface Geotechnical Investigation by DB Contractor

DB Contractor shall determine the specific locations, frequency, and scope of all subsurface geotechnical investigations, testing, research, and analysis DB Contractor considers necessary to provide a safe and reliable roadway, pavement, foundation, structure, and other facilities for the Project.

DB Contractor shall prepare and amend, as needed, their Geotechnical Engineering Reports documenting the assumptions, conditions, and results of the geotechnical investigation and analysis, including the following:

a) The geology of the Project area, including soil and/or rock types, and drainage characteristics
b) Field investigations and laboratory test results used to characterize conditions. Field investigations shall include descriptions of the soil/rock, Texas Cone Penetration test results and RQD for rock. If laboratory testing is required then the results shall include moisture content, plasticity index, gradations for each major soil strata change, percent organic content, levels of shrink/swell potential, levels of sulfate (on-site and borrow), soil compressibility, and short-term and long-term strength tests and properties
c) A discussion of conditions and results with reference to specific locations on the Project
d) Design and construction parameters resulting from the geotechnical investigation and analysis, including parameters for the design of pavements, pipes, structures, slopes, and embankments
e) Slope stability analyses for embankment and excavation and retaining wall slopes including both short-term (undrained) and long-term (drained) conditions, and discussion of design measures undertaken to ensure stability and safety of all slopes. The design minimum factor of safety required for global stability of a slope shall be in accordance with the TxDOT *Geotechnical Manual*. The analysis shall consider the potential for long-term surficial slide failures common to high plasticity clays in Texas, and specific recommendations shall be provided to minimize their occurrence
f) Plan view locations of field sampling, boring logs and other field data, laboratory test results, calculations, and analyses that support design decisions
g) Texas triaxial class for subgrade and borrow
h) Existing depths for the US 77 existing pavement to remain in place.

The report shall:

a) Ensure that adequate investigation, testing, analysis, design, mitigative measures and construction planning are applied to assess and provide for the effects of swell pressures from expansive soil and rock materials on foundations and earth retaining structures. They shall address all design features and facility characteristics that could affect expansive soil behavior.

b) Provide design and construction parameters derived from geotechnical investigation.

c) Assess the corrosion potential of the soil and rock materials and conditions that will be encountered, and the impacts to planned surface and subsurface facilities.

d) Layout of sample locations along corridor.

Each Geotechnical Engineering Report, upon completion and including any later supplements or amendments shall be submitted to TxDOT for review and comment.

8.2.2 Pavement Design

DB Contractor shall design, construct, and, where applicable, maintain roadway pavements using Good Industry Practice and the subsurface geotechnical data collected by DB Contractor. The pavement designs shall be signed and sealed by a Professional Engineer Registered in the State of Texas. DB Contractor shall include the proposed pavement designs for the Project in the Proposal and shall indicate the applicable roadway and station limits for each pavement design. Where applicable, the Proposal shall also include a detailed description of the proposed pavement maintenance program for the duration of the Capital Maintenance Agreement. The DB Contractor shall provide in the Proposal a tabulation of the design k-values, FWD data, resilient modulus, or other basis for the pavement thickness designs, and including station limits. After DB Contractor has completed its pavement investigations and analyses, DB Contractor shall provide verification of the Proposal pavement designs for TxDOT review.

The TxDOT *Pavement Design Guide* shall be the basis for all pavement designs for the Project, and is supplemented with the requirements contained within this document as identified in the paragraphs in this section. Where there are conflicts between the requirements in these two documents, the requirements in this document shall take precedence.

The number of ESALs and/or the traffic volumes to be used in the pavement designs shall be those provided in Attachment 8-1,

DB Contractor should expect that subgrade materials will vary throughout the Project limits. DB Contractor shall verify that the materials encountered or imported meet the Effective Modulus of Subgrade Reaction, modulus, or other design subgrade support value, using the TTC and FWD modulus result, as utilized for the structural section design. If the site subgrade materials have a lower value than used for the Proposal-phase pavement designs, DB Contractor shall submit an adjusted pavement design for review and acceptance by TxDOT.

DB Contractor shall prepare separate pavement designs, including overlay design for US 77 portions to remain, as applicable, for the following:

a) Mainline and ramp pavements

b) Frontage road pavements

c) Cross-road pavements

d) Service driveways and parking areas

e) Temporary pavement construction areas

Pavement design report(s) shall document the assumptions, considerations, and decisions contributing to DB Contractor's pavement designs, including the following:

a) Pavement design details by location, including structural layer materials, general specifications, and thicknesses

b) Where applicable, life-cycle cost analysis, including the periods for resurfacing, reconstruction, and other rehabilitation measures and what these activities are likely to entail

c) Relevant pavement evaluation data (structural and functional) and condition information on adjacent roads

d) Site conditions which might influence the design and performance of pavements

e) Relevant geotechnical data and drainage requirements including boring logs, laboratory soil test results, and active or passive drainage system design

f) Design criteria used in determining the pavement design(s), including traffic loads, pavement material characterization, environmental conditions, and pavement design life

g) Other considerations used in developing the pavement design(s), including subgrade preparations and stabilization procedures

h) Layout of sample locations

DB Contractor shall submit to following to TxDOT for review:

a) Pavement Design Reports including any later supplements or amendments

b) Verification of Proposal phase pavement thickness designs

c) Traffic Control Plans associated with subsurface geotechnical or pavement investigations

d) A list of all geotechnical and pavement design software proposed for use

e) Verification plan for effective modulus of subgrade reaction (FWD and TTC)

f) Material selection justification from surface to subgrade

8.2.2.1 Methodology Enhancements

Recognizing that the development of pavement design methods, products, and procedures are under continuous enhancement within the pavement community, the DB Contractor and TxDOT understand that new methods, procedures, and products may present opportunities for improved pavement design and management during the time frame of this Agreement. Both parties mutually agree to consider the use of new design technologies provided that any such technologies and methods are agreed to by the DB Contractor and approved by TxDOT in writing prior to final implementation.

8.2.2.2 Related Pavement Materials Specifications

Unless otherwise specified herein, pavement material requirements are defined in the most current version of the TxDOT *Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges* (hereafter referred to as the TxDOT *Standard Specifications*) and per special provisions as provided these Contract Documents. Test procedures identified herein shall be the most current version identified in the Materials Test Procedures, AASHTO or ASTM standards or equivalent guidance as approved or provided by TxDOT.

8.2.2.3 Pavement Type Selection

The following requirements shall be incorporated into the final pavement selection and design:

Mainline Pavement. Mainline pavement may be rigid or flexible, but only Continuously Reinforced Concrete Pavement (CRCP) pavement is acceptable for rigid pavement design.

Shoulders. Pavement for the shoulders of all roadways shall be the same section (materials and depths) as the adjacent roadway pavement.

Ramp Pavement. Ramp pavements shall be constructed with the same section (materials and depths) as the adjacent mainline pavement.

Facility Access Parking. Not Applicable

Cross Street Pavement. The following pavement section shall be used for all reconstructed cross streets:

- 1.5" Type D HMAC Surface
- 3.5" Type B HMAC Surface
- 10" CTB at 4%
- 8" Lime treated Subgrade at 6%

For controlled intersections, the pavement shall extend a minimum of 200 feet on all intersecting public roadways.

8.2.2.3.1 Rigid Pavement

Design Specification. Rigid pavement shall be designed in accordance with the TxDOT's *Pavement Design Guide*. The rigid pavement design will use a 30-year life. Continuously Reinforced Concrete Pavement (CRCP) pavement is acceptable for rigid pavement design on the mainlines.

Effective Modulus of Subgrade Reaction. The Effective Modulus of Subgrade Reaction (k in psi/in) is to be used for design and the value to be achieved at all times during construction activities.

Potential Vertical Rise (PVR). For locations where there is a pre-existing pavement, the DB Contractor shall use Attachment 8-2 and PVR design will not be necessary. For new roadbeds, the Developer shall design the overall subgrade and pavement structure to have a PVR no greater than 1.5 inches for mainline and 2.0 inches for non-mainline pavements as calculated in accordance with Tex-124-E from soil tests in a soil column 15 feet deep as measured from the proposed finished pavement. Alternatively, provide materials that result in an Effective Plasticity Index of less than 25 when calculated to a depth of 8 feet from finished pavement surface for mainline and to a depth of 7 feet from finished pavement surface for non-mainline pavements. Calculation and sampling requirements for determination of Effective PI are stated in Section 8.3.1 Pavement Material Requirements.

Continuously Reinforced Concrete Pavement (CRCP). Continuously Reinforced Concrete Pavement (CRCP) may require longitudinal tining as approved by TxDOT. The current TxDOT Standards shall be utilized. Including, but not limited to:

CRCP(1)-11 "Continuously Reinforced Concrete Pavement, One Layer Steel Bar Placement".

CRCP(2)-11 "Continuously Reinforced Concrete Pavement, Two Layer Steel Bar Placement".

8.2.2.3.2 Flexible Pavement

Design Methodology. For flexible pavement design, the DB Contractor shall use the TxDOT online *Pavement Design Guide*. The pavement designs shall utilize either the TxDOT FPS 21 procedure or the 1993 *AASHTO Guide for the Design of Pavement Structures* and the latest version of the DARWin computer program, approved by AASHTO. All pavement thickness designs shall be checked using the Modified Texas Triaxial Class design method, and other analyses techniques necessary to prevent premature failure from rutting and fatigue.

Performance Life Requirements. The design life for the Project will be based on the TxDOT's *Pavement Design Guide*.:

Potential Vertical Rise (PVR). For locations where there is a pre-existing pavement, the DB Contractor shall use Attachment 8-2 and PVR design will not be necessary. For new roadbeds, the Developer shall design the overall subgrade and pavement structure to have a PVR no greater than 1.5 inches for mainline and 2.0 inches for non-mainline as calculated in accordance with Tex-124-E from soil tests in a soil column 15 feet deep as measured from the proposed finished pavement. Alternatively, provide materials that result in an Effective Plasticity Index of less than 25 when calculated to a depth of 8 feet from finished pavement surface for mainline and to a depth of 7 feet from finished pavement surface for non-

mainline pavements. Calculation and sampling requirements for determination of Effective PI are stated in Section 8.3.1 Pavement Material Requirements.

Design Modulus. The DB Contractor shall establish the design modulus using laboratory resilient modulus tests conducted on representative samples of the soils supporting the pavement structures. This design modulus shall be used for either the FPS 21 or AASHTO design procedures, and shall not exceed the Effective Resilient Modulus as described below. Design moduli shall be determined for other pavement layers where the maximum value does not exceed values established from methods and criteria stated below. Design moduli determined from methods identified are irrespective of the pavement design method used, where the material is placed in the pavement structure, and depth of the layer. When it is in the interest of TxDOT to use alternative methods for determining material moduli proposed by the DB Contractor, justification and documentation shall be provided to demonstrate that an equivalent pavement structure will be provided.

(a) Effective Resilient Modulus, (MR). Effective Resilient Modulus testing is only applicable to subgrade materials; that is, natural subgrade or materials imported as embankment and are not stabilized. Determine the MR using the AASHTO laboratory test method T307 for subgrade soil samples over the Project, or segments of the Project, with an adjustment of test results for seasonal variations, per AASHTO *Guide for the Design of Pavement Structures, 1993*. Only load sequence number 7 of 15 (4 psi confining pressure, 4 psi maximum axial stress for Type 2 materials; 10 psi confining pressure, 10 psi maximum axial stress for Type 1 materials) will be used to determine the test result.

Where multiple layers of material are present, MR shall be determined for the predominant soil within three feet in depth from the finished pavement subgrade elevation. Where rock is the predominant subgrade and MR determination is not practical, a maximum MR of 25,000 psi may be assumed.

Run tests on samples at optimum moisture content (OMC), 2% dry of OMC, and 2% wet of OMC. Optimum moisture content shall be determined by the appropriate TxDOT compaction procedure; molding shall be governed by the appropriate method for the material tested as identified in AASHTO T307.

Distribute MR values as shown in Table 3 for the region in which the DB Contractor will be constructing the project. Determine which distribution to apply by selecting the rainfall range appropriate for the project location from Figure 1.

Table 3. Regional distribution of months used to determine Effective Resilient Modulus.

Region	Annual Rainfall Range	Moisture Content Weighting in Months		
		- 2% OMC	@ OMC	+ 2% OMC
1	0 – 12	6	4	2
2	12 – 24	4	4	4
3	24 – 36	2	5	5
4	36 – 48	2	4	6
5	48 – 56	0	3	9

(b) Unbound Base and Subbase. Only material meeting the definition of Unbound Base in Section 8.3.1 will be considered; all other unbound materials used as a pavement layer that do not meet this definition shall be considered subgrade/embankment. For materials meeting the requirements of Item 247, TxDOT *Standard Specifications,* the design modulus shall not exceed

three times the Effective Resilient Modulus for the layer immediately below the unbound base or subbase layer, and shall not exceed 75,000 psi.

(c) Stabilized Base. Stabilized base materials shall meet the requirements of Stabilized Base in Section 8.3.1, or shall be considered a subgrade or subbase material that may require stabilization. The design moduli of stabilized base materials shall be established by the greater of: (a.) the ratio of stress to strain in a near-linear portion of the loading curve during UCS testing, or (b.) ten times the Effective Resilient Modulus for subgrade, whichever is greater. Refer to Table 3 for asphalt stabilized base moduli.

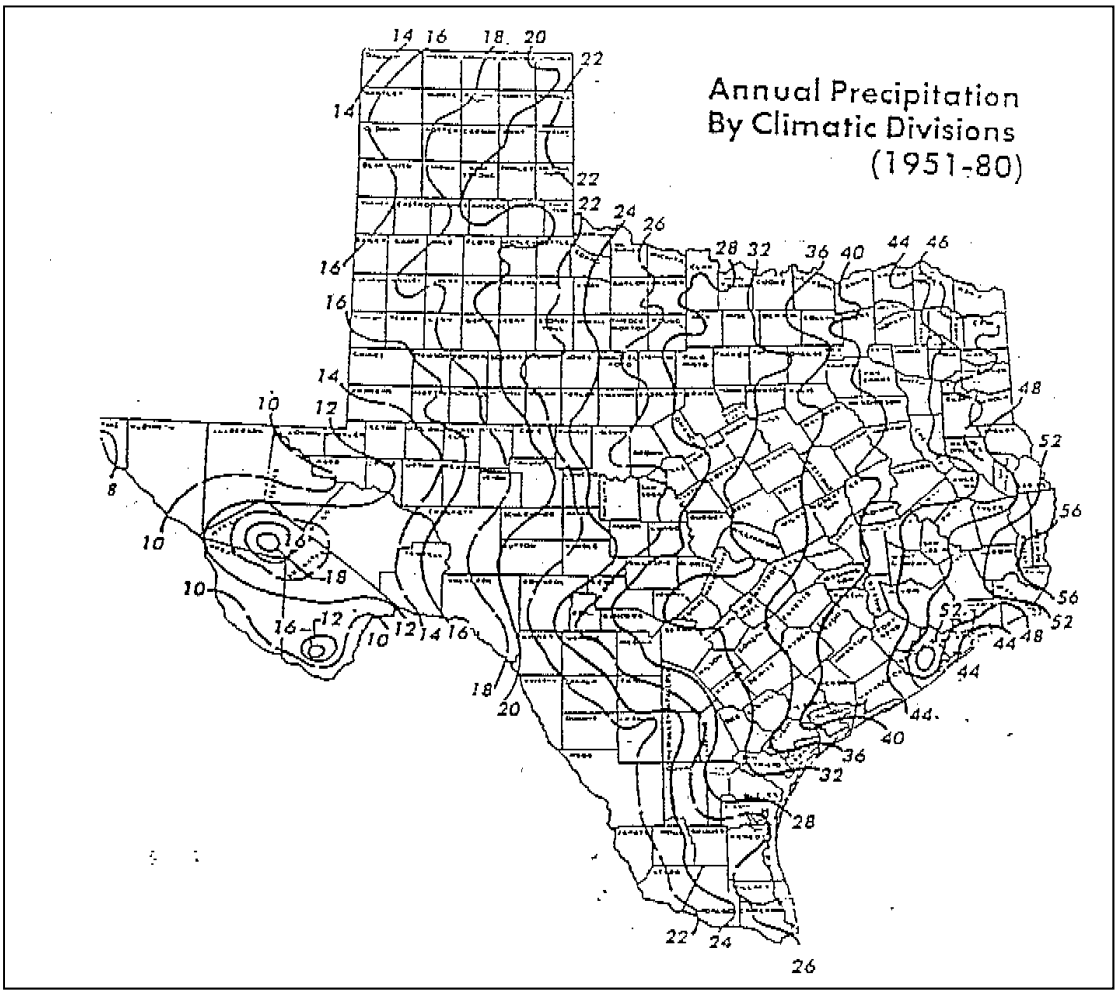

Figure 1. Rainfall graph for determining regional soil testing requirements

(d) *Stabilized Subbase and Stabilized Subgrade.* Materials shall meet the requirements of Subbases in Section 8.3.1 or the material shall be regarded as subgrade material and may be subject to MR measurements. Stabilized subgrade and stabilized subbases may be incorporated as a structural layer and shall have a design modulus equal to the greater of: (a.) the ratio of stress to strain in a near linear portion of the loading curve during UCS testing, or (b.) two times the value of the Effective Resilient Modulus of the subgrade.

(e) *Design Structural Values.* Use Table 4 for structural material design values. For materials not listed, provide documented testing establishing the design value appropriate for the design procedure being used.

Table 4. Design Structural Values

Material Type	2004 Specification	Maximum Modulus for FPS 21	AASHTO layer coefficient (max.)
Dense-Graded Hot Mix Asphalt	Item 340, 341	Combined HMA thickness: ≤8" use 500ksi > 8.0" use 650ksi	 0.44 0.45
Permeable Friction Course	Item 342	300 ksi	0.30
Performance Design Mixtures	Special Specification 3XXX "Superpave Mixtures" in Attachment 8-3 and Item 344	Combined HMA thickness: ≤ 6.0" use 650ksi 6"<T≤8" use 700ksi > 8.0" use 850ksi RBL: 350ksi	 0.45 0.46 0.47 RBL: 0.40
Stone-Matrix Asphalt	Item 346	Same as Item 344	Same as Item 344
Unbound Base	Item 247, Grade 1	*75ksi	0.14
Stabilized Base ▪ Cement ▪ Asphalt	 Items 275 and 276 Item 292	 *200ksi 350 ksi	 0.16 0.34
Stabilized Subgrade or Sub-base ▪ Hydrated Lime ▪ Cement	 Item 260 Item 275	 *30ksi *30ksi	 0.12 0.12

* Maximum design values.

Poisson's Ratio. Use 0.20 for cement stabilized or fly ash stabilized materials meeting the requirements of Items 275, 276 and 265 as defined in the most recent edition of the TxDOT *Standard Specifications*. Use 0.35 for all other materials not identified in the aforementioned Items; except for subgrade or embankment/fill materials, use 0.4.

Truck Volumes. The percentage of truck traffic as well as the annual growth percentage in truck volumes shall be those which are provided in Attachment 8-1, Pavement Design Data.

Initial ADT and 20yr projected ADT. The Initial ADT is the projected ADT when the Project is opened for public access as provided in Attachment 8-1, Pavement Design Data. The ADT projected to occur 20 years after the Project is opened to public access is provided in Attachment 8-1, Pavement Design Data.

Initial Serviceability Index. The initial serviceability index for Mainline pavements on this Project shall be 4.5. Frontage road pavements shall use an initial serviceability index of 4.2.

Serviceability Index (SI) after Overlay. The SI after overlay shall be 4.0.

Terminal (Minimum Acceptable) Serviceability Index. The terminal serviceability index at the end of any performance period for this Project shall be 3.0 (mainline and frontage roads).

Serviceability Index After a Structural Overlay (FPS design only). Where no level up course of HMA is placed prior to a single lift HMA overlay, use 4.0. Where a level up used or multiple HMA lifts, use 4.2.

Design Reliability or Confidence Level. The reliability factor shall be 95% for mainline, ramps, frontage roads and cross roads.

Maximum Period of Overlay. The maximum planning period for any overlay following the initial performance period of this Project shall not exceed 15 years. The minimum period shall be 8 years.

Overall Standard Deviation (AASHTO design only). Use 0.49.

8.3 Construction Requirements

8.3.1 Pavement Materials Requirements

The DB Contractor shall incorporate the following requirements into the preparation of the initial pavement designs for the proposal and the subsequent final pavement designs, plans, quality control and quality assurance programs, and the field construction procedures. Subject to approval by the TxDOT, alternate material specifications and construction requirements may be proposed by the DB Contractor provided the objectives of the Project are met and an equivalent pavement structure is provided.

Subgrade Material Composition. The DB Contractor shall analyze subgrade material composition, design the pavement structure, and perform necessary construction procedures to eliminate soluble sulfate induced heave. When soluble sulfates may present a potential for a reaction detrimental to the pavement structure, DB Contractor shall submit alternate designs and/or construction procedures for TxDOT approval.

When quantities of soluble sulfates detected are greater than 500 ppm, the DB Contractor shall determine the source of the sulfate and whether there are greater concentrations existing or that would be created when pulverized in and surrounding the sampled location. Use the TxDOT *Guidelines for Treatment of Sulfate-Rich Soils and Bases in Pavement Structures* to assist with testing and detection and construction practices. No soil shall have additives introduced to such material that would cause a detrimental reaction to the pavement structure or its ride quality as measured by the International Roughness Index (IRI).

Effective Plasticity Index (PI). The same method of determining Effective PI shall be used for both design and verification of design. DB Contractor shall determine the Effective PI for unstabilized subgrade to the depth specified below finished pavement surface. The Effective PI shall be determined, using Tex-106-E, via a process that proportionately accounts for the plasticity contribution of the soil binder (material passing the #40 sieve) for each individual one foot layer, or portion thereof, to the depth specified. The Effective PI is ultimately a weighted average of the Plasticity Indices of the material in the soil column analyzed. For example, the sum of all PI measurements representative of each one foot deep sample tested divided by the total depth designated by the pavement type. Use soil to the depth of 8 feet for mainline pavements and 7 feet for non-mainline pavements for calculation of Effective PI. Concrete, hot mix asphaltic concrete, stabilized base courses, granular base, and stabilized subgrade/embankment are considered to be non-swelling with no PI. Stabilized materials shall meet material requirements stated herein.

Unbound Base. Provide the appropriate unbound base as recommended in the TxDOT *Pavement Design Guide*. A minimum placement thickness of 6 inches is required.

Stabilized Base. Stabilized base may either be modified with chemical additives or asphaltic binders. Materials to be stabilized shall meet the requirements of either Grade 1, Grade 2, or Grade 5 base as defined by Item 247 of the TxDOT *Standard Specifications* or appropriate special provisions, and shall have a minimum thickness of 6 inches. Asphalt stabilized base material will meet the requirements of Item 292 of the TxDOT *Standard Specifications*. Item 292 may only be used in lieu of subbases, stabilized base, or unbound base. When chemical additives are used to stabilize base, Table 5 will be used to determine the stabilizer content. Stabilized base will be designed to achieve the unconfined compressive strength shown in Table 5 immediately following a 10-day capillary moisture conditioning. Moisture conditioning will be conducted in a similar method as that used in TEX-121-E.

Table 5. Minimum and maximum retained unconfined compressive strength values to be achieved when using chemical additives for stabilization, by pavement type.

Pavement Type	Minimum UCS (psi)	Maximum UCS (psi)
Flexible Pavement	300	500
Rigid Pavement	500	750

Subbases.

(a) Granular Materials. Materials classified by the Unified Soil Classification System as any of the following: GP, GM, SW, SP, SM, SC, ML, shall be stabilized if present within 30 inches of the finished pavement surface. The aforementioned materials may be used as a subbase and included as a structural layer when stabilized and meet the requirements of stabilized subbase as defined herein. These materials shall be stabilized, when required, to achieve a minimum layer thickness of 6 inches. Untreated granular base meeting the requirements of Item 247, Grade 1 or 2 may be used without restriction.

(b) Stabilized Subbase. Materials not included in Granular Materials above, do not meet the requirements of Item 247, TxDOT Standard Specifications, or materials that have a Plasticity Index (PI) value less than 25, may be stabilized and used as a structural layer. For structural layers, provide a minimum 8-inch thickness of compacted material. Stabilized subbase materials shall be designed to achieve not less than 100 psi unconfined compressive strength immediately following a 10-day capillary moisture conditioning. Moisture conditioning will be conducted in a similar method as that used in TEX-121-E. These materials shall be designed as defined in test methods used for the selected additive. Follow the TxDOT's *Pavement Design Guide* stabilization guidelines.

(c) Stabilized Subgrade. If subgrade stabilization is used for purposes of providing a working platform then no structural benefits can be claimed and the stabilized subgrade shall not be included in the pavement design. For structural layers, provide a minimum 8-inch thickness of compacted material. If a structural layer is required, design and mold subgrade material with the desired additive using the TxDOT test method appropriate for the additive incorporated. The design shall achieve not less than 100 psi unconfined compressive strength immediately following a 10-day capillary moisture conditioning conducted in a method similar to that used in TEX-121-E. Follow the TxDOT's *Pavement Design Guide* stabilization guidelines.

Underseal. The DB Contractor shall place a one (1) course surface treatment as an underseal, using materials identified below, directly on top of any untreated or treated base layer.

- ASPH (AC - 5, AC-10, CRS – 2, HFRS-2) (estimated at 0.36 gal/sy) underseal
- AGGR (TY PB GR 4 OR TY PB GR 4S) SAC - B (estimated at 1/90 cy/sy) underseal

Final Surface Course.

(a) State Maintained Overlay Areas. The DB Contractor shall use the following pavement section only for state maintained overlay areas specified in Section 1.2.1.2:

- Superpave Mixture - D SAC - B PG76 - 22 (2") overlay per Special Specification 3XXX in Attachment 8-3
- ASPH (AC - 15P, HFRS - 2P, OR CRS - 2P) (estimated at 0.36 gal/sy) underseal
- AGGR (TY PB GR 4 OR TY PB GR 4S) SAC - B (estimated at 1/90 cy/sy) underseal

DB Contractor shall repair approximately 6,000 SF of full depth pavement prior to overlay at a location to be directed by the State.

(b) State Maintained Seal Coat Areas. The DB Contractor shall use the following for state maintained seal coat areas specified in Section 1.2.1.3:

- ASPH (AC - 15P, HFRS - 2P, OR CRS - 2P) (estimated at 0.36 gal/sy)
- AGGR (TY PB GR 4 OR TY PB GR 4S) SAC - B (estimated at 1/110 cy/sy)

(c) Mainlines and Ramps. The final surface course for all mainlines and ramps shall be Superpave Mixture - D SAC - B PG76 - 22 per Special Specification 3XXX in Attachment 8-3. For Developer maintained areas, the minimum surface thickness is 1.5". For State maintained areas on the mainline the minimum surface thickness is 2".

(d) Frontage Roads. For newly constructed frontage roads, the surface course shall be either:

- Superpave Mixture - D SAC - B PG76 - 22 per Special Specification 3XXX in Attachment 8-3.
- Dense-Graded Hot-Mix Asphalt Ty D SAC – B per Special Specification 3XXX in Attachment 8-3
- A two-course surface treatment (2CST)

(e) Controlled Intersections. A seal coat final surface will be allowed on the frontage roads, but not in the controlled intersections. For controlled intersections, the Ty D hot mix or Superpave material is required and shall extend a minimum of 200 feet on all intersecting public roadways.

8.3.2 Construction Verification

General. The independent Construction Quality Assurance Firm (CQAF) shall perform the DB Contractor's quality acceptance. The construction verification tasks described below are part of the CQAF quality acceptance efforts.

When performing construction activities under or adjacent to existing structures or Utilities, the DB Contractor shall limit vertical settlements and ground deformations so as to not damage structures, including foundation Elements, and/or Utilities. For those occurrences involving third party structures and Utilities, the DB Contractor shall coordinate excavation activities with Section 5 and 6. For those occurrences involving TxDOT's structures and Utilities, the DB Contractor shall coordinate excavation activities with TxDOT.

Effective Modulus of Subgrade Reaction. The DB Contractor shall verify that the design effective modulus of subgrade reaction has been achieved through the field construction activities. This verification process shall include field sampling and testing activities designed to provide confirmation of the design effective modulus of subgrade reaction. This verification process shall be described in a plan that includes, but not limited to, the verification methodology, example calculations, reference documents, and frequency of field sampling and testing. The DB Contractor shall submit this verification plan to the TxDOT for review and comment.

Effective Resilient Modulus, (MR). The DB Contractor shall provide subgrade modulus verification testing in accordance with AASHTO T307. Retrieve a randomly selected verification sample at a minimum rate of one sample (three replicates per sample) for each 2500 linear feet of roadbed; where the roadbed has a dimensioned width greater than 100 feet, one additional sample will be collected and tested. Frontage and other access roads are sampled and tested independently if more than 100 feet separates the roadbeds or are not parallel to the mainline alignment. Additional samples shall also be taken at each location where a significant and recognizable change in subgrade material (a change in USCS classification) is encountered during grading operations.

Where multiple layers of material are present, MR shall be determined for the representative soil within three feet in depth from the finished pavement subgrade elevation. Where rock is the predominant subgrade and MR determination is not practical, a maximum MR of 25,000 psi may be assumed.

Regardless of the position of the layer or material sampled and tested, use only the AASHTO T307 load sequence number 7 of 15 for verification testing (4 psi confining pressure, 4 psi maximum axial stress for Type 2 materials; 10 psi confining pressure, 10 psi maximum axial stress for Type 1 materials). The MR results from this testing shall be compared to the Effective MR selected for use in designing the pavement structure, to confirm that the material meets the design criteria. If the materials fail to meet the criteria, DB Contractor shall be responsible to take corrective action that is acceptable to the TxDOT.

Effective Plasticity Index (PI). The DB Contractor shall demonstrate to TxDOT that the specified design requirements are met by randomly selecting at least one location per 2,500 linear feet of roadbed and shall sample the subgrade materials to a depth below finished pavement surface as designated by the pavement design. Mainline roadbeds, ramps, and frontage roadbeds are considered independently. Sampling shall also take place when a recognizable change in the subgrade material is encountered during grading operations as determined by a change in Unified Soil Classification System classification.

The DB Contractor shall provide for the testing of these materials in accordance with Tex-106-E to determine the Effective PI. The results shall be compared to design requirements to confirm that the strata meet the design criteria. If the materials fail to meet the criteria, DB Contractor shall be responsible to take corrective action that is acceptable to TxDOT. Refer to the TxDOT's *Pavement Design Guide* for more details.

Smoothness Specification. Smoothness of the pavement constructed shall conform to the requirements of TxDOT Item 585, Ride Quality for Pavement Surfaces, amended as cited below:

Article 585.3D. Acceptance Plan and Pay Adjustments. The entire section is voided and replaced by the following:

TxDOT will evaluate profiles based on the CQAF test results to determine acceptance and corrective action. Corrective action acceptable to TxDOT is required, at DB Contractor's sole expense, for any 0.1-mile section that measures an average IRI in excess of 75 inches per mile for rigid pavements, or in excess of 65 inches per mile for flexible pavements. After making corrections, re-profile the pavement section to verify that corrections have produced the required improvements.

Use diamond grinding or other methods approved by TxDOT to correct surface areas that have more than 1/8 inch variation between any two contacts on a 10-foot straightedge. Use diamond grinding or other approved methods to remove localized roughness as determined using an inertial profiler in accordance with TEX-1001-S. For asphalt concrete pavements, fog seal the aggregate exposed from diamond grinding.

Article 585.4 Measurement and Payment. The entire section is voided.

Smoothness Specification for state maintained overlay areas. The International Roughness Index (IRI) for overlay areas defined in Section 1.2.1.2 shall be reduced to 50% of the existing IRI upon completion of surface placement.

9 LAND SURVEYING

9.1 General Requirements

DB Contractor shall provide accurate and consistent land surveying and mapping necessary to support design and construction of the Project.

DB Contractor shall review existing survey data and determine the requirements for updating or extending the existing survey and mapping data. DB Contractor is responsible for the final precision, accuracy, and comprehensiveness of all survey and mapping.

9.2 Administrative Requirements

9.2.1 Standards

DB Contractor shall ensure that all surveying conforms to the *General Rules of Procedures and Practices* of the Texas Board of Professional Land Surveying. DB Contractor shall ensure that any person in charge of a survey field party is proficient in the technical aspects of surveying.

9.2.2 Right-of-Entry

DB Contractor shall secure written permission prior to entering any private property outside the ROW. It shall be DB Contractors' sole responsibility to negotiate this permission and DB Contractor shall be responsible for any and all damages and claims resulting from that ingress. Proper documentation of right-of-entry shall be maintained at all times by DB Contractor.

9.2.3 Survey by TxDOT

In performing surveys for other adjoining projects, TxDOT may need to verify and check DB Contractor's survey work. DB Contractor shall coordinate with the DB Contractor of the adjoining project regarding planned construction activities. DB Contractor shall notify TxDOT within 2 Business Days if TxDOT stakes and marks are altered or disturbed.

9.3 Design Requirements

9.3.1 Units

All survey Work shall be performed in U.S. Survey Feet. Work shall conform to state plane coordinates. The surface adjustment factor for the Project is 1.00006 (Plane Coordinates x 1.00006 = Surface Coordinates).

9.3.2 Survey Control Requirements

DB Contractor shall base all additional horizontal and vertical control on the control provided by TxDOT.

DB Contractor shall establish and maintain additional survey control as needed throughout the duration of the Project. DB Contractor shall tie any additional horizontal and vertical control for the Project to the TxDOT-supplied control network. If DB Contractor chooses to use GPS methods, DB Contractor shall meet the accuracy of the appropriate level of survey as defined in the TxDOT *Survey Manual* and shall utilize the survey control to be provided by TxDOT.

All survey control points shall be set and/or verified by a Registered Professional Land Surveyor licensed in the State of Texas.

Monuments shall be TxDOT -survey markers installed - and marked as directed by the most current edition of the TxDOT Survey Manual. - DB Contractor shall make all survey computations and observations necessary to establish the exact position of all other control points based on the primary control provided.

DB Contractor shall deliver to TxDOT a listing of all control coordinate values, original computations, survey notes, and other records, including GPS observations and analysis made by DB Contractor as the data are available.

9.3.3 Conventional Method (Horizontal & Vertical)

If DB Contractor chooses to use conventional methods to establish additional horizontal control, DB Contractor shall meet the accuracy of the appropriate level of survey as defined in the TxDOT Survey Manual.

Horizontal control is to be established on the Texas State Plane Coordinate System, South Zone, North American Datum of 1983 (NAD 93).

* TxDOT policy requires all bearings or angles be based on the following source: Grid bearing of the Texas Coordinate System of 1983, with the proper zone and epoch specified.

Vertical control shall be established on the North American Vertical Datum of 1988 (NAVD 1988).

9.3.4 Access to TxDOT VRS GPS Network

If DB Contractor chooses to use the TxDOT VRS GPS Network, DB Contractor shall contact the local TxDOT District Survey Coordinator for the appropriate application and usage agreement.

9.3.5 Right of Way Surveys

Not applicable.

9.3.6 Survey Records and Reports

DB Contractor shall produce a horizontal and vertical control report including coordinate listing, maps showing control, preparation of standard TxDOT data sheets for all primary control, monument description and location description of all primary and secondary survey control points installed, marked and referenced along with a listing of the existing control used to create the installed control points. Control from adjoining, incorporated, or crossed roadway projects, which are currently in design, will be located and a comparison of the horizontal and vertical values will be shown. DB Contractor shall provide survey records and reports to TxDOT upon request.

DB Contractor may use an electronic field book to collect and store raw data. DB Contractor shall preserve original raw data and document any changes or corrections made to field data, such as station name, height of instrument, or target. DB Contractor shall also preserve raw and corrected field data in hardcopy output forms in a similar manner to conventional field book preservation.

Field survey data and sketches that cannot be efficiently recorded in the electronic field book shall be recorded in a field notebook and stored with copies of the electronic data.

All field notes shall be recorded in a permanently bound book. (Loose leaf field notes will not be allowed.) DB Contractor shall deliver copies of any or all field notebooks to TxDOT upon request.

9.4 Construction Requirements

9.4.1 Units

All survey Work shall be performed in U.S Survey Feet. Work shall conform to state plane coordinates.

9.5 Deliverables

9.5.1 Survey Records

DB Contractor shall deliver to TxDOT, for its review and acceptance, a listing of all primary, secondary control coordinate values, original computations, survey notes and other records including GPS observations and analysis made by DB Contractor within 90 days of Final Acceptance.

9.5.2 Final ROW Surveying and Mapping

Not applicable.

9.5.3 ROW Monuments

Not applicable.

9.5.4 Record Drawings and Documentation

DB Contractor shall submit the following as part of the Record Drawings and as a condition of Final Acceptance:

a) A listing of all primary and secondary control coordinate values, original computations and other records including Global Positioning System (GPS) observations and analysis made by DB Contractor

b) Copies of all survey control network measurements, computations, unadjusted and adjusted coordinate and evaluation values; and

c) Survey records and survey reports.

DB Contractor shall produce reports documenting the location of the as-built alignments, profiles, structure locations, Utilities, and survey control monuments. These reports shall include descriptive statements for the survey methods used to determine the as-built location of the feature being surveyed. DB Contractor's as-built data shall include the coordinate types (x, y, and/or z) and feature codes in the same format in which the preliminary construction data was generated. Where data has been provided to DB Contractor from TxDOT in an x, y, z only coordinate format, or z only coordinate format, DB Contractor shall provide TxDOT with data in an x, y, z only coordinate format or z only coordinate format.

10 GRADING

10.1 General Requirements

DB Contractor shall conduct all work necessary to meet the requirements of grading, including clearing and grubbing, excavation and embankment, removal of existing buildings, pavement and miscellaneous structures, subgrade preparation and stabilization, dust control, aggregate surfacing and earth shouldering, in accordance with the requirements of this Section 10.

DB Contractor shall demolish or abandon in place, all existing structures within the Project ROW, including but not limited to, pavements, bridges, and headwalls that are no longer required for service, or are required to be treated as described in Section 4 (Environmental). Any features that are abandoned in place shall be removed to at least two (2) feet below the final finished grade or one (1) foot below the pavement stabilized subgrade and drainage structures. DB Contractor shall ensure that abandoned structures are structurally sound after abandonment.

10.2 Preparation within Project Limits

DB Contractor shall develop, implement, and maintain, for the Term, a Demolition and Abandonment Plan that considers types and sizes of Utilities and structures that will be abandoned during the Term. The plan shall ensure that said structures are structurally sound after the abandonment procedure. The plan be submitted to TxDOT for approval no later than 60 days prior to the scheduled date for NTP2.

TxDOT reserves the right to require DB Contractor, at any time to salvage and deliver to a location designated by TxDOT within the TxDOT District in which the Project is located, any TxDOT-owned equipment and materials in an undamaged condition. TxDOT reserves the right to require DB Contractor to salvage and deliver to a reasonable location designated by TxDOT any ITS equipment and materials in an undamaged condition.

Unless otherwise specified by TxDOT, the material from structures designated for demolition shall be DB Contractor's property. All material removed shall be properly disposed of by DB Contractor outside the limits of the Project.

10.3 Slopes and Topsoil

DB Contractor shall use the latest edition of the latest edition of the *AASHTO Roadside Design Guideline* regarding design limitations and roadside safety guidelines associated with the design of slopes along roadways. DB Contractor shall adjust grading to avoid and minimize disturbance to any identified waters of the U.S.

DB Contractor shall perform finished grading and place topsoil in all areas suitable for vegetative slope stabilization (and areas outside the limits of grading that are disturbed in the course of the Work) that are not paved. DB Contractor shall use only materials and soils next to pavement layers that do not cause water or moisture to accumulate in any layer of the pavement structure. For areas outside DB Contractor's limits of maintenance, DB Contractor shall provide stable slopes. For slopes steeper than 4:1, DB Contractor shall submit to TxDOT a slope stability analysis that demonstrates the adequacy of DB Contractor's design. DB Contractor shall submit the slope stability analysis to TxDOT for approval with the Released for Construction Documents.

DB Contractor shall leave at least five feet from the edge of the ROW to the toe of slope.

10.4 Sodding

DB Contractor shall use drill seed native grass species.

11 ROADWAYS

11.1 General Requirements

The objectives of the Project include the provision of a safe, reliable, cost-effective, and aesthetically-pleasing corridor for the traveling public. The requirements contained in this Section 11 provide the framework for the design and construction of the roadway improvements to help attain the Project objectives.

DB Contractor shall coordinate roadway design, construction, and maintenance with other Elements of the Project to achieve the objectives of the Project.

Where changes to the roadway geometrics result in revisions to the Project ROW, DB Contractor is responsible for demonstrating the proposed change is an equally safe alternative as well as the initiation and progression of all environmental and public involvement processes in coordination with TxDOT. DB Contractor shall perform all ROW services that are necessitated by proposed changes in accordance with the Contract Documents.

11.2 Design Requirements

DB Contractor shall coordinate its roadway design with the design of all other components of the Project, including aesthetics. The Project roadways shall be designed to integrate with streets and roadways that are adjacent or connecting to the Project. All design transitions to existing facilities shall be in accordance with the latest edition of the TxDOT *Roadway Design Manual*.

DB Contractor shall design all Elements in accordance with the applicable design criteria and Good Industry Practice based on the Design Speeds for various Elements.

The Project roadways shall be designed to incorporate roadway appurtenances, including fences, noise attenuators, barriers, and hazard protection as necessary to promote safety and to mitigate visual and noise impacts on neighboring properties.

11.2.1 Control of Access

Unless shown to be deleted in the Project Schematic, DB Contractor shall maintain all existing property accesses, including those not shown on the schematic, and shall not revise control of access without TxDOT review and the written agreement of the affected property owner.

11.2.2 Roadway Design Requirements

DB Contractor shall design the Elements of the Project to meet or exceed the geometric design criteria shown in table 11-1 and specified in the latest edition of the TxDOT *Roadway Design Manual*.

Table 11-1 Roadway Design Criteria

	Mainlanes	Frontage Roads	Ramps	Cross Streets
Functional Classification	Rural freeway	Rural collector	-	See Table 11-2
Design Speed	70 mph	45 mph	50 mph	40-45 mph
Superelevation	e(max)= 6%	e(max)= 6%	e(max)= 6%	N/A
Maximum Curvature (Min Radius) w/o Superelevation	10,750 ft	-	6,030 ft[1]	-
	Cross Section Criteria:			

Lane Widths	12 ft	12 ft	14 ft (one)	12 ft
U-turn width	-	25 ft	-	-
Inside Shoulder Widths for Curves	4 ft	4 ft	2 ft	-
Outside Shoulder Widths	10 ft	8 ft	6 ft	-
Pavement Cross Slope	0.02 ft/ft	0.02 ft/ft	0.02 ft/ft	0.02 ft/ft
Side Slopes				
Within Clear Zone	6:1	6:1	6:1	6:1
Outside of Clear Zone	6:1 usual 4:1 max	6:1 usual 4:1 max	6:1 usual 4:1 max	6:1 usual 4:1 max
Gore Width - Entrance	-	-	6 ft min	-
Gore Width - Exit	-	-	6 ft min	-
Clear Zone Width[1]	30 ft	10 ft	16 ft	10 ft
	Intersection horizontal and vertical criteria:			
Corner Radii	-	40 ft min	-	-
Design Vehicle (Intersections)	WB-62	WB-62	WB-62	See Table 11-2
Preferred Corner Geometry	-	Curve w/ taper	-	-

Note:
1. Horizontal clearance to accommodate farming equipment, minimum 30' width.

DB Contractor shall coordinate, design and construct the improvements on crossing streets in accordance with the Governmental Entity having jurisdiction of said roadway.

11.2.2.1 Superelevation

Existing superelevation in areas where ramps are to connect to existing pavement may be retained at existing superelevations. Pavement widening may be constructed by extending the existing pavement cross slope. Superelevation transitions shall be designed and constructed such that zero percent cross-slopes will not occur unless otherwise approved by TxDOT.

DB Contractor shall remove existing crowns at overlay locations, except at existing bridge ends where a transition is required to match an existing crowned bridge section. Milling more than 2 inches will trigger this stretch of the overlay pavement to be treated as a pavement reconstruction and be included in the CMA. The transition from existing cross slope to 2 percent shall occur within 1-foot of the closest lane line to the roadway widening. DB Contractor shall inspect and adjust existing guardrails for proper heights in overlay areas.

11.2.2.2 Roadway Design Deviations

Roadway design deviations will require approval by TxDOT.

11.2.3 Miscellaneous Roadway Design Requirements

All roadside safety devices used on the Project shall meet current crash test and other safety requirements in accordance with TxDOT standards.

Driveways shall be designed in accordance with the guidelines, which will be considered requirements, specified in TxDOT's *Roadway Design Manual* – Appendix C, "Driveways Design Guidelines" to be functionally adequate for land use of adjoining property.

The border width, measured from back of curb, along frontage roads and crossing streets shall be 15 feet minimum unless specified otherwise.

Table 11-2 Cross Streets

Intersecting Street	Functional Classification	Design Speed (MPH)	Configuration (Over/Under)	Design Vehicle	CONFIGURATION													
					EASTBOUND							WESTBOUND						
					U-Turn	Sidewalk Minimum Width	Curb	Curb Offset	Through Lanes	Shoulders	Turn Lanes	Shoulders	Through Lanes	Curb Offset	Curb	Sidewalk Minimum Width	U-Turn	Pedestrian Rail Above Bridge Barrier?
Existing E. Corral Ave./FM 1898	Urban – Low Speed	45	Under	WB-67	Y-25’	Y – 6’	Y	2’	2 (12’)		Y		2 (12’)	2’	Y	N	Y-25’	N
U-Turn	Rural – Low Speed	40	Under	WB-67	N	N	N	-	N		N		N	-	N	N	Y-36’	N
CR 4	Rural – Low Speed	40	Under	WB-67	N	N	N	-	12’	10’	N	10’	12’	-	N	N	N	N
E. 6th St.	Urban – Low Speed	40	Under	WB-67	N	N	N	-	2 (12’)		Y – (14’)		2 (12’)	-	N	N	Y-25’	N
FM 257/ E. 4th St.	Urban – Low Speed	40	Under	WB-67	Y-25’	N	N	-	2 (12’)		Y – (14’)		2 (12’)	-	N	N	N	N
Existing FM 70	Urban – Low Speed	45	Under	WB-67	N	N	N	-	2 (12’)		Y – (14’)		2 (12’)	-	N	N	N	N
CR 10	Rural – Low Speed	40	Under	WB-67	N	N	N	-	2 (12’)	4’	N	10’	12’	-	N	N	N	N
FM 3354/CR 12	Rural – Low Speed	40	Under	WB-67	N	N	N	-	12’	10’	N	10’	12’	-	N	N	N	N
CR 14	Rural – Low Speed	N/A	N/A	WB-67	N	N	N	-	12’	10’	N	10’	12’	-	N	N	N	N
CR 16	Rural – Low Speed	N/A	N/A	WB-67	N	N	N	-	12’	10’	Y – (14’)	10’	12’	-	N	N	N	N

12 DRAINAGE

12.1 General Requirements

Efficient performance of the drainage system is an integral part of the performance of the Project. DB Contractor shall account for all sources of runoff that may reach the Project, whether originating within or outside the Project ROW, in the design of the drainage facilities.

If existing drainage patterns are revised during the Project design, then the DB Contractor shall design and construct a solution that does not adversely impact property owners outside the ROW.

12.2 Administrative Requirements

12.2.1 Data Collection

To establish a drainage system that complies with the requirements and accommodates the historical hydrologic flows in the Project limits, DB Contractor is responsible for collecting all necessary data, including those elements outlined in this Section 12.2.1.

DB Contractor shall collect available data identifying all water resource issues, including water quality requirements as imposed by State and federal government regulations; National Wetland Inventory and other wetland/protected waters inventories; in FEMA mapped floodplains; and official documents concerning the Project, such as the EA or other drainage and environmental studies. Water resource issues include areas with historically inadequate drainage (flooding or citizen complaints), environmentally sensitive areas, localized flooding, maintenance problems associated with drainage, and areas known to contain Hazardous Materials. DB Contractor shall also identify watershed boundaries, protected waters, county ditches, areas classified as wetlands, floodplains, and boundaries between regulatory agencies (e.g., watershed districts and watershed management organizations).

DB Contractor shall acquire all applicable municipal drainage plans, watershed management plans, and records of citizen concerns. DB Contractor shall acquire all pertinent existing storm drain plans and/or survey data, including data for all culverts, drainage systems, and storm sewer systems within the Project limits. DB Contractor shall also identify existing drainage areas that contribute to the highway drainage system and the estimated runoff used for design of the existing system.

DB Contractor shall obtain photogrammetric and/or geographic information system (GIS) data for the Project limits that depicts the Outstanding National Resource Waters and/or impaired waters as listed by the TCEQ. DB Contractor shall conduct surveys for information not available from other sources.

If documentation is not available for Elements of the existing drainage system within the Project limits and scheduled to remain in place, DB Contractor shall investigate and videotape or photograph the existing drainage system to determine condition, size, material, location, and other pertinent information.

The data collected shall be taken into account in the Final Design of the drainage facilities.

Within 30 Days of Substantial Completion, DB Contractor shall submit to TxDOT, as part of the Record Drawings, a Drainage Design Report, which shall be a complete documentation of all components of the Project's drainage system. At a minimum, the Drainage Design Report shall include:

a) Record set of all drainage computations, both hydrologic and hydraulic, and all support data.
b) Hydraulic notes, models, and tabulations
c) Storm sewer drainage report
d) Bridge and culvert designs and reports for major stream crossings
e) Correspondence file

f) Drainage system data (location, type, material, size, and other pertinent information) in a suitable electronic format

12.2.2 Coordination with Other Agencies

DB Contractor shall coordinate all water resource issues with affected interests and regulatory agencies. DB Contractor shall document the resolutions of water resource issues.

The DB Contractor shall provide to the local floodplain administrators all information and technical data needed to file Letters of Map Revision (LOMR) with FEMA.

12.3 Design Requirements

DB Contractor shall design all Elements of the drainage facilities in accordance with the applicable design criteria and Good Industry Practice.

The design of drainage systems shall include reconfiguration of the existing drainage systems within the Project limits, and design of new and reconfigured storm drainage systems as required to meet the performance requirements as defined in this Section 12.

DB Contractor shall provide facilities compatible with existing drainage systems and all applicable municipal drainage plans or approved systems in adjacent properties. DB Contractor shall preserve existing drainage patterns wherever possible.

Elements of the existing drainage system within the Project limits scheduled to remain in place must meet hydraulic capacity requirements as detailed in Section 12. If any Elements of the existing system do not comply with the requirements of Section 12 (Drainage) or Section 13 (Structures), those Elements shall be replaced by DB Contractor.

DB Contractor may make use of existing drainage facilities, provided overall drainage requirements for the Project are achieved and the combined drainage system functions as intended.

DB Contractor shall base its Final Design on design computations and risk assessments for all aspects of Project drainage.

DB Contractor shall design roadside open channels such that the profiles have adequate minimum grade of 0.15%.

The DB Contractor shall provide a drainage system that maintains or improves the existing drainage.

Surface Hydrology

12.3.1.1 Design Frequencies

DB Contractor shall use the recommended design frequencies listed in Table 4-2 of the *TxDOT Hydraulic Design Manual* (Revised October 2011 or latest edition).

12.3.1.2 Hydrologic Analysis

DB Contractor shall design for the future changes in land use that may affect the magnitude of runoff and therefore the design capacity of drainage structures. DB Contractor shall incorporate anticipated changes in the basin land use, characteristics, or water operations into the hydrologic parameters. DB Contractor shall design all drainage facilities to accommodate probable land in accordance with current development policy.

DB Contractor shall design drainage structure capacities for the frequencies for the maximum hydrologic conditions as described in Table 4-2 of the TxDOT Hydraulic Design Manual (Revised October 2011 or latest edition).

12.3.2 Storm Sewer Systems

Where precluded from handling runoff with open channels by physical site constraints, or as directed in this Section 12, DB Contractor shall design enclosed storm sewer systems to collect and convey runoff to appropriate discharge points.

DB Contractor shall prepare a storm sewer drainage report encompassing all storm sewer systems that contains, at a minimum, the following items:

a) Drainage area maps for each storm drain inlet with pertinent data, such as boundaries of the drainage area, topographic contours, runoff coefficients, time of concentration, and land use with design curve number and/or design runoff coefficients, discharges, velocities, ponding, and hydraulic grade line data.
b) Location and tabulation of all existing and proposed pipe and drainage structures. These include size, class or gauge, catch basin spacing, detailed structure designs, and any special designs.
c) Specifications for the pipe bedding material and structural pipe backfill on all proposed pipes and pipe alternates.
d) Complete pipe profiles, including pipe size, type, and gradient; station offsets from the centerline of the roadway; length of pipe; class/gauge of pipe; and numbered drainage structures with coordinate location and elevations.

This report shall be a component of the Drainage Design Report.

DB Contractor shall design all storm sewer systems such that the hydraulic grade line for the design frequency event is at or below the flow line of:

a) curb intlet;
b) the top of grate inlet; and
c) the top of a manhole cover.
d) Runoff within the jurisdiction of the USACE shall be conveyed in accordance with applicable laws and permits.

12.3.2.1 Pipes

Table 12-1: Pipe Design Criteria

Design Element	Mainlanes	Ramp	Direct Connect.	Frontage Road	Arterial / Cross Street	Application Notes
Storm Drain Conduits – General						
Conduit Material/Type	RCP or RCB					
Design Conduit Size	Full flow pipe capacity >= design Q					
Conduit Size Changes	Match soffits at conduit size changes, if possible. Matching flowlines is acceptable if grade is limited.					
Manholes/ Junctions	TxDOT Bridge Division Manhole Type M Junction Box with Access All other junction boxes require special design.					Refer to chapter 10 of the TxDOT Hydraulic Design Manual (Revised October 2011 or latest edition).
Conduit Connections	1. Lateral stub-in to boxes require 2' minimum size differential. 2. Pipe to pipe stub-in requires 3' minimum size differential. 3. Other connections require manhole, junction box, or junction box without riser. 4. Provide detail for accommodating multiple (parallel) conduits at junctions - use equalizer openings.					
Minimum Vertical Clearance (Cover)	1 ft in graded areas and below the base of pavement structure					
Maximum Fill Height	Verify pipe strength requirements under high fill.					Use applicable TxDOT standards and 2004 *TxDOT Standard Specification Book* or latest edition
Location near Retaining Wall	1. Where possible, avoid placement of conduit parallel to MSE wall if located within wall backfill. 2. Preferred lateral placement is under wall, normal to wall alignment. 3. If conduits are outside of and parallel to a fill wall, offset conduit 15 ft minimum from face of wall. If less spacing is required, review with TxDOT.					
Storm Drain Conduits – Laterals						
Minimum Pipe Size	18"	18"	18"	18"	18"	
Minimum Slope	0.15%					
Maximum Slope	3%					Steeper allowed with TxDOT approval
Minimum Velocity	2 ft/sec at full flow					
Maximum Velocity	10 ft/sec					
Storm Drain Conduits – Trunk Lines						

Design Element	Mainlanes	Ramp	Direct Connect.	Frontage Road	Arterial / Cross Street	Application Notes
Minimum Pipe Size	24"	24"	24"	24"	24"	
Minimum RCB Depth	3'	3'	3'	3'	3'	Use of <3' depth requires approval by TxDOT
Minimum Slope	0.15%					
Maximum Slope	3%					Steeper allowed with TxDOT approval
Minimum Velocity	2 ft/sec at full flow					
Maximum Velocity	10 ft/sec					

12.3.2.2 Ponding

DB Contractor shall design drainage systems to limit ponding to the widths listed in chapter 10 section 2 of the *TxDOT Hydraulic Design Manual* (Revised October 2011 or latest edition).

12.3.3 Miscellaneous Drainage Design Requirements

Refer to in Table 4-2 of Separation Ditch Design Criteria

In general, separation ditches shall collect and convey runoff from between the mainlanes and frontage roads to appropriate discharge points. Design of separation ditches shall follow the guidelines listed below in Table 12-4:

Table 12-2: Separation Ditch Design Criteria

Design Element	Mainlanes	Ramp	Direct Connect.	Frontage Road	Arterial / Cross Street	Application Notes
Minimum Depth	Variable					
Maximum Depth	Dictated by roadway design					
Minimum Slope	Minimum slope should be 0.15% if grass lined or pavers if concrete lined					
Maximum Slope	Based on sheer stress of lining					
Maximum Flow Depth	Top of bank					
Side Slopes/ Shape	Based on roadway design criteria and typical section					
Ditch Inlet Types	Separation Ditches: Type H drop inlet, SET Side Road Ditches: Type H drop inlet, SET					Provide detail to add concrete riprap collar 2'-wide around inlet perimeter.

12.3.3.1 Inlet Design Criteria

Inlets shall be placed in accordance with the criteria shown below in Table 12-3 and the *TxDOT Hydraulic Design Manual* (Revised October 2011 or latest edition):

Table 12-3: Inlet Design Criteria

Design Element	Mainlanes	Ramp	Direct Connect.	Frontage Road	Arterial / Cross Street	Application Notes
Storm Drain Inlets						
Inlet Locations						1. On-grade: Place inlets to keep gutter ponding <= allowable. Carryover is acceptable. 2. Low points: Verify inlet location is at sag of vertical curve, not at P.I. Place flanking inlets both sides of low point at a maximum spacing of 100' from low point. 3. Redundant inlets: End of curb returns at intersection and in separation ditches. 4. 100% flow interception: On pavement at end of ret. wall, at ramp gores, at intersections. 5. Provide detail for equalizer pipes to connect multiple boxes in trunkline at inlets.

12.3.4 Stormwater Storage Facilities

DB Contractor shall complete preliminary design of the stormwater storage facilities to meet requirements for water quality, water quantity, and rate control, as determined by the Texas NPDES regulations. Local requirements, if more stringent, shall be handled by DB Contractor with a third party agreement.

DB Contractor shall ensure that stormwater storage facilities meet the requirements listed above by performing all required analyses. Such analyses shall include flood routing analysis, which includes a detailed routing analysis for ponds affected by significant environmental issues such as hazardous waste or groundwater concerns.

12.3.5 Hydraulic Structures

12.3.5.1 Culverts

DB Contractor shall analyze existing and proposed culverts and drainage-ways impacted, replaced, or created by the Project design, for any localized flooding problems.

Where culvert design is influenced by upstream storage, the analysis of the storage shall be incorporated into the design of the culvert.

For all culverts, the maximum allowable headwater elevation for the design frequency shall not exceed one foot below the shoulder point of intersection elevation of the applicable roadway low point.

Existing culverts to remain in place that will not be extended, will not be subject to this Section 12.3.5.1.

12.3.5.2 Bridges

All bridge hydraulic computations, designs, and recommendations shall be consistent with past studies and projects in the area by the USACE and other State or federal agency studies and projects.

Where bridge design is influenced by upstream storage, the analysis of the storage shall be considered in the design of the bridge.

12.3.5.2.1 Method Used to Estimate Flows

DB Contractor shall ensure that the selected hydrologic method is appropriate for the conditions in the watershed.

For all crossings located within a FEMA studied floodplain (Zone AE) with peak flow information, DB Contractor shall gather and utilize, as appropriate, the current effective model.

For a crossing not located within a FEMA Zone AE but on the same waterway as a stream gauging station with a length of record of at least 25 years, DB Contractor shall collect and use the flow data available from the station, as appropriate, to determine design flows within the following limitations, provided there is no major control structure (e.g., a reservoir) between the gauge and the Project:

a) For crossings near the gauging station on the same stream and watershed, use the discharge directly for a specific frequency from the peak stream flow frequency relationship.
b) For crossings within the same basin but not proximate to the gauging station, transposition of gauge analysis results is allowable.
c) For crossings not within a gauged basin, the peak-flow flood frequency shall be developed using data from a group of several gauging stations based on either a hydrologic region (e.g., regional regression equations), or similar hydrologic characteristics.
d) If no significant changes in the channel or basin have taken place during the period of record, the stream gauging data may be used. The urbanization character of the watershed must not be likely to change enough to affect significantly the characteristics of peak flows within the total time of observed annual peaks and anticipated service life of the highway drainage facility.

For crossings not located within a FEMA Zone AE or on a gauged waterway, DB Contractor shall select the appropriate method for calculating the design flows based on site conditions and on chapter 4 section 7 of the *TxDOT Hydraulic Design Manual* (Revised October 2011 or latest edition)..

12.3.5.2.2 Design Frequency

Major waterway crossings, bridges, culverts and storm drain systems shall be designed for the frequency corresponding to the functional classification of the associated roadway. The functional classification for each roadway is shown in Section 11.

DB Contractor shall evaluate bridges for contraction scour and pier scour concerns and incorporate protection in accordance with Good Industry Practice. The DB Contractor shall provide a scour analysis in accordance with TxDOT's *Geotechnical Manual* (Chapter 5 – Section 5 Scour) for all new bridges. If necessary, the DB Contractor shall provide countermeasures for any instability and scour problems in accordance with FHWA Hydraulic Engineering Circular No. 23 - *Bridge and Scour and Stream Instability Countermeasures Experience Selection and Design Guidance*.

For interstate highways, the design flood to be used in the detailed design shall be the 50-year frequency and provide a minimum of 2' of freeboard.

12.3.5.2.3 Hydraulic Analysis

DB Contractor shall design riprap at abutments in accordance with the procedures outlined in HEC-23. For bridge abutments in urban areas, DB Contractor shall install protection in accordance with the Project's aesthetic plan.

12.3.5.2.4 Bridge/Culvert Waterway Design

For existing crossings to be modified by DB Contractor, DB Contractor shall analyze the existing structure with the proposed flows to ensure the headwater does not exceed allowable. If this condition is

not met for the minimum frequency on the completed mainlane structures, DB Contractor shall design a replacement structure with sufficient capacity to pass the recommended design-frequency flows and ensure the maximum headwater for the recommended frequency event does not cause an adverse impact. Culvert extensions may increase the headwater elevation, but not above the maximum allowable headwater, with respect to adjacent property and floodplain concerns.

Bridge waterway design shall maintain the existing channel morphology through the structure, if possible. Existing frontage road structures to remain in place shall be exempt from that requirement.

12.3.5.2.5 Bridge Deck Drainage

Runoff from new bridge decks over named streams shall be carried off the bridge and into the adjacent roadway drainage system. The roadway drainage design shall include bridge approach drains to intercept gutter flow at each end of the bridge.

Stormwater flowing toward the new bridge shall be intercepted upstream from the approach slab. Runoff from new bridge deck drainage shall be treated as required by TCEQ or other applicable regulation prior to discharge to the natural waters of the State.

For existing bridges to be widened, rails for both sides (widened and existing) will need to be replaced with concrete rails; if the existing rails are open rails, both new rails will need to be open rails.

Table 12-4: Bridge Deck Drainage Design Criteria

Design Element	Mainlanes	Ramp	Direct Connect.	Frontage Road	Arterial / Cross Street	Application Notes
Bridge Deck Drainage	1. Drain free-fall through slots in rail, where falling water would not affect adjacent roadway/bridge or other features below. Review open slot (free-fall) locations with Program Team. 2. Outfall deck drain pipe system directly into nearby storm drain inlet or manhole below grade.					

12.3.5.2.6 Drainage Report for Major Stream Crossings

DB Contractor shall prepare a report for each major stream crossing. Major stream crossings are defined as waterways listed as a FEMA studied floodplain (Zone AE) or requiring a bridge or major culvert structure. The report shall include the detailed calculations and electronic and printed copies of the computer software input and output files, as well as a discussion about hydrologic and hydraulic analysis and reasons for the design recommendations. At a minimum, for each crossing the report shall include:

FEMA Special Flood Hazard Area (SFHA)

a) FIRMette

b) Discussion of SFHA and implications

Hydrology

a) Drainage area maps with watershed characteristics, hardcopy

b) Hydrologic calculations (where computer software is used, both hardcopy and electronic input and output files)

c) Historical or site data used to review computed flows

Hydraulics and Recommended Waterway Opening and/or Structure

a) Photographs of Site (pre- and post-construction)

b) General plan, profile, and elevation of recommended waterway opening and/or structure
c) Calculations – hardcopy of output, as well as electronic input and output files for all computer models used for final analysis or for permit request, as well as summary of the basis of the models
d) Cross-sections of waterway (DB Contractor shall provide a hard copy plot, plus any electronic data used)
e) Channel profiles

Scour Analysis

a) Channel cross-sections at bridge showing predicted scour
b) Calculations and summary of calculations, clearly showing predicted scour and assumptions regarding bridge opening and piers used to calculate predicted scour
c) Discussion of review of long-term degradation/aggradation and effects
d) Recommendation for abutment protection

This report shall be a component of the Drainage Design Report.

Major stream crossings are waterways with a FEMA studied SFHA or requiring a bridge class structure, which is defined as any bridge or a culvert with a total opening width greater than or equal to twenty feet. Any other waterway will be by default a minor stream crossing.

12.4 Drainage Design Report

A preliminary Drainage Design Report shall be submitted with prefinal set of construction plans. The preliminary Drainage Design Report shall include at a minimum everything included in the Final Drainage Design Report. Within 30 days of Service Commencement, DB Contractor shall submit to TxDOT, as part of the record set documents, a Final Drainage Design Report, which shall be a complete documentation of all components of the Project's drainage system. At a minimum, the Report shall include:

a) Record set of all drainage computations, both hydrologic and hydraulic, and all support data.
b) Hydraulic notes, models, and tabulations
c) Bridge and culvert designs and reports for major stream crossings including all items listed in Section 12.3.4.1.6
d) Correspondence file
e) Drainage system data (location, type, material, size, and other pertinent information) in a suitable electronic format
f) Storm sewer drainage reports (if applicable)

12.5 Construction Requirements

DB Contractor shall design drainage to accommodate construction staging. The design shall include temporary erosion control ponds and other Best Management Practices needed to satisfy the NPDES and other regulatory requirements. The water resources notes in the plans shall include a description of the drainage design for each stage of construction.

13 STRUCTURES

13.1 General Requirements

The structural Elements of the Project, including bridges, culverts, drainage structures, signage supports, illumination assemblies, retaining walls, and sound walls, shall be designed and constructed in conformance with the requirements of the Contract Documents, the current AASHTO *LRFD Bridge Design Specifications* except where directed otherwise by the TxDOT *Bridge Design Manual – LRFD* and the TxDOT *Geotechnical Manual*, in order to provide the general public a safe, reliable, and aesthetically-pleasing facility.

For bridges, walls, bridge class culverts, sign structures and other miscellaneous structures, a Corridor Structure Type Study and Report shall be submitted to TxDOT for review and comment prior to design of these Elements. At a minimum, structural concepts, details and solutions, soil parameters, hydraulics, environmental requirements, wetland impacts, safety, highway alignment criteria, constructability, aesthetics requirements, and continuity for the Project shall be evaluated in the Study and Report. Evaluation of existing structures that will be retained shall be included in the Study and Report. The Study and Report shall clearly define DB Contractor's action to achieve traditional TxDOT service life for Project bridges, walls, culverts and miscellaneous structures.

DB Contractor shall submit to TxDOT an inventory and operating ratings of constructed structures with the Record Drawings.

13.2 Design Requirements

DB Contractor shall obtain National Bridge Inventory (NBI) numbers from TxDOT for all bridges and bridge class culverts. The NBI numbers shall be shown on the applicable layout sheets of the Final Design Documents.

Bridges and retaining walls must be designed to allow an ultimate 6 lane facility meeting desirable *TxDOT Roadway Design Manual* guidelines with 2 mainlane expansion in the median (1 in each direction).

13.2.1 Design Parameters

Unless otherwise noted, design for all roadway and pedestrian structural elements shall be based on the Load and Resistance Factor Design (LRFD) methodology included in TxDOT's *Bridge Design Manual – LRFD* and the most recent AASHTO *LRFD Bridge Design Specifications*, including all interim revisions.

Pedestrian bridges shall additionally conform to the requirements of AASHTO *Guide Specifications for Design of Pedestrian Bridges* if such facilities are required.

The DB Contractor shall proportion bridge spans to avoid uplift at supports.

DB Contractor shall ensure that bridges crossing over waterways withstand a 100-year frequency event with no loss of structural integrity.

Bridges crossing over the Project shall, at a minimum, be designed to accommodate the Project and all planned expansions or updates of each facility by its respective owner as designated in the owner's current transportation master plan. Alignments shall meet the requirements indicated in Section 11 for the functional classification of each roadway.

All electronic and paper files and calculations design notebooks shall be made available at TxDOT's request.

13.2.2 Bridge Design Loads and Load Ratings

a) Live Loads

All roadway bridges and bridge class culverts shall be designed to accommodate the following live loads:

An HL-93 truck or a tandem truck plus lane load as defined in the AASHTO *LRFD Bridge Design Specifications* shall be utilized for bridges except pedestrian bridges.

Pedestrian bridges and sidewalks of vehicular bridges shall be loaded in accordance with requirements in the AASHTO *LRFD Bridge Design Specifications* and the AASHTO *Guide Specifications for Design of Pedestrian Bridges*. In addition, all pedestrian bridges shall also be designed for an AASHTO H-10 truck live load as defined in the AASHTO *Standard Specifications for Highway Bridges*, 17th edition to account for maintenance and emergency vehicles.

b) Additional Loads

Bridges (except pedestrian bridges) shall also be designed to accommodate a minimum future overlay load of 25 psf.

DB Contractor shall provide to TxDOT both an inventory and an operating rating of the constructed structures using a form provided by TxDOT. Load ratings shall be in accordance with AASHTO's *Manual for Condition Evaluation of Bridges*.

13.2.3 Bridge Decks and Superstructures

Fracture critical members shall not be used for bridges without written authorization from TxDOT and if allowed by TxDOT, fracture critical members shall be designed to allow full access for inspection.

The type of bridge shall not be restricted to those typically used by TxDOT. Other types and components may be used, but will be allowed only if:

a) They have been accepted for general use by the Federal Highway Administration (FHWA); and

b) DB Contractor can demonstrate that the design of the bridge type and components will meet the functional requirements of the Project.

Modular joints shall be used when anticipated movement exceeds 5 inches and shall be designed and tested for fatigue loading.

DB Contractor shall minimize the number of deck joints wherever possible. DB Contractor shall locate joints to provide for maintenance accessibility and future replacement. Joints for all grade separation structures shall be sealed.

DB Contractor shall design sidewalks to meet the criteria of the AASHTO *Roadside Design Guide* and protect sidewalks from vehicular impact by a TxDOT-approved bridge railing as required in the TxDOT *Bridge Railing Manual* based on roadway Design Speed. For the Project, pedestrian rail shall be used along structure pavement edges.

To the extent possible, DB Contractor shall make bridge superstructures, joints, and bearings accessible for long-term inspection and maintenance. DB Contractor shall make open-framed superstructures accessible with walkways or by use of ladders or an under-bridge inspection truck.

Steel and concrete box girders and caps (substructure) shall be accessible without impacting traffic below; DB Contractor shall make steel and concrete box girders and caps (substructure) with a minimum inside depth of six (6) feet to facilitate interior inspection. DB Contractor shall include a minimum access opening of 3’-0” diameter into all cells and between cells of the girders to allow free flow of air during

inspections. The outside access opening cover shall hinge to the inside of the box girder and caps (substructure). An electrical system (110V and 220V) shall be incorporated inside the box girder and caps (substructure) with lighting and power outlets. DB Contractor shall install air-tight, sealed and locked entryways on all hatches and points of access.

Segmental bridges shall additionally conform to the following:

a) Segmental bridge decks shall use deck protection systems to prevent infiltration of corrosive agents into reinforcing in the superstructure. The deck protection system used shall be such that cracking is minimized and adequate bond strength is developed with the superstructure.

b) If monolithically cast overlay is used as part of the deck protection system, the DB Contractor shall develop fully engineered design guidelines for the thickness of the monolithic concrete removed and replaced in a manner that keeps distress and changes in surface profile at the time of concrete removal to levels that do not reduce the structural integrity of the structure.

c) All expansion joints shall be sealed or drained. External tendons, if used, shall be protected with a water-tight duct jointing system.

d) The design, detail and construction of segmental bridges shall provide for the easy addition of supplemental post-tensioning.

13.2.4 Bridge Foundations

Integral abutments, where the superstructure is structurally framed (either completely or partially) into the abutment, shall not be permitted. Mechanically Stabilized Earth (MSE) walls shall not serve as structural foundations for bridges on the Project and shall not be subjected to vertical loads from the bridges. Bridge approach slabs or other settlement mitigation measures shall be designed and constructed to mitigate settlement immediately behind abutment backwalls.

Spread footing foundations are not allowed.

13.2.5 Bridge Railing and Barriers

All barrier systems used on the Project shall meet current crash test and other safety requirements as determined by TxDOT. All testing and associated costs for non-standard railings shall be the sole responsibility of DB Contractor and shall be accomplished through a third party acceptable to TxDOT. A current list of standard railing is provided in TxDOT *Bridge RailingManual*. DB Contractor shall protect sidewalks from vehicular impact by using TxDOT-approved bridge railings.

13.2.6 Retaining Walls

Wall types and components will be allowed only if:

a) They have been accepted for general use by FHWA, and

b) DB Contractor can demonstrate that the design of the wall type and components shall meet the functional requirements of the Project.

Modular walls employing interlocking blocks shall not be used where surcharge loads from vehicular traffic are present.

The design of wall structures shall take into account live load surcharges. The DB Contractor shall apply the appropriate live loading condition (vehicular, heavy rail, transit etc.) that each wall is subjected to. These live load surcharges shall be based on the latest AASHTO *LRFD Bridge Design Specifications*, American Railway Engineering and Maintenance of Way Association (AREMA) specifications, or the requirements of the specific railroad and transit owner/operator, as appropriate.

Structural integrity of retaining walls shall be inspected and monitored in accordance with Good Industry Practice. Tolerances and mitigation measures shall be in accordance with the Maintenance Management Plan and Good Industry Practice.

The retaining wall layout shall address slope maintenance above and below the wall.

To the extent possible, DB Contractor shall design and construct components of the Project to provide embankments without the use of retaining walls. Where earthen embankments are not feasible, DB Contractor may use retaining walls. Metal walls, including bin walls and sheet pile walls, recycled material walls and timber walls are not allowed.

If pipe culverts are to extend through the retaining walls or noise walls, the pipe shall be installed so that no joints are located within or under the wall.

No weep holes through the face of the retaining walls will be allowed, except at the base of the walls.

Perched walls will not be allowed.

Outfalls for underdrains must be provided.

Retaining wall shall be placed at the edge of the mainlane shoulders.

Retaining walls shall end at grade or riprap shall be used to avoid soil erosions.

Select Backfill used within the MSE wall reinforced volume shall conform to Ty A as determined by the test method TEX-110-E as noted under Item 423 of the *Texas Standard Specifications 2004 edition*. No gravel or sand is to be used as select backfill.

13.2.7 Noise/Sound Walls

DB Contractor shall design and construct the noise/sound walls to achieve the decibel reduction requirement in the NEPA Approval(s).

Panel design and construction shall limit the risk of falling debris resulting from traffic impacting the sound wall.

Timber sound walls are not allowed.

13.2.8 Drainage Structures

In developing the design of drainage structures, DB Contractor shall account for maximum anticipated loadings.

Energy dissipaters, if used, shall be considered as structural Elements.

13.2.9 Sign, Illumination, and Traffic Signal Supports

For bridges and walls longer than 500 feet, sign supports shall be provided at 500-foot intervals. The sign supports shall accommodate sign areas up to and including 16 square feet. Cantilever and sign bridge supports shall be placed outside the clear zone or shall be otherwise protected by appropriate safety measures.

13.2.10 Widenings

DB Contractor shall complete a load rating and condition survey of existing structures to be widened. Ratings shall be based on current TxDOT procedures.

13.2.11 Structures to be Used in Place or Rehabilitated

For existing structures to be used in place or rehabilitated, DB Contractor shall perform a visual pre-condition survey including the location, condition rating, remaining service life and recommended mitigation measures. New mainlane structures will need to meet the requirements of this Section 13.

13.3 Construction Requirements

13.3.1 Concrete Finishes

All concrete surfaces that do not have aesthetic treatments shall have a uniform texture and appearance. Color treatment, where required as an aspect of the aesthetic treatment of the concrete, shall be uniform in appearance. Ordinary Surface Finish as defined by the TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, latest version, shall be applied to the following as a minimum:

a) Inside and top of inlets

b) Inside and top of manholes

c) Inside of sewer appurtenances

d) Inside of culvert barrels

e) Bottom of bridge slabs between girders or beams

f) Vertical and bottom of surfaces of interior concrete beams or girders.

g) Wingwalls, Headwalls, Safety End treatments

h) Ripraps, mowstips and flumes

13.3.2 Structure Metals

Welding shall be in accordance with the requirements of the AASHTO/AWS DI.5 2010 Bridge Welding Code.

13.3.3 Steel finishes

Except for weathering steel, all structural steel shall be protected. The color for structural steel paint shall conform to the aesthetic scheme of the Project.

If weathering steel is used, the DB Contractor shall protect all components of the structure (superstructure and substructure) that are susceptible to corrosion and/or staining from weathering steel run-off.

14 RAIL

14.1 General Requirements

If the Project includes a rail corridor within the Project ROW, DB Contractor shall prepare a geometric design for the rail corridor. DB Contractor's PMP shall set forth an approach, procedures, and methods for the rail corridor design and construction meeting the requirements set forth in the Contract Documents.

14.2 Railroad Design Standards

The design for all railroad elements of the Project shall be based on the most recent American Railway Engineering and Maintenance of Way Association (AREMA) and the requirements of operating railroad. DB Contractor's design shall minimize service interruptions to existing rail lines.

All work involving railroad companies, work on railroad Right of Way (ROW), and the development and execution of railroad programs shall be in accordance with State and federal law and the practices, guidelines, procedures and methods contained in the TxDOT *Traffic Operations Manual*, Railroad Operations Volume as amended per Attachment 14-1, *Amendments for the TxDOT's Traffic Operations Manual*, Railroad Operations Volume, February 2000. Additionally, the requirements of the owner of each facility crossed shall be compared to the requirements in the TxDOT manual, and the most restrictive criteria shall be utilized.

At highway-rail grade crossings, the roadway and drainage design parameters shall be maintained at the crossing with exception to the cross slope of the pavement which may be transitioned to match the grade across the rail line. The structural design of any Utilities, including drainage structures, installed by the DB Contractor and crossing a rail line, shall be in accordance with the operating railroad's design criteria. DB Contractor shall coordinate, design and construct the construction staging, including any shooflies, with the operating railroad.

DB Contractor's design shall minimize service interruptions to existing rail lines.

14.2.1 Design Criteria

14.3 Administrative Requirements

14.3.1 Railroad Agreement

DB Contractor shall be responsible for obtaining the required approvals, permits, and agreements as required for the Work, including any railroad related Work.

14.3.2 Project Work Affecting Railroad Operations

Should the Project cross a railroad right of way owned by an operating railroad, DB Contractor shall coordinate the Work with the operating railroad. DB Contractor shall be responsible for obtaining the required approvals, permits, and agreements as required for the railroad-related Work and shall coordinate the design and installation of all railroad warning devices and traffic signals with the appropriate Governmental Entities and operating railroads.

14.3.3 Agreement for Construction, Maintenance, and Use of Right of Way

Whenever a license agreement for construction, maintenance, and use of railroad ROW (hereinafter called the "License Agreement") between the operating railroad and TxDOT is required, DB Contractor shall prepare all the documentation required to obtain the License Agreement, including preparation of the License Agreement application on behalf of TxDOT, the Plans and specifications, making necessary modifications as required, and preparation of the License Agreement.

DB Contractor shall submit the draft License Agreement to TxDOT for transmittal to the operating railroad. After all comments have been incorporated or satisfactorily resolved by either DB Contractor, railroad or TxDOT, DB Contractor shall submit a complete and final License Agreement to TxDOT for execution.

14.3.4 Operation Safety

DB Contractor shall arrange with the operating railroad for railroad flagging as required. DB Contractor shall comply with the operating railroad's requirements for contractor safety training prior to performing Work or other activities on the operating railroad's property.

14.3.5 Railroad Right of Entry Agreement

In order to enter the operating railroad's right-of-way to perform the Work, DB Contractor shall secure a railroad Right of Entry Agreement and shall coordinate the arrangements of the necessary agreements directly with the operating railroad.

Executed railroad agreements in entirety, shall be submitted as part of the Final Design Documents.

14.3.6 DB Contractor Right of Entry Agreement

DB Contractor shall cooperate and coordinate with all operating railroads for access by the operating railroad and/or their agents to the rail ROW as necessary for rail maintenance and operations activities, inspection, repair and emergency responses.

14.3.7 Insurance Requirements

DB Contractor shall procure and maintain, prior to working adjacent to and entry upon operating railroad property, insurance policies naming TxDOT, TxDOT's Consultants, and railroad as named insured.

DB Contractor shall obtain the following types of insurance:

1. Railroad Protective Liability Insurance Policy
2. Comprehensive General Liability Insurance
3. Contractors' Protective Liability Insurance.

All insurance policies shall be in a form acceptable to the operating railroad. Copies of all insurance policies shall be submitted to TxDOT prior to any entry by DB Contractor upon operating railroad property.

14.4 Construction Requirements

DB Contractor shall comply with all construction requirements and specifications set forth by the operating railroad.

DB Contractor shall be responsible for scheduling the work to be completed by operating railroad as well as the work to be completed by its own forces. DB Contractor shall be responsible for all costs associated with the railroad/transit force account work.

15 AESTHETICS AND LANDSCAPING

15.1 General Requirements

This Section 15 defines requirements with which DB Contractor shall design and construct aesthetic treatments for the roadway, structures and landscaping Elements of the Project. Aesthetic treatments shall be designed to harmonize with the local landscape and architecture, as well as the developed themes of the local setting.

A TxDOT discretionary landscape and miscellaneous allowance of $100,000 shall be included in the Price. DB Contractor may be required to landscape improvements within the Project in a manner that utilizes this discretionary allowance. The items anticipated to be credited against this allowance are trees, shrubs, other plant materials, small streetscape and signs. The cost of furnishing and installing irrigation systems, installing water lines, permits, the cost to irrigate and maintain the landscaped areas, etc. shall be excluded from the discretionary allowance.

All other described aesthetic elements in Section 15 are required elements of the Project and shall not be counted towards that $100,000 discretionary allowance.

15.2 Administrative Requirements

This Section 15 presents minimum aesthetics and landscape design requirements for Project designs. For purposes of this Section 15, the following list of items will be used as the aesthetics Elements of the Project design:

a) Material, finish, color, shape and texture of bridge Elements
b) Materials, finish, and color of barriers and railings
c) Finish, color, and texture of retaining walls
d) Raised medians at CR 4, 6th Street, FM 257 and FM 70
e) Plant materials and small streetscape and signs to be constructed within the established discretionary allowance.

15.2.1 Aesthetics Concepts

To the extent practicable, the aesthetic elements shall remain consistent in form, materials, and design throughout the length of the Project where applied.

Based on the guidance provided in Section 15.3 of these Technical Provisions, DB Contractor shall prepare a final aesthetic concept and submit to TxDOT for approval.

15.2.2 Aesthetics and Landscaping Plan

DB Contractor shall prepare an Aesthetics and Landscaping Plan(s) in conformance with the Project's final aesthetic concept and submit to TxDOT for review and approval.

The Aesthetics and Landscaping Plan(s) shall include all elements to fully communicate the proposed aesthetic treatment to TxDOT and shall address:

- Aesthetics
    a) All plans, sections, elevations, perspectives, isometrics, etc., as needed to fully communicate the aesthetic treatment and approach to aesthetic Elements.
    b) Color schemes and their locations
- Landscaping as directed by TxDOT under discretionary allowance

a) A plan indicating plan palettes, locations of plants, plant types, and planting dates

b) A maintenance program

c) Comporsite drawings of all utilities and easements that would interfere with landscaping markers, or any other identified enhancements

The Aesthetic and Landscaping Plan(s) shall include all plans, elevations, perspectives, isometrics, etc., as needed to fully convey the aesthetic treatment.

This Aesthetics and Landscaping Plan(s) shall be presented in the following format:

a) 11x17 format

b) Front sided only

c) Three paper copies, in color

d) Three CD copies, with guidelines in portable document format (PDF)

The Aesthetics and Landscaping Plan(s) shall be incorporated into the final engineering design.

TxDOT approval of the Aesthetics and Landscape Plan(s) is required prior to construction of any Elements affected by the Plan.

15.2.3 Personnel

DB Contractor shall provide a landscape architect, registered in the State of Texas, with a minimum 5 years experience in designing aesthetics and landscaping Elements for roadway projects of similar scope and size, to develop the Aesthetics and Landscaping Plan.

15.3 Design Requirements

15.3.1 Aesthetics Principles and Strategies

DB Contractor shall follow the guidelines and requirements of the approved Aesthetics and Landscaping Plan, as well as the aesthetics principles, requirements, and strategies established by TxDOT for the Project design, including the following:

a) Aesthetics shall not interfere with safety, constructability and maintenance requirements.

b) The Project design shall minimize impact on the existing natural environment to the extent possible.

c) The Project design shall emphasize and enhance the existing natural context and landscape to the fullest extent possible.

d) Simple geometric shapes for structures shall be used to the extent possible for continuity along the entire length of the Project.

e) All bridges and other structures shall be simplified in their design, and to the greatest extent possible kept small in size, bulk, and mass.

f) All structures shall be carefully detailed so as to achieve the greatest level of aesthetic quality and fit within the regional context.

g) Color, texture, and form shall be used appropriately for all structures.

h) Graphics, signage, and lighting shall be consistent along the entire length of the Project.

i) Existing trees and natural features shall be preserved to the greatest extent possible.

j) Aesthetic Elements shall be easy to maintain and resistant to vandalism and graffiti.

k) Exposed Aggregate finish shall not be used

15.3.2 Walls

DB Contractor shall apply aesthetic treatments to the vertical surfaces of retaining and noise/sound walls where the surface is visible from the roadway.

All 4 abutment corners at the intersection of 6th street near Bishop's High School shall receive an inlaid mural depicting Bishop Centennial Celebration Logo with a lightly sandblasted or smooth finish stain and anti-graffiti coating applied. Refer to Attachment 15-1for the Bishop Centennial Celebration Logo. The mural shall begin at the bridge abutment MSE wall pilaster and extend approximately 30', to a subsequent pliaster. Mural height shall be limited by the MSE wall coping and finished grade. Retaining wall coping and finished grade lines shall not obscure mural details. All other wall panels shall receive a lightly sandblasted finish.

Aesthetic design for all other walls shall incorporate Greenstreak form liner 462 Zion Stone or equal and smooth face stone treatment on cast in place or 5'x10' MSE wall panels with applied color stain and anti-graffiti coating. Lone Star shall be installed on the panel at the abutments. For additional information refer to Aesthtetic Guidelines Exhibit included in Attachment 15-1.

The DB Contractor shall clearly detail and identify how wall patterns shall be incorporated.

15.3.3 Bridges and Other Structures

All aesthetic treatments for structural Elements shall be coordinated with DB Contractor's structural design team to facilitate constructability and maintain safety requirements. All substructure columns shall be consistent in form and texture, with similar shapes and details used for all bridges, in accordance with the Projects aesthetics concept.

Aesthetic design for vertical abutments shall incorporate Greenstreak form liner 462 Zion Stone or equal and smooth face stone treatment on cast in place or 5'x10' MSE wall panels. For additional information refer to Aesthtetic Guidelines Exhibit included in Attachment 15-1.

Aesthetic design at bridge piers and bents shall incorporate Greenstreak form liner 462 Zion Stone or equal and smooth face stone treatment on cast in place concrete vertical piers on mainline interchanges; bent design shall be per standard *TxDOT Bridge Manual* design; Lone Star shall be installed on the ends of column bent caps in color. For additional information refer to Aesthtetic Guidelines Exhibit included in the Attachment 15-1.

Square bridge columns shall be used at all intersections; this will not be required at stream crossings.

All applied colors as per approved color pallet.

No exposed conduits or drain pipes will be allowed on bents, columns, bridge beams, retaining walls, or any other visible surface.

DB Contractor shall ensure that a constant superstructure depth is maintained throughout the bridge length for all bridges.

15.3.4 Trees, Shrubs, and Other Plant Materials

DB Contractor shall utilize plant species native to or naturalized in the Project region. To select the best plant that meets the needs and requirements of locations withn the Project, DB Contractor shall coordinate its selections with TxDOT. The overall landscape design, including plant material type, sizes, density, and location, shall be approved by TxDOT. Plant material selection shall consider the soil conditions, slopes and watering requirements.

15.3.5 Riprap

Concrete paving shall be used in hard to reach mowing areas or under structures such as, but not limited to, areas between, near, or next to guard fence posts, sign posts, bent columns, retaining walls, freeway ramp gores, paved ditches, flumes, and ditch inlets to improve roadway appearance.

Concrete riprap at bridge end embankments (shadow riprap) shall be stained.

15.3.6 Color Pallet

As part of the Aesthetics and Landscaping Plan, DB Contractor shall submit a plan that indicates where each color is to be applied. This plan can be diagrammatic in nature, but shall list each element and its colors. In general the dark color shall be HC117 Silk Chocolate as an accent/border and the tan color shall be HC136 Aztec.

15.3.7 Intersection Hardscape

Developer shall use colored textured concrete in all raised medians at the intersections.

15.4 Construction Requirements

DB Contractor shall provide TxDOT sample panels a minimum of 60 Days in advance of starting construction of textured concrete surfaces. DB Contractor shall construct sample panels in accordance with TxDOT *Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges* Item 427.4.B.2.d (Form Liner Finish) that comply with the principles, requirements, and strategies established by TxDOT and the approved Aesthetics and Landscaping Plan. TxDOT must review and approve the sample panels before any construction form liners may be ordered, obtained, or used. DB Contractor shall provide sample panels having a textured portion at least 5.0 feet by 5.0 feet with a representative un-textured surrounding surface.

The approved sample panel shall be the standard of comparison for the production concrete surface texture.

For textured panels or concrete surfaces finished with a coating of paint or stain, DB Contractor shall prepare a corresponding coated panel or surface area of an in-place Element for approval prior to the coating operation.

Color samples shall be provided from the Federal Standard 595B Colors Fan Deck. All sample panels shall be representative of the actual panel that will be placed. Primary, secondary and accent colors shall be displayed.

15.5 Aesthetic Enhancements

The DB Contractor shall provide adjacent Governmental Entities the opportunity to enhance aesthetic and landscaping features consistent with the requirements herein. The capital and maintenance costs of the adjacent Governmental Entity improvements (Aesthetic Enhancements) shall be the responsibility of the adjacent Governmental Entity. DB Contractor shall coordinate the necessary arrangements directly with the appropriate local Governmental Entity for Aesthetic Enhancements within the local Governmental Entity's jurisdiction if so required by the Work.

Aesthetic enhancements shall be incorporated into the final aesthetic concept plan to be submitted to TxDOT for approval.

16 SIGNING, DELINEATION, PAVEMENT MARKING, SIGNALIZATION, AND LIGHTING

16.1 General Requirements

This Section 16 includes requirements with which DB Contractor shall design, construct, and maintain all signing, delineation, pavement markings, signalization, and lighting, for the Project.

16.2 Administrative Requirements

16.2.1 Meetings

DB Contractor shall arrange and coordinate all meetings with local agencies that will assume responsibility for maintaining and operating roadway lighting. DB Contractor shall provide TxDOT with notification of such meetings a minimum of 48 hours prior to the start of the meeting. TxDOT, in its discretion, may attend such meetings.

DB Contractor shall arrange and coordinate all meetings with requesting agencies or individuals regarding special signs.

16.3 Design Requirements

The DB Contractor shall design all signing, delineation, pavement marking, and signalization in accordance with the *Texas Manual on Uniform Traffic Control Devices* (TMUTCD), TxDOT *Sign Crew Field Book*, TxDOT *Freeway Signing Handbook*, TxDOT's *Standard Highway Sign Design for Texas* (SHSD), and TxDOT's Traffic Engineering Standard Sheets and TxDOT specifications.

16.3.1 Final Design

DB Contractor shall advance the Final Design of the signing, delineation, pavement marking, signalization, and lighting based on the preliminary operational signing schematic received with the Proposal. If a preliminary operational signing schematic does not exist, DB Contractor shall prepare and submit a preliminary operational signing schematic for review and approval by TxDOT and Federal Highway Administration (FHWA) prior to commencing Final Design. Before placing any signs, delineation, third party signs, non-standard sign structures, pavement markings, and lighting, DB Contractor shall provide TxDOT a layout indicating the proposed location of such items.

16.3.2 Signing and Delineation

DB Contractor shall design and install all new signs based on their proposed design. DB Contractor's design shall include the locations of ground-mounted and overhead signs, graphic representation of all signs, proposed striping, delineation placement, guide sign and special sign details, and structural and foundation requirements. Signs shall be located in a manner that avoids conflicts with other signs, vegetation, dynamic message signs (DMS), lighting, and structures.

DB Contractor shall ensure that signs are clearly visible, provide clear direction and information for users, and comply with all applicable TMUTCD requirements.

DB Contractor shall review with TxDOT all requests for new signs, including traffic generators, or modifications of existing sign text. Such requests are subject to TxDOT's approval.

DB Contractor's design of delineators and object markers shall comply with TMUTCD requirements.

Signs shall meet the requirements of TxDOT's *Standard Highway Sign Design for Texas*.

16.3.3 Project Signs – Outside the Project ROW

For signs located outside the Project ROW but within a public ROW, DB Contractor shall install the signs in existing rights-of-way controlled by local or other State agencies. DB Contractor shall coordinate with appropriate Governmental Entities for the design and installation of such signs.

16.3.4 Third-Party Signs

In addition to the warning, regulatory, and guide signs within the Project ROW, TxDOT or Governmental Entities may request that third-party signs, including logo signs, be installed by a third party. DB Contractor shall coordinate and cooperate with any third party performing such work. TxDOT may solicit input from DB Contractor in reviewing applications for new third-party signs, but will retain sole authority for approving installation of these signs. All costs associated with fabricating and installing these signs shall be borne by the sign applicant. If approved by TxDOT, TxDOT may require DB Contractor to fabricate and/or install these signs as a TxDOT-Directed Change.

16.3.5 Sign Support Structures

DB Contractor shall determine foundation types and design sign foundations based upon geotechnical surveys/tests using Good Industry Practices. Designs for sign supports shall also comply with requirements in Sections 13 (Structures) and 15 (Aesthetics and Landscaping).

DB Contractor shall design sign support structures to provide a vertical clearance of not less than 19'-6" between the roadway and the bottom of the sign.

16.3.6 Pavement Marking

DB Contractor shall ensure that the design and installation of all pavement markings comply with applicable TMUTCD requirements and TxDOT's Traffic Engineering Standard sheets.

DB Contractor shall mark median noses of all raised islands and inside edges of exclusive turn lanes (channelized curbs) in accordance with the requirements of TMUTCD and TxDOT's Traffic Engineering Standard sheets.

DB Contractor shall use contrast markings for skip lines on the controlled access main lanes where light-colored pavement does not provide sufficient contrast with the markings. Contrast markings consist of black background in combination with standard TMUTCD marking colors.

Milled-in shoulder texturing shall be provided on mainlanes in rural areas outside of city limits.

16.3.7 Signalization

Not applicable.

16.3.7.1 Traffic Signal Requirements

Not applicable.

16.3.7.2 Traffic Signal Timing Plans

Not applicable.

16.3.7.3 Traffic Signal Warrants

Not applicable.

16.3.7.4 Traffic Signal Support Structures

Not applicable.

16.3.7.5 Traffic Signal Systems

Not applicable.

16.3.8 Lighting

DB Contractor shall provide safety roadway lighting at intersections, underpasses and on and off ramps within the Project limits.

DB Contractor shall prepare lighting studies that consider illumination levels, uniformity, and sources for the roadways, interchanges, and special areas. DB Contractor shall maintain an average horizontal luminance on the roadways as described below. DB Contractor shall the photometric data results for all lighted areas within the Project limits to TxDOT for review.

All third-party requests for lighting within the Project Site shall be subject to TxDOT approval.

DB Contractor shall provide an average to minimum uniformity ratio of 3.1, with a minimum lux of 1.85 and an average lux of 6.5 to 8.6 on all traveled roadways to be illuminated. Traveled roadways include: general use lanes, auxiliary lanes, ramps, frontage roads, and ramp terminal intersections with cross streets.

DB Contractor shall design the lighting system to minimize or eliminate illumination of areas outside the Project ROW. DB Contractor shall design safety lighting systems in accordance with Chapters 5, 6, 7, and 9 of the TxDOT *Highway Illumination Manual*. At all times during the Term of the Agreement, DB Contractor shall maintain safe lighting conditions along the Project roadway.

Luminaire poles and breakaway bases shall be designed in accordance with AASHTO's *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*. For all poles located within the clear zone of the roadways, DB Contractor's design shall incorporate breakaway devices that are pre-qualified by TxDOT.

DB Contractor shall place all understructure lighting in a configuration that minimizes the need for lane closures during maintenance.

DB Contractor shall determine and design appropriate foundation types and lengths for permanent lighting structures.

DB Contractor shall not place ITS cable, fiber-optic lines, signal conductors, or any other non-lighting related cables or conductors in the lighting conduit, ground boxes, or junction boxes.

DB Contractor shall minimize the potential hazards of lighting poles through the careful consideration of mounting options and pole placements, including the following options:

- Placing pole bases on existing or proposed concrete traffic barrier
- Placing poles behind existing or proposed concrete traffic barrier or metal beam fence
- Placing high mast lighting outside the clear zone, especially in roadway horizontal curves

DB Contractor shall ensure that lighting structures comply with FAA height restrictions near airport facilities. In the event that proposed or existing luminaires, mast arms, or poles infringe into an airport's or heliport's base surface, DB Contractor shall coordinate with the FAA and TxDOT to permit or relocate such structures. If FAA restrictions prohibit lighting structures from being placed in certain areas near an airport facility, DB Contractor shall find alternative ways of providing the required level of lighting.

16.3.8.1 Additional Requirements

Additional requirements are as follows:

a) High-mast lighting must not infringe into residential areas adjacent to the Project ROW.

b) DB Contractor must coordinate with the FAA regarding installation of obstruction lights, if any, on a case-by-case basis.

c) At a minimum, underground conduit in interchange areas or temporary detours shall not be less than 2" or Schedule 80 polyvinyl chloride (PVC); all other underground conduit installations shall not be less than 2" or Schedule 40 PVC.

d) The minimum conductor size shall be #8 AWG copper. DB Contractor shall not use duct cable for illumination purposes.

e) DB Contractor shall place bridge lighting brackets no more than 10 feet from abutments or bents; however, in special circumstances, the bridge lighting brackets may be placed a maximum of 20 feet from abutments and piers.

f) If overhead electric lines confine the placement of luminaires, DB Contractor may use special davit-arm luminaires.

g) Minimum inside dimensions for ground boxes shall be 15.25 inches (width) by 28.25 inches (length) by 10 inches (depth).

h) Ground box covers shall be 2-inch-thick (nominal), nonconducting material and labeled "Danger High Voltage Illumination".

i) Riprap aprons shall be provided to ground boxes located in grassy areas.

j) Lights shall have an identification tag denoting a contact person or office in case of emergency or for maintenance, and the address and telephone number.

k) Electrical part of the installation shall be designed and installed in conformance with the National Electrical Code (NEC).

16.3.9 Visual Quality

Notwithstanding the requirements of Section 16.3.8 (Permanent Signalization), DB Contractor shall make a reasonable attempt to provide luminaires of equal height along the roadway.

DB Contractor shall not use timber poles for permanent installation.

DB Contractor shall re-sod or re-seed areas of construction disturbed by the installation of signs or lighting systems after final installation.

16.4 Construction Requirements

16.4.1 Permanent Signing and Delineation

DB Contractor shall use established industry and utility safety practices to erect and remove signs located near any overhead or underground utilities, and shall consult with the appropriate Utility Owner(s) prior to beginning such Work. DB Contractor shall stake each sign location in the field and provide TxDOT 72 hours notice prior to installation of any sign.

DB Contractor shall leave all applicable advance guide signs and/or exit direction signs in place at all times and shall not obstruct the view of the signs to the motorist. DB Contractor shall replace any other removed signs before the end of the work day.

DB Contractor shall affix a sign identification decal to the back of all signs for inventory purposes and shall submit inventory information to TxDOT in a TxDOT-compatible format.

All installed signs are required to meet the minimum retro-reflectivity values specified in TMUTCD Table 2A-2.1 (Minimum Maintained Retroreflectivity Levels).

Table 16-2: Retroreflectivity Values

Sign Colors	Sheeting Type (ASTM D4956-04)				Additional Criteria
	I	II	III	VII, VIII, IX	
White on Green	W*; G _	W*; G 15	W*; G 25	W 250; G 25	Overhead
	W*; G 7	W 120; G 15			Ground-mounted
Black on Orange or Black on Yellow	Y*; O*	W _50; G 50			See Note 1
	Y*; O*	W 75; G 75			See Note 2
White on Red	W 35; R 7				See Note 3
Black on White	W 50				—

Notes:

The minimum maintained retro-reflectivity levels shown in this table are in units of candelas per lux per square meter (cd/lx/m^2), measured at an observation angle of 0.2° and an entrance angle of -4.0°.

1 For text and fine symbol signs measuring at least 1200 millimeters (mm) (48 inches) and for all sizes of bold symbol signs

2 For text and fine symbol signs measuring less than 1200 mm (48 inches)

3 Minimum Sign Contrast Ratio _ 3:1 (white retroreflectivity ÷ red retroreflectivity)

* This sheeting type should not be used for this color for this application.

Bold Symbol Signs

W1-1, -2 – Turn and Curve
W1-3, -4 – Reverse Turn and Curve
W1-5 – Winding Road
W1-6, -7 – Large Arrow
W1-8 – Chevron
W1-10 – Intersection in Curve
W1-11 – Hairpin Curve
W1-15 – 270 Degree Loop
W2-1 – Cross Road
W2-2, -3 – Side Road
W2-4, -5 – T and Y Intersection
W2-6 – Circular Intersection
W3-1 – Stop Ahead
W3-2 – Yield Ahead
W3-3 – Signal Ahead
W4-1 – Merge
W4-2 – Lane Ends
W4-3 – Added Lane
W4-5 – Entering Roadway Merge
W4-6 – Entering Roadway Added Lane
W6-1, -2 – Divided Highway Plaques Begins and Ends
W6-3 – Two-Way Traffic
W10-1, -2, -3, -4, -11, -12 – Highway-Railroad Advance
W11-2 – Pedestrian Crossing
W11-3 – Deer Crossing
W11-4 – Cattle Crossing
W11-5 – Farm Equipment
W11-6 – Snowmobile Crossing
W11-7 – Equestrian Crossing
W11-8 – Fire Station
W11-10 – Truck Crossing
W12-1 – Double Arrow
W16-5p, -6p, -7p – Pointing Arrow Plaques
W20-7a – Flagger
W21-1a – Worker

Fine Symbol Signs – Symbol signs not listed as Bold Symbol Signs.

Special Cases

W3-1–Stop Ahead: Red retroreflectivity, 7

W3-2–Yield Ahead: Red retroreflectivity, 7, White retroreflectivity, 35

W3-3–Signal Ahead: Red retroreflectivity, 7, Green retroreflectivity, 7

W3-5–Speed Reduction: White retroreflectivity,_50

For non-diamond-shaped signs such as W14-3 (No Passing Zone), W4-4p (Cross Traffic Does Not Stop), and W13-1, -2, -3, -5 (Speed Advisory Plaques), use largest sign dimension to determine proper minimum retroreflectivity level.

16.4.2 Permanent Pavement marking

DB Contractor shall meet the following minimum retroreflectivity values for edge line markings, centerline/no passing barrier line markings, and lane line markings when measured anytime after three (3) days but not later than ten (10) days after application:

a) Type I, Thermoplastic, Pavement Markings:

- White markings: 250 millicandelas per square meter per lux (mcd/m2/lx)

- Yellow markings: 175 mcd/m2/lx

b) Type II, Paint & Beads, Pavement Markings:

- White markings: 175 mcd/m2/lx
- Yellow markings: 125 mcd/m2/lx

16.4.3 Permanent Signalization

Not Applicable

16.4.4 Permanent Lighting

DB Contractor shall coordinate with the Utility Owner(s) and ensure power service is initiated and maintained for permanent lighting systems. Where the Work impacts existing lighting, DB Contractor shall maintain existing lighting as temporary lighting during construction and restore or replace prior to Substantial Completion. At all times during the Term, safe lighting conditions shall be maintained along the Project roadway. DB Contractor shall stake each pole location in the field and provide TxDOT 72 hours notice prior to installation of any foundation.

DB Contractor shall remove all old illumination-related cable and conduit that does not have existing pavement or riprap above it; any existing illumination-related cable and conduit that is under the existing pavement or riprap may be abandoned.

DB Contractor shall place all bore pits safely away from traffic, provide positive barrier protection, and provide necessary signs to warn of the construction area.

DB Contractor shall contact Utility Owners regarding their specific required working clearance requirements.

DB Contractor shall affix an identification decal on each luminaire, ground box, and electrical service maintained and/or operated by DB Contractor for inventory purposes and shall submit inventory information to TxDOT in a TxDOT-compatible format. This identification shall denote that these are property of DB Contractor and shall provide a contact phone number and address in the event of Emergency or necessary maintenance.

17 INTELLIGENT TRANSPORTATION SYSTEMS

17.1 General Requirements

An Intelligent Transportation System (ITS) is necessary for monitoring the Project's traffic flow and performance both during construction and as a permanent installation. The Project ITS must accurately detect traffic and traffic operational conditions throughout the Project limits, and clearly communicate relevant and useful travel information to the people using the facility.

TxDOT is already operating an ITS network that will need to connect to the new system provided by DB Contractor. The Project ITS must be compatible with such in-place system(s) that TxDOT and other agencies (including other DB Contractors) are currently operating. DB Contractor shall coordinate the ITS planning and implementation with TxDOT and other Governmental Entities that have roadways within or intersecting the Project.

DB Contractor shall maintain and protect the use of the existing ITS functionality within the Project at all times, except for system crossovers that are approved by TxDOT.

The Project ITS shall conform to the Regional Data and Video Communications System (RDVCS) of the TxDOT's LoneStar system. The functionality of the ITS shall be such that command and control of appropriate field devices is shared and exchanged with appropriate Governmental Entities.

DB Contractor shall be responsible for the planning, design, installation, maintenance, and operation of safe and functional ITS for the Project using Good Industry Practice. All components of the ITS shall conform to the provisions of the National Transportation Communication for ITS Protocol (NTCIP). DB Contractor shall maintain ITS interoperability over the Term of the Agreement with the TxDOT Corpus Christi ITS center and other Governmental Entities.

The Project ITS shall operate under the TxDOT's LoneStar system and Center-to-Center (C2C) concept of operations. Communication and interoperability shall be achieved with other TMCs in the region, including the TxDOT Corpus Christi ITS center, such that with appropriate privileges, access to data, command, control and information sharing can occur among centers. All communication and access of information shall occur in near real-time (within logistical restraints).

17.2 Design Requirements

DB Contractor shall provide a complete and operational ITS network throughout the Project that is expandable as capacity is increased along the Project roadways, utilizes hardware and software components consistent and compatible with TxDOT in the manner described in this Section 17.2 and the other affected Governmental Entities, resistant to weather encountered in the Project area, and places components in locations that are not hazardous to Users. DB Contractor shall prepare a preliminary ITS layout for review and concurrence by TxDOT to ensure adequate planning of the ITS implementation.

Subject to the specific requirements of this Section 17, DB Contractor shall determine the number and specific locations of all ITS components.

DB Contractor shall provide safe ingress/egress areas and structures to accommodate authorized personnel access to ITS components for maintenance and operation activities.

17.2.1 ITS Communications Requirements

The communications network shall serve the highway ITS components along the highway Elements of the Project. Where necessary, as determined by TxDOT, DB Contractor shall provide communication node buildings and cabinets to support the communications network.

17.2.2 Connectivity

DB Contractor shall connect ITS components wirelessly to the TxDOT Corpus Christi ITS center.

DB Contractor shall repair each communication cable or electrical conductor that is severed or otherwise rendered not usable.

17.2.3 CCTV Cameras

DB Contractor shall provide five (5) CCTV cameras for Incident verification, traffic management and construction management. The system of cameras shall accurately identify all vehicle(s) involved in an Incident or Emergency, the extent of vehicle(s) damage, and if applicable the likelihood of personal injury. Operation of the cameras shall result in no visual delay in response of the camera pan/tilt/zoom by a user.

17.2.3.1 Equipment

DB Contractor shall provide all necessary CCTV equipment, including cameras, camera controls, cables, and connections. DB Contractor shall provide all the equipment necessary for TxDOT secondary control of all CCTV cameras. The method of secondary control shall be in accordance with TxDOT standards and specifications.

DB Contractor shall provide a digital video format and communications protocol at all connections with TxDOT systems. The format and protocol provided by DB Contractor shall be compatible with systems in use by TxDOT, and if necessary convertible for use by TxDOT's in-place ITS network.

17.2.3.2 Placement

Two (2) cameras shall be located within one thousand feet of the new project's tie-in to existing alignment. Two (2) cameras shall be installed as designated by the engineer within the city limits of Bishop. One (1) camera shall be located in the US 77/Business 77 interchange. The five (5) cameras will be installed and operational within four months of the beginning of construction. .CCTV cameras shall be placed to enable DB Contractor or TxDOT to monitor traffic conditions on highway lanes, frontage roads, connecting facilities, and entrance and exit ramps, and messages displayed on any remotely-controlled dynamic message signs in the Project area. To provide a stable video image, DB Contractor shall mount cameras on dedicated structures unless otherwise approved by TxDOT.

17.2.3.3 Video Requirements

DB Contractor shall provide state-of-the-art CCTV cameras that meet the following requirements. Should any CCTV cameras fail to meet any of the following criteria, DB Contractor shall replace such cameras within 48 hours of discovery of lack of compliance.

a) Solid-state design with digital signal processing (DSP) for digital zoom
   - for auto/manual long-term integration (exposure) control, with built-in frame buffer
   - for auto-focus; for built-in I.D. generator, with white letters and black outline

b) Conformance to a minimum of National Television System Committee (NTSC) video output and Electronic Industries Alliance (EIA)-170A standards

c) No less than 30 frames per second (fps) color

d) Able to produce clear, low-bloom, low-lag video pictures under all conditions, from bright sunlight to nighttime scene illumination of 0.02 foot-candles

e) Maintenance of color quality by a continuous, through-the-lens, automatic, white balance for color temperatures from 2850 degrees Kelvin to greater than 5100 degrees Kelvin, with less than 10 Institute of Radio Engineers (IRE) units unbalance

f) Aspect ratio of 4:3

g) Zero geometric distortion

h) Signal to noise distortion of 55 dB with AGC off

i) Built-in auto focus and auto iris

j) Overexposure protection to prevent permanent damage to cameras when pointed at strong light sources, including the sun, for brief periods of time

17.2.3.4 Operating Requirements

DB Contractor shall provide cameras with built-in heaters, mounting structure, and related equipment capable of operating within the following weather conditions:

a) Wind load of 100 mph without permanent damage to mechanical and electrical equipment

b) Ambient temperature range of -35 degrees Fahrenheit to +140 degrees Fahrenheit

c) Relative humidity range not to exceed 95 percent within the temperature range of +40 degrees Fahrenheit to +110 degrees Fahrenheit

d) Humidity range of 0 to 100 percent condensing

17.2.3.5 Control Requirements

DB Contractor shall provide cameras and related equipment capable of operating with the following pan-tilt unit requirements:

a) Vertical movement of + 40 degrees to – 90 degrees

b) Horizontal movement of 360 degrees

c) Tilt speed of 20 degrees per second

d) Pan speed of 100 degrees per second

e) Simultaneous pan and tilt

f) RS-232 serial communications

17.2.4 Radar Vehicle Sensing Device

DB Contractor shall provide one (1) permanent Radar Vehicle Sensing Device capable to detect each highway lane of the Project measuring vehicle classification, vehicular volume, lane occupancy, and speed information on the roadway. The Radar Vehicle Sensing Device shall be non-intrusive to the roadway users. DB Contractor shall transmit wirelessly to TxDOT the raw data collected by the Radar Vehicle Sensing Device.

DB Contractor may attach the Radar Vehicle Sensing Device to existing structures with prior concurrence from TxDOT. Where an existing structure is not available, or in lieu of attaching the radar unit to an existing structure, DB Contractor shall install a mounting pole solely for the vehicle detector. Any mounting poles placed specifically for ITS items shall conform to TxDOT specifications for CCTV mounting poles.

17.2.5 Portable Changeable Message Signs (PCMS)

DB Contractor shall provide, during the construction phase, four (4) electronic PCMS than can be remotely operated from the construction office. Location and placement shall be approved by TxDOT.

PCMS shall be used to inform motorist of the availability of alternate routes, and to advise travelers of adverse road conditions and congestion. PCMS shall be placed to provide a driver-friendly sign-viewing

angle at each DMS location. DB Contractor shall position each PCMS to allow motorists to safely view the messages being displayed.

17.2.6 Lane Control Signals (LCS)

Not applicable.

17.2.7 Single-Line DMS (SDMS)

Not applicable

17.2.8 DB Contractor Communication Hub Enclosures/Communication Cabinets

Not applicable.

17.3 Construction Requirements

17.3.1 General

DB Contractor shall notify TxDOT thirty (30) days in advance of making connections to the existing TxDOT system.

DB Contractor shall coordinate with Utility Owner(s) and ensure that power service is available for permanent ITS systems.

17.3.2 Salvaging Existing Items

Not applicable.

17.3.3 Existing ITS Relocation

Not applicable.

18 TRAFFIC CONTROL

18.1 General Requirements

DB Contractor shall design and construct the Project, in conformance with the requirements stated in this Section 18, to provide for the safe and efficient movement of people, goods, and services, through and around the Project, while minimizing negative impacts to Users, residents, and businesses. . DB Contractor shall coordinate with local government entities on the development of the Traffic Control Plan (TCP)

It shall be the responsibility of the DB Contractor to gain approval from the appropriate Governmental Entity or property owner on each intersecting street or driveway closure.

During all phases, temporary or existing Intelligent Transportation System (ITS) equipment, street lights, and traffic signals shall remain in operation such that the new and existing equipment operate as a coherent system.

18.2 Administrative Requirements

18.2.1 Traffic Management Plan

DB Contractor shall prepare and implement a Traffic Management Plan (TMP) that includes the following items:

a) Descriptions of the qualifications and duties of the traffic engineering manager, traffic control coordinator, and other personnel with traffic control responsibilities

b) Procedures to identify and incorporate the needs of transit operators, Utility Owners, Governmental Entities, local governmental agencies, Emergency Service providers, school districts, business owners, and other related Users, Customer Groups or entities in the Project corridor and surrounding affected areas

c) Procedures for obtaining acceptance of detours, road and lane closures and other traffic pattern modifications from applicable Governmental Entities, and implementing and maintaining those modifications

d) Procedures for signing transitions during construction from one stage to the next and from interim to permanent signing

e) Procedures for maintenance and replacement of traffic control devices, including pavement markings and traffic barriers, if used

f) Procedures to regularly evaluate and modify, if necessary, traffic signal timings, and the procedures for the development, TxDOT approval, implementation, testing, and maintenance of all affected signals

g) Procedures to coordinate with the appropriate Governmental Entities operating signal networks along the Project or Project detour routes to ensure temporary system compatibility, establish responsibilities for temporary signal installation, maintenance, operation and removal, and coordinate traffic signal timing with local signal networks

h) Procedures and process for the safe ingress and egress of construction vehicles in the work zone

i) Provisions to provide continuous access to established truck routes and Hazardous Material (HazMat) routes, and to provide suitable detour routes, including obtaining any approvals required by the appropriate governmental entities for these uses

j) Procedures to modify plans as needed to adapt to current Project circumstances including a contingency plan to alleviate unreasonable construction-related back-ups that can be implemented immediately upon notification from TxDOT

k) Procedures to communicate TMP information to DB Contractor's public information personnel and notify the public of maintenance of traffic issues in conjunction with the requirements of Section 3

l) Descriptions of contact methods, personnel available, and response times for any deficiencies or Emergency conditions requiring attention during off-hours

m) Procedures for night work (9:00pm to 5:00am) to include a work zone light system design in accordance with NCHRP Report 498 – *Illumination Guidelines for Nighttime Highway Work*

n) DB Contractor shall notify the traveling public by placing changeable message signs a minimum of seven (7) Days in advance of actual roadway closure or major traffic modifications. Where available and when possible, the DB Contractor shall coordinate and utilize Dynamic Message Signs on the regional ITS system.

o) DB Contractor shall utilize uniformed police officers to effect main lane closures.

The TMP must be approved by TxDOT prior to the start of construction activities. DB Contractor shall provide TxDOT sufficient time for review of, and comment on, the TMP. TxDOT retains the right to require revision and re-submittal of the TMP within a reasonable amount of time.

18.3 Design Requirements

18.3.1 Traffic Control Plans

DB Contractor shall use the procedures in the TMP and the standards of the TMUTCD to develop detailed traffic control plans which provide for all construction stages and phasing, as well as all required switching procedures.

DB Contractor shall produce a traffic control plan for each and every phase of Work that impacts traffic and involves traffic control details and shall coordinate with appropriate Governmental Entities on the development of the plan. DB Contractor is responsible for obtaining all necessary permits from such local entities to implement the plans.

Each traffic control plan shall be submitted to TxDOT for review a minimum of 10 Days prior to implementation. The traffic control plan shall include details for all detours, traffic control devices, striping, and signage applicable to each phase of construction. Information included in the traffic control plans shall be of sufficient detail to allow verification of design criteria and safety requirements, including typical sections, alignment, striping layout, drop off conditions, and temporary drainage. The traffic control plans shall clearly designate all temporary reductions in speed limits. Changes to posted speed limits will not be allowed unless specific prior approval is granted by TxDOT.

Opposing traffic on a normally divided roadway shall be separated with appropriate traffic control devices in accordance with Good Industry Practice and TMUTCD based on roadway design speed**.** Approved traffic control devices can be found in the *Compliant Work Zone Traffic Control Device List* (CWZTCD list).

DB Contractor shall maintain signing continuity on all active roadways within or intersecting the Project at all times.

Throughout the duration of the Project, DB Contractor shall ensure all streets and intersections remain open to traffic to the greatest extent possible by constructing the Work in stages. DB Contractor shall

maintain access to all adjacent streets and shall provide for ingress and egress to public and private properties at all times during the Project.

DB Contractor shall prepare public information notices, in coordination with Section 3 (Public Information and Communications), in advance of the implementation of any lane closures or traffic switches. These notices shall be referred to as Traffic Advisories.

18.3.1.1 Design Parameters for Traffic Control Plans

Design Vehicle. Turning movement on all local streets and driveways shall, at a minimum, provide similar characteristics as existing.

Design Speed. On Interstate and State Highways, the design speed shall be 70 miles per hour (mph) or greater, except for major alignment transitions, where the design speed may be reduced to 60 mph if approved by TxDOT in its sole discretion.

Number of Lanes. The minimum number of lanes to be maintained shall be the number of lanes currently available on each facility, Lane closures on other roadways may be considered, within reason, so long as all traffic patterns and accesses are maintained.

Lane Widths. During construction, the minimum lane width for mainlanes, frontage roads and major crossing streets is 11 feet. For minor crossing streets, TxDOT may, in its sole discretion, allow 10' lanes in limited circumstances during construction for short distances after reviewing the DB Contractor's traffic control plan.

Shoulders. A minimum one foot offset from the edge of travel way to the edge of pavement or traffic barrier is required.

18.3.1.2 Allowable Lane and Roadway Closures

Closures will only be permitted when the DB Contractor can demonstrate that the closure will provide clear benefit to the progress of the Work. Closures must be coordinated with adjacent projects and priority shall be given to the closure submitted first.

Lane Closure.

DB Contractor shall seek TxDOT approval if a reduction in the current number of mainlane, frontage road or arterial street lanes is required. Any complete roadway closure will require a Traffic Control Plan to be submitted and approved by TxDOT.

Driveway Closures. DB Contractor shall maintain a minimum of one driveway per business at all times. For businesses with multiple driveways, when driveway closure is necessary to progress Work, no driveway may be closed for more than 30 consecutive days or more than 45 days in a 90-day period.

18.3.1.3 Detour Usage

DB Contractor shall use State routes for detour routes, wherever applicable. If State routes are unavailable, DB Contractor shall use local roadways, provided that DB Contractor has obtained the necessary permits from the Governmental Entity having jurisdiction.

DB Contractor shall provide motorists with guidance on diverting around the construction, detouring around specific construction sites, and traveling through the construction areas. This shall include the installation and maintenance of temporary regional signs to divert traffic around the Project. Motorist guidance to and along detour routes shall be provided, together with regional guidance.

18.3.2 Restricted Hours

A. Holiday Restrictions

No lane closure that restricts or interferes with traffic shall be allowed from noon on the day preceding to 10:00 pm on the day after the following holiday schedule. TxDOT has the right to lengthen, shorten, or otherwise modify these restrictions as actual traffic conditions may warrant.

a) New Year's Eve and New Year's Day (December 31 through January 1)

b) Easter Holiday Weekend (Friday through Sunday)

c) Memorial Day Weekend (Friday through Monday)

d) Independence Day (July 3 through noon on July 5)

e) Labor Day Weekend (Friday through Monday)

f) Thanksgiving Holiday (Wednesday through Sunday)

g) Christmas Holiday (December 23 through December 26)

B. Event Restrictions

No lane closure that restricts or interferes with traffic shall be allowed for the regional events set forth below. TxDOT has the right to lengthen, shorten, or otherwise modify these restrictions as actual traffic conditions may warrant. TxDOT also has the right to modify the list of major events as they are added, rescheduled or warranted.

18.3.3 Hurricane Evacuations

DB Contractor shall provide a Hurricane Evacuation plan by May 15th of each year, for TxDOT's approval, demonstrating how to keep two (2) lanes in each direction open to traffic within two (2) days of TxDOT's notification. The yearly approved Hurricane Evacuation plan must be updated continuously throughout each Hurricane season to reflect changes due to the ongoing construction operation.

18.4 Construction Requirements

Construction shall be in accordance with DB Contractor's TMP, the manufacturer's directions or recommendations where applicable, and the applicable provisions of the TMUTCD.

18.4.1 DB Contractor Responsibility

If at any time TxDOT determines DB Contractor's traffic control operations do not meet the intent of the TMP or any specific traffic control plan, DB Contractor shall immediately revise or discontinue such operations to correct the deficient conditions.

DB Contractor shall provide TxDOT the names of the traffic control coordinator and support personnel, and the phone number(s) where they can be reached 24 hours per day, seven days per week.

18.4.2 Access

Existing bicycle and pedestrian access and mobility shall be maintained parallel with the frontage roads and across all cross streets. Access to existing transit stop locations shall be maintained during construction or reasonable alternative locations shall be provided.

18.4.3 Detours

DB Contractor shall maintain all detours in a safe and traversable condition. A pavement transition, suitable for the posted speed of the section shall be provided at all detour interfaces. DB Contractor shall repair any damages due to detour traffic onto local and/or frontage roads.

DB Contractor shall use State routes for detour routes, wherever applicable. If State routes are unavailable, DB Contractor shall use local arterials, provided that DB Contractor has obtained the necessary permits from the Governmental Entity having jurisdiction.

DB Contractor shall provide motorists with guidance on diverting around the construction, detouring around specific construction sites, and traveling through the construction areas. This shall include the installation and maintenance of temporary regional signs to divert traffic around the Project. Motorist guidance to and along detour routes shall be provided, together with regional guidance.

18.4.4 Local Approvals

DB Contractor shall communicate any ramp closure and staging analysis with the Governmental Entity having jurisdiction within the Project. When ramp movements are diverted or detoured along existing roads, DB Contractor shall be responsible for any and all user costs that may be assessed for the use of these existing roads. This may include traffic operation analysis, temporary traffic control devices, and road user costs, all payable to the local road authority. DB Contractor shall be responsible for obtaining the necessary approvals from agencies having jurisdiction over the routes used.

18.4.5 Pavement Markings

DB Contractor shall be required to remove existing pavement markings that conflict with temporary or permanent pavement markings. These pavement markings shall be removed by any method that does not materially damage the surface or texture of the pavement. Pavement marking removal by over-painting is prohibited.

18.4.6 Reinstatement of Utility Cuts

After installation of drainage structures, storm sewers, or any other public or private Utility facility by open cut beneath existing pavements carrying traffic during construction, the pavement shall be restored to provide a normal satisfactory riding surface.

18.4.7 Hauling Equipment

DB Contractor shall keep traveled surfaces used in its hauling operations clear and free of dirt or other debris that would hinder the safe operation of roadway traffic.

Rubber-tired equipment shall be used for moving dirt or other materials along or across paved surfaces.

Where DB Contractor moves any equipment not licensed for operation on public highways on or across any pavement, DB Contractor shall protect the pavement from all damage caused by such movement. Any damage caused by the operation of DB Contractor shall be repaired at the expense of DB Contractor.

All haul routes utilizing any street of an adjacent Governmental Entity shall be coordinated with the appropriate Governmental Entity

18.4.8 Final Clean-Up

DB Contractor shall clear and remove from the site all surplus and discarded materials and debris of every kind and leave the entire Project in a smooth and neat condition, after any construction process.

18.4.9 Stockpiles

Barricades and warning signs are to be placed at stockpiles to adequately warn motorists of a hazard in accordance with TxDOT's Traffic Engineering Standard sheets and the TMUTCD. All material stockpiles shall not be located within the clear zone of any traveled lane, unless positive protection is provided.

19 MAINTENANCE

19.1 General Requirements

DB Contractor shall maintain the Project in a manner that provides a safe and reliable transportation system for improved mobility.

19.1.1 General Maintenance Obligations

DB Contractor shall take all necessary actions to achieve the following:

a) Maintain the Project and Related Transportation Facilities in a manner appropriate for a facility of the character of the Project.

b) Minimize delay and inconvenience to Users and, to the extent DB Contractor is able to control, users of Related Transportation Facilities.

c) Identify and correct all Defects and damages from Incidents

d) Monitor and observe weather and weather forecasts to proactively deploy resources to minimize delays and safety hazards due to heavy rains, snow, ice, or other severe weather events.

e) Remove debris, including litter, graffiti, animals, and abandoned vehicles or equipment from the Project ROW.

f) Minimize the risk of damage, disturbance, or destruction of third-party property during the performance of maintenance activities.

g) Coordinate with and enable TxDOT and others with statutory duties or functions in relation to the Project or Related Transportation Facilities to perform such duties and functions.

h) Perform systematic Project inspections, periodic maintenance, and routine maintenance in accordance with the provisions of DB Contractor's Maintenance Management Plan and DB Contractor's Safety Plan.

DB Contractor is responsible for providing all resources necessary for the performance of all activities in the Maintenance Management Plan.

The Performance and Measurement Table Baseline is included as Table 19-1 in Attachment 19-1, Performance and Measurement Table Baseline.

19.2 Maintenance Management Plan (MMP)

DB Contractor shall prepare a Maintenance Management Plan (MMP) that is consistent with the general maintenance obligations described in Section 19.1 (General Requirements) and defines the process and procedures for the maintenance of the Project for the Term of the Agreement and Warranty Term. The MMP shall include performance requirements, measurement procedures, threshold values at which maintenance is required, inspection procedures and frequencies, and subsequent maintenance to address noted deficiencies, for each physical Element of the Project in accordance with Table 19-1, including impacts to Related Transportation Facilities. The MMP shall identify response times to mitigate hazards, permanently remedy, and permanently repair Defects. Response times shall be in accordance with the Performance and Measurement Table Baseline, or better. DB Contractor shall differentiate response times for Defects that require prompt attention due to immediate or imminent damage or deterioration, excluding those items which have no impact on any parties other than DB Contractor, and response times for other Defects. DB Contractor shall update this plan as required, or at least annually.

The MMP shall include procedures for managing records of inspection and maintenance activities, including appropriate measures for providing protected duplication of the records. Inspection and maintenance records shall be kept for the Term of the Agreement and shall be provided to TxDOT at the

time the Project is delivered to TxDOT, at either the expiration of the Term or earlier termination of the Agreement.

DB Contractor shall submit the MMP to TxDOT for review and approval at least 60 Days prior to the issuance of NTP2. Approval by TxDOT of the MMP shall be a condition of NTP2.

19.2.1 Maintenance During Work

DB Contractor shall be responsible for maintenance and repairs to any portion of the Work until Final Acceptance is issued in accordance with the Agreement. DB Contractor shall also be responsible for maintenance and repairs to any portion of the existing travel lanes that are utilized as part of the DB Contractor's Traffic Control Plan and portions of the existing travel lanes that are used for hauling of Project equipment and materials. Maintenance activities shall include routine maintenance (such as pothole/surface failure repair, litter pickup, mowing, and repair of third-party-damaged traffic control and safety devices), responding to emergencies and operational problems, and inspections and repairs required on an as-needed basis or as directed by TxDOT until issuance of Final Acceptance. All required maintenance activities during the term of the Agreement for each physical element of the Project shall be performed in accordance with Attachment 19-1. If DB Contractor fails to perform such maintenance within 10 Business Days of discovery of the need for the work, TxDOT reserves the right to perform such work as it deems necessary with its own forces, and/or to enter into special contracts for the maintenance of specific items.

20 BICYCLE AND PEDESTRIAN FACILITIES

20.1 General Requirements

This Section 20 includes requirements with which DB Contractor shall design and construct all pedestrian facilities for the Project. DB Contractor shall ensure the pedestrian facilities of this Project support TxDOT's commitment to integrate pedestrian travel into Project development. DB Contractor shall coordinate the Elements of this Project with the existing and planned trails and other facilities of local and county administrations for pedestrians.

20.2 Administrative Requirements

DB Contractor shall maintain and keep operational all bicycle and pedestrian facilities during construction and throughout the Term of the Agreement.

20.3 Design Requirements

20.3.1 Bicycle Facilities

Not applicable.

20.3.2 Pedestrian Facilities

DB Contractor shall design, construct, and maintain sidewalks along the frontage roads and side streets where sidewalks currently exist and where shown on Schematic Design. Sidewalks and pedestrian facilities shall comply with the *Texas Accessibility Standards*.

DB Contractor is responsible for obtaining Texas Department of Licensing and Regulation (TDLR) reviews and approvals of pedestrian facility design and construction.